

# Технические характеристики

## По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231	Казань (843)206-01-48	Новокузнецк (3843)20-46-81	Смоленск (4812)29-41-54
Архангельск (8182)63-90-72	Калининград (4012)72-03-81	Новосибирск (383)227-86-73	Сочи (862)225-72-31
Астрахань (8512)99-46-04	Калуга (4842)92-23-67	Омск (3812)21-46-40	Ставрополь (8652)20-65-13
Барнаул (3852)73-04-60	Кемерово (3842)65-04-62	Орел (4862)44-53-42	Сургут (3462)77-98-35
Белгород (4722)40-23-64	Киров (8332)68-02-04	Оренбург (3532)37-68-04	Тверь (4822)63-31-35
Брянск (4832)59-03-52	Краснодар (861)203-40-90	Пенза (8412)22-31-16	Томск (3822)98-41-53
Владивосток (423)249-28-31	Красноярск (391)204-63-61	Пермь (342)205-81-47	Тула (4872)74-02-29
Волгоград (844)278-03-48	Курск (4712)77-13-04	Ростов-на-Дону (863)308-18-15	Тюмень (3452)66-21-18
Вологда (8172)26-41-59	Липецк (4742)52-20-81	Рязань (4912)46-61-64	Ульяновск (8422)24-23-59
Воронеж (473)204-51-73	Магнитогорск (3519)55-03-13	Самара (846)206-03-16	Уфа (347)229-48-12
Екатеринбург (343)384-55-89	Москва (495)268-04-70	Санкт-Петербург (812)309-46-40	Хабаровск (4212)92-98-04
Иваново (4932)77-34-06	Мурманск (8152)59-64-93	Саратов (845)249-38-78	Челябинск (351)202-03-61
Ижевск (3412)26-03-58	Набережные Челны (8552)20-53-41	Севастополь (8692)22-31-93	Череповец (8202)49-02-64
Иркутск (395)279-98-46	Нижний Новгород (831)429-08-12	Симферополь (3652)67-13-56	Ярославль (4852)69-52-93
Россия (495)268-04-70	Киргизия (996)312-96-26-47	Казахстан (7172)727-132	

**The complete Mobile Hydraulics Catalog from Bosch Rexroth at a glance:**

Part 1	Pumps	Axial Piston Pumps, External Gear Pumps, Electrohydraulic Pumps, Gerotor Pumps	RE 90010-01
Part 2	Motors, Gears	Axial Piston Motors, External Gear Motors, Radial Piston Motors, Gears	RE 90010-02
Part 3	Mobile Controls	Control Blocks, Valve Modules, Pilot Control Devices, Power Brake Valves	RE 90010-03
Part 4	Mobile Electronics, Accumulators, Filters	Controllers, Application Software, Tools, Sensors, Displays, Video Cameras, Accumulators, Filters, Oil Measurement Technology	RE 90010-04
Part 5	Compact Hydraulics	Mechanical, Solenoid and Proportional Cartridge Valves, Integrated Circuits	RE 90010-05
Part 6	Compact Hydraulics	Load Holding/Motion Control Valves, Compact Directional Valves, Compact Power Modules	RE 90010-06



# Contents

<b>Compact Hydraulics</b>		
Mechanical cartridge valves	35	1
Insert valves	541	2
Sleeve valve for line mounting	595	3
Solenoid cartridge valves (on-off and electro-proportional)	693	4
High pressure cartridge valves (mechanical, solenoid on-off, electro-proportional)	963	5
Proportional pressure reducing valves and remote control manifolds	1239	6
Hydraulic integrated circuits	1329	7
<b>Cavities</b>	1661	8

# Contents

Designation	Page	Chapter	
Product Selection Guide: Cartridge valves: Mechanical, Solenoid, Electro-proportional	5		
Mechanical cartridge valves, relief and unloading	35	<b>1</b>	
Mechanical cartridge valves, pressure reducing and relieving	97		
Mechanical cartridge valves, check and pilot operated check	121		
Mechanical cartridge valves, counterbalance	195		
Mechanical cartridge valves, flow control	269		
Mechanical cartridge valves, logic elements and compensators	317		
Mechanical cartridge valves, directional direct acting	383		
Mechanical cartridge valves, directional manual pilot operated	429		
Mechanical cartridge valves, directional hydraulic pilot operated	463		
Mechanical cartridge valves, directional pneumatic pilot operated	497		
Mechanical cartridge valves, accessories	535		
Insert valves, relief	541		<b>2</b>
Insert valves, flow control	565		
Insert valves, check	583		
Sleeve valve for line mounting, flow control	595	<b>3</b>	
Sleeve valve for line mounting, check and pilot operated check	647		
Sleeve valve for line mounting, sequence	673		
Sleeve valve for line mounting, shut-off pressure gauge	687		
Solenoid cartridge valves, on-off pilot operated	693	<b>4</b>	
Solenoid cartridge valves, on-off direct acting	807		
Solenoid cartridge valves, electro-proportional	865		
Coils and connectors	939		
High Pressure cartridge valves, mechanical	963	<b>5</b>	
High Pressure cartridge valves, Solenoid on-off	1039		
High Pressure cartridge valves, Electro-proportional	1125		
Electro-proportional pressure reducing and relieving cartridge valves	1239	<b>6</b>	
Remote control manifolds	1311		
Manifolds with mechanical cartridges	1329	<b>7</b>	
Manifolds with solenoid cartridges	1487		
Manifolds with emergency by-pass screw and solenoid cartridges	1545		
Standard multi-function manifolds	1567		
Sandwich valve modules	1593		
Manifolds	1643		
Cavities	1661	<b>8</b>	
Technical data	1683		
Code index – Part 5	1693		

# Cartridge valves: Mechanical, Solenoid, Electro-proportional

## Product Selection Guide

**RE 18318-00**

Edition: 05.2016

Replaces: 05.2014

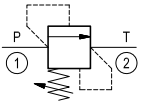
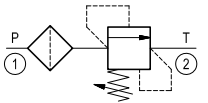
### Summary

<b>Mechanical cartridge valves</b>	<b>Page</b>
Relief and Unloading	2-4
Pressure Reducing and Relieving	4-5
Check and Pilot Operated Check	6-7
Counterbalance	8-9
Flow Control	10-11
Logic Elements and Compensator	12-13
Directional Direct Acting	14-15
Directional Manual Pilot Operated	16
Directional Hydraulic Pilot Operated	17
Directional Pneumatic Pilot Operated	18
Accessories	18

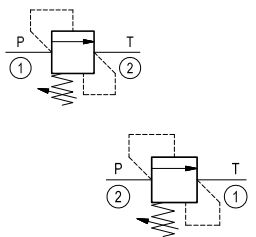
<b>Solenoid cartridge valves</b>	<b>Page</b>
On-Off Pilot Operated	19-22
On-Off Direct Acting	22-26
Electro-Proportional	26-29

## Mechanical - Relief and Unloading

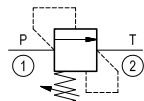
### Relief direct acting poppet type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VSAN-08A	041148X56Z	up to 420 (6000)	3 (0.8)	CA-08A-2N	18318-01	41
	VS-5-CN	041158X99Z	460 (6600)	1.5 (0.4)	Special 348	18318-19	37
	VS-5-CF	041157X99Z	460 (6600)	1.5 (0.4)	Special 348	18318-20	39

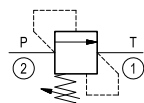
### Relief direct acting guided poppet type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VSBN-08A	041149X56Z	350 (5000)	20 (5)	CA-08A-2N	18318-04	43
	VSBN-10A	041155X85Z	350 (5000)	50 (13)	CA-10A-2N	18318-05	47
	VSBG-10A	041156X85Z	350 (5000)	50 (13)	CA-10A-2N	18318-06	55
	VSBN-08F	041149X20Z	350 (5000)	20 (5)	Special CA-08F-2N	18318-18	45
	VS-30	041118X99Z	350 (5000)	30 (8)	Special 008	18318-23	49
	VS-80	041105X99Z	250 (3600)	80 (21)	Special 009	18318-25	53

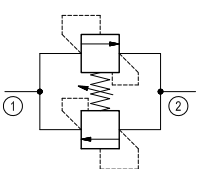
### Relief direct acting guided poppet type hardened seat

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VS-30-NCF	041118X09Z	420 (6000)	30 (8)	Special 008	18318-24	51

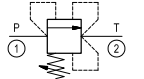
### Relief direct acting poppet type differential area

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VSDN-08A	041522X56Z	350 (5000)	50 (13)	CA-08A-2N	18318-02	57
	VSDN-10A	041523X85Z	350 (5000)	120 (32)	CA-10A-2N	18318-03	59
	VSD-350	041504X99Z	210 (3000)	350 (93)	Special 004	18318-22	61

### Relief bidirectional direct acting poppet type differential area

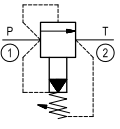
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VSNG-10A	041159X85Z	240 (3500)	56 (15)	CA-10A-2N	18318-07	63

### Relief direct acting poppet type pressure compensated

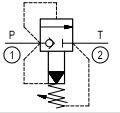
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VS-30-CC	041127X99Z	350 (5000)	30 (8)	Special 008	18318-26	65

## Mechanical - Relief and Unloading

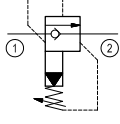
### Relief pilot operated spool type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VSPN-10A	041208X85Z	420 (6000)	3-120 (1-32)	CA-10A-2N	18318-08	67
	VSPN-12A	041210X57Z	420 (6000)	5-200 (1.3-53)	CA-12A-2N	18318-09	69
	VSPN-16A	041211X27Z	420 (6000)	8-300 (2-79)	CA-16A-2N	18318-10	71

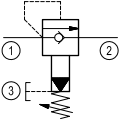
### Relief pilot operated poppet type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VSPC-10A	041209X85Z	350 (5000)	3-80 (1-21)	CA-10A-2N	18318-11	73
	VMP1-16	VMP1.100...	420 (6000)	100 (26)	Special, FB	18318-36	75

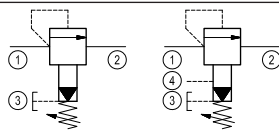
### Relief pilot operated poppet type and anti-cavitation

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VMR1-16	VMR1.100.NG...	420 (6000)	100 (26)	Special, FB	18318-35	77
	VMR2-22-FC	VMR2.240.NG...	420 (6000)	240 (63)	Special, FC	18318-37	79
	VMR2-22-LG	VMR2.240.LG...	420 (6000)	240 (63)	Special, LG	18318-38	81
	MHDBN-16		420 (6000)	100 (26)	Special, metric	64602	1005
	MHDBN-32		420 (6000)	400 (106)	Special, metric	64602	1005

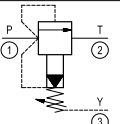
### Relief pilot operated with pulling function

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	MHDBN..Y..02		420 (6000)	400 (106)	Special, metric	64599	995

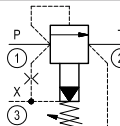
### Relief pilot operated

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	MHDBV.Y-MHDBV.XY		420 (6000)	up to 800 (211)	Special, metric	64606	985

### Relief pilot operated spool type external drain

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VSPY-10A	041305X85Z	420 (6000)	3-120 (0.8-32)	CA-10A-3N	18318-12	83
	VSPY-12A	041307X57Z	350 (5000)	5-200 (1.3-53)	CA-12A-3C	18318-13	85

### Relief pilot operated spool type external pilot

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VSPX-12A	041308X57Z	350 (5000)	5-200 (1.3-53)	CA-12A-3C	18318-14	87

## Mechanical - Relief and Unloading

### Relief pilot operated spool type pressure compensated

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VSP-CC-150	041801X99Z	420 (6000)	5-150 (1.3-40)	Special 065	18318-27	91
	VSPP-10A	041803X85Z	420 (6000)	3-120 (1-32)	CA-10A-2N	18318-39	89

### Relief pilot operated, sequence + cut-off stage

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	MHDBB/MHDBL		420 (6000)	400 (106)	Special, metric	64612	1015

### Priority unloading pilot operated

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VMSN-08A	047521X56Z	350 (5000)	3 (1)	CA-08A-3N	18318-16	93
	VMSP-78	047510X99Z	350 (5000)	5-30 (1.3-8)	Special 308	18318-17	95

## Mechanical - Pressure reducing and relieving

### Pressure reducing and relieving direct acting spool type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRPR-08A	0495118356Z	350 (5000)	8 (2)	CA-08A-3N	18318-52	101
	VRPR-10A	049504X85Z	350 (5000)	30 (8)	CA-10A-3N	18318-53	103
	VRPR-07A	049508X99Z	420 (6000)	5 (1.3)	Special CA-07A-3N	18318-59	99
	MHDRDB			315 (4500)	11 (3)	Special R/LA	18318-55

### Pressure reducing and relieving direct acting spool damped type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRPR-10A-8	0495098385Z	350 (5000)	20 (5)	CA-10A-3N	18318-54	111
	VRPR-07A-S	049509X99Z	420 (6000)	5 (1.3)	Special CA-07A-3N	18318-60	109

## Mechanical - Pressure reducing and relieving

### Pressure reducing pilot operated spool type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRPP-10A	049306X85Z	350 (5000)	60 (16)	CA-10A-3N	18318-50	113
	VRPP-12A	049308X57Z	350 (5000)	100 (26)	CA-12A-3N	18318-51	115

### Pressure reducing and relieving pilot operated spool type


Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRPX-10A	049307X85Z	350 (5000)	60 (16)	CA-10A-3N	18318-56	117

### Pressure reducing and relieving with pilot controlled setting

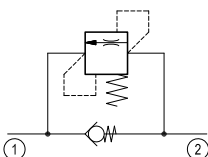
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRPE-10A	049507X85Z	350 (5000)	20 (5)	CA-10A-3N	18318-58	119

## Mechanical - Check and pilot operated check


### Check poppet type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VUCN-08A	0431200056Z	420 (6000)	50 (13)	CA-08A-2N	18318-89	127
	VUCN-10A	0431230085Z	350 (5000)	80 (21)	CA-10A-2N	18318-90	131
	VUCN-12A	0431280057Z	350 (5000)	120 (32)	CA-12A-2N	18318-91	133
	VUCN-16A	0431250027Z	350 (5000)	200 (53)	CA-16A-2N	18318-92	135
	VUCN-20A	0431320058Z	350 (5000)	360 (95)	CA-20A-2N	18318-93	137
	VUCN-04A	0431310054Z	350 (5000)	4 (1)	Special CA-04A-2N	18318-88	123
	VU-N-38	0431190099Z	350 (5000)	30 (8)	Special 690	18318-99	125
	VUCN-08F	043138002000	420 (6000)	50 (13)	Hydac 06020	18319-04	129


### Check poppet type with thermal relief

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VUCN-10A-TR	043137X85Z	350 (5000)	80 (21)	CA-10A-2N	18318-94	139
	VUCN-12A-TR	043137X57Z	350 (5000)	120 (32)	CA-12A-2N	18318-95	141

### Check poppet reverse type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VURN-08A	0431210056Z	420 (6000)	25 (7)	CA-08A-2N	18318-96	143
	VURN-10A	0431270085Z	350 (5000)	60 (16)	CA-10A-2N	18318-97	145
	VURN-12A	0431360057Z	350 (5000)	90 (24)	CA-12A-2N	18318-98	147
	VUR1-16	VUR1.100..	420 (6000)	100 (26)	Special, FB	18319-01	149
	VUR2-22-FC	VUR2.240.FC..	420 (6000)	240 (63)	Special, FC	18319-02	151
	VUR2-22-LG	VUR2.240.LG..	420 (6000)	240 (63)	Special, LG	18319-03	153
	MHSV 16-22-32		420 (6000)	up to 400 (107)	Special, FB/FC/FK	64609	1025

### Pilot operated check pilot to open

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VSOA-08A	043310X56Z	350 (5000)	30 (8)	CA-08A-3N	18319-34	169
	VSOA-10A	043310X85Z	350 (5000)	40 (11)	CA-10A-3N	18319-35	171
	VSON-08A	043306X56Z	350 (5000)	30 (8)	CA-08A-3C	18319-30	155
	VSON-10A	043305X85Z	350 (5000)	60 (16)	CA-10A-3C	18319-31	157
	VSON-12A	043307X57Z	350 (5000)	120 (32)	CA-12A-3C	18319-32	161
	VSON-16A	043308X27Z	350 (5000)	200 (53)	CA-16A-3C	18319-33	165
	VSON-08U	043306X20Z	350 (5000)	60 (16)	SUN T-11A	18319-39	159
	VSON-12U	043307X86Z	350 (5000)	120 (32)	SUN T-2A	18319-40	163
	VSON-16U	043309X47Z	350 (5000)	240 (63)	SUN T-17A	18319-41	167



## Mechanical - Check and pilot operated check

### Dual pilot operated check pilot to open

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VSOD-10A	043603X85Z	350 (5000)	30 (8)	CA-10A-4N	18319-38	173

### Pilot operated check pilot to close

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VUPC-10A	043404X85Z	350 (5000)	70 (18)	CA-10A-3C	18319-36	175
	VUPC-12A	043404X57Z	350 (5000)	120 (32)	CA-12A-3C	18319-37	177
	VUPC-25U	043404X50Z	350 (5000)	560 (148)	SUN T-19A	18319-29	179

### Directional poppet type shuttle

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	SELB-08A	049405005600	350 (5000)	up to 10 (3)	CA-08A-3N	18319-80	183
	SELB-10A	049409008500	220 (3200)	up to 30 (8)	CA-10A-3N	18319-79	187
	SELC-04A	049407005400	350 (5000)	up to 4 (1)	Special CA-04A-3Y	18319-82	181
	SELC-08A	049406X5600	350 (5000)	up to 10 (3)	CA-08A-2N	18319-81	185
	MHSU			420 (6000)	up to 10 (3)	Special, metric	18205

### Directional poppet type shuttle double lock

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VUDN-08A	0439010056Z	350 (5000)	10 (3)	CA-08A-3N	18319-83	191

### Directional hot oil shuttle

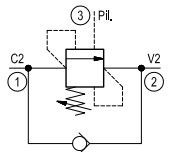
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	SELO-10M	049410X99Z	380 (5500)	40 (11)	Special, 1004	18320-95	189

### Check double lock with mechanical pilot

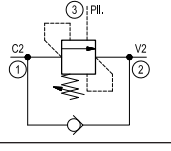
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VU-DT-D7-CM	0443010000Z	350 (5000)	10 (3)	Special 748	18318-87	193

## Mechanical - Counterbalance

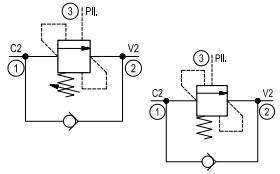
### Standard guided poppet type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBSN-08AA	045220X56Z	350 (5000)	30 (8)	CA-08A-3C	18320-01	199
	VBSN-07HH-TF	045250X18Z	350 (5000)	20 (5.3)	Eaton 22903	18320-33	197

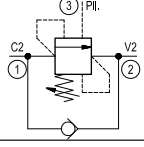
### Standard guided poppet type counterclockwise adjustment

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBSN-08UU-RS	045242X20Z	280 (4000)	30 (8)	SUN T-11A	18320-16	201

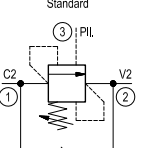
### Standard poppet type differential area

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBSN-10A	045231X85Z	350 (5000)	60 (16)	CA-10-3C	18320-02	203
	VBSN-12A	045228X57Z	350 (5000)	120 (32)	CA-12A-3C	18320-03	209
	VBSN-16A	045229X27Z	350 (5000)	200 (53)	CA-16A-3C	18320-04	213
	VBSN-20A	045225X58Z	350 (5000)	320 (85)	CA-20A-3C	18320-05	219
	VBSN-08U-TF (fix. set.)	045237X20Z	350 (5000)	60 (16)	SUN T-11A	18319-98	207

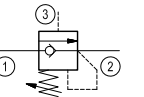
### Standard poppet type differential area, for motor applications

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBSN-16U-RF	045247X47Z	420 (6000)	240 (63)	SUN T-17A	18320-31	217

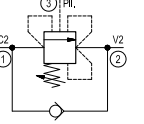
### Standard poppet type differential area counterclockwise adjustment

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBSN-08U-RS	045243X20Z	350 (5000)	60 (16)	SUN T-11A	18320-17	205
	VBSN-12U-RS	045244X86Z	350 (5000)	120 (32)	SUN T-2A	18320-18	211
	VBSN-16U-RS	045245X47Z	420 (6000)	240 (63)	SUN T-17A	18320-19	215
	VBSN-25U-RS	045246X50Z	350 (5000)	480 (127)	SUN T-19A	18320-29	221

### Standard poppet type zero differential area

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBSZ-20A	045241X58Z	350 (5000)	320 (85)	CA-20A-3C	18319-99	223

### Relief compensated guided poppet type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBSP-08AA	045404X56Z	350 (5000)	30 (8)	CA-08A-3C	18320-06	225

## Mechanical - Counterbalance

### Relief compensated poppet type differential area

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBSP-10A	045409X85Z	350 (5000)	60 (16)	CA-10A-3C	18320-07	227
	VBSP-12A	045408X57Z	350 (5000)	120 (32)	CA-12A-3C	18320-08	231
	VBSP-16A	045410X27Z	350 (5000)	200 (53)	CA-16A-3C	18320-09	235
	VBSP-20A	045413X58Z	350 (5000)	320 (85)	CA-20A-3C	18320-10	241

### Relief compensated poppet type differential area, for motor applications

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBSP-16U-RF	045419X47Z	350 (5000)	240 (63)	SUN T-11A	18320-32	239

### Relief compensated poppet type differential area counterclockwise adjustment

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBSP-08U-RS	045415X20Z	350 (5000)	60 (16)	SUN T-11A	18320-20	229
	VBSP-12U-RS	045416X86Z	350 (5000)	120 (32)	SUN T-2A	18320-21	233
	VBSP-16U-RS	045417X47Z	420 (6000)	240 (63)	SUN T-17A	18320-22	237
	VBSP-25U-RS	045418X50Z	350 (5000)	480 (127)	SUN T-19A	18320-30	243

### Vented guided poppet type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBST-08AA	045408X56Z	350 (5000)	30 (8)	CA-08A-3C	18320-11	245
	VBST-10A	045916X85Z	350 (5000)	60 (16)	CA-10A-3C	18320-12	247
	VBST-12A	045926X57Z	350 (5000)	120 (32)	CA-12A-3C	18320-13	251
	VBST-16A	045927X27Z	350 (5000)	200 (53)	CA-16A-3C	18320-14	255
	VBST-20A	045918X58Z	350 (5000)	320 (85)	CA-20A-3C	18320-15	259

### Vented guided poppet type counterclockwise adjustment


Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBST-08U-RS	045929X20Z	350 (5000)	60 (16)	SUN T-11A	18320-23	249
	VBST-12U-RS	045930X86Z	350 (5000)	120 (32)	SUN T-2A	18320-24	253
	VBST-16U-RS	045931X47Z	350 (5000)	240 (63)	SUN T-17A	18320-25	257

### 4 ports vented poppet type external drain counterclockwise adjustment

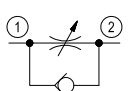
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VBSY-08U-RS	045932X20Z	350 (5000)	60 (16)	SUN T-21A	18320-26	261
	VBSY-12U-RS	045933X86Z	350 (5000)	120 (32)	SUN T-22A	18320-27	263
	VBSY-16U-RS	045934X47Z	350 (5000)	240 (63)	SUN T-23A	18320-28	265
	VBSY-25U-RS	045935X50Z	420 (6000)	480 (127)	SUN T-24A	18320-36	267

## Mechanical - Flow control

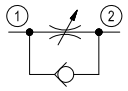
### Cartridge restrictors

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	ST-C-06	OD2101X56	350 (5000)	40 (11)	CA-08A-2N	18321-26	271
	ST-C-10	OD2101X36	350 (5000)	70 (19)	CA-10A-2N	18321-27	273
	ST-C-12	OD2101X89	350 (5000)	150 (39)	CA-12A-2N	18321-28	275
	ST-C-16	OD2101X75	350 (5000)	150 (39)	CA-16A-2N	18321-29	277

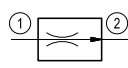
### Needle restrictors free reverse flow

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	STVU-08A	040103X5600	350 (5000)	40 (11)	CA-08A-2N	18321-10	279
	STVU-10A	040105X8500	350 (5000)	80 (22)	CA-10A-2N	18321-11	281

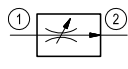
### Needle restrictors free reverse flow fine adjustment

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	STFU-08A	040106X5600	350 (5000)	40 (11)	CA-08A-2N	18321-09	283

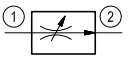
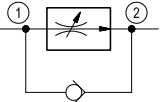
### 2-way pressure compensated fixed setting

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRFA-08A	0402010056Z	up to 210 (3000)	8 (2)	CA-08A-2N	18321-12	287
	VRFA-10A-TF	0402010085Z	up to 350 (5000)	19 (5)	CA-10A-2N	18321-13	289
	VRFA-12A-TF	0402030057Z	up to 350 (5000)	63 (17)	CA-12A-2N	18321-14	295
	MH2FR		420 (6000)	1.2 (0.3)	Special R/MH2FR04K	18321-31	285

### 2-way pressure compensated partially adjustable

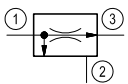
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRFA-10A	040201X85Z	up to 350 (5000)	26 (7)	CA-10A-2N	18321-15	291

### 2-way pressure compensated fully adjustable

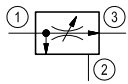
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRFB-10A	040202X85Z	up to 350 (5000)	30 (8)	CA-10A-2N	18321-16	293
	VRFE-12A	040701X57Z	up to 350 (5000)	50 (13)	CA-12A-2N	18321-30	297

## Mechanical - Flow control

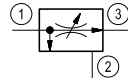
### 3-way pressure compensated fixed setting

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRFC-10A-TF	0404010085Z	up to 350 (5000)	19 (5)	CA-10A-3N	18321-18	299
	VRFC-12A-TF	0404030057Z	up to 350 (5000)	63 (17)	CA-12A-3N	18321-19	305

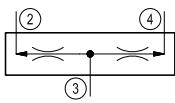
### 3-way pressure compensated partially adjustable

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRFC-10A	040401X85Z	up to 350 (5000)	60 (16)	CA-10A-3N	18321-17	301

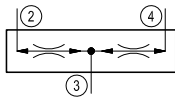
### 3-way pressure compensated fully adjustable

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRFD-10A	040402X85Z	up to 350 (5000)	60 (16)	CA-10A-3N	18321-20	303
	VRFD-12A	040404X57Z	up to 350 (5000)	120 (32)	CA-12A-3N	18321-21	307

## Flow divider

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	DSDN-10A	0405040085Z	up to 350 (5000)	54 (14)	CA-10A-4N	18321-22	309
	DSDN-16A	0405030027Z	up to 350 (5000)	165 (44)	CA-16A-4N	18321-23	311

## Flow divider and combiner

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	DRFN-10A	0405010085Z	up to 350 (5000)	54 (14)	CA-10A-4N	18321-24	313
	DRFN-16A	0405020027Z	up to 350 (5000)	165 (44)	CA-16A-4N	18321-25	315

## Mechanical - Logic elements and compensator

### Flow and pressure control with external pilot

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VLST-10A	048401X85Z	350 (5000)	60 (16)	CA-10A-3C	18321-60	319
	VLST-12A	048401X57Z	350 (5000)	120 (32)	CA-12A-3C	18321-61	321
	VLST-16A	048401X27Z	350 (5000)	up to 200 (53)	CA-16A-3C	18321-62	323
	VLST-20A	048401X58Z	350 (5000)	up to 360 (95)	CA-20A-3C	18321-63	325

### Flow and pressure control with internal pilot

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VLSP-10A	048403X85Z	350 (5000)	60 (16)	CA-10A-3C	18321-64	327
	VLSP-12A	048403X57Z	350 (5000)	120 (32)	CA-12A-3C	18321-65	329
	VLSP-16A	048403X27Z	350 (5000)	200 (53)	CA-16A-3C	18321-66	331
	VLSP-20A	048403X58Z	350 (5000)	360 (95)	CA-20A-3C	18321-67	333

### Flow control with external pilot

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VLSC-10A	048402X85Z	350 (5000)	30 (8)	CA-10A-3C	18321-68	335
	VLSC-12A	048402X57Z	350 (5000)	60 (16)	CA-12A-3C	18321-59	339
	VLSC-16A	048402X27Z	350 (5000)	120 (32)	CA-16A-3C	18321-69	341
	VLSC-20A	048402X58Z	350 (5000)	240 (63)	CA-20A-3C	18321-70	343

### Flow control with external pilot damped type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VLSC-10A-8-TF	048412X85Z	350 (5000)	25 (7)	CA-10A-3C	18321-71	337

### Pressure control with internal pilot

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VLSR-10A	048404X85Z	350 (5000)	40 (11)	CA-10A-3C	18321-72	345
	VLSR-12A	048404X57Z	350 (5000)	60 (16)	CA-12A-3C	18321-73	347
	VLSR-16A	048404X27Z	350 (5000)	120 (32)	CA-16A-3C	18321-74	349
	VLSR-20A	048404X58Z	350 (5000)	230 (61)	CA-20A-3C	18321-75	351

## Mechanical - Logic elements and compensator

### Pressure compensator

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VLSQ-10A	048405X85Z	350 (5000)	40 (11)	CA-10A-3N	18321-77	353
	VLSQ-12A	048405X57Z	350 (5000)	70 (18)	CA-12A-3N	18321-78	355
	VLSQ-16A	048405X27Z	350 (5000)	120 (32)	CA-16A-3N	18321-79	357

### Pressure compensator combination type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VCSQ-10A	048406X85Z	350 (5000)	60 (16)	CA-10A-4N	18321-80	359
	VCSQ-12A	048406X57Z	350 (5000)	120 (32)	CA-12A-4N	18321-81	361
	VCSQ-16A	048406X27Z	350 (5000)	200 (53)	CA-16A-4N	18321-82	363

### Pressure compensator with static load sense

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRLA-10A-S	0484090085Z	350 (5000)	45 (12)	CA-10A-4N	18321-86	365
	VRLA-12A-S	0484090057Z	350 (5000)	100 (26)	CA-12A-4N	18321-87	367
	VRLA-16A-S	0484090027Z	350 (5000)	160 (42)	CA-16A-4N	18321-88	369
	VRLA-20A-S	0484090058Z	350 (5000)	230 (60)	CA-20A-4N	18321-89	371

### Pressure compensator with dynamic load sense

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VRLA-10A-D	048410X85Z	350 (5000)	45 (12)	CA-10A-4N	18321-90	373
	VRLA-12A-D	048410X57Z	350 (5000)	100 (26)	CA-12A-4N	18321-83	375
	VRLA-16A-D	048410X27Z	350 (5000)	160 (42)	CA-16A-4N	18321-84	377
	VRLA-20A-D	048410X58Z	350 (5000)	230 (60)	CA-20A-4N	18321-85	379

### Directional control poppet type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VLDT-10A	048407X85Z	350 (5000)	80 (21)	CA-10A-3C	18321-76	381

## Mechanical - Directional direct acting

### Spool type direct acting external pilot internal drain

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VDSA-10A-6	047729X85Z	350 (5000)	30 (8)	CA-10A-3N	18320-73	385
	VDSA-10A	047732X85Z	350 (5000)	50 (13)	CA-10A-3N	18320-83	387
	VDSA-16A	047732X27Z	350 (5000)	160 (43)	CA-16A-3N	18320-92	389
	VDSB-10A-6	047723X85Z	350 (5000)	30 (8)	CA-10A-3N	18320-74	391
	VDSB-10A	047733X85Z	350 (5000)	50 (13)	CA-10A-3N	18320-84	393
	VDSB-16A	047733X27Z	350 (5000)	160 (43)	CA-16A-3N	18320-93	395
	VDSH-10A	047725X85Z	350 (5000)	40 (11)	CA-10A-4N	18320-75	411
	VDSH-16A	047725X27Z	350 (5000)	160 (43)	CA16A-4N	18320-85	413
	VDSK-10A	047726X85Z	350 (5000)	40 (11)	CA-10A-4N	18320-76	415
	VDSK-16A	047726X27Z	350 (5000)	160 (43)	CA16A-4N	18320-86	417

### Spool type direct acting internal pilot external drain

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VDSR-10A-6	047717X85Z	350 (5000)	12 (3)	CA-10A-3N	18320-82	397

### Spool type direct acting external pilot external drain

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VDSE-10A-6	047737X85Z	350 (5000)	20 (5)	CA-10A-4N	18320-88	399

### Spool type direct acting external pilot external vent

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VDSC-10A	047721X85Z	350 (5000)	50 (13)	CA-10A-3N	18320-77	401
	VDSC-12A	047721X57Z	350 (5000)	120 (32)	CA-12A-3N	18320-91	403
	VDSC-16A	047720X27Z	350 (5000)	160 (43)	CA-16A-3N	18320-78	405



## Mechanical - Directional direct acting

### Spool type direct acting external pilot external vent

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VDSJ-10A	047722X85Z	350 (5000)	50 (13)	CA-10A-3N	18320-79	407
	VDSJ-16A	047722X27Z	350 (5000)	160 (43)	CA-16A-3N	18320-80	409
	VDSJ-10A	047719X85Z	350 (5000)	50 (13)	CA-10A-4N	18320-87	419
	VDSJ-16A	047719X27Z	350 (5000)	160 (43)	CA-16A-4N	18320-81	421

### Spool type direct acting external pilot 5 ports vented

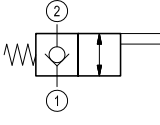
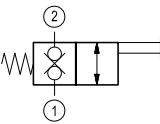
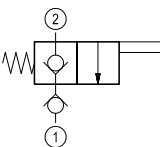
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VDSJ-16A-RN	047742X27Z	350 (5000)	160 (43)	Special CA-16A-5C	18320-94	423

### Spool type 4-way

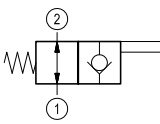
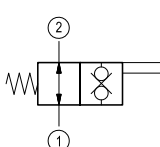
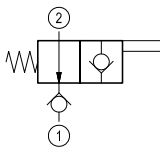
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VDSP-20B	047735X93Z	350 (5000)	200 (53)	Special CA-20B-6C	18320-89	425
	VDSP-20B-R	047736X93Z	350 (5000)	200 (53)	Special CA-20B-6C	18320-90	427

## Mechanical - Directional manual pilot operated

### Manual operated poppet 2-way normally closed

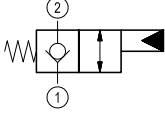
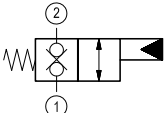
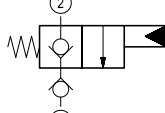
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VMI-8A-2A-06-NC	OD55X1837Z	350 (5000)	40 (11)	CA-08A-2N	18326-01	431
	VMI-8A-2A-09-NC	OD55X1737Z	350 (5000)	70 (19)	Special 017-E	18326-05	439
	VMI-8A-2A-12-NC	OD55X2137Z	350 (5000)	150 (39)	Special 021-E	18326-07	443
	VMI-8A-2A-06-NC	OD55X1837Z	350 (5000)	40 (11)	CA-08A-2N	18326-01	431
	VMI-8A-2A-09-NC	OD55X1737Z	350 (5000)	70 (19)	Special 017-E	18326-05	439
	VMI-8A-2A-12-NC	OD55X2137Z	350 (5000)	150 (39)	Special 021-E	18326-07	443
	VMI-8A-2A-06-NC-VU	OD55111937Z	350 (5000)	40 (11)	Special 019-E	18326-02	435
	VMI-8A-2A-09-NC-VU	OD55X1737Z	350 (5000)	70 (19)	Special 017-E	18326-05	439
	VMI-8A-2A-12-NC-VU	OD55X2137Z	350 (5000)	150 (39)	Special 021-E	18326-07	443

### Manual operated poppet 2-way normally open

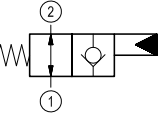
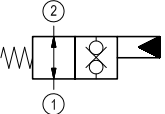
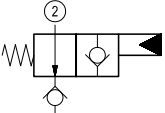
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VMI-8A-2A-06-NA	OD55X181700	350 (5000)	40 (11)	CA-8A-2N	18326-03	447
	VMI-8A-2A-09-NA	OD55X171700	350 (5000)	70 (19)	Special 017-E	18326-06	455
	VMI-8A-2A-12-NA	OD55X211700	350 (5000)	150 (39)	Special 021-E	18326-08	459
	VMI-8A-2A-06-NA	OD55X181700	350 (5000)	40 (11)	CA-8A-2N	18326-03	447
	VMI-8A-2A-09-NA	OD55X171700	350 (5000)	70 (19)	Special 017-E	18326-06	455
	VMI-8A-2A-12-NA	OD55X211700	350 (5000)	150 (39)	Special 021-E	18326-08	459
	VMI-8A-2A-06-NA-VU	OD55121917Z	350 (5000)	40 (11)	Special 019-E	18326-04	451
	VMI-8A-2A-09-NA-VU	OD55X171700	350 (5000)	70 (19)	Special 017-E	18326-06	455
	VMI-8A-2A-12-NA-VU	OD55X211700	350 (5000)	150 (39)	Special 021-E	18326-08	459

## Mechanical - Directional hydraulic pilot operated

### Hydraulic operated poppet 2-way normally closed

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VOI-8A-2A-06-NC	OD75X18Y00	350 (5000)	40 (11)	CA-08A-2N	18326-40	465
	VOI-8A-2A-09-NC	OD75X17Y00	350 (5000)	70 (19)	Special 017-E	18326-44	473
	VOI-8A-2A-12-NC	OD75X21Y00	350 (5000)	150 (39)	Special 021-E	18326-46	477
	VOI-8A-2A-06-NC	OD75X18Y00	350 (5000)	40 (11)	CA-08A-2N	18326-40	465
	VOI-8A-2A-09-NC	OD75X17Y00	350 (5000)	70 (19)	Special 017-E	18326-44	473
	VOI-8A-2A-12-NC	OD75X21Y00	350 (5000)	150 (39)	Special 021-E	18326-46	477
	VOI-8A-2A-06-NC-VU	OD751119Y00	350 (5000)	40 (11)	Special 019-E	18326-41	469
	VOI-8A-2A-09-NC-VU	OD75X17Y00	350 (5000)	70 (19)	Special 017-E	18326-44	473
	VOI-8A-2A-12-NC-VU	OD75X21Y00	350 (5000)	150 (39)	Special 021-E	18326-46	477

### Hydraulic operated poppet 2-way normally open

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VOI-8A-2A-06-NA	OD75X18Y00	350 (5000)	40 (11)	CA-08A-2N	18326-42	481
	VOI-8A-2A-09-NA	OD75X17Y00	350 (5000)	70 (19)	Special 017-E	18326-45	489
	VOI-8A-2A-12-NA	OD75X21Y00	350 (5000)	150 (39)	Special 021-E	18326-47	493
	VOI-8A-2A-06-NA	OD75X18Y00	350 (5000)	40 (11)	CA-08A-2N	18326-42	481
	VOI-8A-2A-09-NA	OD75X17Y00	350 (5000)	70 (19)	Special 017-E	18326-45	489
	VOI-8A-2A-12-NA	OD75X21Y00	350 (5000)	150 (39)	Special 021-E	18326-47	493
	VOI-8A-2A-06-NA-VU	OD751219Y00	350 (5000)	40 (11)	Special 019-E	18326-43	485
	VOI-8A-2A-09-NA-VU	OD75X17Y00	350 (5000)	70 (19)	Special 017-E	18326-45	489
	VOI-8A-2A-12-NA-VU	OD75X21Y00	350 (5000)	150 (39)	Special 021-E	18326-47	493

## Mechanical - Directional pneumatic pilot operated

### Pneumatic operated poppet 2-way normally closed

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VPI-8A-2A-06-NC	OD65X181400	350 (5000)	40 (11)	CA-8A-2N	18326-70	499
	VPI-8A-2A-09-NC	OD65X171400	350 (5000)	70 (19)	Special 017-E	18326-74	507
	VPI-8A-2A-12-NC	OD65X211400	350 (5000)	150 (39)	Special 021-E	18326-76	511
	VPI-8A-2A-06-NC	OD65X181400	350 (5000)	40 (11)	CA-8A-2N	18326-70	499
	VPI-8A-2A-09-NC	OD65X171400	350 (5000)	70 (19)	Special 017-E	18326-74	507
	VPI-8A-2A-12-NC	OD65X211400	350 (5000)	150 (39)	Special 021-E	18326-76	511
	VPI-8A-2A-06-NC-VU	OD6511191400	350 (5000)	40 (11)	Special 019-E	18326-71	503
	VPI-8A-2A-09-NC-VU	OD65X171400	350 (5000)	70 (19)	Special 017-E	18326-74	507
	VPI-8A-2A-12-NC-VU	OD65X211400	350 (5000)	150 (39)	Special 021-E	18326-76	511

### Pneumatic operated poppet 2-way normally open

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VPI-8A-2A-06-NA	OD65X181400	350 (5000)	40 (11)	CA-8A-2N	18326-72	515
	VPI-8A-2A-09-NA	OD65X171400	350 (5000)	70 (19)	Special 017-E	18326-75	523
	VPI-8A-2A-12-NA	OD65X211400	350 (5000)	150 (39)	Special 021-E	18326-77	527
	VPI-8A-2A-06-NA	OD65X181400	350 (5000)	40 (11)	CA-8A-2N	18326-72	515
	VPI-8A-2A-09-NA	OD65X171400	350 (5000)	70 (19)	Special 017-E	18326-75	523
	VPI-8A-2A-12-NA	OD65X211400	350 (5000)	150 (39)	Special 021-E	18326-77	527
	VPI-8A-2A-06-NA-VU	OD6512191400	350 (5000)	40 (11)	Special 019-E	18326-73	519
	VPI-8A-2A-09-NA-VU	OD65X171400	350 (5000)	70 (19)	Special 017-E	18326-75	523
	VPI-8A-2A-12-NA-VU	OD6512211400	350 (5000)	150 (39)	Special 021-E	18326-78	531

## Mechanical - Accessories

### Automatic shut-off pilot to close

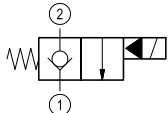
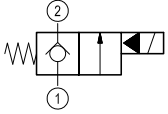
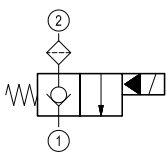
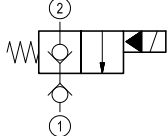
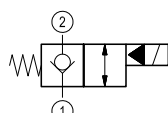
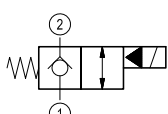
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	VEM-5-SA	049806X99Z	350 (5000)	1 (0.26)	Special 348	18320-71	537

### Hand pump

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Data Sheet	Page
	PM-06	PM5110001800	210 (3000)	1 (0.06)	CA-08A-2N	18321-95	539

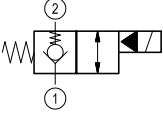
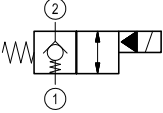
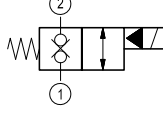
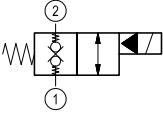
## Solenoid - On-off pilot operated

### Pilot operated poppet 2-way normally closed

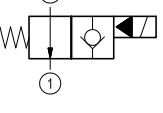
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEI-8I-06-NC	OD15X18YS0	350 (5000)	up to 30 (8)	CA-08A-2N	S8	18323-01	695
	VEI-8A-06-NC	OD15XYZS	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-02	699
	VEI-8A-09-NC	OD15X17YZ	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-03	715
	VEI-8A-12-NC	OD15X21YZ	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-04	723
	VEI-8A-06-NC	OD15XYZS	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-02	699
	VEI-8A-09-NC	OD15X17YZ	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-03	715
	VEI-8A-12-NC	OD15X21YZ	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-04	723
	VEI-8I-06-NC	OD15X18YS0	350 (5000)	up to 30 (8)	CA-08A-2N	S8	18323-01	695
	VEI-8A-06-NC-019-E	OD15X19Z	350 (5000)	up to 40 (11)	Special 019-E	S8	18323-20	703
	VEI-8A-09-NC	OD15X17YZ	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-03	715
	VEI-8A-12-NC	OD15X21YZ	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-04	723
	VEI-8I-06-NC	OD15X18YS0	350 (5000)	up to 30 (8)	CA-08A-2N	S8	18323-01	695
	VEI-8A-06-NC	OD15XYZS	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-02	699
	VEI-8A-06-NC-ET	OD15X183CZ	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-09	707
	VEI-8A-10-NC	OD15X36YZ	350 (5000)	up to 70 (18)	CA-10A-2N	S8	18323-11	711
	VEI-8A-12-NC	OD15X89YZ	350 (5000)	up to 150 (40)	CA-12A-2N	S8	18323-13	719
	VEI-8A-16A-NC	OD15X75YS0	350 (5000)	up to 150 (40)	CA-16A-2N	S8	18323-17	727
	VEI-8A-09-NC	OD15X17YZ	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-03	715
	VEI-8A-12-NC	OD15X21YZ	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-04	723
	VEI-8A-06-NC-019-E	OD15X19Z	350 (5000)	up to 40 (11)	Special 019-E	S8	18323-20	703
	VEI-8A-06-NC	OD15XYZS	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-02	699
	VEI-8A-10-NC	OD15X36YZ	350 (5000)	up to 70 (18)	CA-10A-2N	S8	18323-11	711
	VEI-8A-12-NC	OD15X89YZ	350 (5000)	up to 150 (40)	CA-12A-2N	S8	18323-13	719
	VEI-8A-16A-NC	OD15X75YS0	350 (5000)	up to 150 (40)	CA-16A-2N	S8	18323-17	727
	VEI-8A-09-NC	OD15X17YZ	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-03	715
	VEI-8A-12-NC	OD15X21YZ	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-04	723
	VEI-8A-2B-16-NC-NSS	OD150304YS0	350 (5000)	up to 260 (69)	Special 004	S8	18323-15	731
	VEI-8A-06-NC-019-E	OD15X19Z	350 (5000)	up to 40 (11)	Special 019-E	S8	18323-20	703

## Solenoid - On-off pilot operated

### Pilot operated poppet 2-way normally closed

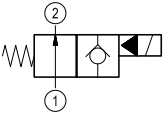
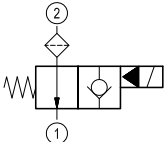
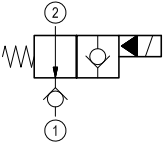
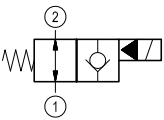
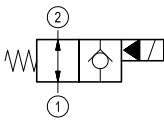
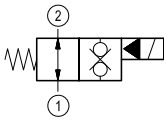
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEI-8A-06-NC	OD15XYZS	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-02	699
	VEI-8A-10-NC	OD15X36YZ	350 (5000)	up to 70 (18)	CA-10A-2N	S8	18323-11	711
	VEI-8A-12-NC	OD15X89YZ	350 (5000)	up to 150 (40)	CA-12A-2N	S8	18323-13	719
	VEI-8A-09-NC	OD15X17YZ	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-03	715
	VEI-8A-12-NC	OD15X21YZ	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-04	723
	VEI-8A-06-NC	OD15XYZS	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-02	699
	VEI-8A-10-NC	OD15X36YZ	350 (5000)	up to 70 (18)	CA-10A-2N	S8	18323-11	711
	VEI-8A-12-NC	OD15X89YZ	350 (5000)	up to 150 (40)	CA-12A-2N	S8	18323-13	719
	VEI-8A-09-NC	OD15X17YZ	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-03	715
	VEI-8A-12-NC	OD15X21YZ	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-04	723
	VEI-8A-06-NC	OD15XYZS	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-02	699
	VEI-8A-06-NC-ET	OD15X183CZ	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-09	707
	VEI-8A-10-NC	OD15X36YZ	350 (5000)	up to 70 (18)	CA-10A-2N	S8	18323-11	711
	VEI-8A-12-NC	OD15X89YZ	350 (5000)	up to 150 (40)	CA-12A-2N	S8	18323-13	719
	VEI-8A-16A-NC	OD15X75YS0	350 (5000)	up to 150 (40)	CA-16A-2N	S8	18323-17	727
	VEI-8A-09-NC	OD15X17YZ	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-03	715
	VEI-8A-12-NC	OD15X21YZ	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-04	723
	VEI-8A-06-NC	OD15XYZS	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-02	699
	VEI-8A-10-NC	OD15X36YZ	350 (5000)	up to 70 (18)	CA-10A-2N	S8	18323-11	711
	VEI-8A-12-NC	OD15X89YZ	350 (5000)	up to 150 (40)	CA-12A-2N	S8	18323-13	719
	VEI-8A-09-NC	OD15X17YZ	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-03	715
	VEI-8A-12-NC	OD15X21YZ	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-04	723

### Pilot operated poppet 2-way normally open

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEI-8I-06-NA	OD15X18YS0	350 (5000)	up to 30 (8)	CA-08A-2N	S8	18323-05	735
	VEI-8A-06-NA	OD15XYZS0	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-06	739
	VEI-8A-09-NA	OD15X17YS0	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-07	751
	VEI-8A-12-NA	OD15X21YS0	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-08	759

## Solenoid - On-off pilot operated

### Pilot operated poppet 2-way normally open

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEI-8A-06-NA	OD15XYZS0	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-06	739
	VEI-8A-09-NA	OD15X17YS0	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-07	751
	VEI-8A-12-NA	OD15X21YS0	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-08	759
	VEI-8I-06-NA	OD15X18YS0	350 (5000)	up to 30 (8)	CA-08A-2N	S8	18323-05	735
	VEI-8A-06-NA-019-E	OD15X19Z	350 (5000)	up to 40 (11)	Special 019-E	S8	18323-21	743
	VEI-8A-09-NA	OD15X17YS0	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-07	751
	VEI-8A-12-NA	OD15X21YS0	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-08	759
	VEI-8I-06-NA	OD15X18YS0	350 (5000)	up to 30 (8)	CA-08A-2N	S8	18323-05	735
	VEI-8A-06-NA	OD15XYZS0	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-06	739
	VEI-8A-10-NA	OD15X36YS0	350 (5000)	up to 70 (18)	CA-10A-2N	S8	18323-12	747
	VEI-8A-12A-NA	OD15X89YS0	350 (5000)	up to 150 (40)	CA-12A-2N	S8	18323-14	755
	VEI-8A-16A-NA	OD15X75YS0	350 (5000)	up to 150 (40)	CA-16A-2N	S8	18323-18	763
	VEI-8A-09-NA	OD15X17YS0	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-07	751
	VEI-8A-12-NA	OD15X21YS0	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-08	759
	VEI-8A-06-NA-019-E	OD15X19Z	350 (5000)	up to 40 (11)	Special 019-E	S8	18323-21	743
	VEI-8A-06-NA	OD15XYZS0	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-06	739
	VEI-8A-10-NA	OD15X36YS0	350 (5000)	up to 70 (18)	CA-10A-2N	S8	18323-12	747
	VEI-8A-12A-NA	OD15X89YS0	350 (5000)	up to 150 (40)	CA-12A-2N	S8	18323-14	755
	VEI-8A-16A-NA	OD15X75YS0	350 (5000)	up to 150 (40)	CA-16A-2N	S8	18323-18	763
	VEI-8A-09-NA	OD15X17YS0	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-07	751
	VEI-8A-12-NA	OD15X21YS0	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-08	759
	VEI-8A-2B-16-NA-NSS	OD150404YS0	350 (5000)	up to 260 (69)	Special 004	S8	18323-16	767
	VEI-8A-06-NA	OD15XYZS0	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18323-06	739
	VEI-8A-10-NA	OD15X36YS0	350 (5000)	up to 70 (18)	CA-10A-2N	S8	18323-12	747
	VEI-8A-12A-NA	OD15X89YS0	350 (5000)	up to 150 (40)	CA-12A-2N	S8	18323-14	755
	VEI-8A-16A-NA	OD15X75YS0	350 (5000)	up to 150 (40)	CA-16A-2N	S8	18323-18	763
	VEI-8A-09-NA	OD15X17YS0	350 (5000)	up to 70 (18)	Special 017-E	S8	18323-07	751
	VEI-8A-12-NA	OD15X21YS0	350 (5000)	up to 150 (40)	Special 021-E	S8	18323-08	759

## Solenoid - On-off pilot operated

### Pilot operated poppet 2-way normally open proximity sensor

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEI-8A-2A-06-NA-S-M-NSS	OD1506181DS2Z	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18325-07	771
	VEI-8A-2A-09-NA-S-M-NSS	OD1506761DS2Z	350 (5000)	up to 70 (18)	Special 076-E	S8	18325-08	775
	VEI-8A-2A-09-NA-S-M-NSS	OD1506171DS0Z	350 (5000)	up to 70 (18)	Special 017-E	S8	18325-09	779
	VEI-8A-2A-12-NA-S-M-NSS	OD1506211DS2Z	350 (5000)	up to 150 (40)	Special 021-E	S8	18325-10	783

### Pilot operated poppet 2-way normally open double lock proximity sensor

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEI-8A-2T-06-NA-S-M-NSS	OD1532181DS2Z	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18325-16	787
	VEI-8A-2T-09-NA-S-M-NSS	OD1532171DS2Z	350 (5000)	up to 70 (18)	Special 017-E	S8	18325-15	791

### Pilot operated poppet 2-way normally closed proximity sensor

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VESP-8A-2A-12A/00-2A05-N7	OD15051841YZ	350 (5000)	up to 40 (11)	CA-08A-2N	S8	18325-03	795
	VESP-16G-16A/00-2A-N7	OD15052165YZ	350 (5000)	up to 150 (40)	Special 021-E	S7	18325-05	803
	VESP-12G-16A/00-2A05-N7	OD1505176504Z	350 (5000)	up to 70 (18)	Special 017-E	S7	18325-04	799
	VESP-16G-16A/00-2A-N7	OD15052165YZ	350 (5000)	up to 150 (40)	Special 021-E	S7	18325-05	803

## Solenoid - On-off direct acting

### Direct acting 2-way poppet type normally closed

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VED-8I-NC	OD11X18Y00	350 (5000)	1.5 (0.4)	CA-08A-2N	S8	18324-06	809
	VED-8I-NC	OD11X18Y00	350 (5000)	1.5 (0.4)	CA-08A-2N	S8	18324-06	809



## Solenoid - On-off direct acting

### Direct acting 2-way poppet type normally open

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VED-8I-NA	OD11X18Y00	350 (5000)	1.5 (0.4)	CA-08A-2N	S8	18324-07	813
	VED-8I-NA	OD11X18Y00	350 (5000)	1.5 (0.4)	CA-08A-2N	S8	18324-07	813

### Direct acting 2-way poppet type normally closed double lock

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEDT-08A-A-12.7-NC	OD113118Y00	250 (3600)	15 (4)	CA-08A-2N	S8	18324-01	817
	VEDT-08A-A-16-NC	OD1131186Y00	250 (3600)	25 (7)	CA-08A-2N	S7	18324-03	821
	VEDT-08F-A-16	OD11X40Y00	250 (3600)	25 (7)	Hydac 06020	S7	18324-04	825
	KSDE U/R 8		500 (7250)	5 (1.3)	SUN T-8A	GZ37	18136-12	1041
	KSDE 0		350 (5000)	20 (5)	Special, metric	GZ37	18136-23	1051
	KSDE U/R 1		500 (7250)	20 (5)	SUN T-13A	GZ37	18136-20	1059

### Direct acting 2-way poppet type normally open double lock

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEDT-08F-A-16	OD11X40Y00	250 (3600)	25 (7)	Hydac 06020	S7	18324-04	825
	KSDE U/R 8		500 (7250)	5 (1.3)	SUN T-8A	GZ37	18136-12	1041
	KSDE 0		350 (5000)	20 (5)	Special, metric	GZ37	18136-23	1051
	KSDE U/R 1		500 (7250)	20 (5)	SUN T-13A	GZ37	18136-20	1059

### Direct acting poppet 3-way 2-position

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEDT-08A-32	OD130151Y00	250 (3600)	15 (4)	CA-08A-3N	S7	18324-05	829

### Direct acting seat valve 3-way 2-position

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	KSDER1-C		350 (5000)	12 (3)	SUN T-11A	GZ37	18136-21	1067
	KSDER1-U		350 (5000)	12 (3)	SUN T-11A	GZ37	18136-21	1067
	KSDEU1-C		500 (7250)	6 (2)	SUN T-11A	GZ37	18136-21	1067
	KSDEU1-U		500 (7250)	6 (2)	SUN T-11A	GZ37	18136-21	1067

### Direct acting spool type 2-way 2-position

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	KKDER1 N-P		350 (5000)	55 (15)	SUN T-13A	GZ37	18136-06	1095
	KKDER8 N-P		350 (5000)	45 (12)	SUN T-8A	GZ37	18136-08	1075

## Solenoid - On-off direct acting

### Direct acting 3-way 2-position spool type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VED-8I-32	OD13X51YZ	210 (3000)	10 (3)	CA-08A-3N	S8	18324-61	833
	VED-10A-32	OD13X77Y00	210 (3000)	20 (6)	CA-10A-3N	S7	18324-58	845
	VEDS-12A-32	OD13X12Y00	315 (4500)	60 (16)	CA-12A-3N	R5	18324-56	861
	VED-8I-32	OD13X51YZ	210 (3000)	10 (3)	CA-08A-3N	S8	18324-61	833
	VED-10A-32	OD13X77Y00	210 (3000)	20 (6)	CA-10A-3N	S7	18324-58	845
	VED-8I-32	OD13X51YZ	210 (3000)	10 (3)	CA-08A-3N	S8	18324-61	833
	VED-10A-32	OD13X77Y00	210 (3000)	20 (6)	CA-10A-3N	S7	18324-58	845
	VED-8I-32	OD13X51YZ	210 (3000)	10 (3)	CA-08A-3N	S8	18324-61	833
	VED-10A-32	OD13X77Y00	210 (3000)	20 (6)	CA-10A-3N	S7	18324-58	845
	KKDER1-C		350 (5000)	60 (16)	SUN T-11A	GZ37	18136-04	1105
	KKDER8-C		350 (5000)	30 (12)	SUN T-9A	GZ37	18136-09	1085
	KKDER1-U		350 (5000)	60 (16)	SUN T-11A	GZ37	18136-04	1105
	KKDER8-U		350 (5000)	30 (12)	SUN T-9A	GZ37	18136-09	1085
	KKDER8-G		350 (5000)	30 (12)	SUN T-9A	GZ37	18136-09	1085
	FTWE 2		100 (1450)	2 (0.5)	Special, metric		58007	1295
	FTWE 4		210 (3000)	7 (2)	Special, metric		58008	1303

## Solenoid - On-off direct acting

### Direct acting 4-way 2-position spool type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VED-8I-42	OD14X58YZ	210 (3000)	10 (3)	CA-08A-4N	S8	18324-62	837
	VED-10A-42	OD144W78Y00	210 (3000)	20 (5)	CA-10A-4N	S7	18324-59	849
	VED-8I-42	OD14X58YZ	210 (3000)	10 (3)	CA-08A-4N	S8	18324-62	837
	VED-10A-42	OD144W78Y00	210 (3000)	20 (5)	CA-10A-4N	S7	18324-59	849
	KKDER1-D		350 (5000)	40 (11)	SUN T-31A	GZ37	18136-05	1115
	KKDER1-E		350 (5000)	40 (11)	SUN T-31A	GZ37	18136-05	1115
	KKDER1-F		350 (5000)	40 (11)	SUN T-31A	GZ37	18136-05	1115

### Direct acting 4-way 3-position spool type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VED-8I-43	OD14X58YZ	210 (3000)	10 (3)	CA-08A-4N	S8	18324-63	841
	VEDS-10A-43	OD14X78KK2Y00	350 (5000)	35 (9)	CA-10A-4N	GP37	18324-64	853
	VEDS-10A-43	OD14X78KK2Y00	350 (5000)	35 (9)	CA-10A-4N	GP37	18324-64	853
	VED-8I-43	OD14X58YZ	210 (3000)	10 (3)	CA-08A-4N	S8	18324-63	841
	VEDS-10A-43	OD14X78KK2Y00	350 (5000)	35 (9)	CA-10A-4N	GP37	18324-64	853
	VEDS-10A-43	OD14X78KK2Y00	350 (5000)	35 (9)	CA-10A-4N	GP37	18324-64	853

## Solenoid - On-off direct acting

### Direct acting 5-way 3-position spool type

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEDS-10A-53	OD53X54KK2Y00	250 (3600)	25 (7)	CA-10A-5N	GP37	18324-65	857

## Solenoid - Electro-proportional

### Electro-proportional Direct acting 4-way 3-position

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEPS-10A-43	OD14X78KP2Y00	350 (5000)	25 (7)	CA-10A-4N	GP37	18324-66	931

### Electro-proportional Direct acting 5-way 3-position

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEPS-10A-53	OD53X54KP2Y00	250 (3600)	25 (7)	CA-10A-5N	GP37	18324-67	935

### Electro-proportional relief direct acting (rising characteristic curve)

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEP-5B-2S-D	OD940118YZ	350 (5000)	5 (1.3)	CA-08A-2N	S5	18323-65	867
	KBPS.8A		420 (6000)	2 (0.5)	SUN T-8A	GP37	18139-04	1127

### Electro-proportional relief direct acting (falling characteristic curve)

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	KBPS.8B		420 (6000)	2 (0.5)	SUN T-8A	GP37	18139-05	1141

## Solenoid - Electro-proportional

### Electro-proportional relief pilot operated (rising characteristic curve)

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEP-5B-2S-10A-P	OD940536YZ	350 (5000)	up to 120 (32)	CA-10A-2N	S5	18323-66	871
	VEP-5B-2S-P	OD940561YZ	350 (5000)	up to 150 (40)	Special 065	S5	18323-67	875
	KBVS.3A		350 (5000)	200 (53)	Special, metric	GP37	18139-08	1179
	KBVS.1A		420 (6000)	80 (21)	CA-10A-2N	GP37	18160	1155

### Electro-proportional relief pilot operated (falling characteristic curve)

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page	
	KBVS.3B		350 (5000)	200 (53)	Special, metric	GP37	18139-07	1191	
	KBVS.1B		420 (6000)	80 (21)	CA-10A-2N	GP37	18152	1167	

### Electro-proportional direct acting pressure reducing

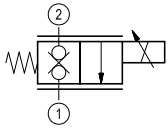
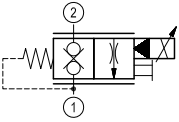
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEP-5A-3R-06	OD910177Y00	210 (3000)	10 (3)	CA-10A-3N	S5	18323-60	879
	MHDRE 06 K		30 (450)	40 (11)	Special, MHDRE	GP45	64655	1241
	MHDRE 06 FK		30 (450)	40 (11)	Special, MHDRE	GP45	64656	1251
	FTDRE 2K		100 (1450)	2 (0.5)	Special, metric		58032	1261
	FTDRE 4K		210 (3000)	5 (1.3)	Special, metric		58038	1285
	FTDRE 2K-044		250 (3600)	2 (0.5)	Special, metric		58034	1273

### Electro-proportional pilot operated pressure reducing

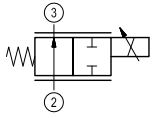
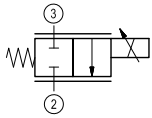
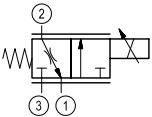
Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page	
	VEP-5A-2R-06-P	OD910677Y00	210 (3000)	up to 60 (16)	CA-10A-3N	S5	18323-61	883	
	KTVS.1A			210 (3000)	80 (21)	CA-10A-3N		18166	1203

## Solenoid - Electro-proportional

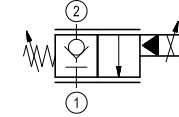
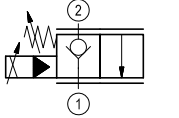
### Electro-proportional 2-way double lock normally closed

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEP-5A-2T-06-NC	OD953118Y00	210 (3000)	up to 20 (5)	CA-08A-2N	S5	18323-68	887
	VEPN-08A-16	OD95311854Y00	250 (3600)	up to 20 (5)	CA-08A-2N	R7	18323-70	907
	VEPN-19E-16	OD95311954Y00	250 (3600)	up to 20 (5)	Special, 019-E	R7	18323-71	911

### Electro-proportional flow regulator not compensated

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	VEP-5A-2Q-09 NA	OD920277YZ	210 (3000)	up to 40 (11)	CA-10A-3N	S5	18323-64	899
	VEP-5A-2Q-09 NA	OD92X77YZ	210 (3000)	up to 40 (11)	CA-10A-3N	S5	18323-63	891
	VEP-5A-2Q-14	OD92X12Y00	210 (3000)	up to 60 (16)	CA-12A-3N	S5	18323-62	895
	VEP-5A-2Q-09 NA	OD92X77YZ	210 (3000)	up to 40 (11)	CA-10A-3N	S5	18323-63	891
	VEP-5A-2Q-14	OD92X12Y00	210 (3000)	up to 60 (16)	CA-12A-3N	S5	18323-62	895

### Electro-proportional poppet type flow regulator not compensated

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
 	VEPN-12A	OD9506897200	210 (3000)	up to 60 (16)	CA-12A-2N	R7	18323-69	903
	KSVS.0	KSVSR0AA/F-YV	350 (5000)	40 (11)	CA-08A-2N	GP37	18323-72	915
	KSVS.1	KSVSR1AA/F-YV	350 (5000)	86 (23)	CA-10A-2N	GP37	18323-73	919
	KSVS.2	KSVSR2AA/F-YV	350 (5000)	145 (38)	CA-12A-2N	GP37	18323-74	923
	KSVS.3	KSVSR3AA/F-YV		250 (66)	CA-16A-2N	GP37	18323-75	927

## Solenoid - Electro-proportional

### Electro-proportional flow regulator pressure compensated

Symbol	Type	Code	Max. Pressure bar (psi)	Max. Flow l/min. (gpm)	Cavity	Coil	Data Sheet	Page
	KUDSR		350 (5000)	120 (32)	CA-16A-3N	GP45	18702	1217





# Mechanical cartridge valves

## Relief and unloading

Designation	Description	Cavity	Code	Data sheet	Page
Relief direct acting poppet type	VS-5-CN	Special	041158X99Z	18318-19	37
Relief direct acting poppet type	VS-5-CF	Special	041157X99Z	18318-20	39
Relief direct acting poppet type	VSAN-08A	Size 08	041148X56Z	18318-01	41
Relief direct acting guided poppet type	VSBN-08A	Size 08	041149X56Z	18318-04	43
Relief direct acting guided poppet type	VSBN-08F	06020	041149X20Z	18318-18	45
Relief direct acting guided poppet type	VSBN-10A	Size 10	041155X85Z	18318-05	47
Relief direct acting guided poppet type	VS-30	Special	041118X99Z	18318-23	49
Relief direct acting guided poppet type hardened seat	VS-30-NCF	Special	041118X09Z	18318-24	51
Relief direct acting guided poppet type	VS-80	Special	041105X99Z	18318-25	53
Relief direct acting guided poppet type	VSBG-10A	Size 10	041156X85Z	18318-06	55
Relief direct acting poppet type differential area	VSDN-08A	Size 08	041522X56Z	18318-02	57
Relief direct acting poppet type differential area	VSDN-10A	Size 10	041523X85Z	18318-03	59
Relief direct acting poppet type differential area	VSD-350	Special	041504X99Z	18318-22	61
Relief bidirectional direct acting poppet type differential area	VSNG-10A	Size 10	041159X85Z	18318-07	63
Relief direct acting poppet type pressure compensated	VS-30-CC	Special	041127X99Z	18318-26	65
Relief pilot operated spool type	VSPN-10A	Size 10	041208X85Z	18318-08	67
Relief pilot operated spool type	VSPN-12A	Size 12	041210X57Z	18318-09	69
Relief pilot operated spool type	VSPN-16A	Size 16	041211X27Z	18318-10	71
Relief pilot operated poppet type	VSPC-10A	Size 10	041209X85Z	18318-11	73
Relief pilot operated poppet type	VMP1-16	Special	VMP1.100.NG	18318-36	75
Pressure relief pilot operated poppet type and anti-cavitation valve	VMR1-16	Special	VMR1.100.NG	18318-35	77

## Mechanical cartridge valves

### Relief and unloading

Designation	Description	Cavity	Code	Data sheet	Page
Pressure relief pilot operated poppet type and anti-cavitation valve	VMR2-22-FC	Special	VMR2.240.NG	18318-37	79
Pressure relief pilot operated poppet type and anti-cavitation valve	VMR2-22-LG	Special	VMR2.240.LG	18318-38	81
Relief pilot operated spool type external drain	VSPY-10A	Size 10	041305X85Z	18318-12	83
Relief pilot operated spool type external drain	VSPY-12A	Size 12	041307X57Z	18318-13	85
Relief pilot operated spool type external pilot	VSPX-12A	Size 12	041308X57Z	18318-14	87
Relief pilot operated spool type pressure compensated	VSP-10A	Size 10	041803X85Z	18318-39	89
Relief pilot operated spool type pressure compensated	VSP-CC-150	Special	041801X99Z	18318-27	91
Priority unloading pilot operated	VMSN-08A	Size 08	047521X56Z	18318-16	93
Priority unloading pilot operated	VMSP-78	Size 10	047510X99Z	18318-17	95

# Relief, direct acting poppet type

## Special cavity, 348

VS-5-CN

04.11.58 - X - 99 - Z



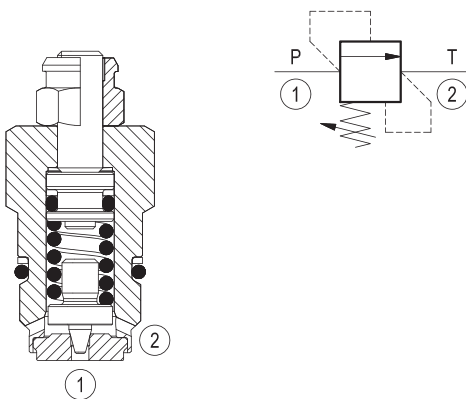
### Description

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve. The cartridge is suitable only for pilot or thermal relief applications.

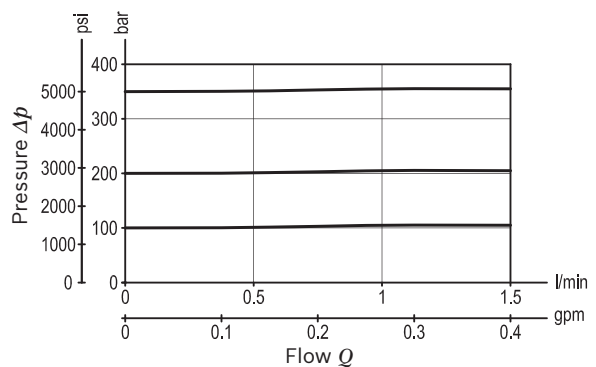
### Technical data

Max. operating pressure	460 bar (6600 psi)
Max. flow	1.5 l/min (0.4 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	27 - 33 Nm (20 - 24 ft-lbs)
Weight	0.05 kg (0.11 lbs)
Special cavity	348 (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG0348010520100 material no: R930001669
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves



### Characteristic curve



**Ordering code**

<b>04.11.58</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting poppet type

Adjustments

**03** Leakproof hex. socket screw

**99** Special cavity, 348

Series O/A to L  
unchanged performances and dimensions

Version and options standard

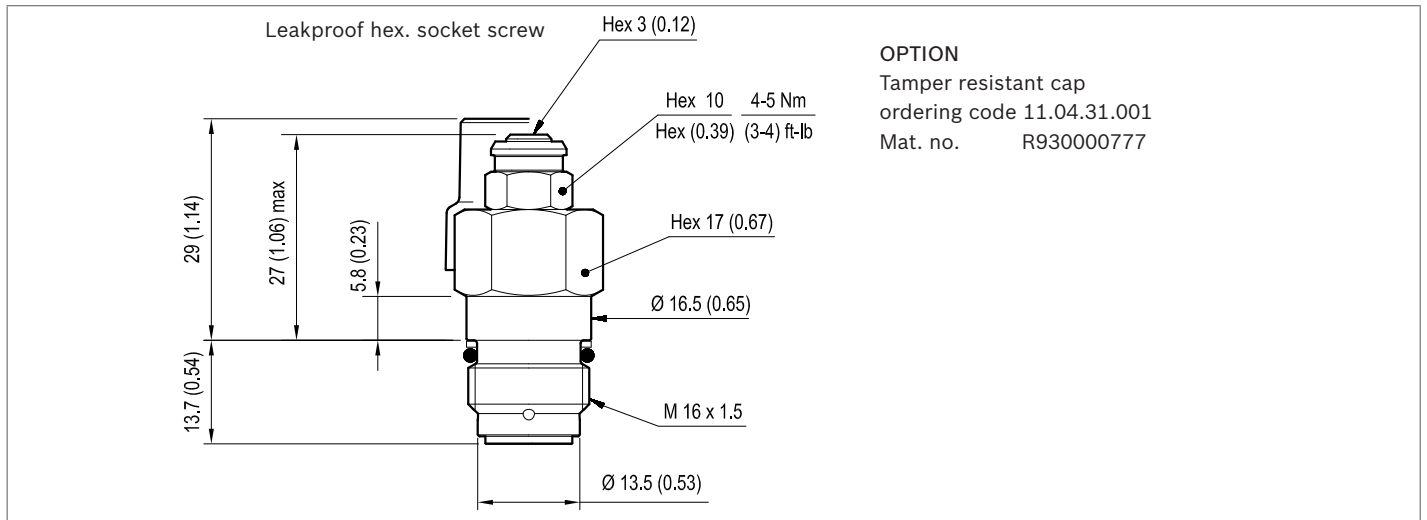
SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>10</b>	25-100 (350-1450)	40 (580)	100 (1450)
<b>20</b>	100-200 (1450-2900)	73 (1059)	200 (2900)
<b>35</b>	200-350 (2900-5000)	167 (2422)	350 (5000)
<b>46</b>	350-460 (5000-6600)	228 (3306)	350 (5000)

**Preferred types**

Type	Material number
04115803991000A	R901098796
041158039920000	R901113594
041158039935000	R901113597
041158039946000	R901098895

Type	Material number

**Dimensions**



Relief, direct acting poppet type

Special cavity, 348

VS-5-CF

04.11.57 - X - 99 - Z

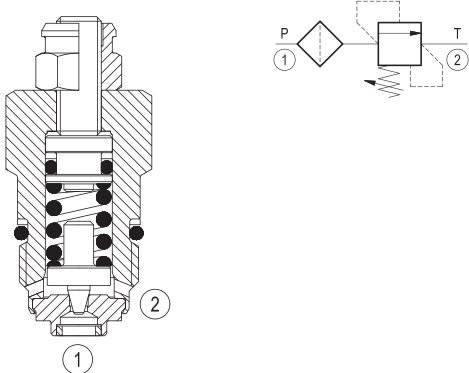


**Description**

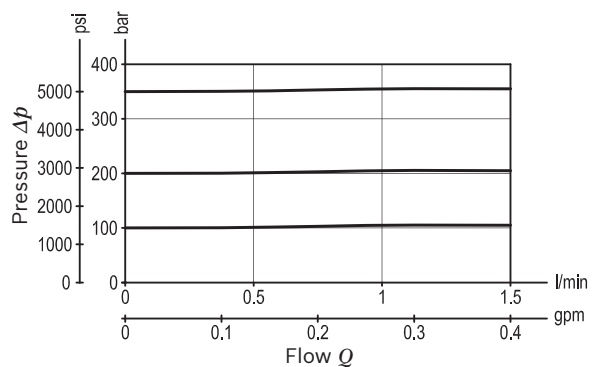
Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve. The cartridge is suitable only for pilot or thermal relief applications.

Technical data	
Max. operating pressure	460 bar (6600 psi)
Max. flow	1.5 l/min (0.4 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	27 - 33 Nm (20 - 24 ft-lbs)
Weight	0.05 kg (0.11 lbs)
Special cavity	348 (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG0348010520100 material no: R930001669
Recommended degree of fluid contamination	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Filtration	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.11.57</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting poppet type

Series 0/A to L  
unchanged performances and dimensions  
Version and options standard

**Adjustments**

**03** Leakproof hex. socket screw

**99** Special cavity, 348

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>10</b>	25-100 (350-1450)	40 (580)	100 (1450)
<b>20</b>	100-200 (1450-2900)	73 (1059)	200 (2900)
<b>35</b>	200-350 (2900-5000)	167 (2422)	350 (5000)
<b>46</b>	350-460 (5000-6600)	228 (3306)	350 (5000)

**Preferred types**

Type	Material number
04115703991000A	R901099066
041157039920000	R901099072
041157039935000	R901099117
041157039946000	R901099135

Type	Material number

**Dimensions**

**OPTION**  
Tamper resistant cap  
ordering code 11.04.31.001  
Mat. no. R930000777

# Relief, direct acting poppet type

## Common cavity, Size 08

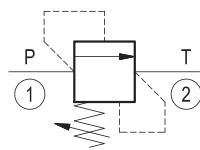
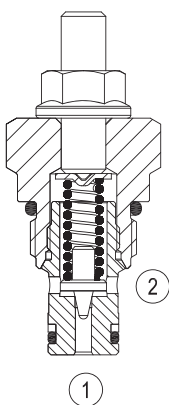
VSAN-08A

04.11.48 - X - 56 - Z



### Description

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through port 2 to tank. Pressure at port 2 is additive to the relief setting of the valve. The cartridge is especially suited for pilot or thermal relief applications.

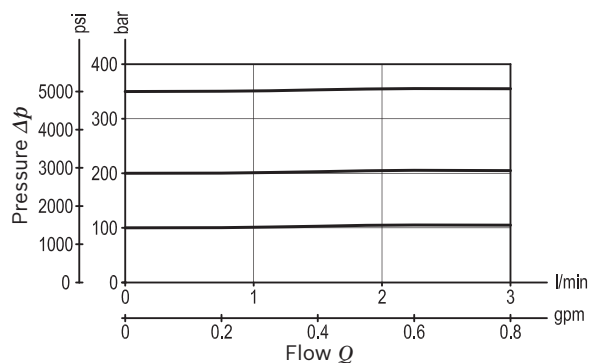


### Technical data

Max. operating pressure port 1 (P)	350 bar (5000 psi); for X=03 420 bar (6000 psi)
Max. pressure admitted port 2 (T)	140 bar (2000 psi)
Max. flow	3 l/min (0.8 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight <sup>2)</sup>	0.14 kg (0.31 lbs)
Cavity	CA-08A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG08A2010520100 material no: R901101437
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Max. to 80% of nominal setting
- 2) Standard version X=03 type
- 3) Only external seals for 10 valves

### Characteristic curve



Ordering code

04.11.48	X	56	Z	00	*
----------	---	----	---	----	---

Relief, direct acting poppet type

Adjustments

- 03** Leakproof hex. socket screw
- 04** Handknob and locknut
- 73** O-Ring seal on adjust screw

**56** Common cavity, Size 08

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

		SPRINGS		
		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=1 l/min
for X= 03	<b>10</b>	35-140 (500-2000)	48 (696)	100 (1450)
	<b>20</b>	105-210 (1500-3000)	88 (1276)	200 (2900)
	<b>35</b>	140-420 (2000-6000)	140 (2030)	350 (5000)
for X= 04	<b>35</b>	35-350 (500-5000)	68 (986)	350 (5000)
for X= 73	<b>35</b>	35-350 (500-5000)	68 (986)	350 (5000)

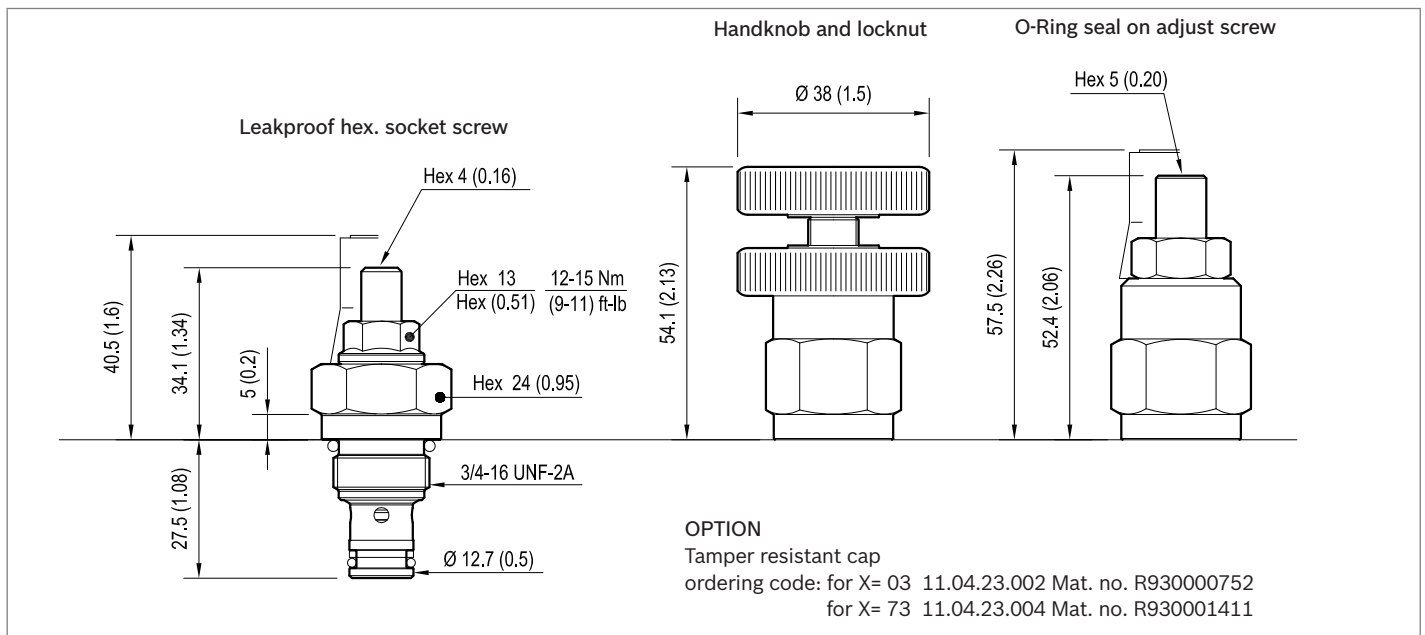
Note: Special settings available. Contact factory authorized representative for ordering code

Preferred types

Type	Material number
041148035610000	R901104094
041148035620000	R901104097
041148035635000	R901104099
041148045635000	R901104100

Type	Material number
041148735635000	R901161970

Dimensions





Relief, direct acting guided  
poppet type  
Common cavity, Size 08

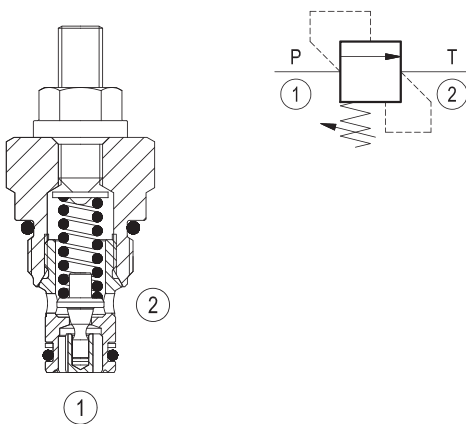
VSBN-08A

04.11.49 - X - 56 - Z



**Description**

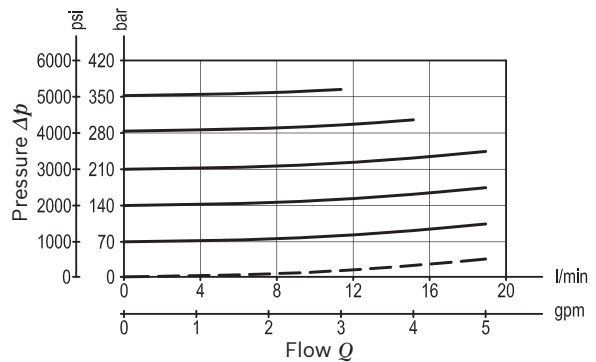
Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through port 2 to tank. Pressure at port 2 is additive to the relief setting of the valve. The unique Bosch Rexroth Oil Control poppet design provides enhanced stability at all flows and pressures.



Technical data	
Max. operating pressure port 1 (P)	350 bar (5000 psi)
Max. pressure admitted port 2 (T)	140 bar (2000 bar)
Max. flow	20 l/min (5.3 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight <sup>2)</sup>	0.09 kg (0.2 lbs)
Cavity	CA-08A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
MTTFd	150 years see data sheet 18350-51
Seal kit <sup>3)</sup>	Code: RG08A2010520100 material no: R901101437
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Max. to 80% of nominal setting
- 2) Standard version X=03 type
- 3) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.11.49</b>	<b>X</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting guided poppet type

**Adjustments**

- 03** Leakproof hex. socket screw
- 04** Handknob and locknut
- 73** O-Ring seal on adjust screw

**56** Common cavity, Size 08

Series 0/A to L unchanged performances and dimensions

Version and options standard

		SPRINGS		
		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=1 l/min
for X= 03	<b>05</b>	* 10-70 (145-1000)	26 (375)	50 (725)
	<b>10</b>	35-140 (500-2000)	50 (725)	100 (1450)
	<b>20</b>	105-210 (1500-3000)	79 (1145)	200 (2900)
	<b>35</b>	175-350 (2500-5000)	170 (2465)	350 (5000)
for X= 04	<b>35</b>	35-350 (500-5000)	72 (1044)	200 (2900)
for X= 73	<b>35</b>	35-350 (500-5000)	72 (1044)	200 (2900)

Note: Special settings available. Contact factory authorized representative for ordering code.

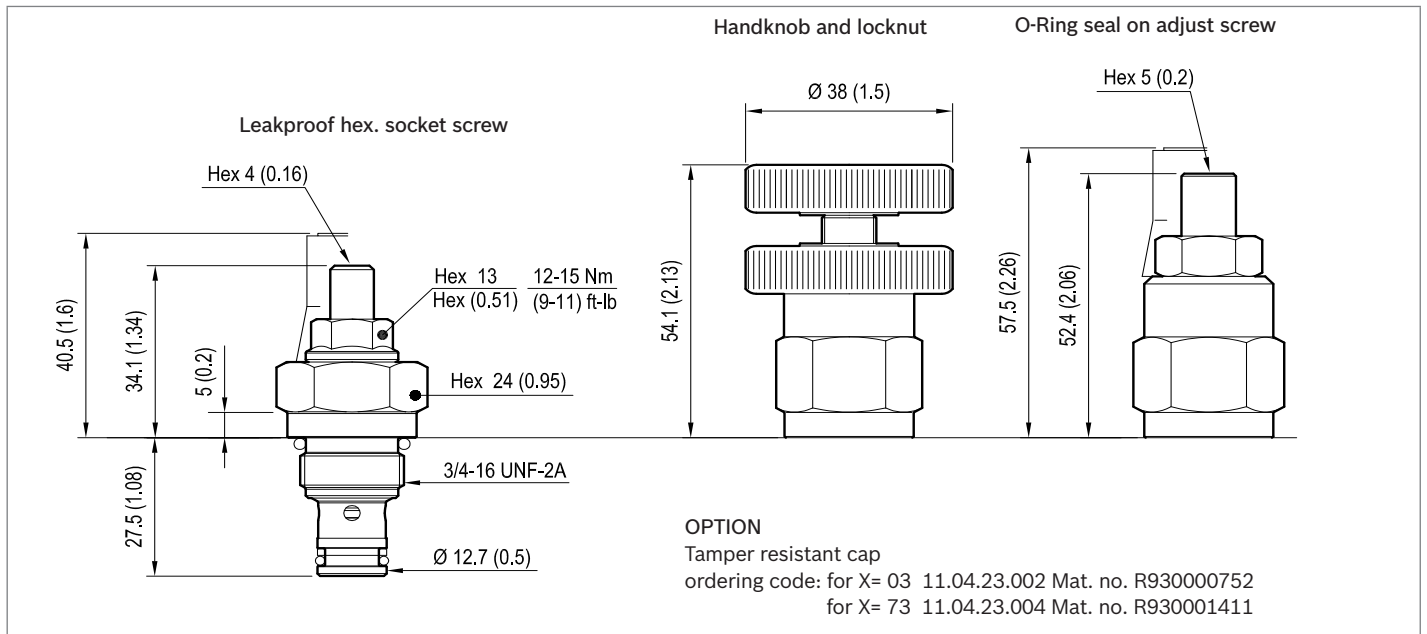
\* minimum pressure setting intended with Q=5 l/min.

**Preferred types**

Type	Material number
041149035605000	R901113598
041149035610000	R901113599
041149035620000	R901097728

Type	Material number
041149035635000	R901091914
041149045635000	R901113600
041149735635000	R901113601

**Dimensions**



Relief, direct acting guided  
poppet type  
Hydac cavity interchange, 06020

VSBN-08F

04.11.49 - X - 20 - Z

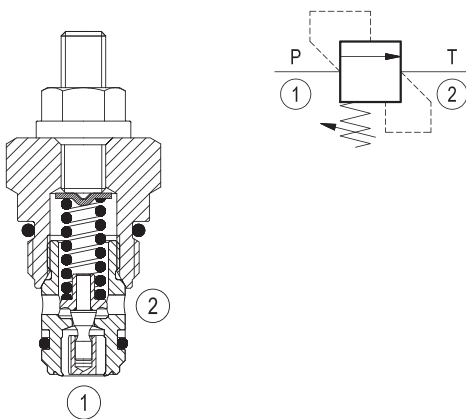
1



**Description**

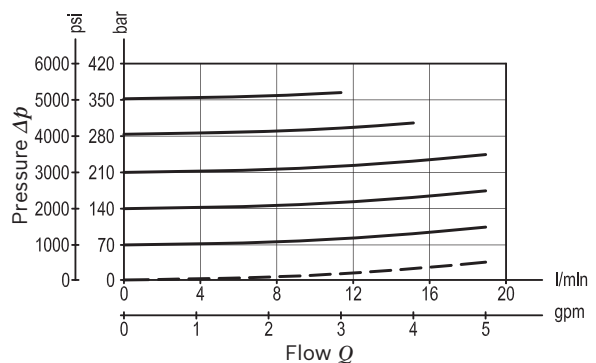
Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through port 2 to tank. Pressure at port 2 is additive to the relief setting of the valve. The unique Bosch Rexroth Oil Control poppet design provides enhanced stability at all flows and pressures.

Technical data	
Max. operating pressure port 1 (P)	350 bar (5000 psi)
Max. pressure admitted port 2 (T)	140 bar (2000 psi)
Max. flow	20 l/min (5.3 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	27 - 30 Nm (20 -22 ft-lbs)
Weight	0.14 kg (0.31 lbs)
Cavity	Hydac 06020
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
MTTFd	150 years see data sheet 18350-51
Seal kit <sup>2)</sup>	Code: RG08F2010520100 material no: R930000994
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50



- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.11.49</b>	<b>X</b>	<b>20</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting guided poppet type

Adjustments

**03** Leakproof hex. socket screw

**20** Hydac cavity interchange, 06020

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>05</b>	* 10-70 (145-1015)	26 (377)	50 (725)
<b>10</b>	35-140 (500-2000)	50 (725)	100 (1450)
<b>20</b>	105-210 (1500-3000)	79 (1146)	200 (2900)
<b>35</b>	175-350 (2500-5000)	170 (2465)	350 (5000)

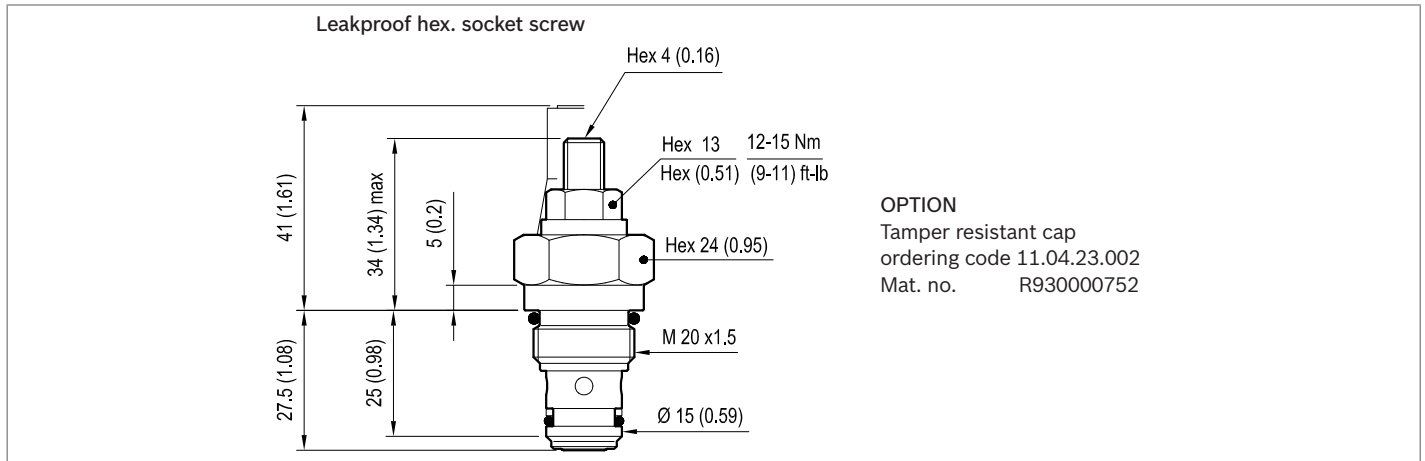
\* minimum pressure setting intended with Q=5 l/min

**Preferred types**

Type	Material number
041149032005000	R901126917
041149032010000	R901113602
041149032020000	R901113604
041149032035000	R901113605

Type	Material number

**Dimensions**



Relief, direct acting guided poppet type  
Common cavity, Size 10

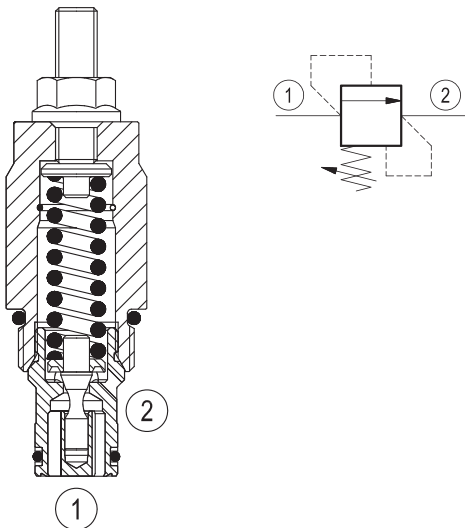
VSBN-10A

04.11.55 - X - 85 - Z



**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through port 2 to tank. Pressure at port 2 is additive to the relief setting of the valve. The unique Bosch Rexroth Oil Control poppet design provides enhanced stability at all flows and pressures.

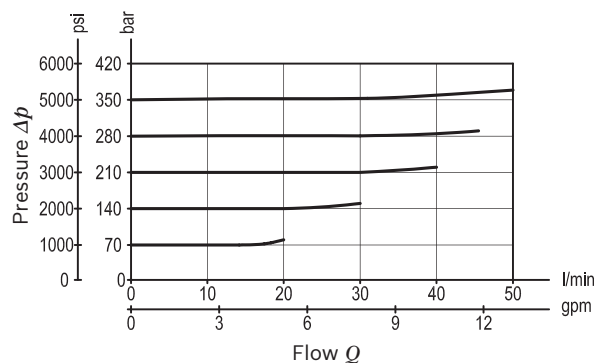


**Technical data**

Max. operating pressure port 1 (P)	350 bar (5000 psi)
Max. pressure admitted port 2 (T)	350 bar (5000 psi)
Max. flow	50 l/min (13 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A2010530100 material no: R901111366
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.11.55</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting guided

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Adjustments

**03** Leakproof hex. socket screw

**04** Handknob and locknut

**85** Common cavity, Size 10

**SPRINGS**

		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
for X= 03	<b>05</b>	* 5-70 (75-1000)	16 (232)	50 (725)
	<b>10</b>	35-140 (500-2000)	24 (348)	100 (1450)
	<b>20</b>	105-210 (1500-3000)	54 (783)	200 (2900)
	<b>35</b>	175-350 (2500-5000)	84 (1218)	350 (5000)
for X= 04	<b>10</b>	25-110 (363-1595)	19 (276)	100 (1450)
	<b>35</b>	90-350 (1305-5075)	68 (986)	350 (5000)

**Note:** Special settings available. Contact factory authorized representative for ordering code.

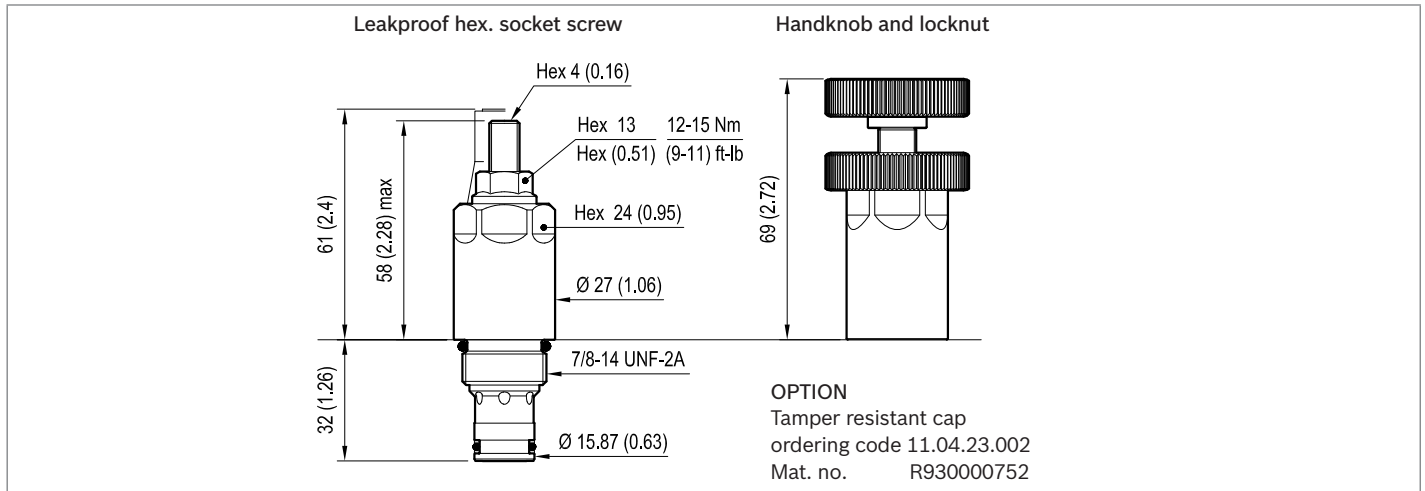
\* minimum pressure setting intended with Q=5 l/min

**Preferred types**

Type	Material number
041155038505000	R901191831
041155038510000	R901113609
041155038520000	R901113610
041155038535000	R901115702

Type	Material number
041155048510000	R930058261
041155048535000	R930058262

**Dimensions**



Relief, direct acting guided  
poppet type  
Special cavity, 008

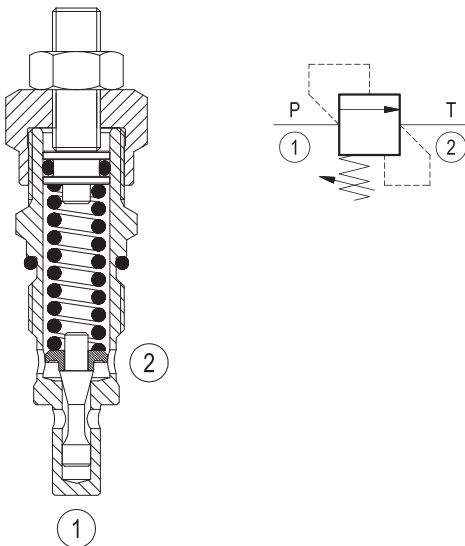
VS-30

04.11.18 - X - 99 - Z



**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through port 2 to tank. Pressure at port 2 is additive to the relief setting of the valve. The unique Bosch Rexroth Oil Control poppet design provides enhanced stability at all flows and pressures.

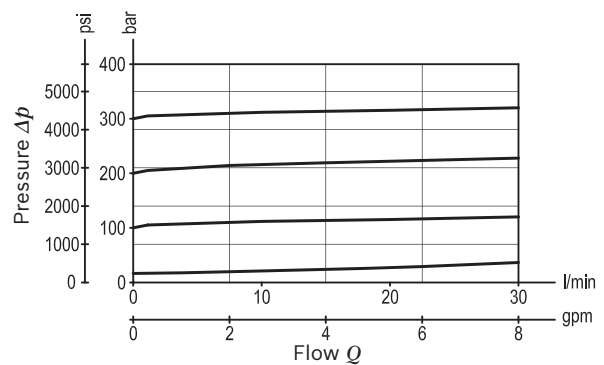


**Technical data**

Max. operating pressure port 1 (P)	350 bar (5000 psi)
Max. pressure admitted port 2 (T)	140 bar (2000 psi)
Max. flow	30 l/min (8 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	45 - 50 Nm (33 - 37 ft-lbs)
Weight <sup>2)</sup>	0.17 kg (0.38 lbs)
Special cavity	008 (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG0008010000100 material no: R930001692
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) At 80% of pressure setting
- 2) Standard version 03 type
- 3) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.11.18</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting guided poppet type

**Adjustments**

- 03** Leakproof hex. socket screw
- 04** Handknob and locknut

**99** Special cavity, 008

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>05</b>	* 5-50 (75-725)	12 (174)	50 (725)
<b>10</b>	30-100 (435-1450)	24 (348)	100 (1450)
<b>20</b>	50-210 (725-3000)	47 (682)	200 (2900)
<b>35</b>	100-350 (1450-5000)	82 (1189)	350 (5000)

**Note:** Special settings available. Contact factory authorized representative for ordering code.

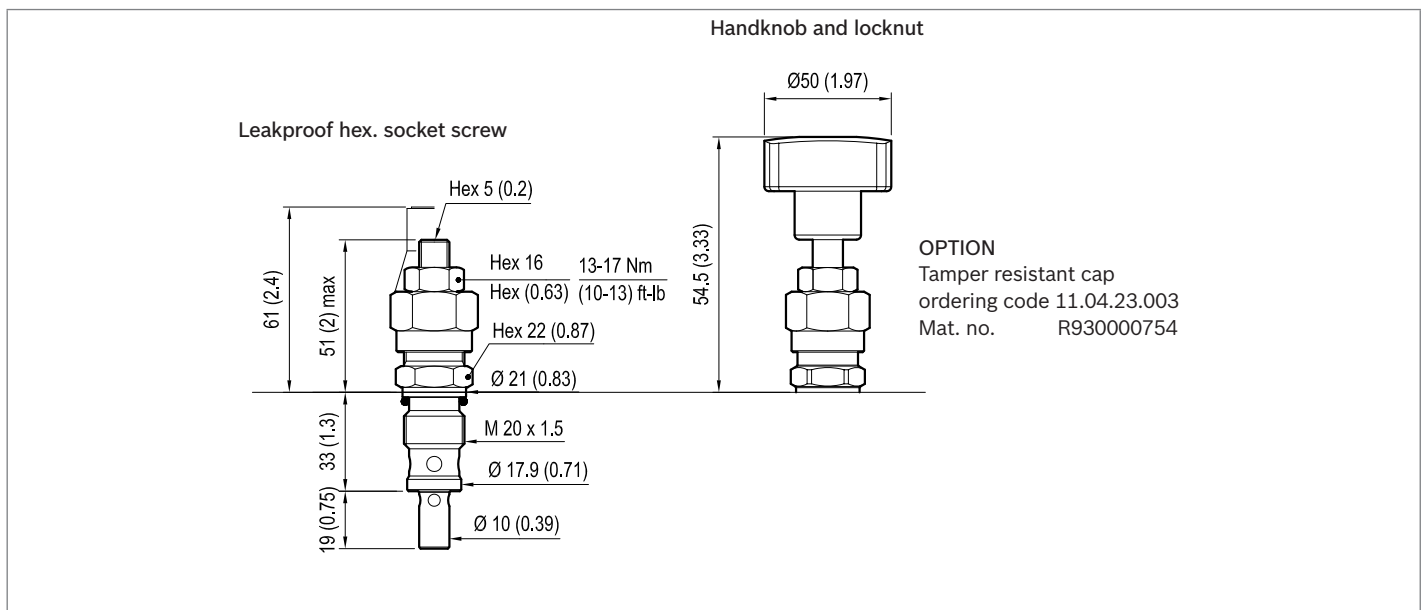
\* minimum pressure setting intended with Q=5 l/min

**Preferred types**

Type	Material number
041118039905000	R901113613
041118039910000	R901113614
041118039920000	R901226876
041118039935000	R901113617

Type	Material number
041118049905000	R930000148
041118049910000	R930000149
041118049920000	R901127942
041118049935000	R930000151

**Dimensions**





Relief, direct acting guided poppet type, hardened seat  
Special cavity, 008

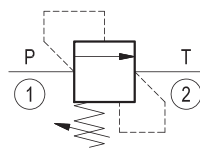
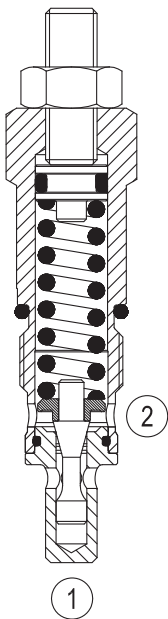
VS-30-NCF

04.11.18 - X - 09 - Z



**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve. The unique Bosch Rexroth Oil Control poppet design provides enhanced stability at all flows and pressures. A hardened seat is provided for increased durability in high-pressure, high-cycle applications.



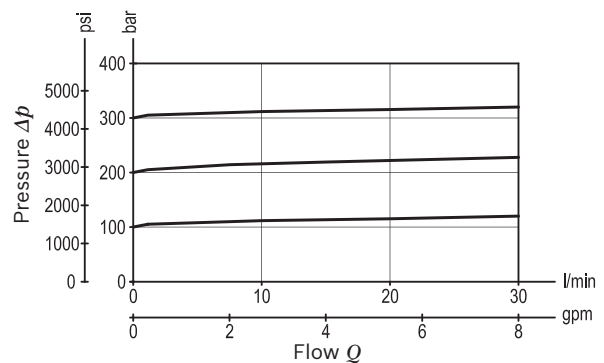
**Technical data**

Max. operating pressure port 1 (P)	420 bar (6000 psi)
Max. pressure admitted port 2 (T)	140 bar (2000 psi)
Max. flow	30 l/min (8 gpm)
Max. internal leakage <sup>1)</sup>	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	45 - 50 Nm (33 - 37 ft-lbs)
Weight	0.17 kg (0.38 lbs)
Special cavity	008 (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG0008010000100 material no: R930001692
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves

**Note:** the pressure setting must be done after installation, because the spring cannot be compressed while the cartridge is out of the cavity. For the same reason the threaded adjuster must be fully released prior to unscrewing the cartridge from the cavity.

**Characteristic curve**



**Ordering code**

<b>04.11.18</b>	<b>X</b>	<b>09</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting guided  
poppet type hardened seat

Series O/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**03** Leakproof hex. socket screw

**09** Special cavity, 008

**SPRINGS**

	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)
<b>05</b>	* 5-50 (75-725)	12 (174)
<b>20</b>	50-210 (725-3000)	47 (682)
<b>35</b>	100-350 (1450-5000)	82 (1189)
<b>42</b>	100-420 (1450-6000)	107 (1552)

**Note:** Special settings available. Contact factory authorized representative for ordering code.

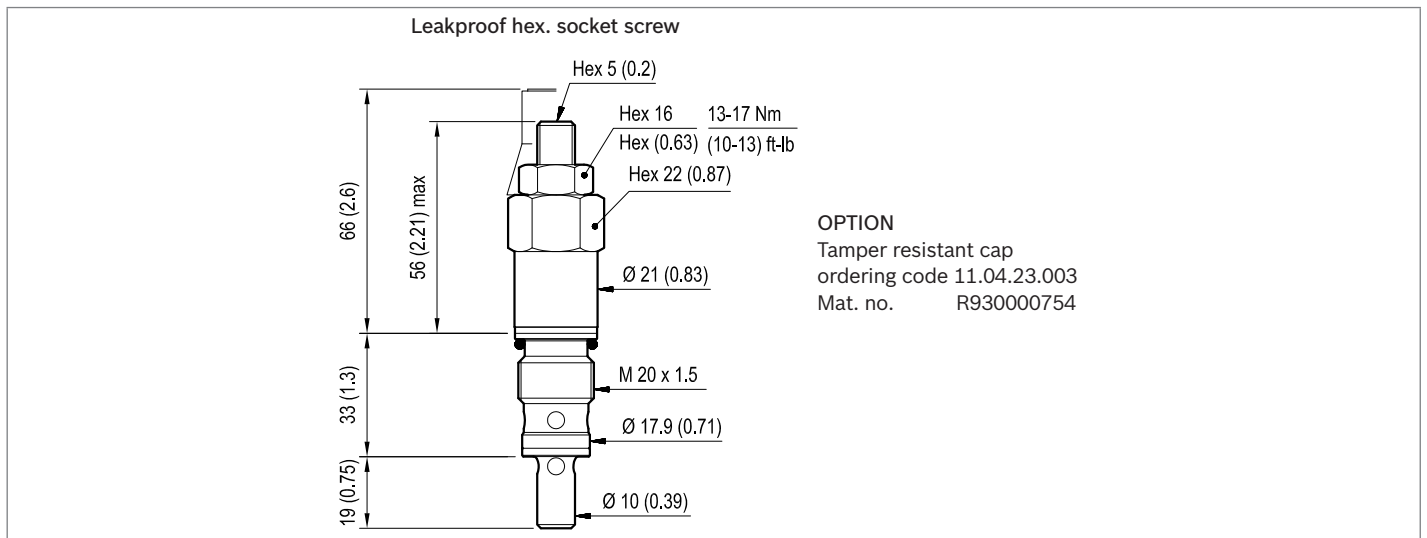
\* minimum pressure setting intended with Q=5 l/min

**Preferred types**

Type	Material number
04111803090500A	R930000129
04111803092000D	R930000132
04111803093500C	R901144794
041118030942000	R930000134

Type	Material number

**Dimensions**



Relief, direct acting guided  
poppet type  
Special cavity, 009

VS-80

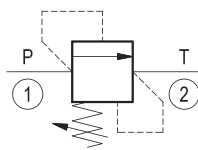
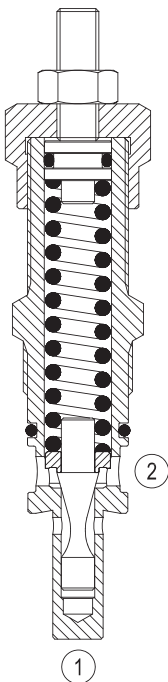
04.11.05 - X - 99 - Z

1



**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve. The unique Bosch Rexroth Oil Control poppet design provides enhanced stability at all flows and pressures.

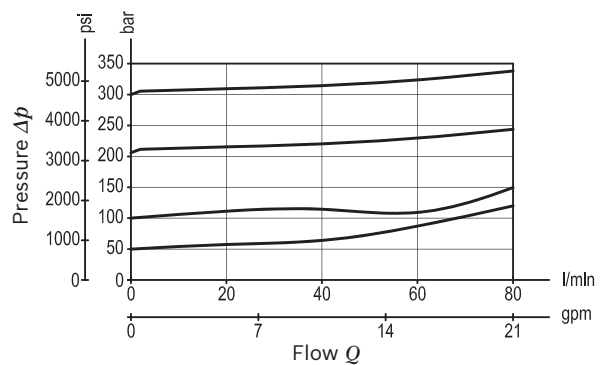


**Technical data**

Max. operating pressure port 1 (P)	250 bar (3600 psi)
Max. pressure admitted port 2 (T)	140 bar (2000 psi)
Max. flow	80 l/min (21 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	83 - 92 Nm (61 - 68 ft-lbs)
Weight	0.35 kg (0.77 lbs)
Special cavity	009 (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG0009010000100 material no: R930001694
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.11.05</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting guided poppet type

**Adjustments**

- 03** Leakproof hex. socket screw
- 04** Handknob and locknut

**99** Special cavity, 009

Series O/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>05</b>	* 5-50 (75-725)	6 (87)	50 (725)
<b>10</b>	30-100 (435-1450)	12 (174)	100 (1450)
<b>20</b>	80-250 (1160-3600)	27 (392)	200 (2900)
<b>35</b>	140-350 (2000-5000)	62 (899)	350 (5000)

**Note:** Special settings available. Contact factory authorized representative for ordering code.

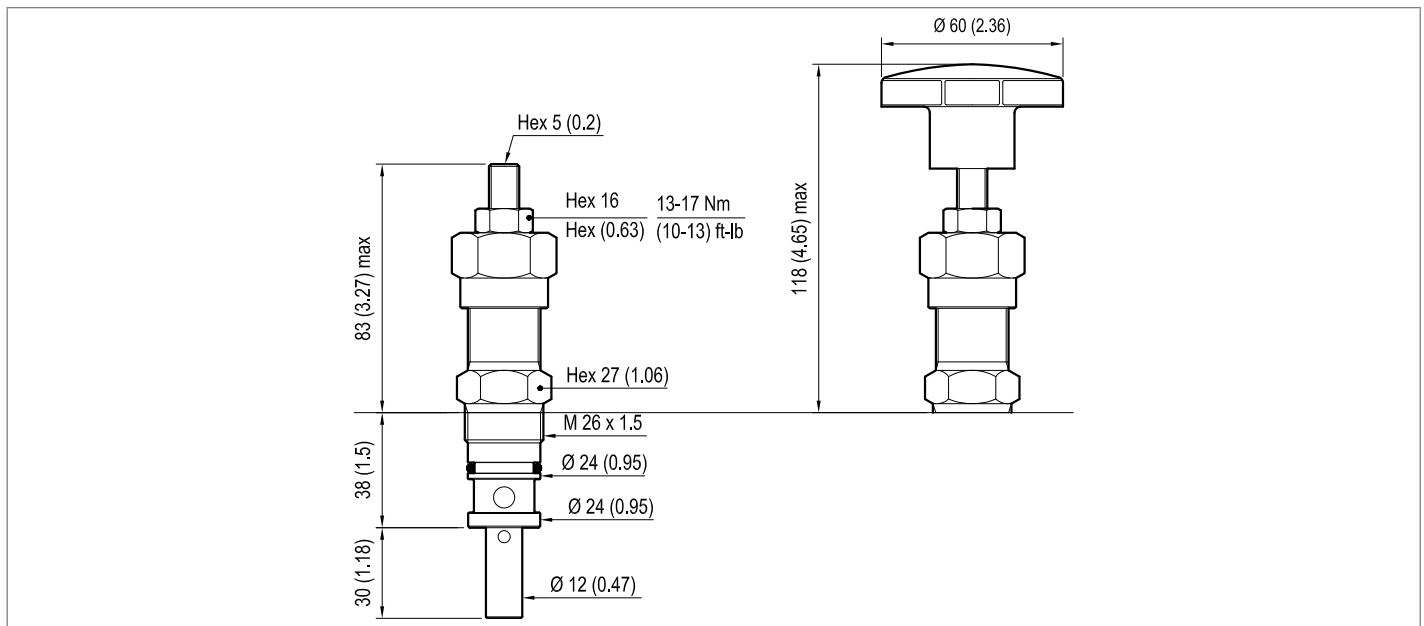
\* minimum pressure setting intended with Q=5 l/min

**Preferred types**

Type	Material number
041105039905000	R930000117
041105039910000	R930000119
041105039920000	R901113620
041105049910000	R930000121

Type	Material number
041105049920000	R930000122
041105039935000	R930008396

**Dimensions**



Relief, direct acting guided poppet type  
Common cavity, Size 10

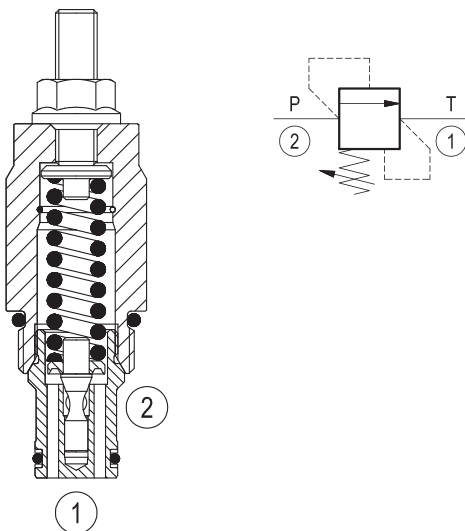
VSBG-10A

04.11.56 - X - 85 - Z



**Description**

Flow is blocked from 2 to 1 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through port 1 to tank. Pressure at port 1 is additive to the relief setting of the valve. The unique Bosch rexroth oil control poppet design provides enhanced stability at all flows and pressures.

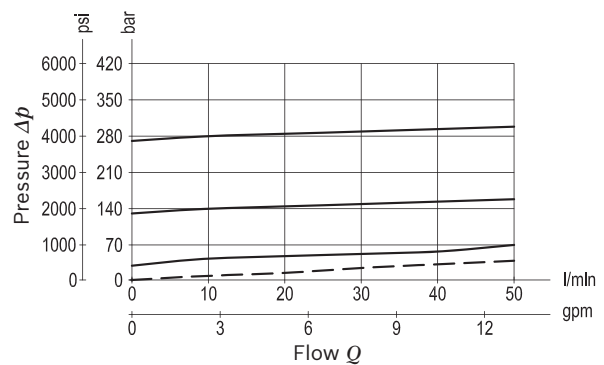


**Technical data**

Max. operating pressure port 1 (P)	350 bar (5000 psi)
Max. pressure admitted port 2 (T)	350 bar (5000 psi)
Max. flow	50 l/min (13 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A2010530100 material no: R901111366
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.11.56</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting guided poppet type

Adjustments

**03** Leakproof hex. socket screw

**85** Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>05</b>	* 5-70 (75-1000)	16 (232)	50 (725)
<b>10</b>	35-140 (500-2000)	24 (348)	100 (1450)
<b>20</b>	105-210 (1500-3000)	54 (783)	200 (2900)
<b>35</b>	175-350 (2500-5000)	84 (1218)	350 (5000)

Note: Special settings available. Contact factory authorized representative for ordering code.

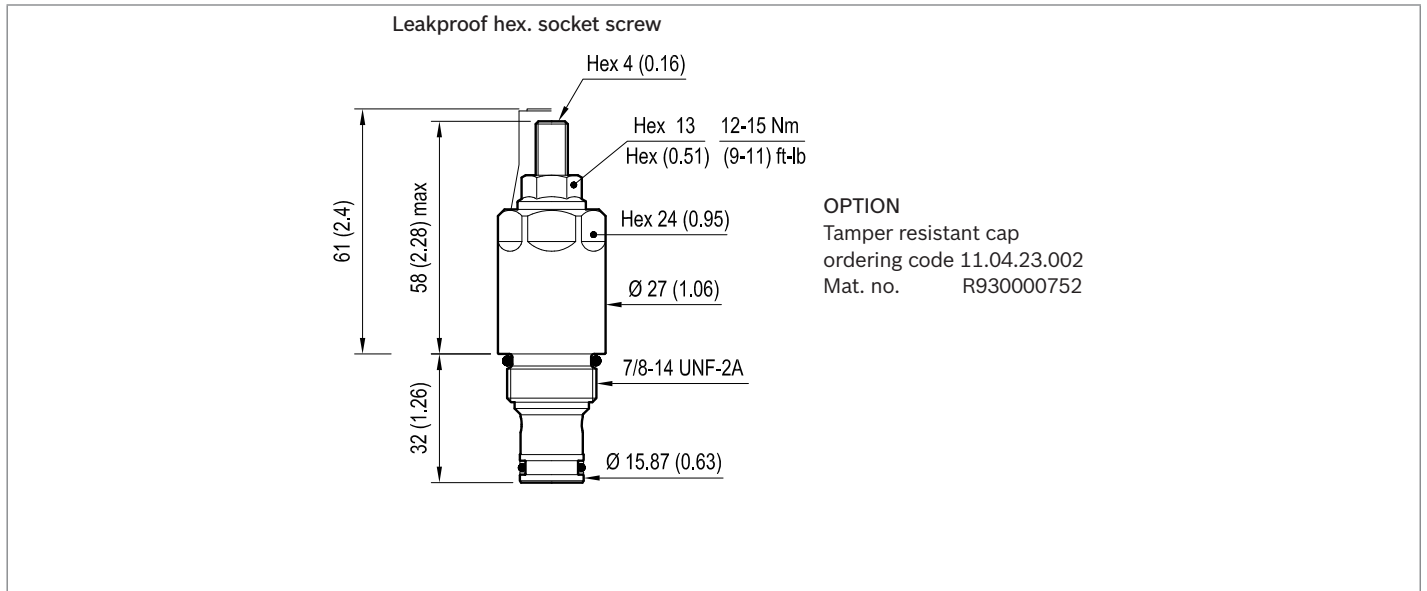
\* minimum pressure setting intended with Q=5 l/min

**Preferred types**

Type	Material number
041156038505000	R901157894
041156038510000	R901113622
041156038520000	R901113624
041156038535000	R901113626

Type	Material number

**Dimensions**



Relief, direct acting poppet type  
differential area  
Common cavity, Size 08

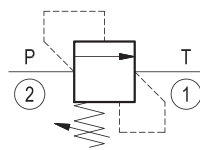
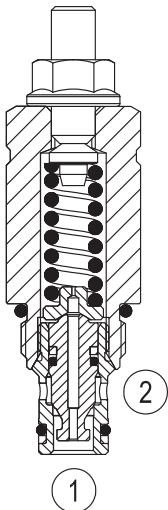
VSDN-08A

04.15.22 - X - 56 - Z



**Description**

Flow is blocked from 2 to 1 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through port 1 to tank. Pressure at port 1 is additive to the relief setting of the valve. The unique Bosch Rexroth Oil Control poppet design provides enhanced stability at all flows and pressures.

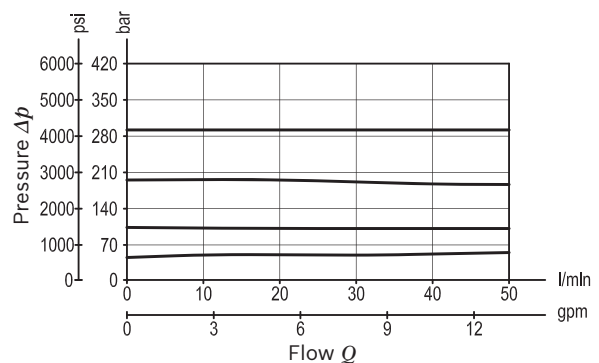


**Technical data**

Max. operating pressure port 2 (P)	350 bar (5000 psi)
Max. pressure admitted port 1 (T)	140 bar (2000 psi)
Max. flow	50 l/min (13 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.15 kg (0.33 lbs)
Cavity	CA-08A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08A2010520100 material no: R901101437
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.15.22</b>	<b>X</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting poppet type differential area

Adjustments

**03** Leakproof hex. socket screw

**56** Common cavity, Size 08

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>05</b>	35-140 (500-2000)	32 (464)	100 (1450)
<b>10</b>	105-210 (1500-3000)	76 (1102)	200 (2900)
<b>20</b>	175-350 (2500-5000)	118 (1711)	300 (4350)

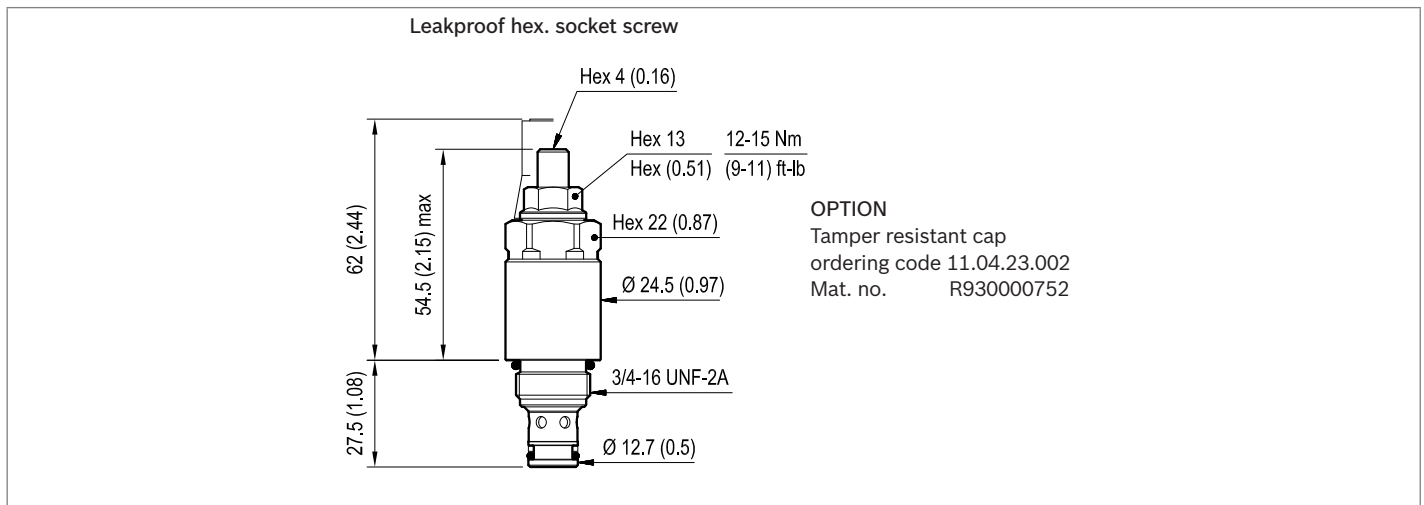
**Note:** Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
041522035610000	R930005640
041522035620000	R930005641
041522035635000	R930005642

Type	Material number

**Dimensions**





Relief, direct acting poppet type  
differential area  
Common cavity, Size 10

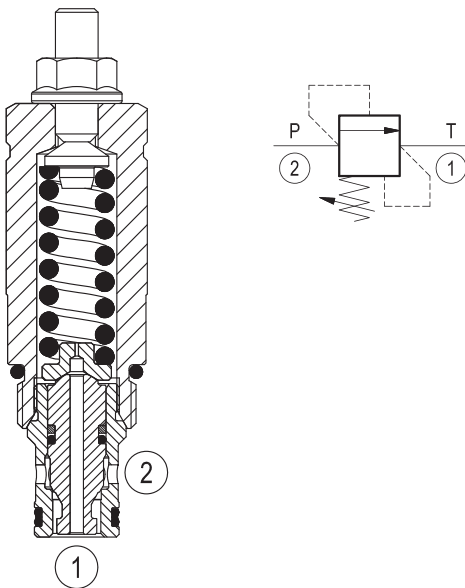
VSDN-10A

04.15.23 - X - 85 - Z



**Description**

Flow is blocked from 2 to 1 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through port 1 to tank. Pressure at port 1 is additive to the relief setting of the valve. The unique Bosch Rexroth Oil Control poppet design provides enhanced stability at all flows and pressures.

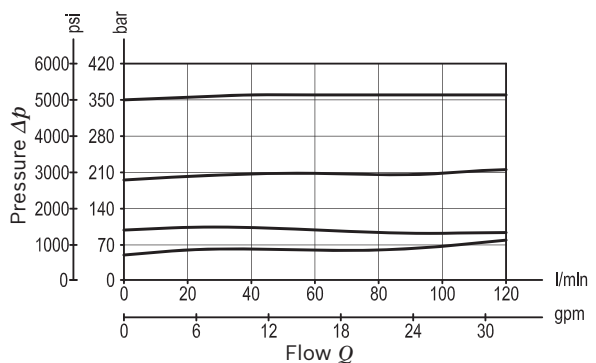


**Technical data**

Max. operating pressure port 2 (P)	350 bar (5000 psi)
Max. pressure admitted port 1 (T)	140 bar (2000 psi)
Max. flow	120 l/min (32 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A2010520100 material no: R901111363
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.15.23</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting poppet type differential area

Adjustments

**03** Leakproof hex. socket screw

**85** Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>10</b>	35-140 (500-2000)	46 (667)	100 (1450)
<b>35</b>	100-350 (1450-5000)	86 (1247)	350 (5000)

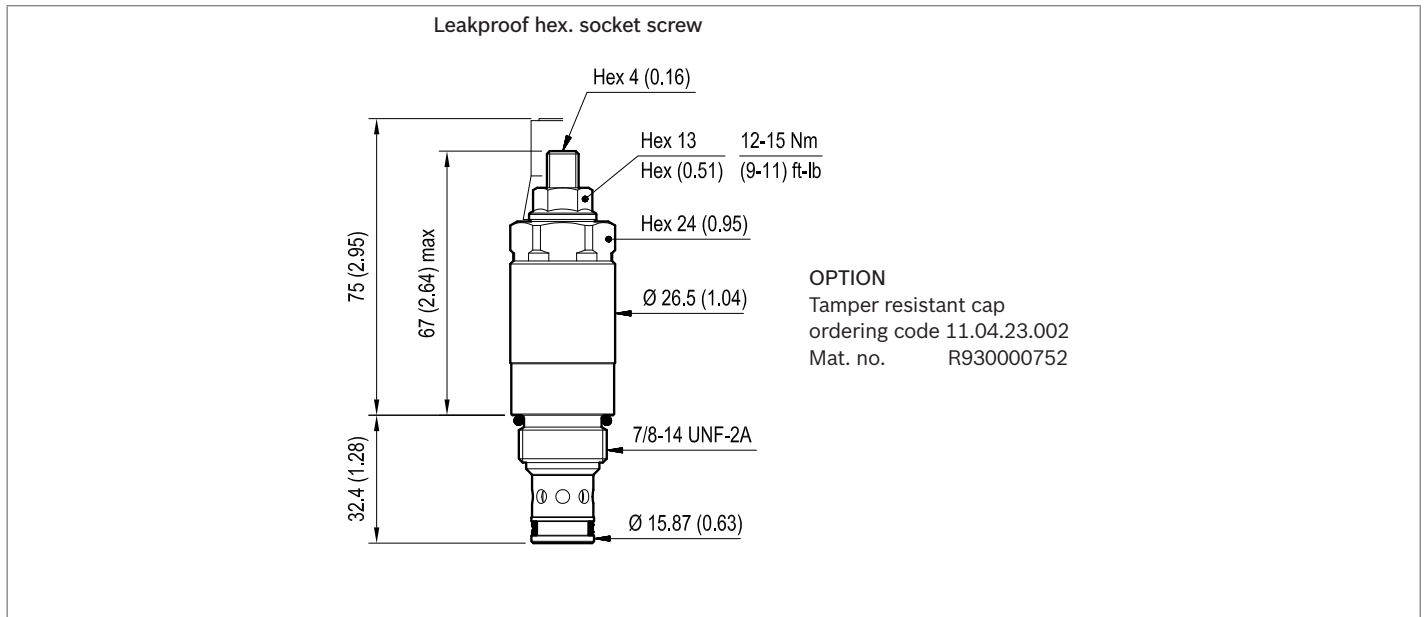
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
041523038510000	R930005643
041523038535000	R930005644

Type	Material number

**Dimensions**



Relief, direct acting poppet type  
differential area  
Special cavity, 004

VSD-350

04.15.04 - X - 99 - Z

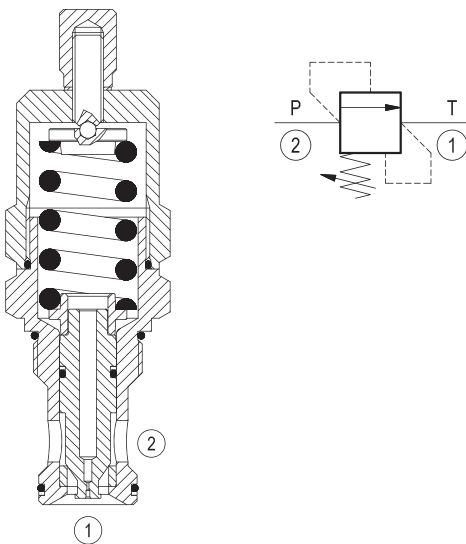
1



**Description**

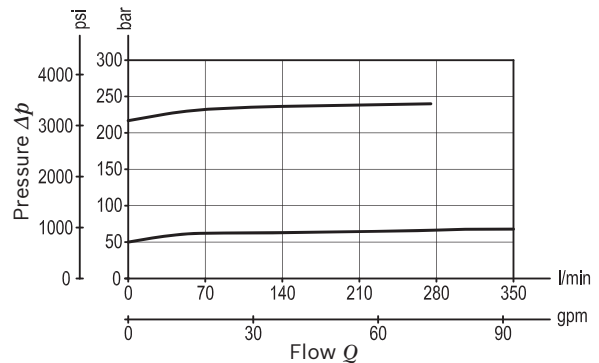
Flow is blocked from 2 to 1 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through 1 to tank. Pressure at 1 is additive to the relief setting of the valve. The combination of stable poppet design and hardened seat provide excellent response, hysteresis and leakage characteristics.

Technical data	
Max. operating pressure port 2 (P)	210 bar (3000 psi)
Max. pressure admitted port 1 (T)	140 bar (2000 psi)
Max. flow	350 l/min (93 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	245 - 264 Nm (181 - 196 ft-lbs)
Weight	1.5 kg (3.3 lbs)
Special cavity	004 (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG004020520100 material no: R930001696
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50



- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.15.04</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting poppet type differential area

Adjustments

**03** Leakproof hex. socket screw

**99** Special cavity, 004

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

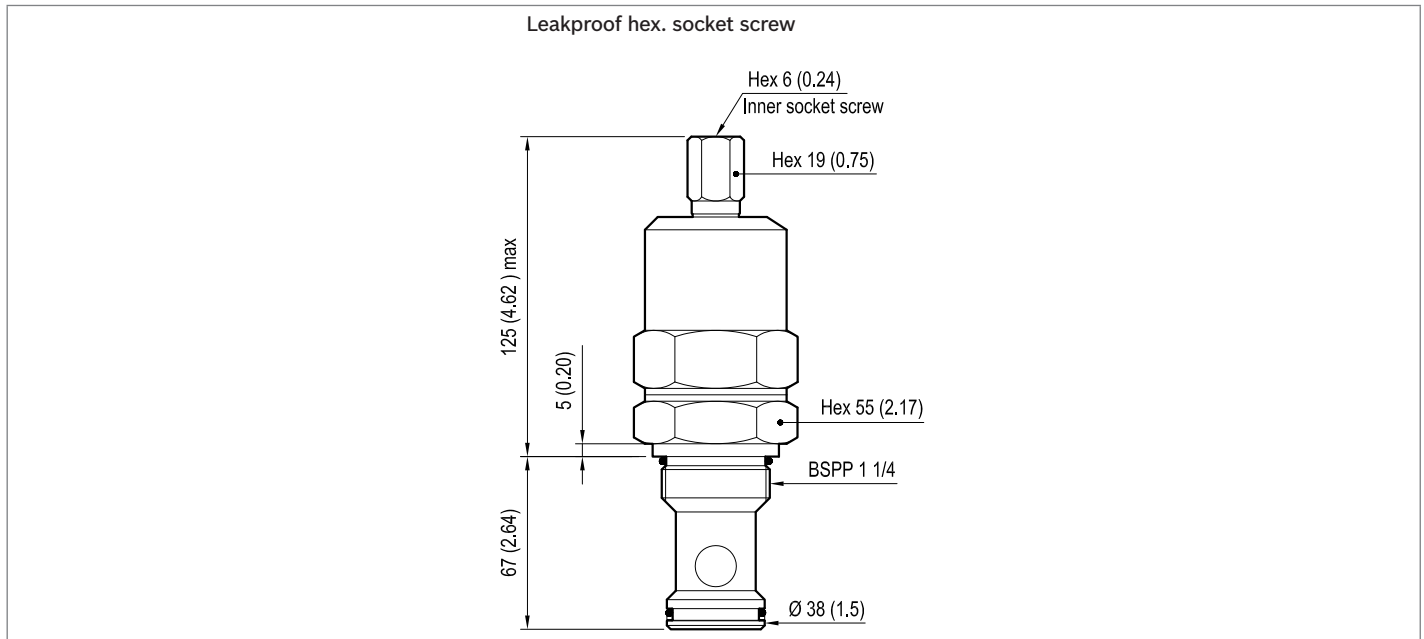
SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>05</b>	15-50 (220-725)	9 (131)	50 (725)
<b>20</b>	80-210 (1160-3000)	37 (537)	200 (2900)

**Preferred types**

Type	Material number
04150403990500A	R930000377
04150403992000A	R901113637

Type	Material number

**Dimensions**



Relief, bi-directional direct acting poppet type  
differential area  
Common cavity, Size 10

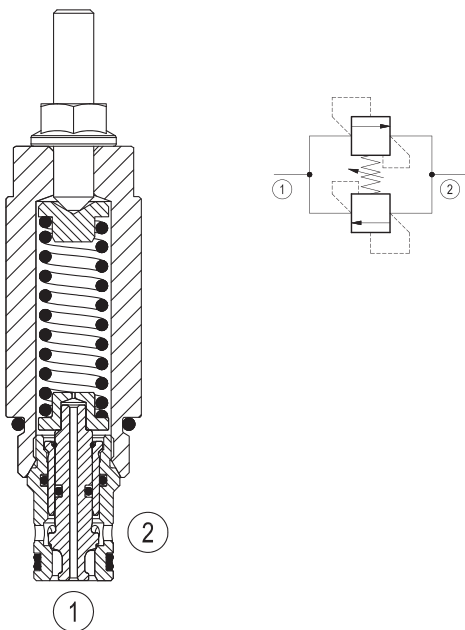
VSNG-10A

04.11.59 - X - 85 - Z



**Description**

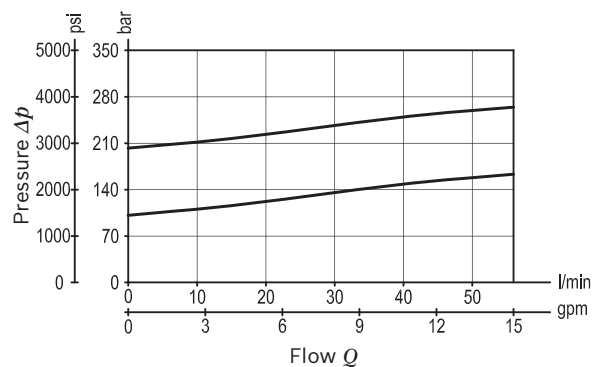
Flow is blocked bi-directionally between 1 and 2 until pressure at either port increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow to the opposite port. The unique Bosch Rexroth Oil Control poppet design provides consistent cracking pressures at both ports and enhanced stability at all flows and pressures. Maximum difference for crack pressure in both direction : 10 bar (145 psi)



Technical data	
Max. operating pressure port 1	240 bar (3500 psi)
Max. pressure admitted port 2	240 bar (3500 psi)
Max. flow	56 l/min (15 gpm)
Max. internal leakage <sup>1)</sup>	30 cm <sup>3</sup> /min. (1.8 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.25 kg (0.55 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A201053100 material no: R901111366
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.11.59</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief,  
bi-directional direct acting poppet type  
differential area

Series O/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**03** Leakproof hex. socket screw

**85** Common cavity, Size 10

**SPRINGS**

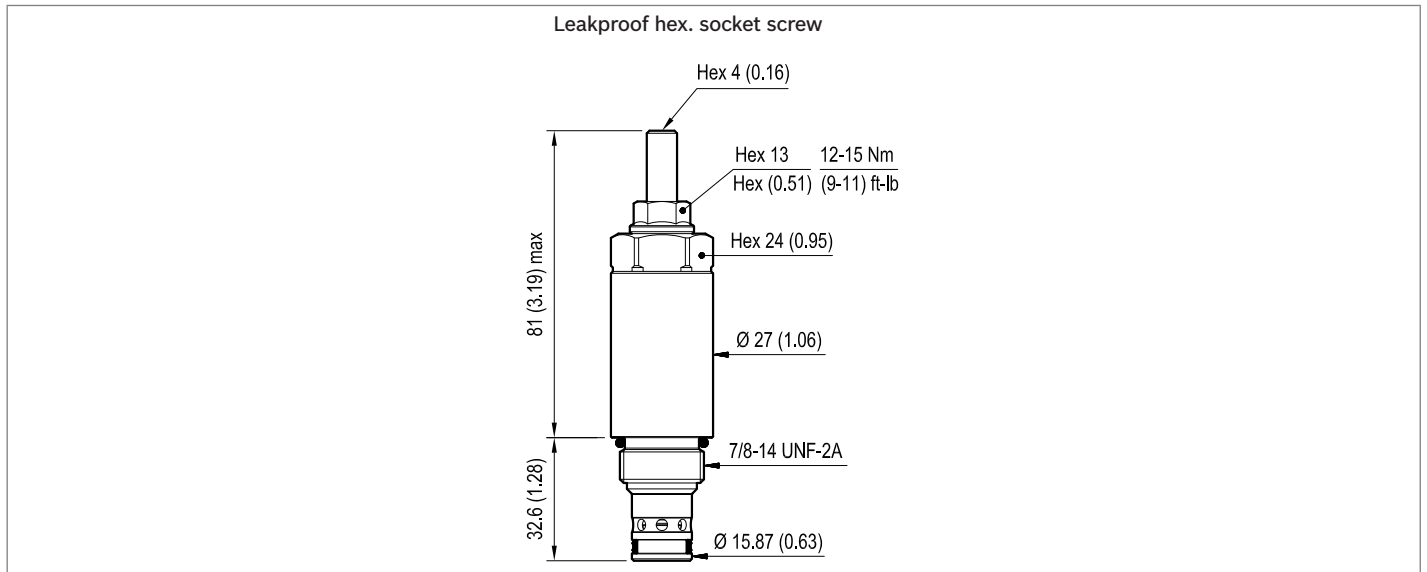
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>10</b>	30-100 (450-1450)	13.5 (196)	100 (1450)
<b>20</b>	100-240 (1450-3500)	31 (450)	200 (2900)

**Preferred types**

Type	Material number
041159038510000	R901109725
041159038520000	R901109726

Type	Material number

**Dimensions**



Relief, direct acting poppet type  
pressure compensated  
Special cavity, 008

VS-30-CC

04.11.27 - X - 99 - Z

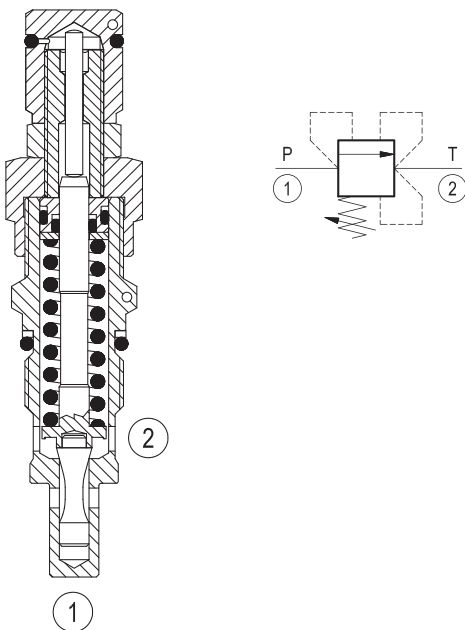


**Description**

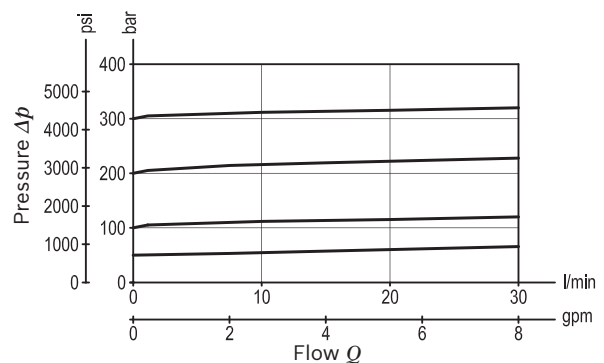
Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the poppet from its seat and allowing relief flow through 2 to tank. The valve applies a balanced piston design allowing consistent relief operation at the valve setting independent of back-pressure at 2. The unique Bosch Rexroth Oil Control poppet design provides enhanced stability at all flows and pressures.

Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	30 l/min (8 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	46 - 51 Nm (34 - 38 ft-lbs)
Weight	0.17 kg (0.38 lbs)
Special cavity	008 (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG0008010520100 material no: R930001693
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.11.27</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, direct acting poppet type  
pressure compensated

Adjustments

**03** Leakproof hex. socket screw

**99** Special cavity, 008

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>05</b>	* 5-50 (75-725)	11 (160)	50 (725)
<b>10</b>	30-100 (435-1450)	23 (334)	100 (1450)
<b>20</b>	50-210 (725-3000)	47 (682)	200 (2900)
<b>35</b>	100-350 (1450-5000)	82 (1189)	350 (5000)

**Note:** Special settings available. Contact factory authorized representative for ordering code.

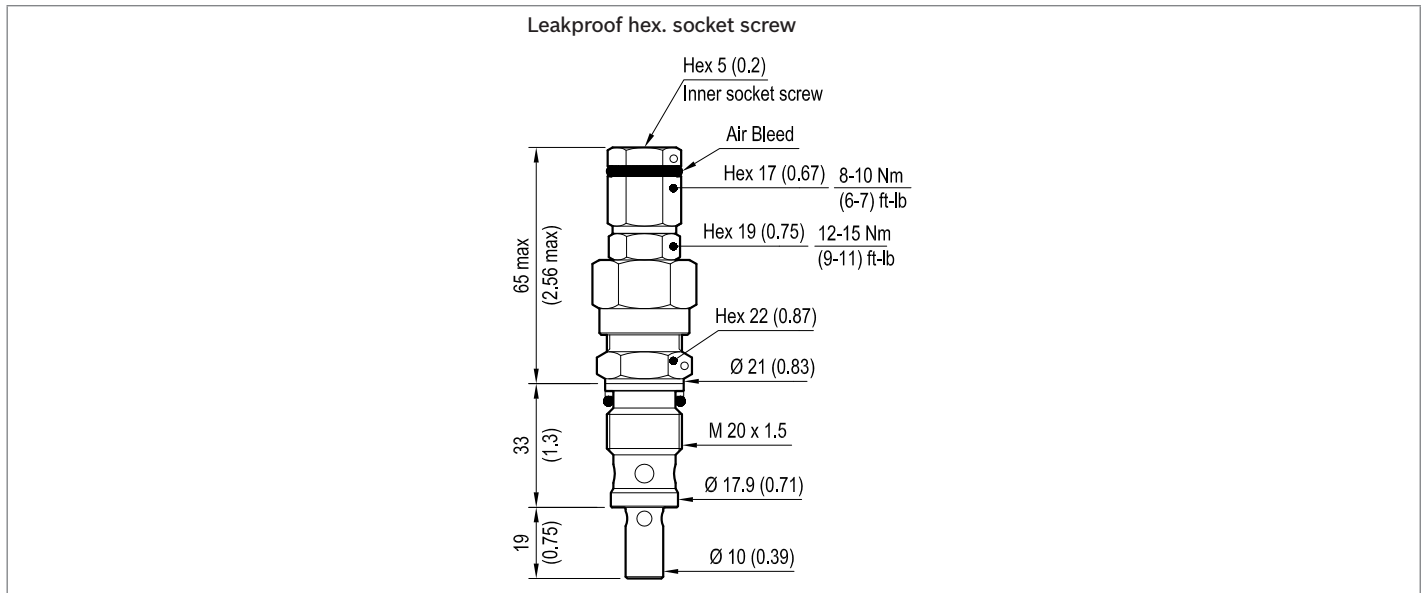
\* minimum pressure setting intended with Q=5 l/min

**Preferred types**

Type	Material number
04112703990500D	R930006231
04112703991000D	R930006233
04112703992000D	R930006234
04112703993500D	R930006239

Type	Material number

**Dimensions**





# Relief, pilot operated spool type

## Common cavity, Size 10

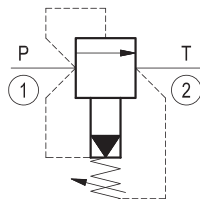
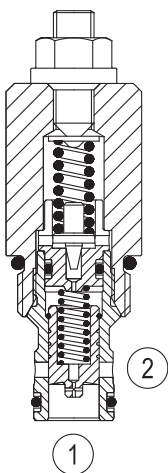
VSPN-10A

04.12.08 - X - 85 - Z



### Description

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage piston (spool type), allowing it to shift and provide relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve.

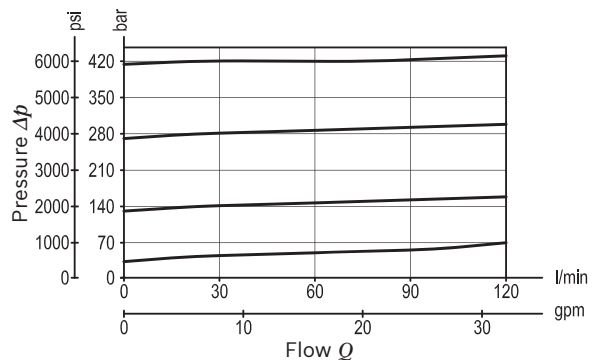


### Technical data

Max. operating pressure port 1 (P)	420 bar (6000 psi)
Max. pressure admitted port 2 (T)	350 bar (5000 psi) for version 03 210 bar (3000 psi) for version 04
Flow range	3 - 120 l/min (1 - 32 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight <sup>2)</sup>	0.21 kg (0.46 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
MTTFd	150 years see data sheet 18350-51
Seal kit <sup>3)</sup>	Code: RG10A2010530100 material no: R901111366
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Standard version X=03 type
- 3) Only external seals for 10 valves

### Characteristic curve



**Ordering code**

<b>04.12.08</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, pilot operated spool type

Version and options standard

Series 0/A to L  
unchanged performances and dimensions

Adjustments

**03** Leakproof hex. socket screw

**04** Handknob and locknut

**85** Common cavity, Size 10

**SPRINGS**

		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
for X= 03	<b>10</b>	35-140 (500-2000)	48 (696)	100 (1450)
	<b>20</b>	70-280 (1000-4000)	88 (1276)	200 (2900)
	<b>35</b>	140-420 (2000-6000)	140 (2030)	350 (5000)
for X= 04	<b>35</b>	35-350 (500-5000)	68 (986)	350 (5000)

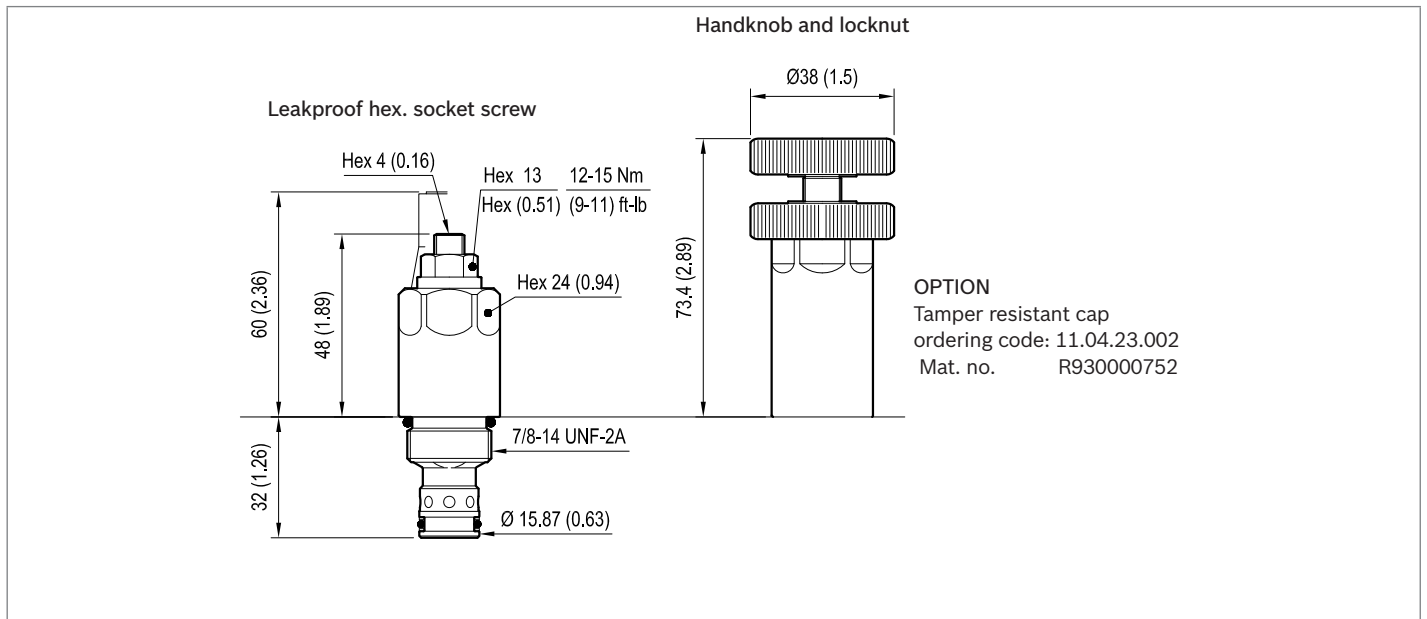
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
041208038510000	R901097726
041208038520000	R901097722
041208038535000	R901104103
041208048535000	R901104104

Type	Material number

**Dimensions**



# Relief, pilot operated spool type

## Common cavity, Size 12

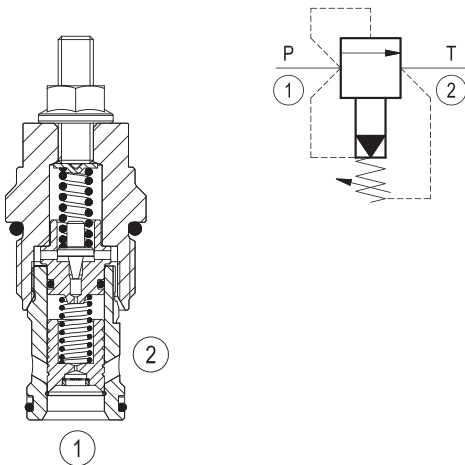
VSPN-12A

04.12.10 - X - 57 - Z



### Description

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage piston (spool type), allowing it to shift and provide relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve.

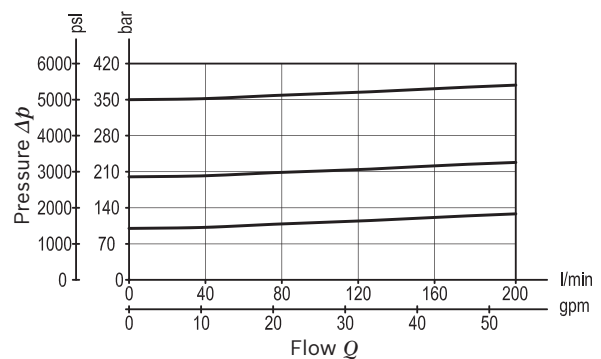


### Technical data

Max. operating pressure port 1 (P)	420 bar (6000 psi)
Max. pressure admitted port 2 (T)	140 bar (2000 psi)
Flow range	5 - 200 l/min (1.3 - 53 gpm)
Max. internal leakage <sup>1)</sup>	350 cm <sup>3</sup> /min. (21 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.2 kg (0.5 lbs)
Cavity	CA-12A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A2010520100 material no: R901111377
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

### Characteristic curve



**Ordering code**

<b>04.12.10</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Series O/A to L  
unchanged performances and dimensions

Version and options standard

Relief, pilot operated spool type

Adjustments

**03** Leakproof hex. socket screw

**57** Common cavity, Size 12

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>10</b>	35-140 (500-2000)	48 (696)	100 (1450)
<b>20</b>	70-280 (1000-4000)	88 (1276)	200 (2900)
<b>35</b>	140-420 (2000-6000)	140 (2030)	350 (5000)

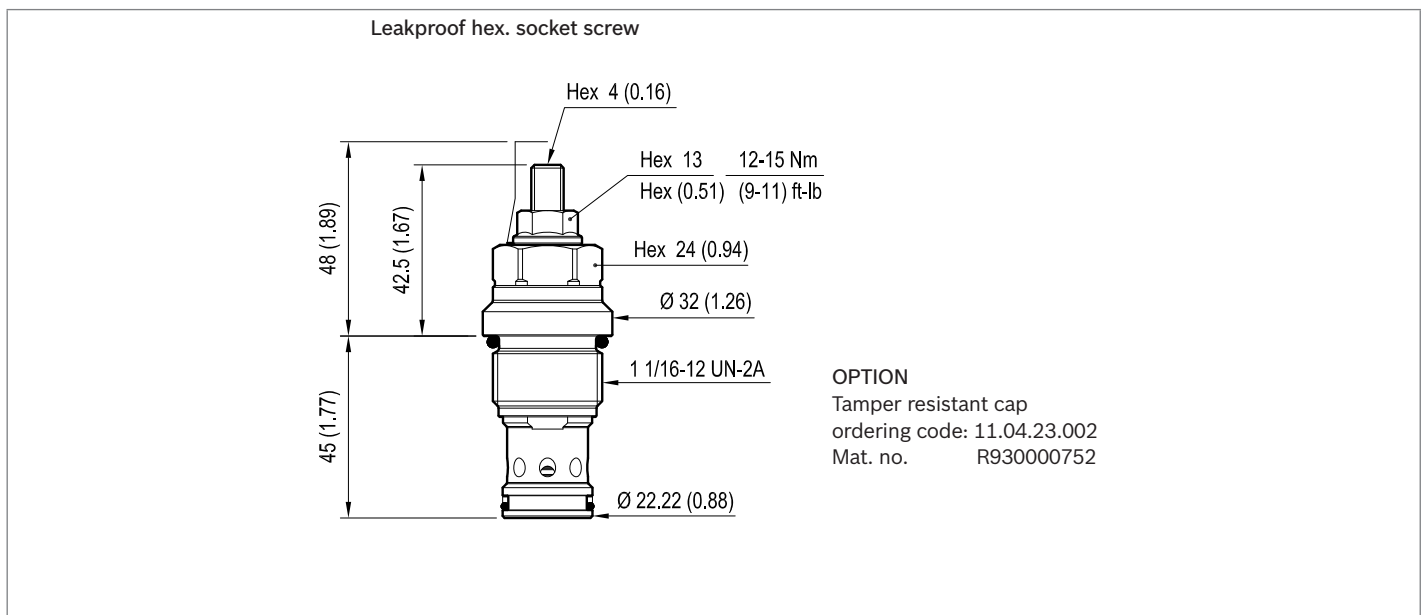
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
041210035710000	R930000334
041210035720000	R930000335
041210035735000	R930000336

Type	Material number

**Dimensions**



# Relief, pilot operated spool type

## Common cavity, Size 16

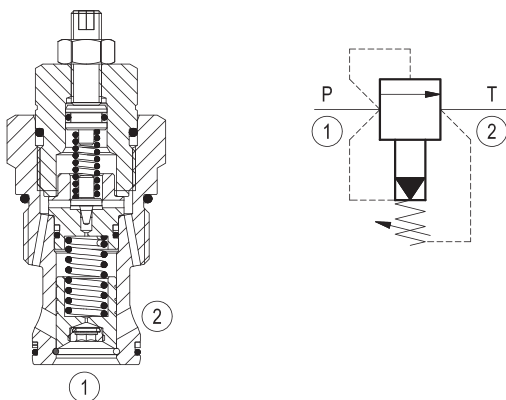
VSPN-16A

04.12.11 - X - 27 - Z



### Description

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage piston (spool type), allowing it to shift and provide relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve. Pilot operation is protected from contamination by a filter screen at the bottom of the main piston.

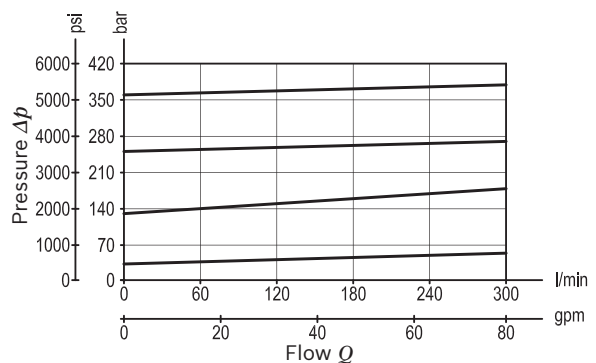


### Technical data

Max. operating pressure port 1 (P)	420 bar (6000 psi)
Max. pressure admitted port 2 (T)	140 bar (2000 psi)
Flow range	8 - 300 l/min (2 - 79 gpm)
Max. internal leakage <sup>1)</sup>	350 cm <sup>3</sup> /min. (21 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight <sup>2)</sup>	0.45 kg (0.99 lbs)
Cavity	CA-16A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG16A2010520100 material no: R901111386
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Standard version X=03 type
- 3) Only external seals for 10 valves

### Characteristic curve



**Ordering code**

<b>04.12.11</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, pilot operated spool type

Version and options standard

Series 0/A to L  
unchanged performances and dimensions

Adjustments

**03** O-Ring seal on adjust screw

**04** Handknob and locknut

**27** Common cavity, Size 16

**SPRINGS**

		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
for X= 03	<b>10</b>	35-140 (500-2000)	48 (696)	100 (1450)
	<b>20</b>	70-280 (1000-4000)	88 (1276)	200 (2900)
	<b>35</b>	140-420 (2000-6000)	140 (2030)	350 (5000)
for X= 04	<b>35</b>	35-350 (500-5000)	66 (957)	350 (5000)

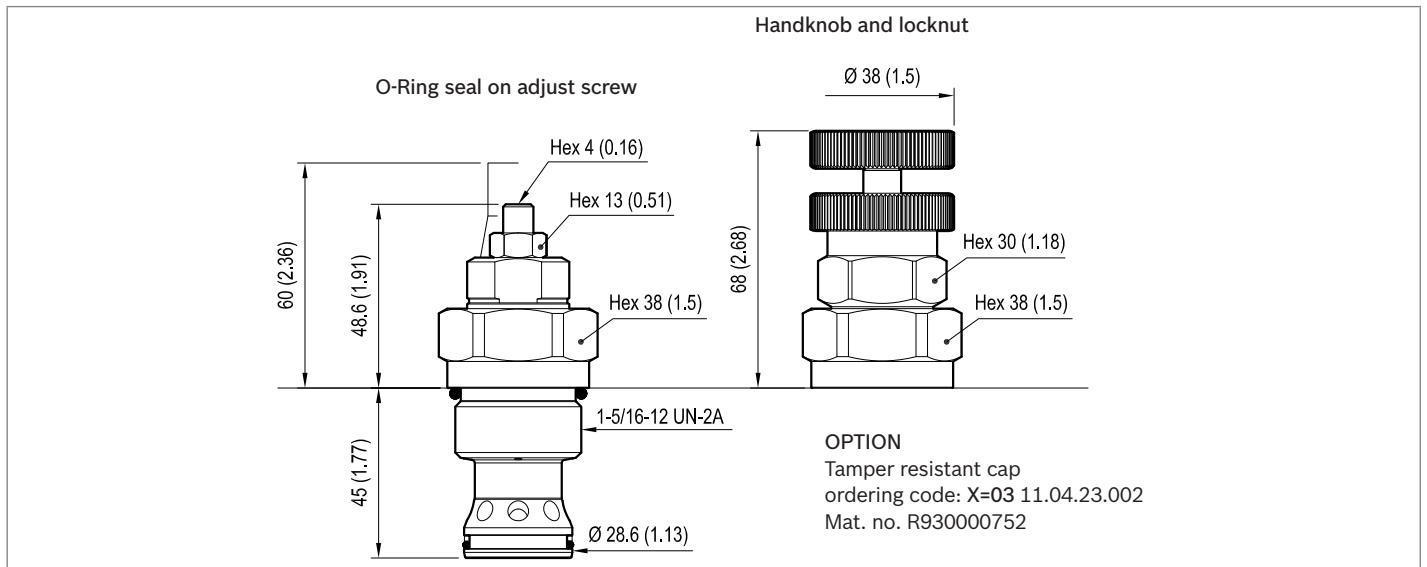
**Note:** Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
041211032710000	R930001025
041211032720000	R930001026
041211032735000	R930001027
041211042735000	R930001024

Type	Material number

**Dimensions**



# Relief, pilot operated poppet type

## Common cavity, Size 10

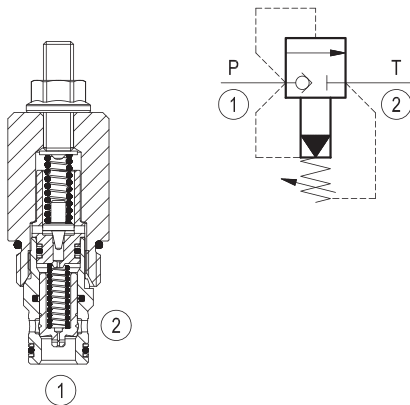
VSPC-10A

04.12.09 - X - 85 - Z



### Description

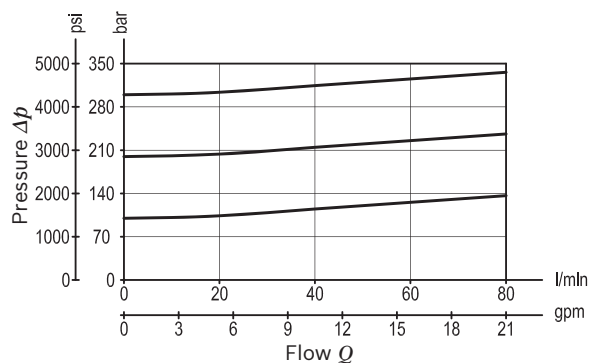
Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage poppet (low-leakage, seat type), allowing it to shift and provide relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve.



Technical data	
Max. operating pressure port 1 (P)	350 bar (5000 psi)
Max. pressure admitted port 2 (T)	210 bar (3000 psi)
Flow range	3 - 80 l/min (1 - 21 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight <sup>2)</sup>	0.21 kg (0.46 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG10A2010530100 material no: R901111366
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Max. to 80% of nominal setting
- 2) Standard version X=03 type
- 3) Only external seals for 10 valves

### Characteristic curve



**Ordering code**

<b>04.12.09</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, pilot operated poppet type

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

- 03** Leakproof hex. socket screw
- 04** Handknob and locknut

**85** Common cavity, Size 10

**SPRINGS**

		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
for X= 03	<b>10</b>	35-140 (500-2000)	48 (696)	100 (1450)
	<b>20</b>	70-280 (1000-4000)	88 (1276)	200 (2900)
	<b>35</b>	140-420 (2000-6000)	140 (2030)	350 (5000)
for X= 04	<b>35</b>	35-350 (500-5000)	68 (986)	350 (5000)

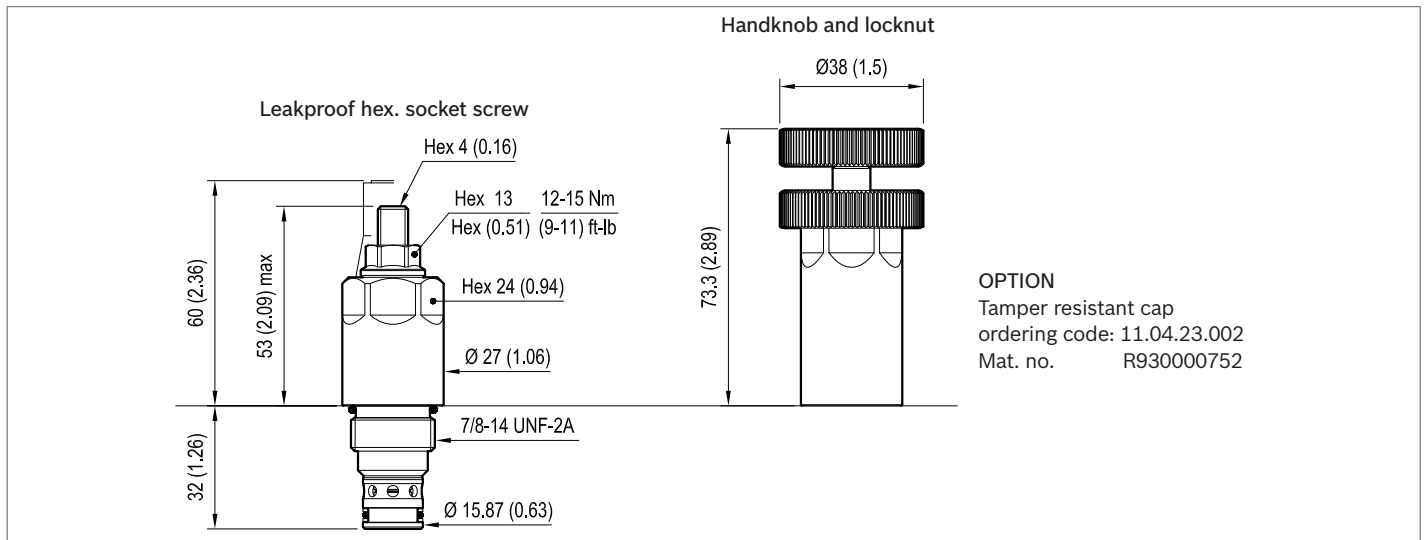
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
04120903851000A	R930051169
04120903852000A	R930051168
04120903853500A	R930051170
04120904853500A	R930051171

Type	Material number

**Dimensions**





# Relief, pilot operated poppet type

## Special cavity, FB

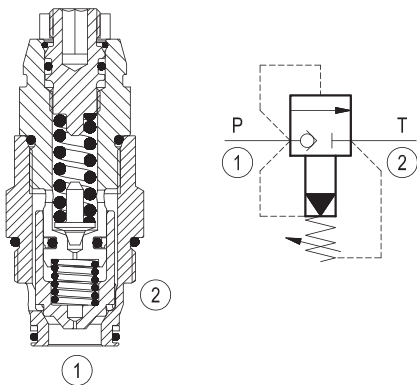
VMP1-16

VMP1.100.NG



### Description

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage poppet (low-leakage, seat type), allowing it to shift and provide relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve.



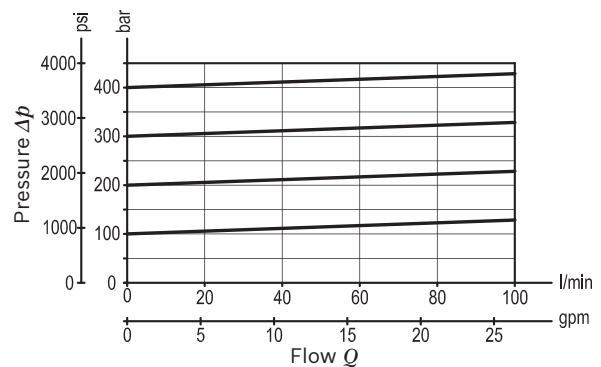
### Technical data

Max. operating pressure port 1 (P)	420 bar (6000 psi)
Max. pressure admitted port 2 (T)	50 bar (725 psi)
Max. flow	100 l/min (26 gpm)
Max. internal leakage <sup>1)</sup>	30 drops/min. for press. range 100-200 bar 15 drops/min. for press. range 200-420 bar
Fluid temperature range	-30 to 100 °C (-22 to 212 °F) (Buna N) -20 to 120 °C (-4 to 248 °F) (Viton)
Installation torque <sup>2)</sup>	90 Nm (67 ft-lbs)
Weight	0.16 kg (0.35 lbs)
Special cavity	FB (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (Buna N)	Code: RG16R2010520100 material no: R931002592
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 380 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 20/18/15
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50
Without surface protection	In case of need of surface protection, please consult factory.

1) At 70% of pressure setting.

2) Torque value valid for installation in cast iron and steel manifolds. In case of different body materials, please consult factory.

### Characteristic curve



**Ordering code**

<b>VMP1.100.NG</b>	<b>*</b>
--------------------	----------

Relief, pilot operated poppet type

	SPRINGS		O-RING
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Material
<b>000</b>	100-420 (1450-6090)	300 (4350)	Buna N (NBR)

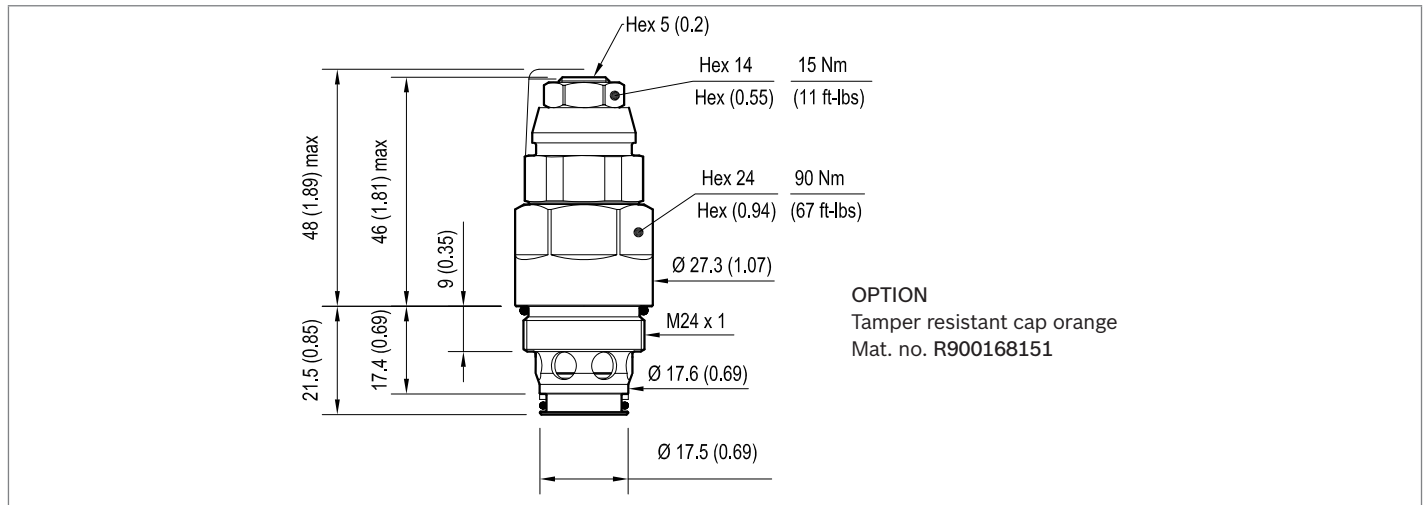
\* Valves are delivered without specific pressure set at the factory and with adjustment device not tighten. Fine setting to be done by customer. For case of request of factory set valve, please consult factory.

**Preferred types**

Type	Material number
VMP1.100.NG.000	R931002603

Type	Material number

**Dimensions**



Pressure relief pilot operated poppet type  
and anti-cavitation valve  
Special cavity, FB

VMR1-16

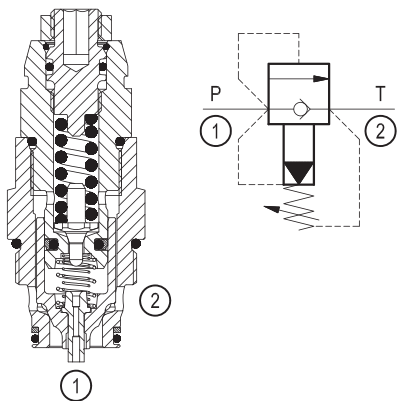
VMR1.100.NG



**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage poppet (low-leakage, seat type), allowing it to shift and provide relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve.

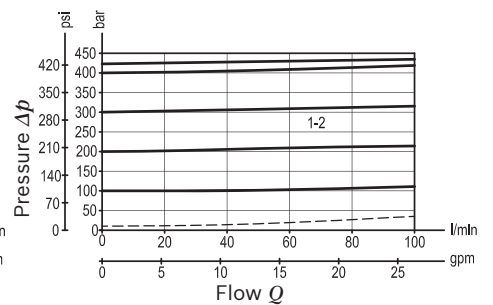
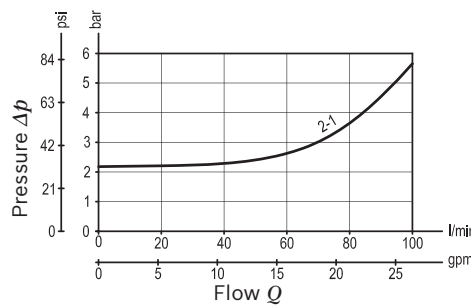
The anti-cavitation function makes up for lacking oil volumes caused, for example, by leakage when pressure valves respond or in the case of leading loads. If the pressure at main port 1 is lower than the one at main port 2, the spool will be lifted out of its seat. Hydraulic fluid flows from main port 2 to main port 1.



Technical data	
Max. operating pressure port 1 (P)	420 bar (6000 psi)
Max. pressure admitted port 2 (T)	50 bar (725 psi)
Max. flow	100 l/min (26 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F) (Buna N) -20 to 120 °C (-4 to 248 °F) (Viton)
Installation torque <sup>2)</sup>	90 Nm (67 ft-lbs)
Weight	0.17 kg (0.37 lbs)
Special cavity	FB (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (Buna N)	Code: RG16R2010520100 material no: R931002592
Seal kit (Viton)	Code: RG16R2040520100 material no: R931002593
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 380 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 20/18/15
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50
Without surface protection	In case of need of surface protection, please consult factory.

- 1) At 80% of pressure setting.
- 2) Torque value valid for installation in cast iron and steel manifolds. In case of different body materials, please consult factory.

**Characteristic curve**



**Ordering code**

<b>VMR1.100.NG</b>	<b>*</b>
--------------------	----------

Pressure relief pilot operated poppet type and anti-cavitation valve

	SPRINGS		O-RING
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Material
<b>020</b>	100-420 (1450-6090)	300 (4350)	Buna N (NBR)
<b>030</b>	100-420 (1450-6090)	300 (4350)	Viton (FKM)

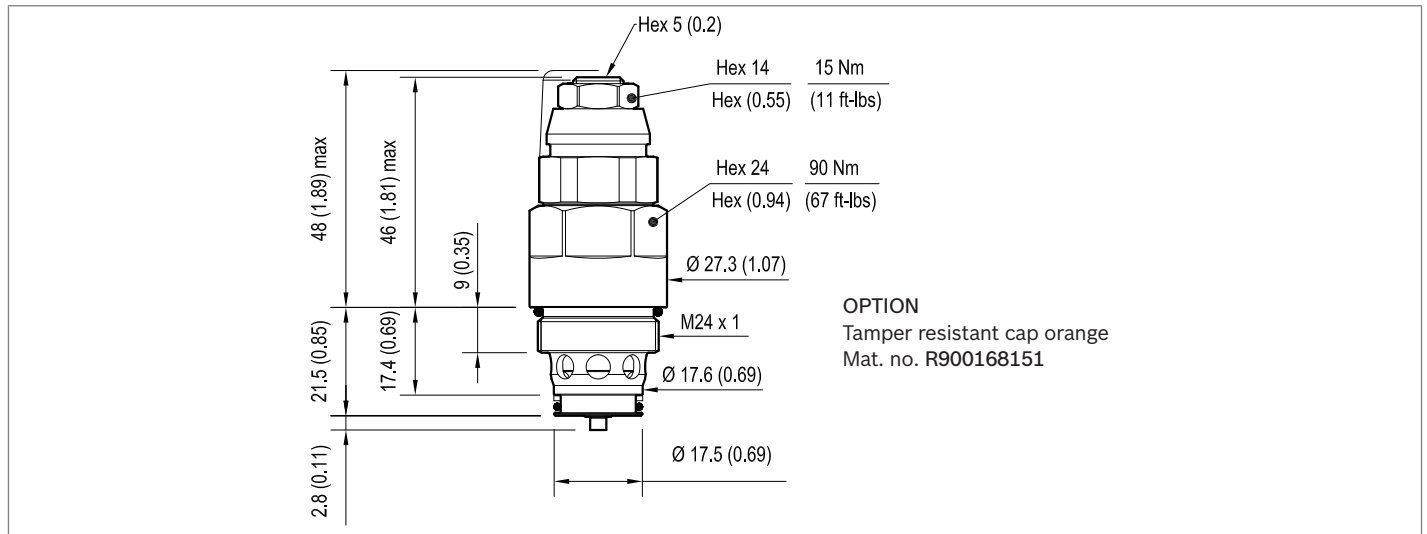
\* Valves are delivered without specific pressure set at the factory and with adjustment device not tighten. Fine setting to be done by customer. For case of request of factory set valve, please consult factory.

**Preferred types**

Type	Material number
VMR1.100.NG.020	R931002529
VMR1.100.NG.030	R931002539

Type	Material number

**Dimensions**



Pressure relief pilot operated poppet type  
and anti-cavitation valve  
Special cavity, FC

VMR2-22-FC

VMR2.240.NG

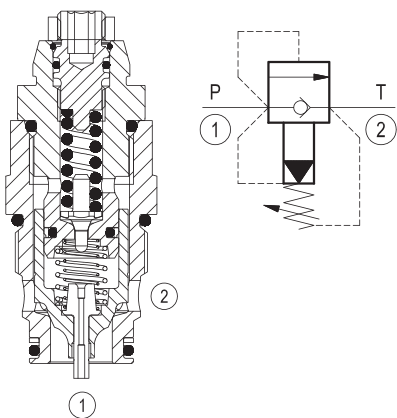


Technical data	
Max. operating pressure port 1 (P)	420 bar (6000 psi)
Max. pressure admitted port 2 (T)	50 bar (725 psi)
Max. flow	240 l/min (63 gpm)
Max. internal leakage <sup>1)</sup>	45 drops/min.
Fluid temperature range	-20 to 120 °C (-4 to 248 °F)
Installation torque <sup>2)</sup>	100 Nm (74 ft-lbs)
Weight	0.24 kg (0.53 lbs)
Special cavity	FC (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (Viton)	Code: RG22R2040520100 material no: R930052887
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 380 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 9) / ISO 4406 20/18/15
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50
Without surface protection	In case of need of surface protection, please consult factory.

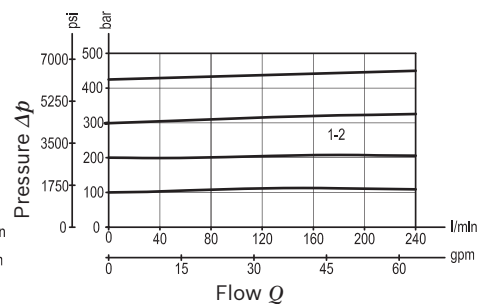
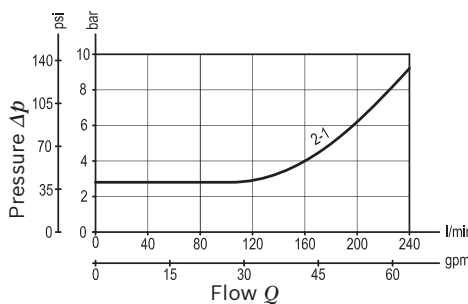
**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage poppet (low-leakage, seat type), allowing it to shift and provide relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve.

The anti-cavitation function makes up for lacking oil volumes caused, for example, by leakage when pressure valves respond or in the case of leading loads. If the pressure at main port 1 is lower than the one at main port 2, the spool will be lifted out of its seat. Hydraulic fluid flows from main port 2 to main port 1.



**Characteristic curve**



- 1) At 80% of pressure setting.
- 2) Torque value valid for installation in cast iron and steel manifolds. In case of different body materials, please consult factory.

**Ordering code**

<b>VMR2.240.NG</b>	<b>*</b>
--------------------	----------

Pressure relief pilot operated poppet type and anti-cavitation valve

	SPRINGS		O-RING
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Material
<b>010</b>	100-420 (1450-6090)	300 (4350)	Viton (FKM)

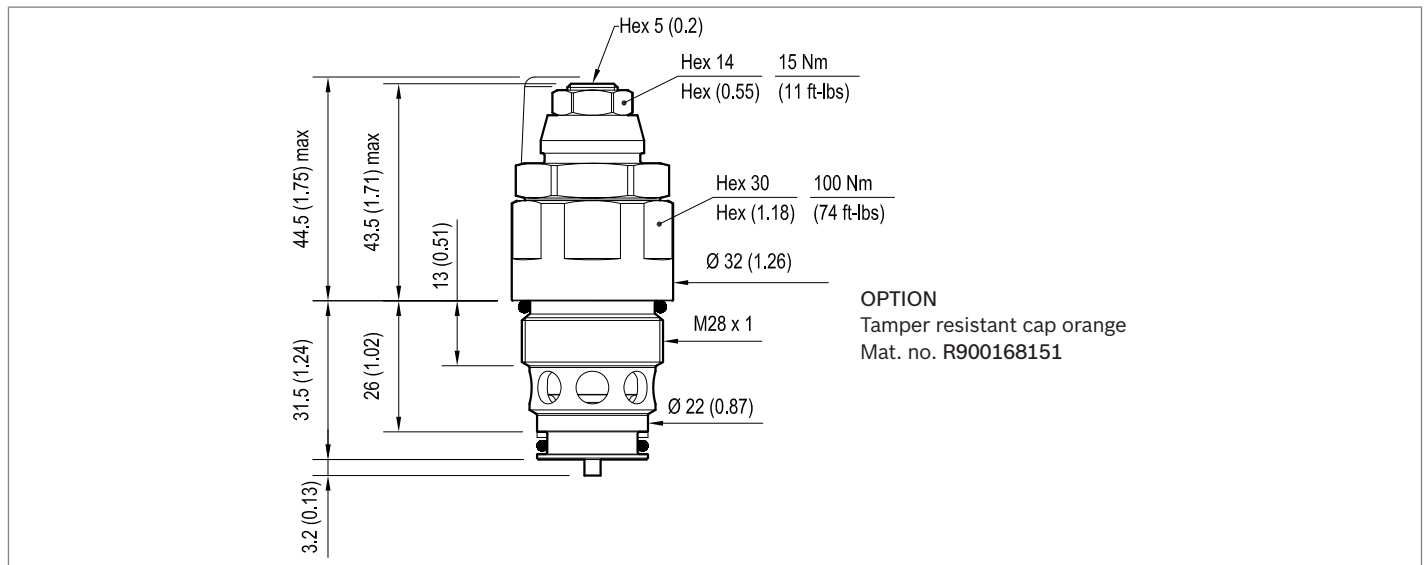
\* Valves are delivered set at pressure setting <25 bar and with adjustment device not tighten. Fine setting to be done by customer. For case of request of factory set valve, please consult factory.

**Preferred types**

Type	Material number
VMR2.240.NG.010	R930052892

Type	Material number

**Dimensions**



Pressure relief pilot operated poppet type  
and anti-cavitation valve  
Special cavity, LG

VMR2-22-LG

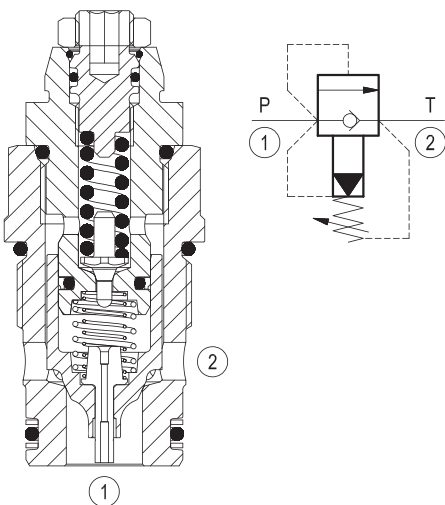
VMR2.240.LG



**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage poppet (low-leakage, seat type), allowing it to shift and provide relief flow through 2 to tank. Pressure at 2 is additive to the relief setting of the valve.

The anti-cavitation function makes up for lacking oil volumes caused, for example, by leakage when pressure valves respond or in the case of leading loads. If the pressure at main port 1 is lower than the one at main port 2, the spool will be lifted out of its seat. Hydraulic fluid flows from main port 2 to main port 1.

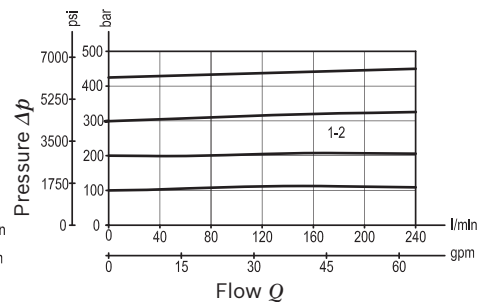
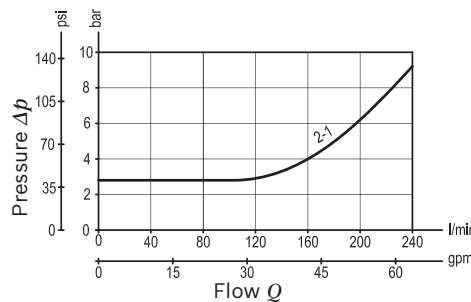


Technical data	
Max. operating pressure port 1 (P)	420 bar (6000 psi)
Max. pressure admitted port 2 (T)	50 bar (725 psi)
Max. flow	240 l/min (63 gpm)
Max. internal leakage <sup>1)</sup>	45 drops/min.
Fluid temperature range	-20 to 120 °C (-4 to 248 °F) (Viton)
Installation torque <sup>2)</sup>	120 Nm (89 ft-lbs)
Weight	0.28 kg (0.62 lbs)
Special cavity	LG (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (Viton)	Code: RGLGR2040520100 material no: R930054948
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 380 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 9) / ISO 4406 20/18/15
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50
Without surface protection	In case of need of surface protection, please consult factory.

1) At 80% of pressure setting.

2) Torque value valid for installation in cast iron and steel manifolds. In case of different body materials, please consult factory.

**Characteristic curve**



**Ordering code**

<b>VMR2.240.LG</b>	<b>*</b>
--------------------	----------

Pressure relief pilot operated poppet type and anti-cavitation valve

	SPRINGS		O-RING
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Material
<b>010</b>	100-420 (1450-6090)	300 (4350)	Viton (FKM)

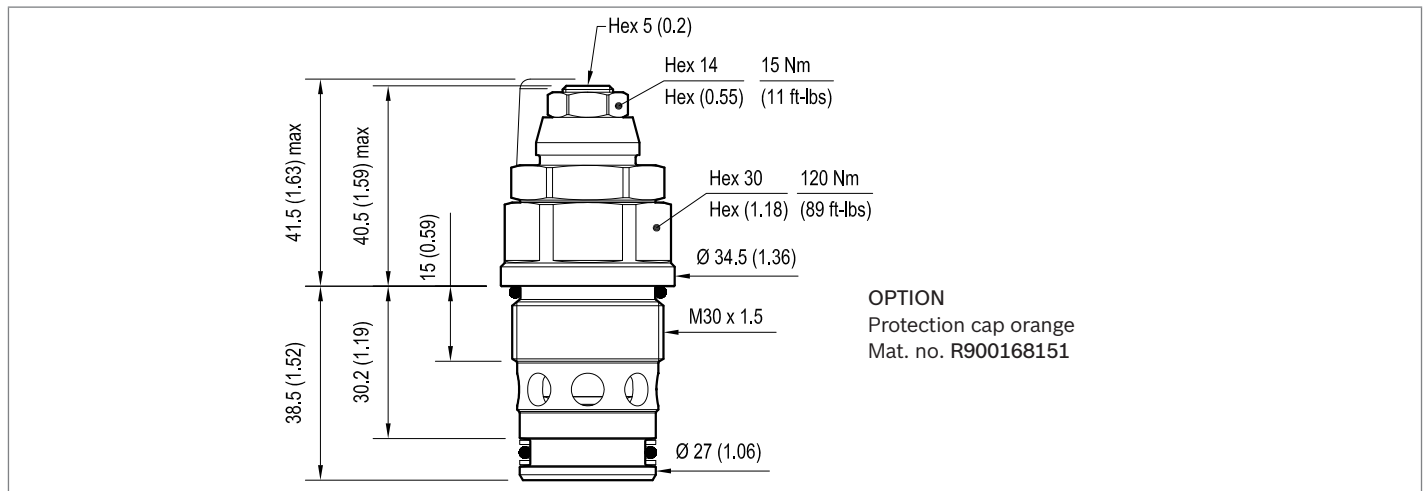
\* Valves are delivered set at pressure setting <25 bar and with adjustment device not tighten. Fine setting to be done by customer. For case of request of factory set valve, please consult factory.

**Preferred types**

Type	Material number
VMR2.240.LG.010	R930054929

Type	Material number

**Dimensions**





Relief, pilot operated spool type  
external drain  
Common cavity, Size 10

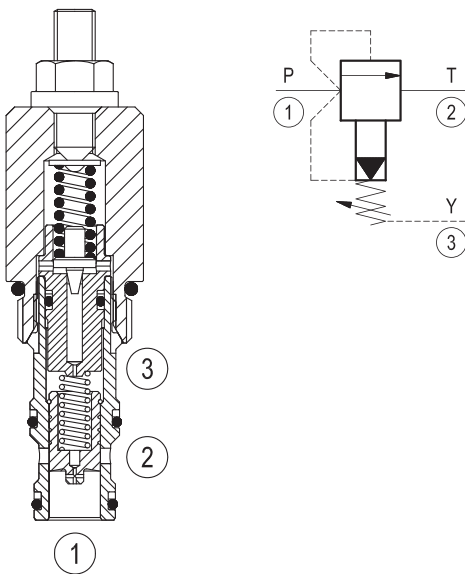
VSPY-10A

04.13.05 - X - 85 - Z



**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage piston (spool type), allowing it to shift and provide relief flow through 2 to tank. The spring chamber is drained to tank at 3 allowing a consistent relief setting independent of back-pressure at 2.

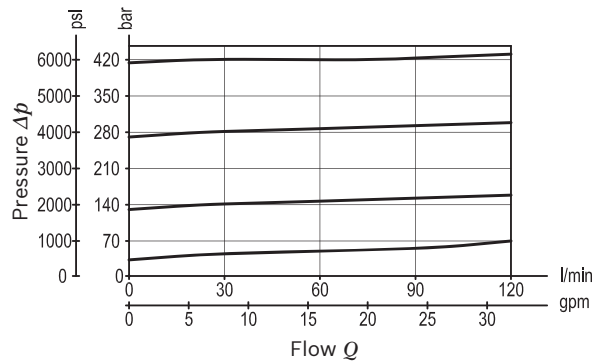


**Technical data**

Max. operating pressure port 1 (P) and 2 (T)	420 bar (6000 psi)
Max. pressure admitted port 3 (Y)	140 bar (2000 psi)
Flow range	3 - 120 l/min (1 - 32 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.21 kg (0.46 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.13.05</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, pilot operated spool type  
external drain

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**03** Leakproof hex. socket screw

**04** Handknob and locknut

**85** Common cavity, Size 10

**SPRINGS**

		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
for X= 03	<b>10</b>	35-140 (500-2000)	48 (696)	100 (1450)
	<b>20</b>	70-280 (1000-4000)	88 (1276)	200 (2900)
	<b>35</b>	140-420 (2000-6000)	140 (2030)	350 (5000)
for X= 04	<b>35</b>	35-350 (500-5000)	68 (986)	350 (5000)

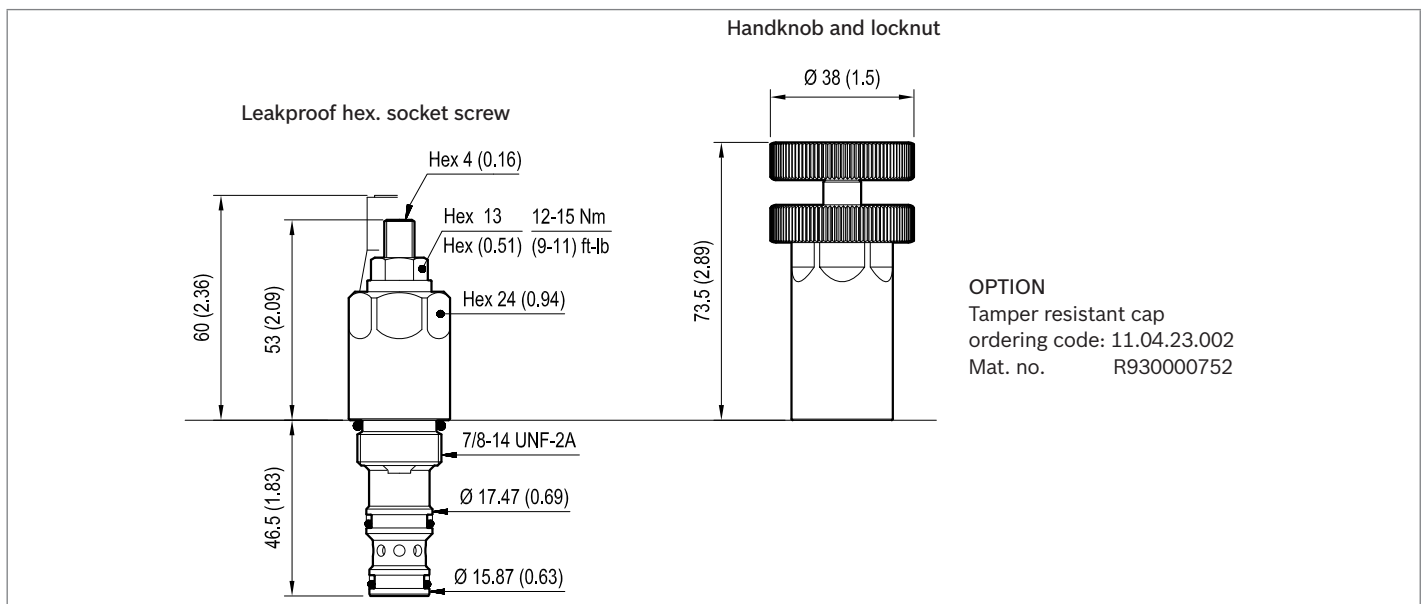
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
041305038510000	R901106472
041305038520000	R901097730
041305038535000	R901106473
041305048535000	R930005674

Type	Material number

**Dimensions**



Relief, pilot operated spool type  
external drain  
Common cavity, Size 12

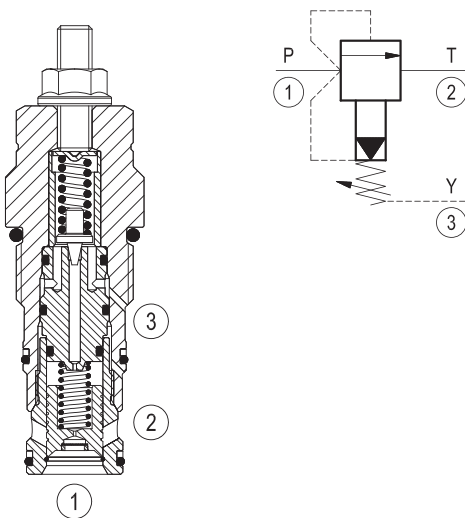
VSPY-12A

04.13.07 - X - 57 - Z



**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage piston (spool type), allowing it to shift and provide relief flow through 2 to tank. The spring chamber is drained to tank at 3 allowing a consistent relief setting independent of back-pressure at 2.

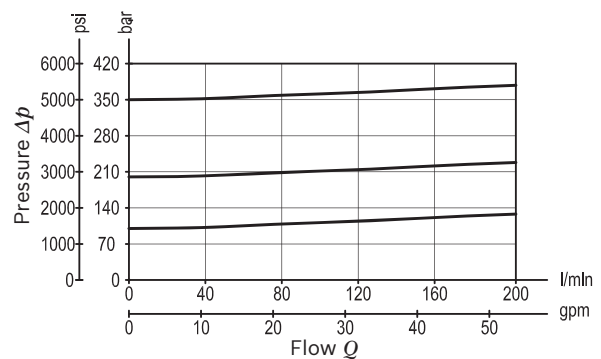


**Technical data**

Max. operating pressure port 1 (P) and 2 (T)	350 bar (5000 psi)
Max. pressure admitted port 3 (Y)	140 bar (2000 psi)
Flow range	5 - 200 l/min (1.3 - 53 gpm)
Max. internal leakage <sup>1)</sup>	350 cm <sup>3</sup> /min. (21 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.3 kg (0.66 lbs)
Cavity	CA-12A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A9010520100 material no: R901111379
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.13.07</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, pilot operated spool type  
external drain

Adjustments

**03** Leakproof hex. socket screw

**57** Common cavity, Size 12

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>10</b>	35-140 (500-2000)	48 (696)	100 (1450)
<b>20</b>	70-280 (1000-4000)	88 (1276)	200 (2900)
<b>35</b>	140-420 (2000-6000)	140 (2030)	350 (5000)

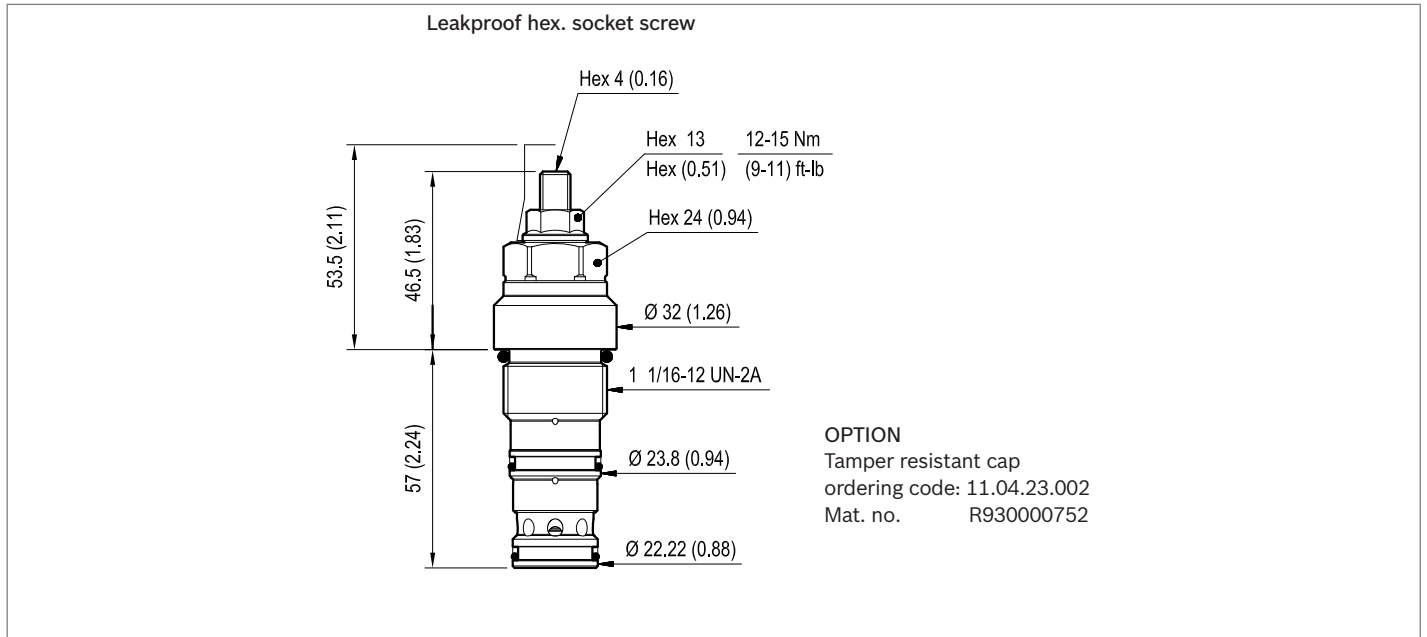
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
041307035710000	R930000356
041307035720000	R930000357
041307035735000	R930000358

Type	Material number

**Dimensions**



Relief, pilot operated spool type  
external pilot  
Common cavity, Size 12

VSPX-12A

04.13.08 - X - 57 - Z



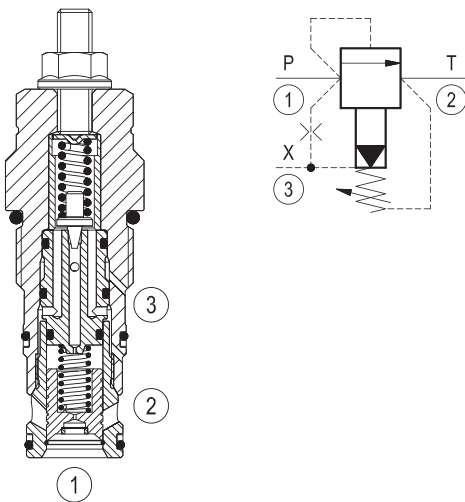
**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage piston (spool type), allowing it to shift and provide relief flow through 2 to tank. Pressure at 2 is additive to the reliefsetting of the valve. With port 3 fully drained to tank, the minimum relief setting of 2 bar (30 psi) is attained. To use the remote control feature, pressure at 3 may be varied externally in control of the main relief setting up to the selected maximum spring adjustment.

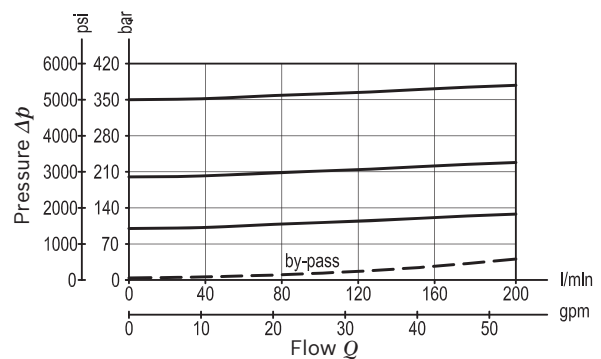
**Technical data**

Max. operating pressure port 1 (P) and 2 (T)	350 bar (5000 psi)
Max. pressure admitted port 3 (Y)	350 bar (5000 psi)
Flow range	5 - 200 l/min (1.3 - 53 gpm)
Max. internal leakage <sup>1)</sup>	350 cm <sup>3</sup> /min. (21 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.3 kg (0.66 lbs)
Cavity	CA-12A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A9010520100 material no: R901111379
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.13.08</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, pilot operated spool type external pilot

Adjustments

**03** Leakproof hex. socket screw

**57** Common cavity, Size 12

Series O/A to L unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>10</b>	35-140 (500-2000)	48 (696)	100 (1450)
<b>20</b>	70-280 (1000-4000)	88 (1276)	200 (2900)
<b>35</b>	140-420 (2000-6000)	140 (2030)	350 (5000)

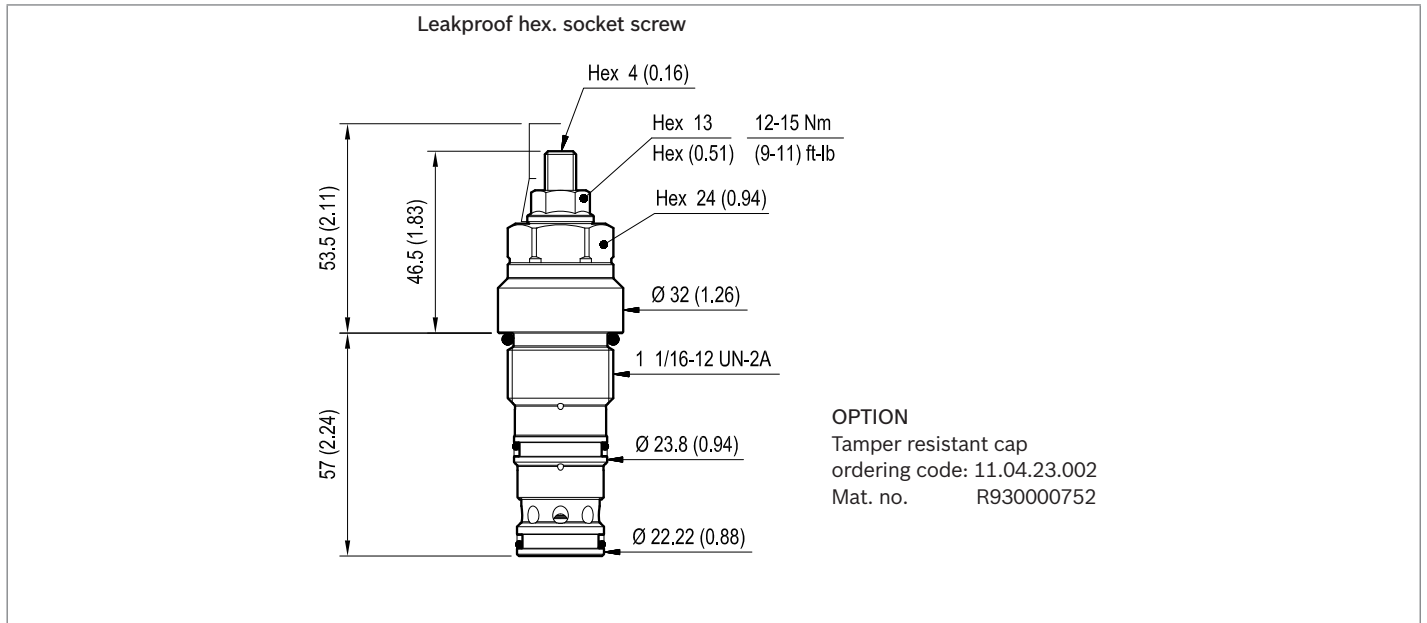
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
041308035710000	R930000359
041308035720000	R930000360
041308035735000	R930000361

Type	Material number

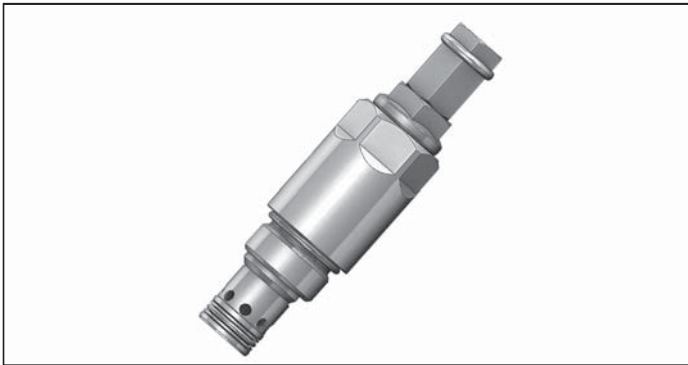
**Dimensions**



Relief, pilot operated spool type  
pressure compensated  
Common cavity, Size 10

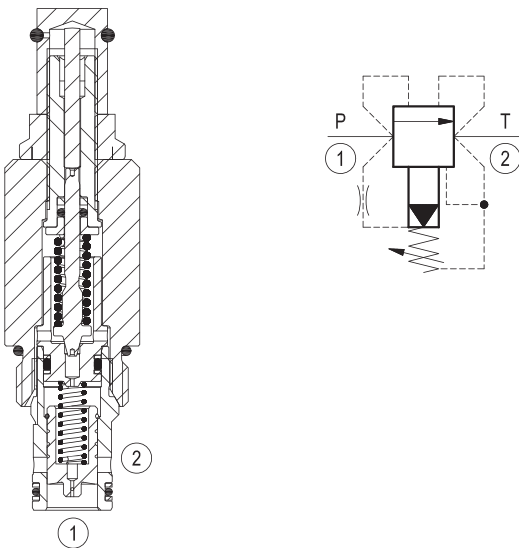
VSPP-10A

04.18.03 - X - 85 - Z



**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the conical, pilot-stage poppet from its seat. This action exhausts oil above the main-stage piston (spool type), allowing it to shift and provide relief flow through 2 to tank. The valve applies a balanced piston design allowing consistent relief operation at the valve setting independent of back-pressure at 2.

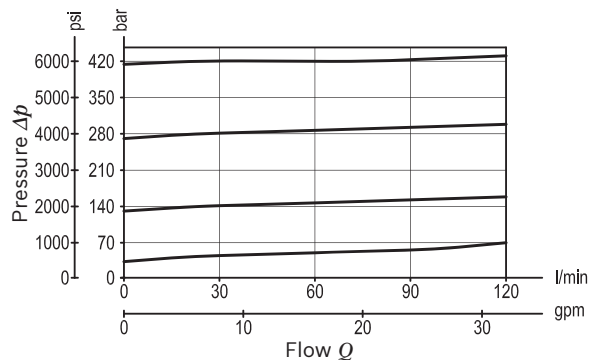


**Technical data**

Max. operating pressure port 1 (P)	420 bar (6000 psi)
Max. pressure admitted port 2 (T)	350 bar (5000 psi)
Flow range	3 - 120 l/min (1 - 32 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.21 kg (0.46 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A2010530100 material no: R901111366
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.18.03</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, pilot operated spool type  
pressure compensated

Series O/A to L  
unchanged performances and dimensions

Version and options standard

Adjustments

**03** Leakproof hex. socket screw

**85** Common cavity, Size 10

**SPRINGS**

	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi)
<b>10</b>	35-140 (500-2000)	38 (551)	100 (1450)
<b>20</b>	70-280 (1000-4000)	70 (1015)	200 (2900)
<b>35</b>	140-420 (2000-6000)	112 (1624)	350 (5000)

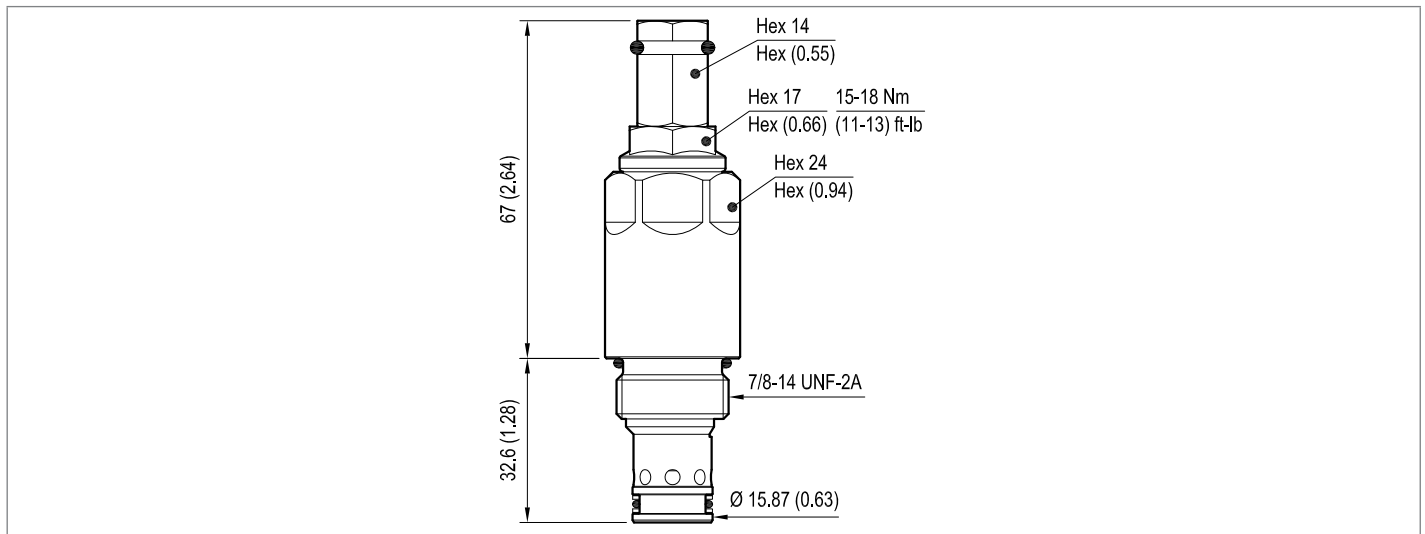
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
041803038510000	R930059443
041803038520000	R930059444
041803038535000	R930059445

Type	Material number

**Dimensions**





Relief, pilot operated spool type  
pressure compensated  
Special cavity, 065

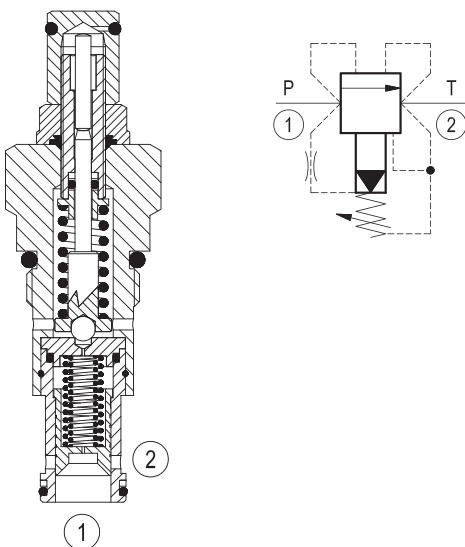
VSP-CC-150

04.18.01 - X - 99 - Z



**Description**

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the pilot-stage ball check from its seat. This action exhausts oil above the main-stage piston (spool type), allowing it to shift and provide relief flow through 2 to tank. The valve applies a balanced piston design allowing consistent relief operation at the valve setting independent of back-pressure at 2.

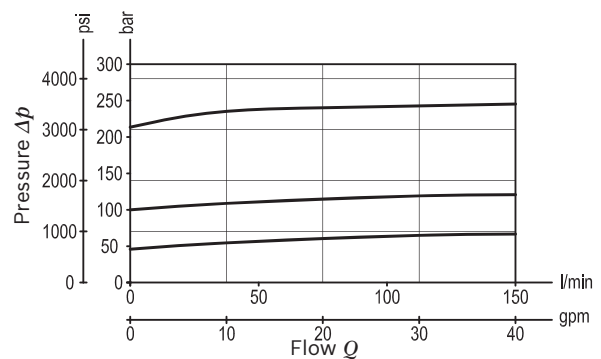


**Technical data**

Max. operating pressure port 1 (P)	420 bar (6000 psi)
Max. pressure admitted port 2 (T)	140 bar (2000 psi)
Flow range	5 - 150 l/min (1.3 - 40 gpm)
Max. internal leakage <sup>1)</sup>	100 cm <sup>3</sup> /min. (6 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	121 - 133 Nm (89 - 98 ft-lbs)
Weight	0.28 kg (0.62 lbs)
Special cavity	065 (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG0065010520100 material no: R930001958
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.18.01</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, pilot operated spool type  
pressure compensated

Adjustments

**03** Leakproof hex. socket screw

**99** Special cavity, 065

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>10</b>	* 20-105 (300-1500)	21 (305)	100 (1450)
<b>20</b>	35-210 (500-3000)	35 (508)	200 (2900)
<b>35</b>	70-420 (1000-6000)	115 (1668)	350 (5000)

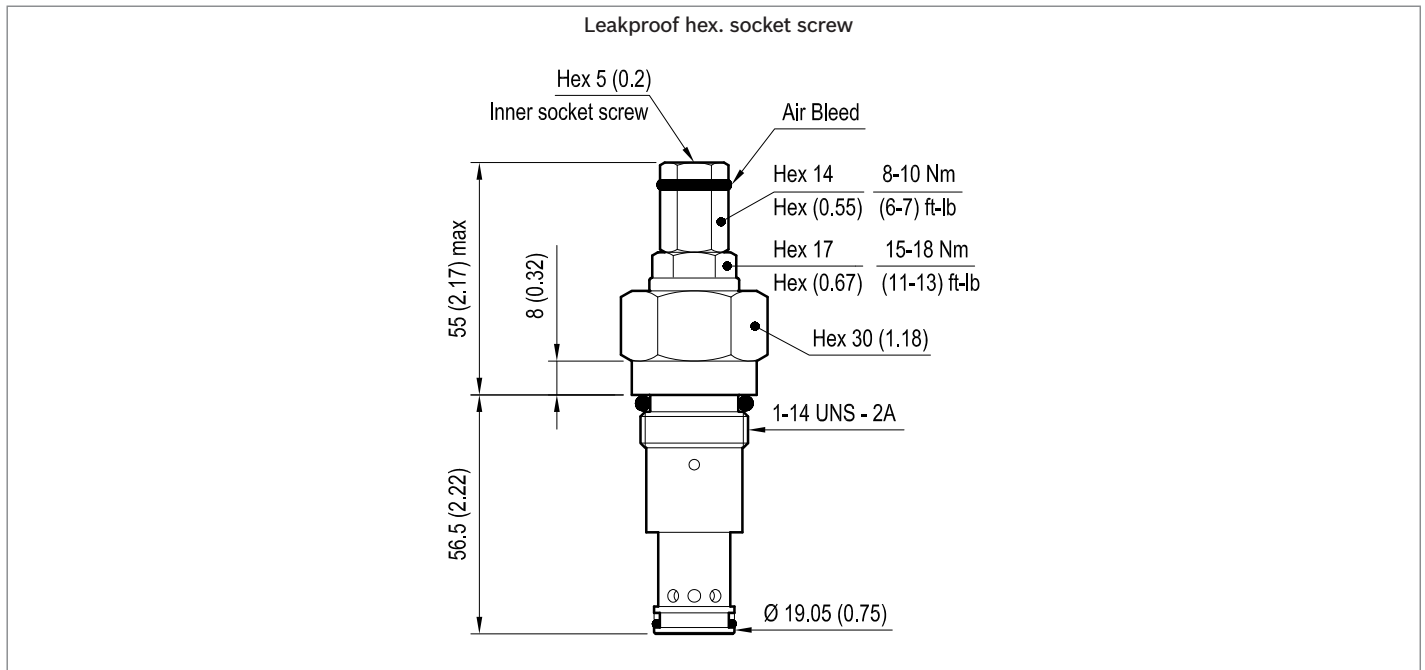
\* Minimum pressure setting intended with Q=5 l/min. (1.3 gpm)

**Preferred types**

Type	Material number
041801039910000	R930000402
04180103992000A	R930000403
04180103993500A	R930000404

Type	Material number

**Dimensions**



# Priority unloading pilot operated

## Common cavity, Size 08

VMSN-08A

04.75.21 - X - 56 - Z

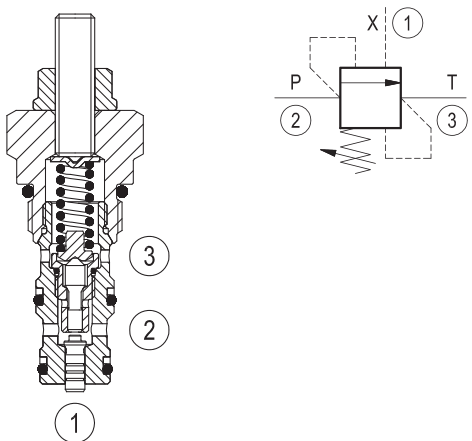


Technical data	
Max. operating pressure port 1-2	350 bar (5000 psi)
Max. pressure admitted port 3	50 bar (750 psi)
Max. flow	3 l/min (1 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.14 kg (0.31 lbs)
Cavity	CA-08A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08A3010520100 material no: R930000861
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

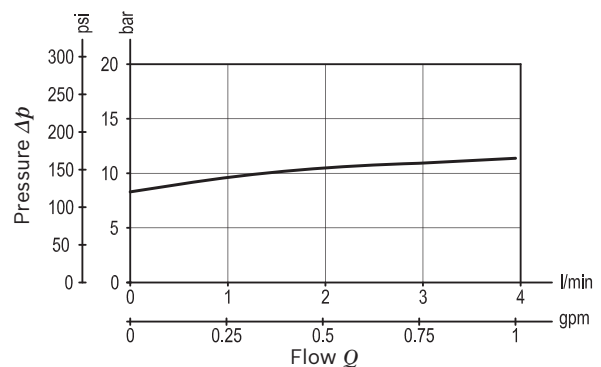
### Description

Flow is blocked from 2 to 3 until pressure increases to meet the selected valve setting, lifting the small, pilot-stage poppet from its seat. This action exhausts oil above the main-stage piston (spool type), allowing it to shift fully and unload flow from 2 through 3 with minimal pressure drop. Similarly, when remote pilot pressure at 1 exceeds the pressure setting, a secondary piston lifts the pilot-stage poppet from its seat, again exhausting fluid from 2 through 3.

- 1) At 80% of pressure setting
- 2) Only external seals for 10 valves



### Characteristic curve



**Ordering code**

<b>04.75.21</b>	<b>X</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Priority unloading pilot operated
Differential unload / reload
<b>05</b> Re-seat at (57 ± 2.5) % of pressure setting
<b>06</b> Re-seat at (66 ± 2.5) % of pressure setting
<b>08</b> Re-seat at (80 ± 2.5) % of pressure setting
<b>56</b> Common cavity, Size 08

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS		
	Adj. press. range bar (psi)	Std. setting bar (psi) Q=1 l/min.
<b>03 *</b>	20-40 (290-580)	30 (435)
<b>05 *</b>	35-70 (500-1000)	50 (725)
<b>10 *</b>	70-140 (1000-2000)	100 (1450)
<b>20</b>	105-210 (1500-3000)	200 (2900)
<b>35</b>	175-350 (2500-5000)	350 (5000)

\* Available only for x=05 and x=06

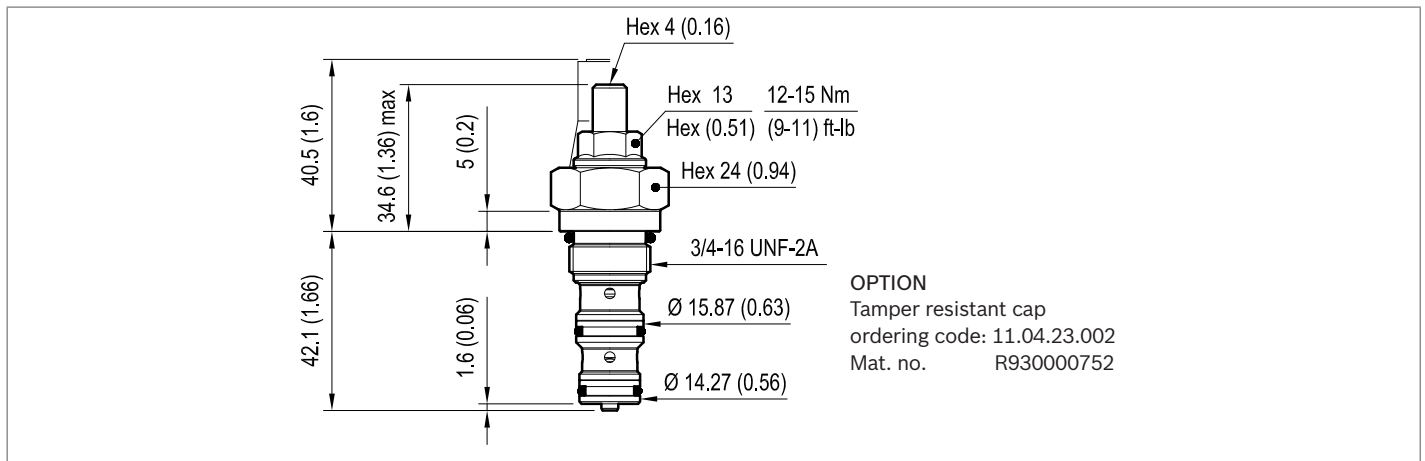
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
047521055603000	R930006649
047521055605000	R930006650
047521055610000	R930006651
047521055620000	R930006647
047521055635000	R930006648
047521065603000	R901109763
047521065605000	R901109764

Type	Material number
047521065610000	R901109765
047521065620000	R901109766
047521065635000	R901109767
047521085620000	R930055341
047521085635000	R930055303

**Dimensions**



# Priority unloading pilot operated

## Common cavity, Size 10

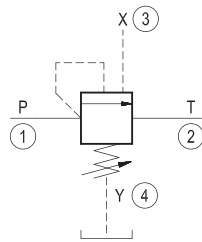
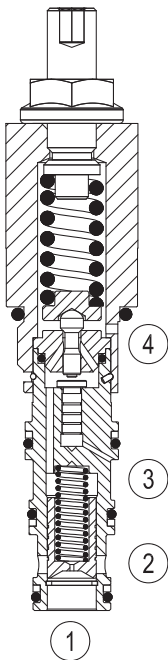
VMSP-78

04.75.10 - X - 99 - Z



### Description

Flow is blocked from 1 to 2 until pressure increases to meet the selected valve setting, lifting the small, pilot-stage poppet from its seat. This action exhausts oil above the main-stage piston (spool type), allowing it to shift fully and unload flow from 1 through 2 with minimal pressure drop. Similarly, when remote pilot pressure at 3 exceeds the pressure setting, a secondary piston lifts the pilot-stage poppet from its seat, again exhausting fluid from 1 through 2. The spring chamber is drained to tank at 4. Any pressure at 4 will be additive to the valve setting.



### Technical data

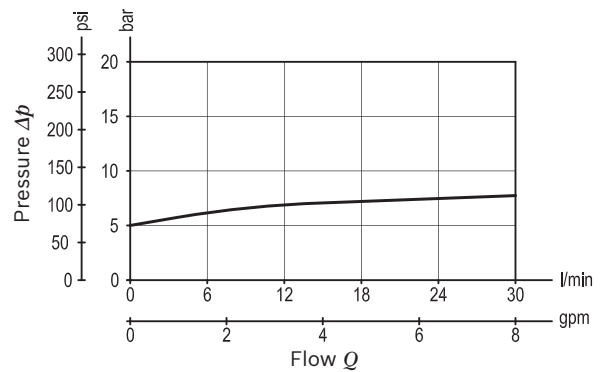
Max. operating pressure port 1-3	350 bar (5000 psi)
Max. pressure admitted port 2	210 bar (3000 psi)
Flow range	5 - 30 l/min (1.3 - 8 gpm)
Max. internal leakage <sup>1)</sup>	25 cm <sup>3</sup> /min. (1.5 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.28 kg (0.62 lbs)
Cavity	CA-10A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG0308010520100 material no: R30005801
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

1) Measured at 200 bar (2900 psi)

2) Only external seals for 10 valves

Setting is performed pressurizing "X" port.

### Characteristic curve



**Ordering code**

<b>04.75.10</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Priority unloading pilot operated

Version and options standard

Differential unloading / reload

**03** Re-seat at (85±2.5)% of pressure setting

**99** Common cavity, CA-10A-4N  
(old code cartridge style)

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>10</b>	7-105 (100-1500)	26 (377)	70 (1000)
<b>20</b>	90-210 (1300-3000)	31 (450)	120 (1750)
<b>35</b>	150-350 (2200-5000)	105 (1523)	200 (2900)

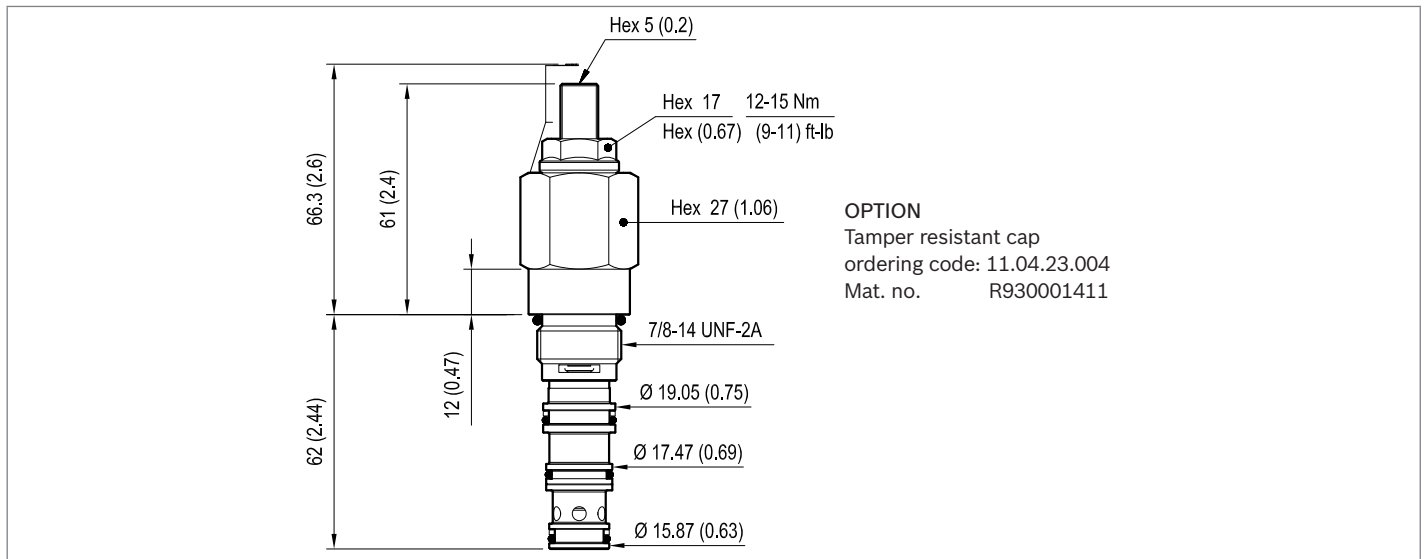
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
04751003991000D	R930005772
04751003992000D	R930005779
04751003993500C	R930005780

Type	Material number

**Dimensions**



# Mechanical cartridge valves

## Pressure reducing and relieving

Designation	Description	Cavity	Code	Data sheet	Page
Pressure reducing and relieving, direct acting spool type	VRPR-07A	Special	049508X99Z	18318-59	99
Pressure reducing and relieving, direct acting spool type, fixed setting	VRPR-08A	Size 08	0495118356Z	18318-52	101
Pressure reducing and relieving, direct acting spool type	VRPR-10A	Size 10	049504X85Z	18318-53	103
Pressure reducing and relieving, direct acting spool type	MHDRDB	Special	MHDRDB 04...	18318-55	105
Pressure reducing and relieving, direct acting spool damped type	VRPR-07A-S	Special	049509X99Z	18318-60	109
Pressure reducing and relieving, direct acting spool damped type, fixed setting	VRPR-10A-8	Size 10	0495098385Z	18318-54	111
Pressure reducing , pilot operated spool type	VRPP-10A	Size 10	049306X85Z	18318-50	113
Pressure reducing , pilot operated spool type	VRPP-12A	Size 12	049308X57Z	18318-51	115
Pressure reducing and relieving, pilot operated spool type	VRPX-10A	Size 10	049307X85Z	18318-56	117
Pressure reducing and relieving, with pilot controlled setting	VRPE-10A	Size 10	049507X85Z	18318-58	119





Pressure reducing and relieving,  
direct acting spool type  
Special cavity, CA-07A-3N

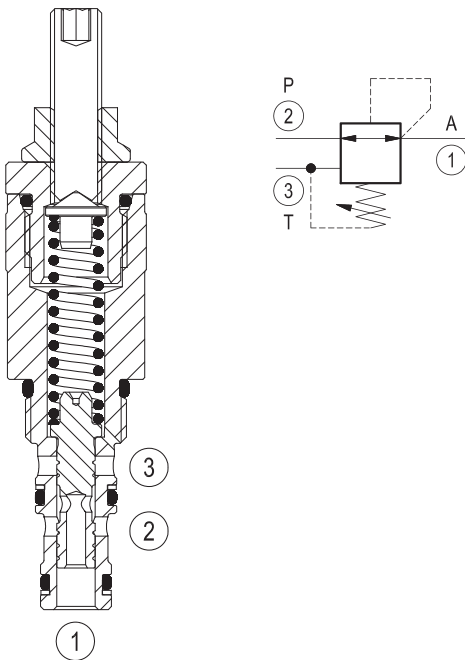
VRPR-07A

04.95.08 - X - 99 - Z



**Description**

Initially, flow passes freely from 2 to 1. When the pressure at 1 exceeds the pressure setting, the valve acts to restrict input flow at 2. This increases the pressure drop through the valve and maintains consistent pressure at 1. The spring chamber is drained at 3 to prevent a build-up of back-pressure against the spool. Additionally, if pressure at 1 rises above the pressure setting, flow is relieved to 3 until the setting is re-attained.

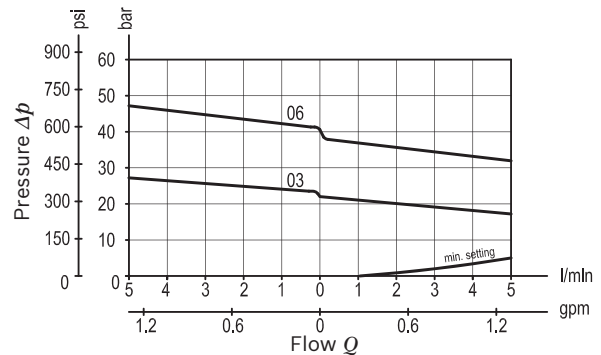


**Technical data**

Max. operating pressure port 2 (P)	420 bar (6000 psi)
Max. pressure admitted port 1 (A)	70 bar (1000 psi)
Max. flow	5 l/min (1.3 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	24 - 27 Nm (18 - 20 ft-lbs)
Weight	0.14 kg (0.31 lbs)
Special cavity	CA-07A-3N (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG07A3010520100 material no: R930001701
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) 1 - 3 to 80% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.95.08</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Pressure reducing and relieving,  
direct acting spool type

Adjustments

**91** Leakproof hex. socket screw

**99** Special cavity, CA-07A-3N

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc mode)
<b>03</b>	5-30 (75-435)	4.5 (65)	20-25 (290-360)
<b>06</b>	10-60 (145-870)	8 (116)	40-45 (580-650)

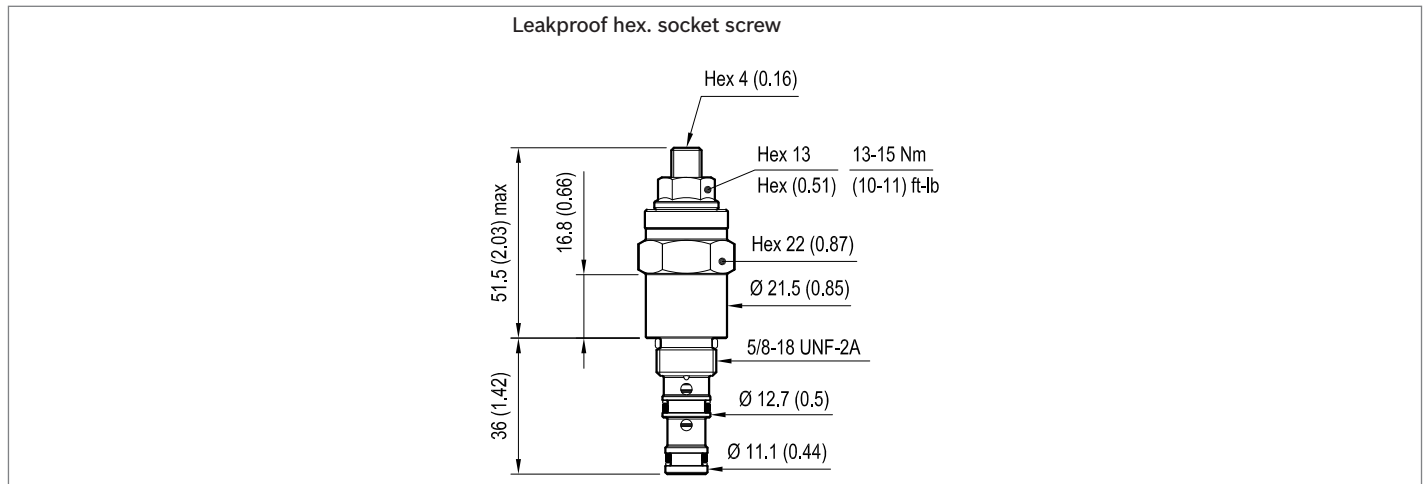
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
049508919903000	R930006721
049508919906000	R930006722

Type	Material number

**Dimensions**



Pressure reducing and relieving,  
direct acting spool type, fixed setting  
Common cavity, Size 08

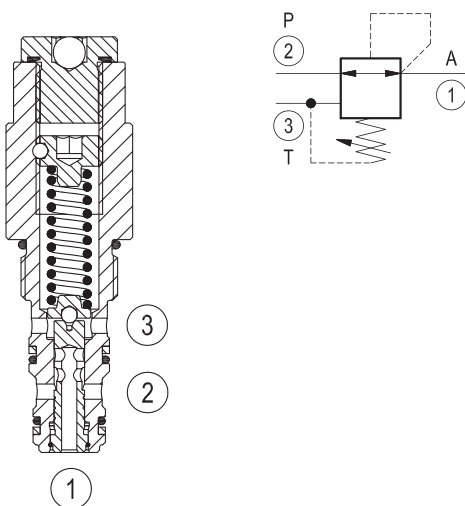
VRPR-08A

04.95.11.83.56 - Z



**Description**

Initially, flow passes freely from 2 to 1. When the pressure at 1 exceeds the pressure setting, the valve acts to restrict input flow at 2. This increases the pressure drop through the valve and maintains consistent pressure at 1. The spring chamber is drained at 3 to prevent a build-up of back-pressure against the spool. Additionally, if pressure at 1 rises above the pressure setting, flow is relieved to 3 until the setting is re-attained.

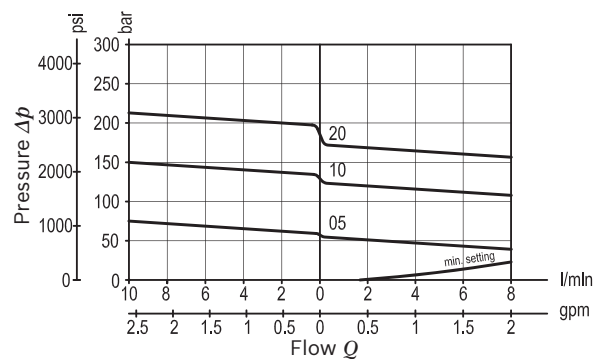


**Technical data**

Max. operating pressure port 2 (P)	350 bar (5000 psi)
Max. pressure admitted port 1 (A)	210 bar (3000 psi)
Max. flow	8 l/min (2 gpm)
Max. internal leakage <sup>1)</sup>	100 cm <sup>3</sup> /min. (6 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-08A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08A3010520100 material no: R930000861
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) 1 - 3 to 80% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.95.11.83</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Pressure reducing and relieving,  
direct acting spool type, fixed setting

Series O/A to L  
unchanged performances and dimensions

Version and options standard

**56** Common cavity, Size 08

SPRINGS	
Fixed setting bar (psi) (reduc. mode)	
<b>05</b>	35 (500)
<b>10</b>	70 (1000)
<b>20</b>	150 (2200)

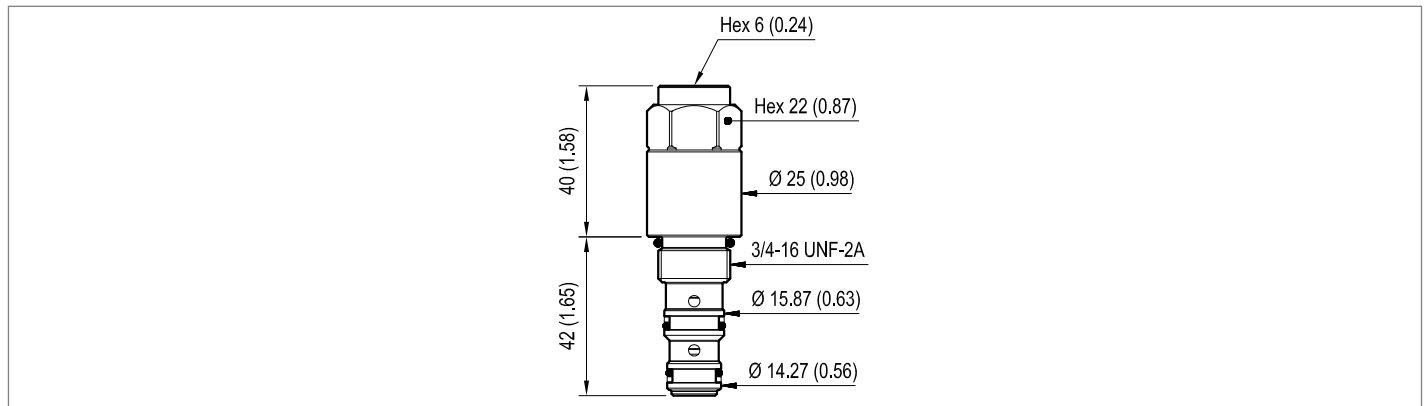
Further settings available on request

**Preferred types**

Type	Material number
04951183560500A	R930006735
04951183561000A	R930006736
04951183562000A	R930006737

Type	Material number

**Dimensions**



Pressure reducing and relieving,  
direct acting spool type  
Common cavity, Size 10

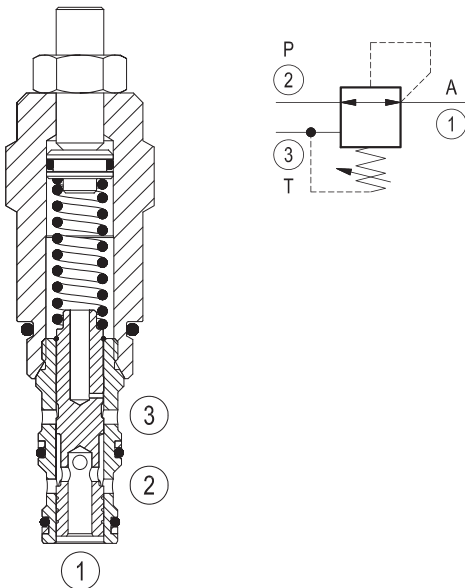
VRPR-10A

04.95.04 - X - 85 - Z



**Description**

Initially, flow passes freely from 2 to 1. When the pressure at 1 exceeds the pressure setting, the valve acts to restrict input flow at 2. This increases the pressure drop through the valve and maintains consistent pressure at 1. The spring chamber is drained at 3 to prevent a build-up of back-pressure against the spool. Additionally, if pressure at 1 rises above the pressure setting, flow is relieved to 3 until the setting is re-attained.

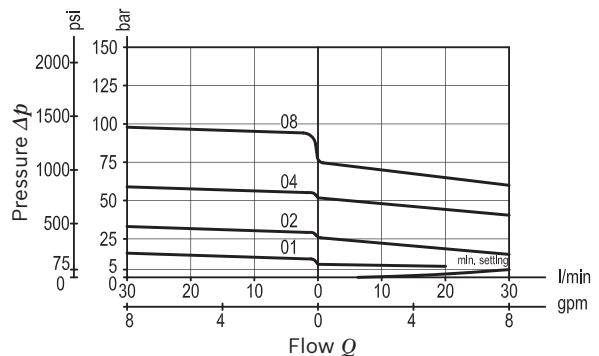


**Technical data**

Max. operating pressure port 2 (P)	350 bar (5000 psi) 210 bar (3000 psi) for version Z=01
Max. pressure admitted port 1 (A)	105 bar (1500 psi)
Max. flow	30 l/min (8 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight <sup>2)</sup>	0.26 kg (0.57 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
MTTFd	150 years see data sheet 18350-51
Seal kit <sup>3)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) 1 - 3 to 80% of pressure setting
- 2) Standard version X=03 type
- 3) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.95.04</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Pressure reducing and relieving,  
direct acting spool type

Adjustments

- 03** Leakproof hex. socket screw
- 04** Handknob and locknut

**85** Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc mode)
<b>01</b>	2-14 (30-200)	2 (29)	8-10 (115-145)
<b>02</b>	2-25 (30-350)	3 (44)	7-10 (100-145)
<b>04</b>	10-50 (145-725)	7 (102)	35-40 (500-580)
<b>08</b>	28-80 (400-1160)	14 (203)	45-50 (650-725)

Note: Special settings available. Contact factory authorized representative for ordering code.

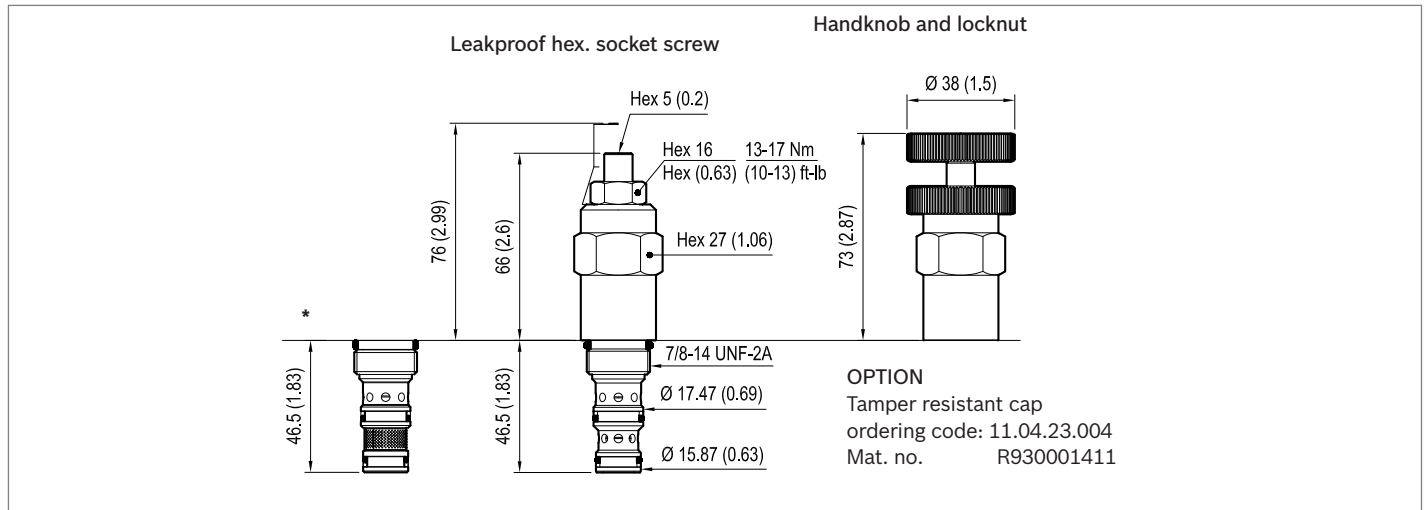
\* Please contact factory in case of need of version with integrated filter.

**Preferred types**

Type	Material number
04950403850100A	R901104066
04950403850200A	R901109740
04950403850400A	R901102333
04950403850800A	R901109742

Type	Material number
049504048501000	R901109743
04950404850200A	R901109744
04950404850400A	R901109745
04950404850800A	R901109747

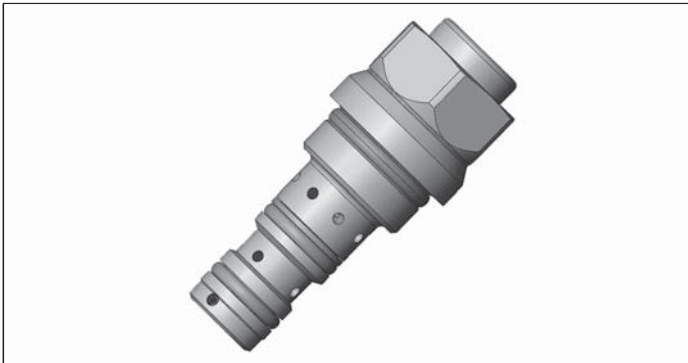
**Dimensions**



Pressure reducing and relieving,  
direct acting spool type  
Special cavity, R/LA

MHDRDB

1



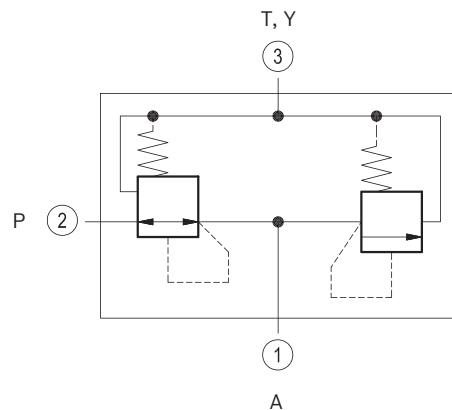
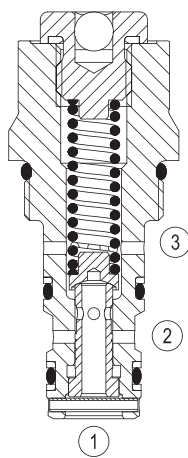
**Technical data**

General	
Weight	0.17 kg (0.37 lbs)
Installation position	Any
Ambient temperature range	-20 to 80 °C (-4 to 176 °F)
Hydraulic	
Max. operating pressure port 2	420 bar (6090 psi)
Max. control pressure port 1	35, 40 bar (508, 580 psi)
Max. tank pressure port 3	30 bar (435 psi)
Max. flow	15 l/min. (4 gpm)
Fluid temperature range	-20 to 100 °C (-4 to 212 °F)
Fluids:	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 800 mm <sup>2</sup> /s (cSt)
Filtration	Class 20/18/15 ISO 4406
Load cycles	2 million

**Description**

Initially, flow passes freely from 2 to 1. When the pressure at 1 exceeds the pressure setting, the valve acts to restrict input flow at 2. This increases the pressure drop through the valve and maintains consistent pressure at 1. The spring chamber is drained at 3 to prevent a build-up of back-pressure against the spool. Additionally, if pressure at 1 rises above the pressure setting, flow is relieved to 3 until the setting is re-attained. An undesirable increase in pressure in main port 1 is additionally prevented by lifting the spring plate off the control spool. Tank pressure is additional to the spring setting.

Note: The valves are not provided with any surface protection.



**Ordering code**

<b>MHDRDB</b>	<b>04</b>	<b>K</b>	<b>0 -</b>	<b>1X/</b>		<b>V</b>	<b>LA</b>	<b>*</b>
---------------	-----------	----------	------------	------------	--	----------	-----------	----------

Pressure reducing and relieving  
direct acting spool type

Further details in clear text

Component series 10 to 19  
(10 to 19: unchanged installation and connection dimensions)

35 bar **035**

40 bar **040**

(lower pressure ratings on request)

**V =**

**Seal material**

FKM seals  
(other seals on request)  
Attention!  
Observe compatibility of  
seals with hydraulic fluid  
used!

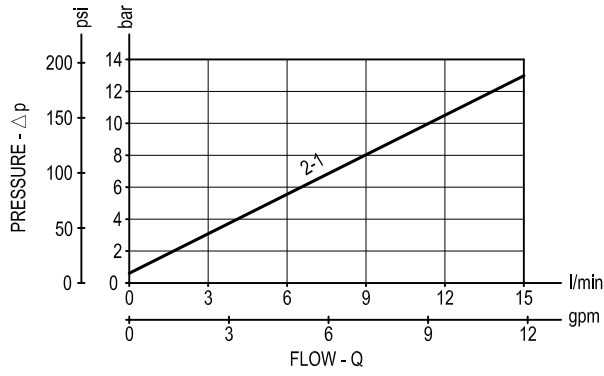
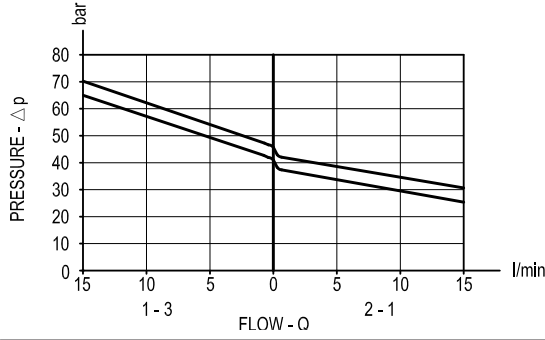
**Preferred types**

Type	Material number
MHDRDB 04 K0-1X/035VLA	R900641606
MHDRDB 04 K0-1X/040VLA	R900751628

Type	Material number

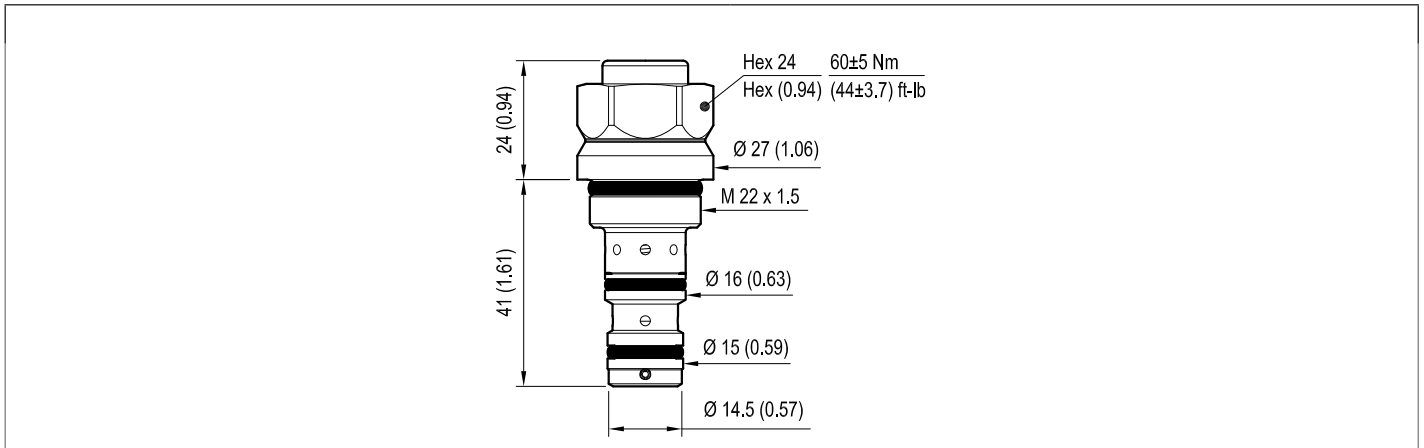


Characteristic curves



**Dimensions**

▼ **Pressure reducing and relieving direct acting spool type**



Pressure reducing and relieving,  
direct acting spool damped type  
Special cavity, CA-07A-3N

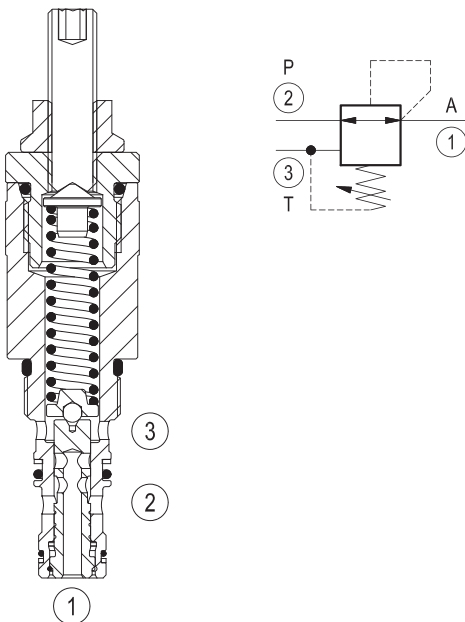
VRPR-07A-S

04.95.09 - X - 99 - Z



**Description**

Initially, flow passes freely from 2 to 1. When the pressure at 1 exceeds the pressure setting, the valve acts to restrict input flow at 2. This increases the pressure drop through the valve and maintains consistent pressure at 1. The spring chamber is drained at 3 to prevent a build-up of back-pressure against the spool. Additionally, if pressure at 1 rises above the pressure setting, flow is relieved to 3 until the setting is re-attained. VRPR-07A-S is equipped with a damped type spool especially designed for demanding applications.

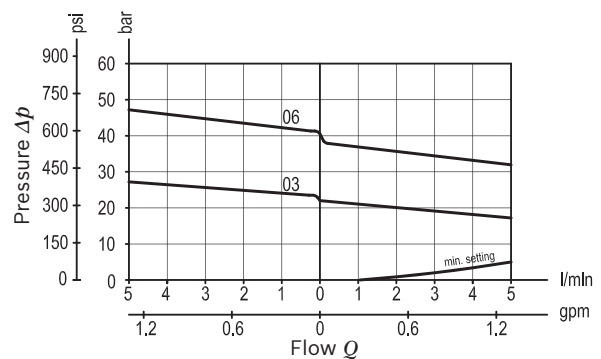


**Technical data**

Max. operating pressure port 2 (P)	420 bar (6000 psi)
Max. pressure admitted port 1 (A)	70 bar (1000 psi)
Max. flow	5 l/min (1.3 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	24 - 27 Nm (18 - 20 ft-lbs)
Weight	0.14 kg (0.31 lbs)
Special cavity	CA-07A-3N (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG07A3010520101 material no: R930006361
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) 1 - 3 to 80% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.95.09</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Pressure reducing and relieving,  
direct acting spool damped type

Adjustments

**91** Leakproof hex. socket screw

**99** Special cavity, CA-07A-3N

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc mode)
<b>03</b>	5-30 (75-435)	4.5 (65)	20-25 (290-3609)
<b>06</b>	10-60 (145-870)	8 (116)	40-45 (580-650)

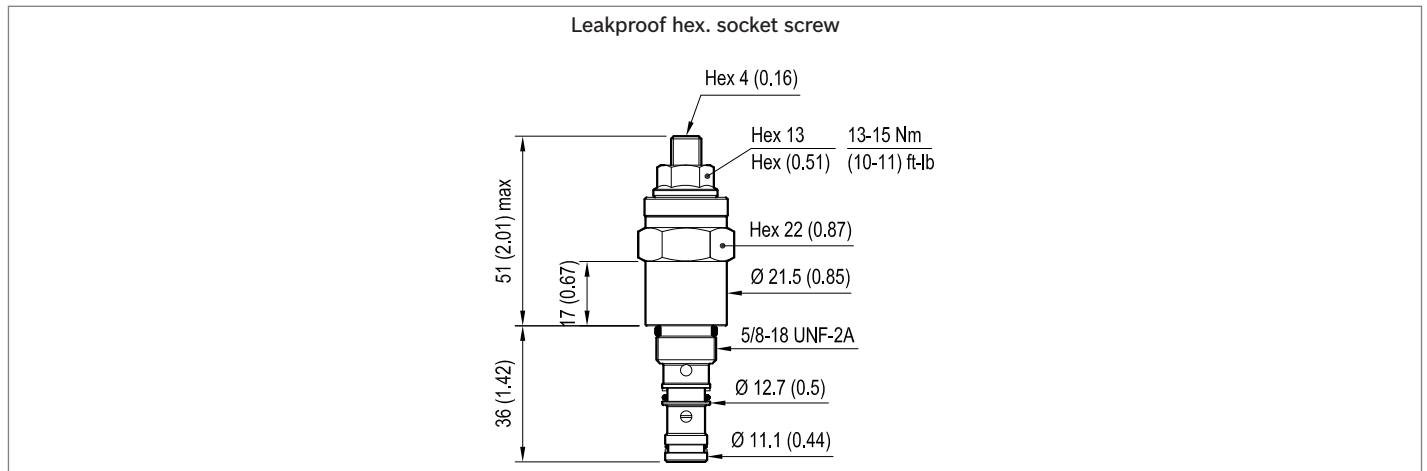
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
049509919903000	R930006724
049509919906000	R930006725

Type	Material number

**Dimensions**



Pressure reducing and relieving,  
direct acting spool damped type, fixed setting  
Common cavity, Size 10

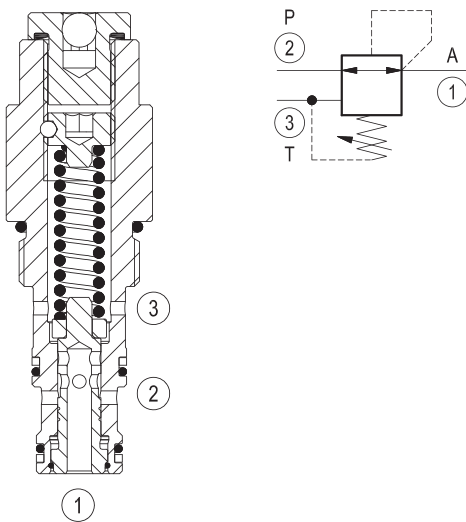
VRPR-10A-8

04.95.09.83.85 - Z



**Description**

Initially, flow passes freely from 2 to 1. When the pressure at 1 exceeds the pressure setting, the valve acts to restrict input flow at 2. This increases the pressure drop through the valve and maintains consistent pressure at 1. The spring chamber is drained at 3 to prevent a build-up of back-pressure against the spool. Additionally, if pressure at 1 rises above the pressure setting, flow is relieved to 3 until the setting is re-attained. Compared to VRPR-10A it allows a smoother dynamic and lower flow rate.

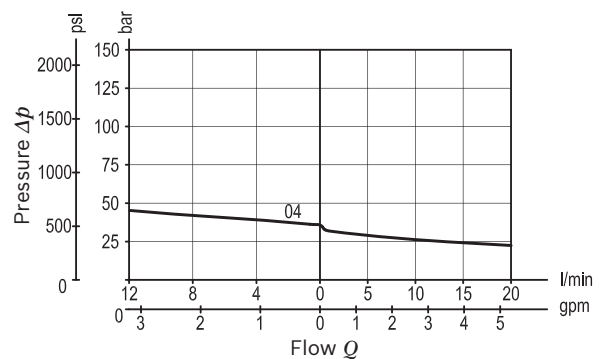


**Technical data**

Max. operating pressure port 2 (P)	350 bar (5000 psi)
Max. pressure admitted port 1 (A)	50 bar (725 psi)
Max. flow	20 l/min (5 gpm)
Max. internal leakage <sup>1)</sup>	130 cm <sup>3</sup> /min. (8 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.3 kg (0.6 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) 1 - 3 to 80% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.95.09.83</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Pressure reducing and relieving, direct acting spool damped type, fixed setting

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**85** Common cavity, Size 10

SPRINGS	
Fixed setting bar (psi) (reduc. mode)	
<b>04</b>	35 (500)
<b>06</b>	60 (870)
<b>10</b>	90 (1305)

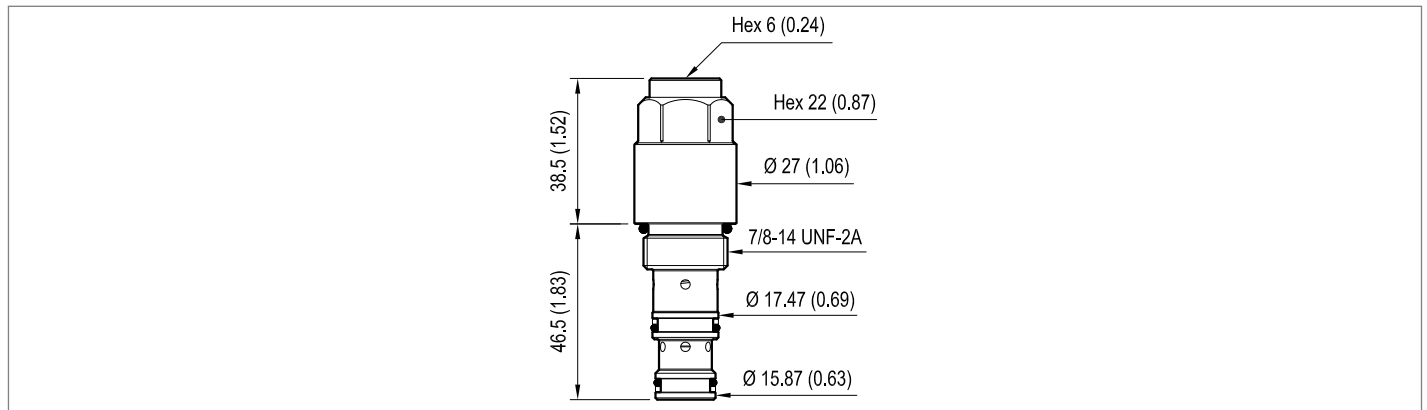
Further settings available on request

**Preferred types**

Type	Material number
04950983850400A	R930006738
04950983850600A	R930006739
04950983851000A	R930006740

Type	Material number

**Dimensions**



# Pressure reducing, pilot operated spool type

## Common cavity, Size 10

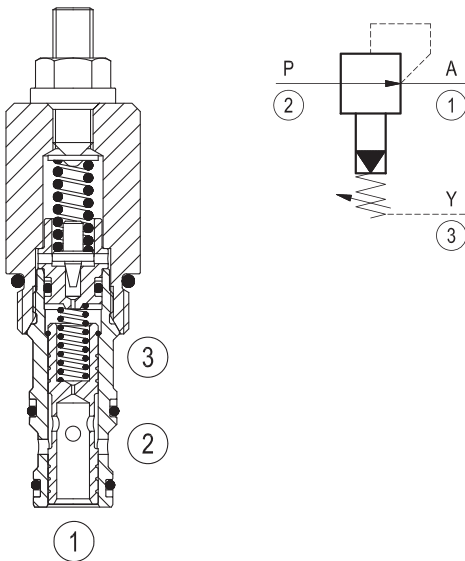
VRPP-10A

04.93.06 - X - 85 - Z



### Description

Initially, flow passes freely from 2 to 1. When the pressure at 1 exceeds the pressure setting, the valve acts to restrict input flow at 2. This increases the pressure drop through the valve and maintains consistent pressure at 1. The spring chamber is drained at 3 to prevent a build-up of back-pressure against the spool.

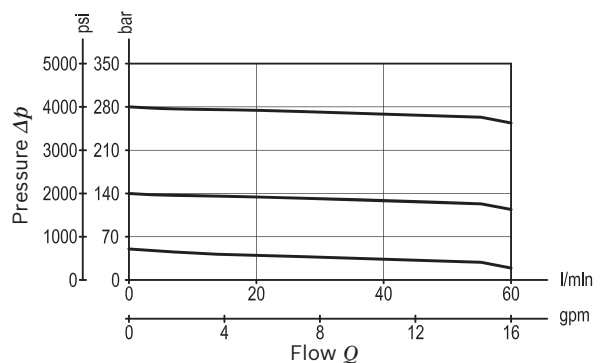


### Technical data

Max. operating pressure port 2 (P)	350 bar (5000 psi)
Max. pressure admitted port 1 (A)	280 bar (4000 psi)
Max. flow	60 l/min (16 gpm)
Standard internal pilot orifice diameter	0.6 mm
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.21 kg (0.46 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves

### Characteristic curve



**Ordering code**

<b>04.93.06</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Relief, pilot operated spool type

Adjustments

**03** Leakproof hex. socket screw

**04** Handknob and locknut

**85** Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

		SPRINGS		
		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc mode)
for X= 03	<b>10</b>	35-140 (500-2000)	48 (696)	100 (1450)
	<b>20</b>	70-280 (1000-4000)	88 (1276)	200 (2900)
for X= 04	<b>35</b>	35-350 (500-5000)	68 (986)	280 (4000)

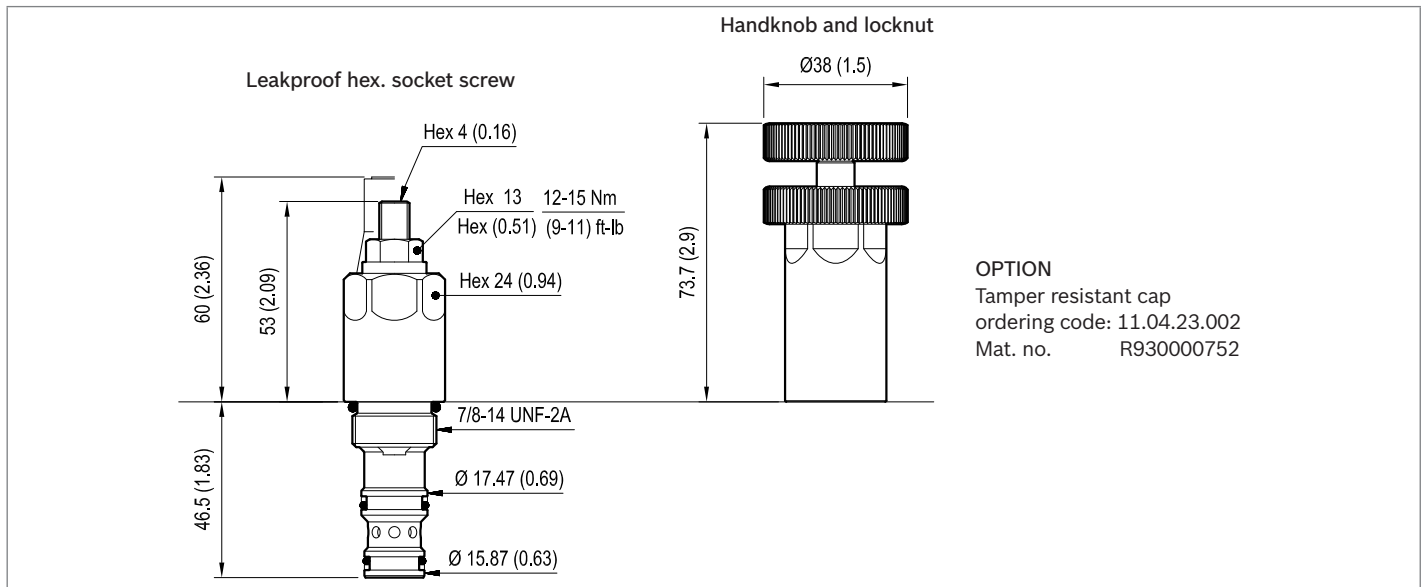
**Note:** Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
049306038510000	R901104112
049306038520000	R901104113
049306048535000	R930005676

Type	Material number

**Dimensions**





# Pressure reducing, pilot operated spool type

## Common cavity, Size 12

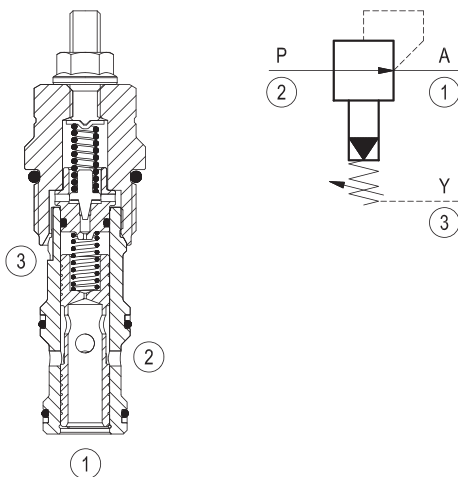
VRPP-12A

04.93.08 - X - 57 - Z



### Description

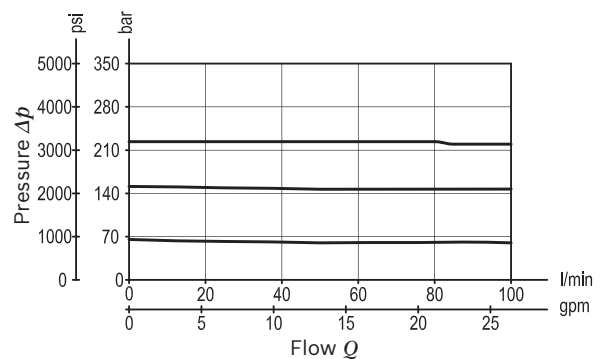
Initially, flow passes freely from 2 to 1. When the pressure at 1 exceeds the pressure setting, the valve acts to restrict input flow at 2. This increases the pressure drop through the valve and maintains consistent pressure at 1. The spring chamber is drained at 3 to prevent a build-up of back-pressure against the spool.



Technical data	
Max. operating pressure port 2 (P)	350 bar (5000 psi)
Max. pressure admitted port 1 (A)	280 bar (4000 psi)
Max. flow	100 l/min (26 gpm)
Standard internal pilot orifice diameter	0.6 mm
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.4 kg (0.88 lbs)
Cavity	CA-12A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A3010520100 material no: R930000941
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves

### Characteristic curve



**Ordering code**

<b>04.93.08</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Pressure reducing,  
pilot operated spool type

Adjustments

**03** Leakproof hex. socket screw

**57** Common cavity, Size 12

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc mode)
<b>10</b>	10-140 (145-2000)	48 (696)	100 (1450)
<b>20</b>	70-280 (1000-4000)	88 (1276)	200 (2900)
<b>35</b>	140-350 (2000-5000)	140 (2030)	280 (4000)

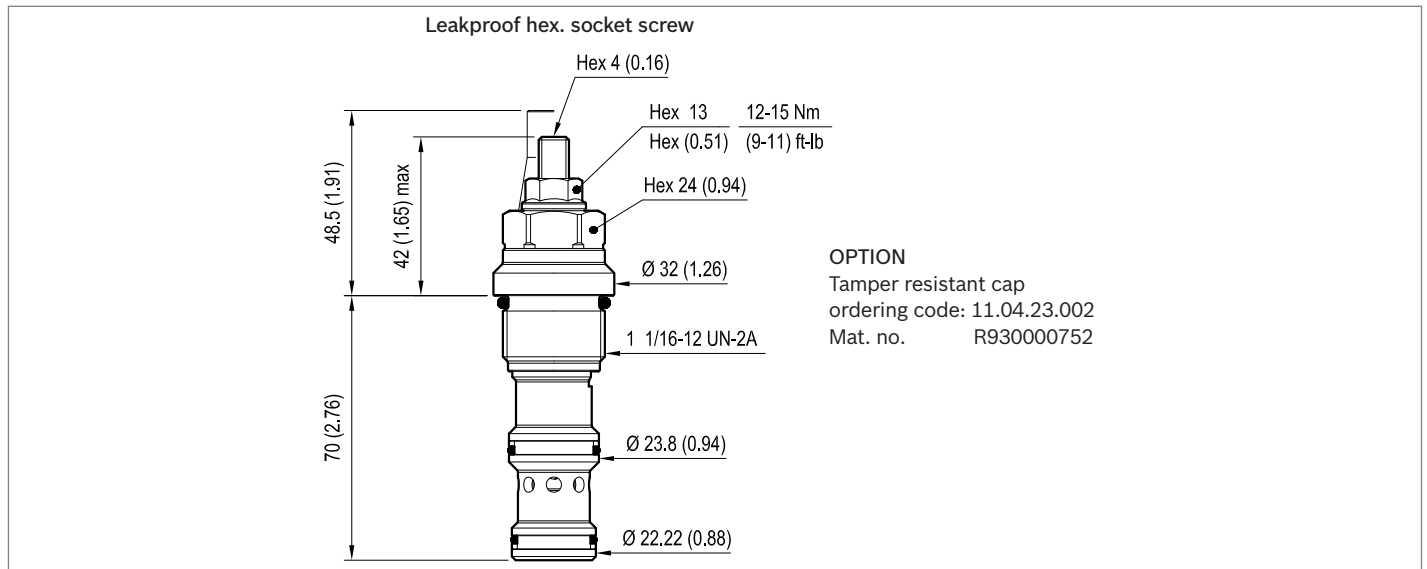
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
049308035710000	R901109737
049308035720000	R901109738
049308035735000	R901109739

Type	Material number

**Dimensions**



Pressure reducing and relieving,  
pilot operated spool type  
Common cavity, Size 10

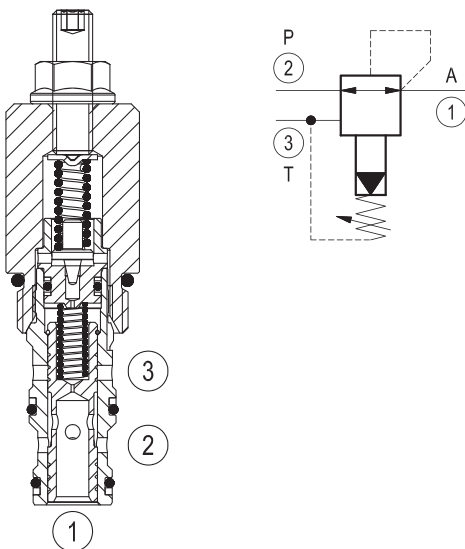
VRPX-10A

04.93.07 - X - 85 - Z



**Description**

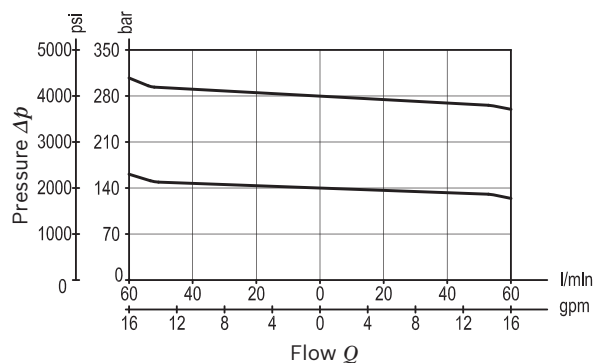
Initially, flow passes freely from 2 to 1. When the pressure at 1 exceeds the pressure setting, the conical poppet in the upper, pilot stage is lifted from its seat. This allows the main-stage piston to shift, restricting input flow at 2. This increases the pressure drop through the valve and maintains consistent pressure at 1. The spring chamber is drained at 3 to prevent a build-up of back-pressure against the spool. Additionally, if pressure at 1 rises above the pressure setting, flow is relieved to 3 until the setting is re-attained.



Technical data	
Max. operating pressure port 2 (P)	350 bar (5000 psi)
Max. pressure admitted port 1 (A)	280 bar (4000 psi)
Max. flow	60 l/min (16 gpm)
Standard internal pilot orifice diameter	0.6 mm
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight <sup>1)</sup>	0.2 kg (0.44 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Standard version X=03 type
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.93.07</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Pressure reducing and relieving, pilot operated spool type

Series 0/A to L unchanged performances and dimensions

Version and options standard

Adjustments

**03** Leakproof hex. socket screw

**04** Handknob and locknut

**85** Common cavity, Size 10

**SPRINGS**

		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc mode)
for X= 03	<b>05</b>	25-100 (360-1450)	31 (450)	50 (725)
	<b>10</b>	35-140 (500-2000)	48 (696)	100 (1450)
	<b>20</b>	70-280 (1000-4000)	88 (1276)	200 (2900)
for X= 04	<b>35</b>	35-350 (500-5000)	68 (986)	350 (5000)

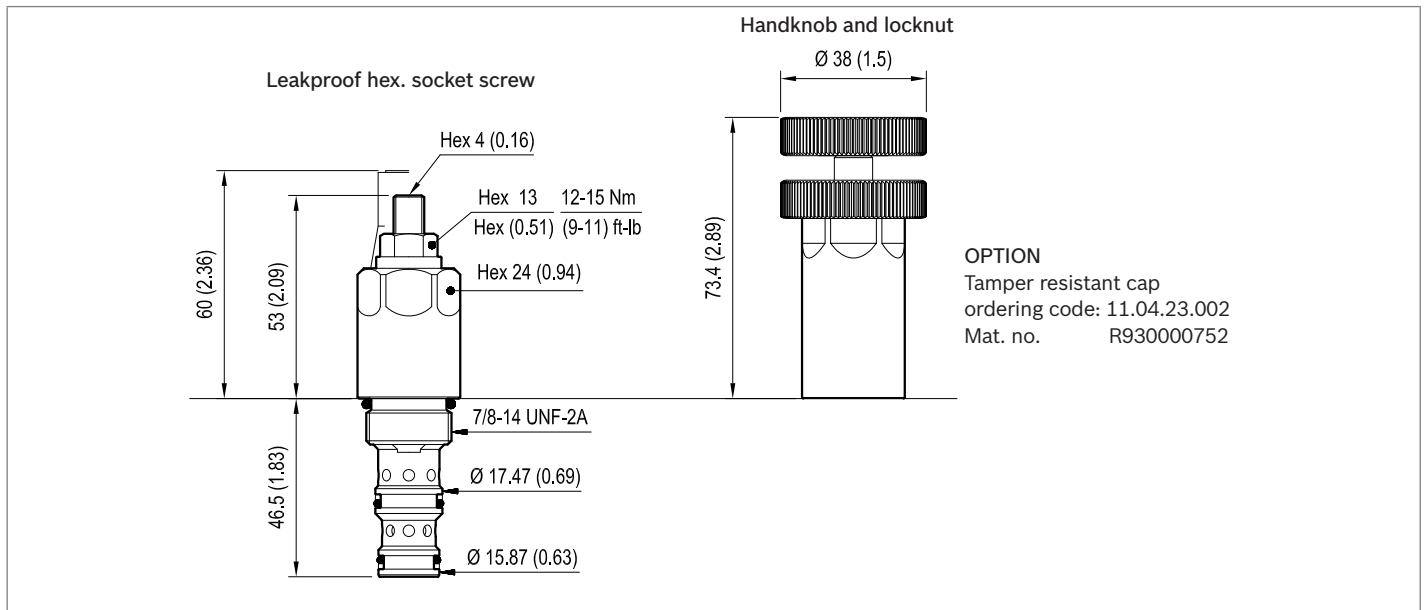
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
049307038505000	R930006982
049307038510000	R901104118
049307038520000	R901106468
049307048535000	R930005596

Type	Material number

**Dimensions**



Pressure reducing and relieving,  
with pilot controlled setting  
Common cavity, Size 10

VRPE-10A

04.95.07 - X - 85 - Z



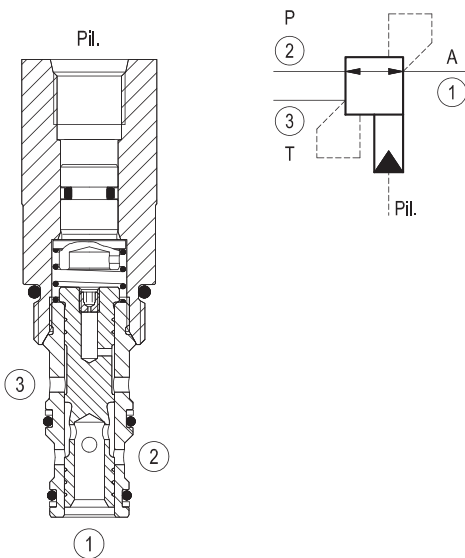
**Description**

When a minimum pilot pressure is applied to port PIL, flow passes from 2 to 1. When the pressure at 1 exceeds the pressure setting (defined by pilot pressure times pilot ratio), the valve acts to restrict flow at 2. This increases the pressure drop through the valve and maintains consistent pressure at 1. Additionally, if pressure at 1 rises above the pressure setting, flow is relieved to 3 until the setting is re-attained.

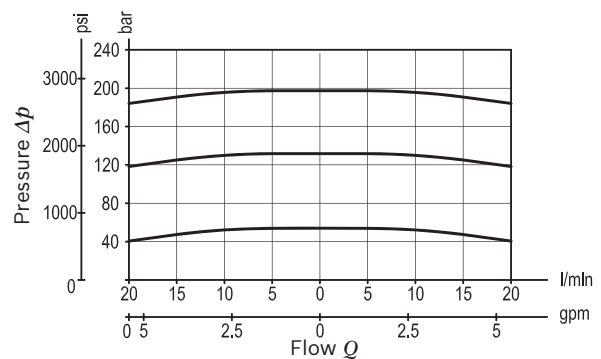
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. pilot pressure	175 bar (2500 psi) for Z=02 and Z=03 250 bar (3600 psi) for Z=13
Max. flow	20 l/min (5 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.28 kg (0.62 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) 1 - 3 to 80% of pressure setting
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.95.07</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Pressure reducing and relieving,  
with pilot controlled setting

Pilot port

**55** 9/16-18 UNF-2B

**85** Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

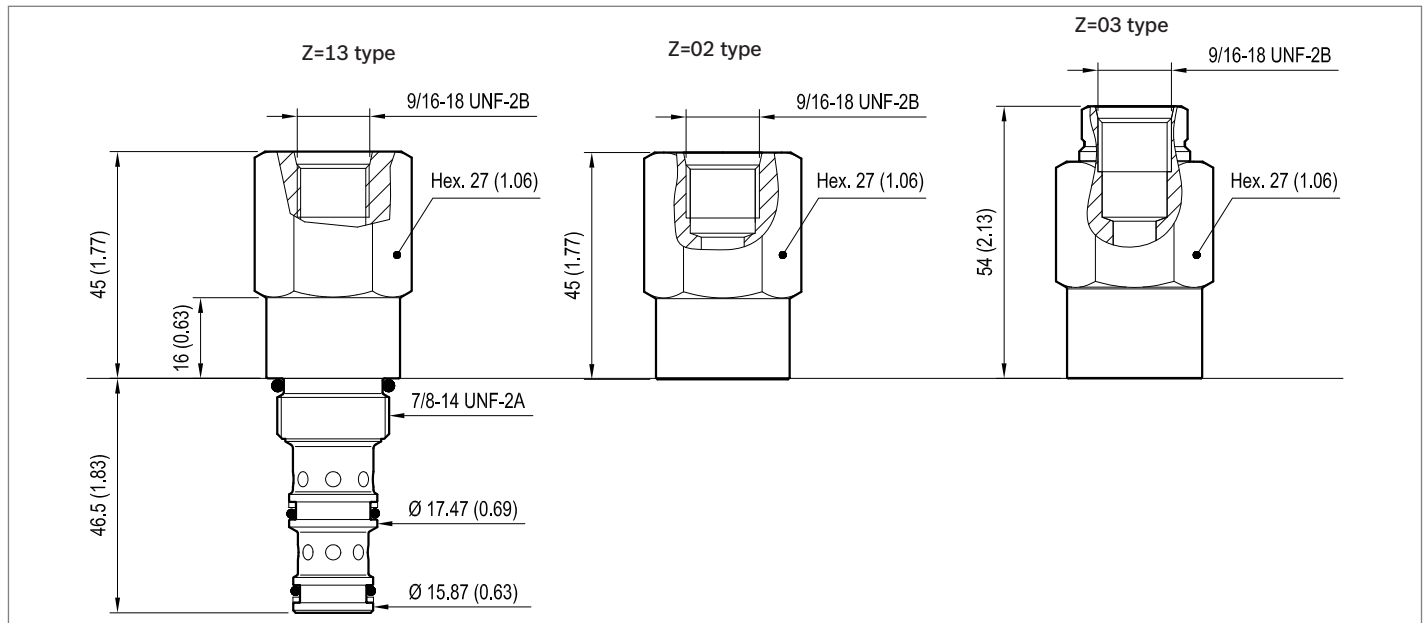
CONTROLLED SETTING VS. PILOT PRESSURE	
<b>02</b>	2 : 1
<b>03</b>	3 : 1
<b>13</b>	1.3 : 1

**Preferred types**

Type	Material number
049507558502000	R930001183
049507558503000	R930001184
049507558513000	R930001185

Type	Material number

**Dimensions**



# Mechanical cartridge valves

## Check and pilot operated check

Designation	Description	Cavity	Code	Data sheet	Page
Check, poppet type	VUCN-04A	Special	0431310054Z	18318-88	123
Check, poppet type	VU-N-38	Special	0431190099Z	18318-99	125
Check, poppet type	VUCN-08A	Size 08	0431200056Z	18318-89	127
Check, poppet type	VUCN-08F	06020	043138002000	18319-04	129
Check, poppet type	VUCN-10A	Size 10	0431230085Z	18318-90	131
Check, poppet type	VUCN-12A	Size 12	0431280057Z	18318-91	133
Check, poppet type	VUCN-16A	Size 16	0431250027Z	18318-92	135
Check, poppet type	VUCN-20A	Size 20	0431320058Z	18318-93	137
Check, poppet type with thermal relief	VUCN-10A-TR	Size 10	043137X85Z	18318-94	139
Check, poppet type with thermal relief	VUCN-12A-TR	Size 12	043137X57Z	18318-95	141
Check, poppet reverse type	VURN-08A	Size 08	0431210056Z	18318-96	143
Check, poppet reverse type	VURN-10A	Size 10	0431270085Z	18318-97	145
Check, poppet reverse type	VURN-12A	Size 12	0431360057Z	18318-98	147
Check, poppet reverse type	VUR1-16	Special	VUR1.100.00	18319-01	149
Check, poppet reverse type	VUR2-22-FC	Special	VUR2.240.FC	18319-02	151
Check, poppet reverse type	VUR2-22-LG	Special	VUR2.240.LG	18319-03	153
Pilot operated check, pilot to open	VSON-08A	Size 08	043306X56Z	18319-30	155
Pilot operated check, pilot to open	VSON-10A	Size 10	043305X85Z	18319-31	157
Pilot operated check, pilot to open	VSON-08U	T-11A	043306X20Z	18319-39	159
Pilot operated check, pilot to open	VSON-12A	Size 12	043307X57Z	18319-32	161
Pilot operated check, pilot to open	VSON-12U	T-2A	043307X86Z	18319-40	163
Pilot operated check, pilot to open	VSON-16A	Size 16	043308X27Z	18319-33	165

## Mechanical cartridge valves

### Check and pilot operated check

Designation	Description	Cavity	Code	Data sheet	Page
Pilot operated check, pilot to open	VSON-16U	T-17A	043309X47Z	18319-41	167
Pilot operated check, pilot to open	VSOA-08A	Size 08	043310X56Z	18319-34	169
Pilot operated check, pilot to open	VSOA-10A	Size 10	043310X85Z	18319-35	171
Dual pilot operated check, pilot to open	VSOD-10A	Size 10	043603X85Z	18319-38	173
Pilot operated check, pilot to close	VUPC-10A	Size 10	043404X85Z	18319-36	175
Pilot operated check, pilot to close	VUPC-12A	Size 12	043404X57Z	18319-37	177
Pilot operated check, pilot to close	VUPC-25U	T-19A	043404X50Z	18319-29	179
Directional poppet type, shuttle	SELC-04A	Special	049407005400	18319-82	181
Directional poppet type, shuttle	SELB-08A	Size 08	049405005600	18319-80	183
Directional poppet type, shuttle	SELC-08A	Size 08	049406X5600	18319-81	185
Directional poppet type, shuttle	SELB-10A	Size 10	049409008500	18319-79	187
Directional hot oil, shuttle	SELO-10M	Special	049410X99Z	18320-95	189
Directional poppet type, shuttle, double check	VUDN-08A	Size 08	0439010056Z	18319-83	191
Check, double lock, with mechanical pilot	VU-DT-D7-CM	Special	0443010000Z	18318-87	193



Check, poppet type

Special cavity, CA-04A-2N

VUCN-04A

04.31.31.00.54 - Z

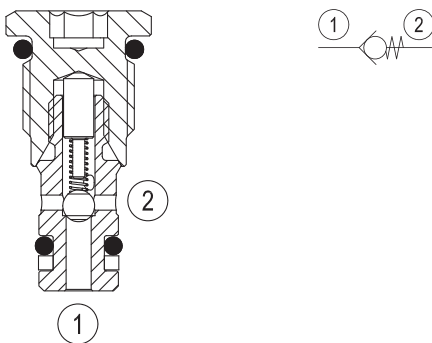


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	4 l/min (1 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	10 - 12 Nm (7 - 9 ft-lbs)
Weight	0.013 kg (0.03 lbs)
Special cavity	CA-04A-2N (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG04S2010520100 material no: R930003786
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

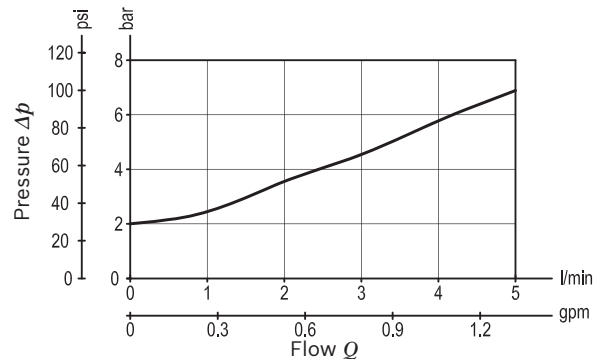
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.31.00</b>	<b>54</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Check, poppet type

**54** Special cavity, CA-04A-2N

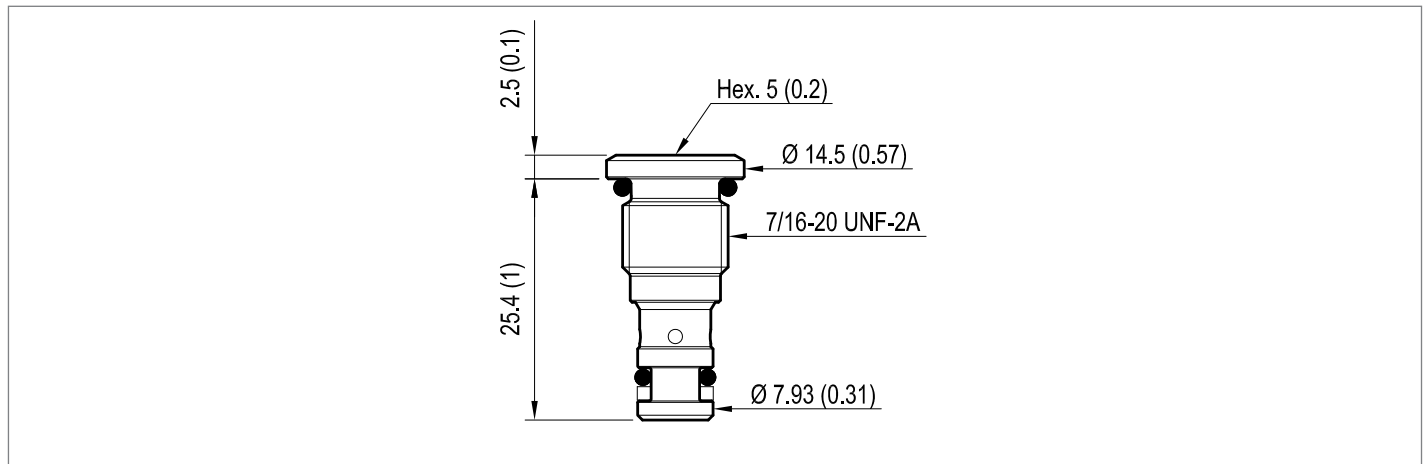
SPRINGS	
	Cracking pressure bar (psi)
<b>00</b>	0.5 (7.3)
<b>02</b>	2 (29)

**Preferred types**

Type	Material number
043131005400000	R930008160
043131005402000	R930000494

Type	Material number

**Dimensions**



Check, poppet type

Special cavity, 690

VU-N-38

04.31.19.00.99 - Z

1

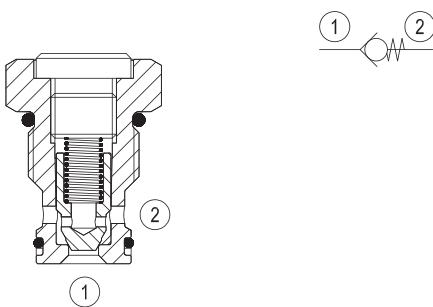


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	30 l/min (8 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	78 - 85 Nm (56 - 63 ft-lbs)
Weight	0.1 kg (0.22 lbs)
Special cavity	690 (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG0690010520100 material no: R930001702
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

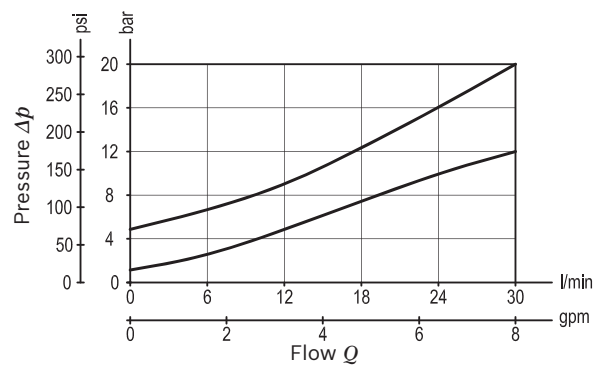
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.19.00</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Check, poppet type

SPRINGS	
Cracking pressure bar (psi)	
<b>00</b>	1 (15)
<b>01</b>	4.5 (65)

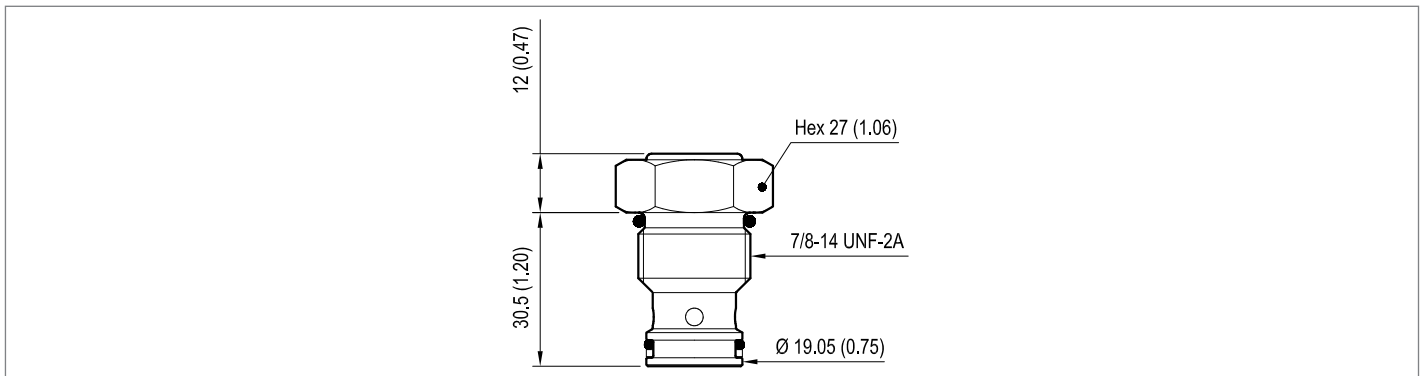
**99** Special cavity, 690

**Preferred types**

Type	Material number
043119009900000	R930000456
043119009901000	R930000457

Type	Material number

**Dimensions**



Check, poppet type

Common cavity, Size 08

VUCN-08A

04.31.20.00.56 - Z

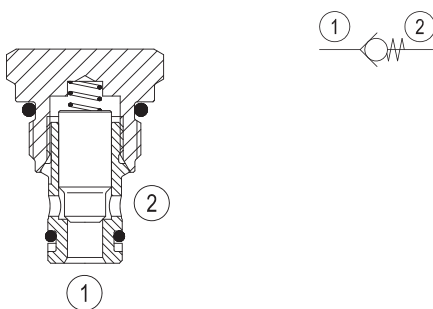


Technical data	
Max. operating pressure	420 bar (6000 psi)
Max. flow	50 l/min (13 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.12 kg (0.27 lbs)
Cavity	CA-08A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG08A2010520100 material no: R901101437
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

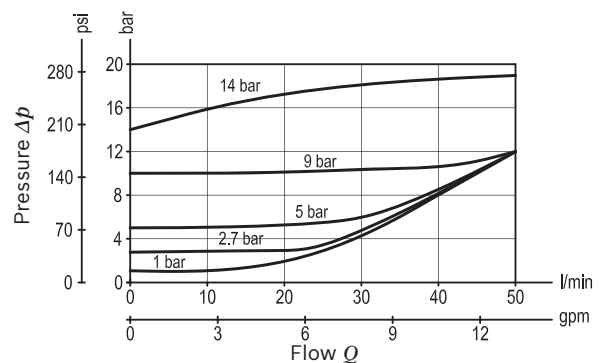
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.20.00</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Check, poppet type

56 Common cavity, Size 08

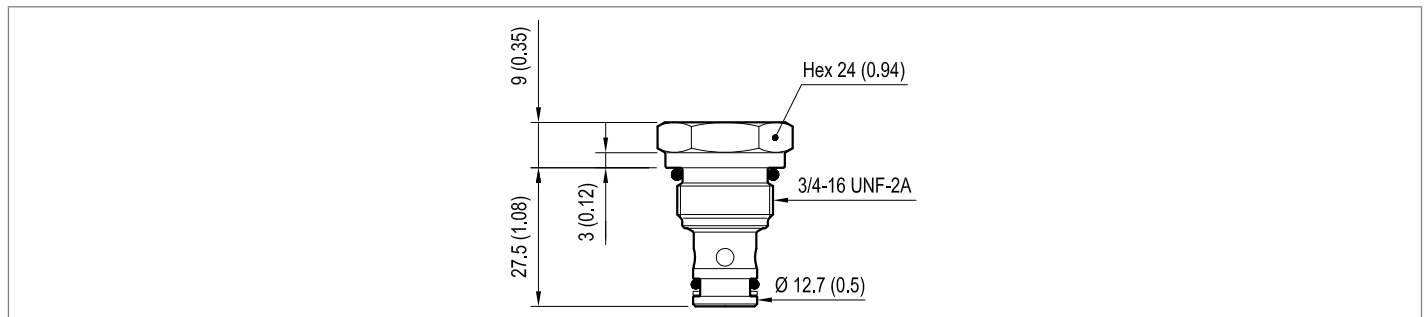
SPRINGS	
	Cracking pressure bar (psi)
<b>A0</b>	0.3 (4.5)
<b>00</b>	1 (15)
<b>03</b>	2.7 (39)
<b>05</b>	5 (73)
<b>06</b>	6 (87)
<b>09</b>	9 (131)
<b>14</b>	14 (203)

**Preferred types**

Type	Material number
0431200056A0000	R930006992
043120005600000	R901007308
043120005603000	R901162183
043120005605000	R901106550

Type	Material number
043120005606000	R901116571
043120005609000	R930000961
043120005614000	R901106592

**Dimensions**



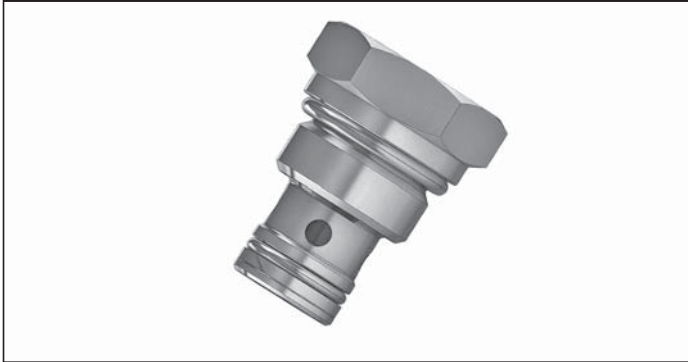
Check, poppet type

Hydac cavity interchange, 06020

VUCN-08F

04.31.38.00.20.00

1

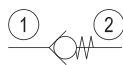
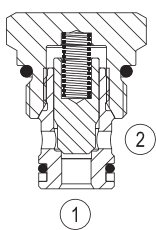


Technical data	
Max. operating pressure	420 bar (6000 psi)
Max. flow	50 l/min. (13 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	40 - 45 Nm (30 - 33 ft-lbs)
Weight	0.12 kg (0.27 lbs)
Cavity	Hydac 06020
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG08F2060520100 material no: R930056630
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

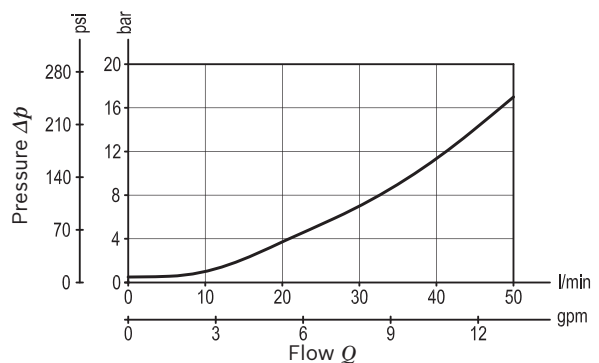
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.38.00</b>	<b>20</b>	<b>00</b>	<b>00</b>	<b>*</b>
--------------------	-----------	-----------	-----------	----------

Series O/A to L  
unchanged performances and dimensions

Version and options standard

Check, poppet type

	<b>SPRINGS</b>
	Cracking pressure bar (psi)
<b>00</b>	0.5 (7.3)

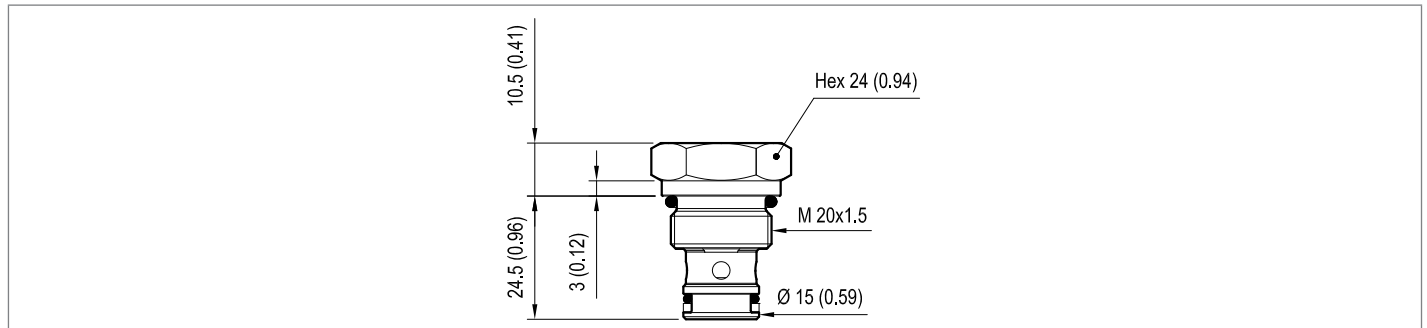
20 Hydac cavity interchange, 06020

**Preferred types**

Type	Material number
043138002000000	R930056629

Type	Material number

**Dimensions**





Check, poppet type

Common cavity, Size 10

VUCN-10A

04.31.23.00.85 - Z

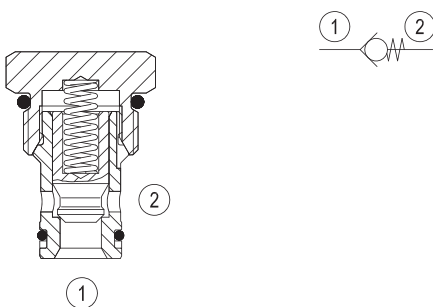


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	80 l/min (21 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.15 kg (0.33 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A2010520100 material no: R901111363
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

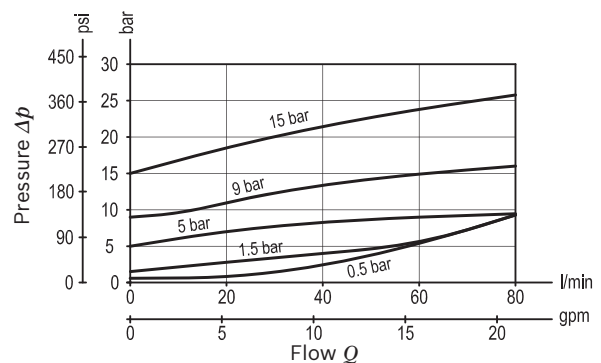
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.23.00</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Series O/A to L  
unchanged performances and dimensions

Version and options standard

Check, poppet type

**85** Common cavity, Size 10

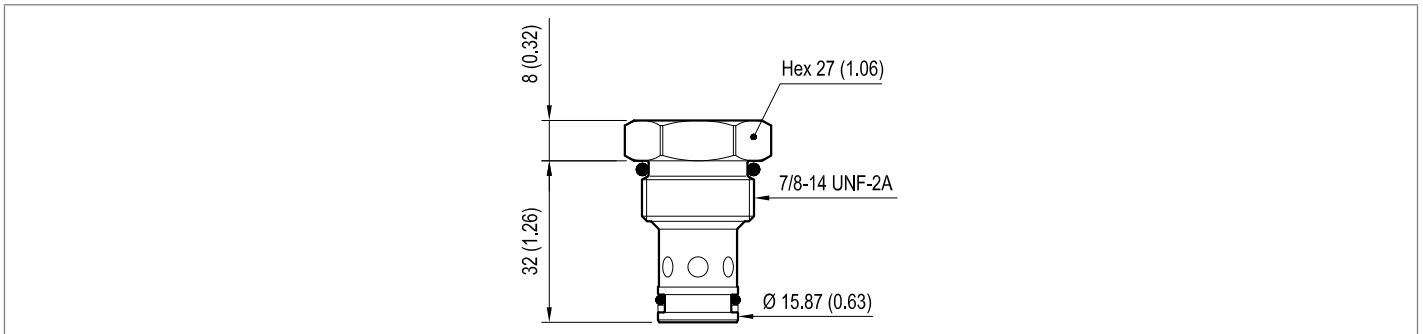
SPRINGS	
	Cracking pressure bar (psi)
<b>00</b>	0.5 (7.25)
<b>01</b>	1.4 (20)
<b>05</b>	5 (75)
<b>09</b>	9 (131)
<b>15</b>	15 (220)

**Preferred types**

Type	Material number
043123008500000	R901106596
043123008501000	R930005884
043123008505000	R901106601
043123008509000	R930000962
04312300851500A	R901106602

Type	Material number

**Dimensions**



Check, poppet type

Common cavity, Size 12

VUCN-12A

04.31.28.00.57 - Z

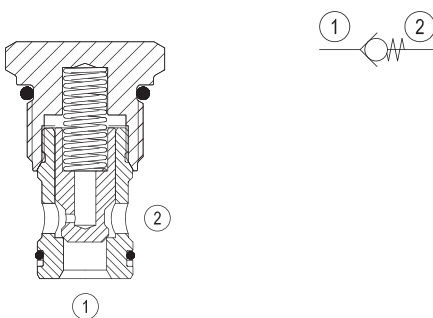


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min (32 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.18 kg (0.4 lbs)
Cavity	CA-12A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A2010520100 material no: R901111377
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

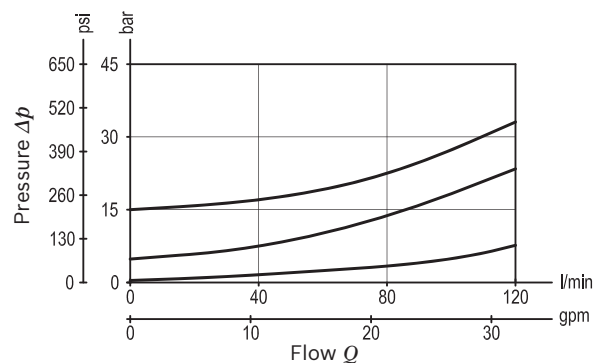
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.28.00</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Check, poppet type

57 Common cavity, Size 12

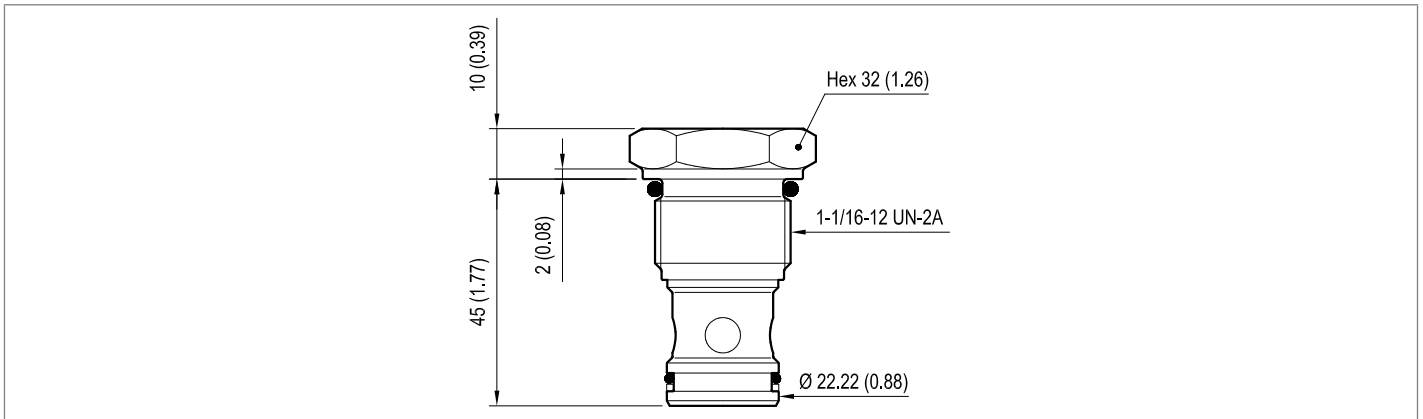
SPRINGS	
Cracking pressure bar (psi)	
<b>00</b>	1 (15)
<b>05</b>	5 (75)
<b>08</b>	8 (115)
<b>15</b>	15 (220)

**Preferred types**

Type	Material number
043128005700000	R901106613
043128005705000	R901106614
043128005708000	R930000490
043128005715000	R901106615

Type	Material number

**Dimensions**



Check, poppet type

Common cavity, Size 16

VUCN-16A

04.31.25.00.27 - Z

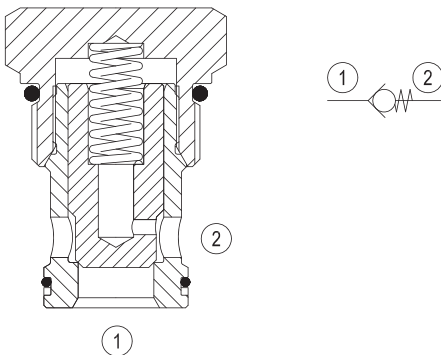


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	200 l/min (53 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.27 kg (0.6 lbs)
Cavity	CA-16A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG16A2010520100 material no: R901111386
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

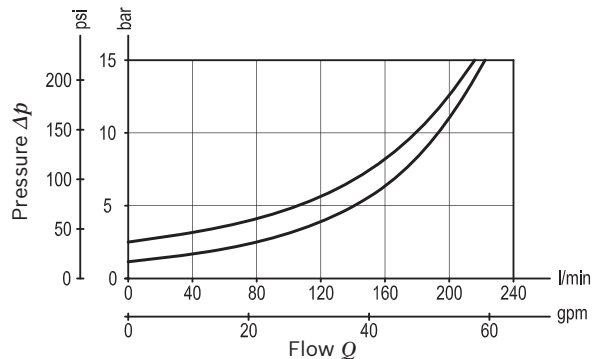
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.25.00</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Check, poppet type

27 Common cavity, Size 16

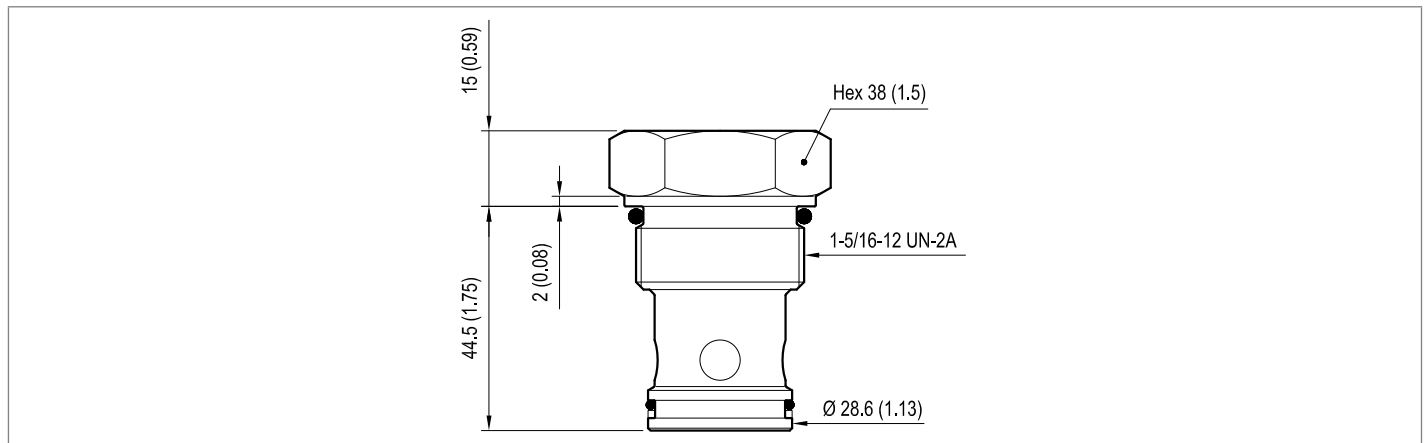
SPRINGS	
	Cracking pressure bar (psi)
<b>A0</b>	0.35 (5.1)
<b>00</b>	1 (15)
<b>02</b>	2 (30)
<b>04</b>	3.5 (51)

**Preferred types**

Type	Material number
0431250027A0000	R930004414
043125002700000	R901106616
043125002702000	R901106617
043125002704000	R930000481

Type	Material number

**Dimensions**



Check, poppet type

Common cavity, Size 20

VUCN-20A

04.31.32.00.58 - Z

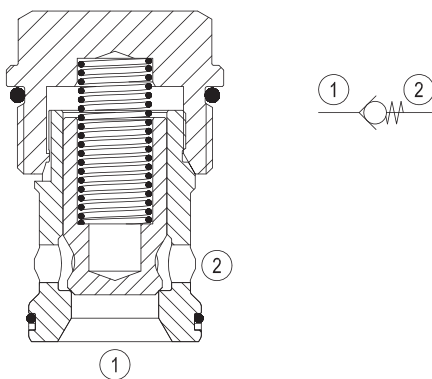


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	360 l/min (95 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	128 - 149 Nm (95 - 110 ft-lbs)
Weight	0.38 kg (0.84 lbs)
Cavity	CA-20A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG20A2010520100 material no: R930005602
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

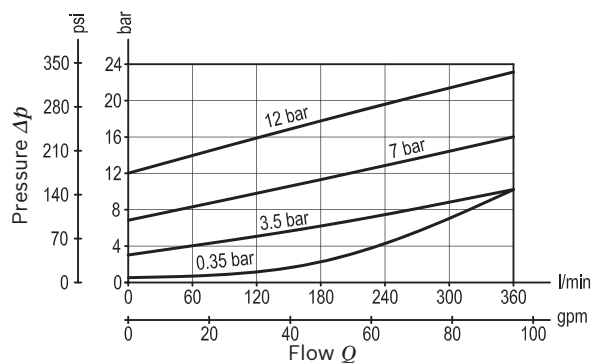
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.32.00</b>	<b>58</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Check, poppet type

SPRINGS	
	Cracking pressure bar (psi)
<b>00</b>	0.35 (5)
<b>01</b>	1 (15)
<b>03</b>	3.5 (51)
<b>07</b>	7 (102)
<b>12</b>	12 (174)

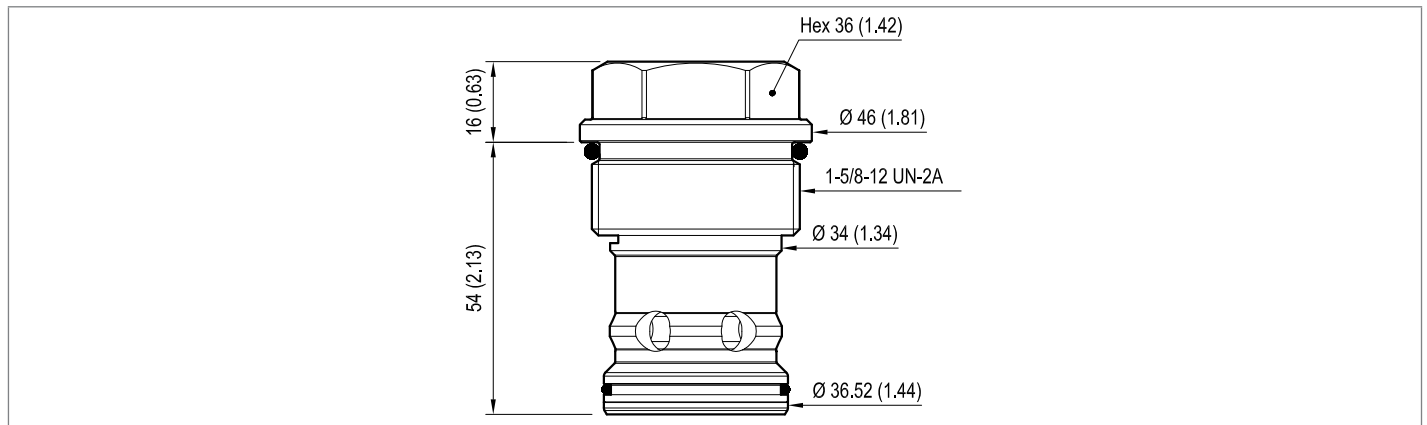
**58** Common cavity, Size 20

**Preferred types**

Type	Material number
043132005800000	R901109780
043132005801000	R930053499
043132005803000	R901109781
043132005807000	R901109783

Type	Material number
043132005812000	R930000319

**Dimensions**





Check, poppet type  
with thermal relief  
Common cavity, Size 10

VUCN-10A-TR

04.31.37 - X - 85 - Z



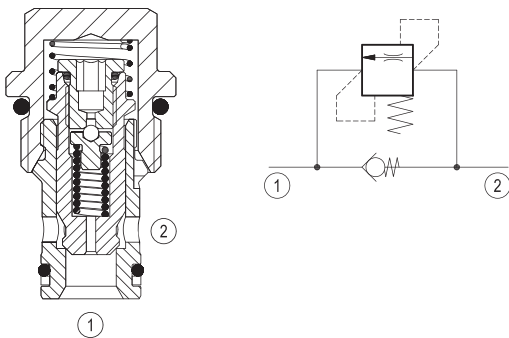
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. If the pressure at 2 increases to meet the thermal relief valve setting, a small amount of oil is allowed from 2 to 1, preventing damage from increasing pressure. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

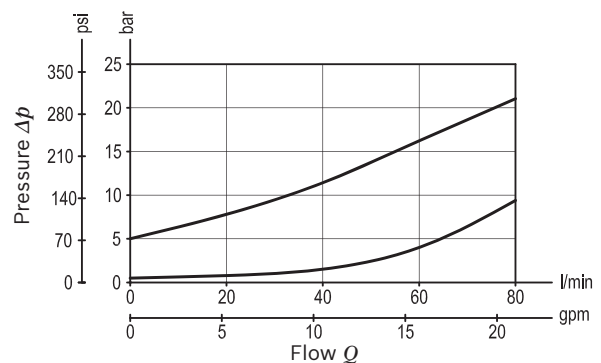
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	80 l/min (21 gpm)
Max. flow relief function	1 l/min. (0.26 gpm)
Thermal relief setting	350 ± 20 bar (5000 ± 290 psi)
Thermal relief reseal	270 bar (4000 psi)
Max. internal leakage	15 drops/min. at 250 bar (3600 psi)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.15 kg (0.33 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A2010520100 material no: R901111363
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.37</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Check, poppet type with thermal relief

Thermal relief Std. Setting bar (psi)

**35** 350 ± 20 (5000 ± 290)

(Different pressure settings available on request)

**85** Common cavity, Size 10

Series O/A to L  
unchanged performances and dimensions

Version and options standard

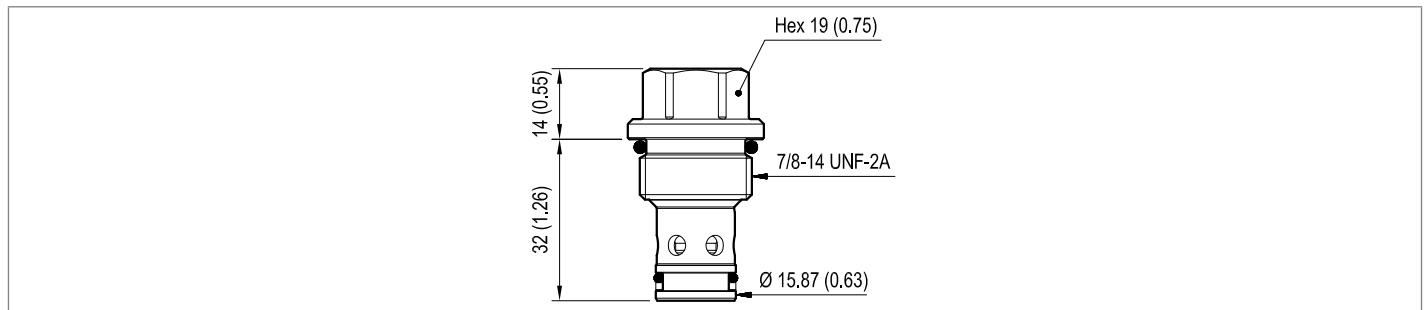
SPRINGS	
Cracking pressure bar (psi)	
<b>00</b>	0.5 (7)
<b>05</b>	5 (72)

**Preferred types**

Type	Material number
04313735850000B	R930005830
043137358505000	R931002579

Type	Material number

**Dimensions**



Check, poppet type  
with thermal relief  
Common cavity, Size 12

VUCN-12A-TR

04.31.37 - X - 57 - Z



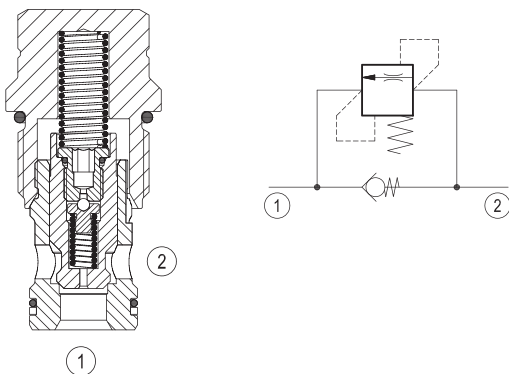
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. If the pressure at 2 increases to meet the thermal relief valve setting, a small amount of oil is allowed from 2 to 1, preventing damage from increasing pressure. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

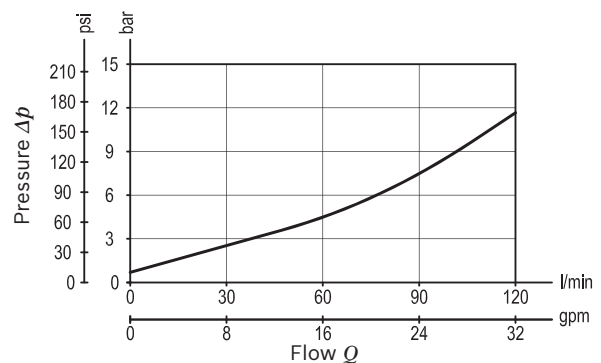
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min (32 gpm)
Max. flow relief function	1 l/min. (0.26 gpm)
Thermal relief setting	350 ± 20 bar (5000 ± 290 psi)
Thermal relief reseal	270 bar (4000 psi)
Max. internal leakage	15 drops/min. at 250 bar (3600 psi)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-12A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A2010520100 material no: R901111377
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.37</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Check, poppet type with thermal relief

Series 0/A to L unchanged performances and dimensions

Version and options standard

Thermal relief Std. Setting bar (psi)

**35** 350 ± 20 (5000 ± 290)

(Different pressure settings available on request)

	<b>SPRINGS</b>
<b>00</b>	1 (14.5)

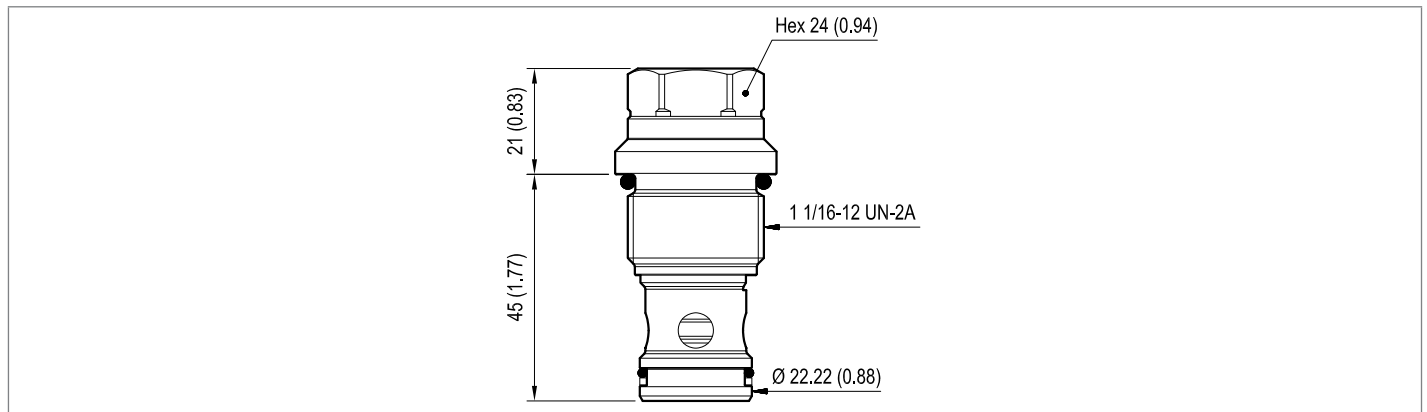
**57** Common cavity, Size 12

**Preferred types**

Type	Material number
04313735570000A	R930005591

Type	Material number
------	-----------------

**Dimensions**



Check, poppet reverse type

Common cavity, Size 08

VURN-08A

04.31.21.00.56 - Z

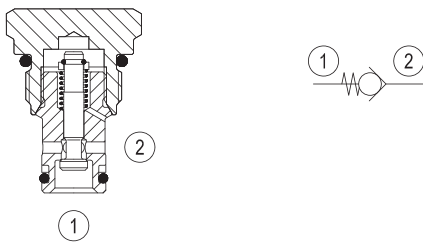


Technical data	
Max. operating pressure	420 bar (6000 psi)
Max. flow	25 l/min (7 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.13 kg (0.29 lbs)
Cavity	CA-08A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG08A2010520100 material no: R901101437
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

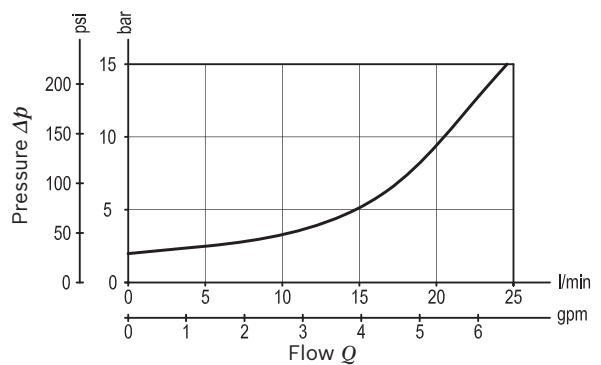
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 1. The valve is closed (checked) from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.21.00</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Check, poppet reverse type

**56** Common cavity, Size 08

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

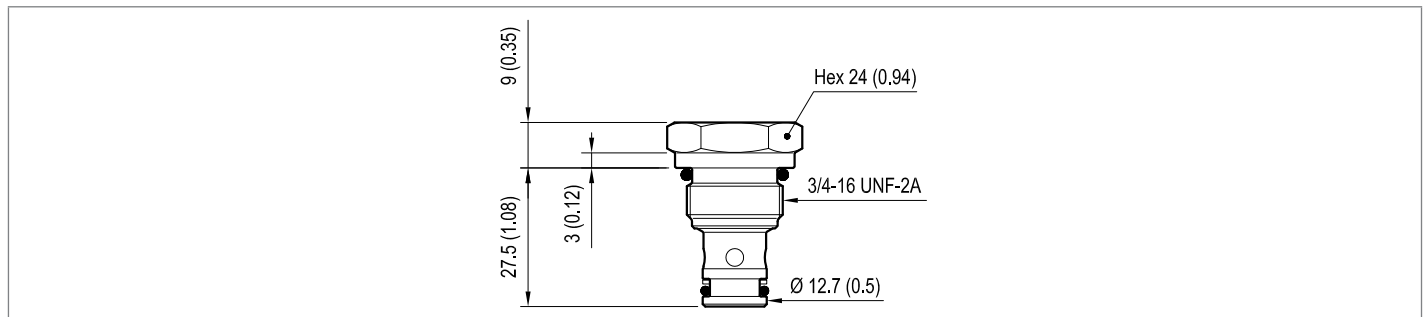
<b>SPRINGS</b>	
Cracking pressure bar (psi)	
<b>02</b>	2 (30)

**Preferred types**

Type	Material number
043121005602000	R901106619

Type	Material number
------	-----------------

**Dimensions**



Check, poppet reverse type

Common cavity, Size 10

VURN-10A

04.31.27.00.85 - Z

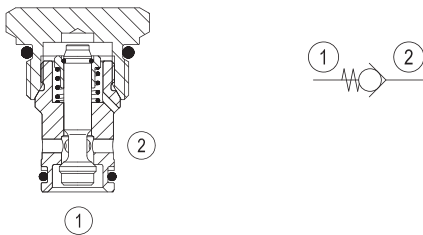


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	60 l/min (16 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.12 kg (0.27 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A2010520100 material no: R901111363
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

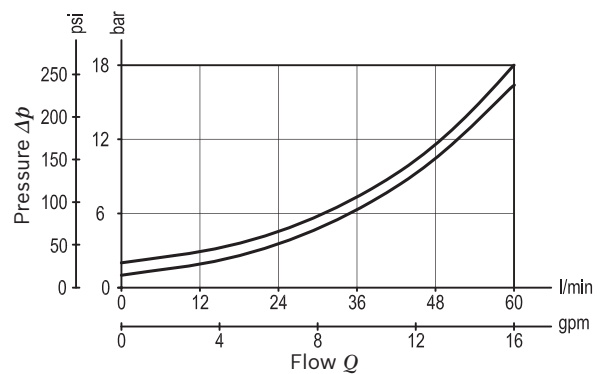
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 1. The valve is closed (checked) from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.27.00</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Check, poppet reverse type

**85** Common cavity, Size 10

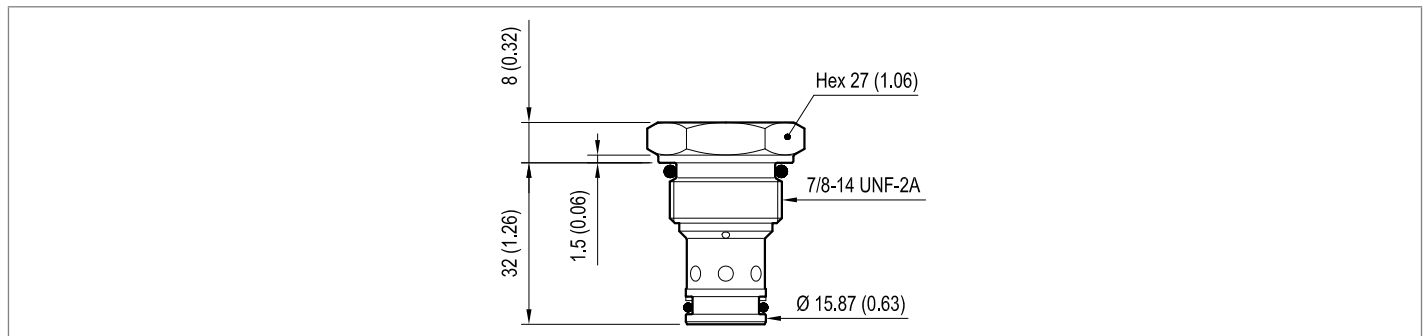
SPRINGS	
Cracking pressure bar (psi)	
<b>00</b>	1 (15)
<b>02</b>	2 (30)

**Preferred types**

Type	Material number
043127008500000	R901106622
043127008502000	R901106623

Type	Material number

**Dimensions**





Check, poppet reverse type

Common cavity, Size 12

VURN-12A

04.31.36.00.57 - Z

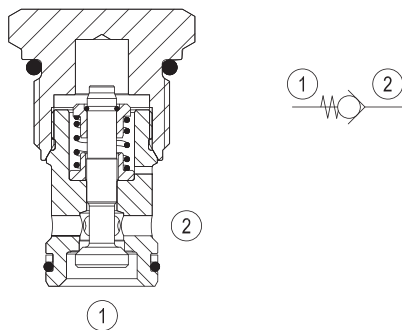


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	90 l/min (24 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-12A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A2010520100 material no: R901111377
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

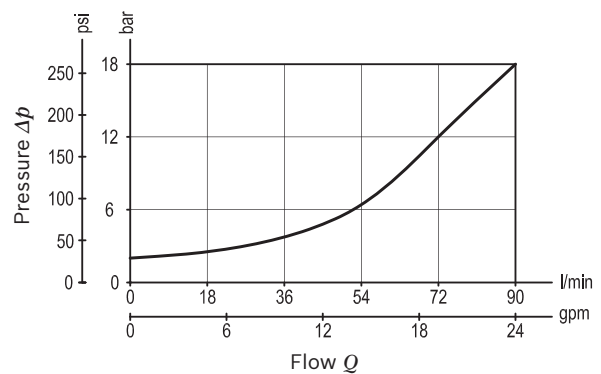
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 1. The valve is closed (checked) from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.31.36.00</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Check, poppet reverse type

**57** Common cavity, Size 12

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

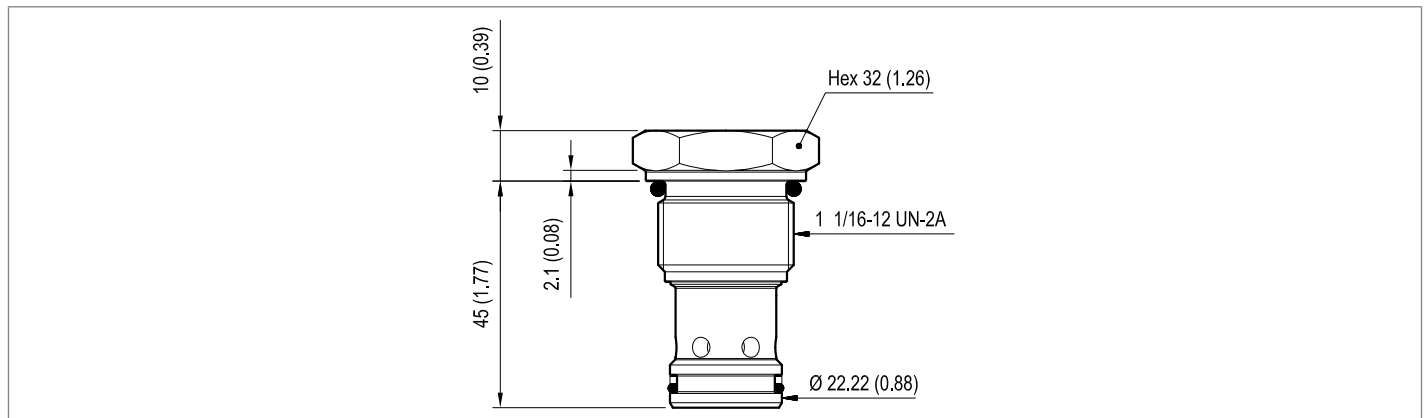
<b>SPRINGS</b>	
Cracking pressure bar (psi)	
<b>02</b>	2 (30)

**Preferred types**

Type	Material number
043136005702000	R930000502

Type	Material number
------	-----------------

**Dimensions**



Check, poppet reverse type

Special cavity, FB

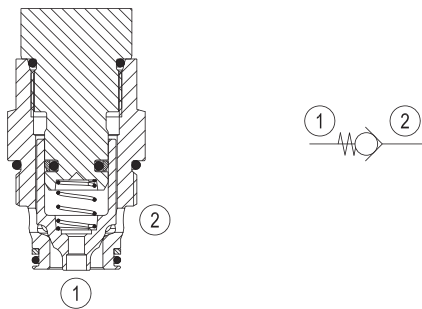
VUR1-16

VUR1.100.00



**Description**

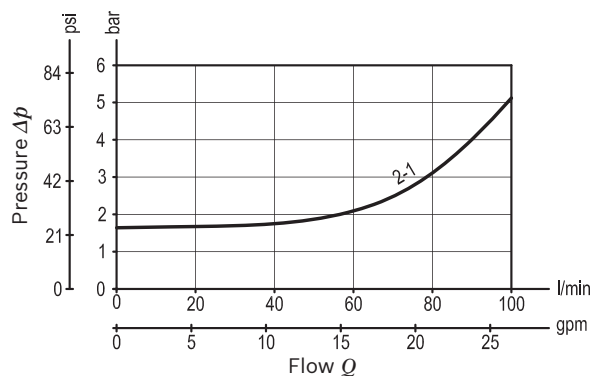
When pressure at 2 rises above the spring bias pressure, the poppet is lifted and flow allowed from 2 to 1. The valve is closed (checked) from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.



Technical data	
Max. operating pressure	420 bar (6000 psi)
Max. flow	100 l/min (26 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F) (Buna N) -20 to 120 °C (-4 to 248 °F) (Viton)
Installation torque <sup>1)</sup>	90 Nm (67 ft-lbs)
Weight	0.14 kg (0.31 lbs)
Special cavity	FB (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (Buna N)	Code: RG16R2010520100 material no: R931002592
Seal kit (Viton)	Code: RG16R2040520100 material no: R931002593
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50
Without surface protection	In case of need of surface protection, please consult factory.

1) Torque valve valid for installation in cast iron and steel manifolds. In case of different body materials, please consult factory.

**Characteristic curve**



**Ordering code**

<b>VUR1.100.00</b>	
--------------------	--

Check, poppet reverse type

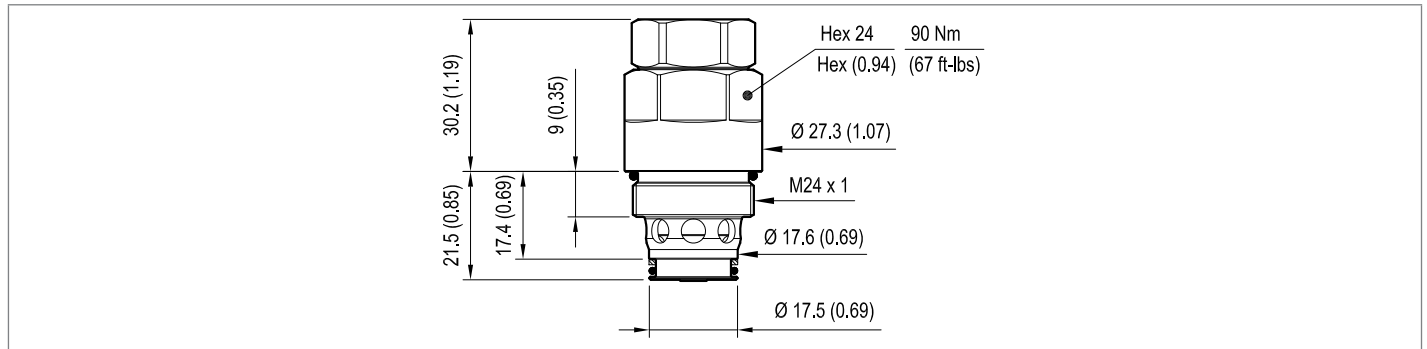
	SPRINGS	O-RING
	Cracking pressure bar (psi)	Material
<b>000</b>	2 (30)	Buna N (NBR)
<b>010</b>	2 (30)	Viton (FKM)

**Preferred types**

Type	Material number
VUR1.100.00.000	R931001849
VUR1.100.00.010	R930050902

Type	Material number

**Dimensions**



Check, poppet reverse type

Special cavity, FC

VUR2-22-FC

VUR2.240.FC

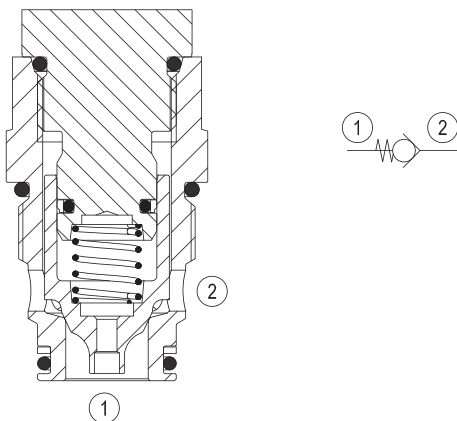


Technical data	
Max. operating pressure	420 bar (6000 psi)
Max. flow	240 l/min (63 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-20 to 120 °C (-4 to 248 °F) (Viton)
Installation torque <sup>1)</sup>	100 Nm (74 ft-lbs)
Weight	0.25 kg (0.55 lbs)
Special cavity	FC (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (Viton)	Code: RG22R2040520100 material no: R930052887
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 380 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50
Without surface protection	In case of need of surface protection, please consult factory.

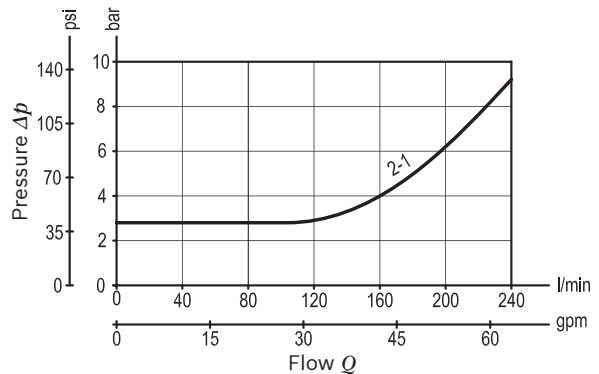
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is lifted and flow allowed from 2 to 1. The valve is closed (checked) from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Torque valve valid for installation in cast iron and steel manifolds. In case of different body materials, please consult factory.



**Characteristic curve**



**Ordering code**

<b>VUR2.240.FC</b>	
--------------------	--

Check, poppet reverse type

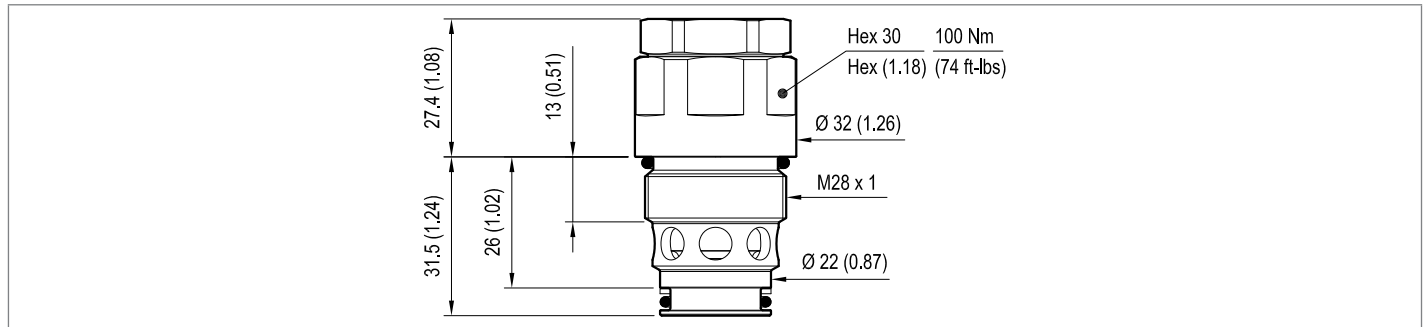
	SPRINGS	O-RING
	Cracking pressure bar (psi)	Material
<b>010</b>	2 (30)	Viton (FKM)

**Preferred types**

Type	Material number
VUR2.240.FC.010	R930054927

Type	Material number

**Dimensions**



Check, poppet reverse type

Special cavity, LG

VUR2-22-LG

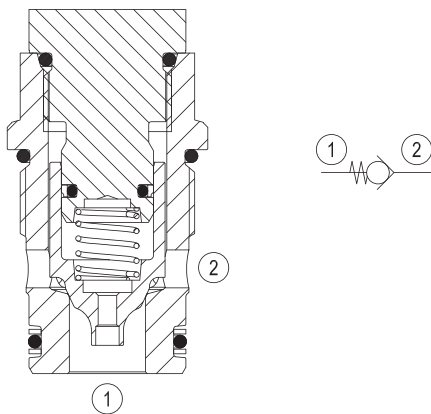
VUR2.240.LG



Technical data	
Max. operating pressure	420 bar (6000 psi)
Max. flow	240 l/min (63 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-20 to 120 °C (-4 to 248 °F) (Viton)
Installation torque <sup>1)</sup>	120 Nm (89 ft-lbs)
Weight	0.28 kg (0.62 lbs)
Special cavity	LG (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (Viton)	Code: RGLGR2040520100 material no: R930054948
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 380 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50
Without surface protection	In case of need of surface protection, please consult factory.

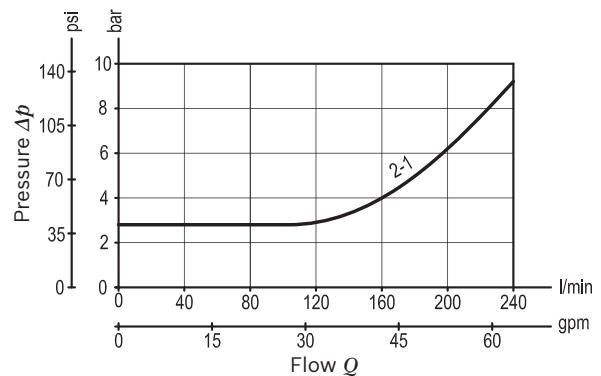
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is lifted and flow allowed from 2 to 1. The valve is closed (checked) from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.



1) Torque valve valid for installation in cast iron and steel manifolds. In case of different body materials, please consult factory.

**Characteristic curve**



**Ordering code**

<b>VUR2.240.LG</b>	
--------------------	--

Check, poppet reverse type

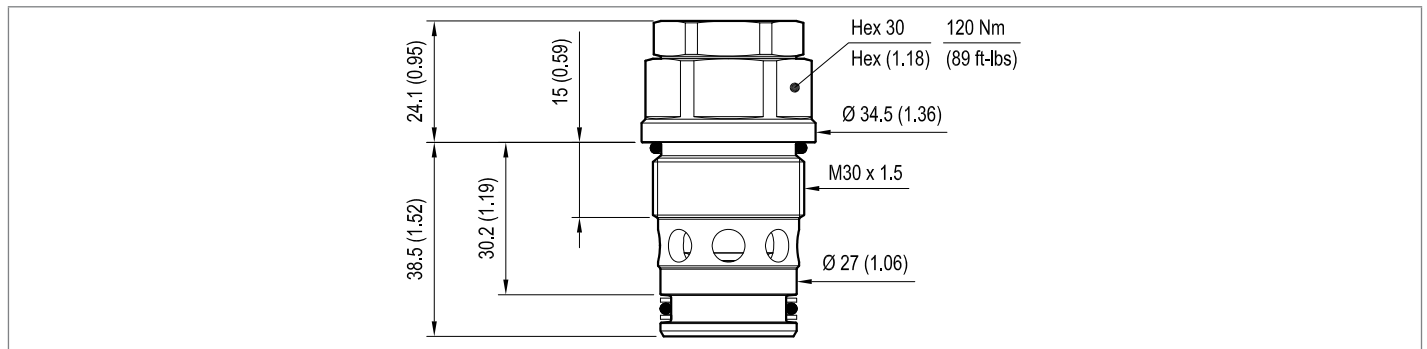
	SPRINGS	O-RING
	Cracking pressure bar (psi)	Material
<b>010</b>	2 (30)	Viton (FKM)

**Preferred types**

Type	Material number
VUR2.240.LG.010	R930054928

Type	Material number

**Dimensions**





Pilot operated check,  
pilot to open  
Common cavity, Size 08

VSON-08A

04.33.06 - X - 56 - Z

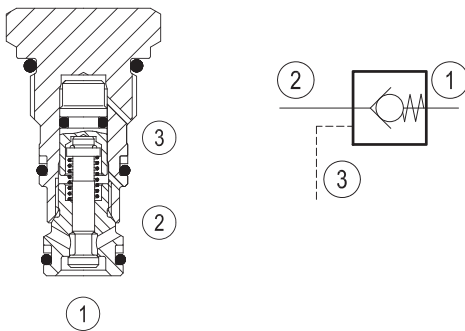


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	30 l/min (8 gpm)
Pilot ratio	3:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.12 kg (0.27 lbs)
Cavity	CA-08A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG08A9010520100 material no: R901101592
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

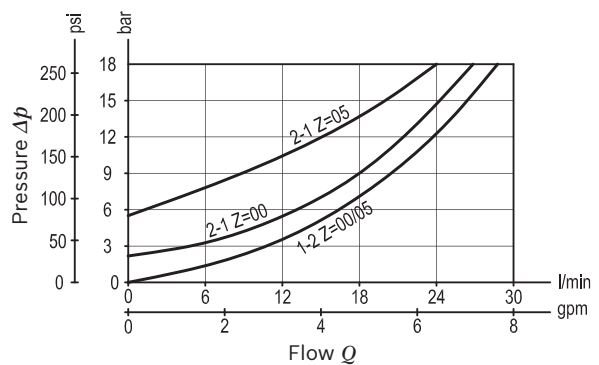
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 1. The valve is normally closed (checked) from 1 to 2. When sufficient pilot pressure is present at port 3, the pilot piston acts to push the poppet from its seat and flow is allowed from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.33.06</b>	<b>X</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Pilot operated check, pilot to open

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

**56** Common cavity, Size 08

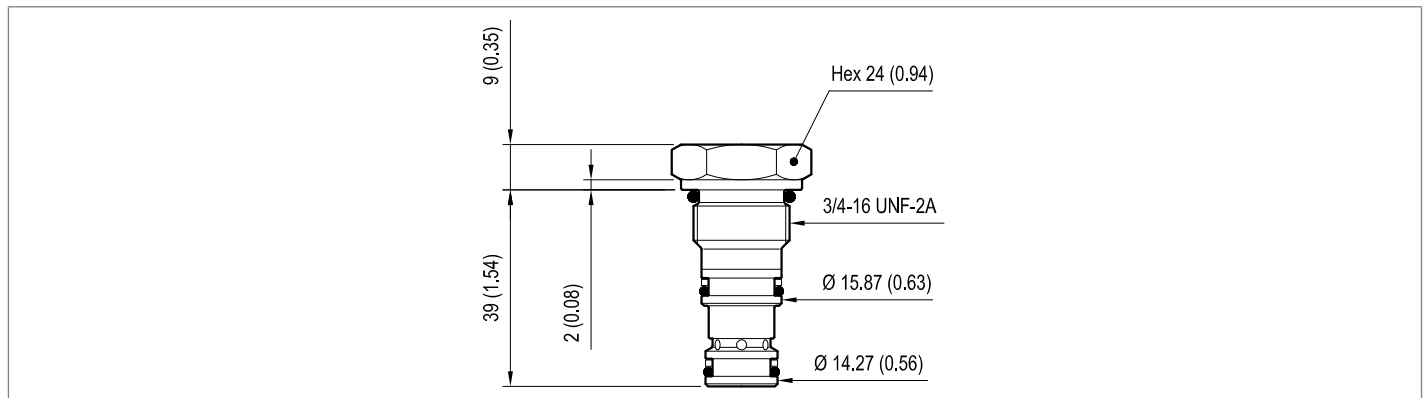
SPRINGS	
Cracking pressure bar (psi)	
<b>00</b>	2 (30)
<b>05</b>	5 (75)

**Preferred types**

Type	Material number
04330600560000A	R901106627
043306005605000	R930000982
04330610560000A	R901099896
043306105605000	R930000818

Type	Material number

**Dimensions**



Pilot operated check,  
pilot to open  
Common cavity, Size 10

VSON-10A

04.33.05 - X - 85 - Z



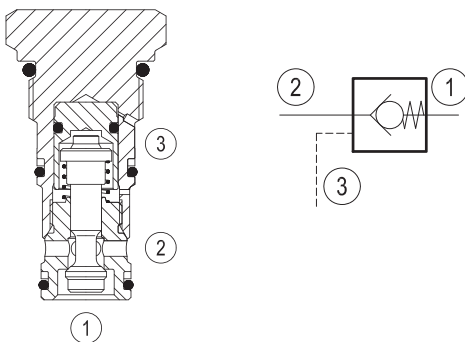
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 1. The valve is normally closed (checked) from 1 to 2. When sufficient pilot pressure is present at port 3, the pilot piston acts to push the poppet from its seat and flow is allowed from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

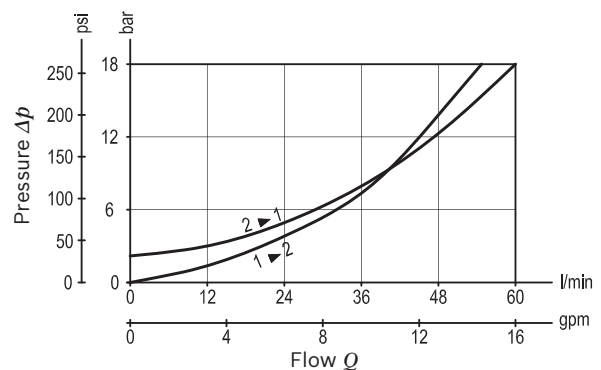
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	60 l/min. (16 gpm)
Pilot ratio	3.2:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.12 kg (0.27 lbs)
Cavity	CA-10A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup> - Buna	Code: RG10A9010520100 material no: R901111367
Seal kit <sup>1)</sup> - Viton	Code: RG10A9040520100 material no: R930006366
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.33.05</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>*0</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Pilot operated check, pilot to open

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

**85** Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

V= version Viton  
0= version Buna

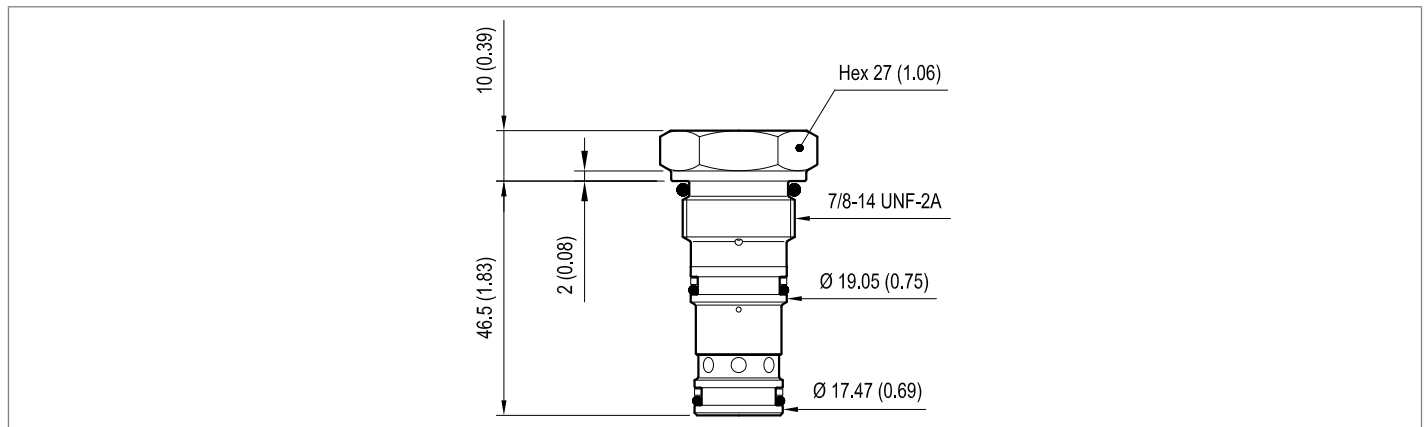
SPRINGS	
	Cracking pressure bar (psi)
<b>00</b>	2 (30)

**Preferred types**

Type	Material number
04330500850000A	R901106629
04330510850000A	R901106632
043305108500V00	R930006365

Type	Material number

**Dimensions**



Pilot operated check,  
pilot to open  
SUN cavity interchange, T-11A

VSON-08U

04.33.06 - X - 20 - Z

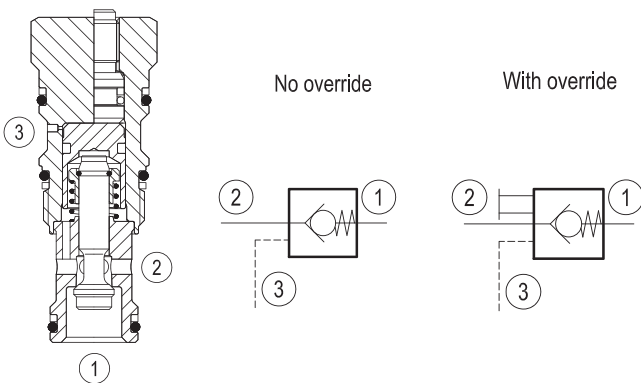


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	60 l/min. (16 gpm)
Pilot ratio	3.2:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	40 - 50 Nm (30 - 37 ft-lbs)
Weight	0.12 kg (0.27 lbs)
Cavity	SUN T-11A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG08U9020110100 material no: R901193388
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

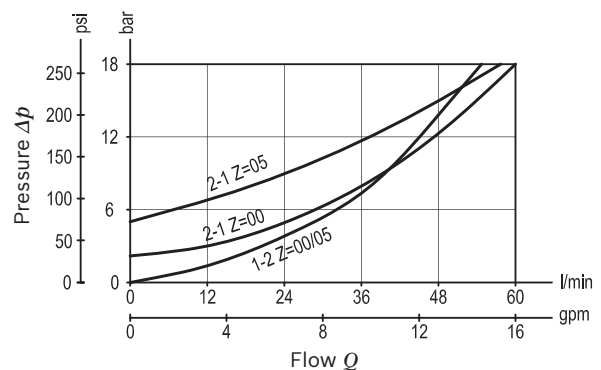
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 1. The valve is normally closed (checked) from 1 to 2. When sufficient pilot pressure is present at port 3, the pilot piston acts to push the poppet from its seat and flow is allowed from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition. Available with "manual override" option.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.33.06</b>	<b>X</b>	<b>20</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Pilot operated check, pilot to open

Version and options standard

**Options**

<b>00</b>	No O-Ring, no manual override
<b>10</b>	With O-Ring, no manual override
<b>01</b>	No O-Ring, with manual override
<b>11</b>	With O-Ring, with manual override

SPRINGS	
	Cracking pressure bar (psi)
<b>00</b>	2 (30)
<b>05</b>	5 (73)

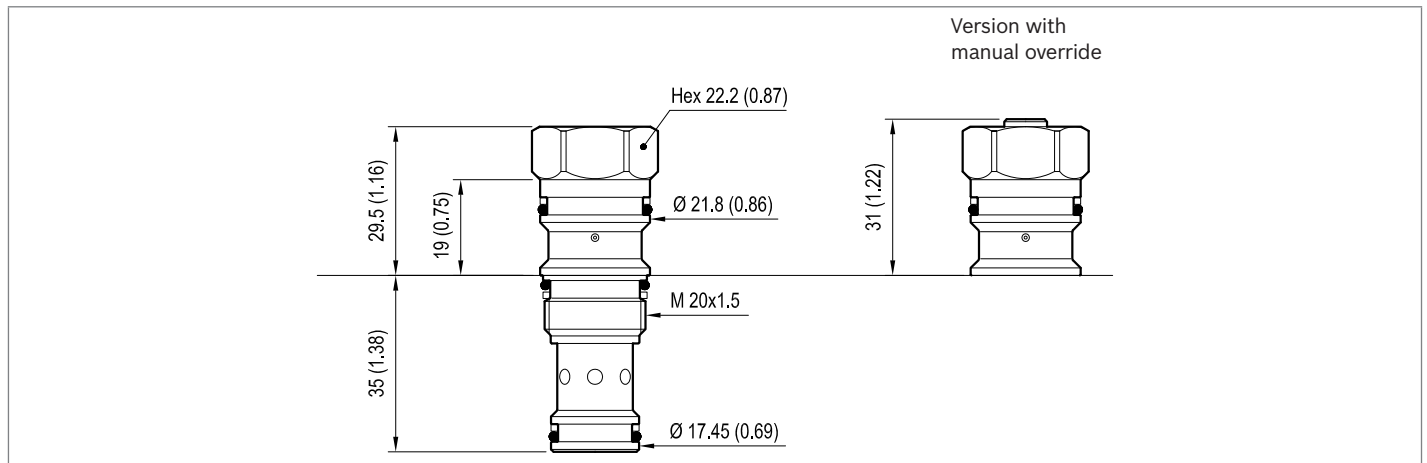
**20** SUN cavity interchange, SUN T-11A

**Preferred types**

Type	Material number
04330600200000A	R901106637
04330610200000A	R901104068
043306012000000	R930005647
043306112000000	R930001975

Type	Material number
043306002005000	R930056986
043306102005000	R930056987
043306012005000	R930056988
043306112005000	R930056989

**Dimensions**



Pilot operated check,  
pilot to open  
Common cavity, Size 12

VSON-12A

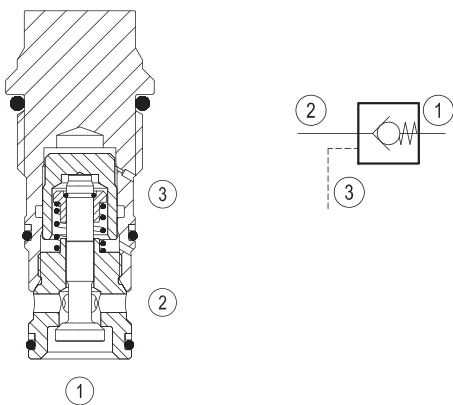
04.33.07 - X - 57 - Z



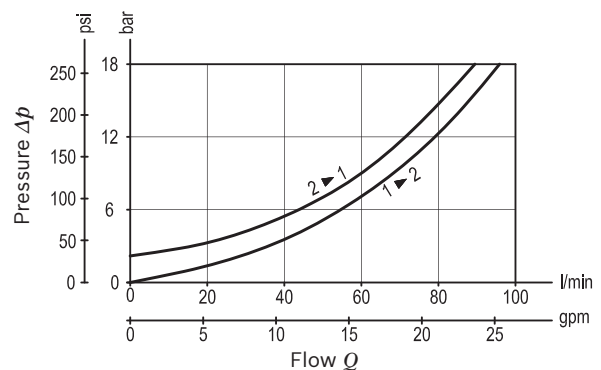
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min. (32 gpm)
Pilot ratio	3.2:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.25 kg (0.55 lbs)
Cavity	CA-12A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A9010520100 material no: R901111379
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 1. The valve is normally closed (checked) from 1 to 2. When sufficient pilot pressure is present at port 3, the pilot piston acts to push the poppet from its seat and flow is allowed from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.



**Characteristic curve**



**Ordering code**

<b>04.33.07</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Pilot operated check, pilot to open

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

**57** Common cavity, Size 12

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

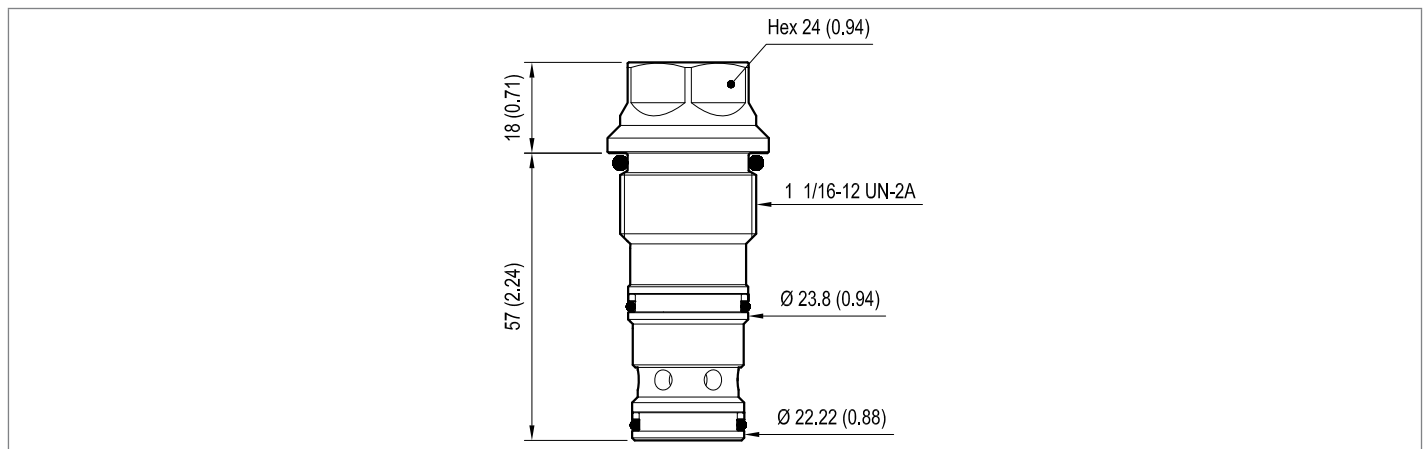
SPRINGS	
	Cracking pressure bar (psi)
<b>00</b>	2 (30)

**Preferred types**

Type	Material number
043307005700000	R930006106
043307105700000	R901106634

Type	Material number

**Dimensions**





Pilot operated check,  
pilot to open  
SUN cavity interchange, T-2A

VSON-12U

04.33.07 - X - 86 - Z

1

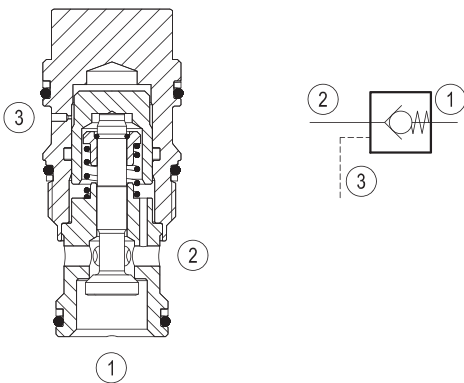


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min. (32 gpm)
Pilot ratio	3.2:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	60 - 70 Nm (44 - 52 ft-lbs)
Weight	0.25 kg (0.55 lbs)
Cavity	SUN T-2A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12U9020110100 material no: R930005599
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

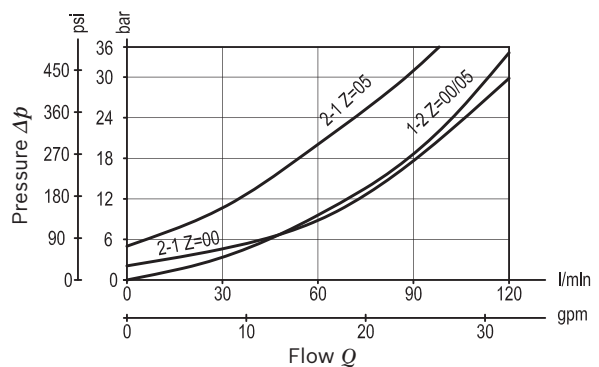
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 1. The valve is normally closed (checked) from 1 to 2. When sufficient pilot pressure is present at port 3, the pilot piston acts to push the poppet from its seat and flow is allowed from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.33.07</b>	<b>X</b>	<b>86</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Pilot operated check, pilot to open

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

**86** SUN cavity interchange, SUN T-2A

**SPRINGS**

Cracking pressure  
bar (psi)

**00** 2 (30)

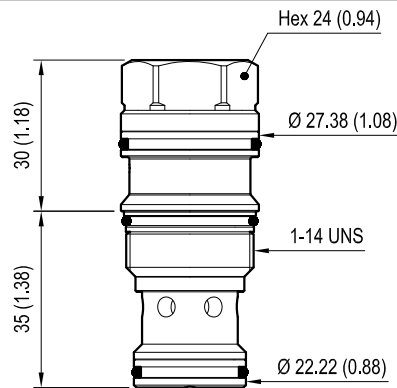
**05** 5 (73)

**Preferred types**

Type	Material number
04330700860000A	R901106638
04330710860000A	R901106639

Type	Material number
043307008605000	R930054250
043307108605000	R930054274

**Dimensions**



Pilot operated check,  
pilot to open  
Common cavity, Size 16

VSON-16A

04.33.08 - X - 27 - Z

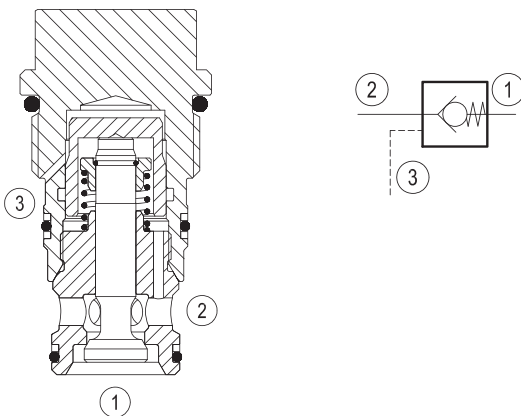


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	200 l/min. (53 gpm)
Pilot ratio	3:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.32 kg (0.71 lbs)
Cavity	CA-16A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG16A9010520100 material no: R901111388
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

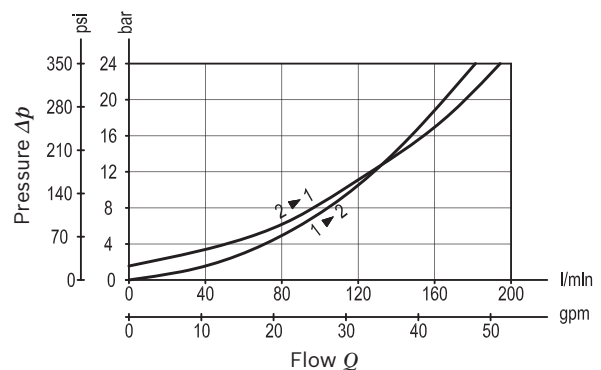
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 1. The valve is normally closed (checked) from 1 to 2. When sufficient pilot pressure is present at port 3, the pilot piston acts to push the poppet from its seat and flow is allowed from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.33.08</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Pilot operated check, pilot to open

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

**27** Common cavity, Size 16

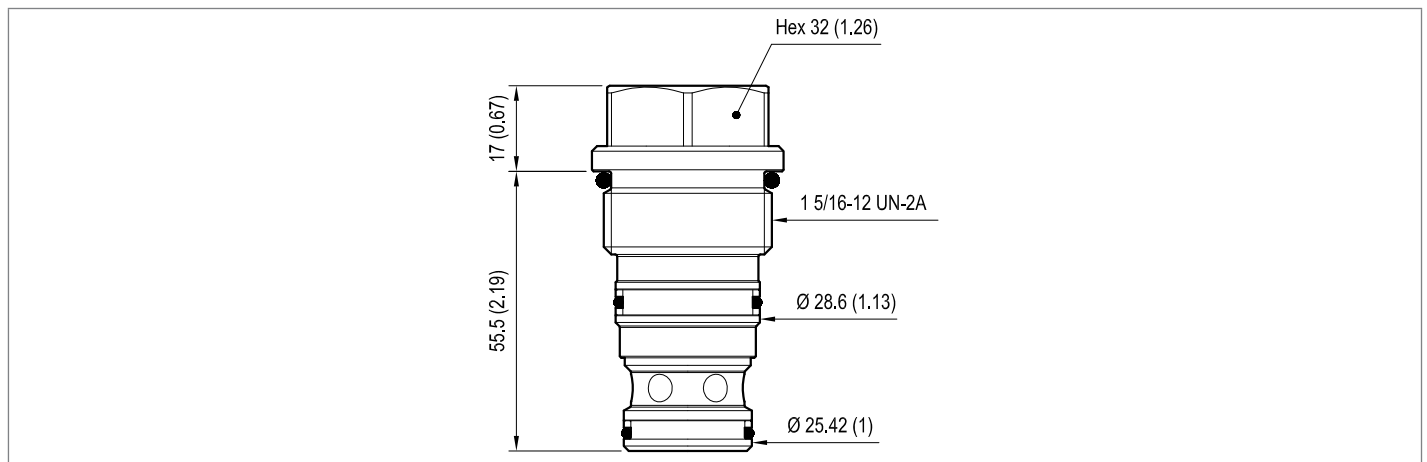
SPRINGS	
	Cracking pressure bar (psi)
<b>00</b>	1.5 (22)

**Preferred types**

Type	Material number
043308002700000	R901106635
043308102700000	R901106636

Type	Material number

**Dimensions**



Pilot operated check,  
pilot to open  
SUN cavity interchange, T-17A

VSON-16U

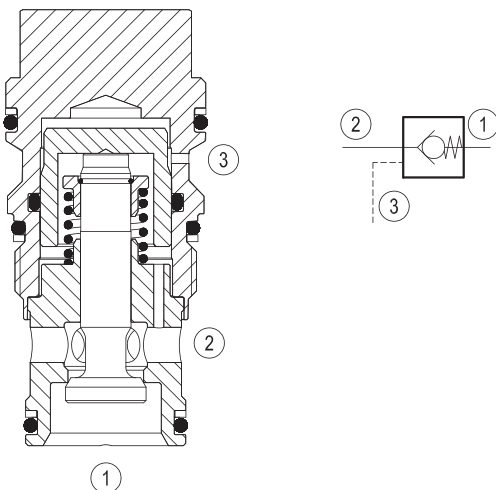
04.33.09 - X - 47 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	240 l/min. (63 gpm)
Pilot ratio	3:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	200 - 215 Nm (148 - 159 ft-lbs)
Weight	0.67 kg (1.48 lbs)
Cavity	SUN T-17A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG16U9020110100 material no: R930000995
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

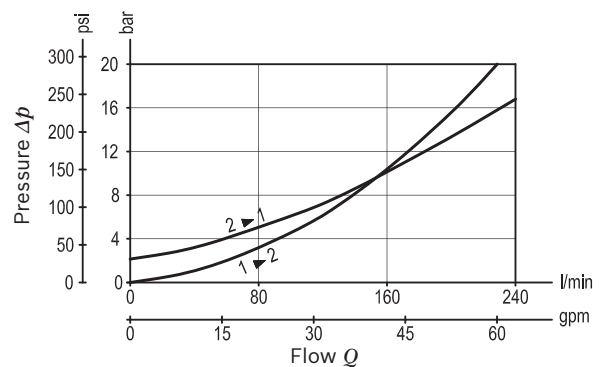
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 1. The valve is normally closed (checked) from 1 to 2. When sufficient pilot pressure is present at port 3, the pilot piston acts to push the poppet from its seat and flow is allowed from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.



1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.33.09</b>	<b>X</b>	<b>47</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Pilot operated check, pilot to open

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

**47** SUN cavity interchange, SUN T-17A

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

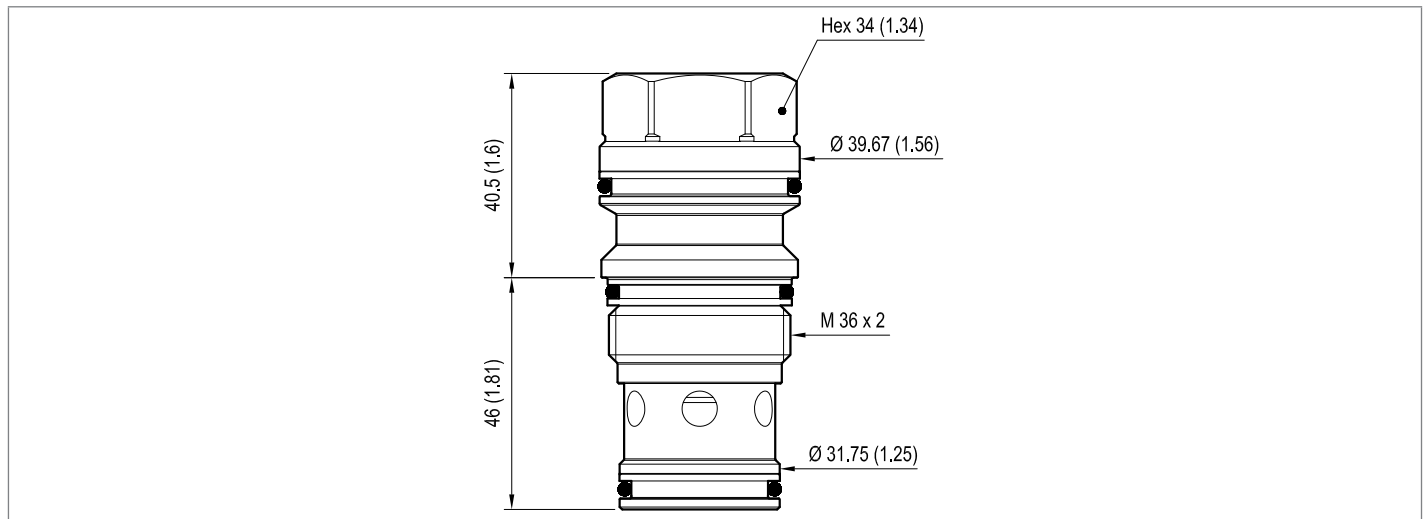
SPRINGS	
	Cracking pressure bar (psi)
<b>00</b>	1.5 (22)

**Preferred types**

Type	Material number
043309004700000	R901106640
043309104700000	R901106641

Type	Material number

**Dimensions**



Pilot operated check,  
pilot to open  
Common cavity, Size 08

VSOA-08A

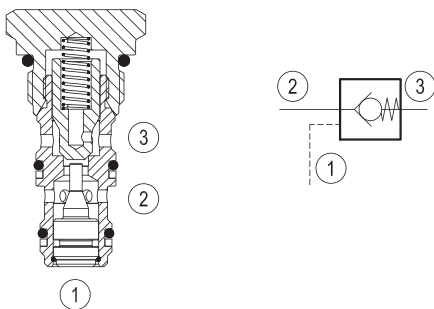
04.33.10 - X - 56 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	30 l/min. (8 gpm)
Pilot ratio	3.2:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	40 - 45 Nm (29 - 33 ft-lbs)
Weight	0.08 kg (0.18 lbs)
Cavity	CA-08A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG08A3010520100 material no: R930000861
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

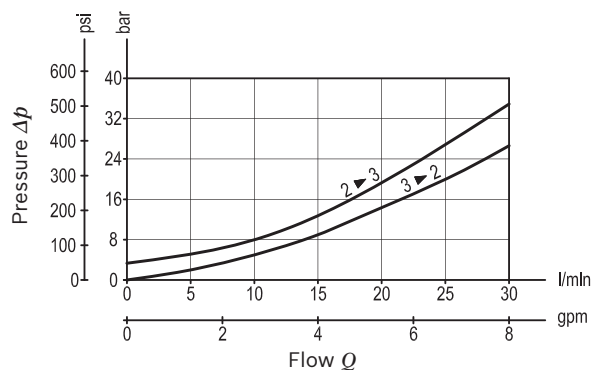
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 3. The valve is normally closed (checked) from 3 to 2. When sufficient pilot pressure is present at port 1, the pilot piston acts to push the poppet from its seat and flow is allowed from 3 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.



1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.33.10</b>	<b>X</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Pilot operated check, pilot to open

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring (available only for Z=05)

**56** Common cavity, Size 08

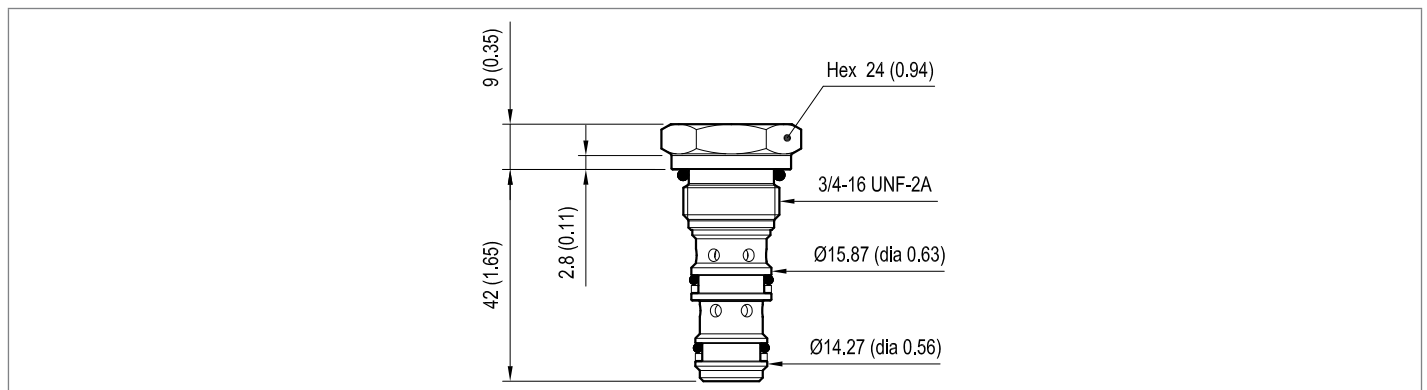
SPRINGS	
Cracking pressure bar (psi)	
<b>00</b>	1 (15)
<b>05</b>	5 (73)

**Preferred types**

Type	Material number
043310005600000	R930000836
043310005605000	R930000846
043310105605000	R930000847

Type	Material number

**Dimensions**





Pilot operated check,  
pilot to open  
Common cavity, Size 10

VSOA-10A

04.33.10 - X - 85 - Z

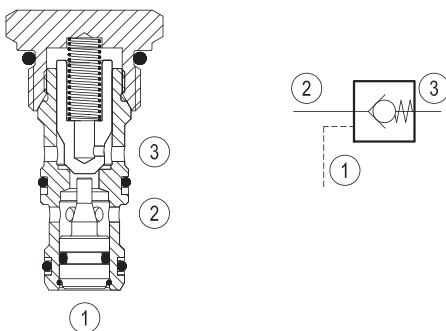


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	40 l/min. (11 gpm)
Pilot ratio	3:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.11 kg (0.24 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A3010530100 material no: R930000990
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

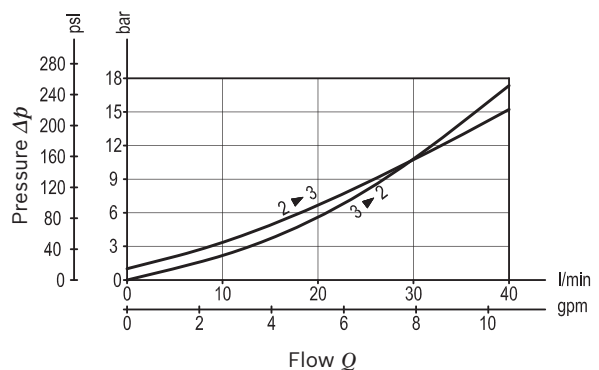
**Description**

When pressure at 2 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 3. The valve is normally closed (checked) from 3 to 2. When sufficient pilot pressure is present at port 1, the pilot piston acts to push the poppet from its seat and flow is allowed from 3 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.33.10</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Pilot operated check, pilot to open

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring (only for Z=03 and Z=14)

**85** Common cavity, Size 10

**SPRINGS**

Cracking pressure  
bar (psi)

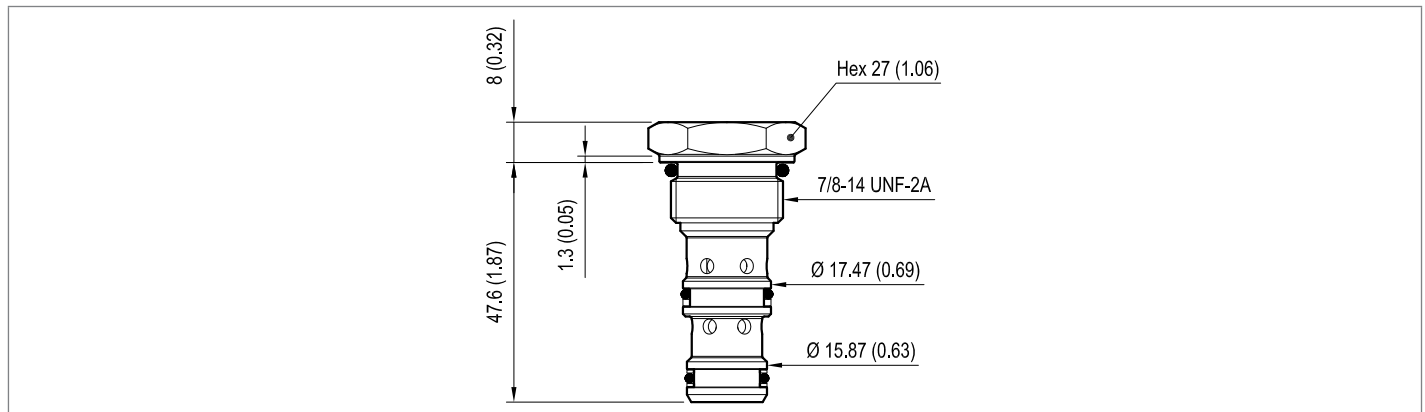
<b>00</b>	1 (15)
<b>03</b>	3.5 (51)
<b>14</b>	14 (203)

**Preferred types**

Type	Material number
043310008500000	R901117416
043310008503000	R901117420
043310008514000	R930000988

Type	Material number
043310108500000	R901117418
043310108503000	R901117421
043310108514000	R930000989

**Dimensions**



Dual pilot operated check,  
pilot to open  
Common cavity, Size 10

VSOD-10A

04.36.03 - X - 85 - Z

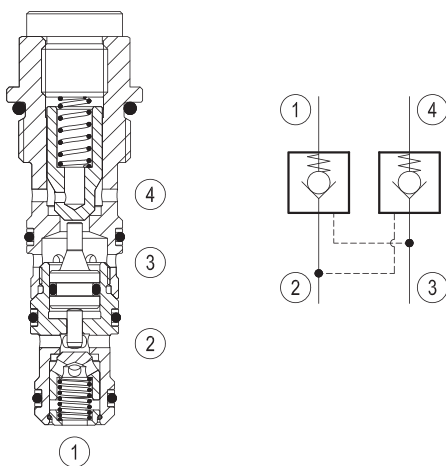


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	30 l/min. (8 gpm)
Pilot ratio	3:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.14 kg (0.31 lbs)
Cavity	CA-10A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A4010530100 material no: R901111373
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

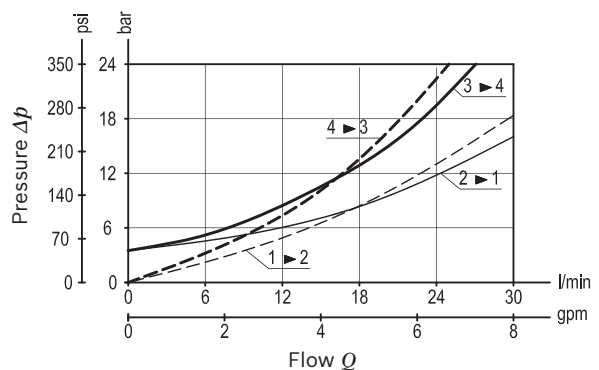
**Description**

When pressure at port 2 or port 3 rises above the spring bias pressure, the poppet is pushed from its seat and flow is allowed from 2 to 1 or 3 to 4. The valve is normally closed (checked) from 1 to 2 and from 4 to 3. When sufficient pilot pressure is present at port 3 or port 2, the pilot piston acts to push the poppet from its seat and flow is allowed from 1 to 2 or from 4 to 3. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.36.03</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Dual pilot operated check, pilot to open

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

**85** Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

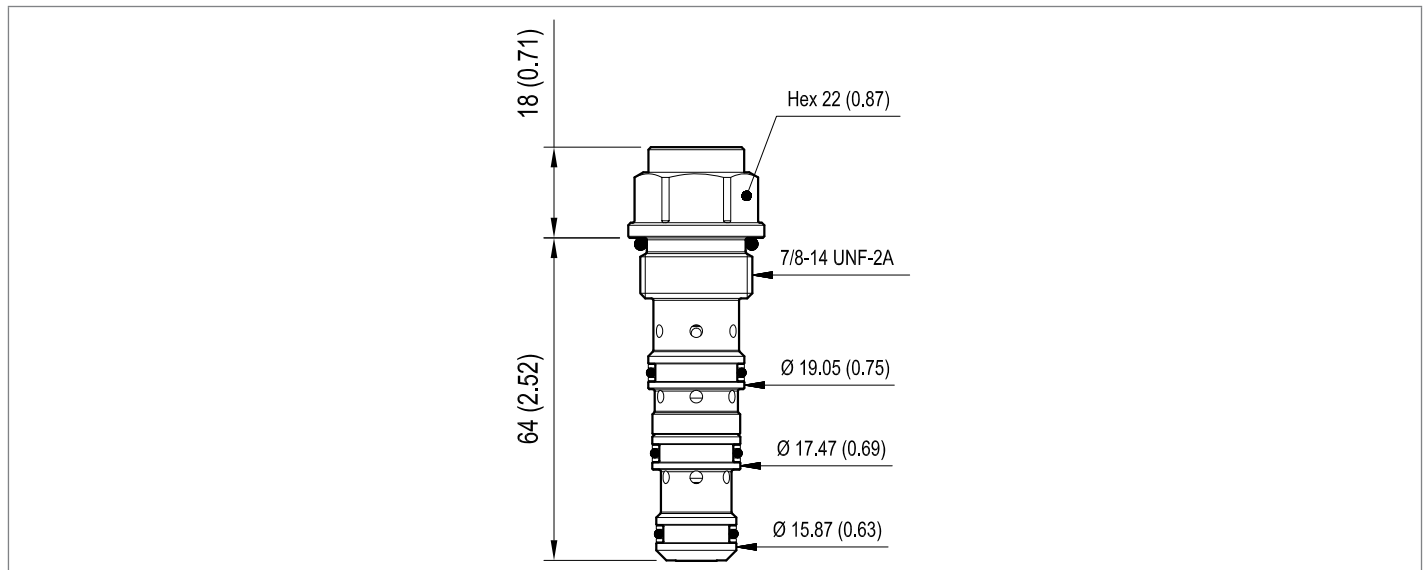
SPRINGS	
	Cracking pressure bar (psi)
<b>03</b>	3.5 (51)

**Preferred types**

Type	Material number
043603008503000	R930000016
043603108503000	R930000015

Type	Material number

**Dimensions**



Pilot operated check,  
pilot to close  
Common cavity, Size 10

VUPC-10A

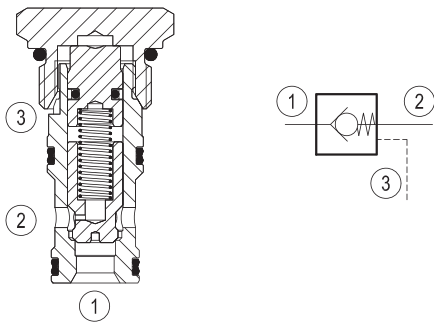
04.34.04 - X - 85 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	70 l/min. (18 gpm)
Pilot ratio	1.9:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.15 kg (0.33 lbs)
Cavity	CA-10A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
MTTFd	150 years see data sheet 18350-51
Seal kit <sup>1)</sup>	Code: RG10A9010530100 material no: R901111368
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

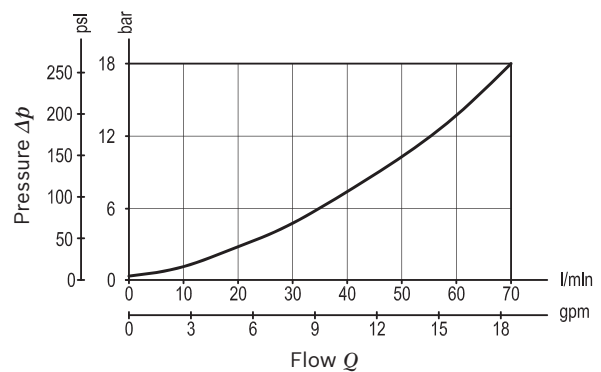
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. When sufficient pilot pressure is present at port 3, the pilot piston acts to hold the poppet on its seat and flow is blocked from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.



1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.34.04</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Pilot operated check, pilot to close

O-Ring on pilot piston

**10** With O-Ring

**85** Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

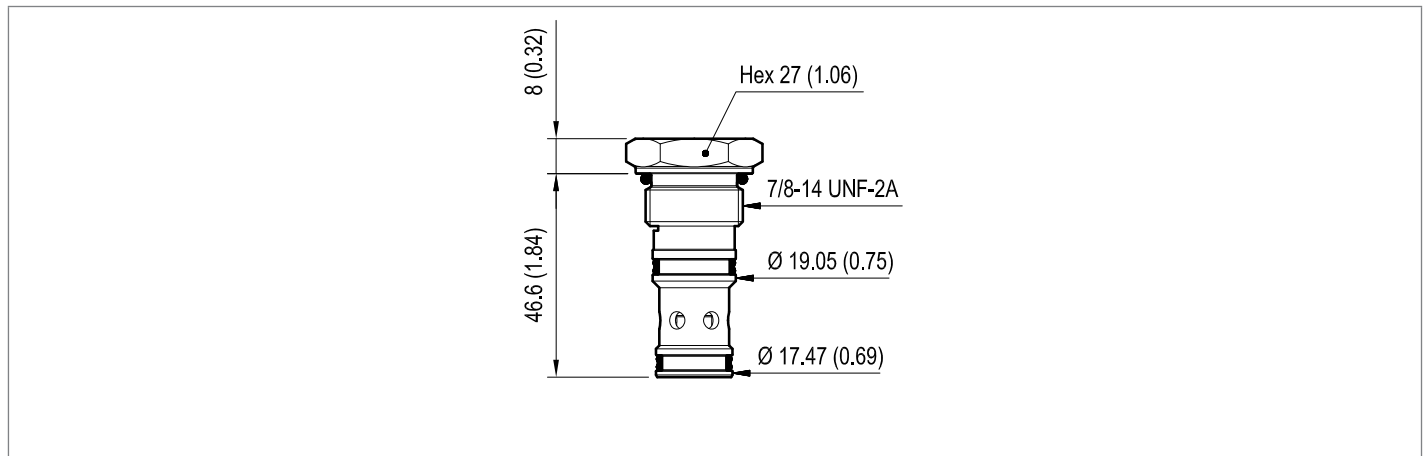
SPRINGS	
	Cracking pressure bar (psi)
<b>00</b>	0.5 (7)

**Preferred types**

Type	Material number
043404108500000	R930000552

Type	Material number

**Dimensions**



Pilot operated check,  
pilot to close  
Common cavity, Size 12

VUPC-12A

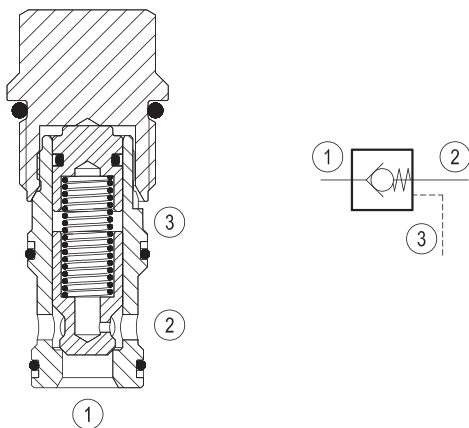
04.34.04 - X - 57 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min. (32 gpm)
Pilot ratio	2:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.25 kg (0.55 lbs)
Cavity	CA-12A-3C (see data sheet 18325-70)
MTTFd	150 years see data sheet 18350-51
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A9010520100 material no: R901111379
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

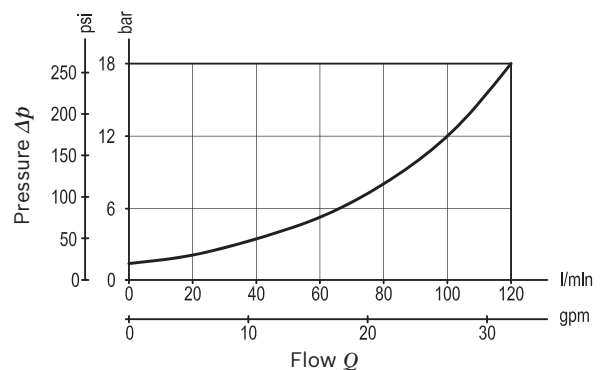
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. When sufficient pilot pressure is present at port 3, the pilot piston acts to hold the poppet on its seat and flow is blocked from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.



1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.34.04</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Pilot operated check, pilot to close

Version and options standard

O-Ring on pilot piston

**10** With O-Ring

SPRINGS	
Cracking pressure bar (psi)	
<b>00</b>	1 (15)
<b>05</b>	5 (72)

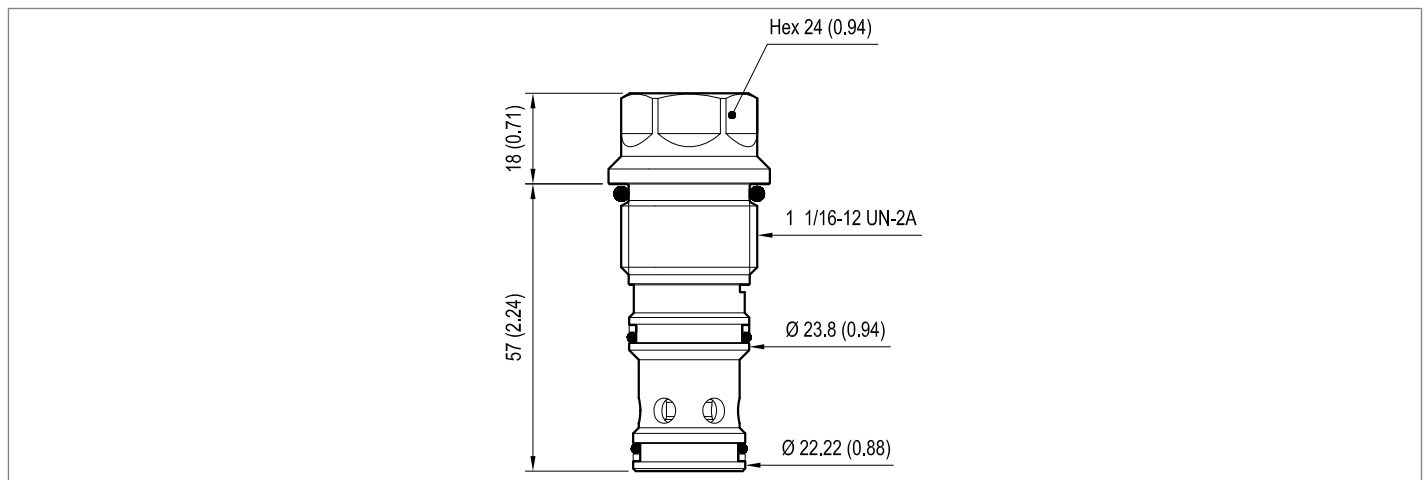
**57** Common cavity, Size 12

**Preferred types**

Type	Material number
043404105700000	R901106642
043404105705000	R901161977

Type	Material number

**Dimensions**





Pilot operated check,  
pilot to close  
SUN cavity interchange, T-19A

VUPC-25U

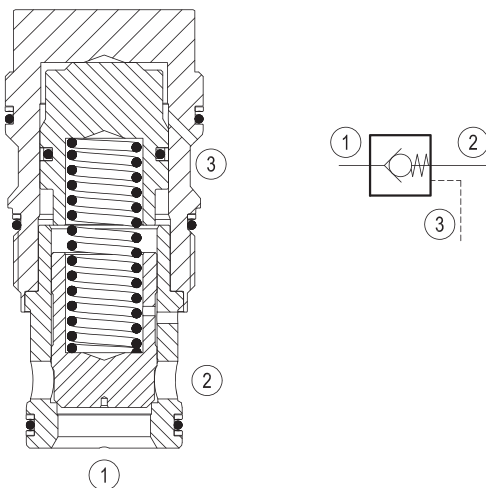
04.34.04 - X - 50 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	560 l/min. (148 gpm)
Pilot ratio	1.9:1
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	465 - 500 Nm (344 - 370 ft-lbs)
Weight	1.2 kg (2.6 lbs)
Cavity	SUN T-19A
MTTFd	150 years see data sheet 18350-51
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG25U9020140100 material no: R930007031
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

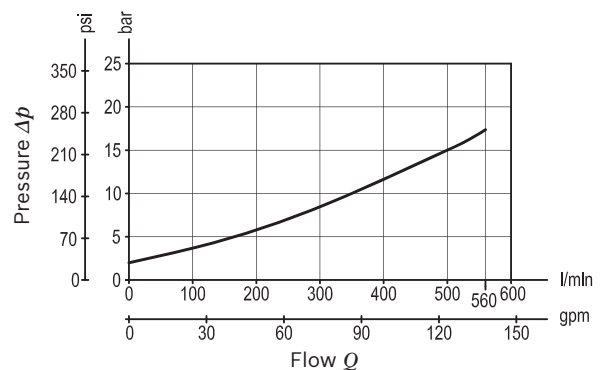
**Description**

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. When sufficient pilot pressure is present at port 3, the pilot piston acts to hold the poppet on its seat and flow is blocked from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.



1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.34.04</b>	<b>X</b>	<b>50</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Series 0/A to L  
unchanged performances and dimensions

Pilot operated check, pilot to close

Version and options standard

O-Ring on pilot piston

**10** With O-Ring

SPRINGS	
Cracking pressure bar (psi)	
<b>00</b>	1 (15)
<b>02</b>	2 (29)

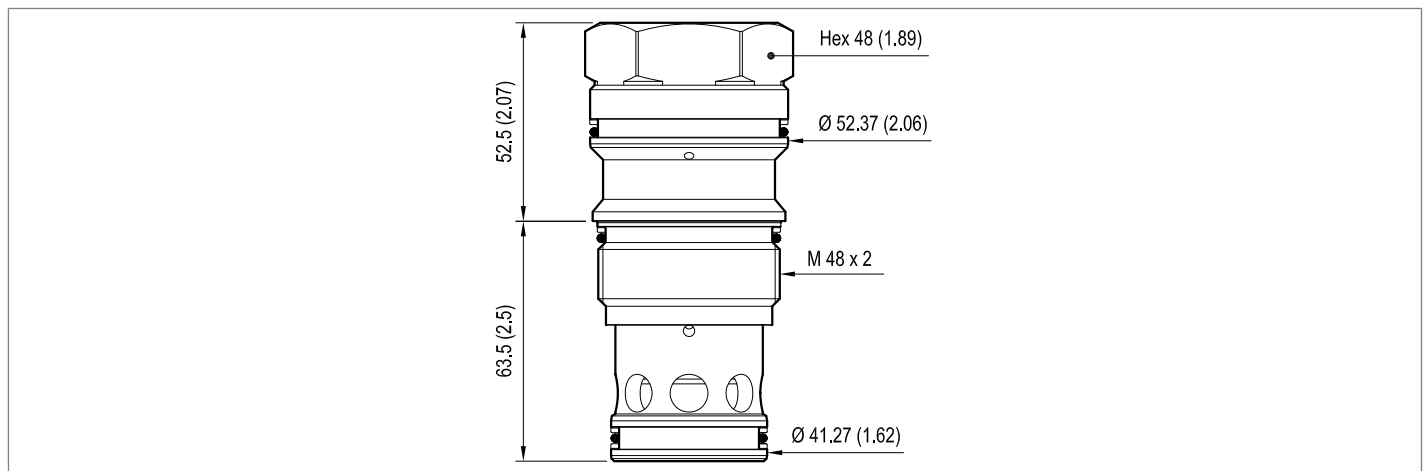
**50** SUN cavity interchange, T-19A

**Preferred types**

Type	Material number
043404105000000	R930007037
043404105002000	R930007030

Type	Material number

**Dimensions**



Directional poppet type, shuttle

Special cavity, CA-04A-3Y

SELC-04A

04.94.07.00.54.00

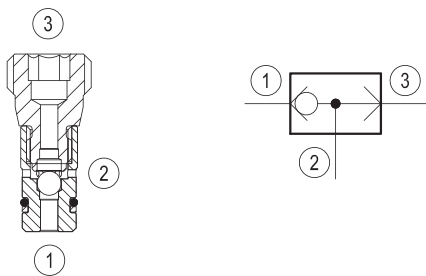


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	See performance graph
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	10 Nm (7 ft-lbs)
Weight	0.01 kg (0.02 lbs)
Special cavity	CA-04A-3Y (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG0939010520100 material no: R930001705
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

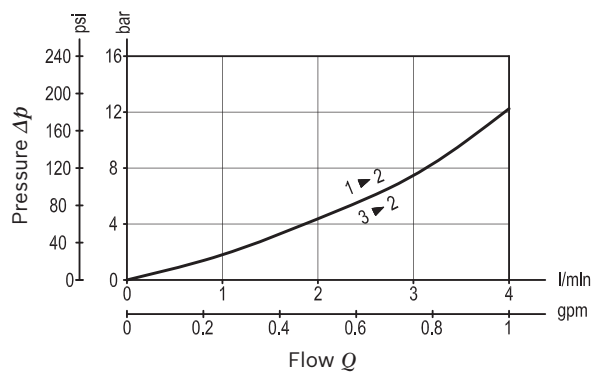
**Description**

The single ball shuttle allows flow from the higher pressure of two work ports 1 and 3 to the 2 port.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.94.07.00</b>	<b>54</b>	<b>00</b>	<b>00</b>	<b>*</b>
--------------------	-----------	-----------	-----------	----------

Directional poppet type, shuttle

Special cavity, CA-04A-3Y

Series O/A to L  
unchanged performances and dimensions

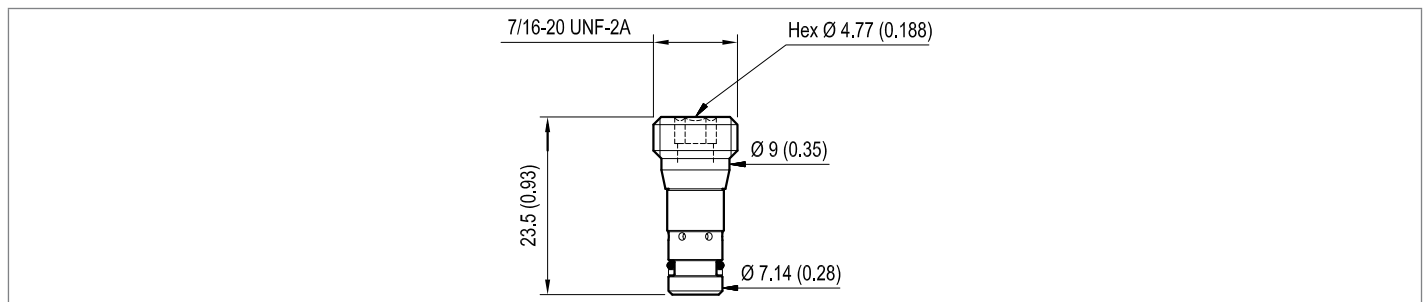
Version and options standard

**Preferred types**

Type	Material number
049407005400000	R930005663

Type	Material number

**Dimensions**



Directional poppet type, shuttle

Common cavity, Size 08

SELB-08A

04.94.05.00.56.00

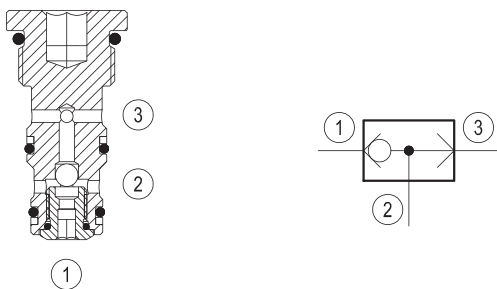


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	See performance graph
Max. internal leakage	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.06 kg (0.13 lbs)
Common cavity	CA-08A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG08A3010520100 material no: R930000861
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

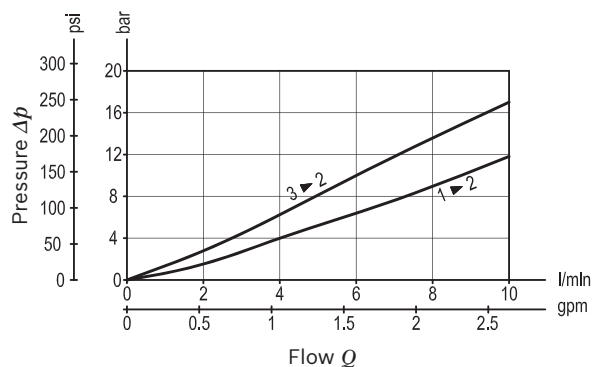
**Description**

The single ball shuttle allows flow from the higher pressure of two work ports 1 and 3 to the 2 port.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.94.05.00</b>	<b>56</b>	<b>00</b>	<b>00</b>	<b>*</b>
--------------------	-----------	-----------	-----------	----------

Directional poppet type, shuttle

Common cavity, Size 08

Series 0/A to L  
unchanged performances and dimensions

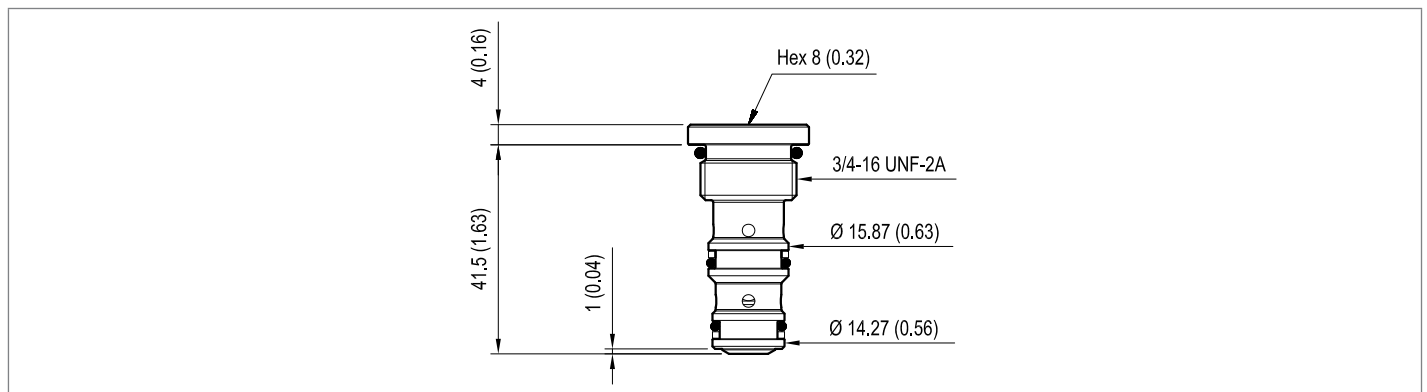
Version and options standard

**Preferred types**

Type	Material number
049405005600000	R901161981

Type	Material number

**Dimensions**



# Directional poppet type, shuttle

## Common cavity, Size 08

SELC-08A

04.94.06 - X - 56.00

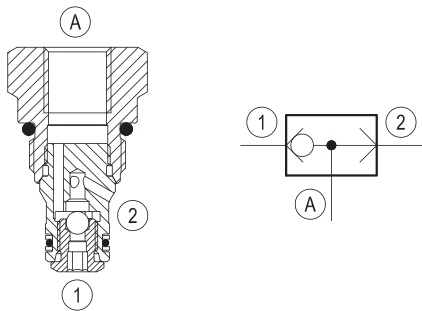


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	See performance graph
Max. internal leakage	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.06 kg (0.13 lbs)
Common cavity	CA-08A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG08A2010530100 material no: R901101544
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

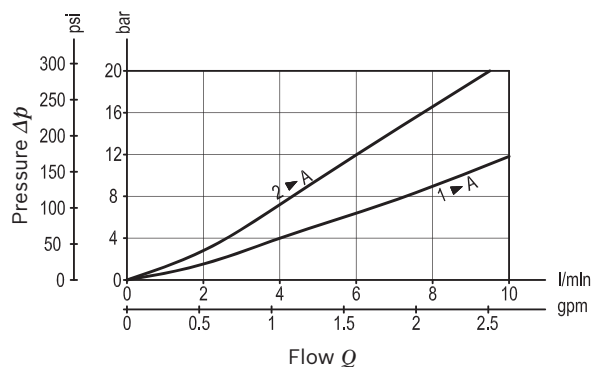
### Description

The single ball shuttle allows flow from the higher pressure of two work ports 1 and 2 to the A port, externally located in the hexagon of the cartridge.

1) Only external seals for 10 valves



### Characteristic curve



**Ordering code**

<b>04.94.06</b>	<b>X</b>	<b>56</b>	<b>00</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	-----------	-----------	----------

Directional poppet type, shuttle

Version and options standard

Series 0/A to L  
unchanged performances and dimensions

Port A size

**09** G 1/4

**55** 9/16-18 UNF

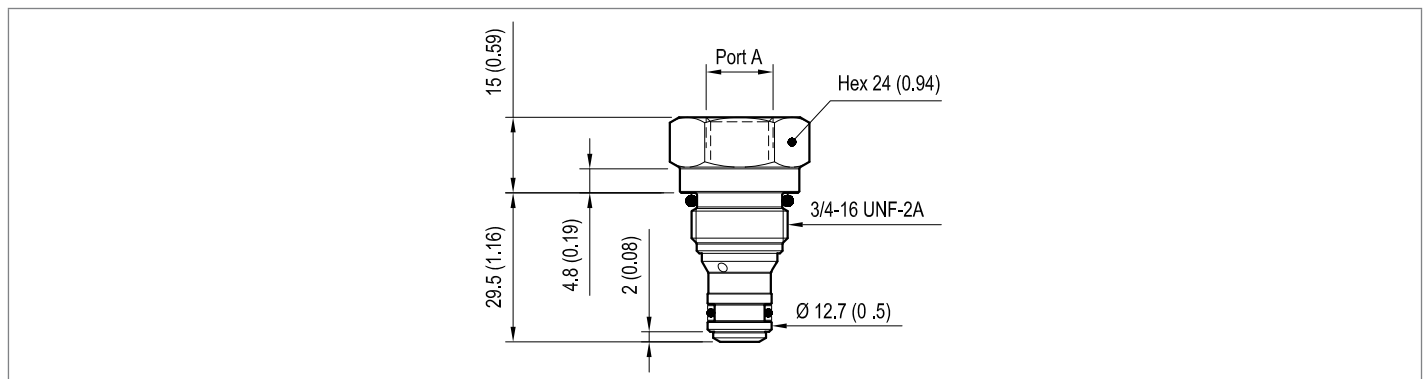
**56** Common cavity, Size 08

**Preferred types**

Type	Material number
049406095600000	R901161985
049406555600000	R901161987

Type	Material number

**Dimensions**



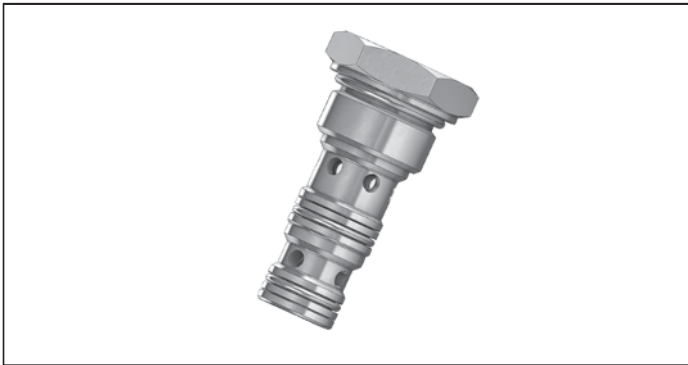


Directional poppet type, shuttle

Common cavity, Size 10

SELB-10A

04.94.09.00.85.00

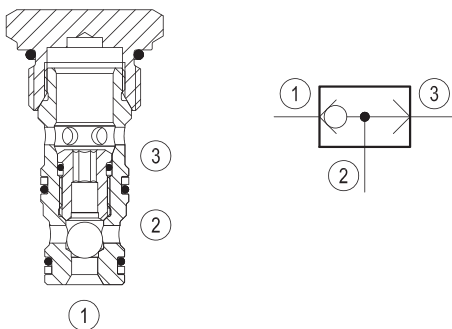


Technical data	
Max. operating pressure	220 bar (3190 psi)
Max. flow	See performance graph
Max. internal leakage	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.4 kg (0.88 lbs)
Common cavity	CA-10A-3N (see data sheet 18325-70)
Line bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

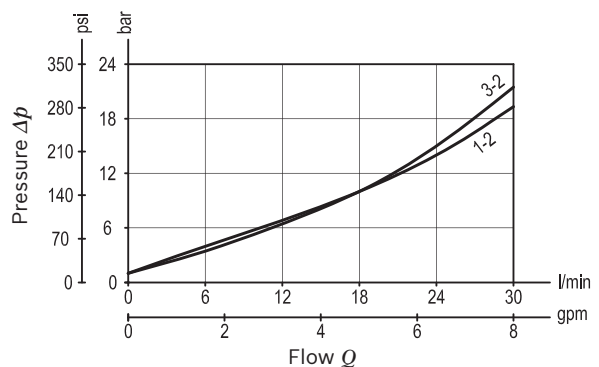
**Description**

The single ball shuttle allows flow from the higher pressure of two work ports 1 and 3 to the 2 port.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.94.09.00</b>	<b>85</b>	<b>00</b>	<b>00</b>	<b>*</b>
--------------------	-----------	-----------	-----------	----------

Directional poppet type, shuttle

Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

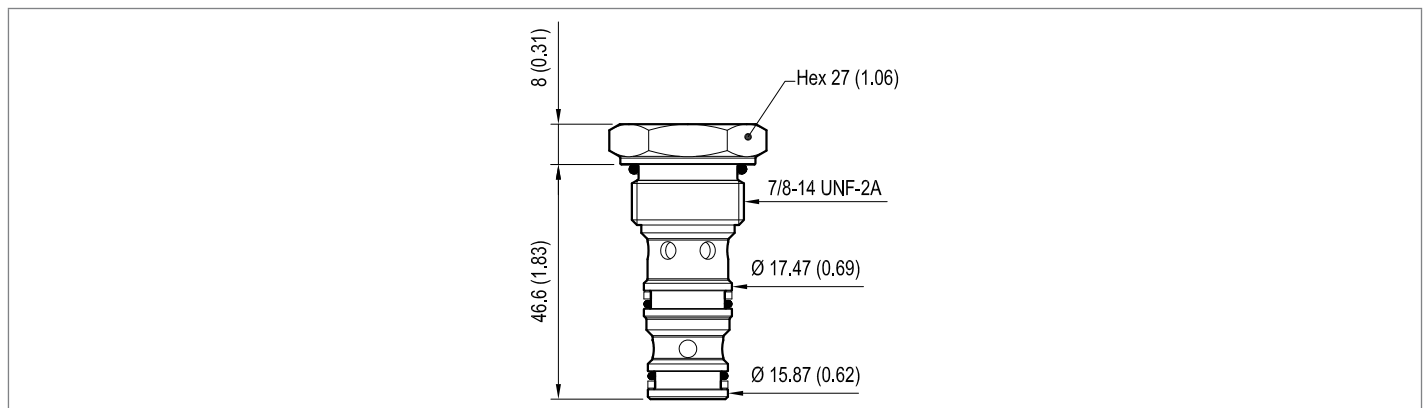
Version and options standard

**Preferred types**

Type	Material number
04940900850000A	R930056708

Type	Material number

**Dimensions**

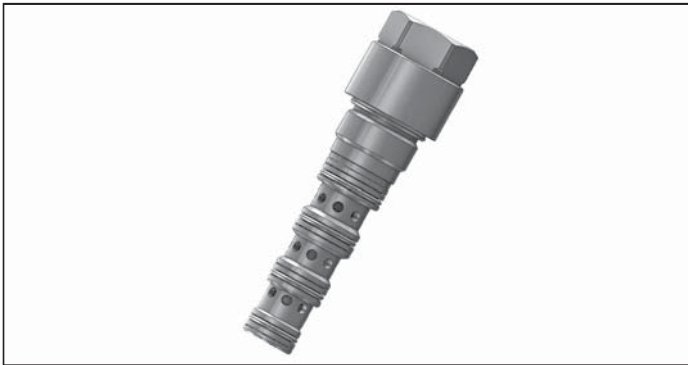


# Directional hot oil, shuttle

## Special cavity, 1004

SELO-10M

04.94.10 - X - 99 - Z



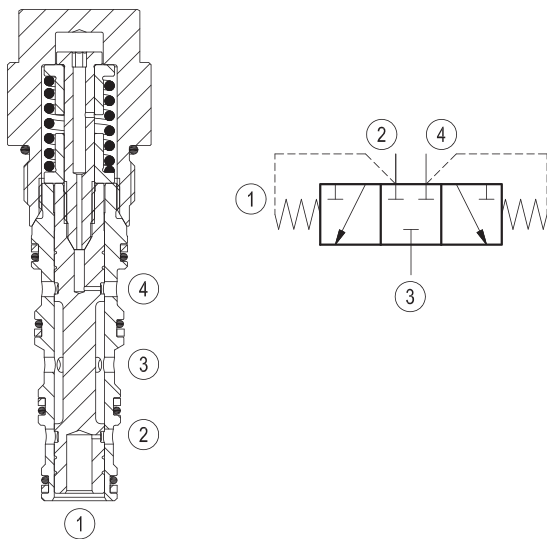
Technical data	
Max. operating pressure	380 bar (5510 psi)
Max. flow	40 l/min. (11 gpm)
Max. internal leakage <sup>1)</sup>	70 cm <sup>3</sup> /min. (4 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.21 kg (0.46 lbs)
Special cavity	1004
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG1004010520100 material no: R930058605
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

### Description

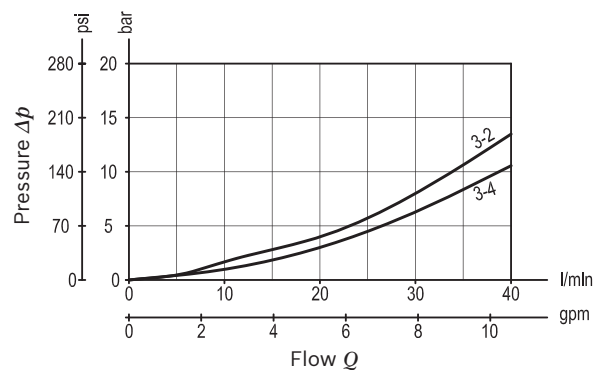
Directional hot oil shuttle valves permit hot oil to be diverted from the low pressure side of a closed loop system. When ports 2 and 3 are at same pressure values, valve configuration is with all ports 2, 3 and 4 closed and the valve spool is centered by the spring. If pressure at port 2 (or port 4) is higher than port 4 (or 2), then port 4 (or 2) is connected to port 3. Port 1 is not used.

Application notes: directional hot oil shuttle valves are especially designed as flushing valves to remove heat from closed loop hydraulic circuits; generally hydraulic fluid is directed from the low pressure side into the motor housing then it is fed into the reservoir. The hydraulic fluid, removed out of the closed circuit must be replaced by cooled hydraulic fluid from the pump.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



### Characteristic curve



**Ordering code**

<b>04.94.10</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional hot oil, shuttle

Adjustments

**00** Fixed setting

**99** Special cavity, 1004

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

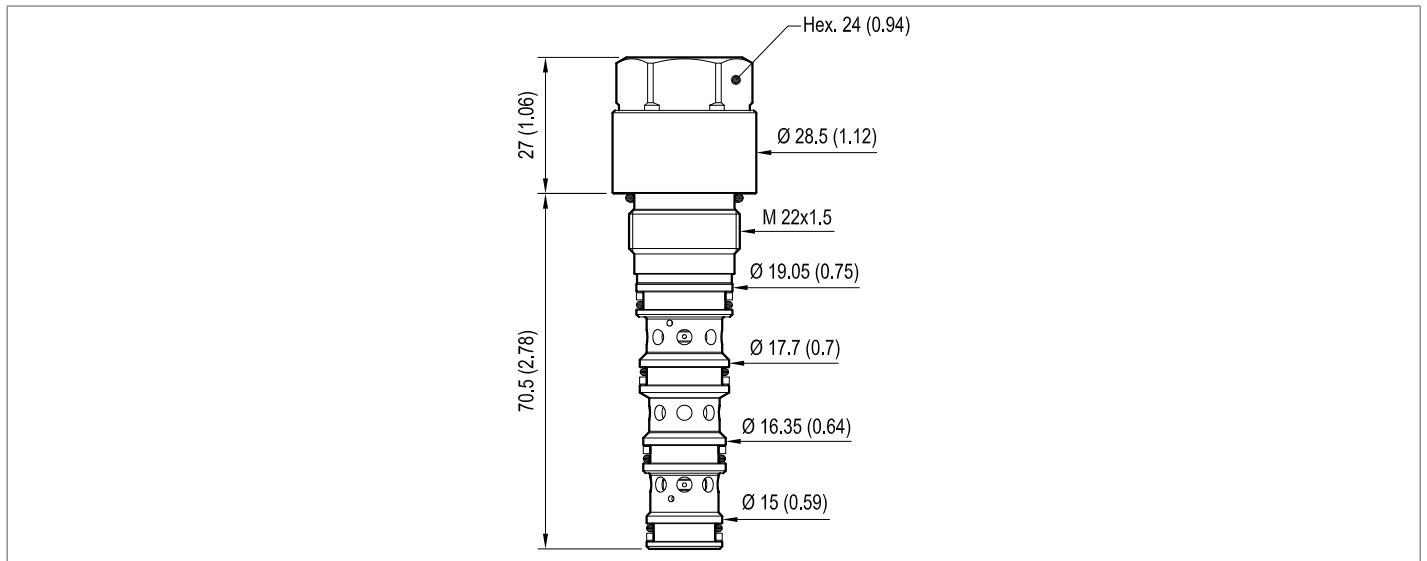
SPRINGS	
	Std. setting bar (psi)
<b>18</b>	18 (261)

**Preferred types**

Type	Material number
049410009918000	R930058604

Type	Material number

**Dimensions**



Directional poppet type, shuttle  
double check  
Common cavity, Size 08

VUDN-08A

04.39.01.00.56 - Z

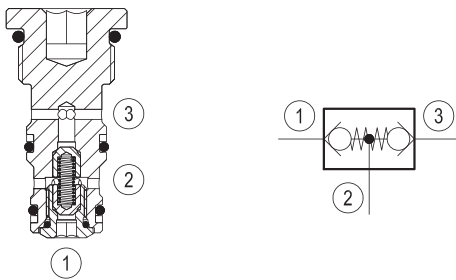


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	10 l/min. (2.6 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.06 kg (0.13 lbs)
Common cavity	CA-08A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG08A3010520100 material no: R930000861
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

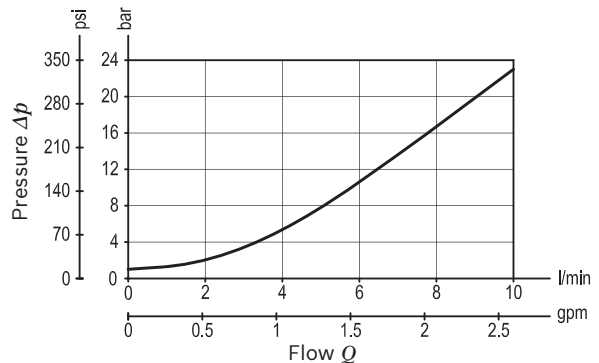
**Description**

This valve combines two simple check valves into a single cartridge. It connects the work port with the higher pressure to the signal or common port. The signal is sensed at port 2.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.39.01.00</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Directional poppet type, shuttle,  
double check

Common cavity, Size 08

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

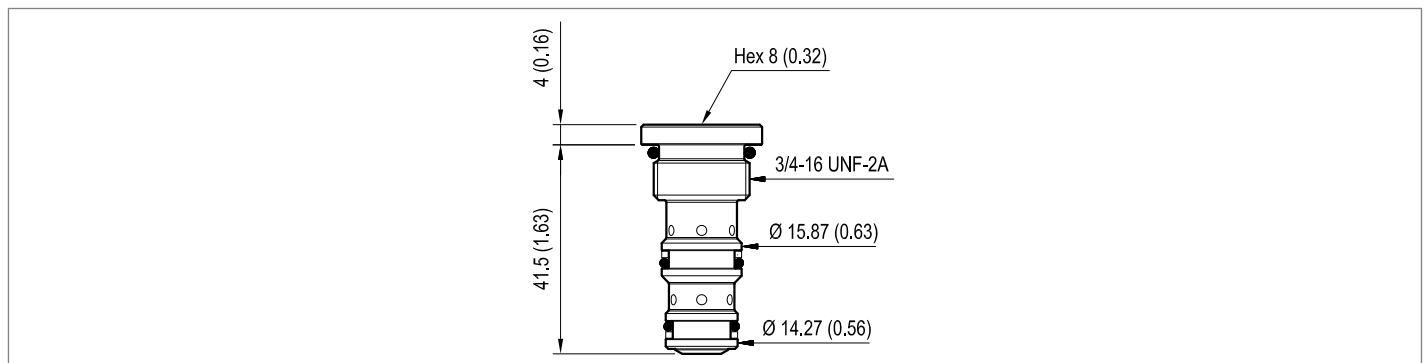
<b>SPRINGS</b>	
	Cracking pressure bar (psi)
<b>00</b>	1 (15)

**Preferred types**

Type	Material number
043901005600000	R930000601

Type	Material number

**Dimensions**



Check, double lock,  
with mechanical pilot  
Special cavity, 748

VU-DT-D7-CM

04.43.01.00.00 - Z

1

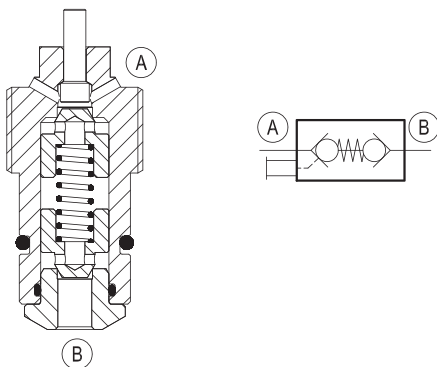


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	10 l/min. (2.6 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	80 - 90 Nm (60 - 70 ft-lbs)
Weight	0.14 kg (0.31 lbs)
Special cavity	748
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG0748010000100 material no: R930002806
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

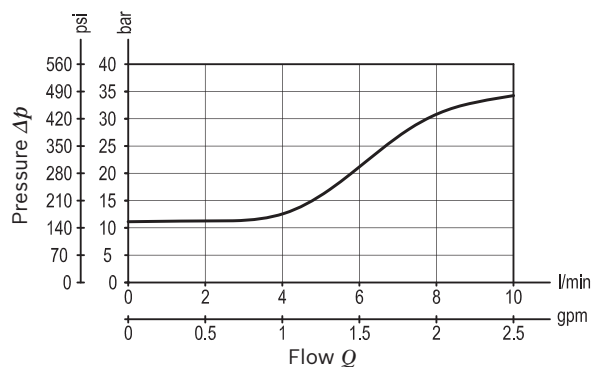
**Description**

Flow is normally locked in both directions. When pressure at B rises above the spring bias pressure, and when the mechanical pilot in A is operated, flow is allowed from B to A. VU-DT-D7-CM allows cylinders working in 'master-slave' circuits to self correct for volume tolerances at the end of working strokes.

1) Only external seals for 10 valves



**Characteristic curve**



Ordering code

04.43.01.00	00	Z	00	*
-------------	----	---	----	---

Check, double lock,  
with mechanical pilot

Special cavity, 748

Series O/A to L  
unchanged performances and dimensions

Version and options standard

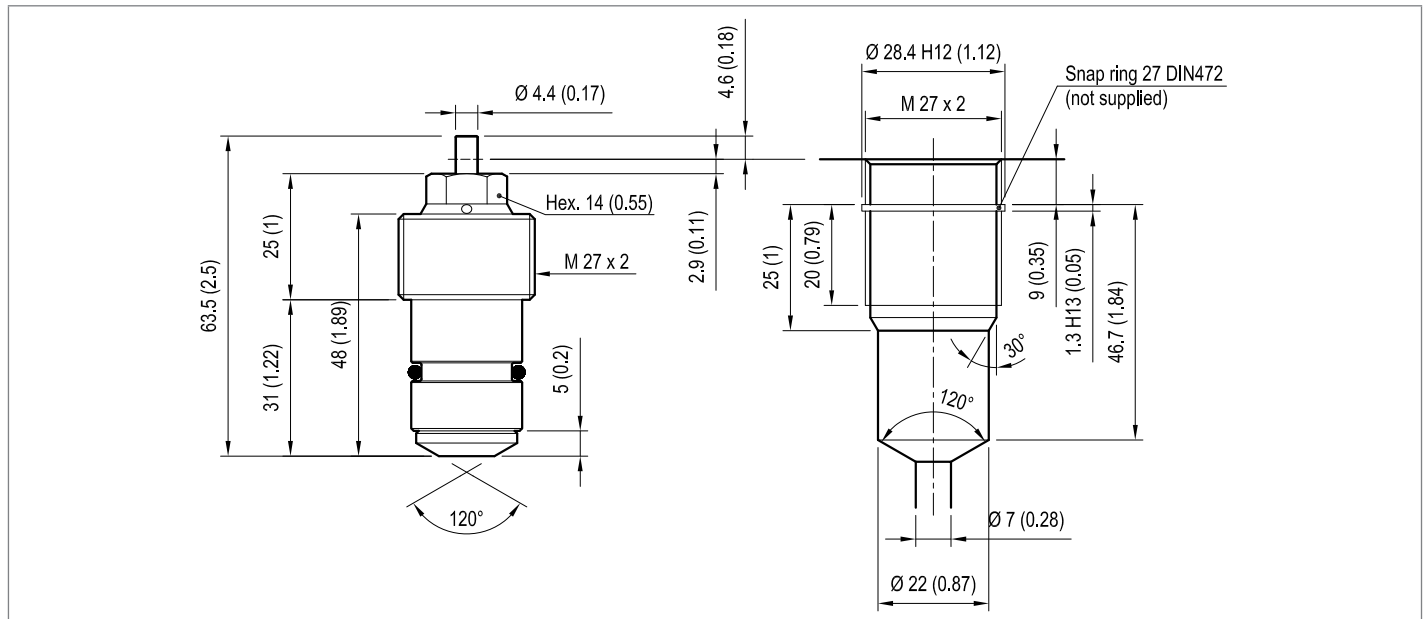
SPRINGS	
	Cracking pressure bar (psi)
01	11 (160)

Preferred types

Type	Material number
04430100001000	R930000608

Type	Material number

Dimensions





# Mechanical cartridge valves

## Counterbalance

Designation	Description	Cavity	Code	Data sheet	Page
Counterbalance, standard guided poppet type, fixed setting	VBSN-07HH-TF	22903	045250X18Z	18320-33	197
Counterbalance, standard guided poppet type	VBSN-08AA	Size 08	045220X56Z	18320-01	199
Counterbalance, standard guided poppet type, counterclockwise adjustment	VBSN-08UU-RS	T-11A	045242X20Z	18320-16	201
Counterbalance, standard poppet type differential area	VBSN-10A	Size 10	045231X85Z	18320-02	203
Counterbalance, standard poppet type differential area, counterclockwise adjustment	VBSN-08U-RS	T-11A	045243X20Z	18320-17	205
Counterbalance, standard poppet type differential area, fixed setting	VBSN-08U-TF	T-11A	045237X20Z	18319-98	207
Counterbalance, standard poppet type differential area	VBSN-12A	Size 12	045228X57Z	18320-03	209
Counterbalance, standard poppet type differential area, counterclockwise adjustment	VBSN-12U-RS	T-2A	045244X86Z	18320-18	211
Counterbalance, standard poppet type differential area	VBSN-16A	Size 16	045229X27Z	18320-04	213
Counterbalance, standard poppet type differential area, counterclockwise adjustment	VBSN-16U-RS	T-17A	045245X47Z	18320-19	215
Counterbalance, standard poppet type differential area, for motor applications	VBSN-16U-RF	T-17A	045247X47Z	18320-31	217
Counterbalance, standard poppet type differential area	VBSN-20A	Size 20	045225X58Z	18320-05	219
Counterbalance, standard poppet type differential area, counterclockwise adjustment	VBSN-25U-RS	T-19A	045246X50Z	18320-29	221
Counterbalance, standard popper type zero differential area	VBSZ-20A	Size 20	045241X58Z	18319-99	223
Counterbalance, relief compensated, guided poppet type	VBSP-08AA	Size 08	045404X56Z	18320-06	225
Counterbalance, relief compensated, poppet type, differential area	VBPS-10A	Size 10	045409X85Z	18320-07	227
Counterbalance, relief compensated, poppet type, differential area, counterclockwise adjustment	VBSP-08U-RS	T-11A	045415X20Z	18320-20	229
Counterbalance, relief compensated, poppet type, differential area	VBSP-12A	Size 12	045408X57Z	18320-08	231

# Mechanical cartridge valves

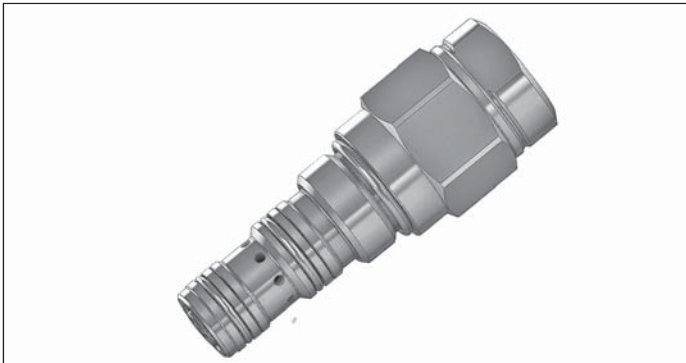
## Counterbalance

Designation	Description	Cavity	Code	Data sheet	Page
Counterbalance, relief compensated, poppet type, differential area, counterclockwise adjustment	VBPS-12U-RS	T-2A	045416X86Z	18320-21	233
Counterbalance, relief compensated, poppet type, differential area	VBSP-16A	Size 16	045410X27Z	18320-09	235
Counterbalance, relief compensated, poppet type, differential area, counterclockwise adjustment	VBSP-16U-RS	T-17A	045417X47Z	18320-22	237
Counterbalance, relief compensated poppet type differential area, for motor applications	VBSP-16U-RF	T-17A	045419X47Z	18320-32	239
Counterbalance, relief compensated, poppet type, differential area	VBSP-20A	Size 20	045413X58Z	18320-10	241
Counterbalance, relief compensated poppet type, differential area, counterclockwise adjustment	VBSP-25U-RS	T-19A	045418X50Z	18320-30	243
Counterbalance, vented guided poppet type	VBST-08AA	Size 08	045908X56Z	18320-11	245
Counterbalance, vented guided poppet type	VBST-10A	Size 10	045916X85Z	18320-12	247
Counterbalance, vented guided poppet type, counterclockwise adjustment	VBST-08U-RS	T-11A	045929X20Z	18320-23	249
Counterbalance, vented guided poppet type	VBST-12A	Size 12	045926X57Z	18320-13	251
Counterbalance, vented guided poppet type, counterclockwise adjustment	VBST-12U-RS	T-2A	045930X86Z	18320-24	253
Counterbalance, vented guided poppet type	VBST-16A	Size 16	045927X27Z	18320-14	255
Counterbalance, vented guided poppet type, counterclockwise adjustment	VBST-16U-RS	T-17A	045931X47Z	18320-25	257
Counterbalance, vented guided poppet type	VBST-20A	Size 20	045918X58Z	18320-15	259
Counterbalance, 4 ports vented, poppet type, external drain, counterclockwise adjustment	VBSY-08U-RS	T-21A	045932X20Z	18320-26	261
Counterbalance, 4 ports vented, poppet type, external drain, counterclockwise adjustment	VBSY-12U-RS	T-22A	045933X86Z	18320-27	263
Counterbalance, 4 ports vented, poppet type, external drain, counterclockwise adjustment	VBSY-16U-RS	T-23A	045934X47Z	18320-28	265
Counterbalance, 4 ports vented, poppet type, external drain, counterclockwise adjustment	VBSY-25U-RS	T-24A	045935X50Z	18320-36	267

Counterbalance, standard guided poppet type,  
fixed setting  
Eaton cavity interchange, 22903

VBSN-07HH-TF

04.52.50 - X - 18 - Z

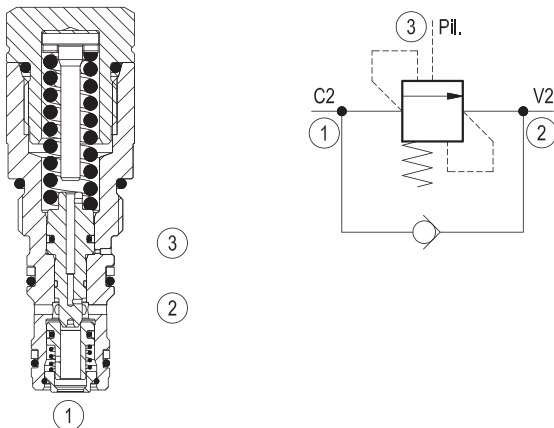


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	20 l/min. (5.3 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	30-35 Nm (22-26 ft-lbs)
Weight	0.22 kg (0.48 lbs)
Cavity	Eaton 22903 (CA-07H-3C)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG07H9010520100 material no: R930057364
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

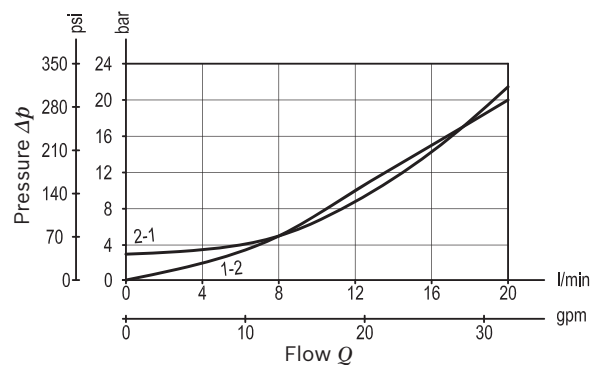
**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2, and any back-pressure at 2 is additive to the pressure setting in all functions.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.52.50</b>	<b>X</b>	<b>18</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance,  
standard guided poppet type, fixed setting

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Pilot ratio

**03** 3.2:1

SPRINGS	
	Std. setting bar (psi) cracking pressure
<b>27</b>	270 ± 15 (3915 ± 218)
<b>30</b>	300 ± 15 (4350 ± 218)

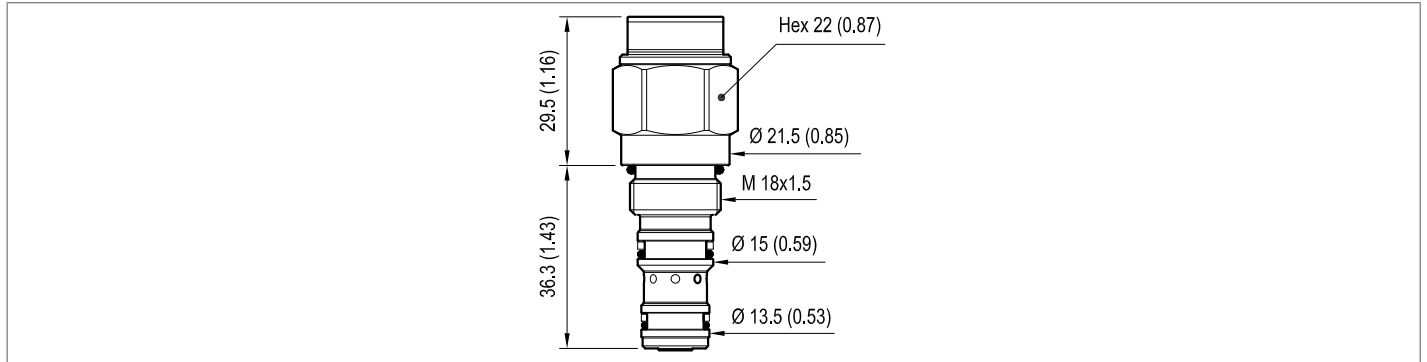
**18** Eaton cavity interchange, 22903

**Preferred types**

Type	Material number
045250031827000	R930056576
045250031830000	R930056577

Type	Material number

**Dimensions**



# Counterbalance, standard guided poppet type

## Common cavity, Size 08

VBSN-08AA

04.52.20 - X - 56 - Z



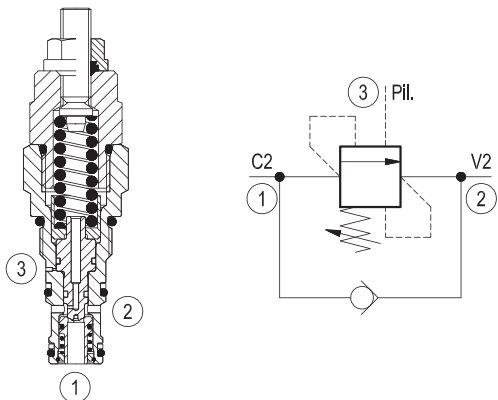
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	30 l/min (8 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.18 kg (0.4 lbs)
Cavity	CA-08A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08A9010520100 material no: R901101592
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

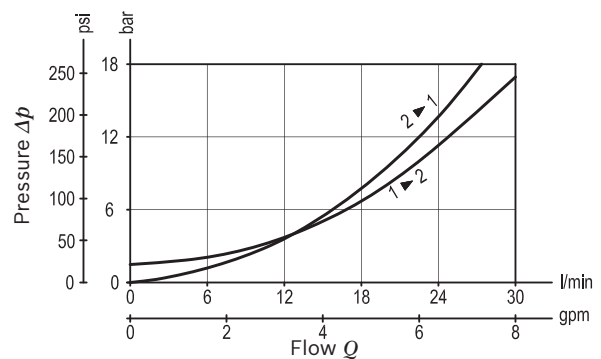
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

### Description

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2, and any back-pressure at 2 is additive to the pressure setting in all functions.



### Characteristic curve



**Ordering code**

<b>04.52.20</b>	<b>X</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance,  
standard guided poppet type  
poppet type

Series O/A to L  
unchanged performances and dimensions

Version and options standard

Pilot ratio

<b>03</b>	4:1
<b>33</b>	4:1 With sealed pilot (for Z=20 only)

**56** Common cavity, Size 08

**SPRINGS**

	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min.
<b>15</b>	70-150 (1000-2200)	72.5 (1051)	150 (2200)
<b>20</b>	100-210 (1450-3000)	109 (1581)	200 (2900)
<b>35</b>	200-350 (2900-5000)	137 (1987)	350 (5000)

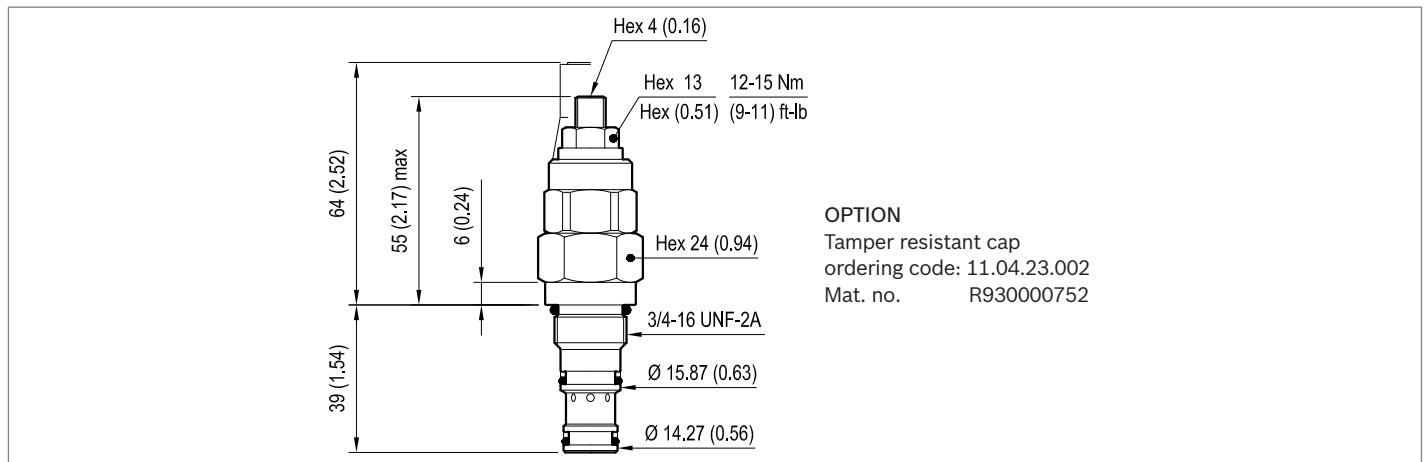
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045220035615000	R901161990
045220035620000	R901095960
045220035635000	R901095961
04522033562000A	R930006428

Type	Material number

**Dimensions**



Counterbalance, standard guided poppet type,  
counterclockwise adjustment  
SUN cavity interchange, T-11A

VBSN-08UU-RS

04.52.42 - X - 20 - Z



Technical data	
Max. operating pressure	280 bar (4000 psi)
Max. flow	30 l/min (8 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	40 - 50 Nm (30 - 37 ft-lbs)
Weight	0.18 kg (0.4 lbs)
Cavity	SUN T-11A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08U9020110100 material no: R901193388
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

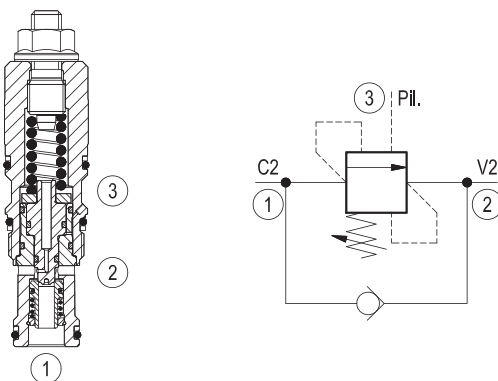
Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

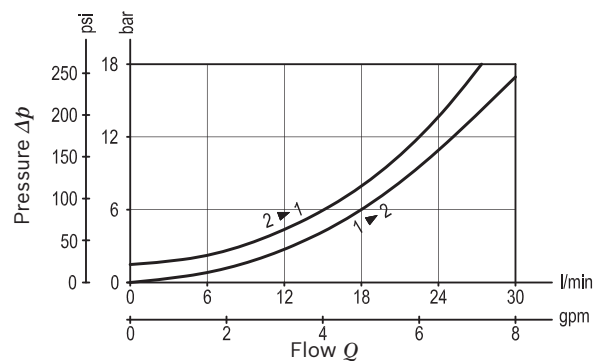
**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1.

When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2, and any back-pressure at 2 is additive to the pressure setting in all functions.



**Characteristic curve**



**Ordering code**

<b>04.52.42</b>	<b>X</b>	<b>20</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, standard guided poppet type, counterclockwise adjustment

Series O/A to L  
unchanged performances and dimensions

Version and options standard

Pilot ratio

**10** 4:1

**37** 9:1

**20** SUN cavity interchange, SUN T-11A

**SPRINGS**

	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>20</b>	70-280 (1000-4000)	124 (1798)	210 (3000)

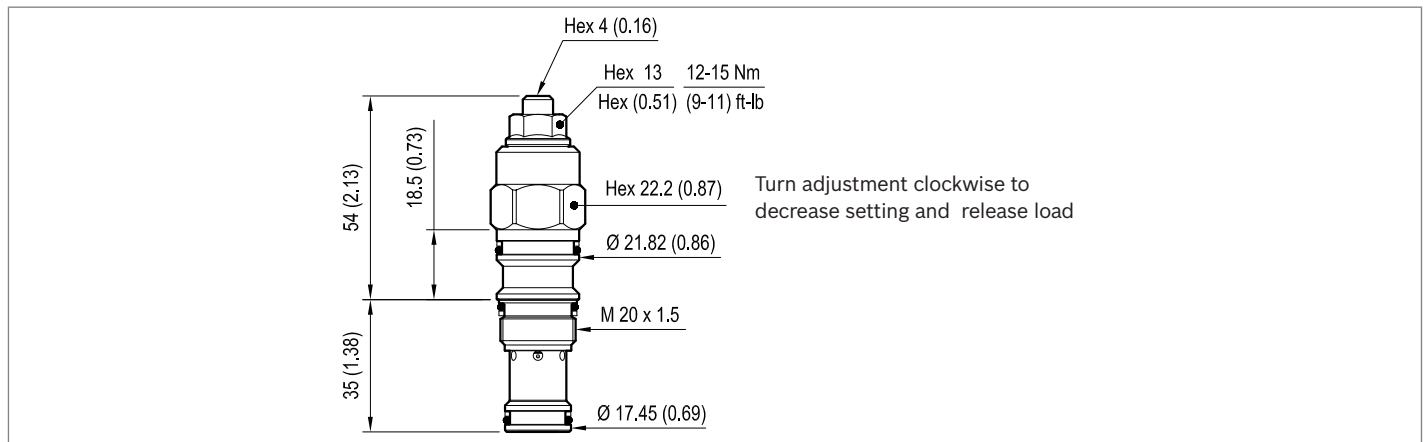
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045242102020000	R930006107
045242372020000	R930006108

Type	Material number

**Dimensions**





Counterbalance, standard poppet type  
differential area  
Common cavity, Size 10

VBSN-10A

04.52.31 - X - 85 - Z



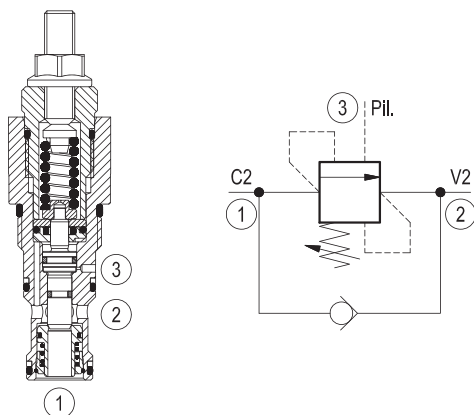
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	60 l/min (16 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A9010520100 material no: R901111367
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

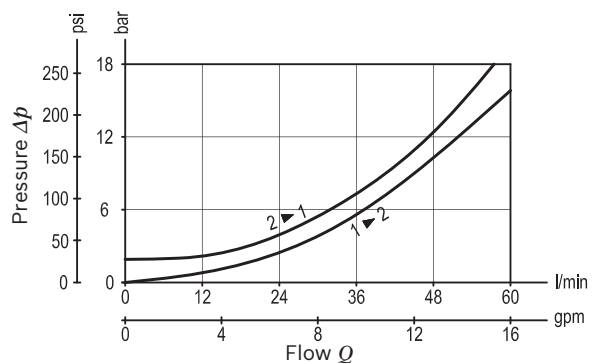
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2, and any back-pressure at 2 is additive to the pressure setting in all functions.



**Characteristic curve**



**Ordering code**

<b>04.52.31</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance,  
standard poppet type, differential area

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Pilot ratio

**03** 3:1

**10** 8:1

**85** Common cavity, Size 10

**SPRINGS**

		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
for X= 03	<b>20</b>	70-210 (1000-3000)	135 (1958)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	196 (2842)	350 (5000)
for X= 10	<b>20</b>	70-210 (1000-3000)	52 (754)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	89 (1291)	350 (5000)

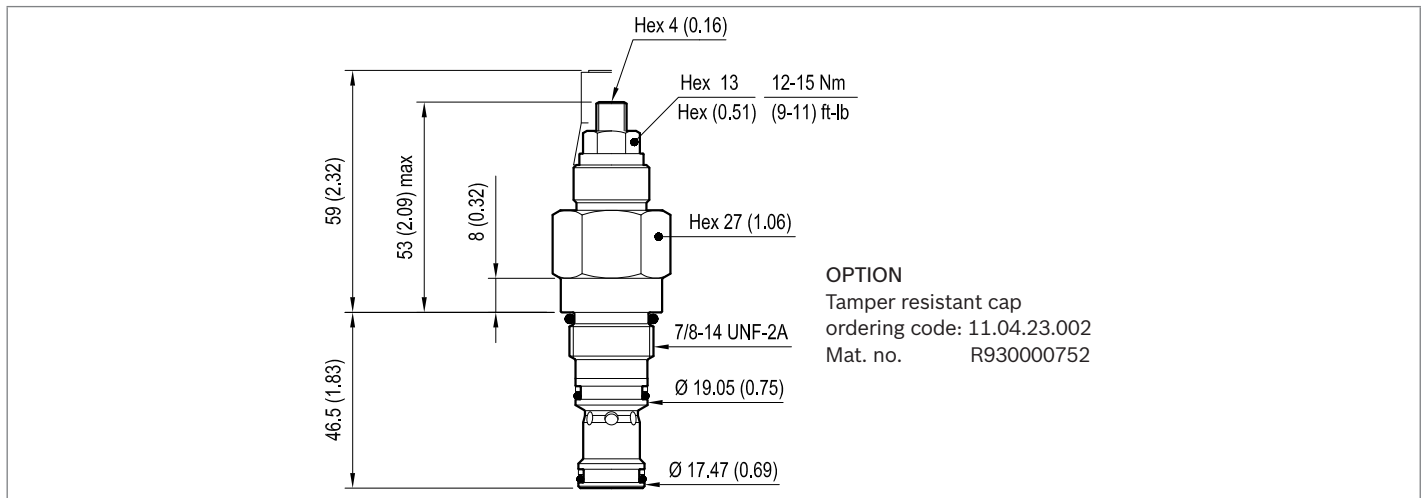
**Note:** Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
04523103852000A	R901096029
04523103853500A	R901096037
04523110852000A	R901096038
04523110853500A	R901096041

Type	Material number

**Dimensions**



Counterbalance, standard poppet type  
differential area, counterclockwise adjustment  
SUN cavity interchange, T-11A

VBSN-08U-RS

04.52.43 - X - 20 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	60 l/min (16 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	40 - 50 Nm (30 - 37 ft-lbs)
Weight	0.19 kg (0.42 lbs)
Cavity	SUN T-11A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08U9020110100 material no: R901193388
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

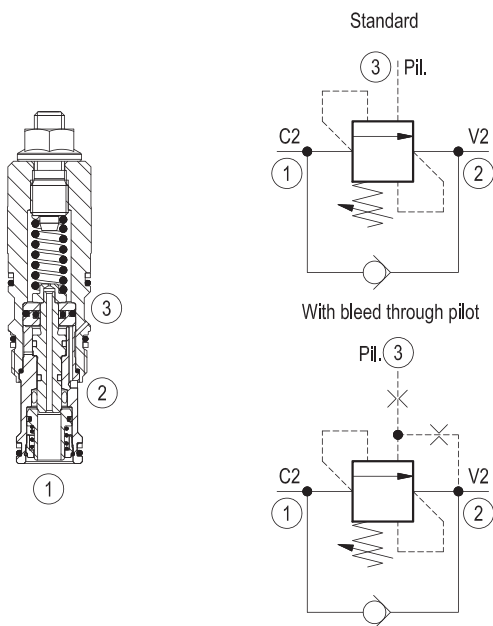
**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. Any back-pressure at 2 is additive to the pressure setting in all functions.

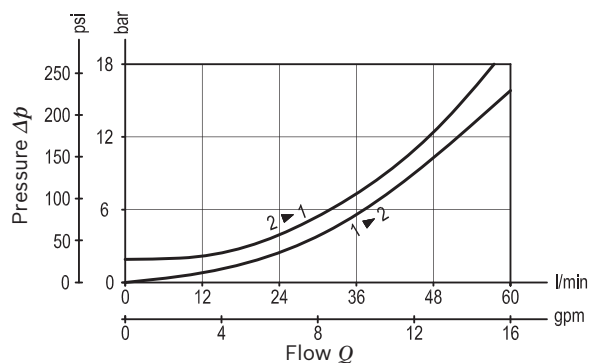
Pressure setting: at least 1.3 times the load induced pressure.

1) At 70% of pressure setting

2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.52.43</b>	<b>X</b>	<b>20</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, standard poppet type, differential area, counterclockwise adjustment

Series 0/A to L unchanged performances and dimensions

Version and options standard

<b>Pilot ratio</b>
<b>03</b> 3:1 standard version
<b>10</b> 8:1 standard version
<b>31</b> 1.5:1 with bleed through pilot

**20** SUN cavity interchange, SIZE T-11A

		SPRINGS		
		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Cracking pressure bar (psi)
for X= 03	<b>10</b>	35-105 (500-1500)	26 (377)	70 (1000)
	<b>20</b>	70-210 (1000-3000)	106 (1537)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	165 (2393)	350 (5000)
for X= 10	<b>20</b>	70-210 (1000-3000)	40 (580)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	70 (1015)	350 (5000)
for X= 31	<b>20</b>	70-210 (1000-3000)	106 (1537)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	165 (2393)	350 (5000)

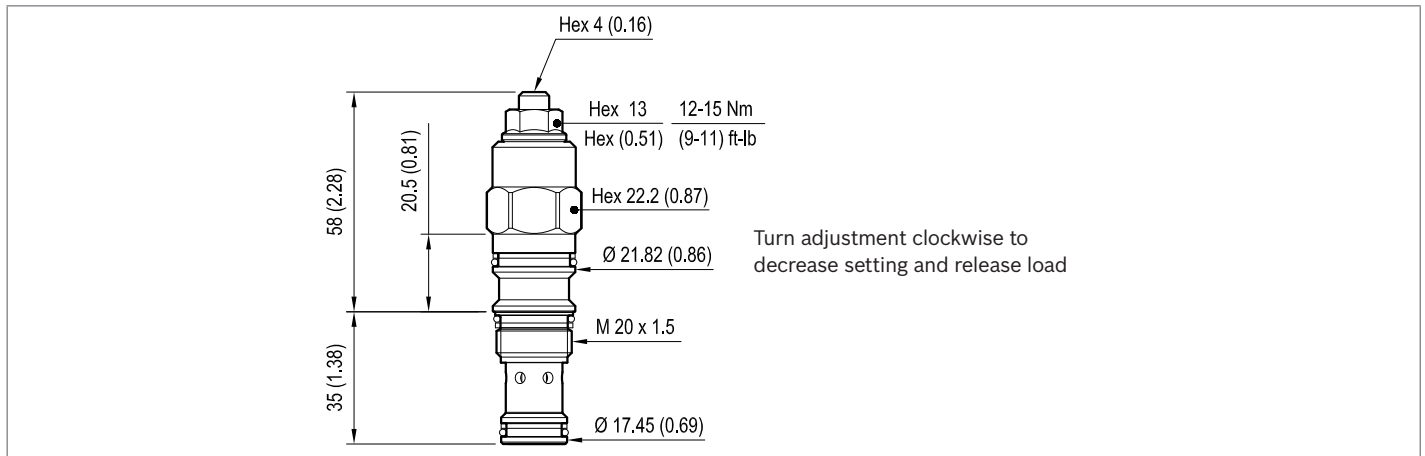
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045243032010000	R930006109
045243032020000	R930006110
045243032035000	R930006111
045243102020000	R930006112

Type	Material number
045243102035000	R930006113
045243312020000	R930006114
045243312035000	R930006115

**Dimensions**



Counterbalance, standard poppet type differential area, fixed setting

SUN cavity interchange, T11-A

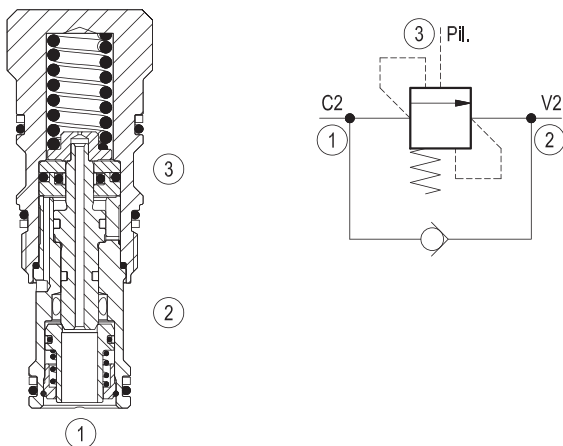
VBSN-08U-TF

04.52.37 - X - 20 - Z



**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2, and any back-pressure at 2 is additive to the pressure setting in all functions.

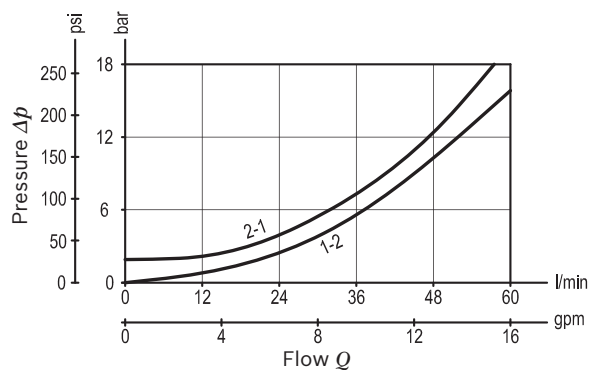


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	60 l/min (16 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	40-50 Nm (30-37 ft-lbs)
Weight	0.18 kg (0.39 lbs)
Cavity	SUN T11-A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08U9020110100 material no: R901193388
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.52.37</b>	<b>X</b>	<b>20</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance,  
standard poppet type differential area,  
fixed setting

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Pilot ratio

**03** 3:1

**20** SUN cavity interchange, T11-A

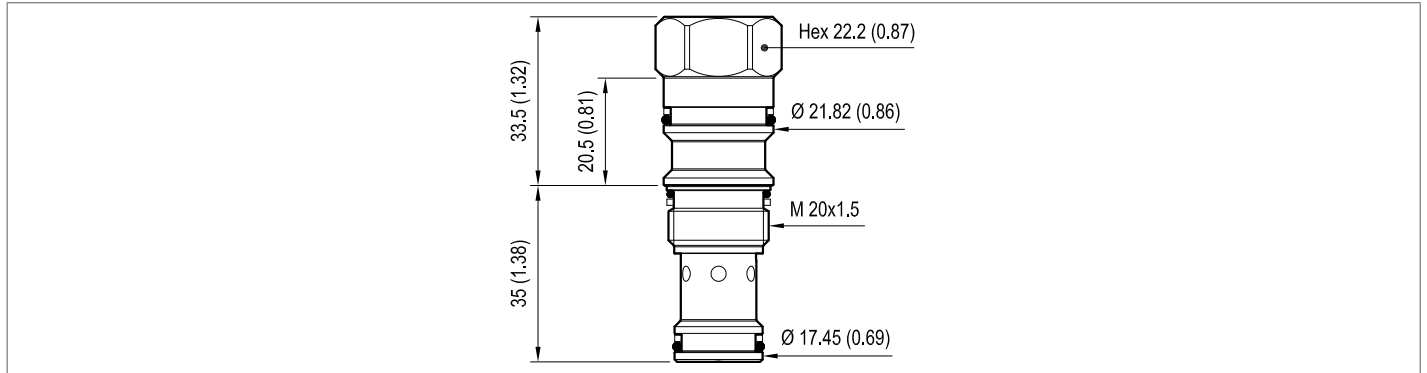
SPRINGS	
	Std. setting bar (psi) Q=5 l/min.
<b>23</b>	230 ± 20 (3350 ± 290)

**Preferred types**

Type	Material number
045237032023000	R930051031

Type	Material number

**Dimensions**



Counterbalance, standard poppet type  
differential area  
Common cavity, Size 12

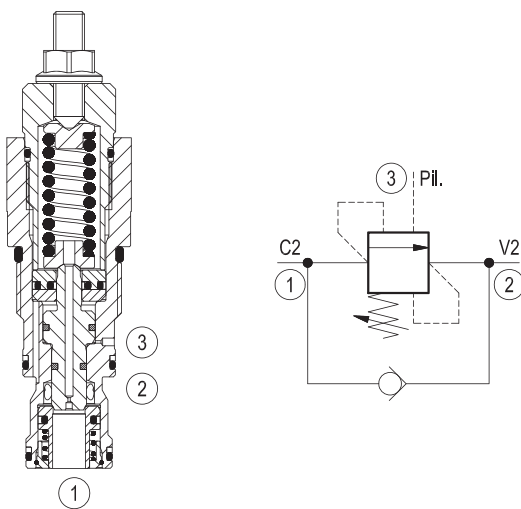
VBSN-12A

04.52.28 - X - 57 - Z



**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2, and any back-pressure at 2 is additive to the pressure setting in all functions.



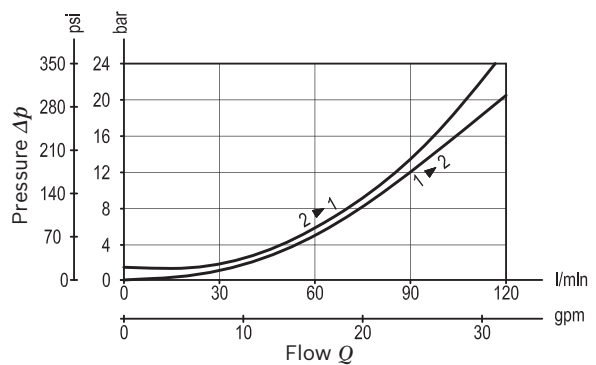
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min (32 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.39 kg (0.86 lbs)
Cavity	CA-12A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A9010520100 material no: R901111379
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.52.28</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance,  
standard poppet type, differential area

Pilot ratio

**03** 4:1

**10** 8:1

**57** Common cavity, Size 12

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

		SPRINGS		
		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
for X= 03	<b>20</b>	70-210 (1000-3000)	50 (725)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	159 (2306)	350 (5000)
for X= 10	<b>20</b>	70-210 (1000-3000)	42 (609)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	67 (972)	350 (5000)

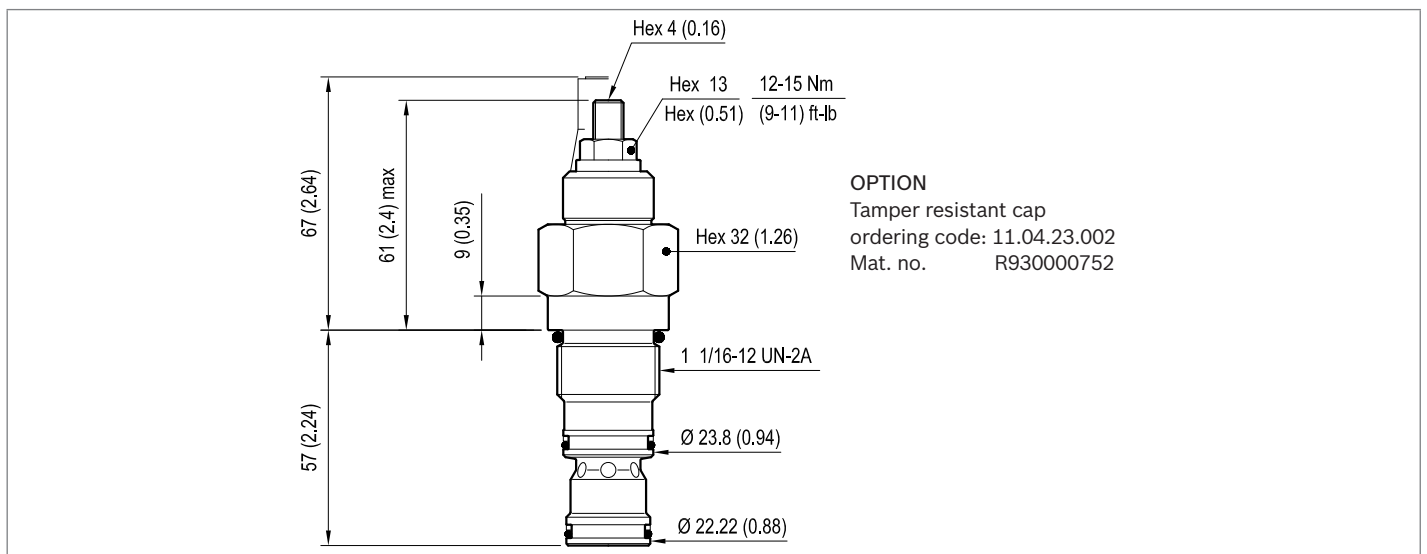
**Note:** Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045228035720000	R901096043
045228035735000	R901096044
045228105720000	R901096045
045228105735000	R901096046

Type	Material number

**Dimensions**





Counterbalance, standard poppet type  
differential area, counterclockwise adjustment  
SUN cavity interchange, T-2A

VBSN-12U-RS

04.52.44 - X - 86 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min (32 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	60 - 70 Nm (44 - 52 ft-lbs)
Weight	0.37 kg (0.82 lbs)
Cavity	SUN T-2A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12U9020110100 material no: R930005599
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

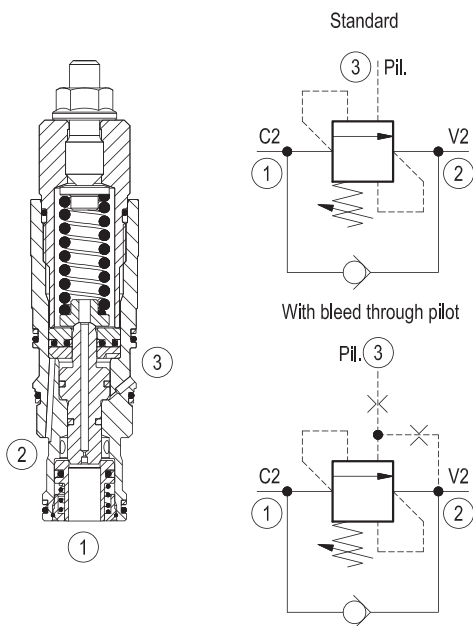
**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. Any back-pressure at 2 is additive to the pressure setting in all functions.

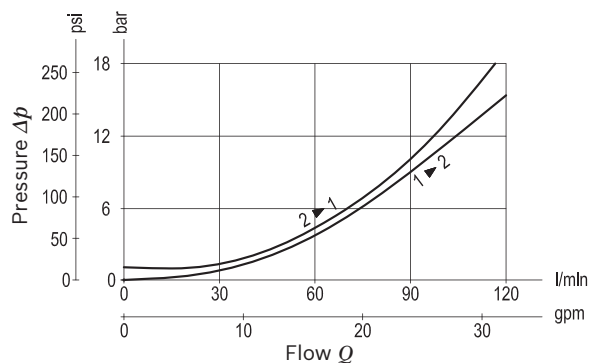
Pressure setting: at least 1.3 times the load induced pressure.

1) At 70% of pressure setting

2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.52.44</b>	<b>X</b>	<b>86</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, standard poppet type, differential area, counterclockwise adjustment

Series 0/A to L unchanged performances and dimensions

Version and options standard

Pilot ratio

**03** 4:1 standard version

**10** 8:1 standard version

**42** 2:1 with bleed through pilot

**86** SUN cavity interchange, T-2A

**SPRINGS**

		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
for X= 03	<b>20</b>	70-210 (1000-3000)	40 (580)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	125 (1813)	350 (5000)
for X= 10	<b>20</b>	70-210 (1000-3000)	53 (769)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	79 (1146)	350 (5000)
for X= 42	<b>20</b>	70-210 (1000-3000)	40 (580)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	125 (1813)	350 (5000)

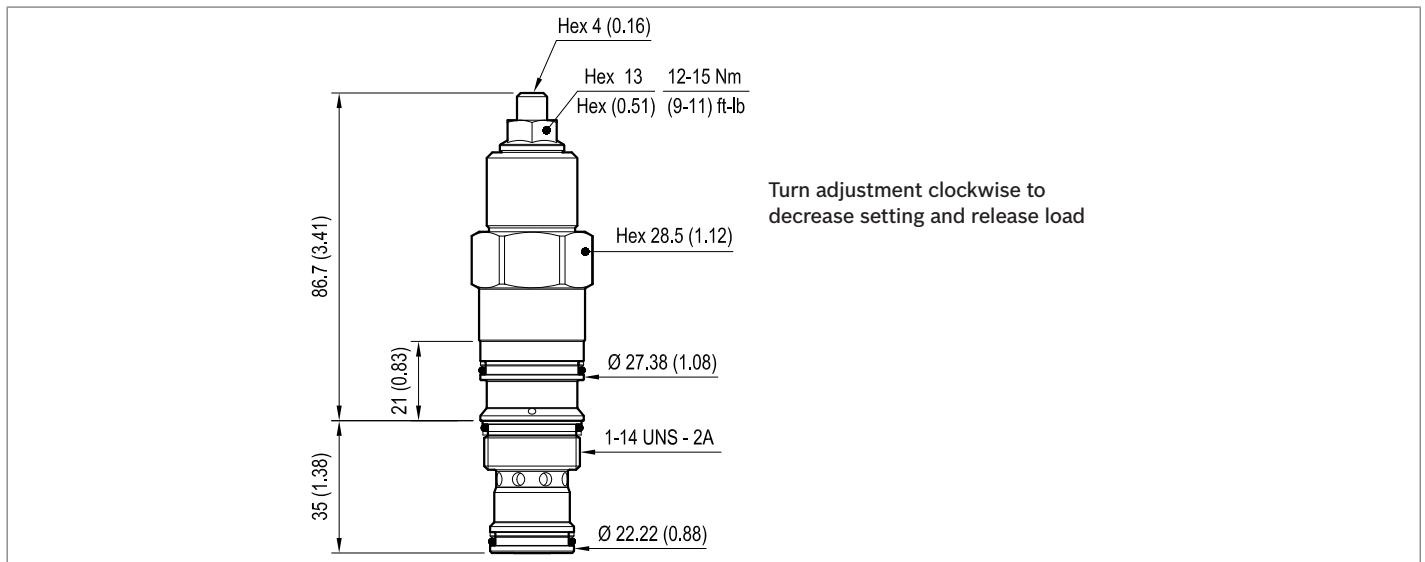
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045244038620000	R930006116
045244038635000	R930006117
045244108620000	R930006118

Type	Material number
045244108635000	R930006119
045244428620000	R930006120
045244428635000	R930006121

**Dimensions**



Counterbalance, standard poppet type  
differential area  
Common cavity, Size 16

VBSN-16A

04.52.29 - X - 27 - Z



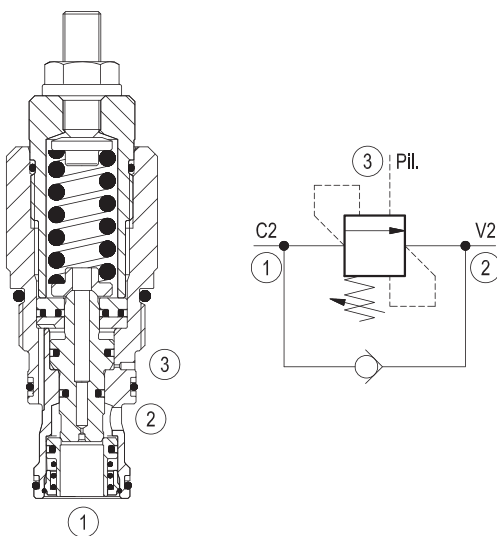
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	200 l/min (53 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.82 kg (1.81 lbs)
Cavity	CA-16A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16A9010530100 material no: R930001200
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

**Description**

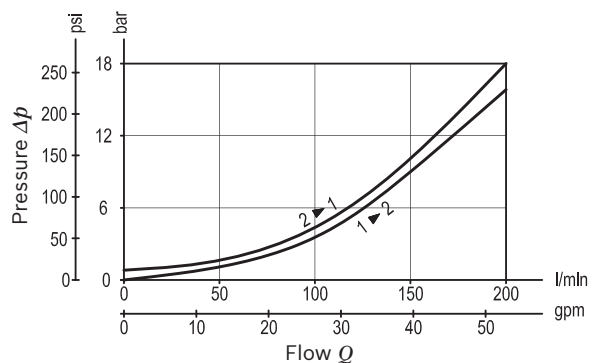
When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2, and any back-pressure at 2 is additive to the pressure setting in all functions.

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.52.29</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance,  
standard poppet type, differential area

Pilot ratio

**03** 4:1

**10** 8:1

**27** Common cavity, Size 16

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

		SPRINGS		
		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
for X= 03	<b>20</b>	70-210 (1000-3000)	40 (580)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	82 (1189)	350 (5000)
for X= 10	<b>20</b>	70-210 (1000-3000)	39 (566)	200 (2900)
	<b>40</b>	140-420 (2000-6000)	85 (1233)	350 (5000)

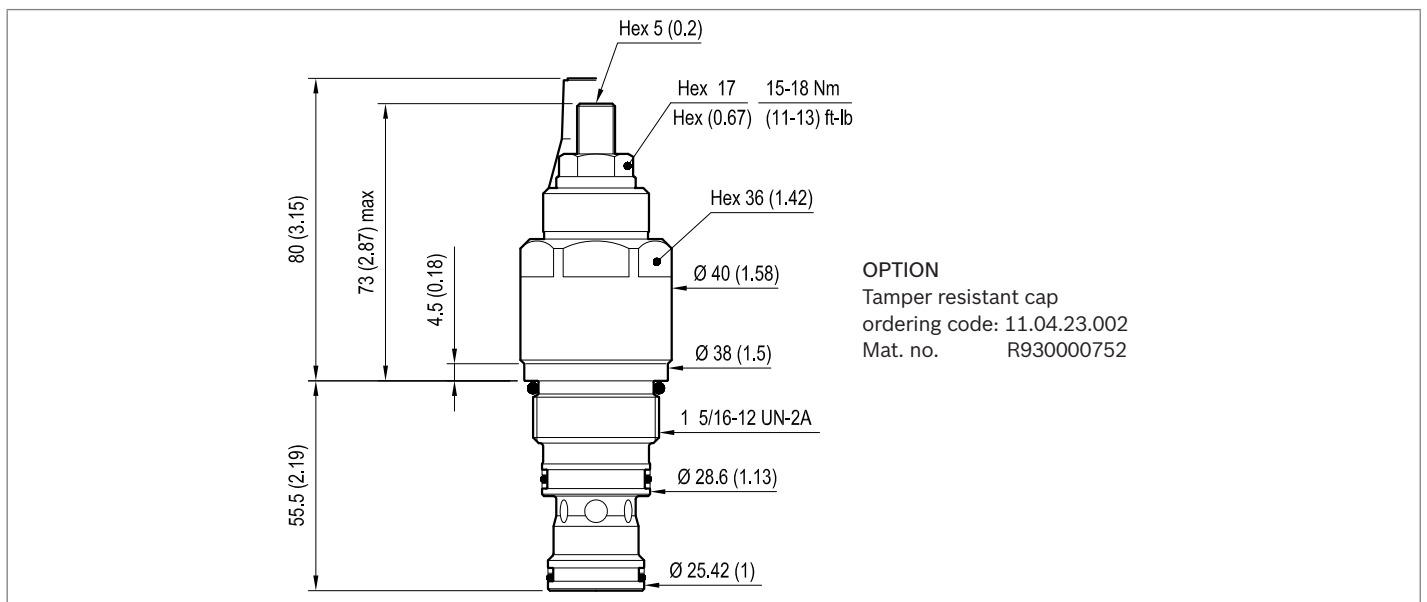
**Note:** Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045229032720000	R901096047
045229032735000	R901096048
045229102720000	R930000797
045229102740000	R901096049

Type	Material number

**Dimensions**



Counterbalance, standard poppet type  
differential area, counterclockwise adjustment  
SUN cavity interchange, T-17A

VBSN-16U-RS

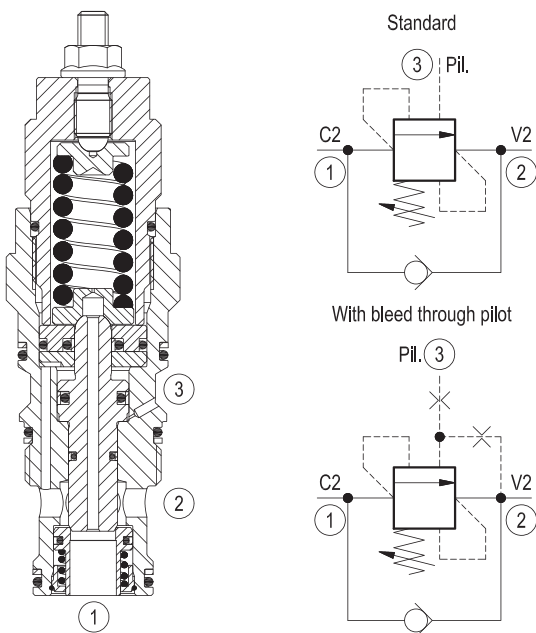
04.52.45 - X - 47 - Z



Technical data	
Max. operating pressure	420 bar (6000 psi)
Max. flow	240 l/min (63 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	200 - 215 Nm (148 - 159 ft-lbs)
Weight	0.8 kg (1.76 lbs)
Cavity	SUN T-17A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16U9020110100 material no: R930000995
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

**Description**

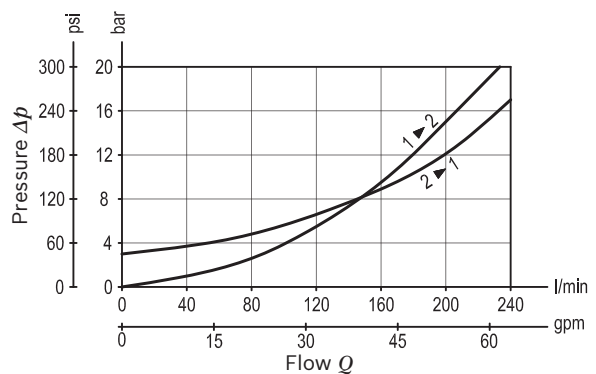
When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. Any back-pressure at 2 is additive to the pressure setting in all functions.



Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.52.45</b>	<b>X</b>	<b>47</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, standard poppet type, differential area, counterclockwise adjustment

Series 0/A to L unchanged performances and dimensions

Version and options standard

Pilot ratio
<b>03</b> 4:1 standard version
<b>10</b> 8:1 standard version
<b>42</b> 2:1 with bleed through pilot
<b>47</b> SUN cavity interchange, T-17A

		SPRINGS		
		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
for X= 03	<b>20</b>	70-280 (1000-4000)	80 (1160)	200 (2900)
	<b>40</b>	200-420 (2900-6000)	118 (1711)	350 (5000)
for X= 10	<b>20</b>	70-280 (1000-4000)	49 (711)	200 (2900)
	<b>40</b>	200-420 (2900-6000)	77 (1117)	350 (5000)
for X= 42	<b>20</b>	70-280 (1000-4000)	80 (1160)	200 (2900)
	<b>40</b>	200-420 (2900-6000)	118 (1711)	350 (5000)

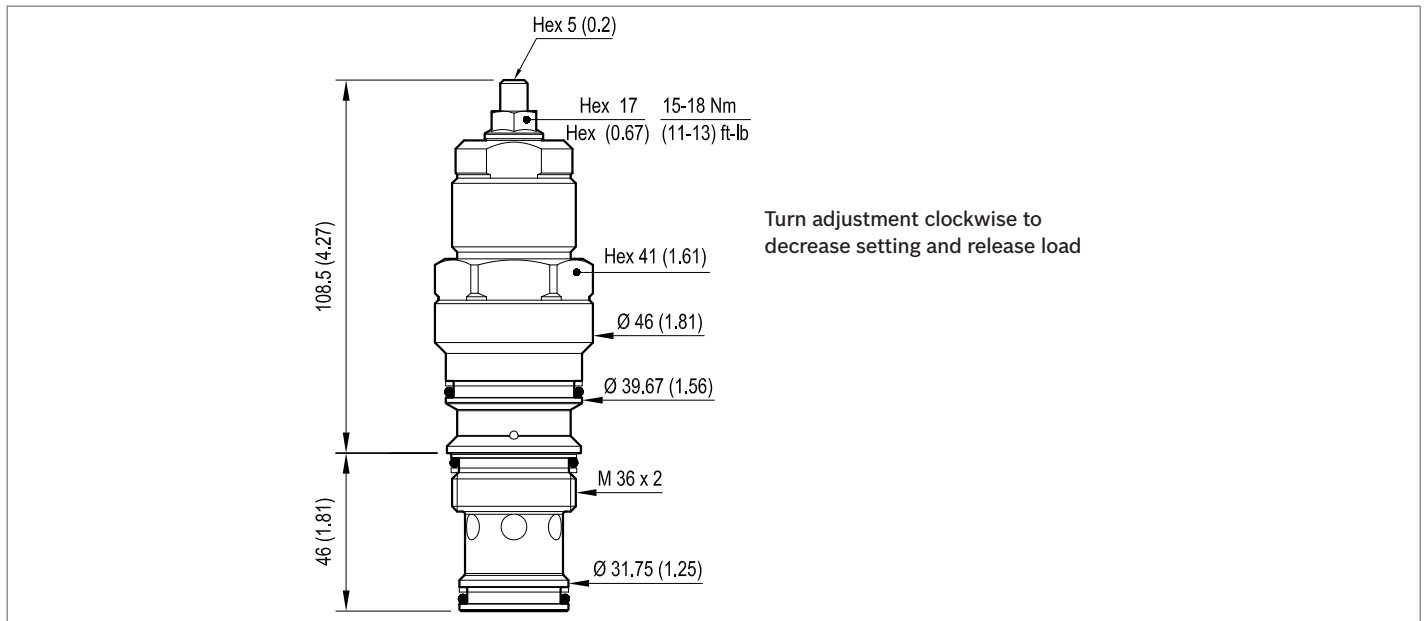
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045245034720000	R930000051
045245034740000	R930000052
045245104720000	R930000053

Type	Material number
045245104740000	R930000054
045245424720000	R930000055
045245424740000	R930000056

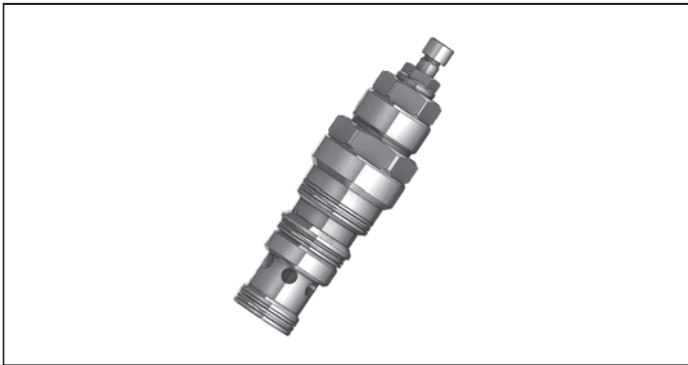
**Dimensions**



# Counterbalance, standard poppet type differential area, for motor applications Sun cavity interchange, T-17A

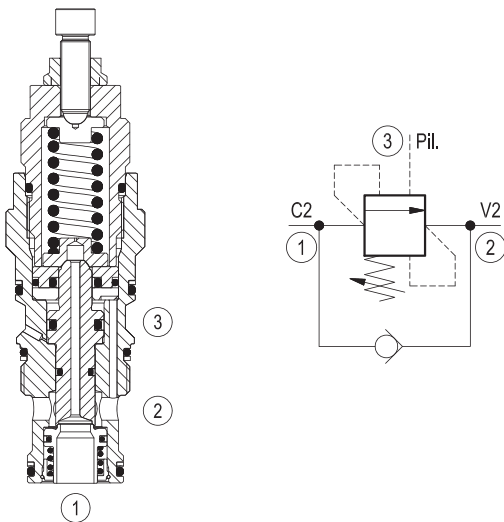
VBSN-16U-RF

04.52.47 - X - 47 - Z



### Description

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. Any back-pressure at 2 is additive to the pressure setting in all functions. The special design of the poppet allows low delta P during relief function and makes the valve especially suitable for hydraulic motors control. Valve especially designed for motor applications, where it is requested a low delta P during relief function.



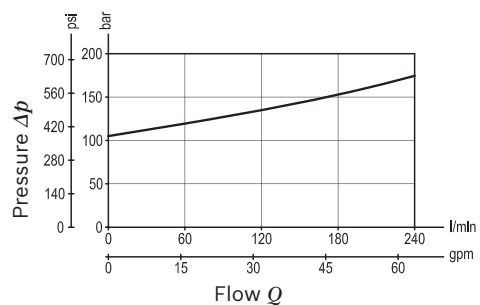
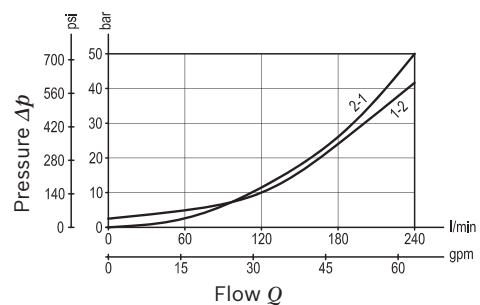
### Technical data

Max. operating pressure	420 bar (6000 psi)
Max. flow	240 l/min (63 gpm)
Max. internal leakage <sup>1)</sup>	5 cm <sup>3</sup> /min. (0.31 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	200 - 215 Nm (147 - 159 ft-lbs)
Weight	0.85 kg (1.87 lbs)
Cavity	SUN T-17A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16U9020110100 material no: R930000995
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

### Characteristic curve



**Ordering code**

<b>04.52.47</b>	<b>X</b>	<b>47</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, standard poppet type differential area, for motor applications

Pilot ratio

**10** 8:1

**47** SUN cavity interchange, T-17A

Series O/A to L unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>35</b>	100-350 (1450-5000)	41 (595)	350 (5000)

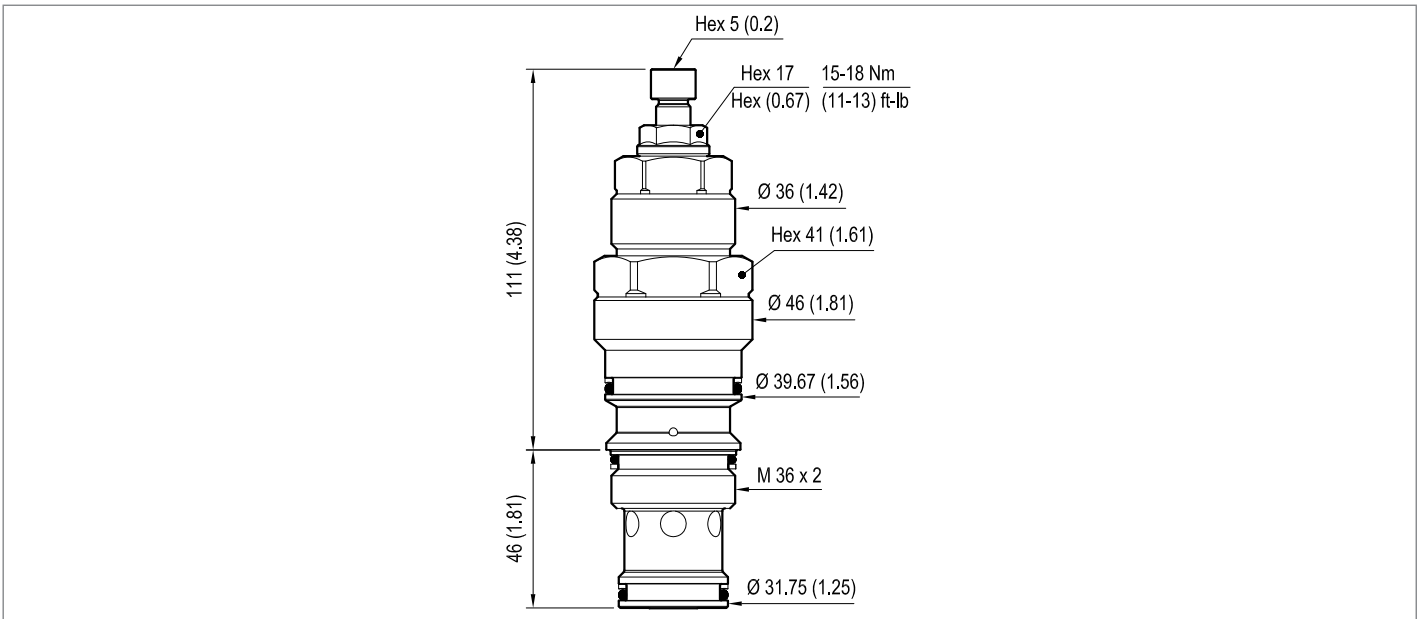
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
04524710473500A	R930056511

Type	Material number

**Dimensions**





Counterbalance, standard poppet type  
differential area  
Common cavity, Size 20

VBSN-20A

04.52.25 - X - 58 - Z



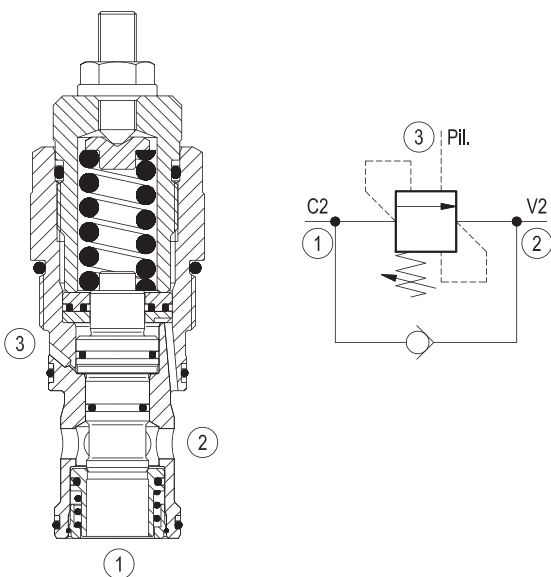
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	320 l/min (85 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	128 - 149 Nm (95 - 110 ft-lbs)
Weight	1.12 kg (2.5 lbs)
Cavity	CA-20A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG20A9010530100 material no: R90111397
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

**Description**

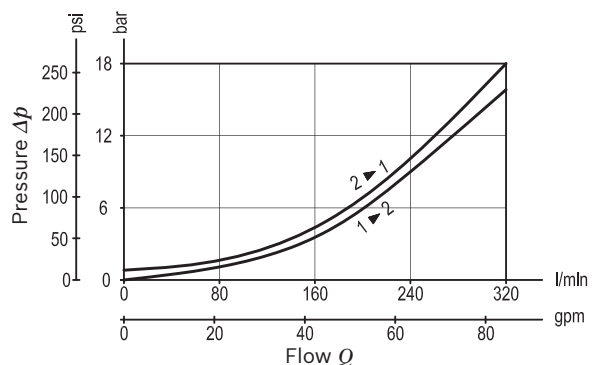
When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2, and any back-pressure at 2 is additive to the pressure setting in all functions.

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.52.25</b>	<b>X</b>	<b>58</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance,  
standard poppet type, differential area

Pilot ratio

**03** 4:1

**10** 8:1

**58** Common cavity, Size 20

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

		SPRINGS		
		Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
for X= 03	<b>20</b>	70-210 (1000-3000)	70 (1015)	200 (2900)
	<b>35</b>	140-350 (2000-5000)	108 (1566)	350 (5000)
for X= 10	<b>20</b>	70-210 (1000-3000)	70 (1015)	200 (2900)
	<b>40</b>	140-420 (2000-6000)	135 (1958)	350 (5000)

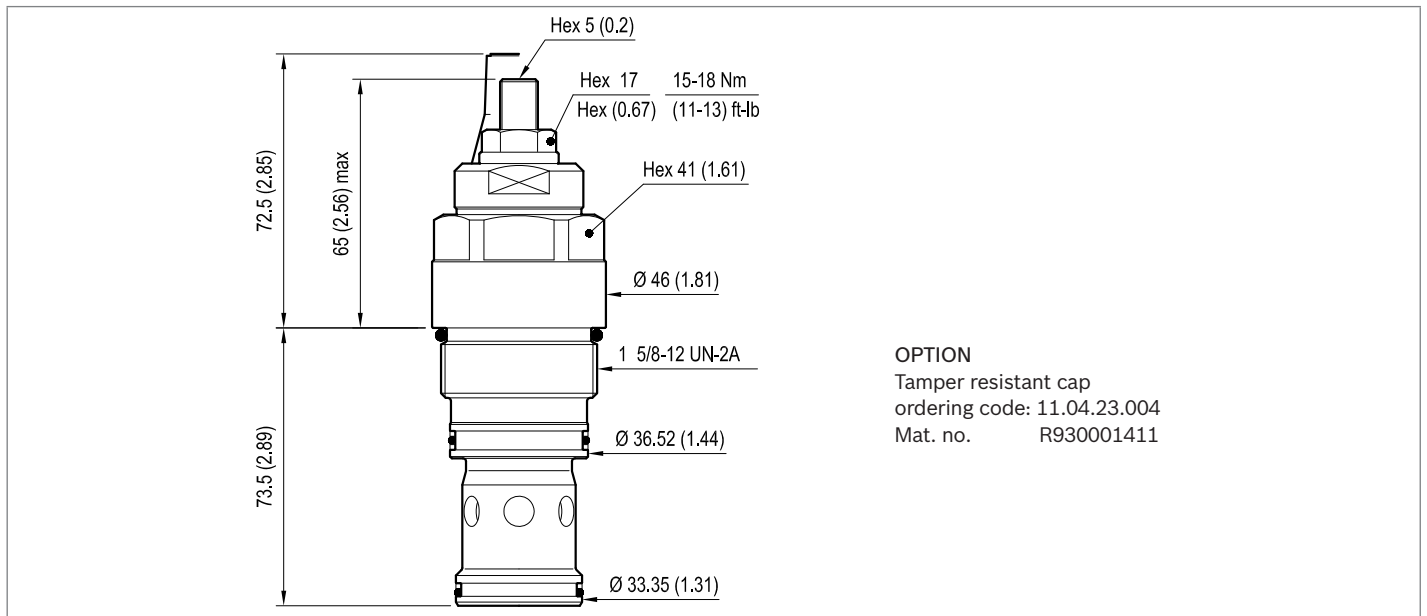
**Note:** Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045225035820000	R901096052
045225035835000	R901096053
045225105820000	R930000852
045225105840000	R901096057

Type	Material number

**Dimensions**



Counterbalance, standard poppet type  
differential area, counterclockwise adjustment  
SUN cavity interchange, T-19A

VBSN-25U-RS

04.52.46 - X - 50 - Z



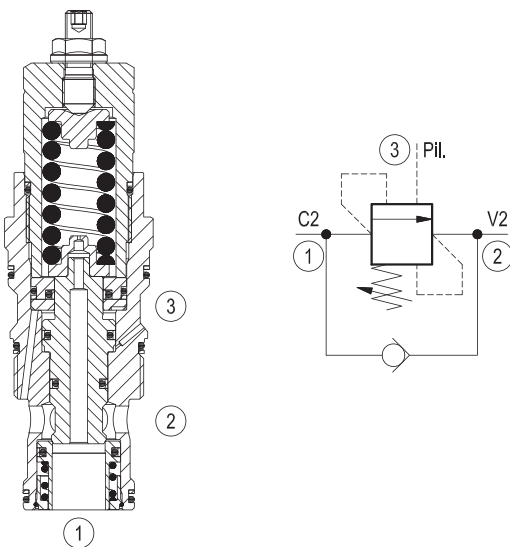
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	480 l/min (127 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	475 - 500 Nm (352 - 370 ft-lbs)
Weight	1.7 kg (3.7 lbs)
Cavity	SUN T-19A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG25U9020110100 material no: R930006268
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

**Description**

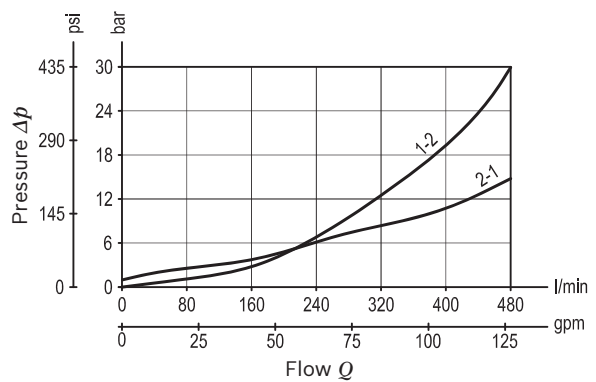
When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. Any back-pressure at 2 is additive to the pressure setting in all functions.

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.52.46</b>	<b>X</b>	<b>50</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, standard poppet type, differential area, counterclockwise adjustment

Series O/A to L unchanged performances and dimensions

Version and options standard

Pilot ratio

**25** 5:1 standard version

**50** SUN cavity interchange, T-19A

**SPRINGS**

	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>35</b>	70-350 (1000-5000)	99 (1436)	350 (5000)

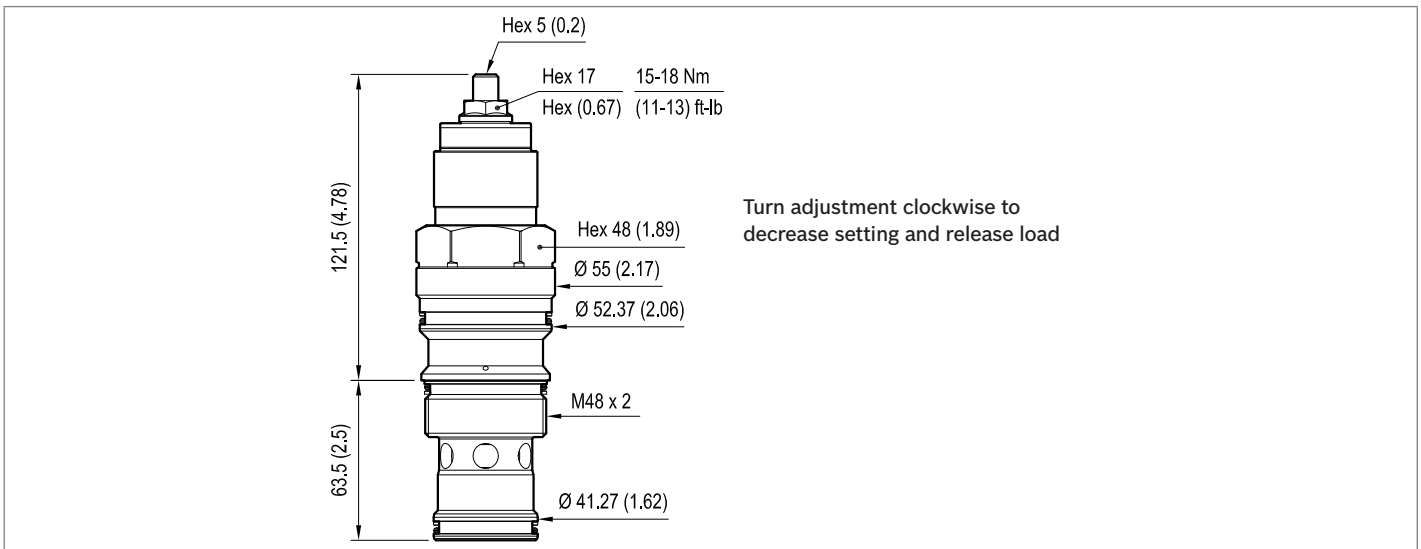
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045246255035000	R930006253

Type	Material number

**Dimensions**



Counterbalance, standard poppet type  
zero differential area  
Common cavity, Size 20

VBSZ-20A

04.52.41 - X - 58 - Z



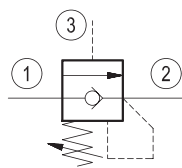
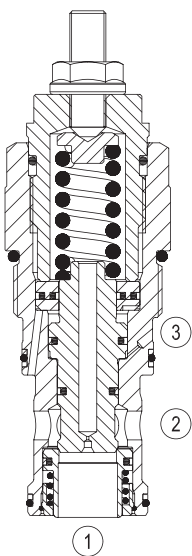
**Description**

When pressure at 2 rises above the check spring bias pressure, the seat is pushed away from the piston and flow is allowed from 2 to 1. Reverse flow is locked, unless the pilot pressure at 3 rises above the piston spring bias pressure (adjustable). Any back-pressure at 2 is additive to the pressure setting.

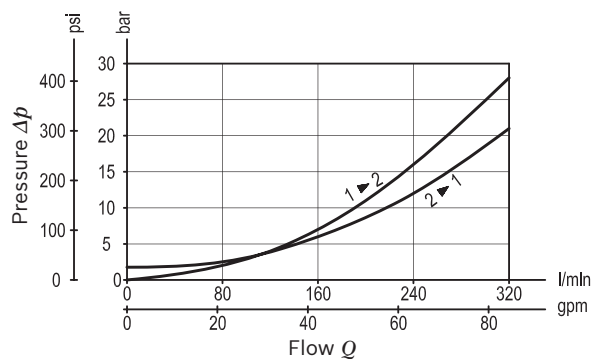
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	320 l/min (85 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	128 - 149 Nm (95 - 110 ft-lbs)
Weight	1.12 kg (2.5 lbs)
Cavity	CA-20A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	Code: RG20A9010530100 material no: R901111397
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

1) At 70% of pressure setting



**Characteristic curve**



**Ordering code**

<b>04.52.41</b>	<b>X</b>	<b>58</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance,  
standard poppet type zero differential  
area

O-Ring on pilot piston

**27** With O-Ring

**58** Common cavity, Size 20

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

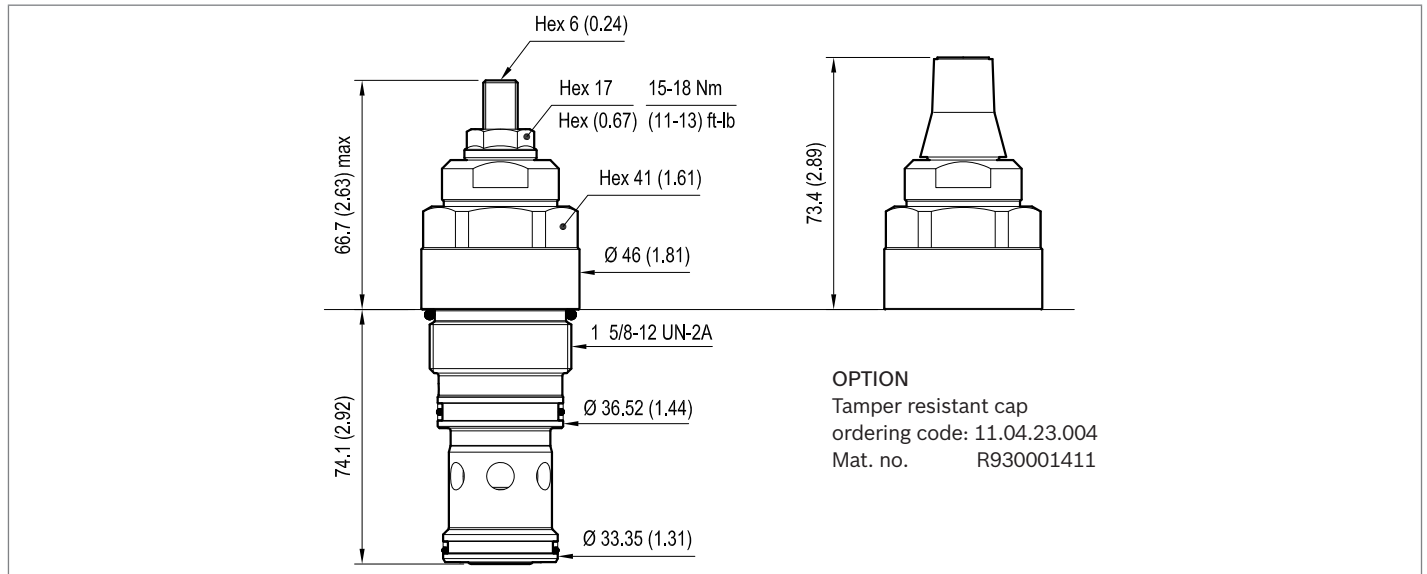
SPRINGS		
Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>20</b>	10-30 (145-450)	10 (145) 15 (220)

**Preferred types**

Type	Material number
045241275820000	R930000844

Type	Material number

**Dimensions**



Counterbalance, relief compensated guided poppet type  
Common cavity, Size 08

VBSP-08AA

04.54.04 - X - 56 - Z



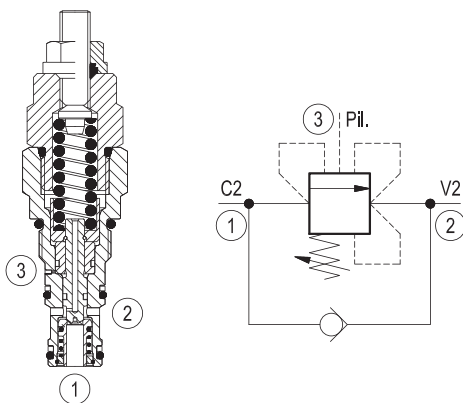
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	30 l/min (8 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.18 kg (0.4 lbs)
Cavity	CA-08A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08A9010520100 material no: R901101592
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

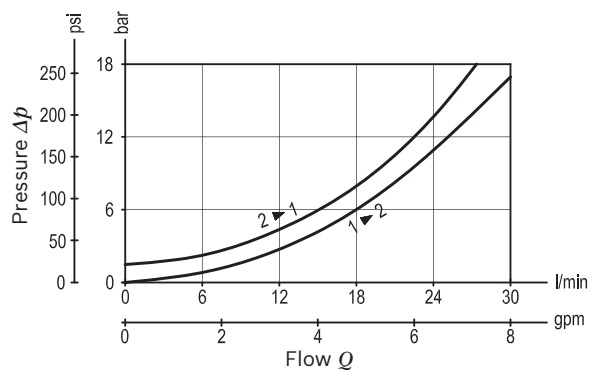
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2. The valve applies a balanced piston design allowing relief operation at the valve setting independent of back-pressure at 2. However, the piloted opening of the valve remains subject to additive pressure at port 2.



**Characteristic curve**



**Ordering code**

<b>04.54.04</b>	<b>X</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, relief compensated guided, poppet type

Pilot ratio

**03** 4:1

**56** Common cavity, Size 08

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>20</b>	100-210 (1450-3000)	109 (1581)	200 (2900)
<b>35</b>	200-350 (2900-5000)	137 (1987)	350 (5000)

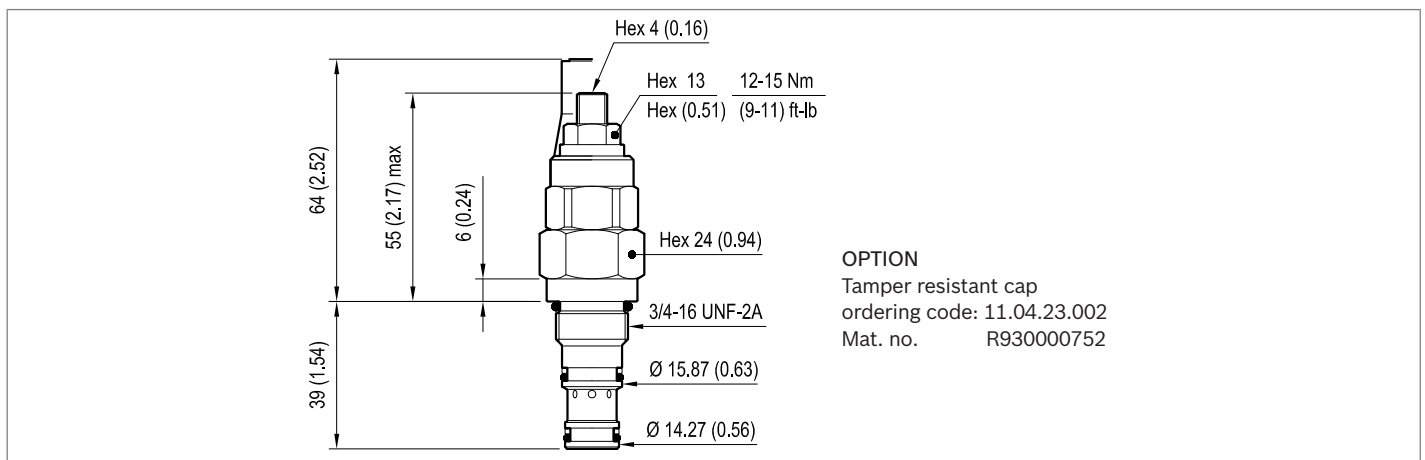
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045404035620000	R901096058
045404035635000	R901096059

Type	Material number

**Dimensions**





Counterbalance, relief compensated  
poppet type differential area  
Common cavity, Size 10

VBSP-10A

04.54.09 - X - 85 - Z



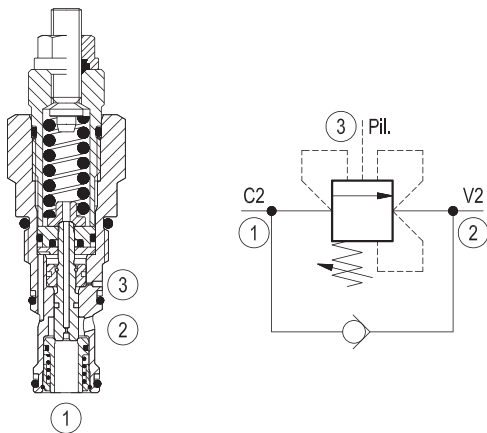
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	60 l/min (16 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A9010520100 material no: R901111367
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

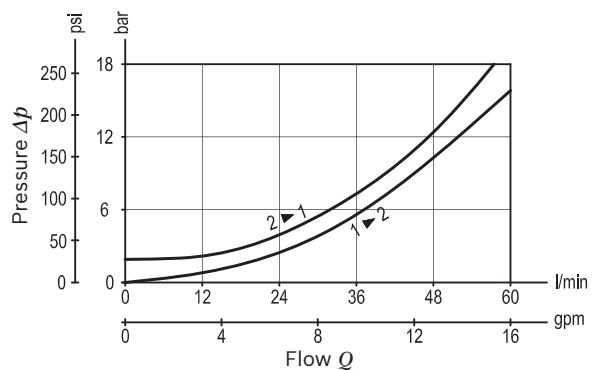
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2. The valve applies a balanced piston design allowing relief operation at the valve setting independent of back-pressure at 2. However, the piloted opening of the valve remains subject to additive pressure at port 2.



**Characteristic curve**



**Ordering code**

<b>04.54.09</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, relief compensated, poppet type differential area

Series O/A to L  
unchanged performances and dimensions

Version and options standard

Pilot ratio

**03** 3:1

**SPRINGS**

	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>20</b>	70-210 (1000-3000)	135 (1958)	200 (2900)
<b>35</b>	140-350 (2000-5000)	196 (2842)	350 (5000)

Note: Special settings available. Contact factory authorized representative for ordering code.

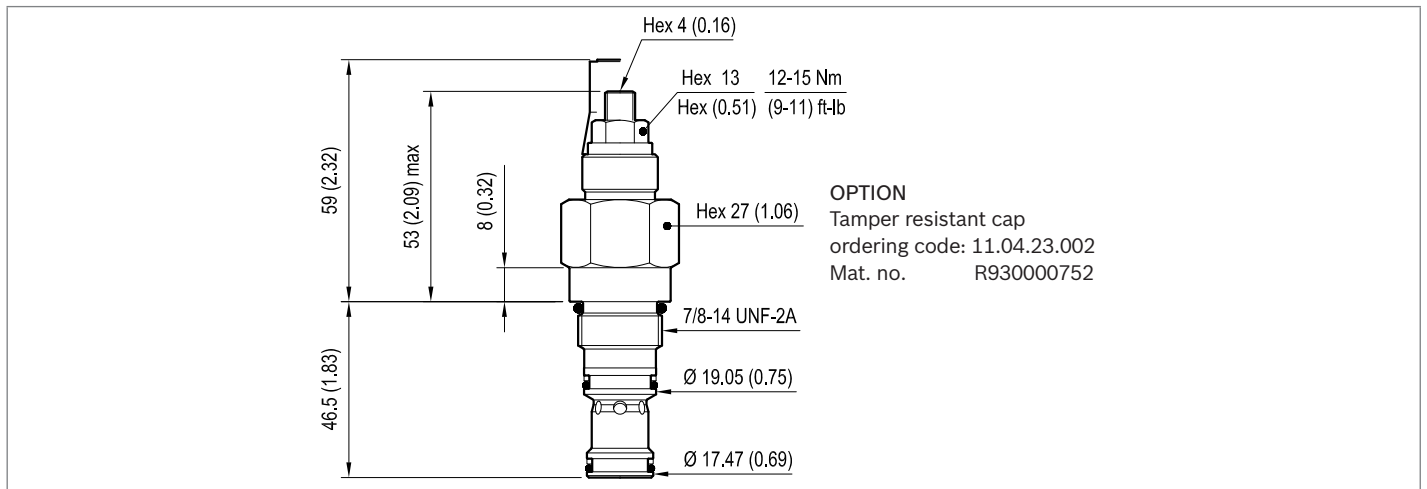
**85** Common cavity, Size 10

**Preferred types**

Type	Material number
04540903852000A	R901096060
04540903853500A	R901096062

Type	Material number

**Dimensions**



Counterbalance, relief compensated  
poppet type differential area, counterclockwise adjustment  
Sun cavity interchange, T-11A

VBSP-08U-RS

04.54.15 - X - 20 - Z



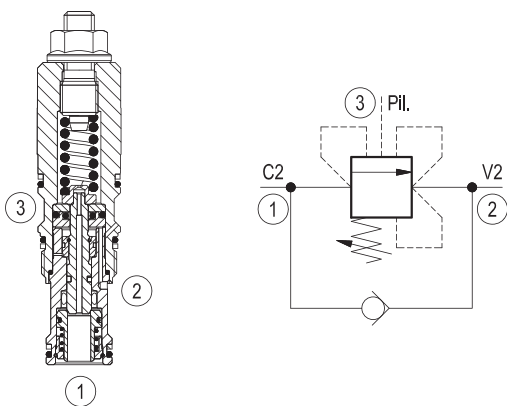
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	60 l/min (16 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	40 - 50 Nm (30 - 37 ft-lbs)
Weight	0.19 kg (0.42 lbs)
Cavity	SUN T-11A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08U9020110100 material no: R901193388
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

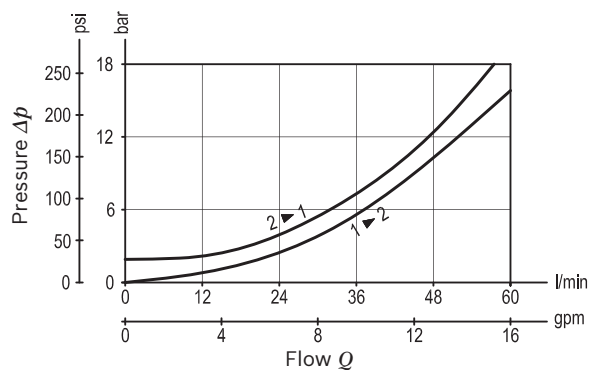
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the directing, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The valve applies a balanced piston design allowing relief operation at the valve setting independent of back-pressure at 2. However, the piloted opening of the valve remains subject to additive pressure at port 2.



**Characteristic curve**



**Ordering code**

<b>04.54.15</b>	<b>X</b>	<b>20</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, relief compensated, poppet type differential area, counter-clockwise adjustment

Pilot ratio

**03** 3:1

**20** SUN cavity interchange, T-11A

Series O/A to L unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>20</b>	70-210 (1000-3000)	106 (1537)	200 (2900)
<b>35</b>	140-350 (2000-5000)	165 (2393)	350 (5000)

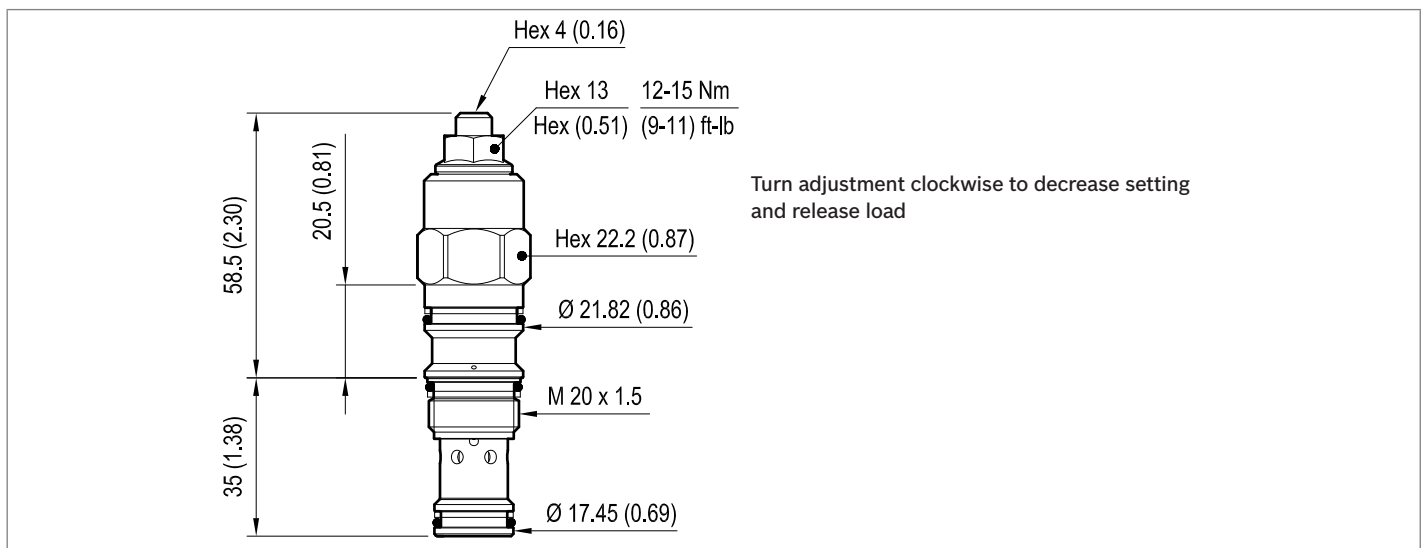
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045415032020000	R930006122
045415032035000	R930006123

Type	Material number

**Dimensions**



Counterbalance, relief compensated  
poppet type differential area  
Common cavity, Size 12

VBSP-12A

04.54.08 - X - 57 - Z



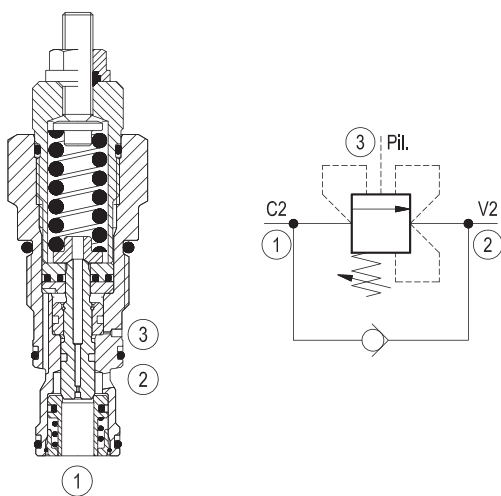
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min (32 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.39 kg (0.86 lbs)
Cavity	CA-12A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A9010520100 material no: R901111379
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

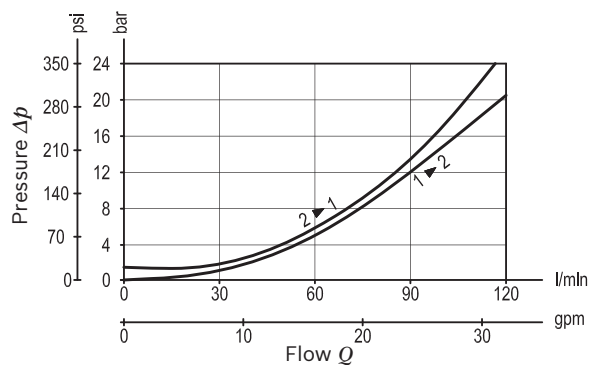
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2. The valve applies a balanced piston design allowing relief operation at the valve setting independent of back-pressure at 2. However, the piloted opening of the valve remains subject to additive pressure at port 2.



**Characteristic curve**



**Ordering code**

<b>04.54.08</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, relief compensated, poppet type differential area

Pilot ratio

**03** 4:1

**57** Common cavity, Size 12

Series O/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>20</b>	70-210 (1000-3000)	50 (725)	200 (2900)
<b>35</b>	140-350 (2000-5000)	159 (2306)	350 (5000)

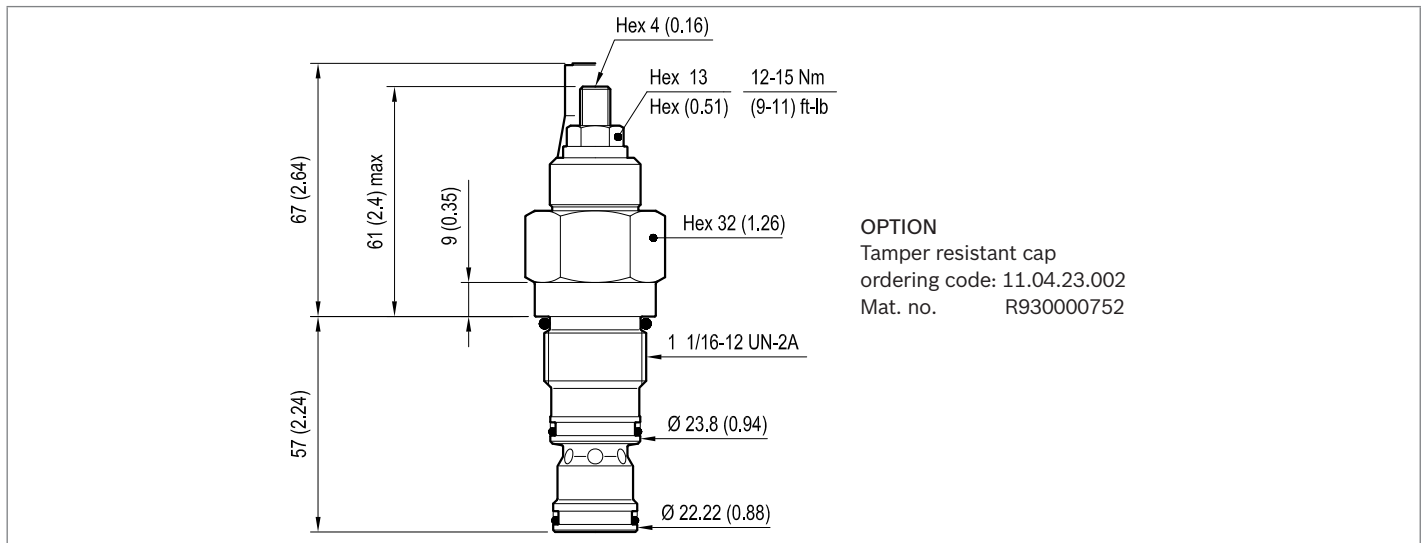
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045408035720000	R901096063
045408035735000	R901096064

Type	Material number

**Dimensions**



Counterbalance, relief compensated  
poppet type differential area, counterclockwise adjustment  
Sun cavity interchange, T-2A

VBSP-12U-RS

04.54.16 - X - 86 - Z



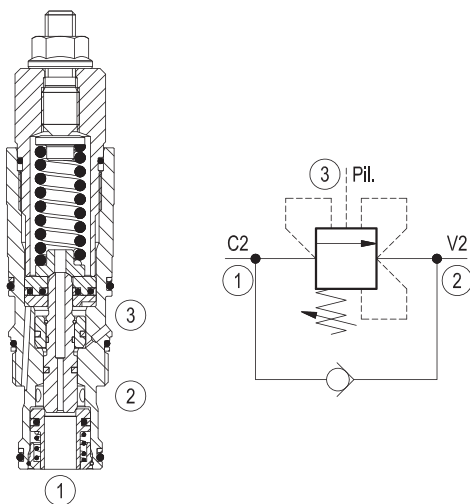
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min (32 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	60 - 70 Nm (44 - 52 ft-lbs)
Weight	0.37 kg (0.82 lbs)
Cavity	SUN T-2A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12U9020110100 material no: R930005599
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

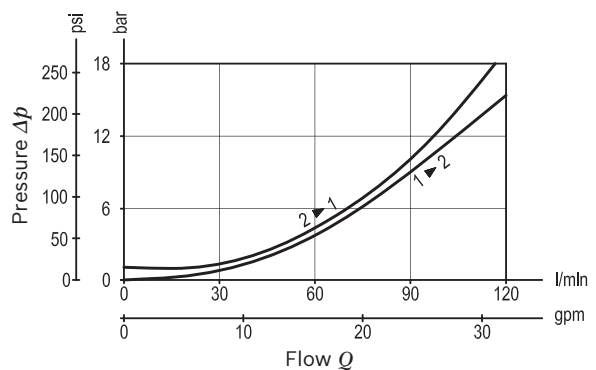
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The valve applies a balanced piston design allowing relief operation at the valve setting independent of back-pressure at 2. However, the piloted opening of the valve remains subject to additive pressure at port 2.



**Characteristic curve**



**Ordering code**

<b>04.54.16</b>	<b>X</b>	<b>86</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, relief compensated, poppet type differential area, counterclockwise adjustment

Pilot ratio

**03** 4:1

**86** SUN cavity interchange, T-2A

Series O/A to L unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>20</b>	70-210 (1000-3000)	40 (580)	200 (2900)
<b>35</b>	140-350 (2000-5000)	125 (1813)	350 (5000)

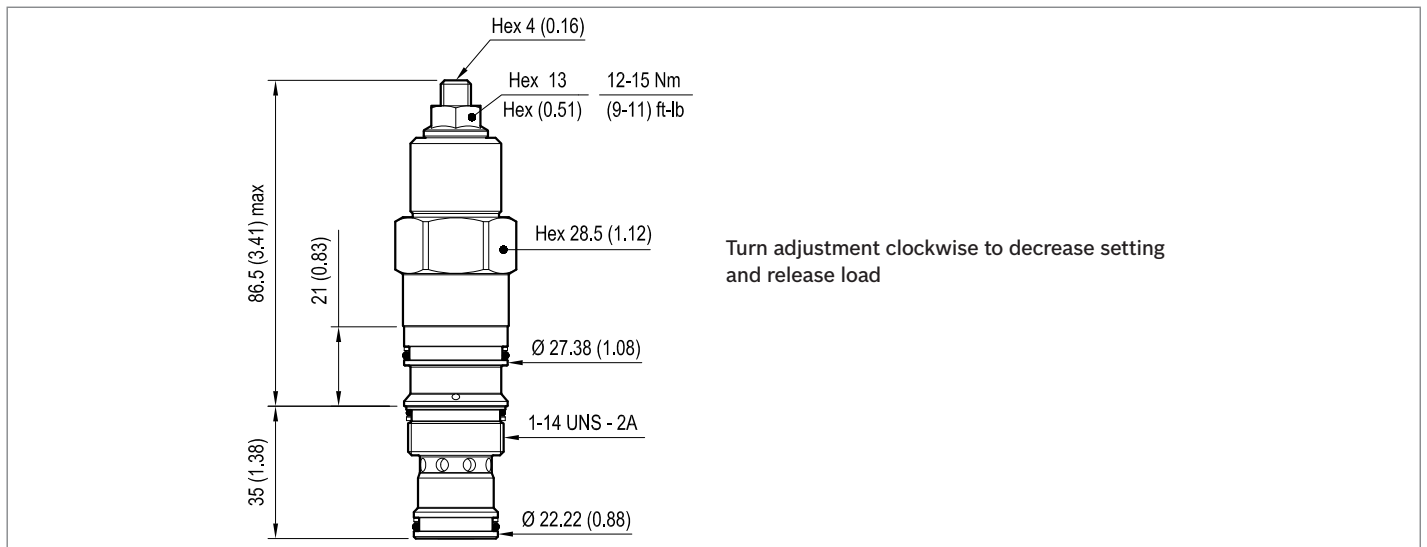
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045416038620000	R930006124
045416038635000	R930006125

Type	Material number

**Dimensions**





Counterbalance, relief compensated  
poppet type differential area  
Common cavity, Size 16

VBSP-16A

04.54.10 - X - 27 - Z



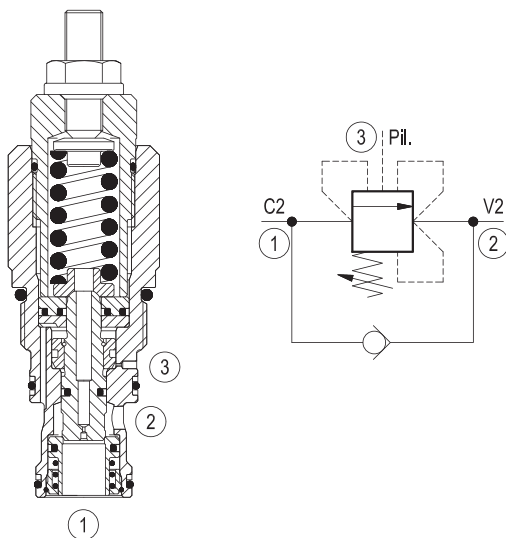
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	200 l/min (53 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.82 kg (1.81 lbs)
Cavity	CA-16A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16A9010530100 material no: R930001200
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

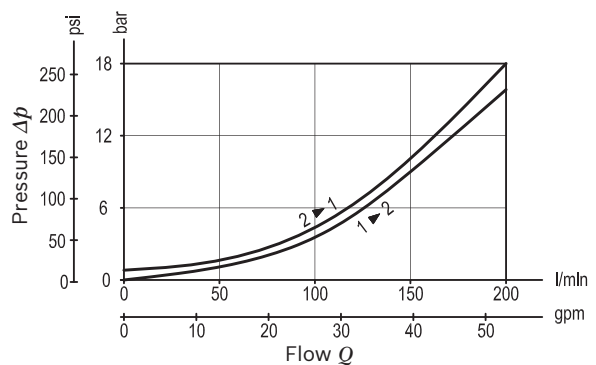
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2. The valve applies a balanced piston design allowing relief operation at the valve setting independent of back-pressure at 2. However, the piloted opening of the valve remains subject to additive pressure at port 2.



**Characteristic curve**



**Ordering code**

<b>04.54.10</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, relief compensated, poppet type differential area

Pilot ratio

**03** 4:1

**27** Common cavity, Size 16

Series O/A to L  
unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>20</b>	70-210 (1000-3000)	70 (1015)	200 (2900)
<b>35</b>	140-350 (2000-5000)	108 (1566)	350 (5000)

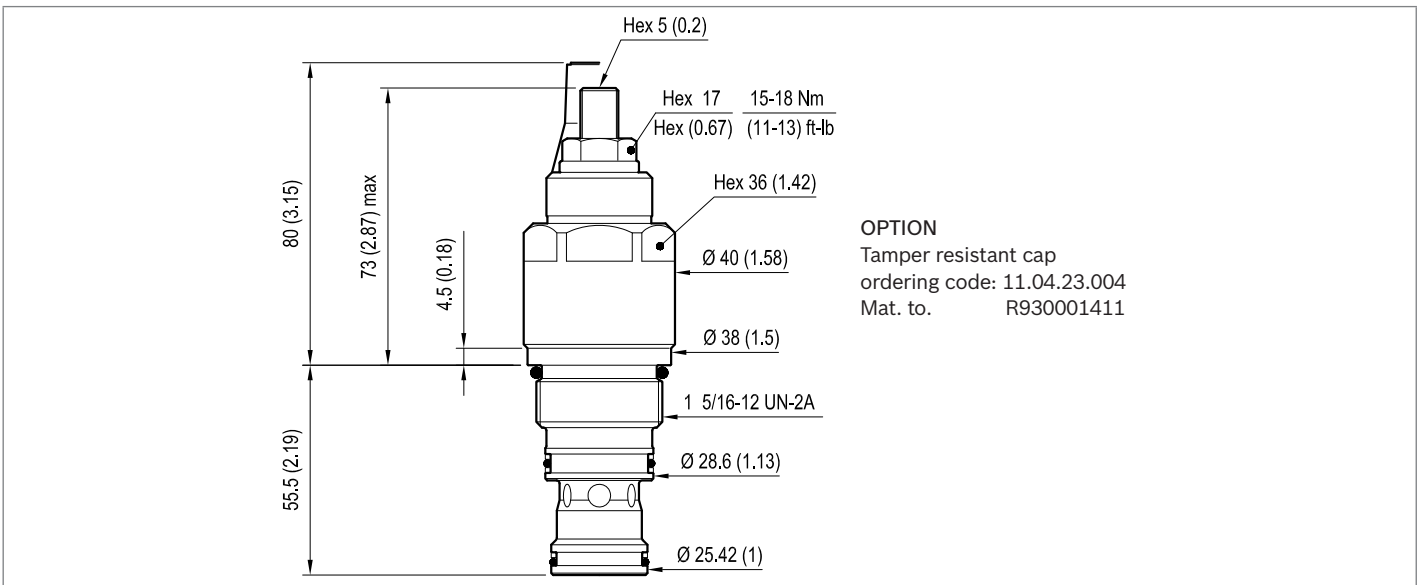
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045410032720000	R901109804
045410032735000	R901109805

Type	Material number

**Dimensions**



Counterbalance, relief compensated  
poppet type differential area, counterclockwise adjustment  
Sun cavity interchange, T-17A

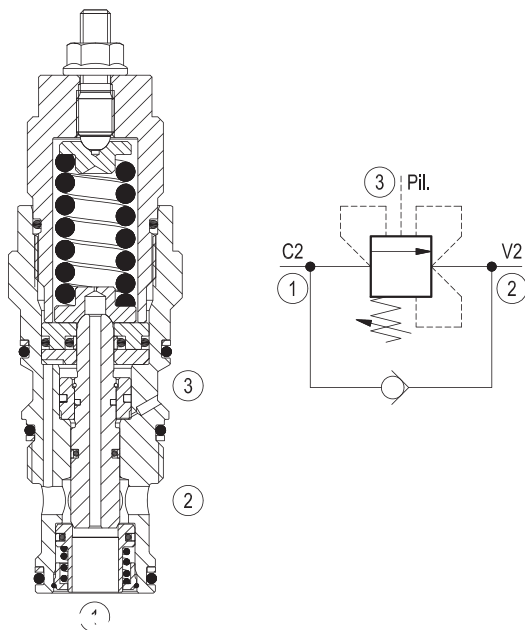
VBSP-16U-RS

04.54.17 - X - 47 - Z



**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The valve applies a balanced piston design allowing relief operation at the valve setting independent of back-pressure at 2. However, the piloted opening of the valve remains subject to additive pressure at port 2.



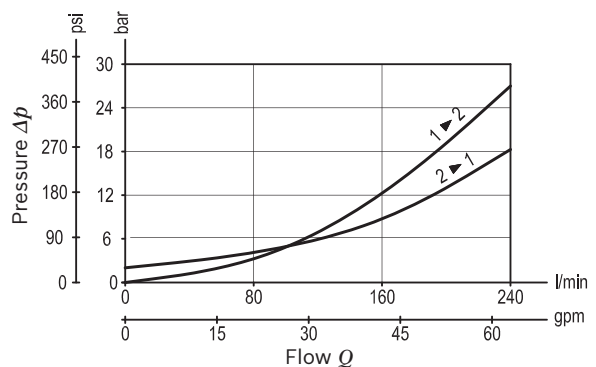
**Technical data**

Max. operating pressure	420 bar (6000 psi)
Max. flow	240 l/min (63 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	200 - 215 Nm (147 - 159 ft-lbs)
Weight	0.8 kg (1.76 lbs)
Cavity	SUN T-17A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16U9020110100 material no: R930000995
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.54.17</b>	<b>X</b>	<b>47</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, relief compensated, poppet type differential area, counterclockwise adjustment

Pilot ratio

**03** 4:1

**47** SUN cavity interchange, T-17A

Series O/A to L unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>20</b>	70-280 (1000-4000)	80 (1160)	200 (2900)
<b>40</b>	200-420 (2900-6000)	118 (1711)	350 (5000)

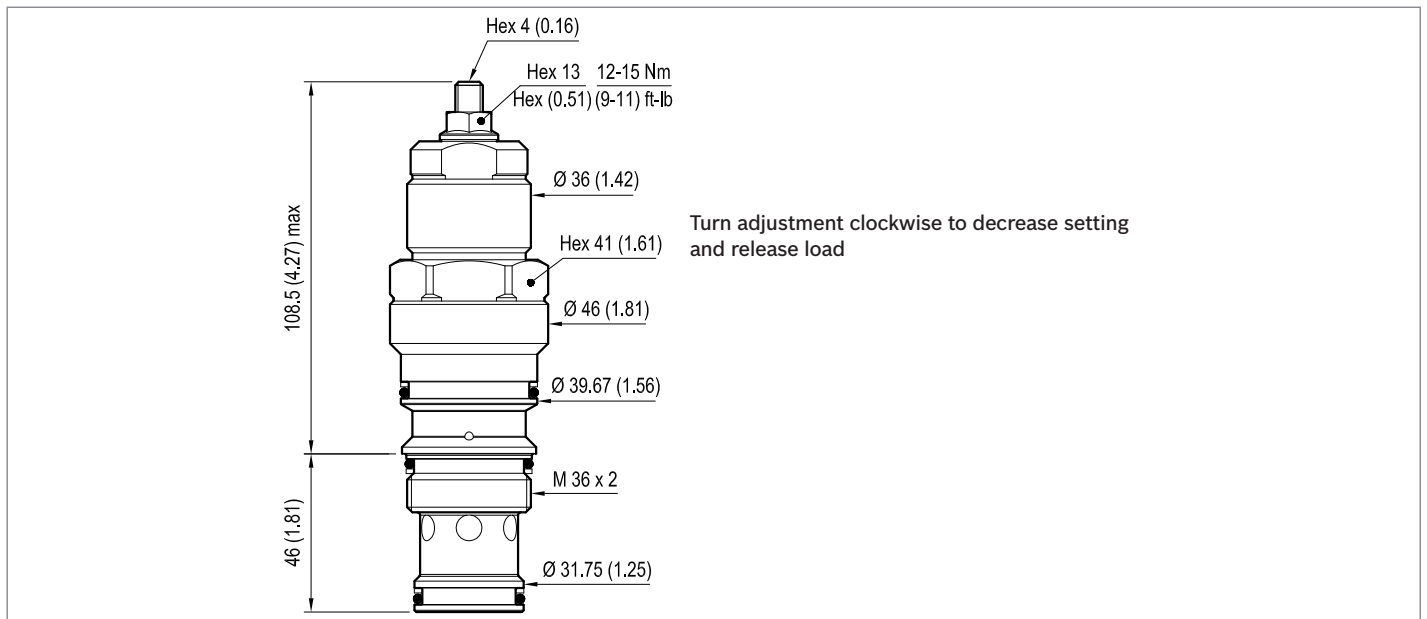
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045417034720000	R930000059
045417034740000	R930000060

Type	Material number

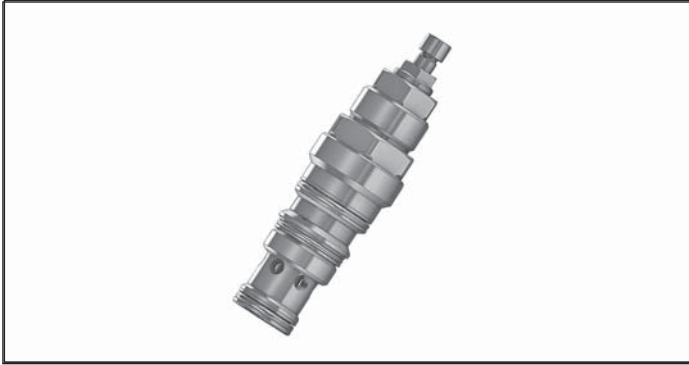
**Dimensions**



# Counterbalance, relief compensated poppet type differential area, for motor applications Sun cavity interchange, T-17A

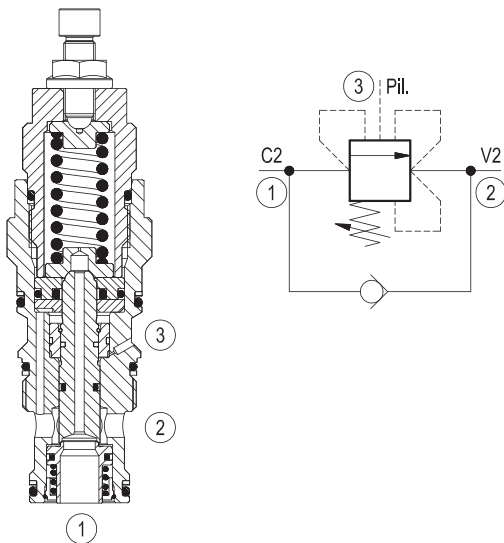
VBSP-16U-RF

04.54.19 - X - 47 - Z



**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The valve applies a balanced piston design allowing relief operation at the valve setting independent of back-pressure at 2. However, the piloted opening of the valve remains subject to additive pressure at port 2. The special design of the poppet allows low delta P during relief function and makes the valve especially suitable for hydraulic motors control. Valve especially designed for motor applications, where it is requested a low delta P during relief function.



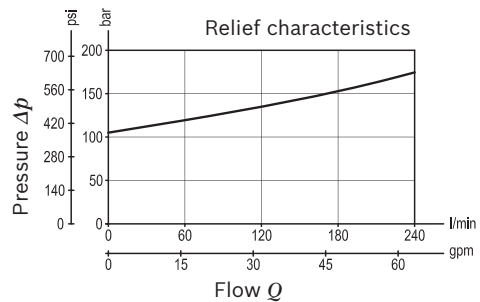
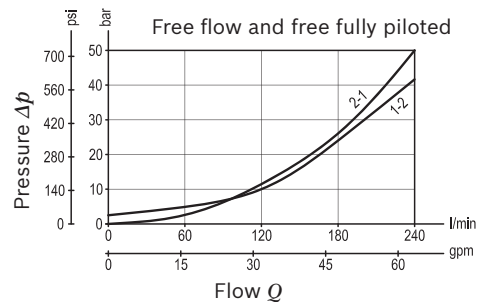
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	240 l/min (63 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	200 - 215 Nm (147 - 159 ft-lbs)
Weight	0.8 kg (1.76 lbs)
Cavity	SUN T-17A
Line bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16U9020110100 material no: R930000995
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.54.19</b>	<b>X</b>	<b>47</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, relief compensated poppet type differential area, for motor applications

Series O/A to L unchanged performances and dimensions

Version and options standard

Pilot ratio

**10** 8:1

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>35</b>	100-350 (1450-5000)	41 (595)	350 (5000)

Note: Special settings available. Contact factory authorized representative for ordering code.

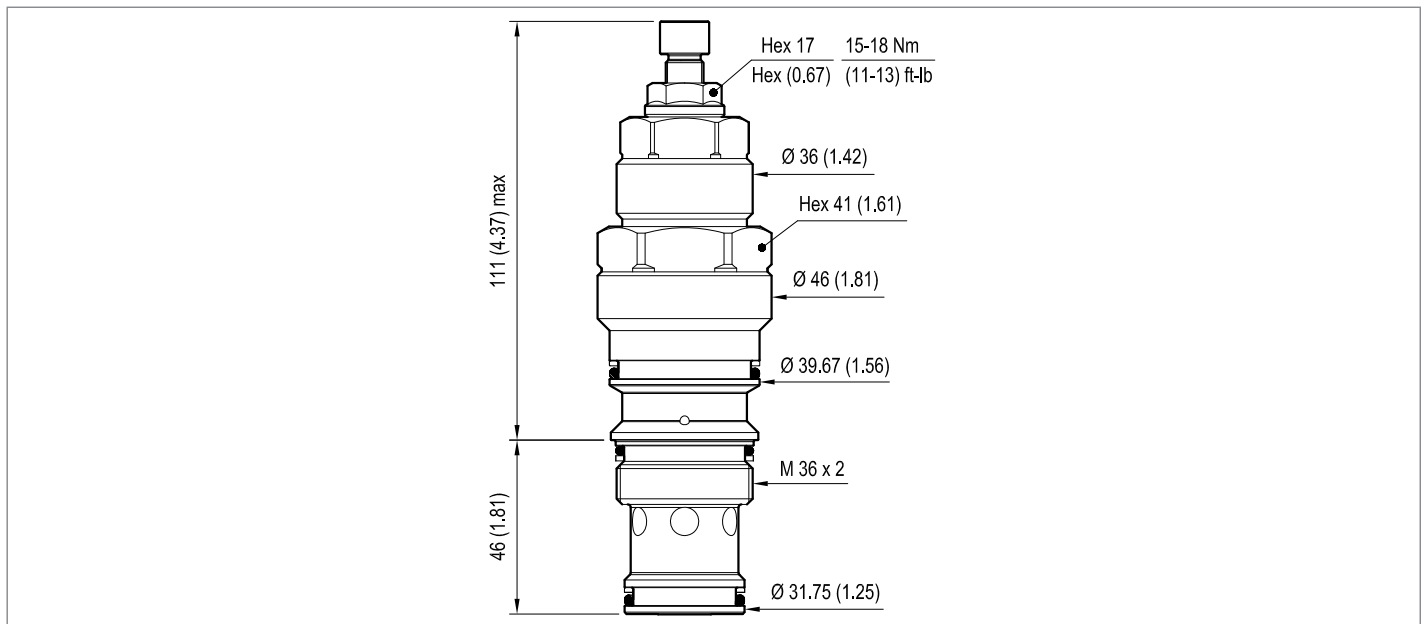
**47** SUN cavity interchange, T-17A

**Preferred types**

Type	Material number
04541910473500A	R930056510

Type	Material number

**Dimensions**



Counterbalance, relief compensated  
poppet type differential area  
Common cavity, Size 20

VBSP-20A

04.54.13 - X - 58 - Z



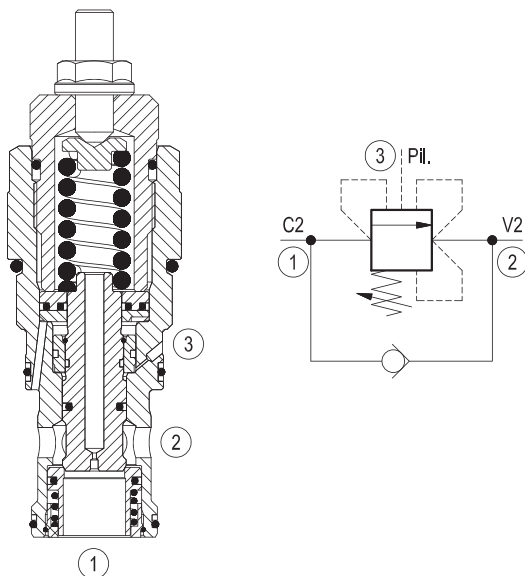
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	320 l/min (85 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	128 - 149 Nm (95 - 110 ft-lbs)
Weight	1.12 kg (2.5 lbs)
Cavity	CA-20A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG20A9010530100 material no: R901111397
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

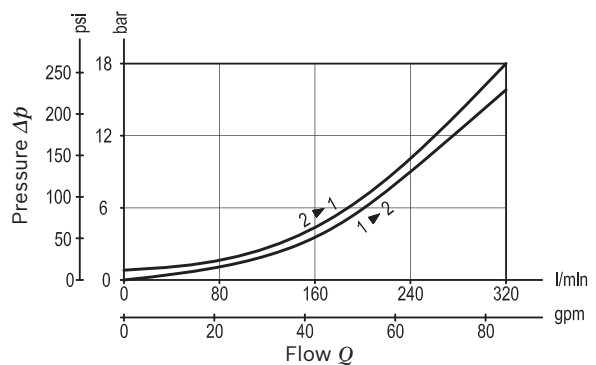
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is drained to 2. The valve applies a balanced piston design allowing relief operation at the valve setting independent of back-pressure at 2. However, the piloted opening of the valve remains subject to additive pressure at port 2.



**Characteristic curve**



**Ordering code**

<b>04.54.13</b>	<b>X</b>	<b>58</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, relief compensated, poppet type differential area

Pilot ratio

**03** 4:1

**58** Common cavity, Size 20

Series O/A to L  
unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>20</b>	70-210 (1000-3000)	70 (1015)	200 (2900)
<b>35</b>	140-350 (2000-5000)	108 (1566)	350 (5000)

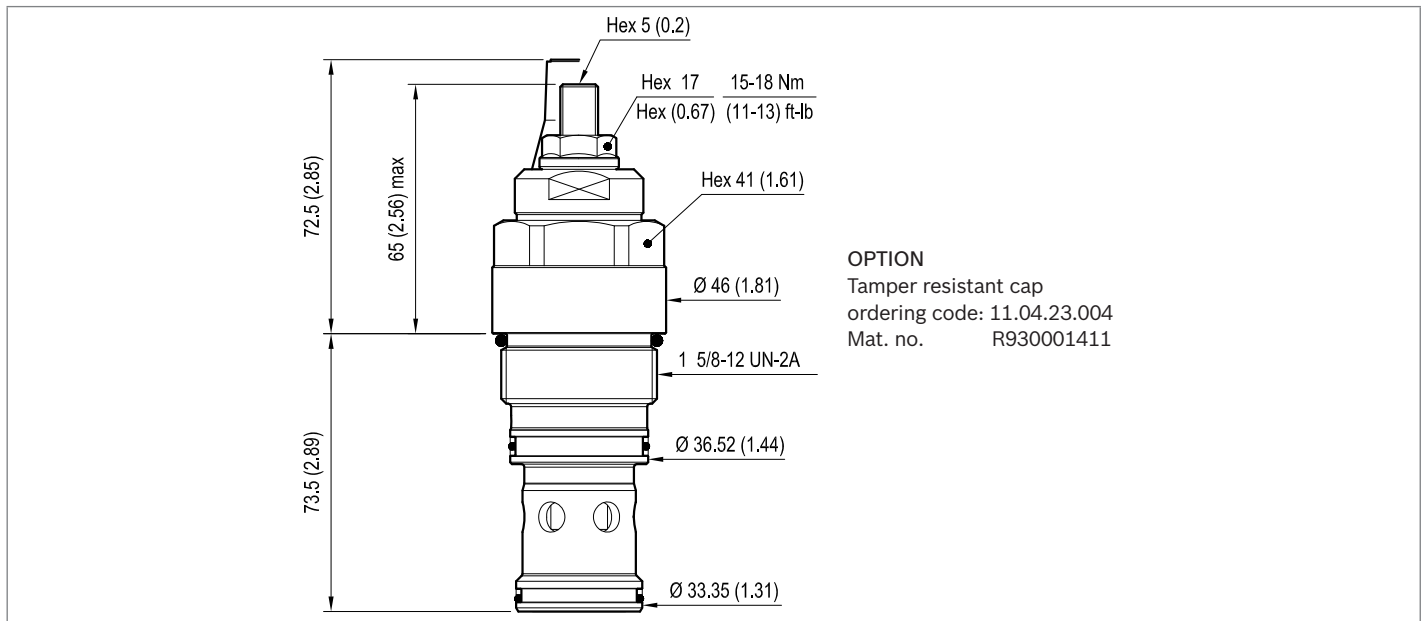
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045413035820000	R901099735
045413035835000	R901099795

Type	Material number

**Dimensions**





Counterbalance, relief compensated  
poppet type differential area, counterclockwise adjustment  
Sun cavity interchange, T-19A

VBSP-25U-RS

04.54.18 - X - 50 - Z



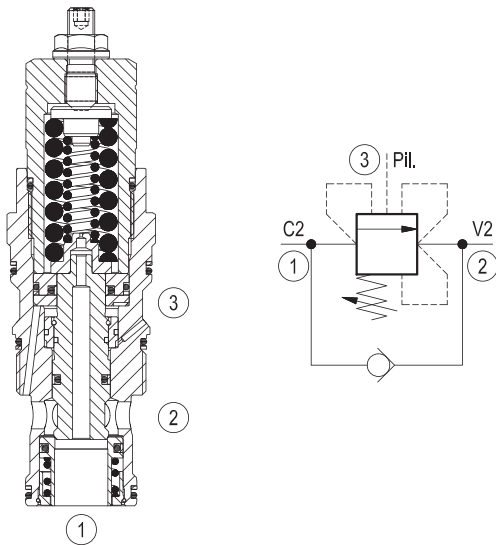
Technical data	
Max. operating pressure	420 bar (6000 psi)
Max. flow	480 l/min (127 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	475 - 500 Nm (352 - 370 ft-lbs)
Weight	1.7 kg (3.7 lbs)
Cavity	SUN T-19A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG25U9020110100 material no: R930006268
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

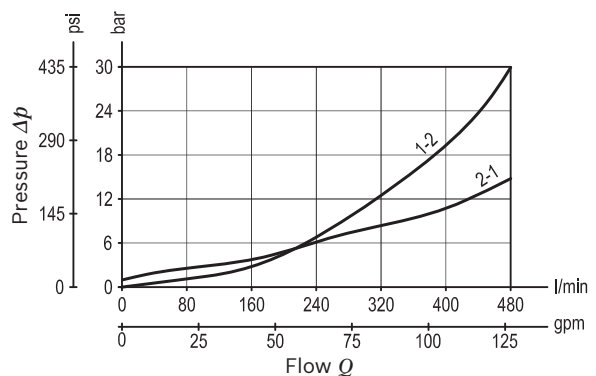
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, differential area relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The valve applies a balanced piston design allowing relief operation at the valve setting independent of back-pressure at 2. However, the piloted opening of the valve remains subject to additive pressure at port 2.



**Characteristic curve**



**Ordering code**

<b>04.54.18</b>	<b>X</b>	<b>50</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, relief compensated, poppet type differential area, counterclockwise adjustment

Series O/A to L unchanged performances and dimensions

Version and options standard

Pilot ratio

**25** 5:1

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>42</b>	200-420 (2900-6000)	118 (1711)	350 (5000)

Note: Special settings available. Contact factory authorized representative for ordering code.

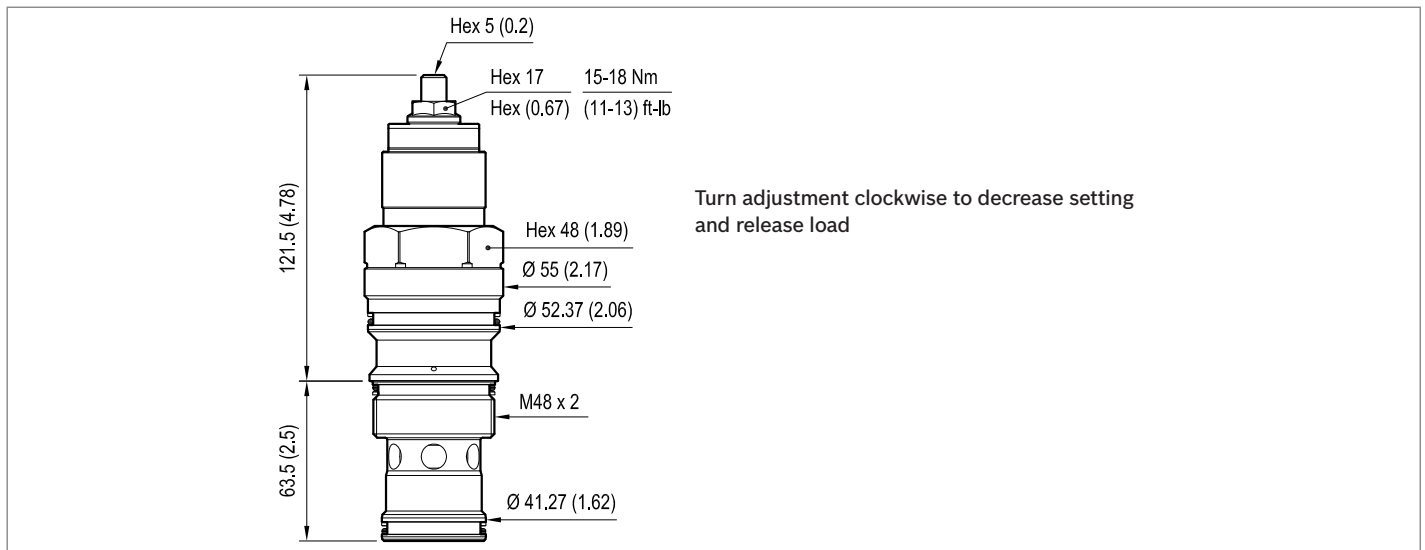
**50** SUN cavity interchange, T-19A

**Preferred types**

Type	Material number
045418255042000	R930006255

Type	Material number

**Dimensions**



Counterbalance, vented guided poppet type  
Common cavity, Size 08

VBST-08AA

04.59.08 - X - 56 - Z



**Description**

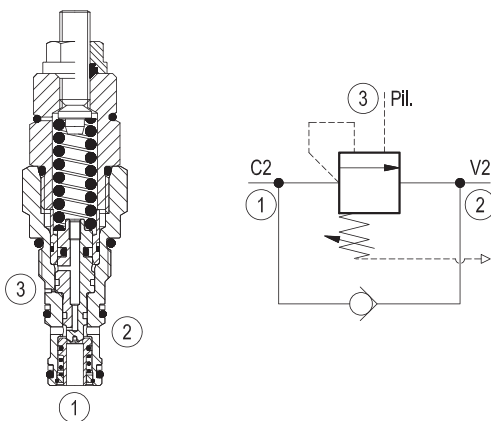
When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to atmosphere allowing operation of all functions independent of back-pressure at 2.

**Technical data**

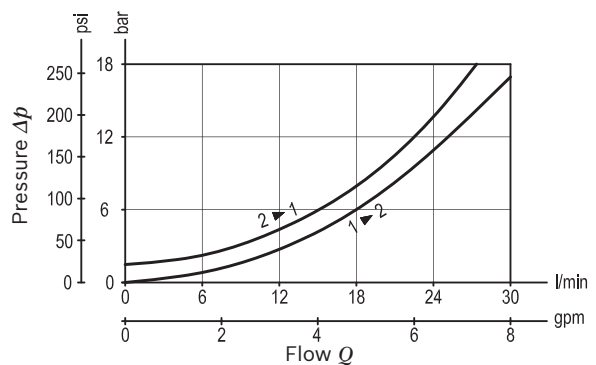
Max. operating pressure	350 bar (5000 psi)
Max. flow	30 l/min (8 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.19 kg (0.42 lbs)
Cavity	CA-08A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08A9010520100 material no: R901101592
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.59.08</b>	<b>X</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, vented guided poppet type

Pilot ratio

**03** 4:1

**56** Common cavity, Size 08

Series 0/A to L unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>20</b>	100-210 (1450-3000)	109 (1581)	200 (2900)
<b>35</b>	200-350 (2900-5000)	137 (1987)	350 (5000)

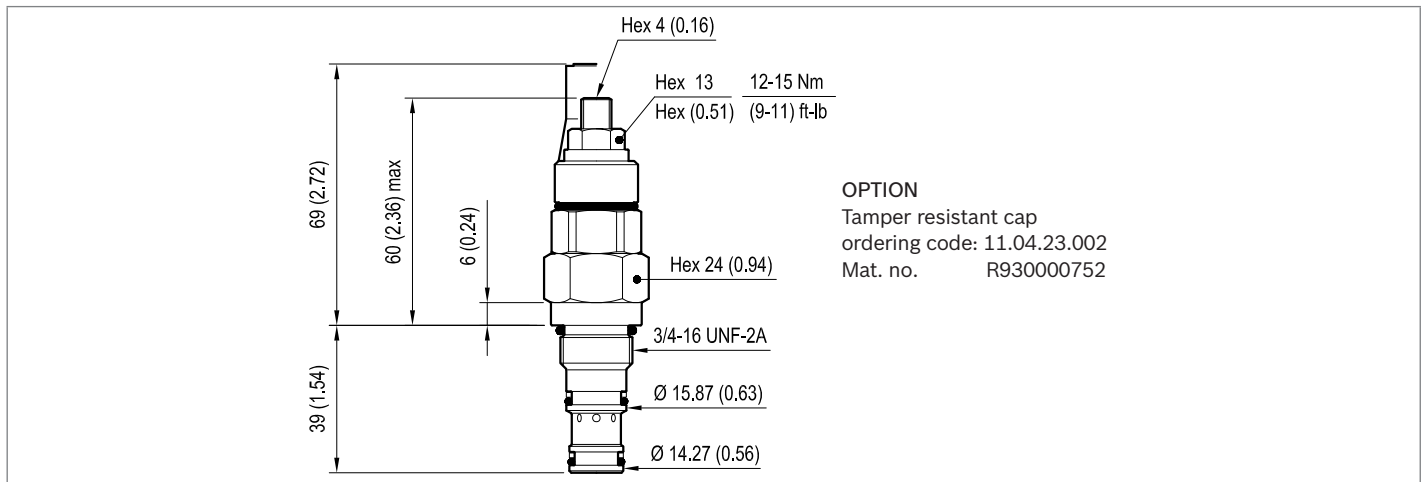
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
04590803562000B	R901096065
04590803563500B	R901096066

Type	Material number

**Dimensions**



Counterbalance, vented guided poppet type  
Common cavity, Size 10

VBST-10A

04.59.16 - X - 85 - Z



**Description**

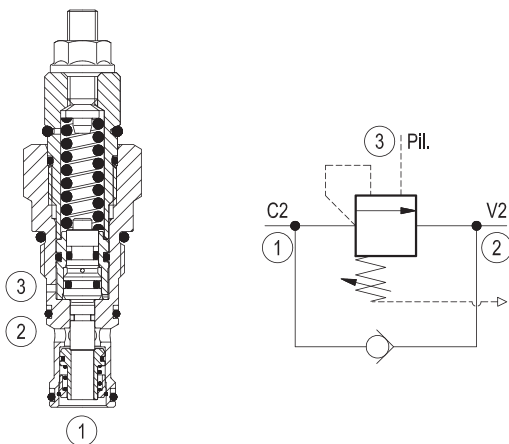
When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to atmosphere allowing operation of all functions independent of back-pressure at 2.

**Technical data**

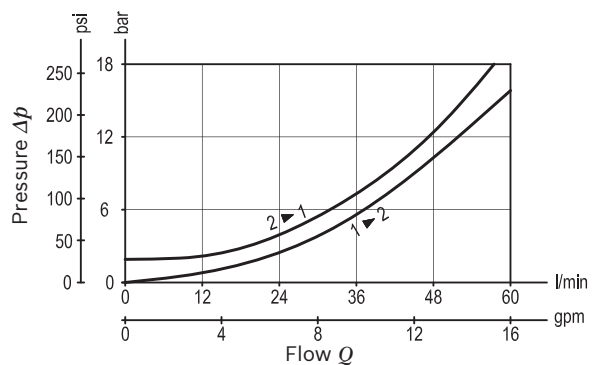
Max. operating pressure	350 bar (5000 psi)
Max. flow	60 l/min (16 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.21 kg (0.46 lbs)
Cavity	CA-10A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A9010520100 material no: R901111367
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.59.16</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, vented guided poppet type

Pilot ratio

**03** 3:1

**85** Common cavity, Size 10

Series O/A to L unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>20</b>	70-210 (1000-3000)	95 (1378)	200 (2900)
<b>35</b>	140-350 (2000-5000)	129 (1871)	350 (5000)

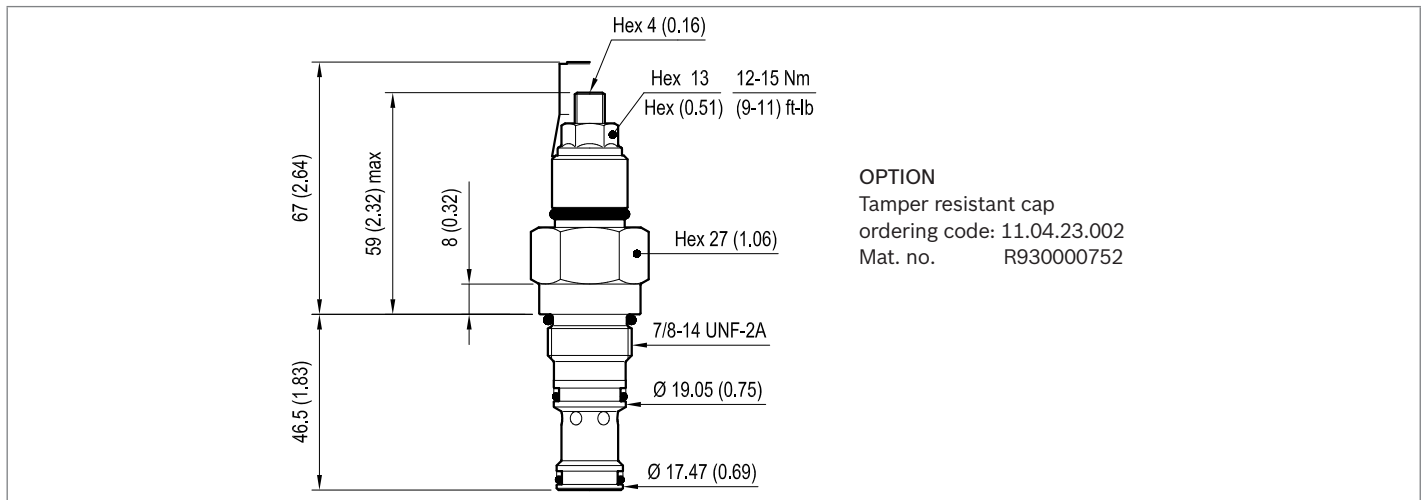
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045916038520000	R901096067
045916038535000	R901096068

Type	Material number

**Dimensions**



Counterbalance, vented guided poppet type, counterclockwise adjustment  
Sun cavity interchange, T-11A

VBST-08U-RS

04.59.29 - X - 20 - Z



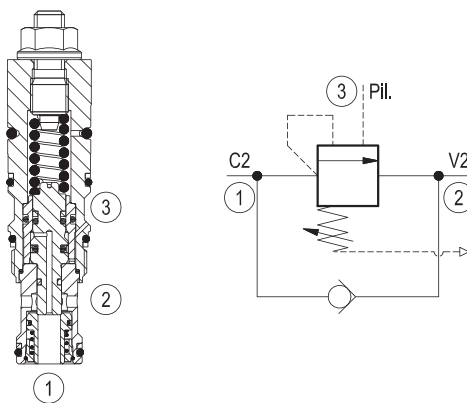
Technical data	
Max. operating pressure	280 bar (4000 psi)
Max. flow	60 l/min (16 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	40 - 50 Nm (30 -37 ft-lbs)
Weight	0.19 kg (0.42 lbs)
Cavity	SUN T-11A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08U9020110100 material no: R901193388
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

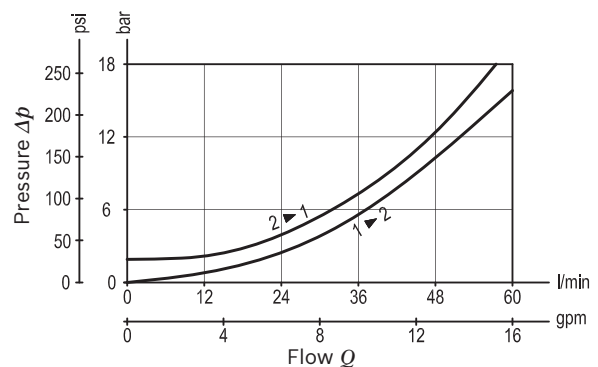
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to atmosphere allowing operation of all functions independent of back-pressure at 2.



**Characteristic curve**



**Ordering code**

<b>04.59.29</b>	<b>X</b>	<b>20</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, vented guided poppet type, counterclockwise adjustment

Pilot ratio

**03** 3:1

**20** SUN cavity interchange, T-11A

Series O/A to L unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>15</b>	25-175 (350-2500)	70 (1015)	175 (2500)
<b>20</b>	70-280 (1000-4000)	109 (1581)	280 (4000)

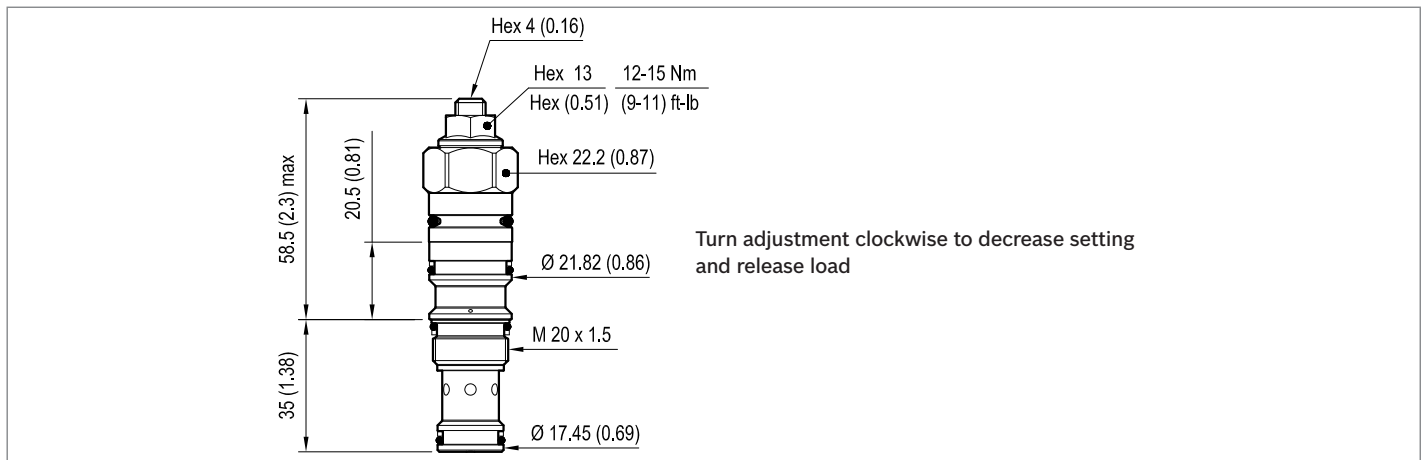
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045929032015000	R930006129
045929032020000	R930006130

Type	Material number

**Dimensions**





Counterbalance, vented guided poppet type  
Common cavity, Size 12

VBST-12A

04.59.26 - X - 57 - Z



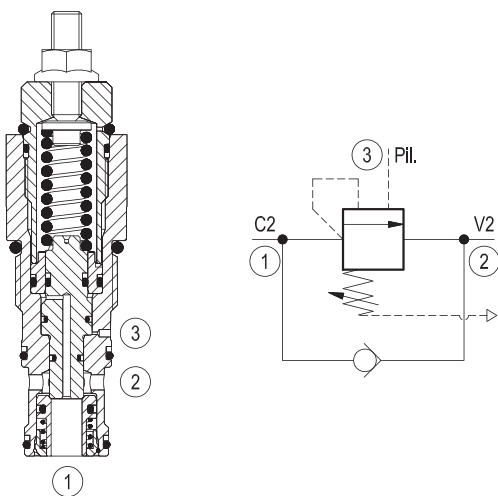
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min (32 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.39 kg (0.86 lbs)
Cavity	CA-12A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A9010520100 material no: R901111379
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

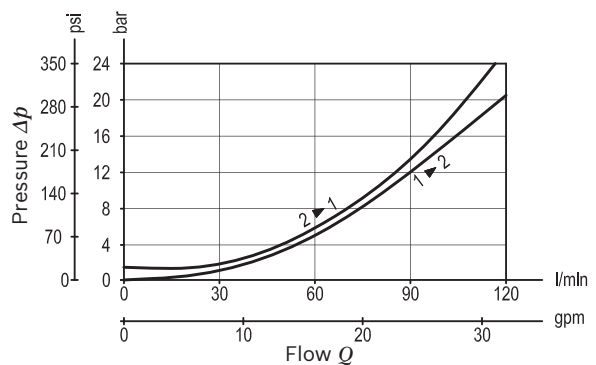
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to atmosphere allowing operation of all functions independent of back-pressure at 2.



**Characteristic curve**



**Ordering code**

<b>04.59.26</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, vented guided poppet type

Pilot ratio

**03** 4:1

**57** Common cavity, Size 12

Series 0/A to L unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>20</b>	70-210 (1000-3000)	50 (725)	200 (2900)
<b>35</b>	140-350 (2000-5000)	159 (2306)	350 (5000)

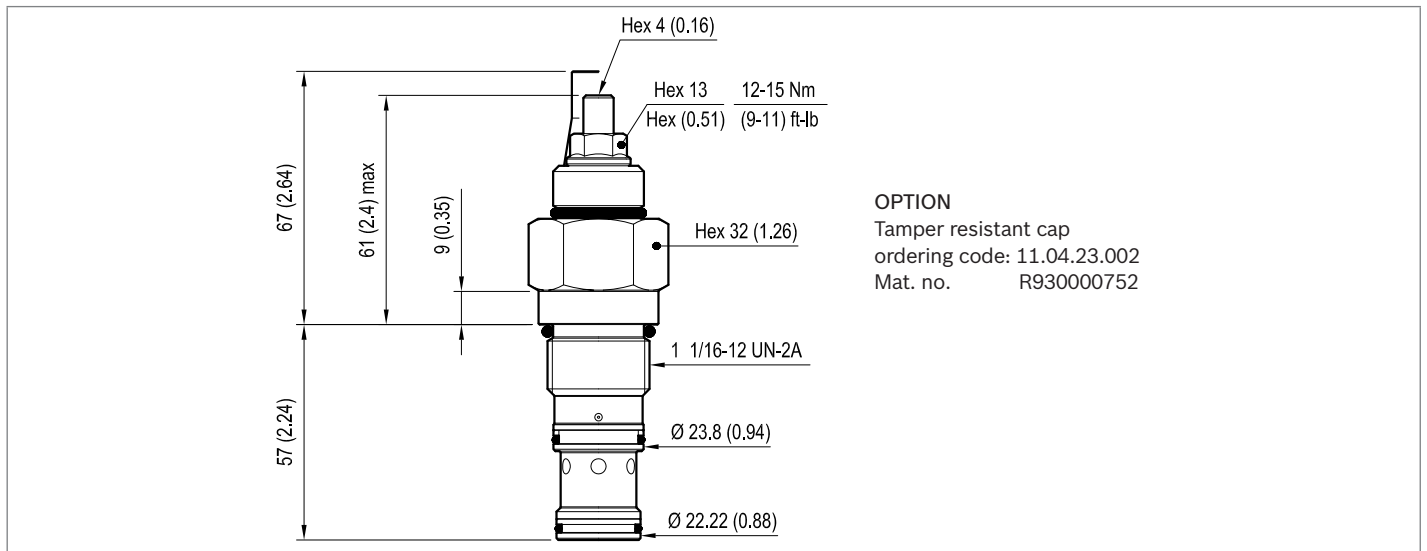
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045926035720000	R901109818
045926035735000	R901109819

Type	Material number

**Dimensions**



**OPTION**  
 Tamper resistant cap  
 ordering code: 11.04.23.002  
 Mat. no. R930000752

Counterbalance, vented guided poppet type, counterclockwise adjustment  
Sun cavity interchange, T-2A

VBST-12U-RS

04.59.30 - X - 86 - Z



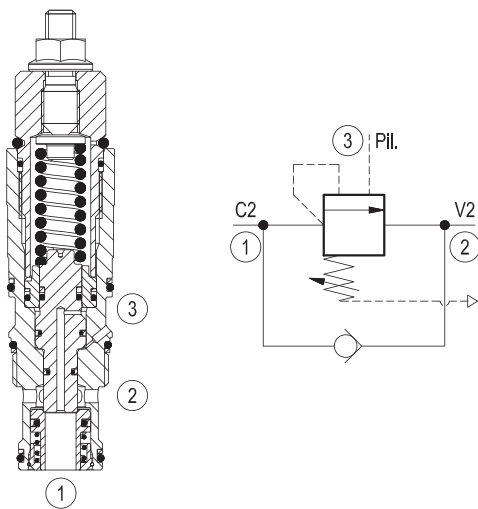
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min (32 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	60 - 70 Nm (45 - 50 ft-lbs)
Weight	0.4 kg (0.88 lbs)
Cavity	SUN T-2A
Seal kit <sup>2)</sup>	Code: RG12U9020110100 material no: R930005599
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Filtration	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

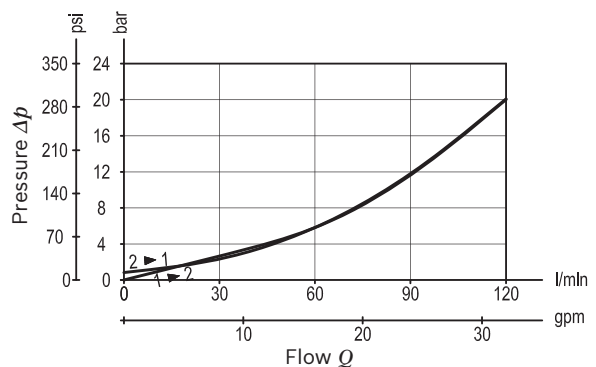
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to atmosphere allowing operation of all functions independent of back-pressure at 2.



**Characteristic curve**



**Ordering code**

<b>04.59.30</b>	<b>X</b>	<b>86</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, vented guided poppet type, counterclockwise adjustment

Pilot ratio  
**03** 4:1

**86** SUN cavity interchange, T-2A

Series O/A to L unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>20</b>	70-210 (1000-3000)	39 (566)	200 (2900)
<b>35</b>	140-350 (2000-5000)	123 (1784)	350 (5000)

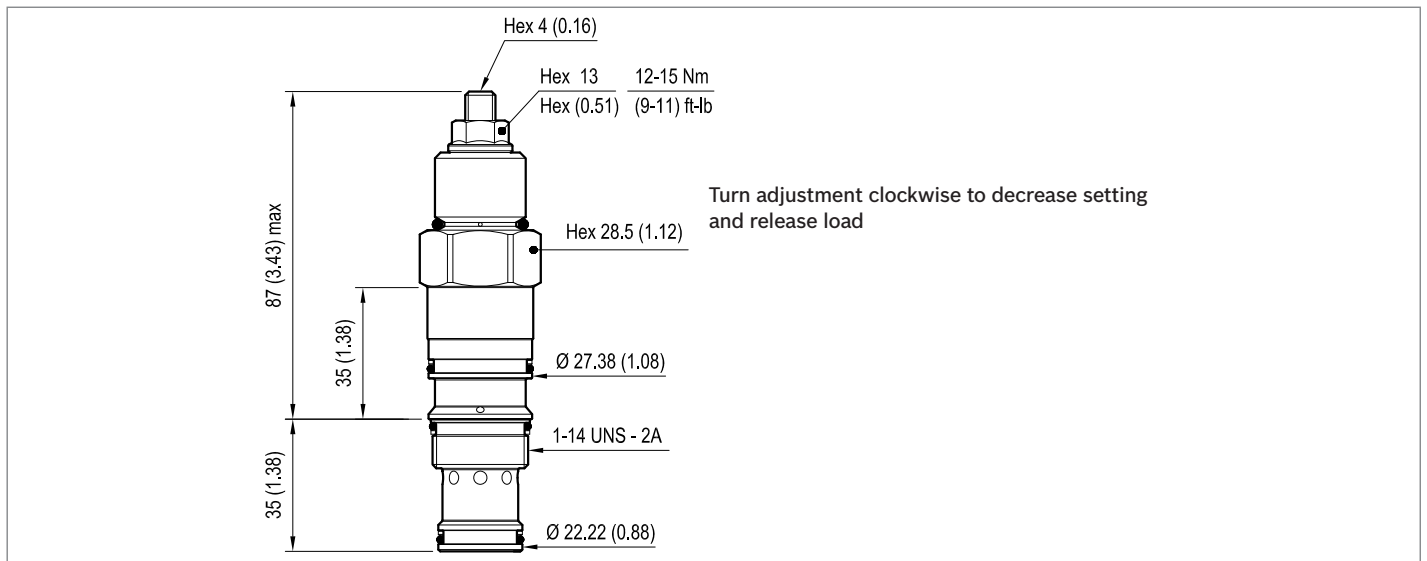
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045930038620000	R930006131
045930038635000	R930006132

Type	Material number

**Dimensions**



Dimensions are in millimeters unless otherwise specified. Tolerances are in parentheses.

# Counterbalance, vented guided poppet type

## Common cavity, Size 16

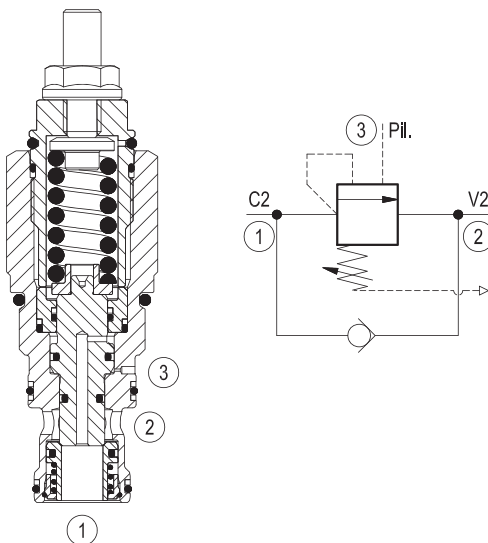
VBST-16A

04.59.27 - X - 27 - Z



### Description

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to atmosphere allowing operation of all functions independent of back-pressure at 2.



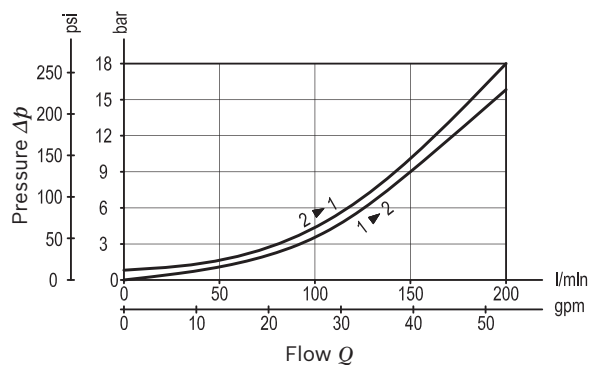
### Technical data

Max. operating pressure	350 bar (5000 psi)
Max. flow	200 l/min (53 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.55 kg (1.21 lbs)
Cavity	CA-16A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16A9010530100 material no: R930001200
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

### Characteristic curve



**Ordering code**

<b>04.59.27</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, vented guided poppet type

Pilot ratio

**03** 4:1

**27** Common cavity, Size 16

Series O/A to L unchanged performances and dimensions

Version and options standard

SPRINGS		
Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>35</b>	140-350 (2000-5000)	83.5 (1210) 350 (5000)

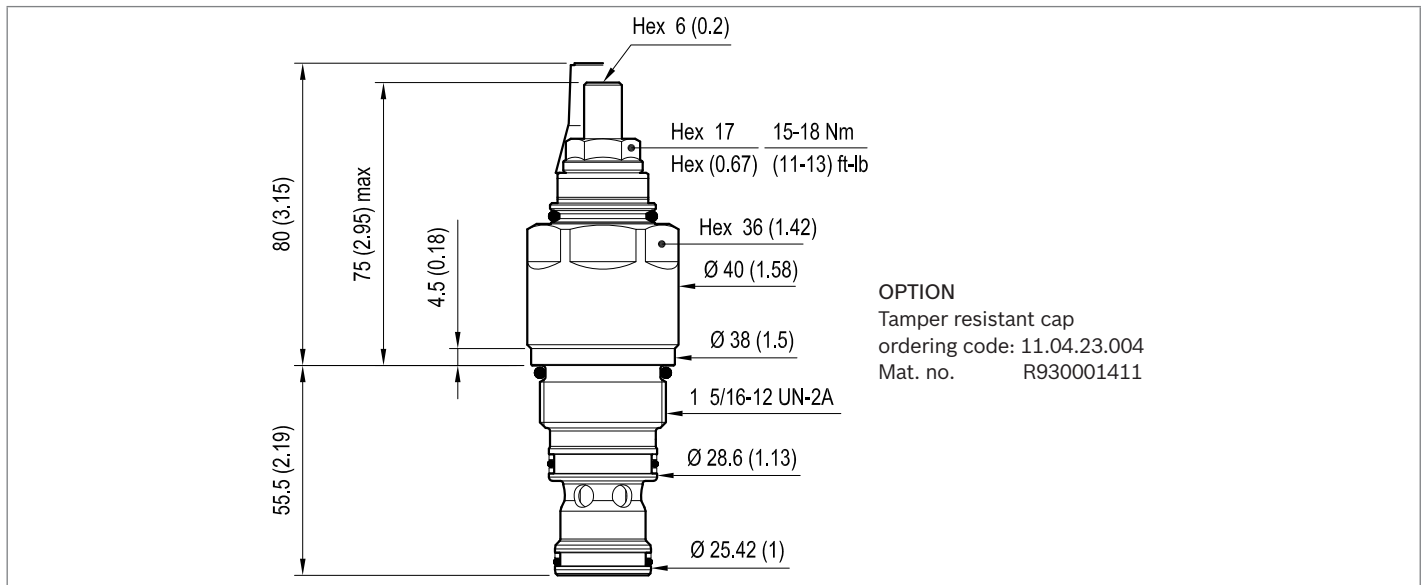
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045927032735000	R901162012

Type	Material number

**Dimensions**



Counterbalance, vented guided poppet type, counterclockwise adjustment  
Sun cavity interchange, T-17A

VBST-16U-RS

04.59.31 - X - 47 - Z



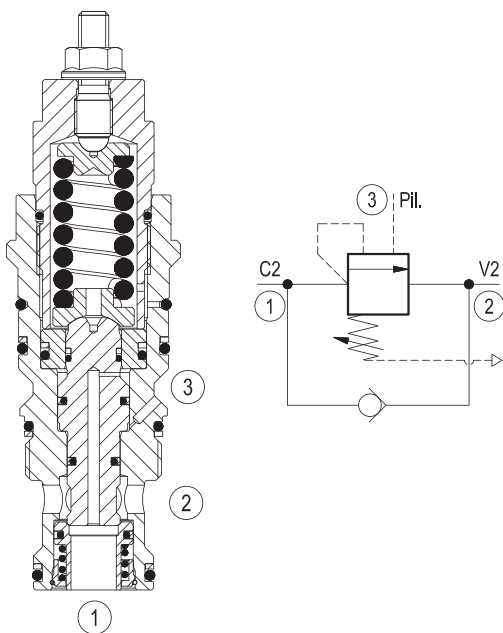
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	240 l/min (63 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	200 - 215 Nm (148 - 159 ft-lbs)
Weight	0.8 kg (1.76 lbs)
Cavity	SUN T-17A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16U9020110100 material no: R930000995
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

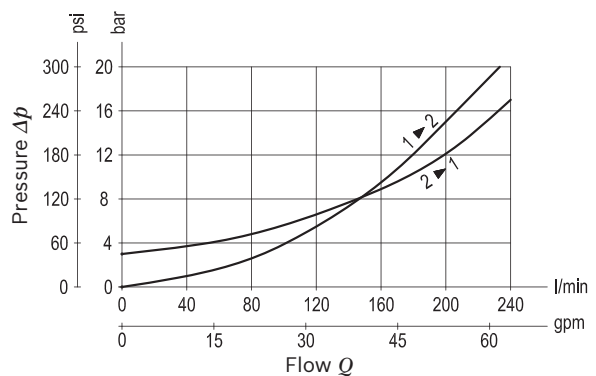
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to atmosphere allowing operation of all functions independent of back-pressure at 2.



**Characteristic curve**



**Ordering code**

<b>04.59.31</b>	<b>X</b>	<b>47</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, vented guided poppet type, counterclockwise adjustment

Pilot ratio  
**03** 3:1

**47** SUN cavity interchange, T-17A

Series O/A to L unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>20</b>	70-250 (1000-3600)	70 (1015)	200 (2900)
<b>40</b>	200-350 (2900-5000)	105 (1523)	350 (5000)

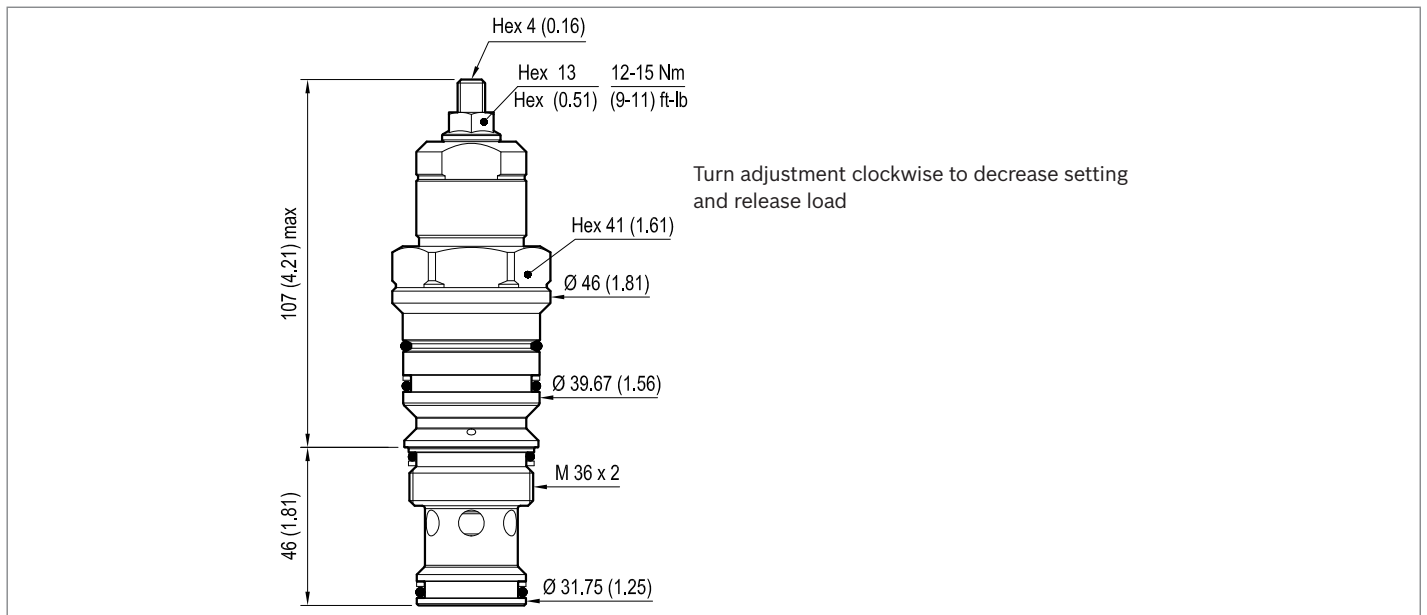
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045931034720000	R930000061
045931034740000	R930000063

Type	Material number

**Dimensions**





Counterbalance, vented guided poppet type  
Common cavity, Size 20

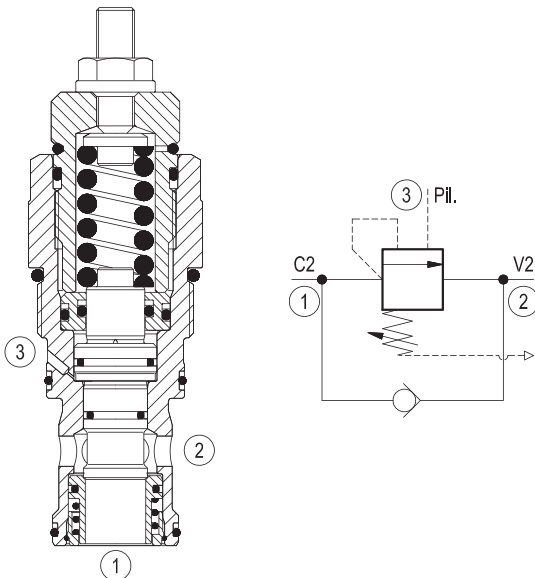
VBST-20A

04.59.18 - X - 58 - Z



**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting, the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to atmosphere allowing operation of all functions independent of back-pressure at 2.



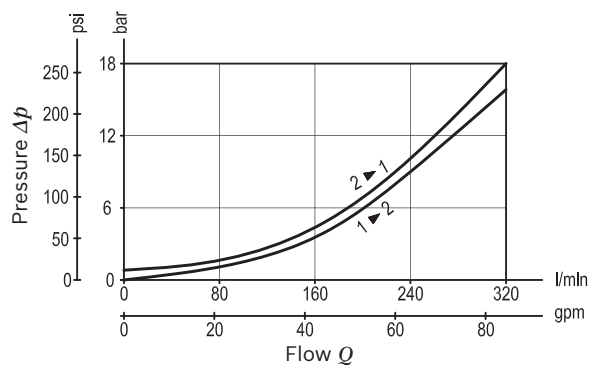
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	320 l/min (85 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	128 - 149 Nm (95 - 110 ft-lbs)
Weight	1.12 kg (2.5 lbs)
Cavity	CA-20A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG20A9010530100 material no: R901111397
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.59.18</b>	<b>X</b>	<b>58</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, vented guided poppet type

Pilot ratio

**03** 4:1

**58** Common cavity, Size 20

Series O/A to L  
unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min
<b>20</b>	70-210 (1000-3000)	95 (1378)	200 (2900)
<b>35</b>	140-350 (2000-5000)	129 (1871)	350 (5000)

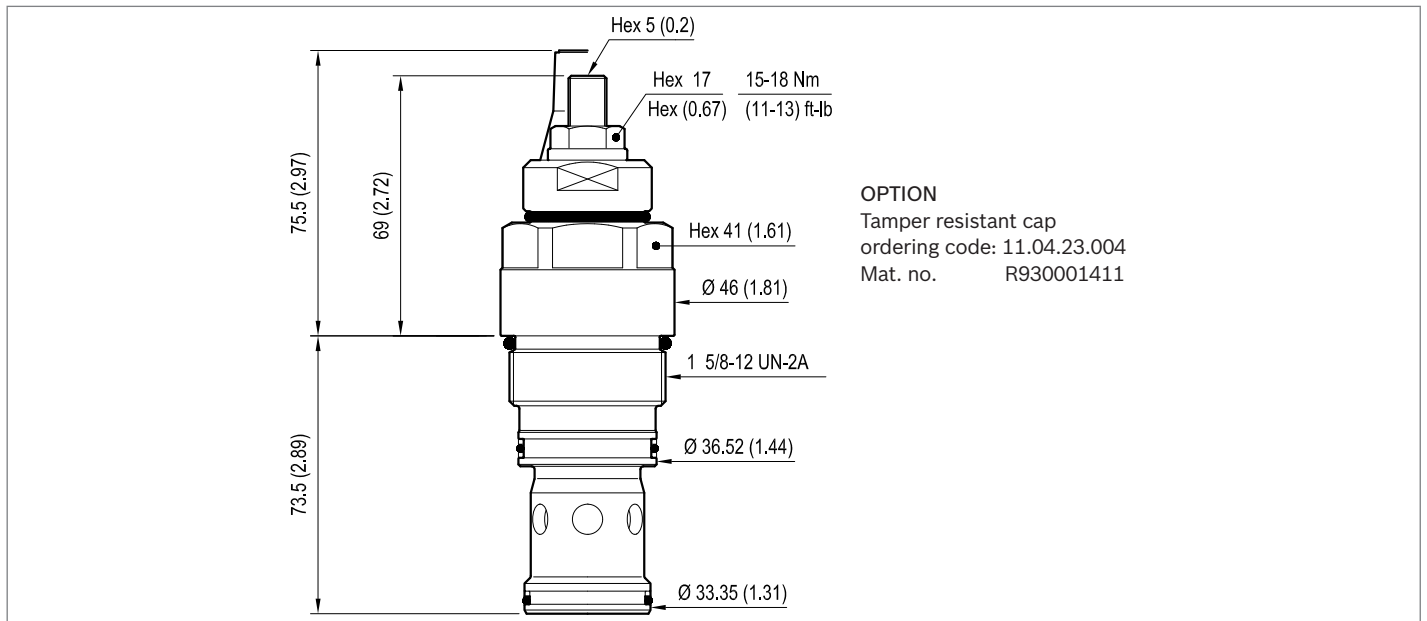
**Note:** Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045918035820000	R901096069
045918035835000	R901096070

Type	Material number

**Dimensions**



Counterbalance, 4 port vented  
poppet type external drain, counterclockwise adjustment  
Sun cavity interchange, T-21A

VBSY-08U-RS

04.59.32 - X - 20 - Z



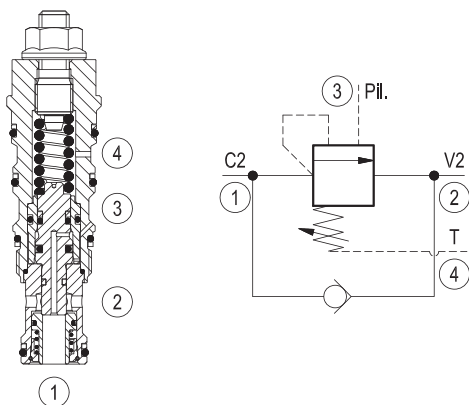
Technical data	
Max. operating pressure	280 bar (4000 psi)
Max. flow	60 l/min (16 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	40 - 50 Nm (30 - 37 ft-lbs)
Weight	0.19 kg (0.42 lbs)
Cavity	SUN T-21A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08U4020110100 material no: R930001201
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

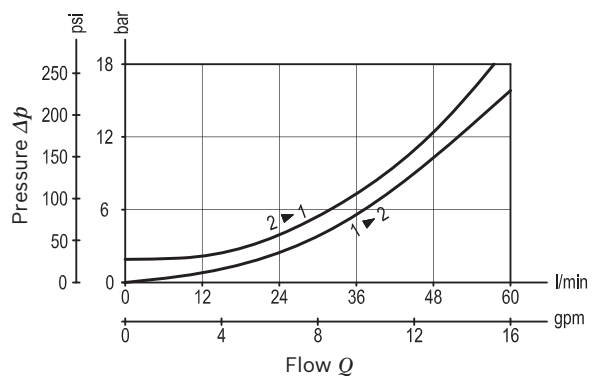
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to 4, allowing operation of all functions independent of back-pressure at 2. Any back-pressure at 4 is additive to the pressure setting in all functions.



**Characteristic curve**



**Ordering code**

<b>04.59.32</b>	<b>X</b>	<b>20</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, 4 port vented  
poppet type external drain,  
counterclockwise adjustment

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Pilot ratio

**03** 3:1

**20** SUN cavity interchange, T-21A

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>15</b>	25-175 (350-2500)	70 (1015)	175 (2500)
<b>20</b>	70-280 (1000-4000)	109 (1581)	280 (4000)

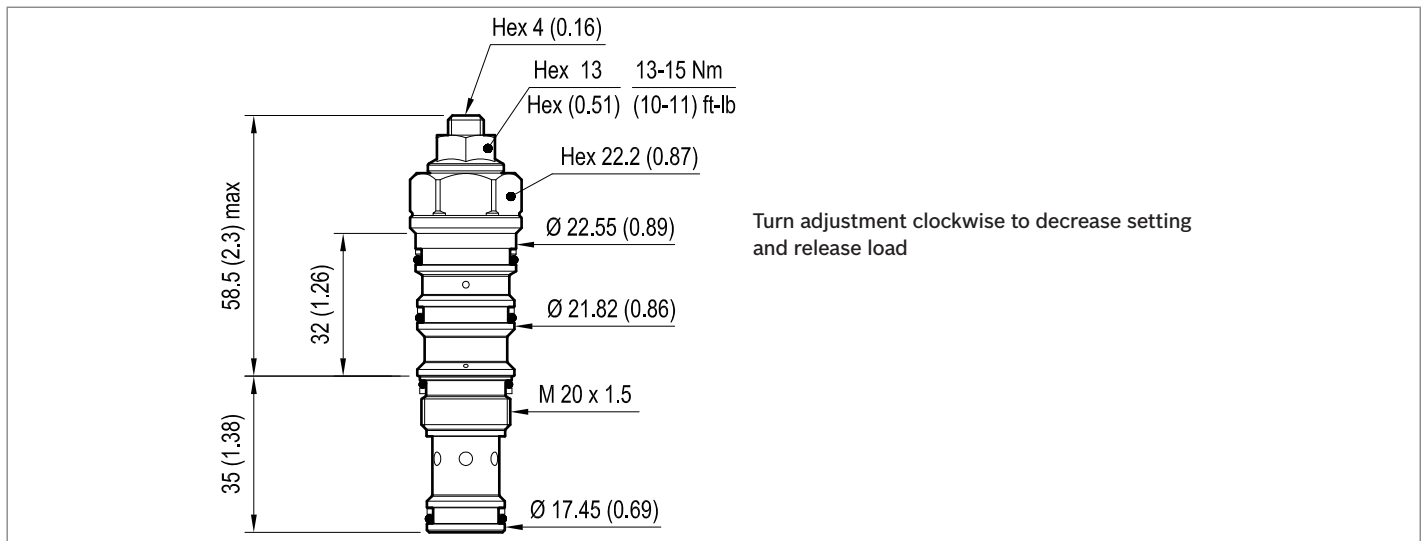
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045932032015000	R930006133
045932032020000	R930006134

Type	Material number

**Dimensions**



Counterbalance, 4 port vented  
poppet type external drain, counterclockwise adjustment  
Sun cavity interchange, T-22A

VBSY-12U-RS

04.59.33 - X - 86 - Z



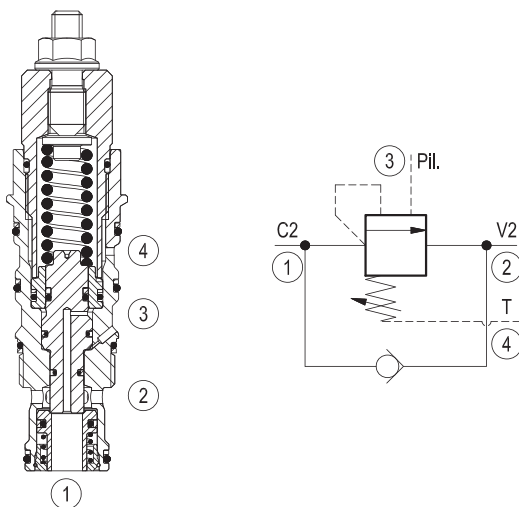
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min (32 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	60 - 70 Nm (44 - 52 ft-lbs)
Weight	0.37 kg (0.82 lbs)
Cavity	SUN T-22A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12U4020110100 material no: R930001204
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

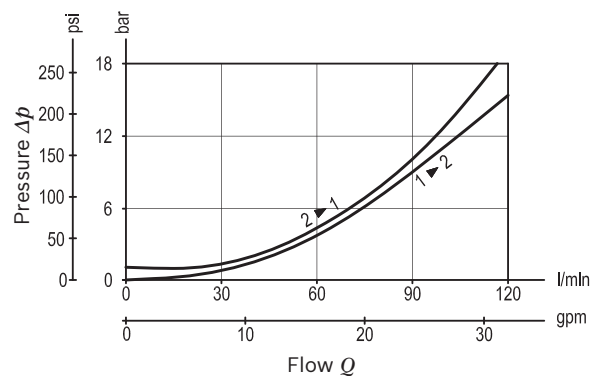
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to 4, allowing operation of all functions independent of back-pressure at 2. Any back-pressure at 4 is additive to the pressure setting in all functions.



**Characteristic curve**



**Ordering code**

<b>04.59.33</b>	<b>X</b>	<b>86</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, 4 port vented  
poppet type external drain,  
counterclockwise adjustment

Pilot ratio  
**03** 4:1

**86** SUN cavity interchange, T-22A

Series O/A to L  
unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>20</b>	70-210 (1000-3000)	39 (566)	200 (2900)
<b>35</b>	140-350 (2000-5000)	123 (1784)	350 (5000)

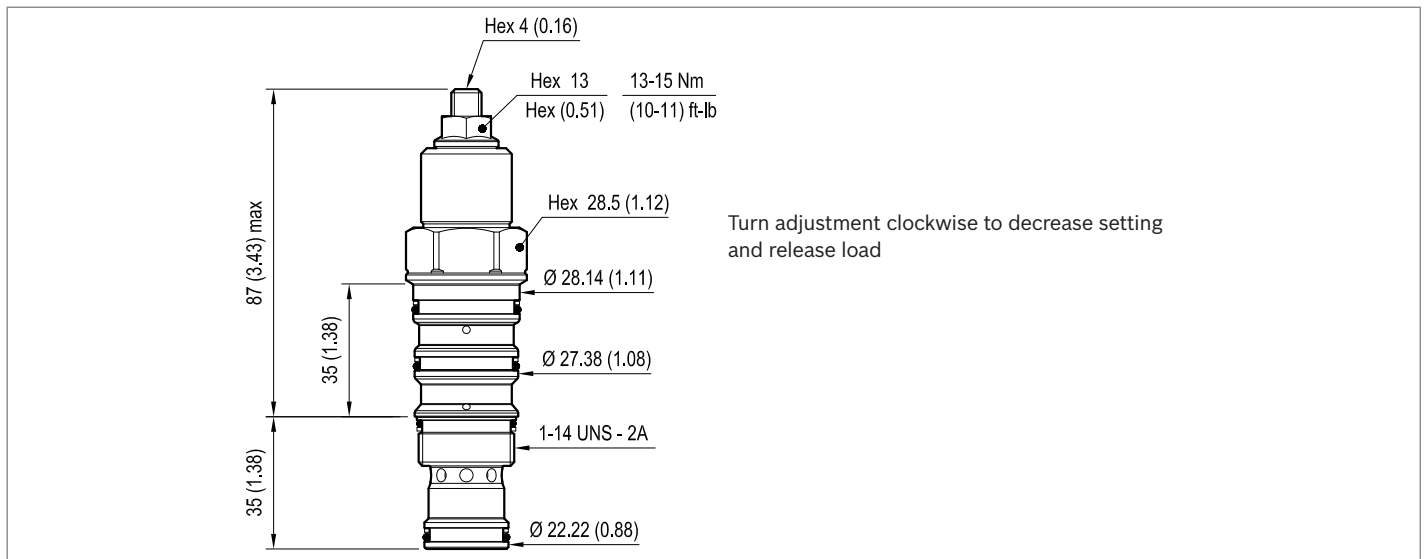
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045933038620000	R930006135
045933038635000	R930006136

Type	Material number

**Dimensions**



Counterbalance, 4 port vented  
poppet type external drain, counterclockwise adjustment  
Sun cavity interchange, T-23A

VBSY-16U-RS

04.59.34 - X - 47 - Z



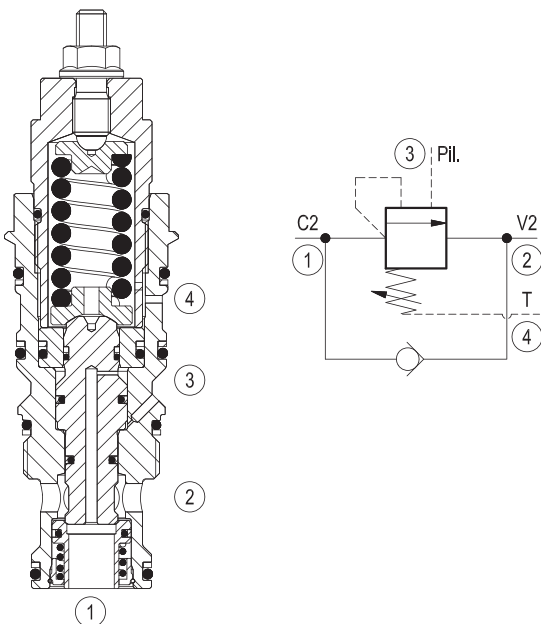
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	240 l/min (63 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	200 - 215 Nm (148 - 159 ft-lbs)
Weight	0.8 kg (1.76 lbs)
Cavity	SUN T-23A
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16U4020110100 material no: R930000994
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

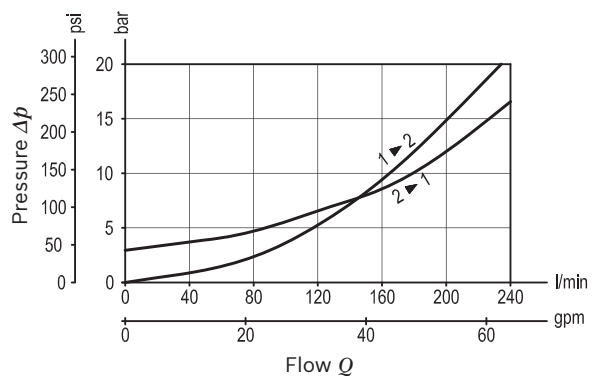
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to 4, allowing operation of all functions independent of back-pressure at 2. Any back-pressure at 4 is additive to the pressure setting in all functions.



**Characteristic curve**



**Ordering code**

<b>04.59.34</b>	<b>X</b>	<b>47</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, 4 port vented  
poppet type external drain,  
counterclockwise adjustment

Series O/A to L  
unchanged performances and dimensions

Version and options standard

Pilot ratio

**03** 3:1

**47** SUN cavity interchange, T-23A

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking pressure
<b>20</b>	70-250 (1000-3600)	70 (1015)	200 (2900)
<b>40</b>	200-350 (2900-5000)	105 (1523)	350 (5000)

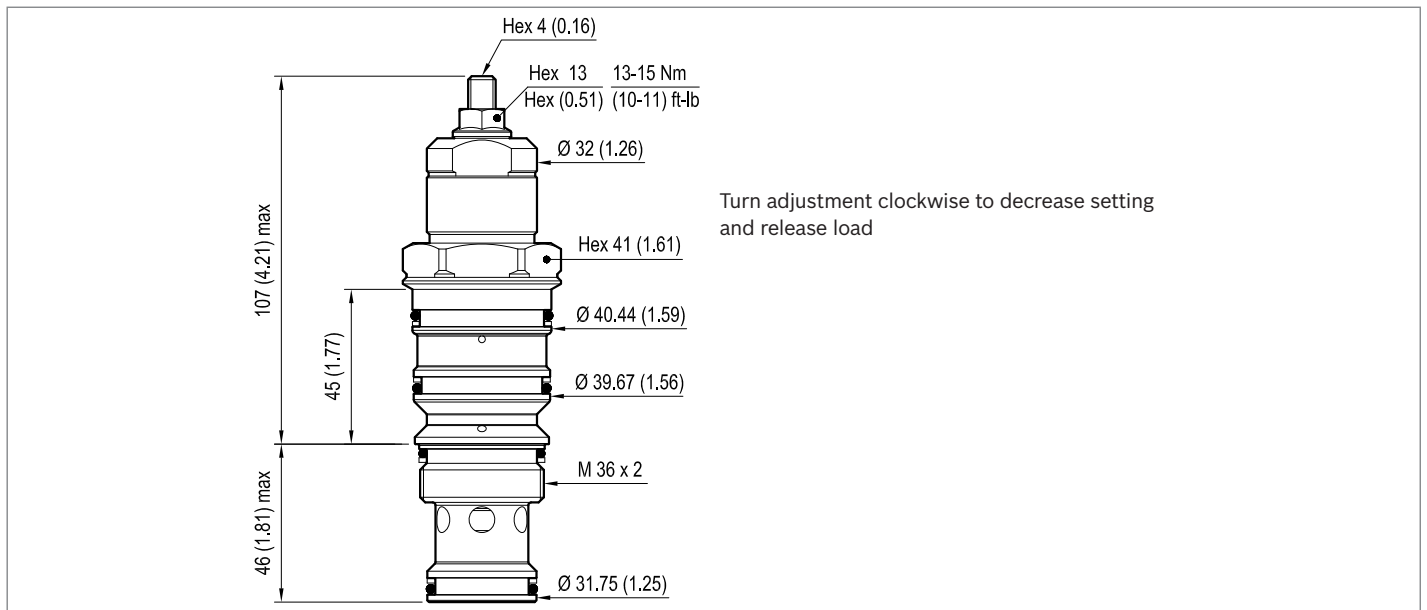
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045934034720000	R930000067
045934034740000	R930000069

Type	Material number

**Dimensions**

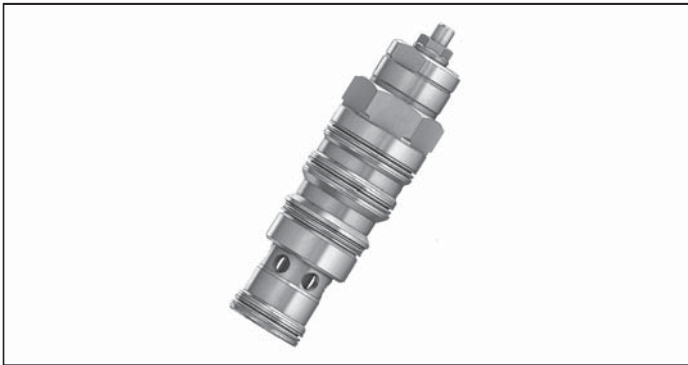




Counterbalance, 4 port vented, poppet type external drain,  
counterclockwise adjustment  
Sun cavity interchange, T-24A

VBSY-25U-RS

04.59.35 - X - 50 - Z



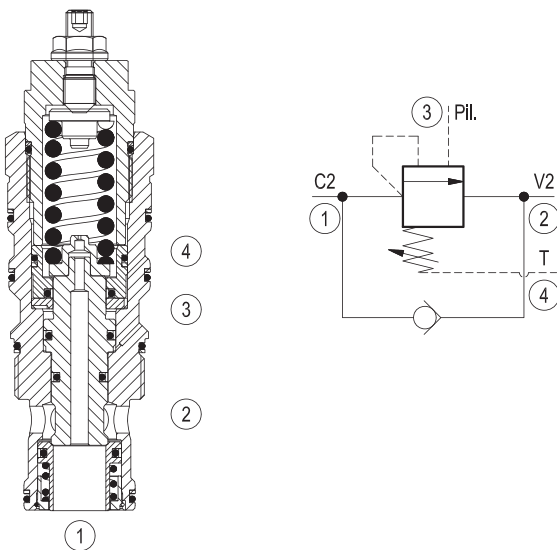
Technical data	
Max. operating pressure	420 bar (6090 psi)
Max. flow	480 l/min (127 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	475 - 500 Nm (352 - 370 ft-lbs)
Weight	1.7 kg (3.7 lbs)
Cavity	SUN T-24A
Seal kit <sup>2)</sup>	Code: RG25U4020110100 material no: R930049586
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

Pressure setting: at least 1.3 times the load induced pressure.

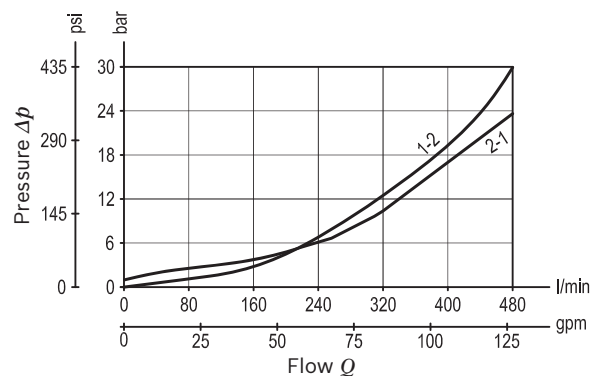
- 1) At 70% of pressure setting
- 2) Only external seals for 10 valves

**Description**

When pressure at 2 rises above the spring bias pressure, the check seat is pushed away from the piston and flow is allowed from 2 to 1. When load pressure at 1 rises above the pressure setting (turn counterclockwise to increase setting - turn clockwise to decrease setting), the direct-acting, relief function is activated and flow is relieved from 1 to 2. With pilot pressure at 3, the pressure setting is reduced in proportion to the stated ratio of the valve, until fully open with free-flow from 1 to 2. The spring chamber is vented to 4, allowing operation of all functions independent of back-pressure at 2. Any back-pressure at 4 is additive to the pressure setting in all functions.



**Characteristic curve**



**Ordering code**

<b>04.59.35</b>	<b>X</b>	<b>50</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Counterbalance, 4 port vented poppet type external drain, counterclockwise adjustment

Pilot ratio  
**25** 5:1

**50** SUN cavity interchange, T-24A

Series O/A to L unchanged performances and dimensions

Version and options standard

	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi) cracking
<b>20</b>	70-280 (1015-4060)	80 (1160)	200 (2900)
<b>42</b>	200-420 (2900-6000)	118 (1711)	350 (5000)

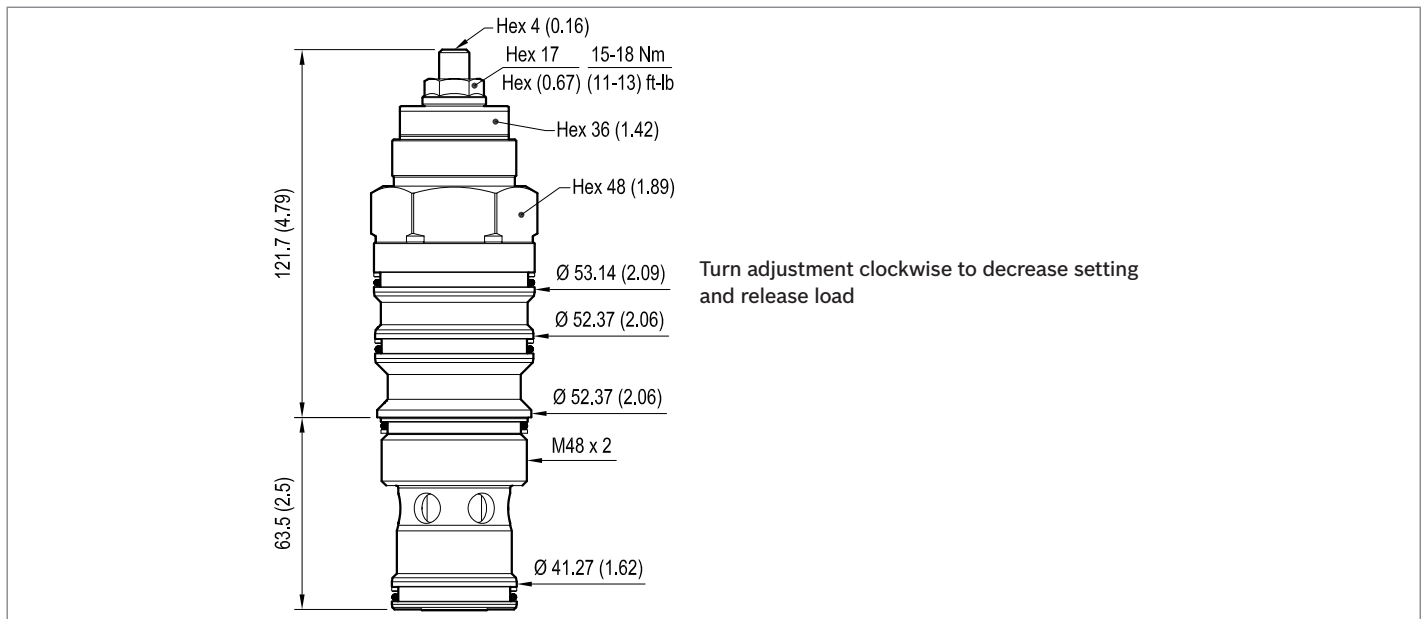
**Note:** Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
045935255020000	R930049585
045935255042000	R930049584

Type	Material number

**Dimensions**



# Mechanical cartridge valves

## Flow control

Designation	Description	Cavity	Code	Data sheet	Page
Flow control,cartridge restrictor	ST-C-06	Size 08	OD2101X56	18321-26	271
Flow control,cartridge restrictor	ST-C-10	Size 10	OD2101X36	18321-27	273
Flow control,cartridge restrictor	ST-C-12	Size 12	OD2101X89	18321-28	275
Flow control,cartridge restrictor	ST-C-16	Size 16	OD2101X75	18321-29	277
Needle restrictor, free reverse flow	STVU-08A	Size 08	040103X5600	18321-10	279
Needle restrictor, free reverse flow	STVU-10A	Size 10	040105X8500	18321-11	281
Needle restrictor, free reverse flow, fine adjustment	STFU-08A	Size 08	040106X5600	18321-09	283
Flow control, 2-way pressure compensated, fixed setting	MH2FR	Special	MH2FR 04,,,	18321-31	285
Flow control, 2-way pressure compensated, fixed setting	VRFA-08A	Size 08	0402010056Z	18321-12	287
Flow control, 2-way pressure compensated, fixed setting	VRFA-10A-TF	Size 10	0402010085Z	18321-13	289
Flow control, 2-way pressure compensated, partially adjustable	VRFA-10A	Size 10	040201X85Z	18321-15	291
Flow control, 2-way pressure compensated, fully adjustable	VRFB-10A	Size 10	040202X85Z	18321-16	293
Flow control, 2-way pressure compensated, fixed setting	VRFA-12A-TF	Size 12	0402030057Z	18321-14	295
Flow control, 2-way pressure compensated, fully adjustable, free reverse flow	VRFE-12A	Size 12	040701X57Z	18321-30	297
Flow control, 3-way pressure compensated, combination type fixed setting	VRFC-10A-TF	Size 10	0404010085Z	18321-18	299
Flow control, 3-way pressure compensated, combination type partially adjustable	VRFC-10A	Size 10	040401X85Z	18321-17	301
Flow control, 3-way pressure compensated, combination type fully adjustable	VRFD-10A	Size 10	040402X85Z	18321-20	303
Flow control, 3-way pressure compensated, combination type fixed setting	VRFC-12A-TF	Size 12	0404030057Z	18321-19	305
Flow control, 3-way pressure compensated, combination type fully adjustable	VRFD-12A	Size 12	040404X57Z	18321-21	307
Flow divider	DSDN-10A	Size 10	0404040085Z	18321-22	309

# Mechanical cartridge valves

## Flow control

Designation	Description	Cavity	Code	Data sheet	Page
Flow divider	DSDN-16A	Size 16	0405030027Z	18321-23	311
Flow divider and combiner	DRFN-10A	Size 10	0405010085Z	18321-24	313
Flow divider and combiner	DRFN-16A	Size 16	0405020027Z	18321-25	315

Flow control,  
cartridge restrictor  
Common cavity, Size 08

ST-C-06

OD.21.01 - X - 56

1

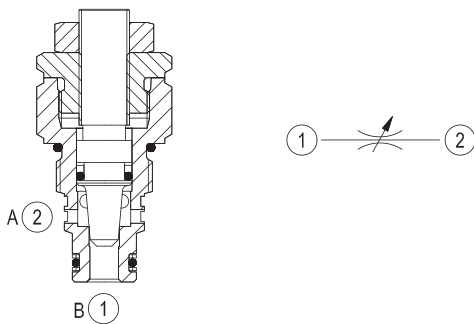


Technical data	
Max. operating pressure	350 bar (5000 psi)
Rated flow	40 l/min. (11 gpm)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	39 - 51 Nm (29 - 38 ft-lbs)
Weight	0.09 kg (0.2 lbs)
Cavity	CA-08A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG08A2010530100 material no: R901101544
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

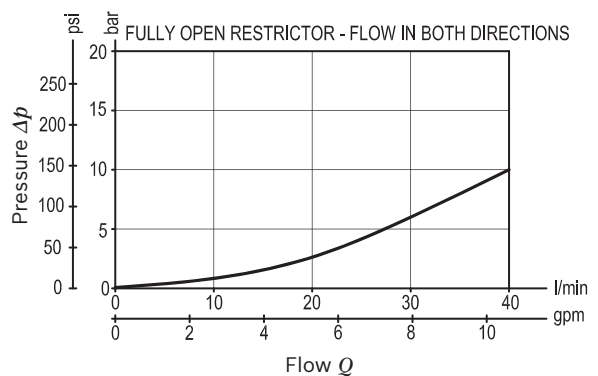
**Description**

Increasing the orifice value from fully closed to fully open, flow is permitted and regulated bi-directional from 1 to 2 and from 2 to 1. With valve fully closed no leakage permitted between ports 1 and 2.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>OD.21.01</b>	<b>X</b>	<b>56</b>
-----------------	----------	-----------

Flow control, cartridge restrictor

Adjustments

**03** Leakproof hex. socket screw

**04** Handknob and locknut

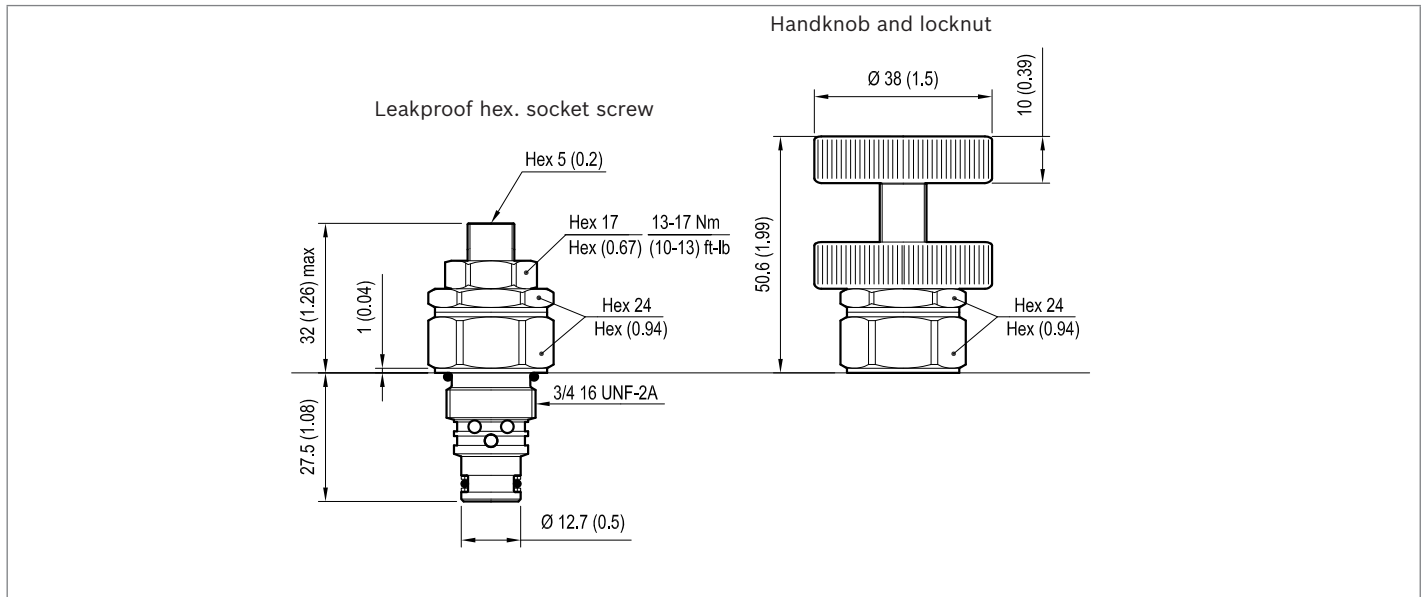
**56** Common cavity, Size 08

**Preferred types**

Type	Material number
OD21010356	R901109366
OD21010456	R901109367

Type	Material number

**Dimensions**



Flow control,  
cartridge restrictor  
Common cavity, Size 10

ST-C-10

OD.21.01 - X - 36

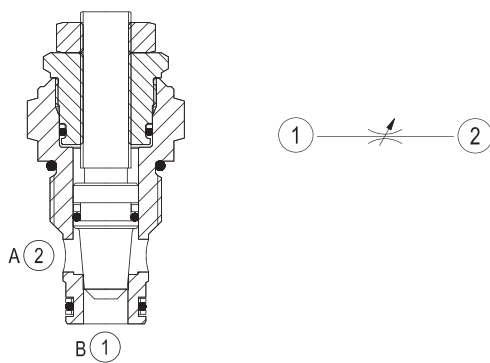


Technical data	
Max. operating pressure	350 bar (5000 psi)
Rated flow	70 l/min. (19 gpm)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	44 - 56 Nm (33 - 41 ft-lbs)
Weight	0.18 kg (0.4 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A2010530100 material no: R901111366
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

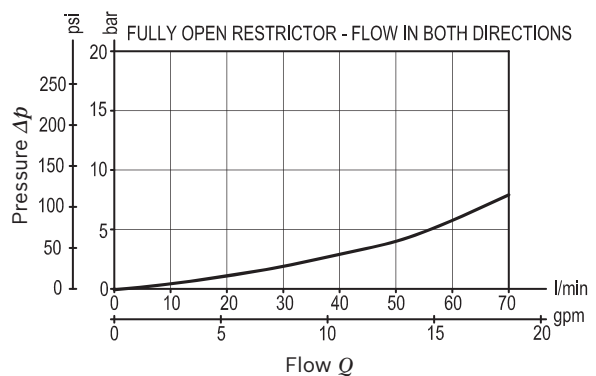
**Description**

Increasing the orifice value from fully closed to fully open, flow is permitted and regulated bi-directional from 1 to 2 and from 2 to 1. With valve fully closed no leakage permitted between ports 1 and 2.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>OD.21.01</b>	<b>X</b>	<b>36</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	-----------	----------

Flow control, cartridge restrictor

Series 0/A to L  
unchanged performances and dimensions

Adjustments

**03** Leakproof hex. socket screw

**04** Handknob and locknut

Version and options standard

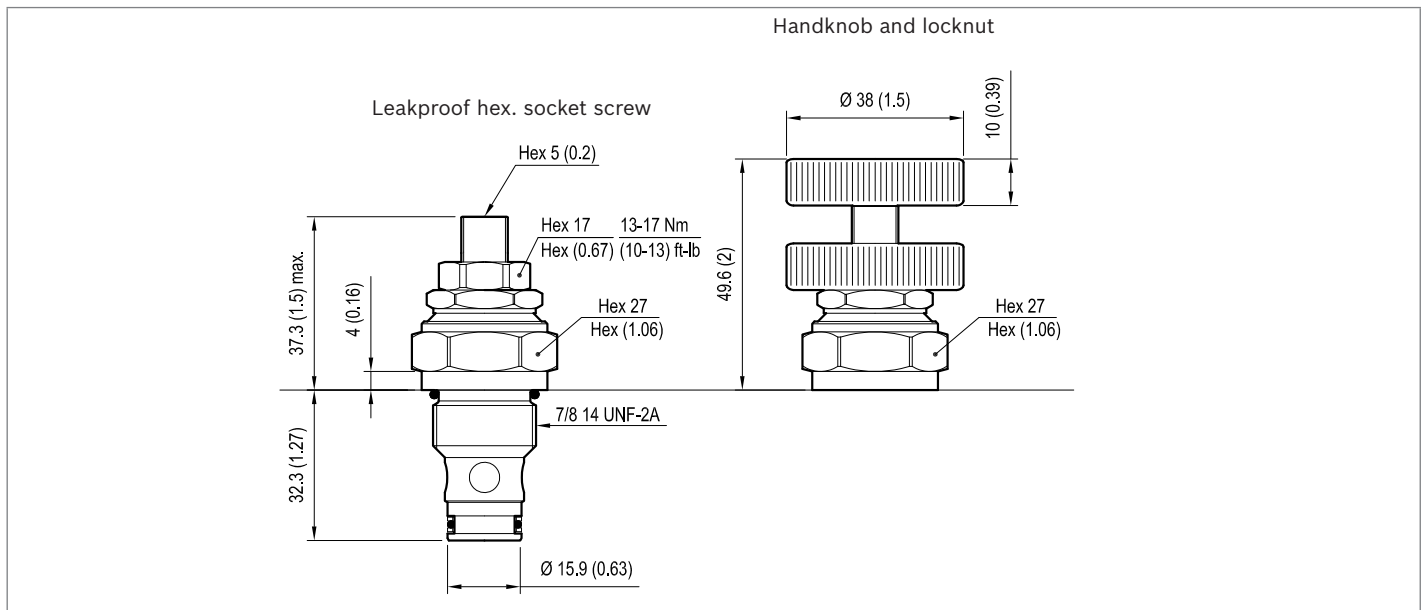
**36** Common cavity, Size 10

**Preferred types**

Type	Material number
OD210103360000	R901109830
OD210104360000	R901109831

Type	Material number

**Dimensions**





Flow control,  
cartridge restrictor  
Common cavity, Size 12

ST-C-12

OD.21.01 - X - 89

1

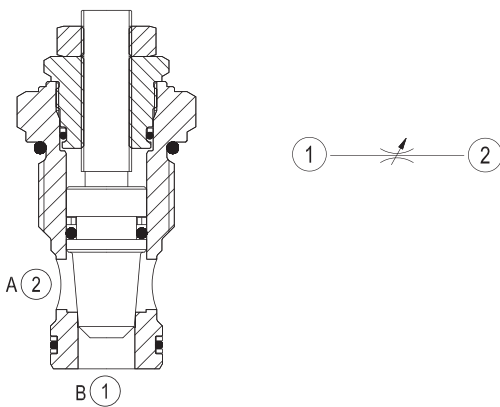


Technical data	
Max. operating pressure	350 bar (5000 psi)
Rated flow	150 l/min. (39 gpm)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	54 - 66 Nm (40 - 49 ft-lbs)
Weight	0.31 kg (0.68 lbs)
Cavity	CA-12A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A2010530100 material no: R930003374
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

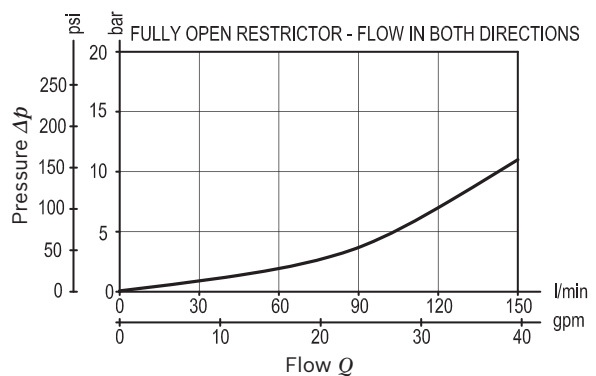
**Description**

Increasing the orifice value from fully closed to fully open, flow is permitted and regulated bi-directional from 1 to 2 and from 2 to 1. With valve fully closed no leakage permitted between ports 1 and 2.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>OD.21.01</b>	<b>X</b>	<b>89</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	-----------	----------

Flow control, cartridge restrictor

Series 0/A to L  
unchanged performances and dimensions

Adjustments

**03** Leakproof hex. socket screw

**04** Handknob and locknut

Version and options standard

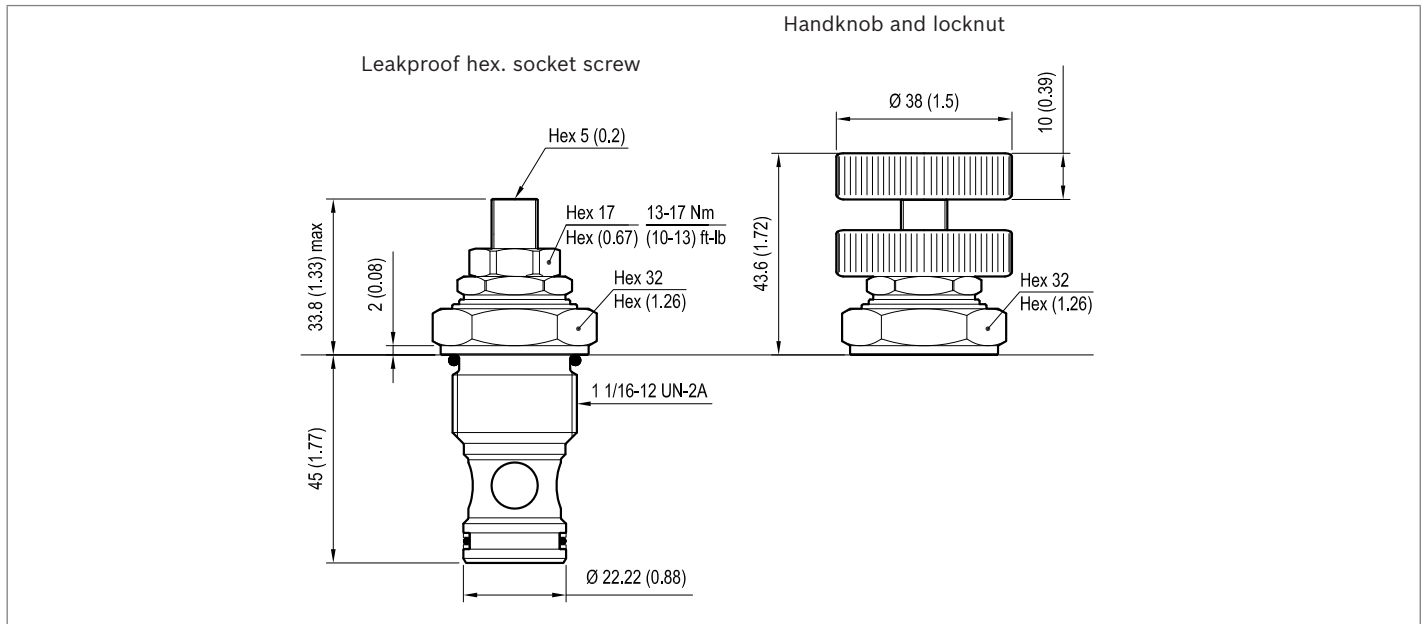
**89** Common cavity, Size 12

**Preferred types**

Type	Material number
OD210103890000	R901109832
OD210104890000	R901109834

Type	Material number

**Dimensions**



Dimensions are in mm (inches) unless otherwise specified.

Flow control,  
cartridge restrictor  
Common cavity, Size 16

ST-C-16

OD.21.01 - X - 75

1

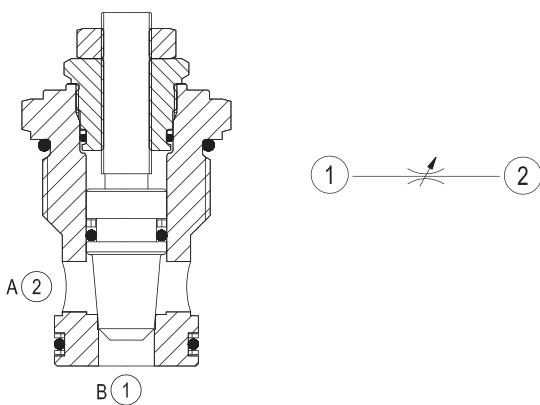


Technical data	
Max. operating pressure	350 bar (5000 psi)
Rated flow	150 l/min. (39 gpm)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	80 - 100 Nm (59 - 74 ft-lbs)
Weight	0.31 kg (0.68 lbs)
Cavity	CA-16A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG16A2010530100 material no: R930003262
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

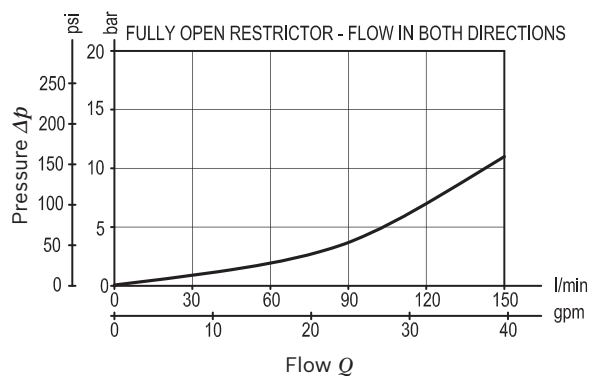
**Description**

Increasing the orifice value from fully closed to fully open, flow is permitted and regulated bi-directional from 1 to 2 and from 2 to 1. With valve fully closed no leakage permitted between ports 1 and 2.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>OD.21.01</b>	<b>X</b>	<b>75</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	-----------	----------

Flow control, cartridge restrictor

Series 0/A to L  
unchanged performances and dimensions

Adjustments

**03** Leakproof hex. socket screw

**04** Handknob and locknut

Version and options standard

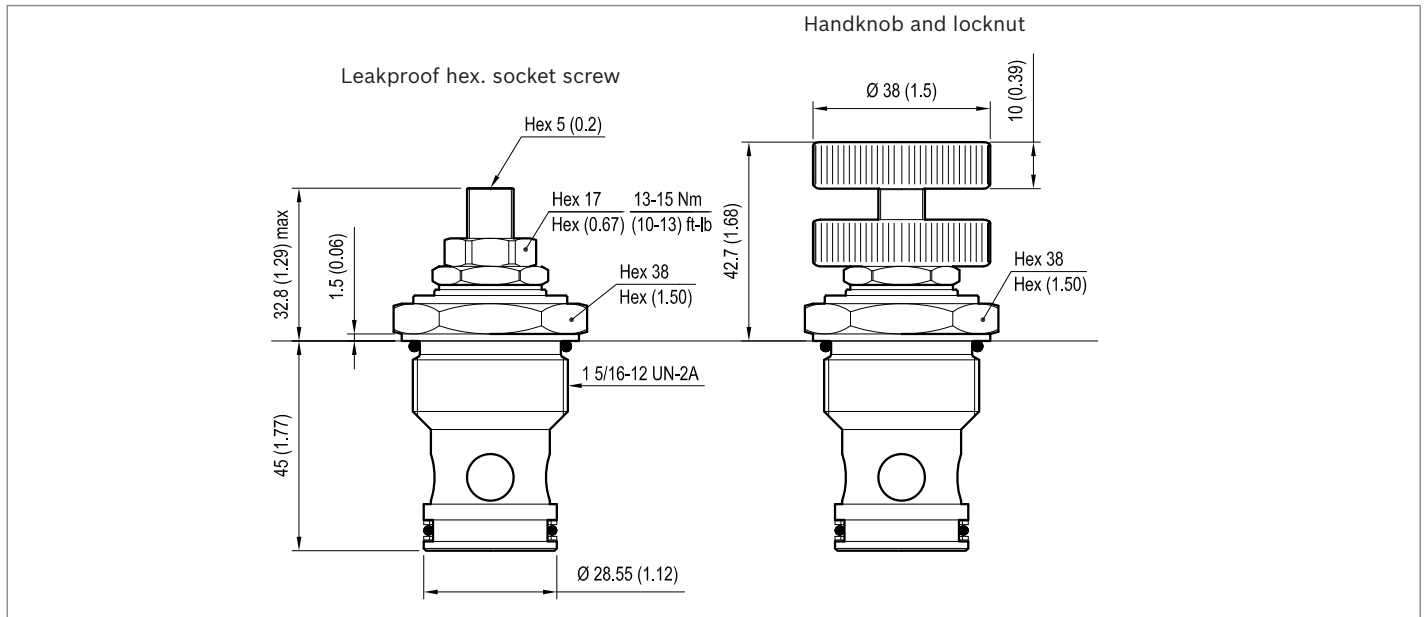
**75** Common cavity, Size 16

**Preferred types**

Type	Material number
OD210103750000	R901109837
OD210104750000	R901109838

Type	Material number

**Dimensions**



Needle restrictor,  
free reverse flow  
Common cavity, Size 08

STVU-08A

04.01.03 - X - 56.00



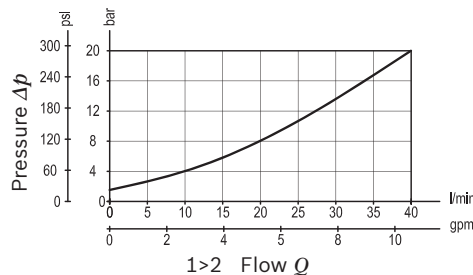
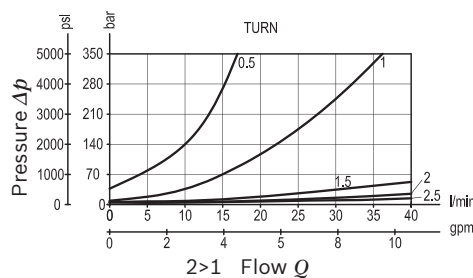
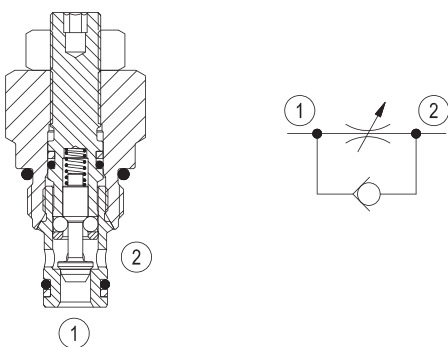
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	40 l/min. (11 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min. closed
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.16 kg (0.35 lbs)
Cavity	CA-08A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08A2010520100 material no: R901101437
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

**Description**

With flow from 2 to 1, the valve provides a fully adjustable orifice restriction. Free flow is permitted from 1 to 2, regardless of valve adjustment, by when pressure overcomes the spring bias of the valve's check function.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.01.03</b>	<b>X</b>	<b>56</b>	<b>00</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	-----------	-----------	----------

Needle restrictor, free reverse flow

Version and options standard

Series O/A to L  
unchanged performances and dimensions

**Adjustments**

**03** Leakproof hex. socket screw

**04** Handknob and locknut

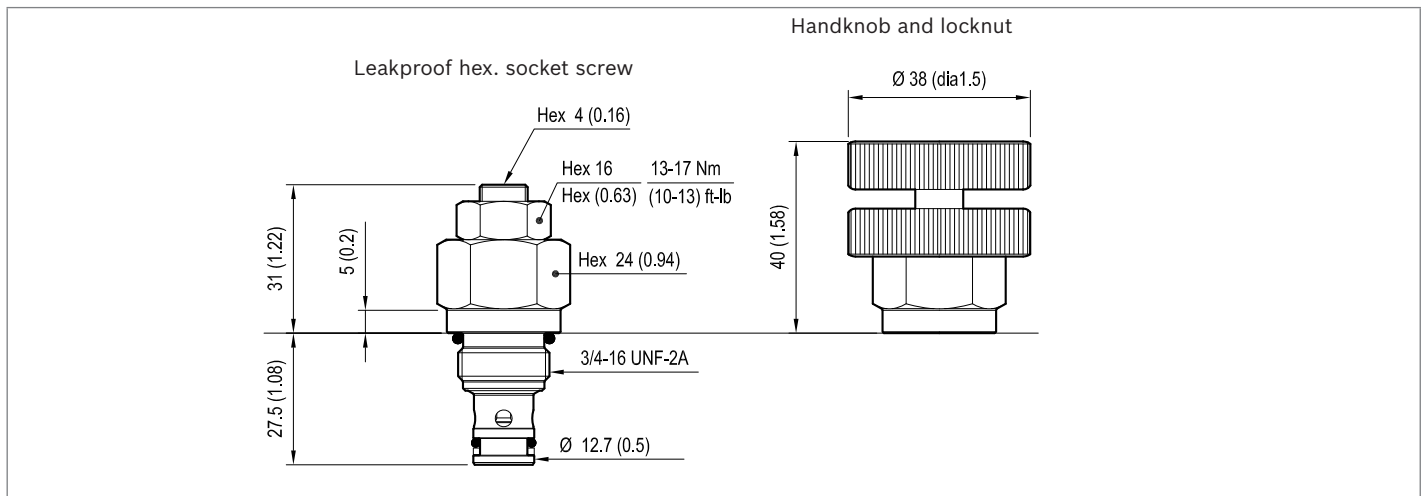
**56** Common cavity, Size 08

**Preferred types**

Type	Material number
040103035600000	R930000002
040103045600000	R930000003

Type	Material number

**Dimensions**



Needle restrictor,  
free reverse flow  
Common cavity, Size 10

STVU-10A

04.01.05 - X - 85.00



**Description**

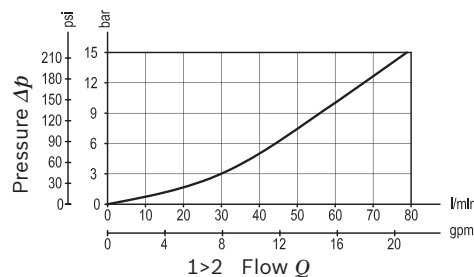
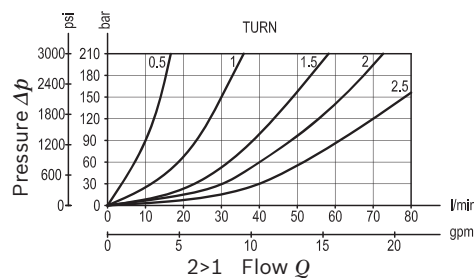
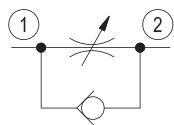
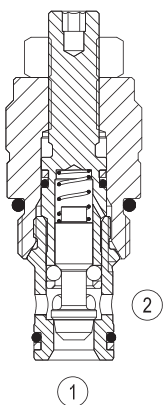
With flow from 2 to 1, the valve provides a fully adjustable orifice restriction. Free flow is permitted from 1 to 2, regardless of valve adjustment, by when pressure overcomes the spring bias of the valve's check function.

**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	80 l/min. (22 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min. closed
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A2010520100 material no: R901111363
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.01.05</b>	<b>X</b>	<b>85</b>	<b>00</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	-----------	-----------	----------

Needle restrictor, free reverse flow

Adjustments

**03** Leakproof hex. socket screw

**04** Handknob and locknut

**85** Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

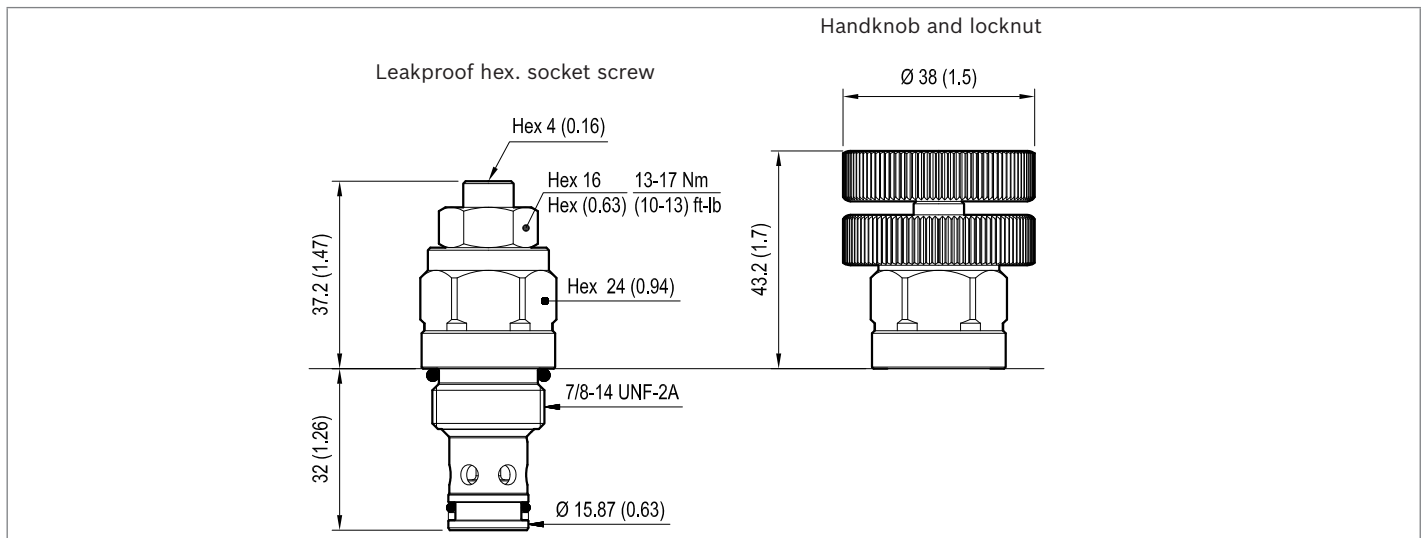
Version and options standard

**Preferred types**

Type	Material number
040105038500000	R930005606
040105048500000	R930005607

Type	Material number

**Dimensions**





Needle restrictor,  
free reverse flow, fine adjustment  
Common cavity, Size 08

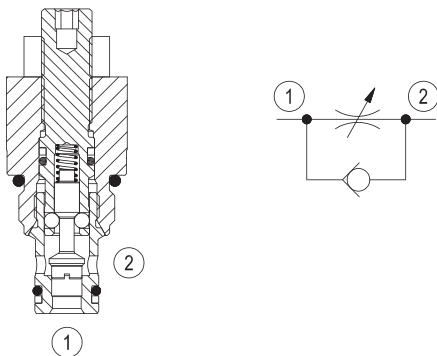
STFU-08A

04.01.06 - X - 56.00



**Description**

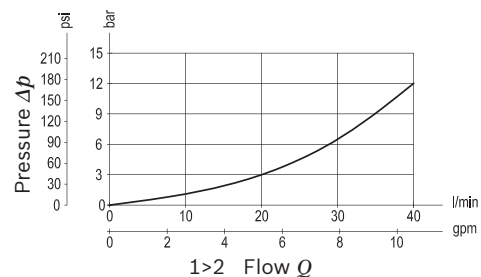
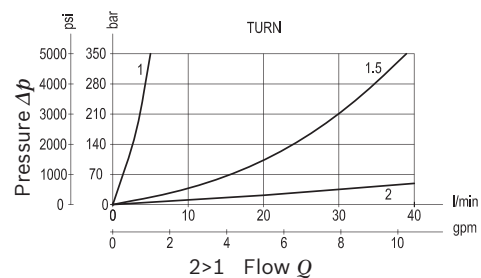
With flow from 2 to 1, the valve provides a fully adjustable orifice restriction. Free flow is permitted from 1 to 2, regardless of valve adjustment, by when pressure overcomes the spring bias of the valve's check function. STFU, compared to STVU, is suitable for applications requiring fine adjustments.



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	40 l/min. (11 gpm)
Max. internal leakage <sup>1)</sup>	15 drops/min. closed
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.16 kg (0.35 lbs)
Cavity	CA-08A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG08A2010520100 material no: R901101437
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.01.06</b>	<b>X</b>	<b>56</b>	<b>00</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	-----------	-----------	----------

Needle restrictor, free reverse flow, fine adjustment

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**03** Leakproof hex. socket screw

**04** Handknob and locknut

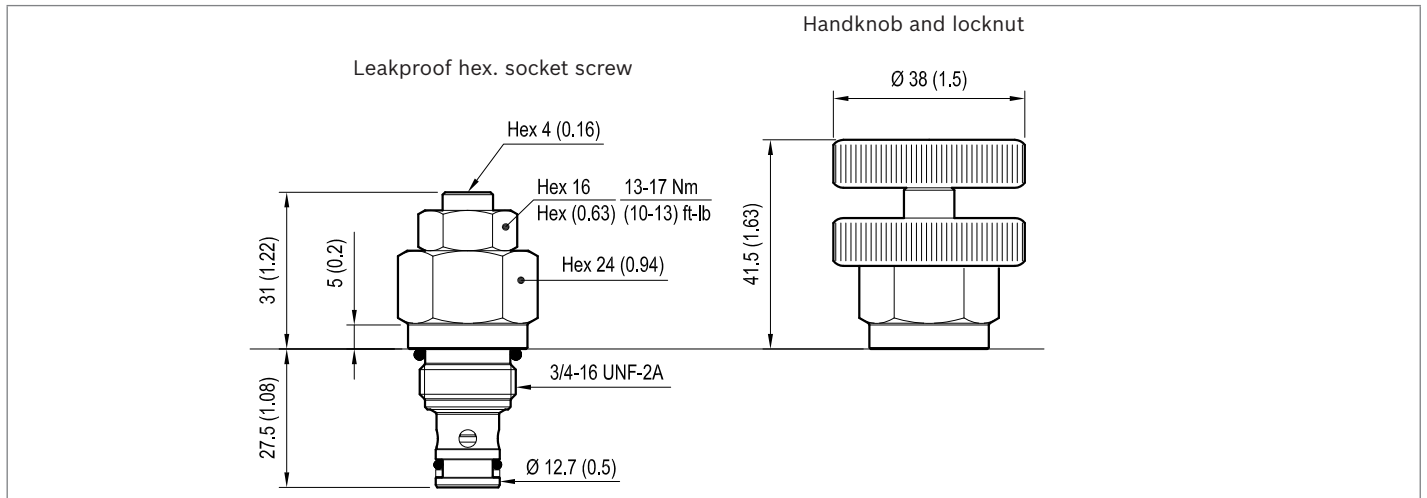
**56** Common cavity, Size 08

**Preferred types**

Type	Material number
040106035600000	R930001067
040106045600000	R930001068

Type	Material number

**Dimensions**



Flow control, 2-way pressure compensated,  
Fixed setting  
Special cavity, R/MH2FR04K

MH2FR

1



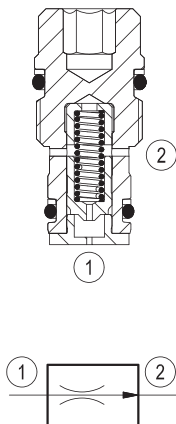
**Technical data**

General	
Weight	0.3 kg (0.66 lbs)
Installation position	Any
Ambient temperature range	-30 to 100 °C (-22 to 212 °F) NBR -15 to 100 °C (5 to 212 °F) FKM
Hydraulic	
Max. operating pressure	420 bar (6090 psi)
Rated flow	0.4 - 0.7 - 1.2 l/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids:	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 800 mm <sup>2</sup> /s (cSt)
Filtration	Class 20/18/15 ISO 4406
Cavity	R/MH2FR04K

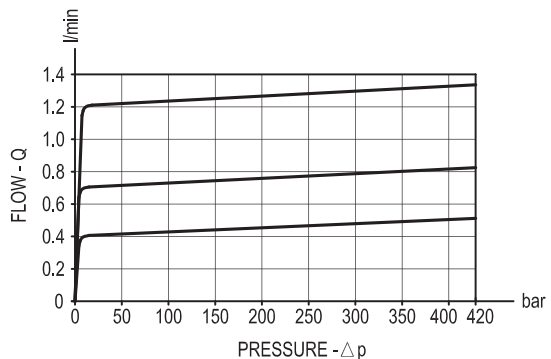
Note: The valves are not provided with any surface protection.

**Description**

The valve type MH2FR is a 2-way flow control valve for block design installation. It is used for pressure and temperature independent flow stabilization. If the direction of flow runs from 1 to 2 through the valve, the pressure in channel 1 exerts force on the pressure compensator. The pressure compensator moves to the control position until the forces are balanced. If the pressure in channel 1 or 2 changes, the pressure compensator keeps readjusting and thereby maintains a constant pressure drop and the unchanging cross-section of the throttling point provide for a constant flow. In the direction of flow from 2 to 1, the return flow runs freely via the throttling point.



**Characteristic curve**



At the beginning of control (8 bar), the stated flow is present with a tolerance of +35% / -5%

**Ordering code**

<b>MH2FR</b>	<b>04</b>	<b>K</b>	<b>A</b>	<b>2X/</b>			<b>*</b>
--------------	-----------	----------	----------	------------	--	--	----------

Flow control, 2-way pressure compensated  
Fixed setting

For further information, see the  
plain text

Component series 20 to 29  
Unchanged installation and connection dimensions

0.4 l/min.	<b>0.4</b>
0.7 l/min.	<b>0.7</b>
1.2 l/min.	<b>1.2</b>

**no code =**  
**V =**

**Seal material**  
NBR seals  
FKM seals  
(other seals on request)  
Attention!  
Observe compatibility of  
seals with the hydraulic  
fluid used!

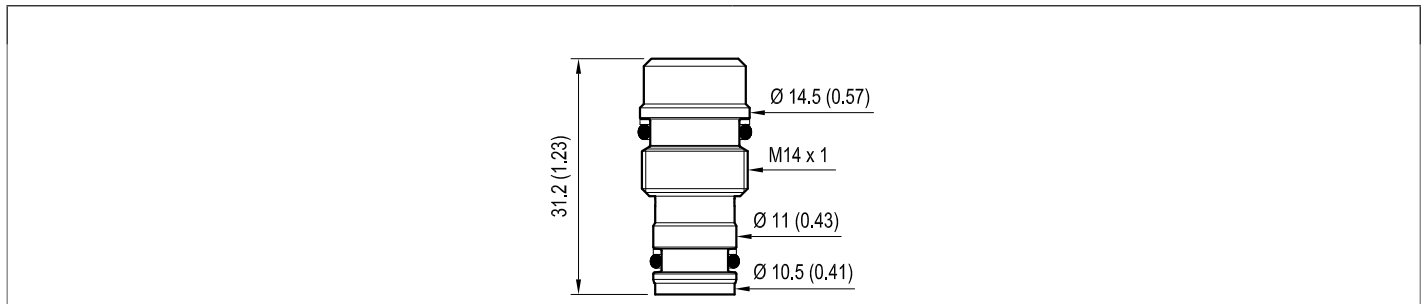
**Preferred types**

Type	Material number
MH2FR 04 KA2X/0.4V	R900753499
MH2FR 04 KA2X/0.7V	R901047887
MH2FR 04 KA2X/1.2V	R901137792

Type	Material number

**Dimensions**

▼ **Flow control, 2-way pressure compensated Fixed setting**



Flow control, 2-way pressure compensated,  
fixed setting

Common cavity, Size 08

VRFA-08A

04.02.01.00.56 - Z

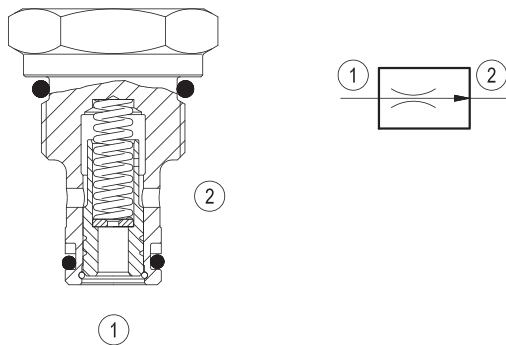


**Description**

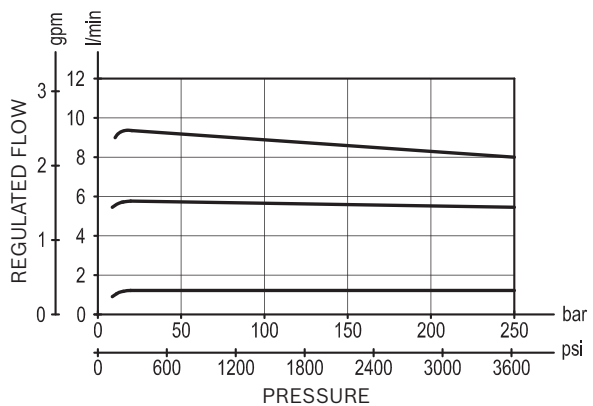
A constant flow rate, regardless of system pressures, is established from 1 to 2 while a minimum pressure differential of 10 bar (145 psi) exists between the two ports. The valve cannot be adjusted for variable flow output. Flow from 2 to 1 is limited by the diameter of the selected control orifice and is not pressure compensated.

Technical data	
Pressure min. - max.	10 - 210 bar (145 - 3000 psi)
Flow range	see "Regulated flow range" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.12 kg (0.27 lbs)
Cavity	CA-08A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG08A2010520100 material no: R901101437
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.02.01.00</b>	<b>56</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Flow control, 2-way pressure compensated fixed setting

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**56** Common cavity, Size 08

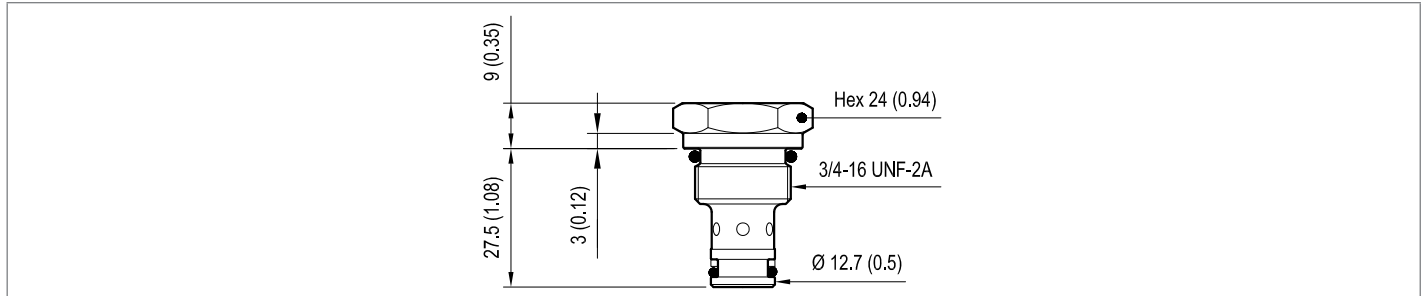
	Regulated flow range l/min. (gpm) ± 10%
<b>09</b>	0.9 (0.24)
<b>13</b>	1.3 (0.34)
<b>15</b>	1.5 (0.4)
<b>20</b>	2 (0.53)
<b>30</b>	3 (0.79)
<b>40</b>	4 (1.06)
<b>53</b>	5.3 (1.4)
<b>65</b>	6.5 (1.72)
<b>80</b>	8 (2.11)
<b>90</b>	9 (2.38)

**Preferred types**

Type	Material number
040201005609000	R901109350
04020100561300A	R901109351
040201005615000	R901184436
04020100562000A	R901109352
040201005630000	R901109355

Type	Material number
04020100564000A	R901109357
040201005653000	R901109360
04020100566500A	R901109361
04020100568000A	R901109362
040201005690000	R930007463

**Dimensions**

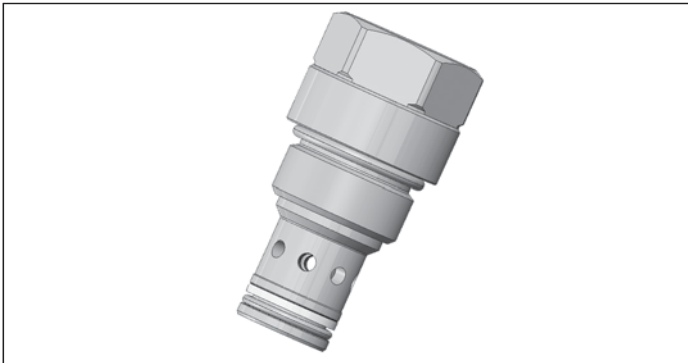


Flow control, 2-way pressure compensated,  
fixed setting

Common cavity, Size 10

VRFA-10A-TF

04.02.01.00.85 - Z



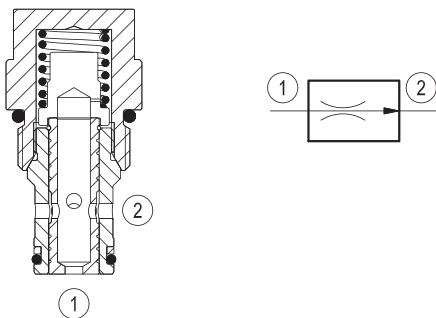
**Description**

A constant flow rate, regardless of system pressures, is established from 1 to 2 while a minimum pressure differential of 14 bar (200 psi) exists between the two ports. The valve cannot be adjusted for variable flow output. Flow from 2 to 1 is limited by the diameter of the selected control orifice and is not pressure compensated.

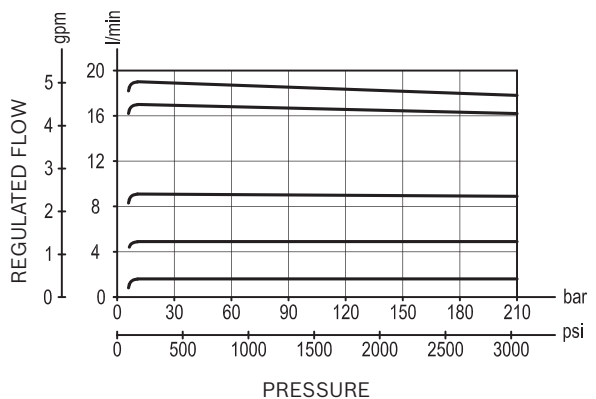
**Technical data**

Pressure min. - max.	14 - 350 bar (200 - 5000 psi)
Flow range	see "Regulated flow range" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.14 kg (0.31 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A2010520100 material no: R901111363
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.02.01.00</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Flow control, 2-way pressure compensated fixed setting

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**85** Common cavity, Size 10

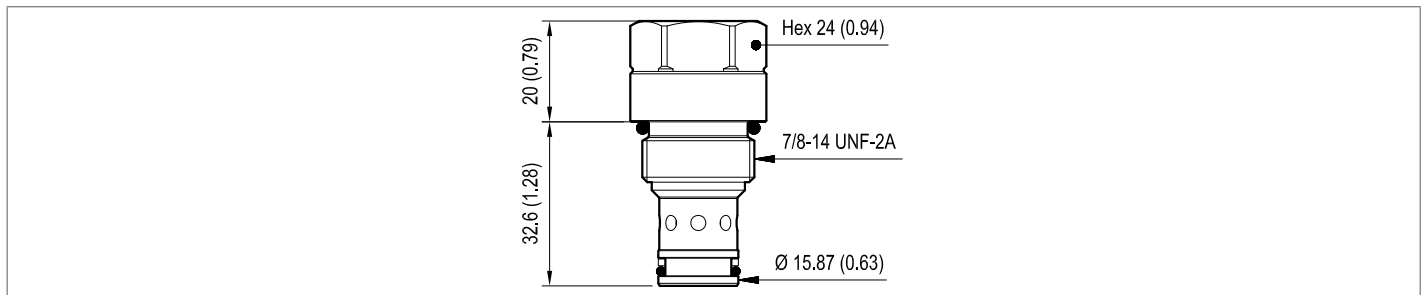
	Regulated flow range l/min. (gpm) ± 10%
<b>02</b>	1.7 (0.5)
<b>04</b>	3.5 (0.9)
<b>05</b>	5 (1.3)
<b>07</b>	7.2 (1.9)
<b>09</b>	8.7 (2.3)
<b>17</b>	17 (4.5)
<b>19</b>	19 (5)

**Preferred types**

Type	Material number
040201008502000	R930005608
040201008504000	R930005609
040201008505000	R930005610
040201008507000	R930005611

Type	Material number
040201008509000	R930005612
040201008517000	R930005613
040201008519000	R930005614

**Dimensions**





Flow control, 2-way pressure compensated,  
partially adjustable  
Common cavity, Size 10

VRFA-10A

04.02.01 - X - 85 - Z



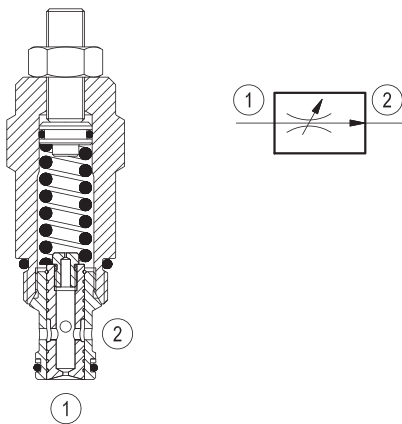
**Description**

A constant flow rate, regardless of system pressures, is established from 1 to 2 while a minimum pressure differential of 14 bar (200 psi) exists between the two ports. Output flow can be varied through a limited range of adjustment and coordinate change in minimum required pressure differential. Flow from 2 to 1 is limited by the diameter of the selected control orifice and is not pressure compensated.

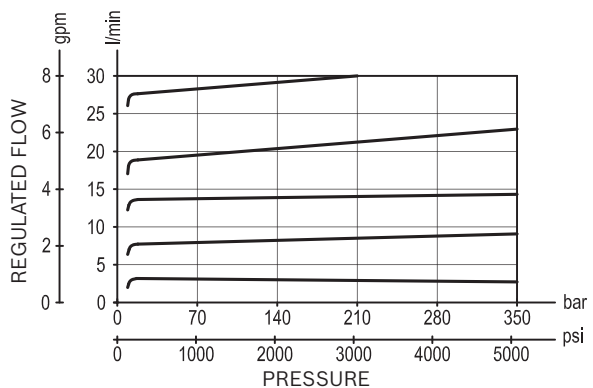
**Technical data**

Pressure min. - max.	14 - 350 bar (200 - 5000 psi)
Flow range	see "Regulated flow range" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight <sup>1)</sup>	0.26 kg (0.57 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A2010520100 material no: R901111363
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Standard version X=03 type
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.02.01</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Flow control, 2-way pressure compensated partially adjustable

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**03** Leakproof hex. socket screw

**04** Handknob and locknut

**85** Common cavity, Size 10

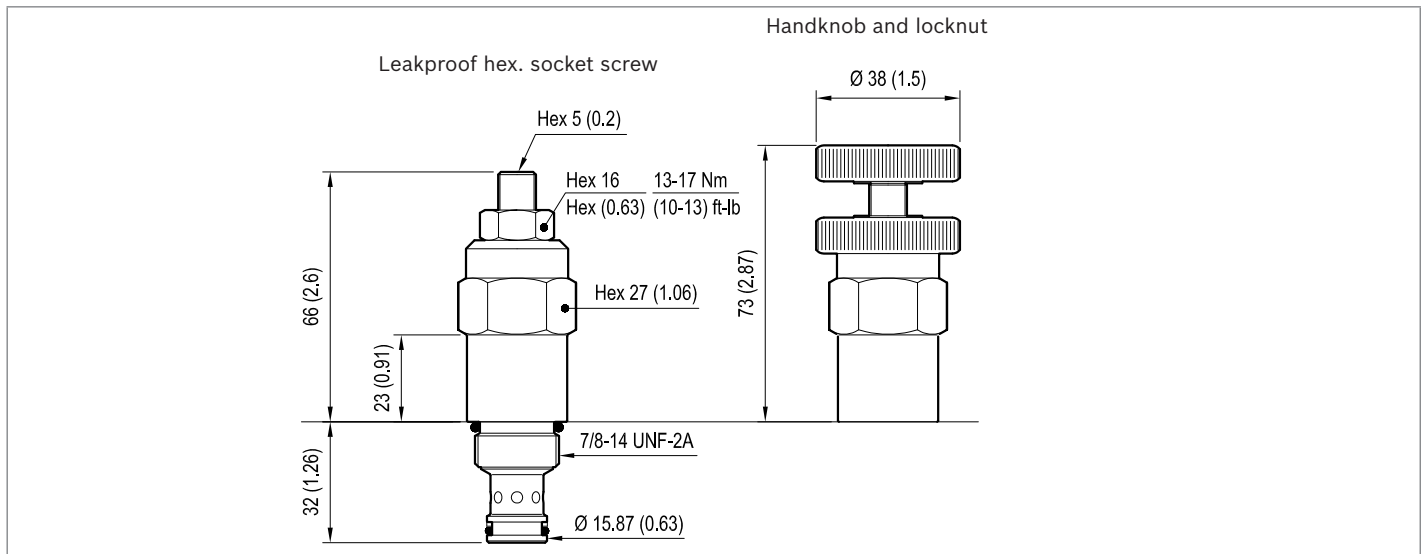
	Regulated flow range l/min. (gpm)
<b>04</b>	3-4.2 (0.79-1.11)
<b>06</b>	4-5.8 (1.06-1.53)
<b>08</b>	5.5-7.8 (1.45-2.06)
<b>11</b>	7.5-11 (1.98-2.91)
<b>14</b>	9.5-14 (2.51-3.70)
<b>20</b>	13-20 (3.44-5.28)
<b>26</b>	19-26 (5.02-6.87)

**Preferred types**

Type	Material number
040201038504000	R901109325
040201038506000	R901109327
040201038508000	R901109330
040201038511000	R901109333
040201038514000	R901109334
040201038520000	R901109335
040201038526000	R901109336

Type	Material number
040201048504000	R901109339
040201048506000	R901109340
040201048508000	R901109341
040201048511000	R901109343
040201048514000	R901109344
040201048520000	R901109345
040201048526000	R901109347

**Dimensions**



Flow control, 2-way pressure compensated,  
fully adjustable  
Common cavity, Size 10

VRFB-10A

04.02.02 - X - 85 - Z



**Description**

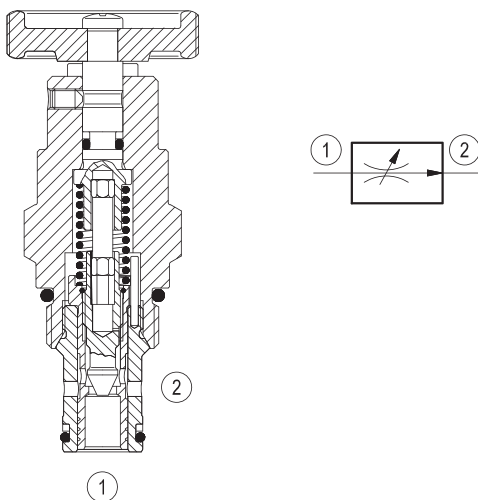
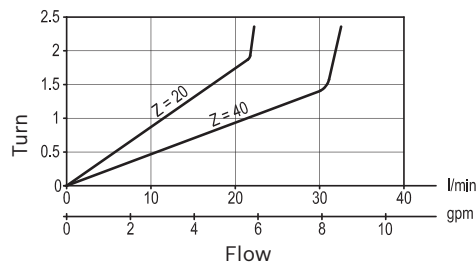
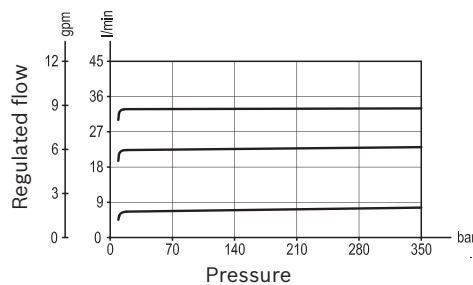
A constant flow rate, regardless of system pressures, is established from 1 to 2 while a minimum pressure differential of 14 bar (200 psi) exists between the two ports. Output flow can be varied from closed to the nominal maximum rating for the valve. Flow from 2 to 1 is limited by the diameter of the selected control orifice and is not pressure compensated.

**Technical data**

Pressure min. - max.	14 - 350 bar (200 - 5000 psi)
Flow range	see "Regulated flow range" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight <sup>1)</sup>	0.27 kg (0.59 lbs)
Cavity	CA-10A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A2010520100 material no: R901111363
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Standard version X=04 type
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.02.02</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Flow control, 2-way pressure compensated fully adjustable

Adjustments

**04** Handknob

**40** Calibrated handknob

**85** Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

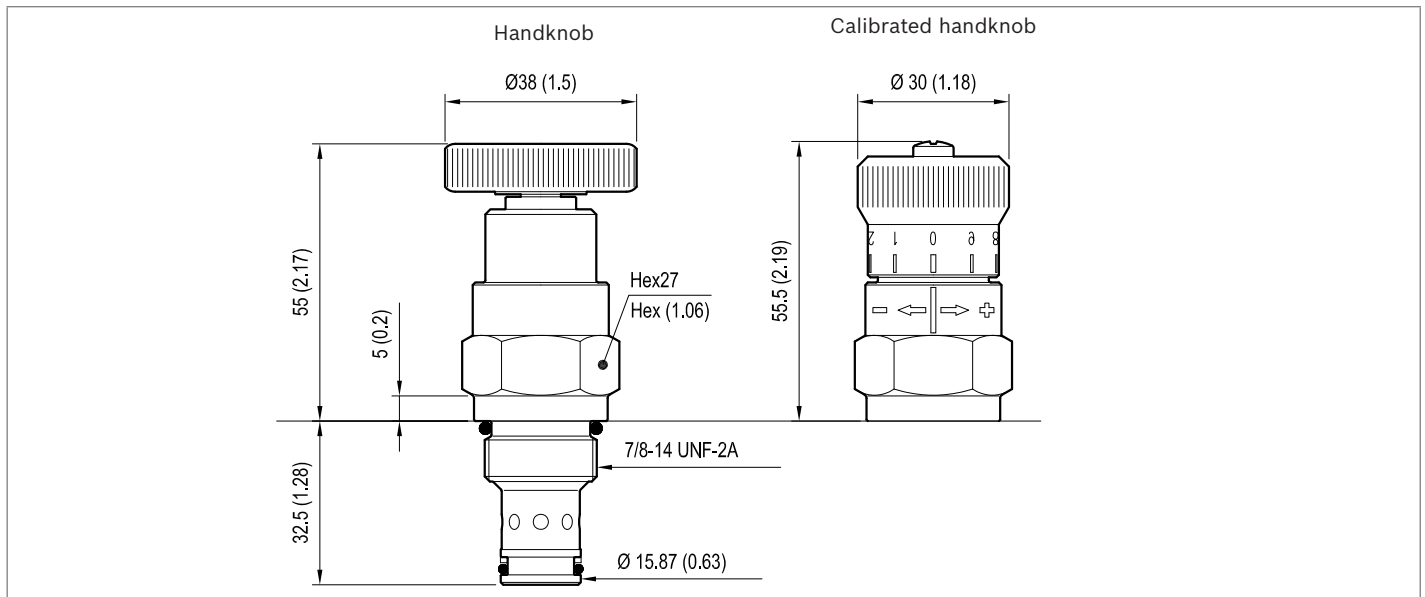
	Regulated flow range l/min. (gpm)
<b>20</b>	0.1-20 (0.03-5.28)
<b>40</b>	0.2-30 (0.05-7.93)

**Preferred types**

Type	Material number
04020204852000A	R930055368
04020204854000A	R930055371

Type	Material number
04020240852000A	R930055372
04020240854000A	R930055373

**Dimensions**



Flow control, 2-way pressure compensated,  
fixed setting  
Common cavity, Size 12

VRFA-12A-TF

04.02.03.00.57 - Z

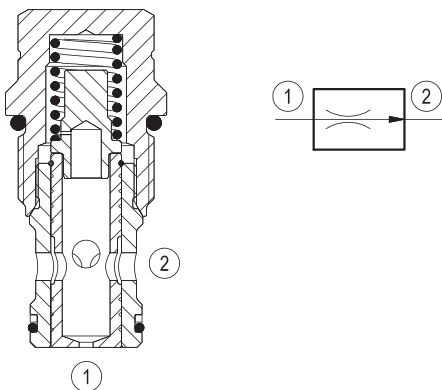


**Description**

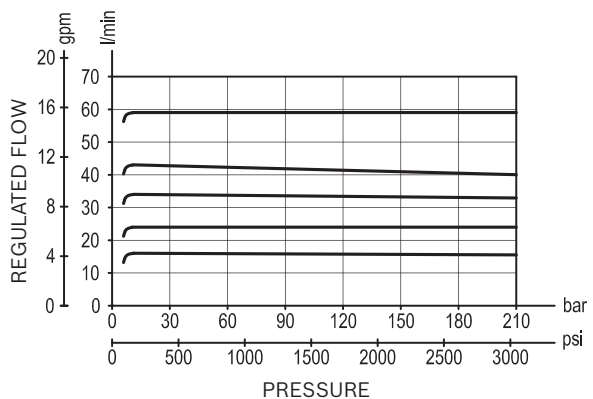
A constant flow rate, regardless of system pressures, is established from 1 to 2 while a minimum pressure differential of 14 bar (200 psi) exists between the two ports. The valve cannot be adjusted for variable flow output. Flow from 2 to 1 is limited by the diameter of the selected control orifice and is not pressure compensated.

Technical data	
Pressure min. - max.	14 - 350 bar (200 - 5000 psi)
Flow range	see "Regulated flow range" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.26 kg (0.57 lbs)
Cavity	CA-12A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A2010520100 material no: R901111377
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.02.03.00</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Flow control, 2-way pressure compensated fixed setting

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**57** Common cavity, Size 12

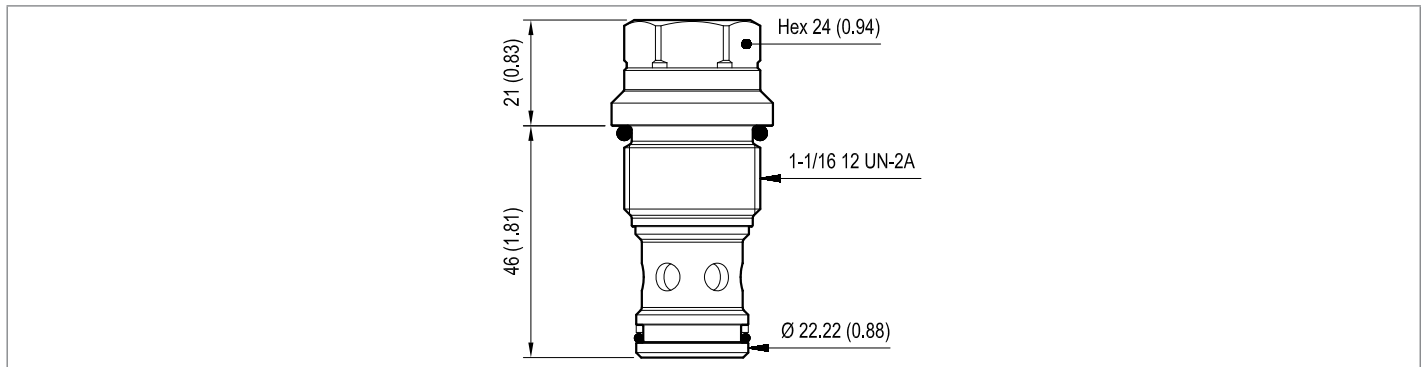
	Regulated flow range l/min. (gpm) ± 10%
<b>15</b>	15 (4)
<b>20</b>	20 (5)
<b>23</b>	23 (6)
<b>26</b>	26 (7)
<b>29</b>	29 (8)
<b>37</b>	37 (10)
<b>41</b>	41 (11)
<b>45</b>	45 (12)
<b>50</b>	50 (13)
<b>58</b>	58 (15)
<b>63</b>	63 (17)

**Preferred types**

Type	Material number
040203005715000	R930005616
040203005720000	R930005617
040203005723000	R930005618
040203005726000	R930005619
040203005729000	R930005620
040203005737000	R930005621

Type	Material number
040203005741000	R930005622
040203005745000	R930005623
040203005750000	R930005624
040203005758000	R930005625
040203005763000	R930005626

**Dimensions**



Flow control, 2-way pressure compensated,  
fully adjustable, free reverse flow  
Common cavity, Size 12

VRFE-12A

04.07.01 - X - 57 - Z

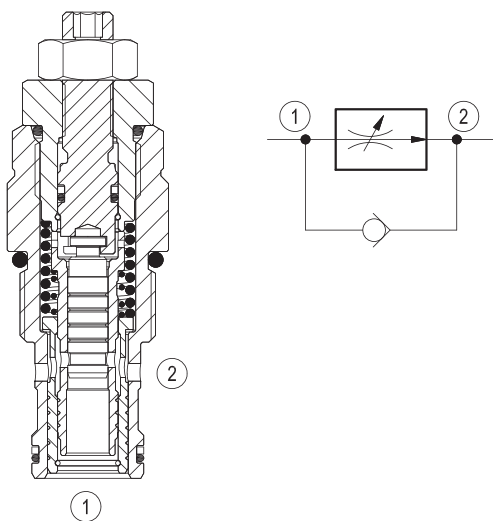


Technical data	
Pressure min. - max.	14 - 350 bar (200 - 5000 psi)
Flow range	see "Regulated flow range" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.3 kg (0.66 lbs)
Cavity	CA-12A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A2010520100 material no: R901111377
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

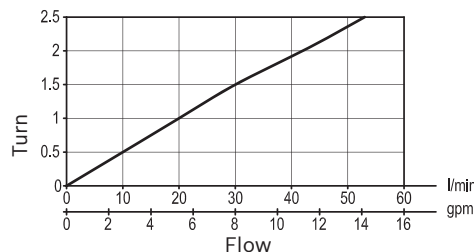
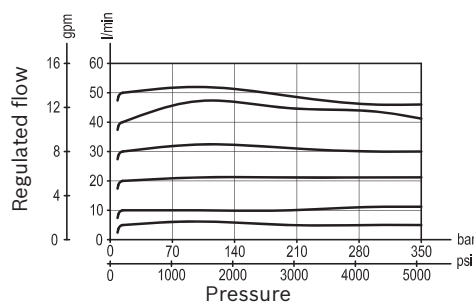
**Description**

A constant flow rate, regardless of system pressures, is established from 1 to 2 while a minimum pressure differential of 14 bar (200 psi) exists between the two ports. Output flow can be varied from closed to the nominal maximum rating for the valve. Free flow is permitted from 2 to 1, regardless of valve adjustment, by when pressure overcomes the spring bias of the valve check function.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.07.01</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Flow control, 2-way pressure compensated fully adjustable, free reverse flow

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**03** Leakproof hex. socket screw

Regulated flow range l/min. (gpm)	
<b>50</b>	1-50 (0.26-13.2)

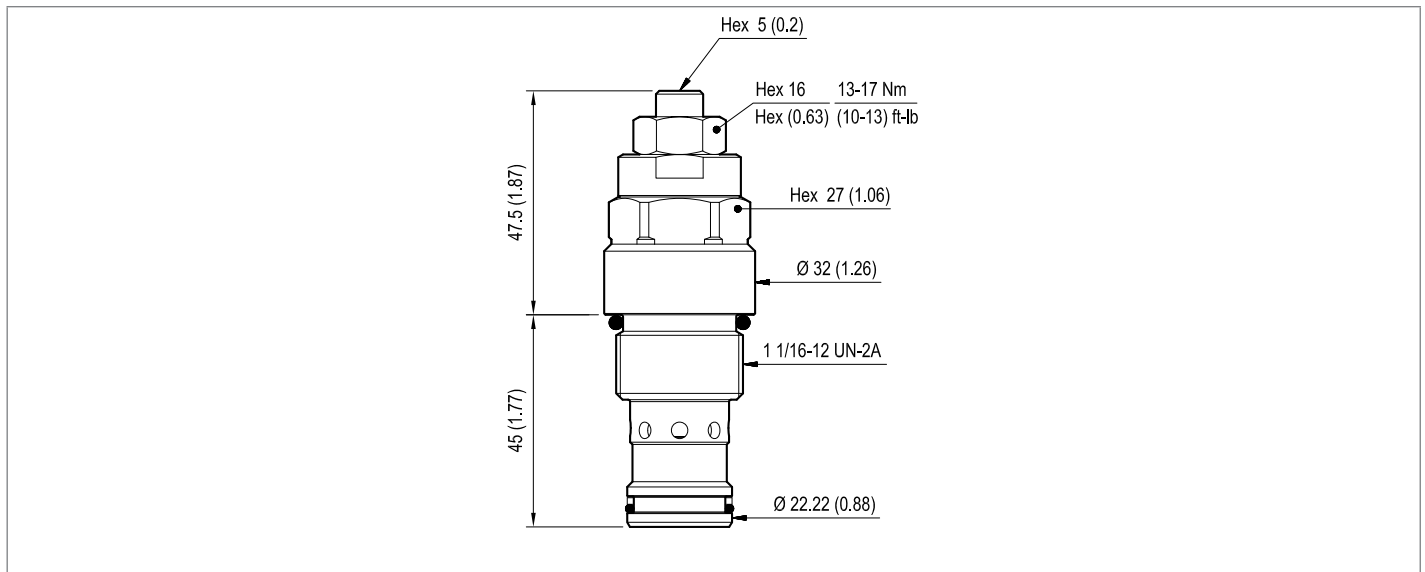
**57** Common cavity, Size 12

**Preferred types**

Type	Material number
040701035750000	R930000009

Type	Material number

**Dimensions**





Flow control, 3-way pressure compensated,  
combination type fixed setting  
Common cavity, Size 10

VRFC-10A-TF

04.04.01.00.85 - Z

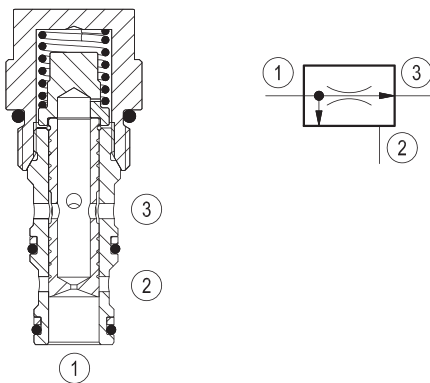


**Description**

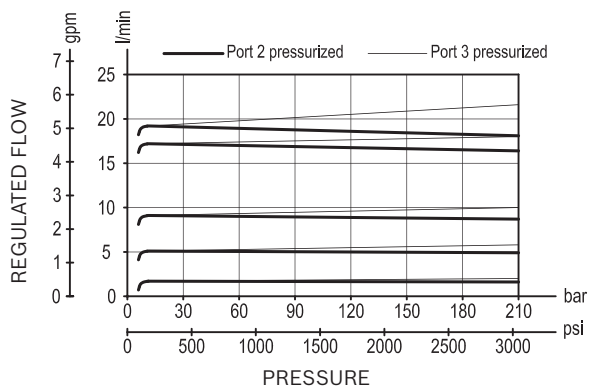
A constant flow rate, regardless of system pressures, is established from 1 to 3 while a minimum pressure differential of 14 bar (200 psi) exists between the two ports. Input flow supplied to 1 in excess of the regulated output at 3 is by-passed to 2. The valve cannot be adjusted for variable flow output. Flow from 3 to 1 is limited by the diameter of the selected control orifice and is not pressure compensated. Flow from 2 to 1 is not permitted.

Technical data	
Pressure min. - max.	14 - 350 bar (200 - 5000 psi)
Max. inlet flow	60 l/min. (16 gpm)
Flow range	see "Regulated flow range" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.14 kg (0.31 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.04.01.00</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Flow control, 3-way pressure compensated combination type fixed setting

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**85** Common cavity, Size 10

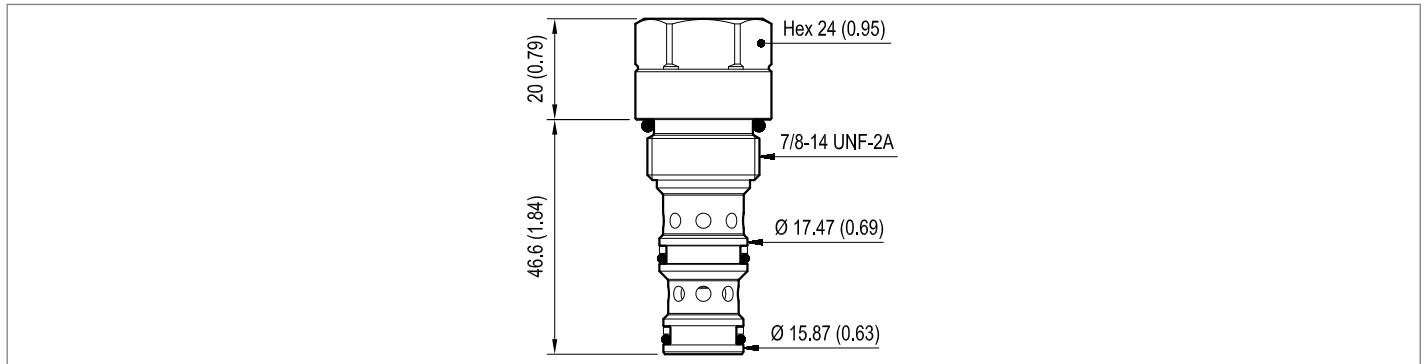
	Regulated flow range l/min. (gpm) ± 10%
<b>02</b>	1.7 (0.5)
<b>04</b>	3.5 (0.9)
<b>05</b>	5 (1.3)
<b>07</b>	7.2 (1.9)
<b>09</b>	8.7 (2.3)
<b>17</b>	17 (4.5)
<b>19</b>	19 (5)

**Preferred types**

Type	Material number
040401008502000	R930005627
040401008504000	R930005628
040401008505000	R930005629
040401008507000	R930005630

Type	Material number
040401008509000	R930005631
040401008517000	R930005632
040401008519000	R930005633

**Dimensions**



Flow control, 3-way pressure compensated,  
combination type partially adjustable  
Common cavity, Size 10

VRFC-10A

04.04.01 - X - 85 - Z

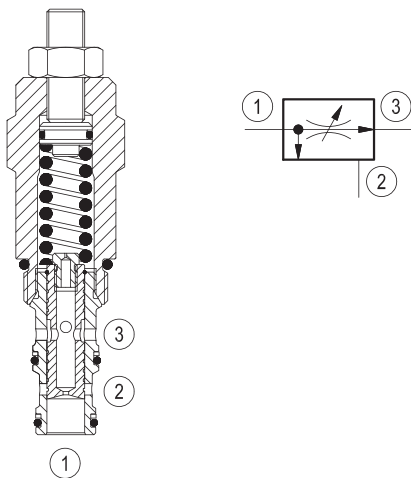


Technical data	
Pressure min. - max.	14 - 350 bar (200 - 5000 psi)
Max. inlet flow	60 l/min. (16 gpm)
Flow range	see "Regulated flow range" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight <sup>1)</sup>	0.26 kg (0.57 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

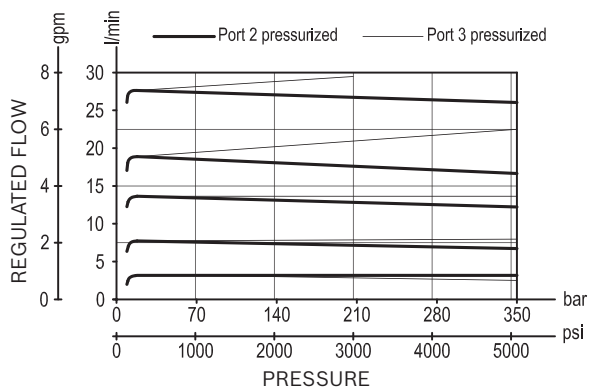
- 1) Standard version X=03 type
- 2) Only external seals for 10 valves

**Description**

A constant flow rate, regardless of system pressures, is established from 1 to 3 while a minimum pressure differential of 14 bar (200 psi) exists between the two ports. Input flow supplied to 1 in excess of the regulated output at 3 is by-passed to 2. Output flow can be varied through a limited range of adjustment and coordinate change in minimum required pressure differential. Flow from 3 to 1 is limited by the diameter of the selected control orifice and is not pressure compensated. Flow from 2 to 1 is not permitted.



**Characteristic curve**



**Ordering code**

<b>04.04.01</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Flow control, 3-way pressure compensated combination type partially adjustable

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

- 03** Leakproof hex. socket screw
- 04** Handknob and locknut

**85** Common cavity, Size 10

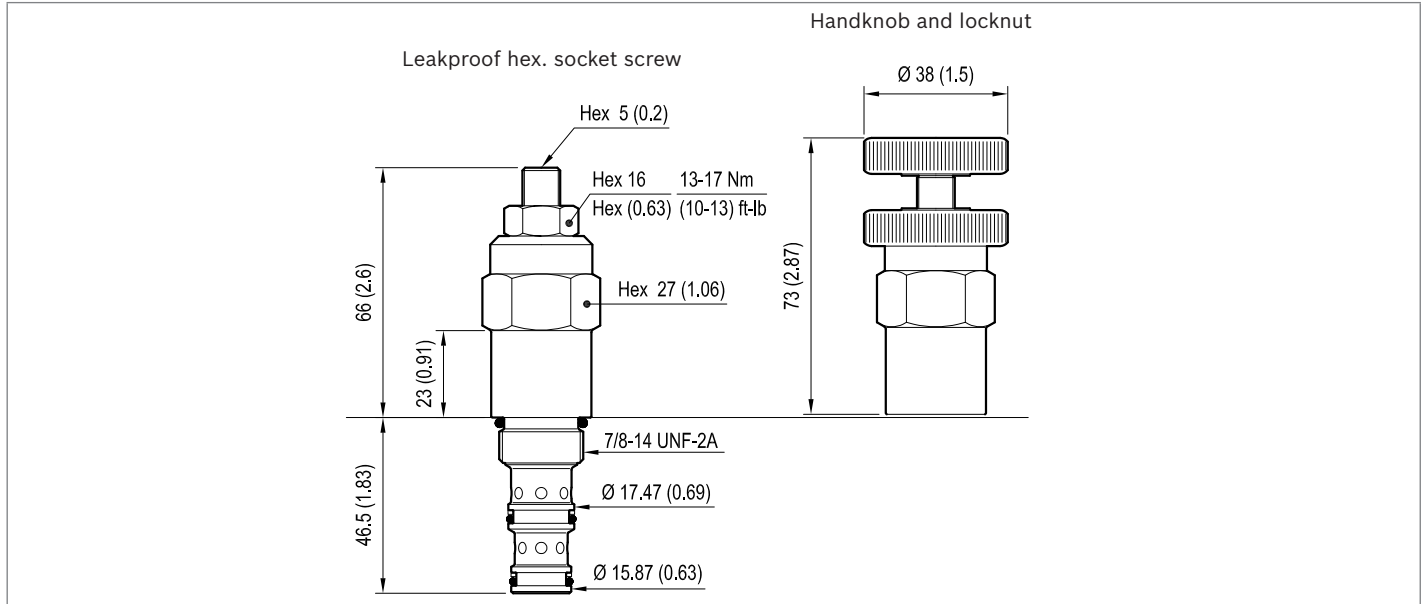
	Regulated flow range l/min. (gpm)
<b>02</b>	1.5-2.5 (0.4-0.66)
<b>04</b>	3-4.2 (0.79-1.11)
<b>06</b>	4-5.8 (1.06-1.53)
<b>08</b>	5.5-7.8 (1.45-2.06)
<b>09</b>	6.5-9.5 (1.72-2.51)
<b>11</b>	7.5-11 (1.98-2.91)
<b>14</b>	9.5-14 (2.51-3.70)
<b>20</b>	13-20 (3.44-5.28)
<b>26</b>	19-26 (5.02-6.87)

**Preferred types**

Type	Material number
040401038502000	R930000266
040401038504000	R901106648
040401038506000	R901106652
040401038508000	R901106657
040401038509000	R901106659
040401038511000	R901106660
040401038514000	R901106661
040401038520000	R901106662
040401038526000	R901106663

Type	Material number
040401048504000	R901106664
040401048506000	R901106665
040401048508000	R901106666
040401048509000	R901106667
040401048511000	R901106668
040401048514000	R901106669
040401048520000	R901106670
040401048526000	R901106671

**Dimensions**



Flow control, 3-way pressure compensated,  
combination type fully adjustable  
Common cavity, Size 10

VRFD-10A

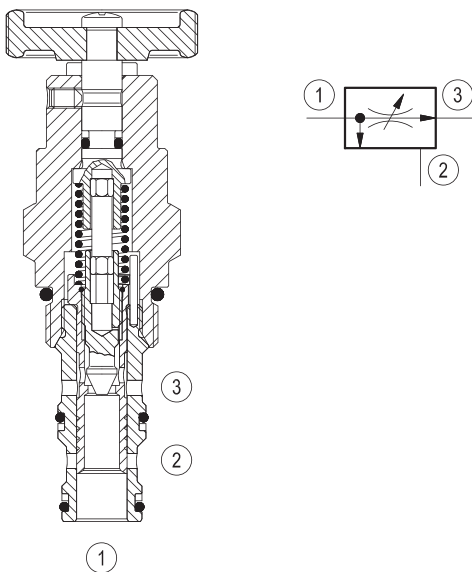
04.04.02 - X - 85 - Z



Technical data	
Pressure min. - max.	14 - 350 bar (200 - 5000 psi)
Max. inlet flow	60 l/min. (16 gpm)
Flow range	see "Regulated flow range" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight <sup>1)</sup>	0.26 kg (0.57 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

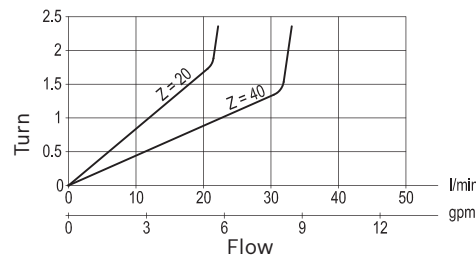
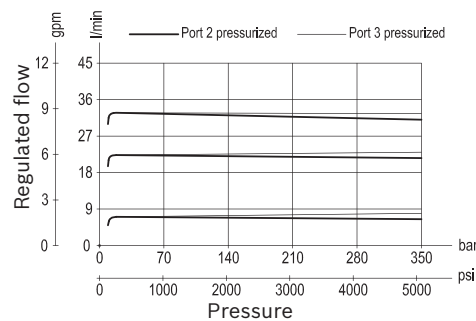
**Description**

A constant flow rate, regardless of system pressures, is established from 1 to 3 while a minimum pressure differential of 14 bar (200 psi) exists between the two ports. Input flow supplied to 1 in excess of the regulated output at 3 is by-passed to 2. Output flow can be varied from closed to the nominal maximum rating for the valve. Flow from 3 to 1 is limited by the diameter of the selected control orifice and is not pressure compensated. Flow from 2 to 1 is not permitted.



- 1) Standard version X=04 type
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.04.02</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Flow control, 3-way pressure compensated combination type fully adjustable

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

- 04** Handknob
- 40** Calibrated handknob

	Regulated flow range l/min. (gpm)
<b>20</b>	0.1-20 (0.03-5.28)
<b>40</b>	0.2-30 (0.05-7.93)

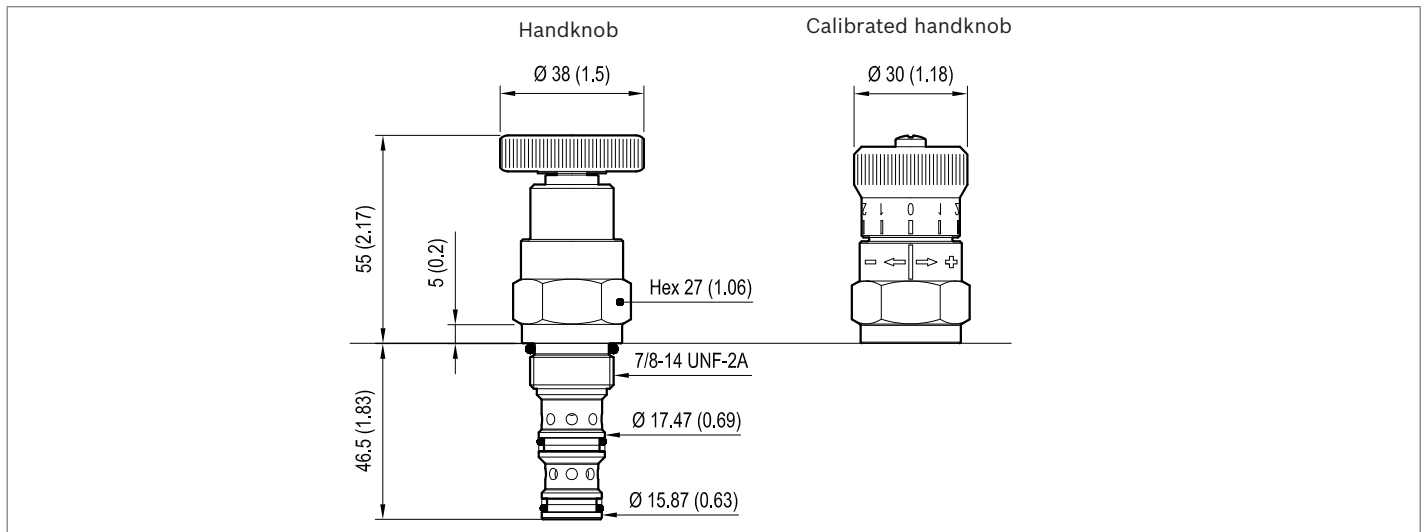
**85** Common cavity, Size 10

**Preferred types**

Type	Material number
04040204852000A	R930055365
04040204854000A	R930055362
04040240852000A	R930055366
04040240854000A	R930055363

Type	Material number

**Dimensions**



Flow control, 3-way pressure compensated,  
combination type fixed setting  
Common cavity, Size 12

VRFC-12A-TF

04.04.03.00.57 - Z

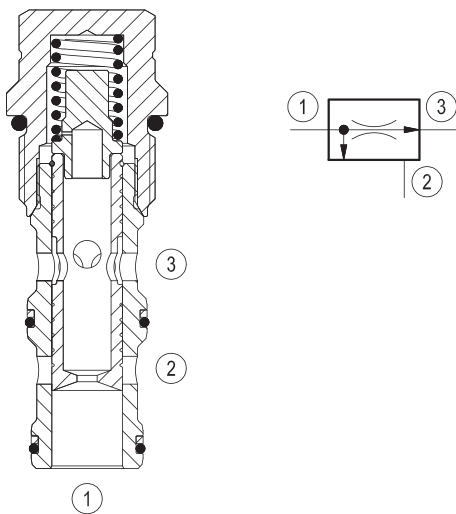


Technical data	
Pressure min. - max.	14 - 350 bar (200 - 5000 psi)
Max. inlet flow	130 l/min. (34 gpm)
Flow range	see "Regulated flow range" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.26 kg (0.57 lbs)
Cavity	CA-12A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A3010520100 material no: R930000941
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

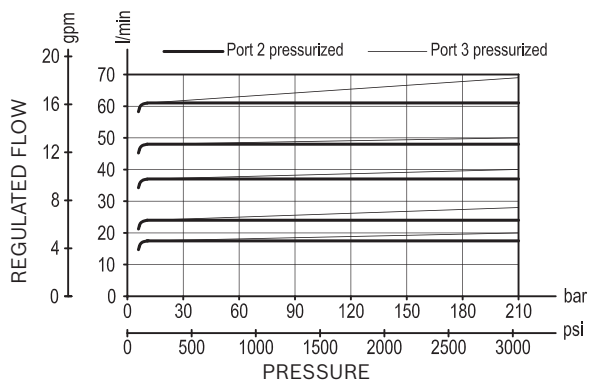
**Description**

A constant flow rate, regardless of system pressures, is established from 1 to 3 while a minimum pressure differential of 14 bar (200 psi) exists between the two ports. Input flow supplied to 1 in excess of the regulated output at 3 is by-passed to 2. The valve cannot be adjusted for variable flow output. Flow from 3 to 1 is limited by the diameter of the selected control orifice and is not pressure compensated. Flow from 2 to 1 is not permitted.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.04.03.00</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Flow control, 3-way pressure compensated combination type fixed setting

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**57** Common cavity, Size 12

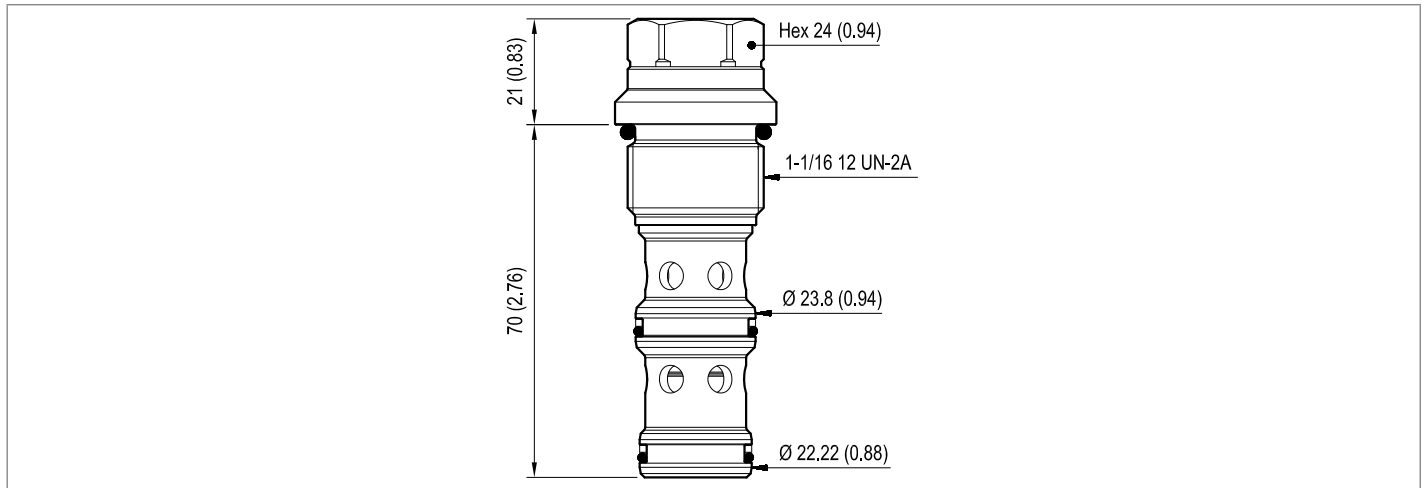
	Regulated flow range l/min. (gpm) ± 10%
<b>15</b>	15 (4)
<b>20</b>	20 (5)
<b>23</b>	23 (6)
<b>26</b>	26 (7)
<b>29</b>	29 (8)
<b>37</b>	37 (10)
<b>41</b>	41 (11)
<b>45</b>	45 (12)
<b>50</b>	50 (13)
<b>58</b>	58 (15)
<b>63</b>	63 (17)

**Preferred types**

Type	Material number
040403005715000	R930000070
040403005720000	R930000071
040403005723000	R930000072
040403005726000	R930000073
040403005729000	R930000074
040403005737000	R930000075

Type	Material number
040403005741000	R930000076
040403005745000	R930000077
040403005750000	R930000078
040403005758000	R930000079
040403005763000	R930000080

**Dimensions**





Flow control, 3-way pressure compensated,  
combination type fully adjustable  
Common cavity, Size 12

VRFD-12A

04.04.04 - X - 57 - Z



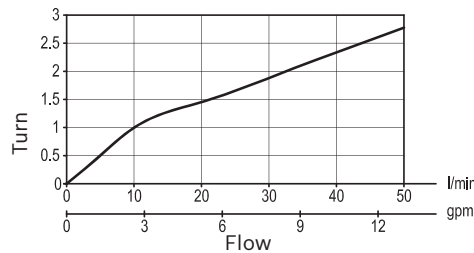
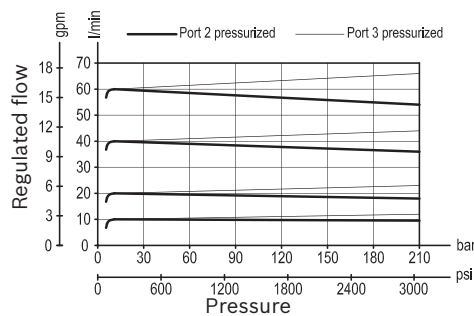
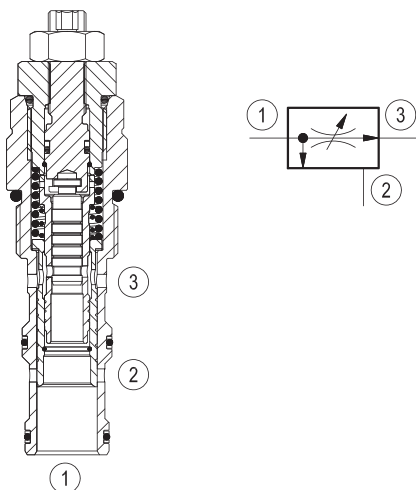
Technical data	
Pressure min. - max.	14 - 350 bar (200 - 5000 psi)
Max. inlet flow	120 l/min. (32 gpm)
Flow range	see "Regulated flow range" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight <sup>1)</sup>	0.3 kg (0.66 lbs)
Cavity	CA-12A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A3010530100 material no: R930001668
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

**Description**

A constant flow rate, regardless of system pressures, is established from 1 to 3 while a minimum pressure differential of 14 bar (200 psi) exists between the two ports. Input flow supplied to 1 in excess of the regulated output at 3 is by-passed to 2. Output flow can be varied from closed to the nominal maximum rating for the valve. Flow from 2 to 1 is not permitted.

- 1) Standard version X=03 type
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.04.04</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Flow control, 3-way pressure compensated combination type fully adjustable

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**03** Leakproof hex. socket screw

**04** Handknob and locknut

**57** Common cavity, Size 12

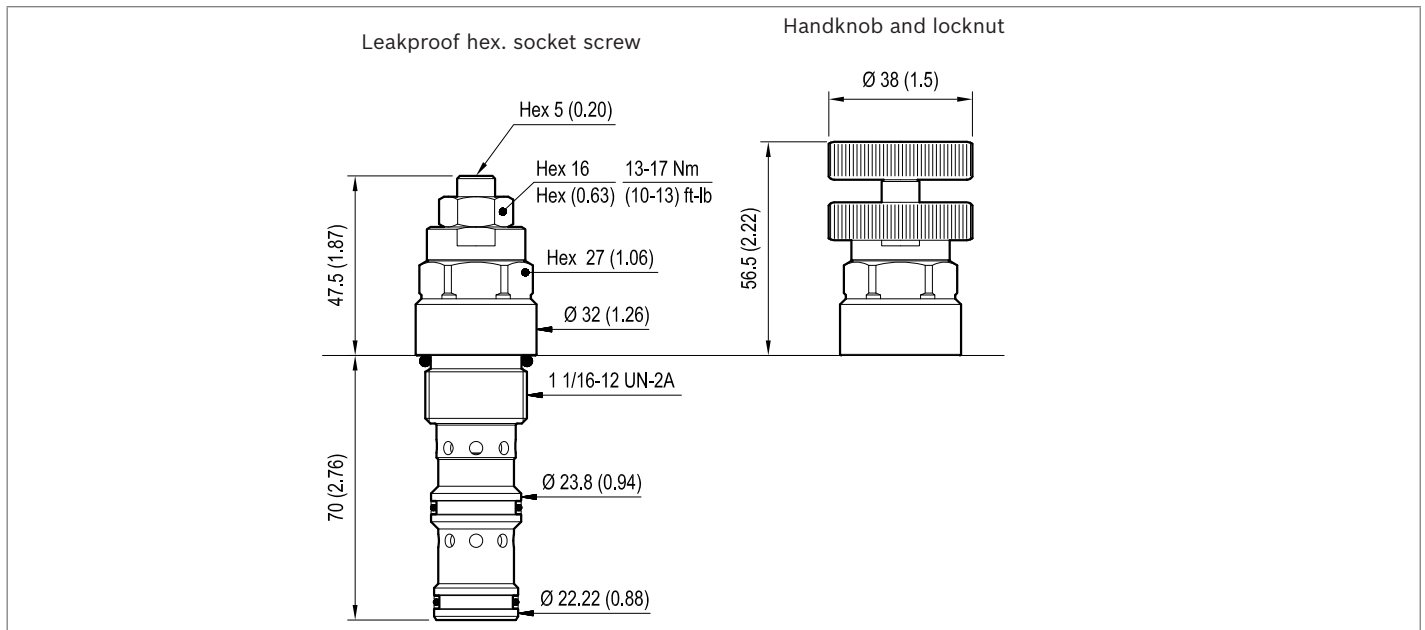
	Regulated flow range l/min. (gpm)
<b>50</b>	2-50 (0.6-13.2)

**Preferred types**

Type	Material number
040404035750000	R930006092
040404045750000	R930006093

Type	Material number

**Dimensions**



# Flow divider

## Common cavity, Size 10

DSDN-10A

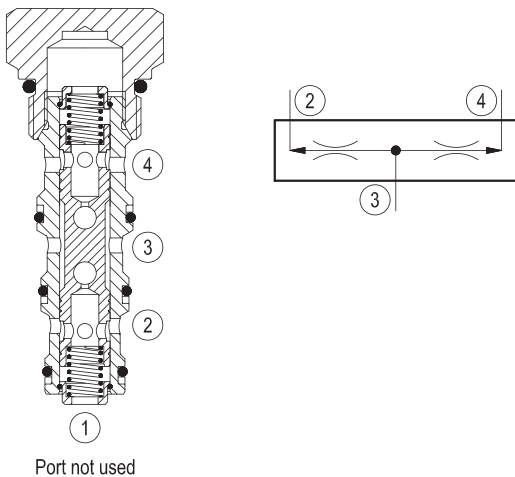
04.05.04.00.85 - Z



Technical data	
Pressure min. - max.	10 - 350 bar (145 - 5000 psi)
Flow range	see "Range of total flow" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Division ratio	50% - 50%
Weight	0.28 kg (0.62 lbs)
Cavity	CA-10A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A4010520100 material no: R901111371
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

### Description

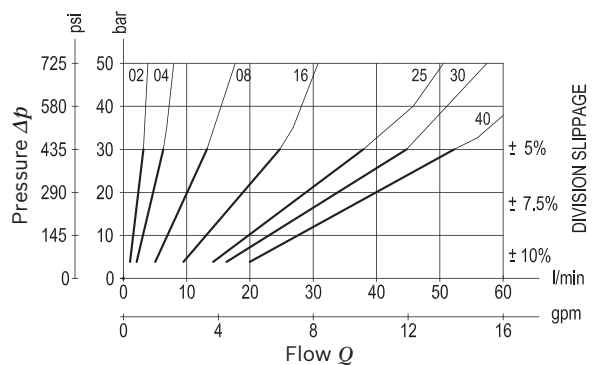
Input flow at 3 will be divided and output equally to 2 and 4 independent of system pressures. Should either 2 or 4 become blocked in flow division mode, approximately 5% of the input flow will be transmitted to the open port. Flow combining is not permitted.



1) Only external seals for 10 valves

Slippage (tolerance) from theoretical divided flows: ±5% to ±10%, depending from inlet flow (see diagram).  
N.B. Slippage is lowest toward upper limit of nominal range.

### Characteristic curve



**Ordering code**

<b>04.05.04.00</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Flow divider

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**85** Common cavity, Size 10

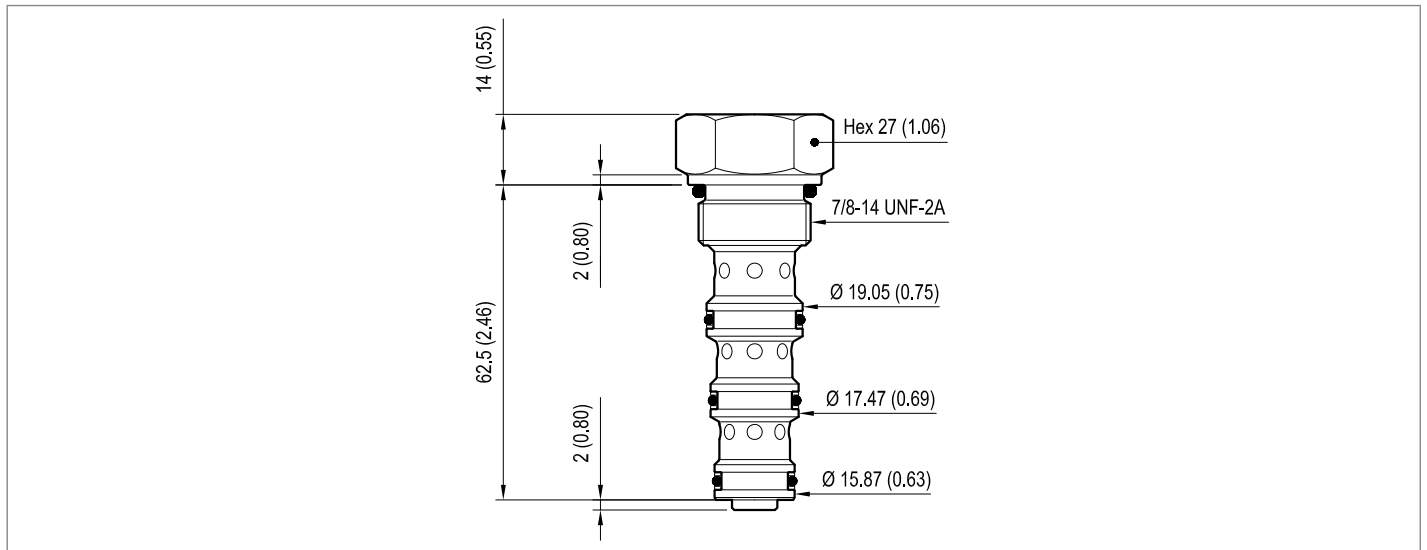
	Regulated flow range l/min. (gpm)
<b>02</b>	1-3 (0.26-0.79)
<b>04</b>	2-6 (0.53-1.59)
<b>08</b>	5-13 (1.32-3.44)
<b>16</b>	9-24 (2.38-6.34)
<b>25</b>	14-37 (3.7-9.78)
<b>30</b>	16-44 (4.23-11.63)
<b>40</b>	20-54 (5.28-14.27)

**Preferred types**

Type	Material number
040504008502000	R901109840
040504008504000	R901109841
040504008508000	R901109843
040504008516000	R901109844
040504008525000	R901109845

Type	Material number
040504008530000	R901109846
040504008540000	R901109849

**Dimensions**



# Flow divider

## Common cavity, Size 16

DSDN-16A

04.05.03.00.27 - Z



Technical data	
Pressure min. - max.	10 - 350 bar (145 - 5000 psi)
Flow range	see "Range of total flow" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Division ratio	50% - 50%
Weight	0.41 kg (0.9 lbs)
Cavity	CA-16A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG16A4010530100 material no: R930000973
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

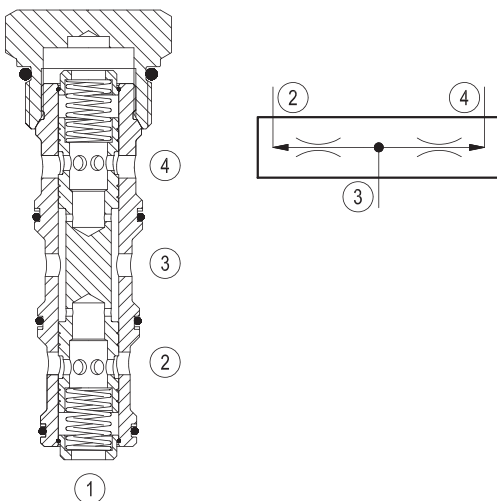
### Description

Input flow at 3 will be divided and output equally to 2 and 4 independent of system pressures. Should either 2 or 4 become blocked in flow division mode, approximately 5% of the input flow will be transmitted to the open port. Flow combining is not permitted.

1) Only external seals for 10 valves

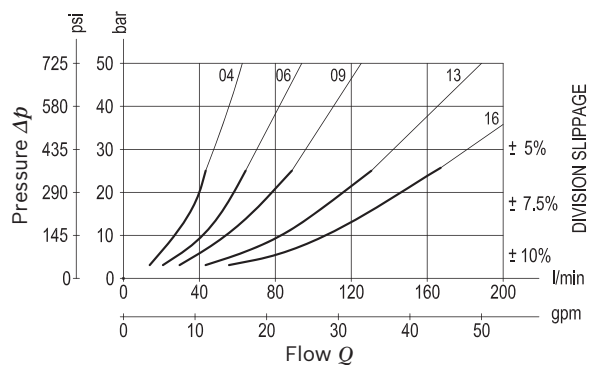
Slippage (tolerance) from theoretical divided flows: ±5% to ±10%, depending from inlet flow (see diagram).

N.B. Slippage is lowest toward upper limit of nominal range.



Port not used

### Characteristic curve



**Ordering code**

<b>04.05.03.00</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Flow divider

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**27** Common cavity, Size 16

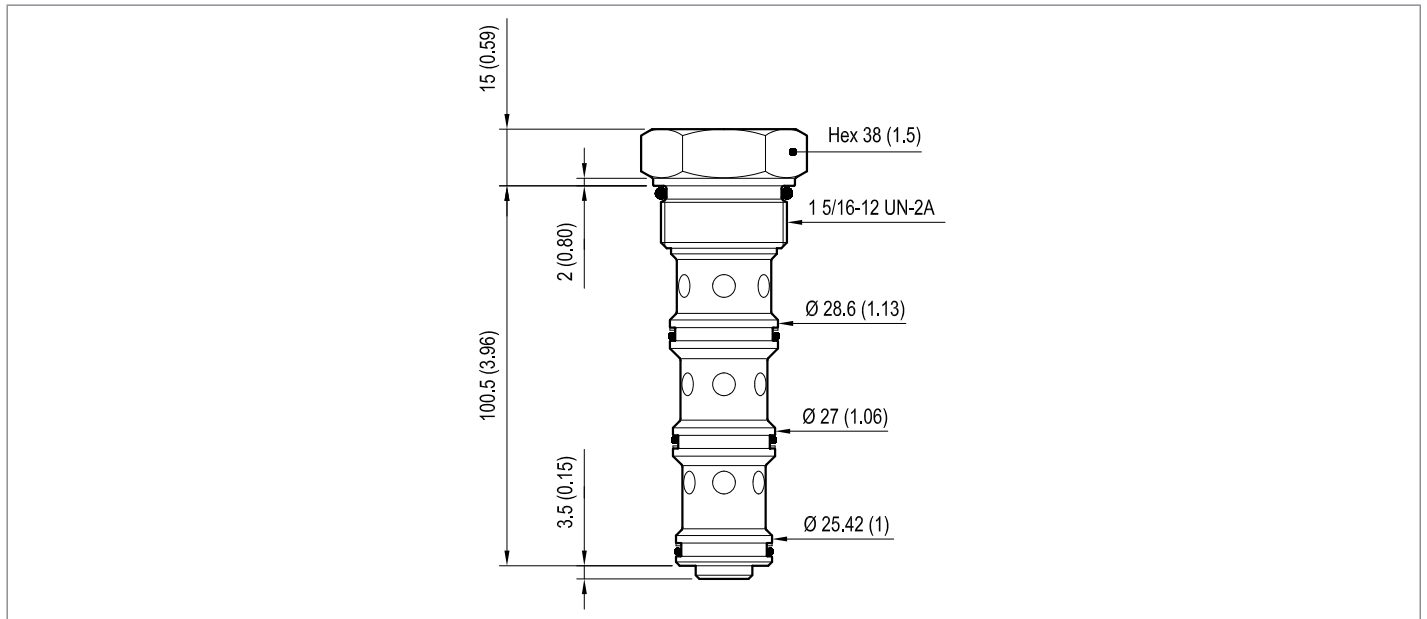
	Regulated flow range l/min. (gpm)
<b>04</b>	15-44 (3.96-11.63)
<b>06</b>	22-66 (5.81-17.44)
<b>09</b>	30-88 (7.93-23.25)
<b>13</b>	44-132 (11.63-34.88)
<b>16</b>	55-165 (14.53-43.59)

**Preferred types**

Type	Material number
040503002704000	R901109851
04050300270600A	R930053918
04050300270900A	R930053920
04050300271300A	R930053921
04050300271600A	R930053923

Type	Material number

**Dimensions**



# Flow divider and combiner

## Common cavity, Size 10

DRFN-10A

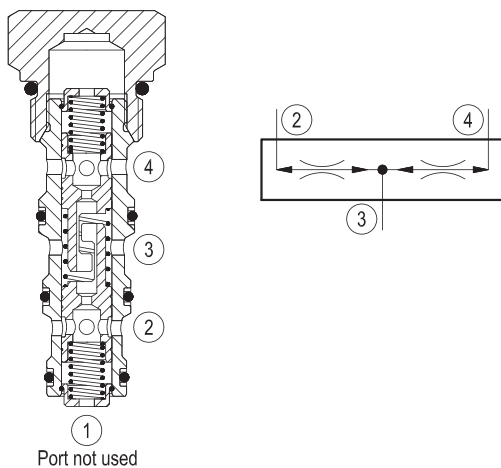
04.05.01.00.85 - Z



Technical data	
Pressure min. - max.	10 - 350 bar (145 - 5000 psi)
Flow range	see "Range of total flow" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Division ratio	50% - 50%
Weight	0.28 kg (0.62 lbs)
Cavity	CA-10A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A4010530100 material no: R901111373
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

### Description

Input flow at 3 will be divided and output equally to 2 and 4 independent of system pressures. Flow input at 2 and 4 will be combined and output at 3. Should either 2 or 4 become blocked in flow division mode, approximately 5% of the input flow will be transmitted to the open port.

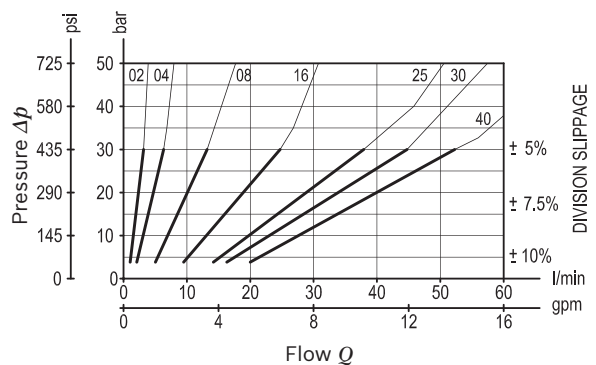


1) Only external seals for 10 valves

Slippage (tolerance) from theoretical divided flows: ±5% to ±10%, depending from inlet flow (see diagram).

N.B. Slippage is lowest toward upper limit of nominal range.

### Characteristic curve



**Ordering code**

<b>04.05.01.00</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Flow divider and combiner

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**85** Common cavity, Size 10

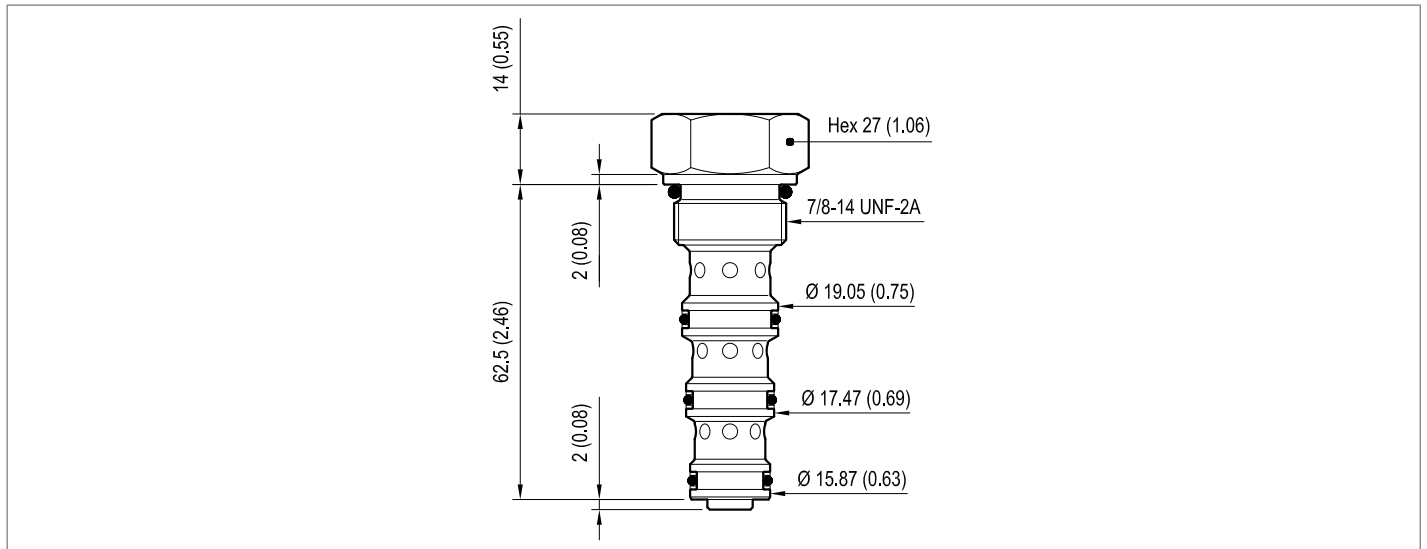
	Regulated flow range l/min. (gpm)
<b>02</b>	1-3 (0.26-0.79)
<b>04</b>	2-6 (0.53-1.59)
<b>08</b>	5-13 (1.32-3.44)
<b>16</b>	9-24 (2.38-6.34)
<b>25</b>	14-37 (3.7-9.78)
<b>30</b>	16-44 (4.23-11.63)
<b>40</b>	20-54 (5.28-14.27)
<b>50</b>	25-60 (6.61-15.85)

**Preferred types**

Type	Material number
040501008502000	R901096072
040501008504000	R901096079
040501008508000	R901096080
040501008516000	R901096083

Type	Material number
040501008525000	R901096085
040501008530000	R901096086
040501008540000	R901096087
040501008550000	R930000091

**Dimensions**



Dimensions are in mm (inches) unless otherwise specified. For more information, please refer to the technical drawing of the product.



# Flow divider and combiner

## Common cavity, Size 16

DRFN-16A

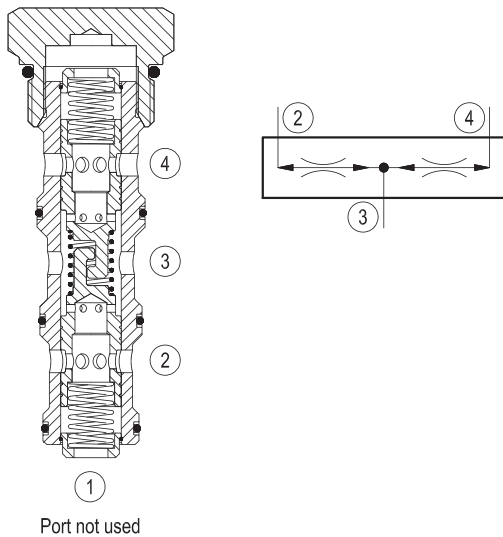
04.05.02.00.27 - Z



Technical data	
Pressure min. - max.	10 - 350 bar (145 - 5000 psi)
Flow range	see "Range of total flow" table
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Division ratio	50% - 50%
Weight	0.41 kg (0.9 lbs)
Cavity	CA-16A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG16A4010530100 material no: R930000973
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

### Description

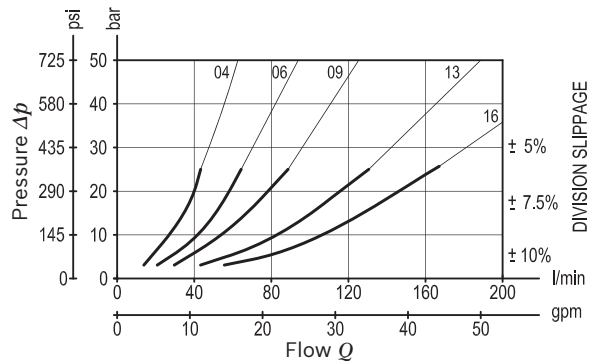
Input flow at 3 will be divided and output equally to 2 and 4 independent of system pressures. Flow input at 2 and 4 will be combined and output at 3. Should either 2 or 4 become blocked in flow division mode, approximately 5% of the input flow will be transmitted to the open port.



1) Only external seals for 10 valves

Slippage (tolerance) from theoretical divided flows: ±5% to ±10%, depending from inlet flow (see diagram).  
N.B. Slippage is lowest toward upper limit of nominal range.

### Characteristic curve



**Ordering code**

<b>04.05.02.00</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Flow divider and combiner

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

	Regulated flow range l/min. (gpm)
<b>04</b>	15-44 (3.96-11.63)
<b>06</b>	22-66 (5.81-17.44)
<b>09</b>	30-80 (7.93-21.14)
<b>13</b>	44-132 (11.63-34.88)
<b>16</b>	55-165 (14.53-43.59)

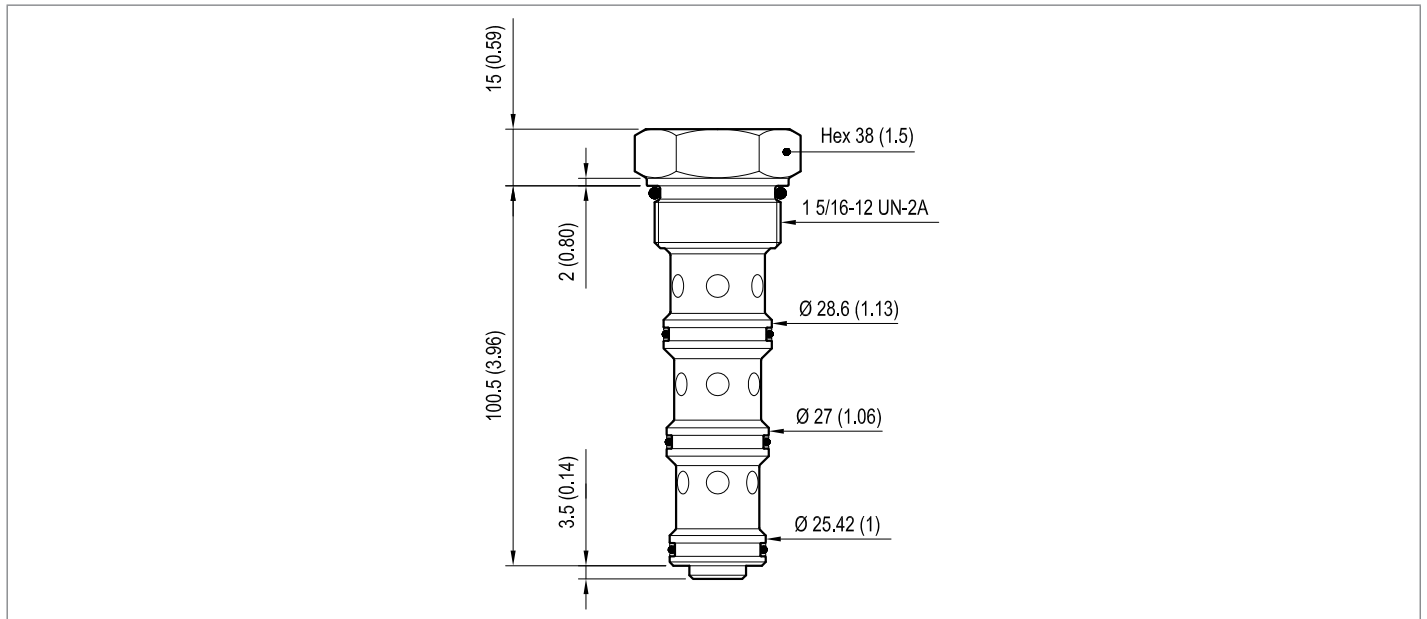
**27** Common cavity, Size 16

**Preferred types**

Type	Material number
04050200270400A	R930053926
04050200270600A	R930053927
04050200270900A	R930053928
04050200271300A	R930053929

Type	Material number
04050200271600A	R930053931

**Dimensions**



# Mechanical cartridge valves

## Logic elements and compensators

Designation	Description	Cavity	Code	Data sheet	Page
Flow and pressure control with external pilot	VLST-10A	Size 10	048401X85Z	18321-60	319
Flow and pressure control with external pilot	VLST-12A	Size 12	048401X57Z	18321-61	321
Flow and pressure control with external pilot	VLST-16A	Size 16	048401X27Z	18321-62	323
Flow and pressure control with external pilot	VLST-20A	Size 20	048401X58Z	18321-63	325
Flow and pressure control with internal pilot	VLSP-10A	Size 10	048403X85Z	18321-64	327
Flow and pressure control with internal pilot	VLSP-12A	Size 12	048403X57Z	18321-65	329
Flow and pressure control with internal pilot	VLSP-16A	Size 16	048403X27Z	18321-66	331
Flow and pressure control with internal pilot	VLSP-20A	Size 20	048403X58Z	18321-67	333
Flow control with external pilot	VLSC-10A	Size 10	048402X85Z	18321-68	335
Flow control with external pilot, fixed setting, damped type	VLSC-10A-8-TF	Size 10	048412X85Z	18321-71	337
Flow control with external pilot	VLSC-12A	Size 12	048402X57Z	18321-59	339
Flow control with external pilot	VLSC-16A	Size 16	048402X27Z	18321-69	341
Flow control with external pilot	VLSC-20A	Size 20	048402X58Z	18321-70	343
Pressure control with internal pilot	VLSR-10A	Size 10	048404X85Z	18321-72	345
Pressure control with internal pilot	VLSR-12A	Size 12	048404X57Z	18321-73	347
Pressure control with internal pilot	VLSR-16A	Size 16	048404X27Z	18321-74	349
Pressure control with internal pilot	VLSR-20A	Size 20	048404X58Z	18321-75	351
Pressure compensator	VLSQ-10A	Size 10	048405X85Z	18321-77	353
Pressure compensator	VLSQ-12A	Size 12	048405X57Z	18321-78	355
Pressure compensator	VLSQ-16A	Size 16	048405X27Z	18321-79	357

# Mechanical cartridge valves

## Logic elements and compensators

Designation	Description	Cavity	Code	Data sheet	Page
Pressure compensator combination type	VCSQ-10A	Size 10	048406X85Z	18321-80	359
Pressure compensator combination type	VCSQ-12A	Size 12	048406X57Z	18321-81	361
Pressure compensator combination type	VCSQ-16A	Size 16	048406X27Z	18321-82	363
Pressure compensator with static load sense	VRLA-10A-S	Size 10	0484090085Z	18321-86	365
Pressure compensator with static load sense	VRLA-12A-S	Size 12	0484090057Z	18321-87	367
Pressure compensator with static load sense	VRLA-16A-S	Size 16	0484090027Z	18321-88	369
Pressure compensator with static load sense	VRLA-20A-S	Size 20	0484090058Z	18321-89	371
Pressure compensator with dynamic load sense	VRLA-10A-D	Size 10	048410X85Z	18321-90	373
Pressure compensator with dynamic load sense	VRLA-12A-D	Size 12	048410X57Z	18321-83	375
Pressure compensator with dynamic load sense	VRLA-16A-D	Size 16	048410X27Z	18321-84	377
Pressure compensator with dynamic load sense	VRLA-20A-D	Size 20	048410X58Z	18321-85	379
Directional control, poppet type	VLDT-10A	Size 10	048407X85Z	18321-76	381

Logic element, flow and pressure control  
with external pilot  
Common cavity, Size 10

VLST-10A

04.84.01 - X - 85 - Z

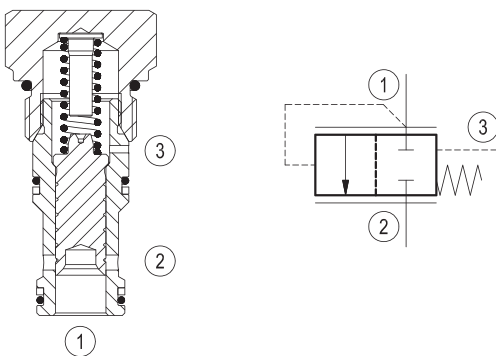


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	60 l/min (16 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight <sup>2)</sup>	0.12 kg (0.27 lbs)
Cavity	CA-10A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG10A9010520100 material no: R901111367
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

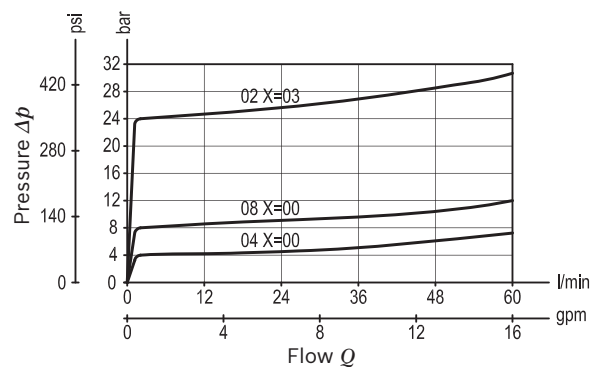
**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow flow from 1 to 2. Pilot pressure at 3 is additive to the spring bias pressure. The valve may be used in switching or compensation type applications.

- 1) Measured at 200 bar (2900 psi)
- 2) Standard version X=00 type
- 3) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.84.01</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow and pressure control, with external pilot

Series 0/A to L unchanged performances and dimensions

Version and options standard

**Adjustments**

- 00** Fixed setting
- 03** Leakproof hex. socket screw

**85** Common cavity, Size 10

		SPRINGS		
		Std. setting bar (psi)	Pressure increase bar/turn (psi/turn)	Bias spring bar (psi)
for X= 00	<b>04</b>	-	-	4 (60) ± 20%
	<b>08</b>	-	-	8 (115) ± 15%
	<b>14</b>	-	-	14 (200) ± 15%
	<b>17</b>	-	-	17 (250) ± 15%
for X= 03	<b>00</b>	4 (60)	1 (15)	2-8 (30-115)
	<b>02</b>	20 (290)	5 (73)	6-24 (87-348)

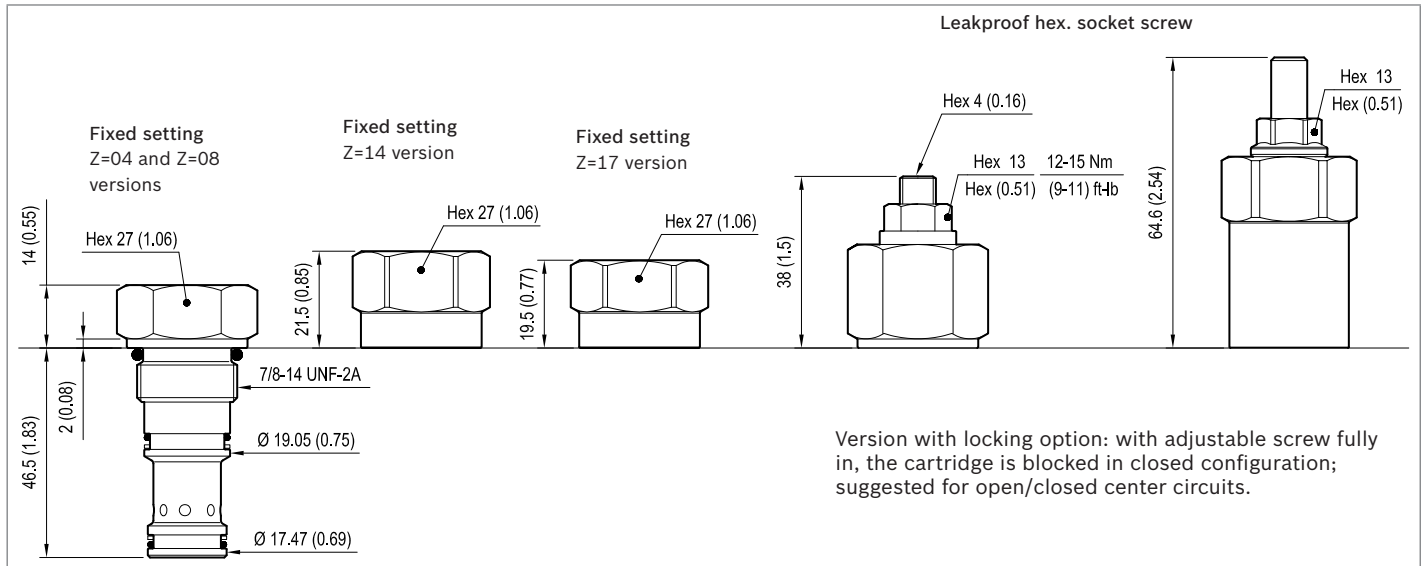
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
04840100850400A	R930008403
04840100850800A	R930008404
04840100851400A	R930008405
04840100851700A	R930008406

Type	Material number
04840103850000A	R930008407
048401038502000	R930058309

**Dimensions**



Logic element, flow and pressure control  
with external pilot  
Common cavity, Size 12

VLST-12A

04.84.01 - X - 57 - Z

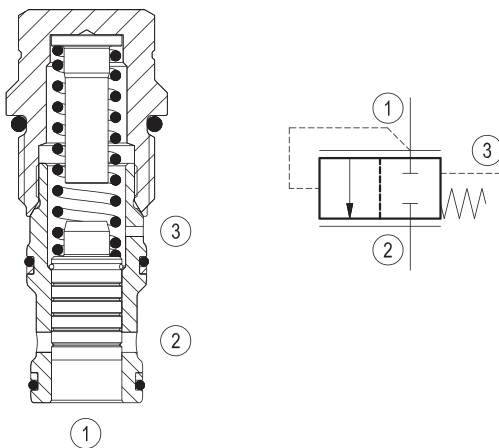


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min. (32 gpm)
Max. internal leakage <sup>1)</sup>	350 cm <sup>3</sup> /min. (21 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 -95 Nm (60 - 70 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-12A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A9010520100 material no: R901111379
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

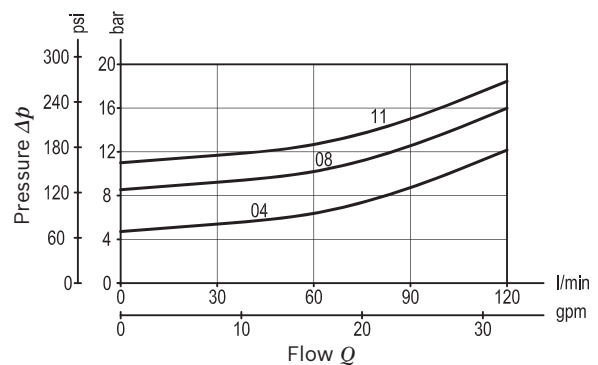
**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow flow from 1 to 2. Pilot pressure at 3 is additive to the spring bias pressure. The valve may be used in switching or compensation type applications.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.84.01</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow and pressure control, with external pilot

Series O/A to L unchanged performances and dimensions

Version and options standard

**Adjustments**

- 00** Fixed setting
- 04** Handknob and locknut

**57** Common cavity, Size 12

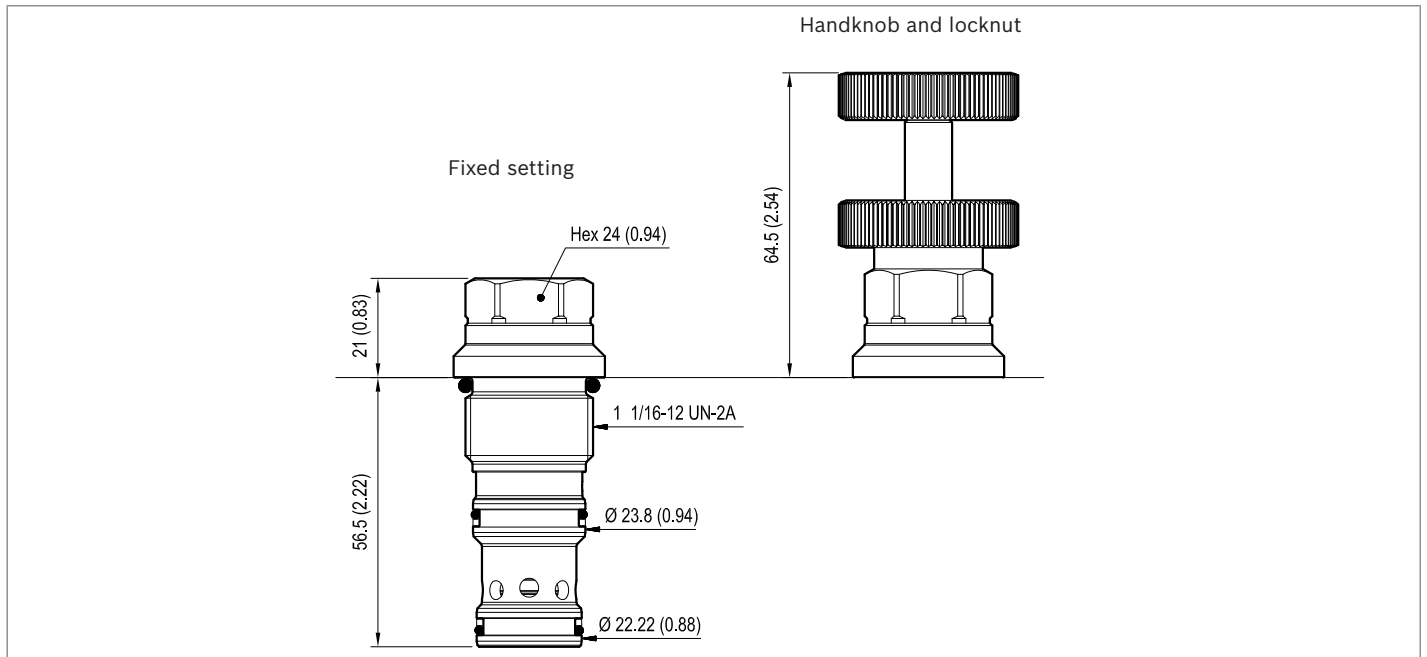
		SPRINGS		
		Std. setting bar (psi)	Pressure increase bar/turn (psi/turn)	Bias spring bar (psi)
for X= 00	<b>04</b>	-	-	4 (60) ± 20%
	<b>08</b>	-	-	8 (116) ± 15%
	<b>11</b>	-	-	11 (160) ± 15%
for X= 04	<b>04</b>	8 (116)	0.8 (12)	4-10 (60-145)

**Preferred types**

Type	Material number
048401005704000	R930000049
048401005708000	R930000050
048401005711000	R930006101

Type	Material number
048401045704000	R930053744

**Dimensions**





Logic element, flow and pressure control  
with external pilot  
Common cavity, Size 16

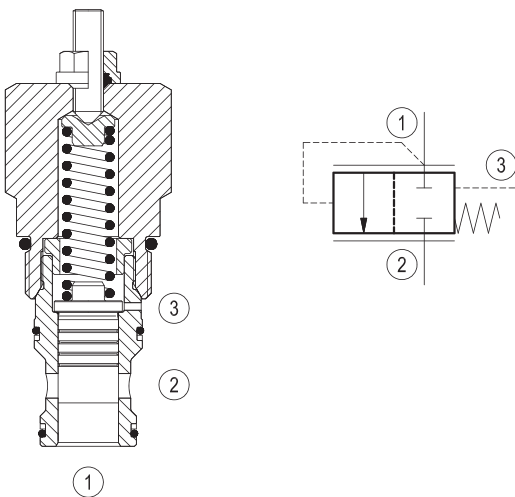
VLST-16A

04.84.01 - X - 27 - Z



**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow flow from 1 to 2. Pilot pressure at 3 is additive to the spring bias pressure. The valve may be used in switching or compensation type applications.

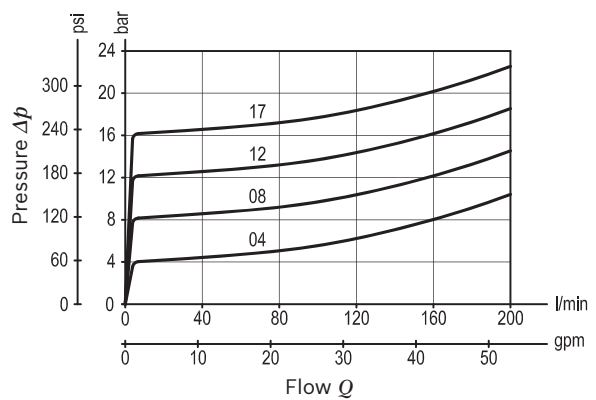


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Flow range	8 - 200 l/min (2 - 53 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight <sup>2)</sup>	0.35 kg (0.77 lbs)
Cavity	CA-16A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG16A9010520100 material no: R901111388
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Standard version X=00 type
- 3) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.01</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow and pressure control, with external pilot

Series O/A to L unchanged performances and dimensions

Version and options standard

**Adjustments**

- 00** Fixed setting
- 03** Leakproof hex. socket screw

**27** Common cavity, Size 16

**SPRINGS**

		Std. setting bar (psi)	Pressure increase bar/turn (psi/turn)	Bias spring bar (psi)
for X= 00	<b>04</b>	-	-	4 (60) ± 20%
	<b>06</b>	-	-	6 (87) ± 20%
	<b>08</b>	-	-	8.5 (123) ± 15%
	<b>12</b>	-	-	12 (175) ± 10%
	<b>15</b>	-	-	15 (218) ± 10%
	<b>17</b>	-	-	17 (247) ± 10%
for X= 03	<b>22</b>	-	-	22 (319)
	<b>00</b>	4 (60)	1 (15)	4-12 (60-175)

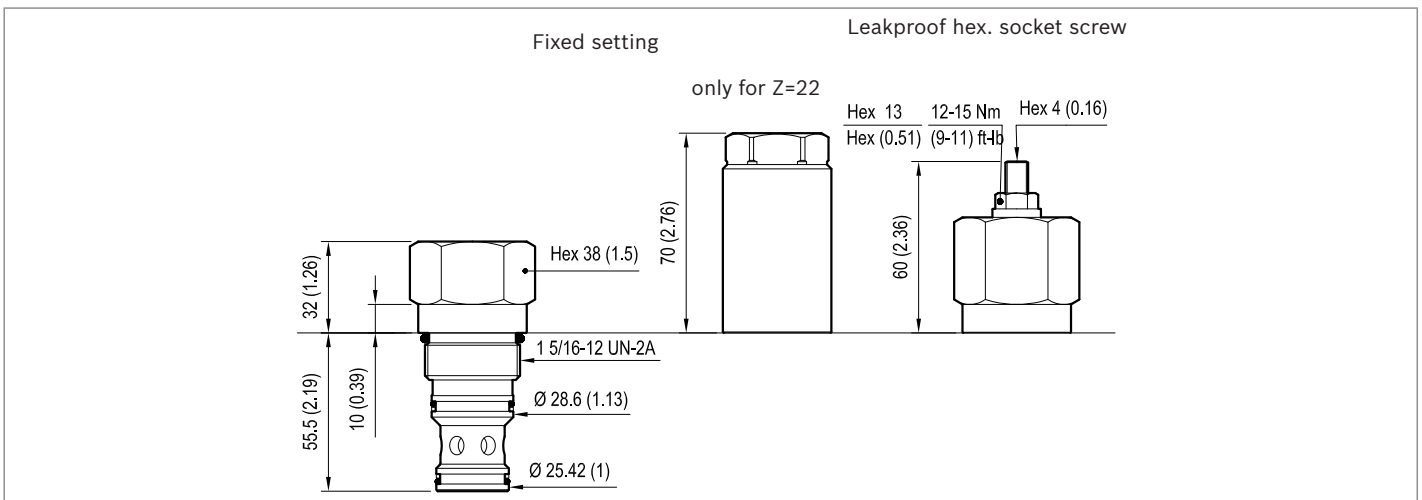
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
048401002704000	R901109369
048401002706000	R930053465
048401002708000	R901109370
048401002712000	R901109371

Type	Material number
048401002715000	R930000999
048401002722000	R930055183
048401032700000	R901109372
048401002717000	R930001047

**Dimensions**



Logic element, flow and pressure control  
with external pilot  
Common cavity, Size 20

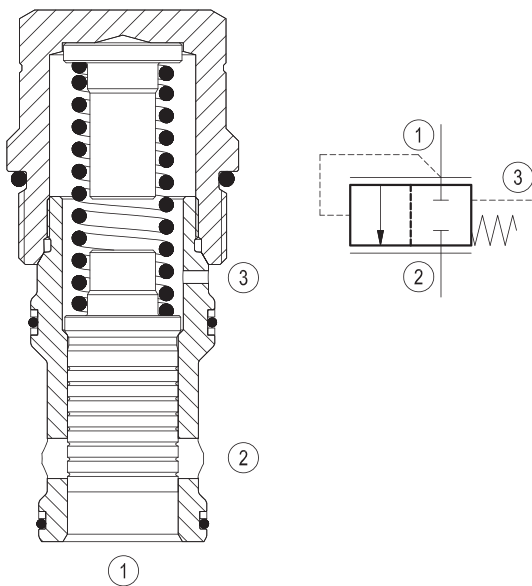
VLST-20A

04.84.01 - X - 58 - Z



**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow flow from 1 to 2. Pilot pressure at 3 is additive to the spring bias pressure. The valve may be used in switching or compensation type applications.

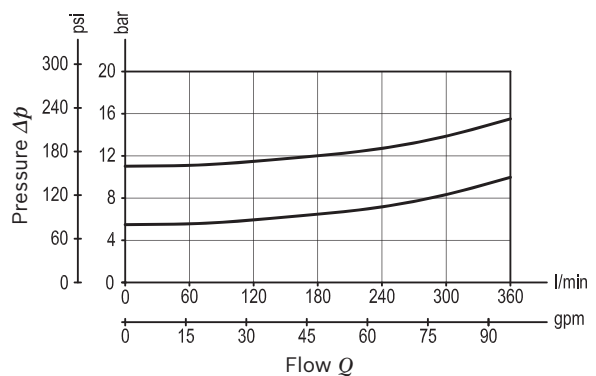


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Flow range	10 - 360 l/min. (3 - 95 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	128 - 149 Nm (95 - 110 ft-lbs)
Weight	0.8 kg (1.7 lbs)
Cavity	CA-20A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG20A9010530100 material no: R901111397
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.01</b>	<b>X</b>	<b>58</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow and pressure control with external pilot

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Adjustments

**00** Fixed setting

**SPRINGS**

<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11.5 (167) ± 15%

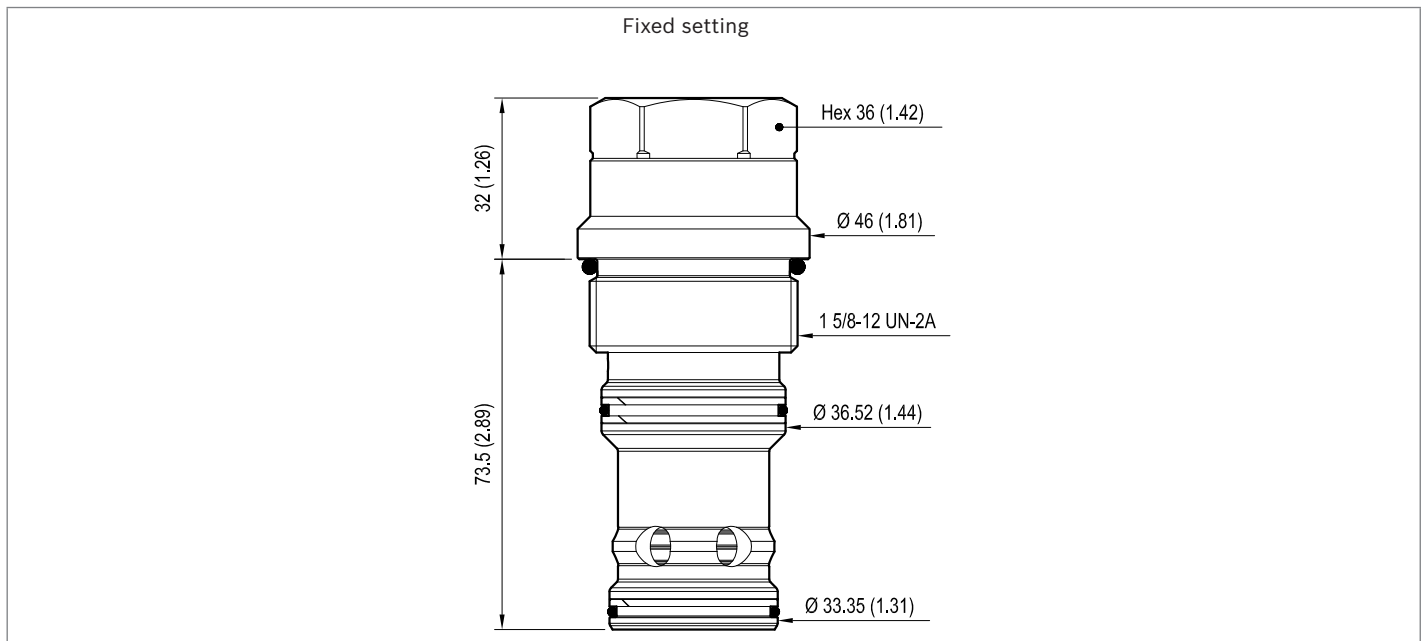
**58** Common cavity, Size 20

**Preferred types**

Type	Material number
048401005805000	R901109862
048401005811000	R901109867

Type	Material number

**Dimensions**



Logic element, flow and pressure control  
with internal pilot  
Common cavity, Size 10

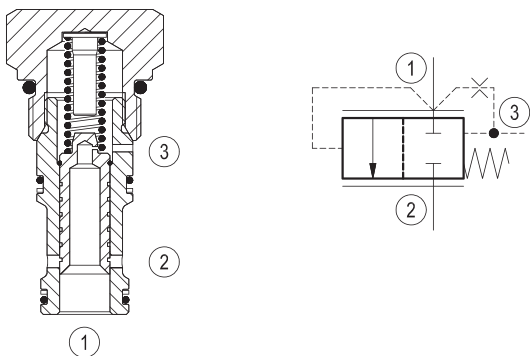
VLSP-10A

04.84.03 - X - 85 - Z



**Description**

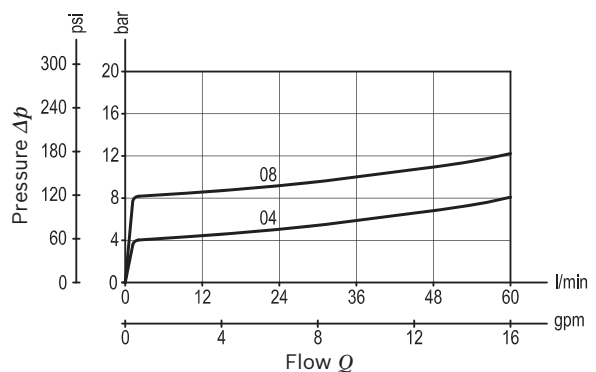
When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow flow from 1 to 2. The differential pressure between 1 and 3, across an internal orifice, is additive to the spring bias pressure. Note that flow, restricted by the internal orifice, can be transmitted from 3 to 1. The valve may be used in switching or compensation type applications.



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	60 l/min (16 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Standard internal orifice	0.6 mm
Weight <sup>2)</sup>	0.12 kg (0.27 lbs)
Cavity	CA-10A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG10A9010520100 material no: R901111367
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Standard version X=00 type
- 3) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.03</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow and pressure control, with internal pilot

Series O/A to L unchanged performances and dimensions

Version and options standard

**Adjustments**

- 00** Fixed setting
- 03** Leakproof hex. socket screw

**85** Common cavity, Size 10

		SPRINGS		
		Std. setting bar (psi)	Pressure increase bar/turn (psi/turn)	Bias spring bar (psi)
for X= 00	<b>04</b>	-	-	4 (60) ± 20%
	<b>08</b>	-	-	8 (115) ± 15%
for X= 03	<b>00</b>	4 (60)	1 (15)	2-8 (30-115)

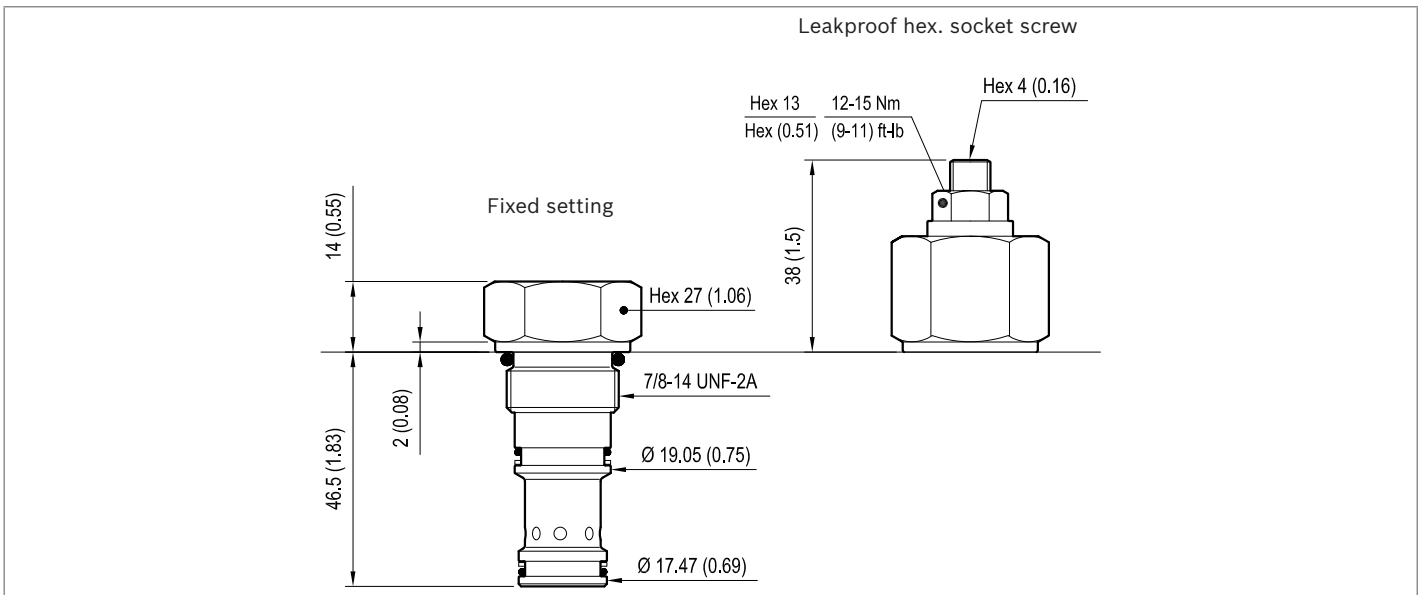
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
048403008504000	R901109373
048403008508000	R901109374
048403038500000	R901109375

Type	Material number

**Dimensions**



Logic element, flow and pressure control  
with internal pilot  
Common cavity, Size 12

VLSP-12A

04.84.03 - X - 57 - Z

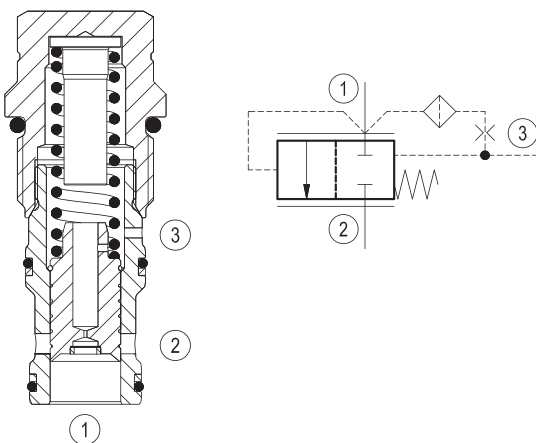


**Description**

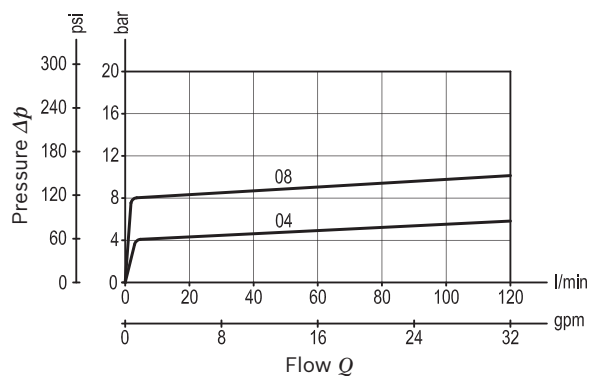
When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow flow from 1 to 2. The differential pressure between 1 and 3, across an internal orifice, is additive to the spring bias pressure. Note that flow, restricted by the internal orifice, can be transmitted from 3 to 1. The valve may be used in switching or compensation type applications.

Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min. (32 gpm)
Max. internal leakage <sup>1)</sup>	350 cm <sup>3</sup> /min. (21 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.25 kg (0.55 lbs)
Standard internal orifice	0.6 mm
Cavity	CA-12A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A9010520100 material no: R901111379
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.84.03</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow and pressure control with internal pilot

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Adjustments

**00** Fixed setting

SPRINGS	
<b>04</b>	4 (60) ± 20%
<b>08</b>	8 (115) ± 15%
<b>11</b>	11 (160) ± 15%

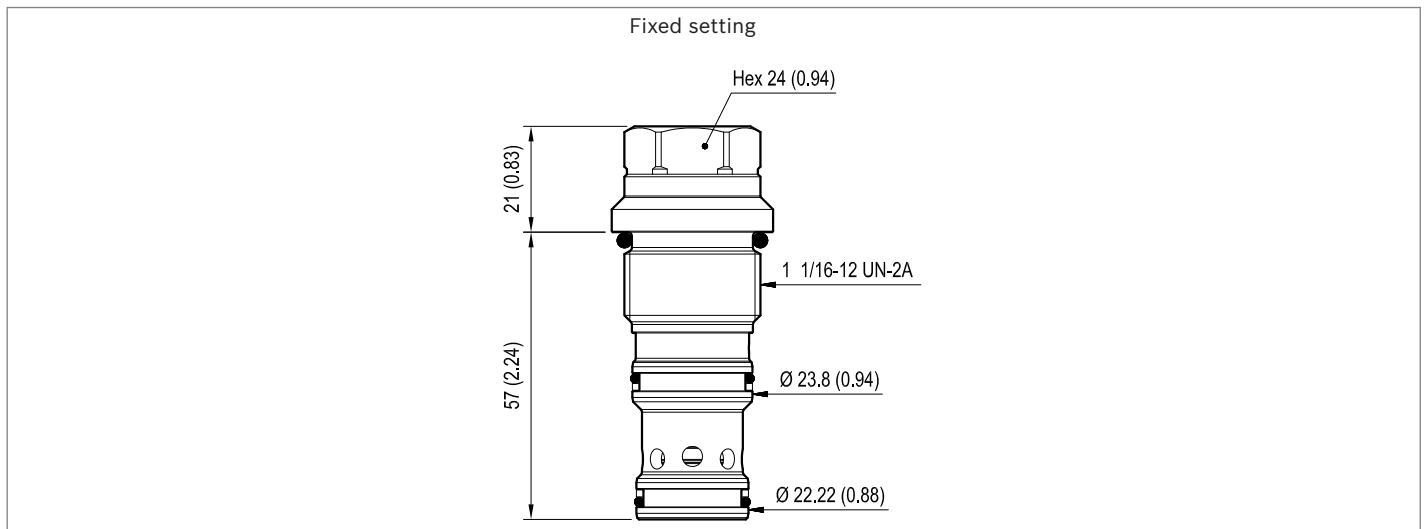
**57** Common cavity, Size 12

**Preferred types**

Type	Material number
048403005704000	R930001950
048403005708000	R930001952
048403005711000	R930006907

Type	Material number

**Dimensions**





Logic element, flow and pressure control  
with internal pilot  
Common cavity, Size 16

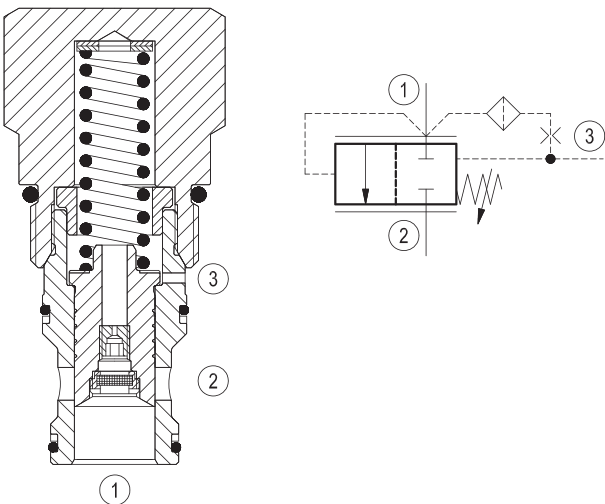
VLSP-16A

04.84.03 - X - 27 - Z



**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow flow from 1 to 2. The differential pressure between 1 and 3, across an internal orifice, is additive to the spring bias pressure. Note that flow, restricted by the internal orifice, can be transmitted from 3 to 1. The valve may be used in switching or compensation type applications.

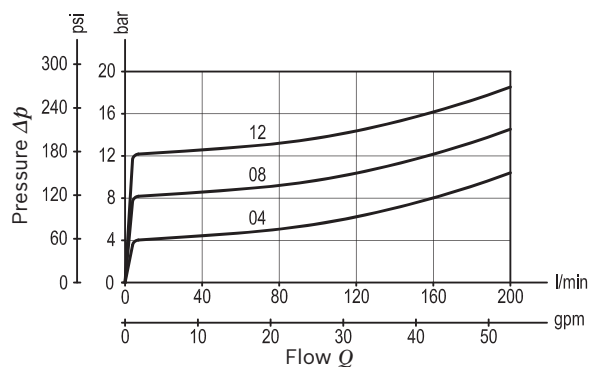


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Flow range	8 - 200 l/min (2 - 53 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Standard internal orifice	0.6 mm
Weight <sup>2)</sup>	0.35 kg (0.77 lbs)
Cavity	CA-16A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG16A9010520100 material no: R901111388
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Standard version X=00 type
- 3) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.03</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow and pressure control, with internal pilot

Series O/A to L unchanged performances and dimensions

Version and options standard

**Adjustments**

**00** Fixed setting

**03** Leakproof hex. socket screw

**27** Common cavity, Size 16

**SPRINGS**

		Std. setting bar (psi)	Pressure increase bar/turn (psi/turn)	Bias spring bar (psi)
for X= 00	<b>04</b>	-	-	4 (60) ± 20%
	<b>08</b>	-	-	8 (115) ± 15%
	<b>12</b>	-	-	12 (175) ± 10%
for X= 03	<b>00</b>	4 (60)	1.5 (22)	4-12 (60-175)

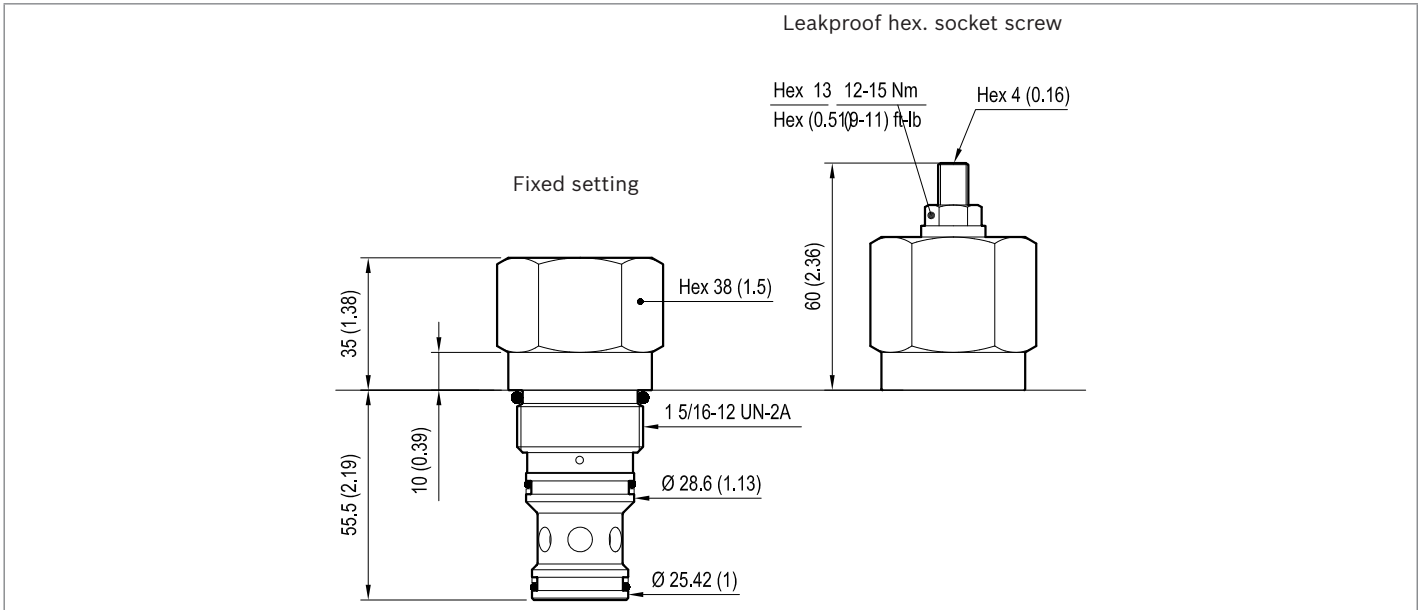
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
048403002704000	R901109868
048403002708000	R901109869
048403002712000	R901109870
048403032700000	R901109871

Type	Material number

**Dimensions**



Logic element, flow and pressure control  
with internal pilot  
Common cavity, Size 20

VLSP-20A

04.84.03 - X - 58 - Z



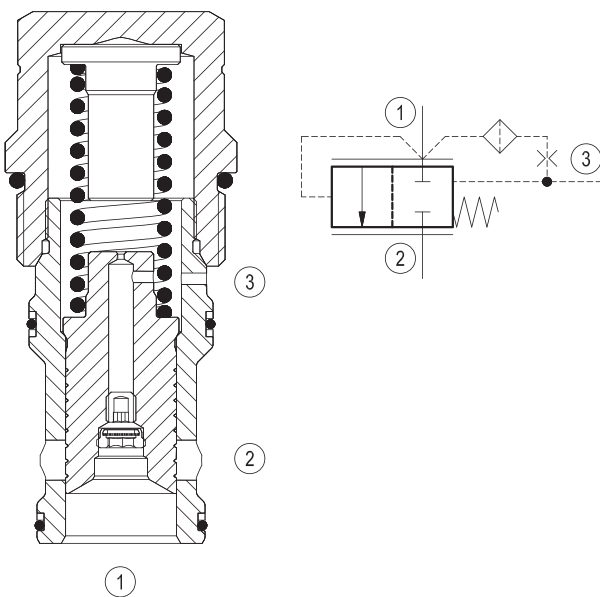
**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow flow from 1 to 2. The differential pressure between 1 and 3, across an internal orifice, is additive to the spring bias pressure. Note that flow, restricted by the internal orifice, can be transmitted from 3 to 1. The valve may be used in switching or compensation type applications.

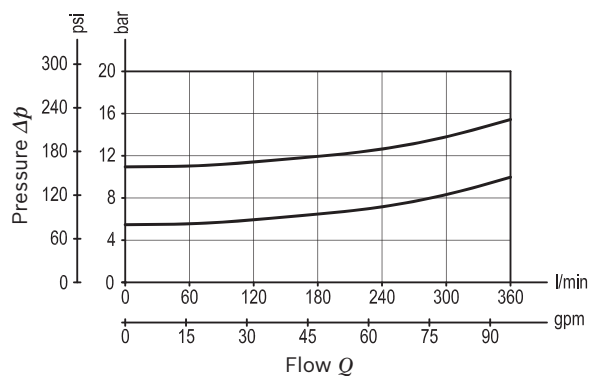
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. Flow	360 l/min. (95 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	128 - 149 Nm (95 - 110 ft-lbs)
Weight	0.8 kg (1.7 lbs)
Cavity	CA-20A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG20A9010530100 material no: R901111397
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.84.03</b>	<b>X</b>	<b>58</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow and pressure control with internal pilot

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Adjustments  
**00** Fixed setting

SPRINGS	
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11 (160) ± 15%

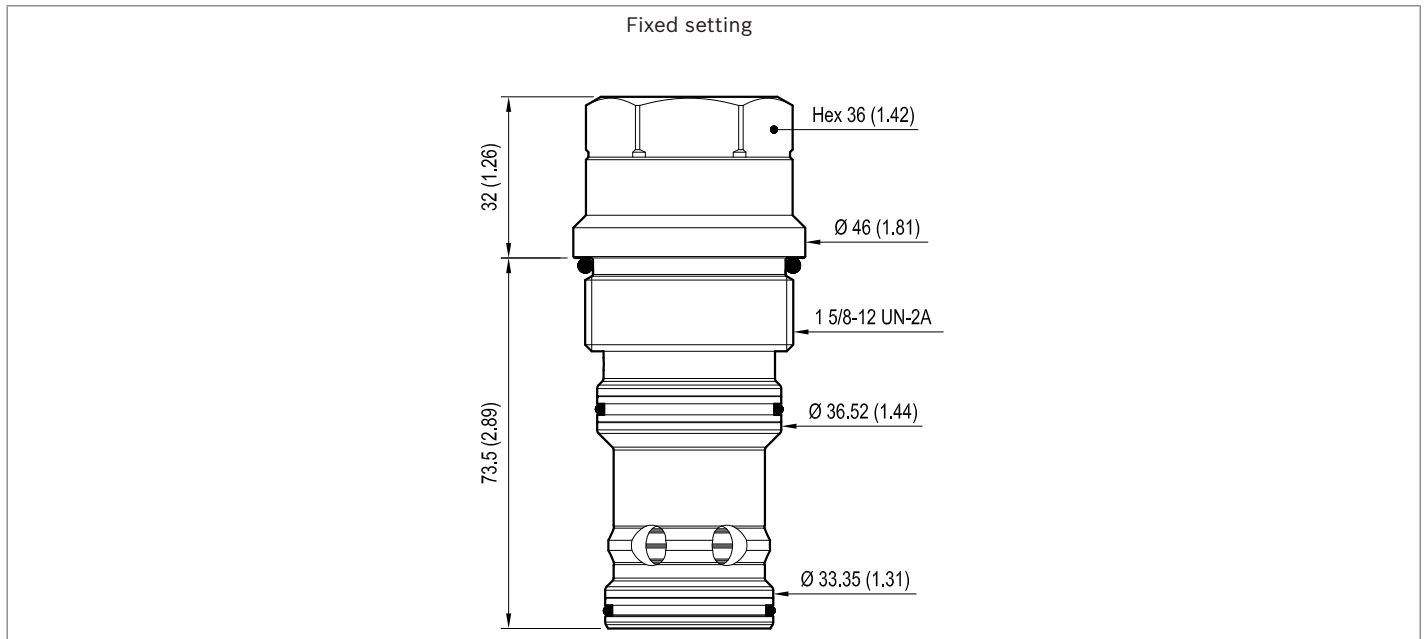
**58** Common cavity, Size 20

**Preferred types**

Type	Material number
048403005805000	R901109872
048403005811000	R901109873

Type	Material number

**Dimensions**



Logic element, flow control  
with external pilot  
Common cavity, Size 10

VLSC-10A

04.84.02 - X - 85 - Z

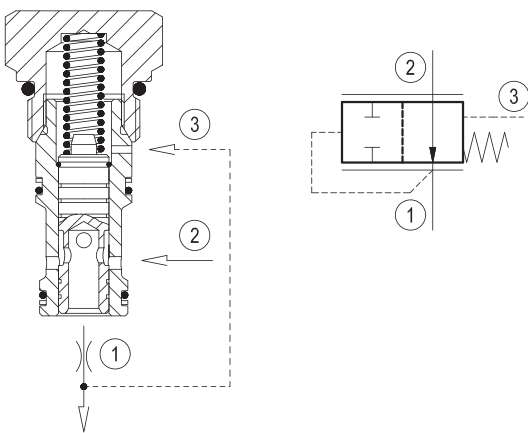


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. Flow	30 l/min (8 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight <sup>2)</sup>	0.12 kg (0.27 lbs)
Cavity	CA-10A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG10A9010520100 material no: R901111367
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

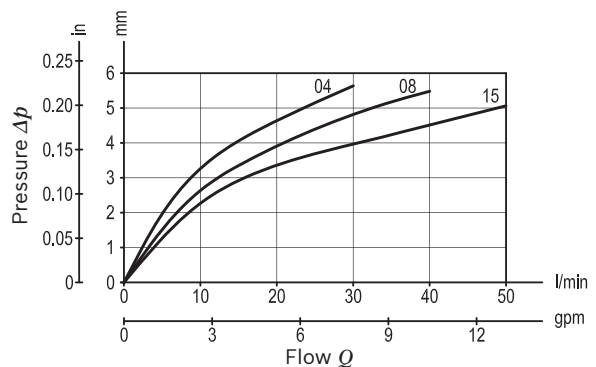
**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to block flow from 2 to 1. Pilot pressure at 3 is additive to the spring bias pressure. The valve may be used in switching or compensation type applications, and will maintain a constant pressure drop across a fixed (or variable) orifice downstream of 1 when installed and piloted per the diagram above.

- 1) Measured at 200 bar (2900 psi)
- 2) Standard version X=00 type
- 3) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.84.02</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow control with external pilot

Series 0/A to L unchanged performances and dimensions

Version and options standard

**Adjustments**

- 00** Fixed setting
- 03** Leakproof hex. socket screw

**85** Common cavity, Size 10

		SPRINGS		
		Std. setting bar (psi)	Pressure increase bar/turn (psi/turn)	Bias spring bar (psi)
for X= 00	<b>04</b>	-	-	4 (60) ± 20%
	<b>08</b>	-	-	8 (115) ± 15%
	<b>15</b>	-	-	15 (218) ± 15%
for X= 03	<b>00</b>	4 (60)	1 (15)	2-8 (30-115)

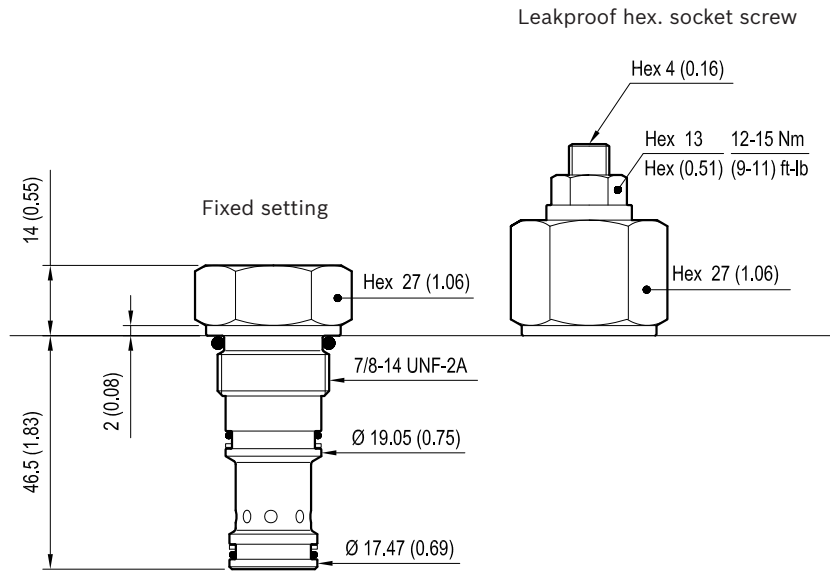
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
04840200850400A	R901109874
04840200850800A	R901109875
048402008515000	R930001018
04840203850000A	R901109876

Type	Material number

**Dimensions**



Logic element, flow control  
with external pilot, fixed setting, damped type  
Common cavity, Size 10

VLSC-10A-8-TF

04.84.12 - X - 85 - Z



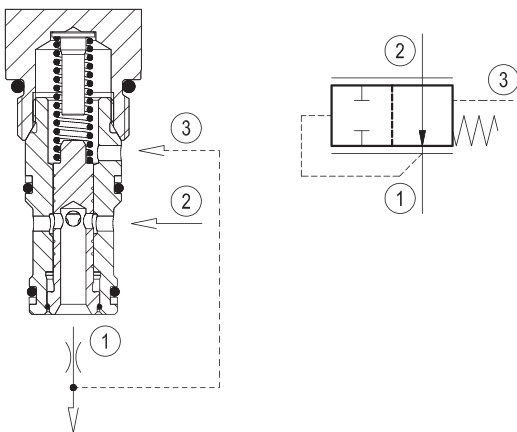
Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. Flow	25 l/min. (7 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.15 kg (0.33 lbs)
Cavity	CA-10A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A9010520100 material no: R901111367
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

**Description**

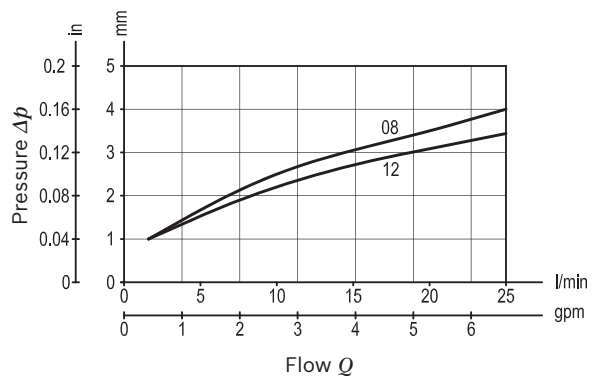
When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow block from 2 to 1. Pilot pressure at 3 is additive to the spring bias pressure. The valve may be used in switching or compensation type applications, and will maintain a constant pressure drop across a fixed (or variable) orifice downstream of 1 when installed and piloted per the diagram above.

VLSC-10A-8-TF is provided of a damped type spool, especially designed for demanding applications.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.84.12</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow control with external pilot, fixed setting, damped type

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**00** Fixed setting

**85** Common cavity, Size 10

**SPRINGS**

Bias spring  
bar (psi) ± 15%

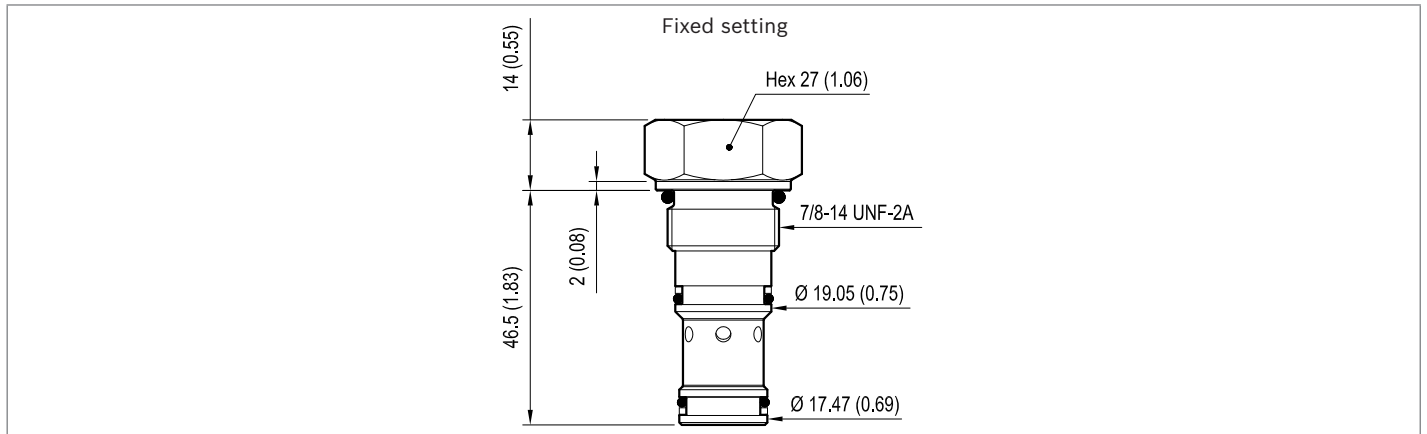
<b>08</b>	8 (115)
<b>12</b>	12 (175)

**Preferred types**

Type	Material number
048412008508000	R930000264
048412008512000	R930000281

Type	Material number

**Dimensions**





Logic element, flow control  
with external pilot  
Common cavity, Size 12

VLSC-12A

04.84.02 - X - 57 - Z

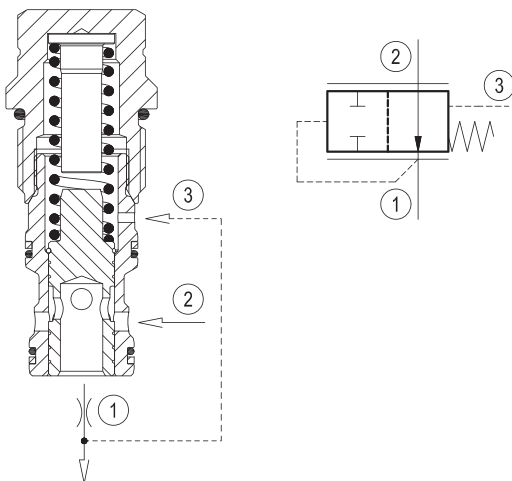


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. Flow	60 l/min (16 gpm)
Max. internal leakage <sup>1)</sup>	100 cm <sup>3</sup> /min. (6 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.23 kg (0.51 lbs)
Cavity	CA-12A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A9010520100 material no: R901111379
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

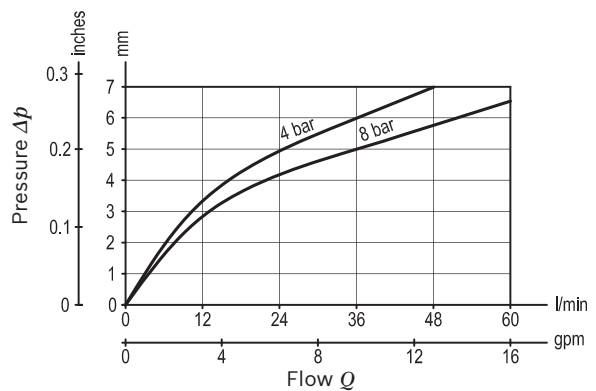
**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to block flow from 2 to 1. Pilot pressure at 3 is additive to the spring bias pressure. The valve may be used in switching or compensation type applications, and will maintain a constant pressure drop across a fixed (or variable) orifice downstream of 1 when installed and piloted per the diagram above.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.84.02</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow control with external pilot

Pilot ratio

**00** Fixed setting

**57** Common cavity, Size 12

Series O/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Bias spring bar (psi)
<b>04</b>	-	-	4 (60) ±20%
<b>08</b>	-	-	8 (115) ±15%

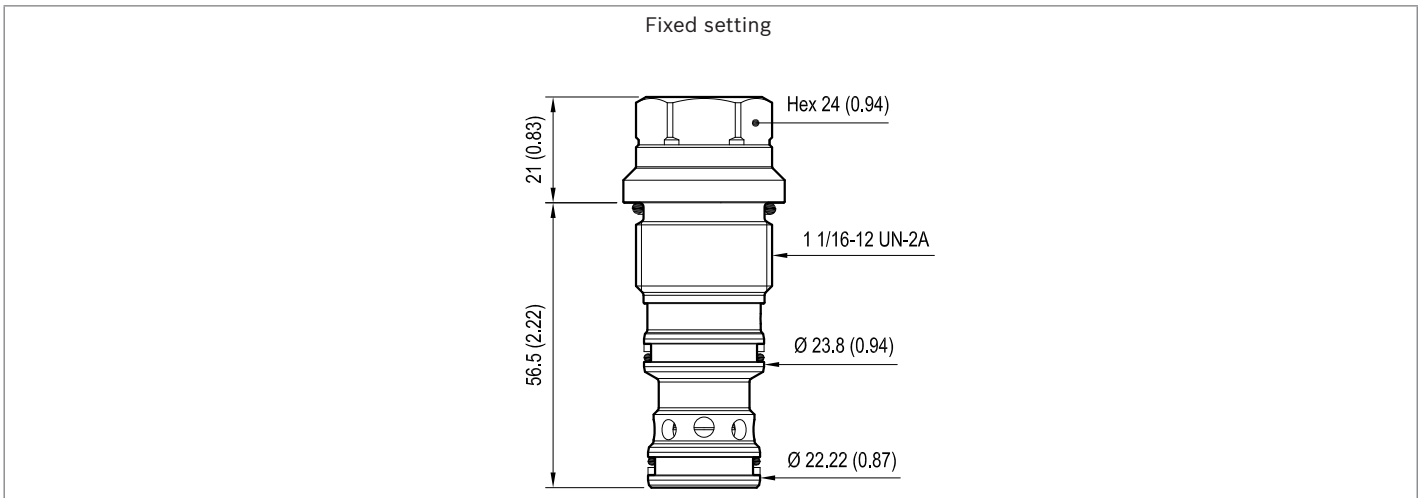
**Note:** Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
048402005704000	R930005759
048402005708000	R930005760

Type	Material number

**Dimensions**



Logic element, flow control  
with external pilot  
Common cavity, Size 16

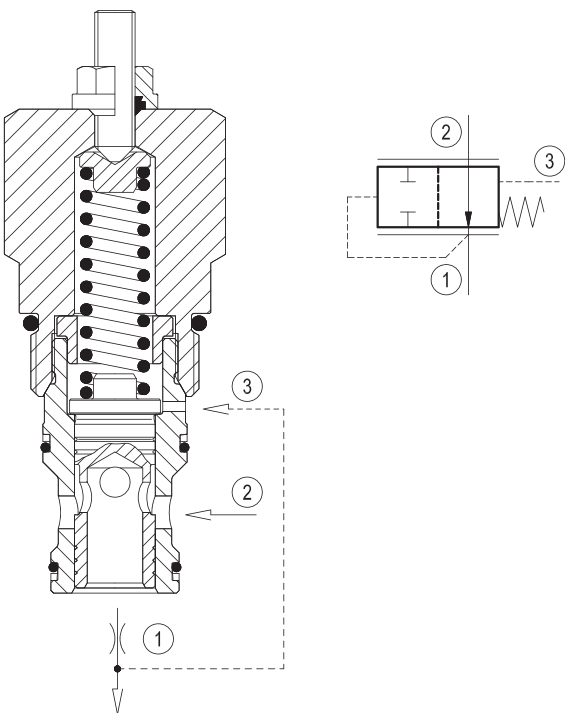
VLSC-16A

04.84.02 - X - 27 - Z



**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to block flow from 2 to 1. Pilot pressure at 3 is additive to the spring bias pressure. The valve may be used in switching or compensation type applications, and will maintain a constant pressure drop across a fixed (or variable) orifice downstream of 1 when installed and piloted per the diagram above.

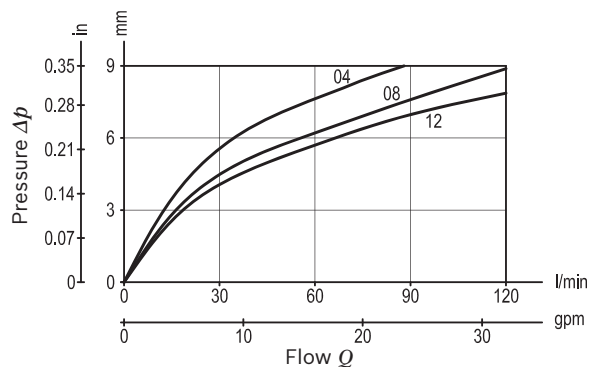


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. Flow	120 l/min (32 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight <sup>2)</sup>	0.35 kg (0.77 lbs)
Cavity	CA-16A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG16A9010520100 material no: R901111388
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Standard version X=00 type
- 3) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.02</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow control with external pilot

Series O/A to L unchanged performances and dimensions

Version and options standard

**Adjustments**

**00** Fixed setting

**03** Leakproof hex. socket screw

**27** Common cavity, Size 16

**SPRINGS**

		Std. setting bar (psi)	Pressure increase bar/turn (psi/turn)	Bias spring bar (psi)
for X=00	<b>04</b>	-	-	4.5 (65) ± 20%
	<b>08</b>	-	-	8 (115) ± 15%
	<b>12</b>	-	-	12.5 (180) ± 15%
for X=03	<b>00</b>	4 (60)	1.5 (22)	4-12.5 (60-180)

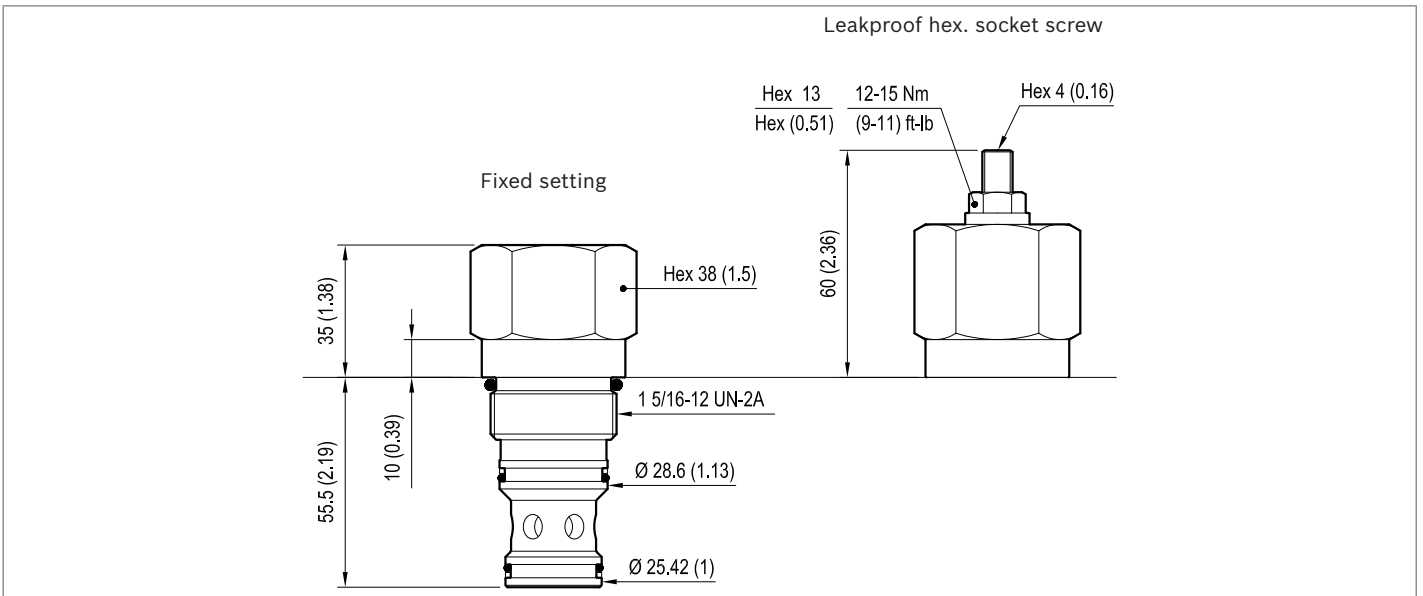
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
04840200270400A	R901109376
04840200270800A	R901109377
04840200271200A	R901077638
04840203270000A	R901109379

Type	Material number

**Dimensions**



Logic element, flow control  
with external pilot  
Common cavity, Size 20

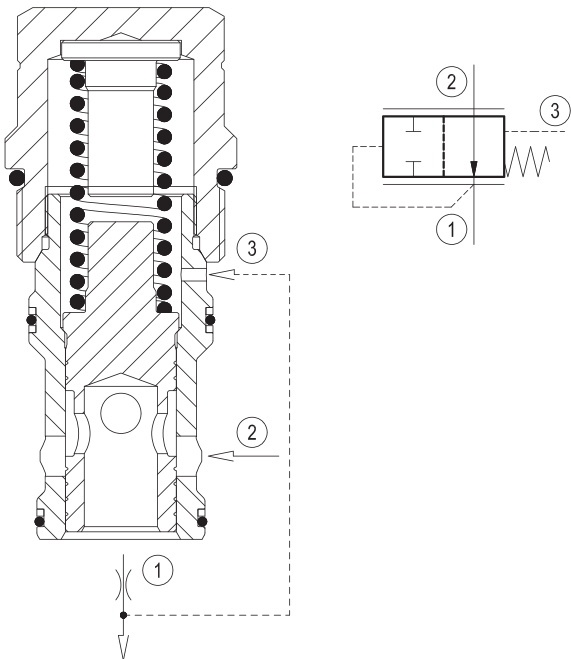
VLSC-20A

04.84.02 - X - 58 - Z



**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow block from 2 to 1. Pilot pressure at 3 is additive to the spring bias pressure. The valve may be used in switching or compensation type applications, and will maintain a constant pressure drop across a fixed (or variable) orifice downstream of 1 when installed and piloted per the diagram above.

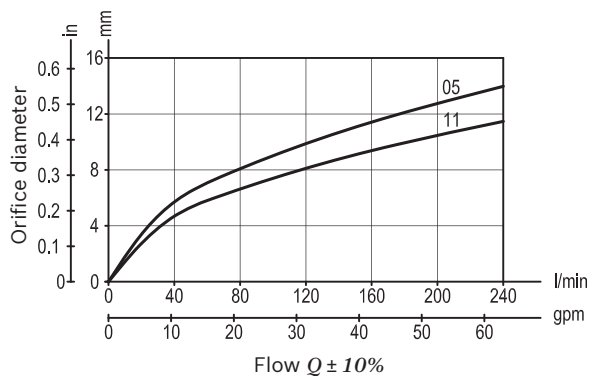


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. Flow	240 l/min. (63 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	128 - 149 Nm (95 - 110 ft-lbs)
Weight	0.65 kg (1.43 lbs)
Cavity	CA-20A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG20A9010530100 material no: R901111397
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.02</b>	<b>X</b>	<b>58</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, flow control with external pilot

Adjustments  
**00** Fixed setting

**58** Common cavity, Size 20

Series 0/A to L  
 unchanged performances and dimensions

Version and options standard

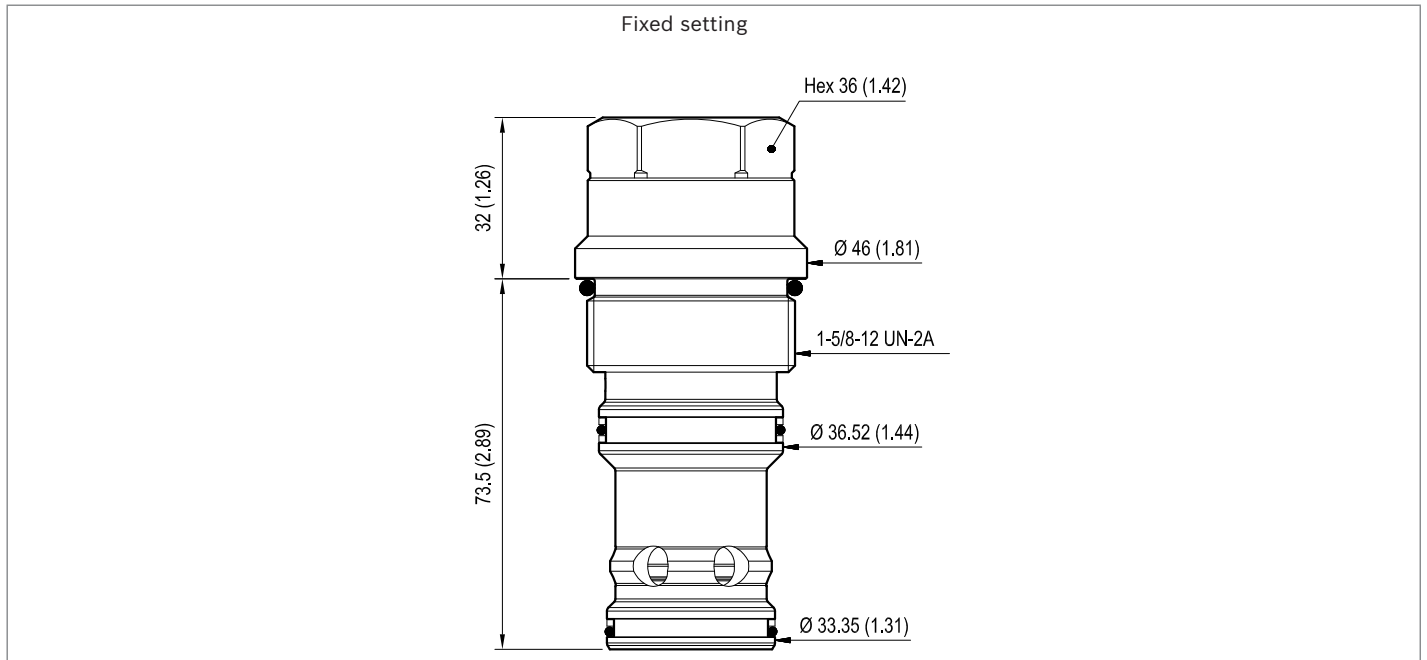
SPRINGS	
	Bias spring bar (psi)
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11 (160) ± 15%

**Preferred types**

Type	Material number
048402005805000	R930002631
048402005811000	R930002687

Type	Material number

**Dimensions**



Logic element, pressure control  
with internal pilot  
Common cavity, Size 10

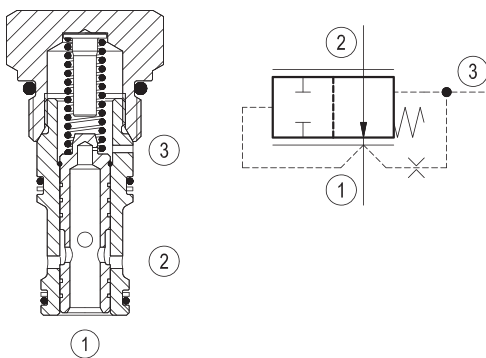
VLSR-10A

04.84.04 - X - 85 - Z



**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to block flow from 2 to 1. The differential pressure between 1 and 3, across an internal orifice, is additive to the spring bias pressure. Note that flow, restricted by the internal orifice, can be transmitted from 3 to 1 and 2. The valve may be used in switching or compensation type applications.

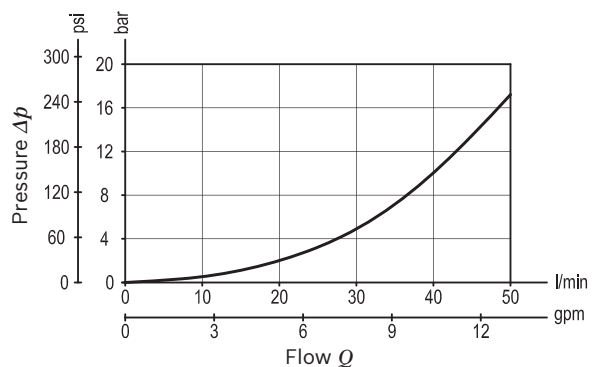


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. Flow	40 l/min. (11 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Standard internal orifice	0.6 mm
Weight <sup>2)</sup>	0.12 kg (0.27 lbs)
Cavity	CA-10A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG10A9010520100 material no: R901111367
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Standard version X=00 type
- 3) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.04</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure control with internal pilot

Series O/A to L unchanged performances and dimensions

Version and options standard

**Adjustments**

- 00** Fixed setting
- 03** Leakproof hex. socket screw

**85** Common cavity, Size 10

		SPRINGS		
		Std. setting bar (psi)	Pressure increase bar/turn (psi/turn)	Bias spring bar (psi)
for X= 00	<b>04</b>	-	-	4 (60) ± 20%
	<b>08</b>	-	-	8 (115) ± 15%
for X= 03	<b>00</b>	4 (60)	1 (15)	2-8 (30-115)

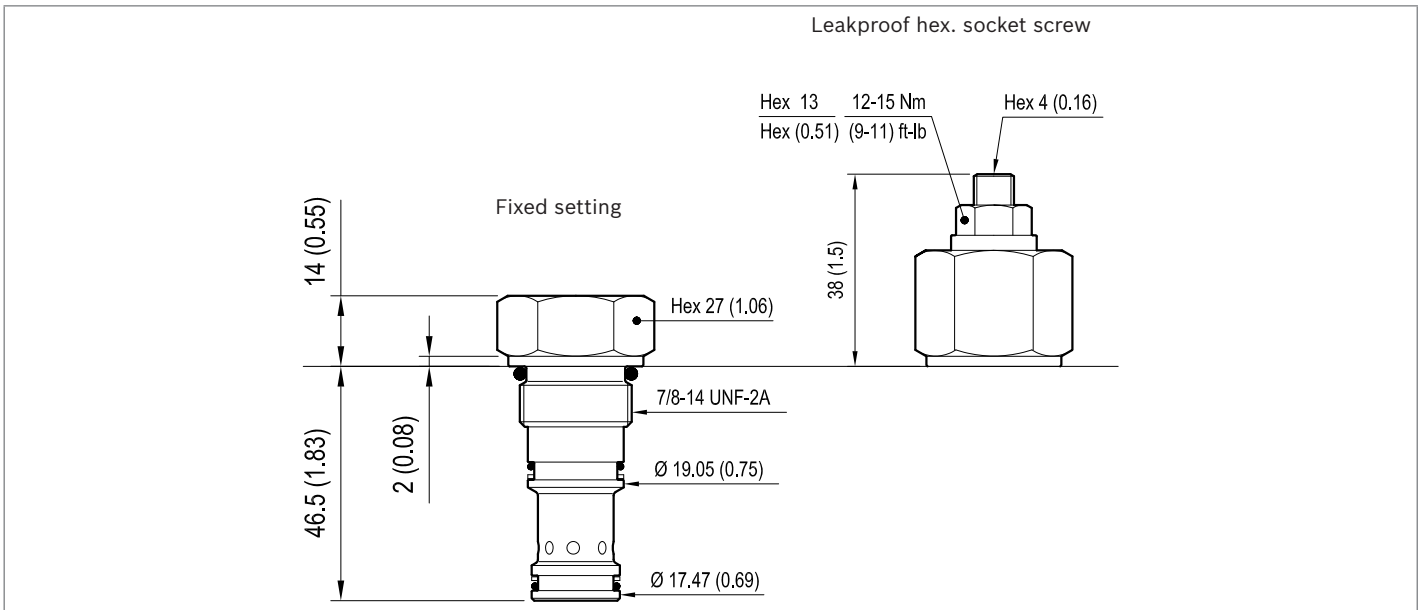
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
04840400850400A	R901109380
04840400850800A	R901109381
04840403850000A	R901109382

Type	Material number

**Dimensions**





Logic element, pressure control  
with internal pilot  
Common cavity, Size 12

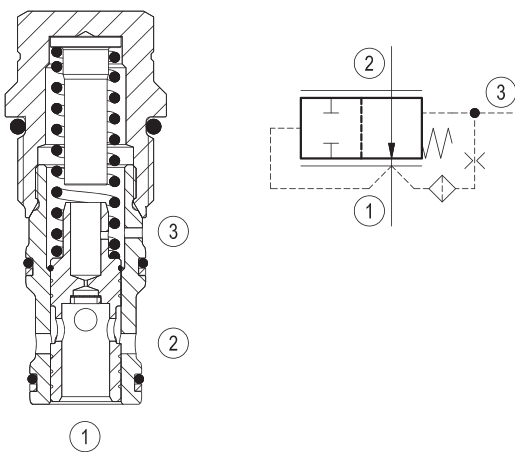
VLSR-12A

04.84.04 - X - 57 - Z



**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow block flow from 2 to 1. The differential pressure between 1 and 3, across an internal orifice, is additive to the spring bias pressure. Note that flow, restricted by the internal orifice, can be transmitted from 3 to 1 and 2. The valve may be used in switching or compensation type applications.



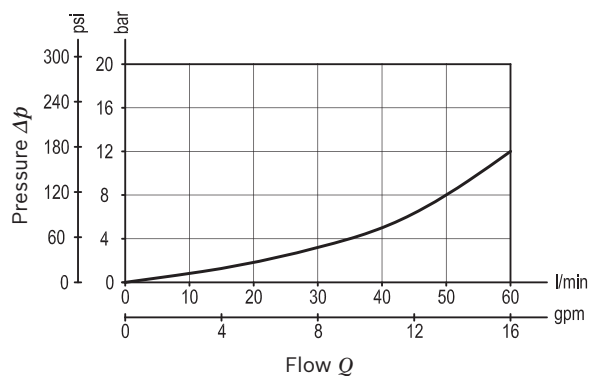
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. Flow	60 l/min. (16 gpm)
Max. internal leakage <sup>1)</sup>	100 cm <sup>3</sup> /min. (6 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.22 kg (0.49 lbs)
Standard internal orifice	0.6 mm
Cavity	CA-12A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A9010520100 material no: R901111379
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Measured at 200 bar (2900 psi)

2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.04</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure control with internal pilot

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**00** Fixed setting

SPRINGS	
Bias spring bar (psi)	
<b>04</b>	4 (60) ± 20%
<b>08</b>	8 (115) ± 15%

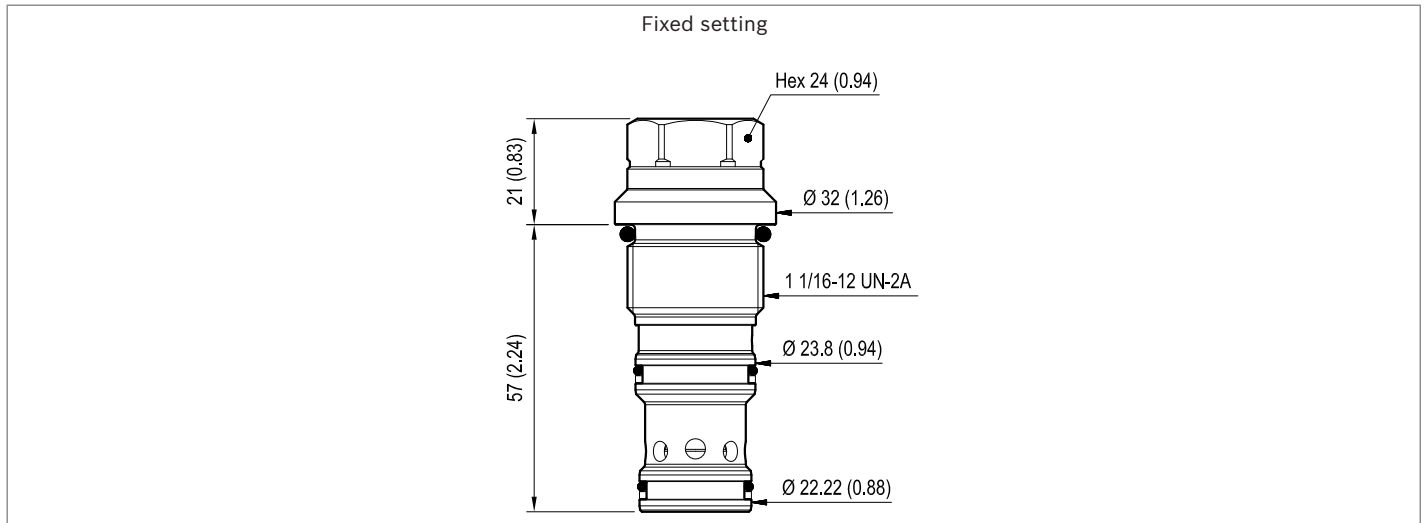
**57** Common cavity, Size 12

**Preferred types**

Type	Material number
048404005704000	R901191617
048404005708000	R901191615

Type	Material number

**Dimensions**



Logic element, pressure control  
with internal pilot  
Common cavity, Size 16

VLSR-16A

04.84.04 - X - 27 - Z

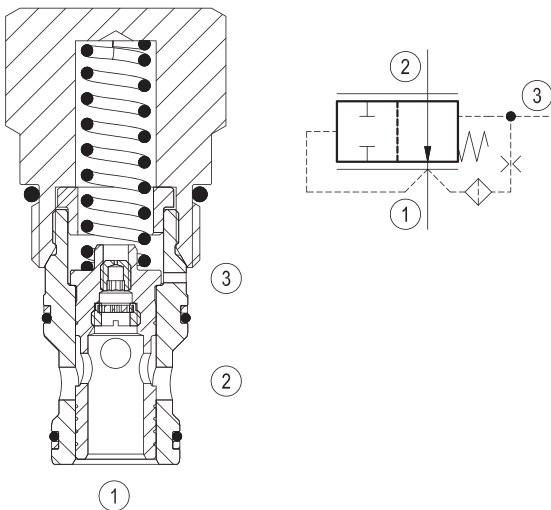


**Description**

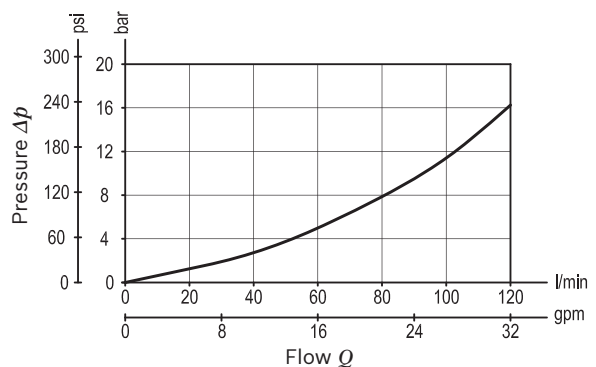
When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow block flow from 2 to 1. The differential pressure between 1 and 3, across an internal orifice, is additive to the spring bias pressure. Note that flow, restricted by the internal orifice, can be transmitted from 3 to 1 and 2. The valve may be used in switching or compensation type applications.

Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. Flow	120 l/min (32 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight <sup>2)</sup>	0.5 kg (1.1 lbs)
Standard internal orifice	0.6 mm
Cavity	CA-16A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>3)</sup>	Code: RG16A9010520100 material no: R901111388
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Standard version X=00 type
- 3) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.84.04</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure control with interal pilot

Series O/A to L unchanged performances and dimensions

Version and options standard

**Adjustments**

**00** Fixed setting

**03** Leakproof hex. socket screw

**27** Common cavity, Size 16

**SPRINGS**

		Std. setting bar (psi)	Pressure increase bar/turn (psi/turn)	Bias spring bar (psi)
for X=00	<b>04</b>	-	-	4 (60) ± 20%
	<b>08</b>	-	-	8 (115) ± 15%
	<b>12</b>	-	-	12 (175) ± 15%
for X=03	<b>00</b>	4 (60)	1.5 (22)	4-12 (60-175)

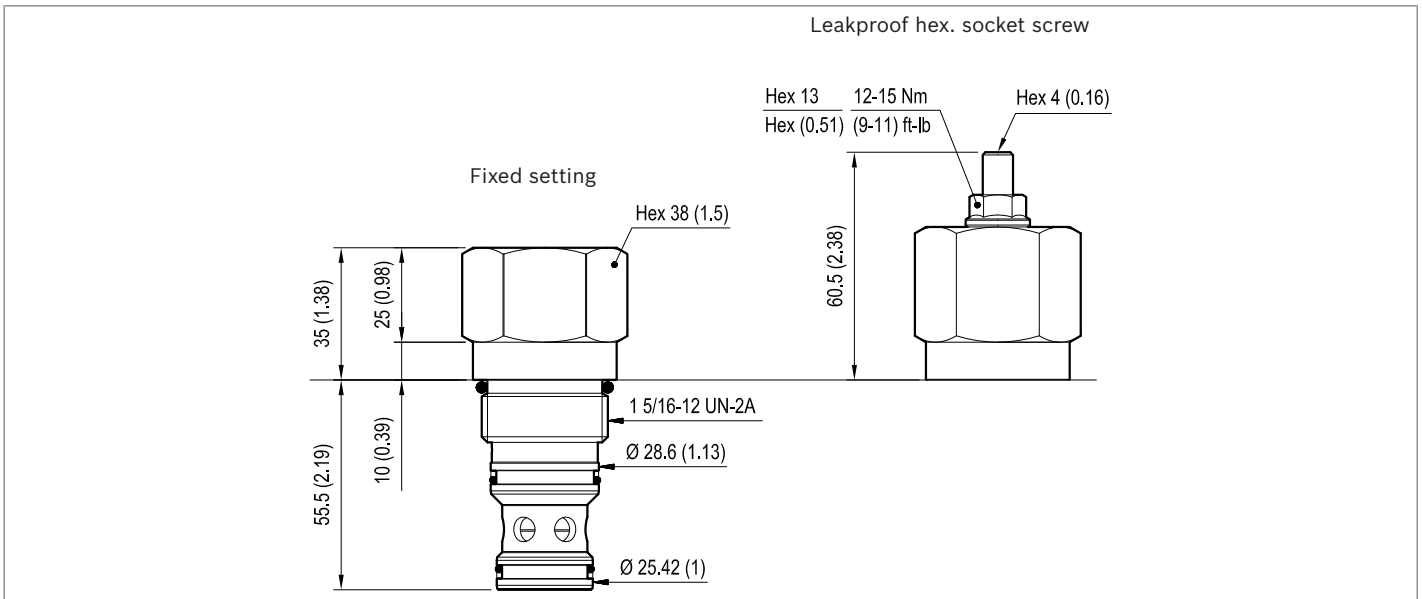
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
048404002704000	R930002688
048404002708000	R930002691
048404002712000	R930002692
048404032700000	R930002784

Type	Material number

**Dimensions**



Logic element, pressure control  
with internal pilot  
Common cavity, Size 20

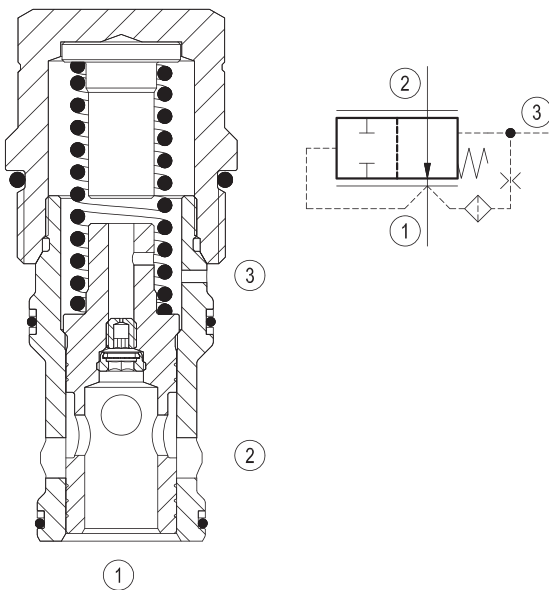
VLSR-20A

04.84.04 - X - 58 - Z



**Description**

When pressure at 1 rises above the selected spring bias pressure against the spool, the valve shifts to allow block flow from 2 to 1. The differential pressure between 1 and 3, across an internal orifice, is additive to the spring bias pressure. Note that flow, restricted by the internal orifice, can be transmitted from 3 to 1 and 2. The valve may be used in switching or compensation type applications.

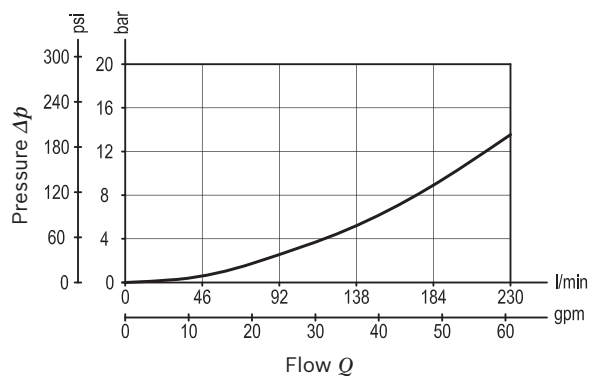


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. Flow	230 l/min. (61 gpm)
Max. internal leakage <sup>1)</sup>	75 cm <sup>3</sup> /min. (5 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	128 - 149 Nm (95 - 110 ft-lbs)
Weight	0.6 kg (1.32 lbs)
Standard internal orifice	0.6 mm
Cavity	CA-20A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG20A9010530100 material no: R901111397
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.04</b>	<b>X</b>	<b>58</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure control with internal pilot

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**00** Fixed setting

SPRINGS	
Bias spring bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11 (160) ± 15%

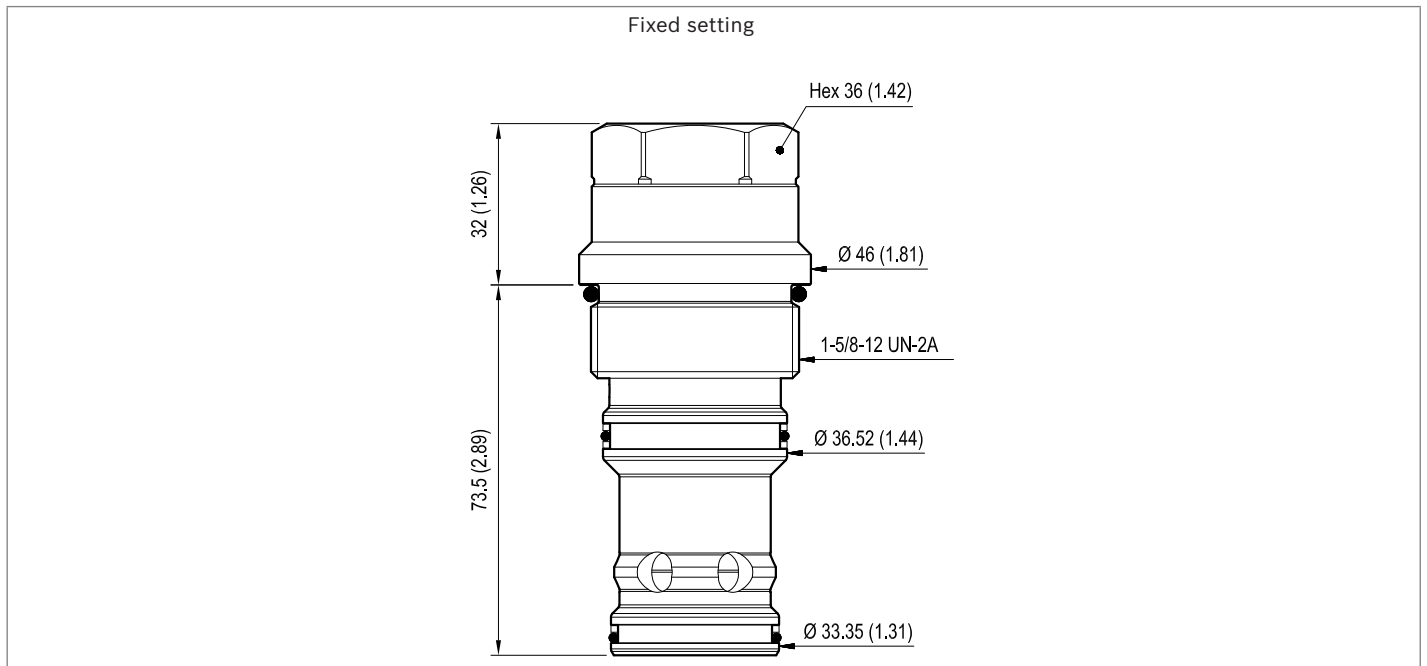
**58** Common cavity, Size 20

**Preferred types**

Type	Material number
048404005805000	R901195553
048404005811000	R930002786

Type	Material number

**Dimensions**



# Logic element, pressure compensator

## Common cavity, Size 10

VLSQ-10A

04.84.05 - X - 85 - Z

1

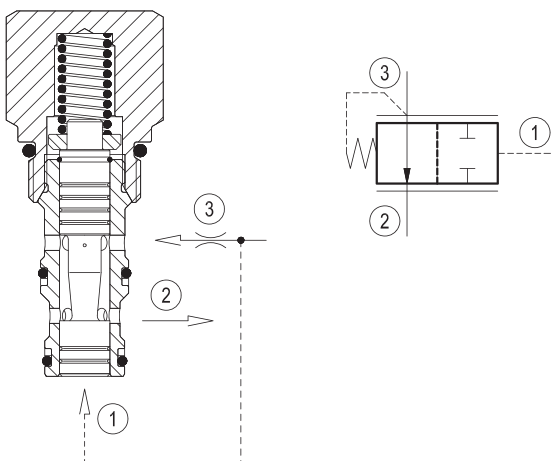


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. Flow	40 l/min. (11 gpm)
Flow maintenance	± 10%
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.13 kg (0.29 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

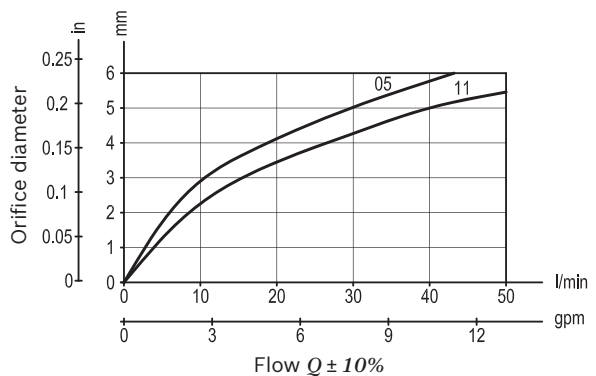
### Description

Flow is normally allowed from 3 to 2. When pilot pressure at 1 rises above the combined pressure of the spring bias, plus pressure at 3, the valve shifts to block flow. The valve may be used in switching or compensation type applications, and will maintain a constant pressure drop across a fixed (or variable) orifice upstream of 3 when installed and piloted per the diagram above.

1) Only external seals for 10 valves



### Characteristic curve



**Ordering code**

<b>04.84.05</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure compensator

Adjustments

**00** Fixed setting

**85** Common cavity, Size 10

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

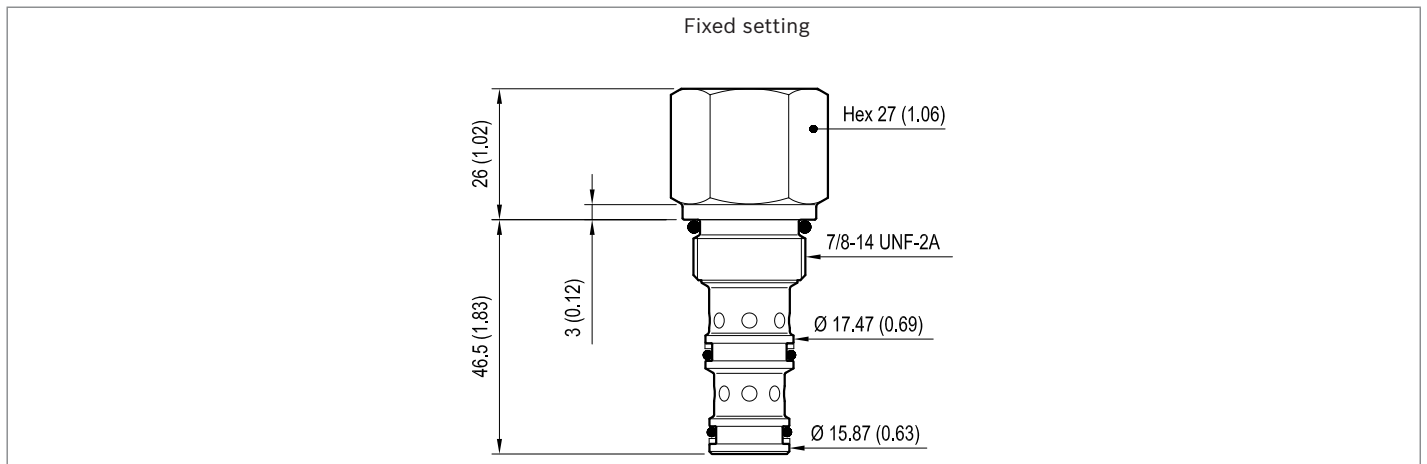
SPRINGS	
Bias spring bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11.5 (167) ± 15%

**Preferred types**

Type	Material number
048405008505000	R901109383
048405008511000	R901109384

Type	Material number

**Dimensions**





# Logic element, pressure compensator

## Common cavity, Size 12

VLSQ-12A

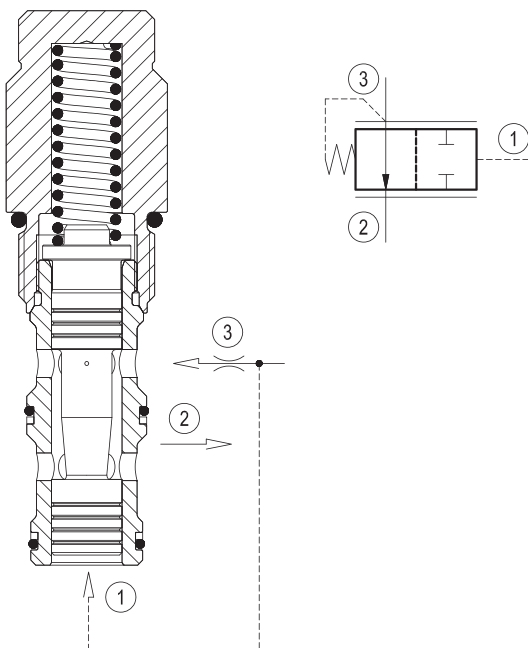
04.84.05 - X - 57 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. Flow	70 l/min. (18 gpm)
Flow maintenance	± 10%
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.4 kg (0.88 lbs)
Cavity	CA-12A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A3010520100 material no: R930000941
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

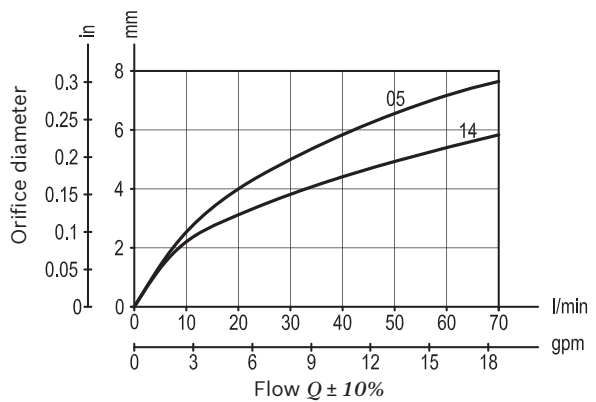
### Description

Flow is normally allowed from 3 to 2. When pilot pressure at 1 rises above the combined pressure of the spring bias, plus pressure at 3, the valve shifts to block flow. The valve may be used in switching or compensation type applications, and will maintain a constant pressure drop across a fixed (or variable) orifice upstream of 3 when installed and piloted per the diagram above.



1) Only external seals for 10 valves

### Characteristic curve



**Ordering code**

<b>04.84.05</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure compensator

Adjustments

**00** Fixed setting

**57** Common cavity, Size 12

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

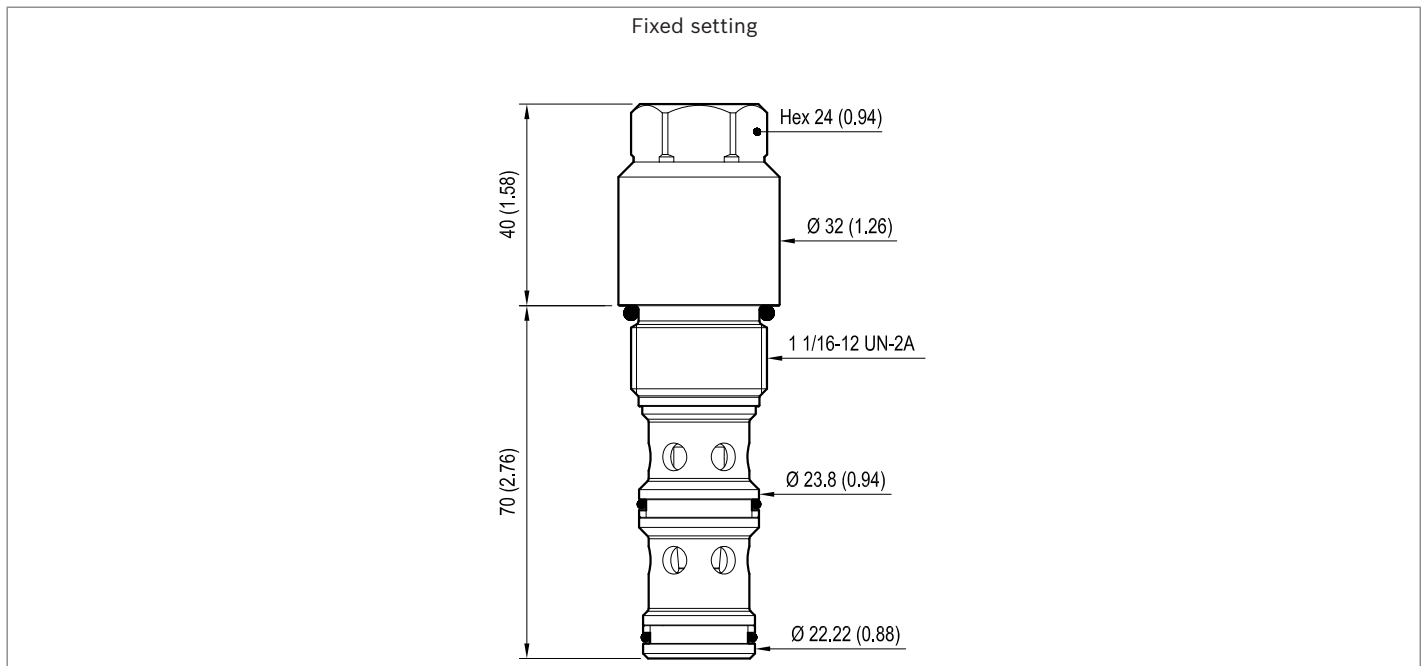
SPRINGS	
Bias spring bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>14</b>	14 (203) ± 15%

**Preferred types**

Type	Material number
04840500570500A	R901109877
048405005714000	R930005661

Type	Material number

**Dimensions**



# Logic element, pressure compensator

## Common cavity, Size 16

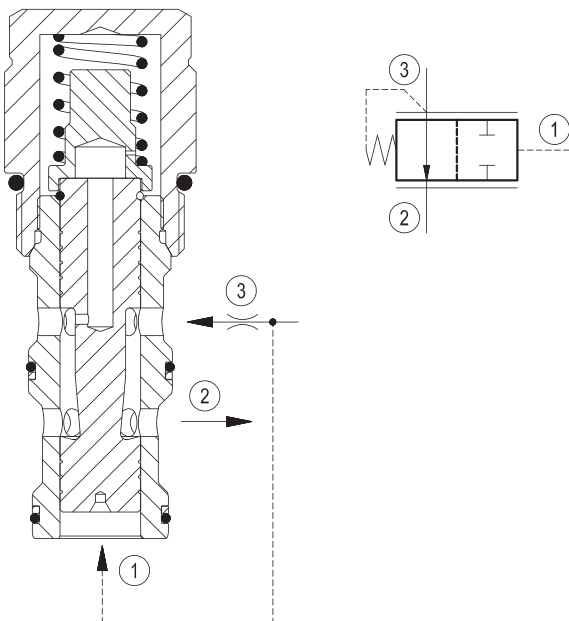
VLSQ-16A

04.84.05 - X - 27 - Z



### Description

Flow is normally allowed from 3 to 2. When pilot pressure at 1 rises above the combined pressure of the spring bias, plus pressure at 3, the valve shifts to block flow. The valve may be used in switching or compensation type applications, and will maintain a constant pressure drop across a fixed (or variable) orifice upstream of 3 when installed and piloted per the diagram above.

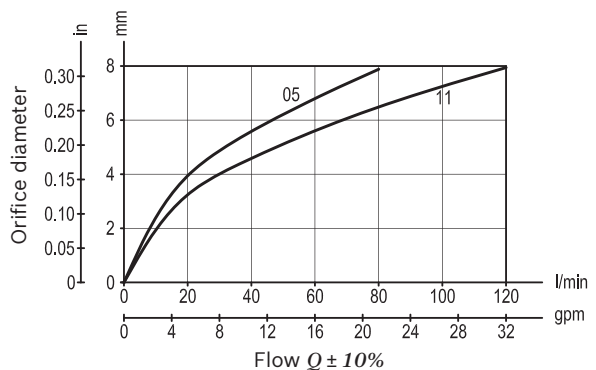


### Technical data

Max. operating pressure	350 bar (5000 psi)
Max. flow for Z=05	80 l/min. (21 gpm)
Max. flow for Z=11	120 l/min. (32 gpm)
Flow maintenance	± 20% (Z=05); ± 10% (Z=11)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.4 kg (0.88 lbs)
Cavity	CA-16A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG16A3010520100 material no: R930001177
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves

### Characteristic curve



**Ordering code**

<b>04.84.05</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure compensator

Adjustments

**00** Fixed setting

**27** Common cavity, Size 16

Series O/A to L  
unchanged performances and dimensions

Version and options standard

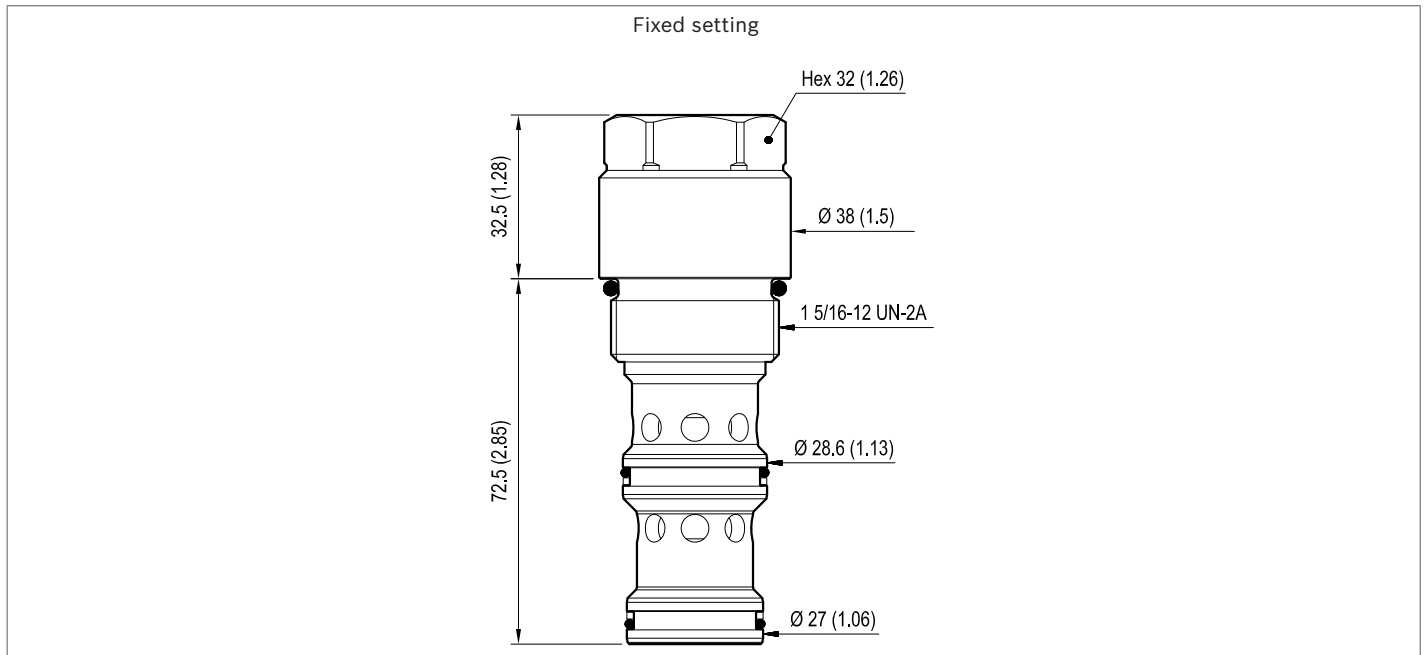
SPRINGS	
Bias spring bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11 (160) ± 15%

**Preferred types**

Type	Material number
048405002705000	R930000887
048405002711000	R930006102

Type	Material number

**Dimensions**



Logic element, pressure compensator  
combination type  
Common cavity, Size 10

VCSQ-10A

04.84.06 - X - 85 - Z

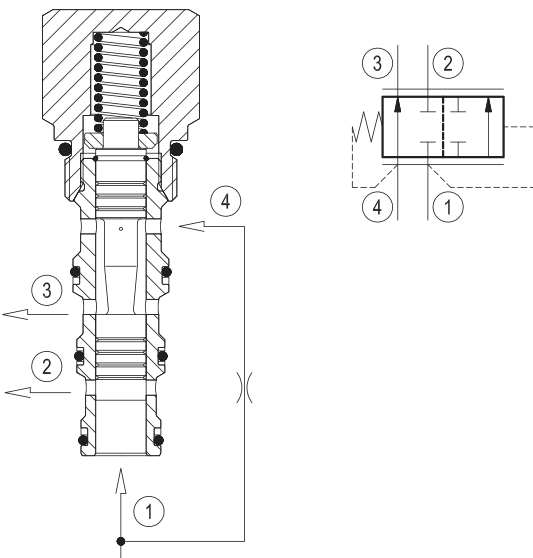


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. inlet flow	60 l/min. (16 gpm)
Max. priority flow	40 l/min. (11 gpm)
Flow maintenance	± 10%
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.14 kg (0.31 lbs)
Cavity	CA-10A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A4010530100 material no: R901111373
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

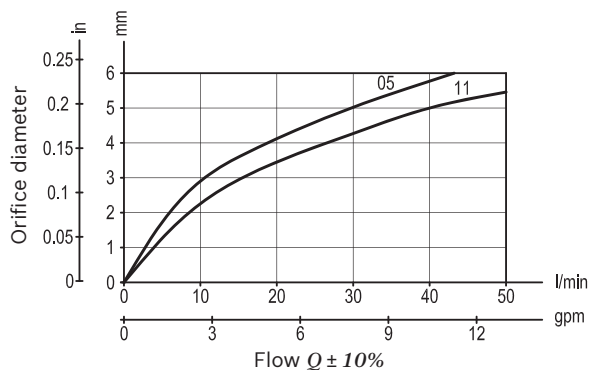
**Description**

Flow is normally allowed from 4 to 3. When pilot pressure at 1 rises above the combined pressure of the spring bias, plus pressure at 4, the valve shifts to block flow between 3 and 4, while diverting flow from 1 to 2. A constant pressure drop is maintained across a fixed (or variable) orifice upstream of 4 when installed and piloted per the diagram above. In this case, flow priority is given to 3, with flow in excess of the orifice differential requirement being by-passed to 2.

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.84.06</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure compensator combination type

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Adjustments

**00** Fixed setting

SPRINGS	
Bias spring bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11.5 (167) ± 15%

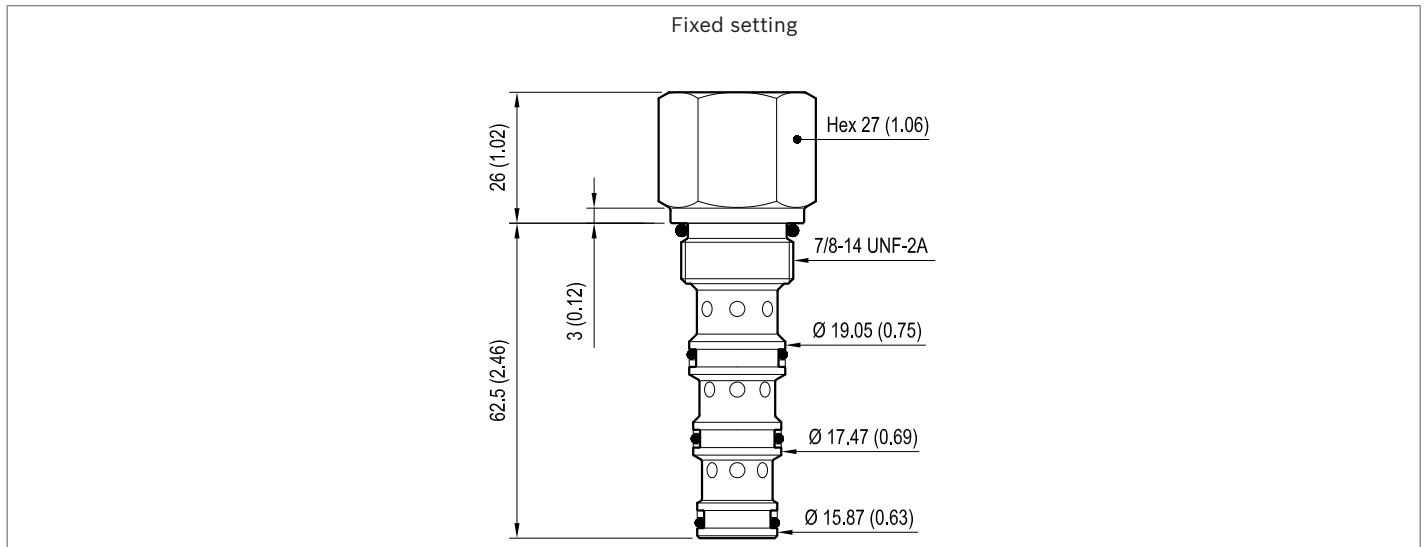
**85** Common cavity, Size 10

**Preferred types**

Type	Material number
048406008505000	R901109385
048406008511000	R901109386

Type	Material number

**Dimensions**



Logic element, pressure compensator  
combination type  
Common cavity, Size 12

VCSQ-12A

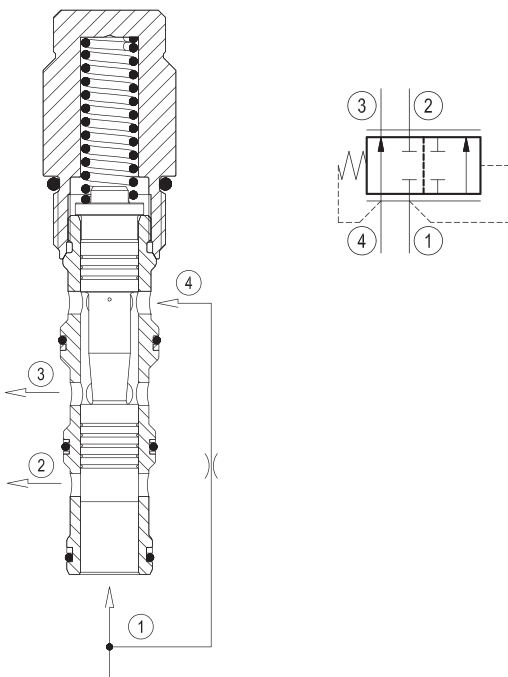
04.84.06 - X - 57 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. inlet flow	120 l/min. (32 gpm)
Max. priority flow	80 l/min. (21 gpm)
Flow maintenance	± 10%
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.3 kg (0.66 lbs)
Cavity	CA-12A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A4010530100 material no: R930001660
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

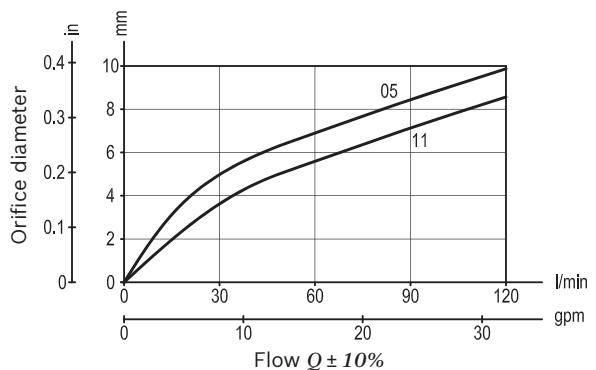
**Description**

Flow is normally allowed from 4 to 3. When pilot pressure at 1 rises above the combined pressure of the spring bias, plus pressure at 4, the valve shifts to block flow between 3 and 4, while diverting flow from 1 to 2. A constant pressure drop is maintained across a fixed (or variable) orifice upstream of 4 when installed and piloted per the diagram above. In this case, flow priority is given to 3, with flow in excess of the orifice differential requirement being by-passed to 2.



1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.06</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure compensator combination type

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Adjustments

**00** Fixed setting

SPRINGS	
	Bias spring bar (psi)
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	10.5 (152) ± 15%

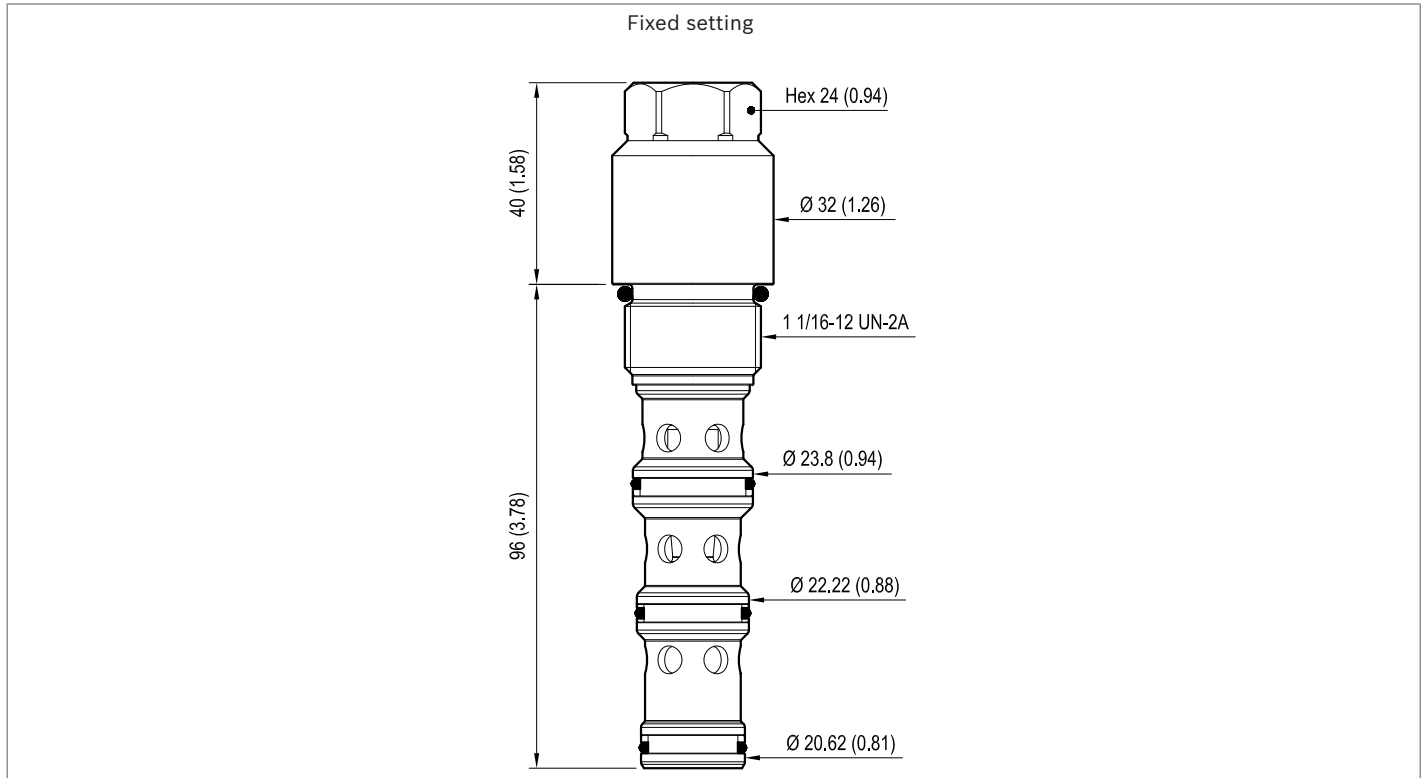
**57** Common cavity, Size 12

**Preferred types**

Type	Material number
048406005705000	R901109889
048406005711000	R930001073

Type	Material number

**Dimensions**





Logic element, pressure compensator  
combination type  
Common cavity, Size 16

VCSQ-16A

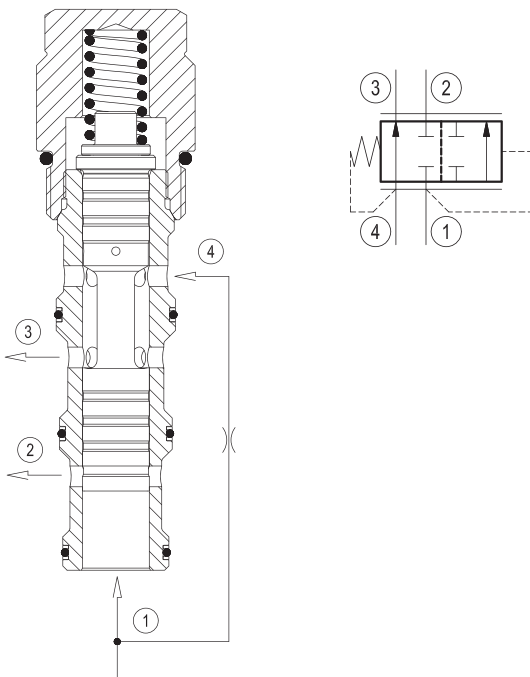
04.84.06 - X - 27 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	200 l/min. (53 gpm)
Max. priority flow	120 l/min. (32 gpm)
Flow maintenance	± 10%
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.75 kg (1.65 lbs)
Cavity	CA-16A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG16A4010530100 material no: R930000973
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

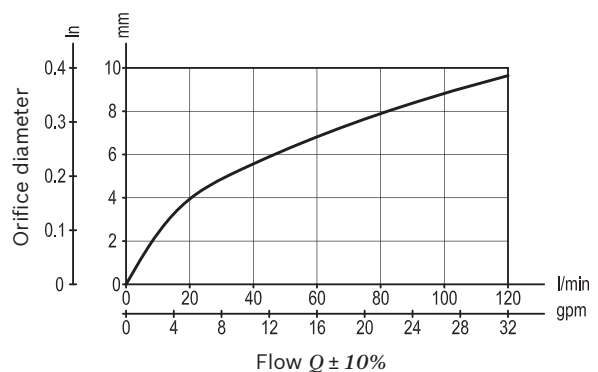
**Description**

Flow is normally allowed from 4 to 3. When pilot pressure at 1 rises above the combined pressure of the spring bias, plus pressure at 4, the valve shifts to block flow between 3 and 4, while diverting flow from 1 to 2. A constant pressure drop is maintained across a fixed (or variable) orifice upstream of 4 when installed and piloted per the diagram above. In this case, flow priority is given to 3, with flow in excess of the orifice differential requirement being by-passed to 2.



1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.06</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure compensator combination type

Series 0/A to L unchanged performances and dimensions

Version and options standard

Adjustments

**00** Fixed setting

**27** Common cavity, Size 16

**SPRINGS**

Bias spring bar (psi)

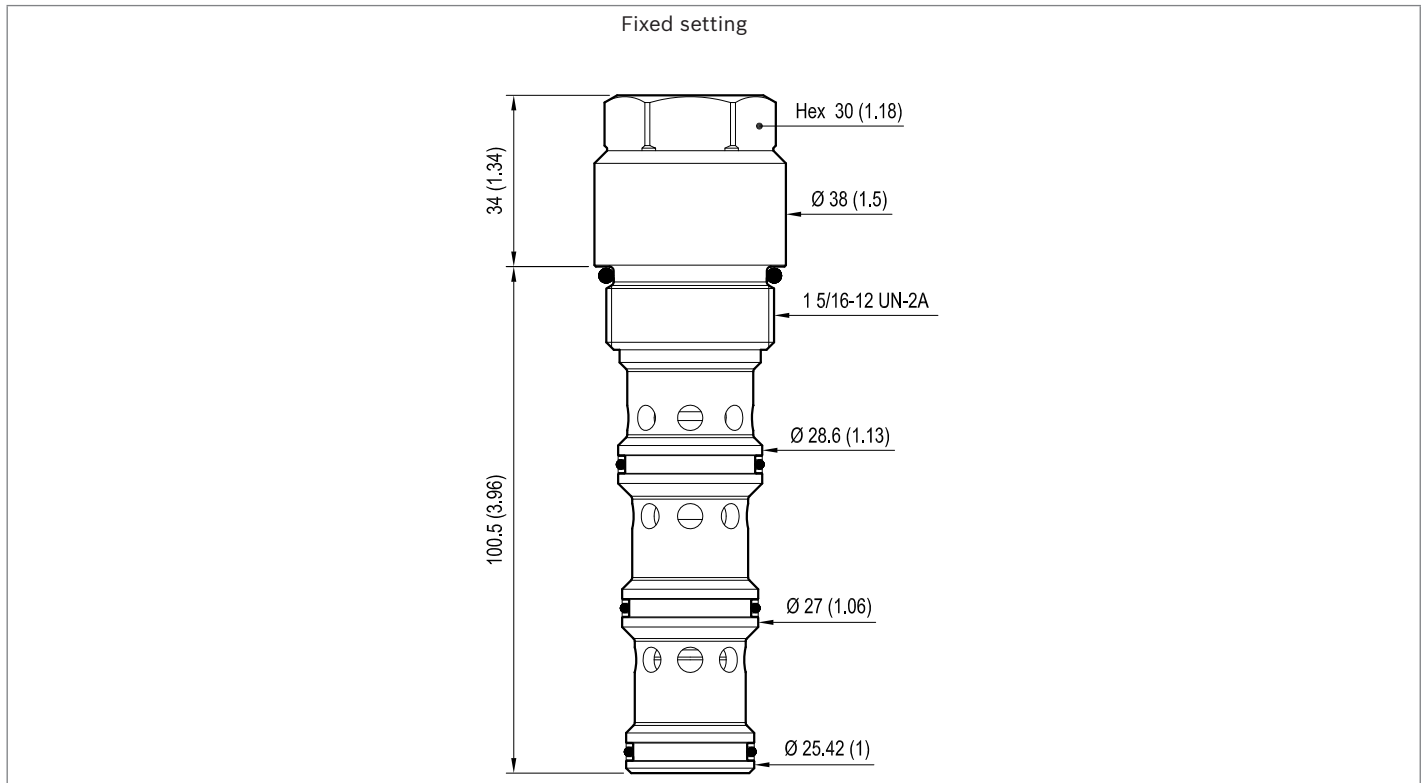
**06** 6 (90) ± 20%

**Preferred types**

Type	Material number
048406002706000	R901162013

Type	Material number

**Dimensions**



Logic element, pressure compensator  
with static load sense  
Common cavity, Size 10

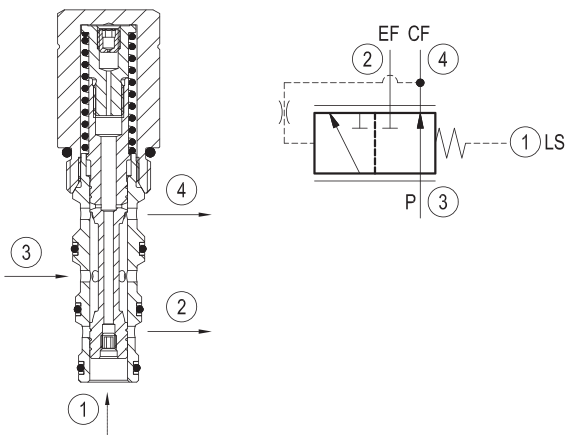
VRLA-10A-S

04.84.09.00.85 - Z



**Description**

The valve delivers priority flow, from 0 to max. available, on demand to port 4, while compensating for load changes downstream. In neutral, all input flow at 3 is given to the priority port 4. Pressure at 4 is applied to the spool against a spring force so that increasing pressure causes increasing by-pass of input flow to port 2. Load sense pressure at port 1, obtained between the downstream control and the load, assists the spring, and moves the spool back toward supplying priority flow. Comparison between priority outlet and LS pressure seeks a constant differential pressure over the control valve. As load and flow control change, the priority flow is increased or decreased to satisfy the demand establishing that differential.

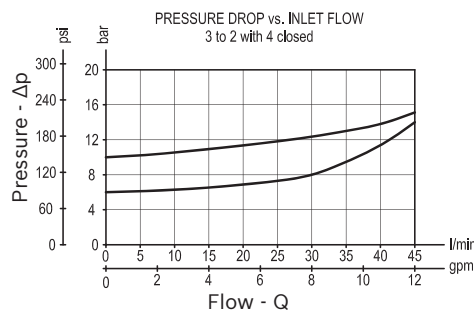
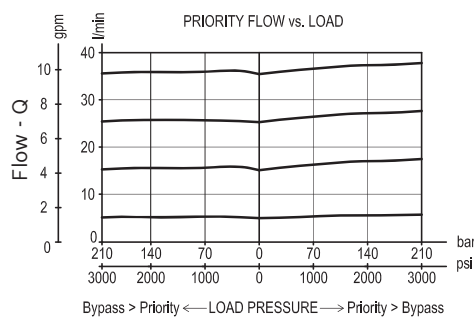


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. inlet flow	45 l/min. (12 gpm)
Max. priority flow	30 l/min. (8 gpm) for Z=05 version 40 l/min. (11 gpm) for Z=10 version
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.22 kg (0.49 lbs)
Cavity	CA-10A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A4010530100 material no: R901111373
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.09.00</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Logic element, pressure compensator with static load sense

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**85** Common cavity, Size 10

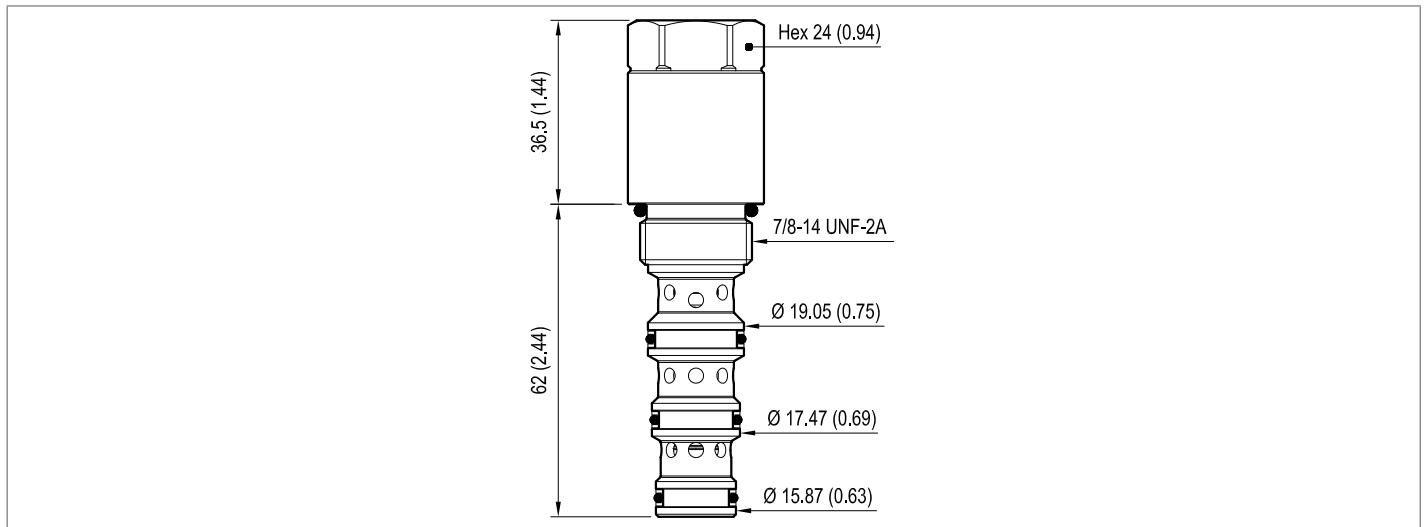
SPRINGS	
	Bias spring bar (psi)
<b>05</b>	5.5 (80) ± 20%
<b>10</b>	10 (145) ± 15%

**Preferred types**

Type	Material number
048409008505000	R930001191
048409008510000	R930001192

Type	Material number

**Dimensions**



Logic element, pressure compensator  
with static load sense  
Common cavity, Size 12

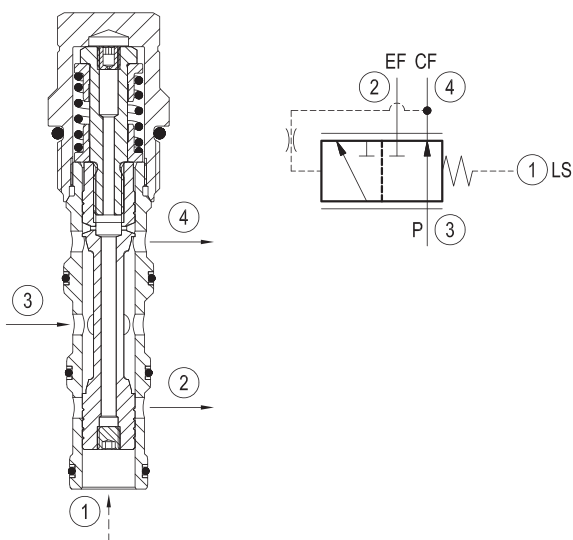
VRLA-12A-S

04.84.09.00.57 - Z



**Description**

The valve delivers priority flow, from 0 to max. available, on demand to port 4, while compensating for load changes downstream. In neutral, all input flow at 3 is given to the priority port 4. Pressure at 4 is applied to the spool against a spring force so that increasing pressure causes increasing by-pass of input flow to port 2. Load sense pressure at port 1, obtained between the downstream control and the load, assists the spring, and moves the spool back toward supplying priority flow. Comparison between priority outlet and LS pressure seeks a constant differential pressure over the control valve. As load and flow control change, the priority flow is increased or decreased to satisfy the demand establishing that differential.

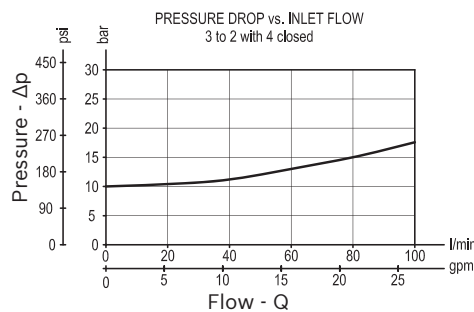
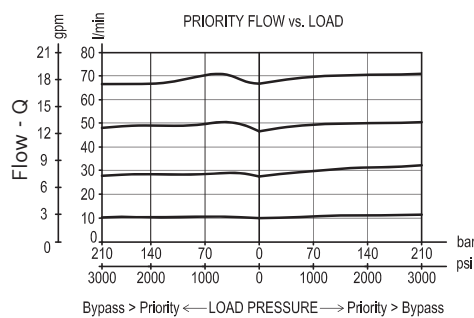


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. inlet flow	100 l/min. (26 gpm)
Max. priority flow	80 l/min. (21 gpm)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.32 kg (0.71 lbs)
Cavity	CA-12A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A4010530100 material no: R930001660
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.09.00</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Logic element, pressure compensator with static load sense

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**57** Common cavity, Size 12

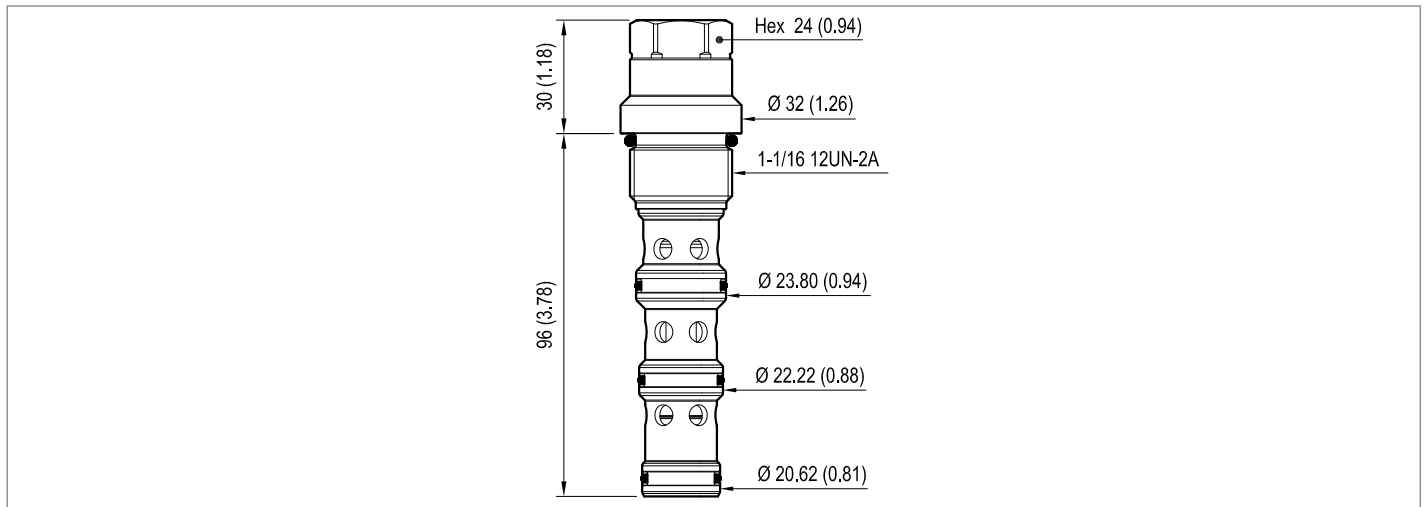
SPRINGS	
Bias spring bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>10</b>	10 (145) ± 15%

**Preferred types**

Type	Material number
048409005705000	R930008062
048409005710000	R930001081

Type	Material number

**Dimensions**



Logic element, pressure compensator  
with static load sense  
Common cavity, Size 16

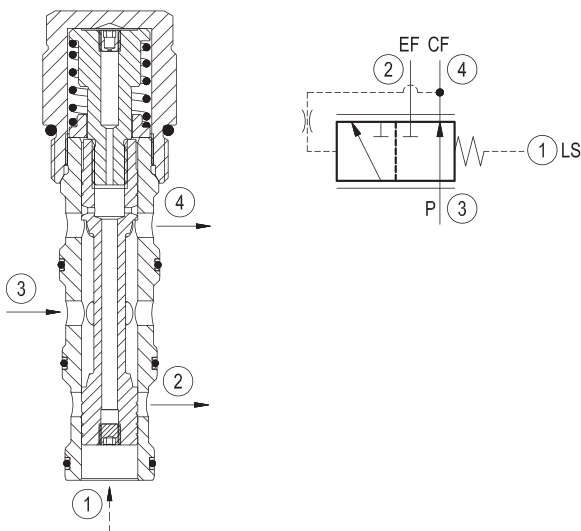
VRLA-16A-S

04.84.09.00.27 - Z



**Description**

The valve delivers priority flow, from 0 to max. available, on demand to port 4, while compensating for load changes downstream. In neutral, all input flow at 3 is given to the priority port 4. Pressure at 4 is applied to the spool against a spring force so that increasing pressure causes increasing by-pass of input flow to port 2. Load sense pressure at port 1, obtained between the downstream control and the load, assists the spring, and moves the spool back toward supplying priority flow. Comparison between priority outlet and LS pressure seeks a constant differential pressure over the control valve. As load and flow control change, the priority flow is increased or decreased to satisfy the demand establishing that differential.

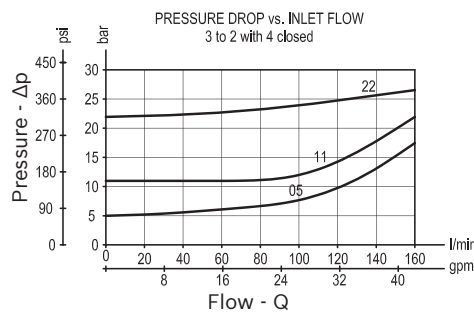
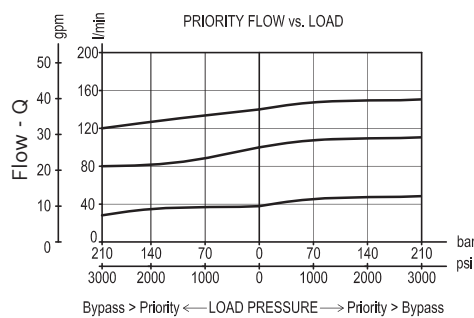


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. inlet flow	160 l/min. (42 gpm)
Max. priority flow	140 l/min. (37 gpm)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108- 122 Nm (80 - 90 ft-lbs)
Weight	0.5 kg (1.1 lbs)
Cavity	CA-16A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG16A4010530100 material no: R930000973
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.09.00</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Logic element, pressure compensator with static load sense

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS	
	Bias spring bar (psi)
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11 (160) ± 15%
<b>22</b>	22 (320) ± 15%

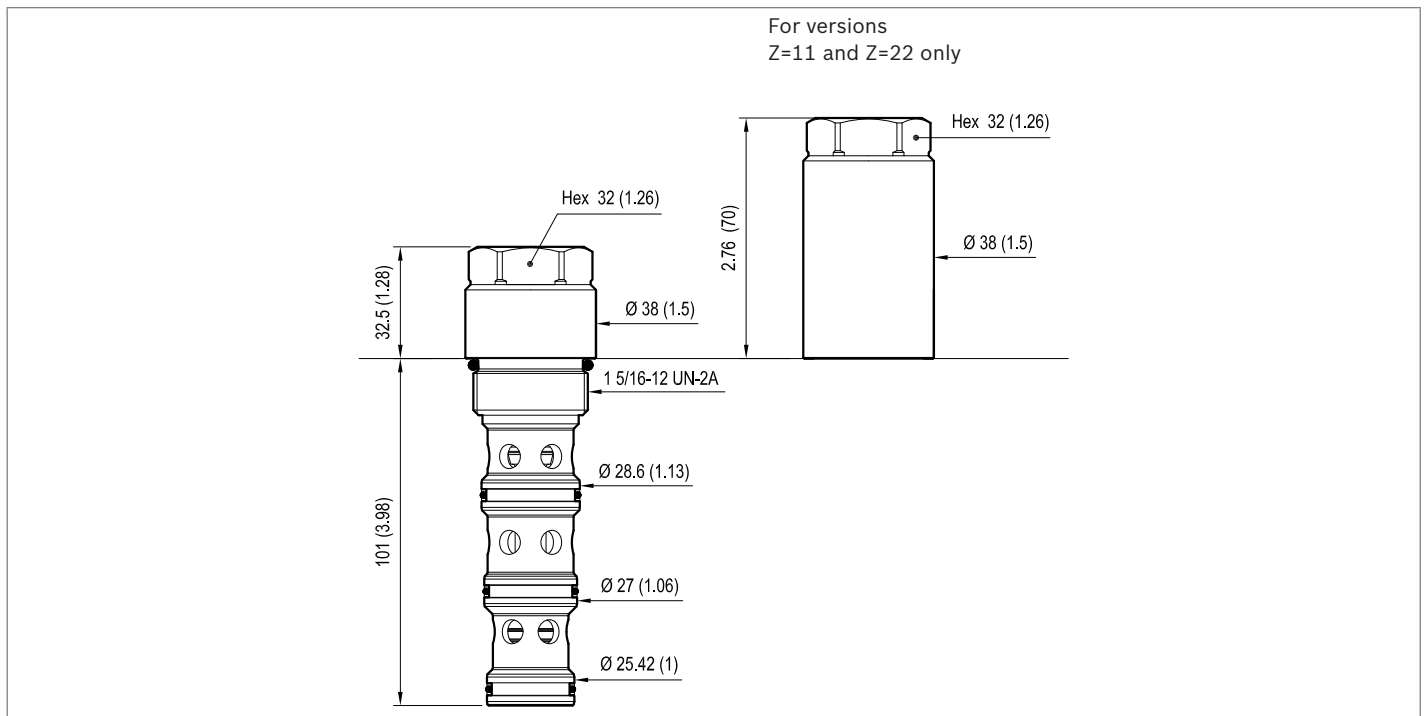
**27** Common cavity, Size 16

**Preferred types**

Type	Material number
048409002705000	R930001078
048409002711000	R930001079
048409002722000	R930001080

Type	Material number

**Dimensions**





Logic element, pressure compensator  
with static load sense  
Common cavity, Size 20

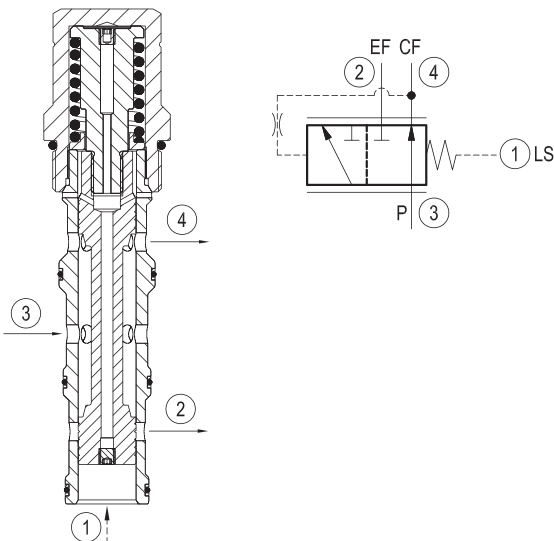
VRLA-20A-S

04.84.09.00.58 - Z



**Description**

The valve delivers priority flow, from 0 to max. available, on demand to port 4, while compensating for load changes downstream. In neutral, all input flow at 3 is given to the priority port 4. Pressure at 4 is applied to the spool against a spring force so that increasing pressure causes increasing by-pass of input flow to port 2. Load sense pressure at port 1, obtained between the downstream control and the load, assists the spring, and moves the spool back toward supplying priority flow. Comparison between priority outlet and LS pressure seeks a constant differential pressure over the control valve. As load and flow control change, the priority flow is increased or decreased to satisfy the demand establishing that differential.

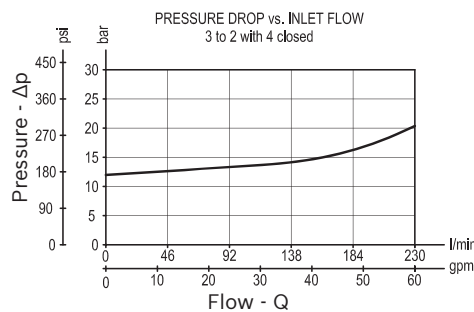
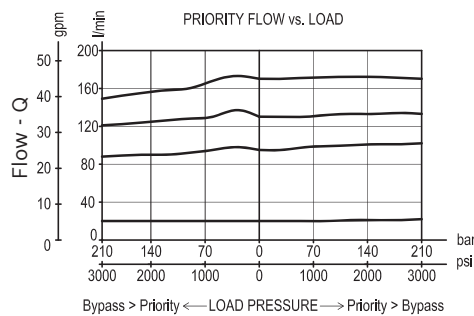


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. inlet flow	230 l/min. (60 gpm)
Max. priority flow	170 l/min. (45 gpm)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	128 - 149 Nm (95 - 110 ft-lbs)
Weight	1.1 kg (2.4 lbs)
Cavity	CA-20A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG20A4010530100 material no: R930001947
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.09.00</b>	<b>58</b>	<b>Z</b>	<b>00</b>	<b>*</b>
--------------------	-----------	----------	-----------	----------

Logic element, pressure compensator with static load sense

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS	
	Bias spring bar (psi)
<b>12</b>	12 (175) ± 15%

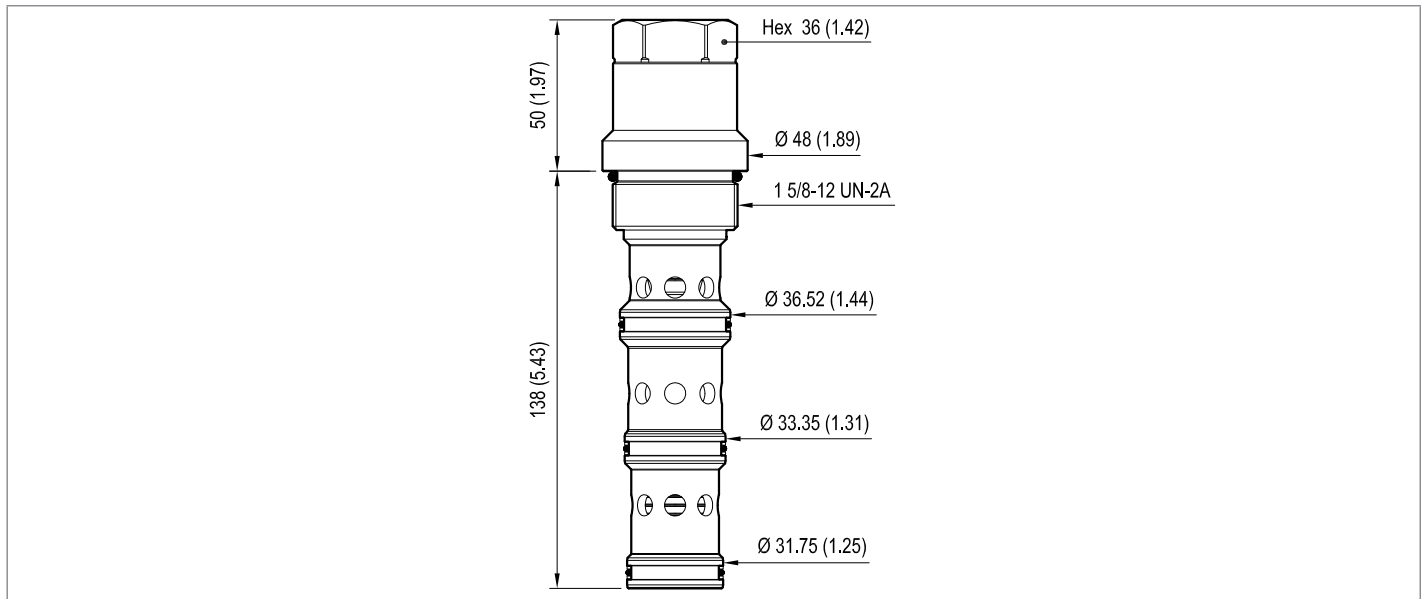
**58** Common cavity, Size 20

**Preferred types**

Type	Material number
048409005812000	R930001082

Type	Material number

**Dimensions**



Logic element, pressure compensator  
with dynamic load sense  
Common cavity, Size 10

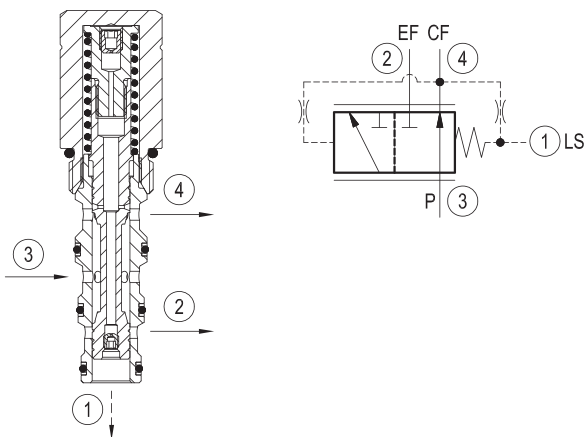
VRLA-10A-D

04.84.10 - X - 85 - Z



**Description**

The valve delivers priority flow, from 0 to max. available, on demand to port 4, while compensating for load changes downstream. In neutral, all input flow at 3 is given to the priority port 4. Pressure at 4 is applied to the spool against a spring force so that increasing pressure causes increasing by-pass of input flow to port 2. Load sense pressure at port 1, obtained between the downstream control and the load, assists the spring, and moves the spool back toward supplying priority flow. Comparison between priority outlet and LS pressure seeks a constant differential pressure over the control valve. As load and flow control change, the priority flow is increased or decreased to satisfy the demand establishing that differential. An orifice connects the priority outlet port and the spring chamber, giving a small pressure assist to the spring, enhancing response time to provide priority flow in the event that load sense pressure momentarily drops.

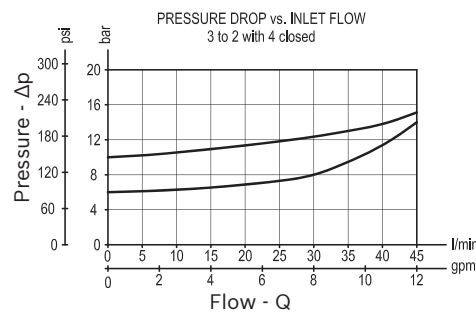
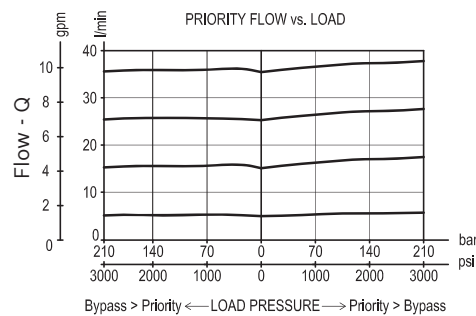


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. inlet flow	45 l/min. (12 gpm)
Max. priority flow	30 l/min. (8 gpm) for Z=05 version 40 l/min. (11 gpm) for Z=10 version
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.22 kg (0.49 lbs)
Cavity	CA-10A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A4010530100 material no: R901111373
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.10</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure compensator with dynamic load sense

Series O/A to L unchanged performances and dimensions

Version and options standard

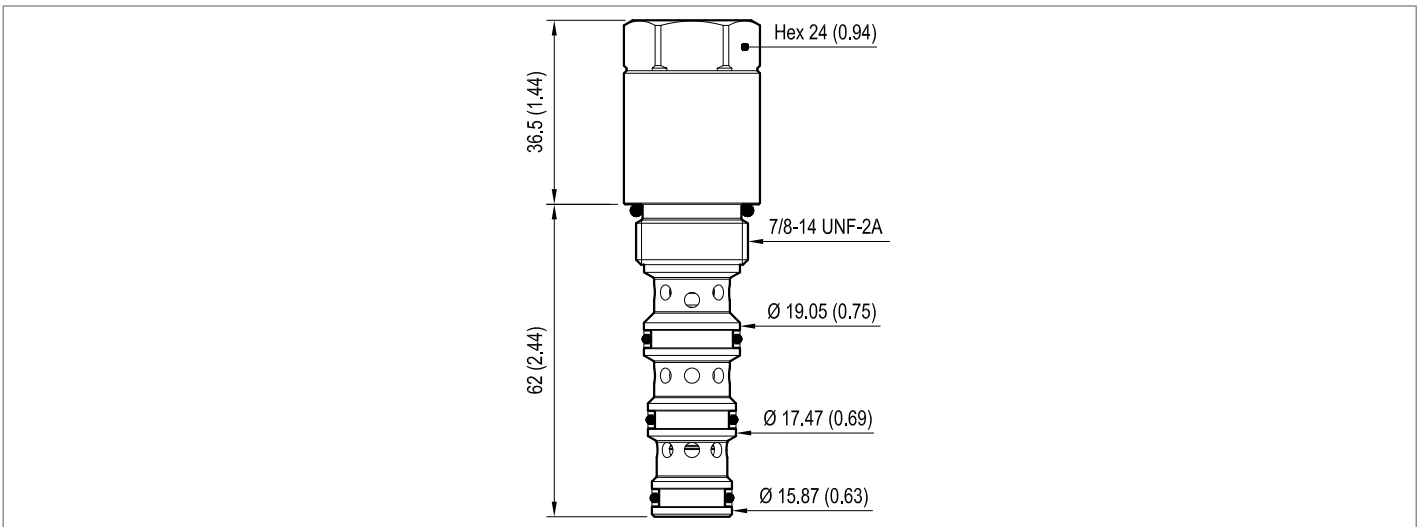
LS orifice diameter mm (inches)		SPRINGS	
		Bias spring bar (psi)	
<b>05</b>	0.5 (0.02)	<b>05</b>	for X=06 and X=09
<b>06</b>	0.6 (0.02)		5.5 (80) ± 20%
<b>08</b>	0.8 (0.03)		
<b>09</b>	0.9 (0.04)		
<b>85</b> Common cavity, Size 10		<b>10</b>	for X=05 and X=08
			10 (145) ± 15%

**Preferred types**

Type	Material number
048410058510000	R930001195
048410068505000	R930001193
048410088510000	R930001196
048410098505000	R930001194

Type	Material number

**Dimensions**



Logic element, pressure compensator  
with dynamic load sense  
Common cavity, Size 12

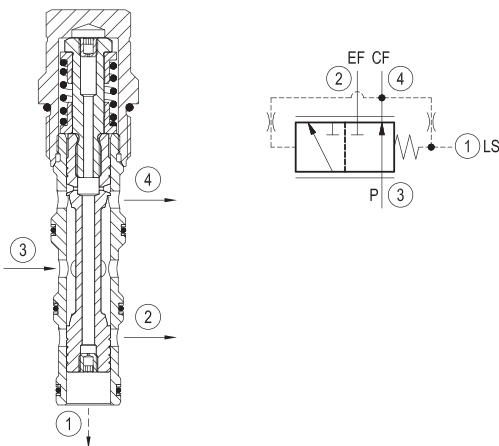
VRLA-12A-D

04.84.10 - X - 57 - Z



**Description**

The valve delivers priority flow, from 0 to max. available, on demand to port 4, while compensating for load changes downstream. In neutral, all input flow at 3 is given to the priority port 4. Pressure at 4 is applied to the spool against a spring force so that increasing pressure causes increasing by-pass of input flow to port 2. Load sense pressure at port 1, obtained between the downstream control and the load, assists the spring, and moves the spool back toward supplying priority flow. Comparison between priority outlet and LS pressure seeks a constant differential pressure over the control valve. As load and flow control change, the priority flow is increased or decreased to satisfy the demand establishing that differential. An orifice connects the priority outlet port and the spring chamber, giving a small pressure assist to the spring, enhancing response time to provide priority flow in the event that load sense pressure momentarily drops.

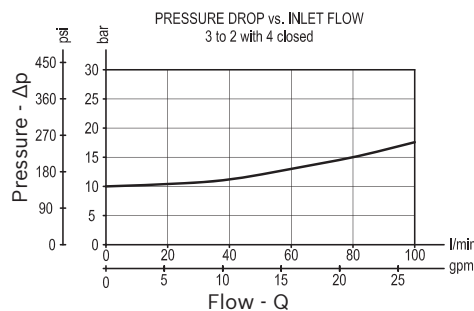
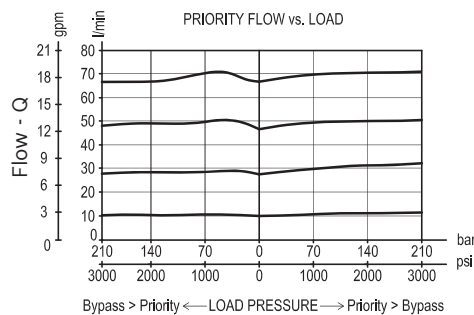


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. inlet flow	100 l/min. (26 gpm)
Max. priority flow	80 l/min. (21 gpm)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.32 kg (0.71 lbs)
Cavity	CA-12A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG12A4010530100 material no: R930001660
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.10</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure compensator with dynamic load sense

Series 0/A to L unchanged performances and dimensions

Version and options standard

LS orifice diameter mm (inches)

<b>05</b>	0.5 (0.02)
<b>07</b>	0.7 (0.03)
<b>10</b>	1.0 (0.04)

SPRINGS	
Bias spring bar (psi)	
<b>10</b>	10 (145) ± 15%

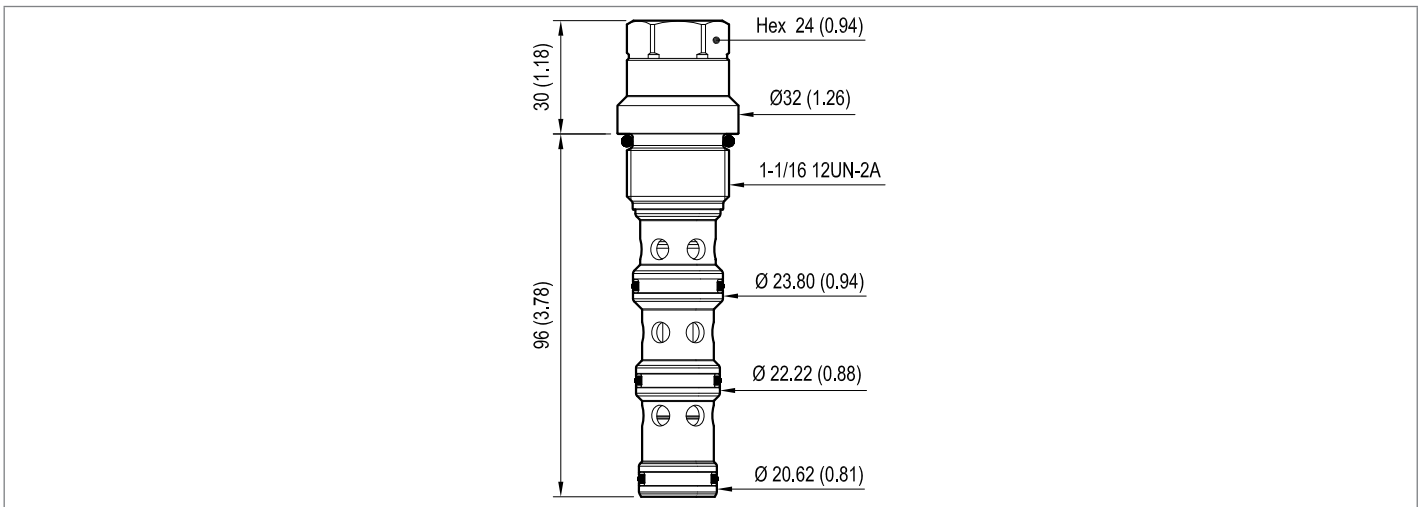
**57** Common cavity, Size 12

**Preferred types**

Type	Material number
048410055710000	R930001086
048410075710000	R930001089
048410105710000	R930001097

Type	Material number

**Dimensions**



Logic element, pressure compensator  
with dynamic load sense  
Common cavity, Size 16

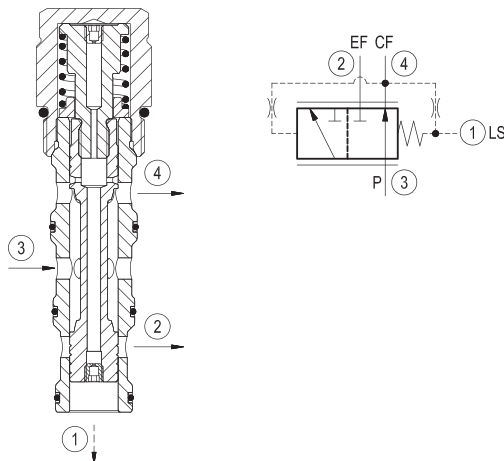
VRLA-16A-D

04.84.10 - X - 27 - Z



**Description**

The valve delivers priority flow, from 0 to max. available, on demand to port 4, while compensating for load changes downstream. In neutral, all input flow at 3 is given to the priority port 4. Pressure at 4 is applied to the spool against a spring force so that increasing pressure causes increasing by-pass of input flow to port 2. Load sense pressure at port 1, obtained between the downstream control and the load, assists the spring, and moves the spool back toward supplying priority flow. Comparison between priority outlet and LS pressure seeks a constant differential pressure over the control valve. As load and flow control change, the priority flow is increased or decreased to satisfy the demand establishing that differential. An orifice connects the priority outlet port and the spring chamber, giving a small pressure assist to the spring, enhancing response time to provide priority flow in the event that load sense pressure momentarily drops.

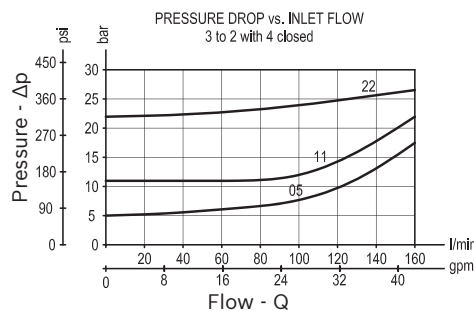
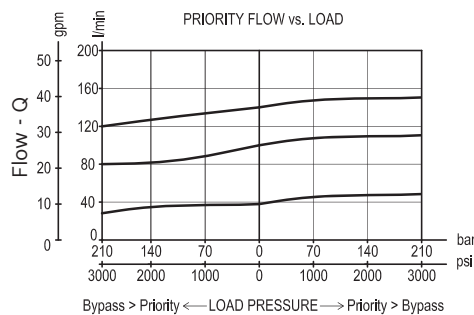


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. inlet flow	160 l/min. (42 gpm)
Max. priority flow	140 l/min. (37 gpm)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.5 kg (1.1 lbs)
Cavity	CA-16A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG16A4010530100 material no: R930000973
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.10</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure compensator with dynamic load sense

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

LS orifice diameter mm (inches)

<b>05</b>	0.5 (0.02)
<b>06</b>	0.6 (0.02)
<b>08</b>	0.8 (0.03)
<b>10</b>	1.0 (0.04)

**27** Common cavity, Size 16

**SPRINGS**

Bias spring  
bar (psi)

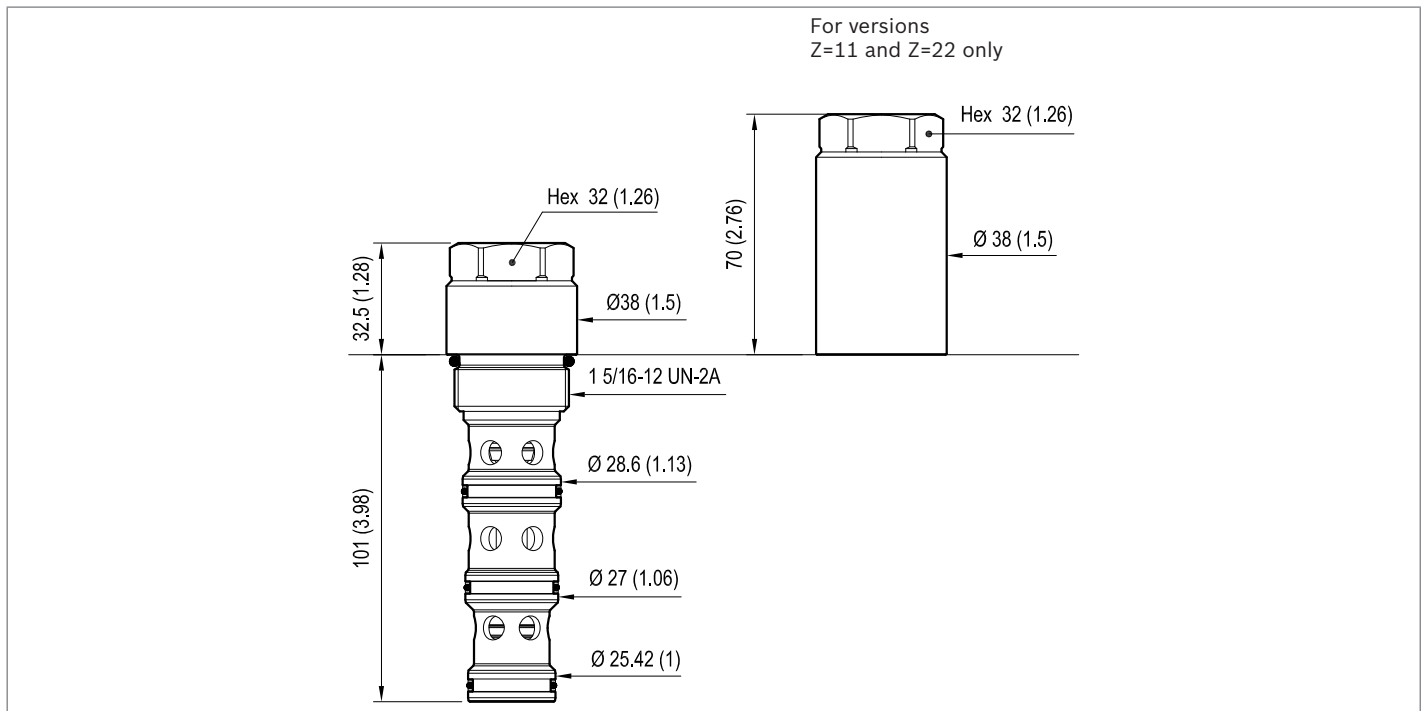
<b>05</b>	5.5 (80) ± 20% for X=06, 08, 10
<b>11</b>	11 (160) ± 15% for X=05, 08, 10
<b>22</b>	22 (320) ± 15% for X=05, 08, 10

**Preferred types**

Type	Material number
048410052711000	R930001084
048410052722000	R930001085
048410062705000	R930001088
048410082705000	R930001090
048410082711000	R930001091

Type	Material number
048410082722000	R930001092
048410102705000	R930001094
048410102711000	R930001095
048410102722000	R930001096

**Dimensions**





Logic element, pressure compensator  
with dynamic load sense  
Common cavity, Size 20

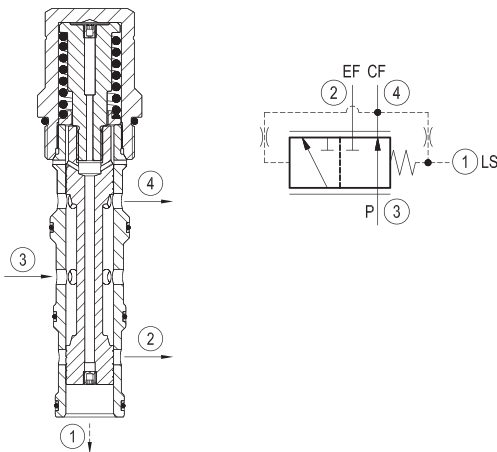
VRLA-20A-D

04.84.10 - X - 58 - Z



**Description**

The valve delivers priority flow, from 0 to max. available, on demand to port 4, while compensating for load changes downstream. In neutral, all input flow at 3 is given to the priority port 4. Pressure at 4 is applied to the spool against a spring force so that increasing pressure causes increasing by-pass of input flow to port 2. Load sense pressure at port 1, obtained between the downstream control and the load, assists the spring, and moves the spool back toward supplying priority flow. Comparison between priority outlet and LS pressure seeks a constant differential pressure over the control valve. As load and flow control change, the priority flow is increased or decreased to satisfy the demand establishing that differential. An orifice connects the priority outlet port and the spring chamber, giving a small pressure assist to the spring, enhancing response time to provide priority flow in the event that load sense pressure momentarily drops.

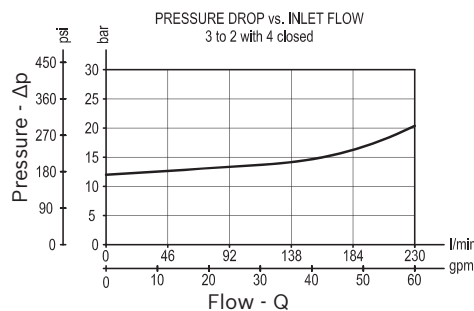
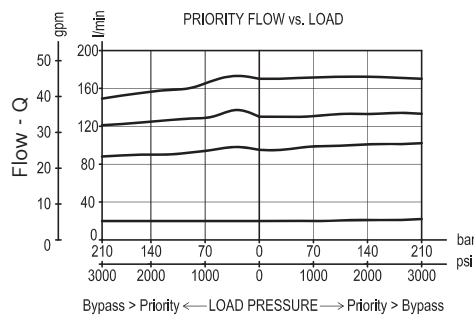


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. inlet flow	230 l/min. (60 gpm)
Max. priority flow	170 l/min. (45 gpm)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	128 - 149 Nm (95 - 110 ft-lbs)
Weight	1.1 kg (2.4 lbs)
Cavity	CA-20A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG20A4010530100 material no: R930001947
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.84.10</b>	<b>X</b>	<b>58</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, pressure compensator with dynamic load sense

Series 0/A to L unchanged performances and dimensions

Version and options standard

LS orifice diameter mm (inches)

<b>05</b>	0.5 (0.02)
<b>08</b>	0.8 (0.03)
<b>10</b>	1.0 (0.04)

SPRINGS	
Bias spring bar (psi)	
<b>12</b>	12 (175) ± 15%

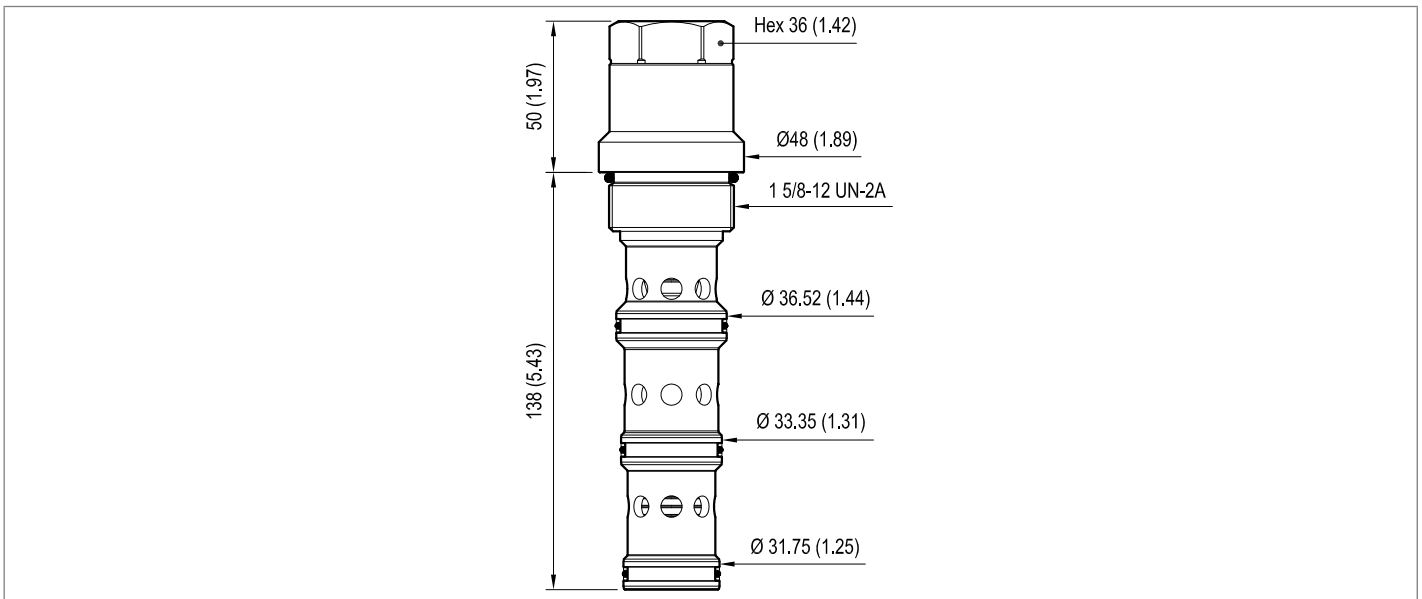
**58** Common cavity, Size 20

**Preferred types**

Type	Material number
048410055812000	R930001087
048410085812000	R930001093
048410105812000	R930001098

Type	Material number

**Dimensions**



Logic element, direction control  
poppet type  
Common cavity, Size 10

VLDT-10A

04.84.07 - X - 85 - Z



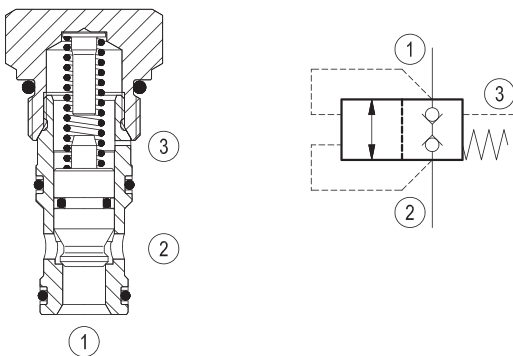
**Description**

Flow is blocked bi-directionally between 1 and 2, until pressure at either 1 or 2 rises above the combined pressure of the spring bias, plus pressure at 3. The poppet is balanced between pressures at 1 and 2 with a 1:1 area ratio, and held locked by pressure at 3 in a 2:1 ratio versus either 1 or 2.

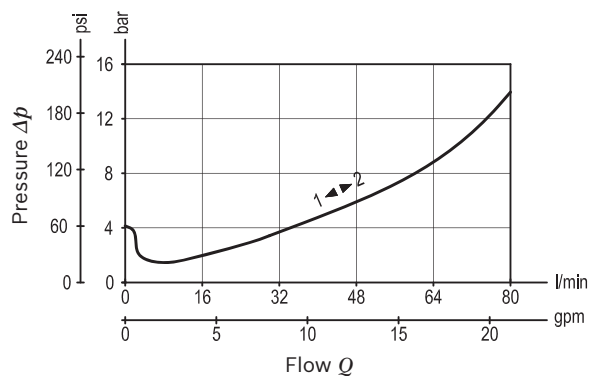
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	80 l/min. (21 gpm)
Pilot ratio	2:1
Max. internal leakage	5 drops/min. at 200 bar (2900 psi) closed
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.12 kg (0.27 lbs)
Cavity	CA-10A-3C (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG10A9010530100 material no: R901111368
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation	No restrictions
Other Technical Data	See data sheet 18350-50

1) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.84.07</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Logic element, direction control poppet type

Adjustments  
**00** Fixed setting

**85** Common cavity, Size 10

Series 0/A to L  
 unchanged performances and dimensions

Version and options standard

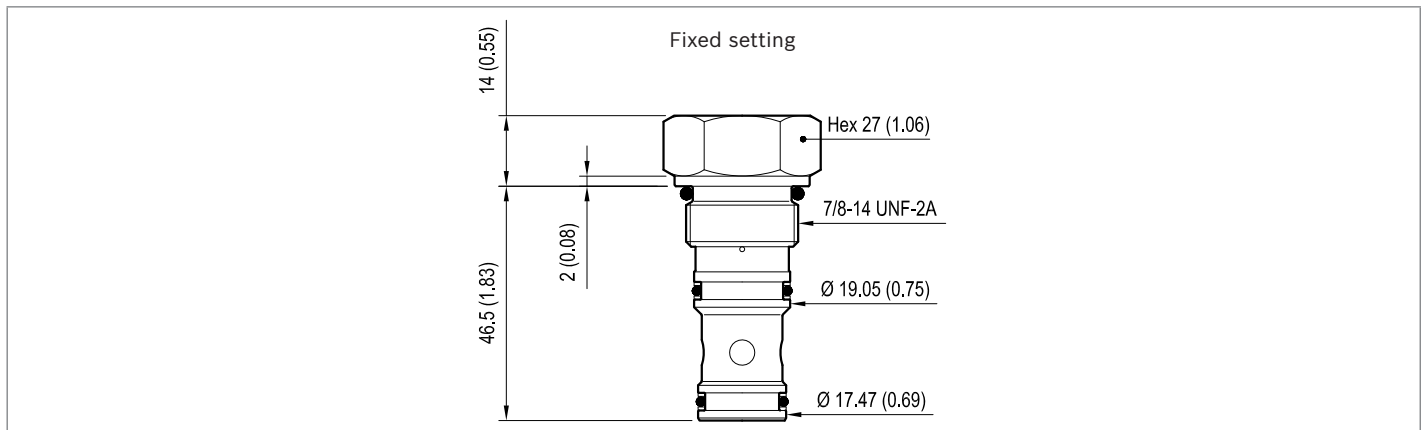
SPRINGS	
	Bias spring bar (psi)
<b>04</b>	4 (60) ± 20%

**Preferred types**

Type	Material number
048407008504000	R901095969

Type	Material number

**Dimensions**



# Mechanical cartridge valves

## Directional direct acting

Designation	Description	Cavity	Code	Data sheet	Page
Spool type, direct acting external pilot internal drain	VDSA-10A-6	Size 10	047729X85Z	18320-73	385
Spool type, direct acting external pilot internal drain	VDSA-10A	Size 10	047732X85Z	18320-83	387
Spool type, direct acting external pilot internal drain	VDSA-16A	Size 16	047732X27Z	18320-92	389
Spool type, direct acting external pilot internal drain	VDSB-10A-6	Size 10	047723X85Z	18320-74	391
Spool type, direct acting external pilot internal drain	VDSB-10A	Size 10	047733X85Z	18320-84	393
Spool type, direct acting external pilot internal drain	VDSB-16A	Size 16	047733X27Z	18320-93	395
Spool type, direct acting internal pilot external drain	VDSR-10A-6	Size 10	047717X85Z	18320-82	397
Spool type, direct acting external pilot external drain	VDSE-10A-6	Size 10	047737X85Z	18320-88	399
Spool type, direct acting external pilot external vent	VDSC-10A	Size 10	047721X85Z	18320-77	401
Spool type, direct acting external pilot external vent	VDSC-12A	Size 12	047721X57Z	18320-91	403
Spool type, direct acting external pilot external vent	VDSC-16A	Size 16	047720X27Z	18320-78	405
Spool type, direct acting external pilot external vent	VDSD-10A	Size 10	047722X85Z	18320-79	407
Spool type, direct acting external pilot external vent	VDSD-16A	Size 16	047722X27Z	18320-80	409
Spool type, direct acting external pilot internal drain	VDSH-10A	Size 10	047725X85Z	18320-75	411
Spool type, direct acting external pilot internal drain	VDSH-16A	Size 16	047725X27Z	18320-85	413
Spool type, direct acting external pilot internal drain	VDSK-10A	Size 10	047726X85Z	18320-76	415
Spool type, direct acting external pilot internal drain	VDSK-16A	Size 16	047726X27Z	18320-86	417
Spool type, direct acting external pilot external drain	VDSJ-10A	Size 10	047719X85Z	18320-87	419

## Mechanical cartridge valves

### Directional direct acting

Designation	Description	Cavity	Code	Data sheet	Page
Spool type, direct acting external pilot external drain	VDSJ-16A	Size 16	047719X27Z	18320-81	421
Spool type, direct acting external pilot ported vent	VDSJ-16A-RN	Size 16	047742X27Z	18320-94	423
Spool type, piloted, 4 ways	VDSP-20B	Special	047735X93Z	18320-89	425
Spool type, piloted, 4 ways	VDSP-20B-R	Special	047736X93Z	18320-90	427

Directional spool type, direct acting,  
external pilot internal drain  
Common cavity, Size 10

VDSA-10A-6

04.77.29 - X - 85 - Z

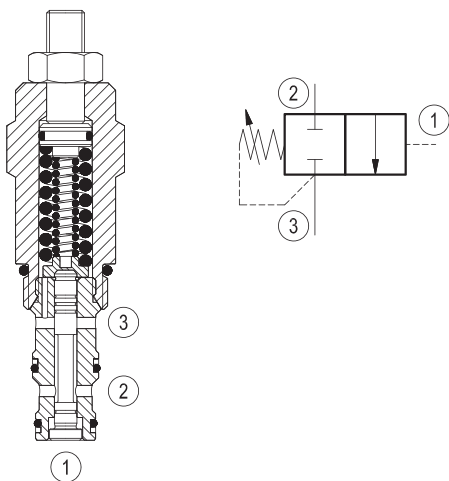


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	30 l/min (8 gpm)
Max. internal leakage <sup>1)</sup>	10 cm <sup>3</sup> /min. (0.6 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.27 kg (0.6 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

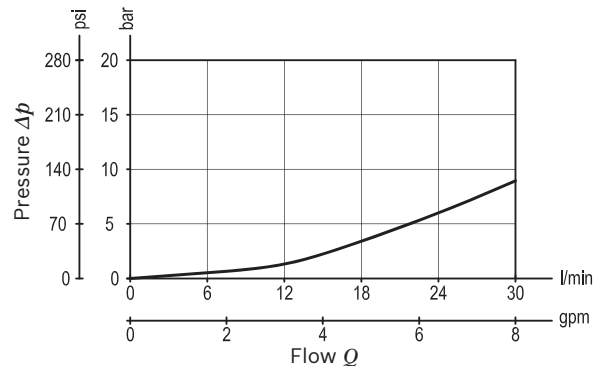
**Description**

Flow is blocked from 2 to 3 until the pressure at 1 rises to the selected spring setting. Upon reaching this pressure, the spool shifts upward, allowing flow from 2 to 3 until pressure at 1 drops below the set point. The spring chamber is drained to 3, thus any pressure at 3 is additive to the spring setting. VDSA-10A-6 is especially designed for application requiring high valve of shifting pressure.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.29</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot internal drain

Series O/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**03** Leakproof hex. socket screw

**85** Common cavity, Size 10

**SPRINGS**

	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi)
<b>05</b>	10-70 (145-1000)	8 (116)	40 (580)
<b>10</b>	35-140 (500-2000)	20 (290)	90 (1300)
<b>20</b>	70-210 (1000-3000)	39 (566)	140 (2000)
<b>35</b>	140-350 (2000-5000)	80 (1160)	210 (3000)

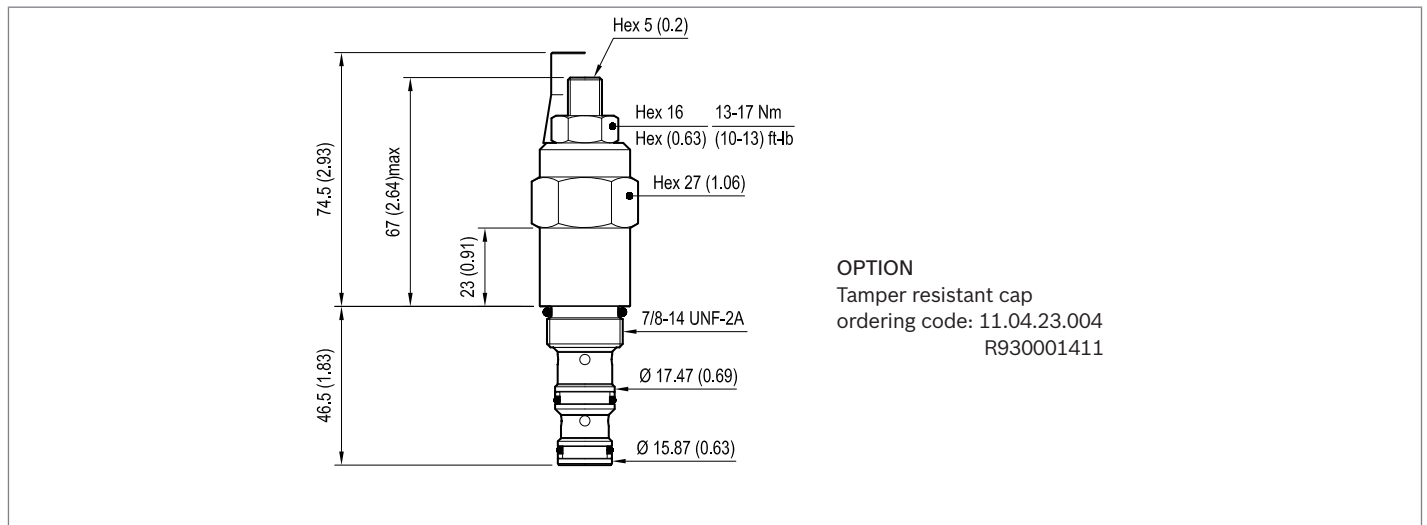
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
047729038505000	R901109943
047729038510000	R901109945
047729038520000	R901109947
047729038535000	R901109949

Type	Material number

**Dimensions**





Directional spool type, direct acting,  
external pilot internal drain  
Common cavity, Size 10

VDSA-10A

04.77.32 - X - 85 - Z

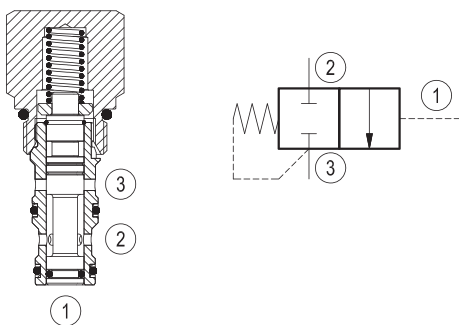


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	50 l/min. (13 gpm)
Max. internal leakage <sup>1)</sup>	70 cm <sup>3</sup> /min. (4 cu.in./min.)
Pilot displacement volume	0.28 cm <sup>3</sup> (0.02 cu.in.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.22 kg (0.49 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010530100 material no: R930000990
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

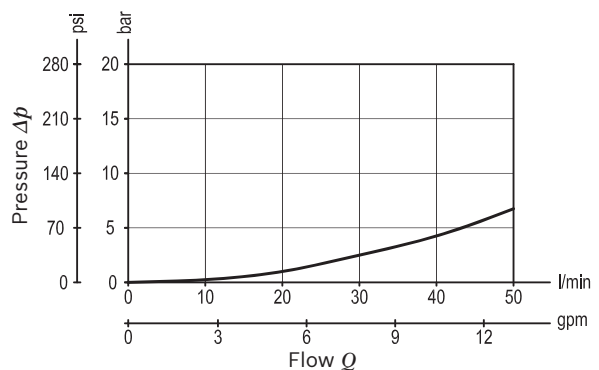
**Description**

Flow is blocked from 2 to 3 until the pressure at 1 rises to the selected spring setting. Upon reaching this pressure, the spool shifts upward, allowing flow from 2 to 3 until pressure at 1 drops below the set point. The spring chamber is drained to 3, thus any pressure at 3 is additive to the spring setting.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.32</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot internal drain

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

O-Ring on pilot piston

- 00** No O-Ring
- 10** With O-Ring

SPRINGS	
Std. setting bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11.5 (167) ± 10%

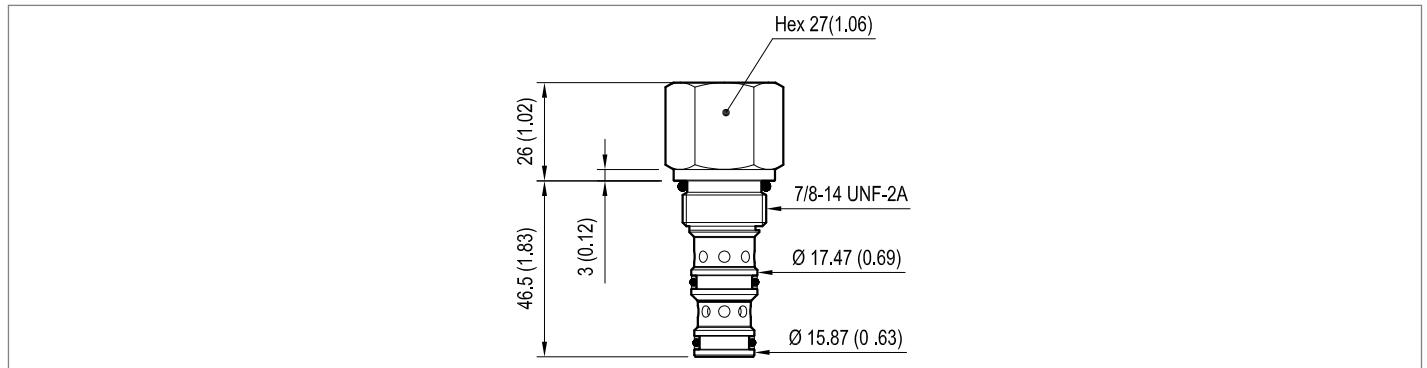
**85** Common cavity, Size 10

**Preferred types**

Type	Material number
047732008505000	R930002334
047732008511000	R930002463
047732108505000	R930005654
047732108511000	R930002602

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot internal drain  
Common cavity, Size 16

VDSA-16A

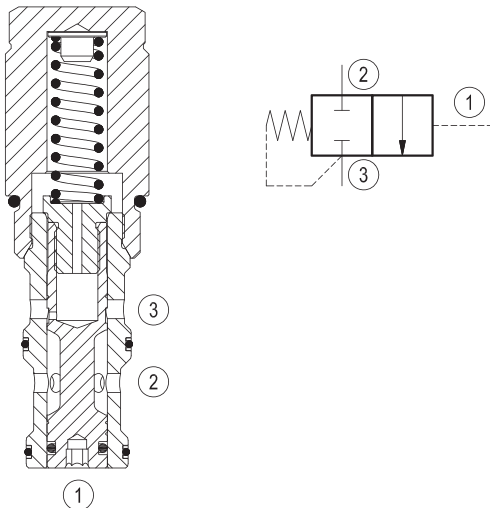
04.77.32 - X - 27 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	160 l/min. (43 gpm)
Max. internal leakage <sup>1)</sup>	170 cm <sup>3</sup> /min. (10 cu.in./min.)
Pilot displacement volume	1.2 cm <sup>3</sup> (0.05 cu.in.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.6 kg (1.32 lbs)
Cavity	CA-16A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16A3010530100 material no: R930001178
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

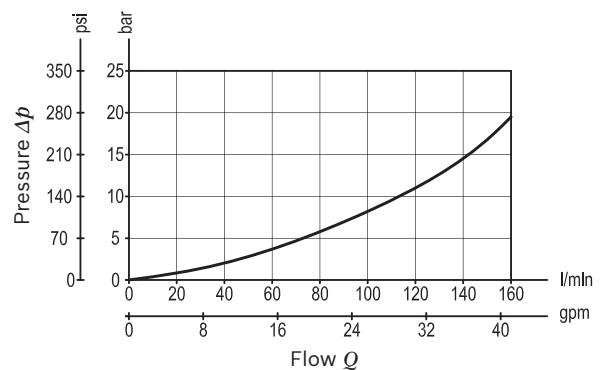
**Description**

Flow is blocked from 2 to 3 until the pressure at 1 rises to the selected spring setting. Upon reaching this pressure, the spool shifts upward, allowing flow from 2 to 3 until pressure at 1 drops below the set point. The spring chamber is drained to 3, thus any pressure at 3 is additive to the spring setting.



- 1) Measured at 210 bar (3000 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.77.32</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot internal drain

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

O-Ring on pilot piston

- 00** No O-Ring
- 10** With O-Ring

SPRINGS	
Std. setting bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11 (160) ± 10%

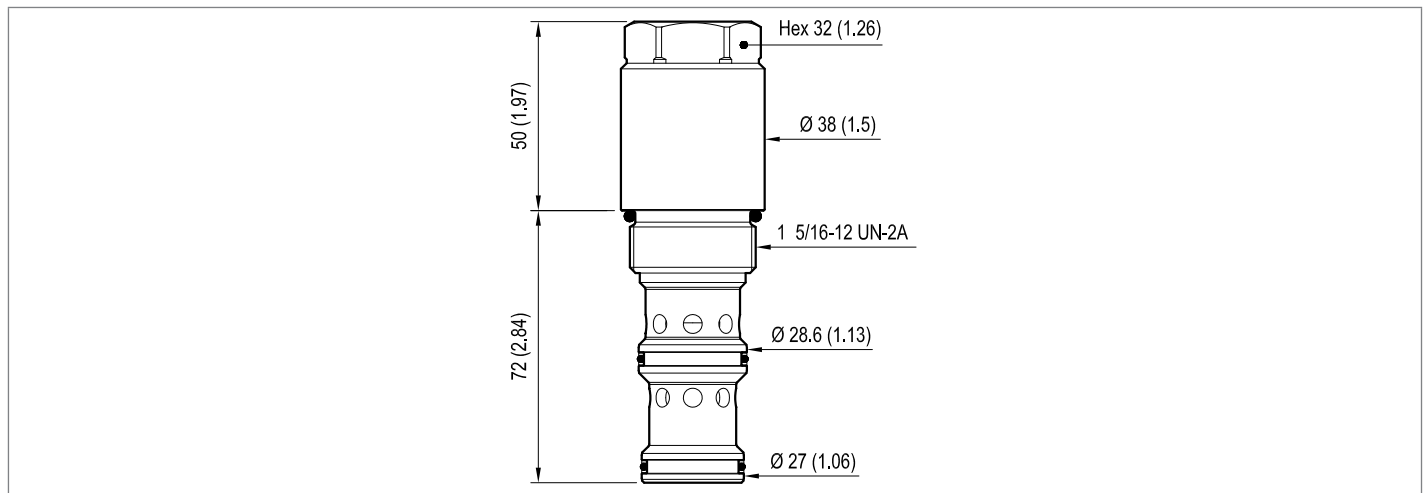
**27** Common cavity, Size 16

**Preferred types**

Type	Material number
047732002705000	R930001157
047732002711000	R930001159
047732102705000	R930001162
047732102711000	R930001163

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot internal drain  
Common cavity, Size 10

VDSB-10A-6

04.77.23 - X - 85 - Z



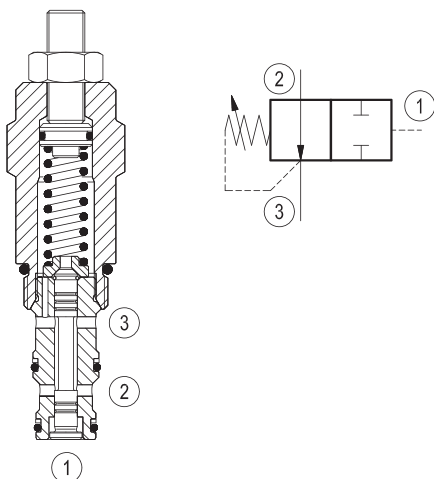
**Description**

Flow is allowed from 2 to 3 until the pressure at 1 rises to the selected spring setting. Upon reaching this pressure, the spool shifts upward, blocking flow until pressure at 1 drops below the set point. The spring chamber is drained to 3, thus any pressure at 3 is additive to the spring setting. VDSB-10A-6 is especially designed for application requiring high value of shifting pressure.

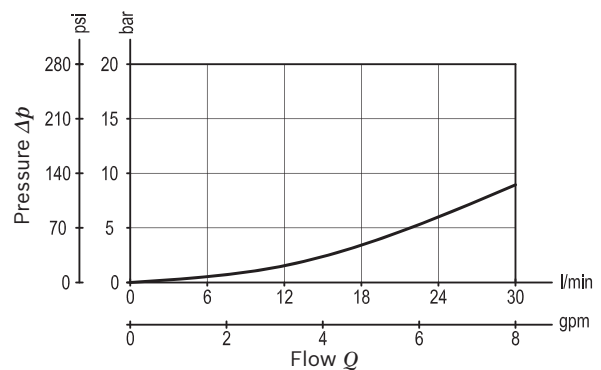
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	30 l/min. (8 gpm)
Max. internal leakage <sup>1)</sup>	10 cm <sup>3</sup> /min. (0.6 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.27 kg (0.6 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.23</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot internal drain

Series O/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**03** Leakproof hex. socket screw

**85** Common cavity, Size 10

**SPRINGS**

	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi)
<b>05</b>	10-70 (145-1000)	8 (116)	40 (580)
<b>10</b>	35-140 (500-2000)	20 (290)	90 (1300)
<b>20</b>	70-210 (1000-3000)	39 (566)	140 (2000)

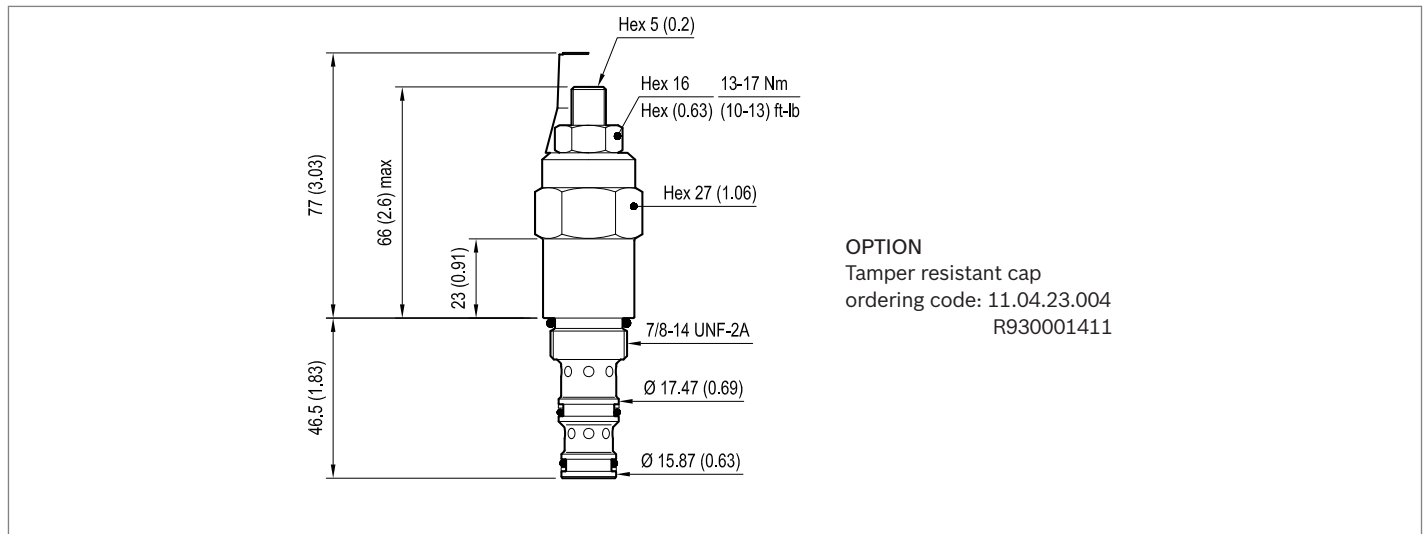
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
047723038505000	R901109479
047723038510000	R901109481
047723038520000	R901109482

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot internal drain  
Common cavity, Size 10

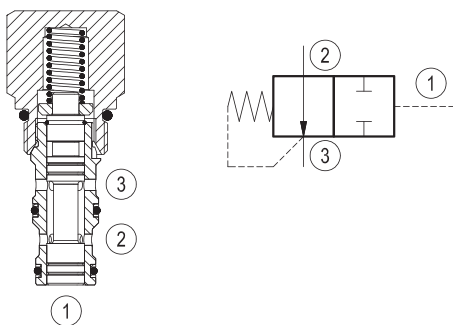
VDSB-10A

04.77.33 - X - 85 - Z



**Description**

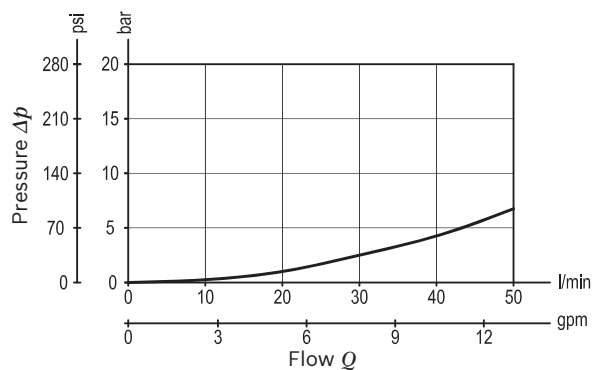
Flow is allowed from 2 to 3 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, blocking flow at both 2 and 3. The spring chamber is drained to 3, thus any pressure at 3 is additive to the spring setting.



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	50 l/min. (13 gpm)
Max. internal leakage <sup>1)</sup>	25 cm <sup>3</sup> /min. (1.5 cu.in./min.)
Pilot displacement volume	0.28 cm <sup>3</sup> (0.02 cu.in.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010530100 material no: R930000990
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.77.33</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot internal drain

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

SPRINGS	
Std. setting bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11.5 (167) ± 10%

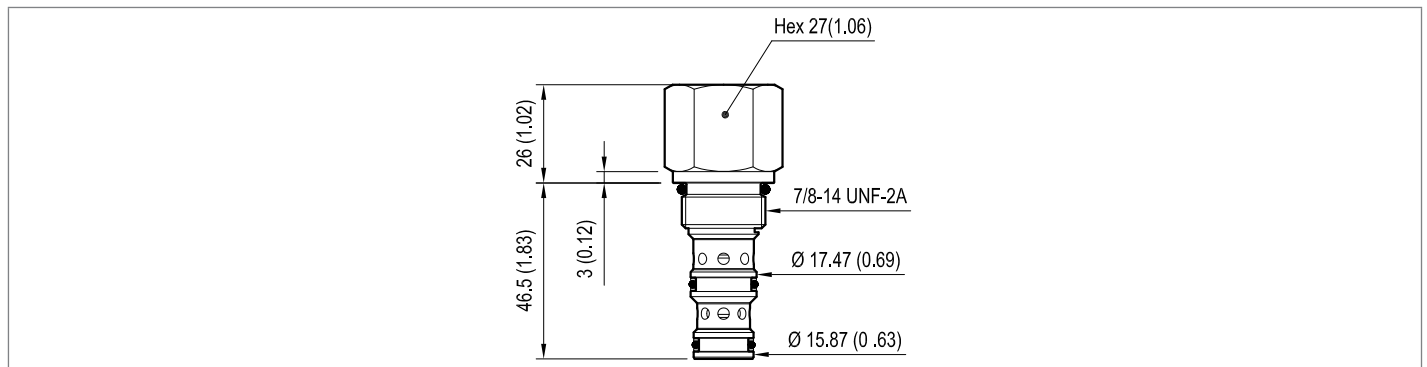
**85** Common cavity, Size 10

**Preferred types**

Type	Material number
047733008505000	R930000965
047733008511000	R930002623

Type	Material number

**Dimensions**





Directional spool type, direct acting,  
external pilot internal drain  
Common cavity, Size 16

VDSB-16A

04.77.33 - X - 27 - Z

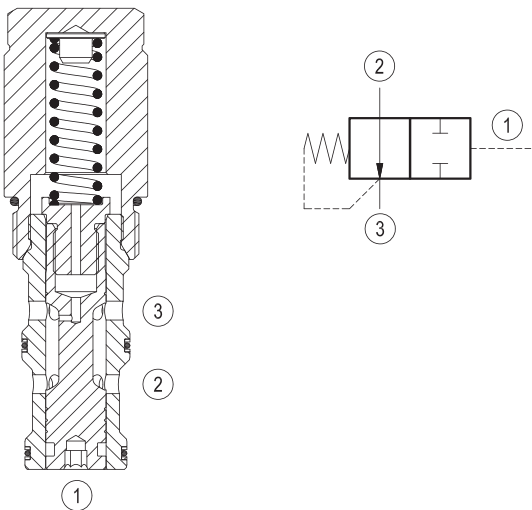


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	160 l/min. (43 gpm)
Max. internal leakage <sup>1)</sup>	100 cm <sup>3</sup> /min. (6 cu.in./min.)
Pilot displacement volume	1.2 cm <sup>3</sup> (0.05 cu.in)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.6 kg (1.32 lbs)
Cavity	CA-16A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16A3010530100 material no: R930001178
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

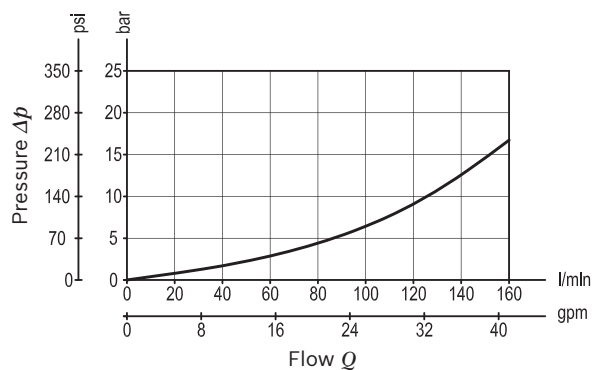
**Description**

Flow is allowed from 2 to 3 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, blocking flow at both 2 and 3. The spring chamber is drained to 3, thus any pressure at 3 is additive to the spring setting.

- 1) Measured at 210 bar (3000 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.33</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot internal drain

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

**27** Common cavity, Size 16

**SPRINGS**

Std. setting  
bar (psi)

**05** 5.5 (80) ± 20%

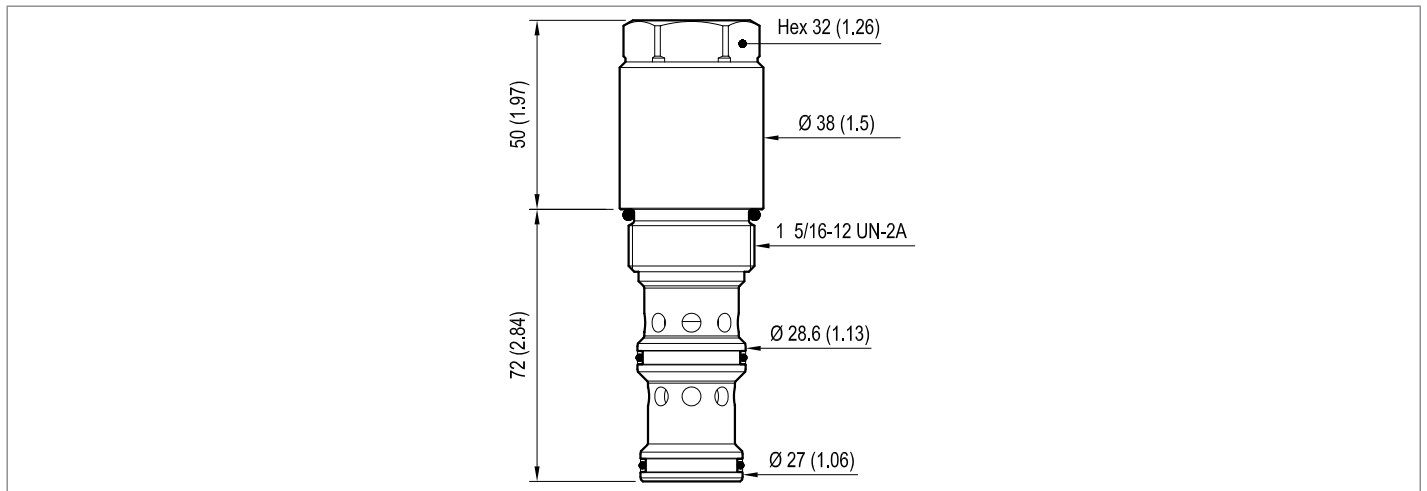
**11** 11 (160) ± 10%

**Preferred types**

Type	Material number
047733002705000	R930001165
047733002711000	R930001167
047733102705000	R930001173
047733102711000	R930001175

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
internal pilot external drain  
Common cavity, Size 10

VDSR-10A-6

04.77.17 - X - 85 - Z

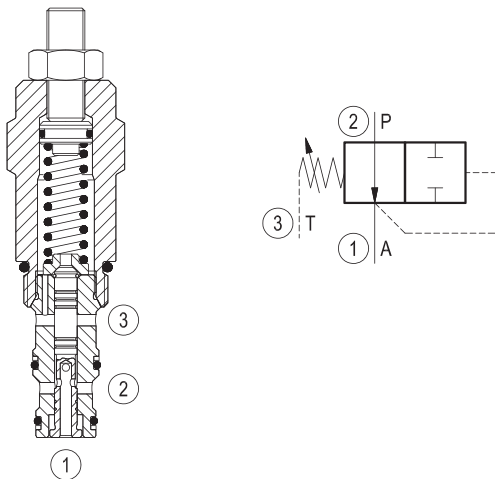


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	12 l/min. (3 gpm)
Max. internal leakage <sup>1)</sup>	10 cm <sup>3</sup> /min. (0.6 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.26 kg (0.57 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010520100 material no: R901111369
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

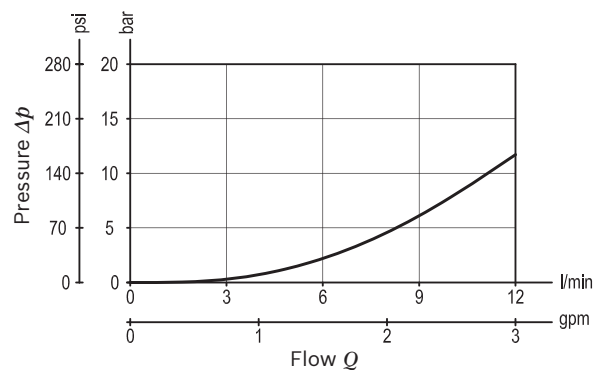
**Description**

Flow is allowed from 2 to 1 until the pressure at 1 rises to the selected spring setting. Upon reaching this pressure, the spool shifts upward, blocking flow until pressure at 1 drops below the set point. The spring chamber is drained to 3 thus any pressure at 3 is additive to the spring setting.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.17</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot external drain

**Adjustments**

**03** Leakproof hex. socket screw

**85** Common cavity, Size 10

Series O/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi)
<b>05</b>	10-70 (145-1000)	8 (116)	40 (580)
<b>10</b>	35-140 (500-2000)	20 (290)	90 (1300)
<b>20</b>	70-210 (1000-3000)	39 (566)	140 (2000)

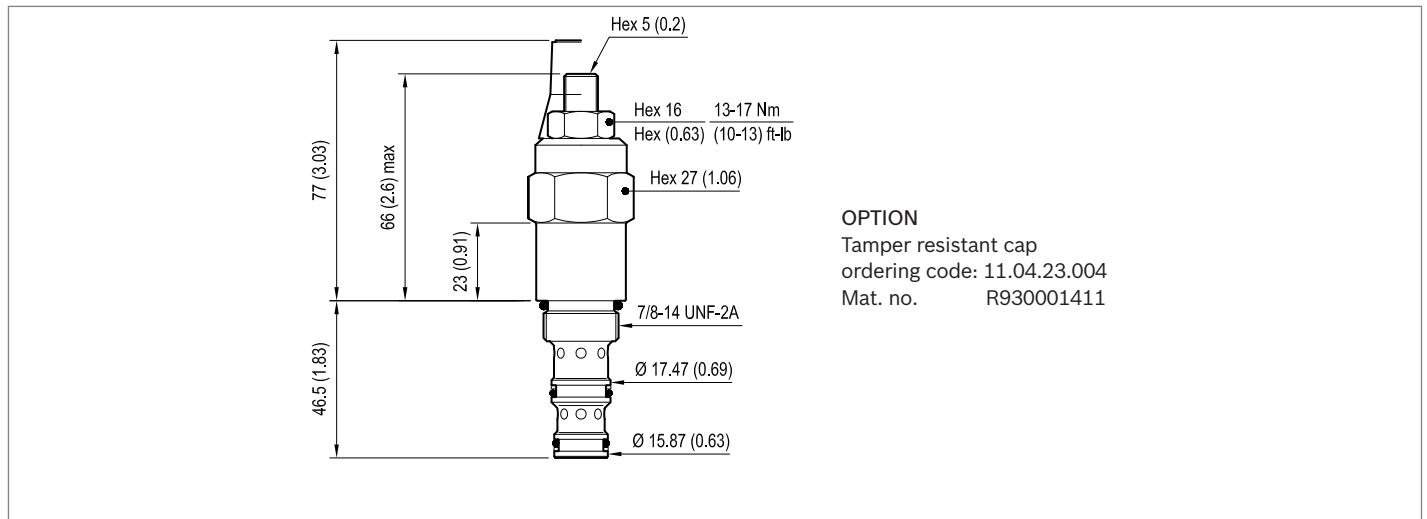
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
047717038505000	R901109500
047717038510000	R901109501
047717038520000	R901109502

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot external drain  
Common cavity, Size 10

VDSE-10A-6

04.77.37 - X - 85 - Z

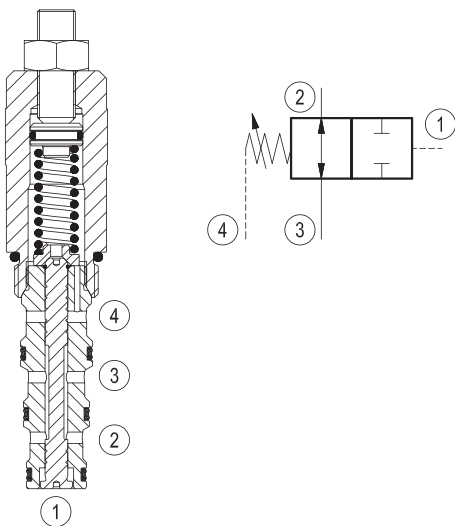


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	20 l/min. (5 gpm)
Max. internal leakage <sup>1)</sup>	10 cm <sup>3</sup> /min. (0.6 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.3 kg (0.66 lbs)
Cavity	CA-10A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A4010530100 material no: R901111373
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

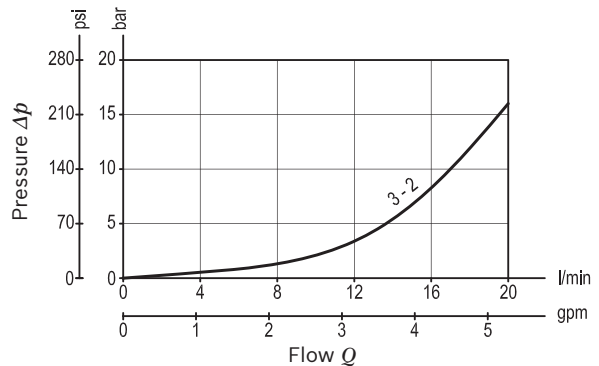
**Description**

Flow is allowed from 2 to 3 until the pressure at 1 rises to the selected spring setting. Upon reaching this pressure, the spool shifts upward, blocking flow until pressure at 1 drops below the set point. The spring chamber is drained to 4 thus the setting is independent from any pressure in 3.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.37</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot external drain

**Adjustments**

**03** Leakproof hex. socket screw

**85** Common cavity, Size 10

Series O/A to L  
unchanged performances and dimensions

Version and options standard

SPRINGS			
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi)
<b>05</b>	10-70 (145-1000)	8 (116)	40 (580)
<b>10</b>	35-140 (500-2000)	20 (290)	90 (1300)
<b>20</b>	70-210 (1000-3000)	39 (566)	140 (2000)

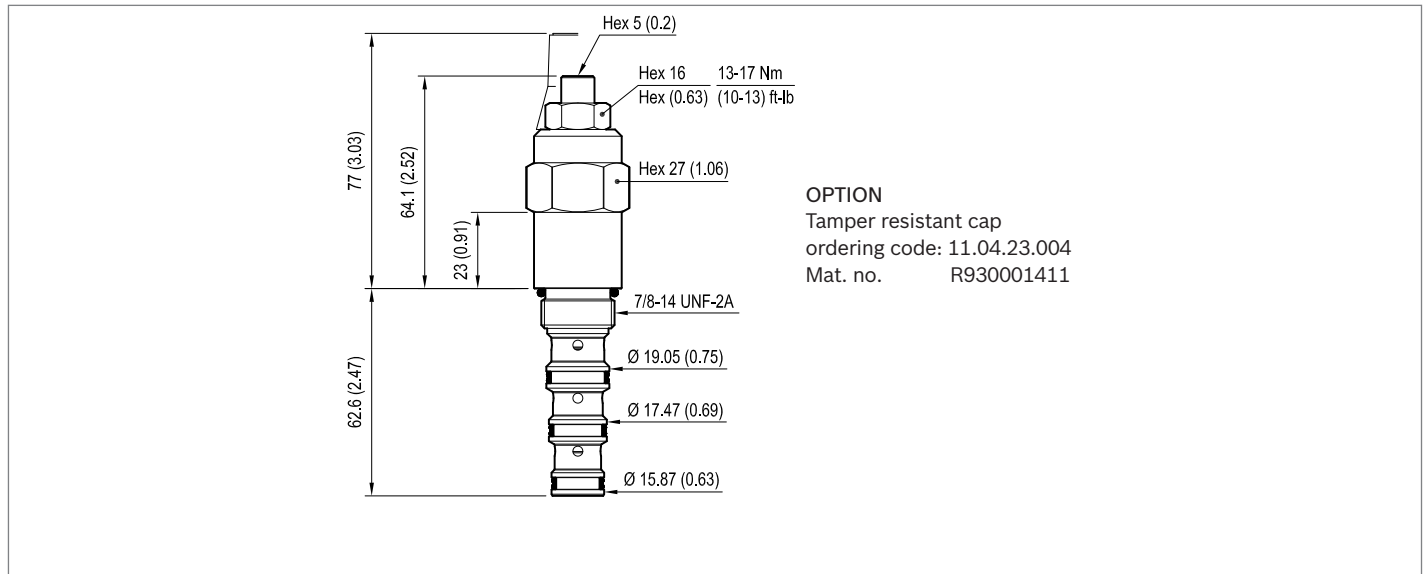
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
047737038505000	R930000977
047737038510000	R930000978
047737038520000	R930000980

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot external vent  
Common cavity, Size 10

VDSC-10A

04.77.21 - X - 85 - Z



**Description**

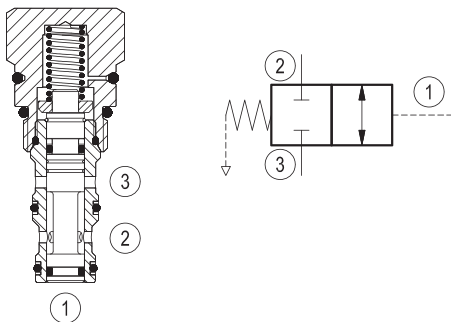
Flow is blocked bi-directionally at 2 and 3 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, allowing flow from 2 to 3, or 3 to 2. The spring chamber is sealed and vented to atmosphere, allowing consistent shifting with only spring bias pressure independent of conditions at 2 or 3.

**Technical data**

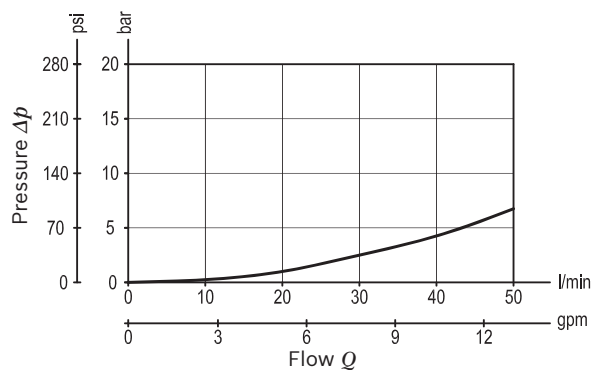
Max. operating pressure	350 bar (5000 psi)
Max. flow	50 l/min. (13 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Pilot displacement volume	0.28 cm <sup>3</sup> (0.02 cu.in.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010530100 material no: R930000990
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

1) Measured at 200 bar (2900 psi)

2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.21</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot external vent

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

SPRINGS	
	Std. setting bar (psi) ± 20%
<b>05</b>	5.5 (80)
<b>11</b>	11.5 (167)

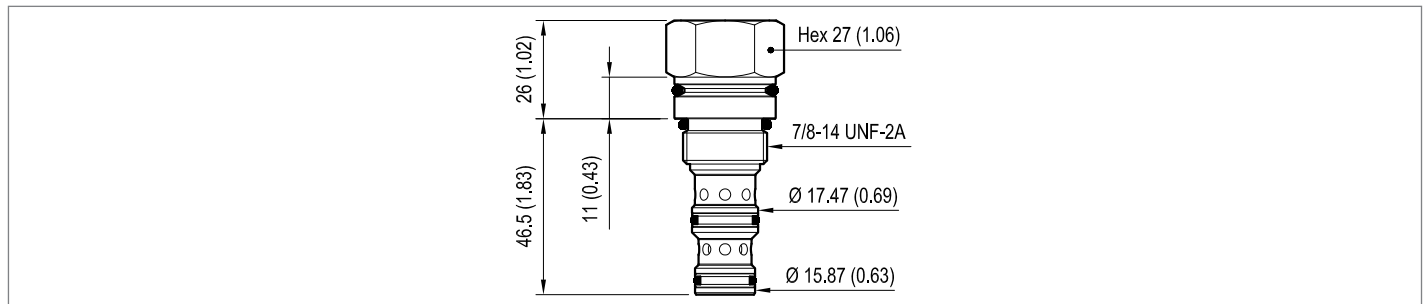
**85** Common cavity, Size 10

**Preferred types**

Type	Material number
047721008505000	R901109490
047721008511000	R901109491
047721108505000	R901109950
047721108511000	R901109951

Type	Material number

**Dimensions**





Directional spool type, direct acting,  
external pilot external vent  
Common cavity, Size 12

VDSC-12A

04.77.21 - X - 57 - Z

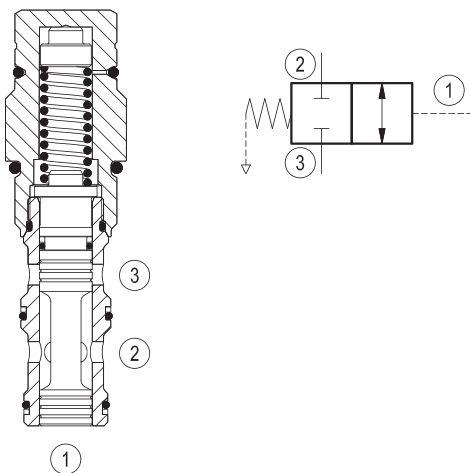


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	120 l/min. (32 gpm)
Max. internal leakage <sup>1)</sup>	160 cm <sup>3</sup> /min. (10 cu.in./min.)
Pilot displacement volume	1.12 cm <sup>3</sup> (0.07 cu.in.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	81 - 95 Nm (60 - 70 ft-lbs)
Weight	0.35 kg (0.77 lbs)
Cavity	CA-12A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG12A3010520100 material no: R930000941
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

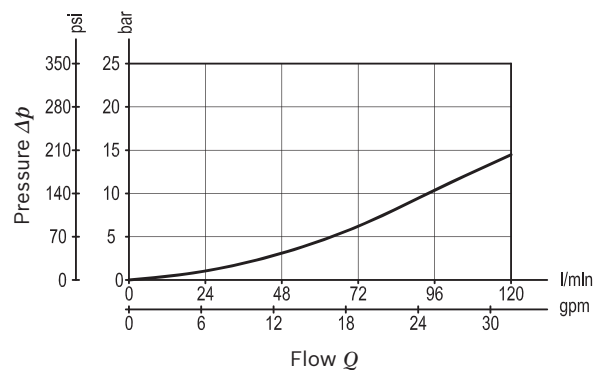
**Description**

Flow is blocked bi-directionally at 2 and 3 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, allowing flow from 2 to 3, or 3 to 2. The spring chamber is sealed and vented to atmosphere, allowing consistent shifting with only spring bias pressure independent of conditions at 2 or 3.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.21</b>	<b>X</b>	<b>57</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot external vent

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring (available only for Z=15)

**57** Common cavity, Size 12

**SPRINGS**

Std. setting  
bar (psi)

**06** 6 (87) ± 15%

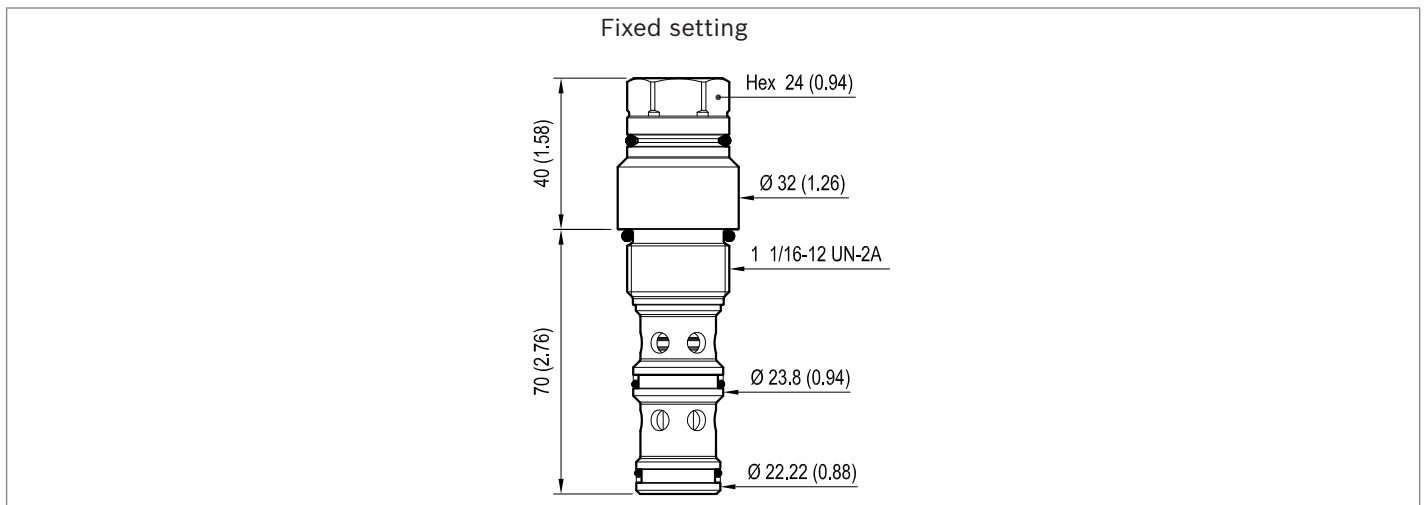
**15** 15 (220) ± 10%

**Preferred types**

Type	Material number
047721005706000	R930008294
04772100571500A	R930006701
047721105715000	R930008083

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot external vent  
Common cavity, Size 16

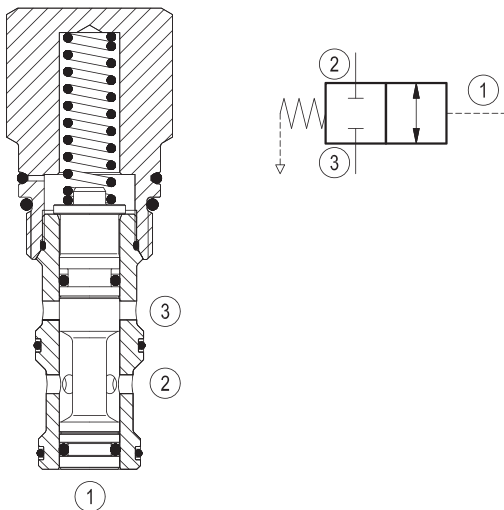
VDSC-16A

04.77.20 - X - 27 - Z



**Description**

Flow is blocked bi-directionally at 2 and 3 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, allowing flow from 2 to 3, or 3 to 2. The spring chamber is sealed and vented to atmosphere, allowing consistent shifting with only spring bias pressure independent of conditions at 2 or 3.

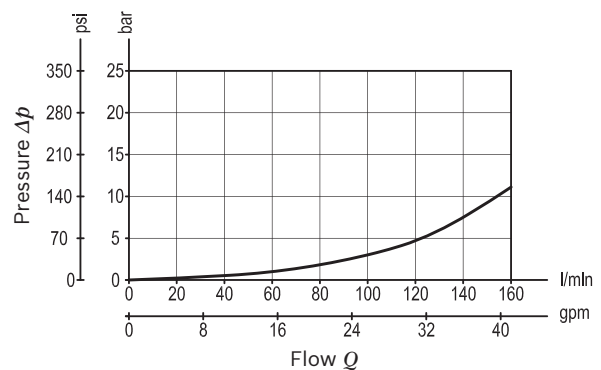


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	160 l/min. (43 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Pilot displacement volume	1.61 cm <sup>3</sup> (0.10 cu.in.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.67 kg (1.48 lbs)
Cavity	CA-16A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16A3010530100 material no: R930001178
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.77.20</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot external vent

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

**27** Common cavity, Size 16

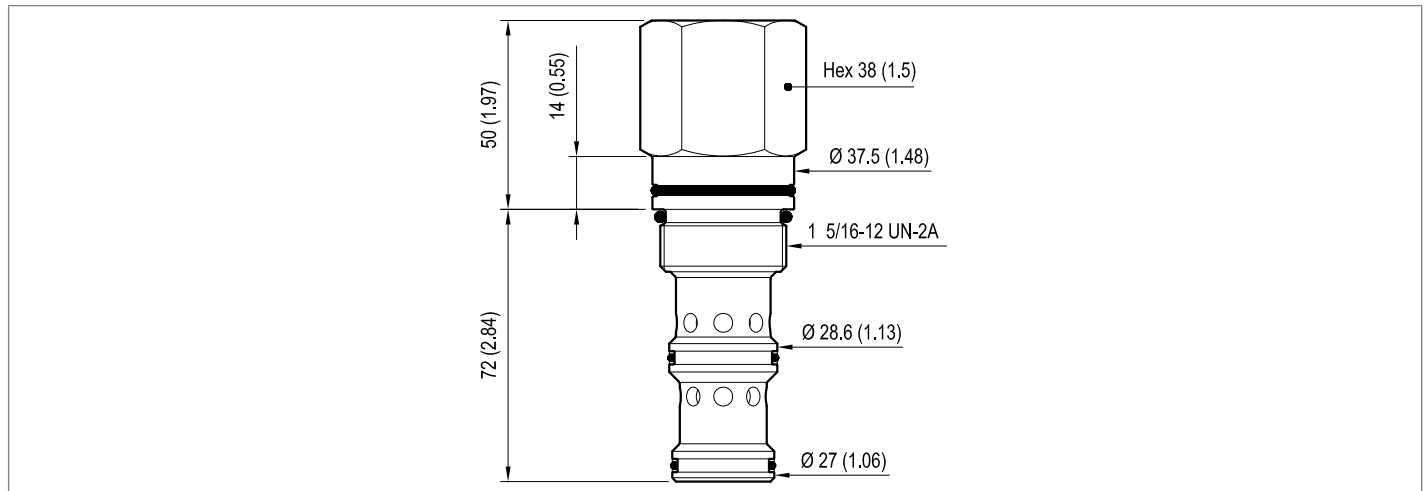
SPRINGS	
Std. setting bar (psi)	
<b>05</b>	5 (73) ± 20%
<b>11</b>	11 (160) ± 10%

**Preferred types**

Type	Material number
04772000270500A	R930000927
04772000271100A	R930000928
047720102705000	R930000956
047720102711000	R930000957

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot external vent  
Common cavity, Size 10

VDSD-10A

04.77.22 - X - 85 - Z

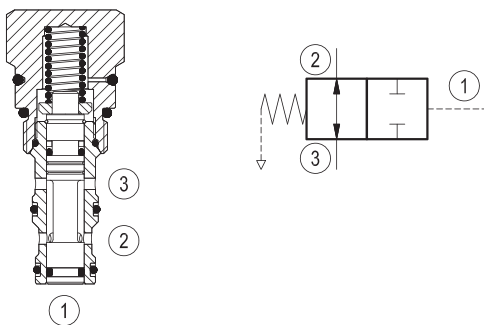


**Description**

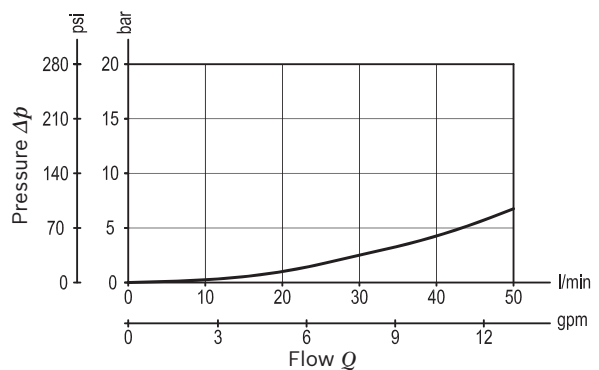
Flow is allowed bi-directionally between 2 and 3 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, blocking flow at both 2 and 3. The spring chamber is sealed and vented to atmosphere, allowing consistent shifting with only spring bias pressure independent of conditions at 2 or 3.

Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	50 l/min. (13 gpm)
Max. internal leakage <sup>1)</sup>	25 cm <sup>3</sup> /min. (1.5 cu.in./min.)
Pilot displacement volume	0.28 cm <sup>3</sup> (0.02 cu.in.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A3010530100 material no: R930000990
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.22</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot external vent

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

SPRINGS	
Std. setting bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11.5 (167) ± 10%

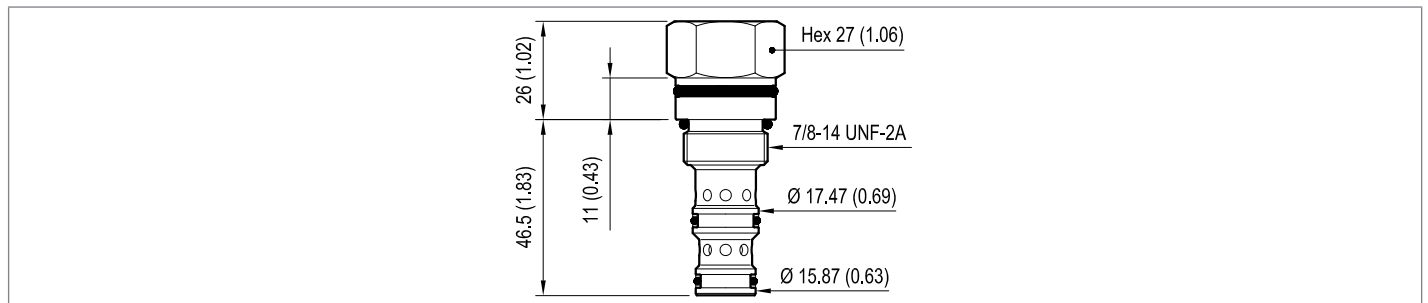
**85** Common cavity, Size 10

**Preferred types**

Type	Material number
04772200850500A	R901109495
04772200851100A	R901109497
047722108505000	R901162014
047722108511000	R901162015

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot external vent  
Common cavity, Size 16

VDSD-16A

04.77.22 - X - 27 - Z



**Description**

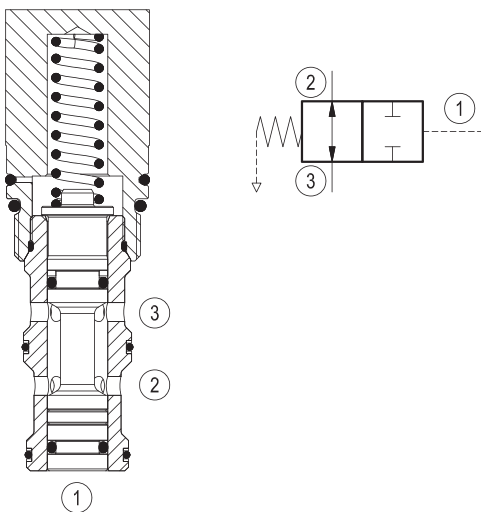
Flow is allowed bi-directionally between 2 and 3 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, blocking flow at both 2 and 3. The spring chamber is sealed and vented to atmosphere, allowing consistent shifting with only spring bias pressure independent of conditions at 2 or 3.

**Technical data**

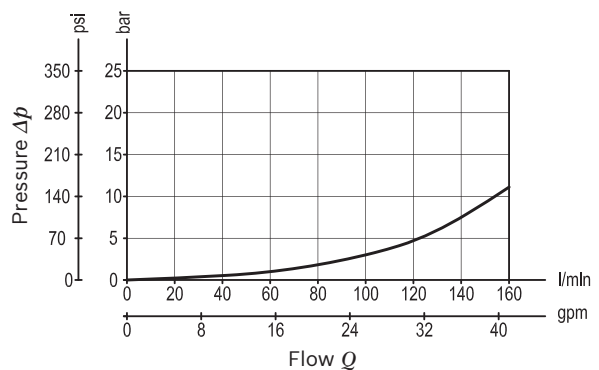
Max. operating pressure	350 bar (5000 psi)
Max. flow	160 l/min. (43 gpm)
Max. internal leakage <sup>1)</sup>	200 cm <sup>3</sup> /min. (12 cu.in./min.)
Pilot displacement volume	1.61 cm <sup>3</sup> (0.1 cu.in.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.67 kg (1.48 lbs)
Cavity	CA-16A-3N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16A3010530100 material no: R930001178
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

1) Measured at 200 bar (2900 psi)

2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.22</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot external vent

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

**27** Common cavity, Size 16

**SPRINGS**

Std. setting  
bar (psi)

**05** 5 (73) ± 20%

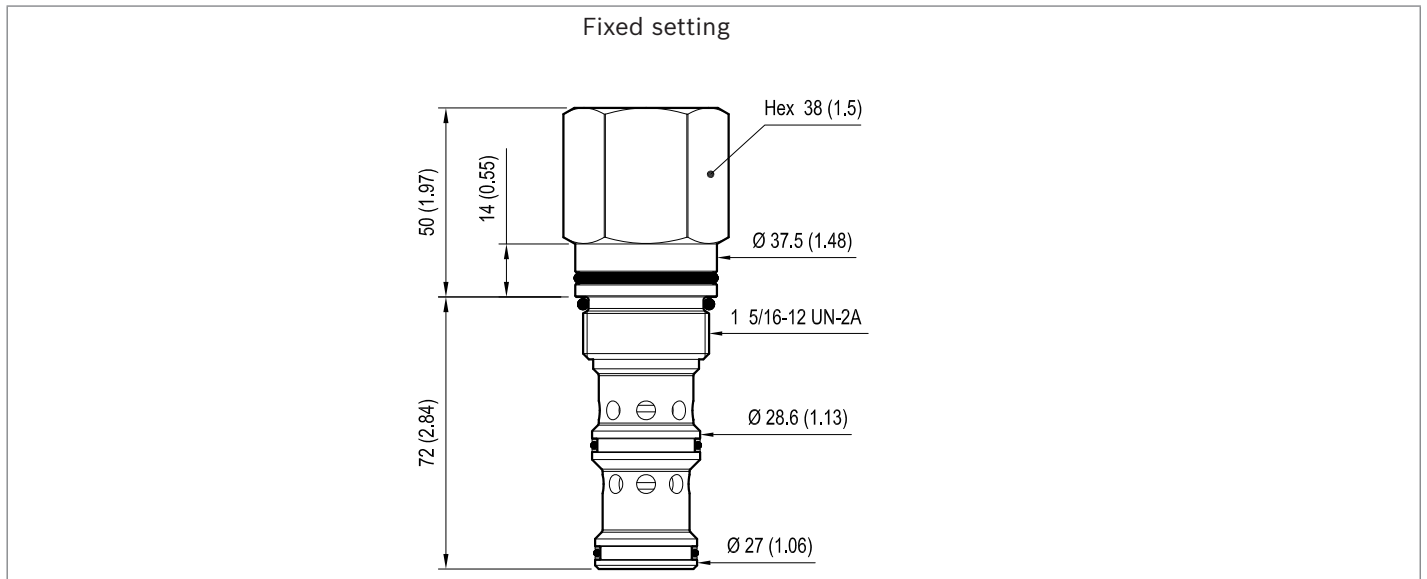
**11** 11 (160) ± 10%

**Preferred types**

Type	Material number
047722002705000	R930000925
047722002711000	R930000926
047722102705000	R930000921
047722102711000	R930000922

Type	Material number

**Dimensions**





Directional spool type, direct acting,  
external pilot internal drain  
Common cavity, Size 10

VDSH-10A

04.77.25 - X - 85 - Z

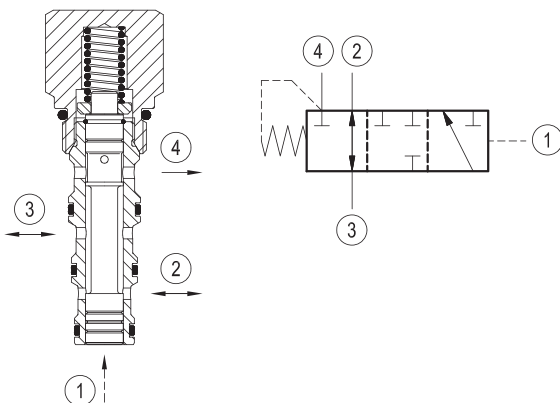


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	40 l/min. (11 gpm)
Max. internal leakage <sup>1)</sup>	150 cm <sup>3</sup> /min. (9 cu.in./min.) flow from 3 to 4 50 cm <sup>3</sup> /min. (3 cu.in./min.) flow from 3 to 2
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A4010530100 material no: R901111373
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

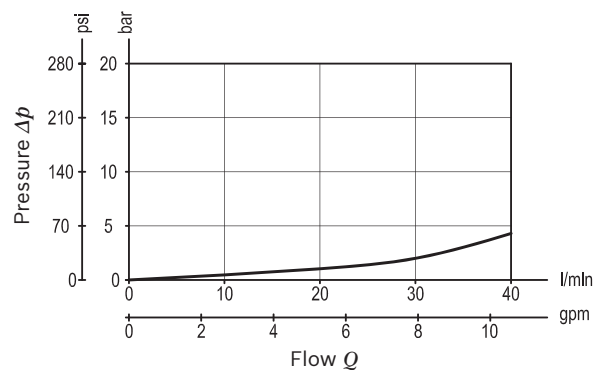
**Description**

Flow is allowed bi-directionally between 2 and 3, and blocked at 4 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, allowing bi-directional flow from 3 to 4 while blocking 2. The spring chamber is drained to 4, thus any pressure at 4 is additive to the spring bias and pilot pressure required for shifting.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.25</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot internal drain

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

**Adjustments**

**00** Fixed setting

**85** Common cavity, Size 10

**SPRINGS**

Std. setting  
bar (psi) ± 20%

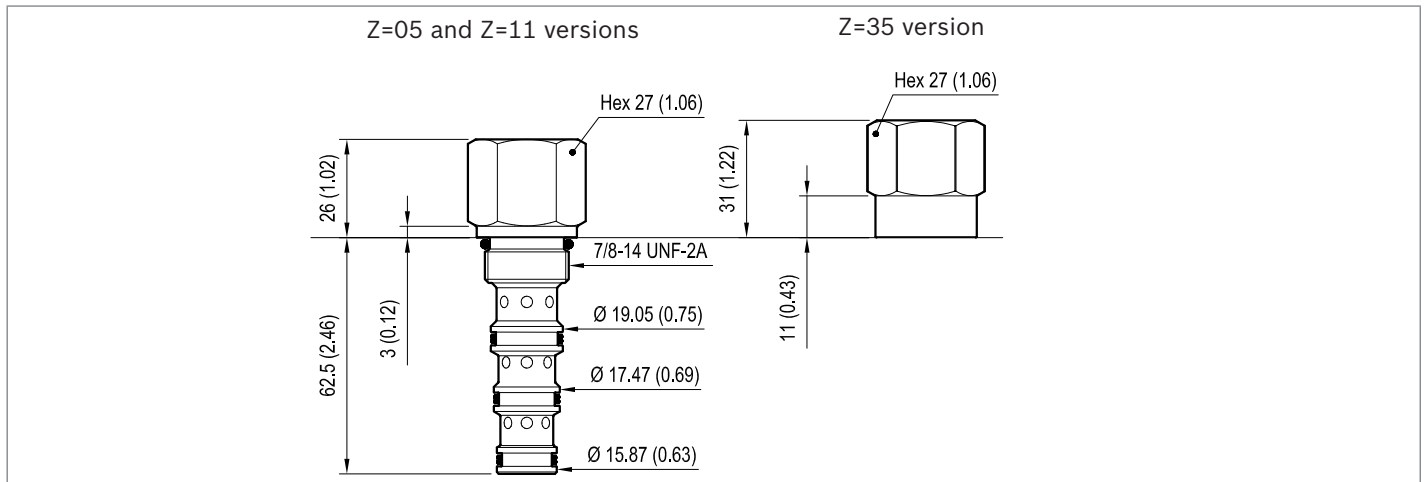
<b>05</b>	5.5 (80)
<b>11</b>	11.5 (167)
<b>35</b>	35 (508)

**Preferred types**

Type	Material number
047725008505000	R901109484
047725008511000	R901109485
047725008535000	R930000997

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot internal drain  
Common cavity, Size 16

VDSH-16A

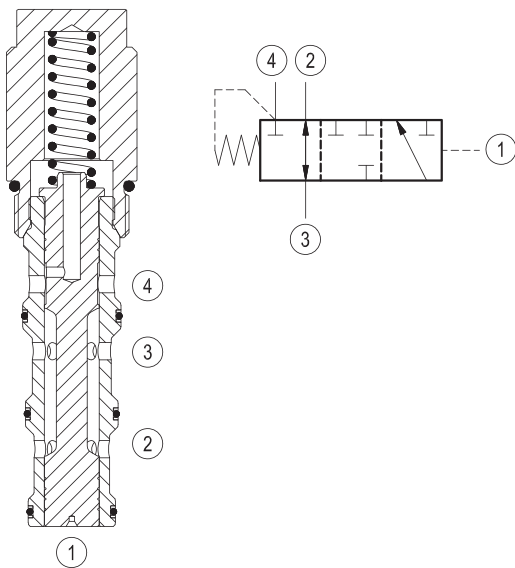
04.77.25 - X - 27 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	160 l/min. (43 gpm)
Max. internal leakage <sup>1)</sup>	160 cm <sup>3</sup> /min. (10 cu.in./min.)
Pilot displacement volume	1.61 cm <sup>3</sup> (0.1 cu.in.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.7 kg (1.54 lbs)
Cavity	CA-16A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16A4010530100 material no: R930000973
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

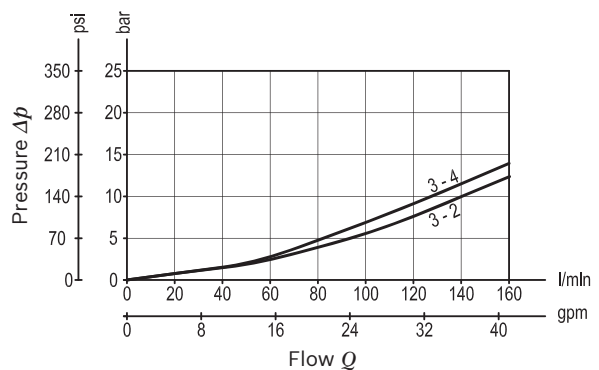
**Description**

Flow is allowed bi-directionally between 2 and 3, and blocked at 4 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, allowing bi-directional flow from 3 to 4 while blocking 2. The spring chamber is drained to 4, thus any pressure at 4 is additive to the spring bias and pilot pressure required for shifting.



- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.77.25</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot internal drain

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Adjustments

**00** Fixed setting

SPRINGS	
Std. setting bar (psi)	
<b>05</b>	5 (73) ± 20%
<b>11</b>	11 (160) ± 10%

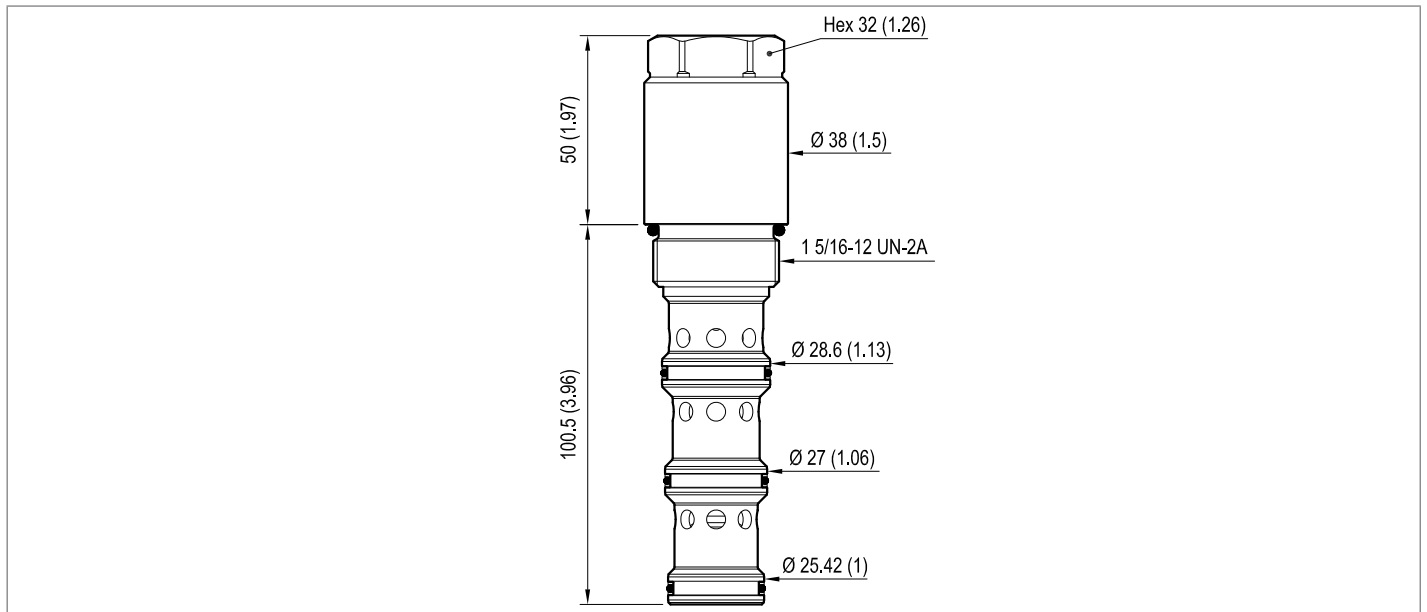
**27** Common cavity, Size 16

**Preferred types**

Type	Material number
047725002705000	R930000971
047725002711000	R930000972

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot internal drain  
Common cavity, Size 10

VDSK-10A

04.77.26 - X - 85 - Z

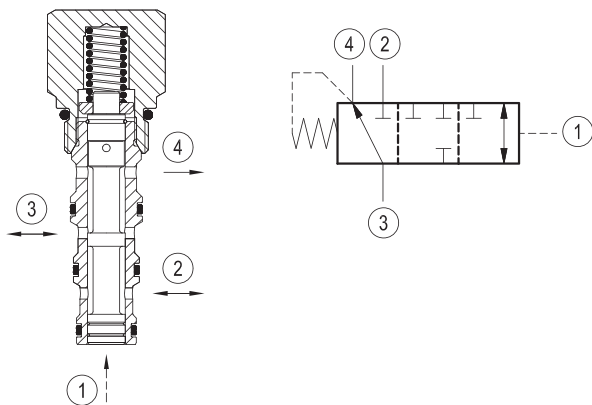


**Description**

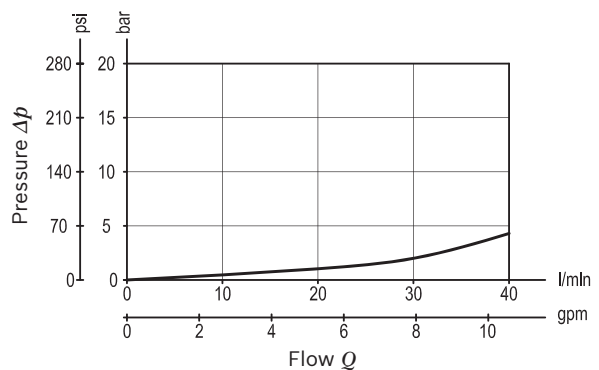
Flow is allowed from 3 to 4 and blocked at 2 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, allowing bi-directional flow between 2 and 3 while blocking 4. The spring chamber is drained to 4, thus any pressure at 4 is additive to the spring bias and pilot pressure required for shifting.

Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	40 l/min. (11 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A4010530100 material no: R901111373
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.26</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot internal drain

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Adjustments

**00** Fixed setting

SPRINGS	
Std. setting bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11.5 (167) ± 10%

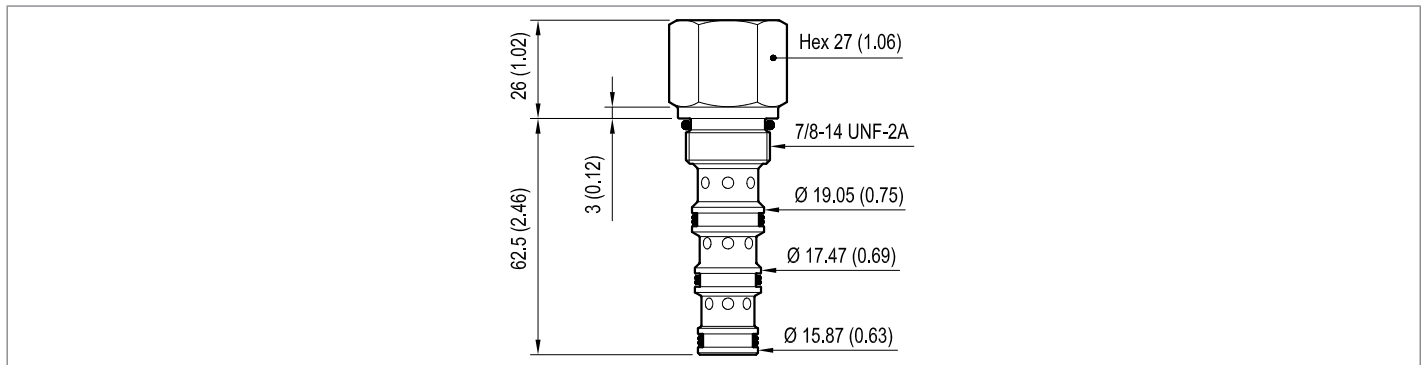
**85** Common cavity, Size 10

**Preferred types**

Type	Material number
047726008505000	R901109486
047726008511000	R901109487

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot internal drain  
Common cavity, Size 16

VDSK-16A

04.77.26 - X - 27 - Z

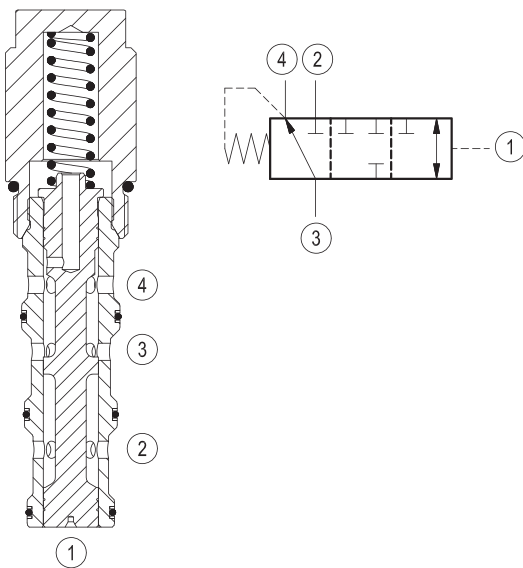


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	160 l/min. (43 gpm)
Max. internal leakage <sup>1)</sup>	160 cm <sup>3</sup> /min. (10 cu.in./min.)
Pilot displacement volume	1.61 cm <sup>3</sup> (0.1 cu.in.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.66 kg (1.46 lbs)
Cavity	CA-16A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16A4010530100 material no: R930000973
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

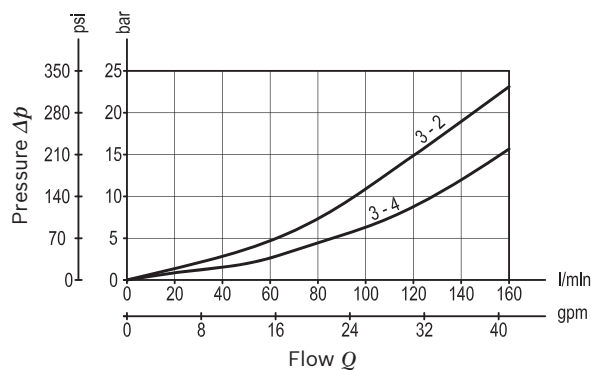
**Description**

Flow is allowed from 3 to 4 and blocked at 2 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, allowing bi-directional flow between 2 and 3 while blocking 4. The spring chamber is drained to 4, thus any pressure at 4 is additive to the spring bias and pilot pressure required for shifting.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.26</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot internal drain

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

Adjustments

**00** Fixed setting

**27** Common cavity, Size 16

SPRINGS	
Std. setting bar (psi)	
<b>05</b>	5 (73) ± 20%
<b>11</b>	11 (160) ± 10%

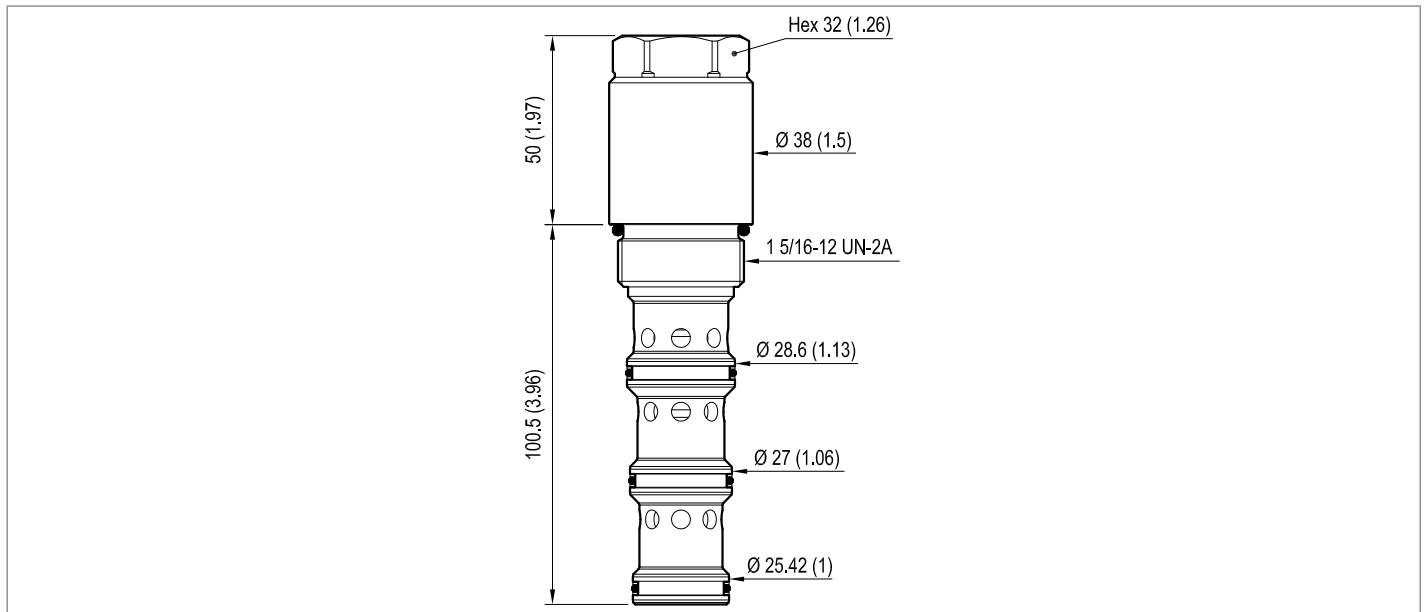
Note: Special settings available. Contact factory authorized representative for ordering code.

**Preferred types**

Type	Material number
047726002705000	R930000975
047726002711000	R930000976

Type	Material number

**Dimensions**





Directional spool type, direct acting,  
external pilot external vent  
Common cavity, Size 10

VDSJ-10A

04.77.19 - X - 85 - Z



**Description**

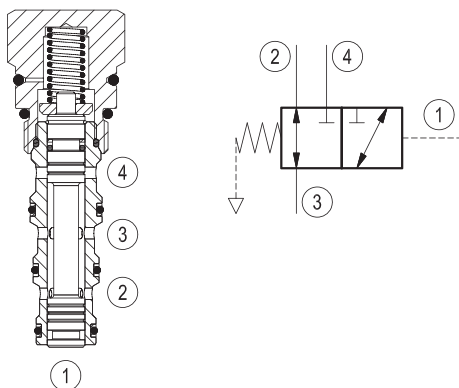
Flow is allowed bi-directionally between 2 and 3, and blocked at 4 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, allowing bi-directional flow between 3 and 4 while blocking 2. The spring chamber is sealed and vented to atmosphere, allowing consistent shifting with only spring bias pressure independent of conditions at 2 or 3.

**Technical data**

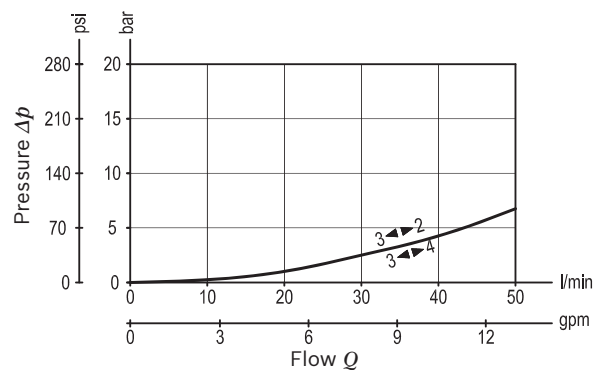
Max. operating pressure	350 bar (5000 psi)
Max. flow	50 l/min. (13 gpm)
Max. internal leakage <sup>1)</sup>	50 cm <sup>3</sup> /min. (3 cu.in./min.)
Pilot displacement volume	0.28 cm <sup>3</sup> (0.02 cu.in)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)
Weight	0.2 kg (0.44 lbs)
Cavity	CA-10A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG10A4010530100 material no: R901111373
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

1) Measured at 200 bar (2900 psi)

2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.19</b>	<b>X</b>	<b>85</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot external vent

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

**10** With O-Ring

SPRINGS	
Std. setting bar (psi)	
<b>05</b>	5.5 (80) ± 20%
<b>11</b>	11.5 (167) ± 10%

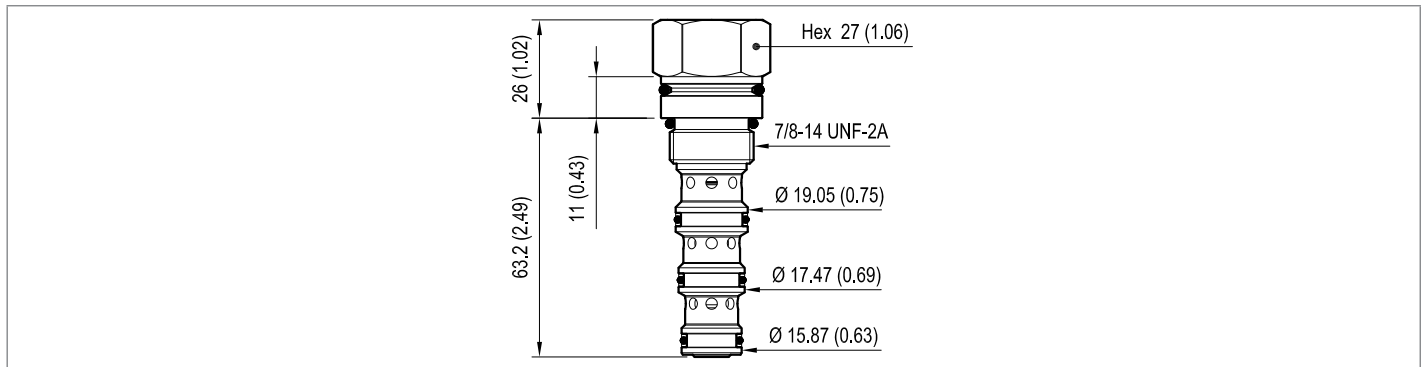
**85** Common cavity, Size 10

**Preferred types**

Type	Material number
047719008505000	R930000952
047719008511000	R930000953
047719108505000	R930001328
047719108511000	R930001329

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot external vent  
Common cavity, Size 16

VDSJ-16A

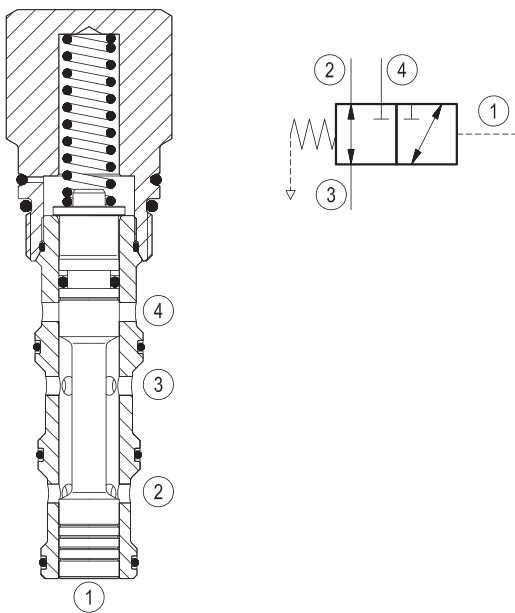
04.77.19 - X - 27 - Z



Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	160 l/min. (43 gpm)
Max. internal leakage <sup>1)</sup>	80 cm <sup>3</sup> /min. (5 cu.in./min.)
Pilot displacement volume	1.61 cm <sup>3</sup> (0.1 cu.in)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.74 kg (1.63 lbs)
Cavity	CA-16A-4N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16A4010530100 material no: R93000973
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

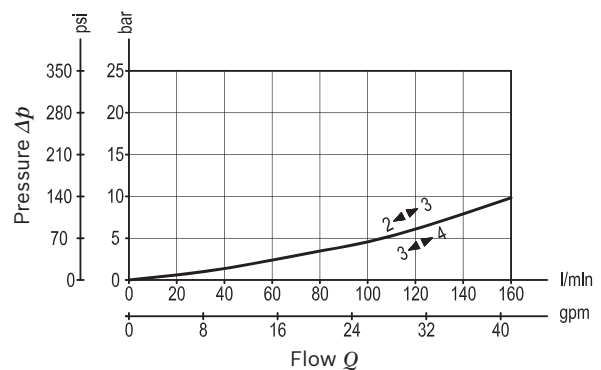
**Description**

Flow is allowed bi-directionally between 2 and 3, and blocked at 4 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, allowing bi-directional flow between 3 and 4 while blocking 2. The spring chamber is sealed and vented to atmosphere, allowing consistent shifting with only spring bias pressure independent of conditions at 2 or 3.



- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.77.19</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot external vent

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

O-Ring on pilot piston

**00** No O-Ring

SPRINGS	
Std. setting bar (psi)	
<b>05</b>	5 (73) ± 20%
<b>11</b>	11 (160) ± 10%

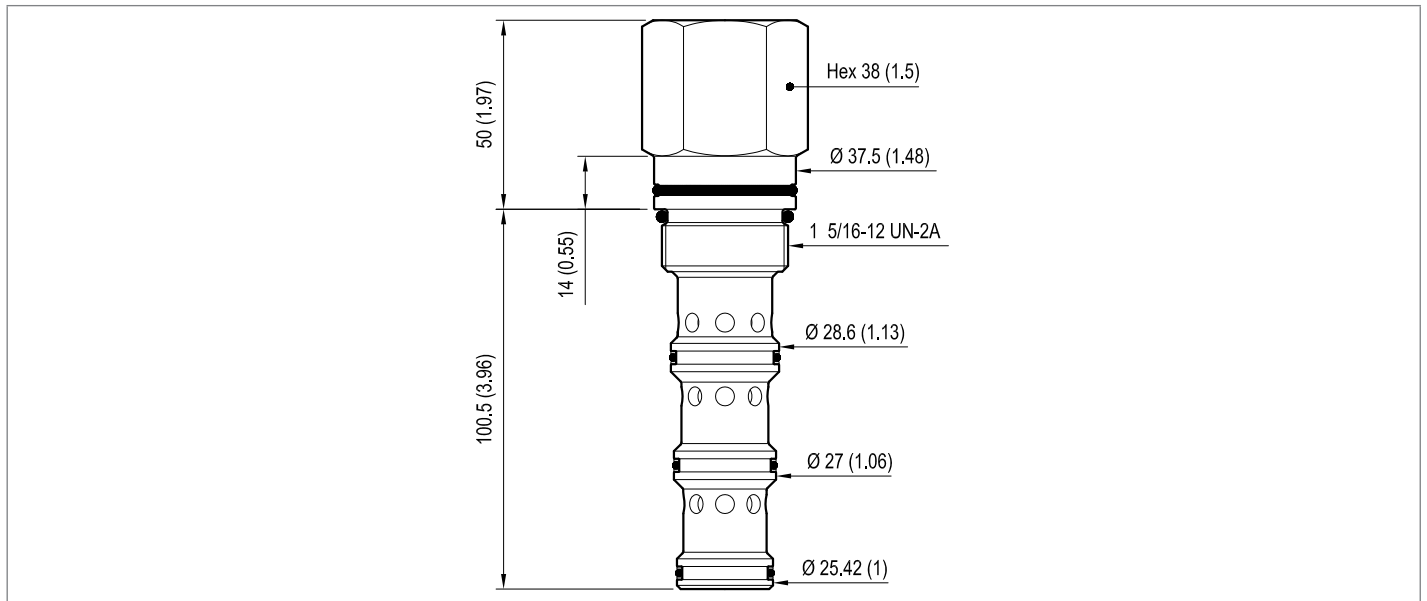
**27** Common cavity, Size 16

**Preferred types**

Type	Material number
04771900270500A	R930006976
04771900271100A	R930006977

Type	Material number

**Dimensions**



Directional spool type, direct acting,  
external pilot port vented  
Special cavity, CA-16A-5C

VDSJ-16A-RN

04.77.42 - X - 27 - Z

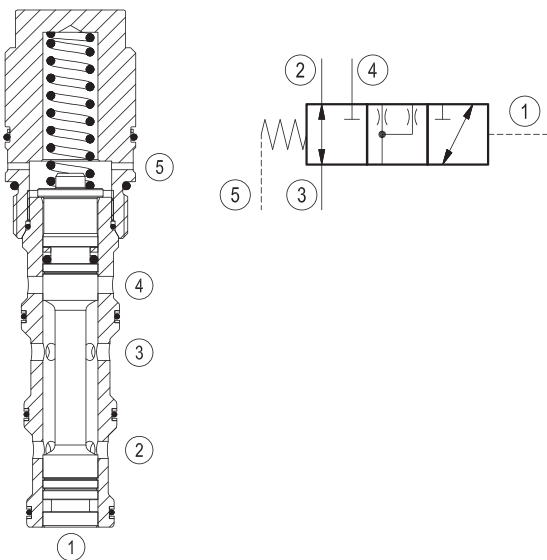


Technical data	
Max. operating pressure	350 bar (5000 psi)
Max. flow	160 l/min. (43 gpm)
Max. internal leakage <sup>1)</sup>	80 cm <sup>3</sup> /min. (5 cu.in./min.)
Pilot displacement volume	1.61 cm <sup>3</sup> (0.1 cu.in)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	108 - 122 Nm (80 - 90 ft-lbs)
Weight	0.74 kg (1.63 lbs)
Cavity	CA-16A-5C (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG16A5010530100 material no: R930006567
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

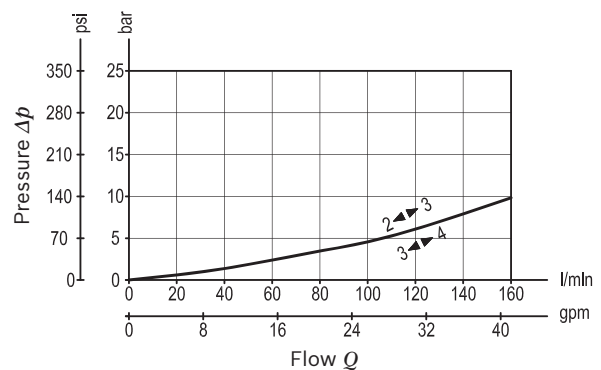
**Description**

Flow is allowed bi-directionally between 2 and 3, and blocked at 4 until pressure at 1 rises to overcome the spring bias against the spool. When this bias pressure is surpassed, the spool shifts, allowing bi-directional flow between 3 and 4 while blocking 2. The port 5 to be connected with the external drain, allowing consistent shifting with only spring bias pressure independent of conditions at 2, 3 and 4.

- 1) Measured at 200 bar (2900 psi)
- 2) Only external seals for 10 valves



**Characteristic curve**



**Ordering code**

<b>04.77.42</b>	<b>X</b>	<b>27</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, direct acting  
external pilot port vented

O-Ring on pilot piston

**00** No O-Ring

**27** Common cavity, Size 16

Series O/A to L  
unchanged performances and dimensions

Version and options standard

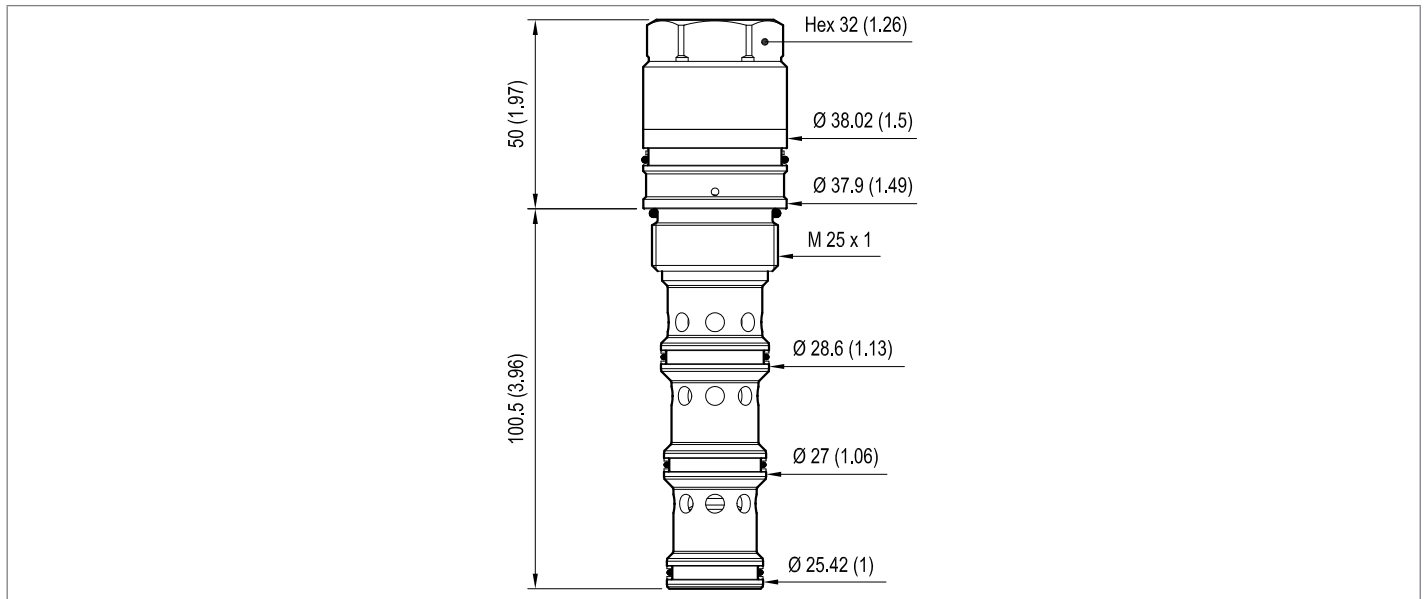
SPRINGS	
Std. setting bar (psi)	
<b>05</b>	5 (73) ± 20%
<b>11</b>	11 (160) ± 10%

**Preferred types**

Type	Material number
047742002705000	R930006568
047742002711000	R930006569

Type	Material number

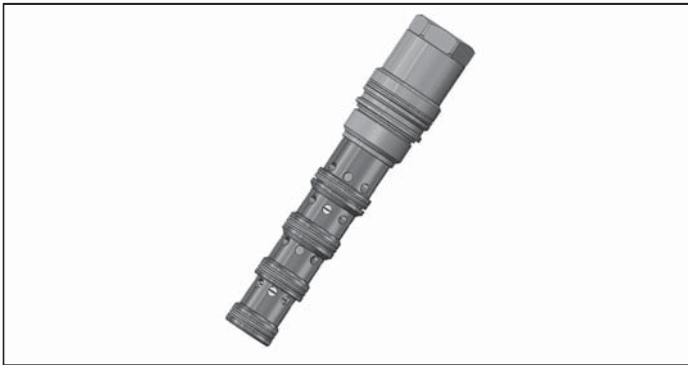
**Dimensions**



Directional spool type,  
piloted, 4-way  
Special cavity, CA-20B-6C

VDSP-20B

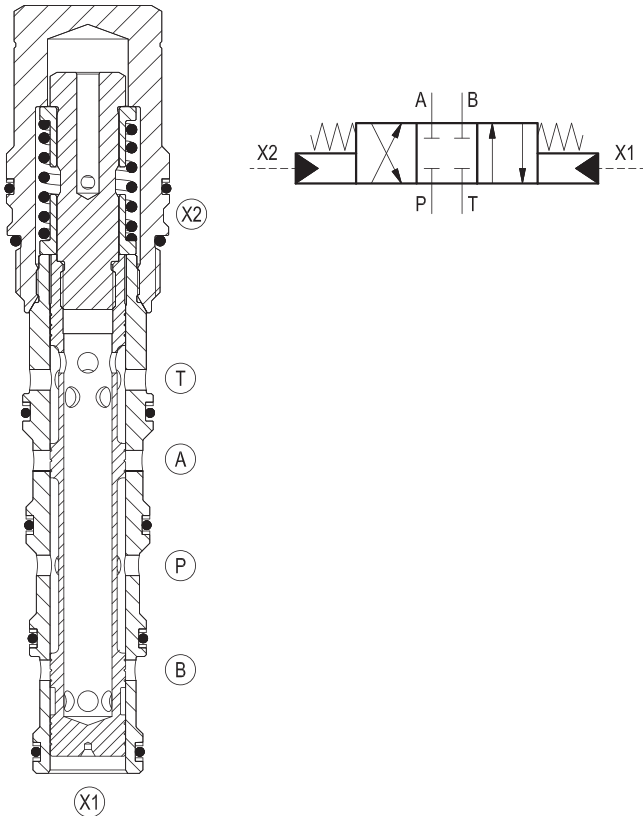
04.77.35 - X - 93 - Z



**Description**

In neutral position, all ports A, B, P, and T are blocked.

When remote pilot signal at port X1 rises to overcome the spring bias against the spool, the valve shifts to allow flow between P and A, and between T and B. When remote pilot signal at port X2 rises to overcome the spring bias against the spool, the valve shifts to allow flow between P and B, and between A and T.



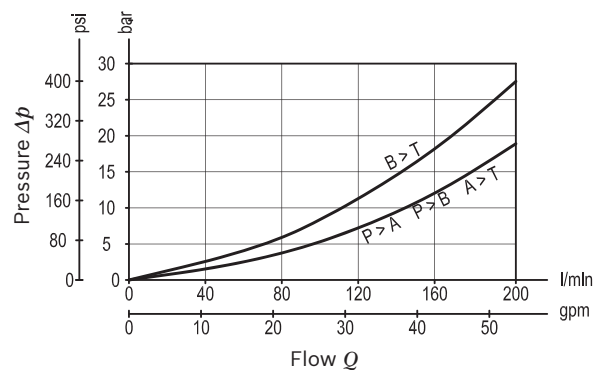
**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. pressure admitted ports X1 and X2	210 bar (3000 psi)
Max. flow	200 l/min. (53 gpm)
Max. internal leakage <sup>1)</sup>	10 cm <sup>3</sup> /min. (0.6 cu.in./min.)
Pilot displacement volume	3.5 cm <sup>3</sup> (0.2 cu.in)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	125 - 155 Nm (92 - 114 ft-lbs)
Weight	1.4 kg (3.1 lbs)
Special cavity	CA-20B-6C
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG20B6010530100 material no: R930001706
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

1) Measured at 300 bar (4500 psi) from A-B to P-T-X1-X2

2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.77.35</b>	<b>X</b>	<b>93</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, piloted, 4-way

Adjustments

**00** Fixed setting

**93** Special cavity, CA-20B-6C

Series O/A to L  
unchanged performances and dimensions

Version and options standard

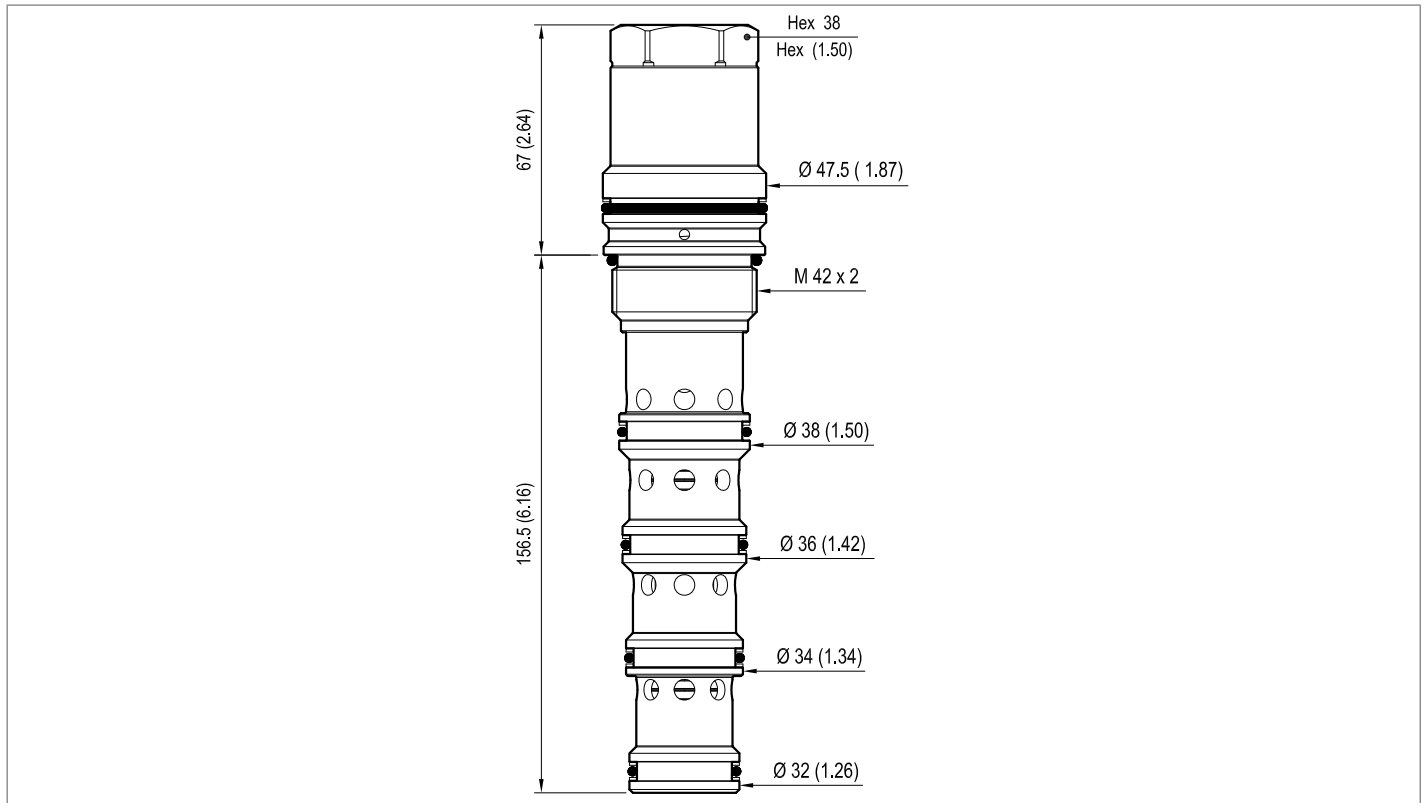
SPRINGS	
	Std. setting bar (psi)
<b>05</b>	7 (100) ± 15%

**Preferred types**

Type	Material number
04773500930500A	R930000370

Type	Material number

**Dimensions**





Directional spool type,  
piloted, 4-way  
Special cavity, CA-20B-6C

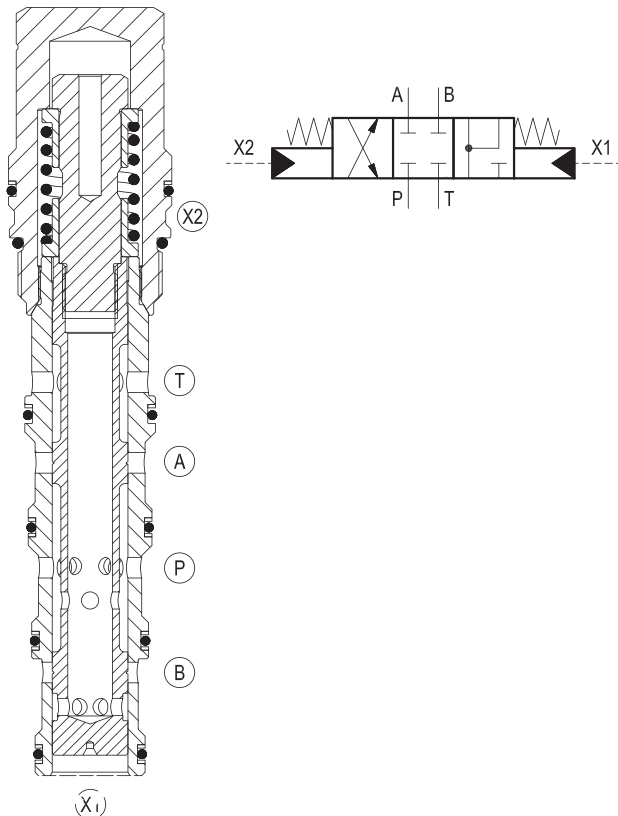
VDSP-20B-R

04.77.36 - X - 93 - Z



**Description**

In neutral position, all ports A, B, P, and T are blocked.  
When remote pilot signal at port X1 rises to overcome the spring bias against the spool, the valve shifts to allow flow between port P, A and B, and port T is blocked.  
When remote pilot signal at port X2 rises to overcome the spring bias against the spool, the valve shifts to allow flow between P and B, and between A and T.  
VDSP-20B-R, compared to VDSB-20B, should be used when regeneration of flow is requested.

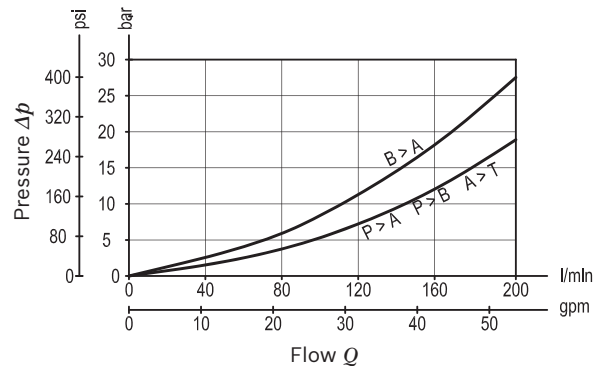


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. pressure admitted ports X1 and X2	210 bar (3000 psi)
Max. flow	200 l/min. (53 gpm)
Max. internal leakage <sup>1)</sup>	10 cm <sup>3</sup> /min. (0.6 cu.in./min.)
Pilot displacement volume	3.5 cm <sup>3</sup> (0.2 cu.in)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	125 - 155 Nm (92 - 114 ft-lbs)
Weight	1.4 kg (3.1 lbs)
Special cavity	CA-20B-6C
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>2)</sup>	Code: RG20B6010530100 material no: R930001706
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

- 1) Measured at 300 bar (4500 psi) from A-B to P-T-X1-X2
- 2) Only external seals for 10 valves

**Characteristic curve**



**Ordering code**

<b>04.77.36</b>	<b>X</b>	<b>93</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Directional spool type, piloted, 4-way

Adjustments

**00** Fixed setting

**93** Special cavity, CA-20B-6C

Series O/A to L  
unchanged performances and dimensions

Version and options standard

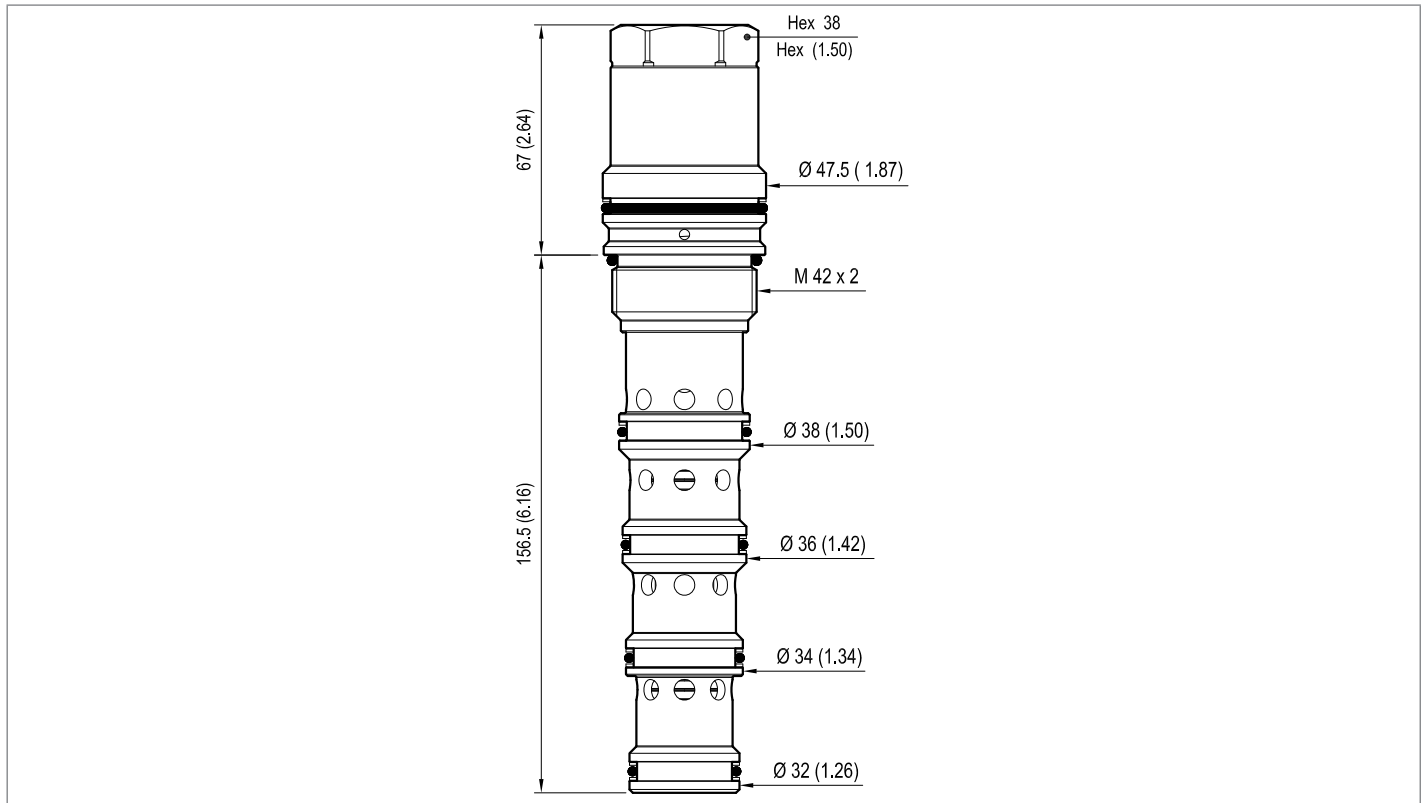
SPRINGS	
	Std. setting bar (psi)
<b>05</b>	7 (100) ± 15%

**Preferred types**

Type	Material number
04773600930500A	R930000832

Type	Material number
------	-----------------

**Dimensions**



## Mechanical cartridge valves

### Directional manual pilot operated

Designation	Description	Cavity	Code	Data sheet	Page
Manual operated, poppet 2-way normally closed	VMI-8A-2A-06-NC	Size 08	OD55X1837Z	18326-01	431
Manual operated, poppet 2-way normally closed	VMI-8A-2A-06-NC-VU	Special	OD55111937Z	18326-02	435
Manual operated, poppet 2-way normally closed	VMI-8A-2A-09-NC	Special	OD55X1737Z	18326-05	439
Manual operated, poppet 2-way normally closed	VMI-8A-2A-12-NC	Special	OD55X2137Z	18326-07	443
Manual operated, poppet 2-way normally open	VMI-8A-2A-06-NA	Size 08	OD55X181700	18326-03	447
Manual operated, poppet 2-way normally open	VMI-8A-2A-06-NA-VU	Special	OD55121917Z	18326-04	451
Manual operated, poppet 2-way normally open	VMI-8A-2A-09-NA	Special	OD55X171700	18326-06	455
Manual operated, poppet 2-way normally open	VMI-8A-2A-12-NA	Special	OD55X211700	18326-08	459



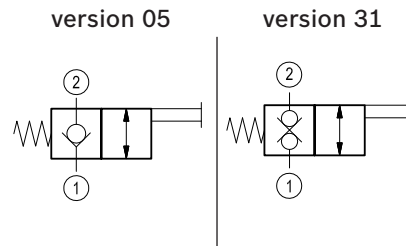
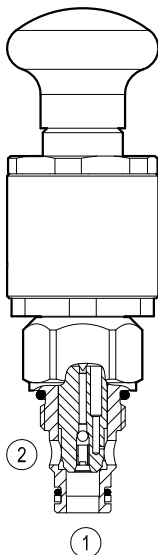
# Directional control valves manual operated poppet 2-way normally closed

Common cavity, Size 08



VMI-8A-2A-06-NC

OD.55 - X - 18.37 - Z



## General

Weight	kg (lbs)	0.28 (0.62)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		CA-08A-2N see RE 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 05	code material no.	RG08A2010520100 R901101437
Seal kit - version 31	code material no.	RG08A2010530100 R901101544
Other technical data		See data sheet RE 18350-50

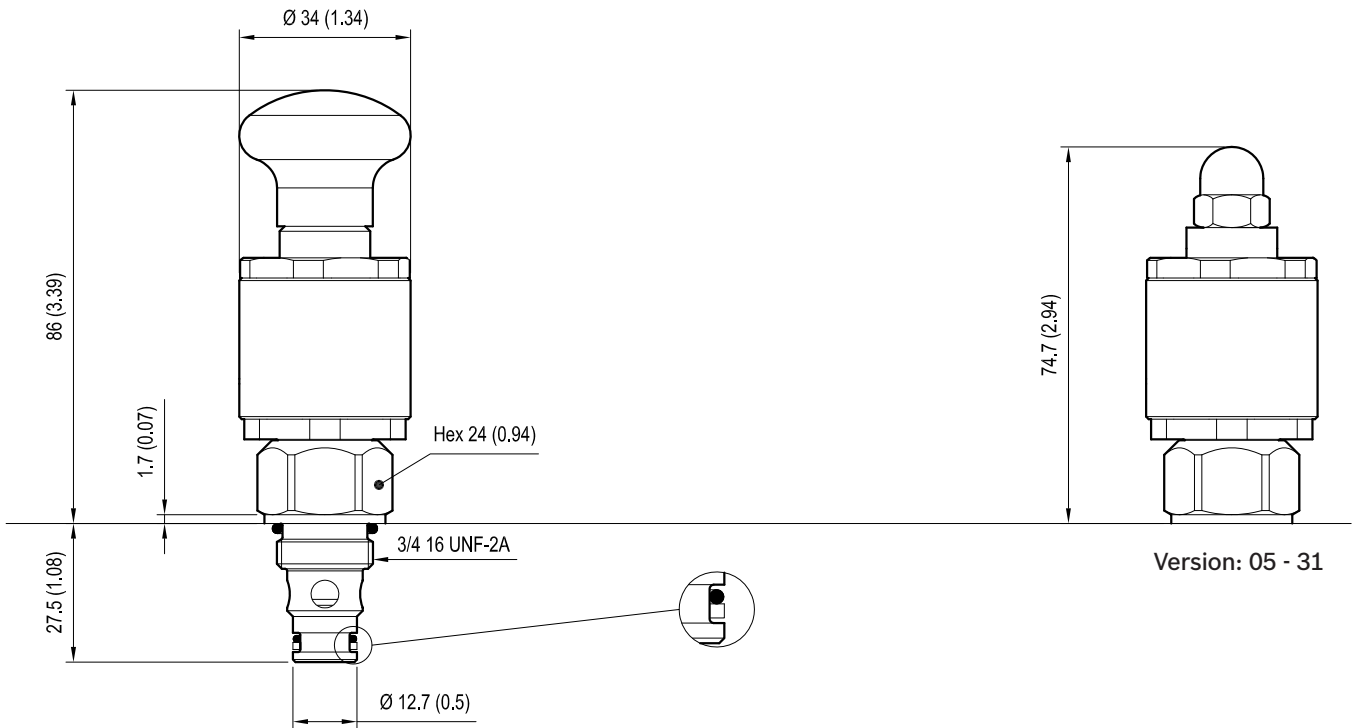
Only for cam-operated valves:

Operating stroke	mm (in)	3 (0.12)
Max. overstroke	mm (in)	0.5 (0.02)

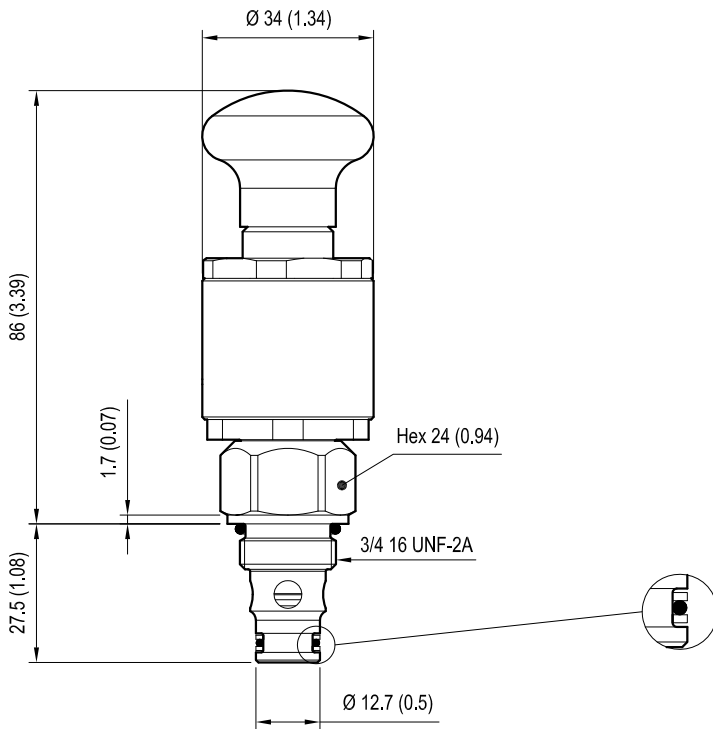
**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure. (version 05)

## Dimensions

Version 05: Directional control valves manual operated poppet 2-way normally closed



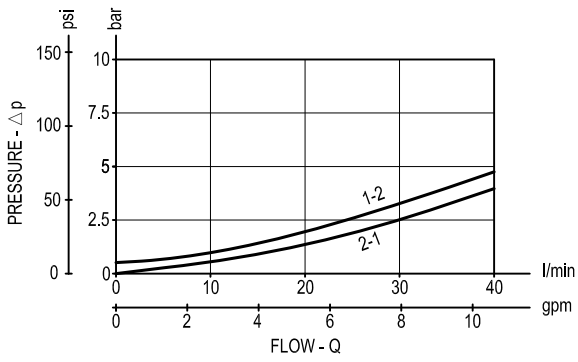
Version 31: Directional control valves manual operated poppet 2-way double lock normally closed



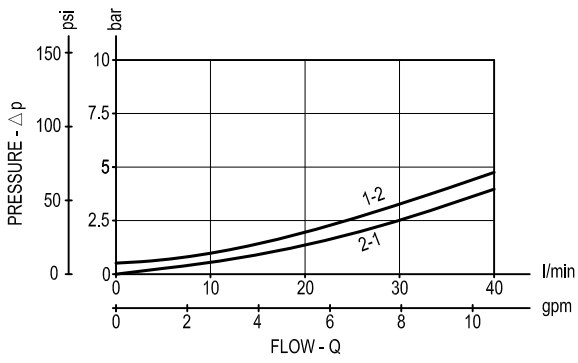
mm (Inches)

# Performance graphs

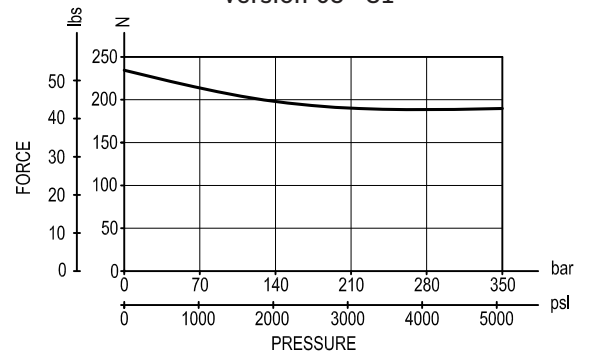
Version 05



Version 31



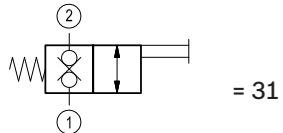
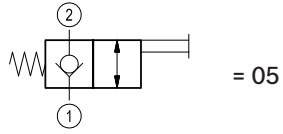
Version 05 - 31



### Ordering code

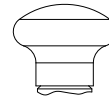
OD.55	X	18	37	Z
-------	---	----	----	---

Directional control valves  
manual operated poppet  
2-way normally closed



Hand-Operated

00 =



Cam-Operated

01 =



Common cavity: CA-08A-2N

**Note:** hand-operated version with detent available by request;  
please consult factory

Type	Material number	Type	Material number
OD550518370000	R901109436		
OD550518370100	R901109443		
OD553118370000	R901109444		
OD553118370100	R901109445		



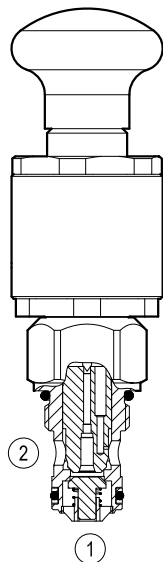
# Directional control valves manual operated poppet 2-way normally closed

Special cavity, 019-E

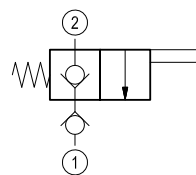


VMI-8A-2A-06-NC-VU

OD.55.11.19.37 - Z



Version 11



2A11

## General

Weight	kg (lbs)	0.28 (0.62)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

Only for cam-operated valves:

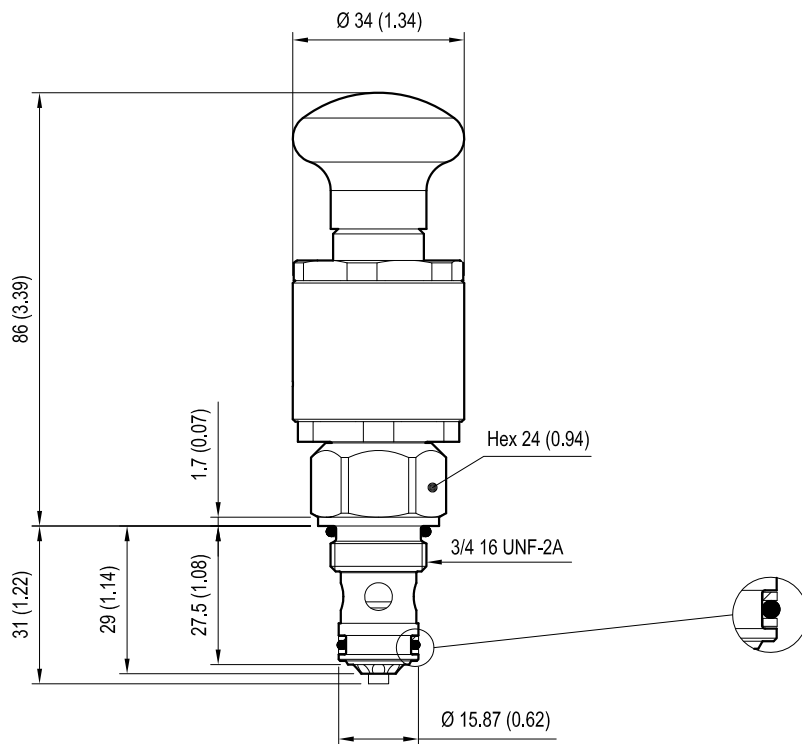
Operating stroke	mm (in)	3 (0.12)
Max. overstroke	mm (in)	0.5 (0.02)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		019-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG19E201053010 R934003561
Other technical data		See data sheet RE 18350-50

## Dimensions

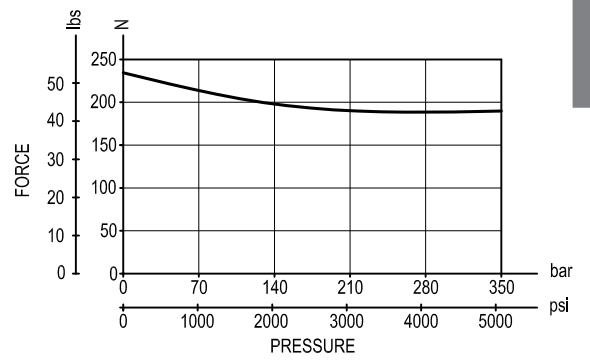
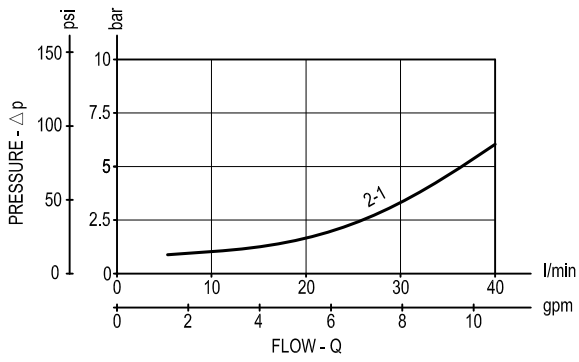
Directional control valves manual operated poppet 2-way normally closed - Special cavity



mm (Inches)

# Performance graphs

Version 11

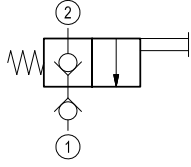


1

### Ordering code

OD.55	11	19	37	Z
-------	----	----	----	---

Directional control valves  
manual operated poppet  
2-way normally closed



Special cavity: 019-E

Hand-Operated

00 =



Cam-Operated

01 =



Type	Material number
OD551119370000	R934003668
OD551119370100	R934003669

Type	Material number

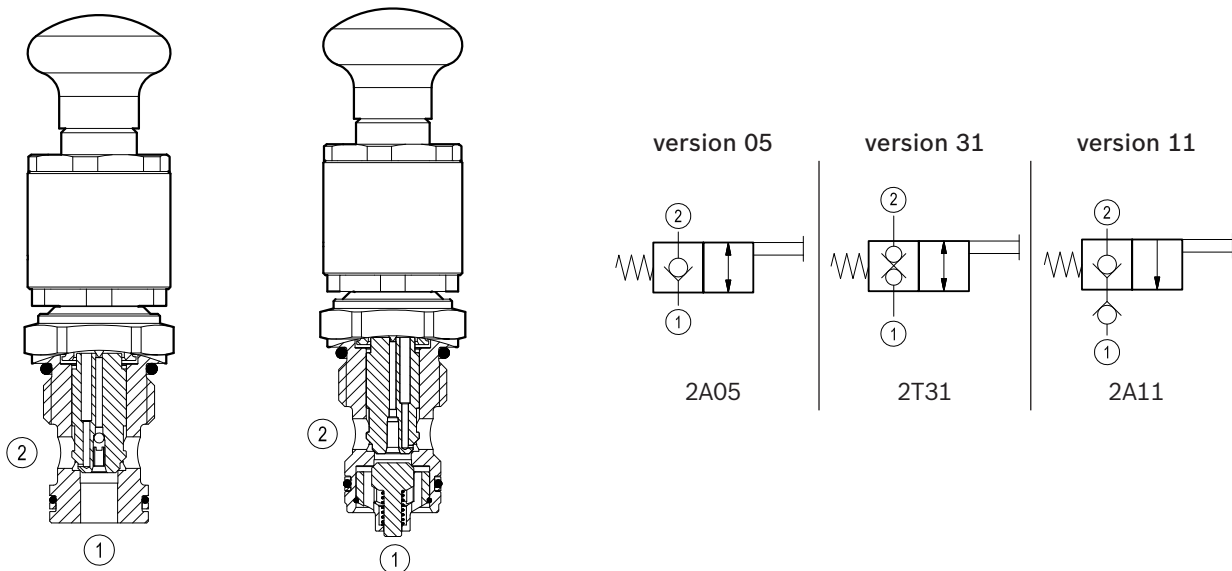
# Directional control valves manual operated poppet 2-way normally closed

Special cavity, 017-E



VMI-8A-2A-09-NC

OD.55 - X - 17.37 - Z



## General

Weight	kg (lbs)	0.28 (0.62)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	70 (19)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	54-66 (40-49)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Special cavity		017-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 05	code material no.	RG17E201052010 R934003562
Seal kit - version 31	code material no.	RG17E201053010 R934003563
Other technical data		See data sheet RE 18350-50

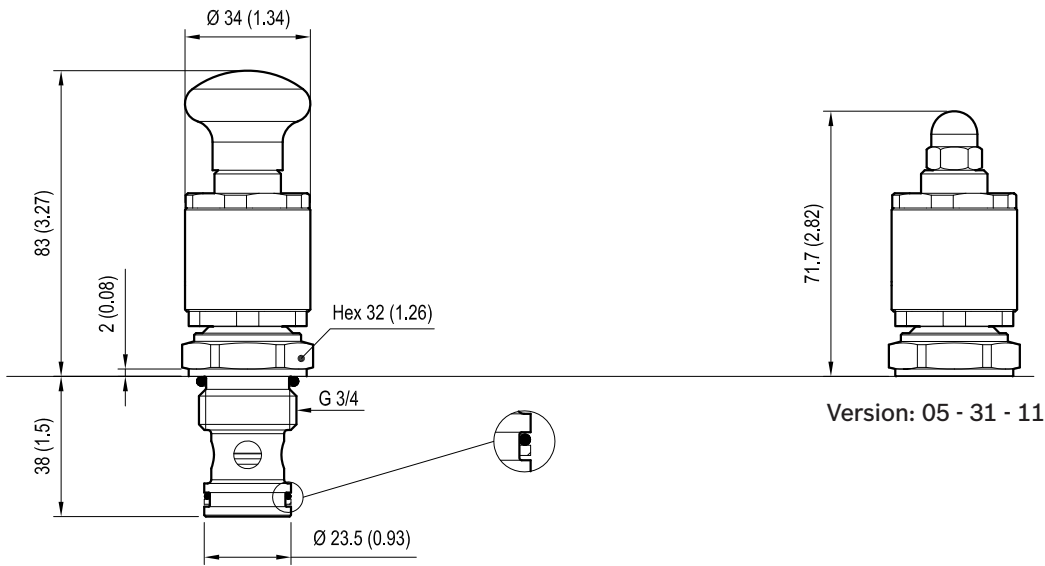
Only for cam-operated valves:

Operating stroke	mm (in)	3 (0.12)
Max. overstroke	mm (in)	0.5 (0.02)

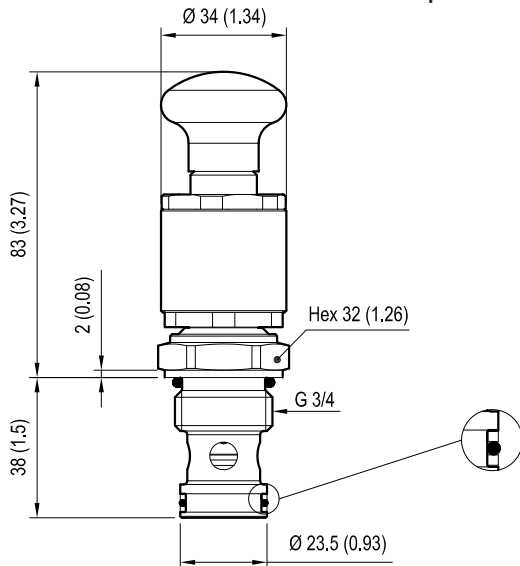
**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure. (version 05)

## Dimensions

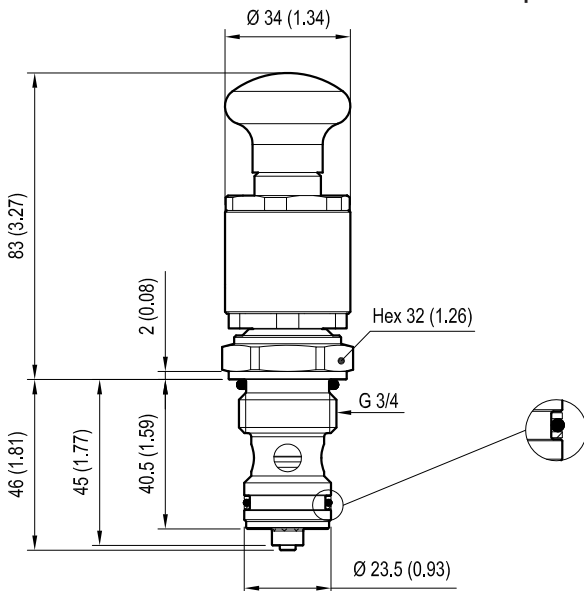
Version 05: Directional control valves manual operated poppet 2-way normally closed - Special cavity



Version 31: Directional control valves manual operated poppet 2-way double lock normally closed - Special cavity



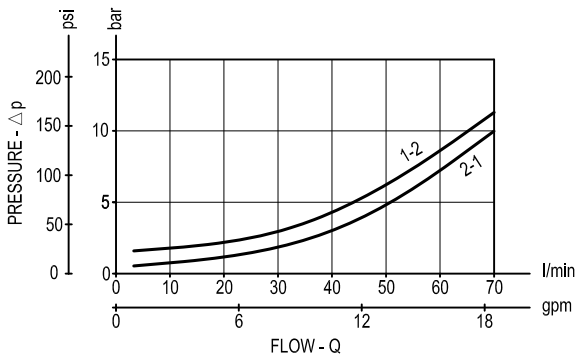
Version 11: Directional control valves manual operated poppet 2-way normally closed - Special cavity



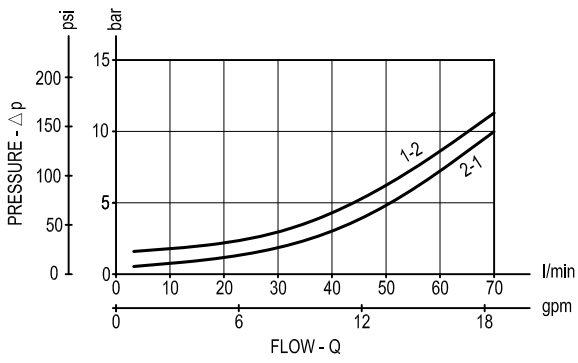
mm (Inches)

# Performance graphs

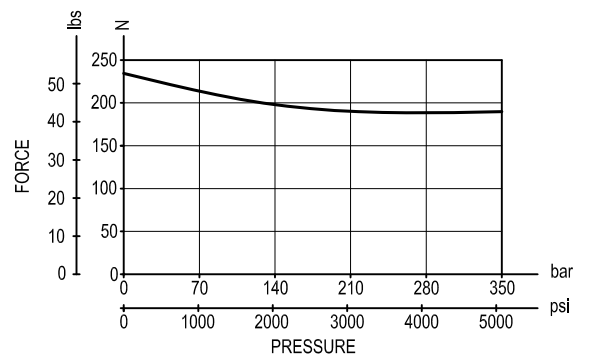
Version 05



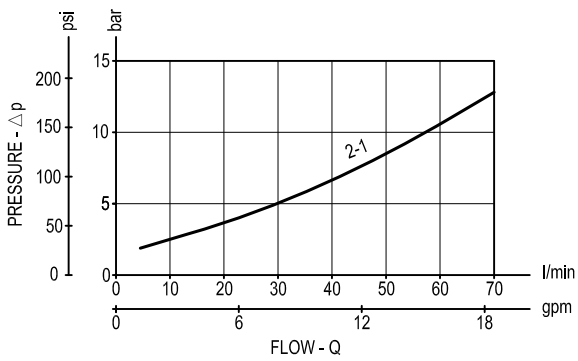
Version 31



Version 05 - 31 - 11



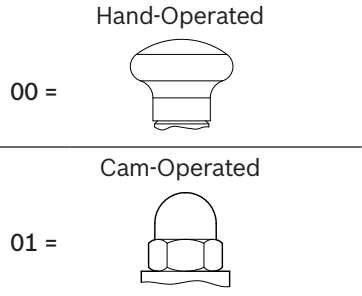
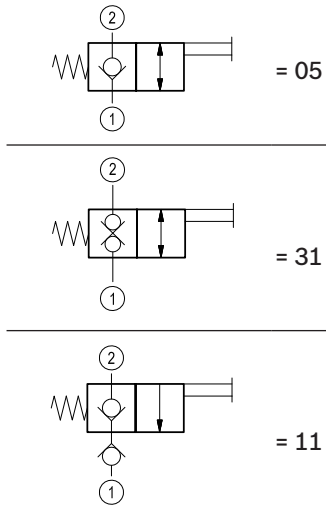
Version 11



### Ordering code

OD.55	X	17	37	Z
-------	---	----	----	---

Directional control valves  
manual operated poppet  
2-way normally closed



Special cavity: 017-E

**Note:** hand-operated version with detent available by request; please consult factory

Type	Material number	Type	Material number
OD550517370000	R934001424		
OD550517370100	R934001425		
OD553117370000	R934001437		
OD553117370100	R934001438		
OD551117370000	R934003846		
OD551117370100	R934003671		



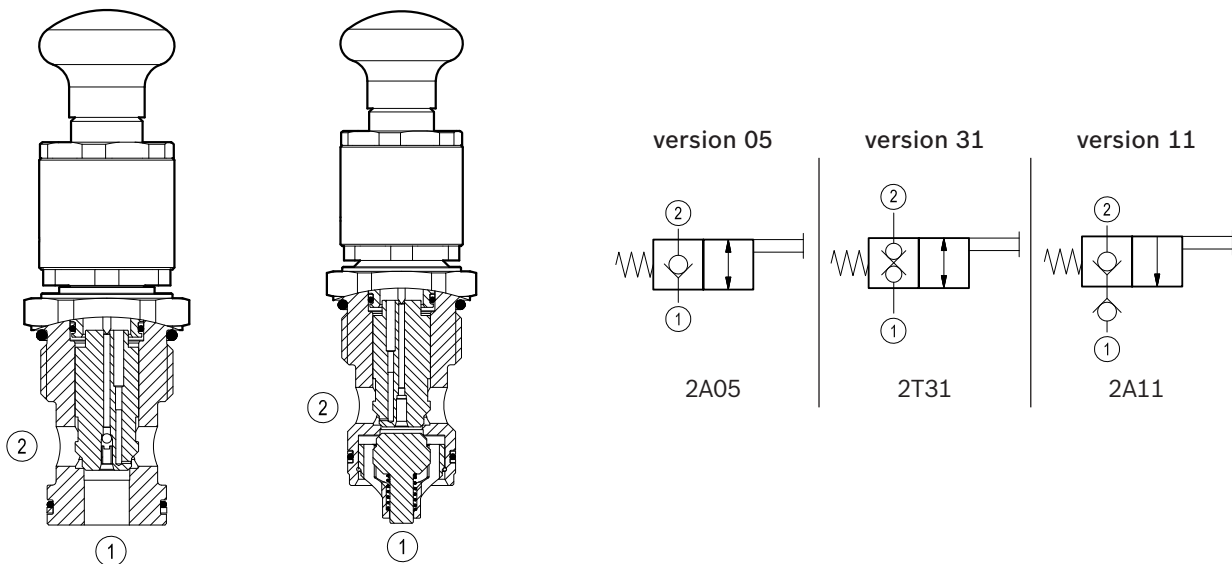
# Directional control valves manual operated poppet 2-way normally closed

Special cavity, 021-E



VMI-8A-2A-12-NC

OD.55 - X - 21.37 - Z



## General

Weight	kg (lbs)	0.5 (1.1)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	150 (39)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	80-100 (59-74)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Special cavity		021-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 05	code material no.	RG21E201052010 R934003566
Seal kit - version 31	code material no.	RG21E201053010 R934003567
Other technical data		See data sheet RE 18350-50

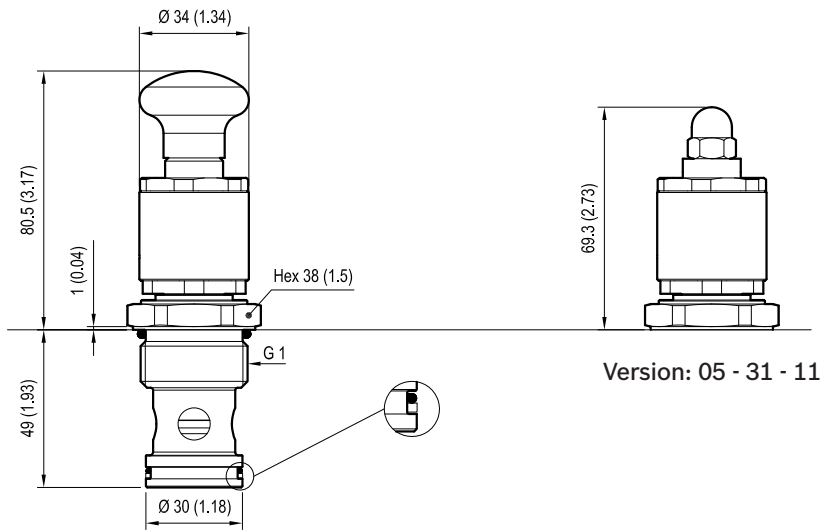
Only for cam-operated valves:

Operating stroke	mm (in)	3 (0.12)
Max. overstroke	mm (in)	0.5 (0.02)

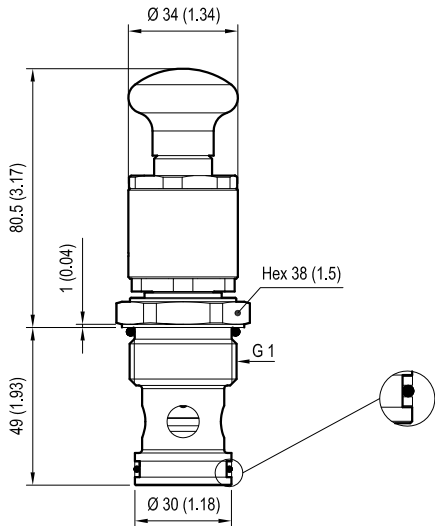
**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure. (version 05)

## Dimensions

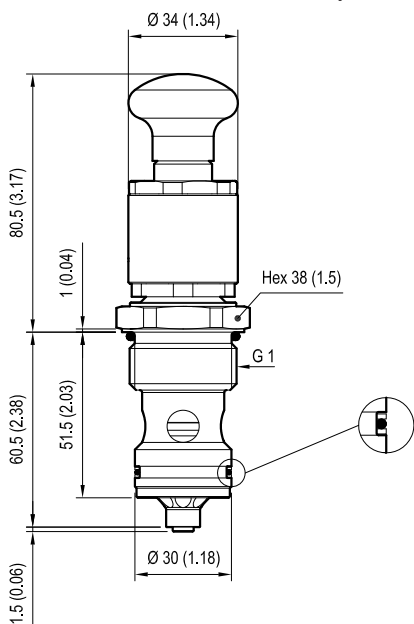
Version 05: Directional control valves manual operated poppet 2-way normally closed - Special cavity



Version 31: Directional control valves manual operated poppet 2-way double lock normally closed - Special cavity



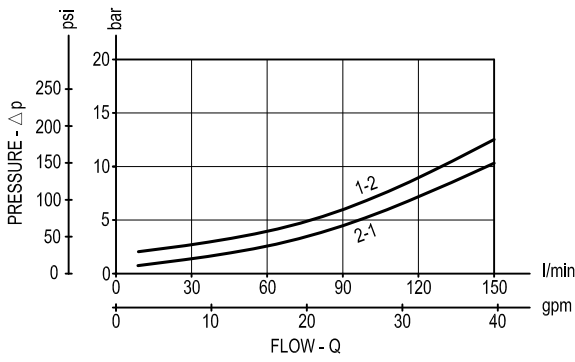
Version 11: Directional control valves manual operated poppet 2-way normally closed - Special cavity



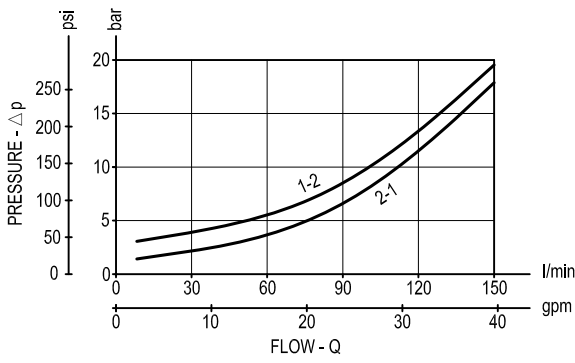
mm (Inches)

# Performance graphs

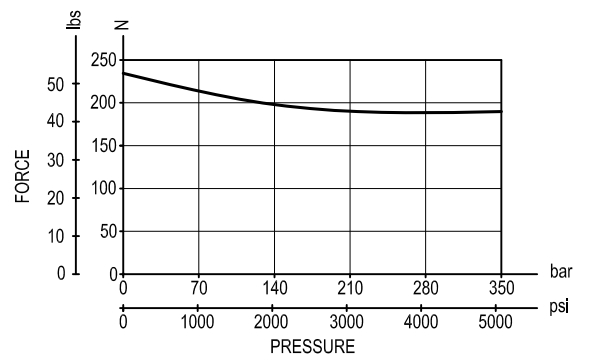
Version 05



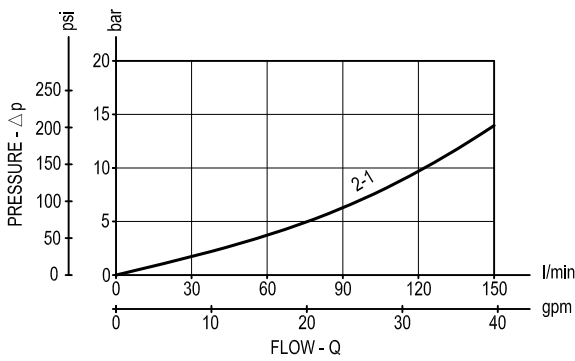
Version 31



Version 05 - 31 - 11



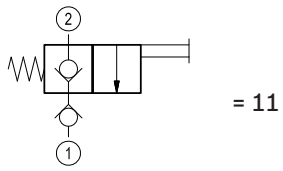
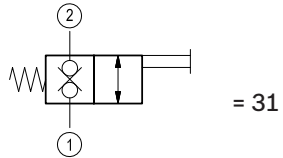
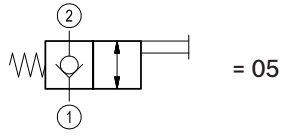
Version 11



### Ordering code

OD.55	X	21	37	Z
-------	---	----	----	---

Directional control valves  
manual operated poppet  
2-way normally closed



Hand-Operated

00 =



Cam-Operated

01 =



Special cavity: 021-E

Type	Material number
OD550521370000	R934001430
OD550521370100	R934001431
OD553121370000	R934001441
OD553121370100	R934001442
OD551121370000	R934004212
OD551121370100	R934004213

Type	Material number

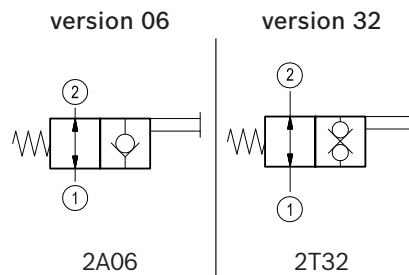
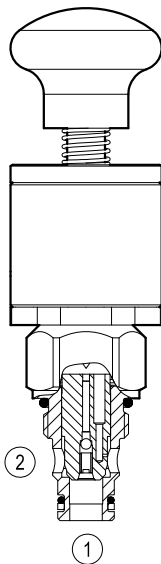
# Directional control valves manual operated poppet 2-way normally open

Common cavity, Size 08



VMI-8A-2A-06-NA

OD.55 - X - 18.17.00



## General

Weight	kg (lbs)	0.27 (0.6)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 39-51 (29-38)

Recommended degree of fluid contamination Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14

Cavity CA-08A-2N see RE 18325-70

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

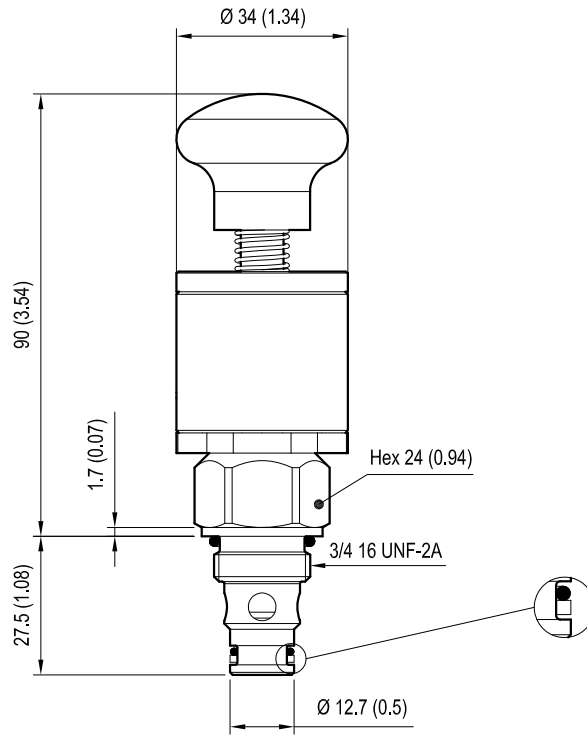
Seal kit - version 06 code material no. RG08A2010520100 R901101437

Seal kit - version 32 code material no. RG08A2010530100 R901101544

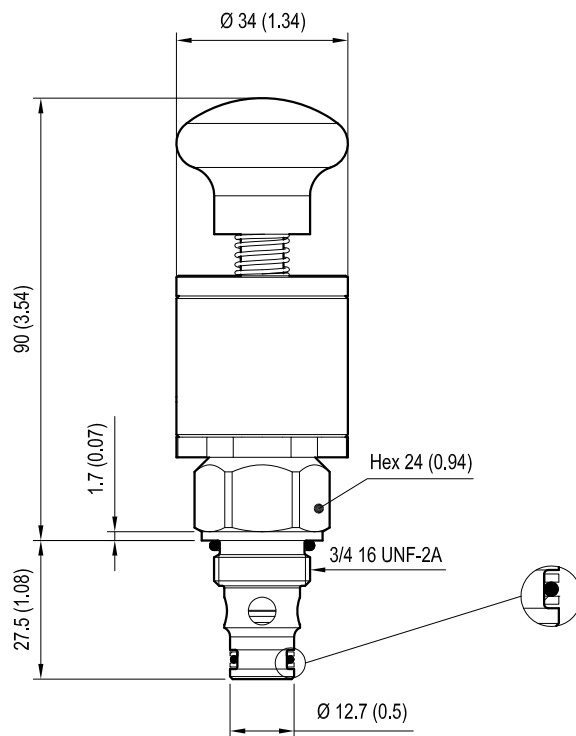
Other technical data See data sheet RE 18350-50

## Dimensions

Version 06: Directional control valves manual operated poppet 2-way normally open



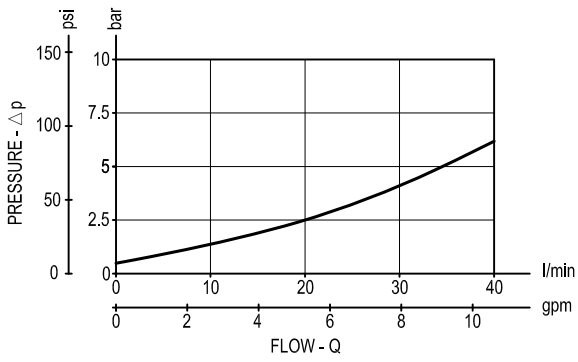
Version 32: Directional control valves manual operated poppet 2-way double lock normally open



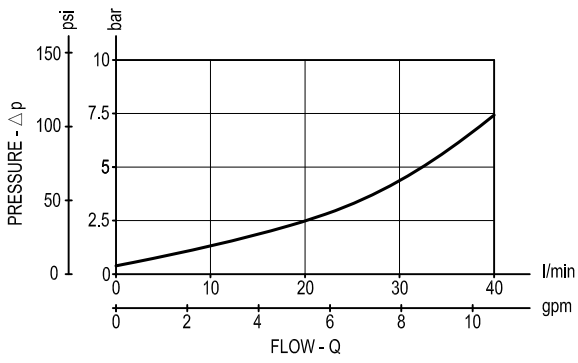
mm (Inches)

# Performance graphs

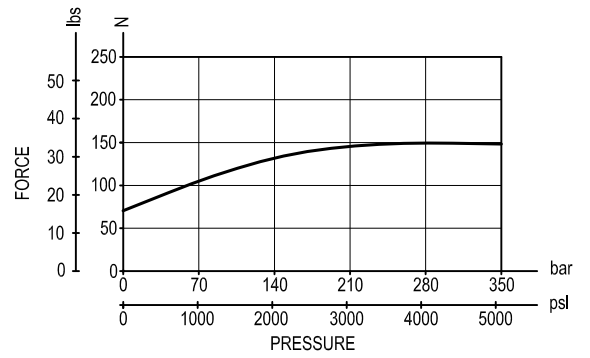
Version 06



Version 32



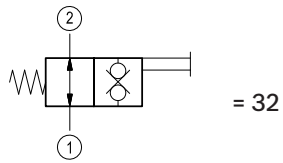
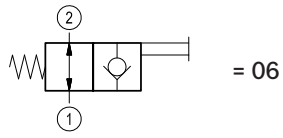
Version 06 - 32



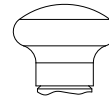
### Ordering code

OD.55	*	18	17	00
-------	---	----	----	----

Directional control valves  
manual operated poppet  
2-way normally open



Hand-Operated



Common cavity: CA-08A-2N

**Note:** hand-operated version with detent available by request;  
please consult factory

Type	Material number
OD550618170000	R901109446
OD553218170000	R901109447

Type	Material number



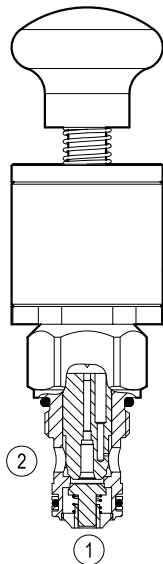
# Directional control valves manual operated poppet 2-way normally open

Special cavity, 019-E

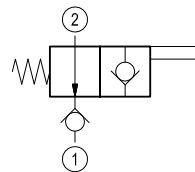


VMI-8A-2A-06-NA-VU

OD.55.12.19.17 - Z



Version 12



2A12

## General

Weight	kg (lbs)	0.27 (0.6)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 39-51 (29-38)

Recommended degree of fluid contamination Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14

Cavity 019-E see RE 18325-75

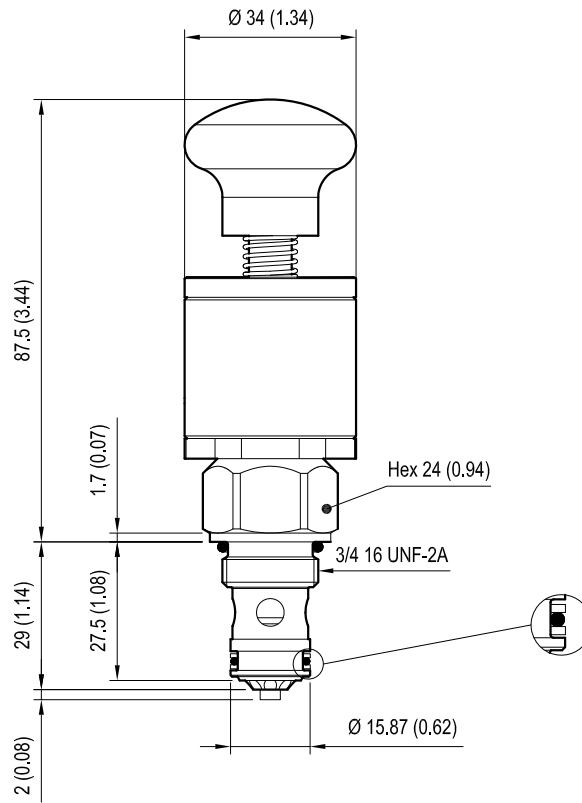
Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit code material no. RG19E201053010 R934003561

Other technical data See data sheet RE 18350-50

## Dimensions

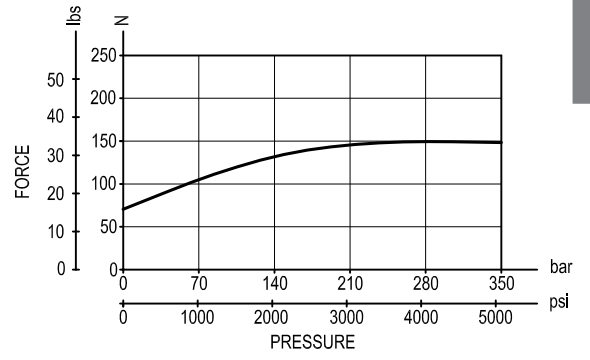
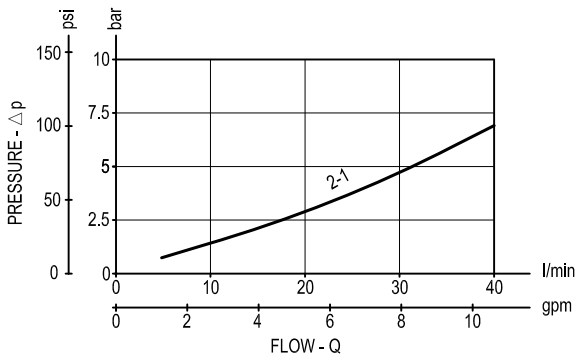
Directional control valves manual operated poppet 2-way normally open - Special cavity



[ mm (Inches) ]

# Performance graphs

Version 12

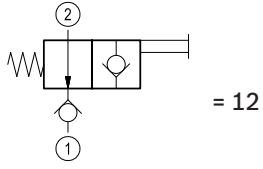


1

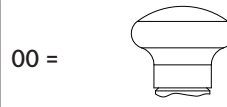
### Ordering code

OD.55	*	19	17	*
-------	---	----	----	---

Directional control valves  
manual operated poppet  
2-way normally open



Hand-Operated



Special cavity: 019-E

Type	Material number
OD551219170000	R934003670

Type	Material number

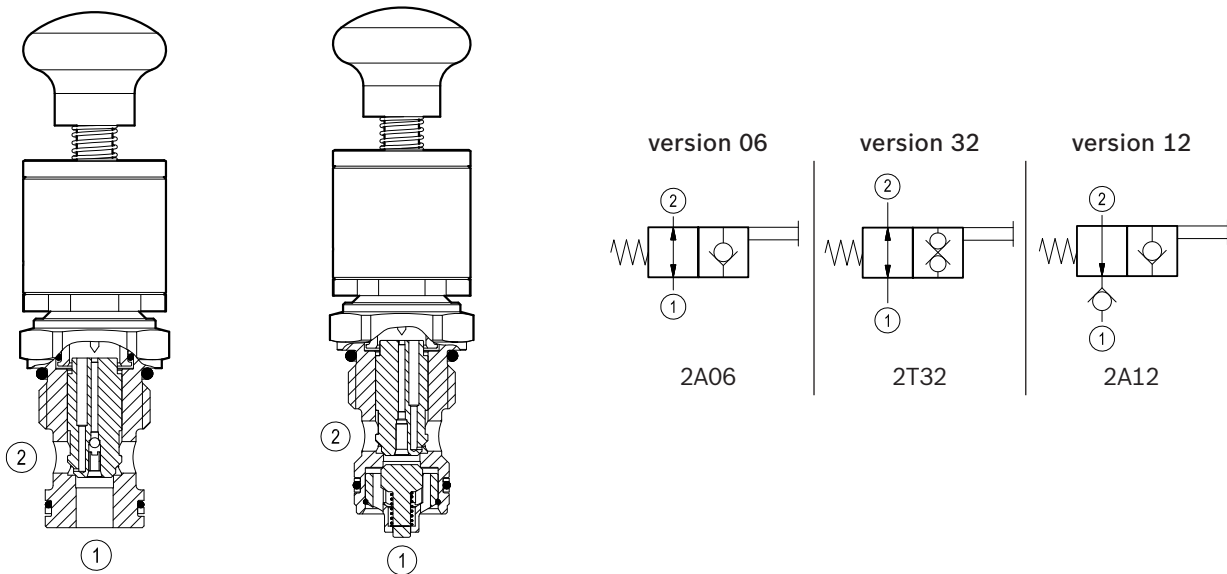
# Directional control valves manual operated poppet 2-way normally open

Special cavity, 017-E



VMI-8A-2A-09-NA

OD.55 - X - 17.17.00



## General

Weight	kg (lbs)	0.36 (0.79)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	70 (19)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 54-66 (40-49)

Recommended degree of fluid contamination Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14

Special cavity 017-E see RE 18325-75

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

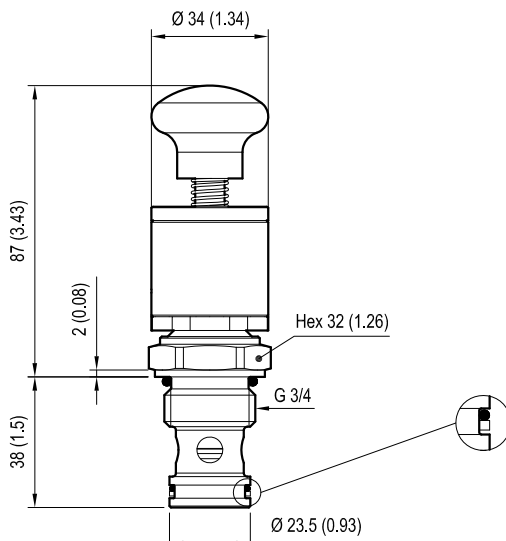
Seal kit - version 06 code material no. RG17E201052010 R934003562

Seal kit - version 12 code material no. RG17E201053010 r934003563

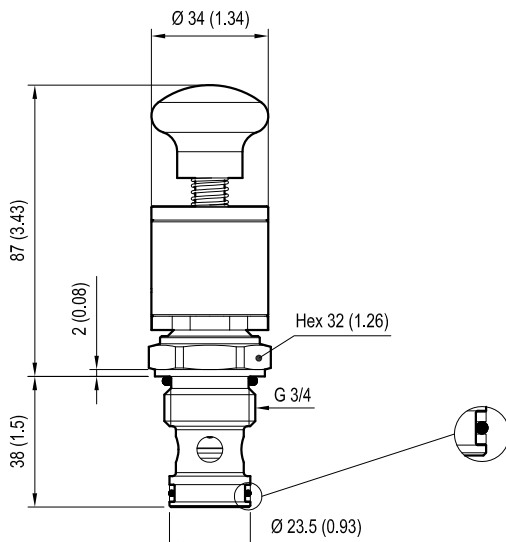
Other technical data See data sheet RE 18350-50

## Dimensions

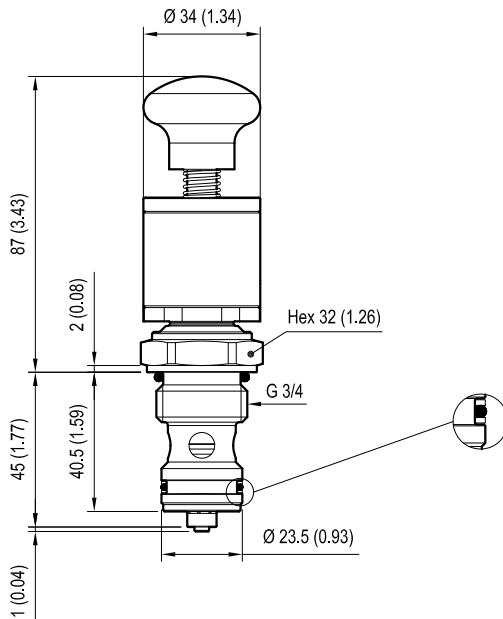
Version 06: Directional control valves manual operated poppet 2-way normally open - Special cavity



Version 32: Directional control valves manual operated poppet 2-way double lock normally open - Special cavity



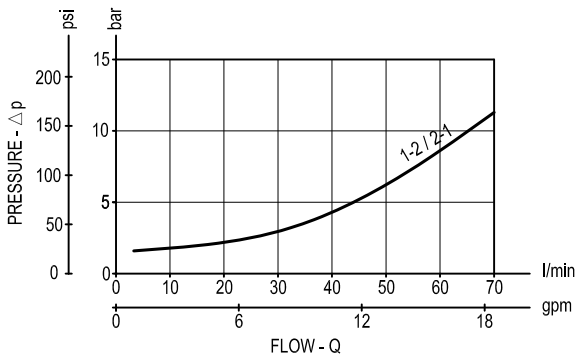
Version 12: Directional control valves manual operated poppet 2-way normally open - Special cavity



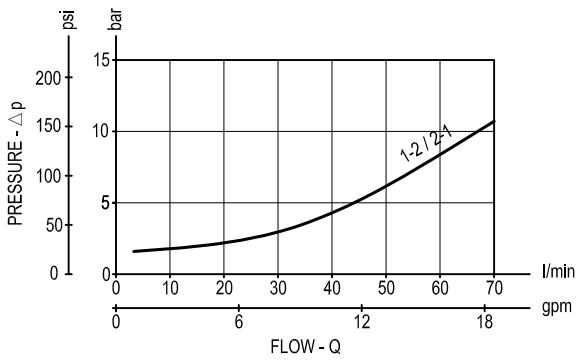
mm (Inches)

# Performance graphs

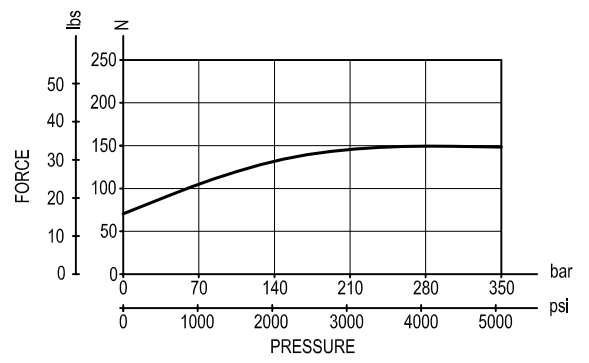
Version 06



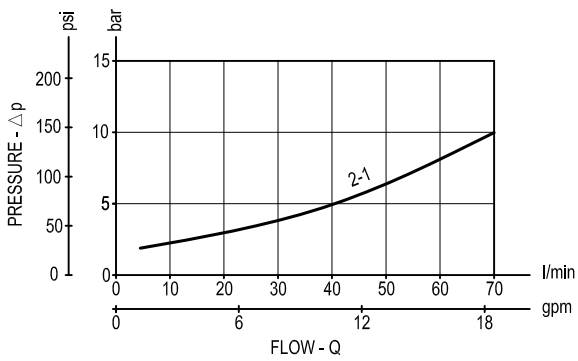
Version 32



Version 06 - 32 - 12



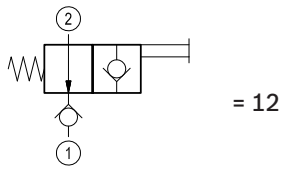
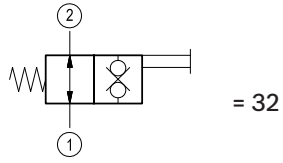
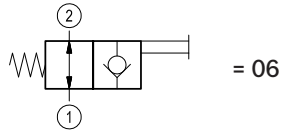
Version 12



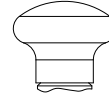
Ordering code

OD.55	*	17	17	00
-------	---	----	----	----

Directional control valves  
manual operated poppet  
2-way normally open



Hand-Operated



Special cavity: 017-E

Type	Material number
OD550617170000	R934001433
OD553217170000	R934003672
OD551217170000	R934003673

Type	Material number



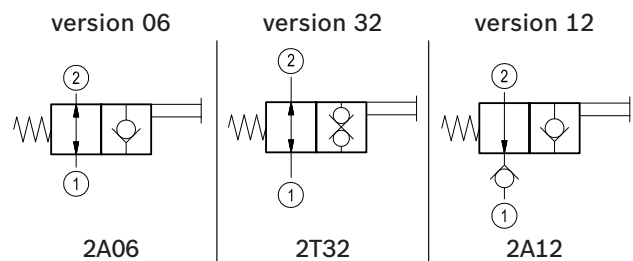
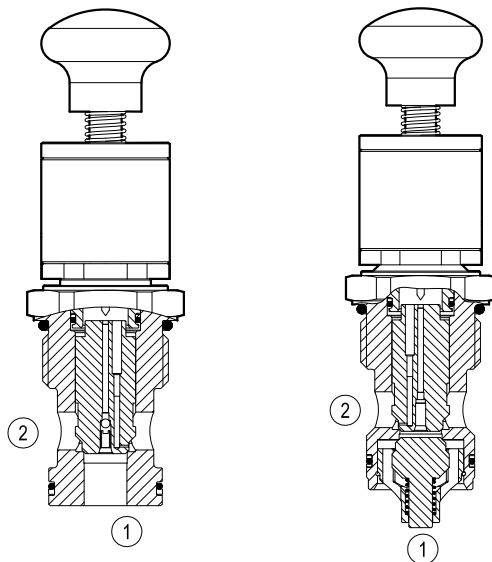
# Directional control valves manual operated poppet 2-way normally open

Special cavity, 021-E



VMI-8A-2A-12-NA

OD.55 - X - 21.17.00



## General

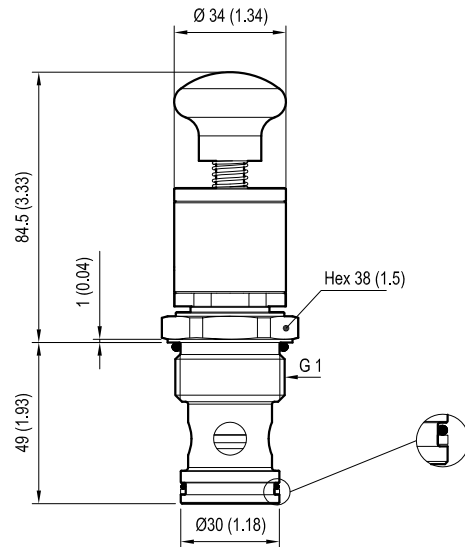
Weight	kg (lbs)	0.5 (1.1)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

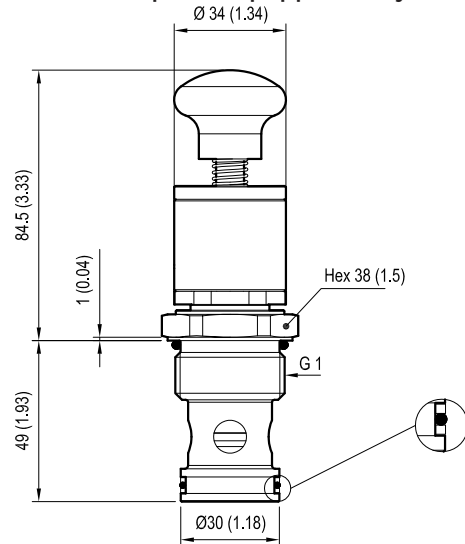
Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	150 (39)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	80-100 (59-74)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Special cavity		021-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 06	code material no.	RG21E201052010 R934003566
Seal kit - version 32	code material no.	RG21E201053010 R934003567
Other technical data		See data sheet RE 18350-50

## Dimensions

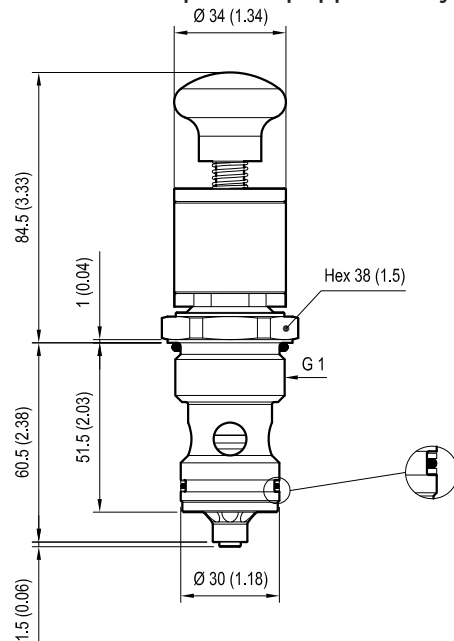
Version 06: Directional control valves manual operated poppet 2-way normally open - Special cavity



Version 32: Directional control valves manual operated poppet 2-way double lock normally open - Special cavity



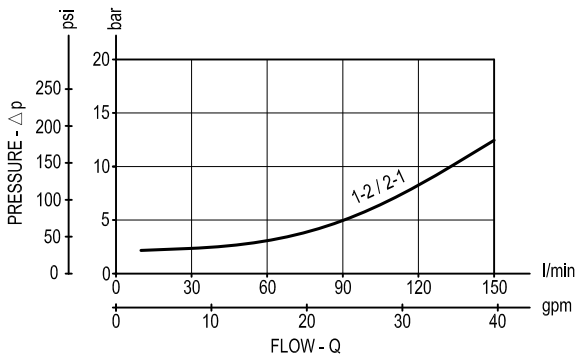
Version 12: Directional control valves manual operated poppet 2-way normally open - Special cavity



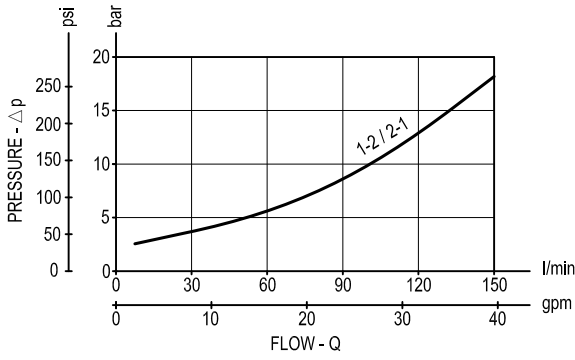
mm (Inches)

# Performance graphs

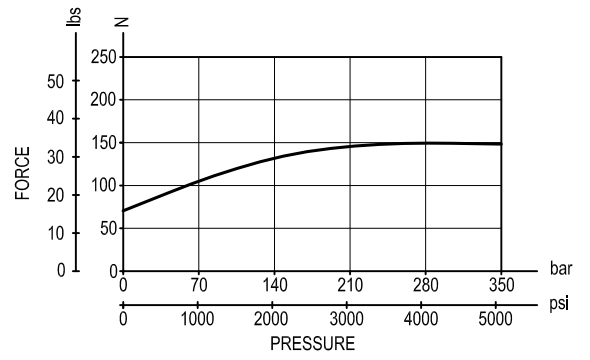
Version 06



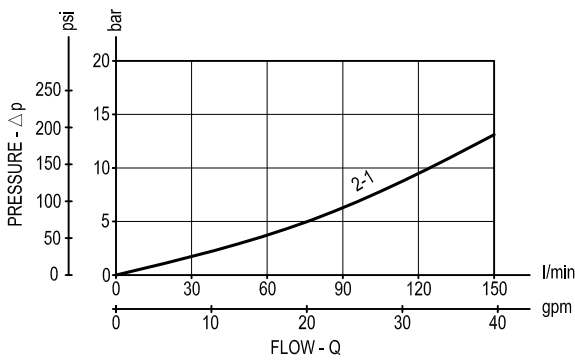
Version 32



Version 06 - 32 - 12



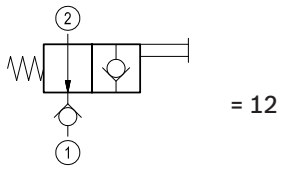
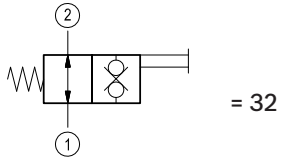
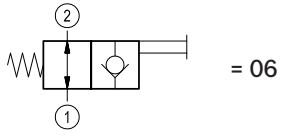
Version 12



### Ordering code

OD.55	*	21	17	00
-------	---	----	----	----

Directional control valves  
manual operated poppet  
2-way normally open



Hand-Operated



Special cavity: 021-E

Type	Material number
OD550621170000	R901122181

Type	Material number

# Mechanical cartridge valves

## Directional hydraulic pilot operated

Designation	Description	Cavity	Code	Data sheet	Page
Hydraulic operated, poppet 2-way normally closed	VOI-8A-2A-06-NC	Size 08	OD75X18Y00	18326-40	465
Hydraulic operated, poppet 2-way normally closed	VOI-8A-2A-06-NC-VU	Special	OD751119Y00	18326-41	469
Hydraulic operated, poppet 2-way normally closed	VOI-8A-2A-09-NC	Special	OD75X17Y00	18326-44	473
Hydraulic operated, poppet 2-way normally closed	VOI-8A-2A-12-NC	Special	OD75X21Y00	18326-46	477
Hydraulic operated, poppet 2-way normally open	VOI-8A-2A-06-NA	Size 08	OD75X18Y00	18326-42	481
Hydraulic operated, poppet 2-way normally open	VOI-8A-2A-06-NA-VU	Special	OD751219Y00	18326-43	485
Hydraulic operated, poppet 2-way normally open	VOI-8A-2A-09-NA	Special	OD75X17Y00	18326-45	489
Hydraulic operated, poppet 2-way normally open	VOI-8A-2A-12-NA	Special	OD75X21Y00	18326-47	493



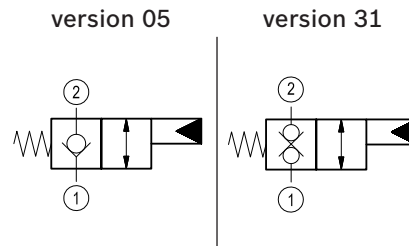
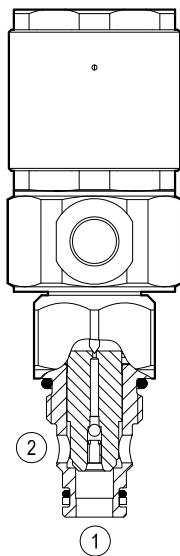
# Directional control valves hydraulic operated poppet 2-way normally closed

Common cavity, Size 08



VOI-8A-2A-06-NC

OD.75 - X - 18 - Y - 00



## General

Weight	kg (lbs)	0.27 (0.58)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 39-51 (29-38)

Recommended degree of fluid contamination Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14

Cavity CA-08A-2N see RE 18325-70

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit - version 05 code material no. RG08A20110520100 R901101437

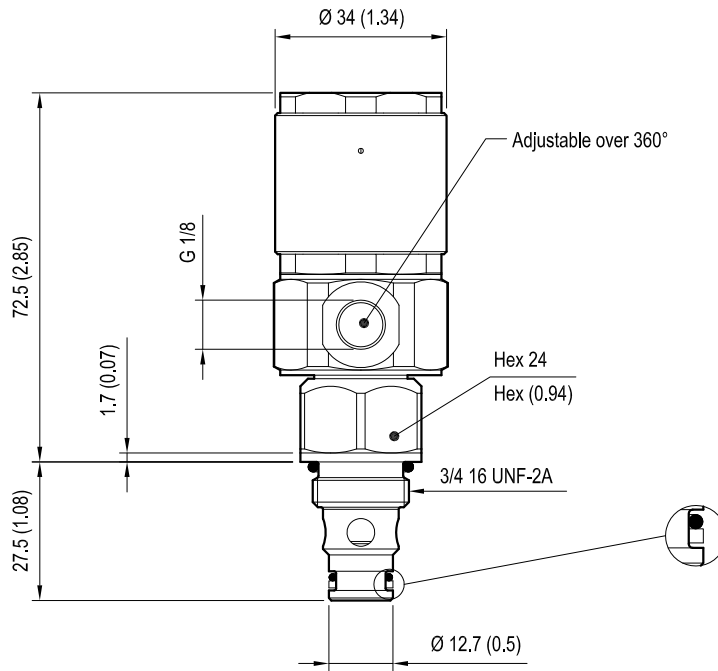
Seal kit - version 31 code material no. RG08A2010530100 R901101544

Other technical data See data sheet RE 18350-50

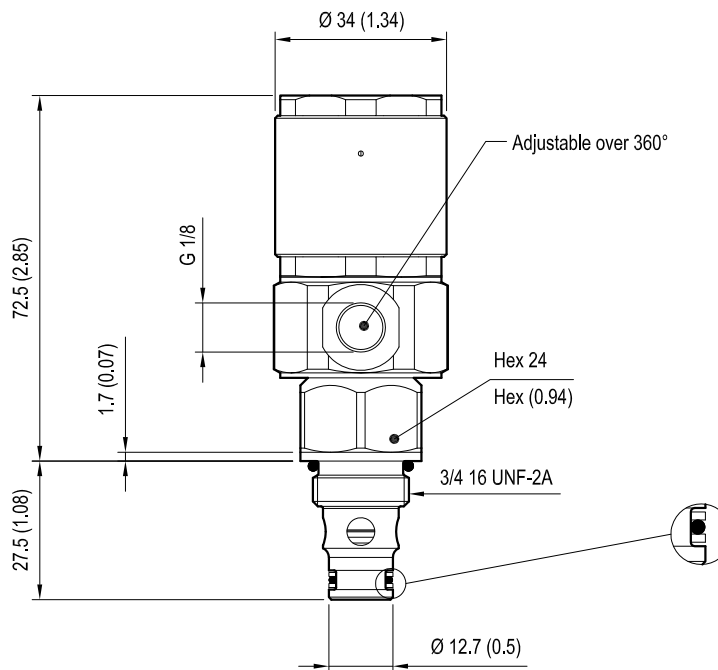
**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure. (version 05)

## Dimensions

### Version 05: Directional control valves hydraulic operated poppet 2-way normally closed



### Version 31: Directional control valves hydraulic operated poppet 2-way double lock normally closed

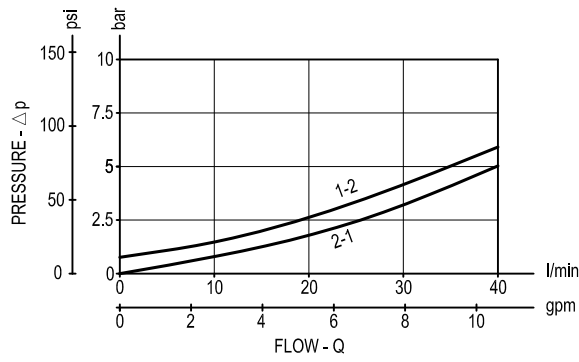


mm (Inches)

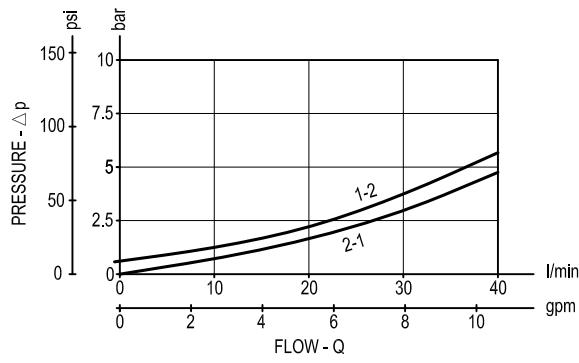


Performance graphs

Version 05



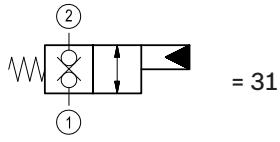
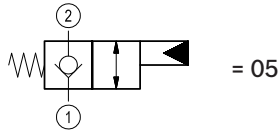
Version 31



Ordering code

OD.75 \* 18 \* 00

Directional control valves  
hydraulic operated poppet  
2-way normally closed



Pilot pressure		
	Min. bar (psi)	Max. bar (psi)
14	2-3 (29-44)	15 (218)
34	15-20 (218-290)	50 (725)

Common cavity: CA-08A-2N

Type	Material number
OD750518140000	R901109467
OD750518340000	R901109471
OD753118140000	R901109472
OD753118340000	R901109473

Type	Material number

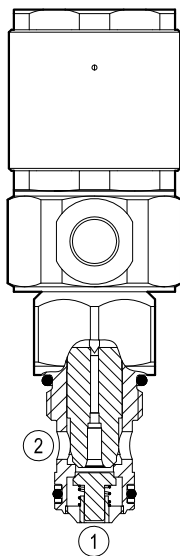
# Directional control valves hydraulic operated poppet 2-way normally closed

Special cavity, 019-E

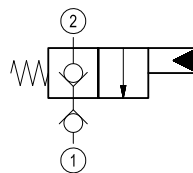


VOI-8A-2A-06-NC-VU

OD.75.11.19 - Y - 00



version 11



## General

Weight	kg (lbs)	0.27 (0.58)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

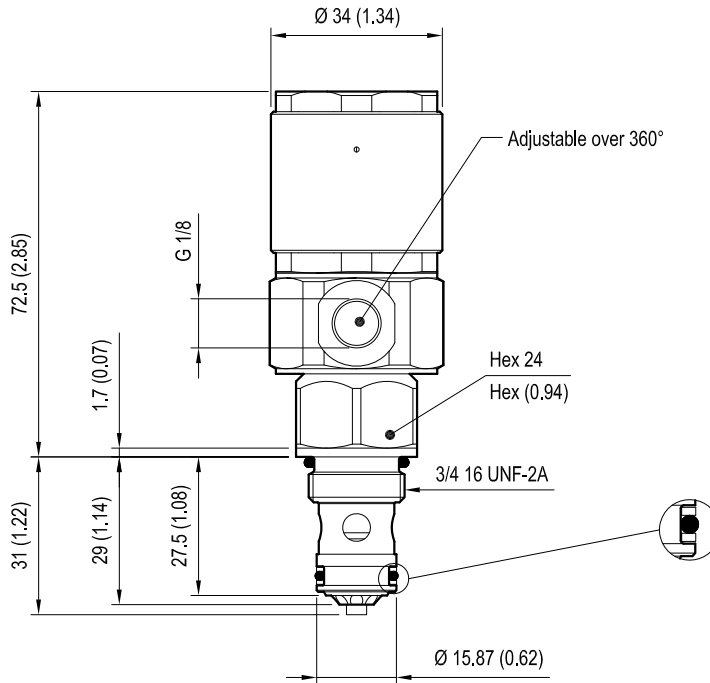
## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination	Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14	
Special cavity	019-E see RE 18325-75	
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory	
Seal kit	code material no.	RG19E201053010 R934003561
Other technical data	See data sheet RE 18350-50	

## Dimensions

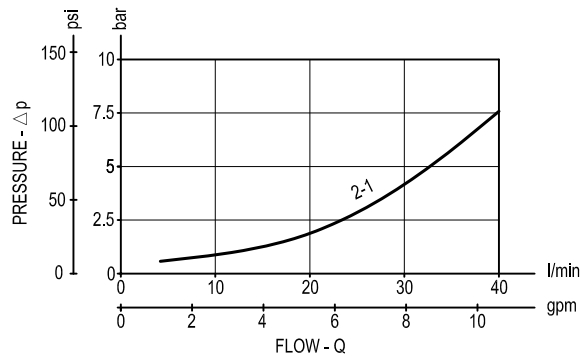
Directional control valves hydraulic operated poppet 2-way normally closed - Special cavity



mm (Inches)

# Performance graphs

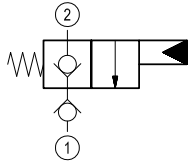
Version 11



### Ordering code

**OD.75 11 19 \* 00**

Directional control valves  
hydraulic operated poppet  
2-way normally closed



	Pilot pressure	
	Min. bar (psi)	Max. bar (psi)
<b>14</b>	2-3 (29-44)	15 (218)
<b>34</b>	15-20 (218-290)	50 (725)

Special cavity: 019-E

Type	Material number
OD751119340000	R934003674

Type	Material number

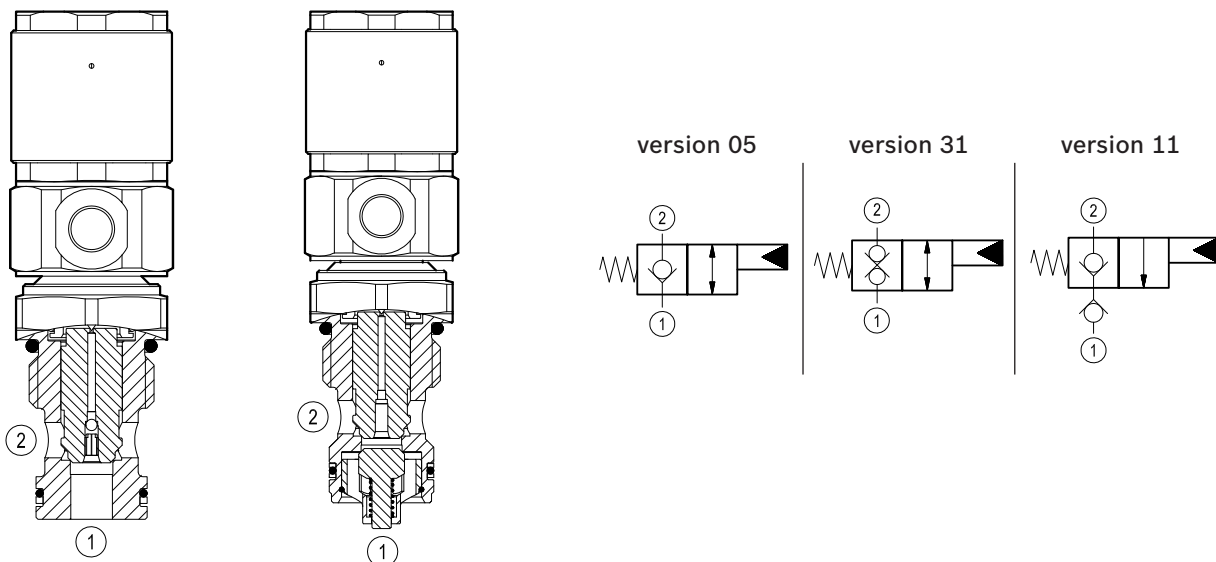
# Directional control valves hydraulic operated poppet 2-way normally closed

Special cavity, 017-E



VOI-8A-2A-09-NC

OD.75 - X - 17 - Y - 00



## General

Weight	kg (lbs)	0.36 (0.79)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	70 (19)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 54-66 (40-49)

Recommended degree of fluid contamination Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14

Cavity 017-E see RE 18325-75

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit - version 05-11 code material no. RG17E201052010 R934003562

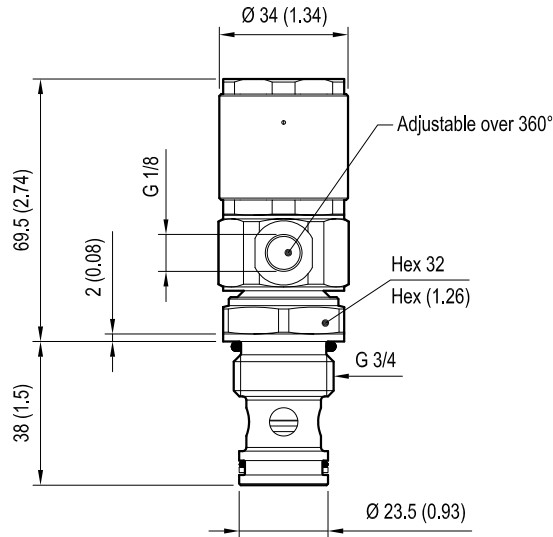
Seal kit - version 31 code material no. RG17E201053010 R934003563

Other technical data See data sheet RE 18350-50

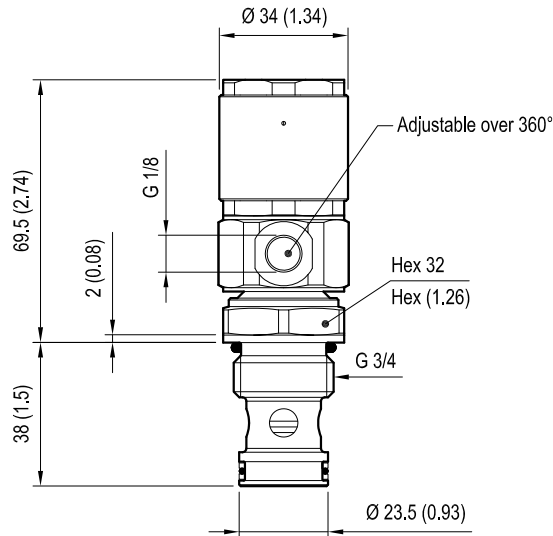
**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure. (version 05)

## Dimensions

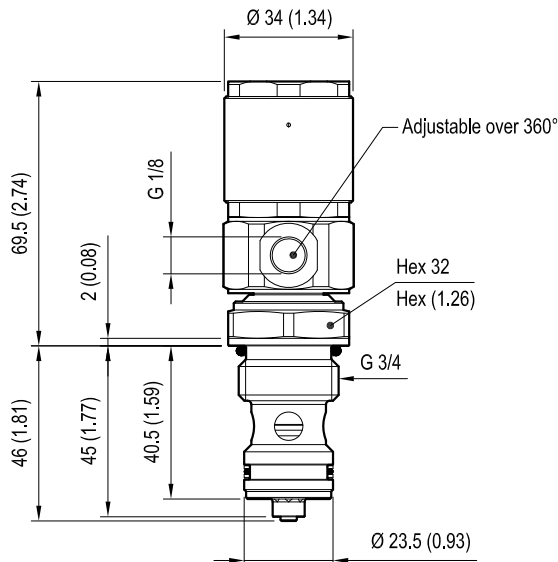
Version 05: Directional control valves hydraulic operated poppet 2-way normally closed - Special cavity



Version 31: Directional control valves hydraulic operated poppet 2-way double lock normally closed - Special cavity



Version 11: Directional control valves hydraulic operated poppet 2-way normally closed - Special cavity



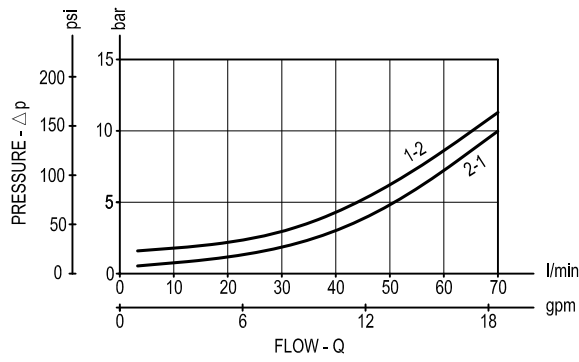
mm (Inches)



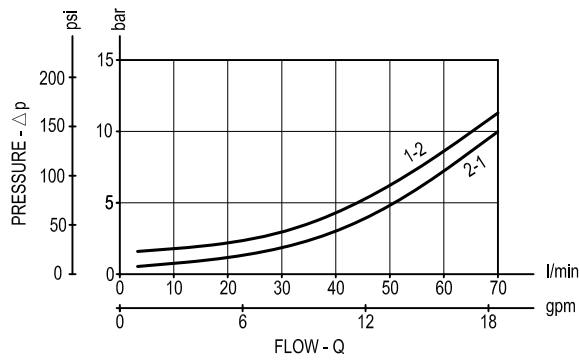
Performance graphs

1

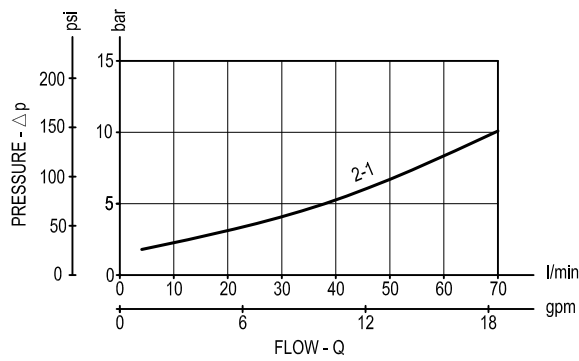
Version 05



Version 31



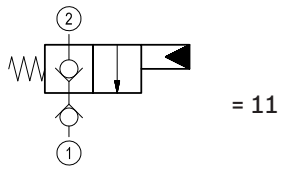
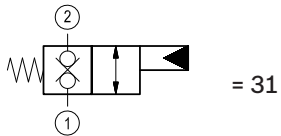
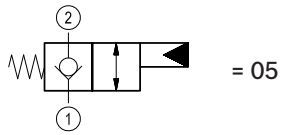
Version 11



### Ordering code

**OD.75 \* 17 \* 00**

Directional control valves  
hydraulic operated poppet  
2-way normally closed



Pilot pressure		
	Min. bar (psi)	Max. bar (psi)
14	2-3 (29-44)	15 (218)
34	15-20 (218-290)	50 (725)

Special cavity: 017-E

Type	Material number
OD750517140000	R934001466
OD750517340000	R934001467
OD753117140000	R934001482
OD753117340000	R987072045
OD751117340000	R934001478

Type	Material number

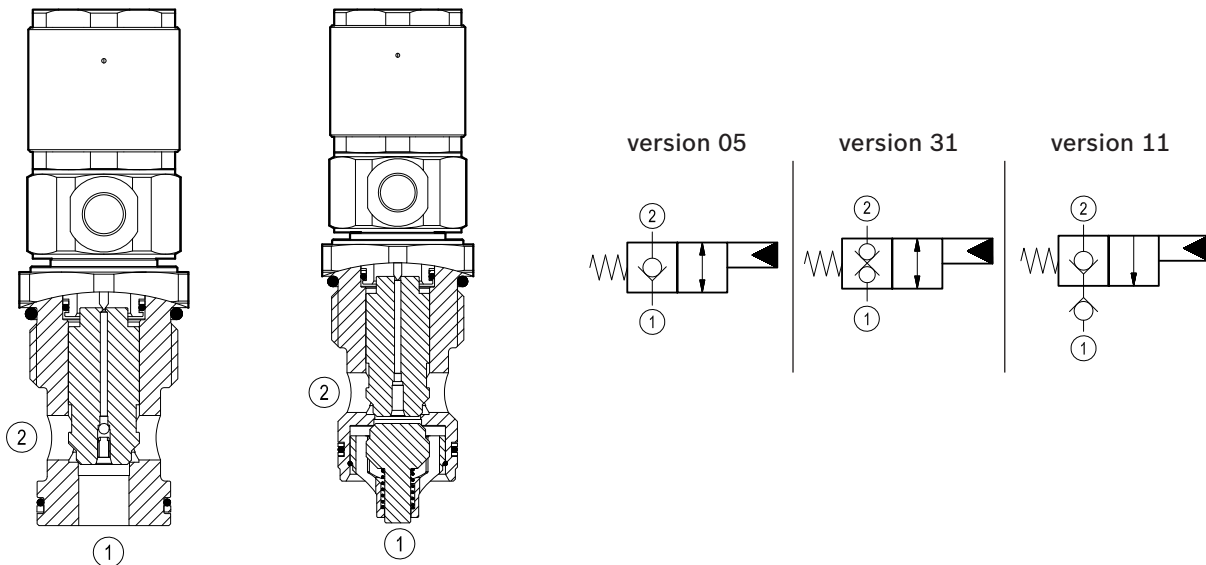
# Directional control valves hydraulic operated poppet 2-way normally closed

Special cavity, 021-E



VOI-8A-2A-12-NC

OD.75 - X - 21 - Y - 00



## General

Weight	kg (lbs)	0.5 (1.1)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

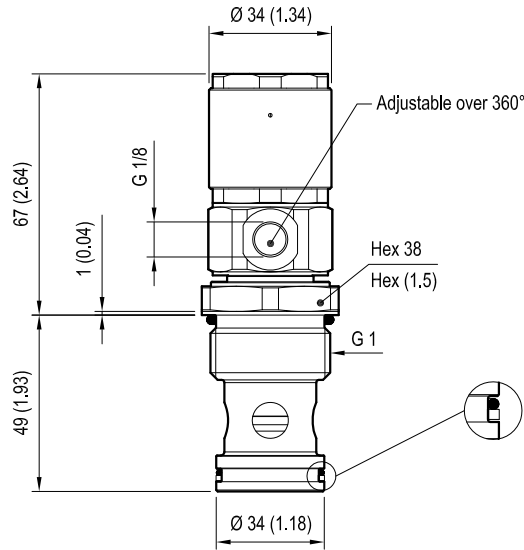
## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	150 (39)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	80-100 (59-74)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		021-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 05-11	code material no.	RG21E201052010 R934003566
Seal kit - version 31	code material no.	RG21E201053010 R934003567
Other technical data		See data sheet RE 18350-50

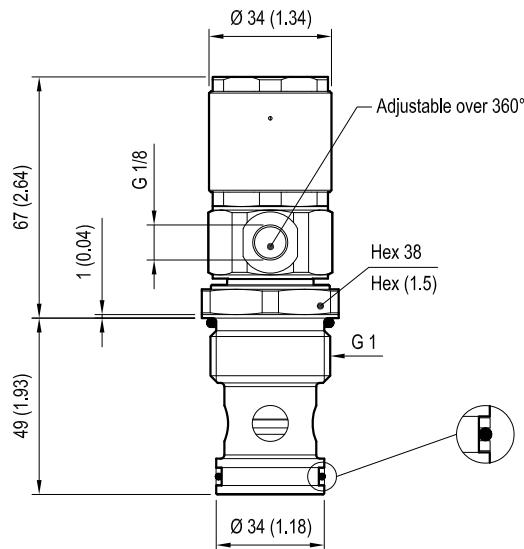
**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure. (version 05)

## Dimensions

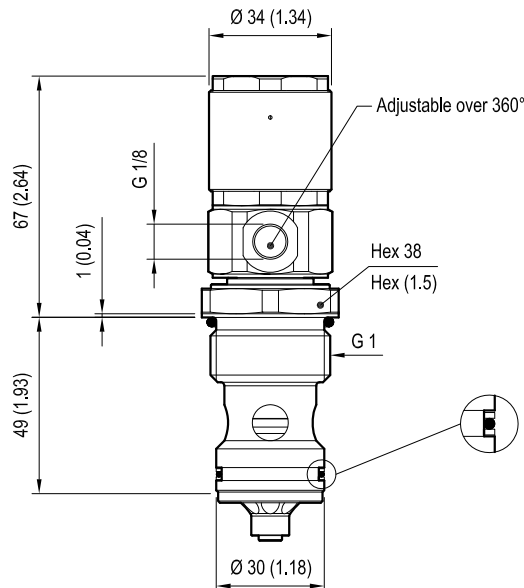
Version 05: Directional control valves hydraulic operated poppet 2-way normally closed - Special cavity



Version 31: Directional control valves hydraulic operated poppet 2-way double lock normally closed - Special cavity



Version 11: Directional control valves hydraulic operated poppet 2-way normally closed - Special cavity

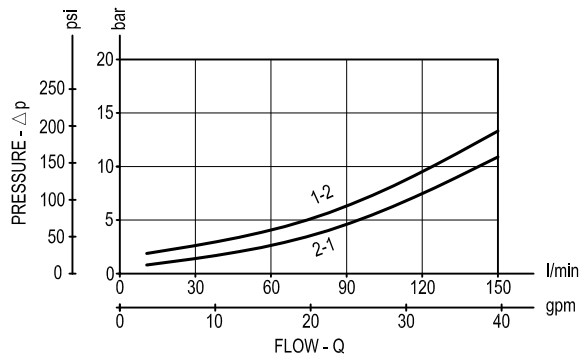


mm (Inches)

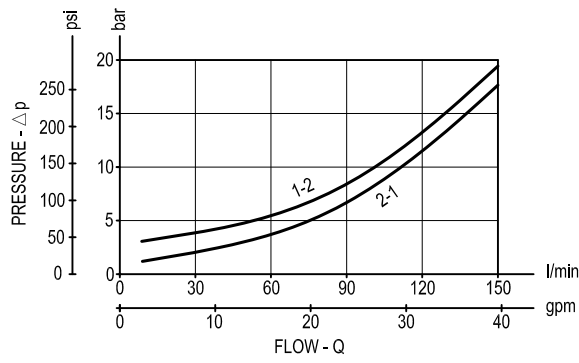
Performance graphs

1

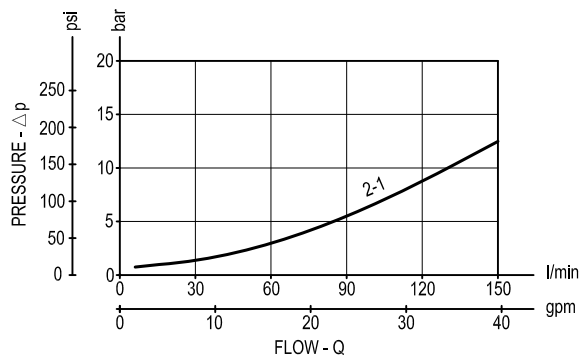
Version 05



Version 31



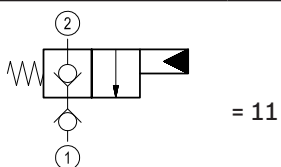
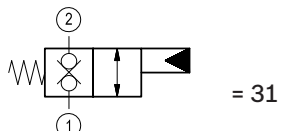
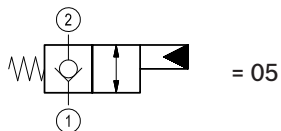
Version 11



### Ordering code

**OD.75 \* 21 \* 00**

Directional control valves  
hydraulic operated poppet  
2-way normally closed



Pilot pressure		
	Min. bar (psi)	Max. bar (psi)
14	2-3 (29-44)	15 (218)
34	15-20 (218-290)	50 (725)

Special cavity: 021-E

Type	Material number
OD750521140000	R934001470
OD750521340000	R987246098
OD753121140000	R934001486
OD753121340000	R934001487
OD751121340000	R934001479

Type	Material number

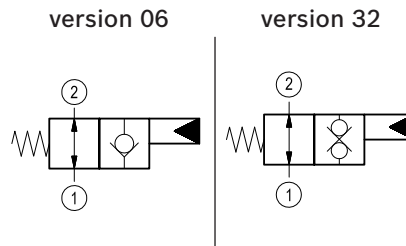
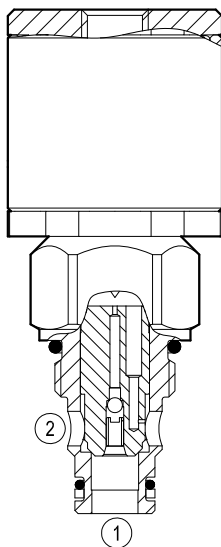
# Directional control valves hydraulic operated poppet 2-way normally open

Common cavity, Size 08



VOI-8A-2A-06-NA

OD.75 - X - 18 - Y - 00



## General

Weight	kg (lbs)	0.25 (0.55)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

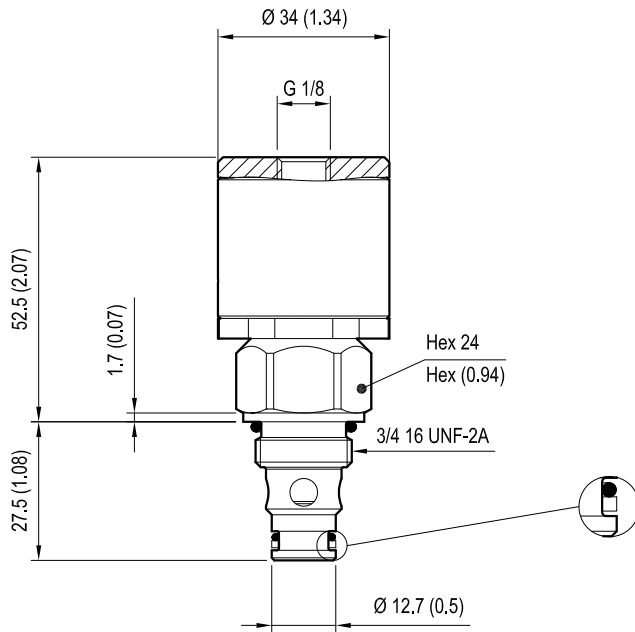
**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure. (version 06)

## Hydraulic

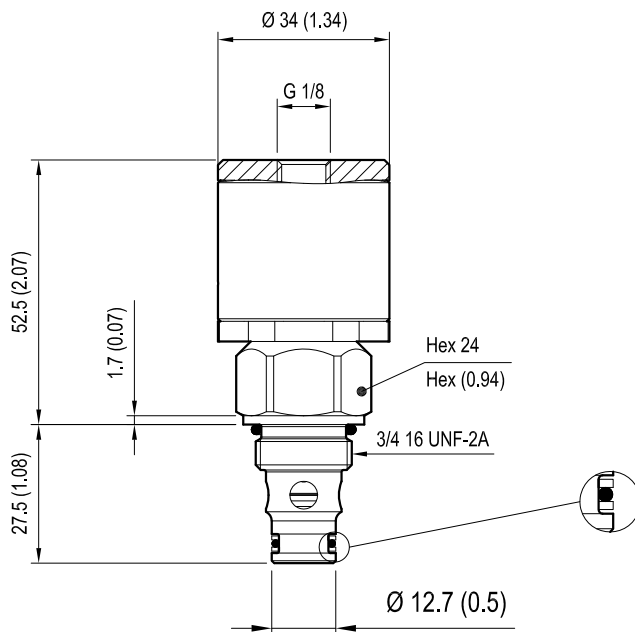
Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		CA-08A-2N see RE 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 06	code material no.	RG08A2010520100 R901101437
Seal kit - version 32	code material no.	RG08A2010530100 R901101544
Other technical data		See data sheet RE 18350-50

## Dimensions

Version 06: Directional control valves hydraulic operated poppet 2-way normally open



Version 32: Directional control valves hydraulic operated poppet 2-way double lock normally open

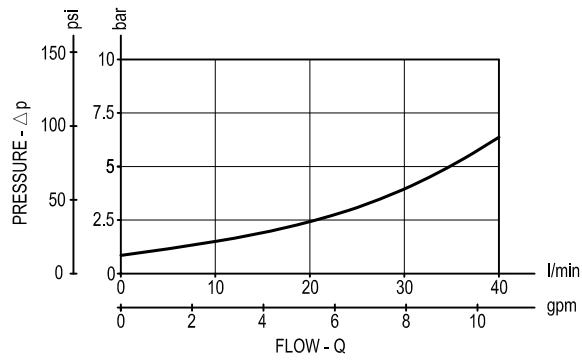


mm (Inches)

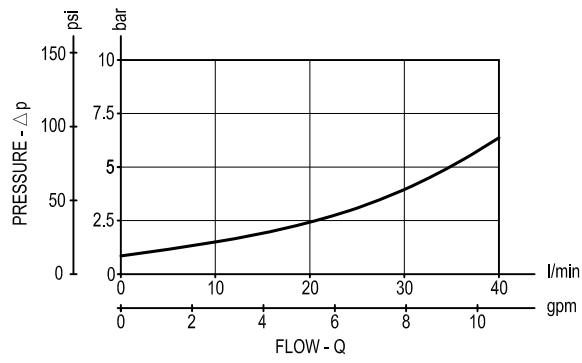


# Performance graphs

Version 06



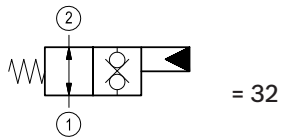
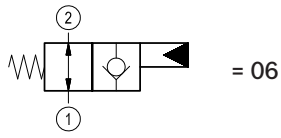
Version 32



### Ordering code

**OD.75 \* 18 \* 00**

Directional control valves  
hydraulic operated poppet  
2-way normally open



Pilot pressure		
	Min. bar (psi)	Max. bar (psi)
14	2-3 (29-44)	15 (218)
34	15-20 (218-290)	50 (725)

Common cavity: CA-08A-2N

Type	Material number
OD750618140000	R901109474
OD750618340000	R901109475
OD753218340000	R901109478

Type	Material number

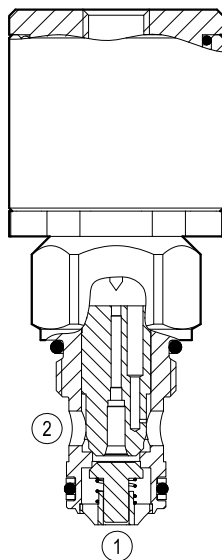
# Directional control valves hydraulic operated poppet 2-way normally open

Special cavity, 019-E

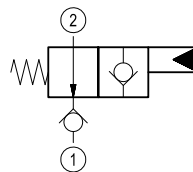


VOI-8A-2A-06-NA-VU

OD.75.12.19 - Y - 00



version 12



## General

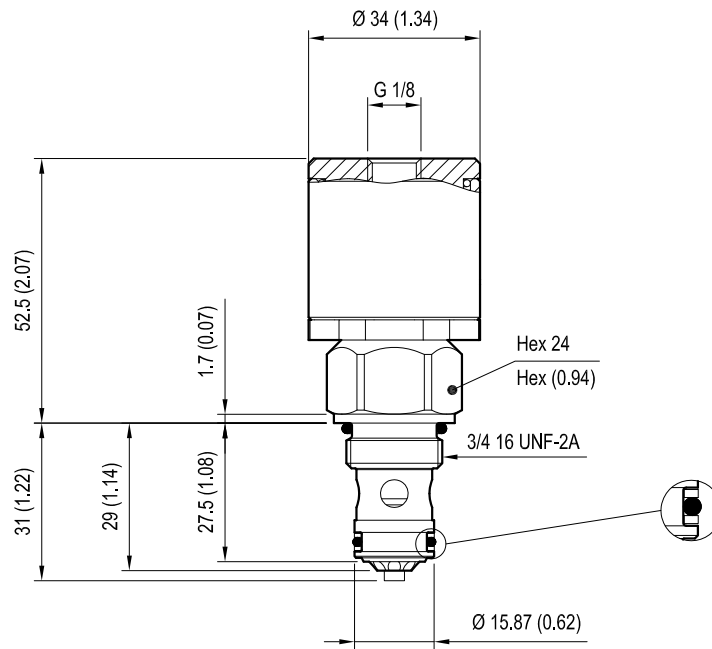
Weight	kg (lbs)	0.25 (0.55)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Special cavity		019-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG19E201052010 R934003560
Other technical data		See data sheet RE 18350-50

## Dimensions

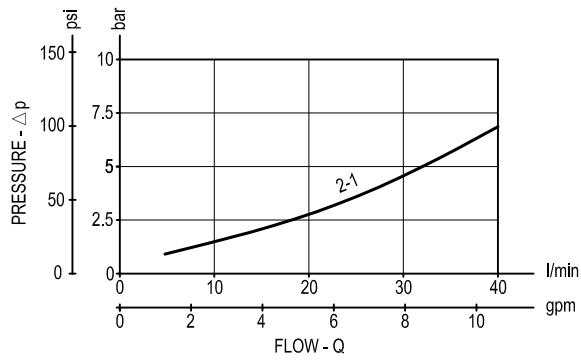
Directional control valves hydraulic operated poppet 2-way normally open - Special cavity



[ mm (Inches) ]

# Performance graphs

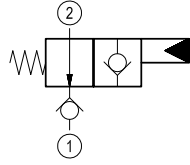
Version 12



### Ordering code

**OD.75 12 19 \* 00**

Directional control valves  
hydraulic operated poppet  
2-way normally open



	Pilot pressure	
	Min. bar (psi)	Max. bar (psi)
<b>14</b>	2-3 (29-44)	15 (218)
<b>34</b>	15-20 (218-290)	50 (725)

Special cavity: 019-E

Type	Material number
OD751219340000	R934003675

Type	Material number

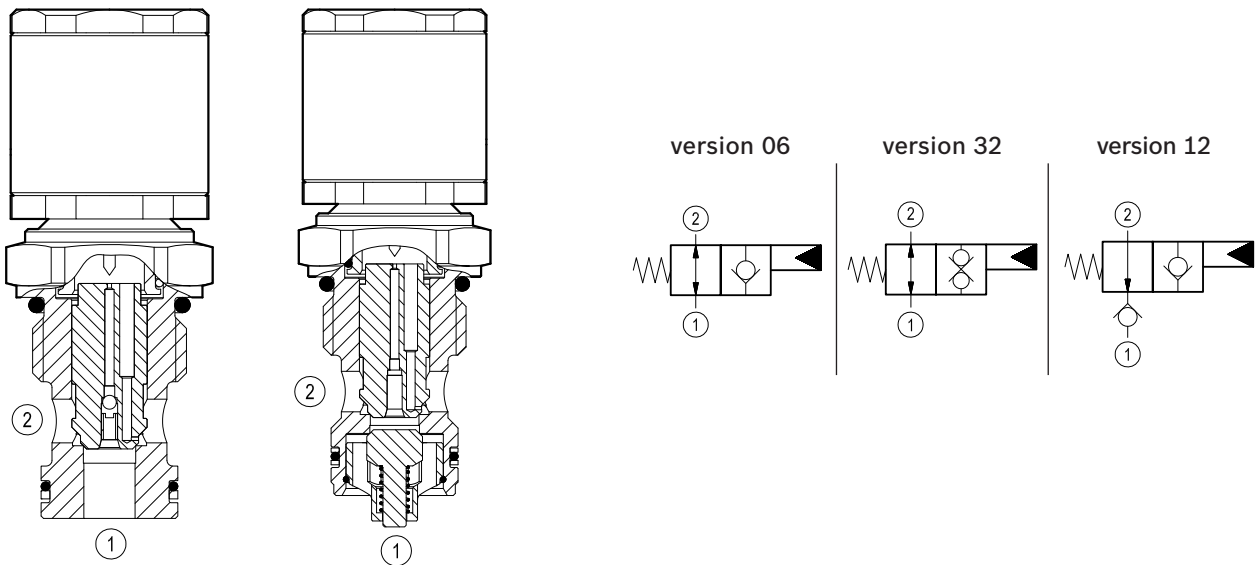
# Directional control valves hydraulic operated poppet 2-way normally open

Special cavity, 017-E



VOI-8A-2A-09-NA

OD.75 - X - 17 - Y - 00



## General

Weight	kg (lbs)	0.34 (0.75)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

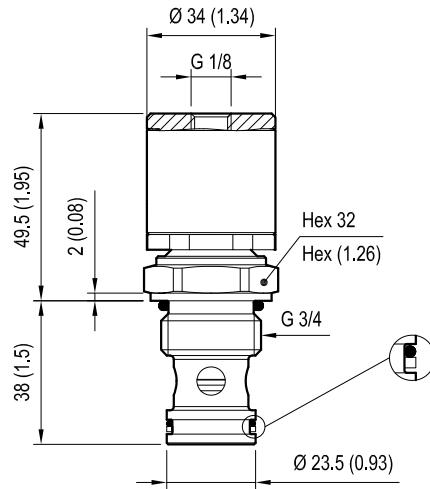
**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure.  
(version 06)

## Hydraulic

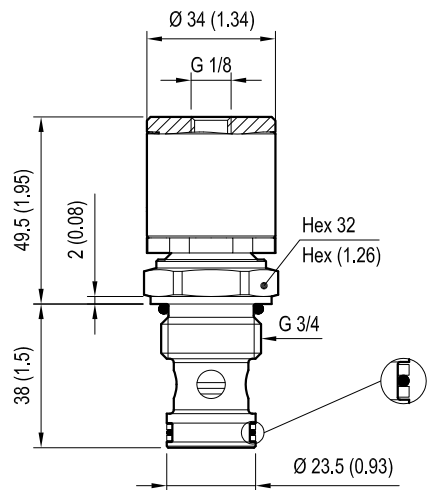
Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	70 (19)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	54-66 (40-49)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		017-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 06	code material no.	RG17E201052010 R934003562
Seal kit - version 32-12	code material no.	RG17E201053010 R934003563
Other technical data		See data sheet RE 18350-50

## Dimensions

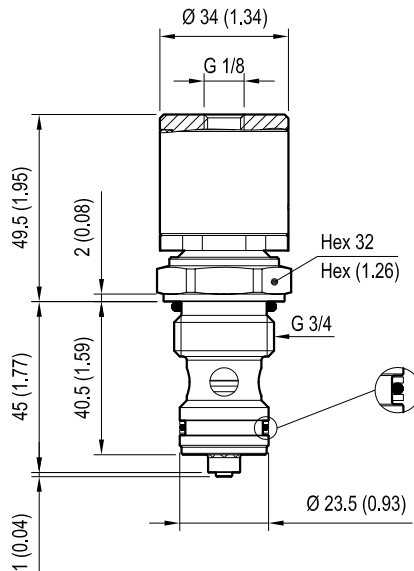
Version 06: Directional control valves hydraulic operated poppet 2-way normally open - Special cavity



Version 32: Directional control valves hydraulic operated poppet 2-way double lock normally open - Special cavity



Version 12: Directional control valves hydraulic operated poppet 2-way normally open - Special cavity

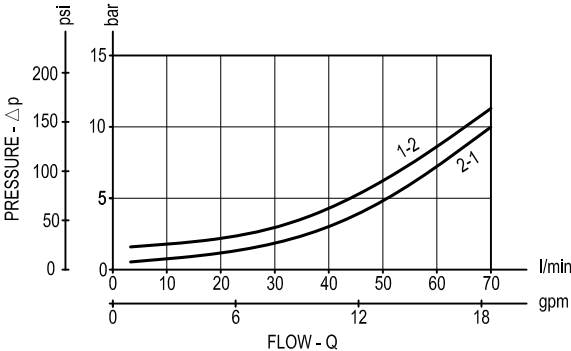


mm (Inches)

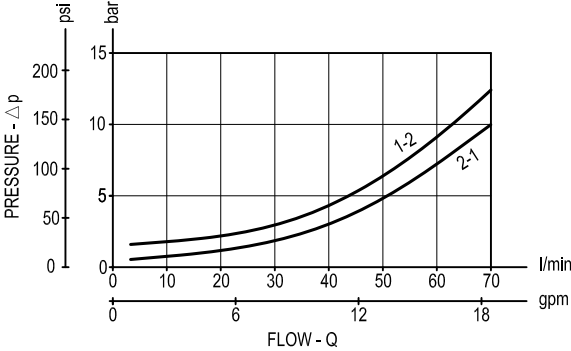


Performance graphs

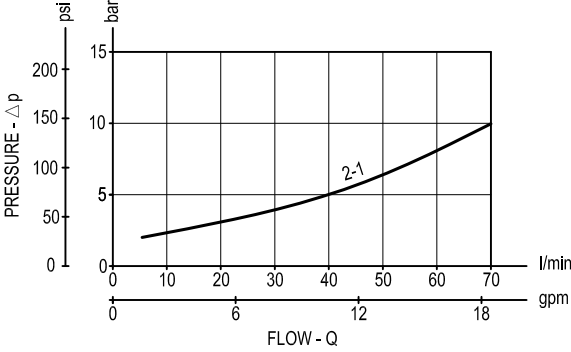
Version 06



Version 32



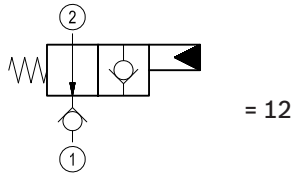
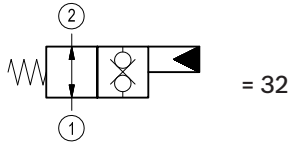
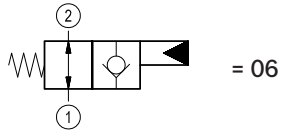
Version 12



### Ordering code

**OD.75 \* 17 \* 00**

Directional control valves  
hydraulic operated poppet  
2-way normally open



Pilot pressure		
	Min. bar (psi)	Max. bar (psi)
14	2-3 (29-44)	15 (218)
34	15-20 (218-290)	50 (725)

Special cavity: 017-E

Type	Material number
OD750617140000	R934001472
OD750617340000	R987248645
OD753217140000	R934001488
OD753217340000	R934001490

Type	Material number

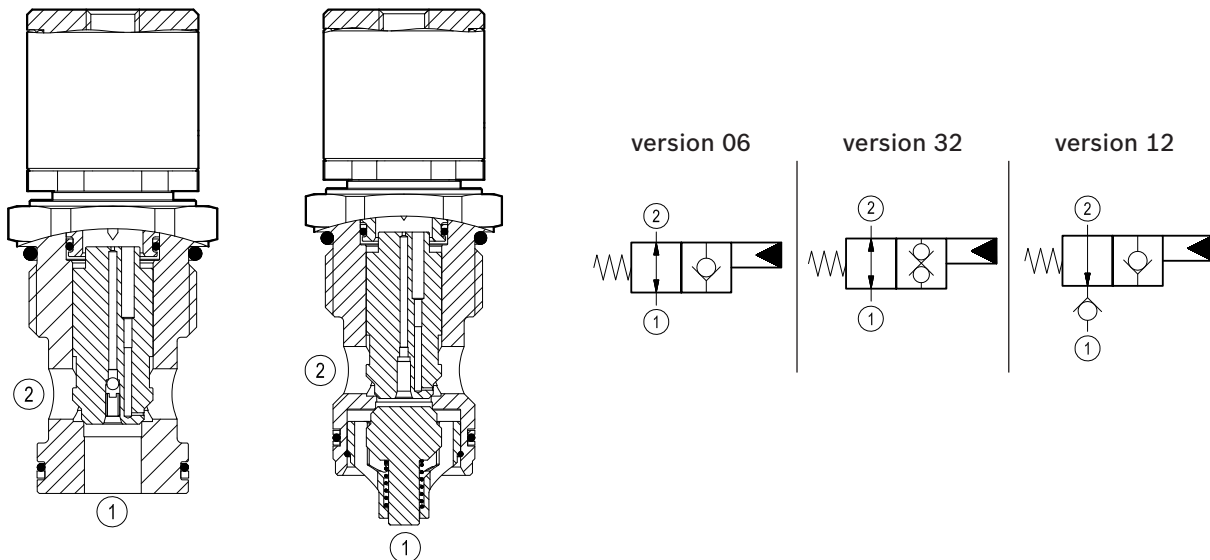
# Directional control valves hydraulic operated poppet 2-way normally open

Special cavity, 021-E



VOI-8A-2A-12-NA

OD.75 -X - 21 - Y - 00



## General

Weight	kg (lbs)	0.48 (1.1)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

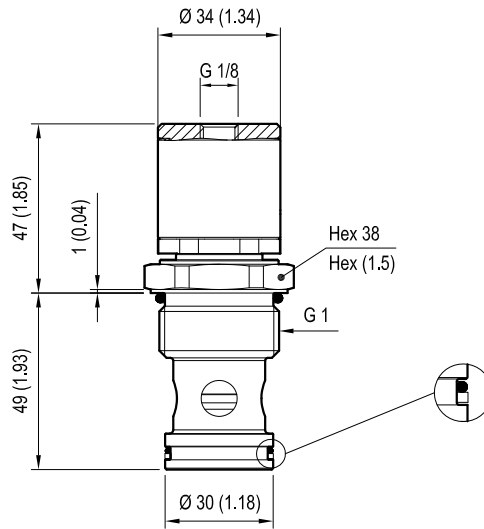
## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	150 (39)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	80-100 (59-74)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		021-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 06-12	code material no.	RG21E201052010 R934003566
Seal kit - version 32	code material no.	RG21E201053010 R934003567
Other technical data		See data sheet RE 18350-50

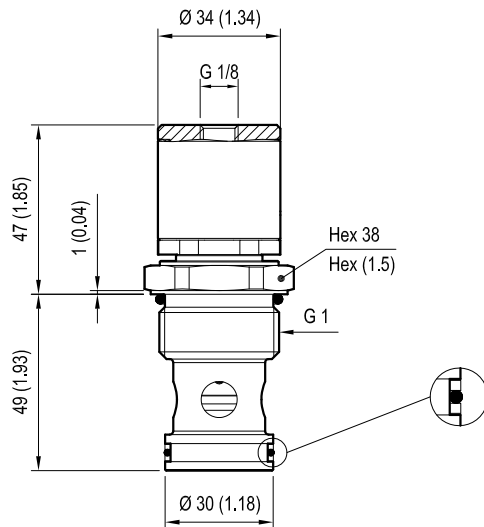
**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure. (version 06)

## Dimensions

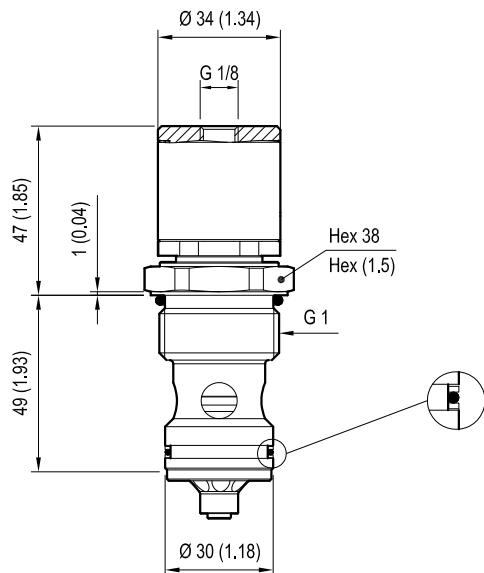
Version 06: Directional control valves hydraulic operated poppet 2-way normally open - Special Cavity



Version 32: Directional control valves hydraulic operated poppet 2-way double lock normally open - Special Cavity



Version 12: Directional control valves hydraulic operated poppet 2-way normally open - Special cavity

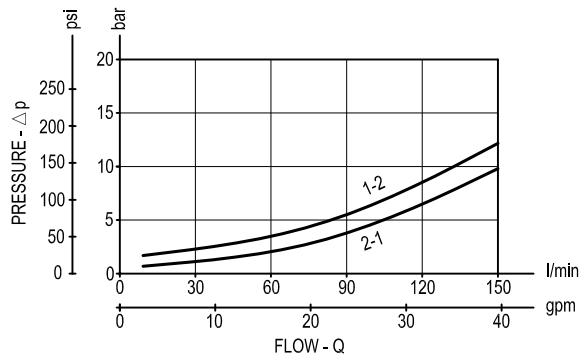


mm (Inches)

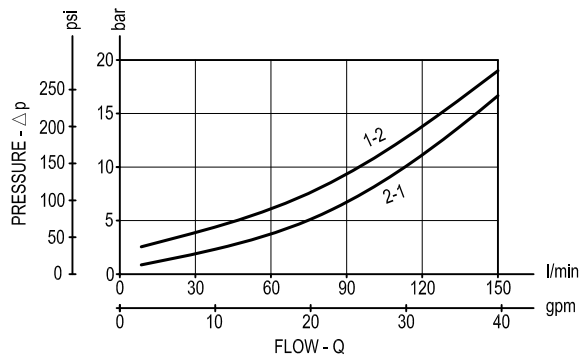
Performance graphs

1

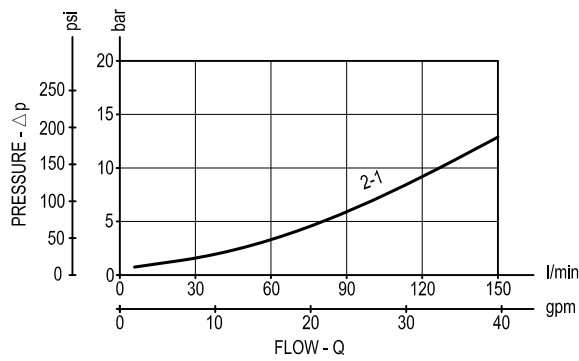
Version 06



Version 32



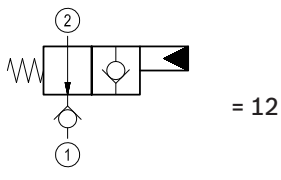
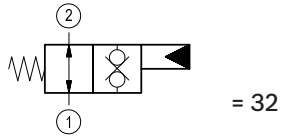
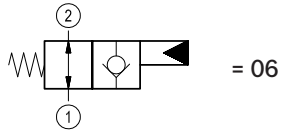
Version 12



Ordering code

OD.75 \* 21 \* 00

Directional control valves  
hydraulic operated poppet  
2-way normally open



Pilot pressure		
	Min. bar (psi)	Max. bar (psi)
14	2-3 (29-44)	15 (218)
34	15-20 (218-290)	50 (725)

Special cavity: 021-E

Type	Material number
OD750621140000	R934001476
OD750621340000	R987246099
OD753221140000	R934001493
OD753221340000	R934001494
OD751221340000	R934001480

Type	Material number

# Mechanical cartridge valves

## Directional pneumatic pilot operated

Designation	Description	Cavity	Code	Data sheet	Page
Pneumatic operated, poppet 2-way normally closed	VPI-8A-2A-06-NC	Size 08	OD65X181400	18326-70	499
Pneumatic operated, poppet 2-way normally closed	VPI-8A-2A-06-NC-VU	Special	OD6511191400	18326-71	503
Pneumatic operated, poppet 2-way normally closed	VPI-8A-2A-09-NC	Special	OD65X171400	18326-74	507
Pneumatic operated, poppet 2-way normally closed	VPI-8A-2A-12-NC	Special	OD65X211400	18326-76	511
Pneumatic operated, poppet 2-way normally open	VPI-8A-2A-06-NA	Size 08	OD65X181400	18326-72	515
Pneumatic operated, poppet 2-way normally open	VPI-8A-2A-06-NA-VU	Special	OD6512191400	18326-73	519
Pneumatic operated, poppet 2-way normally open	VPI-8A-2A-09-NA	Special	OD65X171400	18326-75	523
Pneumatic operated, poppet 2-way normally open	VPI-8A-2A-12-NA	Special	OD65X211400	18326-77	527
Pneumatic operated, poppet 2-way normally open	VPI-8A-2A-12-NA-VU	Special	OD6512211400	18326-78	531





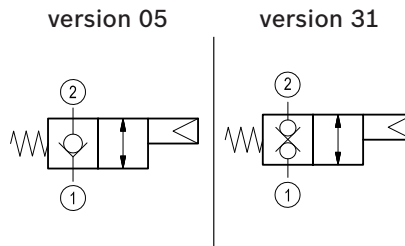
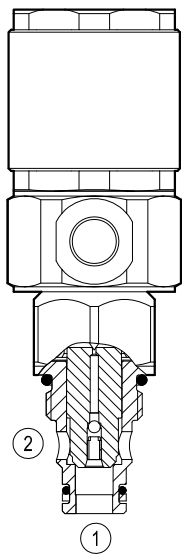
# Directional control valves pneumatic operated poppet 2-way normally closed

Common cavity, Size 08



VPI-8A-2A-06-NC

OD.65 - X - 18.14.00



## General

Weight	kg (lbs)	0.27 (0.58)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

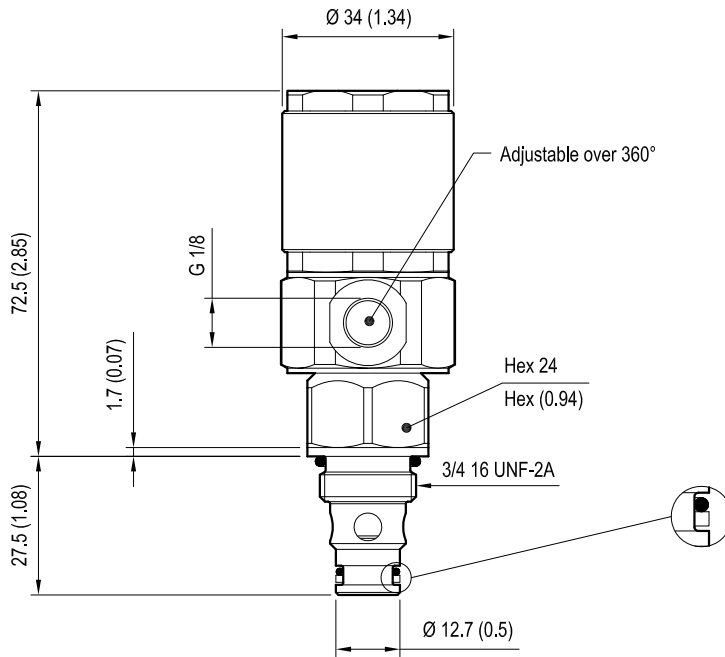
Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		CA-08A-2N see RE 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 05	code material no.	RG08A2010520100 R901101437
Seal kit - version 31	code material no.	RG08A2010530100 R901101544
Other technical data		See data sheet RE 18350-50

**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure.  
(version 05)

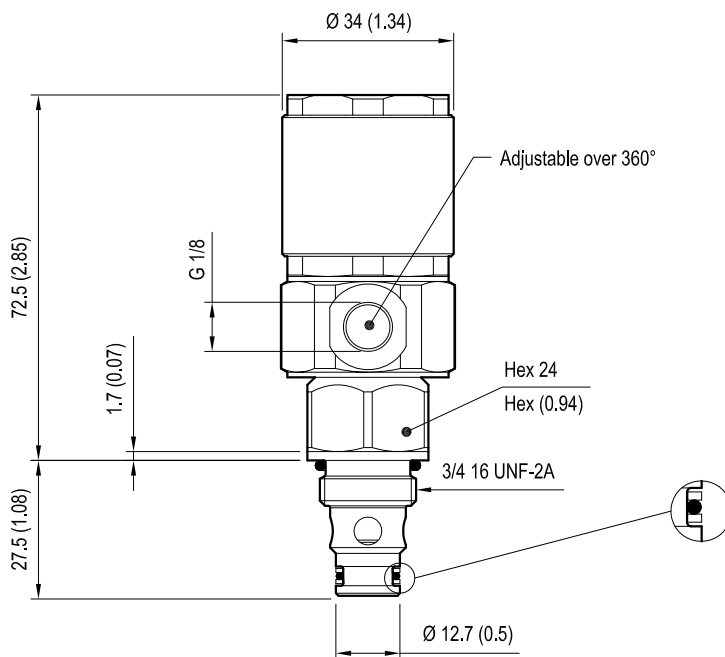
Pilot pressure	bar (psi)	Max. 15 (218)
	bar (psi)	Min. 4 (58)

## Dimensions

Version 05: Directional control valves pneumatic operated poppet 2-way normally closed



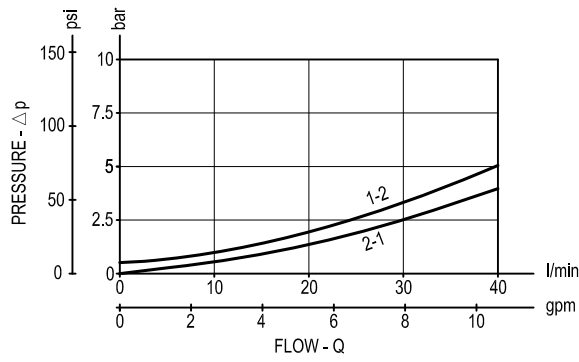
Version 31: Directional control valves pneumatic operated poppet 2-way double lock normally closed



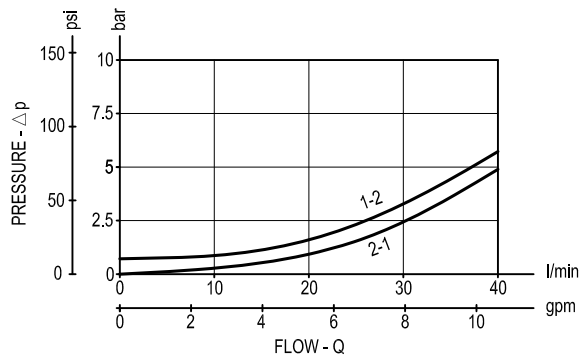
mm (Inches)

Performance graphs

Version 5



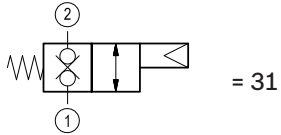
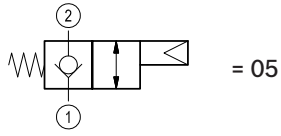
Version 31



### Ordering code

OD.65	*	18	14	00
-------	---	----	----	----

Directional control valves  
pneumatic operated  
poppet 2-way normally  
closed



Common cavity: CA-08A-2N

Type	Material number
OD650518140000	R901109457
OD653118140000	R901109462

Type	Material number

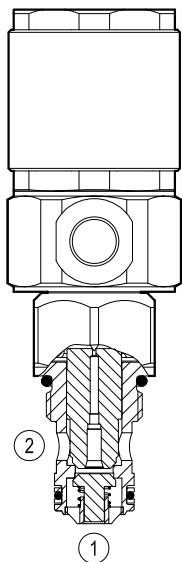
# Directional control valves pneumatic operated poppet 2-way normally closed

Special cavity, 019-E

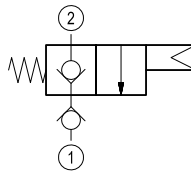


VPI-8A-2A-06-NC-VU

OD.65.11.19.14.00



version 11



### General

Weight	kg (lbs)	0.27 (0.58)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

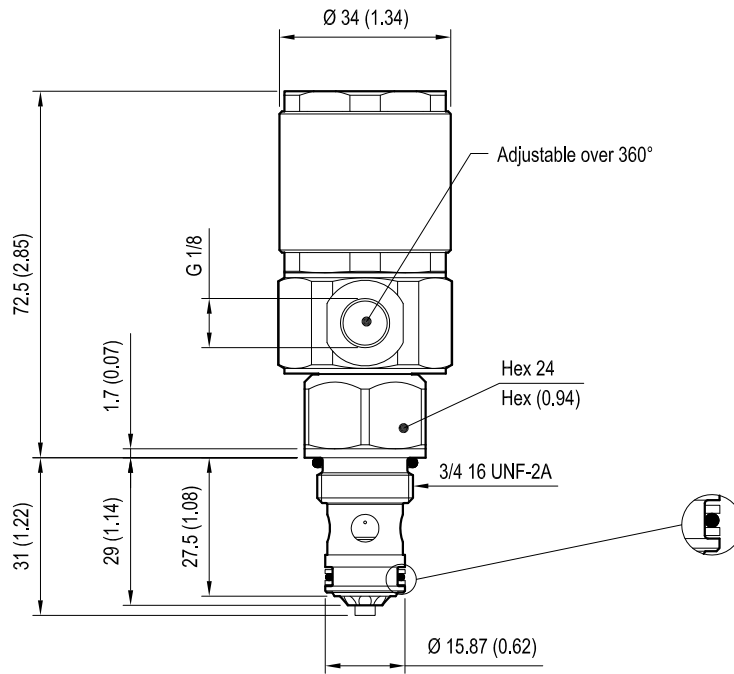
Pilot pressure	bar (psi)	Max. 15 (218)
	bar (psi)	Min. 4 (58)

### Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		019-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG19E201053010 R934003561
Other technical data		See data sheet RE 18350-50

## Dimensions

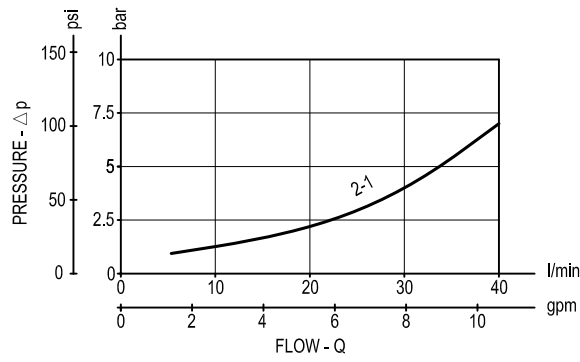
Version 11: Directional control valves pneumatic operated poppet 2-way normally closed - Special cavity



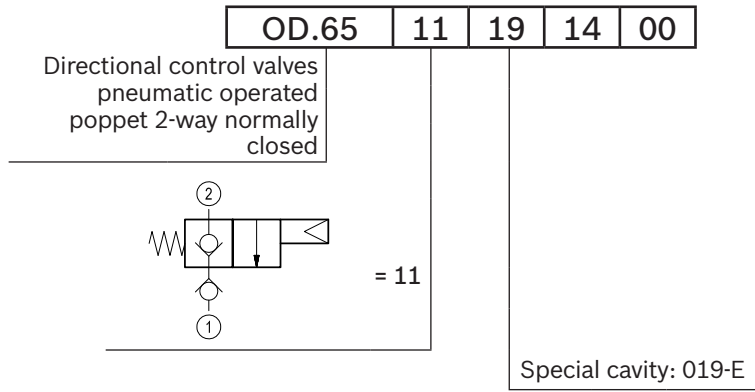
[ mm (Inches) ]

Performance graphs

Version 11



### Ordering code



Type	Material number	Type	Material number
OD651119140000	R901109460		



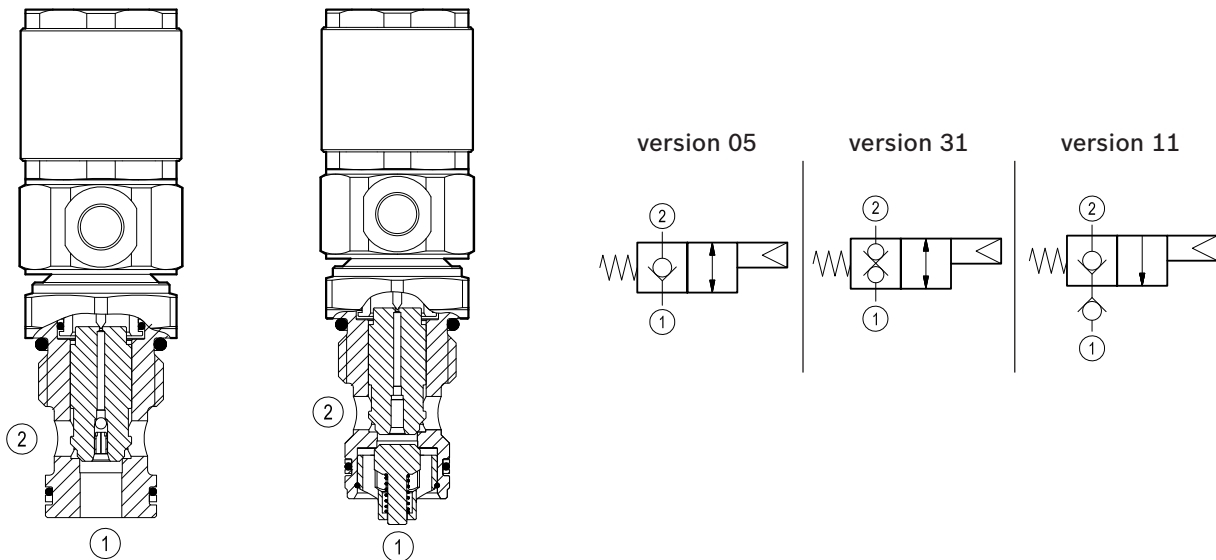
# Directional control valves pneumatic operated poppet 2-way normally closed

Special cavity, 017-E



VPI-8A-2A-09-NC

OD.65 - X - 17.14.00



## General

Weight	kg (lbs)	0.36 (0.79)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

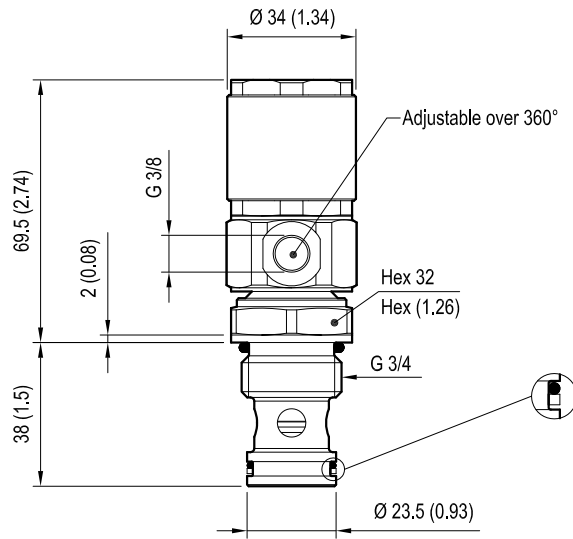
Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	70 (19)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	54-66 (40-49)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Special cavity		017-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 05-11	code material no.	RG17E201052010 R934003562
Seal kit - version 31	code material no.	RG17E201053010 R934003563
Other technical data		See data sheet RE 18350-50

**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure. (version 05)

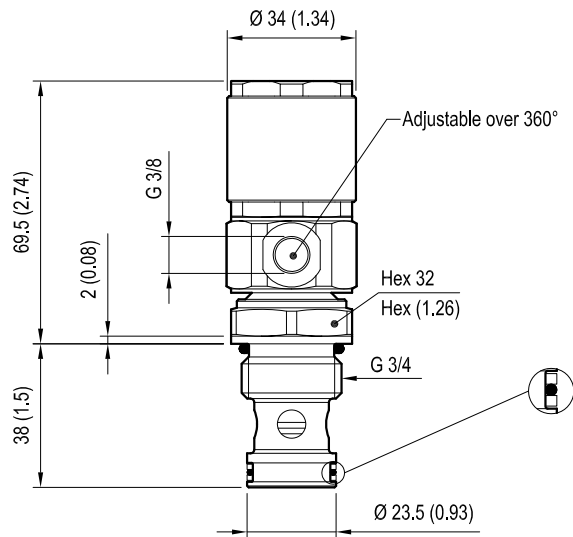
Pilot pressure	bar (psi)	Max. 15 (218)
	bar (psi)	Min. 4 (58)

## Dimensions

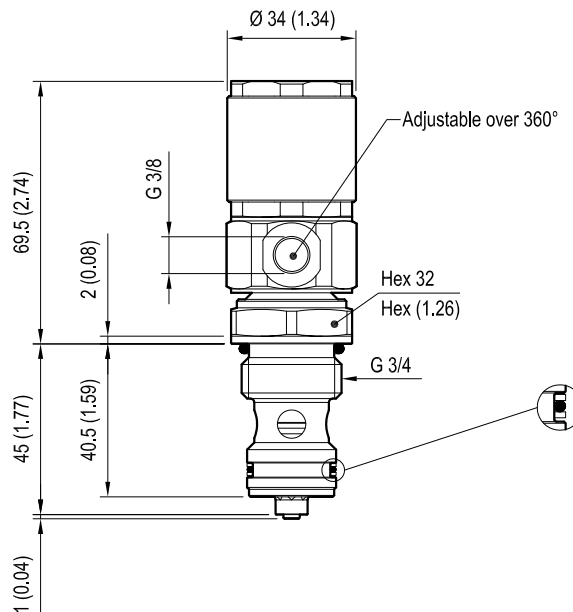
Version 05: Directional control valves pneumatic operated poppet 2-way normally closed - Special cavity



Version 31: Directional control valves pneumatic operated poppet 2-way double lock normally closed - Special cavity



Version 11: Directional control valves pneumatic operated poppet 2-way normally closed - Special cavity

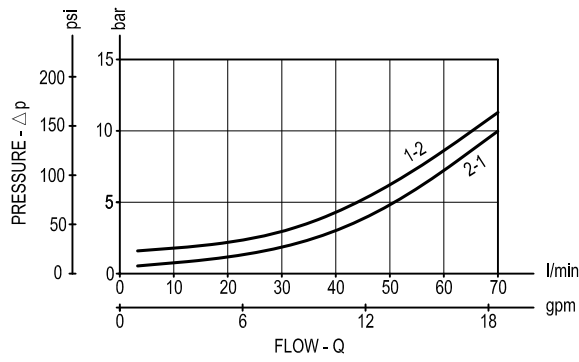


mm (Inches)

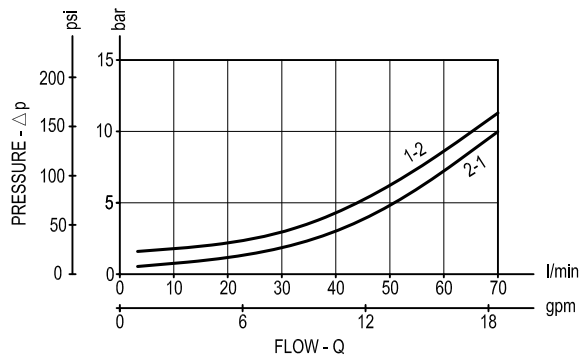
Performance graphs

1

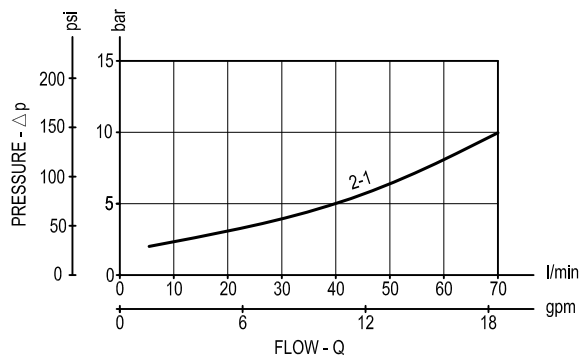
Version 05



Version 31



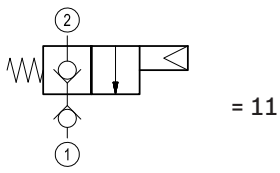
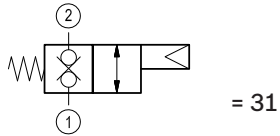
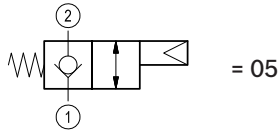
Version 11



### Ordering code

OD.65	*	17	14	00
-------	---	----	----	----

Directional control valves  
pneumatic operated  
poppet 2-way normally  
closed



Special cavity: 017-E

Type	Material number
OD650517140000	R934001444
OD653117140000	R934001457
OD651117140000	R934001454

Type	Material number

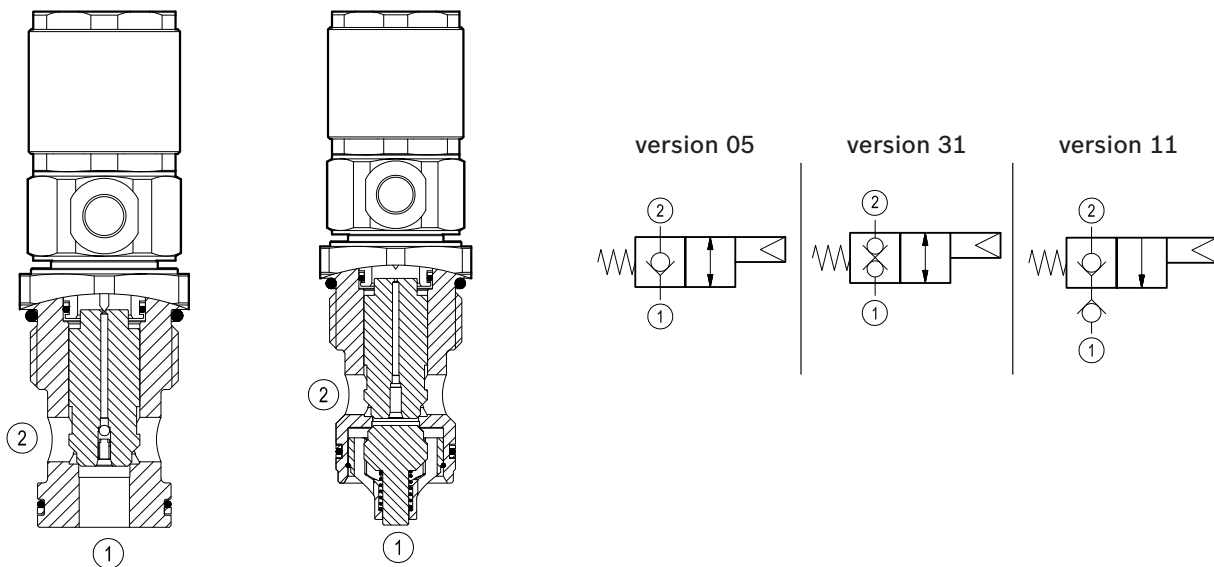
# Directional control valves pneumatic operated poppet 2-way normally closed

Special cavity, 021-E



VPI-8A-2A-12-NC

OD.65 - X - 21.14.00



## General

Weight	kg (lbs)	0.5 (1.1)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

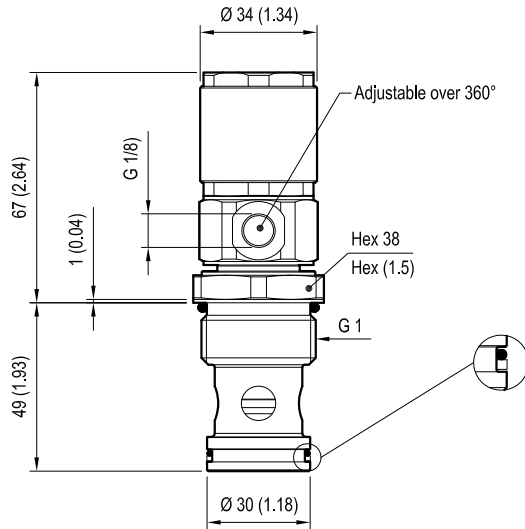
Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	150 (39)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	80-100 (59-74)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Special cavity		021-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 05-11	code material no.	RG21E201052010 R934003566
Seal kit - version 31	code material no.	RG21E201053010 R934003567
Other technical data		See data sheet RE 18350-50

**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure. (version 05)

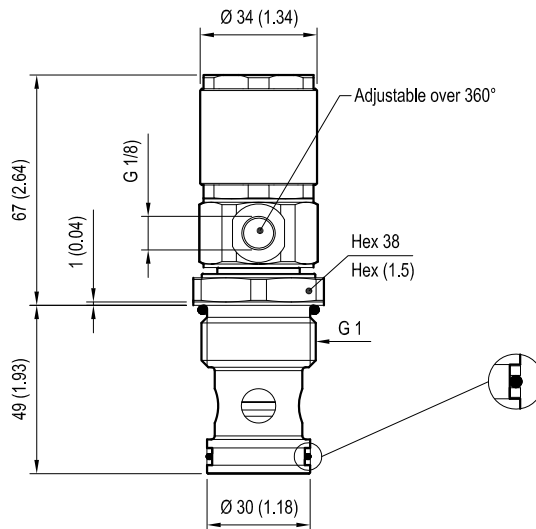
Pilot pressure	bar (psi)	Max. 15 (218)
	bar (psi)	Min. 4 (58)

## Dimensions

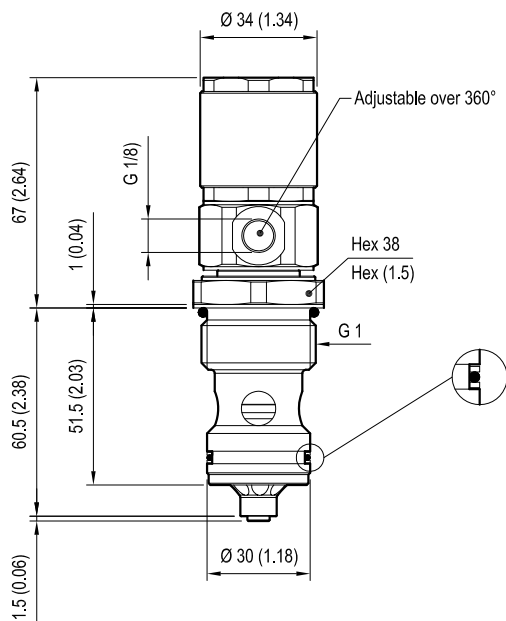
Version 05: Directional control valves pneumatic operated poppet 2-way normally closed - Special cavity



Version 31: Directional control valves pneumatic operated poppet 2-way double lock normally closed - Special cavity



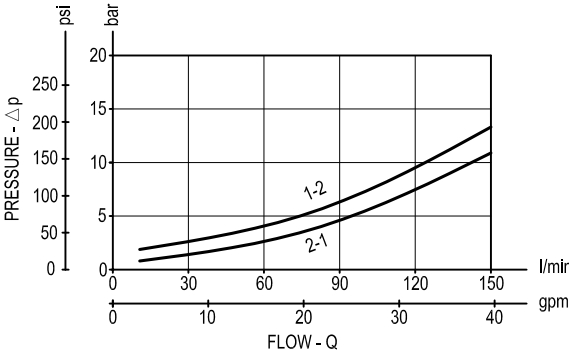
Version 11: Directional control valves pneumatic operated poppet 2-way normally closed - Special cavity



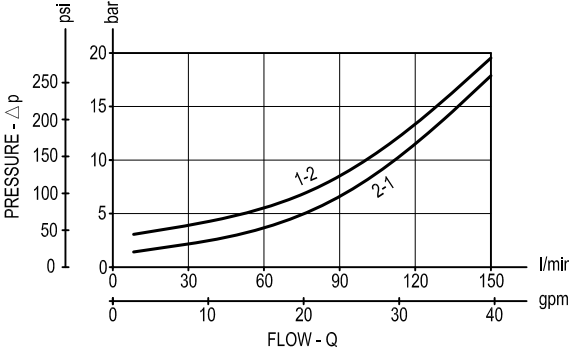
mm (Inches)

Performance graphs

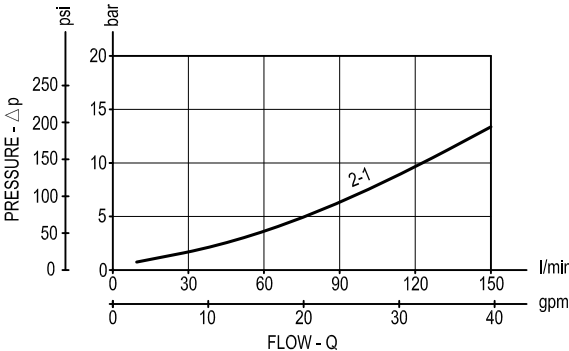
Version 05



Version 31



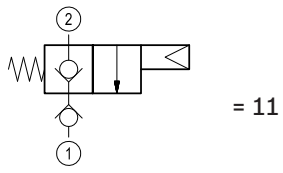
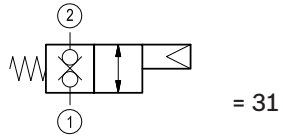
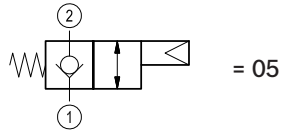
Version 11



Ordering code

OD.65	*	21	14	00
-------	---	----	----	----

Directional control valves  
pneumatic operated  
poppet 2-way normally  
closed



Special cavity: 021-E

Type	Material number
OD650521140000	R901166202
OD653121140000	R934001459
OD651121140000	R934001456

Type	Material number



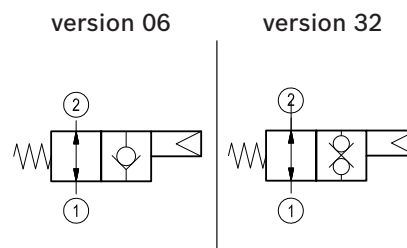
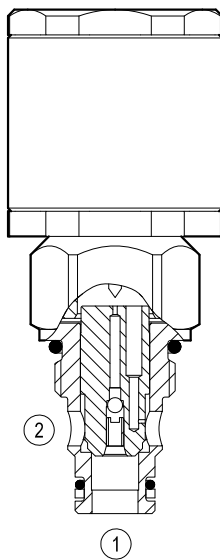
# Directional control valves pneumatic operated poppet 2-way normally open

Common cavity, Size 08



VPI-8A-2A-06-NA

OD.65 - X - 18.14.00



## General

Weight	kg (lbs)	0.27 (0.58)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure.  
(version 06)

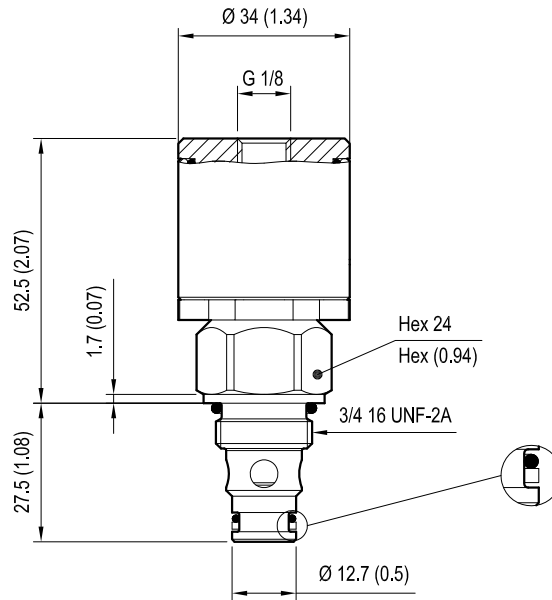
## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		CA-08A-2N see RE 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 06	code material no.	RG08A2010520100 R901101437
Seal kit - version 32	code material no.	RG08A2010530100 R901101544
Other technical data		See data sheet RE 18350-50

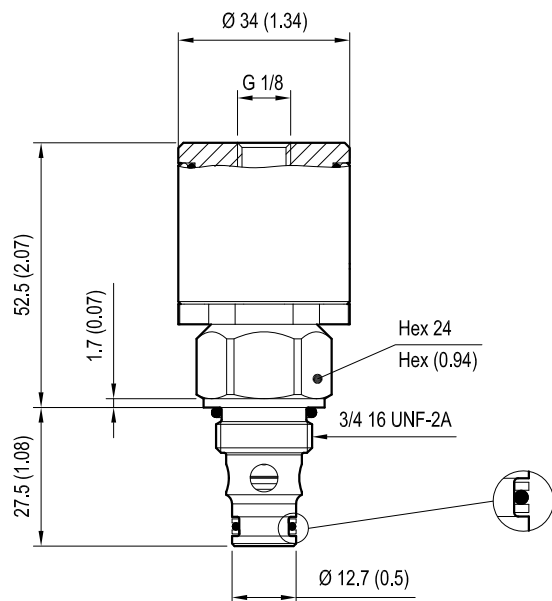
Pilot pressure	bar (psi)	Max. 15 (218)
	bar (psi)	Min. 4 (58)

## Dimensions

Version 06: Directional control valves pneumatic operated poppet 2-way normally open



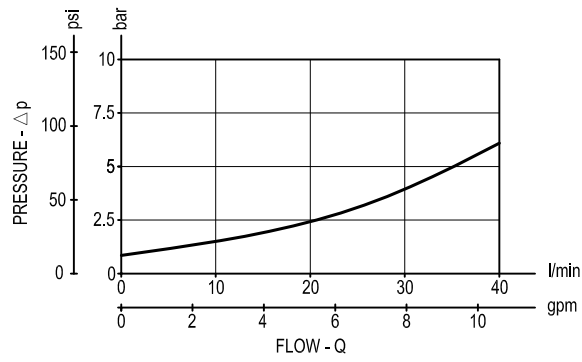
Version 32: Directional control valves pneumatic operated poppet 2-way double lock normally open



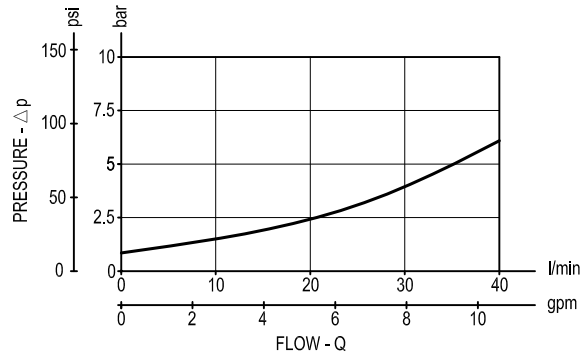
mm (Inches)

Performance graphs

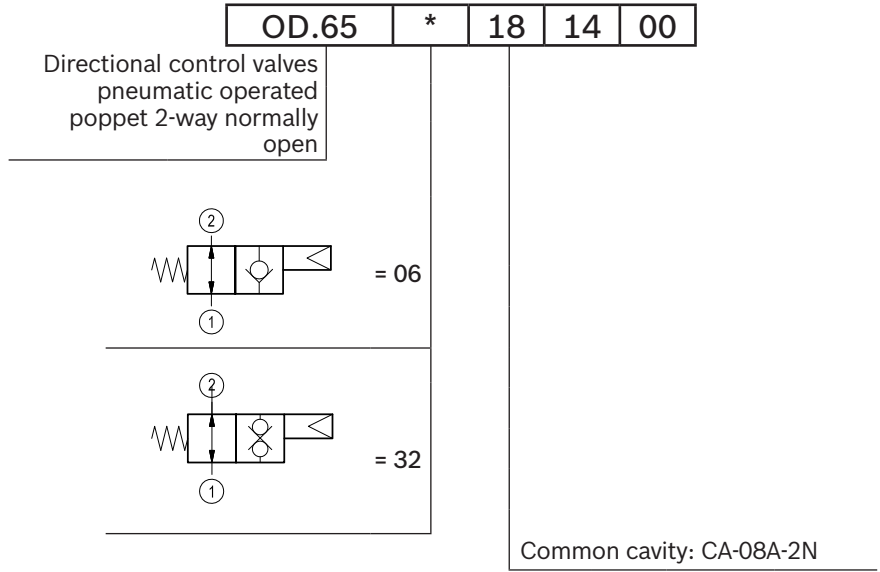
Version 06



Version 32



### Ordering code



Type	Material number
OD650618140000	R901109464
OD653218140000	R901109466

Type	Material number

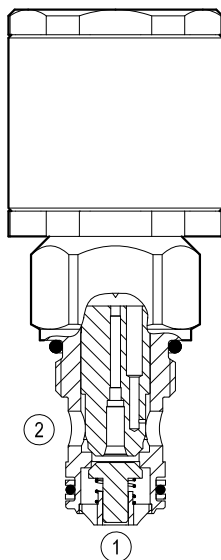
# Directional control valves pneumatic operated poppet 2-way normally open

Special cavity, 019-E

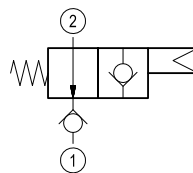


VPI-8A-2A-06-NA-VU

OD.65.12.19.14.00



version 12



## General

Weight	kg (lbs)	0.27 (0.58)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

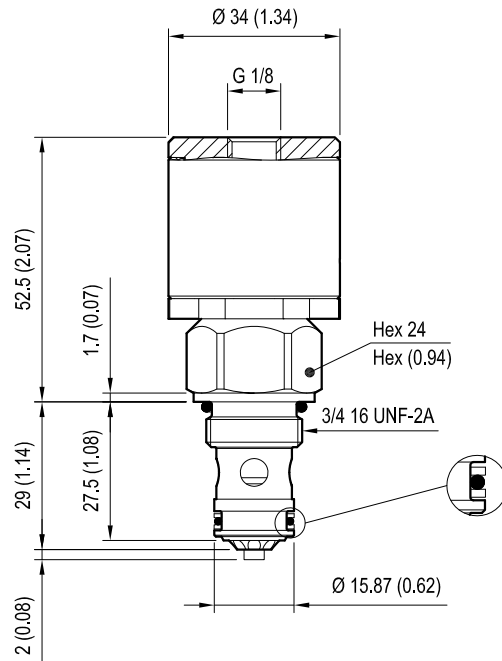
Pilot pressure	bar (psi)	Max. 15 (218)
	bar (psi)	Min. 4 (58)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		019-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG19E201053010 R934003561
Other technical data		See data sheet RE 18350-50

## Dimensions

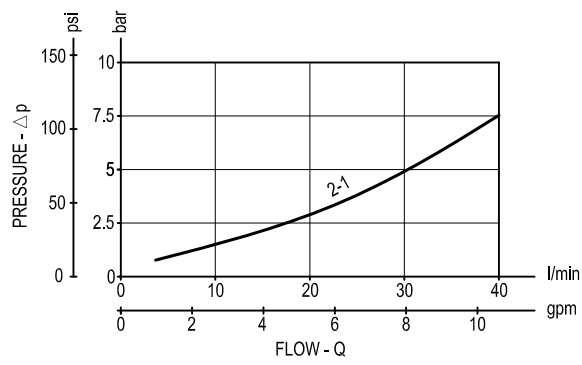
Version 12: Directional control valves pneumatic operated poppet 2-way normally open - Special cavity



mm (Inches)

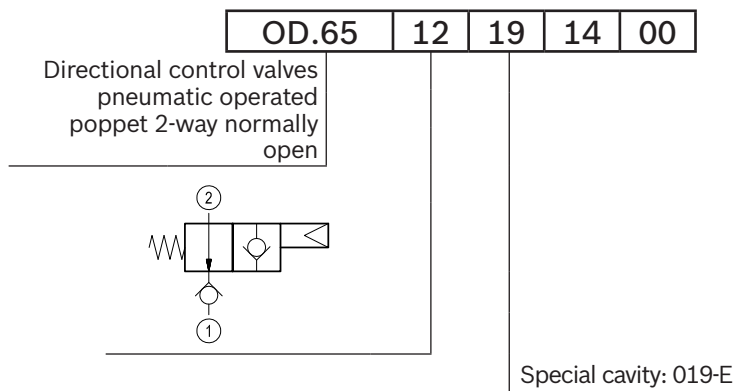
# Performance graphs

Version 12



1

### Ordering code



Type	Material number
OD651219140000	R934003677

Type	Material number



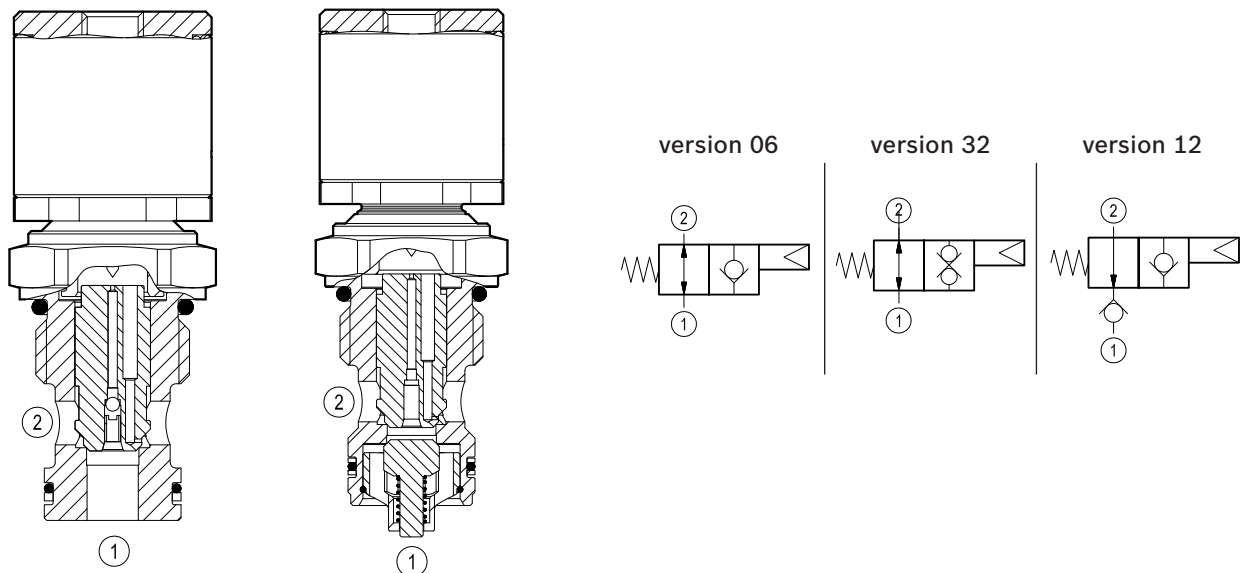
# Directional control valves pneumatic operated poppet 2-way normally open

Special cavity, 017-E



VPI-8A-2A-09-NA

OD.65 - X - 17.14.00



## General

Weight	kg (lbs)	0.34 (0.75)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

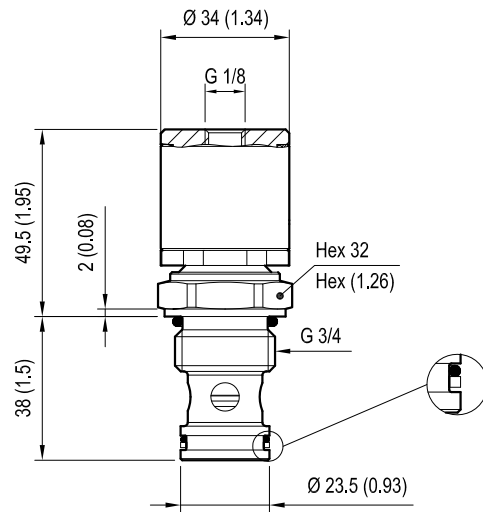
Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	70 (19)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	54-66 (40-49)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Special cavity		017-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit - version 06-12	code material no.	RG17E201052010 R934003562
Seal kit - version 32	code material no.	RG17E201053010 R934003563
Other technical data		See data sheet RE 18350-50

**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure. (version 06)

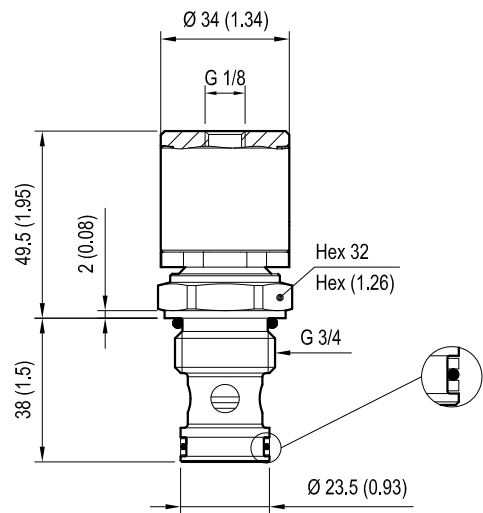
Pilot pressure	bar (psi)	Max. 15 (218)
	bar (psi)	Min. 4 (58)

## Dimensions

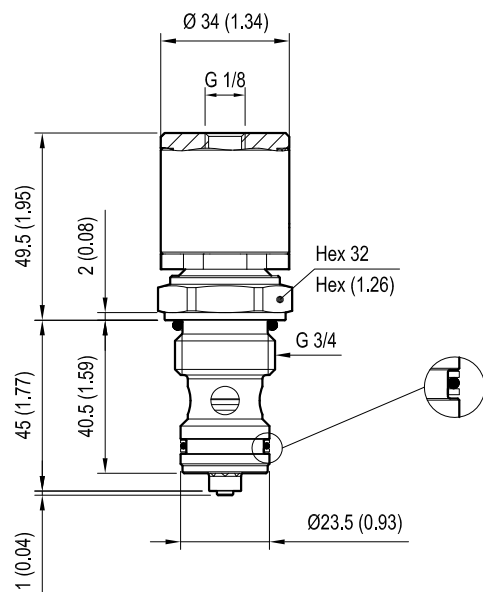
Version 06: Directional control valves pneumatic operated poppet 2-way normally open - Special cavity



Version 32: Directional control valves pneumatic operated poppet 2-way double lock normally open - Special cavity



Version 12: Directional control valves pneumatic operated poppet 2-way normally open - Special cavity

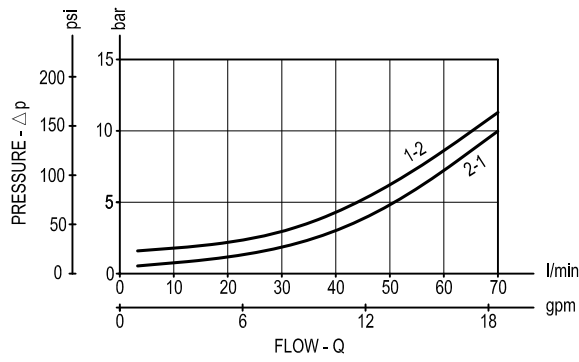


mm (Inches)

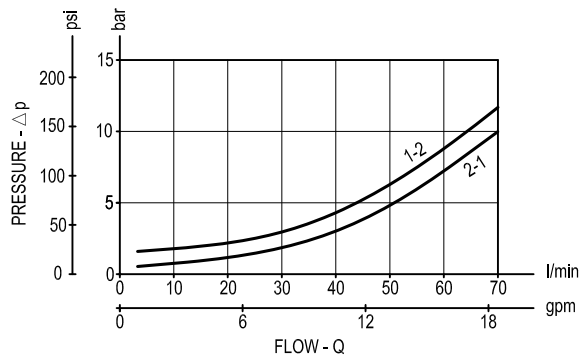
Performance graphs

1

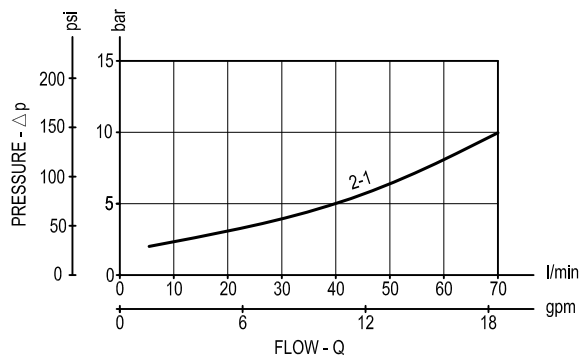
Version 06



Version 32



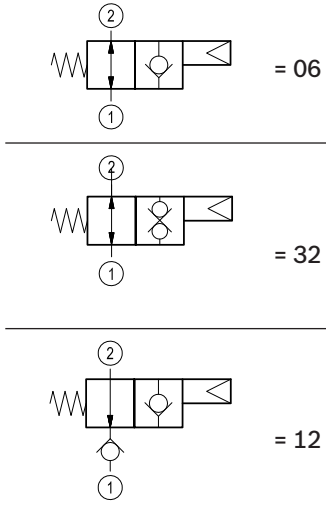
Version 12



### Ordering code

OD.65	*	17	14	00
-------	---	----	----	----

Directional control valves  
pneumatic operated  
poppet 2-way normally  
open



Special cavity: 017-E

Type	Material number
OD650617140000	R934001448
OD653217140000	R934001460
OD651217140000	R934003128

Type	Material number

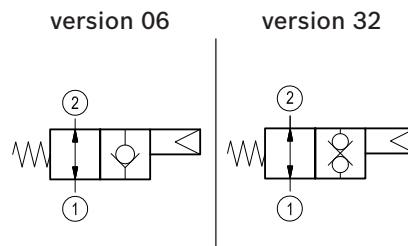
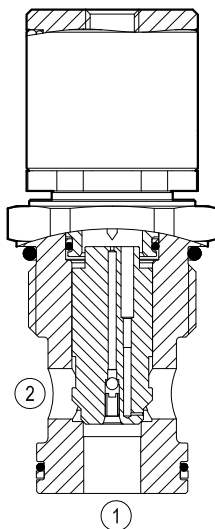
# Directional control valves pneumatic operated poppet 2-way normally open

Special cavity, 021-E



VPI-8A-2A-12-NA

OD.65 - X - 21.14.00



## General

Weight	kg (lbs)	0.48 (1.1)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	150 (39)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm<sup>2</sup>/s (cSt)

Installation torque	Nm (ft-lbs)	80-100 (59-74)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Special cavity		021-E see RE 18325-75

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit - version 06	code	RG21E201052010
	material no.	R934003566
Seal kit - version 32	code	RG21E201053010
	material no.	R934003567

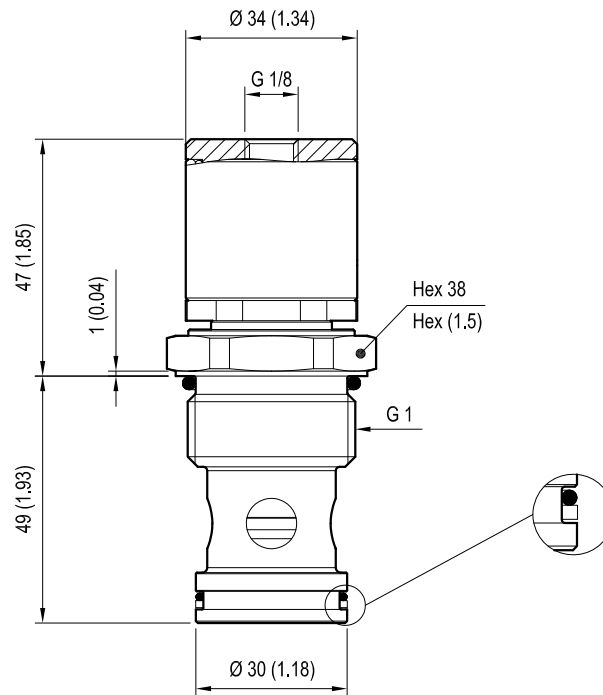
Other technical data See data sheet RE 18350-50

**IMPORTANT:** When valve is not operated, flow from 1 to 2 is not recommended due to high opening pressure.  
(version 06)

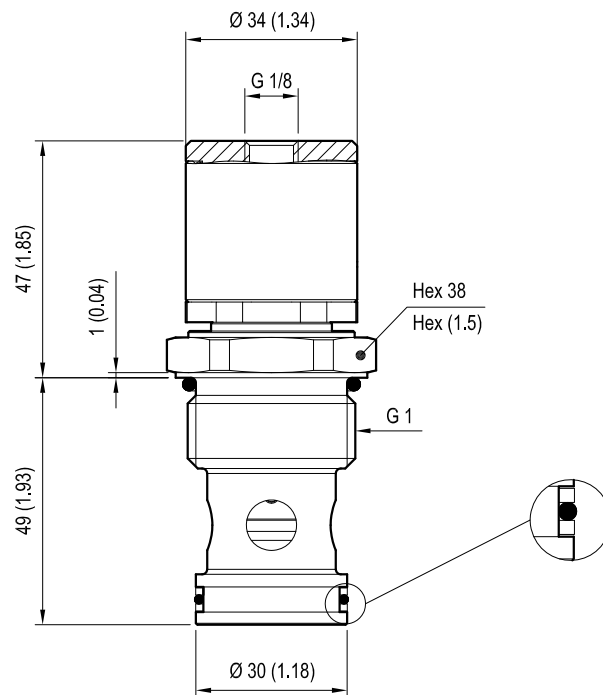
Pilot pressure	bar (psi)	Max. 15 (218)
	bar (psi)	Min. 4 (58)

## Dimensions

Version 06: Directional control valves pneumatic operated poppet 2-way normally open - Special cavity



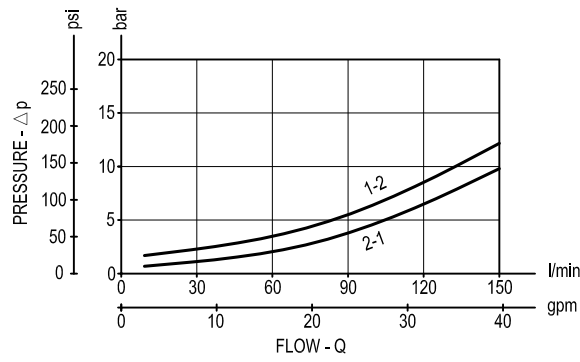
Version 32: Directional control valves pneumatic operated poppet 2-way double lock normally open - Special cavity



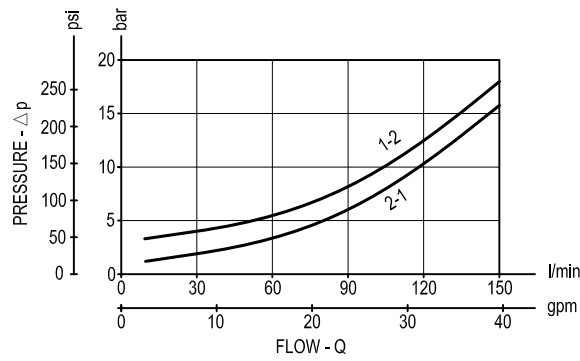
mm (Inches)

Performance graphs

Version 06



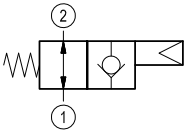
Version 32



### Ordering code

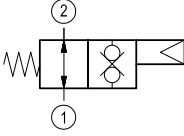
	OD.65	*	21	14	00
--	-------	---	----	----	----

Directional control valves  
pneumatic operated  
poppet 2-way normally  
open



= 06

---



= 32

Special cavity: 021-E

Type	Material number	Type	Material number
OD650621140000	R934001452		



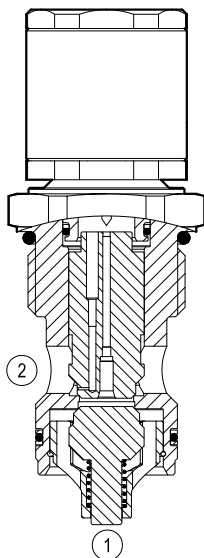
# Directional control valves pneumatic operated poppet 2-way normally open

Special cavity, 021-E

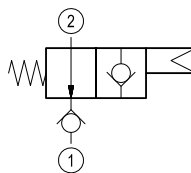


VPI-8A-2A-12-NA-VU

OD.65.12.21.14.00



version 12



## General

Weight	kg (lbs)	0.48 (1.1)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

Only for cam-operated valves:

Operating stroke	mm (in)	3 (0.12)
Max. overstroke	mm (in)	0.5 (0.02)

## Hydraulic

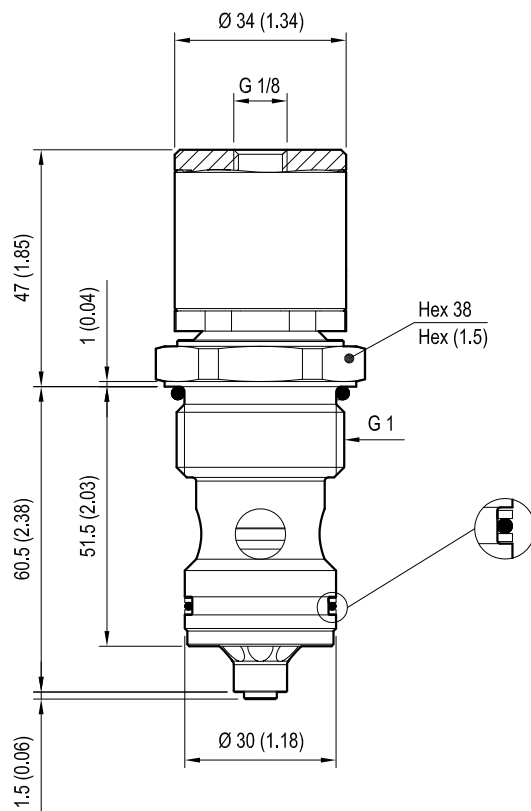
Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	150 (39)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Pilot pressure	bar (psi)	Max. 15 (218)
	bar (psi)	Min. 4 (58)

Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	80-100 (59-74)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		021-E see RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG21E201053010 R934003567
Other technical data		See data sheet RE 18350-50

## Dimensions

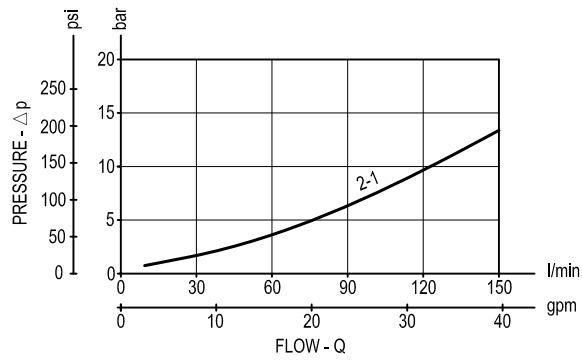
Version 12: Directional control valves pneumatic operated poppet 2-way normally open - Special cavity



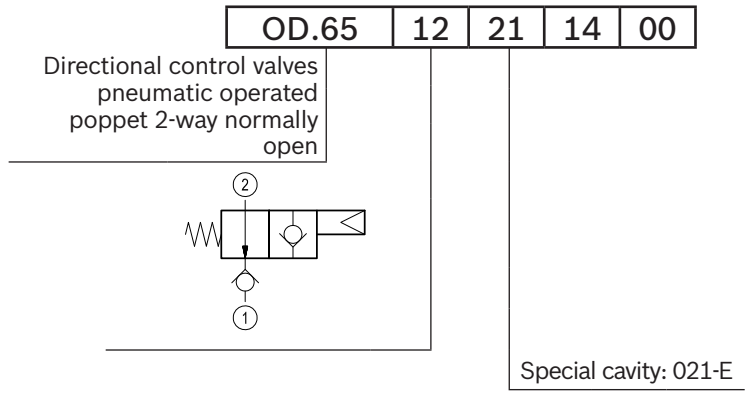
[ mm (Inches) ]

# Performance graphs

Version 12



### Ordering code



Type	Material number	Type	Material number
OD651221140000	R934003676		

# Mechanical cartridge valves

## Accessories

<b>Designation</b>	<b>Description</b>	<b>Cavity</b>	<b>Code</b>	<b>Data sheet</b>	<b>Page</b>
Automatic shut-off, pilot to close	VEM-5-SA	Special	049806X99Z	18320-71	537
Hand pump	PM-06	Size 08	PM5110001800	18321-95	539

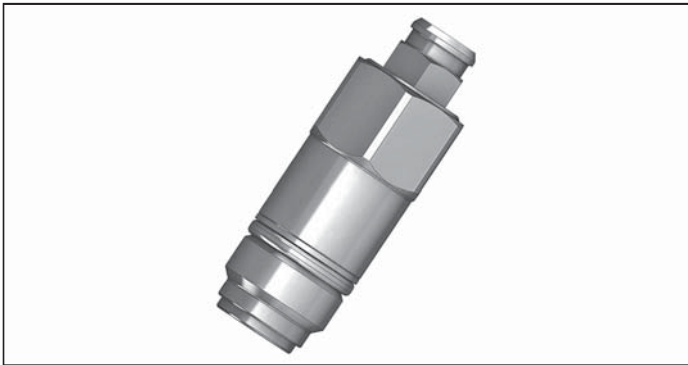


Automatic shut-off, pilot to close

Special cavity, 348

VEM-5-SA

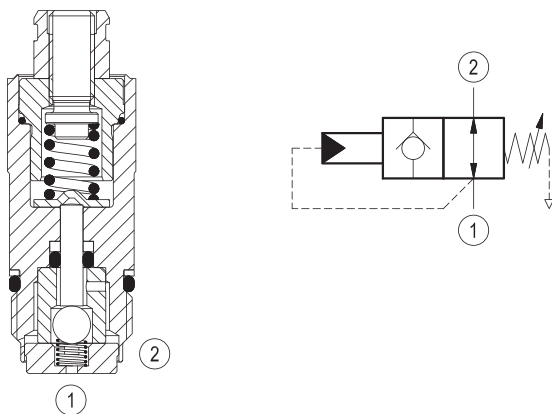
04.98.06 - X - 99 - Z


**Technical data**

Max. operating pressure	350 bar (5000 psi)
Max. flow	1 l/min. (0.26 gpm)
Max. internal leakage	5 drops/min.
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	20 - 23 Nm (15 - 17 ft-lbs)
Weight	0.06 kg (0.13 lbs)
Special cavity	348 (see data sheet 18325-75)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit <sup>1)</sup>	Code: RG0348010520100 material no: R930001669
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 5 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

**Description**

Pilot flow is normally allowed bi-directionally between 1 and 2. When pressure at 1 rises above the selected pressure setting, the ball check seats and blocks flow from 1 to 2. The valve is intended to block undesirable pressure spikes in pilot control systems, particularly in counterbalance applications.


<sup>1)</sup> Only external seals for 10 valves

**Ordering code**

<b>04.98.06</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>00</b>	<b>*</b>
-----------------	----------	-----------	----------	-----------	----------

Automatic shut-off, pilot to close

Adjustments

**03** Leakproof hex. socket screw

**99** Special cavity, 348

Series 0/A to L  
unchanged performances and dimensions

Version and options standard

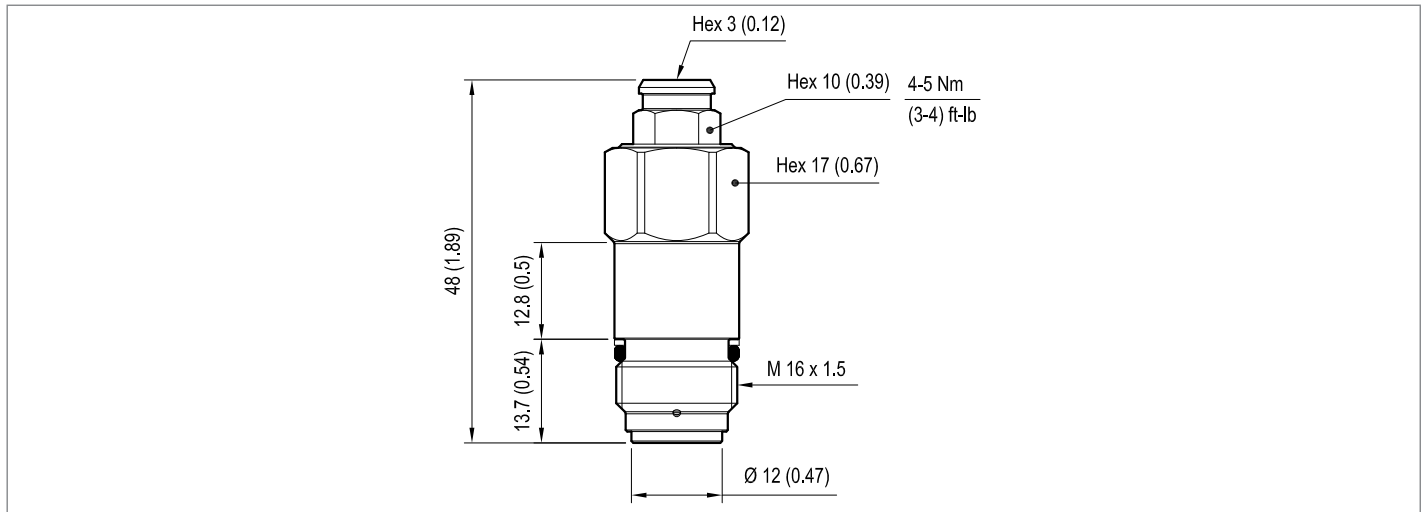
	SPRINGS		
	Adj. press. range bar (psi)	Pressure increase bar/turn (psi/turn)	Std. setting bar (psi)
<b>05</b>	15-35 (220-500)	16 (232)	20 (290)
<b>10</b>	20-70 (290-1000)	31 (450)	50 (725)
<b>20</b>	50-140 (725-2000)	66 (957)	100 (1450)

**Preferred types**

Type	Material number
049806039905000	R930006727
049806039910000	R930006728
049806039920000	R930006730

Type	Material number

**Dimensions**





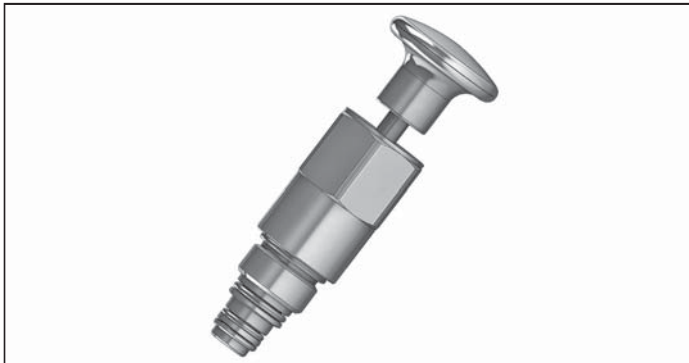
# Accessories, hand pump

## Common cavity, Size 08

PM-06

PM.51.10.00.18.00

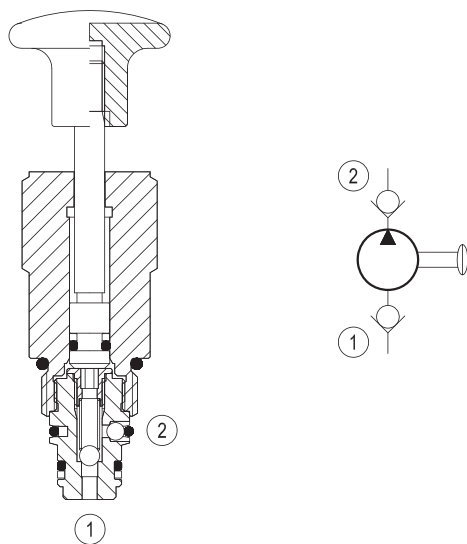
1



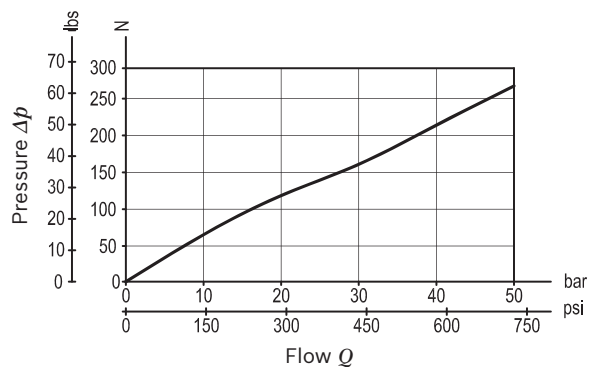
Technical data	
Max. operating pressure port 1	50 bar (725 psi)
Max. operating pressure port 2	210 bar (3000 psi)
Displacement	1 cm <sup>3</sup> (0.06 cu.in.)
Fluid temperature range	-30 to 100 °C (-22 to 212 °F)
Installation torque	34 - 41 Nm (25 - 30 ft-lbs)
Weight	0.15 kg (0.33 lbs)
Cavity	CA-08A-2N (see data sheet 18325-70)
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) / ISO 4406 19/17/14
Installation position	No restrictions
Other Technical Data	See data sheet 18350-50

### Description

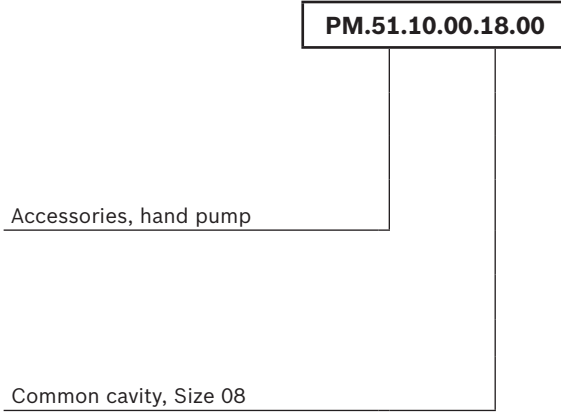
When the operator is pushed PM-06 delivers hydraulic flow from port 1 to port 2. The inlet and outlet checks are integral to the cartridge.



### Characteristic curve



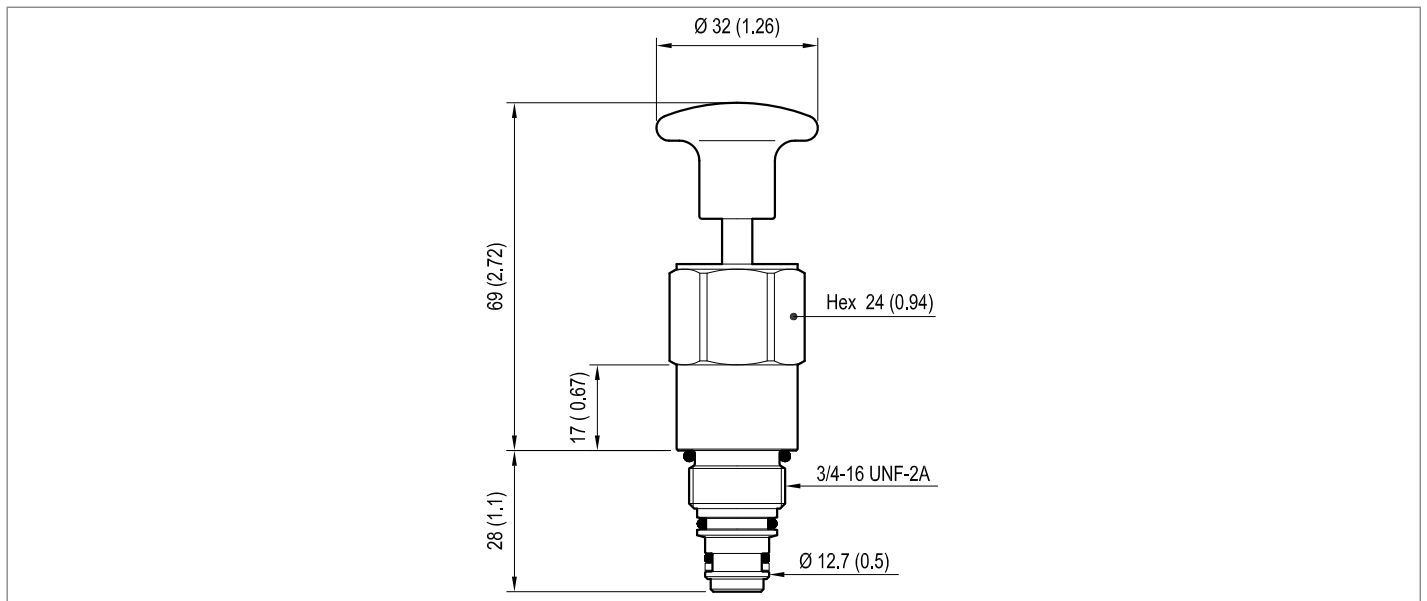
**Ordering code**



Type	Material number
PM511000180000	R934003665

Type	Material number

**Dimensions**



# Insert valves

## Relief

Designation	Description	Cavity	Code	Data sheet	Page
Insert valve relief direct acting poppet type	VSA1.050	Special	0TM201X99ZW	18329-01	543
Insert valve relief direct acting and anti-cavitation function	VMA1.025	Special	0TM405X99ZW	18329-11	545
Insert valve relief direct acting and anti-cavitation function	VMA1.050	Special	0TM406X99ZW	18329-12	547
Insert valve relief direct acting and anti-cavitation function	VMA1.060	Special	0TM407X99ZW	18329-13	549
Insert valve relief direct acting and anti-cavitation function	VMA1.080	Special	0TM408X99ZW	18329-14	551
Insert valve relief direct acting and anti-cavitation function	VMA1.130	Special	0TM410X99ZW	18329-15	553
Insert valve relief direct acting and anti-cavitation function	VMA1.180	Special	0TM409X99ZW	18329-16	555
Insert valve relief direct acting adjustable anti-cavitation function	VRA1.025	Special	0TM601X99Z	18329-31	557
Insert valve relief direct acting adjustable anti-cavitation function	VRA1.050	Special	0TM602X99Z	18329-32	559
Insert valve relief direct acting adjustable anti-cavitation function	VRA1.060	Special	0TM603X99Z	18329-33	561
Insert valve relief direct acting adjustable anti-cavitation function	VRA1.080	Special	0TM604X99Z	18329-34	563



# Insert type, Relief, direct acting poppet type

Special cavity, 730-A

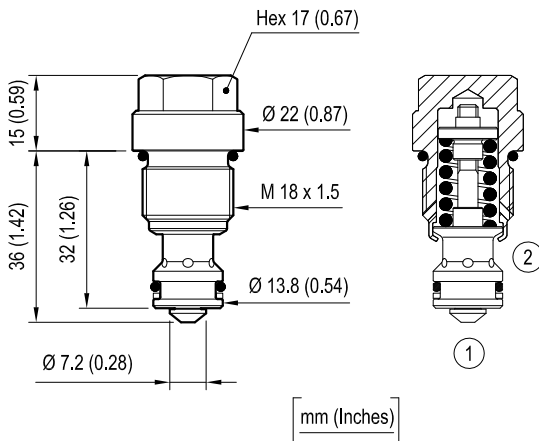
VSA1.050

0T.M2.01 - X - 99 - Z - W



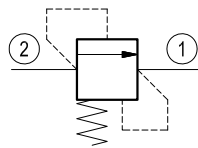
2

## Dimensions

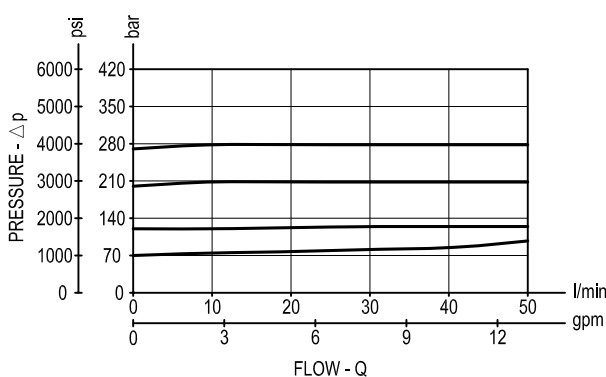


## Description

Flow is blocked from 2 to 1 until pressure increases to meet the selected valve setting, lowering the poppet from its seat and allowing relief flow through port 1 to tank.



## Performance



## Technical data

Max. operating pressure	bar (psi)	380 (5500)
Max. flow	l/min. (gpm)	50 (13)
Max. internal leakage (*)	drops/min.	15
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	45-50 (33-37)
Weight	kg (lbs)	0.07 (0.15)
Special cavity		730-A see data sheet RE 18325-75
MTTFd		150 years see data sheet 18350-51
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (**)	code material no.	RG730A020520100 R931002404
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) at 80% of pressure setting

(\*\*) Only external seals for 10 valves

## Ordering code

OT.M2.01	X	99	Z	W	*
----------	---	----	---	---	---

Relief, direct acting poppet type

Adjustments

= 00 Fixed setting

Special cavity, 730-A

Series O/A to L  
unchanged performances and dimensions

SPRINGS	
Adj. pressure range bar (psi)	
20-70 (290-1000)	= 05
70-120 (1000-1750)	= 10
120-200 (1750-2900)	= 20
200-270 (2900-3900)	= 27
270-320 (3900-4700)	= 32
320-380 (4700-5500)	= 35

Std. SETTING bar (psi) Q=5 l/min (1.3 gpm)

	for Z=05	for Z=10	for Z=20	for Z=27	for Z=32	for Z=35
= 02	20 (290)	80 (1160)	130 (1890)	210 (3050)	280 (4060)	330 (4790)
= 03	30 (440)	90 (1300)	140 (2030)	220 (3190)	290 (4210)	340 (4930)
= 04	40 (580)	100 (1450)	150 (2180)	230 (3340)	300 (4350)	350 (5080)
= 05	50 (730)	110 (1600)	160 (2320)	240 (3480)	310 (4500)	360 (5220)
= 06	60 (870)	120 (1740)	170 (2470)	250 (3630)	320 (4640)	370 (5370)
= 07	70 (1020)		180 (2610)	260 (3770)		380 (5510)
= 08			190 (2760)	270 (3920)		
= 09			200 (2900)			

Type	Material number
OTM201009905020	R931002361
OTM201009905030	R931002362
OTM201009905040	R931002363
OTM201009905050	R931002364
OTM201009905060	R931002365
OTM201009905070	R931002366
OTM201009910020	R931002367
OTM201009910030	R931002369
OTM201009910040	R931002370
OTM201009910050	R931002371
OTM201009910060	R931002372
OTM201009920020	R931002373
OTM201009920030	R931002374
OTM201009920040	R931000034
OTM201009920050	R931002375
OTM201009920060	R931002376
OTM201009920070	R931002377
OTM201009920080	R931002378
OTM201009920090	R901170599
OTM201009927020	R931002380

Type	Material number
OTM201009927030	R931002381
OTM201009927040	R931002382
OTM201009927050	R931002383
OTM201009927060	R931002384
OTM201009927070	R931002385
OTM201009927080	R931002386
OTM201009932020	R931002387
OTM201009932030	R931002388
OTM201009932040	R931002389
OTM201009932050	R931002390
OTM201009932060	R931002391
OTM201009935020	R931002392
OTM201009935030	R931002394
OTM201009935040	R931002395
OTM201009935050	R931002396
OTM201009935060	R931002397
OTM201009935070	R931002398

# Insert type Relief, direct acting and anti-cavitation function

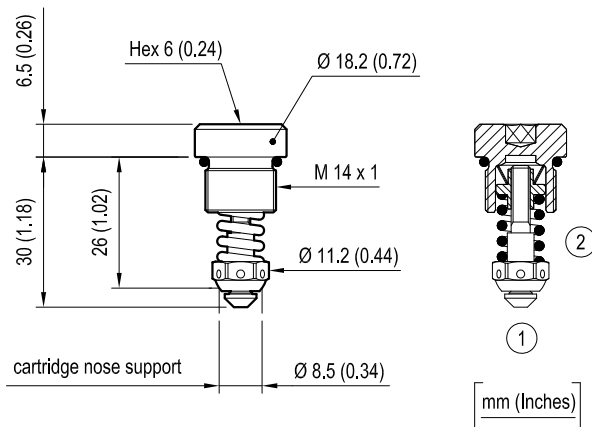
Special cavity, 869

VMA1.025

0T.M4.05 - X - 99 - Z - W



## Dimensions

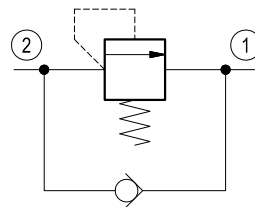


## Description

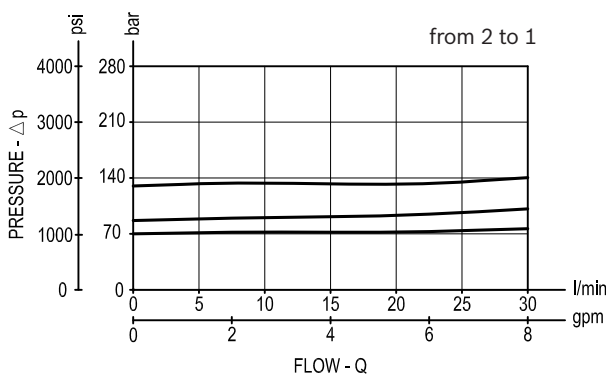
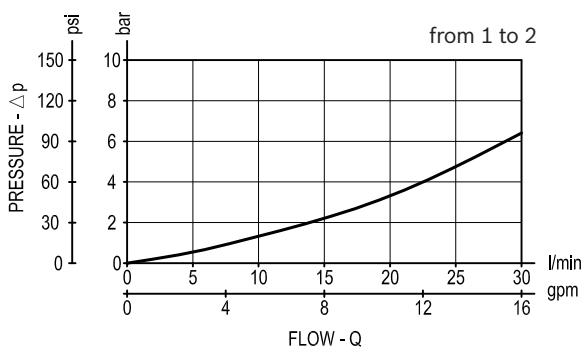
Flow is free from 1 to 2 until pressure increases to meet the selected valve setting, allowing relief flow through port 1 to tank. This valve combine the typical function of shock relief valve (direct acting) and anticavitation function through the check valve. The direct action and the specific design allow a very fast opening and closing.

**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve seat (P/N OF.S0.049) as a coining tool.

Please consult factory for any question.



## Performance



## Technical data

Max. operating pressure	bar (psi)	210 (3000)
Max. flow	l/min. (gpm)	30 (8)
Max. internal leakage (*)	drops/min.	15
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	30-35 (22-26)
Weight	kg (lbs)	0.03 (0.07)
Special cavity		869 see data sheet RE 18325-75
MTTFd		150 years see RE 18350-51
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (**)	code material no.	RG0869020000100 R931002405
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) at 80% of pressure setting

(\*\*) Only external seals for 10 valves





# Insert type Relief, direct acting and anti-cavitation function

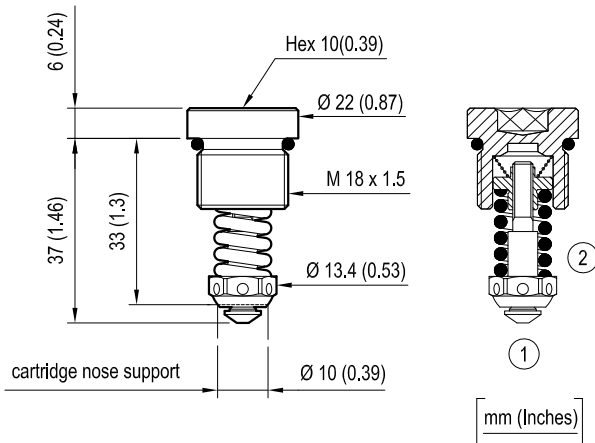
Special cavity, 730

VMA1.050

0T.M4.06 - X - 99 - Z - W



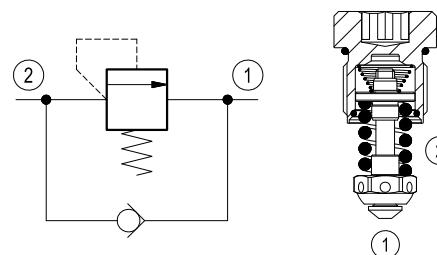
## Dimensions



## Description

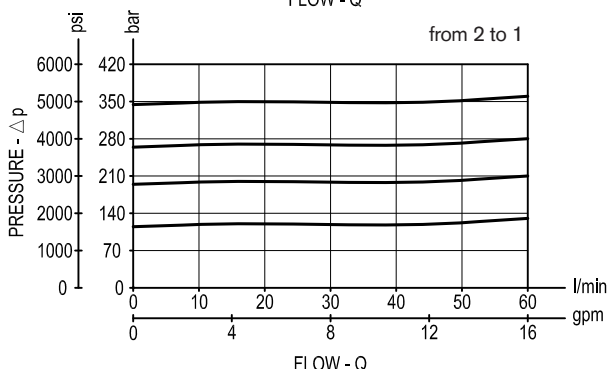
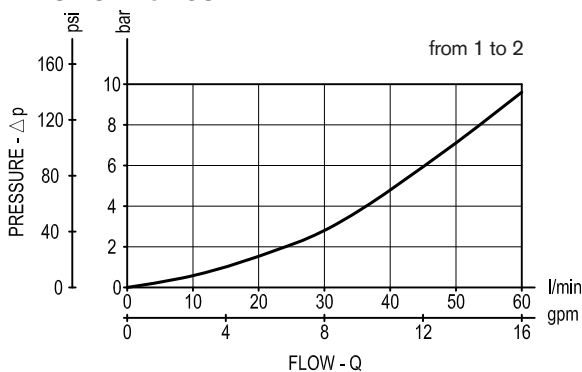
Flow is free from 1 to 2 until pressure increases to meet the selected valve setting, allowing relief flow through port 1 to tank. This valve combine the typical function of shock relief valve (direct acting) and anticavitation function through the check valve. The direct action and the specific design allow a very fast opening and closing.

**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve seat (P/N 0F.S0.108) as a coining tool. Please consult factory for any question.



VMA7.050 version with retainer ring available by request fitting same cavity of VMA1.050

## Performance



## Technical data

Max. operating pressure	bar (psi)	380 (5500)
Max. flow	l/min. (gpm)	60 (16)
Max. internal leakage (*)	drops/min.	15
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	45-50 (33-37)
Weight	kg (lbs)	0.05 (0.11)
Special cavity		730 see data sheet RE 18325-75
MTTFd		150 years see RE18350-51
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (**)	code material no.	RG0730020000100 R931002406
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) at 80% of pressure setting

(\*\*) Only external seals for 10 valves

## Ordering code

<b>OT.M4.06</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>W</b>	<b>*</b>
-----------------	----------	-----------	----------	----------	----------

Insert type - Relief, direct acting  
and anti-cavitation function

Adjustments

= **00** Fixed setting

Special cavity, 730

Series 0/A to L

unchanged performances and dimensions

SPRINGS	
Adj. pressure range bar (psi)	
20-70 (290-1000)	= <b>05</b>
70-120 (1000-1750)	= <b>10</b>
120-200 (1750-2900)	= <b>20</b>
200-270 (2900-3900)	= <b>27</b>
270-320 (3900-4700)	= <b>32</b>
320-380 (4700-5500)	= <b>35</b>

**Std. SETTING** bar (psi) Q=5 l/min (1.3 gpm)

	for Z=05	for Z=10	for Z=20	for Z=27	for Z=32	for Z=35
= <b>02</b>	20 (290)	80 (1160)	130 (1890)	210 (3050)	280 (4060)	330 (4790)
= <b>03</b>	30 (440)	90 (1300)	140 (2030)	220 (3190)	290 (4210)	340 (4930)
= <b>04</b>	40 (580)	100 (1450)	150 (2180)	230 (3340)	300 (4350)	350 (5080)
= <b>05</b>	50 (730)	110 (1600)	160 (2320)	240 (3480)	310 (4500)	360 (5220)
= <b>06</b>	60 (870)	120 (1750)	170 (2470)	250 (3630)	320 (4640)	370 (5370)
= <b>07</b>	70 (1020)		180 (2610)	260 (3770)		380 (5510)
= <b>08</b>			190 (2760)	270 (3920)		
= <b>09</b>			200 (2900)			

Type	Material number
OTM406009905020	R931002131
OTM406009905030	R931002132
OTM406009905040	R931000065
OTM406009905050	R931002133
OTM406009905060	R931002134
OTM406009905070	R931002091
OTM406009910020	R931002135
OTM406009910030	R931002136
OTM406009910040	R931002137
OTM406009910050	R931002138
OTM406009910060	R931002139
OTM406009920020	R931002141
OTM406009920030	R931002142
OTM406009920040	R931002143
OTM406009920050	R901159032
OTM406009920060	R931002144
OTM406009920070	R931002145
OTM406009920080	R931002147
OTM406009920090	R931002148

Type	Material number
OTM406009927020	R931002150
OTM406009927030	R931002151
OTM406009927040	R931002153
OTM406009927050	R931002155
OTM406009927060	R931002156
OTM406009927070	R931002157
OTM406009927080	R931002158
OTM406009932020	R931002159
OTM406009932030	R931002160
OTM406009932040	R931002161
OTM406009932050	R901160150
OTM406009932060	R931002162
OTM406009935020	R931002163
OTM406009935030	R931002164
OTM406009935040	R931002165
OTM406009935050	R931002166
OTM406009935060	R931002167
OTM406009935070	R931000068

# Insert type Relief, direct acting and anti-cavitation function

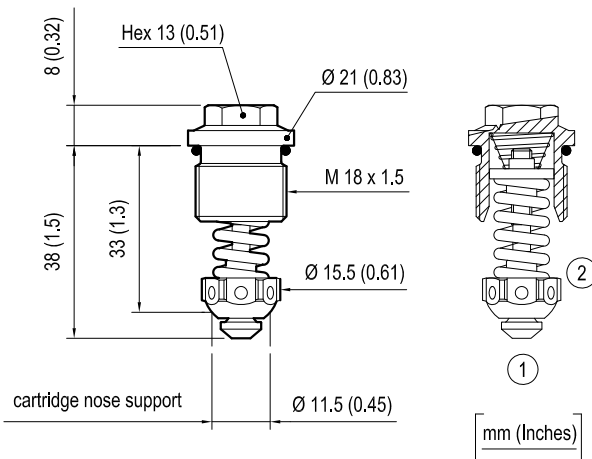
Special cavity, 808

VMA1.060

0T.M4.07 - X - 99 - Z - W



## Dimensions

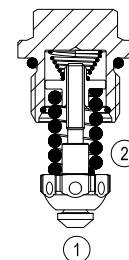
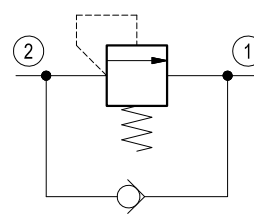


## Description

Flow is free from 1 to 2 until pressure increases to meet the selected valve setting, allowing relief flow through port 1 to tank. This valve combine the typical function of shock relief valve (direct acting) and anticavitation function through the check valve. The direct action and the specific design allow a very fast opening and closing.

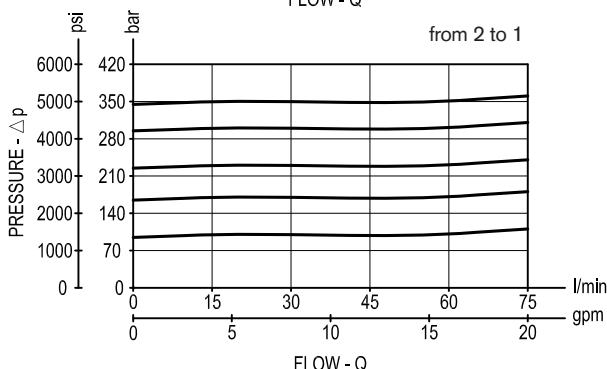
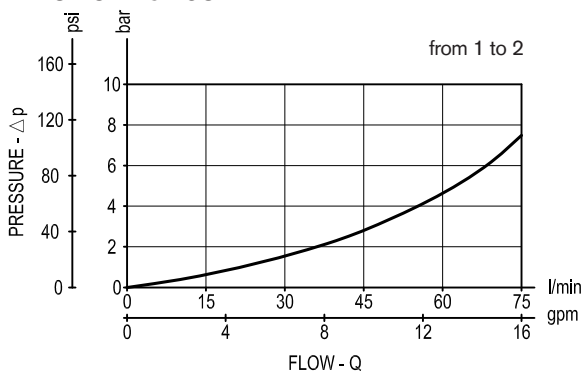
Note: to obtain a good leak proof performance coin the cavity seat using a loose valve seat (P/N 0F.S0.036) as a coining tool.

Impact energy:  $5 \pm 2$  Nm.



VMA7.060 version with retainer ring available by request fitting slightly different cavity of VMA1.060

## Performance



## Technical data

Max. operating pressure	bar (psi)	380 (5500)
Max. flow	l/min. (gpm)	75 (20)
Max. internal leakage (*)	drops/min.	30
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	40-45 (33-37)
Weight	kg (lbs)	0.05 (0.11)
Special cavity		808 see data sheet RE 18325-75
MTTFd		150 years see data sheet 18350-51
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (**)	code material no.	RG0730020000100 R931002406
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) at 80% of pressure setting

(\*\*) Only external seals for 10 valves

## Ordering code

<b>OT.M4.07</b>	<b>X</b>	<b>99</b>	<b>Z</b>	<b>W</b>	<b>*</b>
-----------------	----------	-----------	----------	----------	----------

Insert type - Relief, direct acting  
and anti-cavitation function

Adjustments

= 00 Fixed setting

Special cavity, 808

Series 0/A to L  
unchanged performances and dimensions

SPRINGS	
Adj. pressure range bar (psi)	
20-100 (290-1500)	= 05
100-170 (1500-2500)	= 10
170-230 (2500-3300)	= 20
230-300 (3300-4400)	= 30
300-380 (4400-5500)	= 35

Std. SETTING bar (psi) Q=5 l/min (1.3 gpm)

	for Z=05	for Z=10	for Z=20	for Z=30	for Z=35	
= 01	20 (290)					
= 02	30 (440)	110 (1600)	180 (2610)	240 (3480)	310 (4500)	
= 03	40 (580)	120 (1750)	190 (2760)	250 (3630)	320 (4640)	
= 04	50 (730)	130 (1890)	200 (2900)	260 (3770)	330 (4790)	
= 05	60 (870)	140 (2030)	210 (3050)	270 (3920)	340 (4930)	
= 06	70 (1020)	150 (2180)	220 (3190)	280 (4060)	350 (5080)	
= 07	80 (1160)	160 (2320)	230 (3340)	290 (4210)	360 (5220)	
= 08	90 (1300)	170 (2470)		300 (4350)	370 (5370)	
= 09	100 (1450)				380 (5510)	

Type	Material number
OTM407009905010	R931002169
OTM407009905020	R931002168
OTM407009905030	R931002170
OTM407009905040	R931002171
OTM407009905050	R931002172
OTM407009905060	R931002173
OTM407009905070	R931002174
OTM407009905080	R931002175
OTM407009905090	R931002176
OTM407009910020	R931002077
OTM407009910030	R931002177
OTM407009910040	R931002080
OTM407009910050	R931002179
OTM407009910060	R931002180
OTM407009910070	R931002181
OTM407009910080	R931002183
OTM407009920020	R931002204
OTM407009920030	R931002205
OTM407009920040	R931002206

Type	Material number
OTM407009920050	R931002207
OTM407009920060	R931002208
OTM407009920070	R931002209
OTM407009930020	R931002210
OTM407009930030	R931002211
OTM407009930040	R931002212
OTM407009930050	R931001966
OTM407009930060	R931002213
OTM407009930070	R931001967
OTM407009930080	R931002214
OTM407009935020	R931002215
OTM407009935030	R931001427
OTM407009935040	R931001968
OTM407009935050	R931001969
OTM407009935060	R931002216
OTM407009935070	R931002217
OTM407009935080	R931001970
OTM407009935090	R931002218

# Insert type Relief, direct acting and anti-cavitation function

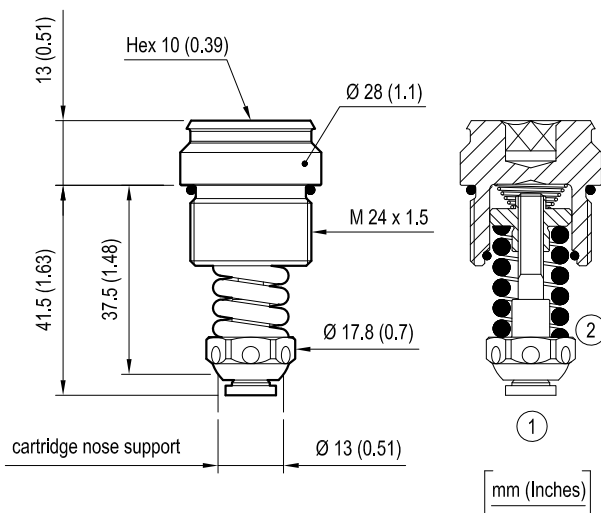
Special cavity, 870

VMA1.080

0T.M4.08 - X - 99 - Z - W



## Dimensions

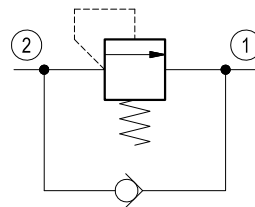


## Description

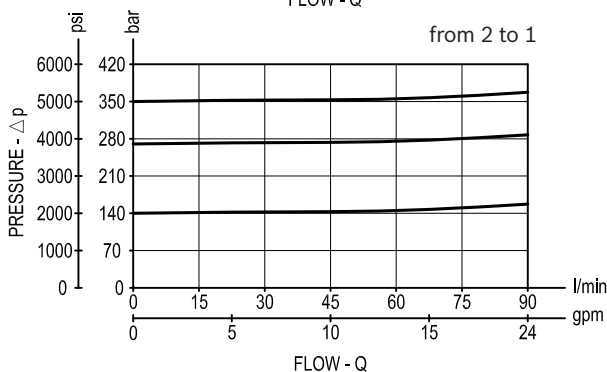
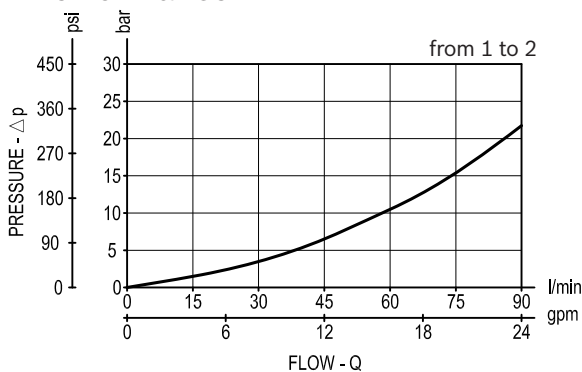
Flow is free from 1 to 2 until pressure increases to meet the selected valve setting, allowing relief flow through port 1 to tank. This valve combine the typical function of shock relief valve (direct acting) and anticavitation function through the check valve. The direct action and the specific design allow a very fast opening and closing.

**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve seat (P/N 0F.S0.011) as a coining tool.

Please consult factory for any question.



## Performance



## Technical data

Max. operating pressure	bar (psi)	400 (5800)
Max. flow	l/min. (gpm)	90 (24)
Max. internal leakage (*)	drops/min.	30
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	50-55 (37-41)
Weight	kg (lbs)	0.11 (0.23)
Special cavity		870 see data sheet RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (**)	code material no.	RG0870020000100 R931002407
Recommended degree of fluid contamination		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Filtration		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) at 80% of pressure setting

(\*\*) Only external seals for 10 valves

Ordering code

OT.M4.08	X	99	Z	W	*
----------	---	----	---	---	---

Insert type - Relief, direct acting and anti-cavitation function

Adjustments

= 00 Fixed setting

Special cavity, 870

Series O/A to L unchanged performances and dimensions

SPRINGS	
Adj. pressure range bar (psi)	
90-140 (1300-2000)	= 10
140-270 (2000-3900)	= 20
270-350 (3900-5000)	= 35
350-400 (5000-5800)	= 40

Std. SETTING bar (psi) Q=10 l/min (2.6 gpm)

	for Z=10	for Z=20	for Z=35	for Z=40		
= 01	90 (1310)					
= 02	100 (1450)	150 (2180)	280 (4060)	360 (5220)		
= 03	110 (1600)	160 (2320)	290 (4210)	370 (5370)		
= 04	120 (1740)	170 (2470)	300 (4350)	380 (5510)		
= 05	130 (1890)	180 (2610)	310 (4500)	390 (5660)		
= 06	140 (2030)	190 (2760)	320 (4640)	400 (5800)		
= 07		200 (2900)	330 (4790)			
= 08		210 (3050)	340 (4930)			
= 09		220 (3190)	350 (5080)			
= 10		230 (3340)				
= 11		240 (3480)				
= 12		250 (3630)				
= 13		260 (3770)				
= 14		270 (3920)				

Type	Material number
OTM408009910010	R931002087
OTM408009910020	R931002219
OTM408009910030	R931002220
OTM408009910040	R931002221
OTM408009910050	R931002222
OTM408009910060	R931002088
OTM408009920020	R931002223
OTM408009920030	R901191435
OTM408009920040	R931002224
OTM408009920050	R931002225
OTM408009920060	R931000754
OTM408009920070	R931002226
OTM408009920080	R901192838
OTM408009920090	R931002227
OTM408009920100	R931002228
OTM408009920110	R931002229

Type	Material number
OTM408009920120	R931002230
OTM408009920130	R931002231
OTM408009920140	R931002232
OTM408009935020	R901196681
OTM408009935030	R931002233
OTM408009935040	R931002234
OTM408009935050	R931002235
OTM408009935060	R931002236
OTM408009935070	R931002237
OTM408009935080	R931002238
OTM408009935090	R931002239
OTM408009940020	R931002241
OTM408009940030	R931002242
OTM408009940040	R931002243
OTM408009940050	R931002244
OTM408009940060	R931002245

# Insert type Relief, direct acting and anti-cavitation function

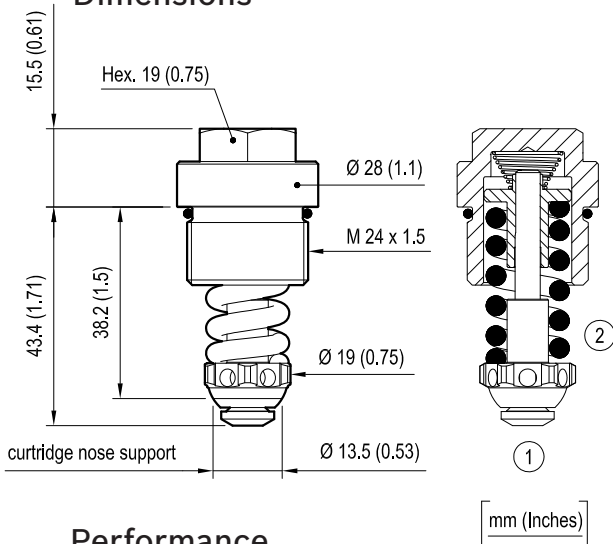
Special cavity, 924

VMA1.130

0T.M4.10 - X - 99 - Z - W



## Dimensions

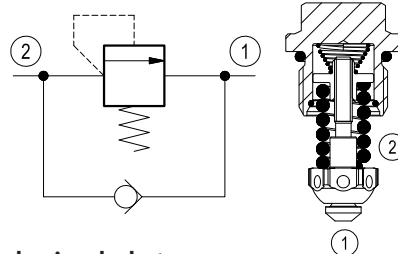


## Description

Flow is free from 1 to 2 until pressure increases to meet the selected valve setting, allowing relief flow through port 1 to tank. This valve combine the typical function of shock relief valve (direct acting) and anticavitation function through the check valve. The direct action and the specific design allow a very fast opening and closing.

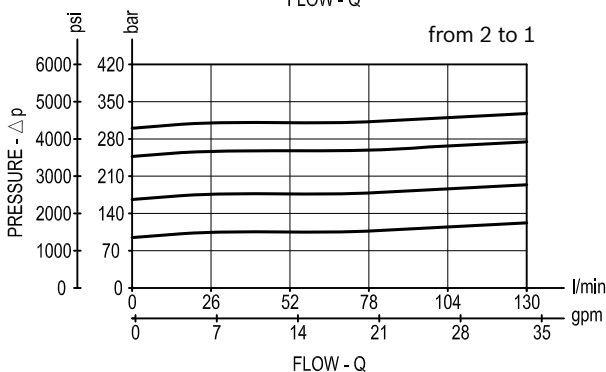
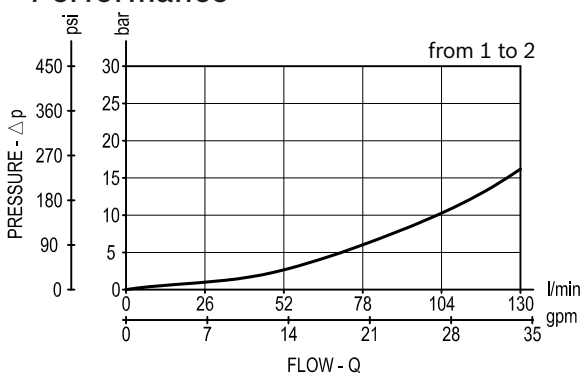
**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve seat (P/N 0F.S0.083) as a coining tool.

Please consult factory for any question.



VMA7.130 version with retainer ring available by request fitting slightly different cavity of VMA1.130

## Performance



## Technical data

Max. operating pressure	bar (psi)	400 (5800)
Max. flow	l/min. (gpm)	130 (34)
Max. internal leakage (*)	drops/min.	30
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	50-55 (37-41)
Weight	kg (lbs)	0.12 (0.27)
Special cavity		924 see data sheet RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (**)	code material no.	RG0870020000100 R931002407
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) at 80% of pressure setting

(\*\*) Only external seals for 10 valves



## Ordering code

OT.M4.10	X	99	Z	W	*
----------	---	----	---	---	---

Insert type - Relief, direct acting and anti-cavitation function

Adjustments

= 00 Fixed setting

Special cavity, 924

Series O/A to L  
unchanged performances and dimensions

SPRINGS	
Adj. pressure range bar (psi)	
20-100 (300-1500)	= 05
100-180 (1500-2600)	= 10
180-250 (2600-3600)	= 20
250-300 (3600-4400)	= 30
300-400 (4400-5800)	= 35

Std. SETTING bar (psi) Q=10 l/min (2.6 gpm)

	for Z=05	for Z=10	for Z=20	for Z=30	for Z=35
= 02	20 (290)	110 (1600)	190 (2760)	260 (3770)	310 (4500)
= 03	30 (440)	120 (1750)	200 (2900)	270 (3920)	320 (4640)
= 04	40 (580)	130 (1890)	210 (3050)	280 (4060)	330 (4790)
= 05	50 (730)	140 (2030)	220 (3190)	290 (4210)	340 (4930)
= 06	60 (870)	150 (2180)	230 (3340)	300 (4350)	350 (5080)
= 07	70 (1020)	160 (2320)	240 (3480)		360 (5220)
= 08	80 (1160)	170 (2470)	250 (3630)		370 (5370)
= 09	90 (1300)	180 (2610)			380 (5510)
= 10	100 (1450)				390 (5660)
= 11					400 (5800)

Type	Material number
OTM410009905020	R931002246
OTM410009905030	R931002247
OTM410009905040	R931002248
OTM410009905050	R931001860
OTM410009905060	R931002253
OTM410009905070	R931001861
OTM410009905080	R931001864
OTM410009905090	R931002254
OTM410009905100	R931002089
OTM410009910020	R931002255
OTM410009910030	R931001587
OTM410009910040	R931002256
OTM410009910050	R931001869
OTM410009910060	R931002257
OTM410009910070	R931001870
OTM410009910080	R931001600
OTM410009910090	R931002090
OTM410009920020	R931002258
OTM410009920030	R931002259
OTM410009920040	R931001871

Type	Material number
OTM410009920050	R931001659
OTM410009920060	R931002260
OTM410009920070	R931002261
OTM410009920080	R931002262
OTM410009930020	R931002263
OTM410009930030	R931001727
OTM410009930040	R931002264
OTM410009930050	R931002265
OTM410009930060	R931002266
OTM410009935020	R931002267
OTM410009935030	R931001779
OTM410009935040	R931002268
OTM410009935050	R931002269
OTM410009935060	R931002270
OTM410009935070	R931002271
OTM410009935080	R931001872
OTM410009935090	R931001780
OTM410009935100	R931002272
OTM410009935110	R931002273

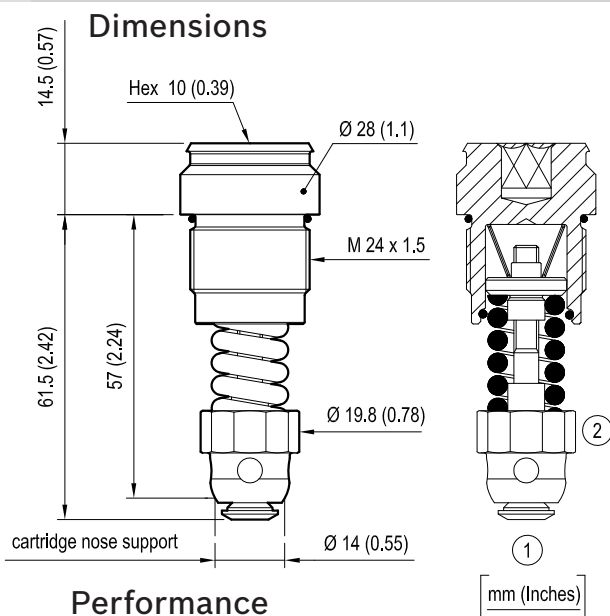


# Insert type Relief, direct acting and anti-cavitation function

Special cavity, 871

VMA1.180

0T.M4.09 - X - 99 - Z - W

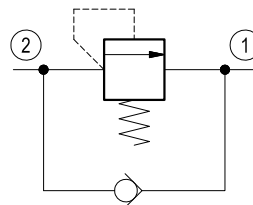


### Description

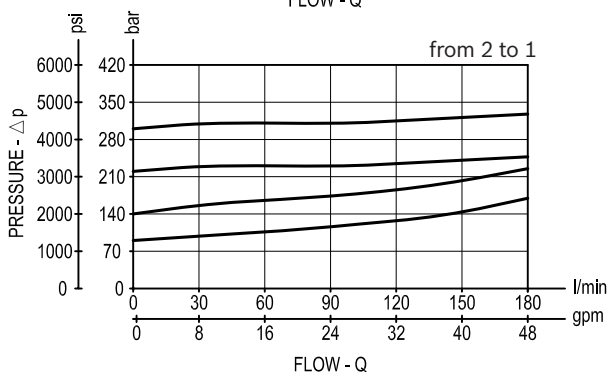
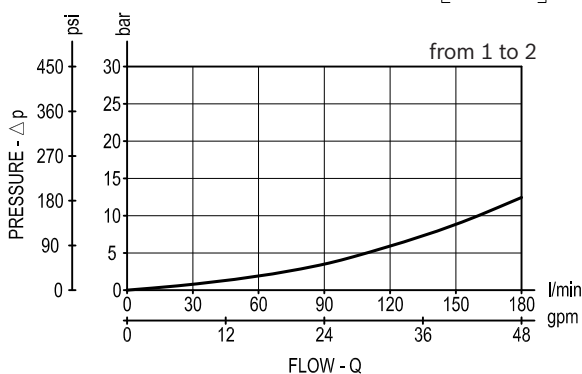
Flow is free from 1 to 2 until pressure increases to meet the selected valve setting, allowing relief flow through port 1 to tank. This valve combine the typical function of shock relief valve (direct acting) and anticavitation function through the check valve. The direct action and the specific design allow a very fast opening and closing.

**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve seat (P/N 0F.S0.050) as a coining tool.

Please consult factory for any question.



### Performance



### Technical data

Max. operating pressure	bar (psi)	400 (5800)
Max. flow	l/min. (gpm)	180 (48)
Max. internal leakage (*)	drops/min.	30
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	50-55 (37-41)
Weight	kg (lbs)	0.15 (0.33)
Special cavity		871 see data sheet RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (**)	code material no.	RG0870020000100 R931002407
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) at 80% of pressure setting

(\*\*) Only external seals for 10 valves

## Ordering code

OT.M4.09	X	99	Z	W	*
----------	---	----	---	---	---

Insert type - Relief, direct acting and anti-cavitation function

Adjustments

= 00 Fixed setting

Special cavity, 871

Series O/A to L  
unchanged performances and dimensions

SPRINGS	
Adj. pressure range bar (psi)	
90-140 (1300-2000)	= 10
140-220 (2000-3200)	= 20
220-300 (3200-4400)	= 30
300-400 (4400-5800)	= 40

Std. SETTING bar (psi) Q=10 l/min (2.6 gpm)

	for Z=10	for Z=20	for Z=30	for Z=40		
= 01	90 (1310)					
= 02	100 (1450)	150 (2180)	230 (3340)	310 (4500)		
= 03	110 (1600)	160 (2320)	240 (3480)	320 (4640)		
= 04	120 (1740)	170 (2470)	250 (3630)	330 (4790)		
= 05	130 (1890)	180 (2610)	260 (3770)	340 (4930)		
= 06	140 (2030)	190 (2760)	270 (3920)	350 (5080)		
= 07		200 (2900)	280 (4060)	360 (5220)		
= 08		210 (3050)	290 (4210)	370 (5370)		
= 09		220 (3190)	300 (4350)	380 (5510)		
= 10				390 (5660)		
= 11				400 (5800)		

Type	Material number
OTM409009910010	R931002340
OTM409009910020	R931001395
OTM409009910030	R931002341
OTM409009910040	R931002342
OTM409009910050	R931001844
OTM409009910060	R931000860
OTM409009920020	R931002343
OTM409009920030	R931002344
OTM409009920040	R931002345
OTM409009920050	R931000862
OTM409009920060	R931001850
OTM409009920070	R931002346
OTM409009920080	R931000921
OTM409009920090	R931002347
OTM409009930020	R931001851
OTM409009930030	R931002348

Type	Material number
OTM409009930040	R931001852
OTM409009930050	R931002349
OTM409009930060	R931001390
OTM409009930070	R931001853
OTM409009930080	R931001854
OTM409009930090	R931002356
OTM409009940020	R931002350
OTM409009940030	R931002351
OTM409009940040	R931002352
OTM409009940050	R931002353
OTM409009940060	R931002354
OTM409009940070	R931001409
OTM409009940080	R931002355
OTM409009940090	R931002357
OTM409009940100	R931002358
OTM409009940110	R931002359

# Insert type Relief direct acting adjustable, anti-cavitation function

Special cavity, 869

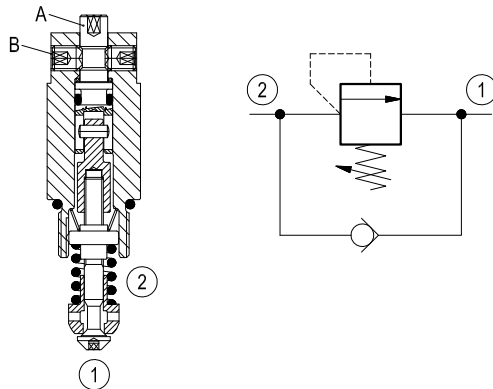
VRA1.025

OT.M6.01 - X - 99 - Z



2

## Dimensions



## Description

Flow is free from 1 to 2 until pressure increases to meet the selected valve setting, allowing relief flow through port 1 to tank. This valve combine the typical function of shock relief valve (direct acting) and anticavitation function through the check valve. The direct action and the specific design allow a very fast opening and closing.

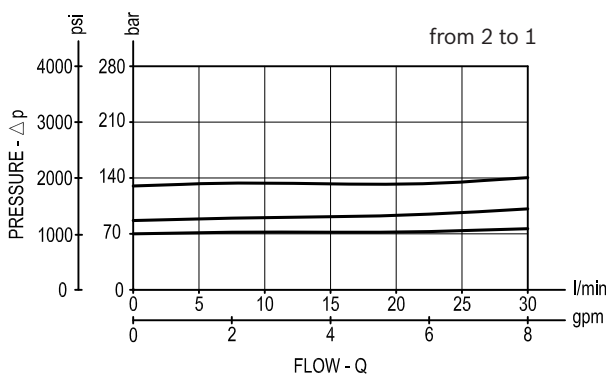
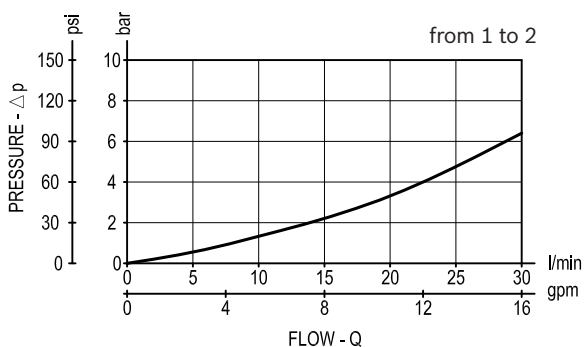
**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve seat (P/N OF.S0.049) as a coining tool.

Please consult factory for any question.

Please be careful to the following instructions:

- 1) Screw the valve into the cavity using the mentioned installation torque;
- 2) Adjust the setting using the stem "A";
- 3) Once the valve is adjusted to the required pressure setting, lock the screw "B". Be careful to make the pressure setting adjustment when the screw "B" is loose; block the screw with torque 2-4 Nm (1.5-3 ft-lbs) only when the pressure setting is adjusted.

## Performance



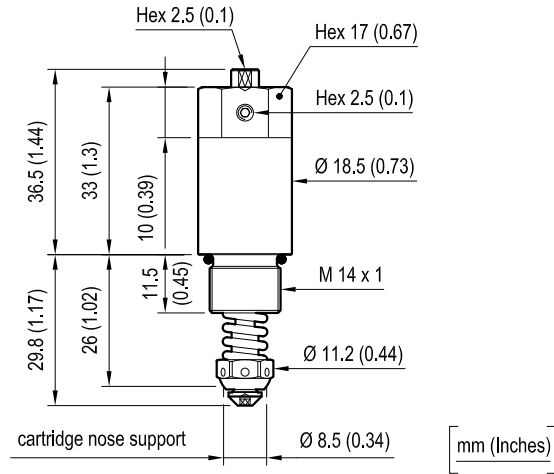
## Technical data

Max. operating pressure	bar (psi)	210 (3000)
Max. flow	l/min. (gpm)	30 (8)
Max. internal leakage (*)	drops/min.	15
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	30-35 (22-26)
Weight	kg (lbs)	0.07 (0.15)
Special cavity		869 see data sheet RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (**)	code material no.	RG0869020000100 R931002405
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) at 80% of pressure setting

(\*\*) Only external seals for 10 valves

### Dimensions



### Ordering code

OT.M6.01	X	99	Z	*
----------	---	----	---	---

Insert type - Relief, direct acting adjustable, anti-cavitation function

Series 0/A to L unchanged performances and dimensions

Adjustments

= 03 Adjustable

Special cavity, 869

SPRINGS	
Adj. pressure range bar (psi)	
= 05	20-70 (290-1000)
= 10	70-100 (1000-1450)
= 15	100-150 (1450-2175)
= 20	150-210 (2175-3000)

Type	Material number
OTM601039905000	R931002274
OTM601039910000	R931002275
OTM601039915000	R931002684
OTM601039920000	R931002276

Type	Material number

# Insert type Relief, direct acting adjustable, anti-cavitation function

Special cavity, 730

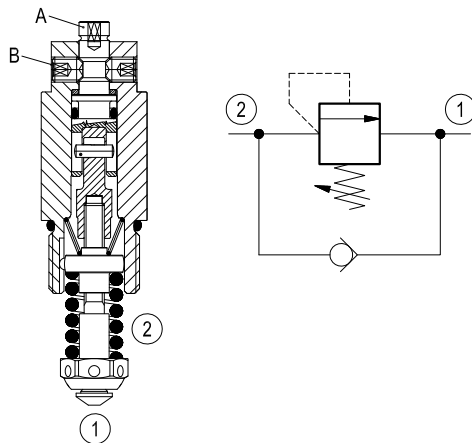
VRA1.050

OT.M6.02 - X - 99 - Z



2

## Dimensions



## Description

Flow is free from 1 to 2 until pressure increases to meet the selected valve setting, allowing relief flow through port 1 to tank. This valve combine the typical function of shock relief valve (direct acting) and anticavitation function through the check valve. The direct action and the specific design allow a very fast opening and closing.

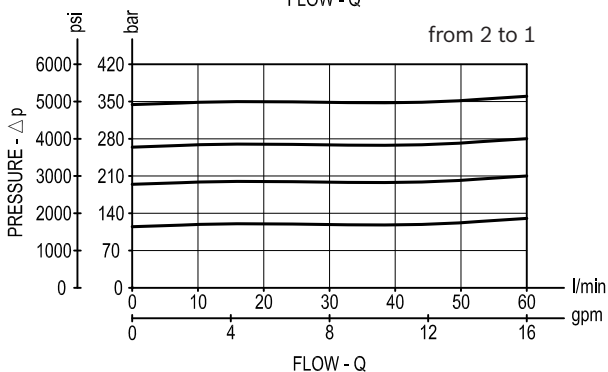
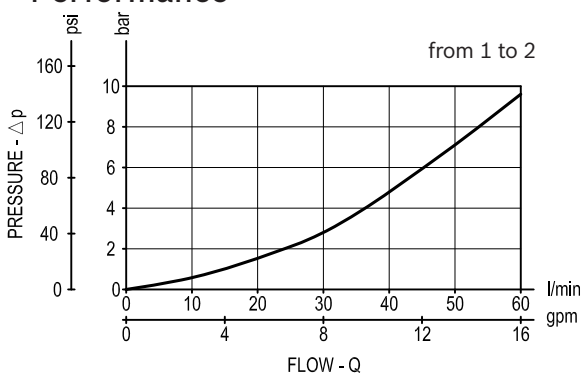
**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve seat (P/N OF.S0.108) as a coining tool.

Please consult factory for any question.

Please be careful to the following instructions:

- 1) Screw the valve into the cavity using the mentioned installation torque;
- 2) Adjust the setting using the stem "A";
- 3) Once the valve is adjusted to the required pressure setting, lock the screw "B". Be careful to make the pressure setting adjustment when the screw "B" is loose; block the screw with torque 2-4 Nm (1.5-3 ft-lbs) only when the pressure setting is adjusted.

## Performance



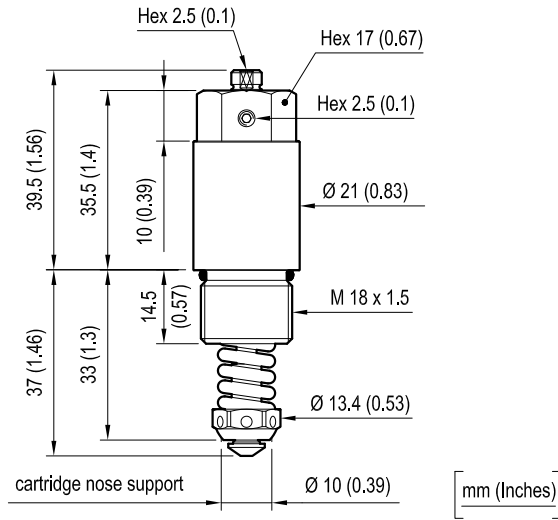
## Technical data

Max. operating pressure	bar (psi)	380 (5500)
Max. flow	l/min. (gpm)	60 (16)
Max. internal leakage (*)	drops/min.	15
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	45-50 (33-37)
Weight	kg (lbs)	0.08 (0.18)
Special cavity		730 see data sheet RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (**)	code material no.	RG0730020000100 R931002406
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) at 80% of pressure setting

(\*\*) Only external seals for 10 valves

### Dimensions



### Ordering code

OT.M6.02	X	99	Z	*
----------	---	----	---	---

Insert type - Relief, direct acting adjustable, anti-cavitation function

Series O/A to L unchanged performances and dimensions

Adjustments

= 03 Adjustable

Special cavity, 730

SPRINGS	
Adj. pressure range bar (psi)	
= 05	20-70 (290-1000)
= 10	70-120 (1000-1750)
= 20	120-200 (1750-2900)
= 27	200-270 (2900-3900)
= 32	270-320 (3900-4700)
= 35	320-380 (4700-5500)

Type	Material number
OTM602039905000	R931002277
OTM602039910000	R931002278
OTM602039920000	R931002279
OTM602039927000	R931002280
OTM602039932000	R931002281
OTM602039935000	R931002282

Type	Material number

# Insert type Relief, direct acting adjustable, anti-cavitation function

Special cavity, 808

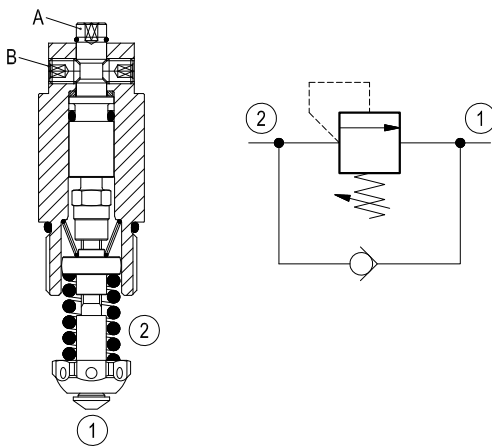
VRA1.060

OT.M6.03 - X - 99 - Z



2

## Dimensions



## Description

Flow is free from 1 to 2 until pressure increases to meet the selected valve setting, allowing relief flow through port 1 to tank. This valve combine the typical function of shock relief valve (direct acting) and anticavitation function through the check valve. The direct action and the specific design allow a very fast opening and closing.

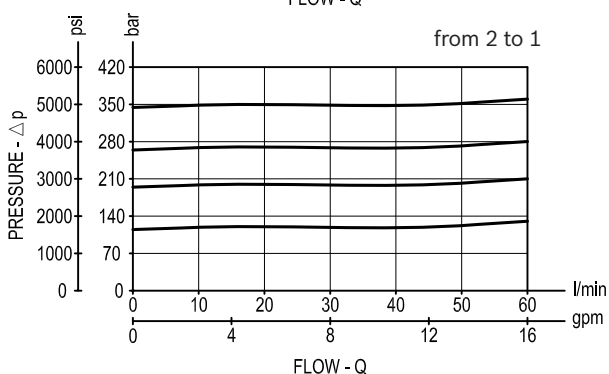
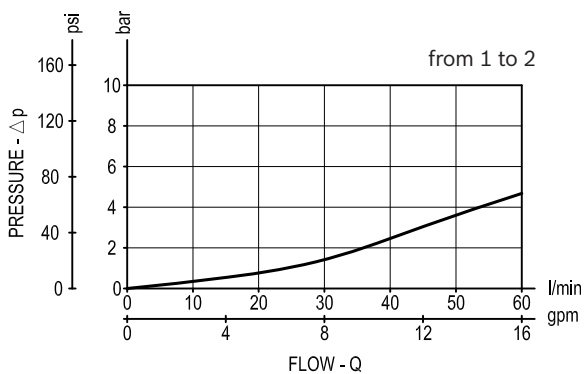
**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve seat (P/N OF.S0.036) as a coining tool.

Please consult factory for any question.

Please be careful to the following instructions:

- 1) Screw the valve into the cavity using the mentioned installation torque;
- 2) Adjust the setting using the stem "A";
- 3) Once the valve is adjusted to the required pressure setting, lock the screw "B". Be careful to make the pressure setting adjustment when the screw "B" is loose; block the screw with torque 2-4 Nm (1.5-3 ft-lbs) only when the pressure setting is adjusted.

## Performance



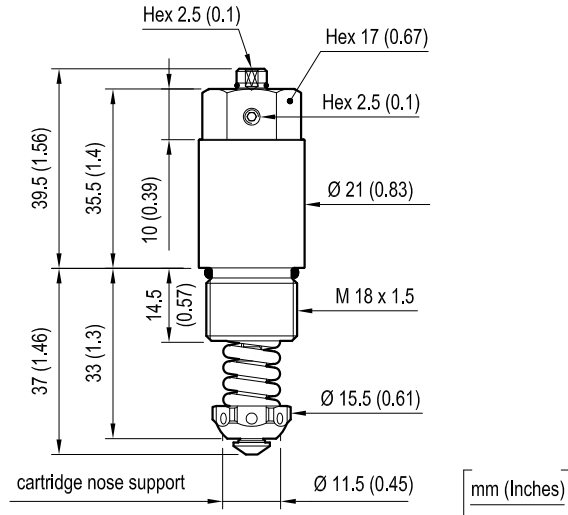
## Technical data

Max. operating pressure	bar (psi)	380 (5500)
Max. flow	l/min. (gpm)	60 (16)
Max. internal leakage (*)	drops/min.	15
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	45-50 (33-37)
Weight	kg (lbs)	0.08 (0.18)
Special cavity		808 see data sheet RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (**)	code material no.	RG0730020000100 R931002406
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) at 80% of pressure setting

(\*\*) Only external seals for 10 valves

### Dimensions



### Ordering code

OT.M6.03	X	99	Z	*
----------	---	----	---	---

Insert type - Relief, direct acting adjustable, anti-cavitation function

Series O/A to L  
unchanged performances and dimensions

Adjustments

= 03 Adjustable

Special cavity, 808

SPRINGS	
Adj. pressure range bar (psi)	
= 05	20-70 (290-1000)
= 10	70-120 (1000-1750)
= 20	120-200 (1750-2900)
= 27	200-270 (2900-3900)
= 32	270-320 (3900-4700)
= 35	320-380 (4700-5500)

Type	Material number
OTM603039905000	R931002283
OTM603039910000	R931002284
OTM603039920000	R931002285
OTM603039927000	R931002286
OTM603039932000	R931002287
OTM603039935000	R931002288

Type	Material number



# Insert type Relief, direct acting adjustable, anti-cavitation function

Special cavity, 870

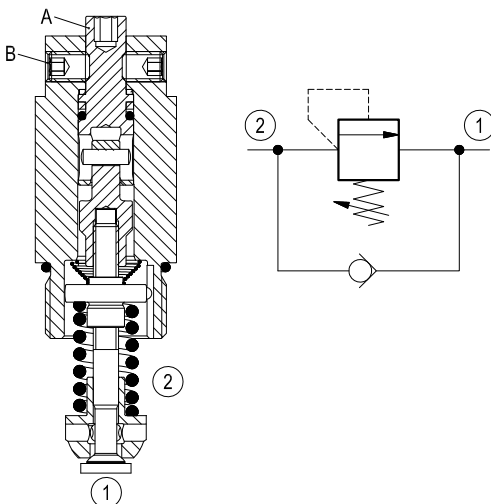
VRA1.080

OT.M6.04 - X - 99 - Z

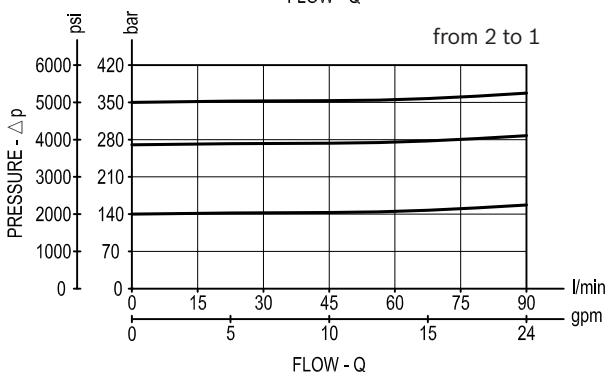
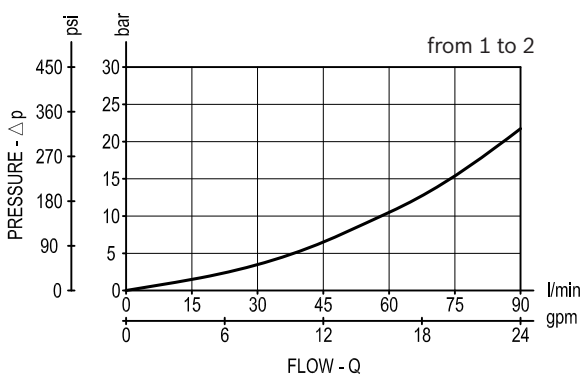


2

## Dimensions



## Performance



## Description

Flow is free from 1 to 2 until pressure increases to meet the selected valve setting, allowing relief flow through port 1 to tank. This valve combine the typical function of shock relief valve (direct acting) and anticavitation function through the check valve. The direct action and the specific design allow a very fast opening and closing.

**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve seat (P/N OF.S0.011) as a coining tool.

Please consult factory for any question.

Please be careful to the following instructions:

- 1) Screw the valve into the cavity using the mentioned installation torque;
- 2) Adjust the setting using the stem "A";
- 3) Once the valve is adjusted to the required pressure setting, lock the screw "B". Be careful to make the pressure setting adjustment when the screw "B" is loose; block the screw with torque 2-4 Nm (1.5-3 ft-lbs) only when the pressure setting is adjusted.

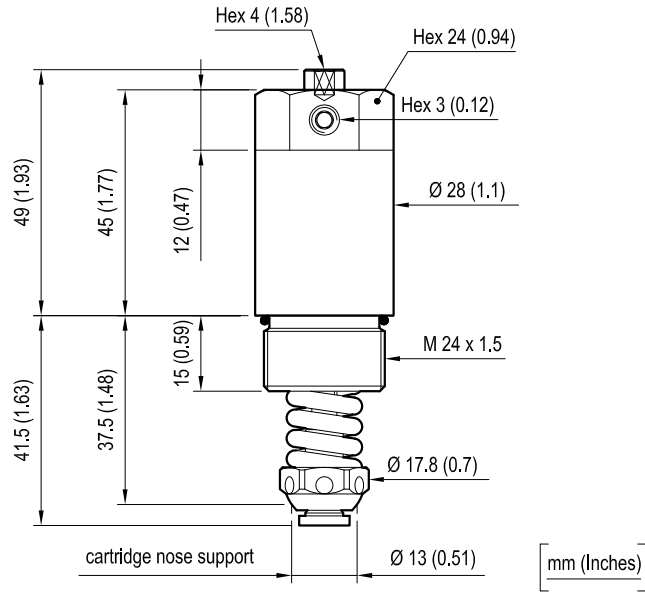
## Technical data

Max. operating pressure	bar (psi)	400 (5800)
Max. flow	l/min. (gpm)	90 (24)
Max. internal leakage (*)	drops/min.	30
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	50-55 (37-41)
Weight	kg (lbs)	0.18 (0.4)
Special cavity		870 see data sheet RE 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (**)	code material no.	RG0870020000100 R931002407
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) at 80% of pressure setting

(\*\*) Only external seals for 10 valves

### Dimensions



### Ordering code

OT.M6.04	X	99	Z	*
----------	---	----	---	---

Insert type - Relief, direct acting adjustable, anti-cavitation function

Series O/A to L unchanged performances and dimensions

Adjustments

= 03 Adjustable

Special cavity, 870

SPRINGS	
Adj. pressure range bar (psi)	
= 10	90-140 (1300-2000)
= 20	140-270 (2000-3900)
= 35	270-350 (3900-5000)
= 40	350-400 (5000-5800)

Type	Material number
OTM604039910000	R931002289
OTM604039920000	R931002290
OTM604039935000	R931002291
OTM604039940000	R931002292

Type	Material number

# Insert valves

## Flow control

<b>Designation</b>	<b>Description</b>	<b>Cavity</b>	<b>Code</b>	<b>Data sheet</b>	<b>Page</b>
Insert valve flow control, 2-way pressure compensated partially adjustable	VCD1	Special	0TF301XYZ	18329-80	567
Insert valve flow control, 2-way pressure compensated fixed setting	SFC1	Special	0TF10100YZ	18329-75	571
Insert valve flow control, 2-way pressure compensated fixed setting	IFC2	Special	0TF1020009Z	18329-70	573
Insert valve hose burst	VPN1	Special	0TF401XYZ	18329-85	575
Flow control, restrictor with reverse flow check	GSU1	Special	GSU1_	18329-83	579



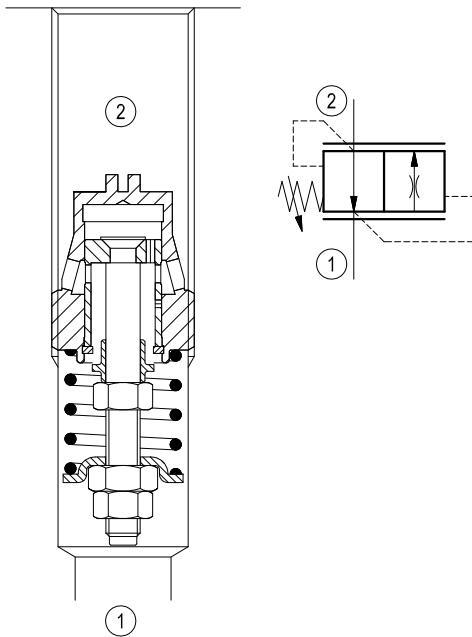
# Insert type Flow control, 2-way pressure compensated, partially adjustable



2

VCD1

OT.F3.01 - X - Y - Z



## Description

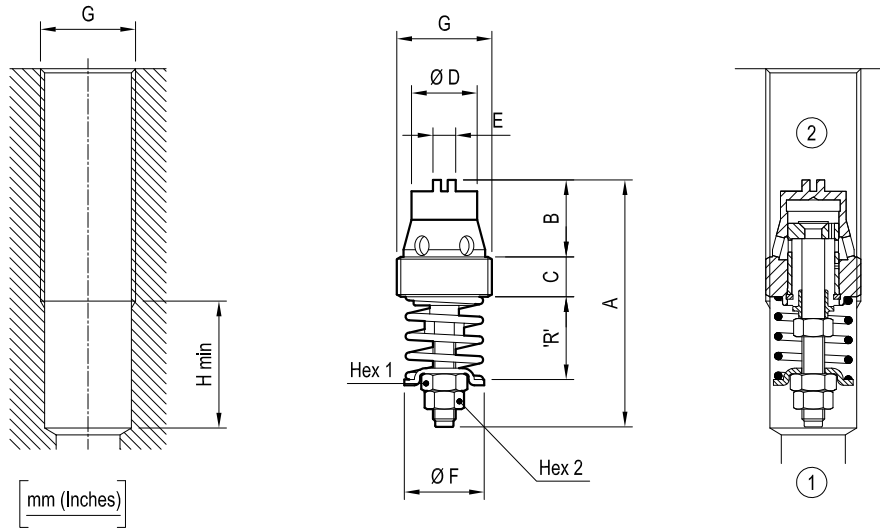
These valves can be used either as lowering control devices or as two ways flow regulators. In the first option, they keep the lowering speed largely independent from the load, while, in the second option, they limit flow to the preset value which can be adjusted within the regulate flow path. On the opposite flow direction, from 2 to 1, the valve is acting as a free flow check reducing the pressure drop to low values (see diagram  $\Delta P - Q$ ).

## Technical data

Max. operating pressure	bar (psi)	315 (4500)
Max. flow	l/min. (gpm)	see "Flow range adjustment" table and "Performance" graphs
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	see "Dimensions" table
Weight	kg (lbs)	see "Dimensions" table
Special cavity		see "Dimensions"
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

Note: available also as "Sleeve valve for line mounting"  
See data sheets RE 18316-14, RE 18316-15,  
RE 18316-16 and RE 18316-17

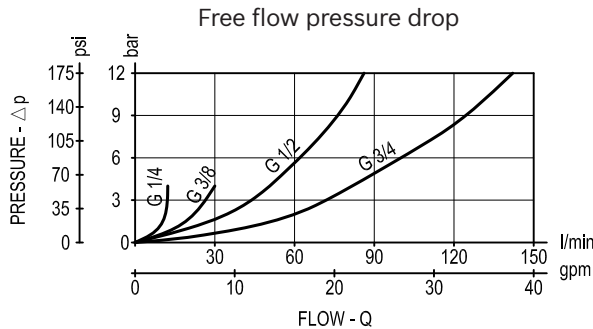
### Dimensions



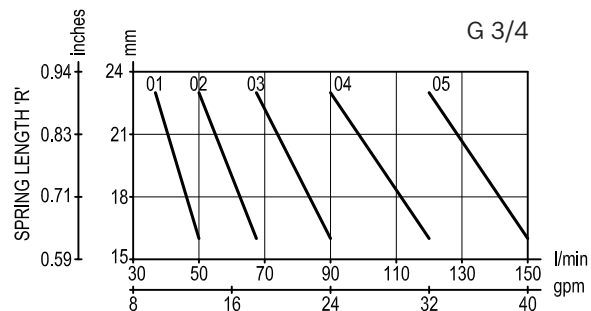
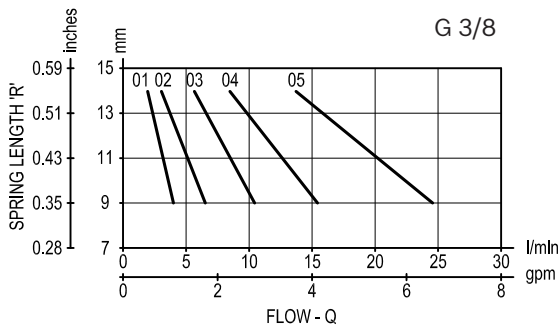
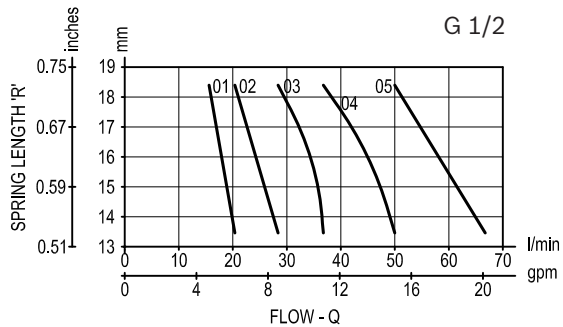
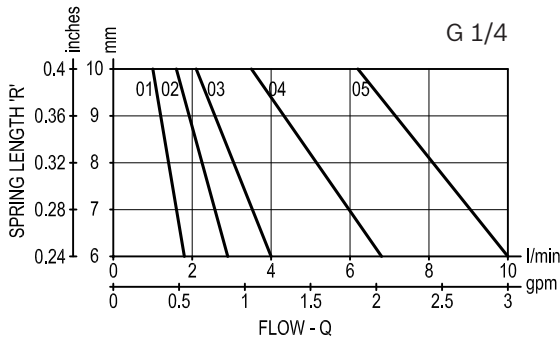
G *	A	B	C	D	E	F	Hex 1	Hex 2	H	Weight kg (lbs)	Inst. torque Nm (ft-lbs)	Flow max. l/min. (gpm)
G 1/4	38.3 (1.51)	12.5 (0.49)	7 (0.28)	10 (0.39)	4 (0.16)	10.3 (0.41)	5.5 (0.22)	4.5 (0.18)	22 (0.87)	0.012 (0.027)	6 (4)	10 (3)
G 3/8	43 (1.69)	13.5 (0.53)	7 (0.28)	11.5 (0.45)	4 (0.16)	14 (0.55)	7 (0.28)	6 (0.24)	23 (0.91)	0.025 (0.055)	8 (6)	25 (7)
G 1/2	49 (1.93)	16 (0.63)	8 (0.32)	15 (0.59)	6 (0.24)	18.2 (0.72)	7 (0.28)	6 (0.24)	27 (1.06)	0.038 (0.084)	12 (9)	67 (18)
G 3/4	60 (2.36)	21 (0.83)	10 (0.39)	20 (0.79)	6 (0.24)	23 (0.91)	7 (0.28)	6 (0.24)	31 (1.22)	0.070 (0.154)	15 (11)	150 (40)

\* Thread in accordance with ISO 228-1 Note: Metric versions available on request. Consult factory.

### Performance



Performance curves: spring's length - flow (regulated flow) with nominal pressure of 50 bar (725 psi). Curves represent the obtained flow range related to orifices 01-02-03-04-05.



## Ordering code

OT.F3.01	X	Y	Z	*
----------	---	---	---	---

Series O/A to L  
unchanged performances and dimensions

Insert type - Flow control

Adjustments

= 02 Locking nut + counter nut  
see graphs ('R' - Q)

Port sizes

= 09 G 1/4

= 02 G 3/8

= 03 G 1/2

= 04 G 3/4

Flow range adjustment l/min. (gpm)

	for Y = 09	for Y = 02	for Y = 03	for Y = 04
= 01	1-1.6 (0.26-0.42)	2.5-4 (0.66-1.06)	16-21 (4.23-5.55)	37-50 (9.78-13.2)
= 02	1.6-2.5 (0.42-0.66)	4-6.3 (1.6-1.67)	21-28 (5.55-7.4)	50-67 (13.2-17.7)
= 03	2.5-4 (0.66-1.06)	6.3-10 (1.67-2.64)	28-37 (7.4-9.78)	67-90 (17.7-23.8)
= 04	4-6.3 (1.6-1.67)	10-16 (2.64-4.23)	37-50 (9.78-13.2)	90-120 (23.8-31.7)
= 05	6.3-10 (1.67-2.64)	16-25 (4.23-6.61)	50-67 (13.2-17.7)	120-150 (31.7-39.6)

Special flow settings available.

Please contact factory authorized representative for ordering code

Note: Metric versions available on request. Consult factory.

Type	Material number
OTF301020201000	R931002328
OTF301020202000	R931002329
OTF301020203000	R931000012
OTF301020204000	R931000013
OTF301020205000	R931000424
OTF301020301000	R931002330
OTF301020302000	R931002332
OTF301020303000	R931002034
OTF301020304000	R931000342
OTF301020305000	R931002333
OTF301020401000	R931000014
OTF301020402000	R931002334
OTF301020403000	R931002335
OTF301020404000	R931002336
OTF301020405000	R931002337
OTF301020901000	R931000015
OTF301020902000	R931002324
OTF301020903000	R931002325
OTF301020904000	R931002326
OTF301020905000	R931002327

Type	Material number



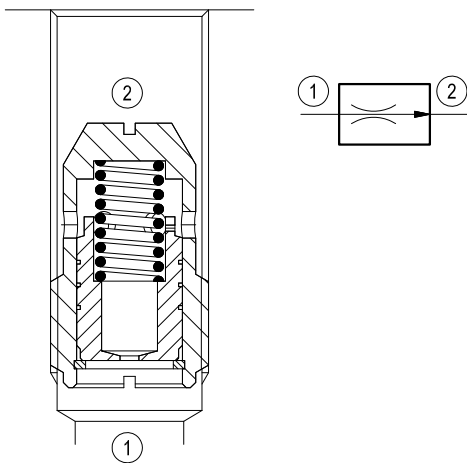


# Insert type Flow control, 2-way pressure compensated fixed setting



SFC1

OT.F1.01.00 - Y - Z



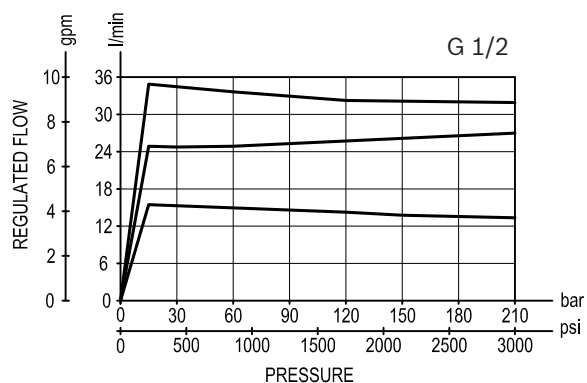
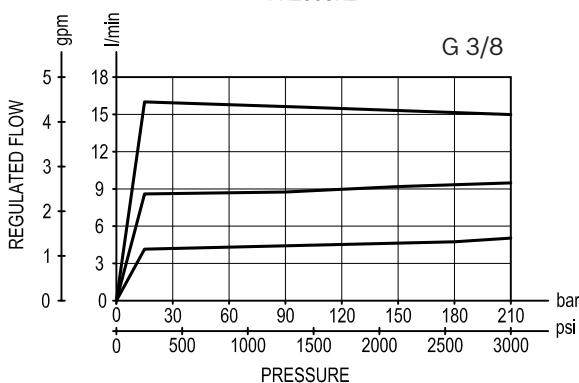
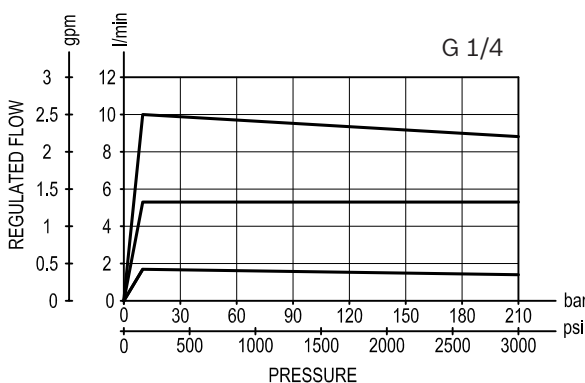
## Description

A constant flow rate, regardless of system pressures, is established from 1 to 2 while a minimum pressure differential of 145 psi exists between the two ports. The valve cannot be adjusted for variable flow output. Flow from 2 to 1 is limited by the diameter of the selected control orifice and is not pressure compensated.

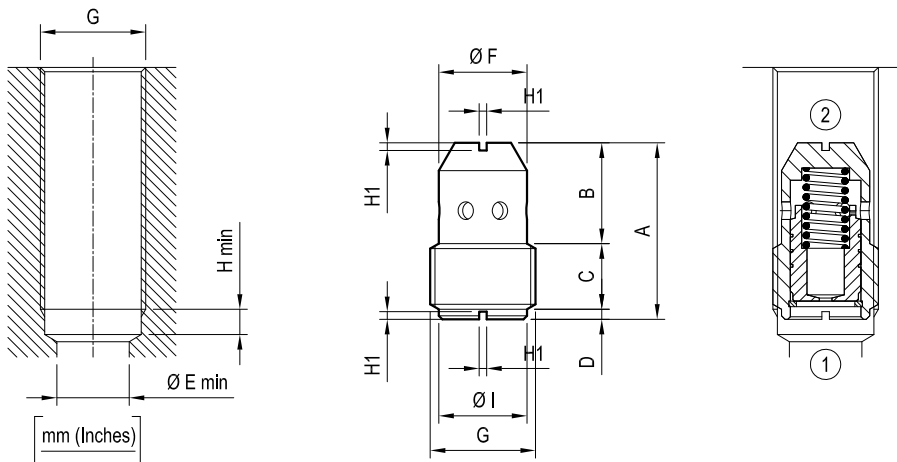
## Technical data

Max. operating pressure	bar (psi)	210 (3000)
Max. flow	l/min. (gpm)	see "Regulated flow range" table
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Weight	kg (lbs)	see "Dimensions" table
Special cavity		see "Dimensions"
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

## Performance



Dimensions



G *	A	B	C	D	E	F	I	H	H1	Weight kg (lbs)	Flow max. l/min. (gpm)
G 1/4	25.5 (1)	13.5 (0.53)	8.5 (0.34)	3 (0.12)	8 (0.32)	10 (0.39)	11 (0.43)	5 (0.2)	1.5 (0.6)	0.011 (0.024)	10 (3)
G 3/8	28 (1.1)	15 (0.59)	10.5 (0.41)	2 (0.08)	11 (0.43)	14 (0.55)	14.5 (0.57)	5 (0.2)	1.5 (0.6)	0.024 (0.053)	16 (4)
G 1/2	35 (1.38)	19.5 (0.77)	13 (0.52)	2 (0.08)	14 (0.55)	17.5 (0.69)	17.5 (0.69)	5 (0.2)	1.5 (0.6)	0.048 (0.106)	40 (11)

\* Thread in accordance with ISO 228-1

Ordering code

OT.F1.01.00 Y Z \*

Note: available also as "Sleeve valve for line mounting"  
See data sheets RE 18316-12 and RE 18316-13

Insert type - Flow control, 2-way pressure compensated fixed setting

Port sizes  
= 09 G 1/4  
= 02 G 3/8  
= 03 G 1/2

Series O/A to L  
unchanged performances and dimensions

	Regulated flow range l/min. (gpm)									
	= 01	= 02	= 03	= 04	= 05	= 06	= 07	= 08	= 09	= 10
for Y=09	1 (0.3) ± 20%	2 (0.5) ± 20%	3 (0.8) ± 20%	4 (1.1) ± 15%	5 (1.3) ± 15%	6 (1.6) ± 15%	7 (1.9) ± 15%	8 (2.1) ± 15%	9 (2.4) ± 15%	10 (2.6) ± 15%
for Y=02	4 (1.1) ± 15%	5 (1.3) ± 15%	6 (1.6) ± 15%	8 (2.1) ± 15%	10 (2.6) ± 15%	12 (3.2) ± 15%	14 (3.7) ± 10%	16 (4.2) ± 10%	-	-
for Y=03	12 (3.2) ± 15%	16 (4.2) ± 10%	20 (5.3) ± 10%	25 (6.6) ± 10%	30 (7.9) ± 10%	35 (9.3) ± 10%	40 (10.6) ± 10%	-	-	-

Type	Material number
OTF101000201000	R931002311
OTF101000202000	R931002312
OTF101000203000	R931002313
OTF101000204000	R931002314
OTF101000205000	R931000009
OTF101000206000	R931002315
OTF101000207000	R931002316
OTF101000208000	R931002317
OTF101000301000	R931002318
OTF101000302000	R931002319
OTF101000303000	R931002320
OTF101000304000	R931002321
OTF101000305000	R931002322

Type	Material number
OTF101000306000	R931002063
OTF101000307000	R931001404
OTF101000901000	R931002304
OTF101000902000	R931000010
OTF101000903000	R931000272
OTF101000904000	R931002305
OTF101000905000	R931002306
OTF101000906000	R931000011
OTF101000907000	R931002307
OTF101000908000	R931002308
OTF101000909000	R931002309
OTF101000910000	R931002310

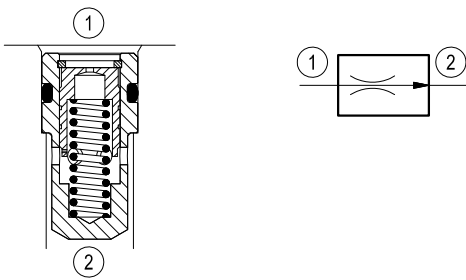
# Insert type Flow control, 2-way pressure compensated fixed setting



2

IFC2

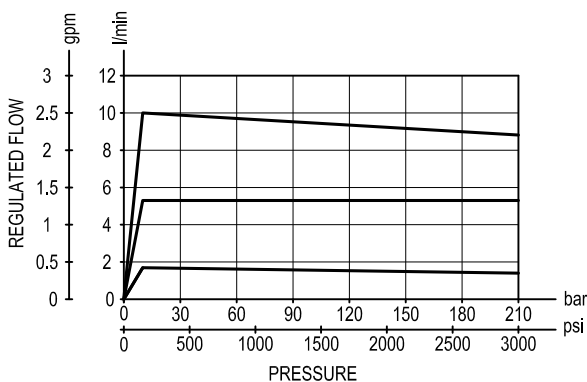
OT.F1.02.00.09 - Z



## Description

A constant flow rate, regardless of system pressures, is established from 1 to 2 while a minimum pressure differential of 145 psi (10 bar) exists between the two ports. The valve cannot be adjusted for variable flow output. Flow from 2 to 1 is limited by the diameter of the selected control orifice and is not pressure compensated.

## Performance

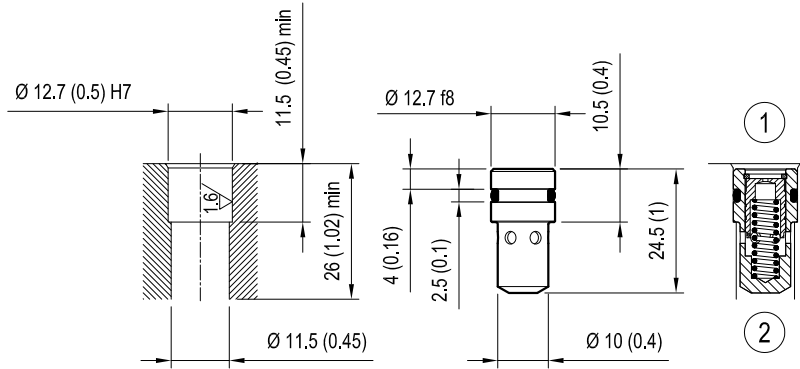


## Technical data

Max. operating pressure	bar (psi)	210 (3000)
Max. flow	l/min. (gpm)	see "Regulated flow range" table
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Weight	kg (lbs)	0.013 (0.03)
Special cavity		see "Dimensions"
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (*)	code material no.	RGIFC2010000100 R931002403
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Other Technical Data		See data sheet RE 18350-50

(\*) Only external seals for 10 valves

## Dimensions



## Ordering code

0T.F1.02.00	09	Z	*
-------------	----	---	---

Insert type - Flow control,  
2-way pressure compensated  
fixed setting

Series 0/A to L  
unchanged performances and dimensions

Port size Ø 12.7 (0.5)

Regulated flow range l/min. (gpm)									
= 01	= 02	= 03	= 04	= 05	= 06	= 07	= 08	= 09	= 10
1 (0.3) ± 20%	2 (0.5) ± 20%	3 (0.8) ± 20%	4 (1.1) ± 15%	5 (1.3) ± 15%	6 (1.6) ± 15%	7 (1.9) ± 15%	8 (2.1) ± 15%	9 (2.4) ± 15%	10 (2.6) ± 15%

Type	Material number
OTF102000901000	R931002294
OTF102000902000	R931002295
OTF102000903000	R931002296
OTF102000904000	R931002297
OTF102000905000	R931002298
OTF102000906000	R931002299
OTF102000907000	R931002300
OTF102000908000	R931002301
OTF102000909000	R931002302
OTF102000910000	R931002303

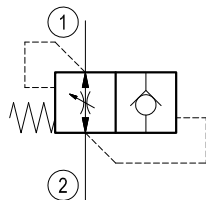
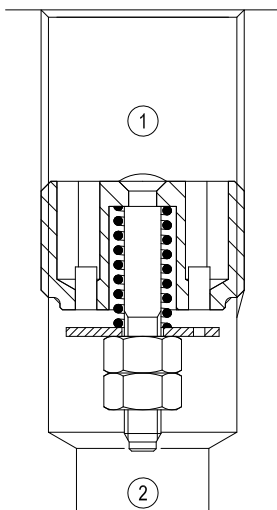
Type	Material number

# Insert type Hose burst

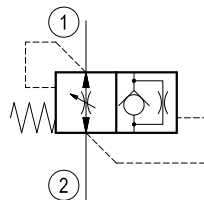


VPN1

OT.F4.01 - X - Y - Z



Hose burst check valve



Hose burst check valve  
with orifice

## Description

When the lowering speed exceeds preset value, as it might happen in case of hose failure, the flow is blocked. These valves should ideally be screwed directly into the actuator outlet port. Sealing parts are superfinished and enable to lock the load in the position where the actuator is in the moment of hose failure. These valves can be supplied, on request, with an orifice on the disc, allowing an emergency lowering of the load. It is recommended to fit a flow regulator valve downstream the hose burst valve, at the end of the flexible hose, to control the lowering speed at the nominal value. The "R" gap must be adjusted to allow a flow at least 50% over the nominal regulated flow from the actuator.

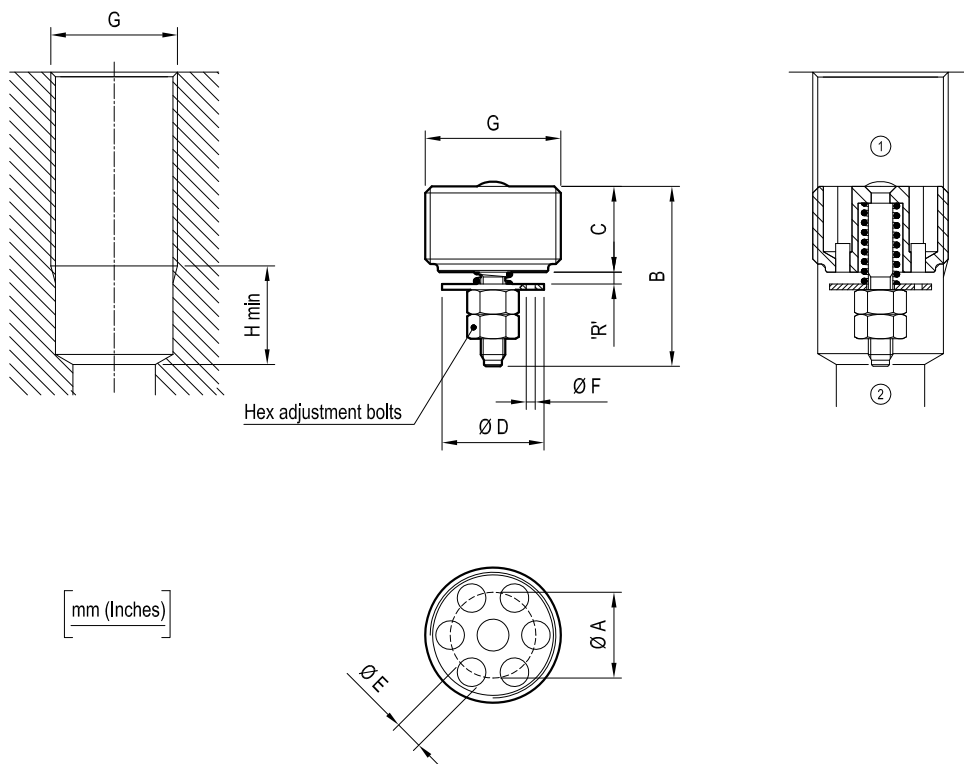
The valve is only supposed to be operated in case of hose failure. Should this circumstance occur, we strongly recommend to verify the integrity of the valve and eventually to replace it in the event that the pressure spike generated by the hose failure was such to damage permanently some valve components.

**Note:** available also as "Sleeve valve for line mounting"  
See data sheets RE 18316-85, RE 18316-86, RE 18316-87 and RE 18316-88

## Technical data

Max. operating pressure	bar (psi)	315 (4500)
Max. flow	l/min. (gpm)	see performance graphs ('R'-Q)
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	see "Dimensions" table
Weight	kg (lbs)	see "Dimensions" table
Special cavity		see "Dimensions"
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

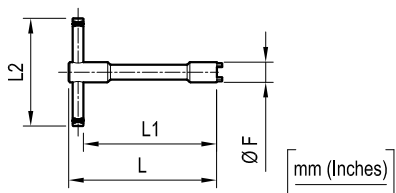
### Dimensions



G *	A	B	C	D	E	F	H	Hex	Weight kg (lbs)	Inst. torque Nm (ft-lbs)	Flow max. l/min. (gpm)	
											min.	max.
G 1/4	8.5 (0.34)	17.5 (0.69)	8 (0.32)	9.5 (0.37)	2.4 (0.1)	on request	11 (0.43)	5.5 (0.22)	0.005 (0.011)	2 (1.5)	4 (1)	25 (7)
G 3/8	10.5 (0.41)	23 (0.91)	10.5 (0.41)	12.5 (0.49)	3.5 (0.14)	on request	11 (0.43)	5.5 (0.22)	0.010 (0.022)	3 (2)	6 (2)	50 (13)
G 1/2	13 (0.51)	25 (0.98)	12 (0.47)	15 (0.59)	4.5 (0.18)	on request	15 (0.59)	7 (0.28)	0.020 (0.044)	4 (3)	16 (4)	80 (21)
G 3/4	16 (0.63)	30.5 (1.2)	17 (0.67)	18 (0.71)	6 (0.24)	on request	16 (0.63)	7 (0.28)	0.042 (0.093)	10 (7)	25 (7)	150 (40)

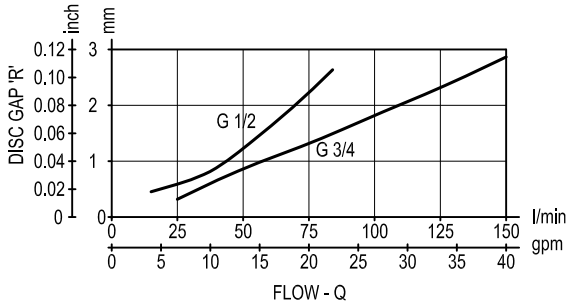
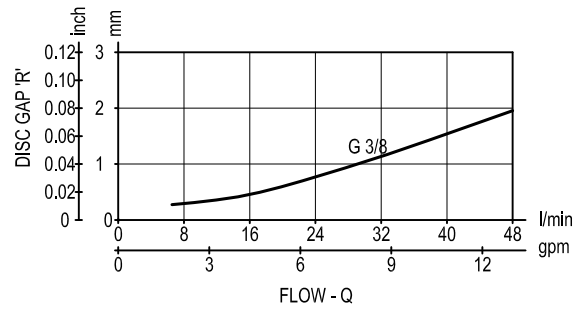
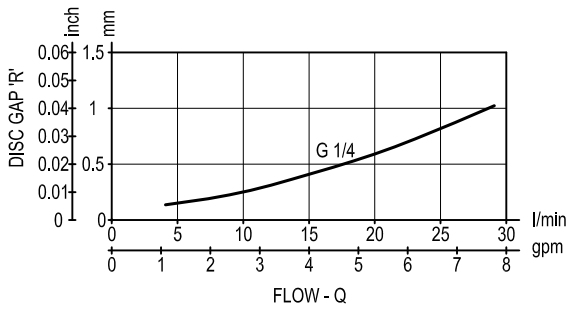
\* Thread in accordance with ISO 228-1 Note: Metric versions available on request. Consult factory.

### Fitting tool dimensions



Type	F	L	L1	L2	Tool code	Material number
VPN1.G14	11.3 (0.45)	120 (4.72)	110 (4.33)	60 (2.36)	AVA18	R931002467
VPN1.G38	15 (0.59)	120 (4.72)	108 (4.25)	80 (3.15)	AVA18-01	R931002468
VPN1.G12	18.8 (0.74)	120 (4.72)	108 (4.25)	80 (3.15)	AVA18-02	R931002469
VPN1.G34	24 (0.95)	120 (4.72)	108 (4.25)	80 (3.15)	AVA18-03	R931002470

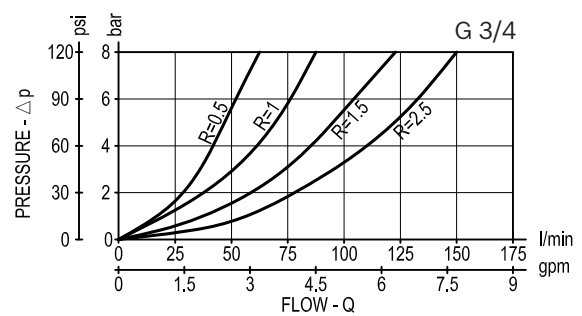
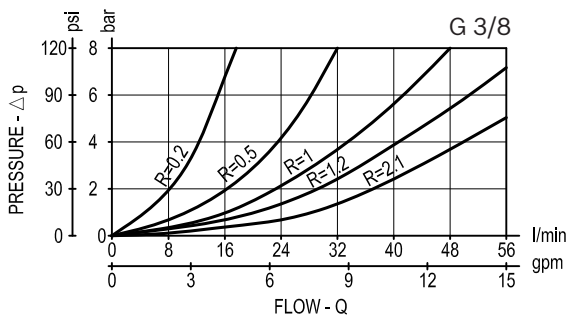
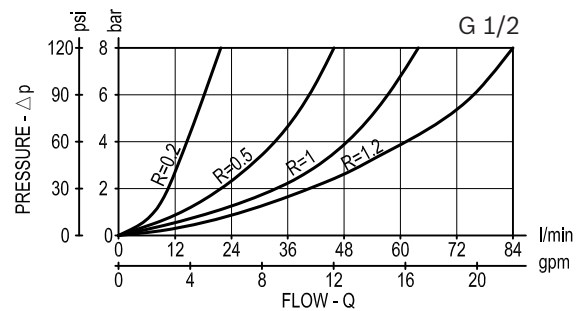
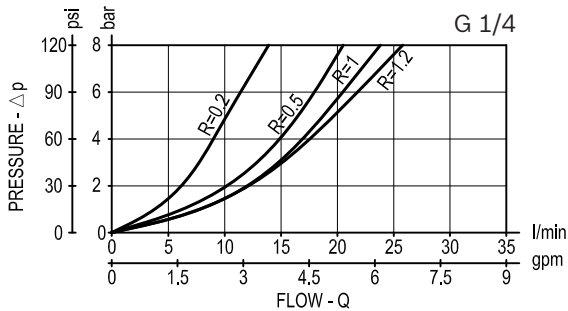
Performance



Performance curves R/flow (allowance can be ±10% from the curve)  
After assembling the valve are preadjusted at the following values

- 0.5 mm (0.02 in) for G 1/4 and G 3/8
- 0.7 mm (0.03 in) for G 1/2 and G 3/4

Flow performance from '1' to '2' depending on R-length



Special flow settings available.  
Please contact factory authorized representative for ordering code

### Ordering code

0T.F4.01	X	Y	Z	*
----------	---	---	---	---

Series O/A to L  
unchanged performances and dimensions

Insert type -  
Check, hose burst

Adjustments

= 03 Locking nut + counter nut  
see graphs ( 'R' - Q )

Port sizes

= 09 G 1/4

= 02 G 3/8

= 03 G 1/2

= 04 G 3/4

	Orifice diameter (mm)
= 00	no orifice
= 01	0.5
= 02	0.6
= 03	0.7
= 04	0.8
= 05	0.9
= 06	1
= 07	1.2
= 08	1.3
= 09	1.5
= 10	1.9
= 11	2

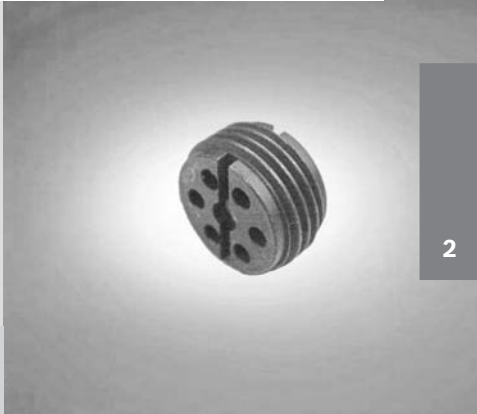
Note: Metric versions available on request. Consult factory.

Type	Material number
0TF401030200000	R931000017
0TF401030300000	R901127828
0TF401030400000	R901161819
0TF401030900000	R931000021

Type	Material number



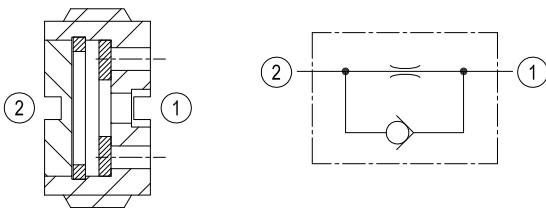
# Insert type Flow control, restrictor with reverse flow check



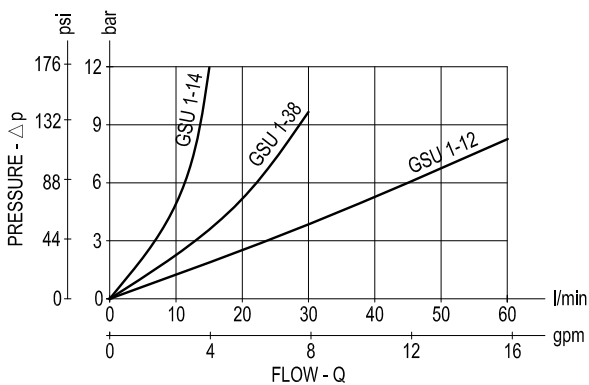
**GSU1**

## Description

The "B-A" flow is restricted by a calibrated orifice while flow "A-B" is always allowed through the incorporated check valve. Pressure compensation is not provided and flow depends from pressure drop and viscosity. The GSU1 cartridge is available in different orifice sizes.



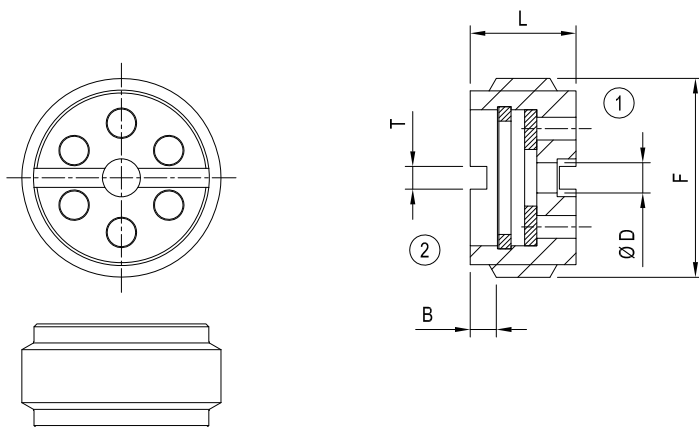
## Performance



## Technical data

Max. operating pressure	bar (psi)	300 (4300)
Max. flow	l/min. (gpm)	see "Regulated flow range" table
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Weight	kg (lbs)	see "Dimensions" table
Special cavity		see "Dimensions"
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 10 to 500 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

Dimensions



F	L	B	T	Weight kg (lbs)	Flow max. l/min. (gpm)
G 1/4	7 (0.28)	1.1 (0.04)	2 (0.08)	0.005 (0.011)	15 (4)
G 3/8	8.5 (0.33)	1.5 (0.06)	1.5 (0.06)	0.009 (0.02)	30 (8)
G 1/2	11 (0.43)	2 (0.08)	1.5 (0.06)	0.018 (0.04)	70 (18)

**Note:** available also as "Sleeve valve for line mounting"  
See data sheet RE 18316-02

Ordering code

GSU1 . . .

Insert type - Restrictor with reverse flow check

Port sizes

- = 14 G 1/4
- = 38 G 3/8
- = 12 G 1/2

	Standard hole diameter ØD mm (inches)		
	for port = 14	for port = 38	for port = 12
= 000	wihout hole	wihout hole	wihout hole
= 030	0.3 (0.012)	-	-
= 040	0.4 (0.016)	-	-
= 050	0.5 (0.02)	0.5 (0.02)	-
= 060	0.6 (0.024)	0.6 (0.024)	-
= 065	0.65 (0.026)	-	-
= 075	0.75 (0.03)	0.75 (0.03)	-
= 080	0.8 (0.031)	0.8 (0.031)	-
= 100	1 (0.039)	1 (0.039)	1 (0.039)
= 110	1.1 (0.043)	-	-
= 120	1.2 (0.047)	-	-
= 125	1.25 (0.049)	1.25 (0.049)	-
= 130	-	-	1.3 (0.051)
= 150	1.5 (0.059)	1.5 (0.059)	1.5 (0.059)
= 160	1.6 (0.063)	1.6 (0.063)	-
= 170	1.7 (0.067)	-	-
= 190	-	-	1.9 (0.075)
= 200	2 (0.079)	2 (0.079)	2 (0.079)
= 220	-	2.2 (0.087)	-
= 250	2.5 (0.098)	2.5 (0.098)	2.5 (0.098)
= 300	-	-	3 (0.12)

Type	Material number
GSU1.14.000	R932500211
GSU1.14.030	R932500212
GSU1.14.040	R932500213
GSU1.14.050	R932500683
GSU1.14.060	R932500684
GSU1.14.065	R932006081
GSU1.14.075	R932500214
GSU1.14.080	R932007455
GSU1.14.100	R932500215
GSU1.14.110	R932500216
GSU1.14.120	R932500217
GSU1.14.125	R932500218
GSU1.14.150	R932500219
GSU1.14.160	R932500220
GSU1.14.170	R932500221
GSU1.14.200	R932500222
GSU1.14.250	R932500223
GSU1.38.000	R932500224
GSU1.38.050	R932500225
GSU1.38.060	R932500226

Type	Material number
GSU1.38.075	R932500227
GSU1.38.080	R932500228
GSU1.38.100	R932500229
GSU1.38.125	R932500230
GSU1.38.150	R932500231
GSU1.38.160	R932500232
GSU1.38.200	R932500233
GSU1.38.220	R932500234
GSU1.38.250	R932500235
GSU1.12.000	R932500208
GSU1.12.100	R932500209
GSU1.12.130	R932500827
GSU1.12.150	R932500814
GSU1.12.190	R932500828
GSU1.12.200	R932500815
GSU1.12.250	R932500210
GSU1.12.300	R932500816



# Insert valves

## Check

<b>Designation</b>	<b>Description</b>	<b>Cavity</b>	<b>Code</b>	<b>Data sheet</b>	<b>Page</b>
Insert valve check poppet type	VUM1.025	Special	0TU6030099Z	18329-51	585
Insert valve check poppet type	VUM1.050	Special	0TU6010099Z	18329-52	587
Insert valve check poppet type	VUM1.060	Special	0TU6020099Z	18329-53	589
Insert valve check poppet type	VUH1	Special	0TU50100YZ	18329-61	591
Insert valve check poppet type	VUB1	Special	0TU30100YZ	18329-65	593



# Insert type Check, poppet type

Special cavity, 869

VUM1.025

OT.U6.03.00.99 - Z



2

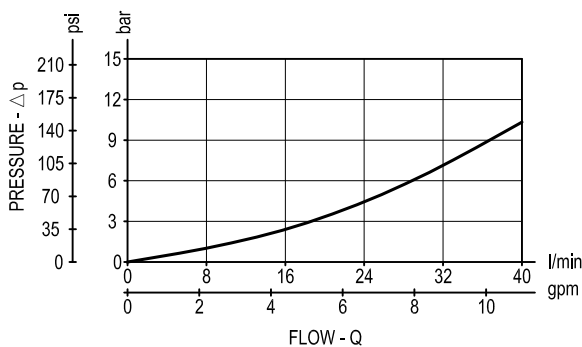


## Description

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve poppet (P/N 0F.S2.020) as a coining tool. Please consult factory for any question.

## Performance

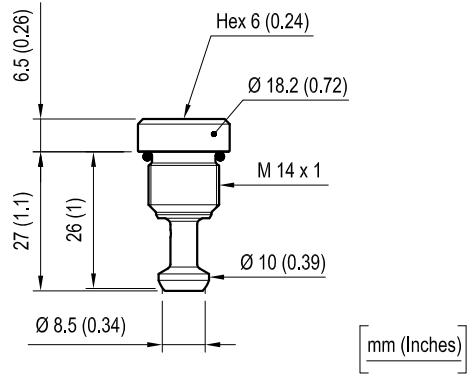


## Technical data

Max. operating pressure	bar (psi)	380 (5500)
Max. flow	l/min. (gpm)	40 (11)
Max. internal leakage	drops/min.	5
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	30-35 (22-26)
Weight	kg (lbs)	0.03 (0.07)
Special cavity		869
MTTFd		150 years see data sheet 18350-51
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (*)	code material no.	RG0869020000100 R931002405
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) Only external seals for 10 valves

## Dimensions



## Ordering code

0T.U6.03.00.99 | Z | \*

Insert type - Check, poppet type

Series O/A to L  
unchanged performances and dimensions

Special cavity, 869

SPRINGS	
Cracking pressure bar (psi)	
= 00	0.5 (7)

Type	Material number
0TU603009900000	R931002250

Type	Material number



# Insert type Check, poppet type

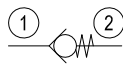
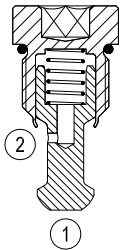
Special cavity, 730

VUM1.050

OT.U6.01.00.99 - Z



2

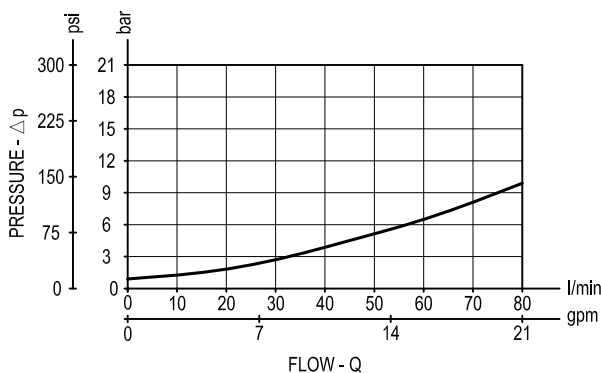


## Description

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve poppet (P/N 0F.S2.013) as a coining tool. Please consult factory for any question.

## Performance

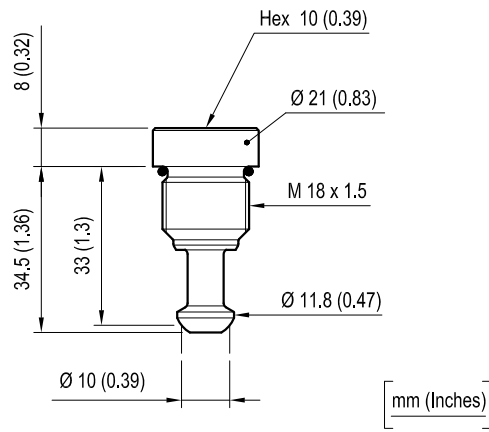


## Technical data

Max. operating pressure	bar (psi)	380 (5500)
Max. flow	l/min. (gpm)	80 (21)
Max. internal leakage	drops/min.	5
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	45-50 (33-37)
Weight	kg (lbs)	0.05 (0.11)
Special cavity		730
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (*)	code material no.	RG0730020000100 R931002406
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) Only external seals for 10 valves

## Dimensions



## Ordering code

0T.U6.01.00.99 | Z | \*

Insert type - Check, poppet type

Series O/A to L  
unchanged performances and dimensions

Special cavity, 730

SPRINGS	
Cracking pressure bar (psi)	
= 00	1 (15)

Type	Material number
0TU601009900000	R901109792

Type	Material number

# Insert type Check, poppet type

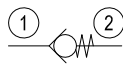
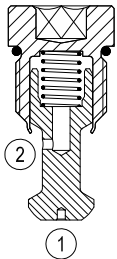
Special cavity, 808

VUM1.060

OT.U6.02.00.99 - Z



2

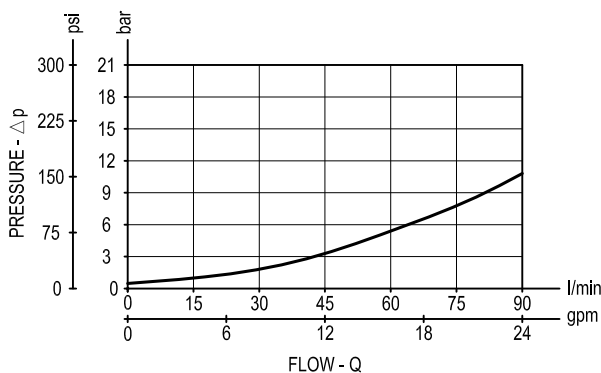


## Description

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

**Note:** to obtain a good leak proof performance coin the cavity seat using a loose valve poppet (P/N 0F.S2.014) as a coining tool. Please consult factory for any question.

## Performance

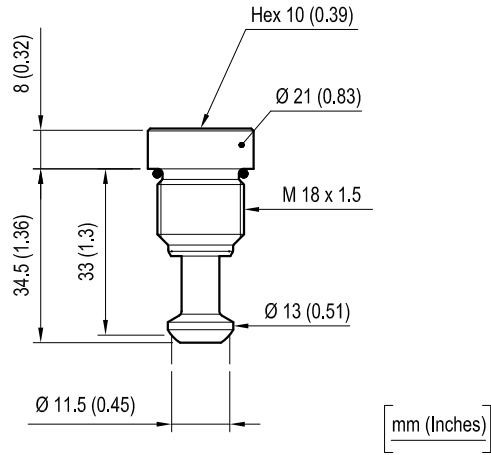


## Technical data

Max. operating pressure	bar (psi)	380 (5500)
Max. flow	l/min. (gpm)	90 (24)
Max. internal leakage	drops/min.	5
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	45-50 (33-37)
Weight	kg (lbs)	0.06 (0.13)
Special cavity		808
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (*)	code material no.	RG0730020000100 R931002406
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Installation		No restrictions
Other Technical Data		See data sheet RE 18350-50

(\*) Only external seals for 10 valves

## Dimensions



## Ordering code

0T.U6.02.00.99 | Z | \*

Insert type - Check, poppet type

Series O/A to L  
unchanged performances and dimensions

Special cavity, 808

SPRINGS	
Cracking pressure bar (psi)	
= 00	0.5 (7)

Type	Material number
0TU602009900000	R931002323

Type	Material number

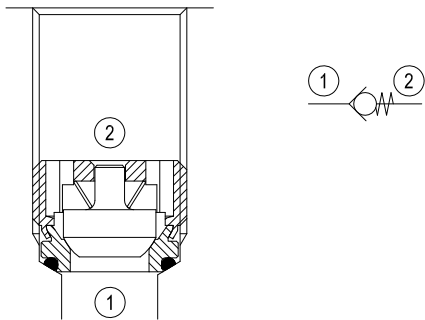
# Insert type Check, poppet type



2

VUH1

OT.U5.01.00 - Y - Z

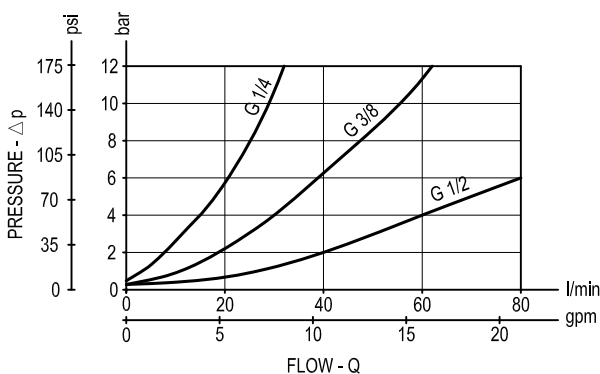


## Description

When pressure at 1 rises above the spring bias pressure, the poppet is lifted and flow allowed from 1 to 2. The valve is closed (checked) from 2 to 1. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

**Note:** UNF and Metric versions available on request. Consult factory.

## Performance

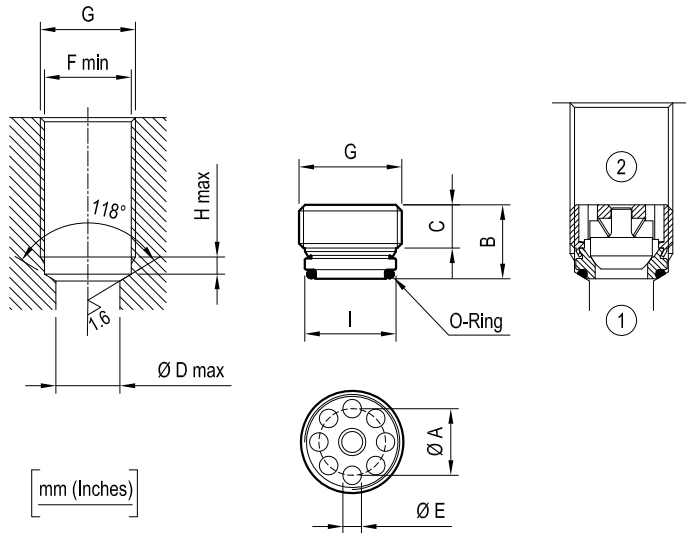


## Technical data

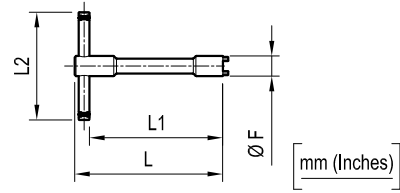
Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	see "performance" graph
Max. internal leakage	drops/min.	5
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	see "Dimensions" table
Weight	kg (lbs)	see "Dimensions" table
Special cavity		see "Dimensions"
MTTFd		150 years see data sheet 18350-51
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (*)	code material no.	see "Dimensions" table
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Other Technical Data		See data sheet RE 18350-50

(\*) Only external seals for 10 valves

### Dimensions



### Fitting tool dimensions



Type	F	L	L1	L2	Tool code	Material number
VUH1.G14	11.3 (0.45)	120 (4.72)	110 (4.33)	60 (2.36)	AVA17	R931002552
VUH1.G38	14.9 (0.59)	120 (4.72)	108 (4.25)	80 (3.15)	AVA17-01	R931002553
VUH1.G12	18.6 (0.73)	120 (4.72)	108 (4.25)	80 (3.15)	AVA17-02	R931002554

G *	A	B	C	D	E	F	O-Ring dimensions	Seal kit	H	I	Weight kg (lbs)	Inst. torque Nm (ft-lbs)	Flow max. l/min. (gpm)
G 1/4	8.5 (0.34)	8.8 (0.35)	4.2 (0.17)	7 (0.28)	2.2 (0.09)	11.6 (0.46)	Ø 8.1x1.6 (0.32x0.06)	RG09UH010000100 R931002413	3 (0.12)	11.3 (0.45)	0.005 (0.011)	6 (4)	20 (5)
G 3/8	10.8 (0.43)	12 (0.47)	7 (0.28)	9 (0.35)	3 (0.12)	15.1 (0.6)	Ø 11x1.5 (0.43x0.06)	RG02UH010000100 R931002411	3 (0.12)	14.8 (0.58)	0.015 (0.033)	6 (4)	50 (13)
G 1/2	14.2 (0.56)	14.7 (0.58)	8 (0.32)	12 (0.47)	3.8 (0.15)	18.8 (0.74)	Ø 14x1.5 (0.55x0.06)	RG03UH010000100 R931002412	4.5 (0.18)	18.6 (0.73)	0.015 (0.033)	10 (7)	80 (21)

\* Thread in accordance with ISO 228-1

### Ordering code

**OT.U5.01.00 | Y | Z | \***

Insert type - Check, poppet type

Series 0/A to L  
unchanged performances and dimensions

Port sizes

- = 09 G 1/4
- = 02 G 3/8
- = 03 G 1/2

**SPRINGS**

Cracking pressure bar (psi)

= 00 < 0.5 (7)

Type	Material number
OTU501000200000	R901064101
OTU501000300000	R901087794
OTU501000900000	R900764338

Type	Material number

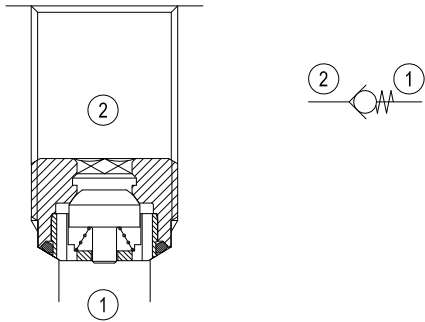
# Insert type Check, poppet type



2

VUB1

OT.U3.01.00 - Y - Z

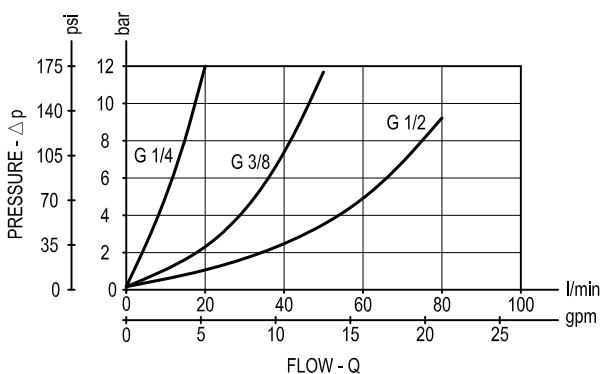


## Description

When pressure at 2 rises above the spring bias pressure, the poppet is lifted and flow allowed from 2 to 1. The valve is closed (checked) from 1 to 2. Precision machining and hardening processes allow virtually leak-free performance in the checked condition.

**Note:** UNF and Metric versions available on request. Consult factory.

## Performance

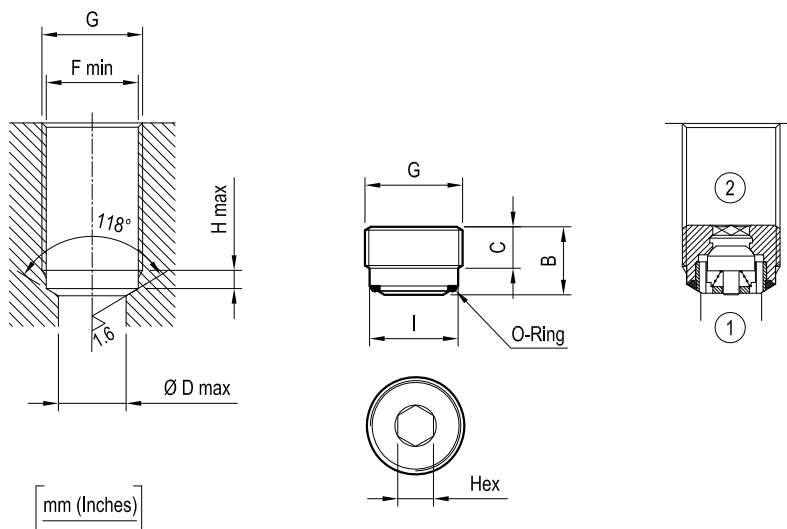


## Technical data

Max. operating pressure	bar (psi)	350 (5000)
Max. flow	l/min. (gpm)	see "performance" graph
Max. internal leakage	drops/min.	5
Fluid temperature range	°C (°F)	-30 to 100 (-22 to 212)
Installation torque	Nm (ft-lbs)	see "Dimensions" table
Weight	kg (lbs)	see "Dimensions" table
Special cavity		see "Dimensions"
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit (*)	code material no.	see "Dimensions" table
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 5 to 800 mm <sup>2</sup> /s (cSt)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
MTTFd		150 years see RE18350-51
Other Technical Data		See data sheet RE 18350-50

(\*) Only external seals for 10 valves

### Dimensions



G	B	C	Hex.	D	I	F	O-Ring dimensions	O-Ring codes	H	Weight kg (lbs)	Inst. torque Nm (ft-lbs)	Flow max. l/min. (gpm)
G 1/4	10 (0.39)	5.5 (0.22)	6 (0.24)	7 (0.28)	11.5 (0.45)	11.6 (0.46)	Ø 9 x 1 (0.35x0.04)	RG09UB010000100 R931002410	3 (0.12)	0.005 (0.011)	15 (11)	20 (5)
G 3/8	11.2 (0.44)	6.7 (0.26)	6 (0.24)	9 (0.35)	14.95 (0.59)	15.1 (0.6)	Ø 11x1.5 (0.43x0.06)	RG02UB010000100 R931002408	3 (0.12)	0.015 (0.033)	20 (15)	50 (13)
G 1/2	13.2 (0.52)	8 (0.32)	8 (0.32)	12 (0.47)	18.7 (0.74)	18.8 (0.74)	Ø 14x1.5 (0.55x0.06)	RG03UB020000100 R931002409	3 (0.12)	0.020 (0.044)	20 (15)	80 (21)

\* Thread in accordance with ISO 228-1

### Ordering code

0T.U3.01.00	Y	Z	*
-------------	---	---	---

Insert type - Check, poppet type

Series 0/A to L  
unchanged performances and dimensions

Port sizes

- = 09 G 1/4
- = 02 G 3/8
- = 03 G 1/2

SPRINGS

Cracking pressure bar (psi)

= 00 < 0.5 (7)

Type	Material number
0TU301000200000	R901106625
0TU301000300000	R901106626
0TU301000900000	R901071238

Type	Material number



# Sleeve valve for line mounting

## Flow control

Designation	Description	Cavity	Data sheet	Page
Sleeve valves for line mounting fixed orifice restrictor with reverse flow check	VF-MF	G 1/4	18316-01	597
Sleeve valves for line mounting fixed orifice restrictor with reverse flow check	GSU	G 1/4; G 3/8; G 1/2	18316-02	599
Sleeve valves for line mounting fixed orifice restrictor with poppet type reverse flow check	SF	G 1/4; G 3/8; M 18X1,5; G 1/2; G 3/4; G 1	18316-03	601
Sleeve valves for line mounting adjustable bidirectional flow restrictor	RD	G 1/4; G 3/8; G 1/2; G 3/4	18316-04	603
Sleeve valves for line mounting adjustable bidirectional flow restrictor	RDF	G 1/4; G 3/8; G 1/2; G 3/4	18316-05	605
Sleeve valves for line mounting adjustable barrel type bidirectional restrictor	SD	G 1/4; G 3/8; M 18X1,5; G 1/2; G 3/4; G 1; G 1 1/4	18316-06	607
Sleeve valves for line mounting adjustable barrel type restrictor with poppet type reverse flow check	FO	G 1/2; G 3/4; G 1; G 1 1/4	18316-09	609
Sleeve valves for line mounting adjustable barrel type restrictor with ball type reverse flow check	SU	G 1/4; G 3/8; M 18X1,5; G 1/2; G 3/4; G 1	18316-08	611
Sleeve valves for line mounting adjustable restrictor with ball type reverse flow check	SUM38	G 3/8	18316-07	613
Sleeve valves for line mounting adjustable restrictor with poppet type reverse flow check	RU	G 1/4; G 3/8; G 1/2; G 3/4	18316-10	615
Sleeve valves for line mounting adjustable restrictor with poppet type reverse flow check	RUF	G 1/4; G 3/8; G 1/2; G 3/4	18316-11	617
Sleeve valves for line mounting pressure compensated fixed setting flow regulator, with female sleeve	SFC-FF	G 1/4; G 3/8; G 1/2	18316-12	619
Sleeve valves for line mounting pressure compensated fixed setting flow regulator, with male-female sleeve	SFC-MF	G 1/4; G 3/8; G 1/2	18316-13	621
Sleeve valves for line mounting pressure compensated partially adjustable flow regulator, with female sleeve	VCDC-H-MC	G 1/4; G 3/8	18316-14	623
Sleeve valves for line mounting pressure compensated partially adjustable flow regulator, with female sleeve	VCDC-H-MC	G 1/2; G 3/4	18316-15	625
Sleeve valves for line mounting pressure compensated partially adjustable flow regulator, with male-female sleeve	VCDC-H-MF	G 1/4; G 3/8	18316-16	627

## Sleeve valve for line mounting

### Flow control

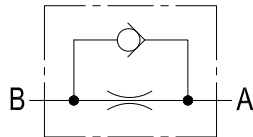
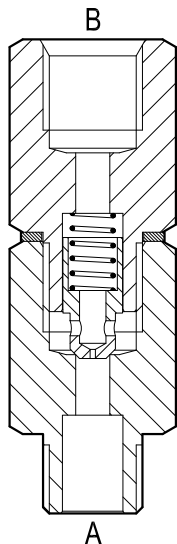
Designation	Description	Cavity	Data sheet	Page
Sleeve valves for line mounting pressure compensated partially adjustable flow regulator, with male-female sleeve	VCDC-H-MF	G 1/2; G 3/4	18316-17	629
Sleeve valves for line mounting pressure compensated adjustable flow regulator with reverse flow check	VCST 1/4	G 1/4	18316-18	631
Sleeve valves for line mounting pressure compensated adjustable flow regulator with reverse flow check	VCST 3/8	G 3/8	18316-19	633
Sleeve valves for line mounting pressure compensated adjustable flow regulator with reverse flow check	VCST 1/2	G 1/2	18316-20	635
Sleeve valves for line mounting pressure compensated adjustable flow regulator with reverse flow check	VCD-RU	G 3/8	18316-21	637
Sleeve valves for line mounting hose burst valve, with female threaded sleeve	VPN-FF	G 1/4; G 3/8	18316-85	639
Sleeve valves for line mounting hose burst valve, with female threaded sleeve	VPN-FF	G 1/2; G 3/4	18316-86	641
Sleeve valves for line mounting hose burst valve, with male-female sleeve	VPN-MF	G 1/4; G 3/8	18316-87	643
Sleeve valves for line mounting hose burst valve, with male-female sleeve	VPN-MF	G 1/2; G 3/4	18316-88	645

Flow control valves

## Fixed orifice restrictor with reverse flow check

VF-MF

04.46.03.00-Y-Z



### Description

The "B-A" flow is restricted by a calibrated orifice, while flow "A-B" is always allowed through the incorporated check valve. Pressure compensation is not provided and flow depends from pressure drop and oil viscosity.

The valve is assembled with two hexagonal threaded sleeves and an internal check poppet. The drawing shows the valve with Male port A and Female port B: the two sleeves can be assembled in the reversed order and the result will be Female A port and Male B port.

### Technical data

Port	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
G 1/4	350 (5000)	10 (3)	0.10 (0.22)

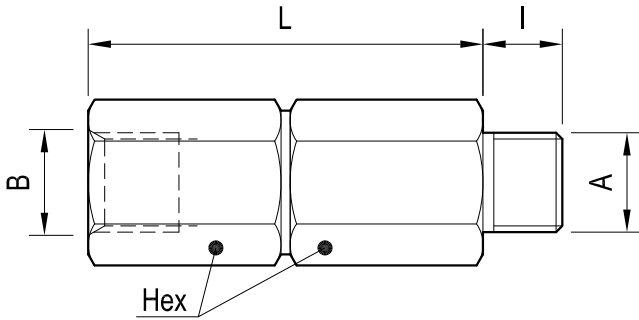
Steel body, zinc plated.

Installation torque: 33 - 37 Nm (24 - 27 ft-lb)

### Advantages

- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.

**Dimensions**



**Ports size / Dimensions**

Y	Ports A-B	L mm (inches)	I mm (inches)	Hex mm (inches)
09	G 1/4	52 (2.05)	10.5 (0.41)	19 (0.75)

The valve is only available with G 1/4 ports, with different size restriction orifices, as indicated by the table of orifices.

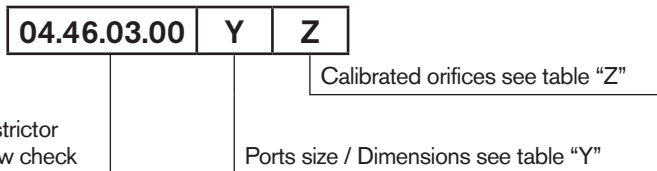
Calibrated orifices											
Z	09	06	00	07	10	12	11	03	08	05	01
Calibrated orifice Ø mm (inches)	0.3* (0.012*)	0.4 (0.016)	0.5 (0.020)	0.6 (0.024)	0.7 (0.028)	0.8 (0.032)	0.9 (0.035)	1.0 (0.039)	1.3 (0.051)	1.5 (0.059)	1.75 (0.069)

\* Hole Ø 0.5 mm (0.020 inch.) with Ø 0.4 mm (0.016 inch.) wire.

**Applications**

- In a variety of cases when a one-way restrictor is needed, especially for cushioning a control circuit (like servo-controls), or delaying brake engagement, etc.
- Control of delay for brake disengagement.
  - Dampening of pressure peaks in joystick controlled lines.
  - Simple and cost-effective solution for a one-way flow control.

**Ordering code**



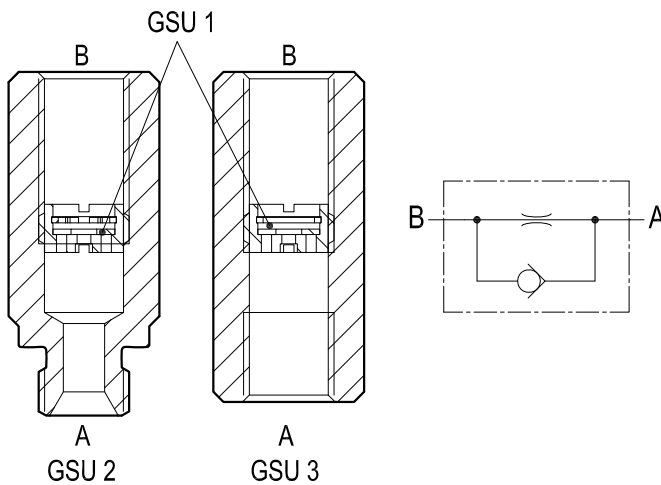
Type	Material number	Type	Material number	Type	Material number
04460300090000A	R930000645	044603000912000	R930000655		
04460300090100A	R930000646				
04460300090300A	R930000647				
04460300090500A	R930000648				
04460300090600A	R930000649				
04460300090700A	R930000650				
04460300090800A	R930000651				
04460300090900A	R930000652				
04460300091000A	R930000653				
044603000911000	R930000654				

Flow control valves

## Fixed orifice restrictors with reverse flow check



GSU Series

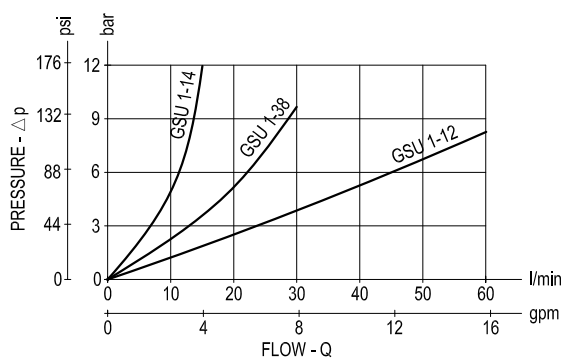


### Description

The "B-A" flow is restricted by a calibrated orifice, while flow "A-B" is always allowed through the incorporated check valve. Pressure compensation is not provided and flow depends from pressure drop and oil viscosity.

The valve is composed by an hexagonal threaded sleeve with a special inserted cartridge (GSU1): the cartridge is available in different orifice sizes, and can be fitted in either direction (see drawing).

### Performance



Δp curves vs. flow in "A-B" free flow direction

### Advantages

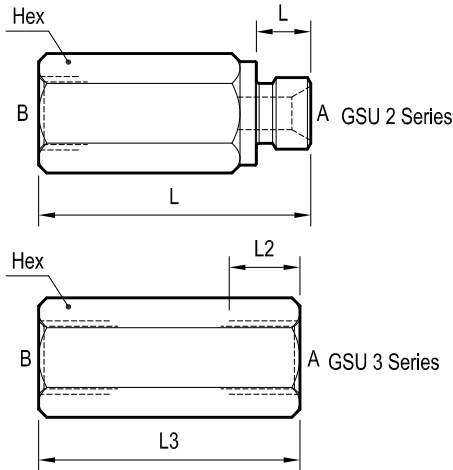
- Compact design and inline mounting for space saving.
- Three sizes provide great adaptability to the system.
- Mounting position is unrestricted.
- Low  $\Delta p$  in the free flow direction.

### Technical data

Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
GSU 2-14	300 (4300)	15 (4)	0.07 (0.15)
GSU 2-38	300 (4300)	30 (8)	0.1 (0.22)
GSU 2-12	300 (4300)	70 (18)	0.19 (0.42)
GSU 3-14	300 (4300)	15 (4)	0.08 (0.18)
GSU 3-38	300 (4300)	30 (8)	0.1 (0.22)
GSU 3-12	300 (4300)	70 (18)	0.17 (0.37)

Steel body, zinc plated

**Dimensions**



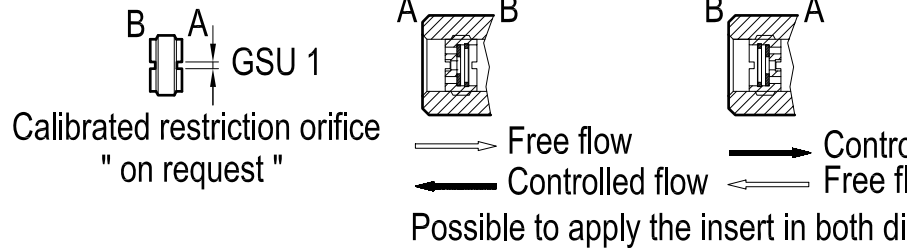
**Ports size / Dimensions**

Code	Ports size A-B	L mm (inches)	L1 mm (inches)	L2 mm (inches)	L3 mm (inches)	Hex mm (inches)
GSU 2-14	G 1/4	10 (0.39)	50 (1.96)	/	/	19 (0.75)
GSU 2-38	G 3/8	12 (0.47)	55 (2.17)	/	/	22 (0.87)
GSU 2-12	G 1/2	14 (0.55)	70	/	/	27 (1.06)
GSU 3-14	G 1/4	/	/	13 (0.51)	48 (1.89)	19 (0.75)
GSU 3-38	G 3/8	/	/	13 (0.51)	52 (2.05)	22 (0.87)
GSU 3-12	G 1/2	/	/	14 (0.55)	60 (2.36)	27 (1.06)

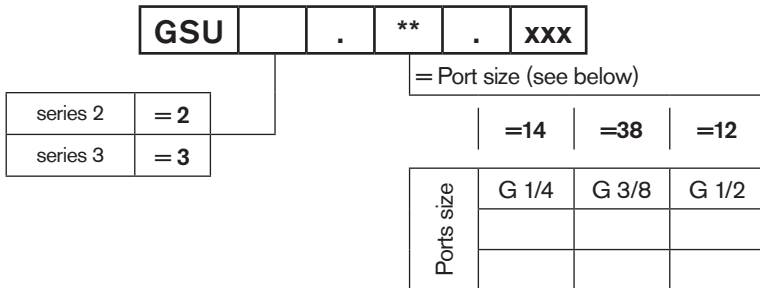
**Applications**

The GSU Series valve is a cost effective non-compensated flow control which can be employed in a variety of cases when a one-way restrictor is needed. The smallest sizes can be used also as dampeners for pressure peaks, control of brake engagement.

**Application example**



**Ordering code**



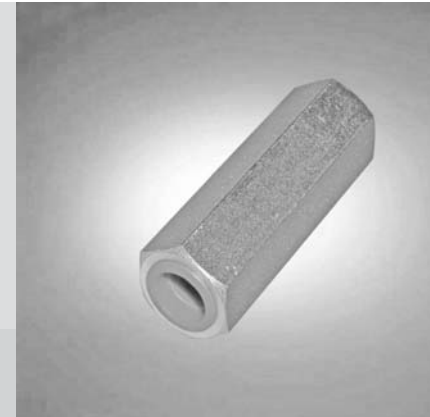
**XXX:** It identifies the I.D. of the requested orifice. (only mm value)

example 1: GSU2.14.200 = M/F - G 1/4 - hole 2 mm (0.079 inches)  
 example 2: GSU3.14.075 = F/F - G 1/4 - hole 0.75 mm (0.030 inches)

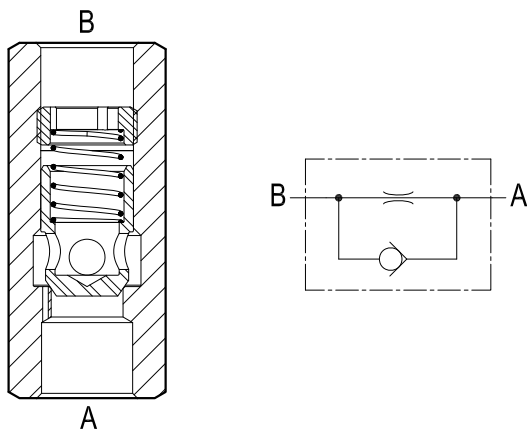
Type	Material number	Type	Material number	Type	Material number
GSU2.12.000	R932006954	GSU3.12.000	R932006959		
GSU2.12.100	R932006953	GSU3.12.075	R932006957		
GSU2.12.200	R932006955	GSU3.12.150	R932006958		
GSU2.14.000	R932006926	GSU3.14.000	R932006960		
GSU2.14.075	R932500236	GSU3.14.075	R932500245		
GSU2.14.200	R932006956	GSU3.14.150	R932500248		
GSU2.38.000	R932006927	GSU3.38.000	R932006961		
GSU2.38.075	R932500237	GSU3.38.100	R932500249		
GSU2.38.100	R932500239	GSU3.38.150	R932500250		

Flow control valves

## Fixed orifice restrictors with poppet type reverse flow check



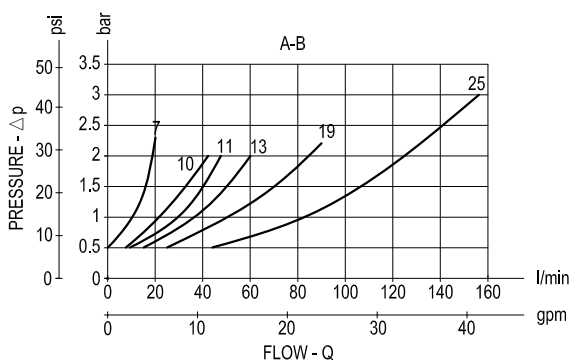
SF Series



### Description

This line mounted valve provides a one-way fixed type restriction, in B-A direction. It has no pressure compensation and flow depends from pressure drop and oil viscosity. Free flow is allowed from A to B by an incorporated check valve, when pressure at A rises above the spring bias pressure and the poppet is pushed from the seat.

### Performance



$\Delta p$  curves vs. flow in "A-B" free flow direction (refer to the specific table).

Cracking pressure is always 0,5 bar.

Different size orifices, (with ID  $\geq$  0,4 mm) are available.

The orifice ID must be specified when ordering (see order code).

### Technical data

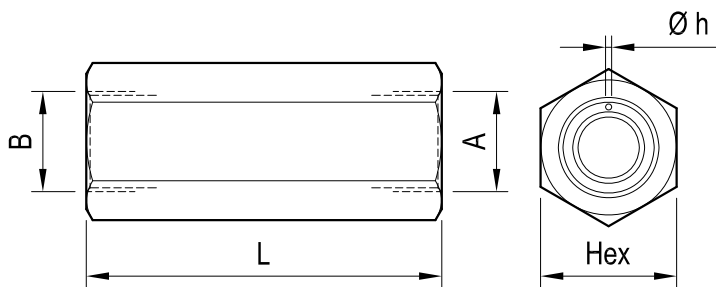
Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
SF 7	350 (5000)	25 (7)	0.10 (0.22)
SF 10	350 (5000)	50 (13)	0.18 (0.40)
SF 11	350 (5000)	50 (13)	0.18 (0.40)
SF 13	350 (5000)	80 (21)	0.22 (0.49)
SF 19	250 (3600)	100 (26)	0.48 (1.06)
SF 25	250 (3600)	160 (42)	0.93 (2.05)

Steel body, zinc plated

### Advantages

- Compact design and inline mounting for space saving.
- Six sizes provide great adaptability to the system.
- Cost effectiveness.
- Mounting position is unrestricted.
- Low  $\Delta p$  in the free flow direction.

### Dimensions



### Ports size / Dimensions

Code	Ports size A-B	Hex mm (inches)	L mm (inches)
SF 7	G 1/4	19 (0.75)	62 (2.44)
SF 10	G 3/8	24 (0.95)	70 (2.76)
SF 11	M18x1.5	24 (0.94)	70 (2.76)
SF 13	G 1/2	27 (1.06)	79 (3.11)
SF 19	G 3/4	36 (1.42)	94 (3.70)
SF 25	G 1	46 (1.81)	114 (4.49)

### Applications

In a variety of cases when a one-way restrictor is needed like building-up some back pressure at the discharge side of of an hydraulic motor.

### Ordering code



series 7	= 7
series 10	= 10
series 11	= 11
series 13	= 13
series 19	= 19
series 25	= 25

Specify the orifice bore in mm (min 0.4)

Cracking pressure (free flow) is always 0.5 bar (7.25 psi)

Type	Material number
SF 7/0.5	R932500585
SF 7/0.8	R932500588
SF 7/1	R932500590
SF 7/1.5	R932006941
SF 7/2	R932006942
SF 10/0.5	R932500591
SF 10/0.8	R932500593
SF 10/1	R932500594
SF 10/2	R932500597
SF 11/1	R932006943

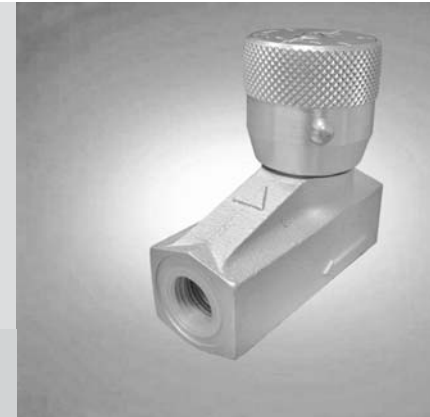
Type	Material number
SF 11/1.5	R932006944
SF 11/2	R932006945
SF 13/0.5	R932006947
SF 13/1	R932500598
SF 13/1.5	R932006962
SF 19/1	R932500599
SF 19/1.5	R932006949
SF 25/2	R932006950
SF 25/3	R932006951

Type	Material number

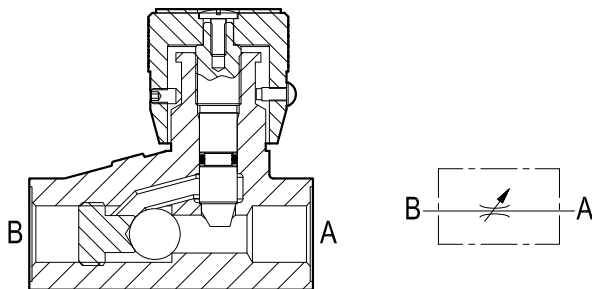


Flow control valves

## Adjustable bidirectional flow restrictors



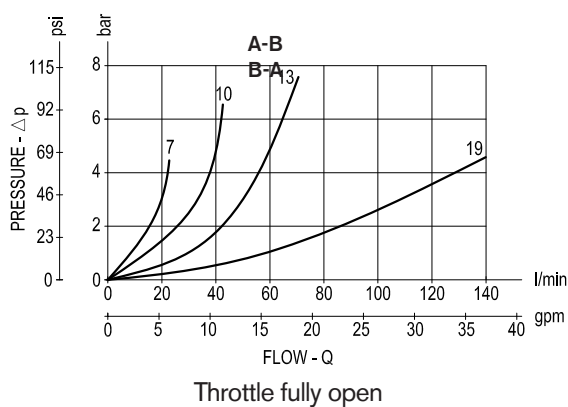
RD Series



### Description

This line mounted valve provides a fully adjustable orifice restriction. Even though the Performance curves shown in the tables refer to the A-B flow direction, the valve is actually bi-directional and the performance curves can be assumed almost accurate also for the reverse flow direction B-A. Pressure compensation is not provided and flow depends from pressure drop and oil viscosity.

### Performance



### Technical data

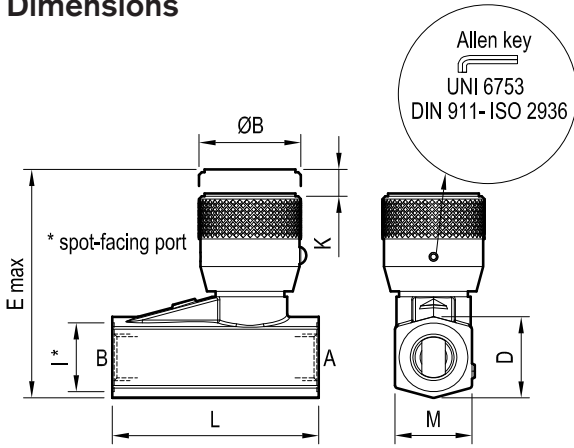
Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
RD 7	350 (5000)	25 (7)	0.28 (0.62)
RD 10	350 (5000)	45 (12)	0.48 (1.06)
RD 13	350 (5000)	70 (19)	0.85 (1.87)
RD 19	350 (5000)	140 (37)	1.58 (3.48)

Cast iron, zinc plated with aluminium hand knob

### Advantages

- Compact design
- Four sizes provide great adaptability to the system.
- Fine adjustment.
- Mounting position is unrestricted.

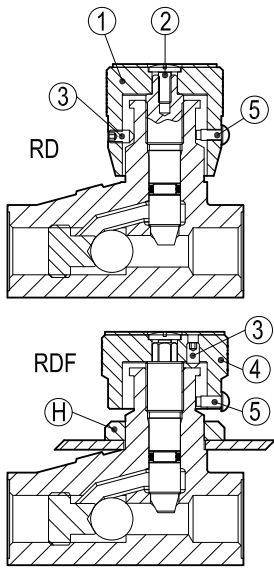
**Dimensions**



**Post size / Dimensions**

Code	Ports size A-B	I* mm (inches)	L mm (inches)	Ø B mm (inches)	E max mm (inches)	D mm (inches)	M mm (inches)
RD 7	G 1/4	21 (0.83)	64 (2.52)	33 (1.30)	63.5 (2.5)	24 (0.95)	24 (0.95)
RD 10	G 3/8	25 (0.98)	75 (2.95)	40 (1.58)	73 (2.87)	30 (1.18)	28 (1.10)
RD 13	G 1/2	29 (1.14)	92 (3.62)	45 (1.77)	93 (3.66)	36 (1.42)	35 (1.38)
RD 19	G 3/4	36.5 (1.44)	115 (3.62)	53 (2.09)	120 (4.72)	43 (1.69)	43 (1.69)

The RD series valves can be converted into panel mounted version (like RDF) by removing and adding the items here indicated.



code	Remove from RD valve				Add For panel mounting			
	Screw (3)	Rivet (5)	Screw (2)	Hand Knob (1)	Ring Nut (H)	Hand Knob (4)	Screw (3)	Rivet (5)
RD 7 RDF 7	M3 x 6 UNI 5927.67 code: 0771432.01	4M x 6.5 code: 0771352.01	M4 x 10 code: 0771432.04	0771431.01	20 x 1 code: 0811131.16	081.1431.05	M3 x 6 UNI 5927.67 code: 0771432.01	4M x 6.5 code: 0771352.01
RD 10 RDF 10	M4 x 8 UNI 5927.67 code: 0781432.02	6M x 8 code: 0781352.02	M4 x 10 code: 0771432.04	078.1431.02	25 x 1.5 code: 0821131.17	082.1431.06	M4 x 8 UNI 5927.67 code: 0781432.02	6M x 8 code: 0781352.02
RD 13 RDF 13	M4 x 8 UNI 5927.67 code: 0781432.02	6M x 8 code: 0781352.02	M5 x 12 0791432.05	079.1431.03	30 x 1.5 code: 0831131.18	083.1431.07	M4 x 8 UNI 5927.67 code: 0781432.02	6M x 8 code: 0781352.02
RD 19 RDF 19	M5 x 10 UNI 5927.67 code: 0801432.03	10M x 9.5 code: 0801352.03	M5 x 12 + rivet Ø 5 (0.20) UNI 6593-69 code: 0791432.05	080.1431.04	35 x 1.5 code: 0841131.19	084.1431.08	M5 x 10 UNI 5927.67 code: 0801432.03	10M x 9.5 code: 0801352.03

**Ordering code**

RD

series 7	=	7
series 10	=	10
series 13	=	13
series 19	=	19

Adj. travel (only bar value see below)

	RD 7	RD 10	RD 13	RD 19
K mm (inch)	7 (0.28)	8 (0.31)	11 (0.43)	14 (0.55)

Type	Material number	Type	Material number	Type	Material number
RD7	R932500528				
RD10	R932500529				
RD13	R932500530				
RD19	R932500531				

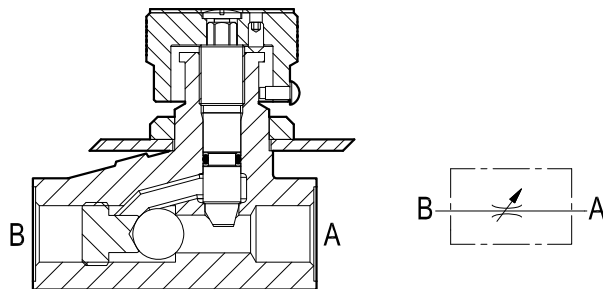
**Applications**

The RD Series valve is a fully and easily adjustable non-compensated flow control which can be employed many applications where a non-compensated bidirectional flow control is desired.

Flow control valves

## Adjustable bidirectional flow restrictors

RDF Series



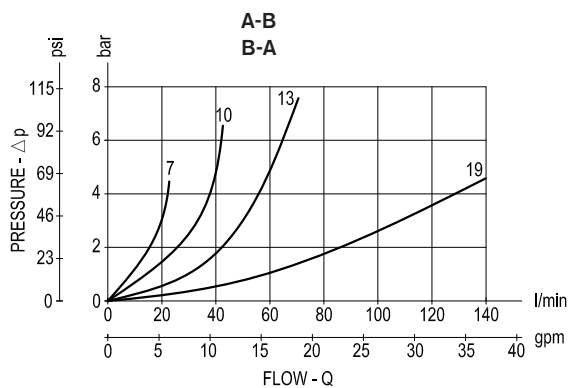
### Description

This valve provides a fully adjustable orifice restriction. Even though the Performance curves shown in the tables refer to the A-B flow direction, the valve is actually bi-directional and the performance curves can be assumed almost accurate also for the reverse flow direction B-A.

Pressure compensation is not provided and flow depends from pressure drop and oil viscosity.

This RDF flow restrictor can be line mounted or panel mounted and the hand-knob can be locked after adjustment.

### Performance



Throttle fully open

### Advantages

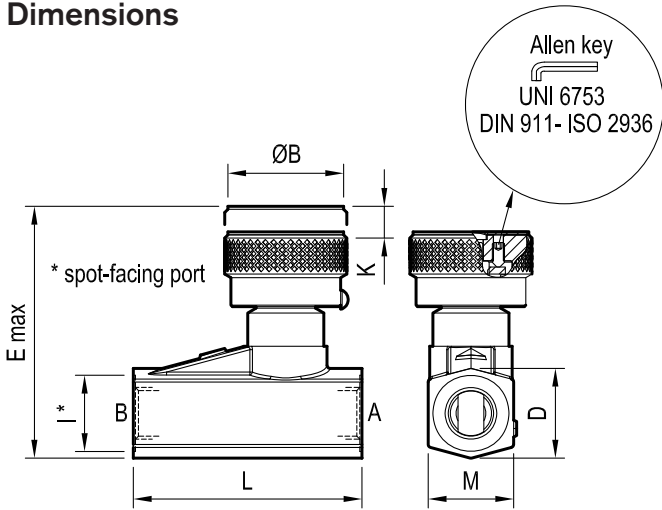
- Compact design.
- Panel mounting.
- Four sizes provide great adaptability to the system.
- Fine adjustment.
- Mounting position is unrestricted.

### Technical data

Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
<b>RDF 7</b>	350 (5000)	25 (7)	0.28 (0.62)
<b>RDF 10</b>	350 (500)	45 (12)	0.48 (1.06)
<b>RDF 13</b>	350 (5000)	70 (19)	0.85 (1.87)
<b>RDF 19</b>	350 (5000)	140 (37)	1.58 (3.48)

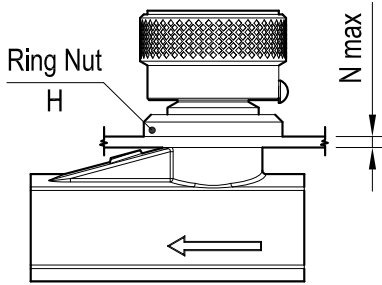
Cast iron, zinc plated with aluminium hand knob

**Dimensions**



**Ports size / Dimensions**

Code	Ports size A-B	I* mm (inches)	L mm (inches)	Ø B mm (inches)	E max mm (inches)	D mm (inches)	M mm (inches)
RDF 7	G 1/4	21 (0.83)	64 (2.52)	33 (1.30)	63.5 (2.5)	24 (0.95)	24 (0.95)
RDF 10	G 3/8	25 (0.98)	75 (2.95)	40 (1.58)	73 (2.87)	30 (1.18)	28 (1.10)
RDF 13	G 1/2	29 (1.14)	92 (3.62)	45 (1.77)	93 (3.66)	36 (1.42)	35 (1.38)
RDF 19	G 3/4	36.5 (1.44)	115 (3.62)	53 (2.09)	120 (4.72)	43 (1.69)	43 (1.69)



Code	N max mm (inches)	H
RDF 7	5.5 (0.22)	M20 x 1
RDF 10	5.5 (0.22)	M25 x 1.5
RDF 13	7.5 (0.30)	M30 x 1.5
RDF 19	7.5 (0.30)	M35 x 1.5

**Applications**

The RDF Series valve is a fully and easily adjustable non-compensated flow control which can be employed many applications where a non-compensated bidirectional flow control is desired.

**Ordering code**

**RDF**  

series 7	=	<b>7</b>
series 10	=	<b>10</b>
series 13	=	<b>13</b>
series 19	=	<b>19</b>

Adj. travel (only bar value see below)

	RDF 7	RDF 10	RDF 13	RDF 19
K mm (inch)	7 (0.28)	8 (0.31)	11 (0.43)	14 (0.55)

Type	Material number
RDF7	R932500532
RDF10	R932500533
RDF13	R932500534
RDF19	R932500535

Type	Material number

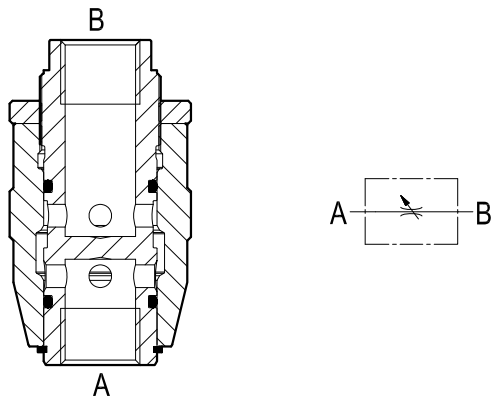
Type	Material number

Flow control valves

## Adjustable barrel type bidirectional restrictors



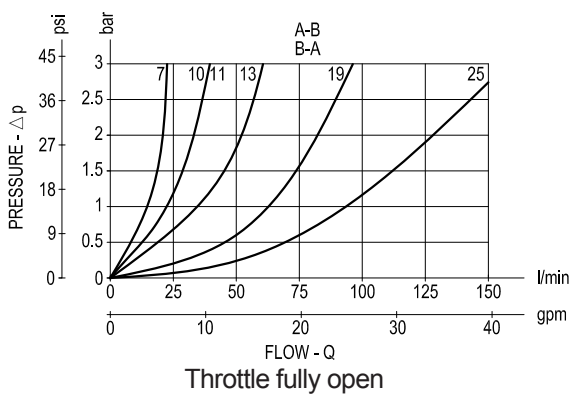
SD Series



### Description

This line mounted valve provides a fully adjustable restriction. Pressure compensation is not provided and flow depends from pressure drop and oil viscosity. Once the flow is adjusted, lock the knurled ring nut (H) in order to maintain the desired opening. Minor leakage in both directions can be expected with valve fully closed.

### Performance



### Advantages

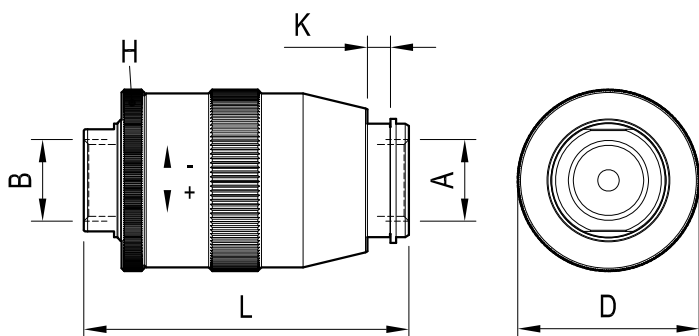
- Compact design and inline mounting for space saving.
- Seven sizes provide great adaptability to the system.
- Easiness of adjustment.
- Mounting position is unrestricted.

### Technical data

Code	Pressure $P$ max bar (psi)	Flow $Q$ max l/min (gpm)	Weight kg (lbs)
<b>SD 7</b>	350 (5000)	12 (3)	0.29 (0.64)
<b>SD 10</b>	350 (5000)	30 (8)	0.39 (0.86)
<b>SD 11</b>	350 (5000)	30 (8)	0.40 (0.88)
<b>SD 13</b>	350 (5000)	45 (12)	0.69 (1.52)
<b>SD 19</b>	250 (3600)	80 (21)	1.08 (2.38)
<b>SD 25</b>	250 (3600)	140 (37)	3.0 (6.6)
<b>SD 32</b>	250 (3600)	250 (66)	2.9 (6.4)

Steel body, zinc plated

### Dimensions



### Ports size / Dimensions

Code	Ports size A-B	Ø D mm (inches)	L mm (inches)	K mm (inches)
SD 7	G 1/4	35 (1.38)	62 (2.44)	5 (0.20)
SD 10	G 3/8	38 (1.50)	72 (2.84)	7 (0.28)
SD 11	M18x1.5	38 (1.50)	72 (2.84)	7 (0.28)
SD 13	G 1/2	48 (1.89)	86 (3.39)	8 (0.32)
SD 19	G 3/4	55 (2.17)	100 (3.94)	11 (0.43)
SD 25	G 1	79 (3.11)	126 (4.96)	12 (0.47)
SD 32	G 1-1/4	79 (3.11)	143 (5.63)	12 (0.47)

### Applications

The SD Series valve is a fully and easily adjustable non-compensated flow control which can be employed for meter-in (Port A connected to the actuator inlet) or meter-out (Port B connected to the actuator outlet in order to control the oil flow from the actuator). The cost effectiveness and the easiness of adjustment make it suitable for many circuits and many applications where a non-compensated flow control is desired.

### Ordering code

**SD**

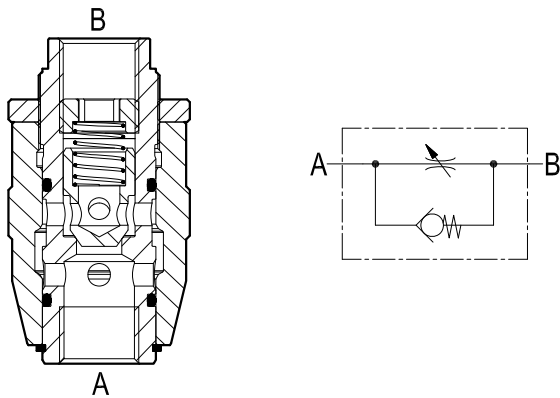
series 7	=	<b>7</b>
series 10	=	<b>10</b>
series 11	=	<b>11</b>
series 13	=	<b>13</b>
series 19	=	<b>19</b>
series 25	=	<b>25</b>
series 32	=	<b>32</b>

Type	Material number	Type	Material number	Type	Material number
SD 7	R932500579				
SD 10	R932500580				
SD 11	R932006966				
SD 13	R932500581				
SD 19	R932500582				
SD 25	R932500583				
SD 32	R932500584				

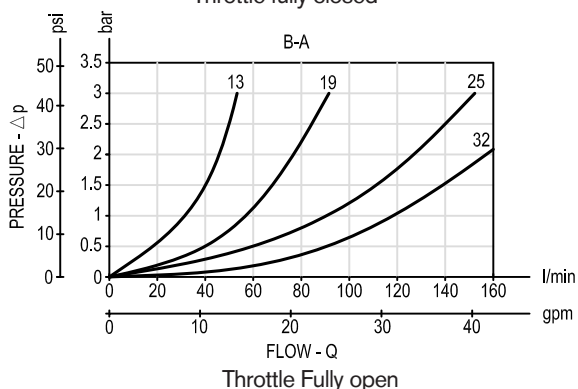
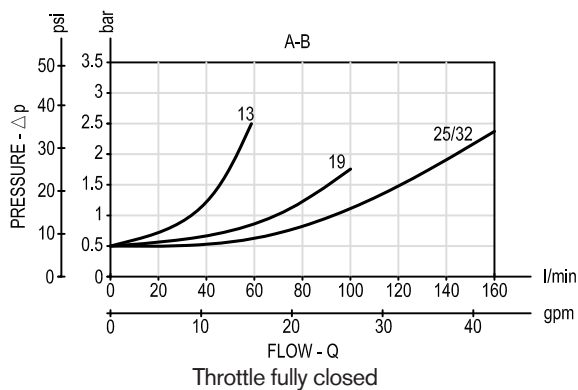
Flow control valves

## Adjustable barrel type restrictors with poppet type reverse flow check

FO Series



### Performance



### Description

This line mounted restrictor throttles and limits the flow from B to A; it has an adjustable built-in restriction which can be tuned by rotating the external pinecone-type knurled sleeve from fully closed to fully open. Flow will increase by rotating the sleeve toward (+) direction. Once the desired adjustment is achieved, the sleeve can be locked by tightening the knurled ring nut (H) in order to prevent inadvertent changes or motion due to line vibrations. The maximum adjustment stroke is identified as K and, for different valve sizes, is shown by the specific table. This valve is a variable adjustable restriction, non-pressure-compensated: the actual flow through the valve will be determined by the pressure differential available between inlet B and outlet A, and also by the oil viscosity. Unrestricted reverse flow from A to B is permitted through a poppet type check valve, with cracking pressure 0,5 bar (7 psi) regardless of valve adjustment. The valve is available in different sizes for different flow ranges, as specified by the tables of the Technical data and Dimensions.

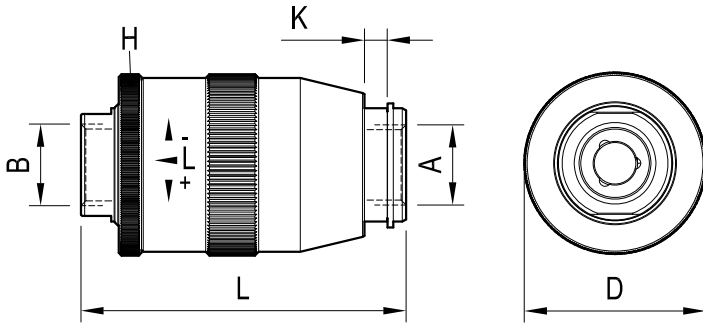
Minor leakage "B-A" can be expected with valve fully closed. Free reverse flow "A-B" is always allowed through the incorporated poppet check valve with 0.5 bar cracking pressure.

### Technical data

Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
FO 13	350 (5000)	80 (21)	0.74 (1.63)
FO 19	250 (3600)	100 (26)	1.18 (2.60)
FO 25	250 (3600)	160 (42)	2.9 (6.4)
FO 32	250 (3600)	160 (42)	3.0 (6.6)

Steel body, zinc plated

**Dimensions**



**Ports size / Dimensions**

Code	Ports size A-B	Ø D mm (inches)	L mm (inches)	K mm (inches)
FO 13	G 1/2	48 (1.89)	86 (3.39)	8 (0.32)
FO 19	G 3/4	55 (2.17)	103 (4.06)	11 (0.43)
FO 25	G 1	79 (3.11)	123 (4.84)	12 (0.47)
FO 32	G 1-1/4	79 (3.11)	143 (5.63)	11.1 (0.44)

**Advantages**

- Advantages
- Compact design and inline mounting for space saving.
  - Five sizes provide great adaptability to the system.
  - Easiness of adjustment.
  - Mounting position is unrestricted
  - Low Δp in the free flow direction

**Applications**

The FO Series valve is a fully and easily adjustable non-compensated flow control which can be employed for meter-in (Port A connected to the actuator inlet) or meter-out (Port B connected to the actuator outlet in order to control the oil flow from the actuator). The easiness of installation and of adjustment make it suitable for many circuits and many applications where a non-compensated flow control is desired.

**Ordering code**



Cracking pressure (free flow) is always 0.5 bar (7.25psi)

series 13	= <b>13</b>
series 19	= <b>19</b>
series 25	= <b>25</b>
series 32	= <b>32</b>

Type	Material number	Type	Material number	Type	Material number
FO 13	R932500203				
FO 19	R932500204				
FO 25	R932500205				
FO 32	R932500206				

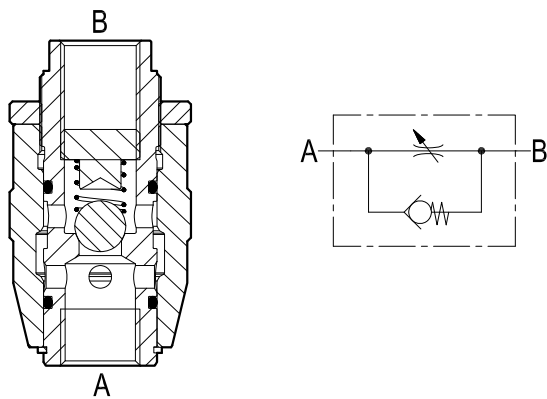


Flow control valves

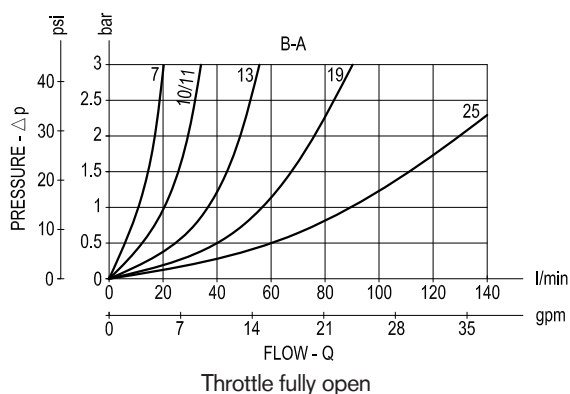
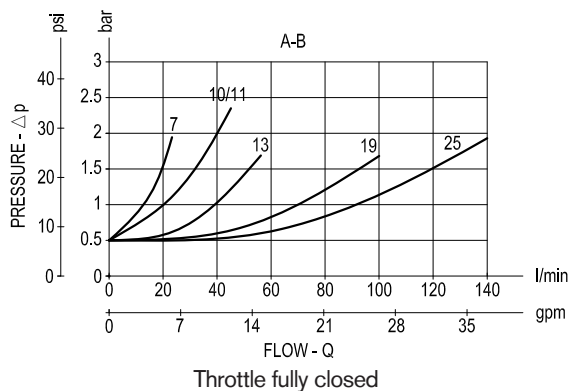
## Adjustable barrel type restrictors with ball type reverse flow check



SU Series



### Performance



### Description

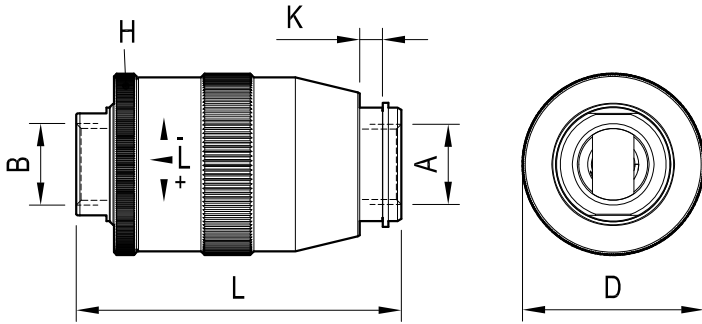
This line mounted restrictor throttles and limits the flow from B to A; it has an adjustable built-in restriction which can be tuned by rotating the external pinecone-type knurled sleeve from fully closed to fully open. Flow will increase by rotating the sleeve toward (+) direction. Once the desired adjustment is achieved, the sleeve can be locked by tightening the knurled ring nut (H) in order to prevent inadvertent changes or motion due to line vibrations. The maximum adjustment stroke is identified as K and, for different valve sizes, is shown by the specific table. This valve is a variable adjustable restriction, non-pressure-compensated: the actual flow through the valve will be determined by the pressure differential available between inlet B and outlet A, and also by the oil viscosity. The valve is available in different sizes for different flow ranges, as specified by the tables of the Technical data and Dimensions. Minor leakage "B-A" can be expected with valve fully closed. Free reverse flow "A-B" is always allowed through the incorporated poppet check valve with 0.5 bar cracking pressure.

### Technical data

Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
SU 7	350 (5000)	12 (3)	0.30 (0.66)
SU 10	350 (5000)	30 (8)	0.40 (0.88)
SU 11	350 (5000)	30 (8)	0.40 (0.88)
SU 13	350 (5000)	45 (12)	0.70 (1.54)
SU 19	250 (3600)	80 (21)	1.12 (2.47)
SU 25	250 (3600)	140 (37)	3.0 (6.6)

Steel body, zinc plated

**Dimensions**



**Ports size / Dimensions**

Code	Ports size A-B	Ø D mm (inches)	L mm (inches)	K mm (inches)
SU 7	G 1/4	35 (1.38)	62 (2.44)	5 (0.20)
SU 10	G 3/8	38 (1.50)	72 (2.84)	7 (0.28)
SU 11	M 18x1.5	38 (1.50)	72 (2.84)	7 (0.28)
SU 13	G 1/2	48 (1.89)	86 (3.39)	8 (0.32)
SU 19	G 3/4	55 (2.17)	100 (3.94)	11 (0.43)
SU 25	G 1	79 (3.11)	126 (4.96)	12 (0.47)

**Advantages**

- Compact design and inline mounting for space saving.
- Six sizes provide great adaptability to the system.
- Easiness of adjustment.
- Mounting position is unrestricted.
- Low Δp in the free flow direction.

**Applications**

The SU Series valve is a fully and easily adjustable non-compensated flow control which can be employed for meter-in (Port A connected to the actuator inlet) or meter-out (Port B connected to the actuator outlet in order to control the oil flow from the actuator). The cost effectiveness and the easiness of adjustment make it suitable for many circuits and many applications where a non-compensated flow control is desired.

**Ordering code**



series 7	= 7
series 10	= 10
series 11	= 11
series 13	= 13
series 19	= 19
series 25	= 25

Cracking pressure (free flow) is always 0.5 bar (7.25psi)

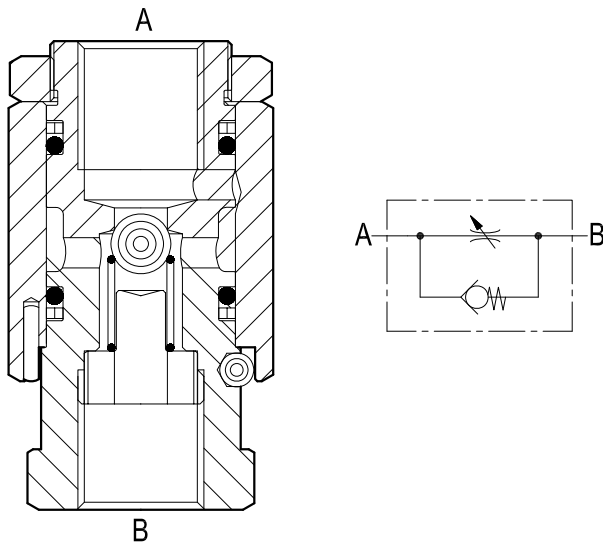
Type	Material number	Type	Material number	Type	Material number
SU7	R932500602				
SU10	R932500603				
SU11	R932500604				
SU13	R932500605				
SU19	R932500606				
SU25	R932500607				

Flow control valves

## Adjustable restrictors with ball type reverse flow check

SUM38

OE.21.01.04.02

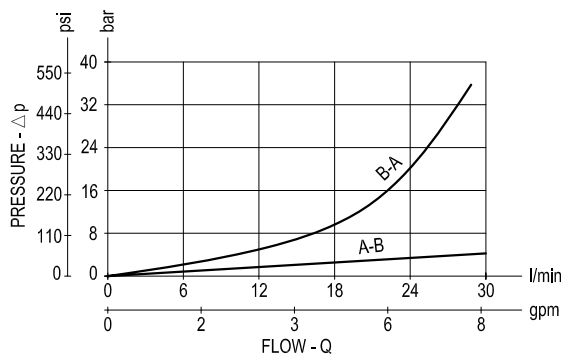


### Description

This line mounted restrictor throttles and limits the flow from B to A; it has an adjustable built-in restriction which can be tuned by rotating the external hexagonal 32mm (1.26 inches) sleeve from fully closed to fully open, as indicated by the arrow. Once the desired adjustment is achieved, the sleeve can be locked by tightening the hexagonal 30 mm (1.18 inches) ring nut in order to prevent inadvertent changes or motion due to line vibrations. This valve is a variable adjustable restriction, non-pressure-compensated: the actual flow through the valve will be determined by the pressure differential available between inlet B and outlet A, and also by the oil viscosity.

Minor leakage "B-A" can be expected with valve fully closed. Free reverse flow "A-B" is always allowed through the incorporated check valve with minimum cracking pressure.

### Performance



Δp curves vs. flow in "A-B" free flow direction

### Technical data

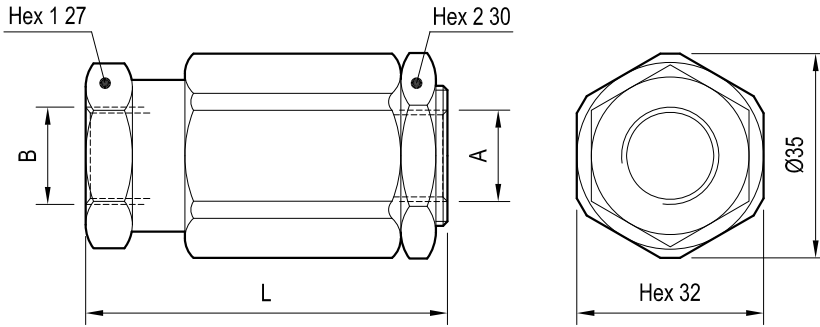
Pressure <b>P</b> max bar (psi)	Flow <b>Q</b> max l/min (gpm)	Weight kg (lbs)
210 (3000)	1-25 (0.3-7)	0.37 (0.82)

Steel body, zinc plated

### Advantages

- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Low Δp in the free flow direction.

**Dimensions**



**Ports size / Dimensions**

Ports A-B	L mm (inches)
G 3/8	62 (2.44)

**Applications**

The SUM Series valve is a fully and easily adjustable non-compensated flow control which can be employed for meter-in (Port A connected to the actuator inlet) or meter-out (Port B connected to the actuator outlet in order to control the oil flow from the actuator). The cost effectiveness and the easiness of adjustment make it suitable for many circuits and many applications where a non-compensated flow control is desired.

**Ordering code**

**OE.21.01.04.02**

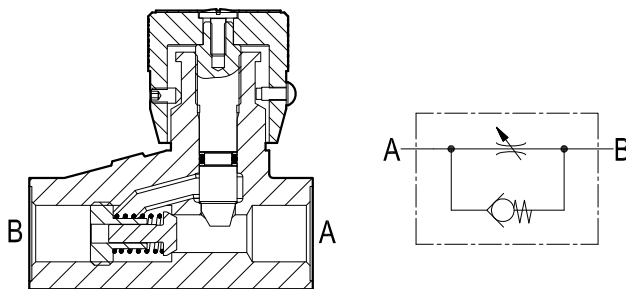
Adjustable restrictors with ball type reverse flow check

Type	Material number	Type	Material number	Type	Material number
OE2101040200000	R934001678				

Flow control valves

## Adjustable restrictors with poppet type reverse flow check

RU Series

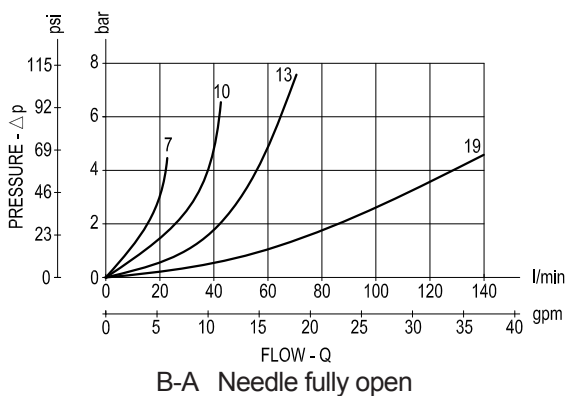
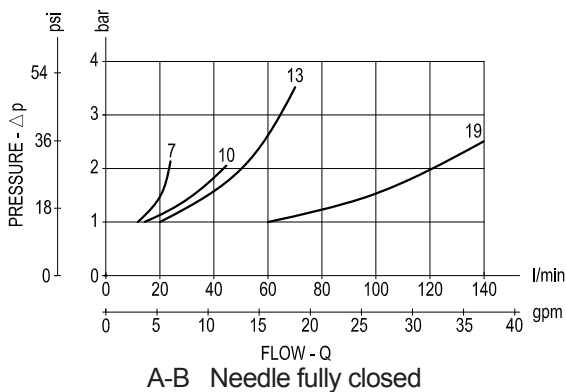


### Description

With flow from B to A this line mounted valve provides a fully adjustable orifice restriction. Pressure compensation is not provided and flow depends from pressure drop and oil viscosity.

Free flow is allowed from A to B by an incorporated check valve, when pressure at A rises above the spring bias pressure and the poppet is pushed from the seat.

### Performance



### Technical data

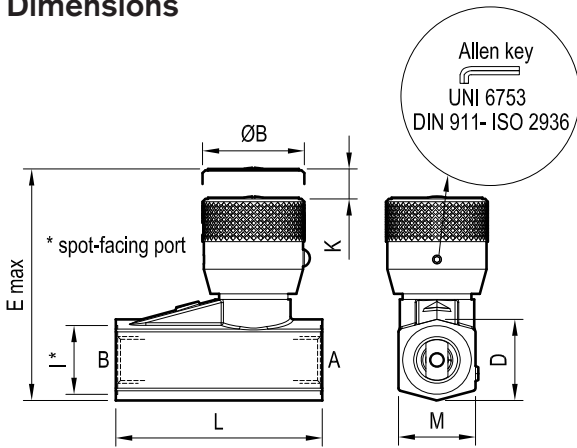
Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
RU 7	350 (5000)	25 (7)	0.28 (0.62)
RU 10	350 (5000)	45 (12)	0.48 (1.06)
RU 13	350 (5000)	70 (19)	0.85 (1.87)
RU 19	350 (5000)	140 (37)	1.58 (3.48)

Cast iron, zinc plated with aluminium hand knob

### Advantages

- Compact design.
- Four sizes provide great adaptability to the system.
- Fine adjustment.

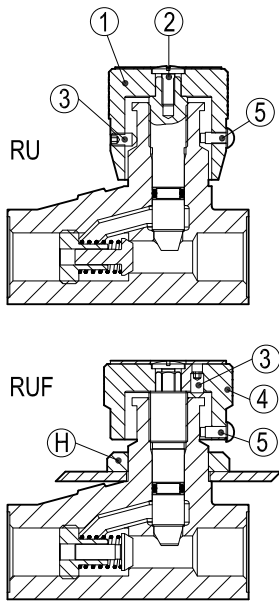
**Dimensions**



**Ports size / Dimensions**

Code	Ports size A-B	I* mm (inches)	L mm (inches)	Ø B mm (inches)	E max mm (inches)	D mm (inches)	M mm (inches)
RU 7	G 1/4	21 (0.83)	64 (2.52)	31 (1.22)	70.5 (2.78)	24 (0.95)	24 (0.95)
RU 10	G 3/8	25 (0.98)	75 (2.95)	37 (1.46)	81 (3.19)	30 (1.18)	28 (1.10)
RU 13	G 1/2	29 (1.14)	92 (3.62)	42 (1.65)	104 (4.09)	36 (1.42)	35 (1.38)
RU 19	G 3/4	36.5 (1.44)	115 (3.62)	50 (1.97)	134 (5.28)	43 (1.69)	43 (1.69)

The RU series valves can be converted into panel mounted version (like RUF) by removing and adding the items here indicated.



code	Remove from RU valve				Add For panel mounting			
	Screw (3)	Rivet (5)	Screw (2)	Hand Knob (1)	Ring Nut (H)	Hand Knob (4)	Screw (3)	Rivet (5)
RU 7 RUF 7	M3 x 6 UNI 5927.67 code: 0771432.01	4M x 6.5 code: 0771352.01	M4 x 10 code: 0771432.04	077:1431.01	20 x 1 code: 0811131.16	081:1431.05	M3 x 6 UNI 5927.67 code: 0771432.01	4M x 6.5 code: 0771352.01
RU 10 RUF 10	M4 x 8 UNI 5927.67 code: 0781432.02	4M x 8 code: 0781352.02	M4 x 10 code: 0771432.04	078:1431.02	25 x 1.5 code: 0821131.17	082:1431.06	M4 x 8 UNI 5927.67 code: 0781432.02	6M x 8 code: 0781352.02
RU 13 RUF 13	M4 x 8 UNI 5927.67 code: 0781432.02	4M x 8 code: 0781352.02	M5 x 12 0791432.05	079:1431.03	30 x 1.5 code: 0831131.18	083:1431.07	M4 x 8 UNI 5927.67 code: 0781432.02	6M x 8 code: 0781352.02
RU 19 RUF 19	M5 x 10 UNI 5927.67 code: 0801432.03	10M x 9.5 code: 0801352.03	M5 x 12 + rivet Ø 5 (0.20) UNI 6593-69 code: 0791432.05	080:1431.04	35 x 1.5 code: 0841131.19	084:1431.08	M5 x 10 UNI 5927.67 code: 0801432.03	10M x 9.5 code: 0801352.03

**Ordering code**



series 7	=	<b>7</b>
series 10	=	<b>10</b>
series 13	=	<b>13</b>
series 19	=	<b>19</b>

Adj. travel (only bar value see below)

	RU 7	RU 10	RU 13	RU 19
K mm (inch)	7 (0.28)	8 (0.31)	11 (0.43)	14 (0.55)

Cracking pressure (free flow) is always 1 bar (14.5psi)

Type	Material number	Type	Material number	Type	Material number
RU7	R932500550				
RU10	R932500552				
RU13	R932500553				
RU19	R932500554				

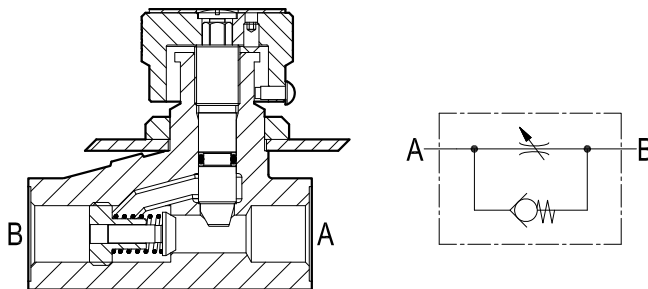
**Applications**

The RU Series valve is a fully and easily adjustable non-compensated flow control which can be employed for meter-in (Port A connected to the actuator inlet) or meter-out (Port B connected to the actuator outlet in order to control the oil flow from the actuator). The easiness of installation and of adjustment make it suitable for many circuits and many applications where a non-compensated flow control is desired.

Flow control valves

## Adjustable restrictors with poppet type reverse flow check

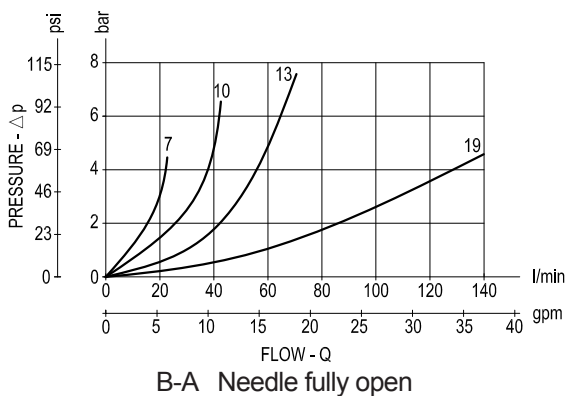
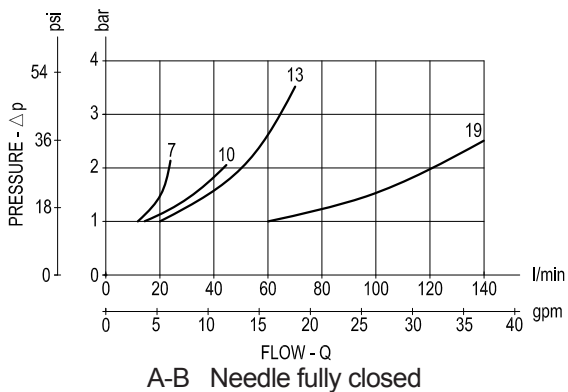
RUF Series



### Description

With flow from B to A this valve provides a fully adjustable orifice restriction. Pressure compensation is not provided and flow depends from pressure drop and oil viscosity. Free flow is allowed from A to B by an incorporated check valve, when pressure at A rises above the spring bias pressure and the poppet is pushed from the seat. This RUF flow restrictor can be line mounted or panel mounted and the hand-knob can be locked after adjustment.

### Performance



### Technical data

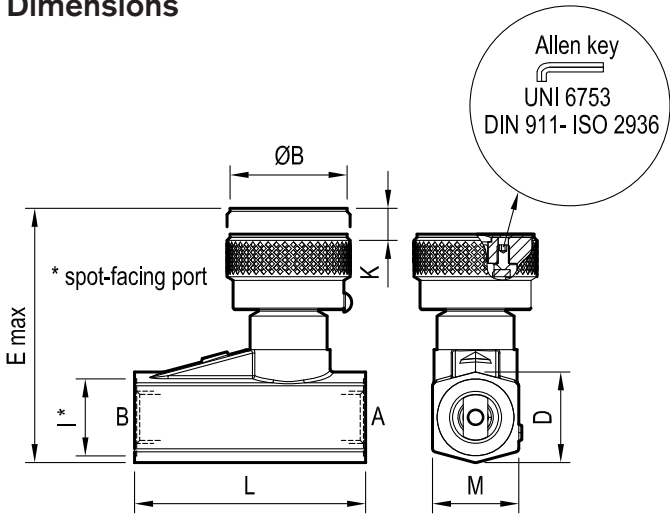
Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
RUF 7	350 (5000)	25 (7)	0.28 (0.62)
RUF 10	350 (5000)	45 (12)	0.48 (1.06)
RUF 13	350 (5000)	70 (19)	0.85 (1.87)
RUF 19	350 (5000)	140 (37)	1.56 (3.48)

Cast iron, zinc plated with aluminium hand knob

### Advantages

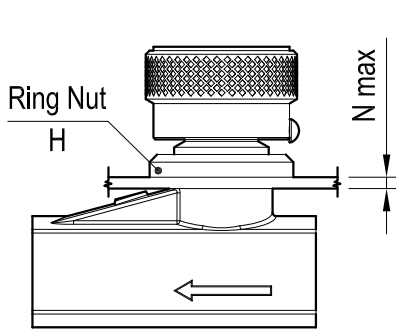
- Compact design.
- Panel mounting.
- Four sizes provide great adaptability to the system.
- Fine adjustment.

**Dimensions**



**Ports size / Dimensions**

Code	Ports size A-B	I* mm (inches)	L mm (inches)	Ø B mm (inches)	E max mm (inches)	D mm (inches)	M mm (inches)
RUF 7	G 1/4	21 (0.83)	64 (2.52)	33 (1.30)	63.5 (2.5)	24 (0.95)	24 (0.95)
RUF 10	G 3/8	25 (0.98)	75 (2.95)	40 (1.58)	73 (2.87)	30 (1.18)	28 (1.10)
RUF 13	G 1/2	29 (1.14)	92 (3.62)	45 (1.77)	93 (3.66)	36 (1.42)	35 (1.38)
RUF 19	G 3/4	36.5 (1.44)	115 (3.62)	53 (2.09)	120 (4.72)	43 (1.69)	43 (1.69)



Code	N max mm (inches)	H
RUF 7	5.5 (0.22)	M20x1
RUF 10	5.5 (0.22)	M25x1.5
RUF 13	7.5 (0.30)	M30x1.5
RUF 19	7.5 (0.30)	M35x1.5

**Applications**

The RUF Series valve is a panel mounted fully and adjustable non-compensated flow control which can be employed for meter-in (Port A connected to the actuator inlet) or meter-out (Port B connected to the actuator outlet in order to control the oil flow from the actuator).The easiness of installation and of adjustment make it suitable for many circuits and many applications where a non-compensated flow control is desired.

**Ordering code**



series 7	=	<b>7</b>
series 10	=	<b>10</b>
series 13	=	<b>13</b>
series 19	=	<b>19</b>

Adj. travel (only bar value see below)

	RUF 7	RUF 10	RUF 13	RUF 19
K mm (inch)	7 (0.28)	8 (0.31)	11 (0.43)	14 (0.55)

Cracking pressure (free flow) is always 1 bar (14.5psi)

Type	Material number	Type	Material number	Type	Material number
RUF7	R932500556				
RUF10	R932500558				
RUF13	R932500559				
RUF19	R932500560				



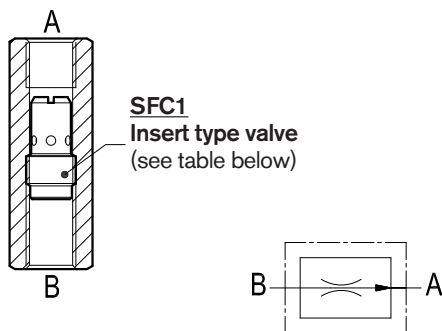
Flow control valves

Pressure compensated fixed setting flow regulators,  
with female sleeve



SFC-FF

OE.F1.01.01-Y-Z



### Description

This valve is composed by a sleeve with an inserted pressure compensated flow regulator cartridge (SFC1); it controls the oil flow from B to A, and prevents it from exceeding the selected value regardless of working pressure, while establishing a minimum pressure differential between the two ports. The inserted cartridge is available in different sizes (as well as the sleeve), and each size is available with different orifices, each one for a pre-determined flow (see "Z" table of Regulated Flow. In the reverse direction, A to B, flow is locked.

### Technical data

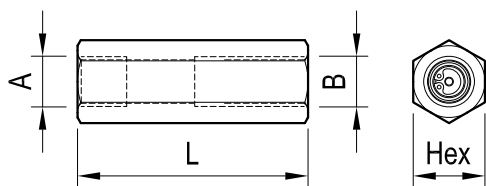
SFC1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
0T.F1.01.00.09...	G 1/4	210 (3000)	10 (3)	0.01 (0.02)
0T.F1.01.00.02...	G 3/8	210 (3000)	16 (4)	0.02 (0.04)
0T.F1.01.00.03...	G 1/2	210 (3000)	45 (12)	0.05 (0.11)

Steel body, zinc plated

### Advantages

- Compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- The inserted flow regulator cartridge can be purchased separately for easy service or for modifications to the original flow adjustment (see data sheet RE 18329-75).

### Dimensions



### Posts size / Dimensions

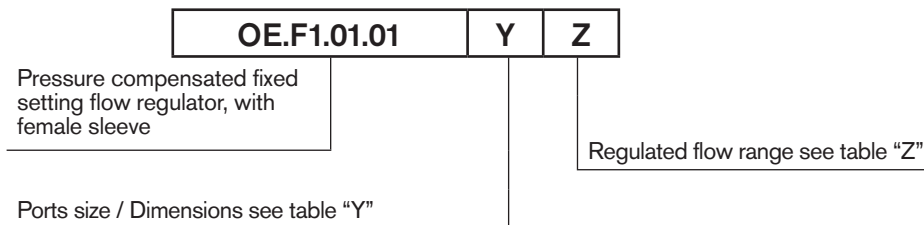
Y	Ports A-B	L mm (inches)	Hex mm (inches)	Sleeve code
09	G 1/4	61 (2.40)	19 (0.75)	OC.51.02.023
02	G 3/8	63 (2.48)	22 (0.87)	OC.51.02.024
03	G 1/2	72.5 (2.85)	27 (1.06)	OC.51.02.025

Z	REGULATED FLOW RANGE (± 10%) at 100 bar (1450 psi) l/min (gpm)									
	01	02	03	04	05	06	07	08	09	10
G 1/4	1 (0.3)	2 (0.5)	3 (0.8)	4 (1.1)	5 (1.3)	6 (1.9)	7 (1.9)	8 (2.1)	9 (2.4)	10 (2.6)
G 3/8	4 (1.1)	5 (1.3)	6 (1.6)	8 (2.1)	10 (2.6)	12 (3.2)	14 (3.7)	16 (4.2)	-	-
G 1/2	12 (3.2)	16 (4.2)	20 (5.3)	25 (6.6)	30 (7.9)	35 (9.3)	40 (10.6)	45 (11.9)	-	-

### Applications

Typical applications are the limitation of the flow into a line; it can also be used as a Meter-OUT device in order to limit the flow out from a one-way working line. The flow, and consequently the maximum actuator speed, will vary slightly with changes in fluid viscosity, but will be largely independent from the load and from the working pressure.

### Ordering code



Type	Material number	Type	Material number	Type	Material number
OEF101010201	R932007157	OEF101010303	R932007167	OEF101010905	R932007151
OEF101010202	R932007158	OEF101010304	R932007168	OEF101010906	R932007152
OEF101010203	R932007159	OEF101010305	R932007169	OEF101010907	R932007153
OEF101010204	R932007160	OEF101010306	R932007170	OEF101010908	R932007154
OEF101010205	R932007161	OEF101010307	R932007171	OEF101010909	R932007155
OEF101010206	R932007162	OEF101010308	R932007172	OEF101010910	R932007156
OEF101010207	R932007163	OEF101010901	R932007147		
OEF101010208	R932007164	OEF101010902	R932007148		
OEF101010301	R932007165	OEF101010903	R932007149		
OEF101010302	R932007166	OEF101010904	R932007150		

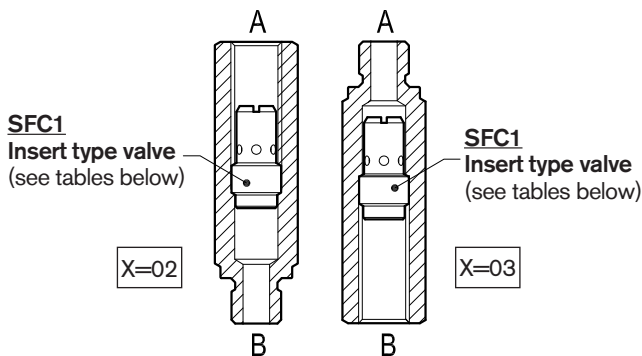
Flow control Valves

Pressure compensated fixed setting flow regulators, with male-female sleeve

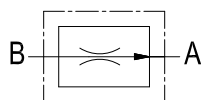


SFC-MF

OE.F1.01-X-Y-Z



X	Male or female regulated port
02	female regulated port A
03	male regulated port A



## Description

This valve is composed by a sleeve with an inserted pressure compensated flow regulator cartridge (SFC1); it controls the oil flow from B to A, and prevents it from exceeding the selected value regardless of working pressure, while establishing a minimum pressure differential between the two ports. The inserted cartridge is available in different sizes (as well as the sleeve), and each size is available with different orifices, each one for a pre-determined flow (see "Z" table of Regulated Flow). In the reverse direction, A to B, flow is locked. The valve can be ordered with MALE "A" port (X = 02), or FEMALE "A" port (X = 03).

## Technical data

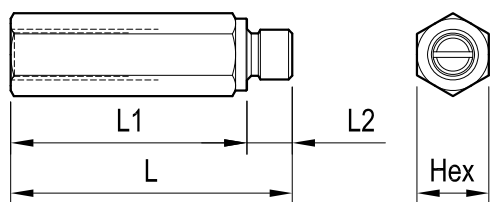
SFC1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
0T.F1.01.00.09...	G 1/4	210 (3000)	10 (3)	0.01 (0.02)
0T.F1.01.00.02...	G 3/8	210 (3000)	16 (4)	0.02 (0.04)
0T.F1.01.00.03...	G 1/2	210 (3000)	45 (12)	0.05 (0.11)

Steel body, zinc plated

## Advantages

- Compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- The inserted flow regulator cartridge can be purchased separately for easy service or for modifications to the original flow adjustment (see data sheet RE 18329-75).

## Dimensions



## Ports size / Dimensions

Y	Ports	L mm (inches)	L1 mm (inches)	L2 mm (inches)	Hex mm (inches)	Sleeve code
09	G 1/4	74.5 (2.93)	62.5 (2.46)	12 (0.47)	19 (0.75)	OC.51.01.072
02	G 3/8	78.5 (3.09)	66.5 (2.62)	12 (0.47)	22 (0.87)	OC.51.01.073
03	G 1/2	93 (3.66)	79 (3.11)	14 (0.55)	27 (1.06)	OC.51.01.074

Z	REGULATED FLOW RANGE ( $\pm 10\%$ ) at 100 bar (1450 psi) l/min (gpm)									
	01	02	03	04	05	06	07	08	09	10
G 1/4	1 (0.3)	2 (0.5)	3 (0.8)	4 (1.1)	5 (1.3)	6 (1.9)	7 (1.9)	8 (2.1)	9 (2.4)	10 (2.6)
G 3/8	4 (1.1)	5 (1.3)	6 (1.6)	8 (2.1)	10 (2.6)	12 (3.2)	14 (3.7)	16 (4.2)	-	-
G 1/2	12 (3.2)	16 (4.2)	20 (5.3)	25 (6.6)	30 (7.9)	35 (9.3)	40 (10.6)	45 (11.9)	-	-

## Applications

Typical applications are the limitation of the flow into a line; it can also be used as a Meter-OUT device in order to limit the flow out from a one-way working line. The flow, and consequently the maximum actuator speed, will vary slightly with changes in fluid viscosity, but will be largely independent from the load and from the working pressure.

## Ordering code

OE.F1.01	X	Y	Z
----------	---	---	---

Pressure compensated fixed setting flow regulators, with male-female sleeve

Regulated flow range see table "Z"

Male e female regulated port see table "X"

Ports size / Dimensions see table "Y"

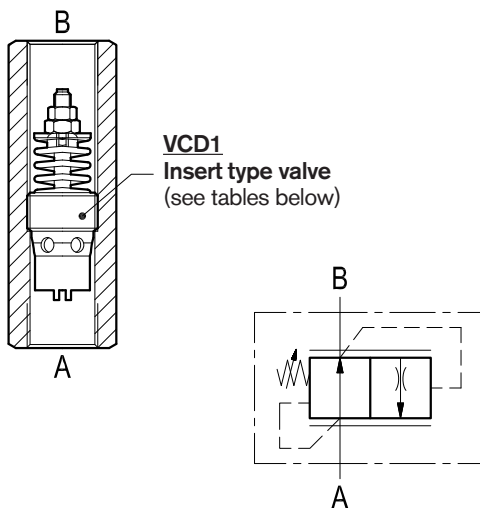
Type	Material number	Type	Material number	Type	Material number
OEF101020201	R932007094	OEF101020905	R932007131	OEF101030307	R932007125
OEF101020202	R932007095	OEF101020906	R932007132	OEF101030308	R932007126
OEF101020203	R932007096	OEF101020907	R932007133	OEF101030901	R932007137
OEF101020204	R932007097	OEF101020908	R932007134	OEF101030902	R932007138
OEF101020205	R932007098	OEF101020909	R932007135	OEF101030903	R932007139
OEF101020206	R932007099	OEF101020910	R932007136	OEF101030904	R932007140
OEF101020207	R932007100	OEF101030201	R932007102	OEF101030905	R932007141
OEF101020208	R932007101	OEF101030202	R932007103	OEF101030906	R932007142
OEF101020301	R932007111	OEF101030203	R932007104	OEF101030907	R932007143
OEF101020302	R932007112	OEF101030204	R932007105	OEF101030908	R932007144
OEF101020303	R932007113	OEF101030205	R932007106	OEF101030909	R932007145
OEF101020304	R932007114	OEF101030206	R932007107	OEF101030910	R932007146
OEF101020305	R932007115	OEF101030207	R932007108		
OEF101020306	R932007116	OEF101030208	R932007109		
OEF101020307	R932007117	OEF101030301	R932007119		
OEF101020308	R932007118	OEF101030302	R932007120		
OEF101020901	R932007127	OEF101030303	R932007121		
OEF101020902	R932007128	OEF101030304	R932007122		
OEF101020903	R932007129	OEF101030305	R932007123		
OEF101020904	R932007130	OEF101030306	R932007124		

Flow control valves

## Pressure compensated partially adjustable flow regulators, with female sleeve

VCDC-H-MC (G1/4 - G3/8)

OE.22.03.01-Y-Z

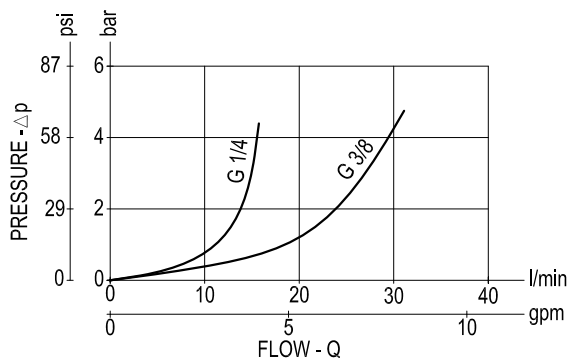


### Description

This valve is composed by a sleeve with an inserted pressure compensated flow regulator cartridge (VCD1); it controls the oil flow from B to A, and prevents it from exceeding the adjusted value regardless of working pressure, while establishing a minimum pressure differential between 3 bar and 8 bar (45 psi and 115 psi) approximately between the two ports. The inserted cartridge is available in different sizes (as well as the sleeve), and each size is available with different orifices, each one for a specific flow range (see Performance Diagram and Flow Range "Z" table). For each selected size and flow range, the pressure compensated flow can be tuned finely by changing the spring load (see table of Dimensions).

In the reverse direction, A to B, the valve behaves as a fixed restriction, and it allows free flow depending from the pressure available (see Performance diagram).

### Performance



### Technical data

VCD1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
OT.F3.01.02.09...	G 1/4	315 (4500)	10 (3)	0.01 (0.02)
OT.F3.01.02.02...	G 3/8	315 (4500)	25 (7)	0.03 (0.07)

Steel body, zinc plated

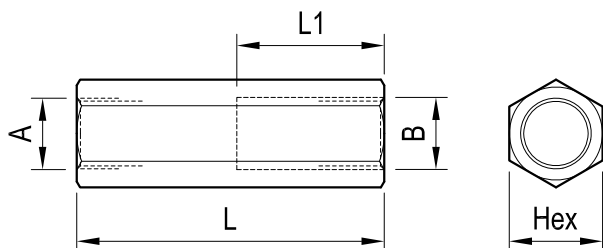
**Special ports available on request.**

Note: the inserted flow regulator cartridge is available with a number of different orifices for different flow ranges, as specified by the "Z" table: when ordering please specify the needed Flow Range ("Z table"), as well as the needed Port Size ("Y table"). Customer tailored flow adjustments are available on request: for details, please consult us.

### Advantages

- Compact design and inline mounting for space saving.
- Mounting position is unrestricted
- The inserted flow regulator cartridge can be purchased separately for easy service or for modifications to the original flow adjustment (see data sheet RE 18329-80).

### Dimensions



### Ports size / Dimensions

Y	Ports A-B	L mm (inches)	L1 mm (inches)	Hex mm (inches)	Sleeve code
09	G 1/4	66 (3.07)	39 (1.54)	19 (0.75)	OC.51.02.006
02	G 3/8	70 (2.76)	42 (1.65)	22 (0.87)	OC.51.02.007

Z	REGULATED FLOW RANGE l/min (gpm)			
	G 1/4	G 3/8	G 1/2	G 3/4
01	-	2.5-4.0 (0.66-1.06)	16-21 (4.23-5.55)	37-50 (9.78-13.21)
02	1-1.6 (0.26-0.43)	4.0-6.3 (1.06-1.67)	21-28 (5.55-7.40)	50-67 (13.21-17.7)
03	1.6-2.5 (0.43-0.66)	6.3-10 (1.67-2.64)	28-37 (7.40-9.78)	67-90 (17.7-23.78)
04	2.5-4.0 (0.66-1.06)	10-16 (2.64-4.23)	37-50 (9.78-13.21)	90-120 (23.78-31.7)
05	4.0-6.3 (1.06-1.67)	16-25 (4.23-6.61)	50-67 (13.21-17.7)	120-150 (31.7-39.63)
06	6.3-10 (1.67-2.64)	-	-	-

### Applications

Typical applications are the control of the maximum speed of an actuator (double or single acting cylinder, or motor), which is generally achieved by regulating the maximum flow out from the actuator (or meter-OUT). The flow, and consequently the maximum actuator speed, will vary slightly with changes in fluid viscosity, but will be largely independent from the load and from the working pressure.

### Ordering code

<b>OE.22.03.01</b>	<b>Y</b>	<b>Z</b>
--------------------	----------	----------

Pressure compensated partially adjustable flow regulators, with female sleeve

Regulated flow range see table "Z"

Ports size / Dimensions see table "Y"

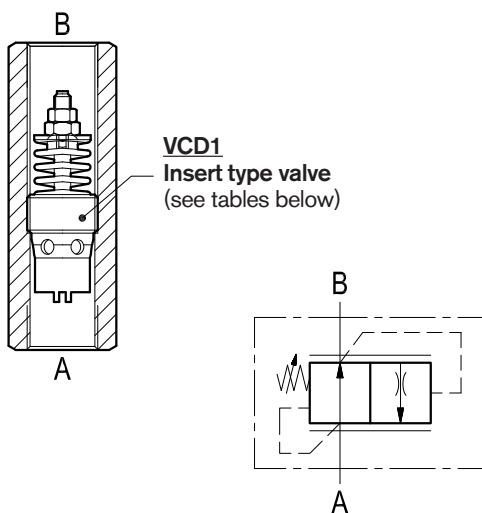
Type	Material number	Type	Material number	Type	Material number
OE2203010902	R932007277				
OE2203010903	R934001704				
OE2203010904	R934001706				
OE2203010905	R934001707				
OE2203010906	R934001709				
OE2203010201	R934003199				
OE2203010202	R934001682				
OE2203010203	R932007278				
OE2203010204	R934001684				
OE2203010205	R934001688				

Flow control valves

## Pressure compensated partially adjustable flow regulators, with female sleeve

VDCD-H-MC (G1/2 - G3/4)

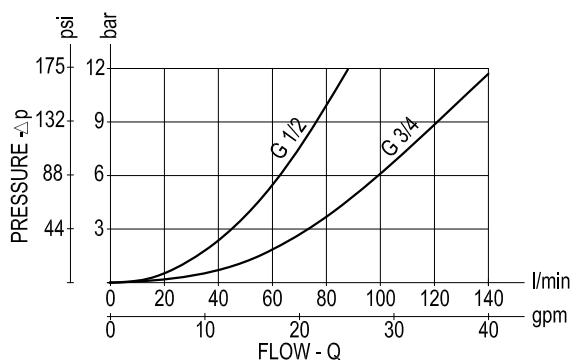
OE.22.03.01-Y-Z



### Description

This valve is composed by a sleeve with an inserted pressure compensated flow regulator cartridge (VCD1); it controls the oil flow from B to A, and prevents it from exceeding the adjusted value regardless of working pressure, while establishing a minimum pressure differential between 3 bar and 8 bar (45 psi and 115 psi) approximately between the two ports. The inserted cartridge is available in different sizes (as well as the sleeve), and each size is available with different orifices, each one for a specific flow range (see Performance Diagram and Flow Range "Z" table). For each selected size and flow range, the pressure compensated flow can be tuned finely by changing the spring load (see table of Dimensions). In the reverse direction, A to B, the valve behaves as a fixed restriction, and it allows free flow depending from the pressure available (see Performance diagram).

### Performance



Note: the inserted flow regulator cartridge is available with a number of different orifices for different flow ranges, as specified by the "Z" table: when ordering please specify the needed Flow Range ("Z table"), as well as the needed Port Size ("Y table"). Customer tailored flow adjustments are available on request: for details, please consult us.

### Advantages

- Compact design and inline mounting for space saving.
- Mounting position is unrestricted
- The inserted flow regulator cartridge can be purchased separately for easy service or for modifications to the original flow adjustment (see data sheet RE 18329-80).

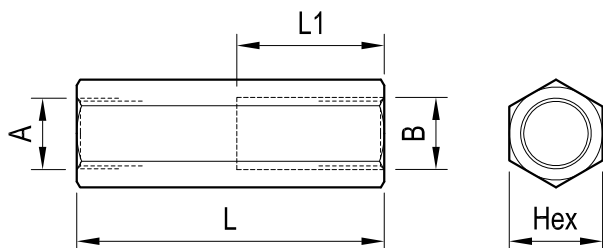
### Technical data

VCD1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
OT.F3.01.02.03...	G 1/2	315 (4500)	67 (18)	0.04 (0.09)
OT.F3.01.02.04...	G 3/4	315 (4500)	150 (40)	0.07 (0.15)

Steel body, zinc plated

Special ports available on request.

### Dimensions



### Ports size / Dimensions

Y	Ports A-B	L mm (inches)	L1 mm (inches)	Hex mm (inches)	Sleeve code
03	G 1/2	80 (3.15)	48 (1.89)	27 (1.06)	OC.51.02.008
04	G 3/4	100 (3.94)	59 (2.32)	32 (1.26)	OC.51.02.009

Z	REGULATED FLOW RANGE l/min (gpm)			
	G 1/4	G 3/8	G 1/2	G 3/4
01	-	2.5-4.0 (0.66-1.06)	16-21 (4.23-5.55)	37-50 (9.78-13.21)
02	1-1.6 (0.26-0.43)	4.0-6.3 (1.06-1.67)	21-28 (5.55-7.40)	50-67 (13.21-17.7)
03	1.6-2.5 (0.43-0.66)	6.3-10 (1.67-2.64)	28-37 (7.40-9.78)	67-90 (17.7-23.78)
04	2.5-4.0 (0.66-1.06)	10-16 (2.64-4.23)	37-50 (9.78-13.21)	90-120 (23.78-31.7)
05	4.0-6.3 (1.06-1.67)	16-25 (4.23-6.61)	50-67 (13.21-17.7)	120-150 (31.7-39.63)
06	6.3-10 (1.67-2.64)	-	-	-

### Applications

Typical applications are the control of the maximum speed of an actuator (double or single acting cylinder, or motor), which is generally achieved by regulating the maximum flow out from the actuator (or meter-OUT). The flow, and consequently the maximum actuator speed, will vary slightly with changes in fluid viscosity, but will be largely independent from the load and from the working pressure.

### Ordering code

<b>OE.22.03.01</b>	<b>Y</b>	<b>Z</b>
--------------------	----------	----------

Pressure compensated partially adjustable flow regulators, with female sleeve

Regulated flow range see table "Z"

Ports size / Dimensions see table "Y"

Type	Material number	Type	Material number	Type	Material number
OE2203010301	R934001694				
OE2203010302	R934001695				
OE2203010303	R934001697				
OE2203010304	R934001699				
OE2203010305	R934001700				
OE2203010401	R932007279				
OE2203010402	R934001701				
OE2203010403	R934001702				
OE2203010404	R932007280				
OE2203010405	R932007281				



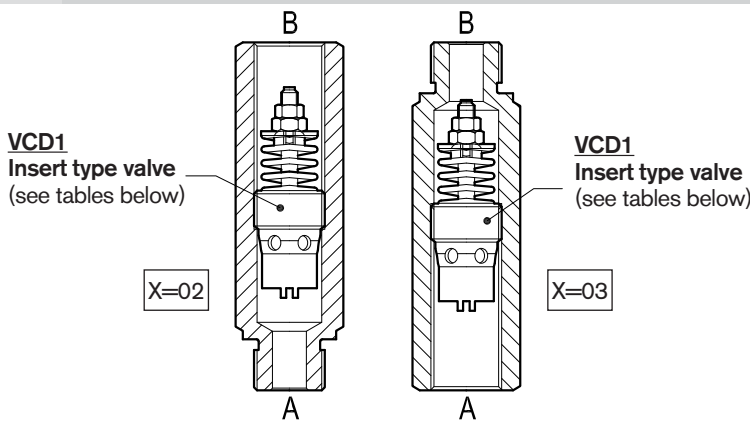
Flow control valves

## Pressure compensated partially adjustable flow regulators, with male-female sleeve

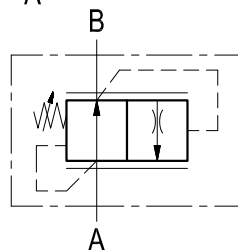


VDCD-H-MF (G1/4 - G3/8)

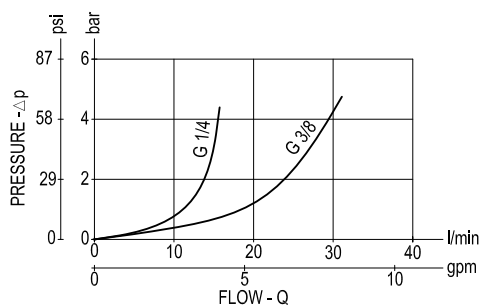
OE.22.03-X-Y-Z



X	Male or female regulated port
02	female regulated port B
03	male regulated port B



### Performance



Note: the inserted flow regulator cartridge is available with a number of different orifices for different flow ranges, as specified by the "Z" table: when ordering please specify the needed Flow Range ("Z table"), as well as the needed Port Size ("Y table"). Customer tailored flow adjustments are available on request: for details, please consult us.

### Advantages

- Compact design and inline mounting for space saving.
- Mounting position is unrestricted
- The inserted flow regulator cartridge can be purchased separately for easy service or for modifications to the original flow adjustment (see data sheet RE 18329-80).

### Description

This valve is composed by a sleeve with an inserted pressure compensated flow regulator cartridge (VCD1); it controls the oil flow from B to A, and prevents it from exceeding the adjusted value regardless of working pressure, while establishing a minimum pressure differential between 3 bar and 8 bar (45 psi and 115 psi) approximately between the two ports. The inserted cartridge is available in different sizes (as well as the sleeve), and each size is available with different orifices, each one for a specific flow range (see Performance Diagram and Flow Range "Z" table). For each selected size and flow range, the pressure compensated flow can be tuned finely by changing the spring load (see table of Dimensions).

In the reverse direction, A to B, the valve behaves as a fixed restriction, and it allows free flow depending from the pressure available (see Performance diagram).

The valve can be ordered with MALE "A" port (X = 02), or FEMALE "A" port (X = 03).

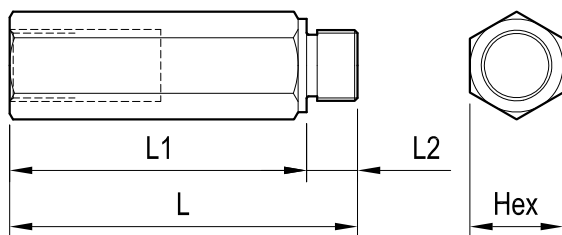
### Technical data

VCD1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
0T.F3.01.02.09...	G 1/4	315 (4500)	10 (3)	0.01 (0.02)
0T.F3.01.02.02...	G 3/8	315 (4500)	25 (7)	0.03 (0.07)

Steel body, zinc plated

Special ports available on request.

### Dimensions



### Ports size / Dimensions

Y	Ports	L mm (inches)	L1 mm (inches)	L2 mm (inches)	Hex mm (inches)	Sleeve code
09	G 1/4	78 (3.07)	66 (2.60)	12 (0.47)	19 (0.75)	OC.51.01.025
02	G 3/8	82 (3.23)	70 (2.76)	12 (0.47)	22 (0.87)	OC.51.01.026

Z	REGULATED FLOW RANGE l/min (gpm)			
	G 1/4	G 3/8	G 1/2	G 3/4
01	-	2.5-4.0 (0.66-1.06)	16-21 (4.23-5.55)	37-50 (9.78-13.21)
02	1-1.6 (0.26-0.42)	4.0-6.3 (1.06-1.67)	21-28 (5.55-7.40)	50-67 (13.21-17.7)
03	1.6-2.5 (0.42-0.66)	6.3-10 (1.67-2.64)	28-37 (7.40-9.78)	67-90 (17.7-23.78)
04	2.5-4.0 (0.66-1.06)	10-16 (2.64-4.23)	37-50 (9.78-13.21)	90-120 (23.78-31.7)
05	4.0-6.3 (1.06-1.66)	16-25 (4.23-6.61)	50-67 (13.21-17.7)	120-150 (31.7-39.63)
06	6.3-10 (1.66-2.64)	-	-	-

### Applications

Typical applications are the control of the maximum speed of an actuator (double or single acting cylinder, or motor), which is generally achieved by regulating the maximum flow out from the actuator (or meter-OUT). The flow, and consequently the maximum actuator speed, will vary slightly with changes in fluid viscosity, but will be largely independent from the load and from the working pressure.

### Ordering code

<b>OE.22.03</b>	<b>X</b>	<b>Y</b>	<b>Z</b>
-----------------	----------	----------	----------

Pressure Compensated partially adjustable flow regulators, with male-female sleeve

Regulated flow range see table "Z"

Male or female regulated port see table "X"

Ports size / Dimensions see table "Y"

Type	Material number	Type	Material number	Type	Material number
OE2203020201	R934003432	OE2203030201	R931000446		
OE2203020202	R932007287	OE2203030202	R931000447		
OE2203020203	R932007288	OE2203030203	R931000449		
OE2203020204	R932007289	OE2203030204	R931000450		
OE2203020205	R932007290	OE2203030205	R934001715		
OE2203020902	R934003200	OE2203030902	R932007285		
OE2203020903	R932007282	OE2203030903	R931000440		
OE2203020904	R934003433	OE2203030904	R931000442		
OE2203020905	R932007283	OE2203030905	R931000444		
OE2203020906	R932007284	OE2203030906	R932007286		

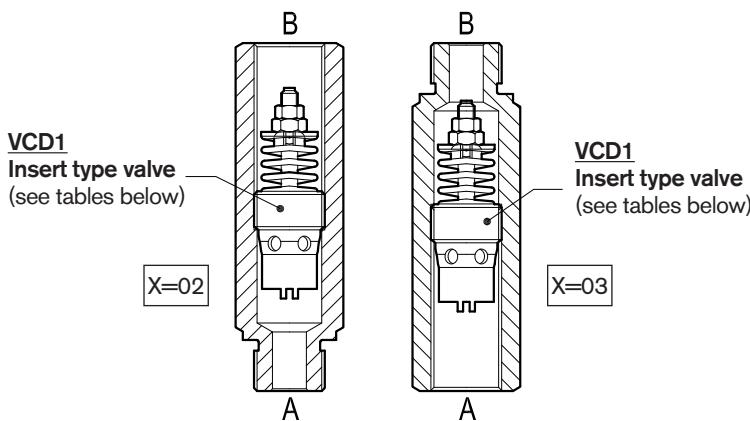
Flow control valves

## Pressure compensated partially adjustable flow regulators, with male-female sleeve

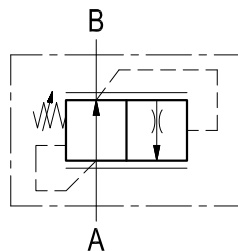


VCDC-H-MF (G1/2 - G3/4)

OE.22.03-X-Y-Z



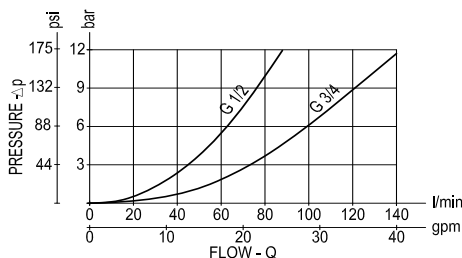
X	Male or female regulated port
02	female regulated port B
03	male regulated port B



### Description

This valve is composed by a sleeve with an inserted pressure compensated flow regulator cartridge (VCD1); it controls the oil flow from B to A, and prevents it from exceeding the adjusted value regardless of working pressure, while establishing a minimum pressure differential between the two ports. The inserted cartridge is available in different sizes (as well as the sleeve), and each size is available with different orifices, each one for a specific flow range (see Performance Diagram and Flow Range "Z" table). For each selected size and flow range, the pressure compensated flow can be tuned finely by changing the spring load (see table of Dimensions). In the reverse direction, A to B, the valve behaves as a fixed restriction, and it allows free flow depending from the pressure available (see Performance diagram). The valve can be ordered with MALE "A" port (X = 02), or FEMALE "A" port (X = 03).

### Performance



Note: the inserted flow regulator cartridge is available with a number of different orifices for different flow ranges, as specified by the "Z" table: when ordering please specify the needed Flow Range ("Z table"), as well as the needed Port Size ("Y table").

Customer tailored flow adjustments are available on request: for details, please consult us.

### Advantages

- Compact design and inline mounting for space saving.
- Mounting position is unrestricted
- The inserted flow regulator cartridge can be purchased separately for easy service or for modifications to the original flow adjustment (see data sheet RE 18329-80).

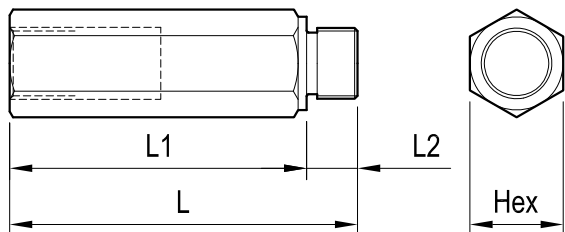
### Technical data

VCD1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
0T.F3.01.02.03...	G 1/2	315 (4568)	67 (18)	0.04 (0.09)
0T.F3.01.02.04...	G 3/4	315 (4568)	150 (40)	0.07 (0.15)

Steel body, zinc plated

Special ports available on request.

### Dimensions



### Ports size / Dimensions

Y	Ports	L mm (inches)	L1 mm (inches)	L2 mm (inches)	Hex mm (inches)	Sleeve code
03	G 1/2	96 (3.78)	82 (3.23)	14 (0.55)	27 (1.06)	OC.51.01.027
04	G 3/4	110 (4.33)	94 (3.70)	16 (0.63)	32 (1.26)	OC.51.01.028

Z	REGULATED FLOW RANGE l/min (gpm)			
	G 1/4	G 3/8	G 1/2	G 3/4
01	-	2.5-4.0 (0.66-1.06)	16-21 (4.23-5.55)	37-50 (9.78-13.21)
02	1-1.6 (0.26-0.42)	4.0-6.3 (1.06-1.67)	21-28 (5.55-7.40)	50-67 (13.21-17.7)
03	1.6-2.5 (0.42-0.66)	6.3-10 (1.67-2.64)	28-37 (7.40-9.78)	67-90 (17.7-23.78)
04	2.5-4.0 (0.66-1.06)	10-16 (2.64-4.23)	37-50 (9.78-13.21)	90-120 (23.78-31.7)
05	4.0-6.3 (1.06-1.66)	16-25 (4.23-6.61)	50-67 (13.21-17.7)	120-150 (31.7-39.63)
06	6.3-10 (1.66-2.64)	-	-	-

### Applications

Typical applications are the control of the maximum speed of an actuator (double or single acting cylinder, or motor), which is generally achieved by regulating the maximum flow out from the actuator (or meter-OUT). The flow, and consequently the maximum actuator speed, will vary slightly with changes in fluid viscosity, but will be largely independent from the load and from the working pressure.

### Ordering code

OE.22.03	X	Y	Z
----------	---	---	---

Pressure compensated partially adjustable flow regulators, with male-female sleeve

Regulated flow range see table "Z"

Male or female regulated port see table "X"

Ports size / Dimensions see table "Y"

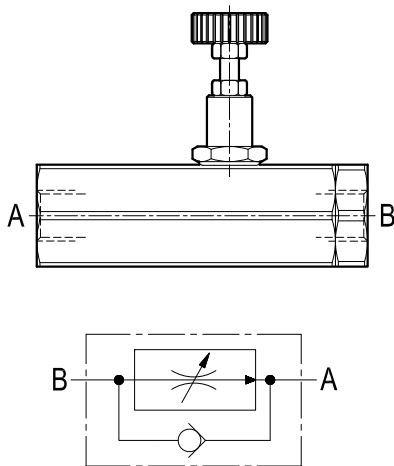
Type	Material number	Type	Material number	Type	Material number
OE2203020301	R932007291	OE2203030301	R932007295		
OE2203020302	R934001711	OE2203030302	R934001716		
OE2203020303	R932007292	OE2203030303	R931000432		
OE2203020304	R932007293	OE2203030304	R931000434		
OE2203020305	R932007294	OE2203030305	R931001457		
OE2203020401	R932007296	OE2203030401	R934001717		
OE2203020402	R934001712	OE2203030402	R932007298		
OE2203020403	R934001713	OE2203030403	R932007299		
OE2203020404	R934001714	OE2203030404	R934001718		
OE2203020405	R932007297	OE2203030405	R932007300		

Flow control valves

## Pressure compensated adjustable flow regulator with reverse flow check



VCST (G1/4) Series



### Description

This pressure compensated flow regulator controls the oil flow from B to A, and prevents it from exceeding the adjusted value regardless of working pressure, while establishing a minimum pressure differential of approximately 5 bar (75 psi) between the two ports. The valve is available in different sizes and versions for different flow ranges, as specified by the tables of the Technical data, Dimensions and Performance diagrams. The fine setting of the output flow at A can be achieved by rotating the hand knob which can be locked in position by the locking nut in order to prevent inadvertent changes. Unrestricted reverse flow "A-B" is permitted through a check valve with zero cracking pressure, regardless of valve adjustment.

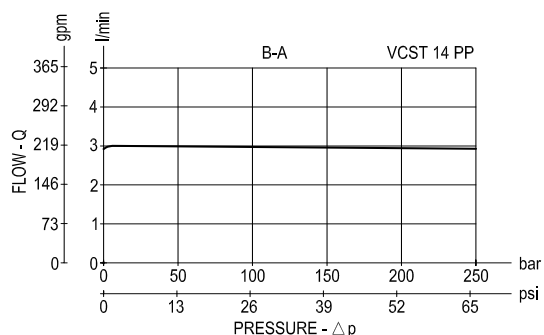
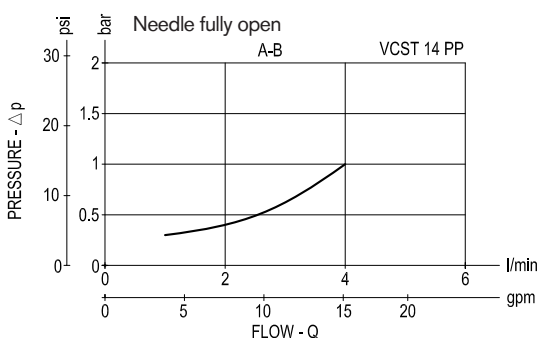
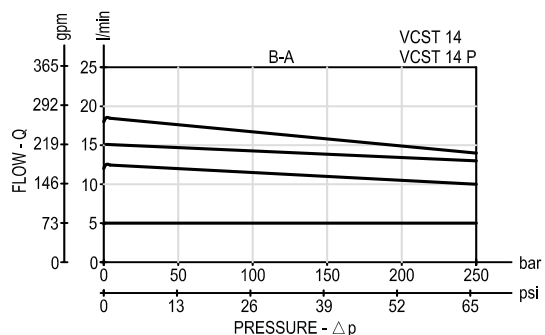
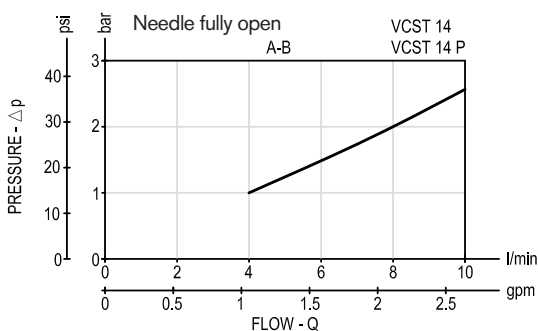
3

### Technical data

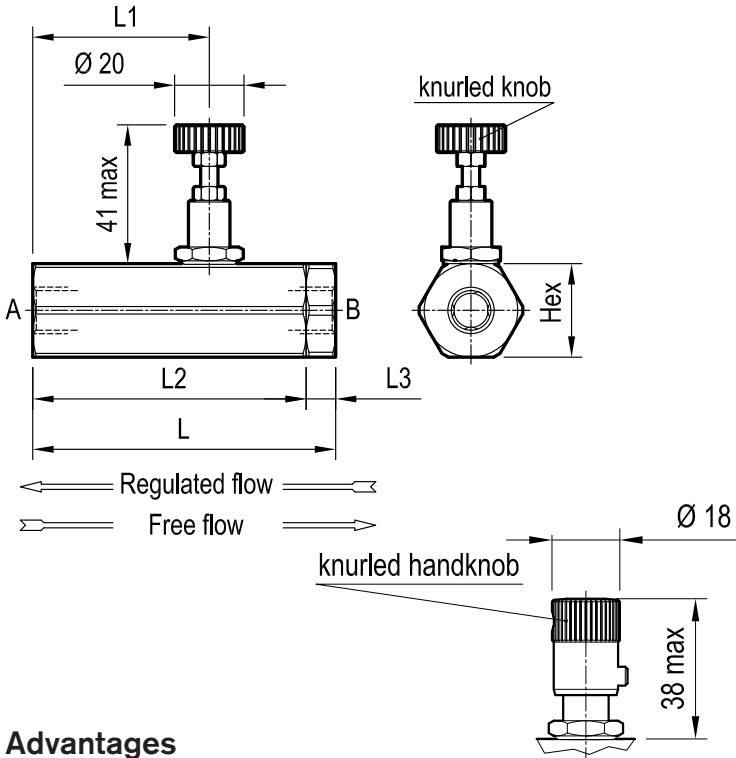
Code	Pressure P max bar (psi)	Flow Q l/min (gpm)	Weight kg (lbs)
VCST 14	250 (3600)	4 - 10 (1 - 3)	0.35 (0.77)
VCST 14 P		1 - 4 (0.3 - 1)	
VCST 14 PP			

Steel body, zinc plated

### Performance



**Dimensions**



**Ports size / Dimensions**

	VCST 14	VCST 14 P	VCST 14 PP
knurled knob	x		x
hand knob		x	
Port size A-B	G 1/4		
L mm (inches)	87.5 (3.45)		
L3 mm (inches)	8.5 (0.34)		
L2 mm (inches)	79 (3.11)		
L1 mm (inches)	51 (2.01)		
Hex mm (inches)	27 (1.06)		

The " I " version is stainless steel made.

**Advantages**

- Compact design and inline mounting for space saving.
- Flow setting can be locked by the locking nut.
- Mounting position is unrestricted.
- Zero cracking pressure for free reverse flow "A-B".
- Three sizes, each with hand knob or knurled hand knob, provide great adaptability to the system.

**Ordering code**



series 14	= 14	G 1/4 Standard version with knob
series 14 P	= 14 P	G 1/4 Standard version with handknob
series 14 PP	= 14 PP	G 1/4 Low flow version with knob

**Application**

The VCST is a normally open, two ports, restrictive type flow regulator, with incorporated check valve for free reverse flow. Typical applications are the control of the maximum speed of an actuator (cylinder or motor), which is achieved by regulating the maximum flow A into or out from the actuator (meter-IN, or meter-OUT). The maximum flow, and consequently the maximum actuator speed, will vary slightly with changes in fluid viscosity, but will be largely independent from the load and from the working pressure. If the valve is used to control the flow from a constant flow line, only the regulated flow will pass through the valve; any excess flow will normally be forced out of the line and delivered to tank through the system relief valve.

Type	Material number
VCST-14	R932500617
VCST-14P	R932500619
VCST-14PP	R932500620

Type	Material number

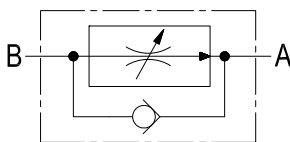
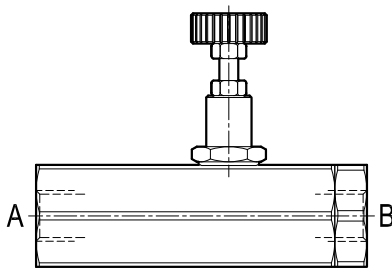
Type	Material number

Flow control valves

## Pressure compensated adjustable flow regulator with reverse flow check



VCST (G 3/8) Series



### Description

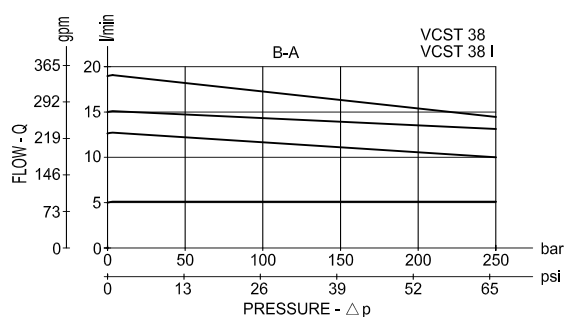
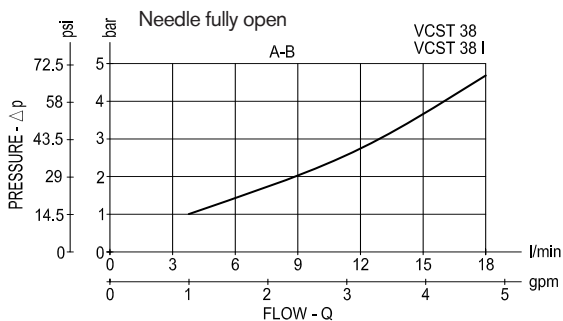
This pressure compensated flow regulator controls the oil flow from B to A, and prevents it from exceeding the adjusted value regardless of working pressure, while establishing a minimum pressure differential of approximately 5 bar (75 psi) between the two ports. The valve is available in different sizes and versions for different flow ranges, as specified by the tables of the Technical data, Dimensions and Performance diagrams. The fine setting of the output flow at A can be achieved by rotating the hand knob which can be locked in position by the locking nut in order to prevent inadvertent changes. Unrestricted reverse flow "A-B" is permitted through a check valve with zero cracking pressure, regardless of valve adjustment.

### Technical data

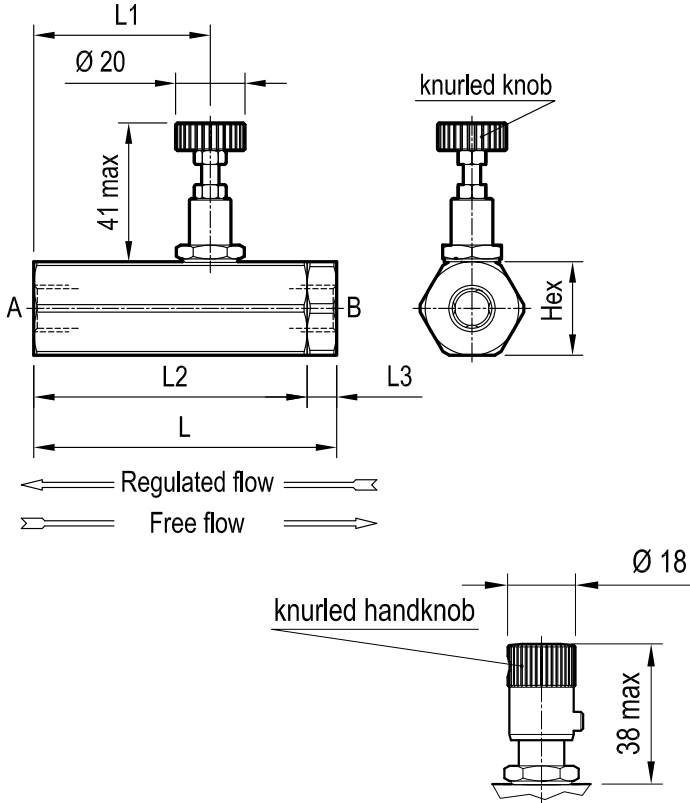
Code	Pressure P max bar (psi)	Flow Q l/min (gpm)	Weight kg (lbs)
VCST 38	250 (3600)	4 - 18 (1 - 5)	0.34 (0.75)
VCST 38 I			

Steel body, zinc plated

### Performance



**Dimensions**



**Ports size / Dimensions**

	VCST 38	VCST 38 I
knurled knob		x
hand knob	x	
Port size A-B	G 3/8	
L mm (inches)	87.5 (3.45)	
L3 mm (inches)	8.5 (0.34)	
L2 mm (inches)	79 (3.11)	
L1 mm (inches)	51 (2.01)	
Hex mm (inches)	27 (1.06)	

The "I" version is stainless steel made.

**Advantages**

- Compact design and inline mounting for space saving.
- Flow setting can be locked by the locking nut.
- Mounting position is unrestricted.
- Zero cracking pressure for free reverse flow "A-B".
- Three sizes, each with hand knob or knurled hand knob, provide great adaptability to the system.

**Ordering code**

VCST - [ ]

series 38	= 38
series 38 I	= 38 I

G 3/8 Standard version with hand knob  
 G 3/8 Stainless version with knob

**Application**

The VCST is a normally open, two ports, restrictive type flow regulator, with incorporated check valve for free reverse flow. Typical applications are the control of the maximum speed of an actuator (cylinder or motor), which is achieved by regulating the maximum flow A into or out from the actuator (meter-IN, or meter-OUT). The maximum flow, and consequently the maximum actuator speed, will vary slightly with changes in fluid viscosity, but will be largely independent from the load and from the working pressure. If the valve is used to control the flow from a constant flow line, only the regulated flow will pass through the valve; any excess flow will normally be forced out of the line and delivered to tank through the system relief valve.

Type	Material number	Type	Material number	Type	Material number
VCST-38	R932500621				
VCST-38I	R932500622				



Flow control valves

## Pressure compensated adjustable flow regulator with reverse flow check

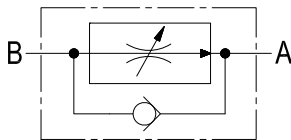
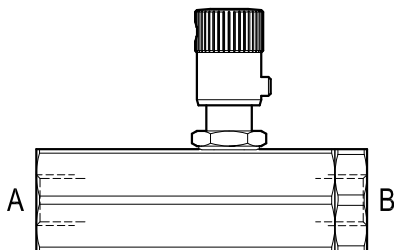


VCST (G 1/2) Series

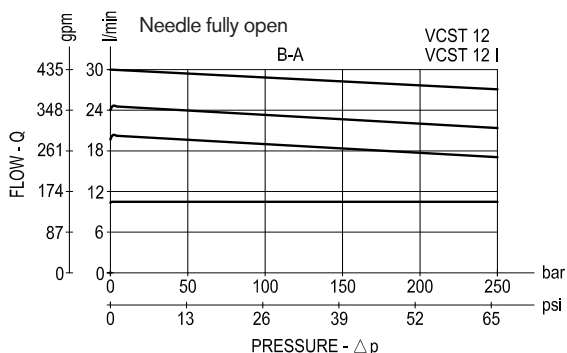
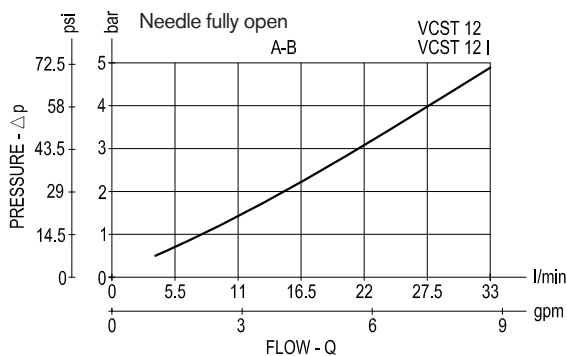
### Description

This pressure compensated flow regulator controls the oil flow from B to A, and prevents it from exceeding the adjusted value regardless of working pressure, while establishing a minimum pressure differential of approximately 5 bar (75 psi) between the two ports. The valve is available in different sizes and versions for different flow ranges, as specified by the tables of the Technical data, Dimensions and Performance diagrams. The fine setting of the output flow at A can be achieved by rotating the hand knob which can be locked in position by the locking nut in order to prevent inadvertent changes. Unrestricted reverse flow "A-B" is permitted through a check valve with zero cracking pressure, regardless of valve adjustment.

3



### Performance



### Technical data

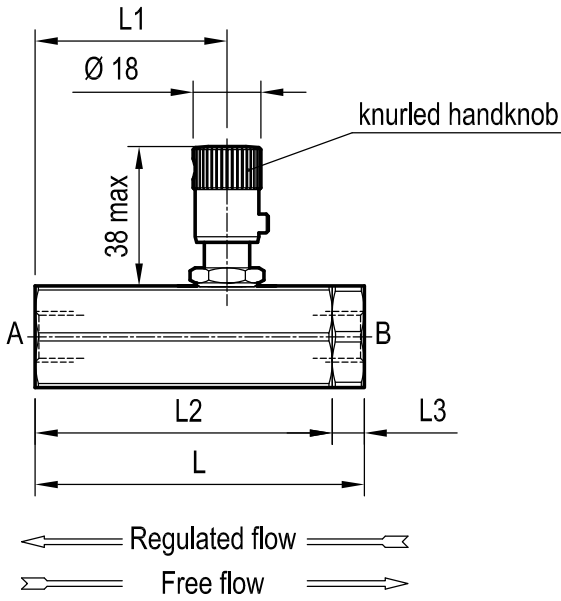
Code	Pressure P max bar (psi)	Flow Q l/min (gpm)	Weight kg (lbs)
VCST 12	250 (3600)	4 - 33 (1 - 9)	0.7 (1.54)
VCST 12 I			

Steel body, zinc plated

### Advantages

- Compact design and inline mounting for space saving.
- Flow setting can be locked by the locking nut.
- Mounting position is unrestricted.
- Zero cracking pressure for free reverse flow "A-B".

**Dimensions**



**Ports size / Dimensions**

	VCST 12	VCST 12 I
Port size A-B	G 1/2	
L mm (inches)	107 (4.21)	
L3 mm (inches)	11 (0.43)	
L2 mm (inches)	96 (3.78)	
L1 mm (inches)	61 (2.40)	
Hex mm (inches)	36 (1.42)	

The "I" version is stainless steel made.

**Ordering code**



series 12	= 12
series 12 I	= 12 I

G 1/2 Standard version with handknob  
 G 1/2 Stainless version with handknob

**Application**

The VCST is a normally open, two ports, restrictive type flow regulator, with incorporated check valve for free reverse flow. Typical applications are the control of the maximum speed of an actuator (cylinder or motor), which is achieved by regulating the maximum flow A into or out from the actuator (meter-IN, or meter-OUT). The maximum flow, and consequently the maximum actuator speed, will vary slightly with changes in fluid viscosity, but will be largely independent from the load and from the working pressure. If the valve is used to control the flow from a constant flow line, only the regulated flow will pass through the valve; any excess flow will normally be forced out of the line and delivered to tank through the system relief valve.

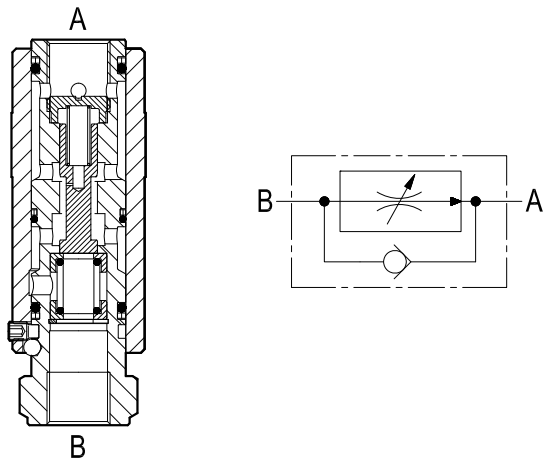
Type	Material number	Type	Material number	Type	Material number
VCST-12	R932500615				
VCST-12I	R932006952				

Flow control valves

## Pressure compensated adjustable flow regulator with reverse flow check

VCD-RU-38

OE.22.01.04.02

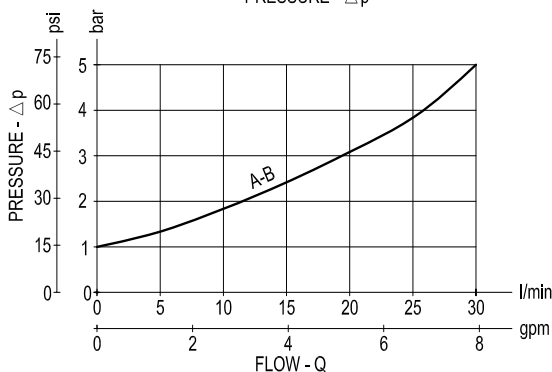
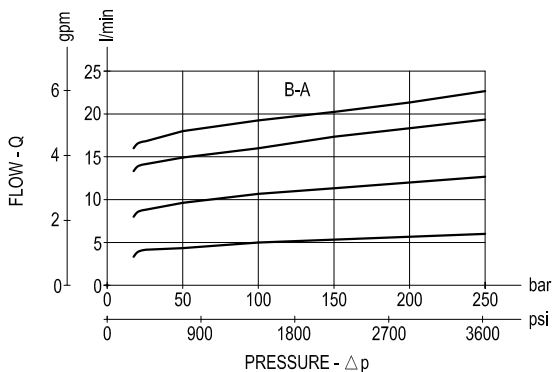


### Description

This line mounted pressure compensated flow regulator limits the flow from B to A to the preset value, regardless of inlet pressure at B port. The internal metering restriction can be enlarged or reduced by rotating the external cylindrical sleeve in the (+) or (-) direction in order to increase or decrease the regulated flow. Once the desired adjustment is achieved, the sleeve can be locked in position by tightening external locking screw (with a 2,5 mm Allen key) in order to prevent inadvertent changes of motion due to line vibrations. Minor leakage "B-A" can be expected with valve fully closed.

Free reverse flow "A-B" is always allowed when pressure at A rises above the spring bias pressure and the poppet is pushed from the seat: cracking pressure is 1 bar.

### Performance



$\Delta p$  curves vs. flow in "A-B" free flow direction.

### Technical data

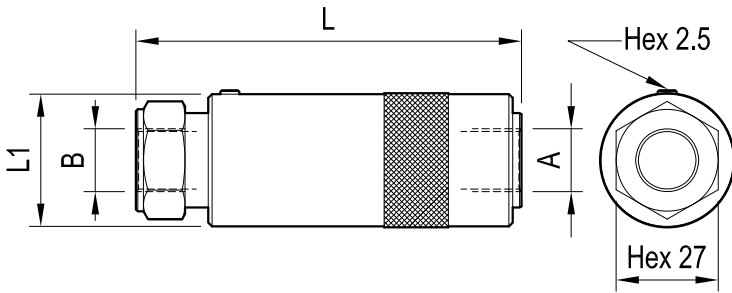
Pressure <b>P</b> max bar (psi)	Flow <b>Q</b> max l/min (gpm)	Weight kg (lbs)
210 (3000)	1-18 (0.26-4.76)	0.33 (0.73)

Steel body, zinc plated

### Advantages

- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.

**Dimensions**



**Ports size / Dimensions**

Ports A-B	L mm (inches)	L1 mm (inches)
G 3/8	102 (4.02)	35 (1.38)

**Applications**

The VCD-RU is a normally open, two ports, restrictive type flow regulator, with incorporated check valve for free reverse flow. Typical applications are the control of the maximum speed of an actuator (cylinder or motor), which is achieved by regulating the maximum flow A into or out from the actuator (meter-IN, or meter-OUT). The maximum flow, and consequently the maximum actuator speed, will vary slightly with changes in fluid viscosity, but will be largely independent from the load and from the working pressure. If the valve is used to control the flow from a constant flow line, only the regulated flow will pass through the valve; any excess flow will normally be forced out of the line and delivered to tank through the system relief valve.

**Ordering code**

**OE.22.01.04.02**

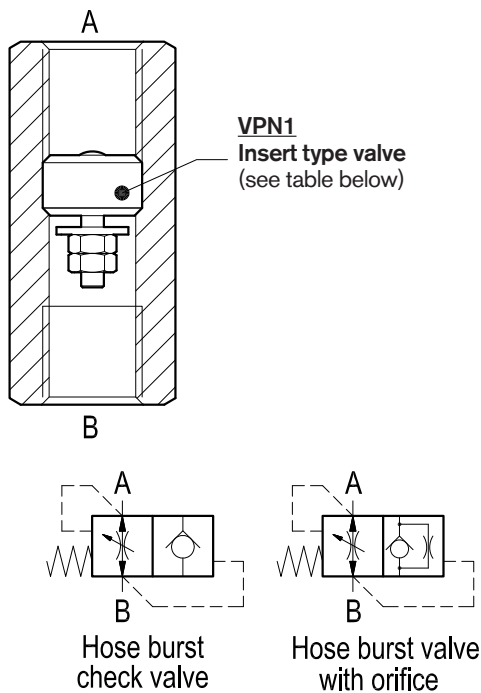
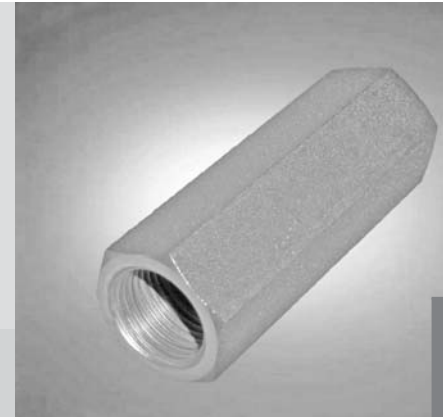
Pressure compensated adjustable flow regulator with reverse flow check

Type	Material number	Type	Material number	Type	Material number
OE2201040200000	R934001680				

## Hose burst insert type check valves With female threaded sleeve

VPN-FF (G1/4 - G3/8)

OE.F4.01.01-Y-Z



### Description

This valve is composed by a sleeve with an inserted "Hose Burst" steel made cartridge type VPN1 (refer to RE 18329-85). Flow is always allowed to pass from A to B according to the  $\Delta p$  curves included in the Performance diagrams. The reverse flow "B" to "A", or reaction flow, is unrestricted up to the pre-set value, above which the pressure drop across the floating disc will push the disc against the valve body, and will determine immediate closing of the line in a checked, leak free mode. The valve will remain closed (checked) from B to A until pressure is removed from the B, or until the A port pressure equalizes the B pressure. To help re-setting, or shorten the time for the disc to go back to the open position, the inserted cartridge can be supplied with the Extra Orifice "F" on request. The orifice diameter has to be specified when ordering (refer to table "Z"). Precision machining and hardening processes allow virtually leak free performance in the checked condition.

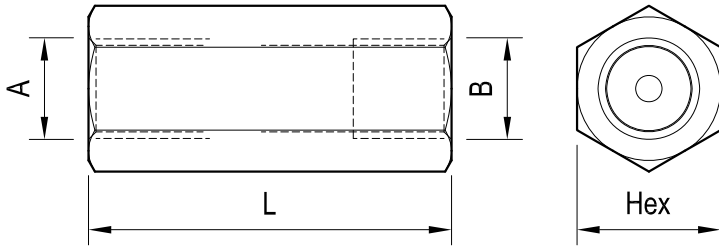
### Technical data

VPN1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
OT.F4.01.03.09...	G 1/4	315 (4568)	4-25 (1-7)	0.01 (0.02)
OT.F4.01.03.02...	G 3/8	315 (4568)	6-50 (2-13)	0.03 (0.07)

Steel body, zinc plated

Special, Metric, UNF: sizes available on request.

**Dimensions**



**Ports size / Dimensions**

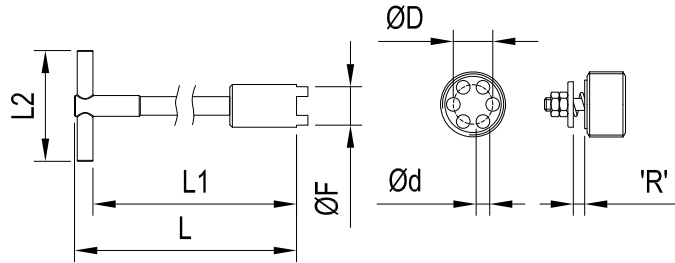
Y	Ports A-B	L mm (inches)	Hex mm (inches)	Sleeve code
09	G 1/4	48 (1.89)	19 (0.75)	OC.51.02.014
02	G 3/8	52 (2.05)	22 (0.87)	OC.51.02.010

**Fitting tool dimension**

Z	ORIFICE DIAMETER mm (inches)		
00	no orifice	06	1 (0.039)
01	0.5 (0.019)	07	1.2 (0.047)
02	0.6 (0.023)	08	1.3 (0.051)
03	0.7 (0.027)	09	1.5 (0.059)
04	0.8 (0.031)	10	1.9 (0.074)
05	0.9 (0.035)	11	2 (0.078)

VPN1 code thread	ØF	L	L1	L2	ØD	Ød	Inst. torque	Tool code
OT.F4.01.03.09... G 1/4	11.3 (0.45)	120 (4.72)	110 (4.33)	60 (2.36)	8.5 (0.34)	2.4 (0.10)	2 Nm (1.5)ft-lb	AVA18
OT.F4.01.03.02... G 3/8	15 (0.59)	120 (4.72)	108 (4.25)	80 (3.15)	10.5 (0.41)	3.5 (0.14)	3 Nm (2)ft-lb	AVA18-01

'R'= GAP corresponding to the maximum desired free flow.



**NOTE**

The complete valve here shown is supplied with the Gap "R" Factory adjusted at 0.5 mm, corresponding to:  
 Approx. (10–14) l/min, for size G 1/4, and  
 Approx. (16–20) l/min, for size G 3/8, depending from oil viscosity.  
 For special settings consult us.

**Important:** the pre-set R gap corresponds to the theoretical shut-off flow; please make sure that the selected shut-off flow is at least 50% higher than the actual Maximum Working Flow, in order to prevent inadvertent valve shutting with cold oil.

**Applications**

In a variety of cases when oil flow must be immediately stopped in case of failure of an hose in order to prevent the load from falling freely. The smallest size G 1/4 is often employed in pressure pick-up lines from cylinders.

**Ordering code**

OE.F4.01.01	Y	Z
-------------	---	---

With female threaded sleeve

Orifice diameter see table "Z"

Ports size / Dimensions see table "Y"

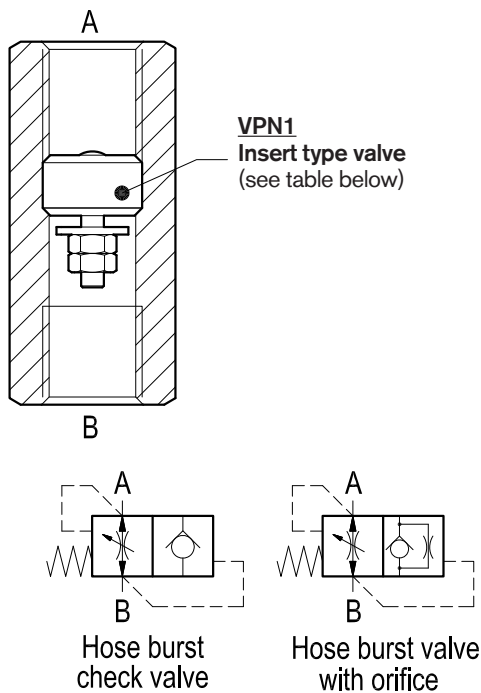
Type	Material number	Type	Material number	Type	Material number
OEF401010200	R931001665	OEF401010210	R932007235	OEF401010908	R932007223
OEF401010201	R932007227	OEF401010211	R932007236	OEF401010909	R932007224
OEF401010202	R932007228	OEF401010900	R931001660	OEF401010910	R932007225
OEF401010203	R932007229	OEF401010901	R932007216	OEF401010911	R932007226
OEF401010204	R932007230	OEF401010902	R932007218		
OEF401010205	R932007231	OEF401010903	R932007219		
OEF401010206	R931001669	OEF401010904	R932007220		
OEF401010207	R932007232	OEF401010905	R932007221		
OEF401010208	R932007233	OEF401010906	R931001663		
OEF401010209	R932007234	OEF401010907	R920207222		

## Hose burst insert type check valves With female threaded sleeve



VPN-FF (G1/2 - G3/4)

OE.F4.01.01-Y-Z



### Description

This valve is composed by a sleeve with an inserted "Hose Burst" steel made cartridge type VPN1 (refer to RE 18329-85). Flow is always allowed to pass from A to B according to the  $\Delta p$  curves included in the Performance diagrams. The reverse flow "B" to "A", or reaction flow, is unrestricted up to the pre-set value, above which the pressure drop across the floating disc will push the disc against the valve body, and will determine immediate closing of the line in a checked, leak free mode. The valve will remain closed (checked) from B to A until pressure is removed from the B, or until the A port pressure equalizes the B pressure. To help re-setting, or shorten the time for the disc to go back to the open position, the inserted cartridge can be supplied with the Extra Orifice "F" on request. The orifice diameter has to be specified when ordering (refer to table "Z"). Precision machining and hardening processes allow virtually leak free performance in the checked condition.

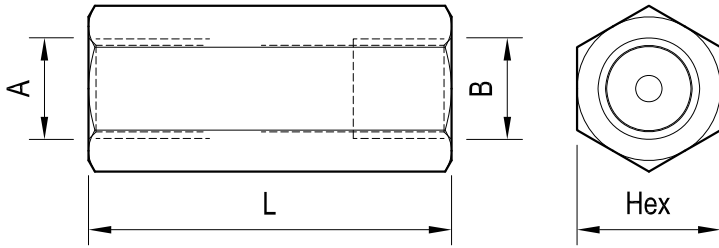
### Technical data

VPN1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
0T.F4.01.03.03...	G 1/2	315 (4500)	16-80 (4-21)	0.04 (0.09)
0T.F4.01.03.04...	G 3/4	315 (4500)	25-150 (7-40)	0.07 (0.15)

Steel body, zinc plated

**Special, Metric, UNF: sizes available on request.**

**Dimensions**



**Ports size / Dimensions**

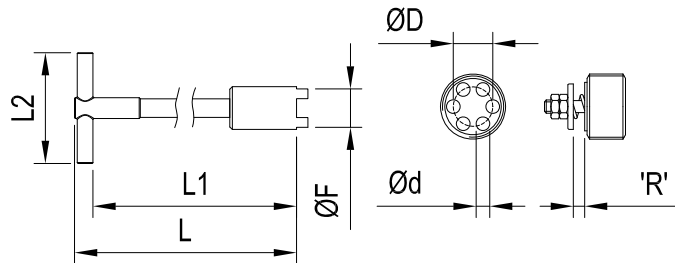
Y	Ports A-B	L mm (inches)	Hex mm (inches)	Sleeve code
03	G 1/2	60 (2.36)	27 (1.06)	OC.51.02.011
04	G 3/4	72 (2.84)	32 (1.26)	OC.51.02.017

**Fitting tool dimension**

Z	ORIFICE DIAMETER mm (inches)		
00	no orifice	06	1 (0.039)
01	0.5 (0.019)	07	1.2 (0.047)
02	0.6 (0.023)	08	1.3 (0.051)
03	0.7 (0.027)	09	1.5 (0.059)
04	0.8 (0.031)	10	1.9 (0.074)
05	0.9 (0.035)	11	2 (0.078)

VPN1 code thread	ØF	L	L1	L2	ØD	Ød	Inst. torque	Tool code
OT.F4.01.03.03... G 1/2	18.8 (0.74)	120 (4.72)	108 (4.25)	80 (3.15)	13 (0.51)	4.5 (0.18)	4 Nm (3)ft-lb	AVA18-02
OT.F4.01.03.04... G 3/4	24 (0.95)	120 (4.72)	108 (4.25)	80 (3.15)	16 (0.63)	6 (0.24)	10 Nm (7)ft-lb	AVA18-03

'R'= GAP corresponding to the maximum desired free flow.



**Applications**

In a variety of cases when oil flow must be immediately stopped in case of failure of an hose in order to prevent the load from falling freely.

**NOTE**

The complete valve here shown is supplied with the Gap "R" Factory adjusted at 0.7 mm, corresponding to:  
 Approx. (32–37) l/min, for size G 1/2 , and  
 Approx. (53–58) l/min, for size G 3/4, depending from oil viscosity.  
 For special settings consult us.

**Important:** the pre-set R gap corresponds to the theoretical shut-off flow: please make sure that the selected shut-off flow is at least 50% higher than the actual Maximum Working Flow, in order to prevent inadvertent valve shutting with cold oil.

**Ordering code**

OE.F4.01.01	Y	Z
-------------	---	---

With female threaded sleeve

Orifice diameter see table "Z"

Ports size / Dimensions see table "Y"

Type	Material number	Type	Material number	Type	Material number
OEF401010300	R931001656	OEF401010310	R932007246	OEF401010408	R932007255
OEF401010301	R932007237	OEF401010311	R932007247	OEF401010409	R932007256
OEF401010302	R932007238	OEF401010400	R931001664	OEF401010410	R932007257
OEF401010303	R932007239	OEF401010401	R932007248	OEF401010411	R932007258
OEF401010304	R932007240	OEF401010402	R932007249		
OEF401010305	R932007241	OEF401010403	R932007250		
OEF401010306	R932007242	OEF401010404	R932007251		
OEF401010307	R932007243	OEF401010405	R932007252		
OEF401010308	R932007244	OEF401010406	R932007253		
OEF401010309	R932007245	OEF401010407	R932007254		

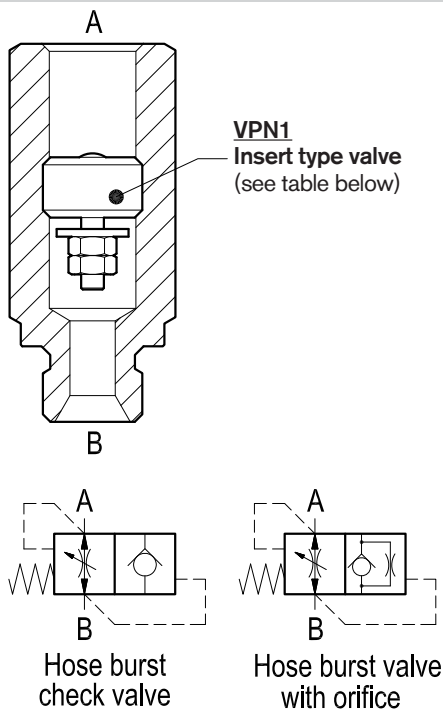


## Hose burst insert type check valves With male-female threaded sleeve



VPN-MF (G1/4 - G3/8)

OE.F4.01.02-Y-Z



### Description

This valve is composed by a sleeve with an inserted "Hose Burst" steel made cartridge type VPN1 (refer to RE 18329-85). Flow is always allowed to pass from A to B according to the  $\Delta p$  curves included in the Performance diagrams. The reverse flow "B" to "A", or reaction flow, is unrestricted up to the pre-set value, above which the pressure drop across the floating disc will push the disc against the valve body, and will determine immediate closing of the line in a checked, leak free mode. The valve will remain closed (checked) from B to A until pressure is removed from the B, or until the A port pressure equalizes the B pressure. To help re-setting, or shorten the time for the disc to go back to the open position, the inserted cartridge can be supplied with the Extra Orifice "F" on request. The orifice diameter has to be specified when ordering (refer to table "Z"). Precision machining and hardening processes allow virtually leak free performance in the checked condition.

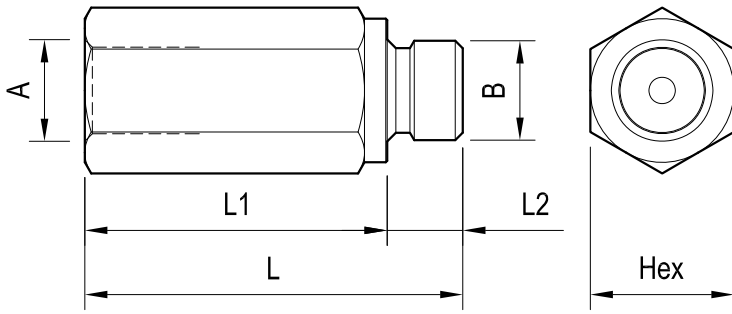
### Technical data

VPN1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
0T.F4.01.03.09...	G 1/4	315 (4500)	4-25 (1-7)	0.01 (0.02)
0T.F4.01.03.02...	G 3/8	315 (4500)	6-50 (2-13)	0.03 (0.07)

Steel body, zinc plated

**Special, Metric, UNF: sizes available on request.**

**Dimensions**



**Ports size / Dimensions**

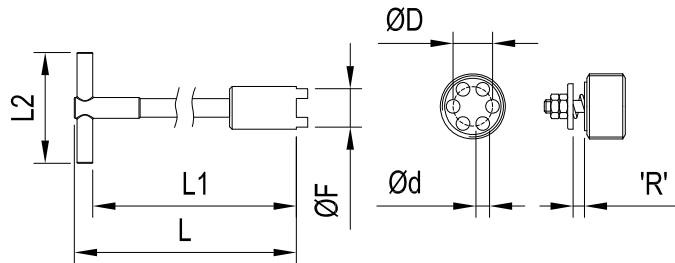
Y	Ports A-B	L mm (inches)	L1 mm (inches)	L2 mm (inches)	Hex mm (inches)	Sleeve code
09	G 1/4	50 (1.97)	40 (1.58)	10 (0.39)	19 (0.75)	OC.51.01.014
02	G 3/8	55 (2.17)	43 (1.69)	12 (0.47)	22 (0.87)	OC.51.01.015

**Fitting tool dimension**

Z	ORIFICE DIAMETER mm (inches)	
00	no orifice	06 1 (0.039)
01	0.5 (0.019)	07 1.2 (0.047)
02	0.6 (0.023)	08 1.3 (0.051)
03	0.7 (0.027)	09 1.5 (0.059)
04	0.8 (0.031)	10 1.9 (0.074)
05	0.9 (0.035)	11 2 (0.078)

VPN1 code thread	ØF	L	L1	L2	ØD	Ød	Inst. torque	Tool code
0T.F4.01.03.09... G 1/4	11.3 (0.45)	120 (4.72)	110 (4.33)	60 (2.36)	8.5 (0.34)	2.4 (0.10)	2 Nm (1.5)ft-lb	AVA18
0T.F4.01.03.02... G 3/8	15 (0.59)	120 (4.72)	108 (4.25)	80 (3.15)	10.5 (0.41)	3.5 (0.14)	3 Nm (2)ft-lb	AVA18-01

'R'= GAP corresponding to the maximum desired free flow.



**NOTE**

The complete valve here shown is supplied with the Gap "R" Factory adjusted at 0.5 mm, corresponding to:  
 Approx. (10 – 14 ) l/min, for size G 1/4 , and  
 Approx. (16 – 20 ) l/min, for size G 3/8, depending from oil viscosity.  
 For special settings consult us.

**Important:** the pre-set R gap corresponds to the theoretical shut-off flow: please make sure that the selected shut-off flow is at least 50% higher than the actual Maximum Working Flow, in order to prevent inadvertent valve shutting with cold oil.

**Applications**

In a variety of cases when oil flow must be immediately stopped in case of failure of an hose in order to prevent the load from falling freely. The smallest size G 1/4 is often employed in pressure pick-up lines from cylinders.

**Ordering code**

OE.F4.01.02	Y	Z
-------------	---	---

With male-female threaded sleeve

Orifice diameter see table "Z"

Ports size / Dimensions see table "Y"

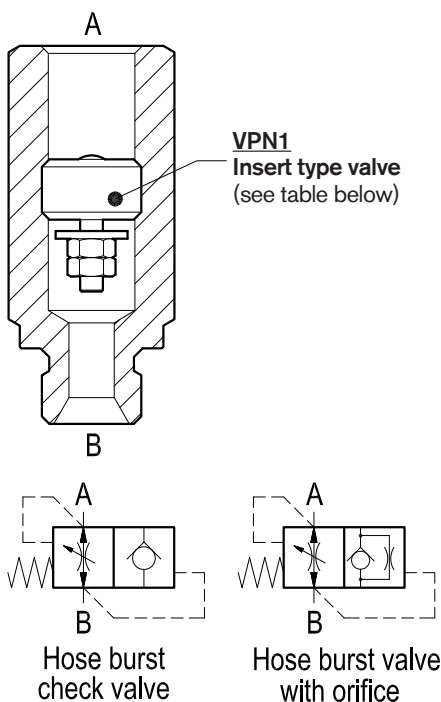
Type	Material number	Type	Material number	Type	Material number
OEF401020200	R931001646	OEF401020210	R932007192	OEF401020908	R932007179
OEF401020201	R932007183	OEF401020211	R932007193	OEF401020909	R932007180
OEF401020202	R932007184	OEF401020900	R931001641	OEF401020910	R932007181
OEF401020203	R932007185	OEF401020901	R932007173	OEF401020911	R932007182
OEF401020204	R932007186	OEF401020902	R932007174		
OEF401020205	R932007187	OEF401020903	R932007175		
OEF401020206	R932007188	OEF401020904	R932007176		
OEF401020207	R932007189	OEF401020905	R932007177		
OEF401020208	R932007190	OEF401020906	R932007217		
OEF401020209	R932007191	OEF401020907	R932007178		

## Hose burst insert type check valves With male-female threaded sleeve



VPN-MF (G1/2 - G3/4)

OE.F4.01.02-Y-Z



### Description

This valve is composed by a sleeve with an inserted "Hose Burst" steel made cartridge type VPN1 (refer to RE 18329-85). Flow is always allowed to pass from A to B according to the  $\Delta p$  curves included in the Performance diagrams. The reverse flow "B" to "A", or reaction flow, is unrestricted up to the pre-set value, above which the pressure drop across the floating disc will push the disc against the valve body, and will determine immediate closing of the line in a checked, leak free mode. The valve will remain closed (checked) from B to A until pressure is removed from the B, or until the A port pressure equalizes the B pressure. To help re-setting, or shorten the time for the disc to go back to the open position, the inserted cartridge can be supplied with the Extra Orifice "F" on request. The orifice diameter has to be specified when ordering (refer to table "Z"). Precision machining and hardening processes allow virtually leak free performance in the checked condition.

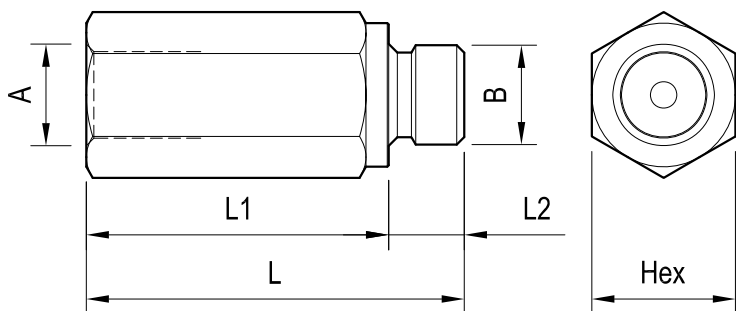
### Technical data

VPN1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
0T.F4.01.03.03...	G 1/2	315 (4500)	16-80 (4-21)	0.04 (0.09)
0T.F4.01.03.04...	G 3/4	315 (4500)	25-150 (7-40)	0.07 (0.15)

Steel body, zinc plated

Special, Metric, UNF: sizes available on request.

### Dimensions



### Ports size / Dimensions

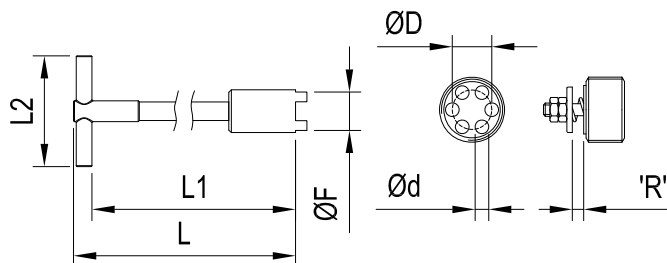
Y	Ports A-B	L mm (inches)	L1 mm (inches)	L2 mm (inches)	Hex mm (inches)	Sleeve code
03	G 1/2	70 (2.76)	56 (2.21)	14 (0.55)	27 (1.06)	OC.51.01.016
04	G 3/4	75 (2.95)	59 (2.32)	16 (0.63)	36 (1.42)	OC.51.01.017

### Fitting tool dimension

Z	ORIFICE DIAMETER mm (inches)	
00	no orifice	06 1 (0.039)
01	0.5 (0.019)	07 1.2 (0.047)
02	0.6 (0.023)	08 1.3 (0.051)
03	0.7 (0.027)	09 1.5 (0.059)
04	0.8 (0.031)	10 1.9 (0.074)
05	0.9 (0.035)	11 2 (0.078)

VPN1 code thread	ØF	L	L1	L2	ØD	Ød	Inst. torque	Tool code
OT.F4.01.03.03... G 1/2	18.8 (0.74)	120 (4.72)	108 (4.25)	80 (3.15)	13 (0.51)	4.5 (0.18)	4 Nm (3)ft-lb	AVA18-02
OT.F4.01.03.04... G 3/4	24 (0.95)	120 (4.72)	108 (4.25)	80 (3.15)	16 (0.63)	6 (0.24)	10 Nm (7)ft-lb	AVA18-03

'R' = GAP corresponding to the maximum desired free flow.



### NOTE

The complete valve here shown is supplied with the Gap "R" Factory adjusted at 0.7 mm, corresponding to:  
 Approx. (32 – 37) l/min, for size G 1/2, and  
 Approx. (53 – 58) l/min, for size G 3/4, depending from oil viscosity.  
 For special settings consult us.

**Important:** the pre-set R gap corresponds to the theoretical shut-off flow:  
 please make sure that the selected shut-off flow is at least 50% higher than the actual Maximum Working Flow, in order to prevent inadvertent valve shutting with cold oil.

### Applications

In a variety of cases when oil flow must be immediately stopped in case of failure of an hose in order to prevent the load from falling freely.

### Ordering code

OE.F4.01.02	Y	Z
-------------	---	---

With male-female threaded sleeve

Orifice diameter see table "Z"

Ports size / Dimensions see table "Y"

Type	Material number	Type	Material number	Type	Material number
OEF401020300	R931001639	OEF401020310	R932007203	OEF401020408	R932007212
OEF401020301	R932007194	OEF401020311	R932007204	OEF401020409	R932007213
OEF401020302	R932007195	OEF401020400	R931001644	OEF401020410	R932007214
OEF401020303	R932007196	OEF401020401	R932007205	OEF401020411	R932007215
OEF401020304	R932007197	OEF401020402	R932007206		
OEF401020305	R932007198	OEF401020403	R932007207		
OEF401020306	R932007199	OEF401020404	R932007208		
OEF401020307	R932007200	OEF401020405	R932007209		
OEF401020308	R932007201	OEF401020406	R932007210		
OEF401020309	R932007202	OEF401020407	R932007211		

# Sleeve valve for line mounting

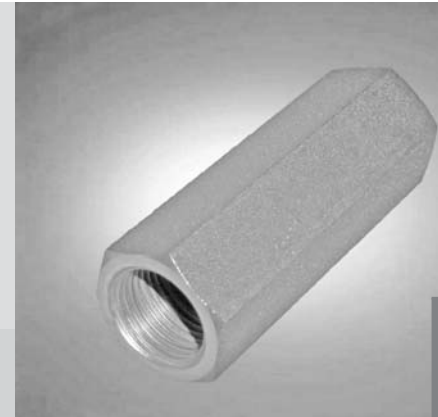
## Check and pilot operated check

Designation	Description	Cavity	Data sheet	Page
Sleeve valves for line mounting poppet type with insert, female-female threaded sleeve	VUH-FF	G 1/4; G 3/8; G 1/2	18316-33	649
Sleeve valves for line mounting poppet type with insert, male-female threaded sleeve	VUH-MF	G 1/4; G 3/8; G 1/2	18316-34	651
Sleeve valves for line mounting ball type with insert, female threaded sleeve	VULN-FF	G 1/4; G 3/8; G 1/2; G 3/4	18316-31	653
Sleeve valves for line mounting ball type with insert, male-female threaded sleeve	VULN-MF	G 1/4; G 3/8; G 1/2; G 3/4	18316-32	655
Sleeve valves for line mounting poppet type with female threaded sleeve	CA	G 1/4; G 3/8; M 18X1,5; G 1/2; G 3/4; G 1; G 1 1/4; G 1 1/2; G 2	18316-35	657
Sleeve valves for line mounting poppet type with male-female threaded sleeve	VU-MF	G 1/2; G 3/4	18316-36	659
Sleeve valves for line mounting poppet type with male-female threaded sleeve	VU-MF	G 1; G 1 1/4	18316-37	661
Sleeve valves for line mounting poppet type with adjustable cracking pressure	LCA 7 / 10	G 1/4; G 3/8	18316-38	663
Sleeve valves for line mounting poppet type with adjustable cracking pressure	LCA 13 / 19	G 1/2; G 3/4	18316-39	665
Sleeve valves for line mounting double acting poppet type	CAB	G 3/8; G 1/2; G 3/4	18316-45	667
Sleeve valves for line mounting single poppet p.o. check	OV	G 1/4; G 3/8; G 1/2; G 3/4; G 1; G 1 1/4"	18316-50	669
Sleeve valves for line mounting poppet type p.o. check with pre-opening	OVP	G 3/4; G 1	18316-51	671



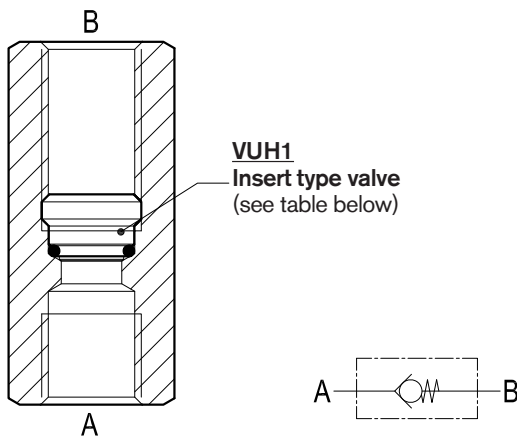
Check valves

Poppet type with insert and female-female threaded sleeve



VUH-FF

OE.U5.01.01-Y-Z



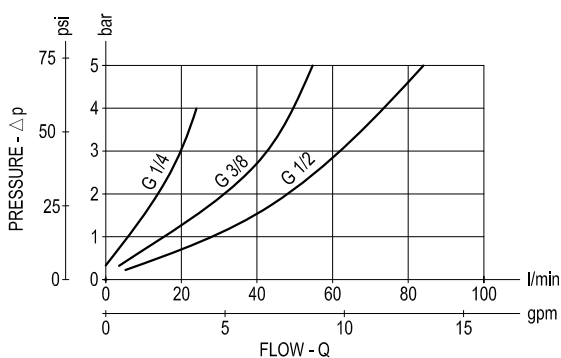
### Description

This valve is composed by a sleeve with an inserted poppet type check cartridge type VUH1.

Flow is always allowed to pass from A to B when pressure at A rises above the spring bias pressure and the ball is pushed from the seat. The valve is normally closed (checked) from B to A.

The inserted cartridge can be screwed-in or screwed-out with an Allen type key 6 or 8 mm, depending from the cartridge size.

### Performance



Δp curves vs. flow in "A-B" free flow direction

As seen on the diagram, the cracking pressure is very low.

### Advantages

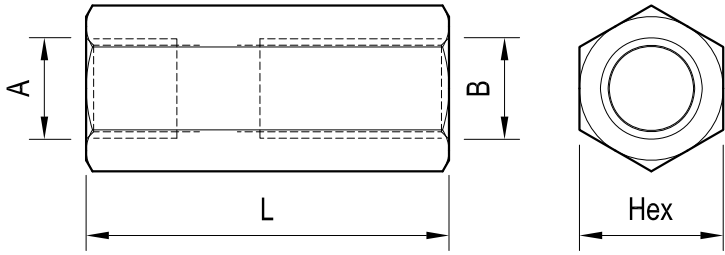
- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Three sizes provide great adaptability to the system.
- The inserted flow regulator cartridge can be purchased separately for easy service or for modifications to the original flow adjustment (ref. Catalogue RE 18329-61).

### Technical data

VUH1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
0T.U5.01.00.09.00	G 1/4	350 (5000)	22 (6)	0.01 (0.02)
0T.U5.01.00.02.00	G 3/8	350 (5000)	50 (13)	0.02 (0.04)
0T.U5.01.00.03.00	G 1/2	350 (5000)	80 (21)	0.02 (0.04)

Steel body, zinc plated

**Dimensions**



**Ports size / Dimensions**

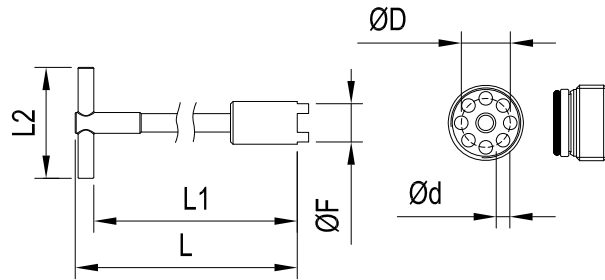
Y	Ports A-B	L mm (inches)	Hex mm (inches)	Sleeve code
09	G 1/4	48 (1.89)	19 (0.75)	OC.51.02.001
02	G 3/8	52 (2.05)	22 (0.87)	OC.51.02.002
03	G 1/2	62 (2.44)	27 (1.06)	OC.51.02.003

Z	Cracking pressure bar (psi)
00	<0.5 (<7)

**Fitting tool dimension**

VUH1 code thread	ØF	L	L1	L2	ØD	Ød	Inst. torque	Tool code
OT.U5.01.00.09.00 G 1/4	11.3 (0.45)	120 (4.72)	110 (4.33)	60 (2.36)	8.5 (0.34)	2.2 (0.09)	6 Nm (4)ft-lb	AVA17
OT.U5.01.00.02.00 G 3/8	14.9 (0.59)	120 (4.72)	108 (4.25)	80 (3.15)	10.8 (0.43)	3 (0.12)	6Nm (4)ft-lb	AVA17-01
OT.U5.01.00.03.00 G 1/2	18.6 (0.73)	120 (4.72)	108 (4.25)	80 (3.15)	14.2 (0.56)	3.8 (0.15)	10Nm (7)ft-lb	AVA17-02

More details on RE 18329-61 catalogue.



**Ordering code**

<b>OE.U5.01.01</b>	<b>Y</b>	<b>Z</b>
--------------------	----------	----------

Poppet type with insert and male-female threaded sleeve

Cracking pressure see table "Z"

Ports size / Dimensions see table "Y"

Type	Material number	Type	Material number	Type	Material number
OEU501010200	R932007302				
OEU501010300	R932007303				
OEU501010900	R932007301				



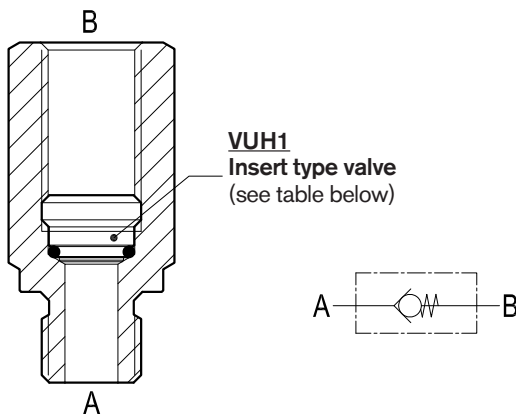
Check valves

Poppet type with insert and male-female threaded sleeve



VUH-MF

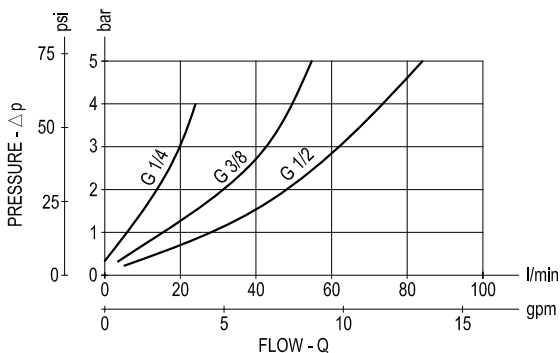
OE.U5.01.02-Y-Z



### Description

This valve is composed by a sleeve with an inserted poppet type check cartridge type VUH1. Flow is always allowed to pass from A to B when pressure at A rises above the spring bias pressure and the ball is pushed from the seat. The valve is normally closed (checked) from B to A. The inserted cartridge can be screwed-in or screwed-out with an Allen type key 6 or 8 mm, depending from the cartridge size.

### Performance



$\Delta p$  curves vs. flow in "A-B" free flow direction

As seen on the diagram, the cracking pressure is very low.

### Advantages

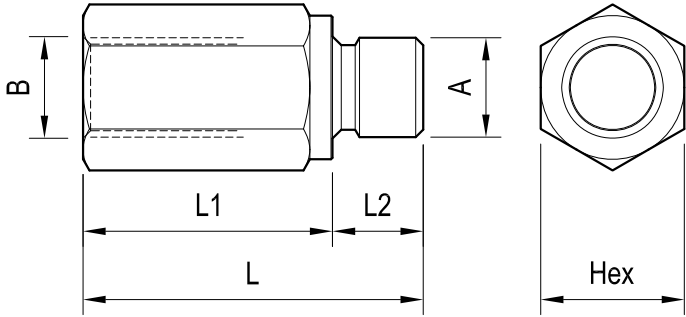
- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Three sizes provide great adaptability to the system.
- The inserted flow regulator cartridge can be purchased separately for easy service or for modifications to the original flow adjustment (ref. Catalogue RE 18329-61).

### Technical data

VUH1 Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
OT.U5.01.00.09.00	G 1/4	350 (5000)	22 (6)	0.01 (0.02)
OT.U5.01.00.02.00	G 3/8	350 (5000)	50 (13)	0.02 (0.04)
OT.U5.01.00.03.00	G 1/2	350 (5000)	80 (21)	0.02 (0.04)

Steel body, zinc plated

**Dimensions**



**Ports size / Dimensions**

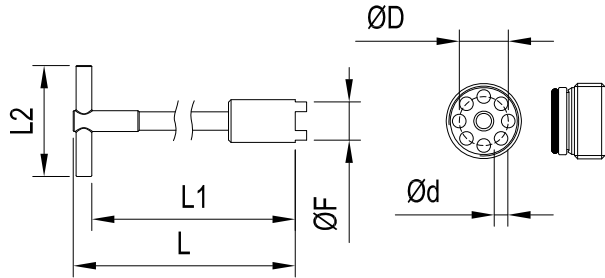
Y	Ports A-B	L mm (inches)	L1 mm (inches)	L2 mm (inches)	Hex mm (inches)	Sleeve code
09	G 1/4	45 (1.77)	33 (1.30)	12 (0.47)	19 (0.75)	OC.51.01.068
02	G 3/8	47.5 (1.87)	35.5 (1.40)	12 (0.47)	22 (0.87)	OC.51.01.069
03	G 1/2	55.5 (2.19)	41.5 (1.63)	14 (0.55)	27 (1.06)	OC.51.01.070

**Fitting tool dimension**

Z	Cracking pressure bar (psi)
00	<0.5 (<7)

VUH1 code thread	ØF	L	L1	L2	ØD	Ød	Inst. torque	Tool code
0T.U5.01.00.09.00 G 1/4	11.3 (0.45)	120 (4.72)	110 (4.33)	60 (2.36)	8.5 (0.34)	2.2 (0.09)	6 Nm (4)ft-lb	AVA17
0T.U5.01.00.02.00 G 3/8	14.9 (0.59)	120 (4.72)	108 (4.25)	80 (3.15)	10.8 (0.43)	3 (0.12)	6Nm (4)ft-lb	AVA17-01
0T.U5.01.00.03.00 G 1/2	18.6 (0.73)	120 (4.72)	108 (4.25)	80 (3.15)	14.2 (0.56)	3.8 (0.15)	10Nm (7)ft-lb	AVA17-02

More details on RE 18329-61 catalogue.



**Ordering code**

<b>OE.U5.01.02</b>	<b>Y</b>	<b>Z</b>
--------------------	----------	----------

Poppet type with insert and male-female threaded sleeve

Cracking pressure see table "Z"

Ports size / Dimensions see table "Y"

Type	Material number	Type	Material number	Type	Material number
OEU501020200	R932007305				
OEU501020300	R932007306				
OEU501020900	R932007304				

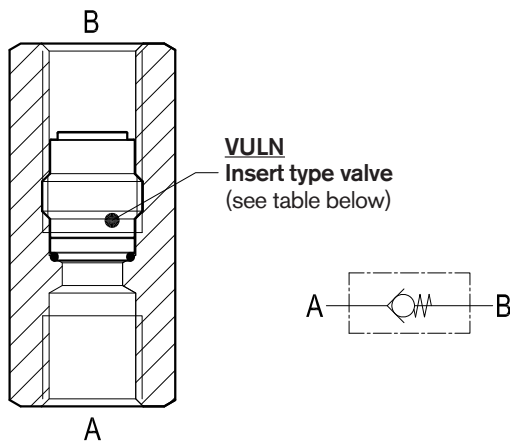
Check valves

Ball type with insert and female threaded sleeve



VULN-FF

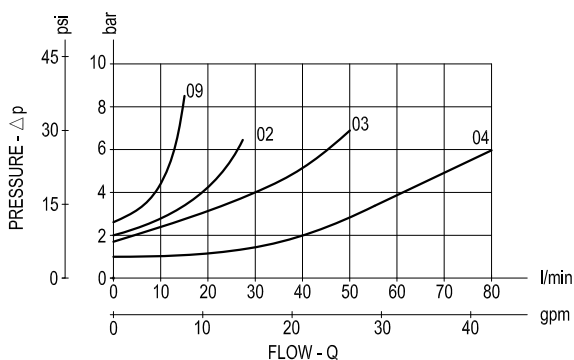
OE.U4.01.01-Y-Z



## Description

This valve is composed by a sleeve with an inserted ball type check cartridge. Flow is always allowed to pass from A to B when pressure at A rises above the spring bias pressure and the ball is pushed from the seat. The valve is normally closed (checked) from B to A. The inserted cartridge can be reached from either port in order to be screwed-in or screwed-out with an Allen type key 3-4-5-6-8 mm, depending from the cartridge size, and from the port used.

## Performance



$\Delta p$  curves vs. flow in "A-B" free flow direction

As seen on the diagram, the cracking pressure is very low.

## Advantages

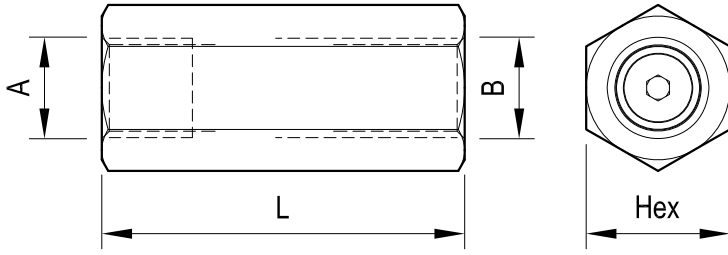
- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Four sizes provide great adaptability to the system.

## Technical data

VULN Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
0T.U4.01.00.09.00	G 1/4	210 (3000)	15 (4)	0.02 (0.04)
0T.U4.01.00.02.00	G 3/8	210 (3000)	30 (8)	0.03 (0.07)
0T.U4.01.00.03.00	G 1/2	210 (3000)	50 (13)	0.04 (0.09)
0T.U4.01.00.04.00	G 3/4	210 (3000)	80 (21)	0.07 (0.15)

Steel body, zinc plated

**Dimensions**



**Ports size / Dimensions**

Y	Ports A-B	L mm (inches)	Hex mm (inches)	Sleeve code
09	G 1/4	48 (1.89)	19 (0.75)	OC.51.02.001
02	G 3/8	52 (2.05)	22 (0.87)	OC.51.02.002
03	G 1/2	62 (2.44)	27 (1.06)	OC.51.02.003
04	G 3/4	70 (2.76)	36 (1.42)	OC.51.02.004

Z	CRACKING PRESSURE bar (psi)			
	G 1/4	G 3/8	G 1/2	G 3/4
00	2.3 (33.4)	1.75 (25.4)	1.75 (25.4)	0.3 (4.4)

**Ordering code**

OE.U4.01.01	Y	Z
-------------	---	---

Ball type with insert and female threaded sleeve

Cracking pressure see table "Z"  
Ports size / Dimensions see table "Y"

Type	Material number	Type	Material number	Type	Material number
OEU401010201	R932007264				
OEU401010301	R932007265				
OEU401010401	R932007266				
OEU401010901	R932007263				

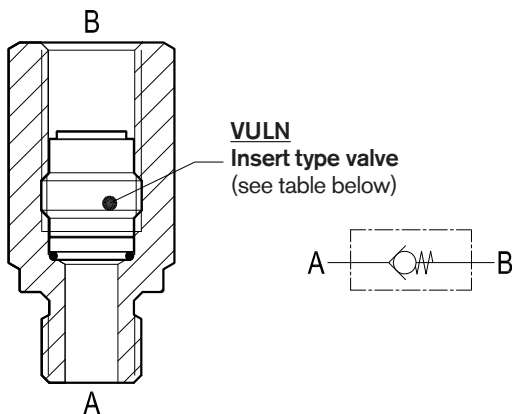
Check valves

Ball type with insert and male-female threaded sleeve



VULN-MF

OE.U4.01.02-Y-Z

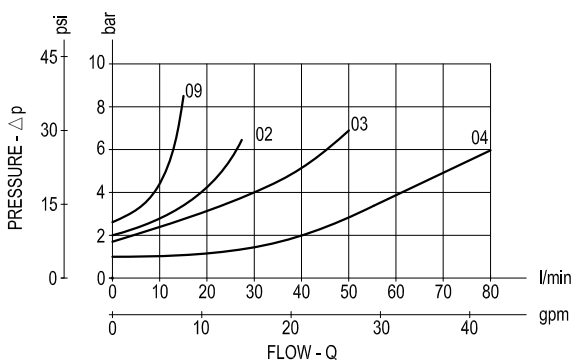


## Description

This valve is composed by a sleeve with an inserted ball type check cartridge. Flow is always allowed to pass from A to B when pressure at A rises above the spring bias pressure and the ball is pushed from the seat. The valve is normally closed (checked) from B to A.

The inserted cartridge can be reached from either port in order to be screwed-in or screwed-out with an Allen type key 3-4-5-6-8 mm, depending from the cartridge size, and from the port used.

## Performance



$\Delta p$  curves vs. flow in "A-B" free flow direction

For cracking pressure range refer to the specific table.

## Advantages

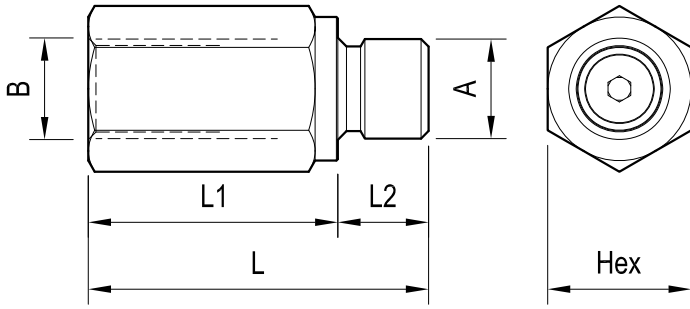
- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Four sizes provide great adaptability to the system.

## Technical data

VULN Code	Ports A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
0T.U4.01.00.09.00	G 1/4	210 (3000)	15 (4)	0.02 (0.04)
0T.U4.01.00.02.00	G 3/8	210 (3000)	30 (8)	0.03 (0.07)
0T.U4.01.00.03.00	G 1/2	210 (3000)	50 (13)	0.04 (0.09)
0T.U4.01.00.04.00	G 3/4	210 (3000)	80 (21)	0.07 (0.15)

Steel body, zinc plated

**Dimensions**



**Ports size / Dimensions**

Y	Ports A-B	L mm (inches)	L1 mm (inches)	L2 mm (inches)	Hex mm (inches)	Sleeve code
09	G 1/4	45 (1.77)	33 (1.30)	12 (0.47)	19 (0.75)	OC.51.01.068
02	G 3/8	47.5 (1.87)	35.5 (1.40)	12 (0.47)	22 (0.87)	OC.51.01.069
03	G 1/2	55.5 (2.19)	41.5 (1.63)	14 (0.55)	27 (1.06)	OC.51.01.070
04	G 3/4	62 (2.44)	46 (1.81)	16 (0.63)	36 (1.42)	OC.51.01.071

Z	CRACKING PRESSURE l/min (gpm)			
	G 1/4	G 3/8	G 1/2	G 3/4
00	2.3 (33.4)	1.75 (25.4)	1.75 (25.4)	0.3 (4.4)

**Ordering code**

OE.U4.01.02	Y	Z
-------------	---	---

Ball type with insert and male-female threaded sleeve

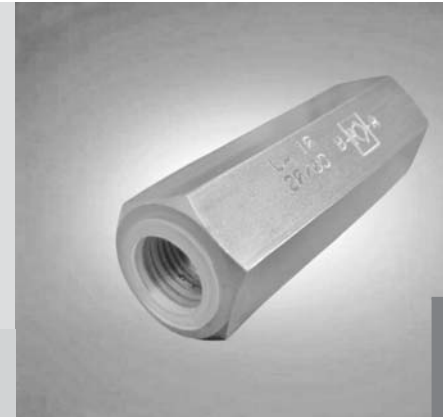
Cracking pressure see table "Z"

Ports size / Dimensions see table "Y"

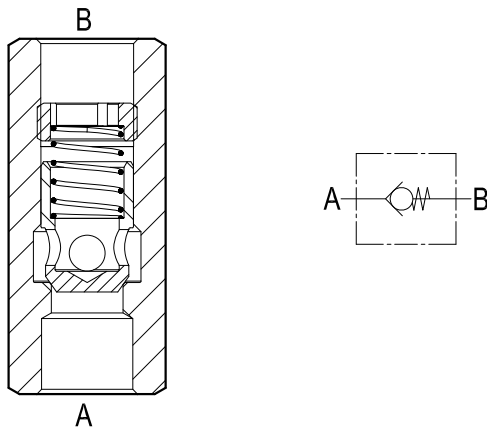
Type	Material number	Type	Material number	Type	Material number
OEU401020200	R932007260				
OEU401020300	R932007261				
OEU401020400	R932007262				
OEU401020900	R932007259				

Check valves

Poppet type with female threaded sleeve



CA Series



## Description

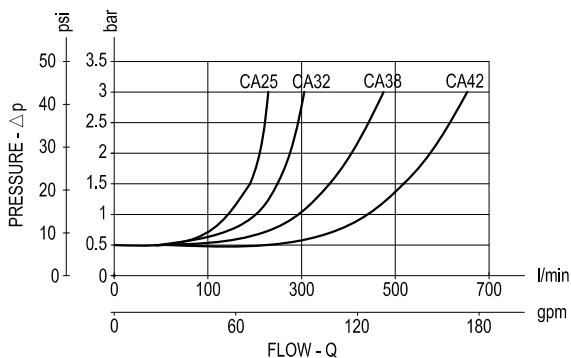
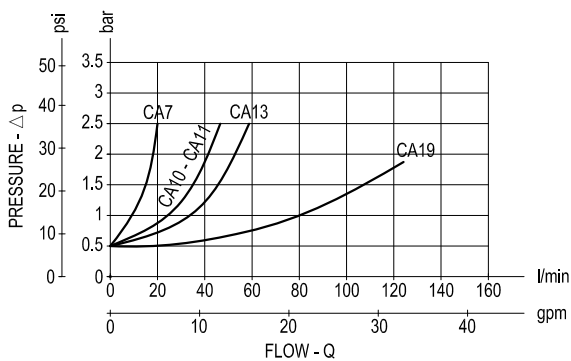
Flow is always allowed to pass from A to B when pressure at A rises above the spring bias pressure and the poppet is pushed from the seat. The valve is normally closed (checked) from B to A.

## Technical data

Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
CA 7	350 (5000)	25 (7)	0.11 (0.24)
CA 10	350 (5000)	50 (13)	0.19 (0.42)
CA 11	350 (5000)	50 (13)	0.19 (0.42)
CA 13	350 (5000)	80 (21)	0.25 (0.55)
CA 19	250 (3600)	100 (26)	0.52 (1.15)
CA 25	250 (3600)	160 (42)	1.04 (2.29)
CA 32	250 (3600)	300 (79)	1.67 (3.68)
CA 38	250 (3600)	450 (119)	2 (4.4)
CA 42	250 (3600)	700 (185)	3.6 (7.9)

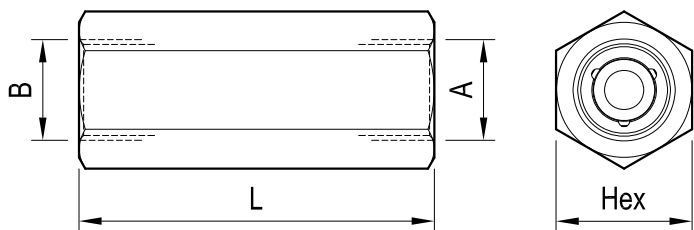
Steel body, zinc plated

## Performance



NOTE: the valve is available also with a choice of special cracking pressures, as shown by the relevant table: when ordering NON-Standard cracking pressure, please specify the desired cracking pressure expressed in "bar" value in the code position (\*\*). Without such specification, the valve will be supplied with standard cracking pressure = 0.5 bar.

### Dimensions



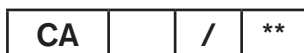
### Ports size / Dimensions

Code	Ports size A-B	Hex mm (inches)	L mm (inches)
CA 7	G 1/4	19 (0.75)	62 (2.44)
CA 10	G 3/8	24 (0.95)	70 (2.76)
CA 11	M 18x1.5	24 (0.95)	71 (2.80)
CA 13	G 1/2	27 (1.06)	79 (3.11)
CA 19	G 3/4	36 (1.42)	94 (3.70)
CA 25	G 1	46 (1.81)	114 (4.49)
CA 32	G 1-1/4	55 (2.17)	138 (5.43)
CA 38	G 1-1/2	60 (2.36)	148 (5.83)
CA 42	G 2	75 (2.95)	168 (6.61)

### Advantages

- Very compact design and inline mounting for space saving.
- Nine sizes provide great adaptability to the system.
- Mounting position is unrestricted.
- Very low  $\Delta p$  in the free flow direction.
- Different values of cracking pressure are available for A-B flow ( see the relevant table).

### Ordering code



= Cracking pressure (only bar value see table below)

series 7	= <b>7</b>
series 10	= <b>10</b>
series 11	= <b>11</b>
series 13	= <b>13</b>
series 19	= <b>19</b>
series 25	= <b>25</b>
series 32	= <b>32</b>
series 38	= <b>38</b>
series 42	= <b>42</b>

	CA 7	CA 10	CA 11	CA 13	CA 19	CA 25	CA 32	CA 38	CA 42
Cracking pressure bar (psi)	2 (29)	2 (29)	4 (58)	2 (29)	2 (29)	2 (29)	2 (29)	2 (29)	2 (29)
	4 (58)	4 (58)		4 (58)	4 (58)	4 (58)	4 (58)	4 (58)	4 (58)
	5 (72.5)	5 (72.5)		5 (72.5)	5 (72.5)	5 (72.5)	5 (72.5)	5 (72.5)	8 (116)
	8 (116)	8 (116)		8 (116)	8 (116)	8 (116)	8 (116)	8 (116)	
		15 (217.5)		10 (145)	10 (145)	10 (145)			
				15 (217.5)	15 (217.5)				

Do not specify for the standard cracking pressure 0.5 bar (7.25 psi)

Type	Material number
CA7	R932500066
CA7/2	R932500067
CA7/4	R932500070
CA7/5	R932500071
CA7/8	R932500072
CA10	R932500074
CA10/2	R932500077
CA10/4	R932500080
CA10/5	R932500081
CA10/8	R932500083
CA10/15	R932500076
CA11	R932500085
CA11/4	R932006965
CA13	R932500086
CA13/2	R932500089
CA13/4	R932500092

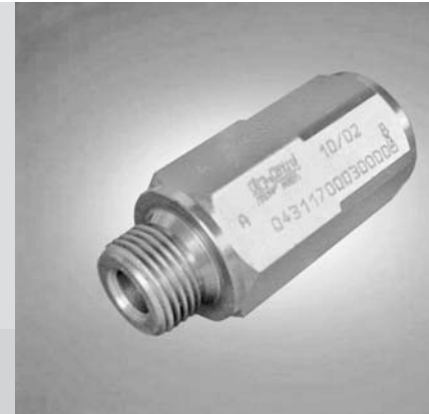
Type	Material number
CA13/5	R932500093
CA13/8	R932500094
CA13/10	R932500088
CA13/15	R932006923
CA19	R932500096
CA19/2	R932500102
CA19/4	R932500105
CA19/5	R932500106
CA19/8	R932500109
CA19/10	R932500100
CA19/15	R932500101
CA25	R932500114
CA25/2	R932500119
CA25/4	R932500122
CA25/5	R932500124
CA25/8	R932500125

Type	Material number
CA25/10	R932500118
CA32	R932500129
CA32/2	R932500132
CA32/4	R932500135
CA32/5	R932500136
CA32/8	R932500137
CA38	R932500138
CA38/2	R932500141
CA38/4	R932500143
CA38/5	R932500144
CA38/8	R932500145
CA42	R932500146
CA42/2	R932500147
CA42/4	R932500148
CA42/8	R932500149



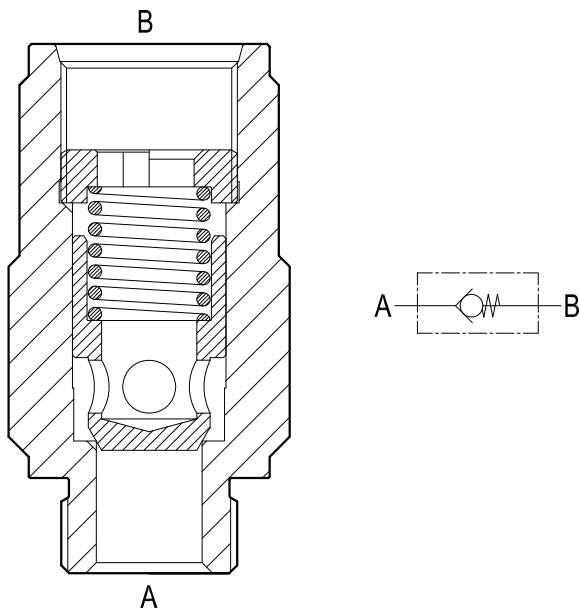
Check valves

Poppet type with male-female threaded sleeve



VU-MF (G1/2 - G3/4)

04.31.17.00-Y-Z



### Description

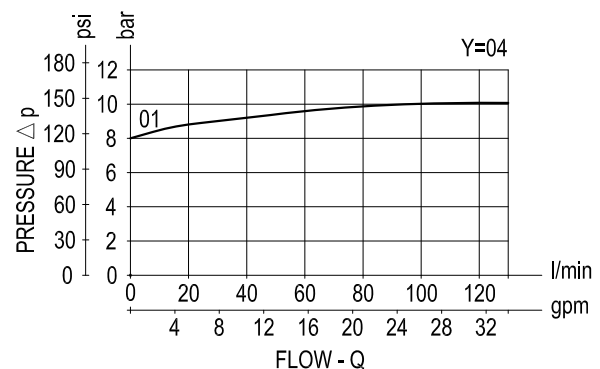
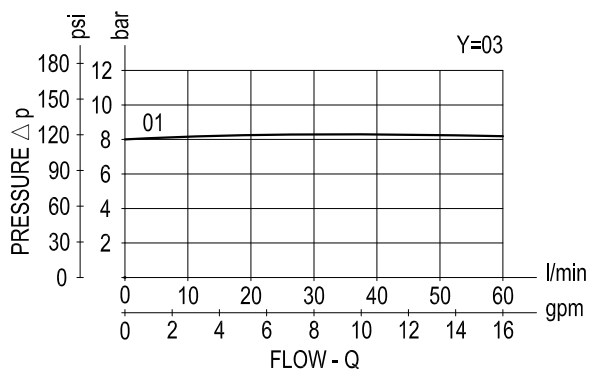
Flow is always allowed to pass from A to B when pressure at A rises above the spring bias pressure and the poppet is pushed from the seat. The valve is normally closed (checked) from B to A. Precision machining and hardening processes allow virtually leak free performance in the checked condition.

### Technical data

Ports	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
G 1/2	350 (5000)	60 (16)	0.30 (0.66)
G 3/4	350 (5000)	130 (34)	0.44 (0.97)

Steel body, zinc plated

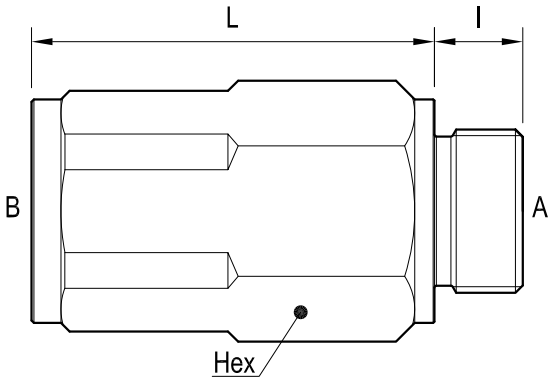
### Performance



$\Delta p$  curves vs. flow in "A-B" free flow direction

For cracking pressure range refer to the specific table.

**Dimensions**



**Ports size / Dimensions**

Y	Ports A - B	L mm (inches)	I mm (inches)	Hex mm (inches)
03	G 1/2	57 (2.24)	14 (0.55)	30 (1.18)
04	G 3/4	69 (2.72)	16 (0.63)	36 (1.42)

**Springs**

Z	Cracking pressure		Ordering code	Ordering code
	bar	psi	Y=03	Y=04
01	8	116	03.51.01.428	03.51.01.450

**Advantages**

- Very compact design and inline mounting for space saving.
- Four sizes (see also next page) provide great adaptability to the system.
- Mounting position is unrestricted.
- Very low  $\Delta p$  in the free flow direction.

**Ordering code**

04.31.17.00	Y	Z
-------------	---	---

Poppet type with male-female threaded sleeve

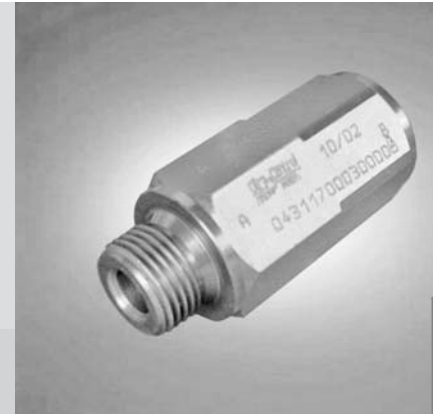
Springs see table "Z"

Ports size / Dimensions see table "Y"

Type	Material number	Type	Material number	Type	Material number
043117000301000	R930000444				
043117000401000	R930000445				

Check valves

Poppet type with male-female threaded sleeve

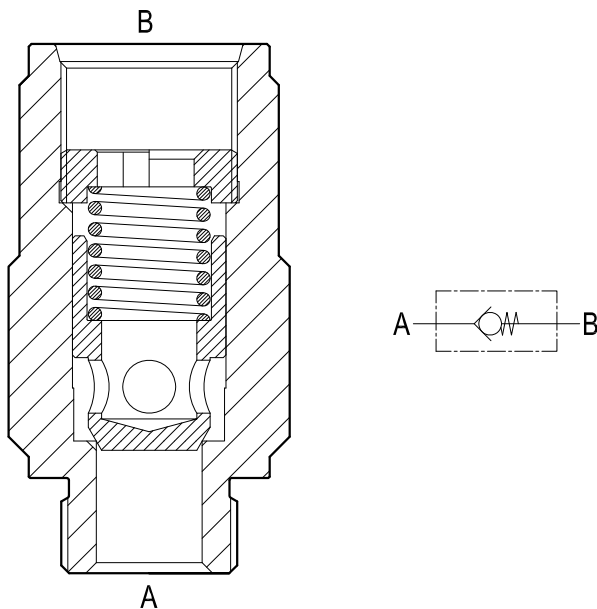


VU-MF (G1 - G1-1/4)

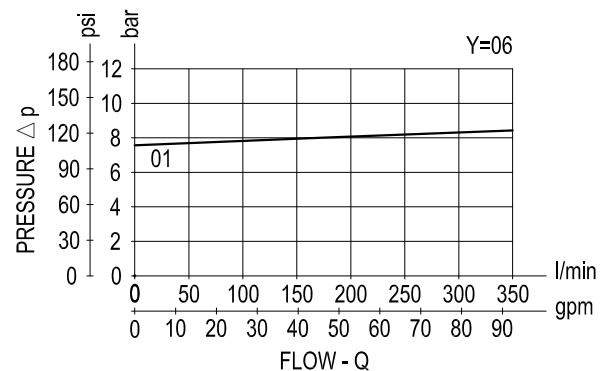
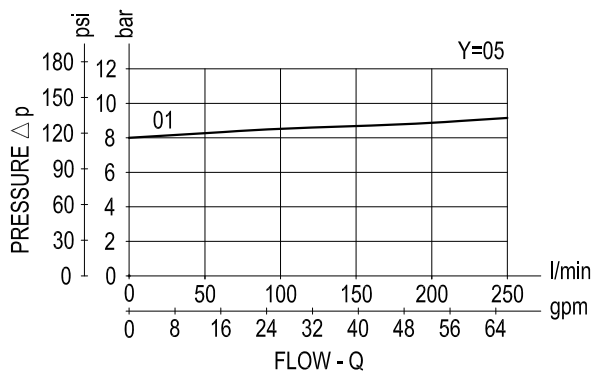
04.31.17.00-Y-Z

### Description

Flow is always allowed to pass from A to B when pressure at A rises above the spring bias pressure and the poppet is pushed from the seat. The valve is normally closed (checked) from B to A. Precision machining and hardening processes allow virtually leak free performance in the checked condition.



### Performance



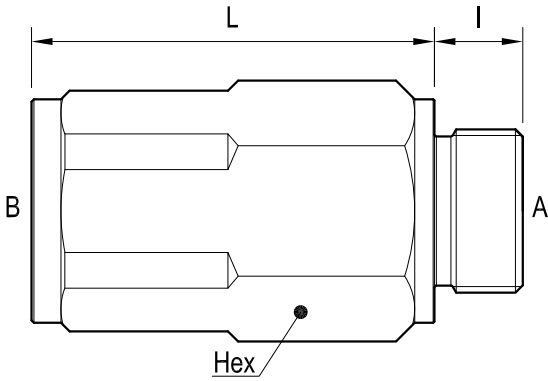
$\Delta p$  curves vs. flow in "A-B" free flow direction

For cracking pressure range refer to the specific table.

### Technical data

Ports	Pressure <b>P</b> max bar (psi)	Flow <b>Q</b> max l/min (gpm)	Weight kg (lbs)
G 1	350 (5000)	250 (66)	0.90 (1.98)
G 1-1/4	350 (5000)	350 (93)	1.50 (3.31)

**Dimensions**



**Ports size / Dimensions**

Y	Ports A - B	L mm (inches)	I mm (inches)	Hex mm (inches)
05	G 1	82 (3.23)	0.71 (46)	46 (1.81)
06	G 1-1/4	102 (4.02)	0.79 (55)	55 (2.17)

Springs				
Z	Cracking pressure		Ordering code	Ordering code
	bar	psi	Y=05	Y=06
01	8	116	03.51.01.430	03.51.01.429

**Advantages**

- Very compact design and inline mounting for space saving.
- Four sizes (see also previous page) provide great adaptability to the system.
- Mounting position is unrestricted.
- Very low  $\Delta p$  in the free flow direction.

**Ordering code**

04.31.17.00	Y	Z
-------------	---	---

Poppet type with male-female threaded sleeve

Springs see table "Z"

Ports size / Dimensions see table "Y"

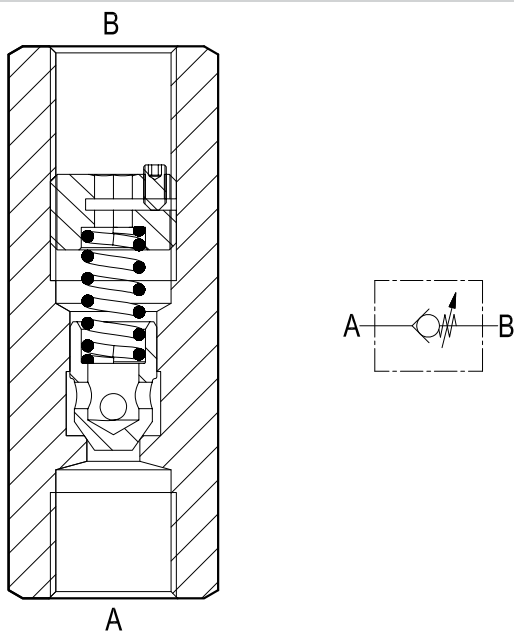
Type	Material number	Type	Material number	Type	Material number
043117000501000	R930000446				
043117000601000	R930000447				

Check valves

Line mounted poppet type,  
with adjustable cracking pressure



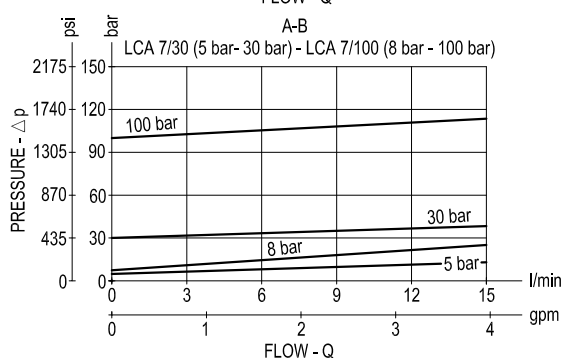
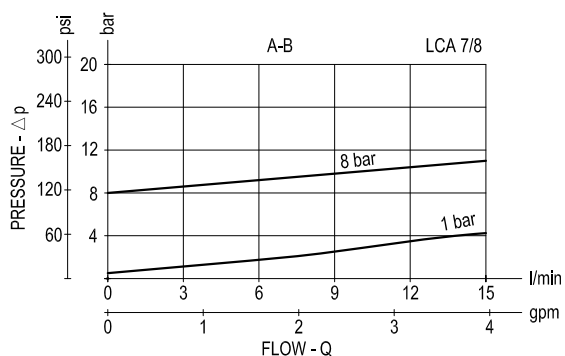
LCA 7 Series/LCA 10 Series



## Description

Flow is always allowed to pass from A to B when pressure at A rises above the spring bias pressure and the poppet is pushed from the seat. The spring load is adjustable by turning the internal ring nut with a 4 mm allen wrench for LCA7 (5 mm allen wrench for LCA10): screwing down increases the spring load and increases the cracking pressure (in order to turn the Ring Nut, loosen first the little locking screw with a 1.5 mm Allen wrench; tighten it again once the spring load is adjusted). The valve is normally closed (checked) from B to A.

## Performance

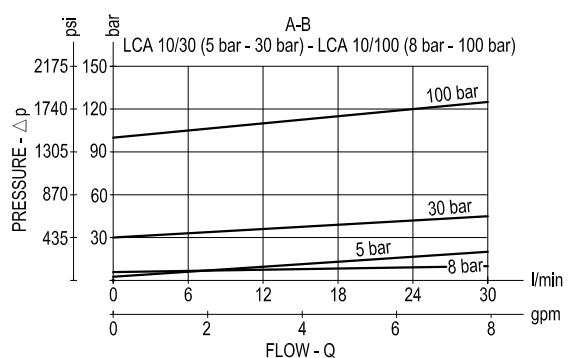


## Technical data

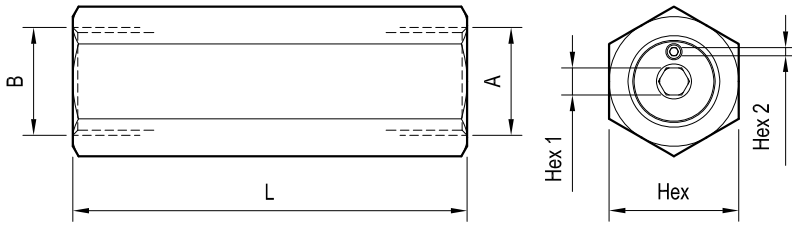
Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)
LCA 7	350 (5000)	25 (7)
LCA 10	350 (5000)	30 (8)

Steel body, zinc plated

$\Delta p$  curves vs. flow in "A-B" free flow direction.  
For cracking pressure range refer to the specific table.



**Dimensions**



**Ports size / Dimensions**

Code	Ports size A-B	L mm (inches)	Hex mm (inches)	Hex 1 mm (inches)	Hex 2 mm (inches)
LCA 7	G 1/4	73 (2.87)	19 (0.75)	4 (0.16)	1.5 (0.06)
LCA 10	G 3/8	73 (2.87)	24 (0.95)	5 (0.20)	1.5 (0.06)

Note: when ordering the valves Factory set please, specify the desired cracking pressure expressed in "bar". Without such specification, the valves will be supplied non adjusted.

**Ordering code**

**LCA**

series 7/8	= <b>7/8</b>
series 7/30	= <b>7/30</b>
series 7/100	= <b>7/100</b>
series 10/30	= <b>10/30</b>
series 10/100	= <b>10/100</b>

Pressure range (only bar value see below)

	LCA 7/8	LCA 7/30	LCA 7/100	LCA 10/30	LCA 10/100
Pressure range bar (psi)	min 1 (14.5)	min 5 (72.5)	min 8 (116)	min 5 (72.5)	min 8 (116)
	max 8 (116)	max 30 (435)	max 100 (1450)	max 30 (435)	max 100 (1450)

Type	Material number
LCA 7/8	R932006929
LCA 7/30	R932500275
LCA 7/100	R932006928
LCA10/30	R932500279
LCA 10/100	R932500277

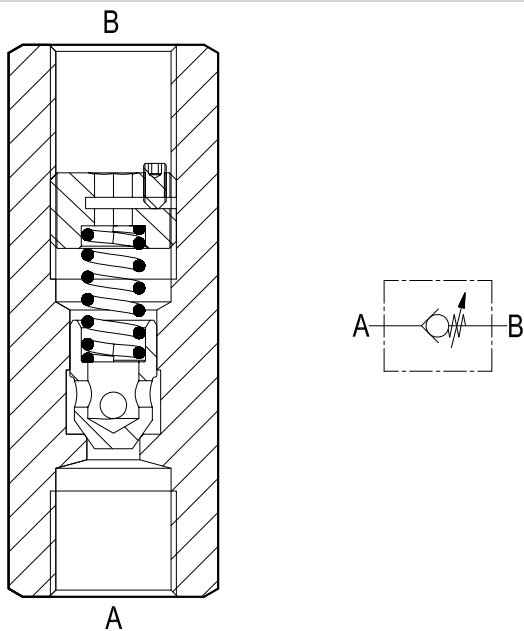
Type	Material number

Type	Material number

Check valves  
Line mounted poppet type,  
with adjustable cracking pressure



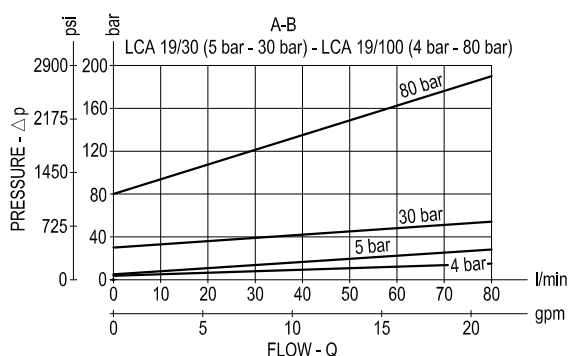
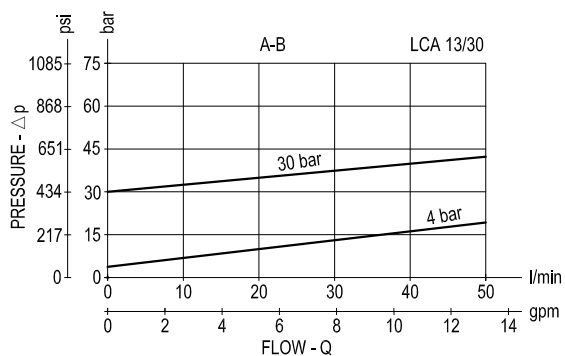
LCA 13 Series/LCA 19 Series



## Description

Flow is always allowed to pass from A to B when pressure at A rises above the spring bias pressure and the poppet is pushed from the seat. The spring load is adjustable by turning the internal ring nut with an 8 mm Allen wrench: screwing down increases the spring load and increases the cracking pressure (in order to turn the Ring Nut, loosen first the little locking screw with a 2 mm Allen wrench; tighten it again once the spring load is adjusted). The valve is normally closed (checked) from B to A.

## Performance



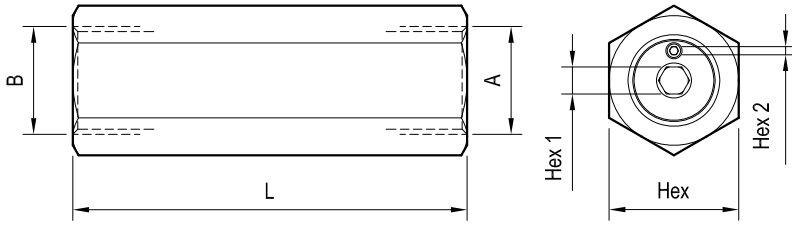
## Technical data

Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)
LCA 13	250 (3600)	50 (13)
LCA 19	250(3600)	80 (21)

Steel body, zinc plated

Δp curves vs. flow in "A-B" free flow direction.  
For cracking pressure range refer to the specific table

**Dimensions**



**Ports size / Dimensions**

Code	Ports size A-B	L mm (inches)	Hex mm (inches)	Hex 1 mm (inches)	Hex 2 mm (inches)
LCA 13	G 1/2	110 (4.33)	27 (1.06)	8 (0.32)	2 (0.08)
LCA 19	G 3/4	110 (4.33)	36 (1.42)	8 (0.32)	2 (0.08)

Note: when ordering the valves Factory set please, specify the desired cracking pressure expressed in "bar". Without such specification, the valves will be supplied non adjusted.

**Ordering code**

**LCA**

series 13/30	= <b>13/30</b>
series 19/30	= <b>19/30</b>
series 19/100	= <b>19/100</b>

Pressure range (only bar value see below)

	LCA 13/30	LCA 19/30	LCA 19/100
Pressure range bar (psi)	min 4 (58) max 30 (435)	min 5 (72.5) max 30 (435)	min 4 (58) max 80 (1160)

Type	Material number
LCA 13/30	R932500281
LCA 19/30	R932500288
LCA 19/100	R932006930

Type	Material number

Type	Material number

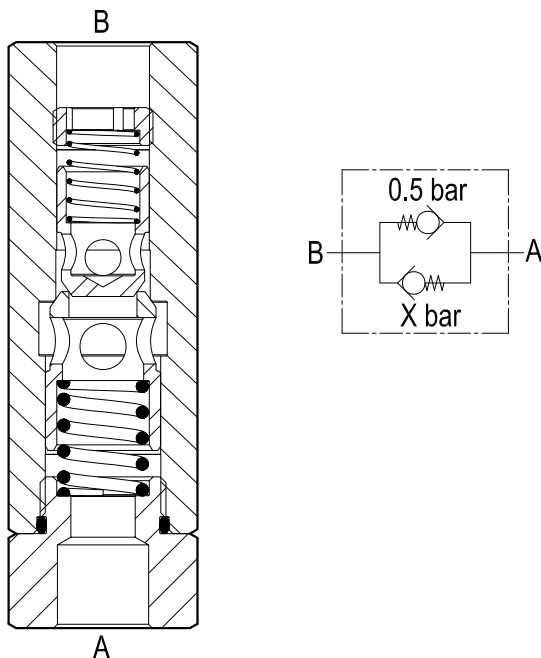


## Bi-directional check valves Line mounted double acting poppet type



CAB Series

3



### Description

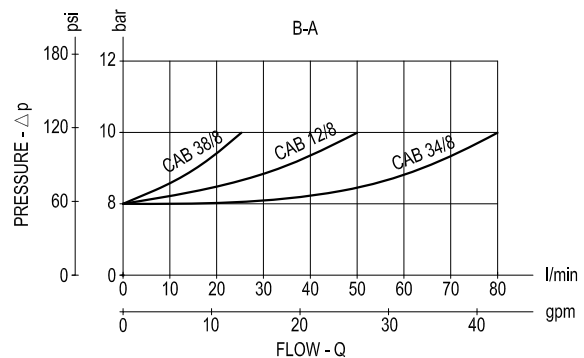
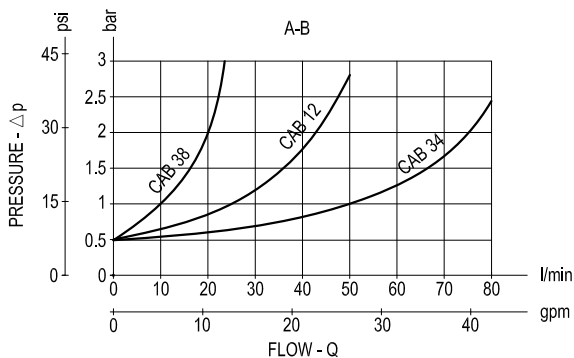
Flow is always allowed to pass from A to B when pressure at A rises above 0.5 bar (7.25 psi). Reverse flow from B to A is possible only when pressure at B rises above the return spring bias pressure; the return B to A cracking pressure can be chosen among the various X values available (see table).

### Technical data

Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
CAB 38	350 (5000)	25 (7)	0.48 (1.06)
CAB 12	350 (5000)	50 (13)	0.88 (1.94)
CAB 34	250 (3600)	80 (21)	1.71 (3.77)

Steel body, zinc plated

### Performance

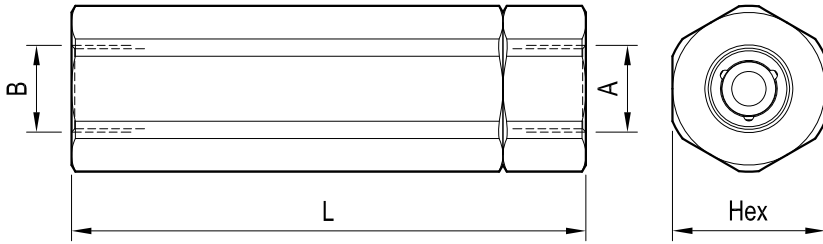


### Advantages

- Very compact design and inline mounting for space saving.
- Three sizes provide great adaptability to the system.
- Mounting position is unrestricted.
- Very low  $\Delta p$ .
- Different values of cracking pressure are available for B-A flow ( see the relevant table).

NOTE: the valve is available also with a choice of cracking pressures B-A, as shown by the relevant table: when ordering please specify the desired B-A cracking pressure expressed in "bar" value in the code position (\*\*). In direction A-B the cracking pressure is always 0.5 bar.

**Dimensions**



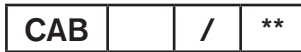
**Ports size / Dimensions**

Code	Ports size A-B	Hex mm (inches)	L mm (inches)
CAB 38	G 3/8	30 (1.18)	102 (4.02)
CAB 12	G 1/2	36 (1.42)	130 (5.12)
CAB 34	G 3/4	46 (1.81)	155 (6.10)

**Applications**

They can be fitted in line either when it is necessary to build-up some pressure "B-A" before feeding an actuator (ex.: opening of the mechanical safety brake before starting a motor), or they can be employed to allow free upstream flow "A-B", and build-up some back pressure "B-A" to hold or stabilize the reverse motion.

**Ordering code**



ports G 3/8	= <b>38</b>
ports G 1/2	= <b>12</b>
ports G 3/4	= <b>34</b>

= Specify cracking pressure "B-A" (only bar value see table below)

	CAB 38	CAB 12	CAB 34
Cracking pressure Controlled flow bar (psi)	5 (72.5)	5 (72.5)	4 (58)
	8 (116)	8 (116)	8 (116)
	15 (217.5)	10 (145)	10 (145)
		15 (217.5)	15 (217.5)

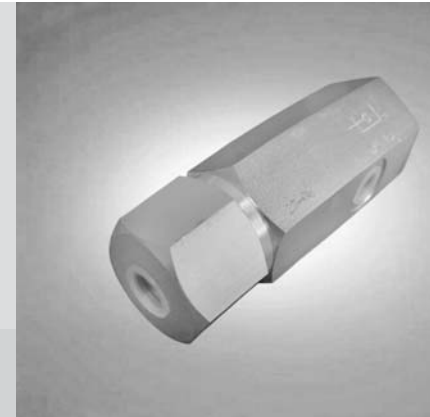
Cracking pressure (free flow A-B) is always 0.5 bar (7.25 psi)

Type	Material number
CAB 12/5	R932500153
CAB 12/8	R932500154
CAB 12/10	R932500151
CAB 12/15	R932500152
CAB 34/4	R932006924
CAB 34/8	R932500157
CAB 34/10	R932500155
CAB 34/15	R932500156
CAB 38/5	R932500159
CAB 38/8	R932500160

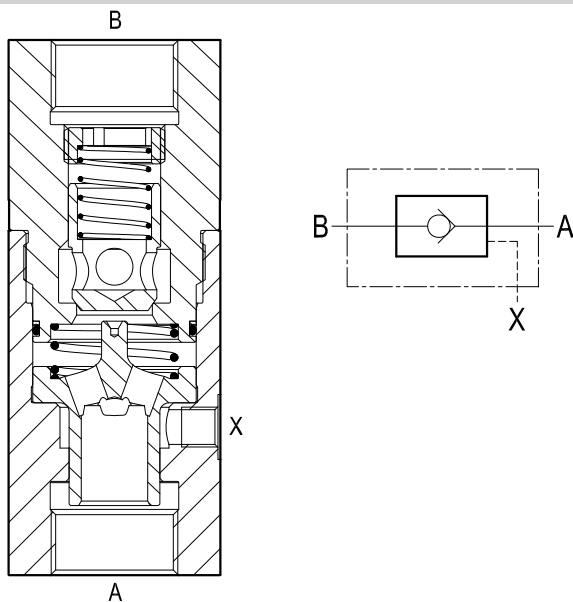
Type	Material number
CAB 38/15	R932500158

Type	Material number

## Pilot operated check valves Single poppet type



OV Series



### Description

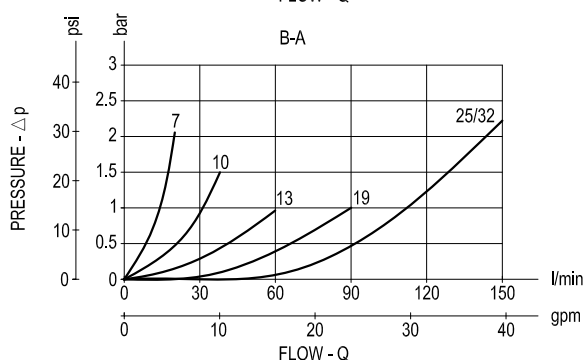
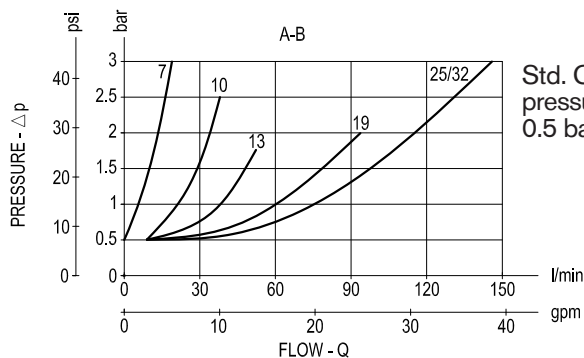
Flow is always allowed to pass from A to B when pressure at A rises above the spring bias pressure and the poppet is pushed from the seat. The valve is normally closed (checked) from B to A; when sufficient pilot pressure is present at Pil port (X), the annular pilot area pushes the poppet from its seat and flow is allowed from B to A. Precision machining and hardening process allow virtually leak-free performance in the checked condition. The valve is available in different sizes and versions for different flow ranges, as specified by the tables of the Technical data, Performance diagrams and Dimensions.

### Technical data

Code	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)	Pilot ratio
OV 7	350 (5000)	15 (4)	0.75 (1.65)	14 : 1
OV 10	350 (5000)	35 (9)	1.04 (2.29)	5 : 1
OV 13	350 (5000)	50 (13)	1.42 (3.13)	5 : 1
OV 19	250 (3600)	100 (26)	2.3 (5.1)	3.2 : 1
OV 25	250 (3600)	150 (40)	4.3 (9.5)	3.2 : 1
OV 32	250 (3600)	150 (40)	4.5 (9.9)	3.2 : 1

Steel body, zinc plated

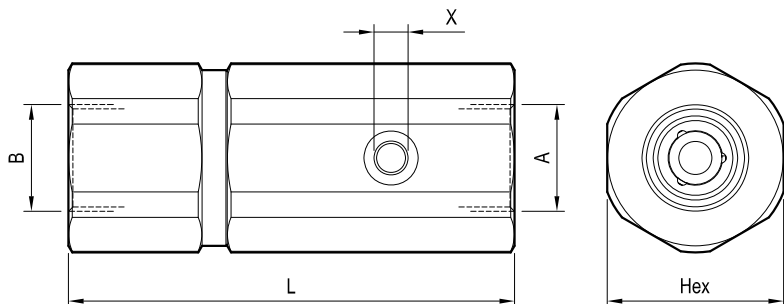
### Performance



### Advantages

- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Different values of cracking pressure are available for A-B flow ( see the relevant table).
- Six sizes provide great adaptability to the system.

### Dimensions



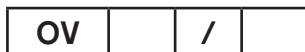
### Ports size / Dimensions

Code	Ports size		Hex mm (inches)	L mm (inches)
	A-B	X		
OV 7	G 1/4	G 1/4	36 (1.42)	98 (3.86)
OV 10	G 3/8	G 1/4	41 (1.61)	106 (4.17)
OV 13	G 1/2	G 1/4	46 (1.81)	119 (4.69)
OV 19	G 3/4	G 1/4	55 (2.17)	139 (5.47)
OV 25	G 1	G 1/4	70 (2.76)	169 (6.65)
OV 32	G 1-1/4	G 1/4	70 (2.76)	177 (6.97)

### Applications

Ideal to lock cylinders in a leak free mode in order lock or clamp loads. They are non-modulating ON-OFF valves suitable for holding applications, but unsuitable to control the motion of overrunning loads which would cause a loss of pilot pressure. They should not be used for paired cylinders and, when fitted to the cylinder annular chamber, the valve pilot ratio should be significantly higher than the cylinder ratio. In case of doubt, please consult us.

### Ordering code



series 7	= <b>7</b>
series 10	= <b>10</b>
series 13	= <b>13</b>
series 19	= <b>19</b>
series 25	= <b>25</b>
series 32	= <b>32</b>

= Cracking pressure (only bar value see below)

	OV 7	OV 10	OV 13	OV 19	OV 25
Cracking pressure free flow bar (psi)	4 (58)	4 (58)	4 (58)	4 (58)	4 (58)
		5 (72.5)	5 (72.5)	8 (116)	8 (116)
				15 (217.5)	10 (145)

Do not specify for the standard pressure 0.5 bar (7.25 psi)

Note: The OV32 cracking pressure is 0.5 bar (7.25 psi)

Type	Material number
OV 7	R932500363
OV 7/4	R932006931
OV 10	R932500364
OV 10/4	R932006932
OV 10/5	R932006933
OV 13	R932500366
OV 13/4	R932006934
OV 13/5	R932006935
OV 19	R932500367
OV 19/4	R932500368

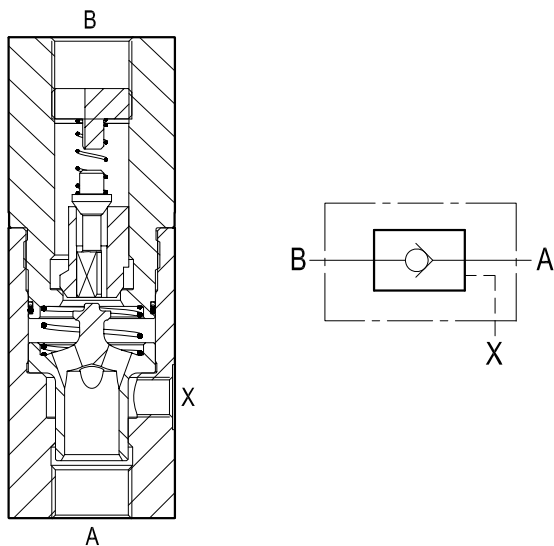
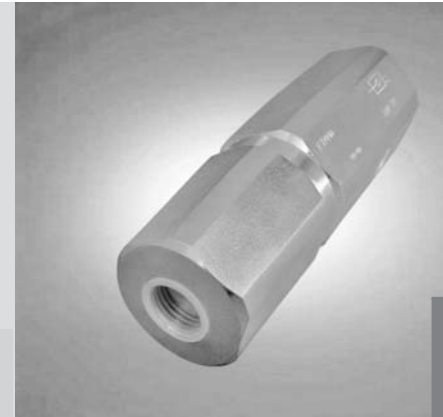
Type	Material number
OV 19/8	R932006936
OV 19/15	R932006937
OV 25	R932500369
OV 25/4	R932006938
OV 25/8	R932006939
OV 25/10	R932006940
OV 32	R932500370

Type	Material number

## Pilot operated check valves

### Poppet type, with pre-opening

#### OVP Series



#### Description

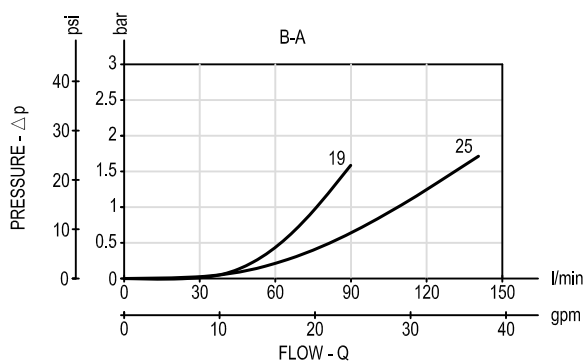
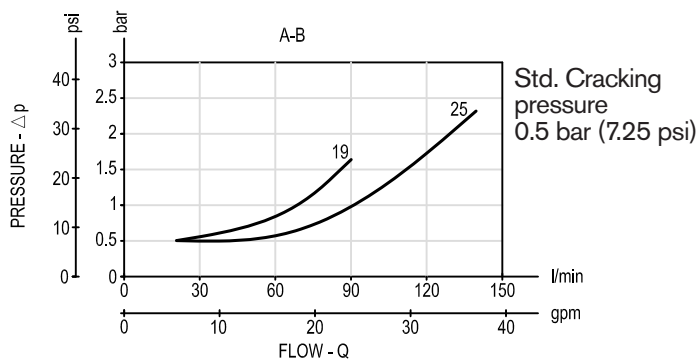
Flow is always allowed to pass from A to B when pressure at A rises above the spring bias pressure and the poppet is pushed from the seat. The valve is normally closed (checked) from B to A; when sufficient pilot pressure is present at Pil port (X), the annular pilot area pushes the pre-opening poppet from its seat and oil starts flowing from B to A; as pilot pressure increases, also the main poppet is lifted from its seat and the opening area B-A becomes larger. Precision machining and hardening process allow virtually leak-free performance in the checked condition. The valve is available in different sizes and versions for different flow ranges, as specified by the tables of the Technical data, Performance diagrams and Dimensions.

#### Technical data

Code	Pressure <b>P</b> max bar (psi)	Flow <b>Q</b> max l/min (gpm)	Weight kg (lbs)	Pilot ratio	
				Main opening	Pre opening
<b>OVP 19</b>	250 (3600)	100 (26)	2.6 (5.8)	1:4.5	1:11
<b>OVP 25</b>	250 (3600)	150 (40)	5.0 (11)	1:4	1:13

Steel body, zinc plated

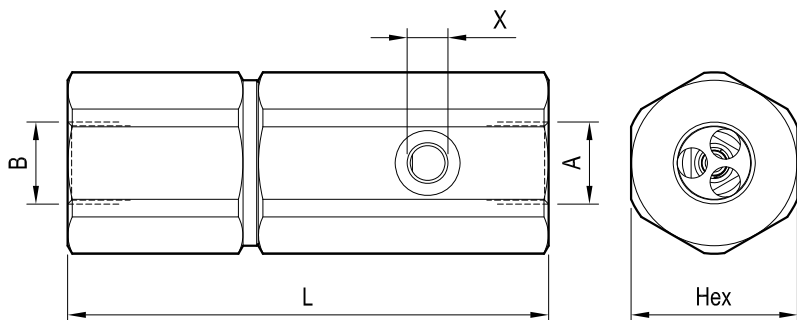
#### Performance



#### Advantages

- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Three sizes provide great adaptability to the system.

### Dimensions



### Ports size / Dimensions

Code	Ports size		Hex mm (inches)	L mm (inches)
	A-B	X		
OVP 19	G 3/4	G 1/4	55 (2.17)	159 (6.26)
OVP 25	G 1	G 1/4	70 (2.76)	186 (7.32)

### Applications

Ideal to lock cylinders in a leak free mode in order lock or clamp loads. They are ON-OFF valves suitable for holding applications; the pre-opening does provide a degree of smooth opening and allows some motion control, but these valves are not designed to control overrunning loads which would cause a loss of pilot pressure. They should not be used for paired cylinders and, when fitted to the cylinder annular chamber, the main pilot ratio should be significantly higher than the cylinder ratio. In case of doubt, please consult us.

### Ordering code

**OVP**  

series 19	= <b>19</b>
series 25	= <b>25</b>

Cracking pressure (free flow) is always 0.5 bar (7.25psi)

Type	Material number	Type	Material number	Type	Material number
OVP19	R932500377				
OVP25	R932500378				

## Sleeve valve for line mounting

### Sequence

<b>Designation</b>	<b>Description</b>	<b>Cavity</b>	<b>Data sheet</b>	<b>Page</b>
Sleeve valves for line mounting sequence valve direct acting poppet type	VSQ-20-LM	G 3/8	18316-60	675
Sleeve valves for line mounting sequence valve direct acting poppet type	VSQ-30-LM	G 1/2	18316-62	677
Sleeve valves for line mounting sequence valve direct acting poppet type, JIC series	VSQ-60-LM	JIS	18316-61	679
Sleeve valves for line mounting sequence valve direct acting poppet type	VSQ-30-LM	G 3/4	18316-63	681
Sleeve valves for line mounting sequence valve direct acting poppet type pressure compensated	VSQ-CC-LM	G 3/8	18316-64	683
Sleeve valves for line mounting sequence valve direct acting poppet type pressure compensated	VSQ-CC-LM	G 1/2	18316-65	685

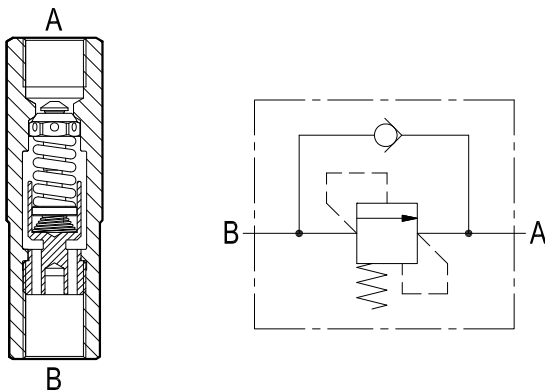




## Sequence valves Direct acting poppet type

VSQ-20-LM (G3/8)

0T.S1.01.00.02-Z-W



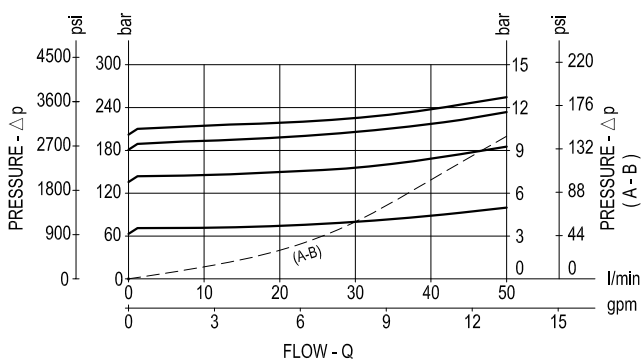
### Description

They are composed by a relief valve (opening "B-A") and by a reverse flow check valve "A-B".

Initially the flow goes to a first line connected in parallel to the B side, not shown here, and pressure increases until reaching the selected relief setting; then the relief valve opens and the second circuit is supplied out of A port, while the actuator connected to the B side remains pressurized. The incorporated check valve allows the reverse motion of the actuators which happens without specific control of the sequence, only depending from the load/pressure conditions.

Note that pressure at A needed to operate the second actuator is additive to the relief setting, and, for this reason, this valve is successfully employed to energize a secondary actuator which only requires low pressure.

### Performance



### Advantages

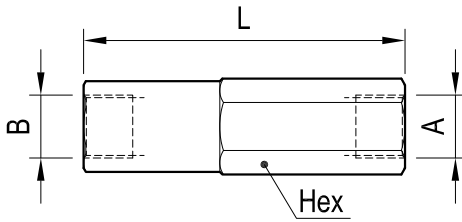
- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Low  $\Delta p$  for B-A flow.
- Different springs available for different pressure ranges ( see the "Z" table).

### Technical data

Pressure <b>P</b> max bar (psi)	Flow <b>Q</b> max l/min (gpm)	Weight kg (lbs)
350 (5000)	50 (13)	0.18 (0.40)

Steel body, zinc plated

**Dimensions**



**Ports size / Dimensions**

Ports A-B	L mm (inches)	Hex mm (inches)
G 3/8	85 (3.35)	22 (0.87)

<b>Springs</b>	
Z	Adj. press. range bar (psi)
05	20-70 (290-1015)
10	80-130 (1160-1885)
20	140-200 (2030-2900)
35	210-350 (3045-5075)

The valve is supplied with Factory set opening pressure and is non-adjustable. Refer to the table. Standard pressure setting are specified in the relevant "W" table. For special pressure settings, consult us.

<b>Std. SETTING bar (psi) Q= 5 l/m</b>				
W	Z=05	Z=10	Z=20	Z=35
01		80 (1160)	140 (2030)	210 (3045)
02	20 (290)	90 (1305)	150 (2175)	220 (3190)
03	30 (435)	100 (1450)	160 (2320)	230 (3335)
04	40 (580)	110 (1595)	170 (2465)	240 (3480)
05	50 (725)	120 (1740)	180 (2610)	250 (3625)
06	60 (870)	130 (1885)	190 (2755)	260 (3770)
07	70 (1015)		200(2900)	270 (3915)

**Applications**

They are employed to control the sequence of two or more cylinders or motors, when the second actuator must be allowed to move only after the first actuator has performed a certain function. The incorporated check valve allows free reverse motion without specific control of the sequence.

**Ordering code**

<b>0T.S1.01.00.02</b>	<b>Z</b>	<b>W</b>
-----------------------	----------	----------

Direct acting poppet type

Std. setting see table "W"

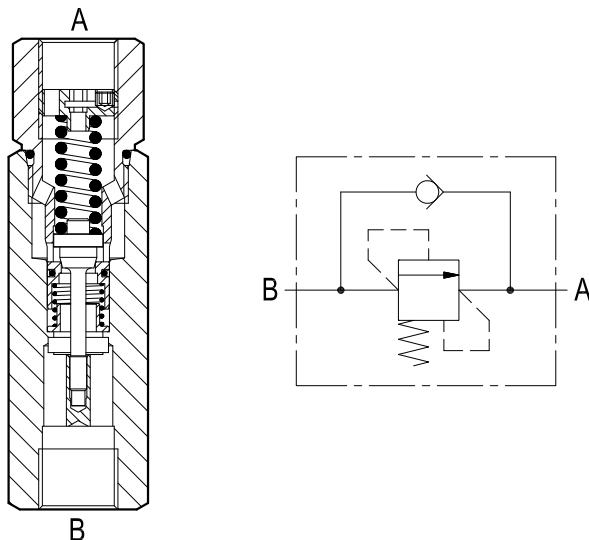
Springs see table "Z"

Type	Material number	Type	Material number	Type	Material number
0TS10100020502	R931000074	0TS10100021005	R931000086	0TS10100023502	R931000656
0TS10100020503	R931000075	0TS10100021006	R931001980	0TS10100023503	R931001988
0TS10100020504	R931000076	0TS10100022001	R931000088	0TS10100023504	R931001990
0TS10100020505	R931000077	0TS10100022002	R931001981	0TS10100023505	R931001991
0TS10100020506	R931000078	0TS10100022003	R931000657	0TS10100023506	R931001992
0TS10100020507	R931000079	0TS10100022004	R931001982	0TS10100023507	R931001993
0TS10100021001	R931000083	0TS10100022005	R931000089		
0TS10100021002	R931000084	0TS10100022006	R931001983		
0TS10100021003	R931000085	0TS10100022007	R931001862		
0TS10100021004	R931001978	0TS10100023501	R931001985		

## Sequence valves Direct acting poppet type

VSQ-30-LM (G1/2)

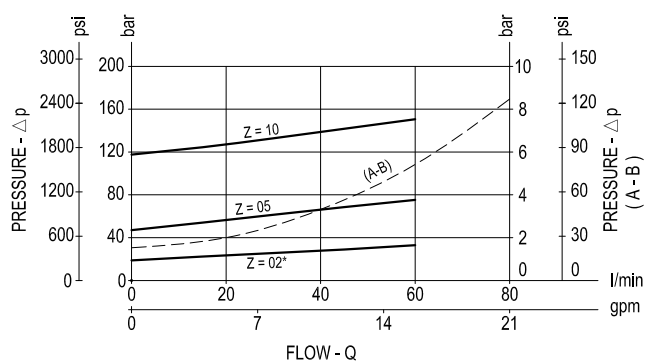
05.21.16.00.03-Z



### Description

They are composed by a relief valve (opening "B-A") with hydraulic dampening, and by a reverse flow annular check valve "A-B". Initially the flow goes to a first line connected in parallel to the B side, not shown here, and pressure increases until reaching the selected relief setting; then the relief valve opens and the second circuit is supplied out of A port, while the actuator connected to the B side remains pressurized. The incorporated check valve allows the reverse motion of the actuators which happens without specific control of the sequence, only depending from the load/pressure conditions. Note that pressure at A needed to operate the second actuator is additive to the relief setting, and, for this reason, this valve is successfully employed to energize a secondary actuator which only requires low pressure.

### Performance



### Advantages

- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Low  $\Delta p$  for B-A flow.
- Different springs available for different pressure ranges ( see the "Z" table).

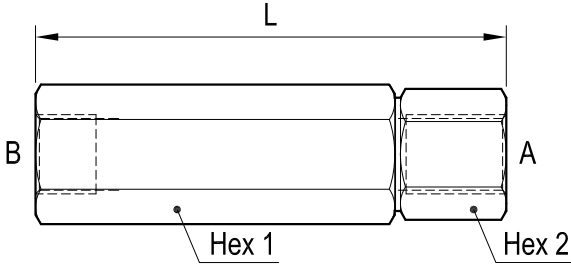
### Technical data

Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
350 (5000)	80 (21)	0.6 (1.32)

Steel body, zinc plated

Pressure drop curves are shown with zero back pressure on "A" port.

**Dimensions**



**Ports size / Dimensions**

Ports A-B	L mm (inches)	Hex 1 mm (inches)	Hex 2 mm (inches)
G 1/2	124 (4.88)	32 (1.26)	30 (1.18)

Springs					
Z	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min	Ordering code	Colour
02*	10-30 (145-435)	9 (131)	20 (290)	03.51.01.155	green
05	25-70 (360-1000)	21 (305)	50 (725)	03.51.01.106	green
10	30-120 (435-1750)	47 (682)	120 (1750)	03.51.01.171	yellow

The relief setting is adjustable by turning the internal ring nut: to turn the nut loosen first the little locking screw, then tighten it again after the adjustment. For the spring selection, refer to the table.

(\*) Z= 02 is only supplied for special applications.

This valve is successfully employed when the pressure needed to move the secondary actuator is not very high.

**Applications**

They are employed to control the sequence of two or more cylinders or motors, when the second actuator must be allowed to move only after the first actuator has performed a certain function. The incorporated check valve allows free reverse motion without specific control of the sequence.

**Ordering code**

<b>05.21.16.00.03</b>	<b>Z</b>
-----------------------	----------

Direct acting poppet type

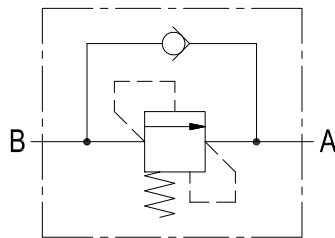
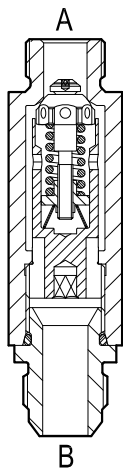
Type	Material number	Type	Material number	Type	Material number
05211600030200A	R901187620				
05211600030500A	R930001441				
05211600031000A	R930001444				

Sequence valves

JIC series direct acting poppet type

VSQ-60-LM

0T.S1.03.00.03-Z-W



### Description

They are composed by a relief valve (opening "B-A") and by a reverse flow check valve "A-B". Initially the flow goes to a first line connected in parallel to the B side, not shown here, and pressure increases until reaching the selected relief setting; then the relief valve opens and the second circuit is supplied out of A port, while the actuator connected to the B side remains pressurized. The incorporated check valve allows the reverse motion of the actuators which happens without specific control of the sequence, only depending from the load/pressure conditions. Note that pressure at A needed to operate the second actuator is additive to the relief setting, and, for this reason, this valve is successfully employed to energize a secondary actuator which only requires low pressure.

### Technical data

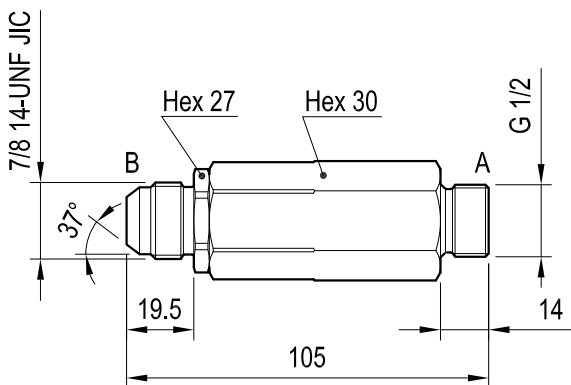
Pressure <b>P</b> max bar (psi)	Flow <b>Q</b> max l/min (gpm)	Weight kg (lbs)
350 (5000)	60 (16)	0.37 (0.82)

Steel body, zinc plated

### Advantages

- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Different springs available for different pressure ranges ( see the "Z" , table).

### Dimensions



Springs	
Z	Adj. press. range bar (psi)
05	20-100 (290-1450)
10	110-170 (1595-2465)
20	180-230 (2610-3335)
35	240-350 (3480-5075)

The valve is supplied with the relief setting requested by the customer and is non-adjustable. Refer to the table. Standard pressure setting are specified in the relevant "W" table. For special pressure setting, consult us.

Std. SETTING bar (psi) Q= 5 l/m				
W	Z=05	Z=10	Z=20	Z=35
01	20 (290)	110 (1595)	180 (2610)	240 (3480)
02	30 (435)	120 (1740)	190 (2755)	250 (3625)
03	40 (580)	130 (1885)	200 (2900)	260 (3770)
04	50 (725)	140 (2030)	210 (3045)	270 (3915)
05	60 (870)	150 (2175)	220 (3190)	280 (4060)
06	70 (1015)	160 (2320)	230 (3335)	290 (4205)
07	80 (1160)	170 (2465)		300 (4350)
08	90 (1305)			310 (4495)
09	100 (1450)			320 (4640)

### Applications

They are employed to control the sequence of two or more cylinders or motors, when the second actuator must be allowed to move only after the first actuator has performed a certain function. The incorporated check valve allows free reverse motion without specific control of the sequence.

### Ordering code

0T.S1.03.00.03	Z	W
----------------	---	---

Jic series direct acting poppet type

Std. Setting see table "W"

Springs see table "Z"

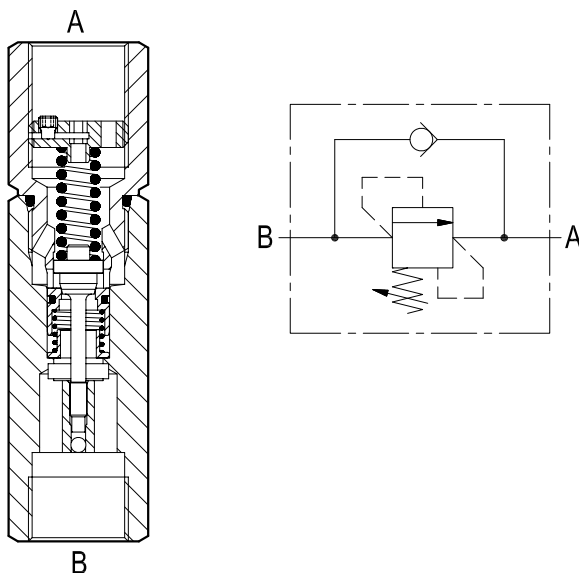
Type	Material number	Type	Material number	Type	Material number
OTS10300030501	R931001994	OTS10300031004	R931002012	OTS10300033503	R931002025
OTS10300030502	R931001995	OTS10300031005	R931002013	OTS10300033504	R931002026
OTS10300030503	R931001996	OTS10300031006	R931002014	OTS10300033505	R931002027
OTS10300030504	R931001997	OTS10300031007	R931002015	OTS10300033506	R931002028
OTS10300030505	R931000099	OTS10300032001	R931002016	OTS10300033507	R931002029
OTS10300030506	R931001998	OTS10300032002	R931002017	OTS10300033508	R931002030
OTS10300030507	R931002000	OTS10300032003	R931002018	OTS10300033509	R931002031
OTS10300030508	R931002004	OTS10300032004	R931002019		
OTS10300030509	R931002005	OTS10300032005	R931002020		
OTS10300031001	R931002009	OTS10300032006	R931002021		
OTS10300031002	R931002010	OTS10300033501	R931002022		
OTS10300031003	R931002011	OTS10300033502	R931002024		

Sequence valves

Direct acting poppet type

VSQ-30-LM (G3/4)

05.21.16.00.04-Z

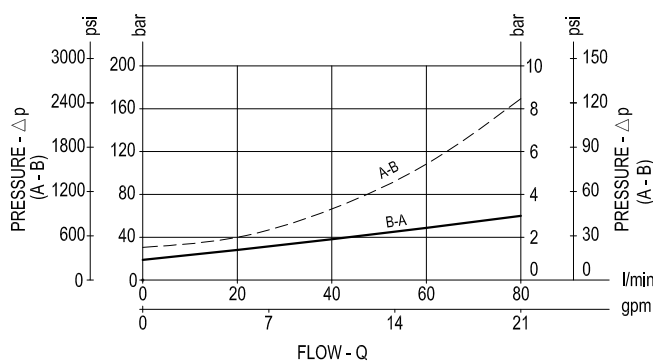


**Description**

They are composed by a relief valve (opening "B-A") with hydraulic dampening, and by a reverse flow annular check valve "A-B". Initially the flow goes to a first line connected in parallel to the B side, not shown here, and pressure increases until reaching the selected relief setting; then the relief valve opens and the second circuit is supplied out of A port, while the actuator connected to the B side remains pressurized. The incorporated check valve allows the reverse motion of the actuators which happens without specific control of the sequence, only depending from the load/pressure conditions.

Note that pressure at A needed to operate the second actuator is additive to the relief setting, and, for this reason, this valve is successfully employed to energize a secondary actuator which only requires low pressure.

**Performance**



**Technical data**

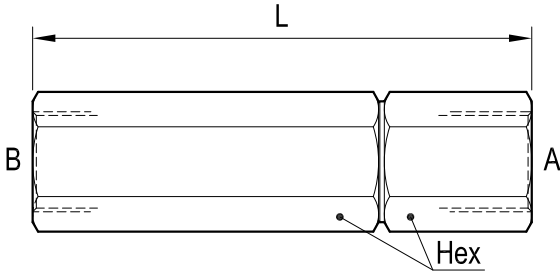
Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
350 (5000)	80 (21)	0.6 (1.32)

Steel body, zinc plated

**Advantages**

- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Low  $\Delta p$  for B-A flow.
- Different springs available for different pressure ranges ( see the "Z" table).

**Dimensions**



**Port size / Dimensions**

Ports A - B	L mm (inches)	Hex mm (inches)
G 3/4	132 (5.2)	32 (1.26)

Springs					
Z	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min	Ordering code	Colour
05	20-70 (290-1000)	21 (305)	20 (290)	03.51.01.106	green

The relief setting is adjustable by turning the internal ring nut: to turn the nut loosen first the little locking screw, then tighten it again after the adjustment. For the spring selection, refer to the table.

**Applications**

They are employed to control the sequence of two or more cylinders or motors, when the second actuator must be allowed to move only after the first actuator has performed a certain function. The incorporated check valve allows free reverse motion without specific control of the sequence.

**Ordering code**

<b>05.21.16.00.04</b>	<b>Z</b>
-----------------------	----------

Direct acting poppet type

Springs see table "Z"

Type	Material number	Type	Material number	Type	Material number
052116000405010	R930001447				



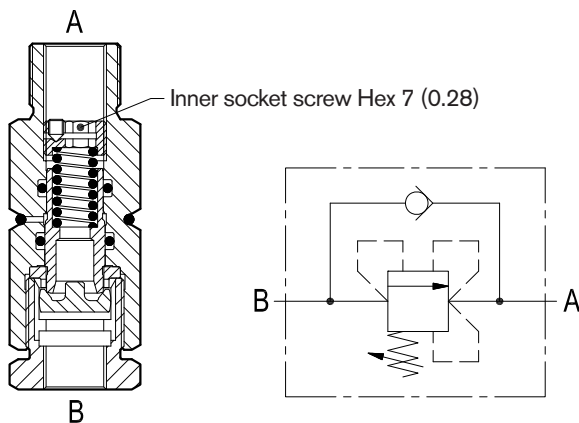
Sequence valves

Direct acting poppet type pressure compensated



VSQ-CC-LM (G3/8)

05.21.19.00-Y-Z



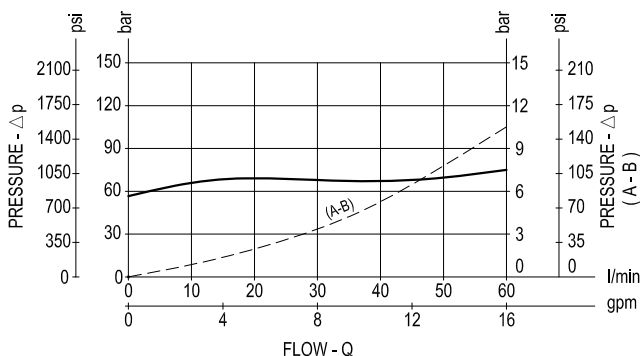
### Description

They are composed by a pressure compensated relief valve (opening "B-A"), and by an annular check valve "A-B". Initially the flow goes to a first line connected in parallel to the B side, not shown here, and pressure increases until reaching the selected relief setting; then the relief valve opens and the second circuit is supplied out of A port, while the actuator connected to the B side remains pressurized.

The valve applies a balanced relief piston allowing relief operation at the valve setting independent of back-pressure at A (back-pressure is not additive). With line pressure equal or higher than setting, after valve opening, the full pressure is transferred from B to A.

The incorporated check valve allows the reverse motion of the actuators which happens without specific control of the sequence, only depending from the load/pressure conditions.

### Performance



### Technical data

Port A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
G 3/8	350 (5000)	60 (16)	0.38 (0.84)

Steel body, zinc plated

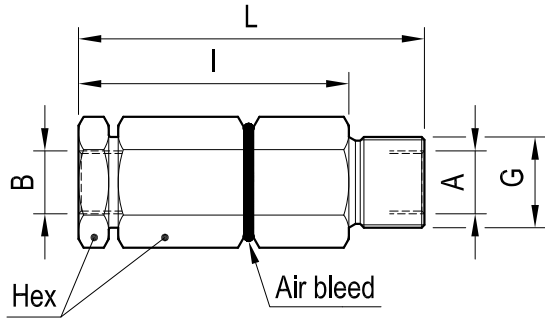
Installation torque: 88 - 90 Nm (65 - 67 ft-lb)

For a good performance, the pressure in the secondary circuit should not drop below 20 bar (290 psi).

### Advantages

- The pressure compensation allows to transfer the full system pressure to the second actuator.
- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Low  $\Delta p$  for B-A flow.

**Dimensions**



**Ports size / Dimensions**

Y	Port A-B	L mm (inches)	I mm (inches)	Hex mm (inches)	G
02	G 3/8	91.5 (3.6)	71.5 (2.82)	30 (1.18)	M24x1.5

Springs				
Z	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min	Ordering code
01	50-140 (725-2000)	25 (363)	100 (1450)	03.51.01.256

The relief setting is adjustable by turning the internal ring nut (hexagon 7 mm): to turn the nut loosen first the little locking screw, then tighten it again after the adjustment. For the spring selection, refer to the table.

**Applications**

They are employed to control the sequence of two or more cylinders or motors, when the second actuator requires less pressure to move, but the pressure needed is not negligible. The pressure at A needed to operate the second actuator is not additive to the relief setting and this results also in energy saving. The incorporated check valve allows free reverse motion without specific control of the sequence.

**Ordering code**

05.21.19.00	Y	Z
-------------	---	---

Direct acting poppet type pressure compensated

Springs see table "Z"

Ports size / Dimensions see table "Y"

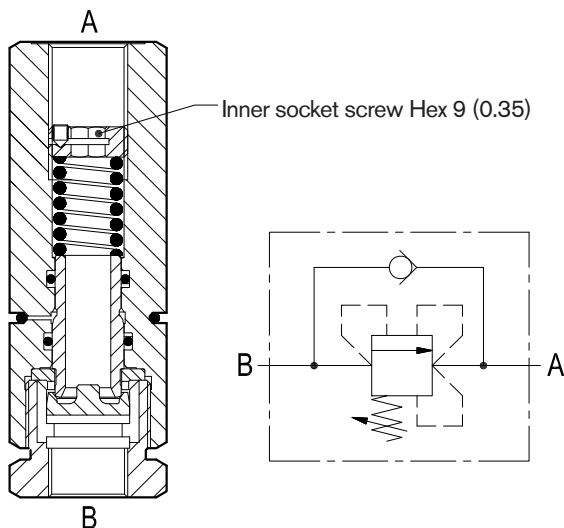
Type	Material number	Type	Material number	Type	Material number
052119000201000	R901187639				

Sequence valves

Direct acting poppet type pressure compensated

VSQ-CC-LM (G1/2)

05.21.17.00-Y-Z



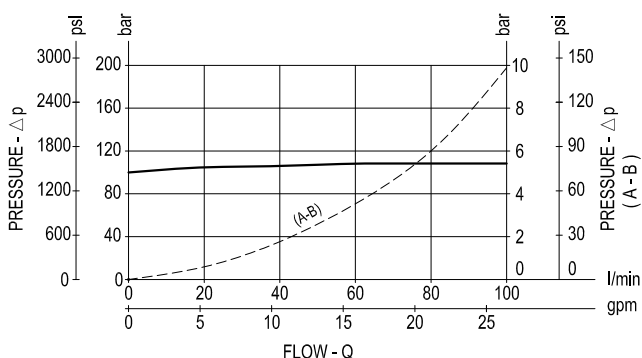
### Description

They are composed by a pressure compensated relief valve (opening "B-A"), and by an annular check valve "A-B". Initially the flow goes to a first line connected in parallel to the B side, not shown here, and pressure increases until reaching the selected relief setting; then the relief valve opens and the second circuit is supplied out of A port, while the actuator connected to the B side remains pressurized.

The valve applies a balanced relief piston allowing relief operation at the valve setting independent of back-pressure at A (back-pressure is not additive). With line pressure equal or higher than setting, after valve opening, the full pressure is transferred from B to A.

The incorporated check valve allows the reverse motion of the actuators which happens without specific control of the sequence, only depending from the load/pressure conditions.

### Performance



### Advantages

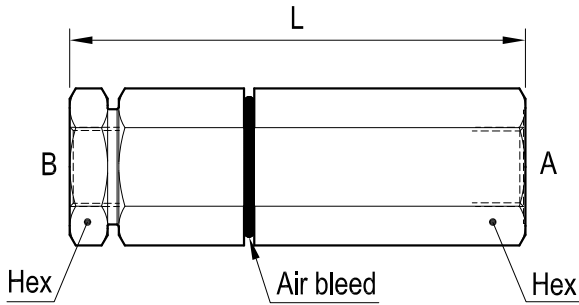
- The pressure compensation allows to transfer the full system pressure to the second actuator.
- Very compact design and inline mounting for space saving.
- Mounting position is unrestricted.
- Low  $\Delta p$  for B-A flow.

### Technical data

Port A-B	Pressure P max bar (psi)	Flow Q max l/min (gpm)	Weight kg (lbs)
G 1/2	350 (5000)	100 (27)	0.38 (0.84)

For a good performance, the pressure in the secondary circuit should not drop below 20 bar (290 psi).

**Dimensions**



**Ports size / Dimensions**

Y	Port A-B	L mm (inches)	Hex mm (inches)
03	G 1/2	120.5 (4.74)	36 (1.42)

Springs				
Z	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) Q=5 l/min	Ordering code
10	50-140 (725-2000)	20 (290)	100 (1450)	03.51.01.251

The relief setting is adjustable by turning the internal ring nut (hexagon 9 mm): to turn the nut loosen first the little locking screw, then tighten it again after the adjustment. For the spring selection, refer to the table.

**Applications**

They are employed to control the sequence of two or more cylinders or motors, when the second actuator requires less pressure to move, but the pressure needed is not negligible. The pressure at A needed to operate the second actuator is not additive to the relief setting and this results also in energy saving. The incorporated check valve allows free reverse motion without specific control of the sequence.

**Ordering code**

05.21.17.00	Y	Z
-------------	---	---

Direct acting poppet type pressure compensated

Springs see table "Z"

Ports size / Dimensions see table "Y"

Type	Material number	Type	Material number	Type	Material number
052117000310000	R930001451				

## Sleeve valve for line mounting Shut-off pressure gauge

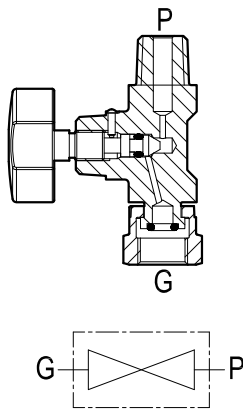
<b>Designation</b>	<b>Description</b>	<b>Cavity</b>	<b>Data sheet</b>	<b>Page</b>
Sleeve valves for line mounting shut-off valve for in-line pressure gauge mounting	EM	G 1/4	18316-75	689
Sleeve valves for line mounting shut-off valve for 90° pressure gauge mounting	EMT	G 1/4	18316-76	691



Shut-off valve for pressure gauge  
Shut-off valves for in-line pressure gauge mounting



EM Series



**Description**

The port G for pressure gauge installation includes a swivelling nut in order to lock the gauge in the preferred direction; further, the G port is available with:  
O-Ring (EM 14 version) for gauges with BSPP, cylindrical, thread  
Copper washer (EM 14C version) for gauges with BSPT, tapered, thread.  
The hand-knob can lock the P port and prevent the pressure gauge from being pressurized at all times.

**Technical data**

Code	Pressure P max bar (psi)	Weight kg (lbs)
<b>EM 14</b>	350 (5000)	0.12 (0.26)
<b>EM 14 C</b>	350 (5000)	0.12 (0.26)

Brass body, plastic hand knob

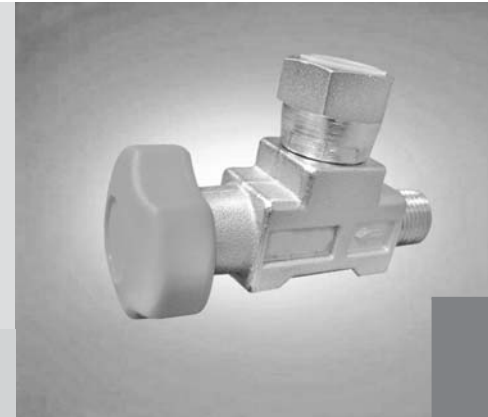
**Advantages**

-Mounting position is optional.

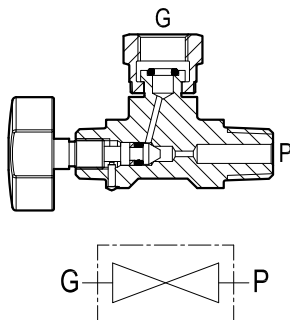




Shut-off valves for pressure gauge  
Shut-off valves for 90° pressure gauge mounting



EMT Series



**Description**

The port G for pressure gauge installation includes a swivelling nut in order to lock the gauge in the preferred direction; further, the G port is available with:

O-Ring (EM 14 version) for gauges with BSPP, cylindrical, thread

Copper washer (EM 14C version) for gauges with BSPT, tapered, thread

The hand-knob can lock the P port and prevent the pressure gauge from being pressurized at all times.

**Technical data**

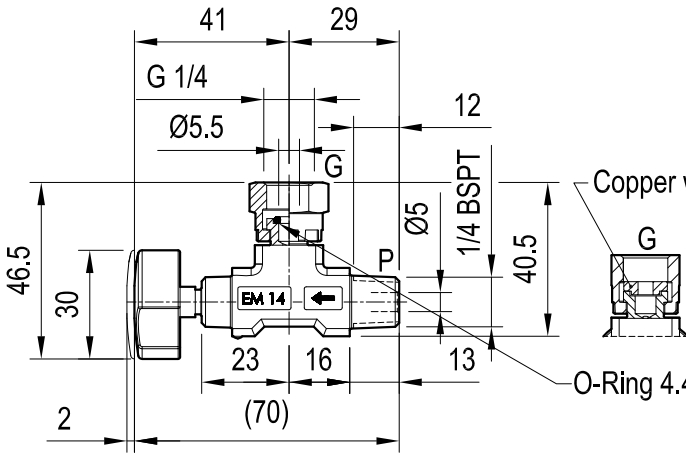
Code	Pressure <b>P</b> max bar (psi)	Weight kg (lbs)
<b>EM 14 T</b>	350 (5000)	0.12 (0.26)
<b>EM 14 T C</b>	350 (5000)	0.12 (0.26)

Brass body, plastic hand knob

**Advantages**

-Mounting position is optional.

**Dimensions**



Code	Port size		Hand Knob turns
	Gauge side (G)	Pressure side (P)	
EM 14 T	G 1/4	1/4 BSPT	2
EM 14 T C		conical	

Copper washer, for conical port gauges EM14T C version

O-Ring 4.47x1.78, for cilindrical port gauges EM14T version

**Ordering code**

EMT

series 14 T	= 14
series 14 T C	= 14 C

Type	Material number	Type	Material number	Type	Material number
EM14T	R932500184				
EM14TC	R932500185				

# Solenoid cartridge valves

## On-off pilot operated

Designation	Description	Cavity	Code	Data sheet	Page
Solenoid cartridge valves, pilot operated poppet 2 way normally closed	VEI-8I-06-NC	Size 08	OD15X18YS0	18323-01	695
Solenoid cartridge valves, pilot operated poppet 2 way normally closed	VEI-8A-06-NC	Size 08	OD15XYZS	18323-02	699
Solenoid cartridge valves, pilot operated poppet 2 way normally closed	VEI-8A-06-NC (019-E)	Special	OD15X19Z	18323-20	703
Solenoid cartridge valves, pilot operated poppet 2 way normally closed	VEI-8A-06-NC-ET	Size 08	OD15X183CZ	18323-09	707
Solenoid cartridge valves, pilot operated poppet 2 way normally closed	VEI-8A-10-NC	Size 10	OD15X36YZ	18323-11	711
Solenoid cartridge valves, pilot operated poppet 2 way normally closed	VEI-8A-09-NC	Special	OD15X17YZ	18323-03	715
Solenoid cartridge valves, pilot operated poppet 2 way normally closed	VEI-8A-12A-NC	Size 12	OD15X89YZ	18323-13	719
Solenoid cartridge valves, pilot operated poppet 2 way normally closed	VEI-8A-12-NC	Special	OD15X21YZ	18323-04	723
Solenoid cartridge valves, pilot operated poppet 2 way normally closed	VEI-8A-16A-NC	Size 16	OD15X75YS0	18323-17	727
Solenoid cartridge valves, pilot operated poppet 2 way normally closed	VEI-8A-2B-16-NC-NSS	Special	OD150304YS0	18323-15	731
Solenoid cartridge valves, pilot operated poppet 2 way normally open	VEI-8I-06-NA	Size 08	OD15X18YS0	18323-05	735
Solenoid cartridge valves, pilot operated poppet 2 way normally open	VEI-8A-06-NA	Size 08	OD15XYZS0	18323-06	739
Solenoid cartridge valves, pilot operated poppet 2 way normally open	VEI-8A-06-NA	Special	OD15X19Z	18323-21	743
Solenoid cartridge valves, pilot operated poppet 2 way normally open	VEI-8A-10-NA	Size 10	OD15X36YS0	18323-12	747
Solenoid cartridge valves, pilot operated poppet 2 way normally open	VEI-8A-09-NA	Special	OD15X17YS0	18323-07	751
Solenoid cartridge valves, pilot operated poppet 2 way normally open	VEI-8A-12A-NA	Size 12	OD15X89YS0	18323-14	755
Solenoid cartridge valves, pilot operated poppet 2 way normally open	VEI-8A-12-NA	Special	OD15X21YS0	18323-08	759
Solenoid cartridge valves, pilot operated poppet 2 way normally open	VEI-8A-16A-NA	Size 16	OD15X75YS0	18323-18	763
Solenoid cartridge valves, pilot operated poppet 2 way normally open	VEI-8A-2B-16-NA-NSS	Special	OD150404YS0	18323-16	767

## Solenoid cartridge valves

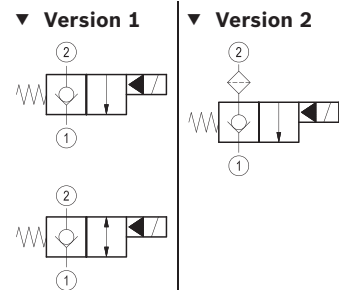
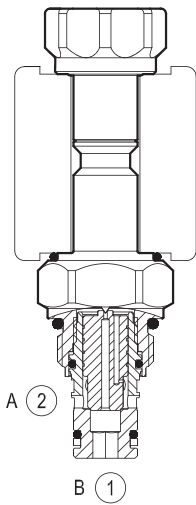
### On-off pilot operated

Designation	Description	Cavity	Code	Data sheet	Page
Solenoid operated valves, pilot operated poppet 2 way normally open proximity sensor	VEI-8A-2A-06-NA-S-M-NSS	Size 08	OD1506182DS2Z	18325-07	771
Solenoid operated valves, pilot operated poppet 2 way normally open proximity sensor	VEI-8A-2A-09-NA-S-M-NSS	Special	OD1506761DS2Z	18325-08	775
Solenoid operated valves, pilot operated poppet 2 way normally open proximity sensor	VEI-8A-2A-09-NA-S-M-NSS	Special	OD1506171DS0Z	18325-09	779
Solenoid operated valves, pilot operated poppet 2 way normally open proximity sensor	VEI-8A-2A-12-NA-S-M-NSS	Special	OD1506211DS2Z	18325-10	783
Solenoid operated valves, pilot operated poppet 2 way normally open proximity sensor	VEI-8A-2T-06-NA-S-M-NSS	Size 08	OD1532181DS2Z	18325-16	787
Solenoid operated valves, pilot operated poppet 2 way normally open double lock proximity sensor	VEI-8A-2T-09-NA-S-M-NSS	Special	OD1532171DS2Z	18325-15	791
Solenoid operated valves, pilot operated poppet 2 way normally closed proximity sensor	VESP-08A-12A/00-2A05-N7	Size 08	OD15051841YZ	18325-03	795
Solenoid operated valves, pilot operated poppet 2 way normally closed proximity sensor - extra spring	VESP-12G-16A/00-2A05-N7	Special	OD1505176504Z	18325-04	799
Solenoid operated valves, pilot operated poppet 2 way normally closed proximity sensor	VESP-16G-16A/00-2A-N7	Special	OD15052165YZ	18325-05	803

Solenoid operated valves pilot operated poppet type  
2-way normally closed  
Common cavity, Size 08

VEI-8I-06-NC

OD.15 - X - 18 - Y - S0

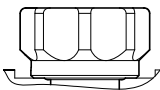
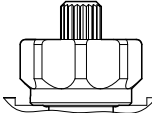
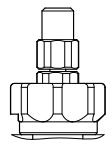
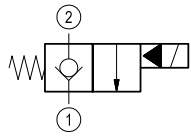
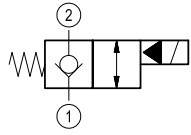
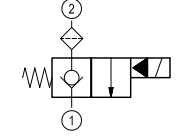


**Technical data**

General	
Weight	0.11 kg (0.24 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
Hydraulic	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	0.5 - 30 l/min (0.1 - 8 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	39 - 51 Nm (29 - 38 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Cavity	CA-08A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 1-2	code material no. RG08A2010520100 R901101437
Seal kit coil	code material no. RG1211PNBR7010 R934003957
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

4

Ordering code

	<b>OD.15</b>	<b>X</b>	<b>18</b>	<b>Y</b>	<b>S0</b>
Solenoid operated valves pilot operated poppet type 2-way normally closed		Tube not welded			
monodirectional type		<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>standard type</p>  <p>3I</p> </div> <div style="text-align: center;"> <p>knob style manual override</p>  <p>3M</p> </div> <div style="text-align: center;"> <p>Cable operated pull style override</p>  <p>3C</p> </div> </div>			
 <p>01</p>					
bidirectional type					
 <p>05</p>					
monodirectional type with filter					
 <p>07</p>					
Common cavity: CA-08A-2N					

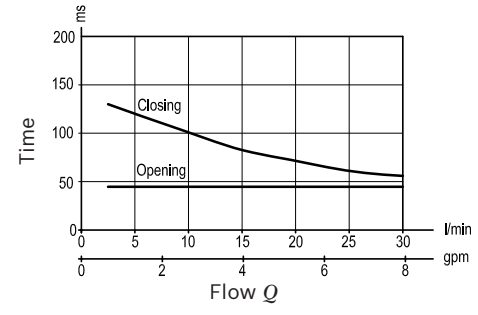
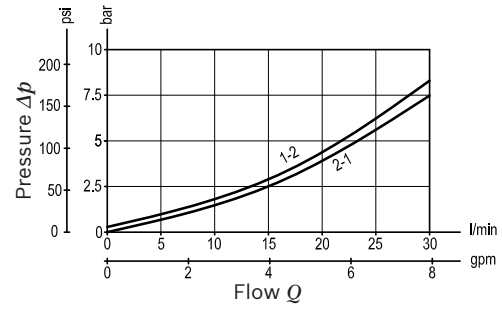
Type	Material number
OD1501183IS000	R901090962
OD1501183MS000	R901090966
OD1505183IS000	R901090953
OD1505183MS000	R901090950
OD1507183IS000	R901091142
OD1507183MS000	R934003486

Type	Material number
OD1507183CS000	R930054706

Characteristic curves

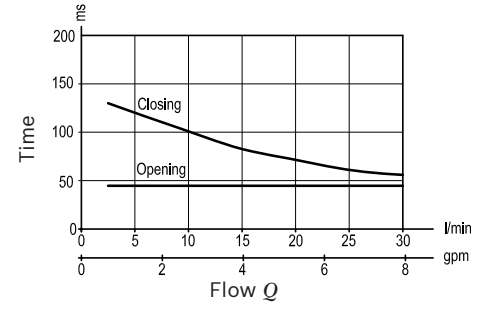
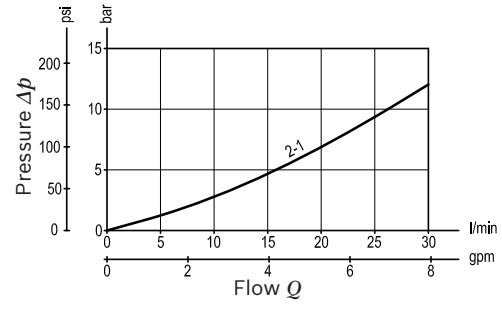
**Version 1**

Standard



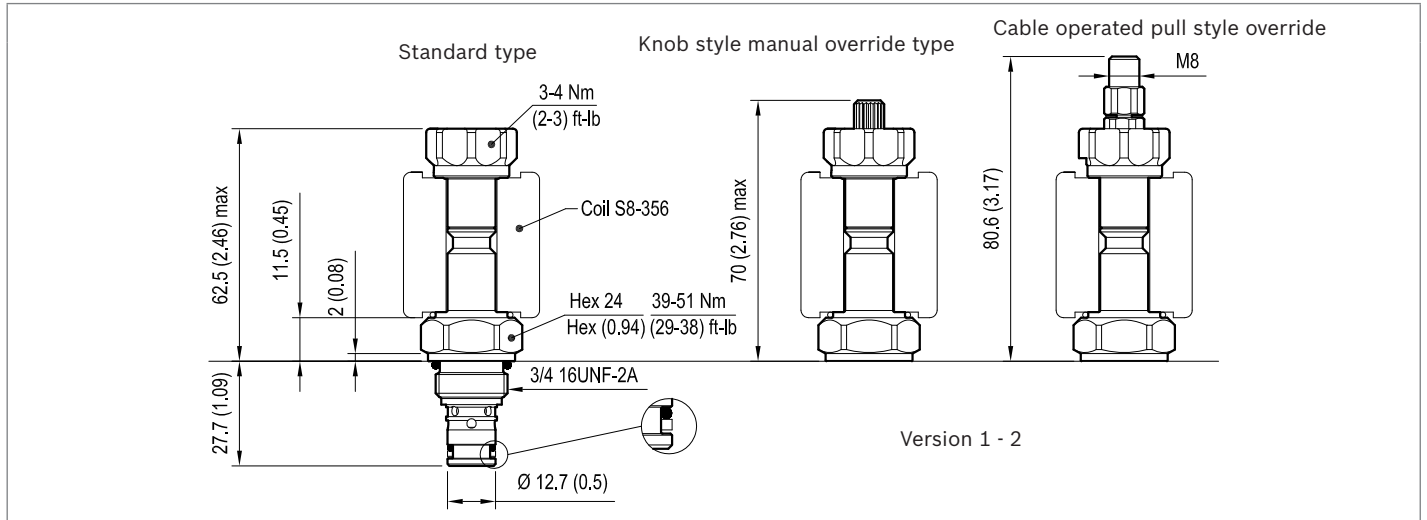
**Version 2**

Standard

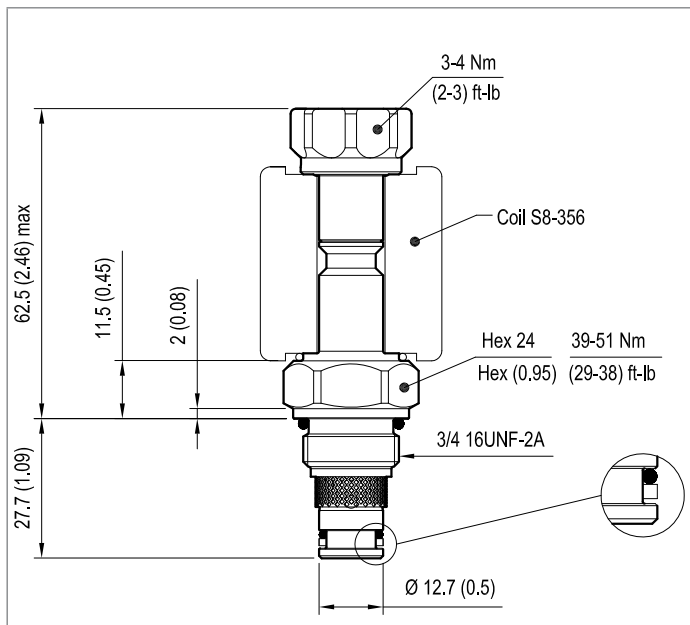


**Dimensions**

▼ **Version 1: Solenoid operated valve, poppet 2-way normally closed**



▼ **Version 2: Solenoid operated valve, poppet 2-way normally closed - filter**

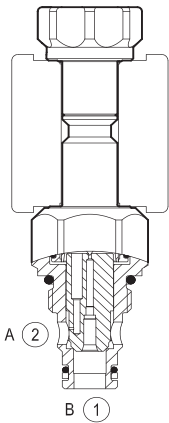




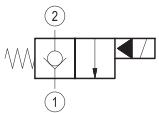
Solenoid operated valves pilot operated poppet type  
2-way normally closed  
Common cavity, Size 08

VEI-8A-06-NC

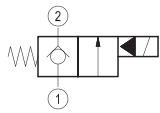
OD.15 - X - Y - Z - S



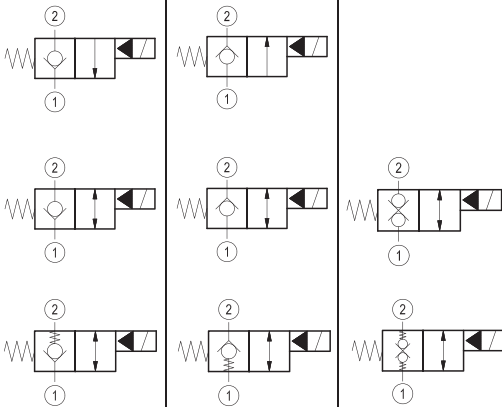
▼ Version 1



▼ Version 2



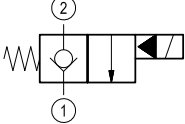
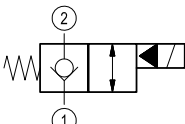
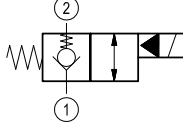
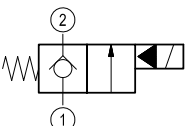
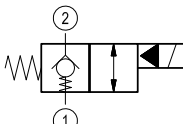
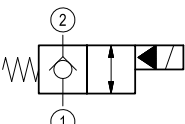
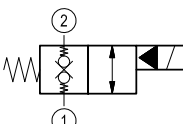
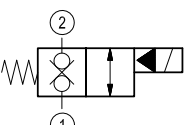
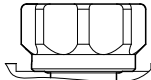
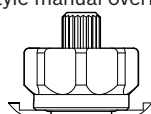
▼ Version 3



**Technical data**

<b>General</b>	
Weight	0.16 kg (0.35 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
<b>Hydraulic</b>	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	0.5 - 40 l/min (0.1 - 11 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	39 - 51 Nm (29 - 38 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Cavity	CA-08A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 1	code material no. RG08A2010520100 R901101437
Seal kit – version 2-3	code material no. RG08A2010530100 R901101544
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

Ordering code

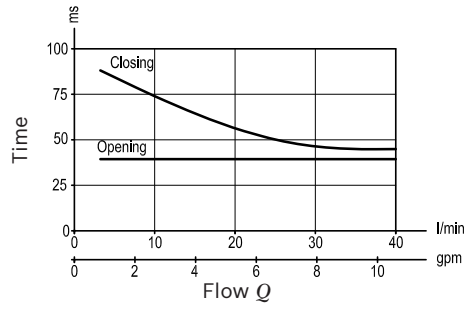
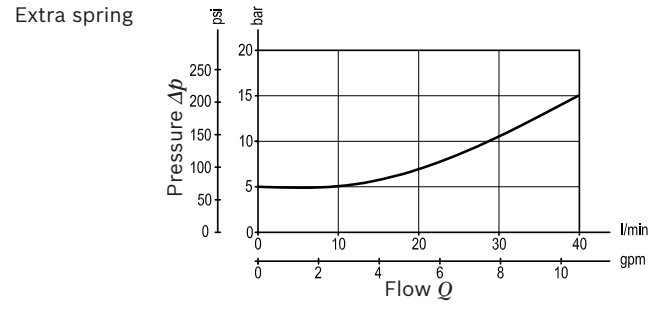
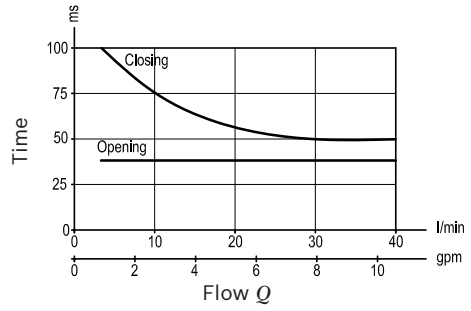
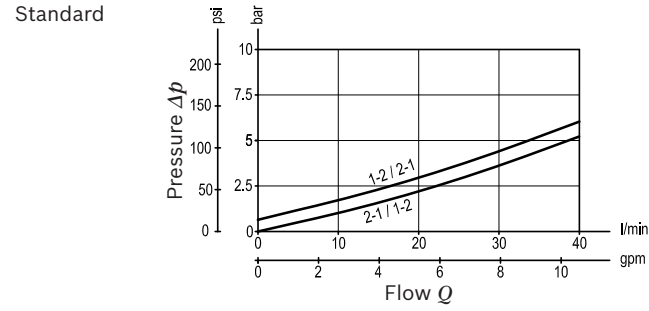
	OD.15	X	18	Y	Z
<p>Solenoid operated valves pilot operated poppet type 2-way normally closed</p>					
<p>monodirectional type</p>  <p style="text-align: right;"><b>01</b></p>					<p><b>S0</b> = Tube not welded</p>
<p>bidirectional type</p>  <p style="text-align: right;"><b>05</b></p>					<p><b>S8</b> = Tube not welded with extra spring</p>  <p style="text-align: right;">for X= 05</p>
<p>monodirectional type</p>  <p style="text-align: right;"><b>09</b></p>					 <p style="text-align: right;">for X= 03</p>
<p>bidirectional type</p>  <p style="text-align: right;"><b>03</b></p>					 <p style="text-align: right;">for X= 31</p>
<p>bidirectional type</p>  <p style="text-align: right;"><b>31</b></p>					<p>standard type</p>  <p style="text-align: left;"><b>3A</b></p>
					<p>knob style manual override</p>  <p style="text-align: left;"><b>3D</b></p>
			18 = Common cavity: CA-08A-2N		

Type	Material number
OD1501183AS000	R901091096
OD1501183DS000	R901091101
OD1503183AS000	R934000779
OD1503183AS800	R934003063
OD1503183DS000	R901091112
OD1503183DS800	R934003064
OD1505183AS000	R901083058
OD1505183AS800	R934003080

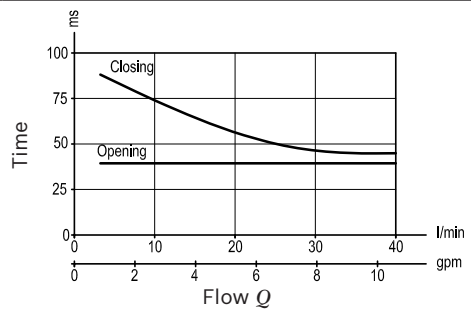
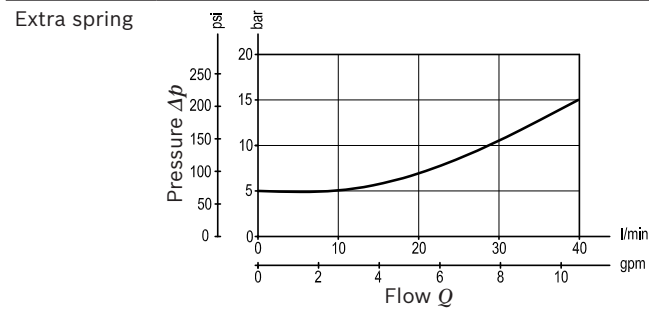
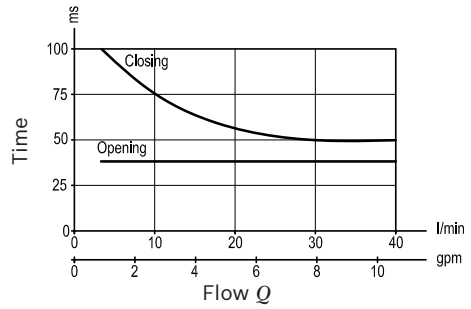
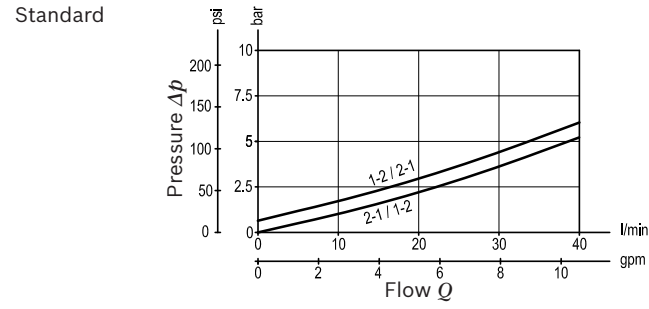
Type	Material number
OD1505183DS000	R901087979
OD1509183AS000	R901091150
OD1509183DS000	R901091151
OD1531183AS000	R901082015
OD1531183AS800	R934000104
OD1531183DS000	R901091164

Characteristic curves

Version 1 - Version 2



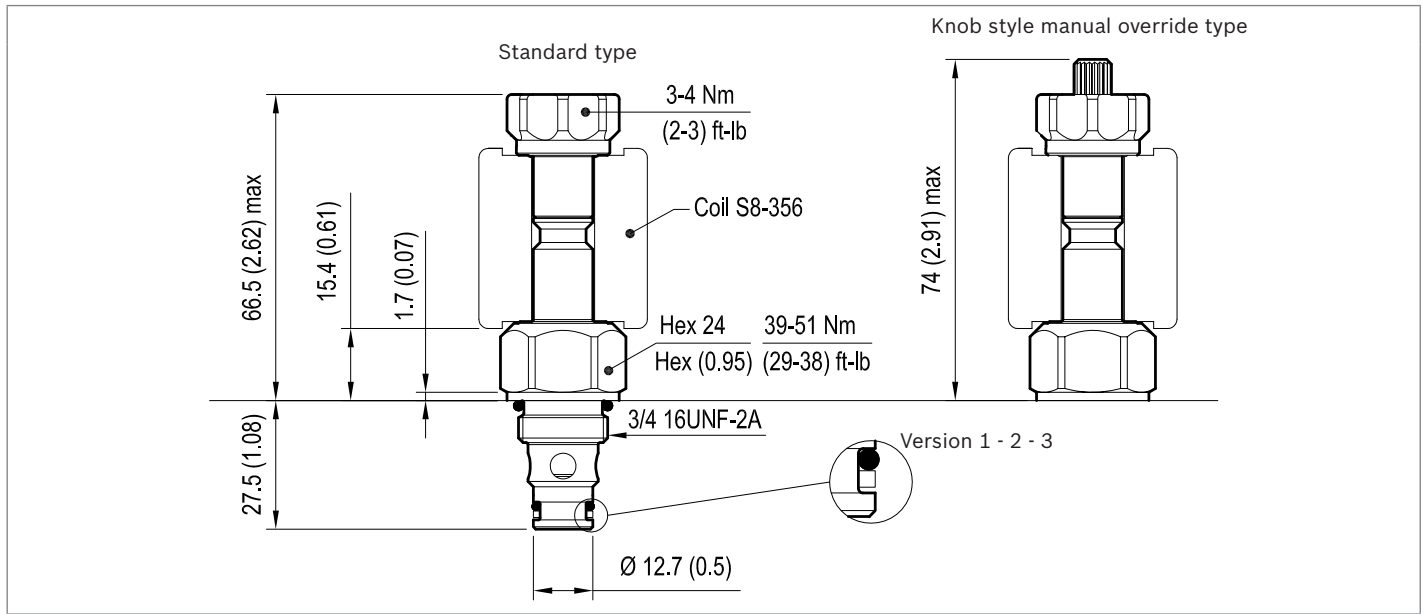
Version 3



4

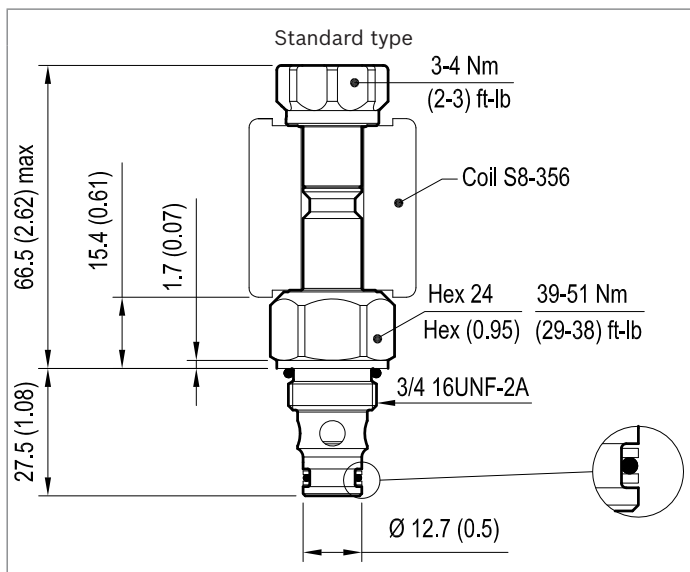
**Dimensions**

▼ **Version 1: Solenoid operated valve, poppet 2-way normally closed**



▼ **Version 2: Solenoid operated valve, poppet 2-way normally closed**

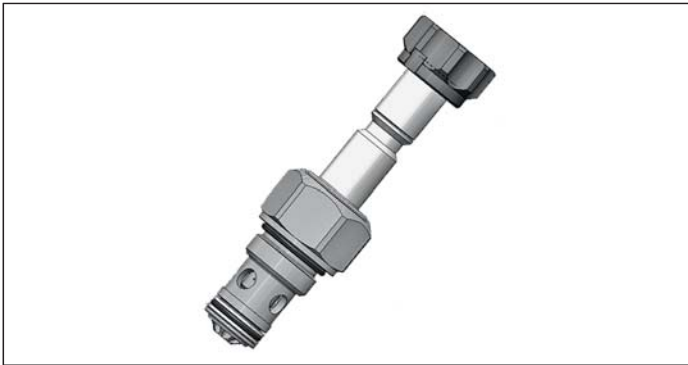
▼ **Version 3: Solenoid operated valve, poppet 2-way double lock normally closed**



Solenoid operated valves pilot operated poppet type  
2-way normally closed  
Special cavity, 019-E

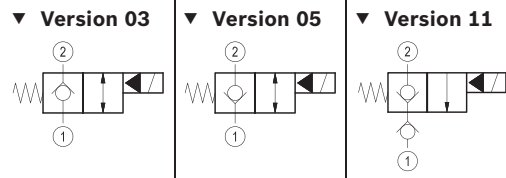
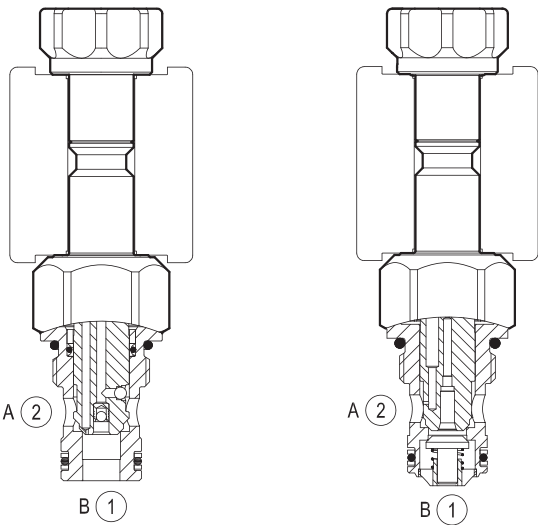
VEI-8A-06-NC

OD.15 - X - 19 - Z

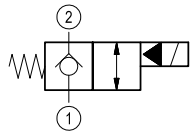
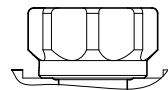
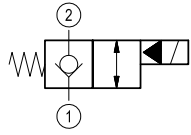
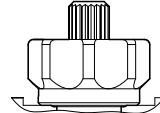
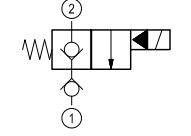


**Technical data**

General	
Weight	0.13 kg (0.29 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
Hydraulic	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	0.5 - 40 l/min (0.1 - 11 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	39 - 51 Nm (29 - 38 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Special cavity	019-E see 18325-75
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 03-11	code material no. RG19E201053010 R934003561
Seal kit – version 5	code material no. RG19E201052010 R934003560
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	



Ordering code

	<b>OD.15</b>	<b>X</b>	<b>19</b>	<b>Z</b>	<b>S0</b>	
Solenoid operated valves pilot operated poppet type 2-way normally closed						Tube not welded
monodirectional type						
		03				3A
bidirectional type						standard type 
		05				3D
monodirectional type						knob style manual override 
		11				
						Special cavity: 019-E

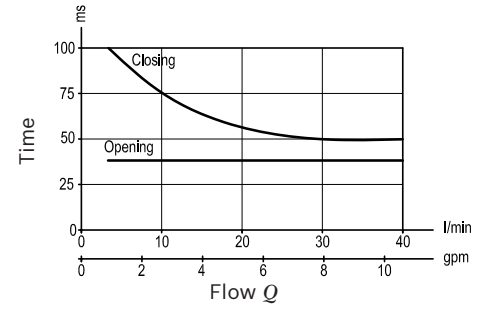
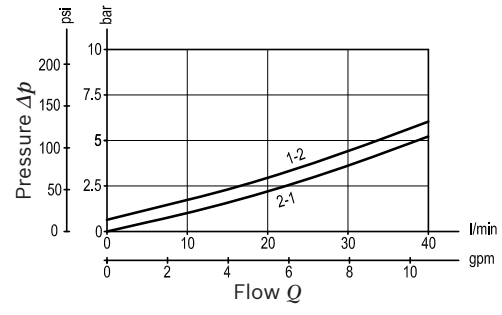
Type	Material number
OD1503193AS00	R934000785
OD1503193DS00	R934000786
OD1505193AS00	R934000895
OD1505193DS00	R934000898
OD1511193AS000	R901091157
OD1511193DS000	R901091158

Type	Material number

Characteristic curves

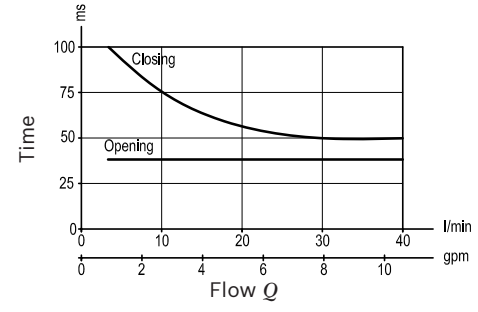
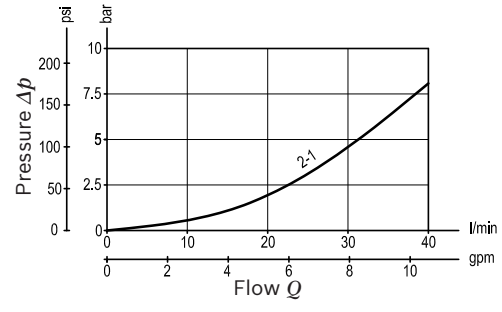
Version 03-05

Standard



Version 11

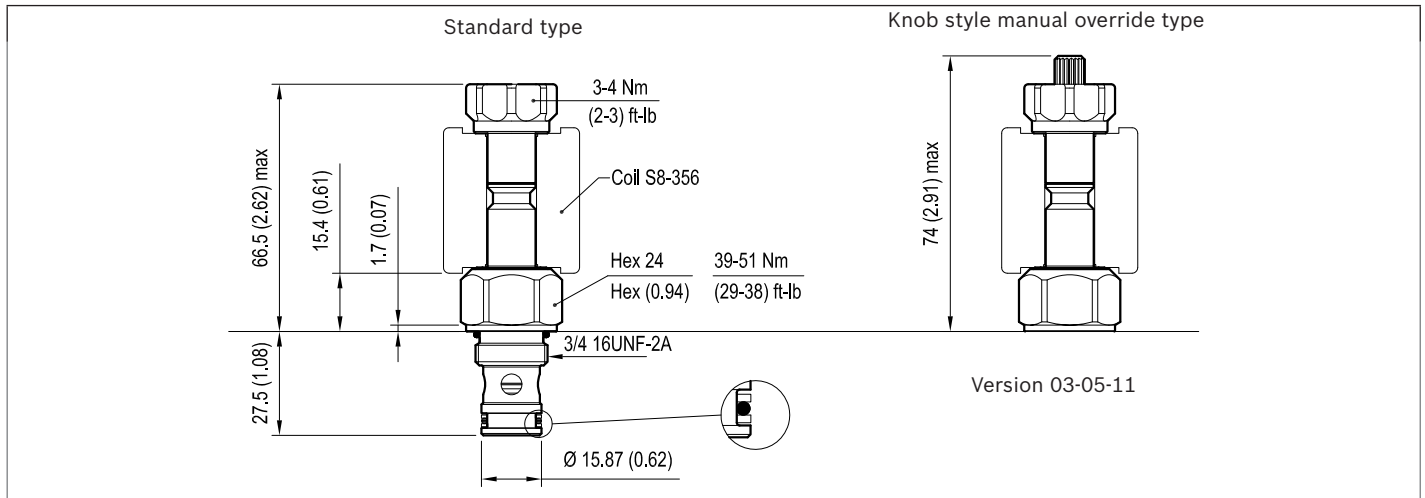
Standard



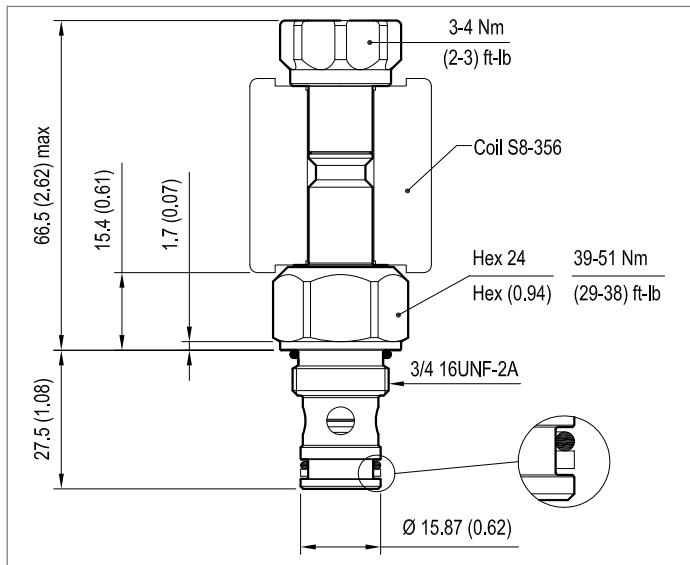
4

**Dimensions**

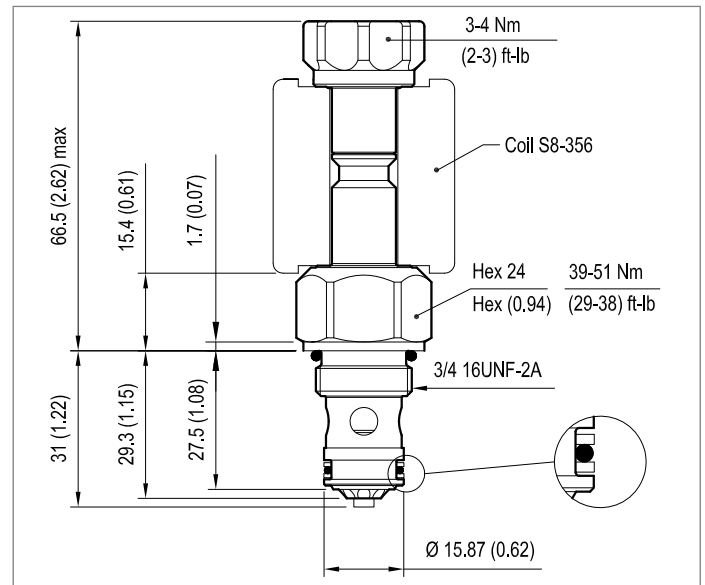
▼ **Version 03: Solenoid operated valves, poppet 2-way normally closed**



▼ **Version 05: Solenoid operated valves, poppet 2-way normally closed**



▼ **Version 11: Solenoid operated valves, poppet 2-way normally closed**

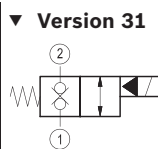
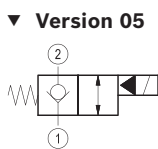
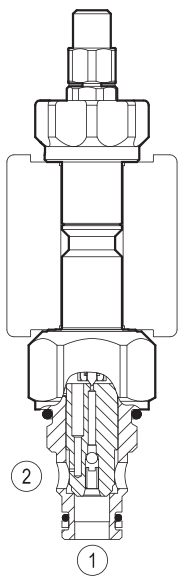




Solenoid operated valves pilot operated poppet type  
2-way normally closed  
Common cavity, Size 08

VEI-8A-06-NC-ET

OD.15 - X - 18.3C - Z



**Technical data**

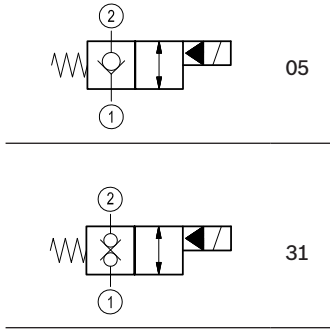
<b>General</b>	
Weight	0.13 kg (0.29 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
<b>Hydraulic</b>	
Max. operating pressure	350 bar (5000 psi)
Rated flow	40 l/min. (11 gpm)
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	39 - 51 Nm (29 - 38 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Cavity	CA-08A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 05	code material no. RG08A2010520100 R901101437
Seal kit – version 31	code material no. RG08A2010530100 R901101544
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

4

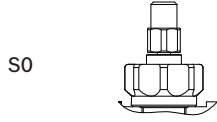
**Ordering code**

<b>OD.15</b>	<b>X</b>	<b>18</b>	<b>3C</b>	<b>Z</b>
--------------	----------	-----------	-----------	----------

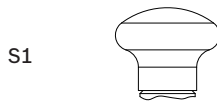
Solenoid operated valves  
pilot operated poppet type  
2-way normally closed



Cable operated pull style override



Hand operated pull style override



Common cavity: CA-08A-2N

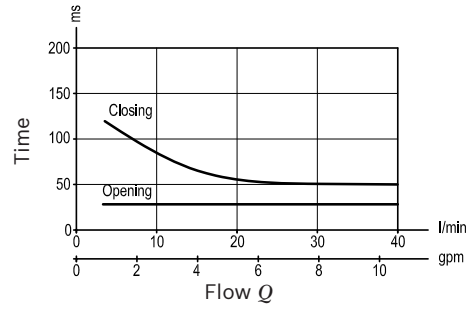
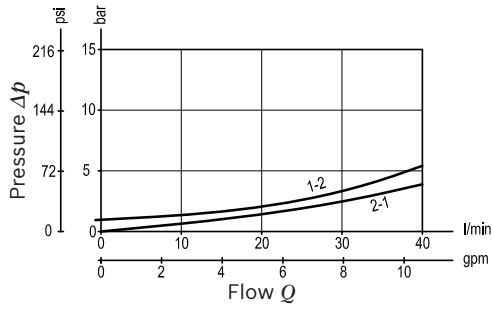
Type	Material number
OD1505183CS000	R901094735
OD1505183CS100	R901094737
OD1531183CS000	R901109982
OD1531183CS100	R901109983

Type	Material number

Characteristic curves

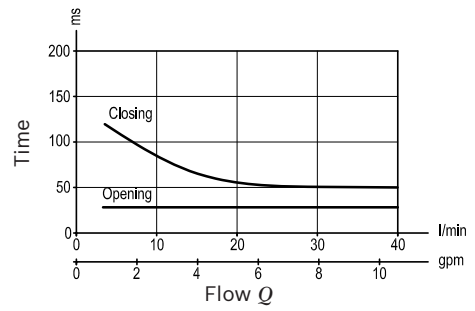
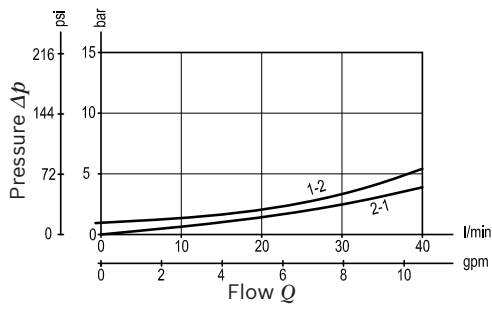
**Version 05**

Standard



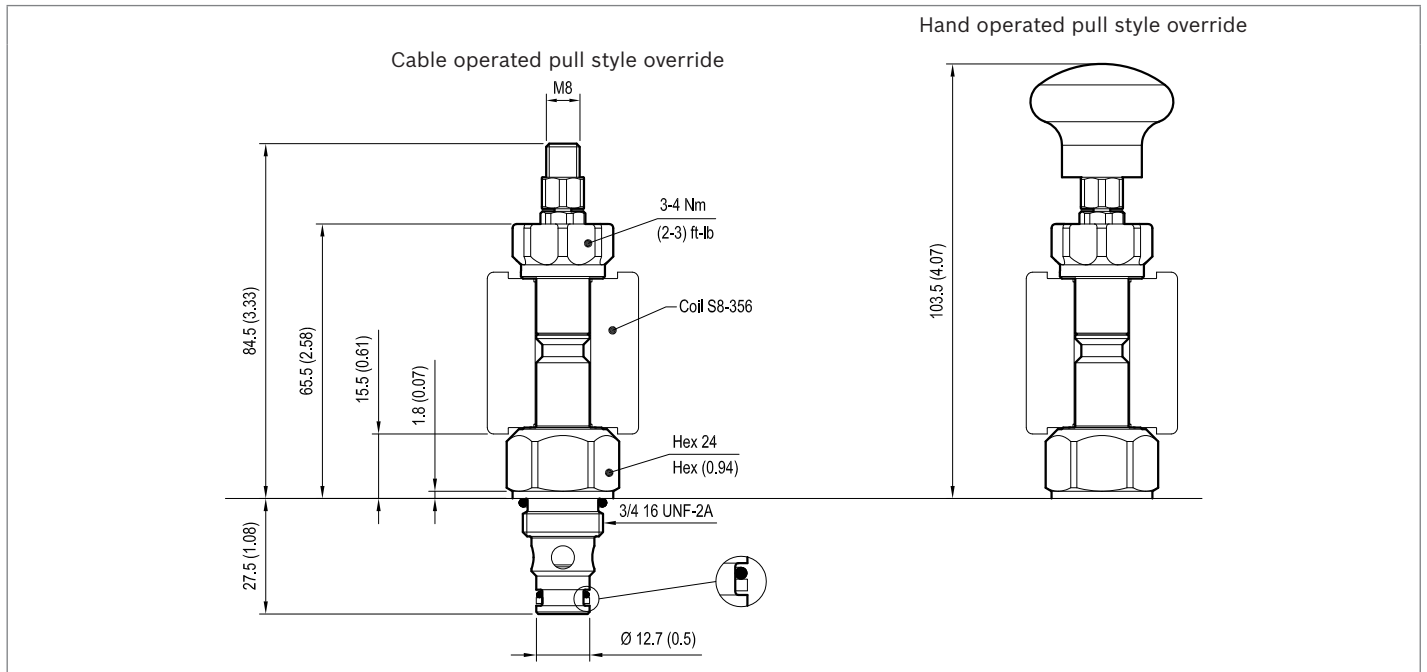
**Version 31**

Standard

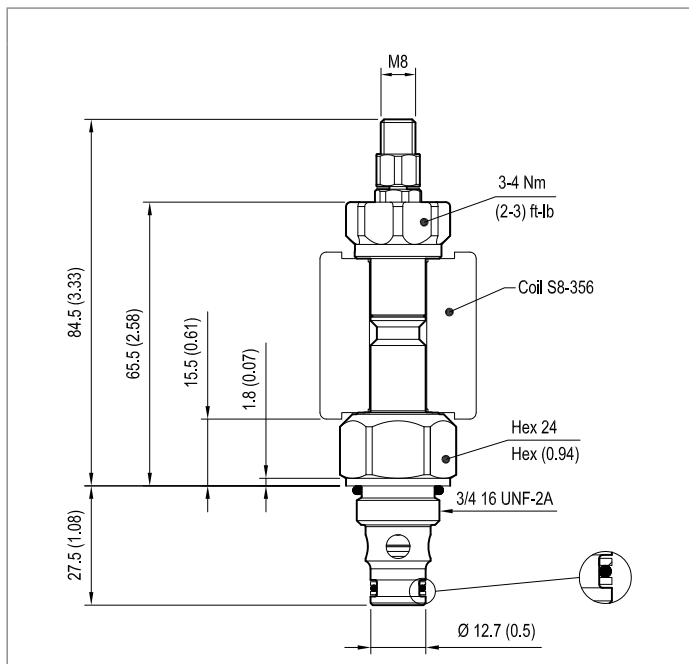


**Dimensions**

▼ **Version 05: Solenoid operated valve, poppet 2-way normally closed**



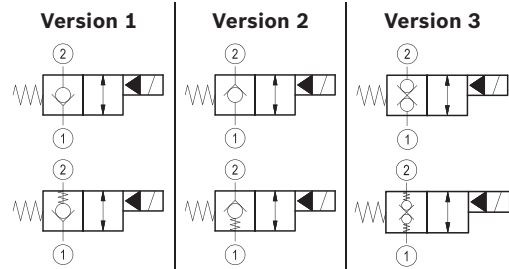
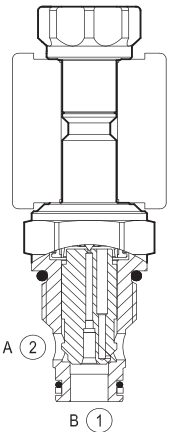
▼ **Version 31: Solenoid operated valve, poppet 2-way double lock normally closed**



Solenoid operated valves pilot operated poppet type  
2-way normally closed  
Common cavity, Size 10

VEI-8A-10-NC

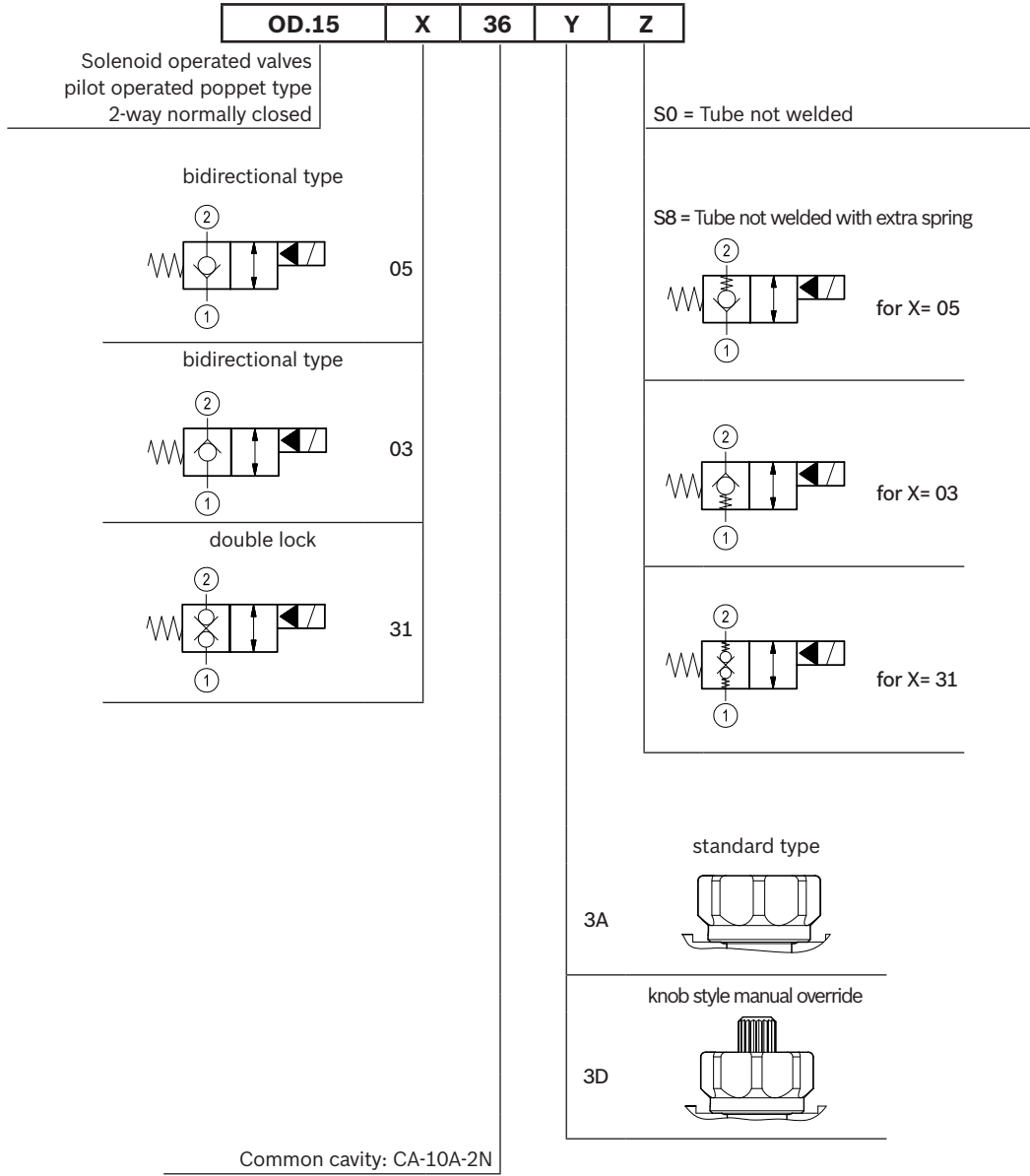
OD.15 - X - 36 - Y - Z



**Technical data**

General		
Weight		0.16 kg (0.35 lbs)
Installation orientation		Optional
Ambient temperature range		-30 to 60 °C (-22 to 140 °F)
Hydraulic		
Max. operating pressure		350 bar (5000 psi)
Max. proof pressure		420 bar (6000 psi)
Flow range		2 - 70 l/min (0.5 - 18 gpm)
Fatigue cycle life		1 million cycles at 350 bar
Max. internal leakage		20 drops/min.
Fluid temperature range		-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)		
Installation torque		44 - 56 Nm (33 - 42 ft-lbs)
Recommended degree of fluid contamination		Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd		150 years see RE 18350-51
Cavity		CA-10A-2N see 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 1	code material no.	RG10A2010520100 R901111363
Seal kit – version 2-3	code material no.	RG10A2010530100 R901111366
Seal kit coil	code material no.	RG12A1PNBR7010 R934003958
Other technical data		See data sheet 18350-50
Electrical		
Type of voltage		DC voltage
Coil type		S8-356 see 18325-90
Supply voltage		See data sheet 18325-90
Nominal voltage		± 10%
Power consumption		20 W
Duty cycle coil		See characteristic curves
Type of protection		See data sheet 18325-90
Note: Coils must be ordered separately		

Ordering code



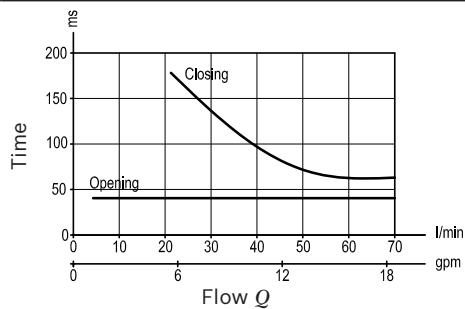
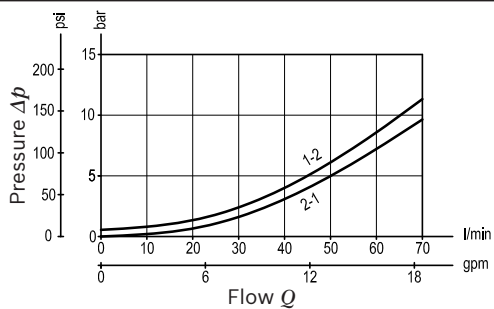
Type	Material number
OD1503363AS000	R901091113
OD1503363AS800	R901091114
OD1503363DS000	R934004878
OD1503363DS800	R901109956
OD1505363AS000	R901090947
OD1505363AS800	R901090945

Type	Material number
OD1505363DS000	R901080482
OD1505363DS800	R901109969
OD1531363AS000	R901091166
OD1531363AS800	R901109984
OD1531363DS000	R901091167
OD1531363DS800	R901109985

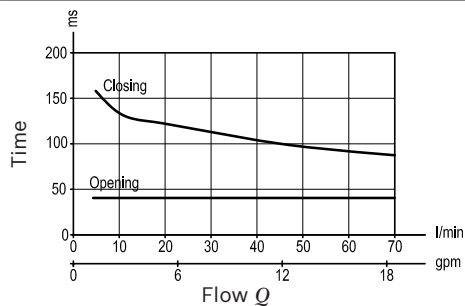
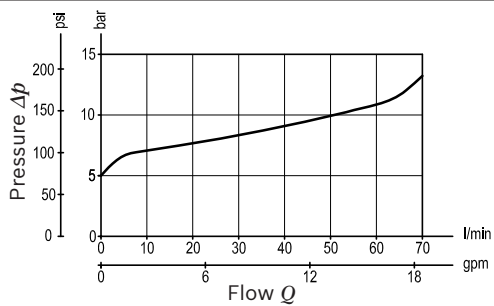
Characteristic curves

Version 1 - Version 2

Standard

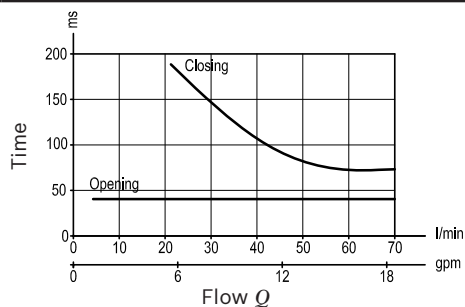
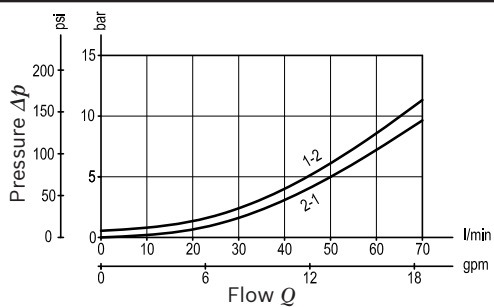


Extra spring

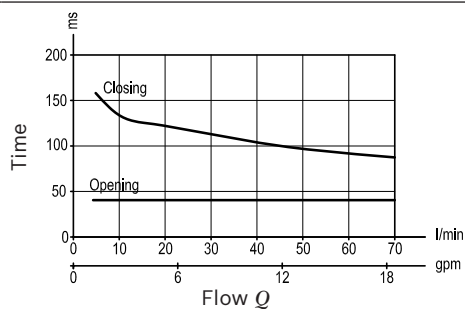
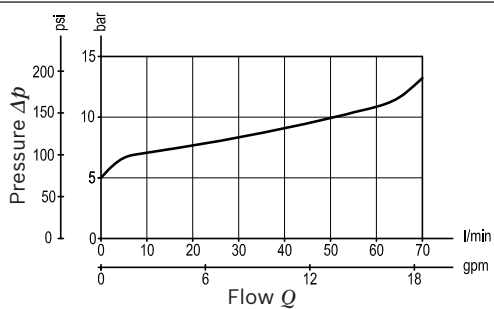


Version 3

Standard



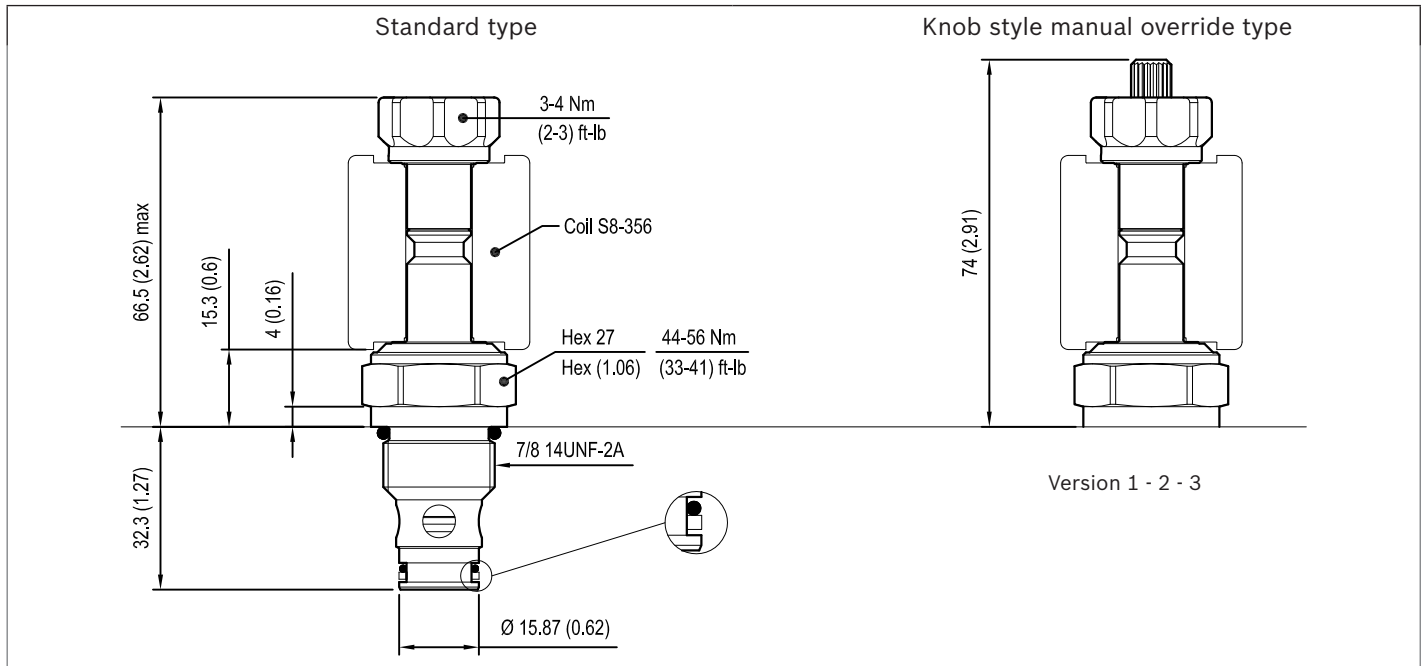
Extra spring



4

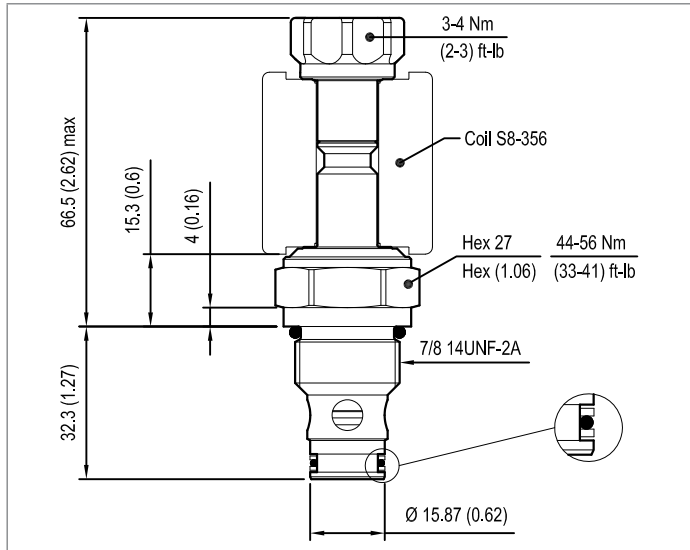
**Dimensions**

**Version 1: Solenoid operated valve, poppet 2-way normally closed**



**Version 2: Solenoid operated valve, poppet 2-way normally closed**

**Version 3: Solenoid operated valve, poppet 2-way double lock normally closed**





Solenoid operated valves pilot operated poppet type  
2-way normally closed  
Special cavity, 017-E

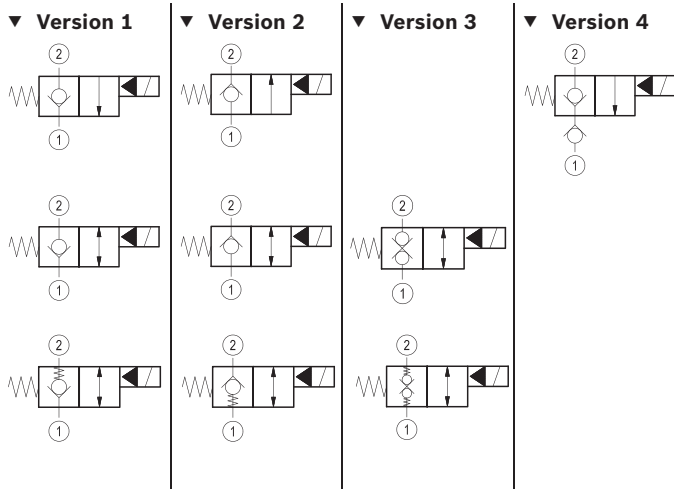
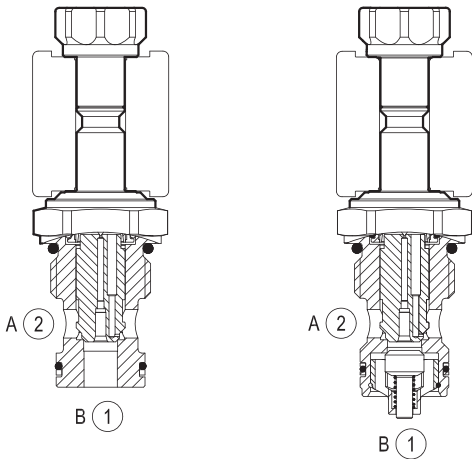
VEI-8A-09-NC

OD.15 - X - 17 - Y - Z

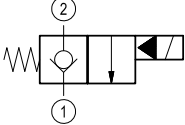
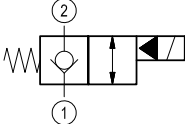
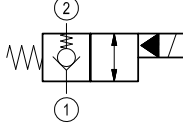
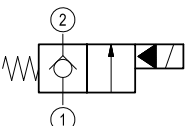
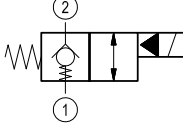
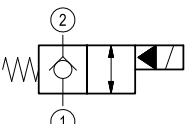
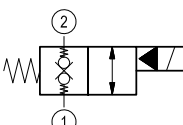
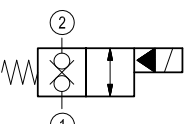
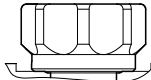
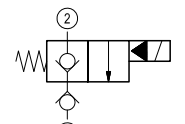
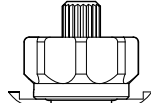


**Technical data**

General	
Weight	0.24 kg (0.53 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
Hydraulic	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	2 - 70 l/min (0.5 - 18 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	54 - 66 Nm (40 - 49 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51 except for codes marked with *
Special cavity	017-E see 18325-75
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 1	code material no. RG17E201052010 R934003562
Seal kit – version 2-3-4	code material no. RG17E201053010 R934003563
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	



Ordering code

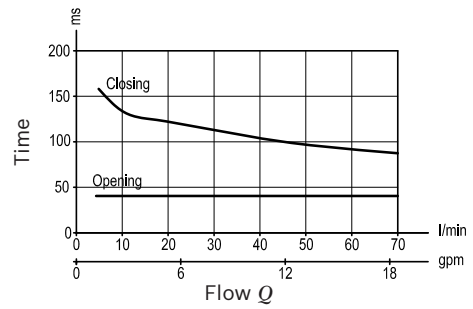
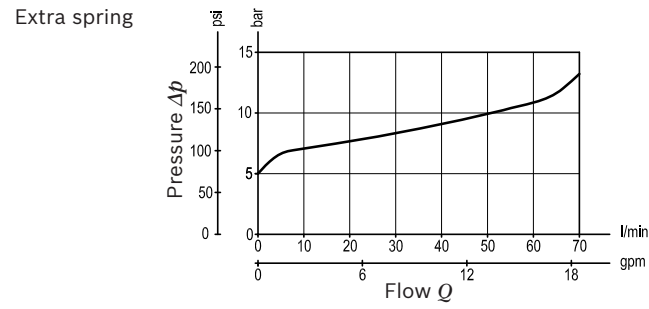
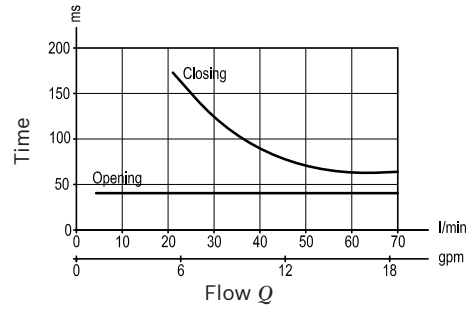
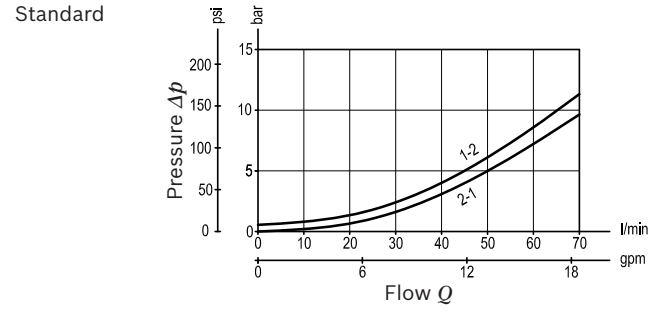
	OD.15	X	17	Y	Z
<p>Solenoid operated valves pilot operated poppet type 2-way normally closed</p>					
<p>monodirectional type</p>  <p style="text-align: right;"><b>01</b></p>					<p><b>S0</b> = Tube not welded</p>
<p>bidirectional type</p>  <p style="text-align: right;"><b>05</b></p>					<p><b>S8</b> = Tube not welded with extra spring</p>  <p style="text-align: right;">for X= 05</p>
<p>monodirectional type</p>  <p style="text-align: right;"><b>09</b></p>					 <p style="text-align: right;">for X= 03</p>
<p>bidirectional type</p>  <p style="text-align: right;"><b>03</b></p>					 <p style="text-align: right;">for X= 31</p>
<p>bidirectional type</p>  <p style="text-align: right;"><b>31</b></p>					<p>standard type</p>  <p style="text-align: left;"><b>3A</b></p>
<p>monodirectional type</p>  <p style="text-align: right;"><b>11</b></p>					<p>knob style manual override</p>  <p style="text-align: left;"><b>3D</b></p>
			17 Special cavity: 017-E		

Type	Material number
OD1501173AS000	R901176045
OD1501173DS000	R934000679
OD1503173AS000	R901113664
OD1503173AS800	R934000773
OD1503173DS000	R901180257
OD1503173DS800	R934003061
OD1505173AS000	R901113673
OD1505173AS800	R901119220
OD1505173DS000	R901125249

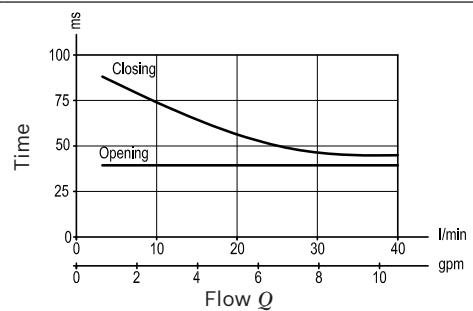
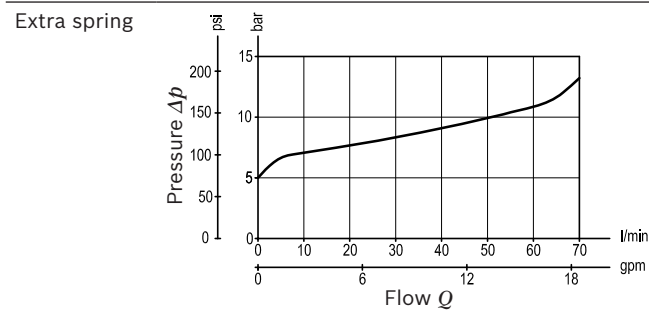
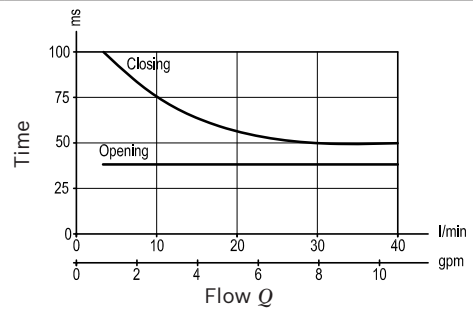
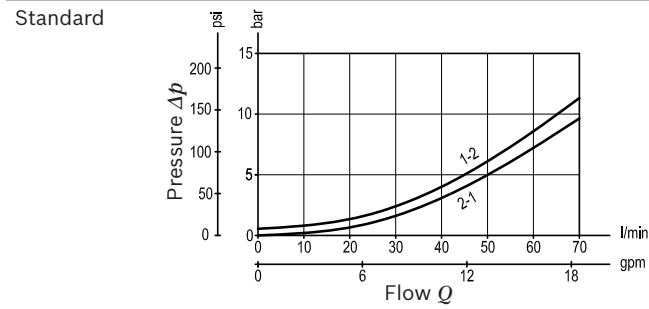
Type	Material number
OD1505173DS800	R934000846
OD1509173AS000	R934001038
OD1509173DS000	R934001039
OD1511173AS000	R934001072 *
OD1511173DS000	R934001075 *
OD1531173AS000	R901113682
OD1531173AS800	R934001116
OD1531173DS000	R934001120
OD1531173DS800	R934003111

Characteristic curves

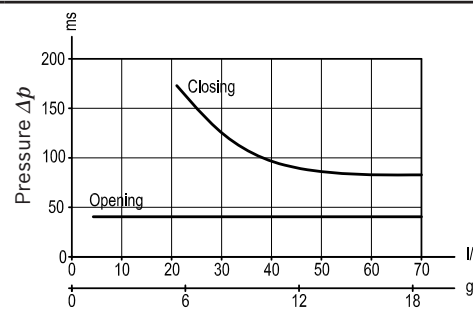
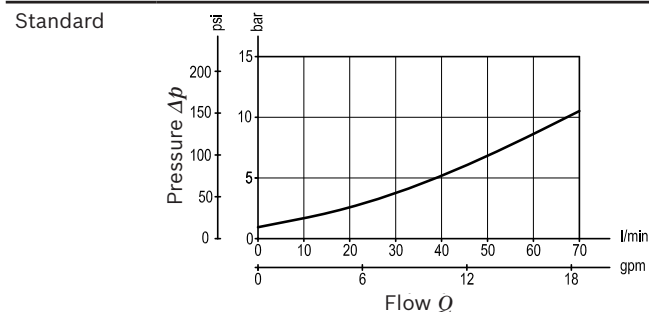
Version 1 - Version 2



Version 3



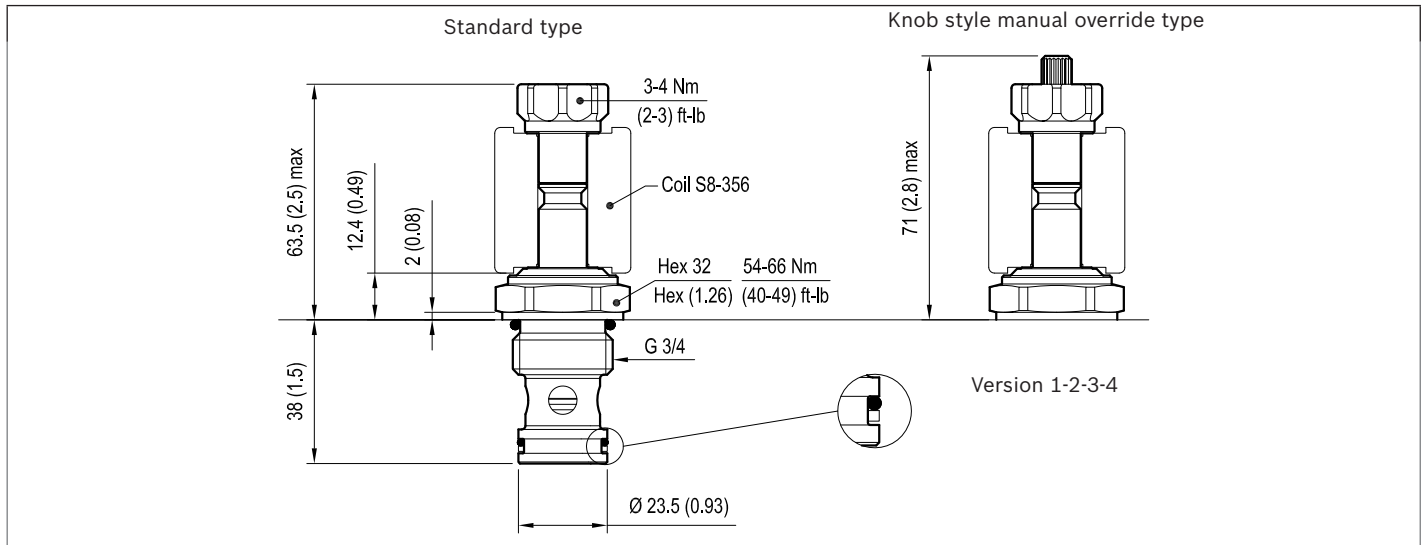
Version 4



4

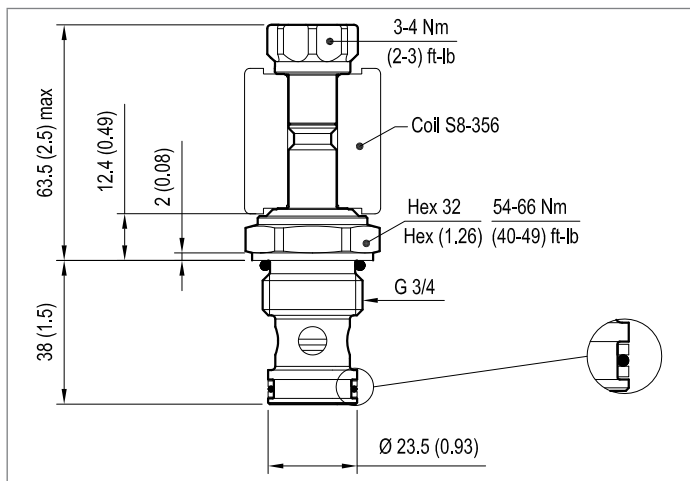
**Dimensions**

▼ **Version 01: Solenoid operated valves, poppet 2-way normally closed**

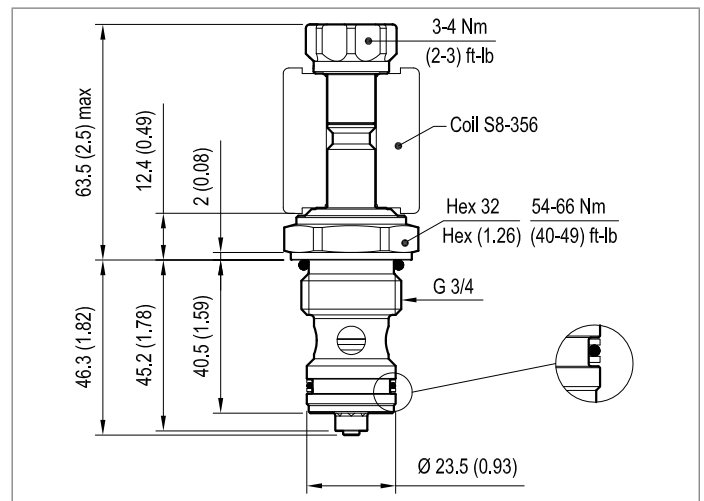


▼ **Version 02: Solenoid operated valves, poppet 2-way normally closed**

▼ **Version 03: Solenoid operated valves, poppet 2-way double lock normally closed**



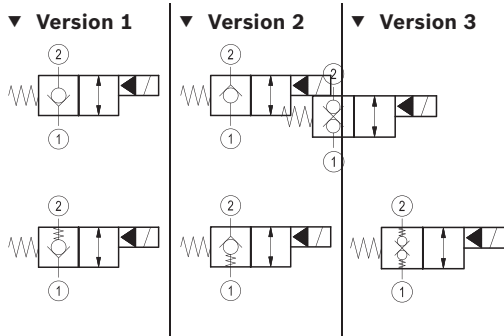
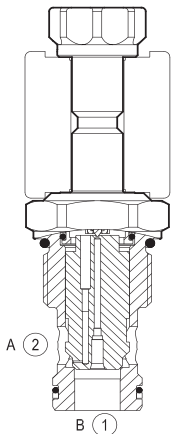
▼ **Version 4: Solenoid operated valves, poppet 2-way normally closed**



Solenoid operated valves pilot operated poppet type  
2-way normally closed  
Common cavity, Size 12

VEI-8A-12A-NC

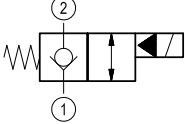
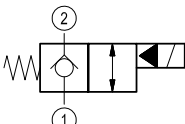
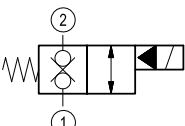
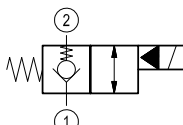
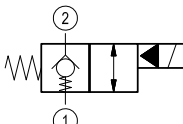
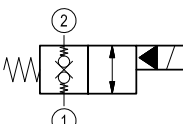
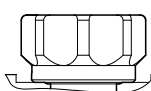
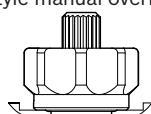
OD.15 - X - 89 - Y - Z



**Technical data**

General	
Weight	0.22 kg (0.48 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
Hydraulic	
Max. operating pressure	350 bar (5000 psi)
Flow range	5 - 150 l/min (1 - 40 gpm)
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	54 - 66 Nm (40 - 49 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Cavity	CA-12A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 1	code material no. RG12A2010520100 R901111377
Seal kit – version 2-3	code material no. RG12A2010530100 R930003374
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

Ordering code

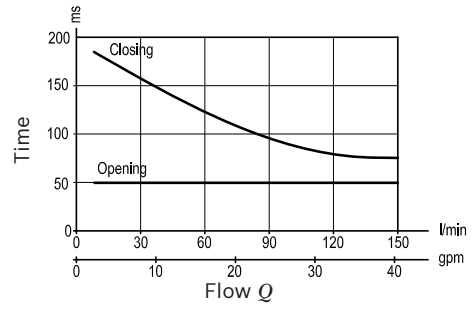
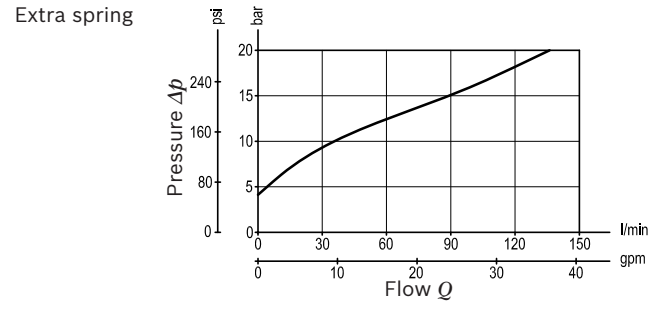
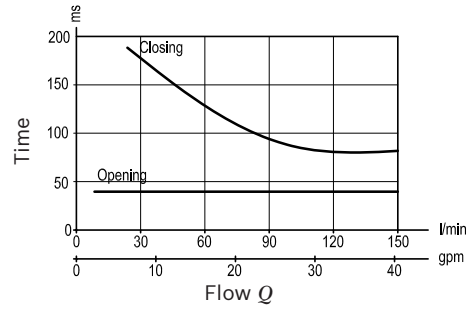
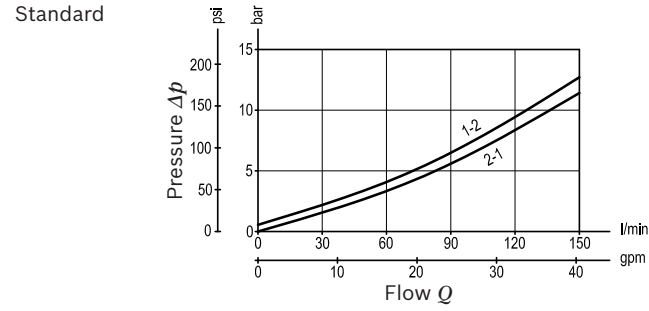
OD.15	X	89	Y	Z
<p>Solenoid operated valves pilot operated poppet type 2-way normally closed</p> <hr/> <p style="text-align: center;">bidirectional type</p>  <p style="text-align: right;"><b>05</b></p> <hr/> <p style="text-align: center;">bidirectional type</p>  <p style="text-align: right;"><b>03</b></p> <hr/> <p style="text-align: center;">double lock</p>  <p style="text-align: right;"><b>31</b></p>				<p><b>S0</b> = Tube not welded</p> <hr/> <p><b>S8</b> = Tube not welded with extra spring</p>  <p style="text-align: right;">for X= 05</p> <hr/>  <p style="text-align: right;">for X= 03</p> <hr/>  <p style="text-align: right;">for X= 31</p> <hr/> <p style="text-align: center;">standard type</p> <p><b>3A</b></p>  <hr/> <p style="text-align: center;">knob style manual override</p> <p><b>3D</b></p> 
89 Common cavity: CA-12A-2N				

Type	Material number
OD1503893AS000	R901091116
OD1503893AS800	R901109961
OD1503893DS000	R901091117
OD1503893DS800	R901109962
OD1505893AS010	R934004977
OD1505893AS800	R901091128
OD1505893DS000	R901091129
OD1505893DS800	R901109978

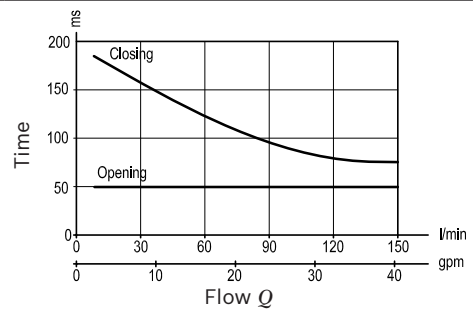
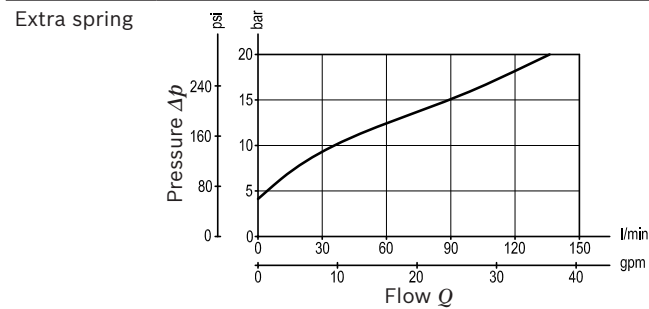
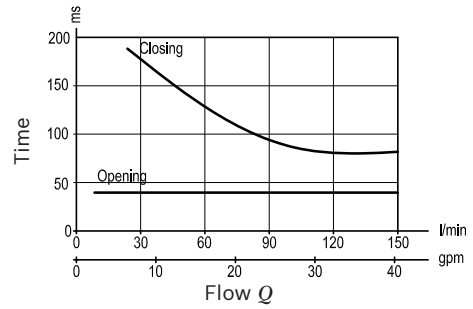
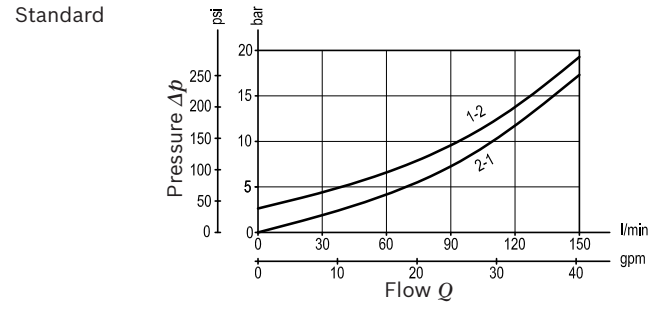
Type	Material number
OD1531893AS000	R901091168
OD1531893AS800	R901091169
OD1531893DS000	R901091170
OD1531893DS800	R901109990

Characteristic curves

Version 1 - Version 2



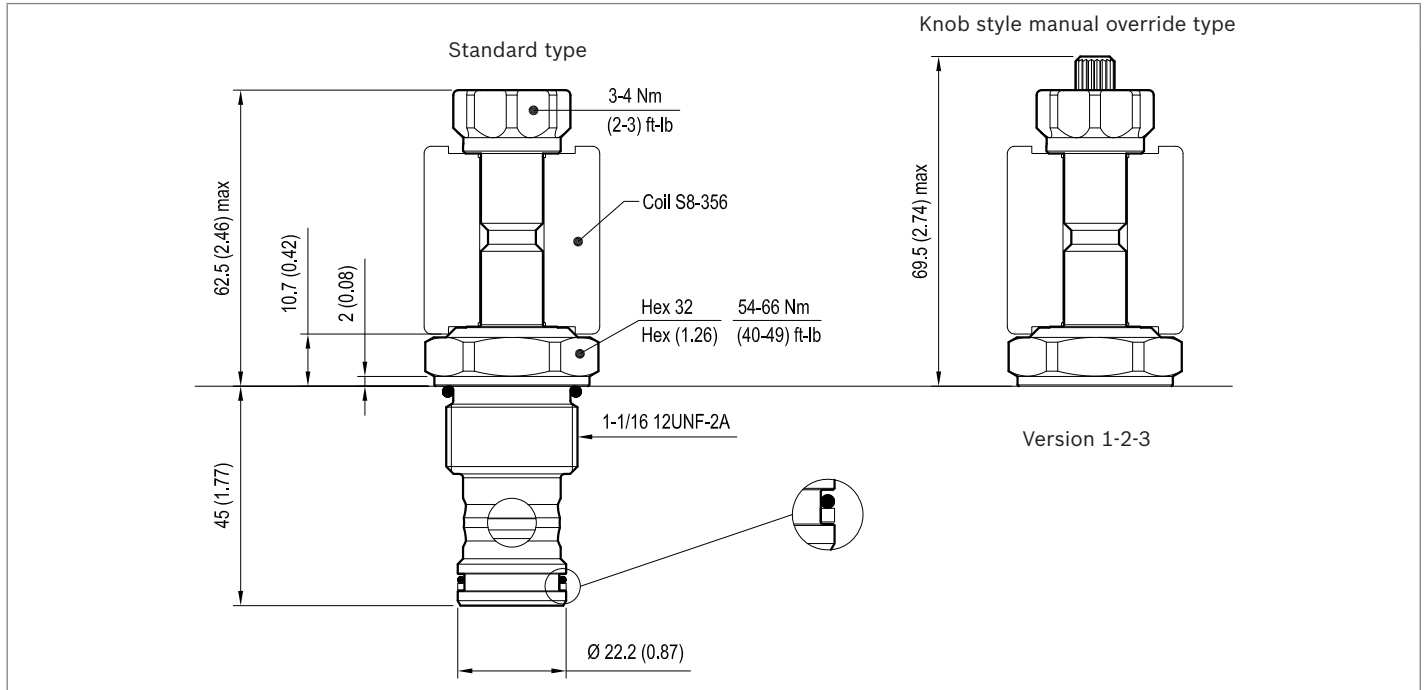
Version 3



4

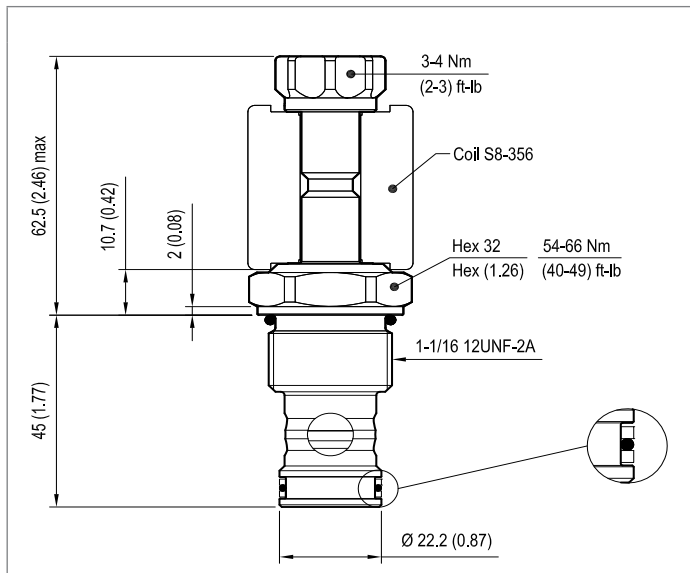
**Dimensions**

▼ **Version 1: Solenoid operated valve, poppet 2-way normally closed**



▼ **Version 2: Solenoid operated valve, poppet 2-way normally closed**

▼ **Version 3: Solenoid operated valve, poppet 2-way double lock normally closed**

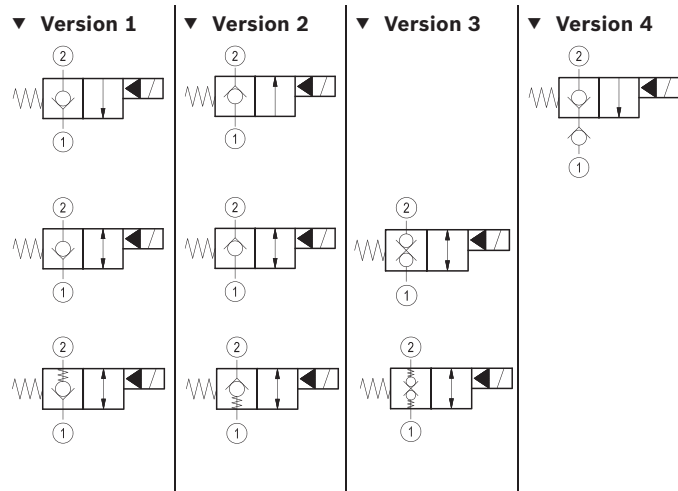
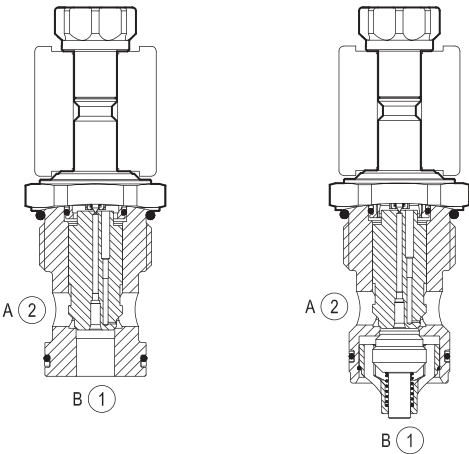




Solenoid operated valves pilot operated poppet type  
2-way normally closed  
Special cavity, 021-E

VEI-8A-12-NC

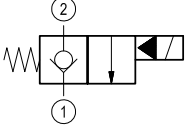
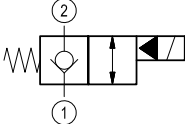
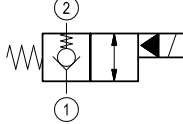
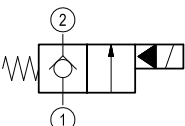
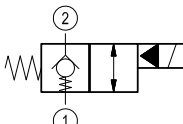
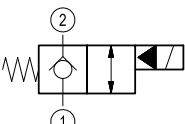
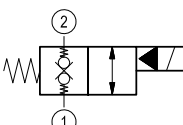
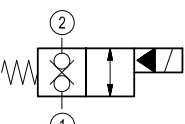
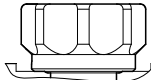
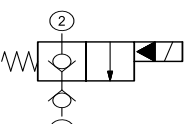
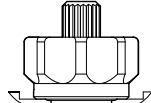
OD.15 - X - 21 - Y - Z



**Technical data**

<b>General</b>	
Weight	0.34 kg (0.75 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
<b>Hydraulic</b>	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	5 - 150 l/min (1 - 40 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	130 - 150 Nm (96 - 111 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51 except for codes marked with *
Special cavity	021-E see 18325-75
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 1	code material no. RG21E201052010 R934003566
Seal kit – version 2-3	code material no. RG21E201053010 R934003567
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

Ordering code

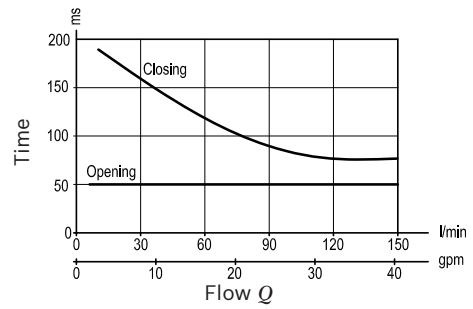
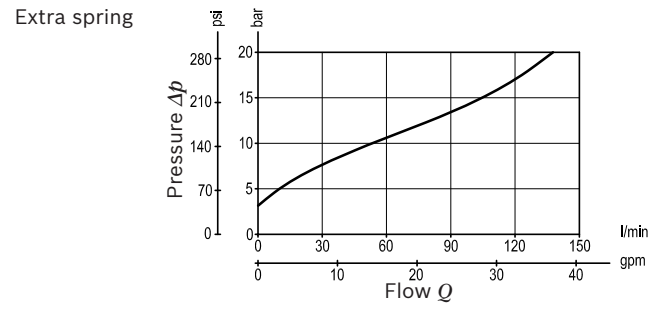
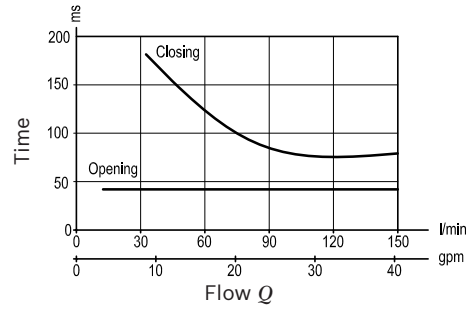
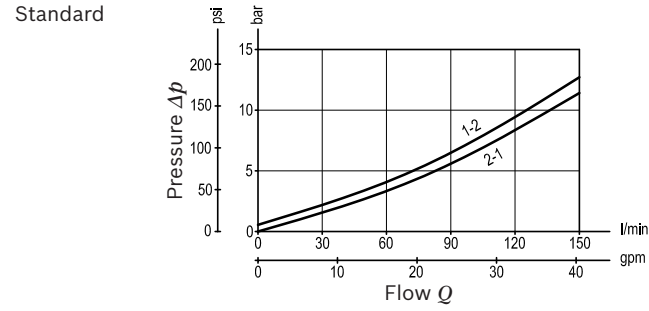
	OD.15	X	21	Y	Z
<p>Solenoid operated valves pilot operated poppet type 2-way normally closed</p>					
<p>monodirectional type</p>  <p style="text-align: right;"><b>01</b></p>					<p><b>S0</b> = Tube not welded</p>
<p>bidirectional type</p>  <p style="text-align: right;"><b>05</b></p>					<p><b>S8</b> = Tube not welded with extra spring</p>  <p style="text-align: right;">for X= 05</p>
<p>monodirectional type</p>  <p style="text-align: right;"><b>09</b></p>					 <p style="text-align: right;">for X= 03</p>
<p>bidirectional type</p>  <p style="text-align: right;"><b>03</b></p>					 <p style="text-align: right;">for X= 31</p>
<p>bidirectional type</p>  <p style="text-align: right;"><b>31</b></p>					<p>standard type</p>  <p style="text-align: left;"><b>3A</b></p>
<p>monodirectional type</p>  <p style="text-align: right;"><b>11</b></p>					<p>knob style manual override</p>  <p style="text-align: left;"><b>3D</b></p>
			21 Special cavity: 021-E		

Type	Material number
OD1501213AS000	R901144300
OD1501213AS800	R934000707
OD1501213DS000	R901085462
OD1503213AS000	R901113666
OD1503213AS800	R934003065
OD1503213DS000	R934000792
OD1503213DS800	R934003066
OD1505213AS000	R901104395
OD1505213AS800	R901119221

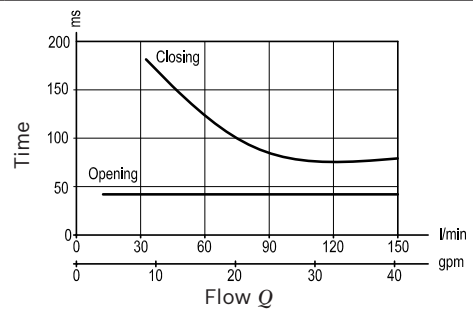
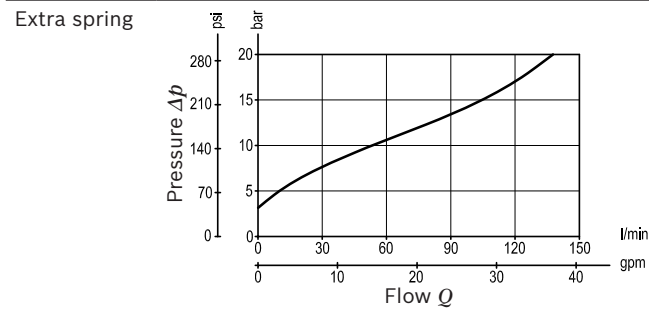
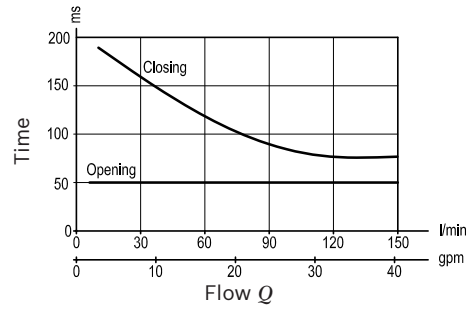
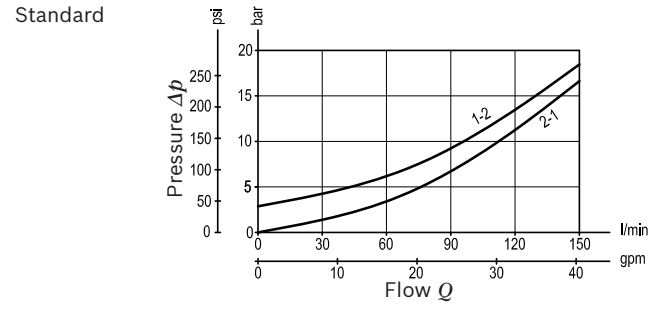
Type	Material number
OD1505213DS000	R901119267
OD1509213AS000	R901132881
OD1511213AS000 *	R901138183
OD1511213AS800 *	R934001086
OD1531213AS000	R901104412
OD1531213AS800	R901119002
OD1531213DS000	R901132876
OD1531213DS800	R901125793

Characteristic curves

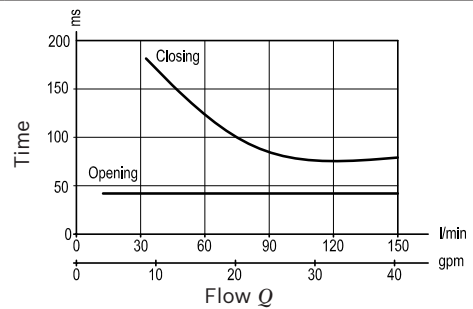
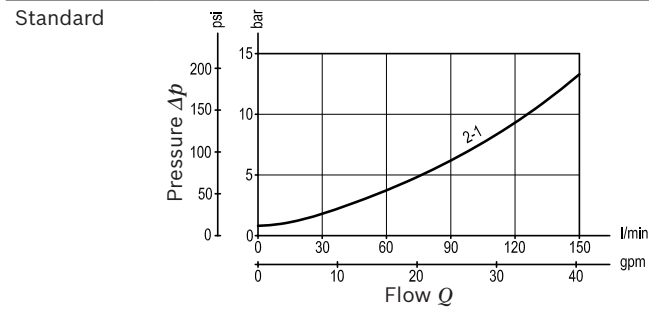
Version 1 - Version 2



Version 3

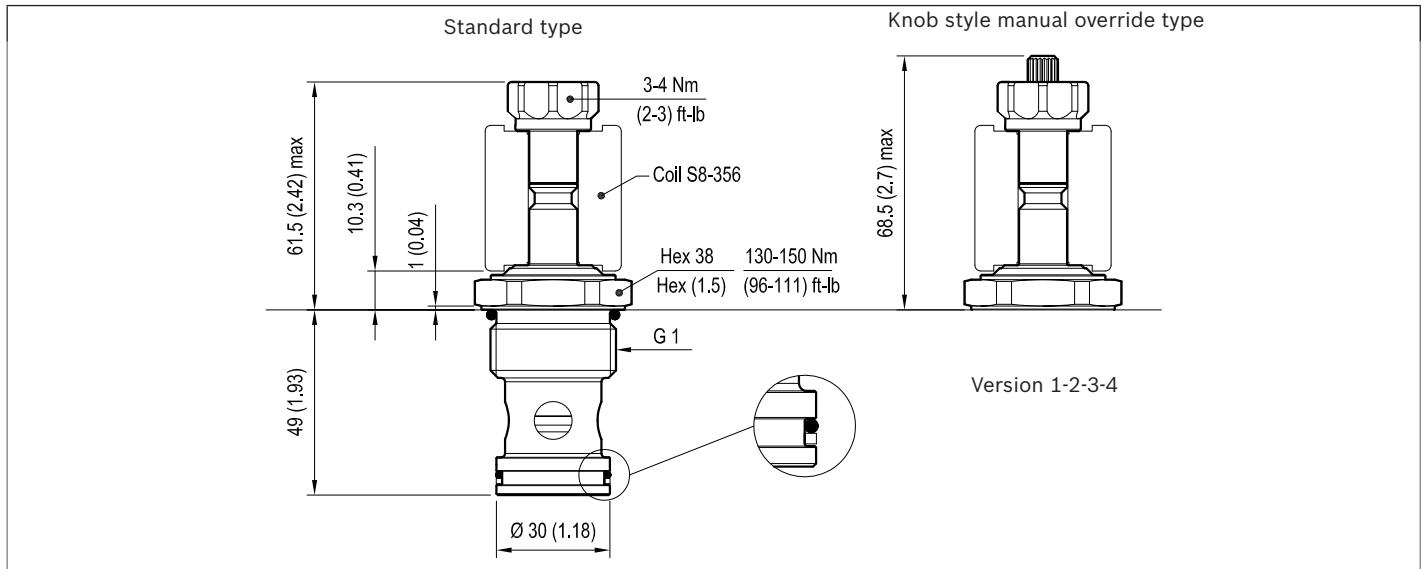


Version 4



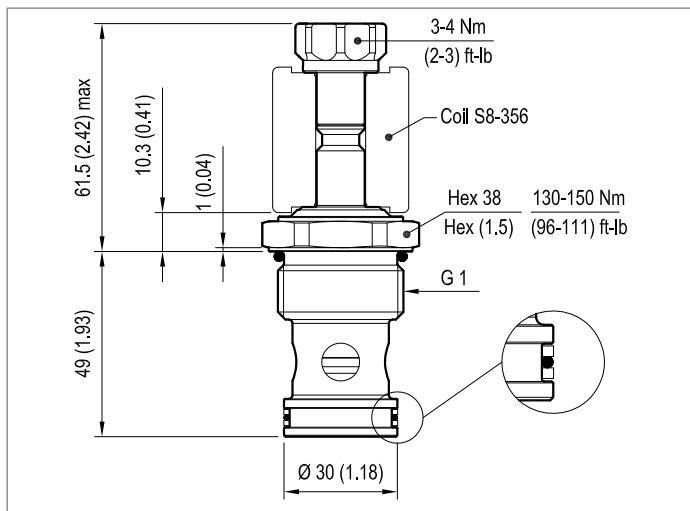
**Dimensions**

▼ **Version 01: Solenoid operated valves, poppet 2-way normally closed**

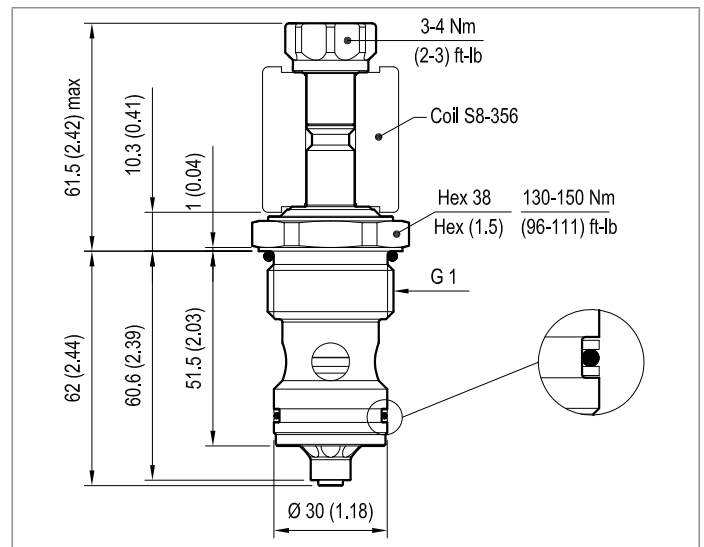


▼ **Version 02: Solenoid operated valves, poppet 2-way normally closed**

▼ **Version 03: Solenoid operated valves, poppet 2-way double lock normally closed**



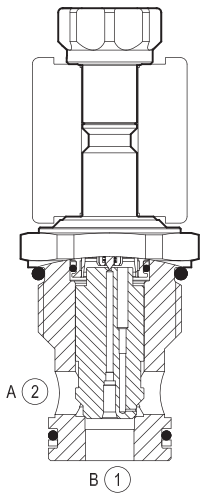
▼ **Version 4: Solenoid operated valves, poppet 2-way normally closed**



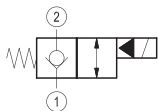
Solenoid operated valves pilot operated poppet type  
2-way normally closed  
Common cavity, Size 16

VEI-8A-16A-NC

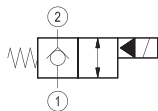
OD.15 - X - 75 - Y - S0



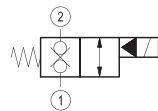
▼ Version 05



▼ Version 03



▼ Version 31

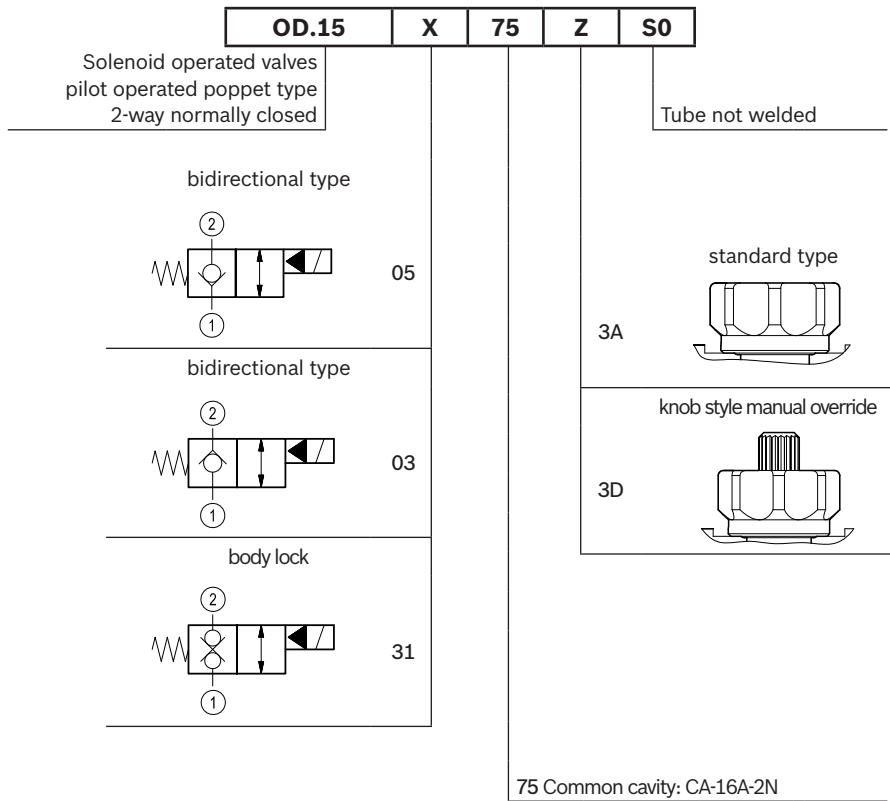


**Technical data**

General	
Weight	0.32 kg (0.71 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
Hydraulic	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	5 - 150 l/min (1 - 40 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	130 - 150 Nm (96 - 111 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Cavity	CA-16A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 05	code material no. RG75E201052010 R934004079
Seal kit – version 03-31	code material no. RG75E201053010 R934004080
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

4

Ordering code



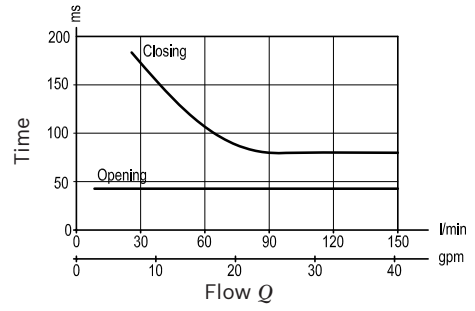
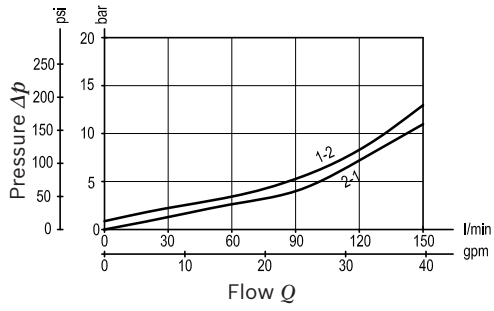
Type	Material number
OD1503753AS000	R901094726
OD1505753AS000	R901094745
OD1505753DS000	R901094746
OD1531753AS000	R901094747
OD1531753DS000	R901094748

Type	Material number

Characteristic curves

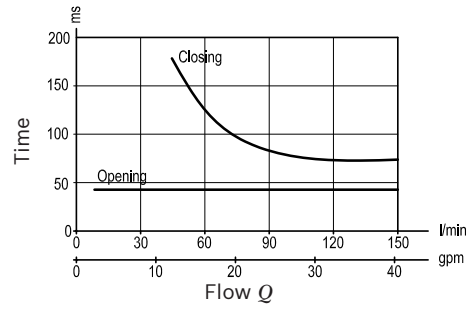
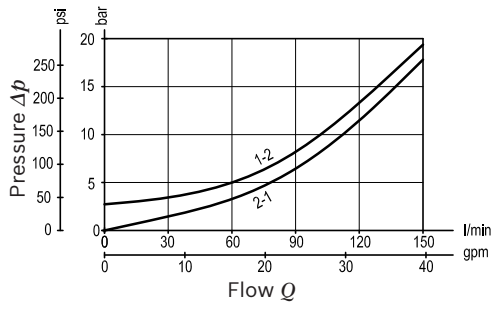
Version 05-03

Standard



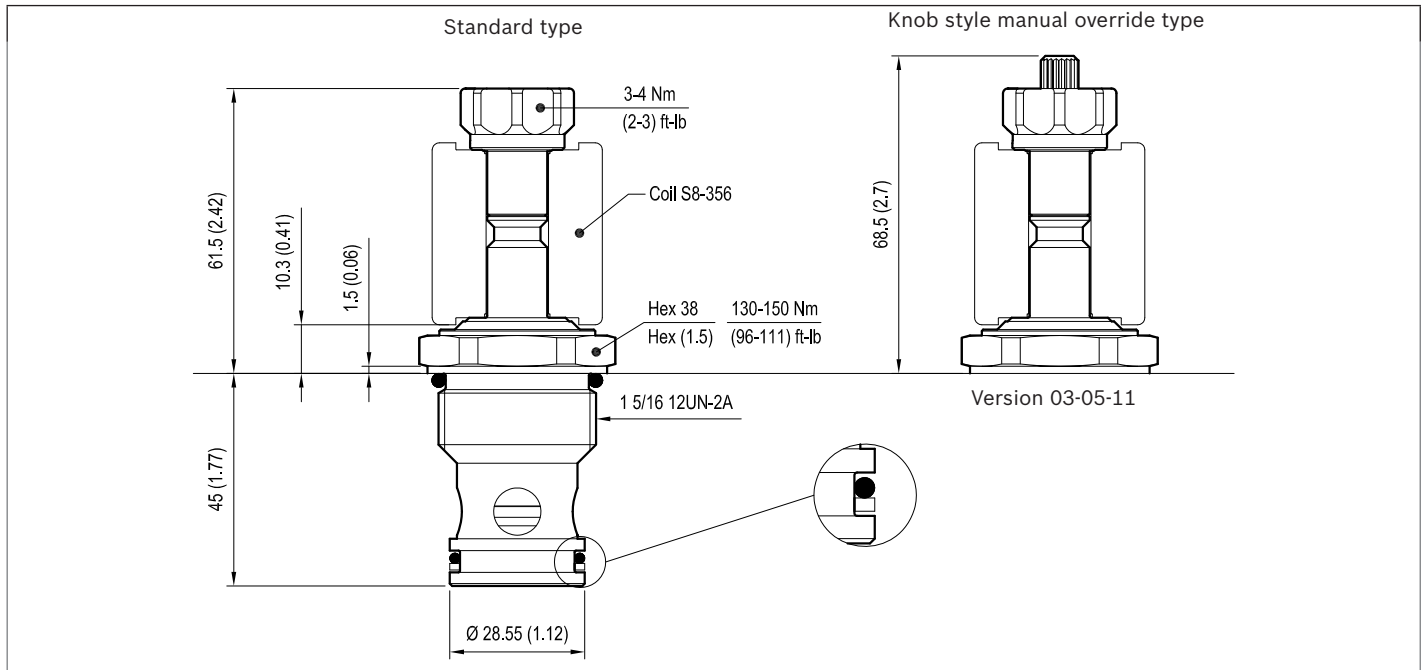
Version 31

Standard



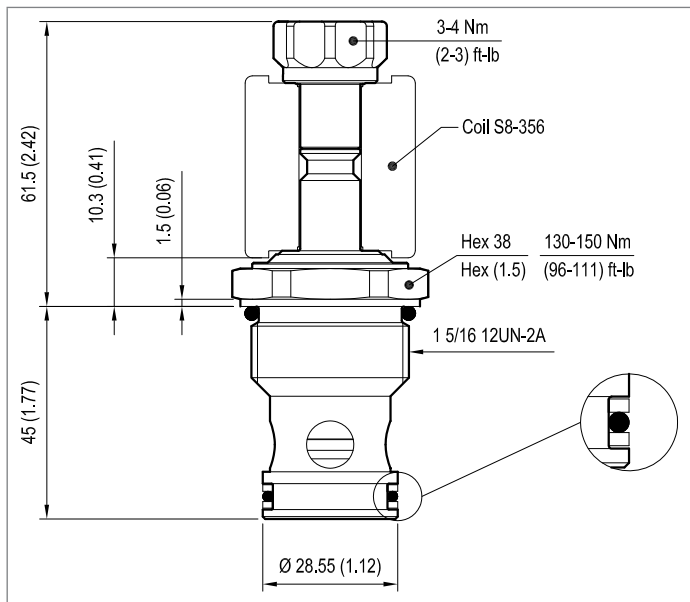
**Dimensions**

▼ **Version 05: Solenoid operated valves, poppet 2-way normally closed**



▼ **Version 03: Solenoid operated valves, poppet 2-way normally closed**

▼ **Version 31: Solenoid operated valves, poppet 2-way double lock normally closed**

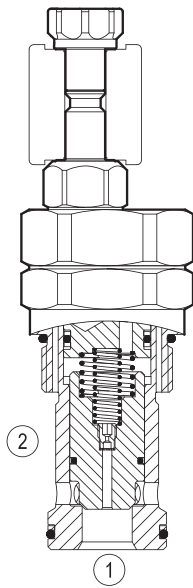




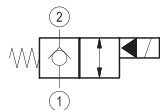
Solenoid operated valves pilot operated poppet type  
2-way normally closed  
Special cavity, 004

VEI-8A-2B-16-NC-NSS

OD.15.03.04 - Y - S0



▼ **Version 03**

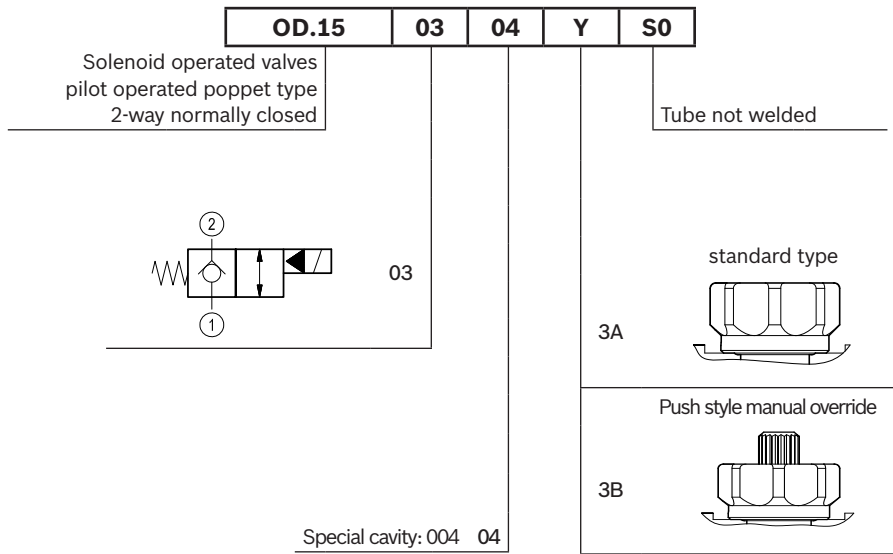


**Technical data**

<b>General</b>	
Weight	1.13 kg (2.5 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
<b>Hydraulic</b>	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Rated flow	260 l/min (69 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	110 - 130 Nm (81 - 96 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 25 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Special cavity	004 see 18325-75
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 04	code RG0004020520100 material no. R930001696
Seal kit coil	code RG12A1PNBR7010 material no. R934003958
Other technical data	See data sheet 18350-50
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90

Note: Coils must be ordered separately

Ordering code



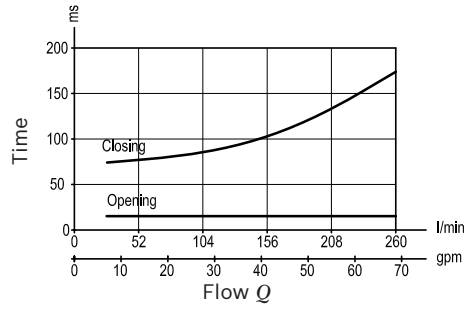
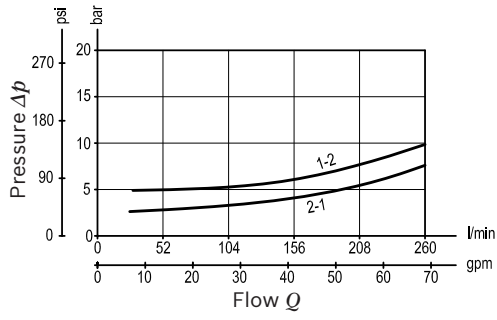
Type	Material number
OD1503043AS000	R934000764
OD1503043DS000	R901091110

Type	Material number

Characteristic curves

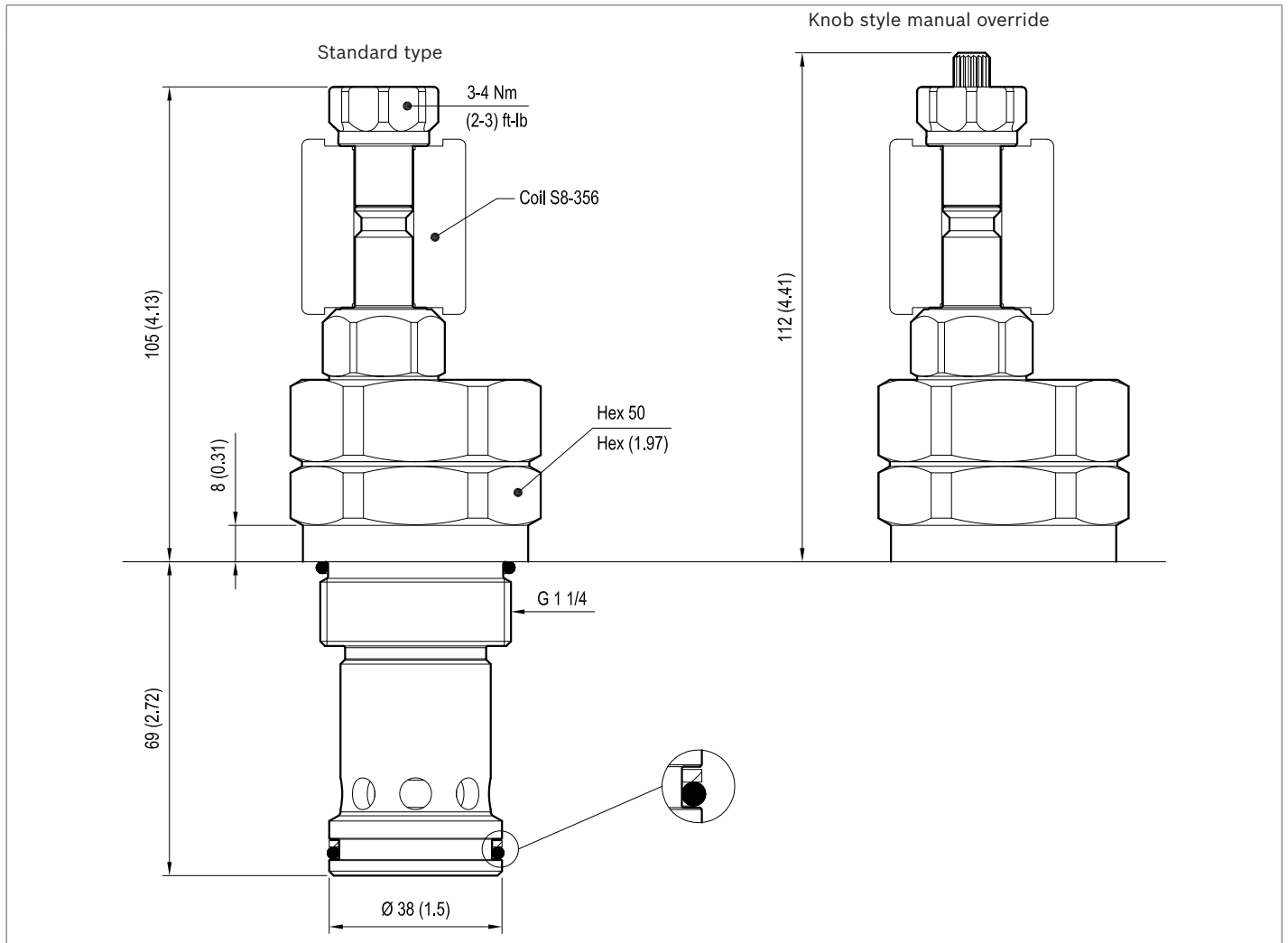
Version 03

Standard



**Dimensions**

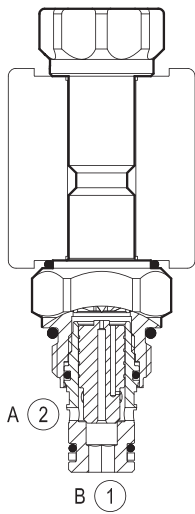
▼ **Version 03: Solenoid operated valve, poppet 2-way normally closed - Special cavity**



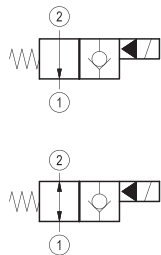
Solenoid operated valves pilot operated poppet type  
2-way normally open  
Common cavity, Size 08

VEI-8I-06-NA

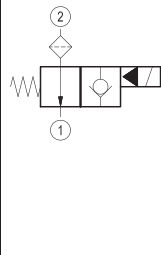
OD.15 - X - 18 - Y - S0



▼ Version 1



▼ Version 2

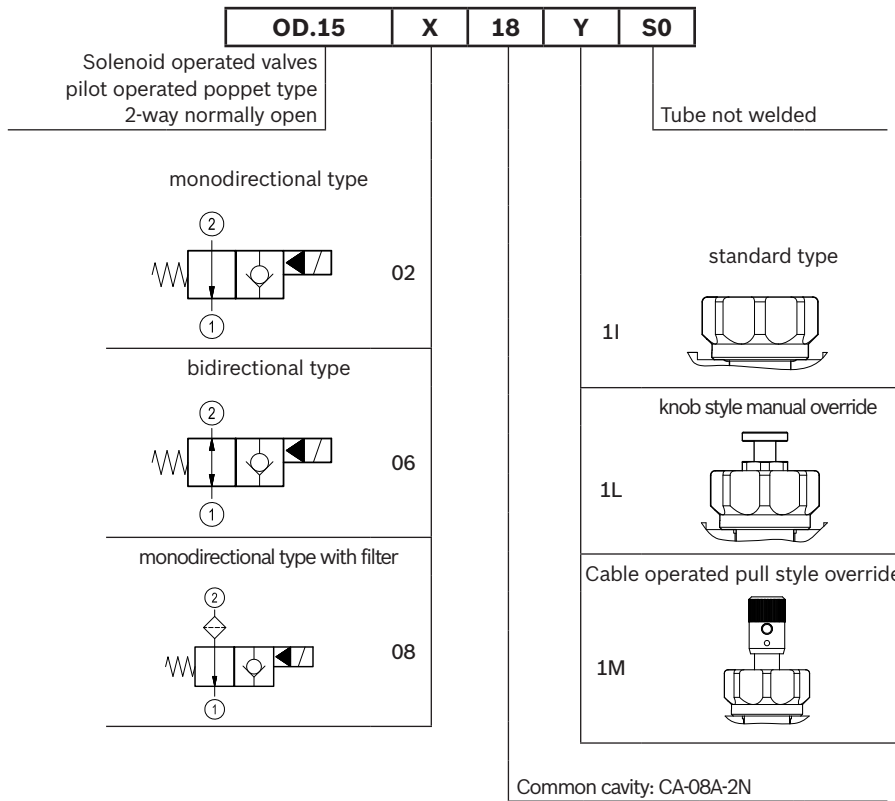


**Technical data**

General		
Weight		0.11 kg (0.24 lbs)
Installation orientation		Optional
Ambient temperature range		-30 to 60 °C (-22 to 140 °F)
Hydraulic		
Max. operating pressure		350 bar (5000 psi)
Max. proof pressure		420 bar (6000 psi)
Flow range		0.5 - 30 l/min (0.1 - 8 gpm)
Fatigue cycle life		1 million cycles at 350 bar
Max. internal leakage		20 drops/min.
Fluid temperature range		-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)		
Installation torque		39 - 51 Nm (29 - 38 ft-lbs)
Recommended degree of fluid contamination		Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd		150 years see RE 18350-51
Cavity		CA-08A-2N see 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code	RG08A2010520100
	material no.	R901101437
Seal kit coil	code	RG1211PNBR7010
	material no.	R934003957
Other technical data		See data sheet 18350-50
Electrical		
Type of voltage		DC voltage
Coil type		S8-356 see 18325-90
Supply voltage		See data sheet 18325-90
Nominal voltage		± 10%
Power consumption		20 W
Duty cycle coil		See characteristic curves %
Type of protection		See data sheet 18325-90
Note: Coils must be ordered separately		

4

Ordering code



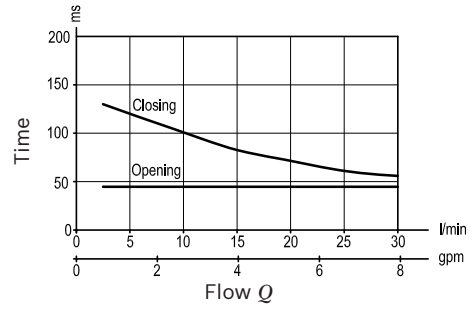
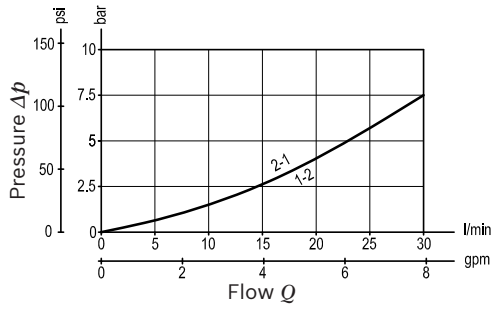
Type	Material number
OD1502181IS000	R901091107
OD1502181LS000	R901091108
OD1502181MS000	R901094588
OD1506181IS000	R901091133
OD1506181LS000	R901091134
OD1506181MS000	R901091135

Type	Material number
OD1508181IS000	R901091146
OD1508181LS000	R901091148
OD1508181MS000	R901091149

**Characteristic curves**

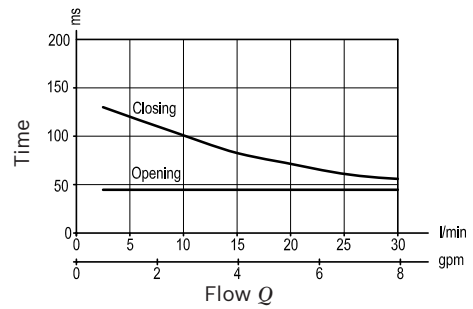
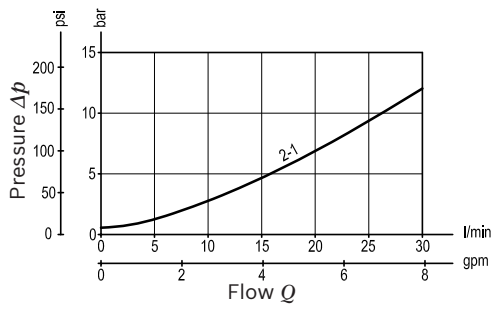
**Version 1**

Standard



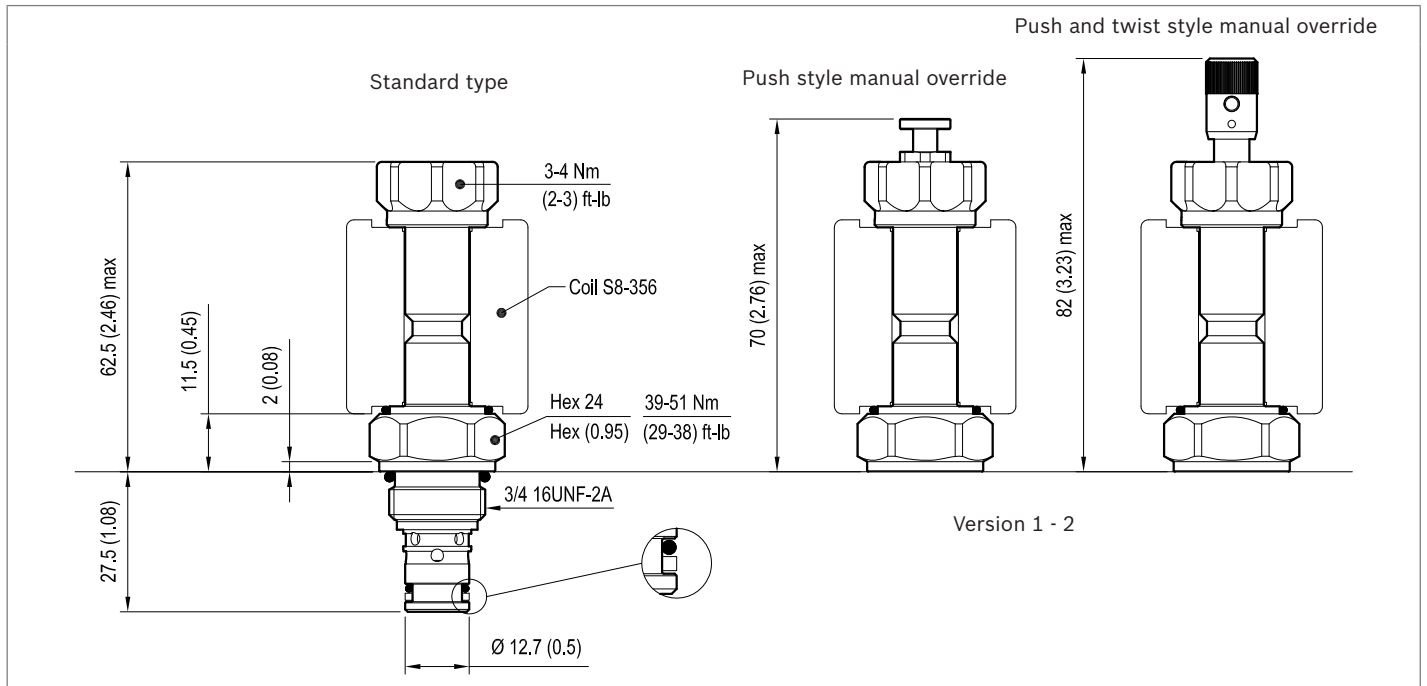
**Version 2**

Standard

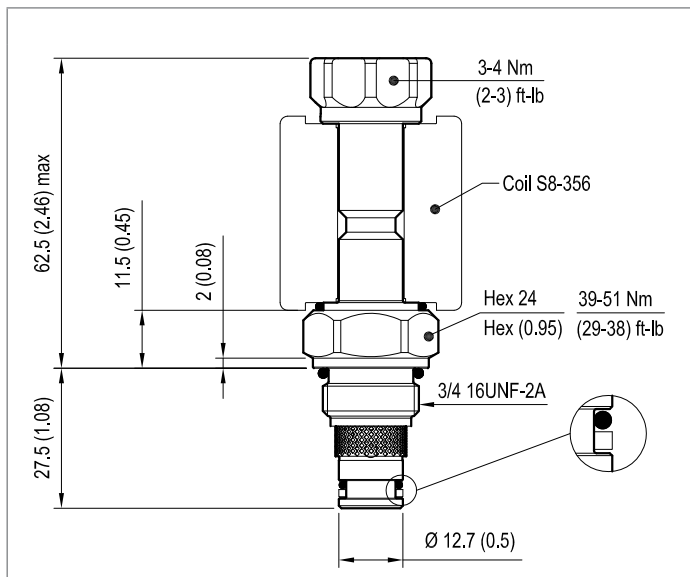


**Dimensions**

▼ **Version 1: Solenoid operated valve, poppet 2-way normally open**



▼ **Version 2: Solenoid operated valve, poppet 2-way normally open - filter**

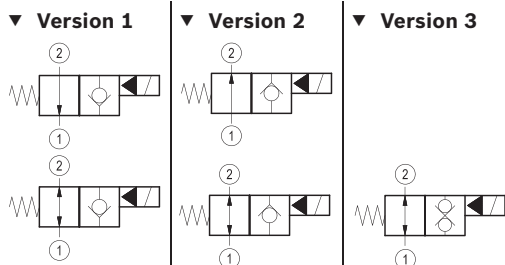
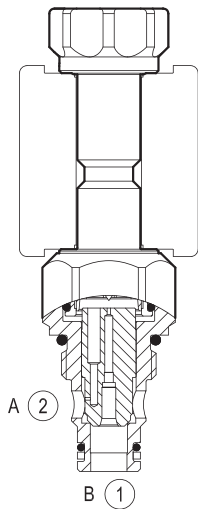




Solenoid operated valves pilot operated poppet type  
2-way normally open  
Common cavity, Size 08

VEI-8A-06-NA

OD.15 - X - Y - Z - S0

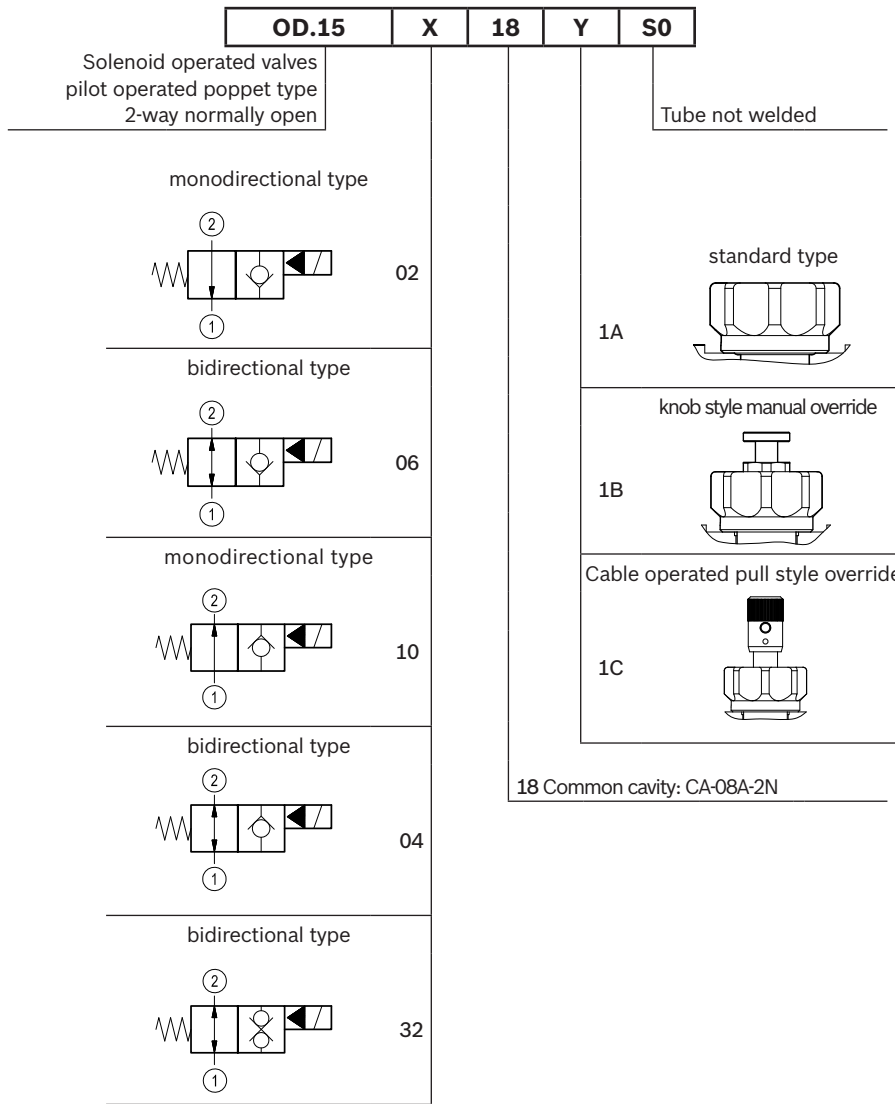


**Technical data**

General	
Weight	0.12 kg (0.26 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
Hydraulic	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	1.5 - 40 l/min (0.4 - 11 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	39 - 51 Nm (29 - 38 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Cavity	CA-08A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 1	code material no. RG08A2010520100 R901101437
Seal kit – version 2-3	code material no. RG08A2010530100 R901101544
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

4

Ordering code



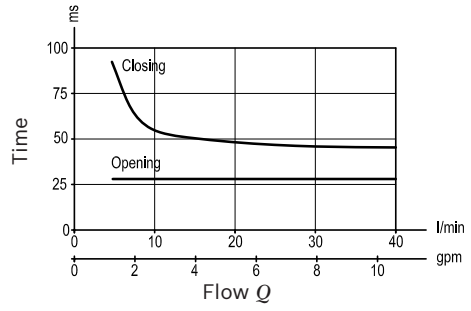
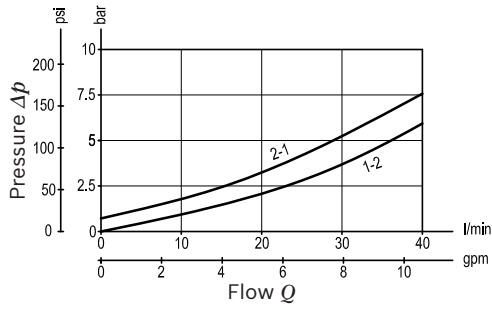
Type	Material number
OD1502181AS000	R901091102
OD1502181BS000	R901091105
OD1502181CS000	R901091106
OD1506181AS000	R901091130
OD1506181BS000	R901091131
OD1506181CS000	R901091132
OD1504181AS000	R901091121
OD1504181BS000	R901091122

Type	Material number
OD1504181CS000	R901091123
OD1510181AS000	R901091152
OD1510181BS000	R901091154
OD1510181CS000	R901091155
OD1532181AS000	R901091171
OD1532181BS000	R901091173
OD1532181CS000	R901091174

Characteristic curves

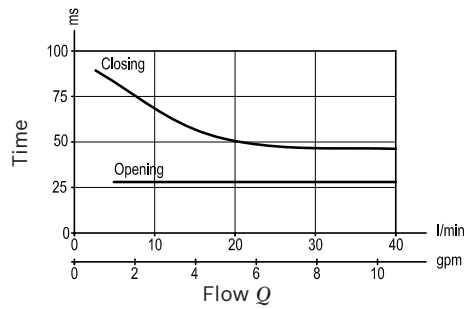
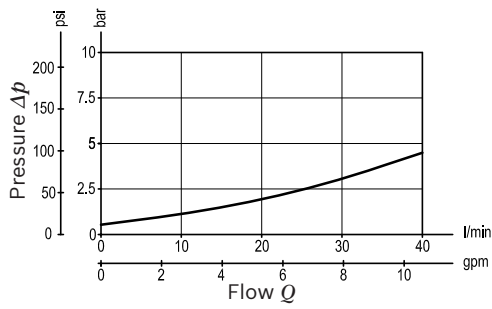
**Version 1-2**

Standard



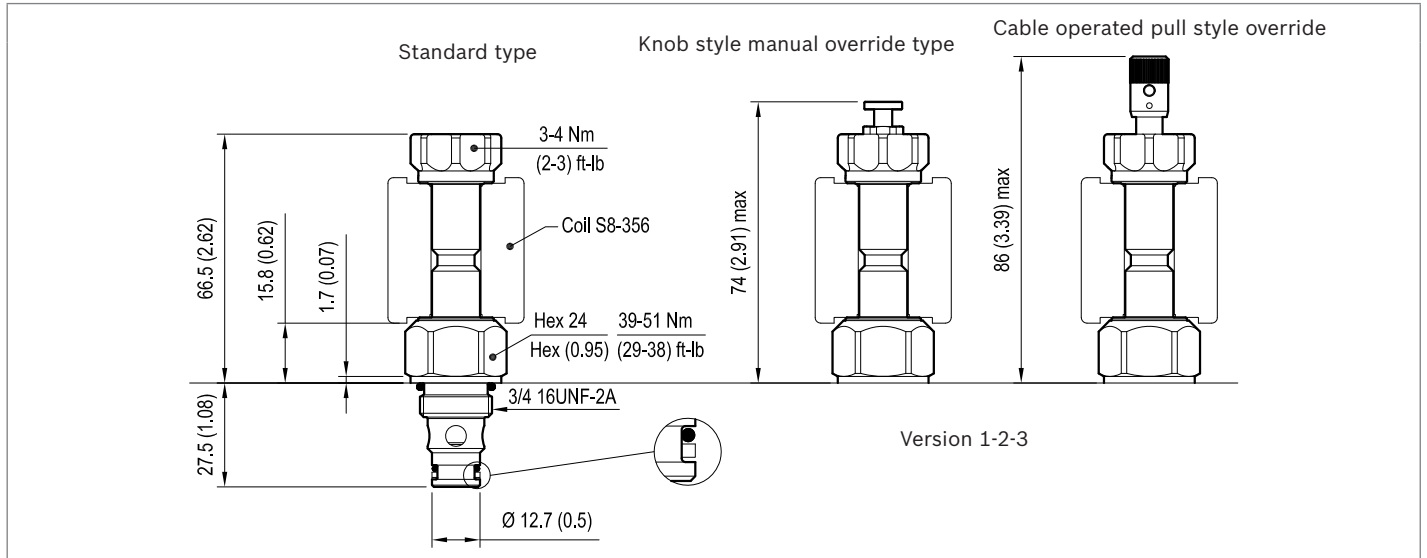
**Version 3**

Standard



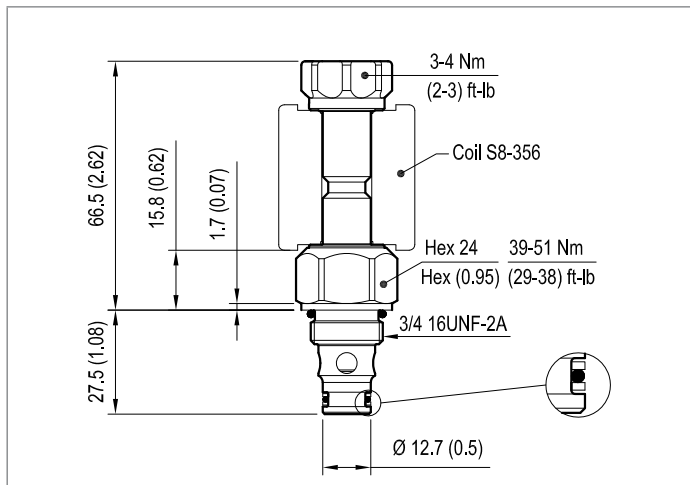
**Dimensions**

▼ **Version 1: Solenoid operated valve, poppet 2-way normally open**



▼ **Version 2: Solenoid operated valve, poppet 2-way normally open**

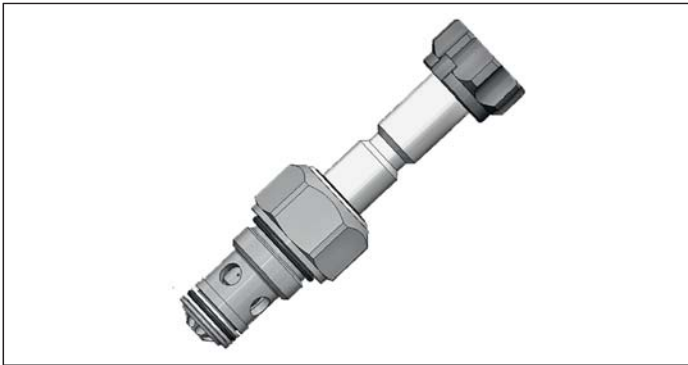
▼ **Version 3: Solenoid operated valve, poppet 2-way double lock normally open**



Solenoid operated valves pilot operated poppet type  
2-way normally open  
Special cavity, 019-E

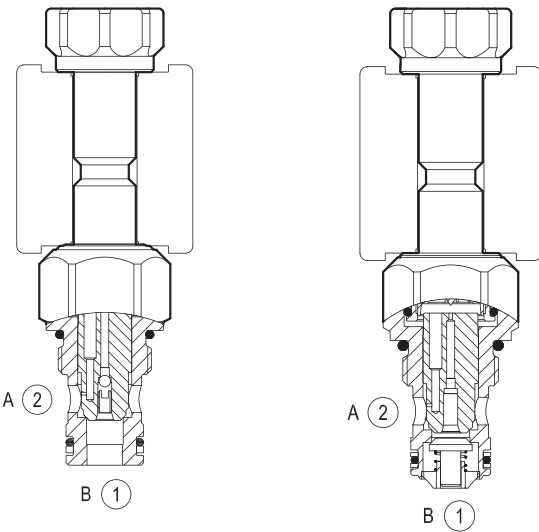
VEI-8A-06-NA

OD.15 - X - 19 - Z

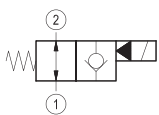


**Technical data**

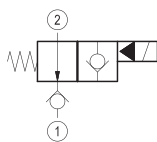
General	
Weight	0.13 kg (0.29 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
Hydraulic	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	1.5 - 40 l/min (0.4 - 11 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	39 - 51 Nm (29 - 38 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
Special cavity	019-E see 18325-75
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 06	code material no. RG19E201052010 R934003560
Seal kit – version 12	code material no. RG19E201053010 R934003561
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	



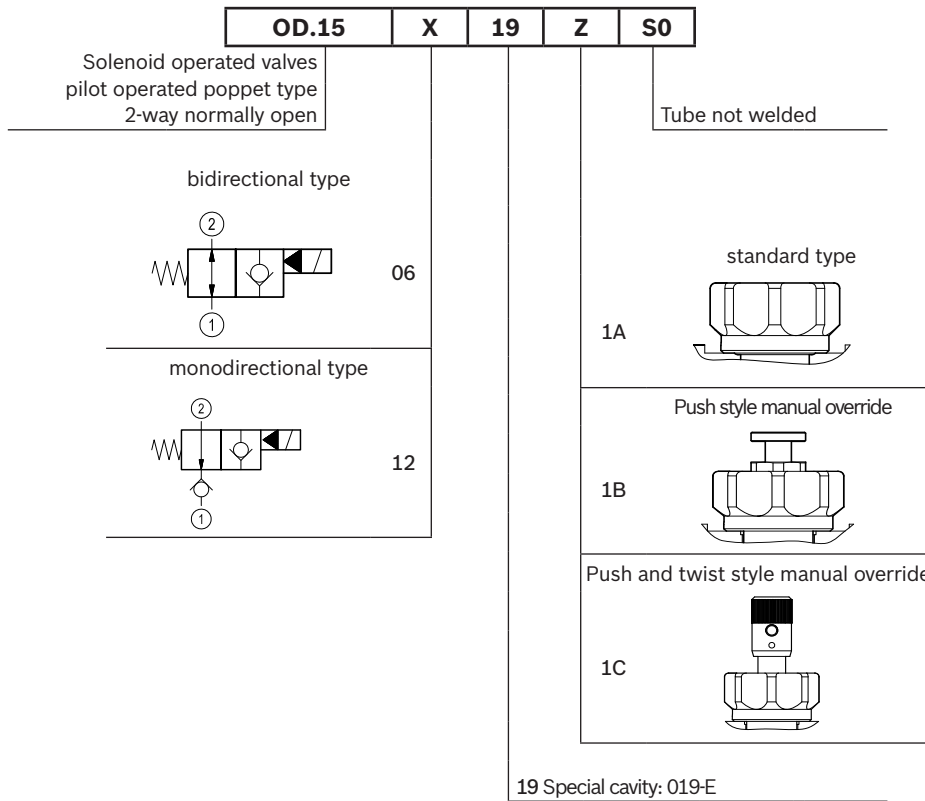
▼ Version 06



▼ Version 12



Ordering code



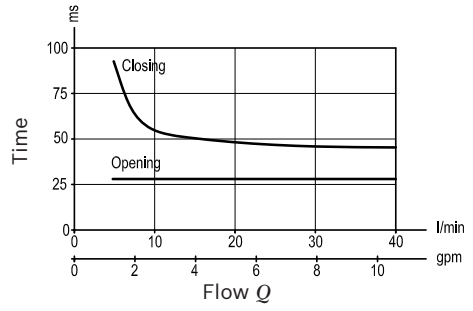
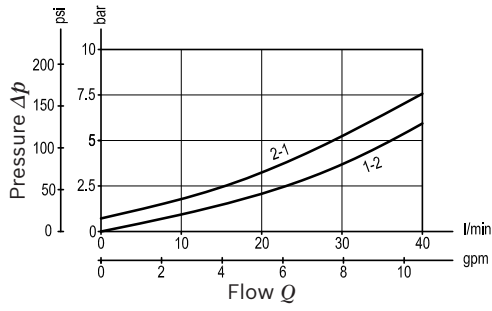
Type	Material number
OD1506191AS000	R934000989
OD1506191BS000	R934000990
OD1506191CS000	R934000991
OD1512191AS000	R901091159
OD1512191BS000	R901091161
OD1512191CS000	R901091162

Type	Material number

Characteristic curves

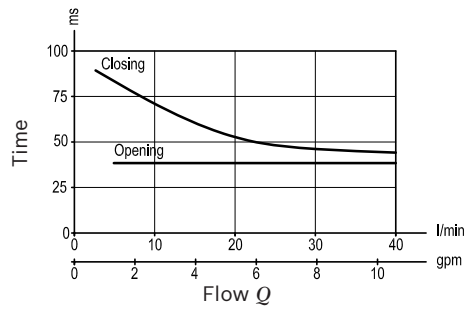
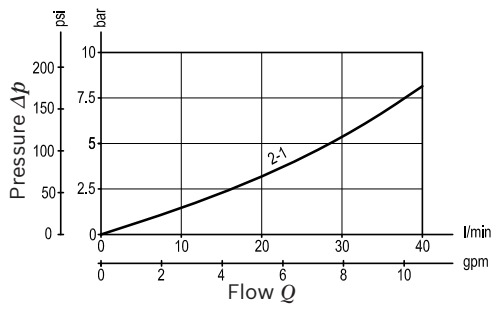
**Version 06**

Standard



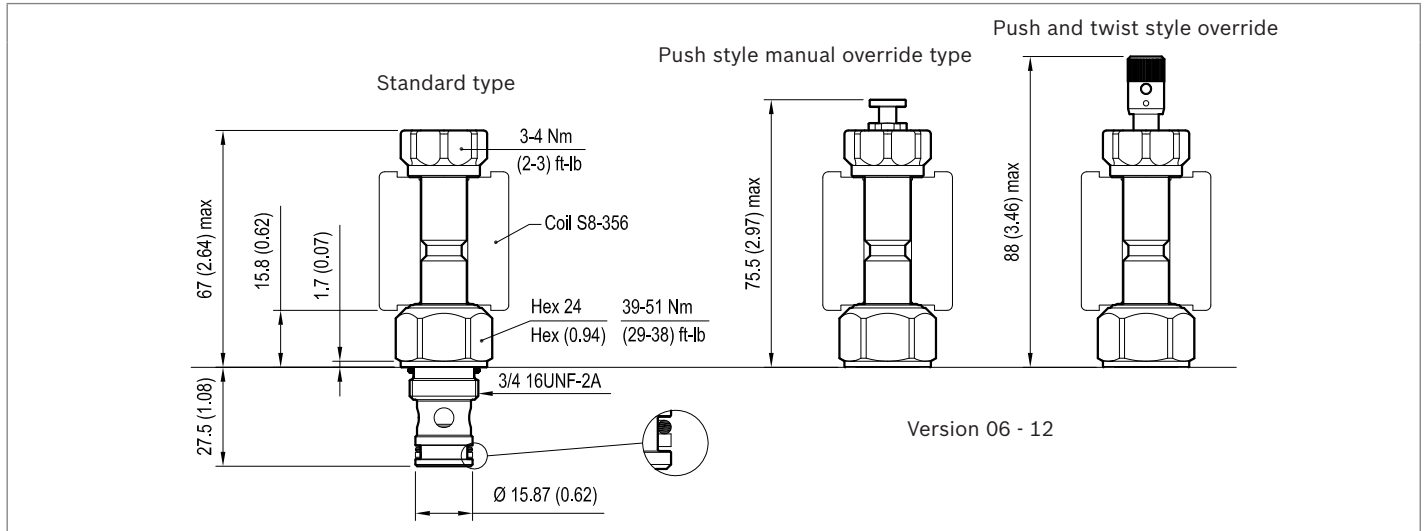
**Version 12**

Standard

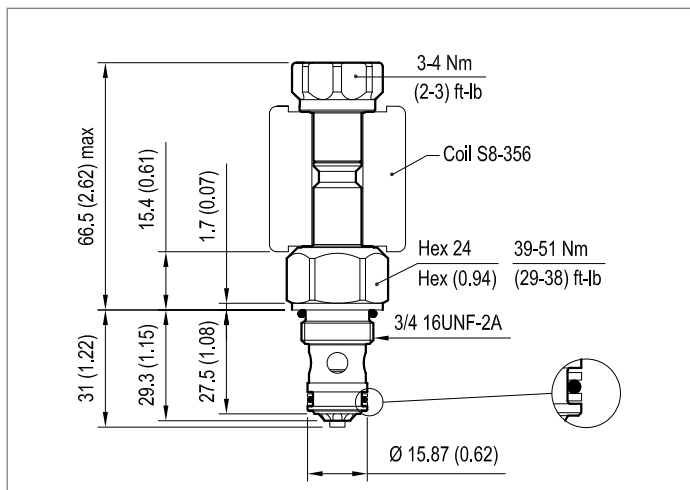


**Dimensions**

▼ **Version 06: Solenoid operated valve, poppet 2-way normally open**



▼ **Version 12: Solenoid operated valve, poppet 2-way normally open**

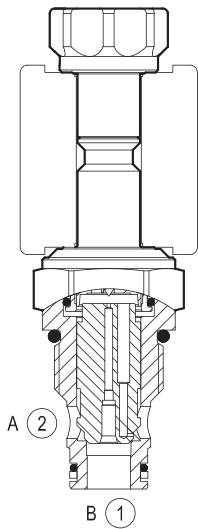




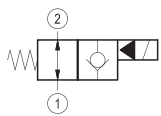
Solenoid operated valves pilot operated poppet type  
2-way normally open  
Common cavity, Size 10

VEI-8A-10-NA

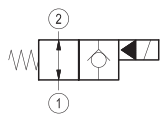
OD.15 - X - 36 - Y - S0



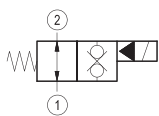
▼ Version 06



▼ Version 04



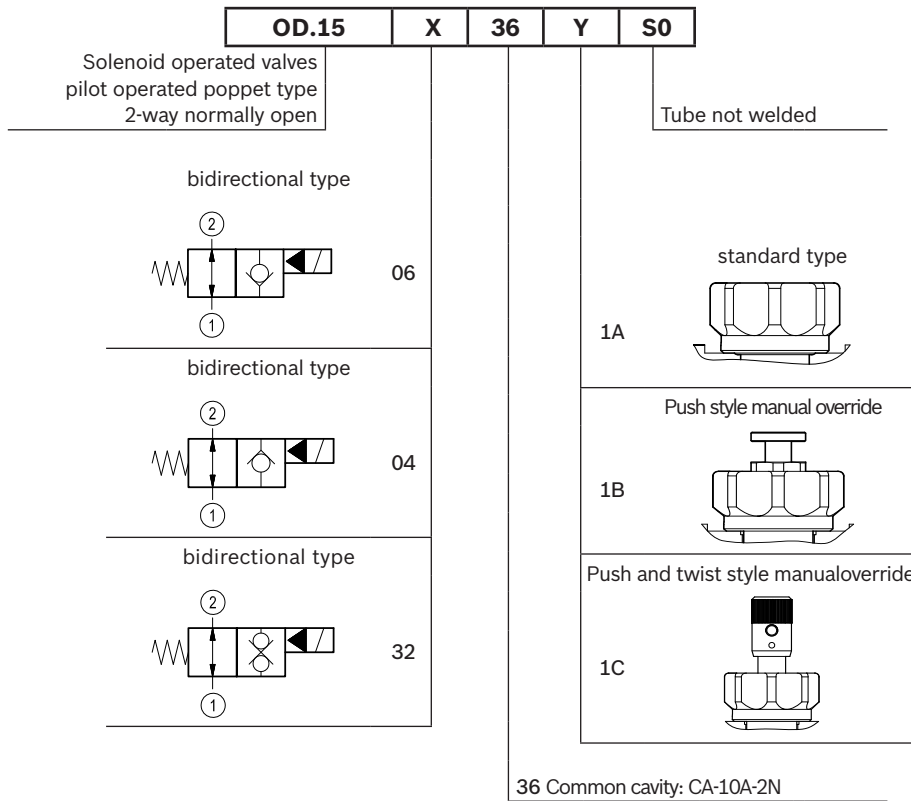
▼ Version 32



**Technical data**

General	
Weight	0.16 kg (0.35 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
Hydraulic	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	2 - 70 l/min (0.5 - 18 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	44 - 56 Nm (33 -42 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Cavity	CA-10A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 06	code material no. RG10A2010520100 R901111363
Seal kit – version 04-32	code material no. RG10A2010530100 R901111366
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

Ordering code



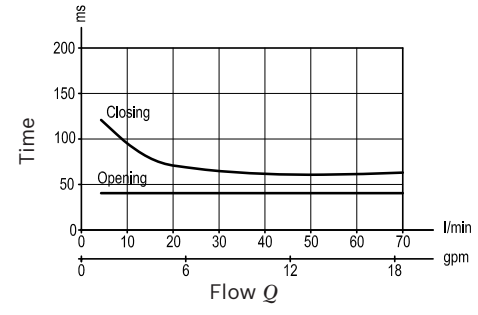
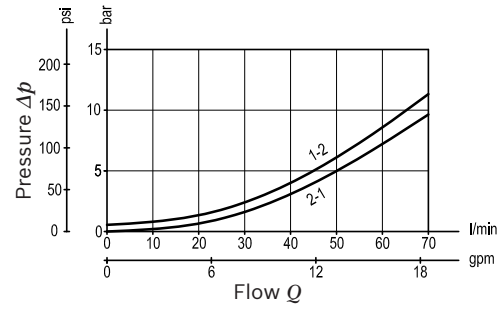
Type	Material number
OD1504361AS000	R901091124
OD1504361BS000	R901091125
OD1504361CS000	R901091126
OD1506361AS000	R901080489
OD1506361BS000	R901091136
OD1506361CS000	R901091137
OD1532361AS000	R901091175

Type	Material number
OD1532361BS000	R901091176
OD1532361CS000	R901091178

Characteristic curves

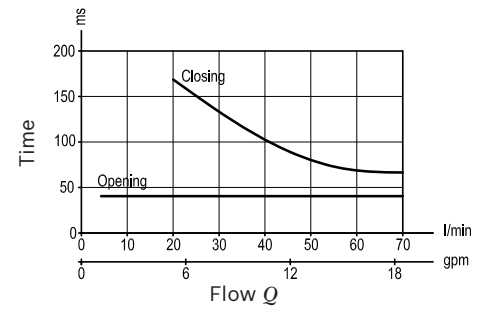
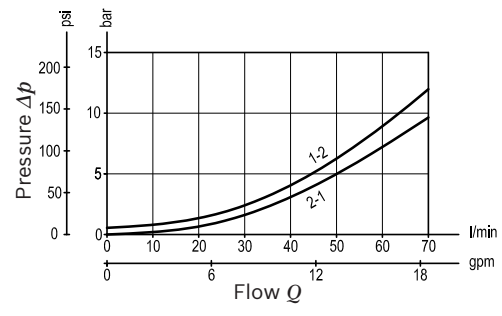
**Version 06 - 04**

Standard



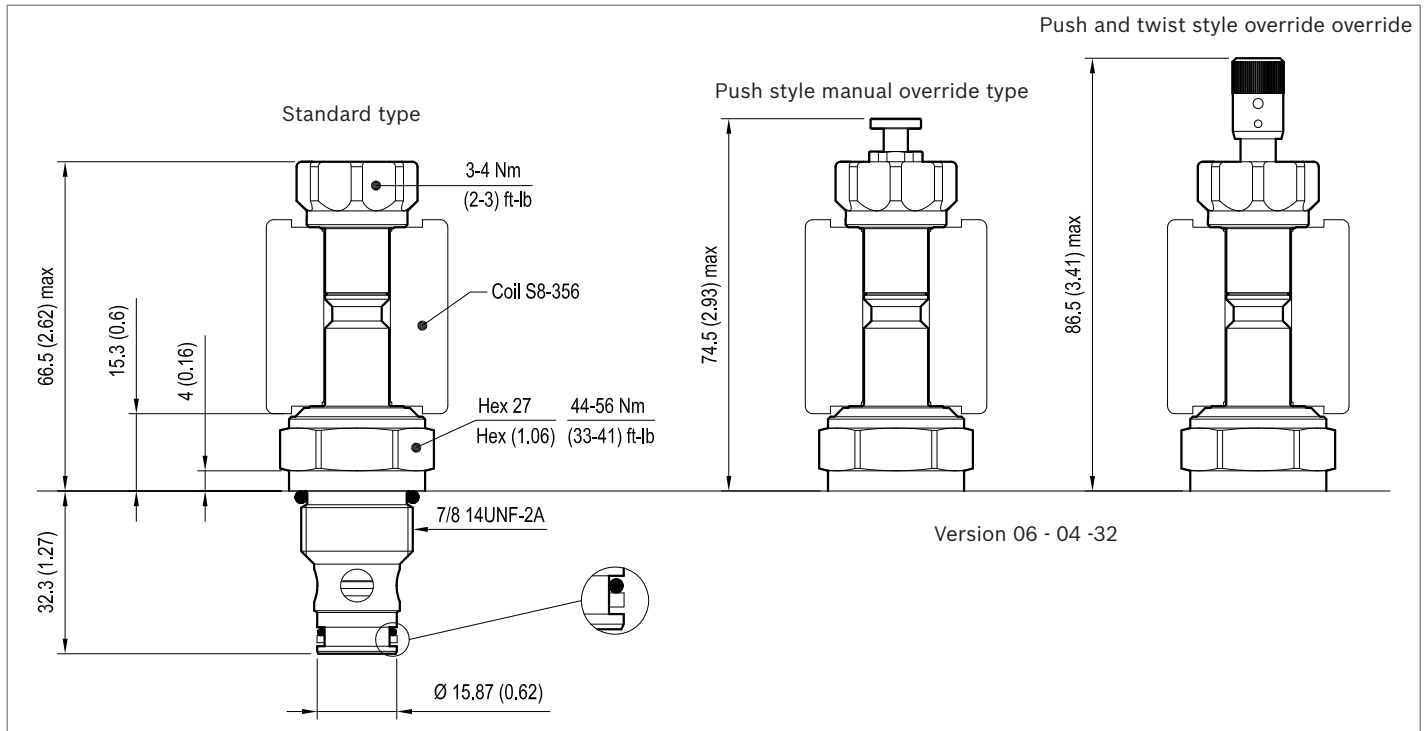
**Version 32**

Standard



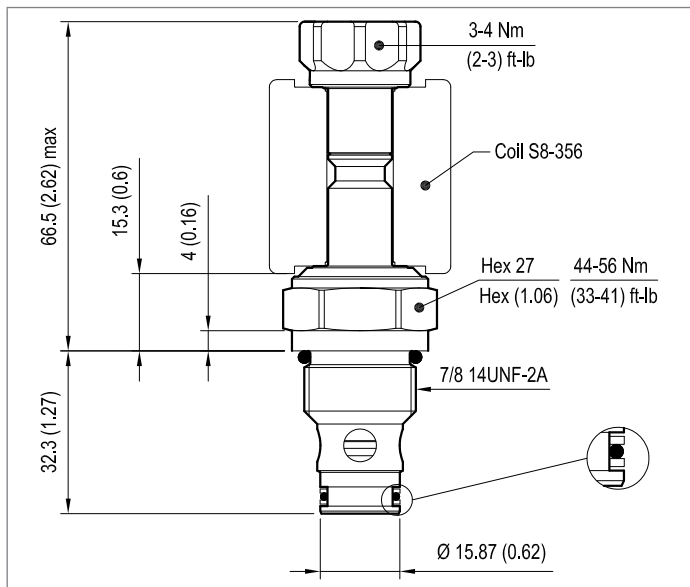
**Dimensions**

**Version 06: Solenoid operated valve, poppet 2-way normally open**



▼ **Version 04: Solenoid operated valve, poppet 2-way normally open**

▼ **Version 32: Solenoid operated valve, poppet 2-way double lock normally open**



Solenoid operated valves pilot operated poppet type  
2-way normally open  
Special cavity, 017-E

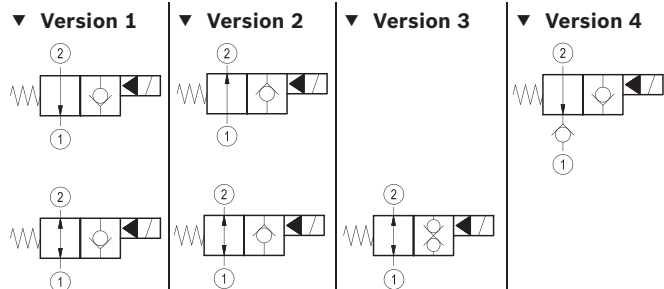
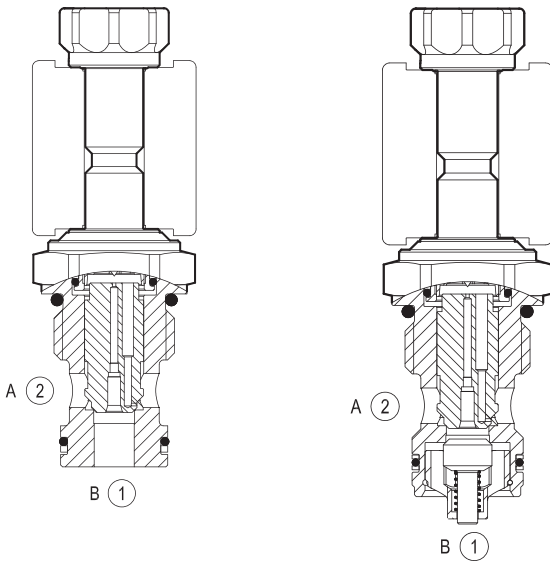
VEI-8A-09-NA

OD.15 - X - 17 - Y - S0

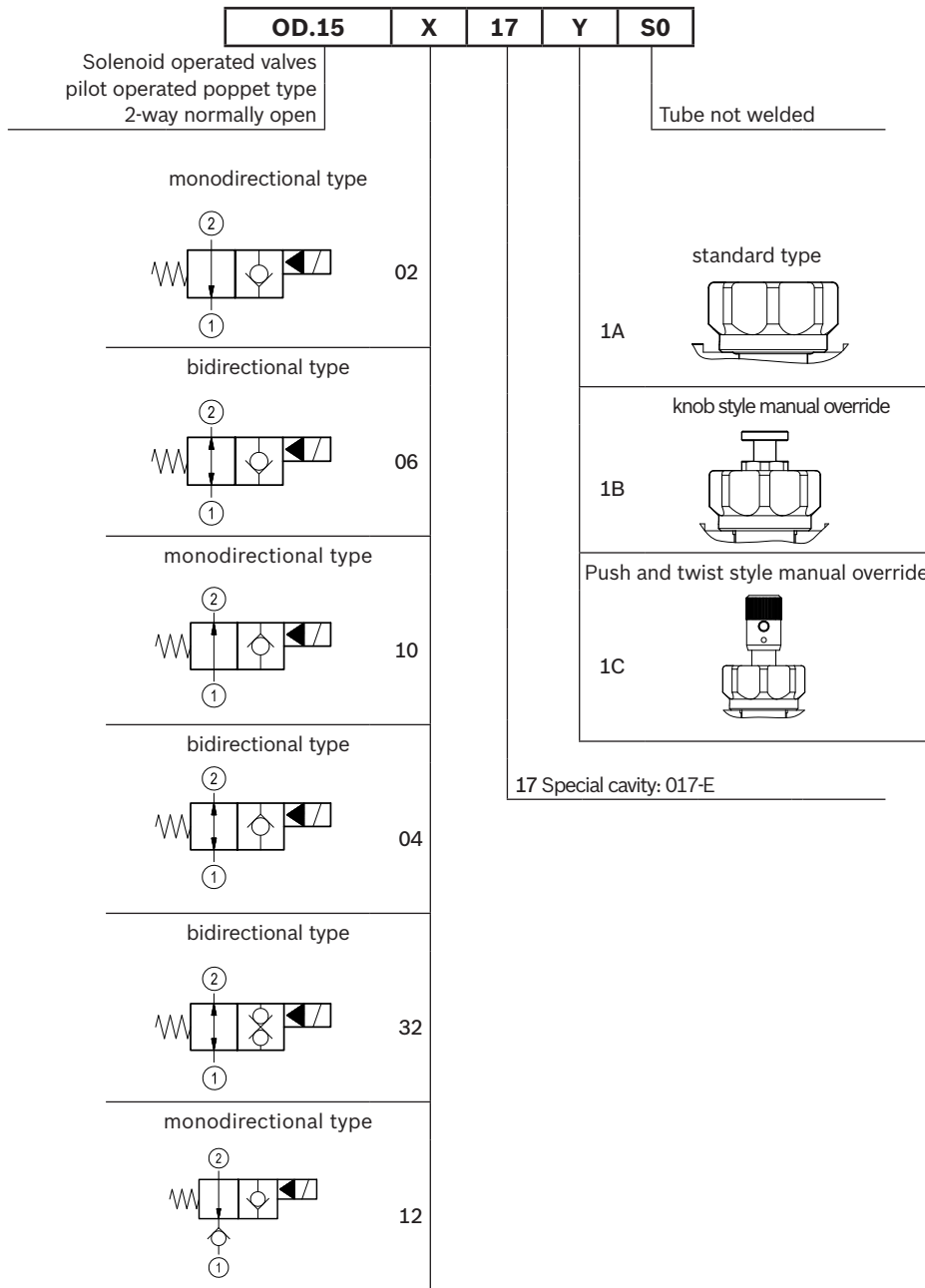


**Technical data**

General	
Weight	0.21 kg (0.46 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
Hydraulic	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	2 - 70 l/min (0.5 - 18 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	54 - 66 Nm (40 - 49 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51 except for codes market with *
Special cavity	017-E see 18325-75
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 1	code material no. RG17E201052010 R934003562
Seal kit – version 2-3-4	code material no. RG17E201053010 R934003563
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	



Ordering code



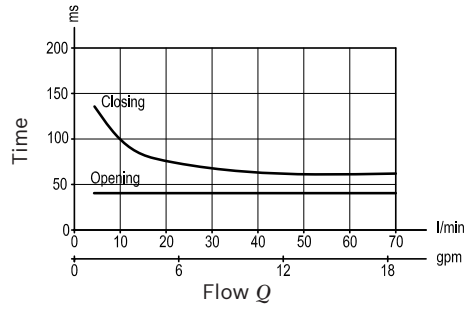
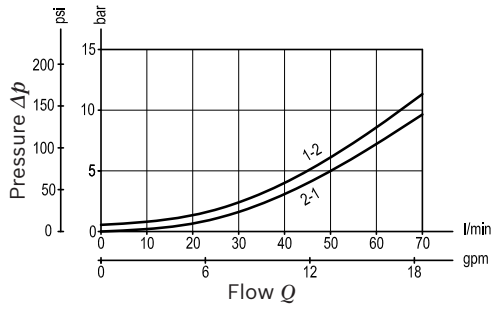
Type	Material number
OD1502171AS000	R934000718
OD1502171BS000	R934000721
OD1502171CS000	R901177370
OD1506171AS000	R901113677
OD1506171BS000	R901113680
OD1506171CS000	R934000956
OD1504171AS000	R901113668
OD1504171BS000	R901113669

Type	Material number
OD1504171CS000	R934000809
OD1510171AS000	R934001051
OD1510171BS000	R934004148
OD1510171CS000	R934001052
OD1512171AS000	R934001090 *
OD1532171AS000	R901113683
OD1532171BS000	R901113684
OD1532171CS000	R934001189

Characteristic curves

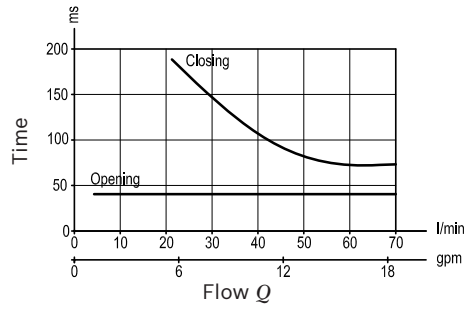
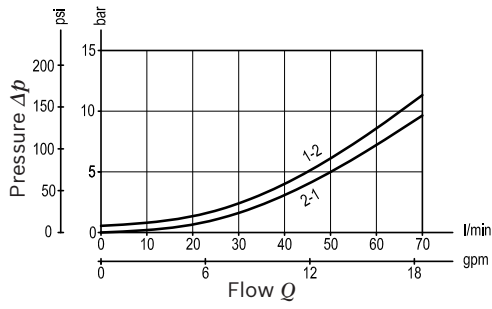
Version 1-2

Standard



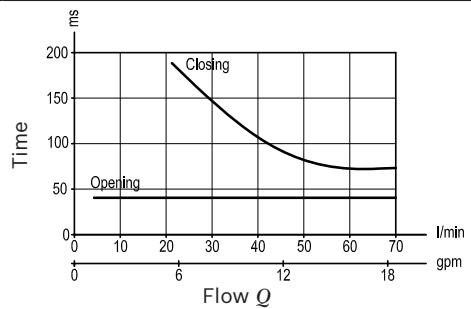
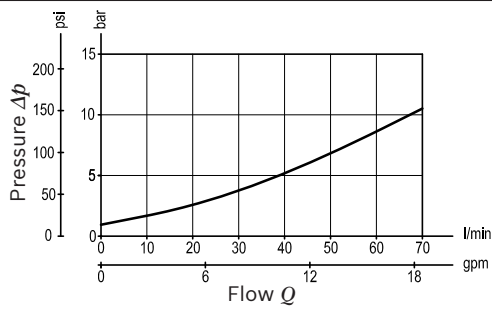
Version 3

Standard



Version 4

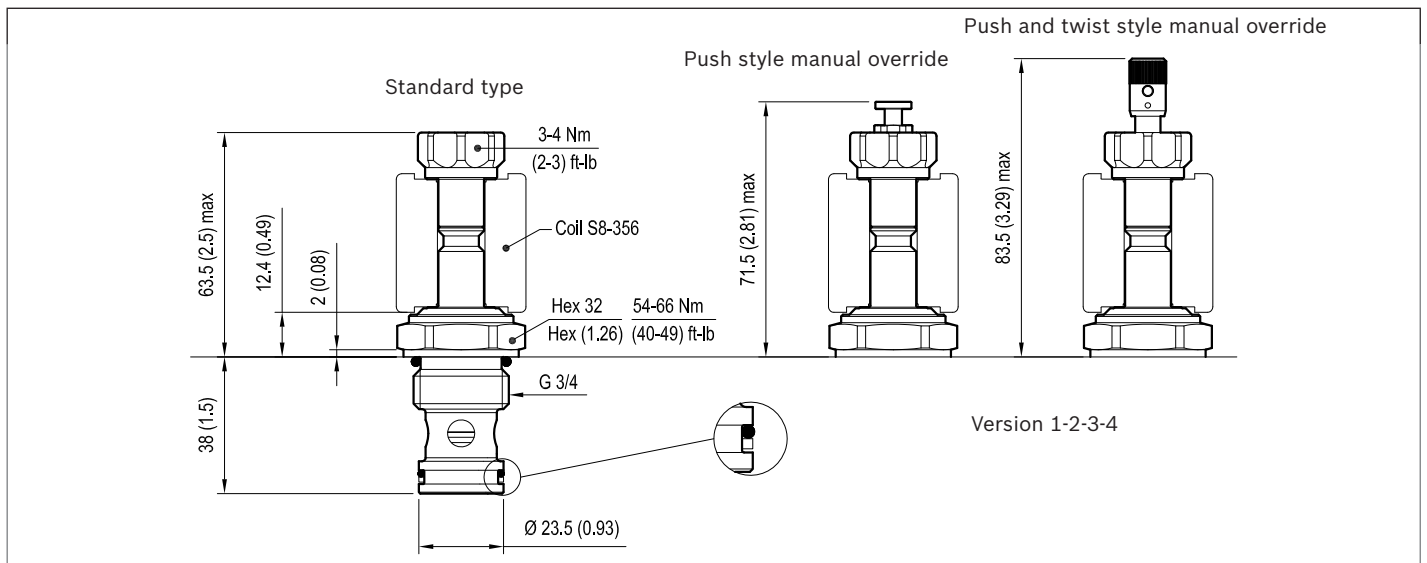
Standard



4

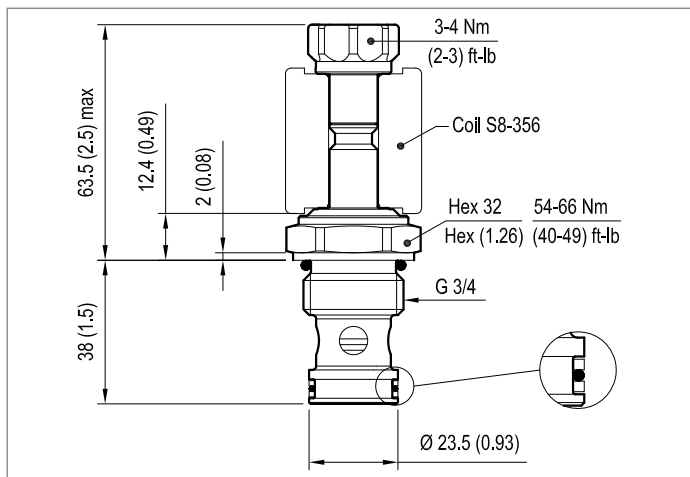
**Dimensions**

▼ **Version 1: Solenoid operated valves, poppet 2-way normally open**

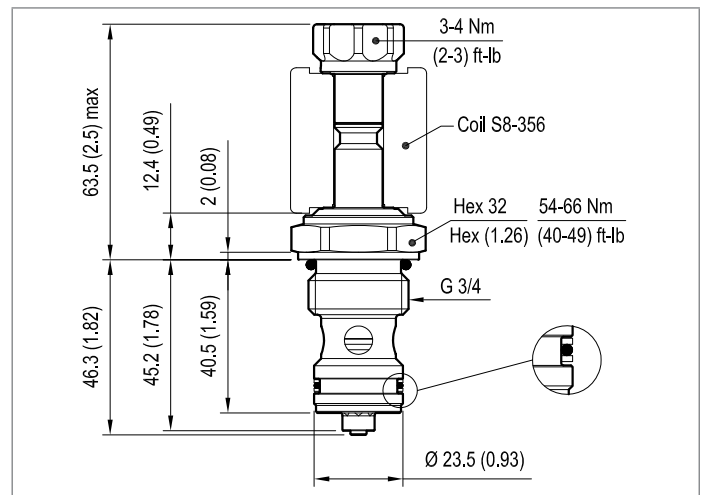


▼ **Version 2: Solenoid operated valves, poppet 2-way normally open**

▼ **Version 3: Solenoid operated valves, poppet 2-way double lock normally open**



▼ **Version 4: Solenoid operated valves, poppet 2-way normally open**

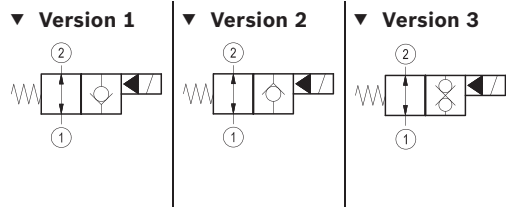
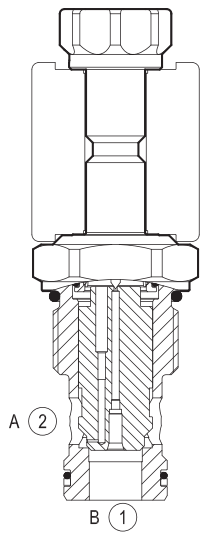




Solenoid operated valves pilot operated poppet type  
2-way normally open  
Common cavity, Size 12

VEI-8A-12A-NA

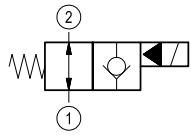
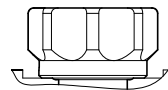
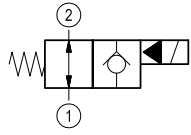
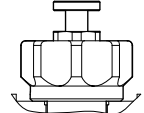
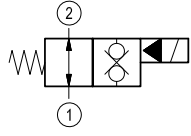
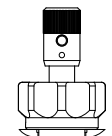
OD.15 - X - 89 - Y - S0



**Technical data**

<b>General</b>	
Weight	0.23 kg (0.51 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
<b>Hydraulic</b>	
Max. operating pressure	350 bar (5000 psi)
Flow range	5 - 150 l/min (1 - 40 gpm)
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	54 - 66 Nm (40 - 49 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Cavity	CA-12A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 1	code material no. RG12A2010520100 R901111377
Seal kit – version 2-3	code material no. RG12A2010530100 R930003374
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

Ordering code

	<b>OD.15</b>	<b>X</b>	<b>89</b>	<b>Y</b>	<b>S0</b>		
Solenoid operated valves pilot operated poppet type 2-way normally open						Tube not welded	
bidirectional type						standard type	
		06					1A 
bidirectional type						Push style manual override	
		04					1B 
bidirectional type with filter						Push and twist style manual override	
		32					1C 
89 Common cavity: CA-12A-2N							

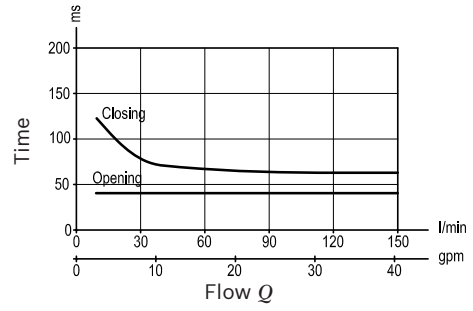
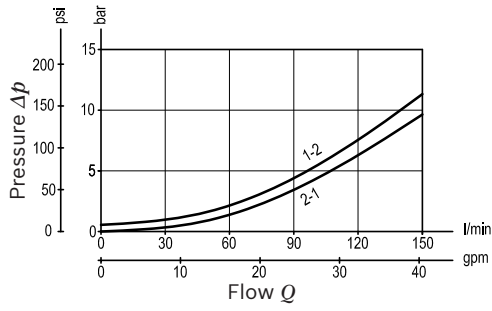
Type	Material number
OD1504891AS000	R901090961
OD1504891BS000	R901090960
OD1506891AS000	R901091139
OD1506891BS000	R901091140
OD1506891CS000	R901091141
OD1532891AS000	R901091179

Type	Material number
OD1532891BS000	R901091180
OD1532891CS000	R901091182

**Characteristic curves**

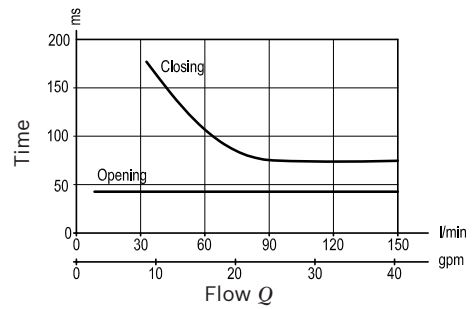
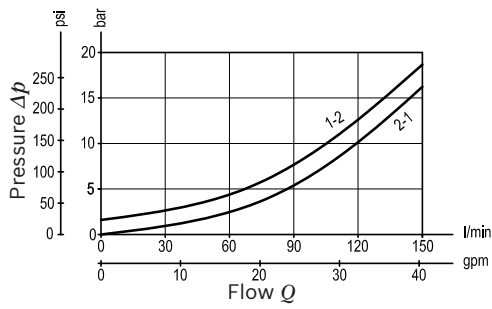
**Version 1-2**

Standard



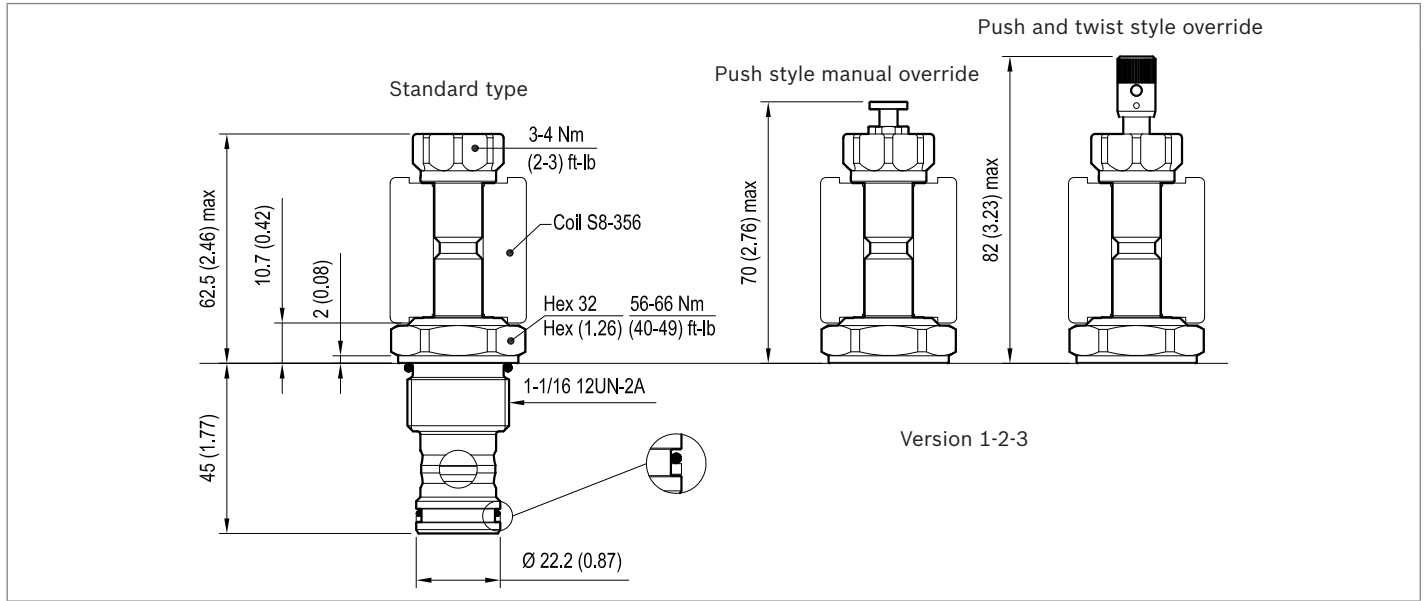
**Version 3**

Standard



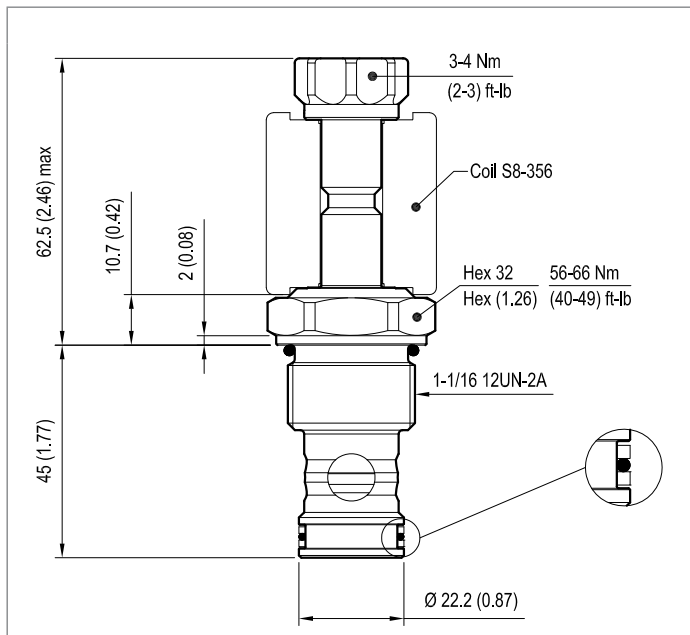
**Dimensions**

▼ **Version 1: Solenoid operated valve, poppet 2-way normally open**



▼ **Version 2: Solenoid operated valve, poppet 2-way normally open**

▼ **Version 3: Solenoid operated valve, poppet 2-way double lock normally open**



Solenoid operated valves pilot operated poppet type  
2-way normally open  
Special cavity, 021-E

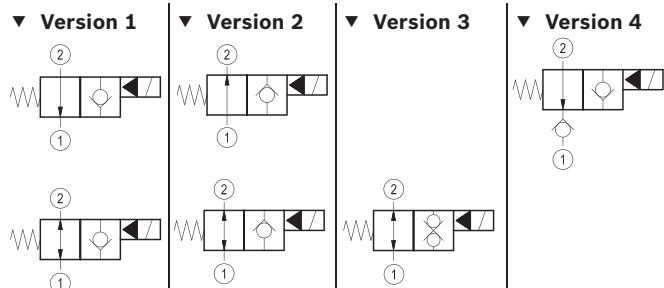
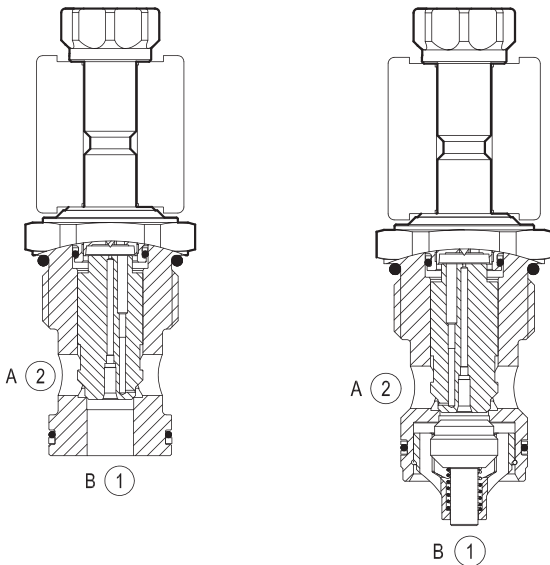
VEI-8A-12-NA

OD.15 - X - 21 - Y - S0

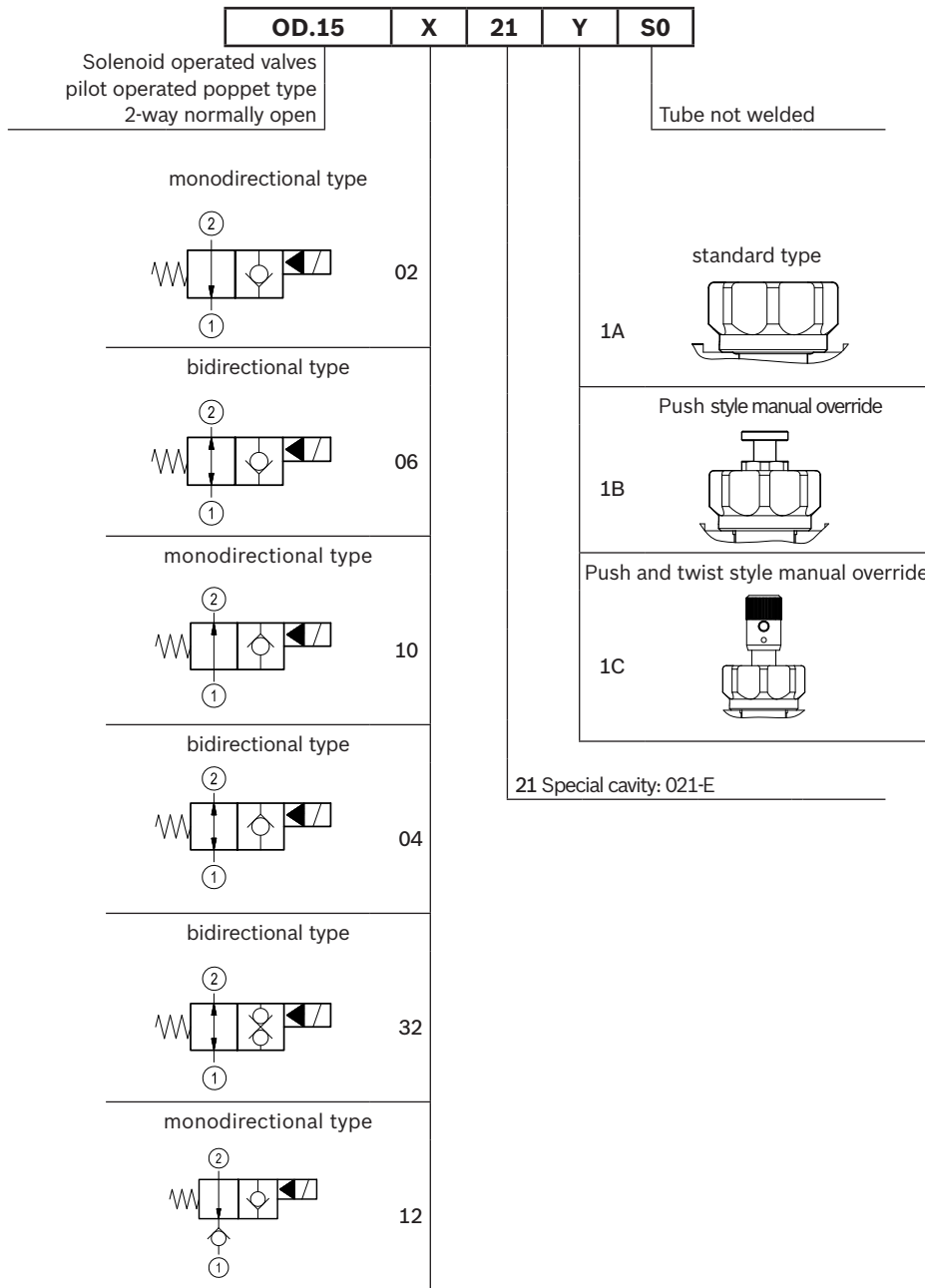


**Technical data**

General	
Weight	0.34 kg (0.75 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
Hydraulic	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	5 - 150 l/min (1 - 40 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	130 - 150 Nm (96 - 111 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Special cavity	021-E see 18325-75
Seal kit – version 1	code material no. RG21E201052010 R934003566
Seal kit – version 2-3-4	code material no. RG21E201053010 R934003567
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	



Ordering code



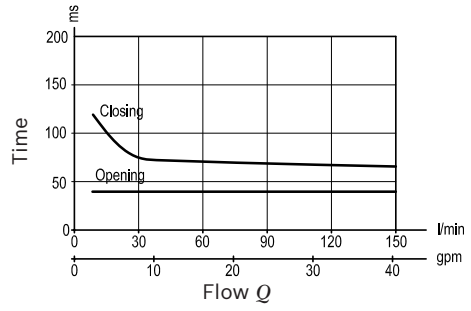
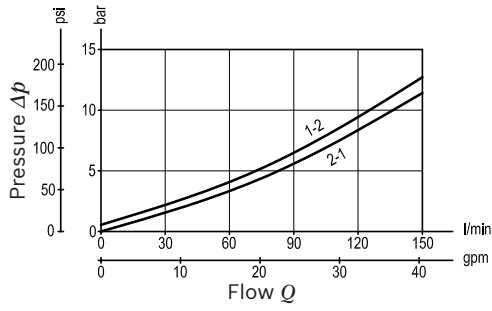
Type	Material number
OD1502211AS000	R987067733
OD1502211BS000	R901186074
OD1502211CS000	R934000758
OD1504211AS000	R901113671
OD1504211BS000	R901113672
OD1504211CS000	R934000820
OD1506211AS000	R901104409
OD1506211BS000	R901113681
OD1506211CS000	R901172041

Type	Material number
OD1510211AS000	R901085464
OD1510211BS000	R934001061
OD1512211AS000	R934001100
OD1512211BS000	R934001101
OD1512211CS000	R934001102
OD1532211AS000	R901104415
OD1532211BS000	R901113685
OD1532211CS000	R901191824

Characteristic curves

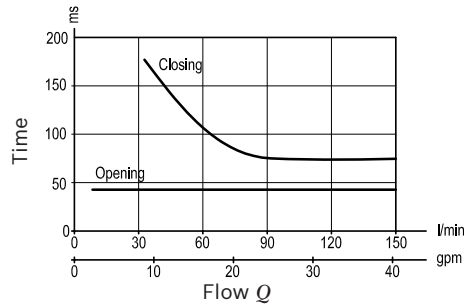
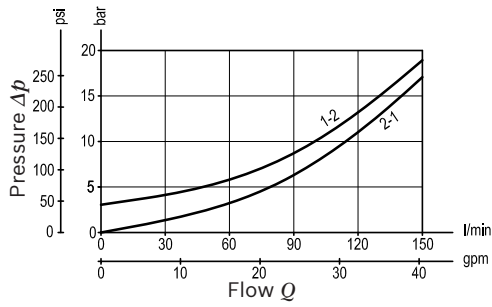
Version 1-2

Standard



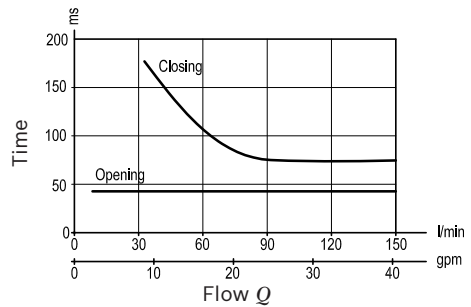
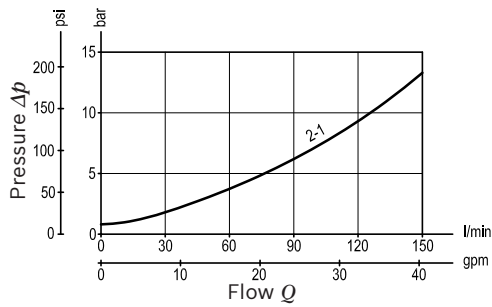
Version 3

Standard



Version 4

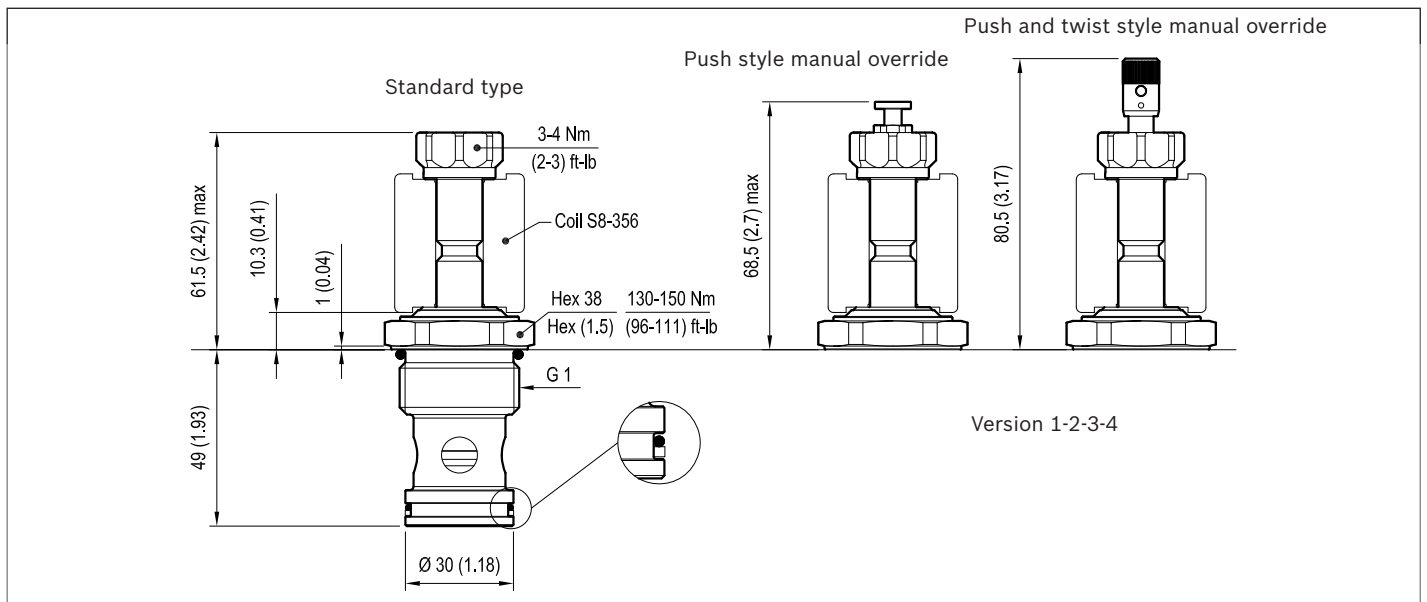
Standard



4

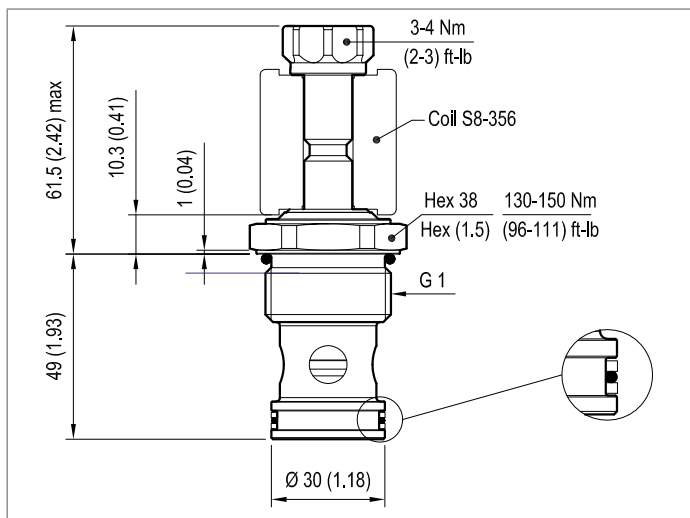
**Dimensions**

▼ **Version 1: Solenoid operated valves, poppet 2-way normally open**

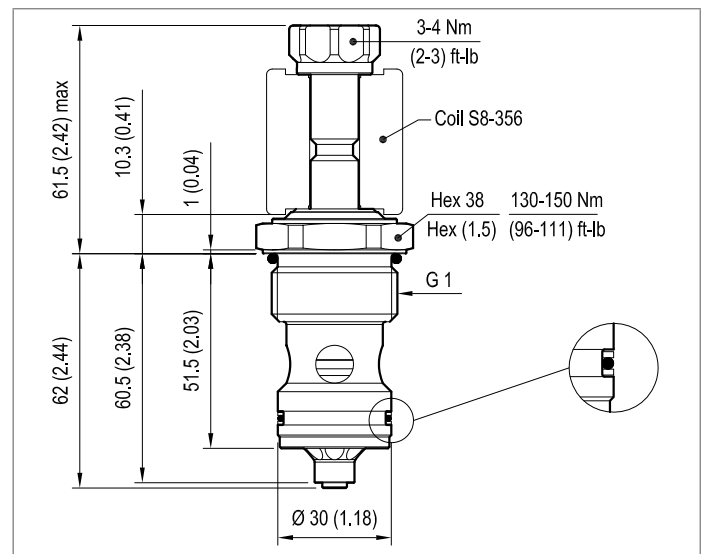


▼ **Version 2: Solenoid operated valves, poppet 2-way normally open**

▼ **Version 3: Solenoid operated valves, poppet 2-way double lock normally open**



▼ **Version 4: Solenoid operated valves, poppet 2-way normally open**

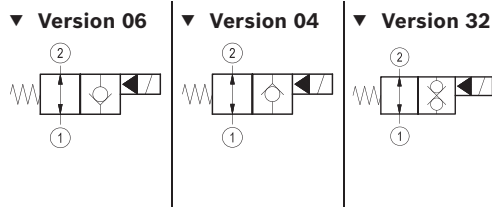
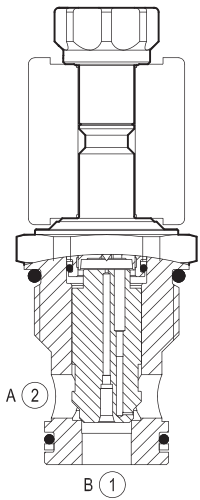




Solenoid operated valves pilot operated poppet type  
2-way normally open  
Common cavity, Size 16

VEI-8A-16A-NA

OD.15 - X - 75 - Y - S0

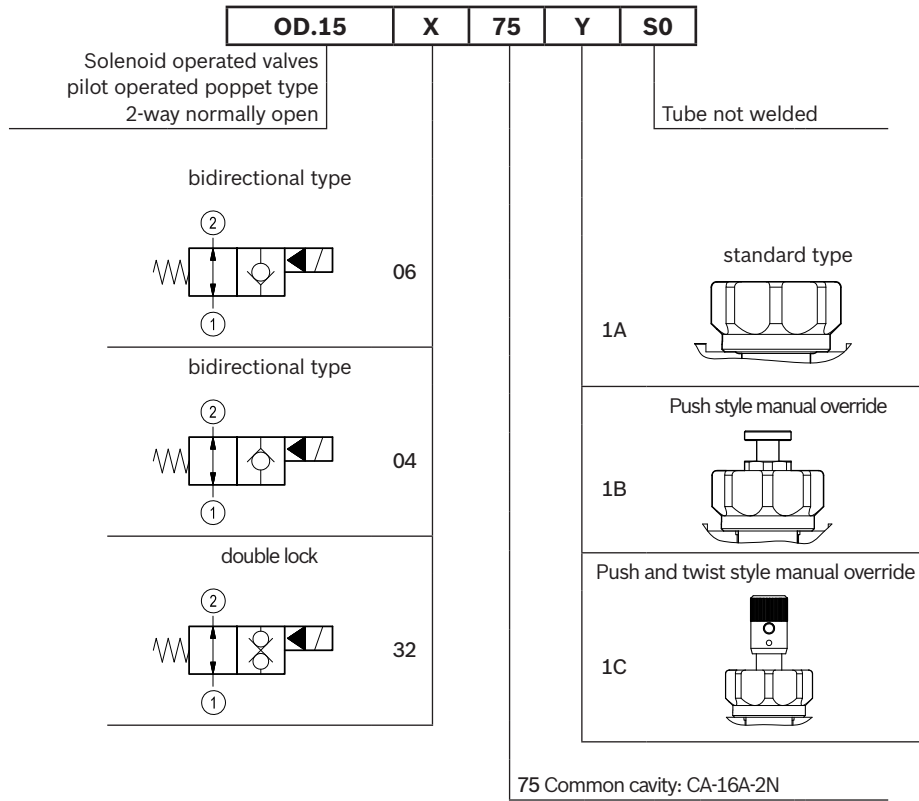


**Technical data**

<b>General</b>	
Weight	0.32 kg (0.71 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
<b>Hydraulic</b>	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Flow range	5 - 150 l/min (1 - 40 gpm)
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	130 - 150 Nm (96 - 111 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Cavity	CA-16A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 06	code material no. RG75E201052010 R934004079
Seal kit – version 04-32	code material no. RG75E201053010 R934004080
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

4

Ordering code



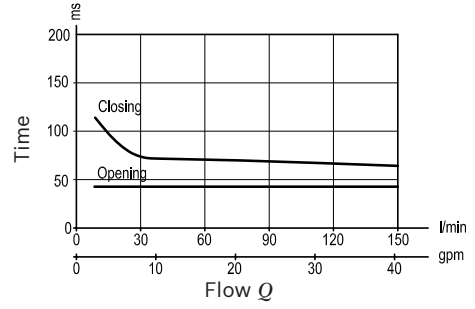
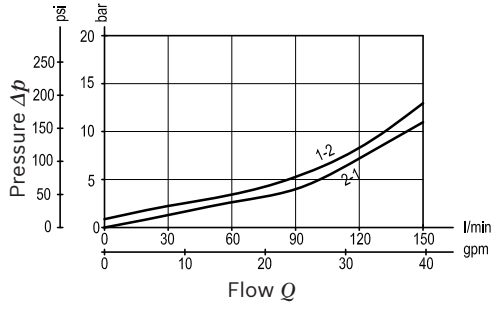
Type	Material number
OD1504751AS000	R901094731
OD1506751AS000	R901095953
OD1506751BS000	R901095955
OD1506751CS000	R901095956
OD1532751AS000	R901094753
OD1532751BS000	R901094754

Type	Material number
OD1532751CS000	R901094755

Characteristic curves

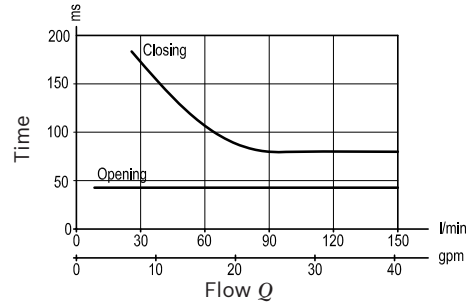
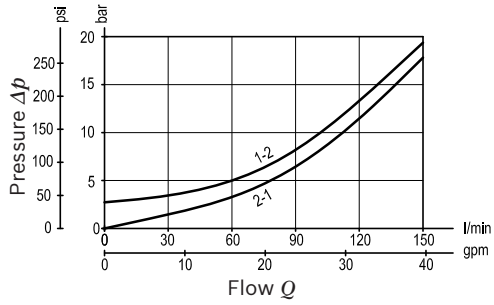
Version 06-04

Standard



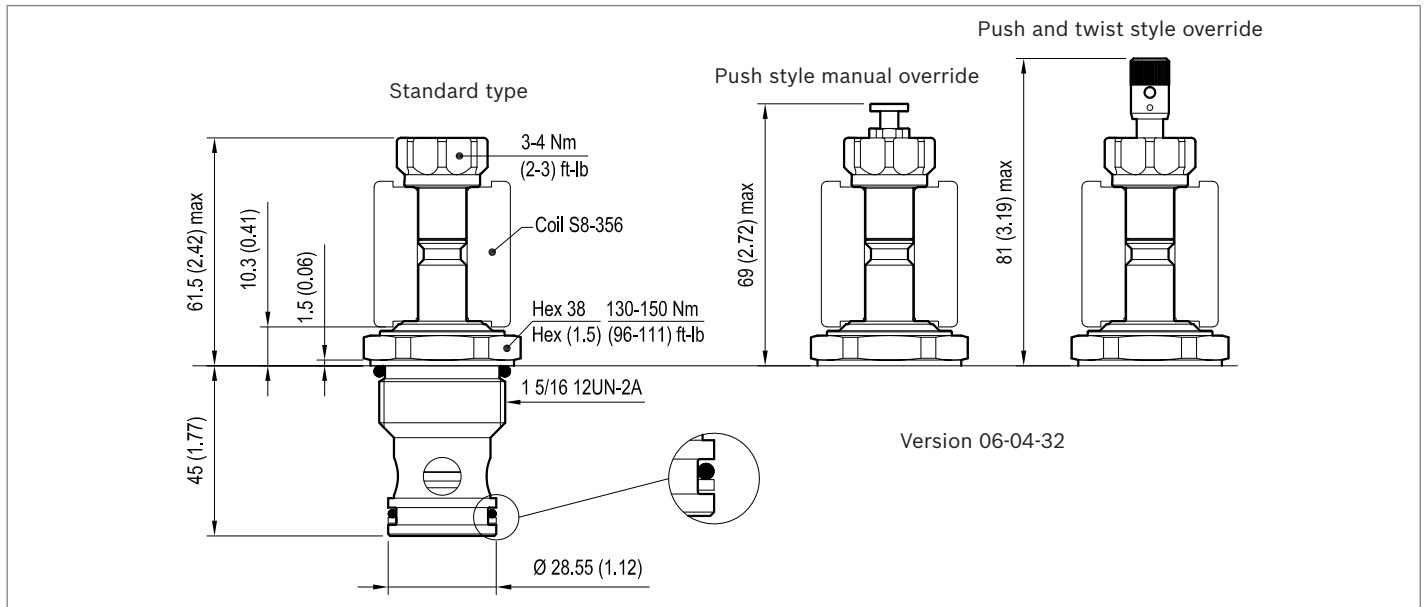
Version 32

Standard



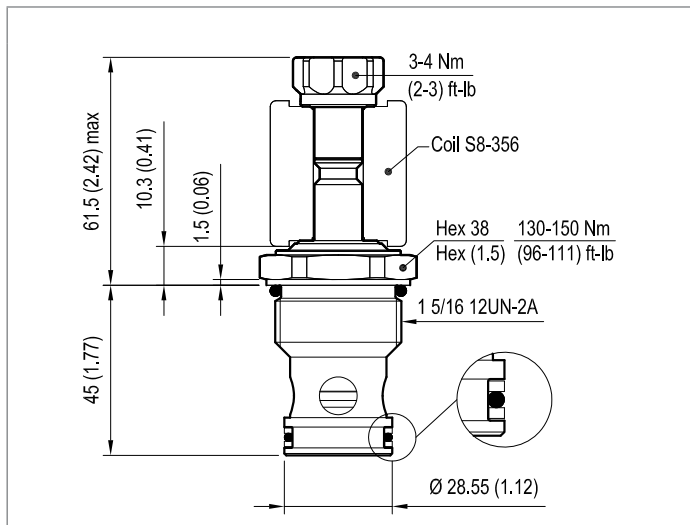
**Dimensions**

▼ **Version 06: Solenoid operated valve, poppet 2-way normally open**



▼ **Version 04: Solenoid operated valve, poppet 2-way normally open**

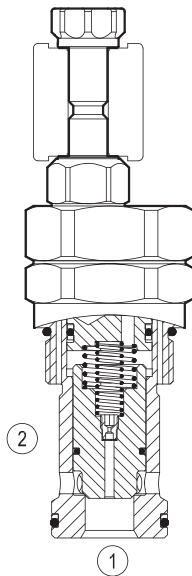
▼ **Version 32: Solenoid operated valve, poppet 2-way double lock normally open**



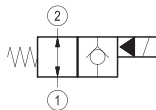
Solenoid operated valves pilot operated poppet type  
2-way normally open  
Special cavity, 004

VEI-8A-2B-16-NA-NSS

OD.15.04.04 - Y - S0



▼ **Version 04**

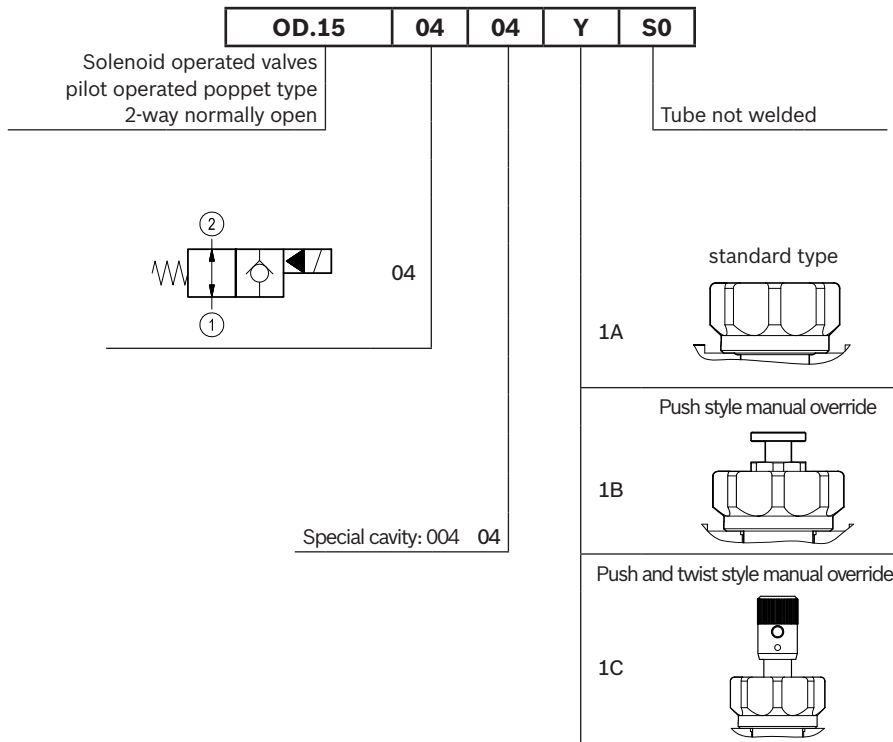


**Technical data**

<b>General</b>	
Weight	1.13 kg (2.5 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 60 °C (-22 to 140 °F)
<b>Hydraulic</b>	
Max. operating pressure	350 bar (5000 psi)
Max. proof pressure	420 bar (6000 psi)
Rated flow	260 l/min (69 gpm)
Fatigue cycle life	1 million cycles at 350 bar
Max. internal leakage	20 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	110 - 130 Nm (81 - 96 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 25 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Special cavity	004 see 18325-75
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 04	code material no. RG0004020520100 R930001696
Seal kit coil	code material no. RG12A1PNBR7010 R934003958
Other technical data	See data sheet 18350-50
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	See characteristic curves %
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

4

Ordering code



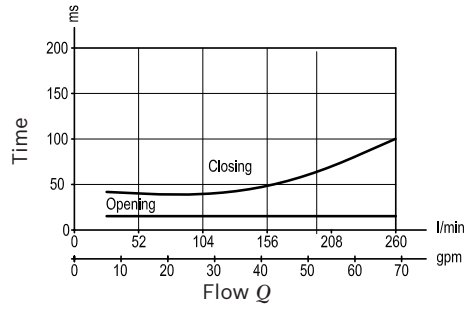
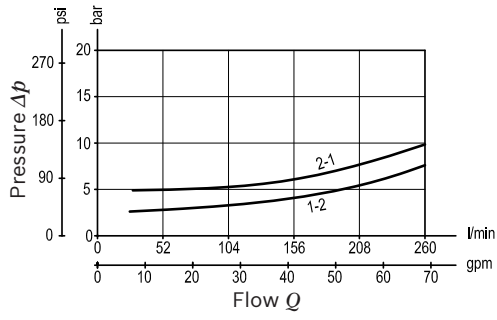
Type	Material number
OD1504041AS000	R901091118
OD1504041BS000	R901091119
OD1504041CS000	R901091120

Type	Material number

Characteristic curves

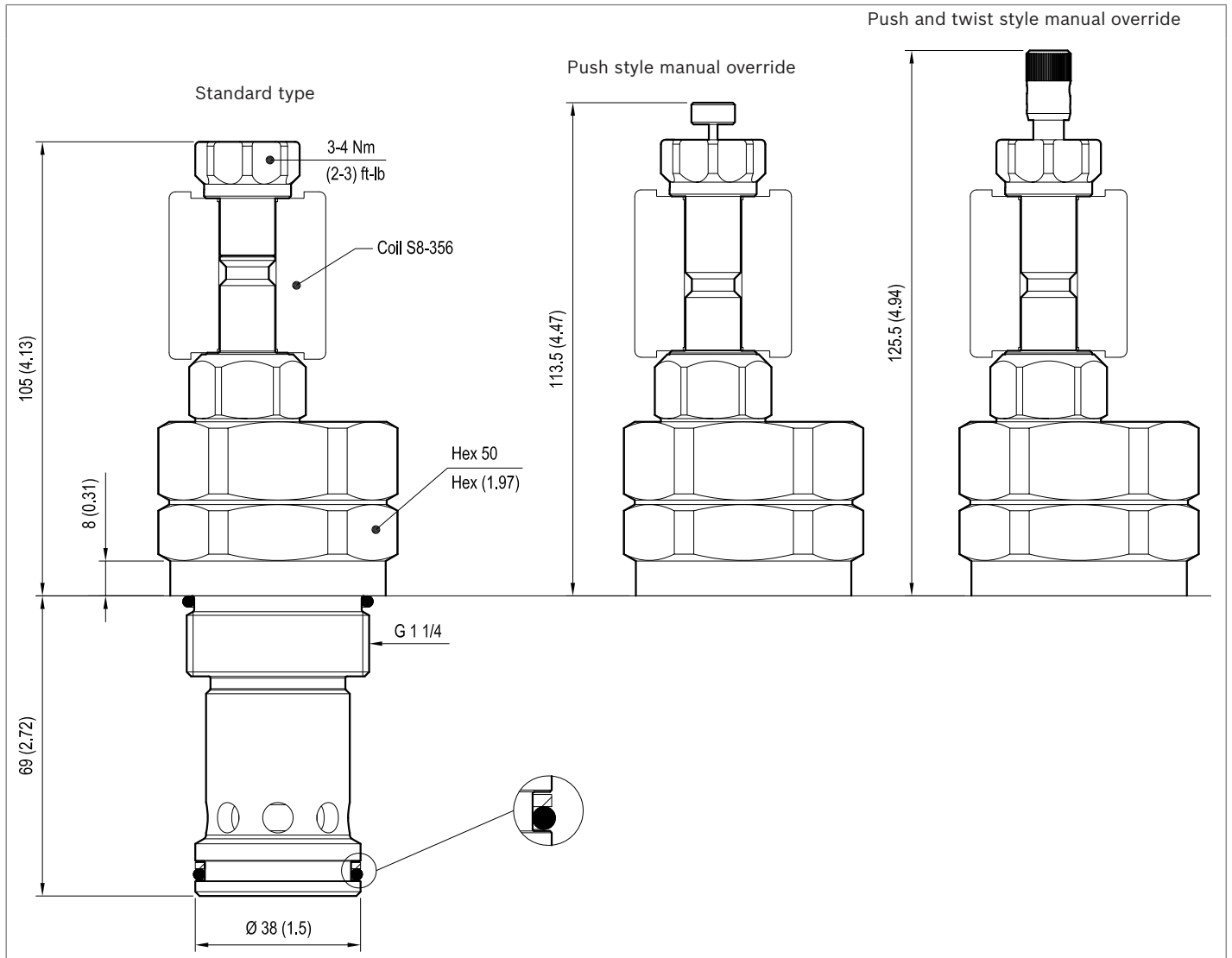
Version 04

Standard



**Dimensions**

▼ **Version 04: Solenoid operated valve, poppet 2-way normally open - Special cavity**

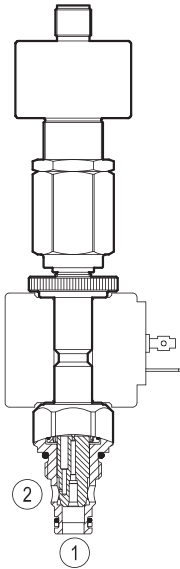




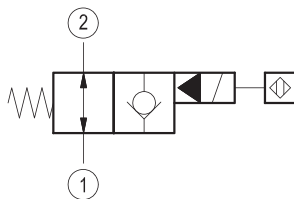
Solenoid operated valves pilot operated poppet type  
2-way normally open proximity sensor  
Common cavity, Size 08

VEI-8A-2A-06-NA-S-M-NSS

OD.15.06.18.2D.S2 - Z



▼ Version 06



**Technical data**

General	
Weight	0.75 kg (1.65 lbs)
Installation orientation	Optional
Ambient temperature range	-25 to 60 °C (-13 to 140 °F)
Hydraulic	
Max. operating pressure	350 bar (5000 psi)
Flow range	2.5 - 40 l/min (0.66 - 11 gpm)
Max. internal leakage	15 drops/min.
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	30 - 35 Nm (22 - 26 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd	150 years see RE 18350-51
Cavity	CA-08A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 06	code material no. RG08A2010520100 R930001696
Other technical data	See data sheet 18350-50

Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	100 % see 18325-90
Type of protection	See data sheet 18325-90

Please consider that a proper function of the valve is guaranteed only if the position of the monitor is not modified; each cartridge is provided of a torque confirmation mark, intended as anti-tampering device.

Sensor is protected against short circuit polarity inversion.

Ordering code

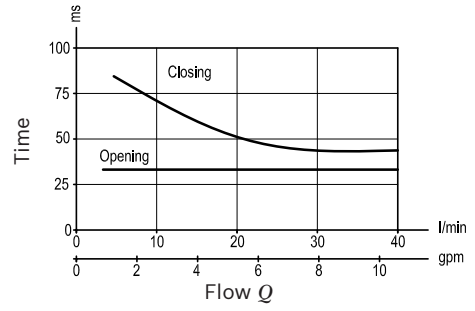
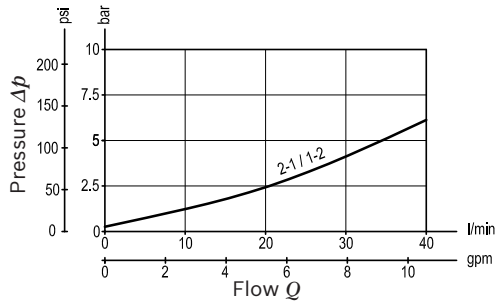
	<b>OD.15</b>	<b>06</b>	<b>18</b>	<b>2DS2</b>	<b>Z</b>
<p>Solenoid operated valves pilot operated poppet type 2-way normally open proximity sensor</p>					<p>OB 12 V DC</p> <hr/> <p>OC 24 V DC</p> <p>Note: please consult factory for different voltages.</p>
					<p>Common cavity: CA-08A-2N</p>

Type	Material number
OD1506182DS2OB	R934004821
OD1506182DS2OC	R934005243

Type	Material number

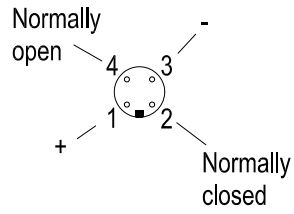
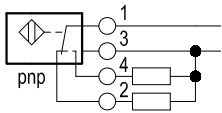
**Characteristic curves**

**Version 06**



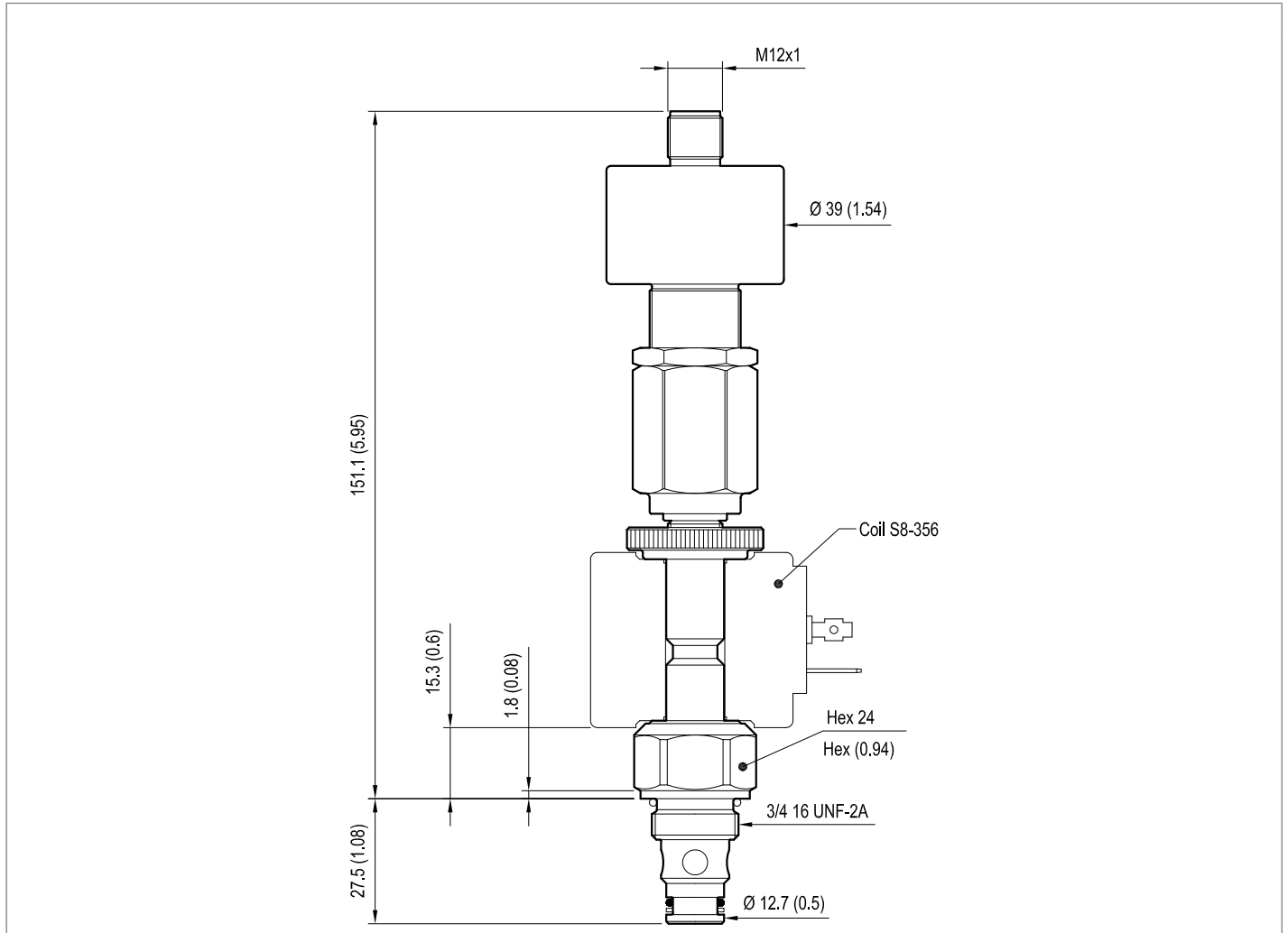
**Sensor data:**

	12 V DC	24 V DC
Supply voltage	10.5 to 16	20 to 32
Output load	≤ 400 mA	≤ 400 mA



**Dimensions**

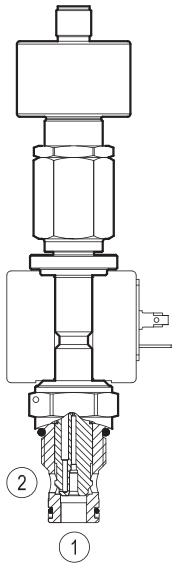
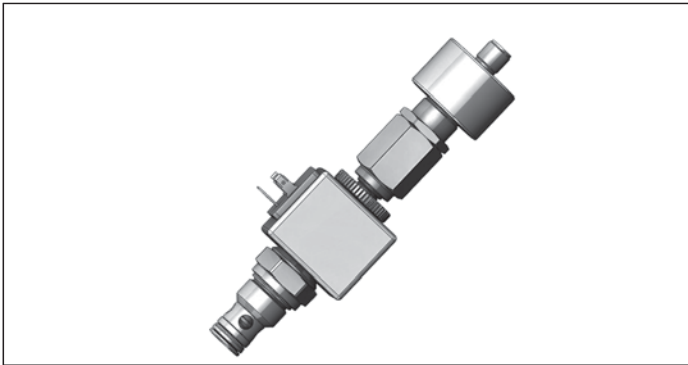
▼ **Version 06: Solenoid operated valve, poppet 2-way normally open proximity sensor**



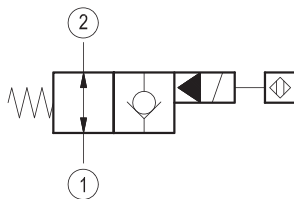
Solenoid operated valves pilot operated poppet type  
2-way normally open proximity sensor  
Special cavity, 076-E

VEI-8A-2A-09-NA-S-M-NSS

OD.15.06.76.1D.S2 - Z



▼ Version 06



**Technical data**

General		
Weight	0.75 kg (1.65 lbs)	
Installation orientation	Optional	
Ambient temperature range	-25 to 60 °C (-13 to 140 °F)	
Hydraulic		
Max. operating pressure	350 bar (5000 psi)	
Flow range	2.5 - 70 l/min (0.66 - 18 gpm)	
Max. internal leakage	15 drops/min.	
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)	
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)		
Installation torque	41 - 47 Nm (30 - 35 ft-lbs)	
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14	
MTTFd	150 years see RE 18350-51	
Special cavity	076-E see 18325-75	
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory	
Seal kit – version 06	code	RG10A2010520100
	material no.	R901111363
Other technical data	See data sheet 18350-50	

Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	100 % see 18325-90
Type of protection	See data sheet 18325-90

Please consider that a proper function of the valve is guaranteed only if the position of the monitor is not modified; each cartridge is provided of a torque confirmation mark, intended as anti-tampering device.

Sensor is protected against short circuit polarity inversion.

Ordering code

	<b>OD.15</b>	<b>06</b>	<b>76</b>	<b>1DS2</b>	<b>Z</b>
--	--------------	-----------	-----------	-------------	----------

Solenoid operated valves  
pilot operated poppet type  
2-way normally open proximity sensor

AC 26 V DC

Note: please consult factory for different voltages.

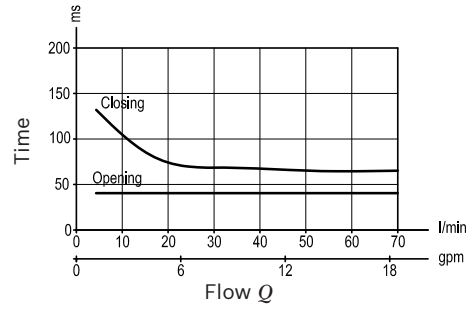
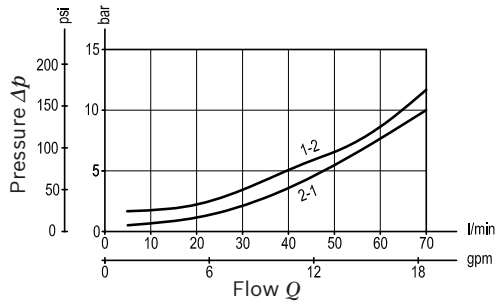
Special cavity: 076-E

Type	Material number
OD1506761DS2AC	R934001233

Type	Material number

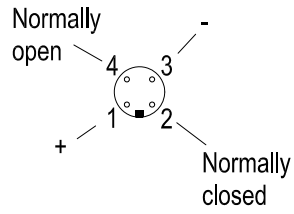
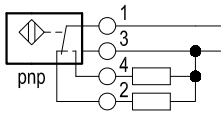
**Characteristic curves**

**Version 06**



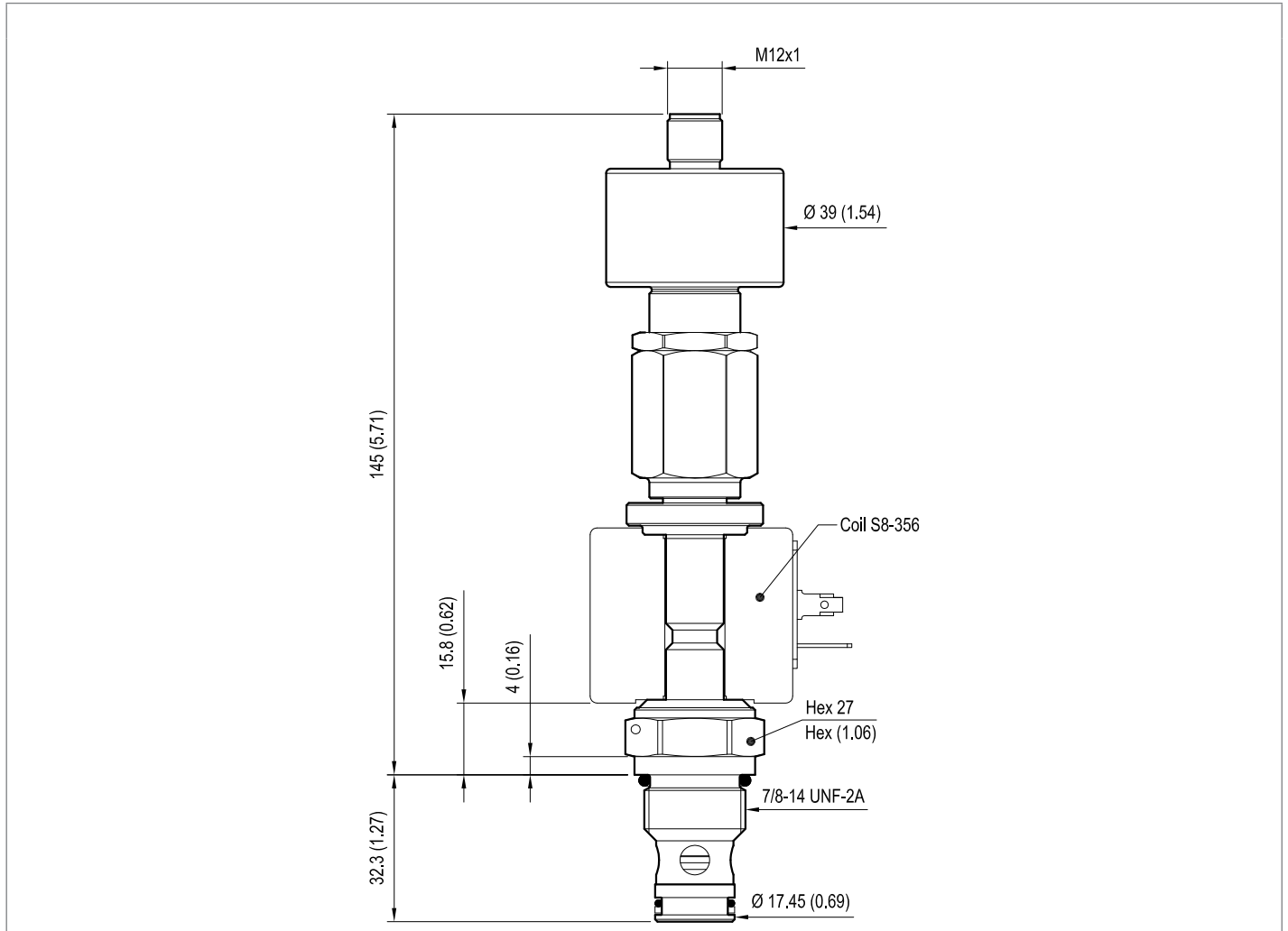
**Sensor data:**

	26 V DC
Supply voltage	20 to 32
Output load	$\leq 400$ mA



**Dimensions**

▼ **Version 06: Solenoid operated valve, poppet 2-way normally open proximity sensor**

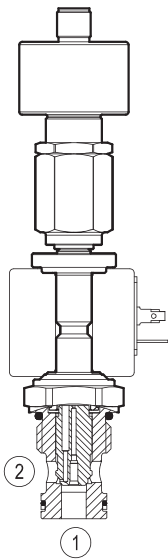




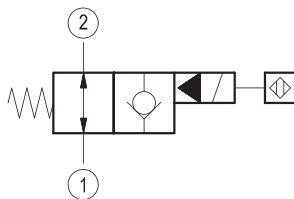
Solenoid operated valves pilot operated poppet type  
2-way normally open proximity sensor  
Special cavity, 017-E

VEI-8A-2A-09-NA-S-M-NSS

OD.15.06.17.1D.S0 - Z



▼ Version 06



**Technical data**

General		
Weight	0.75 kg (1.65 lbs)	
Installation orientation	Optional	
Ambient temperature range	-25 to 60 °C (-13 to 140 °F)	
Hydraulic		
Max. operating pressure	350 bar (5000 psi)	
Flow range	3.5 - 70 l/min (1 - 18 gpm)	
Max. internal leakage	15 drops/min.	
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)	
Fluids:	Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	50 - 55 Nm (37 - 41 ft-lbs)	
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14	
MTTFd	150 years see RE 18350-51	
Special cavity	017-E see 18325-75	
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory	
Seal kit – version 06	code	RG17E201052010
	material no.	R934003562
Other technical data	See data sheet 18350-50	

Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	100 % see 18325-90
Type of protection	See data sheet 18325-90

Please consider that a proper function of the valve is guaranteed only if the position of the monitor is not modified; each cartridge is provided of a torque confirmation mark, intended as anti-tampering device.

Sensor is protected against short circuit polarity inversion.

Ordering code

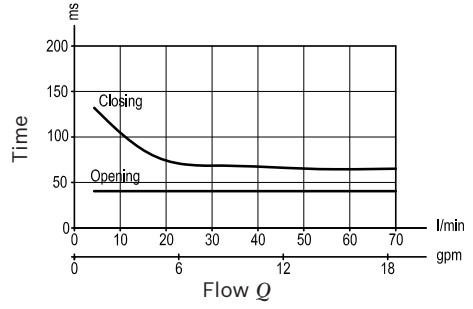
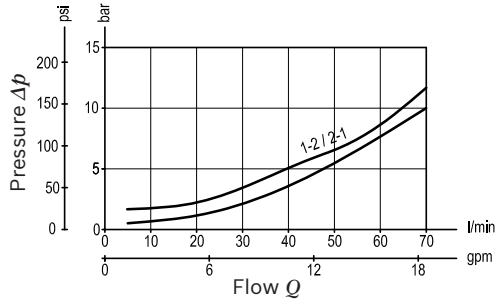
	<b>OD.15</b>	<b>06</b>	<b>17</b>	<b>1DS0</b>	<b>Z</b>
Solenoid operated valves pilot operated poppet type 2-way normally open proximity sensor					OB 12 V DC <hr/> OC 24 V DC  Note: please consult factory for different voltages.
					Special cavity: 017-E

Type	Material number
OD1506171DS2OB	R934001215
OD1506171DS2OC	R934001206

Type	Material number

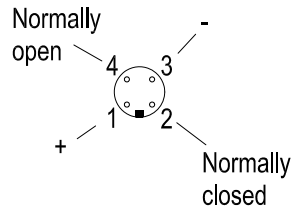
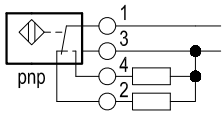
**Characteristic curves**

**Version 06**



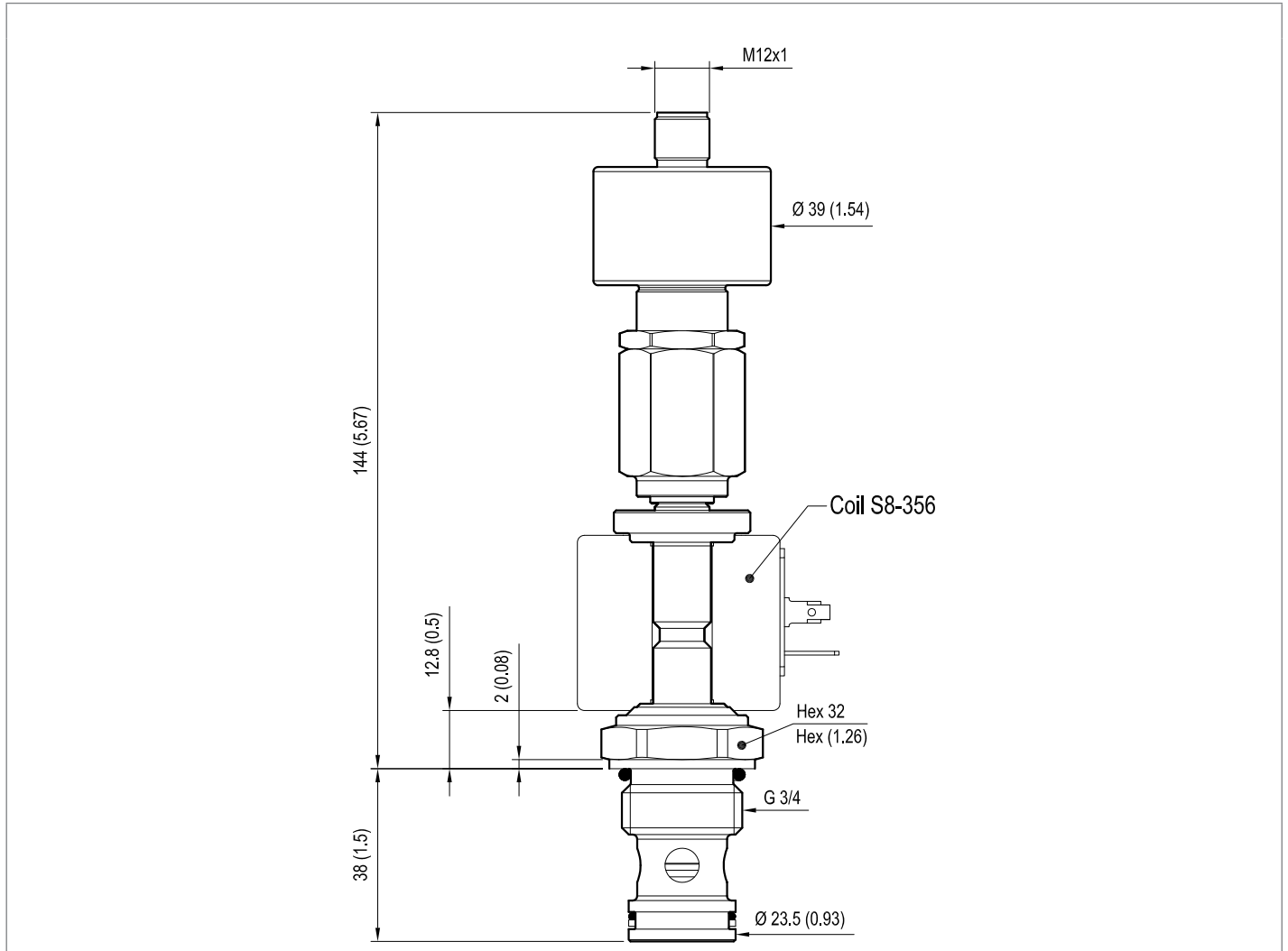
**Sensor data:**

	12 V DC	24 V DC
Supply voltage	10.5 to 16	20 to 32
Output load	≤ 400 mA	≤ 400 mA



**Dimensions**

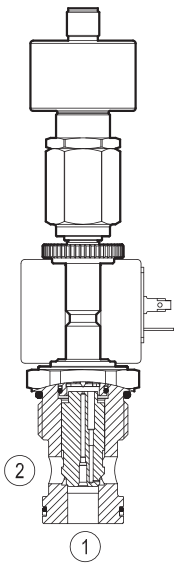
▼ **Version 06: Solenoid operated valve, poppet 2-way normally open proximity sensor**



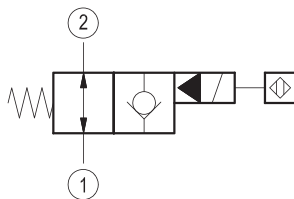
Solenoid operated valves pilot operated poppet type  
2-way normally open proximity sensor  
Special cavity, 021-E

VEI-8A-2A-12-NA-S-M-NSS

OD.15.06.21.1D.S2 - Z



▼ Version 06



**Technical data**

General		
Weight		0.85 kg (1.9 lbs)
Installation orientation		Optional
Ambient temperature range		-25 to 60 °C (-13 to 140 °F)
Hydraulic		
Max. operating pressure		350 bar (5000 psi)
Flow range		3.5 - 150 l/min (1 - 40 gpm)
Max. internal leakage		15 drops/min.
Fluid temperature range		-20 to 80 °C (-4 to 176 °F)
Fluids:	Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque		80 - 85 Nm (59 - 63 ft-lbs)
Recommended degree of fluid contamination		Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd		150 years see RE 18350-51
Special cavity		021-E see 18325-75
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory	
Seal kit – version 06	code	RG21E201052010
	material no.	R934003566
Other technical data	See data sheet 18350-50	

Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	100 % see 18325-90
Type of protection	See data sheet 18325-90

Please consider that a proper function of the valve is guaranteed only if the position of the monitor is not modified; each cartridge is provided of a torque confirmation mark, intended as anti-tampering device.

Sensor is protected against short circuit polarity inversion.

Ordering code

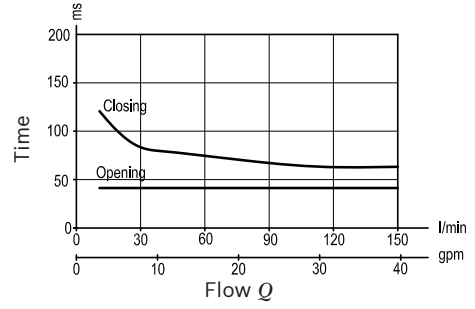
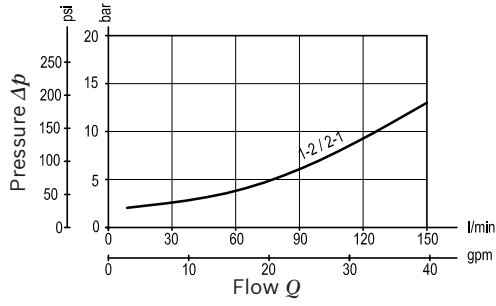
	<b>OD.15</b>	<b>06</b>	<b>21</b>	<b>1DS2</b>	<b>Z</b>
Solenoid operated valves pilot operated poppet type 2-way normally open proximity sensor					OB 12 V DC OC 24 V DC Note: please consult factory for different voltages.
					Special cavity: 021-E

Type	Material number
OD1506211DS2OB	R934001228
OD1506211DS2OC	R934001208

Type	Material number

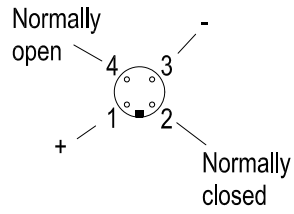
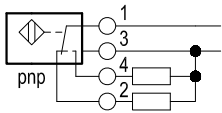
**Characteristic curves**

**Version 06**



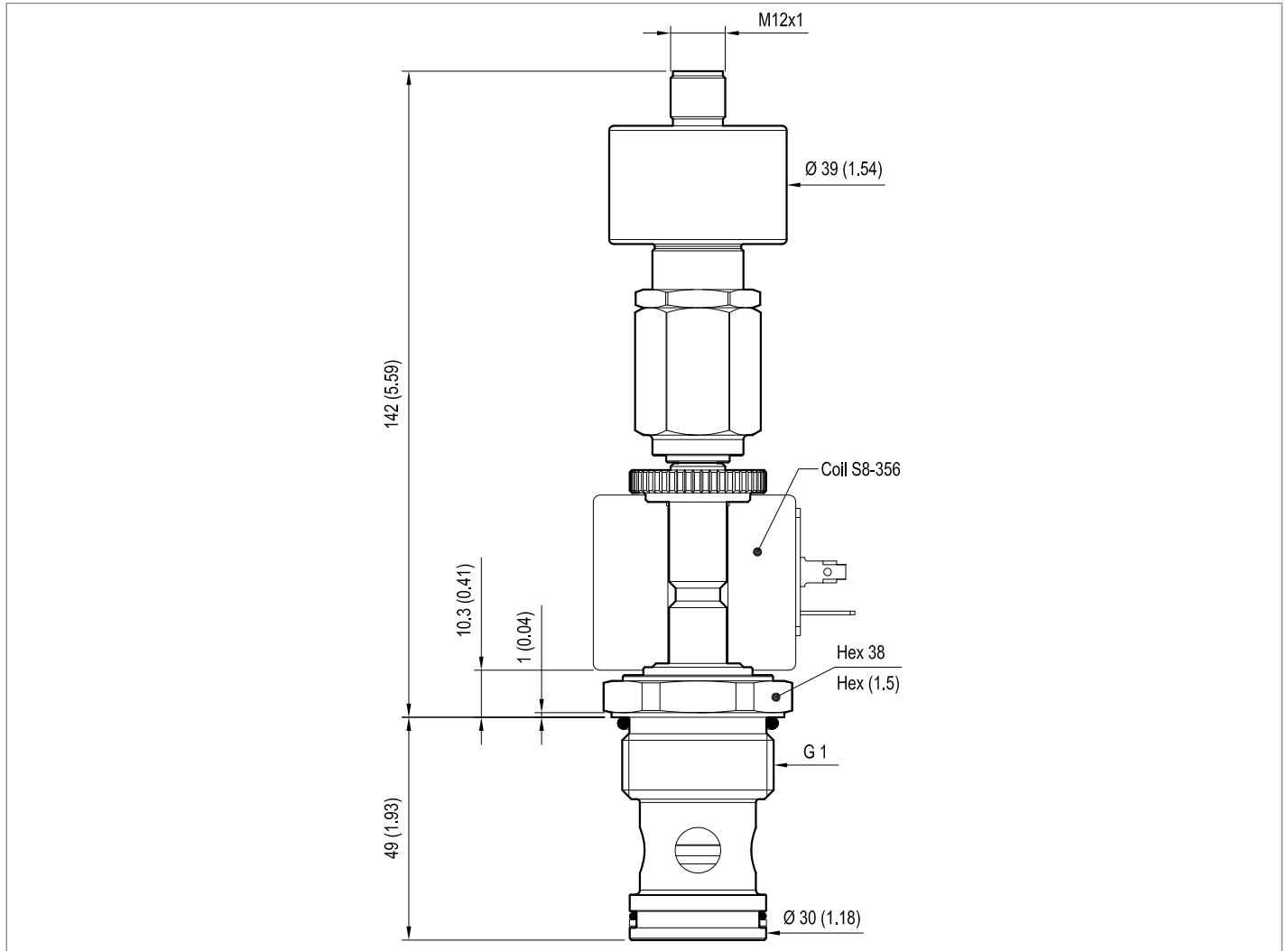
**Sensor data:**

	12 V DC	24 V DC
Supply voltage	10.5 to 16	20 to 32
Output load	$\leq 400$ mA	$\leq 400$ mA



**Dimensions**

▼ **Version 06: Solenoid operated valve, poppet 2-way normally open proximity sensor**

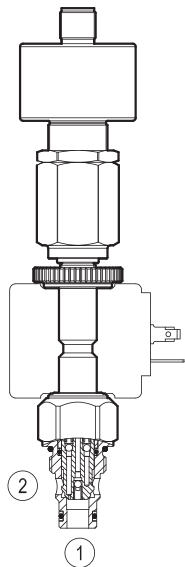
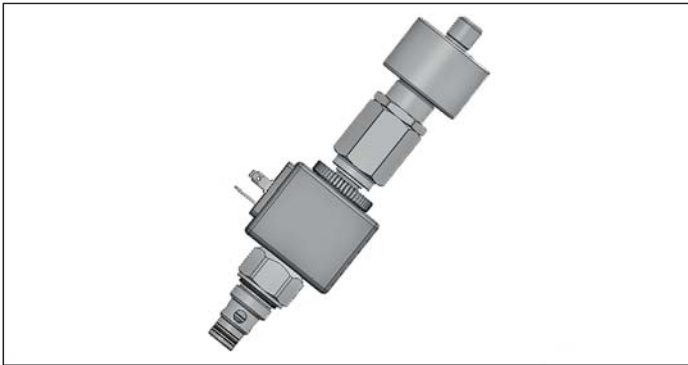




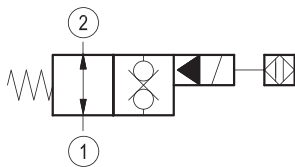
Solenoid operated valves pilot operated poppet type  
2-way normally open proximity sensor  
Common cavity, Size 08

VEI-8A-2T-06-NA-S-M-NSS

OD.15.32.18.1D.S2 - Z



▼ Version 32



**Technical data**

General		
Weight		0.75 kg (1.7 lbs)
Installation orientation		Optional
Ambient temperature range		-25 to 60 °C (-13 to 140 °F)
Hydraulic		
Max. operating pressure		350 bar (5000 psi)
Flow range		2.5 - 40 l/min (0.66 - 11 gpm)
Max. internal leakage		15 drops/min.
Fluid temperature range		-20 to 80 °C (-4 to 176 °F)
Fluids:	Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque		30 - 35 Nm (22 - 26 ft-lbs)
Recommended degree of fluid contamination		Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd		150 years see RE 18350-51
Cavity		CA-08A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory	
Seal kit – version 32	code	RG08A2010530100
	material no.	R901101544
Other technical data	See data sheet 18325-90	

Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	100 % see 18325-90
Type of protection	See data sheet 18325-90

Please consider that a proper function of the valve is guaranteed only if the position of the monitor is not modified; each cartridge is provided of a torque confirmation mark, intended as anti-tampering device.

Sensor is protected against short circuit polarity inversion.

Ordering code

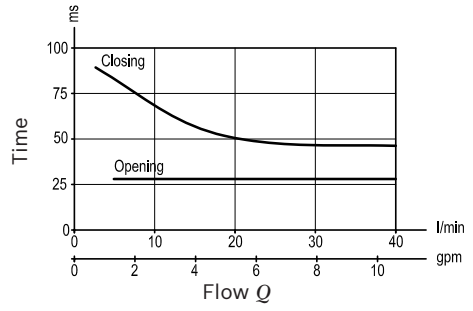
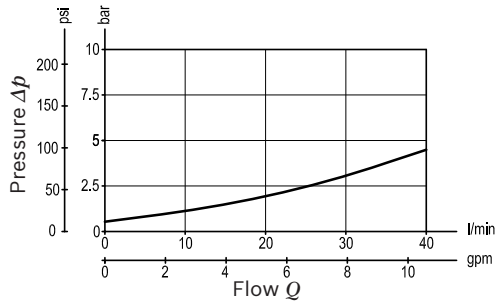
	<b>OD.15</b>	<b>32</b>	<b>18</b>	<b>1DS2</b>	<b>Z</b>
Solenoid operated valves pilot operated poppet type 2-way normally open proximity sensor					OB 12 V DC OC 24 V DC Note: please consult factory for different voltages.
					Common cavity: CA-08A-2N

Type	Material number
OD1532181DS2OB	R934004542
OD1532181DS2OC	R934004903

Type	Material number

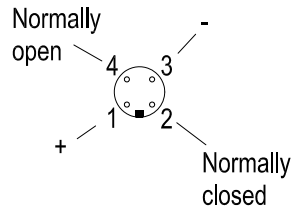
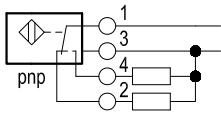
**Characteristic curves**

**Version 32**



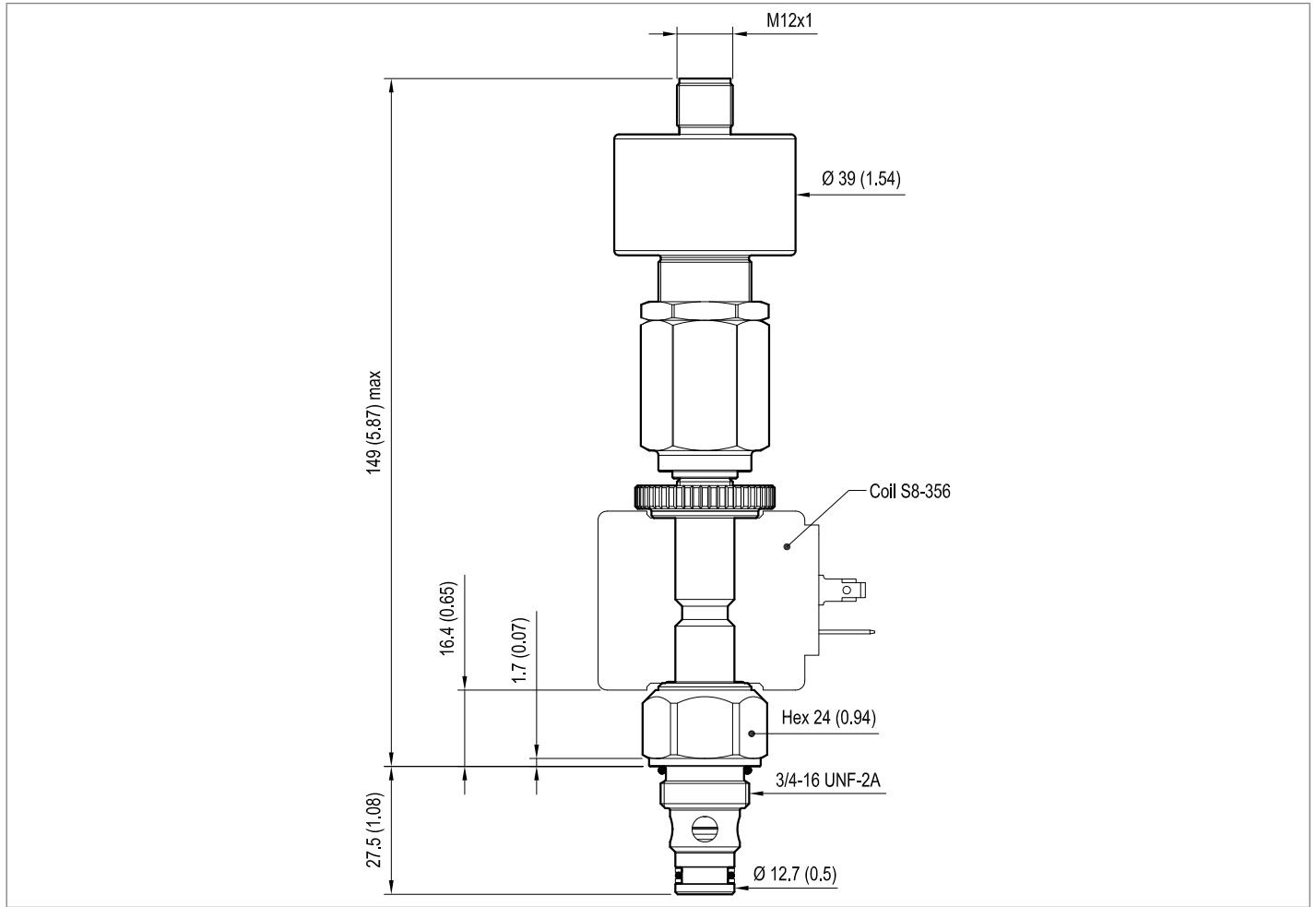
**Sensor data:**

	12 V DC	24 V DC
Supply voltage	10.5 to 16	20 to 32
Output load	≤ 400 mA	≤ 400 mA



**Dimensions**

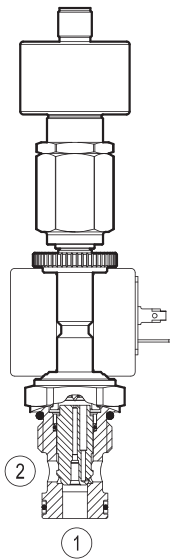
▼ **Version 32: Solenoid operated valve, poppet 2-way normally open proximity sensor**



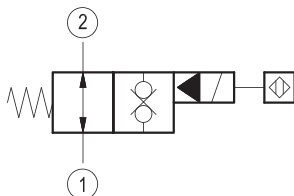
Solenoid operated valves pilot operated poppet type  
2-way normally open double lock proximity sensor  
Special cavity, 017-E

VEI-8A-2T-09-NA-S-M-NSS

OD.15.32.17.1D.S2 - Z



▼ Version 32



**Technical data**

General		
Weight		0.75 kg (1.7 lbs)
Installation orientation		Optional
Ambient temperature range		-25 to 60 °C (-13 to 140 °F)
Hydraulic		
Max. operating pressure		350 bar (5000 psi)
Flow range		2.5 - 70 l/min (0.66 - 18 gpm)
Max. internal leakage		15 drops/min.
Fluid temperature range		-20 to 80 °C (-4 to 176 °F)
Fluids:	Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque		50 - 55 Nm (37 - 41 ft-lbs)
Recommended degree of fluid contamination		Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd		150 years see RE 18350-51
Special cavity		017-E see 18325-90
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory	
Seal kit – version 32	code	RG17E201053010
	material no.	R934003563
Other technical data	See data sheet 18350-50	

Electrical	
Type of voltage	DC voltage
Coil type	S8-356 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	20 W
Duty cycle coil	100 % see 18325-90
Type of protection	See data sheet 18325-90

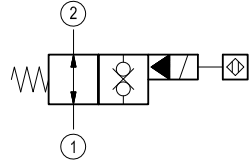
Please consider that a proper function of the valve is guaranteed only if the position of the monitor is not modified; each cartridge is provided of a torque confirmation mark, intended as anti-tampering device.

Sensor is protected against short circuit polarity inversion.

Ordering code

<b>OD.15</b>	<b>32</b>	<b>17</b>	<b>1DS2</b>	<b>Z</b>
--------------	-----------	-----------	-------------	----------

Solenoid operated valves  
pilot operated poppet type  
2-way normally open double lock proximity sensor



OC 24 V DC

Note: please consult factory for different voltages.

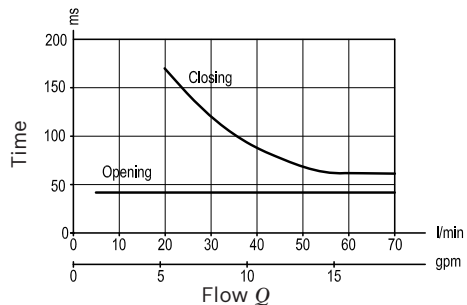
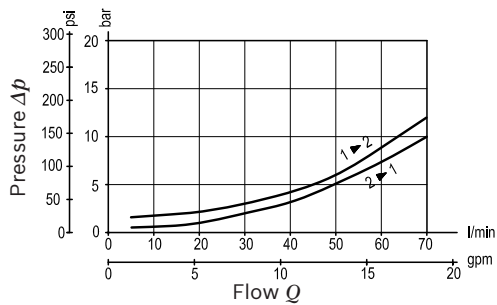
Common cavity: CA-08A-2N

Type	Material number
OD1532171DS2OC	R934001235

Type	Material number

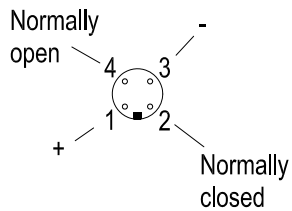
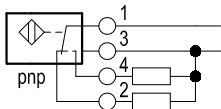
**Characteristic curves**

**Version 32**



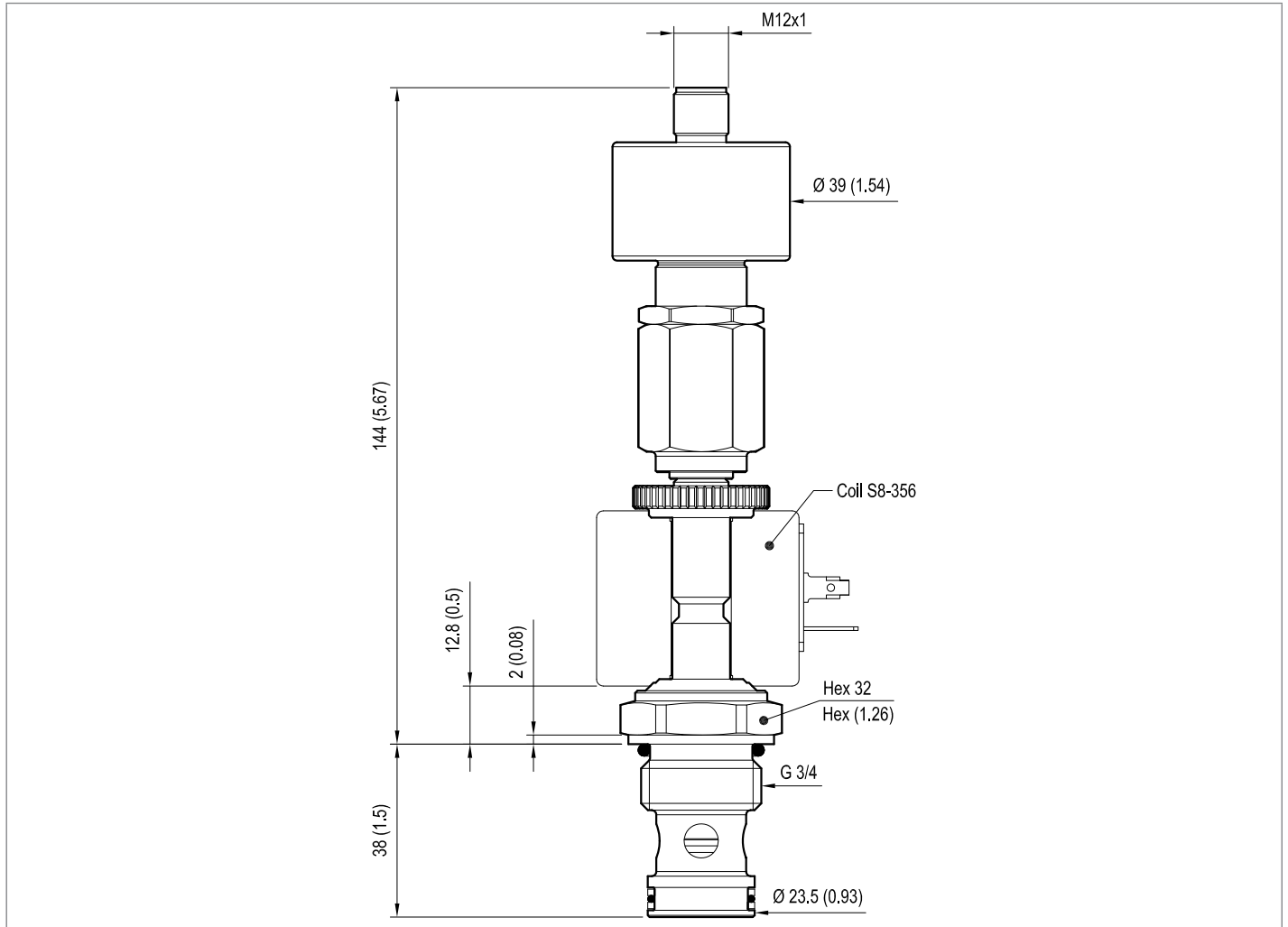
**Sensor data:**

	24 V DC
Supply voltage	20 to 32
Output load	≤ 400 mA



**Dimensions**

▼ **Version 32: Solenoid operated valve, poppet 2-way normally open double lock proximity sensor**

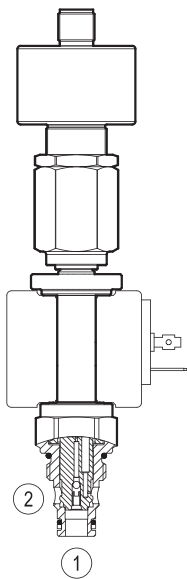
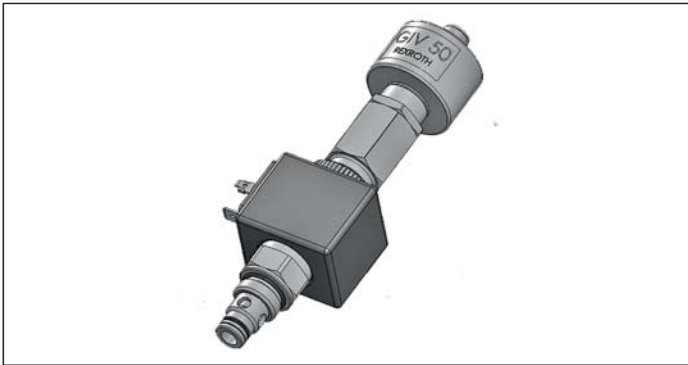




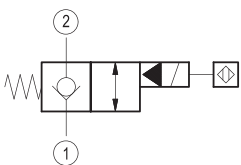
Solenoid operated valves pilot operated poppet type  
2-way normally closed proximity sensor  
Common cavity, Size 08

VESP-08A-12A/00-2A05-N7

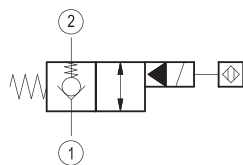
OD.15.05.18.41 - Y - Z



▼ Version 05 / 06



▼ Version 85



**Technical data**

General		
Weight	0.13 kg (0.29 lbs)	
Installation orientation	Optional	
Ambient temperature range	-25 to 60 °C (-13 to 140 °F)	
Hydraulic		
Max. operating pressure	350 bar (5000 psi)	
Flow range	1 - 40 l/min (0.3 - 11 gpm)	
Max. internal leakage	15 drops/min.	
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)	
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)		
Installation torque	30 - 35 Nm (22 - 26 ft-lbs)	
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14	
MTTFd	150 years see RE 18350-51	
Common cavity	CA-08A-2N see 18325-70	
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory	
Seal kit	code	RG08A2010520100
	material no.	R901101437
Other technical data	See data sheet 18350-50	
Electrical		
Type of voltage	DC voltage	
Coil type	S8-356 see 18325-90	
Supply voltage	See data sheet 18325-90	
Nominal voltage	± 10%	
Power consumption	20 W	
Duty cycle coil	100 % see 18325-90	
Type of protection	See data sheet 18325-90	
Please consider that a proper function of the valve is guaranteed only if the position of the monitor is not modified; each cartridge is provided of a torque confirmation mark, intended as anti-tampering device.		
Sensor is protected against short circuit polarity inversion.		

**Ordering code**

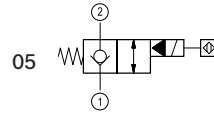
<b>OD.15</b>	<b>05</b>	<b>18</b>	<b>41</b>	<b>Y</b>	<b>Z</b>
--------------	-----------	-----------	-----------	----------	----------

Solenoid operated valves  
pilot operated poppet type  
2-way normally closed proximity sensor

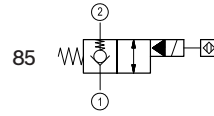
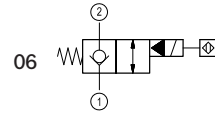
OC 24 V DC

Note: please consult factory for different voltages.

DIN 43650



AMP JUNIOR



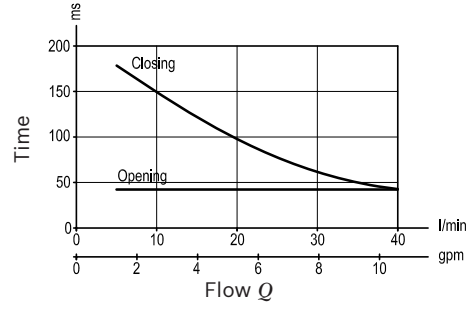
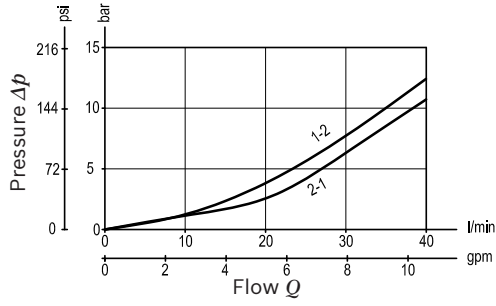
Common cavity: CA-08A-2N

Type	Material number
OD1505184105OC	R934004319
OD1505184185OC	R934004320
OD1505184106OC	R934004812

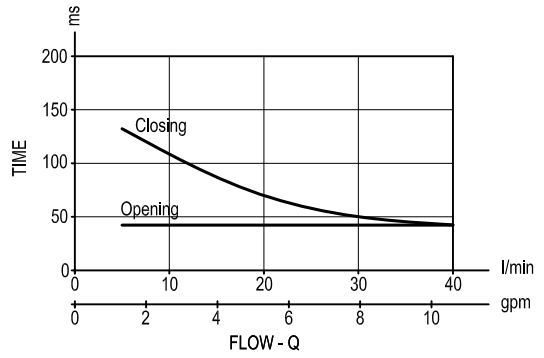
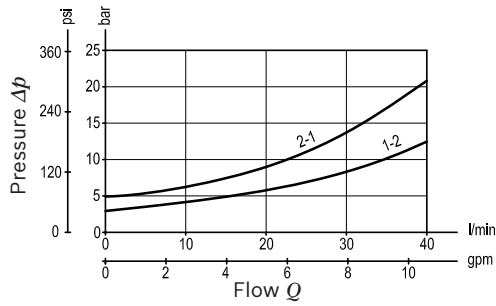
Type	Material number

Characteristic curves

Version 05-06

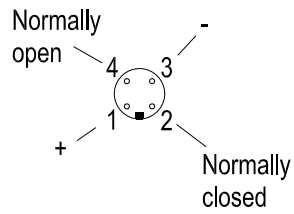
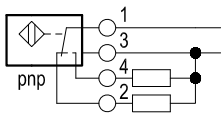


Version 85



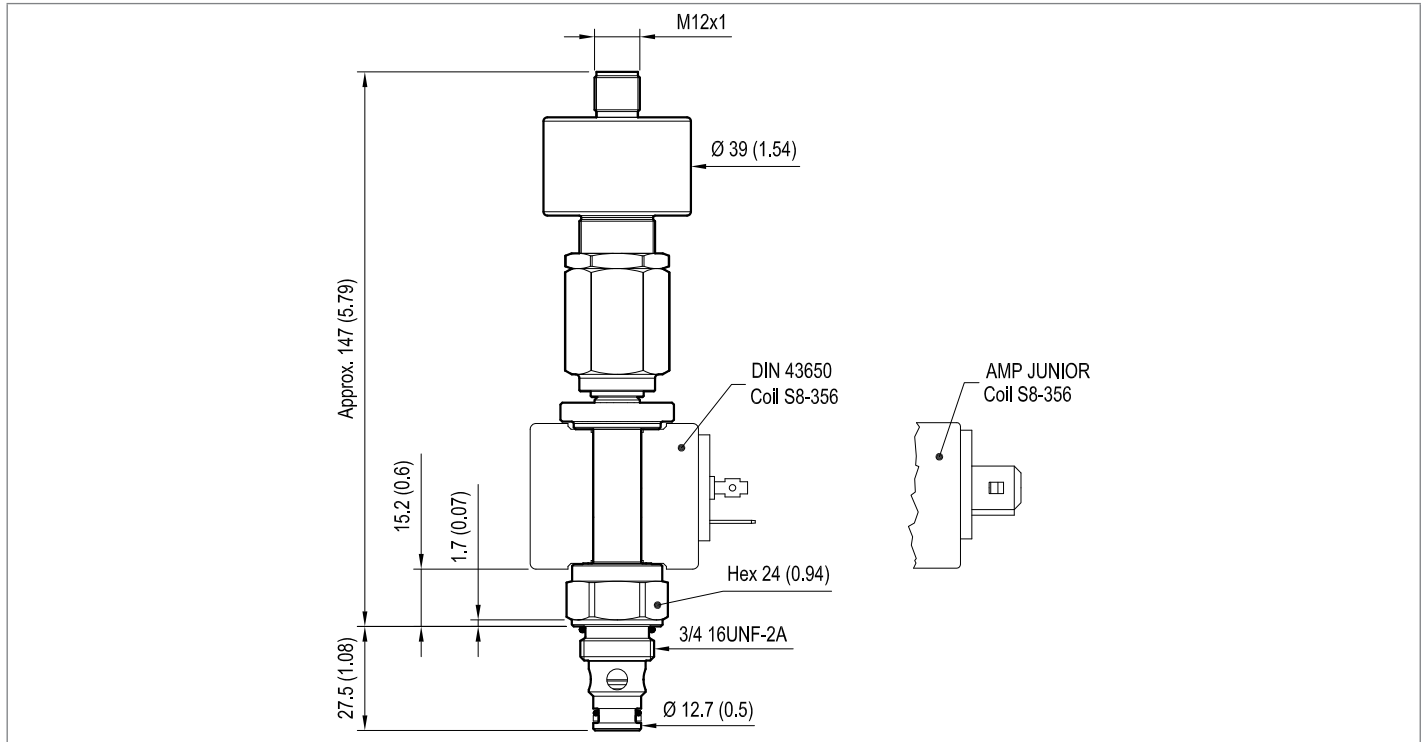
Sensor data:

	24 V DC
Supply voltage	20 to 32
Output load	≤ 400 mA



**Dimensions**

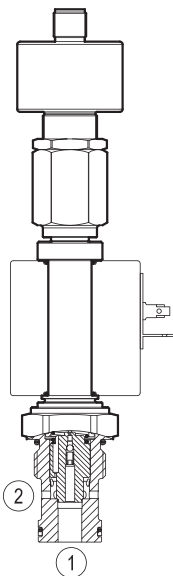
▼ **Version 05-06-85: Solenoid operated valve, poppet 2-way normally closed proximity sensor**



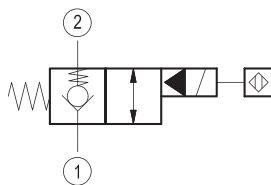
Solenoid operated valves pilot operated poppet type  
2-way normally closed proximity sensor - extra spring  
Special cavity, 017-E

VESP-12G-16A/00-2A05-N7

OD.15.05.17.65.04 - Z



▼ Version 05



**Technical data**

General		
Weight		0.75 kg (1.65 lbs)
Installation orientation		Optional
Ambient temperature range		-25 to 60 °C (-13 to 140 °F)
Hydraulic		
Max. operating pressure		350 bar (5000 psi)
Flow range		5 - 70 l/min (1 - 18 gpm)
Max. internal leakage		15 drops/min.
Fluid temperature range		-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)		
Installation torque		50 - 55 Nm (37-41 ft-lbs)
Recommended degree of fluid contamination		Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
MTTFd		150 years see RE 18350-51
Special cavity		017-E see 18325-75
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit – version 05	code	RG17E201052010
	material no.	R934003562
Other technical data		See data sheet 18350-50

Electrical	
Type of voltage	DC voltage
Coil type	S7 see 18325-90
Supply voltage	See data sheet 18325-90
Nominal voltage	± 10%
Power consumption	30 W
Duty cycle coil	100 % see 18325-90
Type of protection	See data sheet 18325-90

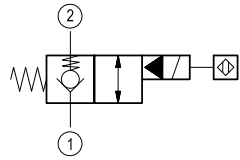
Please consider that a proper function of the valve is guaranteed only if the position of the monitor is not modified; each cartridge is provided of a torque confirmation mark, intended as anti-tampering device.

Sensor is protected against short circuit polarity inversion.

**Ordering code**

<b>OD.15</b>	<b>05</b>	<b>17</b>	<b>6504</b>	<b>Z</b>
--------------	-----------	-----------	-------------	----------

Solenoid operated valves  
 pilot operated poppet type  
 2-way normally closed proximity sensor - extra spring



OB 12 V DC

OC 24 V DC

Note: please consult factory for different voltages.

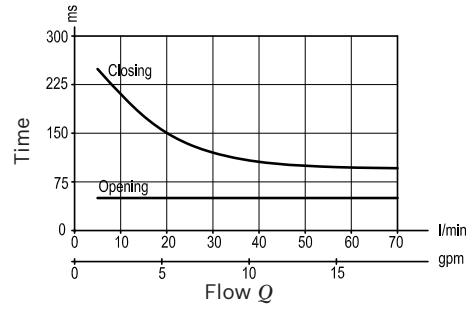
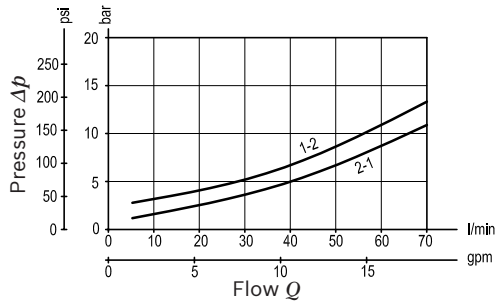
Special cavity: 017-E

Type	Material number
OD1505176504OB	R934004675
OD1505176504OC	R934004674

Type	Material number

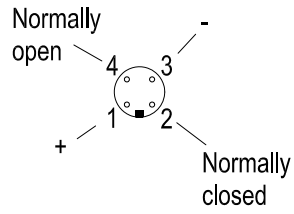
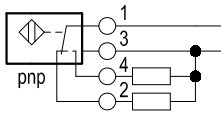
**Characteristic curves**

**Version 05**



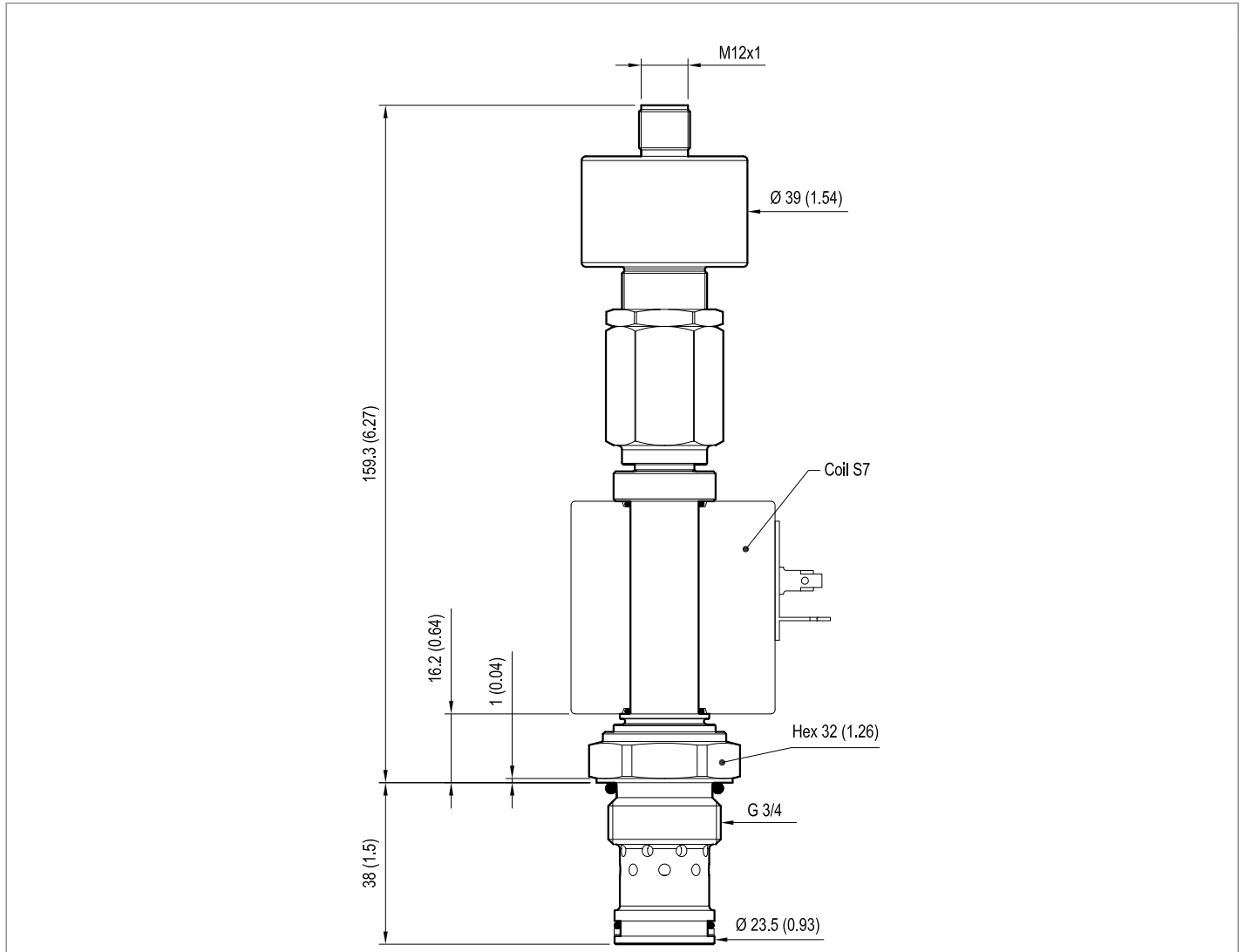
**Sensor data:**

	12 V DC	24 V DC
Supply voltage	10.5 to 16	20 to 32
Output load	$\leq 400$ mA	$\leq 400$ mA



**Dimensions**

▼ **Version 05: Solenoid operated valve, poppet 2-way normally closed proximity sensor - extra spring**

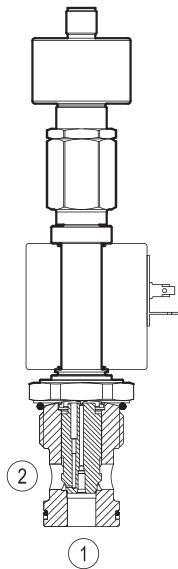




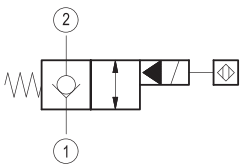
Solenoid operated valves pilot operated poppet type  
2-way normally closed proximity sensor  
Special cavity, 021-E

VESP-16G-16A/00-2A-N7

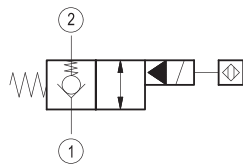
OD.15.05.21.65 - Y - Z



▼ Version 04



▼ Version 84



**Technical data**

General		
Weight	0.9 kg (2 lbs)	
Installation orientation	Optional	
Ambient temperature range	-25 to 60 °C (-13 to 140 °F)	
Hydraulic		
Max. operating pressure	350 bar (5000 psi)	
Flow range	5 - 150 l/min (1 - 40 gpm)	
Max. internal leakage <sup>1)</sup>	20 drops/min.	
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)	
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)		
Installation torque	80 - 100 Nm (59 - 74 ft-lbs)	
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14	
MTTFd	150 years see RE 18350-51	
Special cavity	021-E see 18325-75	
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory	
Seal kit	code	RG21E201052010
	material no.	R934003566
Other technical data	See data sheet 18350-50	
Electrical		
Type of voltage	DC voltage	
Coil type	S7 see 18325-90	
Supply voltage	See data sheet 18325-90	
Nominal voltage	± 10%	
Power consumption	30 W	
Duty cycle coil	100 % see 18325-90	
Type of protection	See data sheet 18325-90	

<sup>1)</sup> (cSt 46)

Please consider that a proper function of the valve is guaranteed only if the position of the monitor is not modified; each cartridge is provided of a torque confirmation mark, intended as anti-tampering device.

Sensor is protected against short circuit polarity inversion.

Ordering code

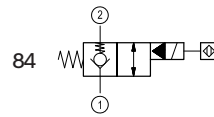
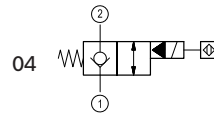
<b>OD.15</b>	<b>05</b>	<b>21</b>	<b>65</b>	<b>Y</b>	<b>Z</b>
--------------	-----------	-----------	-----------	----------	----------

Solenoid operated valves  
pilot operated poppet type  
2-way normally closed proximity sensor

OB 12 V DC for Y=84

OC 24 V DC for Y=04 or 84

Note: please consult factory for different voltages.



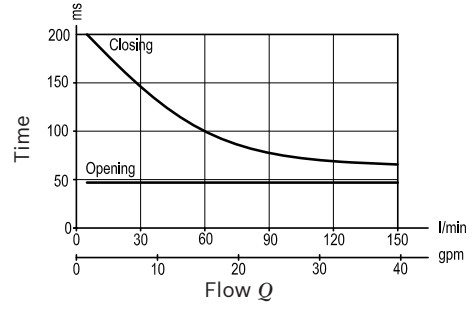
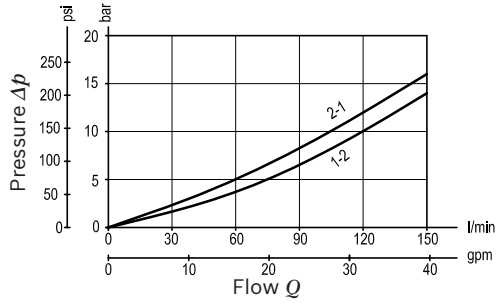
Special cavity: 021-E

Type	Material number
OD1505216504OC	R934004627
OD1505216584OB	R934004630
OD1505216584OC	R934004628

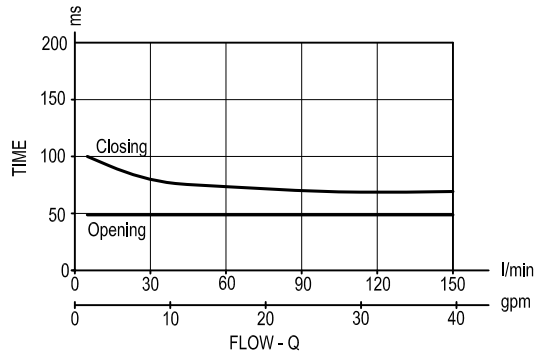
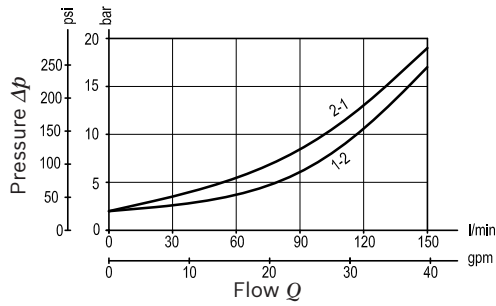
Type	Material number

Characteristic curves

Version 04

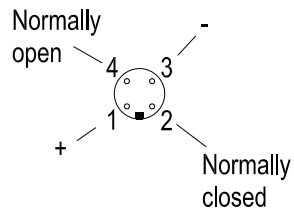
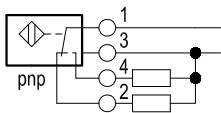


Version 84



Sensor data:

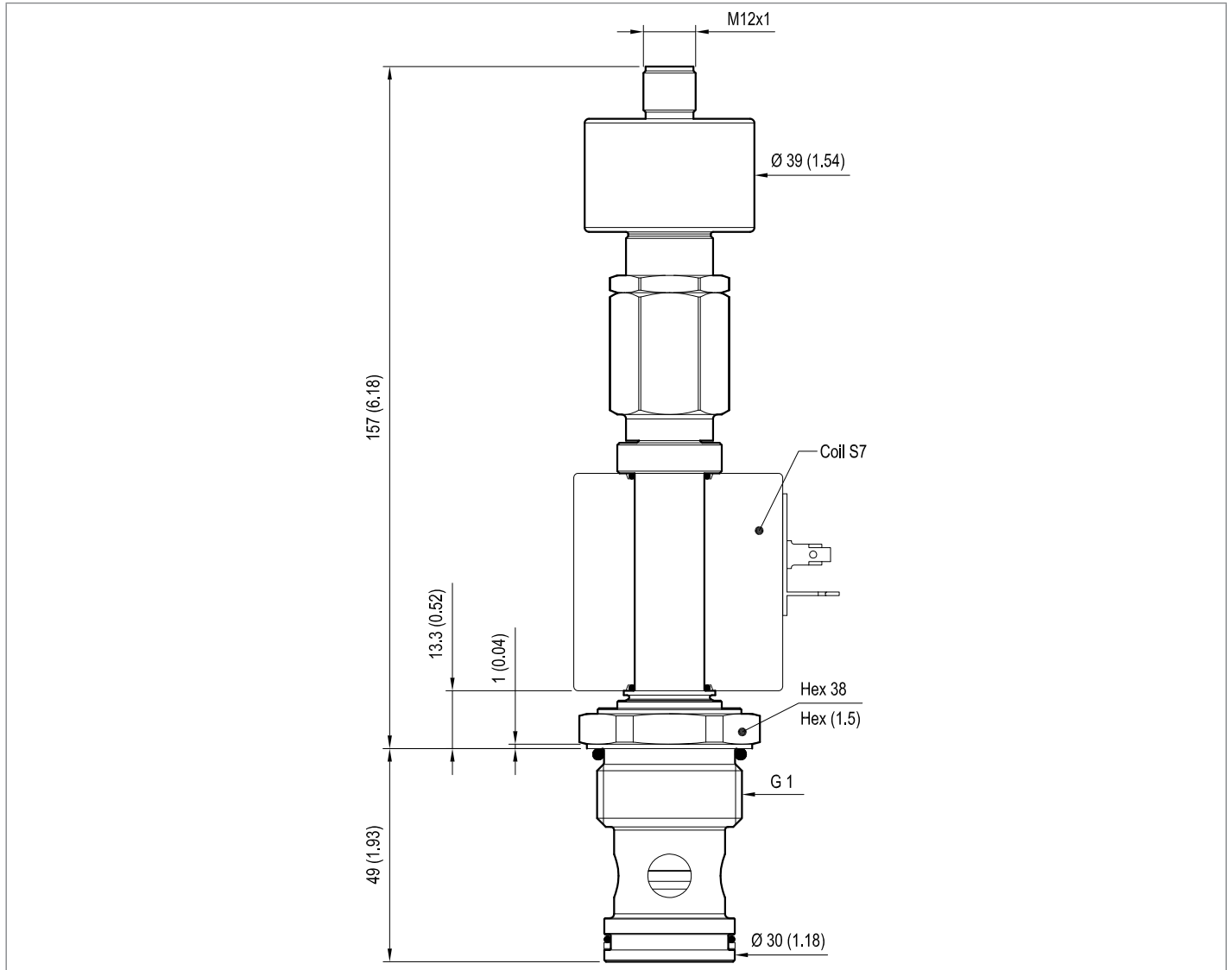
	12 V DC	24 V DC
Supply voltage	10.5 to 16	20 to 32
Output load	≤ 400 mA	≤ 400 mA



4

**Dimensions**

▼ **Version 04-84: Solenoid operated valve, poppet 2-way normally closed proximity sensor**



## Solenoid cartridge valves

### On-off direct acting

Designation	Description	Cavity	Code	Data sheet	Page
Solenoid cartridge valves direct acting 2 way poppet type normally closed	VED-8I-NC	Size 08	OD11X18Y00	18324-06	809
Solenoid cartridge valves direct acting 2 way poppet type normally open	VED-8I-NA	Size 08	OD11X18Y00	18324-07	813
Solenoid cartridge valves direct acting 2 way poppet type normally closed double lock	VEDT-08A-A-12.7-NC	Size 08	OD113118Y00	18324-01	817
Solenoid cartridge valves direct acting 2 way poppet type normally closed double lock	VEDT-08A-A-16-NC	Size 08	OD1131186Y00	18324-03	821
Solenoid cartridge valves direct acting 2 way poppet type double lock	VEDT-08F-A-16	06020	OD11X40Y00	18324-04	825
Solenoid cartridge valves direct acting poppet 3 way 2 position	VEDT-08A-32	Size 08	OD130151Y00	18324-05	829
Solenoid cartridge valves direct acting 3 way 2 position spool type	VED-8I-32	Size 08	OD13X51YZ	18324-61	833
Solenoid cartridge valves direct acting 4 way 2 position spool type	VED-8I-42	Size 08	OD14X58YZ	18324-62	837
Solenoid cartridge valves direct acting 4 way 3 position spool type	VED-8I-43	Size 08	OD14X58YZ	18324-63	841
Solenoid cartridge valves direct acting 3 way 2 position spool type	VED-10A-32	Size 10	OD13X77Y00	18324-58	845
Solenoid cartridge valves direct acting 4 way 2 position spool type	VED-10A-42	Size 10	OD144W78Y00	18324-59	849
Solenoid cartridge valves direct acting 4 way 3 position spool type	VEDS-10A-43	Size 10	OD14X78KK2Y00	18324-64	853
Solenoid cartridge valves direct acting 5 way 3 position spool type	VEDS-10A-53	Size 10	OD53X54KK2Y00	18324-65	857
Solenoid cartridge valves direct acting 3 way 2 position spool type	VEDS-12A-32	Size 12	OD13X12Y00	18324-56	861



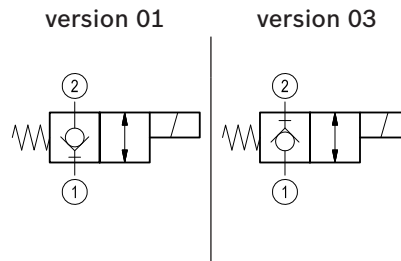
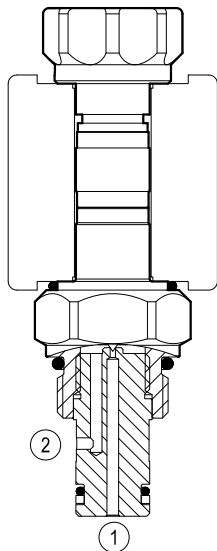
# Solenoid operated valves direct acting poppet 2-way normally closed

Common cavity, Size 08



VED-8I-NC

OD.11 - X - 18 - Y - 00



## General

Weight	kg (lbs)	0.13 (0.29)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Rated flow	l/min. (gpm)	1.5 (0.4)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Cavity		CA-08A-2N see RE 18325-70
MTTFd		150 years see data sheet 18350-51
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG08A2010520100 R901101437
Seal kit coil	code material no.	RG1211PNBR7010 R934003957
Other technical data		See data sheet RE 18350-50

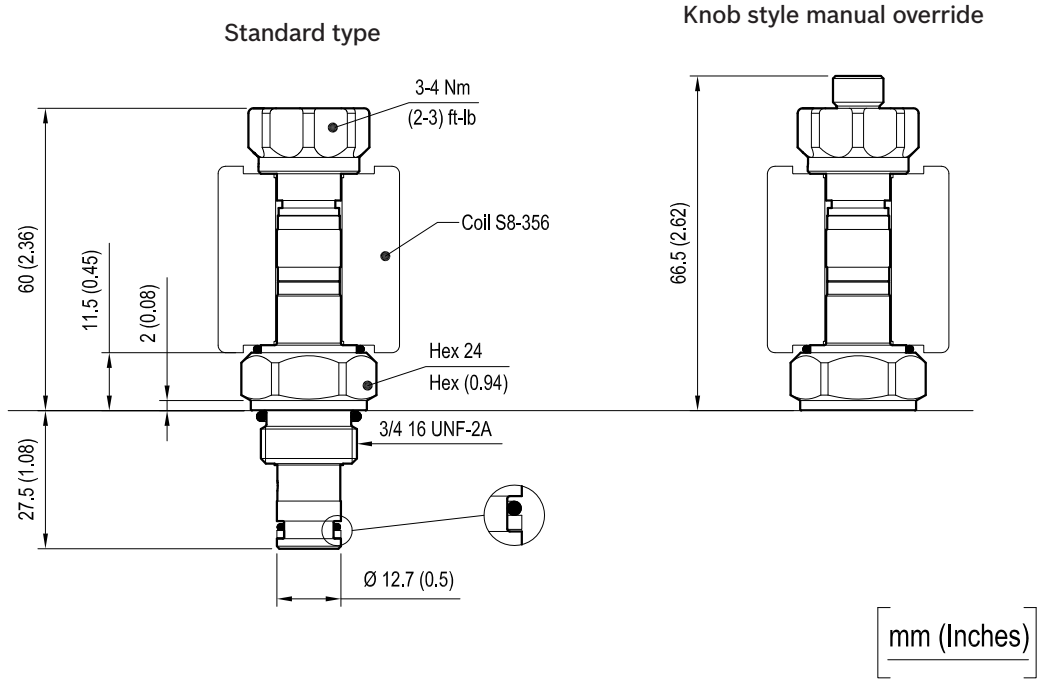
## Electrical

Type of voltage		DC voltage
Coil type		S8-356 see RE 18325-90
Supply voltage		See data sheet RE 18325-90
Nominal voltage		± 10%
Power consumption	W	20
Duty cycle coil	%	See performance graphs
Type of protection		See data sheet RE 18325-90

Note: Coils must be ordered separately.

## Dimensions

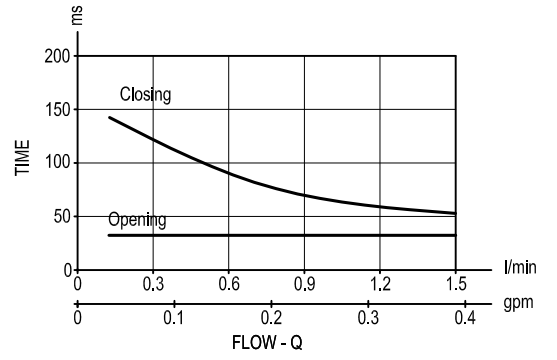
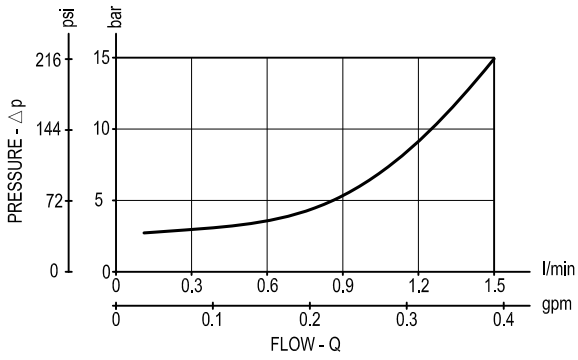
Solenoid operated valves poppet 2-way normally closed



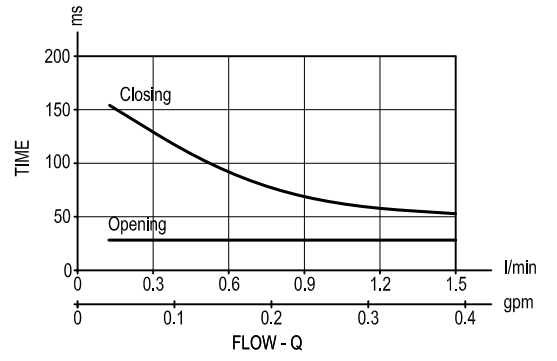
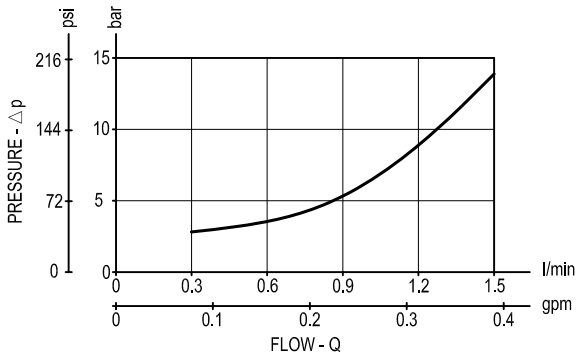


# Performance graph

Version 01



Version 03

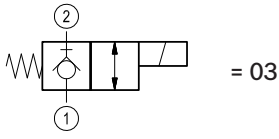
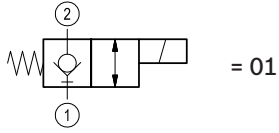


4

### Ordering code

OD.11	*	18	*	00
-------	---	----	---	----

Solenoid operated valves  
poppet 2-way normally  
closed



standard type



Knob style manual override



Common cavity: CA-08A-2N

Type	Material number
OD110118310000	R901090901
OD110118320000	R901090903
OD110318310000	R901090909
OD110318320000	R901090910

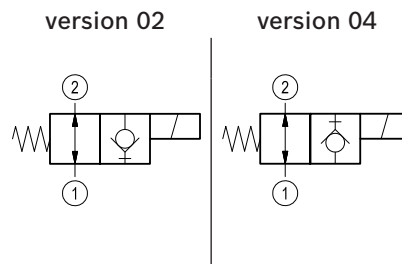
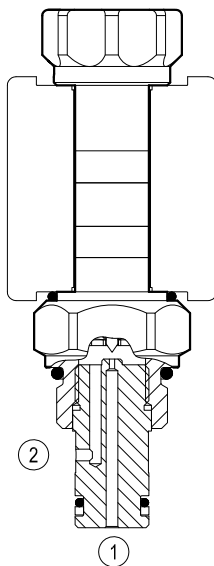
Type	Material number

# Solenoid operated valves direct acting poppet 2-way normally open

Common cavity, Size 08

VED-8I-NA

OD.11 - X - 18 - Y - 00



## General

Weight	kg (lbs)	0.13 (0.29)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Rated flow	l/min. (gpm)	1.5 (0.4)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination		Nominal value max. 25µm (NAS 8) ISO 4406 19/17/14
Common cavity		CA-08A-2N see RE 18325-70
MTTFd		150 years see data sheet 18350-51
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG08A2010520100 R901101437
Seal kit coil	code material no.	RG1211PNBR7010 R934003957
Other technical data		See data sheet RE 18350-50

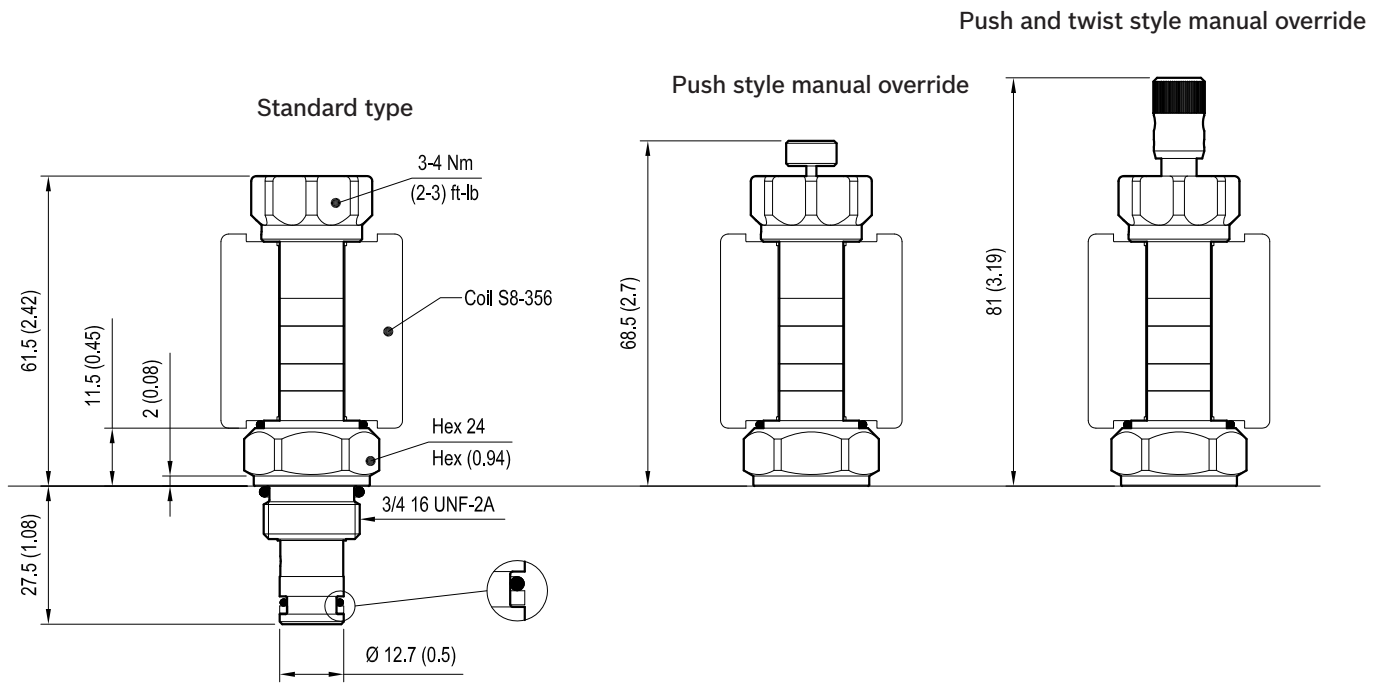
## Electrical

Type of voltage		DC voltage
Coil type		S8-356 see RE 18325-90
Supply voltage		See data sheet RE 18325-90
Nominal voltage		± 10%
Power consumption	W	20
Duty cycle coil	%	100 see RE 18325-90
Type of protection		See data sheet RE 18325-90

Note: Coils must be ordered separately.

## Dimensions

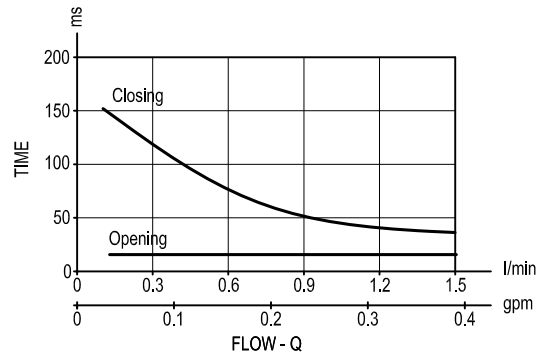
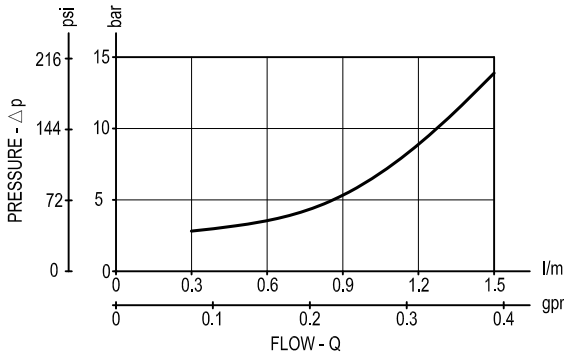
Solenoid operated valves poppet 2-way normally open



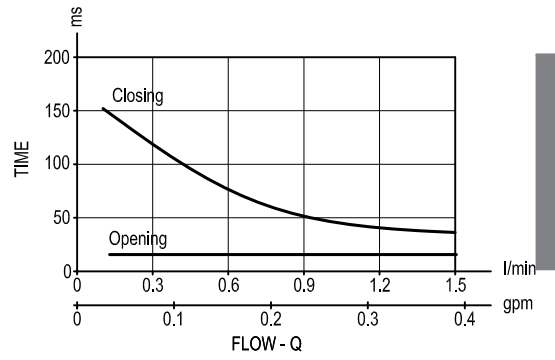
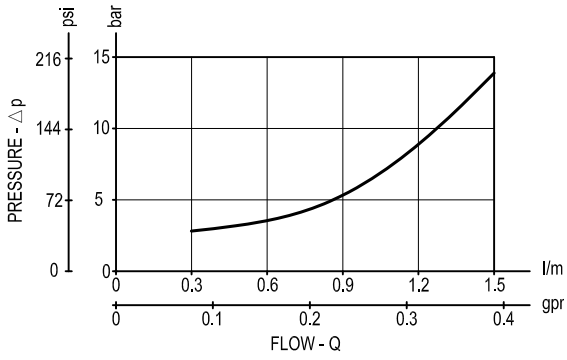
mm (Inches)

# Performance graphs

Version 02



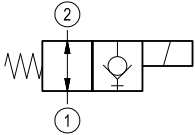
Version 04



### Ordering code

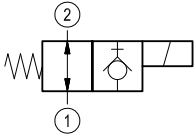
<b>OD.11</b>	<b>*</b>	<b>18</b>	<b>*</b>	<b>00</b>
--------------	----------	-----------	----------	-----------

Solenoid operated valves  
poppet type 2-way  
normally open



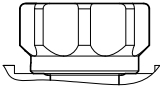
= 02

---



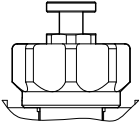
= 04

standard type

20 = 

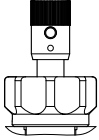
---

Push style manual override

21 = 

---

Push and twist style manual override

22 = 

Common cavity: CA-08A-2N

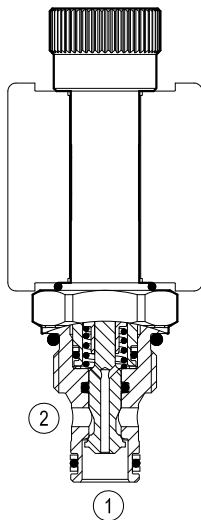
Type	Material number
OD11021820000	R901090905
OD110218210000	R901090906
OD110218220000	R901090908
OD110418200000	R901090911
OD110418210000	R901090914
OD110418220000	R901090915

Type	Material number

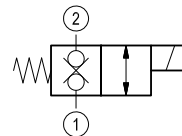
Solenoid operated valves direct acting poppet 2-way double lock normally closed  
Common cavity, Size 08

VEDT-08A-A-12.7-NC

OD.11.31.18 - Y - 00



Version 31



**General**

Weight	kg (lbs)	0.19 (0.42)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

**Hydraulic**

Max. operating pressure	bar (psi)	250 (3600)
Max. flow	l/min.(gpm)	15 (4)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Response time	ms.	40-60 at nominal flow (oil at 46 cSt)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 34-41 (25-30)

Recommended degree of fluid contamination Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14

Cavity CA-08A-2N see RE 18325-70

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit code material no. RG08A2010530100 R901101544

Seal kit coil code material no. RG12A1PNBR7010 R934003958

Other technical data See data sheet RE 18350-50

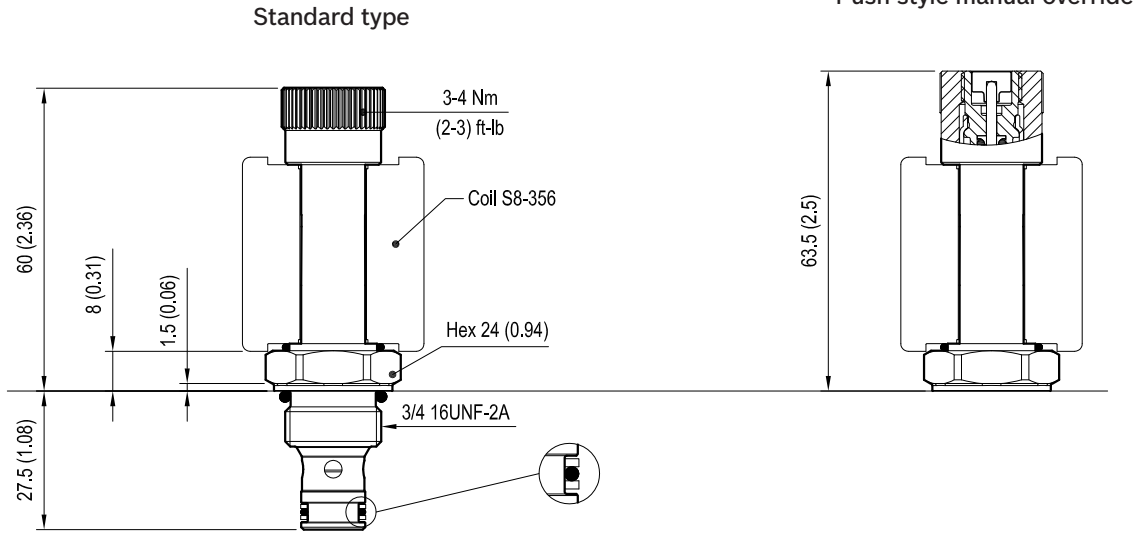
**Electrical**

Type of voltage	DC voltage
Coil type	S8-356
Supply voltage	See data sheet RE 18325-90
Nominal voltage	± 10%
Power consumption	W 20
Duty cycle coil	% See performance graphs
Type of protection	See data sheet RE 18325-90

Note: Coils must be ordered separately.

## Dimensions

Solenoid operated valves poppet 2-way double lock normally closed

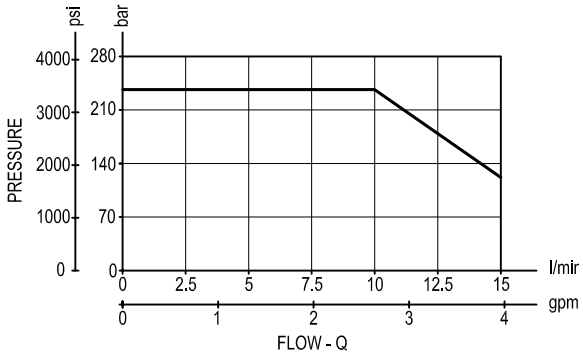


mm (Inches)



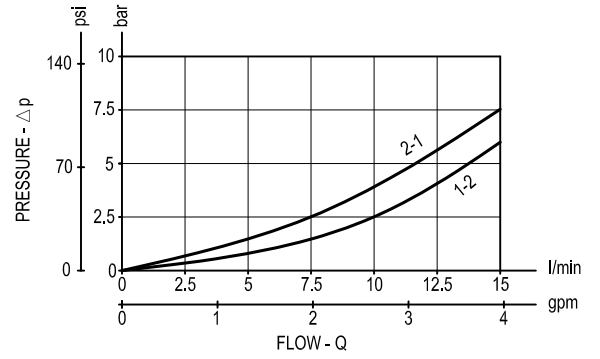
# Performance graphs

Performance limits



version 31

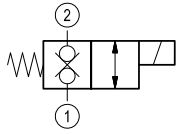
Characteristic curves



### Ordering code

OD.11	*	18	*	00
-------	---	----	---	----

Solenoid operated valves  
poppet 2-way double lock  
normally closed

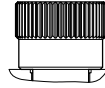


= 31

Common cavity: CA-08A-2N

standard type

2A =



Push style manual override

2B =



Type	Material number
OD1131182A0000	R934003626
OD1131182B0000	R934003627

Type	Material number

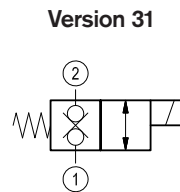
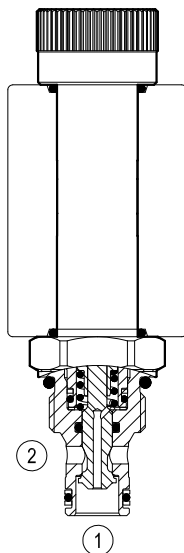
# Solenoid operated valves direct acting poppet 2-way double lock normally closed

Common cavity, Size 08



VEDT-08A-A-16-NC

OD.11.31.18 - 6Y - 00



## General

Weight	kg (lbs)	0.22 (0.48)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140) - coil 30W -30 to 80 (-22 to 176) - coil 26W

## Hydraulic

Max. operating pressure	bar (psi)	250 (3600)
Max. flow	l/min. (gpm)	25 (7)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Response time	ms.	40-60 at nominal flow (oil at 46 cSt)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	34-41 (25-30)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Cavity		CA-08A-2N see RE 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG08A2010530100 R901101544
Seal kit coil	code material no.	RG16A1PMVQ0010 R934003962
Other technical data		See data sheet RE 18350-50

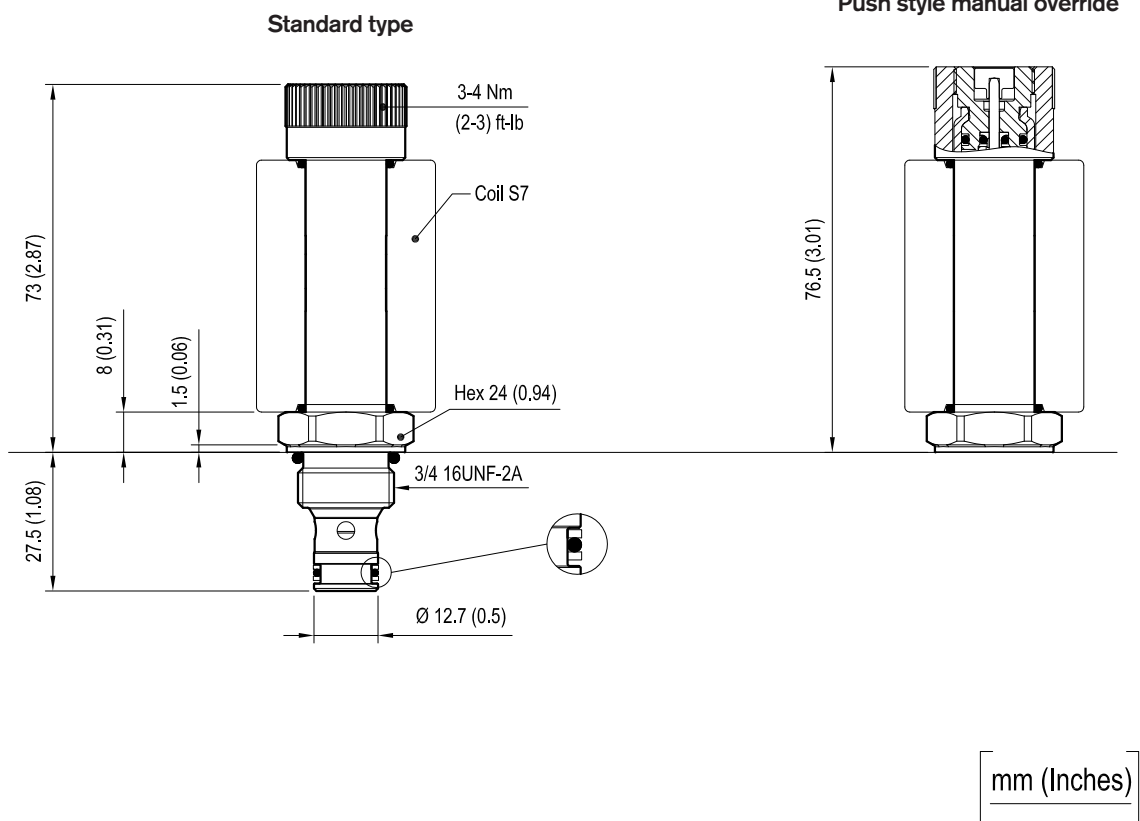
## Electrical

Type of voltage		DC voltage
Coil type		S7
Supply voltage		See data sheet RE 18325-90
Power consumption	W	30 or 26
Duty cycle coil	%	See performance graphs
Type of protection		See data sheet RE 18325-90
Nominal voltage	coil 26W	-15% +10%
Nominal voltage	coil 30W	-10% +10%

**Note: Coils must be ordered separately.**

## Dimensions

Solenoid operated valves poppet 2-way double lock normally closed

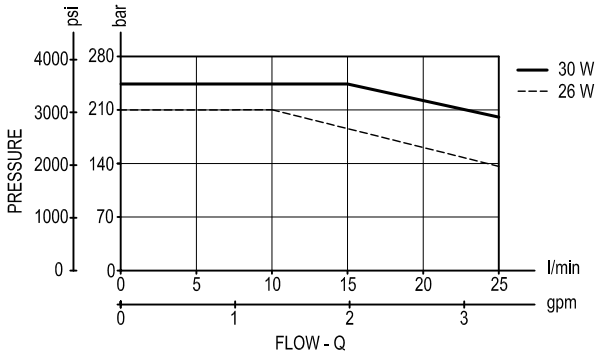


# Performance graphs

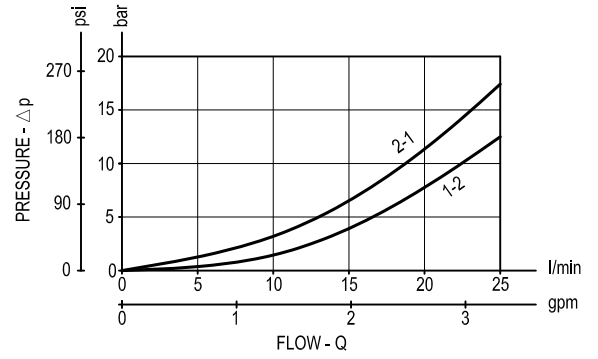
## Performance limits

(Hot coil at nominal voltage)

version 31



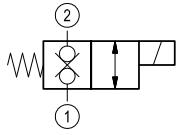
## Characteristic curves



**Ordering code**

OD.11	*	18	*	00
-------	---	----	---	----

Solenoid operated valves  
poppet 2-way double lock  
normally closed

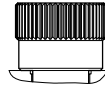


= 31

Common cavity: CA-08A-2N

standard type

6A =



Push style manual override

6B =



Type	Material number
OD1131186A0000	R934003624
OD1131186B0000	R934003625

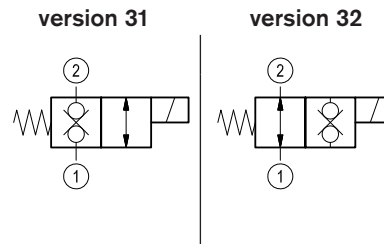
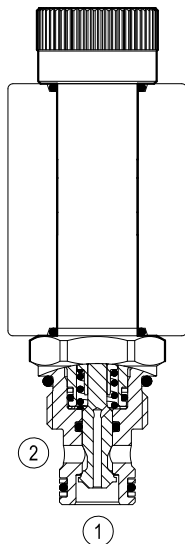
Type	Material number

# Solenoid operated valves direct acting poppet 2-way double lock

Hydac cavity interchange, 06020

VEDT-08F-A-16

OD.11 - X - 40 - Y - 00



## General

Weight	kg (lbs)	0.22 (0.48)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140) - coil 30W -30 to 80 (-22 to 176) - coil 26W

## Hydraulic

Max. operating pressure	bar (psi)	250 (3600)
Max. flow	l/min. (gpm)	25 (7)
Max. internal leakage	drops/min.	20
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Response time	ms.	40-60 at nominal flow (oil at 46 cSt)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	34-41 (25-30)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Special cavity		Hydac 06020
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG40E201053010 R934003587
Seal kit coil	code material no.	RG16A1PMVQ0010 R934003962
Other technical data		See data sheet RE 18350-50

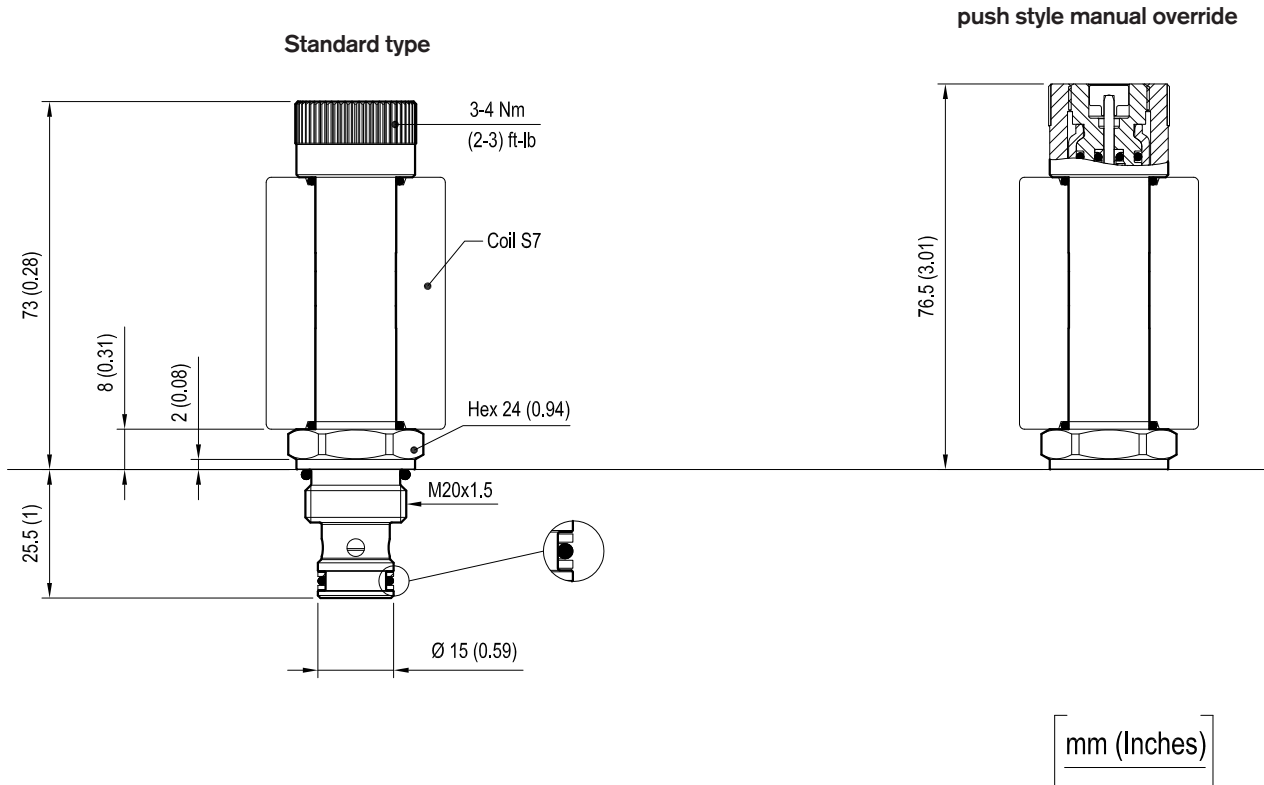
## Electrical

Type of voltage		DC voltage
Coil type		S7
Supply voltage		See data sheet RE 18325-90
Power consumption	W	30 or 26
Duty cycle coil	%	See performance graphs
Type of protection		See data sheet RE 18325-90
Nominal voltage	coil 26W	-15% +10%
Nominal voltage	coil 30W	-10% +10%

**Note: Coils must be ordered separately.**

## Dimensions

### Solenoid operated valves poppet 2-way double lock - Special cavity



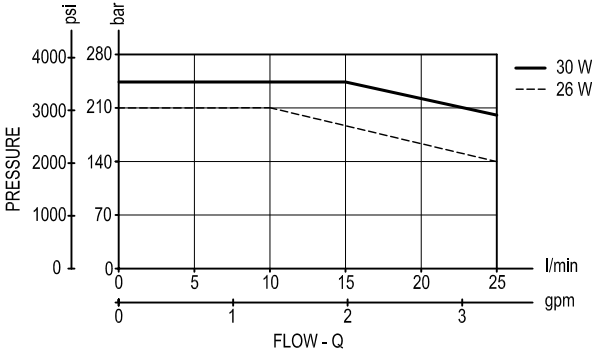


Performance graphs

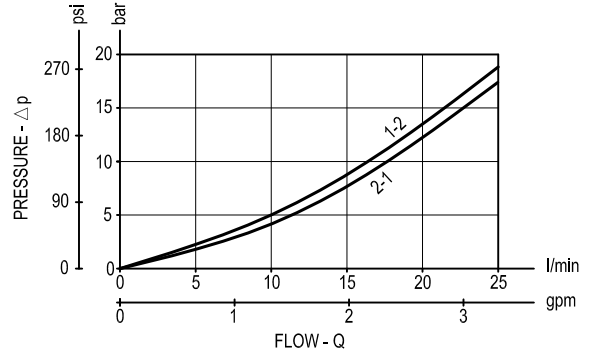
Performance limits

(Hot coil at nominal voltage)

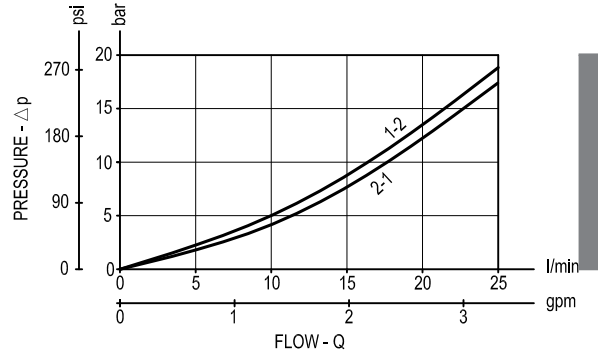
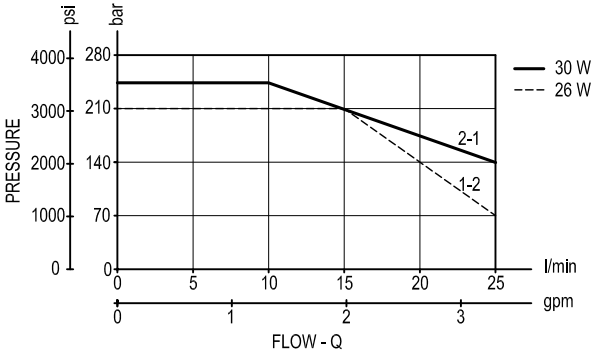
version 31 (NC)



Characteristic curves



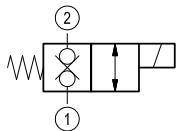
version 32 (NA)



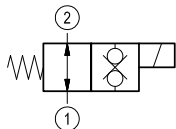
### Ordering code

OD.11	*	40	*	00
-------	---	----	---	----

Solenoid operated valves poppet  
2-way double lock normally  
closed and normally open



= 31

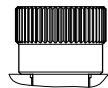


= 32

Special cavity: CA-08F-2N

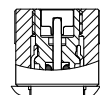
standard type

6A =



Push style manual override

6B =



Type	Material number
OD1131406A0000	R934003630
OD1131406B0000	R934003631
OD1132406A0000	R934003628
OD1132406B0000	R934003629

Type	Material number

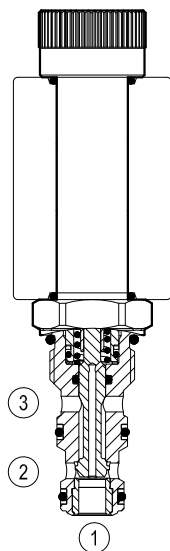
# Solenoid operated valves direct acting poppet 3-way 2-position

Common cavity, Size 08

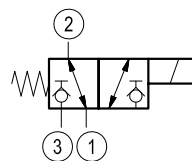


VEDT-08A-32

OD.13.01.51 - Y - 00



Version 01



## General

Weight	kg (lbs)	0.24 (0.53)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140) - coil 30W -30 to 80 (-22 to 176) - coil 26W

## Hydraulic

Max. operating pressure	bar (psi)	250 (3600)
Max. flow	l/min. (gpm)	15 (4)
Max. internal leakage	drops/min.	5
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Response time	ms.	40-60 at nominal flow (oil at 46 cSt)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	34-41 (25-30)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
MTTFd		150 years see RE18350-51
Cavity		CA-08A-3N see RE 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG08A3010530100 R901101723
Seal kit coil	code material no.	RG16A1PMVQ0010 R934003962
Other technical data		See data sheet RE 18350-50

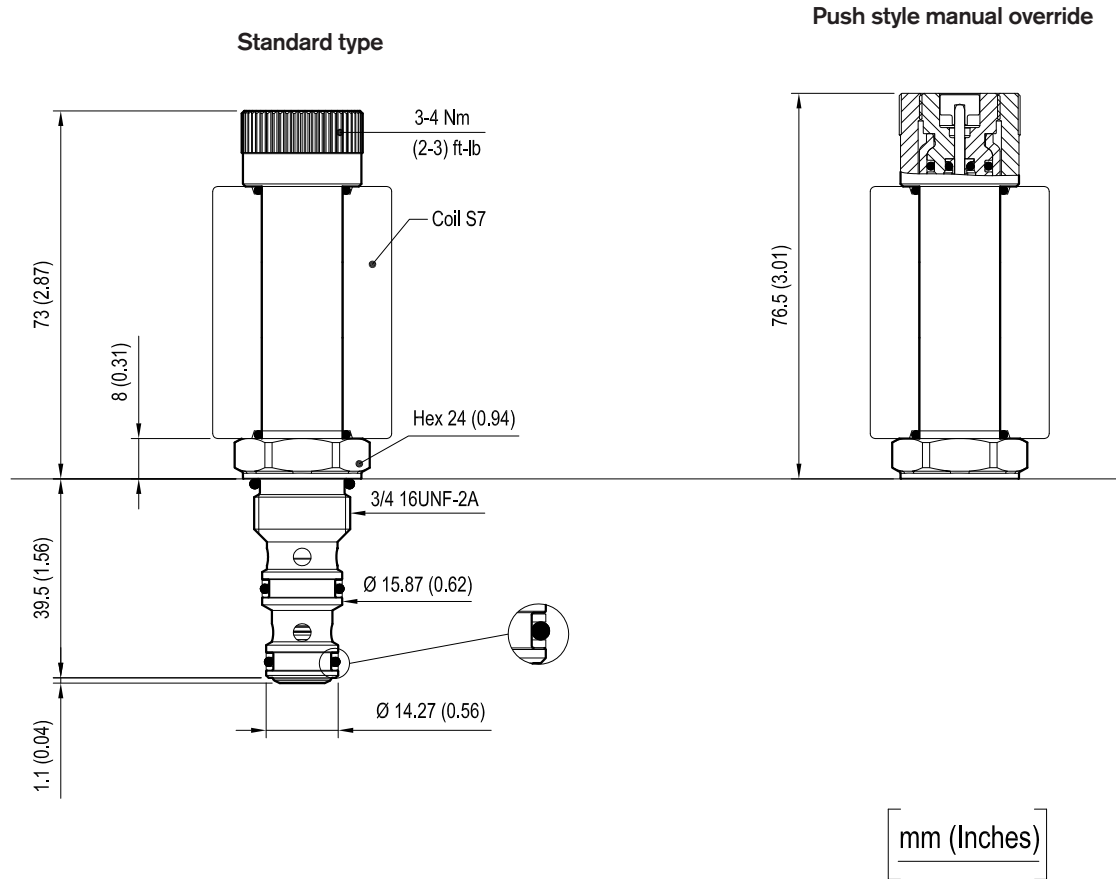
## Electrical

Type of voltage		DC voltage
Coil type		S7
Supply voltage		See data sheet RE 18325-90
Power consumption	W	30 or 26
Duty cycle coil	%	See performance graphs
Type of protection		See data sheet RE 18325-90
Nominal voltage	coil 26W	-10% +15%
Nominal voltage	coil 30W	-10% +10%

**Note: Coils must be ordered separately.**

## Dimensions

### Solenoid operated valves poppet 3-way 2-position

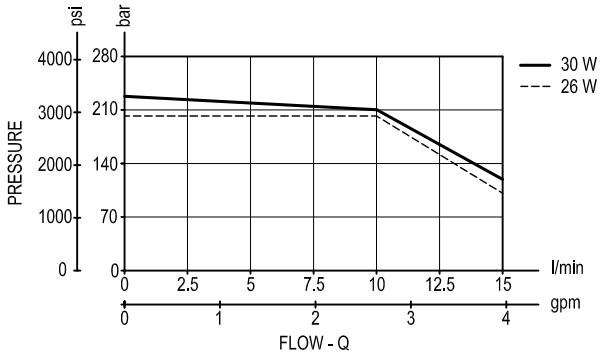


# Performance graphs

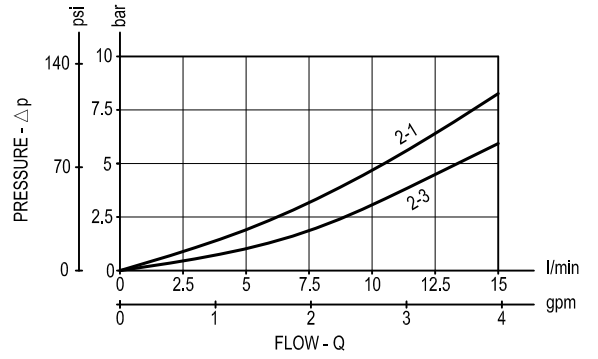
## Performance limits

(Hot coil at nominal voltage)

version 01



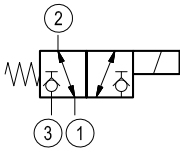
## Characteristic curves



**Ordering code**

<b>OD.13</b>	<b>01</b>	<b>51</b>	<b>*</b>	<b>00</b>	<b>*</b>	<b>0</b>
--------------	-----------	-----------	----------	-----------	----------	----------

Solenoid operated valves  
poppet 3-way 2-position

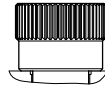


Common cavity: CA-08A-3N

V= version Viton  
0= version Buna

standard type

6A =



Push style manual override

6B =



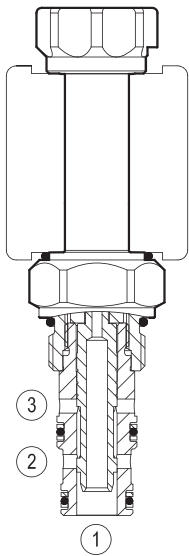
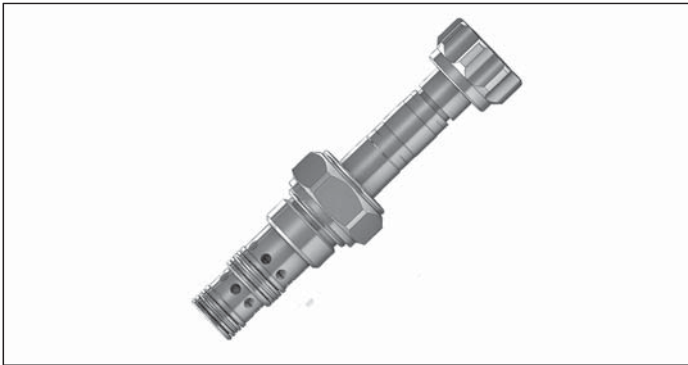
Type	Material number
OD1301516A0000	R934003666
OD1301516B0000	R934003667

Type	Material number

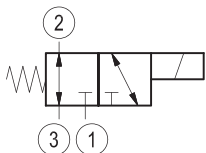
Solenoid operated valves direct acting  
spool 3-way 2-position  
Common cavity, Size 08

VED-8I-32

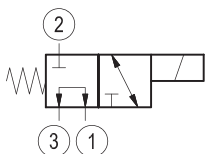
OD.13 - X - 51 - Y - Z



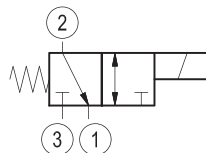
▼ Version 10



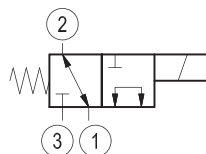
▼ Version 20



▼ Version 11



▼ Version 30



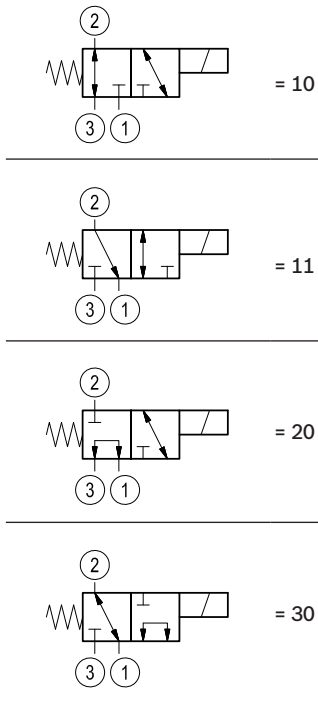
**Technical data**

General	
Weight	0.14 kg (0.31 lbs)
Installation orientation	Any
Ambient temperature range	-30 to 60 °C (-22 to 140 °F) - coil 20W
Hydraulic	
Max. operating pressure	210 bar (3045 psi)
Max. flow	10 l/min. (3 gpm)
Max. internal leakage	40 cm <sup>3</sup> /min. (2.4 cu.in./min.)
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	39 - 51 Nm (29 - 38 ft-lbs)
Filtration	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
Cavity	CA-08A-3N
Seal kit	code RG08A3010530100 material no. R901101723
Seal kit coil	code RG1211PNBR7010 material no. R934003957
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356
Supply voltage	See data sheet 18325-90
Power consumption	See data sheet 18325-90
Duty cycle coil	See data sheet 18325-90
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

**Ordering code**

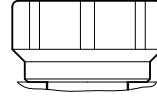
<b>OD.13</b>	*	<b>51</b>	*	<b>00</b>	<b>00</b>
--------------	---	-----------	---	-----------	-----------

Solenoid operated valves direct acting spool 3-way 2-position

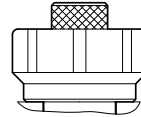


Common cavity: CA-08A-3N

30 = Standard type



40 = knob style manual override



**Preferred types**

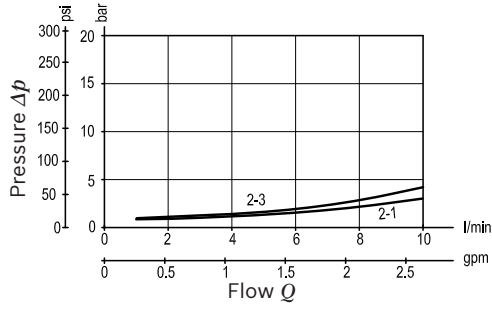
Type	Material number
OD131051300000	R901126871
OD131051400000	R901126872
OD131151300000	R901126873
OD131151400000	R901126875
OD132051300000	R901126892
OD132051400000	R901126895
OD133051300000	R901098192
OD133051400000	R901126897

Type	Material number

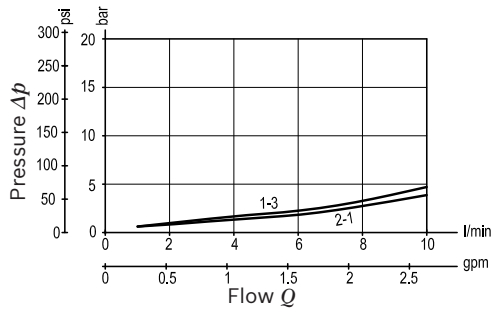


Characteristic curves

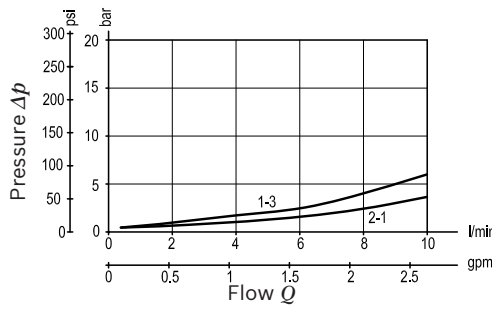
Version 10 - 11



Version 20



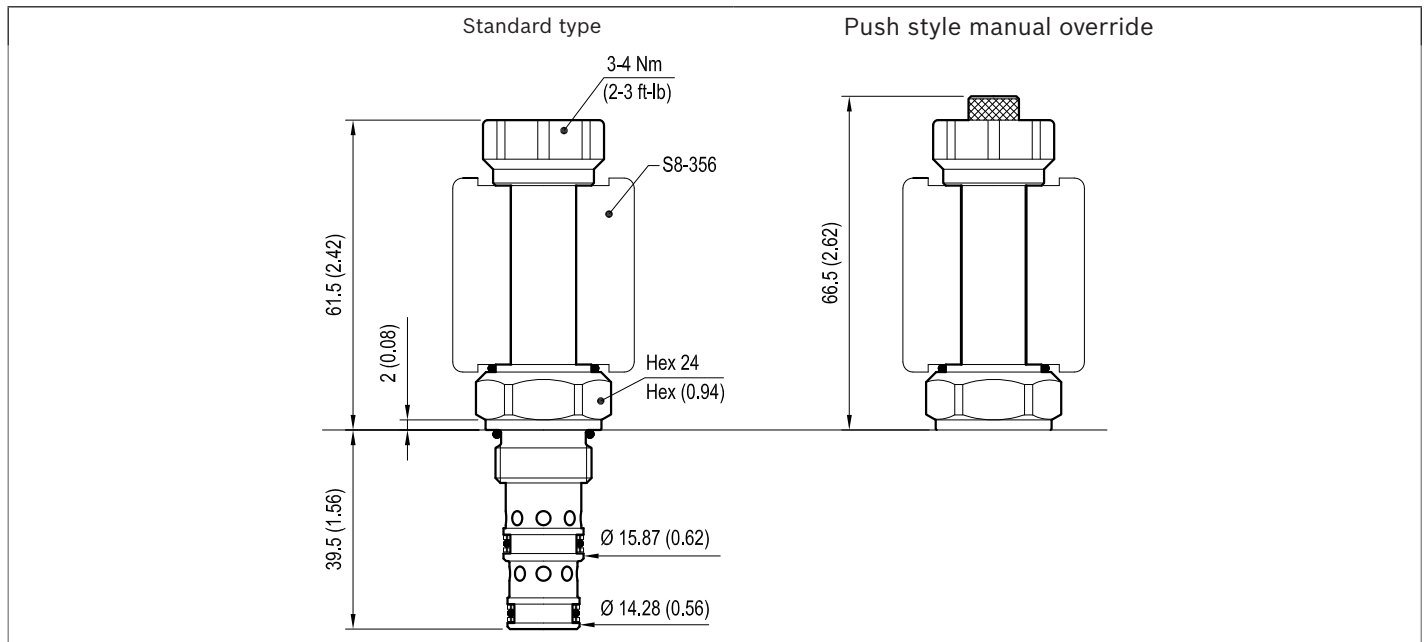
Version 30



4

**Dimensions**

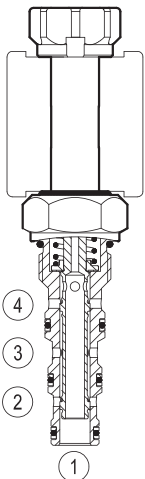
▼ Solenoid operated valves direct acting spool 3-way 2-position



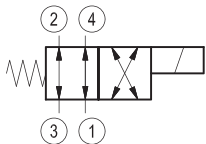
Solenoid operated valves direct acting  
spool 4-way 2-position  
Common cavity, Size 08

VED-8I-42

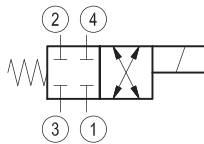
OD.14 - X - 58 - Y - Z



▼ Version 40



▼ Version 41



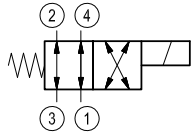
**Technical data**

General	
Weight	0.13 kg (0.29 lbs)
Installation orientation	Any
Ambient temperature range	-30 to 60 °C (-22 to 140 °F) - coil 20W
Hydraulic	
Max. operating pressure	210 bar (3045 psi)
Max. flow	10 l/min. (3 gpm)
Max. internal leakage	40 cm <sup>3</sup> /min. (2.4 cu.in./min.)
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	39 - 51 Nm (29 - 38 ft-lbs)
Filtration	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
Cavity	CA-08A-4N
Seal kit	code RG08A4010530100 material no. R930005582
Seal kit coil	code RG1211PNBR7010 material no. R934003957
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356
Supply voltage	See data sheet 18325-90
Power consumption	See data sheet 18325-90
Duty cycle coil	See data sheet 18325-90
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

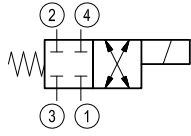
**Ordering code**

<b>OD.14</b>	<b>X</b>	<b>58</b>	<b>Y</b>	<b>00</b>	<b>00</b>
--------------	----------	-----------	----------	-----------	-----------

Solenoid operated valves direct acting spool 4-way 2-position



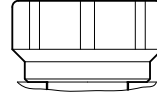
40



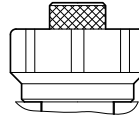
41

Common cavity: CA-08A-3N

30 = Standard type



40 = knob style manual override



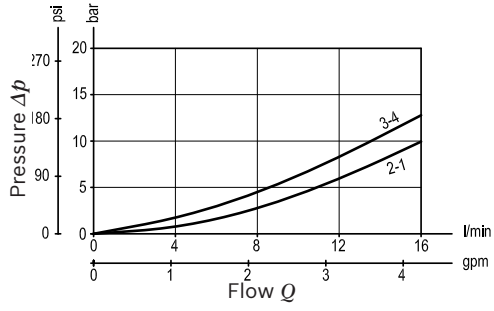
**Preferred types**

Type	Material number
OD144058300000	R901113693
OD144058400000	R901126899
OD144158300000	R901126903
OD144158400000	R901126905

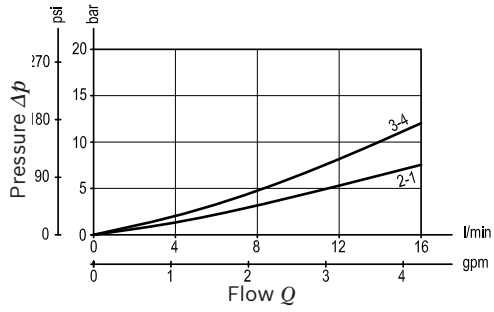
Type	Material number

**Characteristic curves**

**Version 40**

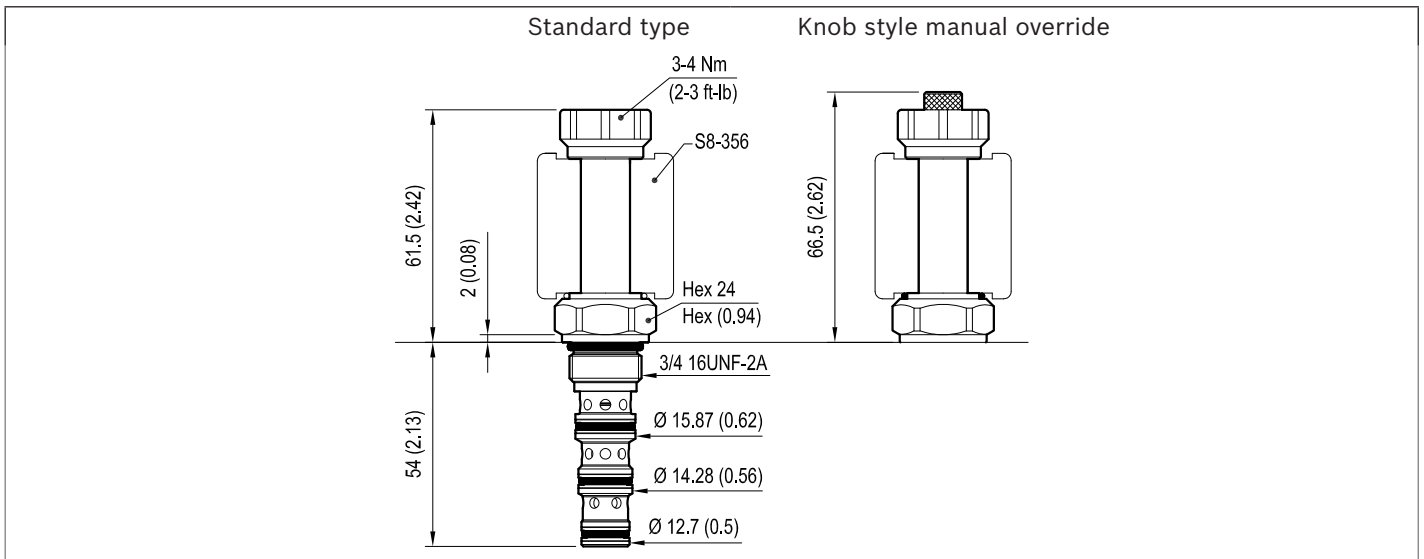


**Version 41**



**Dimensions**

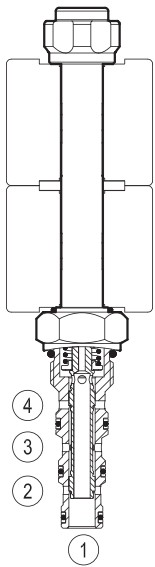
▼ Solenoid operated valves direct acting spool 4-way 2-position



Solenoid operated valves direct acting  
spool 4-way 3-position  
Common cavity, Size 08

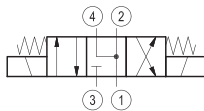
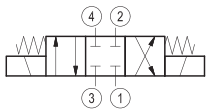
VED-8I-43

OD.14 - X - 58 - Y - Z



▼ Version 31

▼ Version 32



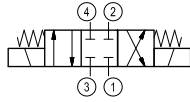
**Technical data**

General	
Weight	0.13 kg (0.29 lbs)
Installation orientation	Any
Ambient temperature range	-30 to 60 °C (-22 to 140 °F) - coil 20W
Hydraulic	
Max. operating pressure	210 bar (3045 psi)
Max. flow	10 l/min. (3 gpm)
Max. internal leakage	40 cm <sup>3</sup> /min. (2.4 cu.in./min.)
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	39 - 51 Nm (29 - 38 ft-lbs)
Filtration	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
Cavity	CA-08A-4N
Seal kit	code RG08A4010530100 material no. R930005582
Seal kit coil	code RG1211PNBR7010 material no. R934003957
Other technical data	See data sheet 18350-50
Electrical	
Type of voltage	DC voltage
Coil type	S8-356
Supply voltage	See data sheet 18325-90
Power consumption	See data sheet 18325-90
Duty cycle coil	See data sheet 18325-90
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

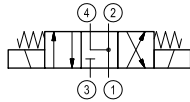
**Ordering code**

<b>OD.14</b>	<b>X</b>	<b>58</b>	<b>Y</b>	<b>00</b>	<b>00</b>
--------------	----------	-----------	----------	-----------	-----------

Solenoid operated valves direct acting spool 4-way 3-position



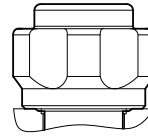
31



32

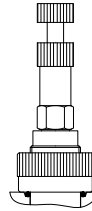
Common cavity: CA-08A-4N

Standard type



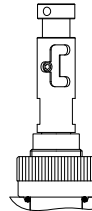
44

Push and pull manual override



4B

Push and pull manual override with detent



4C

**Preferred types**

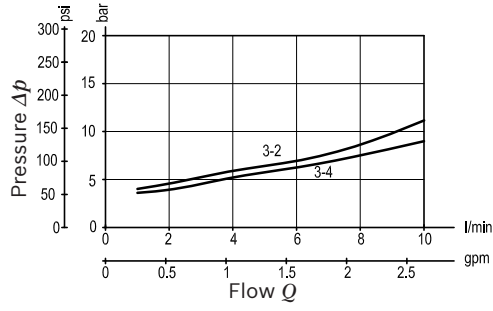
Type	Material number
OD144058300000	R901113693
OD144058400000	R901126899
OD143158440000	R901098194
OD1431584B0000	R930044735
OD1431584C0000	R930044736
OD143258440000	R901113705
OD1432584B0000	R930044738

Type	Material number

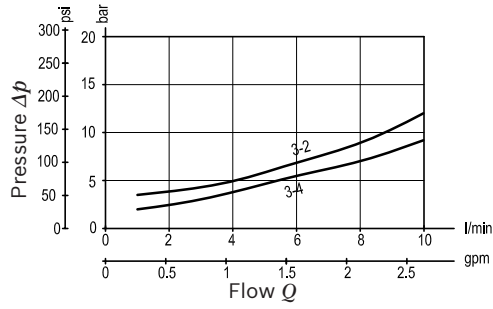


Characteristic curves

Version 31

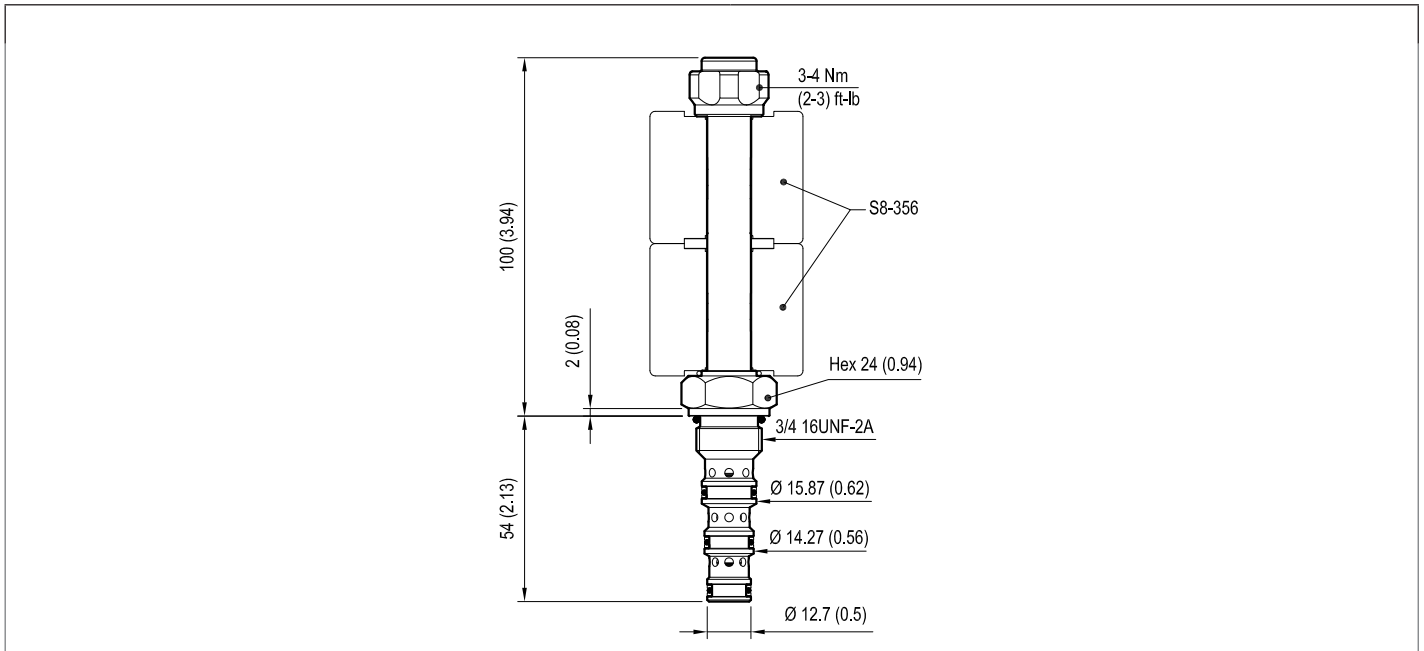


Version 32



**Dimensions**

▼ Solenoid operated valves direct acting spool 4-way 3-position

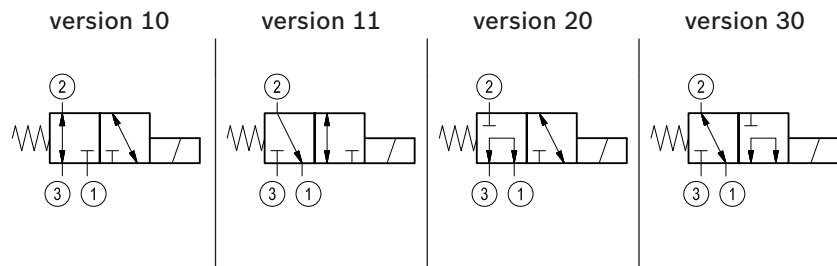
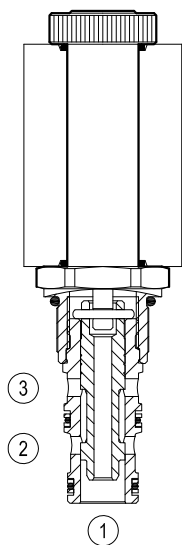
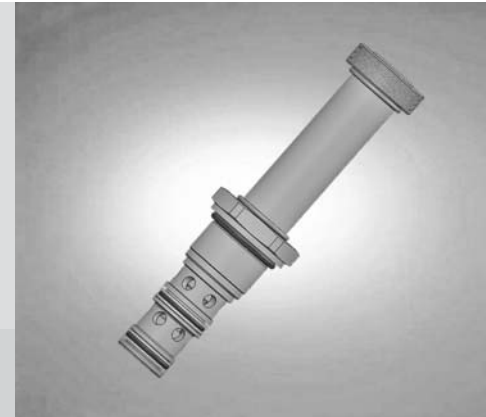


# Solenoid operated valves direct acting spool 3-way 2-position

Common cavity, Size 10

VED-10A-32

OD.13 - X - 77 - Y - 00



## General

Weight	kg (lbs)	0.22 (0.49)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140) - coil 30W

## Hydraulic

Max. operating pressure port 2-3	bar (psi)	280 (4000)
Max. operating pressure port 1	bar (psi)	210 (3000)
Max. flow	l/min. (gpm)	20 (6)
Max. internal leakage (*)	cm <sup>3</sup> /min. (cu.in./min.)	80 (5)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	44-56 (33-41)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
MTTFd		150 years see 18350-51
Cavity		CA-10A-3N see RE 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG10A3010530100 R930000990
Seal kit coil	code material no.	RG16A1PMVQ0010 R934003962
Other technical data		See data sheet RE 18350-50

(\*) Measured at 210 bar (3000 psi) (oil at 46 cSt)

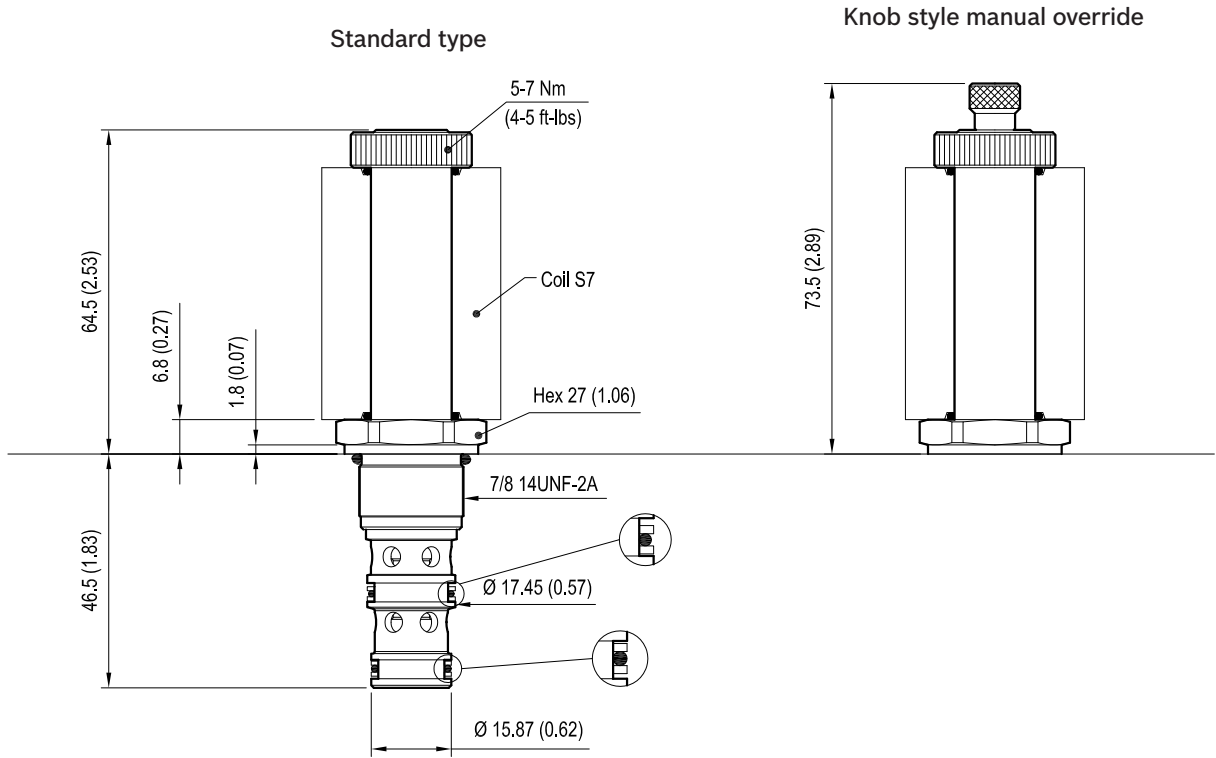
## Electrical

Type of voltage	DC voltage
Coil type	S7
Supply voltage	See data sheet RE 18325-90
Power consumption	W 30
Duty cycle coil	% 100 see RE 18325-90
Type of protection	See data sheet RE 18325-90
Nominal voltage coil 30W	-10% + 10%

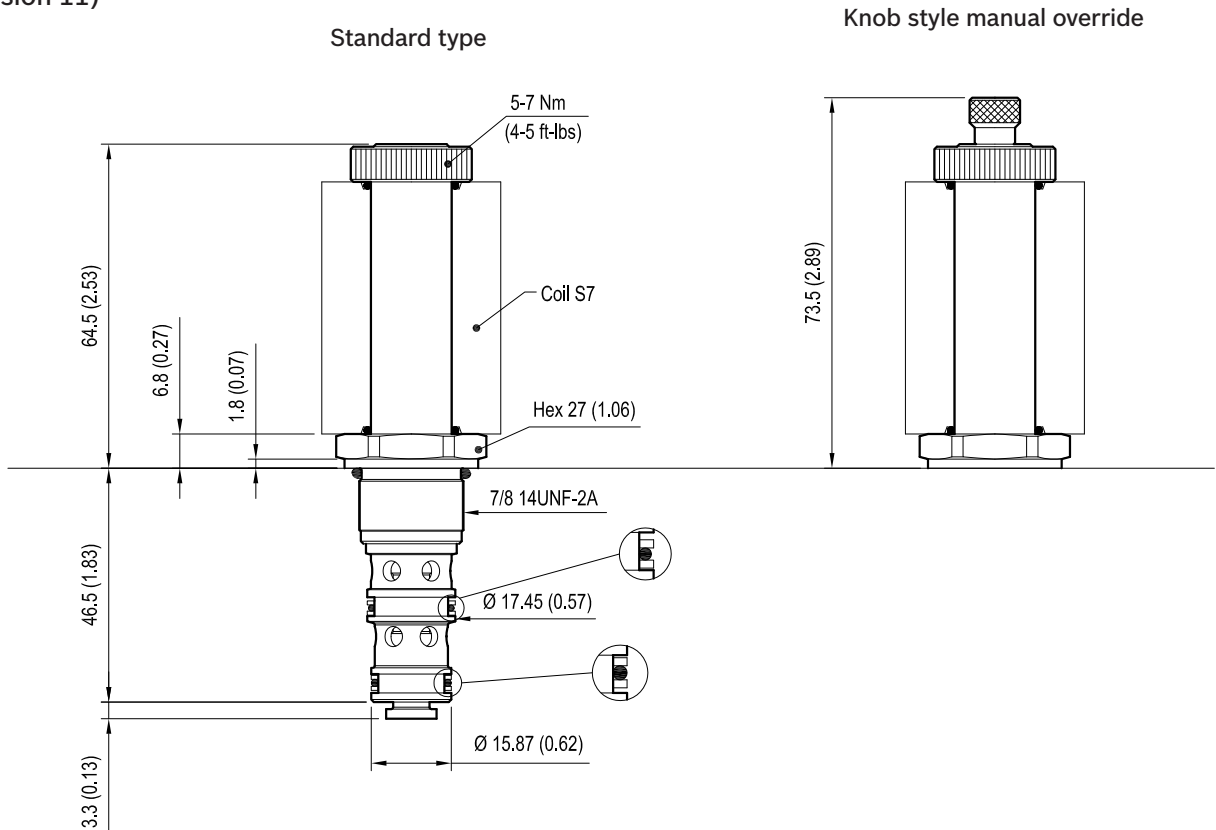
Note: Coils must be ordered separately.

## Dimensions

### Solenoid operated valve, spool 3-way 2-position



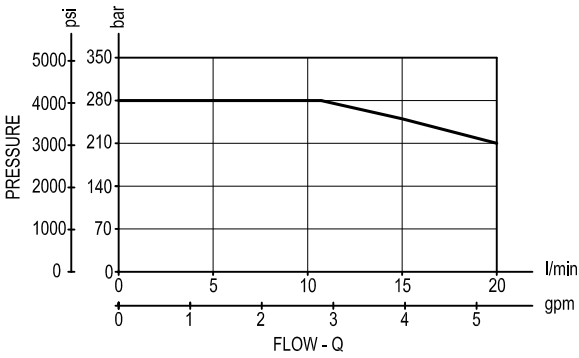
(only version 11)



mm (Inches)

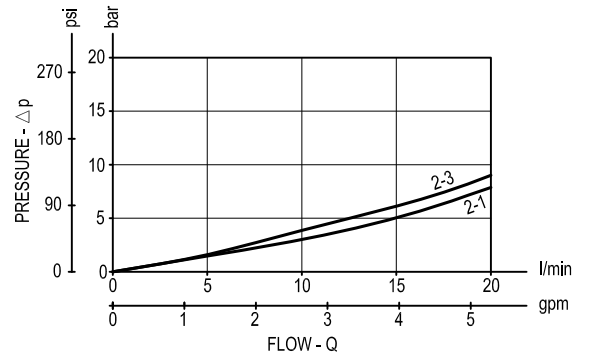
## Performance graphs

Performance limits  
(Hot coil at nominal voltage)

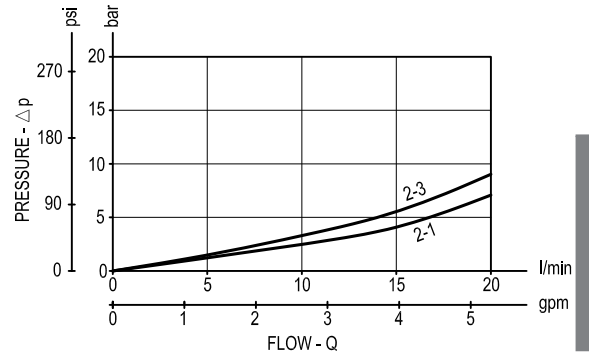
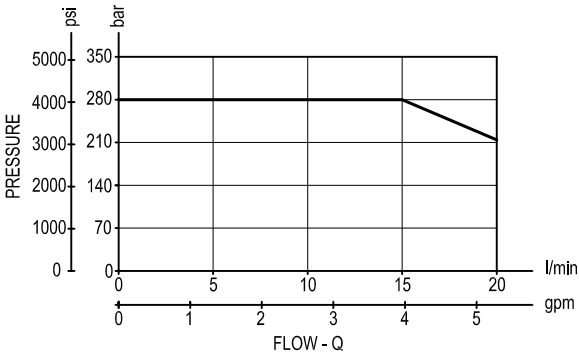


Version 10

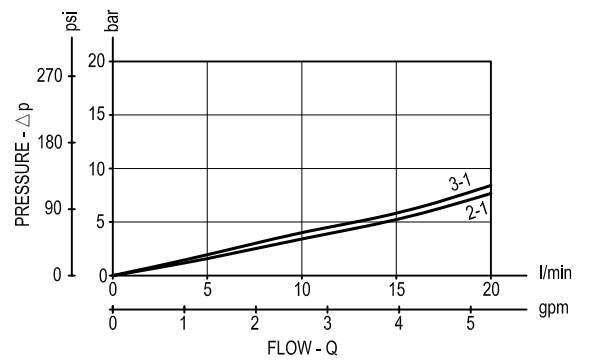
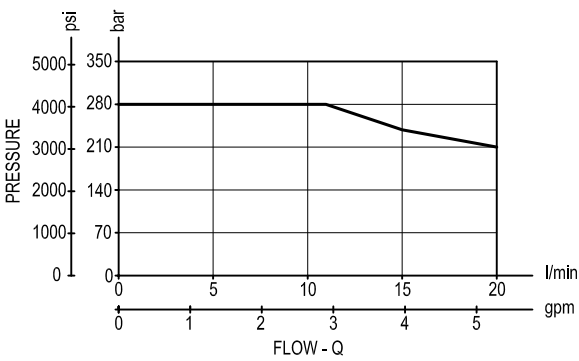
Characteristic curves



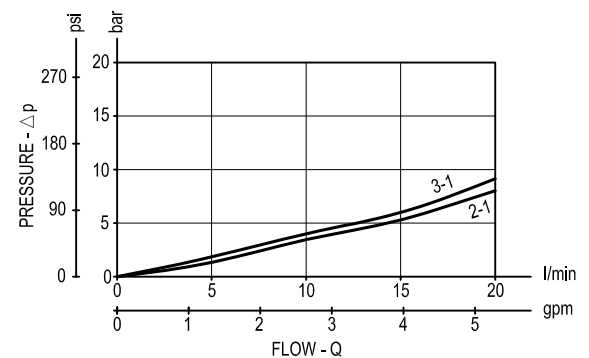
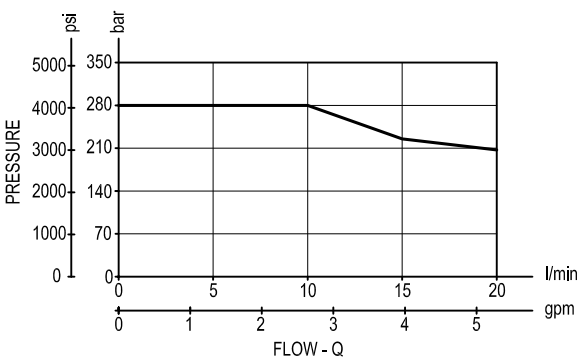
Version 11



Version 20



Version 30

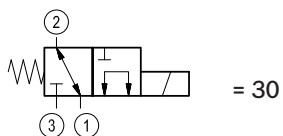
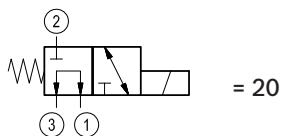
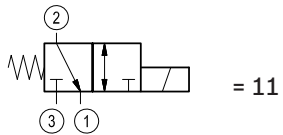
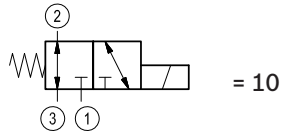


4

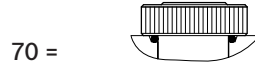
### Ordering code

OD.13	*	77	*	00
-------	---	----	---	----

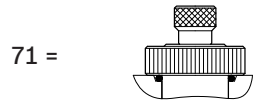
Solenoid operated valves  
spool 4-way 2 position



standard type



Knob style manual override



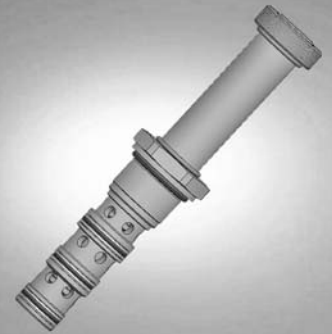
Common cavity: CA-10A-3N

Type	Material number
OD131077700000	R901113686
OD131077710000	R901113687
OD131177700000	R901125116
OD131177710000	R901126890
OD132077700000	R901113690
OD132077710000	R901113692
OD133077700000	R901115704
OD133077710000	R901126898

Type	Material number

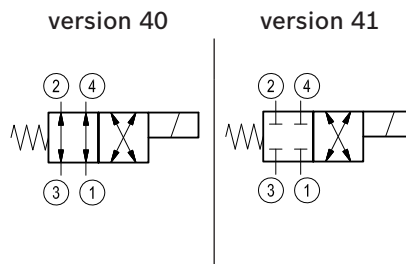
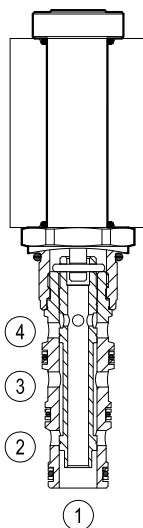
# Solenoid operated valves direct acting spool 4-way 2-position

Common cavity, Size 10



VED-10A-42

OD.14 - 4W - 78 - Y - 00



## General

Weight	kg (lbs)	0.22 (0.48)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140) - coil 30W

## Hydraulic

Max. operating pressure port 2-3-4	bar (psi)	280 (4000)
Max. operating pressure port 1		210 (3000)
Max. flow	l/min. (gpm)	20 (6)
Max. internal leakage (*)	cm <sup>3</sup> /min. (cu.in./min.)	80 (5)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm<sup>2</sup>/s (cSt)

Installation torque	Nm (ft-lbs)	44-56 (33-41)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
MTTFd		150 years see 18350-51
Cavity		CA-10A-4N see RE 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG10A4010530100 R901111373
Seal kit coil	code material no.	RG16A1PMVQ0010 R934003962
Other technical data		See data sheet RE 18350-50

(\*) Measured at 210 bar (3000 psi) (oil at 46 cSt)

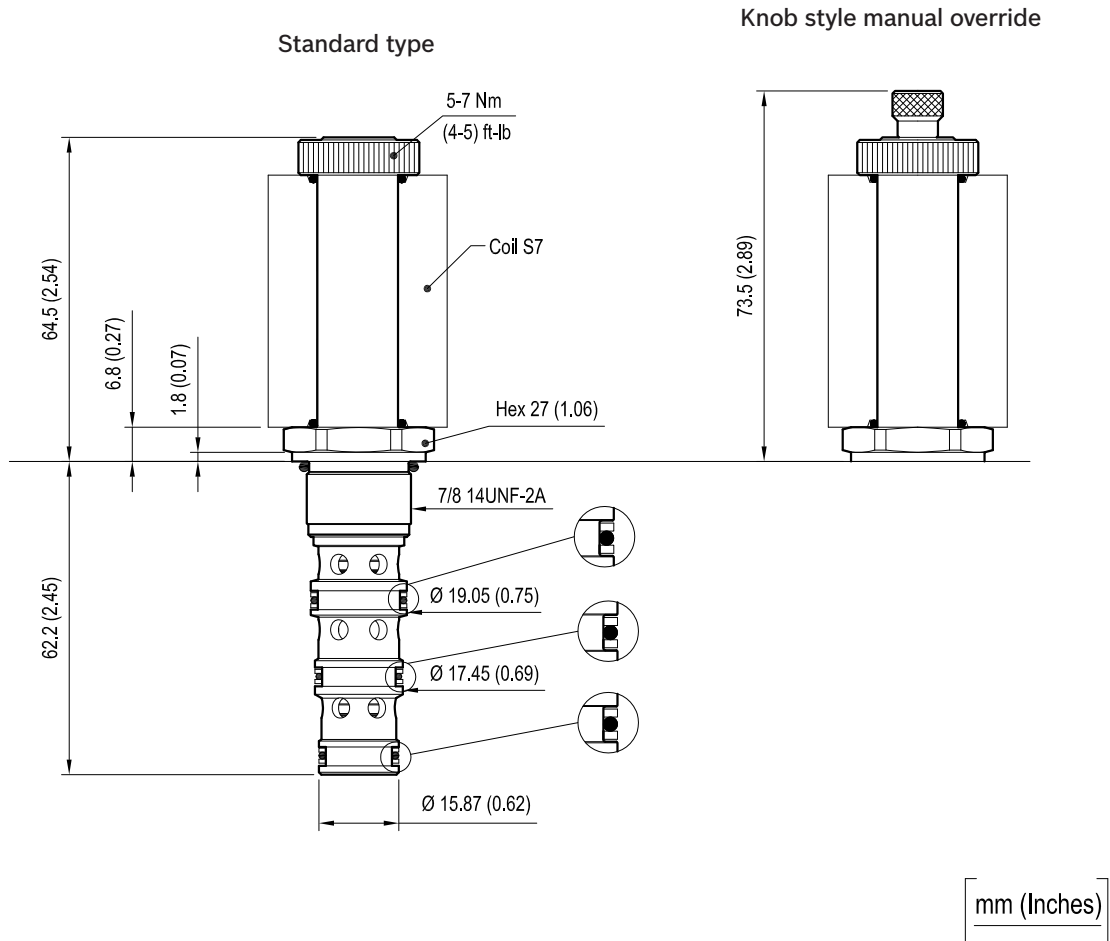
## Electrical

Type of voltage	DC voltage
Coil type	S7
Supply voltage	See data sheet RE 18325-90
Power consumption	W 30
Duty cycle coil	% 100 see RE 18325-90
Type of protection	See data sheet RE 18325-90
Nominal voltage coil 30W	-10% + 10%

Note: Coils must be ordered separately.

## Dimensions

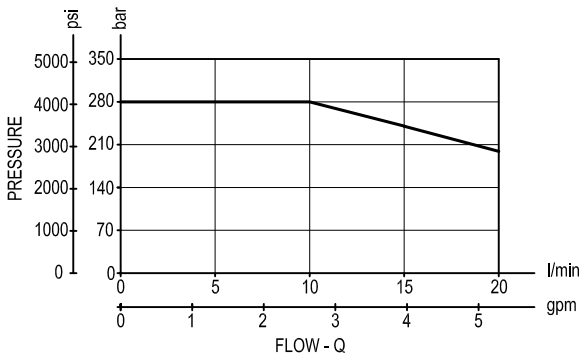
Solenoid operated valve, spool 4-way 2-position





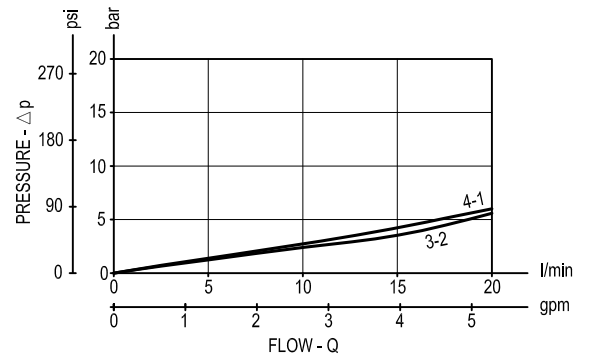
# Performance graphs

Performance limits  
(Hot coil at nominal voltage)

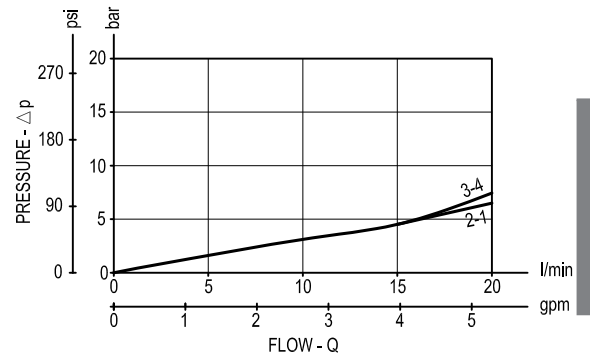
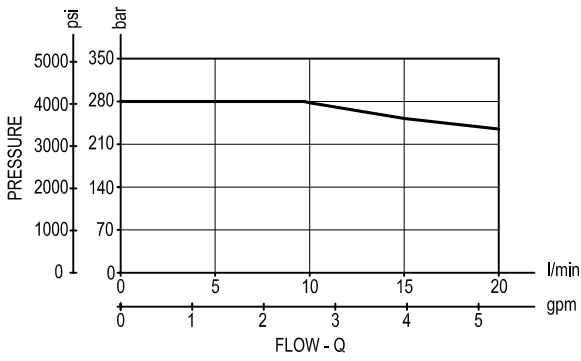


Version 40

Characteristic curves



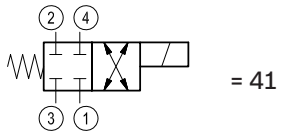
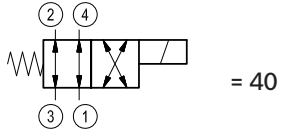
Version 41



### Ordering code

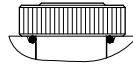
OD.14	*	78	*	00
-------	---	----	---	----

Solenoid operated valves  
spool 4-way 2 position



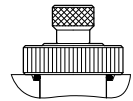
standard type

70 =



Knob style manual override

71 =



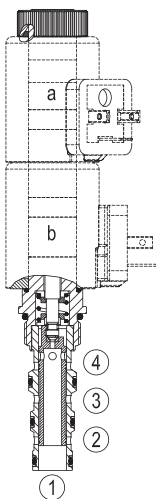
Common cavity: CA-10A-4N

Type	Material number	Type	Material number
OD144078700000	R901113695		
OD144078710000	R901113699		
OD144178700000	R901126906		

Solenoid operated valves direct acting spool  
4-way 3-position  
Common cavity, Size 10

VEDS-10A-43

OD.14 - X - 78 - KK2 - Y - 00

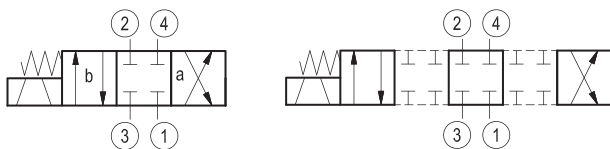


**Technical data**

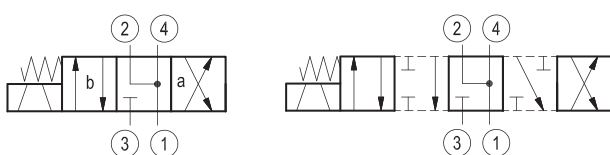
General	
Weight (with coils)	0.85 kg (1.87 lbs)
Installation position	Any
Ambient temperature range	-40 to 110 °C (-40 to 230 °F)
Salt spray test to DIN 50021	720 h
Hydraulic	
Max. operating pressure port 2, 3, 4	350 bar (5075 psi)
Max. operating pressure port 1	250 bar (3625 psi)
Max. flow	35 l/min. (9 gpm)
Max. internal leakage	< 60 ml/min. (with Δp=250 bar; HLP46, T <sub>oil</sub> = 40°C)
Fluid temperature range	-40 to 80 °C (-40 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 5 to 1000 mm <sup>2</sup> /s (preferably 10 to 100 mm <sup>2</sup> /s)	
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Cavity	CA-10A-4N see 18325-70
Seal kit	material no. R961005190
Load cycles	2 Mio.
Electrical	
Type of voltage	DC voltage
Coil type	GZ37 see 18325-90

Note: coils must be ordered separately.

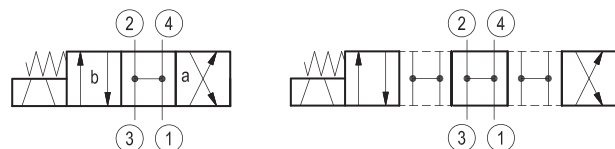
▼ Version 10



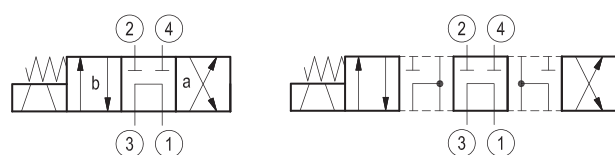
▼ Version 20



▼ Version 40



▼ Version 60



- ① T
- ② A
- ③ P
- ④ B

**Ordering code**

<b>OD14</b>	<b>X</b>	<b>78</b>	<b>KK2</b>	<b>Y</b>	<b>0</b>	<b>0</b>
-------------	----------	-----------	------------	----------	----------	----------

Solenoid operated valves direct acting spool  
4-way 3-position

Version **10**  
Version **20**  
Version **40**  
Version **60**

without manual override **0**  
with pull/push manual override **1**

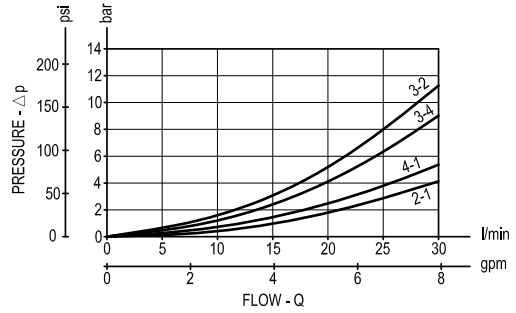
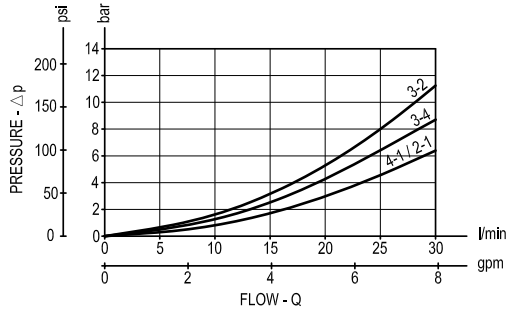
**Preferred types**

Type	Material number
OD141078KK2000	R901237595
OD142078KK2000	R901237594
OD144078KK2000	R901237592
OD146078KK2000	R901237591

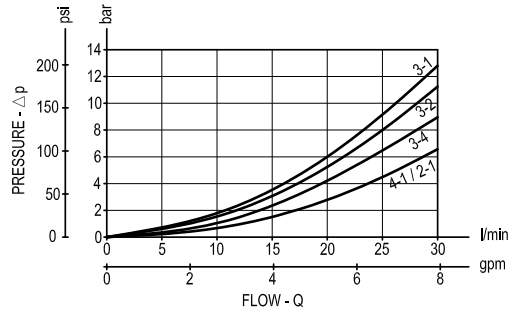
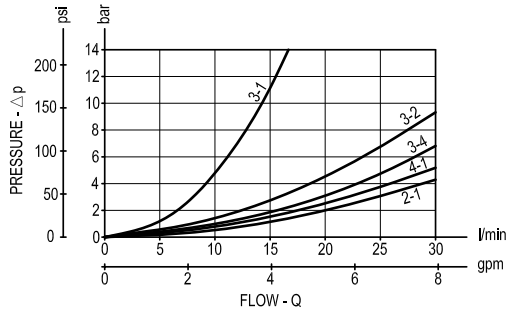
Type	Material number
OD141078KK2100	R901255425
OD142078KK2100	R901255421
OD144078KK2100	R901255423
OD146078KK2100	R901255424

Characteristic curves

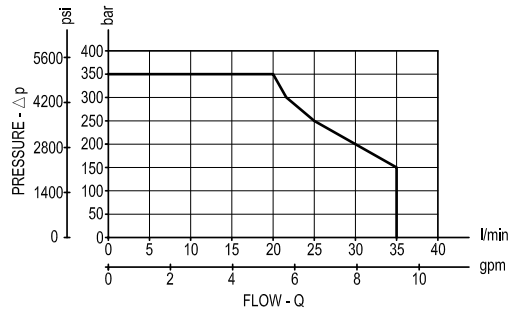
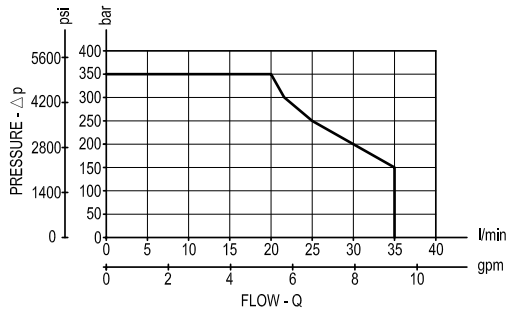
Version 10 Version 20



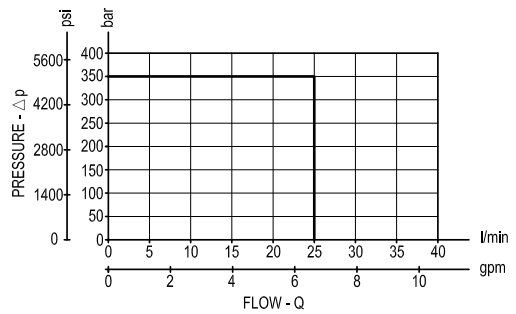
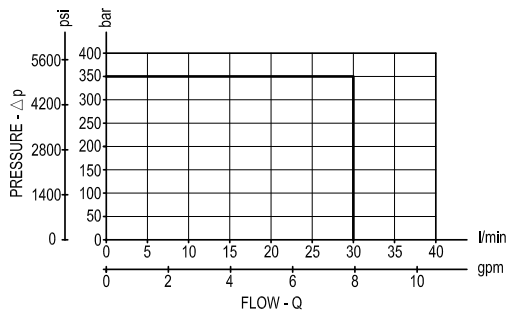
Version 40 Version 60



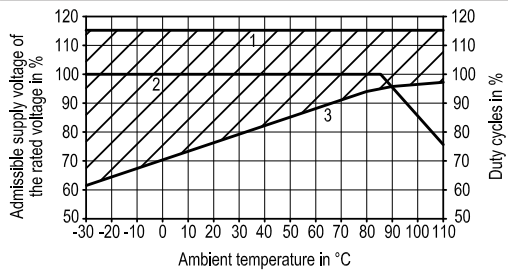
Version 10 - Limits of performance Version 20 - Limits of performance



Version 40 - Limits of performance Version 60 - Limits of performance



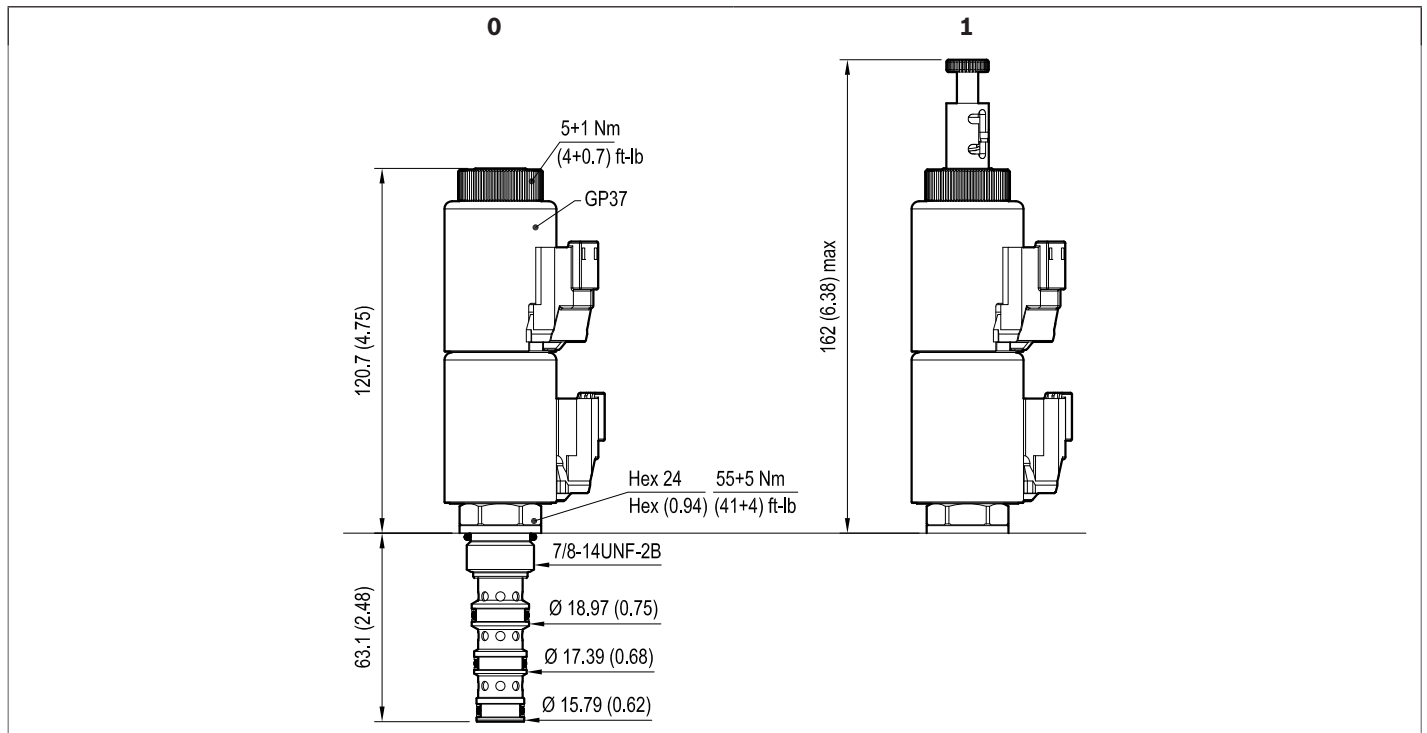
Voltage range and duty cycle depending on the ambient temperature



- 1 Max. voltage
- 2 Duty cycle
- 3 Min. response voltage
- Admissible supply voltage range

**Dimensions**

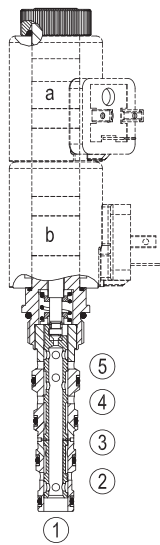
▼ **Solenoid operated valves direct acting spool 4-way 3-position**



Solenoid operated valves direct acting spool  
5-way 3-position  
Common cavity, Size 10

VEDS-10A-53

OD.53 - X - 54 - KK2 - Y - 00

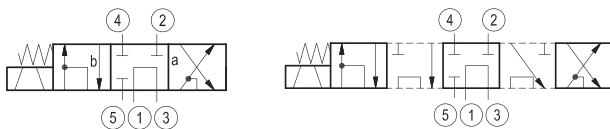


**Technical data**

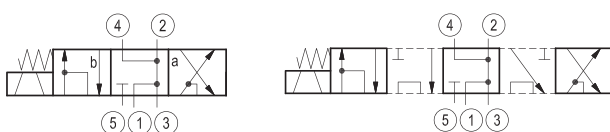
General	
Weight (with coils)	0.85 kg (1.87 lbs)
Installation position	Any
Ambient temperature range	-40 to 110 °C (-40 to 230 °F)
Salt spray test to DIN 50021	720 h
Hydraulic	
Max. operating pressure	250 bar (3625 psi)
Max. flow	25 l/min. (7 gpm)
Max. internal leakage	< 60 ml/min. (with $\Delta p=250$ bar; HLP46, $T_{oil} = 40^{\circ}C$ )
Fluid temperature range	-40 to 80 °C (-40 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 5 to 1000 mm <sup>2</sup> /s (preferably 10 to 100 mm <sup>2</sup> /s)	
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Cavity	CA-10A-5N see 18325-75
Seal kit	material no. R961005837
Load cycles	2 Mio.
Electrical	
Type of voltage	DC voltage
Coil type	GZ37 see 18325-90

Note: coils must be ordered separately.

▼ Version 10



▼ Version 20



- ① LS
- ② A
- ③ T
- ④ B
- ⑤ P

**Ordering code**

<b>OD53</b>	<b>X</b>	<b>54</b>	<b>KK2</b>	<b>Y</b>	<b>0</b>	<b>0</b>
-------------	----------	-----------	------------	----------	----------	----------

Solenoid operated valves direct acting spool  
5-way 3-position

Version **10**  
Version **20**

without manual override **0**  
with pull/push manual override **1**

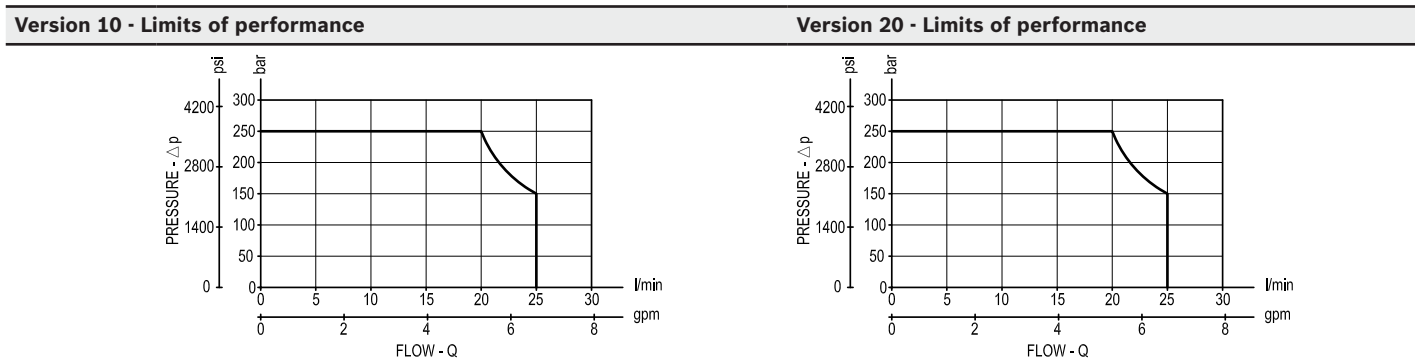
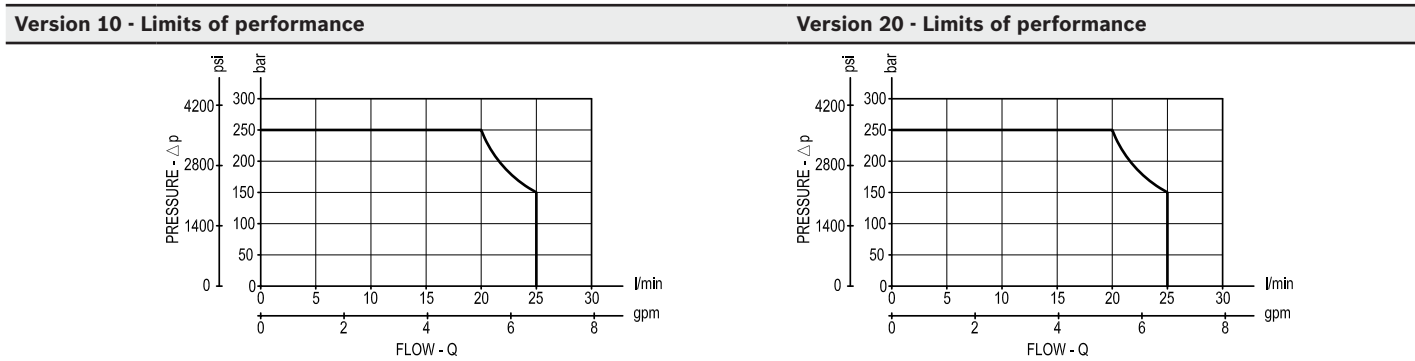
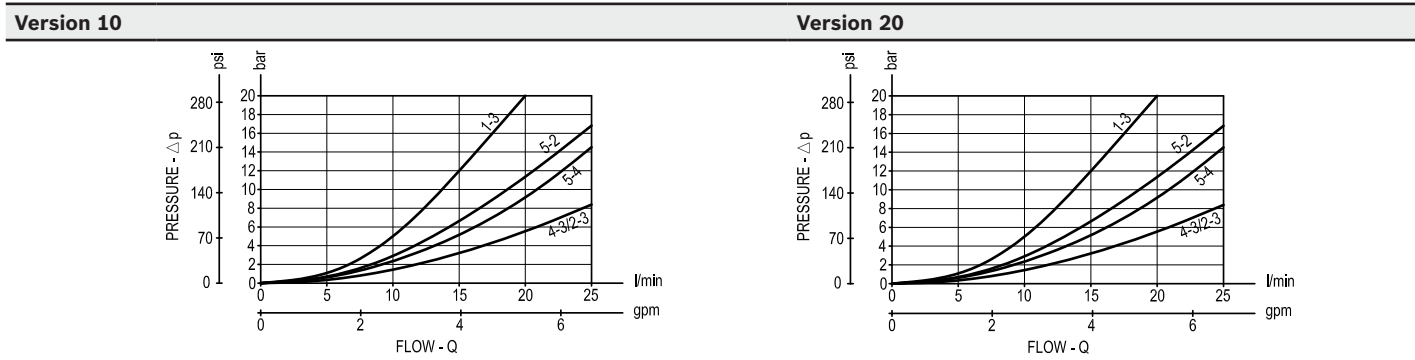
**Preferred types**

Type	Material number
OD531054KK2000	R901274118
OD532054KK2000	R901274117

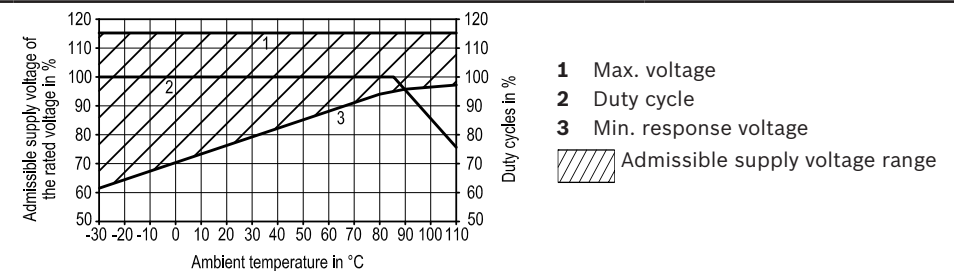
Type	Material number
OD531054KK2100	R901300057
OD532054KK2100	R901300059



Characteristic curves



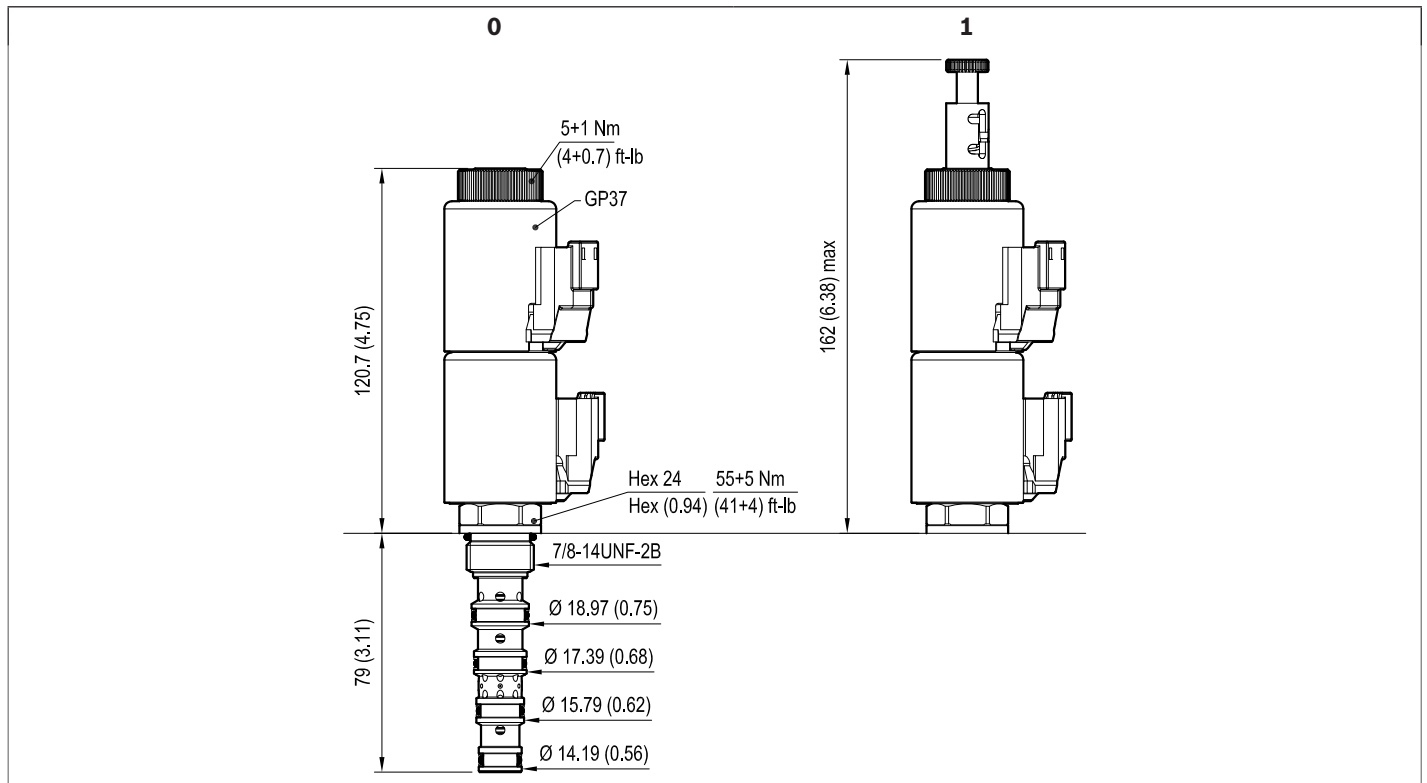
Voltage range and duty cycle depending on the ambient temperature



4

**Dimensions**

▼ **Solenoid operated valves direct acting spool 5-way 3-position**

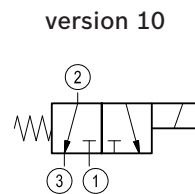
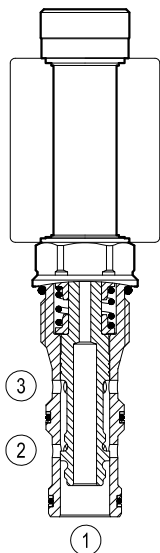


# Solenoid operated valves direct acting spool 3-way 2-position

Common cavity, Size 12

VEDS-12A-32

OD.13 - X - 12 - Y - 00



## General

Weight	kg (lbs)	0.39 (0.86)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	315 (4500)
Max. operating pressure port 1	bar (psi)	210 (3000)
Max. flow	l/min.(gpm)	60 (16)
Max. internal leakage (*)	cm <sup>3</sup> /min. (cu.in/min.)	180 (11)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)
Fluids		Mineral-based or synthetics with lubricating properties at viscosities of 20 to 380 mm <sup>2</sup> /s (cSt)
Installation torque	Nm (ft-lbs)	81-87 (60-64)
Recommended degree of fluid contamination		Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Cavity		CA-12A-3N see RE 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG12A3010520100 R930000941
Seal kit coil	code material no.	RG19A1PNBR7010 R934003964
Other technical data		See data sheet RE 18350-50

(\*) Measured at 210 bar (3000 psi) (oil at 46 cSt)

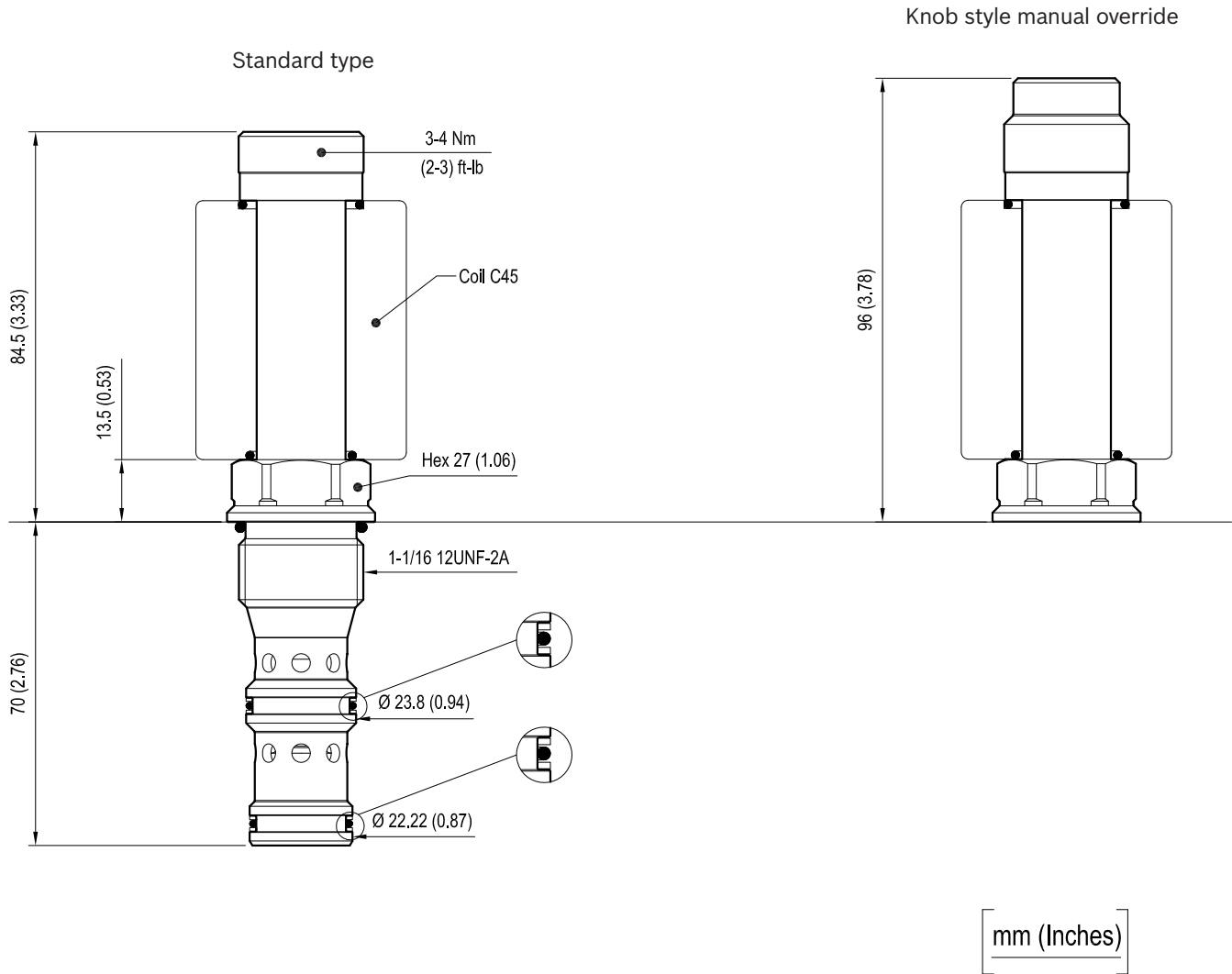
## Electrical

Type of voltage		DC voltage
Coil type		C45
Supply voltage		See data sheet RE 18325-90
Power consumption	W	33
Duty cycle coil	%	100 see RE 18325-90
Type of protection		See data sheet RE 18325-90
Nominal voltage coil 33W		-10%+10%

Note: Coils must be ordered separately.

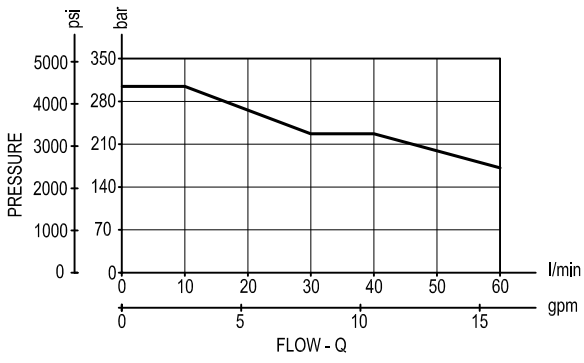
## Dimensions

### Solenoid operated valves direct acting spool 3-way 2-position

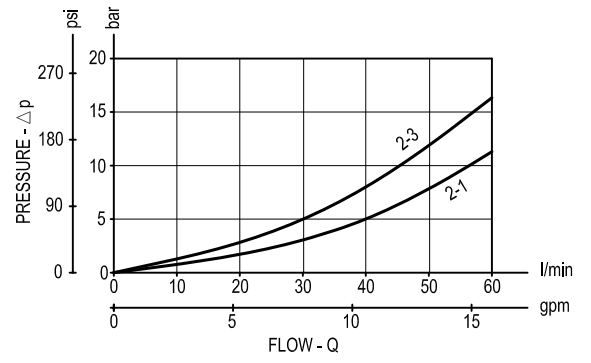


# Performance graphs

Performance limits



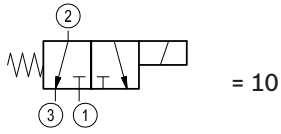
Characteristic curves



### Ordering code

OD.13	*	12	*	00
-------	---	----	---	----

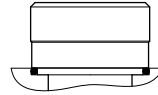
Solenoid operated valves  
spool 3-way 2-position



Common cavity: CA-12A-3N

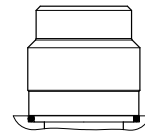
Standard type

1A =



Knob style manual override

1B =



Type	Material number
OD1310121A0000	R934003616
OD1310121B0000	R934003620

Type	Material number

# Solenoid cartridge valves

## Electro-proportional

Designation	Description	Cavity	Code	Data sheet	Page
Solenoid cartridge valves electro-proportional relief direct acting	VEP-5B-2S-D	Size 08	OD940118YZ	18323-65	867
Solenoid cartridge valves electro-proportional relief pilot operated	VEP-5B-2S-10A-P	Size 10	OD940536YZ	18323-66	871
Solenoid cartridge valves electro-proportional relief pilot operated	VEP-5B-2S-P	Special	OD940561YZ	18323-67	875
Solenoid cartridge valves electro-proportional direct acting pressure reducing	VEP-5A-3R-06	Size 10	OD910177Y00	18323-60	879
Solenoid cartridge valves electro-proportional pilot operated pressure reducing	VEP-5A-2R-06-P	Size 10	OD910677Y00	18323-61	883
Solenoid cartridge valves electro-proportional 2 way double lock normally closed	VEP-5A-2T-06-NC	Size 08	OD953118Y00	18323-68	887
Solenoid cartridge valves electro-proportional flow regulator not compensated	VEP-5A-2Q-09	Size 10	OD92X77YZ	18323-63	891
Solenoid cartridge valves electro-proportional flow regulator not compensated	VEP-5A-2Q-14	Size 12	OD92X12Y00	18323-62	895
Solenoid cartridge valves electro-proportional flow regulator not compensated	VEP-5A-2Q-09	Size 10	OD920277YZ	18323-64	899
Solenoid cartridge valves electro-proportional poppet type flow regulator not compensated	VEPN-12A	Size 12	OD9506897200	18323-69	903
Solenoid cartridge valves electro-proportional 2 way double lock normally closed	VEPN-08A-16	Size 08	OD95311854Y00	18323-70	907
Solenoid cartridge valves electro-proportional 2 way double lock normally closed	VEPN-19E-16	Special	OD95311954Y00	18323-71	911
Solenoid cartridge valves electro-proportional 2 way flow regulator not compensated	KSVS.0	Size 08	KSVSR0AA/F-Y-V	18323-72	915
Solenoid cartridge valves electro-proportional 2 way flow regulator not compensated	KSVS.1	Size 10	KSVSR1AA/F-Y-V	18323-73	919
Solenoid cartridge valves electro-proportional 2 way flow regulator not compensated	KSVS.2	Size 12	KSVSR2AA/F-Y-V	18323-74	923

## Solenoid cartridge valves

### Electro-proportional

Designation	Description	Cavity	Code	Data sheet	Page
Solenoid cartridge valves electro-proportional 2 way flow regulator not compensated	KSVS.3	Size 16	KSVSR3AA/F-Y-V	18323-75	927
Solenoid cartridge valves electro-proportional 4 way 3 position direct acting spool type	VEPS-10A-43	Size 10	OD14X78KP2Y00	18324-66	931
Solenoid cartridge valves electro-proportional 5 way 3 position direct acting spool type	VEPS-10A-53	Size 10	OD53X54KP2Y00	18324-67	935

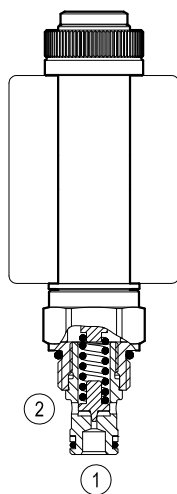


# Proportional valves direct acting relief

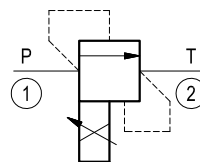
Common cavity, Size 08

VEP-5B-2S-D

OD.94.01.18 - Y - Z



Version 01



## General

Weight	kg (lbs)	0.23 (0.51)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Flow range	l/min.(gpm)	See flow diagram
Max. internal leakage (*)	cm <sup>3</sup> /min. (cu.in./min.)	5 (0.3)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 39-51 (29-38)

Recommended degree of fluid contamination Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14

Cavity CA-08A-2N see RE 18325-70

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit code material no. RG08A2010520100 R901101437

Seal kit coil code material no. RG19A1PNBR7010 R934003964

Other technical data See data sheet RE 18350-50

(\*) at 20% of pressure setting. Oil at 46 cSt

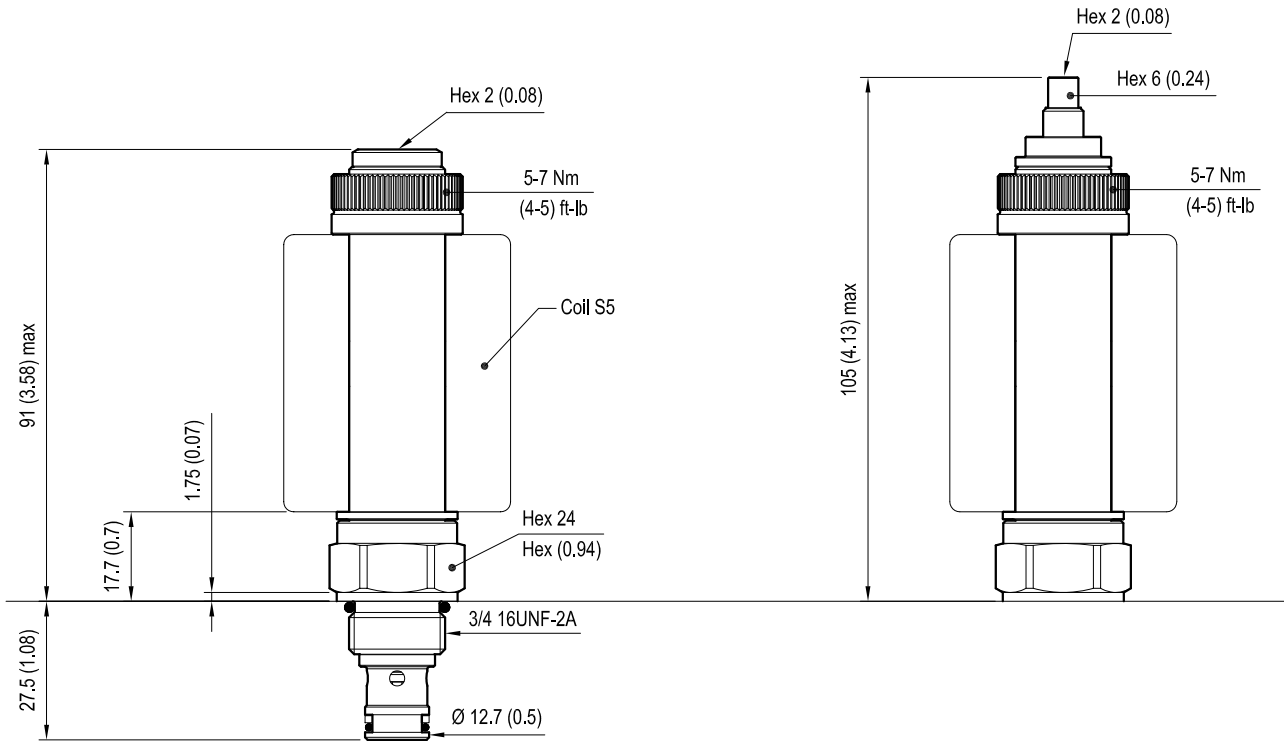
## Electrical

Type of voltage	DC voltage
Coil type	S5
Supply voltage	12 DC
Nominal voltage	± 10%
Power consumption	W 23
Duty cycle	% 100
Type of protection	See data sheet RE 18325-90

Note: Coils must be ordered separately.

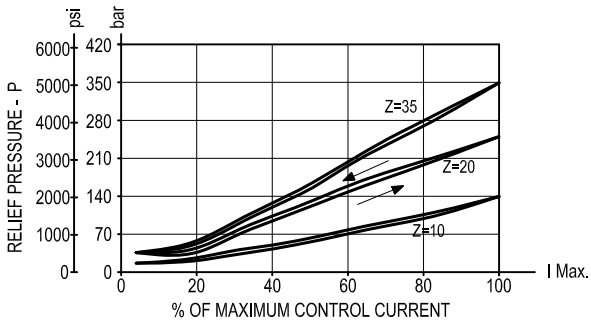
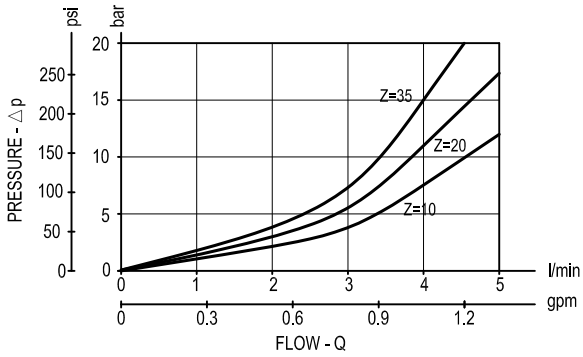
## Dimensions

### Proportional valves direct acting relief



[ mm (Inches) ]

## Performance graphs



PMW Frequency: 120-150 Hz

Hysteresis: < 5%

Note (1): It is recommended to use coil 12 DC.

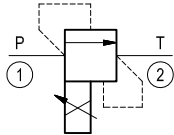
Note (2): It is recommended to bleed air carefully before operation.

Note (3): Performance using coil without diode.

### Ordering code

**OD.94 01 18 Y Z**

Proportional valves direct acting relief

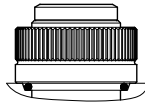


Common cavity: CA-08A-2N

Operating range					
	Pressure range bar (psi)	Voltage V	I Min. A (±10%)	I Max. A (±10%)	Internal orifice mm (Inch)
= 10	15-140 (220-2000)	12	0.25	1.8	2.5 (0.9)
= 20	30-250 (440-3600)	12	0.25	1.8	1.8 (0.7)
= 35	30-350 (440-5000)	12	0.25	1.8	1.5 (0.6)

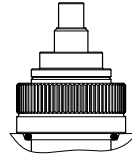
Performance using coil without diode.  
standard type

03 =



knob style manual override

04 =



Type	Material number
OD940118031000	R934001530
OD940118032000	R934001531
OD940118033500	R934001532
OD940118041000	R934001533
OD940118042000	R934001534
OD940118043500	R934001535

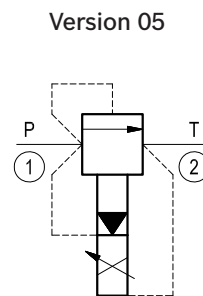
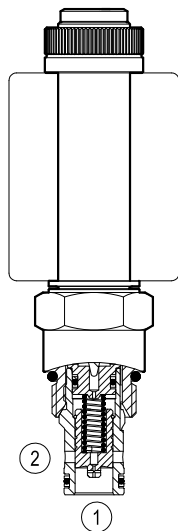
Type	Material number

# Proportional valves pilot operated relief

Common cavity, Size 10

VEP-5B-2S-10A-P

OD.94.05.36 - Y - Z



## General

Weight	kg (lbs)	0.3 (0.66)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Flow range	l/min.(gpm)	7-120 (2-32)
Max. internal leakage	cm <sup>3</sup> /min. (cu.in./min.)	200 (12)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 44-56 (33-41)

Recommended degree of fluid contamination Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14

Cavity CA-10A-2N see Re 18325-70

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit code material no. RG10A2010530100 R901111366

Seal kit coil code material no. RG19A1PNBR7010 R934003964

Other technical data See data sheet RE 18350-50

(\* ) at 20% of pressure setting. Oil at 46 cSt.

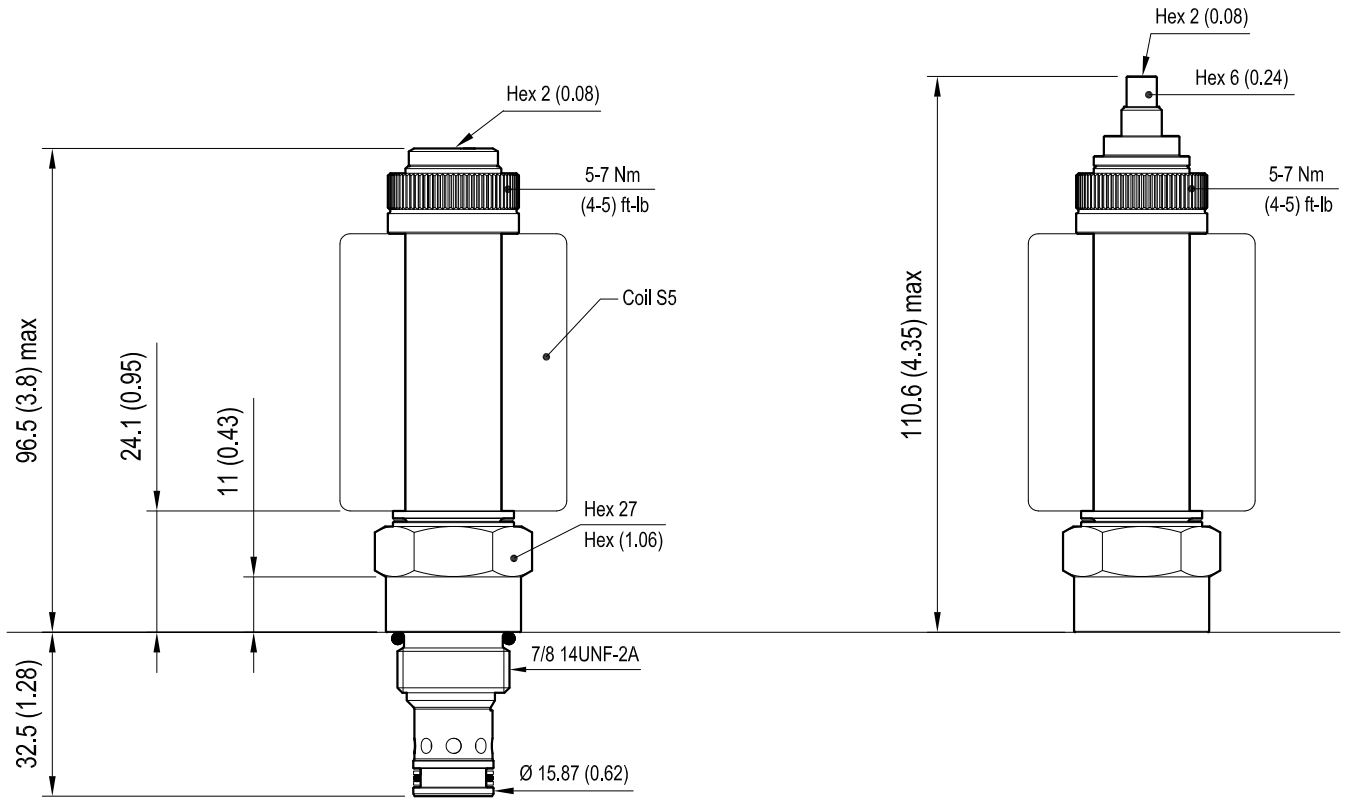
## Electrical

Type of voltage	DC voltage
Coil type	S5
Supply voltage	12 DC
Nominal voltage	± 10%
Power consumption	W 23
Duty cycle	% 100
Type of protection	See data sheet RE 18325-90

Note: Coils must be ordered separately.

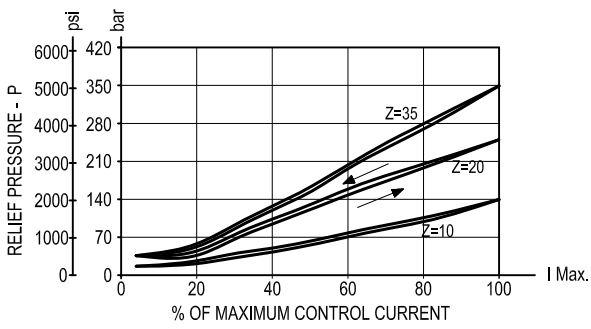
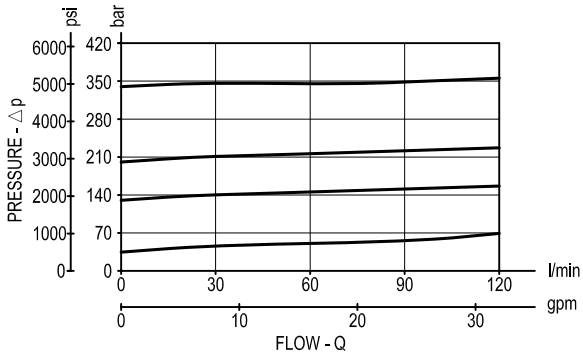
## Dimensions

### Proportional valves pilot operated relief



[ mm (Inches) ]

## Performance graphs



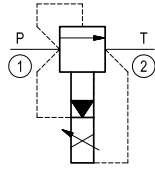
PMW Frequency: 120-150 Hz
Hysteresis: < 5%

- Note (1): It is recommended to use coil 12 DC.
- Note (2): It is recommended to bleed air carefully before operation.
- Note (3): Performance using coil without diode.

### Ordering code

**OD.94 05 36 Y Z**

Proportional valves pilot operated relief



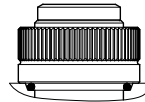
Common cavity: CA-10A-2N

	Operating range			
	Pressure range bar (psi)	Voltage V	I Min. A (±10%)	I Max. A (±10%)
= 10	15-140 (220-2000)	12	0.18	1.6
= 20	30-250 (440-3600)	12	0.13	1.5
= 35	30-350 (440-5000)	12	0.28	1.4

Performance using coil without diode.

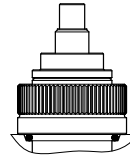
standard type

03 =



knob style manual override

04 =



Type	Material number
OD940536031000	R934001536
OD940536032000	R934001537
OD940536033500	R934001538
OD940536041000	R934001539
OD940536042000	R934001540
OD940536043500	R934003877

Type	Material number

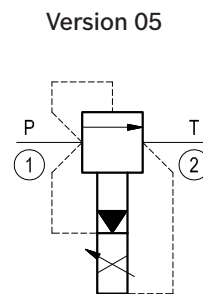
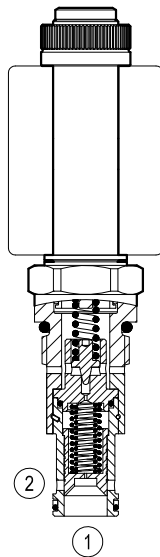


# Proportional valves pilot operated relief

Special cavity, 065

VEP-5B-2S-P

OD.94.05.61 - Y - Z



## General

Weight	kg (lbs)	0.36 (0.79)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	350 (5000)
Flow range	l/min.(gpm)	8-150 (2-40)
Max. internal leakage (*)	cm <sup>3</sup> /min. (cu.in./min.)	180 (11)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 121-133 (90-99)

Recommended degree of fluid contamination Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14

Cavity 065 see RE 18325-75

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit code RG0065010520100 material no. R930001958

Seal kit coil code RG19A1PNBR7010 material no. R934003964

Other technical data See data sheet RE 18350-50

(\*) at 20% of pressure setting. Oil at 46 cSt.

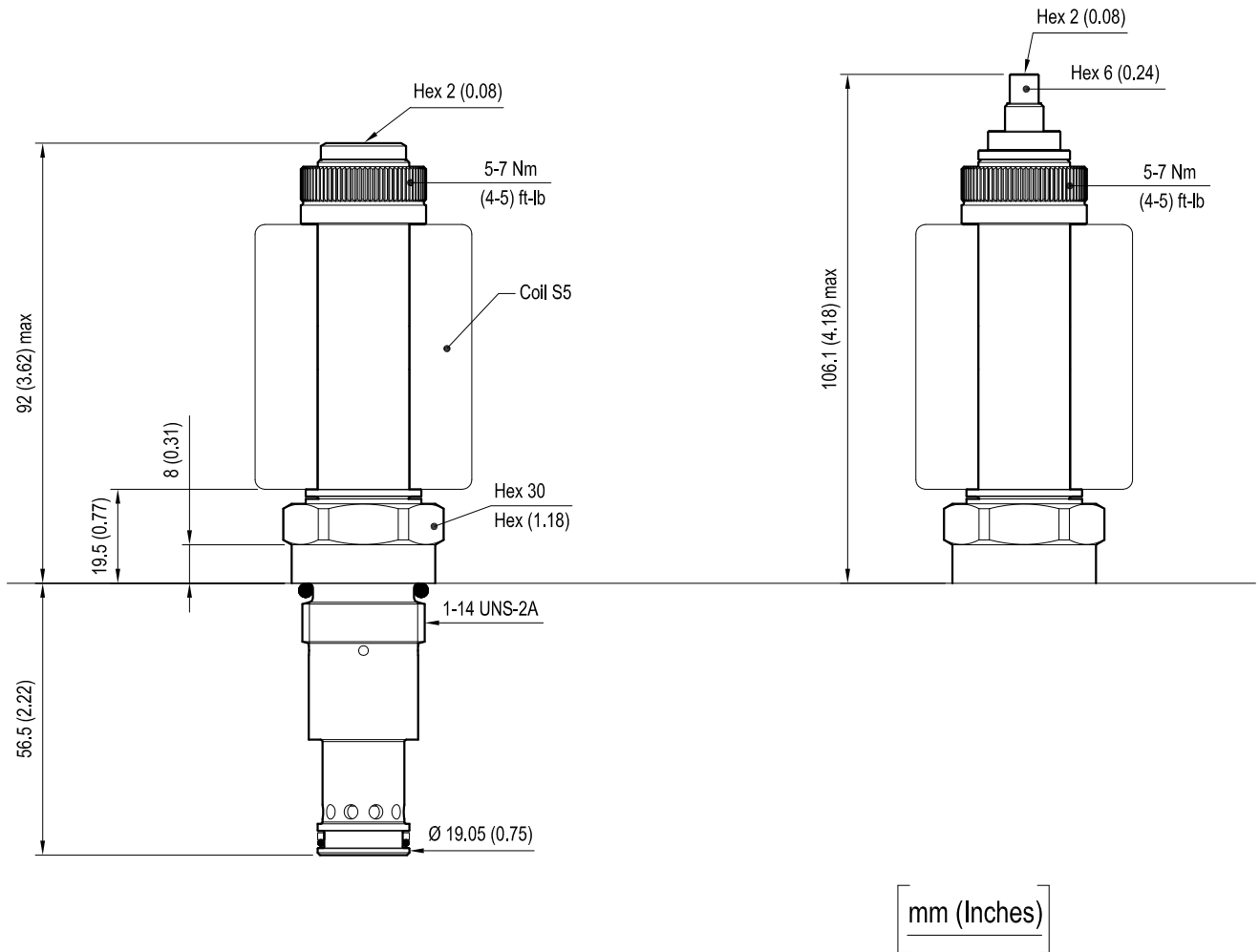
## Electrical

Type of voltage		DC voltage
Coil type		S5
Supply voltage	V	12 DC
Nominal voltage		± 10%
Power consumption	W	23
Duty cycle	%	100
Type of protection		See data sheet RE 18325-90

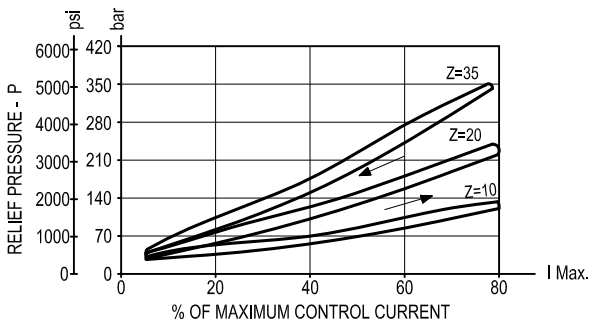
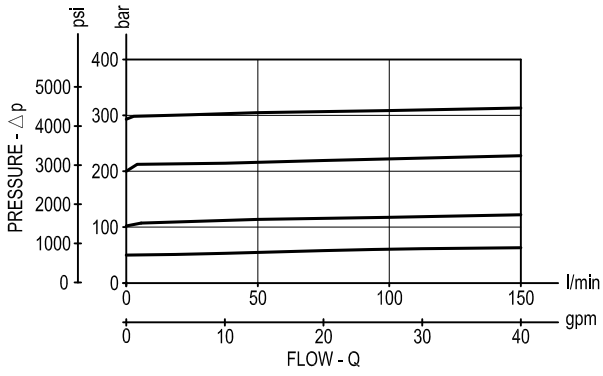
Note: Coils must be ordered separately.

## Dimensions

### Proportional valves pilot operated relief



## Performance graphs



PMW Frequency: 120-150 Hz

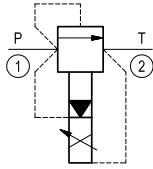
Hysteresis: < 5%

Note: Performance using coil without diode.

### Ordering code

**OD.94** **05** **61** **Y** **Z**

Proportional valves pilot operated relief

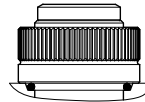


Special cavity: 065

	Operating range			
	Pressure range bar (psi)	Voltage V	I Min. A (±10%)	I Max. A (±10%)
= 10	20-120 (290-1740)	12	0.2	1.5
= 20	20-220 (290-3190)	12	0.1	1.7
= 35	30-350 (440-5000)	12	0.2	1.7

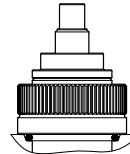
Performance using coil without diode.  
standard type

03 =



knob style manual override

04 =



Type	Material number
OD940561031000	R934001541
OD940561032000	R934001542
OD940561033500	R934001543
OD940561041000	R934001544
OD940561042000	R934001545
OD940561043500	R934003850

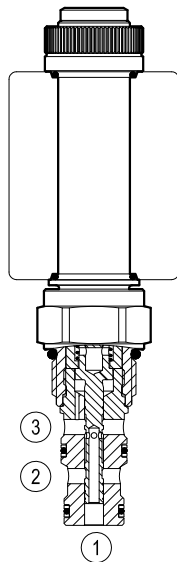
Type	Material number

# Proportional valves direct acting pressure reducing

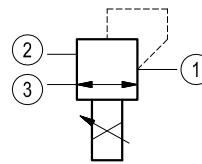
Common cavity, Size 10

VEP-5A-3R-06

OD.91.01.77 - Y - 00



Version 01



## General

Weight	kg (lbs)	0.3 (0.66)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure port 2	bar (psi)	210 (3000)
Max. pressure admitted port 1	bar (psi)	22 (319)
Max. flow	l/min.(gpm)	10 (3)
Max. internal leakage	cm <sup>3</sup> /min. (cu.in./min.)	12 (0.7)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 44-56 (33-41)

Recommended degree of fluid contamination Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14

Cavity CA-10A-3N see RE 18325-70

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit code material no. RG10A3010530100 R930000990

Seal kit coil code material no. RG19A1PNBR7010 R934003964

Other technical data See data sheet RE 18350-50

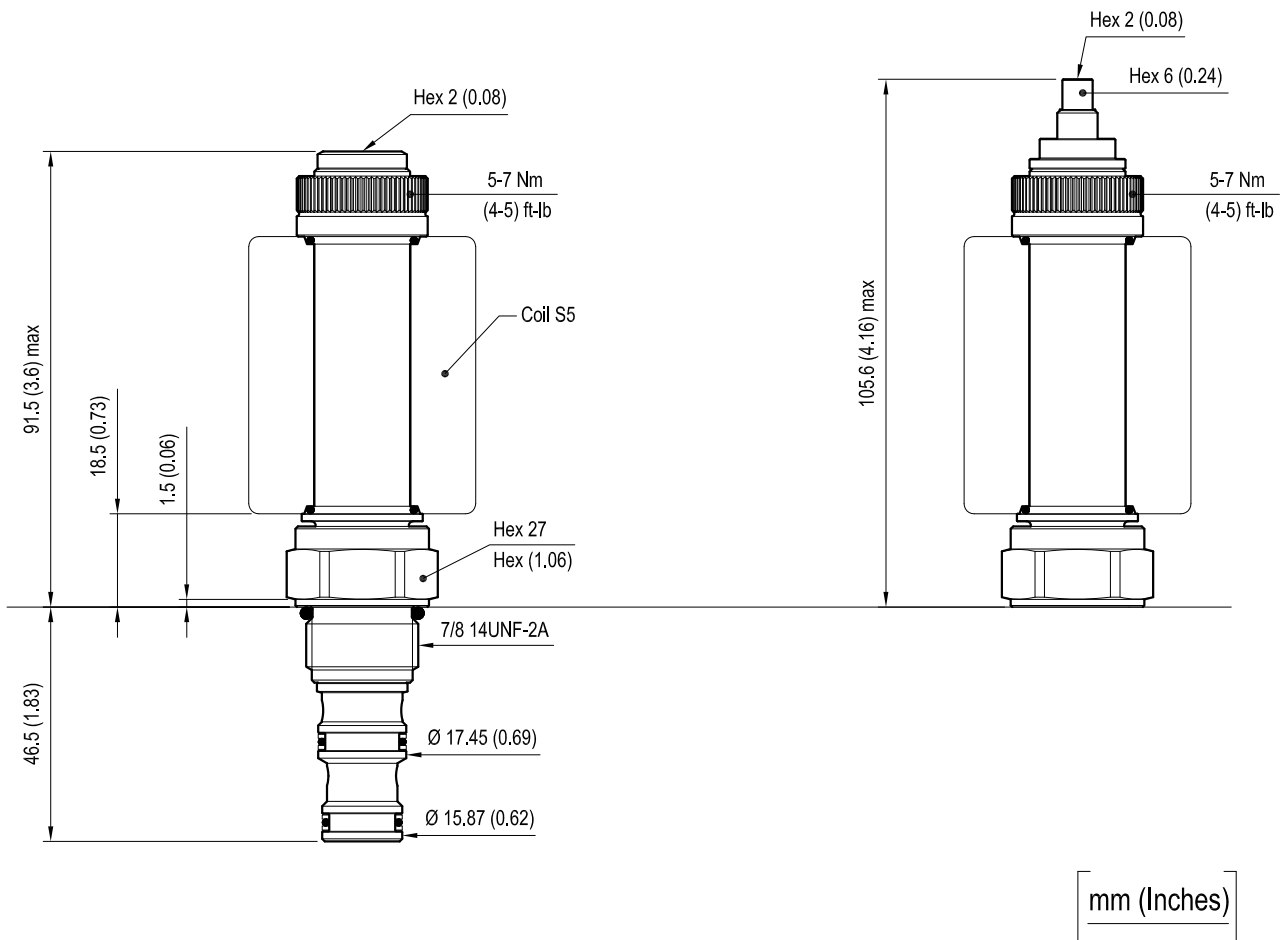
## Electrical

Type of voltage	DC voltage
Coil type	S5
Supply voltage	12 DC
Nominal voltage	± 10%
Power consumption	W 23
Duty cycle	% 100
Type of protection	See data sheet RE 18325-90

Note: Coils must be ordered separately.

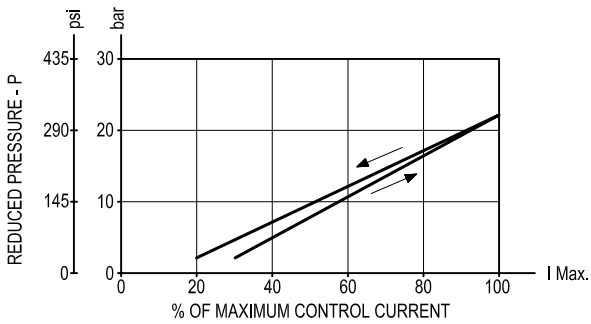
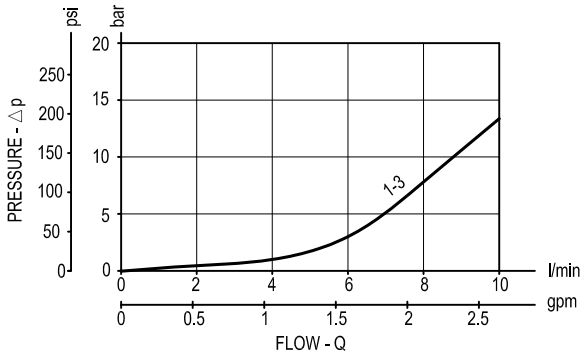
## Dimensions

### Proportional valves direct acting pressure reducing



Allowed back pressure at port 3 (T): 5 bar (73 psi)  
max

## Performance graphs



	I	P bar (psi)	Coils
I min:	0.45 A	2 (29)	12 DC
I max:	2.0 A	22 (319)	12 DC
PMW Frequency: 120-150 Hz			
Hysteresis: < 5%			

Note (1): It is recommended to use coil 12 DC.

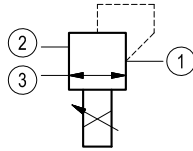
Note (2): It is recommended to bleed air carefully before operation.

Note (3): Performance using coil without diode.

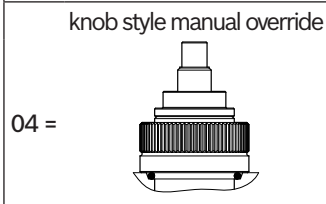
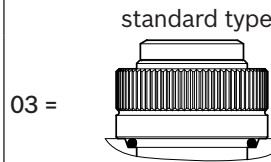
### Ordering code

OD.91 | 01 | 77 | Y | 00

Proportional valves direct acting pressure reducing



Common cavity: CA-10A-3N



Type	Material number
OD910177030000	R934001495
OD910177040000	R934003442

Type	Material number

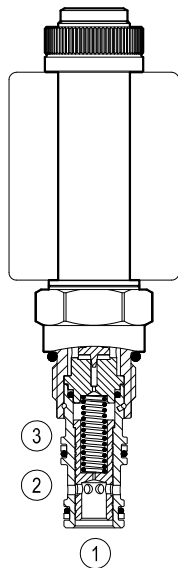


# Proportional valves pilot operated pressure reducing

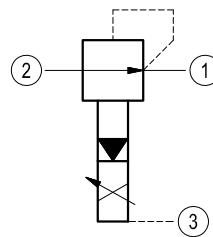
Common cavity, Size 10

VEP-5A-2R-06-P

OD.91.06.77 - Y - 00



Version 06



## General

Weight	kg (lbs)	0.3 (0.66 )
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure port 2	bar (psi)	280 (4000)
Max. operating pressure port 1	bar (psi)	210 (3000)
Flow range	l/min.(gpm)	2-60 (0.5-16)
Max. internal leakage	cm <sup>3</sup> /min. (cu.in./min.)	50 (3)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 44-56 (33-41)

Recommended degree of fluid contamination Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14

Cavity CA-10A-3N see RE 18325-70

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit code RG10A3010520100 material no. R901111369

Seal kit coil code RG19A1PNBR7010 material no. R934003964

Other technical data See data sheet RE 18350-50

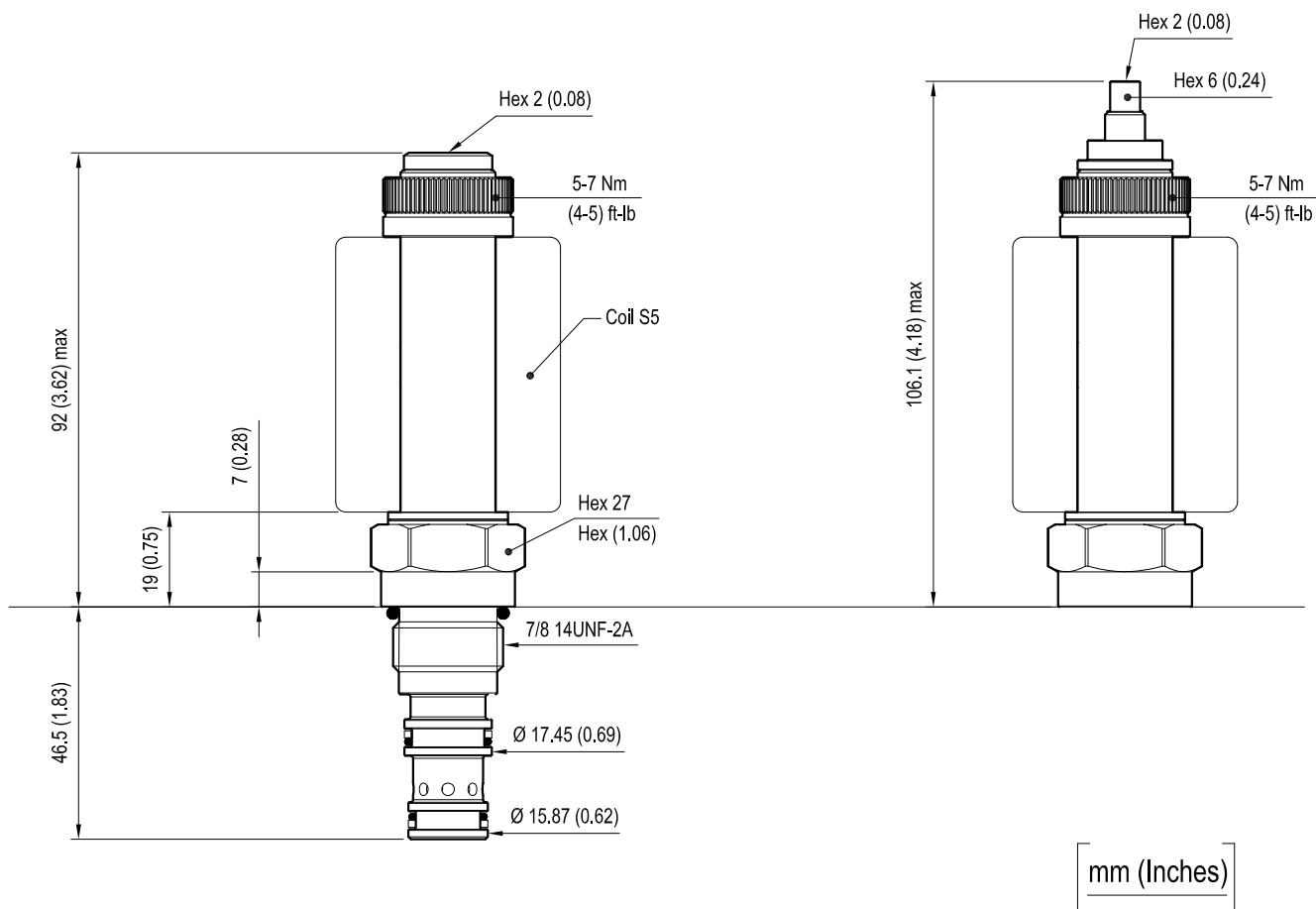
## Electrical

Type of voltage	12 DC voltage
Coil type	S5
Supply voltage	See data sheet RE 18325-90
Nominal voltage	± 10%
Power consumption	W 23
Duty cycle	% 100
Type of protection	See data sheet RE 18325-90

Note: Coils must be ordered separately.

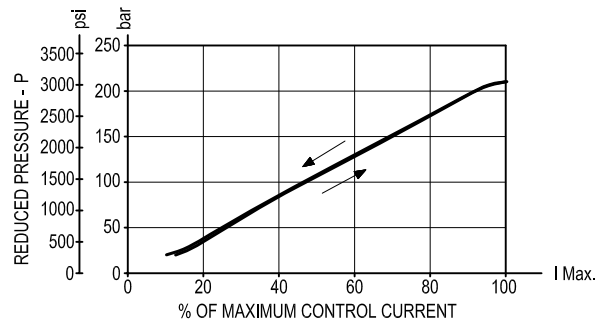
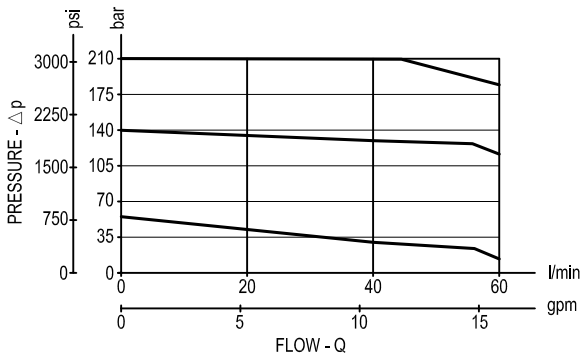
## Dimensions

### Proportional valves pilot operated pressure reducing



Allowed back pressure at port 3 (Y): 5 bar (73 psi)  
max

## Performance graphs



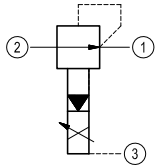
	I	P bar (psi)	Coils
I min:	0.1 A	15 (218)	12 DC
I max:	1.3 A	210 (3045)	12 DC
PMW Frequency: 120-150 Hz			
Hysteresis: < 5%			

- Note (1): It is recommended to use coil 12 DC.
- Note (2): It is recommended to bleed air carefully before operation.
- Note (3): Performance using coil without diode.

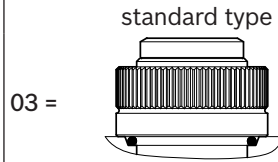
### Ordering code

OD.91	06	77	Y	00
-------	----	----	---	----

Proportional valves pilot operated pressure reducing



Common cavity: CA-10A-3N



Type	Material number
OD910677030000	R901118933
OD910677040000	R901126868

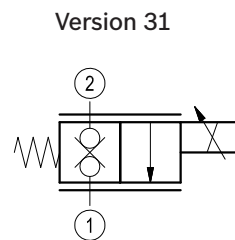
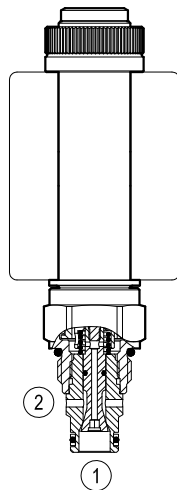
Type	Material number

# Proportional valves 2-way double lock normally closed

Common cavity, Size 08

VEP-5A-2T-06-NC

OD.95.31.18 - Y - 00



## General

Weight - Valve	kg (lbs)	0.25 (0.55)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	210 (3000)
Flow range	l/min.(gpm)	2-20 (0.5-5)
Max. internal leakage	cm <sup>3</sup> /min. (cu.in./min.)	1 (0.1)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

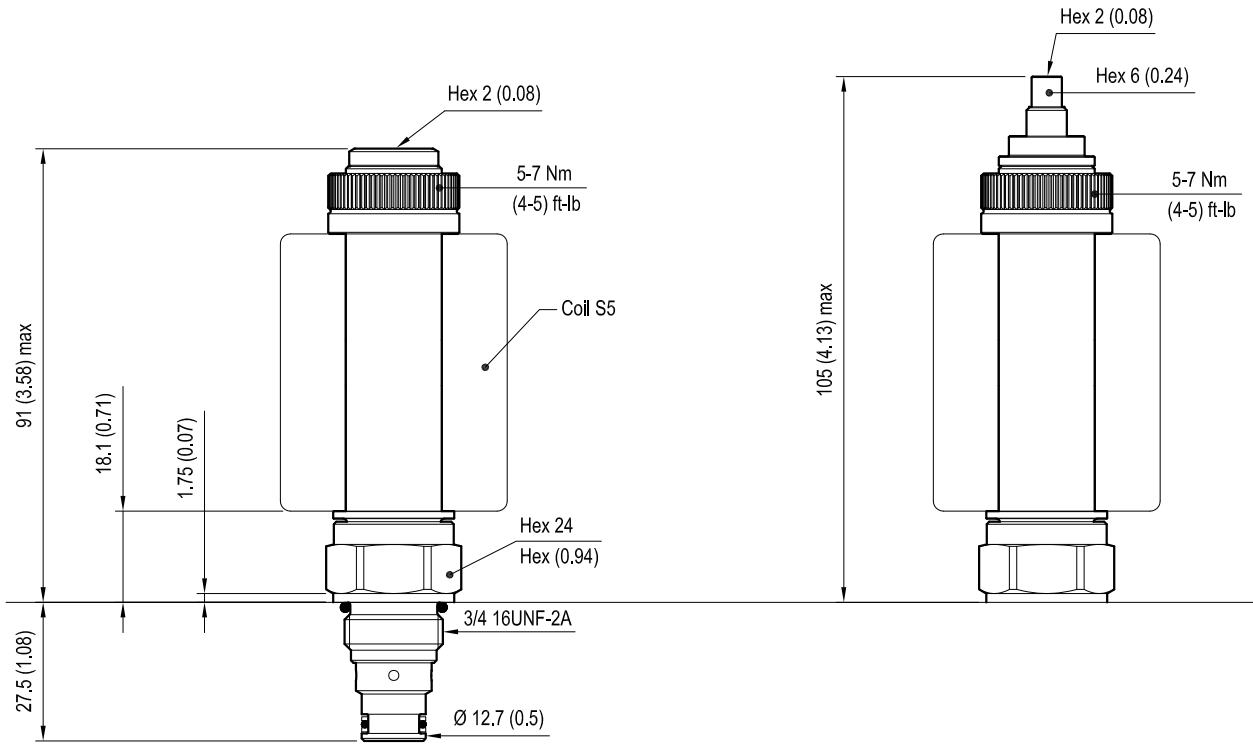
Fluids	Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	Nm (ft-lbs)	39-51 (29-38)
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14	
Cavity	CA-08A-2N see RE 18325-70	
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory	
Seal kit	code material no.	RG08A2010530100 R901101544
Seal kit coil	code material no.	RG19A1PNBR7010 R934003964
Other technical data	See data sheet RE 18350-50	

## Electrical

Type of voltage	DC voltage
Coil type	S5
Supply voltage	12 DC
Nominal voltage	± 10%
Power consumption	W 23
Duty cycle	% 100
Type of protection	See data sheet RE 18325-90

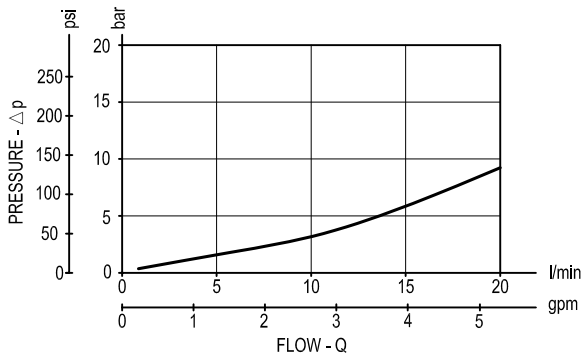
## Dimensions

### Proportional valves 2-way double lock normally closed



mm (Inches)

## Performance graphs



Flow regulation			
Pressure bar (psi)	Flow Q l/min (gpm)	I Min. A (±10%)	I Max. A (±10%)
15 (218)	19 (5)	0.8	1.4
100 (1450)	20 (5.3)	0.9	1.6
200 (2900)	20 (5.3)	0.95	2.1

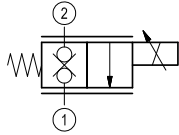
Note (1): it is recommended to use coil 12 DC.  
 Note (2): Performance using coil without diode.

PMW Frequency: 120-150 Hz
Hysteresis: < 5%

### Ordering code

OD.95	31	18	Y	00
-------	----	----	---	----

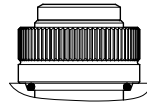
Proportional valves 2-way  
double lock normally  
closed



Common cavity: CA-08A-2N

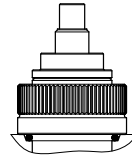
standard type

03 =



knob style manual override

04 =



Type	Material number
OD953118030000	R901113761
OD953118040000	R901126864

Type	Material number

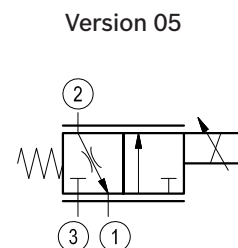
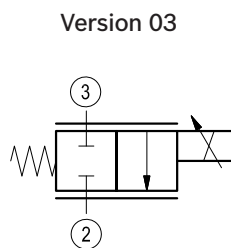
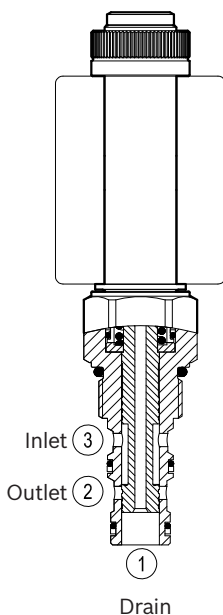


# Proportional valves not compensated flow regulator

Common cavity, Size 10

VEP-5A-2Q-09

OD.92 - X - 77 - Y - Z



Version 03: port 1 not used.

## General

Weight	kg (lbs)	0.32 (0.71)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	210 (3000)
Flow range	l/min.(gpm)	see flow diagram
Max. internal leakage (*)	cm <sup>3</sup> /min. (cu.in./min.)	100 (6)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 44-56 (33-41)

Recommended degree of fluid contamination Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14

Cavity CA-10A-3N see RE 18325-70

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit code RG10A3010520100 material no. R901111369

Seal kit coil code RG19A1PNBR7010 material no. R934003964

Other technical data See data sheet RE 18350-50

(\*) Measure at 210 bar (3000 psi). Oil at 46 cSt.

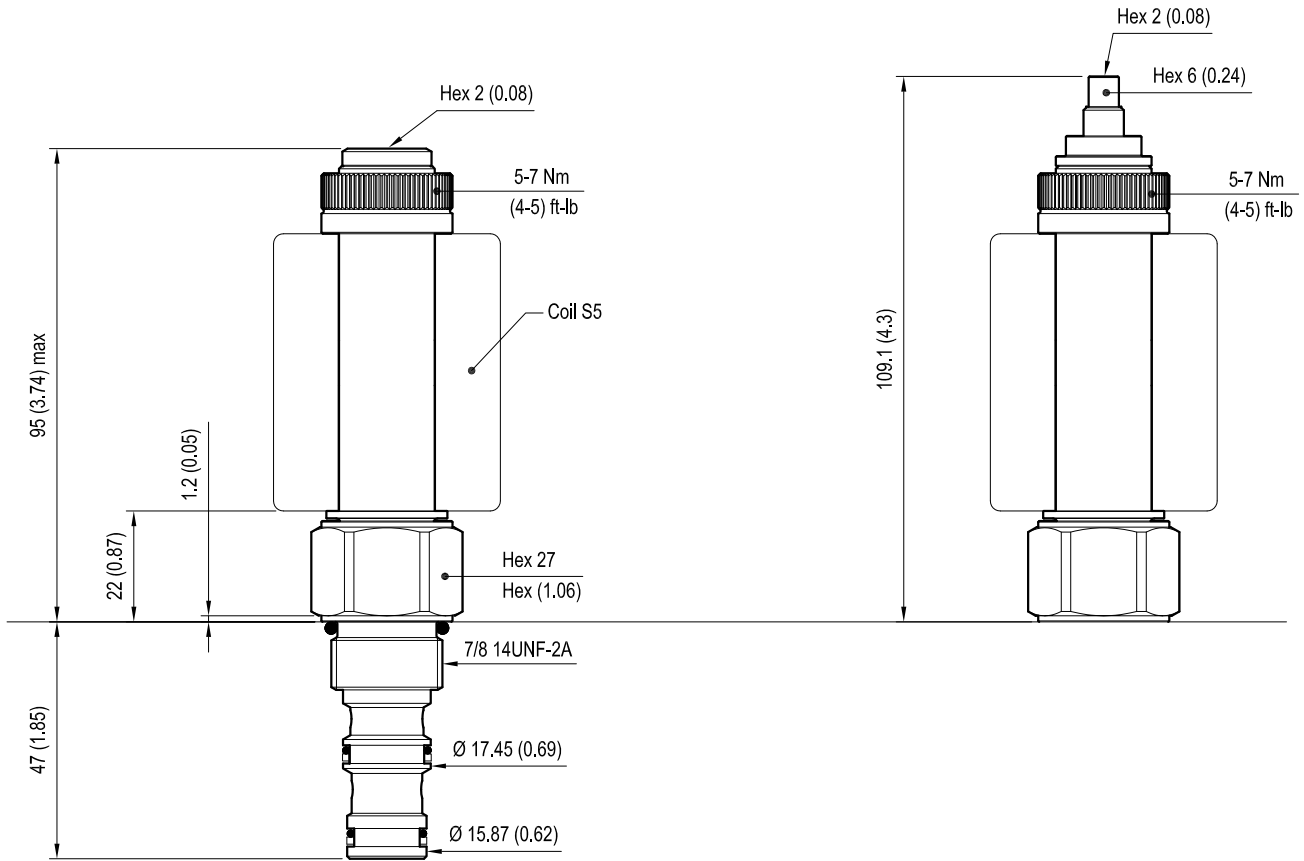
## Electrical

Type of voltage	DC voltage
Coil type	S5
Supply voltage	12 DC
Nominal voltage	± 10%
Power consumption	W 23
Duty cycle	% 100
Type of protection	See data sheet RE 18325-90

Note: Coils must be ordered separately.

## Dimensions

### Proportional valves not compensated flow regulator

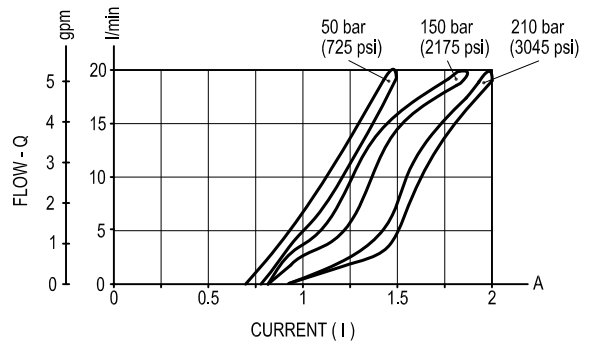
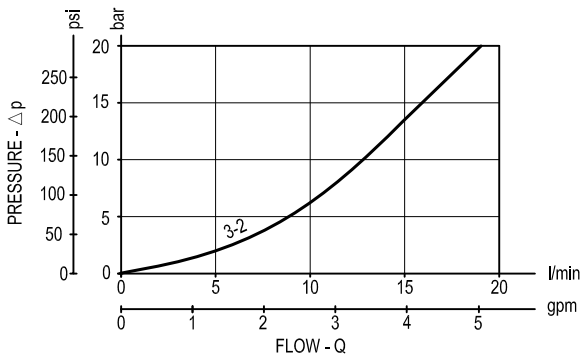


Version 03  
PORT NOT USED

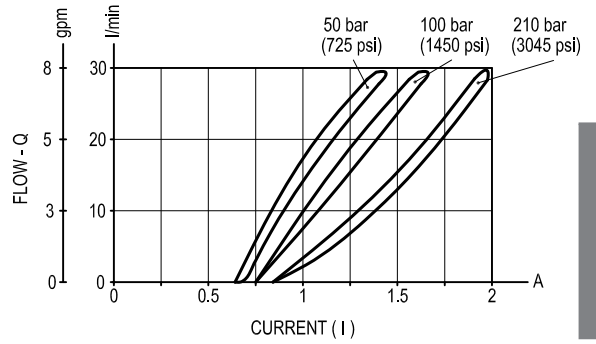
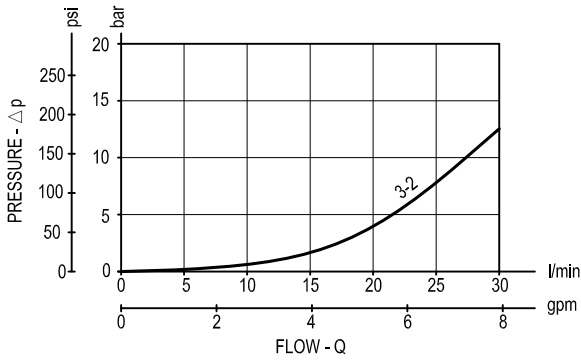
[ mm (Inches) ]

## Performance graphs

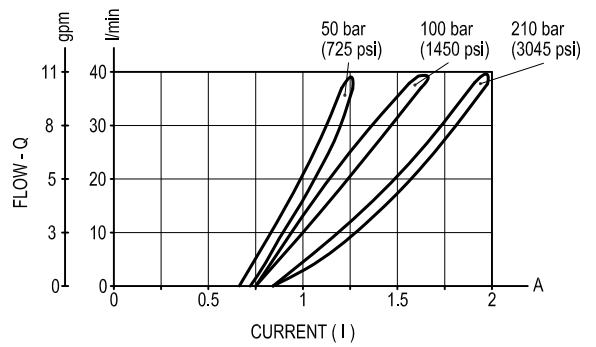
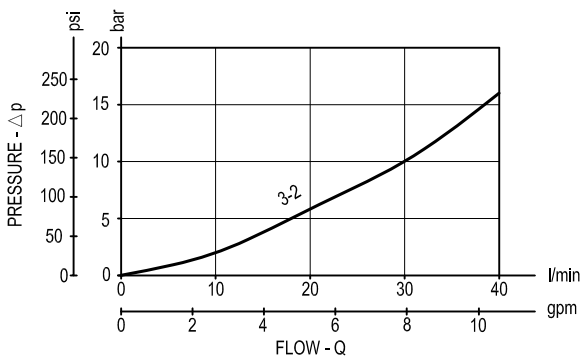
Z= 01



Z= 02



Z= 03



PMW Frequency: 120-150 Hz
Hysteresis: < 5%

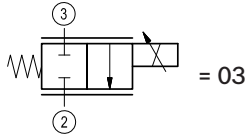
Note (1): It is recommended to use coil 12 DC.

Note (2): Performance using coil without diode.

### Ordering code

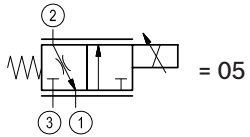
	<b>OD.92</b>	<b>X</b>	<b>77</b>	<b>Y</b>	<b>Z</b>
--	--------------	----------	-----------	----------	----------

Proportional valves not compensated flow regulator



= 03

---

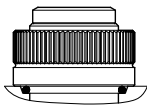


= 05

Operating range			
	Rated flow max l/min (gpm)	I Min. A (±10%)	I Max. A (±10%)
= 01	20 (6)	0.9	2
= 02	30 (8)	0.8	2
= 03	40 (11)	0.8	2

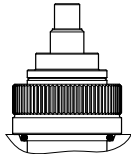
Performance using coil without diode.

standard type

03 = 

---

knob style manual override

04 = 

Common cavity: CA-10A-3N

Type	Material number
OD920377030100	R934001518
OD920377030200	R934001519
OD920377030300	R934001520
OD920377040100	R934001521
OD920377040200	R934003909
OD920377040300	R934001522
OD920577030100	R934001524
OD920577030200	R934003130
OD920577030300	R934001525
OD920577040100	R934001526

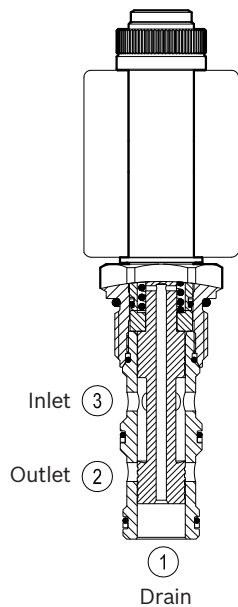
Type	Material number
OD920577040200	R901176252
OD920577040300	R934001528

# Proportional valves not compensated flow regulator

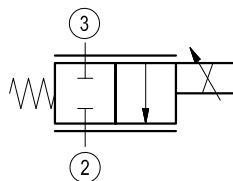
Common cavity, Size 12

VEP-5A-2Q-14

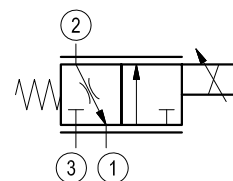
OD.92 - X - 12 - Y - 00



Version 03



Version 05



Version 03: port 1 not used.

## General

Weight	kg (lbs)	0.39 (0.86)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	210 (3000)
Flow range	l/min.(gpm)	5-60 (1-16)
Max. internal leakage (*)	cm <sup>3</sup> /min. (cu.in./min.)	190 (12)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 54-66 (40-49)

Recommended degree of fluid contamination Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14

Cavity CA-12A-3N see RE 18325-70

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit code RG12A3010520100 material no. R930000941

Seal kit coil code RG19A1PNBR7010 material no. R934003964

Other technical data See data sheet RE 18350-50

(\*) Measured at 210 bar (3000 psi). Oil at 46 cSt.

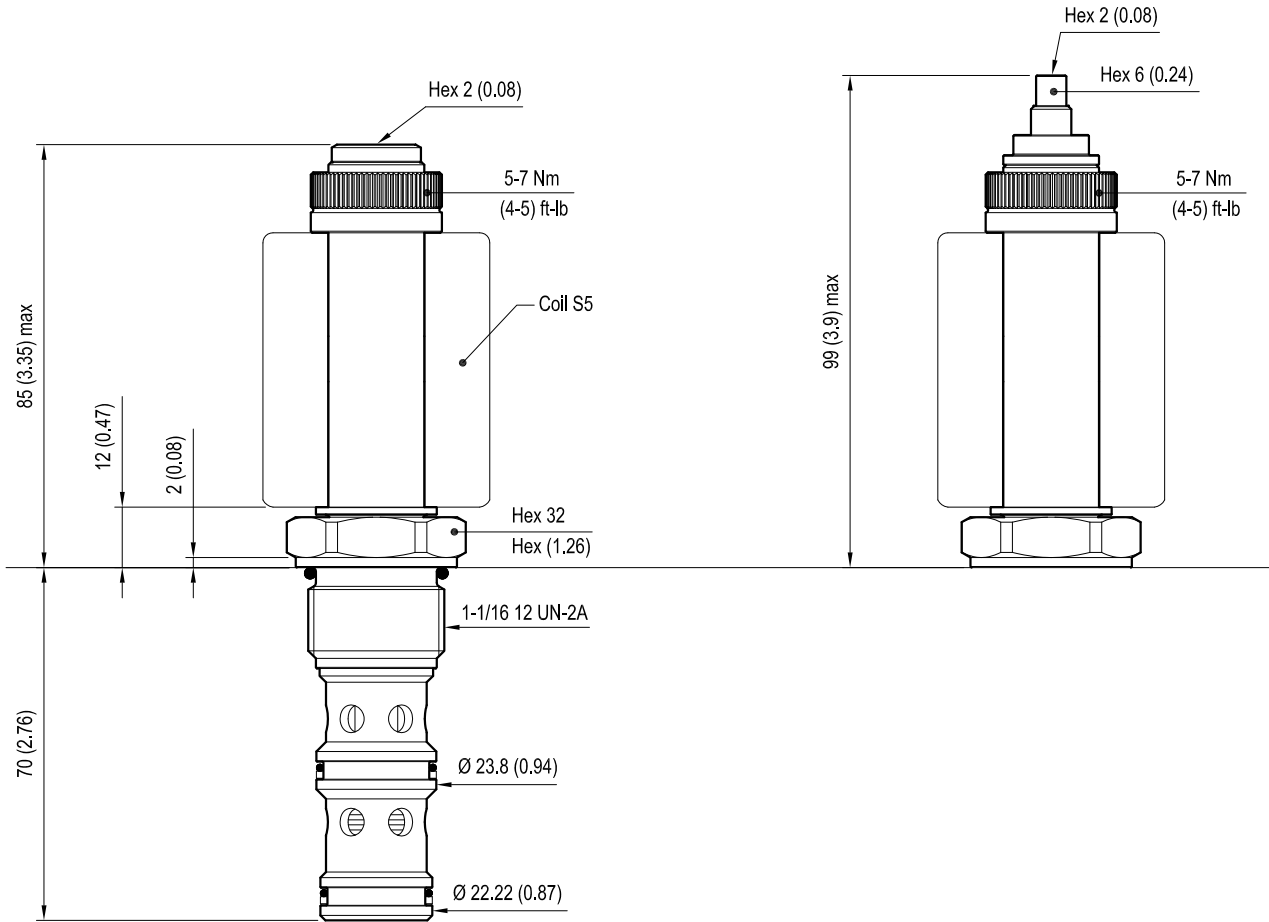
## Electrical

Type of voltage	DC voltage
Coil type	S5
Supply voltage	12 DC
Nominal voltage	± 10%
Power consumption	W 23
Duty cycle	% 100
Type of protection	See data sheet RE 18325-90

Note: Coils must be ordered separately.

## Dimensions

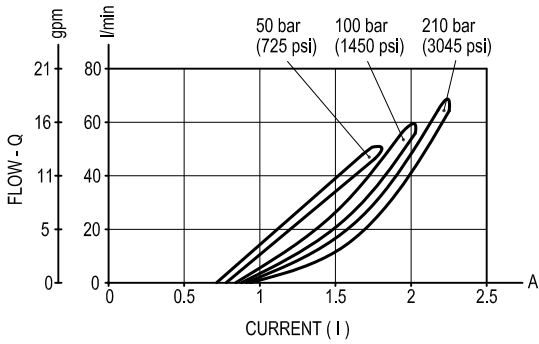
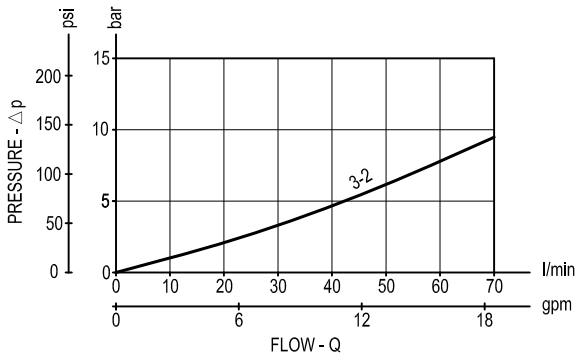
### Proportional valves not compensated flow regulator



Version 03  
PORT NOT USED

mm (Inches)

## Performance graphs



		I	P bar (psi)	Coils
Z=00	I min:	0.75 A	210 (3000)	12 DC
	I max:	2.1 A	210 (3000)	12 DC
PMW Frequency: 150-180 Hz				
Hysteresis: < 5%				

Note (1): It is recommended to use coil 12 DC.  
 Note (2): Performance using coil without diode.

### Ordering code

OD.92	X	12	Y	00
-------	---	----	---	----

Proportional valves  
not compensated flow  
regulator

= 03

= 05

Common cavity: CA-12A-3N

standard type

03 =

knob style manual override

04 =

Type	Material number	Type	Material number
OD920312030000	R934001514		
OD920312040000	R934001515		
OD920512030000	R934001523		
OD920512040000	R934003910		

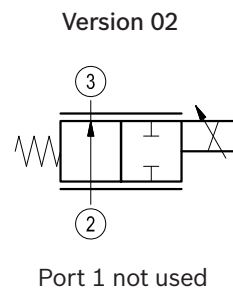
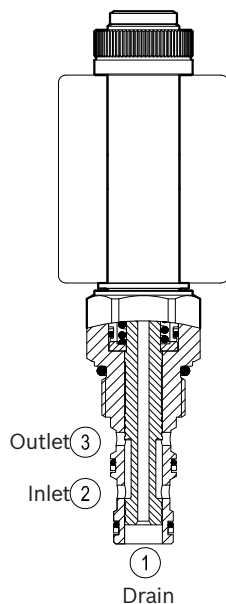


# Proportional valves not compensated flow regulator

Common cavity, Size 10

VEP-5A-2Q-09

OD.92.02.77 - Y - Z



## General

Weight	kg (lbs)	0.32 (0.71)
Installation orientation		Optional
Ambient temperature range	°C (°F)	-30 to 60 (-22 to 140)

## Hydraulic

Max. operating pressure	bar (psi)	210 (3000)
Flow range	l/min.(gpm)	See flow diagram
Max. internal leakage (*)	cm <sup>3</sup> /min. (cu.in./min.)	100 (6)
Fluid temperature range	°C (°F)	-20 to 80 (-4 to 176)

Fluids Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm<sup>2</sup>/s (cSt)

Installation torque Nm (ft-lbs) 44-56 (33-41)

Recommended degree of fluid contamination Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14

Cavity CA-10A-3N see RE 18325-70

Lines bodies and standard assemblies Please refer to section "Hydraulic integrated circuit" or consult factory

Seal kit code material no. RG10A3010520100 R901111369

Seal kit coil code material no. RG19A1PNBR7010 R934003964

Other technical data See data sheet RE 18350-50

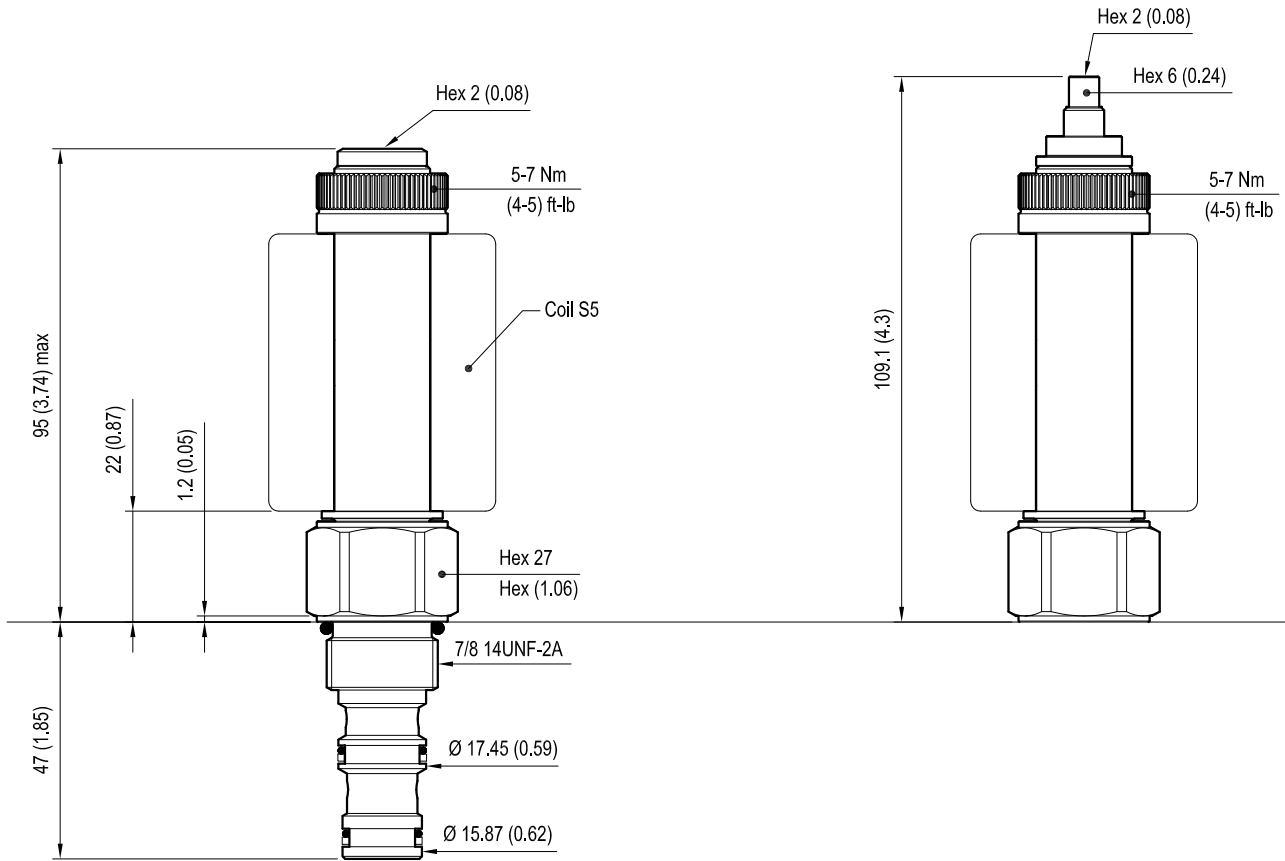
(\*) Measured at 210 bar (3000 psi). Oil at 46 cSt.

## Electrical

Type of voltage	DC voltage
Coil type	S5
Supply voltage	12 DC
Nominal voltage	± 10%
Power consumption	W 23
Duty cycle	% 100
Type of protection	See data sheet RE 18325-90

## Dimensions

### Proportional valves not compensated flow regulator

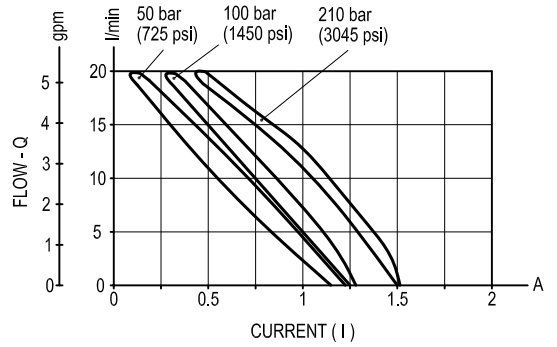
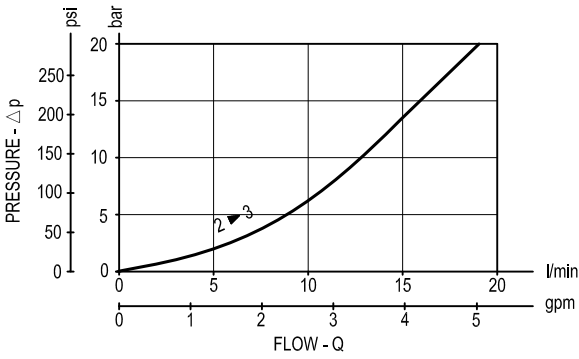


PORT NOT USED

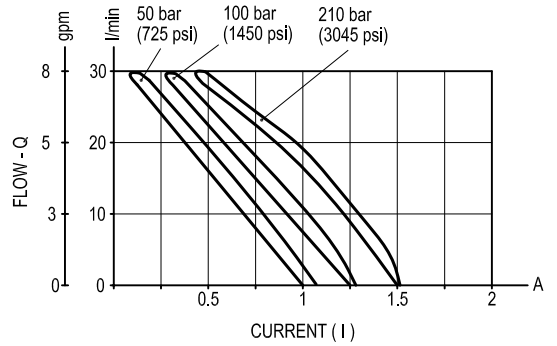
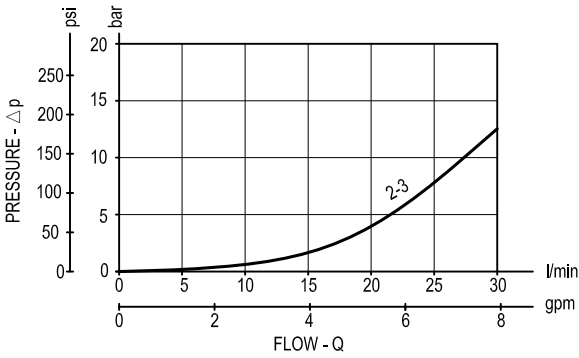
mm (Inches)

### Performance graphs

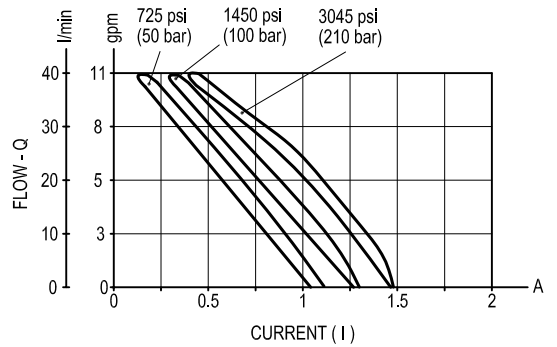
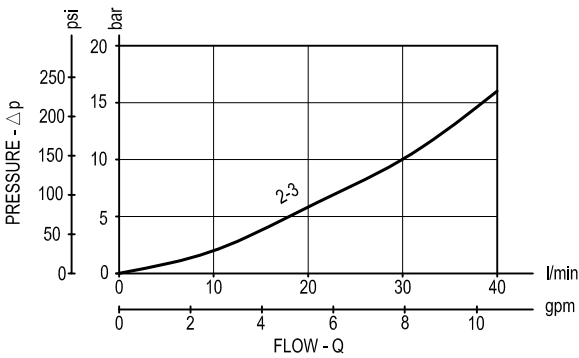
Z= 01



Z= 02



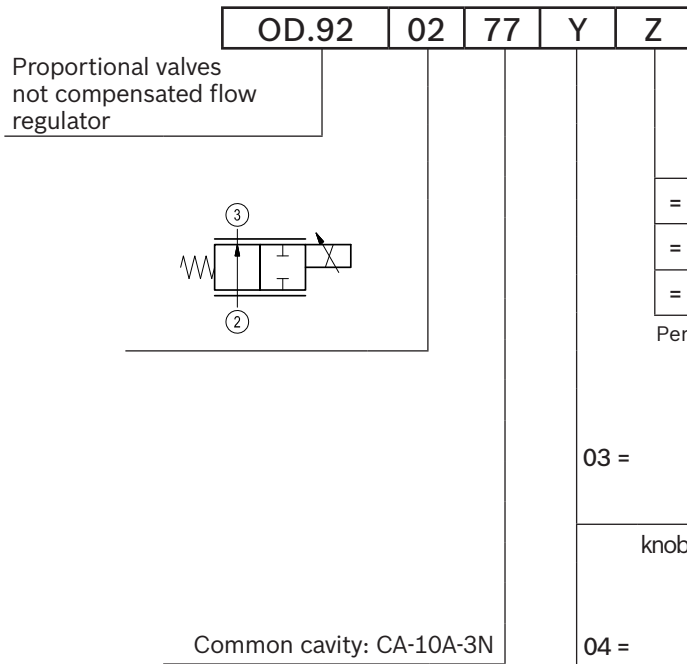
Z= 03



PMW Frequency: 120-150 Hz
Hysteresis: < 5%

Note (1): It is recommended to use coil 12 DC.  
 Note (2): Performance using coil without diode.

### Ordering code

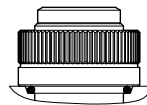


	Operating range		
	Rated flow max l/min (gpm)	I Min. A (±15%)	I Max. A (±15%)
= 01	20 (6)	0.4	1.4
= 02	30 (8)	0.4	1.4
= 03	40 (11)	0.3	1.4

Performance using coil without diode.

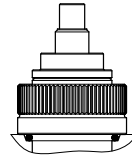
standard type

03 =



knob style manual override

04 =



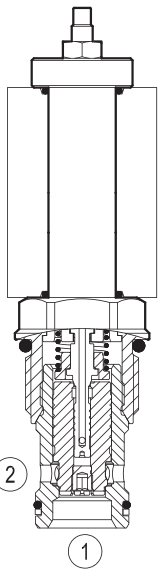
Type	Material number
OD920277030100	R934001510
OD920277030200	R934001511
OD920277030300	R934003129
OD920277040100	R934003908
OD920277040200	R934001512
OD920277040300	R934001513

Type	Material number

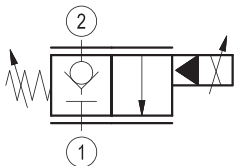
Proportional valves poppet type  
not compensated flow regulator  
Common cavity, Size 12

VEPN-12A

OD.95.06.89.72.00



▼ Version 06



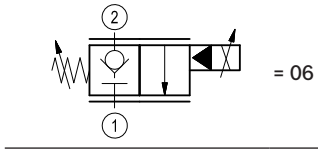
**Technical data**

<b>General</b>	
Weight	0.29 kg (0.64 lbs)
Installation orientation	Optional
Ambient temperature range	-30 to 90 °C (-22 to 194 °F)
<b>Hydraulic</b>	
Max. operating pressure	210 bar (3000 psi)
Flow range	5 - 60 l/min. (1 - 16 gpm)
Max. internal leakage	10 cm <sup>3</sup> /min. (0.6 cu.in./min.)
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)	
Installation torque	51 - 55 Nm (38 - 41 ft-lbs)
Recommended degree of fluid contamination	Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
Cavity	CA-12A-2N see 18325-70
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no. RG12A2010520100 R901111377
Seal kit coil	code material no. RG16A1PMVQ0010 R934003962
Other technical data	See data sheet 18350-50
<b>Electrical</b>	
Type of voltage	12 DC voltage
Coil type	R7
Supply voltage	12 DC
Nominal voltage	± 10%
Power consumption	18 W
Duty cycle coil	100
Type of protection	See data sheet 18325-90
Note: Coils must be ordered separately	

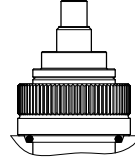
**Ordering code**

<b>OD.95</b>	<b>06</b>	<b>89</b>	<b>72</b>	<b>00</b>	<b>00</b>
--------------	-----------	-----------	-----------	-----------	-----------

Proportional valves poppet type  
not compensated flow regulator



72 = Manual setting off set



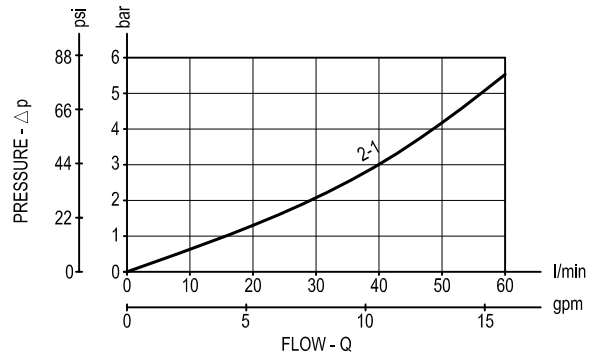
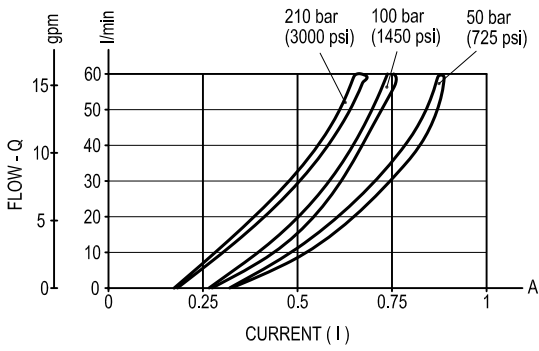
Common cavity: CA-12A-2N

**Preferred types**

Type	Material number
OD950689720000	R934001162

Type	Material number

**Characteristic curves**



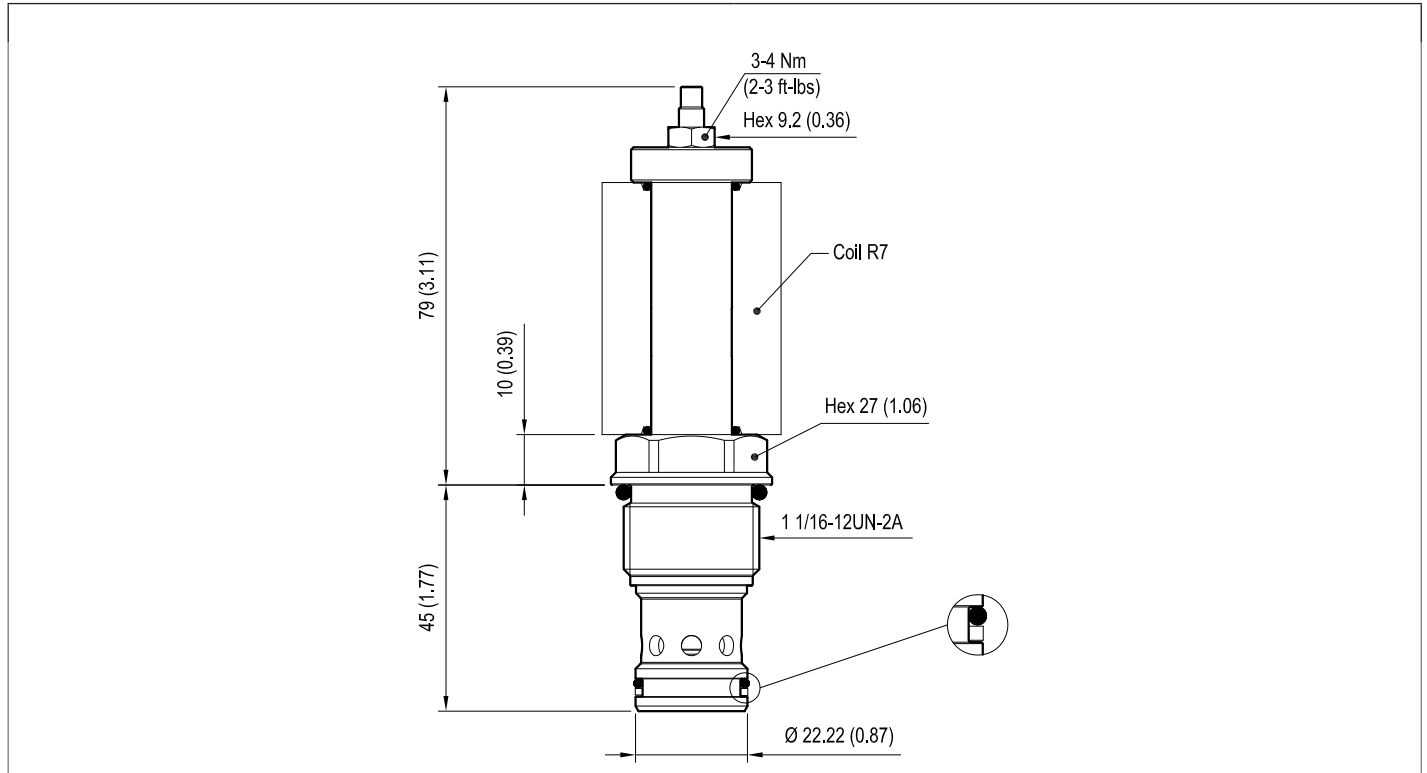
	I	P bar (psi)	Coils
I min:	0.2	210 (3000)	12 DC
I max:	0.65	210 (3000)	12 DC
PMW Frequency: 120-150 Hz			
Hysteresis: < 5%			

Note (1): It is recommended to use coil 12 DC.

Note (2): Performance using coil without diode.

**Dimensions**

▼ **Proportional valves poppet type not compensated flow regulator**

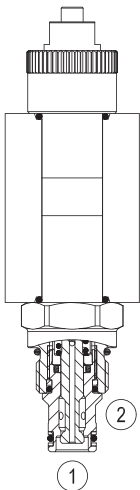
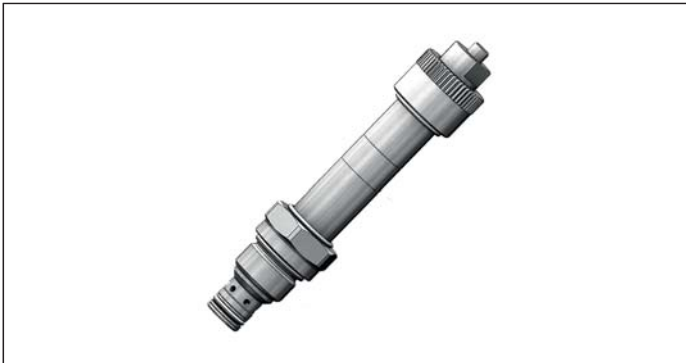




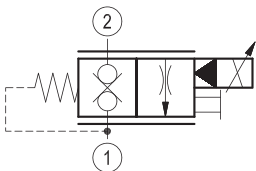
Proportional valves 2-way double lock  
normally closed  
Common cavity, Size 08

VEPN-08A-16

OD.95.31.18.54 - Y - 00



▼ **Version 31**



**Technical data**

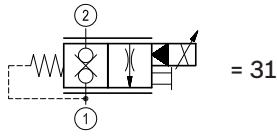
General		
Weight		0.20 kg (0.45 lbs)
Installation orientation		Optional
Ambient temperature range		-30 to 60 °C (-22 to 140 °F)
Hydraulic		
Max. operating pressure		250 bar (3600 psi)
Flow range		5 - 20 l/min. (1.3 - 5 gpm)
Fatigue cycle life		1 million cycles at 250 bar
Max. internal leakage		1 cm <sup>3</sup> /min. (0.1 cu.in./min.)
Fluid temperature range		-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)		
Installation torque		34 -41 Nm (25 - 30 ft-lbs)
Recommended degree of fluid contamination		Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
Cavity		CA-08A-2N see 18325-70
Lines bodies and standard assemblies		Please refer to section "Hydraulic integrated circuit" or consult factory
Seal kit	code material no.	RG08A2010530100 R901101544
Seal kit coil	code material no.	RG16A1PMVQ0010 R934003962
Other technical data		See data sheet 18350-50
Electrical		
Type of voltage		DC voltage
Coil type		R7
Supply voltage		12 - 24 DC
Nominal voltage		± 10%
Power consumption		28 W
Duty cycle coil		100
Type of protection		See data sheet 18325-90
Note: Coils must be ordered separately		

**Ordering code**

<b>OD.95</b>	<b>31</b>	<b>18</b>	<b>54</b>	<b>*</b>	<b>00</b>
--------------	-----------	-----------	-----------	----------	-----------

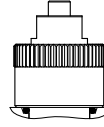
Proportional valves 2-way  
double lock normally closed

monodirectional type

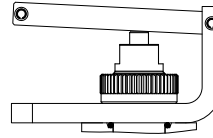


Common cavity: CA-08A-2N

91 = Standard type



90 = Lever option for flexible cable



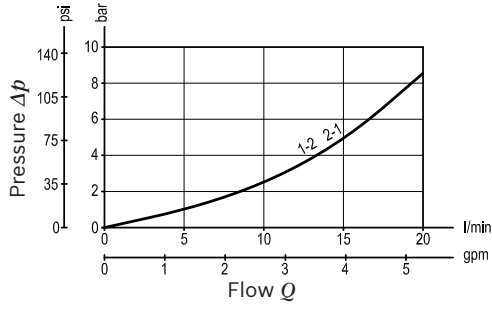
**Preferred types**

Type	Material number
OD953118549000	R930053666
OD953118549100	R930053667

Type	Material number

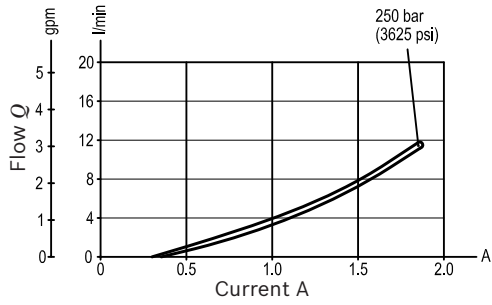
**Characteristic curves**

**Wide open pressure drop**



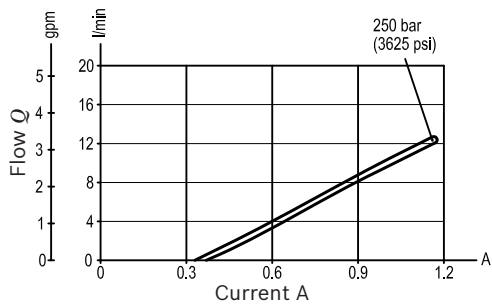
**Flow vs. Current at various differential pressures**

R7 12V  
I max. 1.9A



P bar (psi)	I (A) min.
50 (725)	0.9 ± 0.1
150 (2175)	0.7 ± 0.1
250 (3625)	0.5 ± 0.1

R7 24V  
I max. 0.950A



P bar (psi)	I (A) min.
50 (725)	0.55 ± 0.05
150 (2175)	0.45 ± 0.05
250 (3625)	0.35 ± 0.05

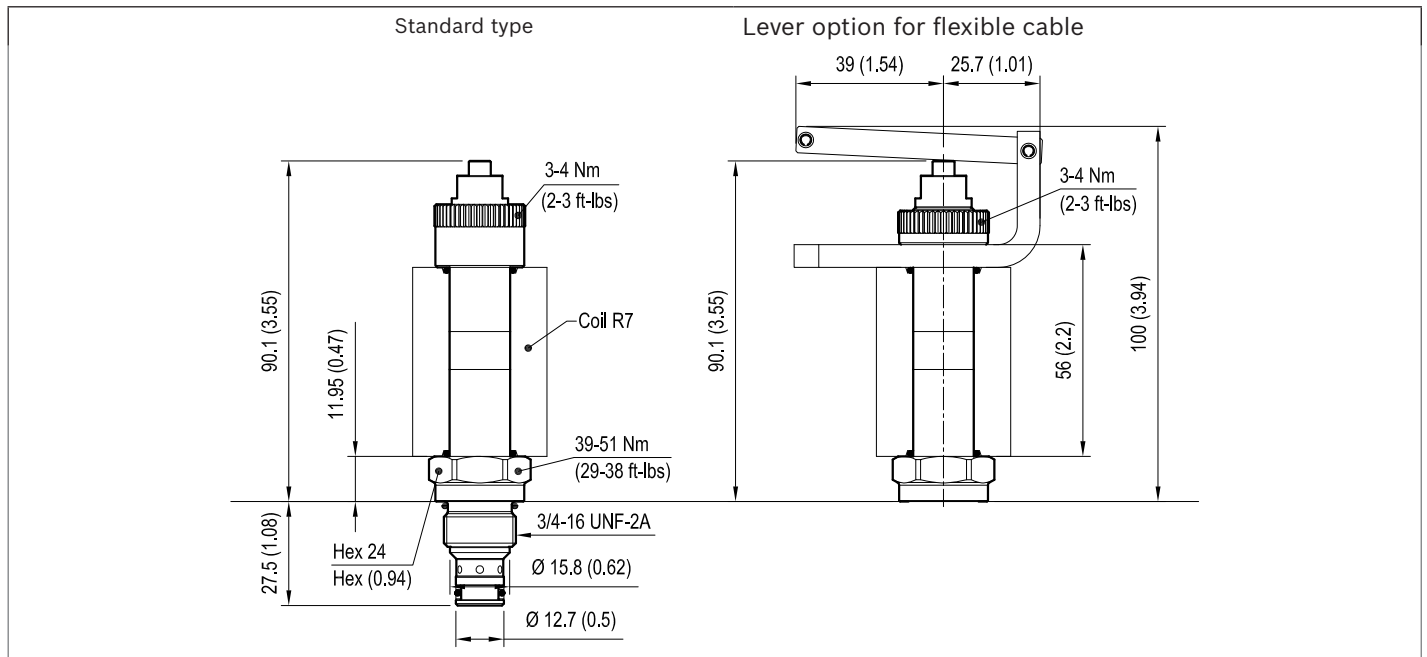
PMW Frequency: 120-150 Hz  
Hysteresis: < 10%

Note: Performance using coil without diode.

4

**Dimensions**

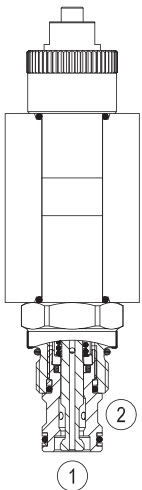
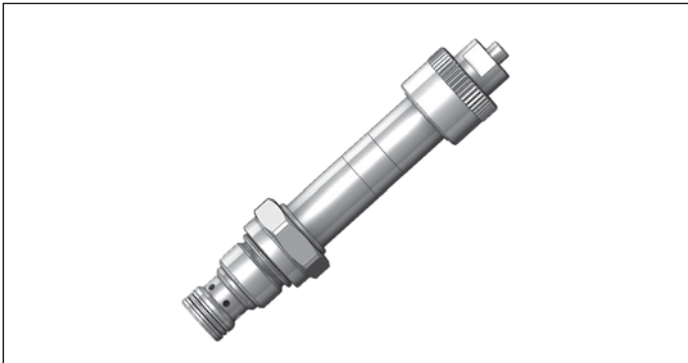
▼ **Proportional valves 2-way double lock**



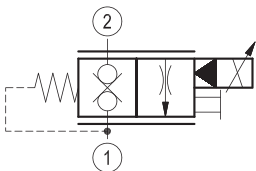
Proportional valves 2-way double lock  
normally closed  
Special cavity, 019-E

VEPN-19E-16

OD.95.31.19.54 - Y - 00



▼ **Version 31**



**Technical data**

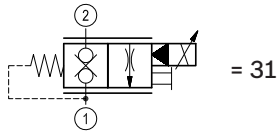
General		
Weight		0.20 kg (0.45 lbs)
Installation orientation		Optional
Ambient temperature range		-30 to 60 °C (-22 to 140 °F)
Hydraulic		
Max. operating pressure		250 bar (3600 psi)
Flow range		5 - 20 l/min. (1.3 - 5 gpm)
Fatigue cycle life		1 million cycles at 250 bar
Max. internal leakage		1 cm <sup>3</sup> /min. (0.1 cu.in./min.)
Fluid temperature range		-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)		
Installation torque		34 -41 Nm (25 - 30 ft-lbs)
Recommended degree of fluid contamination		Nominal value max. 10 µm (NAS 8) ISO 4406 19/17/14
Cavity		019-E see 18325-75
Lines bodies and standard assemblies	Please refer to section "Hydraulic integrated circuit" or consult factory	
Seal kit	code	RG19E201053010
	material no.	R934003561
Seal kit coil	code	RG16A1PMVQ0010
	material no.	R934003962
Other technical data	See data sheet 18350-50	
Electrical		
Type of voltage		DC voltage
Coil type		R7
Supply voltage		12 - 24 DC
Nominal voltage		± 10%
Power consumption		28 W
Duty cycle coil		100
Type of protection		See data sheet 18325-90
Note: Coils must be ordered separately		

**Ordering code**

<b>OD.95</b>	<b>31</b>	<b>19</b>	<b>54</b>	<b>*</b>	<b>00</b>
--------------	-----------	-----------	-----------	----------	-----------

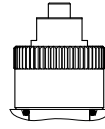
Proportional valves 2-way  
double lock normally closed

monodirectional type

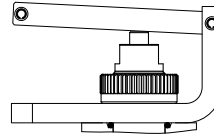


Special cavity: 019-E

91 = Standard type



90 = Lever option for flexible cable



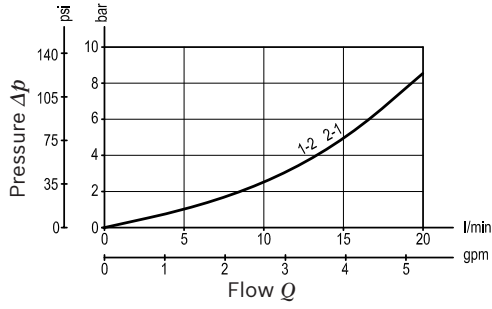
**Preferred types**

Type	Material number
OD953119549000	R930053668
OD953119549100	R930053669

Type	Material number

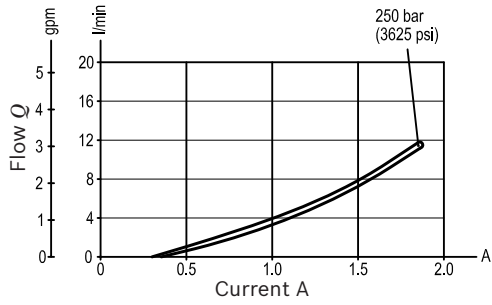
**Characteristic curves**

**Wide open pressure drop**



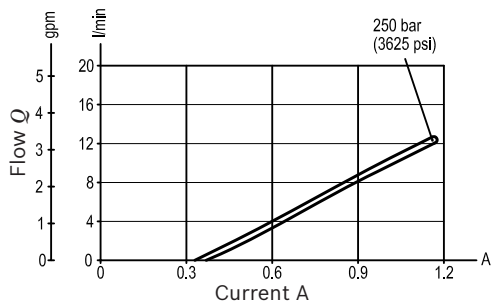
**Flow vs. Current at various differential pressures**

R7 12V  
I max. 1.9A



P bar (psi)	I (A) min.
50 (725)	0.9 ± 0.1
150 (2175)	0.7 ± 0.1
250 (3625)	0.5 ± 0.1

R7 24V  
I max. 0.950A



P bar (psi)	I (A) min.
50 (725)	0.55 ± 0.05
150 (2175)	0.45 ± 0.05
250 (3625)	0.35 ± 0.05

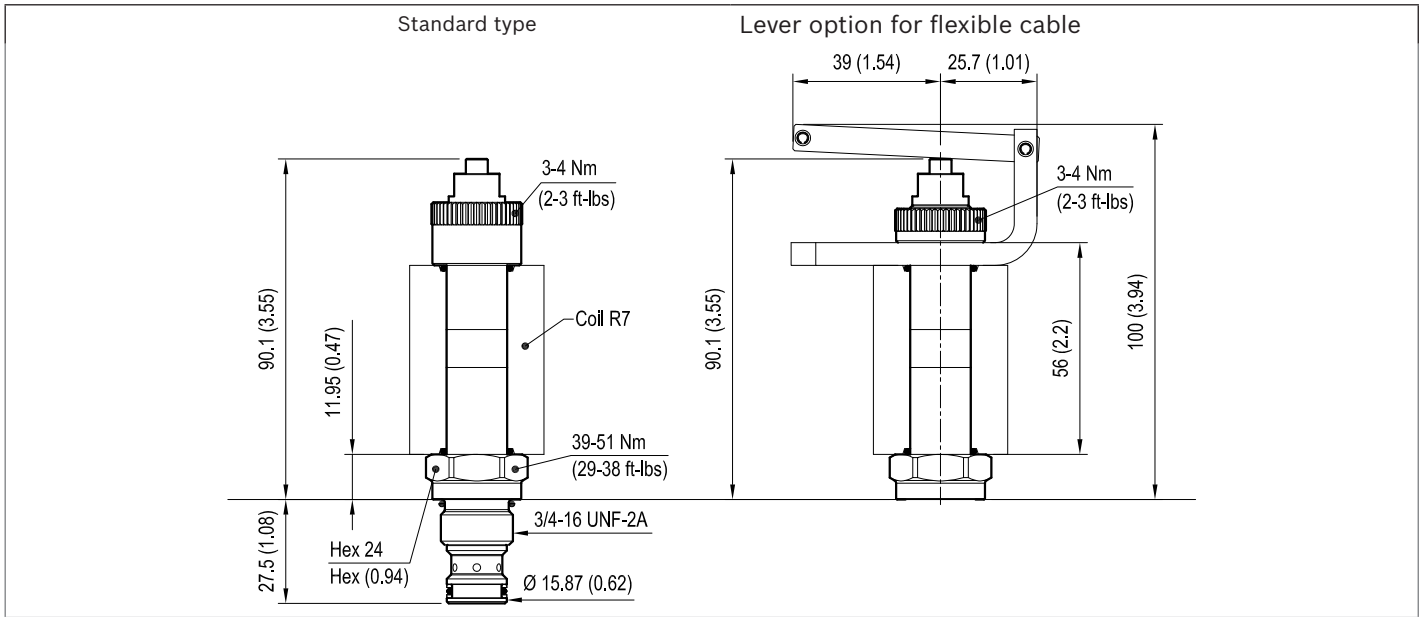
PMW Frequency: 120-150 Hz  
Hysteresis: < 10%

Note: Performance using coil without diode.

4

**Dimensions**

▼ **Proportional valves 2-way double lock**

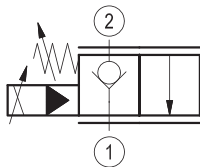
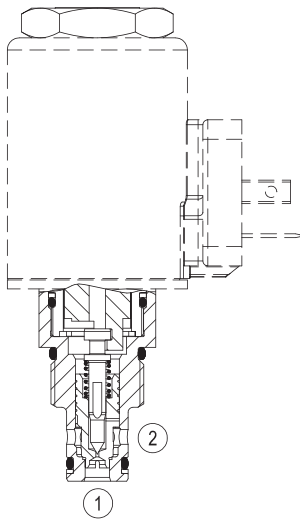
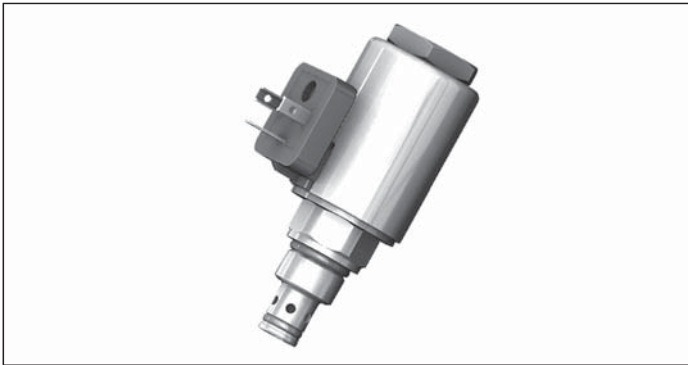




Proportional valves pilot operated poppet type,  
2-way flow regulator not compensated  
Common cavity, Size 08

KSVS.0

KSVSR0AA / F - Y - V



**Technical data**

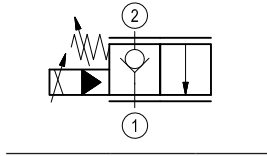
<b>General</b>	
Weight	0.25 kg (0.55 lbs)
Installation position	Any
Ambient temperature range	-20 to 120 °C (-4 to 248 °F)
Salt spray test to DIN 50021	720 h
<b>Hydraulic</b>	
Max. operating pressure port 1, 2	350 bar (5075 psi)
Maximum $\Delta p$	250 bar (3625 psi)
Nominal flow	40 l/min. at 35 bar $\Delta p$ (10 gpm at 508 psi $\Delta p$ )
Max. internal leakage	10 drops/min. (at $\Delta p=150$ bar; HLP46, $T_{oil} = 40^\circ C$ )
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)	
Recommended degree of fluid contamination	Nominal value max. 10 $\mu$ m (NAS 8) ISO 4406 19/17/14
Cavity	CA-08A-2N see 18325-70
Seal kit	material no. R961011028
Load cycles	2 Mio.
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	GP37 see 18325-90

Note: coils must be ordered separately.

**Ordering code**

<b>KSVSR0</b>	<b>A</b>	<b>A/</b>	<b>F</b>	<b>Y</b>	<b>V</b>
---------------	----------	-----------	----------	----------	----------

Proportional valves pilot operated poppet type  
2-way flow regulator not compensated



Common cavity; CA-08A-2N

without manual override **N0**  
with manual override **N11**

Seal material: FKM seals

Further types available by request

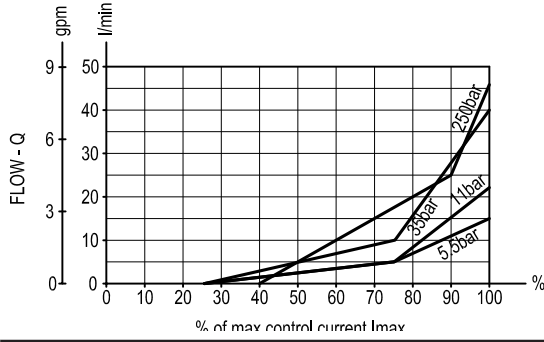
**Preferred types**

Type	Material number
KSVSR0AA/FN0V	R901394654
KSVSR0AA/FN11V	R901394653

Type	Material number

**Characteristic curves**

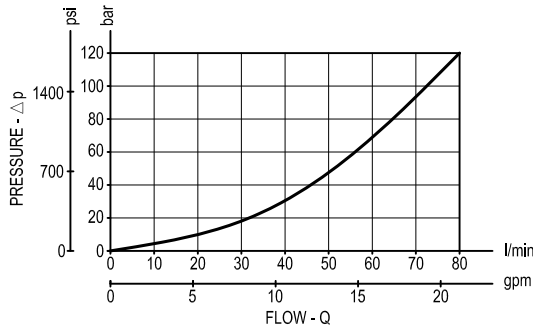
**Compensated flow vs % of control current**



<b>Hysteresis</b>	
≤ 5% : to 85% by I <sub>max</sub>	
≤ 10% : over 85% by I <sub>max</sub>	
≤ 10% : In opening area	

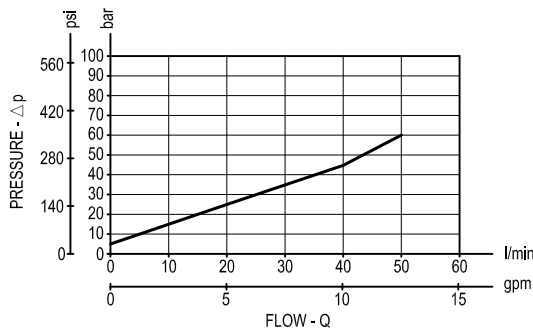
Recommened dither frequency (PWM) 120 Hz

**Delta p 2 to 1 at 100% of I<sub>max</sub> control current**



Max. flow 80 l/min. (21 gpm)

**Delta p 1 to 2**

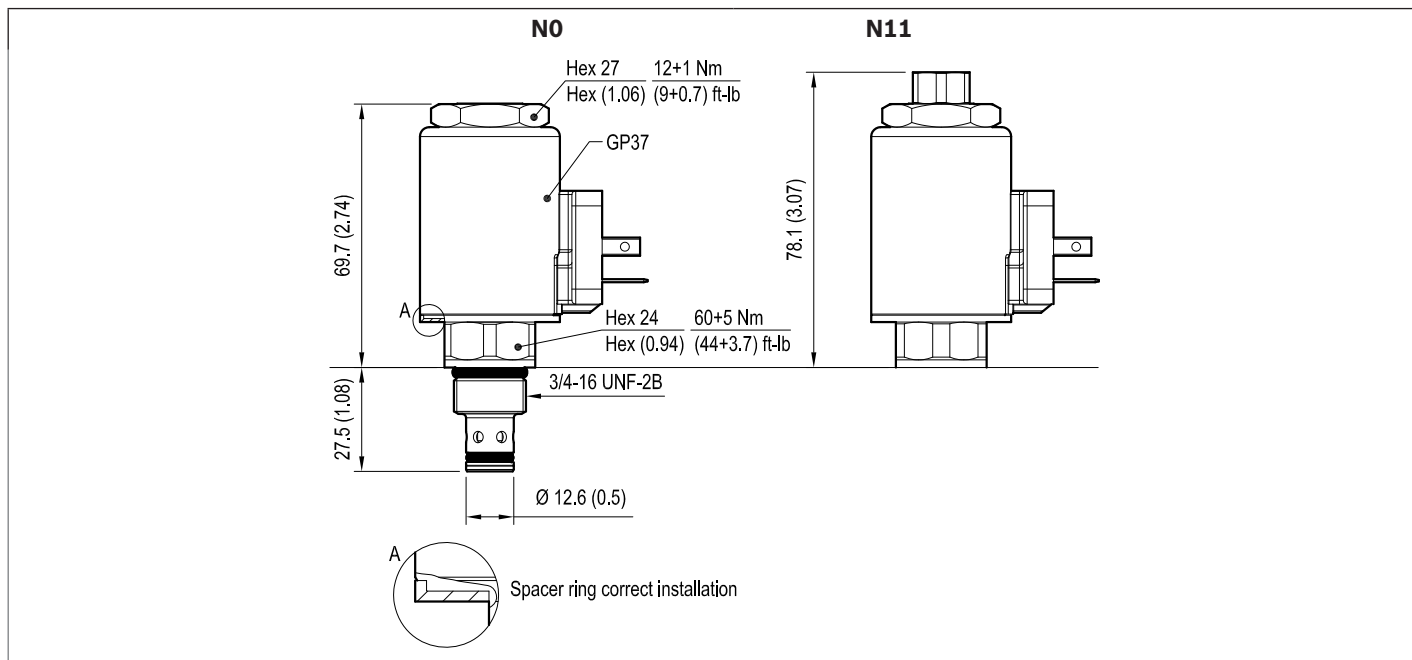


Max. flow 50 l/min. (13 gpm)

4

**Dimensions**

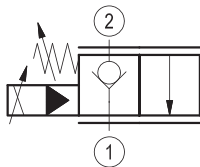
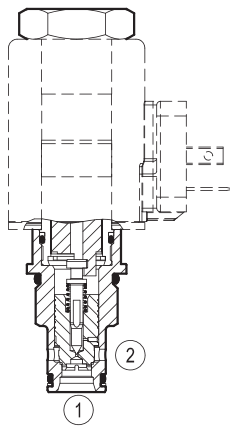
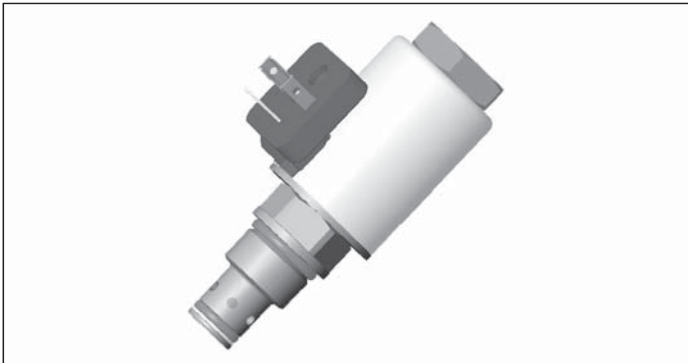
▼ **Proportional valves pilot operated poppet type  
2-way flow regulator not compensated**



Proportional valves pilot operated poppet type,  
2-way flow regulator not compensated  
Common cavity, Size 10

KSVS.1

KSVSR1AA / F - Y - V



**Technical data**

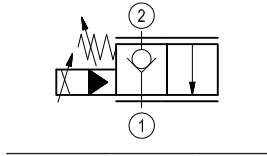
<b>General</b>	
Weight	0.25 kg (0.55 lbs)
Installation position	Any
Ambient temperature range	-20 to 120 °C (-4 to 248 °F)
Salt spray test to DIN 50021	720 h
<b>Hydraulic</b>	
Max. operating pressure port 1, 2	350 bar (5075 psi)
Maximum $\Delta p$	250 bar (3625 psi)
Nominal flow	86 l/min. at 35 bar $\Delta p$ (23 gpm at 508 psi $\Delta p$ )
Max. internal leakage	10 drops/min. (at $\Delta p=150$ bar; HLP46, $T_{oil} = 40^\circ C$ )
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)	
Recommended degree of fluid contamination	Nominal value max. 10 $\mu$ m (NAS 8) ISO 4406 19/17/14
Cavity	CA-10A-2N see 18325-70
Seal kit	material no. R961011030
Load cycles	2 Mio.
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	GP37 see 18325-90

Note: coils must be ordered separately.

**Ordering code**

<b>KSVSR1</b>	<b>A</b>	<b>A/</b>	<b>F</b>	<b>Y</b>	<b>V</b>
---------------	----------	-----------	----------	----------	----------

Proportional valves pilot operated poppet type  
2-way flow regulator not compensated



Common cavity; CA-10A-2N

without manual override **N0**  
with manual override **N11**

Seal material: FKM seals

Further types available by request

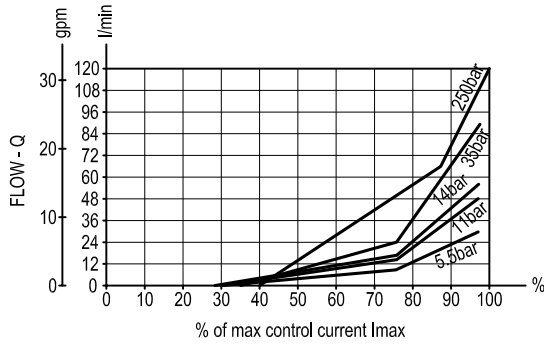
**Preferred types**

Type	Material number
KSVSR1AA/FN0V	R901394662
KSVSR1AA/FN11V	R901394661

Type	Material number

**Characteristic curves**

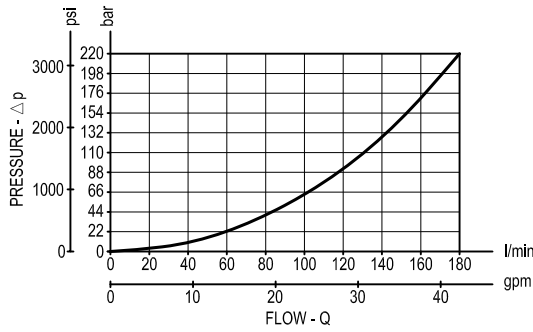
**Compensated flow vs % of control current**



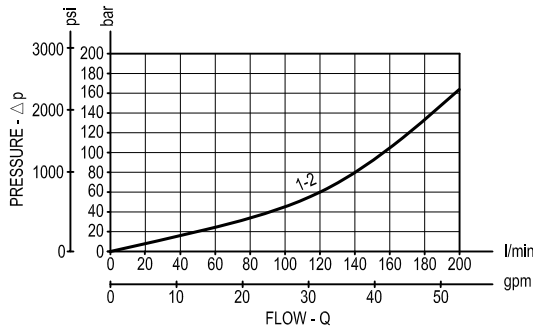
<b>Hysteresis</b>
0 till 85% of Imax. < 15%
> 85% of Imax. < 35%

Reccomended dither frequency (PWM) 120 Hz

**Delta p 2 to 1 at 100% of Imax control current**



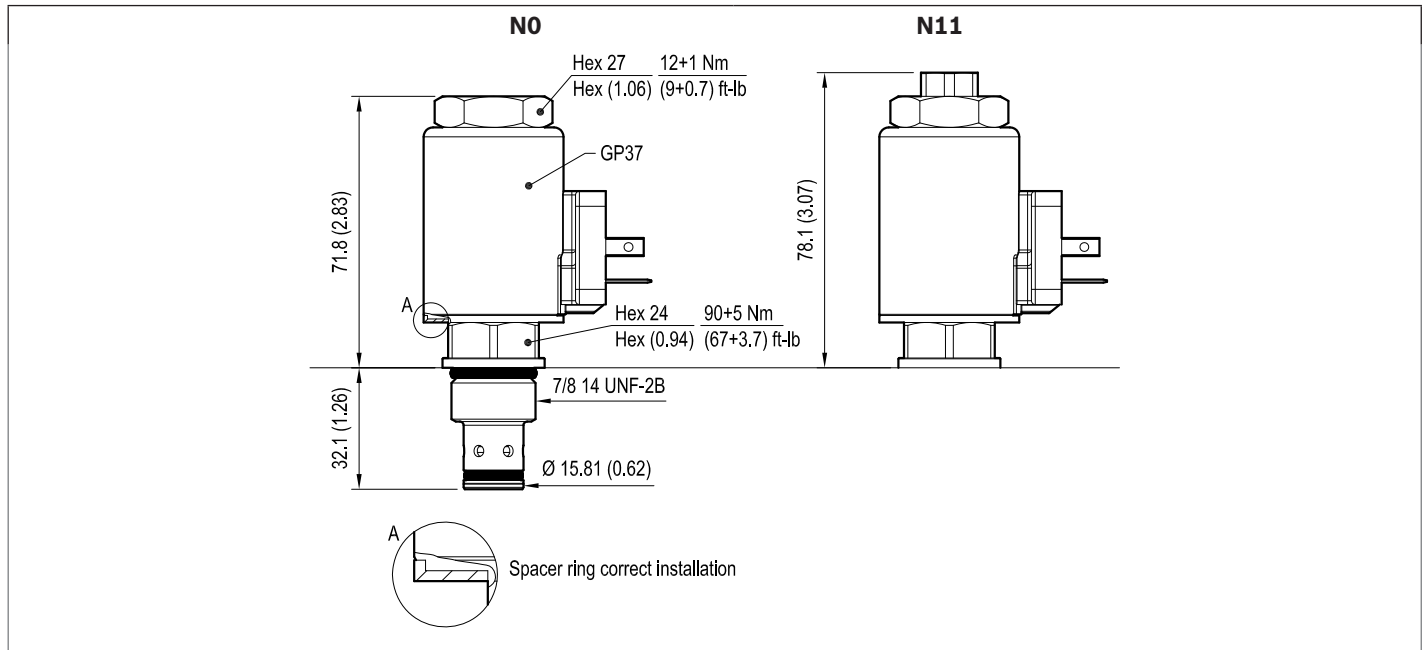
**Delta p 1 to 2**



4

**Dimensions**

▼ **Proportional valves pilot operated poppet type  
2-way flow regulator not compensated**

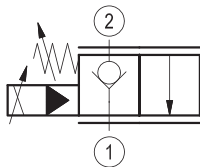
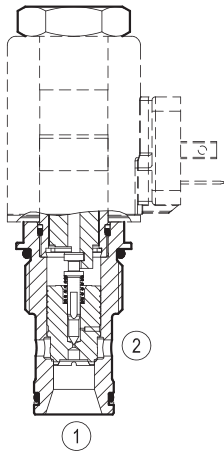
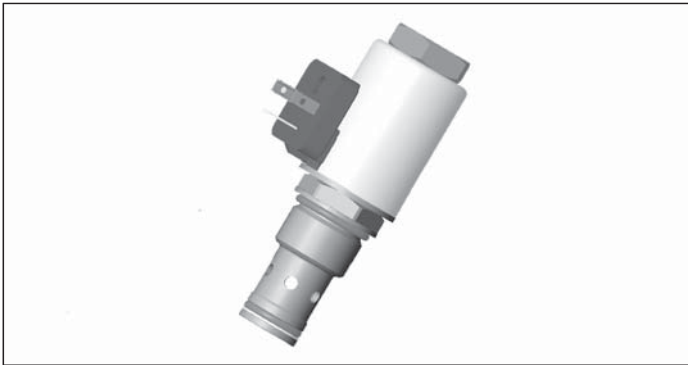




Proportional valves pilot operated poppet type,  
2-way flow regulator not compensated  
Common cavity, Size 12

KSVS.2

KSVSR2AA / F - Y - V



**Technical data**

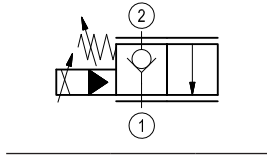
<b>General</b>	
Weight	0.60 kg (1.3 lbs)
Installation position	Any
Ambient temperature range	-20 to 120 °C (-4 to 248 °F)
Salt spray test to DIN 50021	720 h
<b>Hydraulic</b>	
Max. operating pressure port 1, 2	350 bar (5075 psi)
Maximum $\Delta p$	250 bar (3625 psi)
Nominal flow	145 l/min. at 35 bar $\Delta p$ (38 gpm at 508 psi $\Delta p$ )
Max. internal leakage	10 drops/min. (at $\Delta p=150$ bar; HLP46, $T_{oil} = 40^{\circ}C$ )
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)	
Recommended degree of fluid contamination	Nominal value max. 10 $\mu$ m (NAS 8) ISO 4406 19/17/14
Cavity	CA-12A-2N see 18325-70
Seal kit	material no. R961011031
Load cycles	2 Mio.
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	GP37 see 18325-90

Note: coils must be ordered separately.

**Ordering code**

<b>KSVSR2</b>	<b>A</b>	<b>A/</b>	<b>F</b>	<b>Y</b>	<b>V</b>
---------------	----------	-----------	----------	----------	----------

Proportional valves pilot operated poppet type  
2-way flow regulator not compensated



Common cavity; CA-12A-2N

without manual override **N0**  
with manual override **N11**

Seal material: FKM seals

Further types available by request

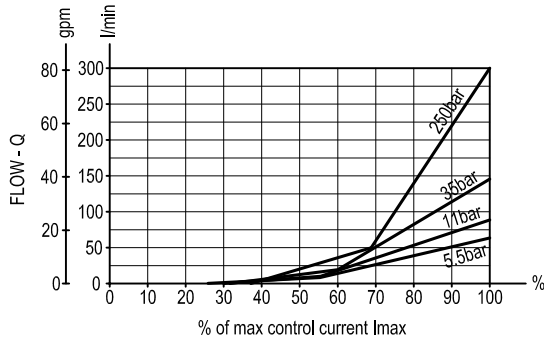
**Preferred types**

Type	Material number
KSVSR2AA/FN0V	R901392636
KSVSR2AA/FN11V	R901392637

Type	Material number

**Characteristic curves**

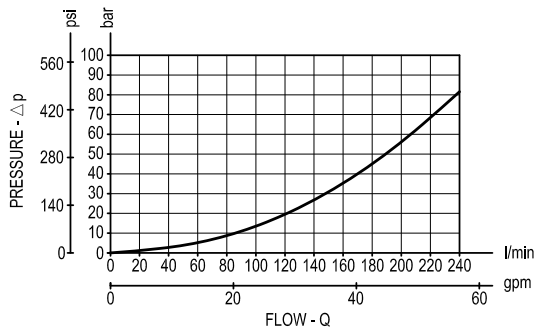
**Compensated flow vs % of control current**



<b>Hysteresis</b>	
≤ 5% : to 85% by I_max	
≤ 10% : over 85% by I_max	
≤ 10% : In opening area	

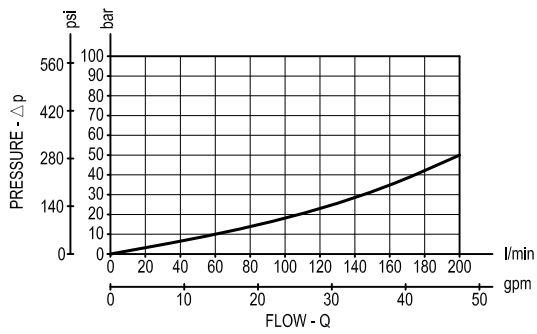
Recommened dither frequency (PWM) 120 Hz

**Delta p 2 to 1 at 100% of I\_max control current**



Max. flow 240 l/min. (63 gpm)

**Delta p 1 to 2**

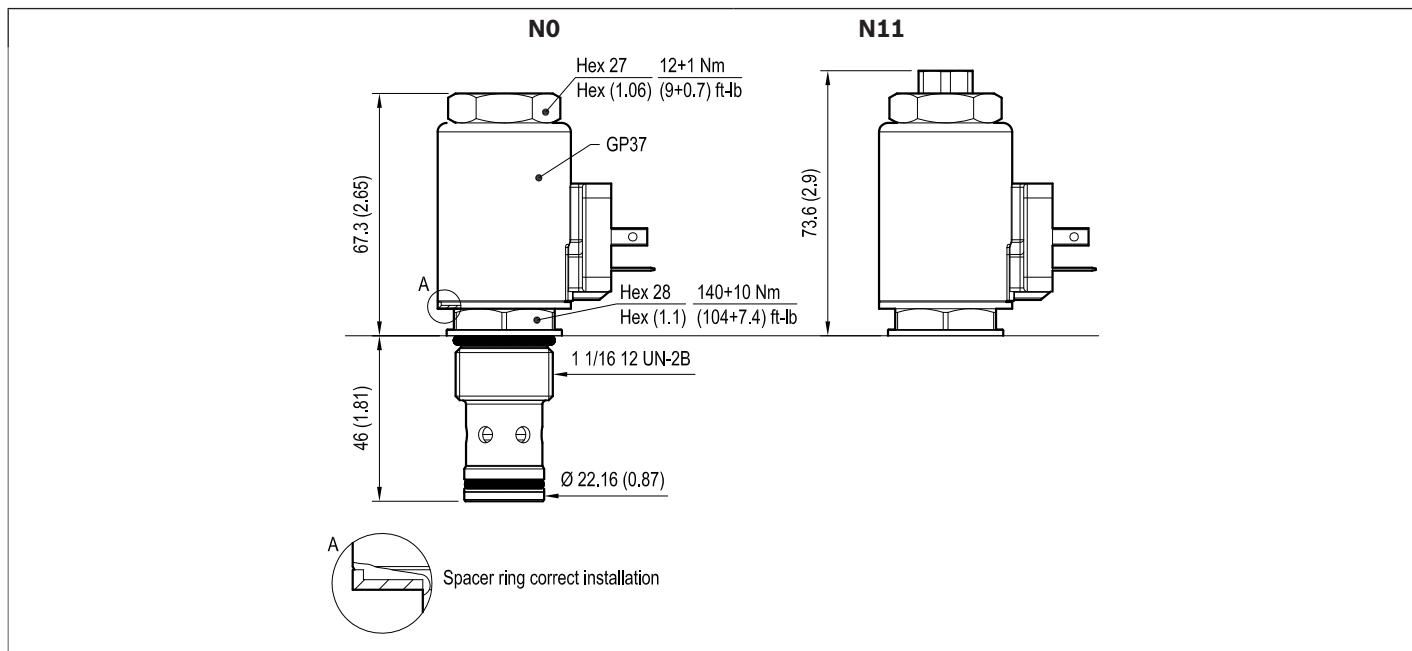


Max. flow 200 l/min. (53 gpm)

4

**Dimensions**

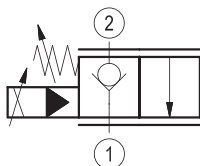
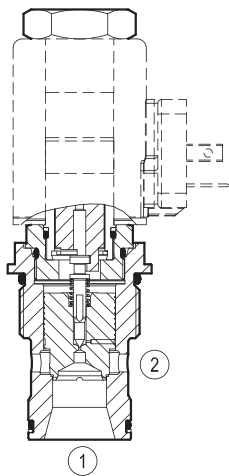
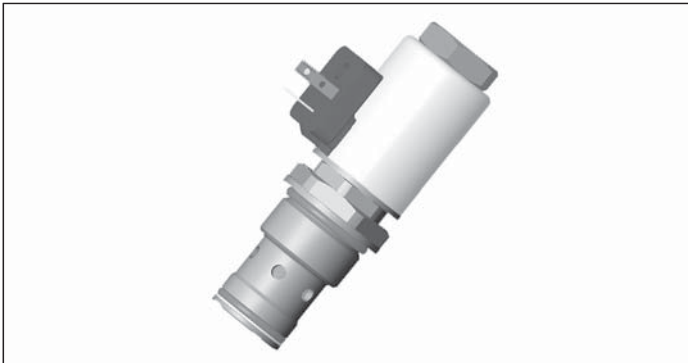
▼ **Proportional valves pilot operated poppet type  
2-way flow regulator not compensated**



Proportional valves pilot operated poppet type,  
2-way flow regulator not compensated  
Common cavity, Size 16

KSVS.3

KSVSR3AA / F - Y - V



**Technical data**

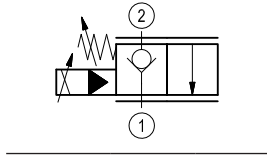
<b>General</b>	
Weight	0.65 kg (1.4 lbs)
Installation position	Any
Ambient temperature range	-20 to 120 °C (-4 to 248 °F)
Salt spray test to DIN 50021	720 h
<b>Hydraulic</b>	
Max. operating pressure port 1, 2	350 bar (5075 psi)
Maximum $\Delta p$	250 bar (3625 psi)
Nominal flow	250 l/min. at 35 bar $\Delta p$ (66 gpm at 508 psi $\Delta p$ )
Max. internal leakage	10 drops/min. (at $\Delta p=150$ bar; HLP46, $T_{oil} = 40^\circ C$ )
Fluid temperature range	-20 to 80 °C (-4 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 15 to 380 mm <sup>2</sup> /s (cSt)	
Recommended degree of fluid contamination	Nominal value max. 10 $\mu$ m (NAS 8) ISO 4406 19/17/14
Cavity	CA-16A-2N see 18325-70
Seal kit	material no. R961011032
Load cycles	2 Mio.
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	GP37 see 18325-90

Note: coils must be ordered separately.

**Ordering code**

<b>KSVSR3</b>	<b>A</b>	<b>A/</b>	<b>F</b>	<b>Y</b>	<b>V</b>	<b>.*</b>
---------------	----------	-----------	----------	----------	----------	-----------

Proportional valves pilot operated poppet type  
2-way flow regulator not compensated



**41** High flow

Common cavity; CA-16A-2N

without manual override **N0**  
with manual override **N11**

Seal material: FKM seals

Further types available by request

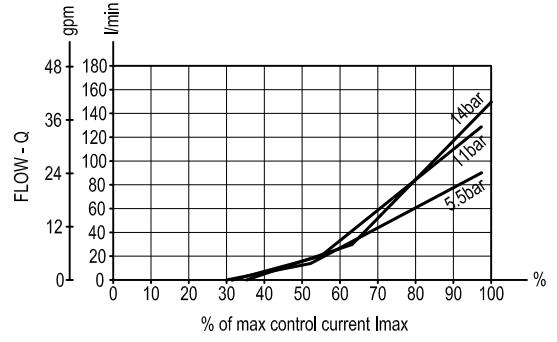
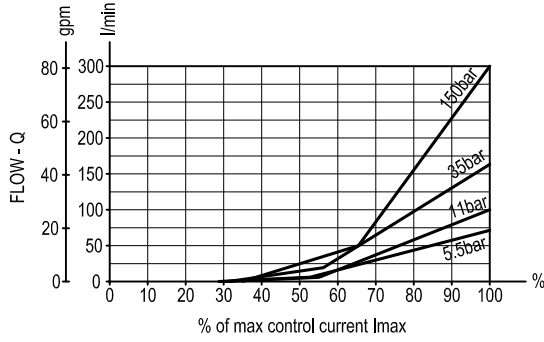
**Preferred types**

Type	Material number
KSVSR3AA/FN0V	R901404827
KSVSR3AA/FN11V	R901407153

Type	Material number
KSVSR3AA/FN0V-41	R901394666
KSVSR3AA/FN11V-41	R901394665

**Characteristic curves**

**Compensated flow vs % of control current** **Version 41**



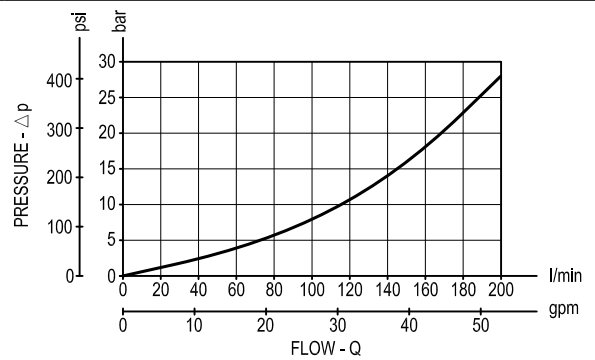
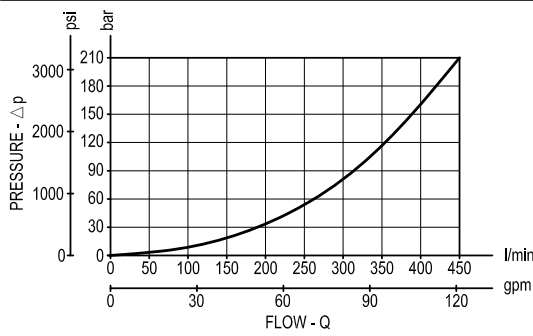
Hysteresis
≤ 5% : to 85% by I <sub>max</sub>
≤ 10% : over 85% by I <sub>max</sub>
≤ 10% : In opening area

Hysteresis
0 till 60% of I <sub>max</sub>
60% till 85% of I <sub>max</sub> < 15%
85% till 100% of I <sub>max</sub> < 30%

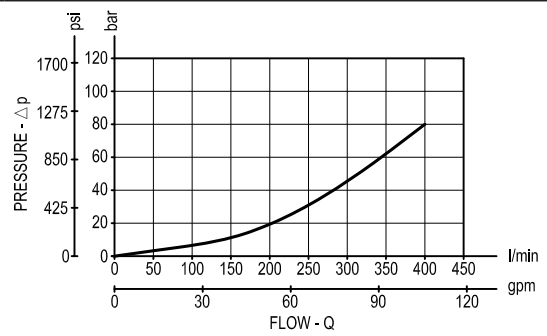
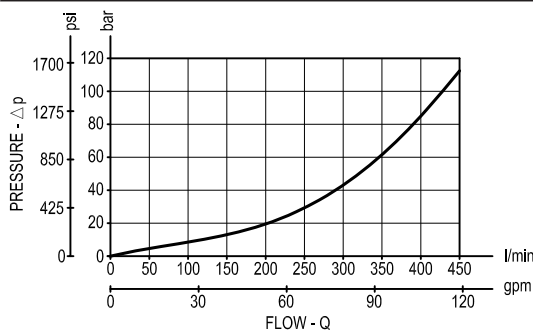
Recommened dither frequency (PWM) 120 Hz

Recommened dither frequency (PWM) 120 Hz

**Delta p 2 to 1 at 100% of I<sub>max</sub> control current** **Version 41**



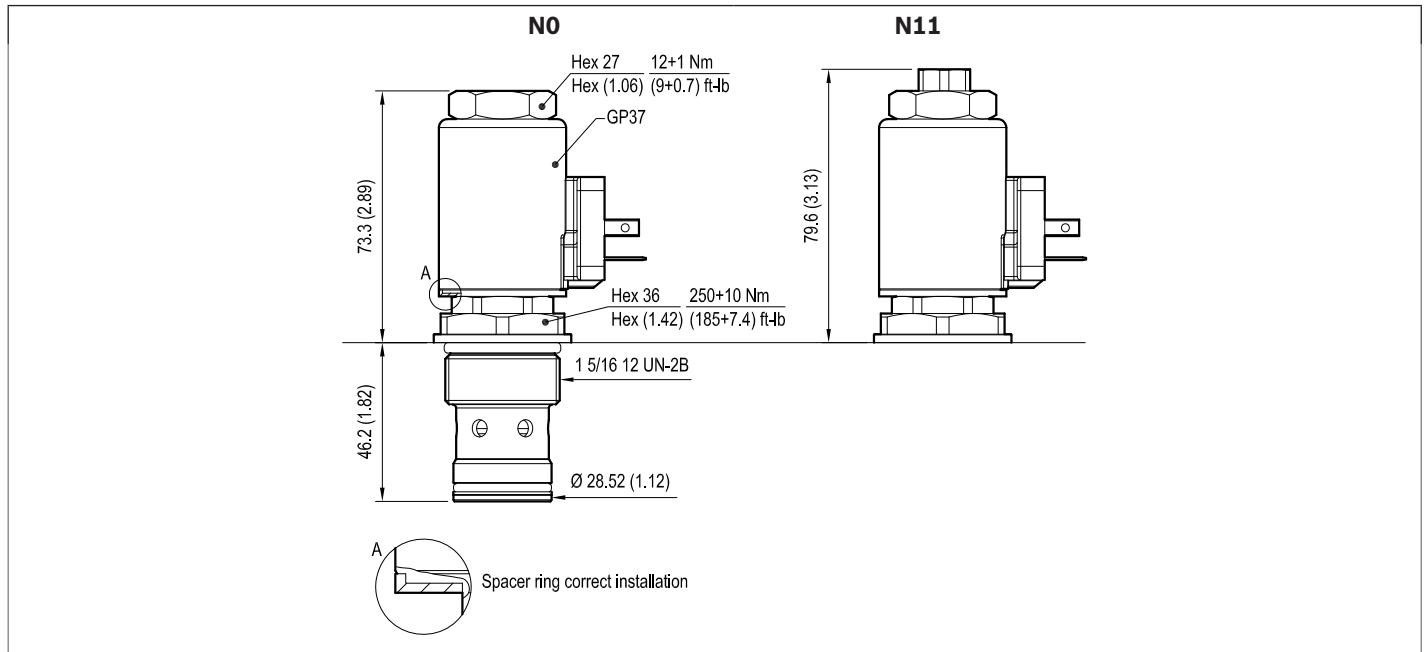
**Delta p 1 to 2** **Version 41**



4

**Dimensions**

▼ **Proportional valves pilot operated poppet type  
2-way flow regulator not compensated**

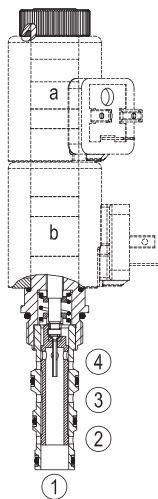
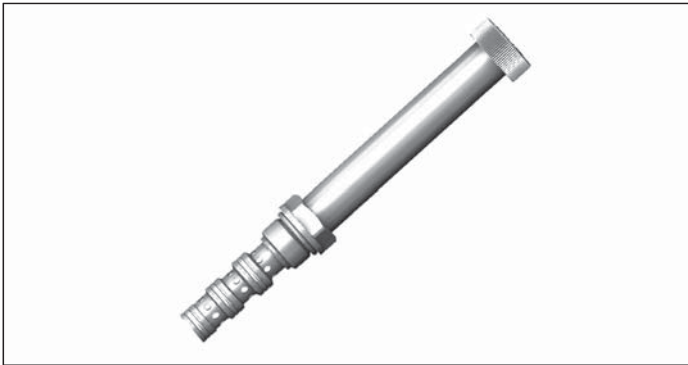




Proportional valves direct acting spool  
4-way 3-position  
Common cavity, Size 10

VEPS-10A-43

OD.14 - X - 78 - KP2 - Y - 00

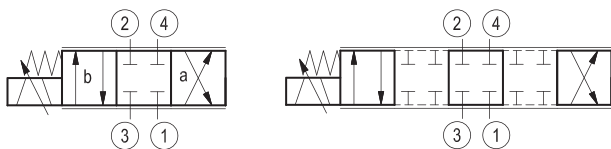


**Technical data**

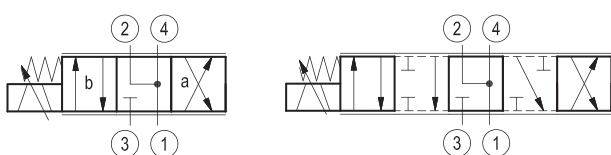
General	
Weight (with coils)	0.85 kg (1.87 lbs)
Installation position	Any
Ambient temperature range	-40 to 110 °C (-40 to 230 °F)
Salt spray test to DIN 50021	720 h
Hydraulic	
Max. operating pressure port 2, 3, 4	350 bar (5075 psi)
Max. operating pressure port 1	250 bar (3625 psi)
Max. flow	25 l/min. (7 gpm)
Max. internal leakage	< 60 ml/min. (with $\Delta p=250$ bar; HLP46, $T_{oil} = 40^{\circ}C$ )
Fluid temperature range	-40 to 80 °C (-40 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 5 to 1000 mm <sup>2</sup> /s (preferably 10 to 100 mm <sup>2</sup> /s)	
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Cavity	CA-10A-4N see 18325-70
Seal kit	material no. R961005190
Load cycles	2 Mio.
Electrical	
Type of voltage	DC voltage
Coil type	GP37 see 18325-90

Note: coils must be ordered separately.

▼ Version 10



▼ Version 20



- ① T
- ② A
- ③ P
- ④ B

**Ordering code**

<b>OD14</b>	<b>X</b>	<b>78</b>	<b>KP2</b>	<b>Y</b>	<b>0</b>	<b>0</b>
-------------	----------	-----------	------------	----------	----------	----------

Proportional valves direct acting spool  
4-way 3-position

Version **10**  
Version **20**

without manual override **0**  
with pull/push manual override **1**

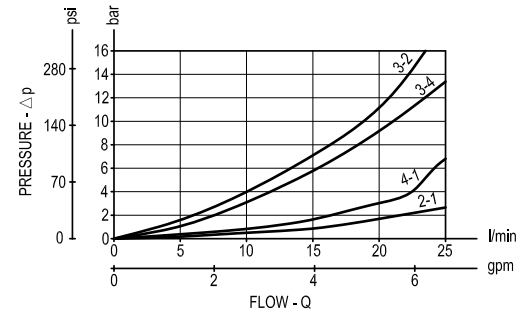
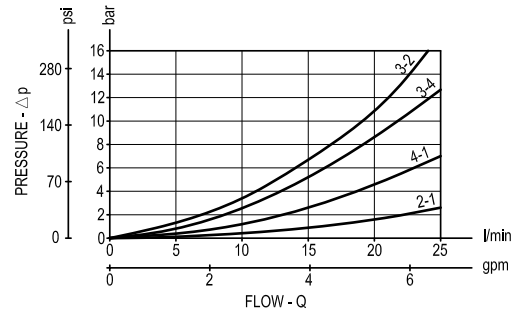
**Preferred types**

Type	Material number
OD141078KP2000	R901271834
OD142078KP2000	R901271837

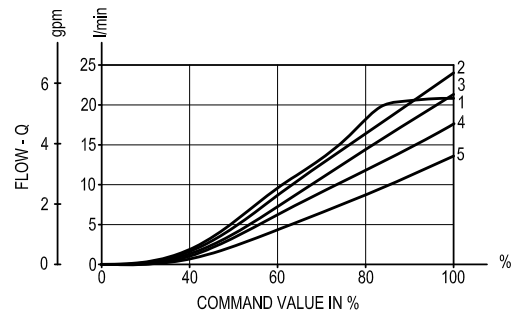
Type	Material number
OD141078KP2100	R901300077
OD142078KP2100	R901300083

Characteristic curves

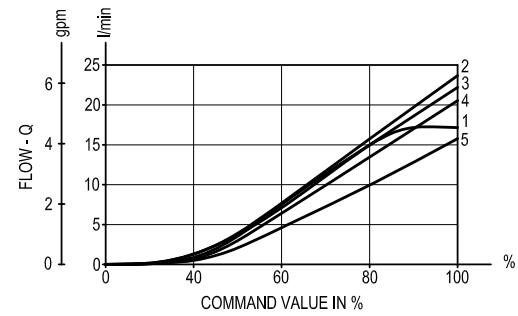
**Version 10** **Version 20**



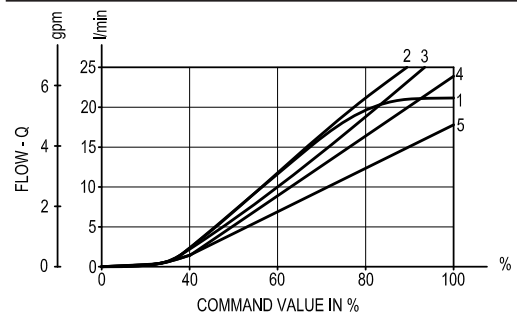
**Version 10 - Direction of flow 3-2** **Version 10 - Direction of flow 3-4**



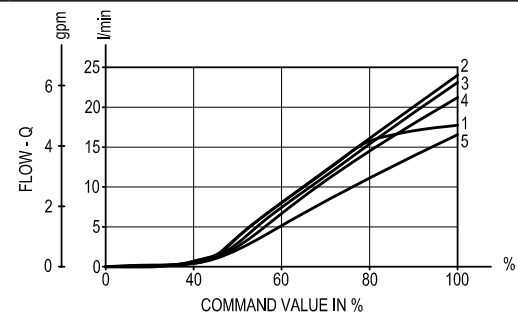
- 1 Δp= 10 bar constant
- 2 Δp= 20 bar constant
- 3 Δp= 30 bar constant
- 4 Δp= 50 bar constant
- 5 Δp= 100 bar constant



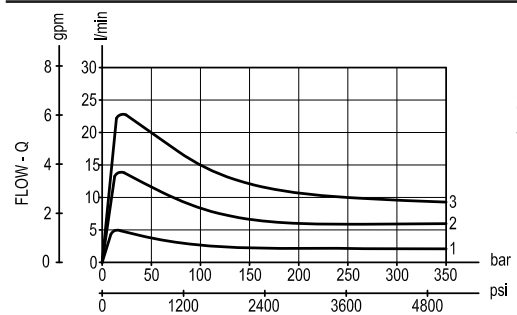
**Version 20 - Direction of flow 3-2** **Version 20 - Direction of flow 3-4**



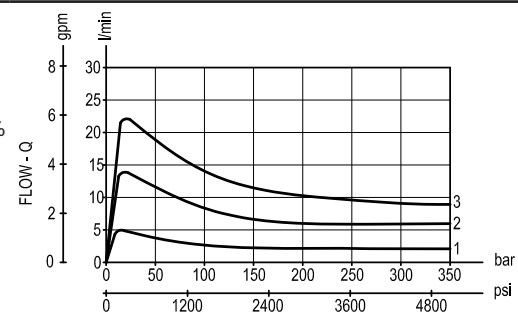
- 1 Δp= 10 bar constant
- 2 Δp= 20 bar constant
- 3 Δp= 30 bar constant
- 4 Δp= 50 bar constant
- 5 Δp= 100 bar constant



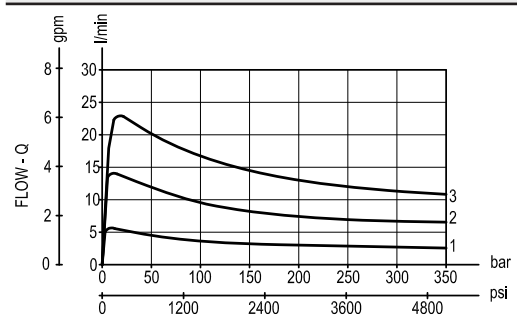
**Version 10 - Direction of flow 3-2 / 4-1** **Version 10 - Direction of flow 3-4 / 2-1**



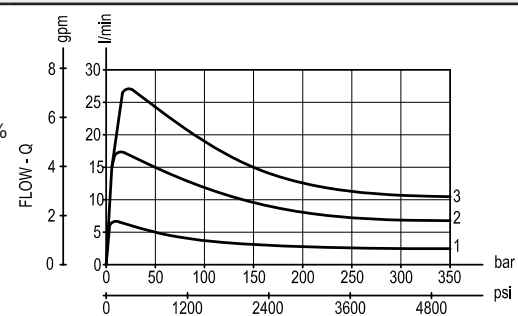
- 1 Command value =50%
- 2 Command value =75%
- 3 Command value =100%



**Version 20 - Direction of flow 3-2 / 4-1** **Version 20 - Direction of flow 3-4 / 2-1**

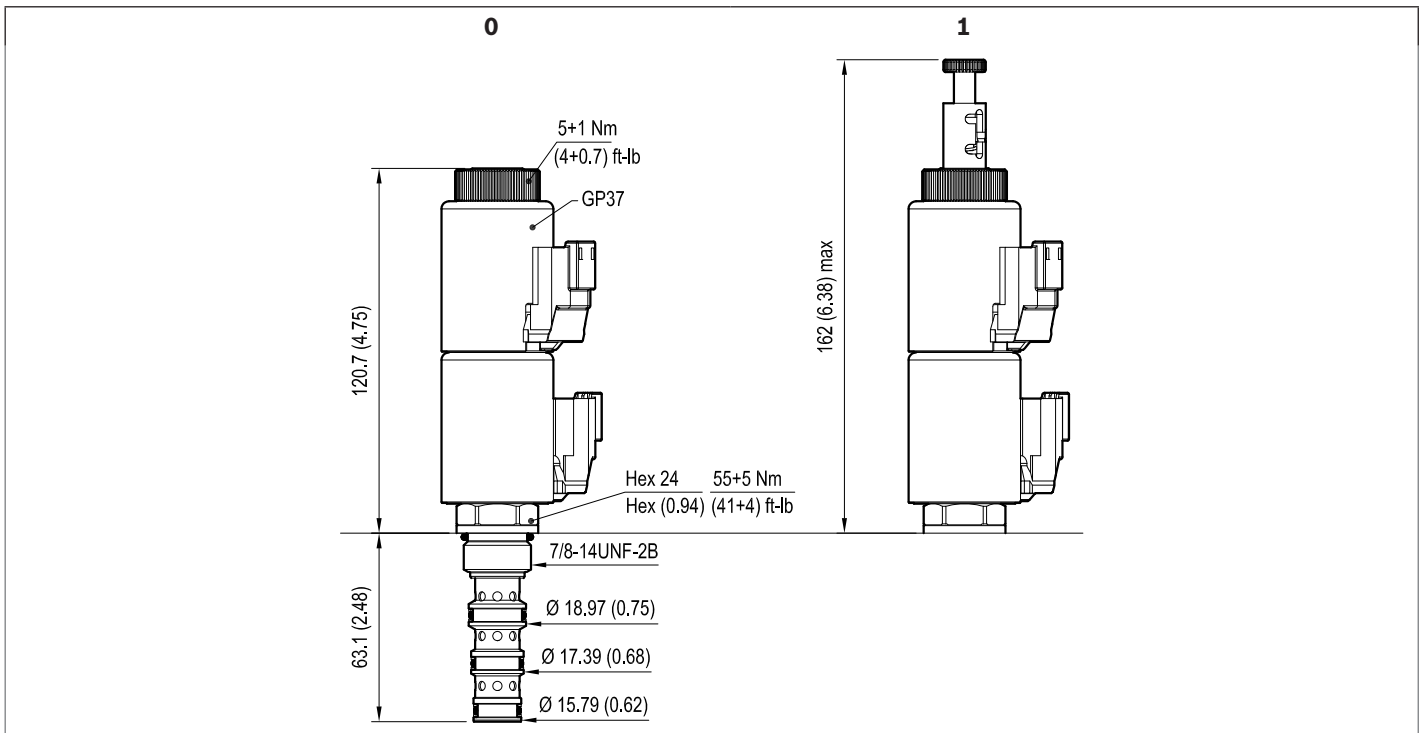


- 1 Command value =50%
- 2 Command value =75%
- 3 Command value =100%



**Dimensions**

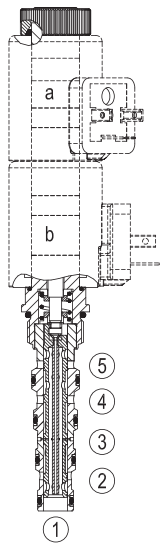
▼ **Proportional valves direct acting spool 4-way 3-position**



Proportional valves direct acting spool  
5-way 3-position  
Common cavity, Size 10

VEPS-10A-53

OD.53 - X - 54 - KP2 - Y - 00

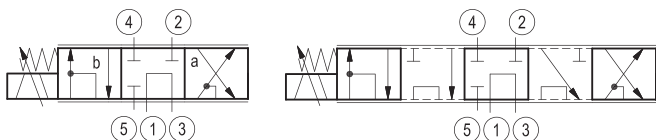


**Technical data**

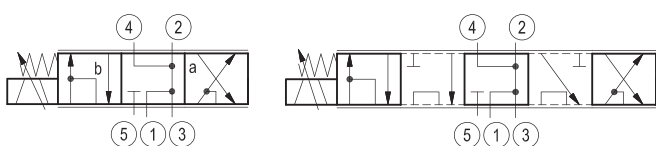
<b>General</b>	
Weight (with coils)	0.85 kg (1.87 lbs)
Installation position	Any
Ambient temperature range	-40 to 110 °C (-40 to 230 °F)
Salt spray test to DIN 50021	720 h
<b>Hydraulic</b>	
Max. operating pressure port 2, 3, 4	350 bar (5075 psi)
Max. operating pressure port 1	250 bar (3625 psi)
Max. flow	25 l/min. (7 gpm)
Max. internal leakage	< 60 ml/min. (with $\Delta p=250$ bar; HLP46, $T_{oil} = 40^{\circ}C$ )
Fluid temperature range	-40 to 80 °C (-40 to 176 °F)
Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 5 to 1000 mm <sup>2</sup> /s (preferably 10 to 100 mm <sup>2</sup> /s)	
Recommended degree of fluid contamination	Nominal value max. 10µm (NAS 8) ISO 4406 19/17/14
Cavity	CA-10A-5N see 18325-75
Seal kit	material no. R961005837
Load cycles	2 Mio.
<b>Electrical</b>	
Type of voltage	DC voltage
Coil type	GP37 see 18325-90

Note: coils must be ordered separately.

▼ **Version 10**



▼ **Version 20**



- ① LS
- ② A
- ③ T
- ④ B
- ⑤ P

**Ordering code**

<b>OD53</b>	<b>X</b>	<b>54</b>	<b>KP2</b>	<b>Y</b>	<b>0</b>	<b>0</b>
-------------	----------	-----------	------------	----------	----------	----------

Proportional valves direct acting spool  
5-way 3-position

Version **10**  
Version **20**

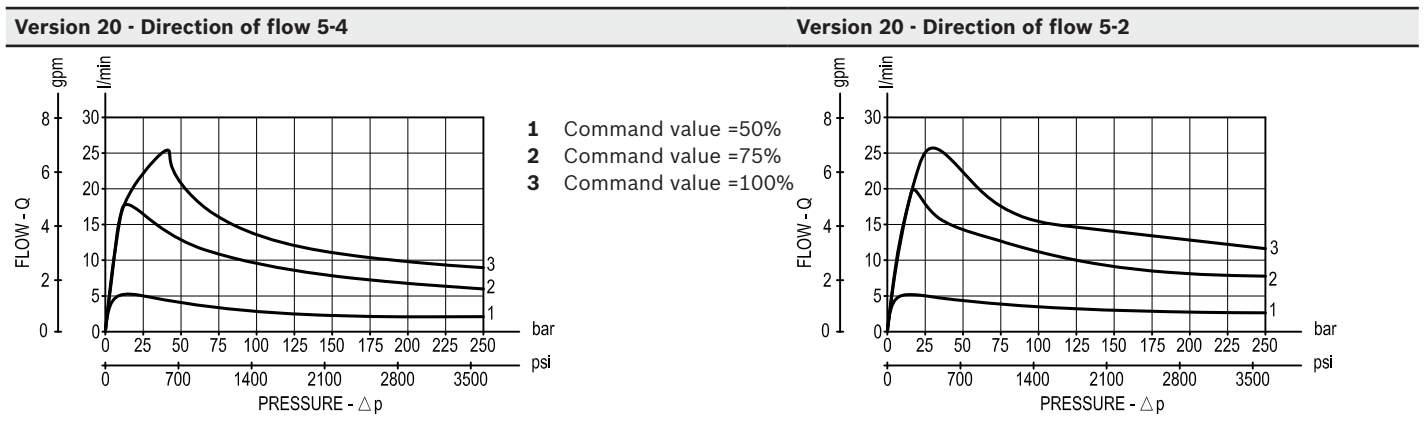
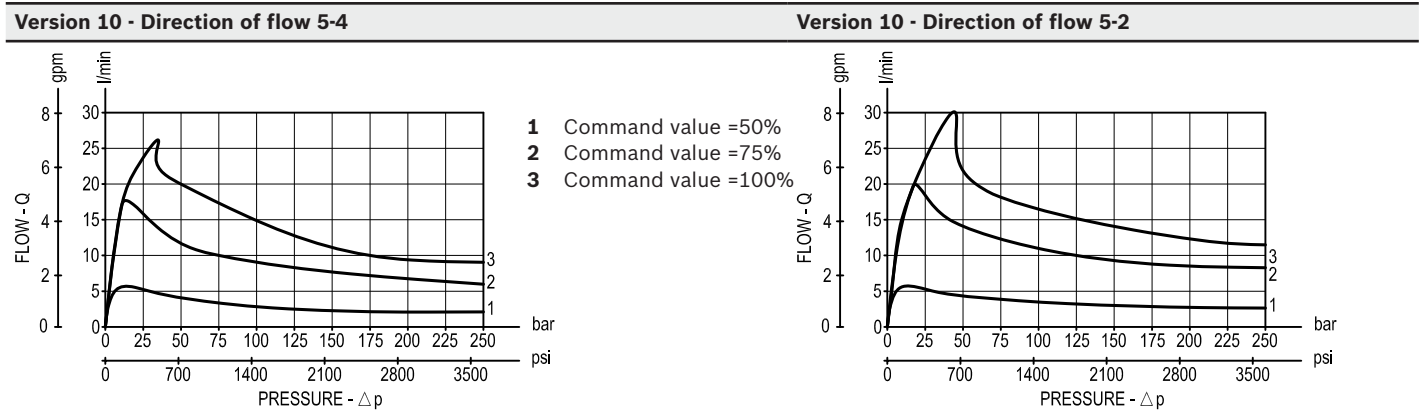
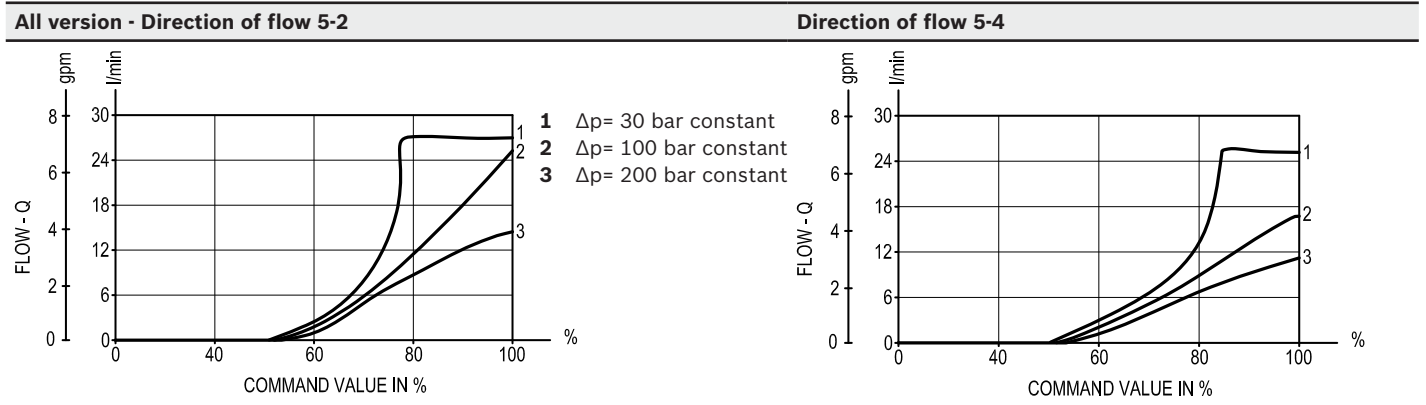
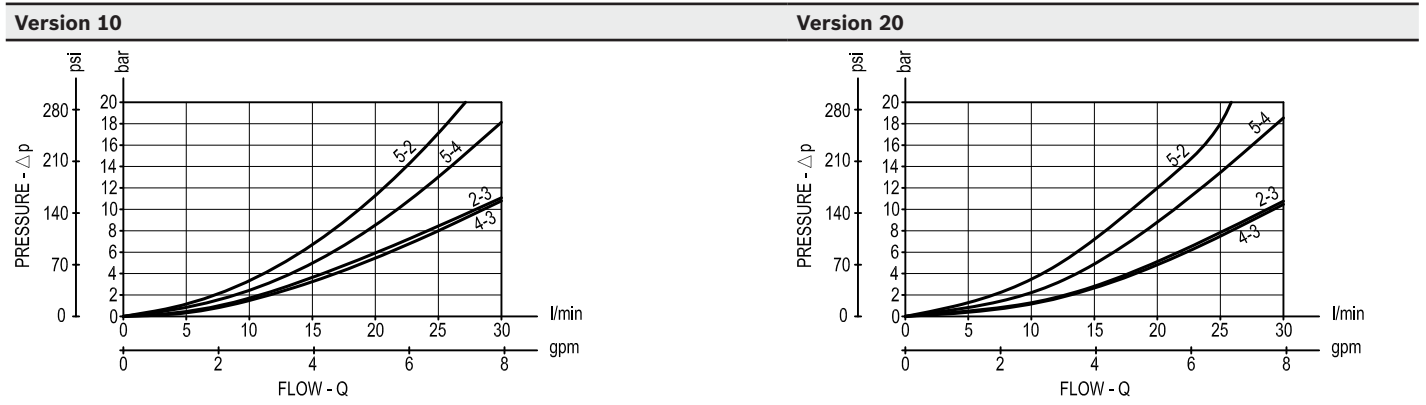
without manual override **0**  
with pull/push manual override **1**

**Preferred types**

Type	Material number
OD531054KP2000	R901317308
OD532054KP2000	R901317306

Type	Material number
OD531054KP2100	R901317303
OD532054KP2100	R901317300

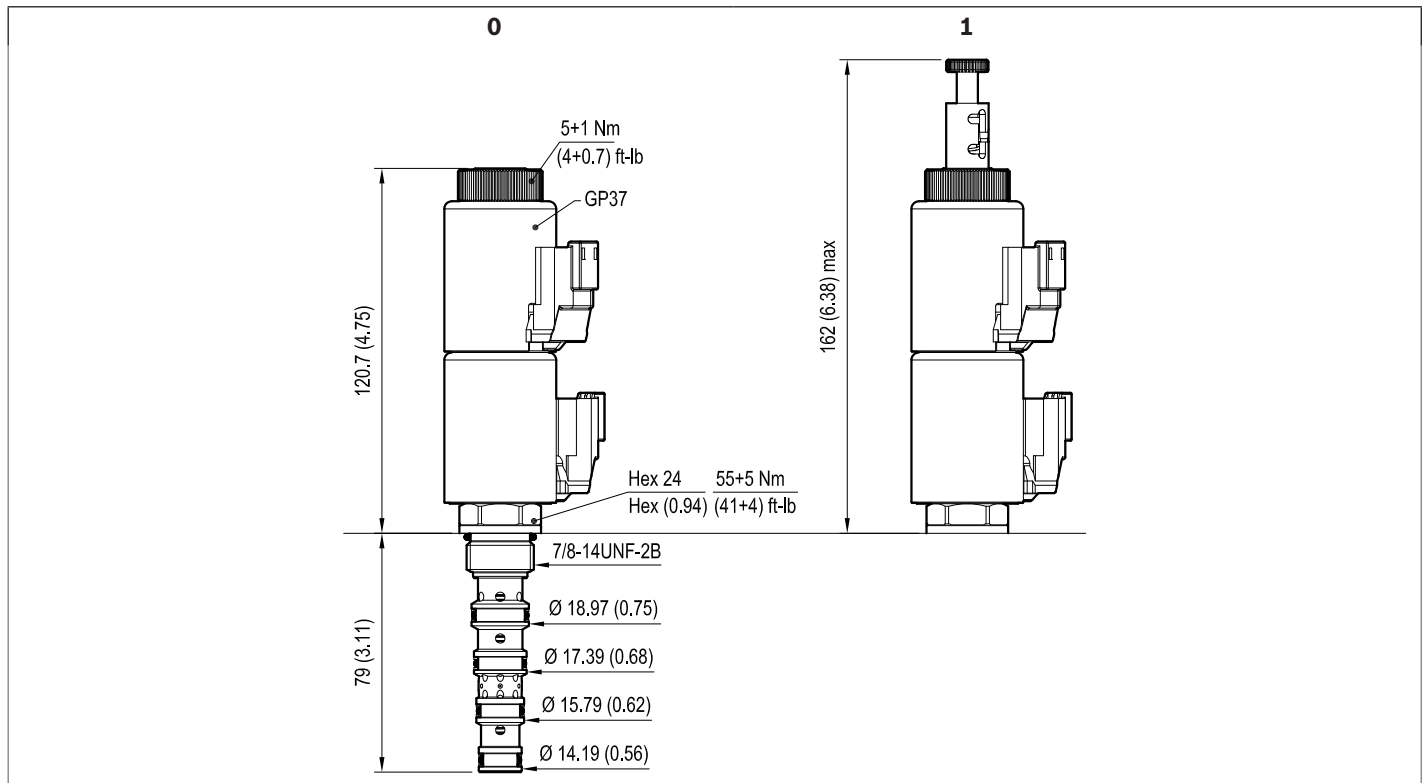
Characteristic curves



4

**Dimensions**

▼ **Proportional valves direct acting spool 5-way 3-position**





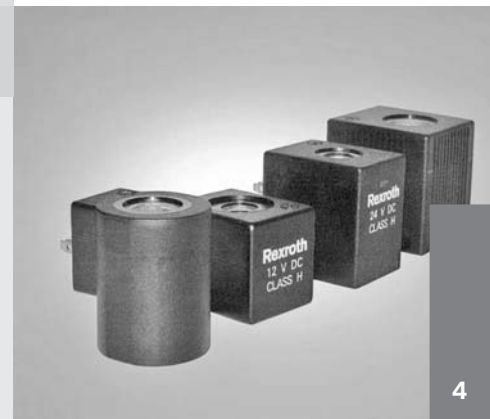
## Coils and connectors

<b>Designation</b>		<b>Data sheet</b>	<b>Page</b>
Coils - connectors		18325-90	941



# Coils - Connectors

Coils  
Connectors



4

## Summary

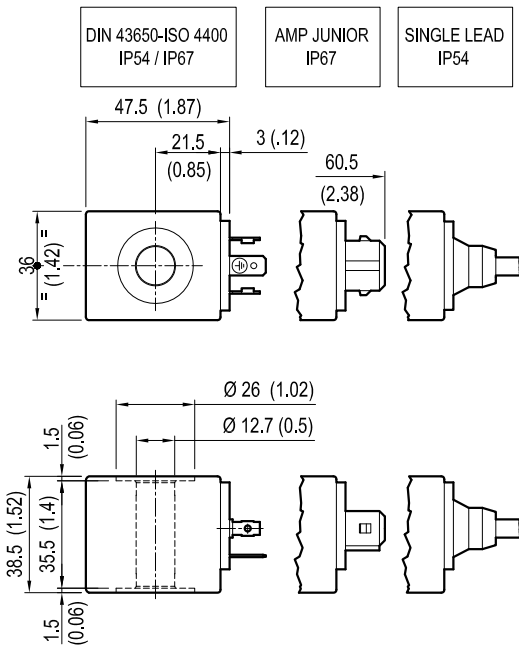
Description	Page
<b>Coils</b>	
Coil S8-356 - CLASS H - 20 W	2-3
Coil S8-356 - CLASS H - 17 W	4
Coil S8-356 - CLASS H - 17 W - LISTED UL	5
Coil S8-356 - G2 - CLASS H - 19.5 W	6
Coil S5 - CLASS H - 20 W	7
Coil S7 - CLASS H - 30 W	8
Coil S7 - CLASS H - 26 W	9
Coil C45 - CLASS H	10
Coil R7 - CLASS H - 18 W	11
Coil R7 - CLASS H - 28 W	12
Coil GZ37 - CLASS H - 22 W	13
Coil GP37 - CLASS H	14
Coil D36 - CLASS H - 20 W	15-16
Coil D36 - CLASS H - 20 W - LISTED UL	17

Description	Page
<b>Connectors</b>	
Connector IP67	18-21

# Coils - Connectors

COIL S8-356 - CLASS H - 20 W

OD.02.17 - X - Y - Z



[ mm / Inches ]

## TECHNICAL DATA

Weight: 0.18 kg (0.40 lbs)

Heat insulation Class H: 180°C (356°F)

Ambient temperature range: -30/+60°C (-22/+140°F)

Inlet voltage fluctuations must not exceed ±10% of nominal voltage to obtain correct operation and long life coils.

X	Y	Connections	Circuit	Voltage
01	30	DIN 43650 - ISO 4400	Standard	DC-RAC
07	30	AMP JUNIOR	Standard	DC
0G	03	SINGLE LEAD	Standard	DC *
14	30	DIN 43650 - ISO 4400	Bidirectional Diode	DC
15	30	AMP JUNIOR	Bidirectional Diode	DC
0H	03	SINGLE LEAD	Bidirectional Diode	DC *

\* Length 300mm (11.8 inches). Ext. diameter 6.3mm (0.25 inches). External and internal Sheath Silicone rubber.

Z	Voltage V	Resistance Ohm (±7%)	Power W	Current A		ΔT °C (°F)
	Nominal	Ta = 20-25°C (68-77°F)	Cold coil	Cold coil	Hot coil	1 hour energized at Ta=20-25°C (68-77°F) Nominal voltage
OB	12 DC	7.2	20	1.7	1.2	105-110 (221-230)
OG	14 DC	9.0	20	1.6	1.1	
OC	24 DC	28.2	20	0.9	0.6	
AC	26 DC	33.6	20	0.8	0.5	
AF	30 DC	44.1	20			
OV	24 RAC	23.1	20	0.9	-	110-125 (230-257)
OW	110 RAC	478.3	20	0.2	-	



[ mm / Inches ]

X	Y	Connections	Circuit	Voltage
20	30	DEUTSCH DT04-2P-L	Standard	DC
20	3P	DEUTSCH DT04-2P-V	Standard	DC
30	3P	AMP SUPERSEAL-V	Standard	DC
22	30	DEUTSCH DT04-2P-L	Bidirectional Diode	DC
22	3P	DEUTSCH DT04-2P-V	Bidirectional Diode	DC
32	3P	AMP SUPERSEAL-V	Bidirectional Diode	DC

Z	Voltage V	Resistance Ohm (±7%)	Power W	Current A		ΔT °C (°F)
	Nominal	Ta = 20-25°C (68-77°F)	Cold coil	Cold coil	Hot coil	1 hour energized at Ta=20-25°C (68-77°F) Nominal voltage
OB	12 DC	7.2	20	1.7	1.2	105-110 (221-230)
OC	24 DC	28.2	20	0.9	0.6	
AC	26 DC	33.6	20	0.8	0.5	

These coils have passed the THERMAL SHOCK DUNK TEST

# Coils - Connectors

## Preferred types (readily available)

Type	Material number
OD02170130AC00	R901058832
OD02170130OB00	R901090821
OD02170130OC00	R901083065
OD02170130OG00	R901144215
OD02170130OV00	R901090820
OD02170130OW00	R901087981
OD02170730AC00	R934000494
OD02170730OB00	R901094604
OD02170730OC00	R901094607
OD02170730OG00	R934000498
OD02170G03OB00	R901100773
OD02170G03OC00	R901100775
OD02171430OB00	R901131889
OD02171430OC00	R901121821
OD02171530AC00	R901133139
OD02171530OB00	R901111032

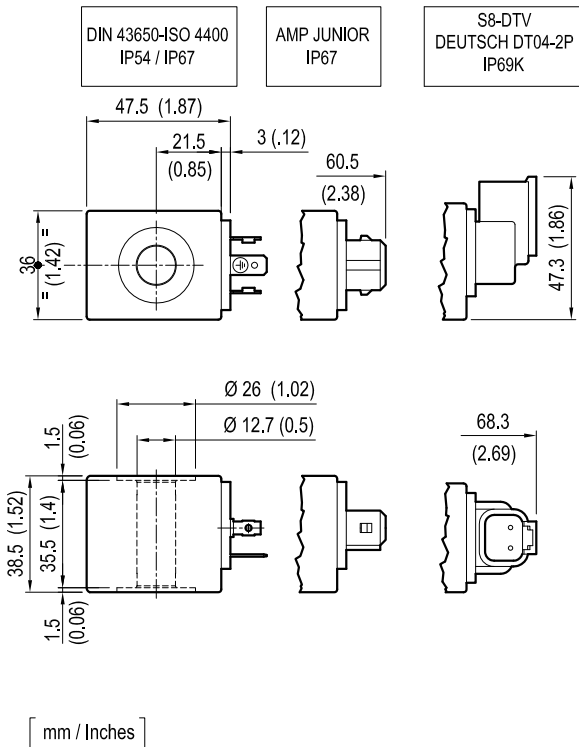
Further types available by request

Type	Material number
OD02171530OC00	R901125292
OD02172030OB00	R901094609
OD02172030OC00	R901094611
OD0217203PAC00	R934000509
OD0217203POB00	R901110014
OD0217203POC00	R901110015
OD02172230OB00	R901130433
OD02172230OC00	R901130401
OD02172230OG00	R934003033
OD0217223POB00	R901120671
OD0217223POC00	R901114602
OD0217303PAC00	R934000516
OD0217303POB00	R901110016
OD0217323POB00	R934000519
OD02170H03OG00	R934004360
OD02170130AF00	R934003029

# Coils - Connectors

COIL S8-356 - CLASS H - 17 W

OD.02.27 - X - Y - Z



S8-DTV  
DEUTSCH DT04-2P  
IP69K

**TECHNICAL DATA**

Weight: 0.18 kg (0.40 lbs)  
Heat insulation Class H: 180°C (356°F)  
Ambient temperature range: -30/+80°C (-22/+176°F)

Inlet voltage fluctuations must not exceed ±10% (not welded solenoid type) ±15% (other welded solenoid type) of nominal voltage to obtain correct operation and long life coils.

X	Y	Connections	Circuit	Voltage
01	30	DIN 43650 - ISO 4400	Standard	DC
07	30	AMP JUNIOR	Standard	DC
15	30	AMP JUNIOR	Bidirectional Diode	DC
20	30	DEUTSCH DT04-2P-L	Standard	DC
20	3P	DEUTSCH DT04-2P-V	Standard	DC

Z	Voltage V	Resistance Ohm (±7%)	Power W	Current A		ΔT °C (°F)
	Nominal	Ta = 20-25°C (68-77°F)	Cold coil	C o l d coil	H o t coil	1 hour energized at Ta=20-25°C (68-77°F) Nominal voltage
OB	12 DC	8.4	17	1.4	1.0	85-90 (185-194)
OG	14 DC	11.4	17	1.2	0.8	
OC	24 DC	33.7	17	0.7	0.5	

## Preferred types (readily available)

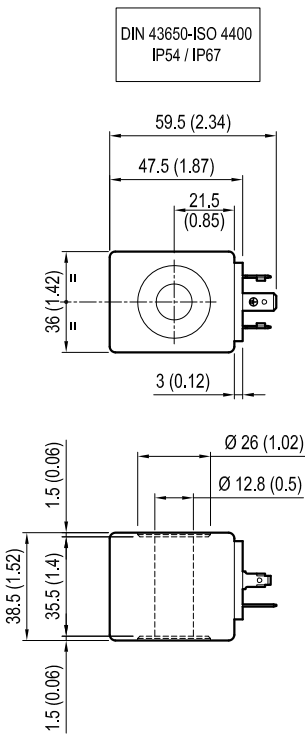
Type	Material number
OD02270730OG00	R934003645
OD02271530OG00	R934003888
OD02272030OB00	R934003647
OD02272030OG00	R934003648
OD02272030OC00	R934003649
OD0227203POB00	R934003650
OD0227203POG00	R934003651
OD0227203POC00	R934003652

Type	Material number

Further types available by request

# Coils - Connectors

COIL S8-356 - CLASS H - 17 W - LISTED UL OD.02.25 - X - Y - Z



DIN 43650-ISO 4400  
IP54 / IP67

LABEL EXAMPLE



**TECHNICAL DATA**

Weight: 0.18 kg (0.4 lbs)  
 Heat insulation Class H: 180°C (356°F)  
 Ambient temperature range: -20/+55°C (-4/+131°F)  
 Inlet voltage fluctuations must not exceed ±10% of nominal voltage to obtain correct operation and long life coils.

UL file number: E247526

X	Y	Connections	Circuit	Voltage
01	30	DIN 43650 - ISO 4400	Standard	DC

Z	Voltage V	Resistance Ohm (±7%)	Power W	Current A		ΔT °C (°F)
	Nominal	Ta = 20-25°C (68-77°F)	Cold coil	C o l d coil	H o t coil	1 hour energized at Ta=20-25°C (68-77°F) Nominal voltage
OC	24 DC	33.7	17	0.7	0.5	105-110 (221-230)

[ mm / Inches ]

Note: UL S8-356 coil is not function interchangeable with standard 20W S8-356 coil; performance on datasheets of Bosch Rexroth cartridge valves are not valid if assembled with UL S8-356 coils.  
 Please consult factory before any installation of UL coils in existing Bosch Rexroth solenoid cartridges.

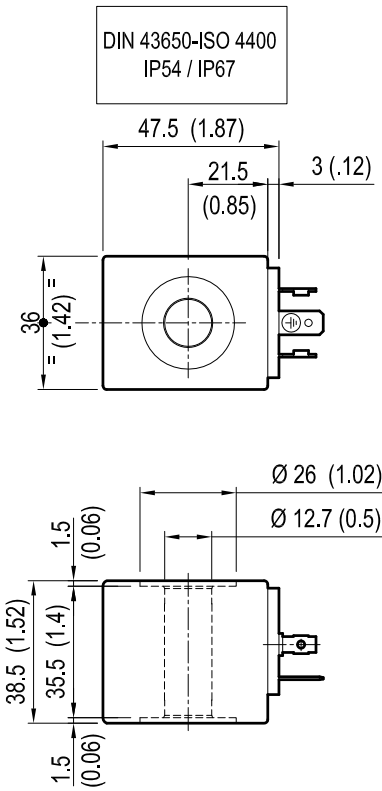
**Preferred types (readily available)**

Type	Material number	Type	Material number
OD02250130OC00	R934004281		

# Coils - Connectors

COIL S8-356 - G2 - CLASS H - 19.5 W

OD.02.28 - X - Y - Z



**TECHNICAL DATA**

Weight DC: 0.20 kg (0.44 lbs)  
 Weight RAC: 0.19 kg (0.42 lbs)  
 Heat insulation Class H: 180°C (356°F)  
 Ambient temperature range: -30/+60°C (-22/+140°F)  
 Inlet voltage fluctuations must not exceed ±10%

X	Y	Connections	Circuit	Voltage
01	30	DIN 43650 - ISO 4400	Standard	DC - RAC

Z	Voltage V	Resistance Ohm (±7%)	Power W	Current A		ΔT °C (°F)
	Nominal	Ta = 20-25°C (68-77°F)	Cold coil	Cold coil	Hot coil	1 hour energized at Ta=20-25°C (68-77°F) Nominal voltage
GV	230 DC	2697.73	19.5	* 0.075	* 0.058	95-100 (205-215)
GA	230 RAC	2179.39	19.5	* 0.087	* 0.064	

\* Note: current valves with Ta= 60 °C (140 °F)

[ mm / Inches ]

**Preferred types (readily available)**

Type	Material number
OD02280130GA00	R934004894
OD02280130GV00	R934004895

Type	Material number

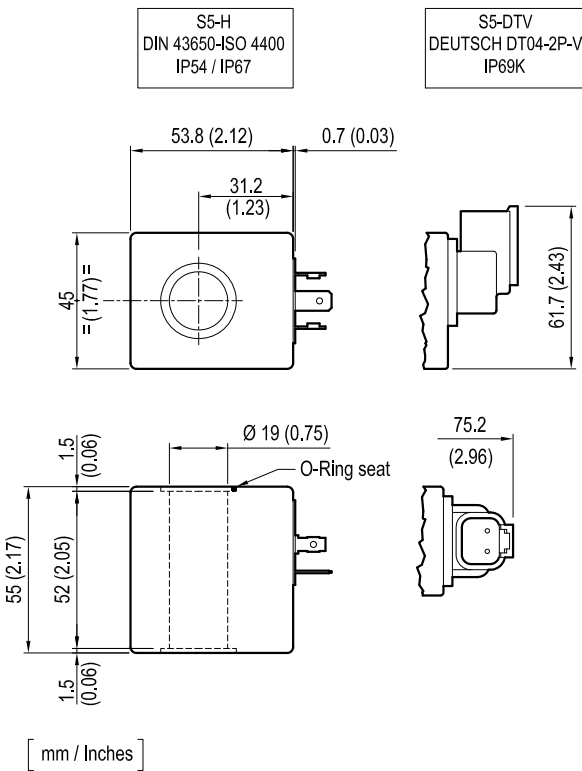
Further types available by request



# Coils - Connectors

COIL S5 - CLASS H - 20 W

OD.02.09 - X - Y - Z - 01



**TECHNICAL DATA**

Weight: 0.47 kg (1.04 lbs)  
 Heat insulation Class H: 180°C (356°F)  
 Ambient temperature range: -30/+70°C (-22/+158°F)  
 Inlet voltage fluctuations must not exceed ±10% of nominal voltage to obtain correct operation and long life coils.

X	Y	Connections	Circuit	Voltage
01	30	DIN 43650 - ISO 4400	Standard	DC
20	3P	DEUTSCH DT-04-2P-V	Standard	DC
22	3P	DEUTSCH DT-04-2P-V	Bidirectional Diode	DC

Z	Voltage V	Resistance Ohm (±7%)	Power W	Current A		ΔT °C (°F) 1 hour energized at Ta=20-25°C (68-77°F) Nominal voltage
	Nominal	Ta = 20-25°C (68-77°F)	Cold coil	C o l d coil	H o t coil	
OB	12 DC	6.2	23	1.9	1.4	92-96 (198-205)
OC	24 DC	24.9	23	1.0	0.7	

**Preferred types (readily available)**

Type	Material number
OD02090130OB01	R901090827
OD02090130OC01	R901090828
OD0209203POB01	R901110011

Type	Material number
OD0209203POC01	R901110012
OD0209223POB01	R901090829
OD0209223POC01	R901110013

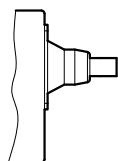
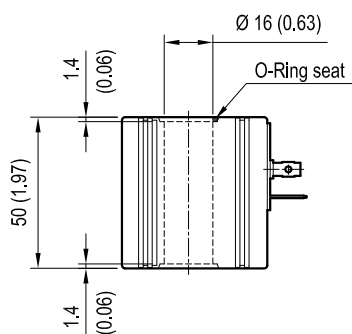
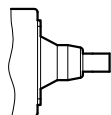
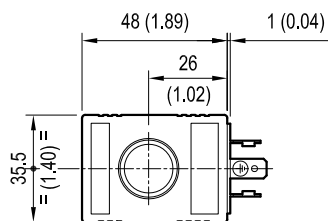
Further types available by request

# Coils - Connectors

## COIL S7 - CLASS H - 30 W

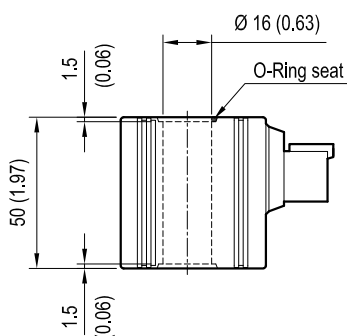
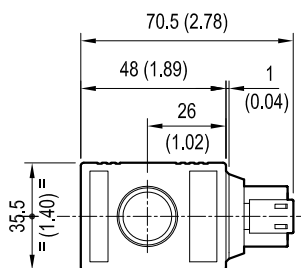
S7-H  
DIN 43650-ISO 4400  
IP54 / IP67

SINGLE LEAD  
IP54



[ mm / Inches ]

S7-D  
DEUTSCH DT04-2P  
IP69K



[ mm / Inches ]

### Preferred types (readily available)

Type	Material number
OD02070130OB02	R901090824
OD02070130OC02	R901090825
OD02072030OB02	R901094589
OD02072030OG02	R934000349
OD02072230OG02	R934000355

## OD.02.07 - X - Y - Z - 02

### TECHNICAL DATA

Weight: 0.33 kg (0.73 lbs)

Heat insulation Class H: 180°C (356°F)

Ambient temperature range: -30/+60°C (-22/+140°F)

Inlet voltage fluctuations must not exceed ±10% of nominal voltage to obtain correct operation and long life coils.

X	Y	Connections	Circuit	Voltage
01	30	DIN 43650 - ISO 4400	Standard	DC
0H	02	SINGLE LEAD	Bidirectional Diode	DC *

\* Length 200 mm (7.87 inches). Ext. diameter 0.53 mm (0.02). External and internal Sheath Silicone rubber.

Z	Voltage V	Resistance Ohm (±7%)	Power W	Current A		ΔT °C (°F) 1 hour energized at Ta=20-25°C (68-77°F) Nominal voltage
	Nominal	Ta = 20-25°C (68-77°F)	Cold coil	Cold coil	Hot coil	
OB	12 DC	4.8	30	2.5	1.8	120-140 (248-284)
OC	24 DC	18.8	30	1.2	0.9	

X	Y	Connections	Circuit	Voltage
20	30	DEUTSCH DT04-2P	Standard	DC
22	30	DEUTSCH DT04-2P	Bidirectional Diode	DC

Z	Voltage V	Resistance Ohm (±7%)	Power W	Current A		ΔT °C (°F) 1 hour energized at Ta=20-25°C (68-77°F) Nominal voltage
	Nominal	Ta = 20-25°C (68-77°F)	Cold coil	Cold coil	Hot coil	
OB	12 DC	4.8	30	2.5	1.8	120-140 (248-284)
OG	14 DC	6.5	30	2.1	1.4	
OC	24 DC	18.8	30	1.2	0.9	

Available on request: different voltages, working duty Ed 50 %

These coils have passed the THERMAL SHOCK DUNK TEST

Note: for general information see "Section 7 - Technical Data"

Type	Material number
OD02072030OC02	R901094594
OD02072230OB02	R901094595
OD02072230OC02	R901094597
OD02070H02OB02	R934004373

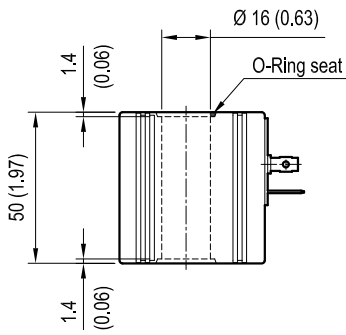
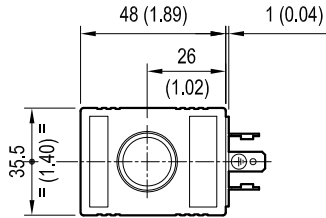
Further types available by request

# Coils - Connectors

COIL S7 - CLASS H - 26 W

OD.02.37 - X - Y - Z - 02

S7-H  
DIN 43650-ISO 4400  
IP54 / IP67



[ mm / Inches ]

**TECHNICAL DATA**

Weight: 0.33 kg (0.73 lbs)  
 Encapsulating material: IXEF  
 Heat insulation Class H: 180°C (356°F)  
 Ambient temperature range: -30/+80°C (-22/+176°F)  
 Inlet voltage fluctuations must not exceed ±15% of nominal voltage to obtain correct operation and long life coils.

X	Y	Connections	Circuit	Voltage
01	30	DIN 43650 - ISO 4400	Standard	DC

Z	Voltage V	Resistance Ohm (±7%)	Power W	Current A		ΔT °C (°F)
	Nominal	Ta = 20-25°C (68-77°F)	Cold coil	Cold coil	Hot coil	1 hour energized at Ta=20-25°C (68-77°F) Nominal voltage
OB	12 DC	5.5	26	2.2	1.6	100-120 (212-248)
OC	24 DC	21.9	26	1.1	0.8	

**Preferred types**

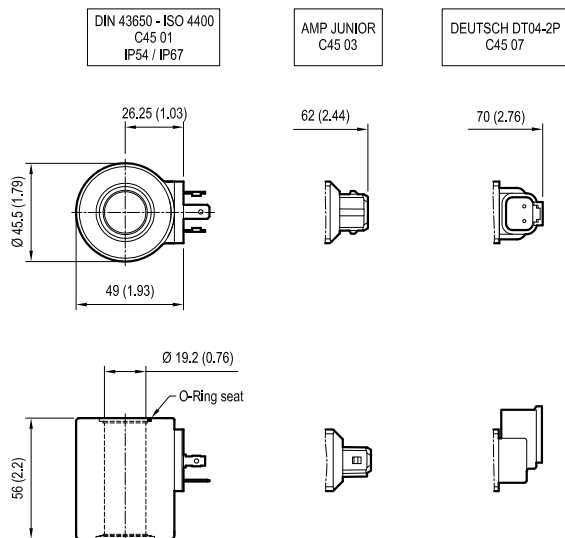
Type	Material number
OD02370130OC02	R934003700

Type	Material number

Further types available by request

# Coils - Connectors

## COIL C45 - CLASS H



### TECHNICAL DATA

Weight: 0.34 kg (0.75 lbs)  
 Heat insulation Class H: 180°C (356°F)  
 Ambient temperature range: -30/+60°C (-22/+140°F)  
 Inlet voltage fluctuations must not exceed ±10% of nominal voltage to obtain correct operation and long life coils.

[ mm / Inches ]

### Connection

#### DIN 43650 - ISO 4400

Description	Voltage V	Power W	Current A to 20°C	Resistance Ω ±7% to 20°C	Code	Material Number
C45 01 12DC	12 DC	33	2.8	4.2	271-0417	R933000026
C45 01 24DC	24 DC	33	1.4	17.1	271-0418	R933000034

### Connection

#### AMP JUNIOR

Description	Voltage V	Power W	Current A to 20°C	Resistance Ω ±7% to 20°C	Code	Material Number
C45 03 12DC	12 DC	33	2.8	4.2	271-041710	R933000027
C45 03 24DC	24 DC	33	1.4	17.1	271-041725	R933003630

### Connection

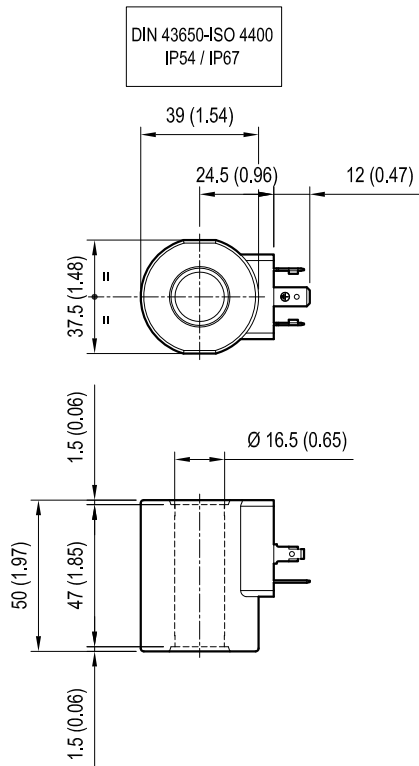
#### DEUTSCH DT04-2P

Description	Voltage V	Power W	Current A to 20°C	Resistance Ω ±7% to 20°C	Code	Material Number
C45 07 12DC	12 DC	33	2.8	4.2	271-041717	R933000030
C45 07 24DC	24 DC	33	1.4	17.1	271-041719	R933000032

# Coils - Connectors

COIL R7 - CLASS H - 18 W

OD.02.21 - X - Y - Z - 00



### TECHNICAL DATA

Weight: 0.31 kg (0.71 lbs)  
 Heat insulation Class H: 180°C (356°F)  
 Ambient temperature range: -30/+80°C (-22/+284°F)  
 Inlet voltage fluctuations must not exceed ±15% of nominal voltage to obtain correct operation and long life coils.

X	Y	Connections	Circuit	Voltage
01	30	DIN 43650 - ISO 4400	Standard	DC

Z	Voltage V	Resistance Ohm (±7%)	Power W	Current A		ΔT °C (°F)
	Nominal	Ta = 20-25°C (68-77°F)	Cold coil	Cold coil	Hot coil	1 hour energized at Ta=20-25°C (68-77°F) Nominal voltage
OB	12 DC	7.9	18	1.5	1.1	90-105 (194-221)

[ mm / Inches ]

### Preferred types (readily available)

Type	Material number
OD02210130OB00	R934001302

Type	Material number

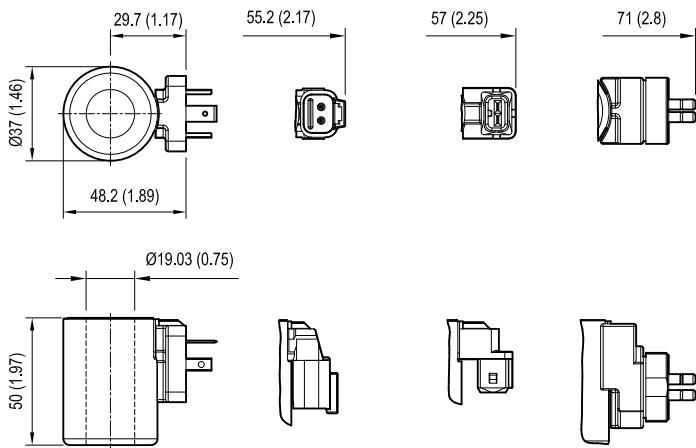
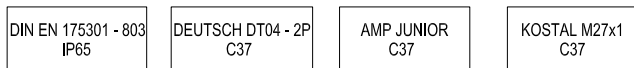
Further types available by request



# Coils - Connectors

COIL GZ37 ON/OFF - CLASS H - 22W

37 - X - 22G - Y 00



**TECHNICAL DATA**

Weight: 0.24 kg (0.53 lbs)  
 Heat insulation Class H: 180°C (356°F)  
 Ambient temperature range: -40/+110°C (-40/+230°F)  
 Inlet voltage fluctuations must not exceed ±15% of nominal voltage to obtain correct operation and long life coils.  
 Coils are not equipped with suppression diode.  
 Coating to DIN 50962 - Fe // ZnNi with thick film passivation.  
 (Salt spray test to DIN 50021 720 h)

[mm / Inches]

X	Connection	Type of protection
C4	AMP JUNIOR TIMER	IP 66 (IP69K with connector R901022127) see RE08006
K40	DT04-2PA DEUTSCH	IP 69K
K4	DIN 43650 - ISO4400	IP65
K46	KOSTAL	IP65

Y	Voltage V	Resistance Ohm ± 5%	Power W
	Nominal	T= 20°C (68°F)	T= 20° (68°F) Nominal Voltage
12	12 DC	6.4	22
24	24 DC	25.8	22
48	48 DC	101	22
96	96 DC	387	22
205	205 DC	1870	22

## Preferred types

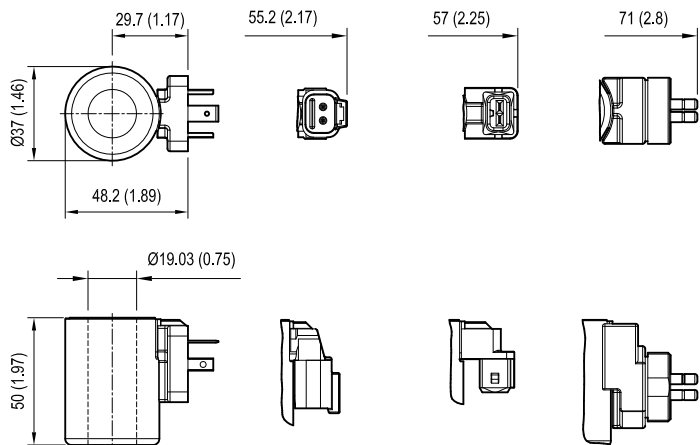
Type	Material number
37-C4-22G1200	R900315818
37-C4-22G2400	R900315819
37-K40-22G1200	R900729189
37-K40-22G2400	R900729190
37-K4-22G1200	R900991678
37-K4-22G2400	R900991121

Type	Material number
37-K4-22G4800	R901037025
37-K4-24G9600	R900704587
37-K4-22G20500	R900704588
37-K46-22G1200	R901269304
37-K46-22G2400	R901237400

# Coils - Connectors

COIL GP37 PROPORTIONAL - CLASS H

37 - X - RY - Y 00

DIN EN 175301 - 803  
IP65DEUTSCH DT04 - 2P  
C37AMP JUNIOR  
C37KOSTAL M27x1  
C37

## TECHNICAL DATA

Weight: 0.24 kg (0.53 lbs)

Heat insulation Class H: 180°C (356°F)

Ambient temperature range: -40/+110°C (-40/+230°F)

Inlet voltage fluctuations must not exceed  $\pm 15\%$  of nominal voltage to obtain correct operation and long life coils.

Coils are not equipped with suppression diode.

Coating to DIN 50962 - Fe // ZnNi with thick film passivation. (Salt spray test to DIN 50021 720 h)

Recommended dither frequency (PWM) 120 Hz

[mm / Inches]

X	Connection	Type of protection
C4	AMP JUNIOR TIMER	IP 66 (IP69K with connector R901022127) see RE08006
K40	DT04-2PA DEUTSCH	IP 69K
K4	DIN 43650 - ISO4400	IP65
K46	KOSTAL	IP65

Y	Nominal Voltage (V)	Resistance at 20°C / 68°F $\pm 5\%$ (Ohm)	Resistance max. hot valve (Ohm)	Max. control current I max. (mA)	Minimum terminal voltage to get I max. at max. hot resistance (V)
2,3	12 DC	2.3	3.8	1760	6.7
4,8	24 DC	4.8	7.9	1200	9.5
11,5	24 DC	11.5	18.5	800	14.5

## Preferred types

Type	Material number
37-C4-R11,500	R901049963
37-C4-R2,300	R901003044
37-C4-R4,800	R901003026
37-K40-R11,500	R901050010
37-K40-R2,300	R901003055
37-K40-R4,800	R901003053

Type	Material number
37-K4-R11,500	R901049962
37-K4-R2,300	R901002932
37-K4-R4,800	R901002319
37-K46-R11,500	R901117075
37-K46-R2,300	R901103949
37-K46-R4,800	R901103947



# Coils - Connectors

COIL D36 - CLASS H - 20 W

OD.02.36 - X - Y - Z

**TECHNICAL DATA**

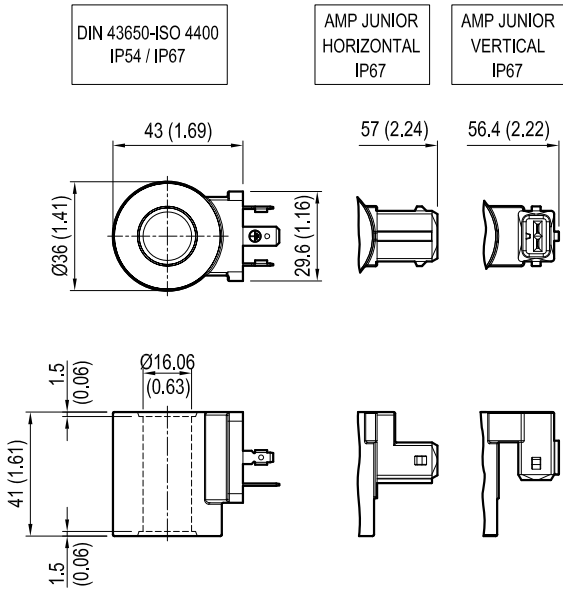
Weight: 0.18 kg (0.40 lbs)

Power: 20 W

Heat insulation Class H: 180°C (356°F)

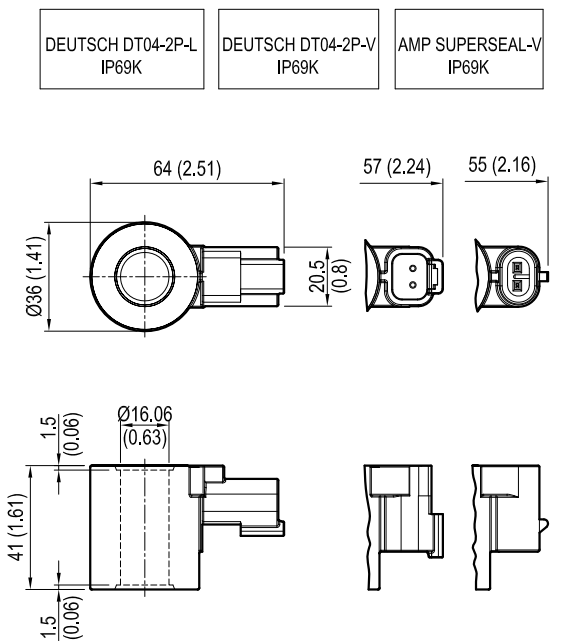
Ambient temperature range: -30/+90°C (-22/+194°F)

Further performance limits in terms of temperature and voltage fluctuations: please refer to data sheet of the solenoid valve where D36 coil is mounted.



[ mm / Inches ]

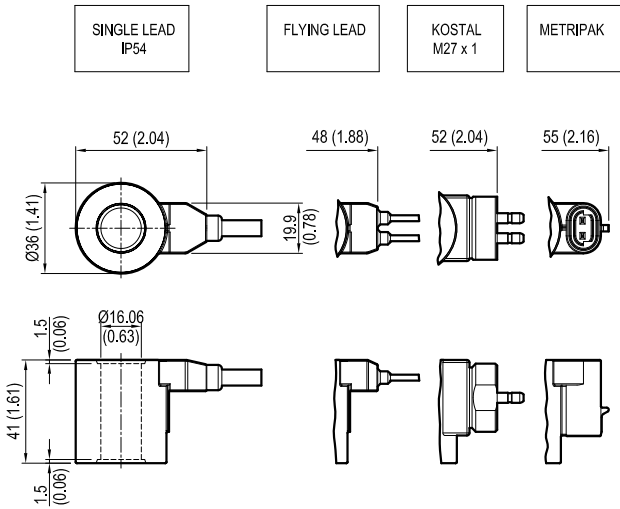
X	Y	Connections	Circuit	Voltage
01	30	DIN 43650 - ISO 4400	Standard	DC
07	30	AMP JUNIOR H	Standard	DC
07	3P	AMP JUNIOR V	Standard	DC
14	30	DIN 43650 - ISO 4400	Bidirectional Diode	DC
15	30	AMP JUNIOR H	Bidirectional Diode	DC
15	3P	AMP JUNIOR V	Bidirectional Diode	DC



[ mm / Inches ]

X	Y	Connections	Circuit	Voltage
20	30	DEUTSCH DT04-2P-L	Standard	DC
20	3P	DEUTSCH DT04-2P-V	Standard	DC
30	3P	AMP SUPERSEAL-V	Standard	DC
22	30	DEUTSCH DT04-2P-L	Bidirectional Diode	DC
22	3P	DEUTSCH DT04-2P-V	Bidirectional Diode	DC
32	3P	AMP SUPERSEAL-V	Bidirectional Diode	DC

# Coils - Connectors



[ mm / Inches ]

X	Y	Connections	Circuit	Voltage
0G	03	SINGLE LEAD *	Standard	DC
02	03	FLYING LEAD **	Standard	DC
03	30	KOSTAL M27x01	Standard	DC
40	3P	METRIPAK	Standard	DC
0H	03	SINGLE LEAD *	Bidirectional Diode	DC
23	03	FLYING LEAD **	Bidirectional Diode	DC
12	30	KOSTAL M27x01	Bidirectional Diode	DC
41	3P	METRIPAK	Bidirectional Diode	DC

\* Length 300mm (11.8 inches). Ext. diameter 6.3mm (0.25 inches). External and internal Shealth Silicone rubber.  
 \*\* Length 300mm

Note: Single lead and Flying lead coil also available with 1000 mm length; ordering code with Y=10 in place of Y=03

Z	Voltage V	Resistance Ohm (±7%)	Power W	Current A	
	Nominal	aT = 20 °C (68 °F)		I Max.	I Nom.
OB	12 DC	7.4	20	1.67	1.04
OC	24 DC	28.4	20	0.83	0.54
OD	48 DC	106.5	20	0.42	0.29
OU*	96 DC	451	20	0.21	0.14
AH*	205 DC	2062	20	0.10	0.06

\* OU and AH versions especially designed in cases of AC supply voltage (respectively for 110AC and 220 AC) to be used in conjunction with connector with circuit including wave rectifier.

Note: diode available only for 12 V DC and 24 V DC coils. Diode set at 27 V DC for 12 V DC coil and at 39 V DC for 24 V DC coil.

# Coils - Connectors

COIL D36 - CLASS H - 20 W - LISTED UL

OD.02.U6 - X - Y - Z

## TECHNICAL DATA

Weight: 0.18 kg (0.40 lbs)

Power: 20 W

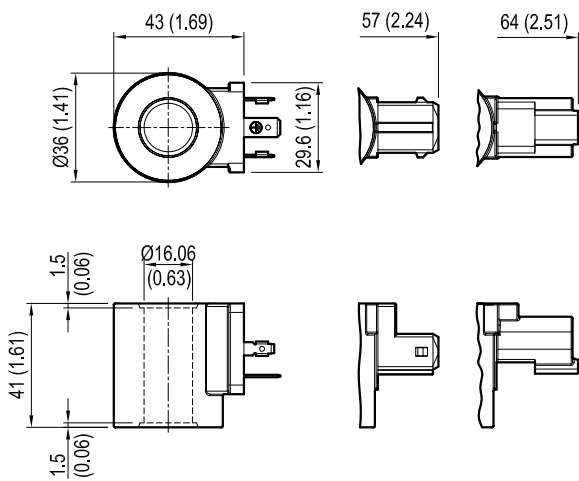
Heat insulation Class H: 180°C (356°F)

Ambient temperature range: -30/+70°C (-22/+158°F)

Further performance limits in terms of temperature and voltage fluctuations: please refer to data sheet of the solenoid valve where D36 coil is mounted.

DIN 43650-ISO 4400 IP54 / IP67	AMP JUNIOR HORIZONTAL IP67	DEUTSCH DT04-2P-L IP69K
-----------------------------------	----------------------------------	----------------------------

UL file number: MH48725



[ mm / Inches ]

X	Y	Connections	Circuit	Voltage
01	30	DIN 43650 - ISO 4400	Standard	DC
07	30	AMP JUNIOR H	Standard	DC
20	30	DEUTSCH DT04-2P-L	Standard	DC

Note: UL D36 coil is function interchangeable with standard 20W D36 coil, except for restricted admissible ambient temperature range.

Z	Voltage V	Resistance Ohm ( $\pm 7\%$ )	Power W	Current A	
	Nominal	aT = 20 °C (68 °F)		I Max.	I Nom.
OB	12 DC	7.4	20	1.67	1.04
OC	24 DC	28.4	20	0.83	0.54
OD	48 DC	106.5	20	0.42	0.29
OU*	96 DC	451	20	0.21	0.14
AH*	205 DC	2062	20	0.10	0.06

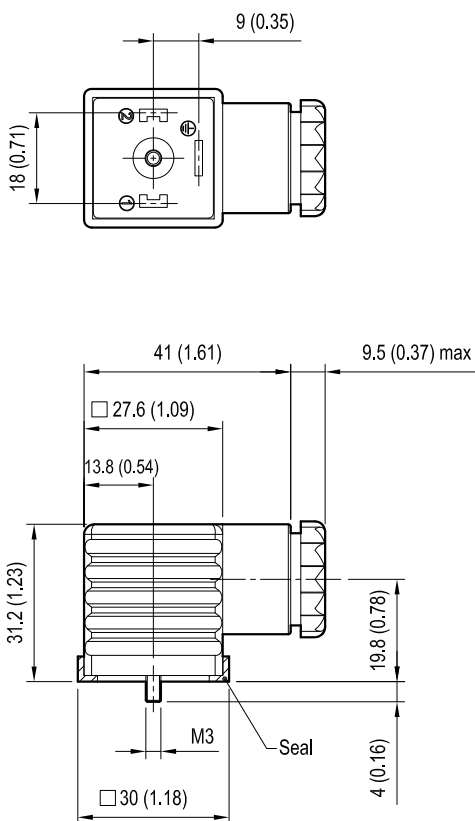
\* OU and AH versions especially designed in cases of AC supply voltage (respectively for 110AC and 220 AC) to be used in conjunction with connector with circuit including wave rectifier.

# Coils - Connectors

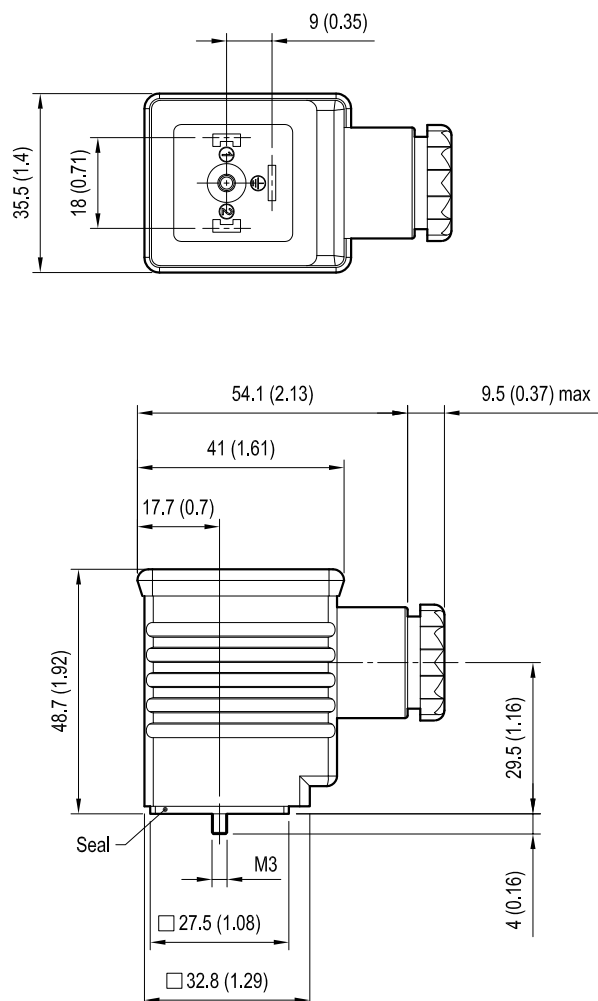
## CONNECTOR IP67 - EN 175000 (DIN 4350-A) / ISO 4400

Ambient temperature	- Standard	°C	- 20 to + 100
	-With indicator lamp/rectifier	°C	-20 to + 60
Type of protection according to DIN 40050	IP67 with cable socket mounted and locked		
Operating voltage	V Choose the proper ordering code according to the circuit		
Maximum operating current	- Standard	A	16
	- With rectifier	A	1 or 3
Current consumption of LED	mA approx. 10		
LED	Red		
Number of pins	2 + PE		
Clamping range for cables having an outer diameter of	mm	5, up to 10	
Cable entry	Pg9 / Pg11 (unified)		
Maximum cable cross-section	mm <sup>2</sup>	1.5	

### Type 1



### Type 2

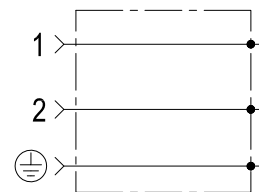


[ mm / Inches ]

# Coils - Connectors

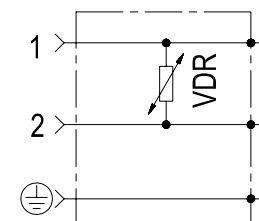
CONNECTOR IP67 - EN 175000 (DIN 4350-A) / ISO 4400

## STANDARD CIRCUIT



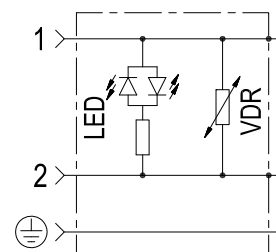
Colour	Valve side	Cable entry	Type connector	Code	Material number
black	B	Pg9 / Pg11	type 1	OD016901000000	R934004344
grey	A	Pg9 / Pg11	type 1	OD016901000003	R934004346

## CIRCUIT WITH VDR



Voltage V	Colour	Valve side	Cable entry	Type connector	Code	Material number
12	black	A/B	Pg9 / Pg11	type 1	OD016907000B00	R934004361
24	black	A/B	Pg9 / Pg11	type 1	OD016907000C00	R934004362
115	black	A/B	Pg9 / Pg11	type 1	OD016907000E00	R934004363
230	black	A/B	Pg9 / Pg11	type 1	OD016907000F00	R934004364

## CIRCUIT WITH VDR + LED



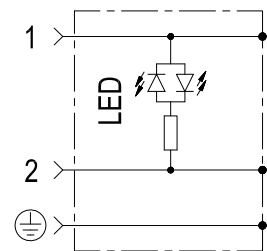
Voltage V	Colour	Valve side	Cable entry	Led colour	Type connector	Code	Material number
12	transparent	A/B	Pg9 / Pg11	red	type 1	OD016921000B00	R934004370
24	transparent	A/B	Pg9 / Pg11	red	type 1	OD016921000C00	R934004371

4

# Coils - Connectors

CONNECTOR IP67 - EN 175000 (DIN 4350-A) / ISO 4400

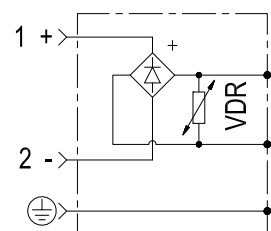
## CIRCUIT WITH LED



Voltage V	Colour	Valve side	Cable entry	Led colour	Type connector	Code	Material number
12	transparent	A/B	Pg9 / Pg11	red	type 1	OD01690300OB00	R934004354
24	transparent	A/B	Pg9 / Pg11	red	type 1	OD01690300OC00	R934004355
230	transparent	A/B	Pg9 / Pg11	red	type 1	OD01690300OF00	R934004356

## CIRCUIT WITH VDR + WAVE RECTIFIER

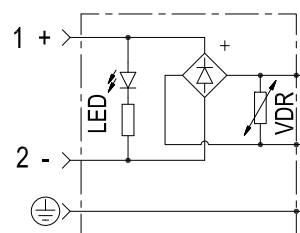
Note: for diode with capacity max 1 Amp, suitable only for S8-356 coils.



Voltage V	Diode Capacity I max	Colour	Valve side	Cable entry	Type connector	Code	Material number	
								AC
115	/	1 A	black	A/B	Pg9 / Pg11	type 1	OD01690201OW00	R934004352
230	/	1 A	black	A/B	Pg9 / Pg11	type 1	OD01690201OZ00	R934004353
24	/	3 A	black	A/B	Pg9 / Pg11	type 2	OD01690200OV00	R934004349
115	/	3 A	black	A/B	Pg9 / Pg11	type 2	OD01690200OW00	R934004350
230	/	3 A	black	A/B	Pg9 / Pg11	type 2	OD01690200OZ00	R934004351

## CIRCUIT WITH VDR + WAVE RECTIFIER + LED

Note: for diode with capacity max 1 Amp, suitable only for S8-356 coils.

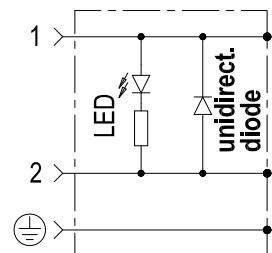


Voltage V	Diode Capacity I max	Colour	Valve side	Cable entry	Led colour	Type connector	Code	Material number
115	/	1 A	transparent	A/B	Pg9 / Pg11	type 1	OD01691901OW00	R934004369
230	/	3 A	transparent	A/B	Pg9 / Pg11	type 2	OD01691900OZ00	R934004367

# Coils - Connectors

CONNECTOR IP67 - EN 175000 (DIN 4350-A) / ISO 4400

CIRCUIT WITH UNIDIRECTIONAL DIODE +LED



Voltage V		Colour	Valve side	Cable entry	Led colour	Type connector	Code	Material number
AC	DC							
/	12	transparent	A/B	Pg9 / Pg11	red	type 1	OD01691000OB00	R934004365
/	24	transparent	A/B	Pg9 / Pg11	red	type 1	OD01691000OC00	R934004366





## High Pressure cartridge valves

### Mechanical

<b>Designation</b>	<b>Description</b>	<b>Cavity</b>	<b>Data sheet</b>	<b>Page</b>
Pressure relief valves	0 532...	Special	25860	965
Safety valves, type-approved	0532 VA ...	Special	50153	977
Pressure relief valve, pilot operated	MHDBV	Special	64606	985
Pressure relief valve, pilot operated, with pulling function	MHDBN-Y-02	Special	64599	995
Pressure relief and anti-cavitation valve, pilot operated	MHDBN	Special	64602	1005
Pressure relief valve, pilot operated, sequence with cut-off stage	MHDBL, MHDBB	Special	64612	1015
Anti-cavitation valve	MHSV	Special	64609	1025
Shuttle valve	MHSU	Special	18205	1033



# Pressure relief valves

**0532 ...**  
**R 917 ...**

Valves for line connections

Valves for block installation

$p_{\max} = 350 \text{ bar}$   
 $Q_{\max} = 120 \text{ l/min}$



## Contents

	Page
Function	2
Technical data	2
Valves for line installation	3
Device dimensions	5
Valves for block installation	7
Device dimensions	9
Curves	11

## Features

- Type of connection for pipeline installation and block installation
- Adjustment methods such as hand wheel, lead-seal capable, fixed, hand wheel with scale (with and without lock)

## Application

In conveying and handling equipment, agricultural engineering, in municipal-vehicles and in general mechanical engineering.

## Note

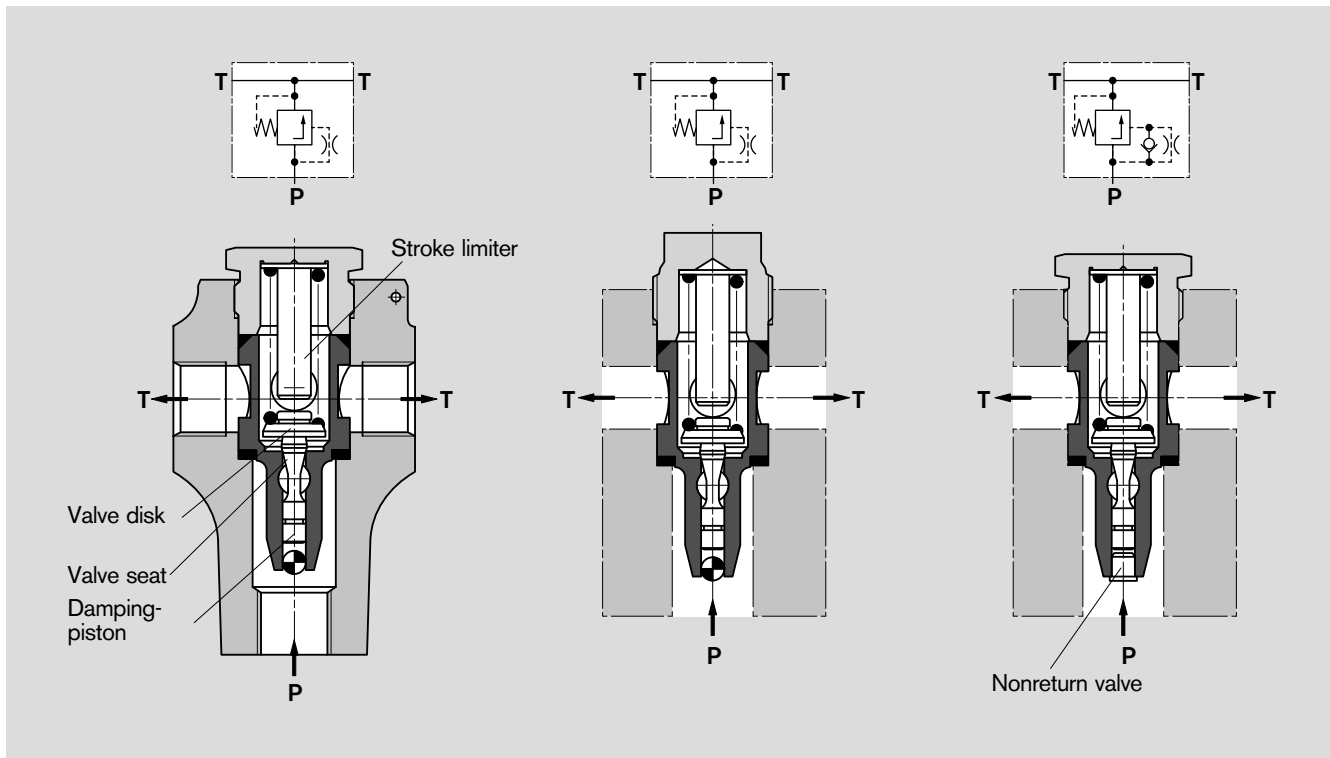
The versions "Safety valves TÜV German Technical Inspection Agency model approved" in accordance with the Pressure Equipment Directive 97/23/EG are used to safeguard hydraulic accumulators, see technical data sheet RDEF 50 153.

# Function

This model series is based on a valve in seat design with damping piston. The punched valve seat serves to ensure high density, the damping piston prevents any valve vibration. It produces a flat control characteristic, i.e., even at an increasing flow rate the set opening pressure is for the most part maintained. This is achieved by the effect of the flow forces on the valve disk, whereby the valve continues to open as the flow rate increases.

Versatile version variants are available:

- Housing for pipeline installation with and without measuring connection.
- Valve cartridges for block installation.
- Various adjustment methods such as hand wheel, lead-seal capable, fixed, hand wheel with scale (with and without lock).
- Check valve before damping piston for fast response times.

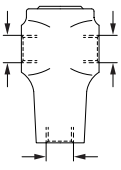



# Technical data

Design	Seat valve with damping
Line connections	for pipeline installation and block installation
Installation position	Optional
Ambient temperature	-30...+80°C
Pressure medium	Hydraulic oils based on mineral oil acc. to DIN/ISO, other, e.g. environmentally-compatible fluids available on request
Viscosity	10...800 mm <sup>2</sup> /s permissible range 20...100 mm <sup>2</sup> /s recommended range ...2000 mm <sup>2</sup> /s for start permissible range
Pressure medium temperature	-30°C...+80°C with NBR sealings, NBR = Perbunan® -15°C...+120°C with FKM sealings, FKM = Viton®
Filtration	Oil contamination Class 19/16 in accordance with ISO/DIS 4406, or Class 10 in accordance with NAS 1638 to be achieved using filter β <sub>25</sub> = 75
Direction of flow rate	shown by symbol or marking
Operating pressure For line installation	P: max. permissible 350 bar, depending on number of load changes and temperature. Counter values on request. T: max. permissible 210 bar (NBR) or 80 bar (FKM), depending on number of load changes and temperature. Counter values on request.
For block installation	P: In accordance with set pressure. T: NBR max. 210 bar, FM max. 80 bar
MTTFd:	max. 150 years, PRV with set value > 210 bar: B10 value on request
Cracking pressure (tolerance p <sub>nom</sub> +5%)	Set at flow 0.1 l/min
Leakage oil flow	Max. 1 cm <sup>3</sup> /min
Flow	Max. 120 l/min, depending on set pressure and line Ø, see chapter "Characteristics"

## Pressure relief valves for line installation


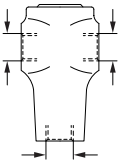





Threaded port	Version		Seals	Set pressure* [bar]	Weight [kg]	Material No.
M 18 x 1,5 	Fixed		NBR	10	0.9	0 532 001 031
			FKM	10		0 532 001 115
			NBR	12		0 532 001 156
				15		0 532 001 004
				20		0 532 001 012
				25		0 532 001 011
				30		0 532 001 014
				40		0 532 001 027
				50		0 532 001 020
				60		0 532 001 018
				70		0 532 001 005
				80		0 532 001 006
				90		0 532 001 026
				100		0 532 001 007
				110		0 532 001 024
				140		0 532 001 008
				140		R 917 002 956**
				150		R 917 002 975**
				150		0 532 001 009
				170		0 532 001 028
				180		0 532 001 022
				190		0 532 001 021
			200	0 532 001 023		
			210	0 532 001 013		
			210	0 532 001 154		
			210	R 917 002 960**		
			230	0 532 001 019		
250	0 532 001 016					
300	0 532 001 030					
	Fixed, with nonreturn valve					
	Fixed					

NBR = Perbunan<sup>®</sup>, FKM = Viton<sup>®</sup>

\*  $p_{nom} + 5\%$  at  $Q = 0.1$  l/min, with back flow unloaded

\*\* Pressure relief valve zinc-plated and transparent-passivated, special options upon request

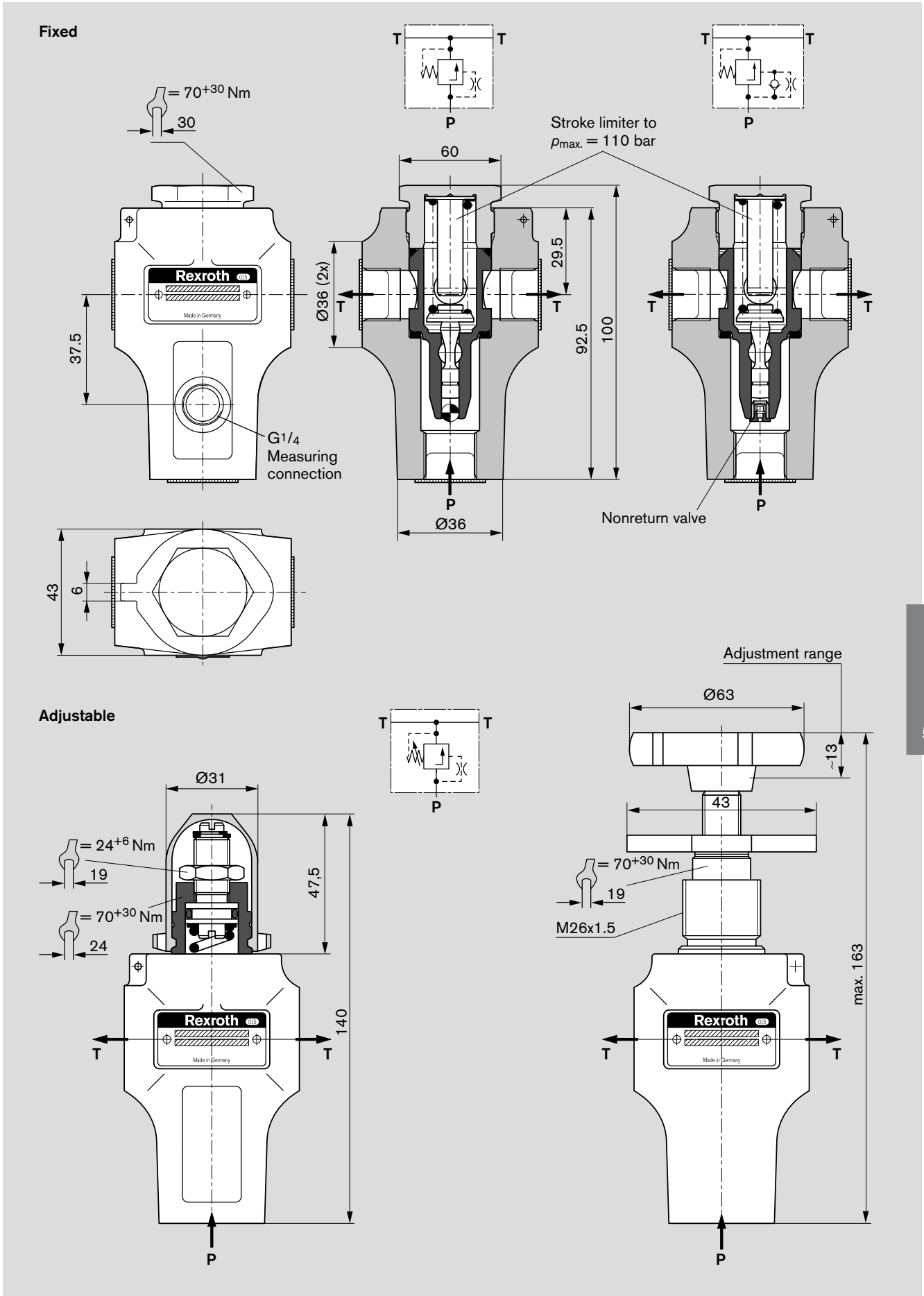
Threaded port	Version		Seals	Set pressure* [bar]	Weight [kg]	Material No.
G <sup>1</sup> / <sub>2</sub> ISO 228	Fixed, with nonreturn valve		NBR	320	0.9	0 532 001 131
M 18 x 1.5 	Adjustable		NBR	10...15	1.0	0 532 002 010
				15...50		R 917 002 939**
				15...50		0 532 002 005
				7...67		0 532 002 052
				40...100		R 917 002 936**
				40...100		0 532 002 003
				50...300		R 917 002 938**
				50...300		0 532 002 007
			FKM	50...300		0 532 002 020
			NBR	50...350		0 532 002 064
				70...180		R 917 002 937**
				70...180		0 532 002 001
				100...250		0 532 002 004
			G <sup>1</sup> / <sub>2</sub> ISO 228			
50...300	0 532 002 044					
50...350	0 532 002 059					
G <sup>1</sup> / <sub>2</sub> ISO 228	Fixed, with nonreturn valve					
M 18 x 1.5	Adjustable, long adjusting shaft Adjustable		NBR	1...10	1.2	0 532 003 014
				1...35		0 532 003 035
				15...80		0 532 003 016
				15...150		0 532 003 001
				30...200		0 532 003 003
				30...200		R 917 005 060**
				50...250		0 532 003 002
				50...300		0 532 003 009
G <sup>1</sup> / <sub>2</sub> ISO 228				50...300		0 532 003 034
M 18 x 1.5	Adjustable			0...250	1.2	0 532 008 002

NBR = Perbunan<sup>®</sup>, FKM = Viton<sup>®</sup>

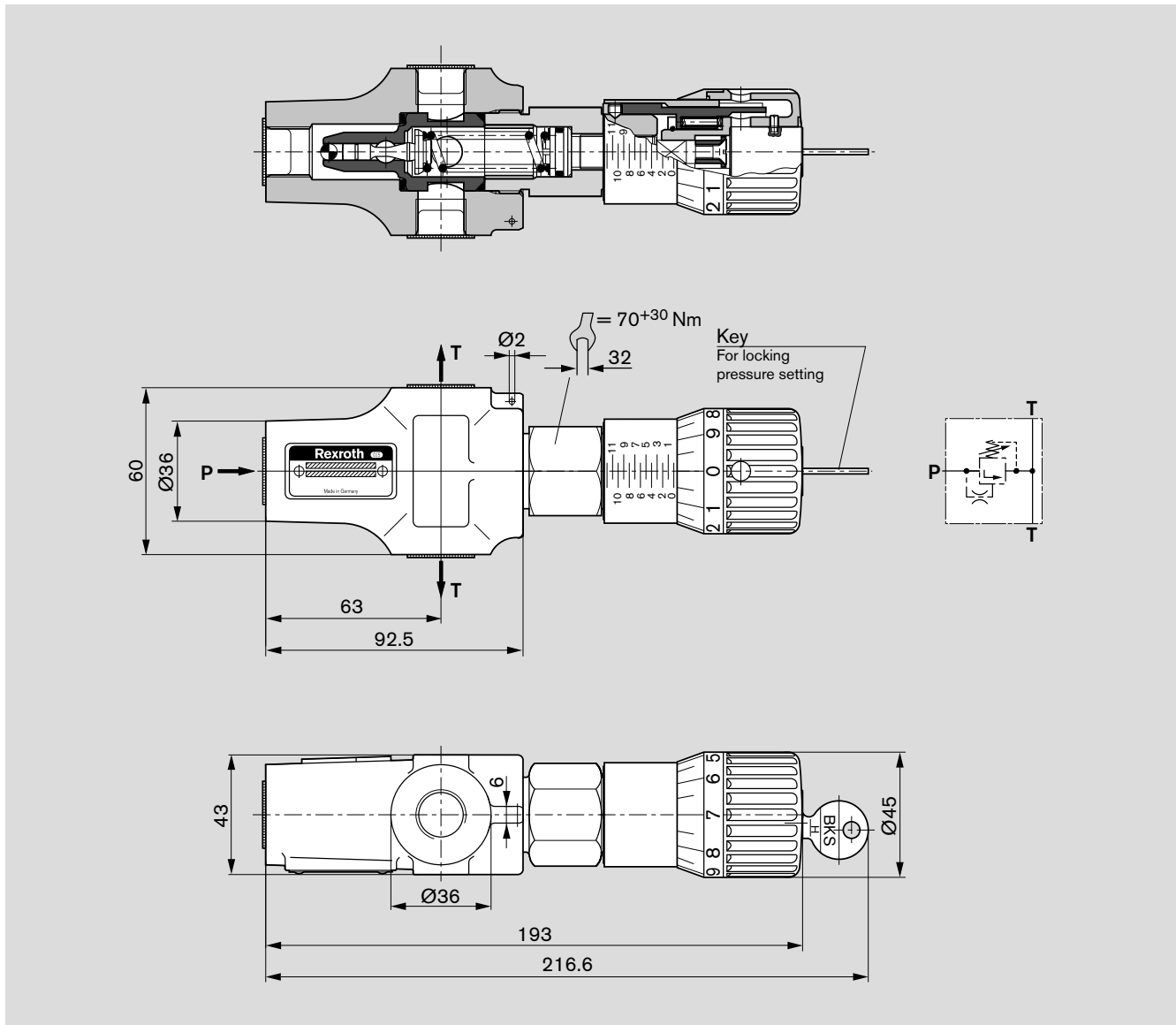
\*  $p_{nom} + 5\%$  at  $Q = 0.1$  l/min, with back flow unloaded

\*\* Pressure relief valve zinc-plated and transparent-passivated, special options upon request

# Device dimensions



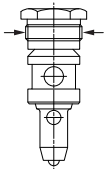

## Device dimensions (Continued)





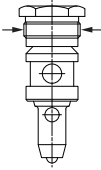

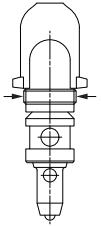



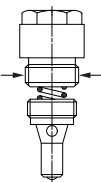

## Pressure relief valves for block installation



Threaded port	Version		Seals	Set pressure* [bar]	Weight [kg]	Material No.
M 30 x 1.5  	Fixed		FKM	5	0.2	0 532 001 148
	Fixed, with nonreturn valve		NBR	6		0 532 001 171
	Fixed		12	0 532 001 060		
			15	0 532 001 055		
			25	0 532 001 039		
			30	0 532 001 113		
			50	0 532 001 059		
			60	0 532 001 142		
			70	0 532 001 127		
			80	0 532 001 032		
			90	0 532 001 036		
			120	0 532 001 048		
			130	0 532 001 057		
			150	0 532 001 041		
			160	0 532 001 029		
			170	0 532 001 147		
			170	0 532 001 040		
			180	0 532 001 050		
			190	0 532 001 037		
			200	0 532 001 052		
			FKM	210		0 532 001 176
			NBR	220		0 532 001 058
	Fixed, with nonreturn valve		HNBR	230		R 917 006 555
	Fixed		NBR	250		0 532 001 051
				260		0 532 001 167
				280		0 532 001 061
			FKM	280		0 532 001 172
NBR		300	0 532 001 043			
		320	0 532 001 145			
	330	0 532 001 173				

NBR = Perbunan<sup>®</sup>, FKM = Viton<sup>®</sup>, HNBR = Therban<sup>®</sup>

\*  $p_{nom} + 5\%$  at  $Q = 0.1$  l/min, with back flow unloaded

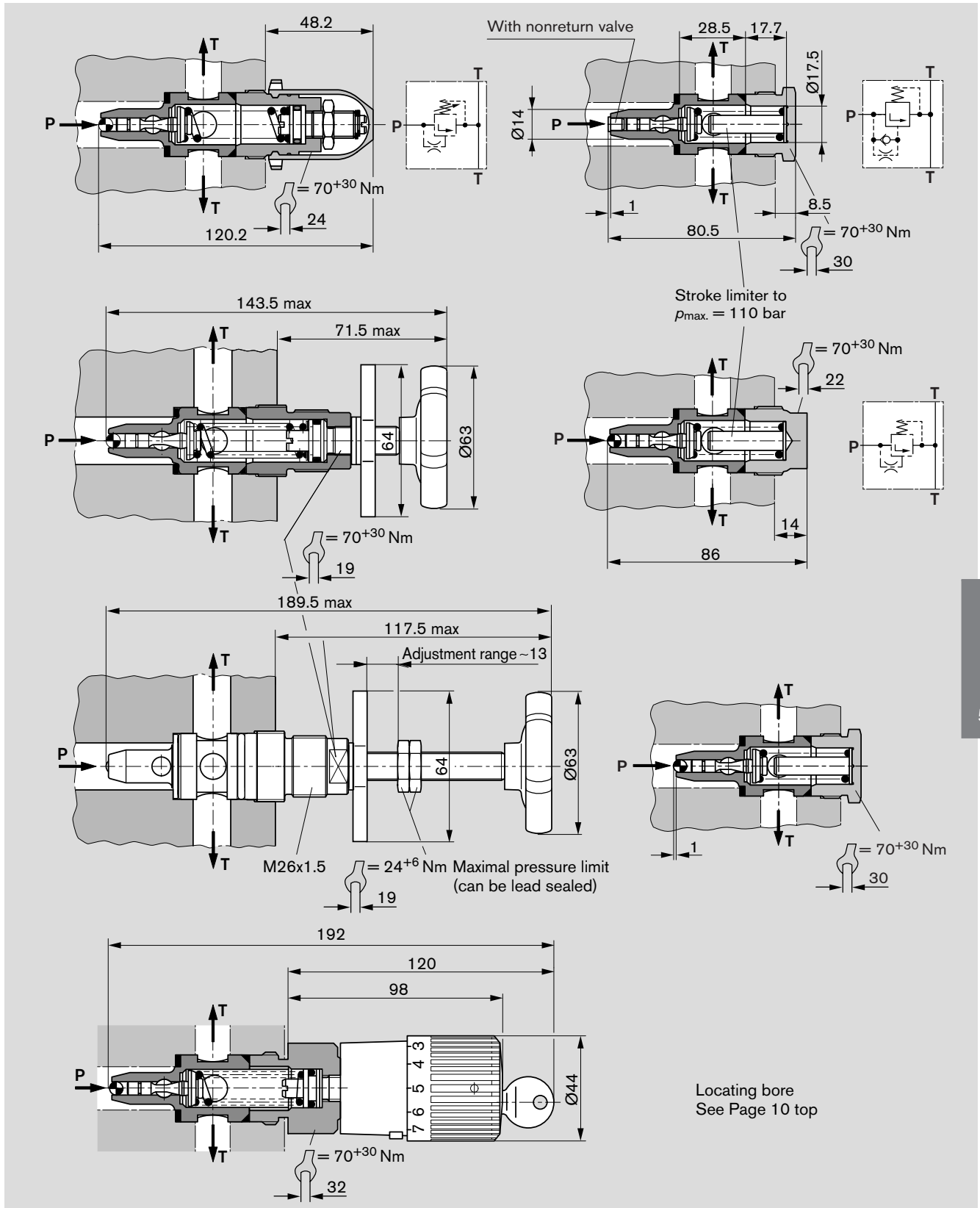
Threaded port	Version		Seals	Set pressure* [bar]	Weight [kg]	Material No.
M 30 x 1.5 	Fixed		NBR	185	0.2	0 532 001 170
				350		0 532 001 139
M 30 x 1.5 	Adjustable		NBR	1...10	0.3	0 532 002 068
	Adj., return loadable up to 330 bar			1...15		0 532 002 048
	Adjustable, preset to 35 <sup>+2</sup> bar		FKM	5...35		0 532 002 065
	Adjustable		NBR	5...35		0 532 002 062
				7...67		0 532 002 042
				10...15		0 532 002 011
				15...50		0 532 002 012
				40...100		0 532 002 015
				40...200		0 532 002 051
				50...300		0 532 002 014
	Adjustable, with nonreturn valve		FKM	50...350		0 532 002 050
	Adjustable			50...350		0 532 002 046
	Adjustable, with nonreturn valve		NBR	50...380		0 532 002 058
	Adjustable			70...180		0 532 002 002
	Adjustable, preset to 190 <sup>+10</sup> bar		FKM	70...180		0 532 002 016
100...250		0 532 002 013				
100...250		0 532 002 019				
Adjustable	100...320	0 532 002 041				
M 30 x 1.5 Adjustable, long adjusting shaft Adjustable	Adjustable, long adjusting shaft		NBR	1...10	0.4	0 532 003 012
				1...35		0 532 003 037
				15...150		0 532 003 011
				40...280		0 532 003 033
M 30 x 1.5 Adjustable	Adjustable		NBR	50...315	0.5	0 532 008 001
M 26 x 1.5 	Fixed, Valve carrier for screwing-in M 24 x 1.5 See device dimensions Page 10 bottom		NBR	30	0.2	0 532 001 813
				40		0 532 001 806
				110		0 532 001 812
				175		0 532 001 805
				200		0 532 001 804

NBR = Perbunan<sup>®</sup>, FKM = Viton<sup>®</sup>

\*  $p_{nom}$  +5% at  $Q = 0.1$  l/min, with back flow unloaded

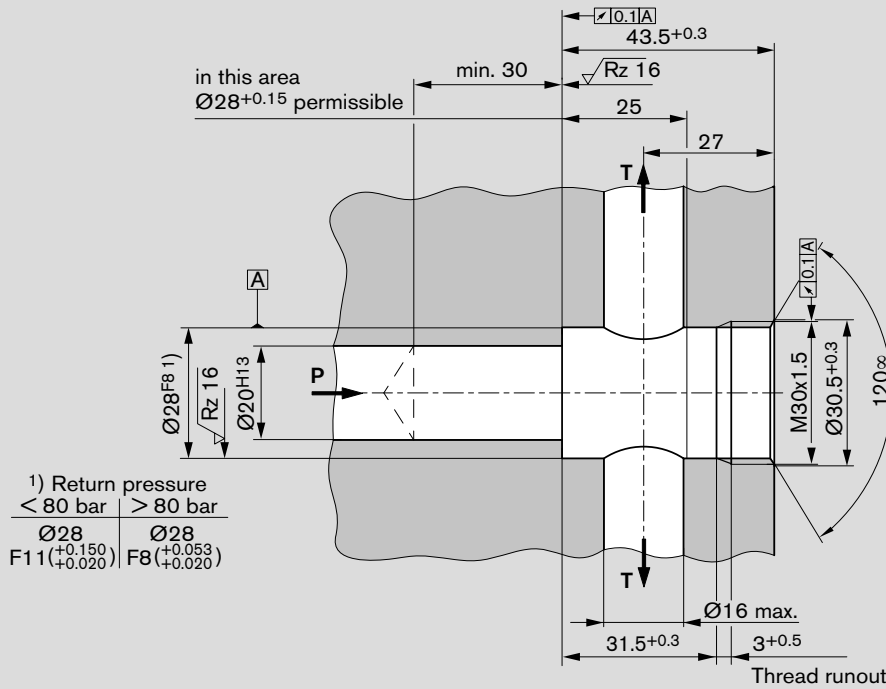
# Device dimensions

All sealing rings included loose

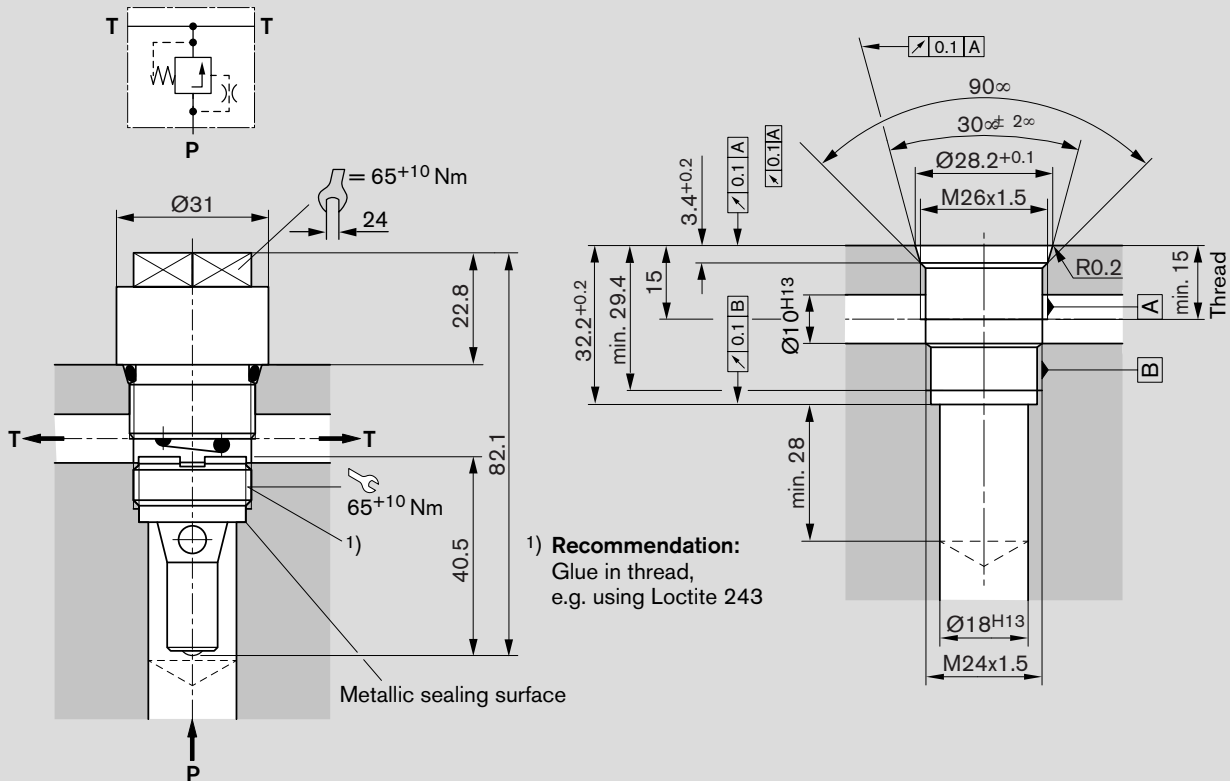


5

# Device dimensions



## Valve carrier for screwing-in

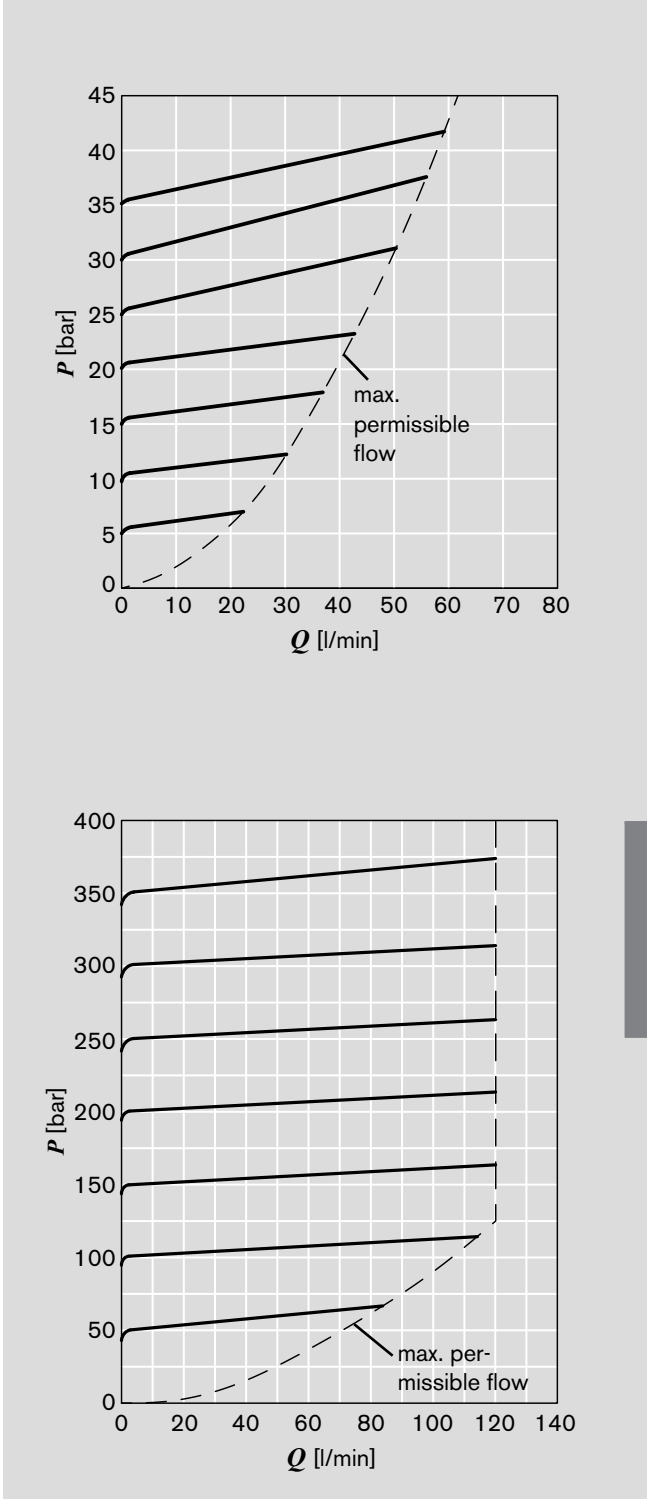


This pressure relief valve for block installation with M26 x 1.5 internal thread is designed for particularly small installation areas. The hydraulic parameters are identical with those for M30 x 1.5 internal thread. The exact pressure setting must ultimately be made by the customer.

# Curves

$\nu$  35 mm<sup>2</sup>/s,  $T$  = 50 °C  
Exceeding the boundaries of application will cause a disproportionate increase in pressure, and even to the functional limit of the PRV.

For lower setting limits



## Further notes

---

**Special models for line installation with fatigue strength up to 350 bar on request.**

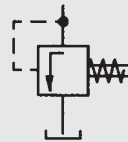
For proper use, please observe the following additional data sheets:

- Hydraulic valves for mobile applications: general information RE 64 020-B1
- Pressure relief valves: product-specific instructions RE 25 860-B2
- Pressure relief valves: repair instructions RDE 25 860-R

Information regarding the correct handling of Bosch Rexroth hydraulic products is available in our publication: "General Product Information for Hydraulic Products" RE 07 008.

# Sicherheitsventile Baumuster geprüft Safety valves, type-approved Valves de sécurité à modèle homologué

0532 VA ...



## Hinweis

Die Sicherheitsventile werden zur Absicherung von Hydrospeichern eingesetzt und müssen seit 29. 05. 2002 ein CE-Zeichen tragen. Pro Gerät muss eine Betriebsanleitung und Konformitätserklärung beigelegt werden. Die Bestellnummern der Geräte bleiben unverändert.

## Verwendung

Sicherheitsventile, TÜV Baumuster geprüft, werden zur Absicherung von Hydrospeichern eingesetzt.

## Ausführung

Das Sicherheitsventil ist als direktgesteuertes Sicherheitsventil ausgeführt und berücksichtigt die Sicherheits- und Abnahmevorschriften, gemäß

- Betriebssicherheitsverordnung
- Technische Regeln Druckbehälter TRB 403.

## Baumuster-Prüfung

Die Ventile wurden im Werk durch TÜV-Sachverständige geprüft und plombiert. Sie sind mit dem CE-Kennzeichen und einer laufenden Nummer versehen. Eine Bescheinigung über die Druckeinstellung wird mitgeliefert.

## Important

Safety valves are employed to secure hydro-pneumatic accumulators and, since 29. 05. 2002, must bear a CE Mark. An instruction booklet and Declaration of Conformity must be enclosed with each valve. The Part Numbers of the valves will remain unchanged.

## Application

Safety valves with TÜV type-approval are used to protect accumulators.

## Design

The safety valve takes the form of a direct-controlled safety valve and complies with safety and approval regulations, namely

- Industrial Safety Decree
- Technical Regulations for Pressure Vessels TRB 403.

## Type-approval

The valves have been tested and sealed by TÜV representatives. They bear the CE Mark and a serial number. Certification of the pressure setting is supplied with the valve.

## Remarque

Les valves de sécurité sont utilisées pour protéger les accumulateurs hydrauliques et doivent porter un sigle CE depuis 29. 05. 2002. Chaque appareil doit être accompagné d'une notice d'utilisation et d'une déclaration de conformité. Les références de commande des appareils restent inchangées.

## Utilisation

Les valves de sécurité avec homologation par le TÜV sont utilisées pour protéger les accumulateurs hydrauliques.

## Exécution

La valve de sécurité est conçue comme une valve de sécurité à commande directe et est conforme aux prescriptions de sécurité et d'homologation contenues dans

- l'Ordonnance sur la sécurité de travail à l'entreprise
- les Règles techniques relatives aux réservoirs sous pression (TRB 403).

## Homologation

Les valves sont contrôlées et plombées à l'usine par un expert du TÜV. Elles sont dotées du label CE et numérotées. Un certificat indiquant le réglage de la pression est fourni avec la valve.

**Plombierung; Entlastung**

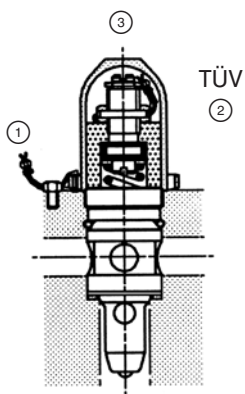
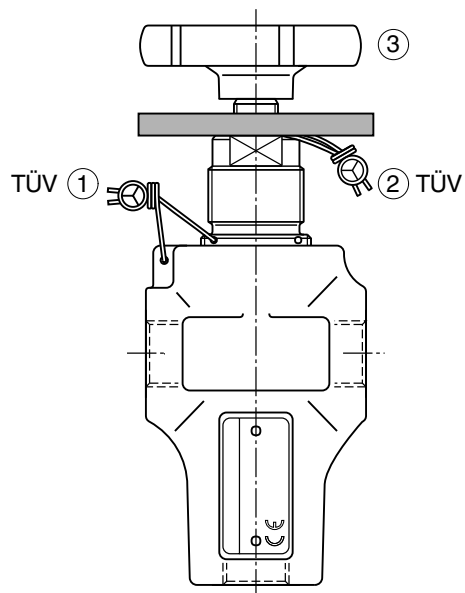
- ① Sicherung gegen Öffnen und Austausch von Federn durch Anwender.
- ② Anschlag und Konterung für  $p_{max}$ .
- ③ Entlastungsmöglichkeit.

**Sealing; discharging**

- ① Protection against opening and removal of springs by the user.
- ② Stop and locking for  $p_{max}$ .
- ③ Discharging possibility.

**Plombage; décharge**

- ① Sécurité contre l'ouverture et l'échange des ressorts par l'utilisateur.
- ② Butée et blocage par contre-écrou pour  $p_{max}$ .
- ③ Possibilité de décharge.





Für Rohrleitungseinbau  
For pipe connection  
Pour montage sur tuyauterie

0 532 VA 03 N 050 D - 40

Rohrgewinde Pipe thread Filetage			$p$ [bar]	Verstellung Adjustment Réglage	$G^*$ [l/min]	[kg]	
03	M 18 x 1,5	N Nitril	50	D	40	1,2	0 532 004 016
04	G 1/2 ISO 228						0 532 004 018
03	M 18 x 1,5		70		50		0 532 004 017
04	G 1/2 ISO 228						0 532 004 019
03	M 18 x 1,5		100		100		0 532 004 004
04	G 1/2 ISO 228						0 532 004 007
04	G 1/2 ISO 228		140		100		0 532 004 023
03	M 18 x 1,5		150		100		0 532 004 024
04	G 1/2 ISO 228						0 532 004 025
03	M 18 x 1,5		160		100		0 532 004 005
03	G 1/2 ISO 228						0 532 004 008
04	G 1/2 ISO 228		200		100		0 532 004 028
03	M 18 x 1,5		211		100		0 532 004 006
04	G 1/2 ISO 228						0 532 004 009
03	M 18 x 1,5		250		130		0 532 004 020
04	G 1/2 ISO 228						0 532 004 014
03	M 18 x 1,5		300		130		0 532 004 021
04	G 1/2 ISO 228						0 532 004 015
03	M 18 x 1,5		330		130		0 532 004 026
04	G 1/2 ISO 228						0 532 004 027



Dichtungssatz  
Set of seals  
Pochette de joints

N 1 537 010 101 V 1 537 010 104

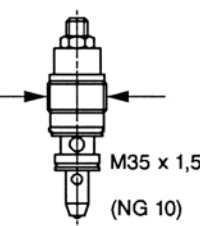


\* Abblasestrom  $G$  gewährleistet  
Druckanstieg  $< 10\% p_{nom}$

\* At excess-flow  $G$   
not pressure increase higher than  
 $< 10\% p_{nom}$

\* Le débit évacué  $G$   
garantit une augmentation de  
pression  $< 10\%$  de  $p_{nom}$

Für Blockeinbau  
For cartridge-type  
Pour type cartouche

0 532 VA **03** **N** **050** **D** - **40**

		$p$ [bar]	Verstellung Adjustment Réglage	$G^*$ [l/min]	[kg]		
14		<b>V</b> FPM	<b>D</b> 	40 50 100 100 100 100 100 100 100 130 130 130 130 130 150	0,4	0 532 004 200	
						70	0 532 004 201
						100	0 532 004 202
						120	0 532 004 211
						140	0 532 004 203
						160	0 532 004 204
						200	0 532 004 209
						211	0 532 004 205
						250	0 532 004 206
						260	R 917 008 405
						270	0 532 004 213
						280	0 532 004 210
						300	0 532 004 207
						330	0 532 004 208
						<b>K</b> 	50
		70	0 532 004 103				
		80	0 532 004 111				
		100	0 532 004 104				
		120	0 532 004 114				
		140	0 532 004 107				
		160	0 532 004 105				
		180	0 532 004 113				
		200	0 532 004 110				
		211	0 532 004 100				
		250	0 532 004 106				
		260	0 532 004 115				
		280	0 532 004 112				
		300	0 532 004 101				
		330	0 532 004 108				
		360	0 532 004 109				

Dichtungssatz  
Set of seals  
Pochette de joints

**N** 1 537 010 236 **V** 1 537 010 298

\* Abblasestrom  $G$  gewährleistet  
Druckanstieg  $< 10\% p_{nom}$

\* At excess-flow  $G$   
not pressure increase higher than  
 $< 10\% p_{nom}$

\* Le débit évacué  $G$   
garantit une augmentation de  
pression  $< 10\%$  de  $p_{nom}$

## Kenngrößen

Bauart	Sitzventile mit Dämpfung, entlastbar
Anschlussart	für Leitungsanschluss oder für Blockeinbau
Einbaulage	beliebig
Durchflussrichtung	siehe Anschlussbezeichnungen
Umgebungstemperaturbereich	-15 °C ... +65 °C
TÜV-Bauteilkennzeichen	für Leitungsanschluss: TÜV · SV · 10-414 · 6 · F · G · p für Blockeinbau: TÜV · SV · 10-697 · 6 · F · G · p
maximaler Betriebsdruck	330 bar
Abblasestrom G [l/min] und $p_{nom}$ bar	siehe Tabellen Seite 3 ... 4
Druckflüssigkeit F	Mineralöle nach DIN 51 524 und schwer entflammbare Druckflüssigkeiten nach VDMA 24 317/24 320
Betriebstemperaturbereich	-15 °C ... +80 °C
Viskositätsbereich	10 ... 380 mm <sup>2</sup> /s
$\Delta p$ -Q Kennlinie	siehe Seite 6

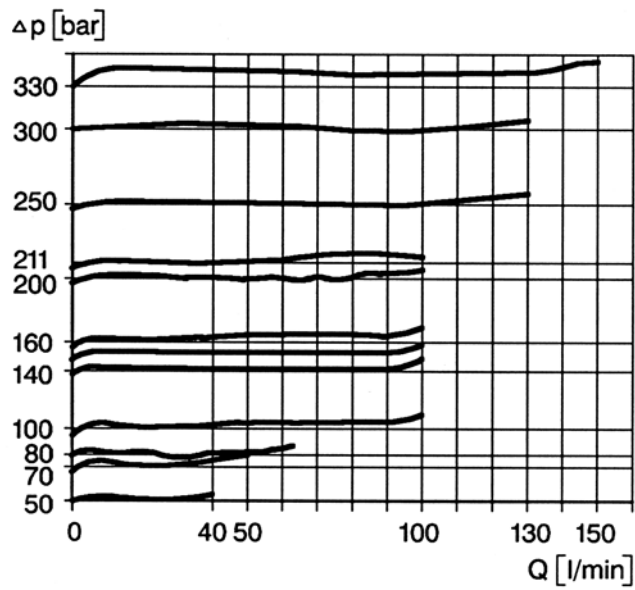
## Characteristics

Design	Damped poppet valve, manual opening
Mounting	Pipe connection or cartridge installation
Installation position	As desired
Direction of flow	See symbols
Ambient temperature range	-15 °C ... +65 °C
TÜV codes	For pipe connection: TÜV · SV · 10-414 · 6 · F · G · p For cartridge installation: TÜV · SV · 10-697 · 6 · F · G · p
Max. operating pressure	330 bar
Excess flow G [l/min] and $p_{nom}$ bar	See tables on page 3 ... 4
Hydraulic fluid F	Mineral oils to DIN 51 524 and flame-resistant fluids to VDMA 24 317/24 320
Operating temperature range	-15 °C ... +80 °C
Viscosity range	10 ... 380 mm <sup>2</sup> /s
$\Delta p$ -Q characteristics	See table on page 6

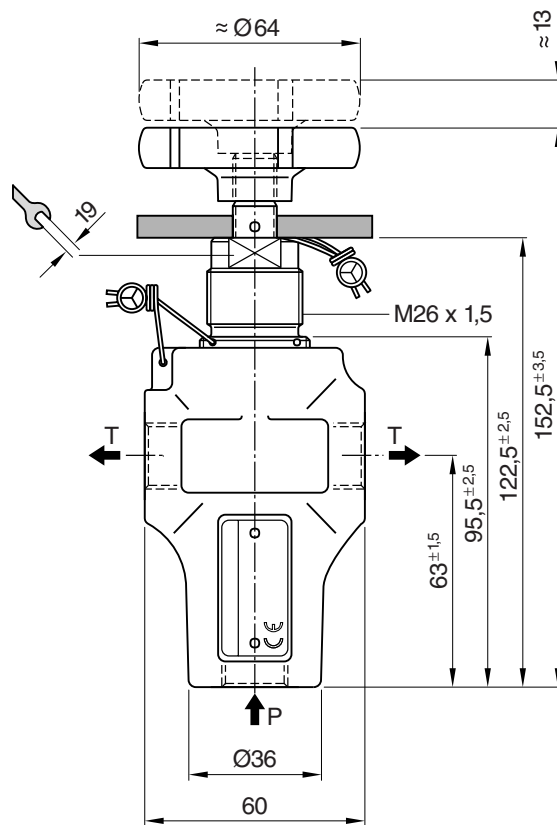
## Caractéristiques

Construction	à clapet avec amortissement, déchargeable
Raccordement	Montage sur tuyauterie ou type cartouche
Position de montage	indifférente
Sens d'écoulement	voir désignations des raccords
Température ambiante	-15 °C ... +65 °C
Références de réception du TÜV	Montage sur tuyauterie: TÜV · SV · 10-414 · 6 · F · G · p Type cartouche: TÜV · SV · 10-697 · 6 · F · G · p
Pression de service max.	330 bar
Débit évacué G [l/min] et $p_{nom}$ bar	voir tableaux pages 3 ... 4
Fluide	Huiles minérales selon la norme DIN 51 524 et fluides difficilement inflammables selon VDMA 24 317/24 320
Plage de température de service	-15 °C ... +80 °C
Plage de viscosité	10 ... 380 mm <sup>2</sup> /s
Courbes $\Delta p$ -Q	voir page 6

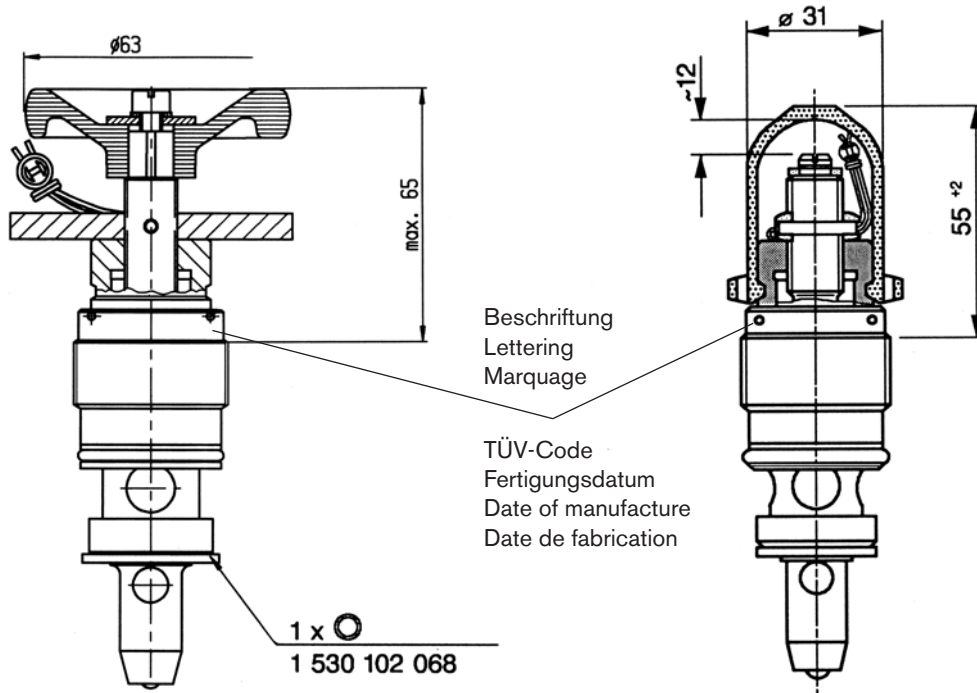
**Kennlinien**  
**Performance curves**  
**Courbes caractéristiques**  
 $v = 35 \text{ mm}^2/\text{s}$



**Abmessungen für Leitungseinbau**  
**Dimensions for pipe connection**  
**Cotes d'encombrement pour montage sur tuyauterie**



**Abmessungen für Blockeinbau**  
**Dimensions for cartridge type**  
**Cotes d'encombrement pour type cartouche**



**Einbaubohrung**

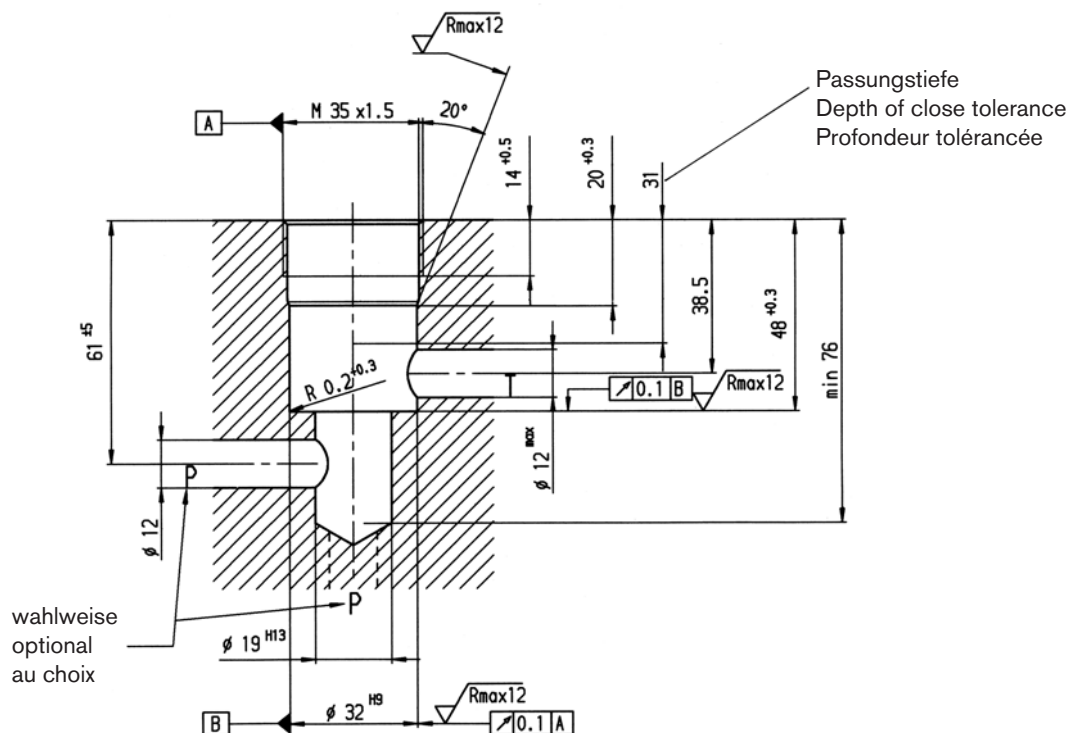
Gestaltung der Zu- und Ablaufleitungen gemäß AD-Merkblatt A 2, Pkt. 6  
 Werkstoffqualität des Blockes mindestens 35 S 20 bzw. GGG 40.

**Mounting dimensions**

Inlet and outlet lines in accordance with AD-Merkblatt A 2, para 6  
 Material quality of block a least 35 S 20 or GGG 40 (cast iron).

**Cotes d'implantation**

Conception des conduites d'arrivée et de retour selon fiche AD A 2, § 6.  
 Matière du bloc au moins 35 S 20 ou GGG 40.



Nach der Reparatur muss das Ventil neu plombiert werden.

The valve is to be re-sealed after repair.

Plomber à nouveau la valve après réparation.



# Pressure relief valve, pilot operated

## Type MHDBV...Y and MHDBV...XY



- ▶ Size 22 and 40
- ▶ Component series 3X
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 800 l/min

### Features

- ▶ Screw-in cartridge valve
- ▶ 2 pressure ratings, optional

### Contents

Features	1
Ordering code	2
Valve types	3
Symbols	3
Function, section	4
Technical data	5
Characteristic curves	6
Dimensions	7
Mounting cavity	8, 9
Available individual components	10

## Ordering code

01	02	03	04	05	06	07	08	09	10	11	12
MH	DBV		K	2	-	3X	/				*

01	Mobile hydraulics	MH
02	Pressure relief valve, pilot operated	DBV
03	Size 22	22
	Size 40	40
04	Screw-in cartridge valve	K

## Adjustment type

05	Grub screw with internal/external hexagon and protective cap	2
06	Component series 30 ... 39 (30 ... 39; unchanged installation and connection dimensions)	3X

Pressure rating <sup>1)</sup>

07	Set pressure up to 100 bar	100
	Set pressure up to 420 bar	420

## Pressure setting

08	Without pressure setting, without protective cap <sup>2)</sup>	no code
	With pressure setting, with protective cap	-... <sup>3)</sup>

## Pilot oil guide

09	Internal pilot oil supply, internal pilot oil return	no code
	Internal pilot oil supply, external pilot oil return	Y
	Internal pilot oil supply (with release function), external pilot oil return	XY

## Seal material

10	NBR seals	M
	FKM seals	V
	Observe compatibility of seals with hydraulic fluid used! (Other seals on request)	


## Mounting cavity

11	M28 x 1.5 (NG22)	FD
	M39 x 1.5 (NG40)	FL
12	Further details in the plain text	*

<sup>1)</sup> The values refer to the screw-in cartridge valve. If the valve is installed in a housing, it has to be ensured that the set pressure of the screw-in cartridge valve does not exceed the value of the housing, which might be lower!

<sup>2)</sup> Protective cap, separate order, material no. **R900169348**; valves without factory-set pressure are delivered in a depressurized state.

<sup>3)</sup> Example:  
set to 300 bar: ...420-**300**...  
(pressure setting at  $q_V = 5 \dots 20$  l/min)

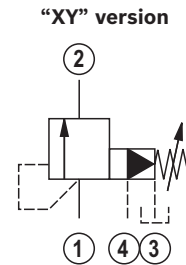
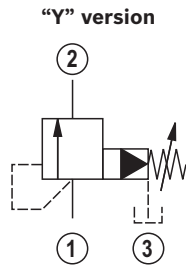
 **Notice:** Factory-set valves are protected by means of a protective cap. In the case of subsequent re-adjustment, the warranty will become void!



## Valve types

Type	Material no.	Mounting cavity (see page 8 and 9)	Characteristic curves (see page 6)
MHDBV 22 K2-3X/420XYMFD	R900307480	"FD"	"D1"
MHDBV 22 K2-3X/420YMFD	R901224584	"FD"	"D1"
MHDBV 40 K2-3X/420XYMFL	R900308696	"FL"	"D2"
MHDBV 40 K2-3X/100YMFL	R900366656	"FL"	"D2"
MHDBV 40 K2-3X/420YMFL	R901225220	"FL"	"D2"

## Symbols



- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (Y)
- ④ = Main port 4 (X)

## Function, section

### General

The pressure valve type MHDBV... is a pilot operated pressure relief valve for installation in block designs. It is used to limit a system pressure. The system pressure can be set steplessly via the adjustment type (7).

### Function

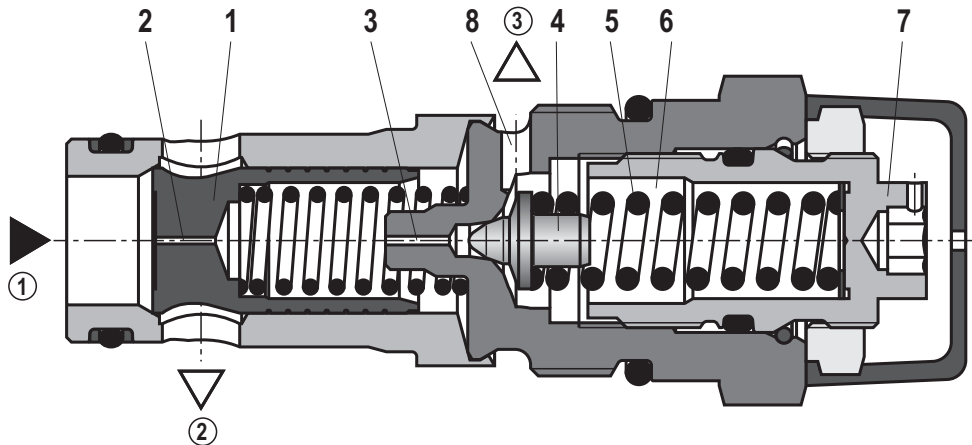
The pressure applied at the main port ① acts on the main spool (1). At the same time, the pressure is applied to poppet (4) via the nozzle bores (2) and (3). If the pressure at the main port ① exceeds the value set at spring (5), then the poppet (4) opens against the spring (5). The hydraulic fluid from the main port ① now flows into the spring chamber (6) via the nozzle bores (2) and (3). From here, the hydraulic fluid is fed externally ("Y" version) via the control line (8) into the main port ② (T).

Due to the state of equilibrium at the main spool (1), hydraulic fluid flows from the main port ① to the main port ②, maintaining the set operating pressure. The pressure relief valve can be unloaded or switched to another pressure (second pressure rating) via port X (9) (version "XY").

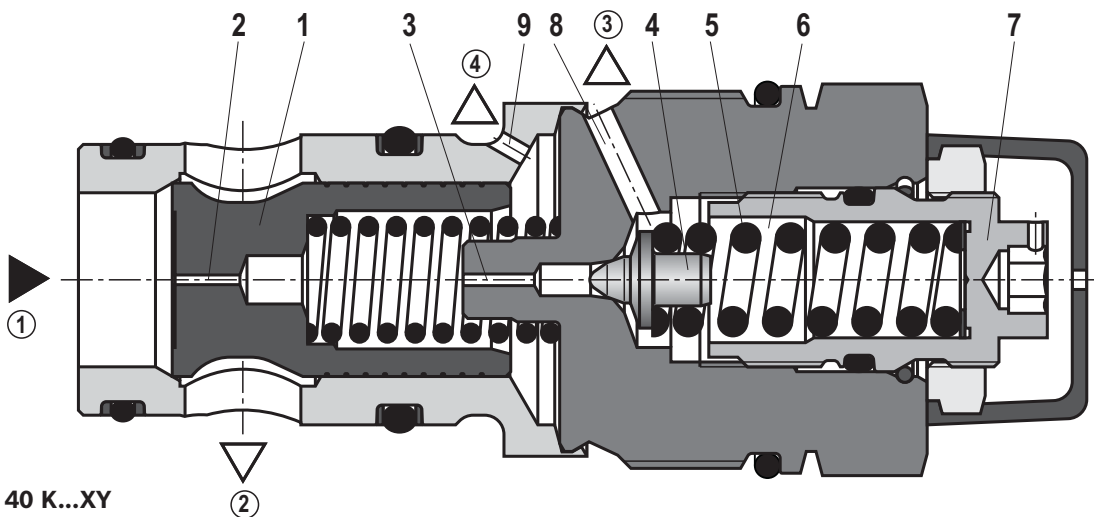
#### Notice:

The maximum operating pressure is formed from the sum of the set pressure and the return flow pressure at main port ③.

- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (Y)
- ④ = Main port 4 (X)



Type MHDBV 22 K...Y



Type MHDBV 40 K...XY

## Technical data

(For applications outside these parameters, please consult us!)

General		
Weight	kg	see page 7
Installation position		any
Ambient temperature range	°C	-20 ... +80
Storage temperature range	°C	-20 ... +80
Surface protection		None – surface protection has to be ensured by painting the components or the entire assembly (e.g. valve and housing).

Hydraulic			
Maximum operating pressure	▶ Main port ① (P), ④ (X)	bar	100; 420
	▶ Main port ② (T)	bar	315
Maximum counter pressure	▶ Main port ③ (Y)	bar	250
Maximum flow		l/min	see characteristic curve page 6
Hydraulic fluid			see table below
Hydraulic fluid temperature range		°C	-30 ... +80 (NBR seal)
			-20 ... +80 (FKM seal)
Viscosity range		mm <sup>2</sup> /s	10 ... 380
Maximum permissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Load cycles			2 million <sup>2)</sup>

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	NBR, FKM	DIN 51524
Biodegradable	– insoluble in water	NBR, FKM	ISO 15380
	– soluble in water	FKM	

### Important information on hydraulic fluids:

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!

- ▶ Biodegradable: If biodegradable hydraulic fluids are used that are also zinc-solvent, there may be an accumulation of zinc.

<sup>1)</sup> The cleanliness classes stated for the components has to be maintained in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .

<sup>2)</sup> Rexroth standard test condition (HLP46;  $\vartheta_{oil} = 40 \text{ °C} \pm 5 \text{ °C}$ )

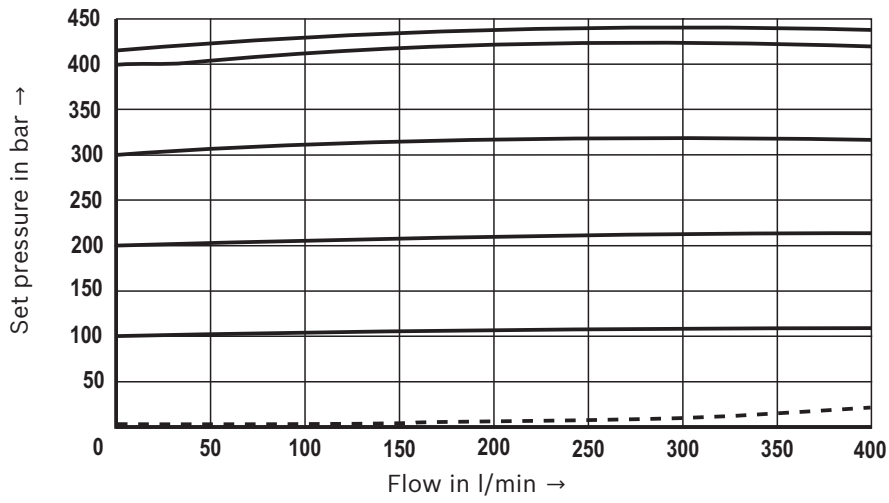
### Notices:

- ▶ The technical data were recorded at a viscosity of 41 mm<sup>2</sup>/s (HLP46;  $\vartheta_{oil} = 40 \text{ °C}$ )
- ▶ The following documentation must be observed: 64020-B1 “Hydraulic valves for mobile applications”
- ▶ When exchanging screw-in cartridge valves, ensure that the correct tightening torque is used (refer to page 7).

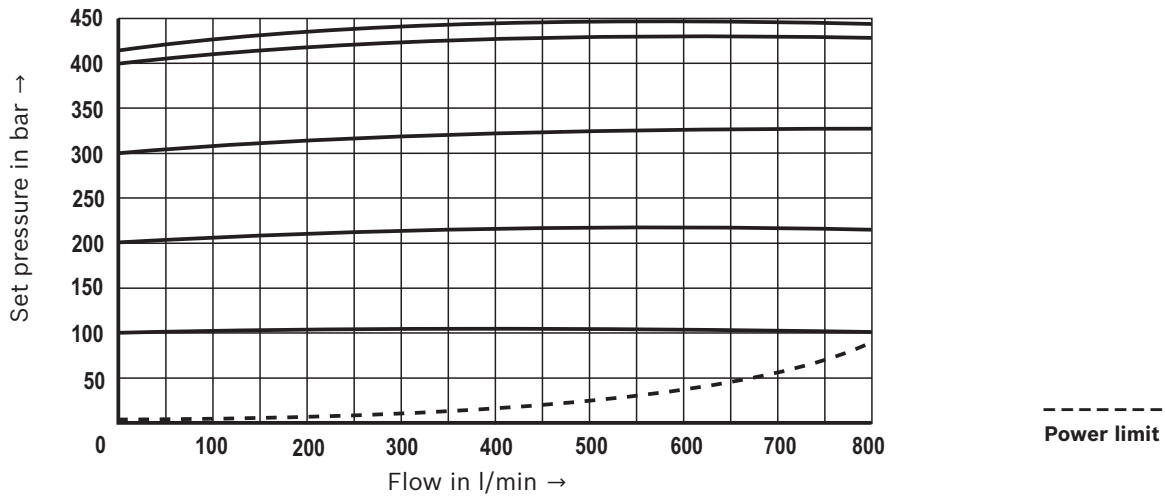
### Characteristic curves

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )

$p_E$ - $q_V$  characteristic curves – “D1”



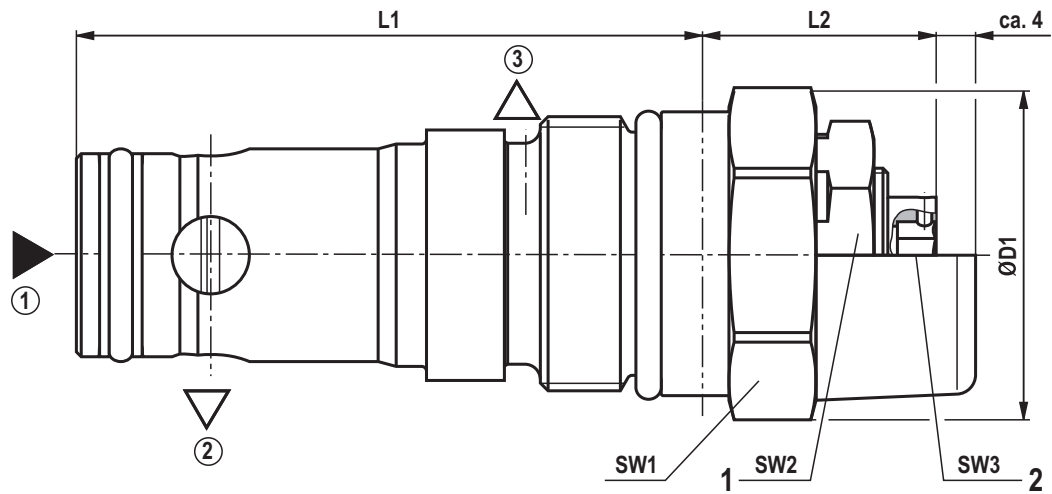
$p_E$ - $q_V$  characteristic curves – “D2”



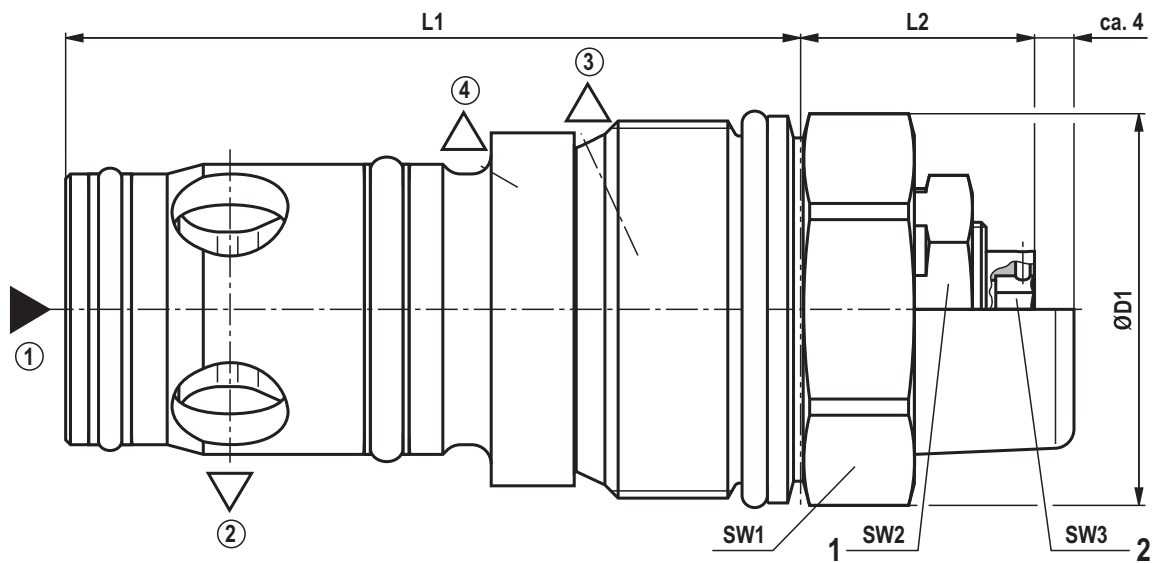
### Dimensions

(dimensions in mm)

#### “Y” version



#### “XY” version



Size	ØD1	L1	L2	Wrench size			Tightening torque in Nm <sup>1)</sup>		Weight in kg
				SW1	SW2	SW3	SW1	SW2	
22	34	64,7	24,2	30	24	6	80	15	0,26
40	40,5	76	24,2	36	24	6	300	15	0,54

<sup>1)</sup> Friction coefficients, tightening torques, and preload forces interact with each other. The friction coefficients are influenced by the surface microstructure, material pairing, etc. Thus, we recommend checking the mounting characteristics with genuine parts and under boundary conditions.

- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (Y)
- ④ = Main port 4 (X)

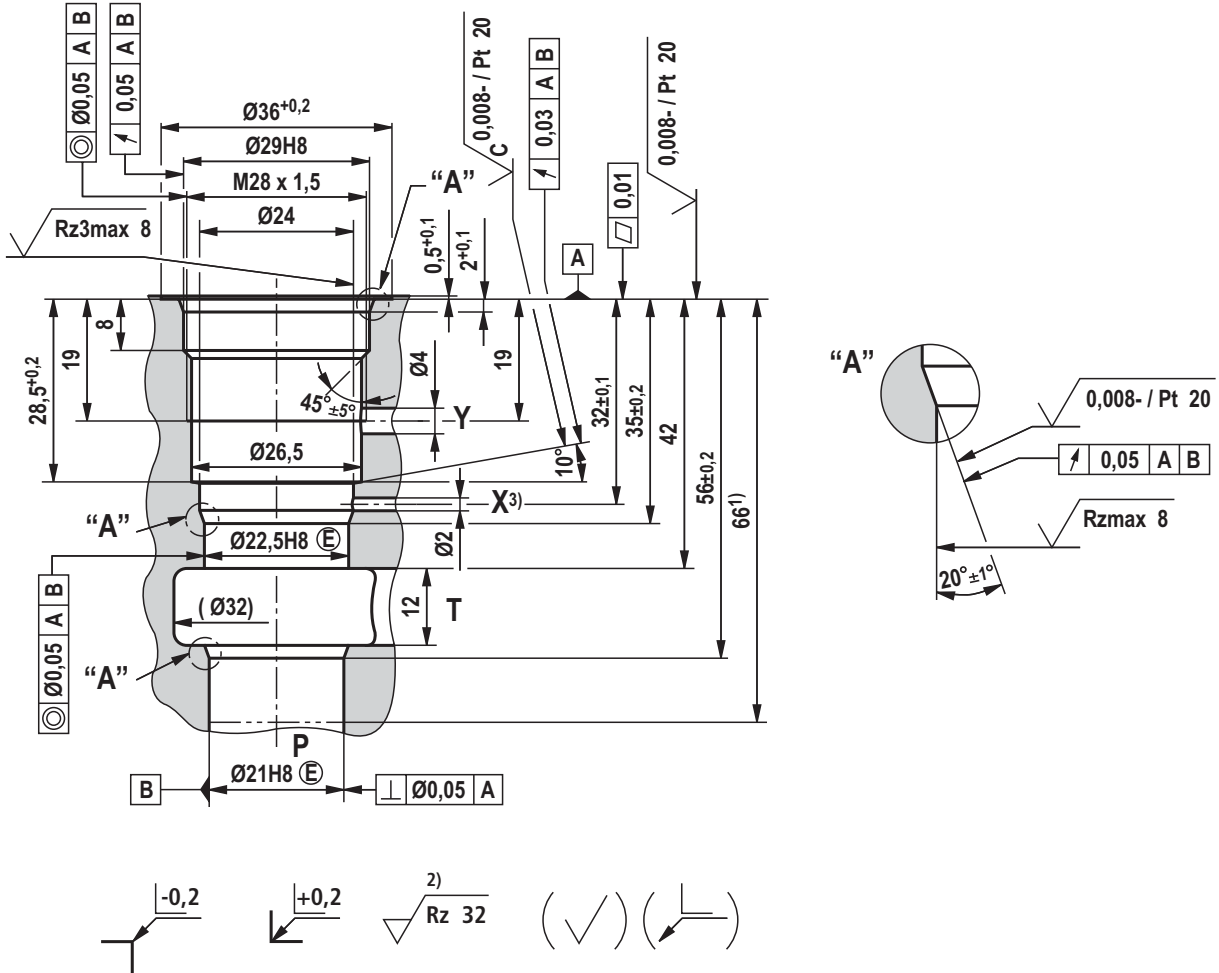
- 1 Lock nut
- 2 Internal hexagon

**Mounting cavity**

(dimensions in mm)

“FD” version (M28 x 1.5)

(Drawing no. R901135263)



① = Main port 1 (P)

② = Main port 2 (T)

③ = Main port 3 (Y)

④ = Main port 4 (X)

1) Depth of fit

2) Visual inspection

3) Optional

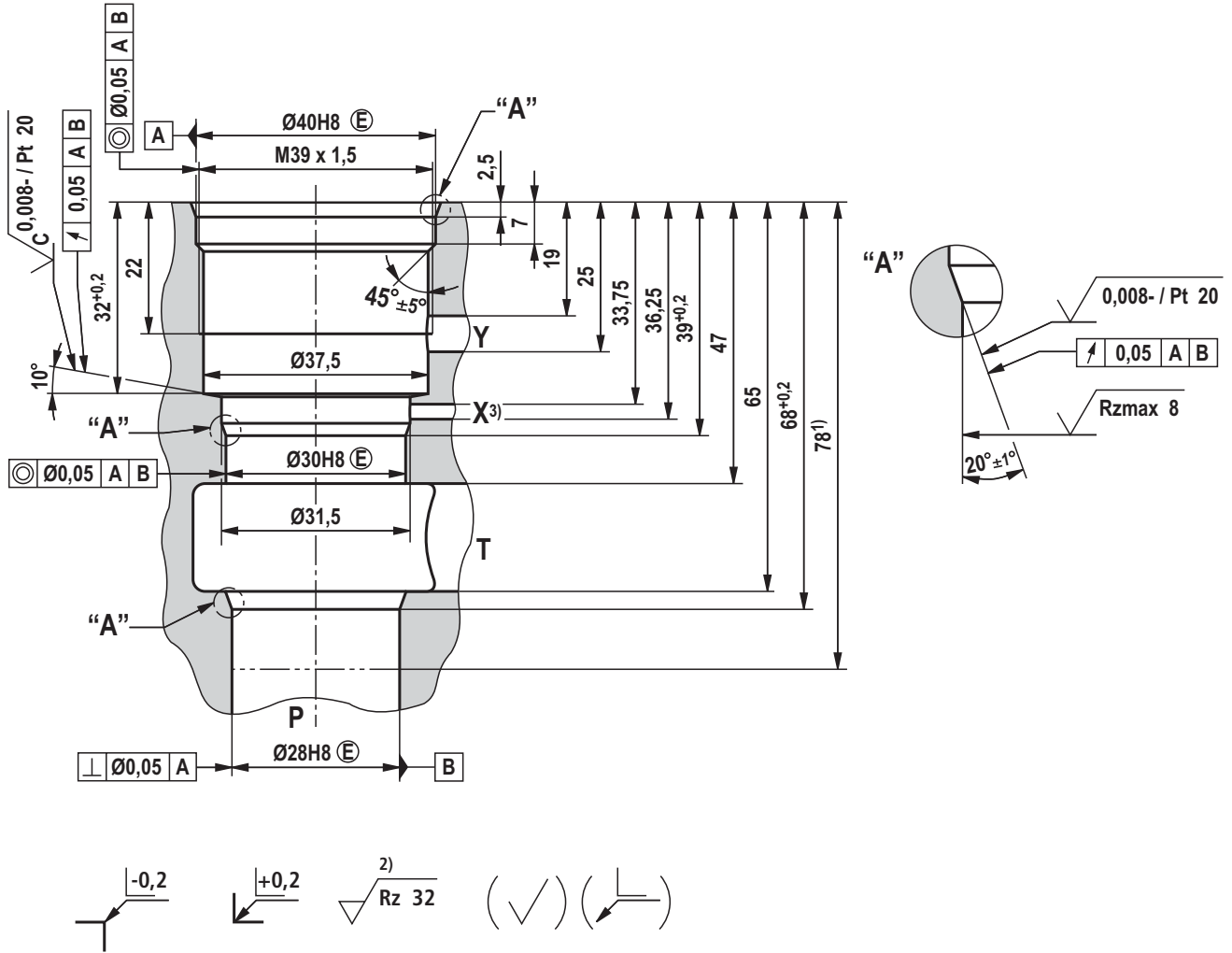
All seal ring insertion faces are rounded and free of burrs

**Standards:**

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerances for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

**Mounting cavity**  
(dimensions in mm)

“FL” version (M39 x 1.5)  
(Drawing no. R9011187280)



- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (Y)
- ④ = Main port 4 (X)

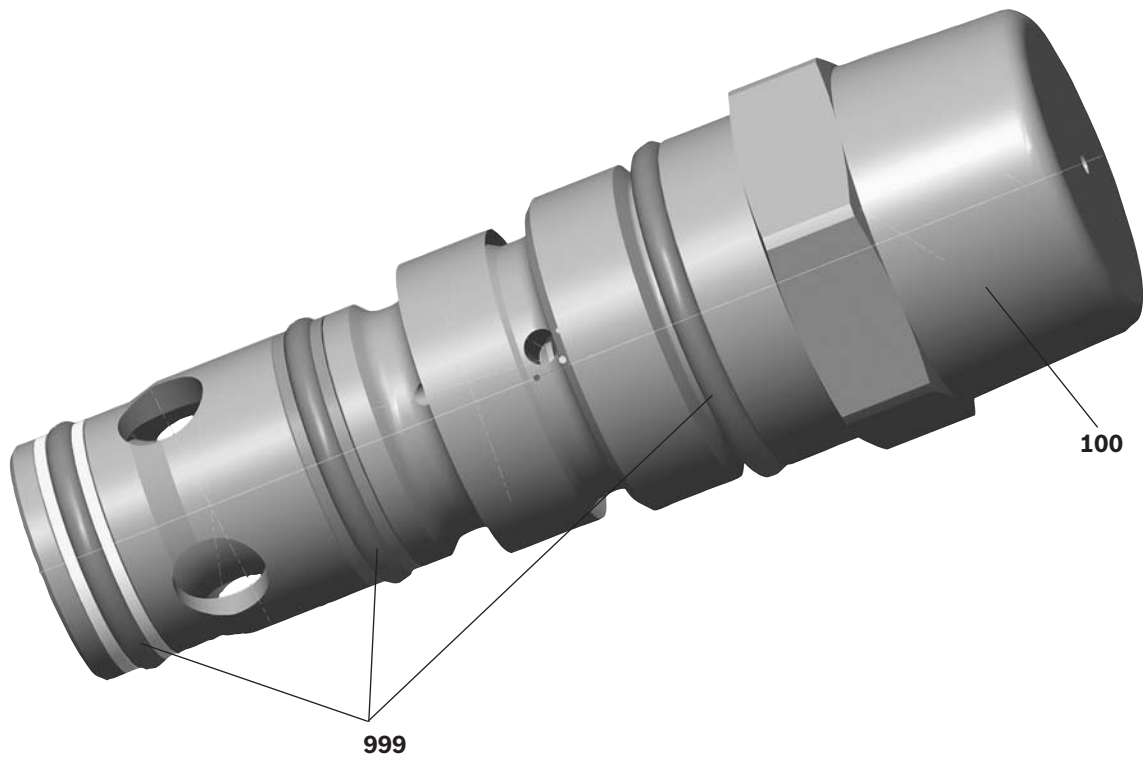
- 1) Depth of fit
- 2) Visual inspection
- 3) Optional

All seal ring insertion faces are rounded and free of burrs

**Standards:**

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerances for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

**Available individual components**



Item	Designation	Seal material	Material no.
100	Protective cap can be delivered separately		R900169348
999	Seal kit of the valve for mounting cavity "FD"	NBR	R961005016
999	Seal kit of the valve for mounting cavity "FL"	NBR	R961005014

Seal kits with other seal materials on request.



## Pressure relief valve, pilot operated, with pulling function

Type MHDBN...Y..02



H7975

- ▶ With external port Y
- ▶ Frame sizes 16, 22, 32
- ▶ Component series 3X
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 400 l/min

### Features

- ▶ Screw-in cartridge valve
- ▶ Seat design
- ▶ Pressure rating 420 bar
- ▶ Available in 3 sizes (16, 22, 32)

### Contents

Features	1
Ordering codes	2
Valve types	2
Function, section, symbol	3
Technical data	4
Characteristic curves	5, 6
Dimensions	7
Mounting cavity	8, 9
Available individual components	10
Additional information	10

## Ordering codes

01	02	03	04	05	06	07	08	09	10	11	12	13	
MH	DBN		K	2	-	3X	/	420		Y		02	*

01	Mobile hydraulics	MH
----	-------------------	----

02	Pressure relief valve, pilot operated, with pulling function <sup>1)</sup>	DBN
----	--	-----

03	Size 16	16
	Size 22	22
	Size 32	32

04	Screw-in cartridge valve	K
----	--------------------------	---

### Adjustment type

05	Grub screw with internal / external hexagon	2
----	---	---

06	Component series 30 ... 39 (30 ... 39: unchanged installation and connection dimensions)	3X
----	--	----

### Pressure rating

07	Set pressure up to 420 bar <sup>2)</sup>	420
----	--	-----

### Pressure adjustment

08	Without pressure adjustment <sup>3)</sup>	no code
	With pressure adjustment	-... <sup>4)</sup>

### Pilot oil flow

09	Pilot oil return, external	Y
----	----------------------------	---

### Seal material

10	NBR seals	M
	FKM seals	V
	Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	

### Mounting cavity

11	M24 x 1	FB
	M28 x 1	FC
	M30 x 1.5	LG
	M33 x 1	FK

### External port

12	Metric (M14 x 1)	02
----	------------------	----

13	Further details in the plain text	*
----	-----------------------------------	---

<sup>1)</sup> Minimum cracking pressure, see characteristic curves pages 5 and 6

<sup>2)</sup> The values refer to the screw-in cartridge valve. If the valve is installed in a housing, it must be ensured that the set pressure of the screw-in cartridge valve does not exceed the possibly lower value of the housing.

<sup>3)</sup> Valves whose pressure is not adjusted at the factory are delivered in pressure-relieved state.

<sup>4)</sup> Example:  
Set to 300 bar: ...420-**300**...  
(pressure adjustment at  $q_{V \max} = 10$  l/min)

#### Notice:

In the case of subsequent re-adjustment of valves set at the factory, the warranty will become void!

## Valve types

Type	Material no.	Mounting cavity (see page 8)	Characteristic curves (see pages 5 and 6)
MHDBN 16 K2-3X/420YVFB02	R901051669	FB	D1 / E1
MHDBN 22 K2-3X/420YVFC02	R900936872	FC	D3 / E4
MHDBN 22 K2-3X/420YVLG02	R900768445	LG	D3 / E4
MHDBN 32 K2-3X/420YVFK02	R900727414	FK	D4 / E6

## Function, section, symbol

### General

The pressure valve type MHDBN...Y..02 is a pilot operated pressure relief valve for installation in block designs. It is used for system pressure limitation. The system pressure can be set steplessly via the adjustment type (4).

### Pressure relief function

The valve is closed in initial position. The pressure in main port ① acts on the spool (1). At the same time, pressure is applied to the spring-loaded side of the spool (1) via nozzle (2) and to the pilot poppet (6) via nozzle (3). If the pressure in main port ① exceeds the value set at spring (5), the pilot poppet (6) opens. Hydraulic fluid flows from the spring-loaded side of the spool (1) via the nozzle (3) and channel (7) into the external port ③. The resulting pressure drop moves the spool (1) and thus opens the connection from main port ① to ② while maintaining the pressure set at the spring (5). The pilot oil return is effected externally via the channel (7) to the external port ③.

The pressure applied to port ③ is added to the pressure value set at the spring (5) in a ratio of 1:1.

### Feed function

The feed function makes up for lacking oil volumes caused, for example, by leakage when pressure valves respond and in the case of leading loads.

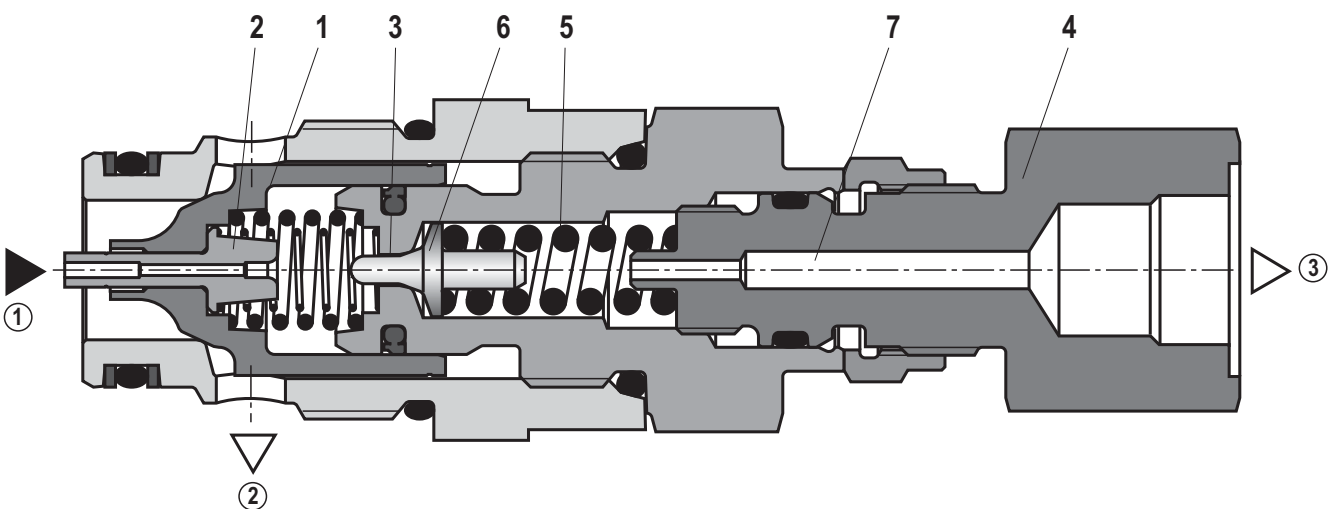
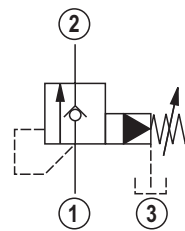
If the pressure at main port ① is lower than that at main port ②, the spool (1) will be lifted out of its seat. Hydraulic fluid flows from main port ② to main port ①. Tank preloading should be  $\geq 4$  bar.

### Notice:

- ▶ The cracking pressure depends on the counter / return flow pressure at main port ②.
- ▶ The pilot operated pressure valves are virtually leakage-free thanks to their design.

### Symbol

Pilot oil supply "Y"



Type MHDBN . K2-3X/420.Y..02

- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (Y)

## Technical data

(for applications outside these values, please consult us!)

general		
Weight	kg	See page 7
Installation position		Any
Ambient temperature range	°C	-20 ... +80
Storage temperature range	°C	-20 ... +80
Surface protection		The valves do not feature any surface protection. Surface protection has to be ensured by painting the components or the entire assembly (e.g. valve with housing).

hydraulic			
Maximum operating pressure	▶ Main port ① (P)	bar	420
	▶ Main port ② (T)	bar	50
	▶ External port ③ (Y), (P <sub>ST</sub> )	bar	420 (added to the pressure adjustment at a ratio of 1:1)
Minimum set pressure	▶ Main port ① (P)	bar	≤ 50
Maximum flow	▶ P → T, T → P	l/min	See characteristic curves on page 5 and 6
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	-30 ... +80 (NBR seal)
			-20 ... +80 (FKM seal)
Viscosity range		mm <sup>2</sup> /s	10 ... 380
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Load cycles			2 million <sup>2)</sup>

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ insoluble in water	HEES	ISO 15380	90221
	▶ soluble in water	HEPG	FKM	

### Important information on hydraulic fluids:

- ▶ For more information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ **Bio-degradable and flame-resistant:** When using hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate (700 mg zinc per pole tube).

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .

<sup>2)</sup> Rexroth standard test condition (HLP46;  $\vartheta_{oil} = 40 \text{ °C} \pm 5 \text{ °C}$ )

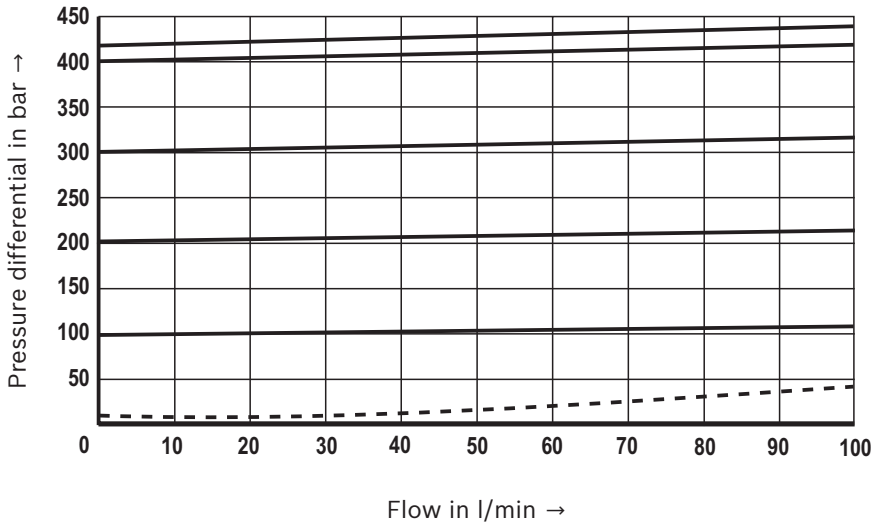
### Notice:

- ▶ Under application conditions with an operating pressure of < 30 bar and a flow of < 30 l/min, valves of another design are to be selected from our valve program. The maximum operating pressure is the sum of the set pressure and counter pressure!
- ▶ The technical data was determined at a viscosity of  $\nu = 41 \text{ mm}^2/\text{s}$  (HLP46;  $\vartheta_{oil} = 40 \text{ °C}$ )
- ▶ The following documentation must be observed: 64020-B1 Hydraulic valves for mobile applications
- ▶ Minimum cracking pressure see characteristic curves on pages 5 and 6
- ▶ When exchanging screw-in cartridge valves, provide for the correct tightening torque!

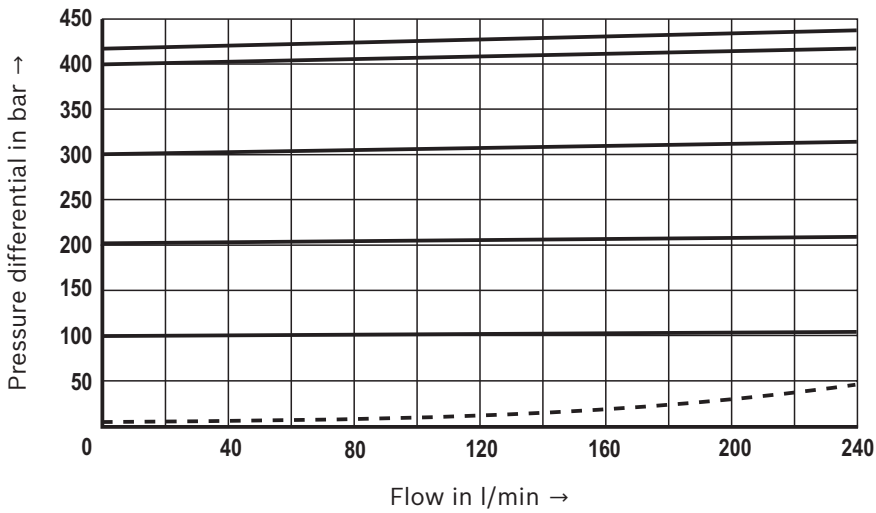
### Characteristic curves

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )

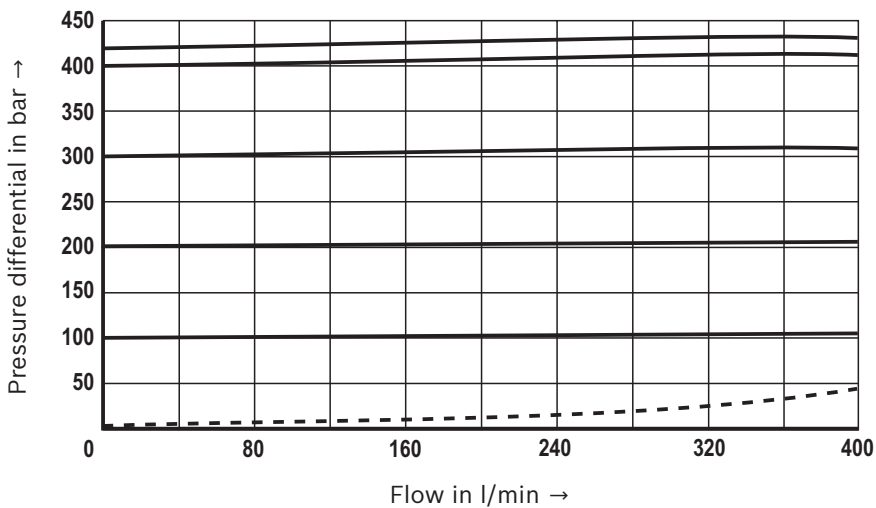
$p_E$ - $q_V$  characteristic curves - "D1"



$p_E$ - $q_V$  characteristic curves - "D3"



$p_E$ - $q_V$  characteristic curves - "D4"

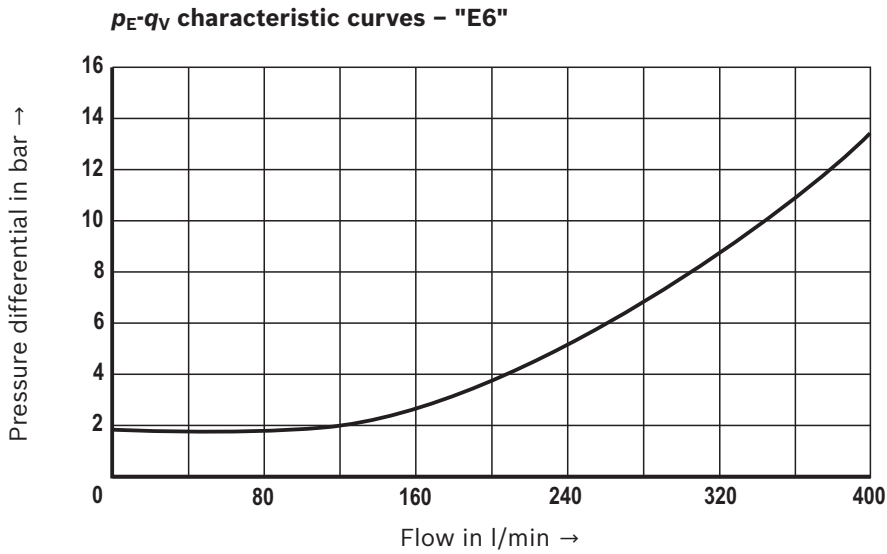
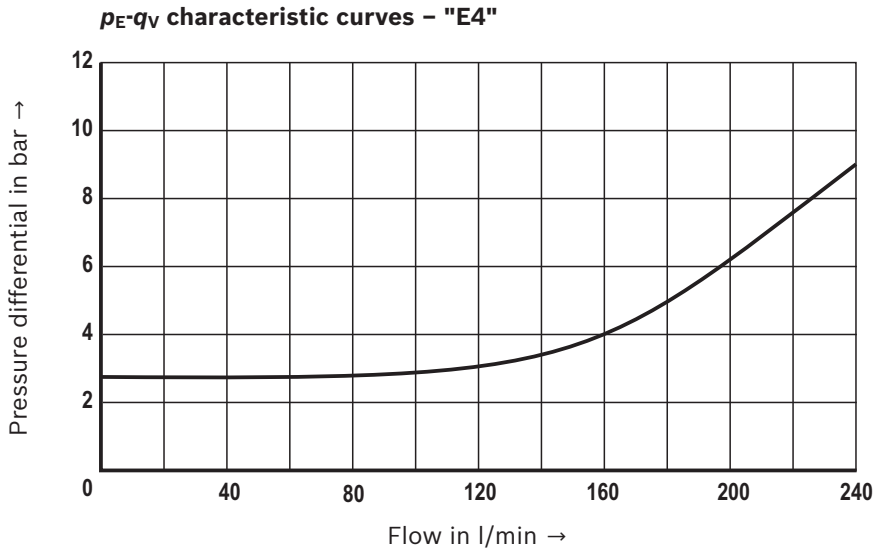
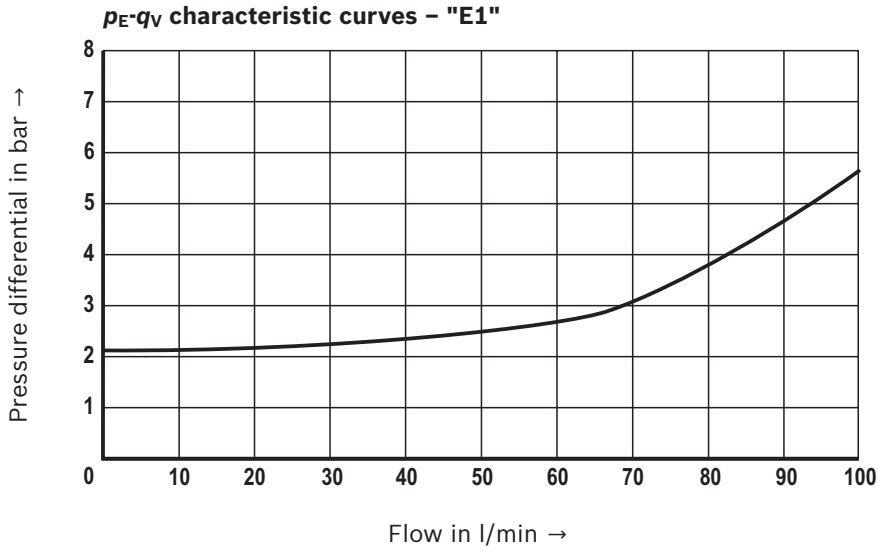


**Notice:**  
The characteristic curves apply for a sequencing pressure of  $p_{St} = 0$  bar without housing resistance in the entire flow range.

-----  
Performance limit

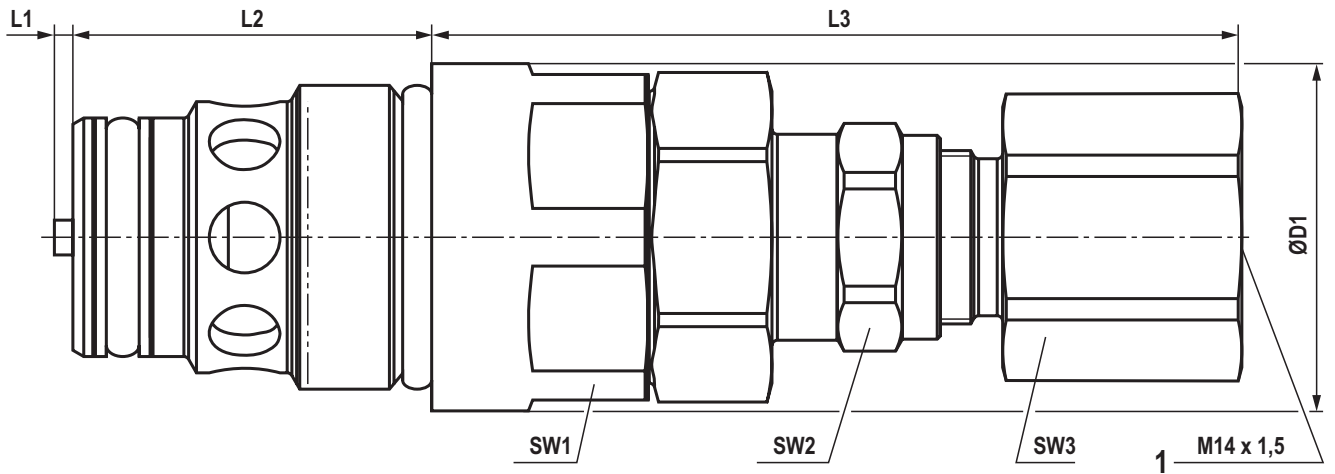
### Characteristic curves

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)



**Notice:**  
The characteristic curves apply for a sequencing pressure of  $p_{St} = 0 \text{ bar}$  without housing resistance in the entire flow range.

**Dimensions**  
(dimensions in mm)



Type	ØD1	L1	L2	L3	Wrench size			Tightening torque in Nm <sup>1)</sup>		Weight in kg
					SW1	SW2	SW3	SW1	SW2	
MHDBN 16 K2-3X/420YVFB02	27.3	2.8	21.5	78.6	24	19	24	90 ± 10	15	0.20
MHDBN 22 K2-3X/420YVFC02	32	1.7	33	76	30	19	24	100 ± 10	15	0.46
MHDBN 22 K2-3X/420YVLG02	34.5	-	38.5	84.5	30	19	24	120 ± 12	15	0.36
MHDBN 32 K2-3X/420YVFK02	37	3.4	37.5	75.5	34	19	24	150 ± 10	15	0.46

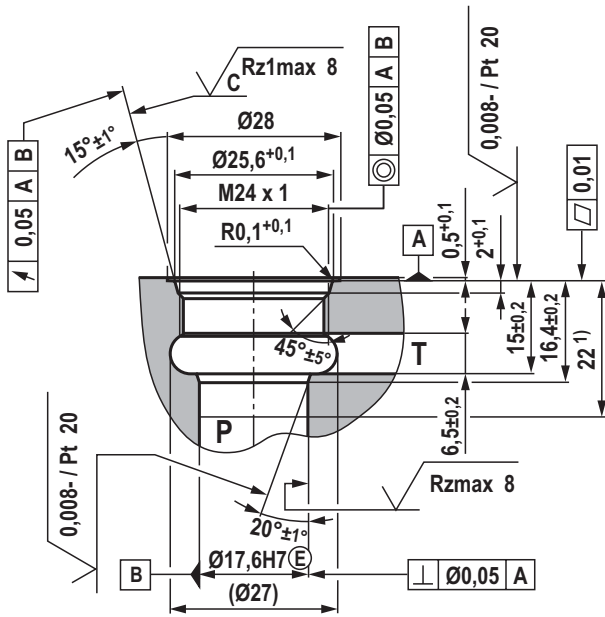
<sup>1)</sup> Friction coefficients, tightening torques, and preload forces interact with each other. The friction coefficients are influenced by surface microstructure, material pairing etc. Thus, we recommend checking the mounting characteristics with original components and boundary conditions

① = Main port 1 (P)  
② = Main port 2 (T)  
③ = Main port 3 (Y)

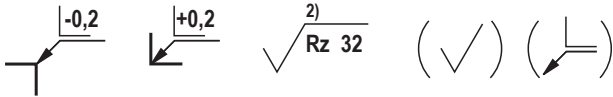
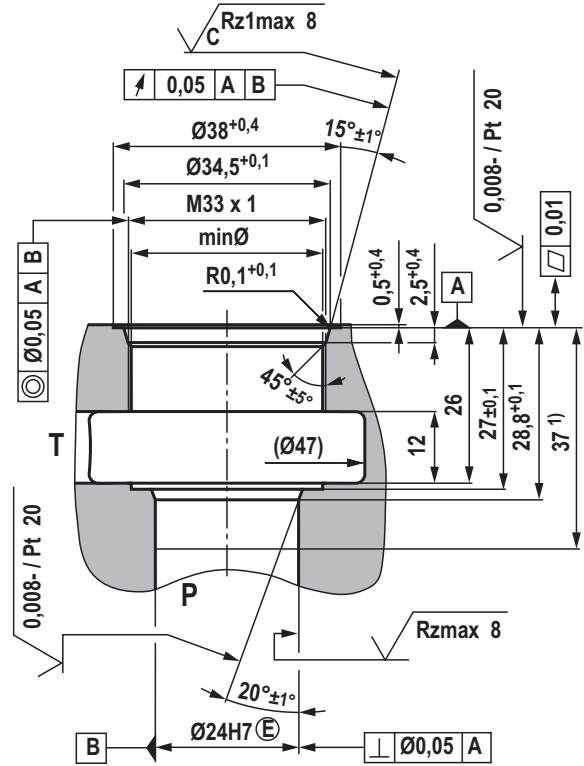
1 Port Y

**Mounting cavity**  
(dimensions in mm)

**Version "FB" (M24 x 1)**  
(Drawing no. R901063585)



**Version "FK" (M33 x 1)**  
(Drawing no. R901148145)



- 1) Depth of fit
  - 2) Visual inspection
- All seal ring insertion faces are rounded and free of burrs

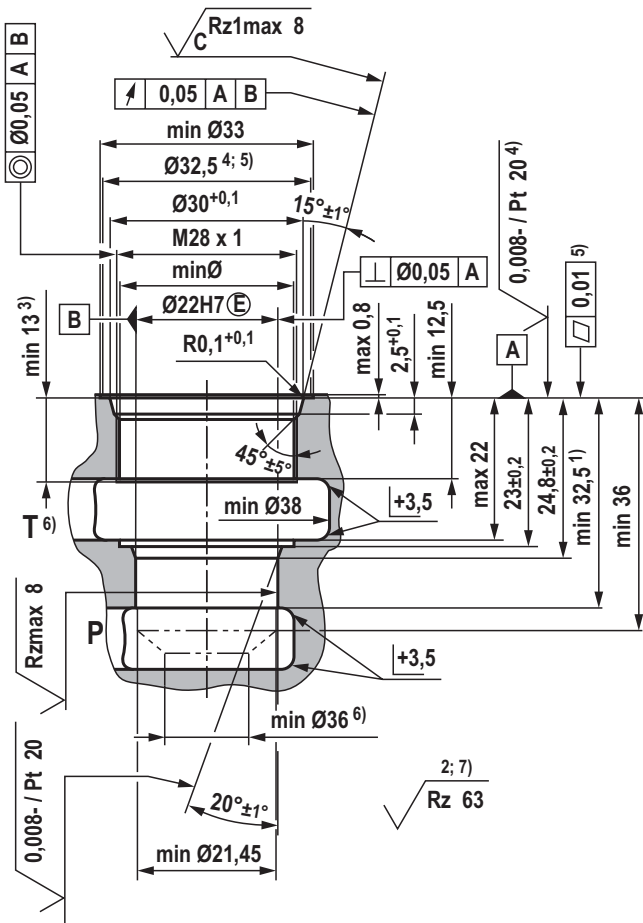
**Standards:**

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerances for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

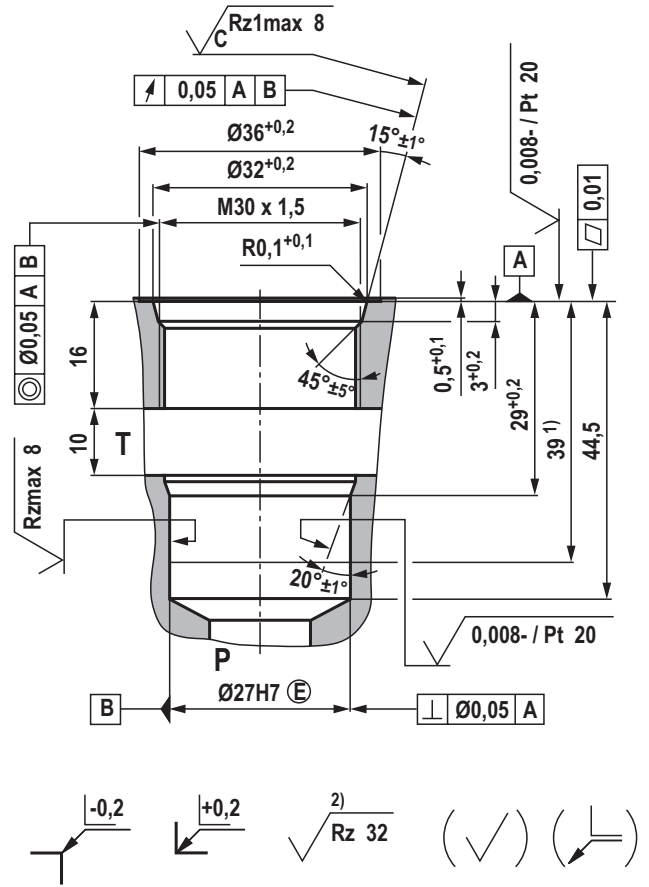


**Mounting cavity**  
(dimensions in mm)

**Version "FC" (M28 x 1)**  
(Drawing no. RA50151421)



**Version "LG" (M30 x 1.5)**  
(Drawing no. R901110408)

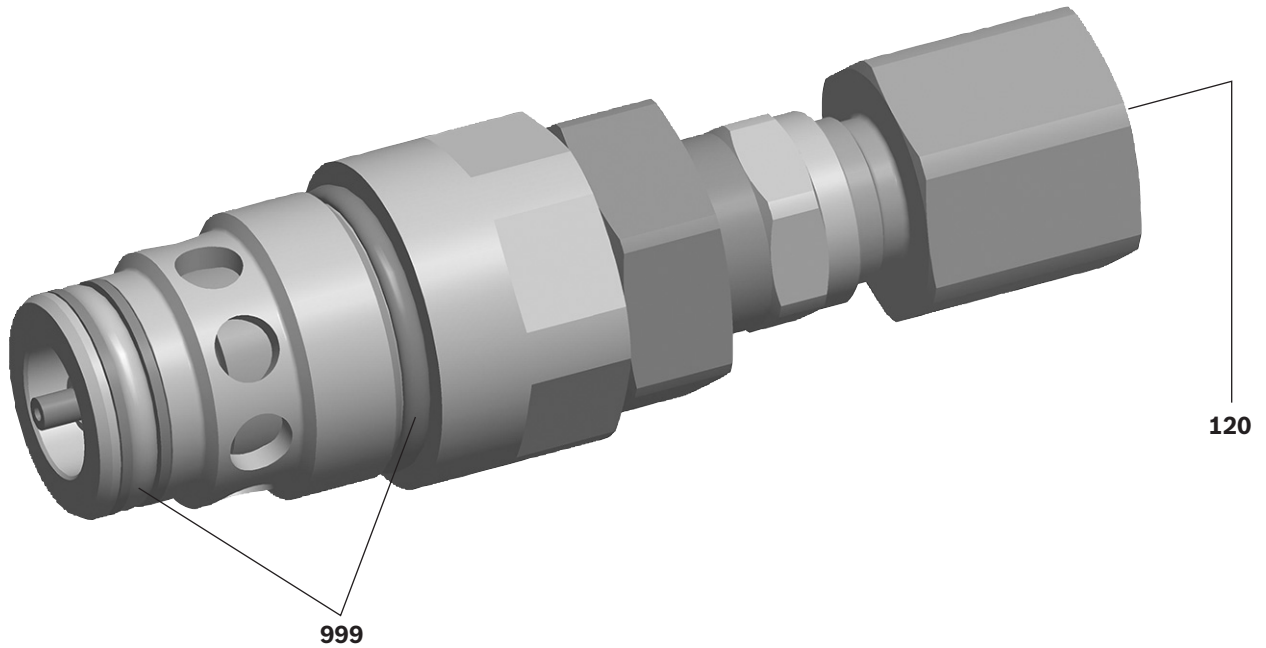


- 1) Depth of fit
  - 2) Visual inspection
  - 3) Thread depth
  - 4) Roughness up to  $\varnothing 32.5$  required
  - 5) Levelness up to  $\varnothing 32.5$  required
  - 6) Required opening cross-section for pumps (P) and tank port (T) > 132 mm<sup>2</sup>
  - 7) For sprues
- All seal ring insertion faces are rounded and free of burrs

**Standards:**

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerances for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

**Available individual components**



Item	Denomination	Design	Seal material	Material no.
120	Protective plug M14 x 1.5			R900992921
999	Seal kit of the valve for mounting cavity	"FB"	FKM	R961003378
999	Seal kit of the valve for mounting cavity	"FC"	FKM	R961003380
999	Seal kit of the valve for mounting cavity	"FK"	FKM	R961003389
999	Seal kit of the valve for mounting cavity	"LG"	FKM	R961003397

Seal kits with NBR seals upon request.

**Additional information**

- ▶ Hydraulic fluids on mineral oil basis
- ▶ Environmentally compatible hydraulic fluids
- ▶ Flame-resistant, water-free hydraulic fluids
- ▶ Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC)
- ▶ Hydraulic valves for mobile applications
- ▶ Selection of filters
- ▶ Information on available spare parts

- Data sheet 90220
- Data sheet 90221
- Data sheet 90222
- Data sheet 90223
- Operating instructions 64020-B1

# Pressure limitation and feed valve, pilot-operated

## Type MHDBN



H7567

- ▶ Frame sizes 16, 32
- ▶ Component series 3X
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 400 l/min

### Features

- ▶ Screw-in cartridge valve
- ▶ For mobile applications
- ▶ Pressure ratings from 100 ... 420 bar
- ▶ Available in 2 frame sizes (16, 32)
- ▶ Versatile applications for pressure limitation and feed functions

### Contents

Features	1
Ordering code	2
Valve types	2
Function, section, symbol	3
Technical data	4
Characteristic curves	5, 6
Dimensions	7
Mounting cavity	8
Available individual components	9
Further information	9

## Ordering code

01	02	03	04	05	06	07	08	09	10	11	12
MH	DBN		K		- 3X	/					*

01	Mobile hydraulics	MH
----	-------------------	----

02	Pressure limitation and feed valve, pilot-operated <sup>1)</sup>	DBN
----	--	-----

03	Size 16	16
	Size 32	32

04	Screw-in cartridge valve	K
----	--------------------------	---

### Adjustment type

05	Grub screw with internal hexagon	2
----	----------------------------------	---

06	Component series 30 ... 39 (30 ... 39: unchanged installation and connection dimensions)	3X
----	--	----

### Pressure rating <sup>2)</sup>

07	Set pressure up to 100 bar	100
	Set pressure up to 420 bar	420

### Pressure adjustment

08	Without pressure adjustment, without protective cap <sup>3)</sup>	no code
	With pressure adjustment, with protective cap	-... <sup>4)</sup>

### Pilot oil supply and pilot oil return

09	Pilot oil supply and pilot oil return, internal	no code
----	---	---------

### Seal material

10	NBR seals	M
	FKM seals	V
	Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	

### Mounting cavity

11	M 24 x 1.5 (size 16)	FH
	M 33 x 1 (size 32)	FK
	M 36 x 1 (size 32)	LM

12	Further details in the plain text	*
----	-----------------------------------	---

<sup>1)</sup> Minimum cracking pressure, see characteristic curves page 5 and 6

<sup>2)</sup> The values refer to the screw-in cartridge valve. If the valve is installed in a housing, it has to be made sure that the set pressure of the screw-in cartridge valve does not exceed the value of the housing that might be lower!

<sup>3)</sup> Protective cap separately available, material no. R900168151; valves without pressure adjustment at the factory are delivered in a pressure-relieved state.

<sup>4)</sup> Example:  
Set to 300 bar: ...420-300...  
(pressure adjustment at  $q_{Vmax} = 10$  l/min)

#### Notice:

Valves set at the factory are protected by means of a protective cap. In the case of subsequent re-adjustment, the warranty will become void!

## Valve types

Type	Material no.	Mounting cavity (see page 8)	Characteristic curves (see page 5 ... 6)
MHDBN 16 K2-3X/420VFH	R901162185	FH	D1 / E2
MHDBN 32 K2-3X/100VFK	R901162658	FK	D4 / E6
MHDBN 32 K2-3X/420VFK	R901162717	FK	D4 / E6
MHDBN 32 K2-3X/420VLM	R901162838	LM	D4 / E7

## Function, section, symbol

### General

The pressure valve type MHDBN is a pilot-operated pressure relief valve for installation in block designs. It is used to limit a system pressure. The system pressure can be set steplessly via the adjustment spindle (4).

### Pressure relief function

The valve is closed in initial position. The pressure in main port ① acts on the spool (1). Simultaneously, pressure is applied to the spring-loaded side of the spool (1) and to the pilot poppet (6) via the nozzle (2). If the pressure in main port ① exceeds the value set at the spring (5), the pilot poppet (6) opens. Hydraulic fluid flows from the spring-loaded side of the spool (1), via nozzle (3) and channel (7), into main port ② (tank). The resulting pressure drop moves the spool (1) and thus opens the connection from main port ① to ② while maintaining the pressure set at the spring (5). The pilot oil return is implemented internally via the channel (7) into main port ②.

### Feed function

The feed function makes up for lacking hydraulic fluid volumes caused, for example, by leakage when pressure valves respond or in the case of leading loads.

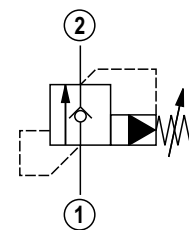
If the pressure at main port ① is lower than the one at main port ②, the spool (1) will be lifted out of its seat. Hydraulic fluid flows from main port ② to main port ①.

#### Notice:

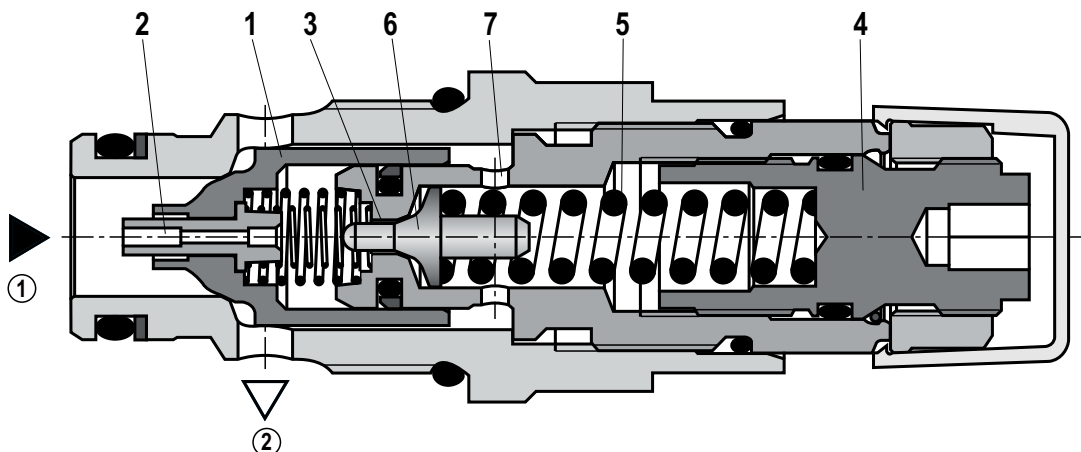
- ▶ The maximum operating pressure is the sum of the set pressure and the return flow pressure at main port ②.
- ▶ The pilot-operated pressure valves are virtually leakage-free thanks to their design.

### Symbol

Pilot oil supply and pilot oil return internal, "no code" version



- ① = Main port 1 (P)
- ② = Main port 2 (T)



Type MHDBN . K2...

## Technical data

(For applications outside these parameters, please consult us!)

general		
Weight	kg	See page 7
Installation position		Any
Ambient temperature range	°C	-20 ... +80
Storage temperature range	°C	-20 ... +80
Surface protection		Without – surface protection has to be ensured by painting the components or the whole assembly (e.g. valve with housing).

hydraulic			
Maximum operating pressure	▶ Main port ① (P)	bar	100; 420
	▶ Main port ② (T)	bar	50
Maximum flow		l/min	See characteristic curve page 5 and 6
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	-30 ... +80 (NBR seal)
			-20 ... +80 (FKM seal)
Viscosity range		mm <sup>2</sup> /s	10 ... 380
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Load cycles			2 million <sup>2)</sup>

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	NBR, FKM	DIN 51524
Bio-degradable	▶ Insoluble in water	HEES	ISO 15380
	▶ Soluble in water	HEPG	FKM

### Important information on hydraulic fluids:

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.  
**Bio-degradable:** When using bio-degradable hydraulic fluids that are zinc-solvent, zinc may accumulate in the fluid (700 mg zinc per pole tube).

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

Available filters can be found at [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter). We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .

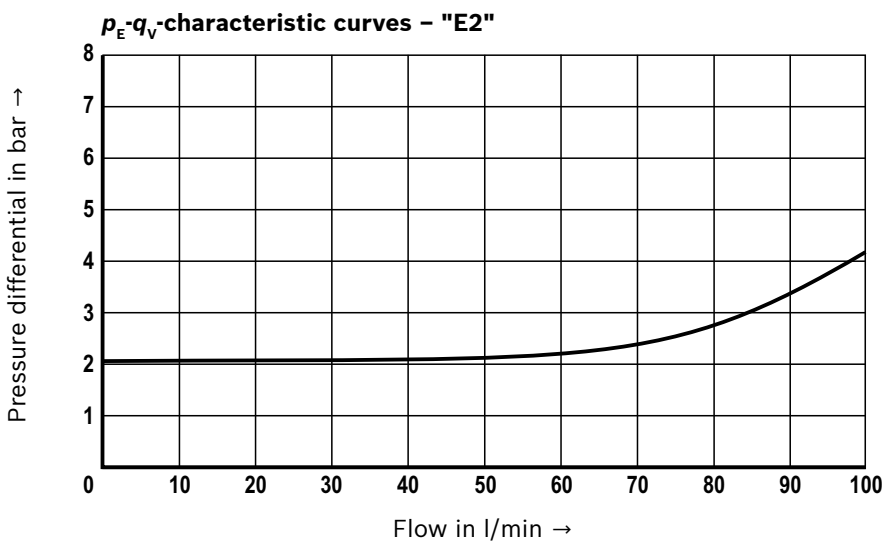
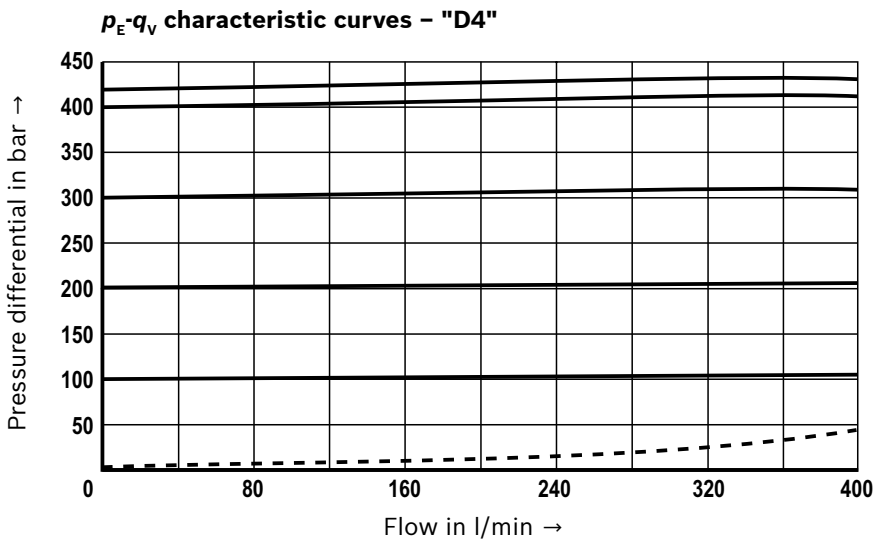
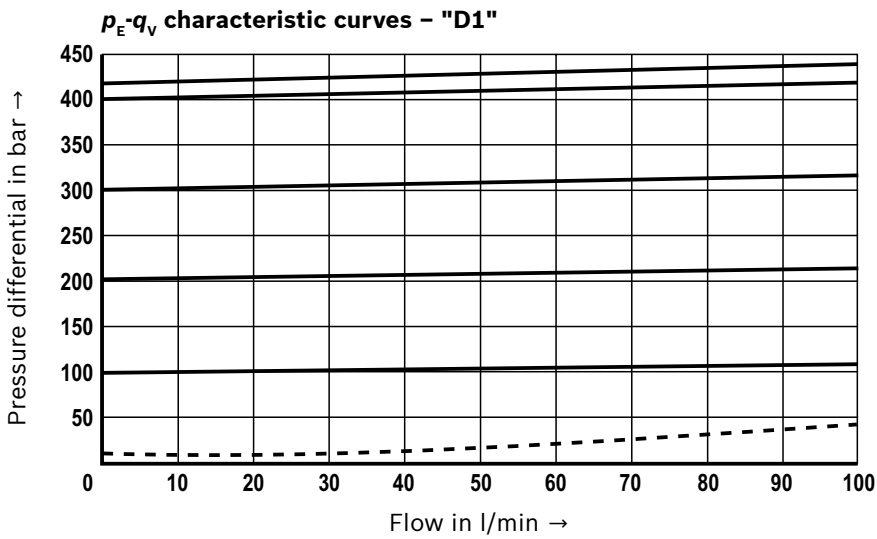
<sup>2)</sup> Rexroth standard test condition (HLP46;  $\vartheta_{oil} = 40 \text{ °C} \pm 5 \text{ °C}$ )

### Notice:

- ▶ Under application conditions with an operating pressure of < 30 bar and a flow of < 30 l/min, valves of another design are to be selected from our valve program. The maximum operating pressure is the sum of the set pressure and counter pressure!
- ▶ The technical data was determined at a viscosity of  $\nu = 41 \text{ mm}^2/\text{s}$  (HLP46;  $\vartheta_{oil} = 40 \text{ °C}$ ).
- ▶ The following documentation must be observed: 64020-B1 Hydraulic valves for mobile applications.
- ▶ Minimum cracking pressure, see characteristic curves page 5 and 6.
- ▶ When exchanging screw-in cartridge valves, provide for the correct tightening torque!

### Characteristic curves

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )



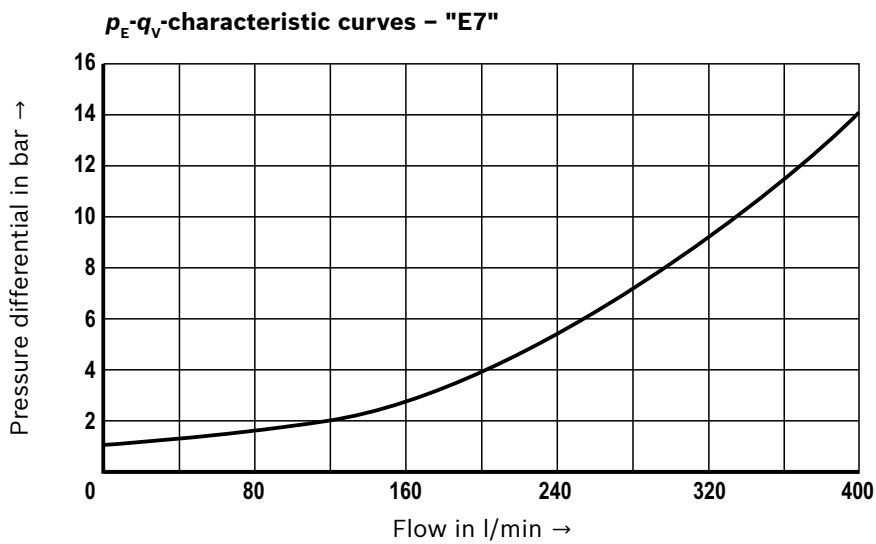
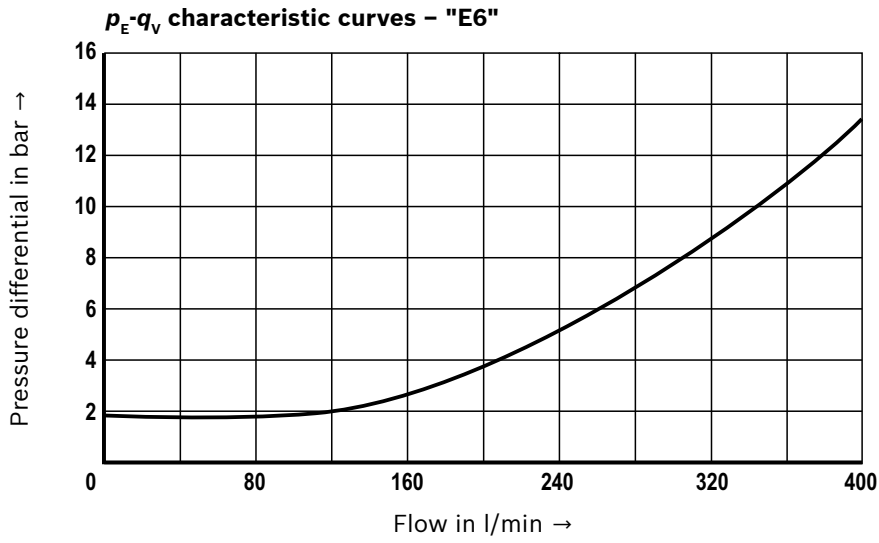
-----  
Performance limit

**Notice:**

- ▶ The characteristic curves apply to an output pressure  $p_T = 0$  bar over the entire volume range and without housing resistance.
- ▶ They refer to the specified nominal values of the pressure ratings (100, 420).
- ▶ Below the nominal pressure, the characteristic curves become increasingly steeper.

## Characteristic curves

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )

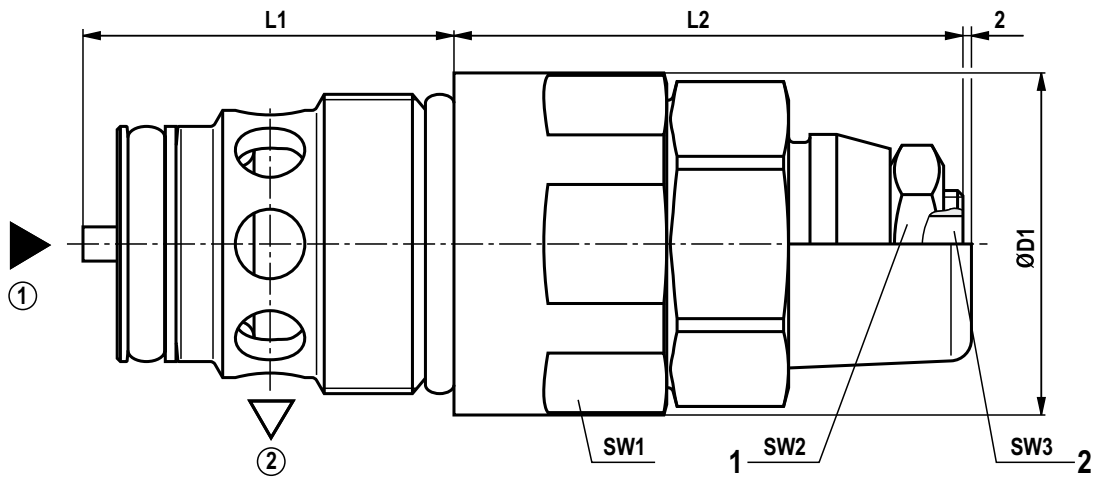


**Notice:**

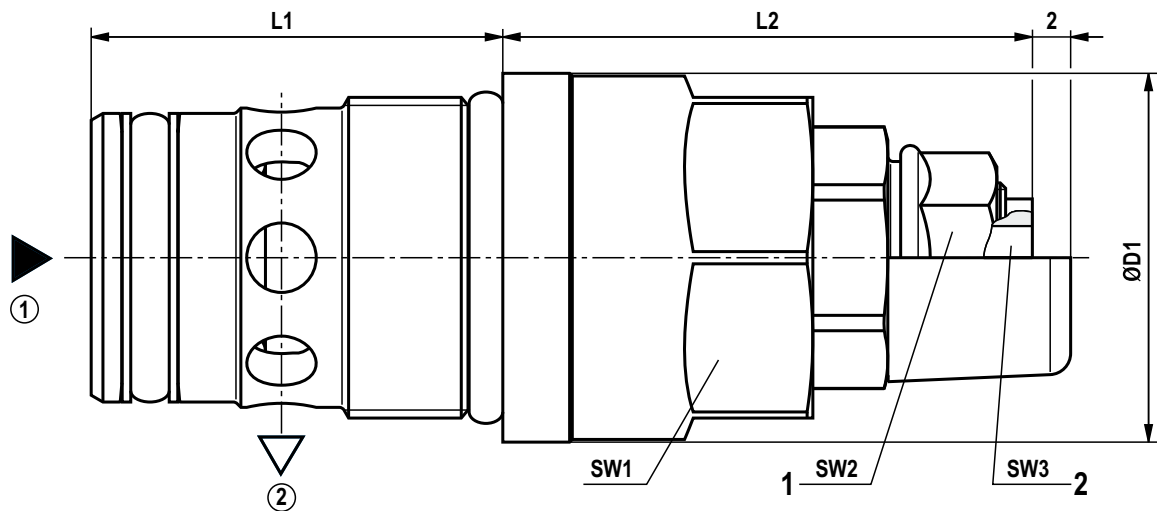
- ▶ The characteristic curves apply to an output pressure  $p_r = 0$  bar over the entire volume range and without housing resistance.
- ▶ They refer to the specified nominal values of the pressure ratings (100, 420).
- ▶ Below the nominal pressure, the characteristic curves become increasingly steeper.



**Dimensions**  
(dimensions in mm)



Type	ØD1	L1	L2	Wrench size			Tightening torque in Nm <sup>1)</sup>		Weight in kg
				SW1	SW2	SW3	SW1	SW2	
MHDBN 32 K2-3X/...VFK	37.0	40.9	46.1	34	16	5	150	15	0.40



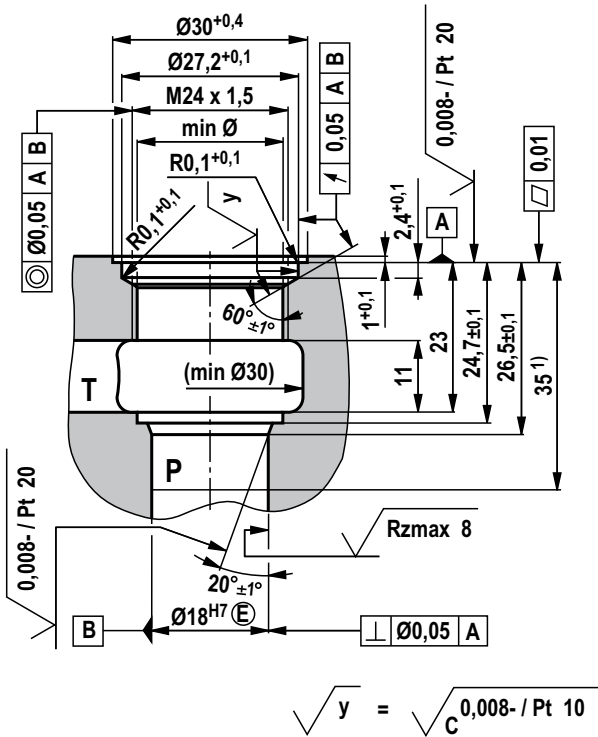
Type	ØD1	L1	L2	Wrench size			Tightening torque in Nm <sup>1)</sup>		Weight in kg
				SW1	SW2	SW3	SW1	SW2	
MHDBN 16 K2-3X/...VFH	29.0	35.0	46.8	24	17	5	100	20	0.21
MHDBN 32 K2-3X/...VLM	41.0	47.4	46.0	36	17	5	150	20	0.45

<sup>1)</sup> Friction coefficients, tightening torques, and preload forces interact with each other. The friction coefficients are influenced by the surface microstructure, material pairing, etc. Thus, we recommend checking the mounting characteristics with original components and under boundary conditions

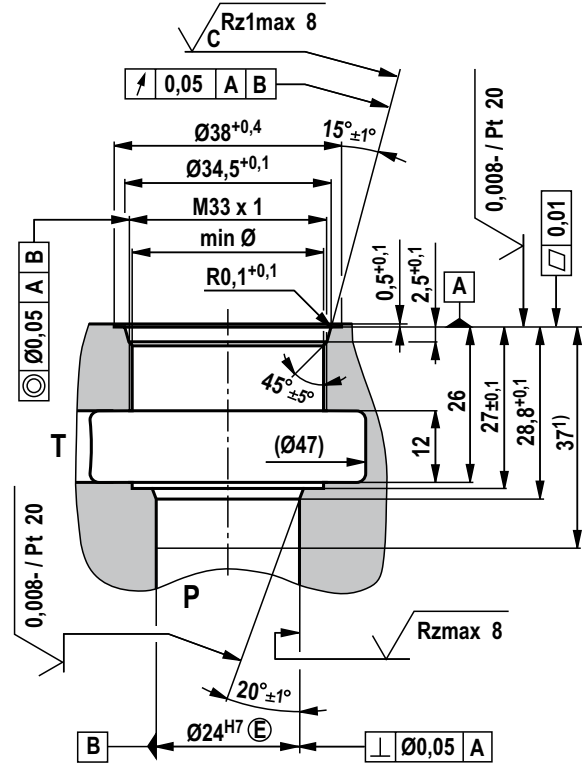
① = Main port 1 (P)  
 ② = Main port 2 (T)  
 1 Lock nut  
 2 Internal hexagon

**Mounting cavity**  
(dimensions in mm)

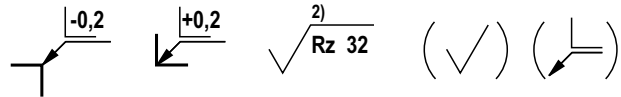
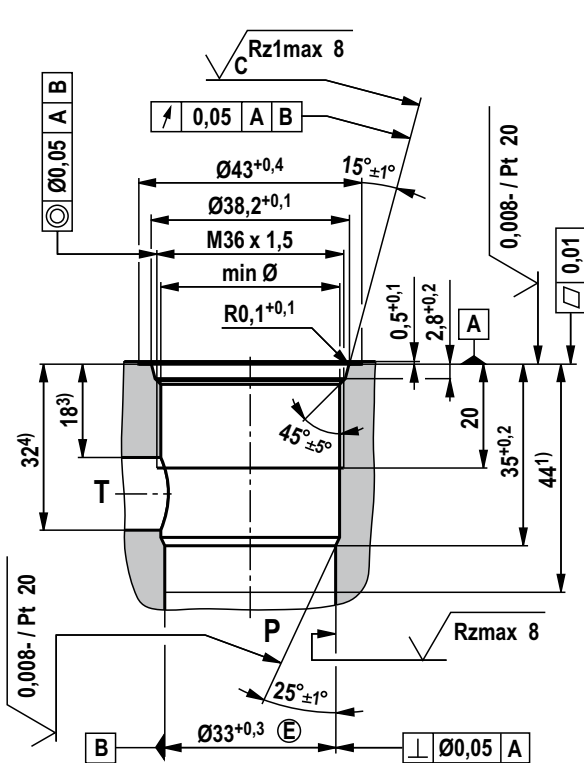
**Version "FH"** (M24 x 1.5)  
(Drawing no. R901148102)



**Version "FK"** (M33 x 1)  
(Drawing no. R901148145)



**Version "LM"** (M36 x 1.5)  
(Drawing no. R901148162)



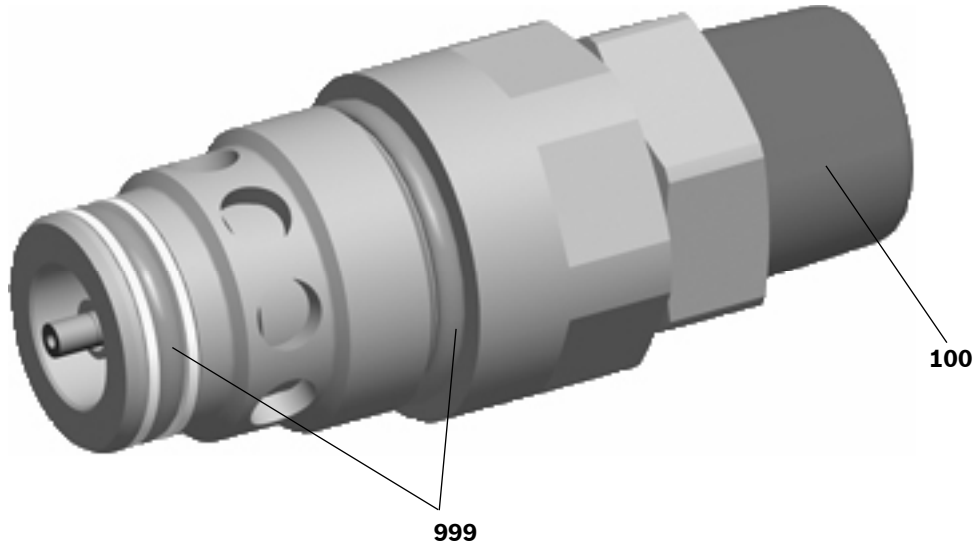
- 1) Depth of fit
- 2) Visual inspection
- 3) Thread depth
- 4) Roughness up to ø32.5 required
- 5) Levelness up to ø32.5 required
- 6) Required opening cross-section for pump (P) and tank port (T) > 132 mm<sup>2</sup>
- 7) For sprues

All seal ring insertion faces are rounded and free of burrs.

**Standards:**

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerances for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

### Available individual components



Item	Denomination	Seal material	Material no.
100	Protective cap separately available	-	<b>R900168151</b>
999	Seal kit of the valve for mounting cavity "FH"	FKM	<b>R961003387</b>
999	Seal kit of the valve for mounting cavity "FK"	FKM	<b>R961003389</b>
999	Seal kit of the valve for mounting cavity "LM"	FKM	<b>R961003398</b>

Seal kits with other seals upon request.

### Further information

- ▶ Hydraulic valves for mobile applications
- ▶ Hydraulic fluids on mineral oil basis
- ▶ Selection of the filters

Data sheet 64020-B  
 Data sheet 90220  
[www.boschrexroth.com/filter](http://www.boschrexroth.com/filter)

**Notes**

Pressure relief valve, pilot-operated,  
 with pulling function, seat design with pressure  
 sequencing and pressure cut-off stage

Type MHDBB and MHDBL



- ▶ Frame sizes 16, 22, 32
- ▶ Component series 3X
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 400 l/min

## Features

- ▶ Screw-in cartridge valve
- ▶ For mobile applications
- ▶ Pressure rating 100 and 420 bar
- ▶ Available in 3 frame sizes (16, 22, 32)

## Contents

Features	1
Ordering code	2
Valve types	3
Function, section	4
Technical data	5
Characteristic curves	6, 7
Dimensions	8
Mounting cavity	9
Available individual components	10

## Ordering code

01	02	03	04	05	06	07	08	09	10	11	12	13	
MH			K	9	-	3X	/			21		01	*

01	Mobile hydraulics	MH
02	Pressure / feed valve, pilot-operated <sup>1)</sup> <b>with</b> hydraulic pressure sequencing stage	DBB
	Pressure / feed valve, pilot-operated <sup>1)</sup> <b>with</b> hydraulic pressure cut-off stage	DBL
03	Size 16	16
	Size 22	22
	Size 32	32
04	Screw-in cartridge valve	K

## Adjustment type

05	Adjustable via pressure sequencing/cut-off stage	9
06	Component series 30 ... 39 (30 ... 39: unchanged installation and connection dimensions)	3X

Pressure rating <sup>2)</sup>

07	Maximum set pressure 100 bar	100
	Maximum set pressure 420 bar	420

## Pressure adjustment

08	<b>Without</b> pressure adjustment <sup>3)</sup>	no code
	<b>With</b> pressure adjustment	... <sup>4)</sup>

## Arithmetic gear ratio

09	(Only for version BB, pressure sequencing stage, different gear ratios upon request)	21
----	--	----

## Seal material

10	NBR seals	M
	FKM seals	V
	Observe compatibility of seals with hydraulic fluids used! (Other seals upon request)	

## Mounting cavity

11	M24 x 1 (NG16)	FB
	M28 x 1 (NG22)	FC
	M33 x 1 (NG32)	FK

## Electrical connection


12	Imperial (G1/4")	01
13	Further details in the plain text	*

<sup>1)</sup> Minimum cracking pressure, see characteristic curves pages 6 and 7

<sup>2)</sup> The values refer to the screw-in cartridge valve. If the valve is installed in a housing, it has to be made sure that the set pressure of the screw-in cartridge valve does not exceed the value of the housing that might be lower!

<sup>3)</sup> Valves whose pressure is not adjusted at the factory are delivered in pressure-relieved state.

<sup>4)</sup> Example: Set to 300 bar: ...420-**300**..  
(pressure adjustment at  $q_V \text{ max} = 10 \text{ l/min}$ )

 **Notice:** In the case of subsequent re-adjustment of valves set at the factory, the warranty will become void!

### Valve types

Valve type, symbol	Type	Material no.	Mounting cavity (see page 9)	Characteristic curve (see pages 6 and 7)
	MHDBB 16 K9-3X/420/21VFB01	<b>R900936672</b>	FB	D1/E1
	MHDBB 22 K9-3X/100/21VFC01	<b>R900962778</b>	FC	D2/E2
	MHDBB 22 K9-3X/420/21VFC01	<b>R900936679</b>	FC	D2/E2
	MHDBB 32 K9-3X/100/21VFK01	<b>R900243973</b>	FK	D3/E3
	MHDBB 32 K9-3X/420/21VFK01	<b>R900936956</b>	FK	D3/E3
	MHDBL 16 K9-3X/420VFB01	<b>R900936656</b>	FB	D1/E1
	MHDBL 22 K9-3X/420VFC01	<b>R900936680</b>	FC	D2/E2
	MHDBL 32 K9-3X/420VFK01	<b>R900936721</b>	FK	D3/E3

## Function, section

### General

Pressure valves type MHDBB and MHDBL are pilot-operated pressure relief valves for block design installation. They are used for system pressure limitation. The system pressure can be set steplessly via the adjustment element (4).

### Pressure relief function:

In the initial position the valves are closed. The pressure in main port ① acts on the spool (1). Simultaneously, pressure is applied to the spring-loaded side of the spool (1) and to the pilot poppet (6) via nozzle (2). If the pressure in main port ① exceeds the value set at spring (5), the pilot poppet (6) opens. Hydraulic fluid flows from the spring-loaded side of the spool (1) via nozzle (3) and channel (7) into the main port ②. The resulting pressure drop moves the spool (1) and thus opens the connection from main port ① to ② while maintaining the pressure set at spring (5).

### Pressure sequencing function (MHDBB)

By connecting pilot oil pressure to the external port ③, the piston (8) is pressurized. This increases the preload of the spring (5) and the maximum set system pressure.

Pressurization at the external port ③ has an effect on the pressure at the main port ① at a ratio of 21:1.

### Pressure shut-off function (MHDBL):

By connecting pilot oil pressure to the external port ③, the piston (8) is pressurized. This reduces the preload of the spring (5) and the maximum set system pressure.

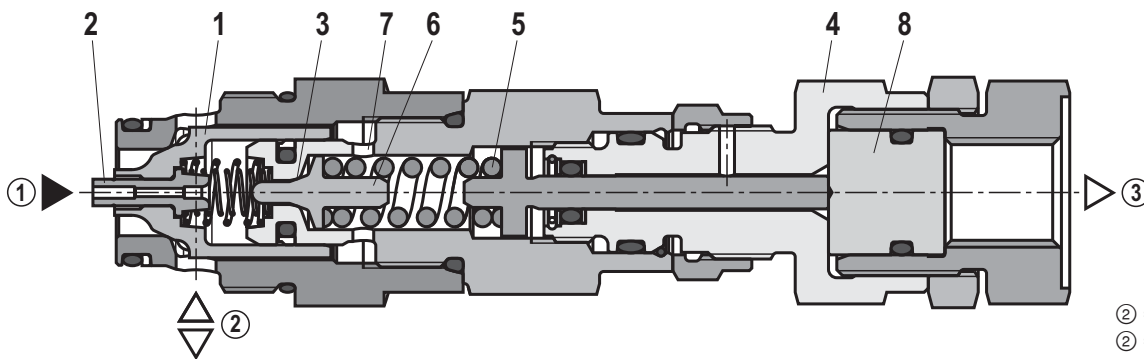
### Feed function:

The feed function makes up for insufficient oil volumes caused by leakage on response of pressure valves and in case of leading loads. If the pressure at main port ① is lower than at main port ②, the spool will be lifted out of its seat. Hydraulic fluid flows from main port ② to main port ①. Tank preloading should be  $\geq 4$  bar.

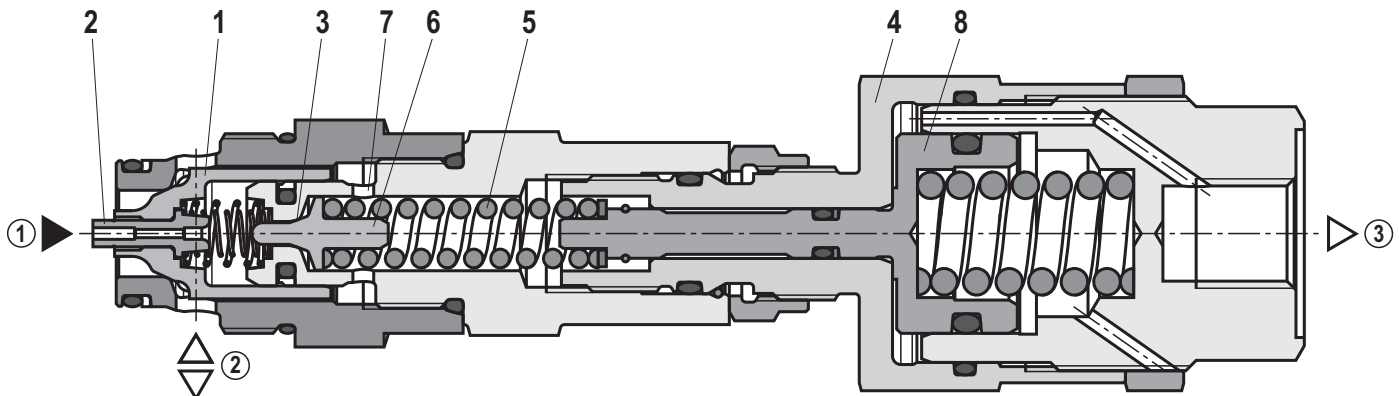
### Notice:

- ▶ The maximum operating pressure is the sum of the set pressure and the return flow pressure at main port ②.
- ▶ Thanks to their design, pilot-operated pressure valves are virtually leakage oil-free.

### MHDBB



### MHDBL





## Technical data

(For applications outside these parameters, please consult us!)

general		
Weight	kg	See table on page 8 for dimensions
Installation position		Any
Ambient temperature range	°C	-20 ... +80
Storage temperature range	°C	-20 ... +80

Environmental audits	
Surface protection	The valves do not feature any surface protection! Surface protection has to be ensured by painting the components or the entire assembly (e.g. valve with housing).

hydraulic			
Maximum operating pressure	▶ Main port ① (P)	bar	100; 420
	▶ Main port ② (T)	bar	50
Max. pilot pressure	▶ External port ③ (Pst)	bar	30
Maximum flow	▶ Port P-T	l/min	See characteristic curves on pages 6 and 7
	▶ Port T-P	l/min	See characteristic curves on pages 6 and 7
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	-30 ... +80 (NBR seal)
			-20 ... +80 (FKM seal)
Viscosity range		mm <sup>2</sup> /s	10 ... 380
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Tested load cycles		LW	2 million <sup>2)</sup>

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	NBR, FKM	DIN 51524
Bio-degradable	▶ Insoluble in water	HEES	NBR, FKM
	▶ Soluble in water	HEPG	FKM

### Important information on hydraulic fluids:

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

**Bio-degradable:** If bio-degradable hydraulic fluids are used that are also zinc-solvent, there may be an accumulation of zinc.

- <sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.  
For selection of filters, see data sheets 50070, 50076, 50081, 50086 and 50088. We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .
- <sup>2)</sup> Rexroth standard test condition (HPL46;  $\eta_{oil} = 40$  °C)

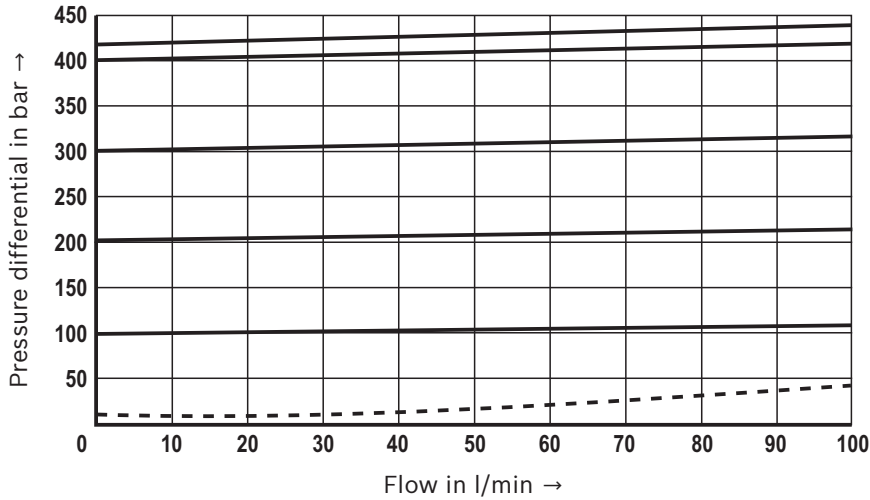
### Notice:

- ▶ The technical data was determined at a viscosity of  $\nu = 41$  mm<sup>2</sup>/s (HLP46;  $\eta_{oil} = 40$  °C)
- ▶ The following documentation must be observed:  
Data sheet 64020-B1 Hydraulic valves for mobile applications
- ▶ When exchanging screw-in cartridge valves, provide for the correct tightening torque!
- ▶ Minimum cracking pressure, see characteristic curves page 6 and 7
- ▶ For use of the valves at an operating pressure of < 30 bar and a flow capacity of < 30 l/min, valves of another design are to be selected from our valve program.

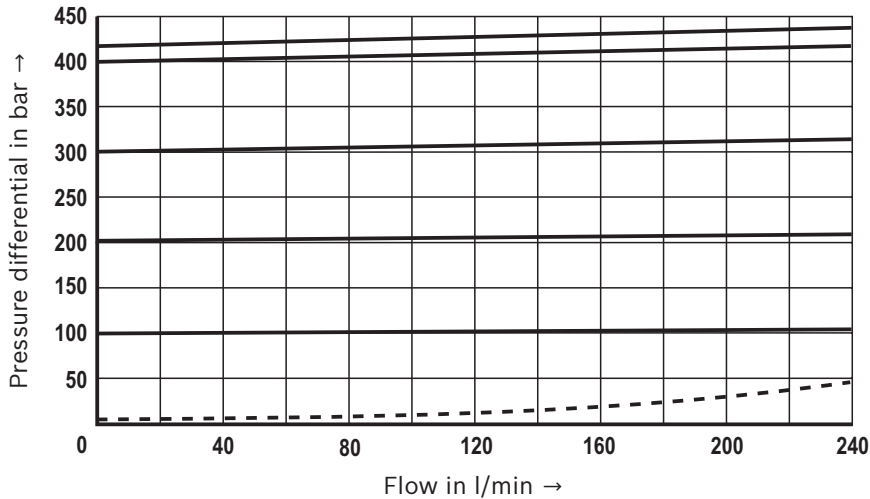
### Characteristic curves

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )

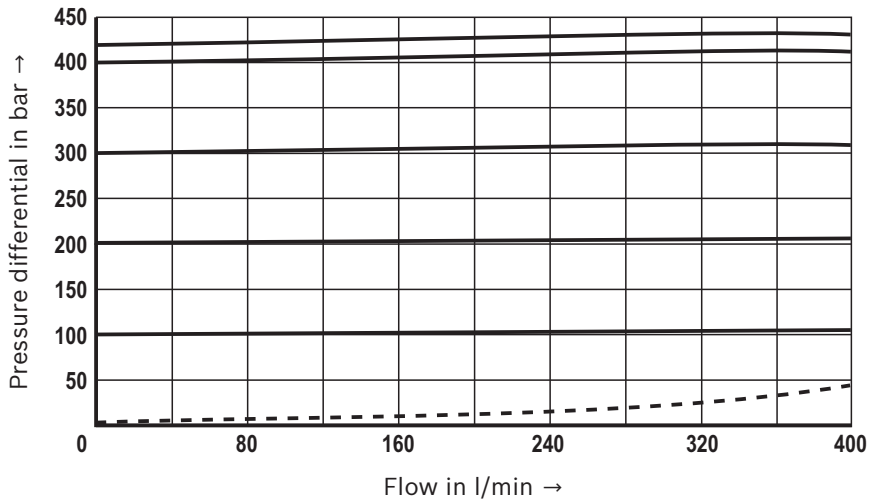
$\Delta p$ - $q_V$ -characteristic curves - "D1"



$\Delta p$ - $q_V$ -characteristic curves - "D2"



$\Delta p$ - $q_V$ -characteristic curves - "D3"



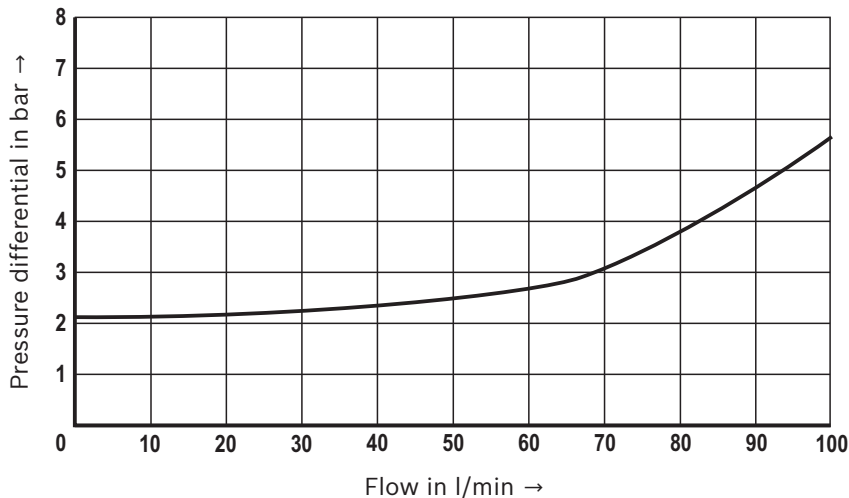
-----  
Performance limit

- Notice:**
- ▶ The characteristic curves apply to an output pressure  $p_T = 0 \text{ bar}$  over the entire volume range and without housing resistance.
  - ▶ They refer to the specified nominal values of the pressure ratings (100, 420).
  - ▶ Below the nominal pressure, the characteristic curves become increasingly steeper.

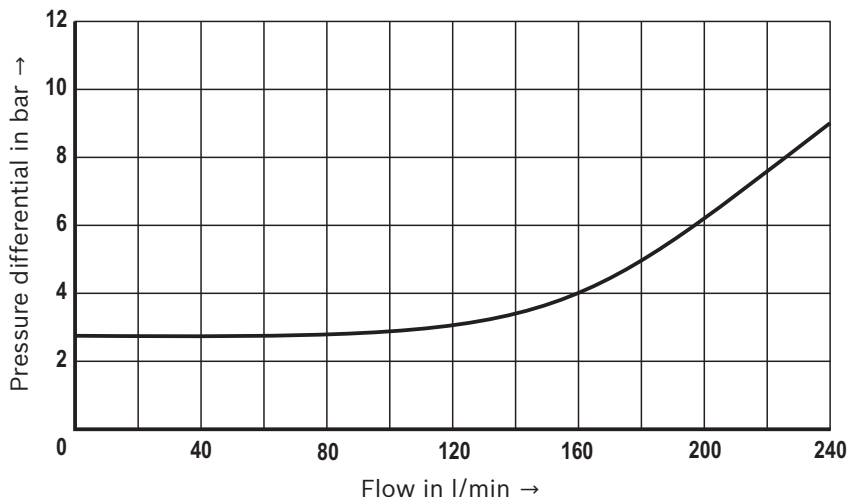
### Characteristic curves

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )

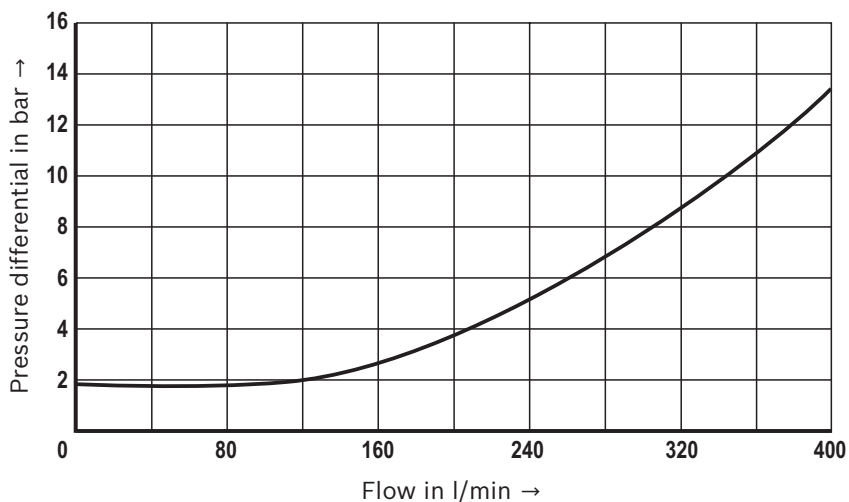
$\Delta p$ - $q_V$ -characteristic curves - "E1"



$\Delta p$ - $q_V$ -characteristic curves - "E2"



$\Delta p$ - $q_V$ -characteristic curves - "E3"

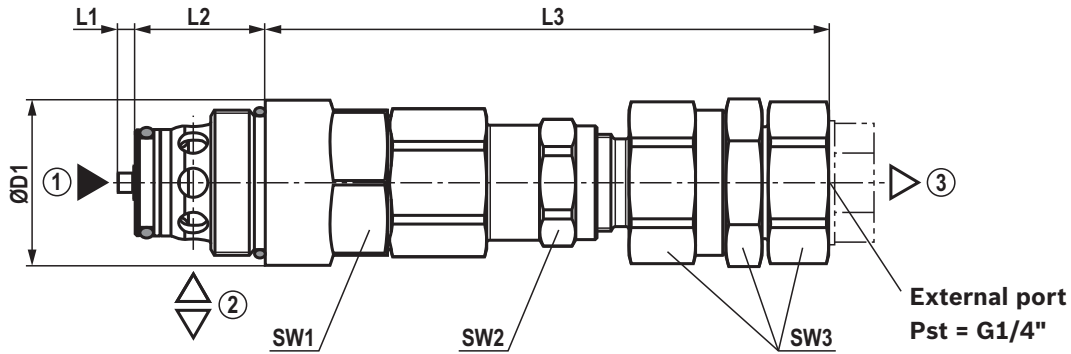


**Notice:**

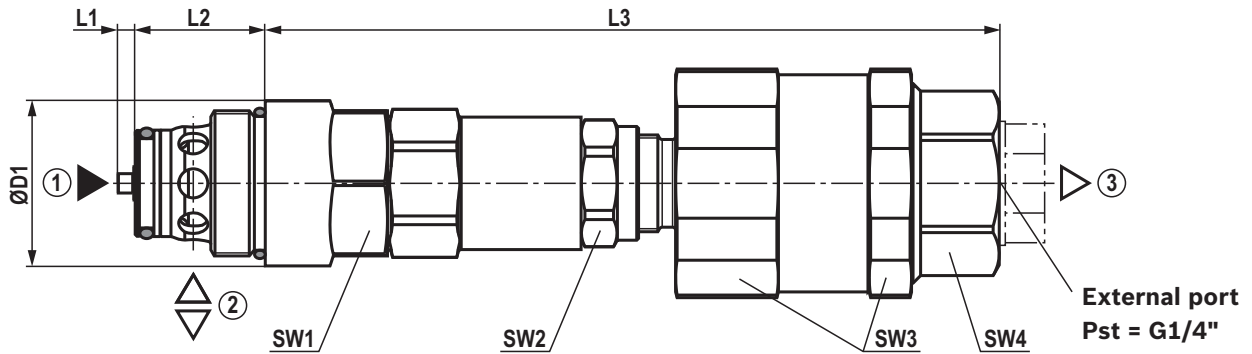
- ▶ The characteristic curves apply to an output pressure  $p_T = 0$  bar over the entire volume range and without housing resistance.
- ▶ They refer to the specified nominal values of the pressure ratings (100, 420).
- ▶ Below the nominal pressure, the characteristic curves become increasingly steeper.

**Dimensions**

(dimensions in mm)



Type	ØD1	L1	L2	L3	Wrench size			Tightening torque in Nm <sup>1)</sup>		Weight in kg
					SW1	SW2	SW3	SW1	SW2	
MHDBB 16 K9-3X/ ...VFB01	27.3	3	21.5	93	24	19	24	90	15	0.30
MHDBB 22 K9-3X/ ...VFC01	32	3	31.5	91	30	19	24	100	15	0.40
MHDBB 32 K9-3X/ ...VFK01	37	5	36	90	34	19	24	150	15	0.50



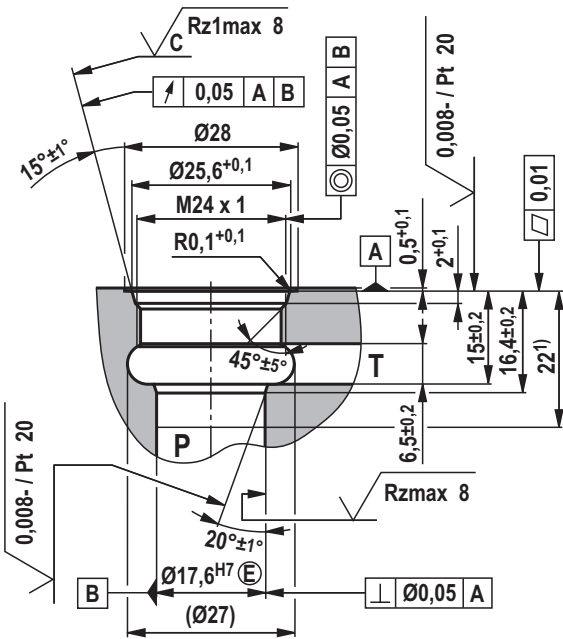
Type	ØD1	L1	L2	L3	Wrench size				Tightening torque in Nm <sup>1)</sup>		Weight in kg
					SW1	SW2	SW3	SW4	SW1	SW2	
MHDBL 16 K9-3X/ ...VFB01	27.3	3	21.5	121	24	19	36	27	90	15	0.53
MHDBL 22 K9-3X/ ...VFC01	32	3	31.5	119	30	19	36	27	100	15	0.66
MHDBL 32 K9-3X/ ...VFK01	37	5	36	118	34	19	36	27	150	15	0.75

<sup>1)</sup> Friction coefficients, tightening torques, and preload forces interact with each other. The friction coefficients are influenced by the surface microstructure, material pairing, etc. Thus, we recommend checking the mounting characteristics with original components and under boundary conditions

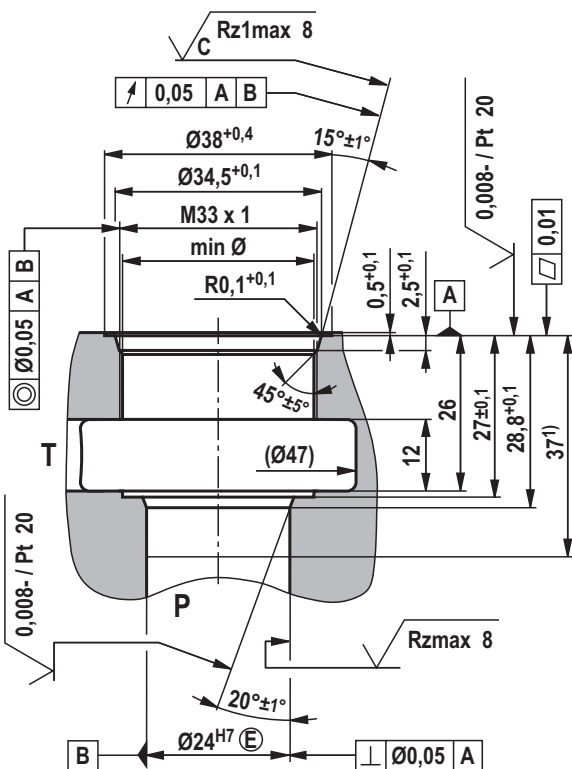
② = Main port (P)  
 ② = Main port (T)  
 ③ = External port (Pst)

**Mounting cavity**  
(dimensions in mm)

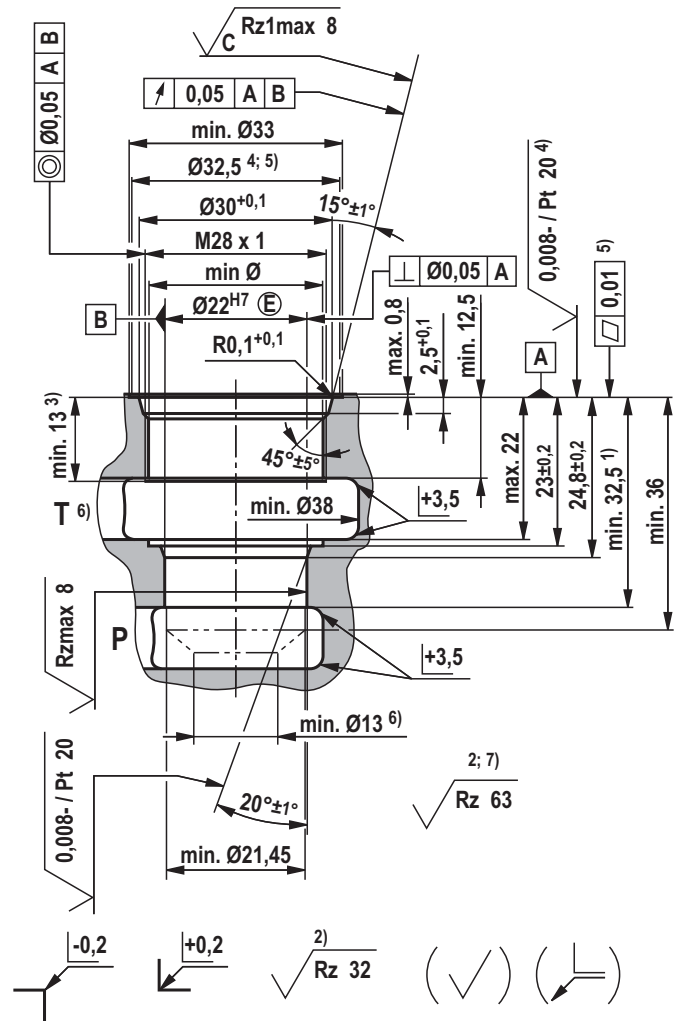
**Version "FB" (M24 x 1)**  
(Drawing no. R901063585)



**Version "FK" (M33 x 1)**  
(Drawing no. R901148145)



**Version "FC" (M28 x 1)**  
(Drawing no. RA50151421)



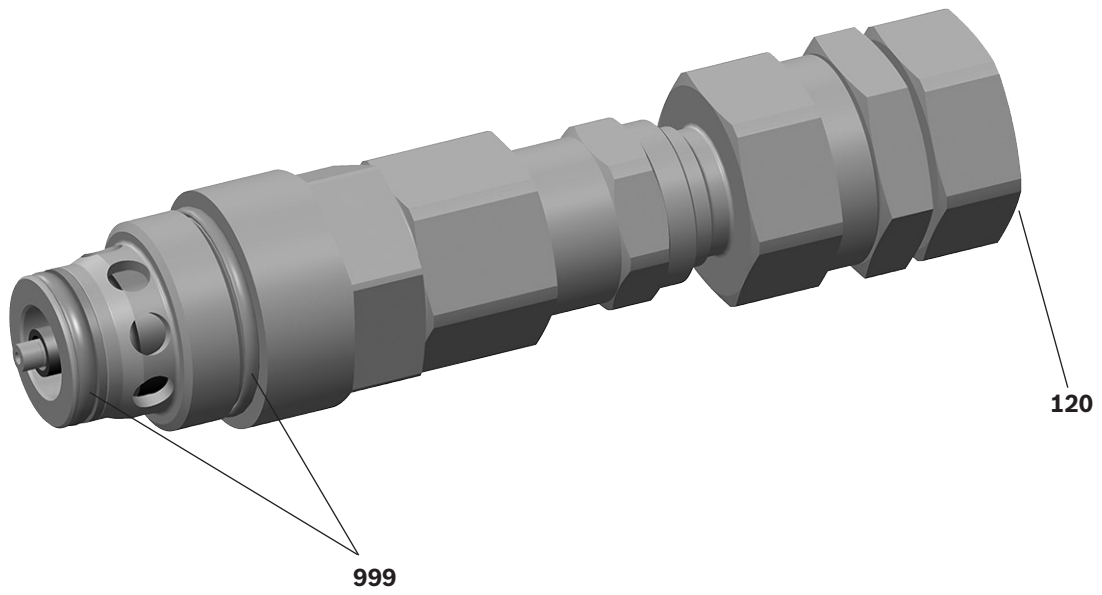
- 1) Depth of fit
- 2) Visual inspection
- 3) Thread depth
- 4) Roughness up to ø32.5 required
- 5) Levelness up to ø32.5 required
- 6) Required opening cross-section for pump (P) and tank port (T) > 132 mm<sup>2</sup>
- 7) For sprues

All seal ring insertion faces are rounded and free of burrs

**Standards:**

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerances for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

**Available individual components**



Item	Denomination	Seal material	Material no.
120	Protective plug	-	<b>R900992908</b>
999	Seal kit of the valve for mounting cavity "FB"	FKM	<b>R961003378</b>
999	Seal kit of the valve for mounting cavity "FC"	FKM	<b>R961003380</b>
999	Seal kit of the valve for mounting cavity "FK"	FKM	<b>R961003389</b>

Seal kits with NBR seals upon request.

# Feed valve

## Type MHSV



HAD7986\_12

- ▶ Frame sizes 16, 22, 32
- ▶ Component series 2X
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 400 l/min

### Features

- ▶ Screw-in cartridge valve
- ▶ Available in 3 sizes (16, 22, 32)

### Contents

Features	1
Ordering code, valve types	2
Function, section, symbol	3
Technical data	4
Characteristic curves	5
Dimensions	6
Mounting cavity	7
Available individual components	8

Ordering code (valve without coil) <sup>1)</sup>

01	02	03	04	05	06	07	08	09	10	11
MH	S	V		K	B	1	-	2X	/	*

01	Mobile hydraulics	MH
02	Feed valve	S
03	Without leakage port	V
04	Size 16	16
	Size 22	22
	Size 32	32
05	Screw-in cartridge valve	K
06	Without pilot poppet	B
07	Cracking pressure 0.5 bar	1
08	Component series 20 to 29 (20 to 29: Unchanged installation and connection dimensions)	2X

## Seal material

09	NBR seals	M
	FKM seals	V
	(Other seals upon request) Attention! Compatibility of seals with hydraulic fluids used must be observed!	

## Mounting cavity

10	M 24 x 1 (size 16)	FB
	M 28 x 1 (size 22)	FC
	M 33 x 1 (size 32)	FK
11	Further details in the plain text	

 Notice:

For other valve types than those listed in the data sheet, please consult us!

## Valve types

Type	Material no.	Mounting cavity (see page 7)	Characteristic curves (see page 5)
MHSV 16 KB1-2X/VFB	R900936508	FB	N1
MHSV 22 KB1-2X/MFC	R900786222	FC	N2
MHSV 22 KB1-2X/VFC	R900936725	FC	N2
MHSV 32 KB1-2X/VFK	R900936726	FK	N3



## Function, section, symbol

### General

The type MHSV screw-in cartridge valve is a direct operated feed valve for installation in block designs. It is used for the leakage-free isolation of pressurized working circuits. Due to the relatively low closing force of the compression spring (2) at the main poppet it is particularly well suited for use as an anti-cavitation valve.

### Function

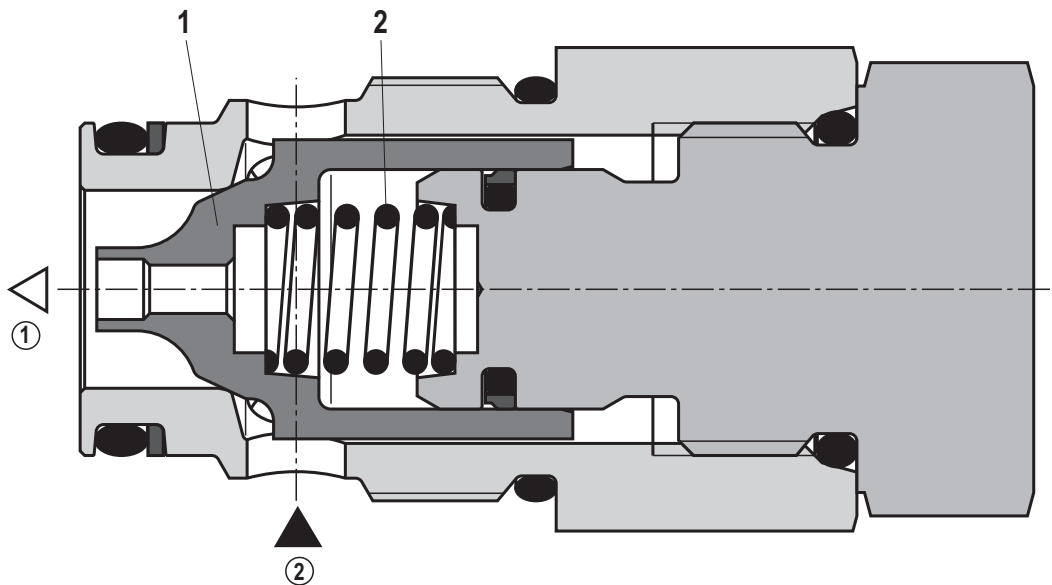
The feed function replaces oil volumes lost by leakage or responding pressure valves. The cracking pressure is greater than 0.5 bar most of the time, which is why the supply pressure must be higher than the atmospheric pressure. If the pressure at main port ① is lower than the one at main port ②, the spool (1) will be lifted out of its seat. Now, hydraulic fluid flows from main port ② to main port ①. Tank preloading should be  $\cong 4$  bar.

### Symbol



① = main port 1 (P)

② = main port 2 (T)



Type MHSV 22 KB1-2X...

## Technical data

(For applications outside these parameters, please consult us!)

general		
Weight	kg	See page 6
Installation position		Any
Ambient temperature range	°C	-20 ... +80
Storage temperature range	°C	-20 ... +80
Surface protection		Without – surface protection has to be ensured by painting the components or the whole assembly (e.g. valve with housing).

hydraulic			
Maximum operating pressure	Main port ② (T)	bar	420
	Main port ① (P)	bar	420
Maximum flow	Main port ② (T) → ① (P)	l/min	See characteristic curve page 5
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	-30 ... +80 (NBR seal)
			-20 ... +80 (FKM seal)
Viscosity range		mm <sup>2</sup> /s	10 ... 380
Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Load cycles			2 million <sup>2)</sup>

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ insoluble in water	HEES	ISO 15380	90221
	▶ soluble in water	HEPG		



### Important information on hydraulic fluids!

- ▶ For more information and data on the use of other hydraulic fluids, refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

- ▶ **Bio-degradable:** When using bio-degradable hydraulic fluids that are also zinc-solvent, zinc may accumulate in the fluid.

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.

We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .

<sup>2)</sup> Rexroth standard test condition (HLP46;  $\vartheta_{oil} = 40 \text{ °C} \pm 5 \text{ °C}$ )



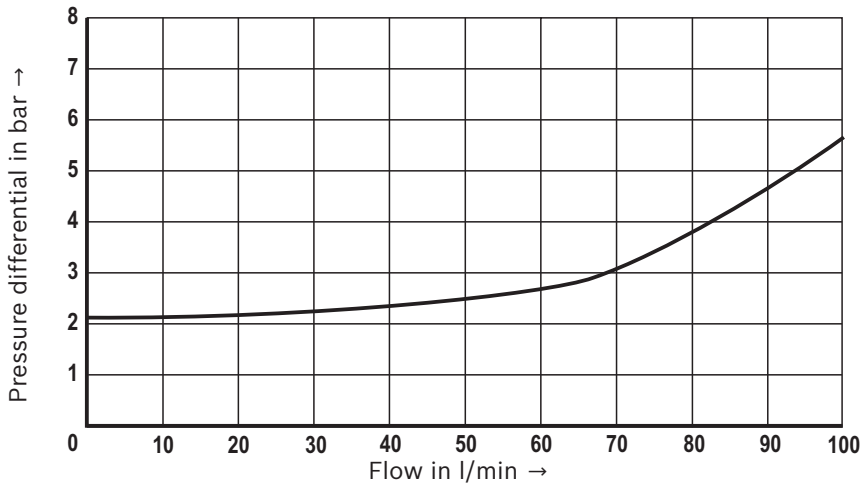
### Notice:

- ▶ The following documentation must be observed: 64020-B1 Hydraulic valves for mobile applications
- ▶ When exchanging screw-in cartridge valves, use the correct tightening torque!
- ▶ The minimum cracking pressure is greater than 0.5 bar. Therefore, a supply pressure  $\geq 4$  bar is recommended.

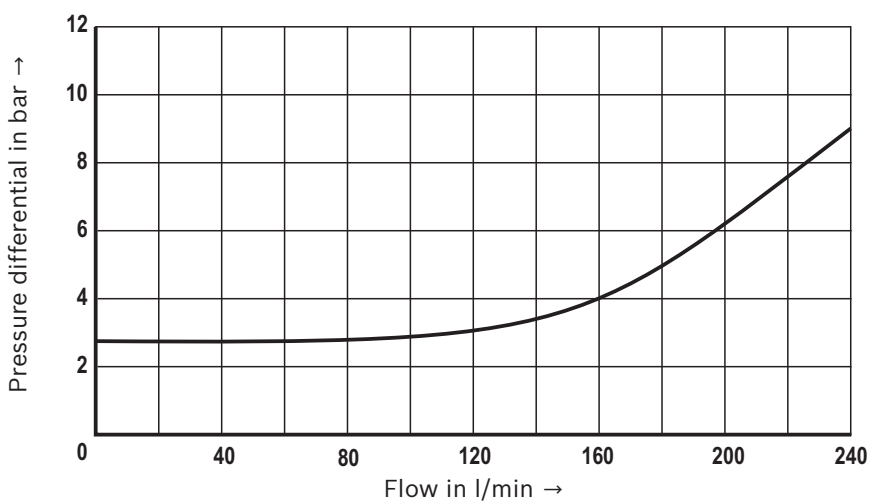
### Characteristic curves

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

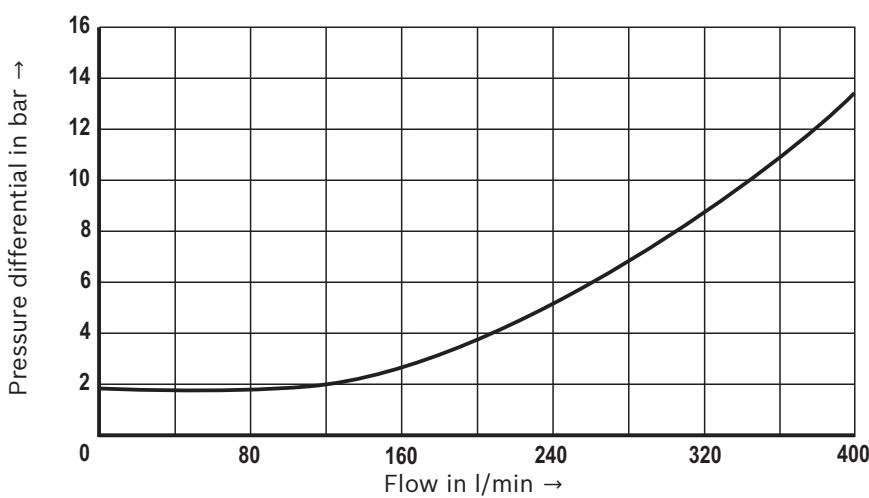
$\Delta p$ - $q_v$  characteristic curves - "N1"



$\Delta p$ - $q_v$  characteristic curves - "N2"



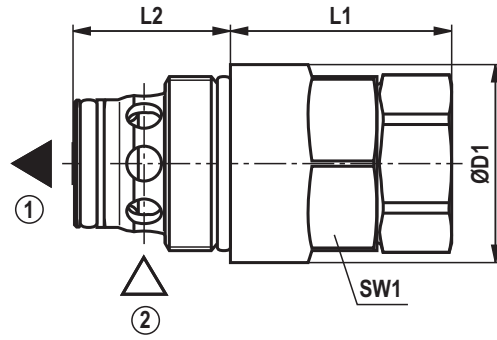
$\Delta p$ - $q_v$  characteristic curves - "N3"



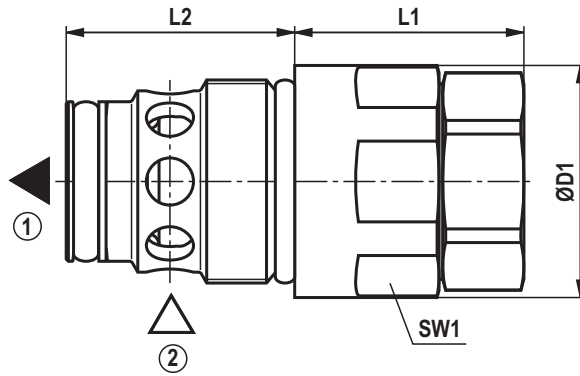
**Notice:**

The characteristic curves apply to an output pressure  $p$  at ① = 0 bar over the entire flow range and without housing resistance

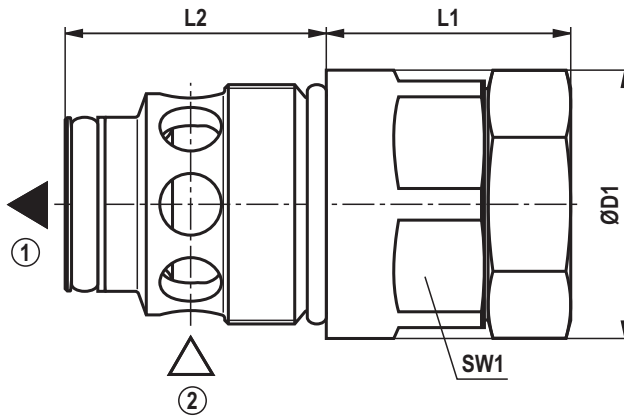
**Dimensions**  
(dimensions in mm)



Type	ØD1	L1	L2	Wrench size SW1	Tightening torque in Nm <sup>1)</sup> SW1	Weight in kg
MHSV 16 KB1-2X/...	27.3	30.5	21.5	24	90 ± 10	0.16



Type	ØD1	L1	L2	Wrench size SW1	Tightening torque in Nm <sup>1)</sup> SW1	Weight in kg
MHSV 22 KB1-2X/...	32.0	31.5	31.6	30	100 ± 10	0.26



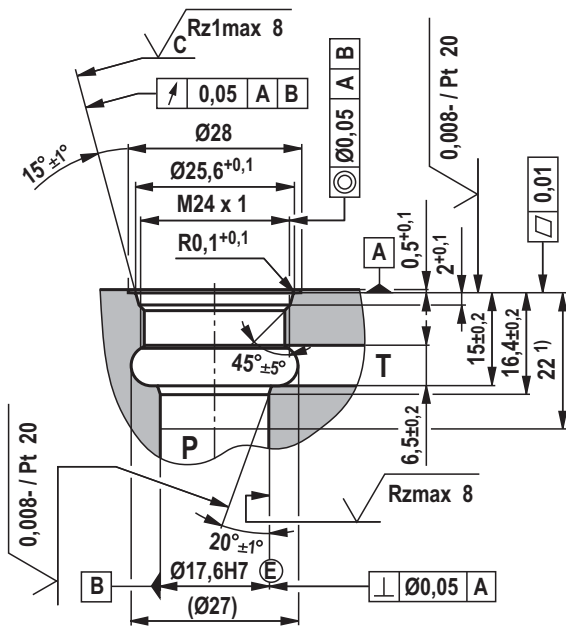
Type	ØD1	L1	L2	Wrench size SW1	Tightening torque in Nm <sup>1)</sup> SW1	Weight in kg
MHSV 32 KB1-2X/...	37.0	33.7	36.0	34	150 ± 10	0.38

<sup>1)</sup> Friction coefficients, tightening torques, and preload forces interact with each other. The friction coefficients are influenced by surface microstructure, material pairing etc. Thus, we recommend checking the mounting characteristics with genuine parts and boundary conditions.

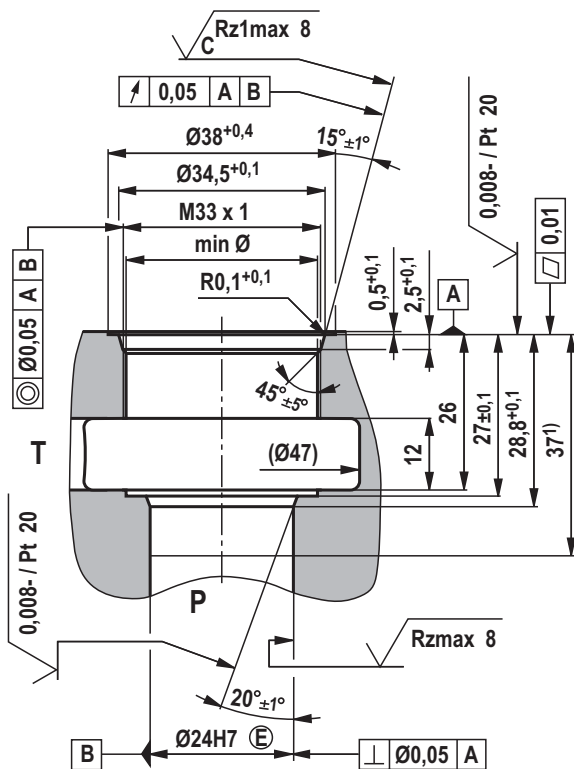
① = main port 1 (P)  
② = main port 2 (T)

**Mounting cavity**  
(dimensions in mm)

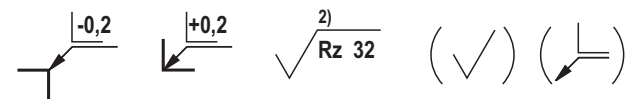
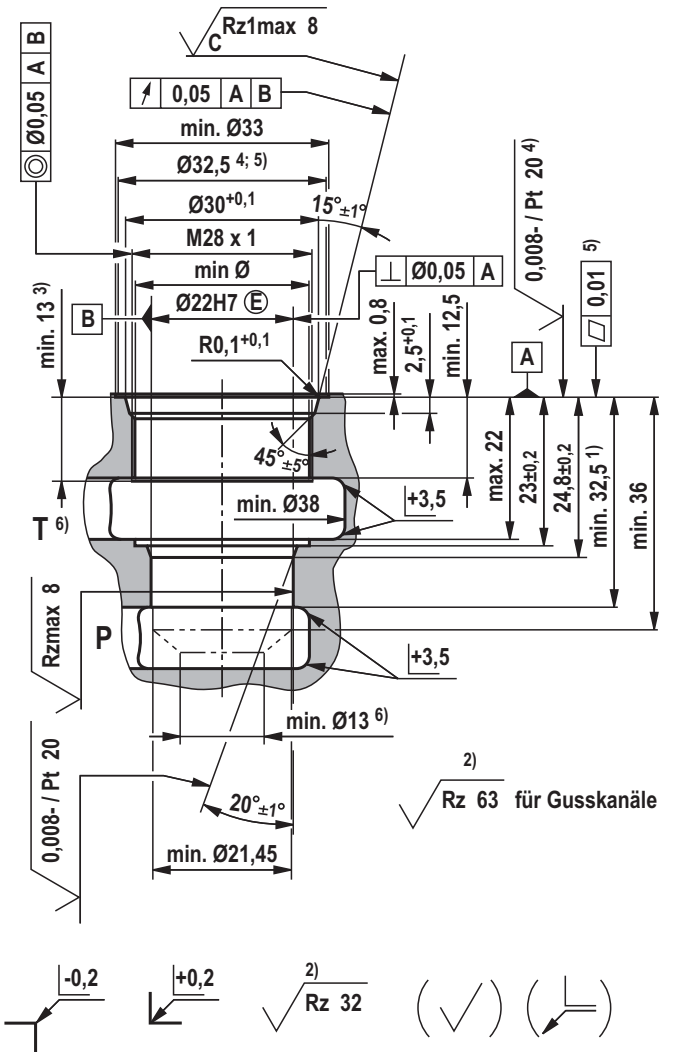
**Version "FB"** (M24x1)  
(drawing no. R901063585)



**Version "FK"** (M33x1)  
(drawing no. R901148145)



**Version "FC"** (M28x1)  
(drawing no. RA50151421)

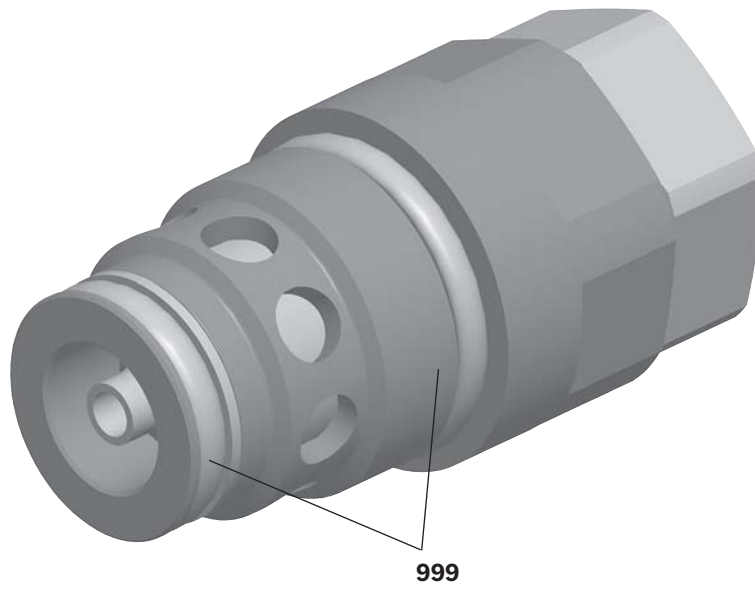


- 1) Depth of fit
  - 2) Visual inspection
  - 3) Thread depth
  - 4) Roughness up to ø32.5 required
  - 5) Levelness up to ø32.5 required
  - 6) Required opening cross-section for pump connection (P) and tank port (T) > 132 mm<sup>2</sup>
- All seal ring insertion faces are rounded and free of burrs.

**Standards:**

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerances for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

**Available individual components**



Item	Denomination	Seal material	Material no.
999	Seal kit of the valve for mounting cavity "FB"	FKM	R961003378
999	Seal kit of the valve for mounting cavity "FC"	FKM	R961003380
999	Seal kit of the valve for mounting cavity "FC"	NBR	R961008541
999	Seal kit of the valve for mounting cavity "FK"	FKM	R961003389

Seal kits with other seals upon request.

# Shuttle valve

## Type MHSU

Size 2 and 3  
Component series 1X  
Maximum operating pressure 420 bar



H7385

## Table of contents

Contents	Page
Features	1
Ordering code	2
Standard types	2
Function, section, symbol	2
Technical data	3
Characteristic curves	4
Unit dimensions	5
Mounting cavities	5
Available individual components	6

## Features

- Cartridge valve
- For mobile applications
- Pressure rating 420 bar
- Available in 2 sizes (2 and 3)

Information on available spare parts:  
[www.boschrexroth.com/spc](http://www.boschrexroth.com/spc)

## Ordering code

MH	SU		K	A	1X/420		*
----	----	--	---	---	--------	--	---

Mobile hydraulics

Shuttle valve

Size 2 = 2

Size 3 = 3

Cartridge valve = K

with ball = A

Further details in the plain text

No code = without orifice

B08 =<sup>1)</sup> Orifice Ø 0.8 mm

420 = Pressure rating 420 bar

1X = Component series 10 to 19  
(10 to 19: unchanged installation and connection dimensions)

<sup>1)</sup> With size 2 available.

## Standard types

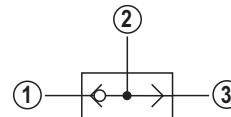
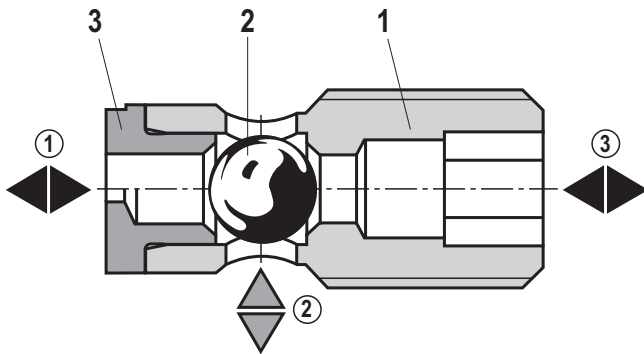
Type	Material number
MHSU 2 KA1X/420	R900541374
MHSU 2 KA1X/420 B08	R900545233
MHSU 3 KA1X/420	R901071225

## Function, section, symbol

The shuttle valve type MHSU is an isolator valve with two inputs ① and ③ as well as one output ②.

It basically comprises housing (1), ball (2) and pressed-in valve seat with/without orifice (3).

The input with the higher pressure is automatically connected with the joint output ② while the other input is blocked.



① = Input "A"

② = Output "B"

③ = Input "C"




**Technical data** (For applications outside these parameters, please consult us!)**general**

Size	NG	2	3
Weight	g	approx. 5	approx. 9
Installation position		Any	
Ambient temperature range	°C	-20 to +80	
Surface protection		Without	

**hydraulic**

Maximum operating pressure	bar	420
Maximum flow	l/min	see characteristic curves page 4
Hydraulic fluid		see table below
Hydraulic fluid temperature range	°C	-30 to +80
Viscosity range	mm <sup>2</sup> /s	10 to 380
Maximum permitted degree of contamination of the hydraulic fluid – cleanliness class according to ISO 4406 (c)		Class 20/18/15 <sup>1)</sup>
Load cycles		2 Mio.
Leakage	Pressure drop from ① to ②	virtually leak-free
	over thread from ③ to ②	$Q_L \leq 15 \text{ cm}^3/\text{min}$ (at 100 bar and $v=32 \text{ mm}^2/\text{s} \pm 5 \text{ mm}^2/\text{s}$ )

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	FKM	VDMA 24568
	– Soluble in water	FKM	
 <b>Important information on hydraulic fluids!</b> ► For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us! ► There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!		► The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature. ► <b>Bio-degradable:</b> When using bio-degradable hydraulic fluids that are simultaneously zinc-solvent, zinc may accumulate in the fluid.	

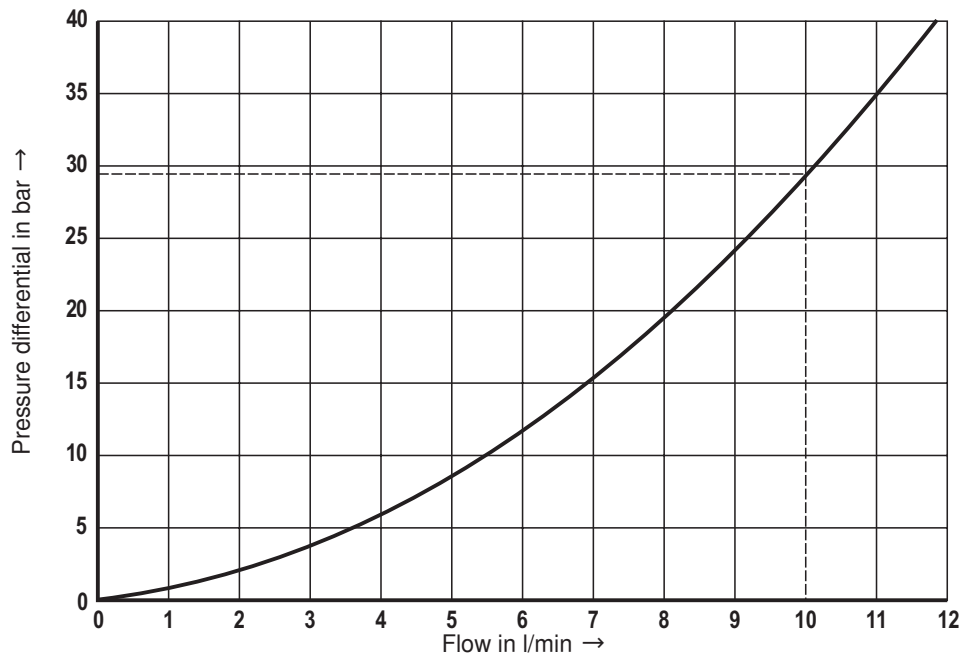
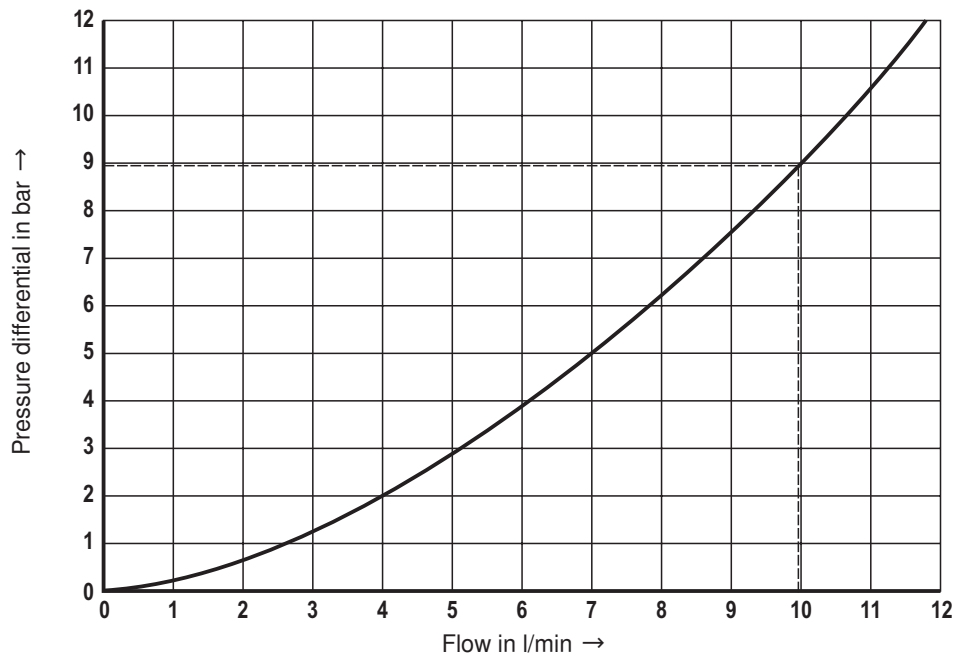
<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Efficient filtration prevents malfunctions and at the same time prolongs the service life of components.

For the selection of the filters, see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter)

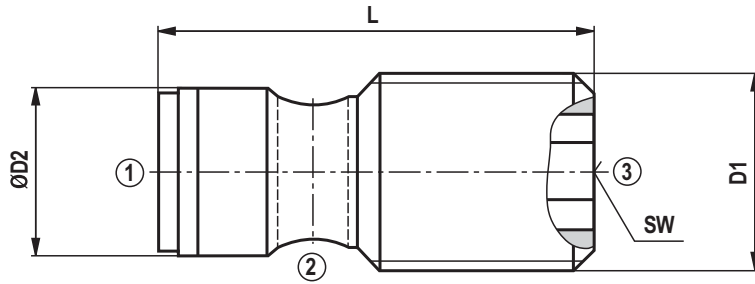
 **Note!**

The technical data was determined with a viscosity of  $v = 41 \text{ mm}^2/\text{s}$  (HLP46,  $\vartheta_{\text{oil}} = 40 \text{ °C} \pm 5 \text{ °C}$ ).

The following documentation must be observed: 64020-B1 "Hydraulic valves for mobile applications"

**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40 \text{ °C} \pm 5 \text{ °C}$ ) $\Delta p$ - $q_v$  characteristic curves – size 2 $\Delta p$ - $q_v$  characteristic curves – size 3

### Unit dimensions (dimensions in mm)



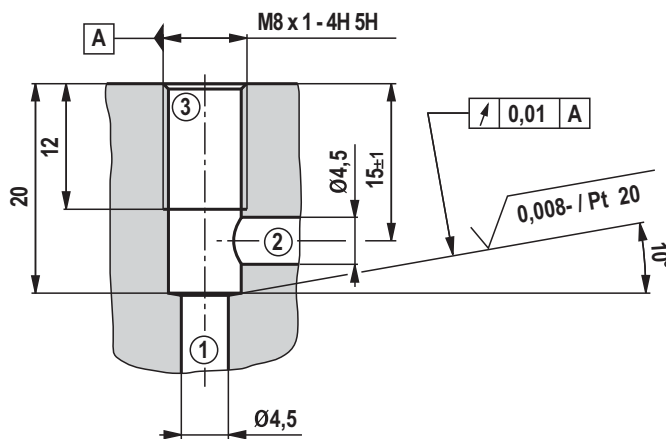
Size	L	D1	ØD2	SW	Tightening torque in Nm <sup>1)</sup>
2	20	M8 x 1	6,4	4	7
3	22	M10 x 1	8	5	10

- ① = Input "A"
- ② = Output "B"
- ③ = Input "C"

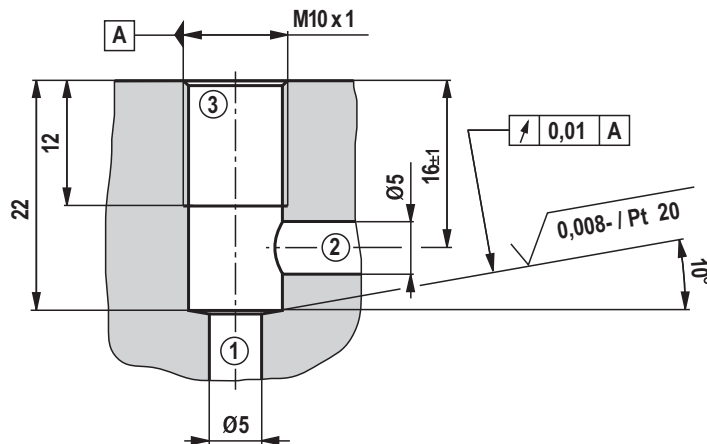
<sup>1)</sup> The specified tightening torques are reference values. Friction coefficients, tightening torques, and preload forces interact with each other. The friction coefficients are influenced by the surface microstructure, material pairing, etc. Thus, we recommend checking the mounting characteristics with genuine parts and boundary conditions.

### Mounting cavities (dimensions in mm)

Size 2

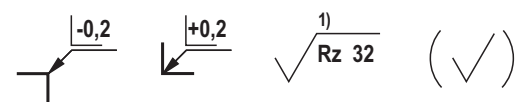


Size 3



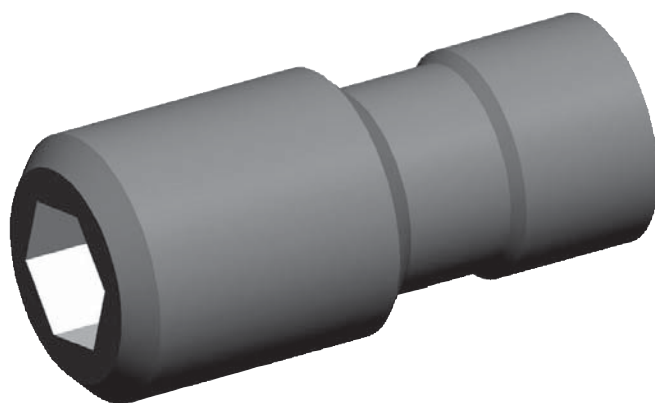
#### Standards:

Workpiece edges	DIN ISO 13715
Form and position tolerance	DIN EN ISO 1101
General tolerances for metal-cutting procedures	DIN ISO 2768-mK
Tolerance	DIN ISO 8015
Surface quality	DIN EN ISO 1302



<sup>1)</sup> Visual inspection

## Available individual components



Description	Unit size	Material number	Flow	Weight in g	M <sub>A</sub> in Nm + 10 %
PLUG SCREW MHSU 2 A/B/C	2	R901221771	① / ② / ③	5,2	7
PLUG SCREW MHSU 3 A/B/C	3	R901149008		8,9	10
PLUG SCREW MHSU 2 A-B/C	2	R901221774	① - ② / ③	4,8	7
PLUG SCREW MHSU 3 A-B/C	3	R901081617		7,8	10
PLUG SCREW MHSU 2 A/B-C	2	R901221780	① / ② - ③	5,0	7
PLUG SCREW MHSU 3 A/B-C	3	R901081616		8,1	10

① = Input "A"

② = Output "B"

③ = Input "C"

## High Pressure cartridge valves

### Solenoid on-off

<b>Designation</b>	<b>Description</b>	<b>Cavity</b>	<b>Data sheet</b>	<b>Page</b>
2/2 directional poppet valve, direct operated with solenoid actuation	KSDE U/R 8	T-8A	18136-12	1041
2/2 directional seat valve, direct operated with solenoid actuation	KSDE 0	Special	18136-23	1051
2/2 directional seat valve, direct operated with solenoid actuation	KSDE U/R 1	T-13A	18136-20	1059
3/2 directional seat valve, direct operated with solenoid actuation	KSDE U/R 1	T-11A	18136-21	1067
2/2 directional spool valve, direct operated with solenoid actuation	KKDER 8	T-8A	18136-08	1075
3/2 directional spool valve, direct operated with solenoid actuation	KKDER 8	T-9A	18136-09	1085
2/2 directional spool valve, direct operated with solenoid actuation	KKDER 1	T-13A	18136-06	1095
3/2 directional spool valve, direct operated with solenoid actuation	KKDER 1	T-11A	18136-04	1105
4/2 directional spool valve, direct operated with solenoid actuation	KKDER 1	T-31A	18136-05	1115



# 2/2 directional seat valve, direct operated with solenoid actuation

**Type KSDE (High Performance)**

Component size 8  
Component series B  
Maximum operating pressure 500 bar  
Maximum flow 5 l/min



H7077

## Table of contents

Contents	Page
Features	1
Ordering code	2
Valve types	2
Available coils	2
Function, section, symbols	3
Technical data	4, 5
Voltage tolerance against ambient temperature	6
Characteristic curves	6
Limits of performance	6
Unit dimensions	7
Mounting cavity	8
Available individual components	9

## Features

- Direct operated directional seat valve with solenoid actuation, tight on both sides
- Mounting cavity R/T-8A
- Blocked connection tight in a leak-free form
- Safe switching also with longer standstill periods
- Wet-pin DC solenoids
- Rotatable solenoid coil

### Ordering code (valve without coil) <sup>1)</sup>

		<b>KSDE</b>		<b>8</b>		<b>B / H</b>		<b>V</b>	<b>*</b>
Directional seat valve, direct operated, electrically operated		Further details in the plain text							
Maximum operating pressure 500 bar = <b>U</b>		<b>V =</b>							
Maximum operating pressure 350 bar = <b>R</b>		<p><b>Seal material</b> FKM seals (other seals upon request) Attention! Observe compatibility of the seal with the hydraulic fluid used!</p>							
Component size = <b>8</b>									
2 main ports									
<b>Symbols</b>	<b>"R"</b> (350 bar)	<b>"U"</b> (500 bar)							
			<b>= N</b>						
			<b>= P</b>						
			<b>N0 = Without manual override</b>						
		<b>N9 = With concealed manual override</b>							
		<b>N11 = With screwable manual override (operation by knurled screw)</b>							
		<b>Symbol N</b>		<b>Symbol P</b>					
		<b>Version</b>	<b>N0</b>	<b>N9</b>	<b>N11</b>	<b>N0</b>	<b>N9</b>		
		<b>R (350 bar)</b>	X	-	X	X	X <sup>2)</sup>		
		<b>U (500 bar)</b>	X	-	-	X	-		
		<b>H =</b>		High-performance and mounting cavity R/T-8A (see page 8)					
		<b>B =</b>		Component series					

### Valve types (without coil) <sup>1)</sup>

Operating pressure 350 bar			Operating pressure 500 bar		
Spool symbol	Type	Material no.	Spool symbol	Type	Material no.
<b>N</b>	KSDE8NB/HN0V	R901085000	<b>N</b>	KSDEU8NB/HN0V	R901085007
	KSDE8NB/HN11V	R901207100		<b>P</b>	KSDEU8PB/HN0V
<b>P</b>	KSDE8PB/HN0V	R901085005			
	KSDE8PB/HN9V	R901207098			

### Available coils (separate order) <sup>1)</sup>

Direct voltage DC <sup>4)</sup>	Material no. for coil with connector <sup>3)</sup>		
	<b>"K4"</b>	<b>"K40"</b>	<b>"C4"</b>
12 V	03pol (2+PE) DIN EN 175301-803 R900991678	02pol K40 DT 04-2PA, company Deutsch R900729189	02pol C4/Z30 AMP Junior-Timer R900315818
24 V	R900991121	R900729190	R900315819

<sup>1)</sup> Complete valves with mounted coil on request

<sup>2)</sup> Screwable manual override "N10" (actuation by means of internal hexagon with lock nut), possible as separate order, Material no. **R901051231**; ordering code **"N9"**!

<sup>3)</sup> Mating connectors (separate order), see data sheet 08006

<sup>4)</sup> Other voltages upon request



## Function, section, symbols

### General

The 2/2 directional seat valves are direct operated, pressure-compensated cartridge valves. They basically comprises of screw-in section (1), solenoid (4) as well as closing element (3) and compression spring (2).

### Function

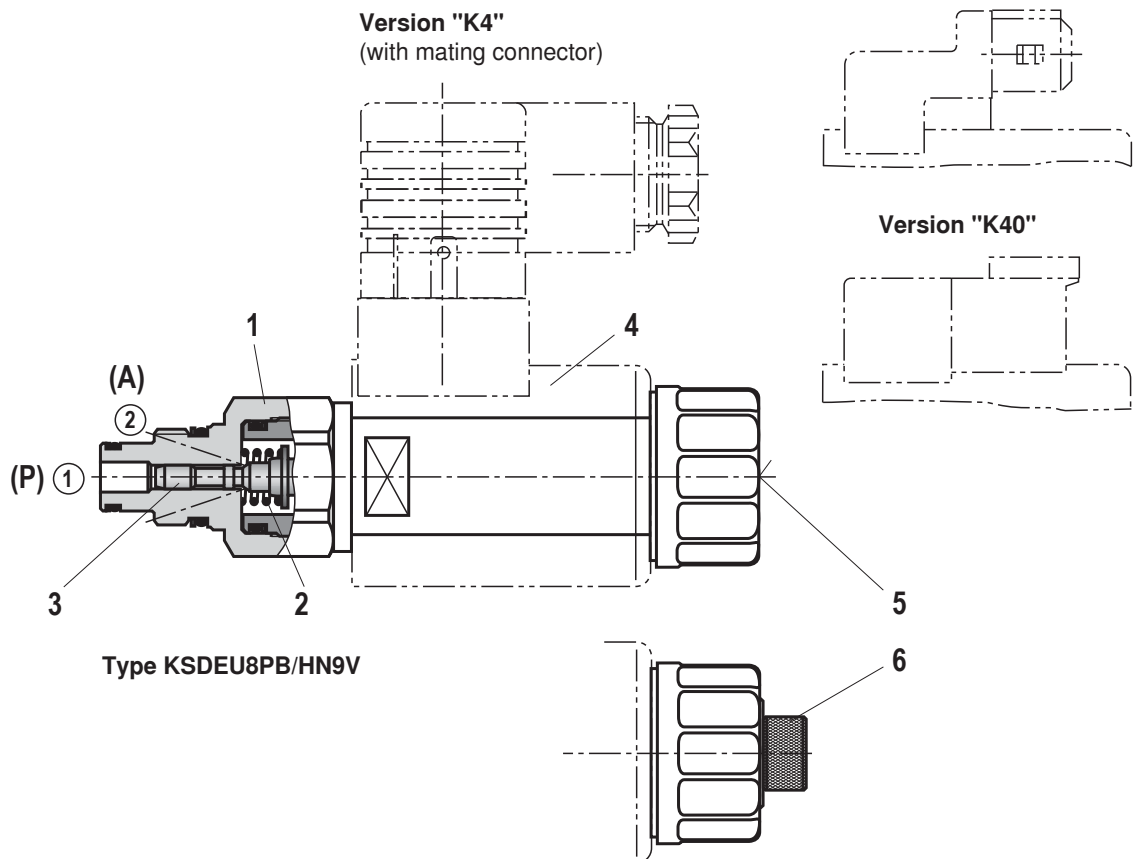
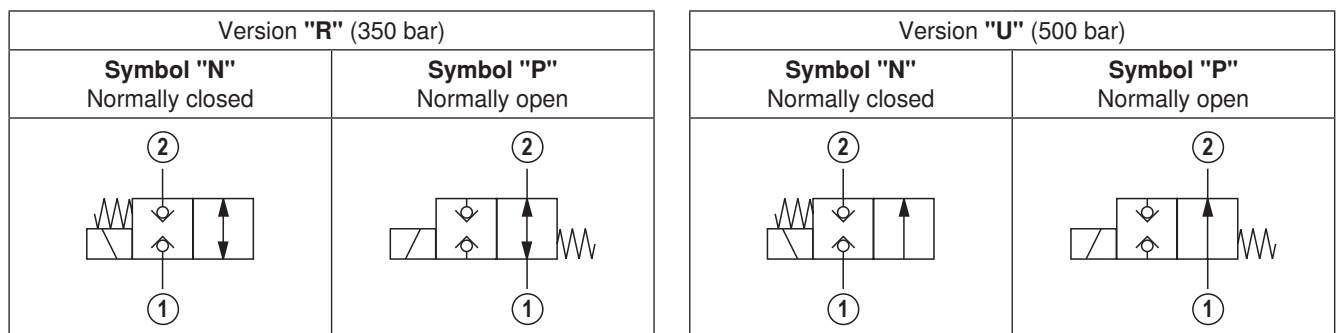
The initial position of the valve (normally open "P" or normally closed "N") is determined by the position of the closing element (3) and the arrangement of the compression spring (2). Due to the structural design, the 2/2 directional seat valves are always pressure-compensated in relation to the actuating forces. The main ports ① and ② can be loaded with an operating pressure of 350/500 bar (see page 4).

### Attention!

Flow is only admissible in the direction of the arrow (see symbols)! With version "U" (operating pressure 500 bar), main port ① must be connected with pump connection P!

With symbol "P", the closing element (3) is pressed onto the seat by the solenoid (4), with symbol "N" by the compression spring (2). The flow is blocked in a leak-free form.

The manual override allows for the the switching of the valve without solenoid energization. It is available in concealed version "N9" (5) or in screwable version "N11" (6) (see page 2).




**Technical data** (For applications outside these parameters, please consult us!)**general**

Weight	– Valve	kg	0.30
	– Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	–40 to +110

**hydraulic**

Maximum operating pressure	– Version "U"	bar	500 (at all ports if $P \geq A$ ; for design reasons)
	– Version "R"	bar	350 (at all ports)
Maximum flow	– Version "U"	l/min	3 (see limits of performance page 6)
	– Version "R"	l/min	5 (see limits of performance page 6)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm <sup>2</sup> /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Load cycles	– Version "R" (350 bar)		10 million
	– Version "U" (500 bar)		5 million

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils and related hydrocarbons	HL, HLP, HLPD, HVLP, HVLPD	FKM	DIN 51524
Environmentally compatible	– Insoluble in water	HETG	ISO 15380
		HEES	
	– Soluble in water	HEPG	ISO 15380
Flame-resistant	– Water-free	HFDU, HFDR	ISO 12922
	– Water-containing	HFAS	ISO 12922

<p> <b>Important information on hydraulic fluids!</b></p> <ul style="list-style-type: none"> <li>– For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!</li> <li>– There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!</li> <li>– The flash point of the process and operating medium used must be 40 K higher than the maximum solenoid surface temperature.</li> </ul>	<ul style="list-style-type: none"> <li>– <b>Flame-resistant – water-containing:</b> Maximum pressure differential per control edge 175 bar, otherwise, increased cavitation erosion! Tank pre-loading &lt; 1 bar or &gt; 20 % of the pressure differential. The pressure peaks should not exceed the maximum operating pressures!</li> <li>– <b>Environmentally compatible:</b> When using environmentally compatible hydraulic fluids that are simultaneously zinc-soluble, zinc may accumulate in the medium (700 mg zinc per pole tube).</li> </ul>
---	--

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of the filters see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

**Technical data** (For applications outside these parameters, please consult us!)**electric**

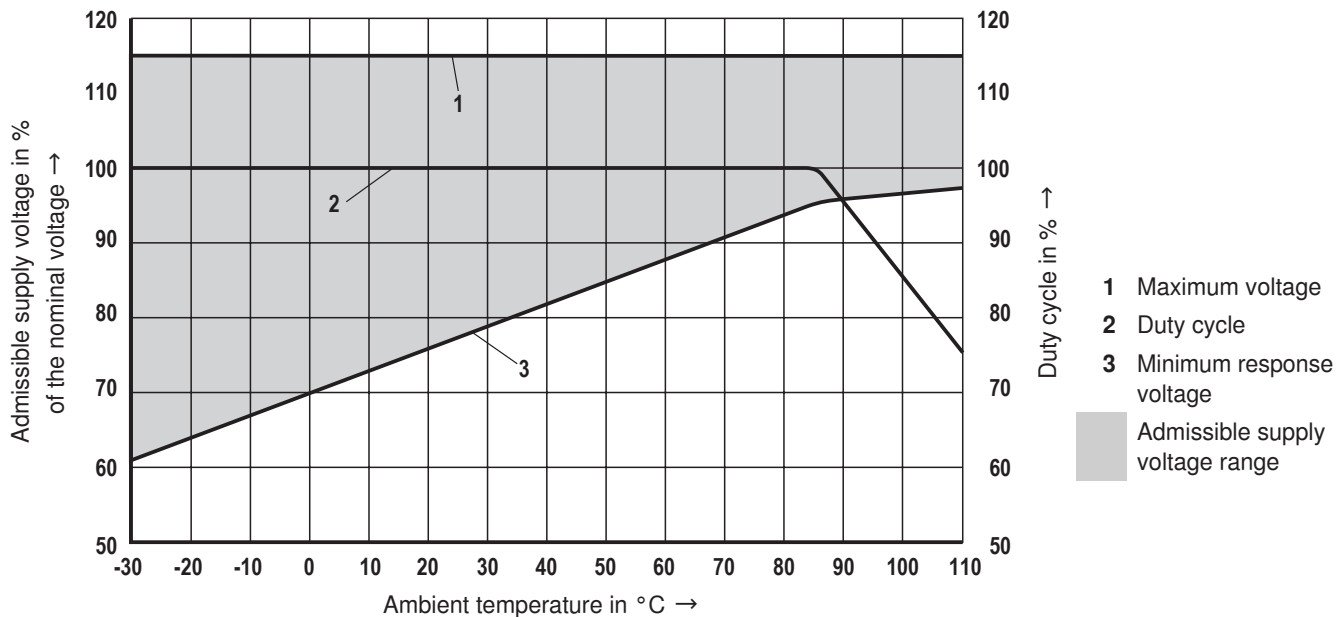
Voltage type		Direct voltage
Supply voltage <sup>2)</sup>	V	12 DC; 24 DC
Voltage tolerance against ambient temperature		See characteristic curves page 6
Power consumption	W	22
Duty cycle	%	See characteristic curves page 6
Maximum coil temperature <sup>3)</sup>	°C	150
Switching time according to ISO 6403 (solenoid horizontal)	- ON (1 → 2)	ms ≤ 80
	- OFF (2 → 1)	ms ≤ 80
Maximum switching frequency	- Version "R"	1/h 9000
	- Version "U"	1/h 3600
Type of protection according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"	IP 65 with mating connector mounted and locked
	- Version "C4"	IP 66 with mating connector mounted and locked
		IP 69K with Rexroth mating connector (Material no. R901022127)
	- Version "K40"	IP 69K with mating connector mounted and locked

<sup>2)</sup> Other voltages upon request

<sup>3)</sup> Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

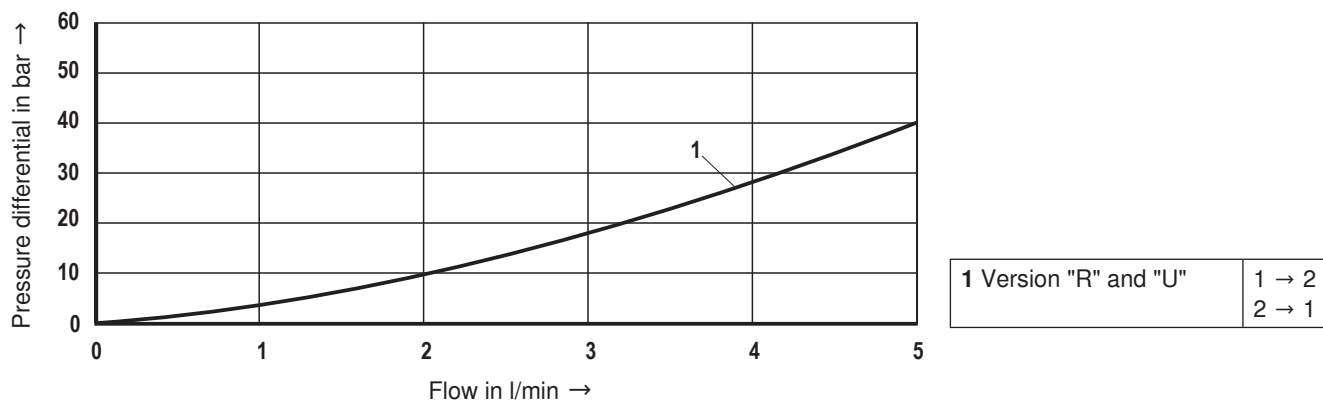
**With the electrical connection "K4", the protective earthing conductor (PE  $\perp$ ) must be connected correctly.**

### Voltage tolerance against ambient temperature; duty cycle

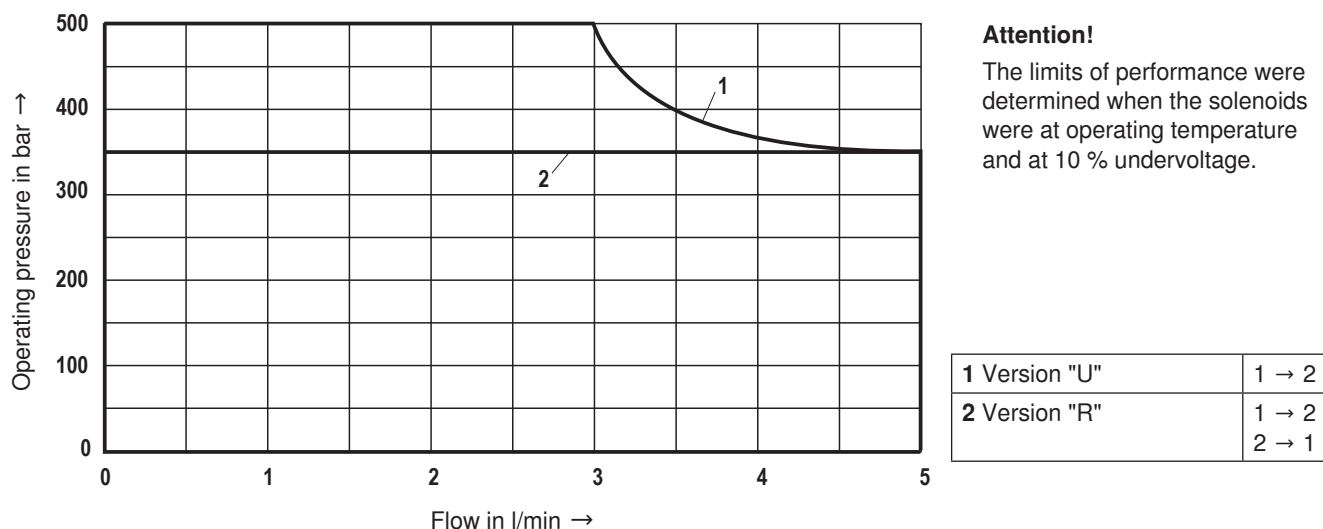


### Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$ and 24 V coil)

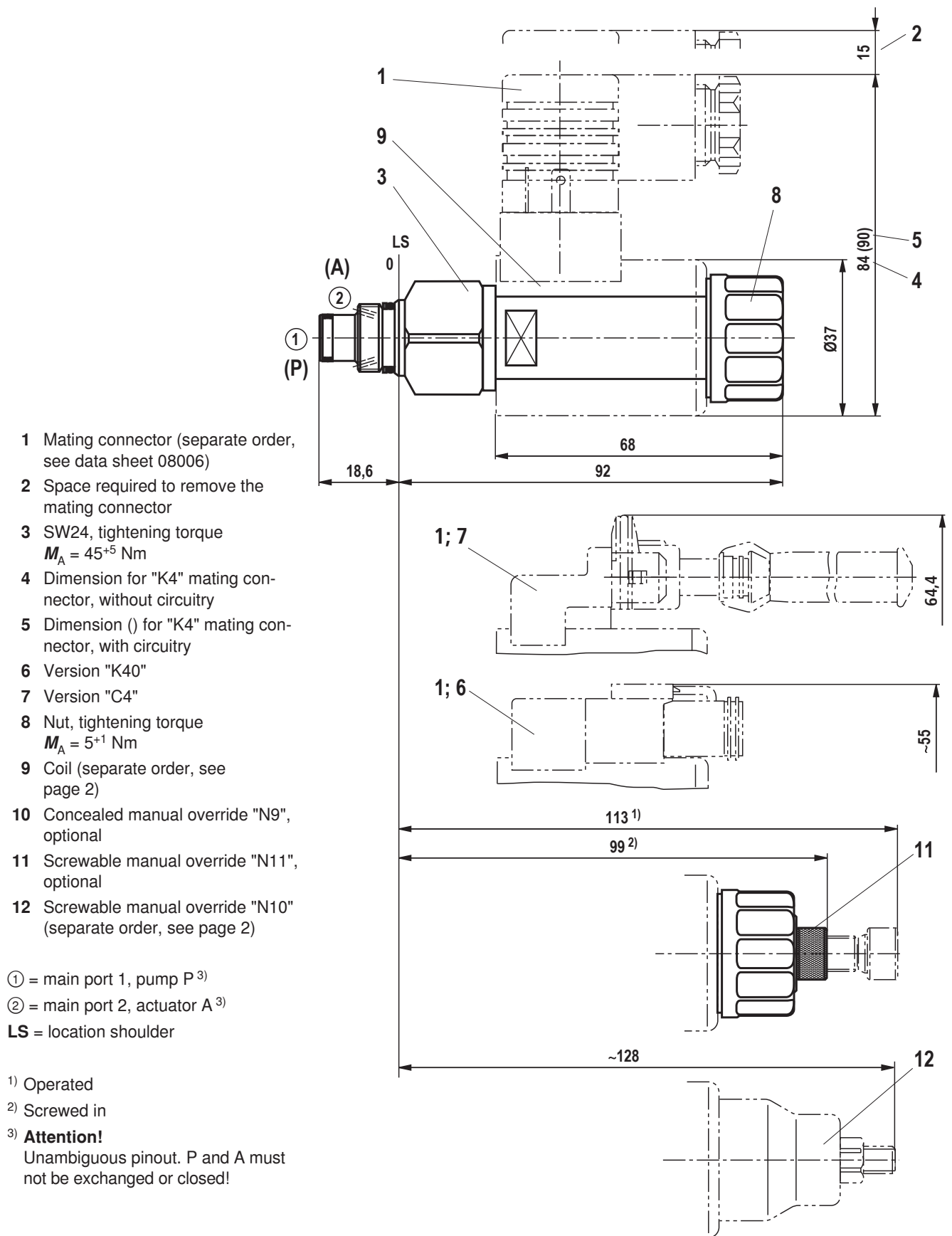
$\Delta p$ - $q_v$ -Characteristic curves



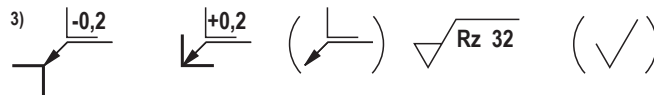
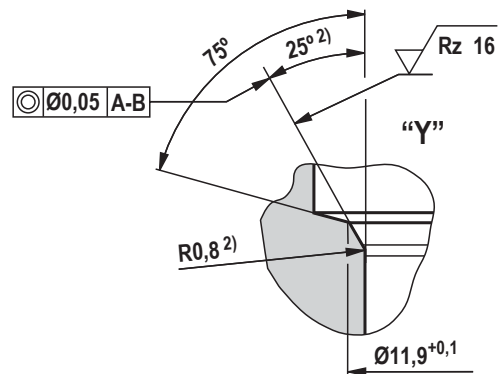
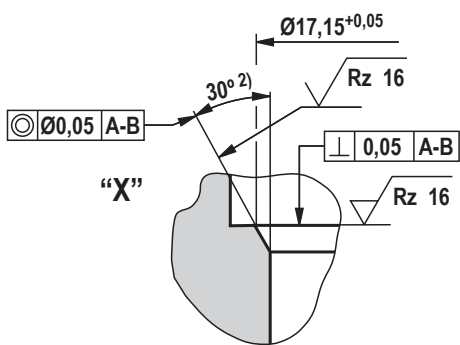
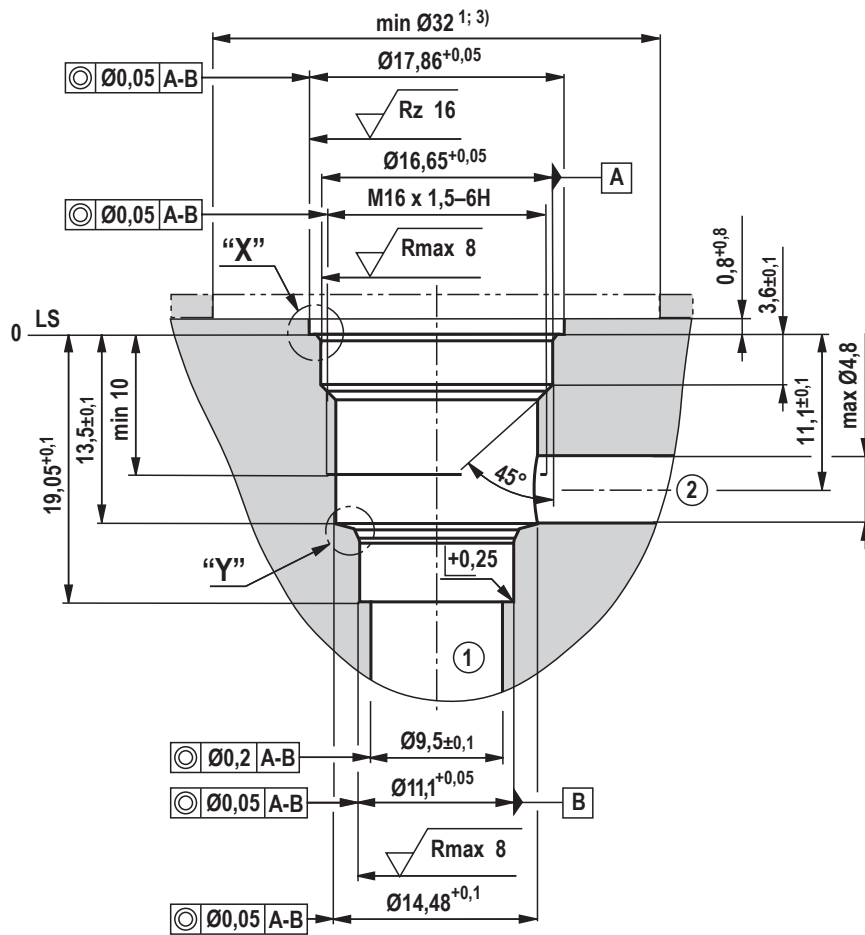
### Limits of performance (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$ and 24 V coil)



## Unit dimensions (dimensions in mm)



**Mounting cavity R/T-8A; 2 main ports; thread M16 x 1.5 (dimensions in mm)**



1) Deviating from T-8A

2) All seal ring insertion faces are rounded and free of burrs

3) With counterbore

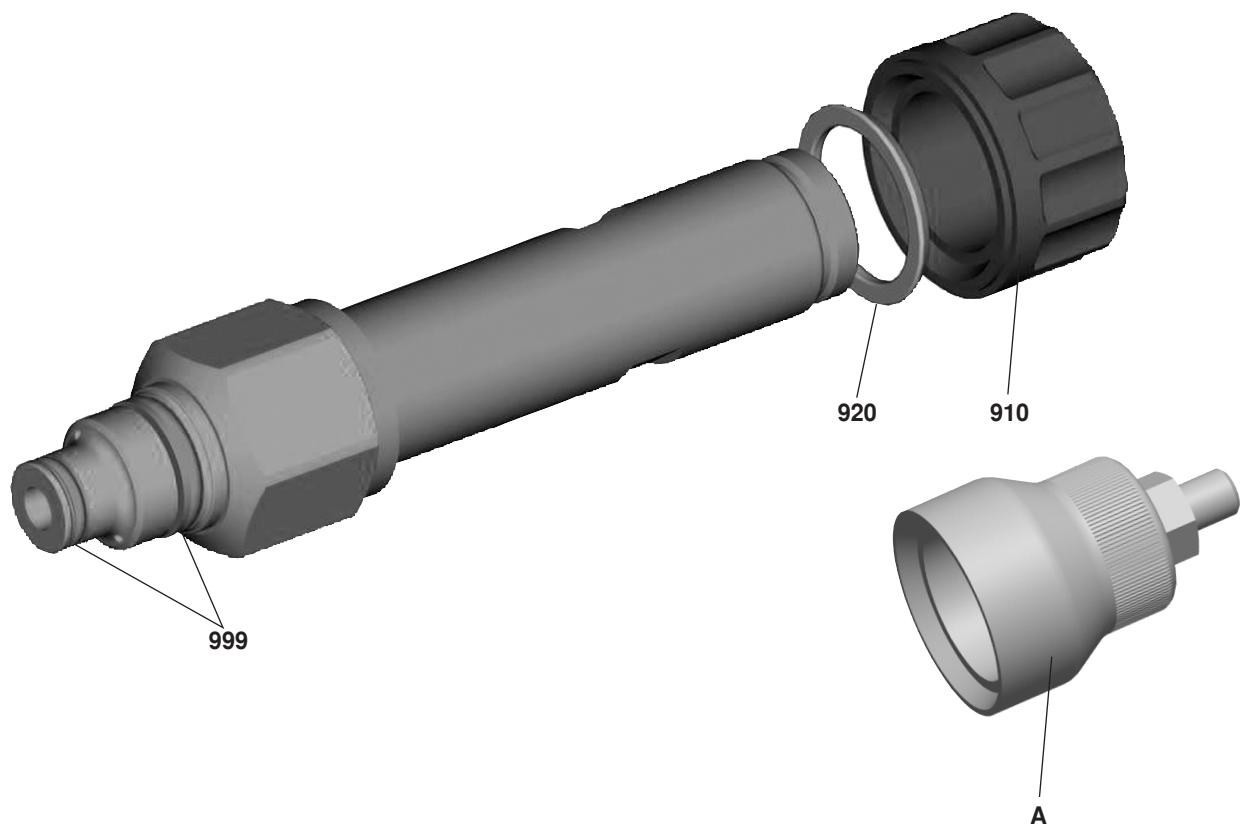
① = main port 1

② = main port 2

LS = location shoulder

Tolerance for all angles  $\pm 0.5^\circ$

## Available individual components



Item	Denomination	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900004280
999	Seal kit of the valve	R961003237
A	Manual override "N10" <sup>1)</sup>	R901051231

Coils, separate order, see page 2

<sup>1)</sup> Only with ordering code "N9", see page 2

## Notes

---



# 2/2 directional poppet valve, direct operated with solenoid actuation

**Type KSDE** (High Performance)

Component size 0  
Component series A  
Maximum operating pressure 350 bar  
Maximum flow 20 l/min



H7739

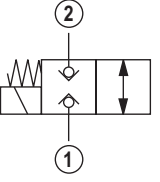
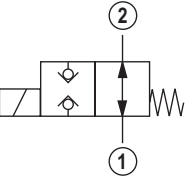
## Table of contents

Contents	Page
Features	1
Ordering code	2
Valve types	2
Available coils	2
Function, section, symbols	3
Technical data	4
Voltage tolerance against ambient temperature	5
Characteristic curves	5
Performance limits	5
Unit dimensions	6
Mounting cavity	7
Available individual components	8

## Features

- Two different mounting cavities R/B or R/C
- Direct operated directional poppet valve with solenoid actuation, tight on both sides
- Blocked connection tight in a leak-free form
- Safe switching also with longer standstill periods
- Wet-pin DC solenoids
- Rotatable solenoid coil

### Ordering code (Valve without coil) <sup>1)</sup>

	<b>KSDE</b>	<b>R</b>	<b>0</b>		<b>A /</b>		<b>V</b>	<b>*</b>																		
Directional poppet valve, direct operated, electrically operated	Further details in the plain text																									
Maximum operating pressure 350 bar	<b>= R</b>																									
Component size	<b>= 0</b>																									
2 main ports																										
<b>Symbols</b>		Normally closed							<b>= N</b>																	
		Normally open							<b>= P</b>																	
<p><b>V =</b></p> <p><b>Seal material</b> FKM seals (other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!</p> <p><b>N0 = Without manual override</b> <b>N9 = With concealed manual override</b> <b>N11 = With screwable manual override</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3">Symbol N</th> <th colspan="3">Symbol P</th> </tr> <tr> <th>N0</th> <th>N9</th> <th>N11</th> <th>N0</th> <th>N9</th> <th>N11</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">-</td> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> <td style="text-align: center;">X <sup>2)</sup></td> <td style="text-align: center;">-</td> </tr> </tbody> </table> <p><b>B =</b> High Performance and mounting cavity R/B (see page 7) <b>C =</b> High Performance and mounting cavity R/C (see page 7)</p> <p><b>A =</b> Component series</p>									Symbol N			Symbol P			N0	N9	N11	N0	N9	N11	X	-	X	X	X <sup>2)</sup>	-
Symbol N			Symbol P																							
N0	N9	N11	N0	N9	N11																					
X	-	X	X	X <sup>2)</sup>	-																					

### Valve types (without coil) <sup>1)</sup>

Operating pressure 350 bar		
Spool symbol	Type	Material no.
<b>N</b>	KSDER0NA/BN0V	R901252718
	KSDER0NA/CN0V	R901252717
<b>P</b>	KSDER0PA/BN0V	R901252713
	KSDER0PA/CN0V	R901252712

### Available coils (separate order) <sup>1)</sup>

Direct voltage DC <sup>4)</sup>	Material no. for coil with connector <sup>3)</sup>		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make: Deutsch	"C4" 02pol C4/Z30 AMP Junior-Timer
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

<sup>1)</sup> Complete valves with mounted coil upon request

<sup>2)</sup> Screwable manual override "N10" (actuation by means of internal hexagon with lock nut), possible as separate order, Material no. **R901051231**; ordering code "**N9**"!

<sup>3)</sup> Mating connectors (order separately), see data sheet 08006

<sup>4)</sup> Other voltages upon request

## Function, section, symbols

### General

The 2/2 directional poppet valves are direct operated, pressure compensated cartridge valves. They basically comprises of screw-in section (4) with valve seat (1), solenoid (5), as well as closing element (3) and compression spring (2).

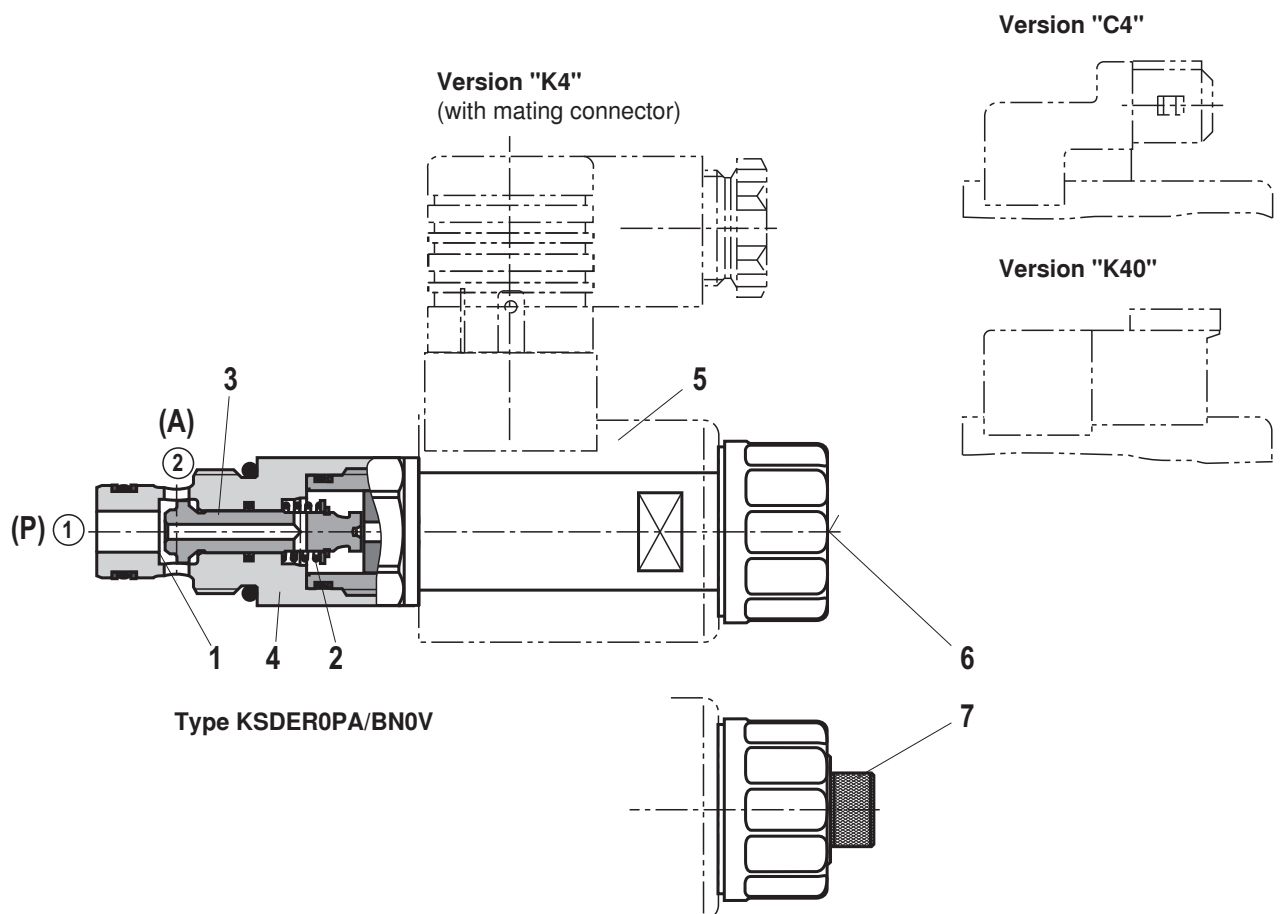
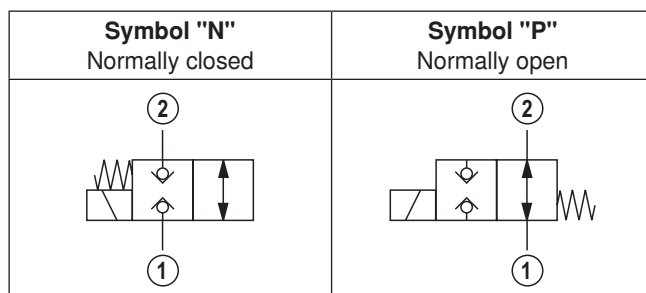
### Function

The initial position of the valve (normally open "P" or normally closed "N") is determined by the position of the closing element (3) and the arrangement of the compression spring (2). Due to the structural design, the 2/2 directional poppet valves are always pressure-compensated in relation to the actuating forces. The main ports ① and ② can be loaded with an operating pressure of 350 bar (see Technical Data, page 4).

With symbol "P", the closing element (3) is pressed onto the seat by the solenoid (5), with symbol "N" by the compression spring (2). The flow is blocked in a leak-free form.

The manual override allows for the the switching of the valve without solenoid energization. It is available in concealed version "N9" (6) or in screwable version "N11" (7) (see page 2).

The screwable manual override (7) must be screwed back into the initial position after actuation.



**Technical data** (For applications outside these parameters, please consult us!)**general**

Weight	- Valve	kg	0.30
	- Coil	kg	0.25
Installation position			Any
Ambient temperature range			°C -40 to +110

**hydraulic**

Maximum operating pressure			bar 350
Maximum flow			l/min 20 (see performance limits page 5)
Hydraulic fluid			
Mineral oil (HL, HLP) according to DIN 51524; fast biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request			
Hydraulic fluid temperature range			°C -40 to +80
Viscosity range	- Minimum	mm <sup>2</sup> /s	5
	- Optimum		10 to 100
	- Mmaximum		1000
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Load cycles			10 million

**electrical**

Voltage type			Direct voltage
Supply voltage <sup>2)</sup>			V 12 DC; 24 DC
Voltage tolerance against ambient temperature			See characteristic curve page 5
Power consumption			W 22
Duty cycle			% See characteristic curve page 5
Maximum coil temperature <sup>3)</sup>			°C 150
Switching time according to ISO 6403 (solenoid horizontal)	- ON (① → ②)	ms	≤ 95
	- OFF (② → ①)	ms	≤ 95
Maximum switching frequency			1/h 9000
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"		IP 65 with mating connector mounted and locked
	- Version "C4"		IP 66 with mating connector mounted and locked
			IP 69K with Rexroth mating connector (Material no. R901022127)
	- Version "K40"		IP 69K with mating connector mounted and locked

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

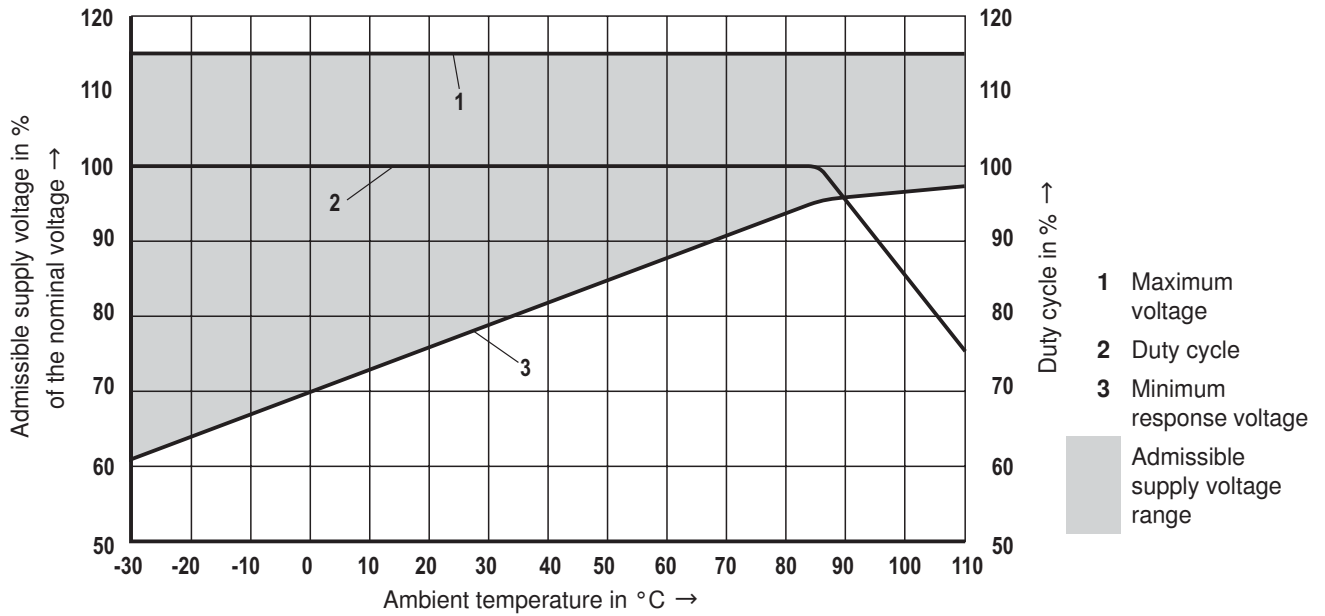
For the selection of the filters see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

<sup>2)</sup> Other voltages upon request

<sup>3)</sup> Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

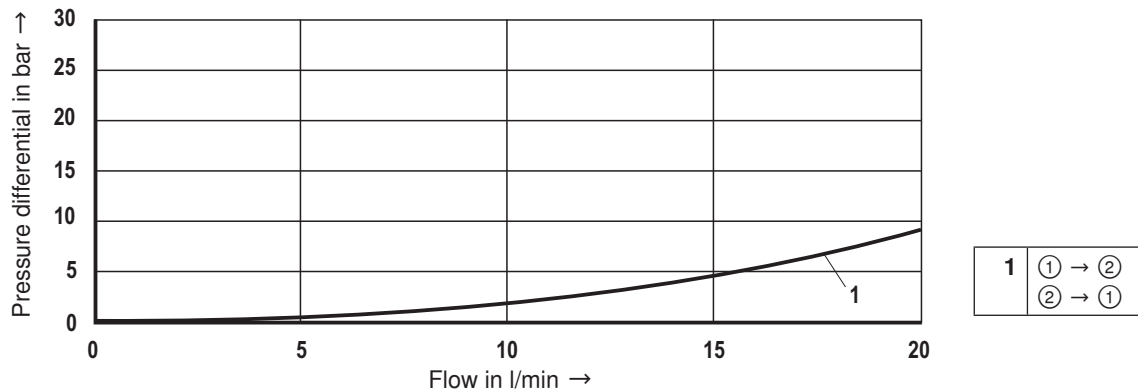
**At the electrical connection "K4", the protective earthing conductor (PE  $\perp$ ) has to be connected properly.**

### Voltage tolerance against ambient temperature; duty cycle

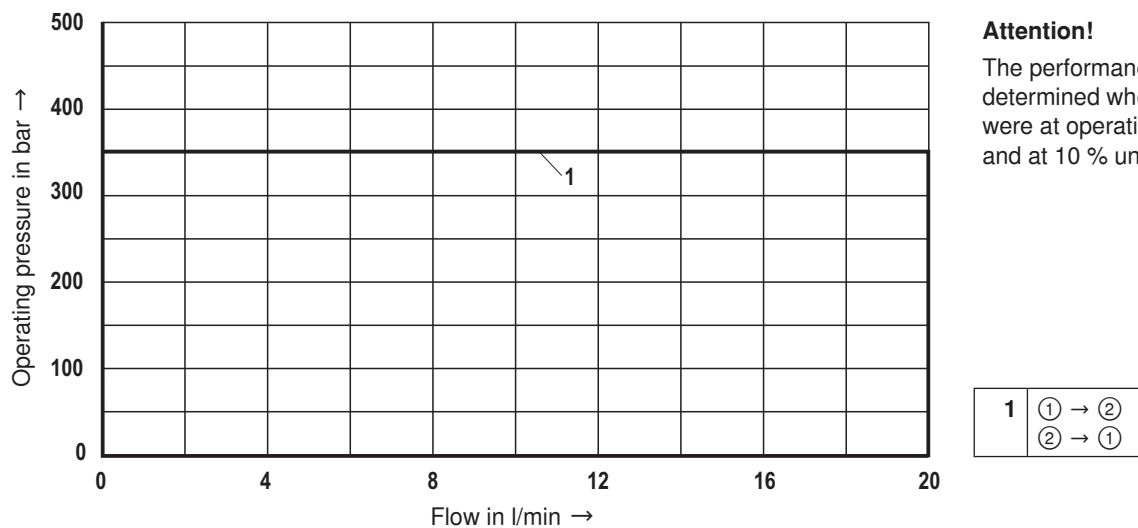


### Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$ and 24 V coil)

$\Delta p$ - $q_v$  characteristic curves

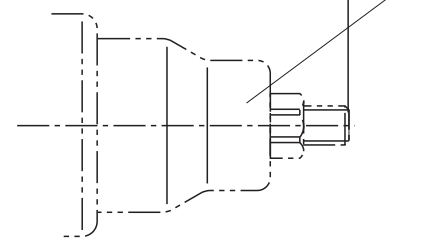
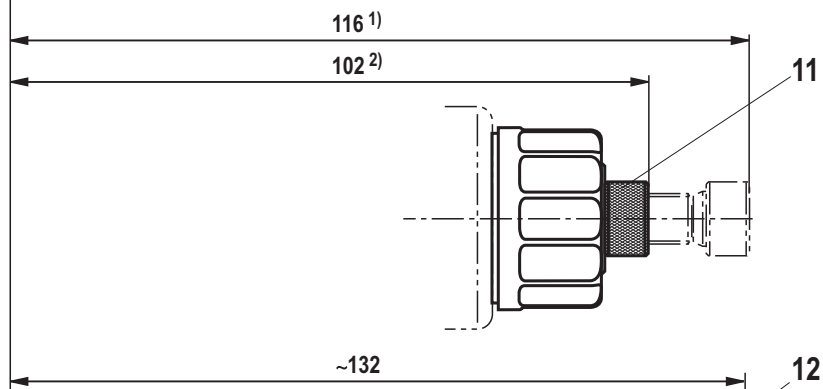
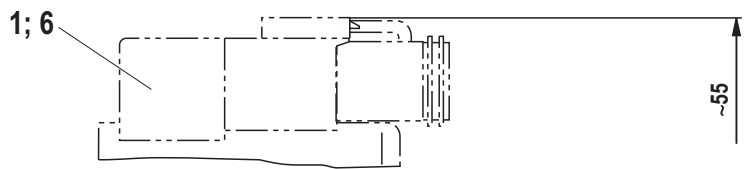
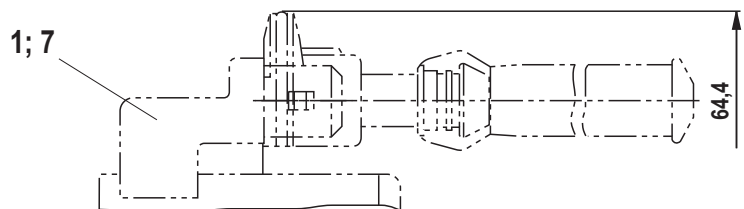
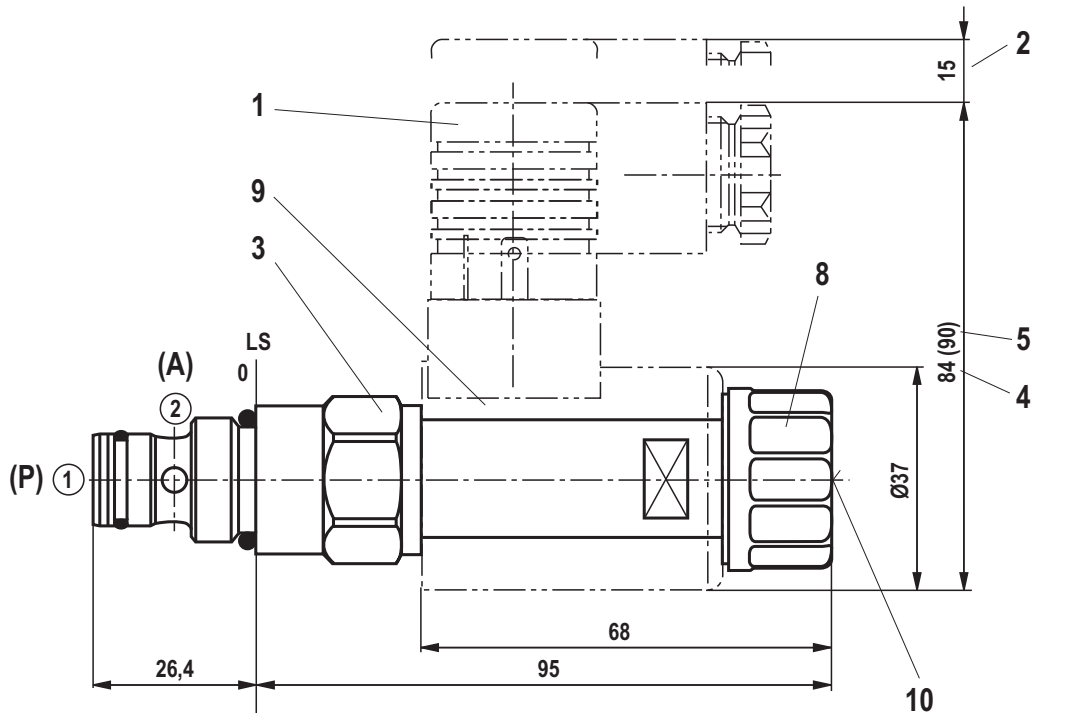


### Performance limits (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$ and 24 V coil)



**Attention!**  
The performance limits were determined when the solenoids were at operating temperature and at 10 % undervoltage.

**Unit dimensions** (dimensions in mm)

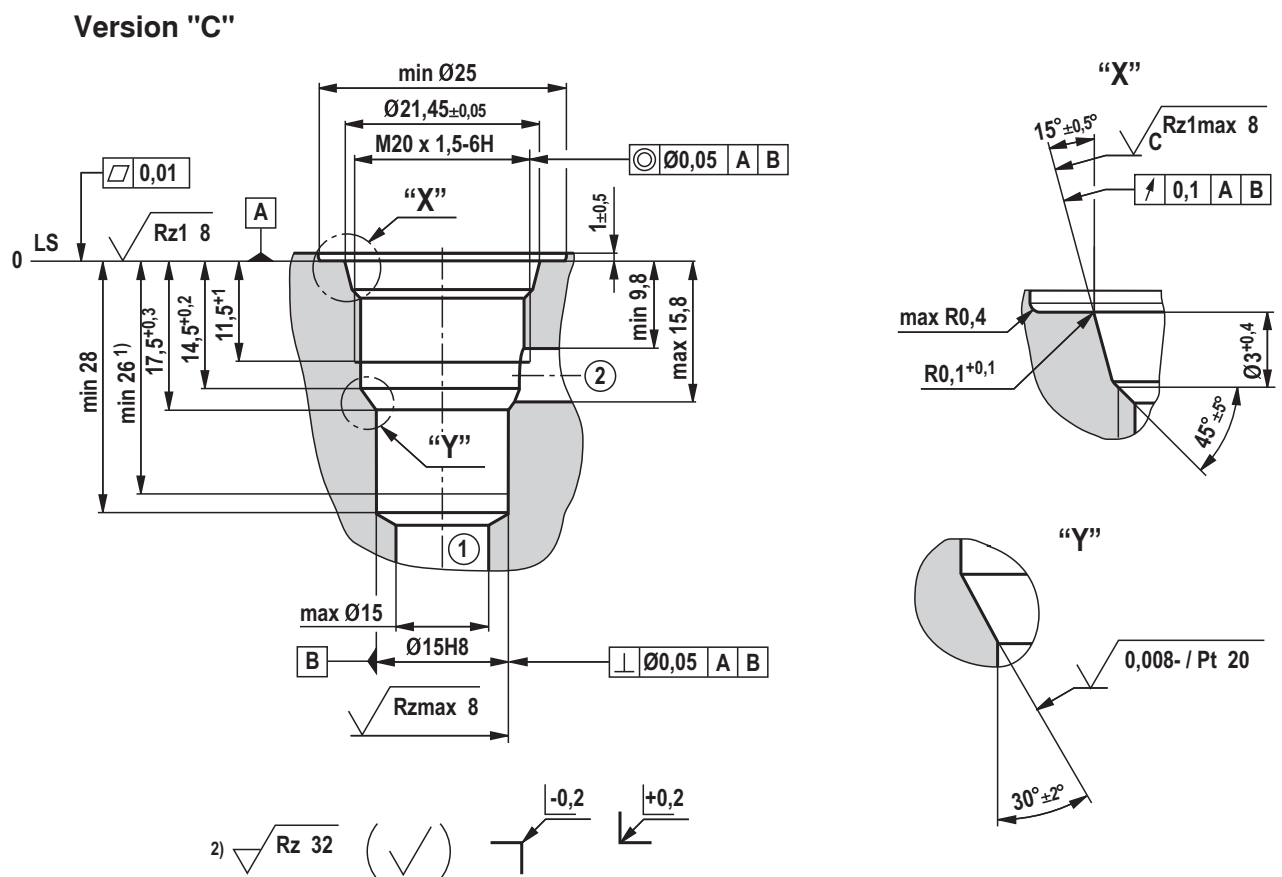
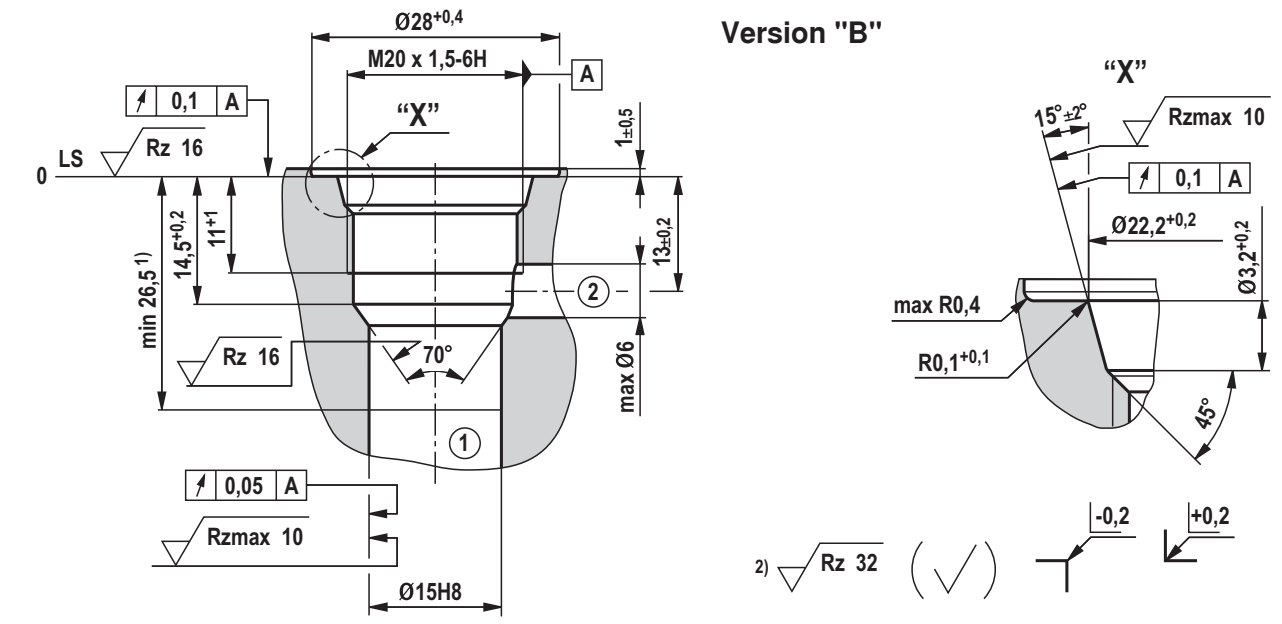


- 1 Mating connector (order separately, see data sheet 08006)
- 2 Space required for removing the mating connector
- 3 SW24, tightening torque  $M_A = 25^{+5}$  Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension ( ) for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque  $M_A = 5^{+1}$  Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N11", optional
- 12 Screwable manual override "N10" (separate order, see page 2)

① = Main port 1, pump P<sup>3)</sup>  
 ② = Main port 2, actuator A<sup>3)</sup>  
 LS = Location shoulder

1) Actuated  
 2) Screwed in  
 3) **Attention!**  
 Unambiguous pinout. P and A must not be exchanged or closed!

**Mounting cavity, 2 main ports; thread M20 x 1.5 (dimensions in mm)**

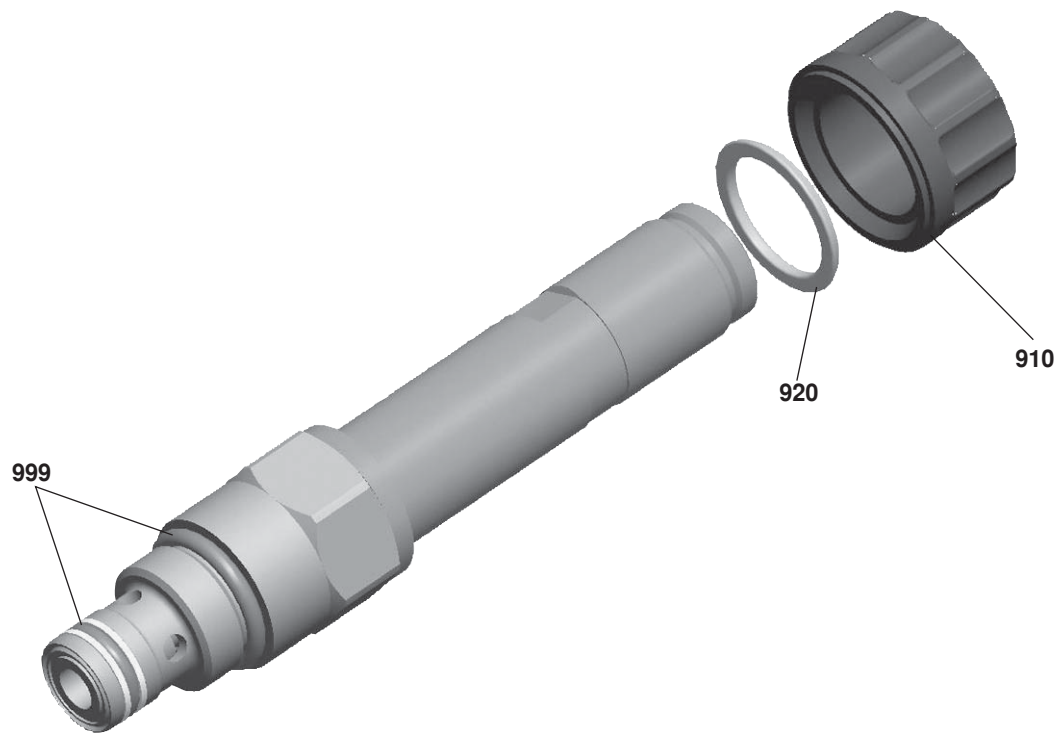


- 1) Depth of fit
- 2) Visual inspection
- ① = Main port 1
- ② = Main port 2

LS = Location Shoulder  
 All seal ring insertion faces are rounded and free of burrs  
 Tolerance for all angles ±0.5°

## Available individual components

---



Item	Denomination	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve (version "B")	R961005311
	Seal kit of the valve (version "C")	R961005312

Coils, separate order, see page 2



# 2/2 directional seat valve, direct operated with solenoid actuation

**Type KSDE** (high-performance)

Component size 1  
Component series B  
Maximum operating pressure 500 bar  
Maximum flow 20 l/min



H6804

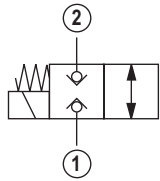
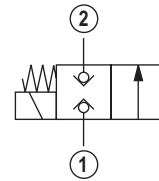
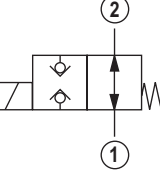
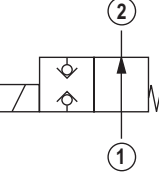
## Table of contents

Contents	Page
Features	1
Ordering code	2
Valve types	2
Available coils	2
Function, section, symbols	3
Technical data	4
Voltage tolerance against ambient temperature	5
Characteristic curves	5
Performance limits	5
Unit dimensions	6
Mounting cavity	7
Available individual components	8

## Features

- Mounting cavity R/T-13A
- Direct operated directional seat valve with solenoid actuation, tight on both sides
- Blocked connection tight in a leak-free form
- Safe switching also with longer standstill periods
- Wet-pin DC solenoids
- Rotatable solenoid coil

### Ordering code (Valve without coil) <sup>1)</sup>

	<b>KSDE</b>	<b>1</b>	<b>B / H</b>	<b>V</b>	<b>*</b>																											
Directional seat valve, direct operated, electrically operated					Further details in the plain text																											
Maximum operating pressure 500 bar = <b>U</b>					<b>no code =</b> Standard																											
Maximum operating pressure 350 bar = <b>R</b>					<b>-17 =</b> Flow-optimized <sup>3)</sup>																											
Component size = <b>1</b>					<b>Seal material</b>																											
2 main ports					<b>V =</b> FKM seals (other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!																											
<b>Symbols</b>	<b>"R"</b> (350 bar)	<b>"U"</b> (500 bar) <b>"R... -17"</b> (350 bar)																														
			<b>= N</b>																													
			<b>= P</b>																													
					<b>N0 =</b> without manual override <b>N9 =</b> with concealed manual override <b>N11 =</b> with screwable manual override																											
					<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Version</th> <th colspan="3">Symbol N</th> <th colspan="3">Symbol P</th> </tr> <tr> <th>N0</th> <th>N9</th> <th>N11</th> <th>N0</th> <th>N9</th> <th>N11</th> </tr> </thead> <tbody> <tr> <td>R (350 bar)</td> <td>X</td> <td>-</td> <td>X</td> <td>X</td> <td>X <sup>2)</sup></td> <td>-</td> </tr> <tr> <td>U (500 bar)</td> <td>X</td> <td>-</td> <td>-</td> <td>X</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Version	Symbol N			Symbol P			N0	N9	N11	N0	N9	N11	R (350 bar)	X	-	X	X	X <sup>2)</sup>	-	U (500 bar)	X	-	-	X	-	-
Version	Symbol N			Symbol P																												
	N0	N9	N11	N0	N9	N11																										
R (350 bar)	X	-	X	X	X <sup>2)</sup>	-																										
U (500 bar)	X	-	-	X	-	-																										
					<b>H =</b> High-performance and mounting cavity R/T-13A (see page 7)																											
					<b>B =</b> Component series																											

### Valve types (without coil) <sup>1)</sup>

Operating pressure 350 bar			Operating pressure 500 bar		
Spool symbol	Type	Material no.	Spool symbol	Type	Material no.
<b>N</b>	KSDER1NB/HN0V	R901083194	<b>N</b>	KSDEU1NB/HN0V	R901083202
	KSDER1NB/HN0V-17	R901176259		<b>P</b>	KSDEU1PB/HN0V
	KSDER1NB/HN11V	R901151293			
	KSDER1NB/HN11V-17	R901206914			
<b>P</b>	KSDER1PB/HN0V	R901083196			
	KSDER1PB/HN0V-17	R901176247			
	KSDER1PB/HN9V	R901151294			
	KSDER1PB/HN9V-17	R901206911			

### Available coils (separate order) <sup>1)</sup>

Direct voltage DC <sup>5)</sup>	Material no. for coil with connector <sup>4)</sup>		
	"K4"	"K40"	"C4"
12 V	03pol (2+PE) DIN EN 175301-803 R900991678	02pol K40 DT 04-2PA, make: Deutsch R900729189	02pol C4/Z30 AMP Junior Timer R900315818
24 V	R900991121	R900729190	R900315819

- <sup>1)</sup> Complete valves with mounted coil upon request
- <sup>2)</sup> Screwable manual override "N10" (actuation by means of internal hexagon with lock nut), possible as separate order, material no. **R901051231**; ordering code "**N9**"!
- <sup>3)</sup> Only version "R" (free-flowing on one side!)
- <sup>4)</sup> Mating connectors (separate order), see RE 08006
- <sup>5)</sup> Other voltages upon request

## Function, section, symbols

### General

The 2/2 directional seat valves are direct operated, pressure compensated cartridge valves. They basically comprises of screw-in section (4) with valve seat (1), solenoid (5), as well as closing element (3) and compression spring (2).

### Function

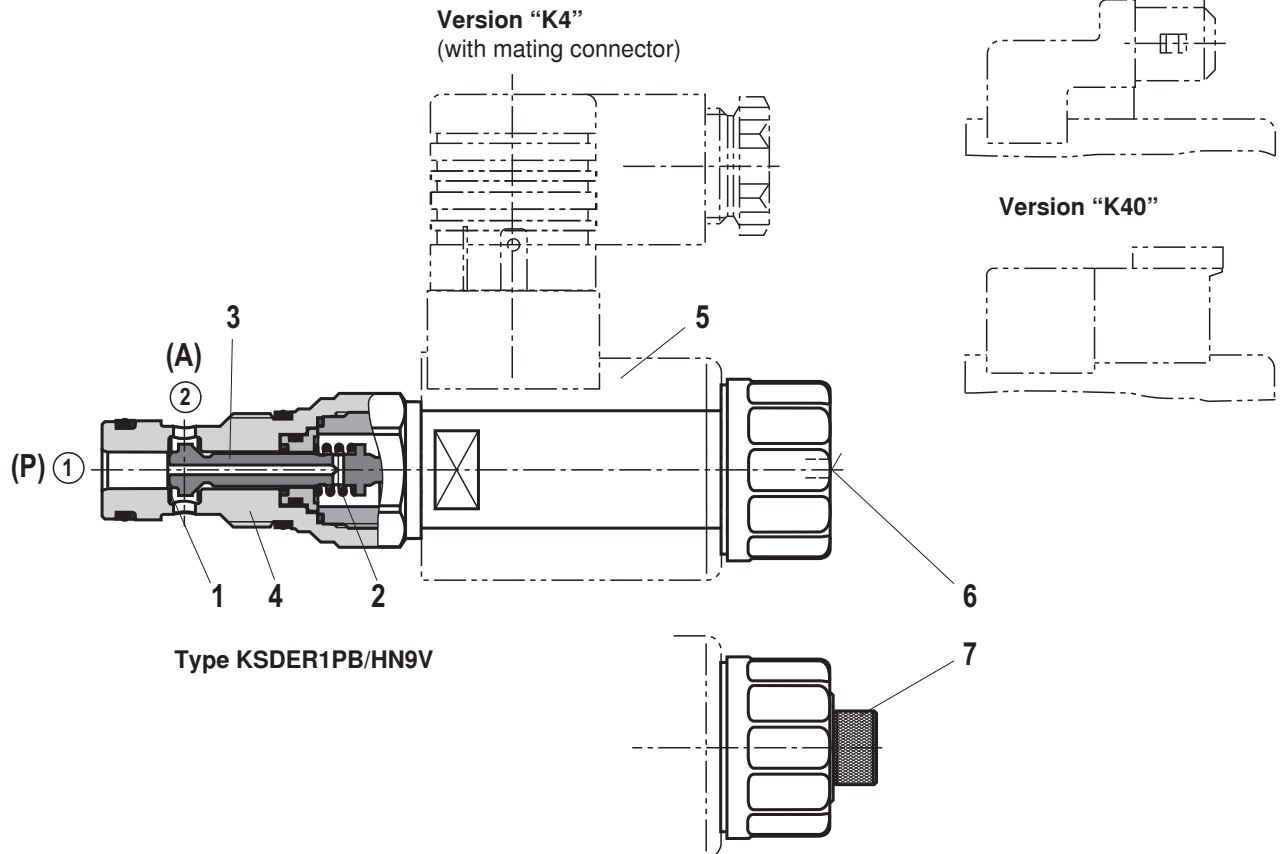
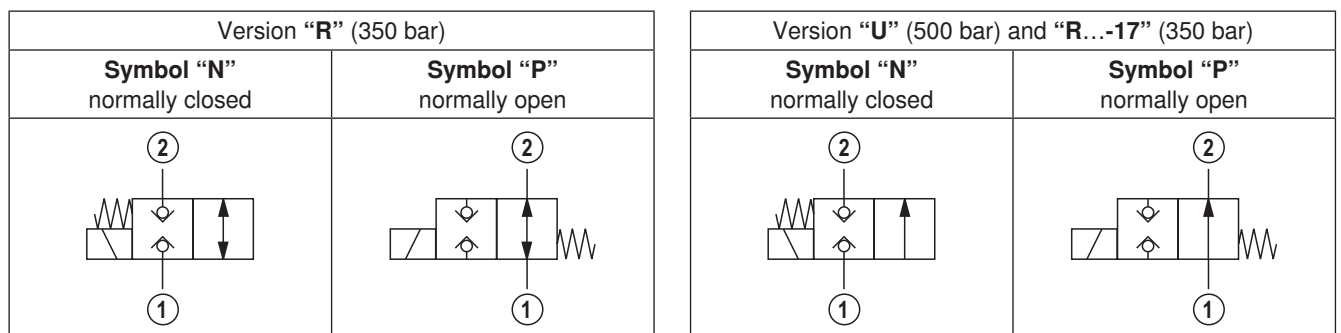
The initial position of the valve (normally open "P" or normally closed "N") is determined by the position of the closing element (3) and the arrangement of the compression spring (2). Due to the structural design, the 2/2 directional seat valves are always pressure-compensated in relation to the actuating forces. The main ports ① and ② can be loaded with an operating pressure of 350 bar/500 bar (see Technical Data, page 4).

### Attention!

The flow is only permitted in the direction of arrow (see symbols)! With version "U" (operating pressure 500 bar) as well as with version "R...-17", main port ① must be connected with pump connection P! Valves with version "R...-17" are flow-optimized and thus achieve a higher pressure differential.

With symbol "P", the closing element (3) is pressed onto the seat by the solenoid (5), with symbol "N" by the compression spring (2). The flow is blocked in a leak-free form.

The manual override allows for the the switching of the valve without solenoid energization. It is available in concealed version "N9" (6) or in screwable version "N11" (7) (see page 2).



**Technical data** (For applications outside these parameters, please consult us!)**general**

Weight	- Valve	kg	0.30
	- Coil	kg	0.25
Installation position			Any
Ambient temperature range			°C -40 to +110

**hydraulic**

Maximum operating pressure	- Version "U"	bar	500 (at all ports if $P \geq A$ ; for design reasons)
	- Version "R"	bar	350 (at all ports)
	- Version "R...-17"	bar	350 (at all ports if $P \geq A$ ; for design reasons)
Maximum flow	- Version "U"	l/min	12 (see performance limits page 5)
	- Version "R"	l/min	20 (see performance limits page 5)
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524; quickly bio-degradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request
Hydraulic fluid temperature range			°C -40 to +80
Viscosity range			mm <sup>2</sup> /s 4 to 500
Maximum permitted degree of contamination of the hydraulic fluid – cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Load cycles	- Version "R" (350 bar)		10 million
	- Version "U" (500 bar)		5 million

**electrical**

Type of voltage		Direct voltage	
Supply voltage <sup>2)</sup>		V	12 DC; 24 DC
Voltage tolerance against ambient temperature		See characteristic curve page 5	
Power consumption		W	22
Duty cycle		%	See characteristic curve page 5
Maximum coil temperature <sup>3)</sup>		°C	150
Switching time according to ISO 6403 (solenoid horizontal)	- ON (① → ②)	ms	≤ 60 (≤ 95 with version "R...-17")
	- OFF (② → ①)	ms	≤ 60 (≤ 95 with version "R...-17")
Maximum switching frequency	- Version "R"	1/h	9000
	- Version "U"	1/h	3600
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"	IP 65 with mating connector mounted and locked	
	- Version "C4"	IP 66 with mating connector mounted and locked	
		IP 69K with Rexroth mating connector (Material no. R901022127)	
	- Version "K40"	IP 69K with mating connector mounted and locked	

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

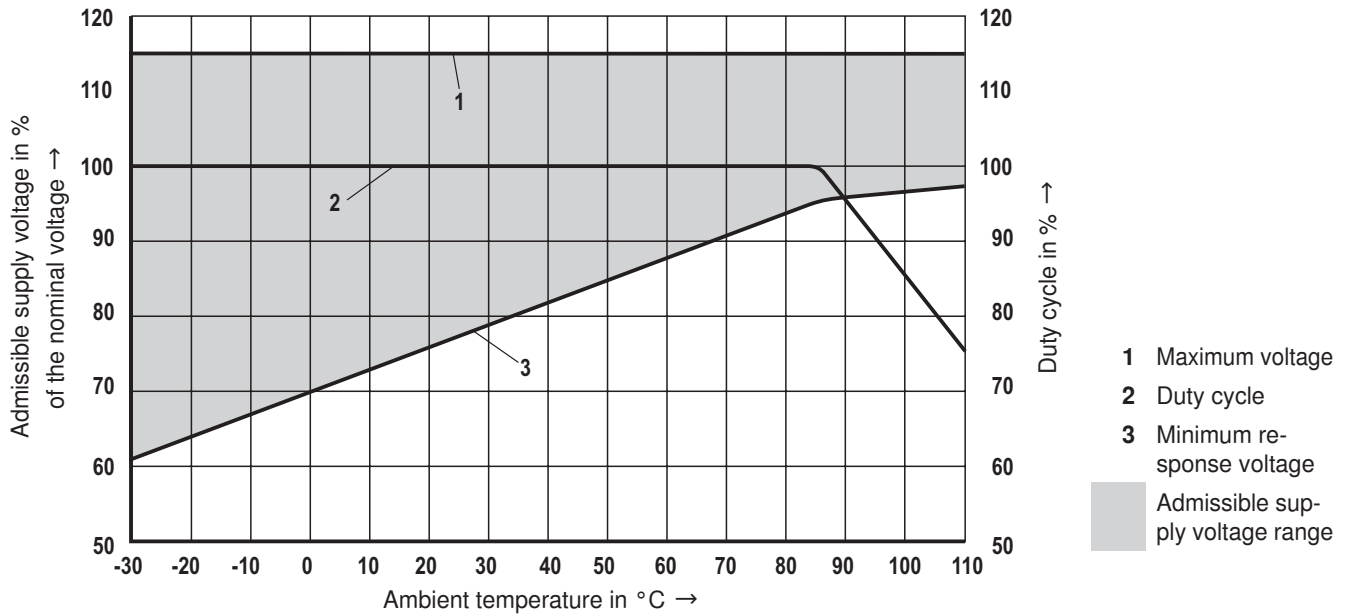
For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

<sup>2)</sup> Other voltages upon request

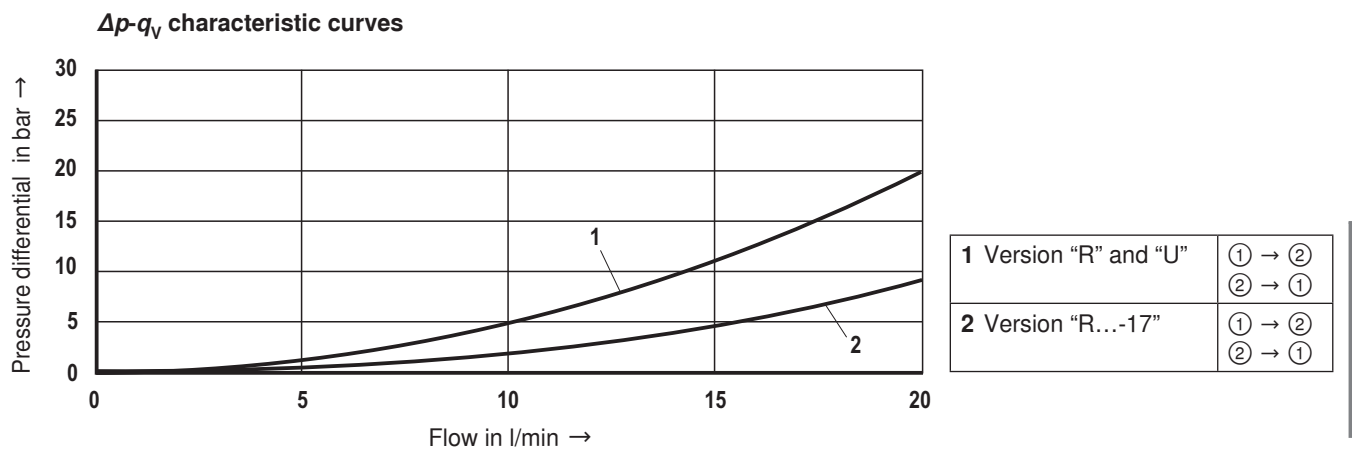
<sup>3)</sup> Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

**At the electrical connection "K4", the protective earthing conductor (PE ≍) has to be connected properly.**

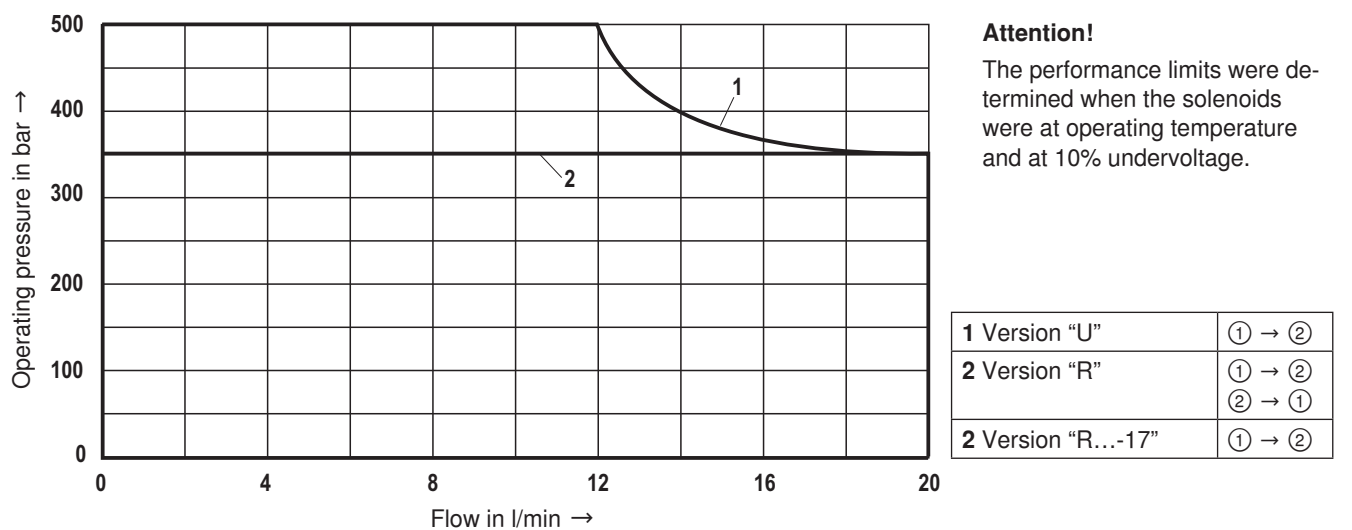
### Voltage tolerance against ambient temperature; duty cycle



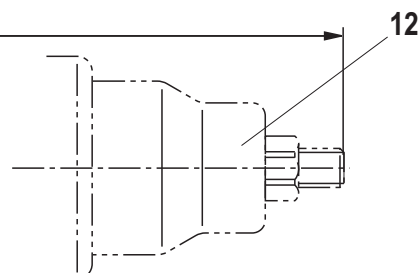
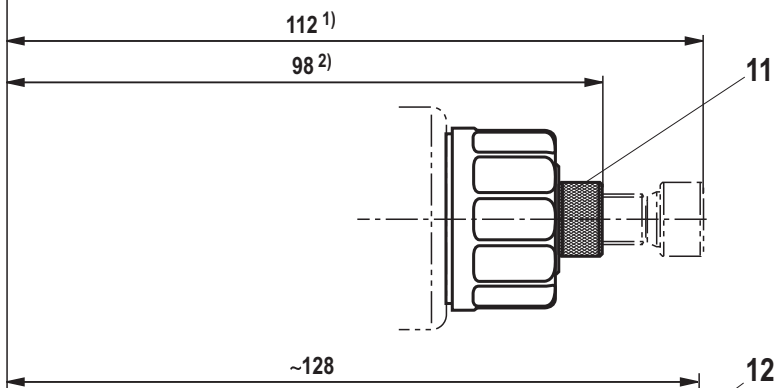
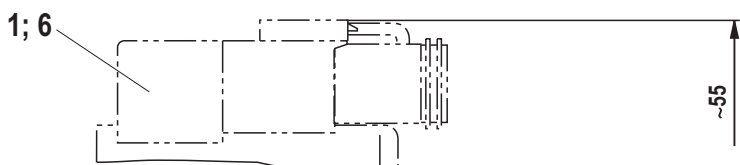
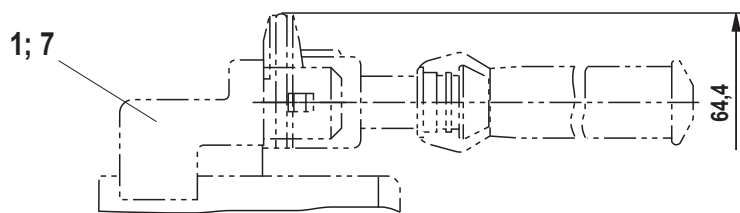
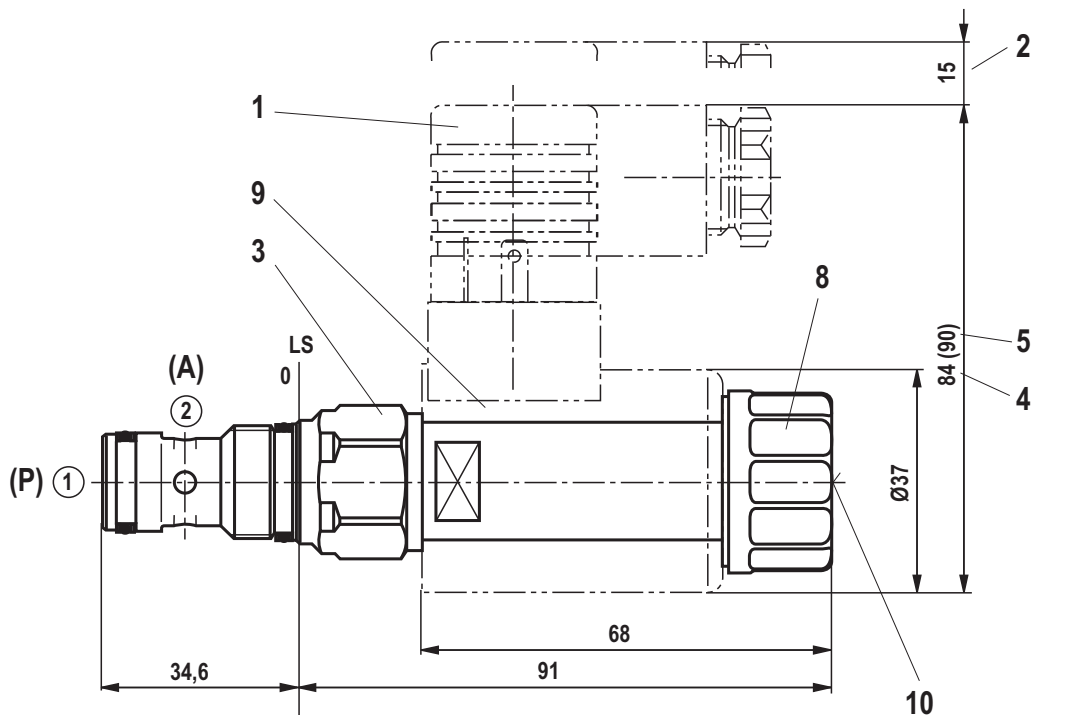
### Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)



### Performance limits (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)



**Unit dimensions** (dimensions in mm)

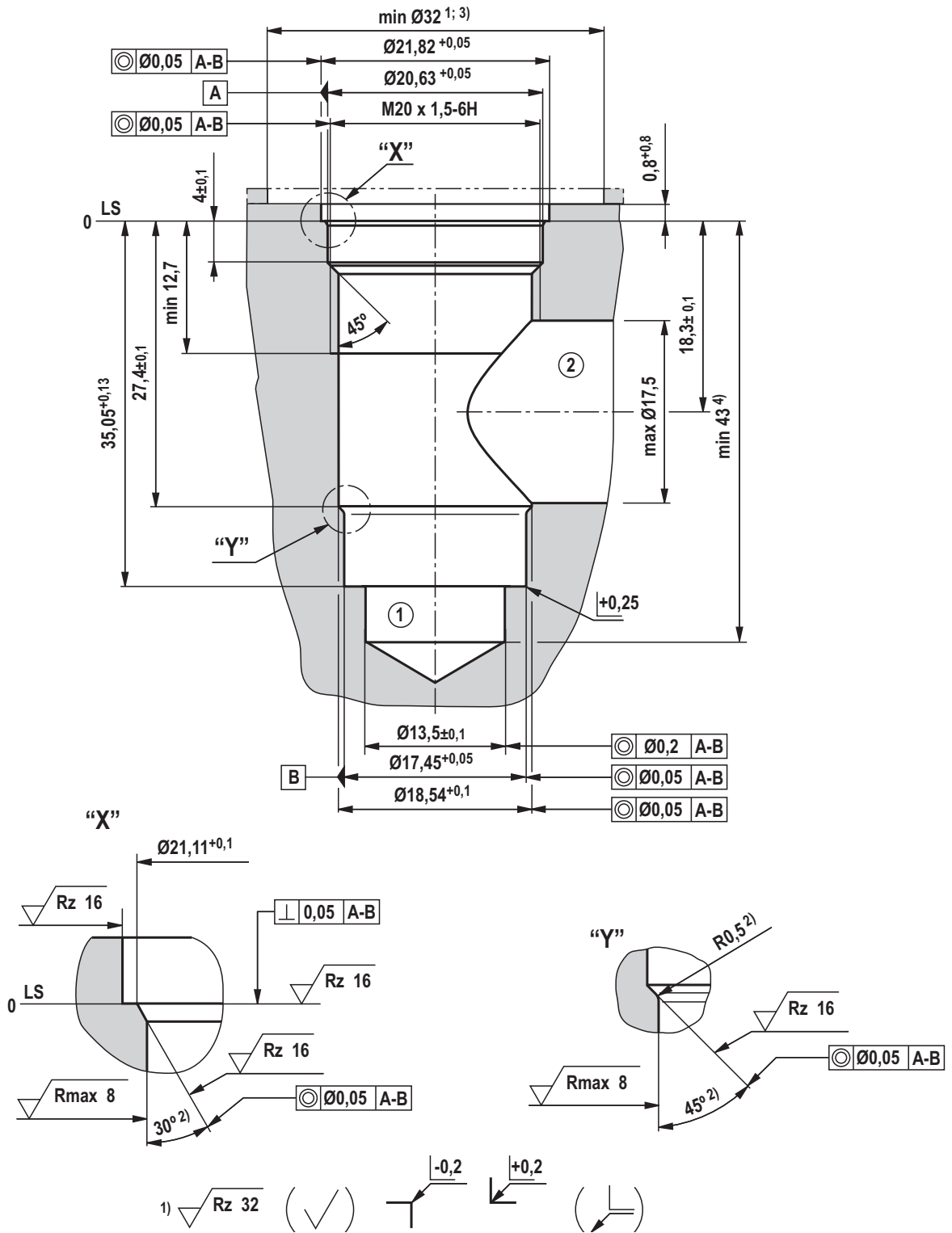


- 1 Mating connector (separate order, see RE 08006)
- 2 Space required to remove the mating connector
- 3 SW24, tightening torque  $M_A = 60^{+5}$  Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension ( ) for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque  $M_A = 5^{+1}$  Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N11", optional
- 12 Screwable manual override "N10" (separate order, see page 2)

① = Main port 1, pump P<sup>3)</sup>  
 ② = Main port 2, actuator A<sup>3)</sup>  
 LS = Positive stop shoulder (location shoulder)

1) Actuated  
 2) Screwed in  
 3) **Attention!**  
 Unambiguous pinout. P and A must not be exchanged or closed!

**Mounting cavity R/T-13A; 2 main ports; thread M20 x 1.5 (dimensions in mm)**



1) Differing from T-13A

2) All seal ring insertion chamfers are rounded and free of burrs

3) with counterbore

4) Depth for moving parts

① = Main port 1

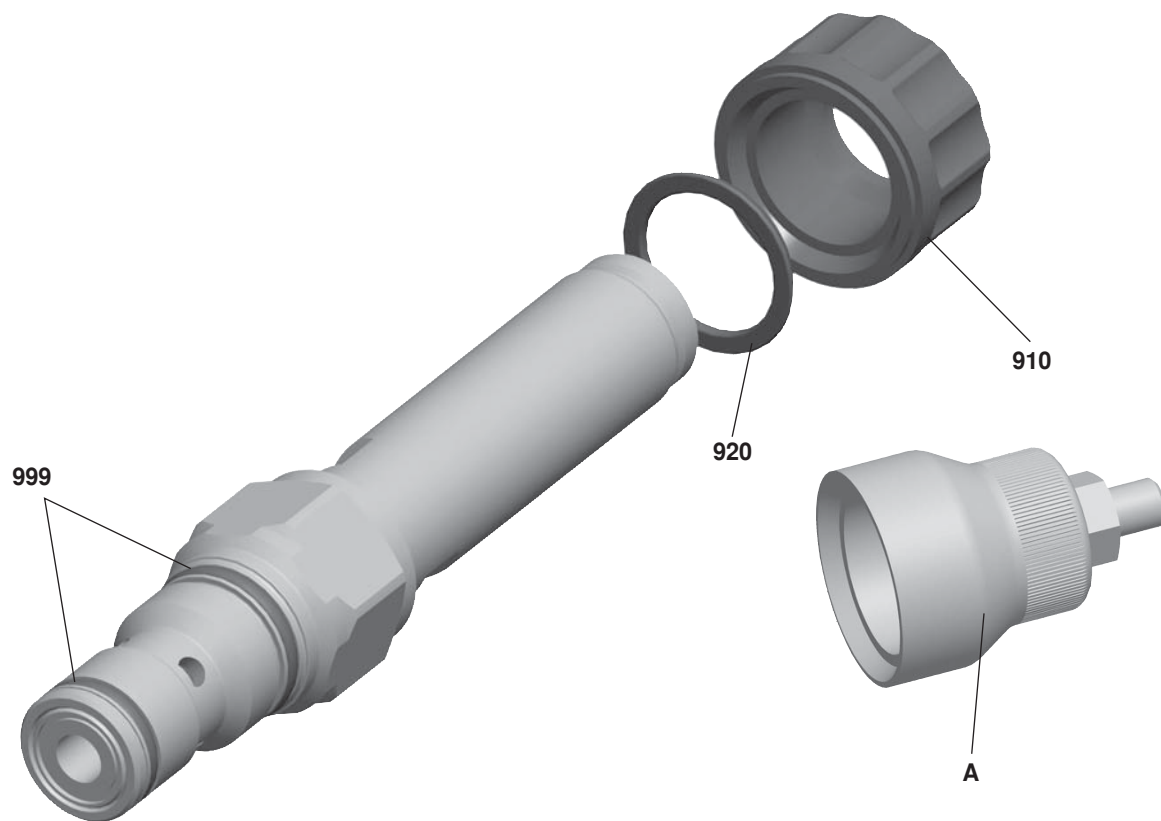
② = Main port 2

LS = Positive stop shoulder (location shoulder)

Tolerance for all angles ±0.5°

## Available individual components

---



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900004280
999	Seal kit of the valve	R961003236
A	Manual override "N10" <sup>1)</sup>	R901051231

Coils, separate order, see page 2

<sup>1)</sup> Only with ordering code "N9", see page 2



# 3/2 directional seat valve, direct operated with solenoid actuation

**Type KSDE** (high-performance)

Component size 1  
Component series B  
Maximum operating pressure 500 bar  
Maximum flow 20 l/min



H6805

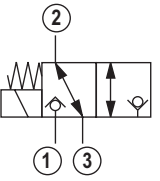
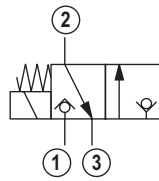
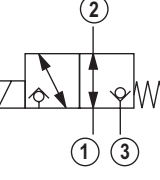
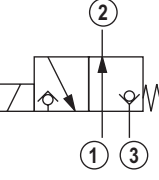
## Table of contents

Contents	Page
Features	1
Ordering code	2
Valve types	2
Available coils	2
Function, section, symbols	3
Technical data	4
Voltage tolerance against ambient temperature	5
Characteristic curves	5
Performance limits	5
Unit dimensions	6
Mounting cavity	7
Available individual components	8

## Features

- Mounting cavity R/T-11A
- Direct operated directional seat valve with solenoid actuation, tight on both sides
- Blocked connection tight in a leak-free form
- Safe switching also with longer standstill periods
- Wet-pin DC solenoids
- Rotatable solenoid coil

### Ordering code (Valve without coil) <sup>1)</sup>

	<b>KSDE</b>	<b>1</b>	<b>B / H</b>	<b>V</b>	<b>*</b>																												
Directional seat valve, direct operated, electrically operated						Further details in the plain text																											
Maximum operating pressure 500 bar	= <b>U</b>					<b>no code =</b> Standard																											
Maximum operating pressure 350 bar	= <b>R</b>					<b>-17 =</b> Flow-optimized <sup>3)</sup>																											
Component size	= <b>1</b>					<b>Seal material</b>																											
3 main ports						FKM seals (other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!																											
<b>Symbols</b>	<b>"R"</b> (350 bar)	<b>"U"</b> (500 bar) <b>"R...-17"</b> (350 bar)																															
						= <b>C</b>																											
						= <b>U</b>																											
						<b>N0 =</b> without manual override <b>N9 =</b> with concealed manual override <b>N11 =</b> with screwable manual override (operation by means of knurled screw)																											
						<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Version</th> <th colspan="3">Symbol C</th> <th colspan="3">Symbol U</th> </tr> <tr> <th>N0</th> <th>N9</th> <th>N11</th> <th>N0</th> <th>N9</th> <th>N11</th> </tr> </thead> <tbody> <tr> <td><b>R</b> (350 bar)</td> <td>X</td> <td>-</td> <td>X</td> <td>X</td> <td>X <sup>2)</sup></td> <td>-</td> </tr> <tr> <td><b>U</b> (500 bar)</td> <td>X</td> <td>-</td> <td>-</td> <td>X</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Version	Symbol C			Symbol U			N0	N9	N11	N0	N9	N11	<b>R</b> (350 bar)	X	-	X	X	X <sup>2)</sup>	-	<b>U</b> (500 bar)	X	-	-	X	-	-
Version	Symbol C			Symbol U																													
	N0	N9	N11	N0	N9	N11																											
<b>R</b> (350 bar)	X	-	X	X	X <sup>2)</sup>	-																											
<b>U</b> (500 bar)	X	-	-	X	-	-																											
						<b>H =</b> High-performance and mounting cavity R/T-11A (see page 7)																											
						<b>B =</b> Component series																											

### Valve types (without coil) <sup>1)</sup>

Operating pressure 350 bar			Operating pressure 500 bar		
Spool symbol	Type	Material no.	Spool symbol	Type	Material no.
<b>C</b>	KSDER1CB/HN0V	R901083205	<b>C</b>	KSDEU1CB/HN0V	R901083198
	KSDER1CB/HN0V-17	R901176263		<b>U</b>	KSDEU1UB/HN0V
	KSDER1CB/HN11V	R901151279			
	KSDER1CB/HN11V-17	R901206917			
<b>U</b>	KSDER1UB/HN0V	R901083191			
	KSDER1UB/HN0V-17	R901176251			
	KSDER1UB/HN9V	R901151288			
	KSDER1UB/HN9V-17	R901206909			

### Available coils (separate order) <sup>1)</sup>

Direct voltage DC <sup>5)</sup>	Material no. for coil with connector <sup>4)</sup>		
	<b>"K4"</b> 03pol (2+PE) DIN EN 175301-803	<b>"K40"</b> 02pol K40 DT 04-2PA, make: Deutsch	<b>"C4"</b> 02pol C4/Z30 AMP Junior Timer
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

<sup>1)</sup> Complete valves with mounted coil upon request

<sup>2)</sup> Screwable manual override "N10" (actuation by means of internal hexagon with lock nut), possible as separate order, material no. R901051231; ordering code "N9"!

<sup>3)</sup> Only version "R" (free-flowing on one side!)

<sup>4)</sup> Mating connectors (separate order), see RE 08006

<sup>5)</sup> Other voltages upon request

## Function, section, symbols

### General

The 3/2 directional seat valves are direct operated, pressure compensated cartridge valves. They basically comprises of screw-in section (4) with valve seat (1), solenoid (5), as well as closing element (3) and compression spring (2).

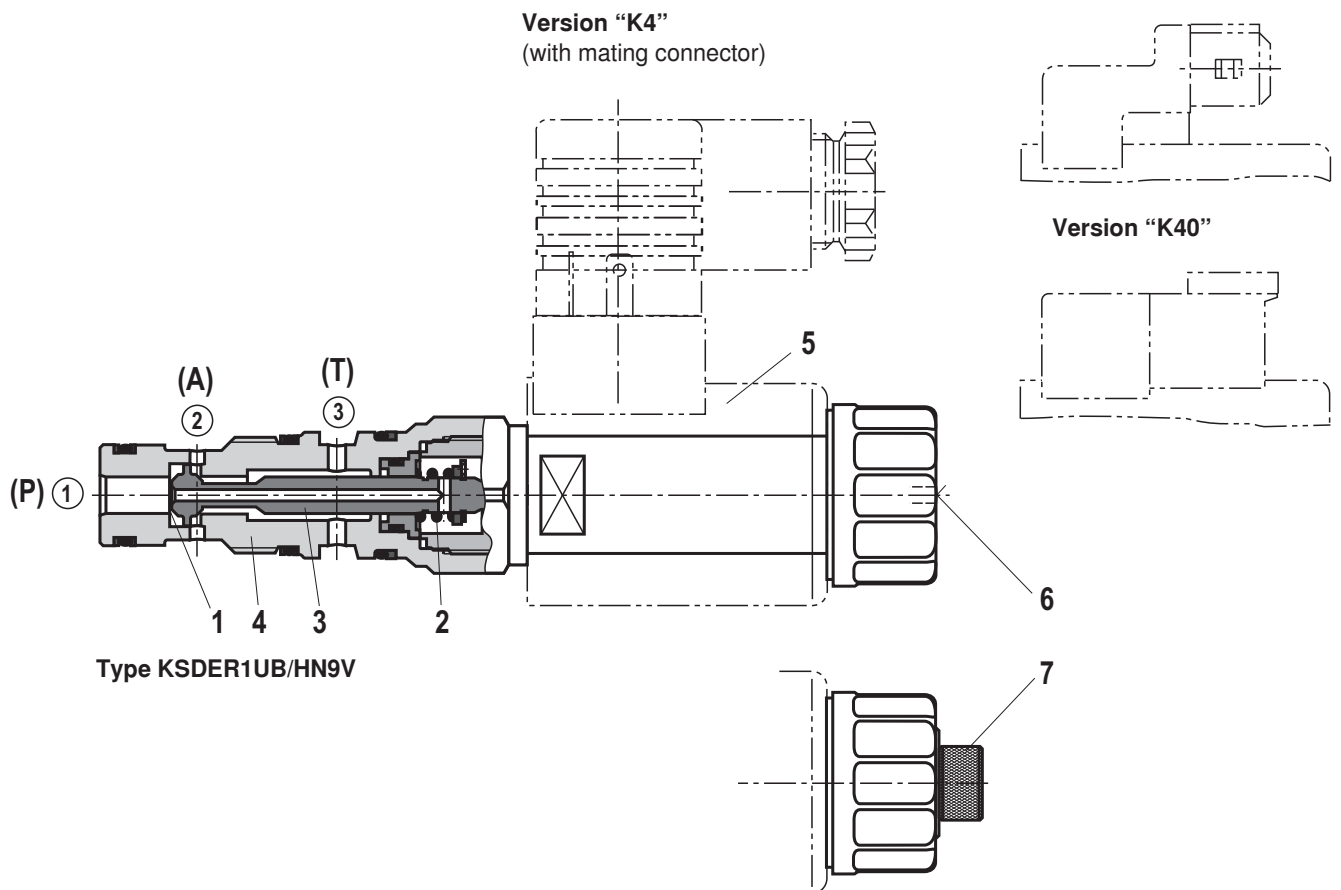
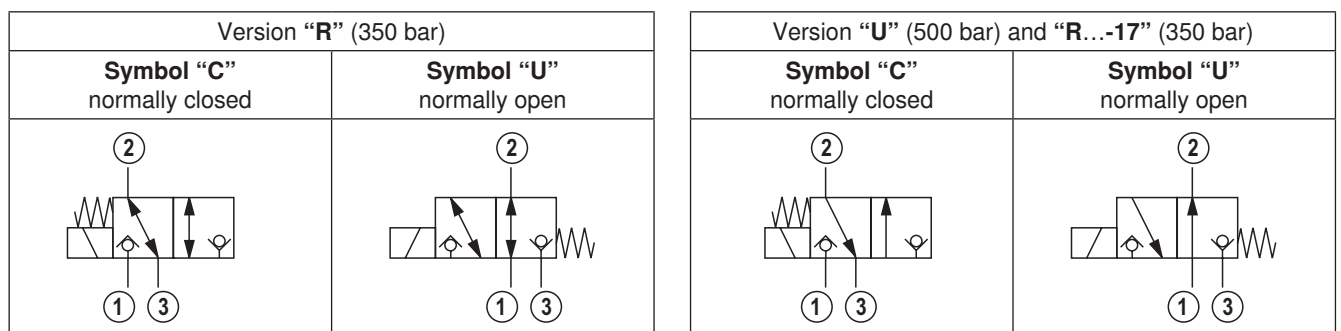
### Function

The initial position of the valve (normally open "U" or normally closed "C") is determined by the position of the closing element (3) and the arrangement of the compression spring (2). Due to the structural design, the 3/2 directional seat valves are always pressure-compensated in relation to the actuating forces. The main ports ① and ② can be loaded with an operating pressure of 350 bar/500 bar (see Technical Data, page 4) and are blocked in a leak-free form in the respective end position. During switching, the main ports are shortly connected (negative overlap).

### Attention!

The flow is only permitted in the direction of arrow (see symbols)! With version "U" (operating pressure 500 bar) as well as with version "R...-17", main port ① must be connected with pump connection P! Valves with version "R...-17" are flow-optimized and thus achieve a higher switching power.

The manual override allows for the the switching of the valve without solenoid energization. It is available in concealed version "N9" (6) or in screwable version "N11" (7) (see page 2).



5

**Technical data** (For applications outside these parameters, please consult us!)**general**

Weight	- Valve	kg	0.30
	- Coil	kg	0.25
Installation position			Any
Ambient temperature range			°C -40 to +110

**hydraulic**

Maximum operating pressure	- Version "U"	bar	500 (at main port ① and ②, if $P \geq A \geq T$ ; for design reasons)
	- Version "R"	bar	350 (at main port ① and ②)
	- Version "R...-17"		350 (at main port ① and ②, if $P \geq A \geq T$ ; for design reasons)
Maximum tank pressure		bar	≤ 50 (at main port ③)
Maximum flow	- Version "U"	l/min	6 (see performance limits page 5)
	- Version "R"	l/min	12 (see performance limits page 5)
	- Version "R...-17"	l/min	20 (see performance limits page 5)
Hydraulic fluid			Mineral oil (HL, HLP) according to DIN 51524; quickly biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request
Hydraulic fluid temperature range			°C -40 to +80
Viscosity range			mm <sup>2</sup> /s 4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Load cycles	- Version "R" (350 bar)		10 million
	- Version "U" (500 bar)		5 million

**electrical**

Type of voltage		Direct voltage	
Supply voltage <sup>2)</sup>		V	12 DC; 24 DC
Voltage tolerance against ambient temperature		See characteristic curve page 5	
Power consumption		W	22
Duty cycle		%	See characteristic curve page 5
Maximum coil temperature <sup>3)</sup>		°C	150
Switching time according to ISO 6403 (solenoid horizontal)	- ON	ms	≤ 60 (≤ 95 with version "R...-17")
	- OFF	ms	≤ 60 (≤ 95 with version "R...-17")
Maximum switching frequency	- Version "R"	1/h	9000
	- Version "U"	1/h	3600
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"	IP 65 with mating connector mounted and locked	
	- Version "C4"	IP 66 with mating connector mounted and locked	
		IP 69K with Rexroth mating connector (Material no. R901022127)	
	- Version "K40"	IP 69K with mating connector mounted and locked	

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

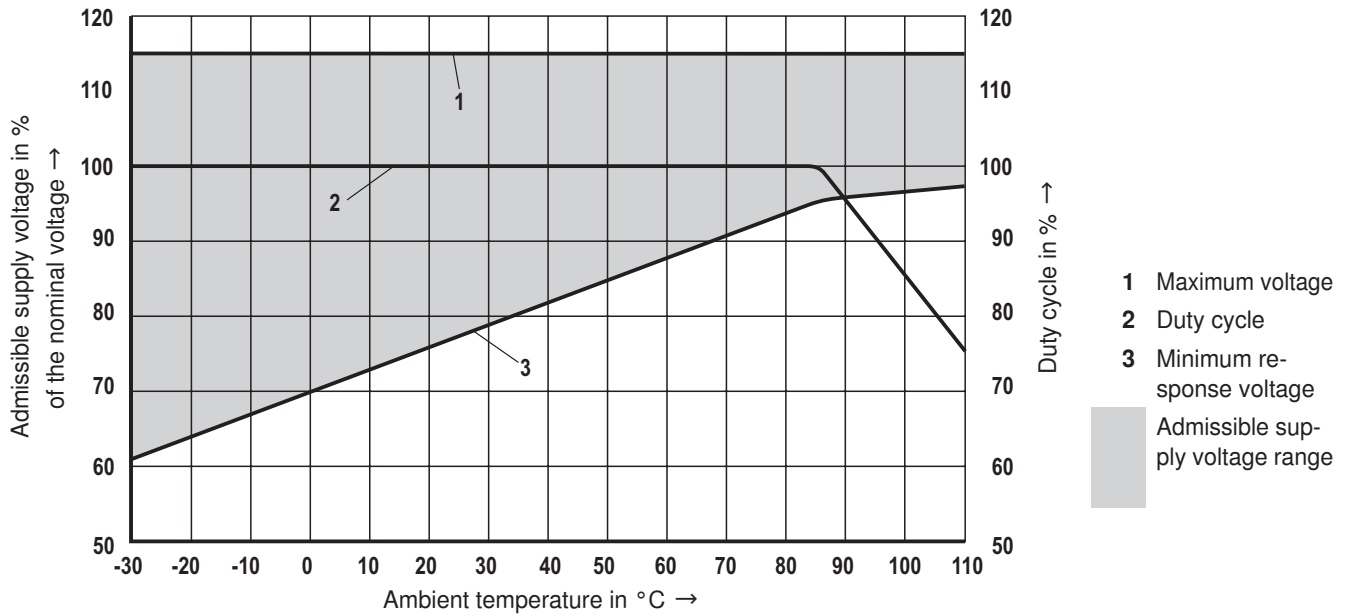
For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

<sup>2)</sup> Other voltages upon request

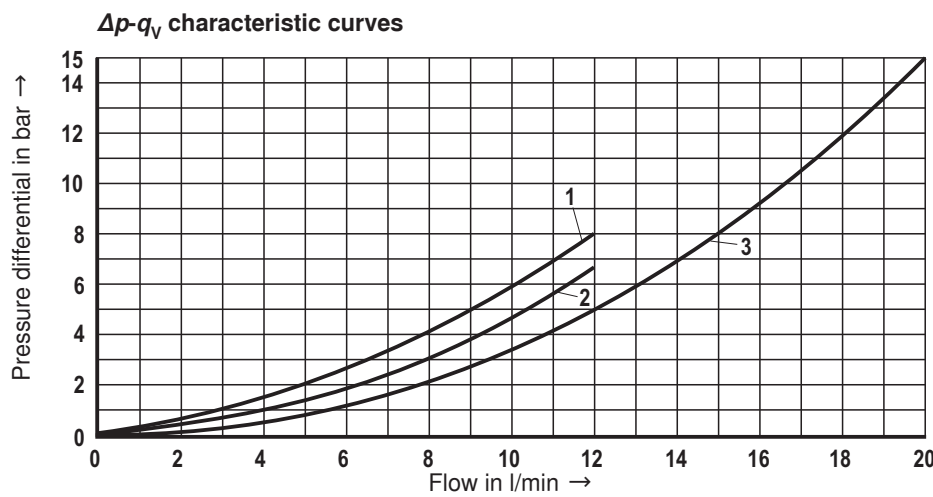
<sup>3)</sup> Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

**At the electrical connection "K4", the protective earthing conductor (PE ≡) has to be connected properly.**

### Voltage tolerance against ambient temperature; duty cycle

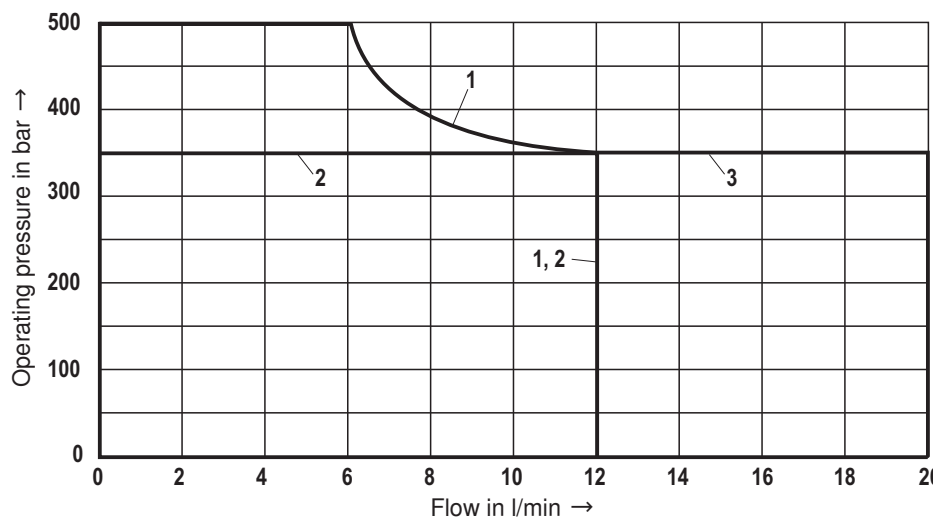


### Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)



1 Standard	② → ③
2 Standard	① → ② ② → ①
3 Version "R...-17"	① → ② ② → ③

### Performance limits (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)

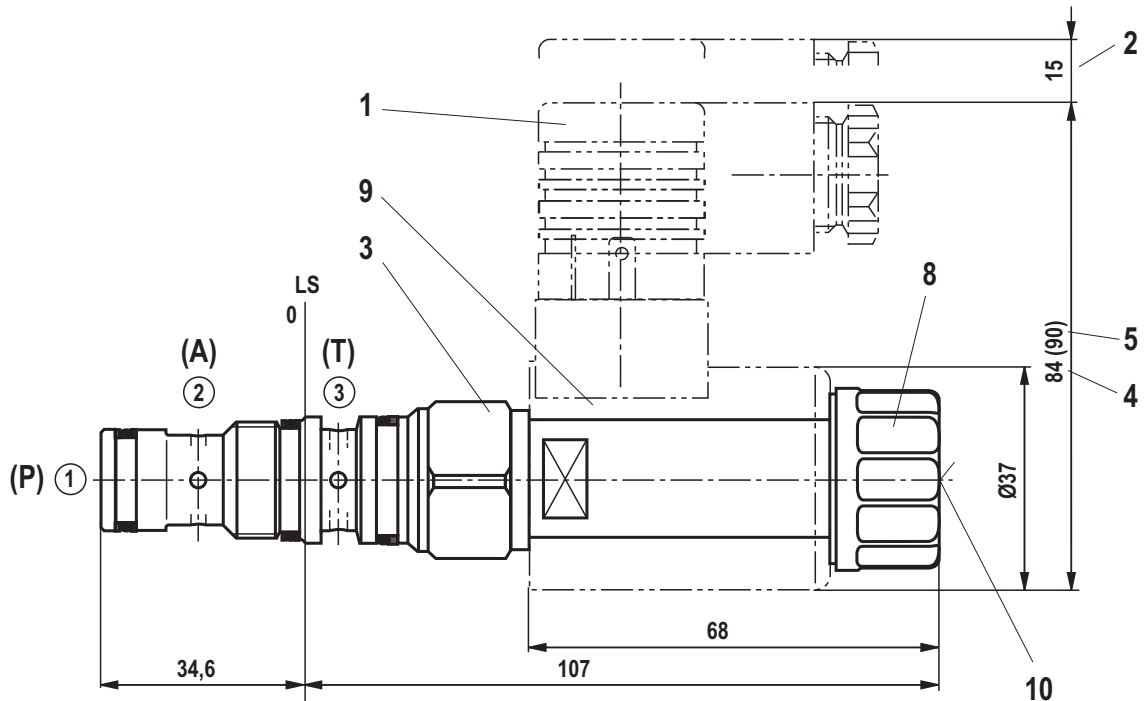


**Attention!**

The performance limits were determined when the solenoids were at operating temperature and at 10% undervoltage.

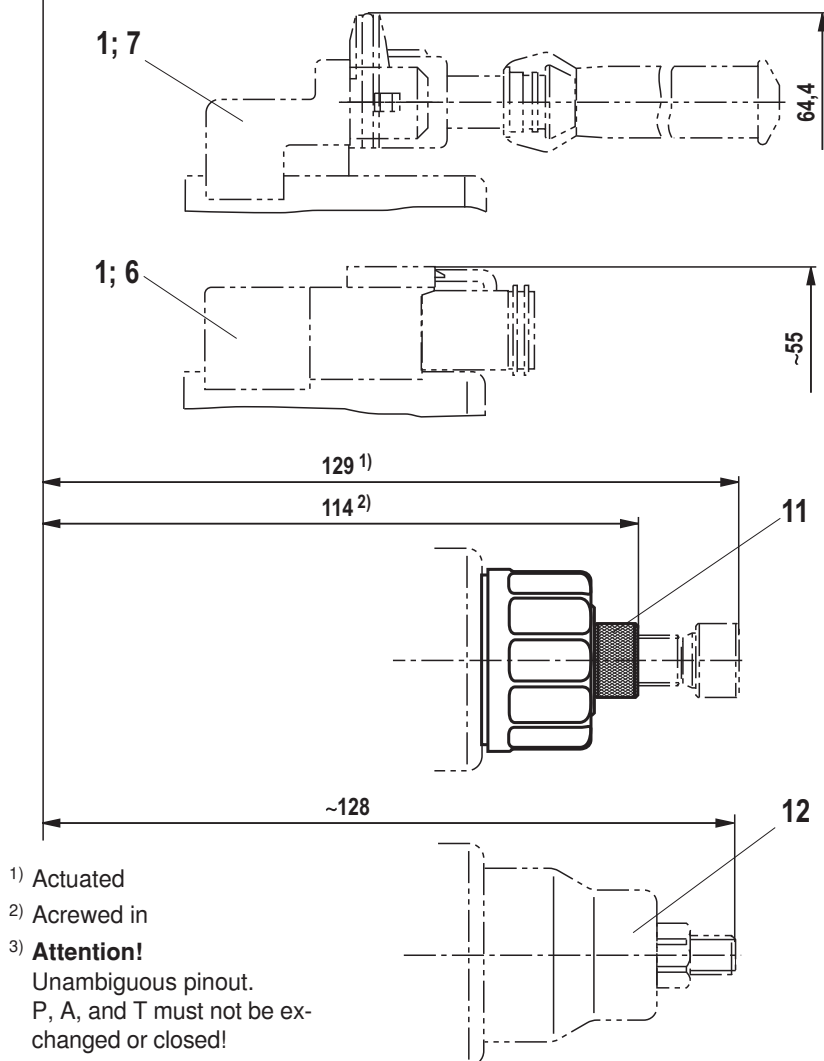
1 Version "U"	① → ②
2 Version "R"	① ↔ ② ② → ①
3 Version "R...-17"	① → ②

**Unit dimensions** (dimensions in mm)



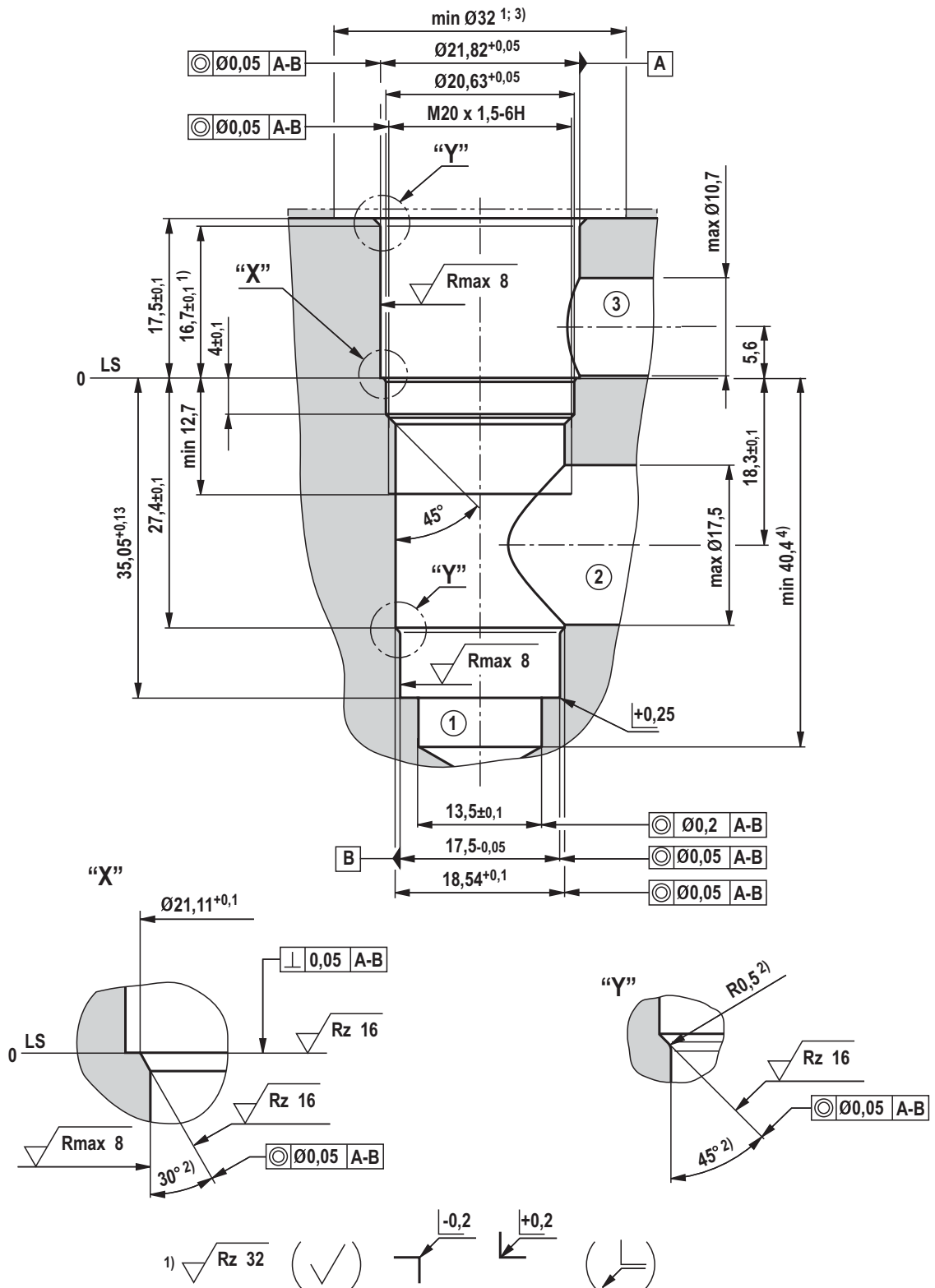
- 1 Mating connector (separate order, see RE 08006)
- 2 Space required for removing the mating connector
- 3 SW24, tightening torque  $M_A = 60^{+5}$  Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension ( ) for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque  $M_A = 5^{+1}$  Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N11", optional
- 12 Screwable manual override "N10" (separate order, see page 2)

- ① = Main port 1, pump P<sup>3)</sup>
- ② = Main port 2, actuator A<sup>3)</sup>
- ③ = Main port 3, tank T<sup>3)</sup>
- LS = Positive stop shoulder (location shoulder)



- 1) Actuated
- 2) Screwed in
- 3) **Attention!** Unambiguous pinout. P, A, and T must not be exchanged or closed!

**Mounting cavity R/T-11A; 3 main ports; thread M20 x 1.5 (dimensions in mm)**



1) Differing from T-11A

2) All seal ring insertion chamfers are rounded and free of burrs

3) with counterbore

4) Depth for moving parts

① = Main port 1

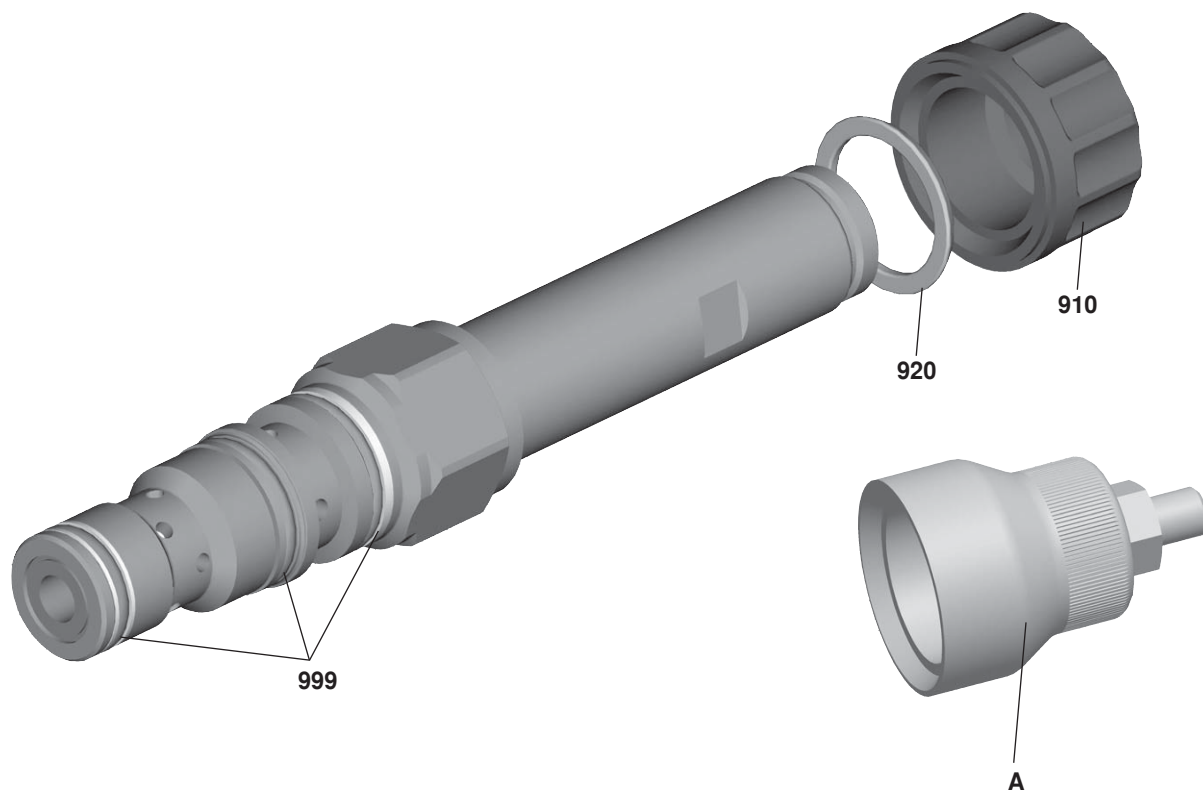
② = Main port 2

③ = Main port 3

LS = Positive stop shoulder (location shoulder)

Tolerance for all angles ±0.5°

## Available individual components



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900004280
999	Seal kit of the valve	R961003235
A	Manual override "N10" 1)	R901051231

Coils, separate order, see page 2

<sup>1)</sup> Only with ordering code "N9", see page 2



# 2/2 directional spool valve direct operated with solenoid actuation

**Type KKDE** (high-performance)

Component size 8  
Component series A  
Maximum operating pressure 350 bar  
Maximum flow 45 l/min



H7010

## Table of contents

Content	Page
Features	1
Ordering code	2
Valve types	2
Available spools	2
Function, section, symbols	3
Technical data	4
Voltage tolerance against ambient temperature	5
Characteristic curves	6
Performance limits	7
Unit dimensions	8
Mounting cavity	9
Available individual components	10

## Features

- Pilot valve
- Mounting cavity R/T-8A
- Direct operated directional spool valve with solenoid actuation
- Free-flowing in both directions
- Positive overlap helps to avoid switching shocks
- Wet-pin DC solenoids
- Rotatable solenoid coil
- With concealed manual override

## Ordering code (Valve without coil) <sup>1)</sup>

KKDE		R	8	A / H	V	*
Directional spool valve, direct operated, electrically operated (pilot valve)		Maximum operating pressure 350 bar = R		Component size = 8		Further details in the plain text
2 main ports						<b>Seal material</b> FKM seals (other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!
Symbols		= N				<b>N0 = without manual override</b> <b>N9 = with concealed manual override <sup>4)</sup></b>
		= P				<b>H = High-performance and mounting cavity R/T-8A (see page 9)</b> <b>A = Component series</b>

## Valve types (without coil) <sup>1)</sup>

Spool variant	without manual override "N0"		with concealed manual override "N9"	
	Type	Material no.	Type	Material no.
N	KKDER8NA/HN0V	R901069969	KKDER8NA/HN9V	R901069975
P	KKDER8PA/HN0V	R901069973	KKDER8PA/HN9V	R901069978

## Available coils (separate order) <sup>1)</sup>

	Material no. for coil with connector <sup>2)</sup>		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make. Deutsch	"C4" 02pol C4/Z30 AMP Junior Timer
Direct voltage DC <sup>3)</sup>			
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

<sup>1)</sup> Complete valves with mounted coil upon request

<sup>2)</sup> Mating connectors (separate order), see RE 08006

<sup>3)</sup> Other voltages upon request

<sup>4)</sup> Screwable manual override "N10" (actuation by means of internal hexagon with lock nut), possible as separate order, Material no. **R901051231**; ordering code "**N9**"!

## Function, section, symbols

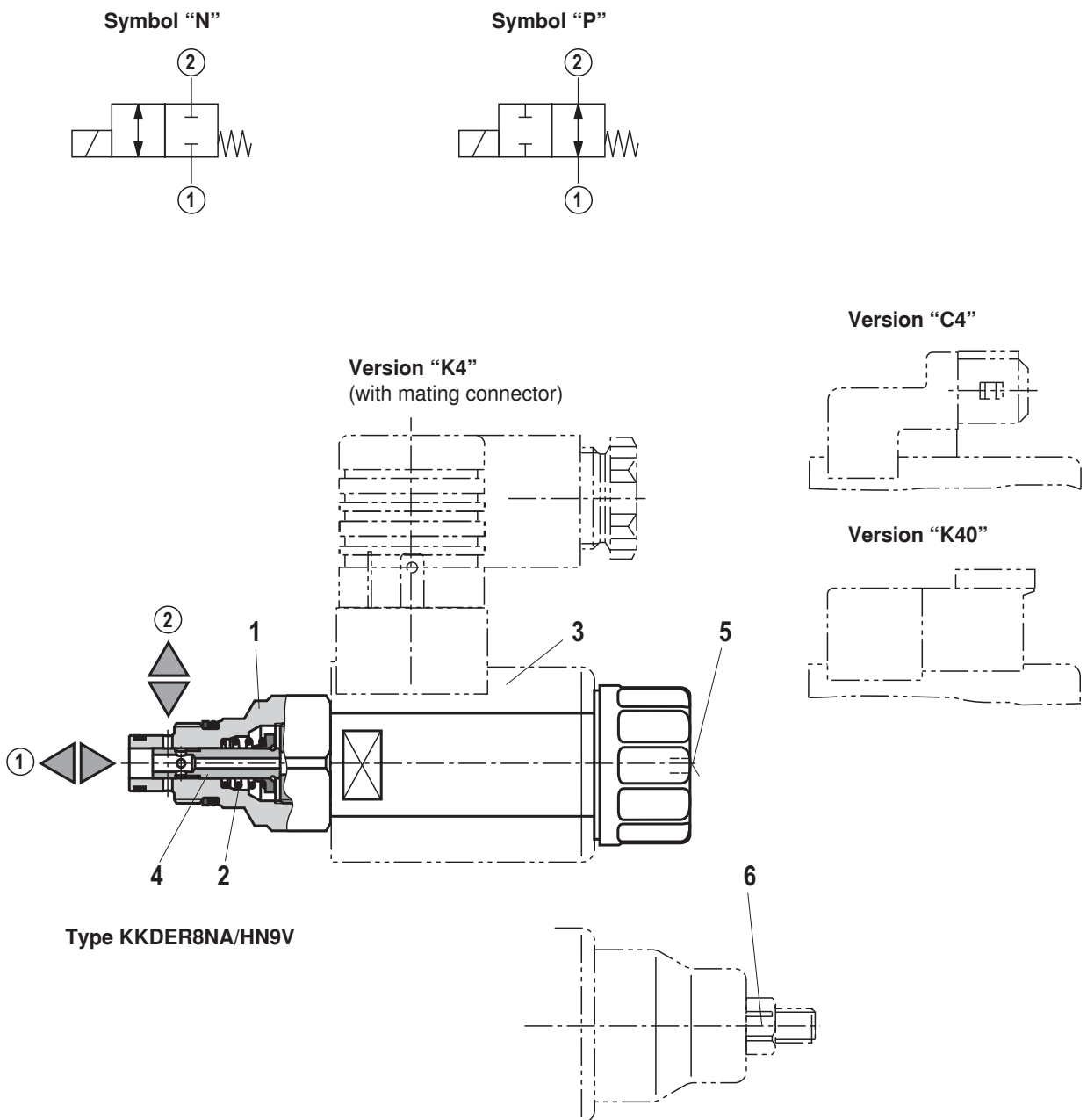
### General

The 2/2 directional spool valves are direct operated, pressure compensated cartridge valves. They control the start, stop and direction of a flow and basically comprise a housing (1), the control spool (4) and a return spring (2).

### Function

In the de-energized condition, control spool (4) is held in the initial position by the return spring (2). Control spool (4) is actuated by wet-pin DC solenoids (3). The various symbols are realized by corresponding spools (N and P). The main ports ① and ② are suitable for a continuous load with an operating pressure of 350 bar and the flow can be directed into both directions (see symbols).

The manual override (5) allows for the switching of the valve without solenoid energization. It is also available in screwable version "N10" (6) (see page 2).



**Technical data** (For applications outside these parameters, please consult us!)**general**

Weight	- Valve	kg	0.30
	- Coil	kg	0.25
Installation position		Any	
Ambient temperature range		°C	-40 to +110

**hydraulic**

Maximum operating pressure	bar	350 (at all ports)
Maximum flow	l/min	45
Hydraulic fluid	Mineral oil (HL, HLP) according to DIN 51524; quickly biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request	
Hydraulic fluid temperature range	°C	-40 to +80
Viscosity range	mm <sup>2</sup> /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)	Class 20/18/15 <sup>1)</sup>	
Load cycles	10 million (at 350 bar)	

**electrical**

Voltage type	Direct voltage	
Supply voltage <sup>2)</sup>	V	12 DC; 24 DC
Voltage tolerance against ambient temperature	See characteristic curve page 5	
Power consumption	W	22
Duty cycle	%	See characteristic curve page 5
Maximum coil temperature <sup>3)</sup>	°C	150
Switching time according to ISO 6403 (solenoid horizontal)	- ON	ms ≤ 80
	- OFF	ms ≤ 50
Maximum switching frequency	cy/h	15000
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"	IP 65 with mating connector mounted and locked
	- Version "C4"	IP 66 with mating connector mounted and locked
		IP 69K with Rexroth mating connector (Material no. R901022127)
	- Version "K40"	IP 69K with mating connector mounted and locked

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

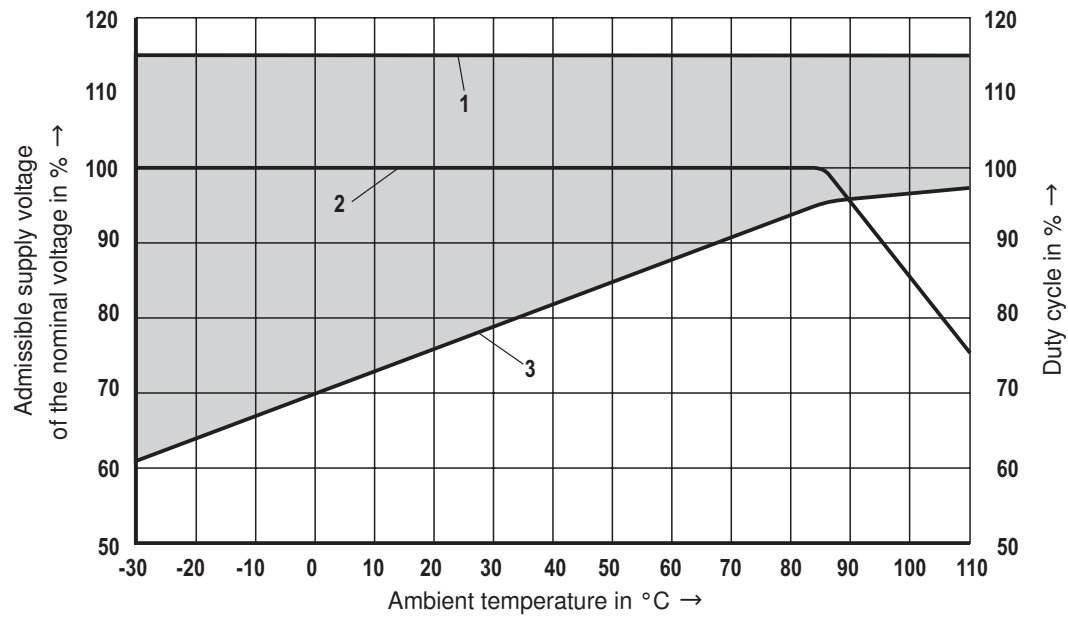
<sup>2)</sup> Other voltages upon request

<sup>3)</sup> Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

**At the electrical connection "K4", the protective earthing conductor (PE  $\frac{1}{2}$ ) has to be connected properly.**

## Voltage tolerance against ambient temperature; duty cycle

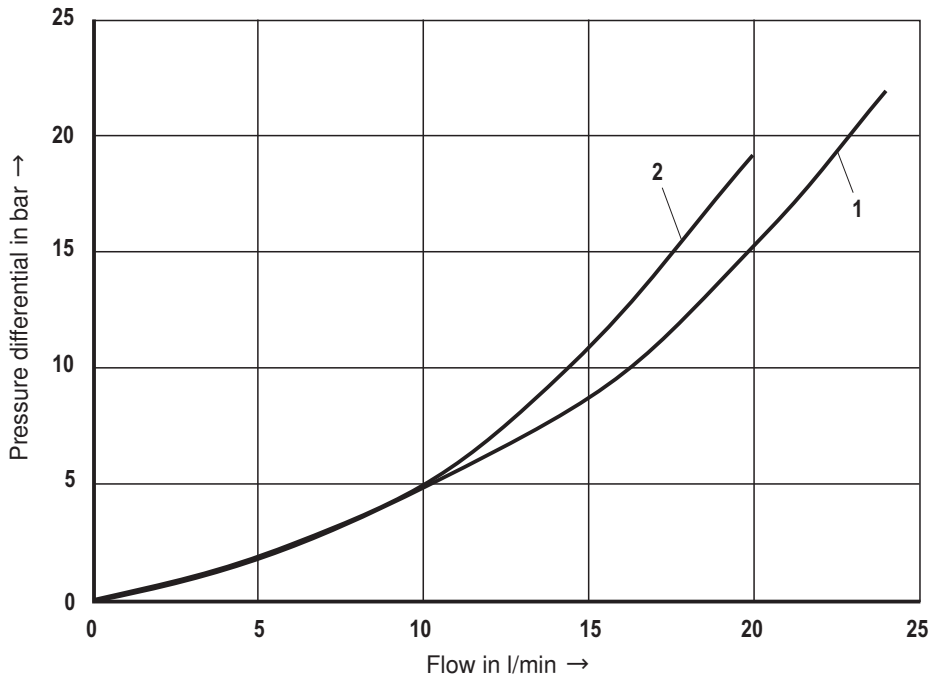
Voltage range and duty cycle depending on the ambient temperature



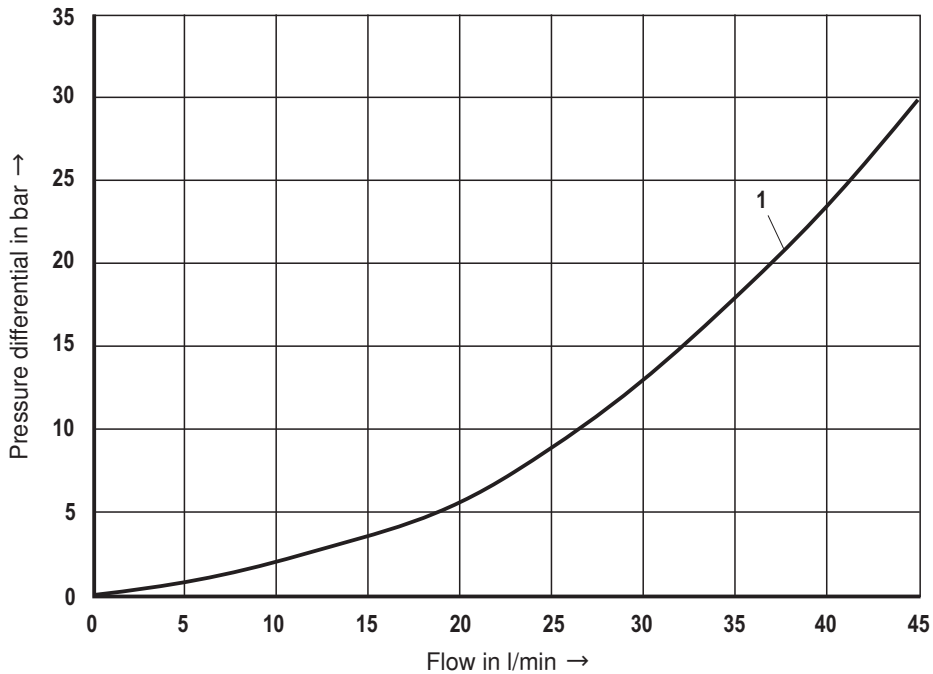
- 1 Maximum voltage
- 2 Duty cycle
- 3 Minimum response voltage
- Admissible supply voltage range

**Characteristic curves** (measured with HLP46,  $\dot{v}_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$  and 24 V coil)

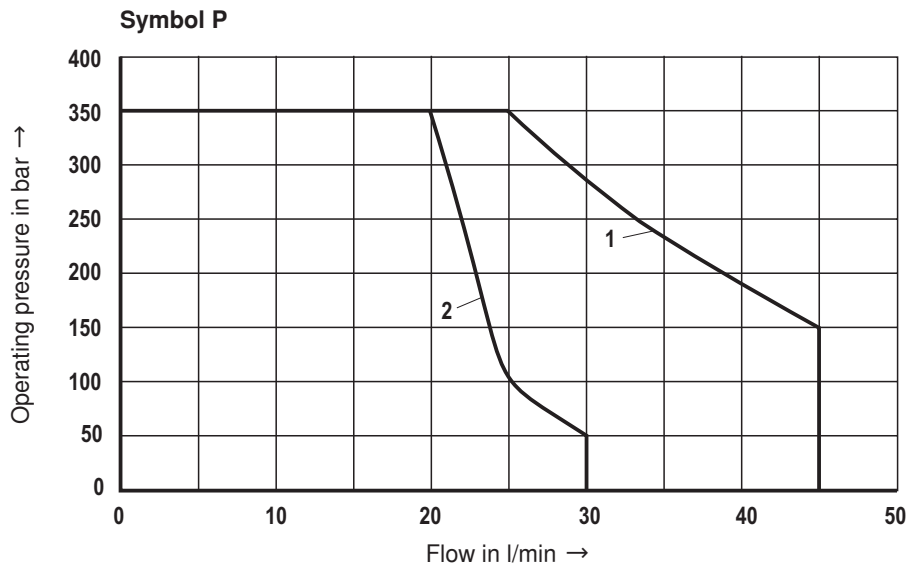
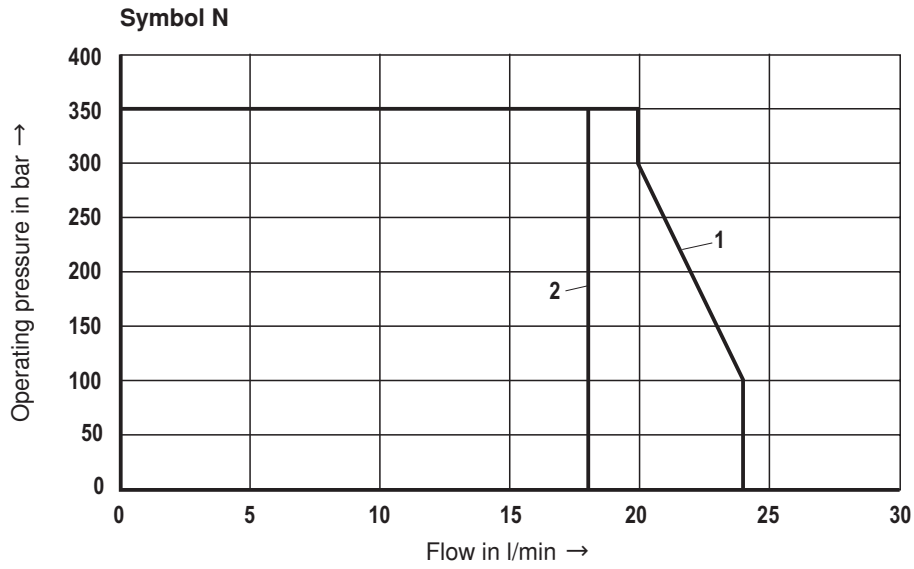
$\Delta p$ - $q_v$  characteristic curves – symbol N



$\Delta p$ - $q_v$  characteristic curves – symbol P



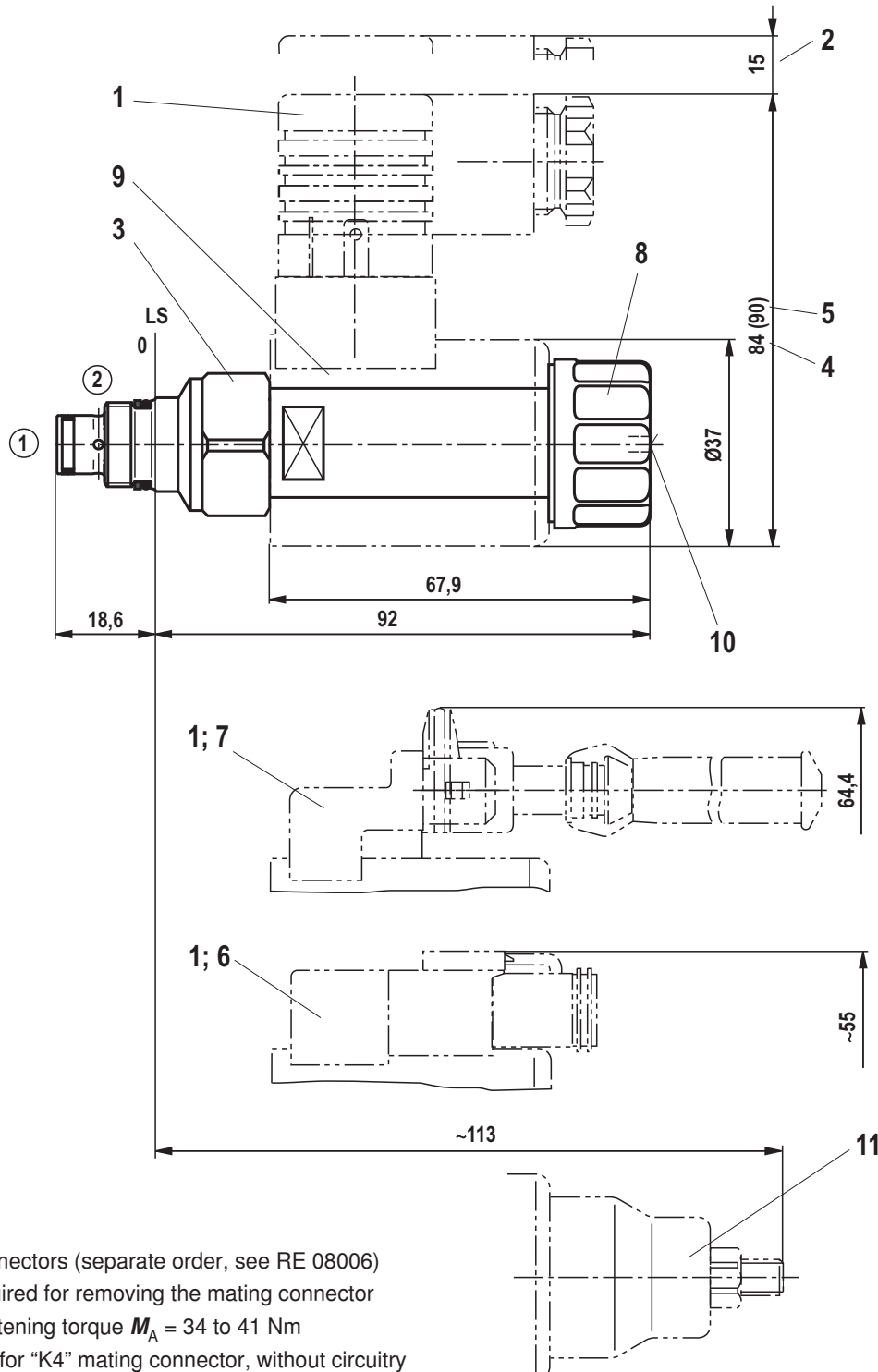
**Performance limits** (measured with HLP46,  $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$  and 24 V coil)



**Attention!**

The performance limits were determined when the solenoids were at operating temperature and at 10% undervoltage.

**Unit dimensions (dimensions in mm)**

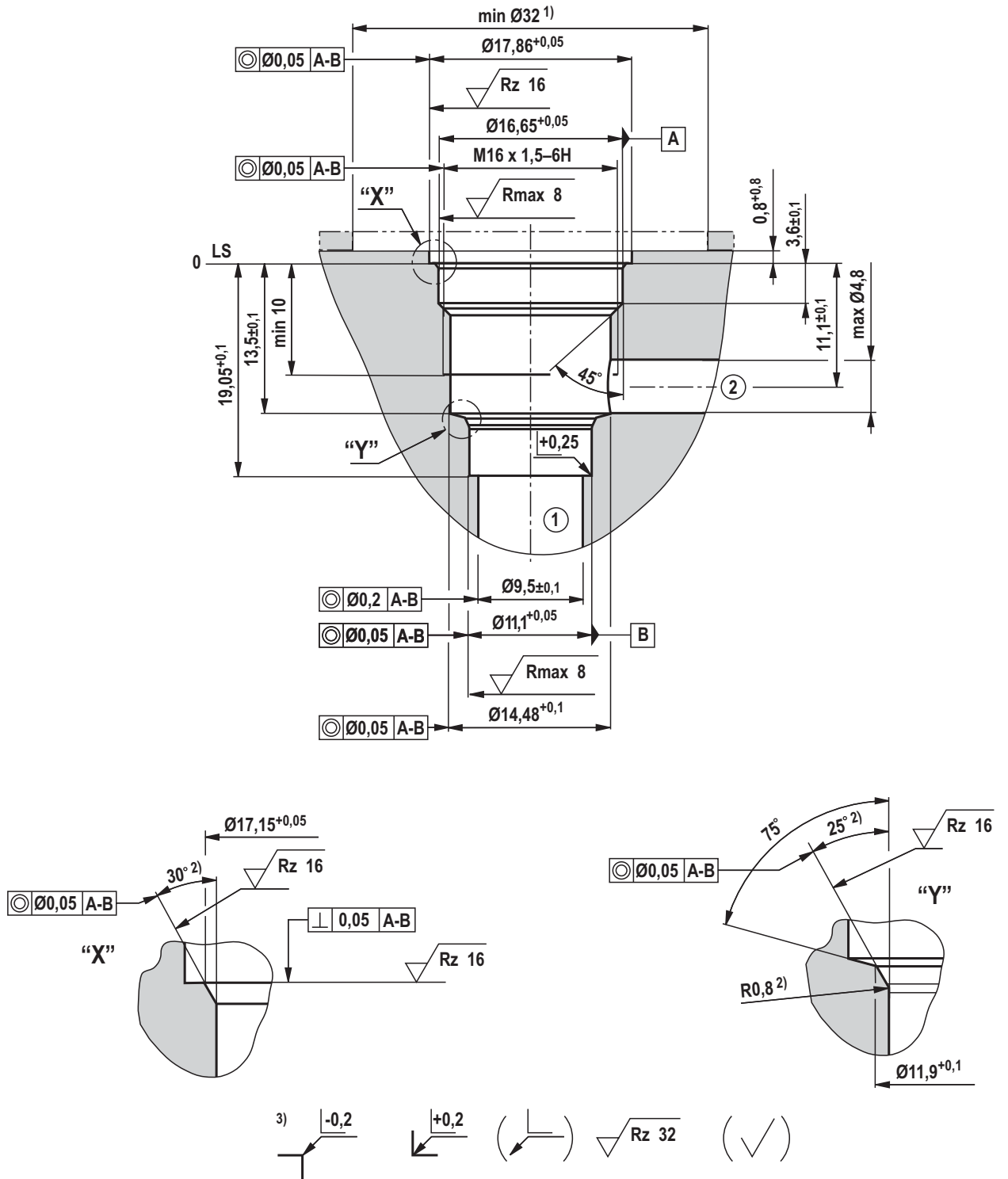


- 1 Mating connectors (separate order, see RE 08006)
- 2 Space required for removing the mating connector
- 3 SW24, tightening torque  $M_A = 34$  to  $41$  Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension ( ) for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque  $M_A = 5^{+1}$  Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N10" (separate order, see page 2)

① = Main port 1  
 ② = Main port 2  
 LS = Location shoulder



**Mounting cavity R/T-8A; 2 main ports; thread M16 x 1.5 (dimensions in mm)**



1) with counterbore, deviating from T-8A

2) All seal ring in section faces are rounded and free of burrs

3) Differing from T-8A

① = Main port 1

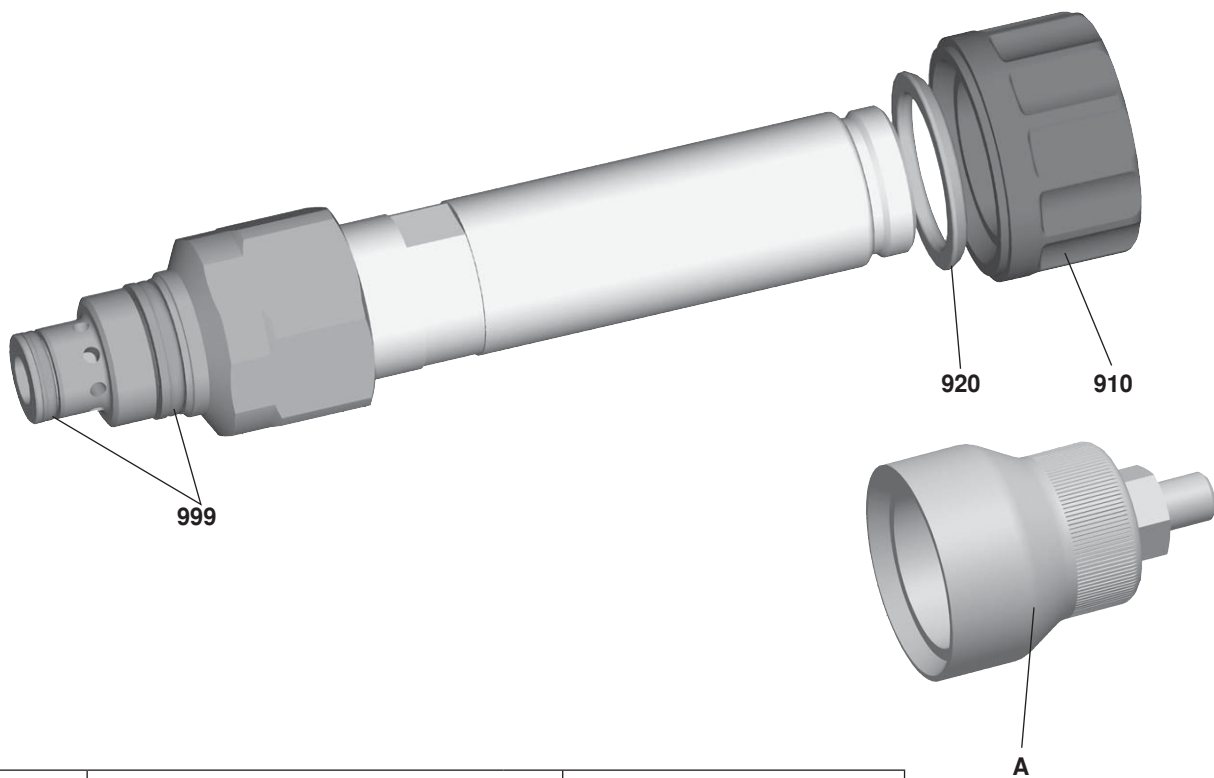
② = Main port 2

LS = Location shoulder

Tolerance for all angles  $\pm 0.5^\circ$

## Available individual components

---



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve	R961003237
A	Manual override "N10" <sup>1)</sup>	R901051231

Coils, separate order, see page 2

<sup>1)</sup> Only with ordering code "N9", see page 2

# 3/2 directional spool valve direct operated with solenoid actuation

**Type KKDE** (high-performance)

Component size 8  
Component series A  
Maximum operating pressure 350 bar  
Maximum flow 30 l/min



H7011

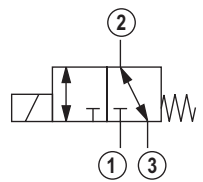
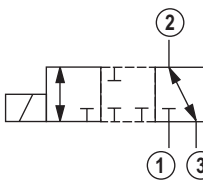
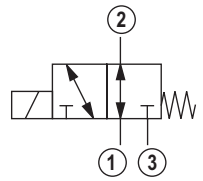
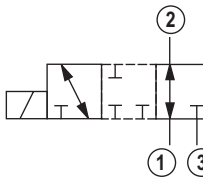
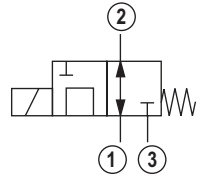
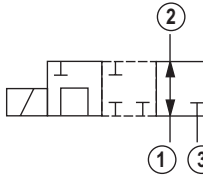
## Table of contents

Content	Page
Features	1
Ordering code	2
Valve types	2
Available spools	2
Function, section, symbols	3
Technical data	4
Voltage tolerance against ambient temperature	5
Characteristic curves	5, 6
Performance limits	7
Unit dimensions	8
Mounting cavity	9
Available individual components	10

## Features

- Pilot valve
- Mounting cavity R/T-9A
- Direct operated directional spool valve with solenoid actuation
- Free-flowing in both directions
- Wet-pin DC solenoids
- Rotatable solenoid coil
- With concealed manual override

### Ordering code (Valve without coil) <sup>1)</sup>

	<b>KKDE</b>	<b>R</b>	<b>8</b>	<b>A / H</b>	<b>V</b>	<b>*</b>	
Directional spool valve, direct operated, electrically operated (pilot valve)						Further details in the plain text	
Maximum operating pressure 350 bar	= R					V =	<b>Seal material</b> FKM seals (other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!
Component size	= 8					N0 = <b>without</b> manual override N9 = <b>with</b> concealed manual override <sup>4)</sup>	
3 main ports							
Symbols			= C				
			= U				
			= G				
						H = High-performance and mounting cavity R/T-9A (see page 9)	
						A = Component series	

### Valve types (without coil) <sup>1)</sup>

Spool variant	without manual override "N0"		with concealed manual override "N9"	
	Type	Material no.	Type	Material no.
<b>C</b>	KKDER8CA/HN0V	R901070049	KKDER8CA/HN9V	R901070055
<b>U</b>	KKDER8UA/HN0V	R901070050	KKDER8UA/HN9V	R901070068
<b>G</b>	KKDER8GA/HN0V	R901070051	KKDER8GA/HN9V	R901070072

### Available coils (separate order) <sup>1)</sup>

	Material no. for coil with connector <sup>2)</sup>		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make. Deusch	"C4" 02pol C4/Z30 AMP Junior Timer
Direct voltage DC <sup>3)</sup>			
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

<sup>1)</sup> Complete valves with mounted coil upon request

<sup>2)</sup> Mating connectors (separate order), see RE 08006

<sup>3)</sup> Other voltages upon request

<sup>4)</sup> Screwable manual override "N10" possible  
(Material no. **R901051231**, separate order)

## Function, section, symbols

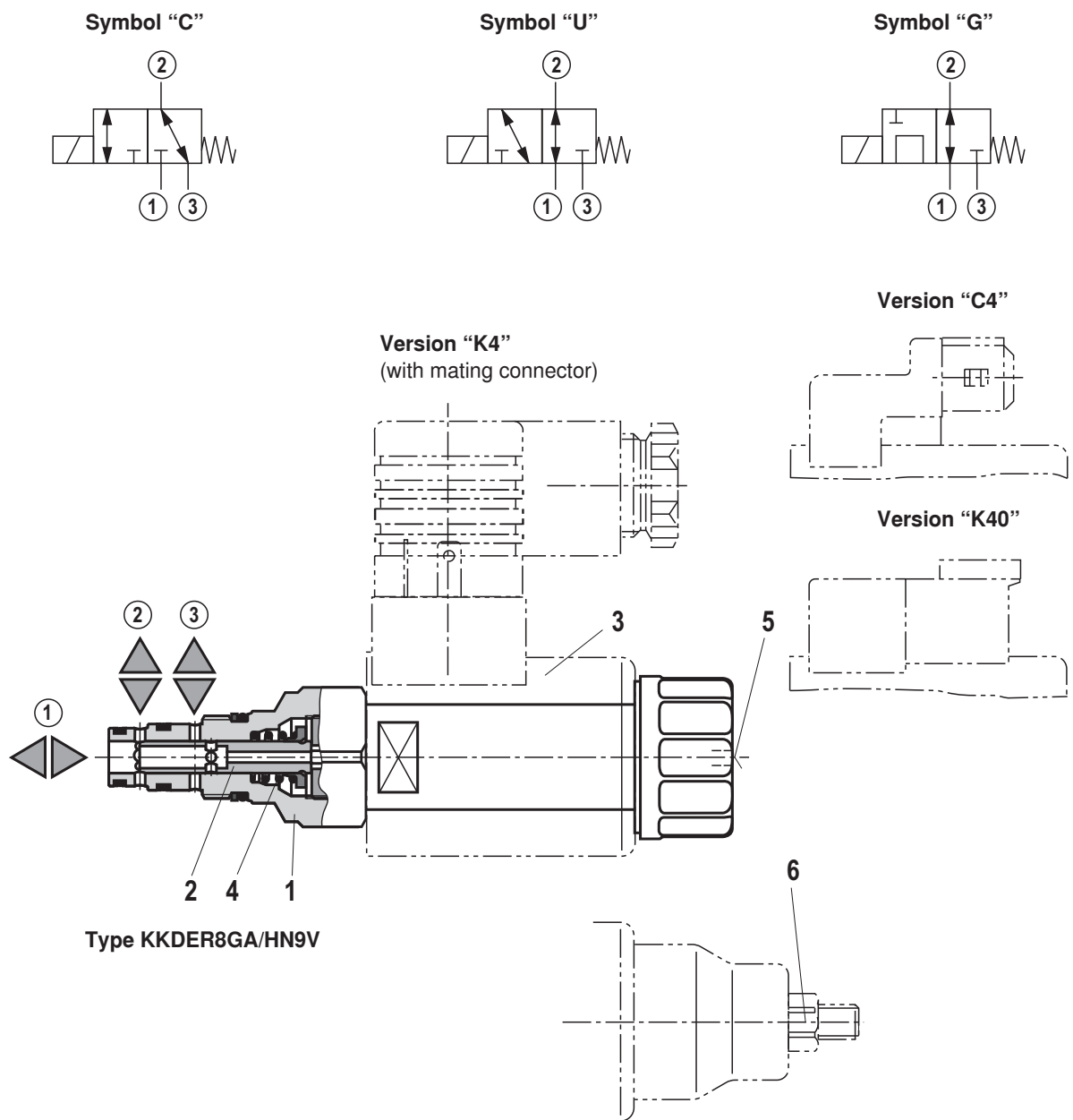
### General

The 3/2 directional spool valves are direct operated, pressure compensated cartridge valves. They control the start, stop and direction of a flow and basically comprise a housing (1), the control spool (2) and a return spring (4).

### Function

In the de-energized condition, control spool (2) is held in the initial position by the return spring (4). Control spool (2) is actuated by wet-pin DC solenoids (3). The various symbols are realized by corresponding spools (C, U, and G). The main ports ①, ②, and ③ are suitable for a continuous load with an operating pressure of 350 bar and the flow can be directed into both directions (see symbols).

The manual override (5) allows for the switching of the valve without solenoid energization. It is also available in screwable version "N10" (6) (see page 2).



**Technical data** (For applications outside these parameters, please consult us!)**general**

Weight	- Valve	kg	0.3
	- Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	-40 to +110

**hydraulic**

Maximum operating pressure	bar	350 (at all ports)
Maximum flow	l/min	30
Hydraulic fluid	Mineral oil (HL, HLP) according to DIN 51524; quickly biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request	
Hydraulic fluid temperature range	°C	-40 to +80
Viscosity range	mm <sup>2</sup> /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)	Class 20/18/15 <sup>1)</sup>	
Load cycles	10 million (at 350 bar)	

**electrical**

Voltage type	Direct voltage		
Supply voltage <sup>2)</sup>	V	12 DC; 24 DC	
Voltage tolerance against ambient temperature	See characteristic curve page 5		
Power consumption	W	22	
Duty cycle	%	See characteristic curve page 5	
Maximum coil temperature <sup>3)</sup>	°C	150	
Switching time according to ISO 6403 (solenoid horizontal)	- ON	ms	≤ 80
	- OFF	ms	≤ 50
Maximum switching frequency	cy/h	15000	
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"	IP 65 with mating connector mounted and locked	
	- Version "C4"	IP 66 with mating connector mounted and locked	
		IP 69K with Rexroth mating connector (Material no. R901022127)	
	- Version "K40"	IP 69K with mating connector mounted and locked	

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

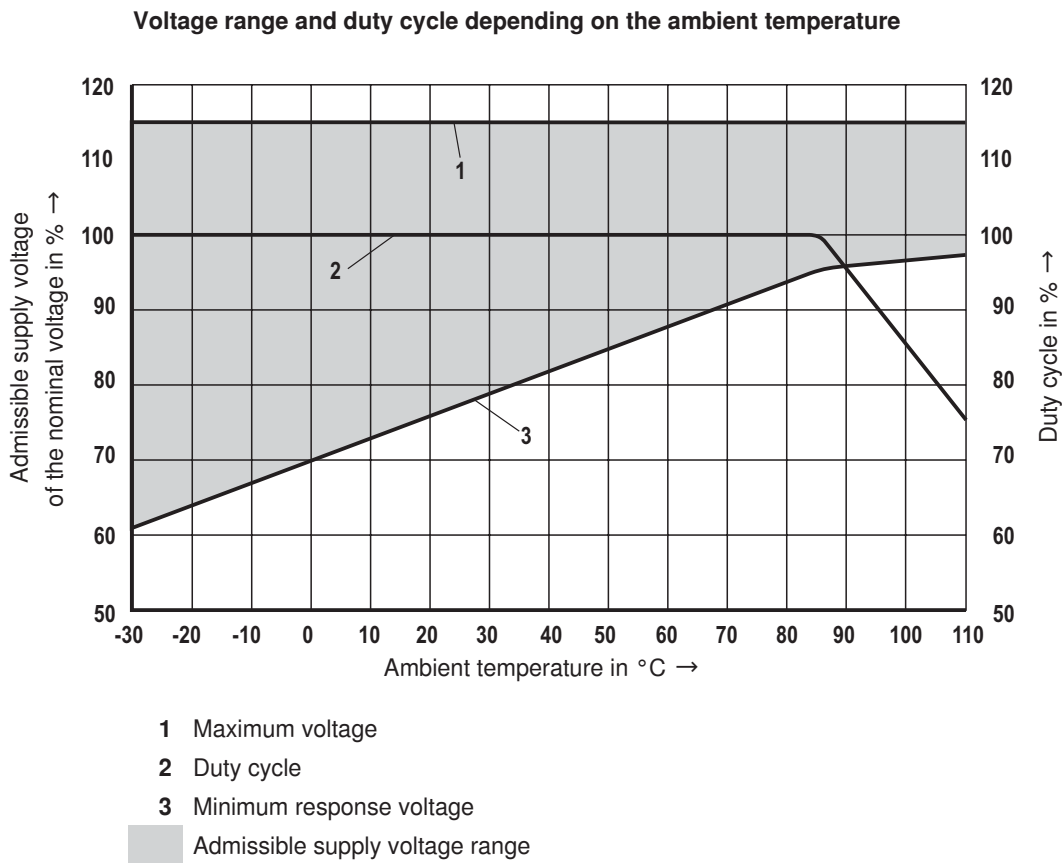
For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

<sup>2)</sup> Other voltages upon request

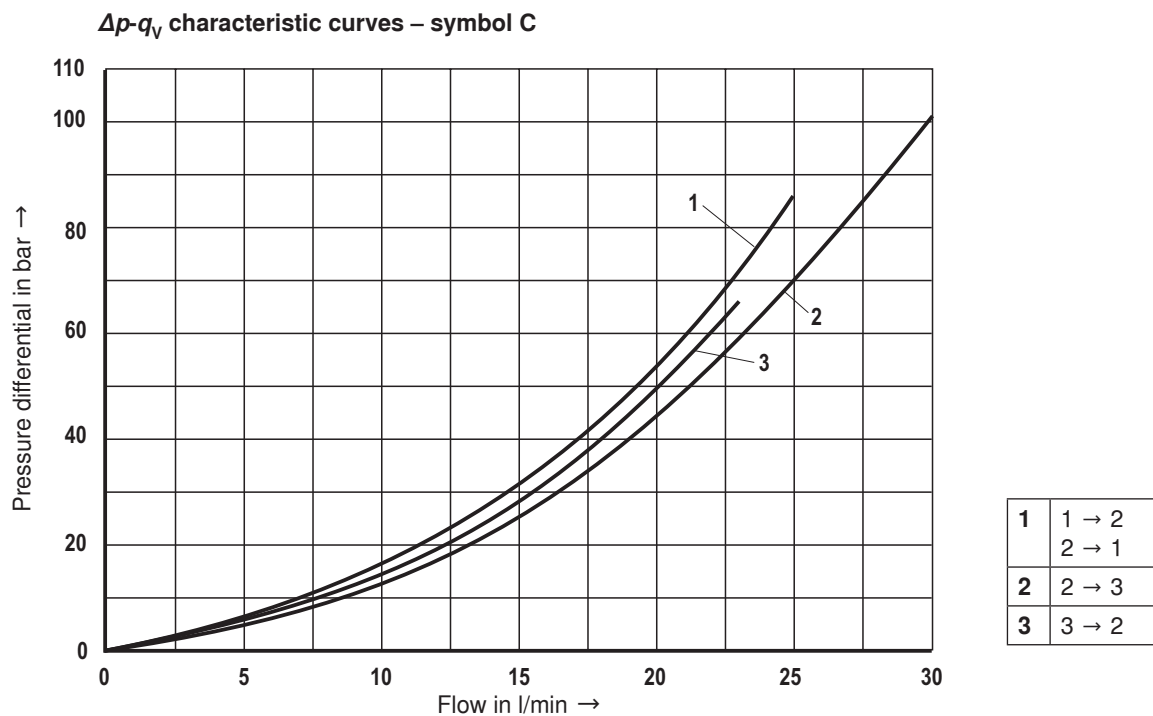
<sup>3)</sup> Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

**At the electrical connection "K4", the protective earthing conductor (PE  $\frac{1}{2}$ ) has to be connected properly.**

## Voltage tolerance against ambient temperature; duty cycle

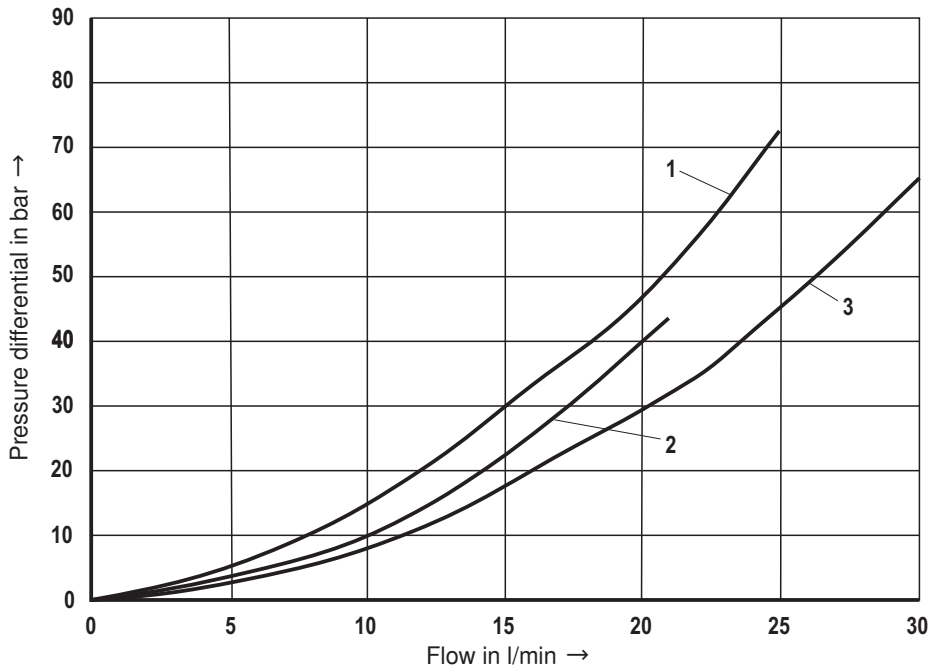


## Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)



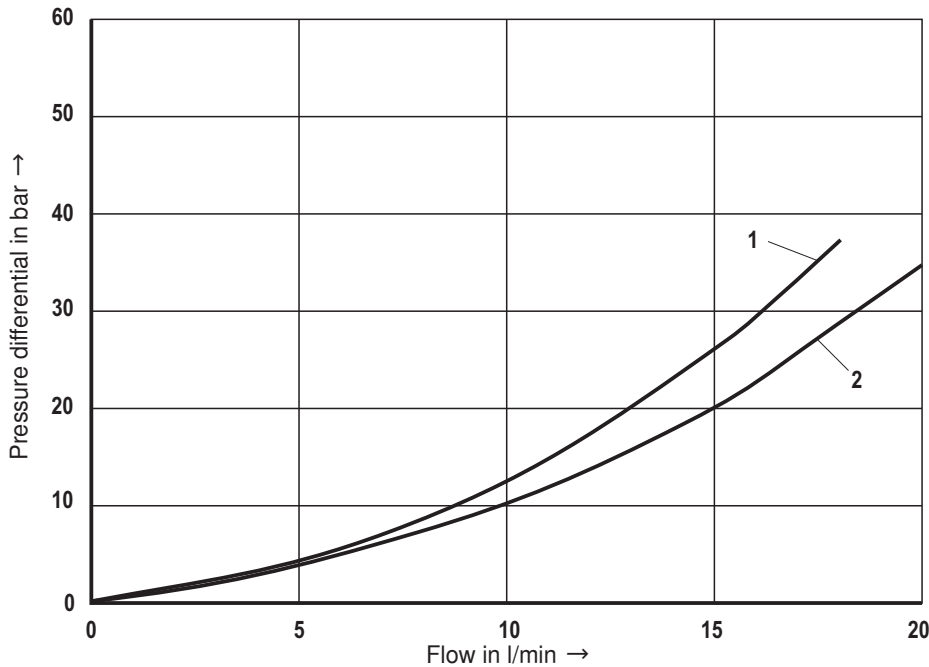
**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$  and 24 V coil)

$\Delta p$ - $q_v$  characteristic curves – symbol U



1	3 → 2
2	1 → 2
3	2 → 1 2 → 3

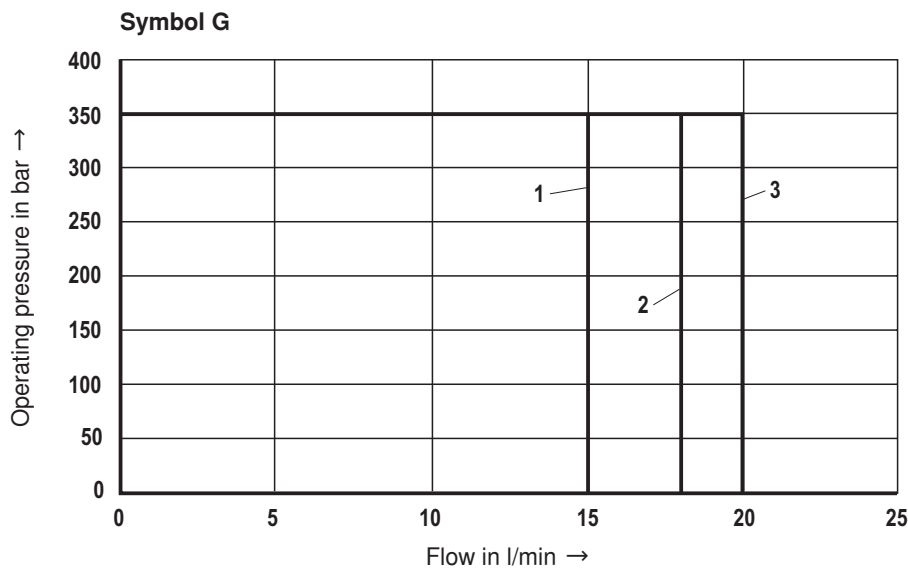
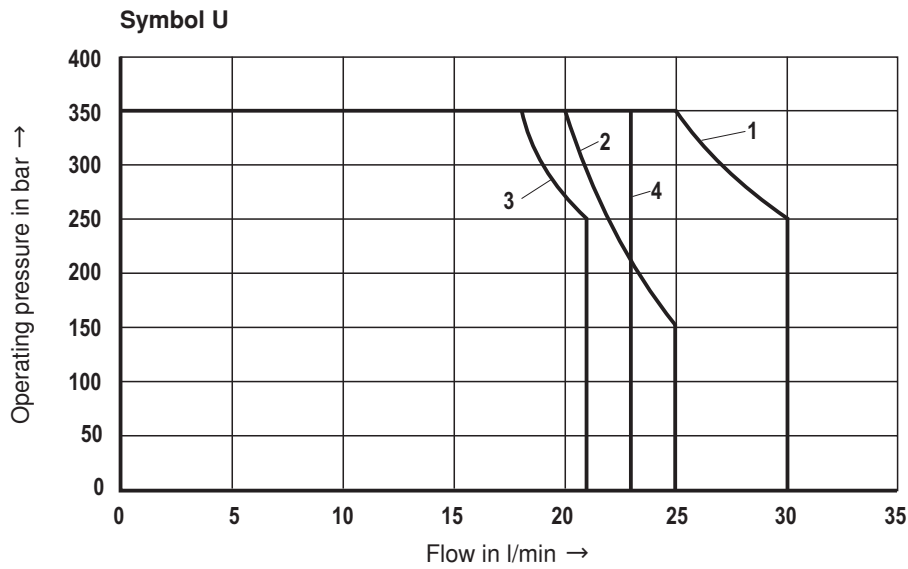
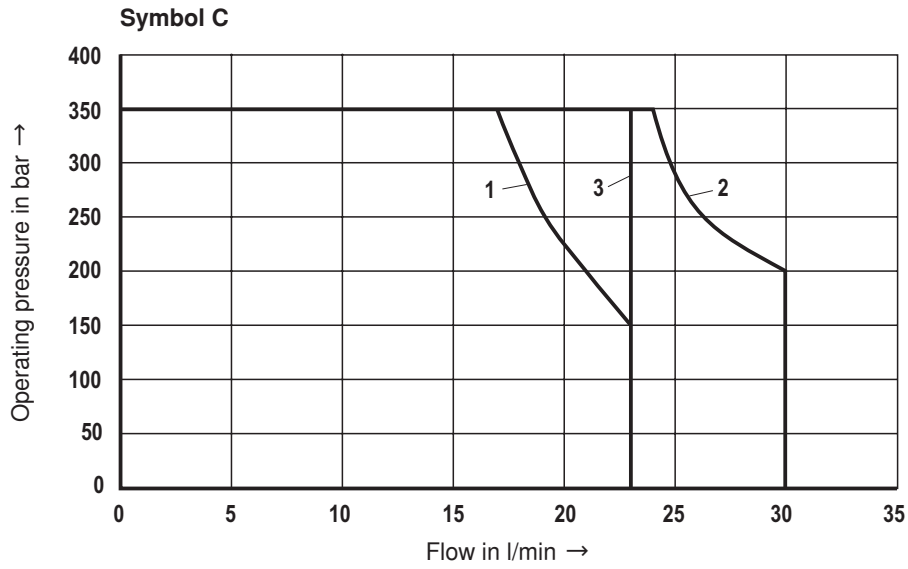
$\Delta p$ - $q_v$  characteristic curves – symbol G



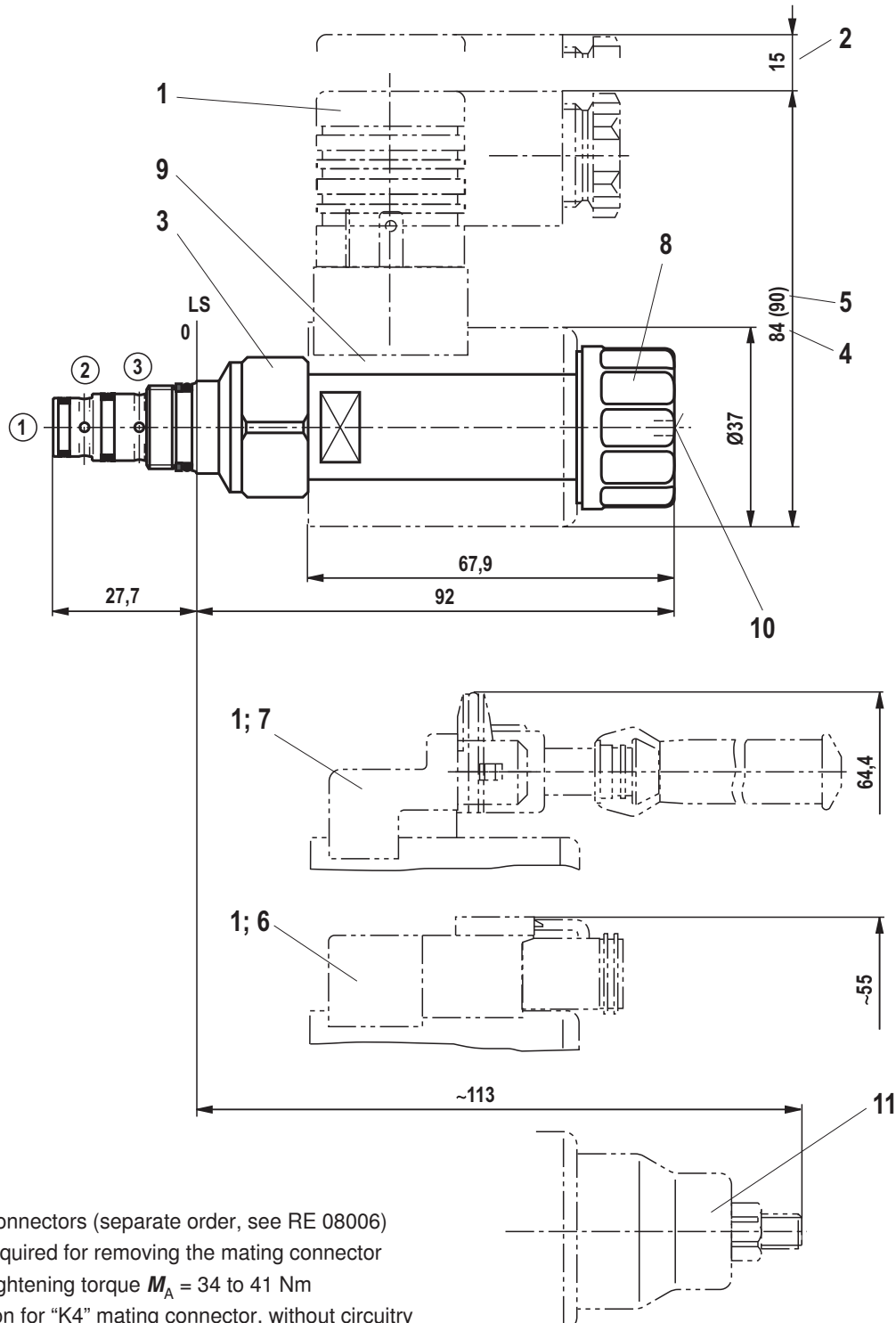
1	1 → 2 3 → 1
2	1 → 3 2 → 1



**Performance limits** (measured with HLP46,  $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$  and 24 V coil)



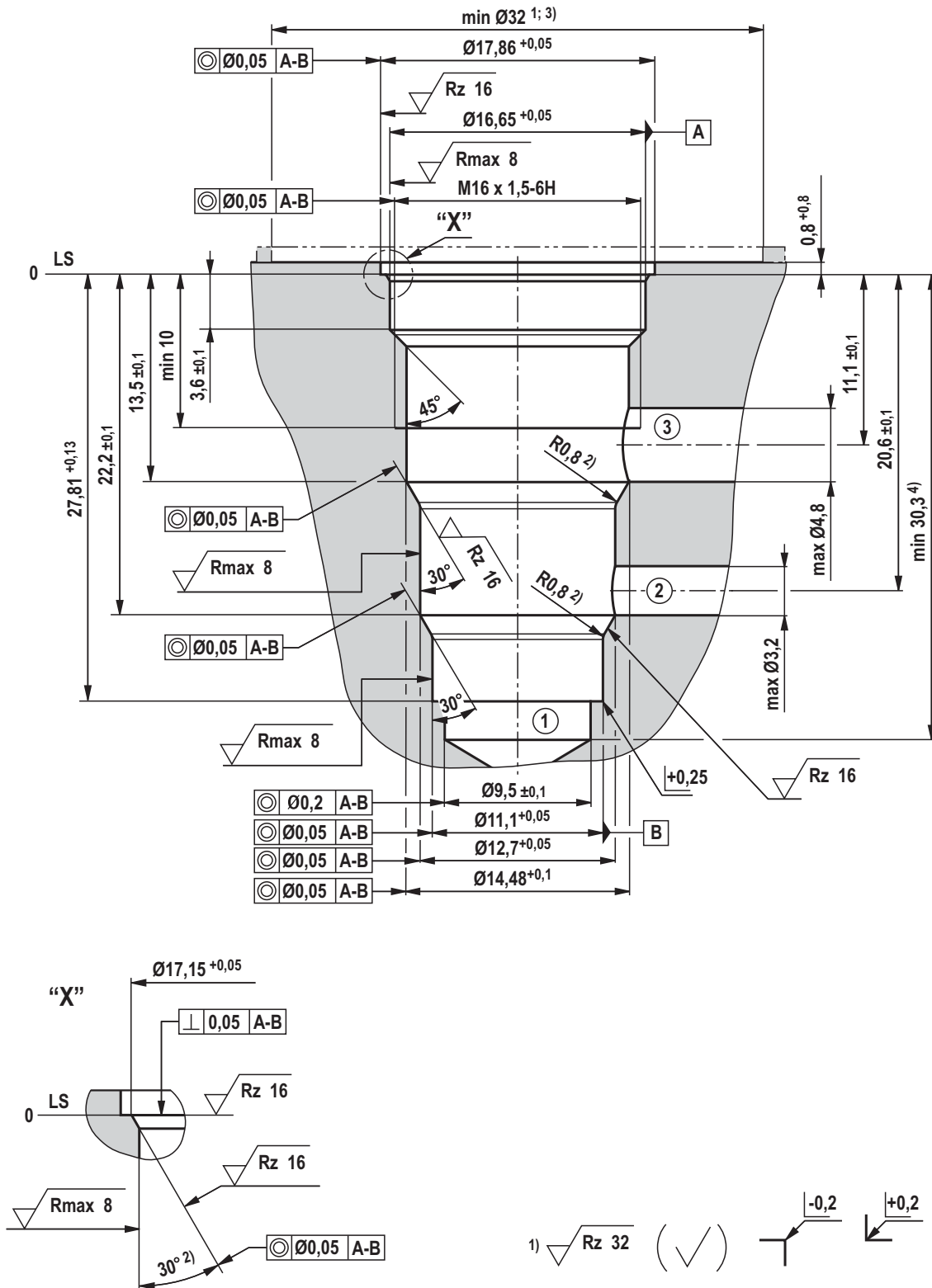
**Unit dimensions** (dimensions in mm)



- 1 Mating connectors (separate order, see RE 08006)
- 2 Space required for removing the mating connector
- 3 SW24, tightening torque  $M_A = 34$  to  $41$  Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension ( ) for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque  $M_A = 5^{+1}$  Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N10" (separate order, see page 2)

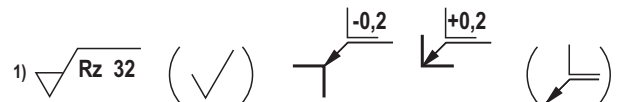
- ① = Main port 1
- ② = Main port 2
- ③ = Main port 3
- LS = Location shoulder

**Mounting cavity R/T-9A; 3 main ports; thread M1 x 1.5 (dimensions in mm)**



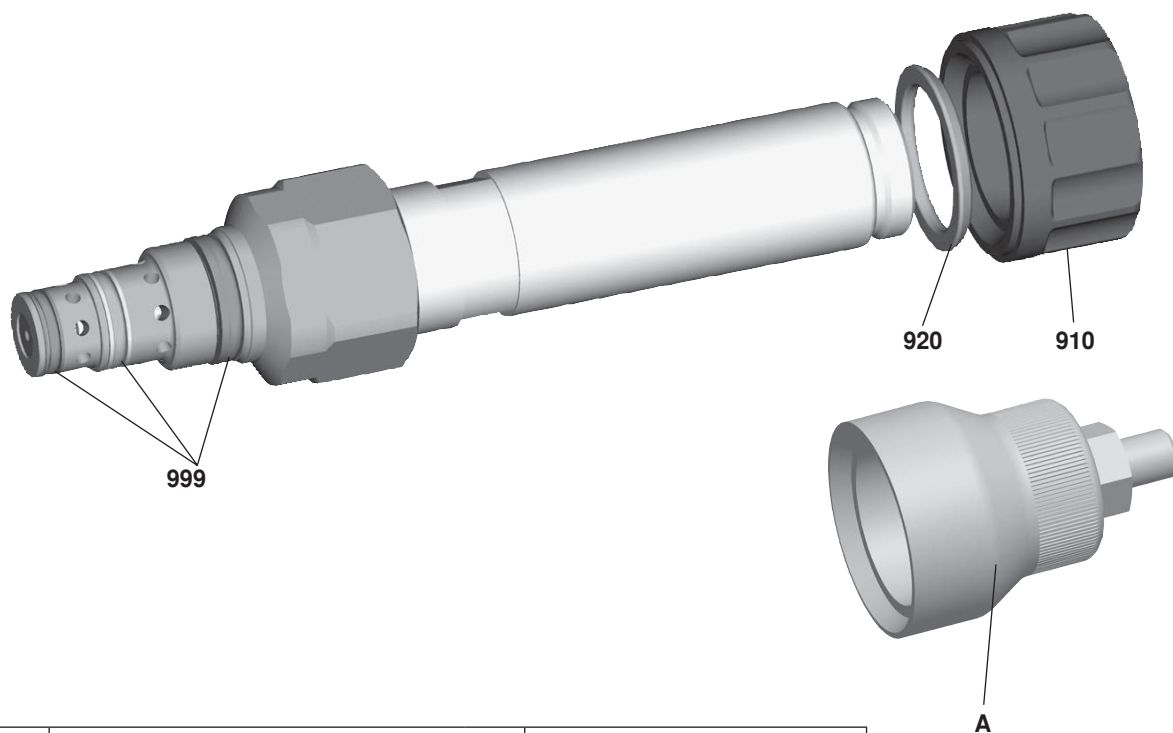
- 1) Differing from T-9A
- 2) All seal ring in section faces are rounded and free of burrs
- 3) with counterbore
- 4) Depth for moving parts

- ① = Main port 1
- ② = Main port 2
- ③ = Main port 3
- LS = Location shoulder
- Tolerance for all angles ±0.5°



## Available individual components

---



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve	R961003414
A	Manual override "N10" <sup>1)</sup>	R901051231

Coils, separate order, see page 2

<sup>1)</sup> Only with ordering code "N9", see page 2

# 2/2 directional spool valve direct operated with solenoid actuation

**Type KKDE** (high-performance)

Component size 1  
Component series A  
Maximum operating pressure 350 bar  
Maximum flow 55 l/min



H6851

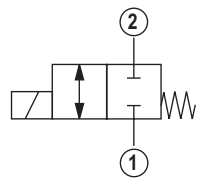
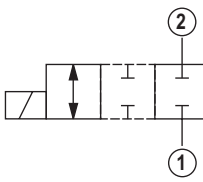
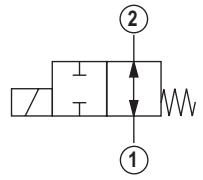
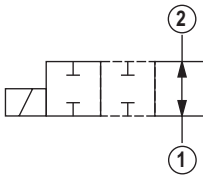
## Table of contents

Content	Page
Features	1
Ordering code	2
Valve types	2
Available spools	2
Function, section, symbols	3
Technical data	4
Voltage tolerance against ambient temperature	5
Characteristic curves	6
Performance limits	7
Unit dimensions	8
Mounting cavity	9
Available individual components	10

## Features

- Mounting cavity R/T-13A
- Direct operated directional spool valve with solenoid actuation
- Free-flowing in both directions
- Very low flow resistance values
- Positive overlap helps to avoid switching shocks
- Wet-pin DC solenoids
- Rotatable solenoid coil
- With concealed manual override

### Ordering code (Valve without coil) <sup>1)</sup>

	<b>KKDE</b>	<b>R</b>	<b>1</b>		<b>A / H</b>		<b>V</b>	<b>*</b>	
Directional spool valve, direct operated, electrically operated	Further details in the plain text								
Maximum operating pressure 350 bar	<b>= R</b>								
Component size	<b>= 1</b>								
2 main ports									
<b>Symbols</b>									<b>= N</b>
									<b>= P</b>

**V =** Seal material  
 FKM seals (other seals upon request)  
 Attention! Observe compatibility of seals with hydraulic fluid used!

**N0 =** without manual override  
**N9 =** with concealed manual override <sup>4)</sup>

**H =** High-performance and mounting cavity R/T-13A (see page 9)

**A =** Component series

### Valve types (without coil) <sup>1)</sup>

Spool variant	without manual override "N0"		with concealed manual override "N9"	
	Type	Material no.	Type	Material no.
<b>N</b>	KKDER1NA/HN0V	R901069995	KKDER1NA/HN9V	R901069997
<b>P</b>	KKDER1PA/HN0V	R901069996	KKDER1PA/HN9V	R901070000

### Available coils (separate order) <sup>1)</sup>

	Material no. for coil with connector <sup>2)</sup>		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make. Deutsch	"C4" 02pol C4/Z30 AMP Junior Timer
Direct voltage DC <sup>3)</sup>			
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

<sup>1)</sup> Complete valves with mounted coil upon request

<sup>2)</sup> Mating connectors (separate order), see RE 08006

<sup>3)</sup> Other voltages upon request

<sup>4)</sup> Screwable manual override "N10" possible  
 (Material no. **R901051231**, separate order)

## Function, section, symbols

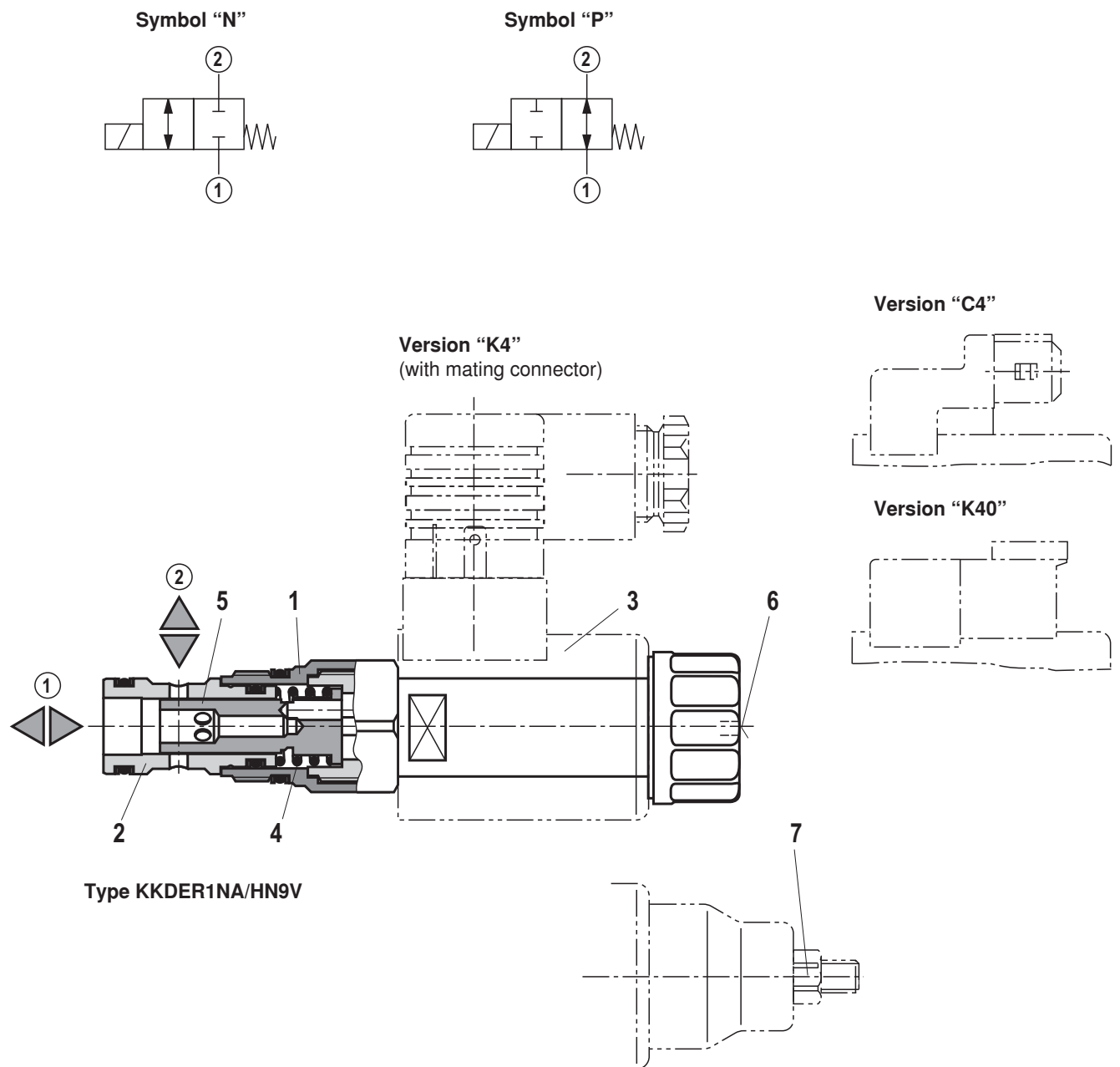
### General

The 2/2 directional spool valves are direct operated, pressure compensated valves. They control the start, stop and direction of a flow and basically comprise a housing (1) with a movably mounted socket (2), the control spool (5) and a return spring (4).

### Function

In the de-energized condition, control spool (5) is held in the initial position by the return spring (4). Control spool (5) is actuated by wet-pin DC solenoids (3). The various symbols are realized by corresponding spools (N and P). The main ports ① and ② are suitable for a continuous load with an operating pressure of 350 bar and the flow can be directed into both directions (see symbols).

The manual override (6) allows for the switching of the valve without solenoid energization. It is also available in screwable version "N10" (7) (see page 2).



**Technical data** (For applications outside these parameters, please consult us!)**general**

Weight	- Valve	kg	0.30
	- Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	-40 to +110

**hydraulic**

Maximum operating pressure	bar	350 (at all ports)
Maximum flow	l/min	55
Hydraulic fluid	Mineral oil (HL, HLP) according to DIN 51524; quickly biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request	
Hydraulic fluid temperature range	°C	-40 to +80
Viscosity range	mm <sup>2</sup> /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)	Class 20/18/15 <sup>1)</sup>	
Load cycles	10 million (at 350 bar)	

**electrical**

Voltage type	Direct voltage	
Supply voltage <sup>2)</sup>	V	12 DC; 24 DC
Voltage tolerance against ambient temperature	See characteristic curve page 5	
Power consumption	W	22
Duty cycle	%	See characteristic curve page 5
Maximum coil temperature <sup>3)</sup>	°C	150
Switching time according to ISO 6403 (solenoid horizontal)	- ON	ms ≤ 80
	- OFF	ms ≤ 50
Maximum switching frequency	cy/h	15000
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"	IP 65 with mating connector mounted and locked
	- Version "C4"	IP 66 with mating connector mounted and locked
		IP 69K with Rexroth mating connector (Material no. R901022127)
	- Version "K40"	IP 69K with mating connector mounted and locked

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

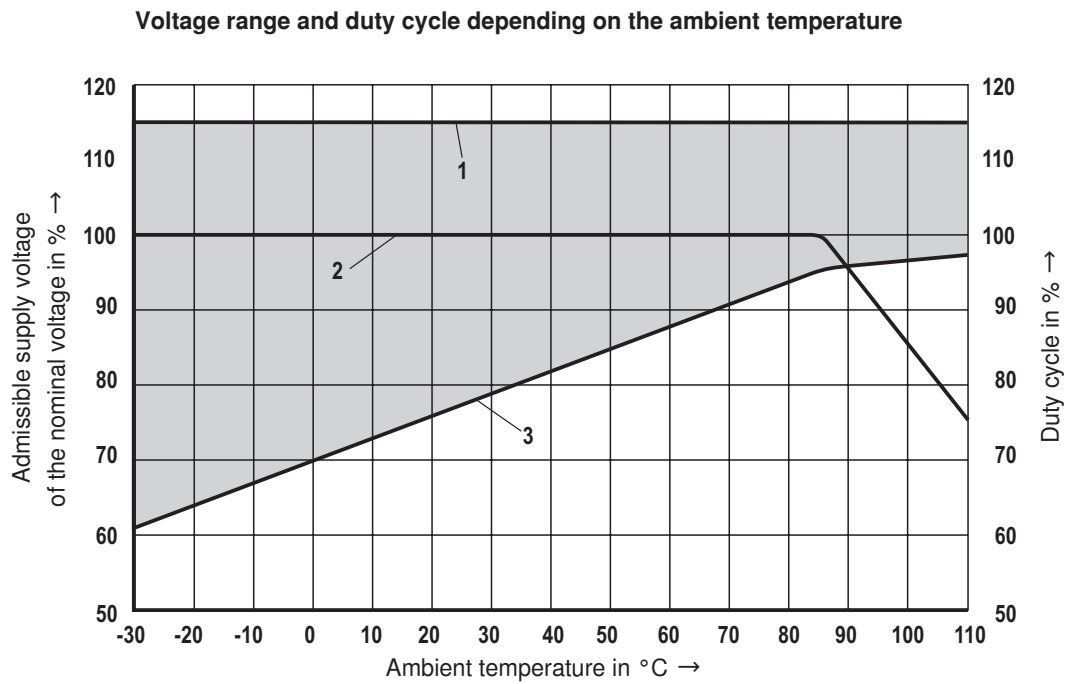
<sup>2)</sup> Other voltages upon request

<sup>3)</sup> Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

**At the electrical connection "K4", the protective earthing conductor (PE  $\frac{1}{2}$ ) has to be connected properly.**



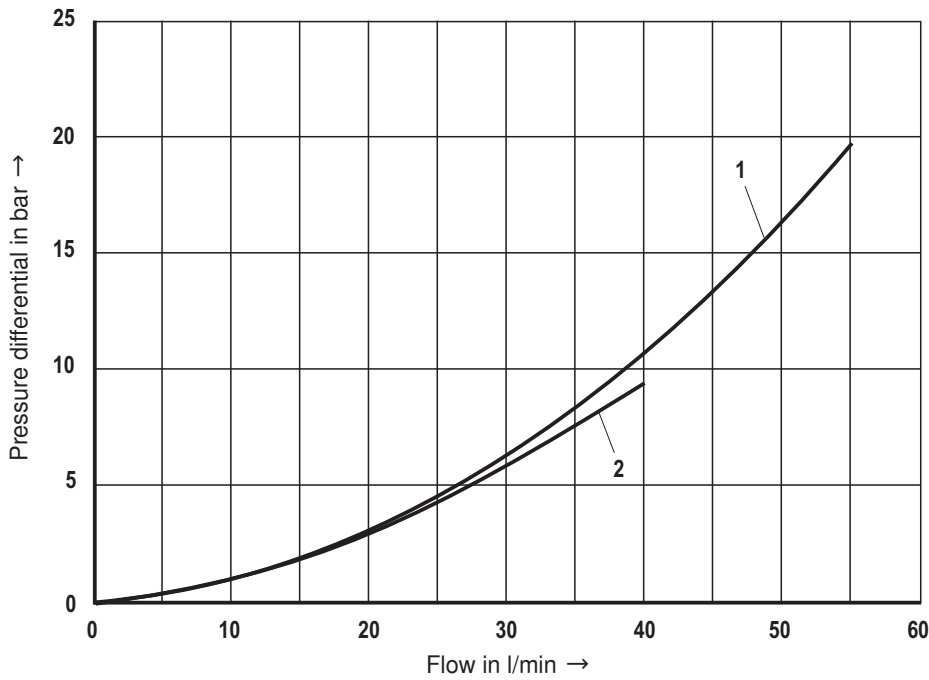
## Voltage tolerance against ambient temperature; duty cycle



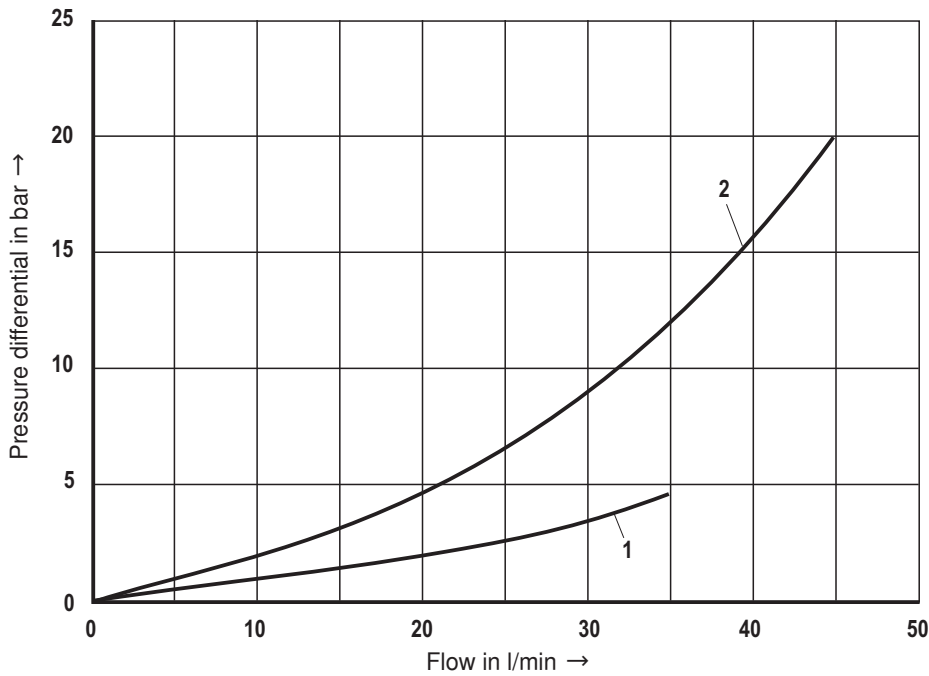
- 1 Maximum voltage
- 2 Duty cycle
- 3 Minimum response voltage
- Admissible supply voltage range

**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$  and 24 V coil)

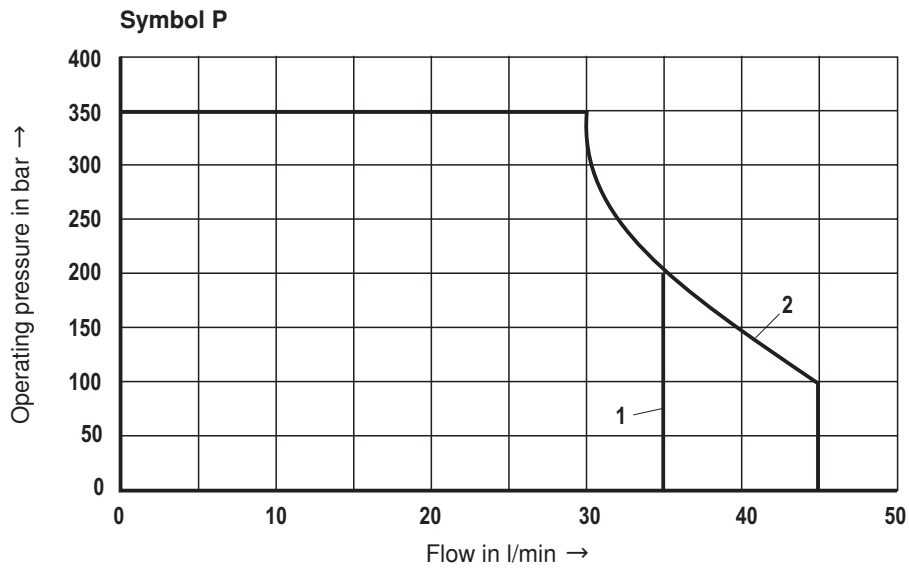
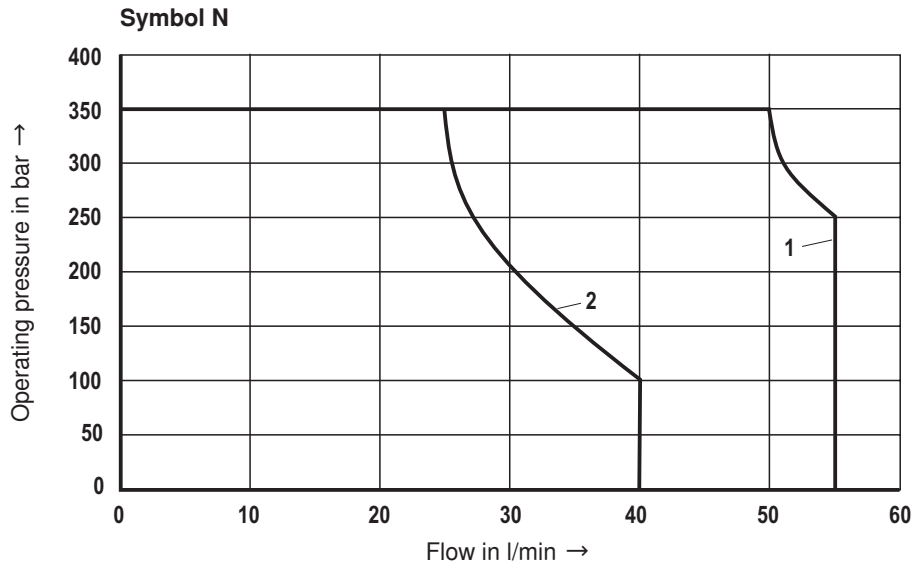
$\Delta p$ - $q_v$  characteristic curves – symbol N



$\Delta p$ - $q_v$  characteristic curves – symbol P



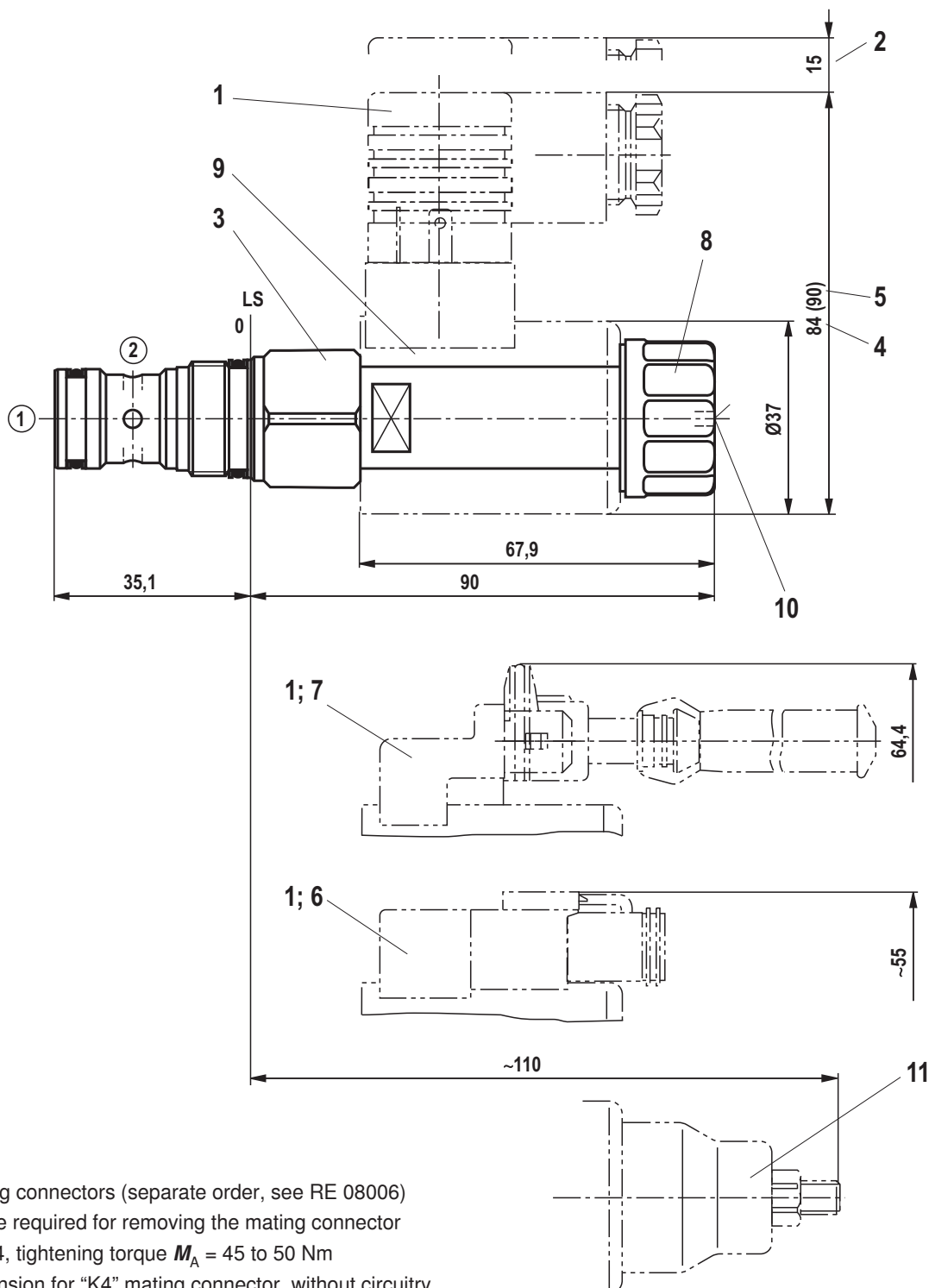
**Performance limits** (measured with HLP46,  $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$  and 24 V coil)



**Attention!**

The performance limits were determined when the solenoids were at operating temperature and at 10% undervoltage.

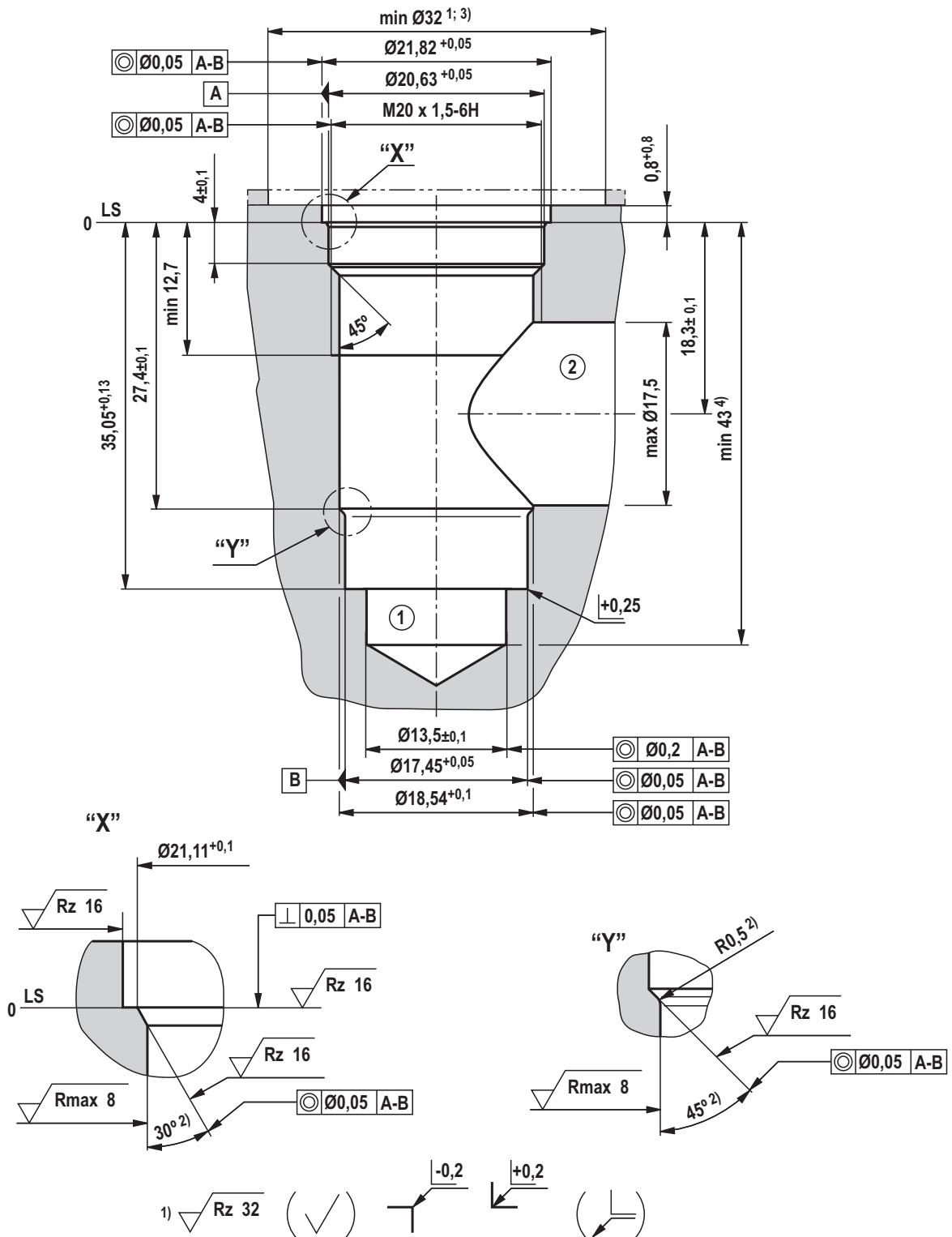
### Unit dimensions (dimensions in mm)



- 1 Mating connectors (separate order, see RE 08006)
- 2 Space required for removing the mating connector
- 3 SW24, tightening torque  $M_A = 45$  to  $50$  Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension ( ) for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque  $M_A = 5^{+1}$  Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N10" (separate order, see page 2)

① = Main port 1  
 ② = Main port 2  
 LS = Location shoulder

### Mounting cavity R/T-13A; 2 main ports; thread M20 x 1.5 (dimensions in mm)



1) Differing from T-13A

2) All seal ring in section faces are rounded and free of burrs

3) with counterbore

4) Depth for moving parts

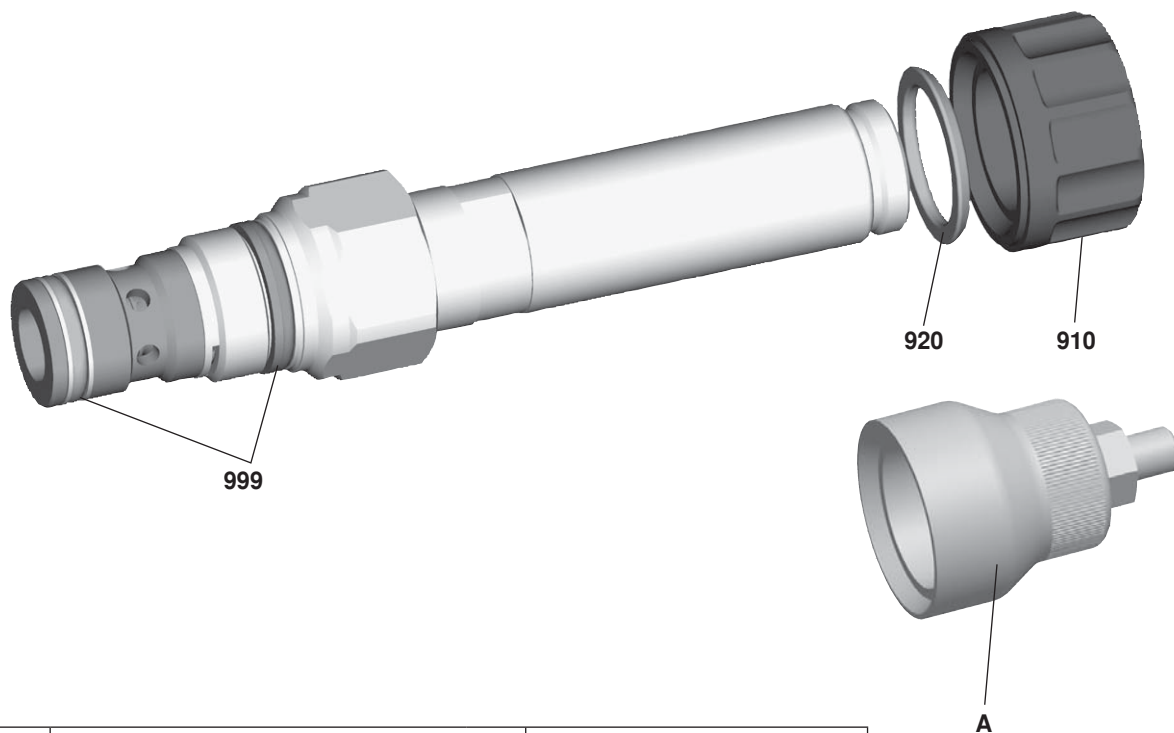
① = Main port 1

① = Main port 2

LS = Location Shoulder

Tolerance for all angles  $\pm 0,5^\circ$

## Available individual components



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve	R961003236
A	Manual override "N10" <sup>1)</sup>	R901051231

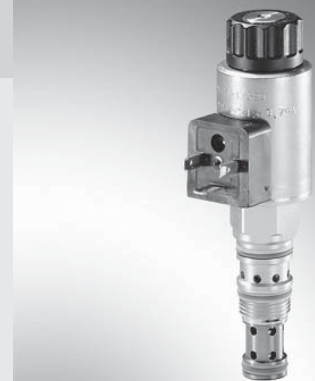
Coils, separate order, see page 2

<sup>1)</sup> Only with ordering code "N9", see page 2

# 3/2 directional spool valve, direct operated with solenoid actuation

**Type KKDE** (high-performance)

Size 1  
Component series A  
Maximum operating pressure 350 bar  
Maximum flow 60 l/min



H6810

## Table of contents

Contents	Page
Features	1
Ordering code	2
Valve types	2
Available coils	2
Function, section, symbols	3
Technical data	4, 5
Voltage tolerance against ambient temperature	5
Characteristic curves	6
Performance limits	7
Unit dimensions	8
Mounting cavity	9
Available individual components	10

## Features

- Direct operated directional spool valve with solenoid actuation
- Mounting cavity R/T-11A
- Free-flowing in both directions
- Wet-pin DC solenoids
- Rotatable solenoid coil
- with concealed manual override

### Ordering code (valve without coil) <sup>1)</sup>

	<b>KKDE</b>	<b>R</b>	<b>1</b>	<b>A / H</b>	<b>V</b>	<b>*</b>
Directional spool valve, direct operated, electrically operated						Further details in the plain text
Maximum operating pressure 350 bar	= R					<b>V =</b>
Size	= 1					<b>Seal material</b> FKM seals (Other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!
3 main ports						<b>N0 = Without manual override</b> <b>N9 = With concealed manual override <sup>5)</sup></b>
Symbols <sup>2)</sup>						= C
						= U
						<b>H = High-performance and mounting cavity R/T-11A (see page 9)</b> <b>A = Component series</b>

### Valve types (without coil) <sup>1)</sup>

Spool symbol	without manual override "N0"		with concealed manual override "N9"	
	Type	Material no.	Type	Material no.
<b>C</b>	KKDER1CA/HN0V	R901070094	KKDER1CA/HN9V	R901070103
<b>U</b>	KKDER1UA/HN0V	R901070099	KKDER1UA/HN9V	R901070105

### Available coils (separate order) <sup>1)</sup>

	Material no. for coil with connector <sup>3)</sup>		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make Deutsch	"C4" 02pol C4/Z30 AMP Junior Timer
Direct voltage DC <sup>4)</sup>			
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

<sup>1)</sup> Complete valves with mounted coil upon request

<sup>2)</sup> With transition function during the switching process

<sup>3)</sup> Mating connectors, separate order, see data sheet 08006

<sup>4)</sup> Other voltages upon request

<sup>5)</sup> Screwable manual override "N10" possible  
(Material no. **R901051231**, separate order)



## Function, section, symbols

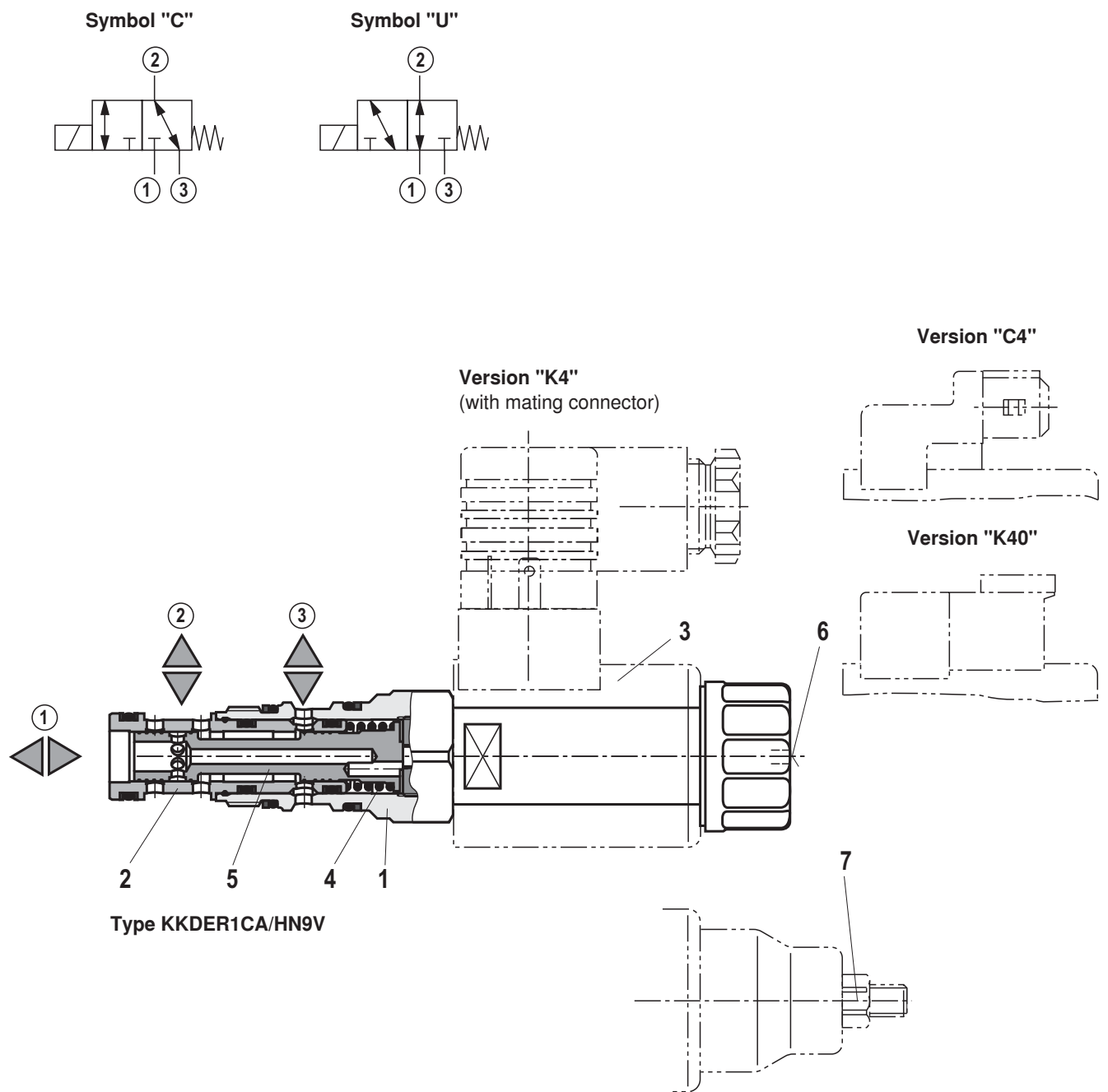
### General

The 3/2 directional spool valves are direct operated, pressure-compensated cartridge valves. They control the start, stop and direction of a flow and basically comprise a housing (1) with a movably mounted socket (2), the control spool (5) and a return spring (4).

### Function

In the de-energized condition, the control spool (5) is held in the initial position by the return spring (4). The control spool (5) is actuated by wet-pin DC solenoids (3). The symbols are realized by different spools (C or U). The main ports ①, ②, and ③ are suitable for a continuous load with an operating pressure of 350 bar and the flow can be directed into both directions (see symbols).

The manual override (6) allows for the switching of the valve without solenoid energization. It is also available in screwable version "N10" (7) (see page 2).



5


**Technical data** (For applications outside these parameters, please consult us!)**general**

Weight	– Valve	kg	0.3
	– Coil	kg	0.25
Installation position			Any
Ambient temperature range		°C	–40 to +110

**hydraulic**

Maximum operating pressure	bar	350 (at all ports)
Maximum flow	l/min	60
Hydraulic fluid		See table below
Hydraulic fluid temperature range	°C	–40 to +80
Viscosity range	mm <sup>2</sup> /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)		Class 20/18/15 <sup>1)</sup>
Load cycles		10 million (at 350 bar )

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils and related hydrocarbons	HL, HLP, HLPD, HVLP, HVLPD	FKM	DIN 51524
Environmentally compatible	– Insoluble in water HEES	FKM	ISO 15380
	HEPR	FKM	
	– Soluble in water HEPG	FKM	ISO 15380
Flame-resistant	– Water-free HFDU, HFDR	FKM	ISO 12922
	– Water-containing HFAS	FKM	ISO 12922

-  **Important information on hydraulic fluids!**
- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
  - There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
  - The flash point of the process and operating medium used must be 40 K higher than the maximum solenoid surface temperature.
  - **Flame-resistant – water-containing:** Maximum pressure differential per control edge 175 bar, otherwise, increased cavitation erosion!  
Tank pre-loading < 1 bar or > 20 % of the pressure differential. The pressure peaks should not exceed the maximum operating pressures!
  - **Environmentally compatible:** When using environmentally compatible hydraulic fluids that are simultaneously zinc-soluble, zinc may accumulate in the medium (700 mg zinc per pole tube).

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of the filters see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

## Technical data (For applications outside these parameters, please consult us!)

### electric

Voltage type		Direct voltage
Supply voltage <sup>2)</sup>	V	12 DC; 24 DC
Voltage tolerance against ambient temperature		See characteristic curve below
Power consumption	W	22
Duty cycle	%	See characteristic curve below
Maximum coil temperature <sup>3)</sup>	°C	150
Switching time according to ISO 6403 (solenoid horizontal)	- ON	ms ≤ 80
	- OFF	ms ≤ 50
Maximum switching frequency	cy/h	15000
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"	IP 65 with mating connector mounted and locked
	- Version "C4"	IP 66 with mating connector mounted and locked
		IP 69K with Rexroth mating connector (Material no. R901022127)
	- Version "K40"	IP 69K with mating connector mounted and locked

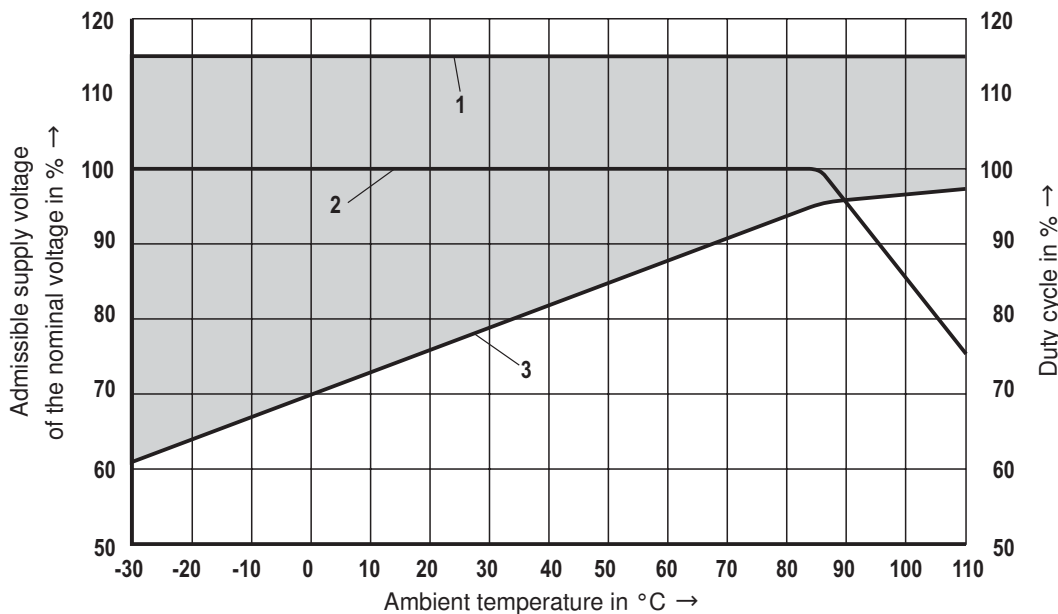
<sup>2)</sup> Other voltages upon request

<sup>3)</sup> Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

**At the electrical connection "K4", the protective earthing conductor (PE  $\frac{1}{2}$ ) has to be connected properly.**

## Voltage tolerance against ambient temperature; duty cycle

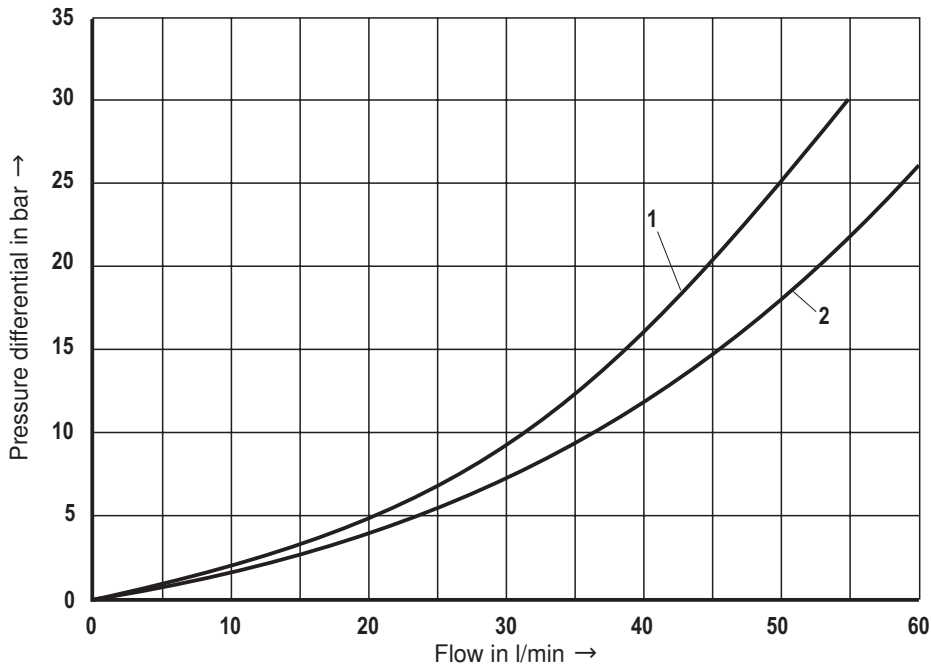
Voltage range and duty cycle depending on the ambient temperature



- 1 Maximum voltage
- 2 Duty cycle
- 3 Minimum response voltage
- Admissible supply voltage range

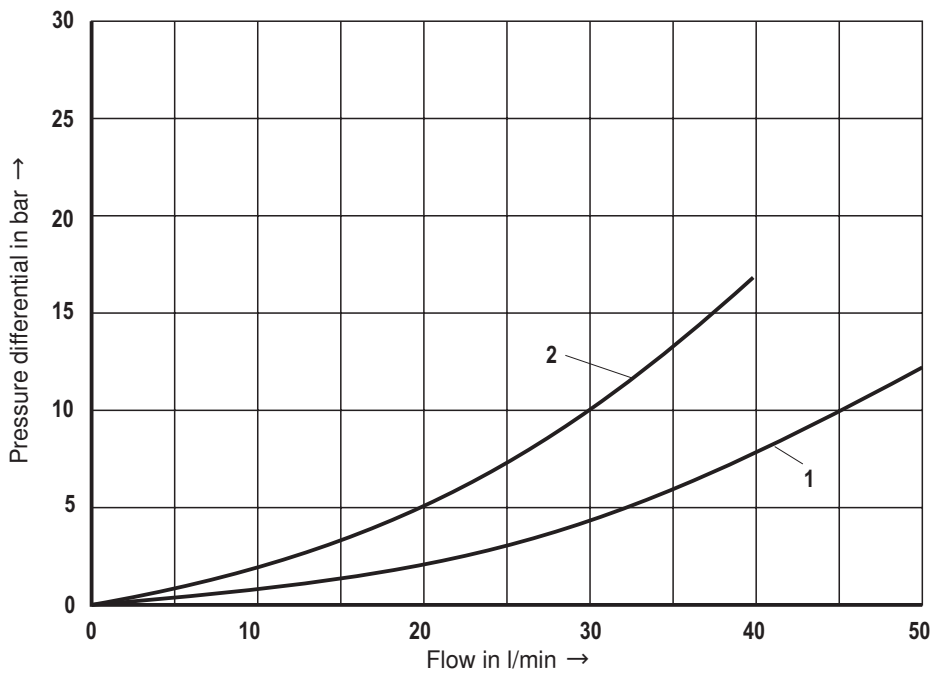
**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$  and 24 V coil)

$\Delta p$ - $q_v$  characteristic curves – symbol C



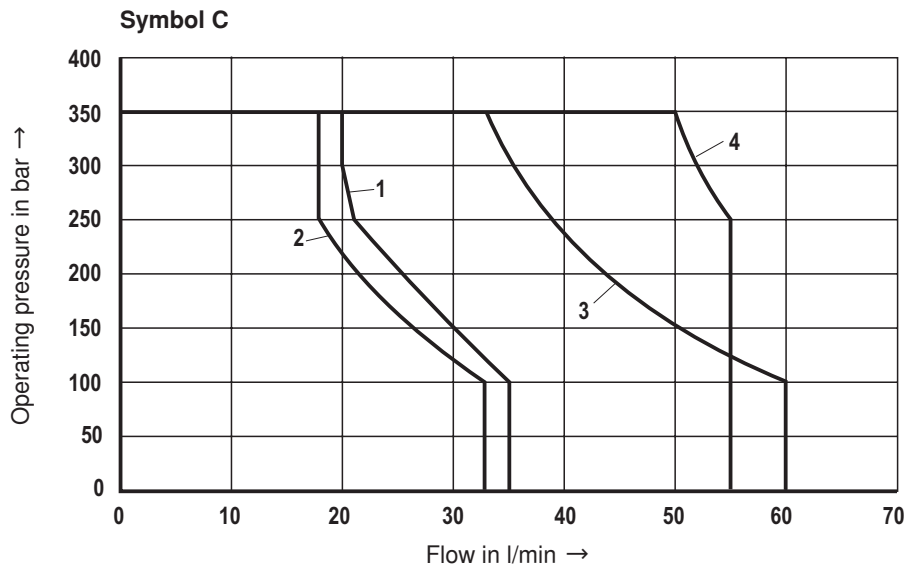
<b>1</b>	① → ②
	② → ①
<b>2</b>	③ → ②
	② → ③

$\Delta p$ - $q_v$  characteristic curves – symbol U



<b>1</b>	① → ②
	② → ①
<b>2</b>	③ → ②
	② → ③

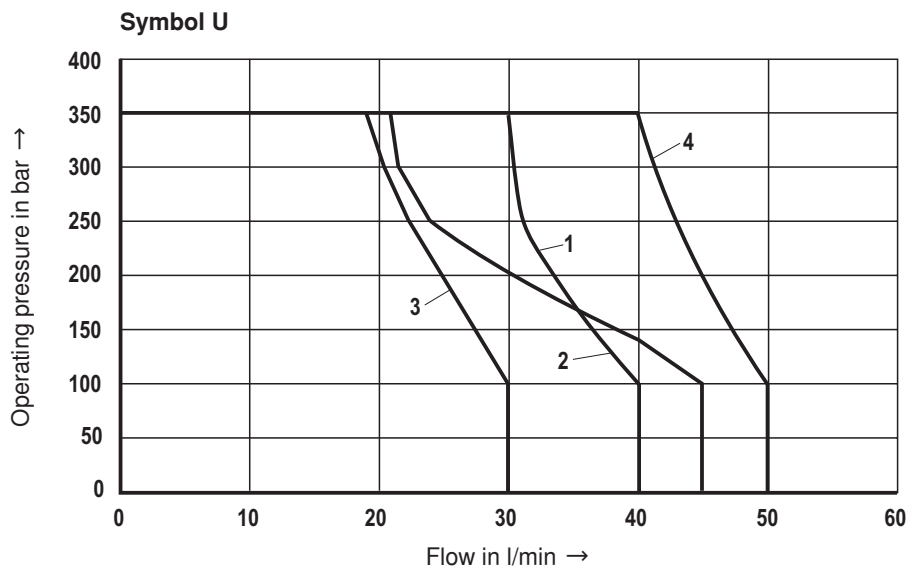
**Performance limits** (measured with HLP46,  $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)



**Attention!**

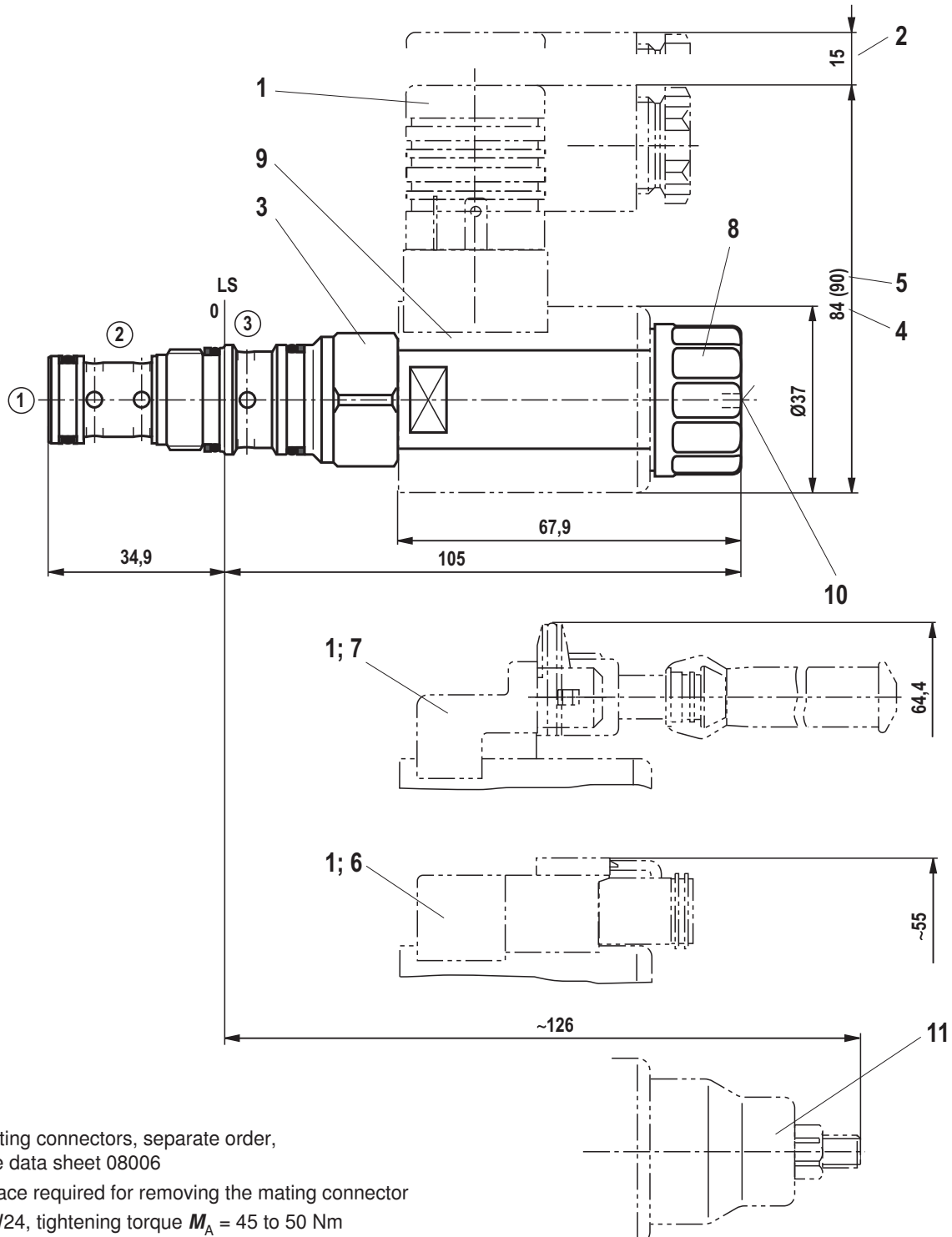
The performance limits were determined when the solenoids were at operating temperature and at 10 % undervoltage.

1	① → ②
2	② → ③
3	③ → ②
4	② → ①



1	① → ②
2	② → ③
3	③ → ②
4	② → ①

## Unit dimensions (dimensions in mm)



- 1 Mating connectors, separate order, see data sheet 08006
- 2 Space required for removing the mating connector
- 3 SW24, tightening torque  $M_A = 45$  to  $50$  Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension ( ) for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque  $M_A = 5^{+1}$  Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N10" (separate order, see page 2)

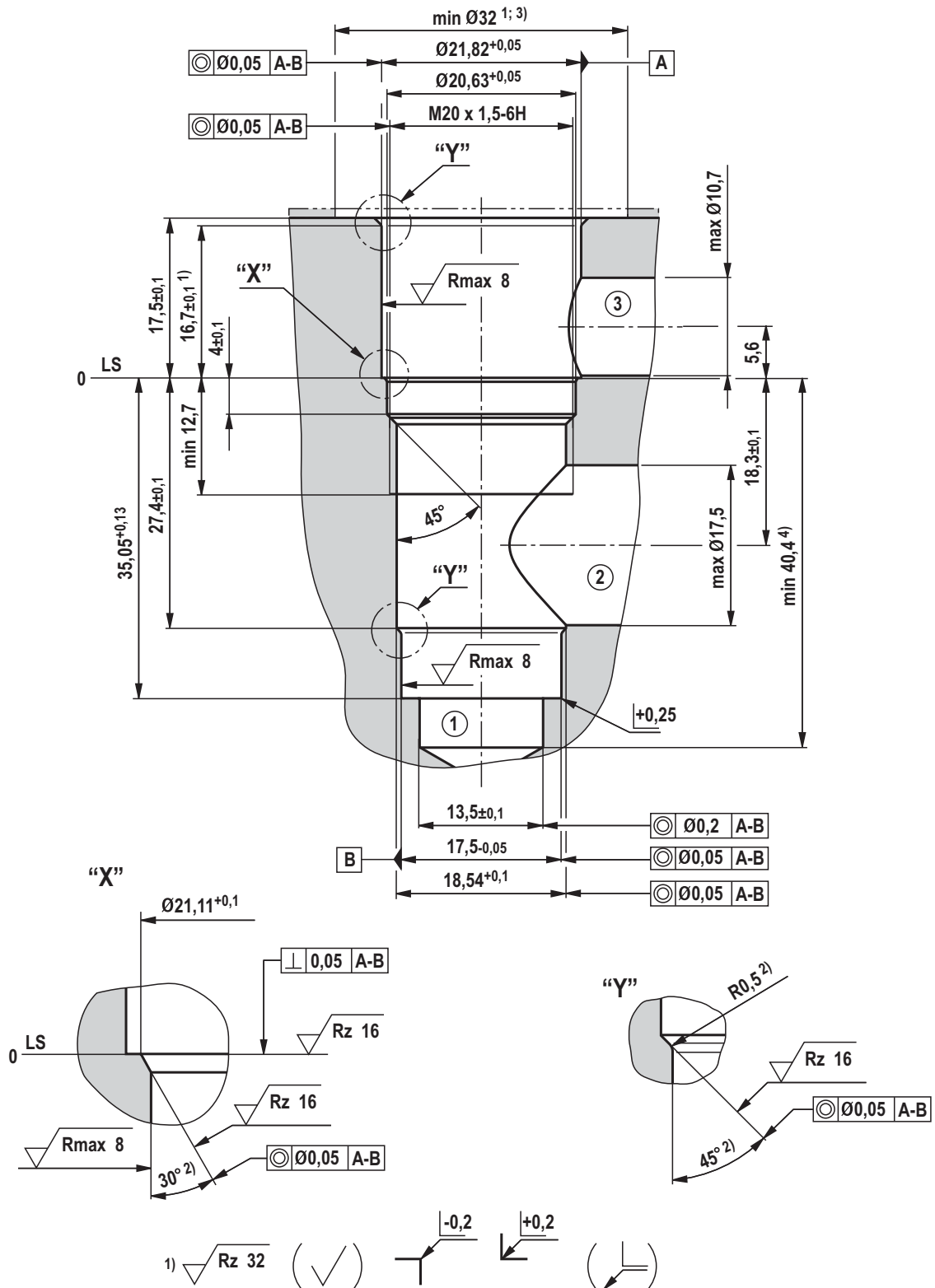
① = Main port 1

② = Main port 2

③ = Main port 3

LS = Location shoulder

**Mounting cavity R/T-11A; 3 main ports; thread M20 x 1.5 (dimensions in mm)**



1) Differing from T-11A

2) All seal ring insertion faces are rounded and free of burrs

3) With counterbore

4) Depth for moving parts

① = Main port 1

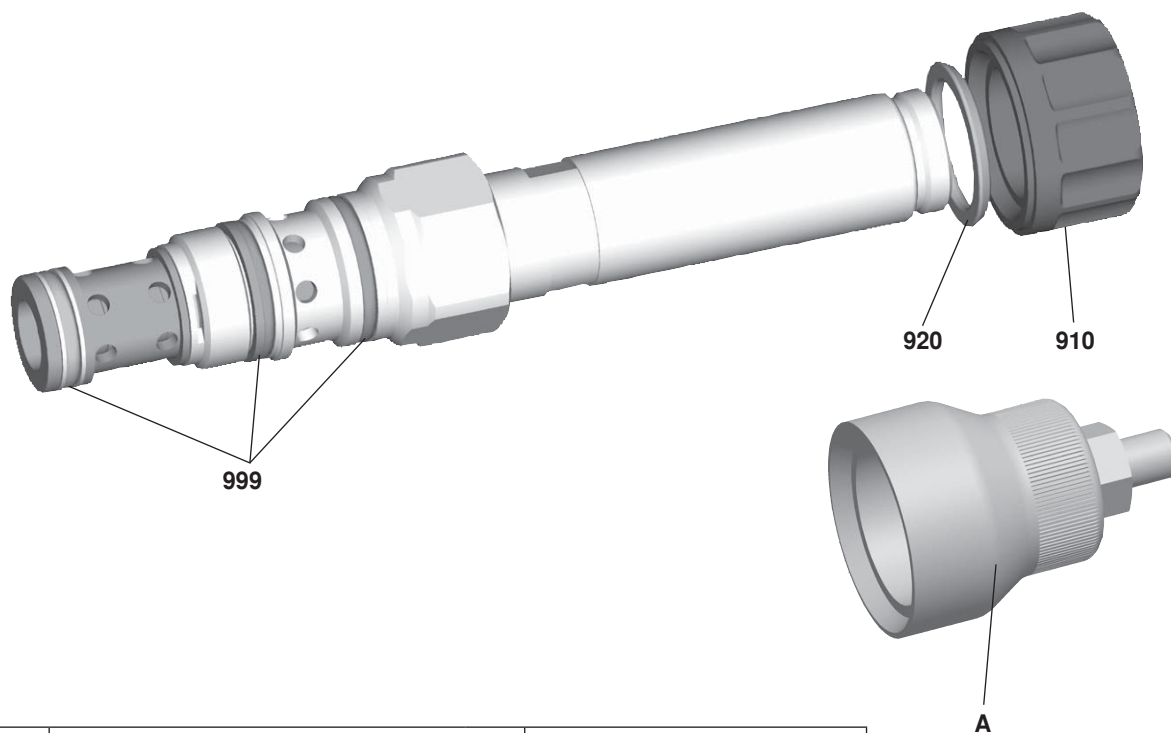
② = Main port 2

③ = Main port 3

LS = Location shoulder

Tolerance for all angles  $\pm 0.5^\circ$

## Available individual components



Item	Denomination	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve	R961003235
A	Manual override "N10" <sup>1)</sup>	R901051231

Coils, separate order, see page 2

<sup>1)</sup> Only with ordering code "N9", see page 2



# 4/2 directional spool valve direct operated with solenoid actuation

**Type KKDE** (high-performance)

Component size 1  
Component series A  
Maximum operating pressure 350 bar  
Maximum flow 40 l/min



H6812

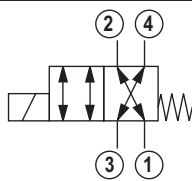
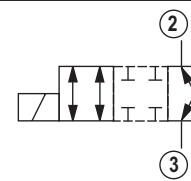
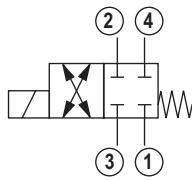
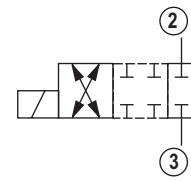
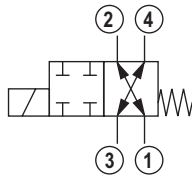
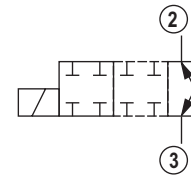
## Table of contents

Content	Page
Features	1
Ordering code	2
Valve types	2
Available spools	2
Function, section, symbols	3
Technical data	4
Voltage tolerance against ambient temperature	5
Characteristic curves	5, 6
Performance limits	7
Unit dimensions	8
Mounting cavity	9
Available individual components	10

## Features

- Mounting cavity R/T-31A
- Direct operated directional spool valve with solenoid actuation
- Free-flowing in both directions
- Wet-pin DC solenoids
- Rotatable solenoid coil
- With concealed manual override

### Ordering code (Valve without coil) <sup>1)</sup>

	<b>KKDE</b>	<b>R</b>	<b>1</b>		<b>A / H</b>		<b>V</b>	<b>*</b>	
Directional spool valve, direct operated, electrically operated	Further details in the plain text								
Maximum operating pressure 350 bar	<b>= R</b>								
Component size	<b>= 1</b>								
4 main ports									
<b>Symbols</b>			<b>= D</b>						
			<b>= E</b>						
			<b>= F</b>						
	<b>V =</b>								<b>Seal material</b> FKM seals (other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!
	<b>N0 =</b>								<b>without</b> manual override
	<b>N9 =</b>								<b>with</b> concealed manual override <sup>4)</sup>
<b>H =</b>								High-performance and mounting cavity R/T-31A (see page 9)	
<b>A =</b>								Component series	

### Valve types (without coil) <sup>1)</sup>

Spool symbol	without manual override "N0"		with concealed manual override "N9"	
	Type	Material no.	Type	Material no.
<b>D</b>	KKDER1DA/HN0V	R901070118	KKDER1DA/HN9V	R901070125
<b>E</b>	KKDER1EA/HN0V	R901070123	KKDER1EA/HN9V	R901070127
<b>F</b>	KKDER1FA/HN0V	R901070124	KKDER1FA/HN9V	R901070129

### Available coils (separate order) <sup>1)</sup>

	Material no. for coil with connector <sup>2)</sup>		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make. Deutsch	"C4" 02pol C4/Z30 AMP Junior Timer
Direct voltage DC <sup>3)</sup>			
12 V	R900991678	R900729189	R900315818
24 V	R900991121	R900729190	R900315819

<sup>1)</sup> Complete valves with mounted coil upon request

<sup>2)</sup> Mating connectors (separate order), see RE 08006

<sup>3)</sup> Other voltages upon request

<sup>4)</sup> Screwable manual override "N10" possible  
(Material no. **R901051231**, separate order)

## Function, section, symbols

### General

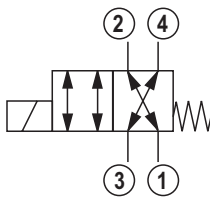
The 4/2 directional spool valves are direct operated, pressure compensated cartridge valves. They control the start, stop and direction of a flow and basically comprise a housing (1) with a movably mounted socket (2), the control spool (5) and a return spring (4).

### Function

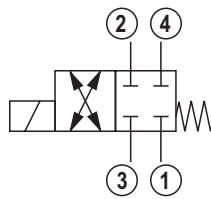
In the de-energized condition, control spool (5) is held in the initial position by the return spring (4). Control spool (5) is actuated by wet-pin DC solenoids (3). The various symbols are realized by corresponding spools (D; E, and F). The main ports ①, ②, ③, and ④ are suitable for a continuous load with an operating pressure of 350 bar and the flow can be directed into both directions (see symbols).

The manual override (6) allows for the switching of the valve without solenoid energization. It is also available in screwable version "N10" (7) (see page 2).

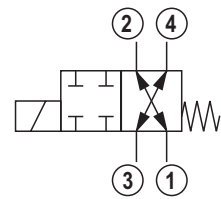
Symbol "D"



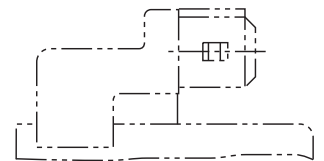
Symbol "E"



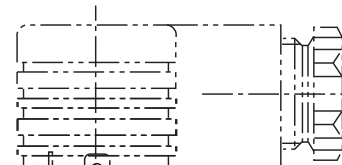
Symbol "F"



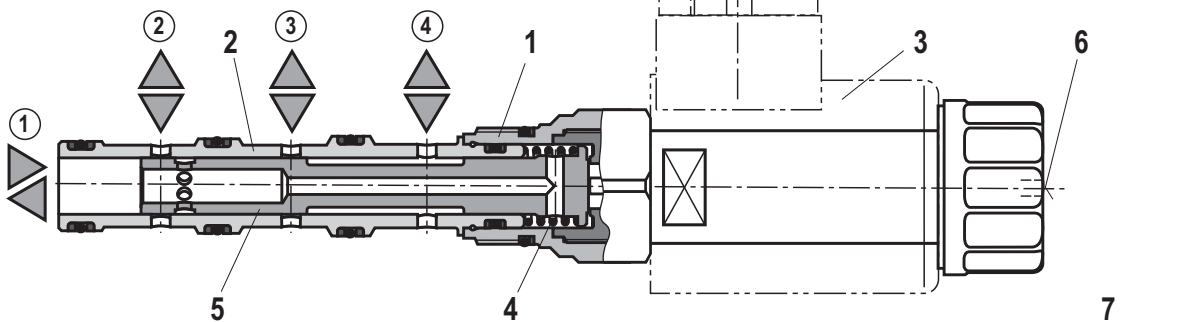
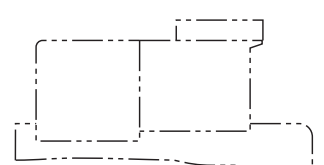
Version "C4"



Version "K4"  
(with mating connector)



Version "K40"



Type KKDER1EA/HN9V

**Technical data** (For applications outside these parameters, please consult us!)**general**

Weight	- Valve	kg	0.35
	- Coil	kg	0.25
Installation position		Any	
Ambient temperature range		°C	-40 to +110

**hydraulic**

Maximum operating pressure	bar	350 (at all ports)
Maximum flow	l/min	40
Hydraulic fluid	Mineral oil (HL, HLP) according to DIN 51524; quickly biodegradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic esters); other hydraulic fluids upon request	
Hydraulic fluid temperature range	°C	-40 to +80
Viscosity range	mm <sup>2</sup> /s	4 to 500
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)	Class 20/18/15 <sup>1)</sup>	
Load cycles	10 million (at 350 bar)	

**electrical**

Voltage type	Direct voltage	
Supply voltage <sup>2)</sup>	V	12DC; 24DC
Voltage tolerance against ambient temperature	See characteristic curve page 5	
Power consumption	W	22
Duty cycle	%	See characteristic curve page 5
Maximum coil temperature <sup>3)</sup>	°C	150
Switching time according to ISO 6403 (solenoid horizontal)	- ON	ms ≤ 80
	- OFF	ms ≤ 50
Maximum switching frequency	cy/h	15000
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"	IP 65 with mating connector mounted and locked
	- Version "C4"	IP 66 with mating connector mounted and locked
	- Version "K40"	IP 69K with Rexroth mating connector (Material no. R901022127)

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

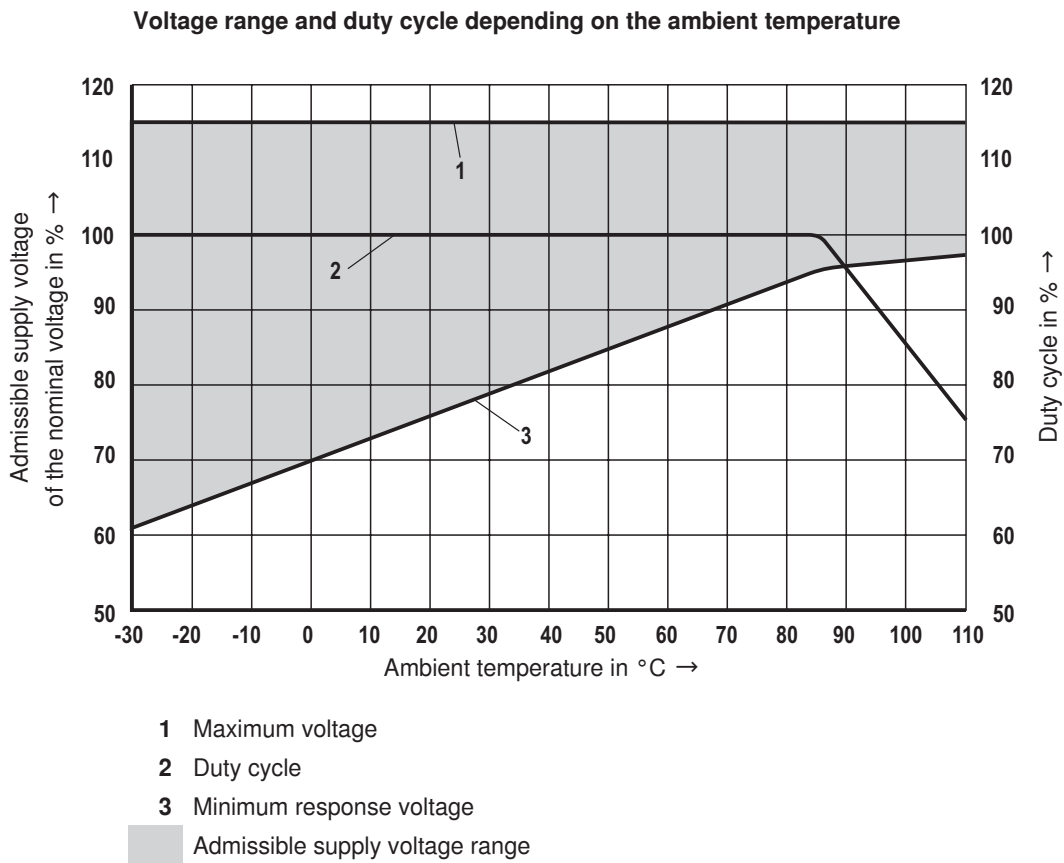
For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

<sup>2)</sup> Other voltages upon request

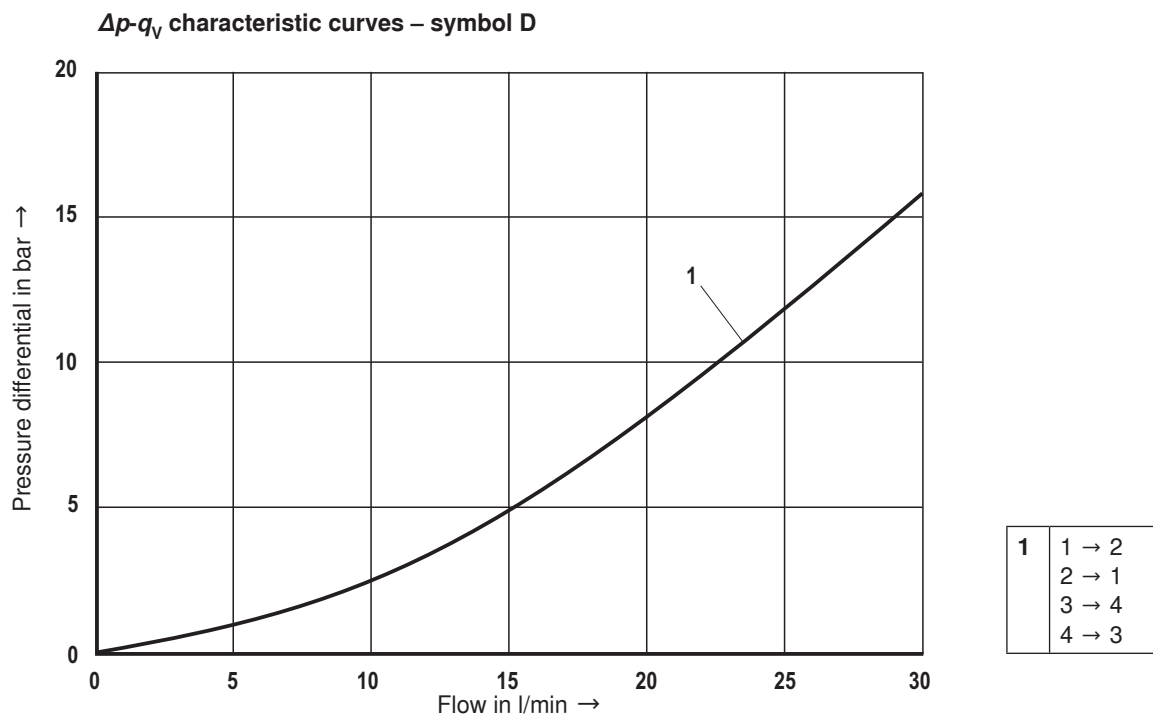
<sup>3)</sup> Due to the temperatures occurring at the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

**At the electrical connection "K4", the protective earthing conductor (PE  $\perp$ ) has to be connected properly.**

## Voltage tolerance against ambient temperature; duty cycle

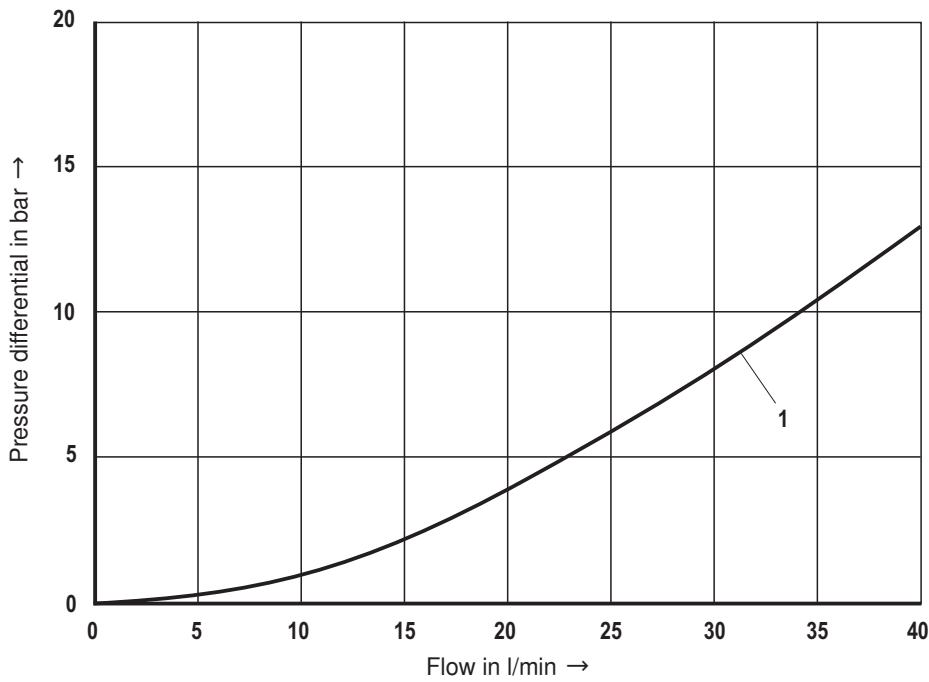


## Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ and 24 V coil)



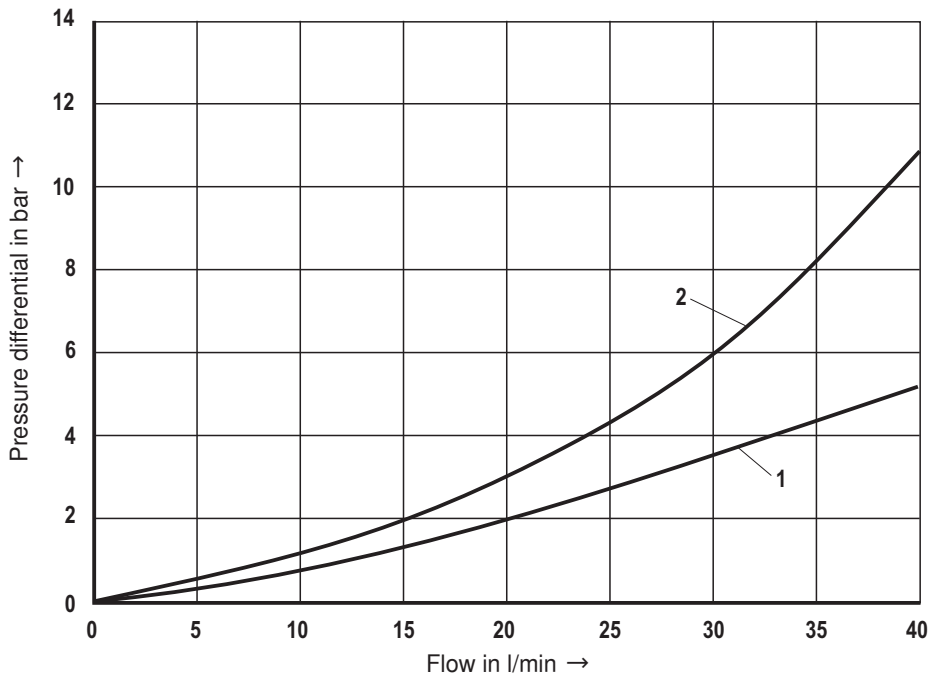
**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and 24 V coil)

$\Delta p$ - $q_v$  characteristic curves – symbol E



<b>1</b>	1 → 2
	3 → 4
	2 → 1
	4 → 3

$\Delta p$ - $q_v$  characteristic curves – symbol F



<b>1</b>	1 → 2
	2 → 1
<b>2</b>	3 → 4
	4 → 3

**Performance limits** (measured with HLP46,  $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and 24 V coil)

**Attention!**

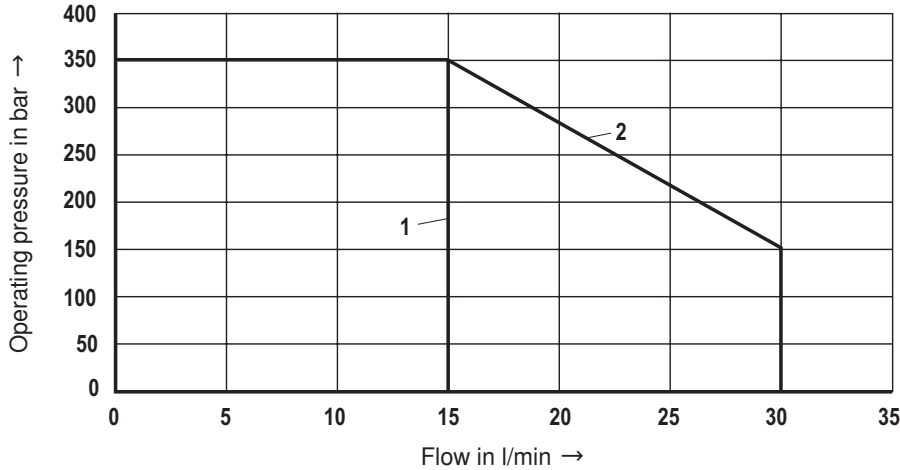
The specified performance limits are valid for operation with two directions of flow (e.g. symbol D: ① to ② and simultaneous return flow from ④ to ③).

Due to the flow forces acting within the valves, the permissible performance limit may be considerably lower with

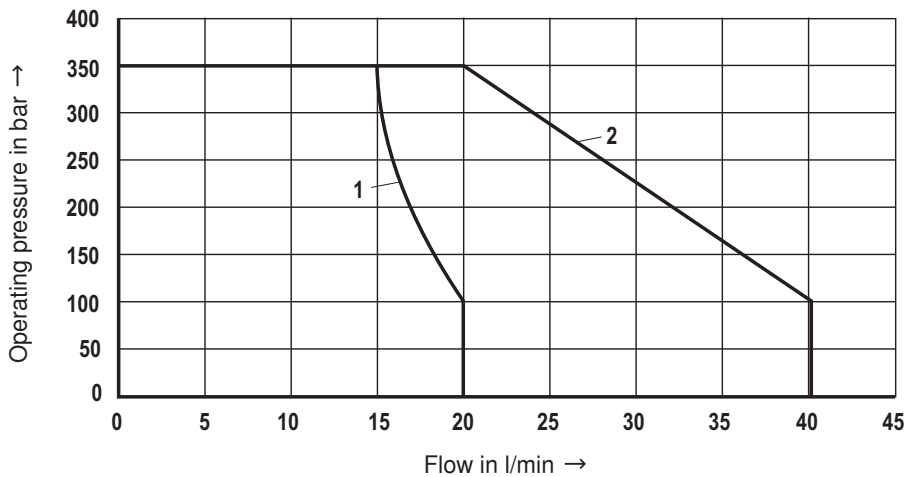
only one direction of flow (e.g. from ① to ② while port B is blocked)! In such cases, please consult us!

The performance limits were determined when the solenoids were at operating temperature and at 10 % undervoltage and without tank pre-loading.

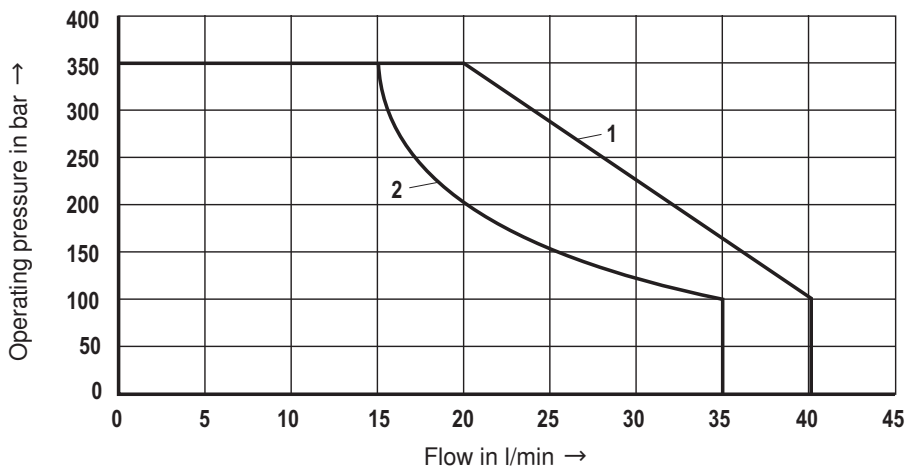
**Symbol D**



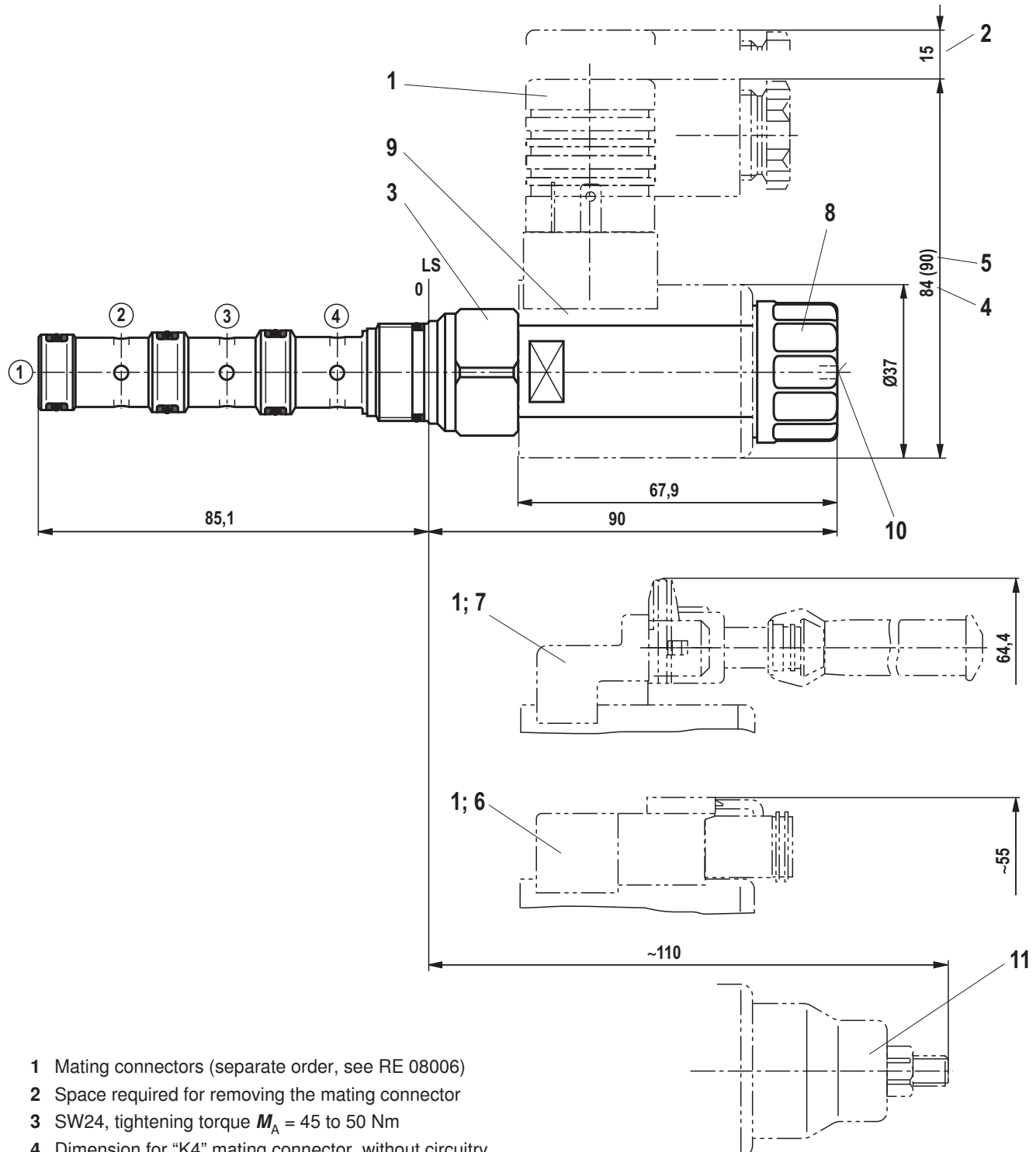
**Symbol E**



**Symbol F**



**Unit dimensions** (dimensions in mm)

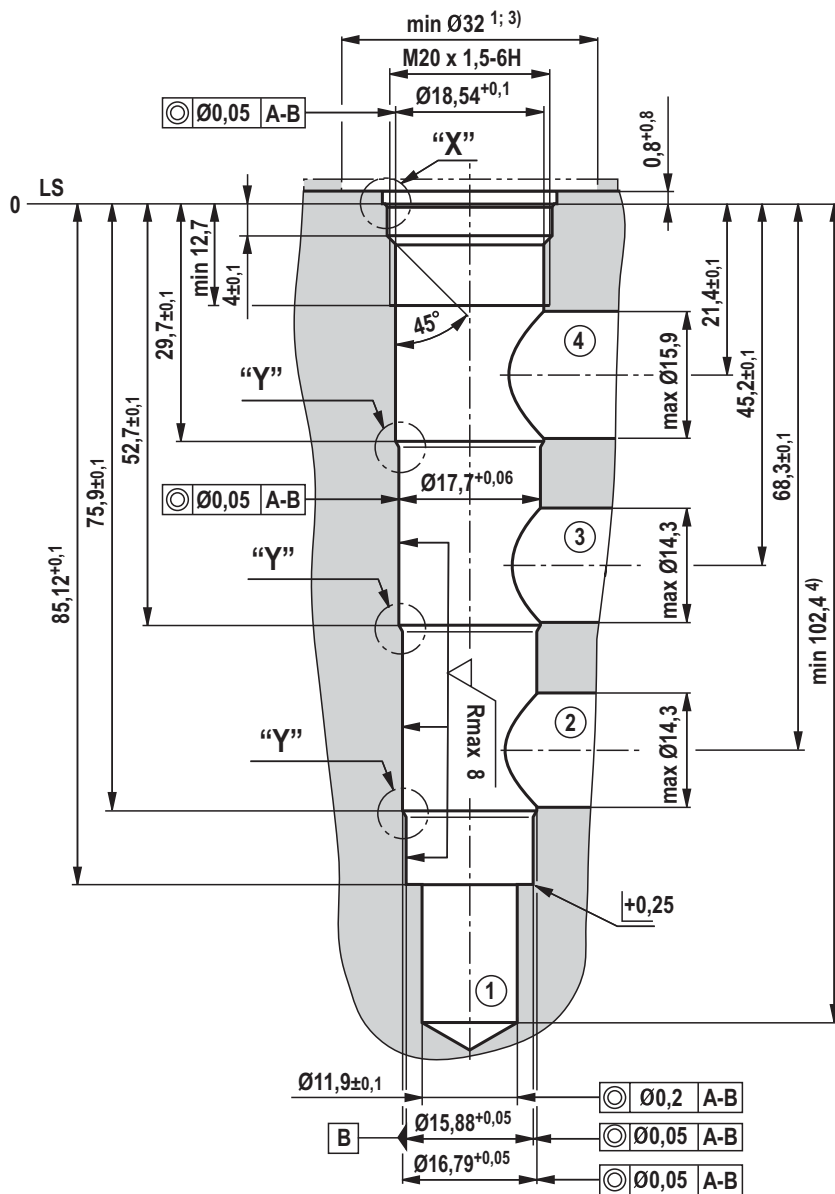


- 1 Mating connectors (separate order, see RE 08006)
- 2 Space required for removing the mating connector
- 3 SW24, tightening torque  $M_A = 45$  to  $50$  Nm
- 4 Dimension for "K4" mating connector, without circuitry
- 5 Dimension () for "K4" mating connector, with circuitry
- 6 Version "K40"
- 7 Version "C4"
- 8 Nut, tightening torque  $M_A = 5^{+1}$  Nm
- 9 Coil (separate order, see page 2)
- 10 Concealed manual override "N9", optional
- 11 Screwable manual override "N10" (separate order, see page 2)

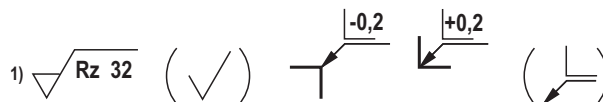
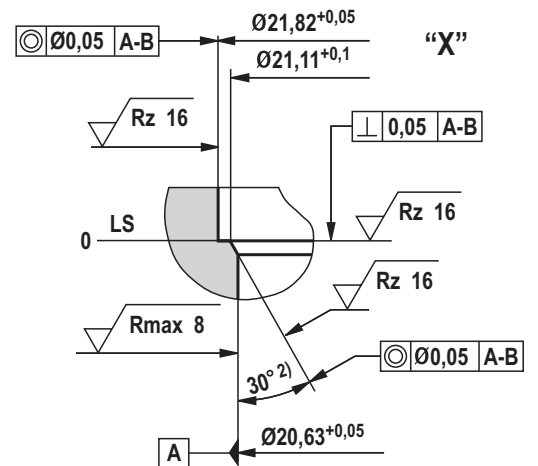
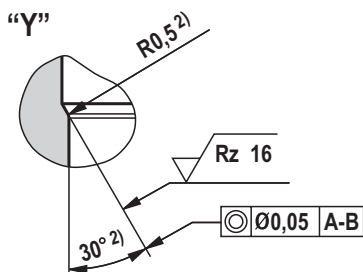
- ① = Main port 1
- ② = Main port 2
- ③ = Main port 3
- ④ = Main port 4
- LS = Location shoulder



### Mounting cavity R/T-31A; 4 main ports; thread M20 x 1.5 (dimensions in mm)

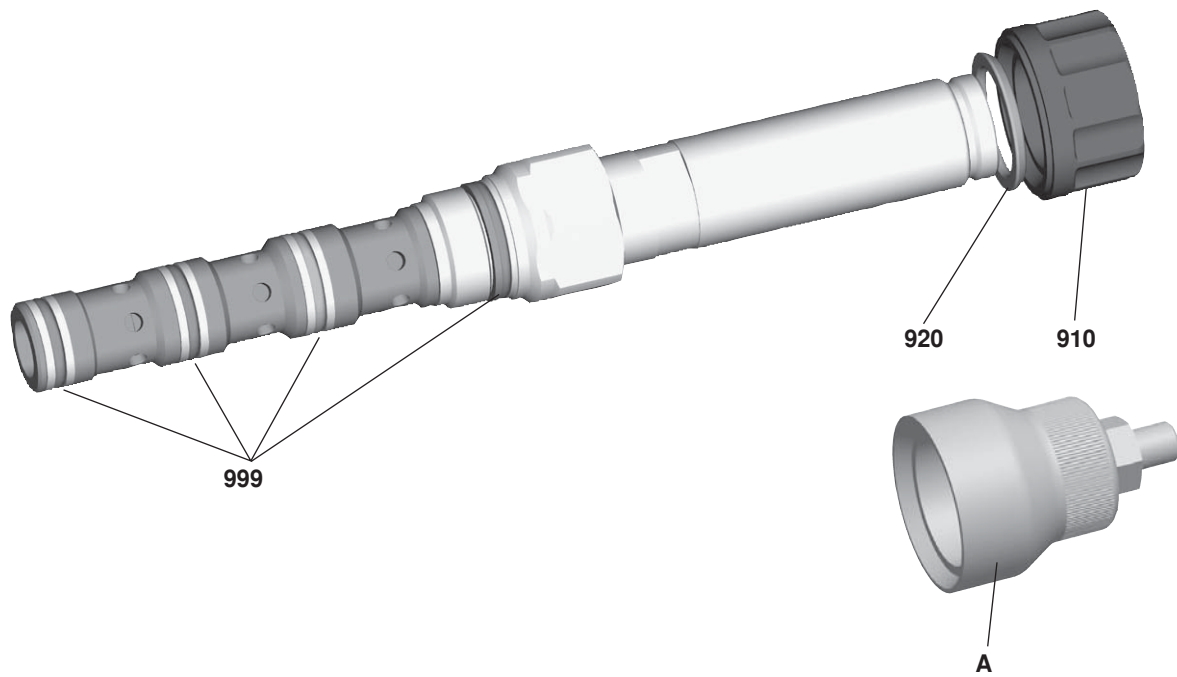


- 1) Differing from T-31A
  - 2) All seal ring in section faces are rounded and free of burrs
  - 3) with counterbore
  - 4) Depth for moving parts
- ① = Main port 1  
 ② = Main port 2  
 ③ = Main port 3  
 ④ = Main port 4  
 LS = Location Shoulder  
 Tolerance for all angles  $\pm 0,5^\circ$



## Available individual components

---



Item	Description	Material no.
910	Nut	R900991453
920	O-ring for pole tube	R900007769
999	Seal kit of the valve	R961003413
A	Manual override "N10" <sup>1)</sup>	R901051231

Coils, separate order, see page 2

<sup>1)</sup> Only with ordering code "N9", see page 2

# High Pressure cartridge valves

## Electro-proportional

<b>Designation</b>	<b>Description</b>	<b>Cavity</b>	<b>Data sheet</b>	<b>Page</b>
Proportional pressure relief valve, direct operated, rising characteristic curve	KBPS.8A	T-8A	18139-04	1127
Proportional pressure relief valve, direct operated, falling characteristic curve	KBPS.8B	T-8A	18139-05	1141
Proportional pressure relief valve, pilot operated, rising characteristic curve	KBVS.1A	Size 10	18160	1155
Proportional pressure relief valve, pilot operated, falling characteristic curve	KBVS.1B	Size 10	18152	1167
Proportional pressure relief valve, pilot operated, rising characteristic curve	KBVS.3A	Special	18139-08	1179
Proportional pressure relief valve, pilot operated, falling characteristic curve	KBVS.3B	Special	18139-07	1191
Proportional pressure reducing/relieving valve, pilot operated, rising characteristic curve	KTVS.1A	Size 10	18166	1203
Proportional flow control valve, with integrated pressure compensator	KUDSR.3	Size 12	18702	1217
Plug- in proportional amplifier	VT-SSPA		30116	1231



# Proportional pressure relief valve, direct operated, increasing characteristic curve

## Type KBPS.8A (High Performance)

Component size 8  
Component series A  
Maximum operating pressure 420 bar  
Maximum flow 2 l/min



H7071

## Table of contents

Contents	Page
Features	1
Ordering code	2
Preferred types	2
Function, section, symbol	3
Technical data	4, 5
Characteristic curves	6 to 9
Minimum terminal voltage at the coil and relative duty cycle	10, 11
Unit dimensions	12
Mounting cavity	13
Available individual components	14

## Features

- Cartridge valve
  - Mounting cavity R/T-8A
  - Direct operated proportional valve for limiting a system pressure
  - Suitable for mobile and industrial applications
  - Operation by means of proportional solenoid with central thread and detachable coil
  - Fine adjustment of the command value pressure characteristic curve possible from the outside at the control electronics
  - In case of power failure, minimum set pressure
- | Control electronics:                                 | Data sheet |
|--|------------|
| • Plug-in proportional amplifier<br>type VT-SSPA1... | 30116      |
| • Analog amplifier type RA...                        | 95230      |
| • BODAS controller type RC...                        | 95200      |

## Ordering code

KBPS		8	A	A / H	C			V	*
Proportional pressure relief valve, direct operated (pilot control valve)									Further details in the plain text
<b>Pressure rating</b>									<b>no code =</b> Standard
up to 30 bar									<b>-8 =</b> Coil 800 mA (see page 5)
up to 50 bar									<b>Seal material</b>
up to 100 bar									<b>V =</b> FKM seals
up to 150 bar									Attention!
up to 210 bar									Observe compatibility of the seals with the hydraulic fluid used!
up to 250 bar									<b>Electrical connection</b> <sup>1)</sup>
up to 315 bar									<b>K4 =</b> Without mating connector, with connector according to DIN EN 175301-803
up to 350 bar									<b>K40 =</b> Without mating connector, with connector DT 04-2PA (Deutsch plug)
up to 420 bar									<b>C4 =</b> Without mating connector, with connector AMP Junior-Timer
Component size 8		= 8							<b>Supply voltage</b>
Minimum pressure with command value = 0			= A						<b>G12 =</b> Control electronics 12 V DC
Component series				= A					<b>G24 =</b> Control electronics 24 V DC
High Performance and mounting cavity R/T-8A (see page 13)					= H				
Proportional solenoid, wet-pin						= C			

<sup>1)</sup> Mating connectors, separate order, see data sheet 08006.

## Preferred types

Type	Material number
KBPSC8AA/HCG24K4V	R901049804
KBPSF8AA/HCG24K4V	R901049817
KBPSL8AA/HCG24K4V	R901027408
KBPSN8AA/HCG24K4V	R901049877
KBPSP8AA/HCG24K4V	R901047007
KBPSR8AA/HCG24K4V	R901049860
KBPST8AA/HCG24K40V	R901045871
KBPSL8AA/HCG24K4V-8	R901053398
KBPSP8AA/HCG24C4V-8	R901132980
KBPSR8AA/HCG24C4V-8	R901128882

## Function, section, symbol

### General

Valves of type KBPS.8A are direct operated proportional pressure relief valves (pilot control valves) in seat design and are used to limit a system pressure. They basically comprise of the pulse tube (3), the solenoid coil (4), the valve seat (5) and the valve poppet (6).

With command value 0 or in case of power failure, the minimum pressure is set. Operation by means of a proportional solenoid with central thread and detachable coil. The solenoid's interior is connected to the main port ② and filled with hydraulic fluid. Depending on the electric command value, these valves can be used to continuously set the system pressure to be limited.

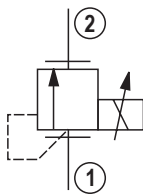
### Basic principle

For the setting of the system pressure, a command value is specified at the control electronics. Depending on the command value, the electronics necessary for operation actuate the solenoid with electric current. The proportional solenoid converts the electric current into mechanical force that acts on the valve poppet (6) via the armature plunger. The valve poppet (6) pushes onto the valve seat (5) and blocks the connection between main port ① and ②. If the hydraulic force on the valve poppet (6) corresponds to the solenoid force, the valve controls the set pressure by lifting the valve poppet (6) off the valve seat (5) and thus enabling hydraulic fluid flow from main port ① to ②. If the command value is zero, the minimum pressure is set.

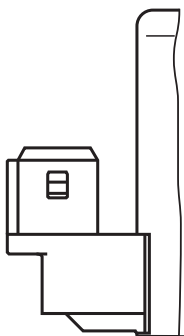
### Notice!

Occurring tank pressures (main port ②) are added up to the set values in the main port ①.

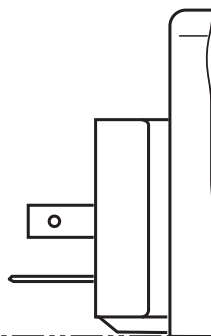
### Symbol



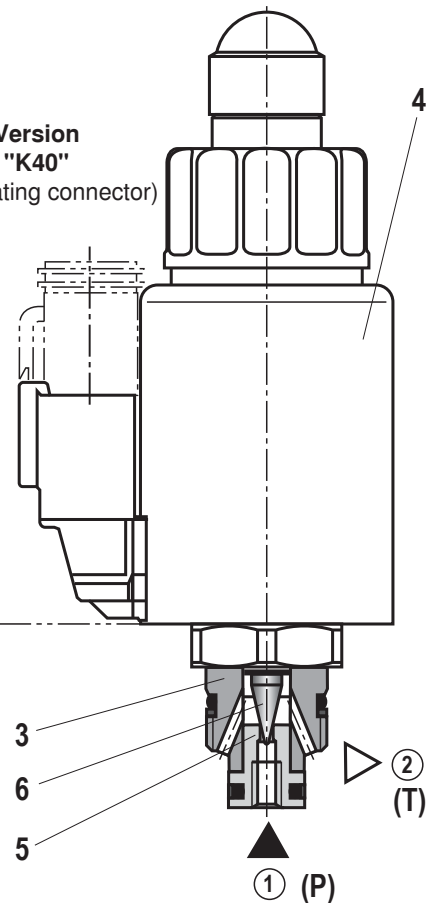
Version "C4"



Version "K4"



Version "K40" (with mating connector)



**Technical data** (For applications outside these parameters, please consult us!)

<b>general</b>		
Weight	kg	0.45
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	-20 to +120
Storage temperature range	°C	-20 to +80

## Environmental audits:

<b>Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Z)</b>		
DIN EN 60068-2-6: 05/96	Vibrations, sine-shaped	10 cycles (5 Hz to 2000 Hz back to 5 Hz) with logarithmic frequency changing speed of 1 octave/min, 5 to 57 Hz, amplitude 1.5 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibrations (random) and broadband noise	20 to 2000 Hz, amplitude 0.05 g <sup>2</sup> /Hz (10 g RMS/30 g peak), testing time 30 min
DIN EN 60068-2-27: 03/95	Shocking	Half sine 15 g / 11 ms, 3 x in positive, 3 x in negative direction (a total of 6 individual shocks)
DIN EN 60068-2-29: 03/95	Bump test	Half sine 25 g / 6 ms, 1000 x in positive, 1000 x in negative direction (a total of 2000 individual shocks)

Indication per axis

<b>Climatic test according to EN 60068-2 / IEC 60068-2 (environmental test):</b>		
DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, duration 16 h
DIN EN 60068-2-2: 08/94		+110 °C, duration 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles -25 °C, duration 2 h
DIN EN 60068-2-2: 08/94	Dry heating test	2 cycles +120 °C, duration 2 h
IEC 60068-2-30: 1985	Humid heat, cyclic	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles à 24 h

**Salt spray test: 720 h according to DIN 50021**

→ Coating generally not necessary. If paint is applied nevertheless, the reduced heat dissipation capacity is to be observed.

**hydraulic**

Maximum operating pressure <sup>1)</sup> (Main port ①)	bar	420
Maximum admissible return flow pressure (main port ②)	bar	210
Maximum set pressure <sup>2)</sup>		See command value pressure characteristic curves page 6
Minimum set pressure with command value 0		See characteristic curves page 8 and 9
Maximum flow	l/min	2 (see characteristic curves page 6 and 7)
Hydraulic fluid		See page 5
Hydraulic fluid temperature range	°C	-20 to +80
Viscosity range	mm <sup>2</sup> /s	15 to 380
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)		Class 20/18/15 <sup>3)</sup>

<sup>1)</sup> **Attention!** The maximum operating pressure is the total of set pressure and return flow pressure!

<sup>2)</sup> If the valve is installed in a mounting cavity made of non-magnetically conductive material, the maximum set pressure is < 3 % lower.

**Attention!** The valves are set in the factory. In case of subsequent adjustment, the warranty will become invalid!

<sup>3)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of the filters see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).




**Technical data** (For applications outside these parameters, please consult us!)

**hydraulic**

Hysteresis <sup>4)</sup>	< 5 % of the max. set pressure	
Range of inversion <sup>4)</sup>	< 0.5 % of the max. set pressure	
Response sensitivity <sup>4)</sup>	< 0.5 % of the max. set pressure	
Manufacturing tolerance of the command value pressure characteristic curve	– Command value 100 %	< 5 % of the max. set pressure
	– Command value 0	< 2 % of the max. set pressure
Step response ( $T_u + T_d$ ) 0 → 100 % and/or 100 % → 0	ms	70 (depending on the system)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils and related hydrocarbons	HL, HLP, HLPD, HVLP, HVLPD	FKM	DIN 51524
Environmentally compatible	– Insoluble in water	HEES	ISO 15380
	– Soluble in water	HEPR	
Flame-resistant	– Water-free	HEPG	ISO 15380
	– Water-containing	HFDU, HFDR	ISO 12922
		HFAS	ISO 12922

 <b>Important information on hydraulic fluids!</b> <ul style="list-style-type: none"> <li>– For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!</li> <li>– There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!</li> <li>– The flash point of the process and operating medium used must be 40 K higher than the maximum solenoid surface temperature.</li> </ul>	<ul style="list-style-type: none"> <li>– <b>Flame-resistant - containing water:</b> Maximum pressure differential per control edge 175 bar, otherwise, increased cavitation erosion! Tank pre-loading &lt; 1 bar or &gt; 20 % of the pressure differential. The pressure peaks should not exceed the maximum operating pressures!</li> <li>– <b>Environmentally compatible:</b> When using environmentally compatible hydraulic fluids that are simultaneously zinc-soluble, zinc may accumulate in the medium (700 mg zinc per pole tube).</li> </ul>
---	--

**electric**

Supply voltage	V	12 DC	24 DC	"-8" / 24 DC
Maximum control current	mA	1760	1200	800
Coil resistance	– Cold value at 20 °C	Ω	2.3	4.8
	– max. hot value	Ω	3.8	7.9
Switch-on duration	%	100 <sup>5)</sup>		
Maximum coil temperature <sup>6)</sup>	°C	150		
Protection class according to DIN EN 60529	– Version "K4"	IP 65 with mating connector mounted and locked		
	– Version "K40"	IP 69K with mating connector mounted and locked		
	– Version "C4"	IP 66 with mating connector mounted and locked		
		IP 69K with Rexroth mating connector (Material no. R901022127)		
Control electronics (separate order)		– Plug-in proportional amplifier type VT-SSPA1..., see data sheet 30116 – Analog amplifier type RA..., see data sheet 95230 – BODAS controller type RC..., see data sheet 95200		
Design according to VDE 0580				

<sup>4)</sup> Measured with analog amplifier type RA2-1/10, see data sheet 95230

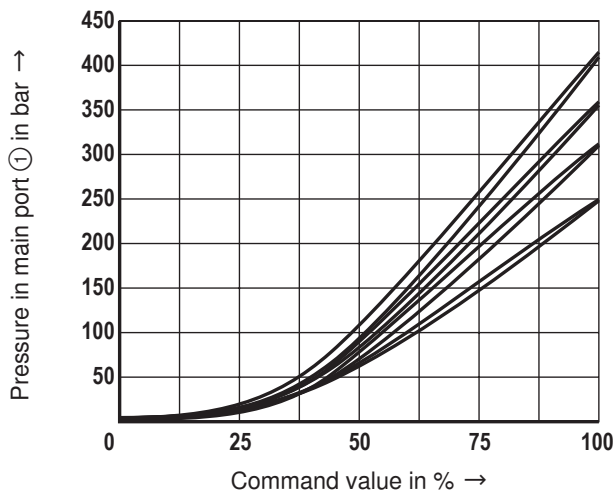
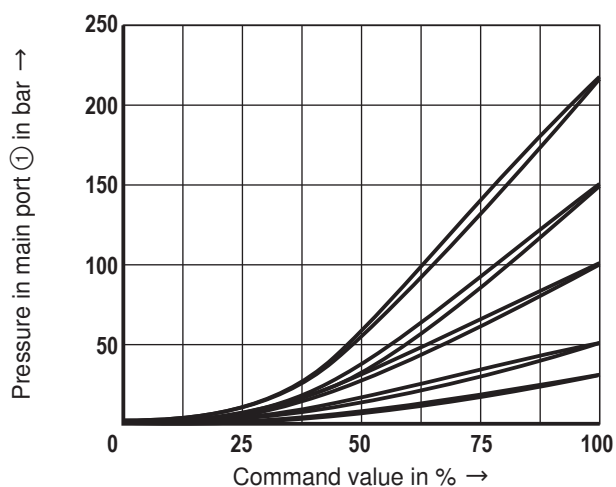
<sup>5)</sup> In case of use more than 2000 m a.s.l., please consult us.

<sup>6)</sup> Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

**In the electrical connection, the protective earthing conductor (PE  $\frac{1}{\text{I}}$ ) must be connected properly.**

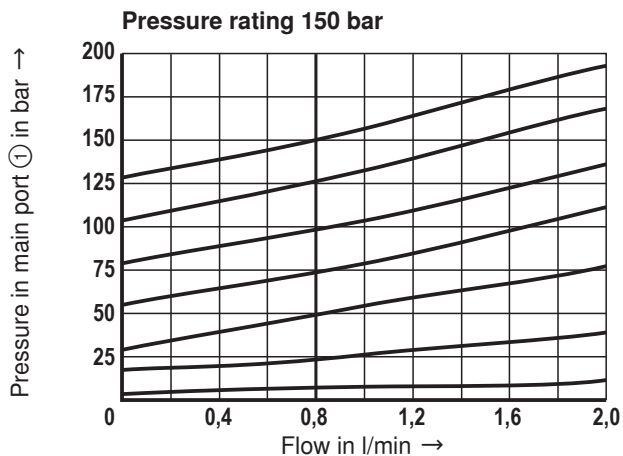
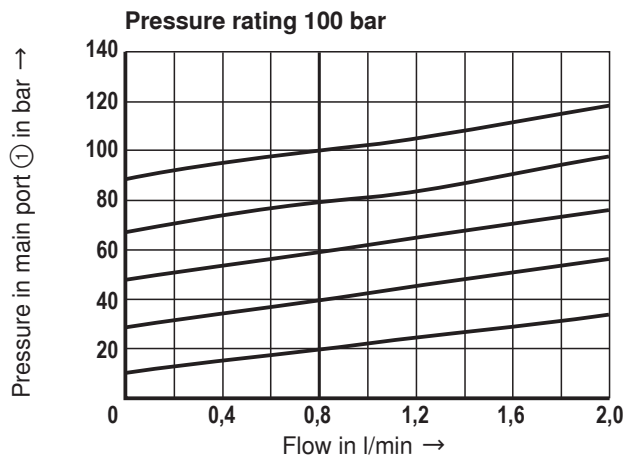
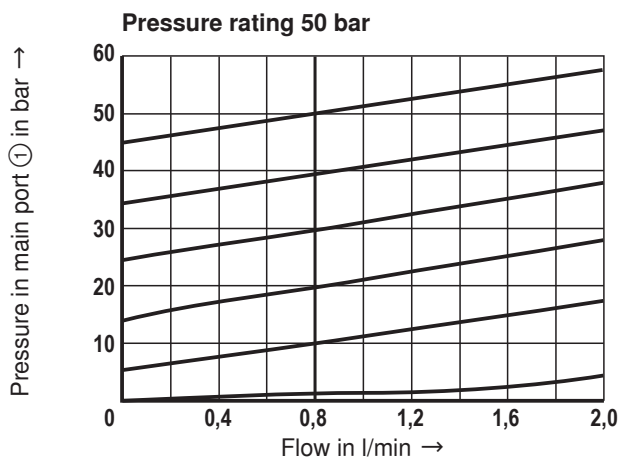
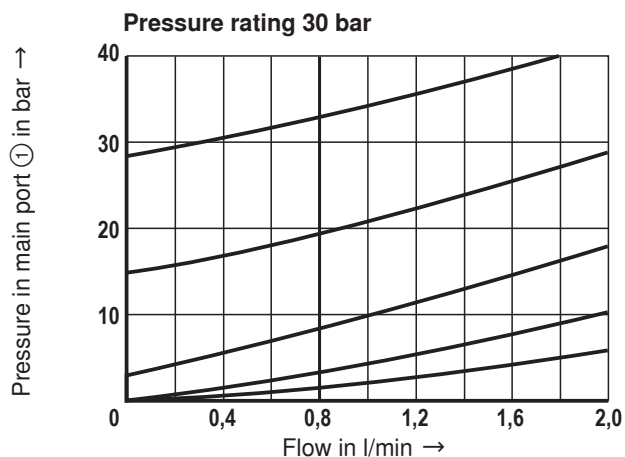
**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

Pressure in the main port ① depending on the command value. Flow = 0.8 l/min



Pressure in the main port ① depending on the flow.

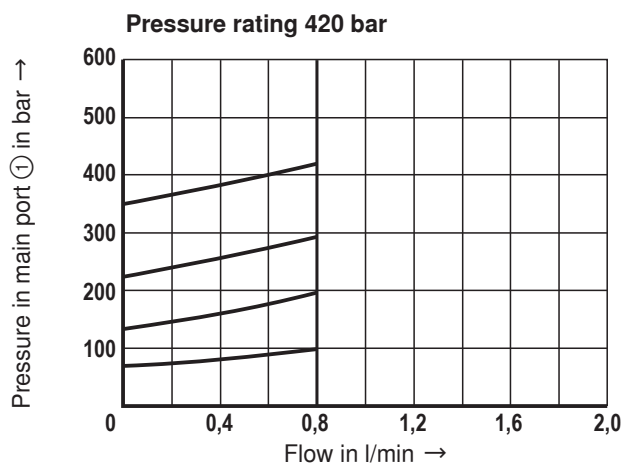
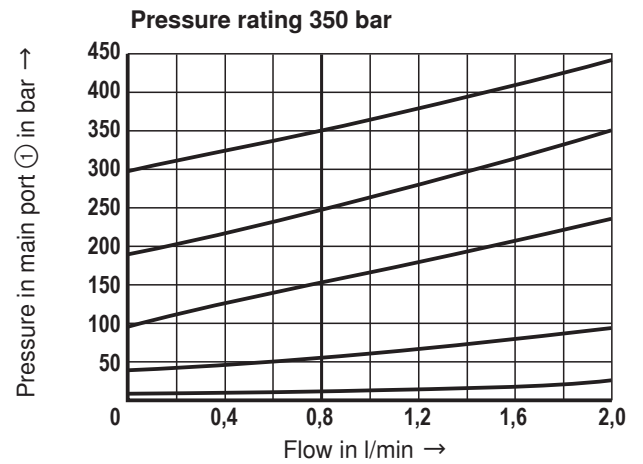
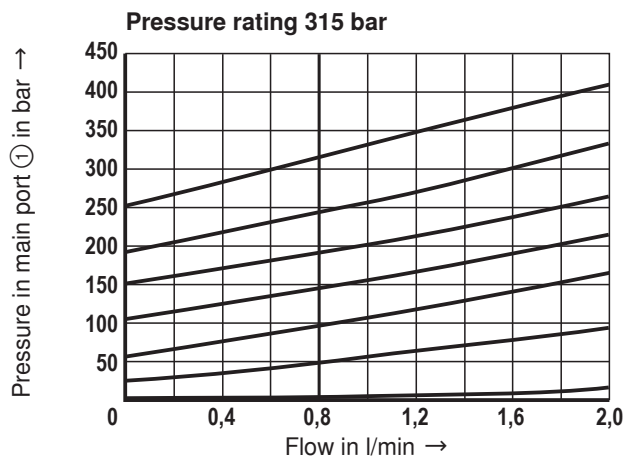
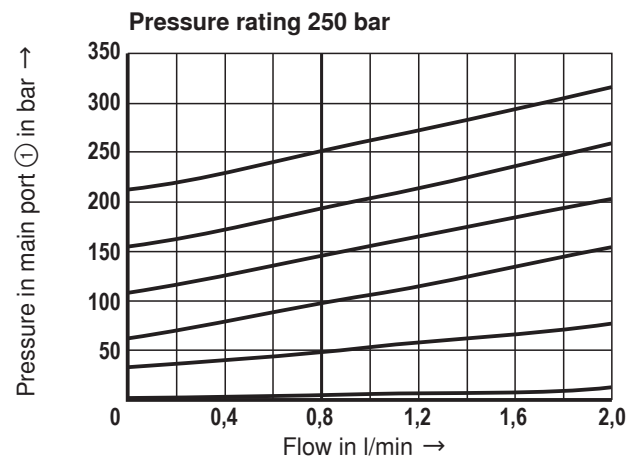
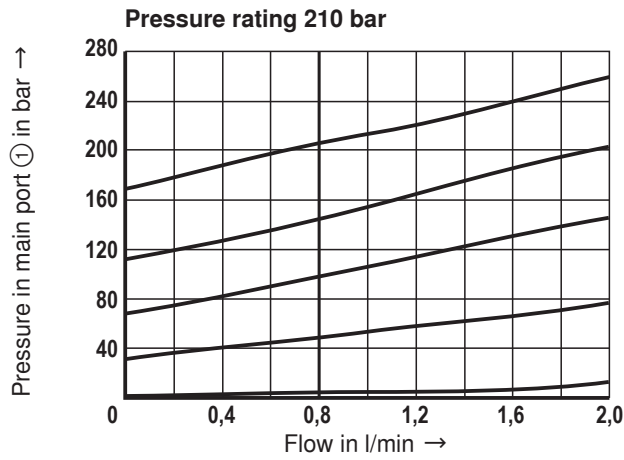
(The characteristic curve was measure without counter pressure in main port ②.)



**Characteristic curves** (measures with HLP46,  $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

**Pressure in the main port ① depending on the flow.**

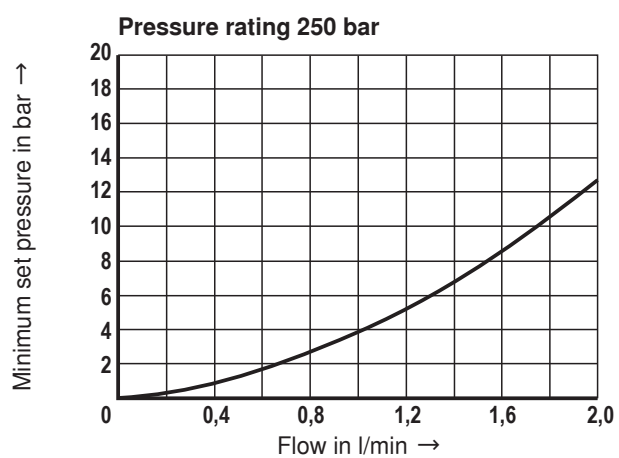
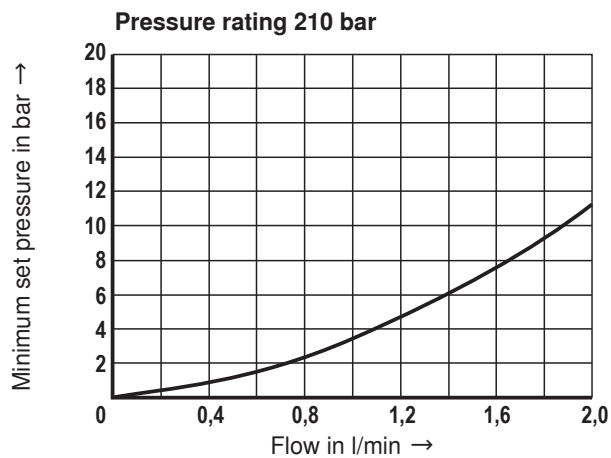
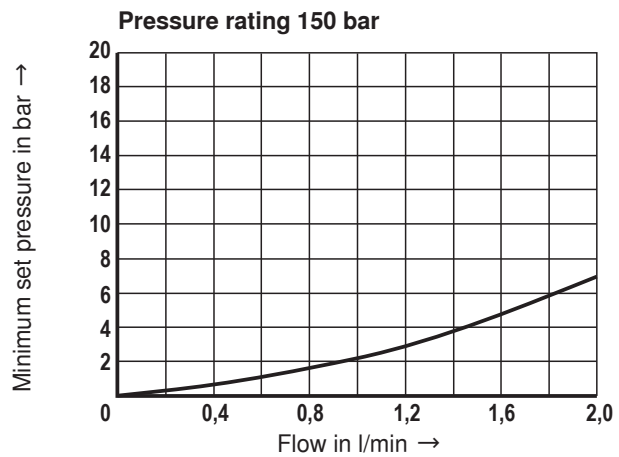
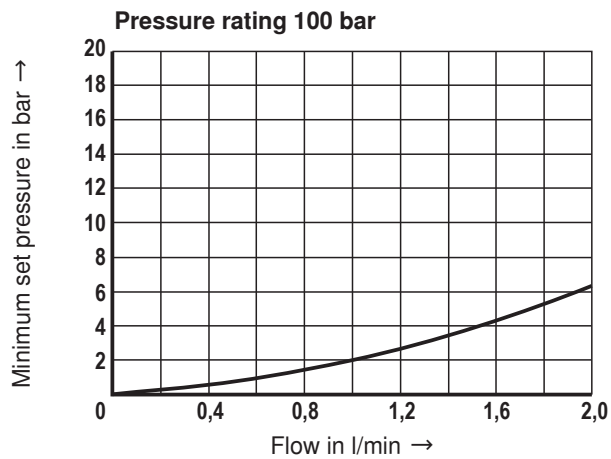
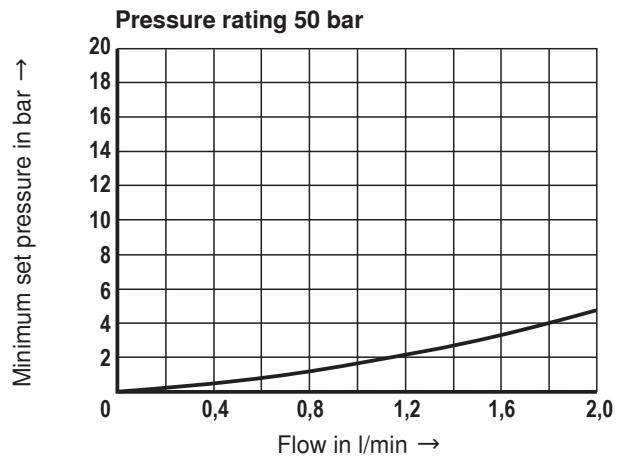
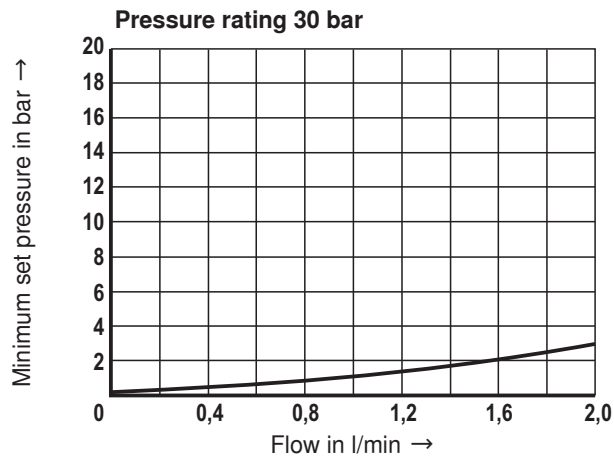
(The characteristic curve was measure without counter pressure in main port ②.)



## Characteristic curves (measured with HLP46, $\vartheta_{\text{Oil}} = 40 \text{ }^{\circ}\text{C} \pm 5 \text{ }^{\circ}\text{C}$ and 24 V coil)

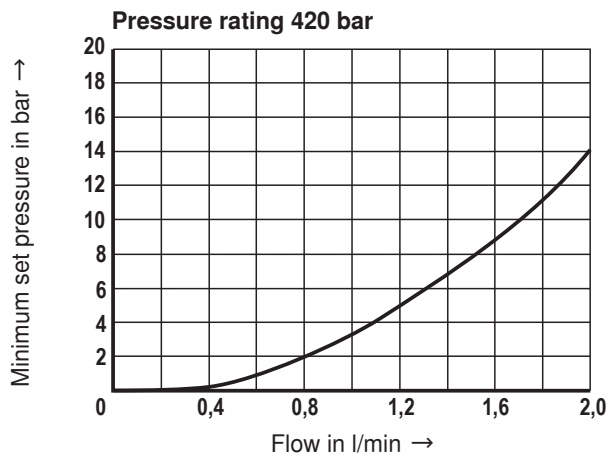
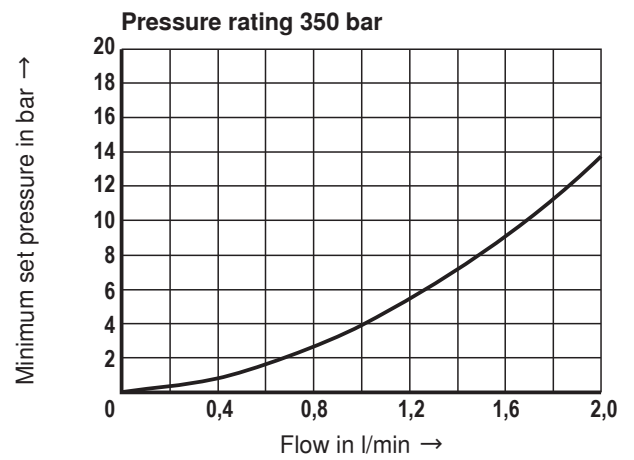
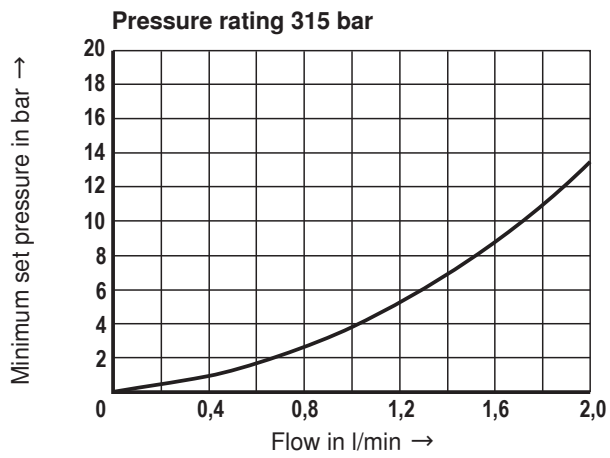
### Minimum set pressure in main port ① with command value 0.

(The characteristic curve was measured without counter pressure in main port ②.)



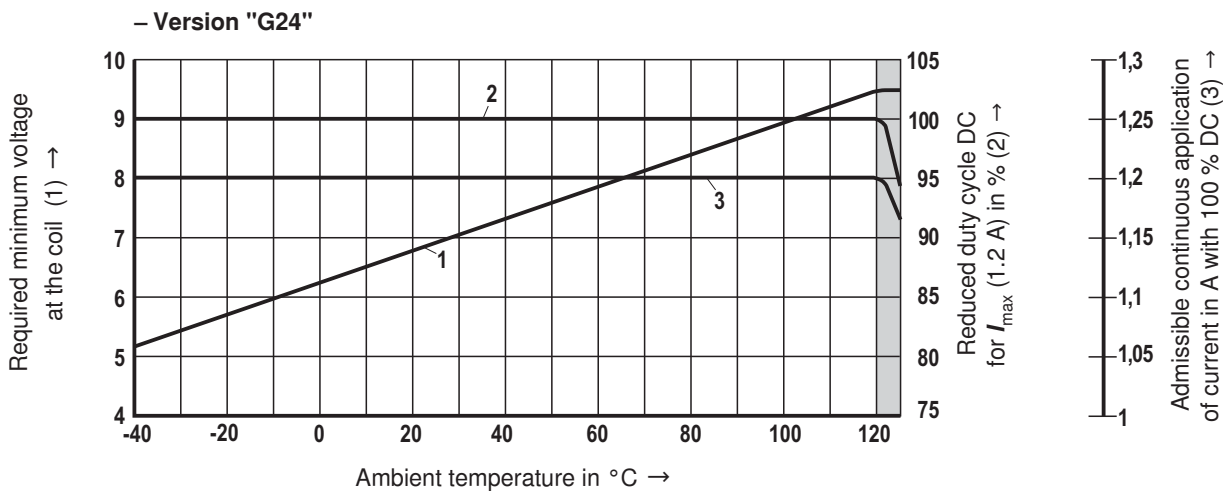
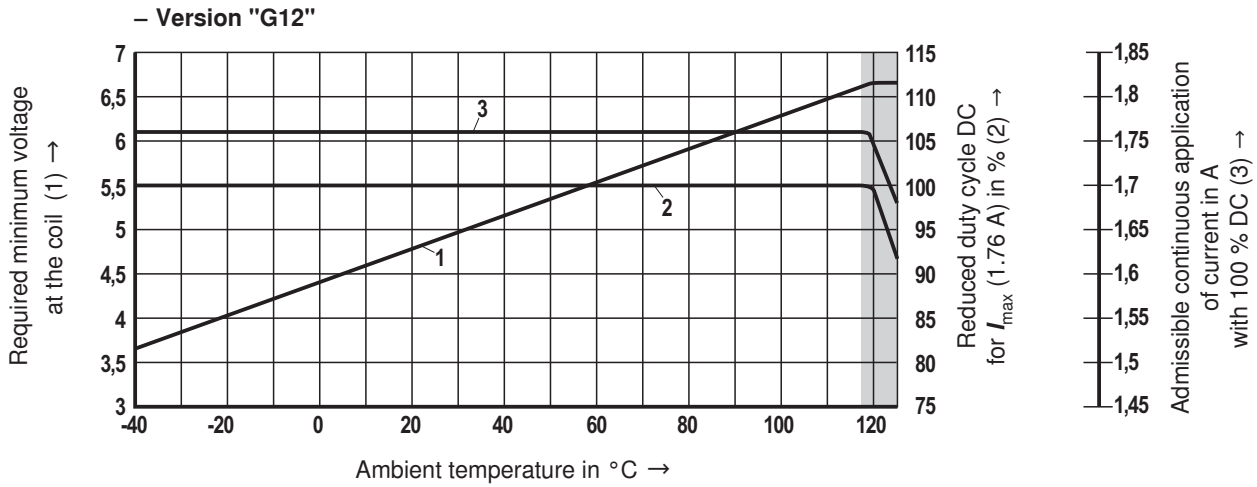
**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

**Minimum set pressure in main port ① with command value 0.**  
 (The characteristic curve was measured without counter pressure in main port ②.)



## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range against the ambient temperature



▒ Limited valve performance

**Notice!**

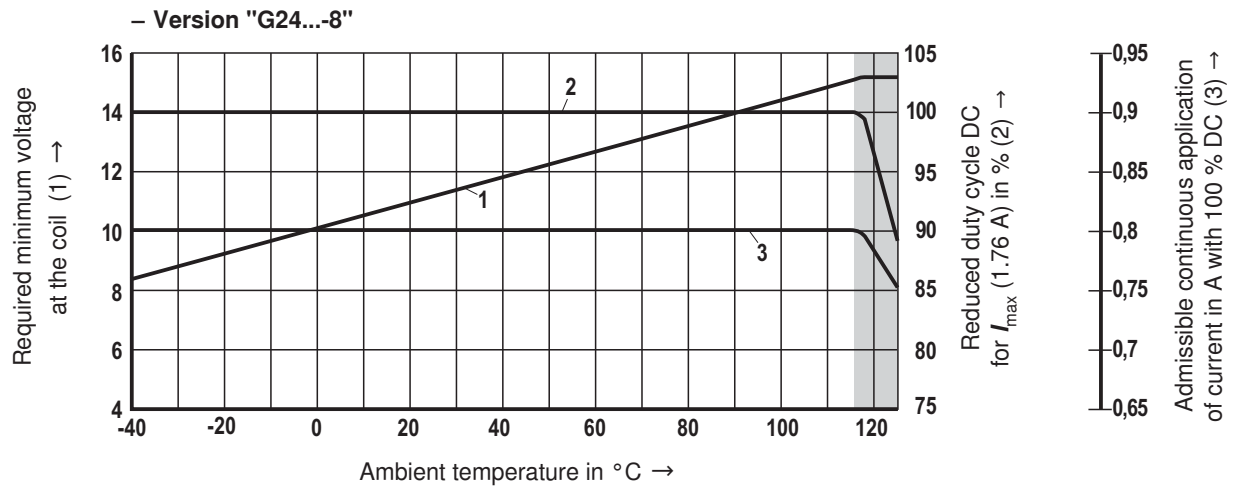
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range against the ambient temperature



Limited valve performance

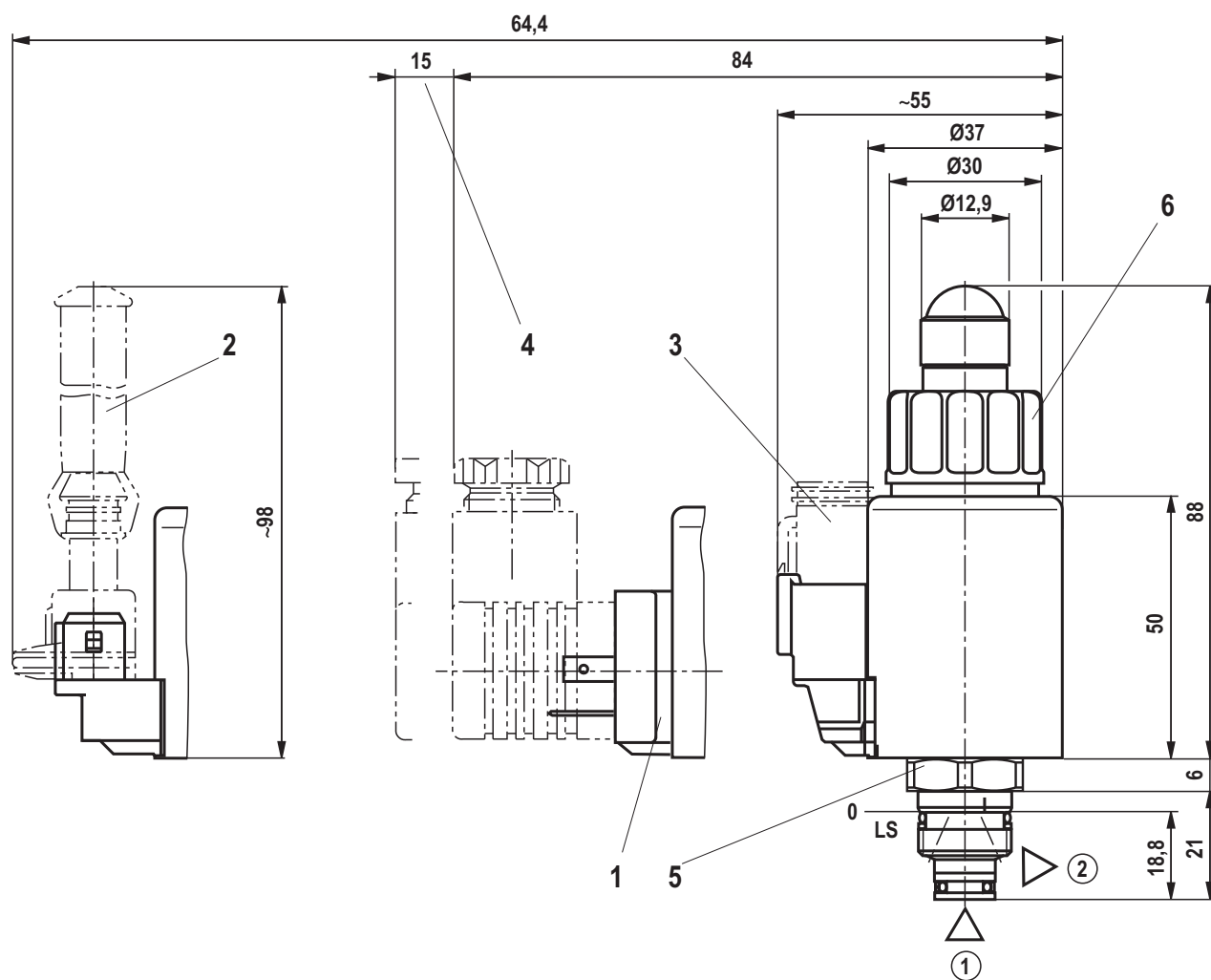
#### Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

## Unit dimensions (dimensions in mm)



① = Main port 1

② = Main port 2

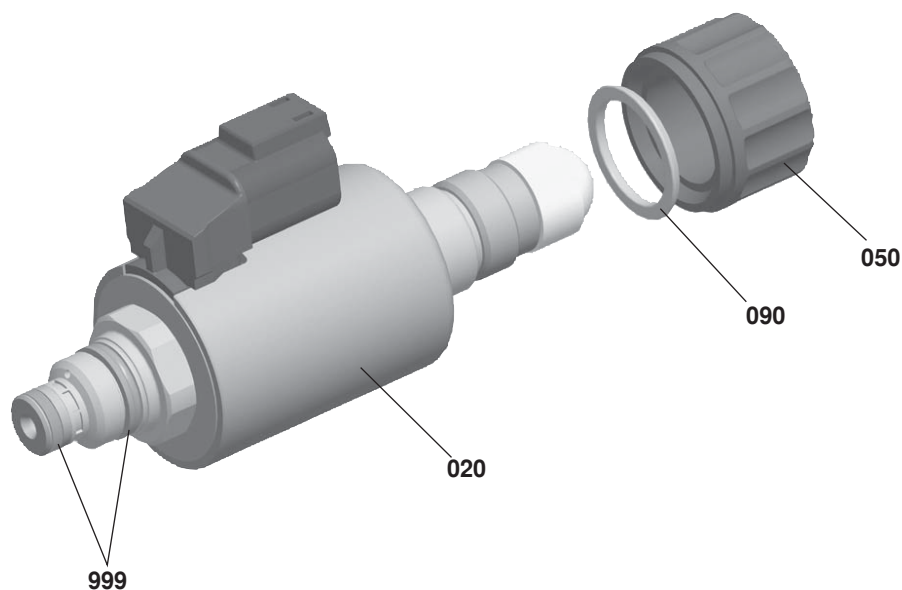
LS = Location Shoulder

- 1 Mating connector for connector "K4"  
(separate order, see data sheet 08006)
- 2 Mating connector for connector "C4"  
(separate order, see data sheet 08006)
- 3 Mating connector for connector "K40"  
(separate order, see data sheet 08006)
- 4 Space required to remove the mating connector
- 5 Hexagon SW22 for screwing in the  
pole tube; tightening torque  $M_A = 40^{+6}$  Nm
- 6 Solenoid nut, tightening torque  $M_A = 5^{+1}$  Nm





## Available individual components



Item	Denomination		Direct voltage	Material no.
020	Coil for individual connection <sup>1)</sup>	Version "K4"	12 V	R901002932
			24 V	R901002319
			24 V / 800 mA	R901049962
		Version "K40"	12 V	R901003055
			24 V	R901003053
			24 V / 800 mA	R901050010
		Version "C4"	12 V	R901003044
			24 V	R901003026
			24 V / 800 mA	R901049963
050	Nut		R900992146	
090	Seal ring for pole tube		R900007769	
998	Seal kit of the valve		R961000376	

<sup>1)</sup> **Notice!**

After exchange of the solenoid coil, the pressure set in the factory may change by  $\pm 5\%$ .

# Proportional pressure relief valve, direct operated, decreasing characteristic curve

**Type KBPS.8B** (High Performance)

Component size 8  
Component series A  
Maximum operating pressure 420 bar  
Maximum flow 2 l/min



H7071

## Table of contents

Contents	Page
Features	1
Ordering code	2
Preferred types	2
Function, section, symbol	3
Technical data	4, 5
Characteristic curves	6 to 9
Minimum terminal voltage at the coil and relative duty cycle	10, 11
Unit dimensions	12
Mounting cavity	13
Available individual components	14

## Features

- Cartridge valve
  - Mounting cavity R/T-8A
  - Direct operated proportional valve for limiting a system pressure
  - Suitable for mobile and industrial applications
  - Operation by means of proportional solenoid with central thread and detachable coil
  - Fine adjustment of the command value pressure characteristic curve possible from the outside at the control electronics
  - Set to the maximum pressure via the adjustment screw
  - In case of power failure, maximum set pressure
- | Control electronics:                              | Data sheet |
|---|------------|
| • Plug-in proportional amplifier type VT-SSPA1... | 30116      |
| • Analog amplifier type RA...                     | 95230      |
| • BODAS control unit type RC...                   | 95200      |

## Ordering code

KBPS		8	B	A / H	C			V	*
Proportional pressure relief valve, direct operated (pilot control valve)									Further details in the plain text
<b>Pressure rating</b>									<b>no code =</b> Standard
up to 30 bar			= B						-8 = Coil 800 mA (see page 5)
up to 50 bar			= C						<b>Seal material</b>
up to 100 bar			= F						V = FKM seals
up to 150 bar			= H						Attention!
up to 210 bar			= L						Observe compatibility of the seals with the hydraulic fluid used!
up to 250 bar			= N						<b>Electrical connection</b> <sup>1)</sup>
up to 315 bar			= P						<b>K4 =</b> Without mating connector, with connector according to DIN EN 175301-803
up to 350 bar			= R						<b>K40 =</b> Without mating connector, with connector DT 04-2PA (Deutsch plug)
up to 420 bar			= T						<b>C4 =</b> Without mating connector, with connector AMP Junior-Timer
Component size 8		= 8							<b>Supply voltage</b>
Maximum pressure with command value = 0			= B						<b>G12 =</b> Control electronics 12 V DC
Component series				= A					<b>G24 =</b> Control electronics 24 V DC
High Performance and mounting cavity R/T-8A (see page 13)					= H				
Proportional solenoid, wet-pin						= C			

<sup>1)</sup> Mating connectors, separate order, see data sheet 08006.

## Preferred types

Type	Material number
KBPSB8BA/HCG24C4V-8	R901144800
KBPSL8BA/HCG24C4V-8	R901120007
KBPSR8BA/HCG24C4V	R901018607
KBPSL8BA/HCG12C4V	R901056361
KBPSL8BA/HCG24C4V	R901018602
KBPSL8BA/HCG12K40V	R901064385
KBPSN8BA/HCG24K40V	R901016229
KBPSP8BA/HCG24K40V	R901026207
KBPSR8BA/HCG24K40V	R901188705
KBPSP8BA/HCG24K4V	R901018593

## Function, section, symbol

### General

Valves of type KBPS.8B are direct operated proportional pressure relief valves (pilot control valves) in seat design and are used to limit a system pressure. They basically comprise of the pole tube (3), the solenoid coil (4), the valve seat (5) and the valve poppet (6).

With command value 0 or in case of power failure, the maximum pressure is set. Operation by means of a proportional solenoid with central thread and detachable coil. The solenoid's interior is connected to the main port ② and filled with hydraulic fluid. Depending on the electric command value, these valves can be used to continuously set the system pressure to be limited.

### Basic principle

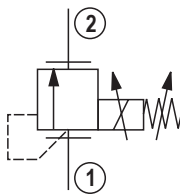
In the factory, the valves are mechanically set to the maximum pressure. For the proportional reduction of the system pressure, a command value is specified at the control electronics. Depending on the command value, the electronics actuate the solenoid with electric current.

The proportional solenoid converts the electric current into mechanical force that acts against the setting spring via the armature and thus reduces the force on the valve poppet (6). The valve poppet (6) pushes onto the valve seat (5) and blocks the connection between main port ① and ②. If the hydraulic force on the valve poppet (6) corresponds to the force difference between setting spring and solenoid force, the valve controls the set pressure by lifting the valve poppet (6) off the valve seat (5) and thus enabling hydraulic fluid flow from main port ① to ②. If the command value is zero, the maximum pressure is set.

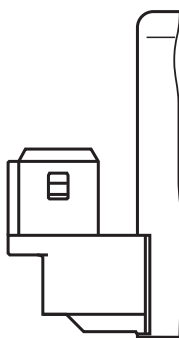
### Notice!

Occurring tank pressures (main port ②) are added up to the set values in the main port ①.

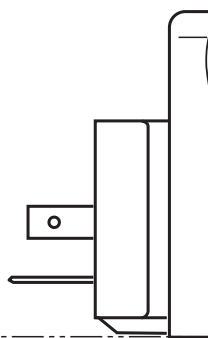
### Symbol



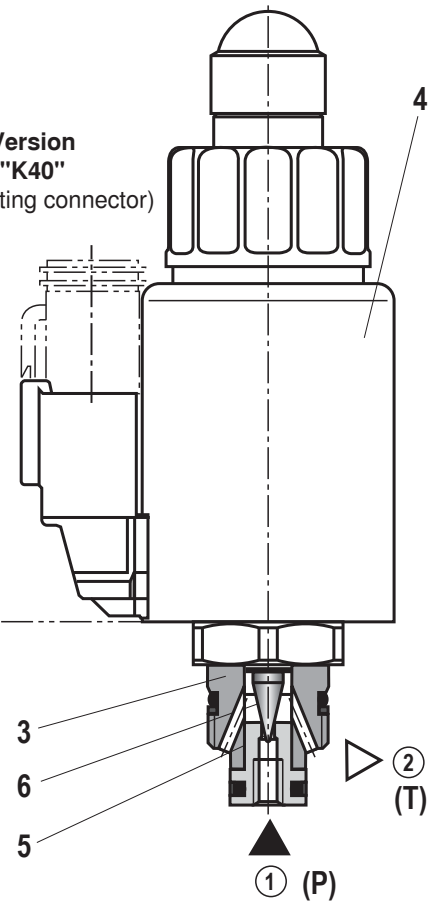
Version "C4"



Version "K4"



Version "K40" (with mating connector)



**Technical data** (For applications outside these parameters, please consult us!)

<b>general</b>		
Weight	kg	0.45
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	-20 to +120
Storage temperature range	°C	-20 to +80

**Environmental audits:**

<b>Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Z)</b>		
DIN EN 60068-2-6: 05/96	Vibrations, sine-shaped	10 cycles (5 Hz to 2000 Hz back to 5 Hz) with logarithmic frequency changing speed of 1 octave/min, 5 to 57 Hz, amplitude 1.5 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibrations (random) and broadband noise	20 to 2000 Hz, amplitude 0.05 g <sup>2</sup> /Hz (10 g RMS/30 g peak), testing time 30 min
DIN EN 60068-2-27: 03/95	Shocking	Half sine 15 g / 11 ms, 3 x in positive, 3 x in negative direction (a total of 6 individual shocks)
DIN EN 60068-2-29: 03/95	Bump test	Half sine 25 g / 6 ms, 1000 x in positive, 1000 x in negative direction (a total of 2000 individual shocks)

Indication per axis

<b>Climatic test according to EN 60068-2 / IEC 60068-2 (environmental test):</b>		
DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, duration 16 h
DIN EN 60068-2-2: 08/94		+110 °C, duration 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles -25 °C, duration 2 h
DIN EN 60068-2-2: 08/94	Dry heating test	2 cycles +120 °C, duration 2 h
IEC 60068-2-30: 1985	Humid heat, cyclic	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles à 24 h

**Salt spray test: 720 h according to DIN 50021**

→ Coating generally not necessary. If paint is applied nevertheless, the reduced heat dissipation capacity is to be observed.

**hydraulic**

Maximum operating pressure <sup>1)</sup> (main port ①)	bar	420
Maximum admissible return flow pressure (main port ②)	bar	210
Maximum set pressure <sup>2)</sup>		See command value pressure characteristic curves page 6
Minimum set pressure with command value max <sup>3)</sup>		See characteristic curves page 8 and 9
Maximum flow	l/min	2 (see characteristic curves page 6 and 7)
Hydraulic fluid		See page 5
Hydraulic fluid temperature range	°C	-20 to +80
Viscosity range	mm <sup>2</sup> /s	15 to 380
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)		Class 20/18/15 <sup>4)</sup>


<sup>1)</sup> **Attention!** The maximum operating pressure is the total of set pressure and return flow pressure!<sup>2)</sup> **Attention!** The valves are set in the factory. In case of subsequent adjustment, the warranty will become invalid!<sup>3)</sup> If the valve is installed in a mounting cavity made of non-magnetically conductive material, the minimum set pressure is slightly higher.<sup>4)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.For the selection of the filters see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

## Technical data (For applications outside these parameters, please consult us!)

### hydraulic

Hysteresis <sup>5)</sup>		< 4 % of the max. set pressure
Range of inversion <sup>5)</sup>		< 0.5 % of the max. set pressure
Response sensitivity <sup>5)</sup>		< 0.5 % of the max. set pressure
Manufacturing tolerance of the command value pressure characteristic curve	– Command value 100 %	< 2 % of the max. set pressure
	– Command value 0	< 5 % of the max. set pressure
Step response ( $T_u + T_g$ ) 0 → 100 % and/or 100 % → 0	ms	70 (depending on the system)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	FKM	VDMA 24568
	– Soluble in water	FKM	

 **Important information on hydraulic fluids!**

- ▶ For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!

- ▶ The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ **Bio-degradable:** When using bio-degradable hydraulic fluids that are simultaneously zinc-soloving, zinc may accumulate in the fluid.

### electric

Supply voltage	V	12 DC	24 DC	"-8" / 24 DC	
Maximum control current	mA	1760	1200	800	
Coil resistance	– Cold value at 20 °C	Ω	2.3	4.8	11.5
	– max. hot value	Ω	3.8	7.9	18.9
Switch-on duration	%	100 <sup>6)</sup>			
Maximum coil temperature <sup>7)</sup>	°C	150			
Protection class according to DIN EN 60529	– Version "K4"	IP 65 with mating connector mounted and locked			
	– Version "K40"	IP 69K with mating connector mounted and locked			
	– Version "C4"	IP 66 with mating connector mounted and locked			
Control electronics (separate order)		IP 69K with Rexroth mating connector (material no. R901022127)			
		– Plug-in proportional amplifier type VT-SSPA1..., see data sheet 30116 – Analog amplifier type RA..., see data sheet 95230 – BODAS control unit type RC..., see data sheet 95200			
Design according to VDE 0580					

<sup>5)</sup> Measured with analog amplifier type RA1-1/10, see data sheet 95230

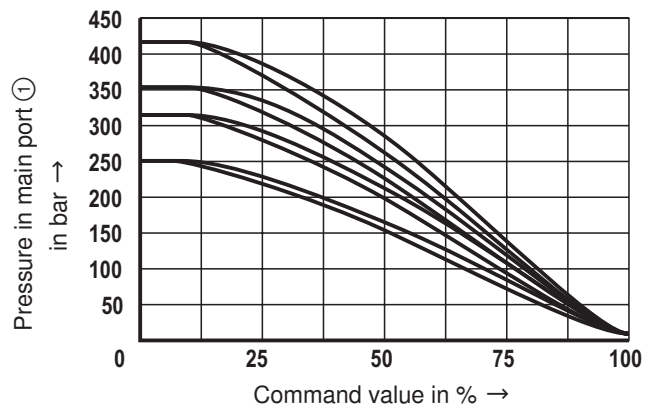
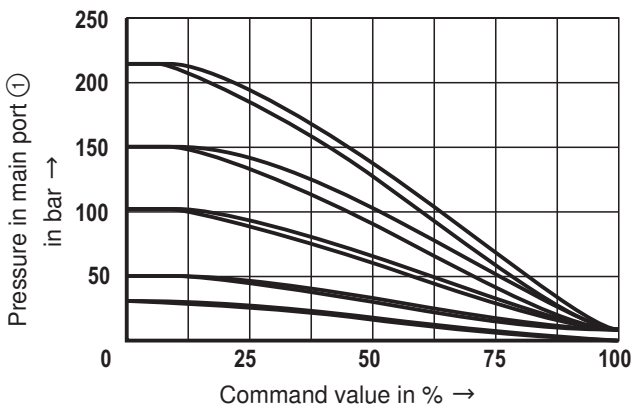
<sup>6)</sup> In case of use more than 2000 m a.s.l., please consult us.

<sup>7)</sup> Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!

**In the electrical connection, the protective earthing conductor (PE  $\perp$ ) must be connected properly.**

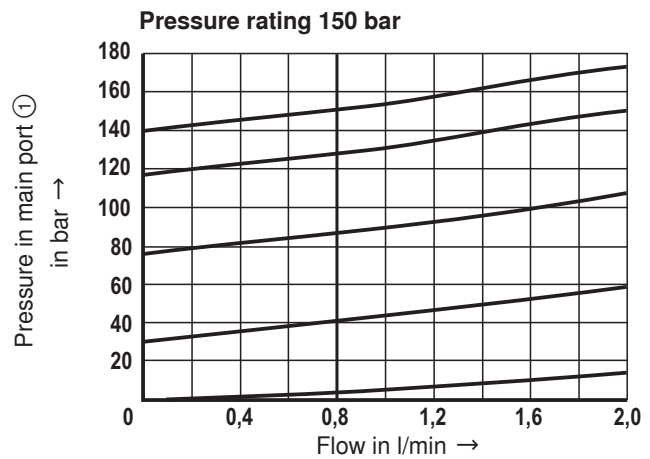
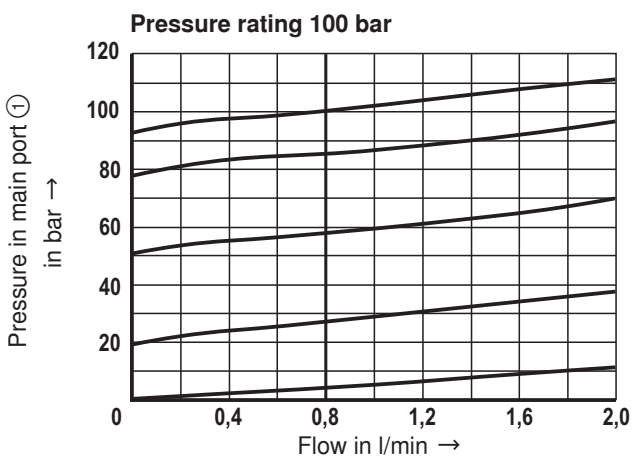
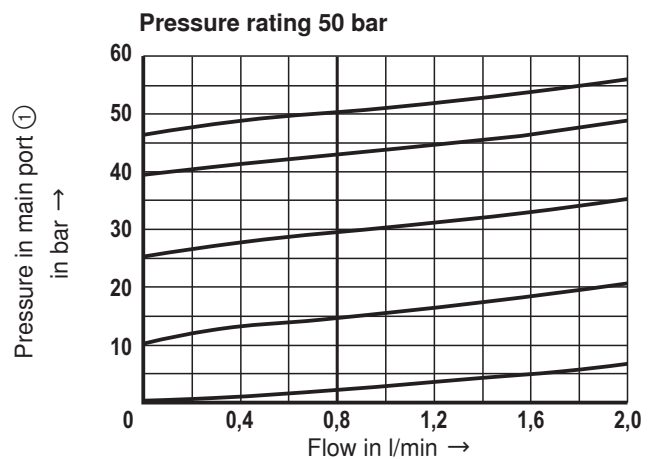
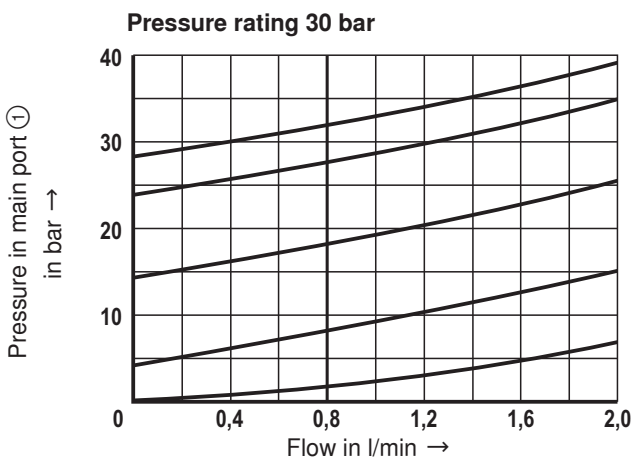
**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

**Pressure in main port ① depending on the command value. Flow = 0.8 l/min**



**Pressure in main port ① depending on the flow.**

(The characteristic curve was measure without counter pressure in main port ②.)

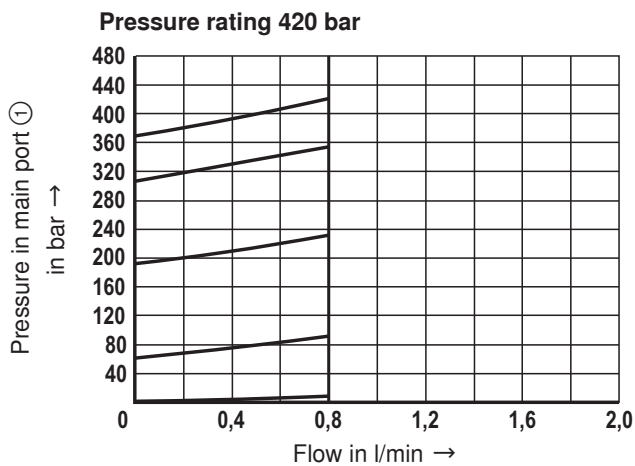
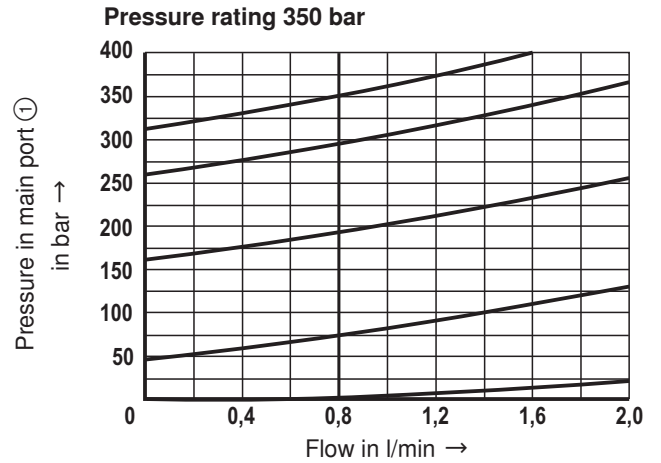
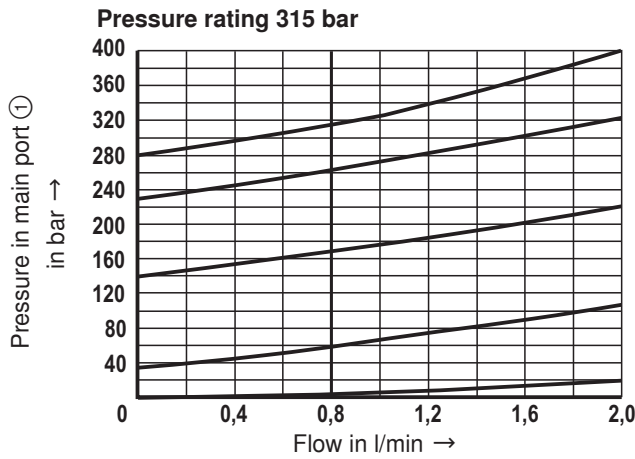
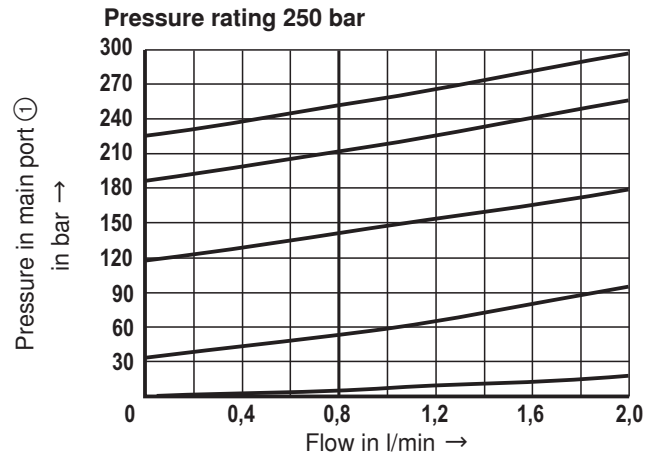
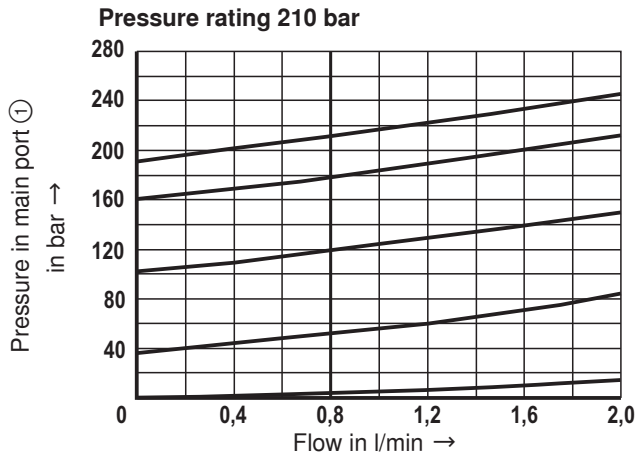




**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

**Pressure in main port ① depending on the flow.**

(The characteristic curve was measured without counter pressure in main port ②.)

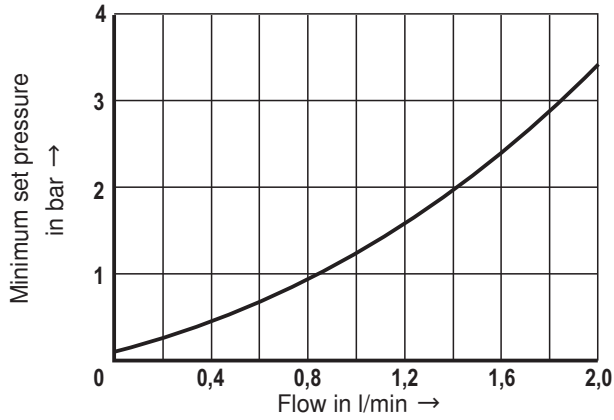


**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

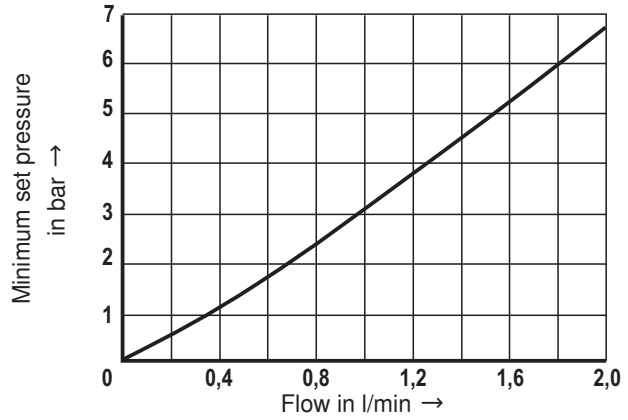
**Minimum set pressure in main port ① with command value 100 %.**

(The characteristic curve was measure without counter pressure in main port ②.)

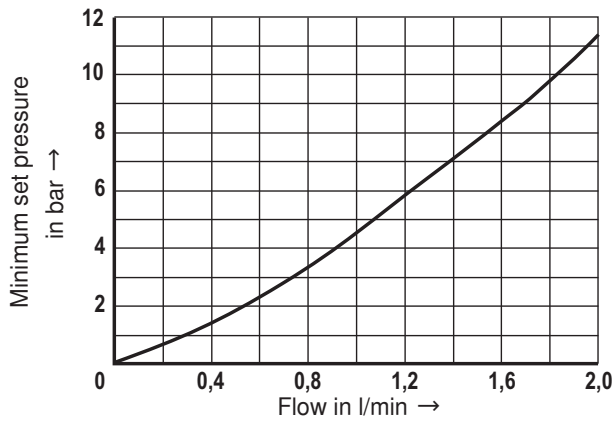
**Pressure rating 30 bar**



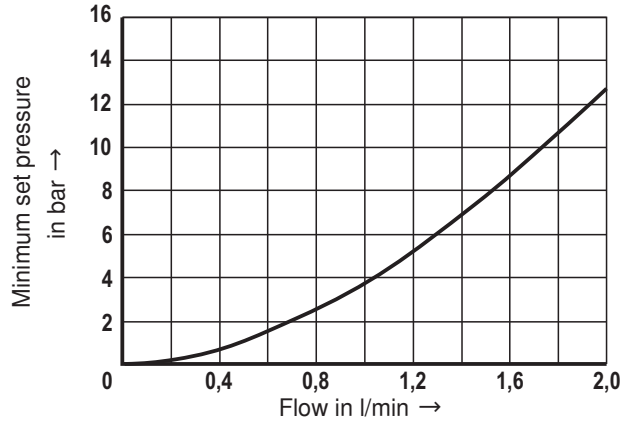
**Pressure rating 50 bar**



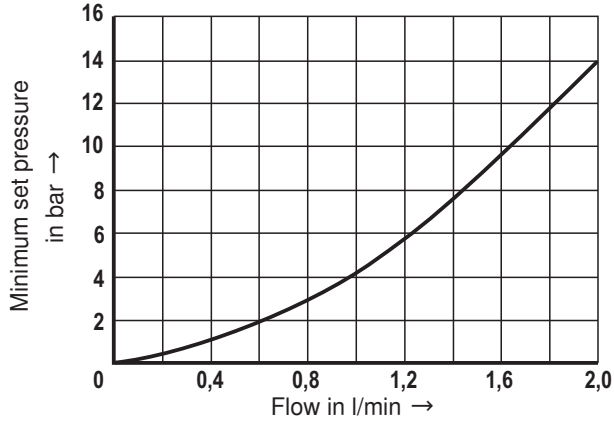
**Pressure rating 100 bar**



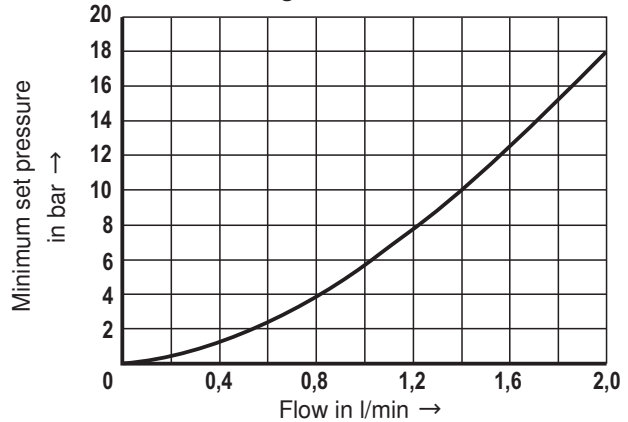
**Pressure rating 150 bar**



**Pressure rating 210 bar**

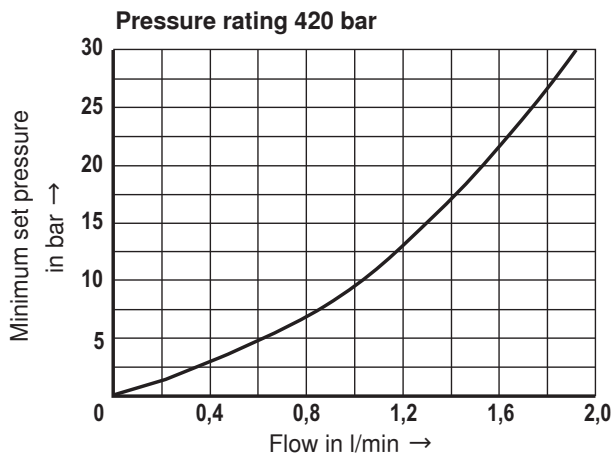
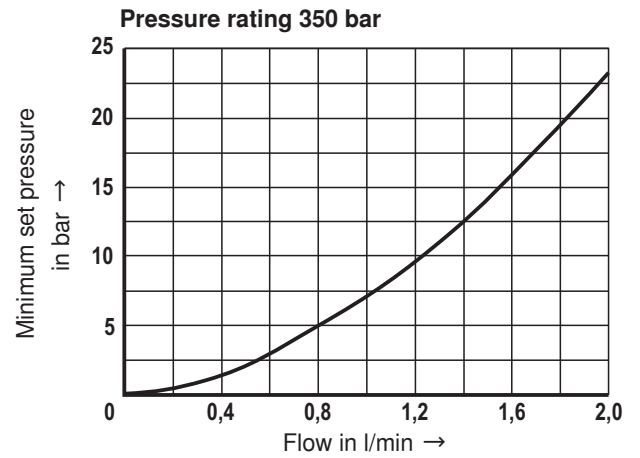
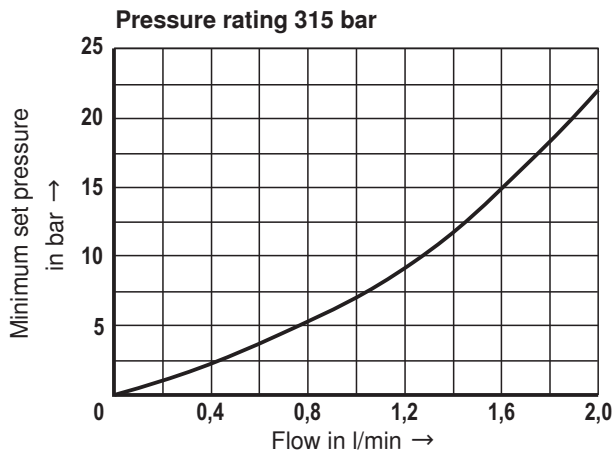


**Pressure rating 250 bar**



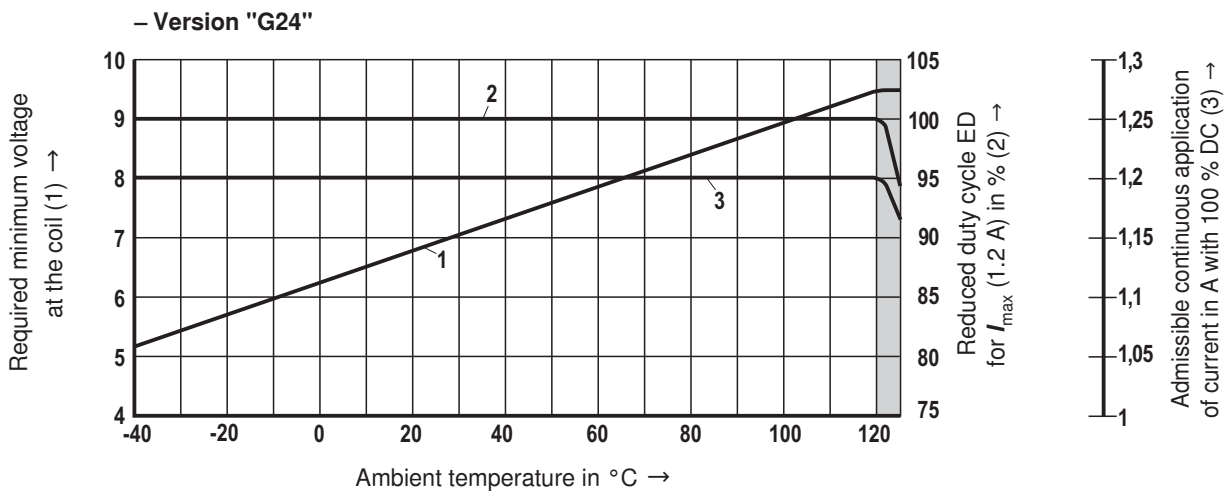
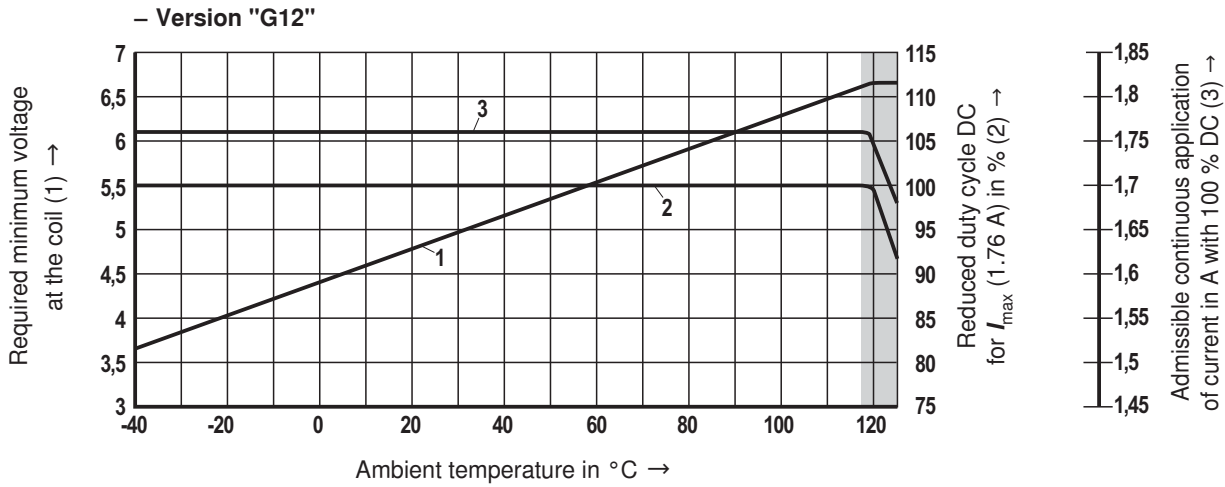
**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

**Minimum set pressure in main port ① with command value 100 %.**  
 (The characteristic curve was measure without counter pressure in main port ②.)



## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range against the ambient temperature



Limited valve performance

**Notice!**

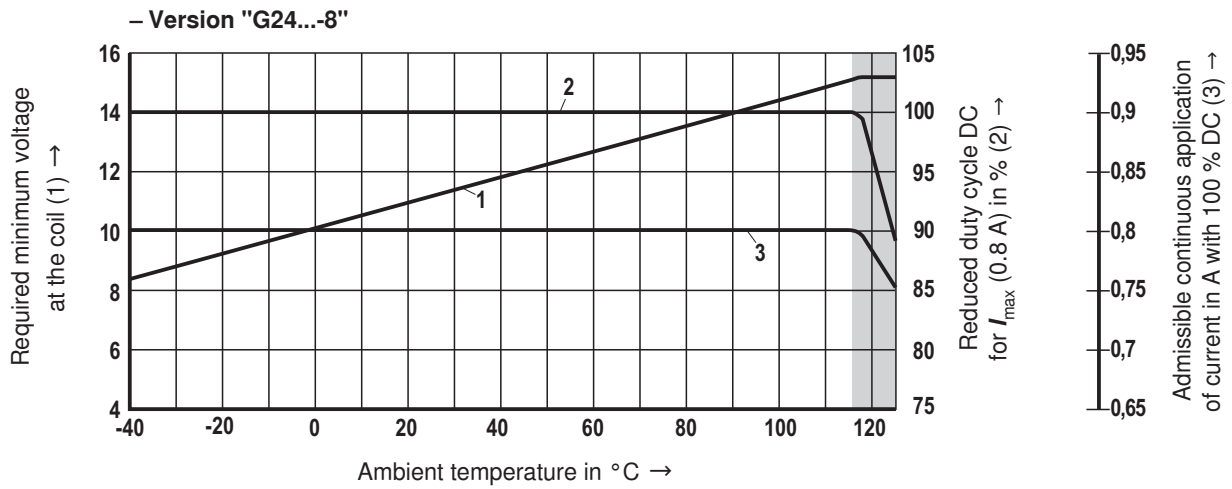
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range against the ambient temperature



Limited valve performance

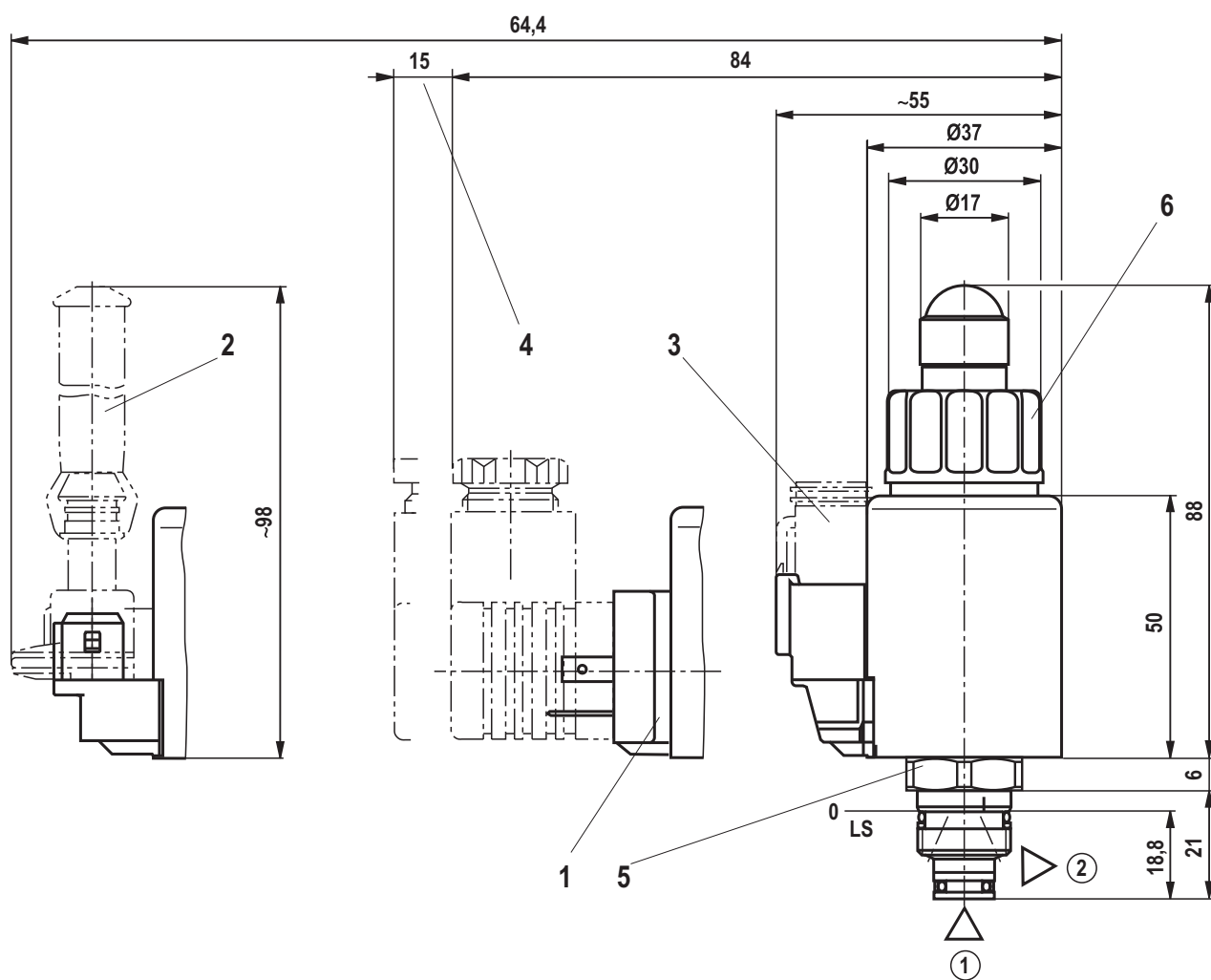
**Notice!**

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

## Unit dimensions (dimensions in mm)



① = main port 1

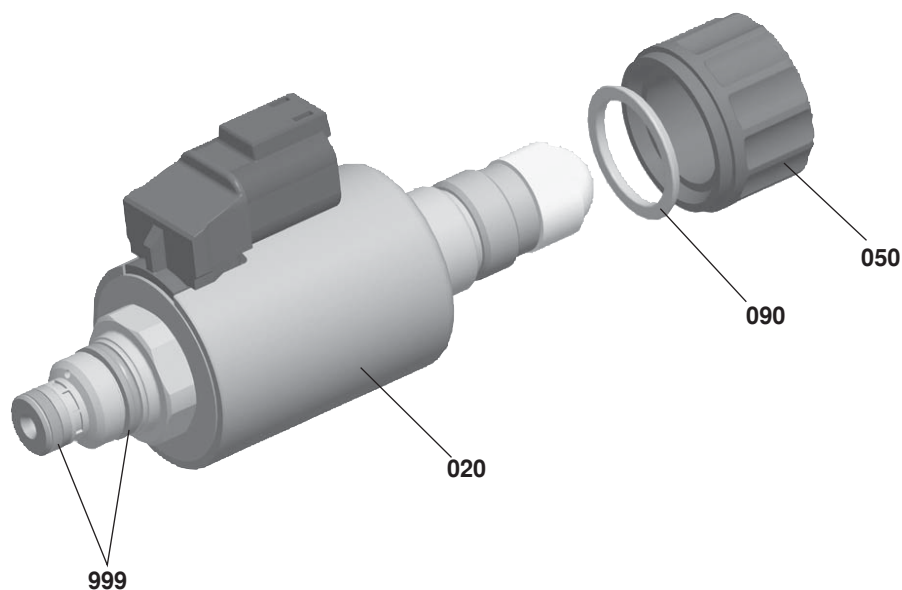
② = main port 2

LS = Location Shoulder

- 1 Mating connector for connector "K4"  
(separate order, see data sheet 08006)
- 2 Mating connector for connector "C4"  
(separate order, see data sheet 08006)
- 3 Mating connector for connector "K40"  
(separate order, see data sheet 08006)
- 4 Space required to remove the mating connector
- 5 Hexagon SW22 for screwing in the  
pole tube; tightening torque  $M_A = 40^{+6}$  Nm
- 6 Solenoid nut, tightening torque  $M_A = 5^{+1}$  Nm



## Available individual components



Item	Denomination		Direct voltage	Material no.
020	Coil for individual connection <sup>1)</sup>	Version "K4"	12 V	R901002932
			24 V	R901002319
			24 V / 800 mA	R901049962
	Version "K40"	12 V	R901003055	
		24 V	R901003053	
		24 V / 800 mA	R901050010	
	Version "C4"	12 V	R901003044	
		24 V	R901003026	
		24 V / 800 mA	R901049963	
050	Nut		R900992146	
090	Seal ring for pole tube		R900007769	
998	Seal kit of the valve		R961000376	

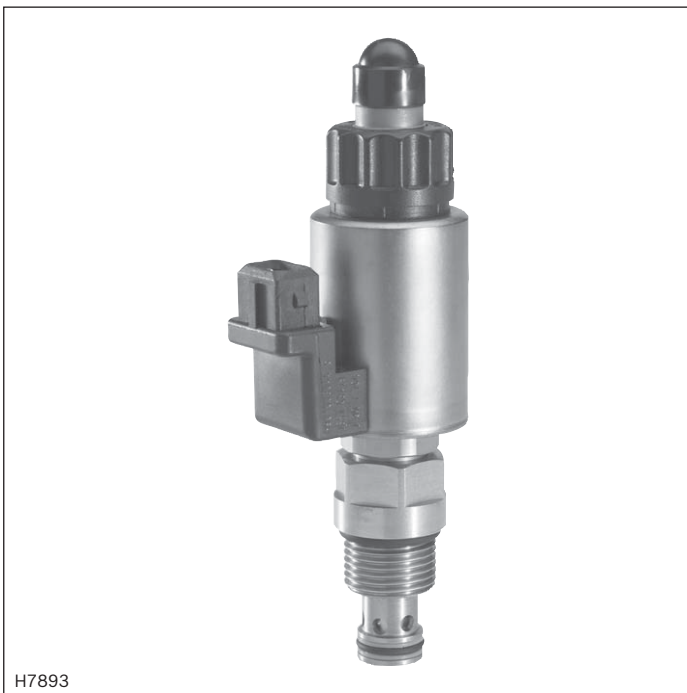
<sup>1)</sup> **Notice!**

After exchange of the solenoid coil, the pressure set in the factory may change by  $\pm 5\%$ .



# Proportional pressure relief valve, pilot operated, increasing characteristic curve

## Type KBVS.1A



- ▶ Component size 1
- ▶ Component series A
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 80 l/min

### Features

- ▶ Cartridge valve
- ▶ Mounting cavity R/UNF10-01-0-06
- ▶ Pilot operated proportional valve for system pressure limitation
- ▶ Suitable for mobile and industrial applications
- ▶ Operation by means of proportional solenoid with central thread and detachable coil
- ▶ Rotatable solenoid coil
- ▶ Via an adjustment screw, the valve is set to maximum pressure
- ▶ In case of power failure, the minimum pressure is set
- ▶ Fine adjustment of the command value pressure characteristic curve possible from the outside at the control electronics

### Contents

Features	1
Ordering code	2
Valve types	3
Function, symbol	4
Technical data	5 ... 7
Characteristic curves	8
Minimum terminal voltage at the coil and relative duty cycle	9, 10
Unit dimensions	11
Mounting cavity	12
Available individual components	13
More information	13

**Ordering code**

01	02	03	04	05	06	07	08	09	10	11	12
<b>KBVS</b>		<b>1</b>	<b>A</b>	<b>A</b>	<b>/</b>	<b>F</b>	<b>C</b>		<b>V</b>		<b>*</b>

01	Proportional pressure relief valve, pilot operated	<b>KBVS</b>
----	--	-------------

**Pressure rating**

02	Up to 50 bar	<b>C</b>
	Up to 100 bar	<b>F</b>
	Up to 150 bar	<b>H</b>
	Up to 210 bar	<b>L</b>
	Up to 250 bar	<b>N</b>
	Up to 315 bar	<b>P</b>
	Up to 350 bar	<b>R</b>
	Up to 420 bar	<b>T</b>

03	Component size 1	<b>1</b>
----	------------------	----------

04	With a command value = 0, the minimum pressure is set	<b>A</b>
----	---	----------

05	Component series	<b>A</b>
----	------------------	----------

06	High Performance and mounting cavity R/UNF-10-01-0-06 (see page 11)	<b>F</b>
----	---	----------

07	Proportional solenoid, wet-pin	<b>C</b>
----	--------------------------------	----------

**Supply voltage**

08	Control electronics 12 V DC	<b>G12</b>
	Control electronics 24 V DC	<b>G24</b>

**Electrical connection**

09	<b>Without</b> mating connector, with connector according to DIN EN 175301-803	<b>K4</b>
	<b>Without</b> mating connector, with connector DT 04-2PA (Deutsch connector)	<b>K40</b>
	<b>Without</b> mating connector, with connector AMP Junior-Timer	<b>C4</b>

**Seal material**

10	FKM seals	<b>V</b>
	(other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!	

11	Standard version	<b>no code</b>
	Coil 800 mA (see page 6)	<b>-8</b>

12	Further details in the plain text	<b>*</b>
----	-----------------------------------	----------

<sup>1)</sup> Mating connectors, separate order, see data sheet 08006.

**Valve types**

Type	Material no.	Type	Material no.
KBVSC1AA/FCG24K40V	R901290550	KBVSN1AA/FCG24K40V	R901290569
KBVSF1AA/FCG24K40V	R901290561	KBVSP1AA/FCG24K40V	R901290570
KBVSH1AA/FCG24K40V	R901290562	KBVSR1AA/FCG24K40V	R901290580
KBVSL1AA/FCG24K40V	R901290567	KBVST1AA/FCG24K40V	R901290585

## Function, symbol

### General

Valves of type KBVS are pilot operated proportional pressure relief valves in spool design and are used to limit the pressure in hydraulic systems. They mainly consist of the screwed-in proportional pilot control valve (1) and the main valve (2).

These valves can be used for infinitely adjusting the pressure to be limited depending on the command value. With command value 0 or in case of power failure, the minimum pressure is set.

### Function

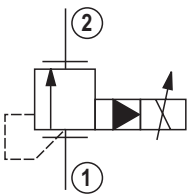
For the proportional increase in the system pressure, a command value is specified at the control electronics. The electronics control the solenoid coil with electric current depending on the command value, which via the pilot control valve (1) and the main valve (2) causes the actual pressure adjustment in main port ①.

( $p_{max}$  = command value max;  $p_{min}$  = command value 0)

#### Notice!

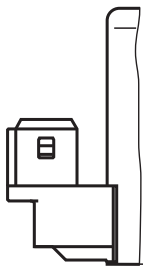
Occurring tank pressures (main port ②) are added up to the set values in main port ①.

### Symbol

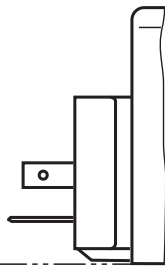


- ① = Main port 1
- ② = Main port 2

Version "C4"

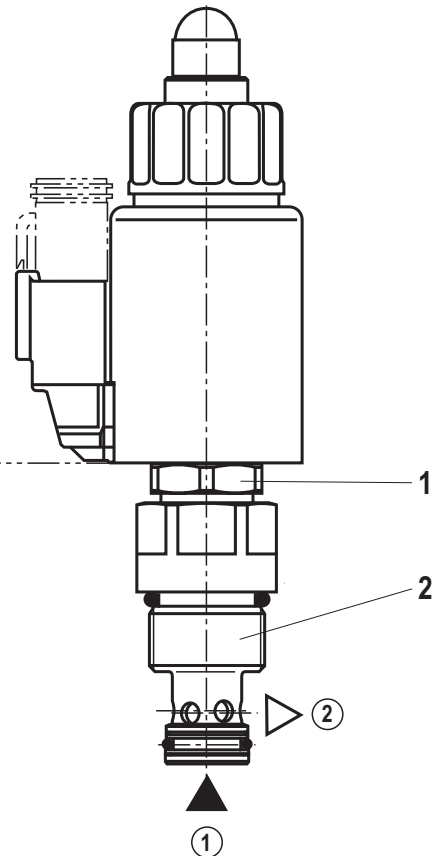


Version "K4"



Version "K40"

(with mating connector)



Type KBVS.1A..

**Technical data** (For applications outside these parameters, please consult us!)

<b>general</b>		
Weight	kg	0.75
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	-40 to +120 (see page 8 and 9)
Storage temperature	°C	-20 to +80

**Environmental audits**

<b>Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Y)</b>		
DIN EN 60068-2-6: 05/96	Vibrations, sine-shaped	10 cycles (5 Hz to 2000 Hz back to 5 Hz) with logarithmic frequency changing speed of 1 octave/min, 5 to 57 Hz, amplitude 1.6 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibrations (random) and broad-band noise	20 to 2000 Hz, amplitude 0.1 g <sup>2</sup> /Hz (14 g RMS/30 g peak), testing time 24 h
DIN EN 60068-2-27: 03/95	Shocking	Half-sine 15 g / 11 ms; 3 x in positive, 3 x in negative direction (a total of 6 single shocks)
DIN EN 60068-2-29: 03/95	Bump test	Half-sine 15 g / 11 ms; 1000 x in positive, 1000 x in negative direction (a total of 2000 single shocks)


Indication per axis

<b>Climatic test according to EN 60068-2 / IEC 60068-2 (environmental audit)</b>		
DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, duration 16 h
DIN EN 60068-2-2: 08/94		+110 °C, duration 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles -25 °C, duration 2 h
DIN EN 60068-2-2: 08/94	Dry heating test	2 cycles +120 °C, duration 2 h
IEC 60068-2-30: 1985	Humid heat, cyclic	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles à 24 h
<b>Salt spray test according to DIN 50021</b>		h 720

→ Coating generally not necessary. If paint is applied nevertheless, the reduced heat dissipation capacity is to be observed.

**Technical data** (For applications outside these parameters, please consult us!)

hydraulic			
Maximum operating pressure <sup>1)</sup>	– Main port ①	bar	420
Maximum admissible return flow pressure	– Main port ②	bar	210
Maximum set pressure <sup>2)</sup>			See command value pressure characteristic curves page 7
Maximum set pressure with command value 0			See characteristic curves page 7
Maximum flow		l/min	80
Pilot oil		l/min	< 0.8
Leakage		ml/min	< 200 (with $\Delta p = 250$ bar; closed pilot control valve and HLP46, $\vartheta_{oil} = 40$ °C)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm <sup>2</sup> /s	5 to 400 (preferably 10 to 100)
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>3)</sup>
Load cycles			10 million
Hysteresis <sup>4)</sup>			< 4 % of the max. set pressure
Turnover voltage <sup>4)</sup>			< 0.5 % of the max. set pressure
Response sensitivity <sup>4)</sup>			< 0.5 % of the max. set pressure
Manufacturing tolerance of the command value pressure characteristic curve	– Command value 100 %		< 5 % of the max. set pressure
	– Command value 0		< 2 % of the max. set pressure
Step response ( $T_u + T_g$ ) 0 → 100 % and/or 100 % → 0		ms	100 (depending on the system)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	VDMA 24568
	– Soluble in water	HEPG	
 <b>Important information on hydraulic fluids!</b> ▶ For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us! ▶ There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)! ▶ The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature.		▶ <b>Bio-degradable:</b> When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.	

- <sup>1)</sup> The maximum operating pressure is added up from the set pressure and the return flow pressure!
- <sup>2)</sup> The valves are factory-set. In case of subsequent adjustment, the warranty will become invalid!
- <sup>3)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

- <sup>4)</sup> Measured with analog amplifier type RA2-1/10, see data sheet 95230 (PWM = 300 Hz).

**Technical data** (For applications outside these parameters, please consult us!)

<b>electric</b>					
Voltage type		Direct voltage			
Supply voltages	V	12 DC	24 DC	"-8" / 24 DC	
Maximum solenoid current	mA	1760	1200	800	
Coil resistance	- Cold value at 20 °C	Ω	2.3	4.8	11.5
	- Max. hot value	Ω	3.8	7.9	18.9
Duty cycle	%	See characteristic curve page 8 and 9 <sup>5)</sup>			
Maximum coil temperature <sup>6)</sup>	°C	150			
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"	IP 65 with mating connector mounted and locked			
	- Version "C4"	IP 66 with mating connector mounted and locked			
		IP 69K with Rexroth mating connector (material no. R901022127)			
	- Version "K40"	IP 69K with mating connector mounted and locked			
Control electronics (separate order)		Plug-in proportional amplifier type VT-SSPA1...	Data sheet 30116		
		Analog amplifier type RA...	Data sheet 95230		
		BODAS control unit type RC...	Data sheet 95200		
Recommended dither frequency (PMW)	Hz	300			
Design according to VDE 0580					

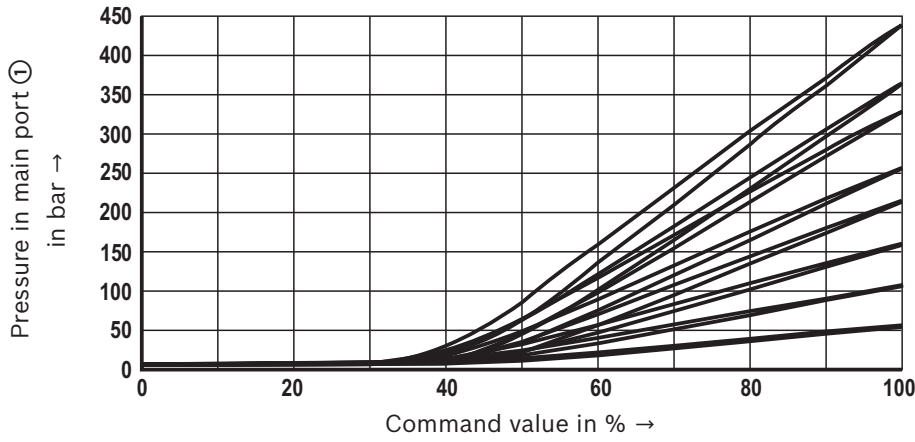
<sup>5)</sup> In case of use in altitudes > 2000 m a.s.l., we recommend consulting the manufacturer.

<sup>6)</sup> Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

**When establishing the electrical connection, the protective earthing conductor (PE  $\perp$ ) has to be connected properly.**

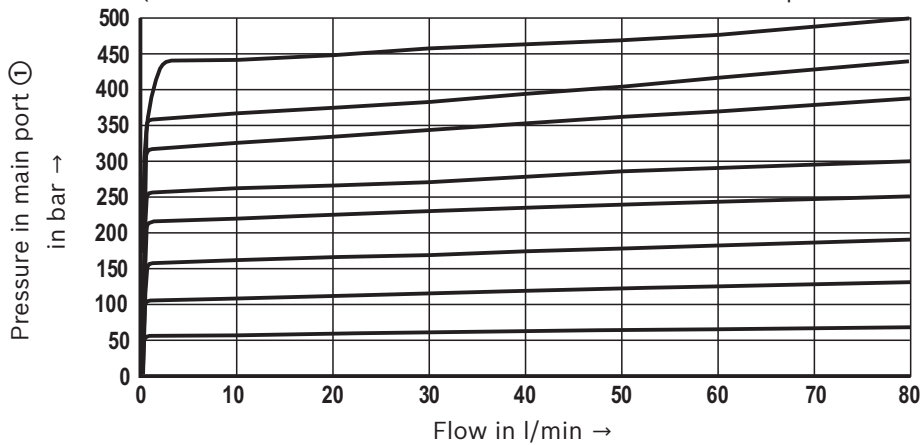
**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

**Pressure in main port ① depending on the command value; flow = 10 l/min**



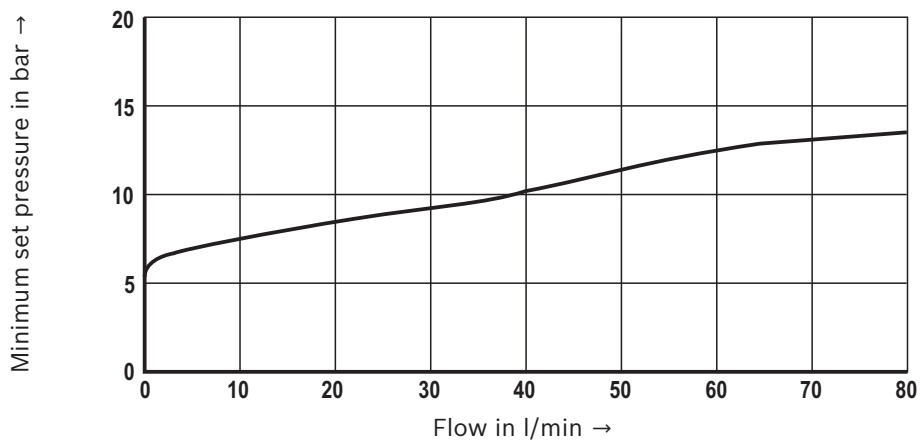
**Pressure in main port ① depending on the flow.**

(The characteristic curves were measured without back pressure in main port ②)



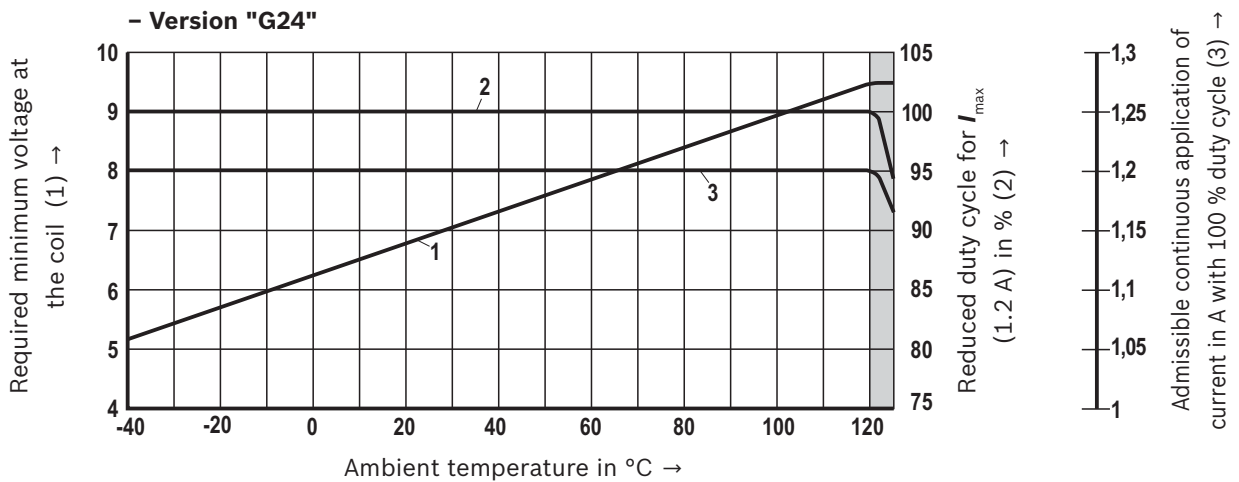
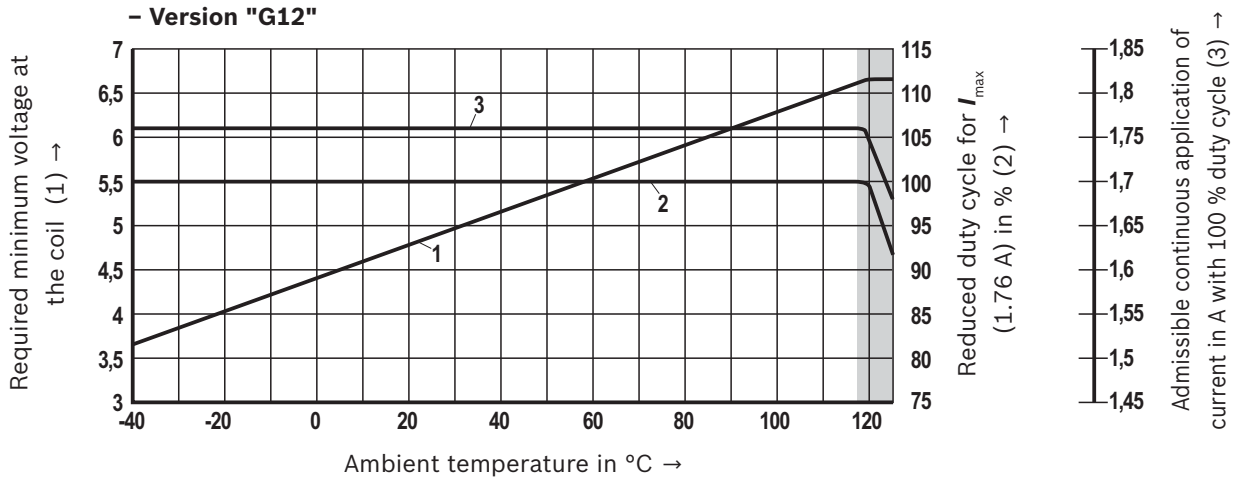
**Minimum set pressure in the main port ① depending on the flow.**

(The characteristic curves were measured without back pressure in main port ②)



## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range depending on the ambient temperature



Limited valve performance

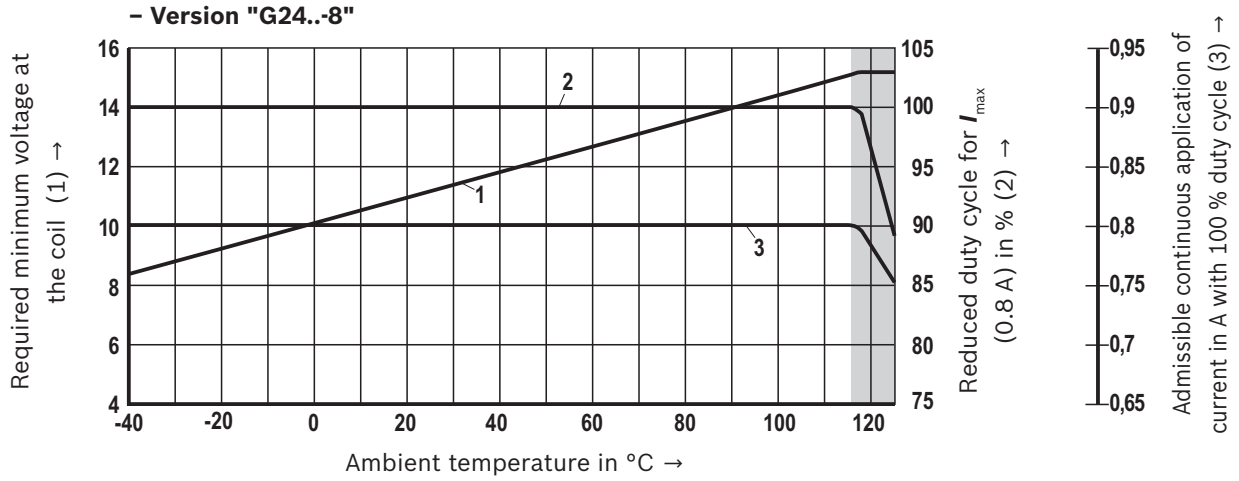
**Notice!**

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air. Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened. In single cases, more unfavorable conditions may lead to limitations of the area of application.



## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range depending on the ambient temperature

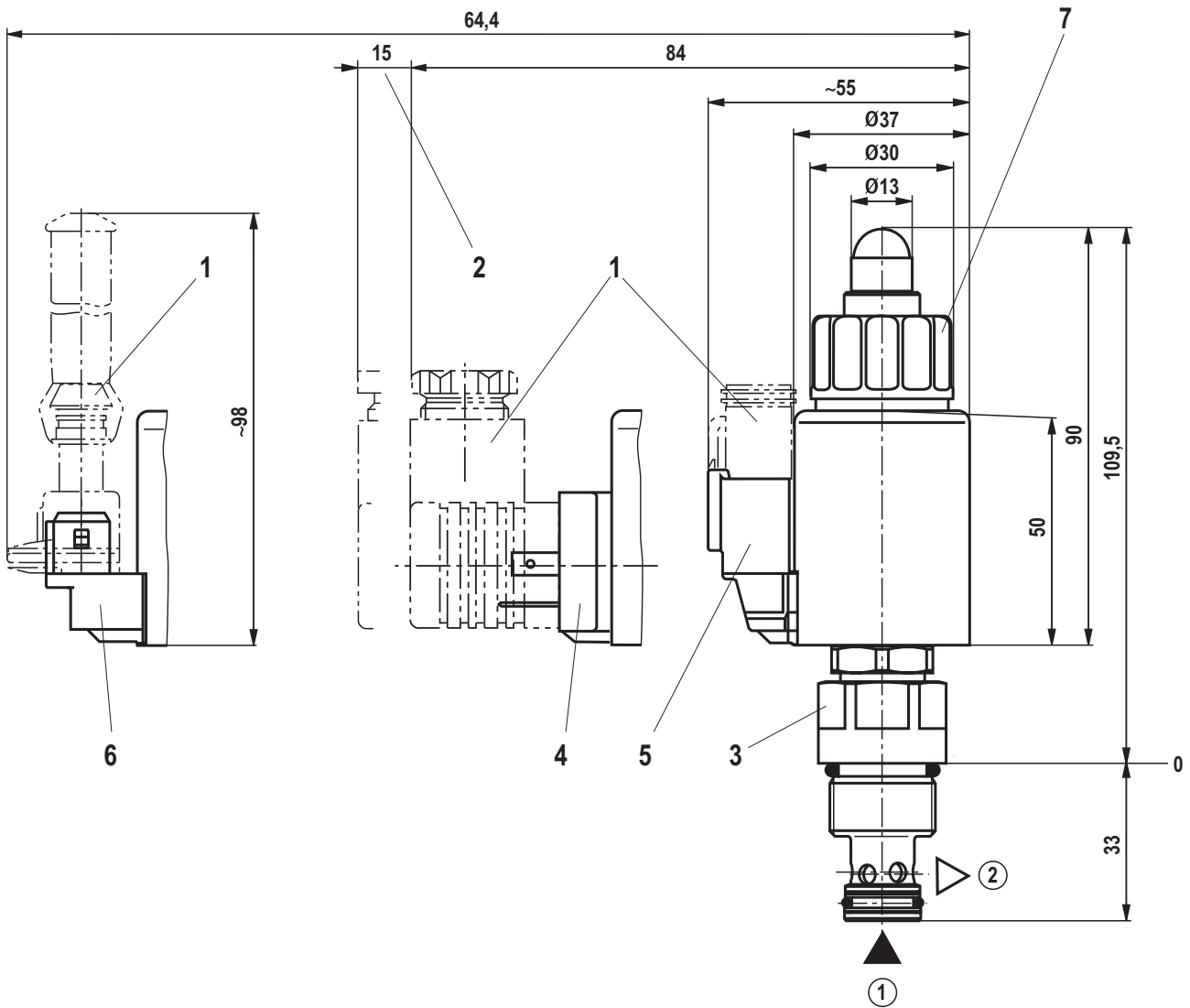


Limited valve performance

**Notice!**

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air. Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened. In single cases, more unfavorable conditions may lead to limitations of the area of application.

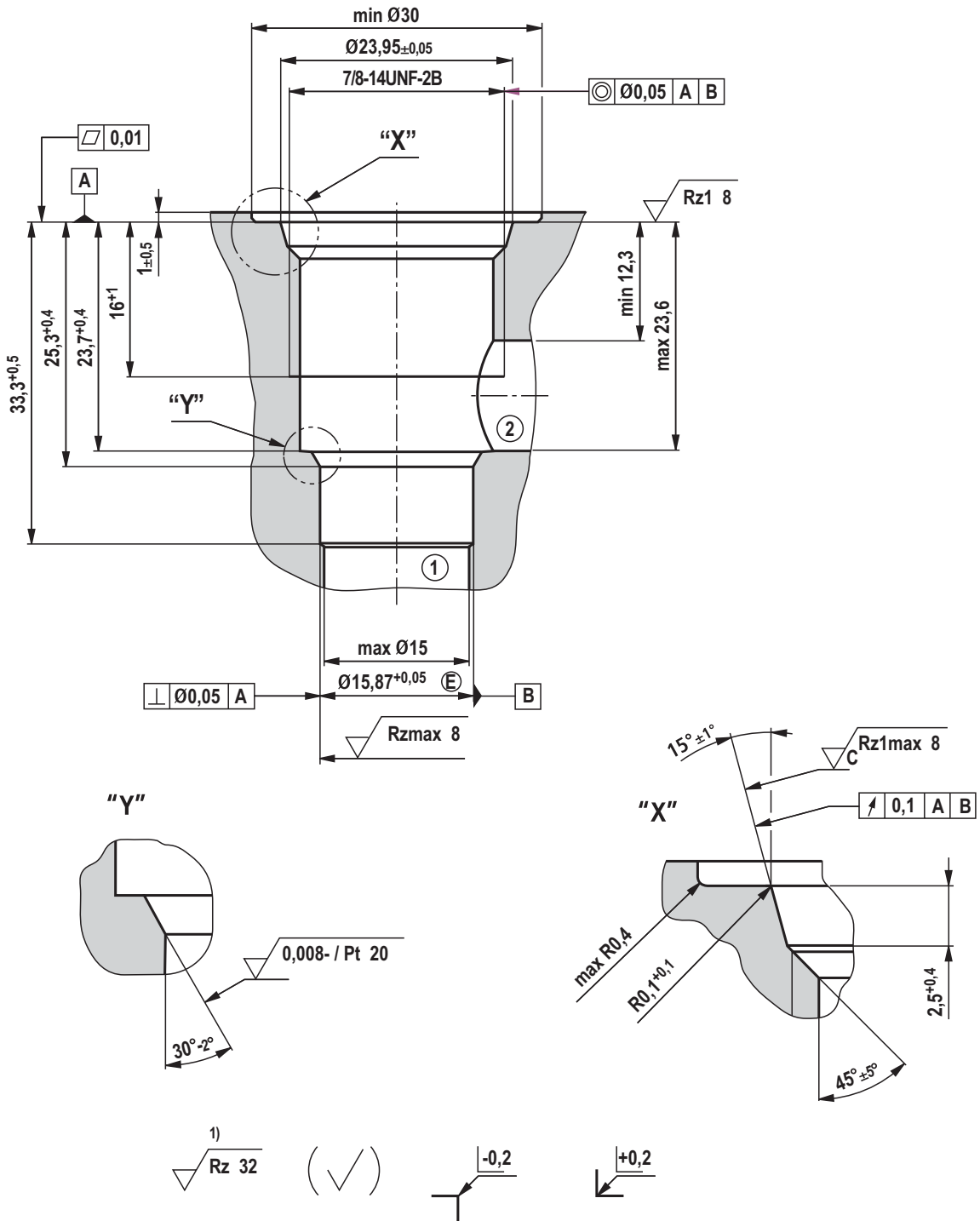
**Unit dimensions** (dimensions in mm)



- 1 Mating connectors, separate order, see data sheet 08006
- 2 Space required to remove the mating connector
- 3 SW24, tightening torque  $M_A = 55^{+5}$  Nm
- 4 Version "K4"
- 5 Version "K40"
- 6 Version "C4"
- 7 Nut, tightening torque  $M_A = 5^{+1}$  Nm

- ① = Main port 1
- ② = Main port 2

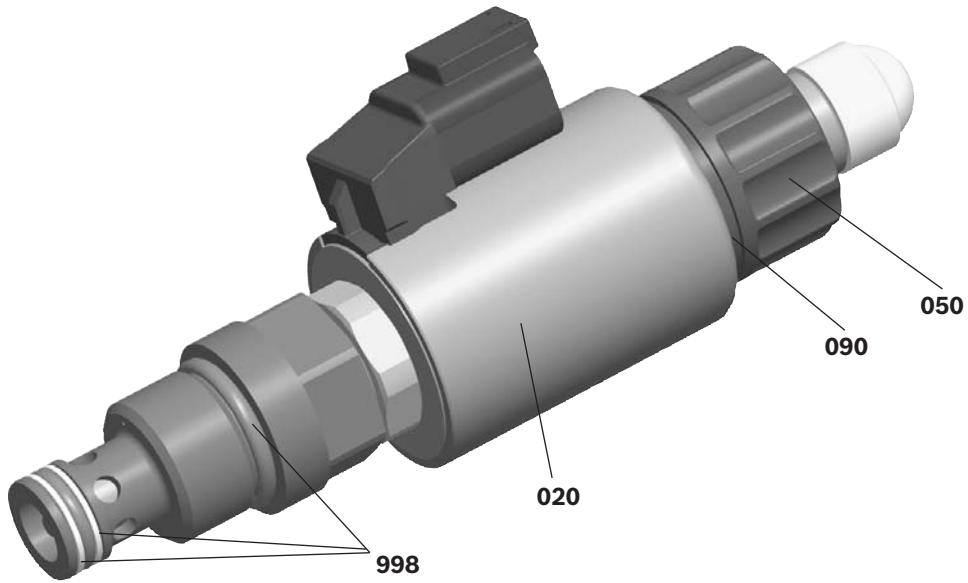
Mounting cavity R/UNF-10-01-0-06; 2 main ports; thread 7/8-14UNF-2B (dimensions in mm)



1) Visual inspection

- ① = Main port 1
- ② = Main port 2

### Available individual components



Item	Denomination		Direct voltage	Material no.
020	Coil for individual connection <sup>1)</sup>	K4	12 V 24 V / 1200 mA 24 V / 800 mA	R901002932 R901002319 R901049962
		K40	12 V 24 V / 1200 mA 24 V / 800 mA	R901003055 R901003053 R901050010
		C4	12 V 24 V / 1200 mA 24 V / 800 mA	R901003044 R901003026 R901049963
050	Nut			R900992146
090	Seal ring for pole tube			R900007769
998	Seal kit of the valve			R901006735

<sup>1)</sup> After exchange of the solenoid coil, the pressure set in the factory may change by  $\pm 5\%$ .

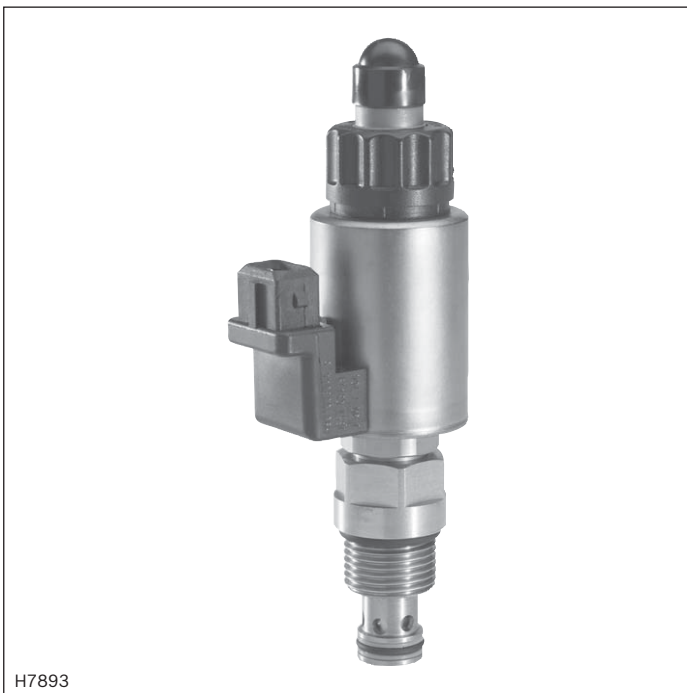
### More information

- ▶ Control electronics:
  - Plug-in proportional amplifier type VT-SSPA1...
  - Analog amplifier type RA...
  - BODAS control unit type RC...
- ▶ Selection of the filters

Data sheet 30116  
Data sheet 95230  
Data sheet 95200

# Proportional pressure relief valve, pilot operated, decreasing characteristic curve

## Type KBVS.1B



- ▶ Component size 1
- ▶ Component series A
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 80 l/min

### Features

- ▶ Cartridge valve
- ▶ Mounting cavity R/UNF10-01-0-06
- ▶ Pilot operated proportional valve for system pressure limitation
- ▶ Suitable for mobile and industrial applications
- ▶ Operation by means of proportional solenoid with central thread and detachable coil
- ▶ Rotatable solenoid coil
- ▶ Via an adjustment screw, the valve is set to maximum pressure
- ▶ In case of power failure, the maximum pressure set results
- ▶ Fine adjustment of the command value pressure characteristic curve possible from the outside at the control electronics

### Contents

Features	1
Ordering code	2
Valve types	3
Available coils	3
Function, symbol	4
Technical data	5 ... 7
Characteristic curves	8
Minimum terminal voltage at the coil and relative duty cycle	9, 10
Unit dimensions	11
Mounting cavity	12
Available individual components	13
More information	13

**Ordering code** (valve without coil) <sup>1)</sup>

01	02	03	04	05	06	07	08	09	10	11	12
<b>KBVS</b>		<b>1</b>	<b>B</b>	<b>A</b>	<b>/</b>	<b>F</b>	<b>C</b>		<b>V</b>		<b>*</b>

01	Proportional pressure relief valve, pilot operated	<b>KBVS</b>
----	--	-------------

**Pressure rating**

02	Up to 50 bar	<b>C</b>
	Up to 100 bar	<b>F</b>
	Up to 150 bar	<b>H</b>
	Up to 210 bar	<b>L</b>
	Up to 250 bar	<b>N</b>
	Up to 315 bar	<b>P</b>
	Up to 350 bar	<b>R</b>
	Up to 420 bar	<b>T</b>

03	Component size 1	<b>1</b>
----	------------------	----------

04	With a command value = 0, the maximum pressure is set	<b>B</b>
----	---	----------

05	Component series	<b>A</b>
----	------------------	----------

06	High Performance and mounting cavity R/UNF-10-01-0-06 (see page 11)	<b>F</b>
----	---	----------

**Seal material**

10	FKM seals	<b>V</b>
	(other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!	

12	Further details in the plain text	<b>*</b>
----	-----------------------------------	----------

**Valve types** (without coil) <sup>1)</sup>

Type	Material no.	Type	Material no.
KBVSC1BA/FV	R901325098	KBVSN1BA/FV	R901325107
KBVSF1BA/FV	R901325099	KBVSP1BA/FV	R901325109
KBVSH1BA/FV	R901325102	KBVSR1BA/FV	R901325111
KBVSL1BA/FV	R901325105	KBVST1BA/FV	R901325112

**Available coils** (separate order) <sup>1)</sup>

	Material no. for coil with connector <sup>2)</sup>		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, make Deutsch	"C4" 02pol C4/Z30 AMP Junior-Timer
Direct voltage DC <sup>3)</sup>			
12 V	R901002932	R901003055	R901003044
24 V / 1200 mA	R901002319	R901003053	R901003026
24 V / 800 mA	R901049962	R901050010	R901049963

<sup>1)</sup> Complete valves with mounted coil upon request

<sup>2)</sup> Mating connectors, separate order, see data sheet 08006.

<sup>3)</sup> Other voltages upon request.

## Function, symbol

### General

Valves of type KBVS are pilot operated proportional pressure relief valves in spool design and are used to limit the pressure in hydraulic systems. They mainly consist of the screwed-in proportional pilot control valve (1) and the main valve (2).

These valves can be used for infinitely adjusting the pressure to be limited depending on the command value. With command value 0 or in case of power failure, the maximum pressure is set (fail-safe characteristics).

### Function

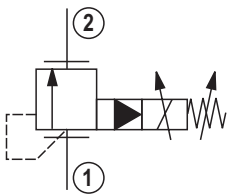
In the factory, the valves are mechanically set to the maximum pressure. For the proportional reduction of the system pressure, a command value is specified at the control electronics. The electronics control the solenoid coil with electric current depending on the command value, which via the pilot control valve (1) and the main valve (2) causes the actual pressure adjustment in main port ①.

( $p_{max}$  = command value 0;  $p_{min}$  = command value max)

#### Notice!

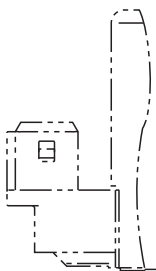
Occurring tank pressures (main port ②) are added up to the set values in main port ①.

### Symbol

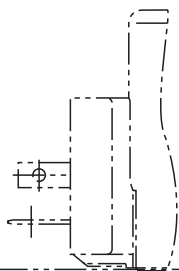


- ① = Main port 1
- ② = Main port 2

Version "C4"

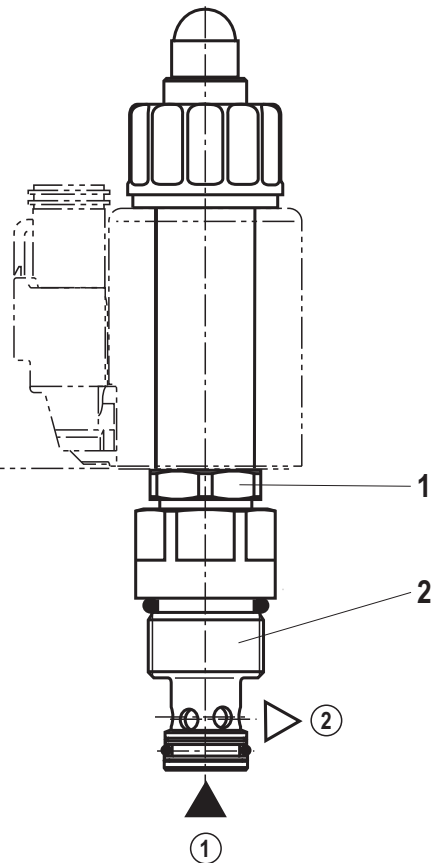


Version "K4"



Version "K40"

(with mating connector)



Type KBVS.1B..

**Technical data** (For applications outside these parameters, please consult us!)

<b>general</b>		
Weight	kg	0.75
Installation position		Any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	-40 to +120 (see page 8 and 9)
Storage temperature	°C	-20 to +80

**Environmental audits**

<b>Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Y)</b>		
DIN EN 60068-2-6: 05/96	Vibrations, sine-shaped	10 cycles (5 Hz to 2000 Hz back to 5 Hz) with logarithmic frequency changing speed of 1 octave/min, 5 to 57 Hz, amplitude 1.6 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibrations (random) and broad-band noise	20 to 2000 Hz, amplitude 0.1 g <sup>2</sup> /Hz (14 g RMS/30 g peak), testing time 24 h
DIN EN 60068-2-27: 03/95	Shocking	Half-sine 15 g / 11 ms; 3 x in positive, 3 x in negative direction (a total of 6 single shocks)
DIN EN 60068-2-29: 03/95	Bump test	Half-sine 15 g / 11 ms; 1000 x in positive, 1000 x in negative direction (a total of 2000 single shocks)

Indication per axis


<b>Climatic test according to EN 60068-2 / IEC 60068-2 (environmental audit)</b>		
DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, duration 16 h
DIN EN 60068-2-2: 08/94		+110 °C, duration 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles -25 °C, duration 2 h
DIN EN 60068-2-2: 08/94	Dry heating test	2 cycles +120 °C, duration 2 h
IEC 60068-2-30: 1985	Humid heat, cyclic	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles à 24 h
<b>Salt spray test according to DIN 50021</b>		h 720

→ Coating generally not necessary. If paint is applied nevertheless, the reduced heat dissipation capacity is to be observed.



**Technical data** (For applications outside these parameters, please consult us!)

hydraulic			
Maximum operating pressure <sup>1)</sup>	– Main port ①	bar	420
Maximum admissible return flow pressure	– Main port ②	bar	210
Maximum set pressure <sup>2)</sup>			See command value pressure characteristic curves page 7
Maximum set pressure with command value 0			See characteristic curves page 7
Maximum flow		l/min	80
Pilot oil		l/min	< 0.8
Leakage		ml/min	< 200 (with $\Delta p = 250$ bar; closed pilot control valve and HLP46, $\vartheta_{oil} = 40$ °C)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	–40 to +80
Viscosity range		mm <sup>2</sup> /s	5 to 400 (preferably 10 to 100)
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>3)</sup>
Load cycles			10 million
Hysteresis <sup>4)</sup>			< 4 % of the max. set pressure
Turnover voltage <sup>4)</sup>			< 0.5 % of the max. set pressure
Response sensitivity <sup>4)</sup>			< 0.5 % of the max. set pressure
Manufacturing tolerance of the command value pressure characteristic curve	– Command value 100 %		< 2 % of the max. set pressure
	– Command value 0		< 5 % of the max. set pressure
Step response ( $T_u + T_g$ ) 0 → 100 % and/or 100 % → 0		ms	100 (depending on the system)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	VDMA 24568
	– Soluble in water	HEPG	
 <b>Important information on hydraulic fluids!</b>		<b>► Bio-degradable:</b> When using bio-degradable hydraulic fluids that are simultaneously zinc-solving, zinc may accumulate in the fluid.	
<ul style="list-style-type: none"> <li>► For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!</li> <li>► There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!</li> <li>► The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature.</li> </ul>			

- <sup>1)</sup> The maximum operating pressure is added up from the set pressure and the return flow pressure!
- <sup>2)</sup> The valves are factory-set. In case of subsequent adjustment, the warranty will become invalid!
- <sup>3)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

- <sup>4)</sup> Measured with analog amplifier type RA2-1/10, see data sheet 95230 (PWM = 300 Hz).

**Technical data** (For applications outside these parameters, please consult us!)

<b>electric</b>					
Voltage type		Direct voltage			
Supply voltages	V	12 DC	24 DC	"-8" / 24 DC	
Maximum solenoid current	mA	1760	1200	800	
Coil resistance	- Cold value at 20 °C	Ω	2.3	4.8	11.5
	- Max. hot value	Ω	3.8	7.9	18.9
Duty cycle	%	See characteristic curve page 8 and 9 <sup>5)</sup>			
Maximum coil temperature <sup>6)</sup>	°C	150			
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	- Version "K4"	IP 65 with mating connector mounted and locked			
	- Version "C4"	IP 66 with mating connector mounted and locked			
		IP 69K with Rexroth mating connector (material no. R901022127)			
	- Version "K40"	IP 69K with mating connector mounted and locked			
Control electronics (separate order)		Plug-in proportional amplifier type VT-SSPA1...	Data sheet 30116		
		Analog amplifier type RA...	Data sheet 95230		
		BODAS control unit type RC...	Data sheet 95200		
Recommended dither frequency (PMW)	Hz	300			
Design according to VDE 0580					

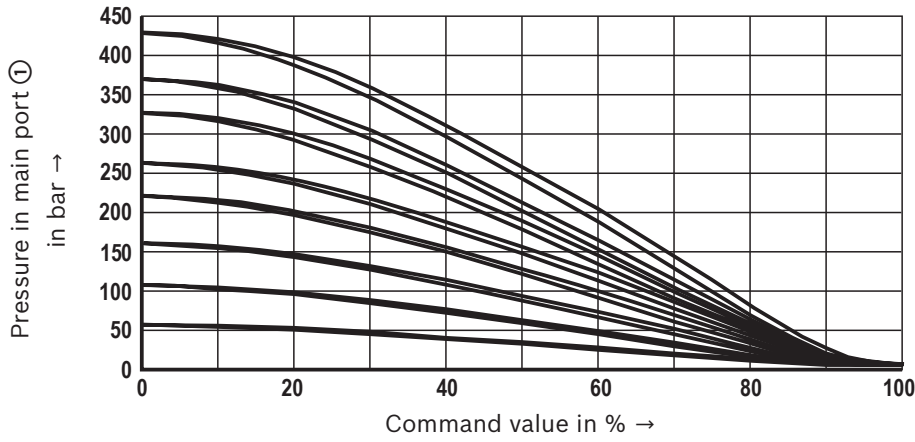
<sup>5)</sup> In case of use in altitudes > 2000 m a.s.l., we recommend consulting the manufacturer.

<sup>6)</sup> Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

**When establishing the electrical connection, the protective earthing conductor (PE  $\perp$ ) has to be connected properly.**

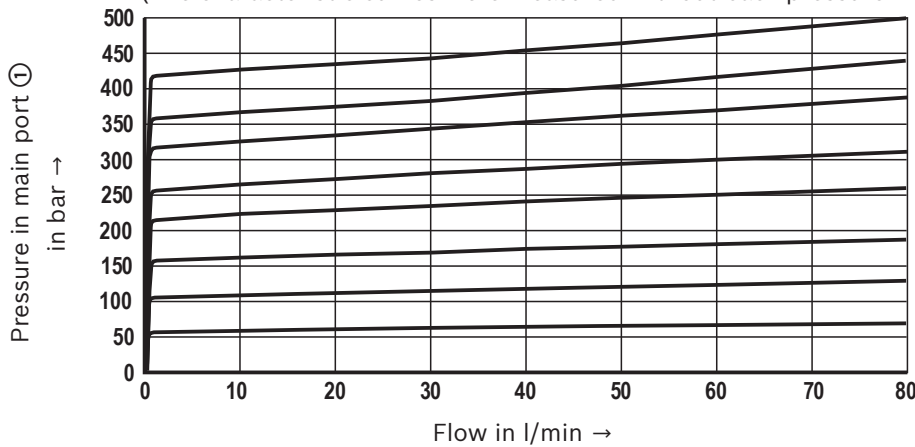
**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

**Pressure in main port ① depending on the command value; flow = 10 l/min**



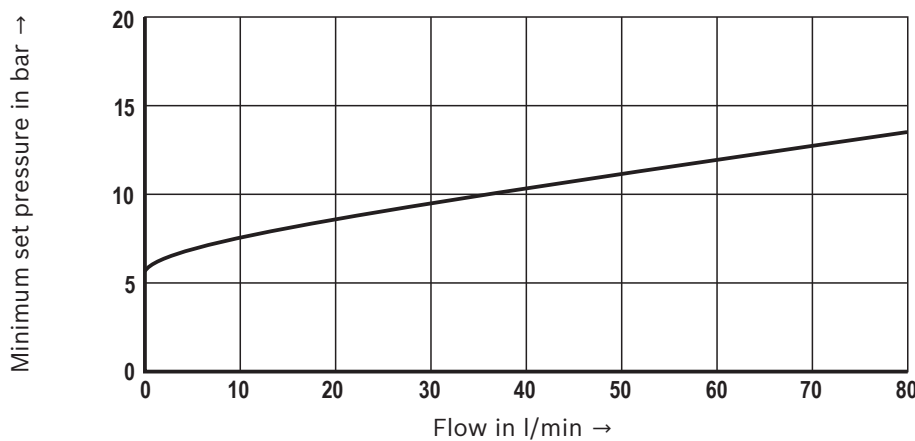
**Pressure in main port ① depending on the flow.**

(The characteristic curves were measured without back pressure in main port ②)



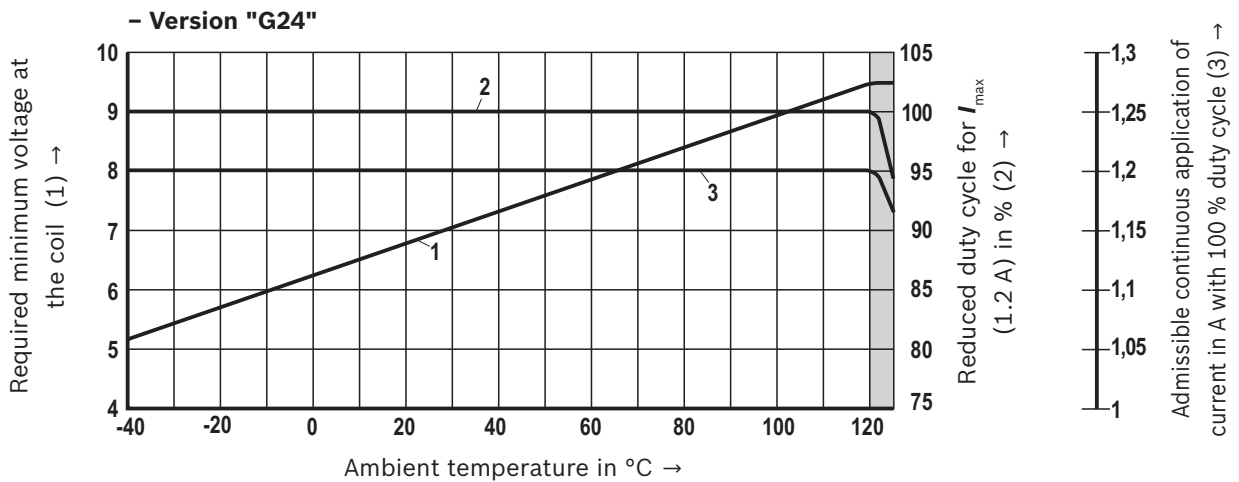
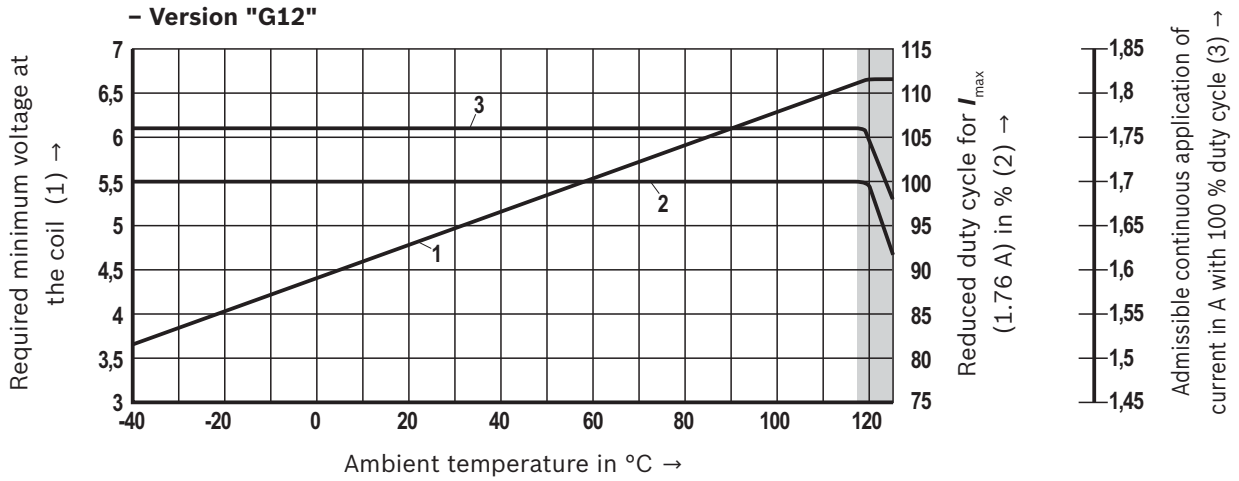
**Minimum set pressure in the main port ① depending on the flow.**

(The characteristic curves were measured without back pressure in main port ②)



## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range depending on the ambient temperature



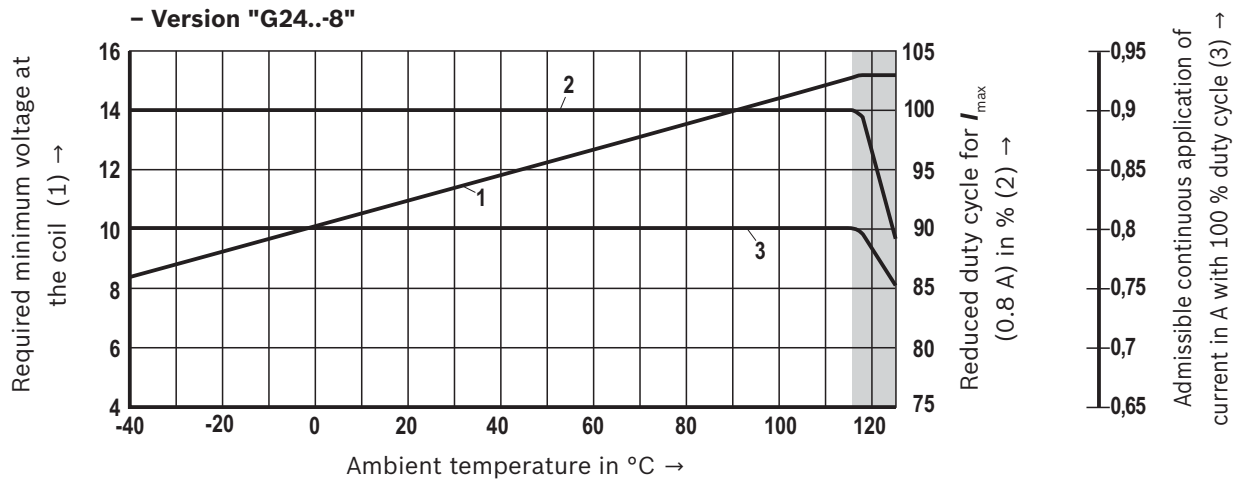
Limited valve performance

**Notice!**

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air. Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened. In single cases, more unfavorable conditions may lead to limitations of the area of application.

## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range depending on the ambient temperature



Limited valve performance

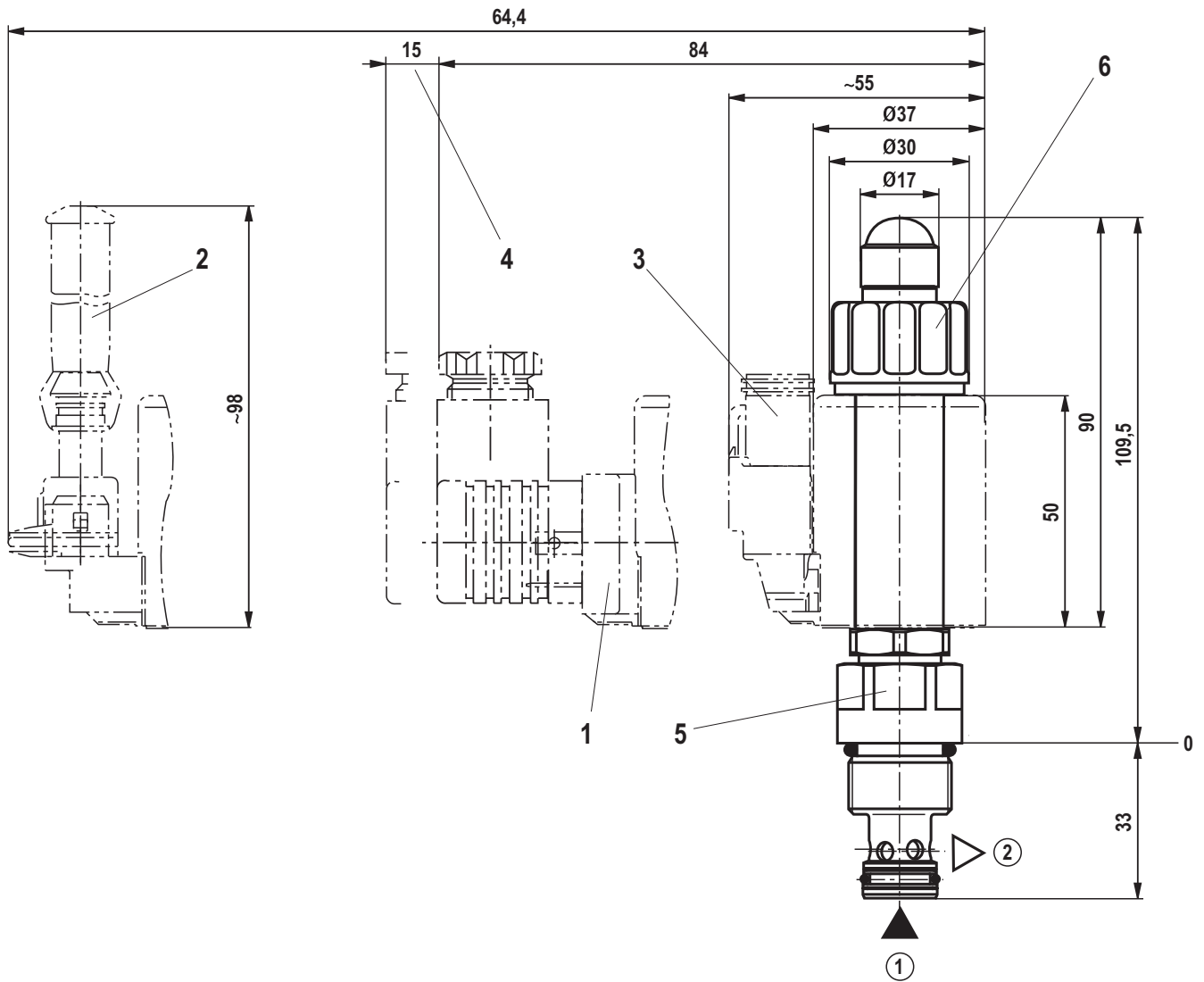
#### Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

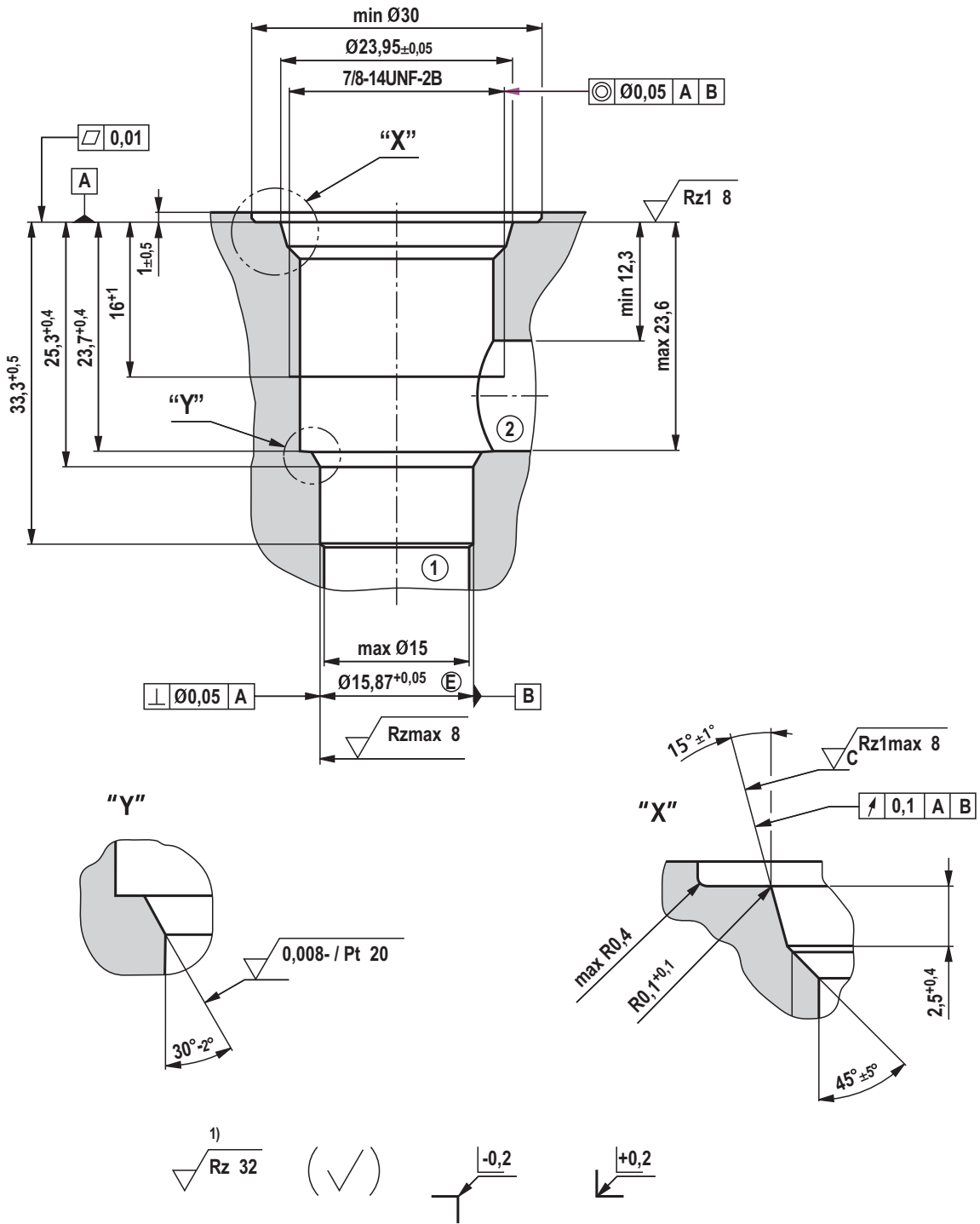
**Unit dimensions** (dimensions in mm)



- 1 Mating connectors, separate order, see data sheet 08006
- 2 Space required to remove the mating connector
- 3 SW24, tightening torque  $M_A = 55^{+5}$  Nm
- 4 Version "K4"
- 5 Version "K40"
- 6 Version "C4"
- 7 Nut, tightening torque  $M_A = 5^{+1}$  Nm

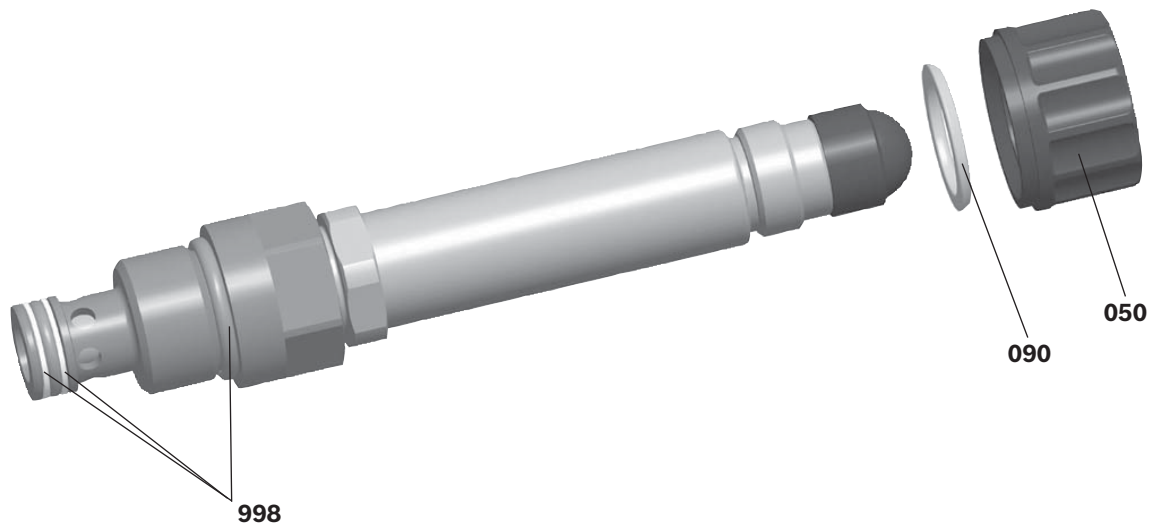
- ① = Main port 1
- ② = Main port 2

Mounting cavity R/UNF-10-01-0-06; 2 main ports; thread 7/8-14UNF-2B (dimensions in mm)



1) Visual inspection

- ① = Main port 1
- ② = Main port 2

**Available individual components**

Item	Denomination	Material no.
050	Nut	R900992146
090	Seal ring for pole tube	R900007769
998	Seal kit of the valve	R901006735

Coils, separate order, see page 2

**More information**

- ▶ Control electronics:
  - Plug-in proportional amplifier type VT-SSPA1...
  - Analog amplifier type RA...
  - BODAS control unit type RC...
- ▶ Selection of the filters

Data sheet 30116

Data sheet 95230

Data sheet 95200

[www.boschrexroth.com/filter](http://www.boschrexroth.com/filter)



# Proportional pressure relief valve, pilot-operated, rising characteristic curve

**Type KBVS.3A** (High-Performance)

Component size 3  
Component series A  
Maximum operating pressure 350 bar  
Maximum flow 200 l/min



H7139

## Overview of contents

Contents	
Features	1
Ordering code	2
Preferred types	2
Function, symbol	3
Technical data	4, 5
Characteristic curves	6
Minimum terminal voltage at the coil and relative duty cycle	7, 8
Unit dimensions	9
Mounting cavity	10
Available individual components	11

## Features

Features	
– Mounting cavity R/ISO 7789-33-01-0-98	1
– Pilot-operated valve for limiting a system pressure	2
– Suitable for mobile and industrial applications	2
– Operation by proportional solenoid	3
– Proportional solenoid with central thread and detachable coil	4, 5
– Cartridge valve	6
– Control electronics: plug-in amplifier VT-SSPA1...	7, 8
– Fine balancing of the command value/pressure characteristic curves possible externally on the control electronics	9
– In the event of a power failure, the minimum pressure becomes effective	10
	11

## Ordering code

KBVS		3	A	A / L	C			V	*
------	--	---	---	-------	---	--	--	---	---

Pilot-operated proportional pressure relief valve

### Pressure stage

up to 50 bar	= C
up to 100 bar	= F
up to 150 bar	= H
up to 210 bar	= L
up to 250 bar	= N
up to 315 bar	= P
up to 350 bar	= R

Component size 3 = 3

At command value = 0 the pressure is set = A

Component series = A

<sup>1)</sup> Cable sockets (separate order), see RE 08006

<sup>2)</sup> See page 10

Further details in clear text

no code = Standard  
-8 = Coil 800 mA (see page 5)

### Seal material

V = FKM seals  
**⚠ Caution!**  
Observe compatibility of seals with the hydraulic fluid used!

### Electrical connection <sup>1)</sup>

K4 = Component plug 03-pin (2+PE) K4, DIN EN 175301-803

K40 = Component plug 02-pin K40 DT 04-2PA, make: Deutsch

C4 = Cable plug 02-pin C4/Z30 type: Junior-Timer

### Supply voltage

G12 = Control electronics 12 V DC

G24 = Control electronics 24 V DC

C = Proportional solenoid, wet pin

L = High-Performance and mounting cavity R/ISO 7789 <sup>2)</sup>

## Preferred types

Type	Material number
KBVSC3AA/LCG24K4V	R901061858
KBVSF3AA/LCG24K4V	R901061859
KBVSH3AA/LCG24K4V	R901061869
KBVSL3AA/LCG24K4V	R901061873
KBVSN3AA/LCG24K4V	R901061874
KBVSP3AA/LCG24K4V	R901061875
KBVSR3AA/LCG24K4V	R901061877

## Function, Symbol

### General

Valves of the KBVS type are pilot-operated proportional pressure relief valves of poppet design and used for limiting the pressure in hydraulic systems. They basically consist of a screwed-in proportional pilot valve (1) and the main valve (2).

These valves can be used for infinitely adjusting the pressure to be limited in dependence upon the command value. At command value 0 or in the event of a power failure, the minimum pressure is set.

### Basic principle

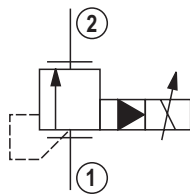
For the proportional increase in the system pressure, a command value is selected on the control electronics. The electronics controls the solenoid coil with electric current in dependence upon the command value, which causes the actual pressure adjustment in main port 1 via pilot valve (1) and main valve (2).

( $p_{max}$  = command value max;  $p_{min}$  = command value 0)  
Internal pilot oil supply and drain.

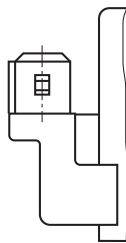
### Note!

Any tank pressures (main port 2) add to the set value in main port 1.

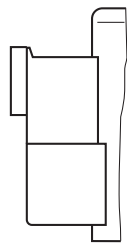
### Symbol



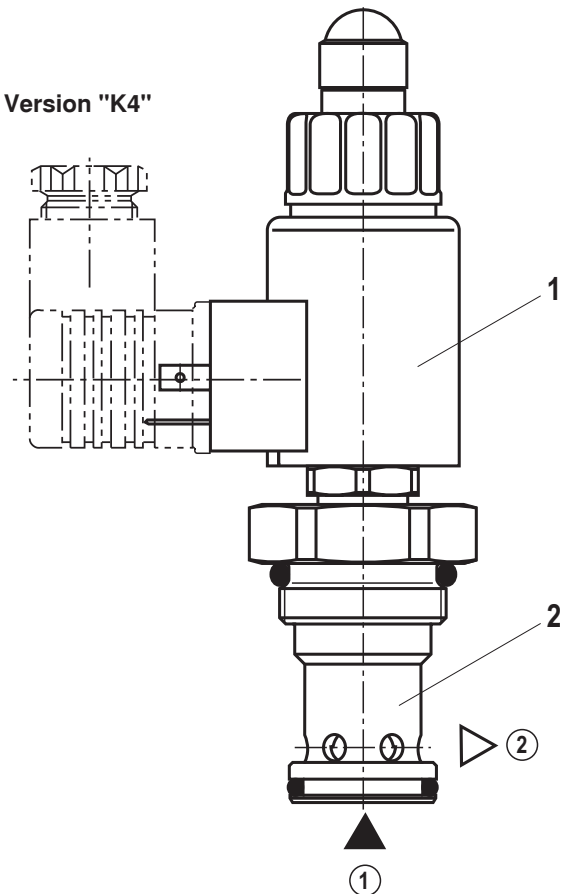
Version "C4"



Version "K40"



Version "K4"



**Technical data** (for applications outside these parameters, please consult us!)**general**

Weight	kg	0,7
Installation orientation		Optional, if it can be ensured that no air can collect upstream of the valve. Otherwise, we recommend that the valve be mounted in a suspended position.
Ambient temperature range	°C	-20 to +120
Storage temperature range	°C	-20 to +80

## Environmental tests:

**Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Z)**

DIN EN 60068-2-6: 05/96	Vibration, sinusoidal	10 cycles at 5 to 2000 to 5 Hz with a logarithmic frequency change rate of 1 Oct./min, 5 to 57 Hz, amplitude 1.5 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibration (random) and broadband noise	20 to 2000 Hz, amplitude 0.05 g <sup>2</sup> /Hz (10 g RMS/30 g peak), testing time 30 min
DIN EN 60068-2-27: 03/95	Shock test	Half sine 15 g / 11 ms; 3 x in pos., 3 x in neg. direction (6 individual shocks in total)
DIN EN 60068-2-29: 03/95	Bump test	Half sine 25 g / 6 ms; 1000 x in pos., 1000 x in neg. direction (2000 individual shocks in total)

Details per axis

**Climatic test according to DIN EN 60068-2 / IEC 60068-2 (environmental testing):**

DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, dwell time 16 h
DIN EN 60068-2-2: 08/94		+110 °C, dwell time 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles at -25 °C, dwell time 2 h
DIN EN 60068-2-2: 08/94	Dry heat test	2 cycles at +120 °C, dwell time 2 h
IEC 60068-2-30: 1985	Damp heat, cyclical	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles, 24 h each

**Salt spray test: 720 h according to DIN 50021**

→ Finish painting generally not required. Should you nevertheless wish to apply a finish coat, observe the reduced heat dissipation capacity.

**hydraulic**

Max. operating pressure <sup>1)</sup> (main port 1)	bar	350
Max. permissible return flow pressure (main port 2)	bar	210
Maximum set pressure <sup>2)</sup>		See command value/pressure characteristic curves on page 6
Minimum set pressure at command value 0		See characteristic curves on page 6
Maximum flow	l/min	200 (with pressure stage 350 bar max. 100 l/min)
Hydraulic fluid		see page 5
Hydraulic fluid temperature range	°C	-20 to +80
Viscosity range	mm <sup>2</sup> /s	15 to 380
Max. permissible degree of contamination of the hydraulic fluid - cleanliness class acc. to ISO 4406 (c)		Class 20/18/15 <sup>3)</sup>

<sup>1)</sup> **⚠ Caution!** The maximum operating pressure is added up from the set pressure and the return flow pressure!


<sup>2)</sup> **⚠ Caution!** The valves are factory-set. In the case of subsequent re-adjustment, the warranty will become void!

<sup>3)</sup> The cleanliness class stated for the components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, increases the service life of components.

For the selection of filters, see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter)

**Technical data** (for applications outside these parameters, please consult us!)**hydraulic**

Hysteresis		< 6 % of max. set pressure
Range of inversion		< 0,5 % of max. set pressure
Response sensitivity		< 0,5 % of max. set pressure
Tolerance of the command value/pressure characteristic curve	– Command value 100 %	< 5 % of max. set pressure
	– Command value 0	< 2 % of max. set pressure
Step response ( $T_u + T_q$ ) 0 → 100 % or 100 % → 0	ms	100 (depends on system)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	FKM	VDMA 24568
	– Soluble in water	FKM	
 <b>Important information on hydraulic fluids!</b> ▶ For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us! ▶ There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!		▶ The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature. ▶ <b>Bio-degradable:</b> When using bio-degradable hydraulic fluids that are simultaneously zinc-soloving, zinc may accumulate in the fluid.	

**electrical**

Supply voltage	V	12 DC	24 DC	"-8" / 24 DC	
Maximum control current	mA	max. nominal current 1760 mA	max. nominal current 1200 mA	max. nominal current 800 mA	
Coil resistance	– Cold value at 20 °C	Ω	2,3	4,8	11,5
	– Max. hot value	Ω	3,8	7,9	18,9
Duty cycle	%	100 <sup>4)</sup>			
Maximum coil temperature <sup>5)</sup>	°C	150			
Type of protection acc. to VDE 0470-1 (DIN EN 60529), DIN 40050-9	– Version "K4"	IP 65 with cable socket mounted and locked			
	– Version "C4"	IP 66 with cable socket mounted and locked			
	– Version "K40"	IP 69K with Rexroth cable socket (material no. R901022127)			
Control electronics <sup>6)</sup>		Plug-in amplifier VT-SSPA1 (300 Hz)			
Rating according to VDE 0580					

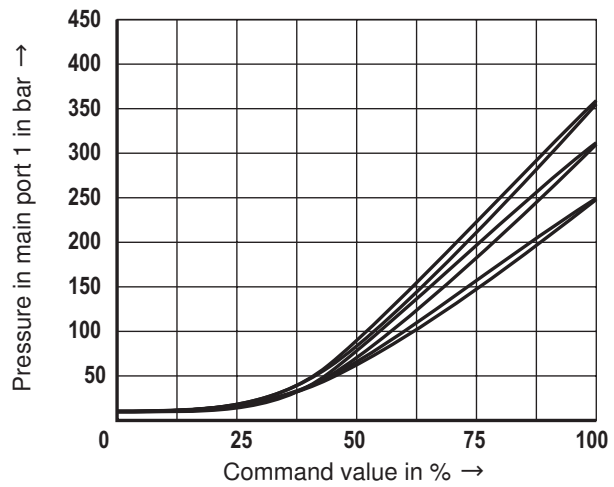
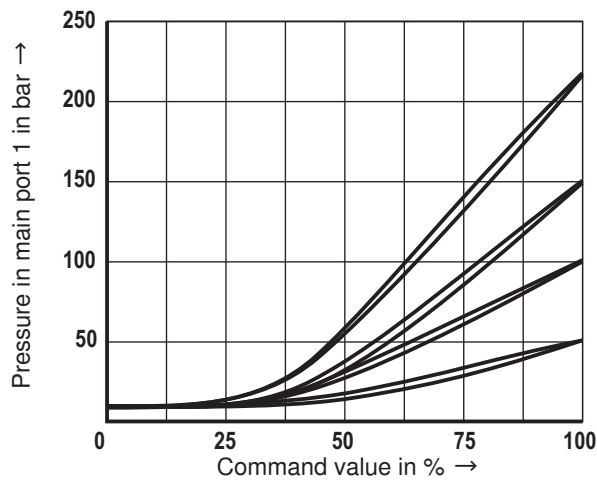
<sup>4)</sup> In the case of use at heights > 2000 m above MSL we recommend that you consult the manufacturer.

<sup>5)</sup> Due to the surface temperatures occurring on solenoid coils, the European standards ISO 13732-1 and EN 982 must be observed!

<sup>6)</sup> Separate order, see RE 30116

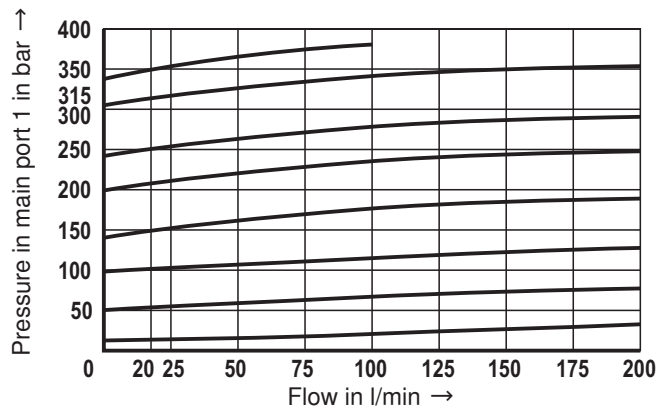
**Characteristic curves** (measured with HLP46,  $t_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

**Pressure in main port 1 in dependence on command value. Flow = 20 l/min**



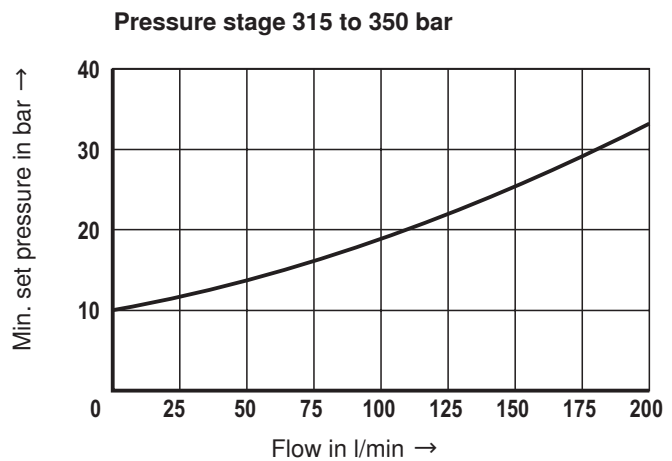
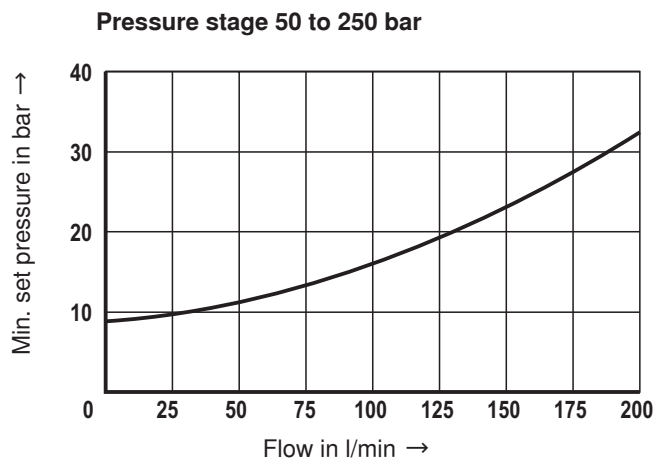
**Pressure in main port 1 in dependence on flow.**

(The characteristic curves were measured without backpressure in main port 2.)



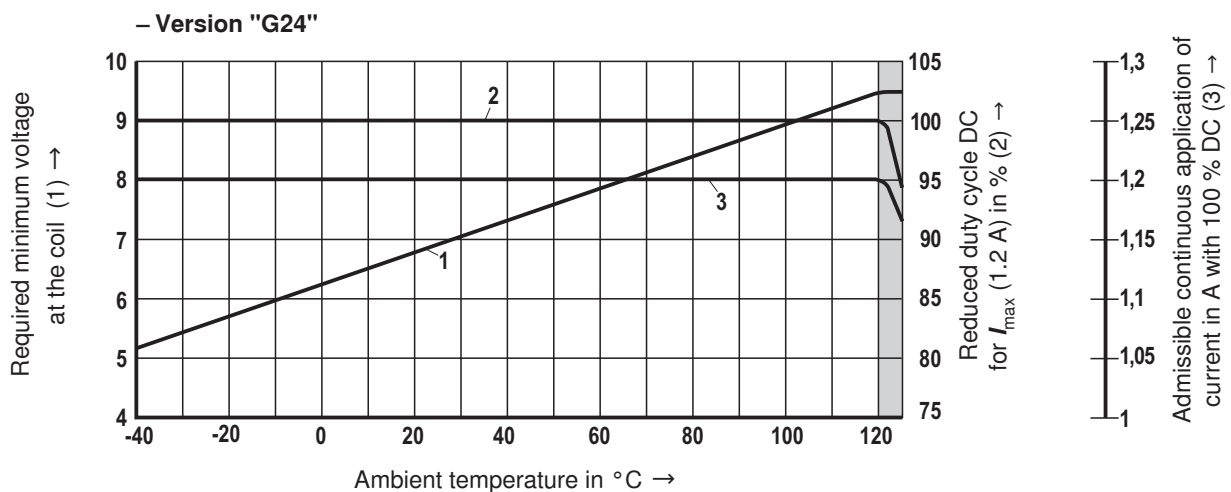
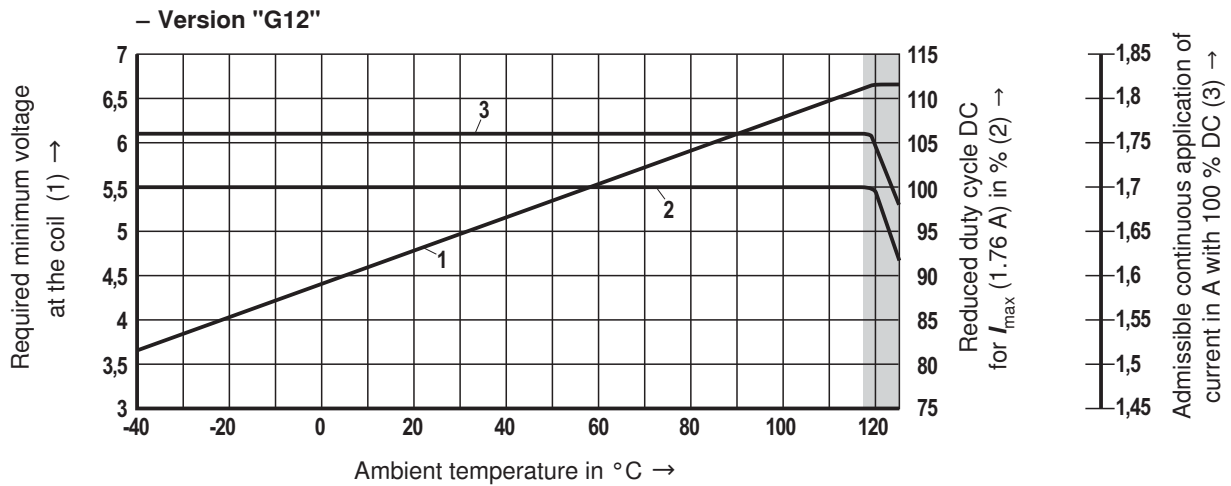
**Minimum set pressure in main port 1 at command value 0.**


(The characteristic curves were measured without backpressure in main port 2.)



## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range against the ambient temperature



 Limited valve performance

#### Notice!

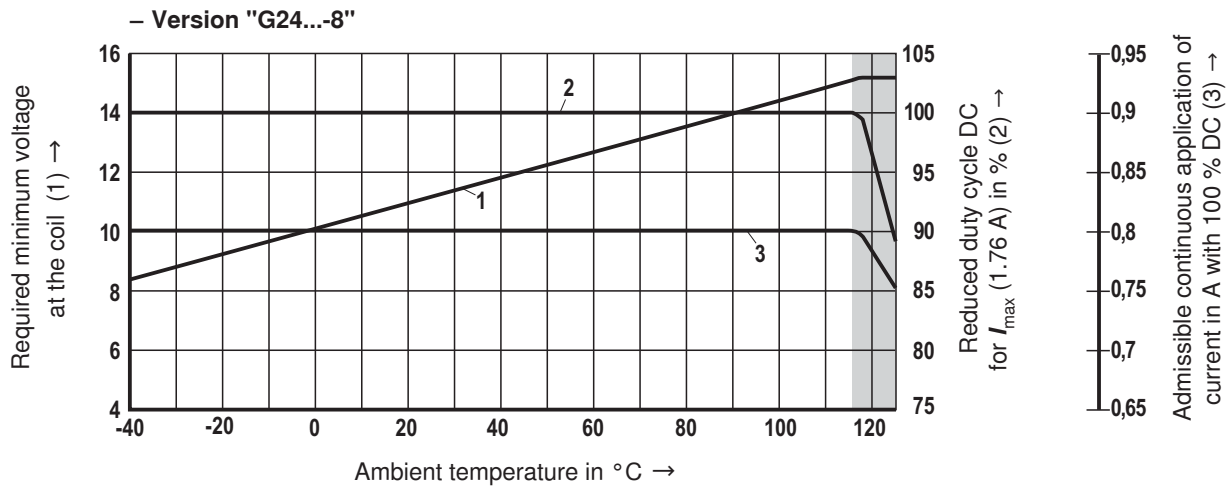
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range against the ambient temperature



Limited valve performance

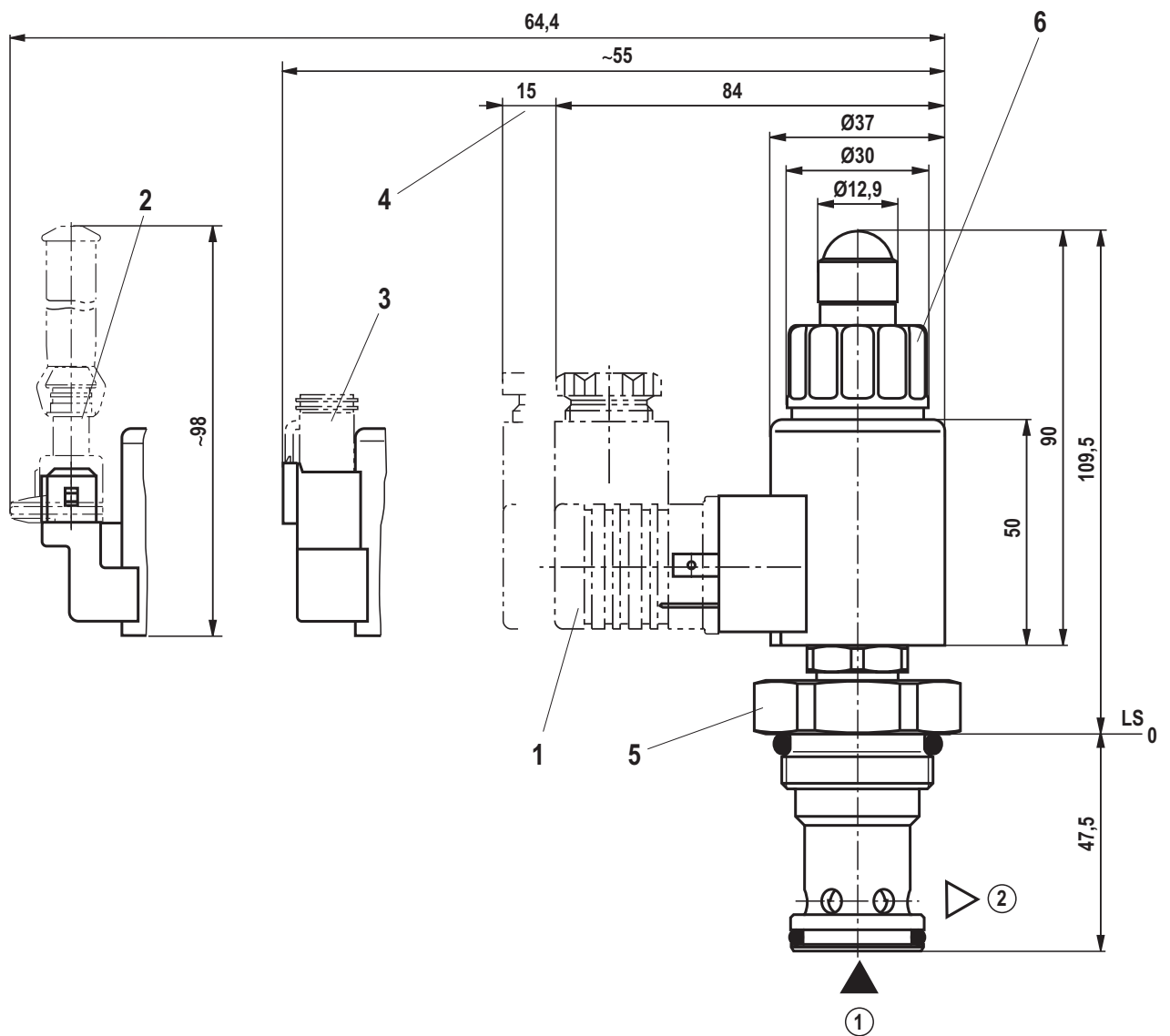
#### Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.



**Unit dimensions** (dimensions in mm)


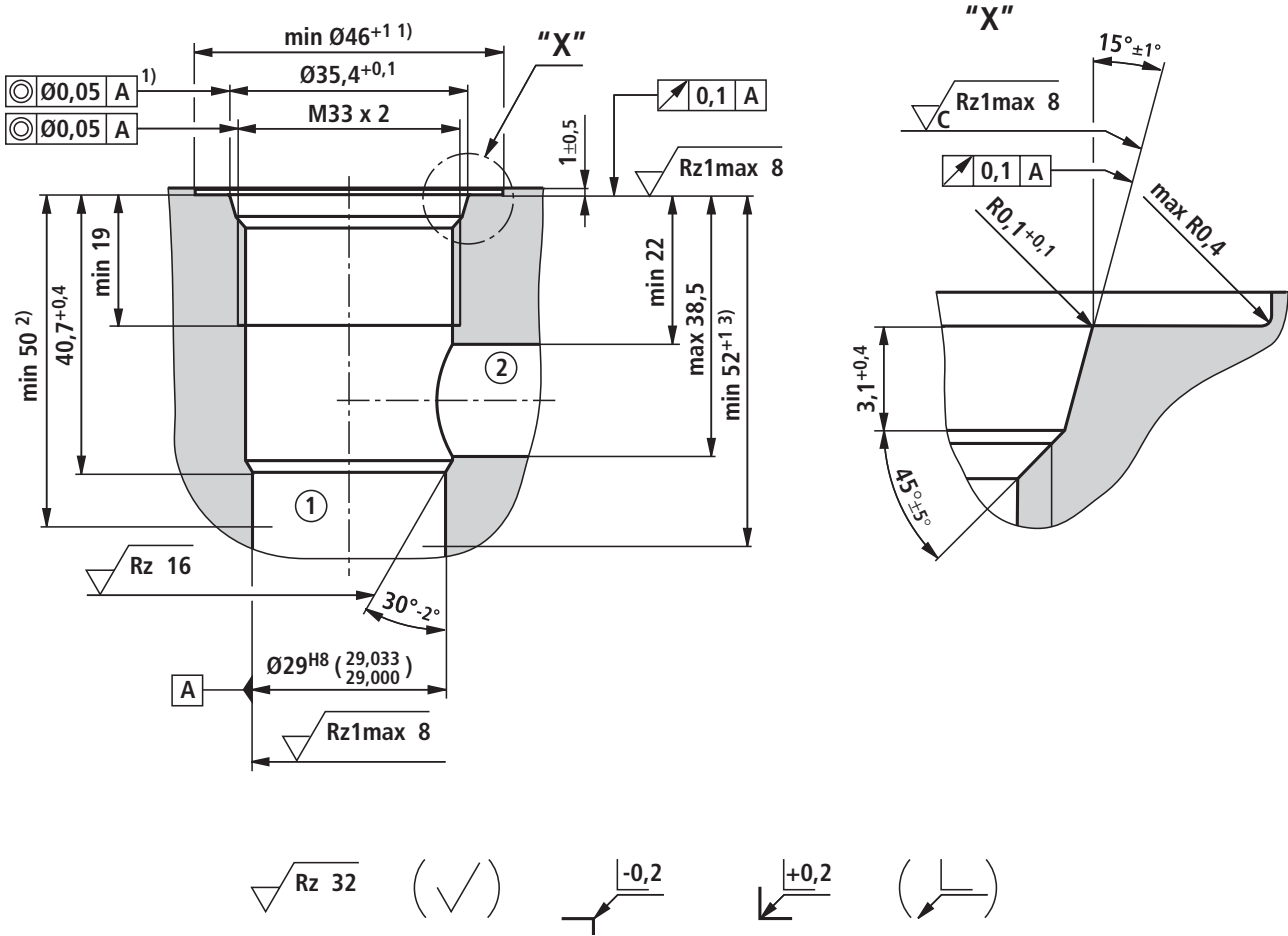
① = Main port 1

② = Main port 2

LS = Location shoulder

- 1 Cable socket for component plug "K4"  
(separate order, see RE 08006)
- 2 Cable socket for component plug "C4"  
(separate order, see RE 08006)
- 3 Cable socket for component plug "K40"  
(separate order, see RE 08006)
- 4 Space required to remove the plug-in connector
- 5 Hexagon SW41;  
– Tightening torque  $M_A = 100^{+20}$  Nm (< 250 bar)  
– Tightening torque  $M_A = 120^{+20}$  Nm (> 250 bar)
- 6 Solenoid nut, tightening torque  $M_A = 5^{+1}$  Nm

**Mounting cavity R/ISO 7789-33-01-0-98; 2 main ports; thread M33 x 2**  
(dimensions in mm)



<sup>1)</sup> Different from ISO 7789-33-01-0-98

<sup>2)</sup> Depth of fit

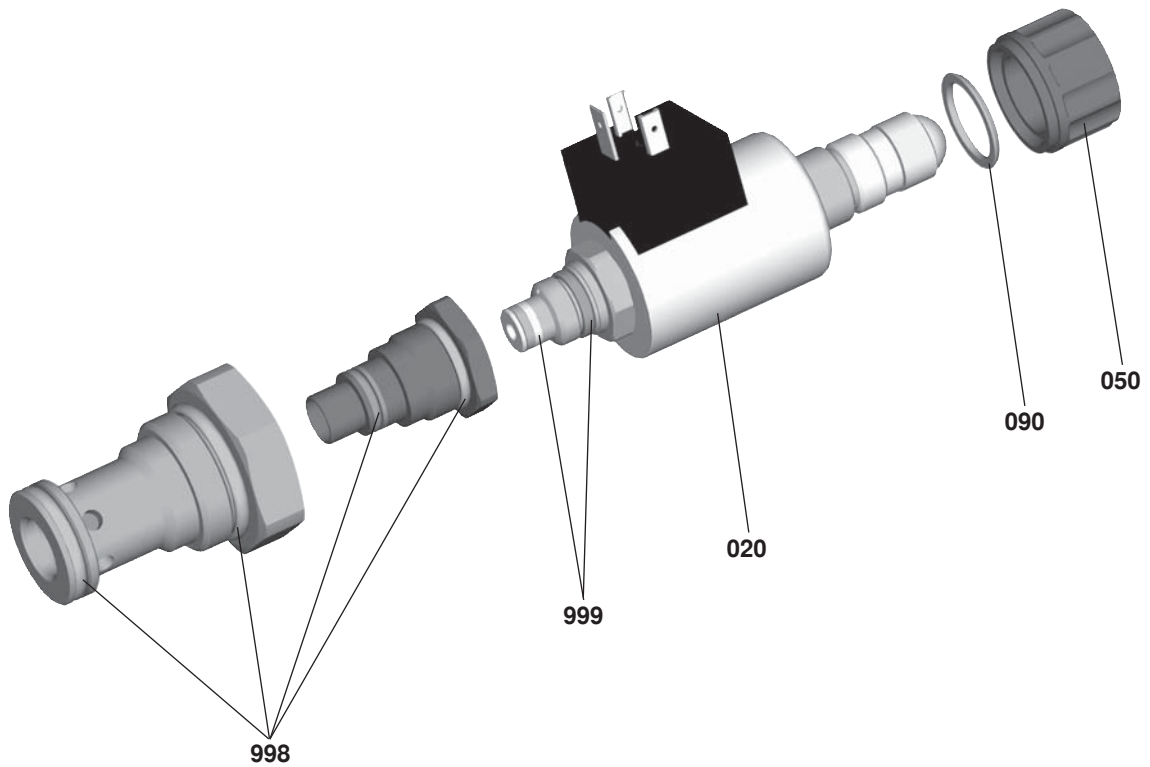
<sup>3)</sup> Optional

① = Main port 1

② = Main port 2

LS = Location shoulder

## Available individual components



Item	Designation		DC	Material no.
020	Coil for individual connection <sup>1)</sup>	Version K4	12 V 24 V 24 V / 800 mA	R901002932 R901002319 R901049962
		Version K40	12 V 24 V 24 V / 800 mA	R901003055 R901003053 R901050010
		Version C4	12 V 24 V 24 V / 800 mA	R901003044 R901003026 R901049963
050	Nut			R900992146
090	Seal ring for pressure tube			R900007769
998	Main stage seal kit			R961001025
999	Pilot valve seal kit			R961000376

<sup>1)</sup> **Note!**

After the solenoid coil was replaced, the factory-set pressure may change by  $\pm 5\%$ .

## Notes

---

# Proportional pressure relief valve, pilot-operated, falling characteristic curve

**Type KBVS.3B** (High-Performance)

Component size 3  
Component series A  
Maximum operating pressure 350 bar  
Maximum flow 200 l/min



H7139

## Overview of contents

Contents	Page
Features	1
Ordering code	2
Preferred types	2
Function, symbol	3
Technical data	4, 5
Characteristic curves	6
Minimum terminal voltage at the coil and relative duty cycle	7, 8
Unit dimensions	9
Mounting cavity	10
Available individual components	11

## Features

- Mounting cavity R/ISO 7789-33-01-0-98
- Pilot-operated valve for limiting a system pressure
- Suitable for mobile and industrial applications
- Operation by proportional solenoid
- Proportional solenoid with central thread and detachable coil
- Cartridge valve
- Control electronics: plug-in amplifier VT-SSPA1..
- Fine balancing of the command value/pressure characteristic curves possible externally on the control electronics
- Valves are adjusted to max. pressure by means of an adjustment screw
- In the event of a power failure, the maximum set pressure becomes effective

## Ordering code

KBVS		3	B	A / L	C			V	*
Pilot-operated proportional pressure relief valve				Further details in clear text					
<b>Pressure stage</b>				<b>no code =</b> Standard <b>-8 =</b> Coil 800 mA (see page 5)					
up to 50 bar = C				<b>Seal material</b>					
up to 100 bar = F				FKM seals					
up to 150 bar = H				⚠ Caution!					
up to 210 bar = L				Observe compatibility of seals with the hydraulic fluid used!					
up to 250 bar = N				<b>Electrical connection</b> <sup>1)</sup>					
up to 315 bar = P				<b>K4 =</b> Component plug 03-pin (2+PE) K4, DIN EN 175301-803 <b>K40 =</b> Component plug 02-pin K40 DT 04-2PA, make: Deutsch <b>C4 =</b> Cable plug 02-pin C4/Z30 type: Junior-Timer					
up to 350 bar = R				<b>Supply voltage</b>					
Component size 3 = 3				<b>G12 =</b> Control electronics 12 V DC <b>G24 =</b> Control electronics 24 V DC					
At command value = 0 the maximum pressure is set = B				<b>C =</b> Proportional solenoid, wet pin					
Component series = A				<b>L =</b> High-Performance and mounting cavity R/ISO 7789 <sup>2)</sup>					

<sup>1)</sup> Cable sockets (separate order), see RE 08006

<sup>2)</sup> See page 10

## Preferred types

Type	Material number
KBVSC3BA/LCG24K4V	R901042645
KBVSF3BA/LCG24K4V	R901042649
KBVSH3BA/LCG24K4V	R901047841
KBVSL3BA/LCG24K4V	R901032852
KBVSN3BA/LCG24K4V	R901041058
KBVSP3BA/LCG24K4V	R901042652
KBVSR3BA/LCG24K4V	R901022444

## Function, Symbol

### General

Valves of the KBVS type are pilot-operated proportional pressure relief valves of poppet design and used for limiting the pressure in hydraulic systems. They basically consist of a screwed-in proportional pilot valve (1) and the main valve (2). These valves can be used for infinitely adjusting the pressure to be limited in dependence upon the command value. At command value 0 or in the event of a power failure, the maximum pressure is set (fail-safe characteristics).

### Basic principle

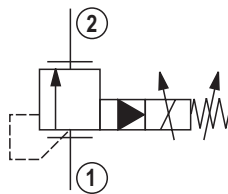
The mechanics of the valve is factory-set to the maximum pressure. A command value for the proportional reduction of the system pressure is selected on the control electronics. The electronics controls the solenoid coil with electric current in dependence upon the command value, which causes the actual pressure adjustment in main port ① via pilot valve (1) and main valve (2).

( $p_{max}$  = command value 0;  $p_{min}$  = command value max.)  
Internal pilot oil supply and drain.

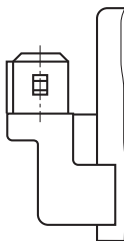
### Note!

Any tank pressures (main port ②) add to the set value in main port ①.

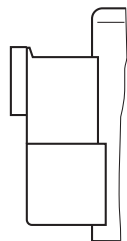
### Symbol



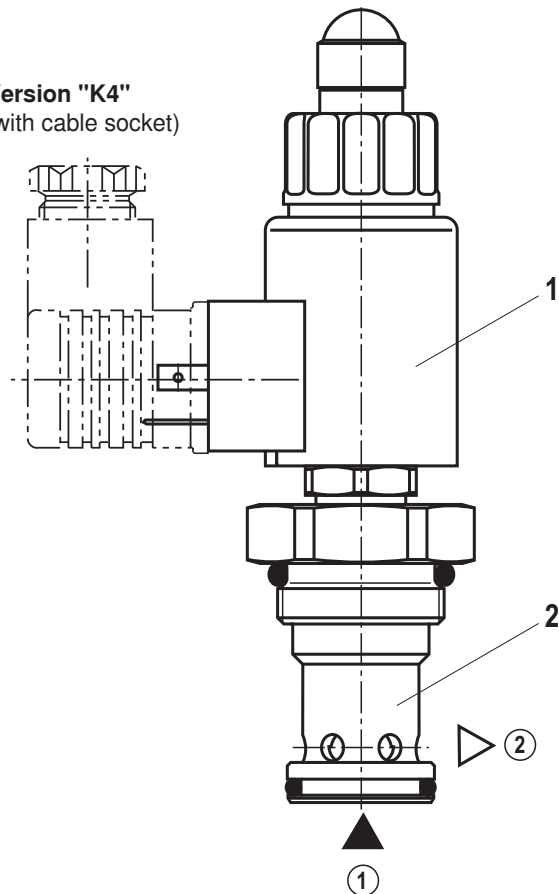
### Version "C4"



### Version "K40"



### Version "K4" (with cable socket)



**Technical data** (for applications outside these parameters, please consult us!)**general**

Weight	kg	0,7
Installation orientation		Optional, if it can be ensured that no air can collect upstream of the valve. Otherwise, we recommend that the valve be mounted in a suspended position.
Ambient temperature range	°C	-20 to +120 (-40 to +110 for fan drives)
Storage temperature range	°C	-20 to +80

## Environmental tests:

**Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Z)**

DIN EN 60068-2-6: 05/96	Vibration, sinusoidal	10 cycles at 5 to 2000 to 5 Hz with a logarithmic frequency change rate of 1 Oct./min, 5 to 57 Hz, amplitude 1.5 mm (p-p), 57 to 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibration (random) and broadband noise	20 to 2000 Hz, amplitude 0.05 g <sup>2</sup> /Hz (10 g RMS/30 g peak), testing time 30 min
DIN EN 60068-2-27: 03/95	Shock test	Half sine 15 g / 11 ms; 3 x in pos., 3 x in neg. direction (6 individual shocks in total)
DIN EN 60068-2-29: 03/95	Bump test	Half sine 25 g / 6 ms; 1000 x in pos., 1000 x in neg. direction (2000 individual shocks in total)

## Details per axis

**Climatic test according to DIN EN 60068-2 / IEC 60068-2 (environmental testing):**

DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, dwell time 16 h
DIN EN 60068-2-2: 08/94		+110 °C, dwell time 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles at -25 °C, dwell time 2 h
DIN EN 60068-2-2: 08/94	Dry heat test	2 cycles at +120 °C, dwell time 2 h
IEC 60068-2-30: 1985	Damp heat, cyclical	Variant 2/ +25 °C to +55 °C 93 % to 97 % relative humidity, 2 cycles, 24 h each

**Salt spray test: 720 h according to DIN 50021**

→ Finish painting generally not required. Should you nevertheless wish to apply a finish coat, observe the reduced heat dissipation capacity.

**hydraulic**

Max. operating pressure <sup>1)</sup> (main port ①)	bar	350
Max. permissible return flow pressure (main port ②)	bar	210
Maximum set pressure <sup>2)</sup>		See command value/pressure characteristic curves on page 6
Minimum set pressure at max. command value		See characteristic curves on page 6
Maximum flow	l/min	200 (with pressure stage 350 bar max. 100 l/min)
Hydraulic fluid		See page 5
Hydraulic fluid temperature range	°C	-20 to +80 (-20 to +110 for fan drives)
Viscosity range	mm <sup>2</sup> /s	12 to 800
Max. permissible degree of contamination of the hydraulic fluid - cleanliness class acc. to ISO 4406 (c)		Class 20/18/15 <sup>3)</sup>

<sup>1)</sup> **⚠ Caution!** The maximum operating pressure is added up from the set pressure and the return flow pressure!

<sup>2)</sup> **⚠ Caution!** The valves are factory-set. In the case of subsequent re-adjustment, the warranty will become void!

<sup>3)</sup> The cleanliness class stated for the components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, increases the service life of components.


For the selection of filters, see [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter)



## Technical data (for applications outside these parameters, please consult us!)

### hydraulic

Hysteresis	< 4 % of max. set pressure
Range of inversion	< 0.5 % of max. set pressure
Response sensitivity	< 0.5 % of max. set pressure
Tolerance of the command value/pressure characteristic curve	– Command value 100 % – Command value 0
	< 2 % of max. set pressure < 5 % of max. set pressure
Step response ( $T_u + T_g$ ) 0 → 100 % or 100 % → 0	ms 100 (depends on system)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– Insoluble in water	HEES	VDMA 24568
	– Soluble in water	HEPG	
 <b>Important information on hydraulic fluids!</b> ▶ For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us! ▶ There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!		▶ The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature. ▶ <b>Bio-degradable:</b> When using bio-degradable hydraulic fluids that are simultaneously zinc-solvent, zinc may accumulate in the fluid.	

### electrical

Supply voltage	V	12 DC	24 DC	"-8" / 24 DC
Maximum control current	mA	max. nominal current 1760 mA	max. nominal current 1200 mA	max. nominal current 800 mA
Coil resistance	– Cold value at 20 °C	Ω 2,3	4,8	11,5
	– Max. hot value	Ω 3,8	7,9	18,9
Duty cycle	%	100 <sup>4)</sup>		
Maximum coil temperature <sup>5)</sup>	°C	150		
Type of protection acc. to VDE 0470-1 (DIN EN 60529), DIN 40050-9	– Version "K4"	IP 65 with cable socket mounted and locked		
	– Version "C4"	IP 66 with cable socket mounted and locked		
	– Version "K40"	IP 69K with Rexroth cable socket (material no. R901022127)		
Control electronics <sup>6)</sup>		Plug-in amplifier VT-SSPA1		
Rating according to VDE 0580				

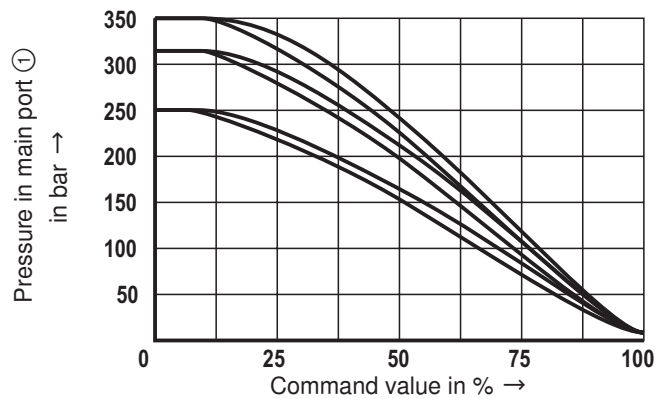
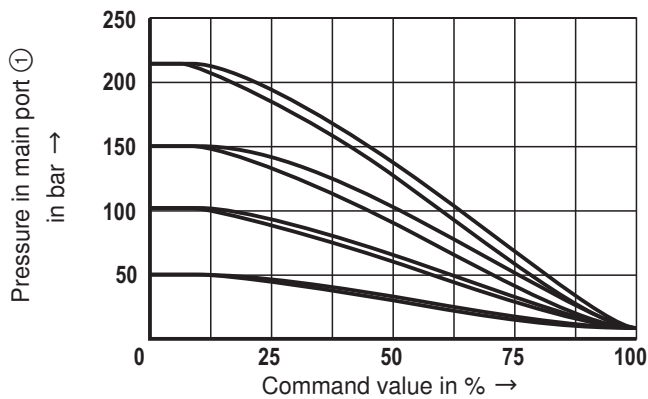
<sup>4)</sup> In the case of use at heights > 2000 m above MSL we recommend that you consult the manufacturer.

<sup>5)</sup> Due to the surface temperatures occurring on solenoid coils, the European standards ISO 13732-1 and EN 982 must be observed!

<sup>6)</sup> Separate order, see RE 30116

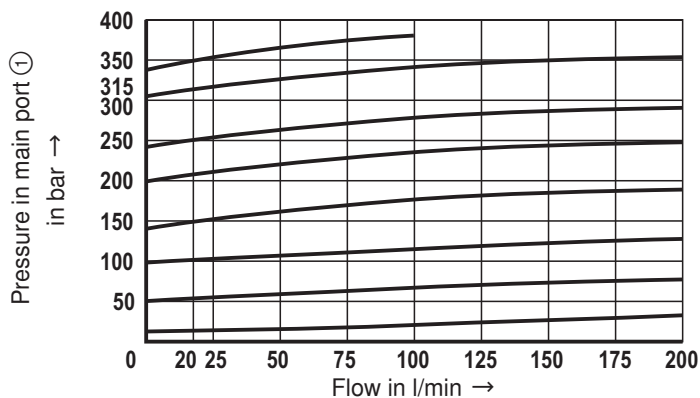
**Characteristic curves** (measured with HLP46,  $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

**Pressure in main port ① in dependence on command value. Flow = 20 l/min**



**Pressure in main port ① in dependence on flow.**

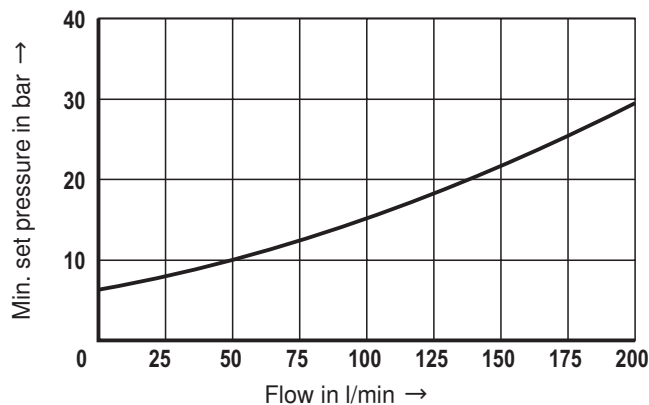
(The characteristic curves were measured without backpressure in main port ②.)



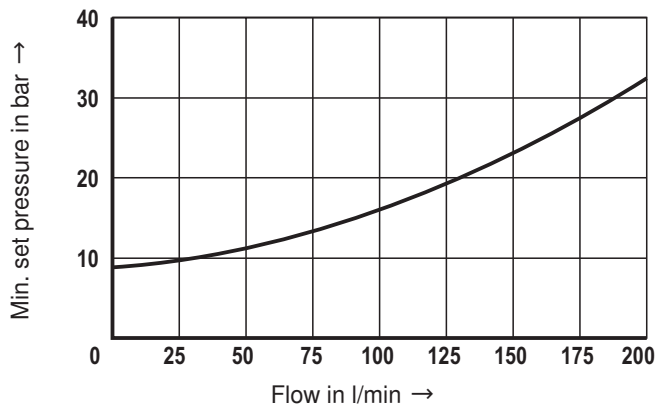
**Minimum set pressure in main port ① at command value 100 %.**

(The characteristic curves were measured without backpressure in main port ②.)

**Pressure stage 50 to 250 bar**

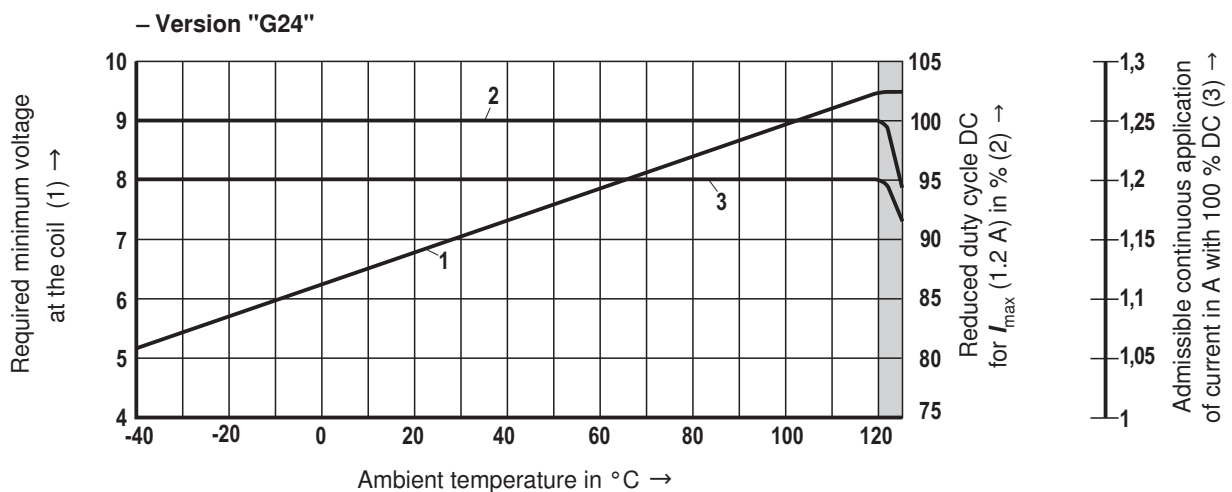
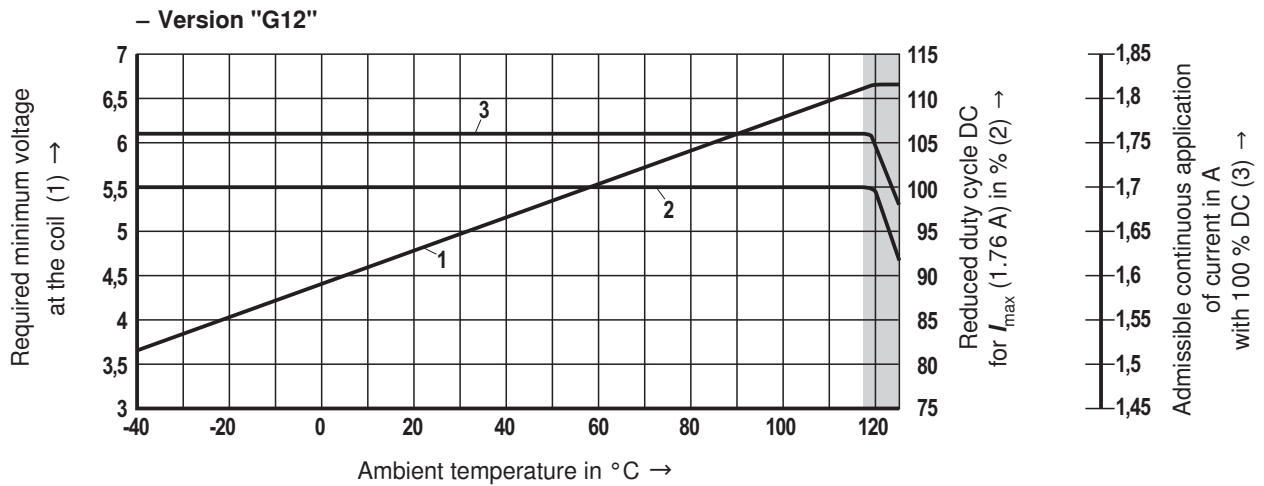


**Pressure stage 315 and 350 bar**



## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range against the ambient temperature



 Limited valve performance

 **Notice!**

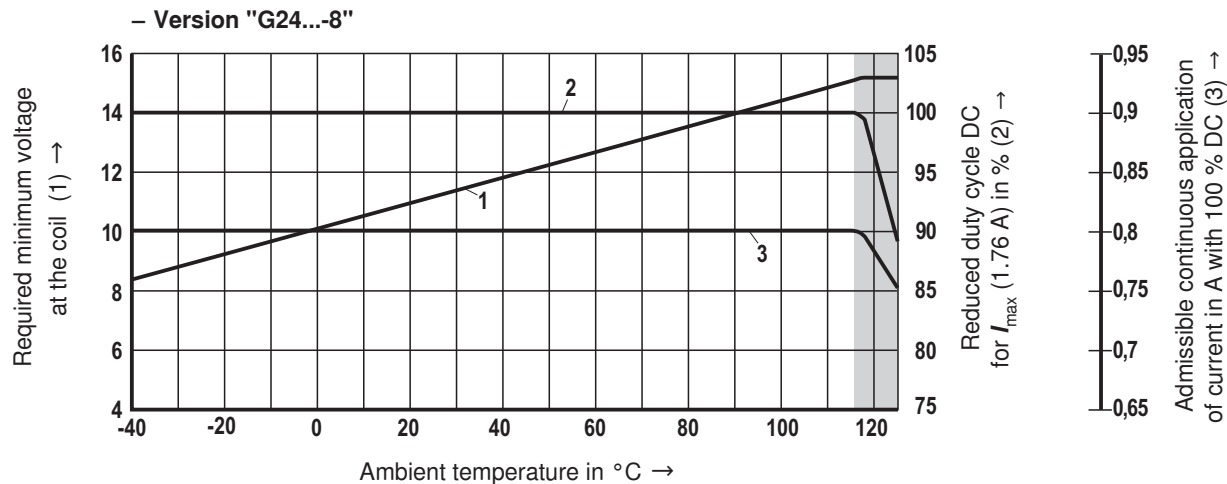
The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range against the ambient temperature



Limited valve performance

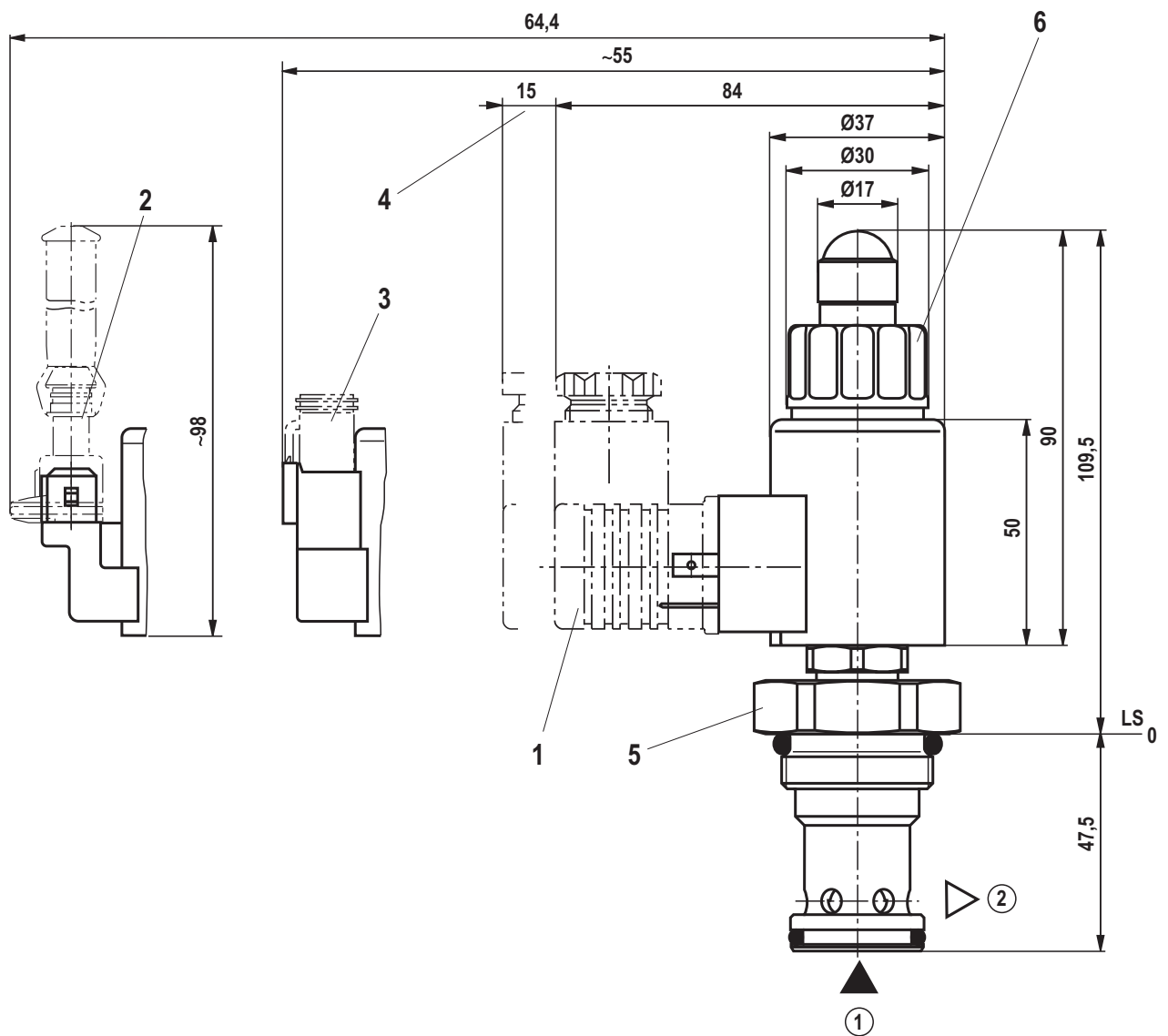
#### Notice!

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In single cases, more unfavorable conditions may lead to limitations of the area of application.

## Unit dimensions (dimensions in mm)



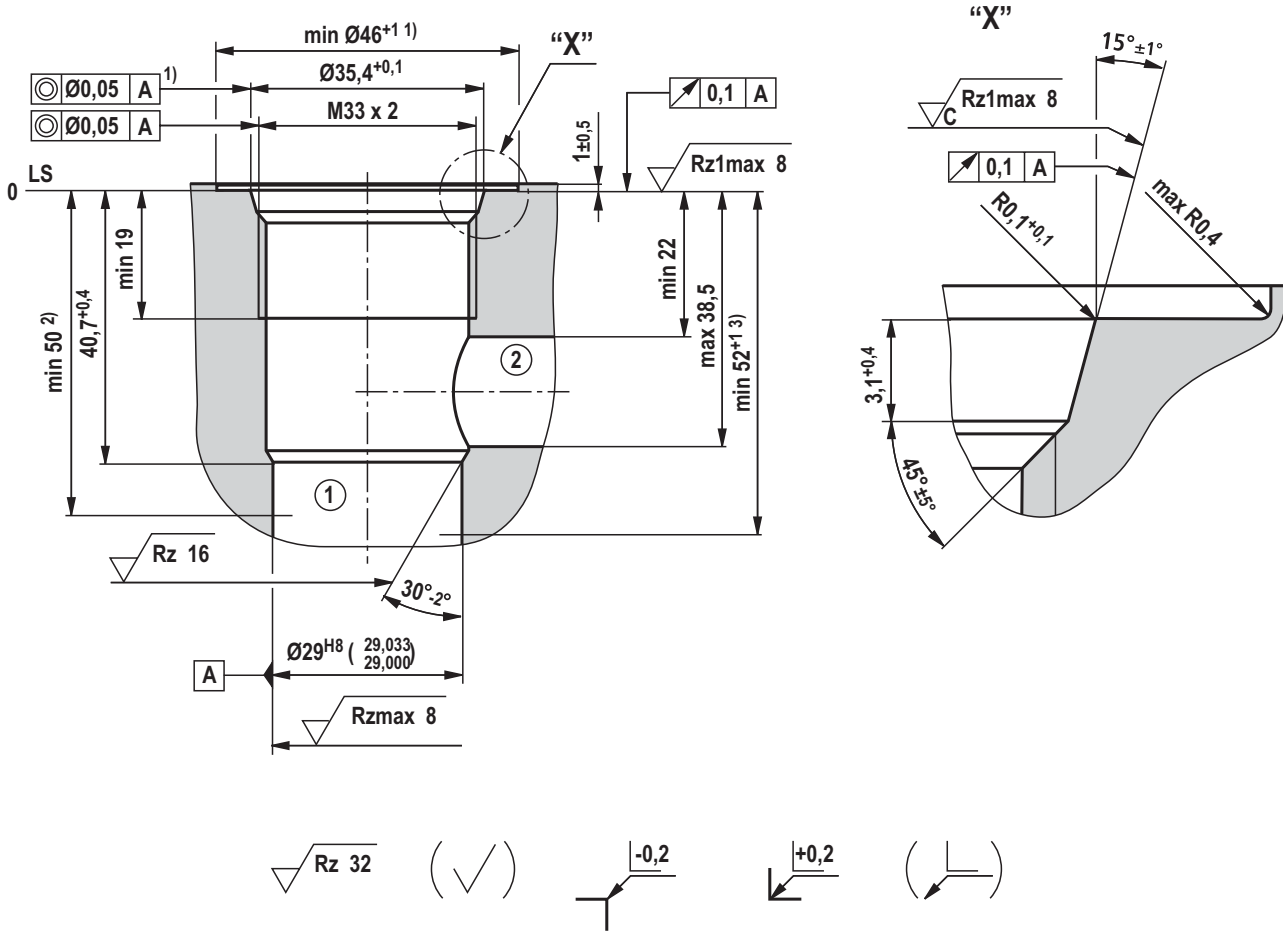
① = Main port 1

② = Main port 2

LS = Location shoulder

- 1 Cable socket for component plug "K4"  
(separate order, see RE 08006)
- 2 Cable socket for component plug "C4"  
(separate order, see RE 08006)
- 3 Cable socket for component plug "K40"  
(separate order, see RE 08006)
- 4 Space required to remove the plug-in connector
- 5 Hexagon SW41;
  - Tightening torque  $M_A = 100^{+20}$  Nm (< 250 bar)
  - Tightening torque  $M_A = 120^{+20}$  Nm (> 250 bar)
- 6 Solenoid nut, tightening torque  $M_A = 5^{+1}$  Nm

**Mounting cavity R/ISO 7789-33-01-0-98; 2 main ports; thread M33 x 2**  
(dimensions in mm)



1) Different from ISO 7789-33-01-0-98

2) Depth of fit

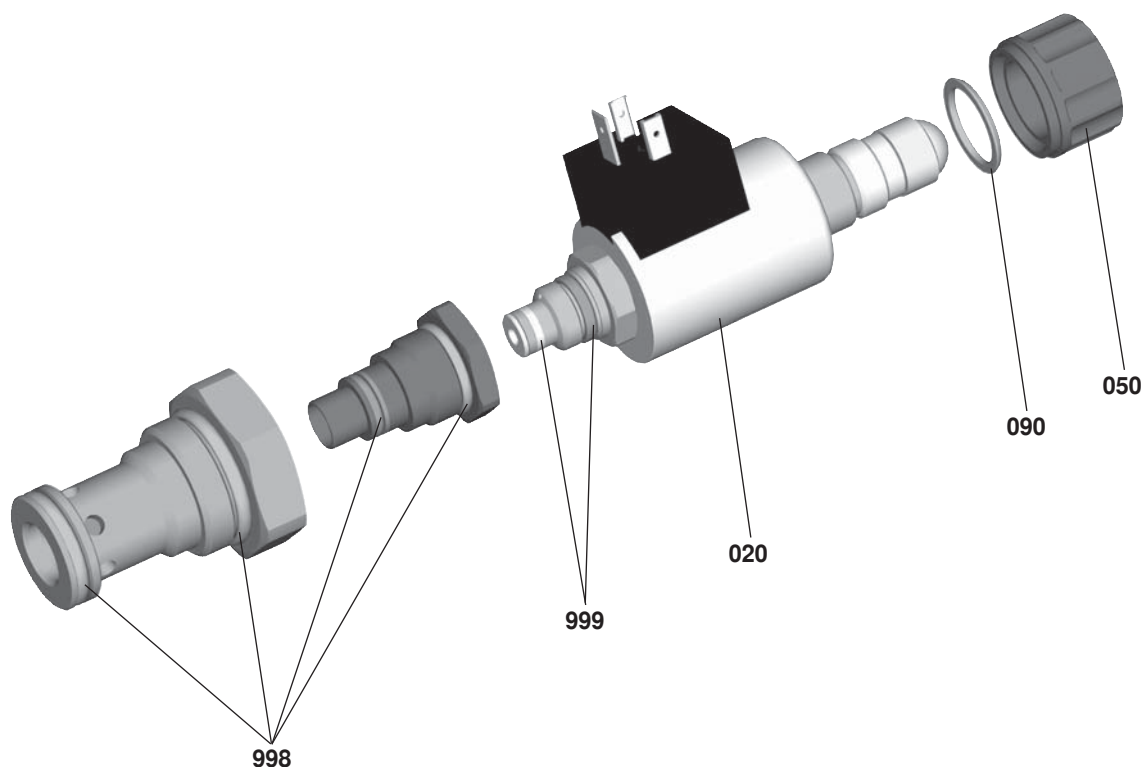
3) Optional

① = Main port 1

② = Main port 2

LS = Location shoulder

## Available individual components



Item	Designation		DC	Material no.
020	Coil for individual connection <sup>1)</sup>	Version K4	12 V 24 V 24 V / 800 mA	R901002932 R901002319 R901049962
		Version K40	12 V 24 V 24 V / 800 mA	R901003055 R901003053 R901050010
		Version C4	12 V 24 V 24 V / 800 mA	R901003044 R901003026 R901049963
050	Nut			R900992146
090	Seal ring for pressure tube			R900007769
998	Main stage seal kit			R961001025
999	Pilot valve seal kit			R961000376

<sup>1)</sup> **Note!**

After the solenoid coil was replaced, the factory-set pressure may change by  $\pm 5\%$ .

## Notes

---



## 3-way proportional pressure reducing valve, pilot-operated, rising characteristic curve

Type KTVS.1A



H8071\_d

- ▶ Component size 1
- ▶ Component series A
- ▶ Maximum operating pressure 210 bar
- ▶ Maximum flow 80 l/min

### Features

- ▶ Screw-in cartridge valve
- ▶ Mounting cavity R/UNF10-03-0-06
- ▶ Pilot-operated 3-way proportional valve for system pressure reduction
- ▶ Suitable for mobile and industrial applications
- ▶ Operation by means of proportional solenoid with central thread and detachable coil
- ▶ Rotatable solenoid coil
- ▶ In case of power failure, the minimum pressure is set
- ▶ Fine adjustment of the command value pressure characteristic curve possible from the outside at the control electronics

### Contents

Features	1
Ordering code	2
Function, symbol	3
Technical data	4 ... 6
Characteristic curves	7 ... 8
Minimum terminal voltage at the coil and relative duty cycle	9, 10
Dimensions	11
Mounting cavity	12
Available individual components	13
Further information	13

**Ordering code**

01 02 03 04 05 06 07 08 09 10 11 12

<b>KTVS</b>		<b>1</b>	<b>A</b>	<b>A</b>	<b>/</b>	<b>F</b>	<b>C</b>			<b>V</b>		<b>*</b>
-------------	--	----------	----------	----------	----------	----------	----------	--	--	----------	--	----------

01	Proportional pressure reducing valve, pilot-operated	<b>KTVS</b>
----	--	-------------

**Pressure rating**

02	Up to 50 bar	<b>C</b>
	Up to 100 bar	<b>F</b>
	Up to 150 bar	<b>H</b>
	Up to 210 bar	<b>L</b>
	Up to 250 bar (on request)	<b>N</b>
	Up to 315 bar (on request)	<b>P</b>
	Up to 350 bar (on request)	<b>R</b>

03	Component size 1	<b>1</b>
----	------------------	----------

04	With a command value = 0, the minimum pressure is set	<b>A</b>
----	---	----------

05	Component series	<b>A</b>
----	------------------	----------

06	High Performance and mounting cavity R/UNF-10-01-0-06 (see page 13)	<b>F</b>
----	---	----------

07	Proportional solenoid, wet-pin	<b>C</b>
----	--------------------------------	----------

**Supply voltage**

08	Control electronics 12 V DC	<b>G12</b>
	Control electronics 24 V DC	<b>G24</b>

**Electrical connection**

09	<b>Without</b> mating connector, with connector according to DIN EN 175301-803	<b>K4</b>
	<b>Without</b> mating connector, with connector DT 04-2PA (Deutsch plug)	<b>K40</b>
	<b>Without</b> mating connector, with AMP Junior-Timer connector	<b>C4</b>

**Seal material**

10	FKM seals	<b>V</b>
	(other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!	

11	Standard version	<b>no code</b>
	Coil 800 mA (see page 6)	<b>-8</b>

12	Further details in the plain text	<b>*</b>
----	-----------------------------------	----------

<sup>1)</sup> Mating connectors, separate order, see data sheet 08006.

**Valve types**

Type	Material no.
KTVSC1AA/FCG24K40V	<b>R901427603</b>
KTVSF1AA/FCG24K40V	<b>R901427610</b>
KTVSH1AA/FCG24K40V	<b>R901427609</b>
KTVSL1AA/FCG24K40V	<b>R901427613</b>

## Function, symbol

### General

Valves of type KTVS are pilot-operated 3-way proportional pressure reducing valves in spool design and are used for pressure reduction in hydraulic systems. They mainly consist of the screwed in proportional pilot control valve (1) and the main valve (2).

These valves can be used for stepless adjustment of the pressure to be limited dependent on the command value.

### Function

For the proportional increase in the system pressure, a command value is specified at the control electronics.

Dependent on the command value, the solenoid coil is

electrically controlled by the electronic system for the actual pressure adjustment in the main port ① via pilot control valve (1) and main valve (2).

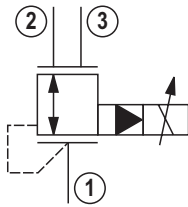
Further increasing system pressure (main port ②) does not have any effect on the pressure in the main port ① (pressure holding function). Pressure losses in main port ① (actuator) are compensated by the valve. If the pressure in the main port ① exceeds the set value, the piston is displaced against the spring and the main port ① is connected to ③.

( $p_{max}$  = max. command value;  $p_{min}$  = command value 0)

#### **Notice:**

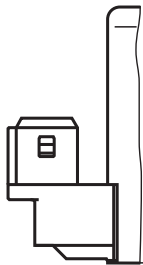
Occurring tank pressures (main port ③) are added to the values set in the main port ①.

### Symbol

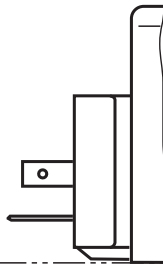


- ① = Main port 1 A
- ① = Main port 2 P
- ② = Main port 3 T

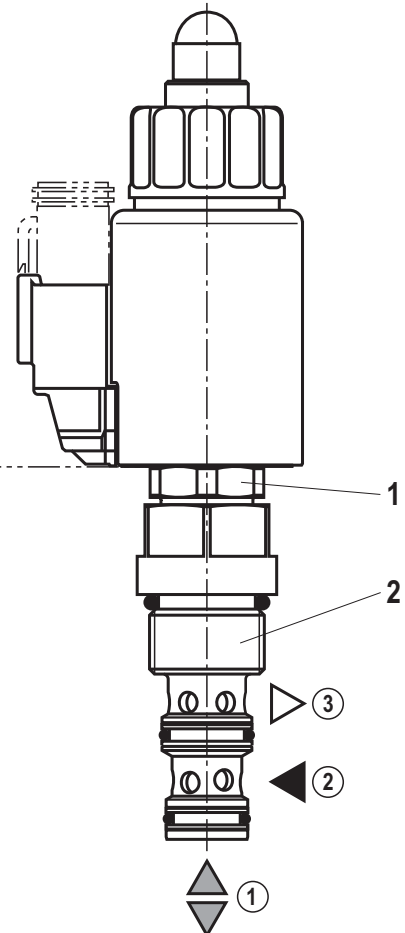
### Version "C4"



### Version "K4"



### Version "K40" (with mating connector)



### Type KTVS.1A..

RF 18136 Edition 10/14-03, Pascal Bartsch 2/3

**Technical data**

(For applications outside these parameters, please consult us!)

<b>general</b>		
Weight	kg	0.6
Installation position		Any - if it is ensured that no air can collect upstream of the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	-40 ... +120 (see pages 10 and 11)
Storage temperature	°C	-20 ... +80

**Environmental audits****Vibration test according to DIN EN 60068-2 / IEC 60068-2 / 2 axes (X/Y)**

DIN EN 60068-2-6: 05/96	Vibrations, sine-shaped	10 cycles (5 Hz ... 2000 Hz back to 5 Hz) with logarithmic frequency changing speed of 1 octave/min, 5 ... 57 Hz, amplitude 1.6 mm (p-p), 57 ... 2000 Hz, amplitude 10 g
IEC 60068-2-64: 05/93	Vibrations (random) and broadband noise	20 ... 2000 Hz, amplitude 0.1 g <sup>2</sup> /Hz (14 g RMS/30 g peak), Testing time 24 h
DIN EN 60068-2-27: 03/95	Shocking	Half-sine 15 g / 11 ms, 3 x in positive, 3 x in negative direction (a total of 6 single shocks)
DIN EN 60068-2-29: 03/95	Bump test	Half-sine 15 g / 11 ms; 1000 x in positive, 1000 x in negative direction (a total of 2000 single shocks)
Indication per axis		

**Climatic test according to EN 60068-2 / IEC 60068-2 (environmental audit)**

DIN EN 60068-2-1: 03/95	Storage temperature	-40 °C, duration 16 h
DIN EN 60068-2-2: 08/94		+110 °C, duration 16 h
DIN EN 60068-2-1: 03/95	Cold test	2 cycles -25 °C, duration 2 h
DIN EN 60068-2-2: 08/94	Dry heating test	2 cycles +120 °C, duration 2 h
IEC 60068-2-30: 1985	Humid heat, cyclic	Variant 2/ +25 °C ... +55 °C 93% to 97% relative humidity, 2 cycles à 24 h

<b>Salt spray test according to DIN 50021</b>	h	720
---	---	-----

→ Coating generally not necessary. If the unit is coated nevertheless, the reduced heat dissipation capacity has to be observed.

## Technical data

(For applications outside these parameters, please consult us!)

hydraulic			
Maximum operating pressure <sup>1)</sup>	▶ main port ①	bar	210
	▶ main port ②	bar	250
Maximum admissible return flow pressure	▶ main port ③	bar	210
Maximum set pressure <sup>2)</sup>			See command value pressure characteristic curves on pages 7 ... 8
Maximum set pressure with command value 0			See characteristic curves on pages 7 ... 8
Maximum flow		l/min	80
Pilot oil		l/min	< 0.8
Leakage		ml/min	< 300 (at $\Delta p = 250$ bar; closed pilot control valve and HLP46, $\vartheta_{oil} = 40$ °C)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	-40 ... +80
Viscosity range		mm <sup>2</sup> /s	5 ... 400 (preferably 10 ... 100)
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>3)</sup>
Load cycles			5 million
Hysteresis <sup>4)</sup>			< 6% of the max. set pressure
Turnover voltage <sup>4)</sup>			< 0.5% of the max. set pressure
Response sensitivity <sup>4)</sup>			< 0.5% of the max. set pressure
Manufacturing tolerance of the command value pressure characteristic curve	▶ Command value 100%		< 5% of the max. set pressure
	▶ Command value 0		< 2% of the max. set pressure
Step response ( $T_u + T_g$ ) 0 → 100% and/or 100% → 0		ms	100 (depending on the system)

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils		HL, HLP	FKM	DIN 51524
Bio-degradable	▶ Insoluble in water	HEES	FKM	VDMA 24568
	▶ Soluble in water	HEPG	FKM	



### Important information on hydraulic fluids:

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!
- ▶ The flash point of the hydraulic fluids used must be 40 K higher than the maximum solenoid surface temperature.

- ▶ Bio-degradable: If bio-degradable hydraulic fluids are used that are also zinc-solvent, there may be an accumulation of zinc.

- 1) The maximum operating pressure is added up from the set pressure and the return flow pressure!
- 2) The valves are set at the factory. In the case of subsequent re-adjustment, the warranty will become void!
- 3) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.
- 4) Measured with analog amplifier type RA2-1/10, see data sheet 95230 (PWM = 300 Hz).

**Technical data**

(For applications outside these values, please consult us!)

<b>electric</b>				
Voltage type		Direct voltage		
Supply voltages	V	12 DC	24 DC	"-8" / 24 DC
Maximum solenoid current	mA	1760	1200	800
Coil resistance	▶ Cold value at 20 °C	Ω	2.3	4.8
	▶ max. hot value	Ω	3.8	7.9
Duty cycle	%	See characteristic curves on pages 10 and 11 <sup>5)</sup>		
Maximum coil temperature <sup>6)</sup>	°C	150		
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	▶ Version "K4"	IP 65 with mating connector mounted and locked		
	▶ Version "C4"	IP 66 with mating connector mounted and locked		
		IP 69K with Rexroth mating connector (material no. R901022127)		
	▶ Version "K40"	IP 69K with mating connector mounted and locked		
Control electronics (separate order)		Plug-in proportional amplifier type VT-SSPA1...	Data sheet 30116	
		Analog amplifier type RA...	Data sheet 95230	
		BODAS control unit type RC...	Data sheet 95200	
Recommended dither frequency (PMW)	Hz	250		
Design according to VDE 0580				

<sup>5)</sup> In case of use in altitudes > 2000 m a.s.l., we recommend consulting the manufacturer.

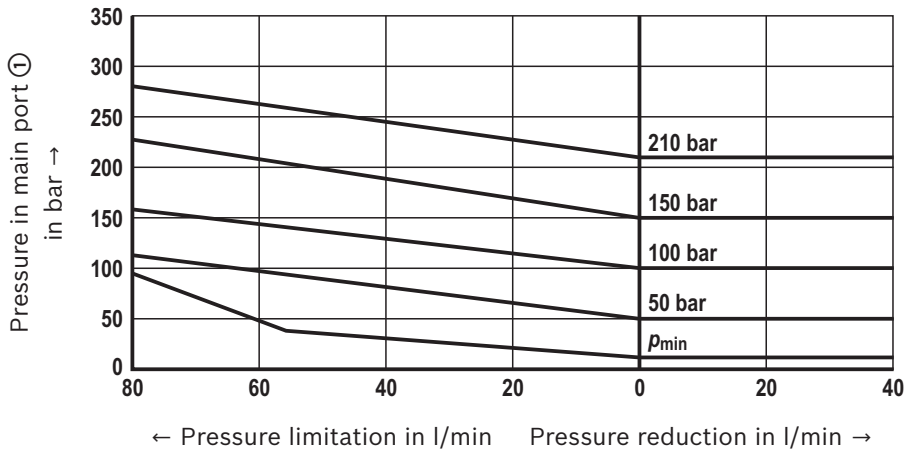
<sup>6)</sup> Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

**When establishing the electrical connection, the protective earthing conductor (PE  $\perp$ ) must be connected correctly.**

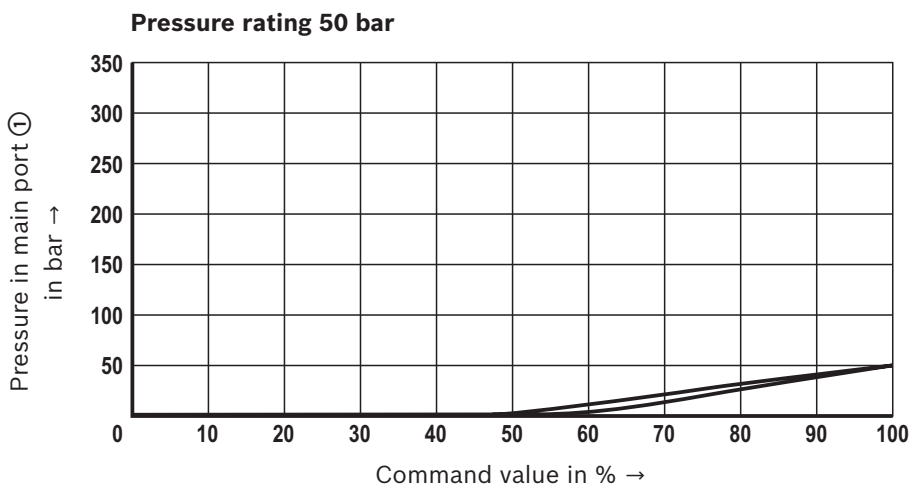
**Characteristic curves**

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

**Pressure-flow characteristic**



**Pressure in main port ① dependent on command value; flow = 0 l/min**



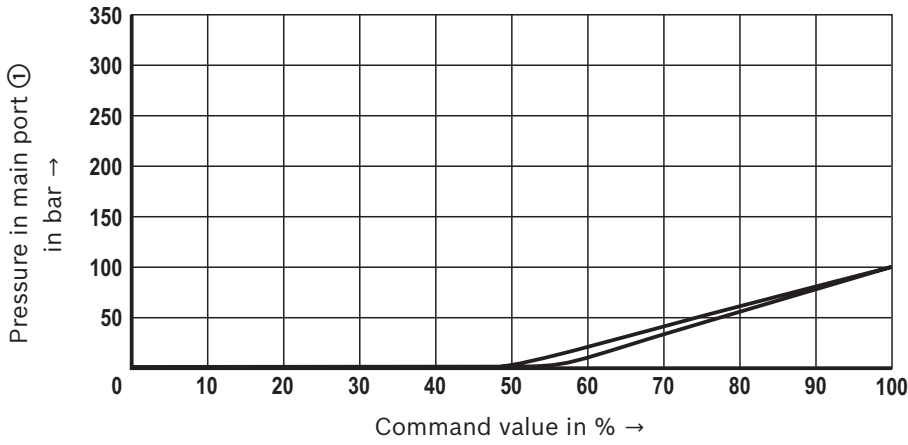
5

**Characteristic curves**

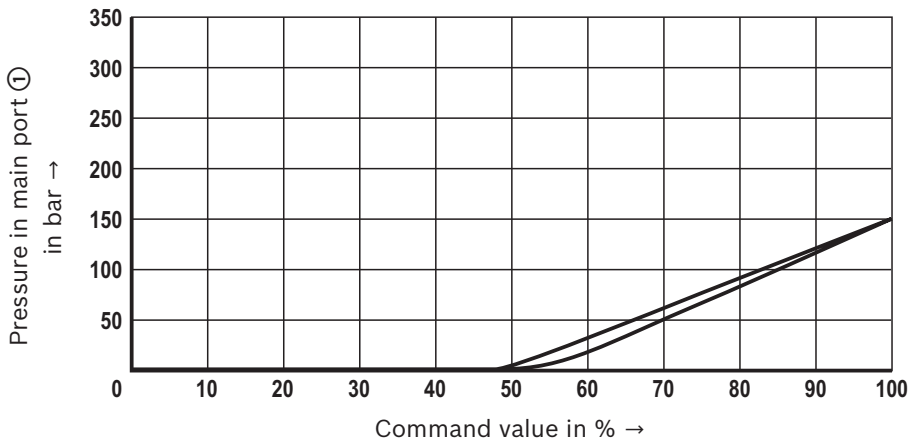
(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

Pressure in main port ① dependent on command value; flow = 0 l/min

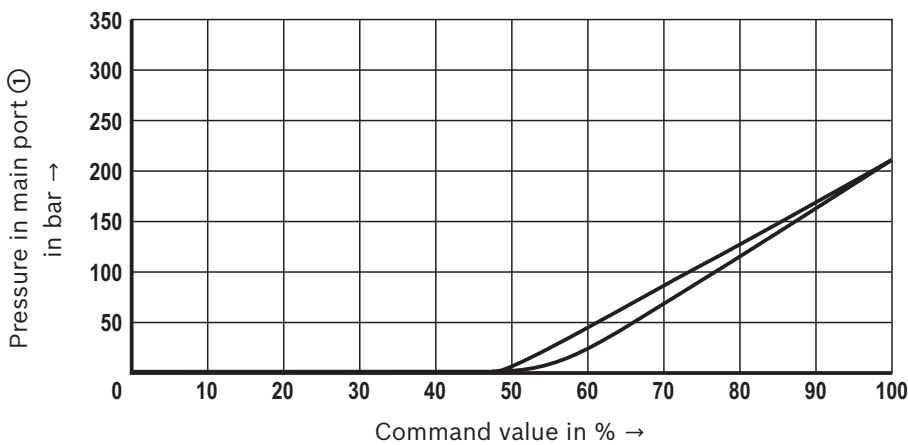
**Pressure rating 100 bar**



**Pressure rating 150 bar**



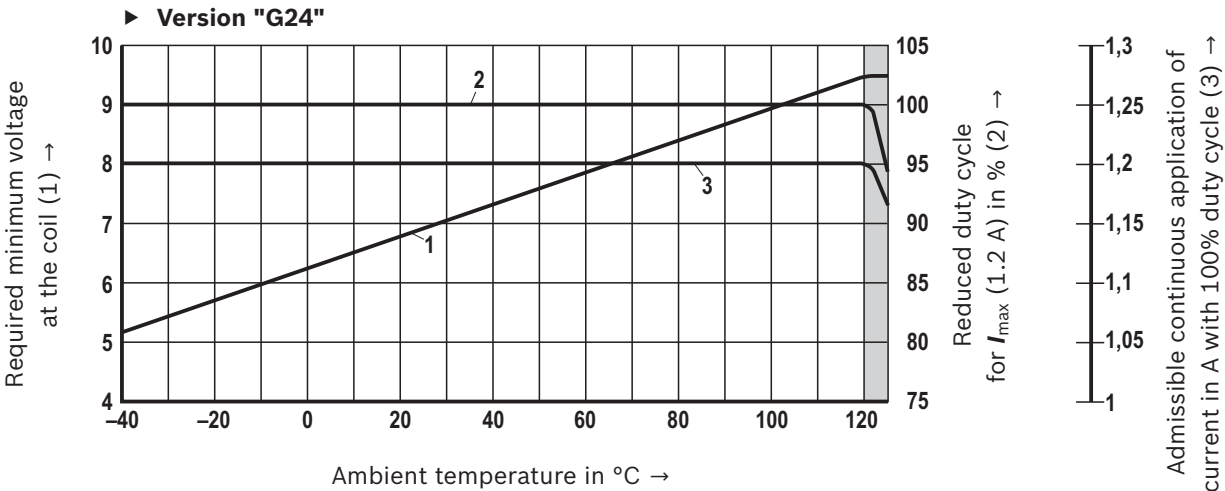
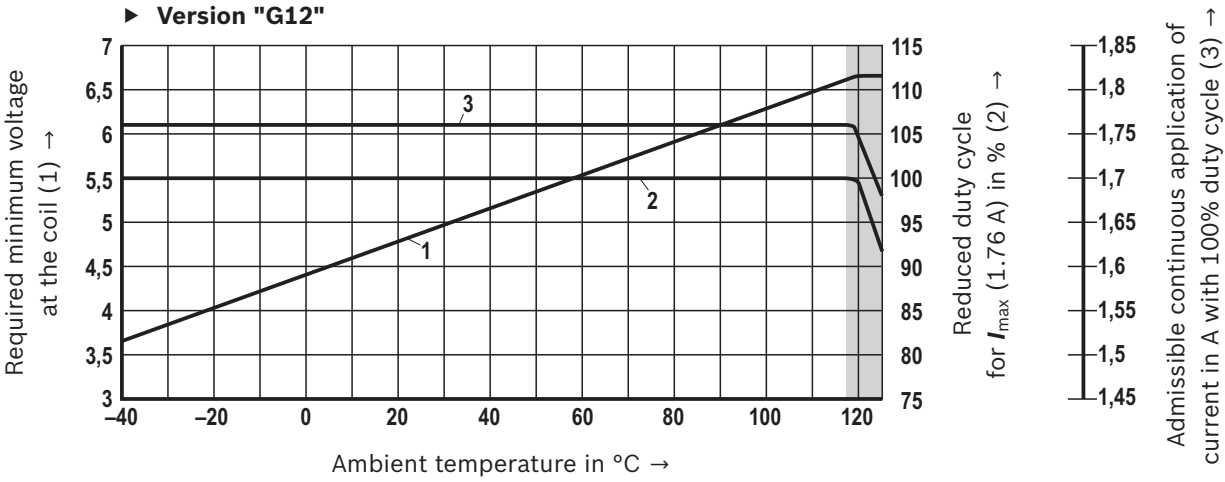
**Pressure rating 210 bar**





### Minimum terminal voltage at the coil and relative duty cycle

Admissible working range dependent on the ambient temperature



Limited valve performance

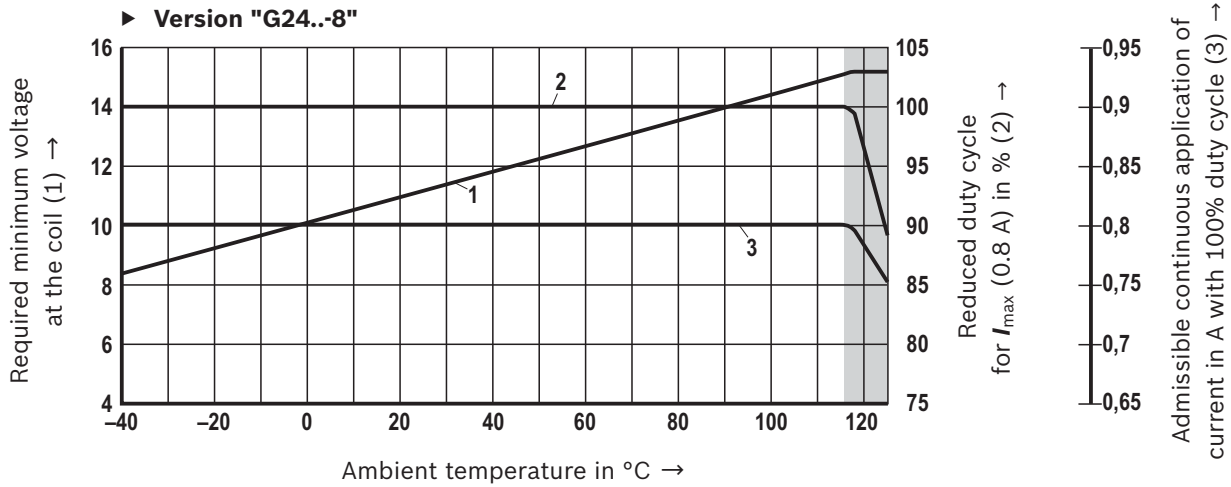


**Notice:**

The characteristic curves have been determined for coils with valve and medium test block size (80 x 80 x 80 mm), without flow in calm air. Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened. In individual cases, more unfavorable conditions may lead to limitations of the area of application.

## Minimum terminal voltage at the coil and relative duty cycle

Admissible working range dependent on the ambient temperature



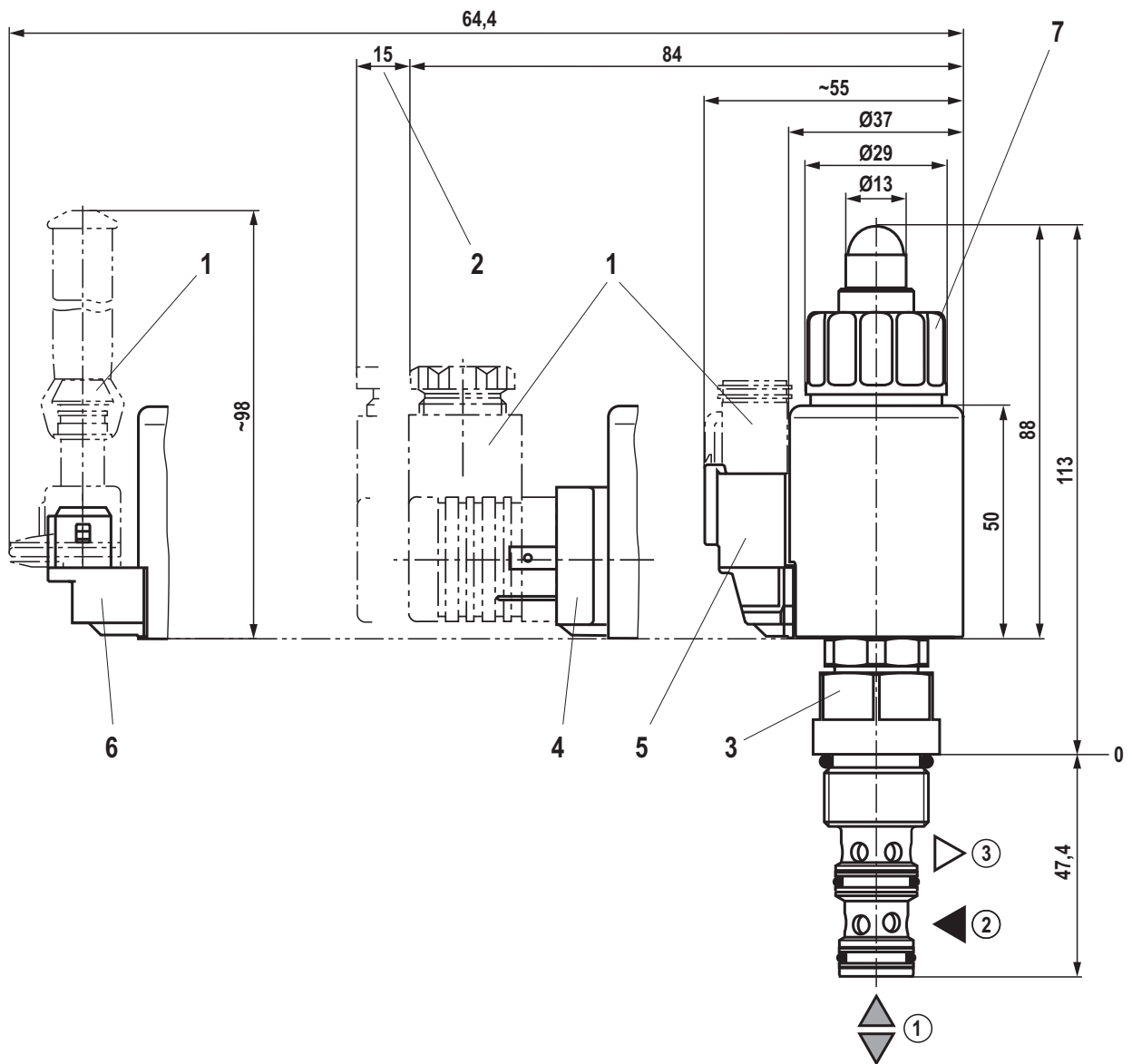
**Notice:**

The characteristic curves have been determined for coils with valve and medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In individual cases, more unfavorable conditions may lead to limitations of the area of application.

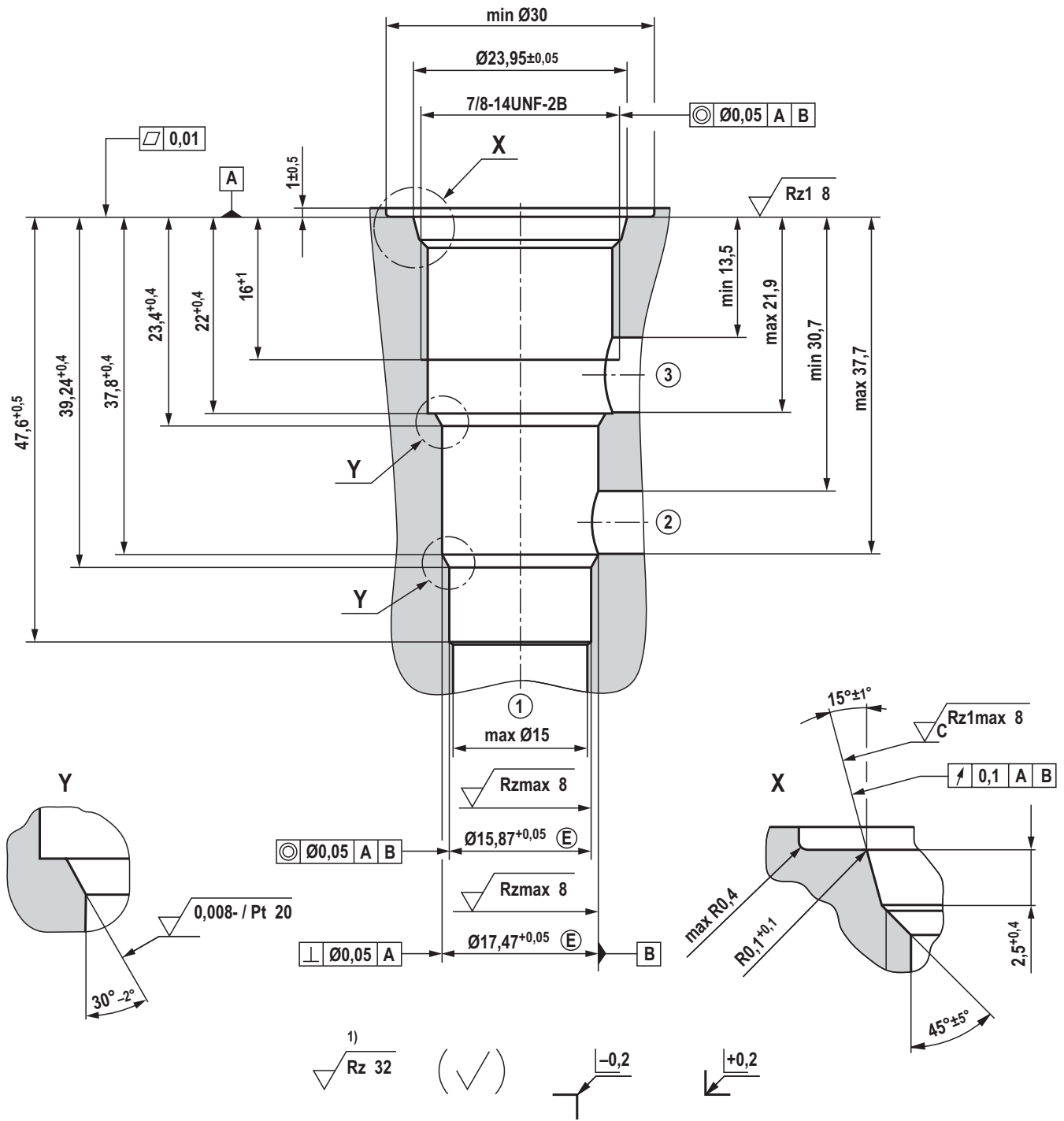
**Dimensions**  
(dimensions in mm)



- 1 Mating connectors, separate order, see data sheet 08006
- 2 Space required to remove the mating connector
- 3 SW24, tightening torque  $M_A = 55^{+5}$  Nm
- 4 Version "K4"
- 5 Version "K40"
- 6 Version "C4"
- 7 Nut, tightening torque  $M_A = 5^{+1}$  Nm

- ① = Main port 1 A
- ② = Main port 2 P
- ③ = Main port 3 T

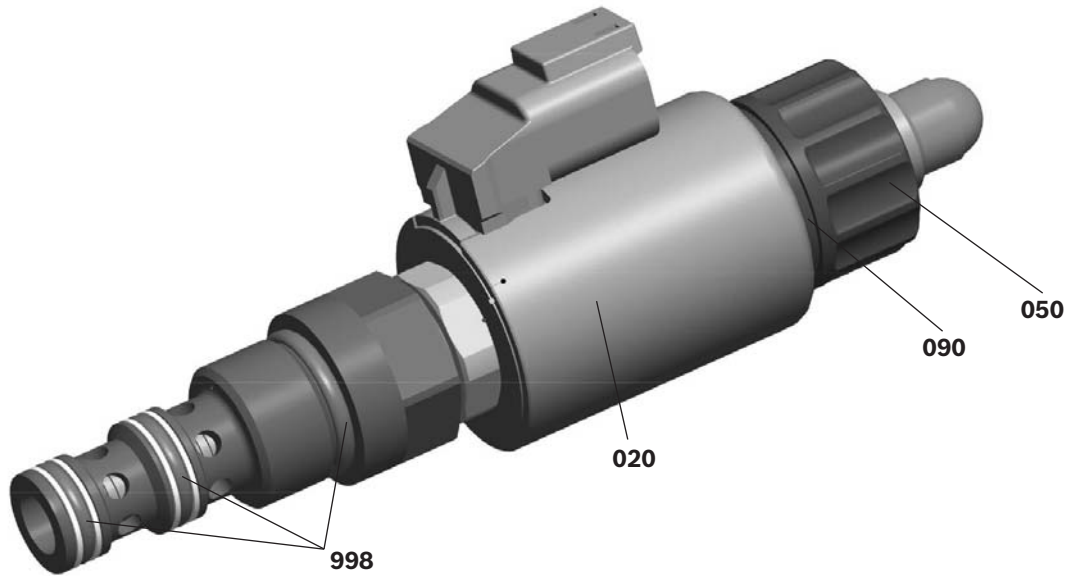
**Mounting cavity R/UNF-10-01-0-06; 3 main ports; thread 7/8-14UNF-2B**  
(dimensions in mm)



1) Visual inspection

- ① = Main port 1 A
- ② = Main port 2 P
- ③ = Main port 3 T

## Available individual components



Item	Denomination		Direct voltage	Material no.
020	Coil for individual connection <sup>1)</sup>	K4	12 V 24 V / 1200 mA 24 V / 800 mA	<b>R901002932</b> <b>R901002319</b> <b>R901049962</b>
		K40	12 V 24 V / 1200 mA 24 V / 800 mA	<b>R901003055</b> <b>R901003053</b> <b>R901050010</b>
		C4	12 V 24 V / 1200 mA 24 V / 800 mA	<b>R901003044</b> <b>R901003026</b> <b>R901049963</b>
050	Nut			<b>R900992146</b>
090	Seal ring for pole tube			<b>R900007769</b>
998	Seal kit of the valve			<b>R961011282</b>

<sup>1)</sup> After exchange of the solenoid coil, the pressure set in the factory may change by  $\pm 5\%$ .

## Further information

- ▶ Control electronics:
  - Plug-in proportional amplifier type VT-SSPA1...
  - Analog amplifier type RA...
  - BODAS control unit type RC...
- ▶ Selection of the filters

Data sheet 30116

Data sheet 95230

Data sheet 95200

**Notes**

# Proportional flow control valve, with integrated pressure compensator

## Type KUDSR



H7659

- ▶ Size 3
- ▶ Component series A
- ▶ Maximum operating pressure 350 bar
- ▶ Maximum flow 120 l/min

### Features

- ▶ Mounting cavity R/UNF-16-03-0-06
- ▶ Direct operated proportional valve for controlling the flow size
- ▶ Operation by means of proportional solenoid with central thread and detachable coil
- ▶ Rotatable solenoid coil
- ▶ With concealed manual override
- ▶ Screwable manual override with star handle, optional

### Contents

Features	1
Ordering code, valve types	2
Available coils, symbols	3
Function	4
Technical data	5 ... 6
Characteristic curves	7 ... 10
Minimum terminal voltage at the coil and relative duty cycle	11
Dimensions	12
Mounting cavity	13
Available individual components	14
Further information	14

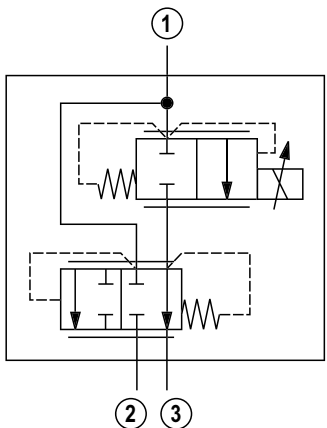
**Ordering code** (valve without coil) <sup>1)</sup>

01 02 03 04 05 06 07 08 09

<b>KUDS</b>	<b>R</b>	<b>3</b>		<b>A</b>	<b>/</b>	<b>F</b>	<b>N9</b>	<b>V</b>	<b>*</b>
-------------	----------	----------	--	----------	----------	----------	-----------	----------	----------

01	Proportional flow control valve, with integrated pressure compensator, direct operated	<b>KUDS</b>
02	Maximum operating pressure 350 bar	<b>R</b>
03	Size 3	<b>3</b>

**Symbol**

04		Flow in the main port ③	
		80 l/min	<b>C</b>
		60 l/min	<b>C1</b>
		40 l/min	<b>C2</b>

05	Component series	<b>A</b>
06	High Performance and mounting cavity R/UNF-16-03-0-06, see page 13	<b>F</b>
07	<b>With</b> concealed manual override <sup>2)</sup>	<b>N9</b>

**Seal material**

08	FKM seals (other seals upon request) Attention! Observe compatibility of seals with hydraulic fluid used!	<b>V</b>
09	Further details in the plain text	<b>*</b>

<sup>1)</sup> Complete valves with mounted coil on request.

<sup>2)</sup> Screwable manual override with star handle "**N14**"  
(separate order, material no. **R913009058**, see page 12).

**Valve types** (without coil) <sup>1)</sup>

Type	Material no.
KUDSR3CA/FN9V	<b>R901255657</b>
KUDSR3C1A/FN9V	<b>R901287409</b>
KUDSR3C2A/FN9V	<b>R901265879</b>



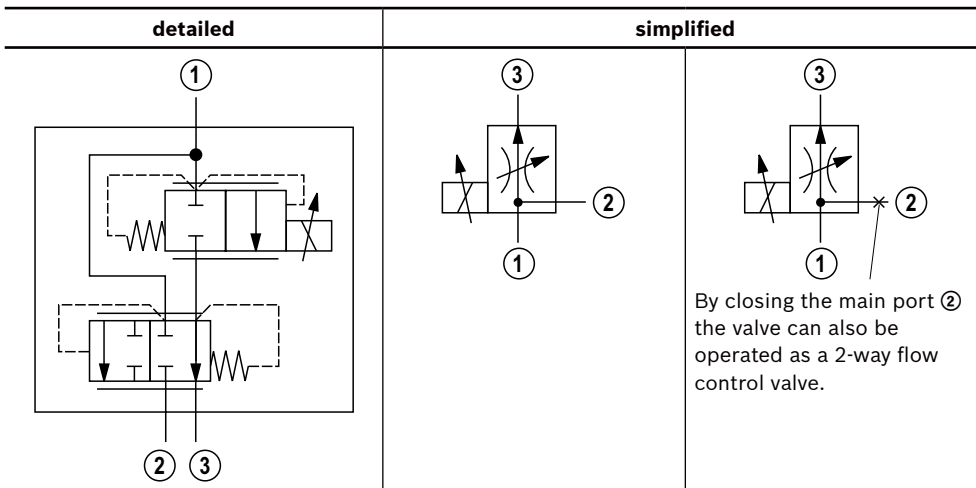
**Available coils** (separate order) <sup>1)</sup>

Direct voltage DC <sup>4)</sup>	Material no. for coil with connector <sup>3)</sup>		
	"K4" 03pol (2+PE) DIN EN 175301-803	"K40" 02pol K40 DT 04-2PA, co. Deutsch	"C4" 02pol C4/Z30 AMP Junior-Timer
12 V (1.8 A)	<b>R901022180</b>	<b>R901272648</b>	<b>R901022680</b>
24 V (1.2 A)	<b>R901022174</b>	<b>R901272647</b>	<b>R901022683</b>

<sup>3)</sup> Mating connectors, separate order, see data sheet 08006.

<sup>4)</sup> Other voltages upon request.

**Symbols**



- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A)

## Function

### General

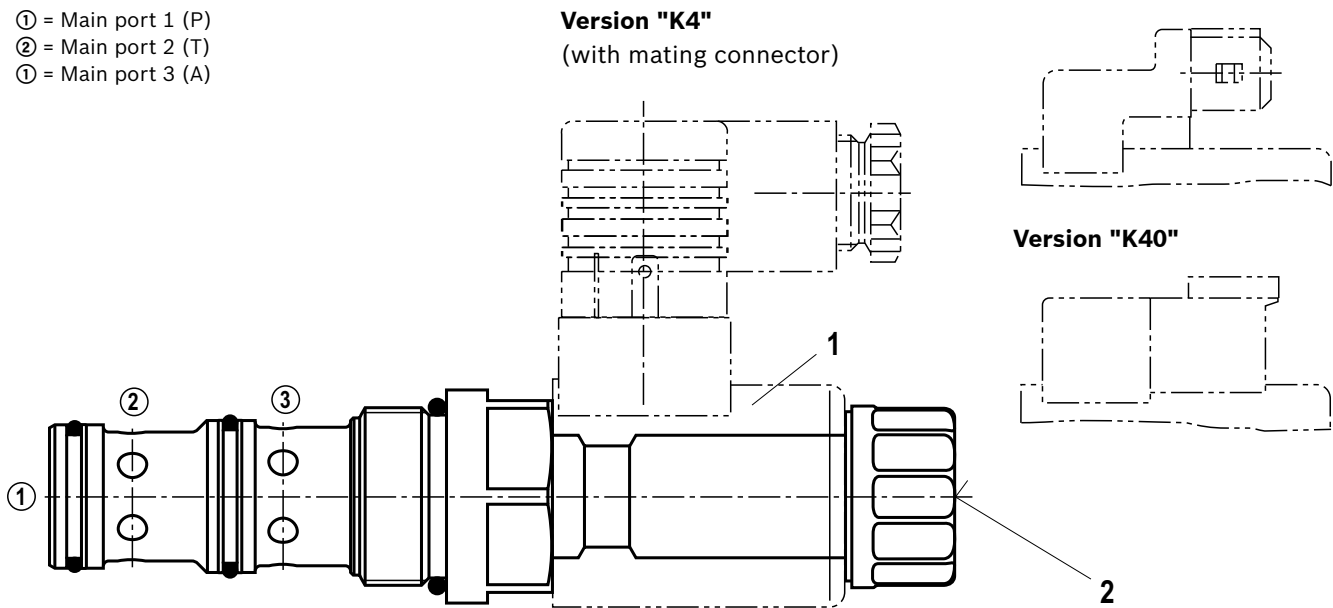
The proportional flow control valve is a direct operated screw-in cartridge valve in spool design with integrated pressure compensator. It regulates the flow proportionally to the input signal in a stepless form from main port ① to ②. Any excessive residual flow is led to the tank or to another actuator via port ③.

The valve basically consists of housing, control spool, control spring, pressure compensator piston, orifice bush, pressure compensator spring as well as proportional solenoid (1) with central thread and detachable coil.

### Function

With de-energized proportional solenoid (1), the control spool that is always pressure-compensated to the actuating forces due to its structural design is held in the initial position by the control spring and blocks the flow between main port ① and ③. By energizing the proportional solenoid (1), the control spool is adjusted directly proportional to the electrical input signal and, via orifice-type cross-sections (with progressive flow characteristics), adjusts and connects the main ports ① and ③. Due to the integrated pressure compensator piston together with the pressure compensator spring, the pressure drop across the valve is kept constant, independent of the pressures at ①, ② and ③. In case of excessive flow from ①, the pressure compensator piston moves to the right and opens the connection ① to ②. In case of de-excitation of the proportional solenoid (1), the control spring returns the control spool into its initial position. The entire flow is now directly led from main port ① to main port ②. The manual override (2) allows for the adjustment of the valve without solenoid energization.

- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A)



Type KUDSR3...

**Technical data**

(For applications outside these parameters, please consult us!)

<b>general</b>			
Weight	kg		0.97
Installation position			Any - if it is ensured that no air can collect upstream of the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C		(see page 11)
Storage temperature range	°C		-20 ... +80
<b>Environmental audits</b>			
Salt spray test according to DIN 50021	h		720
Surface protection DC solenoids			Coating according to DIN 50962-Fe//ZnNi with thick film passivation
<b>hydraulic</b>			
Maximum operating pressure	▶ Main port ①	bar	350
Bypass pressure	▶ Main port ②	bar	350 with $q_{Vmax}$
Prio pressure	▶ Main port ①	bar	330 with ... $q_{Vmax}$
Control pressure differential	▶ ① to ③	bar	12 ... 15
Minimum pressure differential	▶ ① to ③	bar	> 10
Maximum flow	▶ Main port ①	l/min	120
Rated flow	▶ ① to ③	l/min	80 (regulated)
Leakage		ml/min	< 100 (with $\Delta p = 100$ bar in ①; HLP46, $\theta_{oil} = 40$ °C)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	-40 ... +100 (preferably +40 ... +50)
Viscosity range		mm <sup>2</sup> /s	5 ... 400 (preferably 10 ... 100)
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Load cycles		Million	10
Hysteresis <sup>2)</sup>		%	≤ 5
Range of inversion <sup>2)</sup>		%	≤ 2
Response sensitivity <sup>2)</sup>		%	≤ 1

Hydraulic fluid		Classification	Suitable sealing materials	Standards
Mineral oils		HL, HLP	FKM	DIN 51524
Bio-degradable	▶ Insoluble in water	HEES	FKM	VDMA 24568
	▶ Soluble in water	HEPG	FKM	

**Important information on hydraulic fluids:**

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!
- ▶ The flash point of the hydraulic fluids used has to be 40 K above the maximum solenoid surface temperature.

▶ **Bio-degradable:** If bio-degradable hydraulic fluids are used that are also zinc-solvent, there may be an accumulation of zinc.

<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

Available filters can be found at [www.boschrexroth.com/filter](http://www.boschrexroth.com/filter).

<sup>2)</sup> Measured with analog amplifier type RA2-1/10 according to data sheet 95230 (PWM = 100 Hz).

**Technical data**

(For applications outside these parameters, please consult us!)

<b>electric</b>			
Voltage type		Direct voltage	
Supply voltages <sup>3)</sup>	V	12 DC	24 DC
Maximum solenoid current	A	1.8	1.2
Coil resistance	▶ Cold value at 20 °C	Ω	3.3
	▶ Max. hot value	Ω	5.8
Duty cycle	%	see characteristic curve page 11	
Maximum coil temperature <sup>4)</sup>	°C	150	
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	▶ Version "K4"	IP 65 with mating connector mounted and locked	
	▶ Version "C4"	IP 66 with mating connector mounted and locked	
		IP 69K with Rexroth mating connector (material no. <b>R901022127</b> )	
	▶ Version "K40"	IP 69K with mating connector mounted and locked	
Control electronics (separate order)	Analog amplifier module type VT-MSPA1...	Data sheet 30223	
	Plug-in proportional amplifier type VT-SSPA1...	Data sheet 30116	
	Analog amplifier type RA...	Data sheet 95230	
	BODAS control unit type RC...	Data sheet 95200	
Design according to VDE 0580			

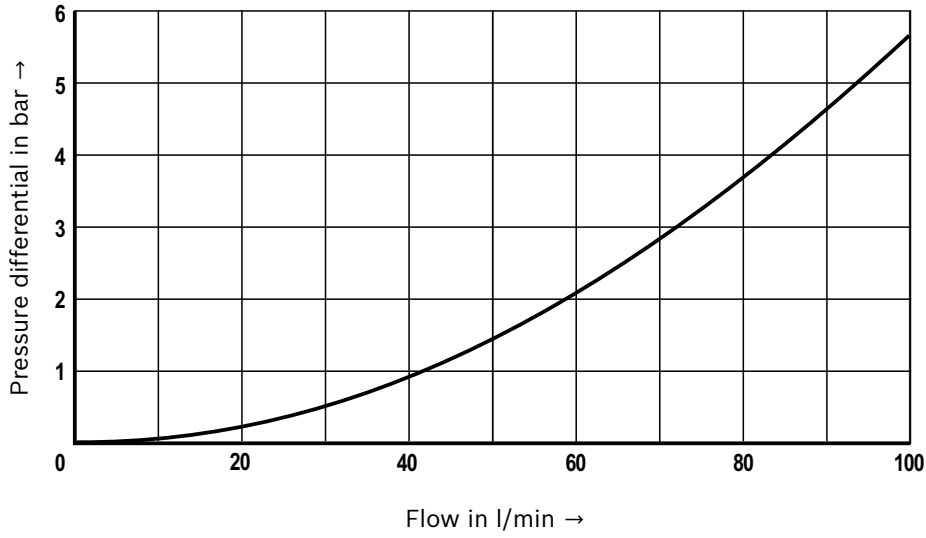
<sup>3)</sup> Other voltages upon request<sup>4)</sup> Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

**When establishing the electrical connection, the protective earthing conductor (PE  $\perp$ ) must be connected correctly.**

**Characteristic curves**

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$  and 24 V coil)

**$\Delta p$ - $q_V$  characteristic curve – main port ① to ② (③ open, orifice closed)**

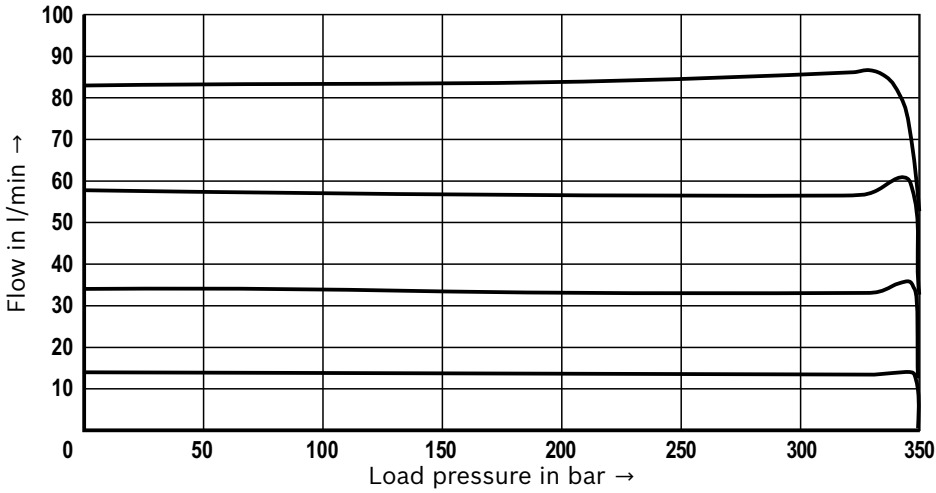


**Characteristic curves: Version "C"**

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$  and  $q_{V\text{①}} = 80 \text{ l/min}$ )

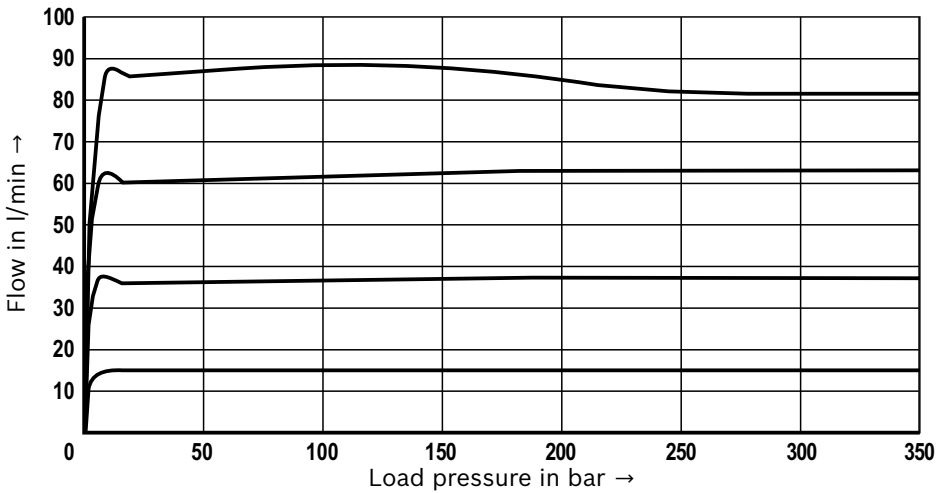
**Regulated flow at main port ③ as a function of the load pressure**

3-way function (main port ② open to the tank)

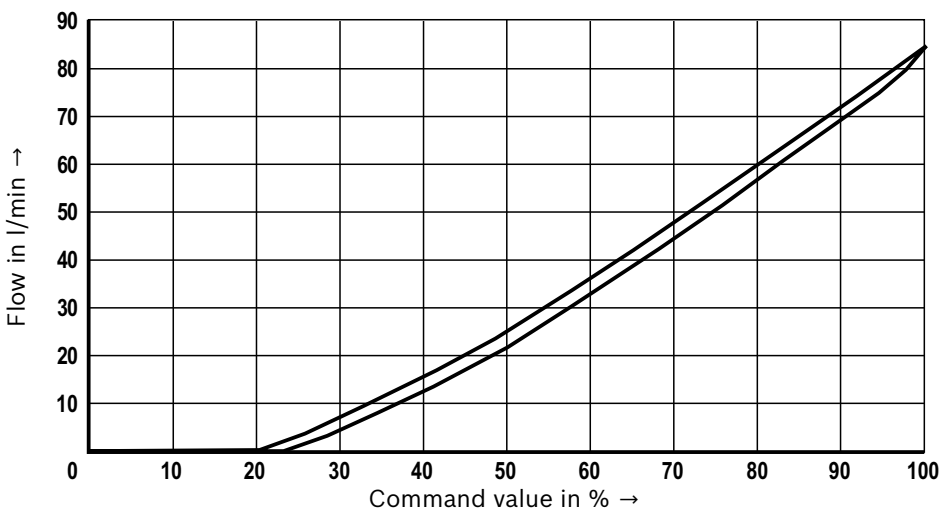


**Regulated flow at main port ③ as a function of the load pressure**

2-way function (main port ② closed)



**Regulated flow at main port ③ as a function of the command value**

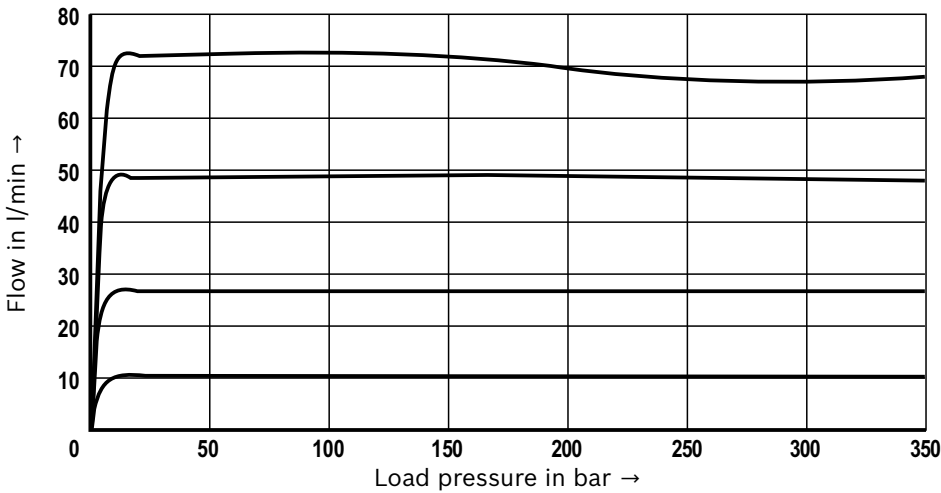


**Characteristic curves:** Version "C1"  
 (measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$  and  $q_{V①} = 60 \text{ l/min}$ )

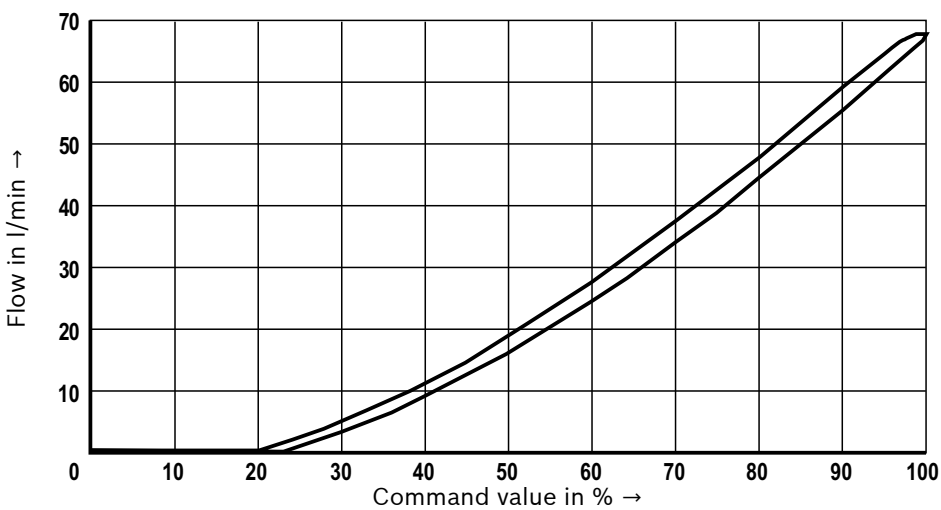
**Regulated flow at main port ③ as a function of the load pressure**  
 3-way function (main port ② open to the tank)



**Regulated flow at main port ③ as a function of the load pressure**  
 2-way function (main port ② closed)



**Regulated flow at main port ③ as a function of the command value**

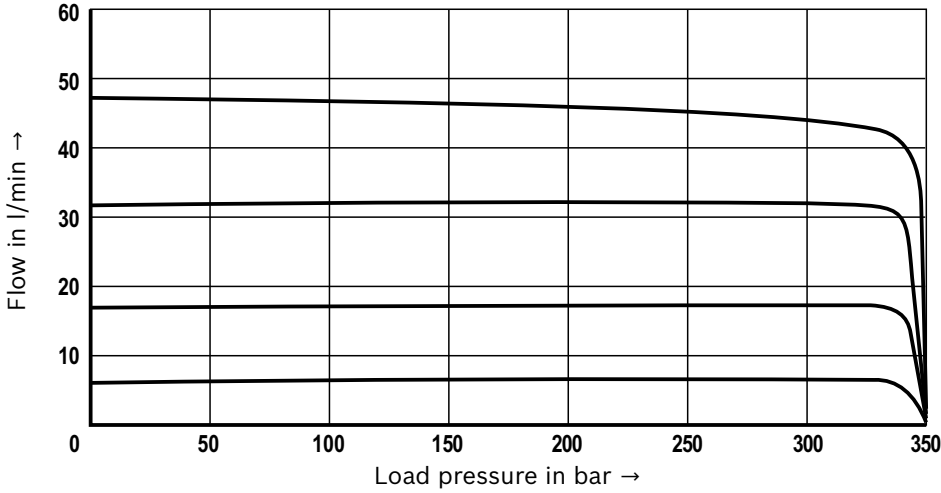


**Characteristic curves: Version "C2"**

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$  and  $q_{V\text{①}} = 40 \text{ l/min}$ )

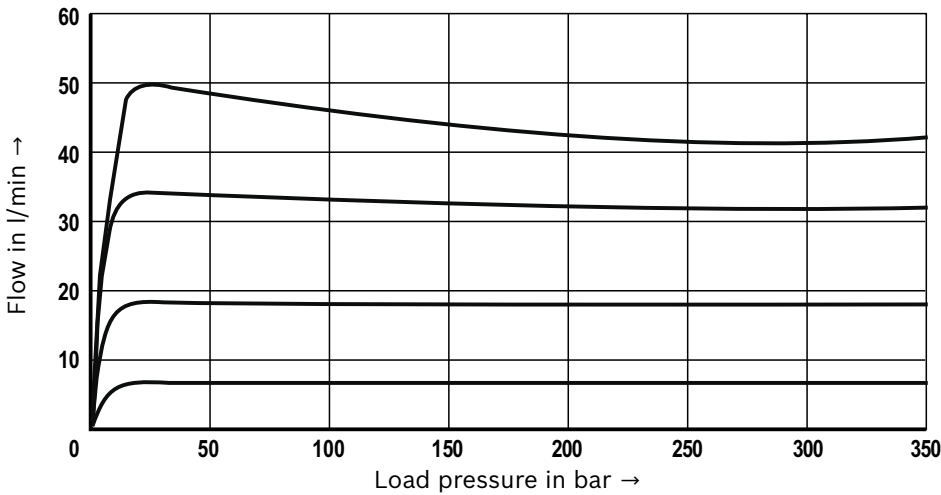
**Regulated flow at main port ③ as a function of the load pressure**

3-way function (main port ② open to the tank)

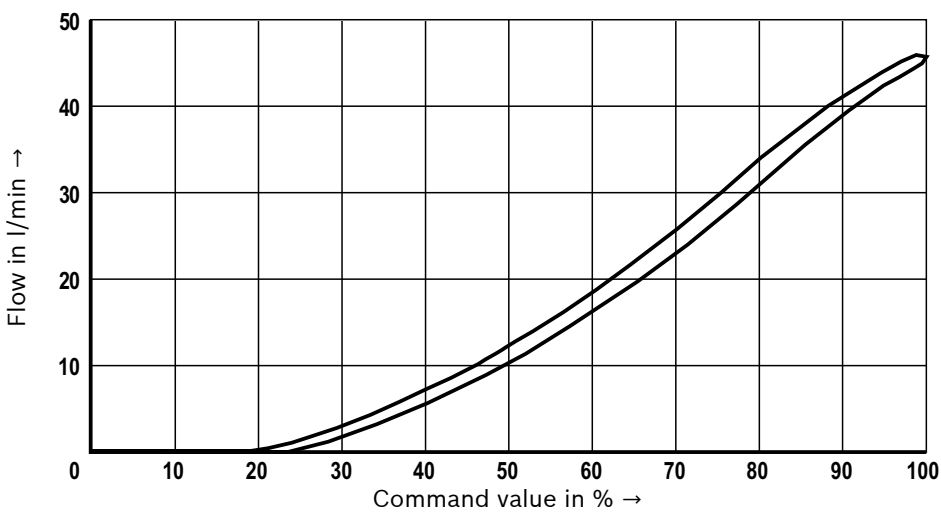


**Regulated flow at main port ③ as a function of the load pressure**

2-way function (main port ② closed)



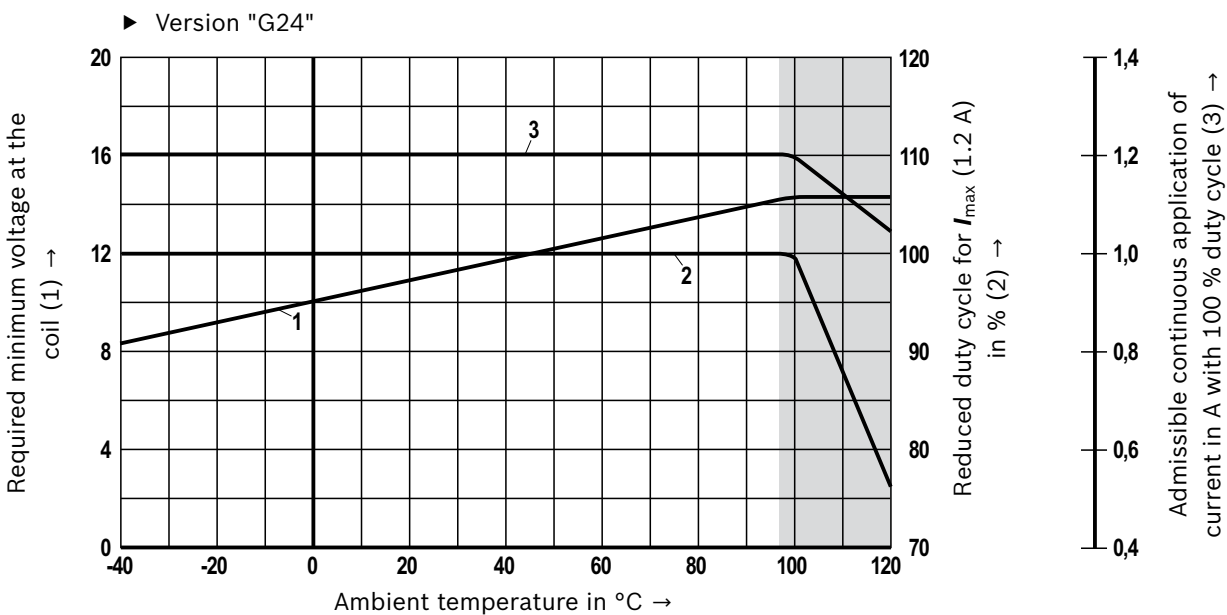
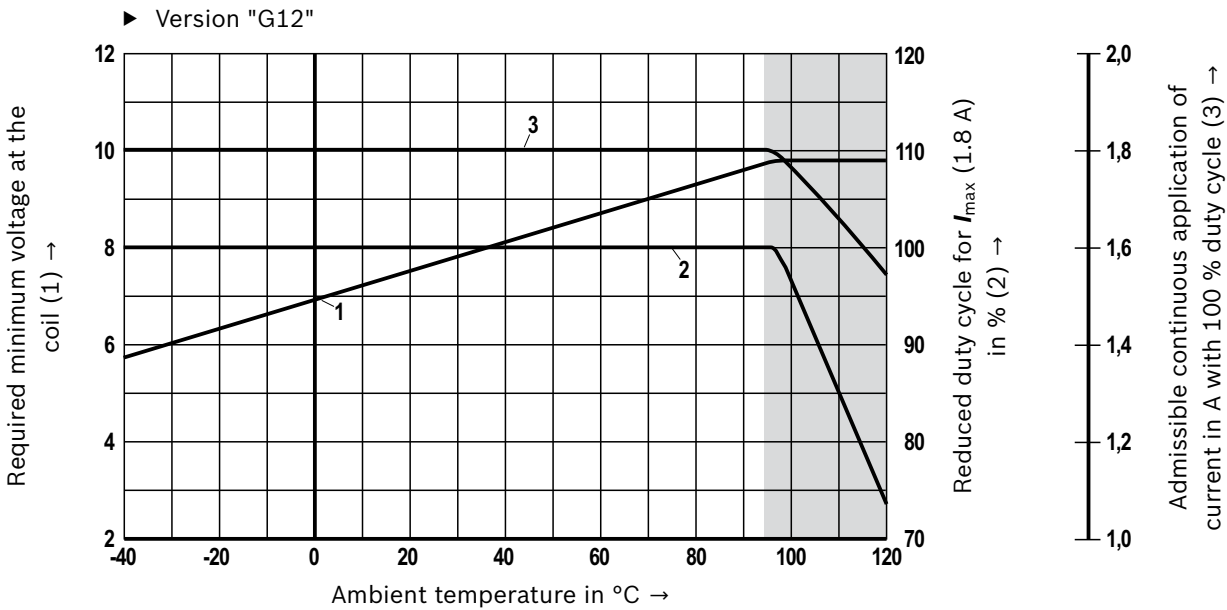
**Regulated flow at main port ③ as a function of the command value**





## Minimum terminal voltage at the coil and relative duty cycle

### Admissible working range dependent on the ambient temperature



Limited valve performance

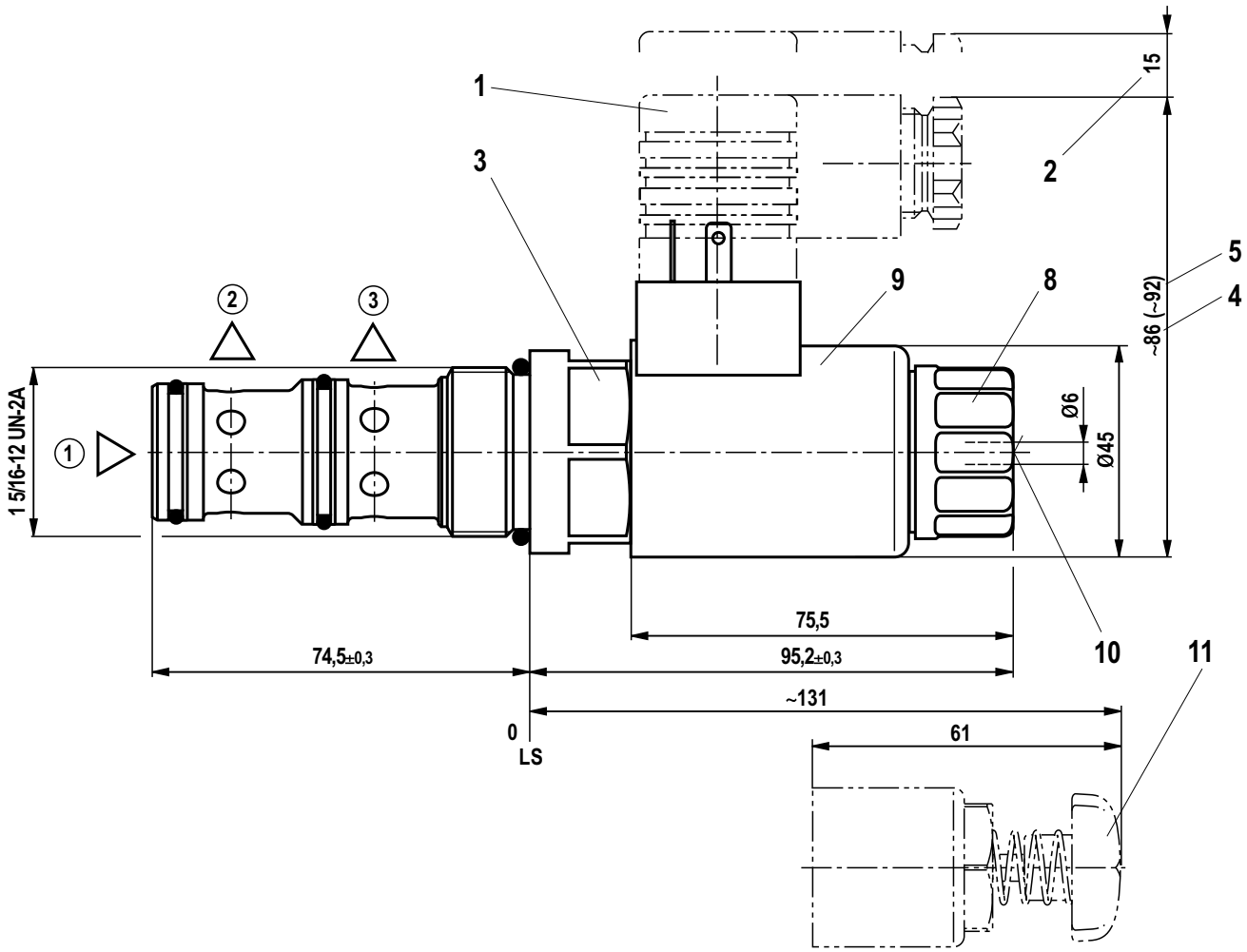
**Notices:**

The characteristic curves have been determined for coils with valve with medium test block size (80 x 80 x 80 mm), without flow in calm air.

Depending on the installation conditions (block size, flow, air circulation, etc.) there may be a better heat dissipation. Thus, the area of application is broadened.

In individual cases, more unfavorable conditions may lead to limitations of the area of application.

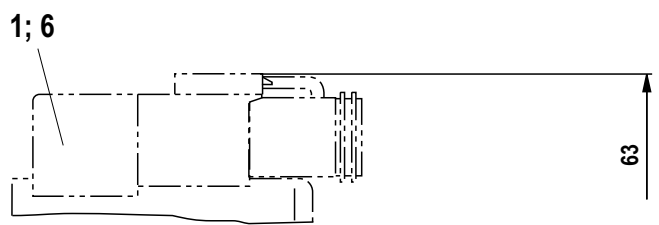
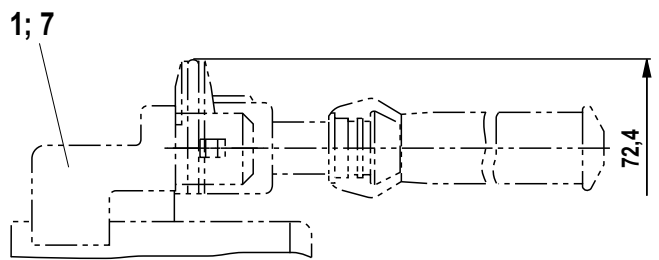
**Dimensions**  
(dimensions in mm)



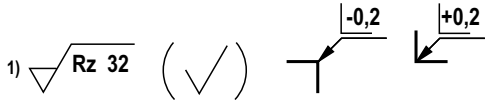
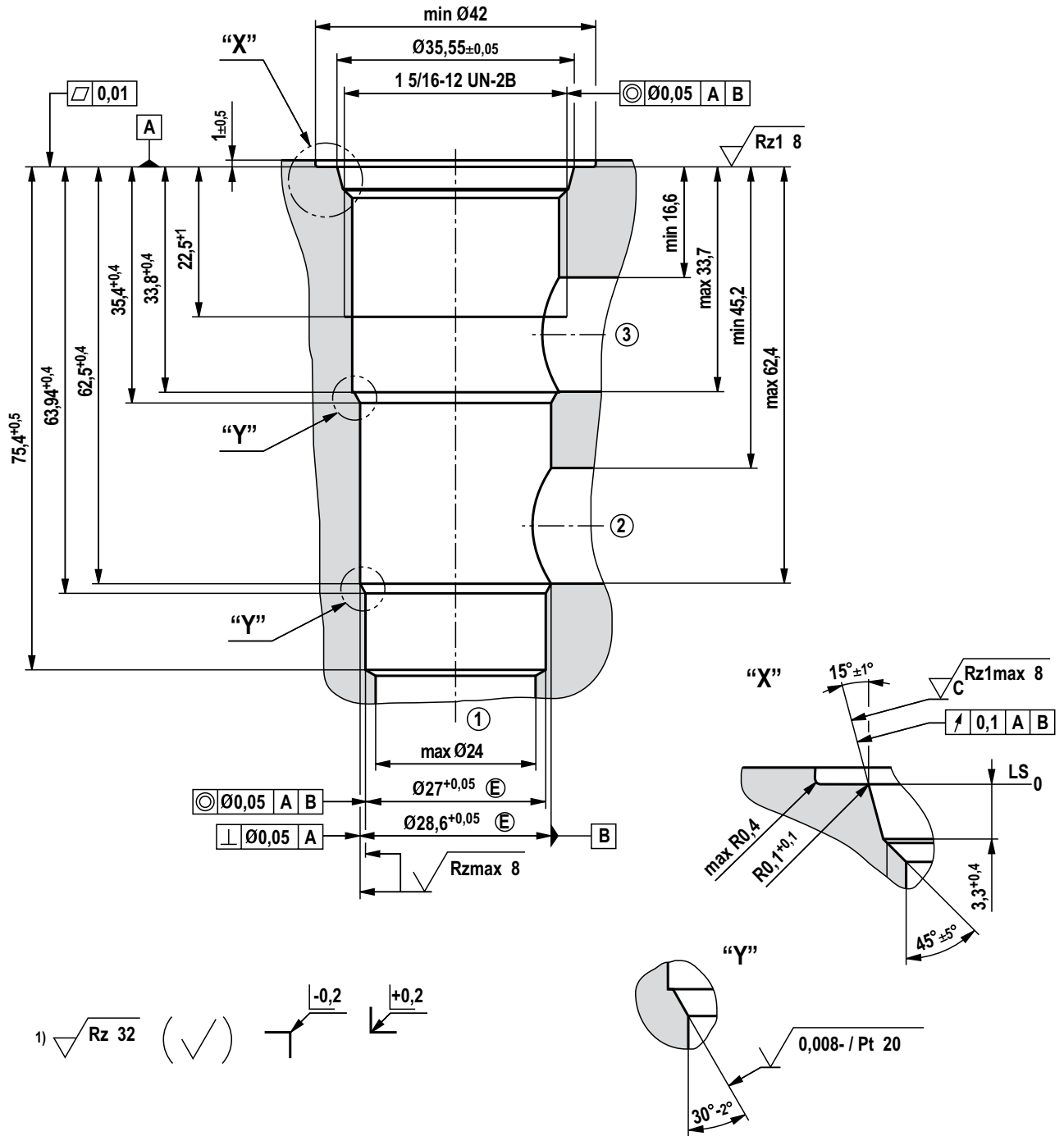
- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A)

LS = Location shoulder

- 1** Mating connector without circuitry for connector "K4" (separate order, see data sheet 08006)
- 2** Space required to remove the mating connector
- 3** SW36, tightening torque  $M_A = 165^{+15}$  Nm
- 4** Dimension ( ) for "K4" mating connector, without circuitry
- 5** Dimension ( ) for "K4" mating connector, with circuitry
- 6** Mating connector for connector "K40" (separate order, see data sheet 08006)
- 7** Mating connector for connector "C4" (separate order, see data sheet 08006)
- 8** Nut, tightening torque  $M_A = 5^{+2}$  Nm
- 9** Coil (separate order, see page 3)
- 10** Concealed manual override "N9"
- 11** Screwable manual override with star handle "N14" (separate order, see page 3)



**Mounting cavity R/UNF16-03-0-06; 3 main ports; thread 1 5/16-12 UN-2B**  
(dimensions in mm)



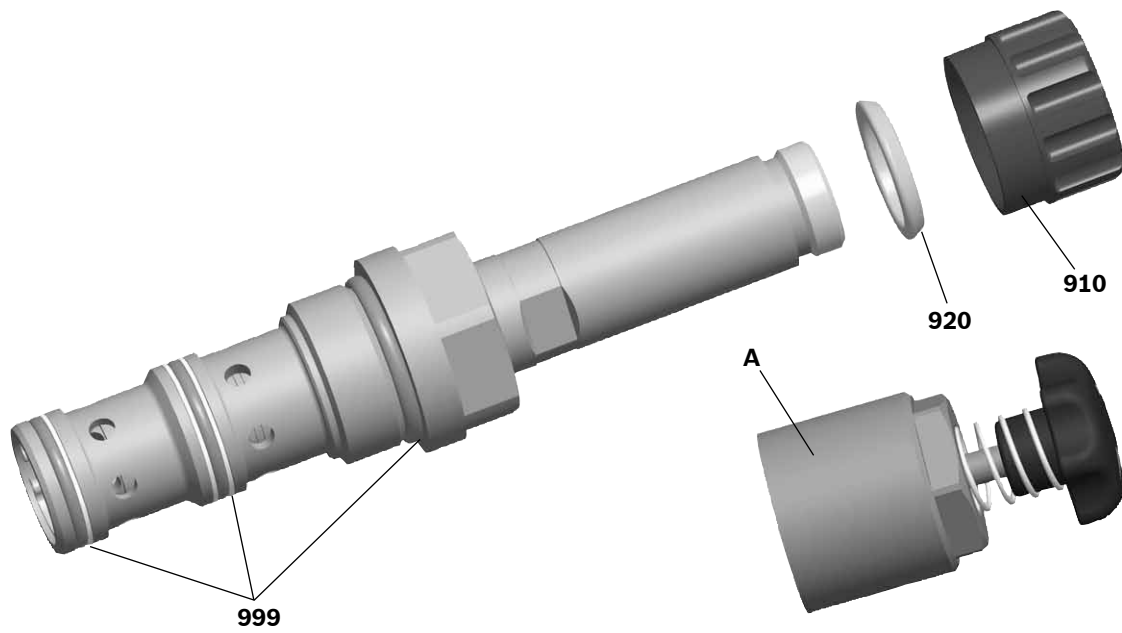
1) Visual inspection

- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A)

LS = Location shoulder

All seal ring insertion faces are rounded and free of burrs

## Available individual components



Item	Denomination	Material no.
910	Nut	<b>R900029574</b>
920	Seal ring for pole tube	<b>R900002507</b>
999	Seal kit of the valve	<b>R961003236</b>
A	Manual override "N14"	<b>R913009058</b>

Coils, separate order, see page 3.

## Further information

### ► Control electronics:

- Analog amplifier module type VT-MSPA1...
- Plug-in proportional amplifier type VT-SSPA1...
- Analog amplifier type RA...
- BODAS control unit type RC...

Data sheet 30223

Data sheet 30116

Data sheet 95230

Data sheet 95200

### ► Selection of the filters

[www.boschrexroth.com/filter](http://www.boschrexroth.com/filter)

## Valve amplifier for proportional valves

Type VT-SSPA1-1 (5, 50, 100, 150)



H7072+7645

- ▶ Component series 1X
- ▶ Analog, connector design
- ▶ Suitable for controlling solenoid-actuated pressure and directional valves without position control (see page 2)

### Features

- ▶ Proportional command value/current characteristic curve for command values between 0 and 100 %
- ▶ Regulated adjustable maximum current for command values greater than approx. 120 % (for differential input only)
- ▶ Differential input
- ▶ Separate up/down ramp generator
- ▶ Zero potentiometer / pilot current
- ▶ Command value attenuator / maximum current
- ▶ Dither frequency potentiometer
- ▶ 24 V operating voltage

### Contents

Features	1
Ordering code	2
Applications	3
Function	4
Block diagram	4
Characteristic curve	5
Technical data	5
Electrical connection	6
Adjustment elements / dimensions	7
Project planning / maintenance instructions / additional information	8
Further information	8

## Ordering code

01	02	03	04	05	06	07
VT-SSPA1	-	-	1X	/	/	0 - 24 /

01	Valve amplifier for proportional valves, analog, connector design	<b>VT-SSPA1</b>
02	For DBET / DRE / DBEM...7x	<b>1</b>
	For KBPS / KBVS / KTVS	<b>5</b>
	Universal, 2.5 A	<b>50</b>
	For KKDSR	<b>100</b>
	Universal, 0.8 A	<b>150</b>
03	Component series 10 to 19 (10 to 19: unchanged technical data and pin assignment)	<b>1X</b>
04	Version: Standard	<b>V0</b>
	Version: ramp time: 10 ms to 2 s (only for variant VT-SSPA1-50-1X)	<b>V002</b>
05	Voltage input	<b>0</b>
06	24 V operating voltage	<b>24</b>
07	Cable gland PG11	<b>no code</b>
	Conector, 4-pole, M12x1 <sup>1)</sup>	<b>K24</b>

<sup>1)</sup> Contact box, separate order, see accessories

## Type overview

Type	Mat. no.	$U_B$	$I_{rated}$	$f$ with $I_{rated}$	Command value	For valve	Solenoid
VT-SSPA1-1-1X/V0/0-24	R900779643	24 V	1.6 A	340 Hz	0...10 V/24 V	DBET / DRE / DBEM...7x	5.5 $\Omega$
VT-SSPA1-1-1X/V0/0-24/K24	R901238534	24 V	1.6 A	340 Hz	0...10 V/24 V	DBET / DRE / DBEM...7x	5.5 $\Omega$
VT-SSPA1-5-1X/V0/0-24	R901024331	24 V	1.2 A	200 Hz 300 Hz <sup>1)</sup>	0...10 V/24 V	KBPS.BA / KBVS.BA / KTVS.BA KBPS.AA / KBVS.AA / KTVS.AA	4.77 $\Omega$
VT-SSPA1-5-1X/V0/0-24/K24	R901238530	24 V	1.2 A	200 Hz 300 Hz <sup>1)</sup>	0...10 V/24 V	KBPS.BA / KBVS.BA / KTVS.BA KBPS.AA / KBVS.AA / KTVS.AA	4.77 $\Omega$
VT-SSPA1-50-1X/V0/0-24	R901005414	24 V	2.5 A	305 Hz	0...10 V/24 V	universal	> 2 $\Omega$
VT-SSPA1-50-1X/V002/0-24	R901336728	24 V	2.5 A	305 Hz	0...10 V/24 V	universal	> 2 $\Omega$
VT-SSPA1-50-1X/V0/0-24/K24	R901238532	24 V	2.5 A	305 Hz	0...10 V/24 V	universal	> 2 $\Omega$
VT-SSPA1-100-1X/V0/0-24	R901030116	24 V	1.2 A	150 Hz	0...10 V/24 V	KKDS / KUDS	7.2 $\Omega$
VT-SSPA1-100-1X/V0/0-24/K24	R901238528	24 V	1.2 A	150 Hz	0...10 V/24 V	KKDS / KUDS	7.2 $\Omega$
VT-SSPA1-150-1X/V0/0-24	R901104644	24 V	0.8 A	150 Hz <sup>2)</sup>	0...10 V	universal	19.5 $\Omega$
VT-SSPA1-150-1X/V0/0-24/K24	R901263782	24 V	0.8 A	150 Hz <sup>2)</sup>	0...10 V	universal	19.5 $\Omega$

<sup>1)</sup> The clock frequency of the output stage must be set to 300 Hz using the potentiometer „f“.

<sup>2)</sup> With a solenoid resistance of  $R = 19.5 \Omega$  and a solenoid current of  $I = 100 \text{ mA}$

## Ordering code (continued)

### Accessories for type .../K24

Cable set (VT-SSPA1) <sup>1)</sup>	Connector	Length in m	Material number
4-pole, A coding, PVC, M12 connector, free line end, line cross-section 0.75 mm <sup>2</sup>	straight	5	R901241656
	straight	10	R901148443
	angled	5	R901241651

<sup>1)</sup> For more information see RD08006

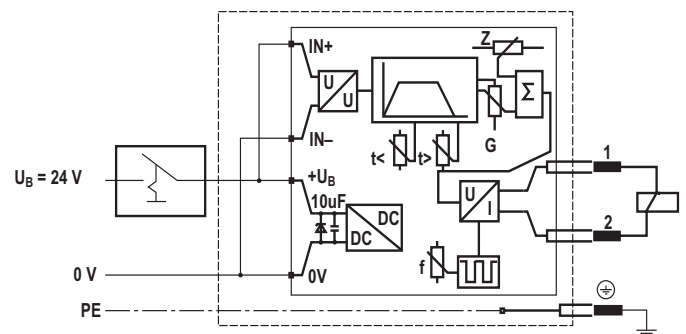
## Applications

### 2-conductor technology (only with differential input)

- ▶ Switching application with fixed flow control
- ▶ Ramp function upon switch-on

The “IN+” input is bridged with supply voltage ( $+U_B$ ) in the connector, the IN- input is bridged with supply voltage (0 V) in the connector.

The maximum current must generally be adjusted according to the solenoid information using potentiometer “G”. The ramp time “ramp up” ( $t <$ ) can be set within the range of  $t_{\min}$  to 5 s.

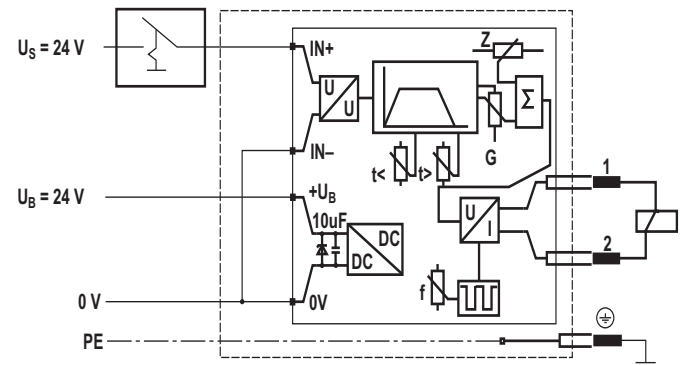


### 3-conductor technology (only with differential input)

- ▶ Switching application with fixed flow control
- ▶ Switching with low control power
- ▶ Ramp function can be adjusted separately when switching on and off the control voltage

The “IN+” input is connected to the control voltage ( $U_s = 24\text{ V}$ ), the “IN-” input is bridged with supply voltage (0 V) in the connector.

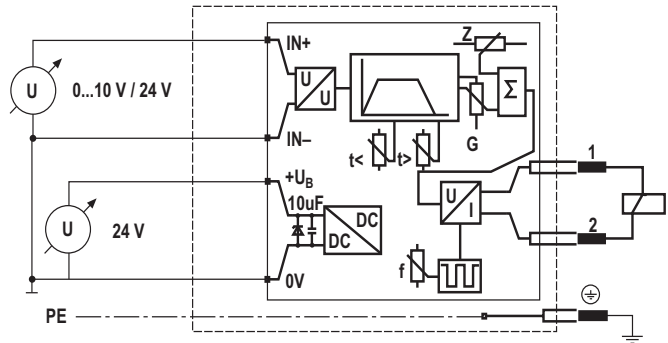
The maximum current must generally be adjusted according to the solenoid information using potentiometer “G”. When switched off (“IN+” = 0 V or “IN+” = open) a pilot current can be set at “Z”. This serves to reduce the switch-on delay, particularly with ramp. If required, this value can be adjusted between approx. 0 mA and approx. 15% of the rated current. The ramp times “ramp up” ( $t <$ ) and “ramp down” – ( $t >$ ) can be set within the range of  $t_{\min}$  to 5 s.



## Applications (continued)

### 4-conductor technology

The “IN+” input is connected to the control signal ( $U_s = 0 \dots 10 \text{ V}/24 \text{ V}$ ), the “IN-” input is connected to the reference potential of the control voltage. Pilot current and maximum current are set using potentiometers “Z” and “G” prior to commissioning. The current can now be proportionally adjusted according to the control voltage between the set pilot current and the set maximum current. The pilot current can be set in the range of approx. 0 mA to approx. 15% of the rated current, the maximum current can be set in the range of 0 to  $I_{max}$  (see technical data page 5).



## Function

The plug-in amplifier is suitable for installation on a valve connection base according to EN 175301-803. By turning the plug insert and the electronics in the housing, the plug-in amplifier can be mounted on the solenoid in 90° increments.

### Command value presetting

The command value range is between 0 and  $U_B$ . In the command value range 0... 10 V the solenoid current is proportional to the command value. Starting with a command value of 12 V up to  $U_B$  the solenoid current is almost constant according to the  $I_{max}$  setting (switching application).

### Ramp generator

The ramp generator (5) limits the rise of the control output. The up and down ramp times can be adjusted separately. In switching applications, the ramps can be used to dampen the switch-on and switch-off impulse. (When switching off only with 3-conductor connection, i.e. switching signal and supply are connected separately.)

This behavior also depends on the valve and solenoid type. The downstream command value attenuator (4) has no influence on the ramp time.

### Characteristic curve

Up to a command value of approx. 110% the transfer characteristic curve rises linearly. The zero point can be corrected using potentiometer “Z”, the maximum value can be corrected using potentiometer “G”.

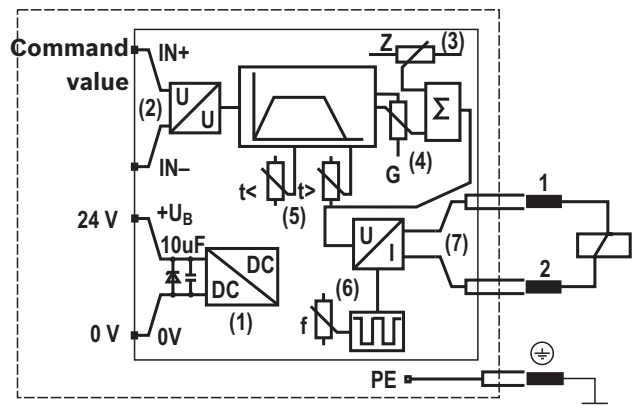
### Power output stage

Output stage (7) is freely clocking. The clock frequency depends on the current level, the operating voltage and the impedance of the controlled solenoid. The clock frequency can be re-adjusted using potentiometer “f”. The current output stage generates a regulated current signal according to the control output provided by the summing device (3). If the clock frequency is too high, the valve hysteresis is increased. If the clock frequency is too low, the noise level of the hydraulic system is increased.

( ) = Assignment to the block diagram

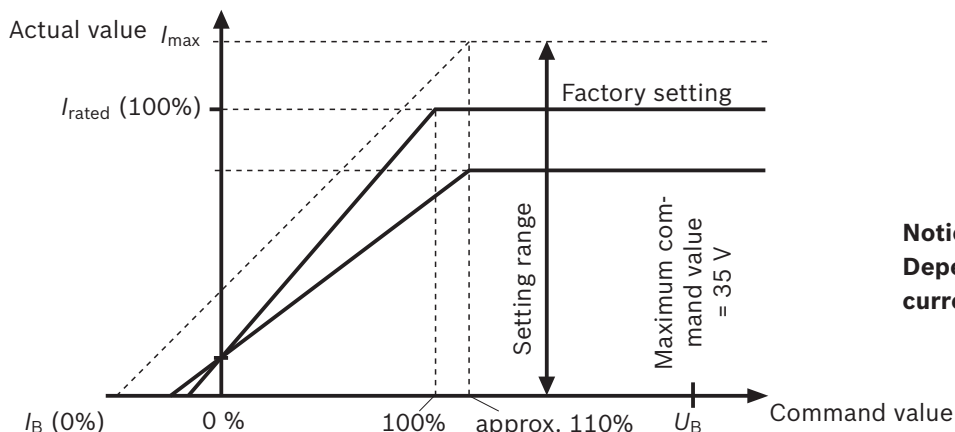
## Block diagram

- (1) Internal voltage adjustment
- (2) Command value input
- (3) Zero point potentiometer “Z” / pilot current / ( $I_{IN} = 0\%$ )
- (4) Command value attenuator “G” / maximum current / ( $I_{IN} = 100\%$ )
- (5) Ramp time potentiometers “t <” and “t >”
- (6) Frequency range correction “f”
- (7) Power output stage





## Characteristic curve



**Notice:**  
Depending on the type, the pilot current can also be "0".

**Technical data** (For applications outside these parameters, please consult us!)

Type		VT-SSPA1-1	VT-SSPA1-5	VT-SSPA1-50	VT-SSPA1-100	VT-SSPA1-150
24 V operating voltage	$U_B$	24 VDC				
	$u(t)_{max}$	35 V				
	$u(t)_{min}$	18 V				
Maximum cable inductance <sup>1)</sup>	$L_{max}$	100 $\mu$ H				
Current and power consumption (dependent on solenoid data)	$I / A$	< 1.7	< 1.7	< 2.6	< 1.7	< 1.2
	$P_{max} / VA$	< 40	< 40	< 60	< 40	< 30
Recommended pre-fuse	$I / A$	2; time-lag	2; time-lag	3.15; time-lag	2; time-lag	1.5; time-lag
Minimum coil inductivity	$L_{min} / mH$	15	15	10	15	15
Pilot current (setting range)	$I_B / mA$	0...300	0...300	0...350	0...250	0...200
Pilot current (factory setting)	$I_B / mA$	100	0	100	0	100
Rated current (factory setting)	$I / A$	1.6	1.2	2.5	1.2	0.8
Maximum current (setting range)	$I_{max} / A$	$I_B \dots 1.7$	$I_B \dots 1.8$	$I_B \dots 2.6$	$I_B \dots 1.7$	$I_B \dots 0.8$
Clock frequency at $I_{max}$	$f / Hz$	340	200	305	150	150 <sup>2)</sup>
Command value input (voltage)						
Proportional range	$U$	0...10 V				
Switching range	$U$	12 V... $U_B$				
Resistance	$R$	20 k $\Omega$				
Ramp time (setting range) <sup>3)</sup>						
Variant V0	$t$	100 ms...5 s	60 ms...5 s			
Variant V002	$t$		10 ms...2 s			
Type of connection (cable gland)		4 screw terminals				
Cable diameter		4.5 ... 11 mm				
Type of connection (M12 connector)		Connector, 4-pole, M12x1, A codification				
Type of connection (solenoid)		Base according to EN 175301-803				
Number of poles (solenoid)		2 + PE				
Dimensions		see page 7				
Type of mounting		M3 x 40 mm				
Admissible operating temperature range (amplifier with cable gland)	$^{\circ}C$	-25 ... +70	-25 ... +70	-25 ... +60	-25 ... +70	-25 ... +70
Admissible operating temperature range (amplifier with M12 connector)	$^{\circ}C$	-25 ... +70	-25 ... +70	-25 ... +50	-25 ... +70	-25 ... +70
Storage temperature range	$^{\circ}C$	-25 ... +85				
Protection class according to EN 60529		IP65 with mounted cable/mounted mating connector				
Weight	$m$	0.125 kg				

<sup>1)</sup> Usually corresponds to a cable length < 100 m

<sup>2)</sup> With a solenoid resistance of  $R = 19.5 \Omega$  and a solenoid current of  $I = 100$  mA

<sup>3)</sup> The minimum ramp time depends on the valve solenoid. The values indicated here should be considered as a guideline only and may vary

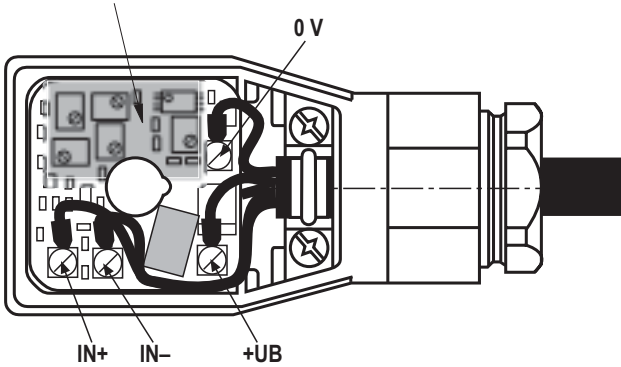
**Electrical connection**

Terminal / pin		Terminal / pin	
+UB / 1	Operating voltage $U_B$ 24 V	IN+ / 2	Command value input 24 V; 0...10 V
0 V / 3	0 V ground	IN- / 4	Reference potential for the command value

**Terminal connection**

Risk of malfunctions in case of EMC/ESD interference on the connection cable

**Do not route command value connection lines through this section!**

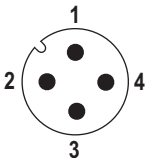


**The connection for the protective earthing conductor is accessible after the electronic printed-circuit board has been removed.**

Connection cross-section:  
 4 x 0.75 mm<sup>2</sup> shielded or  
 5 x 0.5 mm<sup>2</sup> shielded (connect shield in control cabinet)  
 For VT-SSPA1-50:  
 4 x 1.5 mm<sup>2</sup> shielded (connect shield in control cabinet)  
 Cable diameter: 4.5 ... 11 mm

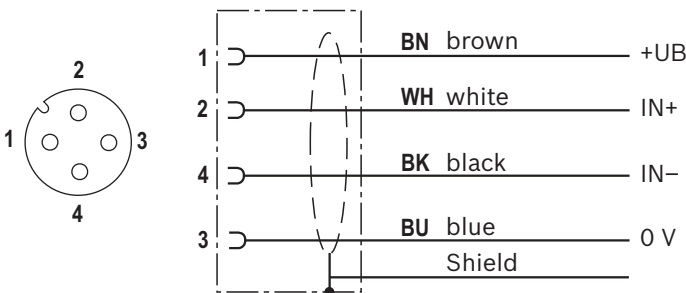
**M12 plug-in connector port**

**Connector on amplifier**



**Mating connector and wire colors with pre-assembled cable set**

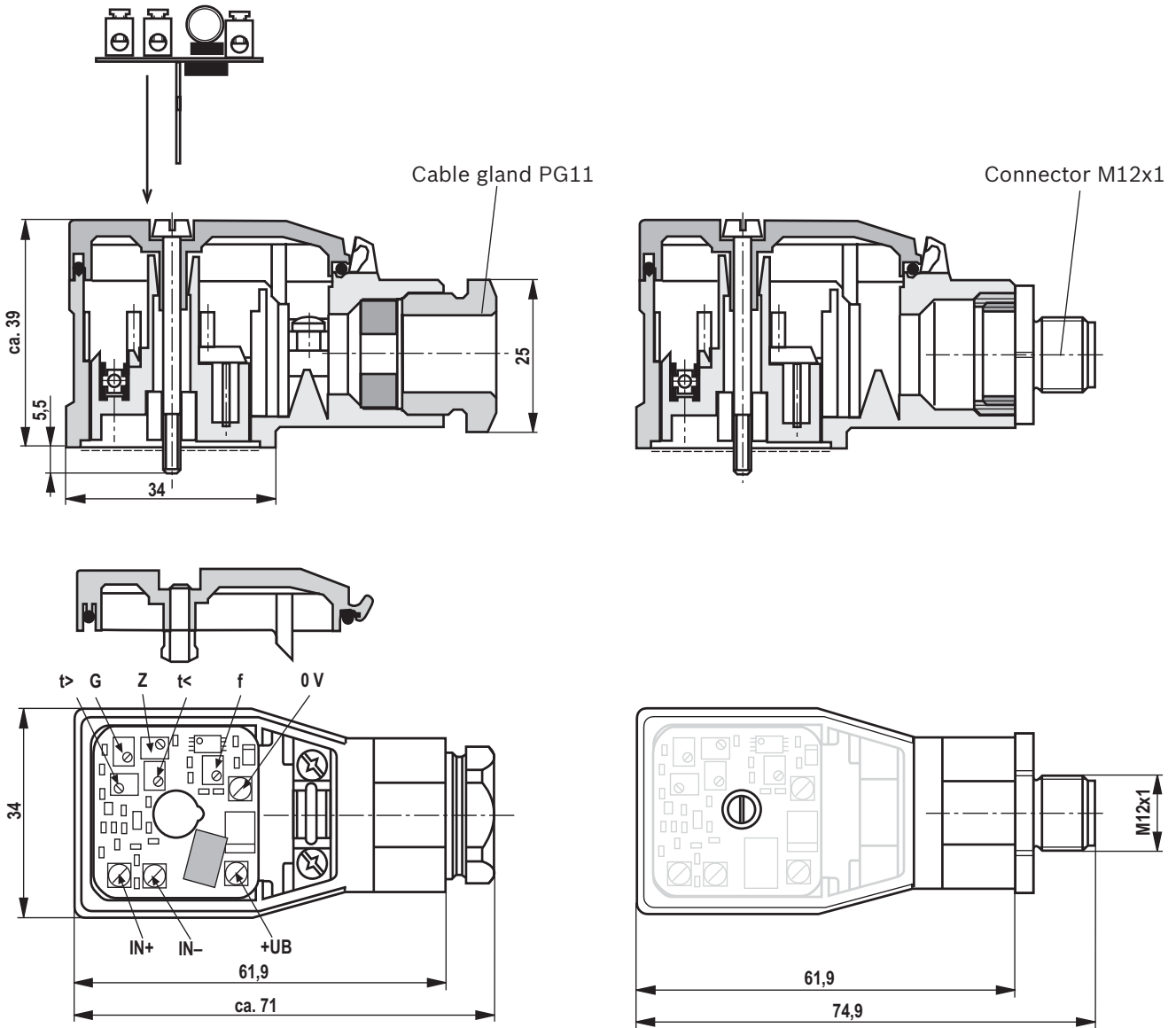
Please order the cable set separately, see page 3



**The connection for the protective earthing conductor is not provided**

Connection cross-section:  
 4 x 0.75 mm<sup>2</sup> shielded  
 (connect shield in control cabinet)

**Adjustment elements / dimensions (dimensions in mm)**



Top view on open housing:

- G Command value attenuator / maximum current
- Z Zero point potentiometer / pilot current
- t < Ramp time "up"
- t > Ramp time "down"
- f Frequency range

## Project planning / maintenance instructions / additional information

- ▶ The plug insert can be rotated in 90° steps in compliance with ESD protective measures.
- ▶ The plug-in amplifier may only be wired when de-energized.
- ▶ Do not lay lines close to power cables!
- ▶ The distance to aerial lines, radios, and radar systems has to be 1 m at least.
- ▶ To set the potentiometers and to check the current values, use the measuring adapter and measure the currents in a potential-free manner.
- ▶ The specified maximum solenoid currents must not be exceeded.
- ▶ Do not use solenoids with integrated free-wheeling diodes.
- ▶ The supply voltage is to be protected by means of a fuse – see “Technical data”.

### Notice:

The solenoids are controlled with a clocked voltage. The solenoid voltage impulse level corresponds to the applied operating voltage ( $+U_B$ ).

Solenoids with integrated EMC protection circuit may only be used if the response voltage of the protection circuit - both, for positive and negative voltage - is greater than the actual operating voltage.

The specifications of the valve manufacturers are to be observed.

### Notice:

- ▶ With a strongly fluctuating operating voltage, it may in the individual case be necessary to use an external smoothing capacitor with a capacity of approx. 470  $\mu\text{F}$  to 2200  $\mu\text{F}$ .
- ▶ The line length should not exceed 50 m. For longer lines, a capacitor with  $C \geq 100 \mu\text{F}$  has to be connected between  $U_B$  and 0 V. The line between capacitor and plug-in amplifier must not be longer than 50 m.

Recommendation: Capacitor module VT 11110 (see data sheet 30750); sufficient for up to 5 plug-in amplifiers

## Further information



### Notice:

For general information regarding safety, assembly and commissioning see operation manual:

07602-B Electronics for industrial applications

## Electro-proportional pressure reducing and relieving cartridge valves

<b>Designation</b>	<b>Description</b>	<b>Cavity</b>	<b>Data sheet</b>	<b>Page</b>
Proportional pressure reducing valve, direct operated, rising characteristic curve	MHDRE 06	Special	64655	1241
Proportional pressure reducing valve, direct operated, falling characteristic curve	MHDRE 06 FK	Special	64656	1251
Proportional pressure reducing valve	FTDRE 2	Special	58032	1261
Proportional pressure reducing valve	FTDRE2K-044	Special	58034	1273
Proportional pressure reducing valve	FTDRE 4	Special	58038	1285
3/2 directional valve with solenoid actuation	FTWE 2	Special	58007	1295
3/2 directional valve with solenoid actuation	FTWE 4	Special	58008	1303



## Proportional pressure reducing valve, direct operated, increasing characteristic curve

### Type MHDRE 06 SK (high-performance)



H8039

- ▶ Size 6
- ▶ Component series 3X
- ▶ Maximum control pressure 30 bar
- ▶ Max. flow 40 l/min

#### Features

- ▶ Direct operated proportional pressure reducing valve for reducing the system pressure
- ▶ Pilot control valve
- ▶ Screw-in cartridge valve
- ▶ Suitable for mobile applications
- ▶ Operation by means of proportional solenoid
- ▶ In case of power failure, the minimum pressure is set
- ▶ Recommended control electronics:  
Type RA and RC mobile amplifiers

#### Contents

Features	1
Ordering codes	2
Valve types	2
Function, section, symbol	3
Technical data	4, 5
Admissible working range	5
Characteristic curves	6, 7
Dimensions	8
Mounting cavity	9
Individual components available	10
Further information	10

Ordering codes <sup>1)</sup>

01	02	03	04	05	06	07	08	09	10	11
<b>MHDRE</b>	<b>06</b>	<b>S</b>	<b>K</b>	<b>3X</b>	<b>/</b>	<b>A</b>			<b>V</b>	<b>*</b>

01	Proportional pressure reducing valve, direct operated	<b>MHDRE</b>
02	Size 6	<b>06</b>
03	Increasing characteristic curve	<b>S</b>
04	Screw-in cartridge valve	<b>K</b>
05	Component series 30 ... 39 (30 ... 39; unchanged installation and connection dimensions)	<b>3X</b>
06	Maximum control pressure 18 bar	<b>18</b>
	Maximum control pressure 20 bar	<b>20</b>
	Maximum control pressure 26 bar	<b>26</b>
	Maximum control pressure 30 bar	<b>30</b>
07	Proportional solenoid, wet-pin	<b>A</b>

## Supply voltage

08	Control electronics 12 V DC	<b>G12</b>
	Control electronics 24 V DC	<b>G24</b>

Electrical connection <sup>1)</sup>

09	<b>Without</b> mating connector; connector according to DIN EN 175301-803	<b>K4</b>
	<b>Without</b> mating connector; with connector DT 04-2P (Deutsch plug)	<b>K40</b>
	<b>Without</b> mating connector, with connector AMP Junior-Timer	<b>C4</b>

## Seal material

10	FKM seals	<b>V</b>
	Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	
11	Further details in the plain text	<b>*</b>

<sup>1)</sup> Mating connectors; separate order, see data sheet 08006.

## Valve types

Type	Material number
MHDRE 06 SK3X/18AG12K40V	R901220628
MHDRE 06 SK3X/20AG12K40V	R901150864
MHDRE 06 SK3X/26AG12K40V	R901220722
MHDRE 06 SK3X/30AG12K40V	R901220724

Type	Material number
MHDRE 06 SK3X/18AG24K40V	R901156353
MHDRE 06 SK3X/20AG24K40V	R901220641
MHDRE 06 SK3X/26AG24K40V	R901220719
MHDRE 06 SK3X/30AG24K40V	R901220723



## Function, section, symbol

### General

The type MHDRE 06 SK proportional pressure reducing valve is a direct operated, 3-way version screw-in cartridge valve. It reduces the control pressure (main port ①) proportionally to the solenoid current and largely works independently of the inlet pressure (main port ②).

When the command value = 0 or in the event of power failure, the minimum pressure is set. Operation is effected by means of proportional solenoid. The solenoid's interior is connected to the main port ③ and filled with hydraulic fluid.

Depending on the electric command value, these valves can be used to continuously reduce the system pressure. The valve is suitable for controlling couplings, pumps, and directional valves, and is also suitable for use in proportional pilot controls (especially in mobile applications).

### Basic principle

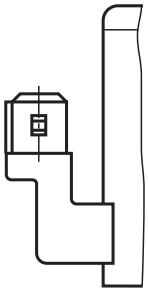
The valve controls the pressure in the main port ① in accordance with the current on the solenoid. The "S" version signifies an increasing characteristic curve, i.e. an increasing current brings about an increased pressure (see characteristic curves on pages 6 and 7).

The proportional solenoid converts the electric current into mechanical force that acts upon the piston via the armature. The piston controls the connection between the main ports.

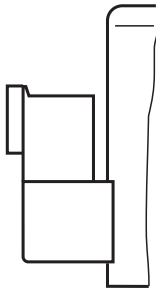
#### Notes:

The tank pressure that occurs (main port ③) is added to the control pressure (main port ①).

Version "C4"

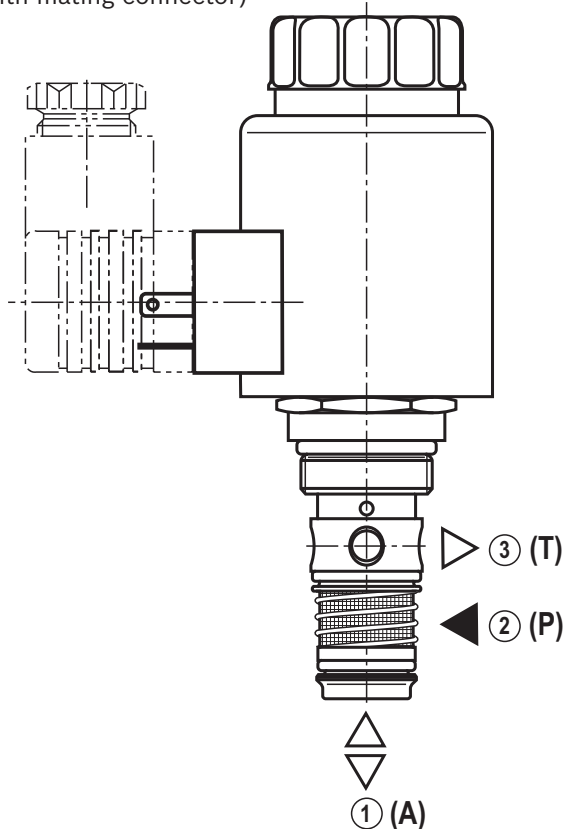


Version "K40"

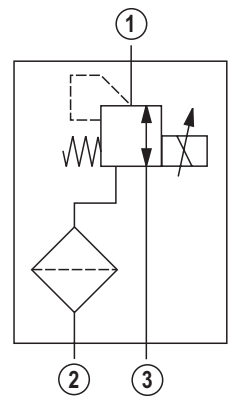


Version "K4"

(with mating connector)



- ① = main port 1 (A)
- ② = main port 2 (P)
- ③ = main port 3 (T)



**Technical data**

(For applications outside these parameters, please consult us!)

General		
Mass	kg	0.7
Installation position		any – if it is ensured that no air can collect upstream of the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	See “Admissible working range” on page 5
Storage temperature range	°C	-40 ... +80
Salt spray test according to EN ISO 9227	h	720 (NSS test)
Solenoid surface protection		Coating according to DIN 50962-Fe//ZnNi with thick film passivation

Hydraulic			
Maximum control pressure	▶ Main port ①	bar	18; 20; 26; 30
Maximum inlet pressure	▶ Main port ②	bar	100
Maximum counter pressure	▶ Main port ③	bar	Depressurized (max. 100 bar; the tank pressures that occur are added to the control pressure (main port ①))
Max. flow		l/min	See characteristic curves page 6
Maximum leakage	▶ Main port ③	ml/min	120 (50 bar in ②; $I = 0$ mA, 46 cSt)
Maximum pilot oil		ml/min	120 (50 bar in ②; $I = I_{max}$ , 46 cSt)
Hydraulic fluid			see table below
Hydraulic fluid temperature range		°C	-40 ... +120
Viscosity range		mm <sup>2</sup> /s	5 ... 400
Maximum admissible degree of contamination of the hydraulic fluid Cleanless class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Hysteresis (within the tolerance band)		bar	≤ 1.5 (control pressure 18, 20 bar) ≤ 2.0 (control pressure 26, 30 bar)
Step response ( $T_u + T_g$ ) 0 % → 100 %; 100 % → 0 %		ms	≤ 60 (50 bar in ②; 46 cSt, $q_v = 0$ l/min, dead volume in ① 140 cm <sup>3</sup> )
Repetition accuracy		%	< 2 % of the maximum control pressure
Load cycles			10 million
Strainer element on the main port ② (P)		µm	240

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral base oils	HL, HLP	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ insoluble in water	FKM	ISO 15380	90221
	▶ soluble in water	FKM	ISO 15380	

**Important information on hydraulic fluids:**

- ▶ For more information and data about the use of other hydraulic fluids, refer to data sheets above or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).

- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ **Bio-degradable:** When using bio-degradable hydraulic fluids that are also zinc-solvent, zinc may accumulate in the fluid (700 mg zinc per pole tube).

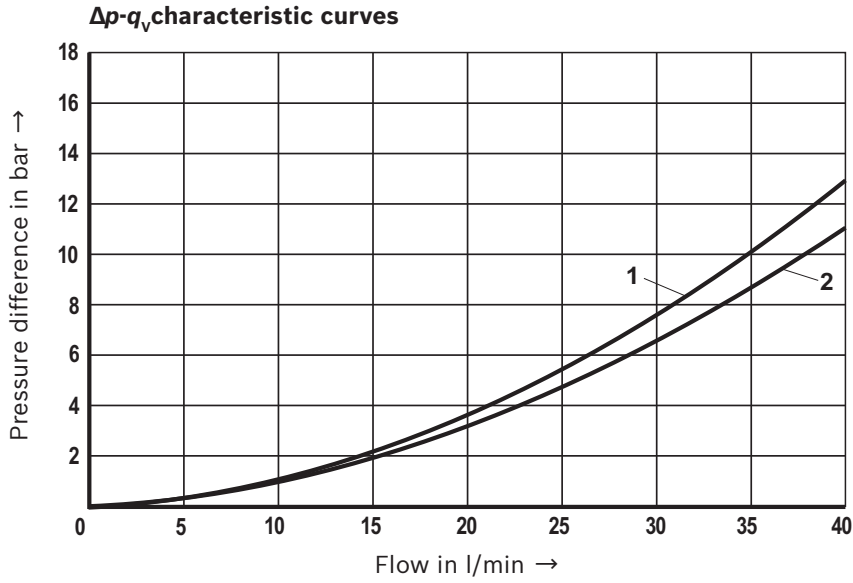
<sup>1)</sup> The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.

We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .



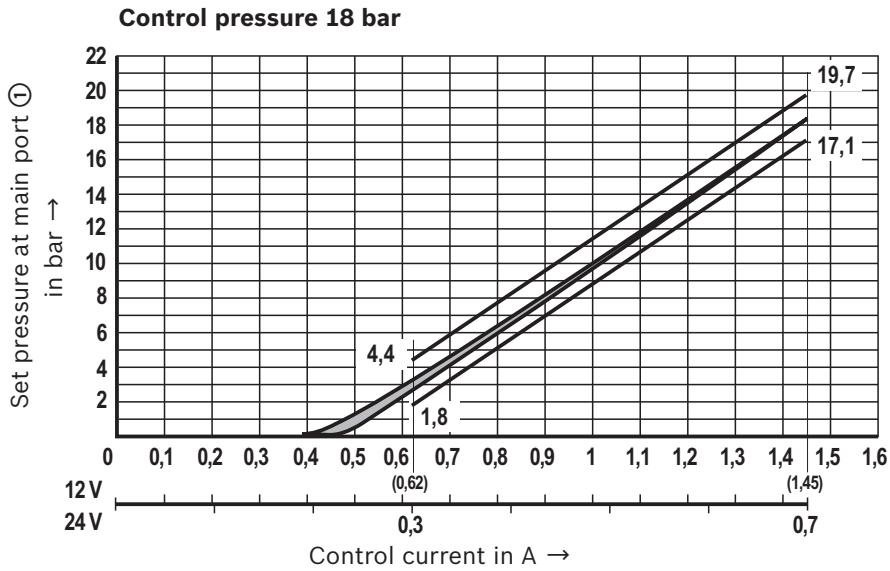
### Characteristic curves

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )



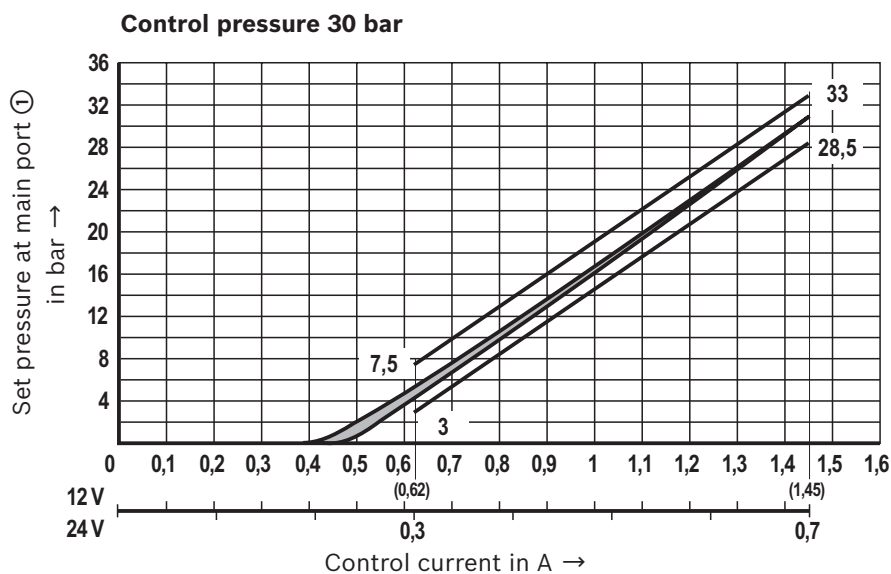
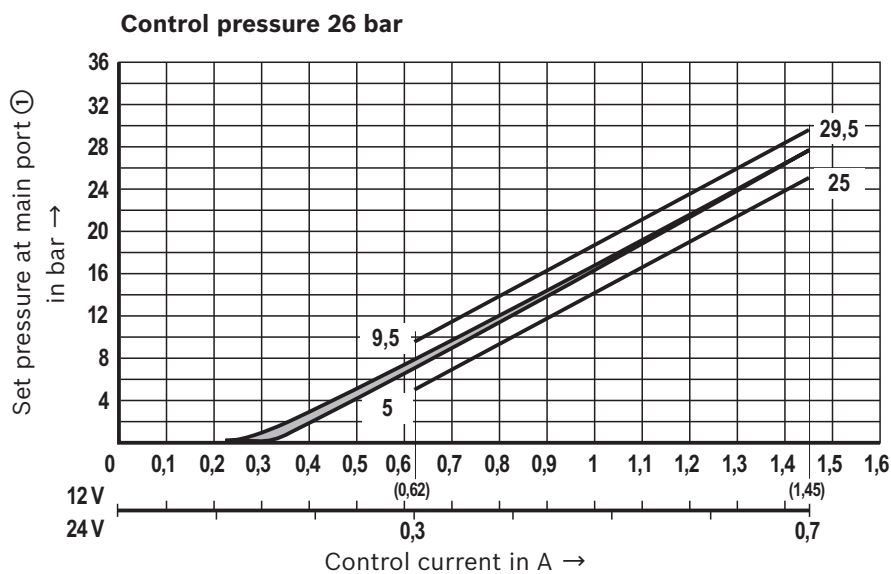
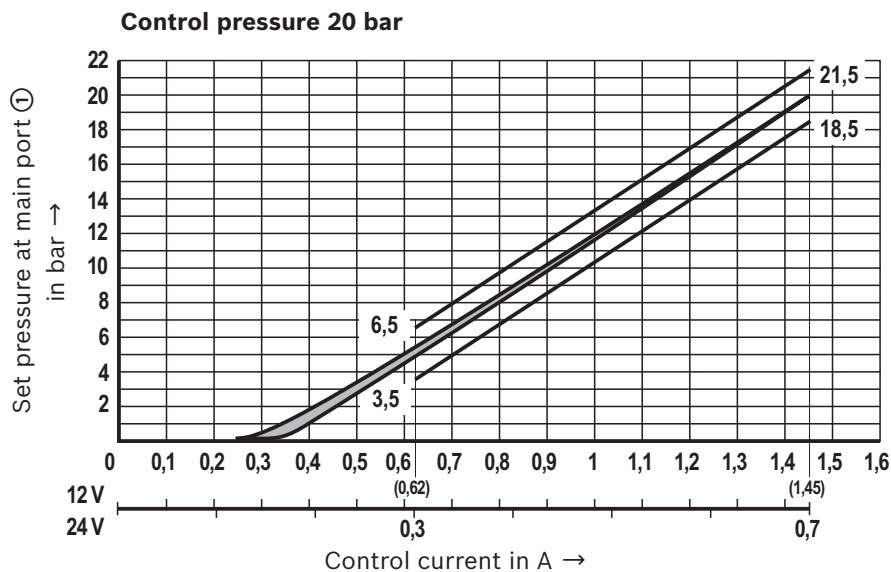
### Characteristic curves with tolerance band

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )

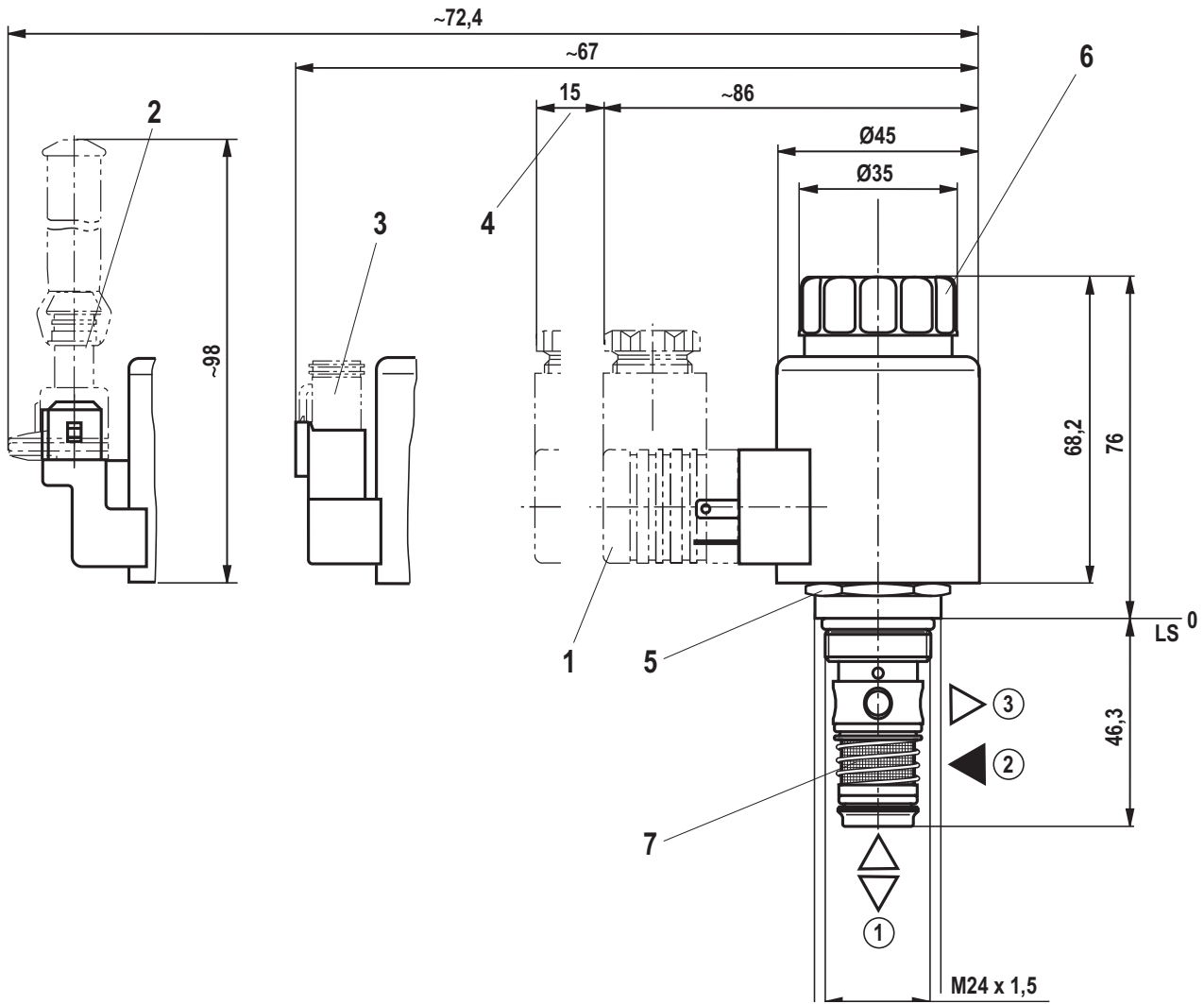


### Characteristic curves with tolerance band

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )



**Dimensions**  
(dimensions in mm)

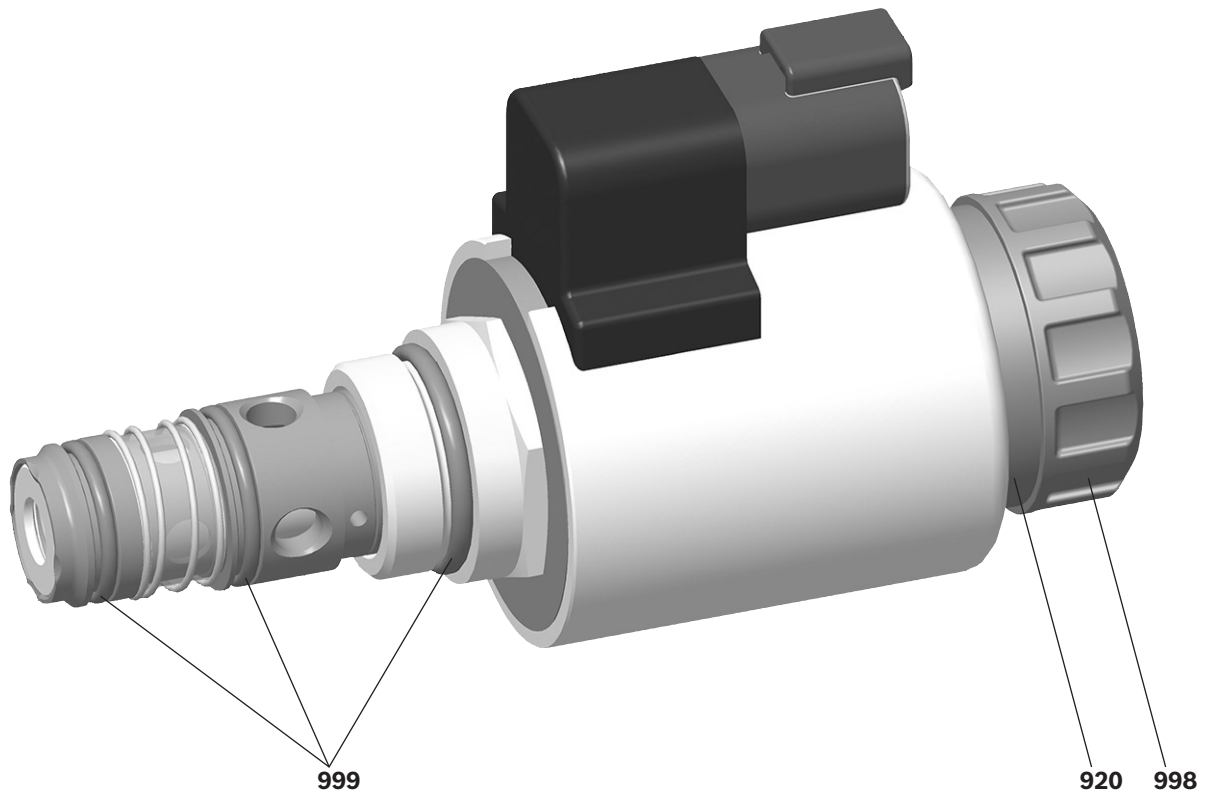


- 1 Mating connector for connector "K4"  
(separate order, see data sheet 08006)
- 2 Mating connector for connector "C4"  
(separate order, see data sheet 08006)
- 3 Mating connector for connector "K40"  
(separate order, see data sheet 08006)
- 4 Space required for removing the mating connector
- 5 SW28 hexagon; tightening torque  $M_A = 10^{+2}$  Nm
- 6 Solenoid nut, tightening torque  $M_A = 5^{+1}$  Nm
- 7 Strainer element

- ① = main port 1 (A)
- ② = main port 2 (P)
- ③ = main port 3 (T)

LS = Location Shoulder



**Individual components available**

Item	Denomination	Material no.
998	Nut GZ45-01V BG	R961004245
999	Seal kit of the valve	R961003854
920	O-ring	R900002507

**Further information**

- ▶ Control electronics:
  - Analog amplifier type RA...
  - BODAS control unit type RC...
- ▶ Hydraulic valves for mobile applications
- ▶ Mineral-oil-based hydraulic fluids
- ▶ Environmentally compatible hydraulic fluids
- ▶ Selection of the filters

Data sheet 95230  
 Data sheet 95200  
 Data sheet 64020-B1  
 Data sheet 90220  
 Data sheet 90221



Proportional pressure reducing valve, direct operated, decreasing characteristic curve

Type MHDRE 06 FK (high-performance)



H8039

- ▶ Size 6
- ▶ Component series 3X
- ▶ Maximum control pressure 30 bar
- ▶ Maximum flow of 40 l/min

## Features

- ▶ Direct operated proportional pressure reducing valve for reducing the system pressure
- ▶ Pilot control valve
- ▶ Screw-in cartridge valve
- ▶ Suitable for mobile applications
- ▶ Operation by means of proportional solenoid
- ▶ In case of power failure, the maximum pressure is set
- ▶ Recommended control electronics:  
Type RA and RC mobile amplifiers

## Contents

Features	1
Ordering code	2
Valve types	2
Function, section, symbol	3
Technical data	4, 5
Admissible working range	5
Characteristic curves	6, 7
Dimensions	8
Mounting cavity	9
Individual components available	10
Further information	10

Ordering code <sup>1)</sup>

01	02	03	04	05	06	07	08	09	10	11
<b>MHDRE</b>	<b>06</b>	<b>F</b>	<b>K</b>	<b>3X</b>	<b>/</b>	<b>A</b>	<b>G24</b>		<b>V</b>	<b>*</b>

01	Proportional pressure reducing valve, direct operated	<b>MHDRE</b>
02	Size 6	<b>06</b>
03	Decreasing characteristic curve	<b>F</b>
04	Screw-in cartridge valve	<b>K</b>
05	Component series 30 ... 39 (30 ... 39; unchanged installation and connection dimensions)	<b>3X</b>
06	Maximum control pressure 18 bar	<b>18</b>
	Maximum control pressure 30 bar	<b>30</b>
07	Proportional solenoid, wet-pin	<b>A</b>

**Supply voltage**

08	Control electronics 24 V DC (12 V DC on request)	<b>G24</b>
----	--	------------

**Electrical connection** <sup>1)</sup>

09	<b>Without</b> mating connector; connector DIN EN 175301-803	<b>K4</b>
	<b>Without</b> mating connector, with connector DT 04-2P (Deutsch connector)	<b>K40</b>
	<b>Without</b> mating connector, with connector AMP Junior-Timer	<b>C4</b>

**Seal material**

10	FKM seals	<b>V</b>
	Observe compatibility of seals with hydraulic fluid used! (Other seals on request)	
11	Further details in plain text	<b>*</b>

<sup>1)</sup> Mating connectors, separate order, see data sheet 08006.

**Valve types**

Type	Material number
MHDRE 06 FK3X/18AG24C4V	R901297359
MHDRE 06 FK3X/30AG24C4V	R901297364

## Function, section, symbol

### General

The type MHDRE 06 FK proportional pressure reducing valve is a direct operated, 3-way version screw-in cartridge valve. It reduces the control pressure (main port ①) proportionally to the solenoid current and largely works independently of the inlet pressure (main port ②).

When the command value = 0 or in the event of power failure, the maximum pressure is set. It is actuated using a proportional solenoid. The solenoid's interior is connected to the main port ③ and filled with hydraulic fluid.

Depending on the electric command value, these valves can be used to continuously reduce the system pressure.

The valve is suitable for controlling couplings, pumps, and directional valves, and is also suitable for use in proportional pilot controls (especially in mobile applications).

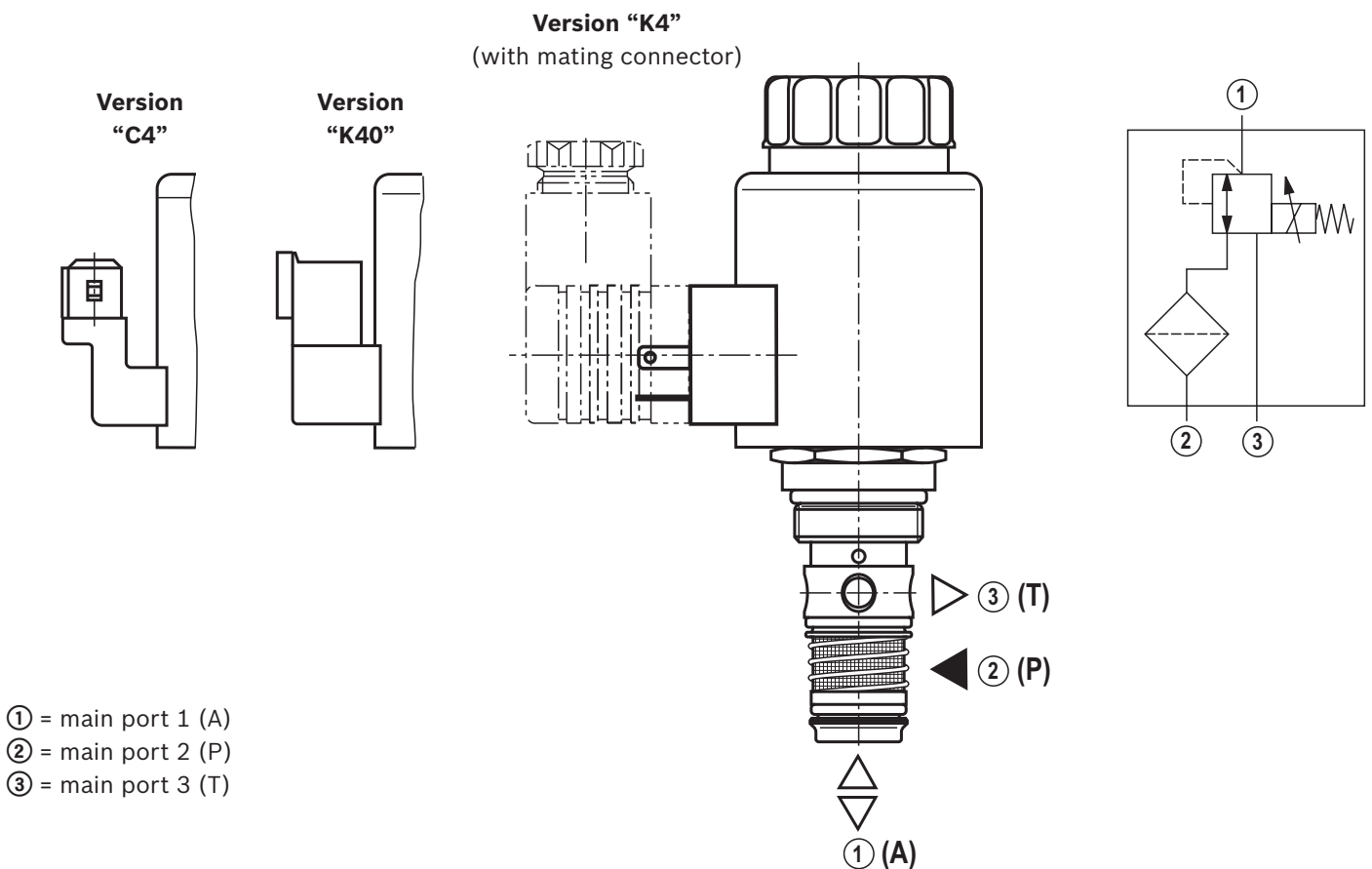
### Basic principle

The valve controls the pressure in the main port ① in accordance with the current on the solenoid. The "F" version signifies a decreasing characteristic curve, i.e. an increasing current brings about a reduced pressure (see characteristic curves on pages 6 and 7).

The proportional solenoid converts the electric current into mechanical force that acts upon the piston via the armature. The piston controls the connection between the main ports.

#### Notes:

The tank pressure that occurs (main port ③) is added to the control pressure (main port ①).



**Technical data**

(For applications outside these parameters, please consult us.)

General		
Weight	kg	0,7
Installation position		any - if it is ensured that no air can collect upstream the valve. Otherwise, we recommend suspended installation of the valve.
Ambient temperature range	°C	See "Admissible working range" on page 5
Storage temperature range	°C	-40 ... +80
Salt spray test according to EN ISO 9227	h	720 (NSS test)
Solenoid surface protection		Coating according to DIN 50962-Fe//ZnNi with thick film passivation

Hydraulic			
Maximum control pressure	▶ main port ①	bar	18; 30
Maximum inlet pressure	▶ main port ②	bar	100
Maximum counter pressure	▶ Main port ③	bar	Depressurized (max. 100 bar; the tank pressures that occur are added to the control pressure (main port ①))
Maximum flow		l/min	see characteristic curves page 6
Maximum leakage	▶ Main port ③	ml/min	120 (50 bar in ②; $I = 0$ mA, 46 cSt)
Maximum pilot oil		ml/min	120 (50 bar in ②; $I = I_{max}$ , 46 cSt)
Hydraulic fluid			See table below
Hydraulic fluid temperature range		°C	-40 ... +120
Viscosity range		mm <sup>2</sup> /s	5 ... 400
Maximum permissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>1)</sup>
Hysteresis (within the tolerance band)		bar	≤ 1.5 (control pressure 18 bar) ≤ 2.0 (control pressure 30 bar)
Step response ( $T_u + T_g$ ) 0 → 100 % and/or 100 % → 0		ms	≤ 100 (50 bar in ②; 46 cSt, $q_v = 0$ l/min, dead volume in ① 140 cm <sup>3</sup> )
Repetition accuracy		%	< 2 % of the maximum control pressure
Load cycles			10 million
Strainer element on the main port ② (P)		µm	240

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ Insoluble in water	FKM	ISO 15380	90221
	▶ Soluble in water	FKM	ISO 15380	

**Important information about hydraulic fluids:**

- ▶ For more information and data about the use of other hydraulic fluids, refer to data sheets above or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ **Bio-degradable:** When using bio-degradable hydraulic fluids that are also zinc-solvent, zinc may accumulate in the fluid (700 mg zinc per pole tube).

<sup>1)</sup> The cleanliness classes stated for the components need to be maintained in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.

We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .

### Technical data

(For applications outside these parameters, please consult us.)

Electrical			
Supply voltage	V	12 DC	24 DC
Maximum control current	A	1,45	0,7
Coil resistance at 20 °C	Ω	5	22,5
Duty cycle (ED) <sup>2)</sup>	%	100	
Maximum coil temperature <sup>3)</sup>	°C	185	
Protection class according to DIN EN 60529	▶ Version "K4"	IP 65 with mating connector mounted and locked	
	▶ Version "C4"	IP 66 with mating connector mounted and locked	
		IP 69K with Rexroth mating connector, material no. R901022127	
	▶ Version "K40"	IP 69K with mating connector mounted and locked	
Chopper frequency (recommended) <sup>4)</sup>	Hz	150	
Control electronics		Analog amplifier type RA... (Data sheet 95230)	
		BODAS control unit type RC... (Data sheet 95200)	
Design according to VDE 0580			

- 2) Consultation is recommended for use at > 2000 m above sea level.
- 3) Due to the surface temperatures of the solenoid coils, the ISO 13732-1 and ISO 4413 standards must be adhered to.
- 4) The chopper frequency should be optimized for the application. The working temperature range should be taken into consideration.

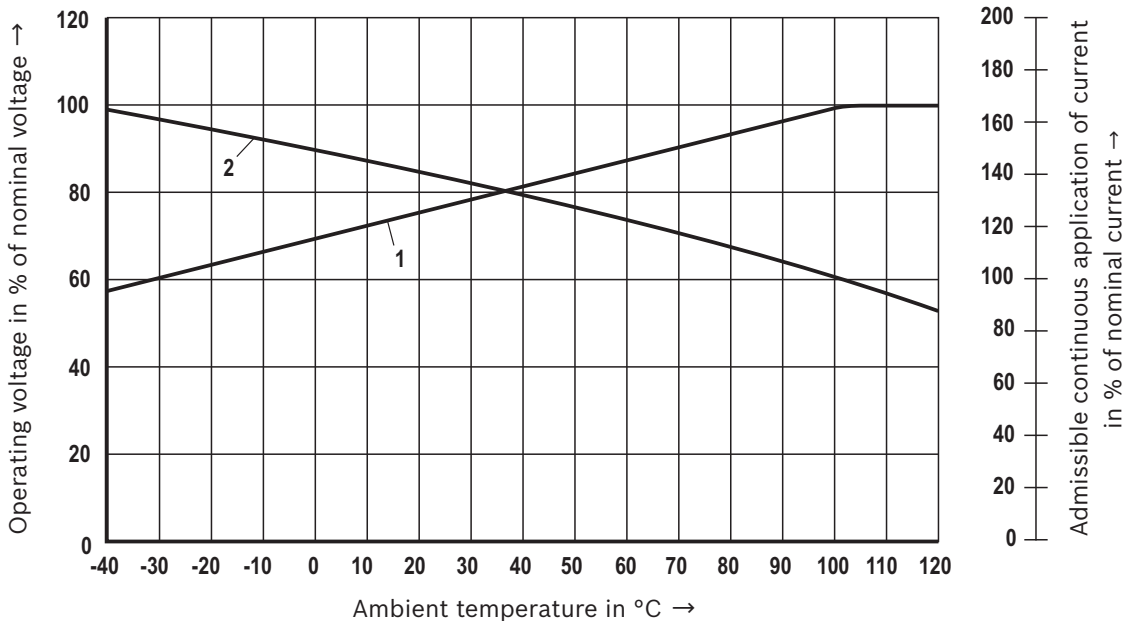
**When establishing the electrical connection, the protective earthing conductor (PE  $\perp$ ) must be connected correctly.**

**Note:**

- ▶ The technical data was determined at a viscosity of  $\nu = 46 \text{ mm}^2/\text{s}$  (HLP46;  $\vartheta_{\text{oil}} = 40 \text{ °C}$ )
- ▶ The following documentation must be observed: 64020-B1 Hydraulic valves for mobile applications

### Admissible working range

Admissible working range depending on ambient temperature

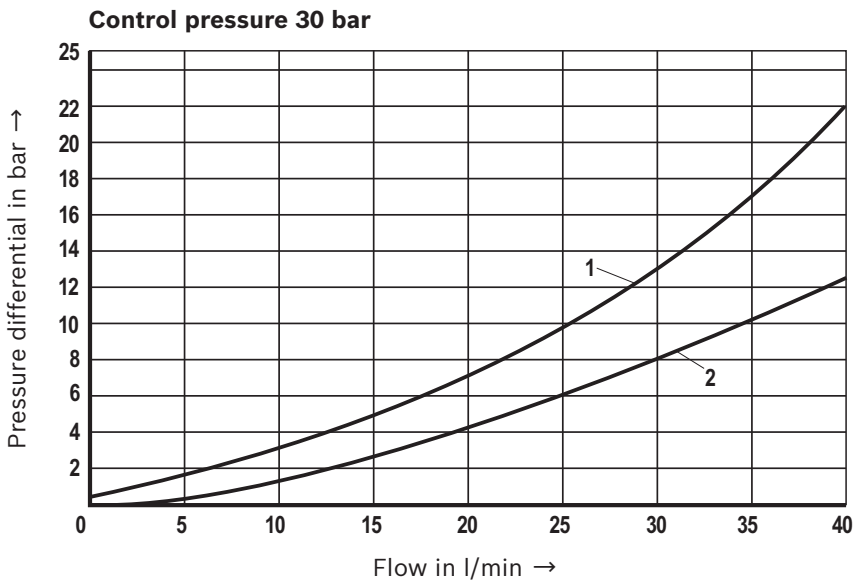
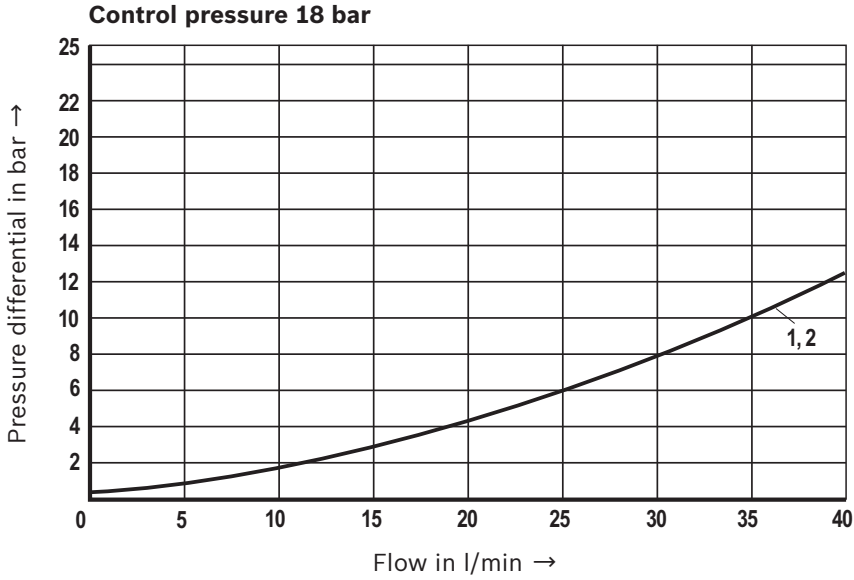


- 1 Required operating voltage in % of nominal voltage
- 2 Admissible continuous application of current in % of nominal current

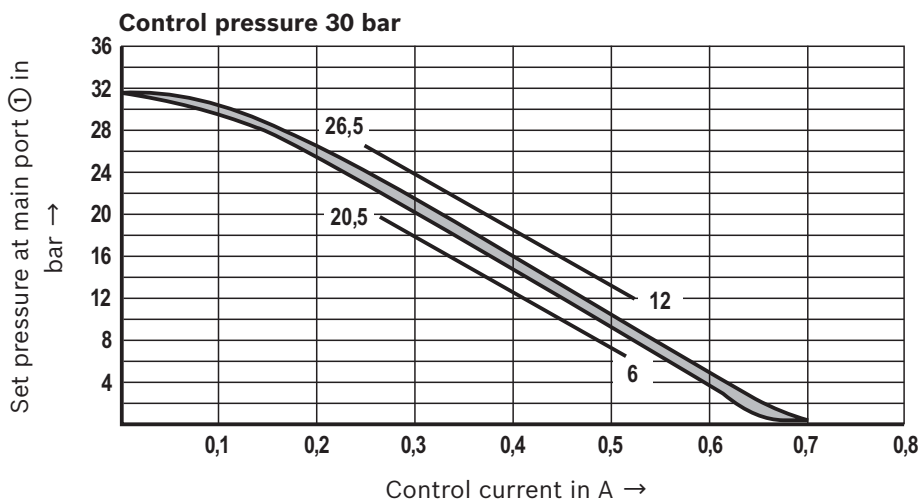
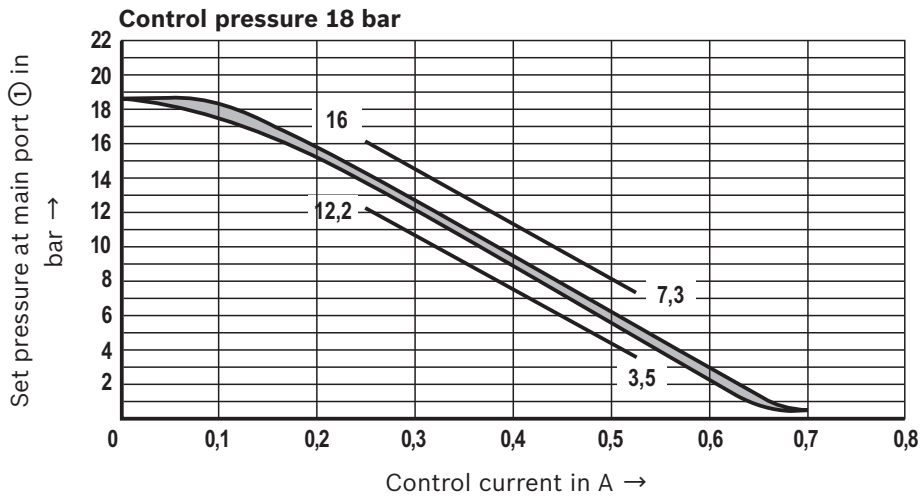
**Characteristic curves**

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )

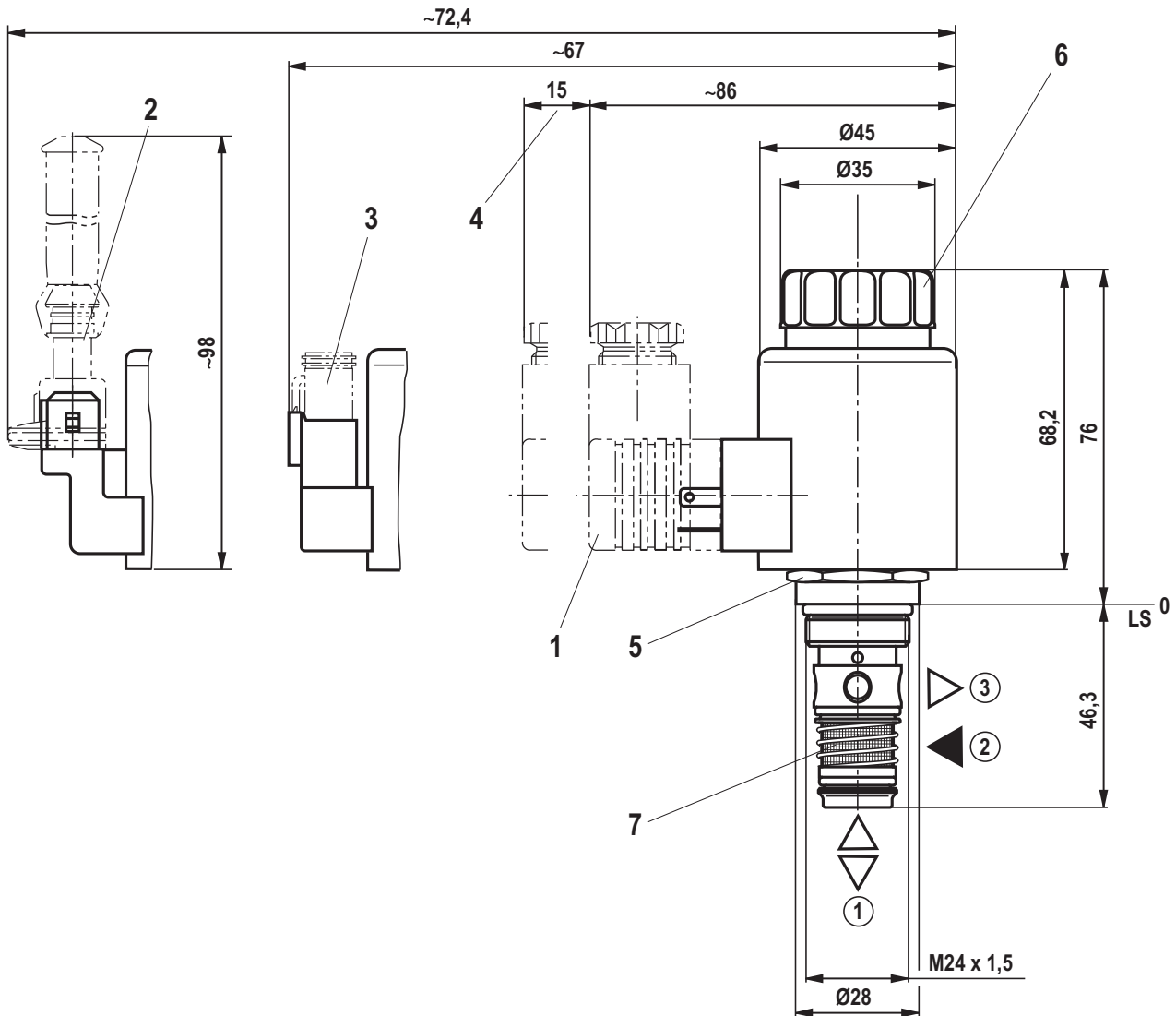
**$\Delta p$ - $q_v$ -characteristic curve**



**Characteristic curves with tolerance band**  
 (measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )



**Dimensions**  
(dimensions in mm)



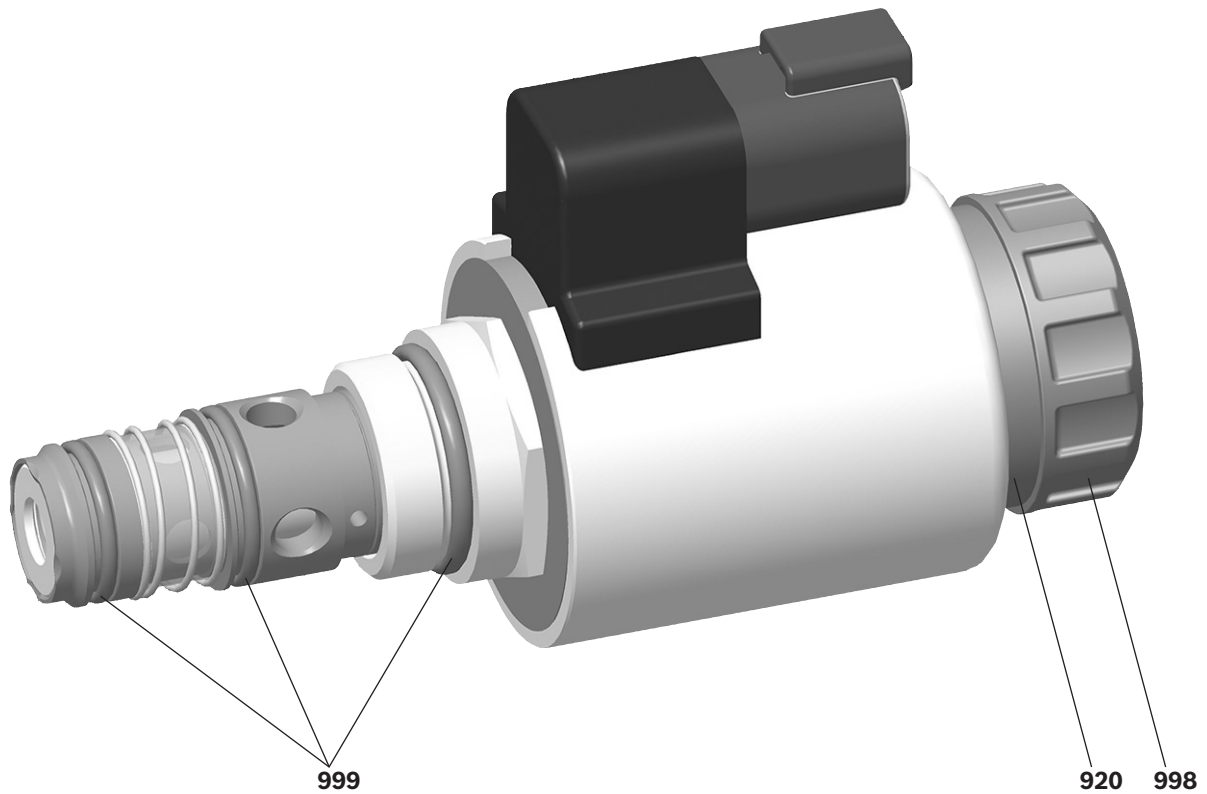
- 1 Mating connector for connector “K4”  
(separate order, see data sheet 08006)
- 2 Mating connector for connector “C4”  
(separate order, see data sheet 08006)
- 3 Mating connector for connector “K40”  
(separate order, see data sheet 08006)
- 4 Space required to remove the mating connector
- 5 SW28 hexagon; tightening torque  $M_A = 10^{+2}$  Nm
- 6 Solenoid nut, tightening torque  $M_A = 5^{+1}$  Nm
- 7 Strainer element

- ① = main port 1 (A)
- ② = main port 2 (P)
- ③ = main port 3 (T)

LS = Location shoulder





**Individual components available**

Item	Designation	Material no.
998	Nut GZ45-01V BG	R961004245
999	Valve seal kit	R961003854
920	O-ring	R900002507

**Further information**

- ▶ Control electronics:
  - Analog amplifier type RA...
  - BODAS control unit type RC...
- ▶ Hydraulic valves for mobile applications
- ▶ Mineral oil-based hydraulic fluids
- ▶ Environmentally compatible hydraulic fluids
- ▶ Filter range

Data sheet 95230  
 Data sheet 95200  
 Data sheet 64020-B1  
 Data sheet 90220  
 Data sheet 90221

# Proportional pressure reducing valve

## Type FTDRE2K



H7981

- ▶ Frame size 2
- ▶ Component series 3X
- ▶ Maximum control pressure 18, 24 bar
- ▶ Maximum operating pressure 100 bar
- ▶ Maximum flow 2 l/min (at  $\Delta p = 7$  bar)

### Features

- ▶ Direct operated proportional pressure reducing valve for reducing a system pressure
- ▶ Cartridge valve
- ▶ Suitable for mobile and industrial applications
- ▶ Operation by means of proportional solenoid
- ▶ In case of power failure, the minimum pressure is set
- ▶ Recommended control electronics:  
Mobile amplifier type RA and RC

### Contents

Features	1
Ordering code, valve types	2
Function, section, symbols	3
Technical data	4, 5
Characteristic curves with tolerance band	6
Admissible working range	7, 8
Dimensions	9
Mounting cavity	10
Available individual components	11
More information	11

**Ordering code** (valve without coil) <sup>1)</sup>

01 02 03 04 05 06 07 08 09 10 11

<b>FTDRE</b>	<b>2</b>	<b>K</b>	<b>3X</b>	<b>/</b>	<b>A</b>			<b>V</b>	<b>-8</b>	<b>*</b>
--------------	----------	----------	-----------	----------	----------	--	--	----------	-----------	----------

01	Proportional pressure reducing valve, non-standardized design, electrical operation	<b>FTDRE</b>
02	Size 2	<b>2</b>
03	Screw-in cartridge valve	<b>K</b>
04	Component series 30 to 39 (30 to 39; unchanged installation and connection dimensions)	<b>3X</b>
05	Maximum control pressure 18 bar	<b>18</b>
	Maximum control pressure 24 bar	<b>24</b>
06	Proportional solenoid, wet-pin	<b>A</b>

**Supply voltage**


07	Control electronics 12 V DC	<b>G12</b>
	Control electronics 24 V DC	<b>G24</b>
08	<b>With</b> manual override	<b>no code</b>
	<b>Without</b> manual override	<b>N0</b>

**Electrical connection** <sup>1)</sup>

09	<b>Without</b> mating connector, with DT 04-2P connector (Deutsch plug)	<b>K40</b>
	<b>Without</b> mating connector, with AMP Junior-Timer connector	<b>C4</b>

**Seal material**

10	FKM seals	<b>V</b>
	Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	
11	Further details in the plain text	<b>*</b>

<sup>1)</sup> Mating connectors, separate order, see data sheet 08006. **Notice:**

For other valve types than those listed in the data sheet, please consult us!

**Valve types**

Type	Material no.
FTDRE 2 K3X/18AG12C4V-8	<b>R900726604</b>
FTDRE 2 K3X/18AG12K40V-8	<b>R901047323</b>
FTDRE 2 K3X/18AG24C4V-8	<b>R900701407</b>
FTDRE 2 K3X/18AG24K40V-8	<b>R901023204</b>

Type	Material no.
FTDRE 2 K3X/18AG12NOC4V-8	<b>R901377809</b>
FTDRE 2 K3X/18AG12NOK40V-8	<b>R901377815</b>
FTDRE 2 K3X/18AG24NOC4V-8	<b>R901377808</b>
FTDRE 2 K3X/18AG24NOK40V-8	<b>R901377814</b>

## Function, section, symbols

### General

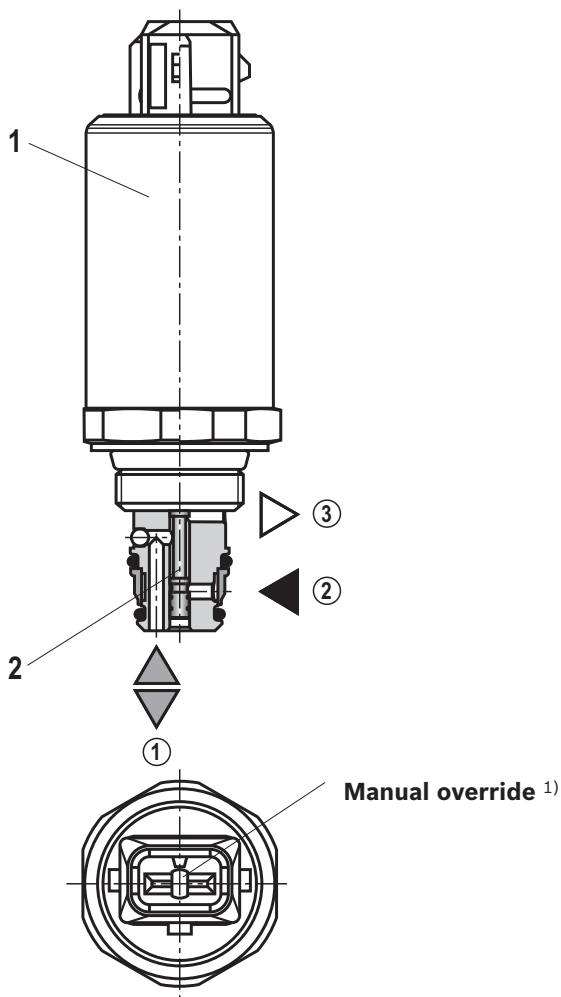
The proportional pressure reducing valve type FTDRE 2 K is a direct operated screw-in cartridge valve in 3-way version. It reduces the control pressure (main port ①) proportionally to the solenoid current and functions largely independently from the inlet pressure (main port ②). With a command value of 0 or in case of power failure, the minimum pressure is set. Operation is effected by means of a proportional solenoid. The solenoid's interior is connected to the main port ③ and filled with hydraulic fluid. Depending on the electric command value, these valves can be used to reduce the system pressure continuously. The valve is suitable for controlling couplings, pumps and directional valves as well as for use in proportional pilot controls (particularly in the mobile area, however also for industrial applications).

### Basic principle

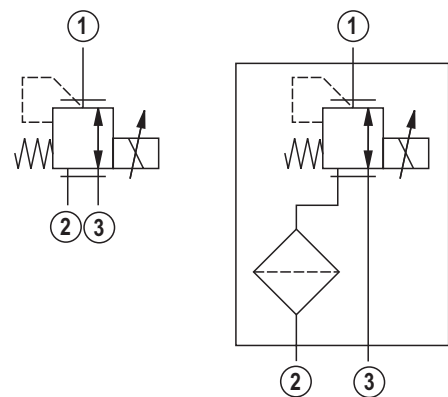
The valve controls the pressure in the main port ① proportionally to the current at the solenoid. The proportional solenoid (1) converts the electric current into a mechanical force that acts on the control spool (2) via the armature. The control spool controls the connection between the main ports.

#### 👉 Notices:

- ▶ Occurring tank pressure (main port ③) is added up to the control pressure (main port ①).
- ▶ If the valve is not installed or installed in a system that is not completely bled, the valve must not be energized as otherwise, the entering air has a very negative effect on the valve's dynamic behavior.



Type FTDRE 2 K3X/..C4..



- ① = Main port 1 (A)
- ② = Main port 2 (P)
- ③ = Main port 3 (T)

<sup>1)</sup> Not contained in "N0" version. Operation by pin tool (to operate the manual override, the connector must be disconnected ("C4" and "K40" version). Maximum number of plug-in processes 10 (specification AMP 108-18013).

## Technical data

(For applications outside these parameters, please consult us!)

general	
Weight	kg Approx. 0.16
Installation position	Any; preferably with electrical connection hanging down (for horizontal position of valve or electrical connection standing up, a minimum counter pressure must be generated to ensure the valve remains filled with oil).
Ambient temperature range	▶ Version "18" °C -30 ... +120 ▶ Version "24" °C -30 ... +80
Salt spray test according to ISO 9227	h 600 (NSS test)
Surface protection Solenoid	Coating according to DIN 50962-Fe//ZnNi with thick film passivation

hydraulic	
Maximum control pressure	▶ Main port ① (A) bar 18, 24
Maximum inlet pressure	▶ Main port ② (P) bar 100
Maximum counter pressure	▶ Main port ③ (T) bar Depressurized (maximum admissible 30) Counter pressure increases set pressure, even for current $I = 0$
Flow ( $\Delta p = 7 \text{ bar}$ ) <sup>1)</sup>	l/min $\geq 2$ (maximum admissible 7.5)
Maximum leakage flow	▶ Main port ③ (T) cm <sup>3</sup> /min $\leq 60$ ( $p_p = 50 \text{ bar}$ and control current $I = 0$ )
Maximum pilot flow	cm <sup>3</sup> /min $\leq 500$ ( $p_p = 50 \text{ bar}$ , $q_{VA} = 0$ and control current $I = I_{\max}$ )
Hydraulic fluid	See table page 5
Hydraulic fluid temperature range	°C -30 ... +80
Viscosity range	mm <sup>2</sup> /s 10 ... 380
Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)	Class 20/18/15 <sup>1)</sup>
Load cycles	5 million <sup>1)</sup>
Maximum step response in case of control current change (see characteristic curve below)	▶ $t_{\text{on}}$ ms 25 ▶ $t_{\text{off}}$ ms 20
Mesh size strainer element at the main port ②	$\mu\text{m}$ 160

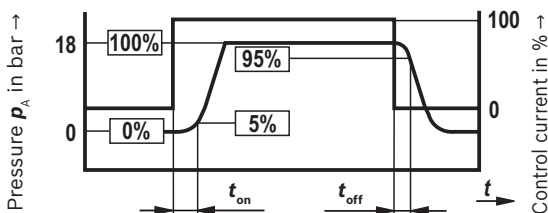
- 1) Rexroth standard test condition (HLP32;  $\vartheta_{\text{oil}} = 40 \text{ °C} \pm 5 \text{ °C}$ )
- 2) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.

We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .

### Notice:

- ▶ The following documentation must be observed: 64020-B1 Hydraulic valves for mobile applications
- ▶ When exchanging screw-in cartridge valves, provide for the correct tightening torque!

Maximum step response



**Technical data**

(For applications outside these parameters, please consult us!)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– insoluble in water	FKM	VDMA 24568
	– soluble in water	FKM	

**Important information on hydraulic fluids!**

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us.
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ **Bio-degradable:** If bio-degradable hydraulic fluids are used that are also zinc-solvent, there may be an accumulation of zinc.

electric			
Voltage type		Direct voltage	
Supply voltages	V	12 DC	24 DC
Maximum solenoid current <sup>3)</sup>	▶ Version "18"	mA	1800
	▶ Version "24"	mA	2200
Coil resistance (cold value at 20 °C)	Ω	2.4	12
Duty cycle	%	100 See characteristic curves on page 7 and 8	
Maximum coil temperature <sup>4)</sup>	°C	150	
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	▶ Version "C4"	IP 65 with mating connector mounted and locked IP 67 and IP 69K with Rexroth mating connector (material no. R901022127)	
	▶ Version "K40"	IP 67 and IP 69K with mating connector mounted and locked	
Control electronics (separate order)		Analog amplifier type RA... (data sheet 95230)	
		BODAS control unit type RC... (data sheet 95200)	
Recommended dither frequency (PMW) Chopper frequency (recommended) <sup>5)</sup>	Hz	150	
Design according to VDE 0580			

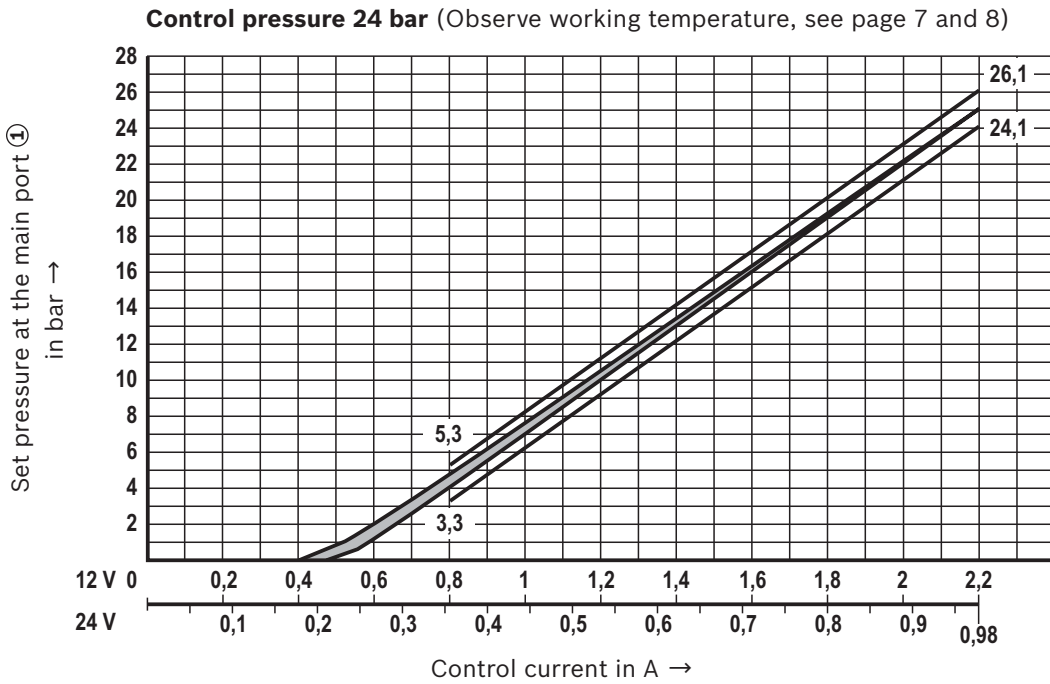
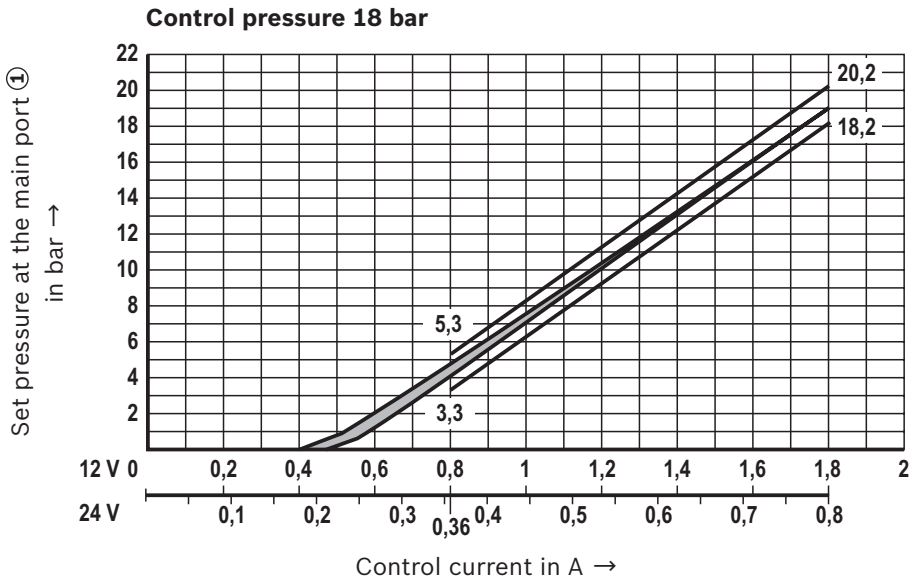
<sup>3)</sup> With version "24", observe working temperature, see page 7 and 8

<sup>4)</sup> Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

<sup>5)</sup> The chopper frequency is to be optimized depending on the application.  
In this regard, observe the working temperature range of the application.

**When establishing the electrical connection, the protective earthing conductor (PE  $\perp$ ) has to be connected correctly.**

**Characteristic curves with tolerance band**  
(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )



**Measuring conditions**

Amplifier	Analog amplifier RA (data sheet 95230)	
Chopper frequency	Hz	150
Inlet pressure	bar	50
Dead volume at the main port ①	ml	135

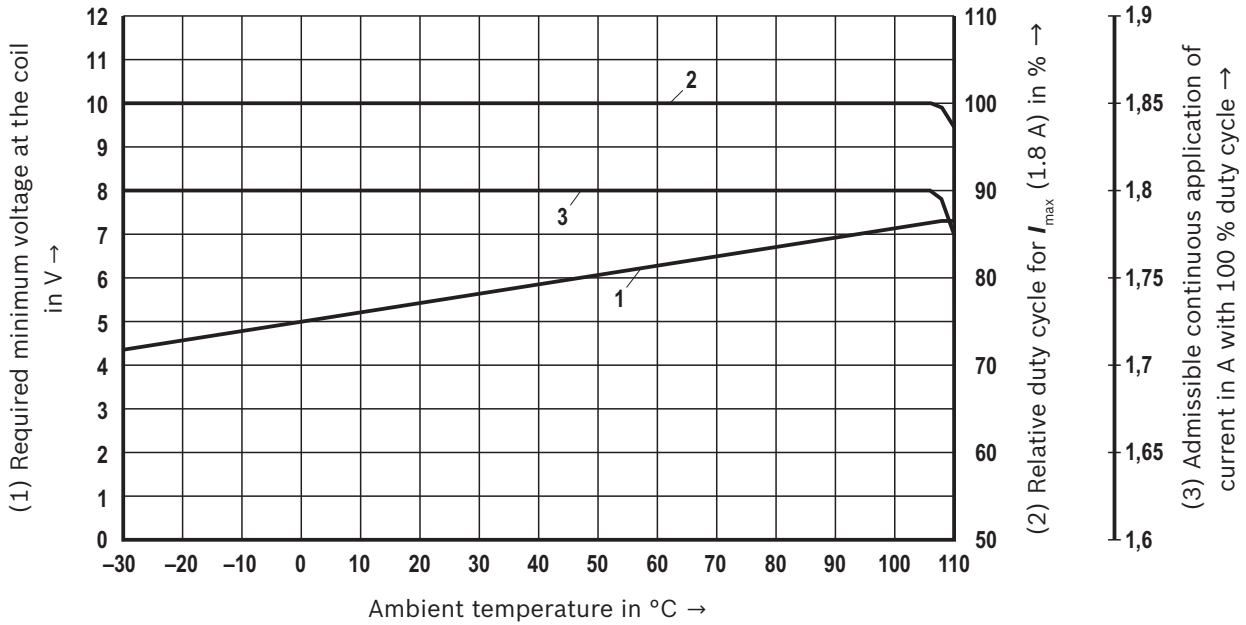


**Admissible working range: Version "G12"**

Minimum terminal voltage at the coil and relative duty cycle

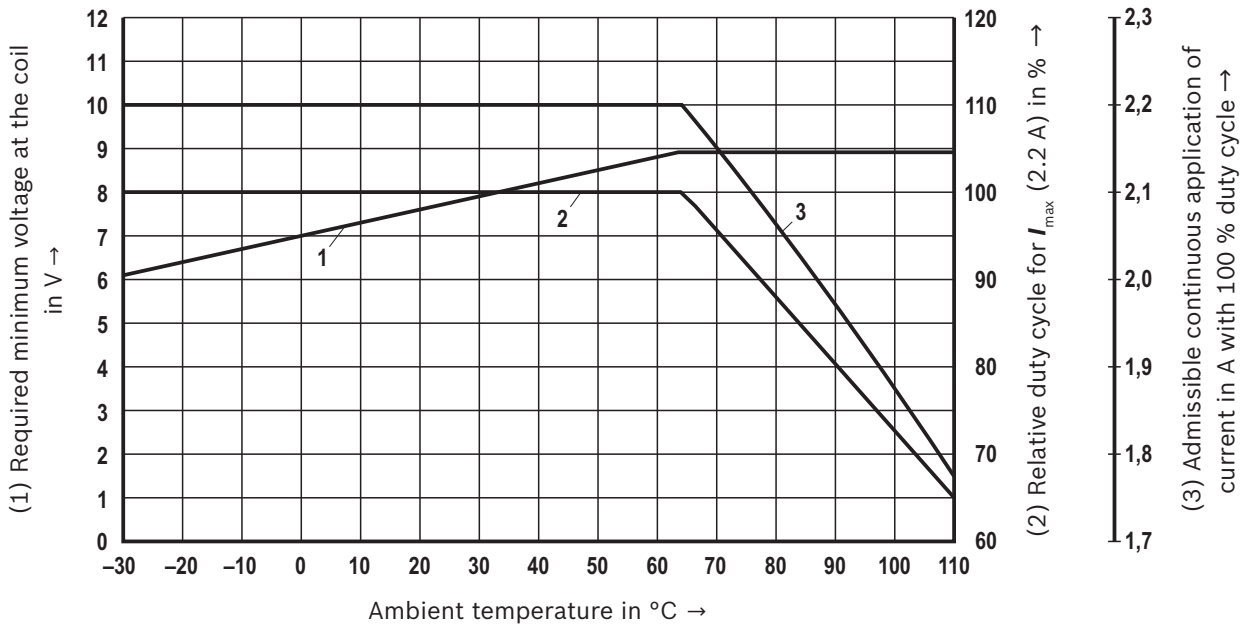
**Admissible working range against the ambient temperature**

**Version "18"** (2.4 Ω - 12 V - 1.8 A)



**Admissible working range against the ambient temperature**

**Version "24"** (2.4 Ω - 12 V - 2.2 A)

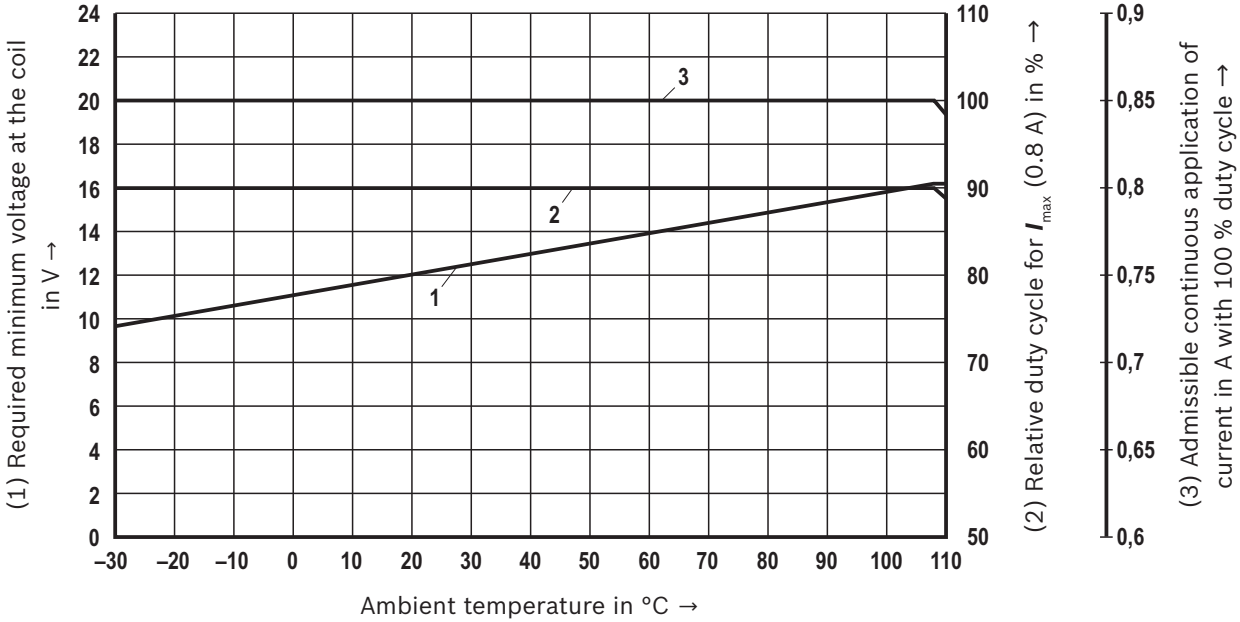


**Admissible working range: Version "G24"**

Minimum terminal voltage at the coil and relative duty cycle

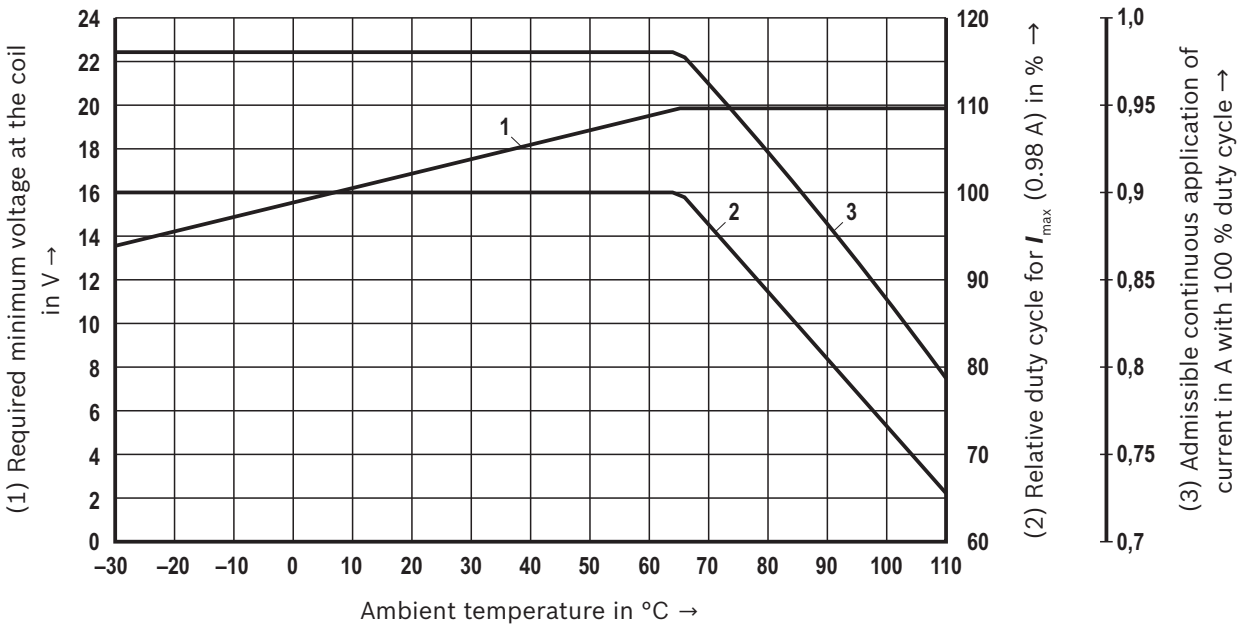
**Admissible working range against the ambient temperature**

**Version "18"** (12 Ω - 24 V - 0.8 A)



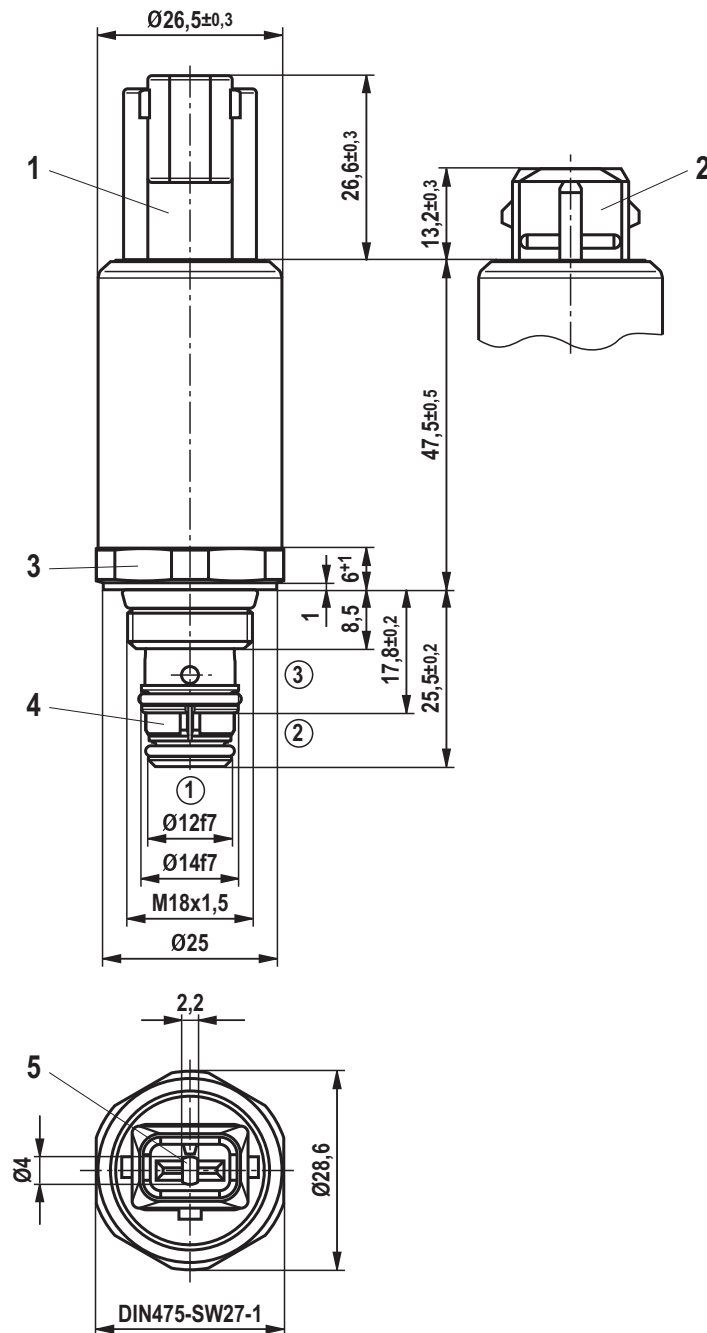
**Admissible working range against the ambient temperature**

**Version "24"** (12 Ω - 24 V - 0.98 A)



## Dimensions

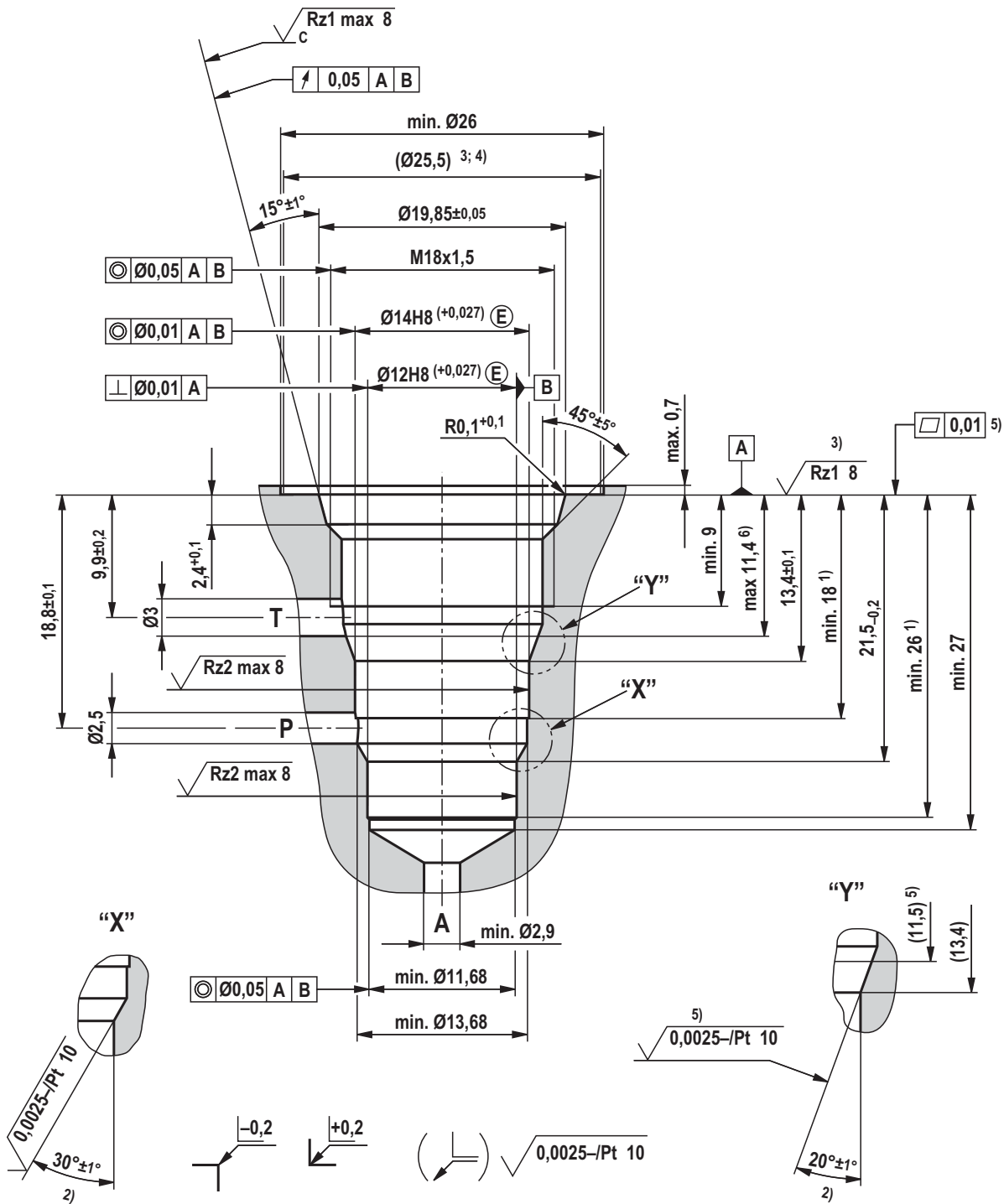
(dimensions in mm)



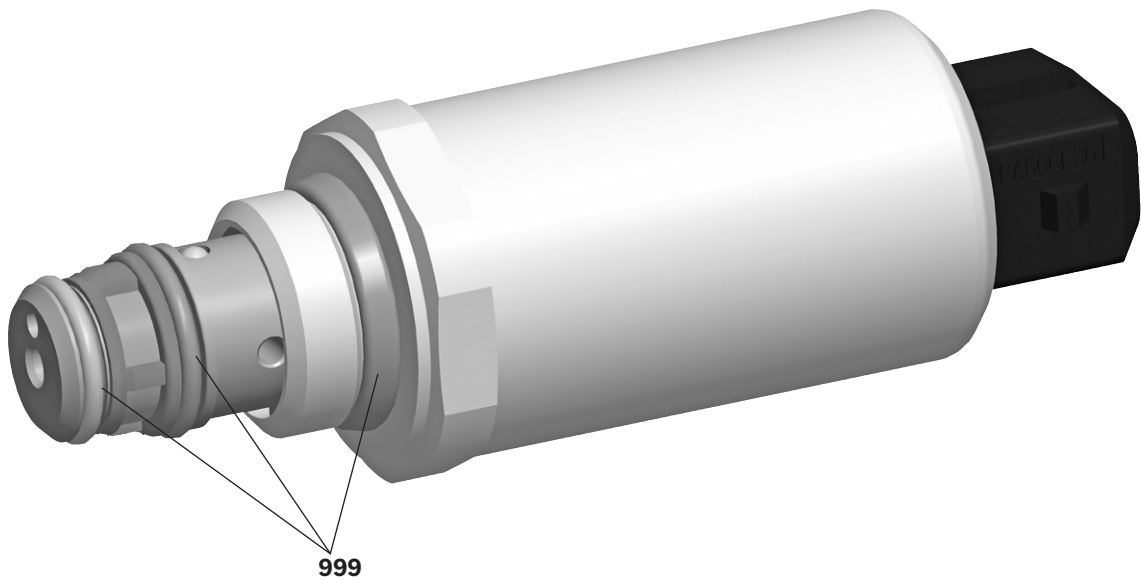
- ① = Main port 1 (A)
- ② = Main port 2 (P)
- ③ = Main port 3 (T)

- 1 Mating connector for connector "K40" (separate order, see data sheet 08006)
- 2 Mating connector for connector "C4" (separate order, see data sheet 08006)
- 3 Wrench size SW27;  $M_A = 10^{+5}$  Nm
- 4 Strainer 160  $\mu\text{m}$
- 5 Not contained in "N0" version. Operation by pin tool (to operate the manual override, the connector must be disconnected ("C4" and "K40" version). Maximum number of plug-in processes 10 (specification AMP 108-18013).

**Mounting cavity**  
(dimensions in mm)



## Available individual components



Item	Denomination	Seal material	Material no.
999	Seal kit of the valve	FKM	<b>R961007179</b>

Seal kits with other seals upon request.

## More information

- ▶ Control electronics:
  - Analog amplifier type RA...
  - BODAS control unit type RC...
- ▶ Hydraulic valves for mobile applications
- ▶ Hydraulic fluids on mineral oil basis
- ▶ Selection of the filters

Data sheet 95230

Data sheet 95200

Data sheet 64020-B1

Data sheet 90220

## Notes

# Proportional pressure reducing valve

## Type FTDRE2K-044



- ▶ Frame size 2
- ▶ Component series 3X
- ▶ Maximum control pressure 18, 24 bar
- ▶ Maximum operating pressure 250 bar
- ▶ Maximum flow 2 l/min (at  $\Delta p = 7$  bar)

### Features

- ▶ Direct operated proportional pressure reducing valve for reducing a system pressure
- ▶ Cartridge valve
- ▶ Suitable for mobile and industrial applications
- ▶ Operation by means of proportional solenoid
- ▶ In case of power failure, the minimum pressure is set
- ▶ Recommended control electronics:  
Mobile amplifier type RA and RC

### Contents

Features	1
Ordering code, valve types	2
Function, section, symbols	3
Technical data	4, 5
Characteristic curves with tolerance band	6
Admissible working range	7, 8
Dimensions	9
Mounting cavity	10
Individual components available	11
Further information	11

**Ordering code** <sup>1)</sup>

01 02 03 04 05 06 07 08 09 10 11

<b>FTDRE</b>	<b>2</b>	<b>K</b>	<b>3X</b>	<b>/</b>	<b>A</b>	<b>NO</b>	<b>M</b>	<b>-44</b>	<b>*</b>
--------------	----------	----------	-----------	----------	----------	-----------	----------	------------	----------

01	Proportional pressure reducing valve, non-standardized design, electrical operation	<b>FTDRE</b>
02	Size 2	<b>2</b>
03	Screw-in cartridge valve	<b>K</b>
04	Component series 30 ... 39 (30 ... 39; unchanged installation and connection dimensions)	<b>3X</b>
05	Maximum control pressure 18 bar	<b>18</b>
	Maximum control pressure 24 bar	<b>24</b>
06	Proportional solenoid, wet-pin	<b>A</b>

**Supply voltage**

07	Control electronics 12 V DC	<b>G12</b>
	Control electronics 24 V DC	<b>G24</b>
08	<b>Without</b> manual override	<b>NO</b>

**Electrical connection** <sup>1)</sup>

09	<b>Without</b> mating connector, with DT 04-2P connector (Deutsch plug)	<b>K40</b>
	<b>Without</b> mating connector, with AMP Junior-Timer connector	<b>C4</b>

**Seal material**

10	NBR seals	<b>M</b>
	Ensure compatibility of seals with hydraulic fluid used!	
11	For further information, see the plain text	<b>*</b>

<sup>1)</sup> Mating connectors, separate order, see data sheet 08006.

**Notice:**

For other valve types than those listed in the data sheet, please consult us!

**Valve types**

Type	Material no.
FTDRE 2 K3X/24AG12NOK40M-044	<b>R901426044</b>



## Function, section, symbols

### General

The proportional pressure reducing valve type FTDRE 2 K is a direct operated screw-in cartridge valve in 3-way version. It reduces the control pressure (main port ①) proportionally to the solenoid current and functions largely independently from the inlet pressure (main port ②).

With a command value of 0 or in case of power failure, the minimum pressure is set. Operation is effected by means of proportional solenoid. The solenoid's interior is connected to the main port ③ and filled with hydraulic fluid.

Dependent on the electric command value, these valves can be used to steplessly reduce the system pressure. The valve is suitable for controlling couplings, pumps and directional valves as well as for use in proportional pilot controls (particularly in the mobile area, however also for industrial applications).

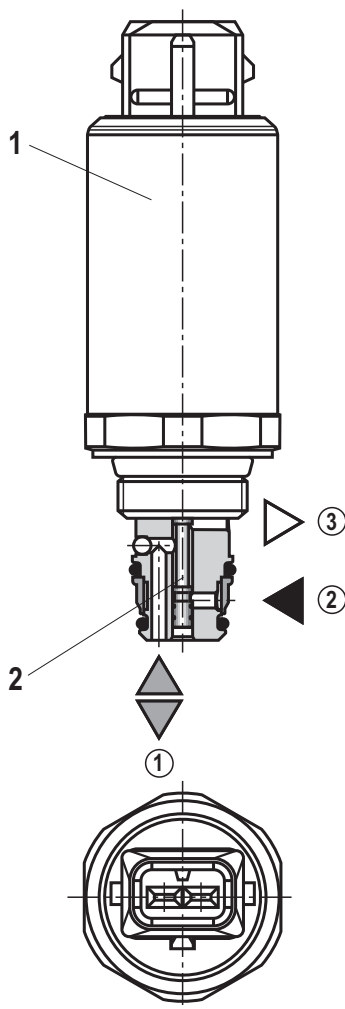
### Basic principle

The valve controls the pressure in the main port ① proportionally to the current at the solenoid.

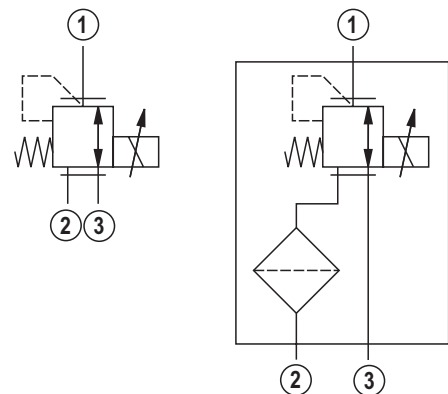
The proportional solenoid (1) converts the electric current into mechanical force that acts on the control spool (2) via the armature. The control spool controls the connection between the main ports.

#### Notices:

- ▶ Occurring tank pressure (main port ③) is added up to the control pressure (main port ①).
- ▶ If the valve is not installed or installed in a system that is not completely bled, the valve must not be energized as otherwise, the entering air has a very negative effect on the valve's dynamic behavior.



Type FTDRE 2 K3X/..C4..



- ① = Main port 1 (A)
- ② = Main port 2 (P)
- ③ = Main port 3 (T)

## Technical data

(For applications outside these parameters, please consult us!)

general			
Weight	kg	Approx. 0.16	
Installation position	Any; preferably with electrical connection hanging down (for horizontal position of valve or electrical connection standing up, a minimum counter pressure must be executed to ensure the valve remains filled with oil).		
Ambient temperature range	▶ Version "18"	°C	-30 ... +80
	▶ Version "24"	°C	-30 ... +80
Salt spray test according to ISO 9227	h	600 (NSS test)	
Surface protection Solenoid	Coating according to DIN 50962-Fe//ZnNi with thick film passivation		

hydraulic			
Maximum control pressure	▶ Main port ① (A)	bar	18, 24
Maximum inlet pressure	▶ Main port ② (P)	bar	250
Maximum counter pressure	▶ Main port ③ (T)	bar	Depressurized (maximum admissible 30) Counter pressure increases set pressure, even for current $I = 0$
Flow ( $\Delta p = 7 \text{ bar}$ ) <sup>1)</sup>		l/min	$\geq 2$ (maximum admissible 4.0)
Maximum leakage flow	▶ Main port ③ (T)	cm <sup>3</sup> /min	$\leq 60$ ( $p_p = 50 \text{ bar}$ and control current $I = 0$ )
Maximum pilot flow		cm <sup>3</sup> /min	$\leq 500$ ( $p_p = 50 \text{ bar}$ , $q_{vA} = 0$ and control current $I = I_{\text{max}}$ )
Hydraulic fluid	See table page 5		
Hydraulic fluid temperature range		°C	-30 ... +80
Viscosity range		mm <sup>2</sup> /s	10 ... 380
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness class according to ISO 4406 (c)	Class 20/18/15 <sup>1)</sup>		
Load cycle	2 million <sup>1)</sup>		
Maximum step response in case of control current change (see characteristic curve below)	▶ $t_{\text{on}}$	ms	25
	▶ $t_{\text{off}}$	ms	20
Mesh size strainer element at the main port ②		$\mu\text{m}$	160

1) Rexroth standard test condition (HLP32;  $\vartheta_{\text{oil}} = 40 \text{ °C} \pm 5 \text{ °C}$ )

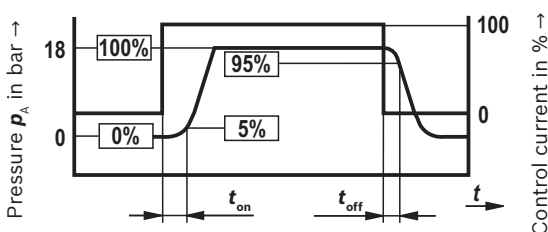
2) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.

We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .

### Notice:

- ▶ The following documentation must be observed: 64020-B1 Hydraulic valves for mobile applications
- ▶ When exchanging screw-in cartridge valves, provide for the correct tightening torque!

Maximum step response



**Technical data**

(For applications outside these parameters, please consult us!)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	▶ Insoluble in water	FKM	VDMA 24568
	▶ Soluble in water	FKM	

**Important information on hydraulic fluids:**

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ Bio-degradable: If bio-degradable hydraulic fluids are used that are also zinc-solvent, there may be an accumulation of zinc.

electric			
Voltage type		Direct voltage	
Supply voltages	V	12 DC	24 DC
Maximum solenoid current <sup>3)</sup>	▶ Version "18"	mA	1200
	▶ Version "24"	mA	1460
Coil resistance (cold value at 20 °C)	Ω	5.1	12
Duty cycle	%	100 (with max. +60 °C) See characteristic curves on pages 7 and 8	
Maximum coil temperature <sup>4)</sup>	°C	150	
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	▶ Version "C4"	IP 65 with mating connector mounted and locked IP 67 and IP 69K with Rexroth mating connector (material no. <b>R901022127</b> )	
	▶ Version "K40"	IP 67 and IP 69K with mating connector mounted and locked	
Control electronics (separate order)		Analog amplifier type RA... (Data sheet 95230)	
		BODAS control unit type RC... (Data sheet 95200)	
Recommended dither frequency (PMW) Chopper frequency (recommended) <sup>5)</sup>	Hz	150	
Design according to VDE 0580			

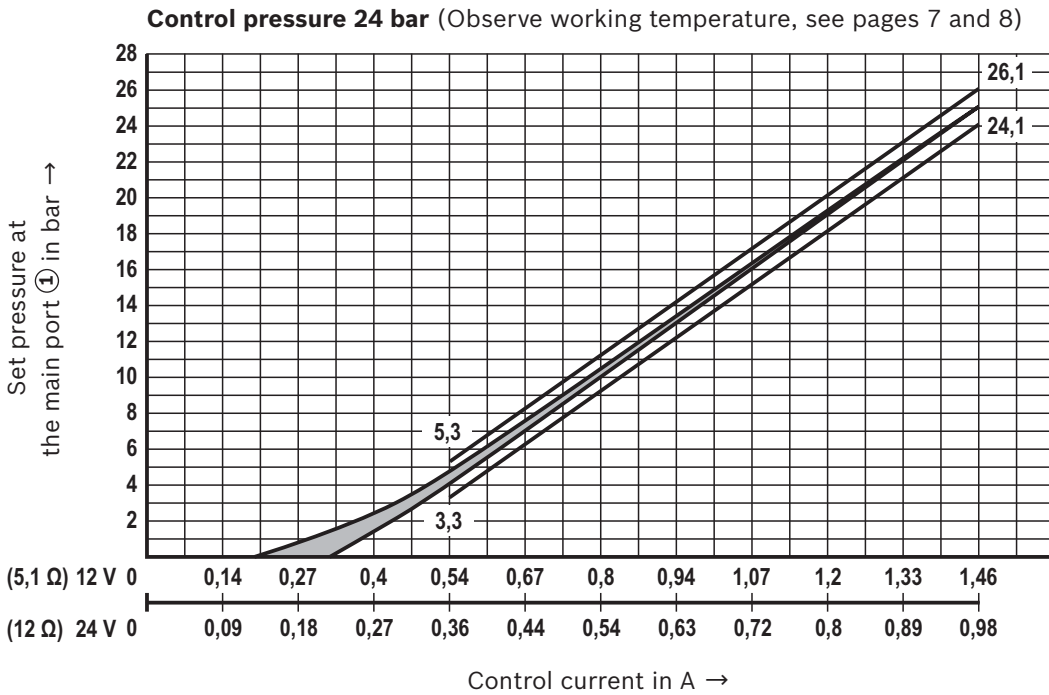
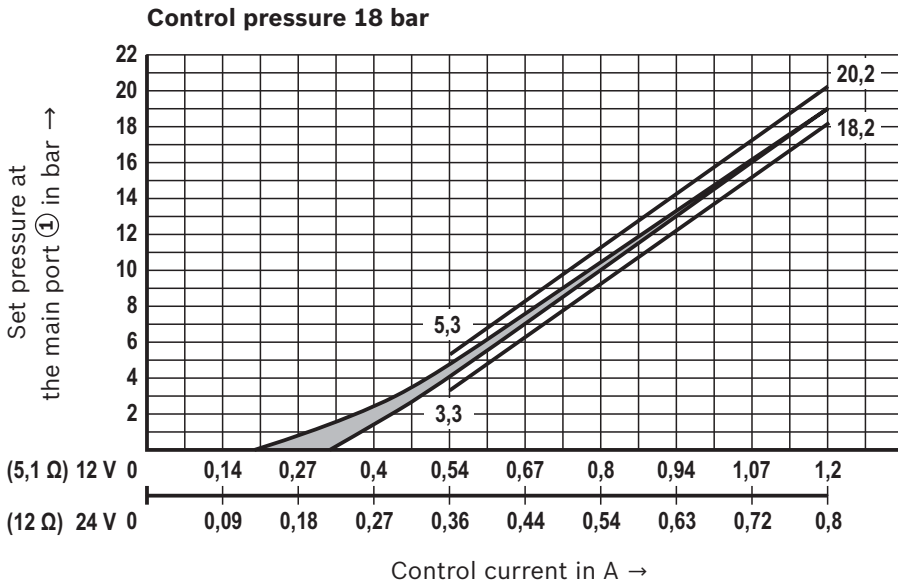
<sup>3)</sup> With version "24", observe working temperature, see page 7 and 8

<sup>4)</sup> Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

<sup>5)</sup> The chopper frequency is to be optimized depending on the application. In this regard, observe the working temperature range of the application.

**When establishing the electrical connection, the protective earthing conductor (PE  $\frac{1}{\equiv}$ ) has to be connected correctly.**

**Characteristic curves with tolerance band**  
(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )



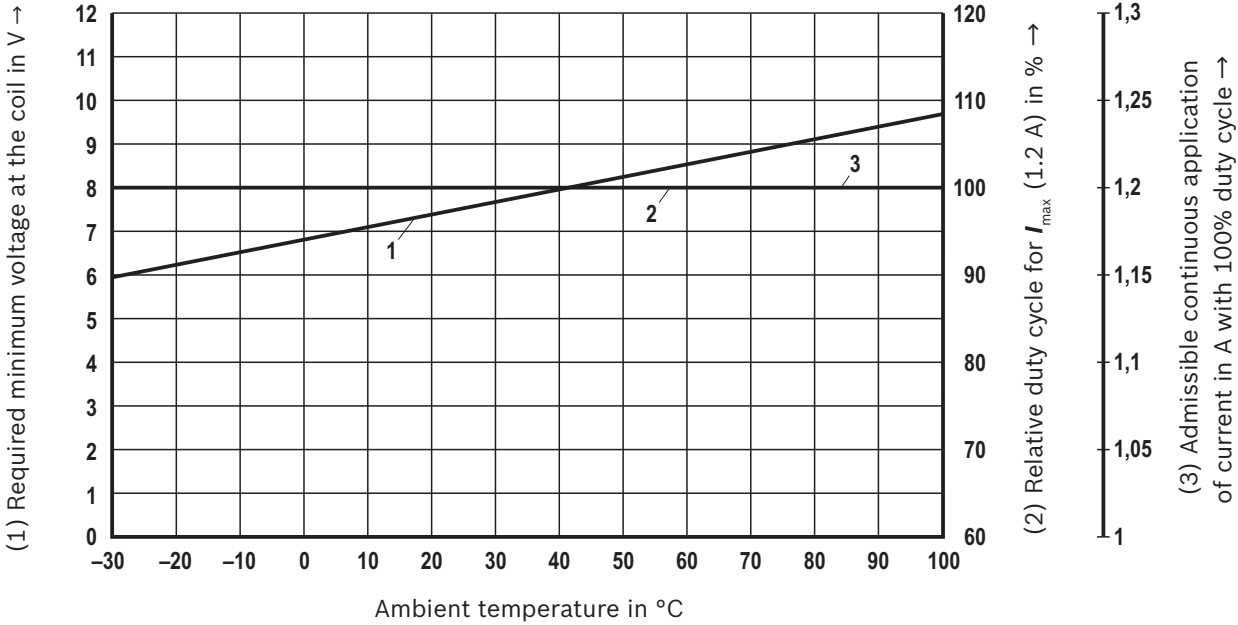
**Measuring conditions**

Amplifier	Analog amplifier RA (data sheet 95230)	
Chopper frequency	Hz	150
Inlet pressure	bar	50
Dead volume at the main port ①	ml	135

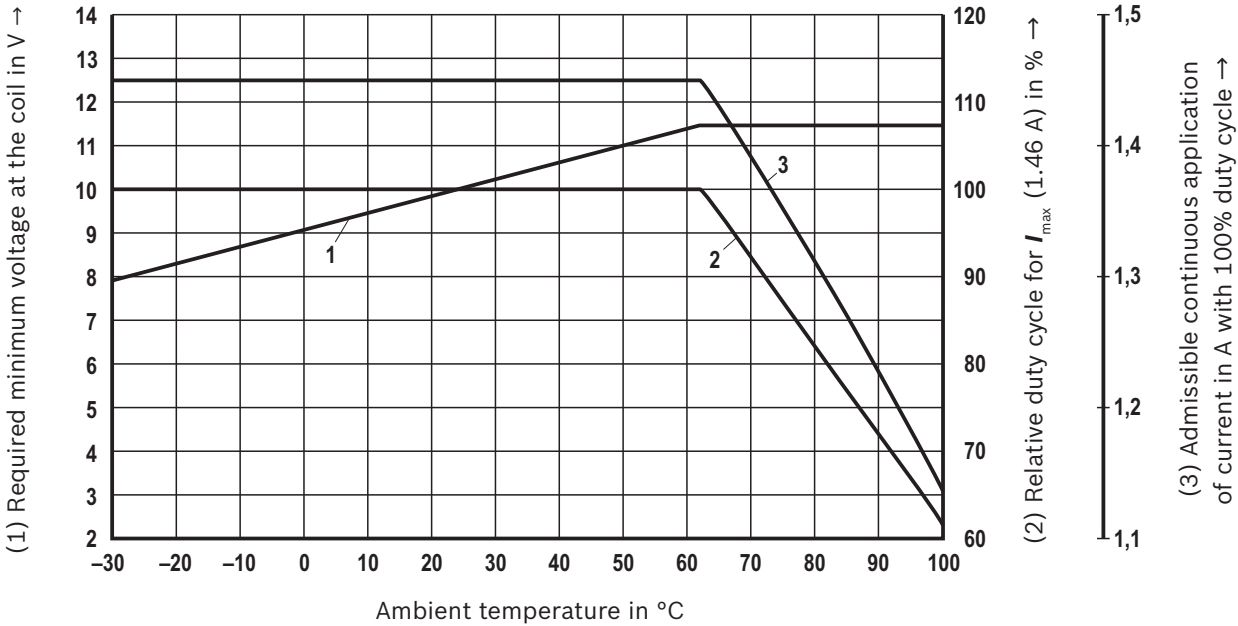
**Admissible working range: Version "G12"**

Minimum terminal voltage at the coil and relative duty cycle

**Admissible working range as a function of the ambient temperature**  
**Version "18 bar"** (5.1 Ω - 12 V - 1.2 A)



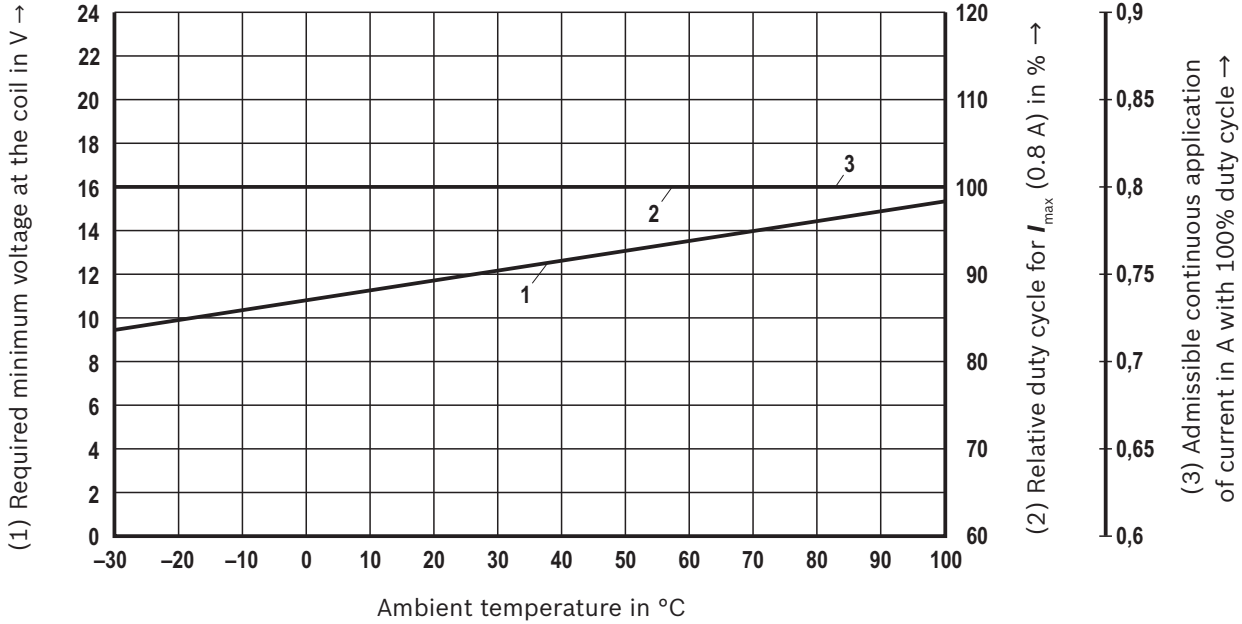
**Admissible working range as a function of the ambient temperature**  
**Version "24 bar"** (5.1 Ω - 12 V - 1.46 A)



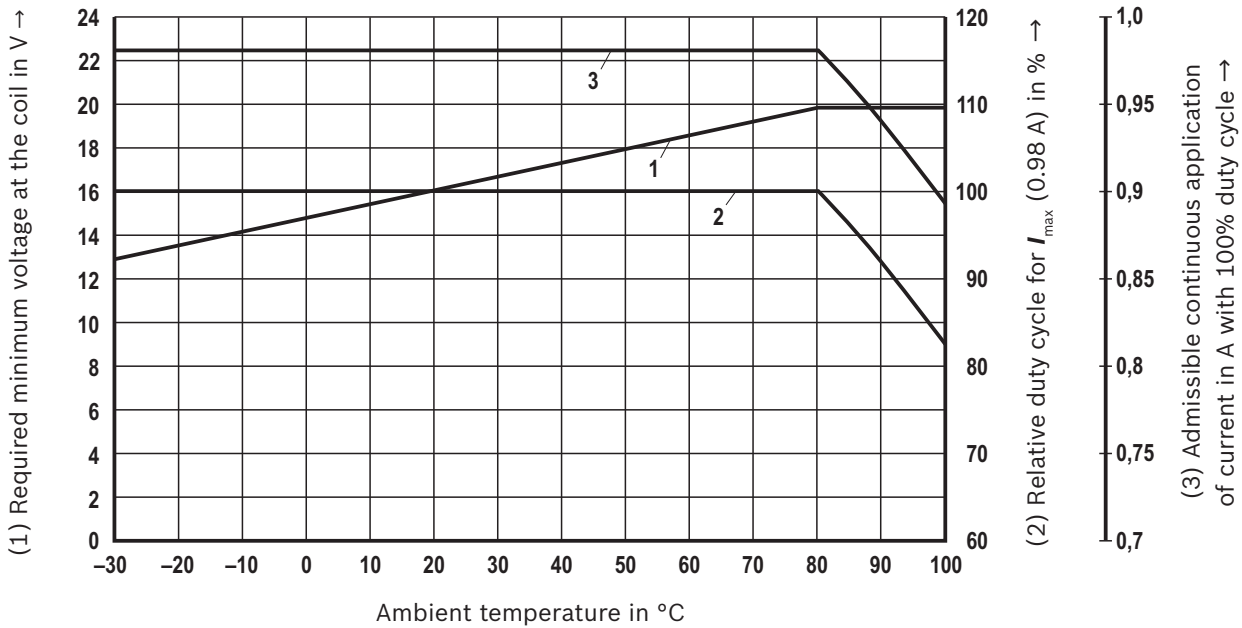
**Admissible working range: Version "G24"**

Minimum terminal voltage at the coil and relative duty cycle

**Admissible working range as a function of the ambient temperature**  
**Version "18 bar"** (12 Ω - 24 V - 0.8 A)

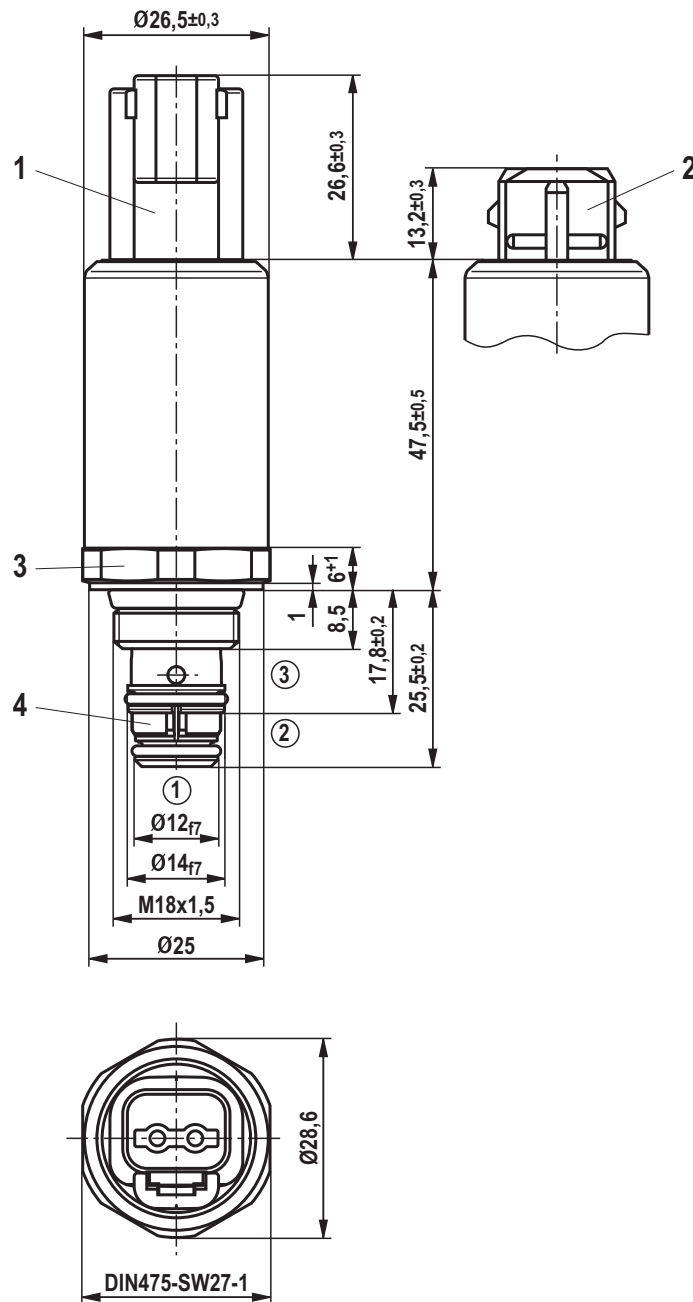


**Admissible working range as a function of the ambient temperature**  
**Version "24 bar"** (12 Ω - 24 V - 0.98 A)



## Dimensions

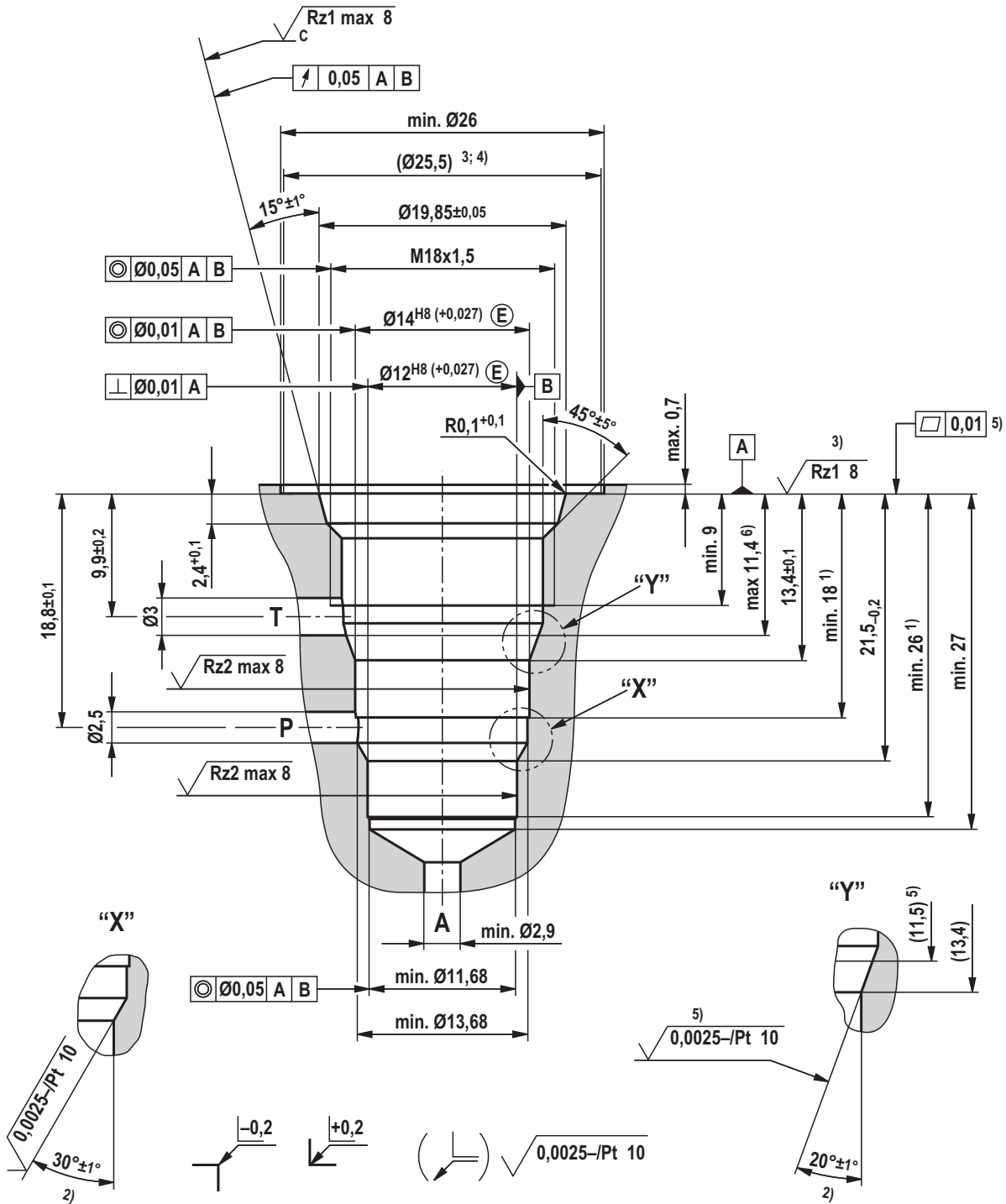
(dimensions in mm)



- ① = Main port 1 (A)
- ② = Main port 2 (P)
- ③ = Main port 3 (T)

- 1 Mating connector for connector "K40"  
(separate order, see data sheet 08006)
- 2 Mating connector for connector "C4"  
(separate order, see data sheet 08006)
- 3 Wrench size 27;  $M_A = 20 \pm 2$  Nm
- 4 Strainer 160  $\mu$ m

**Mounting cavity**  
(dimensions in mm)



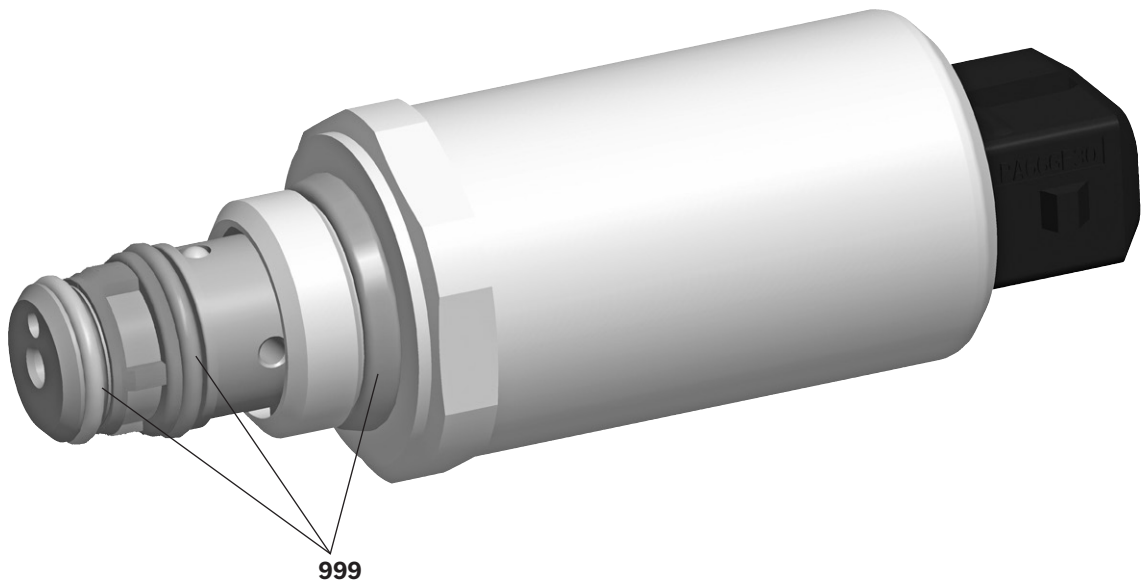
**Standards:**

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerances for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

- 1) Depth of fit
- 2) All seal ring insertion faces are rounded and free of burrs
- 3) Required roughness up to Ø25.5 mm
- 4) Required levelness up to Ø25.5 mm
- 5) Required roughness of 11.5 ... 13.4 mm
- 6) Step in chamfer possible



## Individual components available



Item	Denomination	Seal material	Material no.
999	Seal kit of the valve	NBR	<b>R961011251</b>

Seal kits with other seals upon request.

## Further information

- ▶ Control electronics:
  - Analog amplifier type RA...
  - BODAS control unit type RC...
- ▶ Hydraulic valves for mobile applications
- ▶ Hydraulic fluids on mineral oil basis
- ▶ Selection of the filters

Data sheet 95230

Data sheet 95200

Data sheet 64020-B1

Data sheet 90220

**Notes**

# Proportional pressure reducing valve

## Type FTDRE4K



H7980

- ▶ Frame size 4
- ▶ Component series 1X
- ▶ Maximum control pressure 18, 30 bar
- ▶ Maximum operating pressure 100 bar
- ▶ Maximum flow 5 l/min (at  $\Delta p = 7$  bar)

### Features

- ▶ Direct operated proportional pressure reducing valve for reducing a system pressure
- ▶ Cartridge valve
- ▶ Suitable for mobile and industrial applications
- ▶ Operation by means of proportional solenoid
- ▶ In case of power failure, the minimum pressure is set
- ▶ Recommended control electronics:  
Mobile amplifier type RA and RC

### Contents

Features	1
Ordering code, valve types	2
Function, section, symbols	3
Technical data	4, 5
Characteristic curves with tolerance band	6
Admissible working range	7
Dimensions	8
Mounting cavity	9
Available individual components	10
More information	10

**Ordering code** (valve without coil) <sup>1)</sup>

01	02	03	04	05	06	07	08	09	10	11
<b>FTDRE</b>	<b>4</b>	<b>K</b>	<b>1X</b>	<b>/</b>	<b>A</b>			<b>V</b>	<b>-8</b>	<b>*</b>

01	Proportional pressure reducing valve, non-standardized design, electrical operation	<b>FTDRE</b>
02	Size 4	<b>4</b>
03	Screw-in cartridge valve	<b>K</b>
04	Component series 10 to 19 (10 to 19; unchanged installation and connection dimensions)	<b>1X</b>
05	Maximum control pressure 18 bar	<b>18</b>
	Maximum control pressure 30 bar	<b>30</b>
06	Proportional solenoid, wet-pin	<b>A</b>

**Supply voltage**

07	Control electronics 12 V DC	<b>G12</b>
	Control electronics 24 V DC	<b>G24</b>
08	<b>With</b> manual override	<b>no code</b>
	<b>Without</b> manual override	<b>N0</b>

**Electrical connection** <sup>1)</sup>

09	<b>Without</b> mating connector, with DT 04-2P connector (Deutsch plug)	<b>K40</b>
	<b>Without</b> mating connector, with AMP Junior-Timer connector	<b>C4</b>

**Seal material**

10	FKM seals	<b>V</b>
	Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	
11	Further details in the plain text	<b>*</b>

<sup>1)</sup> Mating connectors, separate order, see data sheet 08006.

**Notice:**

For other valve types than those listed in the data sheet, please consult us!

**Valve types**

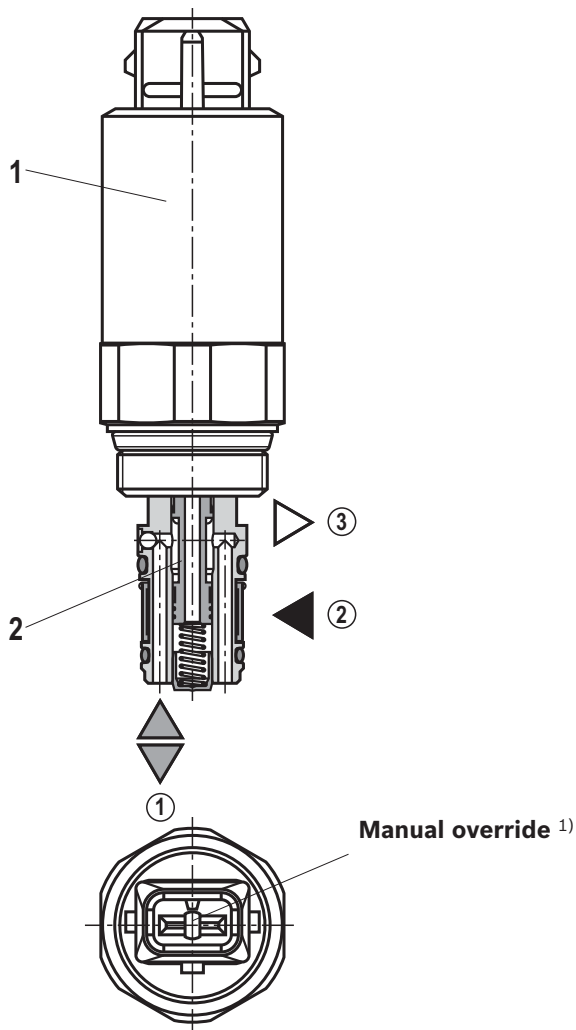
Type	Material no.
FTDRE 4 K1X/30AG12C4V-8	<b>R901060306</b>
FTDRE 4 K1X/30AG12K40V-8	<b>R901082420</b>
FTDRE 4 K1X/30AG24C4V-8	<b>R900727801</b>
FTDRE 4 K1X/30AG24K40V-8	<b>R900771731</b>

Type	Material no.
FTDRE 4 K1X/30AG12N0C4V-8	<b>R901377829</b>
FTDRE 4 K1X/30AG12N0K40V-8	<b>R901377830</b>
FTDRE 4 K1X/30AG24N0C4V-8	<b>R901377824</b>
FTDRE 4 K1X/30AG24N0K40V-8	<b>R901377826</b>

## Function, section, symbols

### General

The proportional pressure reducing valve type FTDRE 4 K is a direct operated screw-in cartridge valve in 3-way version. It reduces the control pressure (main port ①) proportionally to the solenoid current and functions largely independently from the inlet pressure (main port ②). With a command value of 0 or in case of power failure, the minimum pressure is set. Operation is effected by means of a proportional solenoid. The solenoid's interior is connected to the main port ③ and filled with hydraulic fluid. Depending on the electric command value, these valves can be used to reduce the system pressure continuously. The valve is suitable for controlling couplings, pumps and directional valves as well as for use in proportional pilot controls (particularly in the mobile area, however also for industrial applications).



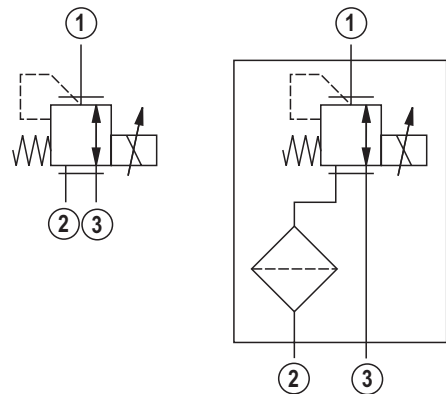
Type FTDRE 4 K3X/..C4..

### Basic principle

The valve controls the pressure in the main port ① proportionally to the current at the solenoid. The proportional solenoid (1) converts the electric current into a mechanical force that acts on the control spool (2) via the armature. The control spool controls the connection between the main ports.

#### Notices:

- ▶ Occurring tank pressure (main port ③) is added up to the control pressure (main port ①).
- ▶ If the valve is not installed or installed in a system that is not completely bled, the valve must not be energized as otherwise, the entering air has a very negative effect on the valve's dynamic behavior.



- ① = Main port 1 (A)
- ② = Main port 2 (P)
- ③ = Main port 3 (T)

<sup>1)</sup> Not contained in "N0" version. Operation by pin tool, to operate the manual override, the connector must be disconnected ("C4" and "K40" version). Maximum number of plug-in processes 10 (specification AMP 108-18013).

## Technical data

(For applications outside these parameters, please consult us!)

general			
Weight	kg	Approx. 0.19	
Installation position	Any; preferably with electrical connection hanging down (for horizontal position of valve or electrical connection standing up, a minimum counter pressure must be generated to ensure the valve remains filled with oil).		
Ambient temperature range	► Version "18"	°C	-30 ... +120
	► Version "30"	°C	-30 ... +120
Salt spray test according to ISO 9227	h	600 (NSS test)	
Surface protection Solenoid	Coating according to DIN 50962-Fe//ZnNi with thick film passivation		

hydraulic			
Maximum control pressure	► Main port ① (A)	bar	18, 30
Maximum inlet pressure	► Main port ② (P)	bar	100
Maximum counter pressure	► Main port ③ (T)	bar	Depressurized (maximum admissible 30) Counter pressure increases set pressure, even for current $I = 0$
Flow ( $\Delta p = 7 \text{ bar}$ ) <sup>1)</sup>		l/min	$\geq 5$ (maximum admissible 7.5)
Maximum leakage flow	► Main port ③ (T)	cm <sup>3</sup> /min	$\leq 100$ ( $p_p = 100 \text{ bar}$ and control current $I = 0$ )
Maximum pilot flow		cm <sup>3</sup> /min	$\leq 350$ ( $p_p = 100 \text{ bar}$ , $q_{VA} = 0$ and control current $I = I_{\text{max}}$ )
Hydraulic fluid	See table page 5		
Hydraulic fluid temperature range		°C	-30 ... +80
Viscosity range		mm <sup>2</sup> /s	10 ... 380
Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)	Class 20/18/15 <sup>1)</sup>		
Load cycles	5 million <sup>1)</sup>		
Maximum step response in case of control current change (see characteristic curve below)	► $t_{\text{on}}$	ms	40
	► $t_{\text{off}}$	ms	20
Mesh size strainer element at the main port ②	$\mu\text{m}$	160	

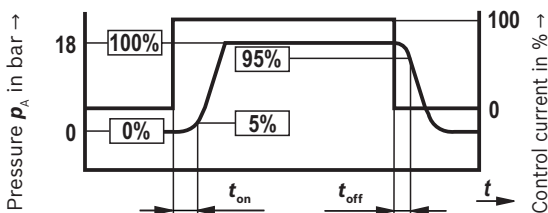
- 1) Rexroth standard test condition (HLP32;  $\vartheta_{\text{oil}} = 40 \text{ °C} \pm 5 \text{ °C}$ )
- 2) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.

We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .

### Notice:

- The following documentation must be observed: 64020-B1 Hydraulic valves for mobile applications
- When exchanging screw-in cartridge valves, provide for the correct tightening torque!

Maximum step response



**Technical data**

(For applications outside these parameters, please consult us!)

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Bio-degradable	– insoluble in water	FKM	VDMA 24568
	– soluble in water	HEPG	

**Important information on hydraulic fluids!**

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us.
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ **Bio-degradable:** If bio-degradable hydraulic fluids are used that are also zinc-solvent, there may be an accumulation of zinc.

electric			
Voltage type		Direct voltage	
Supply voltages	V	12 DC	24 DC
Maximum solenoid current	mA	1800	800
Coil resistance (cold value at 20 °C)	Ω	2.4	12
Duty cycle	%	100 See characteristic curves page 7.	
Maximum coil temperature <sup>3)</sup>	°C	150	
Protection class according to VDE 0470-1 (DIN EN 60529) DIN 40050-9	▶ Version "C4"	IP 65 with mating connector mounted and locked	
		IP 67 and IP 69K with Rexroth mating connector (material no. R901022127)	
	▶ Version "K40"	IP 67 and IP 69K with mating connector mounted and locked	
Control electronics (separate order)		Analog amplifier type RA... (data sheet 95230)	
		BODAS control unit type RC... (data sheet 95200)	
Recommended dither frequency (PMW) Chopper frequency (recommended) <sup>4)</sup>	Hz	200	
Design according to VDE 0580			

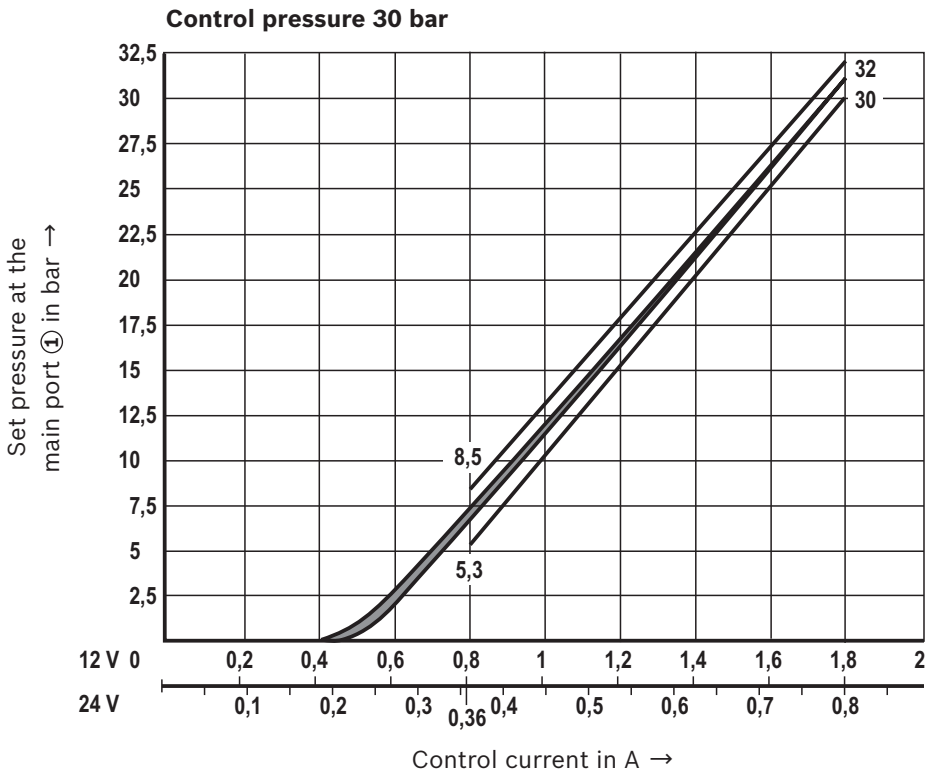
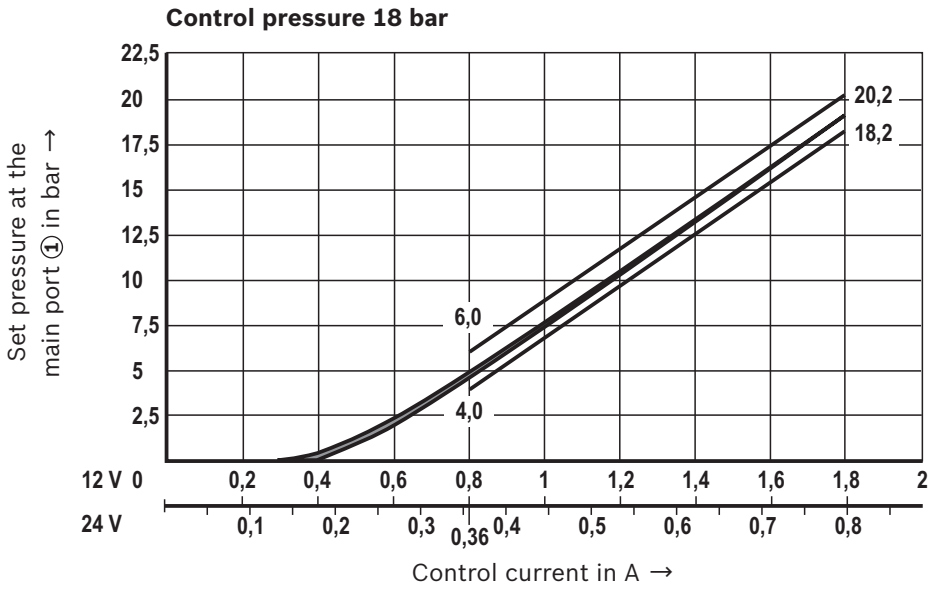
<sup>3)</sup> Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

<sup>4)</sup> The chopper frequency is to be optimized depending on the application.  
In this regard, observe the working temperature range of the application.

**When establishing the electrical connection, the protective earthing conductor (PE  $\frac{1}{\text{I}}$ ) has to be connected correctly.**

**Characteristic curves with tolerance band**

(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ )



**Measuring conditions**

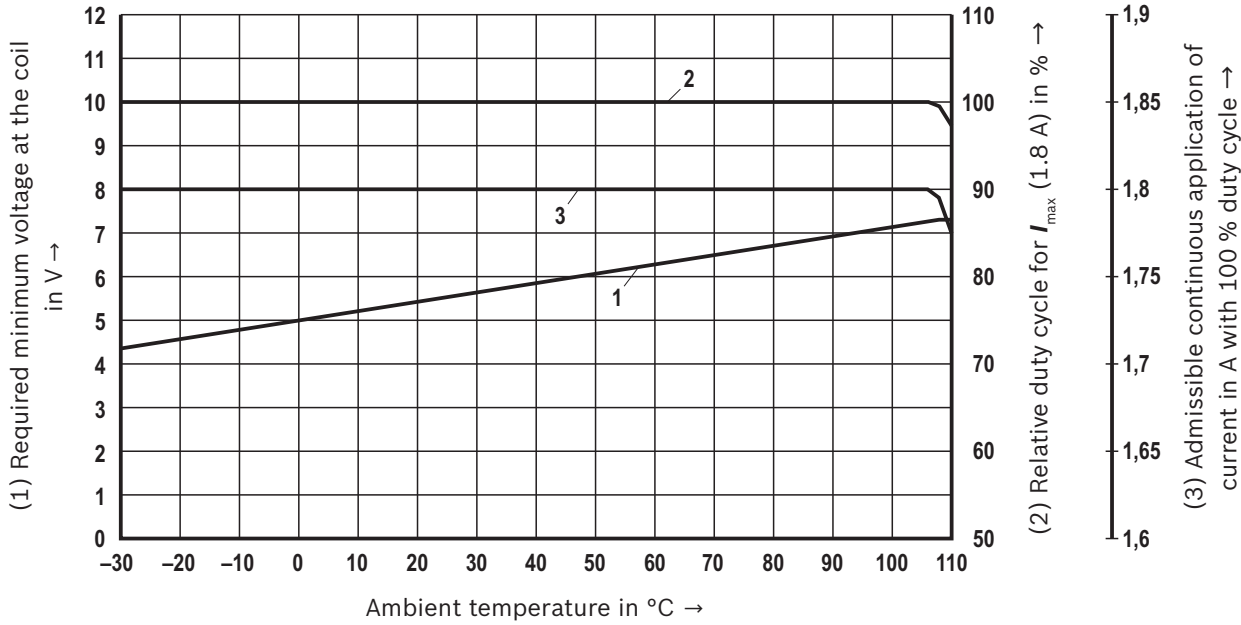
Amplifier		Analog amplifier RA (data sheet 95230)
Chopper frequency	Hz	200
Inlet pressure	bar	50
Dead volume at the main port ①	ml	135



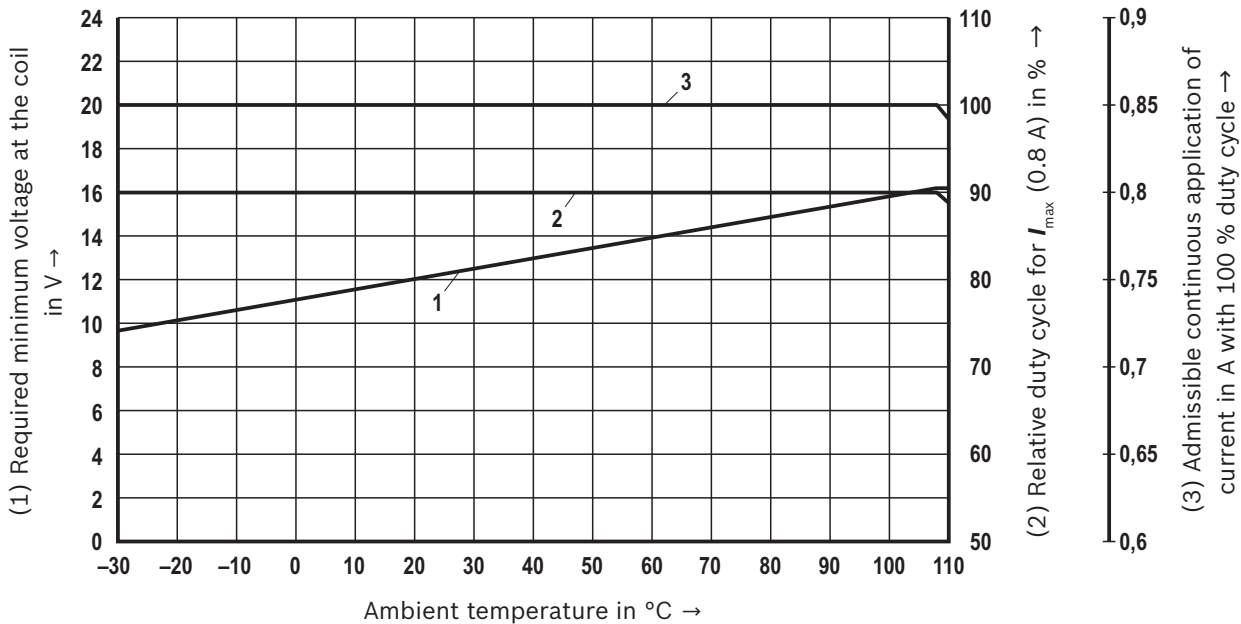
**Admissible working range**

Minimum terminal voltage at the coil and relative duty cycle

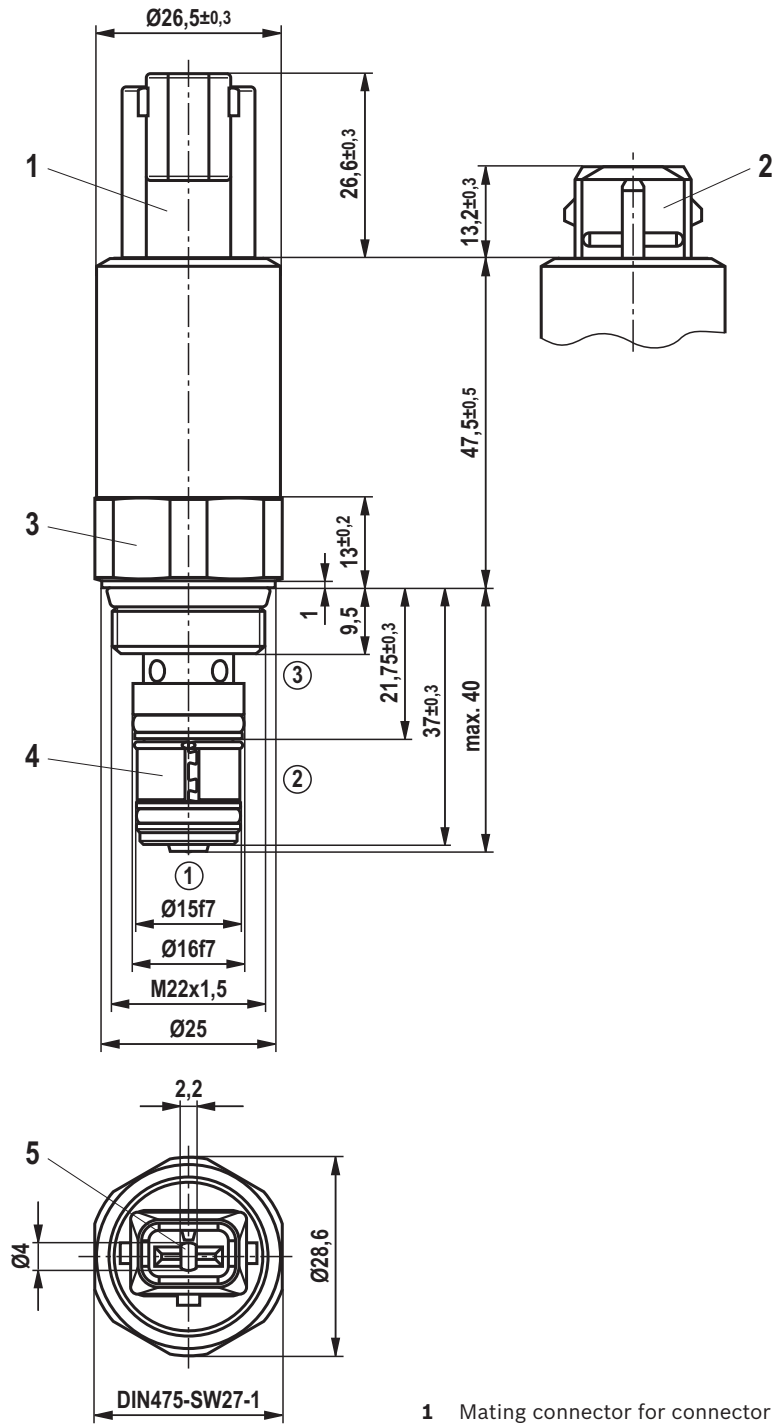
**Admissible working range against the ambient temperature**  
Version "G12" (2.4 Ω - 12 V - 1.8 A)



**Admissible working range against the ambient temperature**  
Version "G24" (12 Ω - 24 V - 0.8 A)



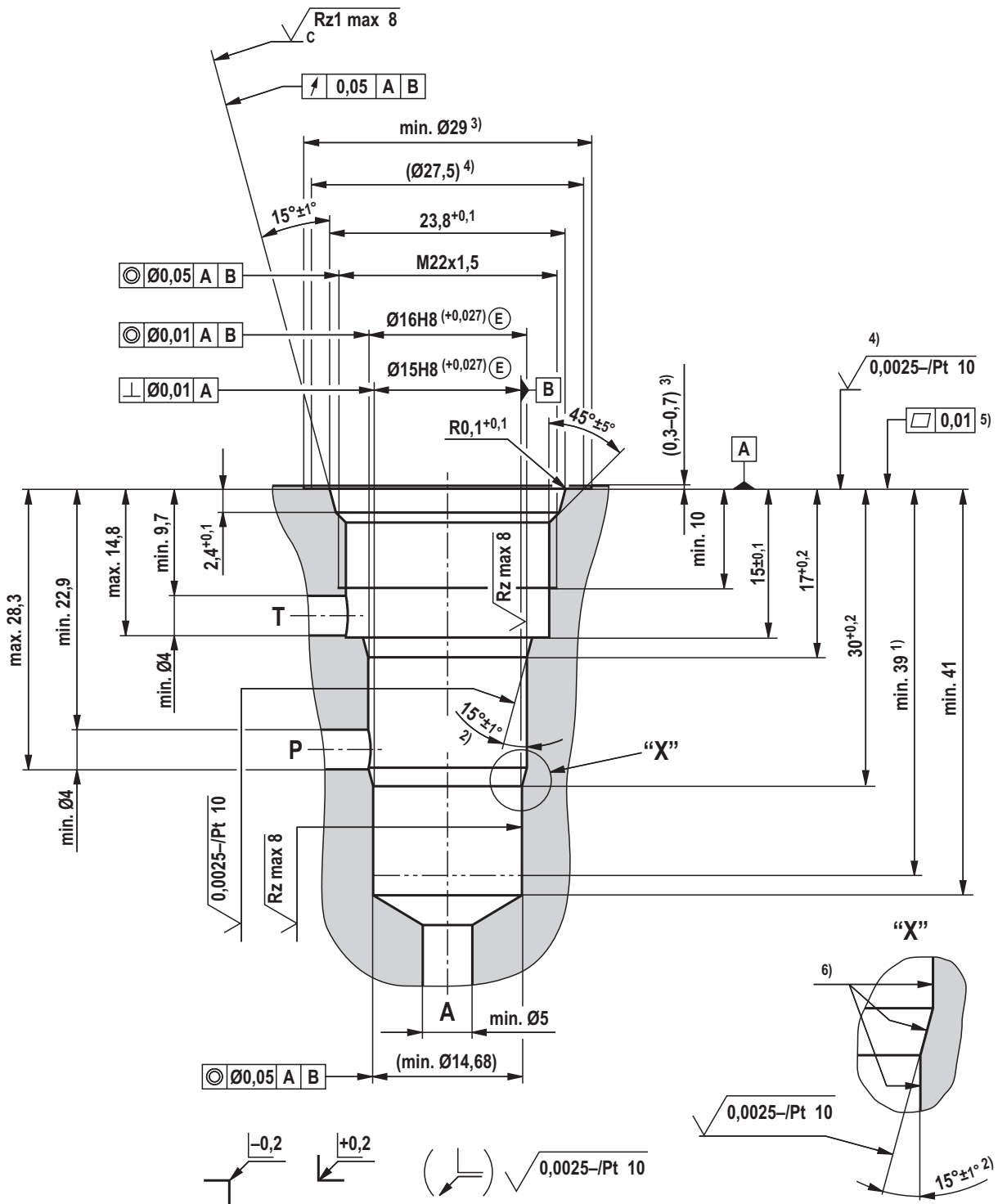
**Dimensions**  
(dimensions in mm)



- ① = Main port 1 (A)
- ② = Main port 2 (P)
- ③ = Main port 3 (T)

- 1 Mating connector for connector "K40" (separate order, see data sheet 08006)
- 2 Mating connector for connector "C4" (separate order, see data sheet 08006)
- 3 Wrench size SW27;  $M_A = 12^{+5}$  Nm
- 4 Strainer 160  $\mu\text{m}$
- 5 Not contained in "N0" version. Operation by pin tool, to operate the manual override, the connector must be disconnected ("C4" and "K40" version). Maximum number of plug-in processes 10 (specification AMP 108-18013).

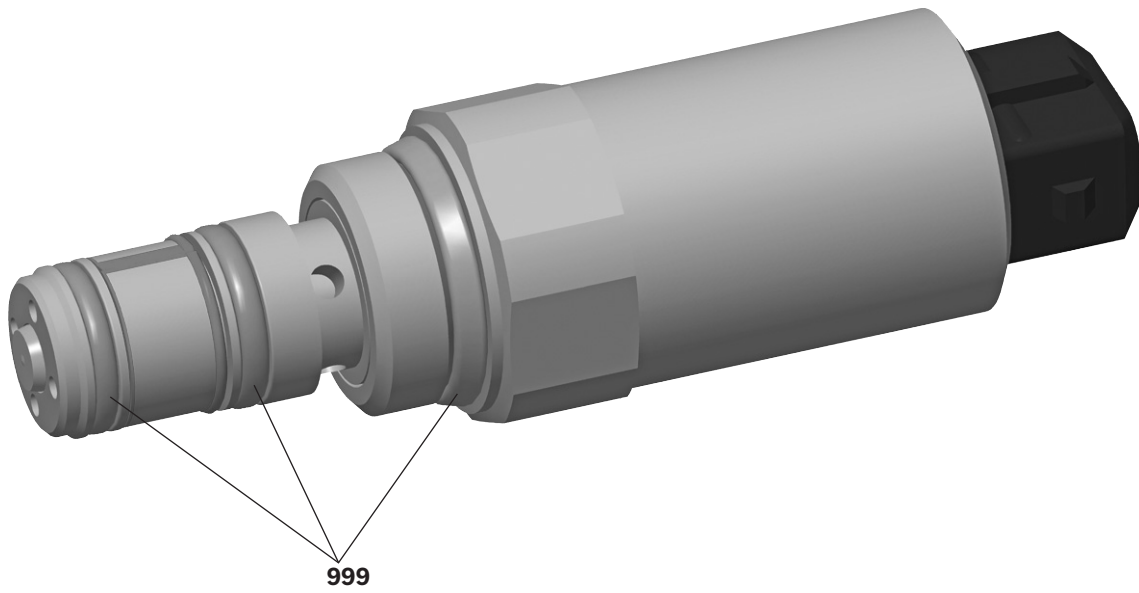
**Mounting cavity**  
(dimensions in mm)



**Standards:**

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerances for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

- 1) Depth of fit
- 2) All seal ring insertion faces are rounded and free of burrs
- 3) If recess depth > 1 mm → recess Ø ≥ 33 mm
- 4) Required roughness up to Ø27.5 mm
- 5) Required levelness up to Ø27.5 mm
- 6) Overall contour completed with molding tool

**Available individual components**

Item	Denomination	Seal material	Material no.
999	Seal kit of the valve	FKM	R900846072

Seal kits with other seals upon request.

**More information**

- ▶ Control electronics:
  - Analog amplifier type RA...
  - BODAS control unit type RC...
- ▶ Hydraulic valves for mobile applications
- ▶ Hydraulic fluids on mineral oil basis
- ▶ Selection of the filters

Data sheet 95230  
 Data sheet 95200  
 Data sheet 64020-B1  
 Data sheet 90220

Directional spool valves, direct operated,  
with solenoid actuation

Type FTWE 2 K



H7979

- ▶ Size 2
- ▶ Component series 3X
- ▶ Maximum operating pressure 100 bar
- ▶ Maximum flow 2 l/min

## Features

- ▶ 3/2-way version
- ▶ Screw-in cartridge valve
- ▶ Minimized size
- ▶ Wet-pin DC solenoid
- ▶ Electrical connection as individual connection
- ▶ With manual override
- ▶ For use in vehicles and mobile machines

## Contents

Features	1
Ordering code	2
Valve types	2
Function, section, symbols	3
Technical data	4, 5
Characteristic curves	5
Dimensions	6
Mounting cavity	7
Available individual components	8
More information	8

Ordering code (valve without coil) <sup>1)</sup>

01 02 03 04 05 06 07 08 09 10 11

<b>FTWE</b>	<b>2</b>	<b>K</b>	<b>3X</b>	<b>/</b>	<b>100</b>	<b>A</b>		<b>V</b>	<b>*</b>
-------------	----------	----------	-----------	----------	------------	----------	--	----------	----------

01	Directional spool valve, non-standard design, electric actuation	<b>FTWE</b>
02	Size 2	<b>2</b>
03	Screw-in cartridge valve	<b>K</b>
04	Switching characteristics (more on request)	<b>C</b>
05	Component series 30 ... 39 (30 ... 39; unchanged installation and connection dimensions)	<b>3X</b>
06	Maximum nominal pressure 100 bar	<b>100</b>
07	Solenoid, wet-pin	<b>A</b>

## Supply voltage

08	Control electronics 12 V DC	<b>G12</b>
	Control electronics 24 V DC	<b>G24</b>

Electrical connection <sup>1)</sup>


09	<b>Without</b> mating connector, with connector DT 04-2P (Deutsch connector)	<b>K40</b>
	<b>Without</b> mating connector, with connector AMP Junior-Timer	<b>C4</b> <sup>2)</sup>

## Seal material

10	FKM seals	<b>V</b>
	Observe compatibility of seals with hydraulic fluid used! (Other seals on request)	
11	Further details in the plain text (e.g. for special versions see page 3)	<b>*</b>

<sup>1)</sup> Mating connectors, separate order, see data sheet 08006.

<sup>2)</sup> The manual override can only be performed once the connector is removed!

 **Notice:**

For other valve types than those listed in the data sheet, please consult us!

## Valve types

Type	Material no.
FTWE 2 KC3X/100AG12C4V	<b>R900578533</b>
FTWE 2 KC3X/100AG12K40V	<b>R901047340</b>
FTWE 2 KC3X/100AG24C4V	<b>R900578535</b>
FTWE 2 KC3X/100AG24K40V	<b>R901032720</b>

## Function, section, symbols

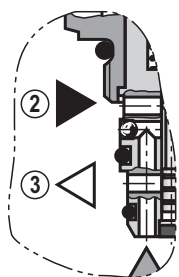
### General

The directional spool valves type FTWE 2 K are direct operated, pressure-compensated screw-in cartridge valves in 3-way design. They control the start, stop and direction of a flow.

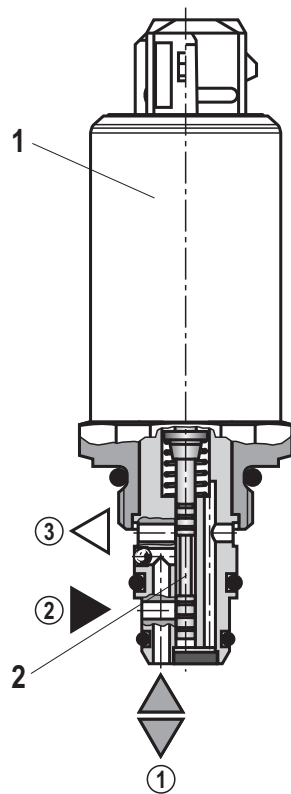
### Function

In the de-energized condition, the control spool (2) is held in the initial position by the return spring.

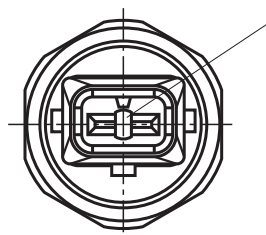
- ▶ Version “C” (standard) initial position from ① → ③; on actuation, the valve opens from ② → ①.
  - ▶ Version “U” (special version on request) initial position from ② → ①, on actuation, the valve opens from ① → ③.
- The control spool (2) is actuated by wet-pin DC solenoids (1). Main ports ① and ② can be charged continuously with 100 bar operating pressure, main port ③ with a maximum of 30 bar.



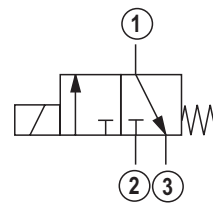
Type FTWE 2 KU...



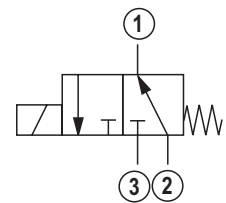
Type FTWE 2 KC3X/..C4..



Symbol “C”  
(Standard)



Symbol “U”  
(Special version)



**Notice:**

Special versions (e.g. symbol “U”) on request.  
Special installation drawings apply for all special versions.

- ① = Main port 1 (A)
- ② = Main port 2 (P)
- ③ = Main port 3 (T)

### Manual override <sup>1)</sup>

<sup>1)</sup> Actuated via pin tool (to actuate the manual override the connector must be removed (version “C4” and “K40”). Maximum number of plug-in processes 10 (specification AMP 108-18013).

**Technical data**

(For applications outside these parameters, please consult us!)

General	
Weight	kg approx. 0.16
Installation position	any
Ambient temperature range	°C -30 ... +80
Salt spray test according to ISO 9227	h 600 (NSS test)
Solenoid surface protection	Coating according to DIN 50962-Fe//ZnNi with thick film passivation

Hydraulic			
Maximum operating pressure	▶ Main port ① (A)	bar	100
	▶ Main port ② (P)	bar	100
Maximum counter pressure	▶ Main port ③ (T)	bar	30
Maximum flow ( $\Delta p = 5 \text{ bar}$ ) <sup>1)</sup>		l/min	2
Maximum leakage flow	▶ Main port ③ (T)	cm <sup>3</sup> /min	≤ 60 ( $p_p = 50 \text{ bar}$ and control current $I = 0$ )
Hydraulic fluid			see table below
Hydraulic fluid temperature range		°C	-30 ... +80
Viscosity range		mm <sup>2</sup> /s	10 ... 380
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>2)</sup>
Load cycles			10 million <sup>1)</sup>

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Biodegradable	- insoluble in water	FKM	ISO 15380
	- soluble in water	HEPG	

**Important information on hydraulic fluids!**

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!

- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ Biodegradable: If biodegradable hydraulic fluids are used that are also zinc-solvent, there may be an accumulation of zinc

<sup>1)</sup> Rexroth standard test condition (HLP32;  $\vartheta_{oil} = 40 \text{ °C} \pm 5 \text{ °C}$ )

<sup>2)</sup> The cleanliness classes stated for the components need to be maintained in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .



## Technical data

(For applications outside these parameters, please consult us!)

Electrical		Direct voltage	
Voltage type		12 DC	24 DC
Supply voltages ( $\pm 15\%$ )	V	12 DC	24 DC
Power consumption (at 20 °C)	W	14.4	
Coil resistance (cold value at 20 °C)	$\Omega$	10	40
Duty cycle	%	100	
Maximum coil temperature <sup>3)</sup>	°C	150	
Switching time	▶ ON	ms	$\leq 20$
	▶ OFF	ms	$\leq 30$
Protection class according to DIN EN 60529	▶ Version "C4"	IP 65 with mating connector mounted and locked	
		IP 67 and IP 69K with Rexroth mating connector (material no. R901022127)	
	▶ Version "K40"	IP 67 and IP 69K with mating connector mounted and locked	
Switching frequency	Hz	5	
Design		as per VDE 0580	

<sup>3)</sup> Surface temperature > 50 °C possible, provide contact protection in accordance with standards ISO 13732-1 and ISO 4413 .

**When establishing the electrical connection, the protective earthing conductor (PE  $\frac{1}{2}$ ) has to be connected correctly.**

### Notice:

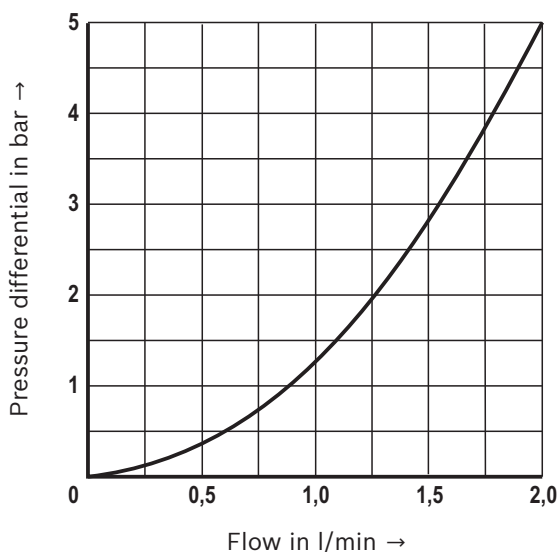
- ▶ The technical data were determined at a viscosity of 46 mm<sup>2</sup>/s (HLP46; 40 °C).
- ▶ For further information relating to correct usage of Rexroth hydraulic products, refer to data sheet 64020-B, "Hydraulic valves for mobile applications – General information".

## Characteristic curves

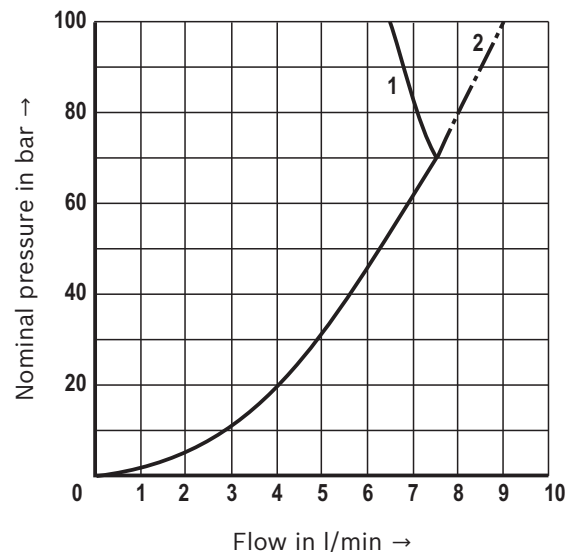
(measured with HLP46,  $\vartheta_{\text{oil}} = 40 \pm 5$  °C)

### $\Delta p$ - $q_v$ characteristic curve ( $q_v$ = minimum value)

②(P) → ①(A); ①(A) → ③(T)

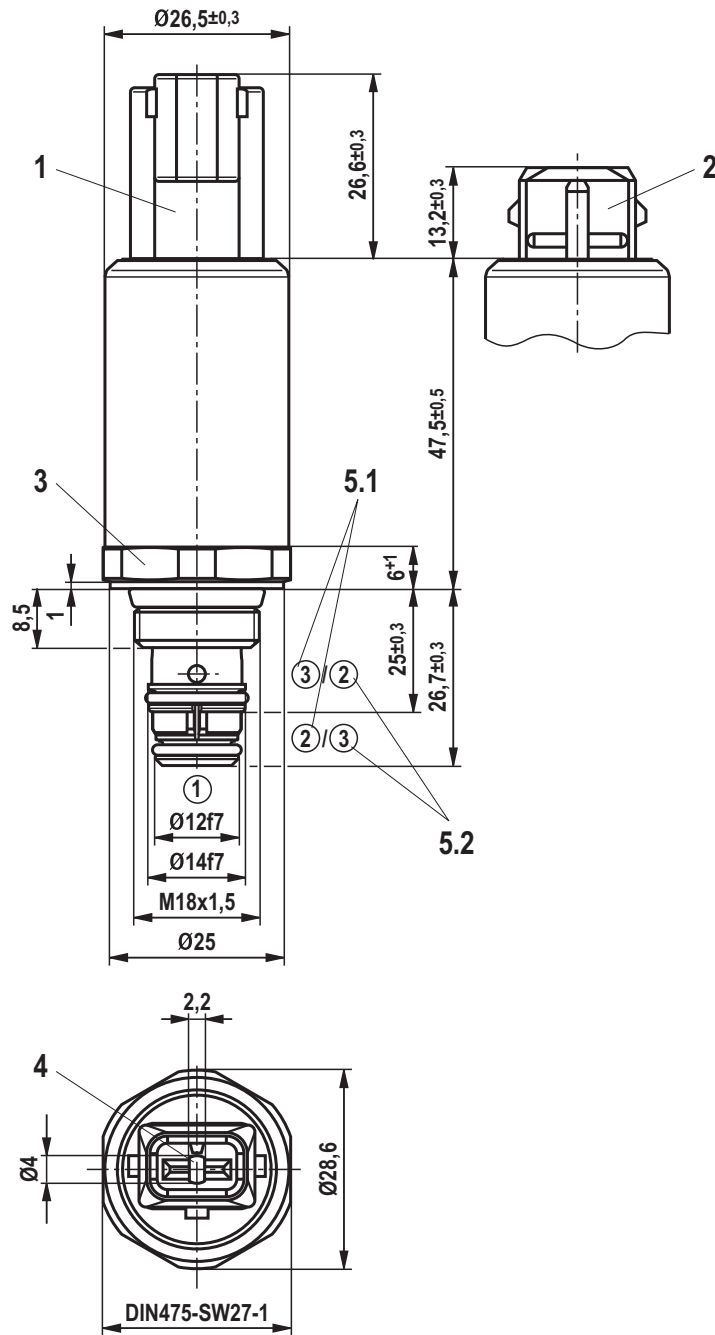


### Power limit



- 1 Main port ①(A) → ③(T)
- 2 Main port ②(P) → ①(A)

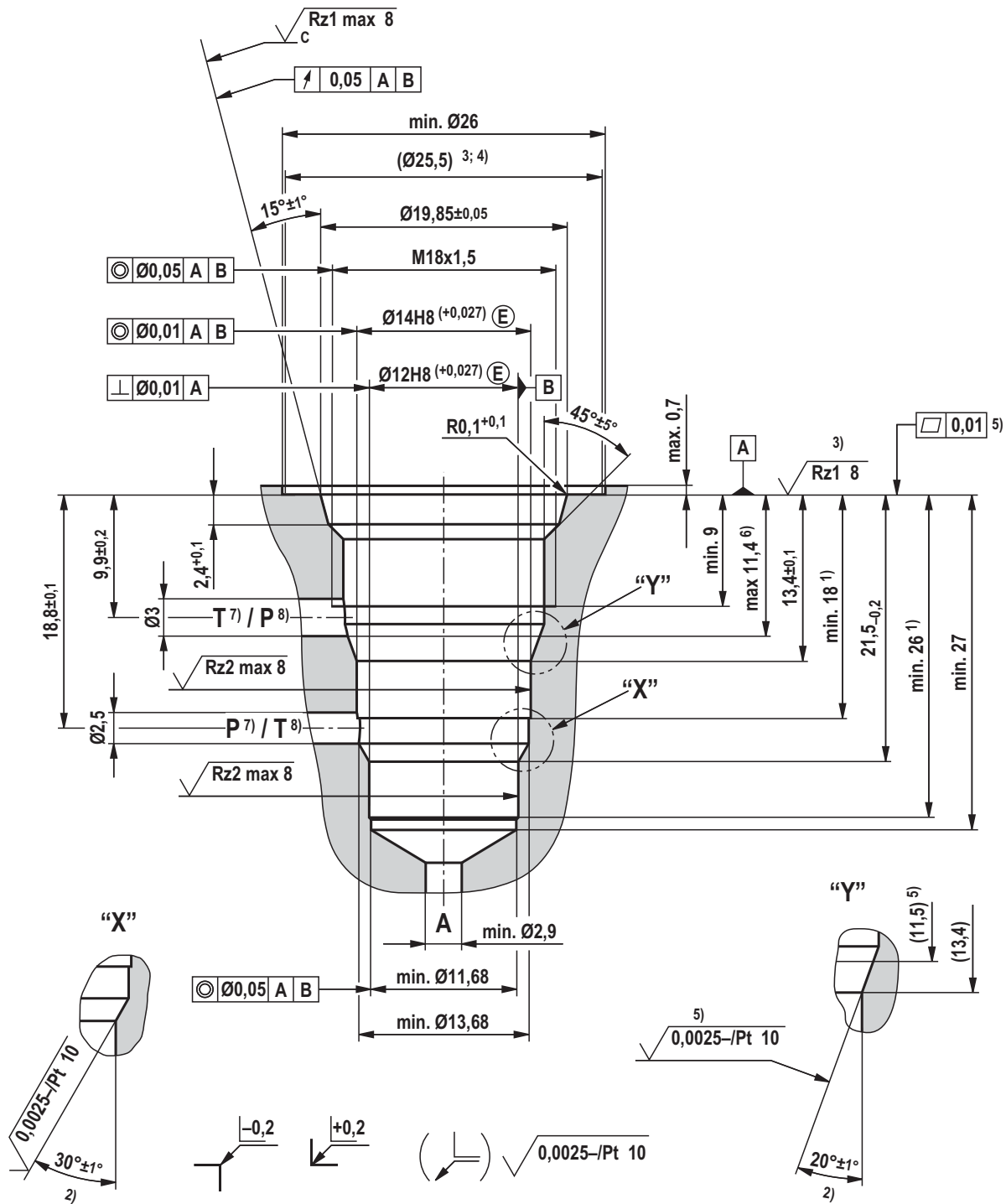
**Dimensions**  
(dimensions in mm)



- ① = main port 1 (A)
- ② = main port 2 (P)
- ③ = main port 3 (T)

- 1 Mating connector for connector “K40” (separate order, see data sheet 08006)
- 2 Mating connector for connector “C4” (separate order, see data sheet 08006)
- 3 Wrench size 27;  $M_A = 10^{+5}$  Nm
- 4 Manual override: Actuated via pin tool (to actuate the manual override the connector must be removed (version “C4” and “K40”). Maximum number of plug-in processes 10 (specification AMP 108-18013)).
- 5.1 Symbol “C” (standard)
- 5.2 Symbol “U” (on request)

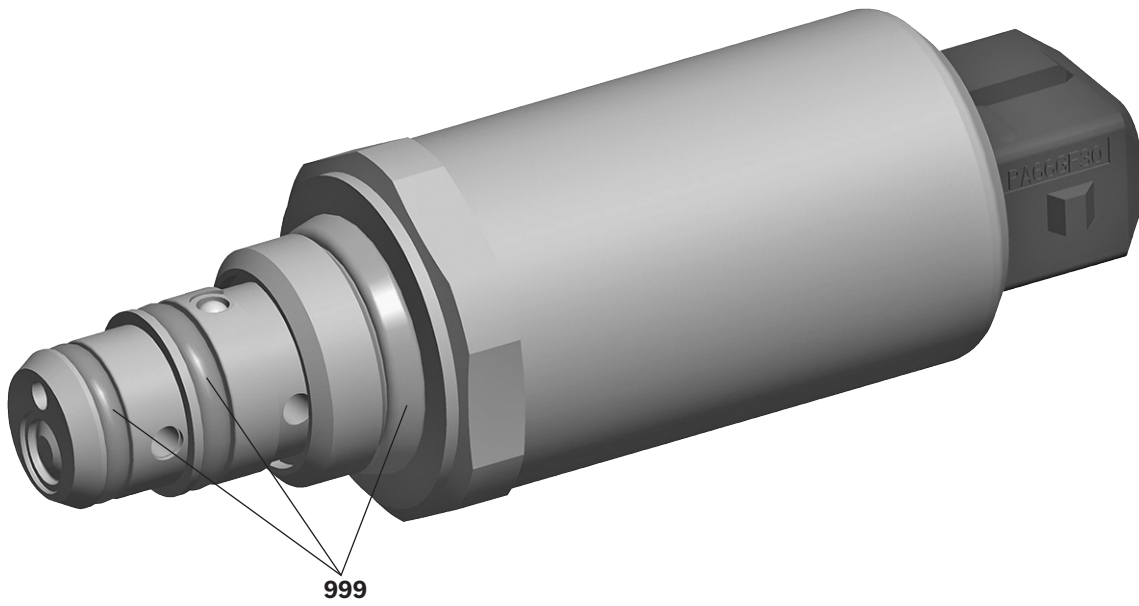
**Mounting cavity**  
(dimensions in mm)



**Standards:**

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerance for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

- 1) Depth of fit
- 2) All seal ring insertion faces are rounded and free of burrs
- 3) Required roughness up to Ø 25.5 mm
- 4) Required evenness up to Ø 25.5 mm
- 5) Required roughness of 11.5 ... 13.4 mm
- 6) Step in chamfer possible
- 7) Symbol "C" (standard)
- 8) Symbol "U" (on request)

**Available individual components**

Item	Designation	Seal material	Material no.
999	Seal kit of the valve	FKM	<b>R961007176</b>

Seal kits with other seals on request.

**More information**

- ▶ Hydraulic valves for mobile applications
- ▶ Mineral-oil-based hydraulic fluids
- ▶ Filter range

Data sheet 64020-B  
Data sheet 90220

## Directional spool valves, direct operated, with solenoid actuation

### Type FTWE 4 K



H7978

- ▶ Size 4
- ▶ Component series 1X
- ▶ Maximum operating pressure 210 bar
- ▶ Maximum flow 7 l/min

#### Features

- ▶ 3/2-way version
- ▶ Screw-in cartridge valve
- ▶ Minimized size
- ▶ Wet-pin DC solenoid
- ▶ Electrical connection as individual connection
- ▶ With manual override
- ▶ For use in vehicles and mobile machines

#### Contents

Features	1
Ordering code, valve types	2
Function, section, symbol	3
Technical data	4, 5
Characteristic curves	5
Dimensions	6
Mounting cavity	7
Available individual components	8
More information	8

Ordering code (valve without coil) <sup>1)</sup>

01 02 03 04 05 06 07 08 09 10 11

FTWE	4	K		1X	/	210	A			V	*
------	---	---	--	----	---	-----	---	--	--	---	---

01	Directional spool valve, non-standard design, electric actuation	FTWE
02	Size 2	4
03	Screw-in cartridge valve	K
04	Switching characteristics (more on request)	C
05	Component series 10 ... 19 (10 ... 19; unchanged installation and connection dimensions)	1X
06	Maximum nominal pressure 210 bar	210
07	Solenoid, wet-pin	A

## Supply voltage

08	Control electronics 12 V DC	G12
	Control electronics 24 V DC	G24

Electrical connection <sup>1)</sup>


09	Without mating connector, with connector DT 04-2P (Deutsch connector)	K40
	Without mating connector, with connector AMP Junior-Timer	C4 <sup>2)</sup>

## Seal material

10	FKM seals	V
	Observe compatibility of seals with hydraulic fluid used! (Other seals on request)	
11	Further details in the plain text	*

<sup>1)</sup> Mating connectors, separate order, see data sheet 08006.

<sup>2)</sup> The manual override can only be performed once the connector is removed!

 **Notice:**

For other valve types than those listed in the data sheet, please consult us!

## Valve types

Type	Material no.
FTWE 4 KC1X/210AG12C4V	R900568315
FTWE 4 KC1X/210AG12K40V	R901119907
FTWE 4 KC1X/210AG24C4V	R900568316
FTWE 4 KC1X/210AG24K40V	R901772014

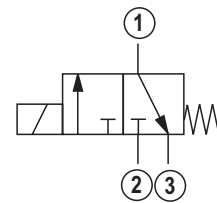
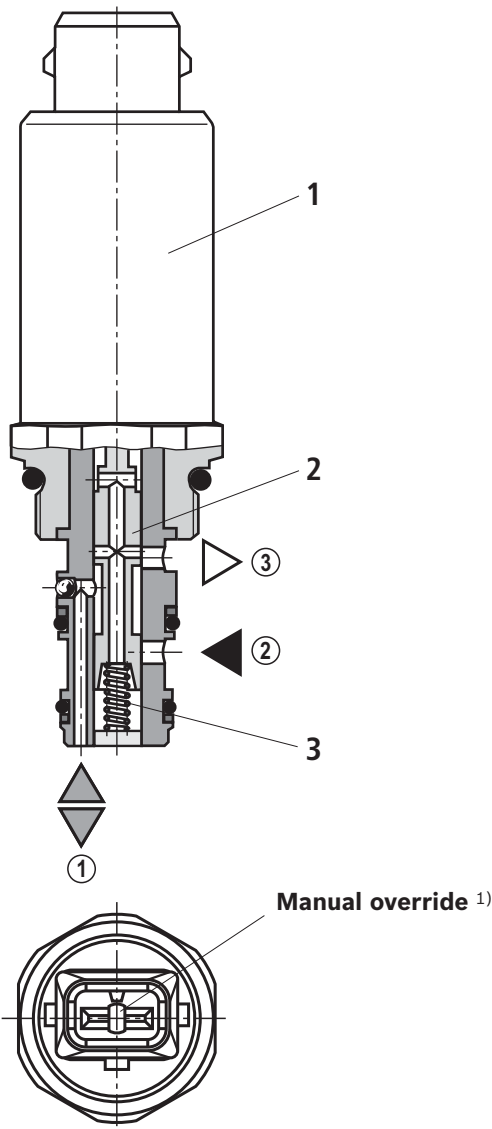
**Function, section, symbol**

**General**

The directional spool valves type FTWE 4 K are direct operated, pressure-compensated screw-in cartridge valves in 3-way design. They control the start, stop and direction of a flow.

**Function**

In the de-energized condition, the control spool (2) is held in the initial position by the return spring (3). Initial position from ① → ③; on actuation, the valve opens from ② → ①. The control spool (2) is actuated by wet-pin DC solenoids (1). Main ports ① and ② can be charged continuously with 210 bar operating pressure; main port ③ with a maximum of 30 bar.



**Notice:**

Special versions on request. Special installation drawings apply for all special versions.

- ① = Main port 1 (A)
- ② = Main port 2 (P)
- ③ = Main port 3 (T)

Type FTWE 4 KC1X/..C4..

<sup>1)</sup> Actuated via pin tool (to actuate the manual override the connector must be removed (version "C4" and "K40"). Maximum number of plug-in processes 10 (specification AMP 108-18013).

**Technical data**

(For applications outside these parameters, please consult us!)

General	
Weight	kg approx. 0.16
Installation position	any
Ambient temperature range	°C -30 ... +80
Salt spray test according to ISO 9227	h 600 (NSS test)
Solenoid surface protection	Coating according to DIN 50962-Fe//ZnNi with thick film passivation

Hydraulic			
Maximum operating pressure	▶ Main port ① (A)	bar	210
	▶ Main port ② (P)	bar	210
Maximum counter pressure	▶ Main port ③ (T)	bar	30
Maximum flow ( $\Delta p = 5 \text{ bar}$ ) <sup>1)</sup>		l/min	7
Maximum leakage flow	▶ Main port ③ (T)	cm <sup>3</sup> /min	≤ 115 ( $p_p = 100 \text{ bar}$ and control current $I = 0$ )
Hydraulic fluid			see table below
Hydraulic fluid temperature range		°C	-30 ... +80
Viscosity range		mm <sup>2</sup> /s	10 ... 380
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)			Class 20/18/15 <sup>2)</sup>
Load cycles			10 million <sup>1)</sup>

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	FKM	DIN 51524
Biodegradable	- insoluble in water	FKM	ISO 15380
	- soluble in water	HEPG	

**Important information on hydraulic fluids!**

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!

- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ Biodegradable: If biodegradable hydraulic fluids are used that are also zinc-solvent, there may be an accumulation of zinc

<sup>1)</sup> Rexroth standard test condition (HLP32;  $\vartheta_{\text{oil}} = 40 \text{ °C} \pm 5 \text{ °C}$ )

<sup>2)</sup> The cleanliness classes stated for the components need to be maintained in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

We recommend using a filter with a minimum retention rate of  $\beta_{10} \geq 75$ .



## Technical data

(For applications outside these parameters, please consult us!)

Electrical			
Voltage type		Direct voltage	
Supply voltages ( $\pm 15\%$ )	V	12 DC	24 DC
Power consumption (at 20 °C)	W	14.4	
Coil resistance (cold value at 20 °C)	$\Omega$	10	40
Duty cycle	%	100	
Maximum coil temperature <sup>3)</sup>	°C	150	
Switching time	► ON	ms	$\leq 30$
	► OFF	ms	$\leq 25$
Protection class according to DIN EN 60529	► Version "C4"	IP 65 with mating connector mounted and locked	
	► Version "K40"	IP 67 and IP 69K with Rexroth mating connector (material no. R901022127)	
Switching frequency	Hz	5	
Design		as per VDE 0580	

<sup>3)</sup> Surface temperature > 50 °C possible, provide contact protection in accordance with standards ISO 13732-1 and ISO 4413 .

**When establishing the electrical connection, the protective earthing conductor (PE  $\frac{1}{2}$ ) has to be connected correctly.**

### Notice:

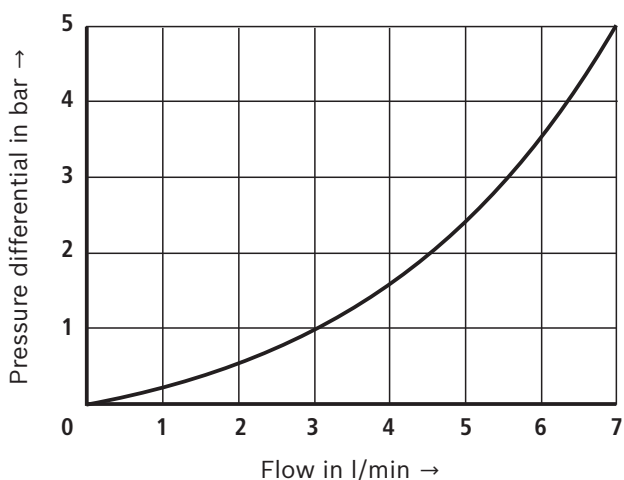
- The technical data were determined at a viscosity of 46 mm<sup>2</sup>/s (HLP46; 40 °C).
- For further information relating to correct usage of Rexroth hydraulic products, refer to data sheet 64020-B, "Hydraulic valves for mobile applications – General information".

## Characteristic curves

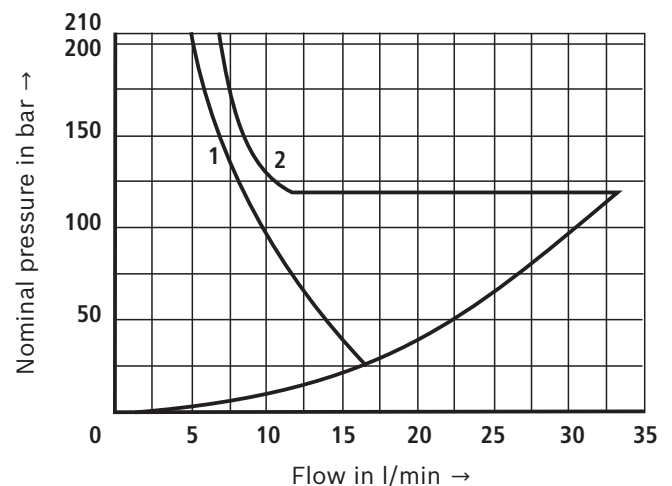
(measured with HLP46,  $\vartheta_{oil} = 40 \pm 5$  °C)

**$\Delta p$ - $q_v$  characteristic curve** ( $q_v =$  minimum value)

②(P) → ①(A); ①(A) → ③(T)



### Power limit

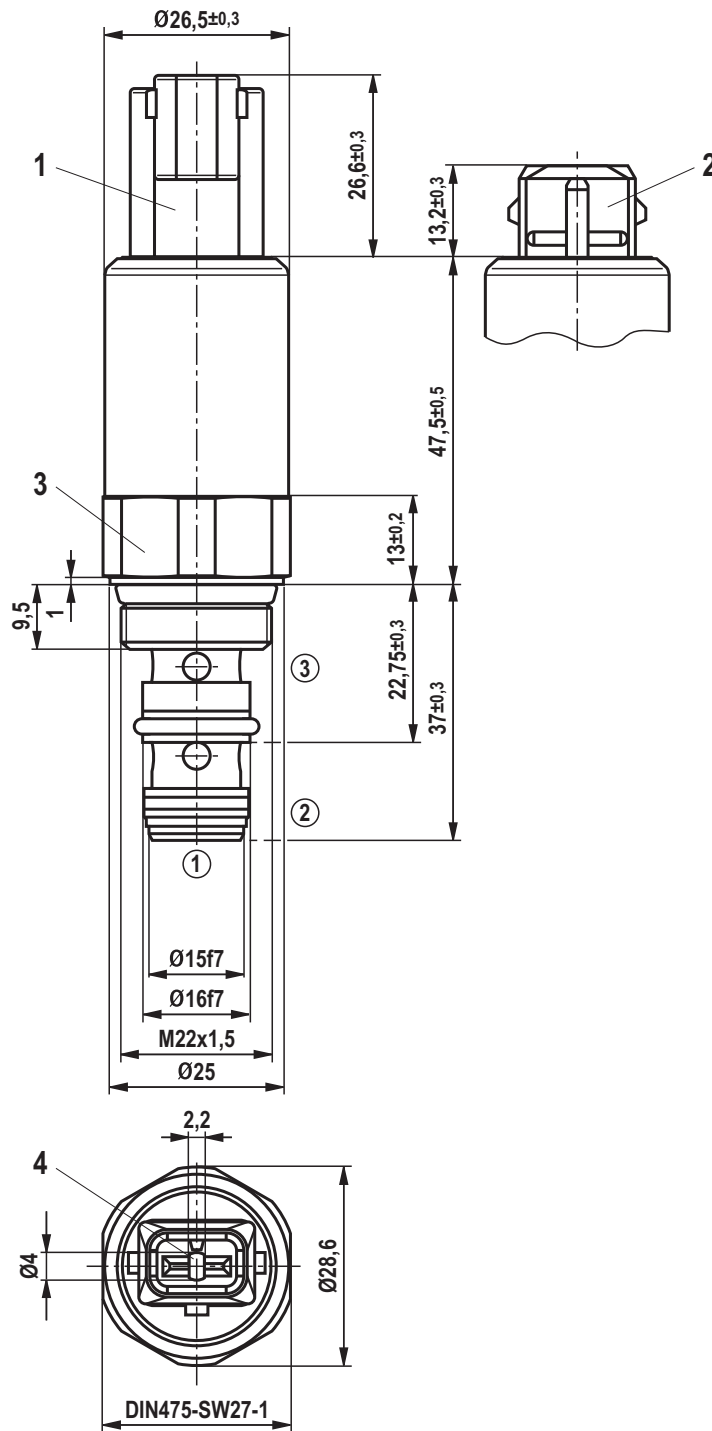


- 1 Main port ①(A) → ③(T)
- 2 Main port ②(P) → ①(A)

### Notice:

The power limit was determined when the solenoids were at operating temperature and at 10 % undervoltage.

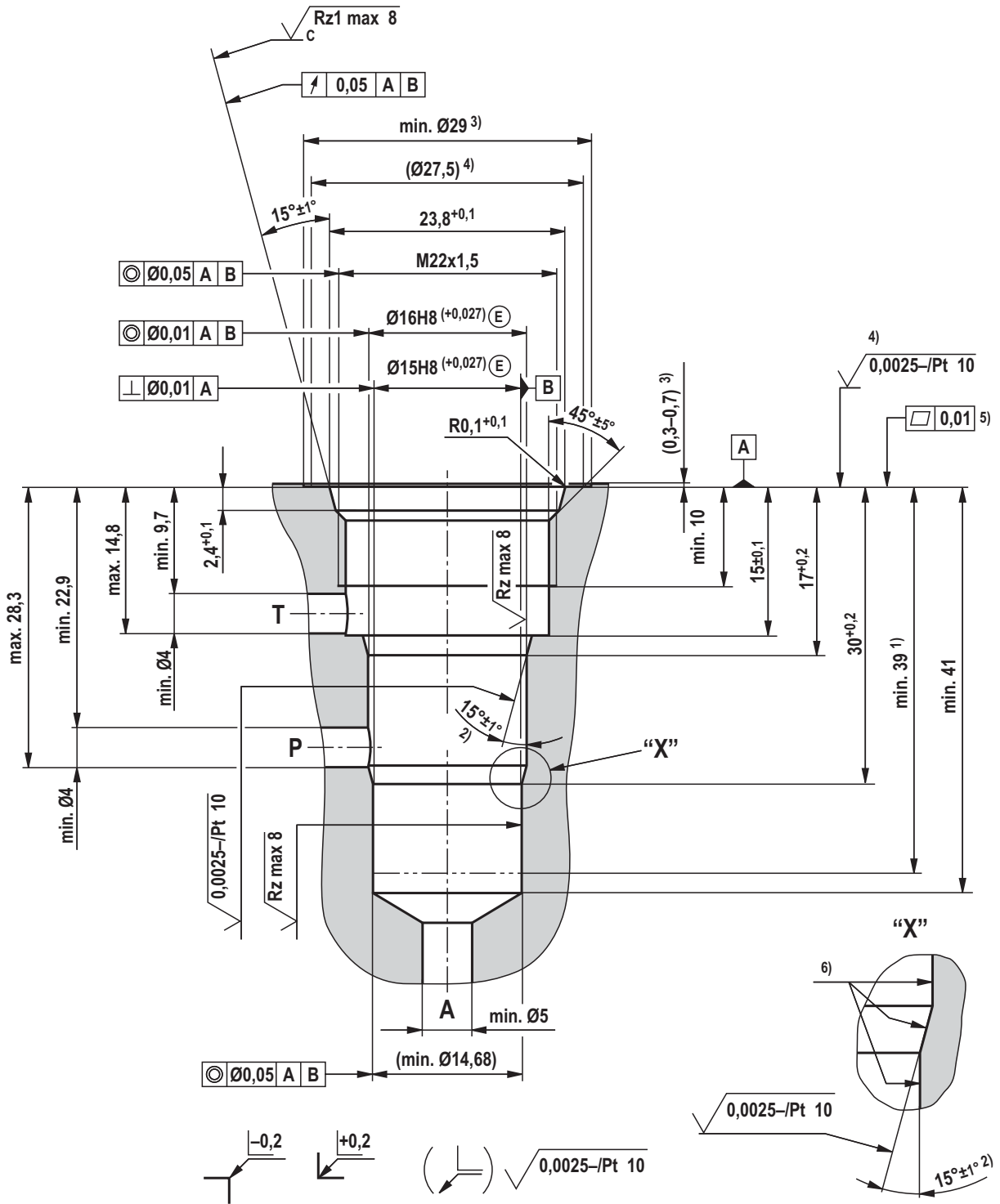
**Dimensions**  
(dimensions in mm)



- 1 Mating connector for connector “K40” (separate order, see data sheet 08006)
- 2 Mating connector for connector “C4” (separate order, see data sheet 08006)
- 3 Wrench size 27;  $M_A = 12^{+5} \text{ Nm}$
- 4 Manual override: Actuated via pin tool (to actuate the manual override the connector must be removed (version “C4” and “K40”). Maximum number of plug-in processes 10 (specification AMP 108-18013)).

- ① = main port 1 (A)
- ② = main port 2 (P)
- ③ = main port 3 (T)

**Mounting cavity**  
(dimensions in mm)

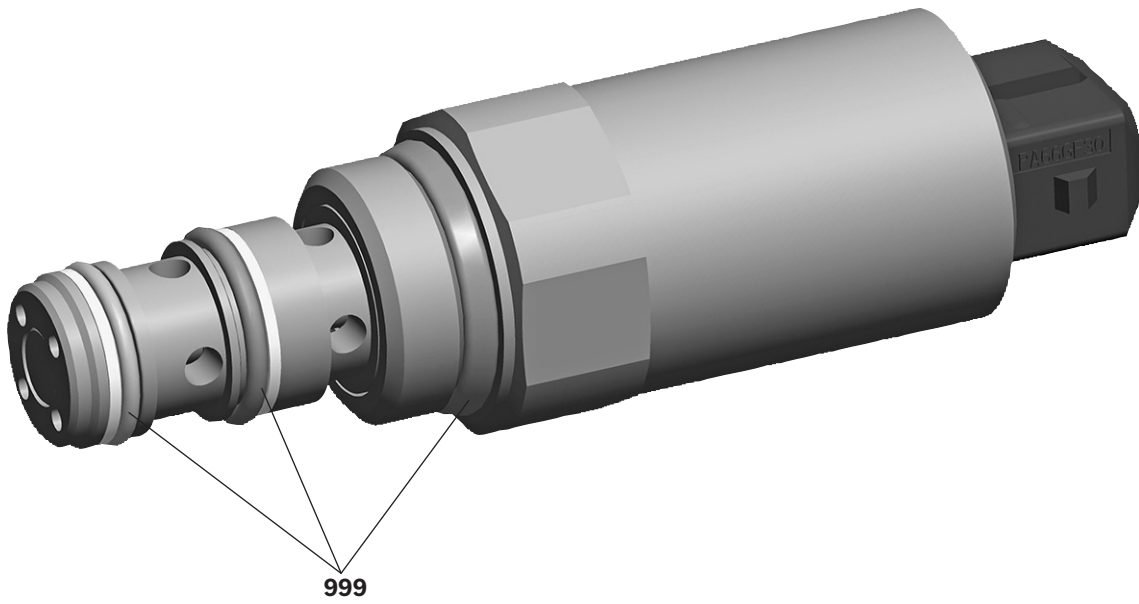


**Standards:**

Workpiece edges	ISO 13715
Form and position tolerance	ISO 1101
General tolerance for metal-cutting procedures	ISO 2768 (mK)
Tolerance	ISO 8015
Surface condition	ISO 1302

- 1) Depth of fit
- 2) All seal ring insertion faces are rounded and free of burrs
- 3) If counterbore depth >1 mm → counterbore Ø ≥33 mm
- 4) Required roughness up to Ø27.5 mm
- 5) Required evenness up to Ø27.5 mm
- 6) Entire contour finished with molding tool

## Available individual components



Item	Designation	Seal material	Material no.
999	Seal kit of the valve	FKM	R900846072

Seal kits with other seals on request.

## More information

- ▶ Hydraulic valves for mobile applications
- ▶ Mineral-oil-based hydraulic fluids
- ▶ Filter range

Data sheet 64020-B

Data sheet 90220

## Remote control manifolds

<b>Designation</b>	<b>Description</b>	<b>Cavity</b>	<b>Data sheet</b>	<b>Page</b>
Remote control manifold	HICFP		64663	1313



# Remote control plate

## Type HICFP



- ▶ Size 02, 04, and 06
- ▶ Component series 1X
- ▶ Maximum control pressure 30 bar
- ▶ Maximum flow 40 l/min

### Features

- ▶ Cost-effective solution variant for electro-hydraulic proportional control systems of mobile control blocks
- ▶ Separate accommodation of the electro-hydraulic devices in the accessible and protected area of the machine
- ▶ Easy retrofitting from hydraulic to electric control system
- ▶ Combines high performance and cost-effective design
- ▶ Different valve versions

### Contents

Features	1
Ordering code	2
Preferred types	3
Symbols	4 ... 6
Technical data	7, 8
Dimensions	9 ... 14
Circuit example	15
Available individual components	16
Further information	16

## Ordering code

01	02	03	04	05	06	07	08	09	10	11	12	13	14	
HIC	FP		-		-	AL	-	1X	/				V	*

01	Hydraulic Integrated Circuit	HIC
----	------------------------------	-----

02	Remote control plate	FP
----	----------------------	----

## Size

03	Size 02	02
	Size 04	04
	Size 06	06

## Frame size (Number of screw-in cartridge valves)

04	2 screw-in cartridge valves	02
	3 screw-in cartridge valves	03
	4 screw-in cartridge valves	04
	6 screw-in cartridge valves	06

## Type of connection

05	Threaded connection, flat-sealing according to DIN 3852-2	A
	Threaded connection, taper-sealing according to DIN EN ISO 6149	B
	Threaded connection UNF-2B ANSI B1.1 according to ISO 11926	D

## Manifold material

06	Aluminum	AL
----	----------	----

## Component series

07	Component series 10 ... 19 (10 ... 19: unchanged installation and connection dimensions)	1X
----	--	----

## Valve fitting

08	No valve fitting	XX/FTXX
	MHDRE 06	DR
	FTDRE 02 / 04	FTDR
	FTWE 02 / 04	FTWE
	FTMX <sup>3)</sup>	FTMX

## Maximum control pressure

09	18 bar	18
	30 bar <sup>4)</sup>	30
	Valve fitting WE	00

## Nominal voltage

10	DC 12 V	G12
	DC 24 V	G24

Manual override <sup>2)</sup>

11	Without manual override (preferred)	N0
	With manual override	N9

Electrical connection <sup>1)</sup>

12	Without mating connector, with connector plug DT 04-2PA (Deutsch connector)	K40
	Without mating connector, with connector plug AMP Junior-Timer	C4

## Seal material

13	FKM seals	V
----	-----------	---

14	Further details in the plain text	*
----	-----------------------------------	---

<sup>1)</sup> Mating connector (separate order) see data sheet 08006

<sup>3)</sup> SO variant (mixture of FTWE and FTDRE)

<sup>2)</sup> Manual override (N9) not available for BG 06.

<sup>4)</sup> FTDRE 02 upon request

Without manual override (N0) not available for FTWE.



## Preferred types

### 30 bar, standard is without manual override

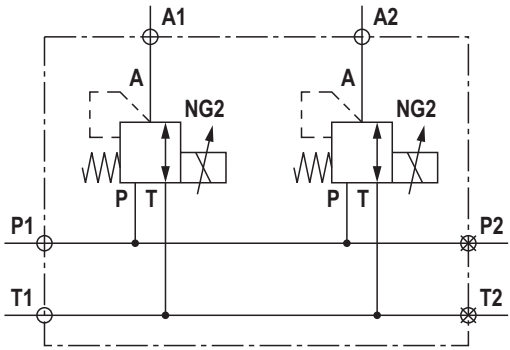
Frame size	24 V (K40; C4)		12 V (K40; C4)		not fitted	
	Type	Material no.	Type	Material no.	Type	Material no.
BG 02	30 bar upon request 18 bar in series 24 bar in series		30 bar upon request 18 bar in series 24 bar in series		HICFP02-2A-AL-1X/FTXX	R901434588
					HICFP02-3A-AL-1X/FTXX	R901434591
					HICFP02-4A-AL-1X/FTXX	R901434592
					HICFP02-6A-AL-1X/FTXX	R901434594

Frame size	24 V (K40; C4)		12 V (K40; C4)		not fitted	
	Type	Material no.	Type	Material no.	Type	Material no.
BG 04	HICFP04-2A-AL-1X/FTDR30G24N0K40V	R901434345	HICFP04-2A-AL-1X/FTDR30G12N0K40V	R901434370	HICFP04-2A-AL-1X/FTXX	R901426715
	HICFP04-3A-AL-1X/FTDR30G24N0K40V	R901434346	HICFP04-3A-AL-1X/FTDR30G12N0K40V	R901434371	HICFP04-3A-AL-1X/FTXX	R901434343
	HICFP04-4A-AL-1X/FTDR30G24N0K40V	R901182076	HICFP04-4A-AL-1X/FTDR30G12N0K40V	R901434372	HICFP04-4A-AL-1X/FTXX	R901415571
	HICFP04-6A-AL-1X/FTDR30G24N0K40V	R901182153	HICFP04-6A-AL-1X/FTDR30G12N0K40V	R901434373	HICFP04-6A-AL-1X/FTXX	R901415575

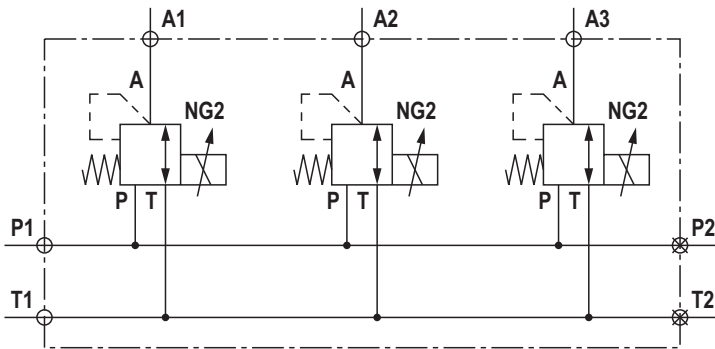
Frame size	24 V (K40; C4)		12 V (K40; C4)		not fitted	
	Type	Material no.	Type	Material no.	Type	Material no.
BG 06	HICFP06-2A-AL-1X/DR30G24N0K40V	R901391736	HICFP06-2A-AL-1X/DR30G12N0K40V	R901434490	HICFP06-2A-AL-1X/XX	R901267591
	HICFP06-3A-AL-1X/DR30G24N0K40V	R901434562	HICFP06-3A-AL-1X/DR30G12N0K40V	R901434492	HICFP06-3A-AL-1X/XX	R901434483
	HICFP06-4A-AL-1X/DR30G24N0K40V	R901420952	HICFP06-4A-AL-1X/DR30G12N0K40V	R901434493	HICFP06-4A-AL-1X/XX	R901434484
	HICFP06-6A-AL-1X/DR30G24N0K40V	R901368620	HICFP06-6A-AL-1X/DR30G12N0K40V	R901434494	HICFP06-6A-AL-1X/XX	R901434485

**Symbols: Size 02**

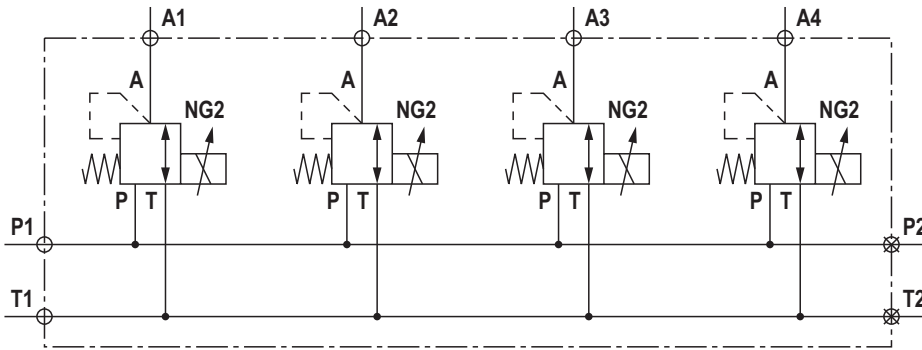
**2-fold fitting HICFP02-2./FT**



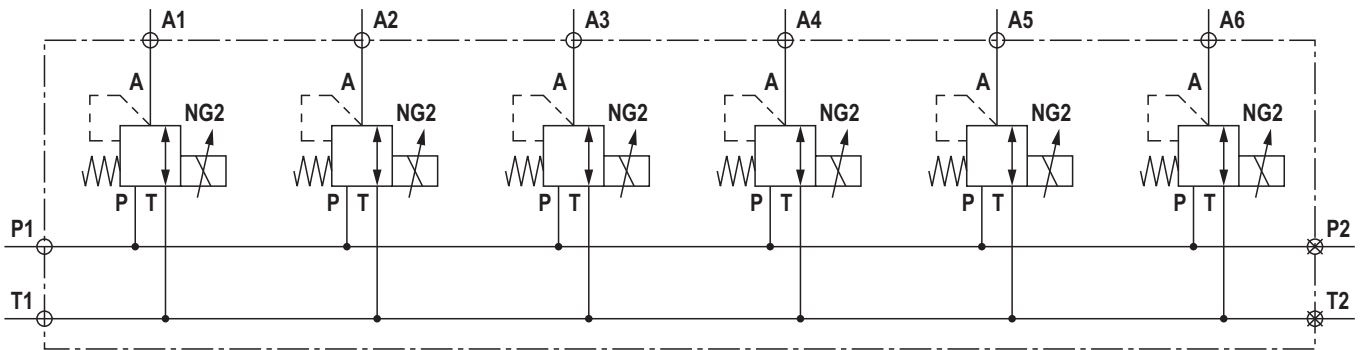
**3-fold fitting HICFP02-3./FT**



**4-fold fitting HICFP02-4./FT**

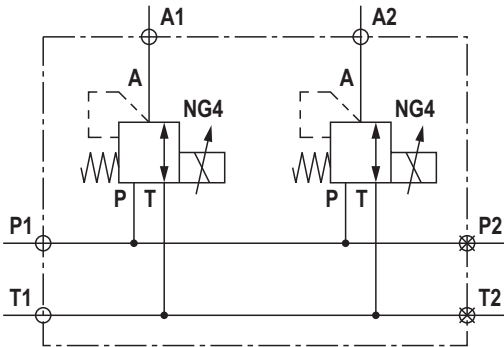


**6-fold fitting HICFP02-6./FT**

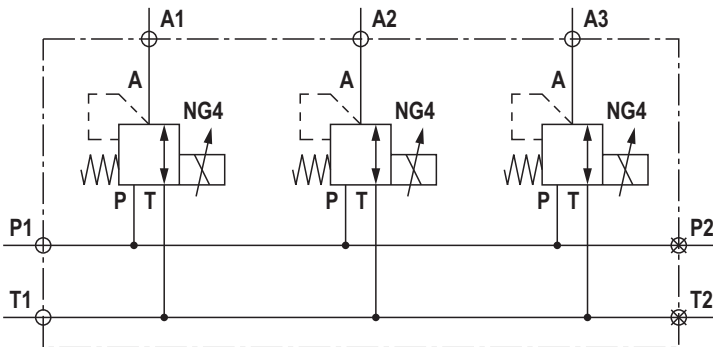


**Symbols: Size 04**

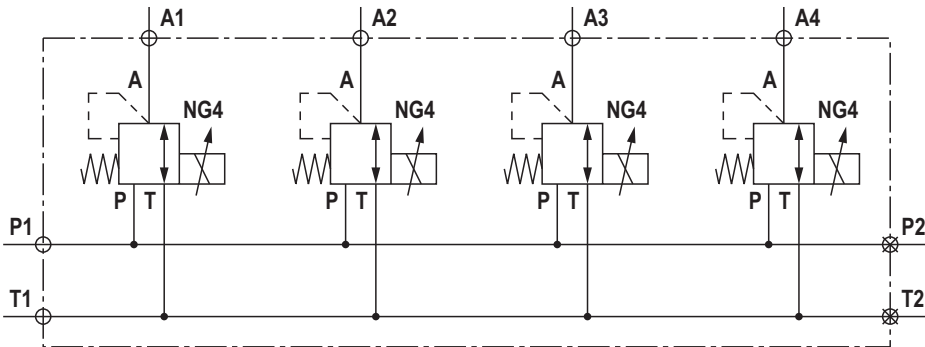
**2-fold fitting HICFP04-2./FT**



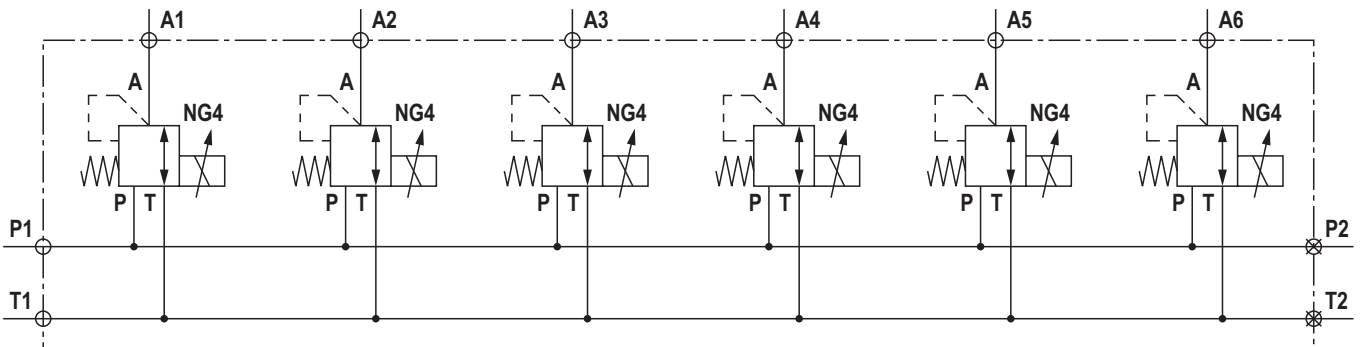
**3-fold fitting HICFP04-3./FT**



**4-fold fitting HICFP04-4./FT**

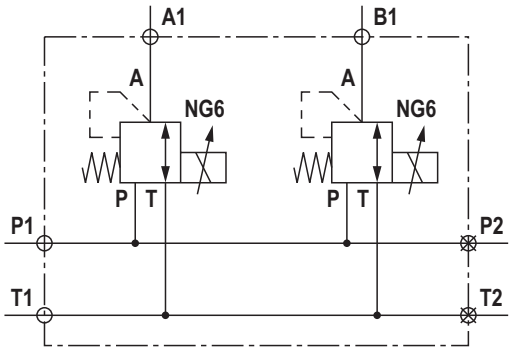


**6-fold fitting HICFP04-6./FT**

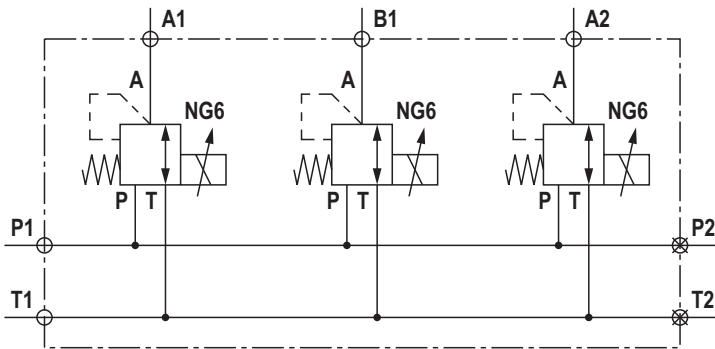


**Symbols: Size 06**

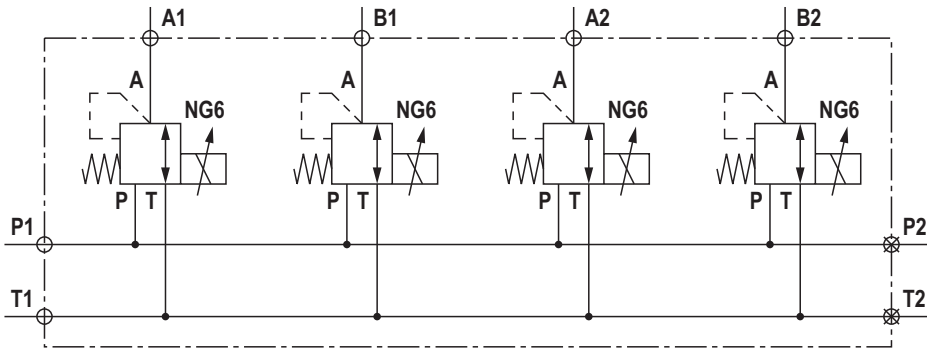
**2-fold fitting HICFP06-2**



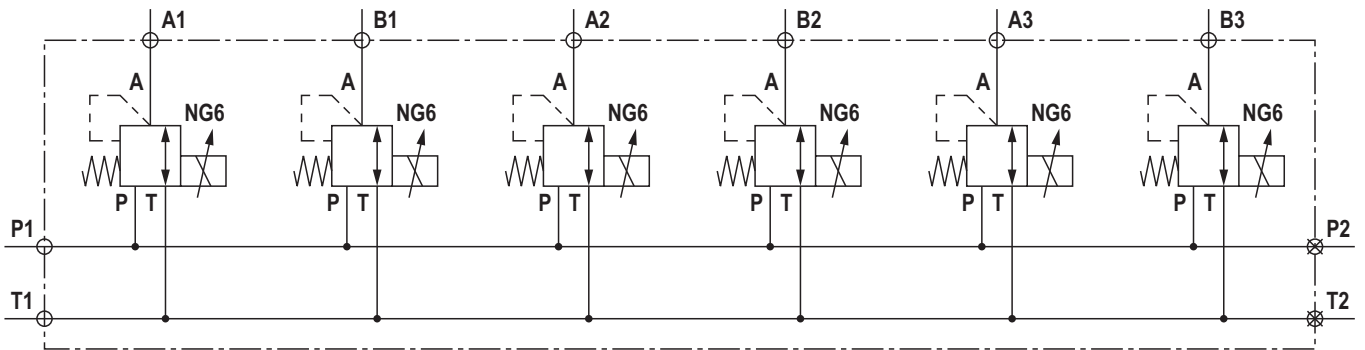
**3-fold fitting HICFP06-3**



**4-fold fitting HICFP06-4**



**6-fold fitting HICFP06-6**



## Technical data

(For application outside these values, please consult us!)

general				
Valve type		FTDRE		MHDRE
Size	NG	02	04	06
Weight	kg	Page 9 ... 14		
Installation position		Any - if it is ensured that no air can collect upstream the valves. Otherwise we recommend mounting the remote control plate in a position with hanging valves.		
Ambient temperature range		See "Voltage tolerance" in the data sheets of the screw-in cartridge valves <sup>1)</sup>		
Storage temperature range	°C	-30 ... +80		

hydraulic				
Maximum control pressure ▶ Main port ① (A1, A2, A3)	bar	18; 30		
Maximum inlet pressure ▶ Main port ① (P1, P2)	bar	100	100	100
Maximum counter pressure ▶ Main port ① (T1, T2)	bar	Depressurized recommended (occurring tank pressures add up to the control pressure of the screw-in cartridge valves); depressurized up to a maximum of:		
	bar	30	30	100
Maximum flow	l/min	See data sheets of the screw-in cartridge valves <sup>1)</sup>		
Hydraulic fluid		See table below		
Hydraulic fluid temperature range	°C	-30 ... +100	-30 ... +100	-30 ... +100
Viscosity range	mm <sup>2</sup> /s	10 ... 380	10 ... 380	10 ... 380
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness class according to ISO 4406 (c)		See data sheets of the screw-in cartridge valves <sup>1)</sup>		
Hysteresis (within tolerance band)	bar	See data sheets of the screw-in cartridge valves <sup>1)</sup>		
Step response	ms	See data sheets of the screw-in cartridge valves <sup>1)</sup>		
Repetition accuracy	%	See data sheets of the screw-in cartridge valves <sup>1)</sup>		
Load cycles ▶ Valves	Million	5	5	10
Strainer element at the main port ② "P" of the screw-in cartridge valves	µm	160	160	250

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524
Bio-degradable ▶ Insoluble in water	HETG	NBR, FKM	ISO 15380
	HEES	FKM	
▶ Soluble in water	HEPG	FKM	ISO 15380

### Important notices on hydraulic fluids:

- ▶ For more information and data on the use of other hydraulic fluids, please refer to data sheet 90220 or contact us!
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.
- ▶ **Bio-degradable:** When using bio-degradable hydraulic fluids that are zinc-soluble, zinc may accumulate in the fluid (700 mg zinc per pole tube).

<sup>1)</sup> Proportional pressure reducing valves

- ▶ Type FTDRE 02 according to data sheet 58032
- ▶ Type FTDRE 04 according to data sheet 58038
- ▶ Type MHDRE 06 according to data sheet 64655

**Technical data**

(For application outside these values, please consult us!)

<b>electric</b>								
Valve type		<b>FTDRE</b>		<b>MHDRE</b>	<b>FTDRE</b>		<b>MHDRE</b>	
Size	NG	<b>02</b>	<b>04</b>	<b>06</b>	<b>02</b>	<b>04</b>	<b>06</b>	
Supply voltage	V	<b>12 DC</b>			<b>24 DC</b>			
Voltage type		Direct voltage						
Maximum control current	▶ 18 bar	mA	1800	1800	1450	800	800	700
	▶ 30 bar	mA	1900			850		
Coil resistance (cold value at 20 °C)	Ω	2.4		5	12		22.5	
Duty cycle	%	100 (see characteristic curves in data sheets)						
Maximum coil temperature <sup>1)</sup>	°C	150		185	150		185	
Protection class according to VDE 0470-1 (DIN EN 60529), DIN 40050-9	▶ Version "C4"	See data sheets of the screw-in cartridge valves						
	▶ Version "K40"	See data sheets of the screw-in cartridge valves						
Control electronics (separate order)		Analog amplifier type RA... (Data sheet 95230) BODAS control unit type RC.. (Data sheet 95200)						
Recommended sealer frequency (PWM) Chopper frequency (recommended) <sup>2)</sup>	Hz	150	200	150	150	200	150	
Design		According to VDE 0580						

<sup>1)</sup> Due to the surface temperatures of the solenoid coils, the standards ISO 13732-1 and ISO 4413 need to be adhered to!

<sup>2)</sup> The chopper frequency is to be optimized depending on the application. In this regard, observe the working temperature range of the application.

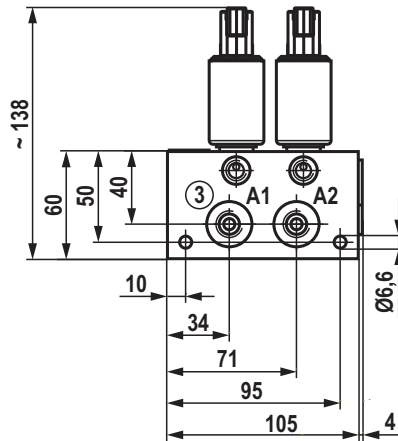
**Notice:**

- ▶ The technical data were determined at a viscosity of 46 mm<sup>2</sup>/s (HLP46; 40 °C).
- ▶ You can find further information on the correct handling of Rexroth hydraulic products in data sheet 64020-B, "Hydraulic valves for mobile applications - General information".

**Dimensions: Size 02**  
(dimensions in mm)

**2-fold fitting**  
HICFP02-2./FT

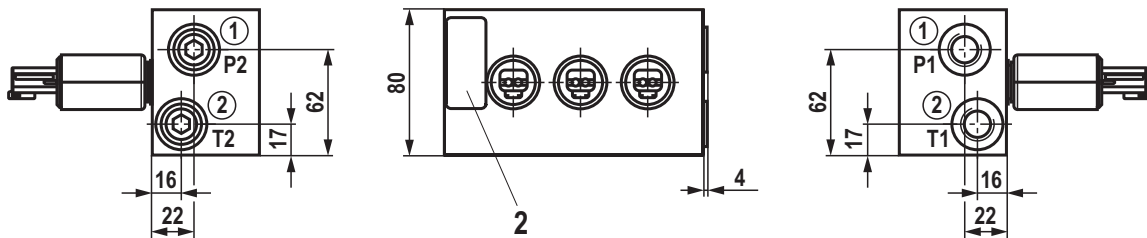
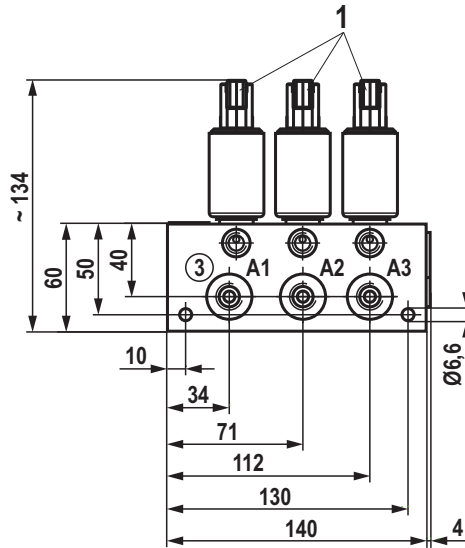
Weight approx. 1.8 kg



Type of connection A, connections DIN 3852-2	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6
Type of connection B, connections ISO 6149	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6
Type of connection D, connections ISO 11926	
3/4-16 UNF	P1, T1, P2, T2
9/16-18 UNF	A1, A2, A3, A4, A5, A6

**3-fold fitting**  
HICFP02-3./FT

Weight approx. 2.6 kg



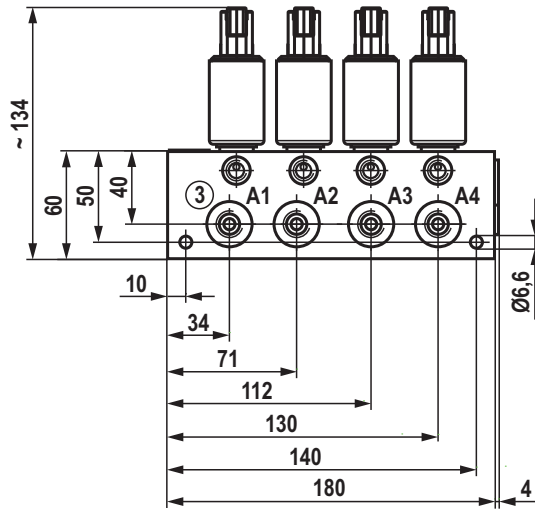
- 1 Proportional pressure reducing valves
  - ▶ Type FTDRE 02 according to data sheet 58032
  - ▶ Type FTDRE 04 according to data sheet 58038
  - ▶ Type MHDRE 06 according to data sheet 64655
  - ▶ Type FTWE 02 according to data sheet 58007
  - ▶ Type FTWE 04 according to data sheet 58008
- 2 Name plate

- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A1, B1, A2, ...)

**Dimensions: Size 02**  
(dimensions in mm)

**4-fold fitting**  
HICFP02-4./FT

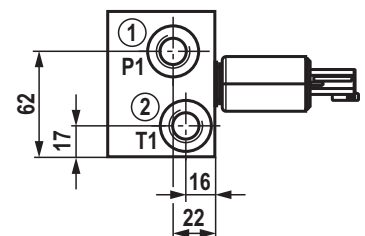
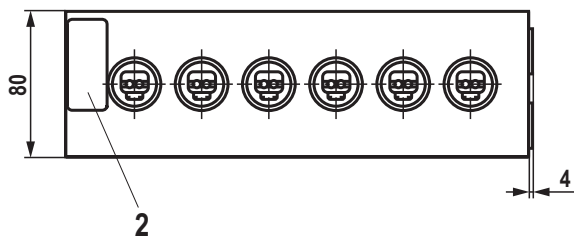
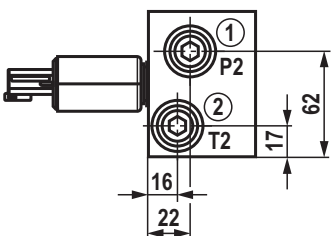
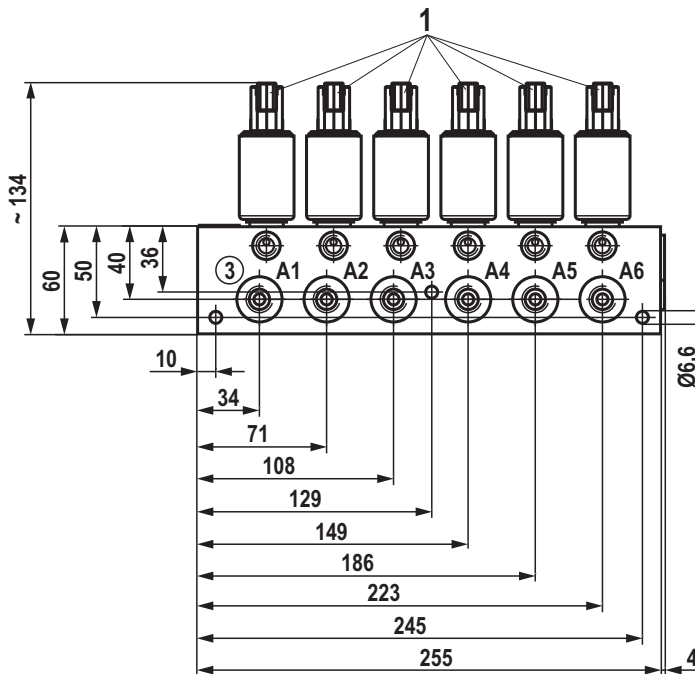
Weight approx. 3.2 kg



Type of connection A, connections DIN 3852-2	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6
Type of connection B, connections ISO 6149	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6
Type of connection D, connections ISO 11926	
3/4-16 UNF	P1, T1, P2, T2
9/16-18 UNF	A1, A2, A3, A4, A5, A6

**6-fold fitting**  
HICFP02-6./FT

Weight approx. 4.6 kg



- 1 Proportional pressure reducing valves
  - ▶ Type FTDRE 02 according to data sheet 58032
  - ▶ Type FTDRE 04 according to data sheet 58038
  - ▶ Type MHDRE 06 according to data sheet 64655
  - ▶ Type FTWE 02 according to data sheet 58007
  - ▶ Type FTWE 04 according to data sheet 58008
- 2 Name plate

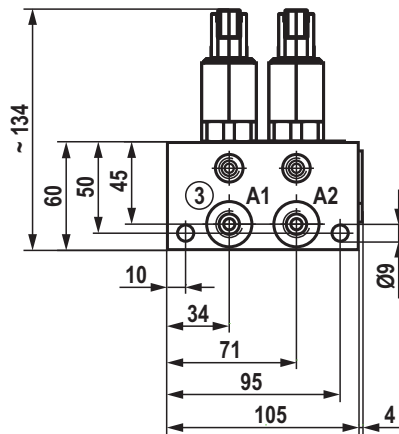
- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A1, B1, A2, ...)



**Dimensions: Size 04**  
(dimension in mm)

**2-fold fitting**  
HICFP04-2./FT

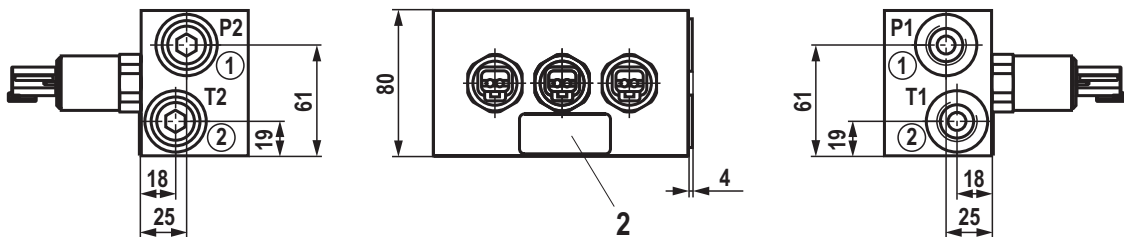
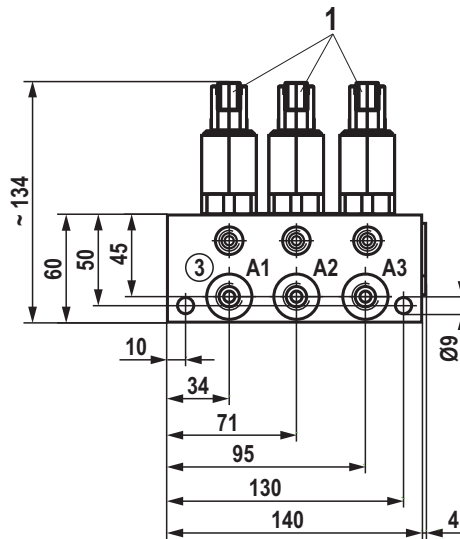
Weight approx. 1.8 kg



Type of connection A, connections DIN 3852-2	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6
Type of connection B, connections ISO 6149	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6
Type of connection D, connections ISO 11926	
3/4-16 UNF	P1, T1, P2, T2
9/16-18 UNF	A1, A2, A3, A4, A5, A6

**3-fold fitting**  
HICFP04-3./FT

Weight approx. 2.6 kg



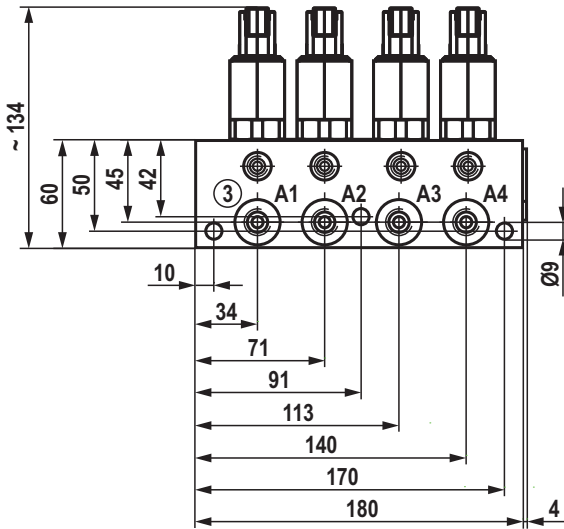
- 1 Proportional pressure reducing valves
  - ▶ Type FTDRE 02 according to data sheet 58032
  - ▶ Type FTDRE 04 according to data sheet 58038
  - ▶ Type MHDRE 06 according to data sheet 64655
  - ▶ Type FTWE 02 according to data sheet 58007
  - ▶ Type FTWE 04 according to data sheet 58008
- 2 Name plate

- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A1, B1, A2, ...)

**Dimensions: Size 04**  
(dimension in mm)

**4-fold fitting**  
HICFP04-4./FT

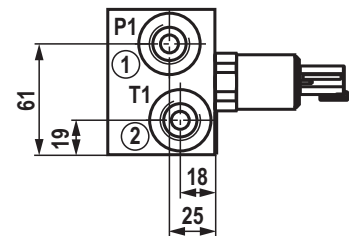
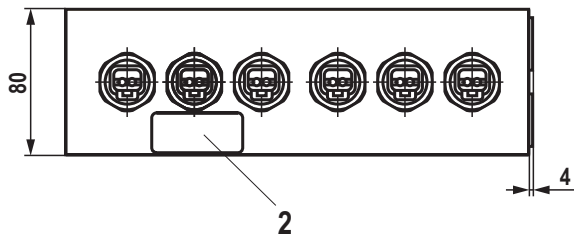
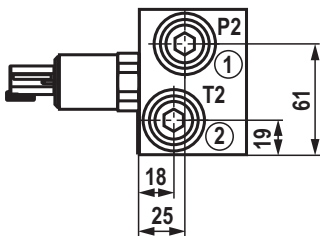
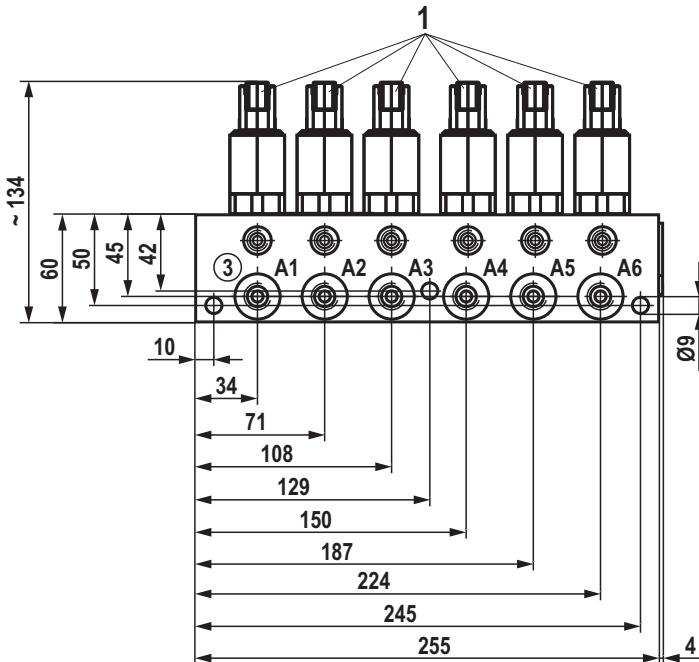
Weight approx. 3.2 kg



Type of connection A, connections DIN 3852-2	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6
Type of connection B, connections ISO 6149	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6
Type of connection D, connections ISO 11926	
3/4-16 UNF	P1, T1, P2, T2
9/16-18 UNF	A1, A2, A3, A4, A5, A6

**6-fold fitting**  
HICFP04-6./FT

Weight approx. 4.6 kg



- 1** Proportional pressure reducing valves
- ▶ Type FTDRE 02 according to data sheet 58032
  - ▶ Type FTDRE 04 according to data sheet 58038
  - ▶ Type MHDRE 06 according to data sheet 64655
  - ▶ Type FTWE 02 according to data sheet 58007
  - ▶ Type FTWE 04 according to data sheet 58008

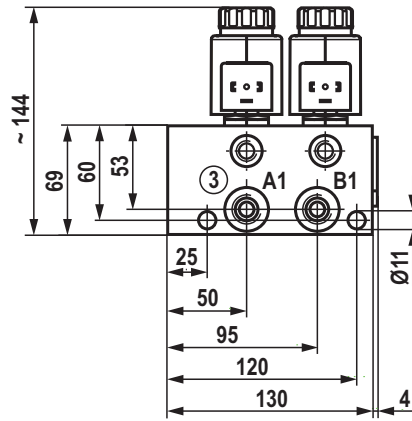
- ① = Main port 1 (P)  
 ② = Main port 2 (T)  
 ③ = Main port 3 (A1, B1, A2, ...)

**2** Name plate

**Dimensions: Size 06**  
(dimension in mm)

**2-fold fitting**  
**HICFP06-2**

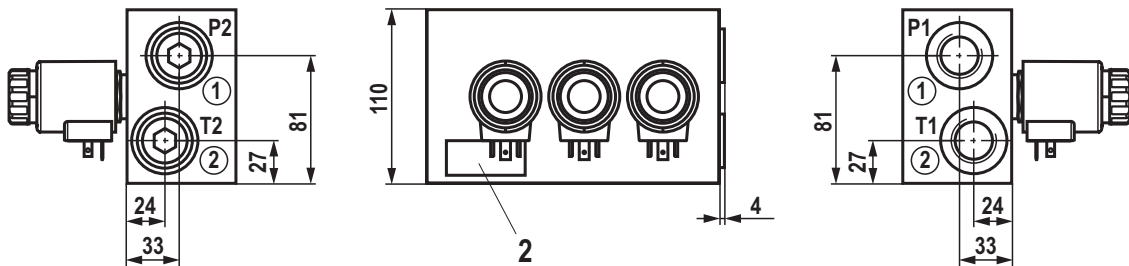
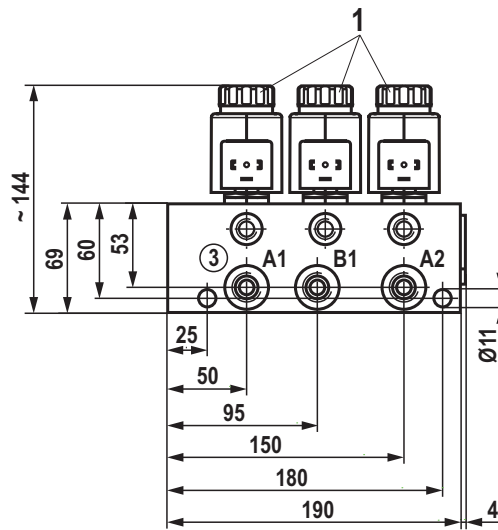
**Weight approx. 3.9 kg**



Type of connection A, connections DIN 3852-2	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6
Type of connection B, connections ISO 6149	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6

**3-fold fitting**  
**HICFP06-3**

**Weight approx. 5.6 kg**



- 1** Proportional pressure reducing valves
  - ▶ Type FTDRE 02 according to data sheet 58032
  - ▶ Type FTDRE 04 according to data sheet 58038
  - ▶ Type MHDRE 06 according to data sheet 64655
  - ▶ Type FTWE 02 according to data sheet 58007
  - ▶ Type FTWE 04 according to data sheet 58008

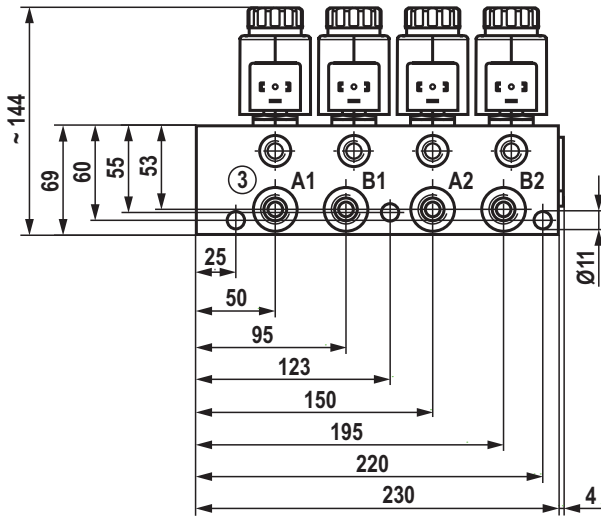
- ① = Main port 1 (P)
- ② = Main port 2 (T)
- ③ = Main port 3 (A1, B1, A2, ...)

- 2** Name plate

**Dimensions: Size 06**  
(dimension in mm)

**4-fold fitting**  
**HICFP06-4**

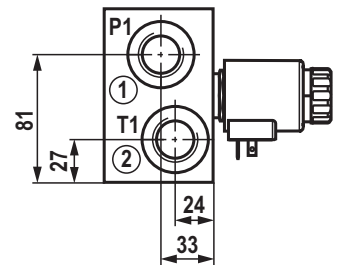
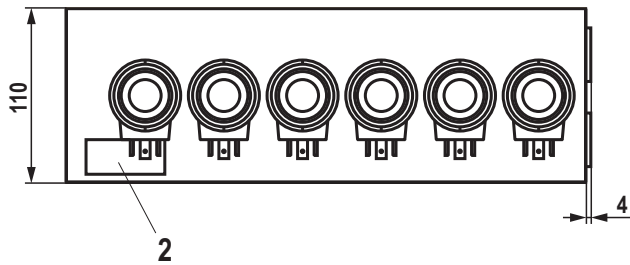
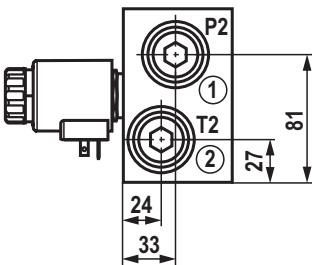
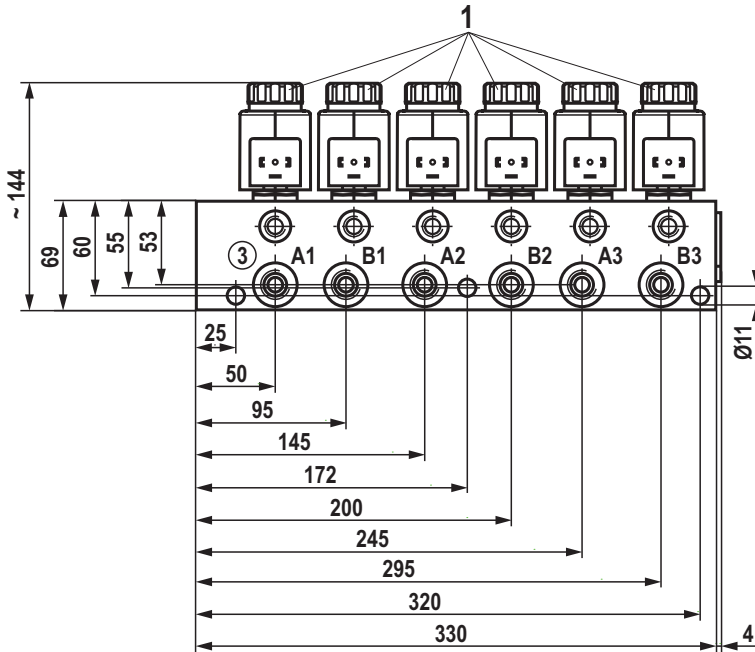
**Weight approx.**  
**7.3 kg**



Type of connection A, connections DIN 3852-2	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6
Type of connection B, connections ISO 6149	
G1/2	P1, T1, P2, T2
G1/4	A1, A2, A3, A4, A5, A6

**6-fold fitting**  
**HICFP06-6**

**Weight approx.**  
**10.6 kg**

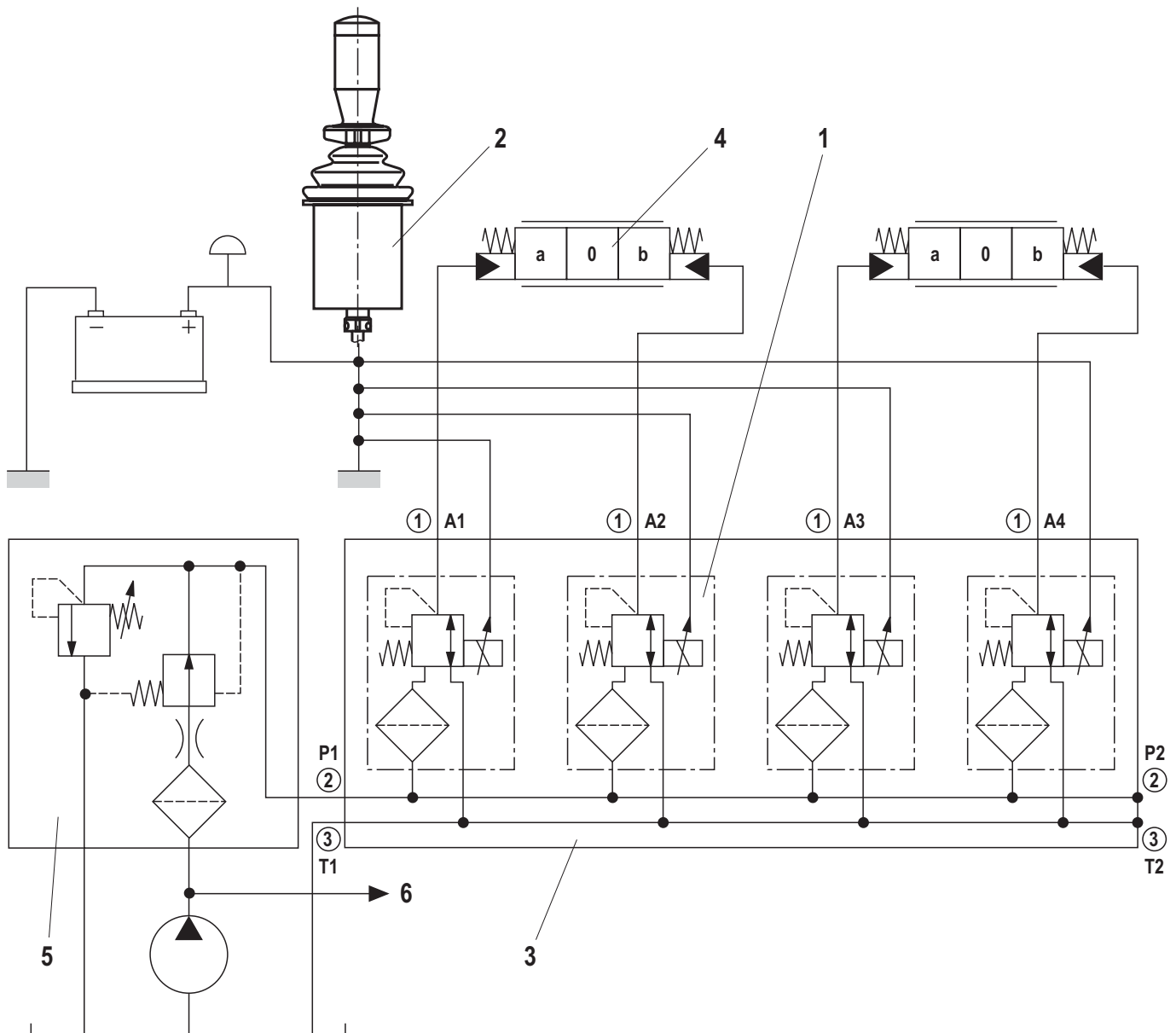


- 1** Proportional pressure reducing valves
- ▶ Type FTDRE 02 according to data sheet 58032
  - ▶ Type FTDRE 04 according to data sheet 58038
  - ▶ Type MHDRE 06 according to data sheet 64655
  - ▶ Type FTWE 02 according to data sheet 58007
  - ▶ Type FTWE 04 according to data sheet 58008

- ① = Main port 1 (P)  
 ② = Main port 2 (T)  
 ③ = Main port 3 (A1, B1, A2, ...)

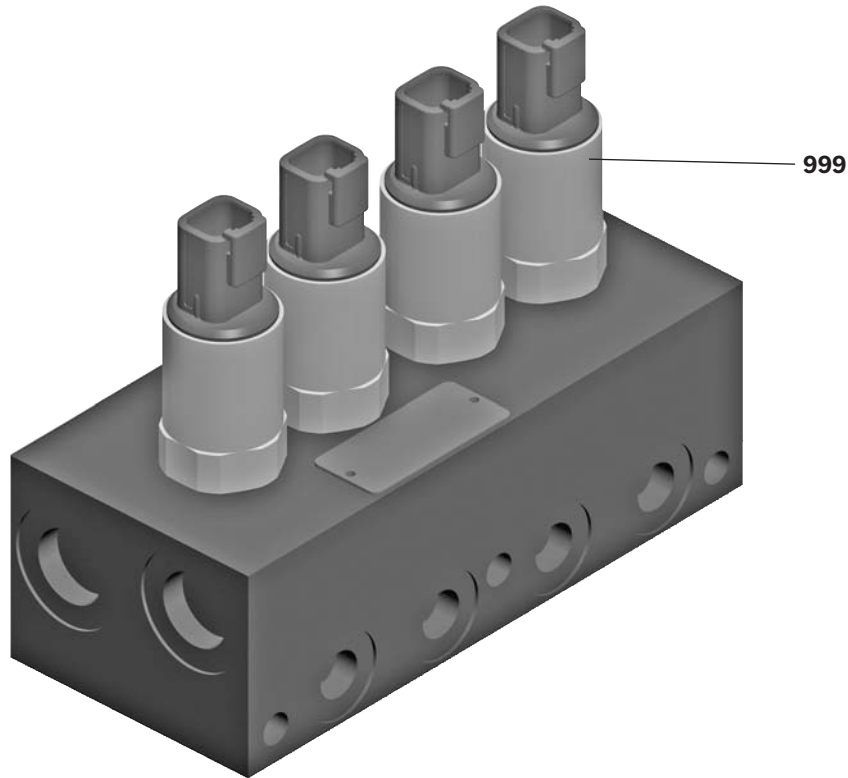
**2** Name plate

## Circuit example



- 1 Proportional pressure reducing valves  
Type MHDRE 06 according to data sheet 64655
- 2 Electronic remote control and modules (see overview  
according to data sheet 64013)
- 3 Remote control plate HICFP
- 4 Directional valve, hydraulically actuated
- 5 Pilot oil supply system (not included in the scope of delivery)
- 6 Work hydraulics

## Available individual components



### Example

Item	Denomination	Data sheet no. NG02
999	Proportional pressure reducing valve	58032

## Further information

- ▶ Proportional pressure reducing valve type FTDRE 02 Data sheet 58032
- ▶ Proportional pressure reducing valve type FTDRE 04 Data sheet 58038
- ▶ Proportional pressure reducing valve type MHDRE 06 Data sheet 64655
- ▶ Proportional pressure reducing valve type FTWE 02 Data sheet 58007
- ▶ Proportional pressure reducing valve type FTWE 04 Data sheet 58008
- ▶ BODAS control unit RC Data sheet 95200
- ▶ Analog amplifier RA Data sheet 95230
- ▶ Hydraulic valves for mobile applications Data sheet 64020-B
- ▶ Hydraulic fluids on mineral oil basis Data sheet 90220
- ▶ Selection of the filters

## Manifolds with mechanical cartridges

Designation	Description	Code	Data sheet	Page
Relief, direct acting (guided) poppet type	VSAN-08A-C / VSNB-08A-C	OR01KXYZW	18330-01	1331
Relief, direct acting guided poppet type	VSNB-10A-C	OR02KXYZW	18330-02	1335
Relief, direct acting poppet type differential area	VSDN-08A-C	OR12KXYZW	18330-10	1339
Relief, direct acting poppet type differential area	VSDN-10A-C	OR13KXYZW	18330-11	1343
Relief, bi-directional direct acting poppet type differential area	VSNG-10A-C	OR03KXYZW	18330-03	1347
Relief, pilot operated spool type	VSPN-C	OR04KXYZW	18330-04	1351
Relief, pilot operated poppet type	VSPC-10A-C	OR05KXYZW	18330-05	1355
Relief, pilot operated spool type external drain	VSPY-10A-C / VSPY-12A-C	OR06KXYZW	18330-06	1359
Pressure reducing and relieving, direct acting spool type	VRPR-C	OR08KXYZW	18330-08	1363
Pressure reducing, pilot operated spool type	VRPP-C	OR07KXYZW	18330-07	1367
Pressure reducing and relieving, pilot operated spool type	VRPX-10A-C	OR09KXYZW	18330-09	1371
Check poppet type	VUCN-08A-C	OU01K00YZW	18330-40	1375
Check poppet type	VUCN-C	OU02K00YZW	18330-41	1379
Pilot operated check, pilot to open	VSON-C	OY01KXYZW	18330-70	1383
Dual pilot operated check	VSO-DE-C	2Y01KXYZW	18330-71	1387
Counterbalance, standard poppet type	VBSN-C	OY02KXYZW	18330-72	1391
Dual counterbalance, standard poppet type	VBSN-DE-C	2Y02KXYZW	18330-73	1395
Counterbalance, relief compensated poppet type	VBSP-C	OY03KXYZW	18330-74	1399
Dual counterbalance, relief compensated poppet type	VBSP-DE-C	2Y03KXYZW	18330-75	1403
Counterbalance, vented guided poppet type	VBST-C	OY04KXYZW	18330-76	1407
Dual counterbalance, vented guided poppet type	VBST-DE-C	2Y04KXYZW	18330-77	1411

## Manifolds with machanical cartridges

Designation	Description	Code	Data sheet	Page
Flow control, restrictor	ST-C-06-C	ON01KXY00W	18331-01	1415
Flow control, restrictor	ST-C-C	ON02KXY00W	18331-02	1419
Needle restrictor, free reverse flow	STVU-08A	ON03KXY00W	18331-03	1423
Needle restrictor, free reverse flow	STVU-10A	ON09KXY00W	18331-04	1427
Flow control, 2-way pressure compensated fully adjustable	VRFB-10A-C / VRFE-12A-C	ON05KXYZW	18331-05	1431
Flow control, 3-way pressure compensated combination type partially adjustable	VRFC-10A-C	ON10KXYZW	18331-10	1435
Flow control, 3-way pressure compensated combination type fully adjustable	VRFD-10A-C / VRFD-12A-C	ON06KXYZW	18331-06	1439
Flow divider	DSDN-C	ON07K00YZW	18331-07	1443
Flow divider and combiner	DRFN-C	ON08K00YZW	18331-08	1447
Logic element, flow and pressure control, with internal pilot	VLSP-C	OU09K00YZW	18330-46	1451
Logic element, pressure compensator with static load sense	VRLA-S-C	OU06K00YZW	18330-43	1455
Logic element, pressure compensator with dynamic load sense	VRLA-D-C	OU05K00YZW	18330-42	1459
Directional spool type, direct acting external pilot, external vent	VDSD-C	OU07K00YZW	18330-44	1463
Directional spool type, direct acting external pilot, internal vent	VDSH-C	OU08K00YZW	18330-45	1467
Relief, direct acting guided poppet type special cavity	VSC-30	051301XYZ	18331-40	1471
Relief, direct acting guided poppet type special cavity	VSC-80	051302XYZ	18331-41	1475
Relief, direct acting poppet type differential area special cavity	VSDC-350	051204XYZ	18331-43	1479
Relief, direct acting poppet type pressure compensated special cavity	VSC-30-CC	OR1027XYZ	18331-44	1483



# Relief, direct acting (guided) poppet type

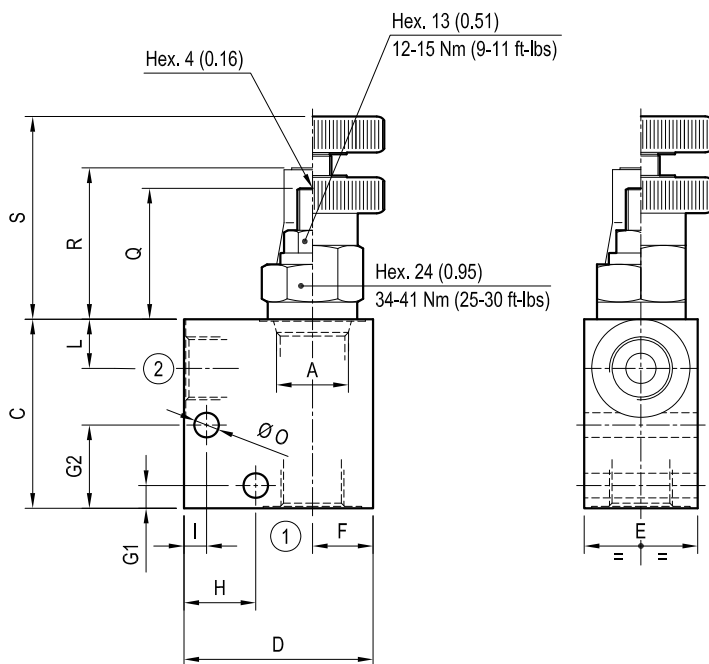
Common cavity

Cartridge style in manifold

VSAN-08A-C / VSBN-08A-C

OR.01 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow:	up to 20 l/min	(5 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

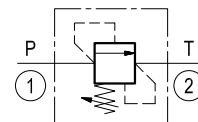
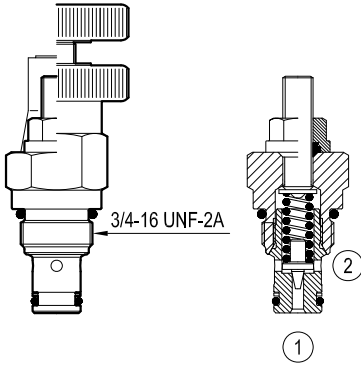


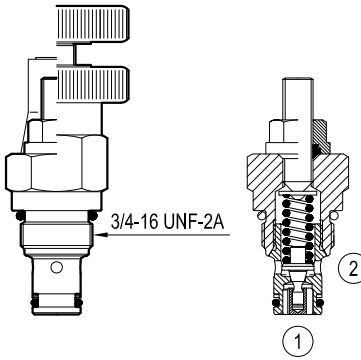
Table "Y"

Cavity	Y	PORT SIZE	Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
				C	D	E	F	G1	G2	H	I	L	O	Q	R	S
A		1 - 2		50 (1.97)	50 (1.97)	30 (1.18)	16 (0.63)	6 (0.24)	22 (0.87)	19 (0.75)	6 (0.24)	13 (0.51)	6.5 (0.26)	35.5 (1.4)	40 (1.58)	54 (2.13)
SIZE	09	G 1/4	up to 20 (5)	50 (1.97)	50 (1.97)	30 (1.18)	16 (0.63)	6 (0.24)	22 (0.87)	19 (0.75)	6 (0.24)	13 (0.51)	6.5 (0.26)			
08	02	G 3/8		50 (1.97)	50 (1.97)	30 (1.18)	16 (0.63)	6 (0.24)	22 (0.87)	19 (0.75)	6 (0.24)	13 (0.51)	6.5 (0.26)			

**Cartridge style**



**K = 48**  
Especially suited for pilot or thermal relief applications.  
**SIZE 08**







**K = 49**  
Designed to provide enhanced stability at all flows and pressures.  
**SIZE 08**

**Table "K"**

			K				
CARTRIDGE CODE	04	11	48	X	56	Z	VSAN-08A
	04	11	49	X	56	Z	VSBN-08A

**Table "X"**

X	ADJUSTMENTS	OPTIONS
<b>03</b>	Leakproof hex. socket screw 	 Ordering code X=03 11.04.23.002 X=73 11.04.23.004
<b>04</b>	Handknob and locknut 	
<b>73</b>	O-Ring seal on adjust screw 	

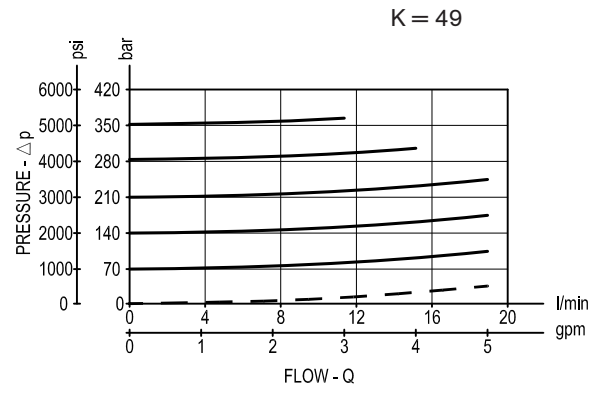
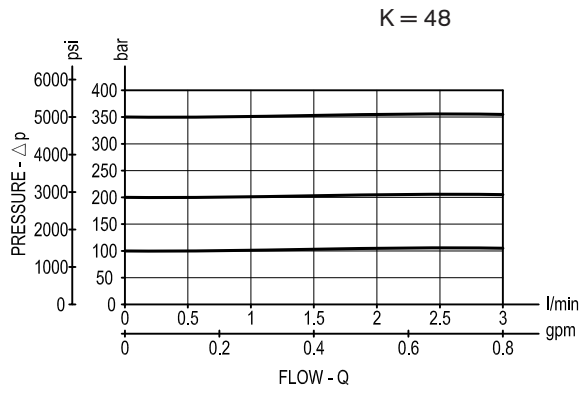
**CARTRIDGE TECHNICAL DATA**

Common cavity: **CA-08A-2N**  
For other details see data sheet RE 18318-01 and RE 18318-04

**Table "Z"**

Z	SPRINGS																					
	K=48 type			K=49 type																		
	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 1 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)																
X=03	05			10-70 (145-1000)	26 (375)	50 (725)																
	10	35-140 (500-2000)	48 (696)	100 (1450)	35-140 (500-2000)	50 (725)	100 (1450)															
	20	105-210 (1500-3000)	88 (1276)	200 (2900)	105-210 (1500-3000)	79 (1145)	200 (2900)															
	35	140-420 (2000-6000)	140 (2030)	350 (5000)	175-350 (2500-5000)	170 (2465)	350 (5000)															
X=04	10																					
	20																					
	35	35-350 (500-5000)	68 (986)	350 (5000)	35-350 (500-5000)	72 (1044)	200 (2900)															
X=73	35	35-350 (500-5000)	68 (986)	350 (5000)	35-350 (500-5000)	72 (1044)	200 (2900)															

Performance graphs



## Ordering code

OR.01	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with relief direct acting (guided) poppet type**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Adjustments  
(see table X on page 2)

**Manifold material**

= 00 Aluminium manifold

= S0 Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

## Preferred types (readily available)

Type	Material number
OR0148030210S0	R934001560
OR0148030220S0	R934001148
OR0148030235S0	R934001590
OR014803091000	R934001013
OR014803093500	R934003314
OR0149030210S0	R934001607
OR0149030220S0	R934001616
OR0149030235S0	R934001629
OR014903020500	R934003368
OR014903090500	R934003367
OR014904023500	R934003496

Type	Material number

Further types available by request

# Relief, direct acting guided poppet type

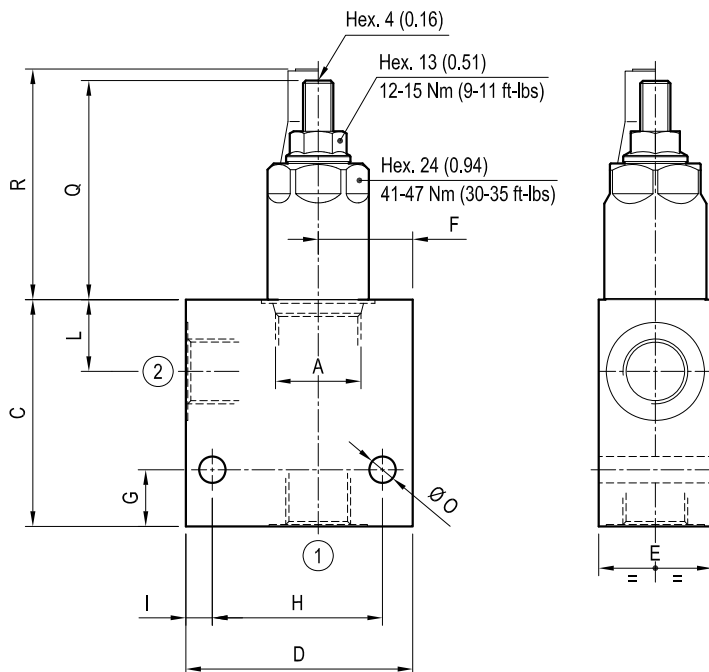
Common cavity

Cartridge style in manifold

VSBN-10A-C

OR.02 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 50 l/min (13 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

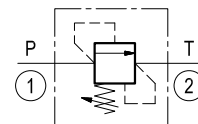


Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2			C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08																	
SIZE 10	03	G 1/2		50 (13)	60 (2.36)	60 (2.36)	35 (1.38)	25 (0.98)	15 (0.59)	45 (1.77)	7.5 (0.3)	19 (0.75)			7.5 (0.30)		
	04	G 3/4			60 (2.36)	70 (2.76)	40 (1.58)	30 (1.18)	15 (0.59)	55 (2.17)	7.5 (0.3)	20 (0.79)			9 (0.35)	58 (2.28)	61 (2.4)
SIZE 12																	
SIZE 16																	
SIZE 20																	

Cartridge style

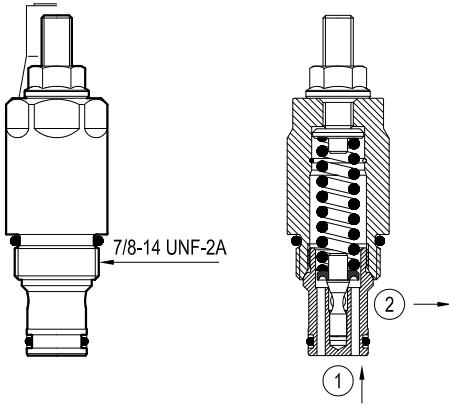




Table "K"

			K				
CARTRIDGE CODE	04	11	55	X	85	Z	VSBN-10A

Table "X"

X	ADJUSTMENTS	OPTIONS
03	Leakproof hex. socket screw 	 Ordering code 11.04.23.002

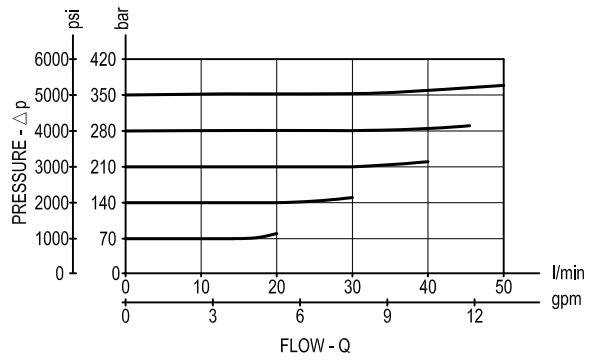
**CARTRIDGE TECHNICAL DATA**

Common cavity: **CA-10A-2N**  
 For other details see data sheet RE 18318-05

Table "Z"

Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)
05				5-70 (75-1000)	16 (232)	50 (725)									
10				35-140 (500-2000)	24 (348)	100 (1450)									
20				105-210 (1500-3000)	54 (783)	200 (2900)									
35				175-350 (2500-5000)	84 (1218)	350 (5000)									

# Performance graph







# Relief, direct acting poppet type differential area

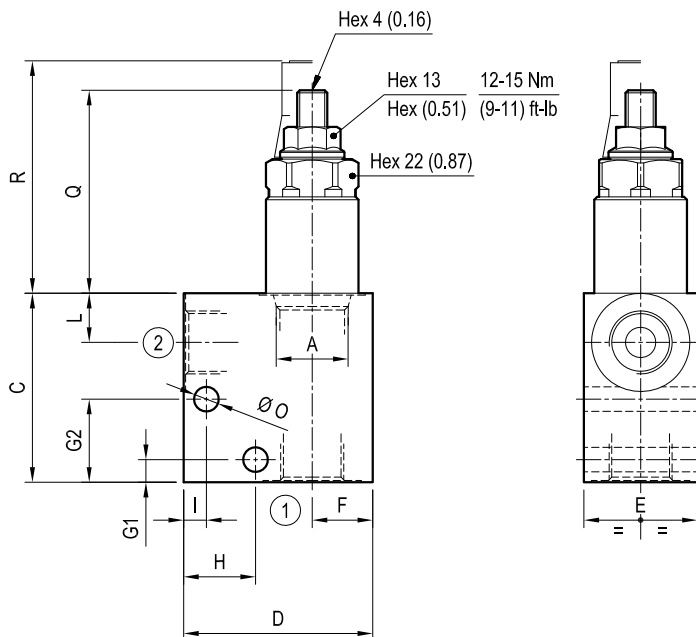
Common cavity

Cartridge style in manifold

VSDN-08A-C

OR.12 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 50 l/min (13 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

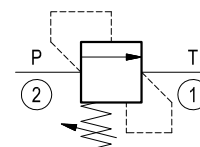


Table "Y"

Cavity	Y	PORT SIZE	Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
				C	D	E	F	G1	G2	H	I	L	O	Q	R	
A		1 - 2		50 (1.97)	50 (1.97)	30 (1.18)	16 (0.63)	6 (0.24)	22 (0.87)	19 (0.75)	6 (0.24)	13 (0.51)	6.5 (0.26)	53.5 (2.11)	61 (2.4)	
SIZE 08	09	G 1/4	50 (13)	50 (1.97)	50 (1.97)	30 (1.18)	16 (0.63)	6 (0.24)	22 (0.87)	19 (0.75)	6 (0.24)	13 (0.51)	6.5 (0.26)	53.5 (2.11)	61 (2.4)	
SIZE 10	02	G 3/8														
SIZE 12																
SIZE 16																
SIZE 20																

Cartridge style

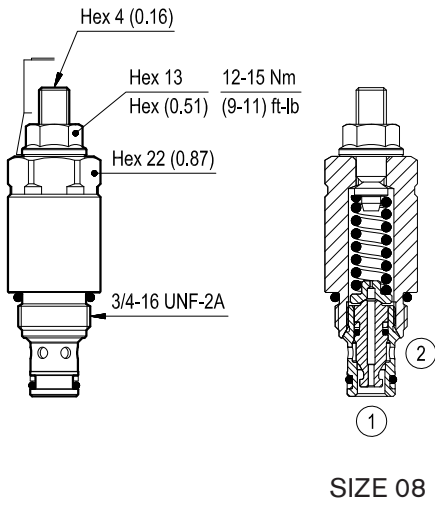


Table "K"

			K				
CARTRIDGE CODE	04	15	22	X	56	Z	VSDN-08A

Table "X"

X	ADJUSTMENTS	OPTIONS
03	Leakproof hex. socket screw	
		Ordering code 11.04.23.002

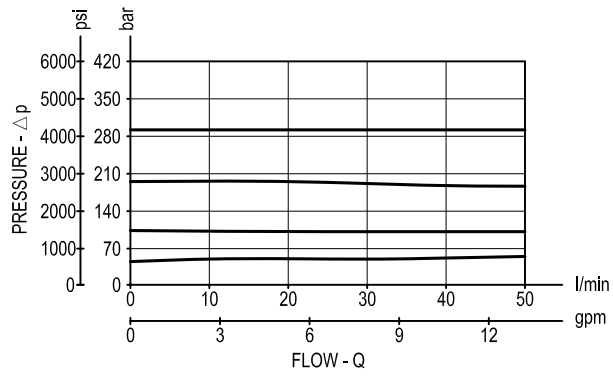
CARTRIDGE TECHNICAL DATA

Common cavity: CA-08A-2N  
 For other details see data sheet RE 18318-02

Table "Z"

Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)
10	35-140 (500-2000)	32 (464)	100 (1450)												
20	105-210 (1500-3000)	76 (1102)	200 (2900)												
35	175-315 (2500-4500)	118 (1711)	300 (4350)												

# Performance graphs



### Ordering code

OR.12	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with relief direct acting poppet type differential area**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Adjustments  
(see table X on page 2)

**Manifold material**

= 00	Aluminium manifold
= S0	Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

### Preferred types (readily available)

Type	Material number
OR1222030210S0	R934003525
OR1222030220S0	R934003526
OR1222030235S0	R934003527

Type	Material number

Further types available by request

# Relief, direct acting poppet type differential area

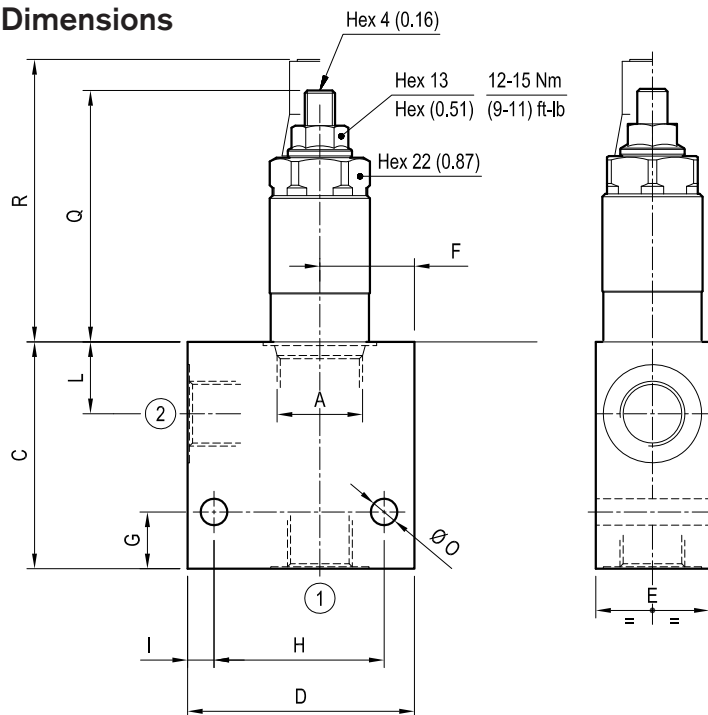
Common cavity

Cartridge style in manifold

VSDN-10A-C

OR.13 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 120 l/min (32 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

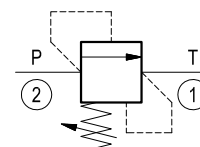


Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2			C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08																	
SIZE 10	03	G 1/2		120 (32)	60 (2.36)	60 (2.36)	35 (1.38)	25 (0.98)	15 (0.59)	45 (1.77)	7.5 (0.3)	19 (0.75)			7.5 (0.30)		
	04	G 3/4			60 (2.36)	70 (2.76)	40 (1.58)	30 (1.18)	15 (0.59)	55 (2.17)	7.5 (0.3)	20 (0.79)			9 (0.30)	66 (2.6)	74 (2.9)
SIZE 12																	
SIZE 16																	
SIZE 20																	

Cartridge style

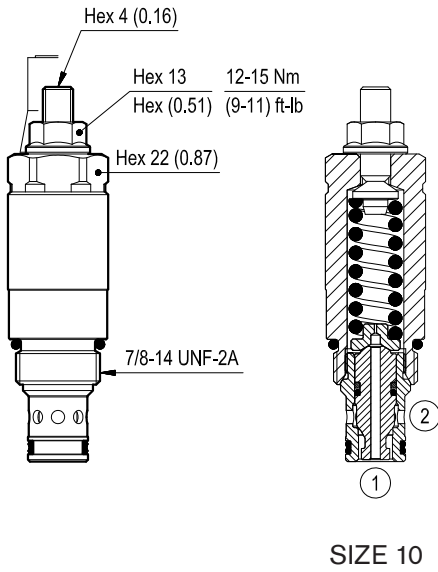




Table "K"

			K				
CARTRIDGE CODE	04	15	23	X	85	Z	VSDN-10A

Table "X"

X	ADJUSTMENTS	OPTIONS
03	Leakproof hex. socket screw 	
		Ordering code 11.04.23.002

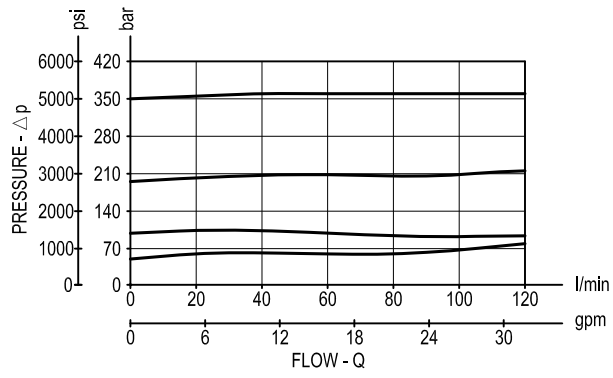
CARTRIDGE TECHNICAL DATA

Common cavity: CA-10A-2N  
For other details see data sheet RE 18318-03

Table "Z"

Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)
10				35-140 (500-2000)	46 (667)	100 (1450)									
35				100-350 (1450-5000)	86 (1247)	350 (5000)									

# Performance graphs



### Ordering code

OR.13	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with relief direct acting poppet type differential area**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Adjustments  
(see table X on page 2)

**Manifold material**

= 00	Aluminium manifold
= S0	Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

### Preferred types (readily available)

Type	Material number
OR1323030410S0	R934003528
OR1323030435S0	R934003529

Type	Material number

Further types available by request



# Relief, bi-directional direct acting poppet type differential area

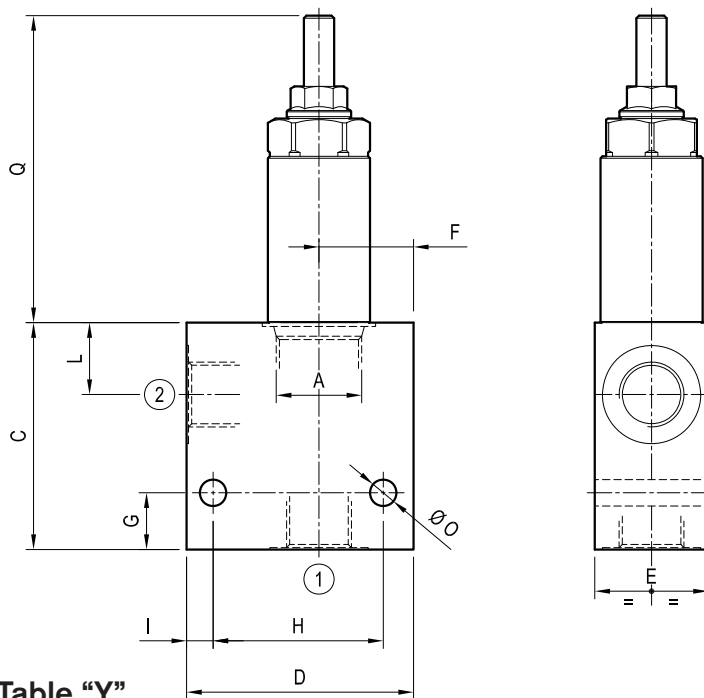
Common cavity

Cartridge style in manifold

VSNG-10A-C

OR.03 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 56 l/min (15 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

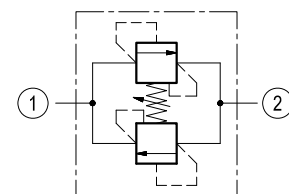
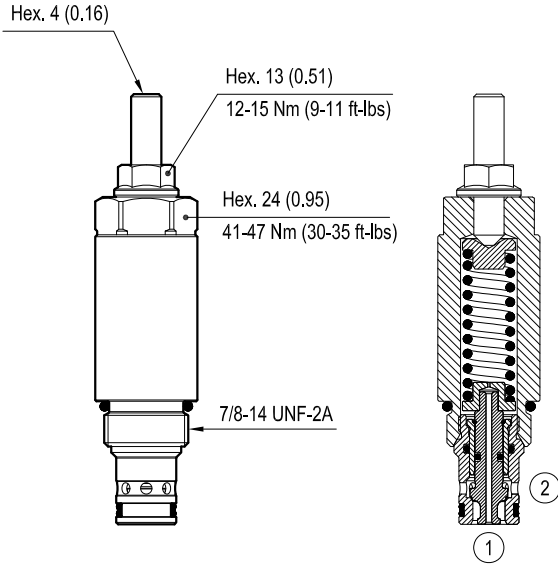


Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2			C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08																	
SIZE 10	03	G 1/2		56 (15)	60 (2.36)	60 (2.36)	35 (1.38)	25 (0.98)	15 (0.59)	45 (1.77)	7.5 (0.30)	19 (0.75)			7 (0.28)		
	04	G 3/4			60 (2.36)	70 (2.76)	40 (1.58)	30 (1.18)	15 (0.59)	55 (2.17)	7.5 (0.30)	20 (0.79)			9 (0.35)	81 (3.19)	
SIZE 12																	
SIZE 16																	
SIZE 20																	

**Cartridge style**




SIZE 10

[ mm (inches) ]

**Table "K"**

			K				
CARTRIDGE CODE	04	11	59	X	85	Z	VSNG-10A

**Table "X"**

X	ADJUSTMENTS	
<b>03</b>	Leakproof hex. socket screw	

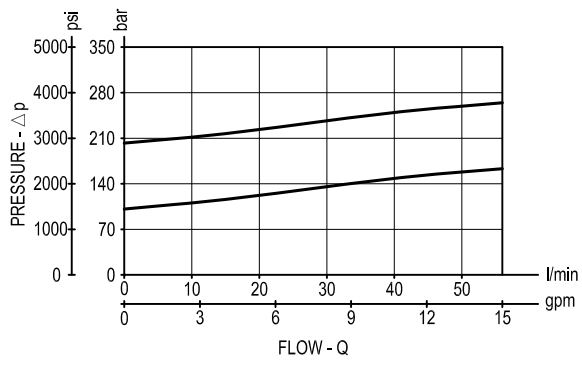
**CARTRIDGE TECHNICAL DATA**

Common cavity: **CA-10A-2N**  
 For other details see data sheet RE 18318-07

**Table "Z"**

Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)
<b>10</b>				30-100 (450-1450)	13.5 (196)	100 (1450)									
<b>20</b>				100-240 (1450-3500)	31 (450)	200 (2900)									

### Performance graph





# Relief, pilot operated spool type

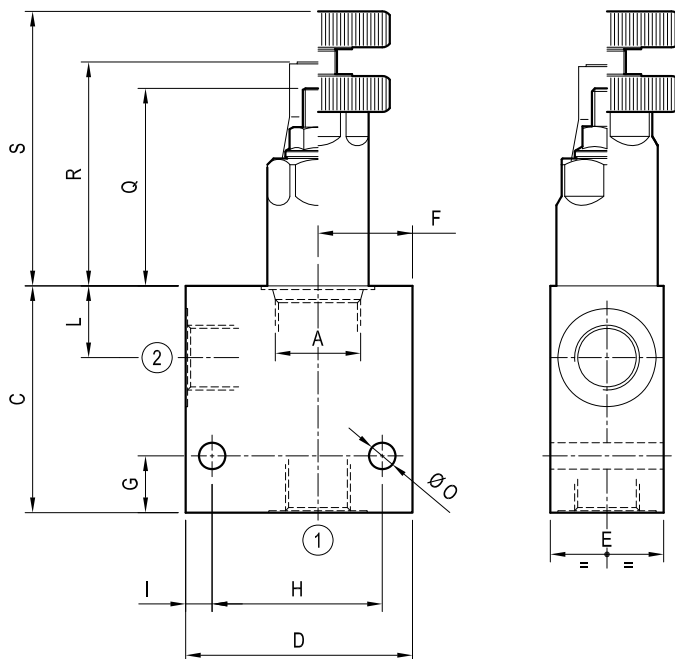
Common cavity

Cartridge style in manifold

VSPN-C

OR.04 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow:	up to 300 l/min	(79 gpm)
Max operating pressure for <b>steel</b> body:	420 bar	(6000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

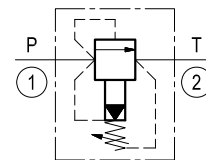
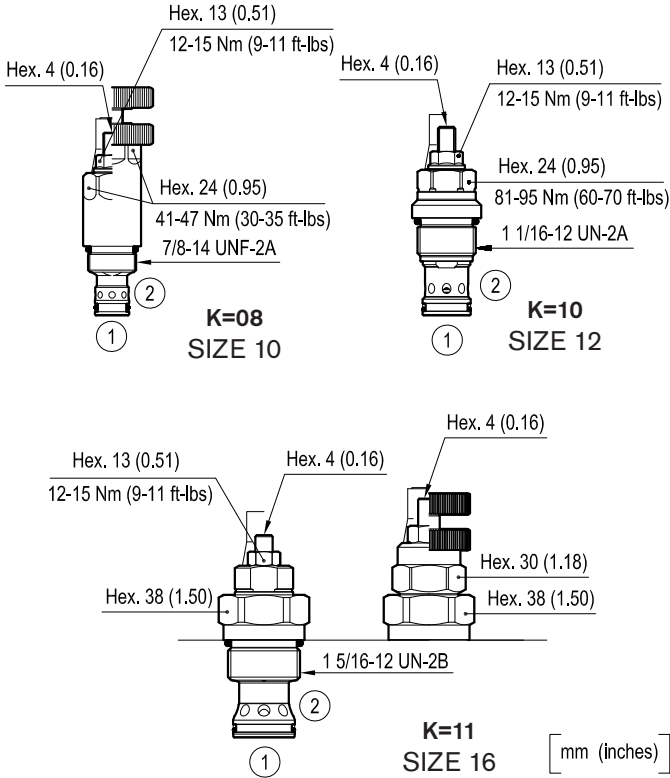


Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2			C	D	E	F	G	H	I	L	M	O	Q	R	S
SIZE 08																	
SIZE 10	03	G1/2		120 (32)	60 (2.36)	60 (2.36)	35 (1.38)	25 (0.98)	15 (0.59)	45 (1.77)	7.5 (0.3)	19 (0.75)		7.5 (0.30)			
	04	G 3/4			60 (2.36)	70 (2.76)	40 (1.58)	30 (1.18)	15 (0.59)	55 (2.17)	7.5 (0.3)	20 (0.79)		7.5 (0.30)	48 (1.89)	60 (2.36)	74 (2.91)
SIZE 12	04	G 3/4		200 (53)	75 (2.95)	80 (3.15)	40 (1.58)	35 (1.38)	20 (0.79)	60 (2.36)	10 (0.39)	26.5 (1.04)		9 (0.35)	42.5 (1.67)	48 (1.89)	
	05	G 1			75 (2.95)	80 (3.15)	50 (1.97)	35 (1.38)	20 (0.79)	60 (2.36)	10 (0.39)	26.5 (1.04)		9 (0.35)			
SIZE 16	04	G 3/4		300 (79)	80 (3.15)	80 (3.15)	50 (1.97)	32 (1.26)	22 (0.87)	60 (2.36)	10 (0.39)	26 (1.02)		9 (0.35)	65.5 (2.58)	70.5 (2.78)	68 (2.68)
	05	G 1			80 (3.15)	90 (3.54)	50 (1.97)	37 (1.46)	22 (0.87)	60 (2.36)	20 (0.79)	26 (1.02)		9 (0.35)			
SIZE 20																	





**Cartridge style**



**Table "K"**

			K				
CARTRIDGE CODE	04	12	08	X	85	Z	VSPN-10A
	04	12	10	X	57	Z	VSPN-12A
	04	12	11	X	27	Z	VSPN-16A

**Table "X"**

X	ADJUSTMENTS	OPTIONS
03	Leakproof hex. socket screw 	 Ordering code X=03 11.04.23.002 X=73 11.04.23.004
04	Handknob and locknut (only for K=08 and K=11 types) 	
73	O-Ring seal on adjust screw (only for K=11 type) 	

**CARTRIDGE TECHNICAL DATA**

Int. leakage ave.:  
 200 bar (2900 psi) - 200 cm<sup>3</sup>/min (12 in<sup>3</sup>/min) - for K=08 type

Int. leakage ave.:  
 200 bar (2900 psi) - 350 cm<sup>3</sup>/min (21 in<sup>3</sup>/min)  
 for K=10 and K=11 type

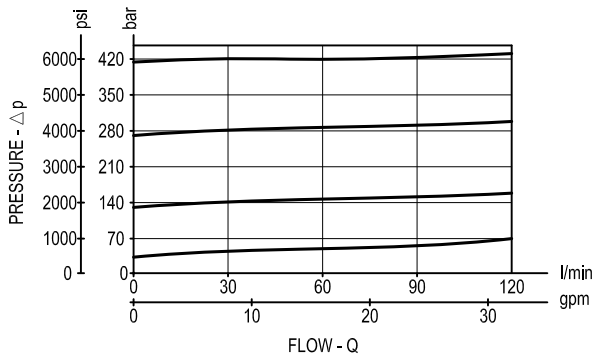
Common cavity: **CA-10A-2N / CA-12A-2N / CA-16A-2N**  
 For other details see data sheet RE 18318-08, RE 18318-09 and RE 18318-10

**Table "Z"**

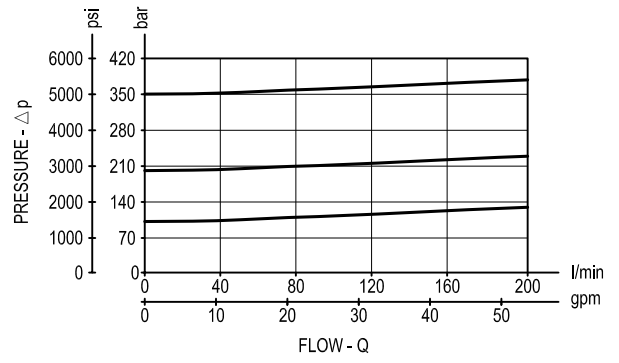
Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)
X=03	10			35-140 (500-2000)	48 (696)	100 (1450)	35-140 (500-2000)	48 (696)	100 (1450)	35-140 (500-2000)	48 (696)	100 (1450)			
	20			70-280 (1000-4000)	88 (1276)	200 (2900)	70-280 (1000-4000)	88 (1276)	200 (2900)	70-80 (1000-4000)	88 (1276)	200 (2900)			
	35			140-420 (2000-6000)	140 (2030)	350 (5000)	140-420 (2000-6000)	140 (2030)	350 (5000)	140-420 (2000-6000)	140 (2030)	350 (5000)			
X=04	35			35-350 (500-5000)	68 (986)	350 (5000)				35-350 (500-5000)	66 (957)	350 (5000)			
	35									35-350 (500-5000)	66 (957)	350 (5000)			

Performance graphs

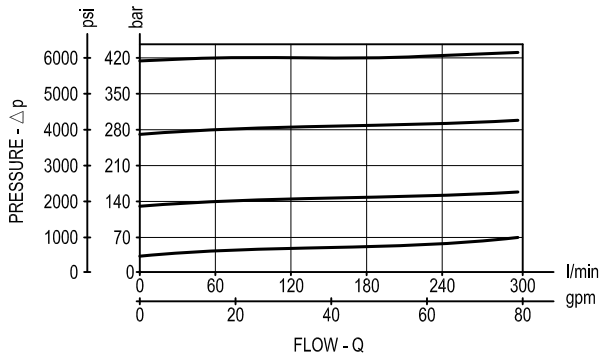
SIZE 10



SIZE 12



SIZE 16



## Ordering code

OR.04	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with relief pilot operated spool type cartridge**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Adjustments  
(see table X on page 2)

**Manifold material**

= 00	Aluminium manifold
= S0	Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

## Preferred types (readily available)

Type	Material number
OR0408030410S0	R934001483
OR0408030420S0	R934001484
OR0408030435S0	R934000784
OR0410030510S0	R934001517
OR0410030520S0	R934001527
OR0410030535S0	R934001546
OR0411030510S0	R934003570
OR0411030520S0	R934003571
OR0411030535S0	R934003572
OR0111040535S0	R934003842

Type	Material number

Further types available by request



# Relief, pilot operated poppet type

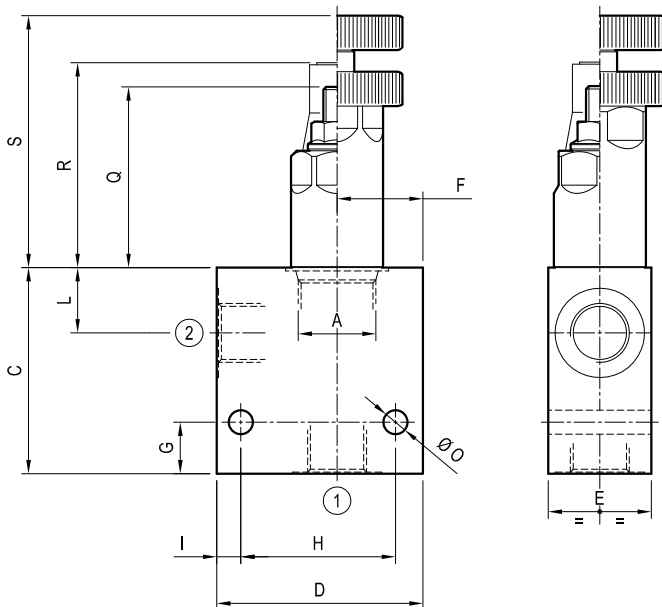
Common cavity

Cartridge style in manifold

VSPC-10A-C

OR.05 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 80 l/min (21 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

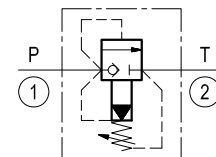
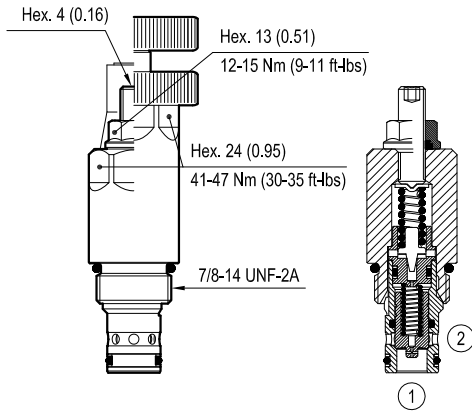


Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		P - T			C	D	E	F	G	H	I	L	M	O	Q	R	S
A																	
SIZE 08																	
SIZE 10	03	G 1/2		80 (21)	60 (2.36)	60 (2.36)	35 (1.38)	25 (0.98)	15 (0.59)	45 (1.77)	7.5 (0.30)	19 (0.75)		7 (0.28)	53 (2.09)	60 (2.36)	74 (2.91)
	04	G 3/4			60 (2.36)	70 (2.76)	40 (1.58)	30 (1.18)	15 (0.59)	55 (2.17)	7.5 (0.30)	20 (0.79)		9 (0.35)			
SIZE 12																	
SIZE 16																	
SIZE 20																	

Cartridge style






SIZE 10

Table "K"

			K				
CARTRIDGE CODE	04	12	09	X	85	Z	VSPC-10A

Table "X"

X	ADJUSTMENTS	OPTIONS
03	Leakproof hex. socket screw	
04	Handknob and locknut	
		 Ordering code 11.04.23.002

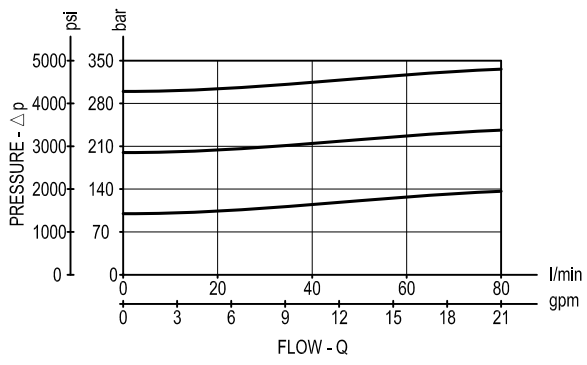
**CARTRIDGE TECHNICAL DATA**

Common cavity: CA-10A-2N  
 For other details see data sheet RE 18318-11

Table "Z"

Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)
X=03	10			35-140 (500-2000)	48 (696)	100 (1450)									
	20			70-280 (1000-4000)	88 (1276)	200 (2900)									
	35			140-350 (2000-5000)	140 (2030)	350 (5000)									
X=04	35			35-350 (500-5000)	68 (986)	350 (5000)									

### Performance graph



## Ordering code

OR.05	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with relief pilot operated poppet type**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Adjustments  
(see table X on page 2)

**Manifold material**

= 00	Aluminium manifold
= S0	Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

## Preferred types (readily available)

Type	Material number
OR0509030410S0	R934001475
OR0509030420S0	R934001477
OR0509030435S0	R934000927

Type	Material number

Further types available by request

# Relief, pilot operated spool type external drain

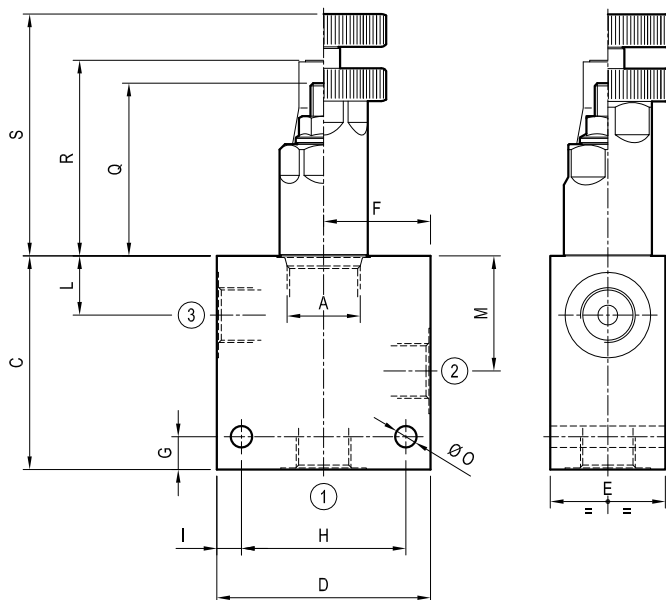
Common cavity

Cartridge style in manifold

VSPY-10A-C / VSPY-12A-C

OR.06 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 200 l/min (53 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

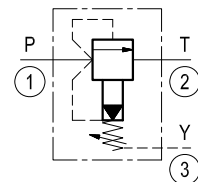
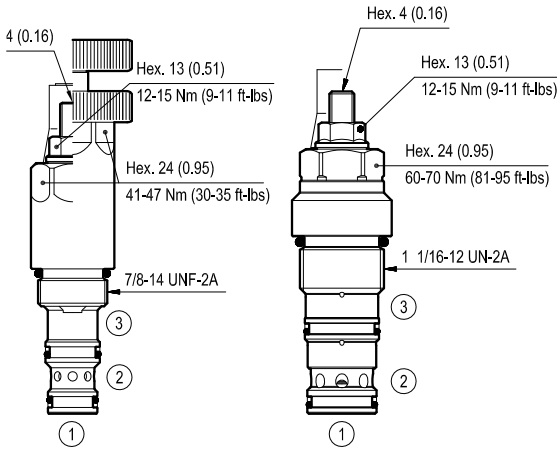


Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2 - 3			C	D	E	F	G	H	I	L	M	O	Q	R	S
SIZE 08																	
SIZE 10	02	G 3/8		120 (32)	65 (2.56)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.30)	18 (0.71)	35 (1.38)	6.5 (0.26)	53 (2.09)	60 (2.36)	74 (2.91)
	03	G 1/2			70 (2.76)	70 (2.76)	35 (1.38)	35 (1.38)	15 (0.59)	50 (1.97)	10 (0.39)	18 (0.71)	35 (1.38)	6.5 (0.26)			
SIZE 12	03	G1/2		200 (53)	80 (3.15)	75 (2.95)	40 (1.58)	40 (1.58)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)	9 (0.35)	46.5 (1.83)	53.5 (2.11)	-
	04	G 3/4			90 (3.54)	75 (2.95)	40 (1.58)	40 (1.58)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)	9 (0.35)			
SIZE 16																	
SIZE 20																	

Cartridge style



SIZE 10




SIZE 12

[ mm (inches) ]

Table "K"

			K				
CARTRIDGE CODE	04	13	05	X	85	Z	VSPY-10A
	04	13	07	X	57	Z	VSPY-12A

Table "X"

X	ADJUSTMENTS	OPTIONS
03	Leakproof hex. socket screw	
04	Handknob and locknut (only for K=05 type)	
		 Ordering code 11.04.23.002

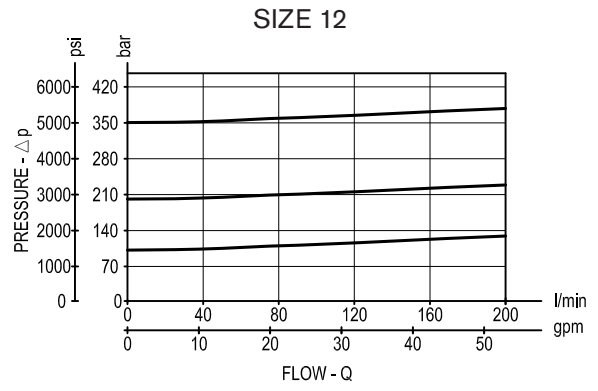
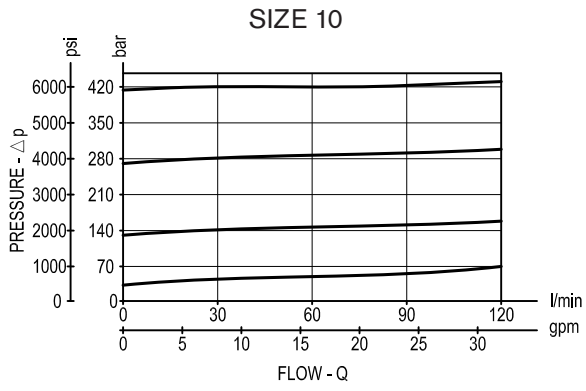
CARTRIDGE TECHNICAL DATA

Int. leakage ave.: 200 bar (2900 psi) - 200 cm <sup>3</sup> /min (12 in <sup>3</sup> /min) for K=05
Int. leakage ave.: 200 bar (2900 psi) - 350 cm <sup>3</sup> /min (21 in <sup>3</sup> /min) for K=07
Common cavity: <b>CA-10A-3N / CA-12A-3C</b> For other details see data sheet RE 18318-12 and RE 18318-13

Table "Z"

Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)
X=03	10			35-140 (500-2000)	48 (696)	100 (1450)	35-140 (500-2000)	48 (696)	100 (1450)						
	20			70-280 (1000-4000)	88 (1276)	200 (2900)	70-280 (1000-4000)	88 (1276)	200 (2900)						
	35			140-420 (2000-6000)	140 (2030)	350 (5000)	140-420 (2000-6000)	140 (2030)	350 (5000)						
X=04	35			35-350 (500-5000)	68 (986)	350 (5000)									

Performance graphs



### Ordering code

OR.06	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with relief pilot operated spool type external drain**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Adjustments  
(see table X on page 2)

**Manifold material**

= 00 Aluminium manifold

= S0 Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

### Preferred types (readily available)

Type	Material number
OR0605030310S0	R934001492
OR0605030320S0	R934001506
OR0605030335S0	R934001507
OR0607030410S0	R934001508
OR0607030420S0	R934001509
OR0607030435S0	R934001516

Type	Material number

Further types available by request



# Pressure reducing and relieving, direct acting spool type

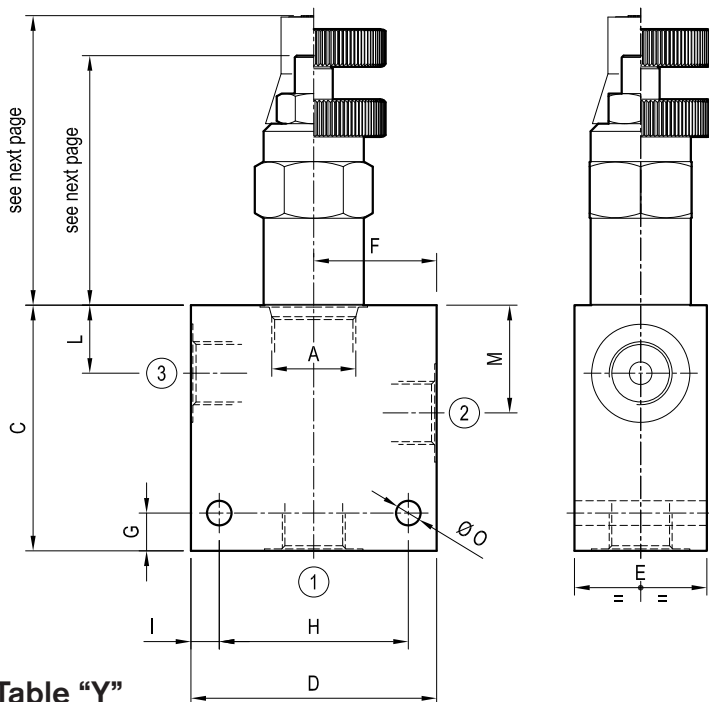
Common cavity

Cartridge style in manifold

VRPR-C

OR.08 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 30 l/min (8 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

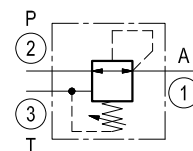


Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2 - 3			C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08	09	G 1/4		8 (2)	65 (2.56)	60 (2.36)	30 (1.18)	30 (1.18)	10 (0.39)	40 (1.58)	10 (0.39)	15 (0.59)	28.5 (1.12)		6.5 (0.26)		
	02	G 3/8			65 (2.56)	60 (2.36)	30 (1.18)	30 (1.18)	10 (0.39)	40 (1.58)	10 (0.39)	15 (0.59)	28.5 (1.12)		6.5 (0.26)		
SIZE 10	09	G 1/4		30 (8)	65 (2.56)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.30)	18 (0.71)	35 (1.38)		6.5 (0.26)		
	02	G 3/8			65 (2.56)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.30)	18 (0.71)	35 (1.38)		6.5 (0.26)		
SIZE 12																	
SIZE 16																	
SIZE 20																	

Cartridge style

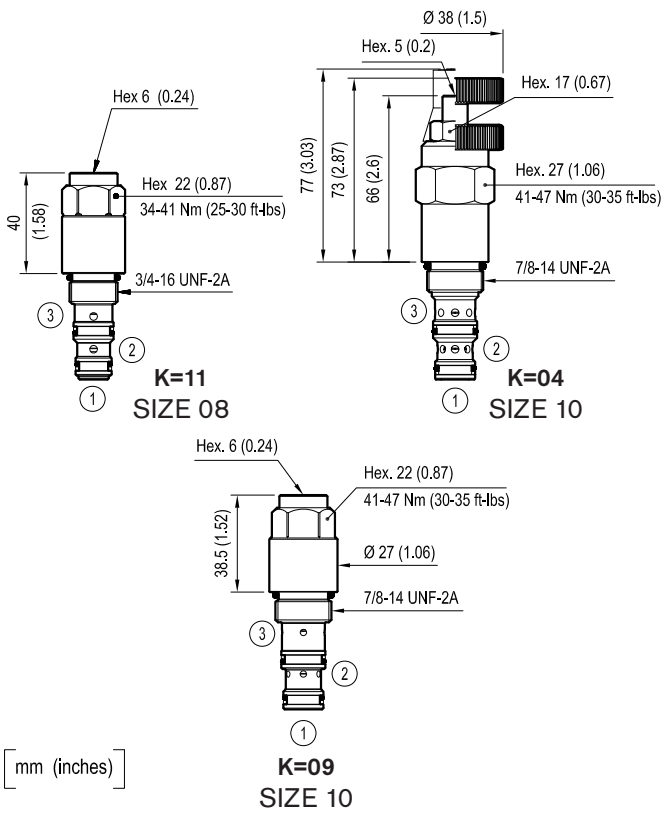





Table "K"

			K				
CARTRIDGE CODE	04	95	11	83	56	Z	VRPR-08A
	04	95	04	X	85	Z	VRPR-10A
	04	95	09	83	85	Z	VRPR-10A-8

Table "X"

X	ADJUSTMENTS	OPTIONS
03	Leakproof hex. socket screw (only for K=04)	
04	Handknob and locknut (only for K=04)	
83	Factory preset, adjustable (for K=09 and K=11)	

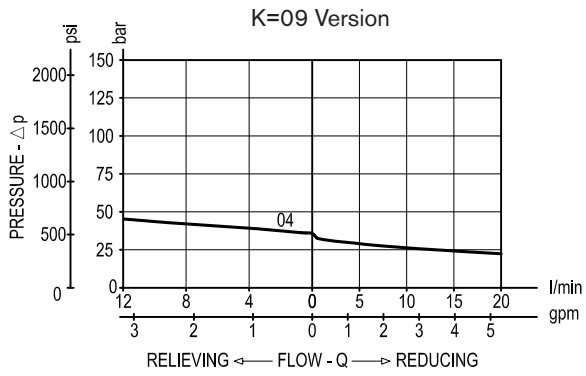
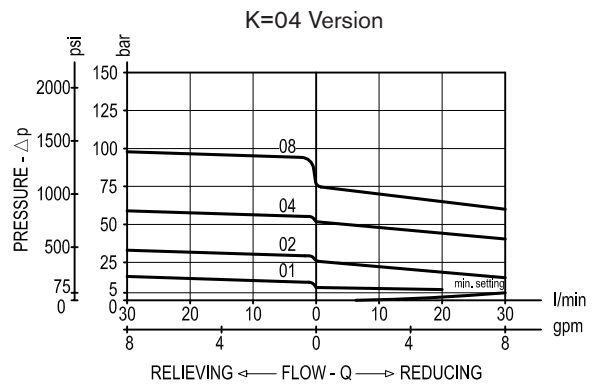
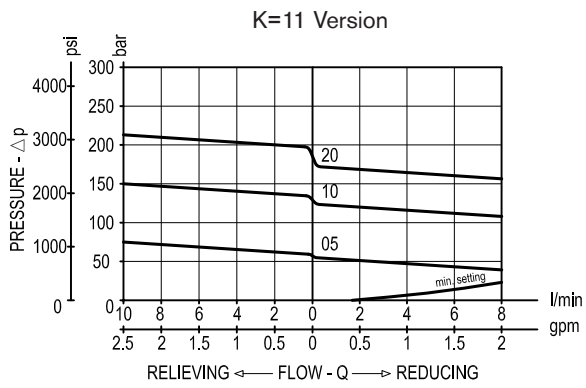
CARTRIDGE TECHNICAL DATA

Int. leakage ave.: 100 cm <sup>3</sup> /min (6 in <sup>3</sup> /min) - for K=11 type
Int. leakage ave.: 50 cm <sup>3</sup> /min (3 in <sup>3</sup> /min) - for K=04 type
Int. leakage ave.: 130 cm <sup>3</sup> /min (8 in <sup>3</sup> /min) - for K=09 type
Common cavity: CA-08A-3N / CA-10A-3N
For other details see data sheet RE 18318-52, RE 18318-53 and RE18318-54

Table "Z"

Z	SPRINGS														
	SIZE 08			SIZE 10 (K=04 type)			SIZE 10 (K=09 type)			SIZE 16			SIZE 20		
		Fixed setting bar (psi) (reduc.mode)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc.mode)			Fixed setting bar (psi) (reduc.mode)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc.mode)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc.mode)	
01			2-14 (30-200)	2 (29)	8-10 (115-145)										
02			2-25 (30-350)	3 (44)	7-10 (100-145)										
04			10-50 (145-725)	7 (102)	35-40 (500-580)			35 (500)							
05		35 (500)													
06								60 (870)							
08			28-80 (400-1160)	14 (203)	45-50 (650-725)										
10		70 (1000)						90 (1305)							
20		150 (2200)													

# Performance graphs



### Ordering code

OR.08	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with pressure reducing and relieving, direct acting spool type**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Adjustments  
(see table X on page 2)

**Manifold material**

= 00 Aluminium manifold

= S0 Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

### Preferred types (readily available)

Type	Material number
OR0804030202S0	R934000627
OR0804030204S0	R934001152
OR0804030208S0	R934000630
OR080403020200	R934003315
OR0804030902S0	R934000825
OR080404020200	R934003393
OR0811830220S0	R934001153

Type	Material number

Further types available by request

# Pressure reducing, pilot operated spool type

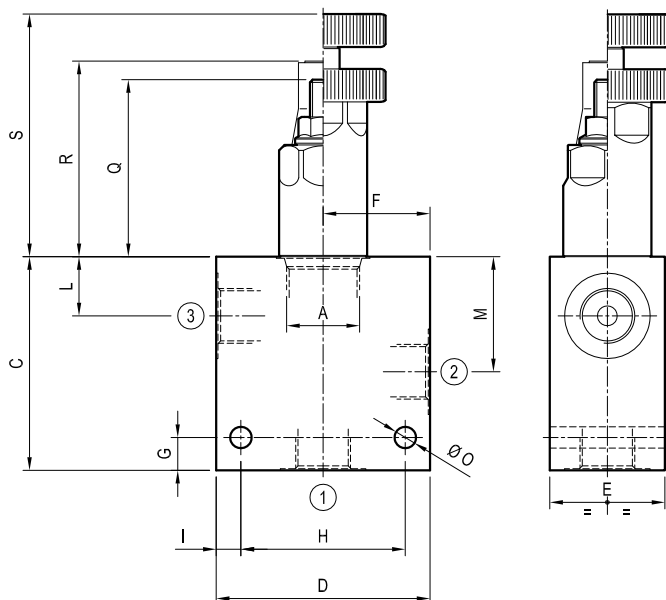
Common cavity

Cartridge style in manifold

VRPP-C

OR.07 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 100 l/min (26 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

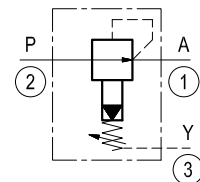
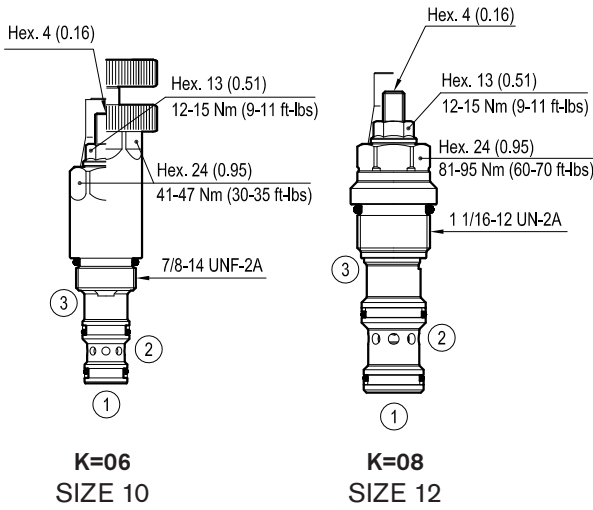


Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1	2 - 3		C	D	E	F	G	H	I	L	M	O	Q	R	S
SIZE 08																	
SIZE 10	02	G 3/8		60 (16)	65 (2.56)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.30)	18 (0.71)	35 (1.38)	6.5 (0.26)	53 (2.1)	60 (2.36)	74 (2.91)
	03	G 1/2			70 (2.76)	70 (2.76)	35 (1.38)	35 (1.38)	15 (0.59)	50 (1.97)	10 (0.39)	18 (0.71)	35 (1.38)	6.5 (0.26)			
SIZE 12	03	G 1/2		100 (26)	100 (3.94)	80 (3.15)	40 (1.58)	40 (1.58)	15 (0.59)	55 (2.17)	12.5 (0.49)	29 (1.14)	54 (2.13)	7 (0.28)	42 (1.65)	49 (1.93)	-
	04	G 3/4			100 (3.94)	80 (3.15)	40 (1.58)	40 (1.58)	15 (0.59)	55 (2.17)	12.5 (0.49)	29 (1.14)	54 (2.13)	7 (0.28)			
SIZE 16																	
SIZE 20																	

**Cartridge style**






[ mm (inches) ]

**Table "K"**

			<b>K</b>				
CARTRIDGE CODE	04	93	06	X	85	Z	VRPP-10A
	04	93	08	X	57	Z	VRPP-12A

**Table "X"**

X	ADJUSTMENTS	OPTIONS
<b>03</b>	Leakproof hex. socket screw 	  Ordering code 11.04.23.002
<b>04</b>	Handknob and locknut (only for K=06 type) 	

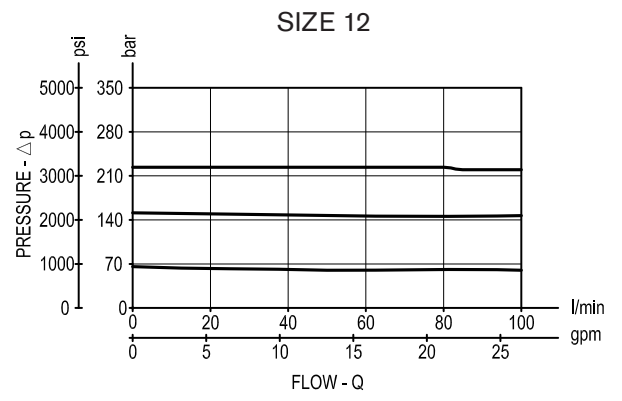
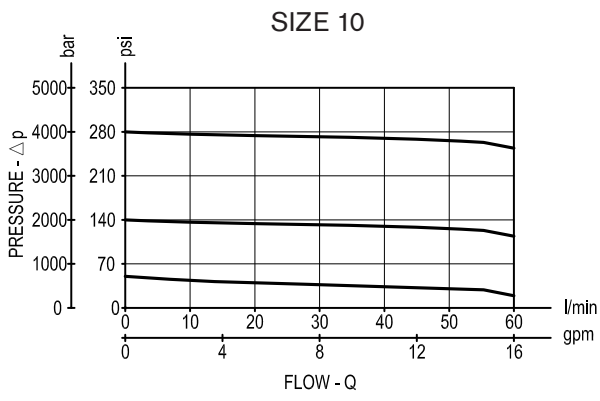
**CARTRIDGE TECHNICAL DATA**

Common cavity: **CA-10A-3N / CA-12A-3N**  
For other details see data sheet RE 18318-50 and RE 18318-51

**Table "Z"**

Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc.mode)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc.mode)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc.mode)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc.mode)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (reduc.mode)
X=03	10			10-140 (145-2000)	48 (696)	100 (1450)	10-140 (145-2000)	48 (696)	100 (1450)						
	20			70-280 (1000-4000)	88 (1276)	200 (2900)	70-280 (1000-4000)	88 (1276)	200 (2900)						
	35						140-350 (2000-5000)	140 (2030)	280 (4000)						
X=04	35			35-350 (500-5000)	68 (986)	350 (5000)									

Performance graphs







# Pressure reducing and relieving, pilot operated spool type

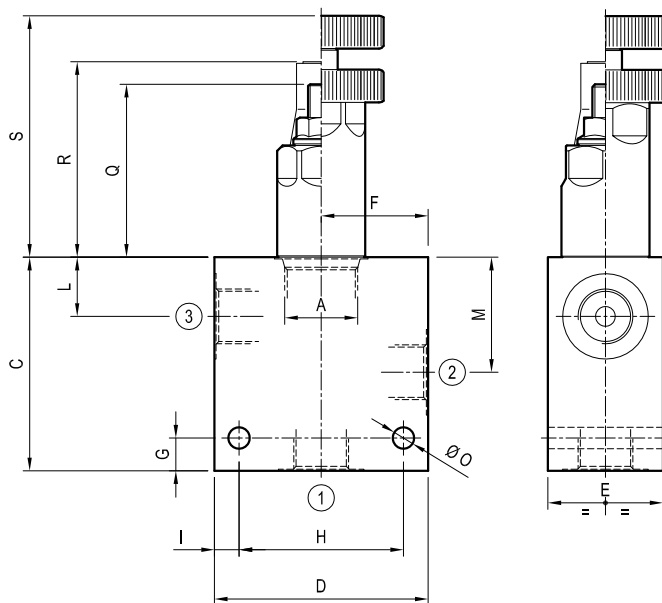
Common cavity

Cartridge style in manifold

VRPX-10A-C

OR.09 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 60 l/min (16 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

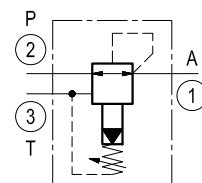
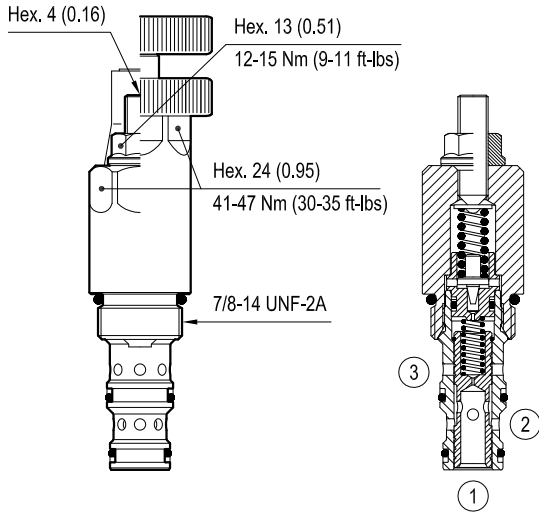


Table "Y"

Cavity	Y	PORT SIZE	Max Flow l/min (gpm)	DIMENSIONS mm (Inches)													
				1 - 2 - 3	C	D	E	F	G	H	I	L	M	O	Q	R	S
SIZE 08																	
SIZE 10	02	G 3/8	60 (16)		65 (2.56)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.30)	18 (0.71)	35 (1.38)	6.5 (0.26)	53 (2.09)	60 (2.36)	74 (2.91)
	03	G 1/2			70 (2.76)	70 (2.76)	35 (1.38)	35 (1.38)	15 (0.59)	50 (1.97)	10 (0.39)	18 (0.71)	35 (1.38)	6.5 (0.26)			
SIZE 12																	
SIZE 16																	
SIZE 20																	

Cartridge style






SIZE 10

[ mm (inches) ]

Table "K"

			K				
CARTRIDGE CODE	04	93	07	X	85	Z	VRPX-10A

Table "X"

X	ADJUSTMENTS	OPTIONS
03	Leakproof hex. socket screw 	 Ordering code 11.04.23.002
04	Handknob and locknut 	

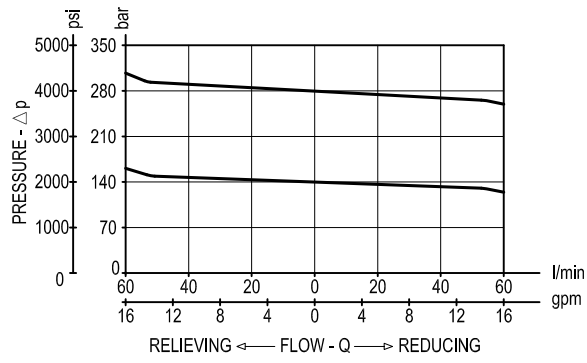
CARTRIDGE TECHNICAL DATA

Common cavity: CA-10A-3N  
For other details see data sheet RE 18318-56

Table "Z"

Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (re d u c. mode)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (re d u c. mode)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (re d u c. mode)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (re d u c. mode)	Adj. press. range bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting bar (psi) (re d u c. mode)
X=03	05			25-100 (360-1450)	31 (450)	50 (725)									
	10			35-140 (500-2000)	48 (696)	100 (1450)									
	20			70-280 (1000-4000)	88 (1276)	200 (2900)									
X=04	35			35-350 (500-5000)	68 (986)	350 (5000)									

# Performance graph





# Check poppet type

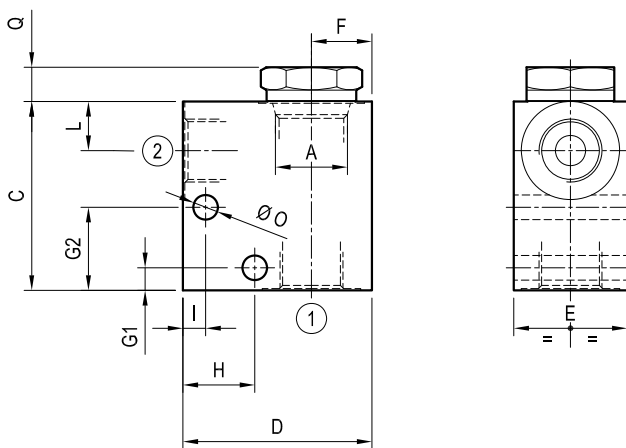
Common cavity

Cartridge style in manifold

VUCN-08A-C

OU.01 - K - 00 - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 50 l/min (13 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

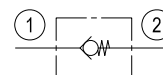
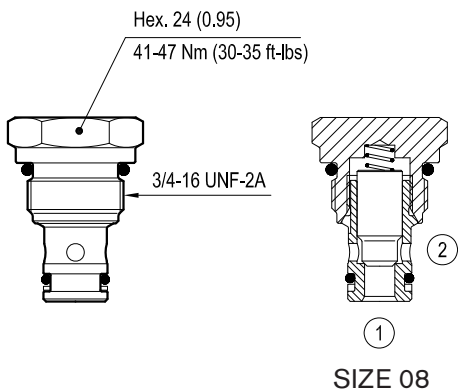


Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2			C	D	E	F	G1	G2	H	I	L	M	O	Q	R
SIZE 09	09	G 1/4		up to 50 (13)	50 (1.97)	50 (1.97)	30 (1.18)	16 (0.63)	6 (0.24)	22 (0.87)	19 (0.75)	6 (0.24)	13 (0.51)		6.5 (0.26)	9 (0.35)	
SIZE 08	02	G 3/8			50 (1.97)	50 (1.97)	30 (1.18)	16 (0.63)	6 (0.24)	22 (0.87)	19 (0.75)	6 (0.24)	13 (0.51)		6.5 (0.26)		
SIZE 10																	
SIZE 12																	
SIZE 16																	
SIZE 20																	

### Cartridge style



[ mm (inches) ]

Table "K"

			K				
CARTRIDGE CODE	04	31	20	00	56	Z	VUCN-08A

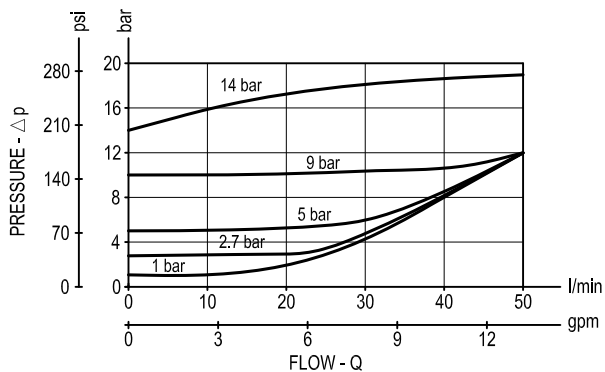
### CARTRIDGE TECHNICAL DATA

Common cavity: **CA-08A-2N**  
For other details see data sheet RE 18318-89

Table "Z"

Z	SPRINGS											
	SIZE 08		SIZE 10		SIZE 12		SIZE 16		SIZE 20			
	Cracking pressure bar(psi)		Cracking pressure bar(psi)		Cracking pressure bar(psi)		Cracking pressure bar(psi)		Cracking pressure bar(psi)		Cracking pressure bar(psi)	
A0	0.3 (4.5)											
00	1 (15)											
03	2.7 (39)											
05	5 (75)											
06	6 (87)											
09	9 (131)											
14	14 (200)											

### Performance graph









# Check poppet type

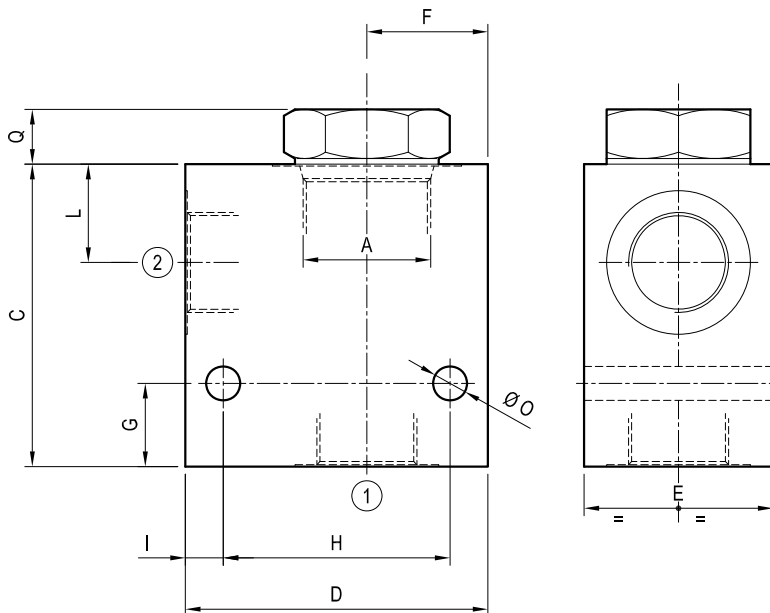
Common cavity

Cartridge style in manifold

VUCN-C

OU.02 - K - 00 - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 360 l/min (95 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

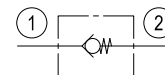
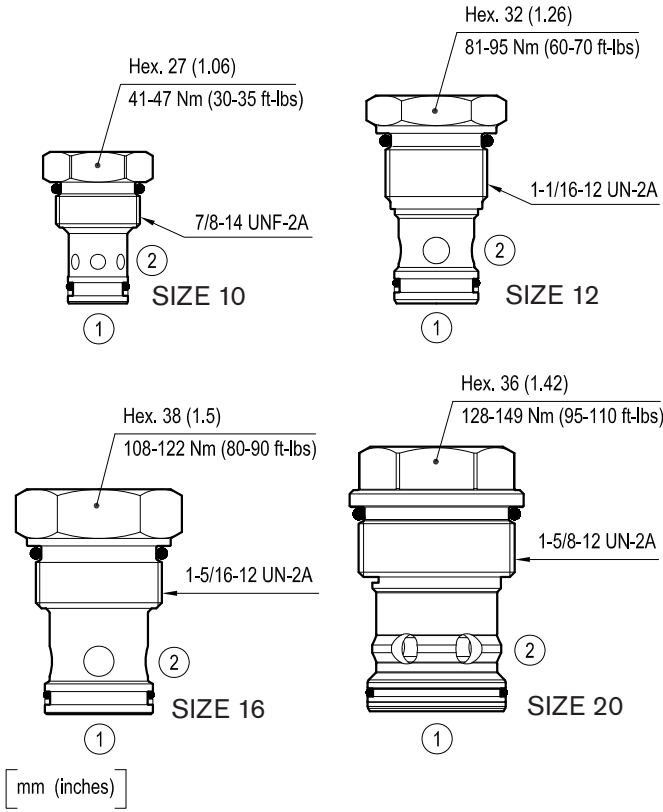


Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2			C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08																	
SIZE 10	03	G 1/2		up to 80 (21)	60 (2.36)	60 (2.36)	35 (1.38)	25 (0.98)	15 (0.59)	45 (1.77)	7.5 (0.30)	19 (0.75)			7 (0.28)	8 (0.32)	
	04	G 3/4			60 (2.36)	70 (2.76)	40 (1.58)	30 (1.18)	15 (0.59)	55 (2.17)	7.5 (0.30)	20 (0.79)			9 (0.35)		
SIZE 12	04	G 3/4		up to 120 (32)	75 (2.95)	80 (3.15)	40 (1.58)	35 (1.38)	20 (0.79)	60 (2.36)	10 (0.39)	26.5 (1.04)			9 (0.35)	10 (0.39)	
	05	G 1			75 (2.95)	80 (3.15)	50 (1.97)	35 (1.38)	20 (0.79)	60 (2.36)	10 (0.39)	26.5 (1.04)			9 (0.35)		
SIZE 16	04	G 3/4		up to 200 (53)	80 (3.15)	80 (3.15)	50 (1.97)	32 (1.26)	22 (0.87)	60 (2.36)	10 (0.39)	26 (1.02)			9 (0.35)	15 (0.59)	
	05	G 1			80 (3.15)	90 (3.54)	50 (1.97)	37 (1.46)	22 (0.87)	60 (2.36)	20 (0.79)	26 (1.02)			9 (0.35)		
SIZE 20	05	G 1		up to 360 (95)	100 (3.94)	100 (3.94)	60 (2.36)	45 (1.77)	25 (0.98)	75 (2.95)	12.5 (0.49)	32 (1.26)			11 (0.43)	16 (0.63)	
	06	G 1-1/4			100 (3.94)	100 (3.94)	60 (2.36)	45 (1.77)	25 (0.98)	75 (2.95)	12.5 (0.49)	32 (1.26)			11 (0.43)		

**Cartridge style**



**Table "K"**

				K			
CARTRIDGE CODE	04	31	23	00	85	Z	VUCN-10A
	04	31	28	00	57	Z	VUCN-12A
	04	31	25	00	27	Z	VUCN-16A
	04	31	32	00	58	Z	VUCN-20A

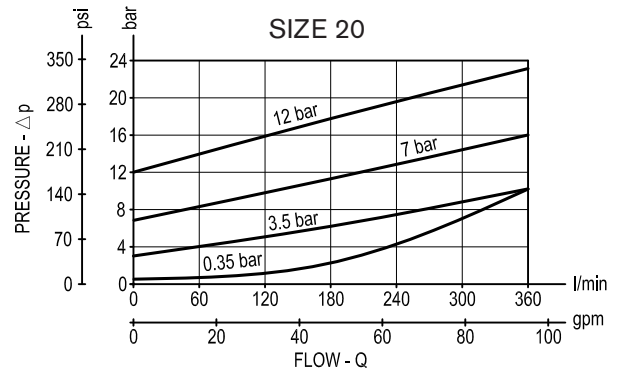
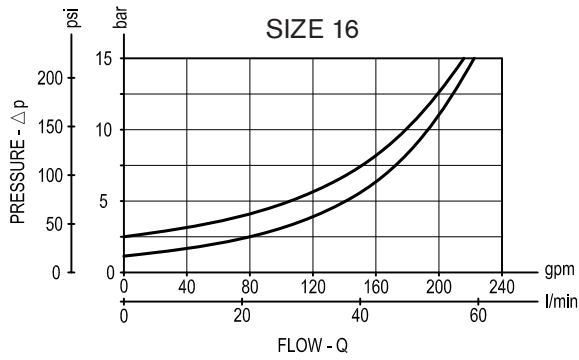
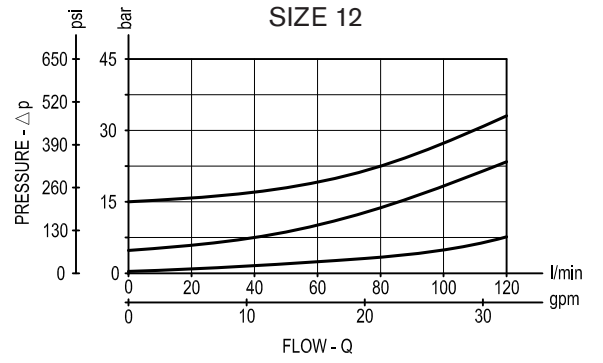
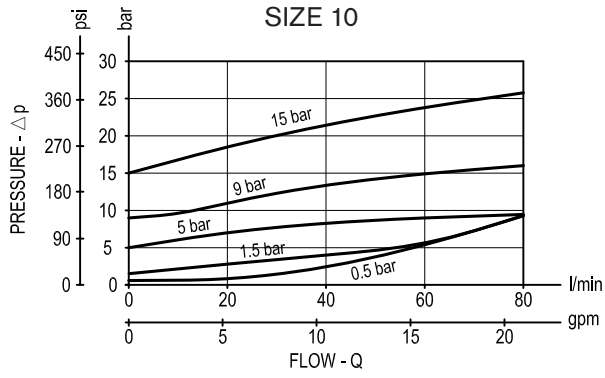
**CARTRIDGE TECHNICAL DATA**

Common cavity: **CA-10A-2N / CA-12A-2N / CA-16A-2N / CA-20A-2N**  
 For other details see data sheet RE 18318-90, RE 18318-91, RE 18318-92 and RE 18318-93

**Table "Z"**

Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Cracking pressure bar(psi)			Cracking pressure bar(psi)			Cracking pressure bar(psi)			Cracking pressure bar(psi)			Cracking pressure bar(psi)		
A0										0,35 (5.1)					
00				0,5 (7)			1 (15)			1 (15)			0,35 (5)		
01				1,4 (20)											
02										2 (30)					
03													3,5 (51)		
04										3,5 (51)					
05				5 (75)			5 (75)								
07													7 (102)		
08							8 (116)								
09				9 (131)											
12													12 (174)		
15				15 (220)			15 (220)								

Performance graphs





# Pilot operated check, pilot to open

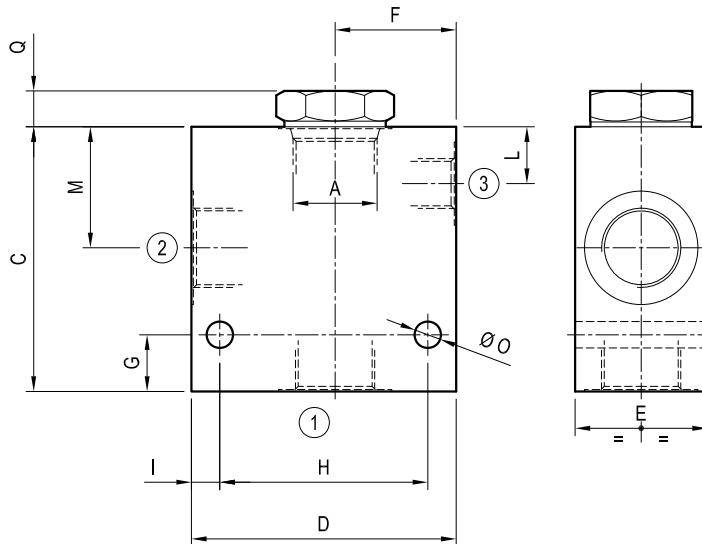
Common cavity

Cartridge style in manifold

VSON-C

OY.01 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 200 l/min (53 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

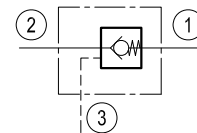
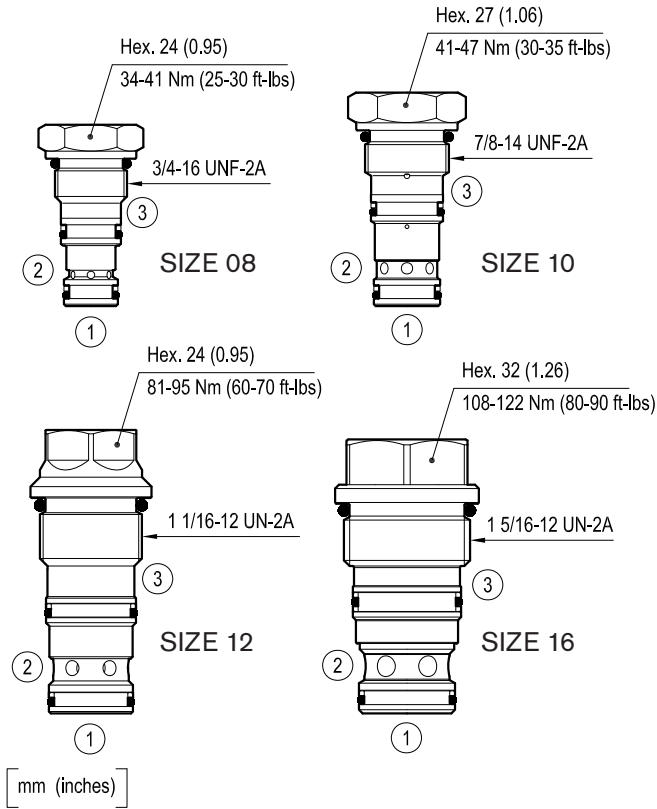


Table "Y"

Cavity A	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2	3		C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08	09	G 1/4	G 1/4	30 (8)	60 (2.36)	60 (2.36)	30 (1.18)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.3)	13 (0.51)	27 (1.06)		7 (0.28)	9 (0.35)	
	02	G 3/8	G 1/4		60 (2.36)	60 (2.36)	30 (1.18)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.3)	13 (0.51)	27 (1.06)		7 (0.28)		
SIZE 10	02	G 3/8	G 1/4	60 (16)	70 (2.76)	60 (2.36)	35 (1.38)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.30)	15 (0.59)	32 (1.26)		7 (0.28)	10 (0.39)	
	03	G 1/2	G 1/4		70 (2.76)	70 (2.76)	35 (1.38)	35 (1.38)	15 (0.59)	55 (2.17)	7.5 (0.30)	15 (0.59)	32 (1.26)		7 (0.28)		
SIZE 12	03	G 1/2	G 1/4	120 (32)	80 (3.15)	75 (2.95)	40 (1.58)	35 (1.38)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)		9 (0.35)	18 (0.71)	
	04	G 3/4	G 1/4		90 (3.54)	75 (2.95)	40 (1.58)	35 (1.38)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)		9 (0.35)		
SIZE 16	04	G 3/4	G 1/4	200 (53)	90 (3.54)	80 (3.15)	50 (1.97)	38 (1.50)	22 (0.87)	60 (2.36)	10 (0.39)	18.5 (0.73)	39 (1.54)		9 (0.35)	17 (0.67)	
	05	G 1	G 1/4		90 (3.54)	90 (3.54)	50 (1.97)	40 (1.58)	22 (0.87)	70 (2.76)	10 (0.39)	18.5 (0.73)	39 (1.54)		9 (0.35)		
SIZE 20																	

**Cartridge style**



**Table “K”**

				K			
CARTRIDGE CODE	04	33	06	X	56	Z	VSON-08A
	04	33	05	X	85	Z	VSON-10A
	04	33	07	X	57	Z	VSON-12A
	04	33	08	X	27	Z	VSON-16A

**Table “X”**

X	O-RING ON PILOT PISTON
00	No O-Ring
10	With O-Ring

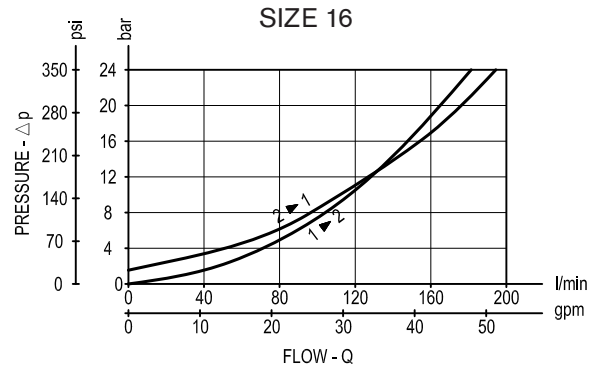
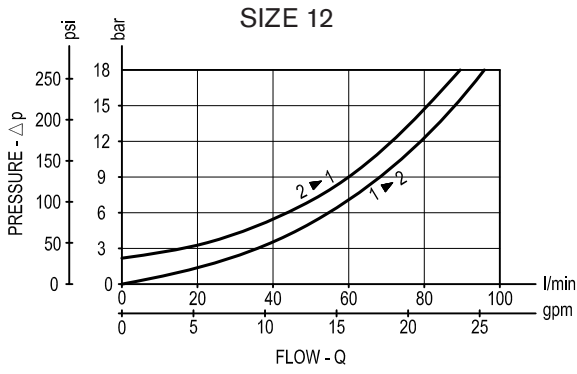
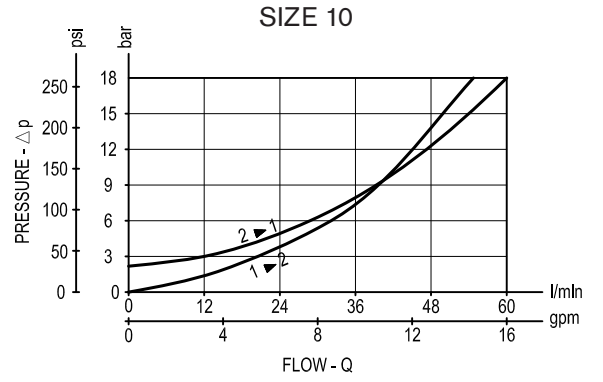
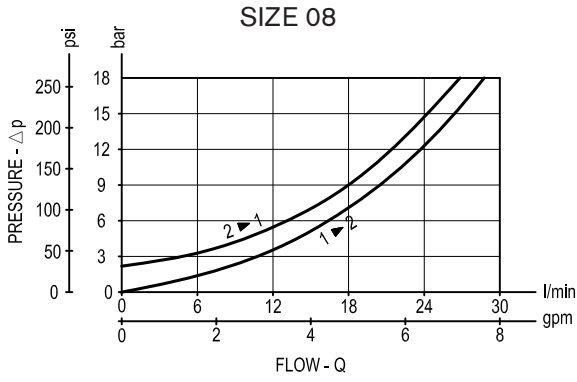
**CARTRIDGE TECHNICAL DATA**

Common cavity: CA-08A-3C / CA-10A-3C / CA-12A-3C / CA-16A-3C  
 For other details see data sheet RE 18319-30, RE 18319-31, RE 18319-32 and RE 18319-33.

**Table “Z”**

Z	SPRINGS									
	SIZE 08		SIZE 10		SIZE 12		SIZE 16		SIZE 20	
	Cracking pressure bar(psi)		Cracking pressure bar(psi)		Cracking pressure bar(psi)		Cracking pressure bar(psi)		Cracking pressure bar(psi)	
00	2 (30)		2 (30)		2 (30)		1.5 (22)			
05	5 (75)									

Performance graphs



## Ordering code

OY.01	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with pilot operated check, pilot to open**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - O-Ring on pilot piston  
(see table X on page 2)

**Manifold material**

= 00	Aluminium manifold
= S0	Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

## Preferred types (readily available)

Type	Material number
OY0106100200S0	R934000621
OY0105100300S0	R934000618
OY0107000400S0	R934001440
OY0108000500S0	R934000931

Type	Material number

Further types available by request



# Dual pilot operated check

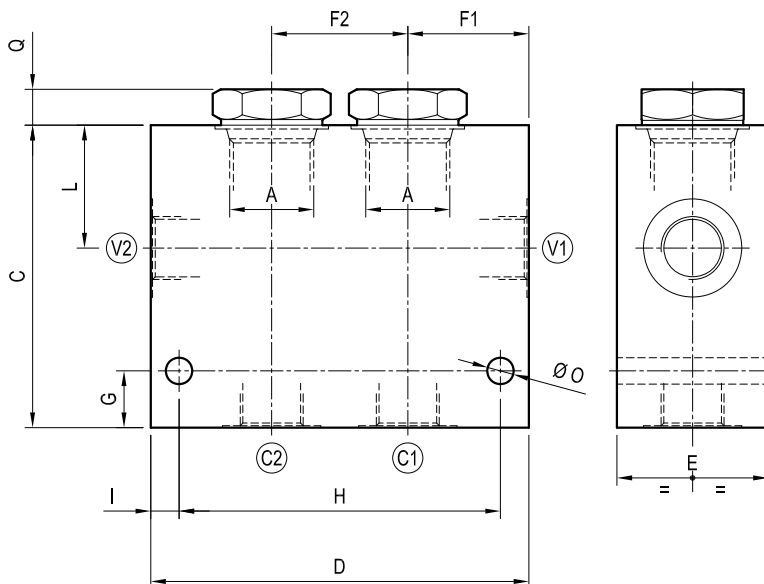
Double common cavity

Cartridge style in manifold

VSO-DE-C

2Y.01 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 200 l/min (53 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

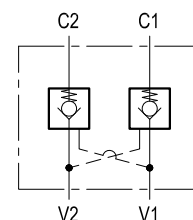
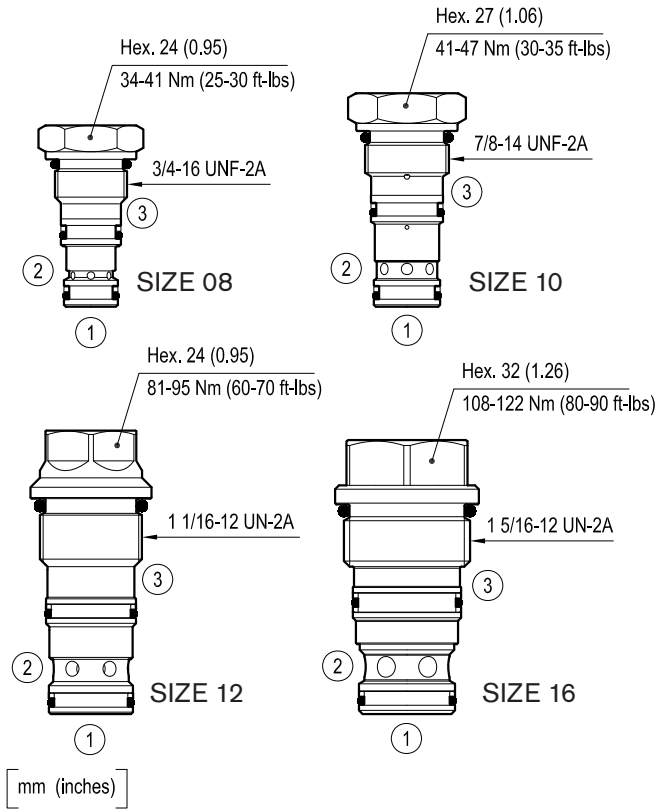


Table "Y"

Cavity A	Y	PORT SIZE V1-V2-C1-C2	Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
				C	D	E	F1	F2	G	H	I	L	M	O	Q	R
SIZE 08	02	G 3/8	30 (8)	60 (2.36)	90 (3.54)	30 (1.18)	27 (1.06)	36 (1.42)	15 (0.59)	75 (2.95)	7.5 (0.3)	27.5 (1.08)		7 (0.28)	9 (0.35)	
	03	G 1/2		80 (3.15)	100 (3.94)	40 (1.58)	32 (1.26)	36 (1.42)	15 (0.59)	85 (3.35)	7.5 (0.30)	32.5 (1.28)		7 (0.28)	10 (0.39)	
SIZE 12	03	G 1/2	120 (32)	90 (3.54)	125 (4.92)	50 (1.97)	40 (1.58)	45 (1.77)	15 (0.59)	105 (4.13)	10 (0.39)	41.5 (1.63)		7 (0.28)	18 (0.71)	
	04	G 3/4		90 (3.54)	125 (4.92)	50 (1.97)	40 (1.58)	45 (1.77)	15 (0.59)	105 (4.13)	10 (0.39)	41.5 (1.63)		7 (0.28)	18 (0.71)	
SIZE 16	05	G 1	200 (53)	90 (3.54)	145 (5.71)	50 (1.97)	45 (1.77)	55 (2.17)	22 (0.87)	125 (4.92)	10 (0.39)	38.5 (1.52)		9 (0.35)	17 (0.67)	
SIZE 20																

**Cartridge style**



**Table “K”**

			K				
CARTRIDGE CODE	04	33	06	X	56	Z	VSON-08A
	04	33	05	X	85	Z	VSON-10A
	04	33	07	X	57	Z	VSON-12A
	04	33	08	X	27	Z	VSON-16A

**Table “X”**

X	<b>O-RING ON PILOT PISTON</b>
00	No O-Ring
10	With O-Ring

**CARTRIDGE TECHNICAL DATA**

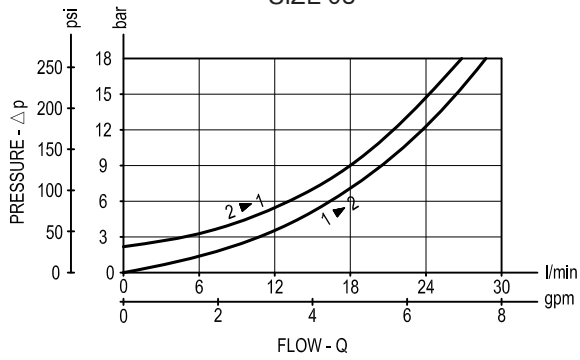
Common cavity: **CA-08A-3C / CA-10A-3C / CA-12A-3C / CA-16A-3C**  
 For other details see data sheet RE 18319-30, RE 18319-31, RE 18319-32 and RE 18319-33.

**Table “Z”**

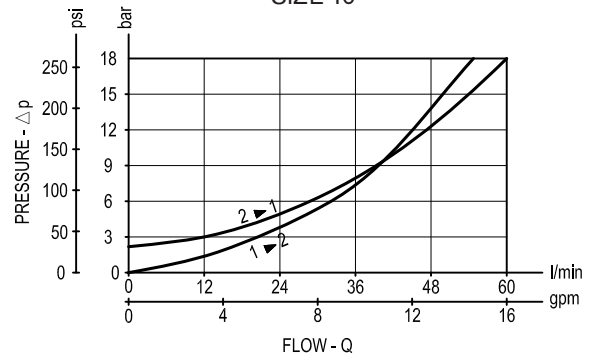
Z	SPRINGS									
	SIZE 08		SIZE 10		SIZE 12		SIZE 16		SIZE 20	
	Cracking pressure bar(psi)		Cracking pressure bar(psi)		Cracking pressure bar(psi)		Cracking pressure bar(psi)		Cracking pressure bar(psi)	
00	2 (30)		2 (30)		2 (30)		1.5 (22)			
05	5 (75)									

Performance graphs

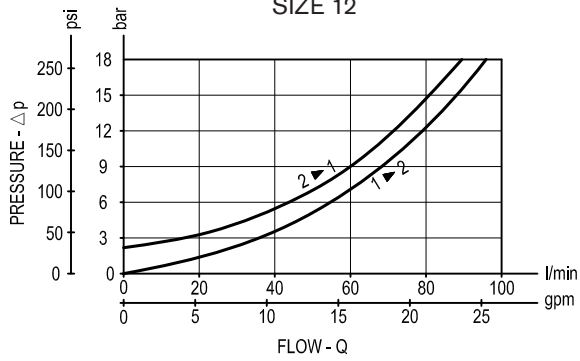
SIZE 08



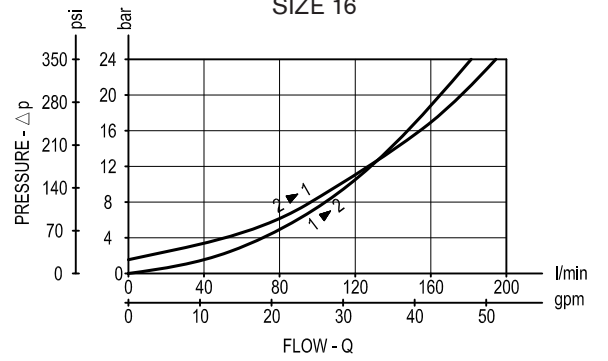
SIZE 10



SIZE 12



SIZE 16



### Ordering code

2Y.01	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with dual pilot operated check**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - O-Ring on pilot piston  
(see table X on page 2)

**Manifold material**

= 00 Aluminium manifold

= S0 Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

### Preferred types (readily available)

Type	Material number
2Y0106000200S0	R934001443
2Y0105000300S0	R934001445
2Y0107000400S0	R934001447
2Y0108000500S0	R934001449
2Y0105100300S0	R934000620
2Y0106100200S0	R934000619

Type	Material number

Further types available by request

# Counterbalance, standard poppet type

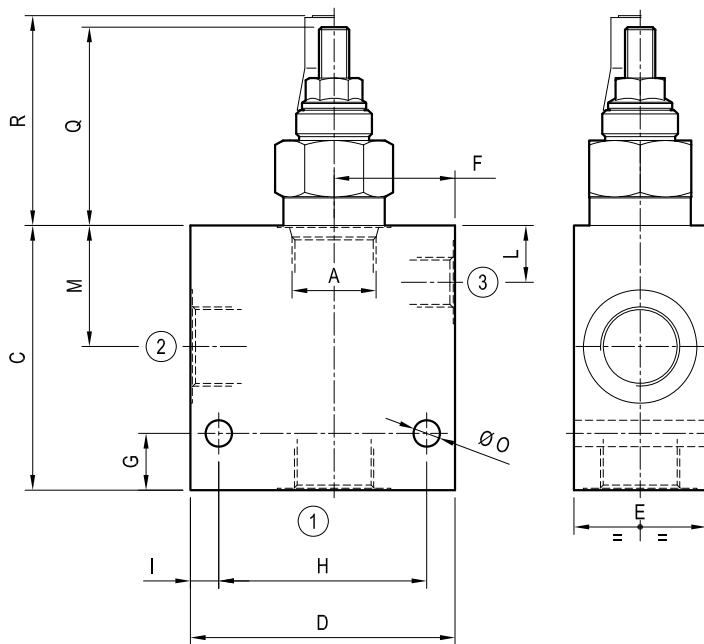
Common cavity

Cartridge style in manifold

VBSN-C

OY.02 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 320 l/min (85 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

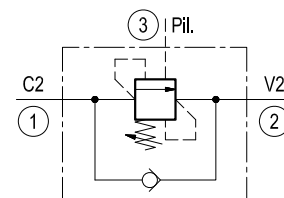
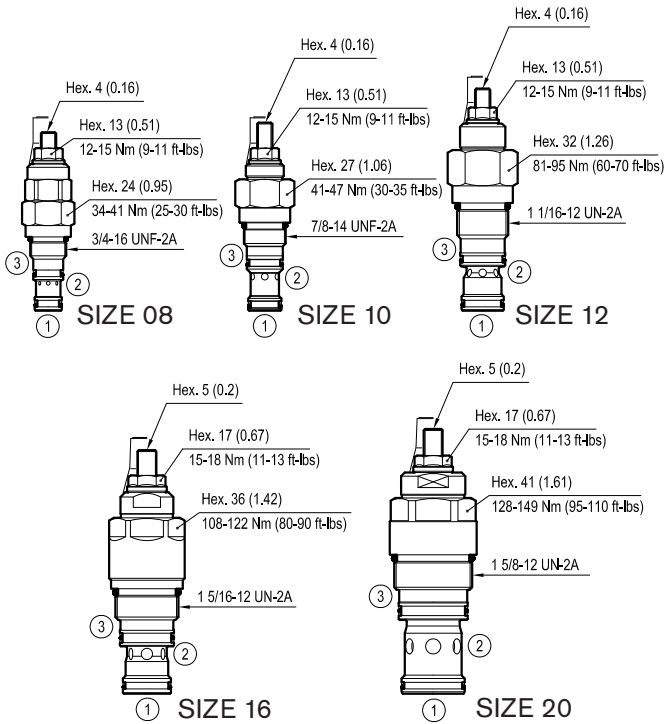


Table "Y"

Cavity A	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2	3		C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08	09	G 1/4	G 1/4	30 (8)	60 (2.36)	60 (2.36)	30 (1.18)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.3)	13 (0.51)	27 (1.06)		7 (0.28)	55 (2.17)	64 (2.52)
	02	G 3/8	G 1/4		60 (2.36)	60 (2.36)	30 (1.18)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.3)	13 (0.51)	27 (1.06)		7 (0.28)		
SIZE 10	02	G 3/8	G 1/4	60 (16)	70 (2.76)	60 (2.36)	35 (1.38)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.30)	15 (0.59)	32 (1.26)		7 (0.28)	53 (2.09)	59 (2.32)
	03	G 1/2	G 1/4		70 (2.76)	70 (2.76)	35 (1.38)	32 (1.26)	15 (0.59)	55 (2.17)	7.5 (0.30)	15 (0.59)	32 (1.26)		7 (0.28)		
SIZE 12	03	G 1/2	G 1/4	120 (32)	80 (3.15)	75 (2.95)	40 (1.58)	35 (1.38)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)		9 (0.35)	61 (2.4)	67 (2.64)
	04	G 3/4	G 1/4		90 (3.54)	75 (2.95)	40 (1.58)	35 (1.38)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)		9 (0.35)		
SIZE 16	04	G 3/4	G 1/4	200 (53)	90 (3.54)	80 (3.15)	50 (1.97)	38 (1.50)	22 (0.87)	60 (2.36)	10 (0.39)	18.5 (0.73)	39 (1.54)		9 (0.35)	73 (2.87)	80 (3.15)
	05	G 1	G 1/4		90 (3.54)	90 (3.54)	50 (1.97)	40 (1.58)	22 (0.87)	70 (2.76)	10 (0.39)	18.5 (0.73)	39 (1.54)		9 (0.35)		
SIZE 20	05	G 1	G 1/4	320 (85)	110 (4.33)	100 (3.94)	60 (2.36)	45 (1.77)	25 (0.98)	75 (2.95)	12.5 (0.49)	21 (0.83)	51 (2.01)		11 (0.43)	65 (2.56)	72.5 (2.85)
	06	G 1 1/4	G 1/4		110 (4.33)	100 (3.94)	60 (2.36)	45 (1.77)	25 (0.98)	75 (2.95)	12.5 (0.49)	21 (0.83)	51 (2.01)		11 (0.43)		

Cartridge style



[ mm (Inches) ]

Table "K"

CARTRIDGE CODE	K						
	04	52	20	X	56	Z	
	04	52	31	X	85	Z	VBSN-10A
	04	52	28	X	57	Z	VBSN-12A
	04	52	29	X	27	Z	VBSN-16A
	04	52	25	X	58	Z	VBSN-20A

Table "X"

X	PILOT RATIO		OPTIONS
03	4 : 1	3:1 only for K=31 version	 Ordering code K=20,31,28 11.04.23.002 K=29,25 11.04.23.004
10	8 : 1		
33	4 : 1	With sealed pilot (only for K=20 version)	

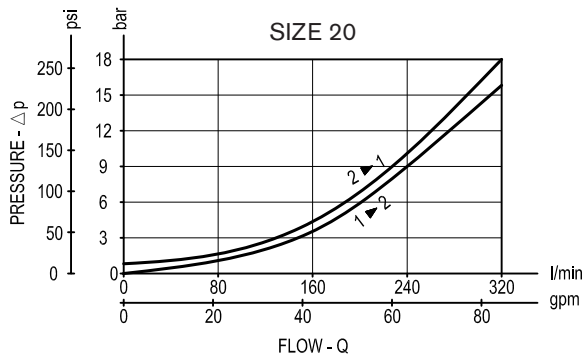
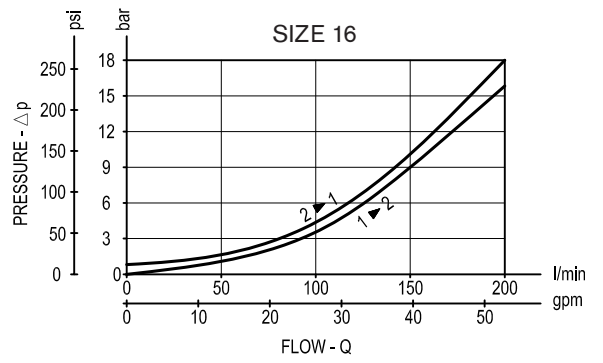
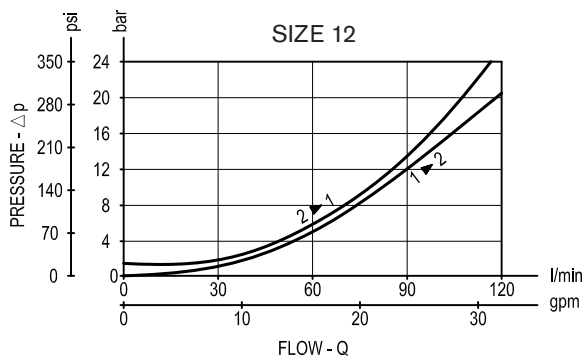
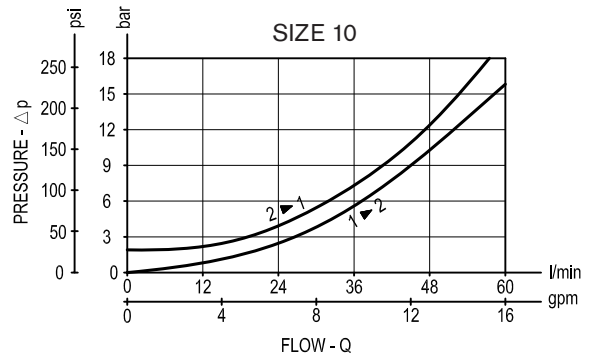
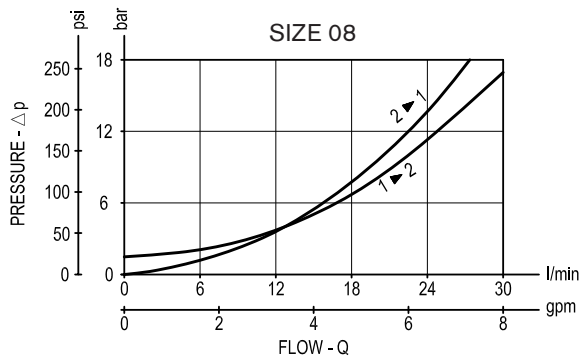
CARTRIDGE TECHNICAL DATA

Common cavity: CA-08A-3C / CA-10A-3C / CA-12A-3C / CA-16A-3C / CA-20A-3C  
 For other details see data sheet RE 18320-01, RE 18320-02, RE 18320-03, RE 18320-04 and RE 18320-05

Table "Z"

Z	SPRINGS															
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20			
	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	
X=03	15	70-150 (1000-2200)	72.5 (1051)	150 (2200)												
	20	100-210 (1450-3000)	109 (1581)	200 (2900)	70-210 (1000-3000)	135 (1958)	200 (2900)	70-210 (1000-3000)	50 (725)	200 (2900)	70-210 (1000-3000)	70 (1015)	200 (2900)	70-210 (1000-3000)	70 (1015)	200 (2900)
	35	200-350 (2900-5000)	137 (1987)	350 (5000)	140-350 (2000-5000)	196 (2842)	350 (5000)	140-350 (2000-5000)	159 (2306)	350 (5000)	140-350 (2000-5000)	108 (1566)	350 (5000)	140-350 (2000-5000)	108 (1566)	350 (5000)
X=10	20			70-210 (1000-3000)	52 (754)	200 (2900)	70-210 (1000-3000)	42 (609)	200 (2900)	70-210 (1000-3000)	39 (566)	200 (2900)	70-210 (1000-3000)	70 (1015)	200 (2900)	
	35			140-350 (2000-5000)	89 (1291)	350 (5000)	140-350 (2000-5000)	67 (972)	350 (5000)							
	40									140-420 (2000-6000)	135 (15958)	350 (5000)	140-420 (2000-6000)	135 (15958)	350 (5000)	
X=33	20	100-210 (1450-3000)	109 (1581)	200 (2900)												

### Performance graphs



## Ordering code

OY.02	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with counterbalance, standard poppet type**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Pilot ratio  
(see table X on page 2)

### Manifold material

= 00 Aluminium manifold

= S0 Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

## Preferred types (readily available)

Type	Material number
OY0220030220S0	R934001402
OY0220030235S0	R934001403
OY0231030320S0	R934001404
OY0231030335S0	R934001405
OY0228030420S0	R934001406
OY0228030435S0	R934001407
OY0229030520S0	R934001408
OY0229030535S0	R934001409
OY0225030620S0	R934001413
OY0225030635S0	R934001414
OY022503063500	R934000949
OY022803032000	R934003852
OY0228030320S0	R934003359

Type	Material number

Further types available by request



# Dual counterbalance, standard poppet type

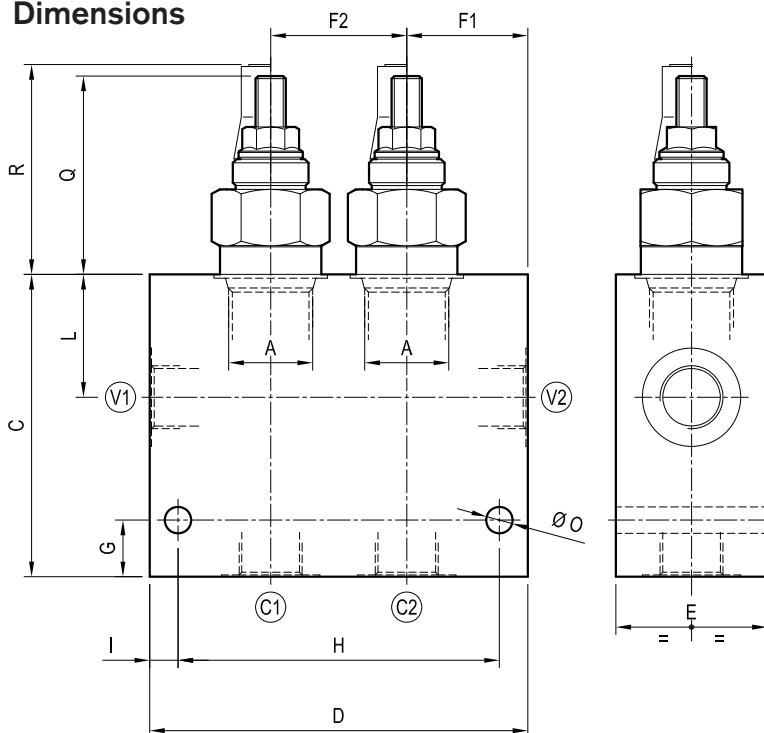
Double common cavity

Cartridge style in manifold

VBSN-DE-C

2Y.02 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow:	up to 320 l/min	(85 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

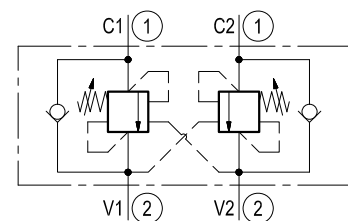
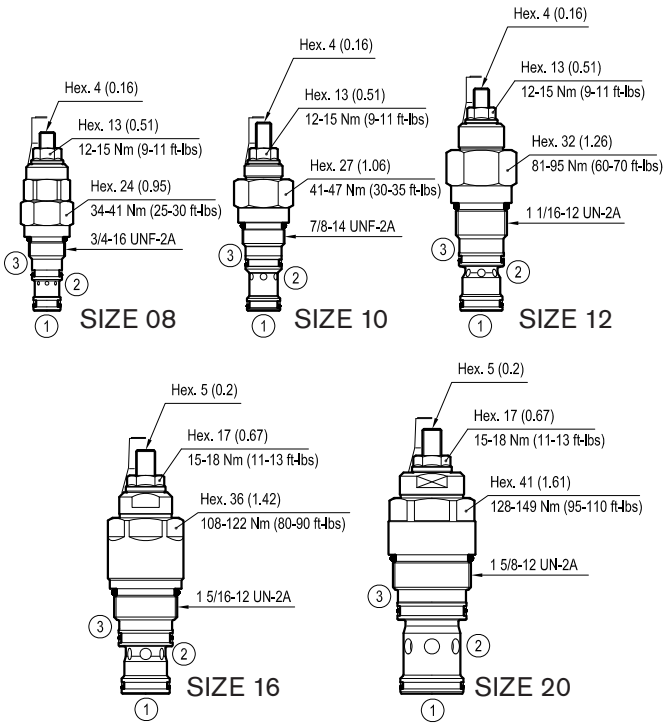


Table "Y"

Cavity	Y	PORT SIZE V1-V2-C1-C2	Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
				C	D	E	F1	F2	G	H	I	L	M	O	Q	R
SIZE 08	02	G 3/8	30 (8)	60 (2.36)	90 (3.54)	30 (1.18)	27 (1.06)	36 (1.42)	15 (0.59)	75 (2.95)	7.5 (0.3)	27.5 (1.08)		7 (0.28)	55 (2.17)	64 (2.52)
SIZE 10	02	G 3/8	60 (16)	80 (3.15)	100 (3.94)	40 (1.58)	32 (1.26)	36 (1.42)	15 (0.59)	85 (3.35)	7.5 (0.30)	32.5 (1.28)		7 (0.28)	53 (2.09)	59 (2.32)
	03	G 1/2		80 (3.15)	100 (3.94)	40 (1.58)	32 (1.26)	36 (1.42)	15 (0.59)	85 (3.35)	7.5 (0.30)	32.5 (1.28)		7 (0.28)		
SIZE 12	03	G 1/2	120 (32)	90 (3.54)	125 (4.92)	50 (1.97)	40 (1.58)	45 (1.77)	15 (0.59)	105 (4.13)	10 (0.39)	41.5 (1.63)		7 (0.28)	61 (2.4)	67 (2.64)
	04	G 3/4		90 (3.54)	125 (4.92)	50 (1.97)	40 (1.58)	45 (1.77)	15 (0.59)	105 (4.13)	10 (0.39)	41.5 (1.63)		7 (0.28)		
SIZE 16	05	G 1	200 (53)	90 (3.54)	145 (5.71)	50 (1.97)	45 (1.77)	55 (2.17)	22 (0.87)	125 (4.92)	10 (0.39)	38.5 (1.52)		9 (0.35)	73 (2.87)	80 (3.15)
SIZE 20	06	G 1 1/4	320 (85)	120 (4.72)	175 (6.89)	60 (2.36)	55 (2.17)	65 (2.56)	25 (0.98)	150 (5.91)	12.5 (0.49)	51 (2.01)		11 (0.43)	65 (2.56)	72.5 (2.85)

Cartridge style




[ mm (Inches) ]

Table "K"

				K			
CARTRIDGE CODE	04	52	20	X	56	Z	VBSN-08AA
	04	52	31	X	85	Z	VBSN-10A
	04	52	28	X	57	Z	VBSN-12A
	04	52	29	X	27	Z	VBSN-16A
	04	52	25	X	58	Z	VBSN-20A

Table "X"

X	PILOT RATIO		OPTIONS
03	4 : 1	3:1 only for K=31 version	 Ordering code K=20,31,28 11.04.23.002 K=29,25 11.04.23.004
10	8 : 1		
33	4 : 1	With sealed pilot (only for K=20 version)	

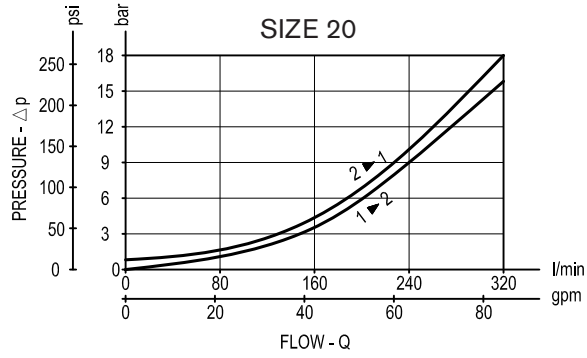
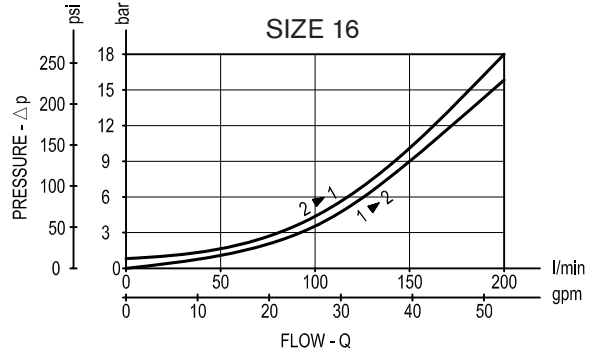
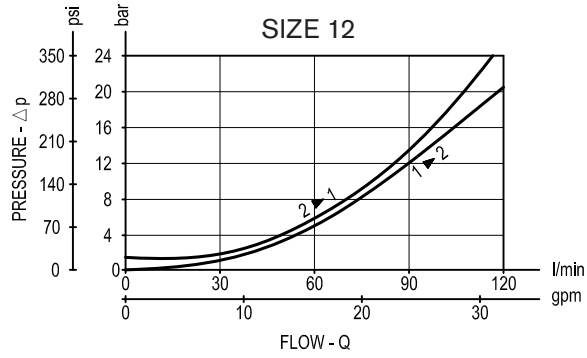
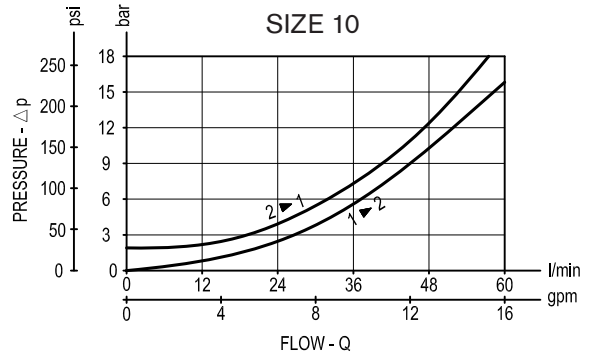
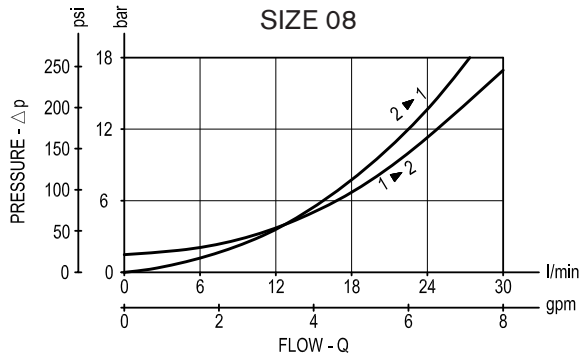
CARTRIDGE TECHNICAL DATA

Common cavity: CA-08A-3C / CA-10A-3C / CA-12A-3C / CA-16A-3C / CA-20A-3C  
 For other details see data sheet RE 18320-01, RE 18320-02, RE 18320-03, RE 18320-04 and RE 18320-05

Table "Z"

Z	SPRINGS															
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20			
	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	
X=03	15	70-150 (1000-2200)	72.5 (1051)	150 (2200)												
	20	100-210 (1450-3000)	109 (1581)	200 (2900)	70-210 (1000-3000)	135 (1958)	200 (2900)	70-210 (1000-3000)	50 (725)	200 (2900)	70-210 (1000-3000)	70 (1015)	200 (2900)	70-210 (1000-3000)	70 (1015)	200 (2900)
	35	200-350 (2900-5000)	137 (1987)	350 (5000)	140-350 (2000-5000)	196 (2842)	350 (5000)	140-350 (2000-5000)	159 (2306)	350 (5000)	140-350 (2000-5000)	108 (1566)	350 (5000)	140-350 (2000-5000)	108 (1566)	350 (5000)
X=10	20			70-210 (1000-3000)	52 (754)	200 (2900)	70-210 (1000-3000)	42 (609)	200 (2900)	70-210 (1000-3000)	39 (566)	200 (2900)	70-210 (1000-3000)	70 (1015)	200 (2900)	
	35			140-350 (2000-5000)	89 (1291)	350 (5000)	140-350 (2000-5000)	67 (972)	350 (5000)							
	40									140-420 (2000-6000)	135 (15958)	350 (5000)	140-420 (2000-6000)	135 (15958)	350 (5000)	
X=33	20	100-210 (1450-3000)	109 (1581)	200 (2900)												

Performance graphs



## Ordering code

2Y.02	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with dual counterbalance, standard poppet type**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Pilot ratio  
(see table X on page 2)

### Manifold material

= 00 Aluminium manifold

= S0 Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

## Preferred types (readily available)

Type	Material number
2Y0220030220S0	R934001415
2Y0220030235S0	R934001416
2Y0231030320S0	R934001426
2Y0231030335S0	R934001428
2Y0228030420S0	R934001432
2Y0228030435S0	R934001435
2Y0229030520S0	R934001436
2Y0229030535S0	R934003341
2Y0225030620S0	R934001439
2Y0225030635S0	R934003340
2Y022003022000	R934000653
2Y0225100640S0	R934003365
2Y022803032000	R934000656
2Y022803042000	R934000658
2Y0228100435S0	R934003490

Type	Material number
2Y0229100540S0	R934000807
2Y023103022000	R934000726
2Y0231030235S0	R934000876
2Y023103032000	R934000725
2Y0231100335S0	R934003491

Further types available by request

# Counterbalance, relief compensated, poppet type

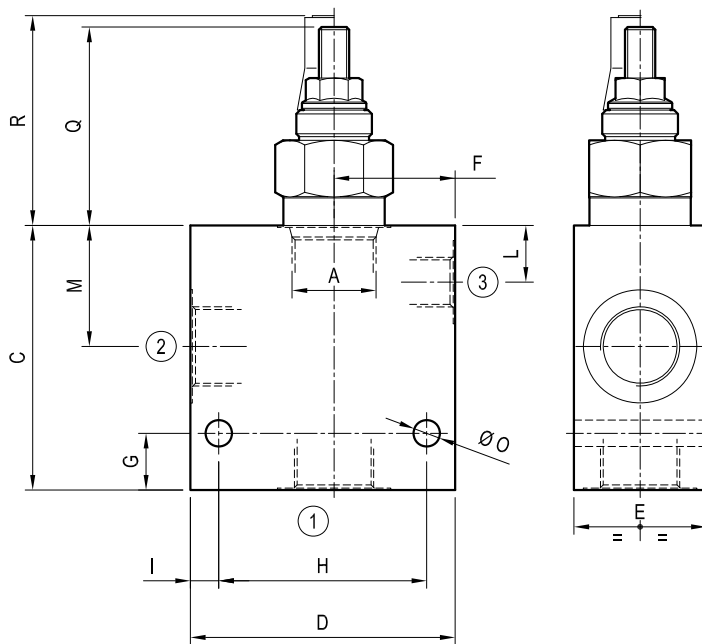
Common cavity

Cartridge style in manifold

**VBSP-C**

**OY.03 - K - X - Y - Z - W**

## Dimensions



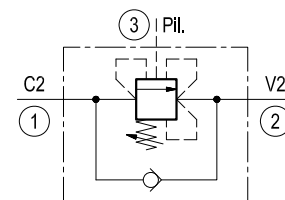
## Technical data

Max flow: up to 320 l/min (85 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

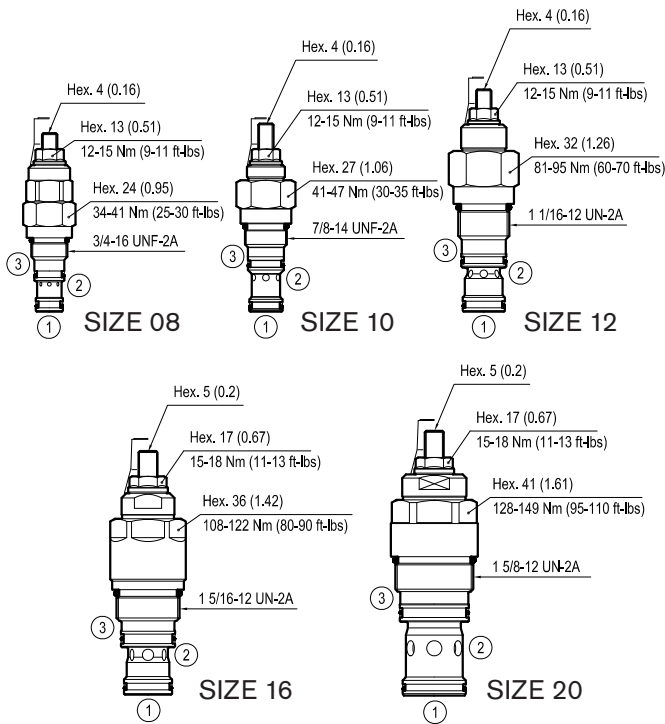
To order only manifold see data sheet RE 18325-85



**Table "Y"**

Cavity A	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2	3		C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08	09	G 1/4	G 1/4	30 (8)	60 (2.36)	60 (2.36)	30 (1.18)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.3)	13 (0.51)	27 (1.06)		7 (0.28)	55 (2.17)	64 (2.52)
	02	G 3/8	G 1/4		60 (2.36)	60 (2.36)	30 (1.18)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.3)	13 (0.51)	27 (1.06)		7 (0.28)		
SIZE 10	02	G 3/8	G 1/4	60 (16)	70 (2.76)	60 (2.36)	35 (1.38)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.30)	15 (0.59)	32 (1.26)		7 (0.28)	53 (2.09)	59 (2.32)
	03	G 1/2	G 1/4		70 (2.76)	70 (2.76)	35 (1.38)	32 (1.26)	15 (0.59)	55 (2.17)	7.5 (0.30)	15 (0.59)	32 (1.26)		7 (0.28)		
SIZE 12	03	G 1/2	G 1/4	120 (32)	80 (3.15)	75 (2.95)	40 (1.58)	35 (1.38)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)		7 (0.28)	61 (2.4)	67 (2.64)
	04	G 3/4	G 1/4		90 (3.54)	75 (2.95)	40 (1.58)	35 (1.38)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)		9 (0.35)		
SIZE 16	04	G 3/4	G 1/4	200 (53)	90 (3.54)	80 (3.15)	50 (1.97)	38 (1.50)	22 (0.87)	60 (2.36)	10 (0.39)	18.5 (0.73)	39 (1.54)		9 (0.35)	73 (2.87)	80 (3.15)
	05	G 1	G 1/4		90 (3.54)	90 (3.54)	50 (1.97)	40 (1.58)	22 (0.87)	70 (2.76)	10 (0.39)	18.5 (0.73)	39 (1.54)		9 (0.35)		
SIZE 20	05	G 1	G 1/4	320 (85)	110 (4.33)	100 (3.94)	60 (2.36)	45 (1.77)	25 (0.98)	75 (2.95)	12.5 (0.49)	21 (0.83)	51 (2.01)		11 (0.43)	65 (2.56)	72.5 (2.85)
	06	G 1 1/4	G 1/4		110 (4.33)	100 (3.94)	60 (2.36)	45 (1.77)	25 (0.98)	75 (2.95)	12.5 (0.49)	21 (0.83)	51 (2.01)		11 (0.43)		

**Cartridge style**




[ mm (inches) ]

**Table "K"**

			<b>K</b>				
CARTRIDGE CODE	04	54	04	X	56	Z	VBSP-08AA
	04	54	09	X	85	Z	VBSP-10A
	04	54	08	X	57	Z	VBSP-12A
	04	54	10	X	27	Z	VBSP-16A
	04	54	13	X	58	Z	VBSP-20A

**Table "X"**

X	PILOT RATIO		OPTIONS
<b>03</b>	4 : 1	3:1 only for K=09 version	 Ordering code K=04,09,08 11.04.23.002 K=10,13 11.04.23.004

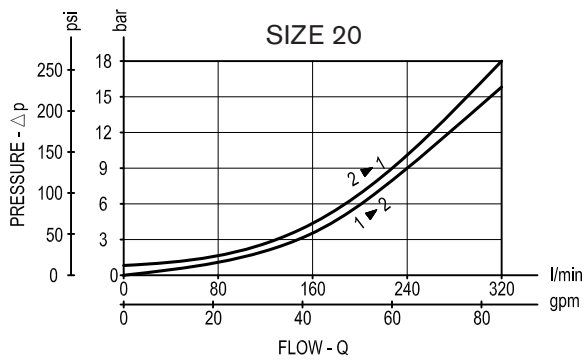
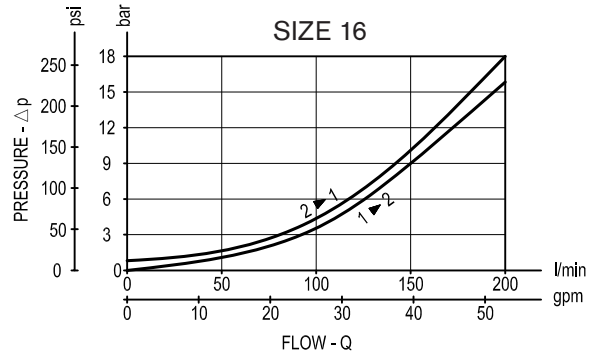
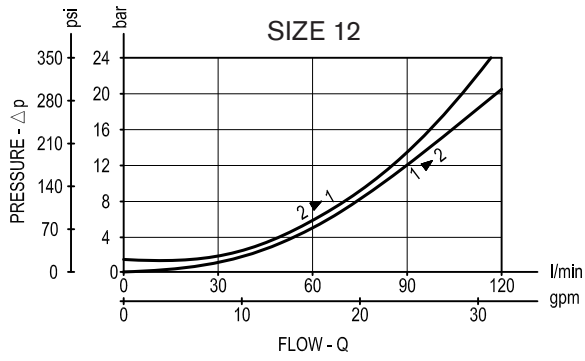
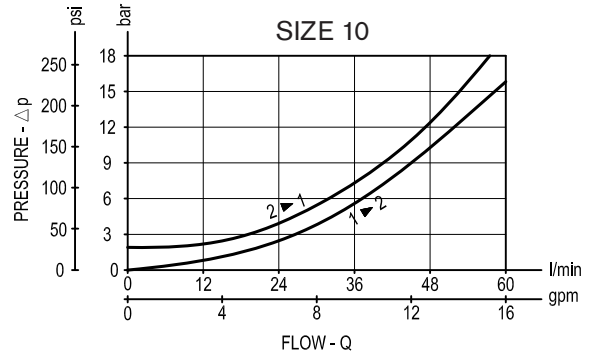
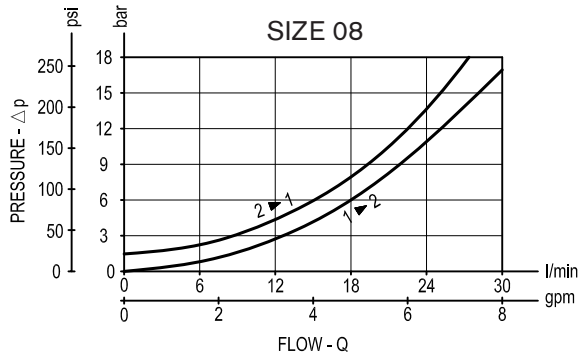
**CARTRIDGE TECHNICAL DATA**

Common cavity: **CA-08A-3C / CA-10A-3C / CA-12A-3C / CA-16A-3C / CA-20A-3C**  
 For other details see data sheet RE 18320-06, RE 18320-07, RE 18320-08, RE 18320-09 and RE 18320-10

**Table "Z"**

Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)
<b>20</b>	100-210 (1450-3000)	109 (1581)	200 (2900)	70-210 (1000-3000)	135 (1958)	200 (2900)	70-210 (1000-3000)	50 (725)	200 (2900)	70-210 (1000-3000)	70 (1015)	200 (2900)	70-210 (1000-3000)	70 (1015)	200 (2900)
<b>35</b>	200-350 (2900-5000)	137 (1987)	350 (5000)	140-350 (2000-5000)	196 (2842)	350 (5000)	140-350 (2000-5000)	159 (2306)	350 (5000)	140-350 (2000-5000)	108 (1566)	350 (5000)	140-350 (2000-5000)	108 (1566)	350 (5000)

Performance graphs



## Ordering code

OY.03	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with counterbalance, relief compensated, poppet type**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Pilot ratio  
(see table X on page 2)

### Manifold material

= 00 Aluminium manifold

= S0 Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

## Preferred types (readily available)

Type	Material number
OY0304030220S0	R934001351
OY0304030235S0	R934001356
OY0309030320S0	R934001363
OY0309030335S0	R934001367
OY0308030420S0	R934001368
OY0308030435S0	R934001396
OY0310030520S0	R934001399
OY0310030535S0	R934001398
OY0313030620S0	R934001400
OY0313030635S0	R934001401

Type	Material number

Further types available by request



# Dual counterbalance, relief compensated, poppet type

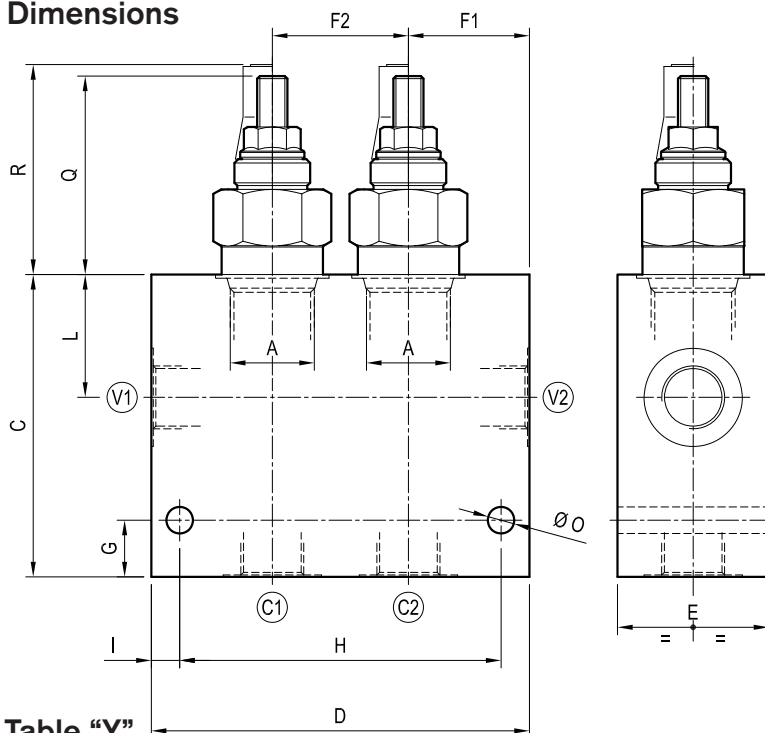
Double common cavity

Cartridge style in manifold

**VBSP-DE-C**

**2Y.03 - K - X - Y - Z - W**

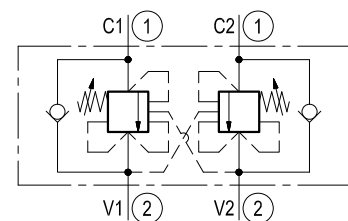
## Dimensions



## Technical data

Max flow:	up to 320 l/min	(85 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

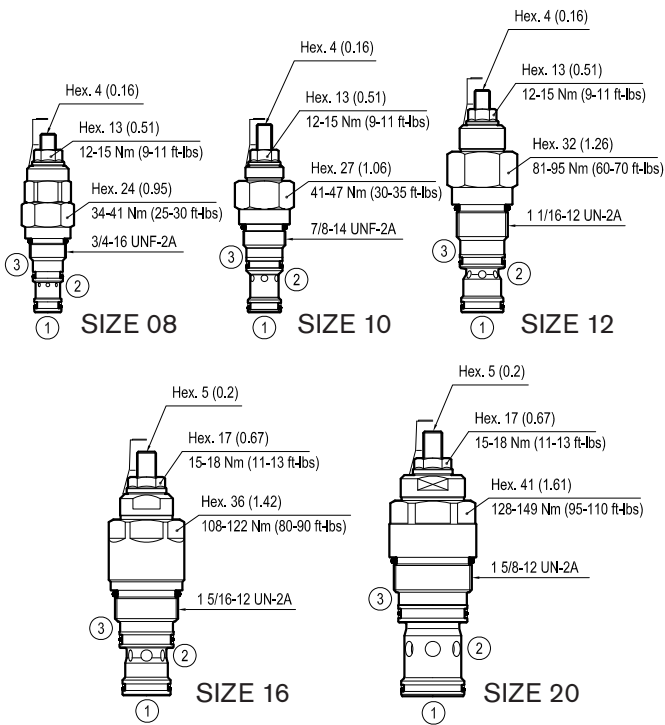
To order only manifold see data sheet RE 18325-85



**Table "Y"**

Cavity A	Y	PORT SIZE V1-V2-C1-C2	Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
				C	D	E	F1	F2	G	H	I	L	M	O	Q	R
SIZE 08	02	G 3/8	30 (8)	60 (2.36)	90 (3.54)	30 (1.18)	27 (1.06)	36 (1.42)	15 (0.59)	75 (2.95)	7.5 (0.3)	27.5 (1.08)		7 (0.28)	55 (2.17)	64 (2.52)
	03	G 1/2		80 (3.15)	100 (3.94)	40 (1.58)	32 (1.26)	36 (1.42)	15 (0.59)	85 (3.35)	7.5 (0.30)	32.5 (1.28)		7 (0.28)	53 (2.09)	59 (2.32)
SIZE 10	02	G 3/8	60 (16)	80 (3.15)	100 (3.94)	40 (1.58)	32 (1.26)	36 (1.42)	15 (0.59)	85 (3.35)	7.5 (0.30)	32.5 (1.28)		7 (0.28)	53 (2.09)	59 (2.32)
	03	G 1/2		80 (3.15)	100 (3.94)	40 (1.58)	32 (1.26)	36 (1.42)	15 (0.59)	85 (3.35)	7.5 (0.30)	32.5 (1.28)		7 (0.28)	53 (2.09)	59 (2.32)
SIZE 12	03	G 1/2	120 (32)	90 (3.54)	125 (4.92)	50 (1.97)	40 (1.58)	45 (1.77)	15 (0.59)	105 (4.13)	10 (0.39)	41.5 (1.63)		7 (0.28)	61 (2.4)	67 (2.64)
	04	G 3/4		90 (3.54)	125 (4.92)	50 (1.97)	40 (1.58)	45 (1.77)	15 (0.59)	105 (4.13)	10 (0.39)	41.5 (1.63)		7 (0.28)	61 (2.4)	67 (2.64)
SIZE 16	05	G 1	200 (53)	90 (3.54)	145 (5.71)	50 (1.97)	45 (1.77)	55 (2.17)	22 (0.87)	125 (4.92)	10 (0.39)	38.5 (1.52)		9 (0.35)	73 (2.87)	80 (3.15)
	06	G 1 1/4		120 (4.72)	175 (6.89)	60 (2.36)	55 (2.17)	65 (2.56)	25 (0.98)	150 (5.91)	12.5 (0.49)	51 (2.01)		11 (0.43)	65 (2.56)	72.5 (2.85)
SIZE 20	06	G 1 1/4	320 (85)	120 (4.72)	175 (6.89)	60 (2.36)	55 (2.17)	65 (2.56)	25 (0.98)	150 (5.91)	12.5 (0.49)	51 (2.01)		11 (0.43)	65 (2.56)	72.5 (2.85)

Cartridge style




[ mm (inches) ]

Table "K"

			K				
CARTRIDGE CODE	04	54	04	X	56	Z	VBSP-08AA
	04	54	09	X	85	Z	VBSP-10A
	04	54	08	X	57	Z	VBSP-12A
	04	54	10	X	27	Z	VBSP-16A
	04	54	13	X	58	Z	VBSP-20A

Table "X"

X	PILOT RATIO		OPTIONS
03	4 : 1	3:1 only for K=09 version	 Ordering code K=04,09,08 11.04.23.002 K=10,13 11.04.23.004

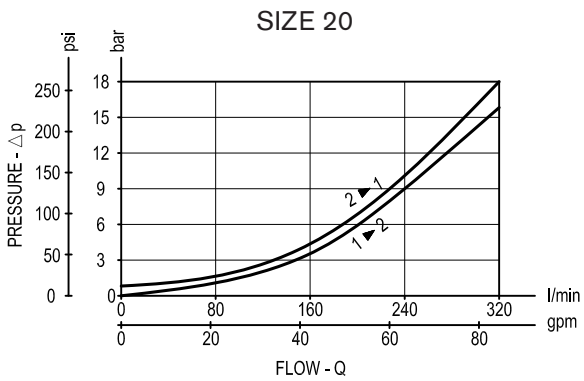
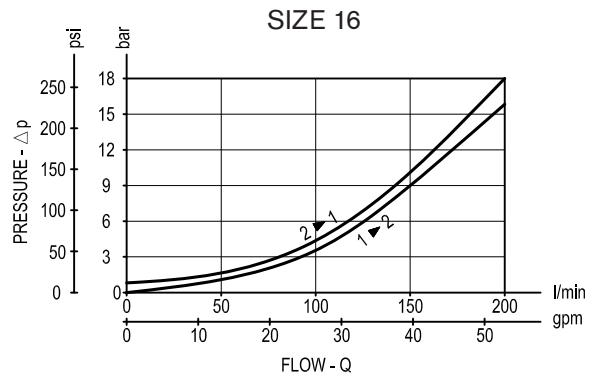
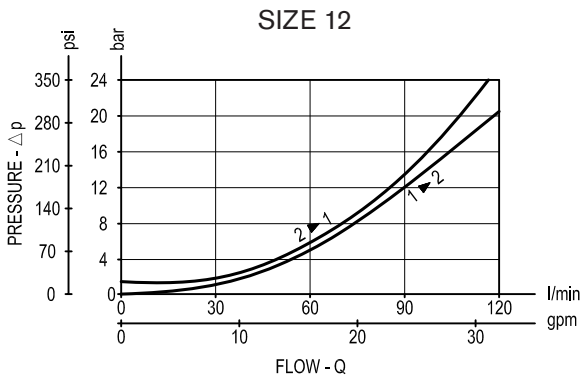
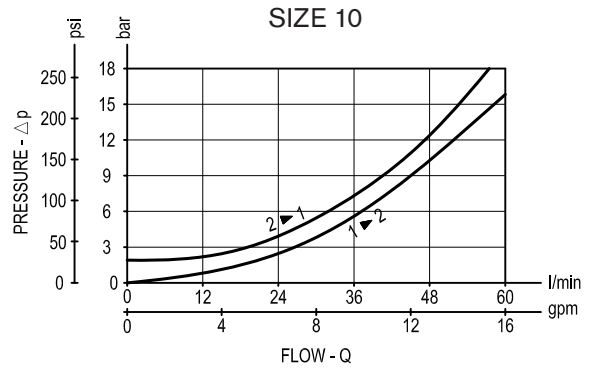
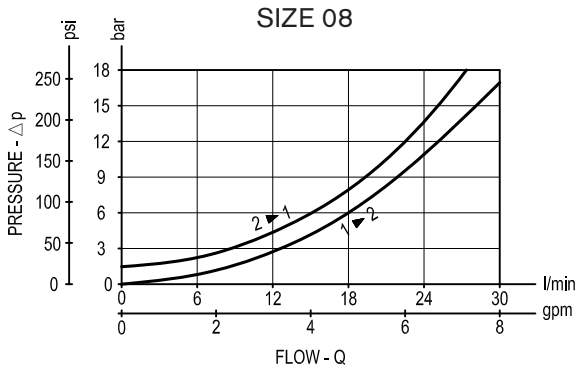
CARTRIDGE TECHNICAL DATA

Common cavity: CA-08A-3C / CA-10A-3C / CA-12A-3C / CA-16A-3C / CA-20A-3C  
 For other details see data sheet RE 18320-06, RE 18320-07, RE 18320-08, RE 18320-09 and RE 18320-10

Table "Z"

Z	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)
20	100-210 (1450-3000)	109 (1581)	200 (2900)	70-210 (1000-3000)	135 (1958)	200 (2900)	70-210 (1000-3000)	50 (725)	200 (2900)	70-210 (1000-3000)	70 (1015)	200 (2900)	70-210 (1000-3000)	70 (1015)	200 (2900)
35	200-350 (2900-5000)	137 (1987)	350 (5000)	140-350 (2000-5000)	196 (2842)	350 (5000)	140-350 (2000-5000)	159 (2306)	350 (5000)	140-350 (2000-5000)	108 (1566)	350 (5000)	140-350 (2000-5000)	108 (1566)	350 (5000)

Performance graphs



**Ordering code**

<b>2Y.03</b>	<b>K</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>W</b>
--------------	----------	----------	----------	----------	----------

**Manifold with dual counterbalance, relief compensated, poppet type**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Pilot ratio  
(see table X on page 2)

**Manifold material**

= 00 Aluminium manifold

= S0 Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

**Preferred types (readily available)**

Type	Material number
2Y0304030220S0	R934001325
2Y0304030235S0	R934001326
2Y0309030320S0	R934001328
2Y0309030335S0	R934001329
2Y0308030420S0	R934001332
2Y0308030435S0	R934001333
2Y0310030520S0	R934001335
2Y0310030535S0	R934001336
2Y0313030620S0	R934001344
2Y0313030635S0	R934001346
2Y030803032000	R934003938
2Y030903032000	R934003843

Type	Material number

Further types available by request

# Counterbalance, vented guided poppet type

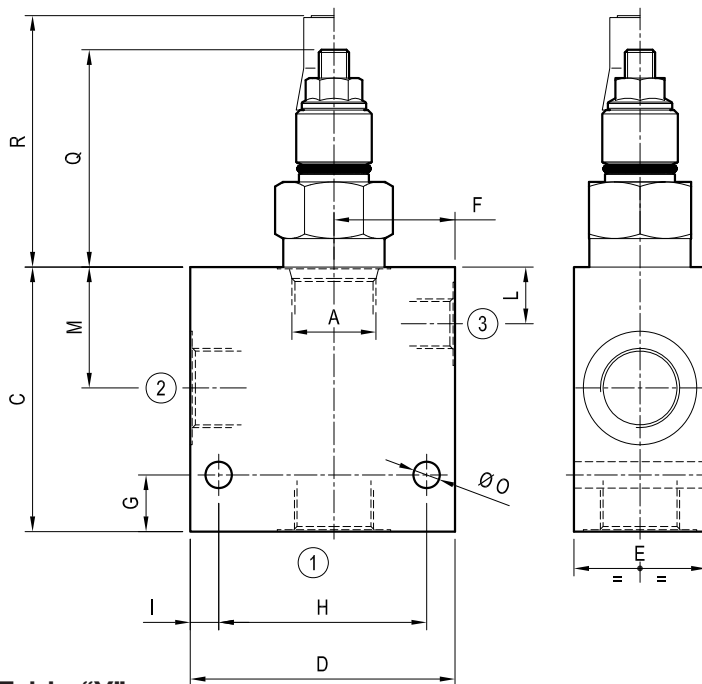
Common cavity

Cartridge style in manifold

VBST-C

OY.04 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 320 l/min (85 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

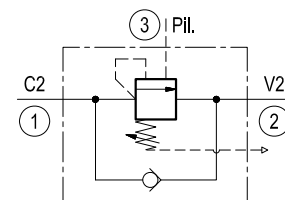
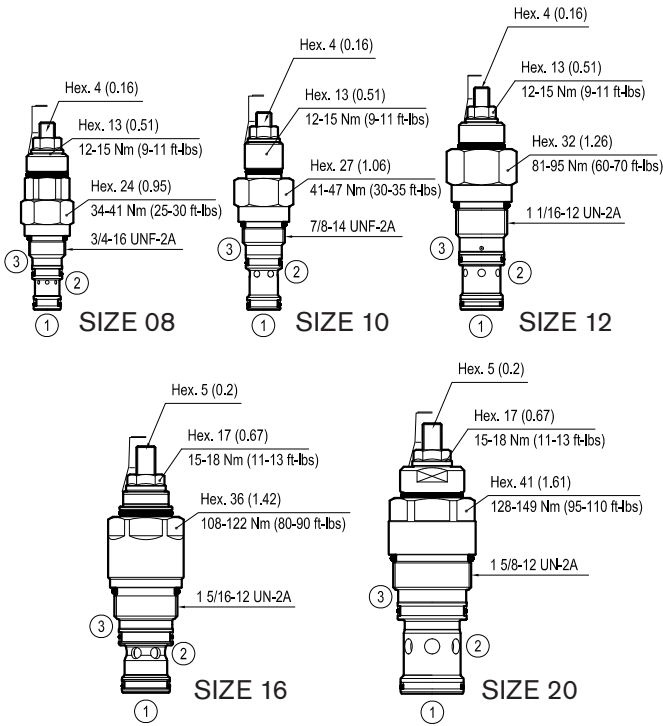


Table "Y"

Cavity A	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2	3		C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08	09	G 1/4	G 1/4	30 (8)	60 (2.36)	60 (2.36)	30 (1.18)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.3)	13 (0.51)	27 (1.06)		7 (0.28)	60 (2.36)	69 (2.72)
	02	G 3/8	G 1/4		60 (2.36)	60 (2.36)	30 (1.18)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.3)	13 (0.51)	27 (1.06)		7 (0.28)		
SIZE 10	02	G 3/8	G 1/4	60 (16)	70 (2.76)	60 (2.36)	35 (1.38)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.30)	15 (0.59)	32 (1.26)		7 (0.28)	59 (2.32)	67 (2.64)
	03	G 1/2	G 1/4		70 (2.76)	70 (2.76)	35 (1.38)	32 (1.26)	15 (0.59)	55 (2.17)	7.5 (0.30)	15 (0.59)	32 (1.26)		7 (0.28)		
SIZE 12	03	G 1/2	G 1/4	120 (32)	80 (3.15)	75 (2.95)	40 (1.58)	35 (1.38)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)		7 (0.28)	61 (2.4)	67 (2.64)
	04	G 3/4	G 1/4		90 (3.54)	75 (2.95)	40 (1.58)	35 (1.38)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)		9 (0.35)		
SIZE 16	04	G 3/4	G 1/4	200 (53)	90 (3.54)	80 (3.15)	50 (1.97)	38 (1.50)	22 (0.87)	60 (2.36)	10 (0.39)	18.5 (0.73)	39 (1.54)		9 (0.35)	75 (2.95)	80 (3.15)
	05	G 1	G 1/4		90 (3.54)	90 (3.54)	50 (1.97)	40 (1.58)	22 (0.87)	70 (2.76)	10 (0.39)	18.5 (0.73)	39 (1.54)		9 (0.35)		
SIZE 20	05	G 1	G 1/4	320 (85)	110 (4.33)	100 (3.94)	60 (2.36)	45 (1.77)	25 (0.98)	75 (2.95)	12.5 (0.49)	21 (0.83)	51 (2.01)		11 (0.43)	69 (2.72)	75.5 (2.97)
	06	G 1 1/4	G 1/4		110 (4.33)	100 (3.94)	60 (2.36)	45 (1.77)	25 (0.98)	75 (2.95)	12.5 (0.49)	21 (0.83)	51 (2.01)		11 (0.43)		

Cartridge style




[ mm (inches) ]

Table "K"

			K				
CARTRIDGE CODE	04	59	08	X	56	Z	VBST-08AA
	04	59	16	X	85	Z	VBST-10A
	04	59	26	X	57	Z	VBST-12A
	04	59	27	X	27	Z	VBST-16A
	04	59	18	X	58	Z	VBST-20A

Table "X"

X	PILOT RATIO		OPTIONS
03	4 : 1	3:1 only for K=16 version	 Ordering code K=08,16,26   11.04.23.002 K=27,18   11.04.23.004

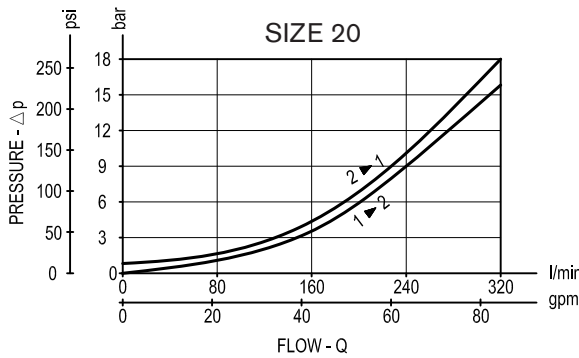
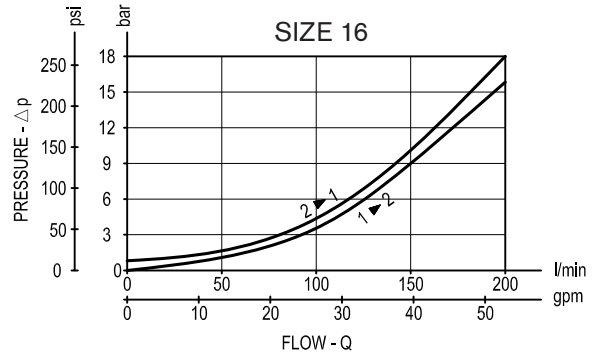
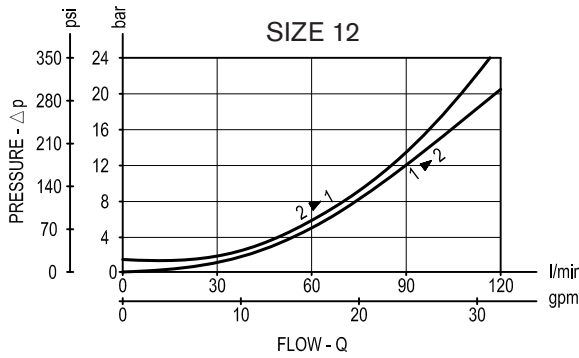
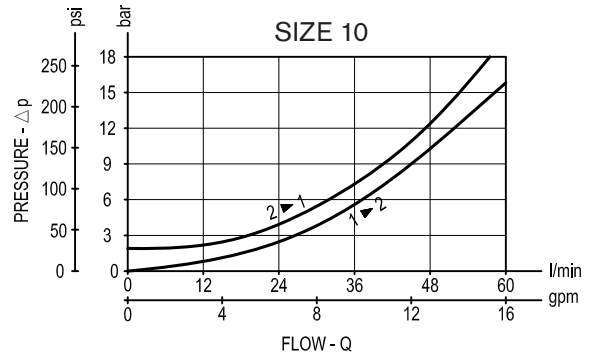
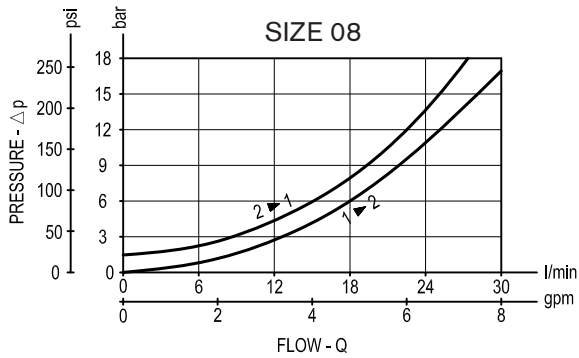
CARTRIDGE TECHNICAL DATA

Common cavity: **CA-08A-3C / CA-10A-3C / CA-12A-3C / CA-16A-3C / CA-20A-3C**  
 For other details see data sheet RE 18320-11, RE 18320-12, RE 18320-13, RE 18320-14 and RE 18320-15.

Table "Z"

Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)
20	100-210 (1450-3000)	109 (1581)	200 (2900)	70-210 (1000-3000)	95 (1378)	200 (2900)	70-210 (1000-3000)	50 (725)	200 (2900)				70-210 (1000-3000)	95 (1378)	200 (2900)
35	200-350 (2900-5000)	137 (1987)	350 (5000)	140-350 (2000-5000)	129 (1871)	350 (5000)	140-350 (2000-5000)	159 (2306)	350 (5000)	140-350 (2000-5000)	83.5 (1210)	350 (5000)	140-350 (2000-5000)	129 (1871)	350 (5000)

Performance graphs



### Ordering code

OY.04	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with counterbalance, vented guided poppet type**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Pilot ratio  
(see table X on page 2)

**Manifold material**

= 00 Aluminium manifold

= S0 Steel manifold

**Settings** - Springs  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

### Preferred types (readily available)

Type	Material number
OY0408030220S0	R934001303
OY0408030235S0	R934001304
OY0416030320S0	R934001306
OY0416030335S0	R934001307
OY0426030420S0	R934001308
OY0426030435S0	R934001309
OY0427030535S0	R934001311
OY0418030620S0	R934001322
OY0418030635S0	R934001323

Type	Material number

Further types available by request



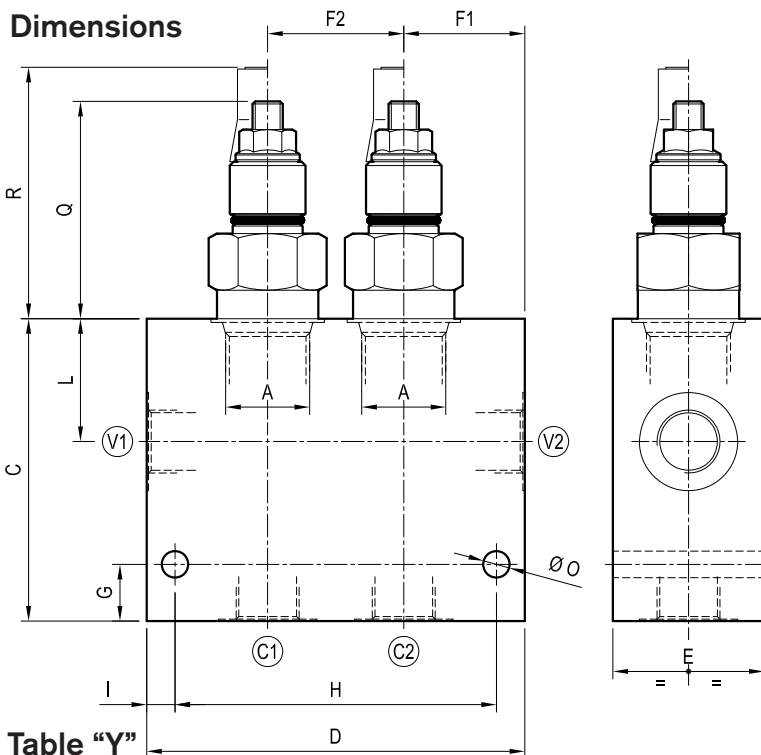
# Dual counterbalance, vented guided poppet type

Double common cavity

Cartridge style in manifold

VBST-DE-C

2Y.04 - K - X - Y - Z - W



## Technical data

Max flow:	up to 320 l/min	(85 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

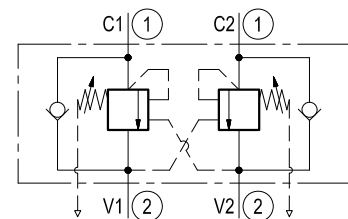
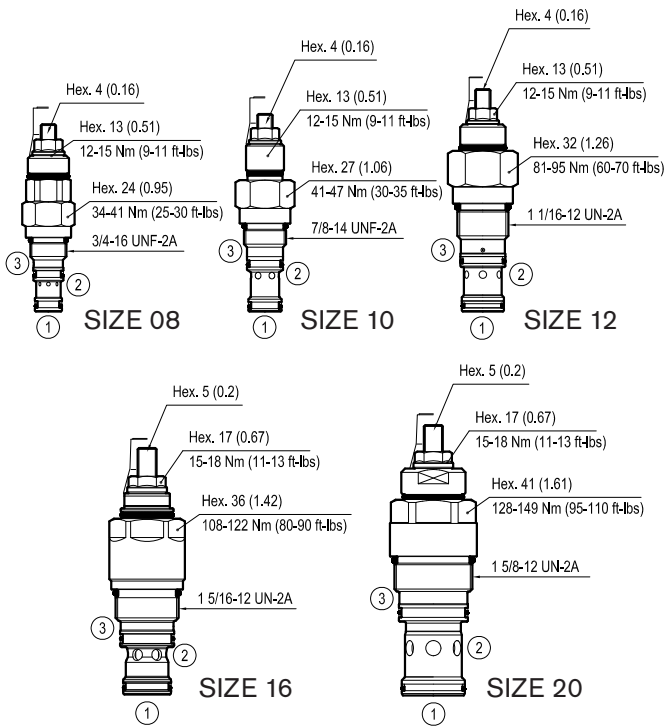


Table "Y"

Cavity	Y	PORT SIZE V1-V2-C1-C2	Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
				C	D	E	F1	F2	G	H	I	L	M	O	Q	R
SIZE 08	02	G 3/8	30 (8)	60 (2.36)	90 (3.54)	30 (1.18)	27 (1.06)	36 (1.42)	15 (0.59)	75 (2.95)	7.5 (0.3)	27.5 (1.08)		7 (0.28)	55 (2.17)	64 (2.52)
SIZE 10	02	G 3/8	60 (16)	80 (3.15)	100 (3.94)	40 (1.58)	32 (1.26)	36 (1.42)	15 (0.59)	85 (3.35)	7.5 (0.30)	32.5 (1.28)		7 (0.28)	53 (2.09)	59 (2.32)
	03	G 1/2		80 (3.15)	100 (3.94)	40 (1.58)	32 (1.26)	36 (1.42)	15 (0.59)	85 (3.35)	7.5 (0.30)	32.5 (1.28)		7 (0.28)		
SIZE 12	03	G 1/2	120 (32)	90 (3.54)	125 (4.92)	50 (1.97)	40 (1.58)	45 (1.77)	15 (0.59)	105 (4.13)	10 (0.39)	41.5 (1.63)		7 (0.28)	61 (2.4)	67 (2.64)
	04	G 3/4		90 (3.54)	125 (4.92)	50 (1.97)	40 (1.58)	45 (1.77)	15 (0.59)	105 (4.13)	10 (0.39)	41.5 (1.63)		7 (0.28)		
SIZE 16	05	G 1	200 (53)	90 (3.54)	145 (5.71)	50 (1.97)	45 (1.77)	55 (2.17)	22 (0.87)	125 (4.92)	10 (0.39)	38.5 (1.52)		9 (0.35)	73 (2.87)	80 (3.15)
SIZE 20	06	G 1 1/4	320 (85)	120 (4.72)	175 (6.89)	60 (2.36)	55 (2.17)	65 (2.56)	25 (0.98)	150 (5.91)	12.5 (0.49)	51 (2.01)		11 (0.43)	65 (2.56)	72.5 (2.85)

Cartridge style




[ mm (inches) ]

Table "K"

			<b>K</b>				
CARTRIDGE CODE	04	59	<b>08</b>	X	56	Z	VBST-08AA
	04	59	<b>16</b>	X	85	Z	VBST-10A
	04	59	<b>26</b>	X	57	Z	VBST-12A
	04	59	<b>27</b>	X	27	Z	VBST-16A
	04	59	<b>18</b>	X	58	Z	VBST-20A

Table "X"

X	PILOT RATIO		OPTIONS
<b>03</b>	4 : 1	3:1 only for K=16 version	 Ordering code K=08,16,26 11.04.23.002 K=27,18 11.04.23.004

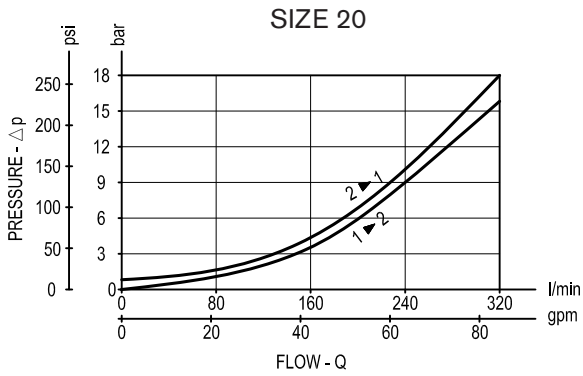
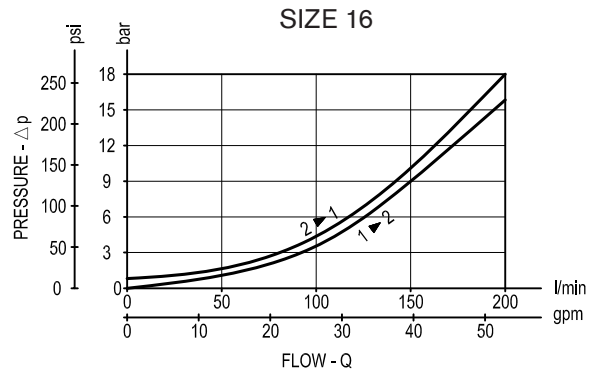
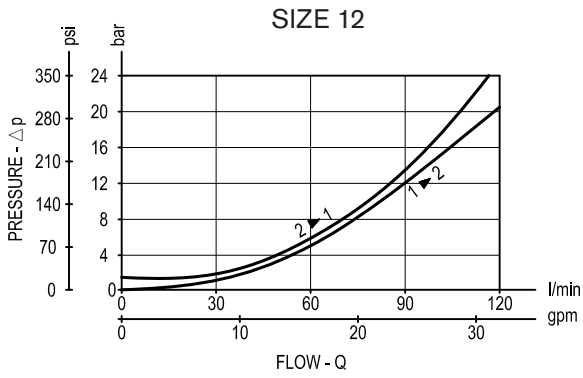
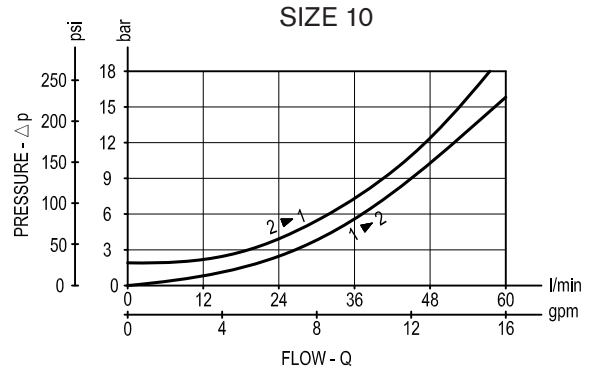
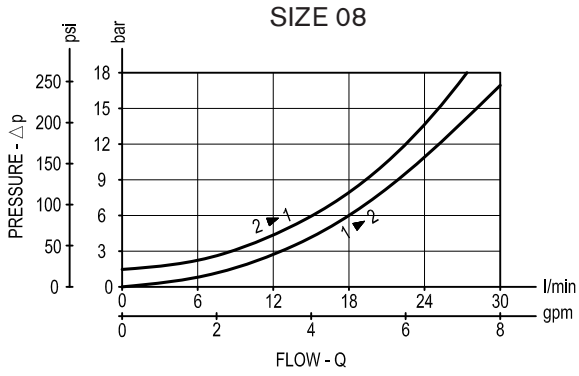
**CARTRIDGE TECHNICAL DATA**

Common cavity: **CA-08A-3C / CA-10A-3C / CA-12A-3C / CA-16A-3C / CA-20A-3C**  
 For other details see data sheet RE 18320-11, RE 18320-12, RE 18320-13, RE 18320-14 and RE 18320-15.

Table "Z"

Z	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Adj. press. range bar (psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)
<b>20</b>	100-210 (1450-3000)	109 (1581)	200 (2900)	70-210 (1000-3000)	95 (1378)	200 (2900)	70-210 (1000-3000)	50 (725)	200 (2900)				70-210 (1000-3000)	95 (1378)	200 (2900)
<b>35</b>	200-350 (2900-5000)	137 (1987)	350 (5000)	140-350 (2000-5000)	129 (1871)	350 (5000)	140-350 (2000-5000)	159 (2306)	350 (5000)	140-350 (2000-5000)	83.5 (1210)	350 (5000)	140-350 (2000-5000)	129 (1871)	350 (5000)

Performance graphs



### Ordering code

2Y.04	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with double counterbalance, vented guided poppet type**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Pilot ratio  
(see table X on page 2)

**Manifold material**

= 00 Aluminium manifold

= S0 Steel manifold

**Settings - Springs**  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

### Preferred types (readily available)

Type	Material number
2Y0408030220S0	R934001290
2Y0408030235S0	R934001291
2Y0416030320S0	R934001292
2Y0416030335S0	R934001293
2Y0426030420S0	R934001294
2Y0426030435S0	R934001295
2Y0427030535S0	R934001297
2Y0418030620S0	R934001298
2Y0418030635S0	R934001300
2Y0427030520S0	R934001296

Type	Material number

Further types available by request

# Flow control, restrictor

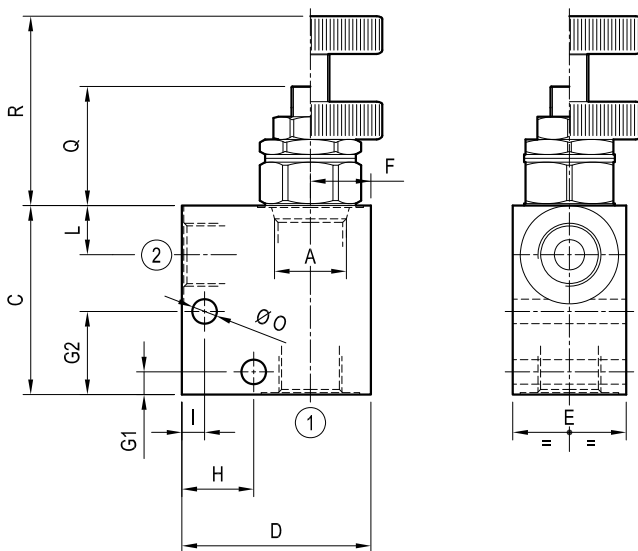
Common cavity

Cartridge style in manifold

ST-C-06-C

ON.01 - K - X - Y - 00 - W

## Dimensions



## Technical data

Max flow: up to 40 l/min (11 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

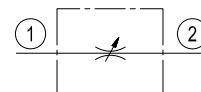


Table "Y"

Cavity	Y	PORT SIZE		Rated Flow l/min (gpm)	DIMENSIONS mm (Inches)											
		1 - 2			C	D	E	F	G1	G2	H	I	L	O	Q	R
SIZE 09	09	G 1/4		up to 40 (11)	50 (1.97)	50 (1.97)	30 (1.18)	16 (0.63)	6 (0.24)	22 (0.87)	19 (0.75)	6 (0.24)	13 (0.51)	6.5 (0.26)	32 (1.26)	51 (2.00)
SIZE 08	02	G 3/8			50 (1.97)	50 (1.97)	30 (1.18)	16 (0.63)	6 (0.24)	22 (0.87)	19 (0.75)	6 (0.24)	13 (0.51)	6.5 (0.26)		
SIZE 10																
SIZE 12																
SIZE 16																
SIZE 20																

### Cartridge style

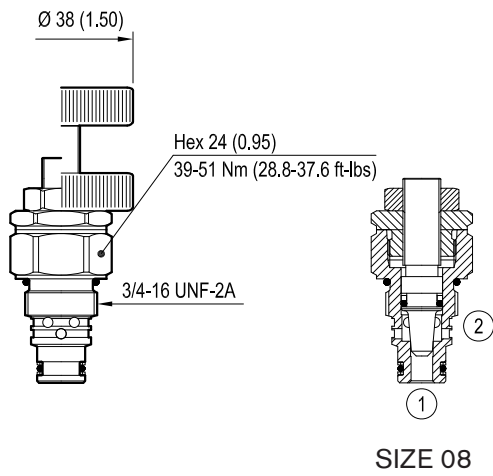




Table "K"

					K		
CARTRIDGE CODE	OD	21	01	X	56	00	ST-C-06-C

Table "X"

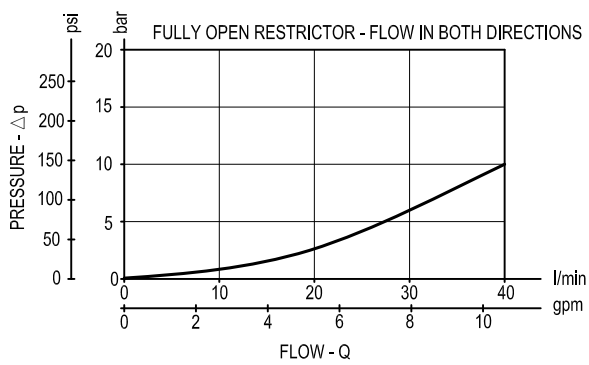
X	ADJUSTMENTS	
<b>03</b>	Leakproof hex. socket screw 	
<b>04</b>	Handknob and locknut 	

[ mm (inches) ]

### CARTRIDGE TECHNICAL DATA

Common cavity: **CA-08A-2N**  
 For other details see data sheet RE 18321-26

### Performance graph









# Flow control, restrictor

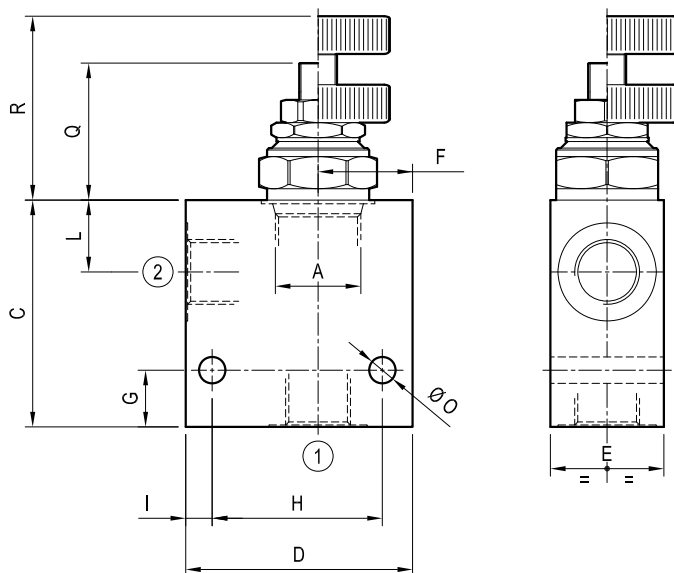
Common cavity

Cartridge style in manifold

ST-C-C

ON.02 - K - X - Y - 00 - W

## Dimensions



## Technical data

Max flow: up to 150 l/min (39 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

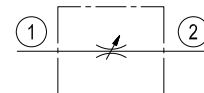
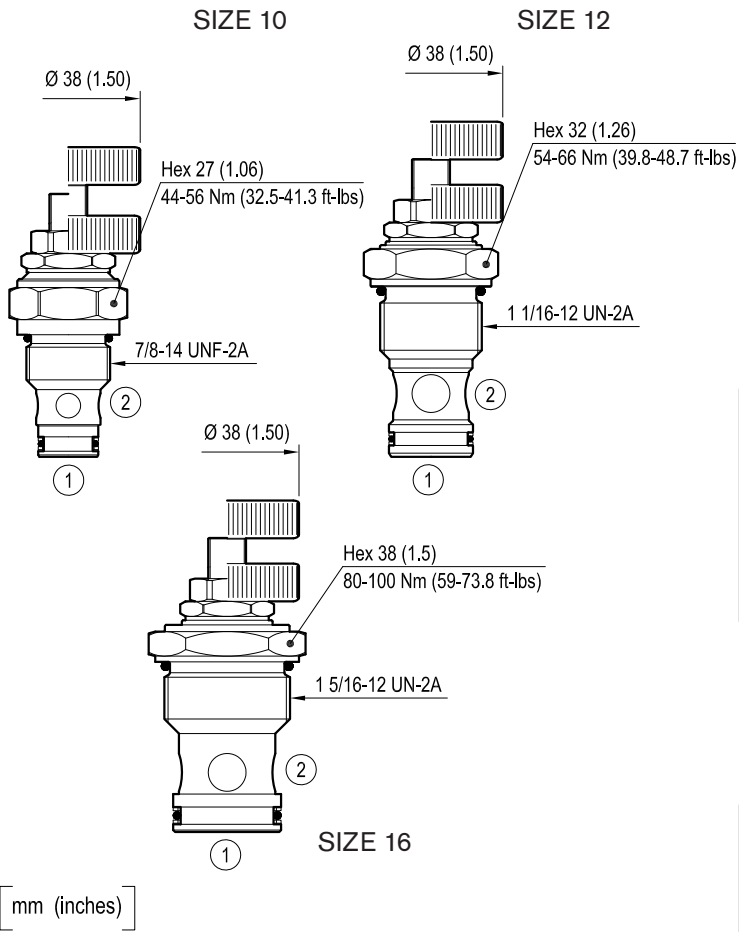


Table "Y"

Cavity A	Y	PORT SIZE		Rated Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2			C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08																	
SIZE 10	03	G 1/2		up to 70 (19)	60 (2.36)	60 (2.36)	35 (1.38)	25 (0.98)	15 (0.59)	45 (1.77)	7.5 (0.30)	19 (0.75)			7 (0.28)	38 (1.5)	50 (1.97)
	04	G 3/4			60 (2.36)	70 (2.76)	40 (1.58)	30 (1.18)	15 (0.59)	55 (2.17)	7.5 (0.30)	20 (0.79)			9 (0.35)		
SIZE 12	04	G 3/4		up to 150 (39)	75 (2.95)	80 (3.15)	40 (1.58)	35 (1.38)	20 (0.79)	60 (2.36)	10 (0.39)	26.5 (1.04)			9 (0.35)	34 (1.34)	44 (1.73)
	05	G 1			75 (2.95)	80 (3.15)	50 (1.97)	35 (1.38)	20 (0.79)	60 (2.36)	10 (0.39)	26.5 (1.04)			9 (0.35)		
SIZE 16	04	G 3/4		up to 150 (39)	80 (3.15)	80 (3.15)	50 (1.97)	32 (1.26)	22 (0.87)	60 (2.36)	10 (0.39)	26 (1.02)			9 (0.35)	33 (1.3)	43 (1.69)
	05	G 1			80 (3.15)	90 (3.54)	50 (1.97)	37 (1.46)	22 (0.87)	60 (2.36)	20 (0.79)	26 (1.02)			9 (0.35)		
SIZE 20																	

**Cartridge style**



**Table "K"**

					K		
CARTRIDGE CODE	OD	21	01	X	36	00	ST-C-10A
	OD	21	01	X	89	00	ST-C-12A
	OD	21	01	X	75	00	ST-C-16A

**Table "X"**

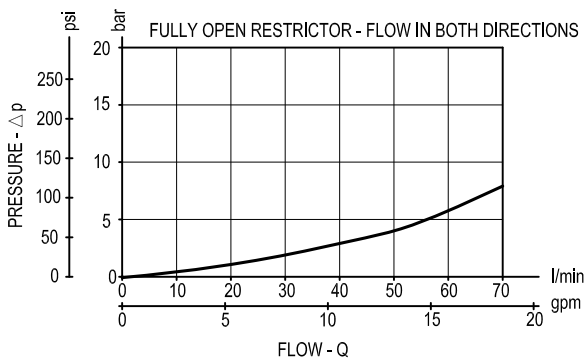
X	ADJUSTMENTS	
03	Leakproof hex. socket screw	
04	Handknob and locknut	

**CARTRIDGE TECHNICAL DATA**

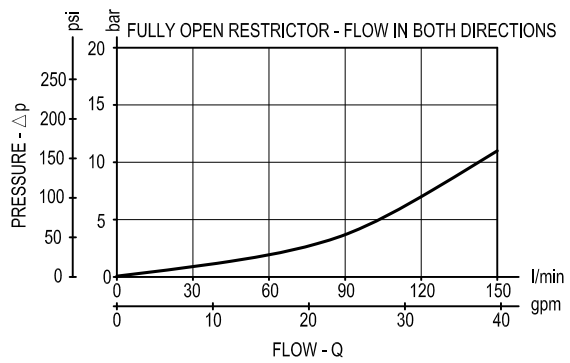
Common cavity: **CA-10A-2N / CA-12A-2N / CA-16A-2N**  
 For other details see data sheet RE 18321-27, RE 18321-28, and RE 18321-29

**Performance graphs**

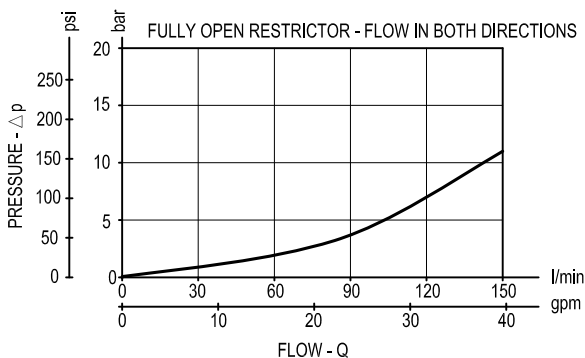
**SIZE 10**



**SIZE 12**



**SIZE 16**







# Needle restrictor, free reverse flow

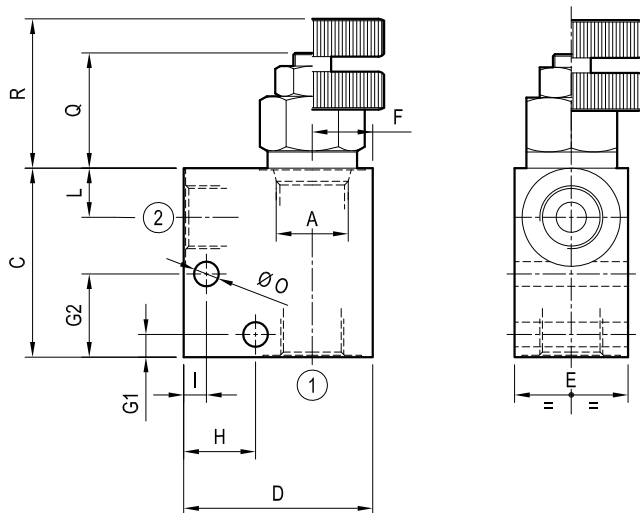
Common cavity

Cartridge style in manifold

STVU-08A

ON.03 - K - X - Y - 00 - W

## Dimensions



## Technical data

Max flow: up to 40 l/min (11 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

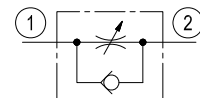


Table "Y"

Cavity	Y	PORT SIZE	Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
				C	D	E	F	G1	G2	H	I	L	O	Q	R	
A		1 - 2		50 (1.97)	50 (1.97)	30 (1.18)	16 (0.63)	6 (0.24)	22 (0.87)	19 (0.75)	6 (0.24)	13 (0.51)		6.5 (0.26)	31 (1.22)	40 (1.58)
SIZE 08	09	G 1/4	up to 40 (11)	50 (1.97)	50 (1.97)	30 (1.18)	16 (0.63)	6 (0.24)	22 (0.87)	19 (0.75)	6 (0.24)	13 (0.51)		6.5 (0.26)		
SIZE 10	02	G 3/8														
SIZE 12																
SIZE 16																
SIZE 20																

### Cartridge style

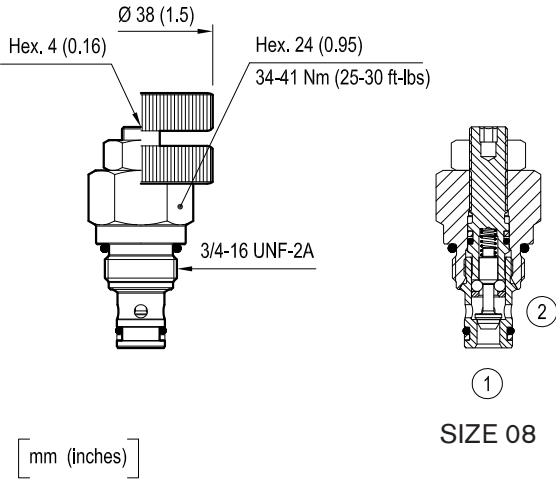


Table "K"

			K				
CARTRIDGE CODE	04	01	03	X	56	00	STVU-08A

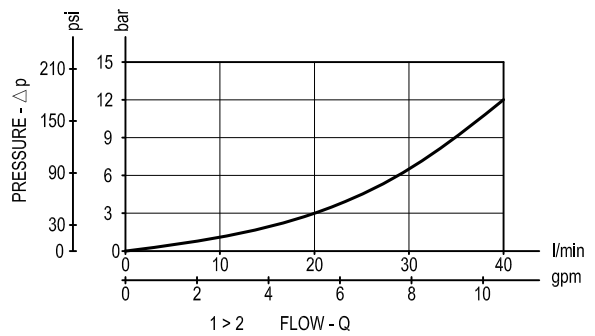
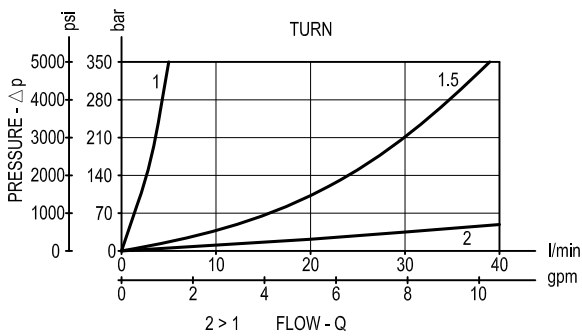
Table "X"

X	ADJUSTMENTS	
03	Leakproof hex. socket screw	
04	Handknob and locknut	

### CARTRIDGE TECHNICAL DATA

Common cavity: **CA-08A-2N**  
 For other details see data sheet RE 18321-10

### Performance graphs









# Needle restrictor, free reverse flow

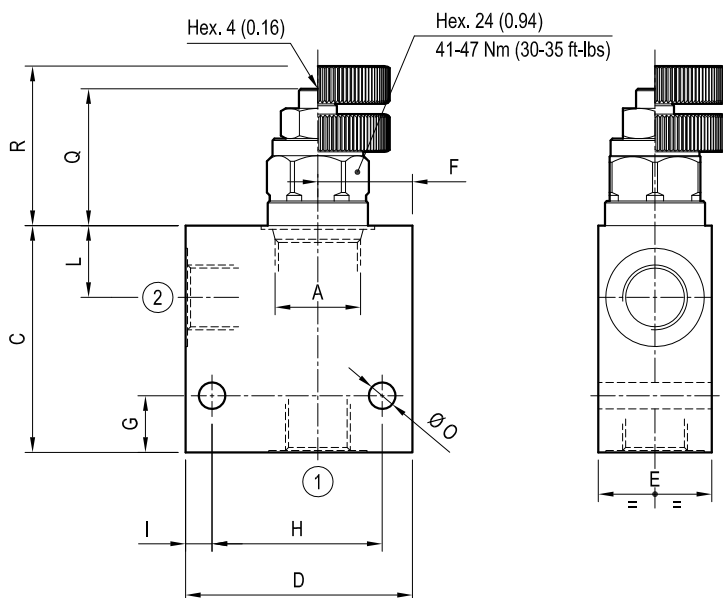
Common cavity

Cartridge style in manifold

STVU-10A

ON.09 - K - X - Y - 00 - W

## Dimensions



## Technical data

Max flow:	up to 80 l/min	(22 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

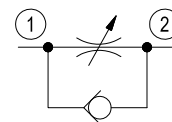
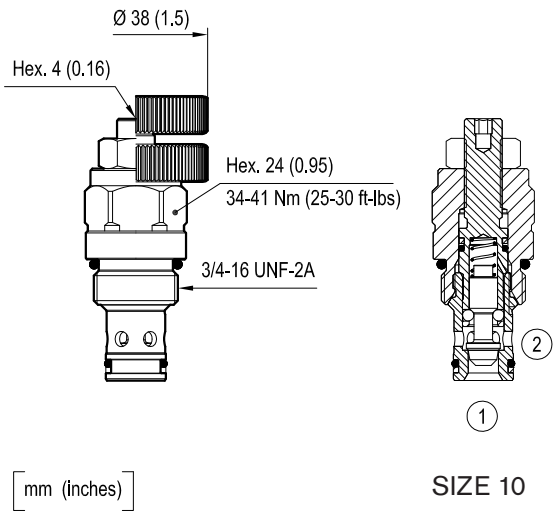


Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2			C	D	E	F	G1	G2	H	I	L	O	Q	R	
SIZE 08																	
SIZE 10	03	G 1/2		80 (22)	60 (2.36)	60 (2.36)	35 (1.38)	25 (0.98)	15 (0.59)	45 (1.77)	7.5 (0.3)	19 (0.75)		7.5 (0.30)			
	04	G 3/4			60 (2.36)	70 (2.76)	40 (1.58)	30 (1.18)	15 (0.59)	55 (2.17)	7.5 (0.3)	20 (0.79)		9 (0.30)	37 (1.46)	43 (1.69)	
SIZE 12																	
SIZE 16																	
SIZE 20																	

**Cartridge style**



**Table "K"**

			K				
CARTRIDGE CODE	04	01	05	X	85	00	STVU-10A

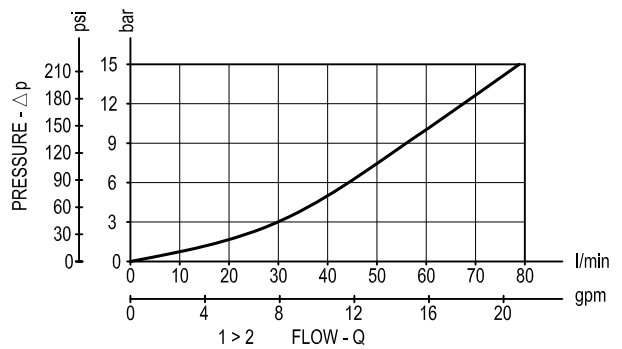
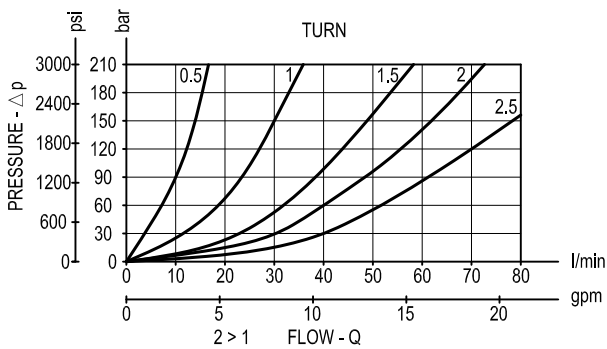
**Table "X"**

X	ADJUSTMENTS	
03	Leakproof hex. socket screw	
04	Handknob and locknut	

**CARTRIDGE TECHNICAL DATA**

Common cavity: **CA-10A-2N**  
For other details see data sheet RE 18321-11

**Performance graphs**







# Flow control, 2-way pressure compensated fully adjustable

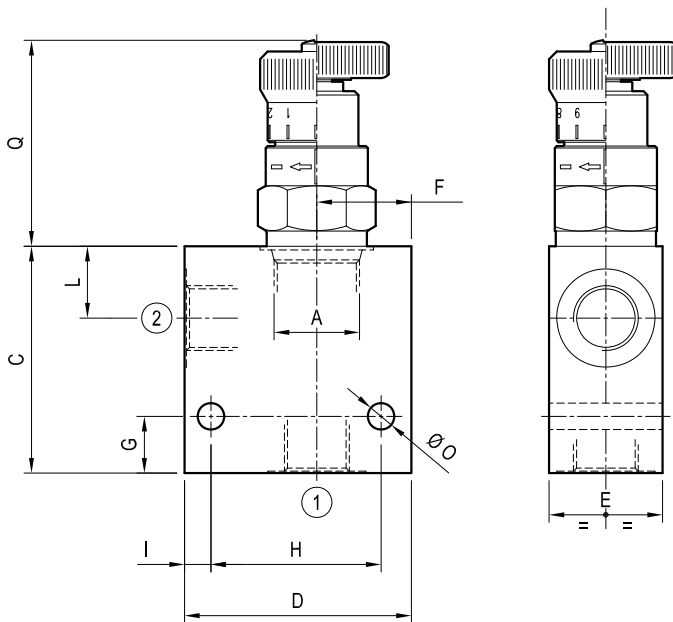
Common cavity

Cartridge style in manifold

VRFB-10A-C / VRFE-12A-C

ON.05 - K - X - Y - Z - W

## Dimensions



## Technical data

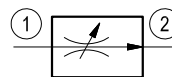
Flow: adjustable (see table "Z" and performance graph)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

K=02 type



K=01 type  
(free reverse flow)

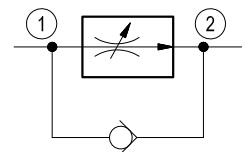


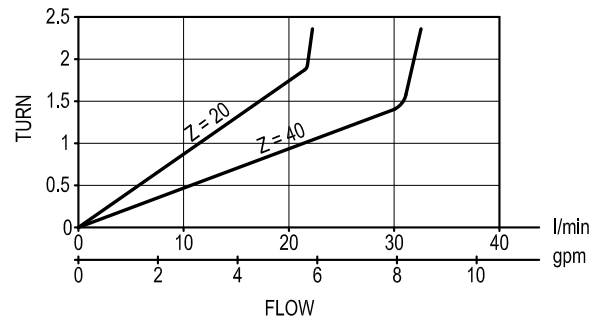
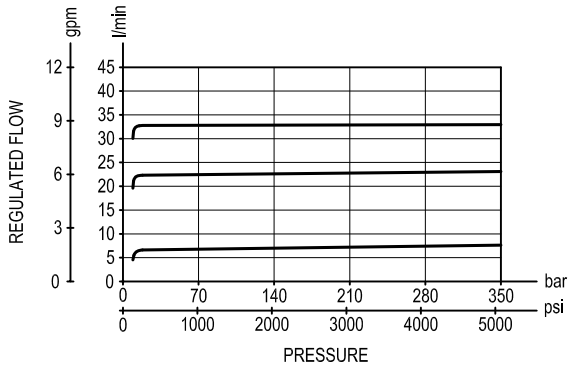
Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2			C	D	E	F	G	H	I	L	O	Q	R		
SIZE 08																	
SIZE 10	03	G 1/2		see table "Z"	60 (2.36)	60 (2.36)	35 (1.38)	25 (0.98)	15 (0.59)	45 (1.77)	7.5 (0.30)	19 (0.75)			7 (0.28)		
	04	G 3/4			60 (2.36)	70 (2.76)	40 (1.58)	30 (1.18)	15 (0.59)	55 (2.17)	7.5 (0.30)	20 (0.79)			9 (0.35)	55 (2.17)	
SIZE 12	04	G 3/4		see table "Z"	75 (2.95)	80 (3.15)	40 (1.58)	35 (1.38)	20 (0.79)	60 (2.36)	10 (0.39)	26.5 (1.04)			9 (0.35)		
	05	G 1			75 (2.95)	80 (3.15)	50 (1.97)	35 (1.38)	20 (0.79)	60 (2.36)	10 (0.39)	26.5 (1.04)			9 (0.35)	47.5 (1.87)	
SIZE 16																	
SIZE 20																	

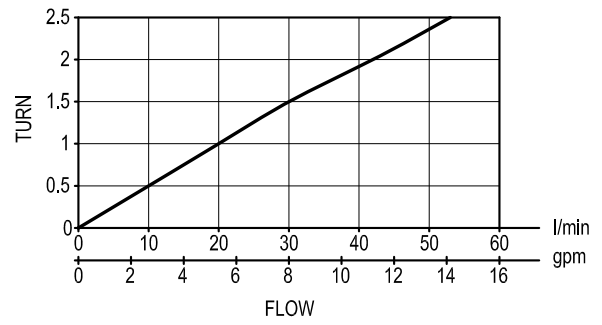
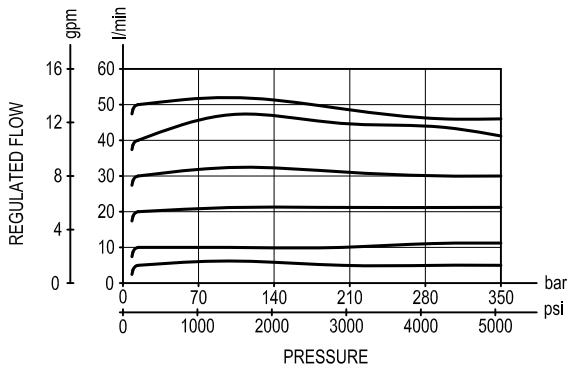


Performance graphs

K = 02 type



K = 01 type



## Ordering code

ON.05	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with flow control, 2-way pressure compensated fully adjustable**

**Cartridge style** - Common cavity (see table K on page 2)

**Cartridge style** - Adjustments (see table X on page 2)

**Manifold material**

= 00 Aluminium manifold

= S0 Steel manifold

**Settings** - Regulated flow range (see table Z on page 2)

**Manifold style** - Dimensions and port sizes (see table Y on page 1)

## Preferred types (readily available)

Type	Material number
ON0502400320S0	R934000625
ON0502400340S0	R934000622
ON0501030450S0	R934003575
ON050204034000	R934003778

Type	Material number

Further types available by request



# Flow control, 3-way pressure compensated combination type partially adjustable

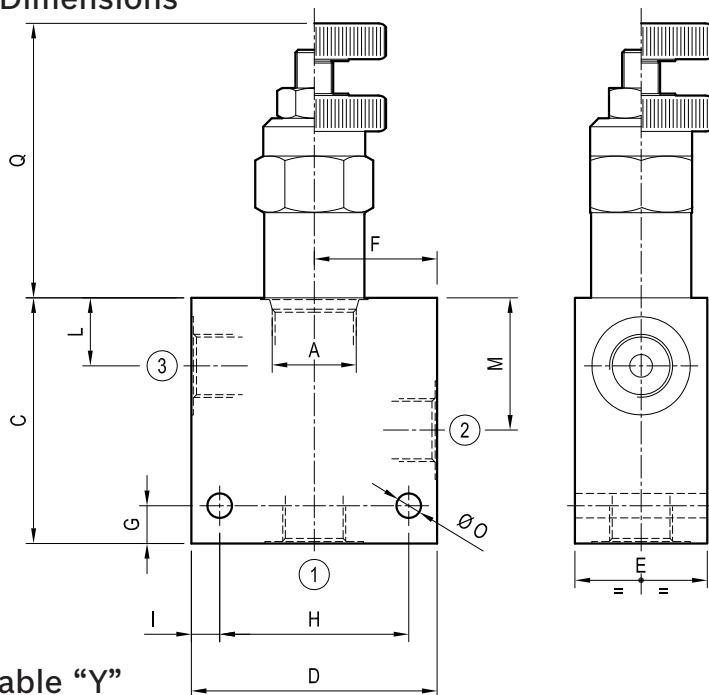
Common cavity

Cartridge style in manifold

VRFC-10A - C

ON.10 - K - X - Y - Z - W

## Dimensions



## Technical data

Flow: adjustable (see table "Z" and performance graph)

Max operating pressure for steel body: 350 bar (5000 psi)

Max operating pressure for aluminium body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

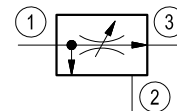
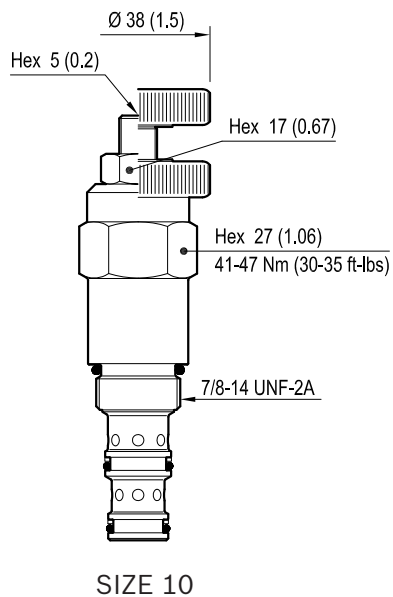


Table "Y"

Cavity	Y	PORT SIZE	Max Flow l/min (gpm)	DIMENSIONS mm (Inches)													
				1	2	3	C	D	E	F	G	H	I	L	M	O	Q
SIZE 08																	
SIZE 10	09	G 1/4	see table "Z"	65 (2.56)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.3)	18 (0.71)	35 (1.38)	6.5 (0.26)	73 (2.87)			
	02	G 3/8		65 (2.56)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.3)	18 (0.71)	35 (1.38)	6.5 (0.26)				
	03	G 1/2		70 (2.76)	70 (2.76)	35 (1.38)	35 (1.38)	15 (0.59)	50 (1.97)	10 (0.39)	18 (0.71)	35 (1.38)	6.5 (0.26)				
SIZE 12																	
SIZE 16																	
SIZE 20																	

### Cartridge style



[ mm (inches) ]

Table "K"

			K				
CARTRIDGE CODE	04	04	01	X	85	Z	VRFC-10A

Table "X"

X	ADJUSTMENTS	
03	Leakproof hex. socket screw	
04	Handknob	

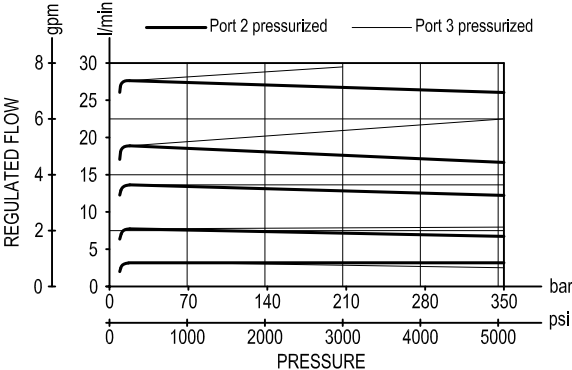
#### CARTRIDGE TECHNICAL DATA

Common cavity: CA-10A-3N  
For other details see data sheet RE 18321-17

Table "Z"

Z	REGULATED FLOW RANGE				
	SIZE 08 l/min (gpm)	SIZE 10 l/min (gpm)	SIZE 12 l/min (gpm)	SIZE 16 l/min (gpm)	SIZE 20 l/min (gpm)
02		1.5-2.5 (0.4-0.66)			
04		3-4.2 (0.79-1.11)			
06		4-5.8 (1.06-1.53)			
08		5.5-7.8 (1.45-2.06)			
09		6.5-9.5 (1.72-2.51)			
11		7.5-11 (1.98-2.91)			
14		9.5-14 (2.51-3.70)			
20		13-20 (3.44-5.28)			
26		19-26 (5.02-6.87)			

### Performance graphs



### Ordering code



Manifold with flow control,  
3-way pressure compensated  
combination type  
partially adjustable

Cartridge style - Common cavity  
(see table K on page 2)

Cartridge style - Adjustments  
(see table X on page 2)

**Manifold material**

= 00 Aluminium manifold

= S0 Steel manifold

Settings - Regulated flow range  
(see table Z on page 2)

Manifold style - Dimensions and port sizes  
(see table Y on page 1)

### Preferred types (readily available)

Type	Material number
ON1001030204S0	R934004139
ON1001030211S0	R934004140
ON1001030226S0	R934004095
ON100103031100	R934004299
ON100103032000	R934004300

Type	Material number

Further types available by request

# Flow control, 3-way pressure compensated combination type fully adjustable

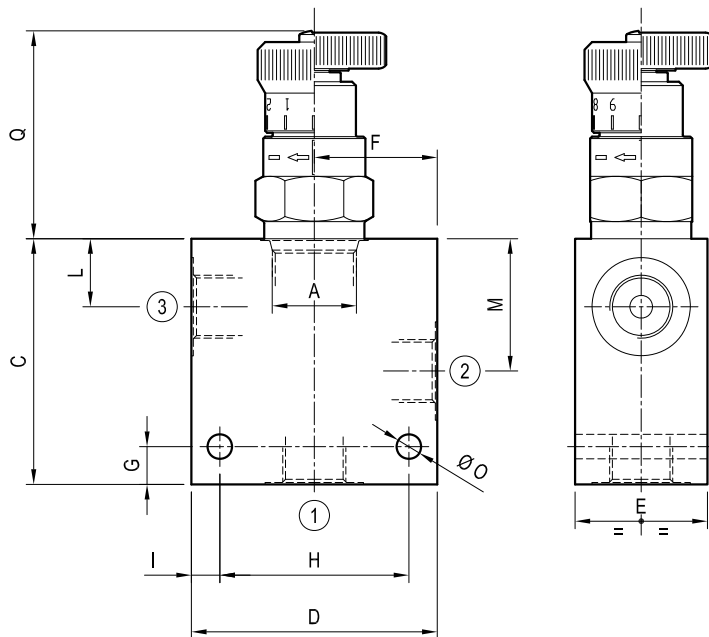
Common cavity

Cartridge style in manifold

VRFD-10A / VRFD-12A - C

ON.06 - K - X - Y - Z - W

## Dimensions



## Technical data

Flow: adjustable (see table "Z" and performance graph)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

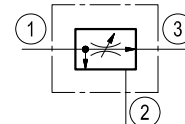


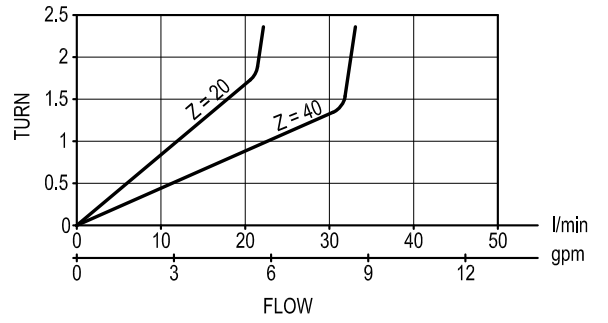
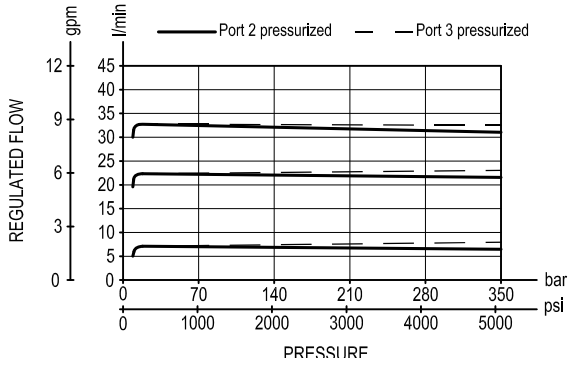
Table "Y"

Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)											
		1 - 2 - 3			C	D	E	F	G	H	I	L	M	O	Q	
SIZE 08																
SIZE 10	09	G 1/4		see table "Z"	65 (2.56)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.3)	18 (0.71)	35 (1.38)	6.5 (0.26)	55 (2.17)	
	02	G 3/8			65 (2.56)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.3)	18 (0.71)	35 (1.38)	6.5 (0.26)		
SIZE 12	03	G 1/2		see table "Z"	100 (3.94)	80 (3.15)	40 (1.58)	40 (1.58)	15 (0.59)	55 (2.17)	12.5 (0.49)	29 (1.14)	54 (2.13)	7 (0.28)	56.5 (2.22)	
	04	G 3/4			100 (3.94)	80 (3.15)	40 (1.58)	40 (1.58)	15 (0.59)	55 (2.17)	12.5 (0.49)	29 (1.14)	54 (2.13)	7 (0.28)		
SIZE 16																
SIZE 20																

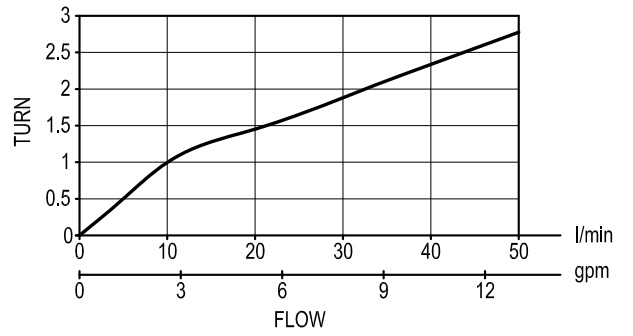
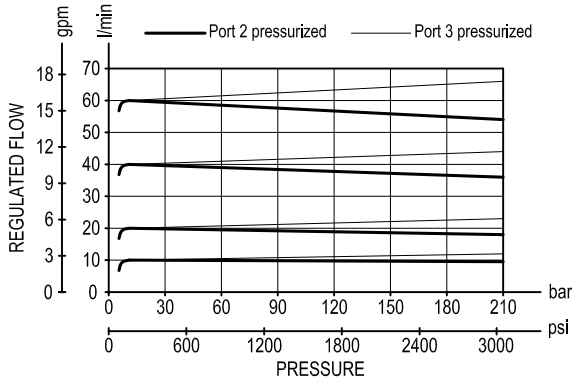


Performance graphs

SIZE 10



SIZE 12



## Ordering code

ON.06	K	X	Y	Z	W
-------	---	---	---	---	---

**Manifold with flow control, 3-way pressure compensated combination type fully adjustable**

**Cartridge style** - Common cavity  
(see table K on page 2)

**Cartridge style** - Adjustments  
(see table X on page 2)

**Manifold material**

= 00 Aluminium manifold

= S0 Steel manifold

**Settings** - Regulated flow range  
(see table Z on page 2)

**Manifold style** - Dimensions and port sizes  
(see table Y on page 1)

## Preferred types (readily available)

Type	Material number
ON0602040220S0	R934001276
ON0602040240S0	R934001277
ON0604040450S0	R934003540
ON060204022000	R934003779

Type	Material number

Further types available by request



# Flow divider

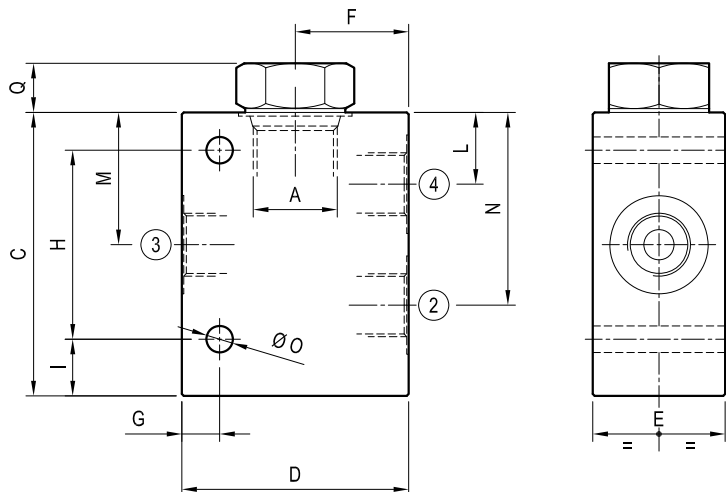
Common cavity

Cartridge style in manifold

DSDN-C

ON.07 - K - 00 - Y - Z - W

## Dimensions



## Technical data

Range of rated total flow: see table "Z"

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

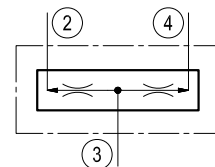
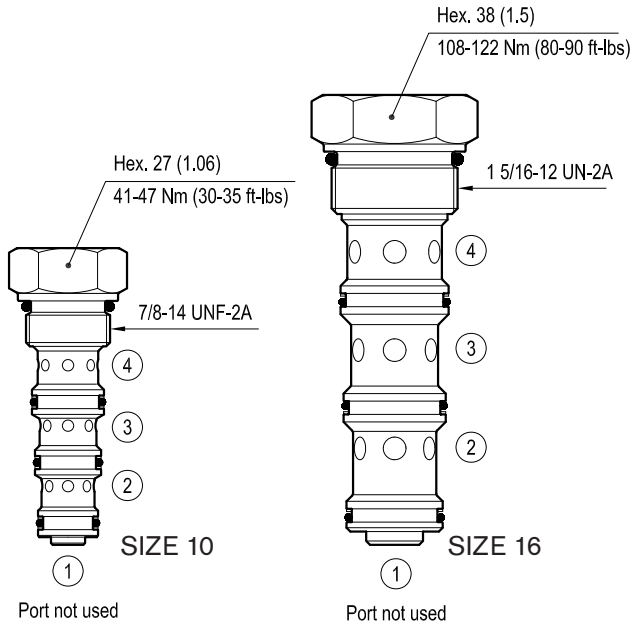


Table "Y"

Cavity	Y	PORT SIZE		Flow l/min (gpm)	DIMENSIONS mm (Inches)											
		2 - 3 - 4			C	D	E	F	G	H	I	L	M	N	O	Q
SIZE 08																
SIZE 10	02	G 3/8		see table "Z"	75 (2.95)	70 (2.95)	35 (1.38)	35 (1.38)	10 (0.39)	50 (1.97)	15 (0.59)	19 (0.75)	35 (1.38)	51 (2.01)	7 (0.28)	14 (0.55)
	03	G 1/2			75 (2.95)	70 (2.95)	35 (1.38)	35 (1.38)	10 (0.39)	50 (1.97)	15 (0.59)	19 (0.75)	35 (1.38)	51 (2.01)	7 (0.28)	
SIZE 12																
SIZE 16	04	G 3/4		see table "Z"	120 (4.72)	90 (3.54)	50 (1.97)	45 (1.77)	15 (0.59)	80 (3.15)	20 (0.79)	26 (1.02)	54.5 (2.15)	83 (3.27)	9 (0.35)	15 (0.59)
	05	G 1			120 (4.72)	100 (3.94)	50 (1.97)	50 (1.97)	15 (0.59)	80 (3.15)	20 (0.79)	26 (1.02)	54.5 (2.15)	83 (3.27)	9 (0.35)	
SIZE 20																

**Cartridge style**



[ mm (inches) ]

**Table "K"**

			K				
CARTRIDGE CODE	04	05	04	00	85	Z	DSDN-10A
	04	05	03	00	27	Z	DSDN-16A

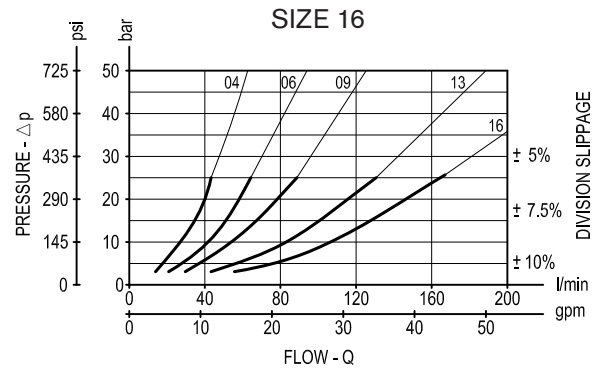
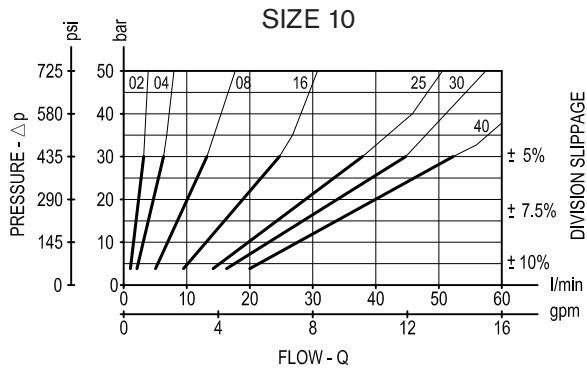
**CARTRIDGE TECHNICAL DATA**

Common cavity: **CA-10A-4N / CA-16A-4N**  
 For other details see data sheet RE 18321-22 and RE18321-23

**Table "Z"**

Z	RANGE OF RATED TOTAL FLOW				
	SIZE 08	SIZE 10	SIZE 12	SIZE 16	SIZE 20
	l/min (gpm)	l/min (gpm)	l/min (gpm)	l/min (gpm)	l/min (gpm)
02		1-3 (0.26-0.79)			
04		2-6 (0.53-1.59)		15-44 (3.96-11.63)	
06				22-66 (5.81-17.44)	
08		5-13 (1.32-3.44)			
09				30-88 (7.93-23.25)	
13				44-132 (11.63-34.88)	
16		9-24 (2.38-6.34)		55-165 (14.53-43.59)	
25		14-37 (3.70-9.78)			
30		16-44 (4.23-11.63)			
40		20-54 (5.28-14.27)			

Performance graphs





# Flow divider and combiner

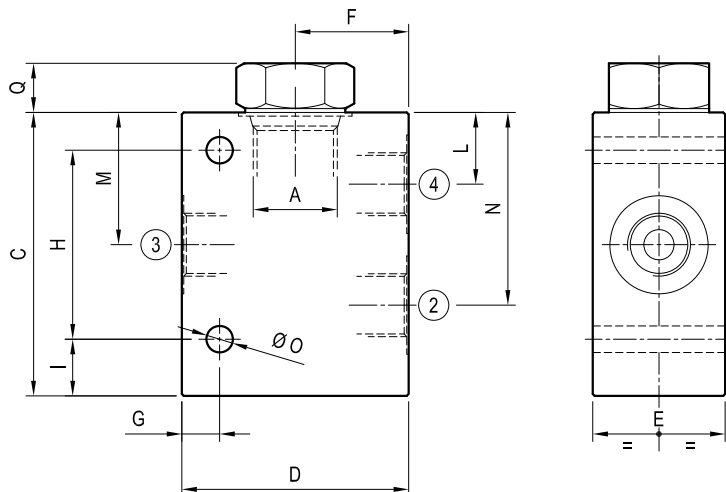
Common cavity

Cartridge style in manifold

DRFN-C

ON.08 - K - 00 - Y - Z - W

## Dimensions



## Technical data

Range of rated total flow: see table "Z"

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

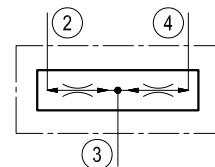
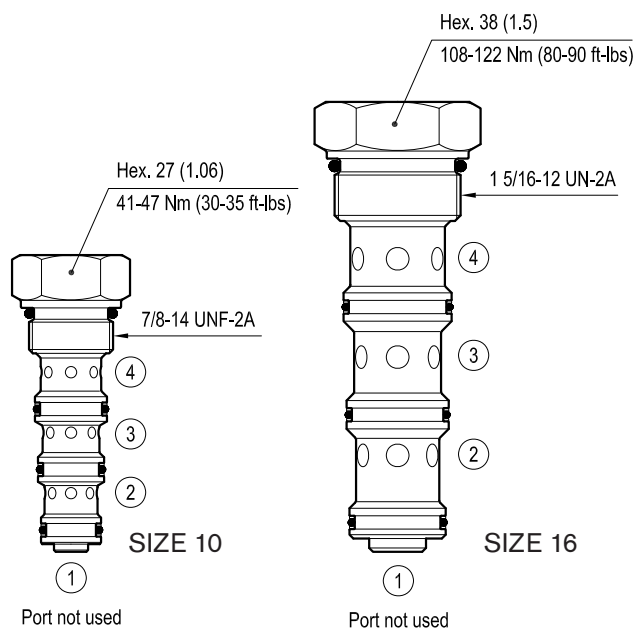


Table "Y"

Cavity	Y	PORT SIZE		Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		2 - 3 - 4			C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08																	
SIZE 10	02	G 3/8		see table "Z"	75 (2.95)	70 (2.76)	35 (1.38)	30 (1.18)	10 (0.39)	50 (1.97)	15 (0.59)	19 (0.75)	35 (1.38)	51 (2.01)	7 (0.28)	14 (0.55)	
	03	G 1/2			75 (2.95)	70 (2.76)	35 (1.38)	30 (1.18)	10 (0.39)	50 (1.97)	15 (0.59)	19 (0.75)	35 (1.38)	51 (2.01)	7 (0.28)		
SIZE 12																	
SIZE 16	04	G 3/4		see table "Z"	120 (4.72)	90 (3.54)	50 (1.97)	45 (1.77)	15 (0.59)	80 (3.15)	20 (0.79)	26 (1.02)	54.5 (2.15)	83 (3.27)	9 (0.35)	15 (0.59)	
	05	G 1			120 (4.72)	100 (3.94)	50 (1.97)	50 (1.97)	15 (0.59)	80 (3.15)	20 (0.79)	26 (1.02)	54.5 (2.15)	83 (3.27)	9 (0.35)		
SIZE 20																	

### Cartridge style



[ mm (inches) ]

Table "K"

			K				
CARTRIDGE CODE	04	05	01	00	85	Z	DRFN-10A
	04	05	02	00	27	Z	DRFN-16A

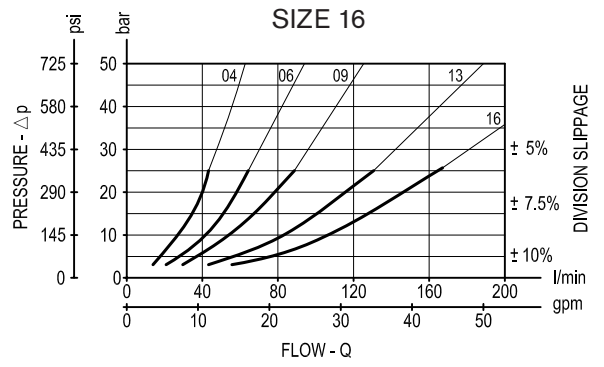
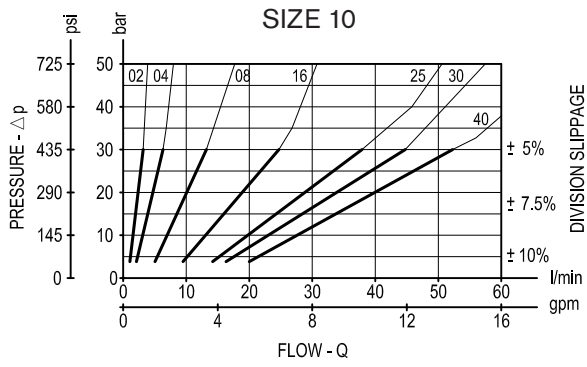
#### CARTRIDGE TECHNICAL DATA

Common cavity: **CA-10A-4N / CA-16A-4N**  
For other details see data sheet RE 18321-24 and RE 18321-25

Table "Z"

Z	RANGE OF RATED TOTAL FLOW				
	SIZE 08	SIZE 10	SIZE 12	SIZE 16	SIZE 20
	l/min (gpm)	l/min (gpm)	l/min (gpm)	l/min (gpm)	l/min (gpm)
02		1-3 (0.26-0.79)			
04		2-6 (0.53-1.59)		15-44 (3.96-11.63)	
06				22-66 (5.81-17.44)	
08		5-13 (1.32-3.44)			
09				30-80 (7.93-21.14)	
13				44-132 (11.63-34.88)	
16		9-24 (2.38-6.34)		55-165 (14.53-43.59)	
25		14-37 (3.70-9.78)			
30		16-44 (4.23-11.63)			
40		20-54 (5.28-14.27)			
50		25-60 (6.61-15.85)			

Performance graphs







## Logic element, flow and pressure control, with internal pilot

Common cavity

Cartridge style in manifold

VLSP-C

OU.09 - K - X - Y - Z - W

### Dimensions

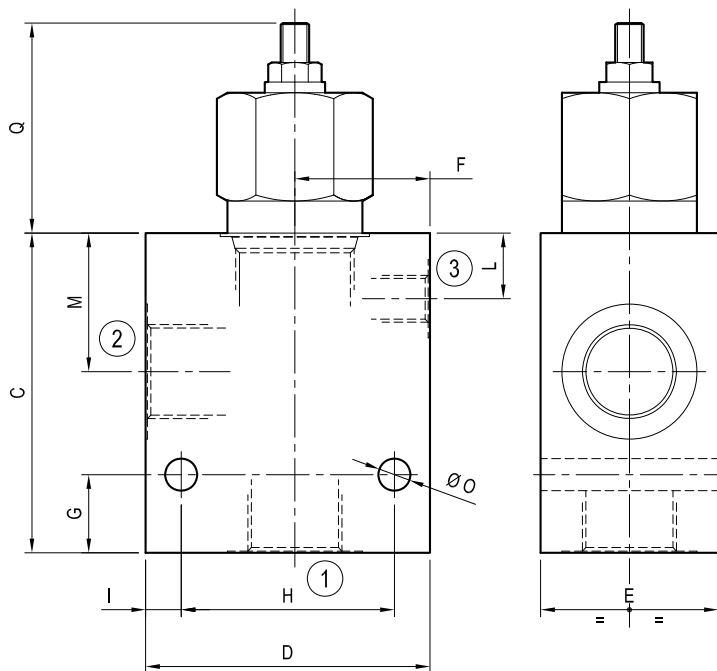
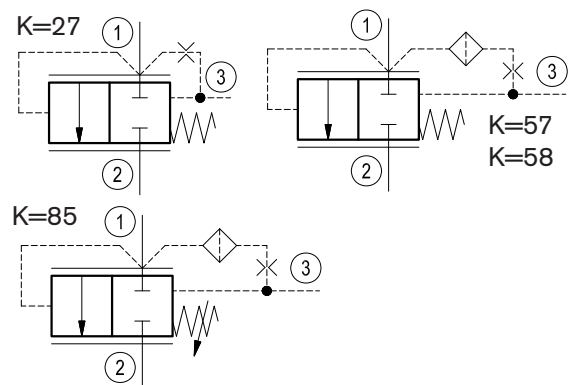


Table "Y"

### Technical data

Max flow:	up to 360 l/min	(43 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85



Cavity	Y	PORT SIZE		Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
		1 - 2	3		C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE																	
08																	
SIZE	02	G 3/8	G 1/4	60 (16)	70 (2.76)	60 (2.36)	35 (1.38)	30 (1.18)	15 (0.59)	45 (1.77)	7.5 (0.30)	15 (0.59)	32 (1.26)		7 (0.28)	37 (1.46)	
10	03	G 1/2	G 1/4		70 (2.76)	70 (2.76)	35 (1.38)	32 (1.26)	15 (0.59)	55 (2.17)	7.5 (0.30)	15 (0.59)	32 (1.26)		7 (0.28)		
SIZE	03	G 1/2	G 1/4	120 (32)	80 (3.15)	75 (2.95)	40 (1.58)	35 (1.38)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)		9 (0.35)	20 (0.79)	
12	04	G 3/4	G 1/4		90 (3.54)	75 (2.95)	40 (1.58)	35 (1.38)	15 (0.59)	55 (2.17)	10 (0.39)	24 (0.95)	42 (1.65)		9 (0.35)		
SIZE	04	G 3/4	G 1/4	200 (53)	90 (3.54)	80 (3.15)	50 (1.97)	38 (1.50)	22 (0.87)	60 (2.36)	10 (0.39)	18.5 (0.73)	39 (1.54)		9 (0.35)	59 (2.32)	
16	05	G 1	G 1/4		90 (3.54)	90 (3.54)	50 (1.97)	40 (1.58)	22 (0.87)	70 (2.76)	10 (0.39)	18.5 (0.73)	39 (1.54)		9 (0.35)		
SIZE	05	G 1	G 1/4	360 (95)	110 (4.33)	100 (3.94)	60 (2.36)	45 (1.77)	25 (0.98)	75 (2.95)	12.5 (0.49)	21 (0.83)	51 (2.01)		11 (0.43)	31 (1.22)	
20	06	G 1 1/4	G 1/4		110 (4.33)	100 (3.94)	60 (2.36)	45 (1.77)	25 (0.98)	75 (2.95)	12.5 (0.49)	21 (0.83)	51 (2.01)		11 (0.43)		

Cartridge style

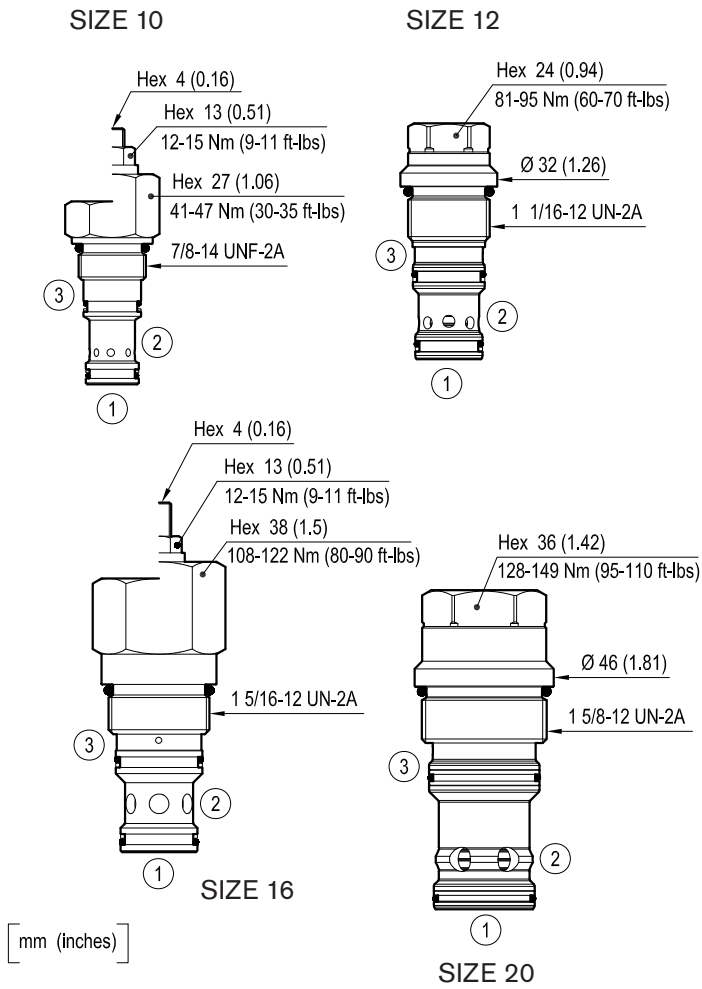


Table "K"

					K		
CARTRIDGE CODE	04	84	03	X	85	Z	VLSP-10A
	04	84	03	X	57	Z	VLSP-12A
	04	84	03	X	27	Z	VLSP-16A
	04	84	03	X	58	Z	VLSP-20A

Table "X"

X	ADJUSTMENTS	
00	Fixed setting	
03	Leakproof hex. socket screw (only for K=85 and K=27)	

CARTRIDGE TECHNICAL DATA

Int. leakage ave.:  
200 bar (2900 psi) - 200 cm<sup>3</sup>/min (12 in<sup>3</sup>/min)  
for K=27 and K=58 type

Int. leakage ave.:  
200 bar (2900 psi) - 50 cm<sup>3</sup>/min (3 in<sup>3</sup>/min)  
for K=85 type

Int. leakage ave.:  
200 bar (2900 psi) - 350 cm<sup>3</sup>/min (21 in<sup>3</sup>/min)  
for K=57 type

Common cavity: **CA-10A-3C / CA-12A-3C / CA-16A-3C / CA-20A-3C.**

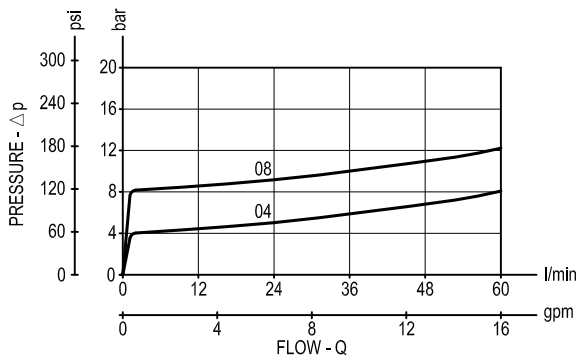
For other details see data sheets RE 18321-64, RE 18321-65, RE 18321-66 and RE 18321-67.

Table "Z"

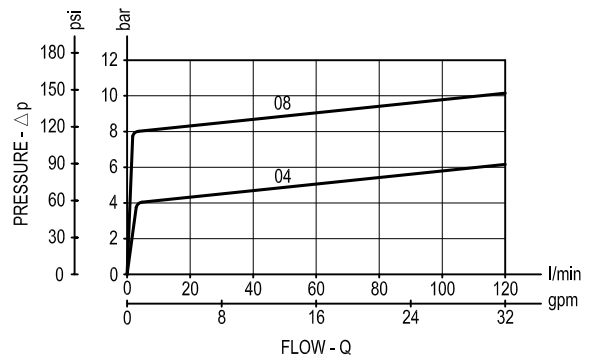
Z	SPRINGS													
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20	
			Bias spring bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Bias spring bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Bias spring bar(psi)	Pres. increase bar/turn (psi/turn)	Std. setting 5 l/min bar (psi)	Bias spring bar(psi)		
X=00	04		4 ± 20% (60 ± 20%)			4 ± 20% (60 ± 20%)			4 ± 20% (60 ± 20%)					
	05												5.5 (80)	
	08		8 ± 15% (115 ± 15%)			8 ± 15% (115 ± 15%)			8 ± 15% (115 ± 15%)					
	11					11 ± 15% (160 ± 15%)							11 (160)	
X=03	12								12 ± 10% (175 ± 10%)					
	00		2-8 (30-115)	1 (15)	4 (60)				4-12 (60-175)	1.5 (22)	4 (60)			

Performance graphs

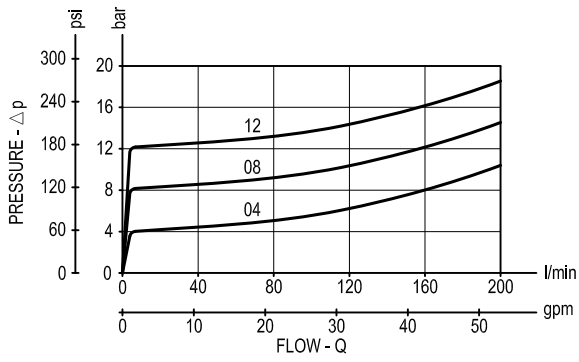
SIZE 10



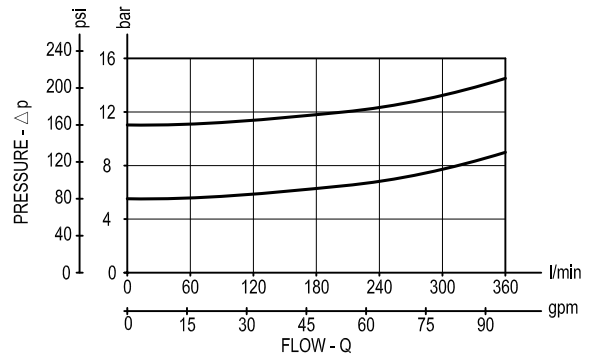
SIZE 12



SIZE 16



SIZE 20





# Logic element, pressure compensator, with static load sense

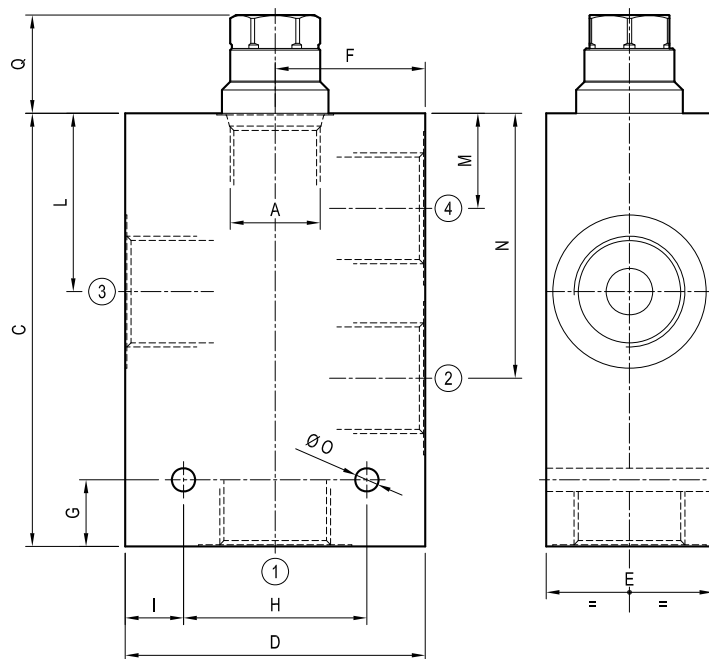
Common cavity

Cartridge style in manifold

VRLA-S-C

OU.06 - K - 00 - Y - Z - W

## Dimensions



## Technical data

Max inlet flow:	up to 230 l/min	(60 gpm)
Max priority flow:	up to 170 l/min	(45 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

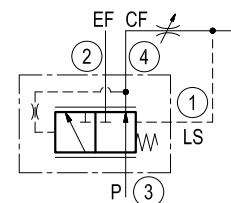
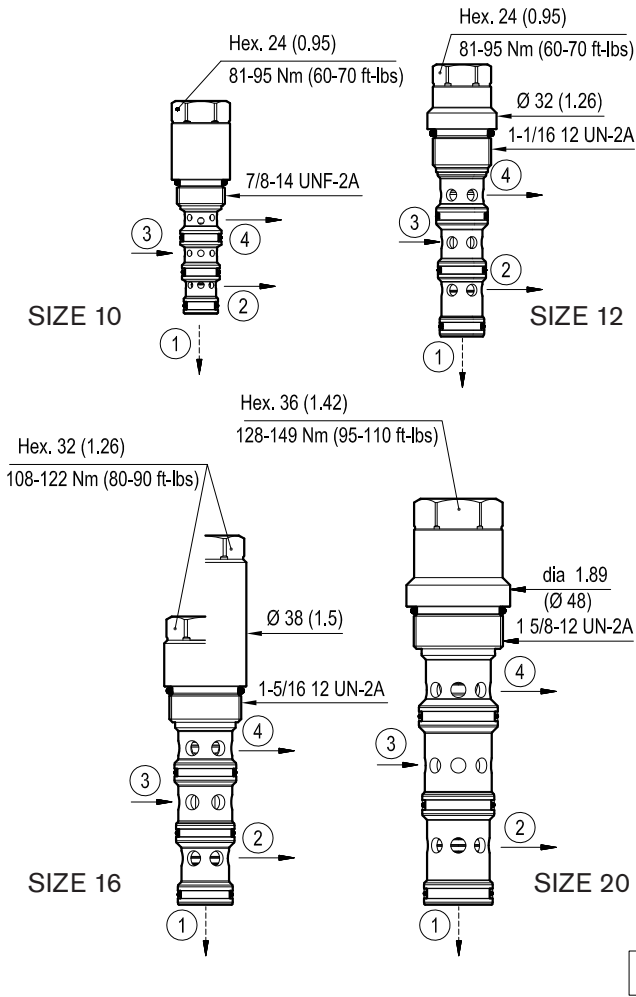


Table "Y"

Cavity	Y	PORT SIZE 1 - 2 - 3 - 4	Inlet Flow l/min (gpm)	Priority Flow l/min (gpm)	DIMENSIONS mm (Inches)												
					C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08																	
SIZE 10	09	G 1/4	45 (12)	40 (11)	80 (3.15)	65 (2.56)	35 (1.38)	32,5 (1.28)	10 (0.39)	50 (1.97)	7,5 (0.30)	35 (1.38)	18 (0.71)	50 (1.97)	6,5 (0.26)	36,5 (1.44)	
	02	G 3/8			80 (3.15)	65 (2.56)	35 (1.38)	32,5 (1.28)	10 (0.39)	50 (1.97)	7,5 (0.30)	35 (1.38)	18 (0.71)	50 (1.97)	6,5 (0.26)		
SIZE 12	04	G 3/4	100 (26)	80 (21)	125 (4.92)	80 (3.15)	40 (1.58)	40 (1.58)	20 (0.79)	55 (2.17)	12,5 (0.49)	53,5 (2.11)	28,5 (1.12)	79,5 (3.13)	7 (0.28)	29 (1.14)	
	05	G 1			130 (5.12)	90 (3.54)	50 (1.97)	45 (1.77)	20 (0.79)	55 (2.17)	17,5 (0.69)	53,5 (2.11)	28,5 (1.12)	79,5 (3.13)	7 (0.28)		
SIZE 16	04	G 3/4	160 (42)	140 (37)	130 (5.12)	90 (3.54)	50 (1.97)	45 (1.77)	20 (0.79)	60 (2.36)	15 (0.59)	54,5 (2.15)	26 (1.02)	83 (3.27)	10,5 (0.41)	31,5 (1.24)	
	05	G 1			130 (5.12)	100 (3.94)	50 (1.97)	50 (1.97)	20 (0.79)	60 (2.36)	20 (0.79)	54,5 (2.15)	26 (1.02)	83 (3.27)	10,5 (0.41)		
SIZE 20	05	G1	230 (60)	170 (45)	175 (6.89)	120 (4.72)	60 (2.36)	60 (2.36)	18 (0.71)	75 (2.95)	22,5 (0.89)	72,5 (2.85)	32 (1.26)	114,5 (4.51)	11 (0.43)	50 (1.97)	
	06	G1 1/4			175 (6.89)	120 (4.72)	60 (2.36)	60 (2.36)	18 (0.71)	75 (2.95)	22,5 (0.89)	72,5 (2.85)	32 (1.26)	114,5 (4.51)	11 (0.43)		

**Cartridge style**



[ mm (inches) ]

**Table "K"**

						K	
CARTRIDGE CODE	04	84	09	00	85	Z	VRLA-10A-S
	04	84	09	00	57	Z	VRLA-12A-S
	04	84	09	00	27	Z	VRLA-16A-S
	04	84	09	00	58	Z	VRLA-20A-S

**CARTRIDGE TECHNICAL DATA**

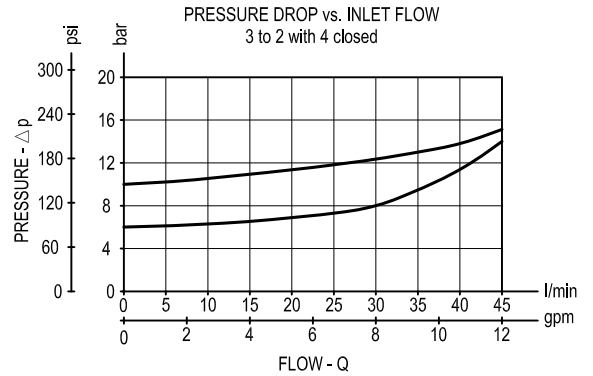
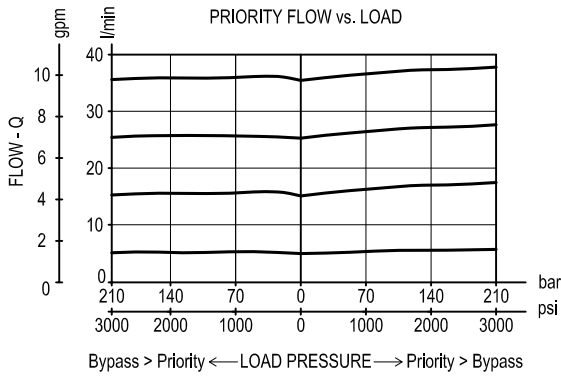
Common cavity: **CA-10A-4N / CA-12A-4N / CA-16A-4N / CA-20A-4N**  
 For other details see data sheet RE 18321-86, RE 18321-87, RE 18321-88 and RE 18321-89

**Table "Z"**

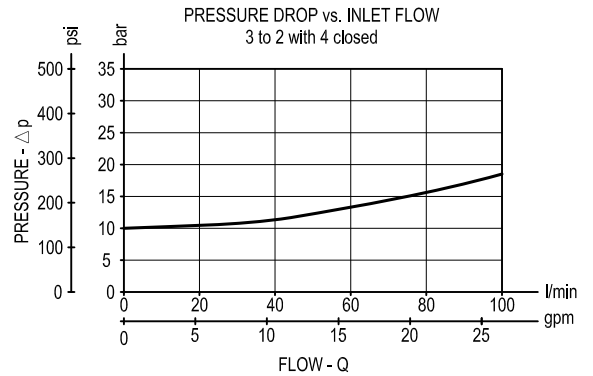
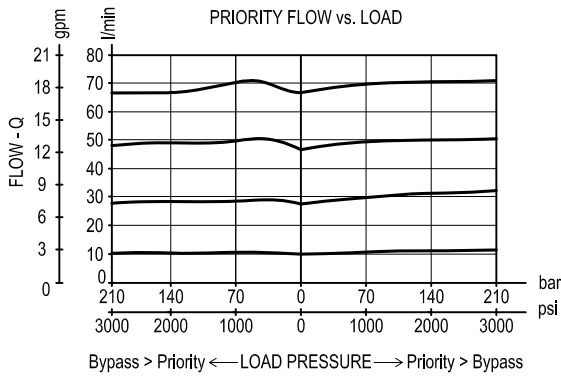
Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Bias spring bar(psi)			Bias spring bar(psi)			Bias spring bar(psi)			Bias spring bar(psi)			Bias spring bar(psi)		
05				5,5±20% (80)±20%						5,5±20% (80)±20%					
10				10±15% (145)±15%			10±15% (145)±15%								
11										11±15% (160)±15%					
12													12±15% (175)±15%		
22										22±15% (320)±15%					

Performance graphs

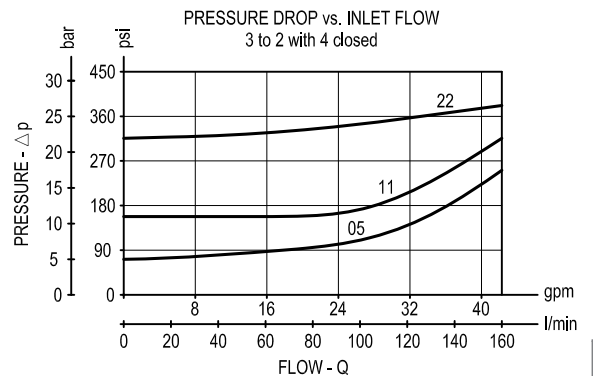
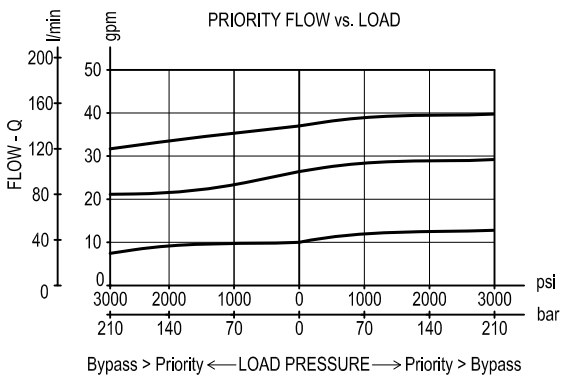
SIZE 10



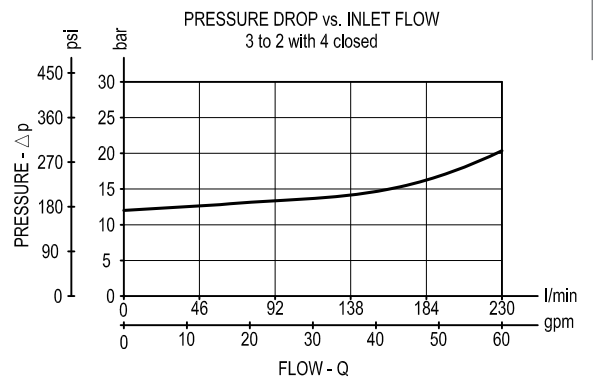
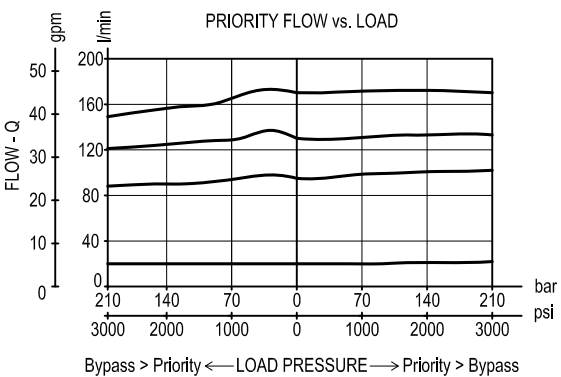
SIZE 12



SIZE 16



SIZE 20







# Logic element, pressure compensator, with dynamic load sense

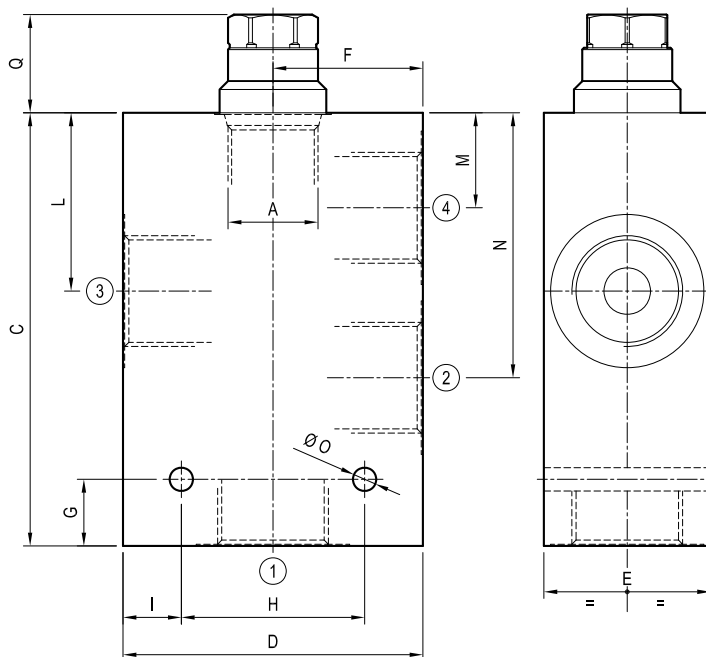
Common cavity

Cartridge style in manifold

VRLA-D-C

OU.05 - K - X - Y - Z - W

## Dimensions



## Technical data

Max inlet flow: up to 230 l/min (60 gpm)

Max priority flow: up to 170 l/min (45 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

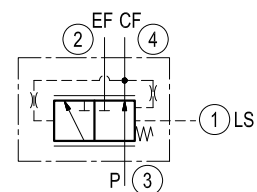


Table "Y"

Cavity	Y	PORT SIZE 1 - 2 - 3 - 4	Inlet Flow l/min (gpm)	Priority Flow l/min (gpm)	DIMENSIONS mm (Inches)												
					C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08																	
SIZE 10	09	G 1/4	45 (12)	40 (11)	80 (3,15)	65 (2,56)	35 (1,38)	32,5 (1,28)	10 (0,39)	50 (1,97)	7,5 (0,30)	35 (1,38)	18 (0,71)	50 (1,97)	6,5 (0,26)	36,5 (1,44)	
	02	G 3/8			80 (3,15)	65 (2,56)	35 (1,38)	32,5 (1,28)	10 (0,39)	50 (1,97)	7,5 (0,30)	35 (1,38)	18 (0,71)	50 (1,97)	6,5 (0,26)		
SIZE 12	04	G 3/4	100 (26)	80 (21)	125 (4,92)	80 (3,15)	40 (1,58)	40 (1,58)	20 (0,79)	55 (2,17)	12,5 (0,49)	53,5 (2,11)	28,5 (1,12)	79,5 (3,13)	7 (0,28)	30 (1,18)	
	05	G 1			130 (5,12)	90 (3,54)	50 (1,97)	45 (1,77)	20 (0,79)	55 (2,17)	17,5 (0,69)	53,5 (2,11)	28,5 (1,12)	79,5 (3,13)	7 (0,28)		
SIZE 16	04	G 3/4	160 (42)	140 (37)	130 (5,12)	90 (3,54)	50 (1,97)	45 (1,77)	20 (0,79)	60 (2,36)	15 (0,59)	54,5 (2,15)	26 (1,02)	83 (3,27)	10,5 (0,41)	up to 70 (2,76)	
	05	G 1			130 (5,12)	100 (3,94)	50 (1,97)	50 (1,97)	20 (0,79)	60 (2,36)	20 (0,79)	54,5 (2,15)	26 (1,02)	83 (3,27)	10,5 (0,41)		
SIZE 20	05	G1	230 (60)	170 (45)	175 (6,89)	120 (4,72)	60 (2,36)	60 (2,36)	18 (0,71)	75 (2,95)	22,5 (0,89)	72,5 (2,85)	32 (1,26)	114,5 (4,51)	11 (0,43)	50 (1,97)	
	06	G1 1/4			175 (6,89)	120 (4,72)	60 (2,36)	60 (2,36)	18 (0,71)	75 (2,95)	22,5 (0,89)	72,5 (2,85)	32 (1,26)	114,5 (4,51)	11 (0,43)		

Cartridge style

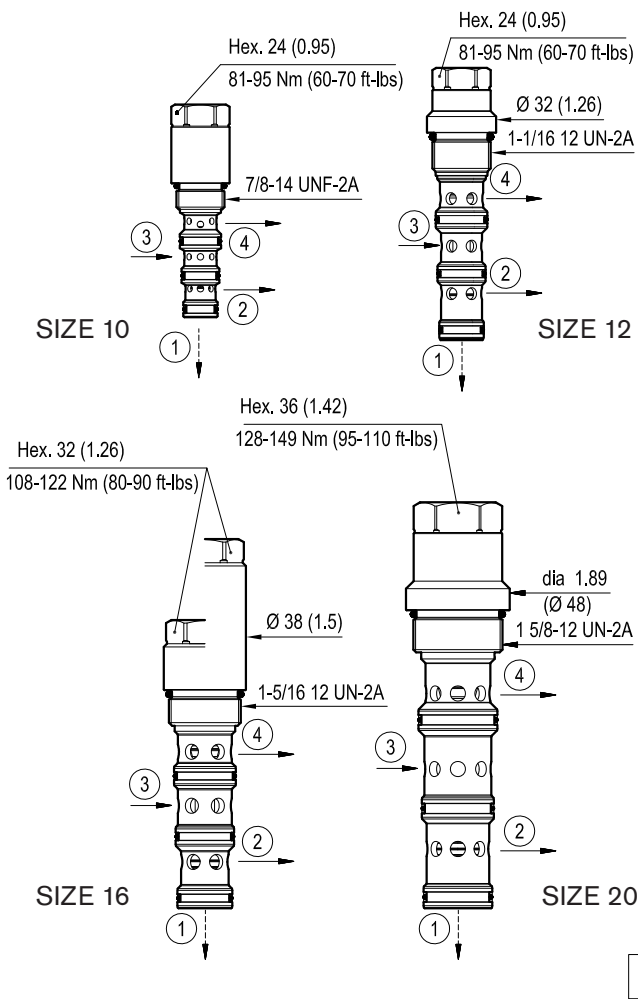


Table "K"

						K	
CARTRIDGE CODE	04	84	10	X	85	Z	VRLA-10A-D
	04	84	10	X	57	Z	VRLA-12A-D
	04	84	10	X	27	Z	VRLA-16A-D
	04	84	10	X	58	Z	VRLA-20A-D

X	LS Orifice Diameter mm (inches)
05	0.5 (0.02)
06	0.6 (0.02) only for SIZE 10 and 16
07	0.7 (0.03) only for SIZE 12
08	0.8 (0.03) only for SIZE 10, 16 and 20
09	0.9 (0.04) only for SIZE 10
10	1 (0.04) only for SIZE 12, 16 and 20

CARTRIDGE TECHNICAL DATA	
Common cavity: CA-10A-4N / CA-12A-4N / CA-16A-4N / CA-20A-4N	
For other details see data sheet RE 18321-90, RE 18321-83, RE 18321-84 and RE 18321-85	

[ mm (inches) ]

Table "Z"

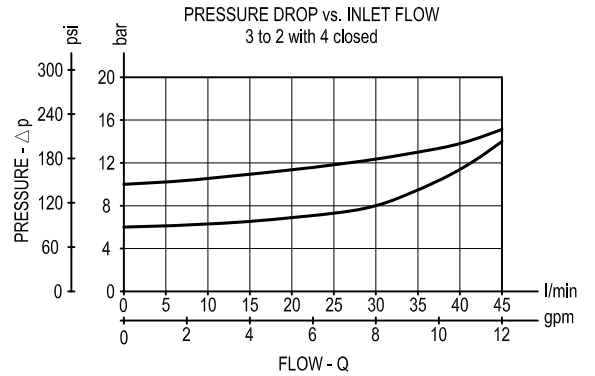
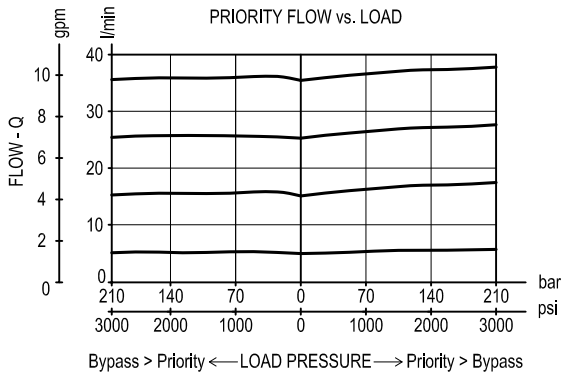
Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Bias spring bar(psi)			Bias spring bar(psi)			Bias spring bar(psi)			Bias spring bar(psi)			Bias spring bar(psi)		
05				*5,5±20% (80)±20%						5,5±20% (80)±20%					
10				**10±15% (145)±15%			10±15% (145)±15%								
11										11±15% (160)±15%					
12													12±15% (175)±15%		
22										22±15% (320)±15%					

\* only for X=06 and X=09 versions

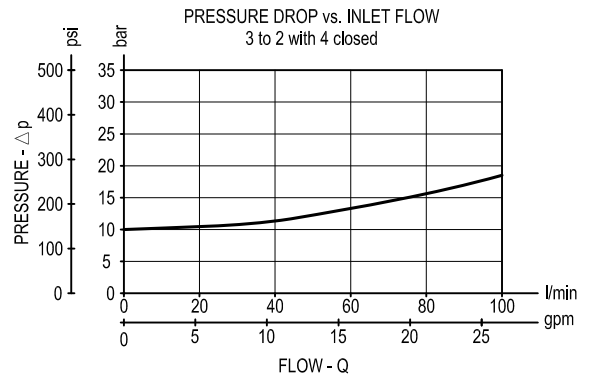
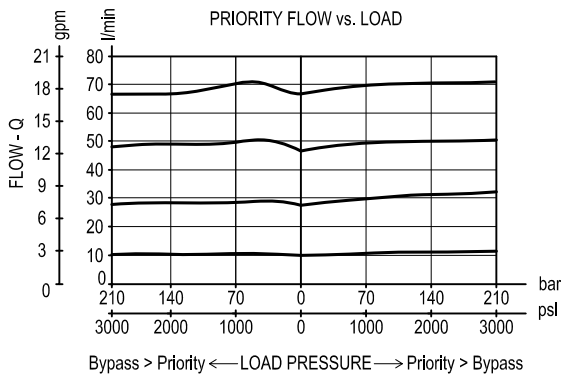
\*\* only for X=05 and X=08 versions

Performance graphs

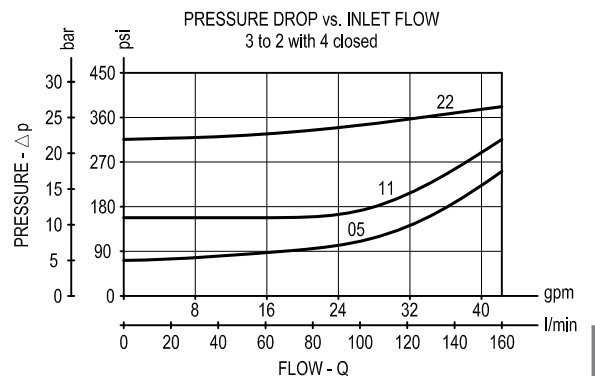
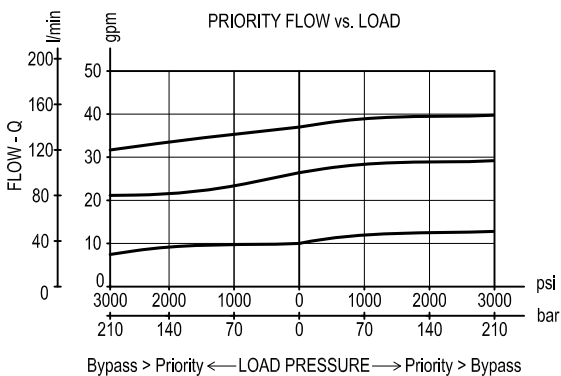
SIZE 10



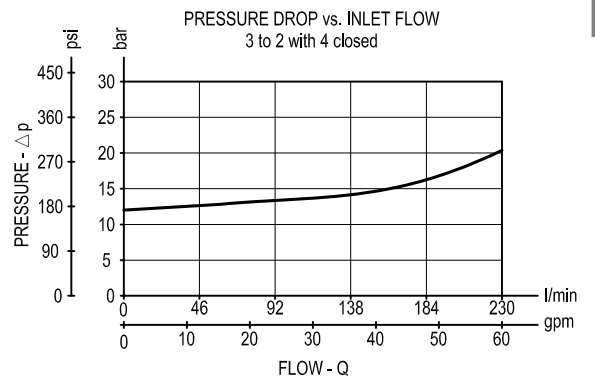
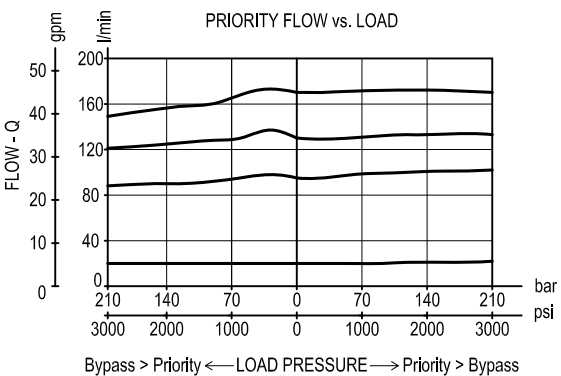
SIZE 12



SIZE 16



SIZE 20





# Directional spool type, direct acting external pilot, external vent

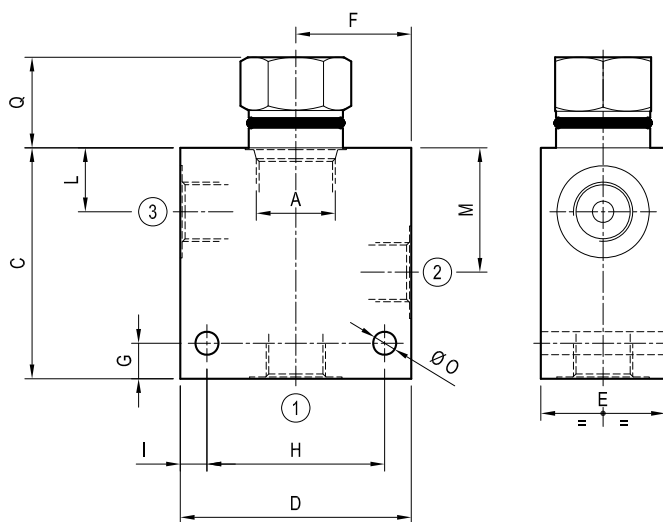
Common cavity

Cartridge style in manifold

VDS-D-C

OU.07 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 160 l/min (43 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

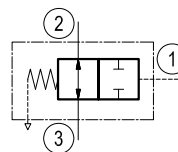
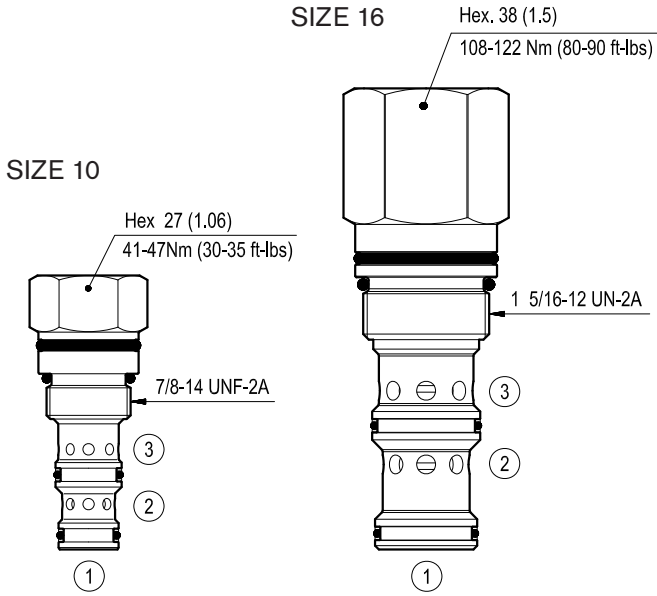


Table "Y"

Cavity	Y	PORT SIZE	Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
				C	D	E	F	G	H	I	L	M	N	O	Q	R
A		1 - 2 - 3														
SIZE 08																
SIZE 10	02	G 3/8	50 (13)	65 (2.56)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.30)	18 (0.71)	35 (1.38)		6.5 (0.26)	25.5 (1)	
	03	G 1/2		70 (2.76)	70 (2.76)	35 (1.38)	35 (1.38)	15 (0.59)	50 (1.97)	10 (0.39)	18 (0.71)	35 (1.38)		6.5 (0.26)		
SIZE 12																
SIZE 16	04	G 3/4	160 (4)	100 (3.94)	90 (3.54)	50 (1.97)	45 (1.77)	20 (0.79)	60 (2.36)	15 (0.59)	26 (1.02)	54.5 (2.15)		10.5 (0.41)	49.5 (1.95)	
	05	G 1		105 (4.13)	100 (3.94)	50 (1.97)	50 (1.97)	20 (0.79)	60 (2.36)	20 (0.79)	26 (1.02)	54.5 (2.15)		10.5 (0.41)		
SIZE 20																

**Cartridge style**



[ mm (inches) ]

**Table “K”**

					K		
CARTRIDGE CODE	04	77	22	X	85	Z	VDSD-10A
	04	77	22	X	27	Z	VDSD-16A

**Table “X”**

X	O-Ring on pilot piston	
00	No O-Ring	
10	With O-Ring	

**CARTRIDGE TECHNICAL DATA**

Common cavity: **CA-10A-3N / CA-16A-3N**

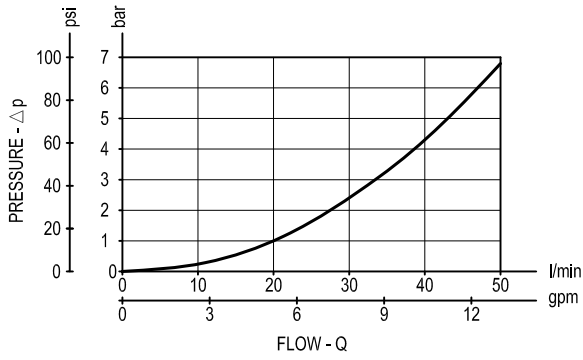
For other details see data sheet RE 18320-79 and RE 18320-80

**Table “Z”**

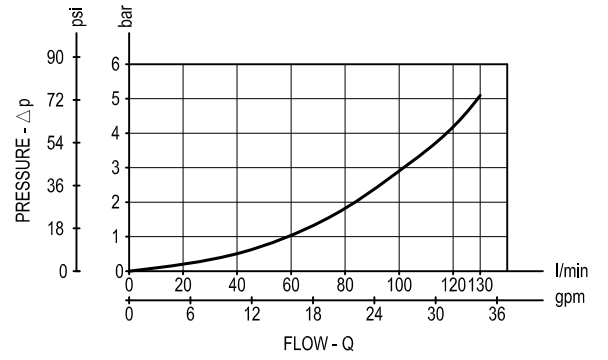
Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Setting pressure bar(psi)			Setting pressure bar(psi)			Setting pressure bar(psi)			Setting pressure bar(psi)			Setting pressure bar(psi)		
05				5.5 ±20% (80 ±20%)						5 ±20% (73 ±20%)					
11				11.5 ±10% (167 ±10%)						11 ±10% (160 ±10%)					

Performance graphs

SIZE 10



SIZE 16







# Directional spool type, direct acting external pilot, internal vent

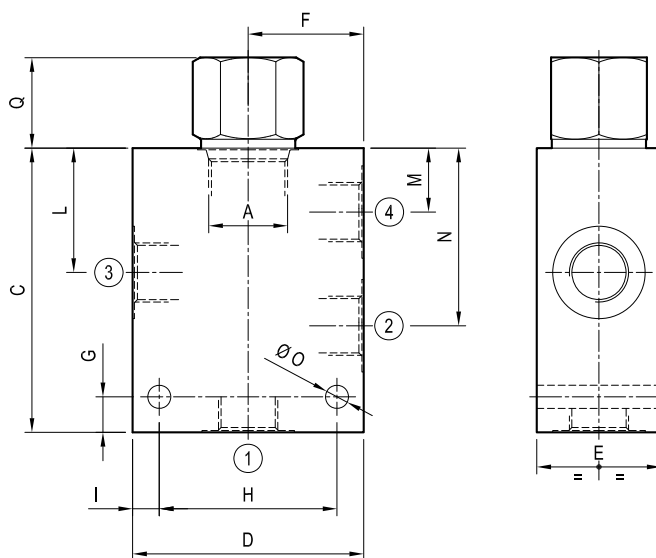
Common cavity

Cartridge style in manifold

VDSH-C

OU.08 - K - X - Y - Z - W

## Dimensions



## Technical data

Max flow: up to 160 l/min (43 gpm)

Max operating pressure for **steel** body: 350 bar (5000 psi)

Max operating pressure for **aluminium** body: 210 bar (3000 psi)

To order only manifold see data sheet RE 18325-85

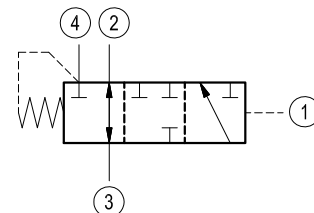
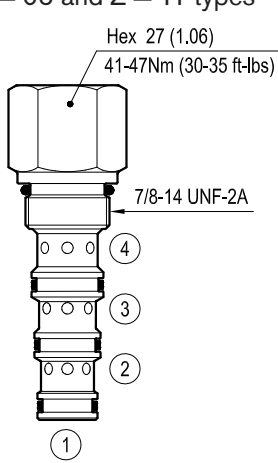


Table "Y"

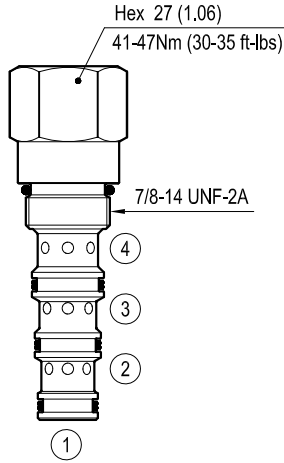
Cavity	Y	PORT SIZE 1 - 2 - 3 - 4	Max Flow l/min (gpm)	DIMENSIONS mm (Inches)												
				C	D	E	F	G	H	I	L	M	N	O	Q	R
SIZE 08																
SIZE 10	09	G 1/4	40 (11)	80 (3.15)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.30)	35 (1.38)	18 (0.71)	50 (1.97)	7.5 (0.30)	31 (1.22) max.	
	02	G 3/8		80 (3.15)	65 (2.56)	35 (1.38)	32.5 (1.28)	10 (0.39)	50 (1.97)	7.5 (0.30)	35 (1.38)	18 (0.71)	50 (1.97)	7.5 (0.30)		
SIZE 12																
SIZE 16	04	G 3/4	160 (43)	130 (5.12)	90 (3.54)	50 (1.97)	45 (1.77)	20 (0.79)	60 (2.36)	15 (0.59)	54.5 (2.15)	26 (1.02)	83 (3.27)	10.5 (0.41)	50 (1.97)	
	05	G 1		130 (5.12)	100 (3.94)	50 (1.97)	50 (1.97)	20 (0.79)	60 (2.36)	20 (0.79)	54.5 (2.15)	26 (1.02)	83 (3.27)	10.5 (0.41)		
SIZE 20																

**Cartridge style**

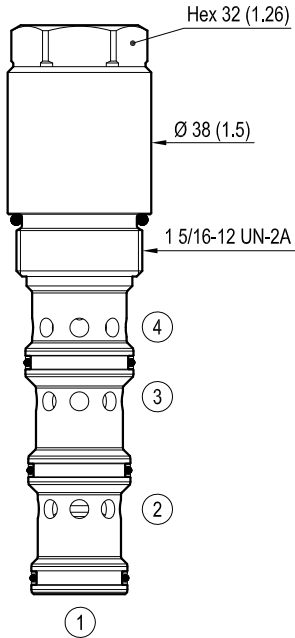
SIZE 10  
Z = 05 and Z = 11 types



SIZE 10  
Z = 35 type



SIZE 16



(mm) Inches

**Table "K"**

					K		
CARTRIDGE CODE	04	77	25	X	85	Z	VDSH-10A
	04	77	25	X	27	Z	VDSH-16A

**Table "X"**

X	Adjustments	
00	Fixed setting	

**CARTRIDGE TECHNICAL DATA**

Common cavity: CA-10A-4N / CA-16A-4N

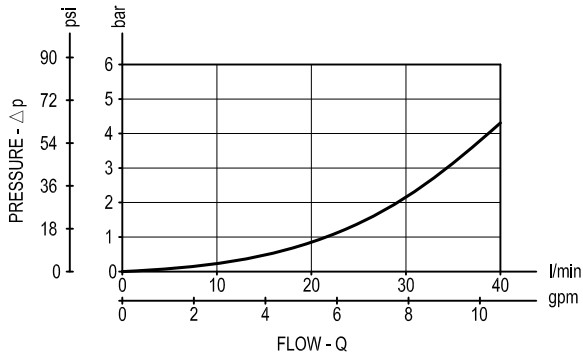
For other details see data sheet RE 18320-75 and RE 18320-85

**Table "Z"**

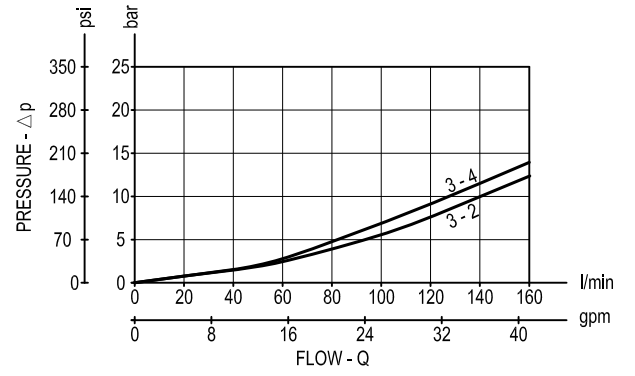
Z	SPRINGS														
	SIZE 08			SIZE 10			SIZE 12			SIZE 16			SIZE 20		
	Setting pressure bar(psi)			Setting pressure bar(psi)			Setting pressure bar(psi)			Setting pressure bar(psi)			Setting pressure bar(psi)		
05				5.5 ±20% (80 ±20%)						5 ±20% (73 ±20%)					
11				11.5 ±10% (167 ±10%)						11 ±10% (160 ±10%)					
35				35 ±10% (508 ±10%)											

Performance graphs

SIZE 10



SIZE 16





# Relief, direct acting guided poppet type

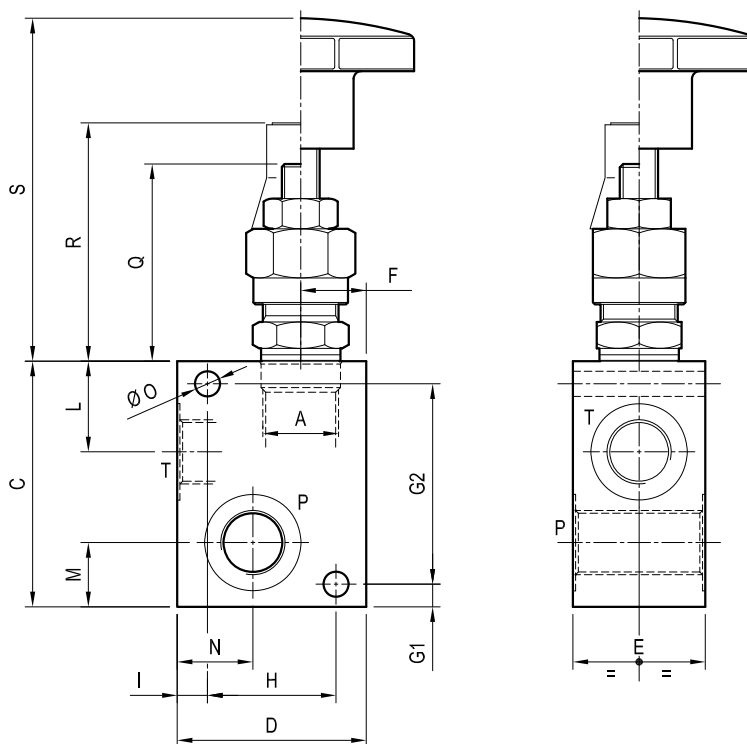
Special cavity

Cartridge style in manifold

VSC-30

05.13.01 - X - Y - Z

## Dimensions



## Technical data

Max flow: up to 30 l/min (8 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

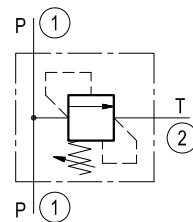
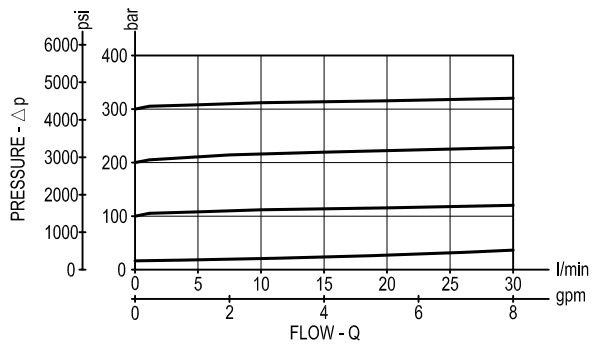


Table "Y"

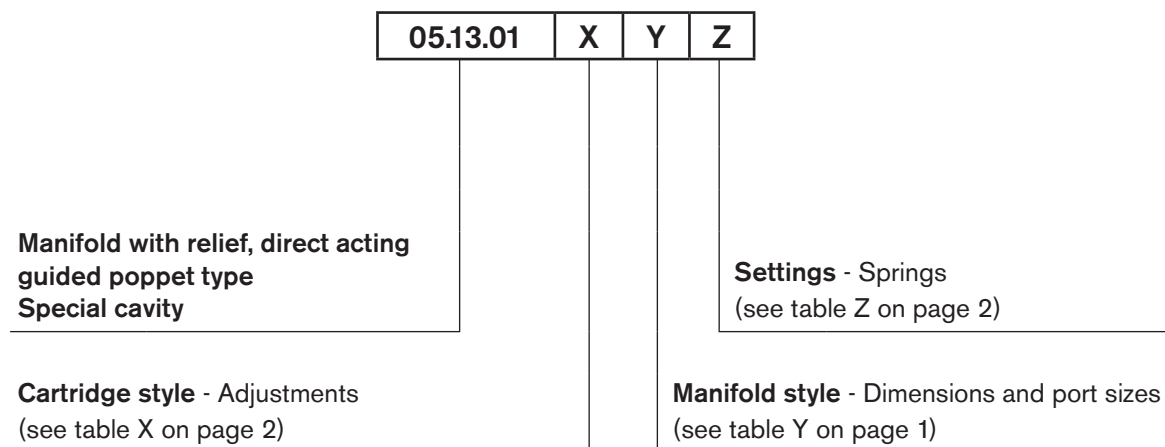
Special Cavity	Y	PORT SIZE	DIMENSIONS mm (Inches)														
			P - T	C	D	E	F	G1	G2	H	I	L	M	N	O	Q	R
008	09	G 1/4	65 (2.56)	50 (1.97)	35 (1.38)	18 (0.71)	6 (0.24)	53 (2.09)	34 (1.34)	8 (0.32)	24 (0.95)	17 (0.67)	22 (0.87)	6.5 (0.26)	51 (2.01)	61 (2.40)	89 (3.50)
	02	G 3/8	65 (2.56)	50 (1.97)	35 (1.38)	18 (0.71)	6 (0.24)	53 (2.09)	34 (1.34)	8 (0.32)	24 (0.95)	17 (0.67)	20 (0.79)	6.5 (0.26)	51 (2.01)	61 (2.40)	89 (3.50)
	03	G 1/2	65 (2.56)	50 (1.97)	35 (1.38)	18 (0.71)	6 (0.24)	53 (2.09)	34 (1.34)	8 (0.32)	24 (0.95)	17 (0.67)	18 (0.71)	6.5 (0.26)	51 (2.01)	61 (2.40)	89 (3.50)



# Performance graph



## Ordering code



## Preferred types (readily available)

Type	Material number	Type	Material number
051301030905000	R930001280	051301040235000	R930001290
051301030910000	R930001281	051301040305000	R930001291
051301030920000	R930001282	051301040320000	R930001292
051301030935000	R930001283	051301040335000	R930001293
051301030205000	R930001263		
051301030210000	R930001264		
051301030220000	R930001266		
051301030235000	R930001269		
051301030305000	R930001271		
051301030310000	R930001274		
051301030320000	R930001275		
051301030335000	R930001278		
051301040205000	R930001287		
051301040210000	R930001288		
051301040220000	R930001289		

Further types available by request



# Relief, direct acting guided poppet type

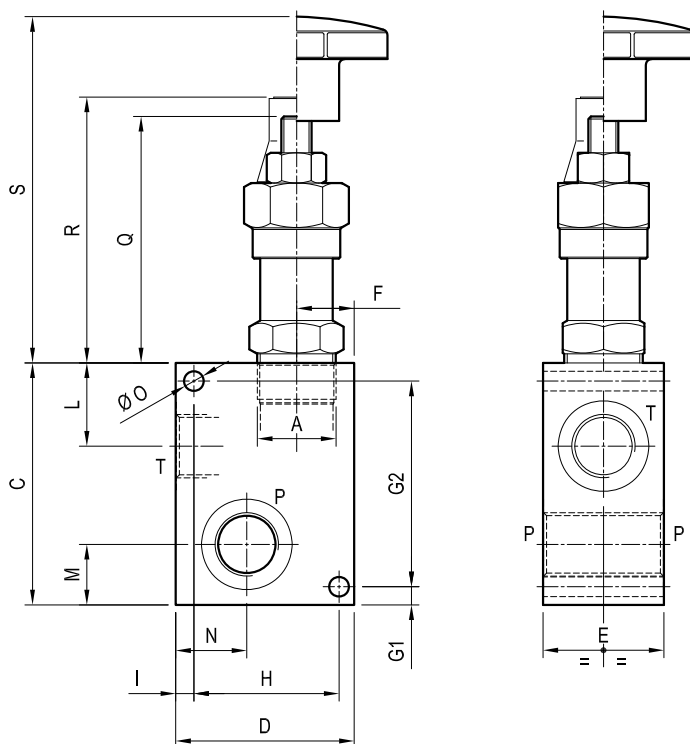
Special cavity

Cartridge style in manifold

VSC-80

05.13.02 - X - Y - Z

## Dimensions



## Technical data

Max flow: up to 80 l/min (21 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

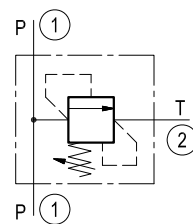
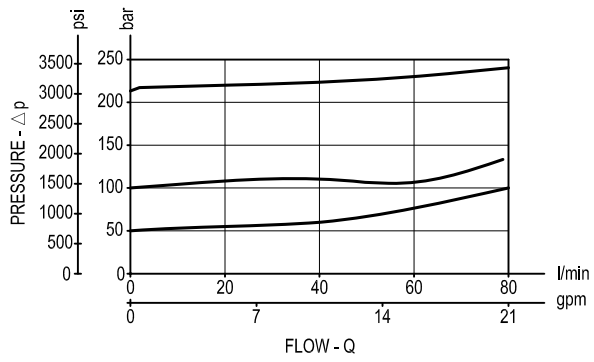


Table "Y"

Special Cavity	Y	PORT SIZE	DIMENSIONS mm (Inches)														
			P-T	C	D	E	F	G1	G2	H	I	L	M	N	O	Q	R
009	03	G 1/2	80 (3.15)	60 (2.36)	40 (1.58)	19 (0.75)	6 (0.24)	68 (2.68)	48 (1.89)	5 (0.20)	27.5 (1.08)	20 (0.79)	23.5 (0.93)	6.5 (0.26)	83 (3.27)	88 (3.47)	118 (4.65)
	04	G 3/4	80 (3.15)	60 (2.36)	40 (1.58)	19 (0.75)	6 (0.24)	68 (2.68)	48 (1.89)	5 (0.20)	27.5 (1.08)	22 (0.87)	21 (0.83)	6.5 (0.26)	83 (3.27)	88 (3.47)	118 (4.65)



# Performance graph



### Ordering code

05.13.02	X	Y	Z
----------	---	---	---

**Manifold with relief, direct acting  
guided poppet type  
Special cavity**

**Settings - Springs**  
(see table Z on page 2)

**Cartridge style - Adjustments**  
(see table X on page 2)

**Manifold style - Dimensions and port sizes**  
(see table Y on page 1)

### Preferred types (readily available)

Type	Material number
051302030305000	R930001296
051302030310000	R930001297
051302030320000	R930001298
051302030405000	R930001299
051302030410000	R930001300
051302030420000	R930001301
051302040310000	R930001304
051302040320000	R930001305
051302040410000	R930001306
051302040420000	R930001307

Type	Material number

Further types available by request

# Relief, direct acting poppet type, differential area

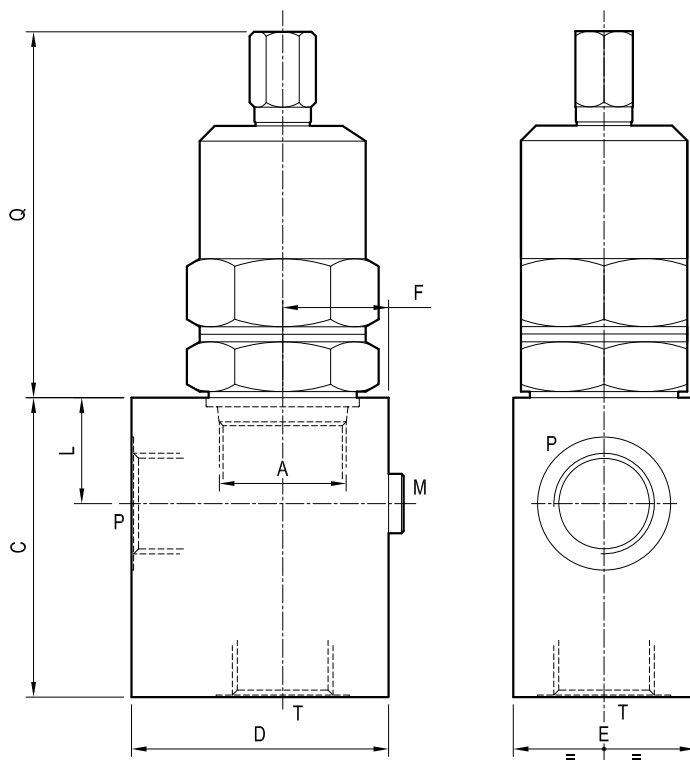
Special cavity

Cartridge style in manifold

VSDC-350

05.12.04 - X - Y - Z

## Dimensions



## Technical data

Max flow: up to 350 l/min (93 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

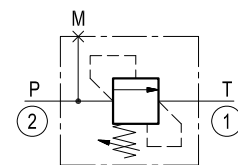
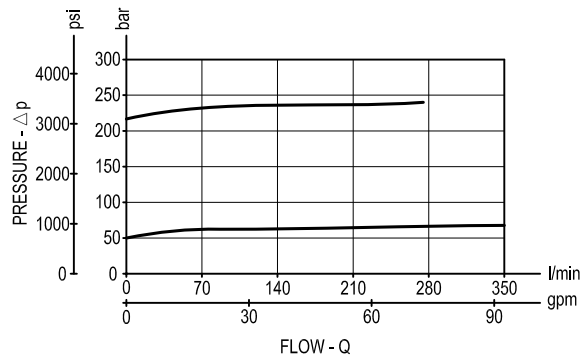


Table "Y"

Special Cavity	Y	PORT SIZE		DIMENSIONS mm (Inches)														
		P-T	M	C	D	E	F	G	H	I	L	M	N	O	Q	R	S	
004	05	G 1	G 1/4	99 (3.90)	85 (3.35)	60 (2.36)	35 (1.38)				35 (1.38)					121 (4.76)		
	06	G 1 1/4	G 1/4	99 (3.90)	85 (3.35)	60 (2.36)	35 (1.38)				35 (1.38)					121 (4.76)		



## Performance graph







# Relief, direct acting poppet type, pressure compensated

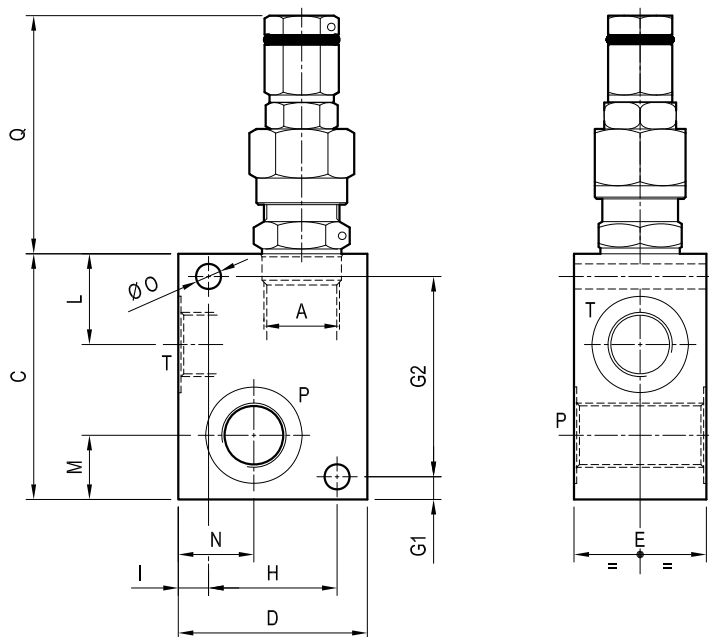
Special cavity

Cartridge style in manifold

VSC-30-CC

OR.10.27 - X - Y - Z

## Dimensions



## Technical data

Max flow:	up to 30 l/min	(8 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

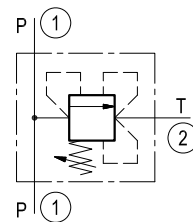
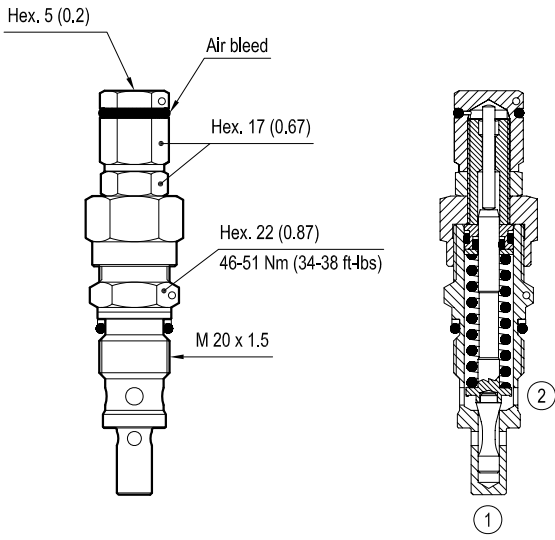


Table "Y"

Special Cavity	Y	PORT SIZE	DIMENSIONS mm (Inches)														
			P-T	C	D	E	F	G1	G2	H	I	L	M	N	O	Q	R
008	09	G 1/4	65 (2.56)	50 (1.97)	35 (1.38)	18 (0.71)	6 (0.24)	53 (2.09)	34 (1.34)	8 (0.32)	24 (0.95)	17 (0.67)	22 (0.87)	6.5 (0.26)	63 (2.48)		
	02	G 3/8	65 (2.56)	50 (1.97)	35 (1.38)	18 (0.71)	6 (0.24)	53 (2.09)	34 (1.34)	8 (0.32)	24 (0.95)	17 (0.67)	20 (0.79)	6.5 (0.26)	63 (2.48)		
	03	G 1/2	65 (2.56)	50 (1.97)	35 (1.38)	18 (0.71)	6 (0.24)	53 (2.09)	34 (1.34)	8 (0.32)	24 (0.95)	17 (0.67)	18 (0.71)	6.5 (0.26)	63 (2.48)		

### Cartridge style



Cartridge code: 04.11.27 - X - 99 - Z

[ mm (inches) ]

Table "X"

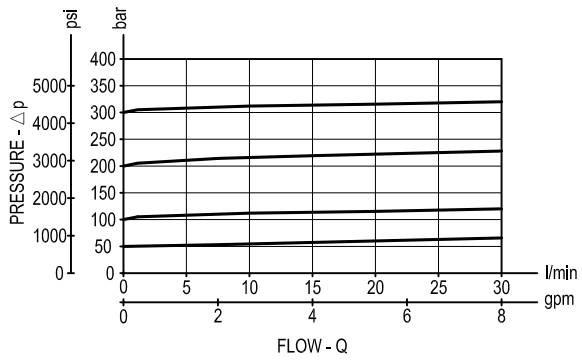
X	ADJUSTMENTS	
03	Leakproof inner hex. socket screw	

CARTRIDGE TECHNICAL DATA	
Special cavity: 008	
For other details see data sheet RE 18318-26	

Table "Z"

Z	SPRINGS			
	Adjust pressure range bar (psi)	Pressure increase bar (psi)	Standard setting bar (psi) Q = 5 l/min	
05	5-50 (75-725)	11 (160)	50 (725)	
10	30-100 (435-1450)	23 (334)	100 (1450)	
20	50-210 (725-3000)	47 (682)	200 (2900)	
35	100-350 (1450-5000)	82 (1189)	350 (5000)	

### Performance graph





## Manifolds with solenoid cartridges

<b>Designation</b>	<b>Description</b>	<b>Code</b>	<b>Data sheet</b>	<b>Page</b>
Solenoid operated valves, 2-way 2-positions	VED-CS-7A/8I-06	OS11K18YZW	18331-70	1489
Solenoid operated valves, 2-way 2-positions	VEI-CS-8A/8I-06	OS15K18YZW	18331-71	1493
Solenoid operated valves, 2-way 2-positions	VEI-CS-8A-10A	OS15K36YZW	18331-72	1497
Solenoid operated valves, 2-way 2-positions	VEI-CS-8A-12A	OS15K89YZW	18331-73	1501
Solenoid operated valves, 2-way 2-positions	VEI-CS-7A/8A-16A	OS15K75YZW	18331-74	1505
Solenoid operated valves, 3-way 2-positions	VED-CS-8I-32-06	OS13K51YZW	18331-75	1509
Solenoid operated valves, 3-way 2-positions	VED-CS-7I-32-06	OS13K77YZW	18331-76	1513
Solenoid operated valves, 4-way 2-positions	VED-CS-8I-42-06	OS14K58YZW	18331-77	1517
Solenoid operated valves, 4-way 2-positions	VED-CS-7I-42-09	OS14K78YZW	18331-78	1521
Solenoid operated valves, 4-way 3-positions	VED-CS-8I-43-06	OS14K58YZW	18331-79	1525
Solenoid operated valves, 4-way 3-positions	VED-CS-7I-43-09	OS14K78YZW	18331-80	1529
Solenoid operated valves, 2-way 2-positions special cavity	VEI-CS-8A-06	OS15K19YZW	18331-81	1533
Solenoid operated valves, 2-way 2-positions special cavity	VEI-CS-8A-09	OS15K17YZW	18331-82	1537
Solenoid operated valves, 2-way 2-positions special cavity	VEI-CS-7A/8A-12	OS15K21YZW	18331-83	1541



# Solenoid operated valves

## 2-way 2-positions

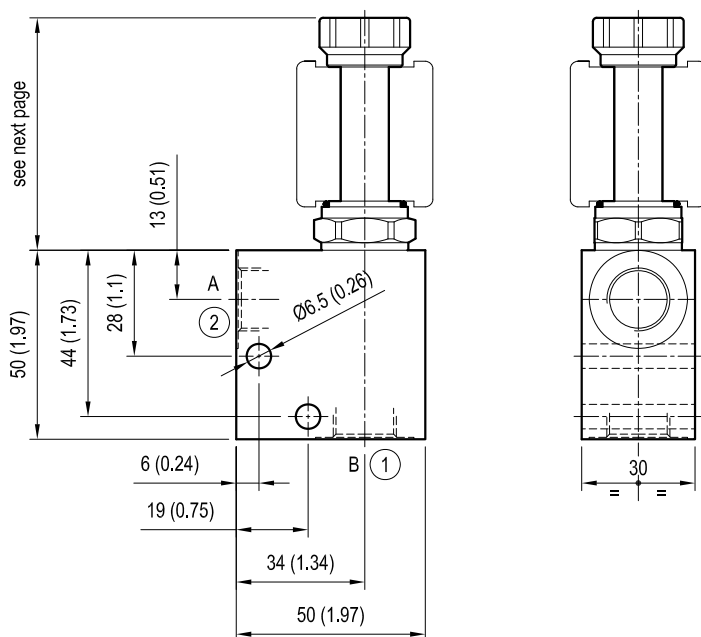
Common cavity size 08

Cartridge style in manifold

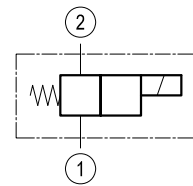
VED-CS-7A/8I-06

OS.11 - K - 18 - Y - Z - W

### Dimensions



[ mm (inches) ]



### Cartridge schemes

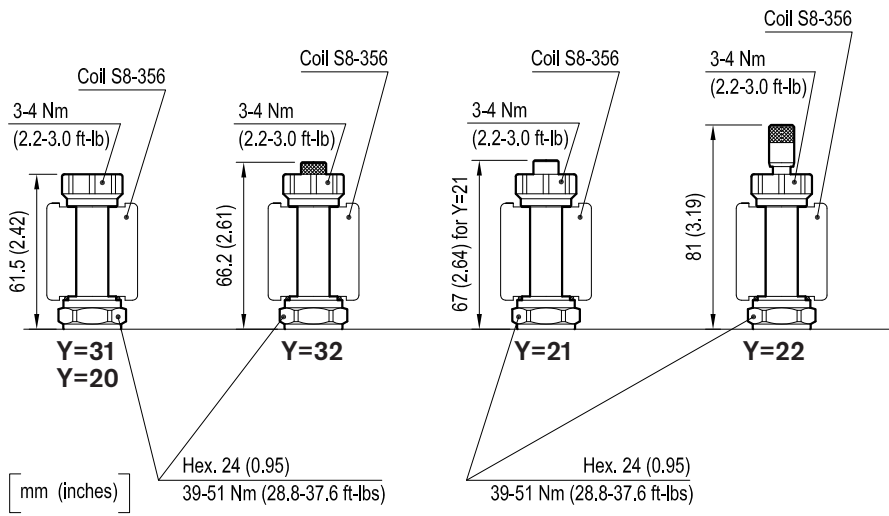
monodirectional type	bidirectional type

### Technical data

Max flow:	up to 1,5 l/min	(0,4 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

### Dimensions



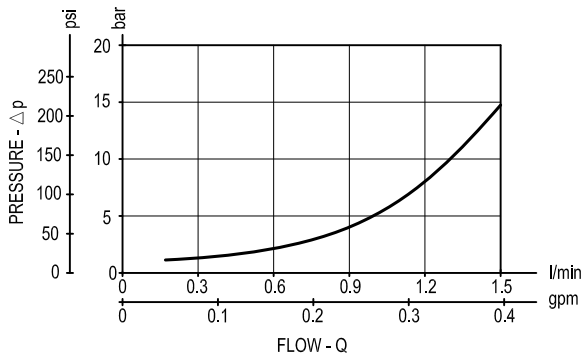
CARTRIDGE TECHNICAL DATA
Common cavity: <b>CA-08A-2N</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : <b>must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted
For other details see cartridge data sheet

OS11	- K -		18	- Y -			- Z -		- W -		CARTRIDGE SCHEME	
	monodir.	bidir.		Rated Flow			Ports size 1-2		Material		monodir.	bidir.
				1.5 l/min (0.4 gpm)			G 1/4	G 3/8	Aluminium	Steel		
OD11		<b>01</b>	18	<b>31</b>			<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
OD11		<b>01</b>	18	<b>32</b>			<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
OD11		<b>02</b>	18	<b>20</b>			<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
OD11		<b>02</b>	18	<b>21</b>			<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
OD11		<b>02</b>	18	<b>22</b>			<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
CARTRIDGE CODE												

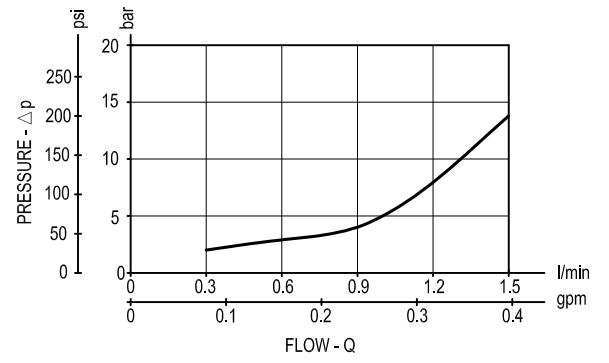


Performance graphs

K = 01



K = 02





# Solenoid operated valves

## 2-way 2-positions

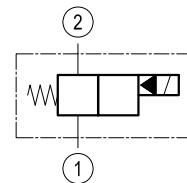
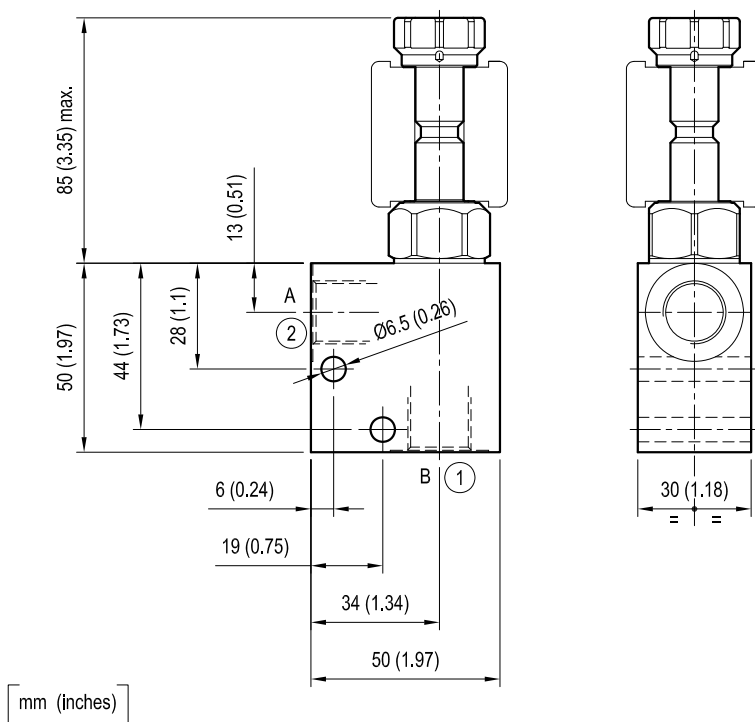
Common cavity size 08

Cartridge style in manifold

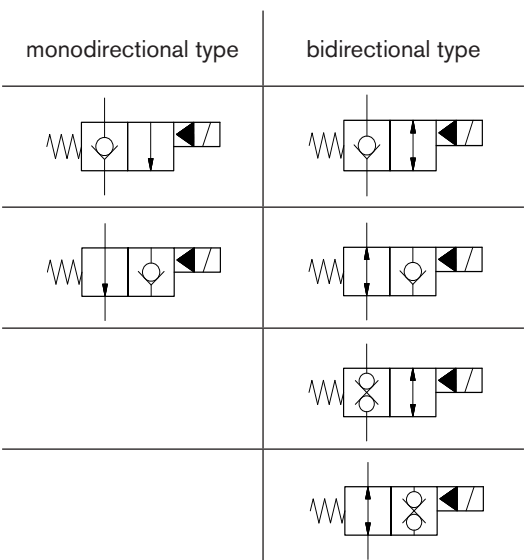
VEI-CS-8A/8I-06

OS.15 - K - 18 - Y - Z - W

### Dimensions



### Cartridge schemes

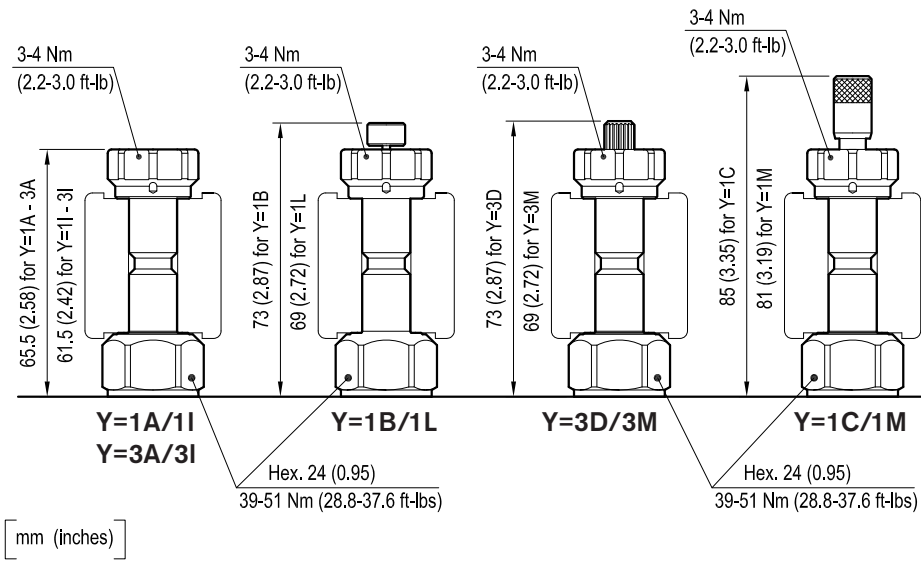


### Technical data

Max flow:	up to 40 l/min	(11 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

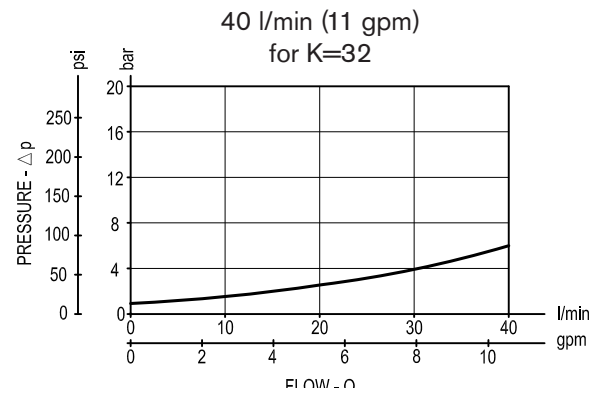
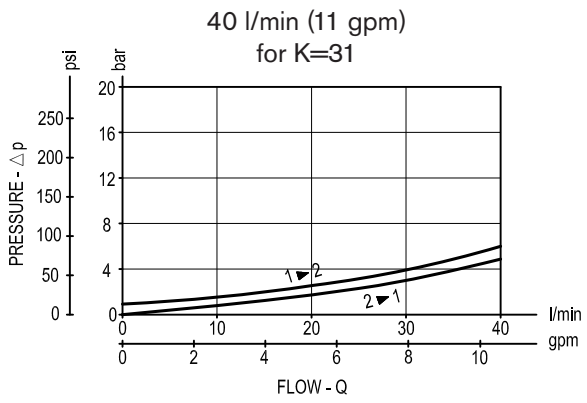
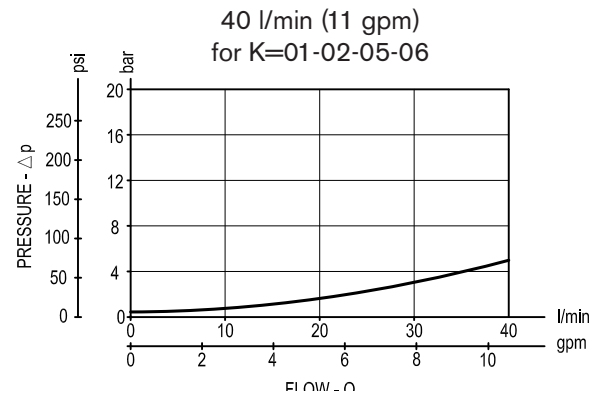
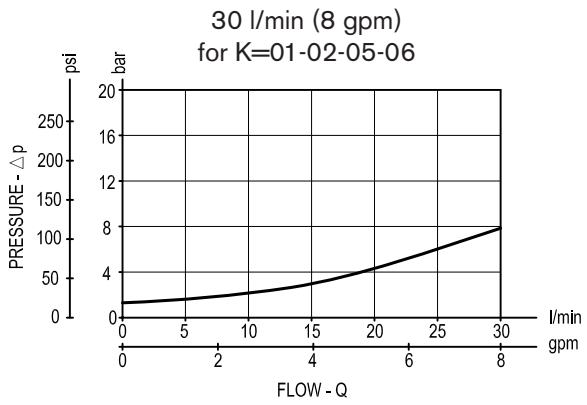
Dimensions



CARTRIDGE TECHNICAL DATA
Common cavity: <b>CA-08A-2N</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : S8-356 <b>must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted
For other details see cartridge data sheet

OS15	- K -		18	- Y -		- Z -		- W -		CARTRIDGE SCHEME		
	monodir.	bidir.		Rated Flow		Ports size 1-2		Material		monodir.	bidir.	
				30 l/min (8 gpm)	40 l/min (11 gpm)	G 1/4	G 3/8	Aluminium	Steel			
CARTRIDGE CODE	OD15	<b>01</b>	<b>05</b>	18	<b>3I</b>	<b>3A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>01</b>	<b>05</b>	18	<b>3M</b>	<b>3D</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	18	<b>1I</b>	<b>1A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	18	<b>1L</b>	<b>1B</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	18	<b>1M</b>	<b>1C</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>31</b>	18		<b>3A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>31</b>	18		<b>3D</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	18		<b>1A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	18		<b>1B</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	18		<b>1C</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		

Performance graphs



## Ordering code

OS.15	K	18	Y	Z	W
-------	---	----	---	---	---

Manifold with solenoid operated valve, 2-way 2-positions

Cartridge scheme (see page 1 and 2)

= 01	Monodirectional
= 02	
= 05	Bidirectional
= 06	
= 31	
= 32	

Common cavity Size 08

Manifold material

= 00	Aluminium
= S0	Steel

Port sizes (see table on page 2)

= 09	G 1/4
= 02	G 3/8

See table on page 2

## Preferred types (readily available)

Type	Material number
OS1501183I0200	R934002825
OS1501183I0900	R934002826
OS1501183M0200	R934002830
OS1502181C0200	R934002835
OS1502181C0900	R934002836
OS1502181C09S0	R934002837
OS1502181I0200	R934002838
OS1502181I02S0	R934000418
OS1502181I0900	R934002839
OS1502181L0200	R934002842
OS1502181M0200	R934002844
OS1505183A0200	R934002868
OS1505183A0900	R934002872
OS1505183D0200	R934002876

Type	Material number
OS1505183D09S0	R934000727
OS1505183I0200	R934002878
OS1505183I0900	R934002881
OS1505183M0200	R934003480
OS1516181A0200	R934002922
OS1506181A0900	R934002925
OS1506181B0200	R934002927
OS1506181C0200	R934002929
OS1506181C0900	R934002934
OS1506181I0900	R934002937
OS1531183A0200	R934002972
OS1531183A0900	R934002976
OS1532181A0200	R901132028
OS1532181A0900	R934002998

Further types available by request

# Solenoid operated valves

## 2-way 2-positions

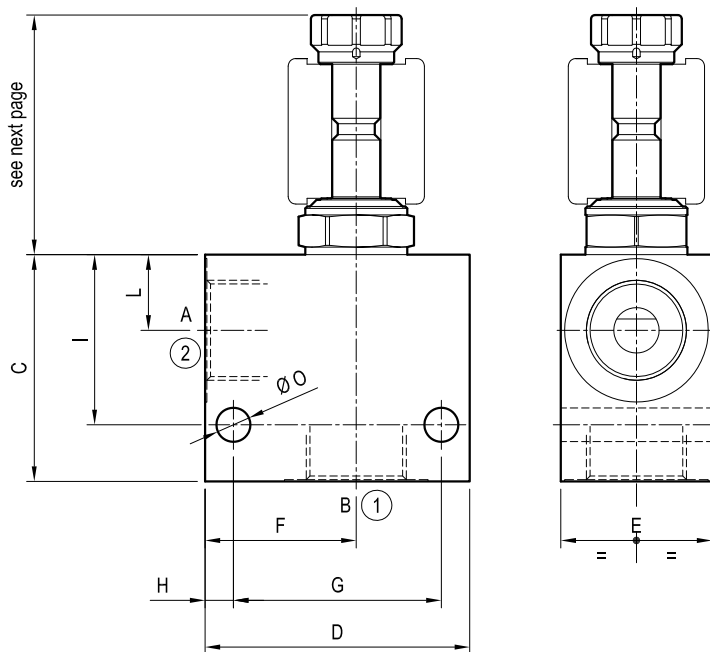
Common cavity size 10

Cartridge style in manifold

VEI-CS-8A-10A

OS.15 - K - 36 - Y - Z - W

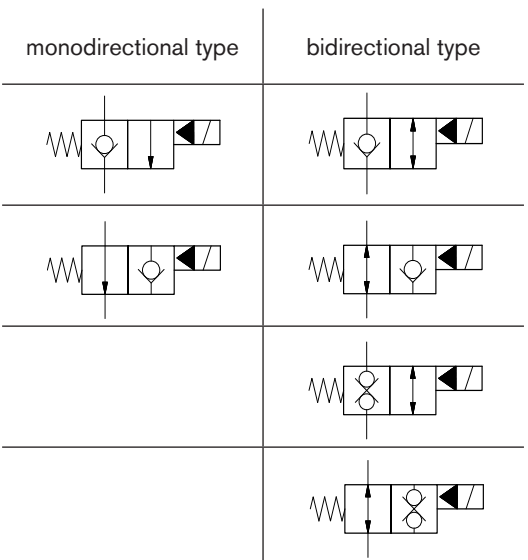
### Dimensions



[ mm (inches) ]

A - B	C	D	E	F	G	H	I	L	O
G 1/2	60 (2.36)	60 (2.36)	35 (1.38)	35 (1.38)	45 (1.77)	7.5 (0.3)	45 (1.77)	19 (0.75)	7.5 (0.3)
G 3/4	60 (2.36)	70 (2.76)	40 (1.58)	40 (1.58)	55 (2.17)	7.5 (0.3)	45 (1.77)	20 (0.79)	9 (0.35)

### Cartridge schemes

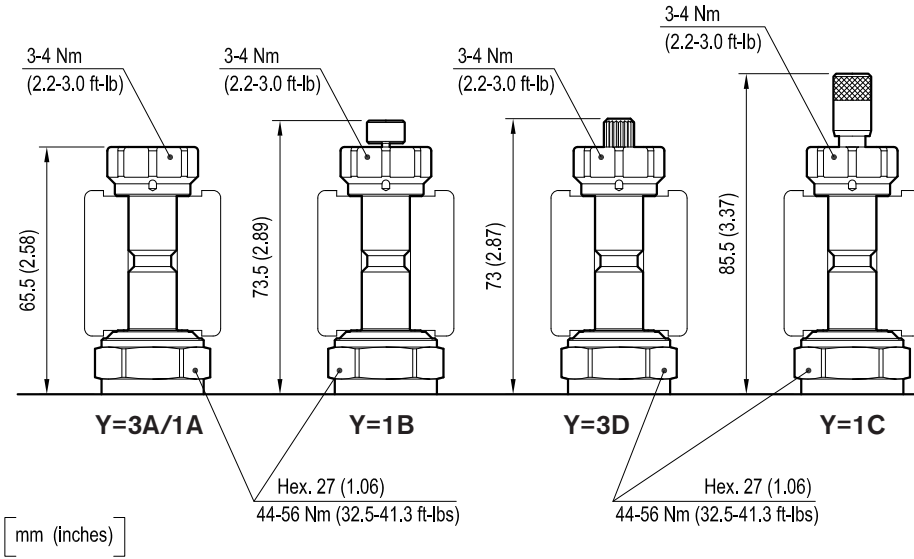


### Technical data

Max flow:	up to 70 l/min	(19 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

**Dimensions**



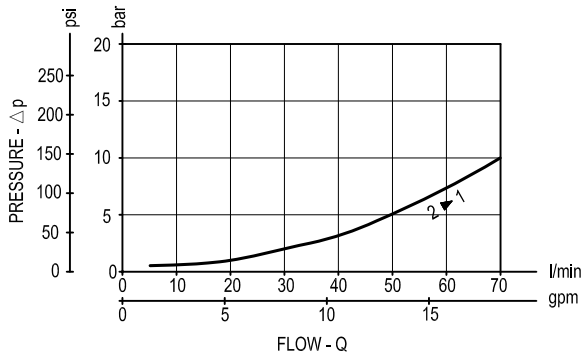
<b>CARTRIDGE TECHNICAL DATA</b>	
Common cavity: <b>CA-10A-2N</b>	
Filtration: 25 µm nominal or better	
Minimum voltage required: 90% of nominal value	
Coil : S8-356 <b>must be ordered separately</b> see data sheet RE 18325-90	
Mounting position: unrestricted	
For other details see cartridge data sheet	

OS15	- K -		36	- Y - Rated Flow 70 l/min (19 gpm)	- Z - Ports size 1-2 G 1/2   G 3/4		- W - Material Aluminium   Steel		CARTRIDGE SCHEME		
	monodir.	bidir.			G 1/2	G 3/4	Aluminium	Steel	monodir.	bidir.	
CARTRIDGE CODE	OD15	<b>01</b>	<b>05</b>	36	<b>3A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>01</b>	<b>05</b>	36	<b>3D</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	36	<b>1A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	36	<b>1B</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	36	<b>1C</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>31</b>	36	<b>3A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>31</b>	36	<b>3D</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	36	<b>1A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	36	<b>1B</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	36	<b>1C</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		

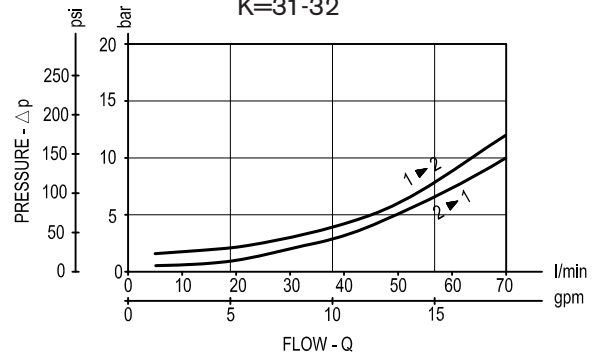


Performance graphs

K=01-02



K=05-06  
K=31-32





# Solenoid operated valves

## 2-way 2-positions

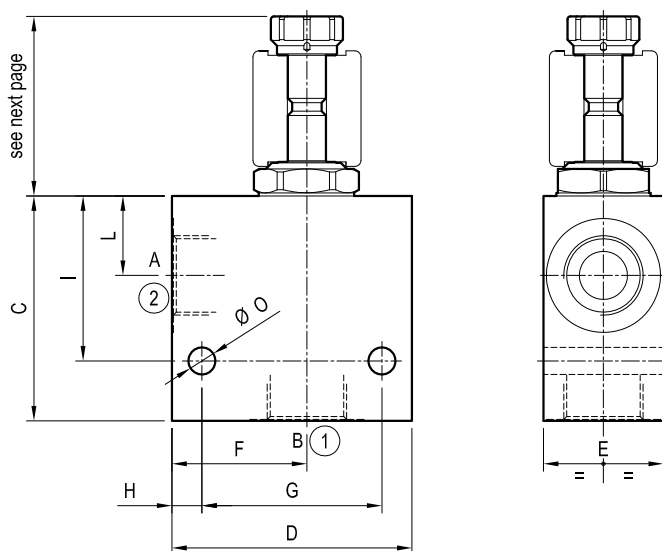
Common cavity size 12

Cartridge style in manifold

VEI-CS-8A-12A

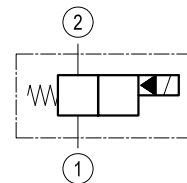
OS.15 - K - 89 - Y - Z - W

### Dimensions

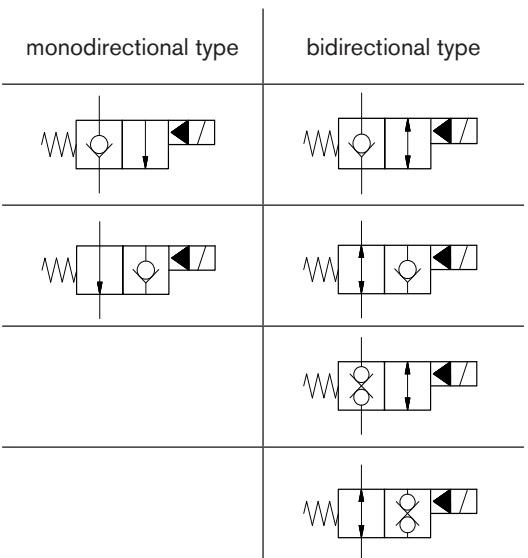


[mm (inches)]

A - B	C	D	E	F	G	H	I	L			O
G 3/4	75 (2.95)	80 (3.15)	40 (1.58)	45 (1.77)	60 (2.36)	10 (0.39)	55 (2.17)	26.5 (1.04)			9 (0.35)
G 1	75 (2.95)	80 (3.15)	50 (1.97)	45 (1.77)	60 (2.36)	10 (0.39)	55 (2.17)	26.5 (1.04)			9 (0.35)



### Cartridge schemes

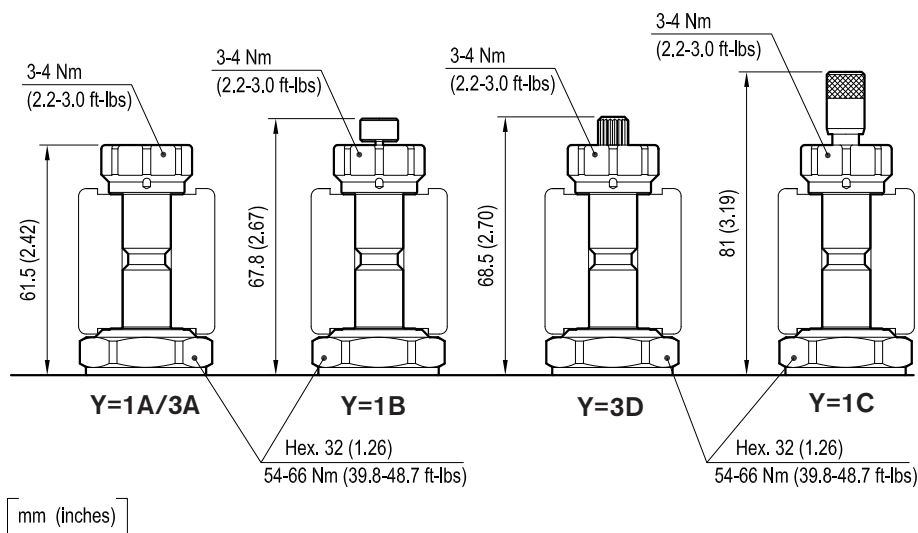


### Technical data

Max flow:	up to 150 l/min	(40 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

Dimensions

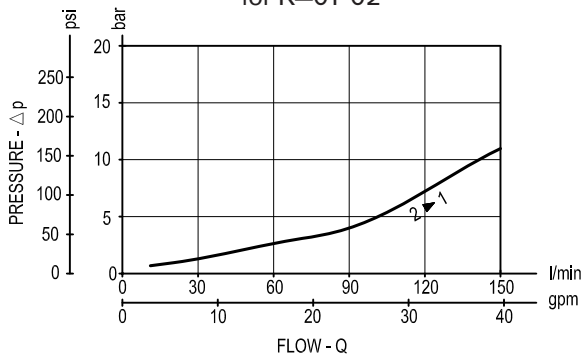


CARTRIDGE TECHNICAL DATA
Common cavity: <b>CA-12A-2N</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : S8-356 <b>must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted
For other details see cartridge data sheet

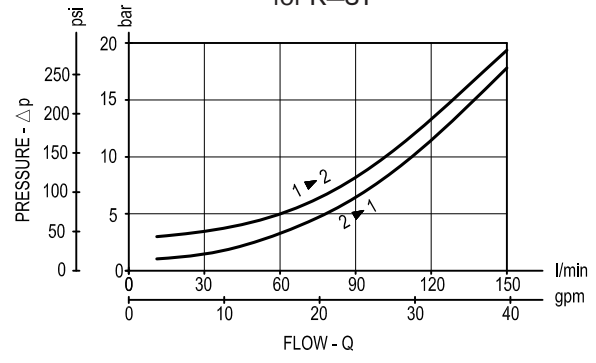
OS15	- K -		89	- Y - Rated Flow 150 l/min (40 gpm)	- Z - Ports size 1-2 G 3/4 G 1		- W - Material Aluminium Steel		CARTRIDGE SCHEME		
	monodir.	bidir.			monodir.	bidir.					
CARTRIDGE CODE	OD15	01	05	89	3A	04	05	00	S0		
	OD15	01	05	89	3D	04	05	00	S0		
	OD15	02	06	89	1A	04	05	00	S0		
	OD15	02	06	89	1B	04	05	00	S0		
	OD15	02	06	89	1C	04	05	00	S0		
	OD15		31	89	3A	04	05	00	S0		
	OD15		31	89	3D	04	05	00	S0		
	OD15		32	89	1A	04	05	00	S0		
	OD15		32	89	1B	04	05	00	S0		
	OD15		32	89	1C	04	05	00	S0		

Performance graphs

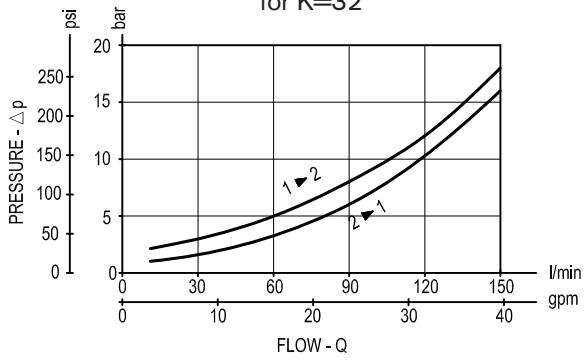
for K=01-02



for K=31



for K=32





# Solenoid operated valves

## 2-way 2-positions

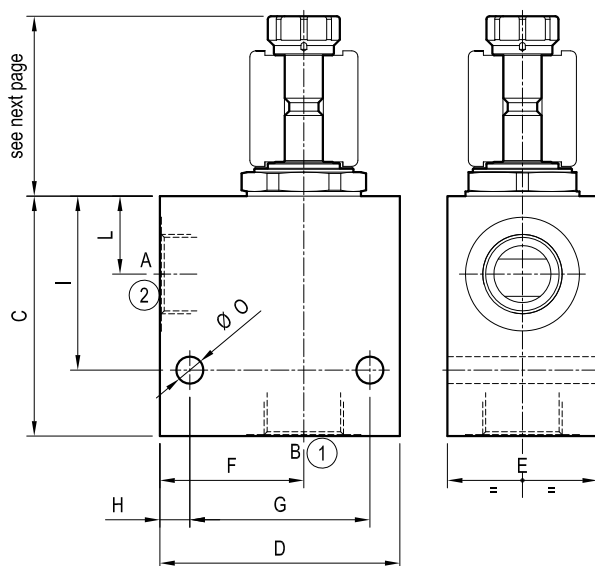
Common cavity size 16

Cartridge style in manifold

VEI-CS-7A/8A-16A

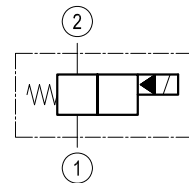
OS.15 - K - 75 - Y - Z - W

### Dimensions

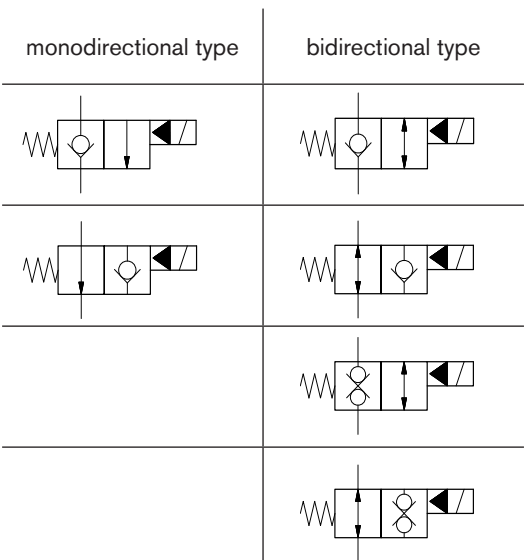


[ mm (inches) ]

A - B	C	D	E	F	G	H	I	L		O
G 3/4	80 (3.15)	80 (3.15)	50 (1.97)	48 (1.89)	60 (2.36)	10 (0.39)	58 (2.28)	26 (1.02)		9 (0.35)
G 1	80 (3.15)	90 (3.54)	50 (1.97)	53 (2.09)	60 (2.36)	20 (0.79)	58 (2.28)	26 (1.02)		9 (0.35)



### Cartridge schemes

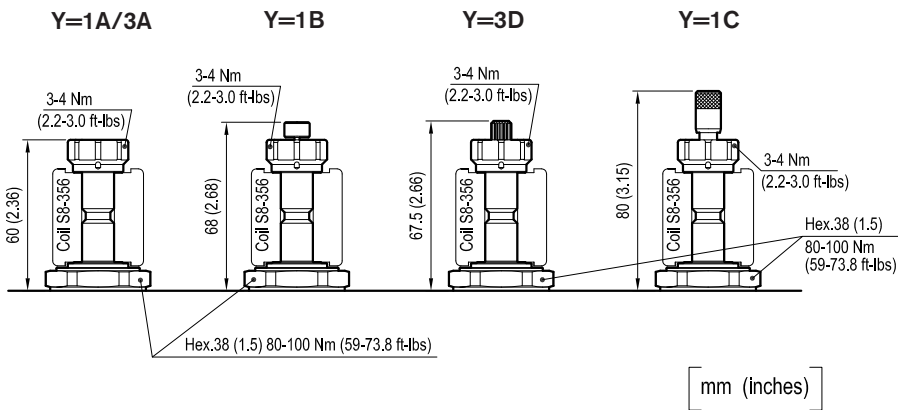


### Technical data

Max flow:	up to 150 l/min	(40 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

Dimensions



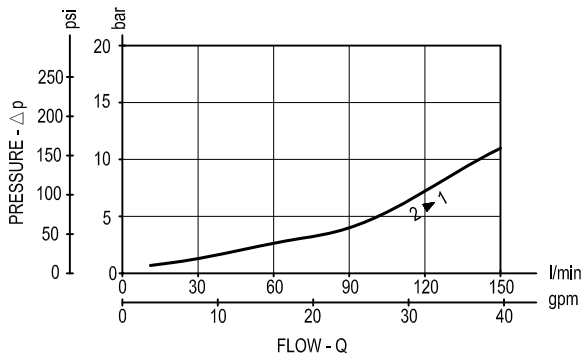
CARTRIDGE TECHNICAL DATA
Common cavity: <b>CA-16A-2N</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : <b>must be ordered separately</b> (see data sheets RE 18325-90)
Mounting position: unrestricted

OS15	- K -		75	- Y -		- Z -		- W -		CARTRIDGE SCHEME	
	monodir.	bidir.		Rated Flow	Ports size 1-2	Material		monodir.	bidir.		
			150 l/min (40 gpm)	G 3/4	G 1	Aluminium	Steel				
CARTRIDGE CODE	OD15	01	05	75	3A	04	05	00	S0		
	OD15	01	05	75	3D	04	05	00	S0		
	OD15	02	06	75	1A	04	05	00	S0		
	OD15	02	06	75	1B	04	05	00	S0		
	OD15	02	06	75	1C	04	05	00	S0		
	OD15		31	75	3A	04	05	00	S0		
	OD15		31	75	3D	04	05	00	S0		
	OD15		32	75	1A	04	05	00	S0		
	OD15		32	75	1B	04	05	00	S0		
	OD15		32	75	1C	04	05	00	S0		

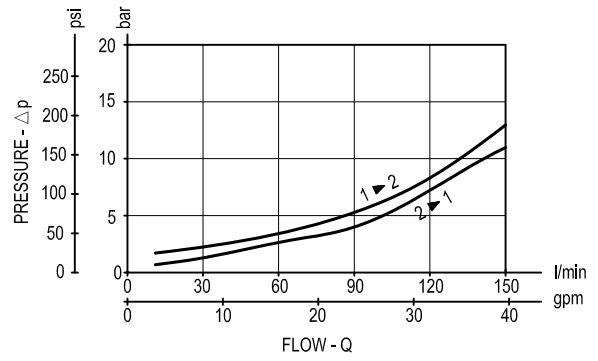


Performance graphs

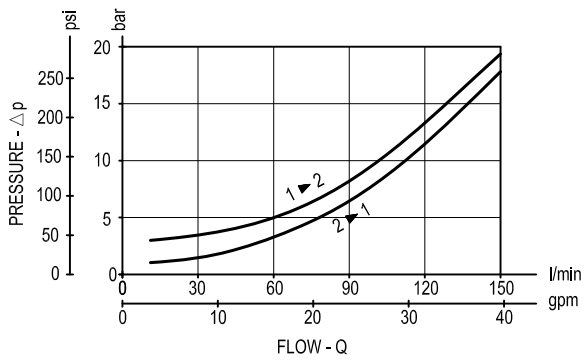
for K=01-02



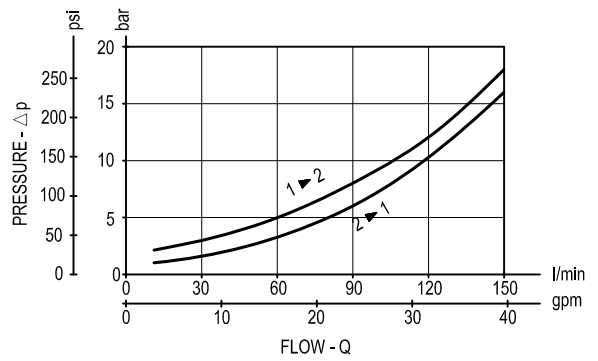
for K=05 / Y=3A-3D  
for K=06 / Y=1A-1B-1C



for K=31 / Y=3A-3D



for K=32 / Y=1A-1B-1C





# Solenoid operated valves

## 3-way 2-positions

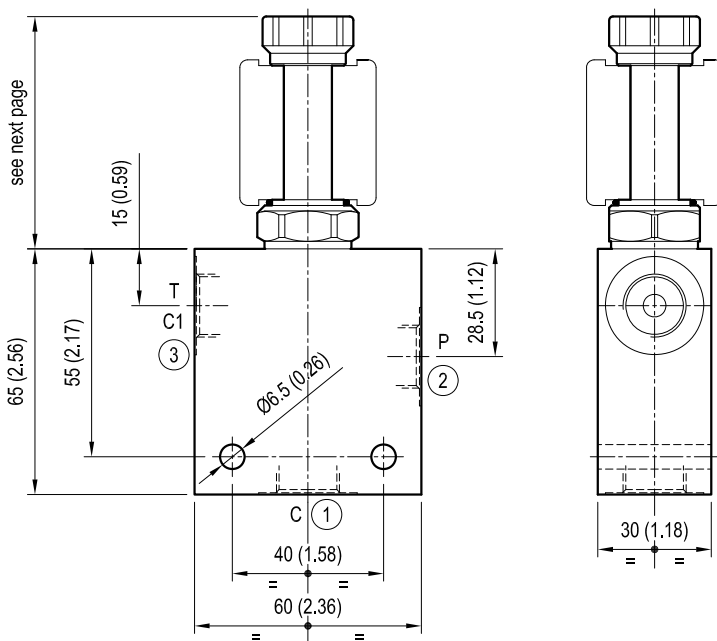
Common cavity size 08

Cartridge style in manifold

VED-CS-8I-32-06

OS.13 - K - 51 - Y - Z - W

### Dimensions



[ mm (inches) ]

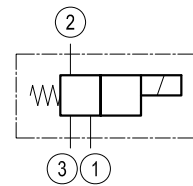
### Technical data

Max flow: up to 10 l/min (3 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

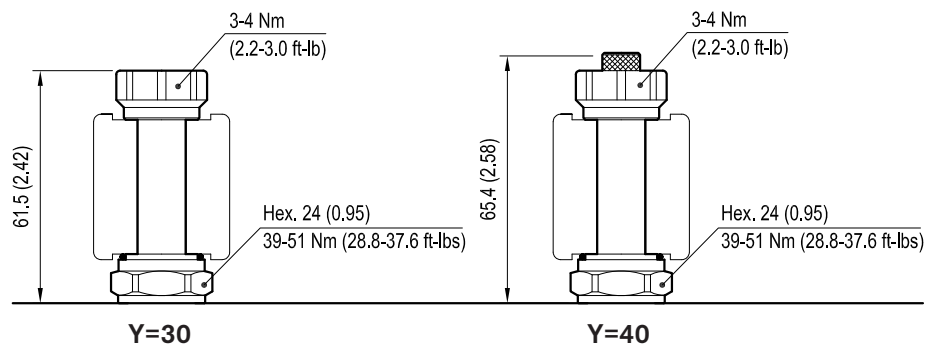
To order only manifold see data sheet RE 18325-85



### Cartridge schemes

monodirectional type	bidirectional type

### Dimensions

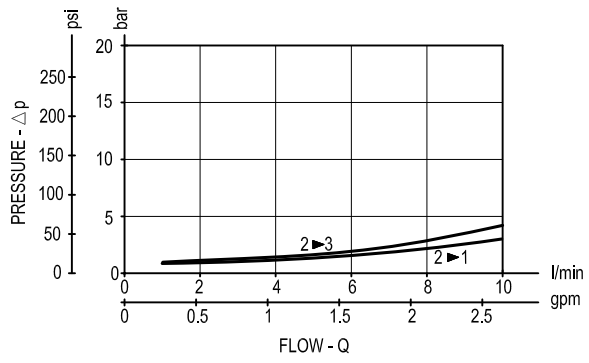


CARTRIDGE TECHNICAL DATA
Common cavity: <b>CA-08A-3N</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : S8-356 <b>must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted

[ mm (inches) ]

OS13	- K -		51	- Y - Rated Flow 10 l/min (3 gpm)	- Z - Ports size 1-2-3		- W - Material		CARTRIDGE SCHEME	
	monodir.	bidir.			G 1/4	G 3/8	Aluminium		monodir.	bidir.
CARTRIDGE CODE	OD13	<b>10</b>	51	<b>30</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>10</b>	51	<b>40</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>11</b>	51	<b>30</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>11</b>	51	<b>40</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>20</b>	51	<b>30</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>20</b>	51	<b>40</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>30</b>	51	<b>30</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>30</b>	51	<b>40</b>	<b>09</b>	<b>02</b>	<b>00</b>			

# Performance graph



## Ordering code

OS.13	K	51	Y	Z	W
-------	---	----	---	---	---

**Manifold with solenoid operated valve, 3-way 2-positions**

**Cartridge scheme** (see page 1 and 2)

= 10

= 11

= 20

= 30

Bidirectional

**Common cavity Size 08**

**Manifold material**

= 00 Aluminium

**Port sizes** (see table on page 2)

= 09 G 1/4

= 02 G 3/8

See table on page 2

# Solenoid operated valves

## 3-way 2-positions

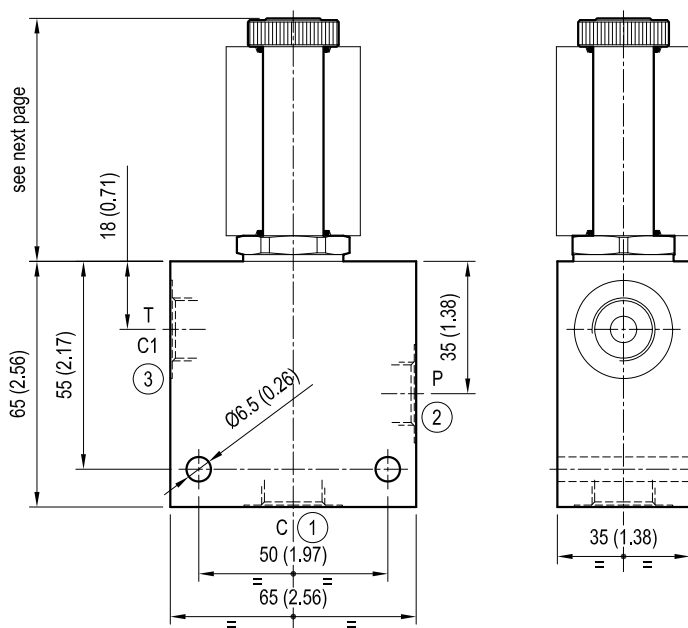
Common cavity size 10

Cartridge style in manifold

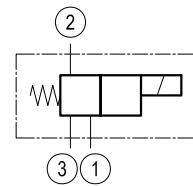
VED-CS-71-32-09

OS.13 - K - 77 - Y - Z - W

### Dimensions



[ mm (inches) ]



### Cartridge schemes

monodirectional type	bidirectional type

### Technical data

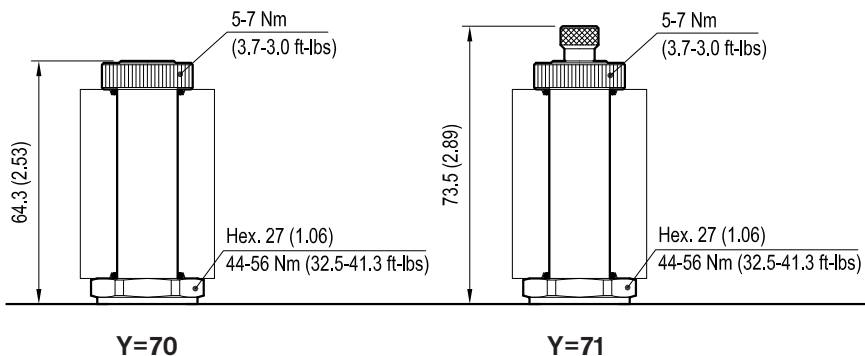
Max flow: up to 20 l/min (6 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

To order only manifold see data sheet RE 18325-85

Dimensions



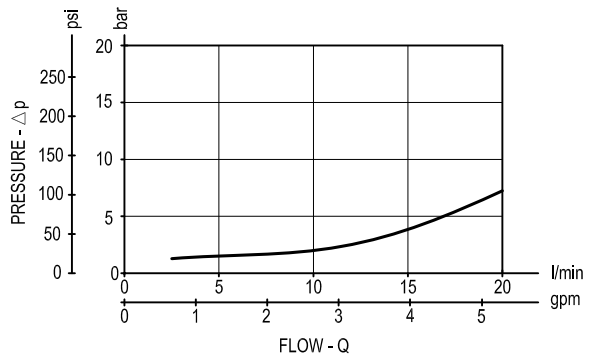
CARTRIDGE TECHNICAL DATA
Common cavity: <b>CA-10A-3N</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : <b>S7 must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted

[ mm (inches) ]

OS13	- K -		77	- Y - Rated Flow 20 l/min (6 gpm)	- Z - Ports size 1-2-3		- W - Material		CARTRIDGE SCHEME	
	monodir.	bidir.			G 1/4	G 3/8	Aluminium		monodir.	bidir.
CARTRIDGE CODE	OD13	<b>10</b>	77	<b>70</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>10</b>	77	<b>71</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>11</b>	77	<b>70</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>11</b>	77	<b>71</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>20</b>	77	<b>70</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>20</b>	77	<b>71</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>30</b>	77	<b>70</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD13	<b>30</b>	77	<b>71</b>	<b>09</b>	<b>02</b>	<b>00</b>			



### Performance graph



## Ordering code

OS.13	K	77	Y	Z	W
-------	---	----	---	---	---

Manifold with solenoid operated valve, 3-way 2-positions

Cartridge scheme (see page 1 and 2)

= 10

= 11

= 20

= 30

Bidirectional

Common cavity Size 10

Manifold material

= 00 Aluminium

Port sizes (see table on page 2)

= 09 G 1/4

= 02 G 3/8

See table on page 2

# Solenoid operated valves

## 4-way 2-positions

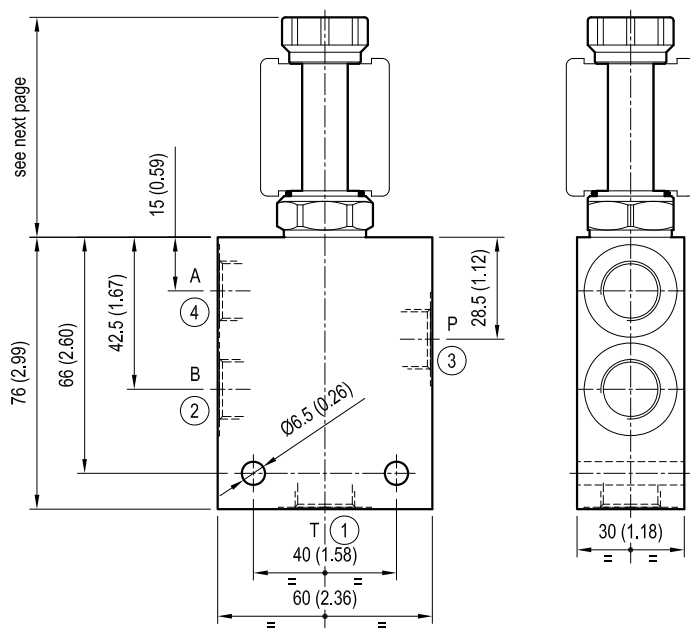
Common cavity size 08

Cartridge style in manifold

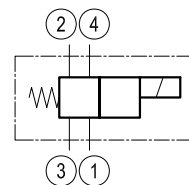
VED-CS-8I-42-06

OS.14 - K - 58 - Y - Z - W

### Dimensions



[ mm (inches) ]



### Cartridge schemes

monodirectional type	bidirectional type

### Technical data

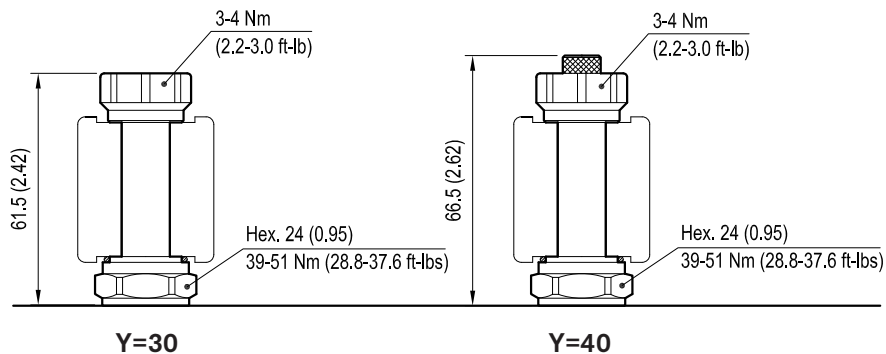
Max flow: up to 10 l/min (3 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

To order only manifold see data sheet RE 18325-85

### Dimensions

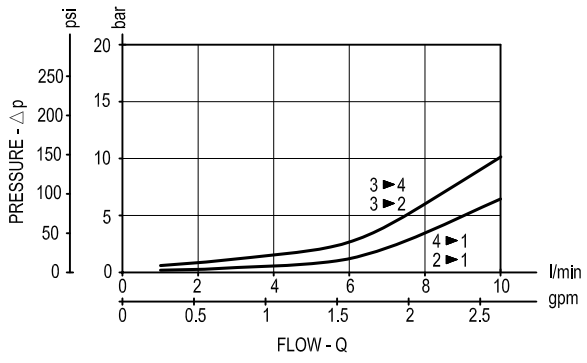


CARTRIDGE TECHNICAL DATA
Common cavity: <b>CA-08A-4N</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : <b>S8-356 must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted

[ mm (inches) ]

OS14	- K -		58	- Y - Rated Flow 10 l/min (3 gpm)	- Z - Ports size 1-2- 3-4		- W - Material		CARTRIDGE SCHEME	
	monodir.	bidir.			G 1/4	G 3/8	Aluminium		monodir.	bidir.
CARTRIDGE CODE	OD14	<b>40</b>	58	<b>30</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD14	<b>40</b>	58	<b>40</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD14	<b>41</b>	58	<b>30</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD14	<b>41</b>	58	<b>40</b>	<b>09</b>	<b>02</b>	<b>00</b>			

# Performance graph



## Ordering code

OS.14	K	58	Y	Z	W
-------	---	----	---	---	---

Manifold with solenoid operated valve, 4-way 2-positions

Cartridge scheme (see page 1 and 2)

= 40

Bidirectional

= 41

Common cavity size 08

Manifold material

= 00 Aluminium

Port sizes (see table on page 2)

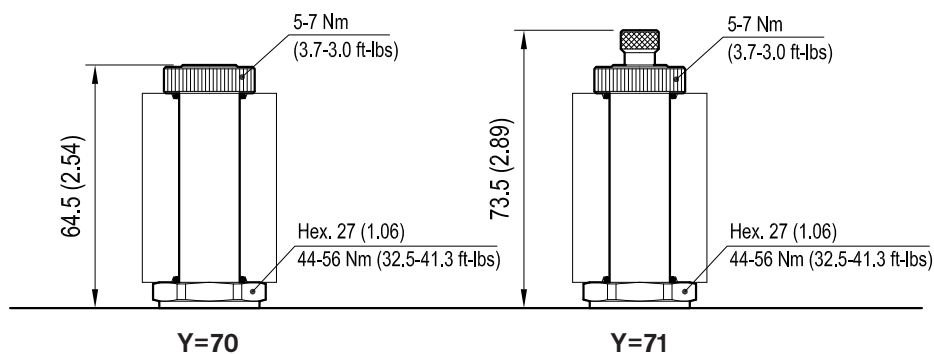
= 09 G 1/4

= 02 G 3/8

See table on page 2



### Dimensions



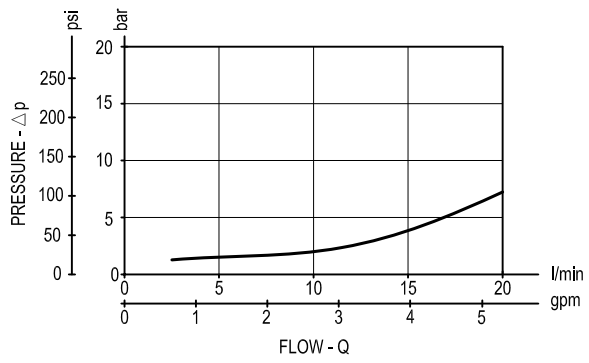
CARTRIDGE TECHNICAL DATA	
Common cavity: <b>CA-10A-4N</b>	
Filtration: 25 µm nominal or better	
Minimum voltage required: 90% of nominal value	
Coil : <b>S7 must be ordered separately</b> see data sheet RE 18325-90	
Mounting position: unrestricted	

[ mm (inches) ]

OS14	- K -		78	- Y - Rated Flow 20 l/min (6 gpm)	- Z - Ports size 1-2- 3-4		- W - Material		CARTRIDGE SCHEME	
	monodir.	bidir.			G 1/4	G 3/8	Aluminium		monodir.	bidir.
CARTRIDGE CODE	OD14	<b>40</b>	78	<b>70</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD14	<b>40</b>	78	<b>71</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD14	<b>41</b>	78	<b>70</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD14	<b>41</b>	78	<b>71</b>	<b>09</b>	<b>02</b>	<b>00</b>			



## Performance graph



## Ordering code

OS.14	K	78	Y	Z	W
-------	---	----	---	---	---

Manifold with solenoid operated valve, 4-way 2-positions

Cartridge scheme (see page 1 and 2)

= 40

Bidirectional

= 41

Common cavity size 10

Manifold material

= 00 Aluminium

Port sizes (see table on page 2)

= 09 G 1/4

= 02 G 3/8

See table on page 2

# Solenoid operated valves

## 4-way 3-positions

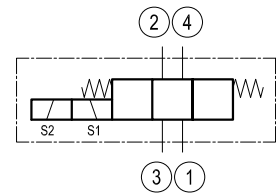
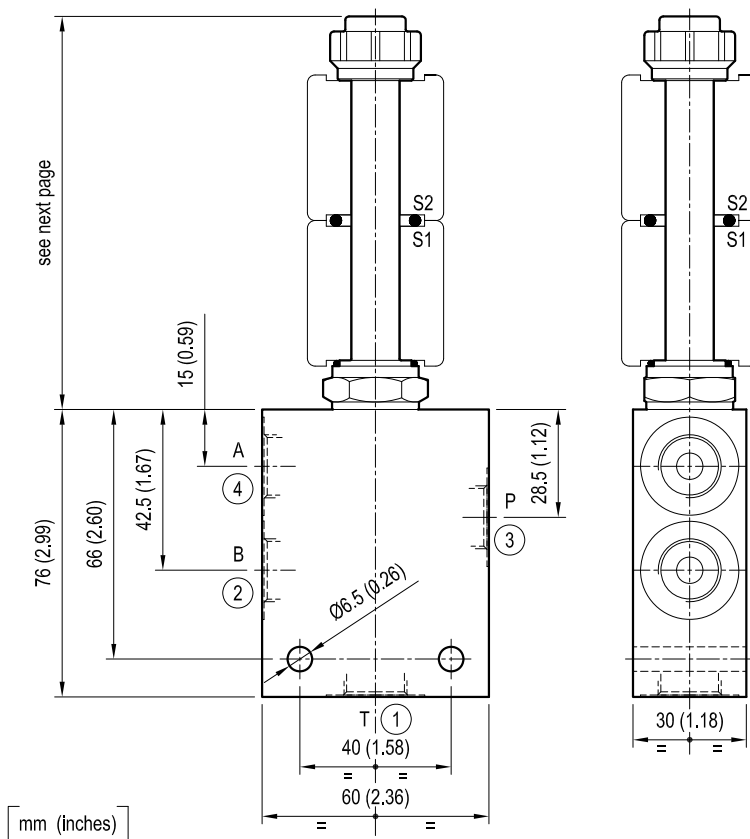
Common cavity size 08

Cartridge style in manifold

VED-CS-8I-43-06

OS.14 - K - 58 - Y - Z - W

### Dimensions



### Cartridge schemes

monodirectional type	bidirectional type

### Technical data

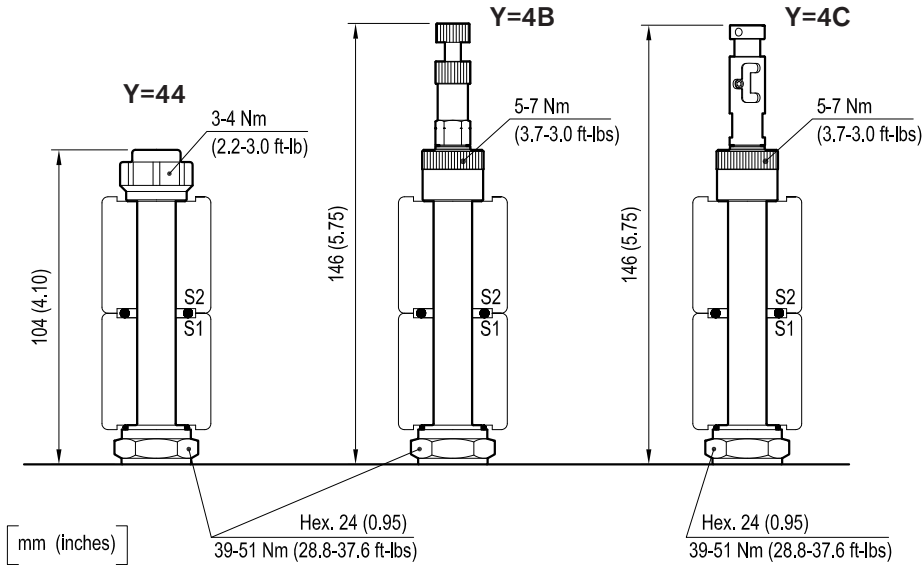
Max flow: up to 10 l/min (3 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

To order only manifold see data sheet RE 18325-85

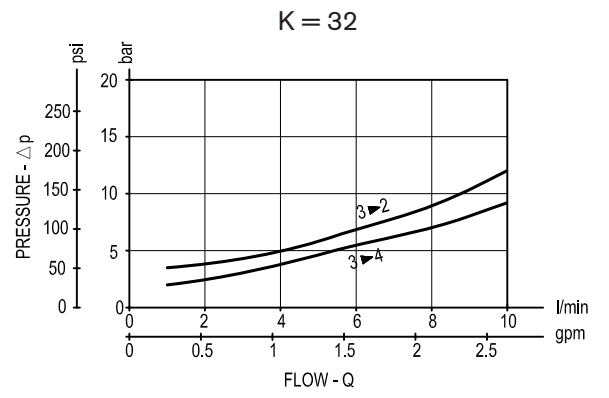
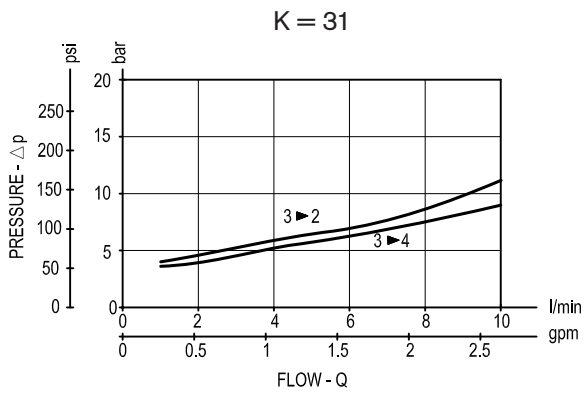
Dimensions



CARTRIDGE TECHNICAL DATA
Common cavity: <b>CA-08A-4N</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : n°2 coils S8-356 <b>must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted

OS14	- K -		58	- Y - Rated Flow 10 l/min (3 gpm)	- Z - Ports size 1-2- 3-4		- W - Material		CARTRIDGE SCHEME	
	monodir.	bidir.			G 1/4	G 3/8	Aluminium		monodir.	bidir.
CARTRIDGE CODE	OD14	<b>31</b>	58	<b>44</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD14	<b>31</b>	58	<b>4B</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD14	<b>31</b>	58	<b>4C</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD14	<b>32</b>	58	<b>44</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD14	<b>32</b>	58	<b>4B</b>	<b>09</b>	<b>02</b>	<b>00</b>			
	OD14	<b>32</b>	58	<b>4C</b>	<b>09</b>	<b>02</b>	<b>00</b>			

Performance graphs



## Ordering code

OS.14	K	58	Y	Z	W
-------	---	----	---	---	---

Manifold with solenoid operated valve, 4-way 3-positions

Cartridge scheme (see page 1 and 2)

= 31

Bidirectional

= 32

Common cavity size 08

Manifold material

= 00 Aluminium

Port sizes (see table on page 2)

= 09 G 1/4

= 02 G 3/8

See table on page 2

# Solenoid operated valves

## 4-way 3-positions

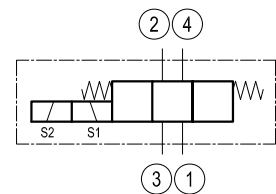
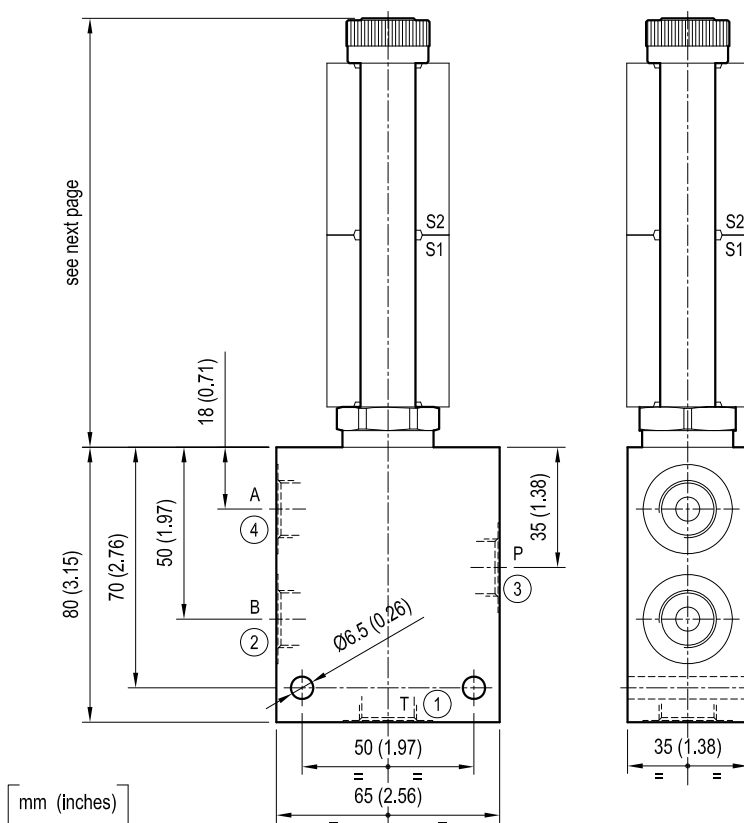
Common cavity size 10

Cartridge style in manifold

VED-CS-7I-43-09

OS.14 - K - 78 - Y - Z - W

### Dimensions



### Cartridge schemes

monodirectional type	bidirectional type

### Technical data

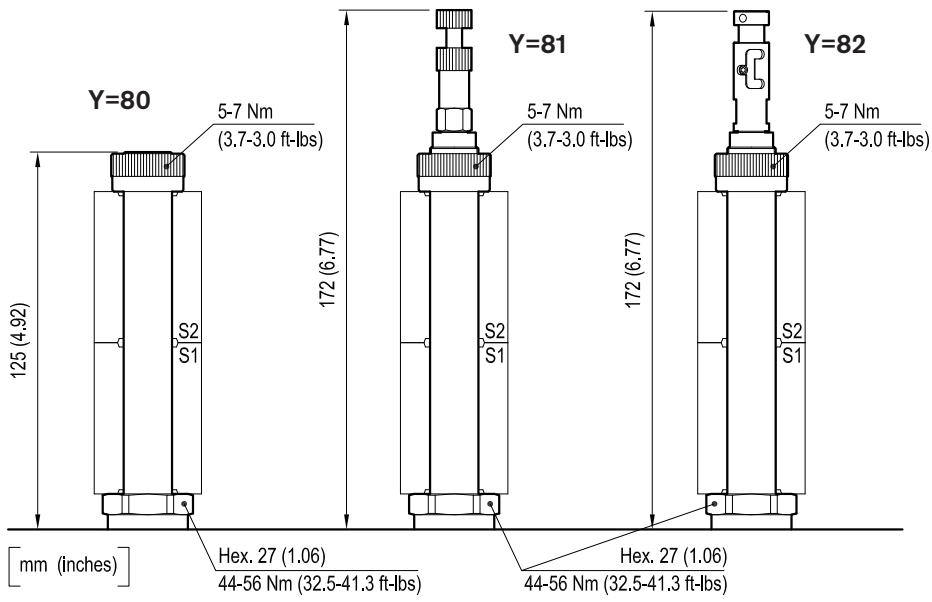
Max flow: up to 20 l/min (6 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

To order only manifold see data sheet RE 18325-85

Dimensions

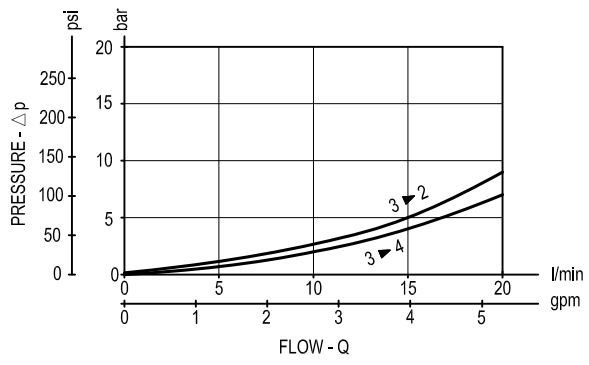


CARTRIDGE TECHNICAL DATA	
Common cavity: <b>CA-10A-4N</b>	
Filtration: 25 µm nominal or better	
Minimum voltage required: 90% of nominal value	
Coil : n°2 coils S7 <b>must be ordered separately</b> see data sheet RE 18325-90	
Mounting position: unrestricted	

OS14	- K -		78	Y Rated Flow 20 l/min (5 gpm)	- Z - Ports size 1-2-3-4		- W - Material		CARTRIDGE SCHEME		
	monodir.	bidir.			G 1/4	G 3/8	Aluminium		monodir.	bidir.	
CARTRIDGE CODE	OD14	<b>31</b>	78	<b>80</b>	<b>09</b>	<b>02</b>	<b>00</b>				
	OD14	<b>31</b>	78	<b>81</b>	<b>09</b>	<b>02</b>	<b>00</b>				
	OD14	<b>31</b>	78	<b>82</b>	<b>09</b>	<b>02</b>	<b>00</b>				
	OD14	<b>32</b>	78	<b>80</b>	<b>09</b>	<b>02</b>	<b>00</b>				
	OD14	<b>32</b>	78	<b>81</b>	<b>09</b>	<b>02</b>	<b>00</b>				
	OD14	<b>32</b>	78	<b>82</b>	<b>09</b>	<b>02</b>	<b>00</b>				



# Performance graph



## Ordering code

OS.14	K	78	Y	Z	W
-------	---	----	---	---	---

Manifold with solenoid operated valve, 4-way 3-positions

Cartridge scheme (see page 1 and 2)

= 31

Bidirectional

= 32

Common cavity size 10

Manifold material

= 00 Aluminium

Port sizes (see table on page 2)

= 09 G 1/4

= 02 G 3/8

See table on page 2

# Solenoid operated valves

## 2-way 2-positions

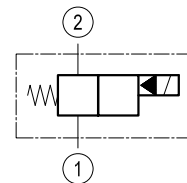
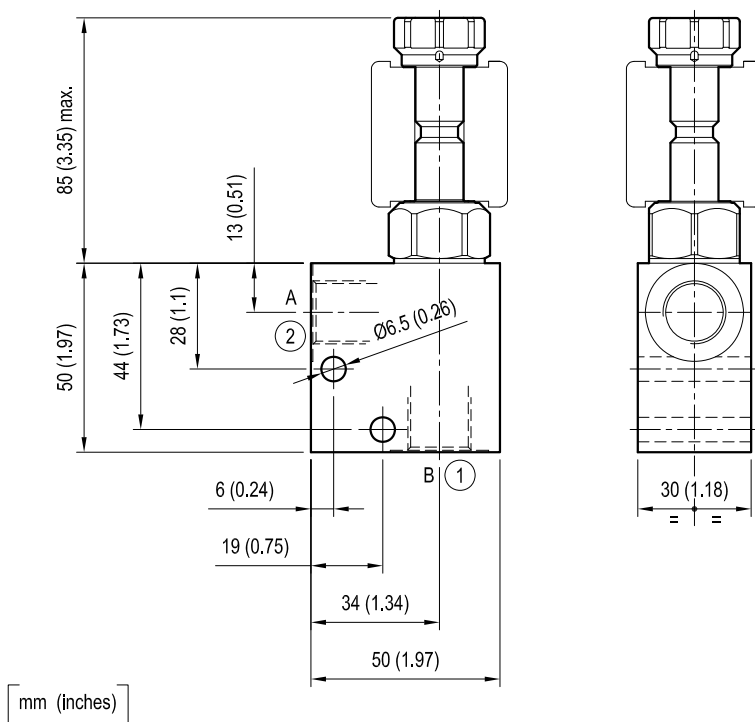
Special cavity

Cartridge style in manifold

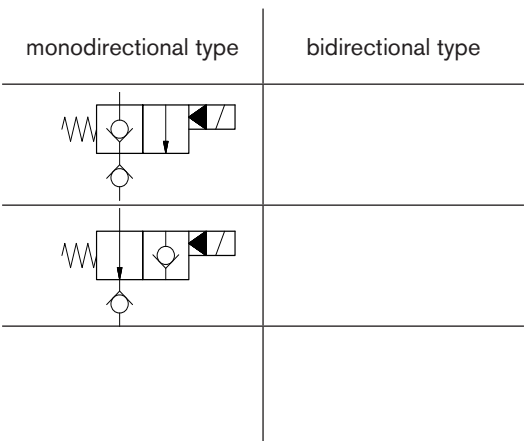
VEI-CS-8A-06

OS.15 - K - 19 - Y - Z - W

### Dimensions



### Cartridge schemes

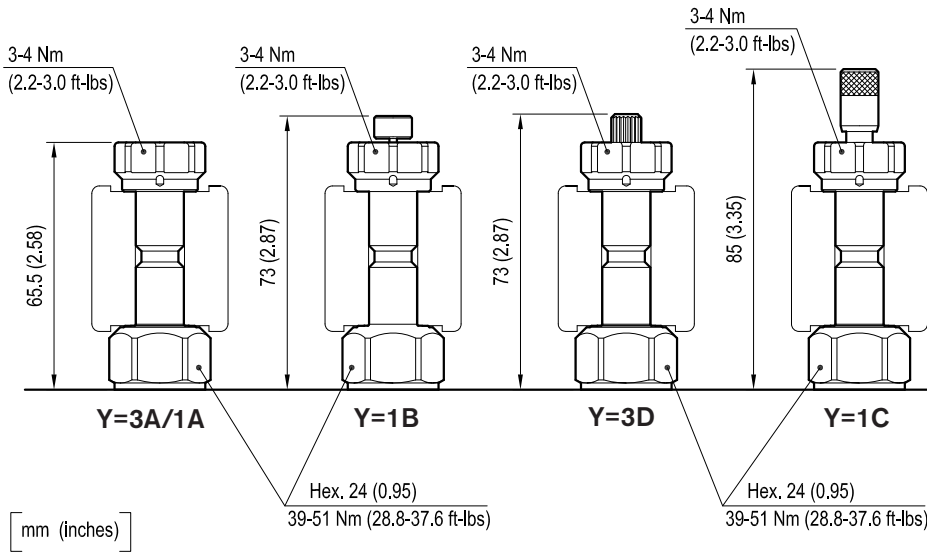


### Technical data

Max flow:	up to 40 l/min	(11 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

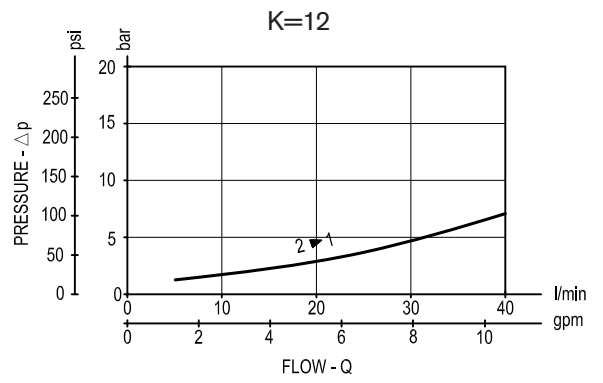
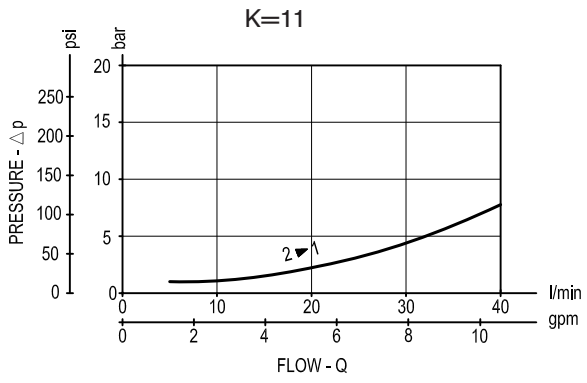
### Dimensions



CARTRIDGE TECHNICAL DATA
Special cavity: <b>019-E</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : S8-356 <b>must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted
For other details see cartridge data sheet

OS15	- K -		19	- Y - Rated Flow 40 l/min (11 gpm)	- Z - Ports size 1-2		- W - Material		CARTRIDGE SCHEME		
	monodir.	bidir.			G 1/4	G 3/8	Aluminium	Steel	monodir.	bidir.	
CARTRIDGE CODE	OD15	<b>11</b>		19	<b>3A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>11</b>		19	<b>3D</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>12</b>		19	<b>1A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>12</b>		19	<b>1B</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>12</b>		19	<b>1C</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		

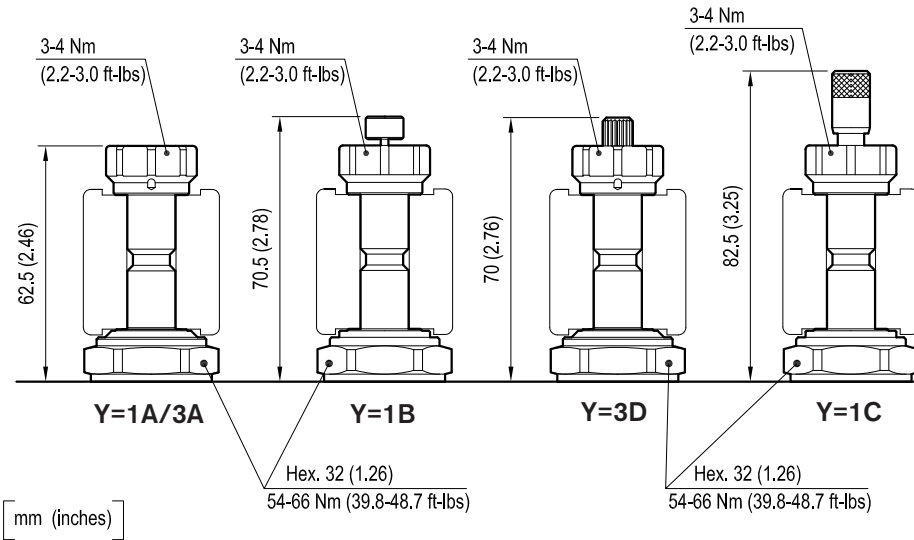
Performance graphs







Dimensions



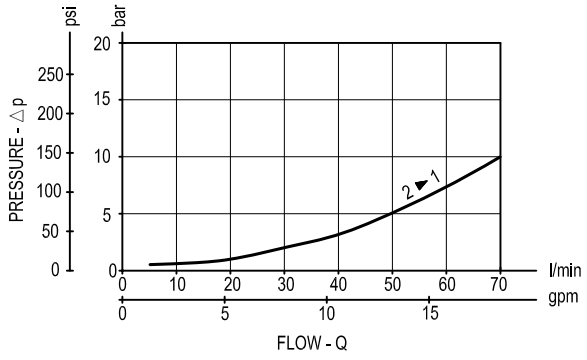
CARTRIDGE TECHNICAL DATA
Special cavity: <b>017-E</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : S8-356 <b>must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted
For other details see cartridge data sheet

OS15	- K -		17	- Y - Rated Flow 70 l/min (19 gpm)	- Z - Ports size 1-2 G 1/2   G 3/4		- W - Material Aluminium   Steel		CARTRIDGE SCHEME		
	monodir.	bidir.			G 1/2	G 3/4	Aluminium	Steel	monodir.	bidir.	
CARTRIDGE CODE	OD15	<b>01</b>	<b>05</b>	17	<b>3A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>01</b>	<b>05</b>	17	<b>3D</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	17	<b>1A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	17	<b>1B</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	17	<b>1C</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>11</b>		17	<b>3A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>11</b>		17	<b>3D</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>12</b>		17	<b>1A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>12</b>		17	<b>1B</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>12</b>		17	<b>1C</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>31</b>	17	<b>3A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>31</b>	17	<b>3D</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	17	<b>1A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	17	<b>1B</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	17	<b>1C</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		

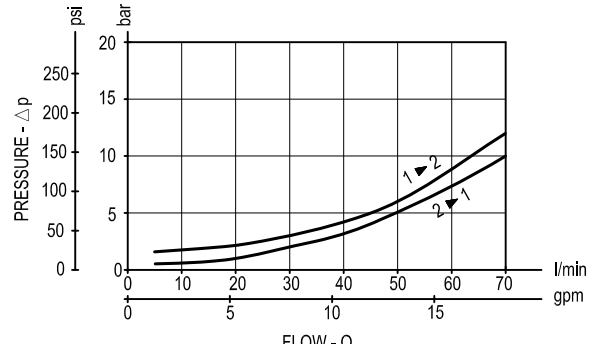


Performance graphs

for K=01-02-11-12



for K=05-06-31-32





# Solenoid operated valves

## 2-way 2-positions

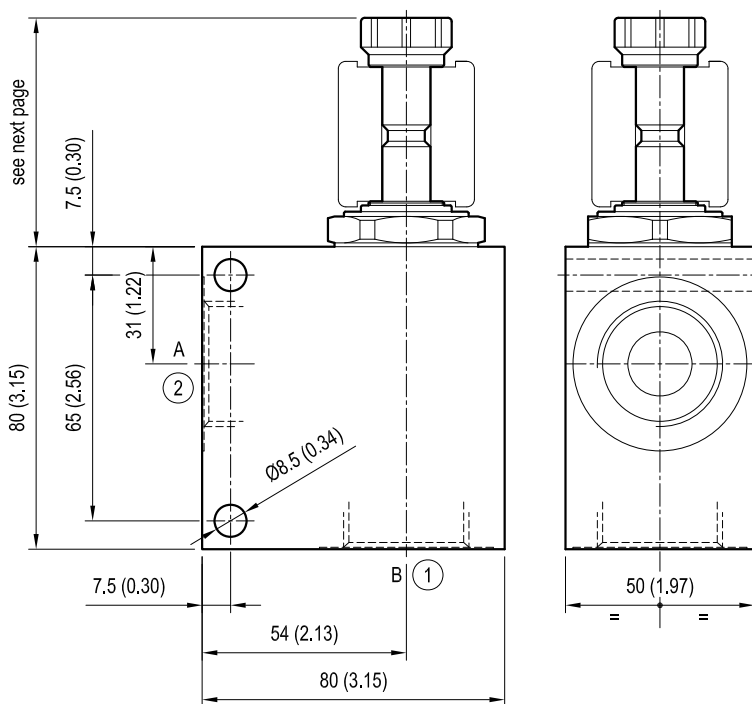
Special cavity

Cartridge style in manifold

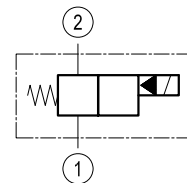
VEI-CS-7A/8A-12

OS.15 - K - 21 - Y - Z - W

### Dimensions



[ mm (inches) ]



### Cartridge schemes

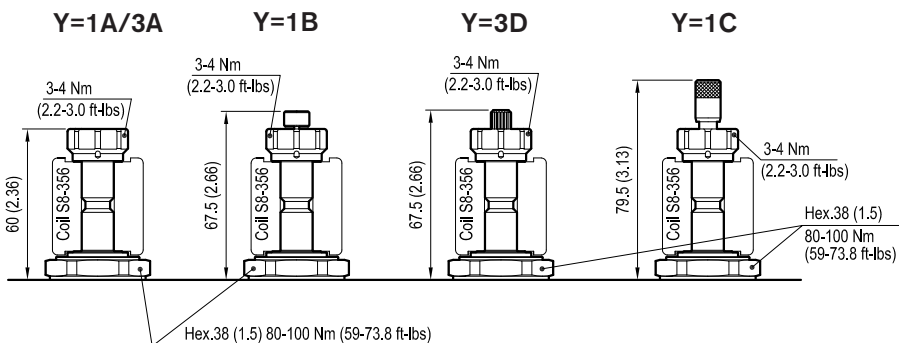
monodirectional type	bidirectional type

### Technical data

Max flow:	up to 150 l/min	(40 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

### Dimensions



[ mm (inches) ]

#### CARTRIDGE TECHNICAL DATA

Special cavity: **021-E**

Filtration: 25 µm nominal or better

Minimum voltage required: 90% of nominal value

Coil : **must be ordered separately**  
see data sheet RE 18325-90

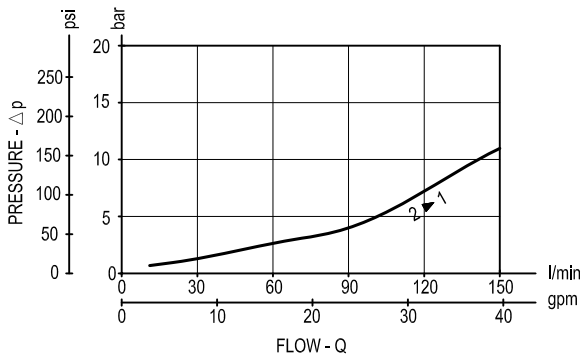
Mounting position: unrestricted

For other details see cartridge data sheet

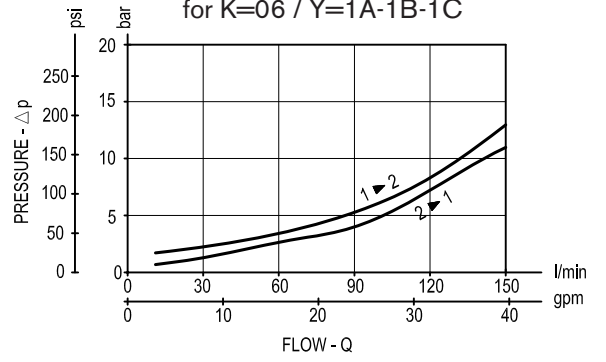
OS15	- K -		21	- Y -		- Z -		- W -		CARTRIDGE SCHEME	
	monodir.	bidir.		Rated Flow	Ports size 1-2	Material	monodir.	bidir.			
			150 l/min (40 gpm)	G 3/4	G 1	Aluminium	Steel				
CARTRIDGE CODE	OD15	<b>01</b>	<b>05</b>	21	<b>3A</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>01</b>	<b>05</b>	21	<b>3D</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	21	<b>1A</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	21	<b>1B</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>02</b>	<b>06</b>	21	<b>1C</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>11</b>		21	<b>3A</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>11</b>		21	<b>3D</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>12</b>		21	<b>1A</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>12</b>		21	<b>1B</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>12</b>		21	<b>1C</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>31</b>	21	<b>3A</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>31</b>	21	<b>3D</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	21	<b>1A</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	21	<b>1B</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>32</b>	21	<b>1C</b>	<b>04</b>	<b>05</b>	<b>00</b>	<b>S0</b>		

Performance graphs

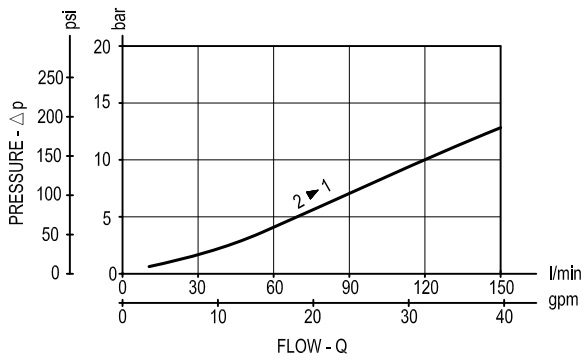
for K=01-02



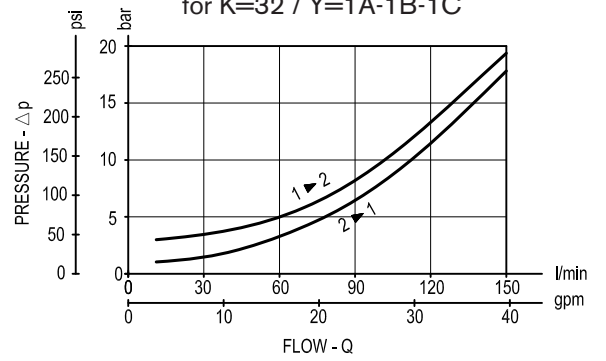
for K=05 / Y=3A-3D  
for K=06 / Y=1A-1B-1C



for K=11-12



for K=31 / Y=3A-3D  
for K=32 / Y=1A-1B-1C





## Manifolds with emergency by-pass screw and solenoid cartridges

<b>Designation</b>	<b>Description</b>	<b>Code</b>	<b>Data sheet</b>	<b>Page</b>
Solenoid operated valves, 2-way 2-positions normally closed	VED-CE-7A/8I-06	OE11K18YZW	18332-10	1547
Solenoid operated valves, 2-way 2-positions normally closed	VEI-CE-8A/8I-06	OE15K18YZW	18332-11	1551
Solenoid operated valves, 2-way 2-positions	VEI-CN-8A/8I-06	OE17K18YZW	18332-12	1555
Solenoid operated valves, 2-way 2-positions normally closed special cavity	VEI-CE-8A-12	OE15K21YZW	18332-13	1559
Solenoid operated valves, 2-way 2-positions normally closed special cavity	VEI-CE-8A-09	OE15K17YZW	18332-14	1563





# Solenoid operated valves

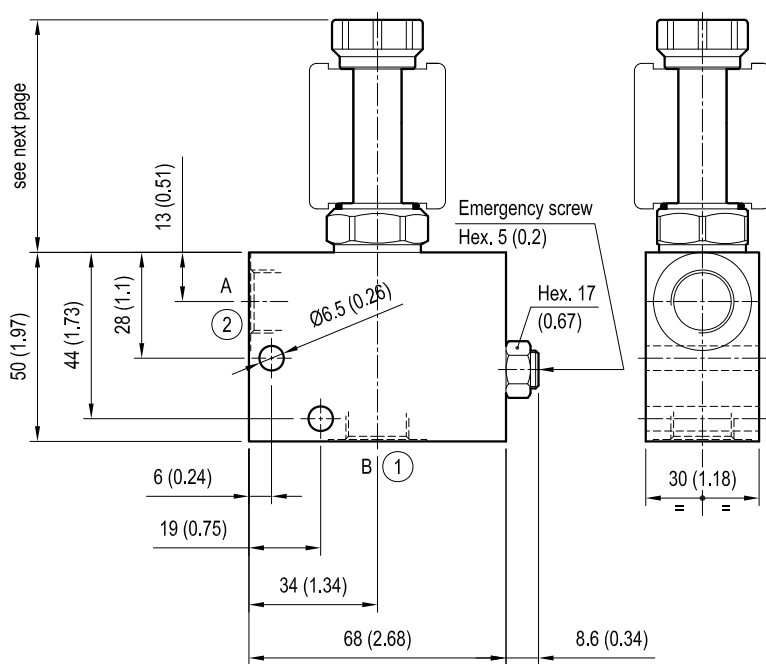
## 2-way 2-positions, normally closed

Common cavity size 08  
in emergency manifold

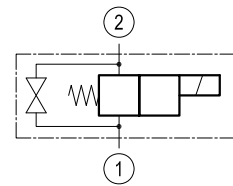
VED-CE-7A/8I-06

OE.11 - K - 18 - Y - Z - W

### Dimensions



[ mm (inches) ]



### Cartridge schemes

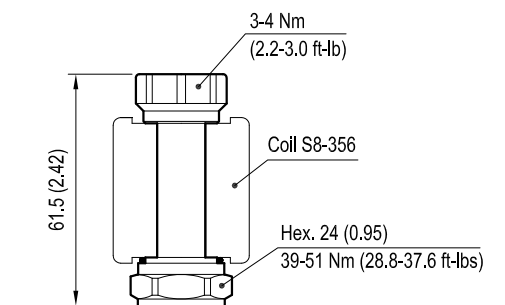
monodirectional type	bidirectional type

### Technical data

Max flow:	up to 1,5 l/min	(0,4 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

### Dimensions

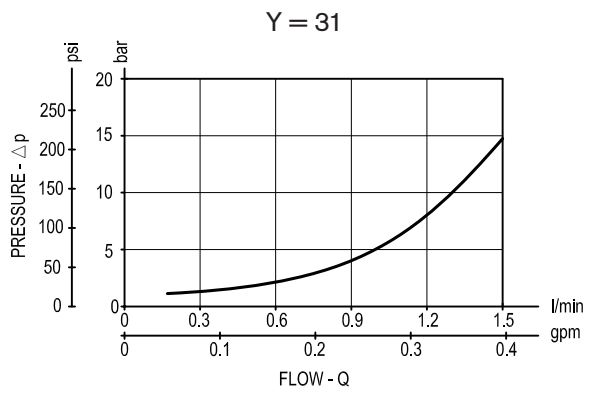


CARTRIDGE TECHNICAL DATA
Common cavity: <b>CA-08A-2N</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : <b>must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted

[ mm (inches) ]

OE11	- K -		18	- Y -			- Z -		- W -		CARTRIDGE SCHEME	
	monodir.	bidir.		Rated Flow			Ports size 1-2		Material		monodir.	bidir.
				1.5 l/min (0.4 gpm)	15 l/min (4 gpm)	25 l/min (7 gpm)	G 1/4	G 3/8	Aluminium	Steel		
OD11		<b>01</b>	18	<b>31</b>			<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		

## Performance graph





# Solenoid operated valves

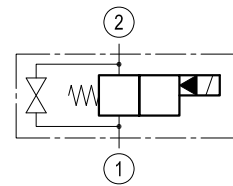
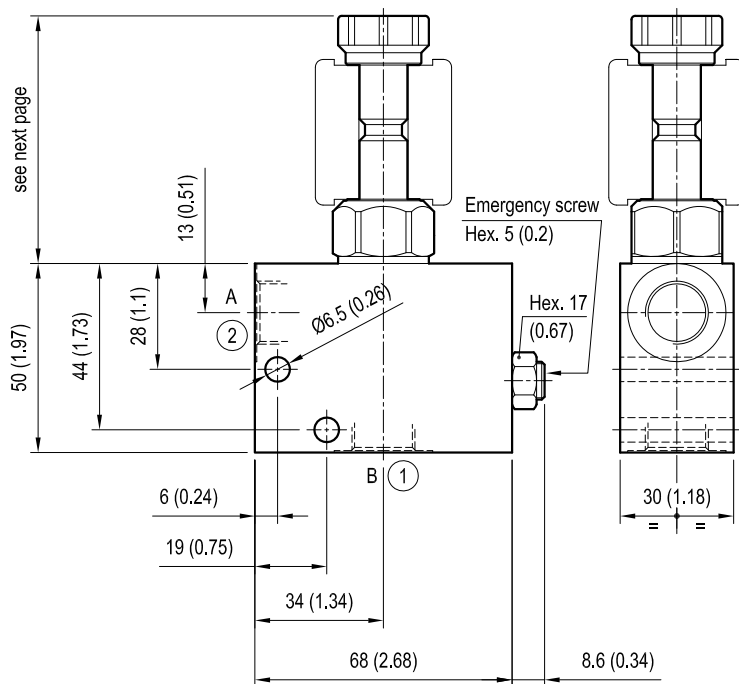
## 2-way 2-positions, normally closed

Common cavity size 08  
in emergency manifold

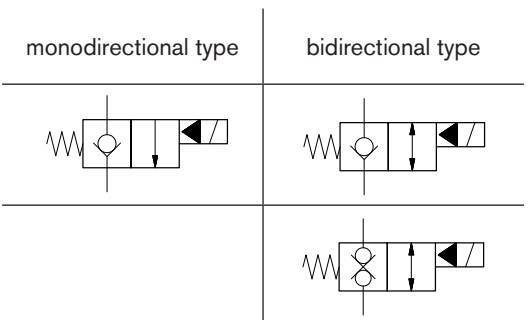
VEI-CE-8A/8I-06

OE.15 - K - 18 - Y - Z - W

### Dimensions



### Cartridge schemes



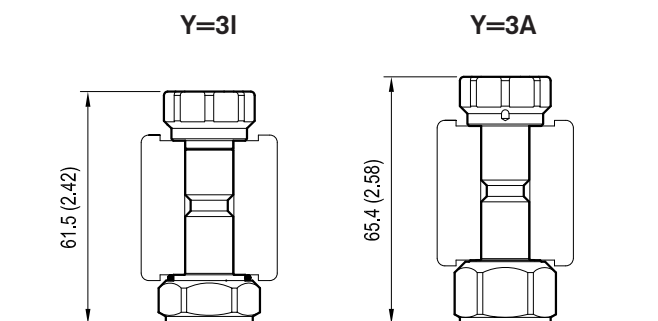
[ mm (inches) ]

### Technical data

Max flow:	up to 40 l/min	(11 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

### Dimensions

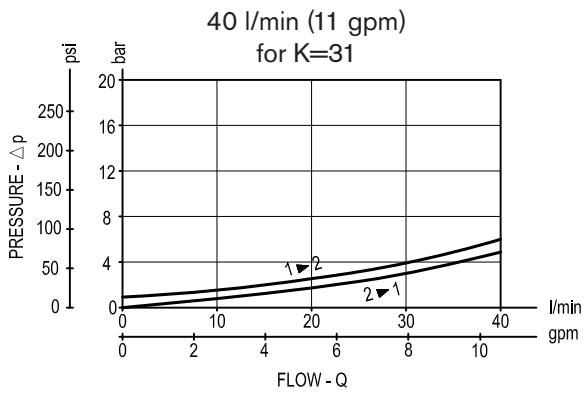
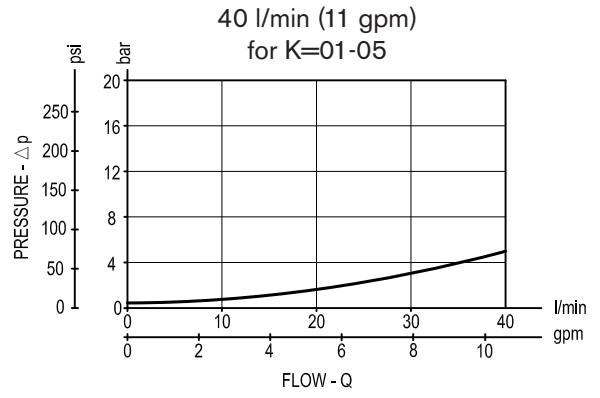
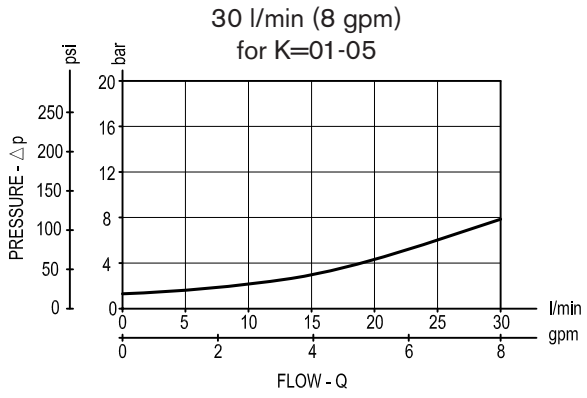


[ mm (inches) ]

CARTRIDGE TECHNICAL DATA
Common cavity: <b>CA-08A-2N</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : S8-356 <b>must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted
For other details see cartridge data sheet

OE15	- K -		18	- Y -		- Z -		- W -		CARTRIDGE SCHEME	
	monodir.	bidir.		Rated Flow		Ports size		Material		monodir.	bidir.
				30 l/min (8 gpm)	40 l/min (11 gpm)	G 1/4	G 3/8	Aluminium	Steel		
OD15	<b>01</b>	<b>05</b>	18	<b>3I</b>	<b>3A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
OD15		<b>31</b>	18		<b>3A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		

### Performance graph







# Solenoid operated valves

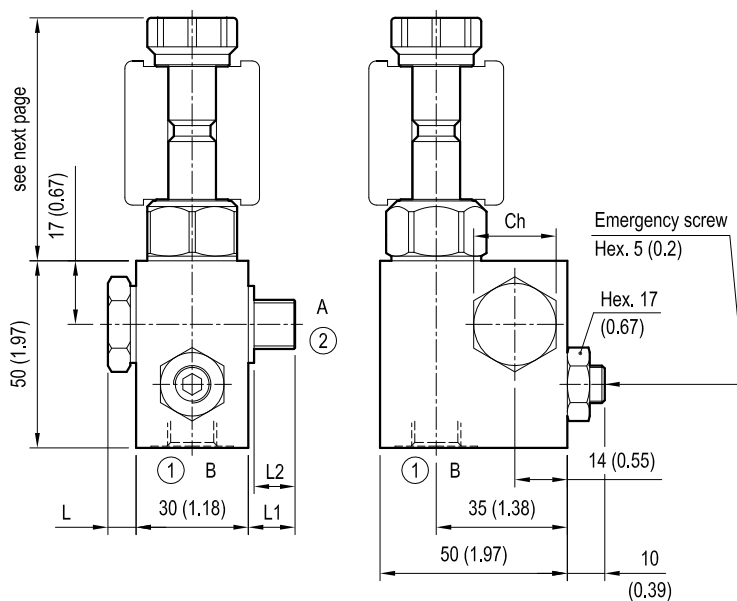
## 2-way 2-positions

Common cavity size 08  
in emergency manifold

VEI-CN-8A/8I-06

OE.17 - K - 18 - Y - Z - W

### Dimensions



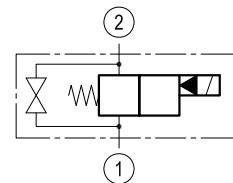
[ mm (inches) ]

7.5 (0.3)	14 (0.55)	10.9 (0.43)	22 (0.87)			G 1/4	30 (22)
8.5 (0.34)	15 (0.59)	11.9 (0.47)	22 (0.87)			G 3/8	60 (44)
L	L1	L2	Ch			Ports Size	Tightening Torque Nm (ft-lb)

### Technical data

Max flow:	up to 40 l/min	(11 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

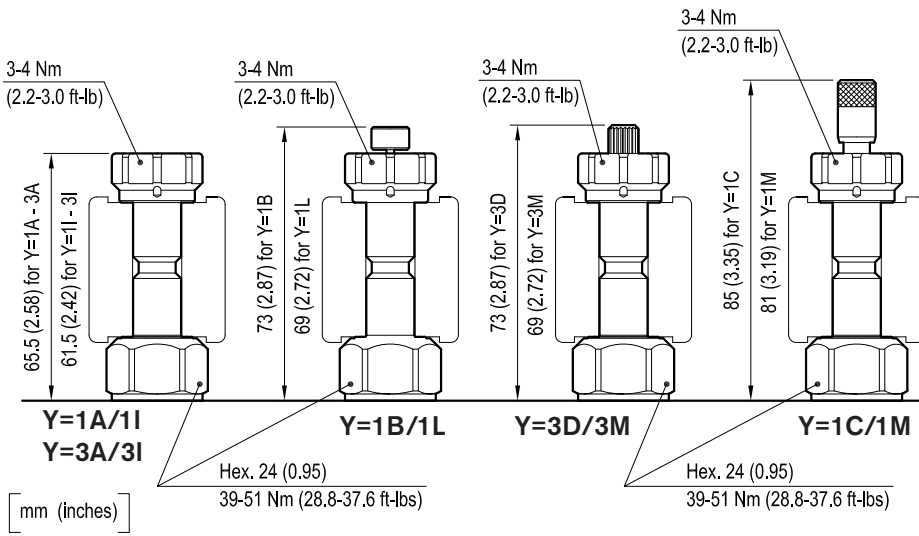
To order only manifold see data sheet RE 18325-85



### Cartridge schemes

monodirectional type	bidirectional type

Dimensions

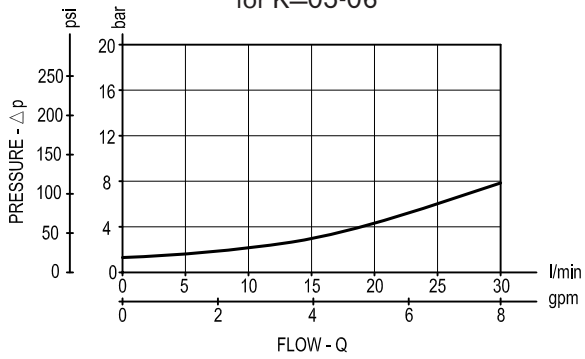


CARTRIDGE TECHNICAL DATA	
Common cavity: <b>CA-08A-2N</b>	
Filtration: 25 µm nominal or better	
Minimum voltage required: 90% of nominal value	
Coil : S8-356 <b>must be ordered separately</b> see data sheet RE18325-90	
Mounting position: unrestricted	
For other details see cartridge data sheet	

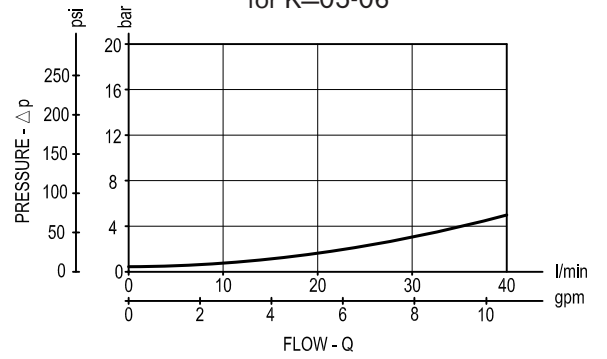
OE17	- K -		18	- Y -		- Z -		- W -		CARTRIDGE SCHEME	
	monodir.	bidir.		Rated Flow		Ports size 1-2		Material		monodir.	bidir.
				30 l/min (8 gpm)	40 l/min (11 gpm)	G 1/4	G 3/8	Aluminium	Steel		
CARTRIDGE CODE	OD15	<b>05</b>	18	<b>3I</b>	<b>3A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>05</b>	18	<b>3M</b>	<b>3D</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>06</b>	18	<b>1I</b>	<b>1A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>06</b>	18	<b>1L</b>	<b>1B</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>06</b>	18	<b>1M</b>	<b>1C</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>31</b>	18		<b>3A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>31</b>	18		<b>3D</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>32</b>	18		<b>1A</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>32</b>	18		<b>1B</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		
	OD15	<b>32</b>	18		<b>1C</b>	<b>09</b>	<b>02</b>	<b>00</b>	<b>S0</b>		

Performance graphs

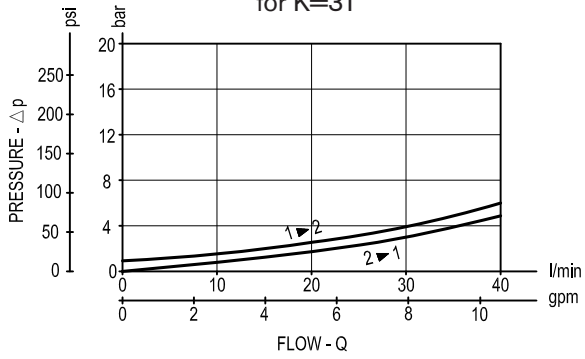
30 l/min (8 gpm)  
for K=05-06



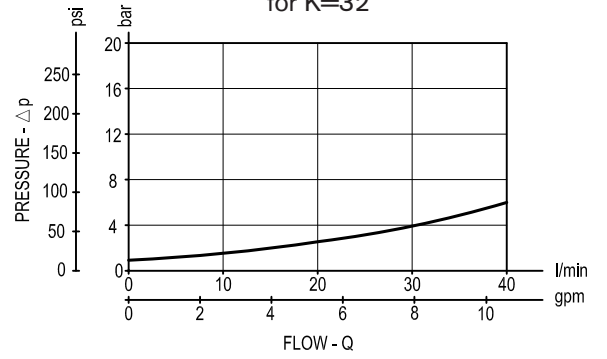
40 l/min (11 gpm)  
for K=05-06



40 l/min (11 gpm)  
for K=31



40 l/min (11 gpm)  
for K=32





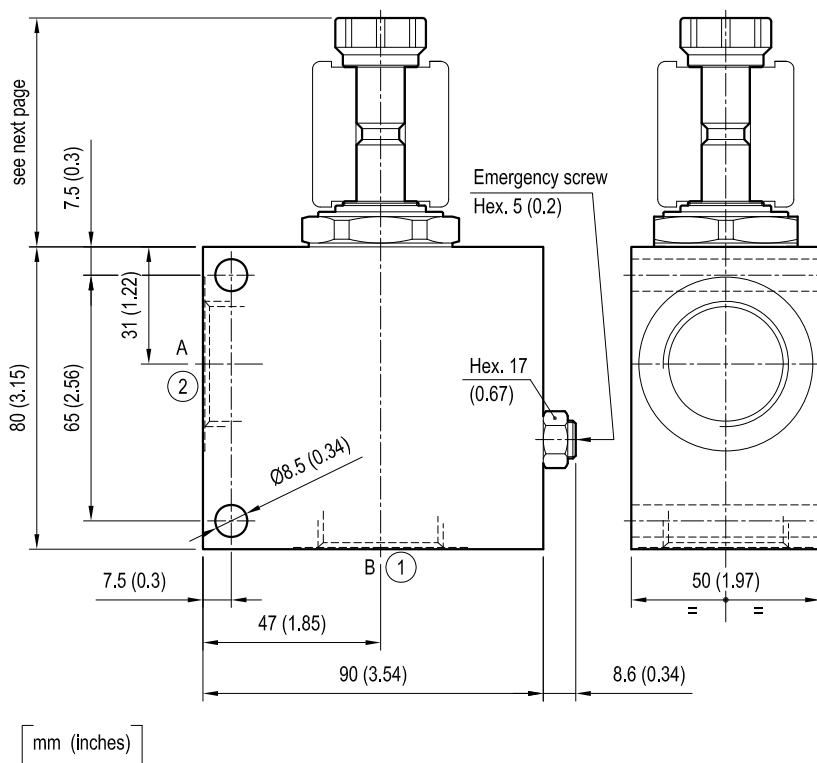
# Solenoid operated valves 2-way 2-positions, normally closed

Special cavity  
in emergency manifold

VEI-CE-8A-12

OE.15 - K - 21 - Y - Z - W

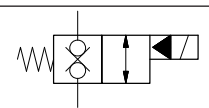
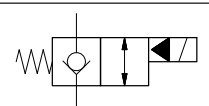
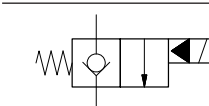
## Dimensions



## Cartridge schemes

monodirectional type

bidirectional type

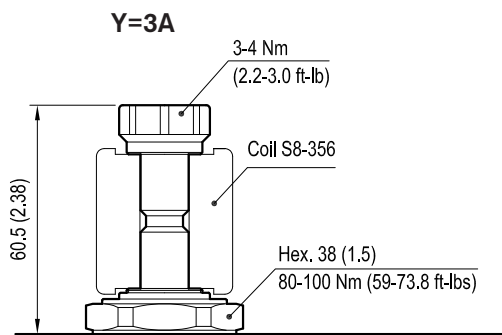


## Technical data

Max flow:	up to 150 l/min	(40 gpm)
Max operating pressure for <b>steel</b> body:	350 bar	(5000 psi)
Max operating pressure for <b>aluminium</b> body:	210 bar	(3000 psi)

To order only manifold see data sheet RE 18325-85

### Dimensions



[ mm (inches) ]

#### CARTRIDGE TECHNICAL DATA

Special cavity: **021-E**

Filtration: 25 µm nominal or better

Minimum voltage required: 90% of nominal value

Coil : **must be ordered separately**  
see data sheet RE 18325-90

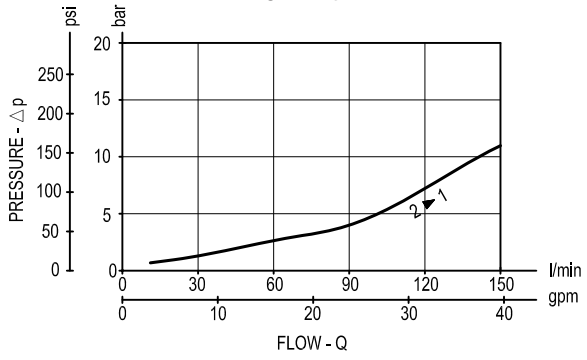
Mounting position: unrestricted

For other details see cartridge data sheet

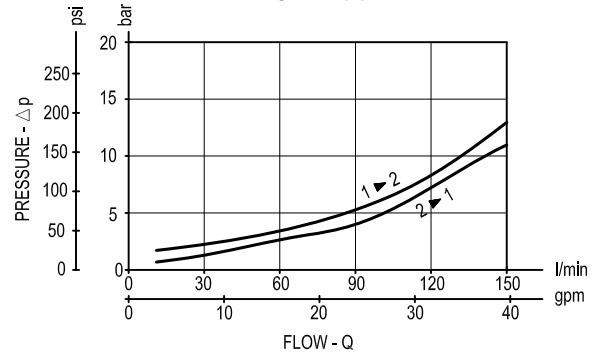
OE15	- K -		21	- Y -		- Z -		- W -		CARTRIDGE SCHEME	
	monodir.	bidir.		Rated Flow	Ports size 1-2	Material	monodir.	bidir.			
				150 l/min (40 gpm)	G 1	Aluminium	Steel				
OD15	<b>01</b>	<b>05</b>	21	<b>3A</b>		<b>05</b>	<b>00</b>	<b>S0</b>			
OD15		<b>31</b>	21	<b>3A</b>		<b>05</b>	<b>00</b>	<b>S0</b>			

Performance graphs

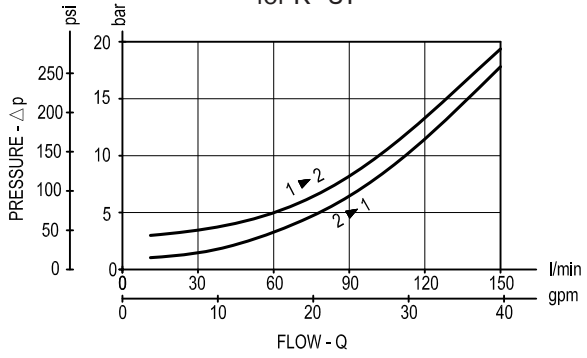
for K=01



for K=05



for K=31

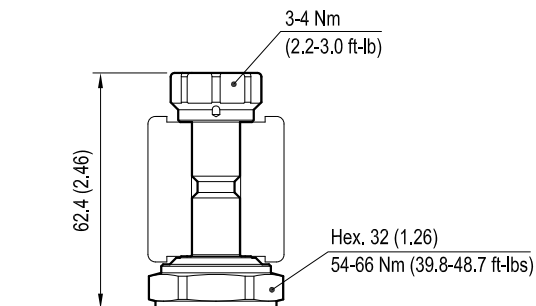








### Dimensions

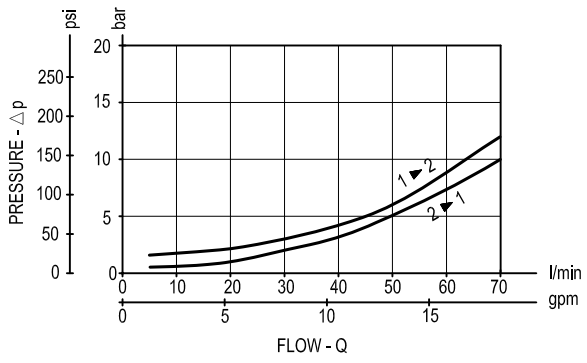


[ mm (inches) ]

CARTRIDGE TECHNICAL DATA
Special cavity: <b>017-E</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : S8-356 <b>must be ordered separately</b> see data sheet RE 18325-90
Mounting position: unrestricted
For other details see cartridge data sheet

CARTRIDGE CODE	OE15	- K -		17	- Y - Rated Flow 70 l/min (19 gpm)	- Z - Ports size 1-2		- W - Material		CARTRIDGE SCHEME	
		monodir.	bidir.			G 1/2	G 3/4	Aluminium	Steel	monodir.	bidir.
	OD15	<b>01</b>	<b>05</b>	17	<b>3A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		
	OD15		<b>31</b>	17	<b>3A</b>	<b>03</b>	<b>04</b>	<b>00</b>	<b>S0</b>		

# Performance graph





## Standard multi-function manifolds

<b>Designation</b>	<b>Description</b>	<b>Code</b>	<b>Data sheet</b>	<b>Page</b>
Relief valve with solenoid by-pass	VEI8A-VSBN-08A	OLKYZW00_19_20_VSBN	18332-40	1569
Relief valve with solenoid by-pass	VEI8A-VS30	OLKYZW00_19_20_VS30	18332-41	1573
Solenoid operated ventable relief valve	VSP-19-VEI8A	OLKYZW00_27_28	18332-42	1577
Solenoid operated ventable relief valve	VSP-25-VEI8A	OLKYZW00_29_30	18332-43	1581
Standard integrated circuits for single-acting cylinder	VEI8A-VU-VS-ST-06	OLKYZW00_51_52_ST-06	18332-44	1585
Standard integrated circuits for single-acting cylinder	VEI-VCDCBL-8A-06	OL17K18YZW	18332-45	1589

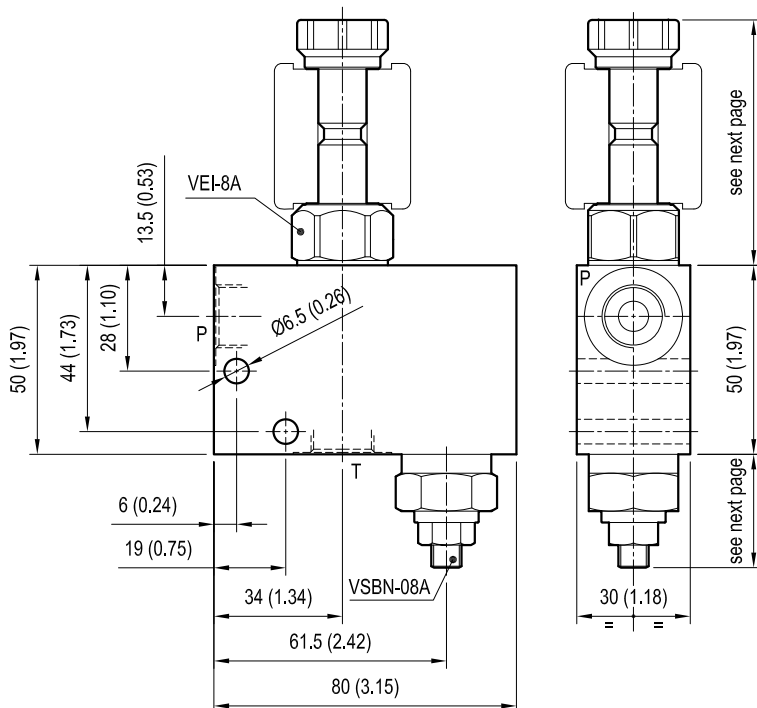


# Standard integrated circuits relief valve with solenoid by-pass

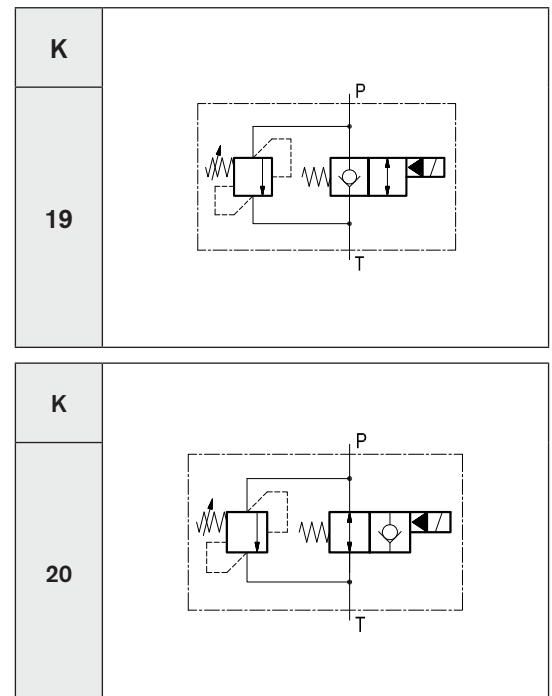
VEI8A-VSBN-08A

OL - K - Y - Z - W - 00

## Dimensions



[ mm (inches) ]



## Technical data

Max flow: up to 20 l/min (5 gpm)

Max operating pressure: 210 bar (3000 psi)

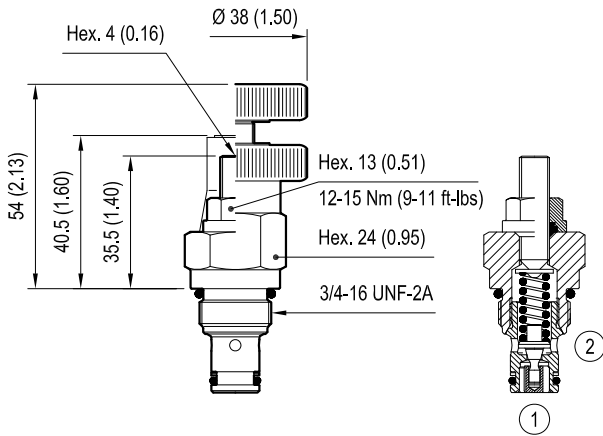
Standard manifolds in high strength **aluminium**.

For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

Weight: 0.5 kg (1.1 lbs)

These integrated circuit contains one relief valve type VSBN-08A operating from P to T and one solenoid valve type VEI-8A (see next page).

**VSBN-08A Cartridge valve (code 04.11.49.X.56.Z)**



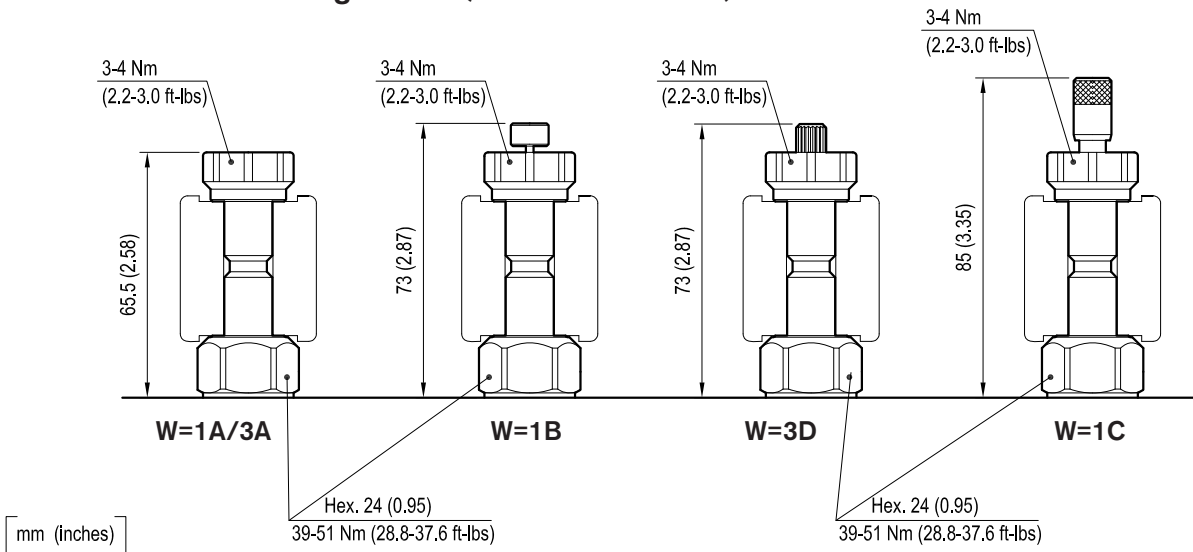
mm (inches)

Z		VSBN-08A SETTING		
		Adj. pressure range bar (psi)	Press. increase bar/turn (psi/turn)	Std. setting bar (psi) (Q=5 l/min)
	<b>04</b>	35-140 (500-2000)	50 (725)	100 (1450)
	<b>07</b>	105-210 (1500-3000)	79 (1145)	200 (2900)
	<b>10</b>	175-350 (2500-5000)	170 (2465)	350 (5000)
	<b>08</b>	35-350 (500-5000)	72 (1044)	200 (2900)

ADJUSTMENTS		OPTIONS
Leakproof hex. socket screw		 Ordering code 11.04.23.002
Handknob and locknut		

VSBN-08A TECHNICAL DATA
See table "Z", for other details see data sheet RE 18318-04

**VEI-8A Solenoid cartridge valve (code OD.15.K.18...)**



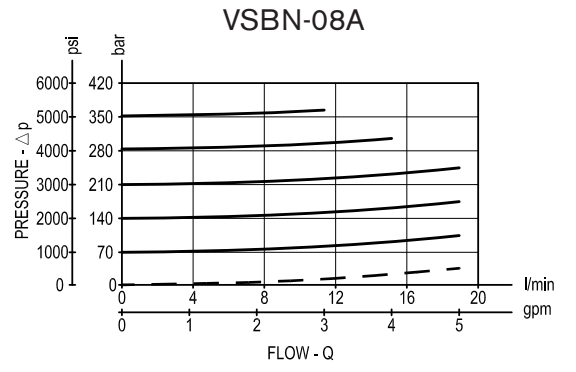
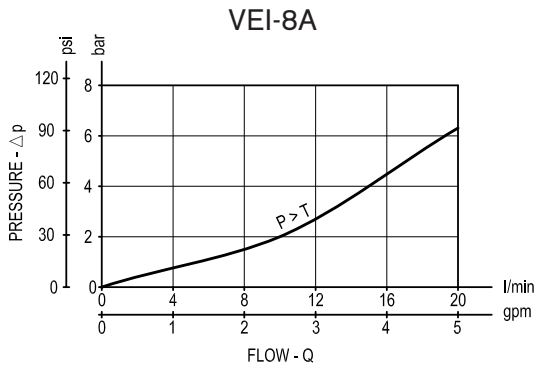
mm (inches)

W	MANUAL OVERRIDE OPTIONS	
	K = 19	K = 20
<b>1A</b>	/	No override
<b>1B</b>	/	Push style
<b>1C</b>	/	Push and twist style
<b>3A</b>	No override	/
<b>3D</b>	Knob style	/

VEI-8A TECHNICAL DATA
Internal leakage: max. 1 cm <sup>3</sup> /min (0.06 inch <sup>3</sup> /min)
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil: S8-356 ( <b>must be ordered separately</b> ) (see data sheet RE 18325-90)
For other details see cartridge data sheet



Performance graphs



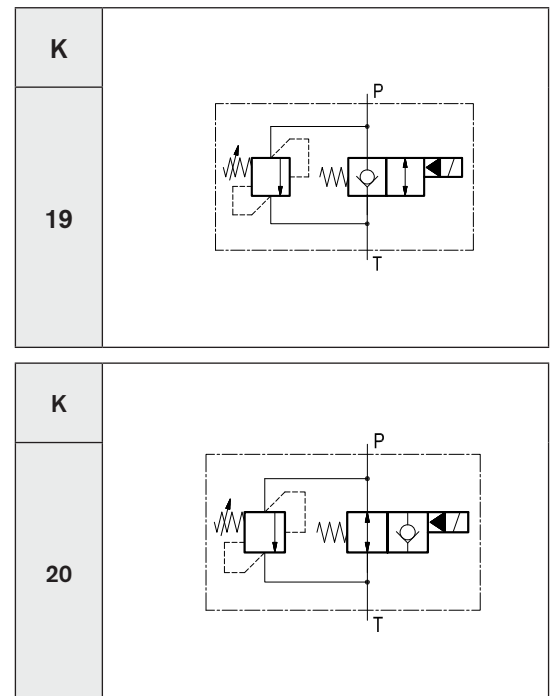
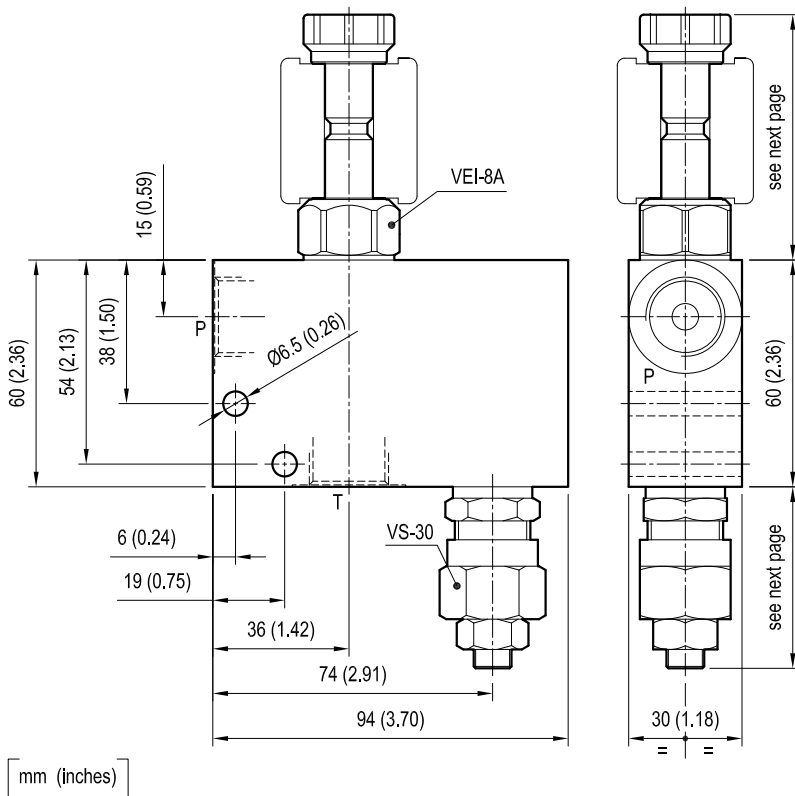


# Standard integrated circuits relief valve with solenoid by-pass

VEI8A-VS30

OL - K - Y - Z - W - 00

## Dimensions



## Technical data

Max flow: up to 30 l/min (8 gpm)

Max operating pressure: 210 bar (3000 psi)

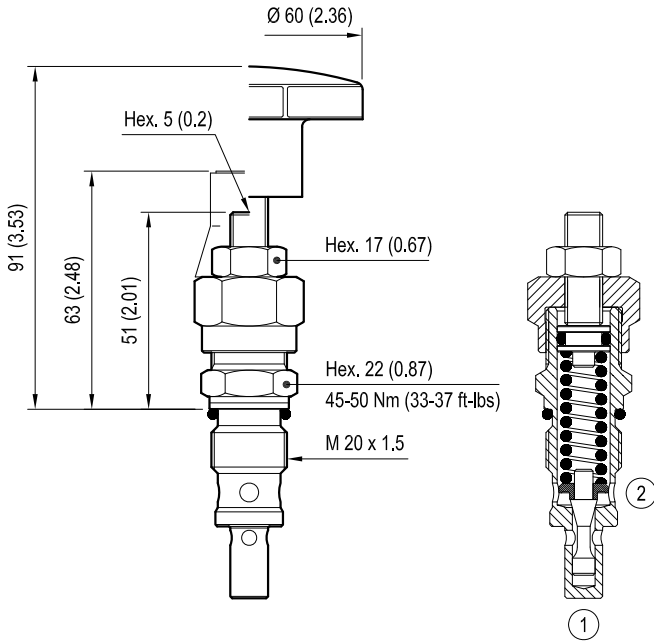
Standard manifolds in high strength **aluminium**.

For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

Weight: 0.65 kg (1.4 lbs)

These integrated circuit contains one relief valve type VS-30 operating from P to T and one solenoid valve type VEI-8A (see next page).

**VS-30 Cartridge valve (code 04.11.18.X.99.Z)**



Z		VS-30 SETTING		
		Adj. pressure range bar (psi)	Press. increase bar/turn (psi/turn)	Std. setting bar (psi) (Q=5 l/min)
	04	30-100 (435-1450)	24 (348)	100 (1450)
	07	50-210 (725-3000)	47 (682)	200 (2900)
	10	100-350 (1450-5000)	82 (1189)	350 (5000)
	05	30-100 (435-1450)	24 (348)	100 (1450)
	08	50-210 (725-3000)	47 (682)	200 (2900)
	11	100-350 (1450-5000)	82 (1189)	350 (5000)

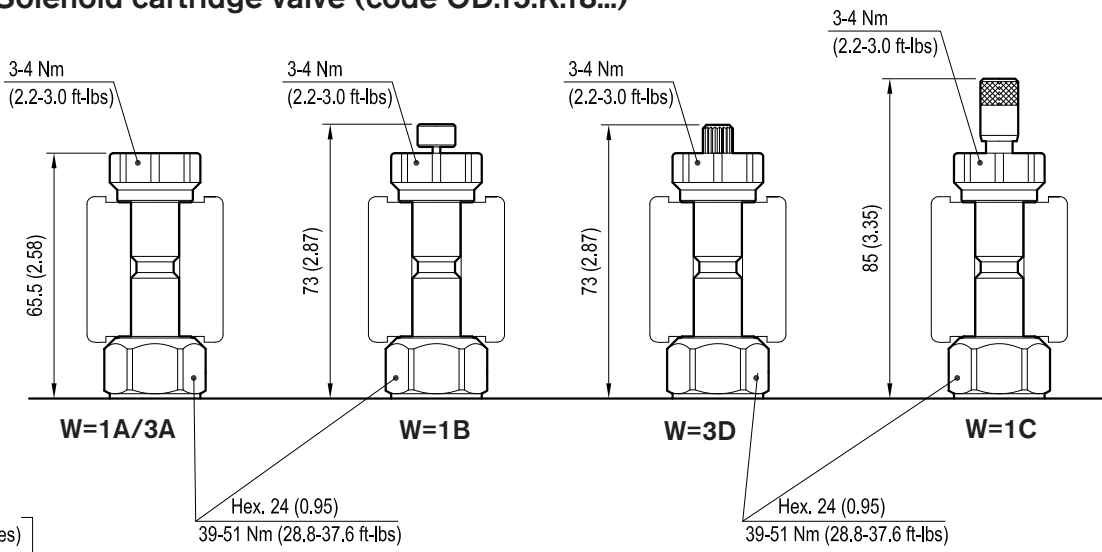
ADJUSTMENTS	
Leakproof hex. socket screw	
Handknob and locknut	

OPTIONS
 Tamper resistant cap 11.04.23.003

VS-30 TECHNICAL DATA
See table "Z", for other details see data sheet RE 18318-23

[ mm (inches) ]

**VEI-8A Solenoid cartridge valve (code OD.15.K.18...)**

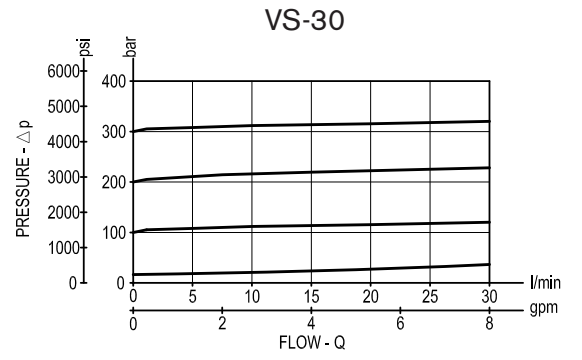
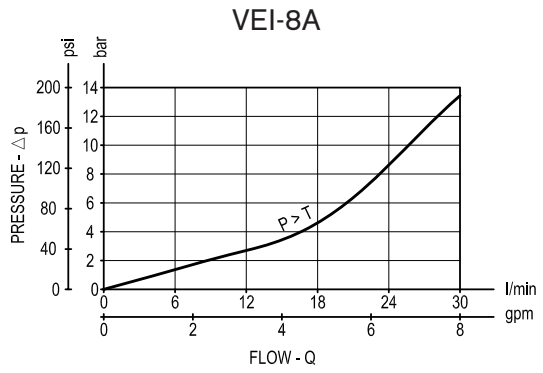


[ mm (inches) ]

W	MANUAL OVERRIDE OPTIONS	
	K = 19	K = 20
1A	/	No override
1B	/	Push style
1C	/	Push and twist style
3A	No override	/
3D	Knob style	/

VEI-8A TECHNICAL DATA		
Internal leakage:	max. 1 cm <sup>3</sup> /min	(0.06 inch <sup>3</sup> /min)
Filtration:	25 μm nominal or better	
Minimum voltage required:	90% of nominal value	
Coil:	S8-356 (must be ordered separately) (see data sheet RE 18325-90)	
For other details see cartridge data sheet		

Performance graphs



### Ordering code

OL	K	Y	Z	W	00
----	---	---	---	---	----

Solenoid operated valves  
standard integrated circuits  
relief valve with solenoid by-pass

Hydraulic schemes (see page 1)

Manual override options  
(see table on page 2)

Port sizes	P - T	
= 03	G 1/2	

VS-30 setting  
(see table on page 2)

### Preferred types (readily available)

Type	Material number
OL1903043A0000	R934002533
OL1903073A0000	R901208390
OL1903103A0000	R934002538
OL1903113D0000	R934002543
OL2003041A0000	R934002552
OL2003071A0000	R934002554
OL2003071B0000	R934002555
OL2003071C0000	R934002556
OL2003081B0000	R934002557
OL2003101A0000	R934002558
OL2003101C0000	R934002559

Type	Material number

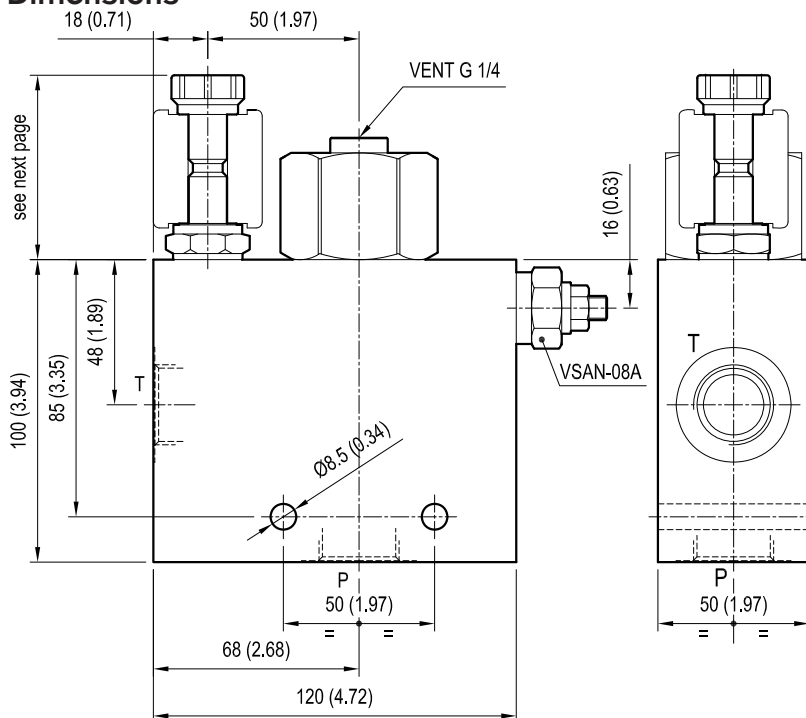
Further types available by request

# Standard integrated circuits solenoid operated ventable relief valve

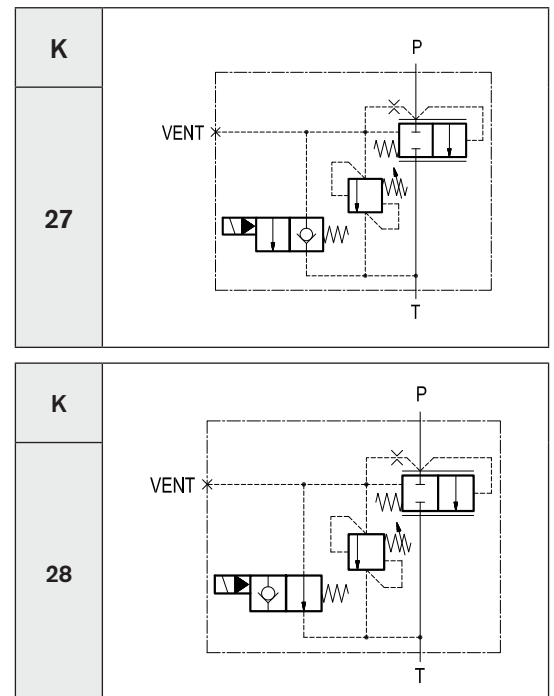
VSP-19-VEI8A

OL - K - Y - Z - W - 00

## Dimensions



[ mm (inches) ]



## Technical data

Max flow: up to 200 l/min (53 gpm)

Max operating pressure: 210 bar (3000 psi)

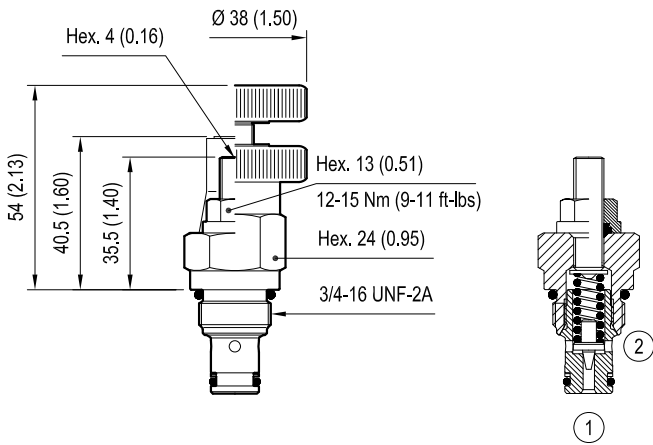
Standard manifolds in high strength **aluminium**.

For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

Weight: 1.3 kg (2.9 lbs)

These integrated circuit contains one relief valve type VSAN-08A operating from P to T and one solenoid valve type VEI-8A (see next page).

**VSAN-08A Cartridge valve (code 04.11.48.X.56.Z)**



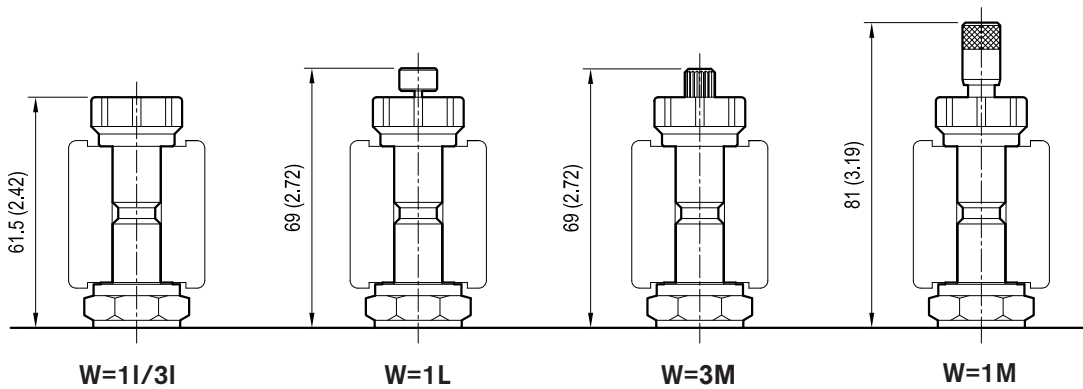
[ mm (inches) ]

Z		VSAN-08A SETTING		
		Adj. pressure range bar (psi)	Press. increase bar/turn (psi/turn)	Std. setting bar (psi) (Q=5 l/min)
	01	35-140 (500-2000)	48 (696)	100 (1450)
	04	105-210 (1500-3000)	88 (1276)	200 (2900)
	07	140-420 (2000-6000)	140 (2030)	350 (5000)
	08	35-350 (500-5000)	68 (986)	350 (5000)

ADJUSTMENTS		OPTIONS
Leakproof hex. socket screw		 Ordering code 11.04.23.002
Handknob and locknut		

VSAN-08A TECHNICAL DATA
See table "Z", for other details see data sheet RE 18318-01

**VEI-8A Solenoid cartridge valve (code OD.15.K.18...)**

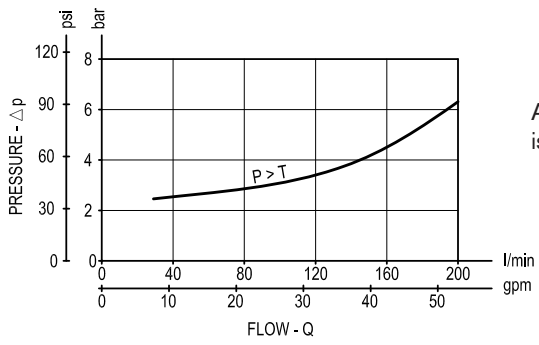


[ mm (inches) ]

W	MANUAL OVERRIDE OPTIONS		VEI-8A TECHNICAL DATA	
	K = 27	K = 28		
1I	/	No override	Internal leakage:	100 cm <sup>3</sup> /min (0.06 inch <sup>3</sup> /min)
1L	/	Push style	Filtration:	25 µm nominal or better
1M	/	Push and twist style	Minimum voltage required:	90% of nominal value
3I	No override	/	Coil:	S8-356 (must be ordered separately) (see data sheet RE 18325-90)
3M	Knob style	/	For other details see cartridge data sheet	



## Performance graph



A pressure of approximately 2 bar (29 psi) is required to open the main poppet.

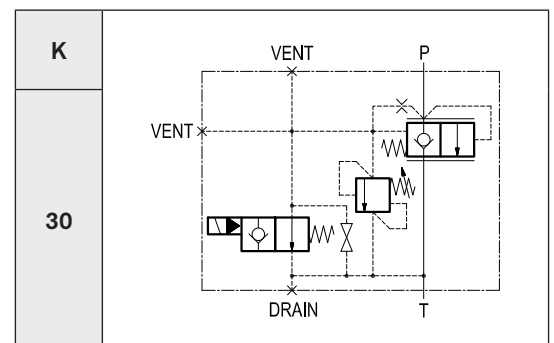
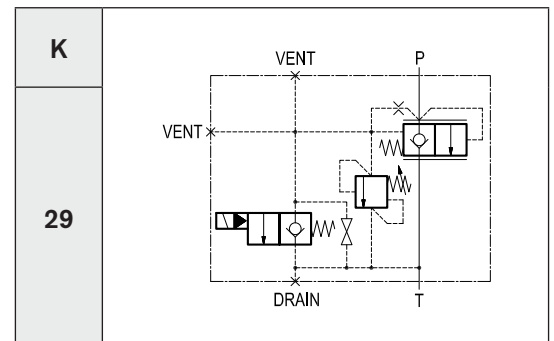
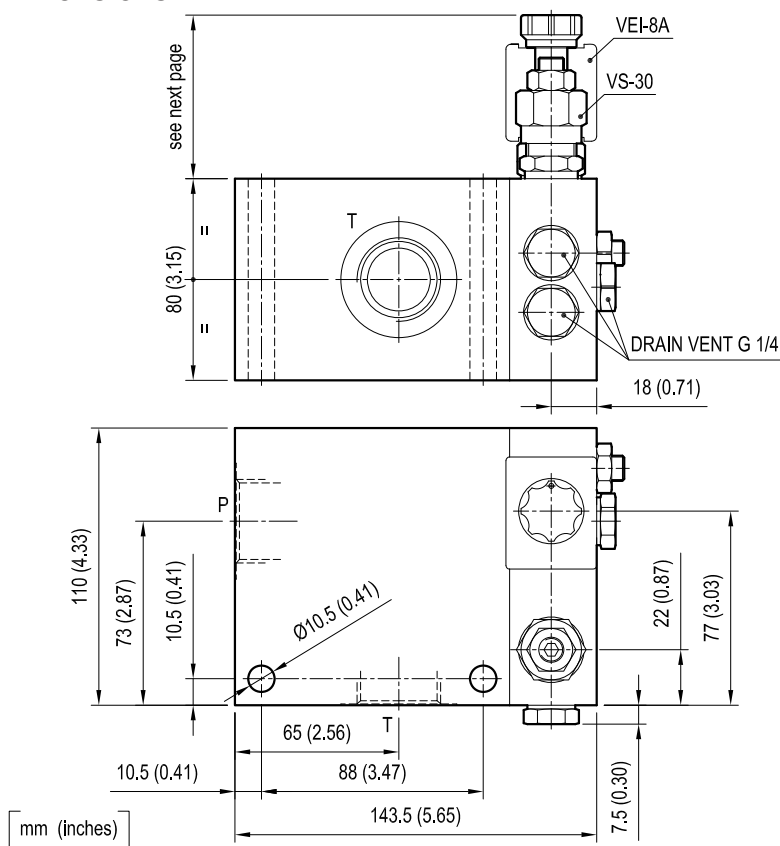


# Standard integrated circuits solenoid operated ventable relief valve

VSP-25-VEI8A

OL - K - Y - Z - W - 00

## Dimensions



## Technical data

Max flow: up to 300 l/min (80 gpm)

Max operating pressure: 210 bar (3000 psi)

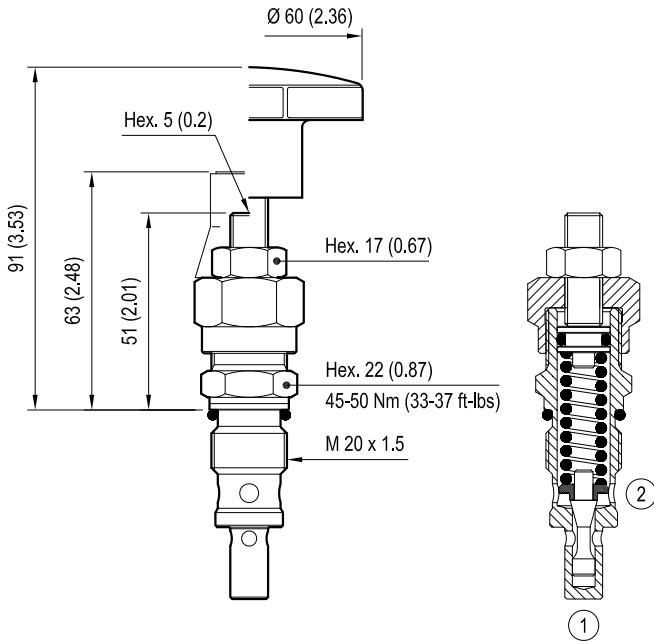
Standard manifolds in high strength **aluminium**.

For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

Weight: 3.2 kg (7.1 lbs)

These integrated circuit contains one relief valve type VS-30 operating from P to T and one solenoid valve type VEI-8A (see next page).

**VS30 Cartridge valve (code 04.11.18.X.99.Z)**



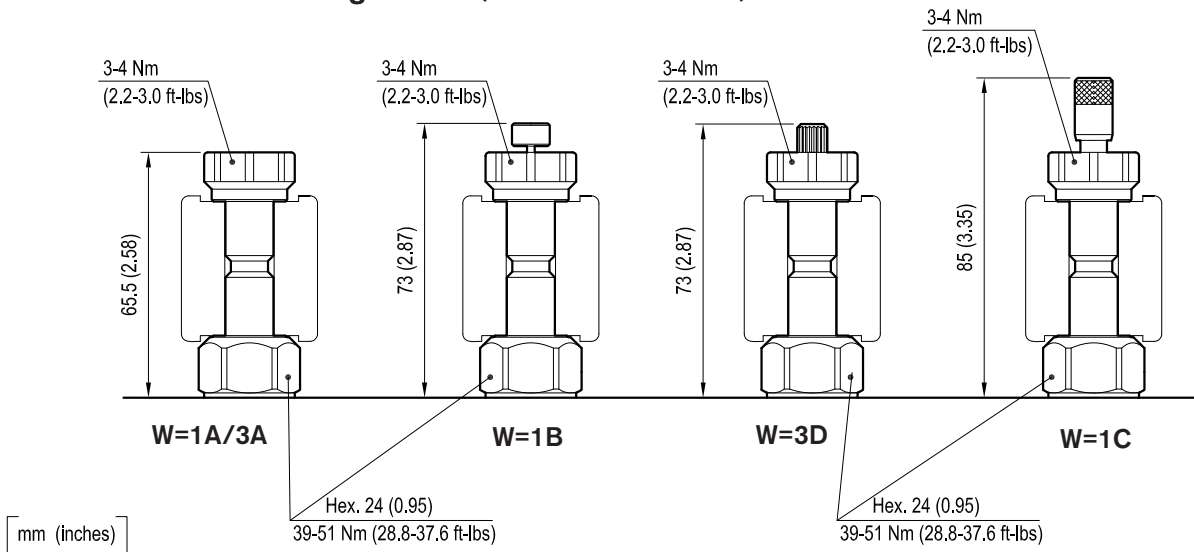
Z	VS-30 SETTING			
	Adj. pressure range bar (psi)	Press. increase bar/turn (psi/turn)	Std. setting bar (psi) (Q=5 l/min)	
	01	5-50 (75-725)	12 (174)	50 (725)
	04	30-100 (435-1450)	24 (348)	100 (1450)
	07	50-210 (725-3000)	47 (682)	200 (2900)
	10	100-350 (1450-5000)	82 (1189)	350 (5000)
	02	5-50 (75-725)	12 (174)	50 (725)
	05	30-100 (435-1450)	24 (348)	100 (1450)
	08	50-210 (725-3000)	47 (682)	200 (2900)
	11	100-350 (1450-5000)	82 (1189)	350 (5000)

ADJUSTMENTS		OPTIONS
Leakproof hex. socket screw		 Tamper resistant cap 11.04.23.003
Handknob and locknut		

VS-30 TECHNICAL DATA
See table "Z", for other details see data sheet RE 18318-23

mm (inches)

**VEI-8A Solenoid cartridge valve (code OD.15.K.18...)**

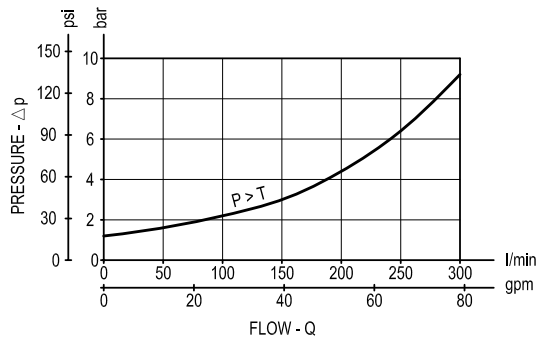


mm (inches)

W	MANUAL OVERRIDE OPTIONS	
	K = 29	K = 30
1A	/	No override
1B	/	Push style
1C	/	Push and twist style
3A	No override	/
3D	Knob style	/

VEI-8A TECHNICAL DATA
Internal leakage: max. 1 cm <sup>3</sup> /min (0.06 inch <sup>3</sup> /min)
Filtration: 25 μm nominal or better
Minimum voltage required: 90% of nominal value
Coil: S8-356 (must be ordered separately) (see data sheet RE 18325-90)
For other details see cartridge data sheet

# Performance graph



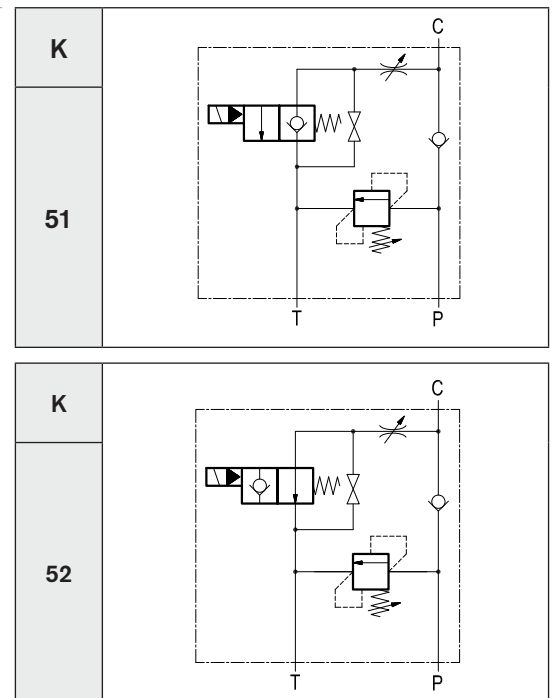
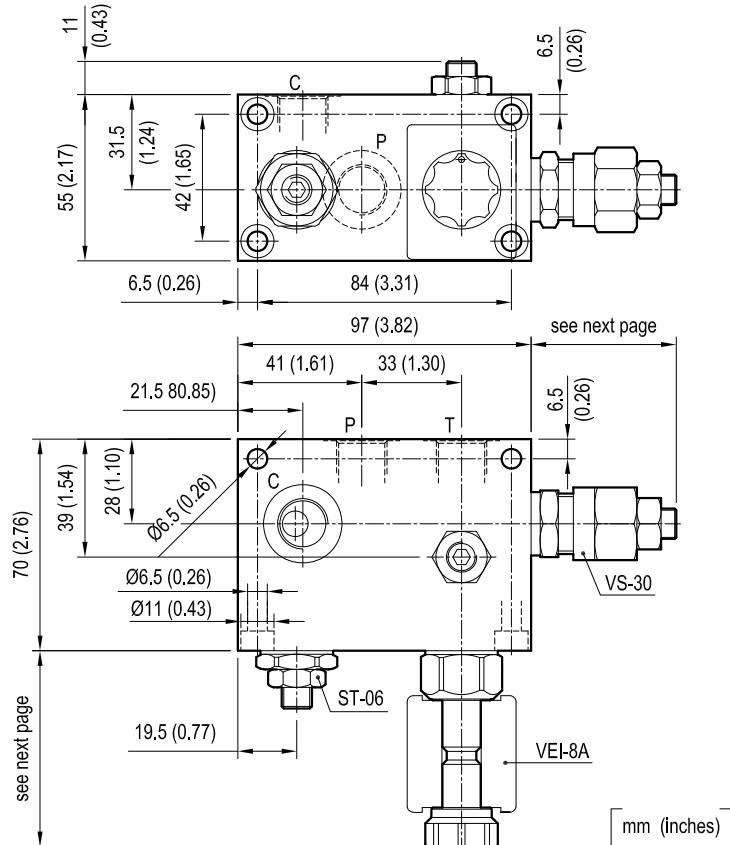


# Standard integrated circuits for single-acting cylinder

VEI8A-VU-VS-ST-06

OL - K - Y - Z - W - 00

## Dimensions



## Technical data

Max flow: up to 25 l/min (7 gpm)

Max operating pressure: 210 bar (3000 psi)

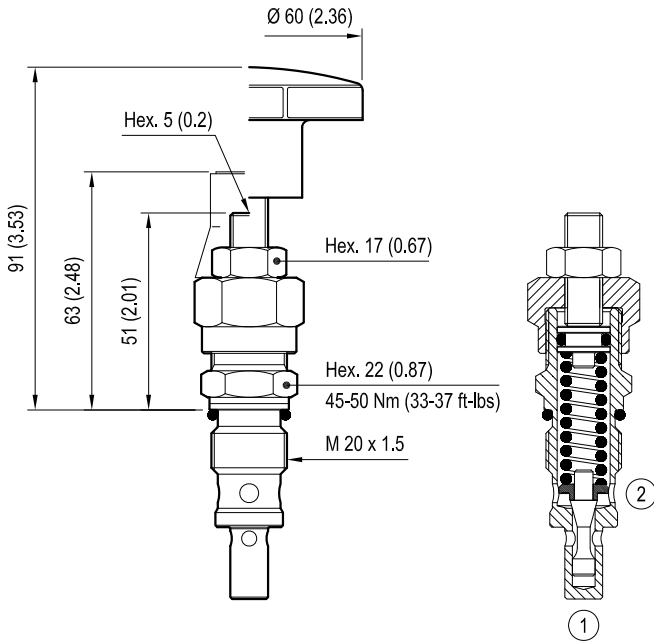
Standard manifolds in high strength **aluminium**.

For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

Weight: 1.3 kg (2.9 lbs)

These integrated circuit contains one relief valve type VS-30 operating from P to T and one solenoid valve type VEI-8A (see next page).

**VS30 Cartridge valve (code 04.11.18.X.99.Z)**



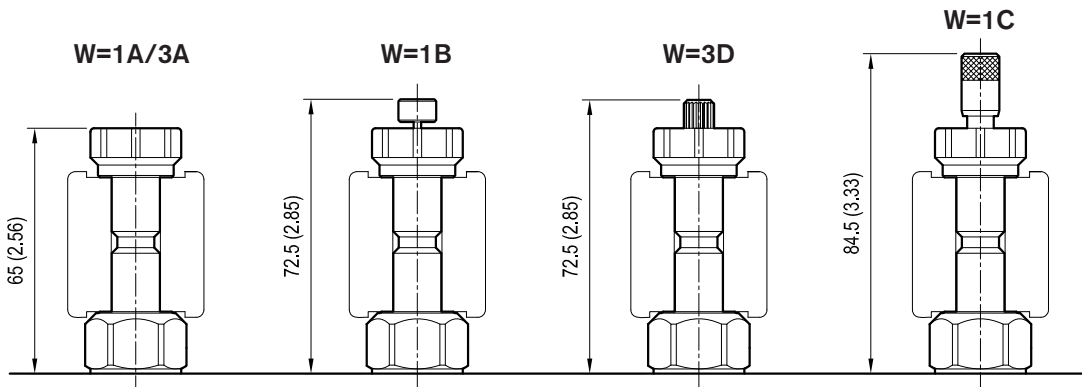
Z	VS-30 SETTING		
	Adj. pressure range bar (psi)	Press. increase bar/turn (psi/turn)	Std. setting bar (psi) (Q=5 l/min)
04	30-100 (435-1450)	24 (348)	100 (1450)
07	50-210 (725-3000)	47 (682)	200 (2900)
10	100-350 (1450-5000)	82 (1189)	350 (5000)
05	30-100 (435-1450)	24 (348)	100 (1450)
08	50-210 (725-3000)	47 (682)	200 (2900)
11	100-350 (1450-5000)	82 (1189)	350 (5000)

ADJUSTMENTS		OPTIONS
Leakproof hex. socket screw		 Tamper resistant cap 11.04.23.003
Handknob and locknut		

VS-30 TECHNICAL DATA
See table "Z", for other details see data sheet RE 18318-23

[ mm (inches) ]

**VEI-8A Solenoid cartridge valve (code OD.15.K.18...)**



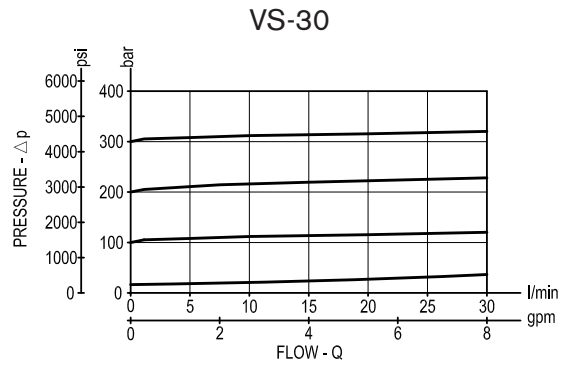
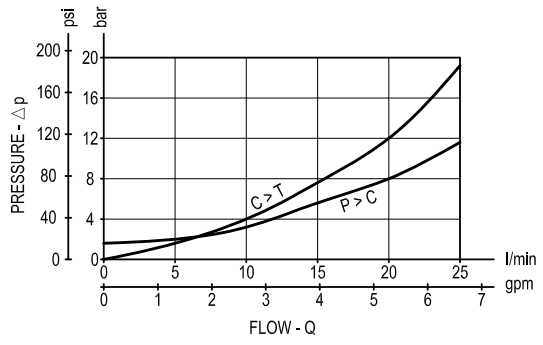
[ mm (inches) ]

W	MANUAL OVERRIDE OPTIONS	
	K = 51	K = 52
1A	/	No override
1B	/	Push style
1C	/	Push and twist style
3A	No override	/
3D	Knob style	/

VEI-8A TECHNICAL DATA
Internal leakage: max. 1 cm <sup>3</sup> /min (0.06 inch <sup>3</sup> /min)
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil: S8-356 (must be ordered separately) (see data sheet RE 18325-90)
For other details see cartridge data sheet



Performance graphs



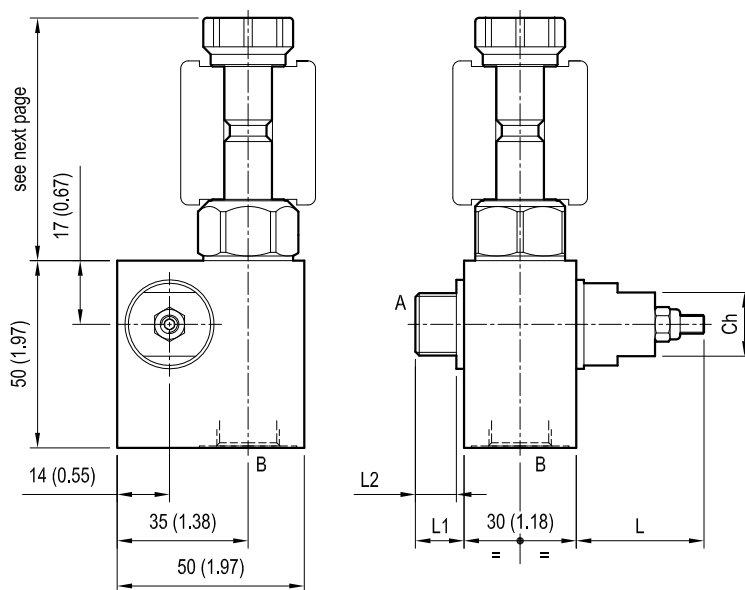


# Standard integrated circuits for single acting cylinder

VEI-VCDCBL-8A-06

OL17 - K - 18 - Y - Z - W

## Dimensions



[ mm (inches) ]

30.2 (1.19)	12.5 (0.49)	11 (0.43)	14 (0.55)			G 1/4	30 (22)
33.6 (1.32)	12.5 (0.49)	12 (0.47)	17 (0.67)			G 3/8	60 (44)
L	L1	L2	Ch			Ports Size	Tightening Torque Nm (ft-lb)

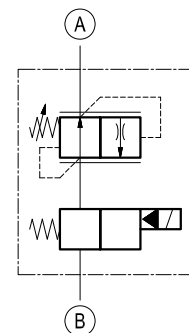
## Technical data

Max flow: up to 40 l/min (11 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

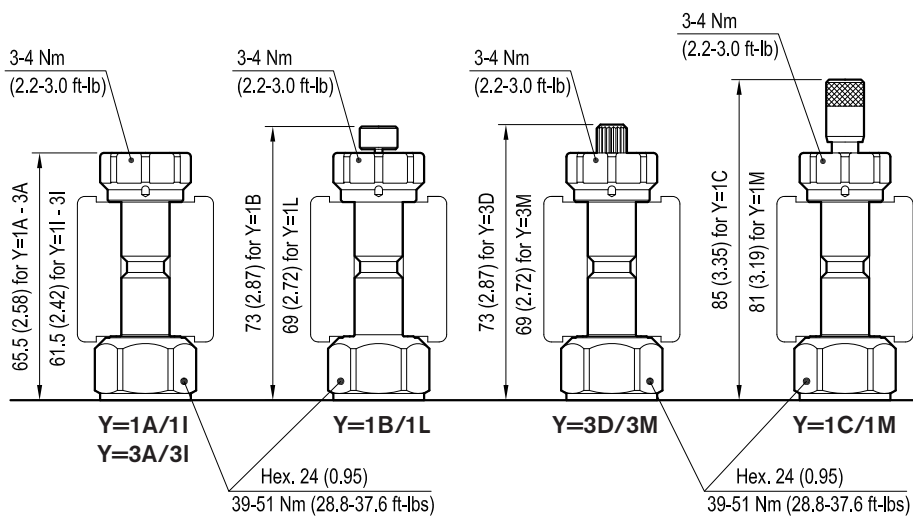
For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.



## Cartridge schemes

monodirectional type	bidirectional type

### Cartridge style

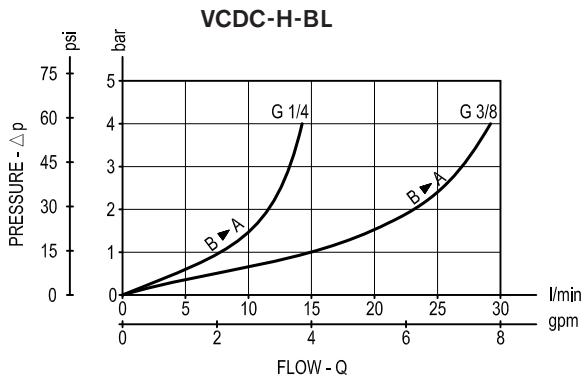
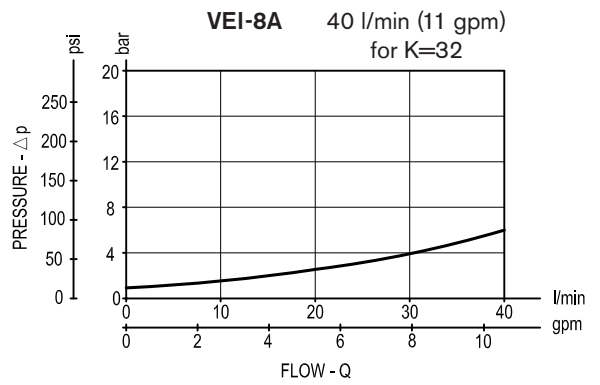
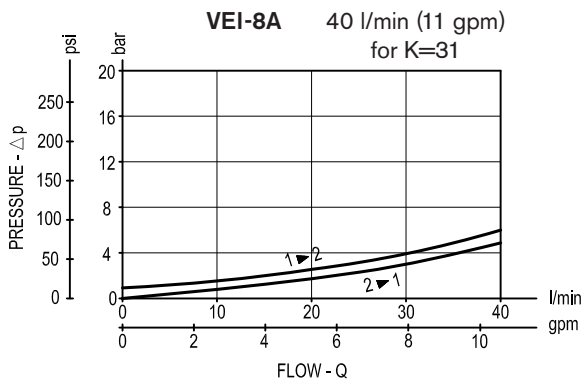
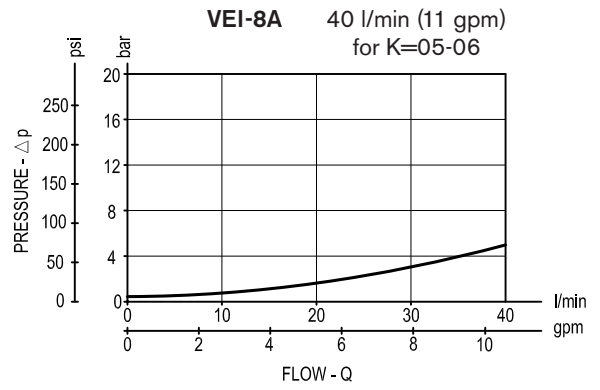
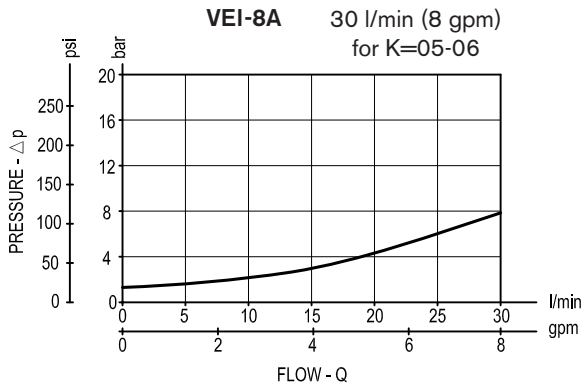


[ mm (inches) ]

CARTRIDGE TECHNICAL DATA	
Common cavity: <b>CA-08A-2N</b>	
Filtration: 25 µm nominal or better	
Minimum voltage required: 90% of nominal value	
Coil : S8-356 <b>must be ordered separately</b> (see data sheet RE 18325-90)	
Mounting position: unrestricted	
For other details see cartridge data sheet	

CARTRIDGE CODE	OL17	- K -		18	- Y -		- Z -		CARTRIDGE SCHEME	- W -	REGULATED FLOW RANGE A > B l/min (gpm/min)		
		monodir.	bidir.		Rated Flow		Ports size A-B				bidir.	G 1/4	G 3/8
					30 l/min (8 gpm)	40 l/min (11 gpm)	G 1/4	G 3/8					
	OD15		<b>05</b>	18	<b>3I</b>	<b>3A</b>	<b>09</b>	<b>02</b>		<b>02</b>	1-1.6 (0.26-0.42)	/	
	OD15		<b>05</b>	18	<b>3M</b>	<b>3D</b>	<b>09</b>	<b>02</b>		<b>03</b>	1.6-2.5 (0.42-0.66)	2-10 (0.53-2.64)	
	OD15		<b>06</b>	18	<b>1I</b>	<b>1A</b>	<b>09</b>	<b>02</b>		<b>04</b>	2.5-4 (0.66-1.06)	10-16 (2.64-4.23)	
	OD15		<b>06</b>	18	<b>1L</b>	<b>1B</b>	<b>09</b>	<b>02</b>		<b>05</b>	4-6.3 (1.06-1.67)	16-25 (4.23-6.61)	
	OD15		<b>06</b>	18	<b>1M</b>	<b>1C</b>	<b>09</b>	<b>02</b>		<b>06</b>	6.3-10 (1.67-2.64)	/	
	OD15		<b>31</b>	18		<b>3A</b>	<b>09</b>	<b>02</b>					
	OD15		<b>31</b>	18		<b>3D</b>	<b>09</b>	<b>02</b>					
	OD15		<b>32</b>	18		<b>1A</b>	<b>09</b>	<b>02</b>					
	OD15		<b>32</b>	18		<b>1B</b>	<b>09</b>	<b>02</b>					
	OD15		<b>32</b>	18		<b>1C</b>	<b>09</b>	<b>02</b>					

Performance graphs





## Sandwich valve modules

<b>Designation</b>	<b>Description</b>	<b>Code</b>	<b>Data sheet</b>	<b>Page</b>
Module with solenoid valve	EM-VEI8A/8I-CETOP 3-A	OP14K1829Y	18332-70	1595
Module with solenoid valve	EM-VEI8A/8I-CETOP 3-B	OP16K1829Y	18332-71	1599
Module with solenoid valve	EM-VEI8A/8I-CETOP 3-A/B	OP15K1829Y	18332-72	1603
Relief valve module	EM-VS30-CETOP 3	OP0101X29Z	18332-73	1607
Module with relief and solenoid by-pass	EM-VEI8A/8I-VSBN-CETOP 3	OP35KX29Y	18332-74	1611
Relief valve module	EM-VSBN-08A-CETOP 3	OP0201X29Z	18332-75	1615
Module with solenoid valve and flow restrictor	EM-VEI8A/8I-ST-CETOP 3-P1	OP63KX29Y	18332-76	1619
Module with solenoid valve and flow restrictor	EM-VEI8A/8I-ST-CETOP 3-A1	OP61KX29Y	18332-77	1623
Module with solenoid valve and flow restrictor	EM-VEI8A/8I-ST-CETOP 3-A	OP65KX29Y	18332-78	1627
Module with solenoid valve and flow restrictor	EM-VEI8A/8I-ST-CETOP 3-B1	OP62KX29Y	18332-79	1631
Module with solenoid valve and flow restrictor	EM-VEI8A/8I-ST-CETOP 3-B	OP64KX29Y	18332-80	1635
Module with solenoid valve and flow restrictor	EM-VEI8A/8I-ST-CETOP 3-T	OP60KX29Y	18332-81	1639



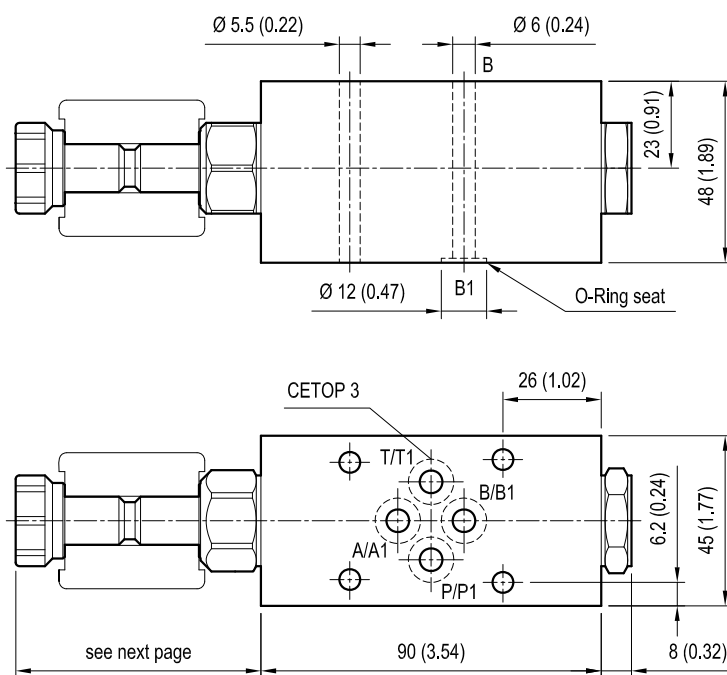


# Sandwich valves, module with solenoid valve

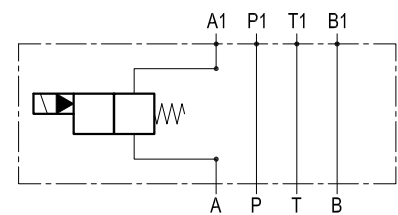
EM-VEI8A/8I-CETOP3-A

OP . 14 - K - 18 - 29 - Y

## Dimensions



[ mm (inches) ]



## Cartridge schemes

monodirectional type	bidirectional type

## Technical data

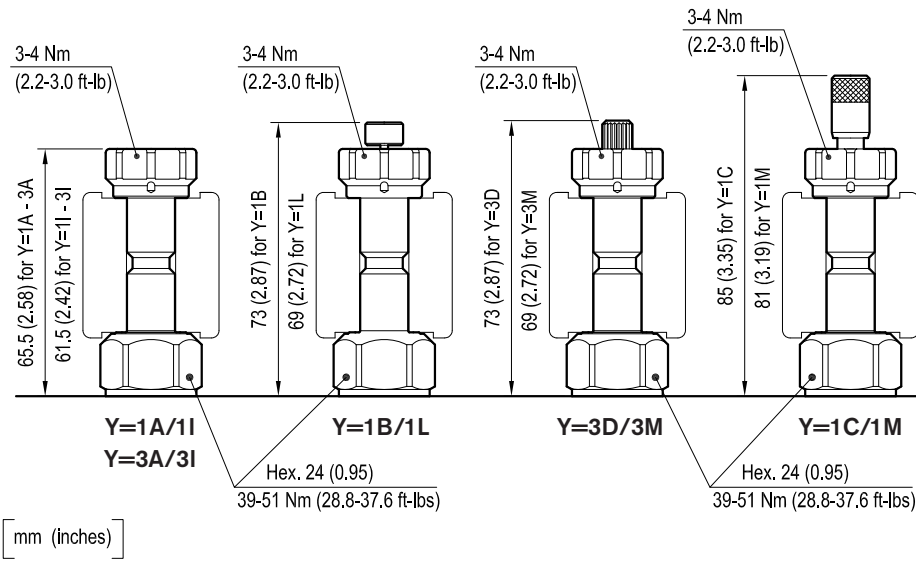
Max flow: up to 40 l/min (11 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

Dimensions

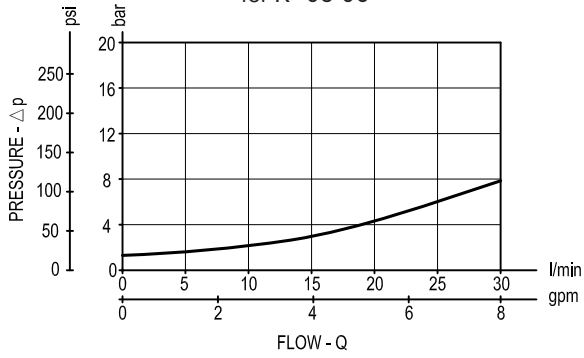


CARTRIDGE TECHNICAL DATA	
Common cavity: <b>CA-08A-2N</b>	
Filtration: 25 µm nominal or better	
Minimum voltage required: 90% of nominal value	
Coil : S8-356 <b>must be ordered separately</b> (see data sheets RE 18325-90)	
Mounting position: unrestricted	
For other details see cartridge data sheet	

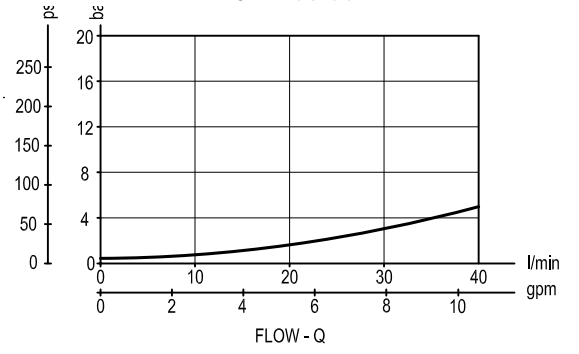
OP14	- K -		18	29	- Y -		CARTRIDGE SCHEME	
	monodir.	bidir.			Rated Flow		monodir.	bidir.
					30 l/min (8 gpm)	40 l/min (11 gpm)		
CARTRIDGE CODE	OD15	<b>05</b>	18	29	<b>3I</b>	<b>3A</b>		
	OD15	<b>05</b>	18	29	<b>3M</b>	<b>3D</b>		
	OD15	<b>06</b>	18	29	<b>1I</b>	<b>1A</b>		
	OD15	<b>06</b>	18	29	<b>1L</b>	<b>1B</b>		
	OD15	<b>06</b>	18	29	<b>1M</b>	<b>1C</b>		
	OD15	<b>31</b>	18	29		<b>3A</b>		
	OD15	<b>31</b>	18	29		<b>3D</b>		
	OD15	<b>32</b>	18	29		<b>1A</b>		
	OD15	<b>32</b>	18	29		<b>1B</b>		
	OD15	<b>32</b>	18	29		<b>1C</b>		

### Performance graphs

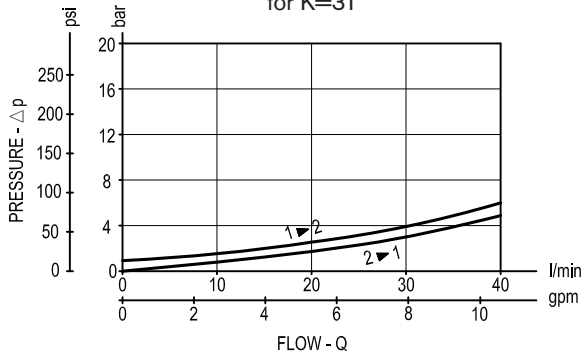
30 l/min (8 gpm)  
for K=05-06



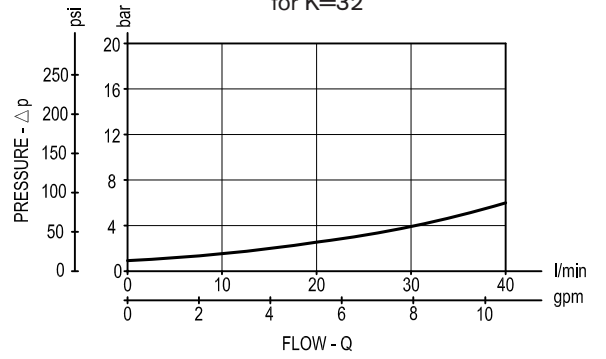
40 l/min (11 gpm)  
for K=05-06



40 l/min (11 gpm)  
for K=31



40 l/min (11 gpm)  
for K=32



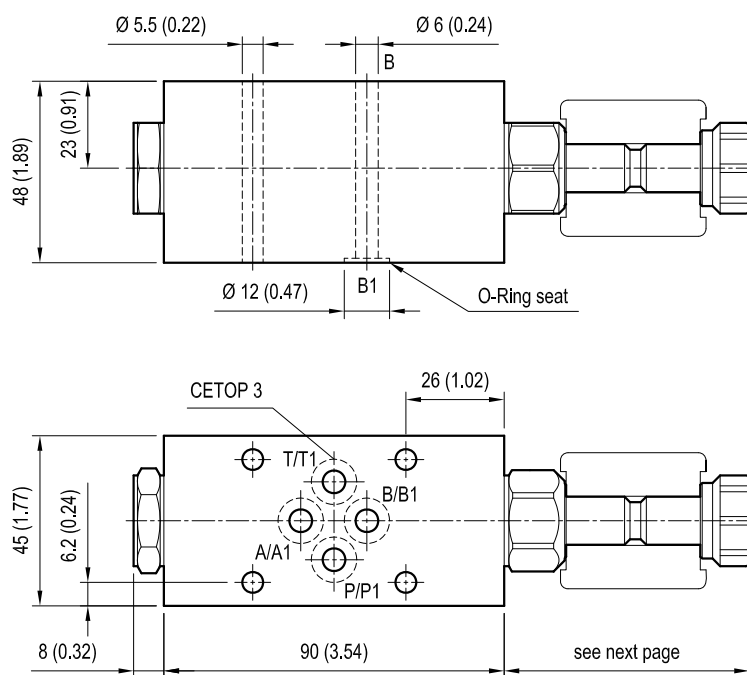


# Sandwich valves, module with solenoid valve

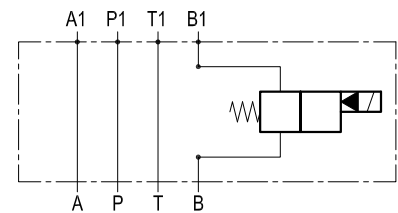
EM-VE18A/8I-CETOP 3-B

OP:16 - K - 18 - 29 - Y

## Dimensions



[ mm (inches) ]



## Cartridge schemes

monodirectional type	bidirectional type

## Technical data

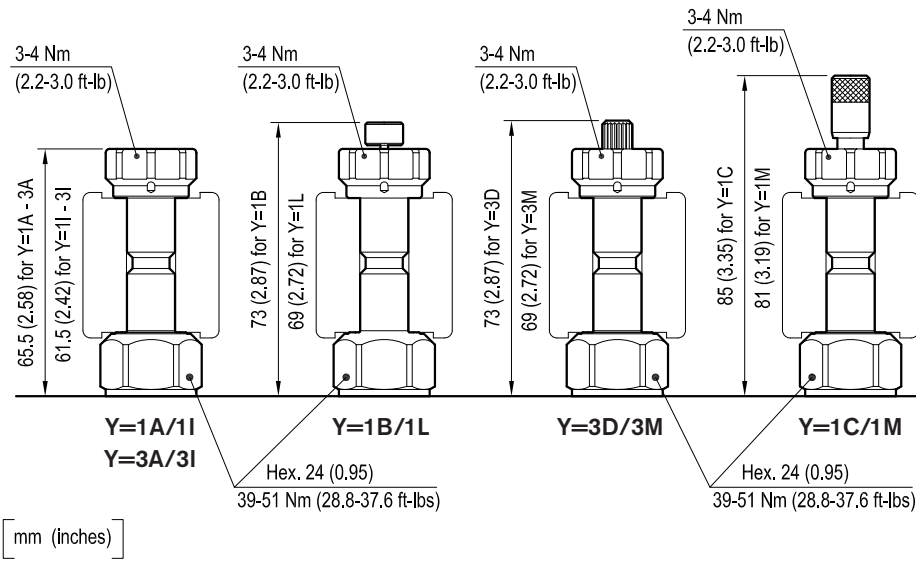
Max flow: up to 40 l/min (11 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

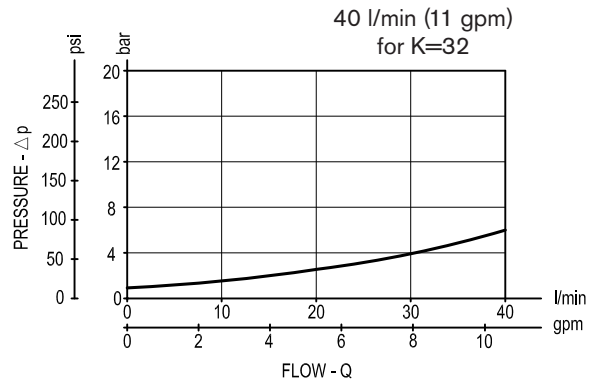
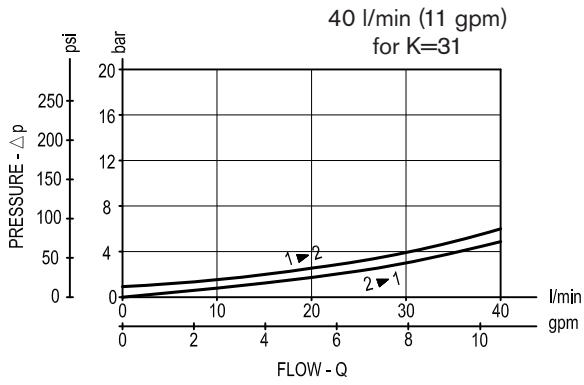
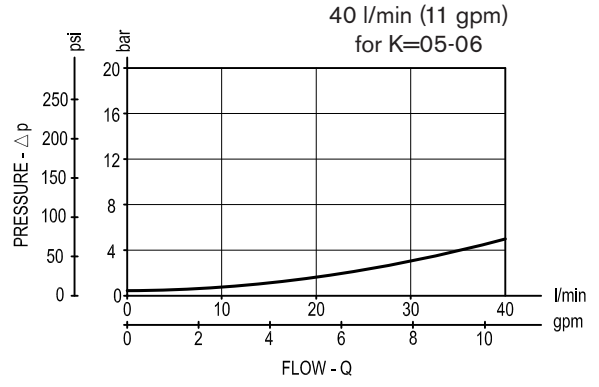
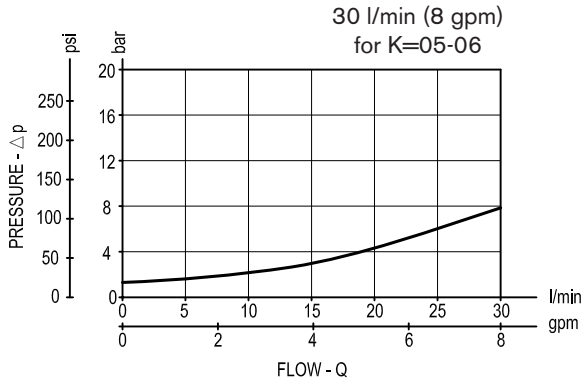
Dimensions



CARTRIDGE TECHNICAL DATA
Common cavity: <b>CA-08A-2N</b>
Filtration: 25 µm nominal or better
Minimum voltage required: 90% of nominal value
Coil : <b>must be ordered separately</b> (see data sheets RE 18325-90)
Mounting position: unrestricted
For other details see cartridge data sheet

OP16	- K -		18	29	- Y -		CARTRIDGE SCHEME
	monodir.	bidir.			Rated Flow		
					30 l/min (8 gpm)	40 l/min (11 gpm)	
CARTRIDGE CODE	OD15	<b>05</b>	18	29	<b>3I</b>	<b>3A</b>	
	OD15	<b>05</b>	18	29	<b>3M</b>	<b>3D</b>	
	OD15	<b>06</b>	18	29	<b>1I</b>	<b>1A</b>	
	OD15	<b>06</b>	18	29	<b>1L</b>	<b>1B</b>	
	OD15	<b>06</b>	18	29	<b>1M</b>	<b>1C</b>	
	OD15	<b>31</b>	18	29		<b>3A</b>	
	OD15	<b>31</b>	18	29		<b>3D</b>	
	OD15	<b>32</b>	18	29		<b>1A</b>	
	OD15	<b>32</b>	18	29		<b>1B</b>	
	OD15	<b>32</b>	18	29		<b>1C</b>	

Performance graphs





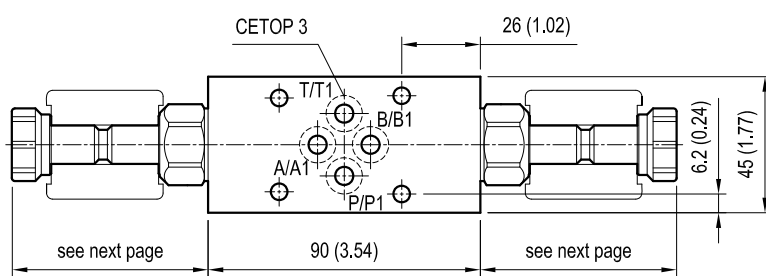
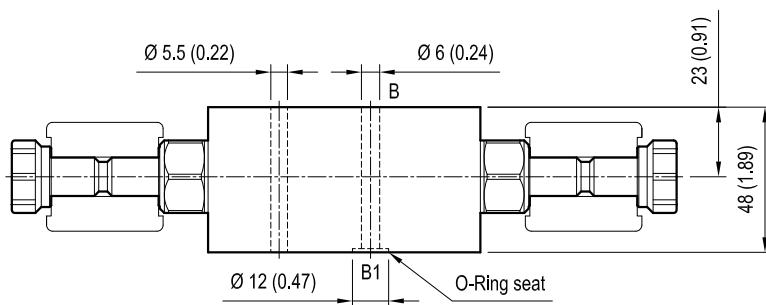


# Sandwich valves, module with solenoid valve

EM-VEI8A/8I-CETOP 3-A/B

OP . 15 - K - 18 - 29 - Y

## Dimensions



[ mm (inches) ]

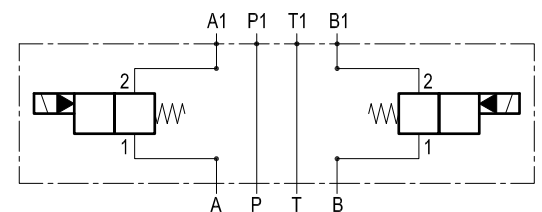
## Technical data

Max flow: up to 40 l/min (11 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

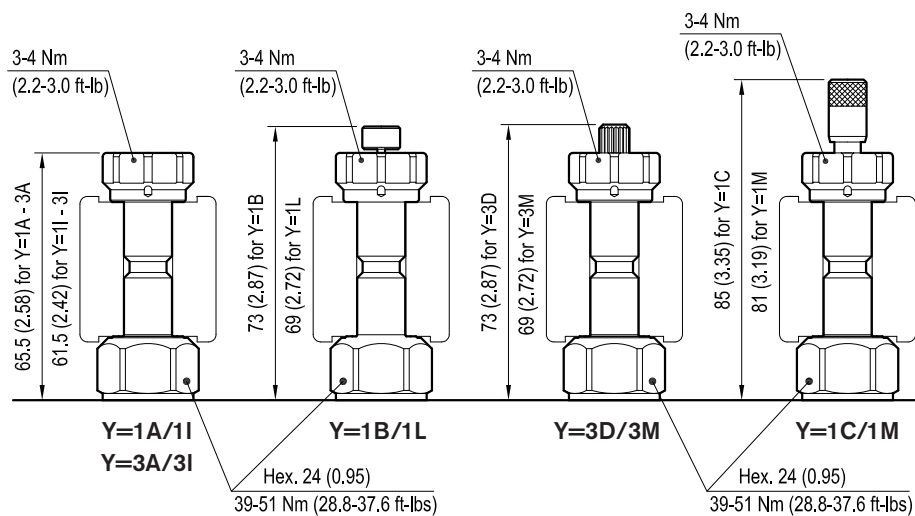
For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.



## Cartridge schemes

monodirectional type	bidirectional type

### Dimensions



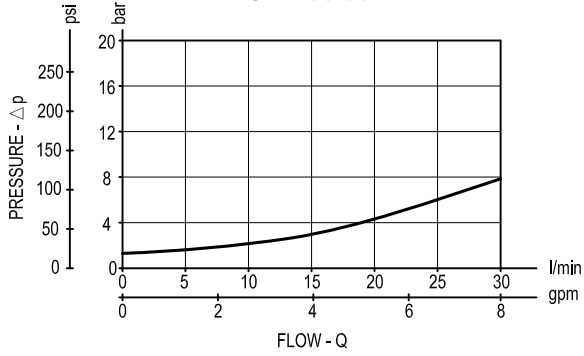
mm (inches)

CARTRIDGE TECHNICAL DATA	
Common cavity: <b>CA-08A-2N</b>	
Filtration: 25 µm nominal or better	
Minimum voltage required: 90% of nominal value	
Coil : S8-356 <b>must be ordered separately</b> (see data sheets RE 18325-90)	
Mounting position: unrestricted	
For other details see cartridge data sheet	

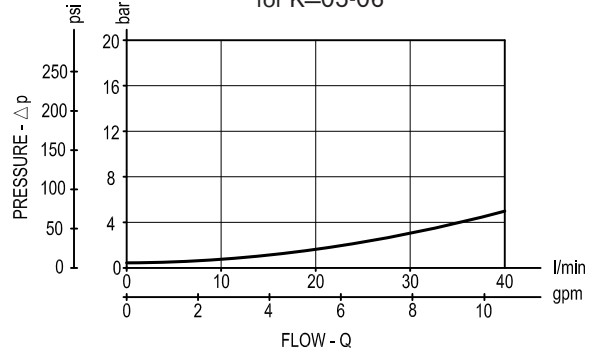
OP14	- K -		18	29	- Y -		CARTRIDGE SCHEME	
	monodir.	bidir.			Rated Flow		monodir.	bidir.
					30 l/min (8 gpm)	40 l/min (11 gpm)		
CARTRIDGE CODE	OD15	<b>05</b>	18	29	<b>3I</b>	<b>3A</b>		
	OD15	<b>05</b>	18	29	<b>3M</b>	<b>3D</b>		
	OD15	<b>06</b>	18	29	<b>1I</b>	<b>1A</b>		
	OD15	<b>06</b>	18	29	<b>1L</b>	<b>1B</b>		
	OD15	<b>06</b>	18	29	<b>1M</b>	<b>1C</b>		
	OD15	<b>31</b>	18	29		<b>3A</b>		
	OD15	<b>31</b>	18	29		<b>3D</b>		
	OD15	<b>32</b>	18	29		<b>1A</b>		
	OD15	<b>32</b>	18	29		<b>1B</b>		
	OD15	<b>32</b>	18	29		<b>1C</b>		

Performance graphs

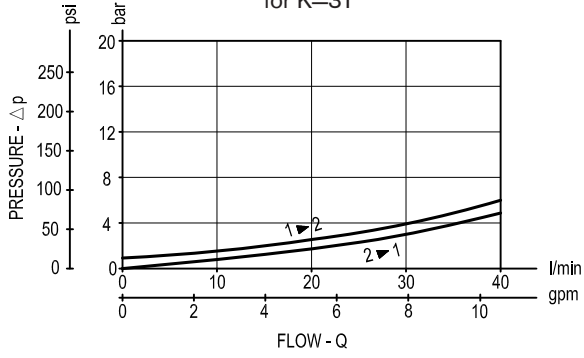
30 l/min (8 gpm)  
for K=05-06



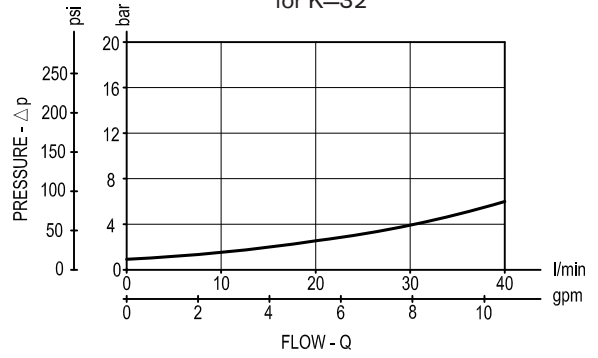
40 l/min (11 gpm)  
for K=05-06



40 l/min (11 gpm)  
for K=31



40 l/min (11 gpm)  
for K=32



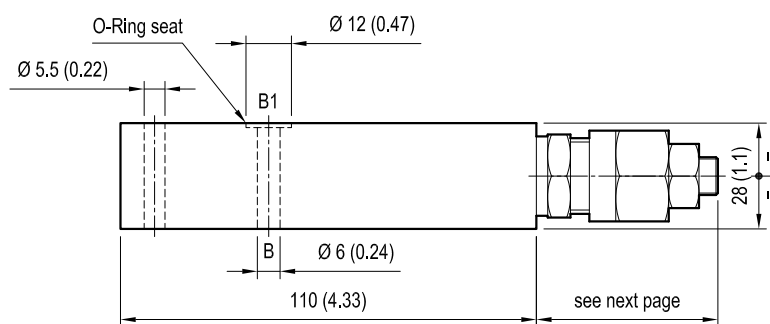
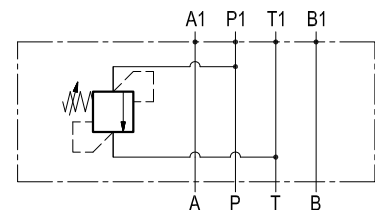
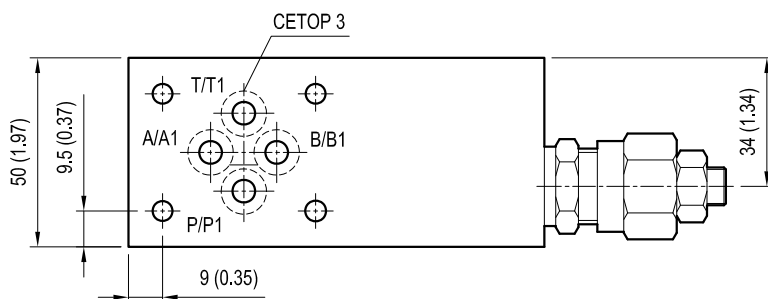


# Sandwich valves, relief valve module

EM-VS30-CETOP 3

OP.01.01 - X - 29 - Z

## Dimensions



[ mm (inches) ]

## Technical data

Max flow: up to 30 l/min (8 gpm)

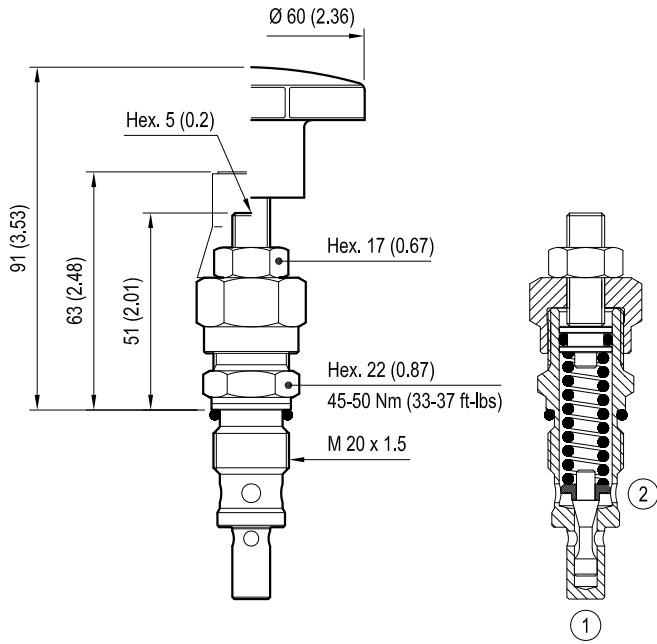
Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.

For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

Weight: 0.53 kg (1.17 lbs)

**VS-30 code 04.11.18-X-99-Z**



X	VS-30 ADJUSTMENTS	
03	Leakproof hex. socket screw	
04	Handknob and locknut	

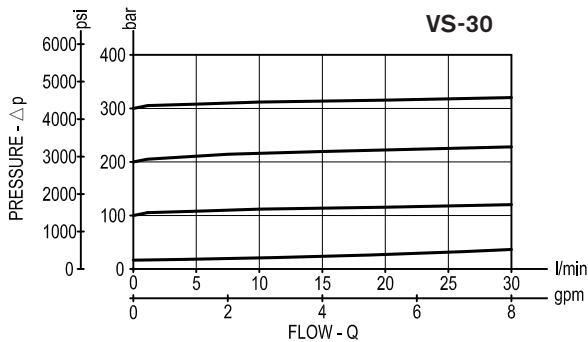
OPTIONS	
Ordering code	Description
11.04.23.003	Tamper resistant cap

For other details see data sheet RE 18318-23

[ mm (inches) ]

Z	SPRINGS			
	Adjust pressure range bar (psi)	Pressure increase bar (psi)	Standard setting bar (psi) Q = 5 l/min	
05	5-50 (75-725)	12 (174)	50 (725)	
10	30-100 (435-1450)	24 (348)	100 (1450)	
20	50-210 (725-3000)	47 (682)	200 (2900)	
35	100-350 (1450-5000)	82 (1189)	350 (5000)	

**Performance graph**







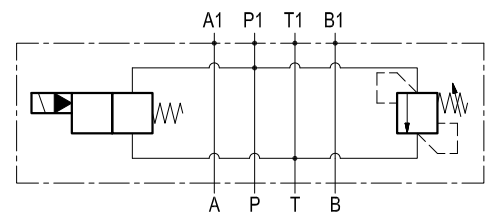
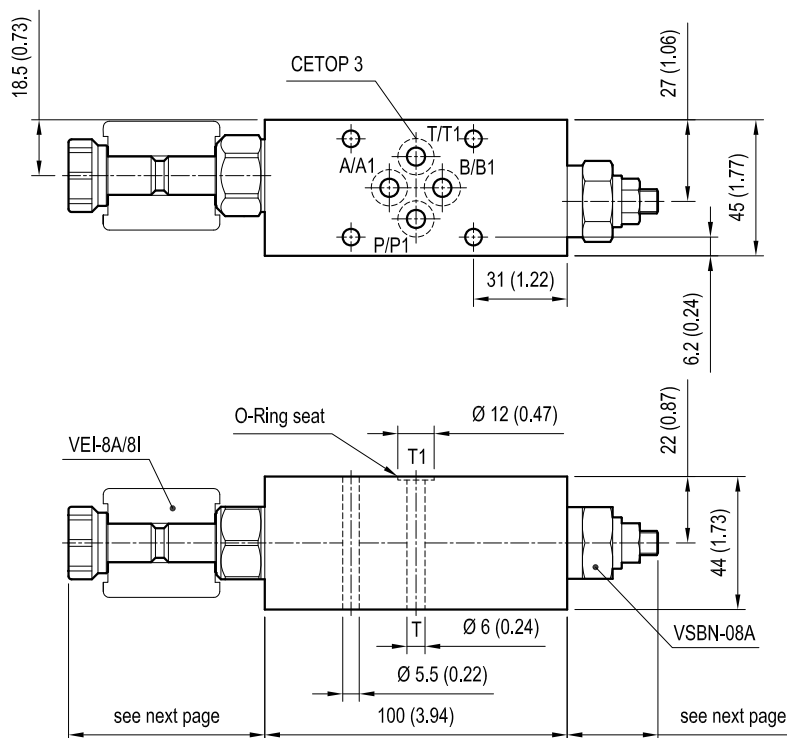


# Sandwich valves, module with relief valve and solenoid by-pass

EM-VEI8A/8I-VSBN-CETOP 3

OP.35 - K - X - 29 - Y

## Dimensions



## Technical data

Max flow: up to 20 l/min (5 gpm)

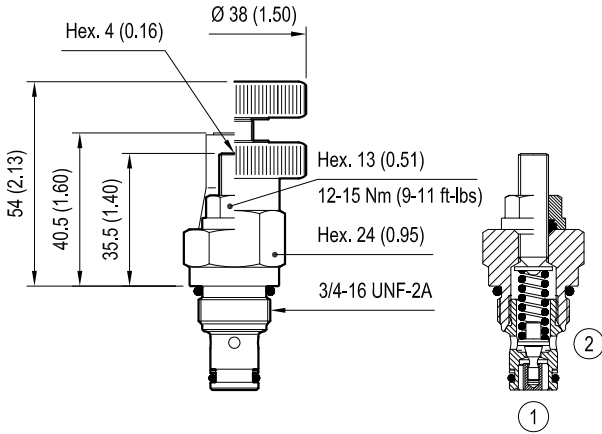
Max operating pressure: 210 bar (3000 psi)



Standard manifolds in high strength **aluminium**.  
For working pressure up to 350 bar (5000 psi)  
and for fatigue applications with any working  
pressure, steel manifolds are available upon  
request.


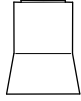

[ mm (inches) ]

CARTRIDGE CODE	OP35	- K -		- X -	29	- Y -		CARTRIDGE SCHEME	
		monodir.	bidir.			Rated Flow	30 l/min (8 gpm)	40 l/min (11 gpm)	monodir.
see next page	OD15	<b>01</b>		see next page	18	<b>3I</b>	<b>3A</b>		
	OD15	<b>01</b>			18	<b>3M</b>	<b>3D</b>		
	OD15	<b>02</b>			18	<b>1I</b>	<b>1A</b>		
	OD15	<b>02</b>			18	<b>1L</b>	<b>1B</b>		
	OD15	<b>02</b>			18	<b>1M</b>	<b>1C</b>		

**VSNB-08A code 04.11.49-X-56-Z**



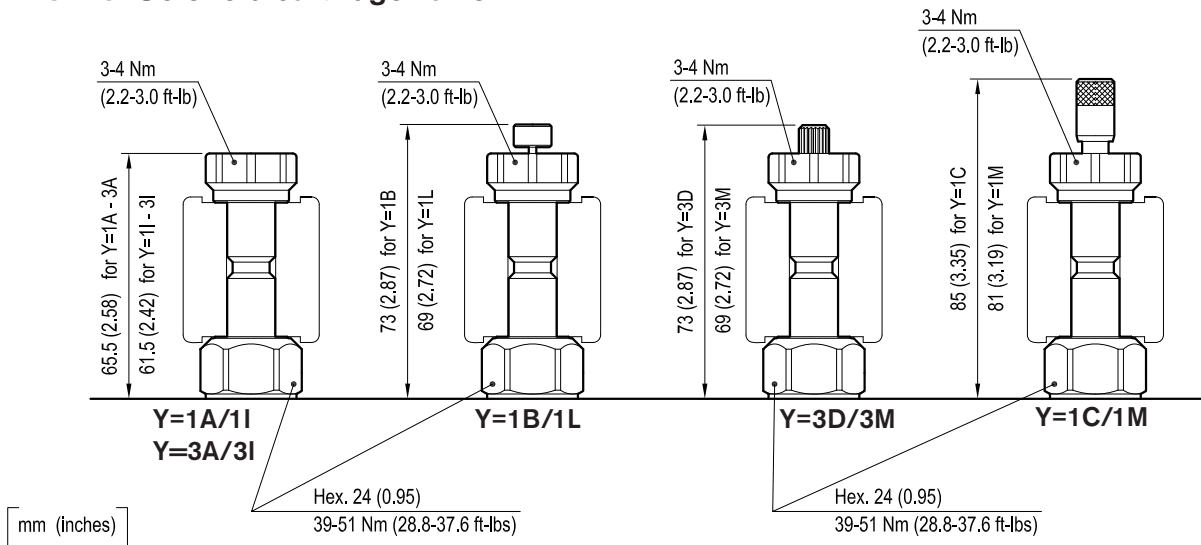
X	VSNB-08A SETTING		
	Adj. pressure range bar (psi)	Press. increase bar/turn (psi/turn)	Std. setting bar (psi) (Q=5 l/min)
	<b>04</b> 35-140 (500-2000)	50 (725)	100 (1450)
	<b>07</b> 105-210 (1500-3000)	79 (1145)	200 (2900)
	<b>10</b> 175-350 (2500-5000)	170 (2465)	350 (5000)
	<b>08</b> 35-350 (500-5000)	72 (1044)	200 (2900)

ADJUSTMENTS		OPTIONS
Leakproof hex. socket screw		 Ordering code 11.04.23.002
Handknob and locknut		

For other details see data sheet RE 18318-04

[ mm (inches) ]

**VEI-8A/8I Solenoid cartridge valve**

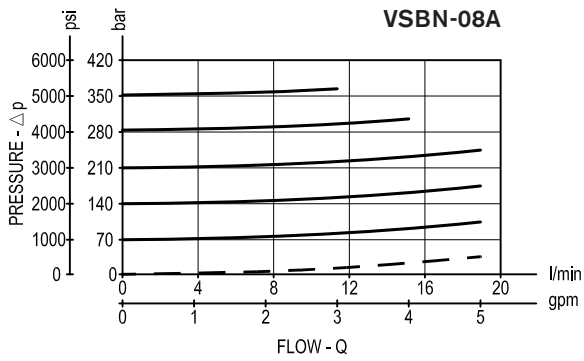
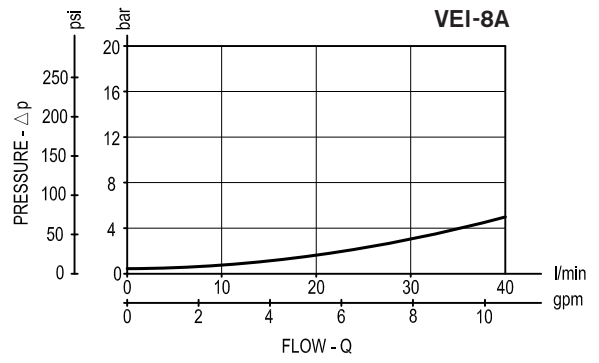
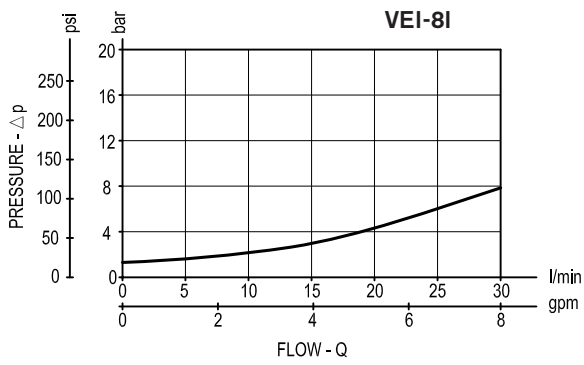


[ mm (inches) ]

Y	MANUAL OVERRIDE OPTIONS	
	K = 01	K = 02
<b>1A/1I</b>	/	No override
<b>1B/1L</b>	/	Push style
<b>1C/1M</b>	/	Push and twist style
<b>3A/3I</b>	No override	/
<b>3D/3M</b>	Knob style	/

VEI-8A TECHNICAL DATA	
Internal leakage:	max. 1 cm <sup>3</sup> /min (0.06 inch <sup>3</sup> /min)
Filtration:	25 µm nominal or better
Minimum voltage required:	90% of nominal value
Coil:	S8-356 (must be ordered separately) (see data sheet RE 18325-90)
For other details see cartridge data sheets	

Performance graphs



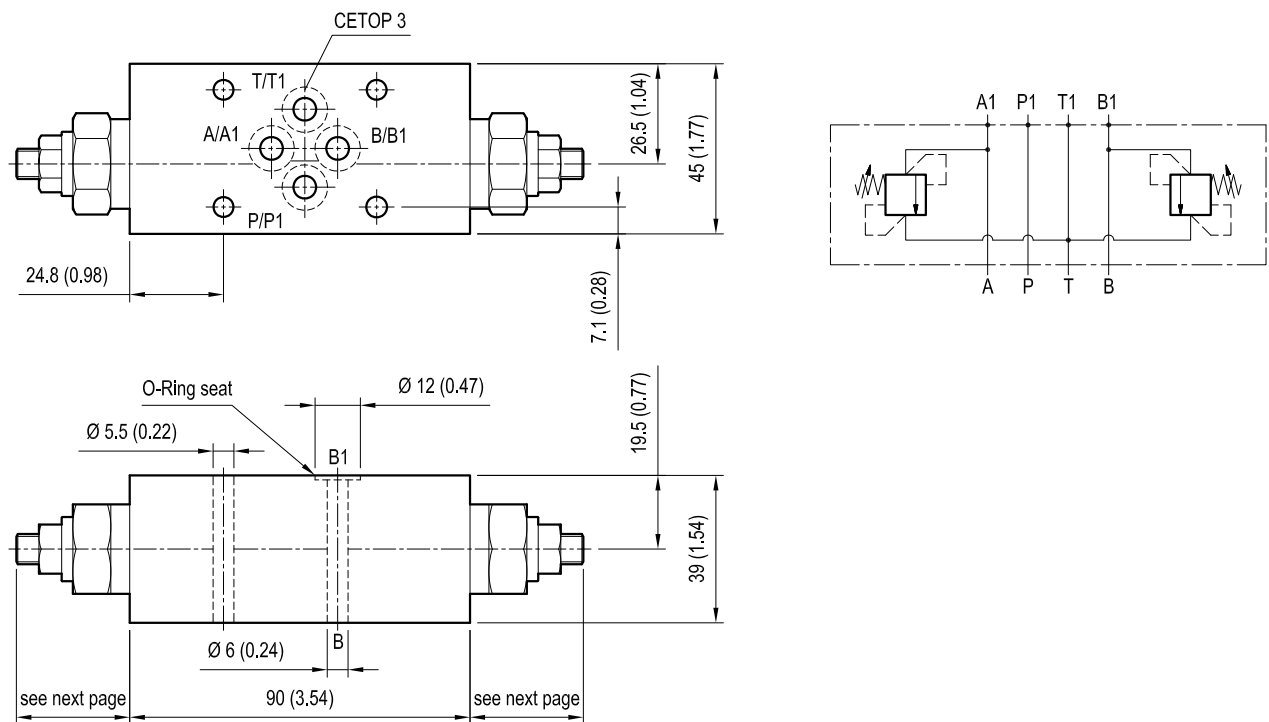


# Sandwich valves, relief valve module

EM-VSBN-08A-CETOP 3

OP.02.01 - X - 29 - Z

## Dimensions



[ mm (inches) ]

## Technical data

Max flow: up to 20 l/min (5 gpm)

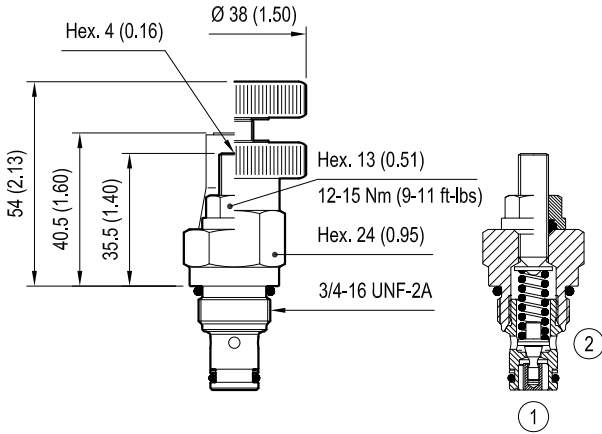
Max operating pressure: 210 bar (3000 psi)



Standard manifolds in high strength **aluminium**.

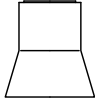
For working pressure up to 350 bar (5000 psi) and for fatigue applications with any working pressure, steel manifolds are available upon request.

Weight: 0.53 kg (1.17 lbs)

**VSBN-08A code 04.11.49-X-56-Z**

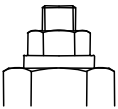
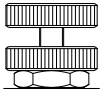


X		VSBN-08A ADJUSTMENTS
03	Leakproof hex. socket screw	
04	Handknob and locknut	

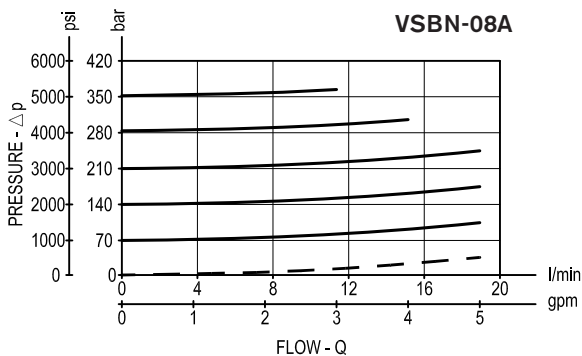
OPTIONS	
Ordering code	Description
11.04.23.002	 Tamper resistant cap

For other details see data sheet RE 18318-04

[ mm (inches) ]

Z		SPRINGS		
		Adjust pressure range bar (psi)	Pressure increase bar (psi)	Standard setting bar (psi) Q = 5 l/min
	04	10-70 (145-1000)	26 (375)	50 (725)
	10	35-140 (500-2000)	50 (725)	100 (1450)
	20	105-210 (1500-3000)	79 (1145)	200 (2900)
	35	175-350 (2500-5000)	170 (2465)	350 (5000)
	35	35-350 (500-5000)	72 (1044)	200 (2900)

**Performance graph**







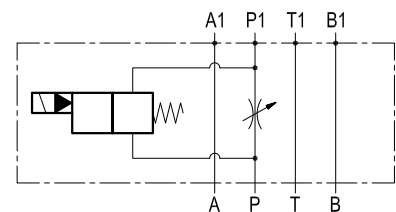
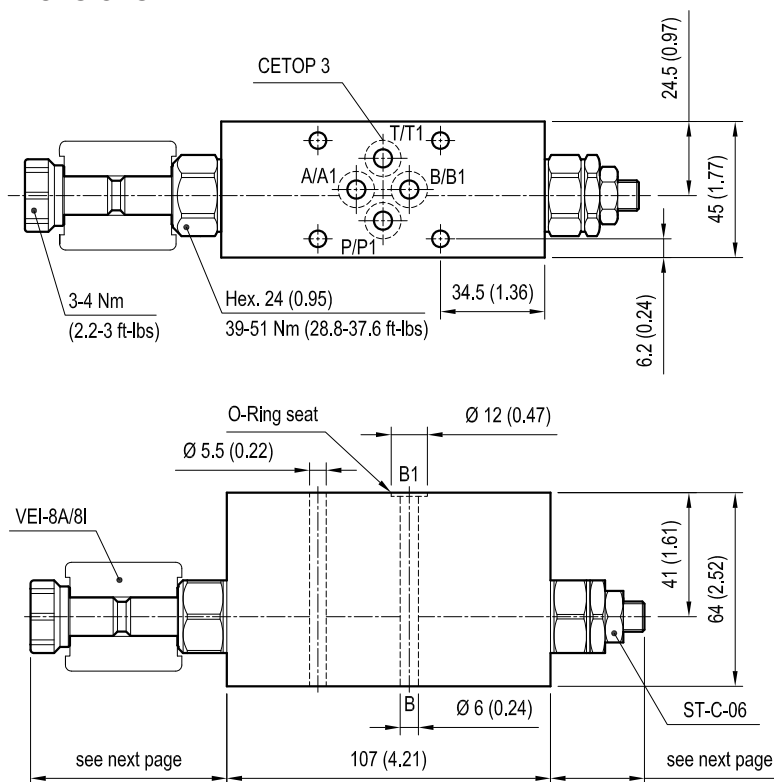


# Sandwich valves, module with solenoid valve and flow restrictor

EM-VEI8A/8I-ST-CETOP3-P1

OP . 63 - K - X - 29 - Y

## Dimensions



## Technical data

Max flow: up to 40 l/min (11 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.  
For working pressure up to 350 bar (5000 psi)  
and for fatigue applications with any working  
pressure, steel manifolds are available upon  
request.

[ mm (inches) ]

CARTRIDGE CODE	OP63	- K -		- X -	29	- Y -		CARTRIDGE SCHEME	
		monodir.	bidir.			Rated Flow	30 l/min (8 gpm)	40 l/min (11 gpm)	monodir.
see next page	OD15	<b>01</b>		see next page	18	<b>3I</b>	<b>3A</b>		
	OD15	<b>01</b>			18	<b>3M</b>	<b>3D</b>		
	OD15	<b>02</b>			18	<b>1I</b>	<b>1A</b>		
	OD15	<b>02</b>			18	<b>1L</b>	<b>1B</b>		
	OD15	<b>02</b>			18	<b>1M</b>	<b>1C</b>		

**ST-C-06 FLOW RESTRICTOR**  
code OD.21.01.X.56.Z

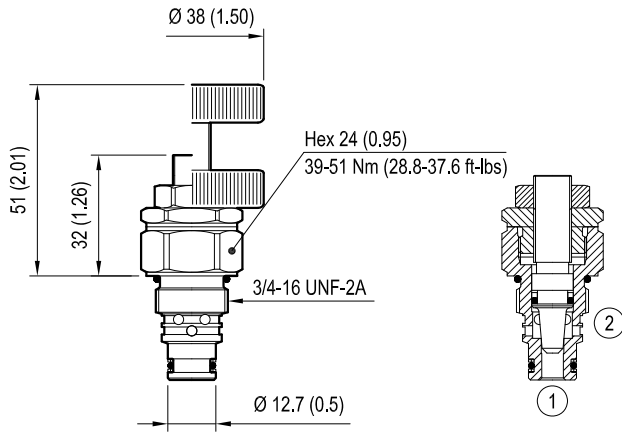


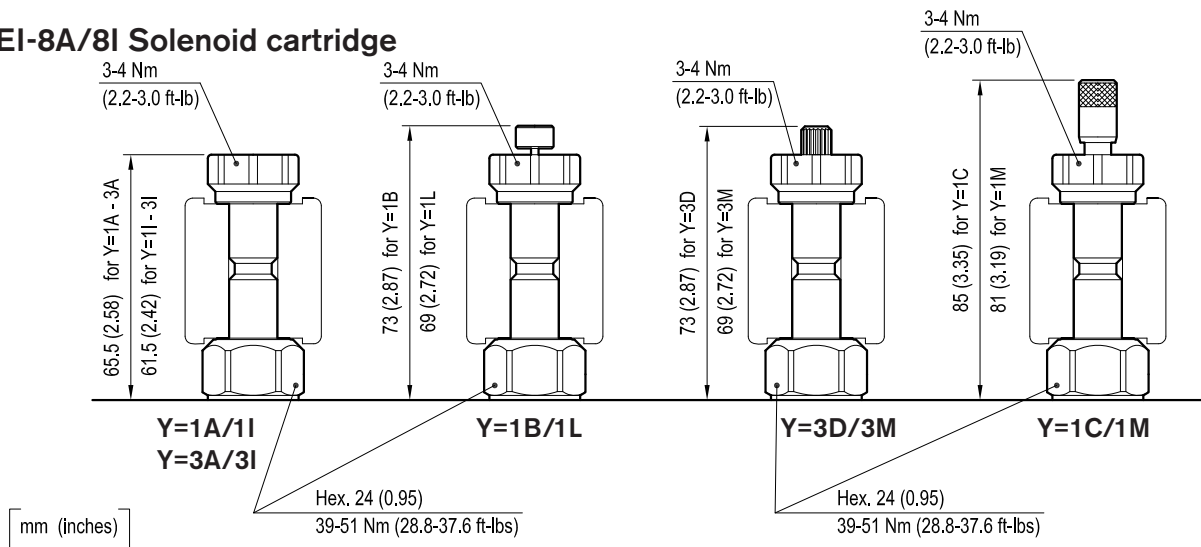
Table "X"

X	ST-C-06 ADJUSTMENTS	
03	Leakproof hex. socket screw	
04	Handknob and locknut	

For other details see data sheet RE 18321-26

[ mm (inches) ]

**VEI-8A/8I Solenoid cartridge**

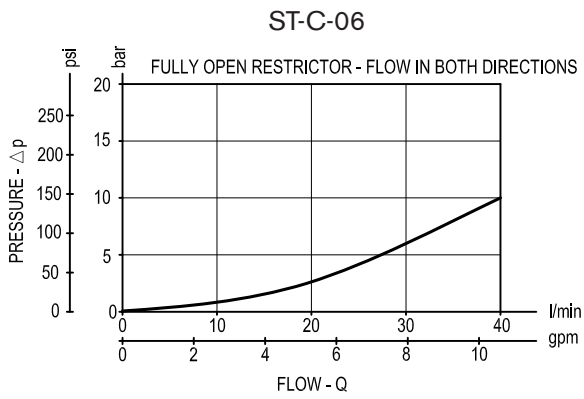
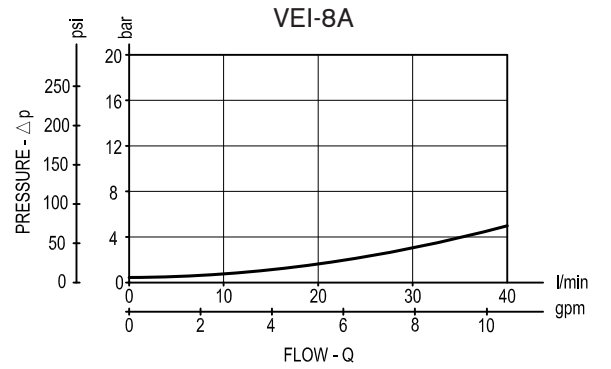
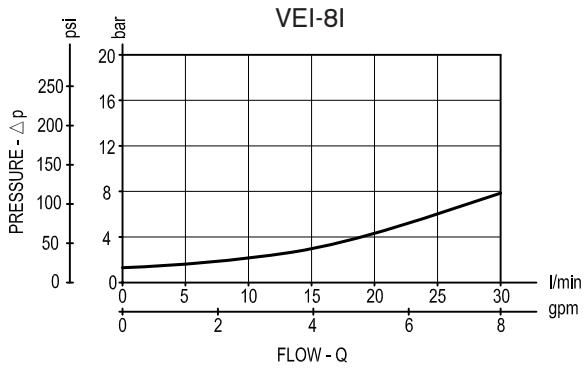


[ mm (inches) ]

Table "Y"

Y	MANUAL OVERRIDE OPTIONS		VEI-8A TECHNICAL DATA	
	K = 01	K = 02		
1A/1I	/	No override	Internal leakage:	max. 1 cm <sup>3</sup> /min (0.06 inch <sup>3</sup> /min)
1B/1L	/	Push style	Filtration:	25 µm nominal or better
1C/1M	/	Push and twist style	Minimum voltage required:	90% of nominal value
3A/3I	No override	/	Coil:	S8-356 (must be ordered separately) (see data sheet RE 18325-90)
3D/3M	Knob style	/	For other details see cartridge data sheet	

### Performance graph



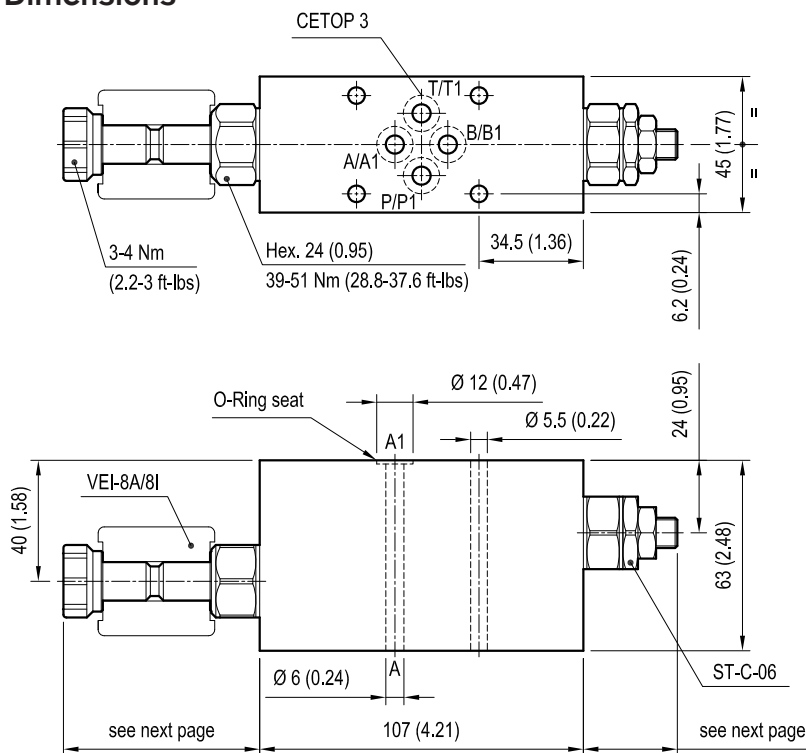


# Sandwich valves, module with solenoid valve and flow restrictor

EM-VEI8A/8I-ST-CETOP3-A1

OP . 61 - K - X - 29 - Y

## Dimensions



## Technical data

Max flow: up to 40 l/min (11 gpm)

Max operating pressure: 210 bar (3000 psi)

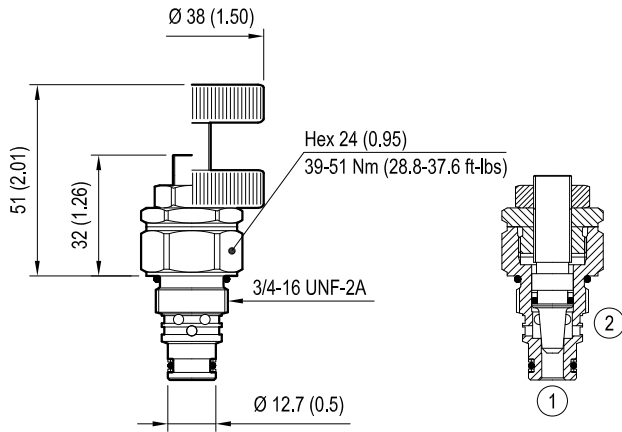
Standard manifolds in high strength **aluminium**.  
For working pressure up to 350 bar (5000 psi)  
and for fatigue applications with any working  
pressure, steel manifolds are available upon  
request.

**Note:** meter-in control

[ mm (inches) ]

CARTRIDGE CODE	OP61	- K -		- X -	29	- Y -		CARTRIDGE SCHEME	
		monodir.	bidir.			Rated Flow		monodir.	bidir.
						30 l/min (8 gpm)	40 l/min (11 gpm)		
	OD15		<b>05</b>	see next page	18	<b>3I</b>	<b>3A</b>		
	OD15		<b>05</b>		18	<b>3M</b>	<b>3D</b>		
	OD15		<b>06</b>		18	<b>1I</b>	<b>1A</b>		
	OD15		<b>06</b>		18	<b>1L</b>	<b>1B</b>		
	OD15		<b>06</b>		18	<b>1M</b>	<b>1C</b>		

**ST-C-06 FLOW RESTRICTOR**  
code OD.21.01.X.56.Z



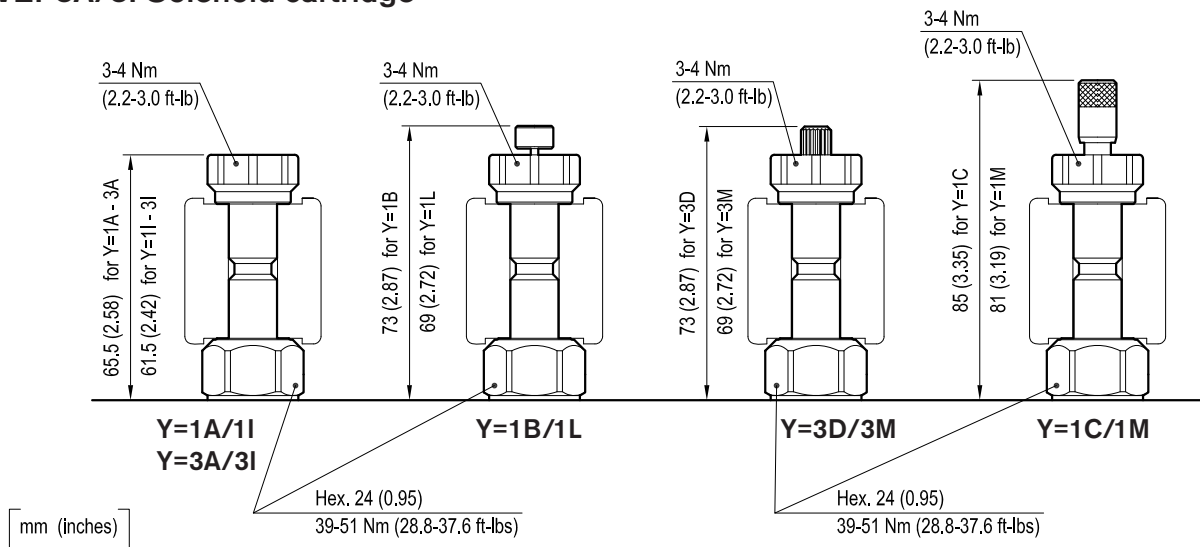
[ mm (inches) ]

**Table "X"**

X	ST-C-06 ADJUSTMENTS	
03	Leakproof hex. socket screw	
04	Handknob and locknut	

For other details see data sheet RE 18321-26

**VEI-8A/8I Solenoid cartridge**

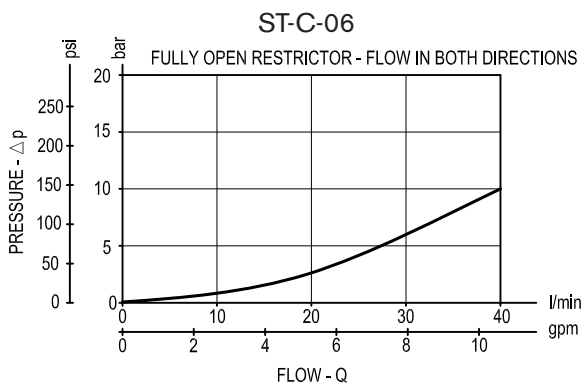
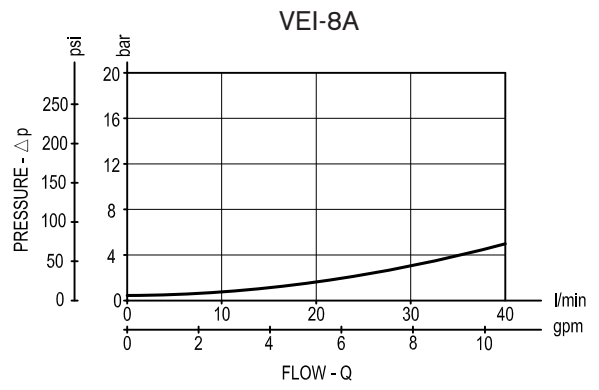
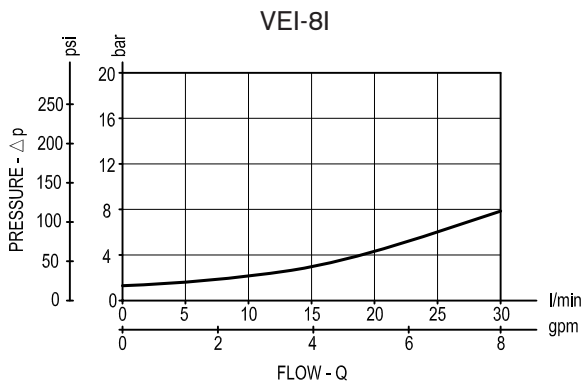


[ mm (inches) ]

**Table "Y"**

Y	MANUAL OVERRIDE OPTIONS		VEI-8A TECHNICAL DATA	
	K = 05	K = 06		
1A/1I	/	No override	Internal leakage:	max. 1 cm <sup>3</sup> /min (0.06 inch <sup>3</sup> /min)
1B/1L	/	Push style	Filtration:	25 µm nominal or better
1C/1M	/	Push and twist style	Minimum voltage required:	90% of nominal value
3A/3I	No override	/	Coil:	S8-356 ( <b>must be ordered separately</b> ) (see data sheet RE 18325-90)
3D/3M	Knob style	/	For other details see cartridge data sheet	

Performance graphs





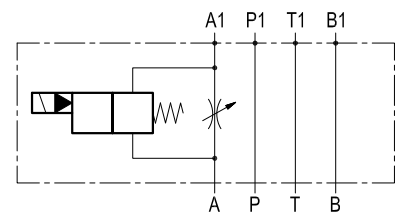
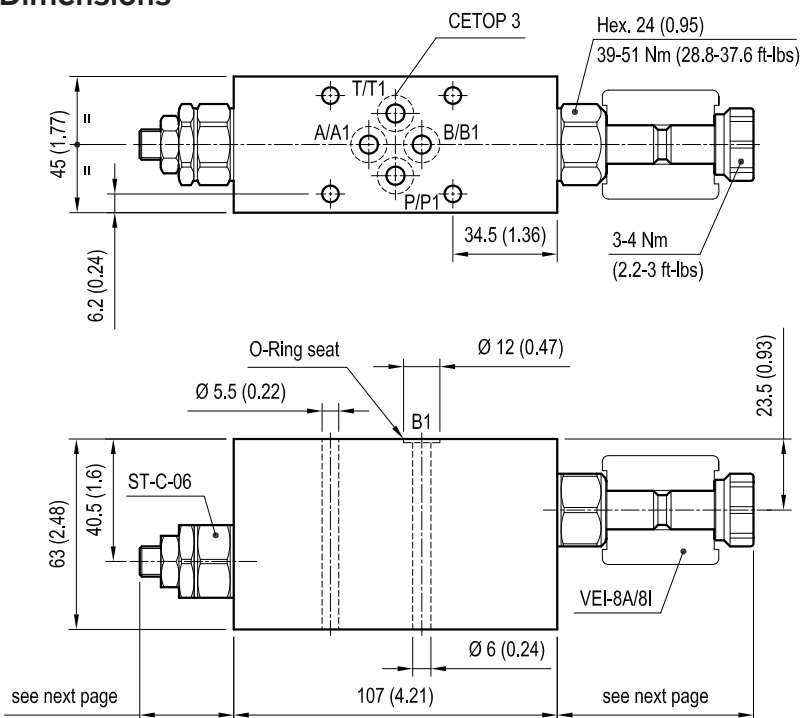


# Sandwich valves, module with solenoid valve and flow restrictor

EM-VEI8A/8I-ST-CETOP3-A

OP . 65 - K - X - 29 - Y

## Dimensions



## Technical data

Max flow: up to 40 l/min (11 gpm)

Max operating pressure: 210 bar (3000 psi)

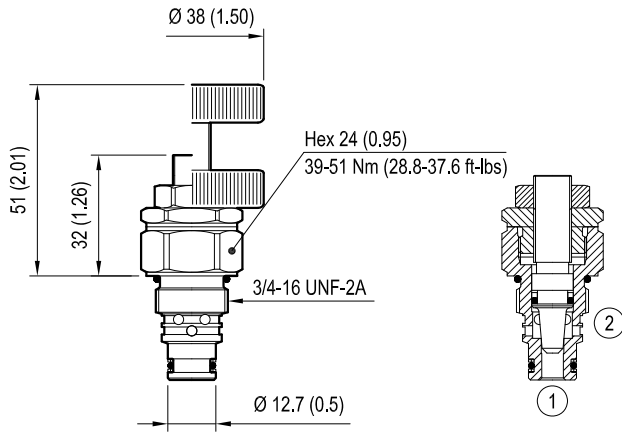
Standard manifolds in high strength **aluminium**.  
For working pressure up to 350 bar (5000 psi)  
and for fatigue applications with any working  
pressure, steel manifolds are available upon  
request.

**Note:** meter-out control

[ mm (inches) ]

OP65		- K -		- X -	29	- Y -		CARTRIDGE SCHEME	
		monodir.	bidir.			Rated Flow		monodir.	bidir.
						30 l/min (8 gpm)	40 l/min (11 gpm)		
CARTRIDGE CODE	OD15		<b>05</b>	see next page	18	<b>3I</b>	<b>3A</b>		
	OD15		<b>05</b>		18	<b>3M</b>	<b>3D</b>		
	OD15		<b>06</b>		18	<b>1I</b>	<b>1A</b>		
	OD15		<b>06</b>		18	<b>1L</b>	<b>1B</b>		
	OD15		<b>06</b>		18	<b>1M</b>	<b>1C</b>		

**ST-C-06 FLOW RESTRICTOR**  
code OD.21.01.X.56.Z



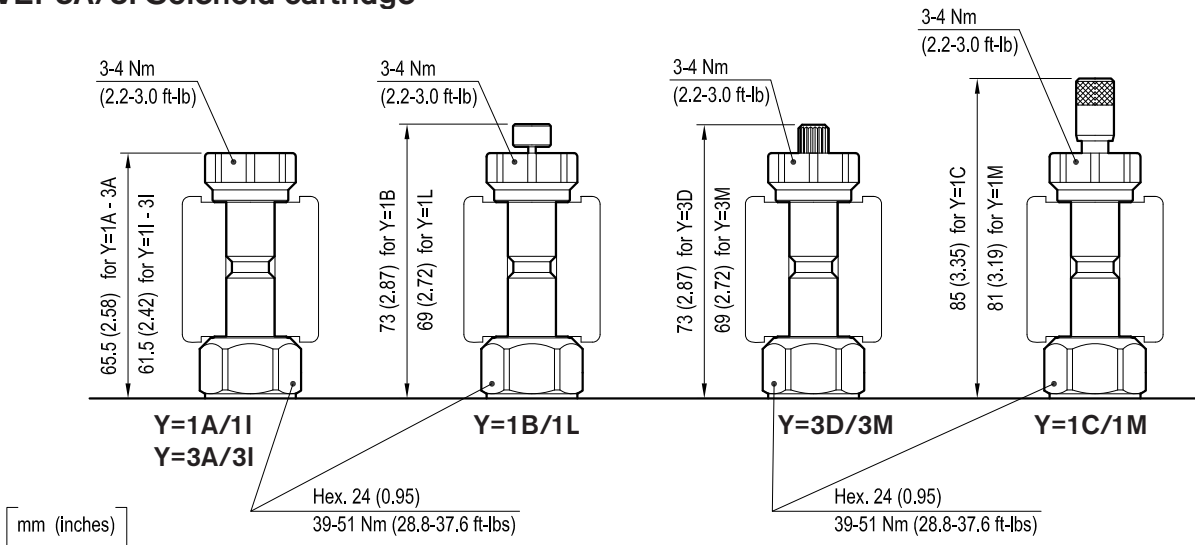
[ mm (inches) ]

**Table "X"**

X	ST-C-06 ADJUSTMENTS	
03	Leakproof hex. socket screw	
04	Handknob and locknut	

For other details see data sheet RE 18321-26

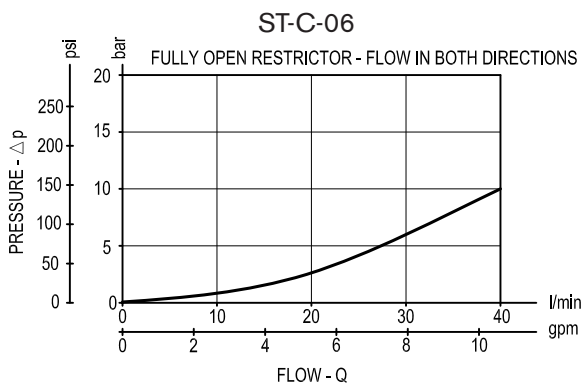
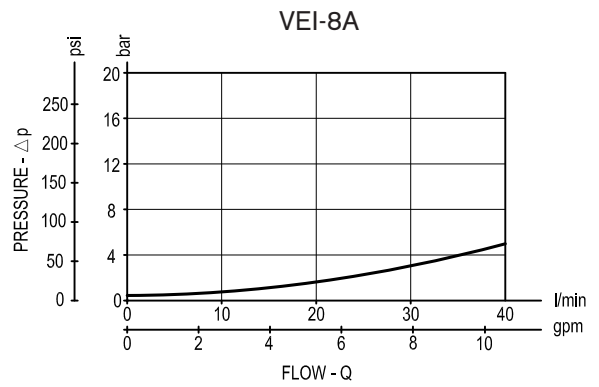
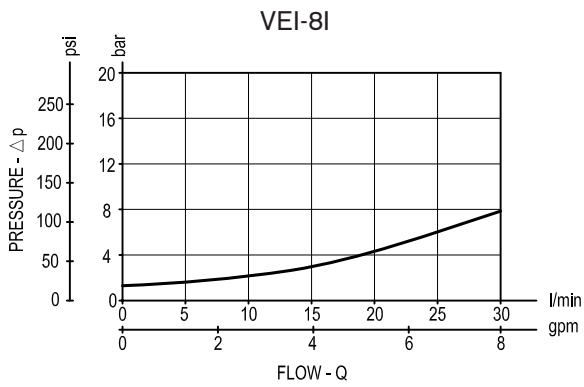
**VEI-8A/8I Solenoid cartridge**



**Table "Y"**

Y	MANUAL OVERRIDE OPTIONS		VEI-8A TECHNICAL DATA	
	K = 05	K = 06		
1A/1I	/	No override	Internal leakage:	max. 1 cm <sup>3</sup> /min (0.06 inch <sup>3</sup> /min)
1B/1L	/	Push style	Filtration:	25 µm nominal or better
1C/1M	/	Push and twist style	Minimum voltage required:	90% of nominal value
3A/3I	No override	/	Coil:	S8-356 ( <b>must be ordered separately</b> ) (see data sheet RE 18325-90)
3D/3M	Knob style	/	For other details see cartridge data sheet	

Performance graphs



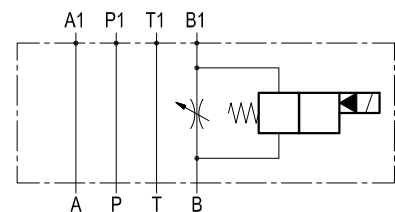
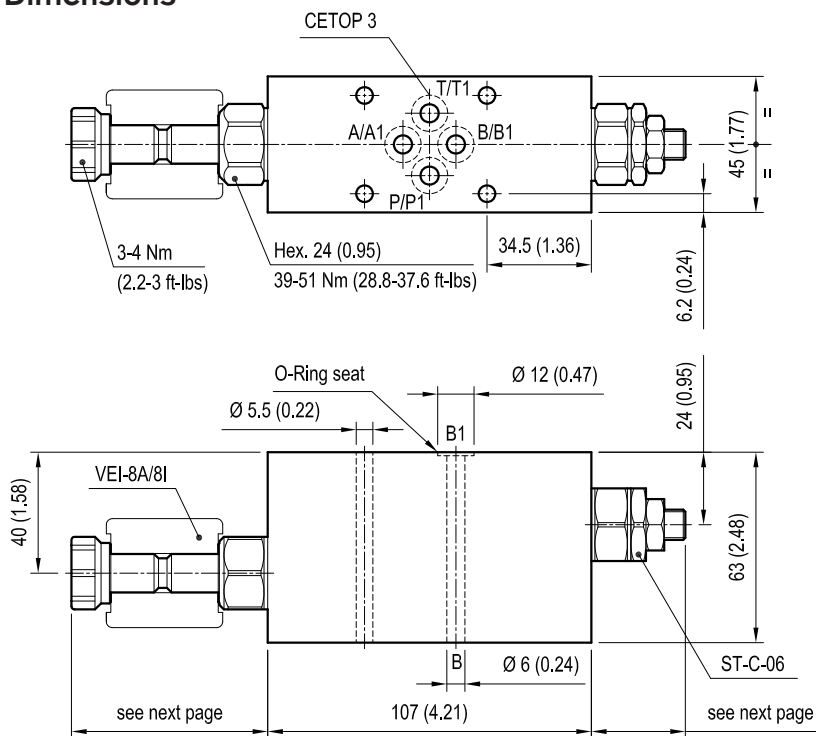


# Sandwich valves, module with solenoid valve and flow restrictor

EM-VEI8A/8I-ST-CETOP3-B1

OP . 62 - K - X - 29 - Y

## Dimensions



## Technical data

Max flow: up to 40 l/min (11 gpm)

Max operating pressure: 210 bar (3000 psi)

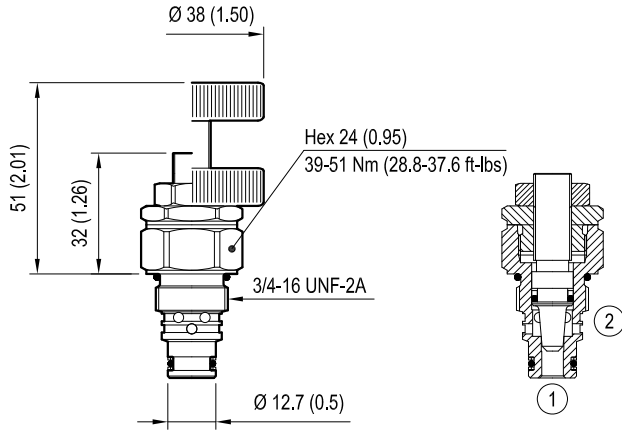
Standard manifolds in high strength **aluminium**.  
For working pressure up to 350 bar (5000 psi)  
and for fatigue applications with any working  
pressure, steel manifolds are available upon  
request.

**Note:** meter-in control

[ mm (inches) ]

CARTRIDGE CODE	OP62	- K -		- X -	29	- Y -		CARTRIDGE SCHEME	
		monodir.	bidir.			Rated Flow		monodir.	bidir.
						30 l/min (8 gpm)	40 l/min (11 gpm)		
	OD15		<b>05</b>	see next page	18	<b>3I</b>	<b>3A</b>		
	OD15		<b>05</b>		18	<b>3M</b>	<b>3D</b>		
	OD15		<b>06</b>		18	<b>1I</b>	<b>1A</b>		
	OD15		<b>06</b>		18	<b>1L</b>	<b>1B</b>		
	OD15		<b>06</b>		18	<b>1M</b>	<b>1C</b>		

**ST-C-06 FLOW RESTRICTOR**  
code OD.21.01.X.56.Z



[ mm (inches) ]

Table "X"

X	ST-C-06 ADJUSTMENTS	
03	Leakproof hex. socket screw	
04	Handknob and locknut	

For other details see data sheet RE 18321-26

**VEI-8A/8I Solenoid cartridge**

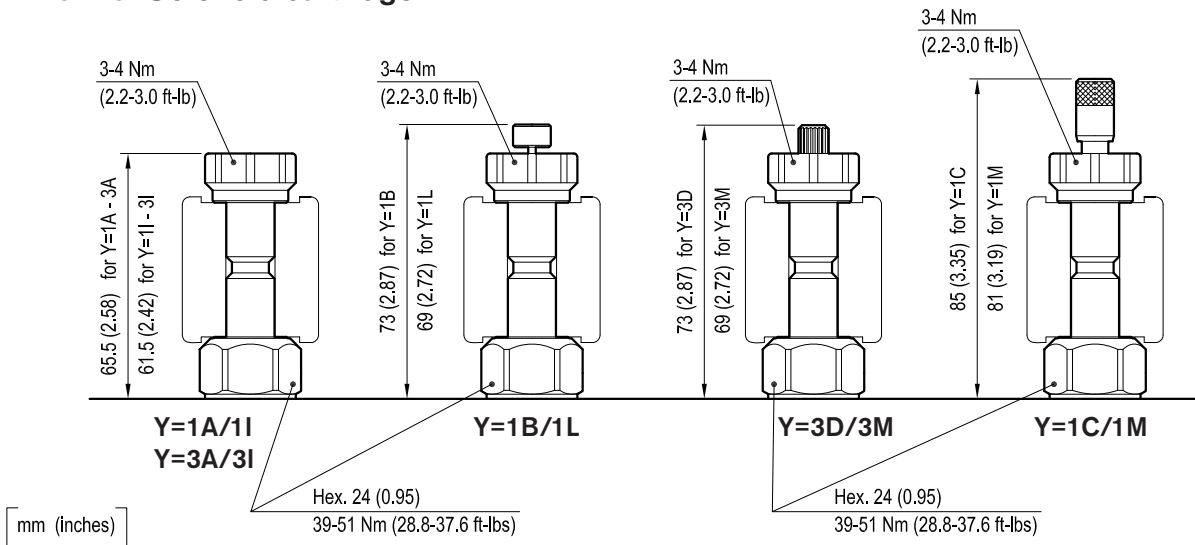
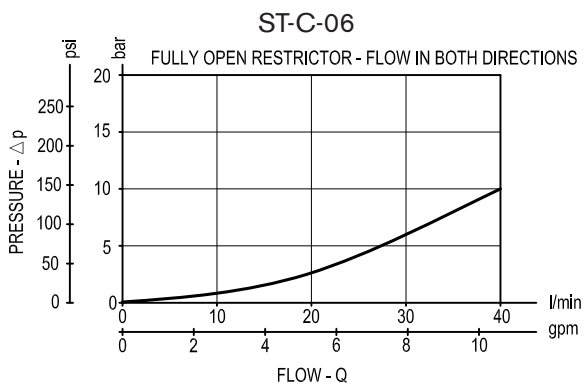
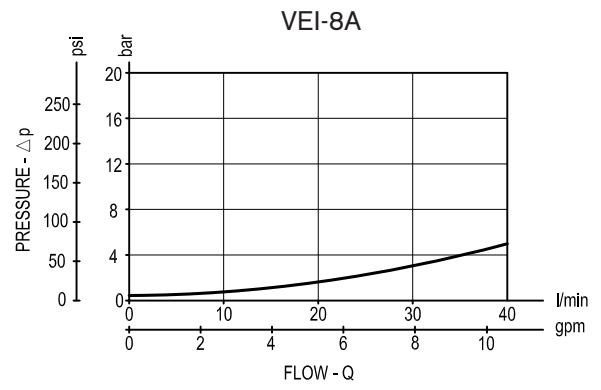
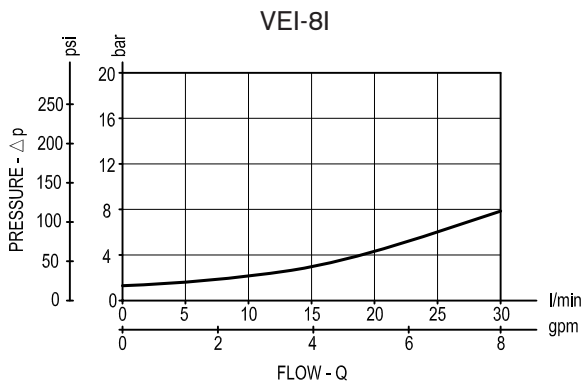


Table "Y"

Y	MANUAL OVERRIDE OPTIONS	
	K = 05	K = 06
1A/1I	/	No override
1B/1L	/	Push style
1C/1M	/	Push and twist style
3A/3I	No override	/
3D/3M	Knob style	/

VEI-8A TECHNICAL DATA		
Internal leakage:	max. 1 cm <sup>3</sup> /min	(0.06 inch <sup>3</sup> /min)
Filtration:	25 µm nominal or better	
Minimum voltage required:	90% of nominal value	
Coil:	S8-356 (must be ordered separately) (see data sheet RE 18325-90)	
For other details see cartridge data sheet		

Performance graphs

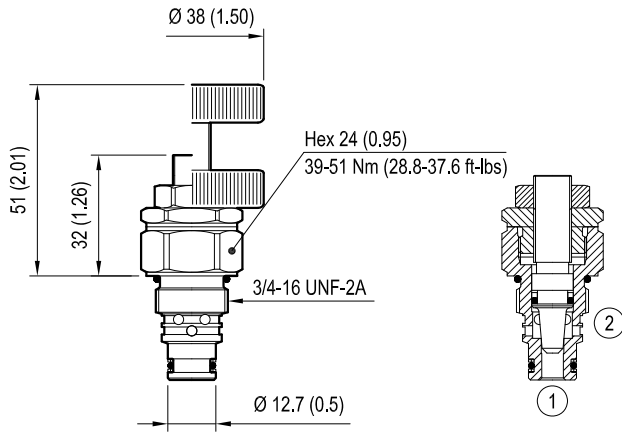








**ST-C-06 FLOW RESTRICTOR**  
code OD.21.01.X.56.Z



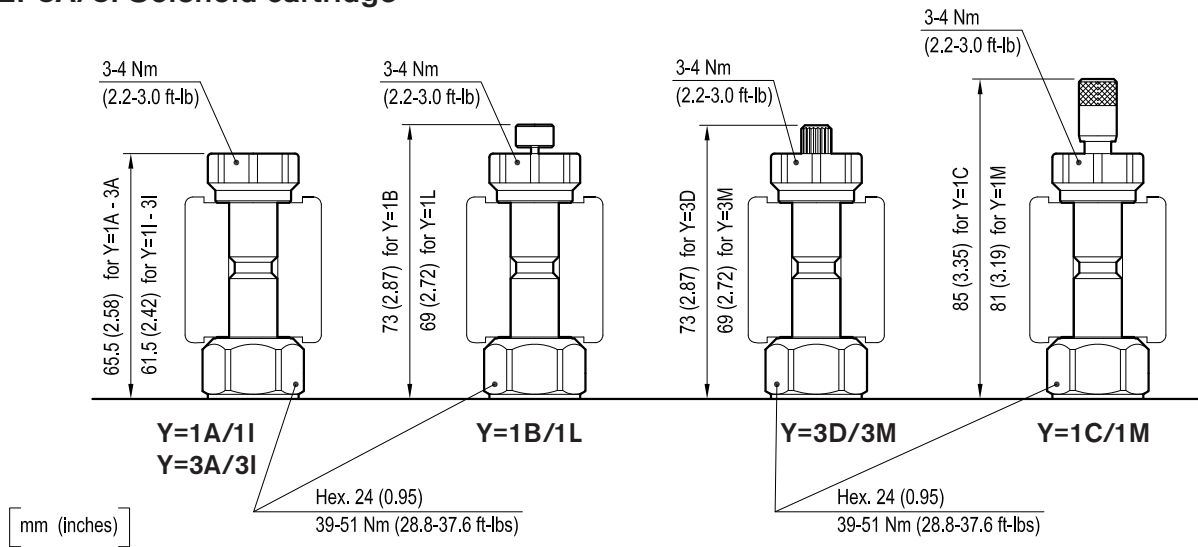
[ mm (inches) ]

**Table "X"**

X	ST-C-06 ADJUSTMENTS	
03	Leakproof hex. socket screw	
04	Handknob and locknut	

For other details see data sheet RE 18321-26

**VEI-8A/8I Solenoid cartridge**

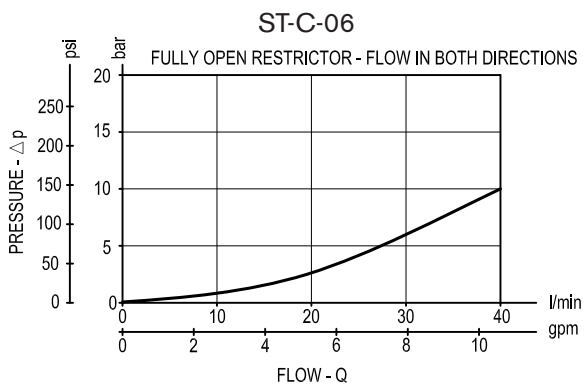
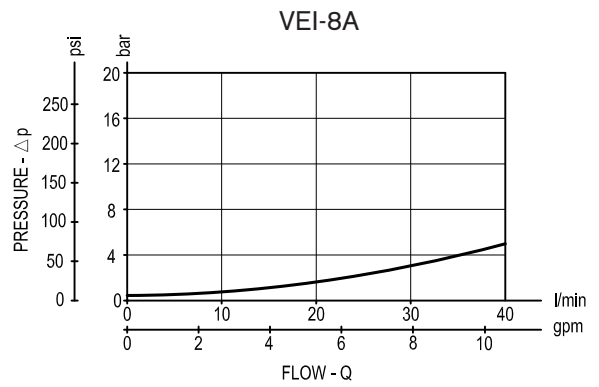
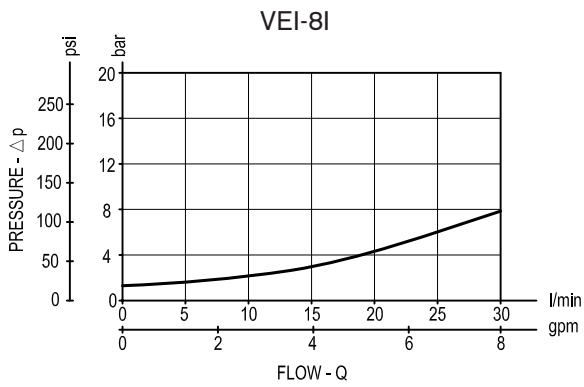


[ mm (inches) ]

**Table "Y"**

Y	MANUAL OVERRIDE OPTIONS		VEI-8A TECHNICAL DATA	
	K = 05	K = 06		
1A/1I	/	No override	Internal leakage:	max. 1 cm <sup>3</sup> /min (0.06 inch <sup>3</sup> /min)
1B/1L	/	Push style	Filtration:	25 µm nominal or better
1C/1M	/	Push and twist style	Minimum voltage required:	90% of nominal value
3A/3I	No override	/	Coil:	S8-356 (must be ordered separately) (see data sheet RE 18325-90)
3D/3M	Knob style	/	For other details see cartridge data sheet	

Performance graphs



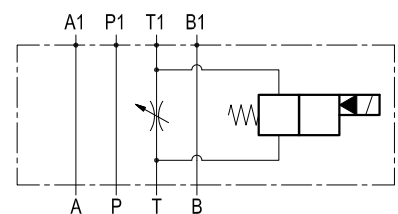
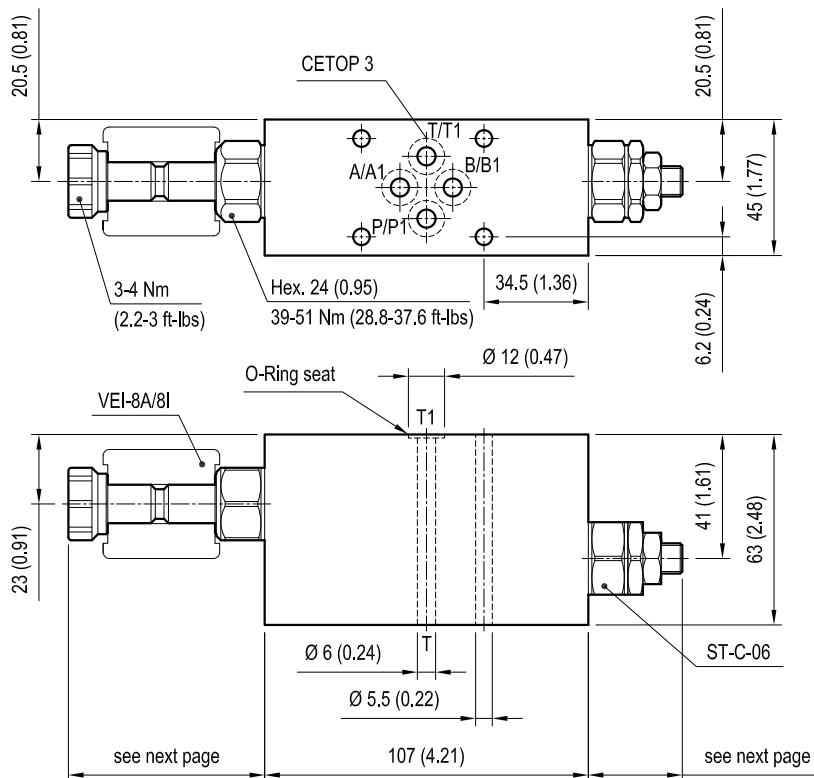


# Sandwich valves, module with solenoid valve and flow restrictor

EM-VEI8A/8I-ST-CETOP3-T

OP . 60 - K - X - 29 - Y

## Dimensions



## Technical data

Max flow: up to 40 l/min (11 gpm)

Max operating pressure: 210 bar (3000 psi)

Standard manifolds in high strength **aluminium**.  
For working pressure up to 350 bar (5000 psi)  
and for fatigue applications with any working  
pressure, steel manifolds are available upon  
request.

[ mm (inches) ]

CARTRIDGE CODE	OP60	- K -		- X -	29	- Y -		CARTRIDGE SCHEME	
		monodir.	bidir.			Rated Flow	monodir.	bidir.	
						30 l/min (8 gpm)	40 l/min (11 gpm)		
OD15	01			see next page	18	<b>3I</b>	<b>3A</b>		
					18	<b>3M</b>	<b>3D</b>		
					18	<b>1I</b>	<b>1A</b>		
					18	<b>1L</b>	<b>1B</b>		
					18	<b>1M</b>	<b>1C</b>		

**ST-C-06 FLOW RESTRICTOR**  
code OD.21.01.X.56.Z

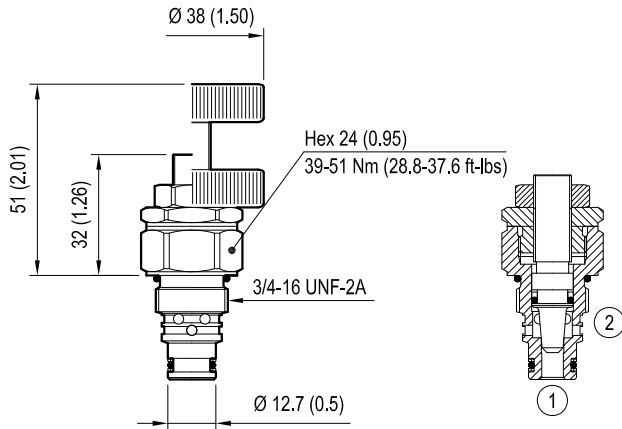


Table "X"

X	ST-C-06 ADJUSTMENTS	
03	Leakproof hex. socket screw	
04	Handknob and locknut	

For other details see data sheet RE 18321-26

[ mm (inches) ]

**VEI-8A/8I Solenoid cartridge**

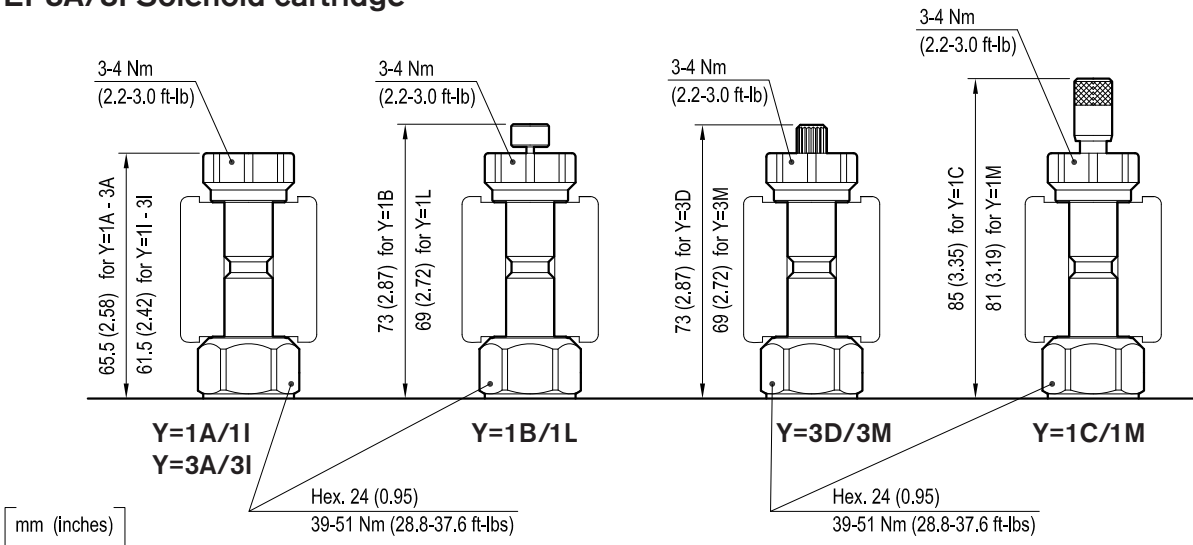
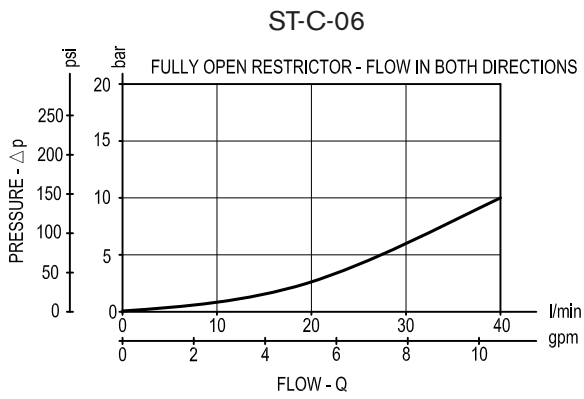
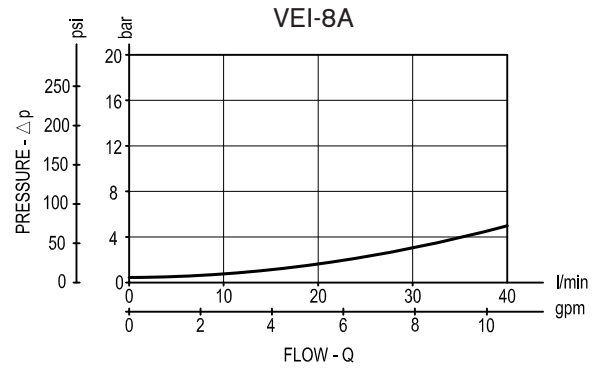
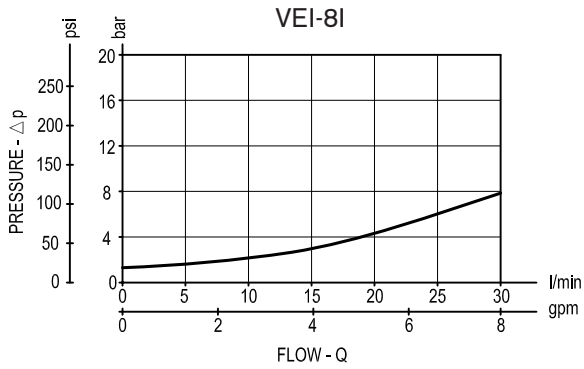


Table "Y"

Y	MANUAL OVERRIDE OPTIONS		VEI-8A TECHNICAL DATA	
	K = 01	K = 02		
1A/1I	/	No override	Internal leakage:	max. 1 cm <sup>3</sup> /min (0.06 inch <sup>3</sup> /min)
1B/1L	/	Push style	Filtration:	25 μm nominal or better
1C/1M	/	Push and twist style	Minimum voltage required:	90% of nominal value
3A/3I	No override	/	Coil:	S8-356 (must be ordered separately) (see data sheet RE 18325-90)
3D/3M	Knob style	/	For other details see cartridge data sheet	

Performance graphs







# Manifolds

Designation		Data sheet	Page
Standard manifolds (common cavity, special cavity, with emergency screw)		18325-85	1645



# Manifolds

- Standard manifolds common cavity
- Standard manifolds special cavity
- Manifolds with emergency screw



## Summary

Description	Page
Standard manifold common cavity aluminium or steel	
Size 07	2
Size 08	2-3
Size 10	4-5
Size 12	6-7
Size 16	8-9
Size 20	10-11
Standard manifold special cavity aluminium or steel	
017-E	12
021-E	12
019-E	12
004	13
Manifold with emergency screw aluminium or steel	
Size 08	14
017-E	14
021-E	14

## General specifications

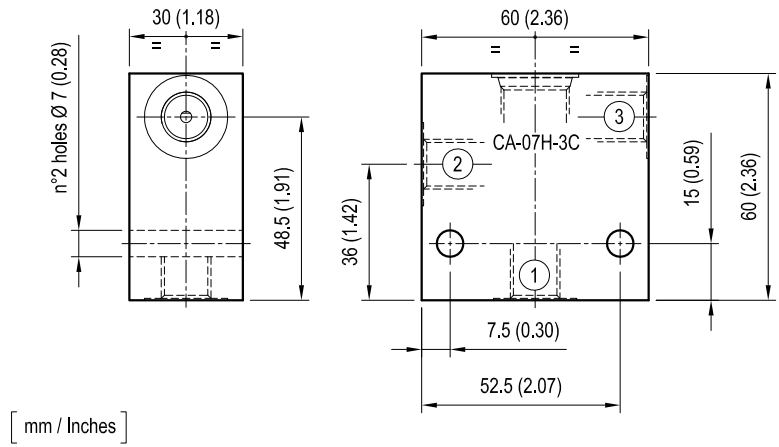
- |  |                    |
|--|--------------------|
| • Max operating pressure for steel body:     | 350 bar (5000 psi) |
| • Max operating pressure for aluminium body: | 210 bar (3000 psi) |

Note: aluminium bodies are often strong enough for operating pressures exceeding 210 bar (3000 psi), depending from the fatigue life expected in the specific application. If in doubt, consult our Service Network.

## Standard manifolds - Common cavity Size 07 - Aluminium / Steel

CAVITY: CA-07H-3C

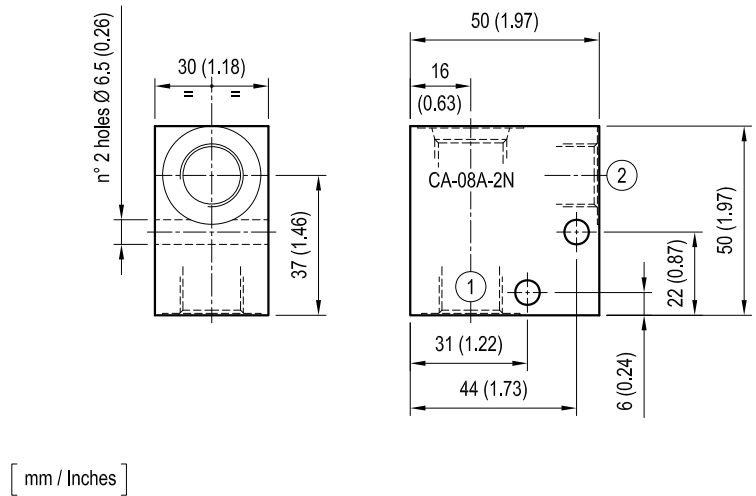
	Ordering code	Ports		Weight kg (lbs)
		1-2	3	
Aluminium	OC1009311 R930057783	G 1/4	G 1/4	0.26 (0.57)
	OC1009312 R930057785	G 3/8	G 1/4	0.25 (0.55)
Steel	OC1009314 R930057787	G 1/4	G 1/4	0.72 (1.59)
	OC1009313 R930057786	G 3/8	G 1/4	0.70 (1.54)



## Standard manifolds - Common cavity Size 08 - Aluminium / Steel

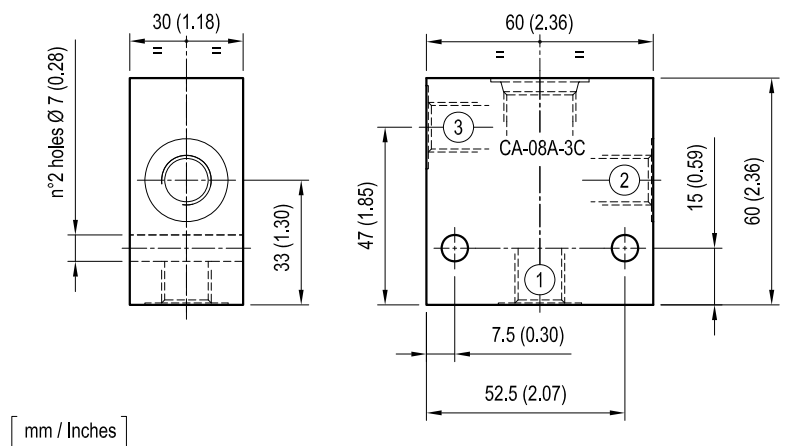
CAVITY: CA-08A-2N

	Ordering code	Ports		Weight kg (lbs)
		1-2	3	
Aluminium	OC1009009 R901090786	G 1/4		0.17 (0.38)
	OC1009004 R901082022	G 3/8		0.16 (0.35)
Steel	OC1009067 R901090800	G 1/4		0.47 (1.04)
	OC1009066 R901090799	G 3/8		0.45 (0.99)



CAVITY: CA-08A-3C

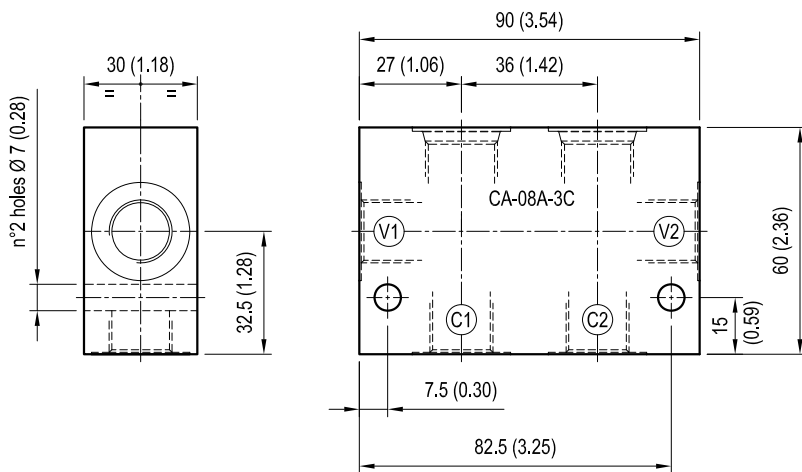
	Ordering code	Ports		Weight kg (lbs)
		1-2	3	
Aluminium	OC1009262 R934000223	G 1/4	G 1/4	0.25 (0.55)
	OC1009260 R934000221	G 3/8	G 1/4	0.25 (0.55)
Steel	OC1009263 R934000224	G 1/4	G 1/4	0.71 (1.57)
	OC1009261 R934000222	G 3/8	G 1/4	0.69 (1.52)



### Standard manifolds - Common cavity Size 08 - Aluminium / Steel

CAVITY: CA-08A-3C  
(DOUBLE CAVITY)

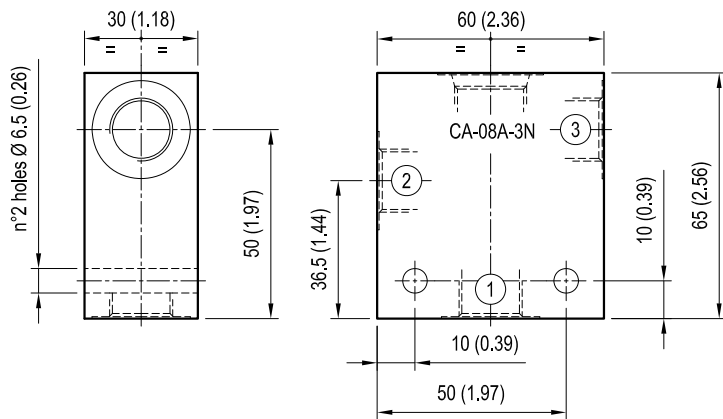
	Ordering code	Ports V1-V2-C1-C2	Weight kg (lbs)
Aluminium	OC1009185 R934000146	G 3/8	0.36 (0.79)
Steel	OC1009184 R934000145	G 3/8	1.00 (2.21)



[ mm / Inches ]

CAVITY: CA-08A-3N

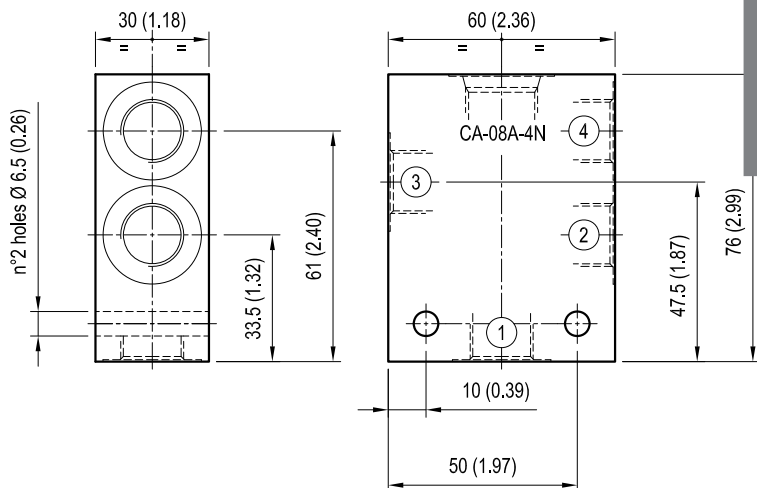
	Ordering code	Ports 1-2-3	Weight kg (lbs)
Aluminium	OC1009042 R901100471	G 1/4	0.30 (0.66)
Aluminium	OC1009048 R901100497	G 3/8	0.27 (0.60)
Steel	OC1009225 R934000186	G 1/4	0.78 (1.72)
Steel	OC1009153 R934000140	G 3/8	0.74 (1.63)



[ mm / Inches ]

CAVITY: CA-08A-4N

	Ordering code	Ports 1-2-3-4	Weight kg (lbs)
Aluminium	OC1009047 R901100531	G 1/4	0.33 (0.73)
Aluminium	OC1009046 R901100524	G 3/8	0.29 (0.64)
Steel	OC1009236 R934000197	G 1/4	0.93 (2.05)
Steel	OC1009237 R934000198	G 3/8	0.81 (1.79)

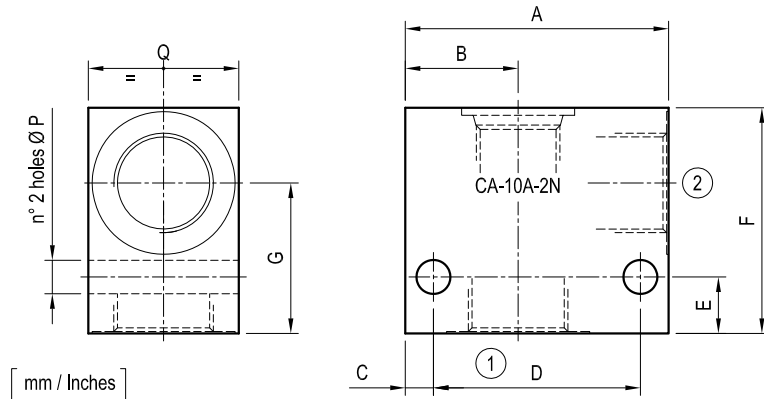


[ mm / Inches ]

## Standard manifolds - Common cavity Size 10 - Aluminium / Steel

CAVITY: CA-10A-2N

	Ordering code	Ports 1-2	Weight kg (lbs)
	Aluminium	OC1009294 R934003943	G 3/8
	OC1009209 R934000170	G 1/2	0.28 (0.62)
	OC1009211 R934000172	G 3/4	0.36 (0.79)
Steel	OC1009295 R934003944	G 3/8	0.82 (1.81)
	OC1009210 R934000171	G 1/2	0.77 (1.70)
	OC1009212 R934000173	G 3/4	1.00 (2.21)

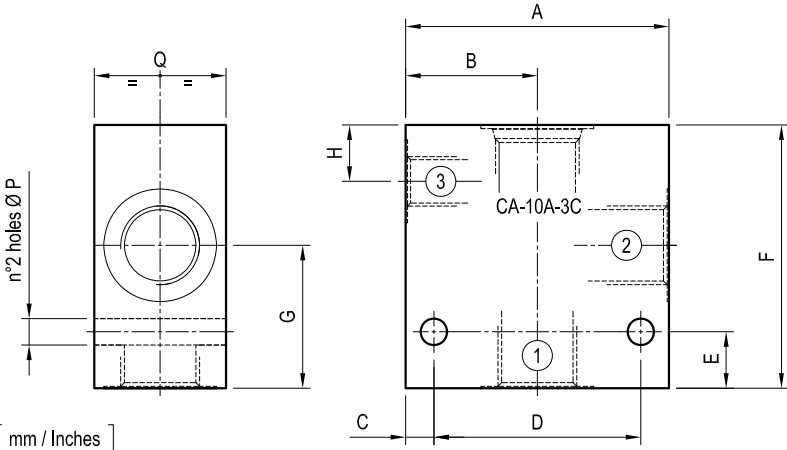


[ mm / Inches ]

60 (2.36)	25 (0.98)	7.5 (0.30)	45 (1.77)	15 (0.59)	60 (2.36)	41 (1.61)	-	-	-	-	-	-	-	7 (0.28)	35 (1.38)	-	-	G 3/8
60 (2.36)	25 (0.98)	7.5 (0.30)	45 (1.77)	15 (0.59)	60 (2.36)	41 (1.61)	-	-	-	-	-	-	-	7 (0.28)	35 (1.38)	-	-	G 1/2
70 (2.76)	30 (1.18)	7.5 (0.30)	55 (2.17)	15 (0.59)	60 (2.36)	40 (1.57)	-	-	-	-	-	-	-	9 (0.35)	40 (1.58)	-	-	G 3/4
A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	PORTS	

CAVITY: CA-10A-3C

	Ordering code	Ports 1-2	3	Weight kg (lbs)
	Aluminium	OC1009264 R934000225	G 3/8	G 1/4
	OC1009266 R934000227	G 1/2	G 1/4	0.39 (0.86)
Steel	OC1009265 R934000226	G 3/8	G 1/4	0.94 (2.07)
	OC1009267 R934000228	G 1/2	G 1/4	1.10 (2.43)

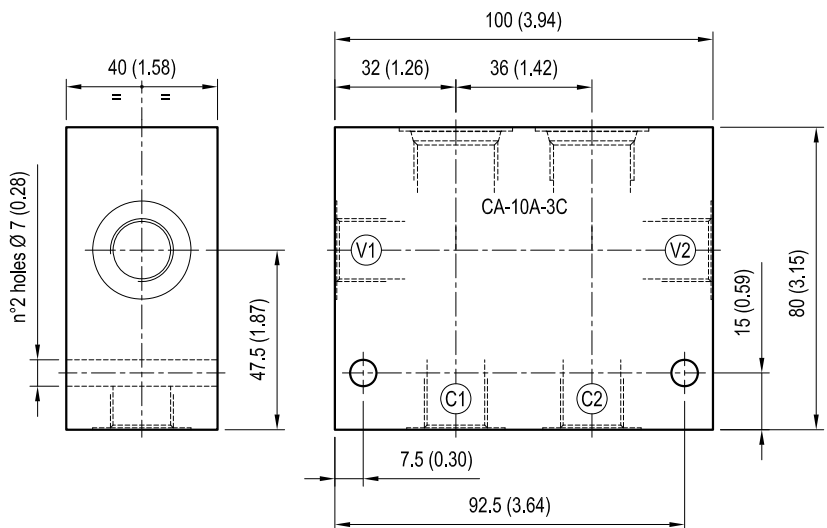


[ mm / Inches ]

60 (2.36)	30 (1.18)	7.5 (0.30)	45 (1.77)	15 (0.59)	70 (2.76)	38 (1.50)	15 (0.59)	-	-	-	-	-	-	7 (0.28)	35 (1.38)	-	-	G 3/8
70 (2.76)	35 (1.38)	7.5 (0.30)	55 (2.17)	15 (0.59)	70 (2.76)	38 (1.50)	15 (0.59)	-	-	-	-	-	-	7 (0.28)	35 (1.38)	-	-	G 1/2
A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	PORTS	

CAVITY: CA-10A-3C  
(DOUBLE CAVITY)

	Ordering code	Ports V1-V2-C1-C2	Weight kg (lbs)
	Aluminium	OC1009187 R934000148	G 3/8
	OC1009189 R934000150	G 1/2	0.72 (1.59)
Steel	OC1009186 R934000147	G 3/8	2.10 (4.63)
	OC1009188 R934000149	G 1/2	2.03 (4.48)

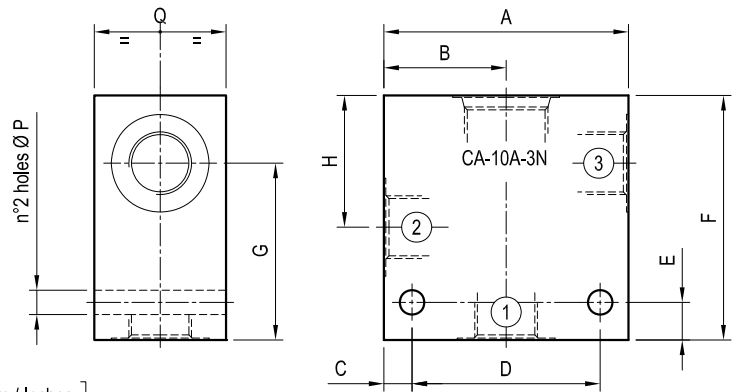


[ mm / Inches ]

### Standard manifolds - Common cavity Size 10 - Aluminium / Steel

CAVITY: CA-10A-3N

	Ordering code	Ports 1-2-3	Weight kg (lbs)
Aluminium	OC1009116 R901100626	G 1/4	0.35 (0.77)
	OC1009115 R901100638	G 3/8	0.34 (0.75)
	OC1009283 R934000244	G 1/2	0.38 (0.84)
Steel	OC1009226 R934000187	G 1/4	0.98 (2.16)
	OC1009227 R934000188	G 3/8	0.95 (2.09)
	OC1009284 R934000245	G 1/2	1.07 (2.36)

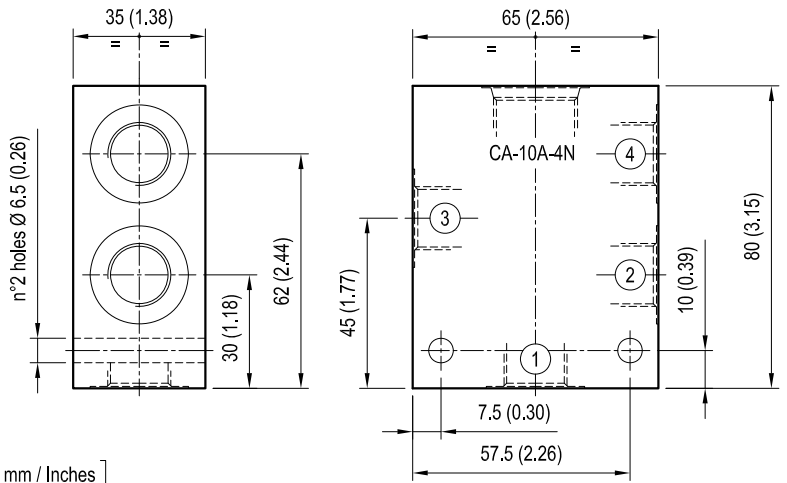


[ mm / Inches ]

65 (2.56)	32.5 (1.28)	7.5 (0.30)	50 (1.97)	10 (0.39)	65 (2.56)	47 (1.85)	35 (1.38)	-	-	-	-	-	-	6.5 (0.26)	35 (1.38)	-	-	G 1/4
65 (2.56)	32.5 (1.28)	7.5 (0.30)	50 (1.97)	10 (0.39)	65 (2.56)	47 (1.85)	35 (1.38)	-	-	-	-	-	-	6.5 (0.26)	35 (1.38)	-	-	G 3/8
70 (2.76)	35 (1.38)	10 (0.39)	50 (1.97)	15 (0.59)	70 (2.76)	52 (2.05)	35 (1.38)	-	-	-	-	-	-	6.5 (0.26)	35 (1.38)	-	-	G 1/2
A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	PORTS	

CAVITY: CA-10A-4N

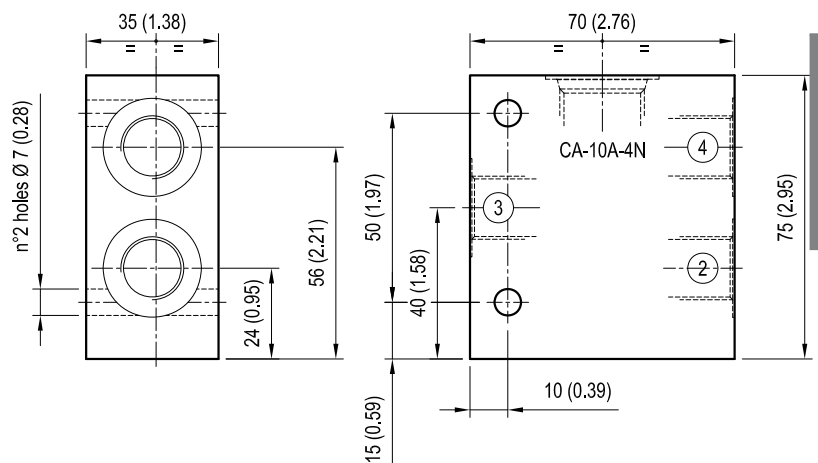
	Ordering code	Ports 1-2-3-4	Weight kg (lbs)
Aluminium	OC1009117 R901100734	G 1/4	0.43 (0.95)
	OC1009118 R901100747	G 3/8	0.41 (0.90)
Steel	OC1009238 R934000199	G 1/4	1.21 (2.67)
	OC1009239 R934000200	G 3/8	1.15 (2.54)



[ mm / Inches ]

CAVITY: CA-10A-4N  
(Port 1 closed)

	Ordering code	Ports 1-2-3-4	Weight kg (lbs)
Aluminium	OC1009252 R934000213	G 3/8	0.42 (0.93)
	OC1009254 R934000215	G 1/2	0.40 (0.88)
Steel	OC1009253 R934000214	G 3/8	1.18 (2.60)
	OC1009255 R934000216	G 1/2	1.12 (2.47)



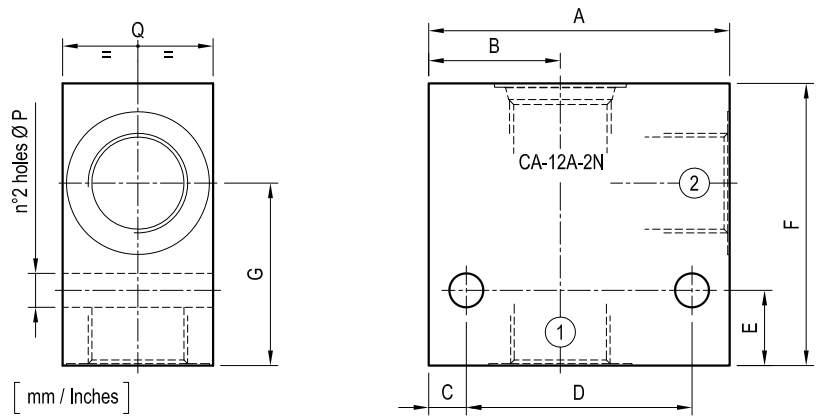
[ mm / Inches ]

# Standard manifolds - Common cavity

## Size 12 - Aluminium / Steel

CAVITY: CA-12A-2N

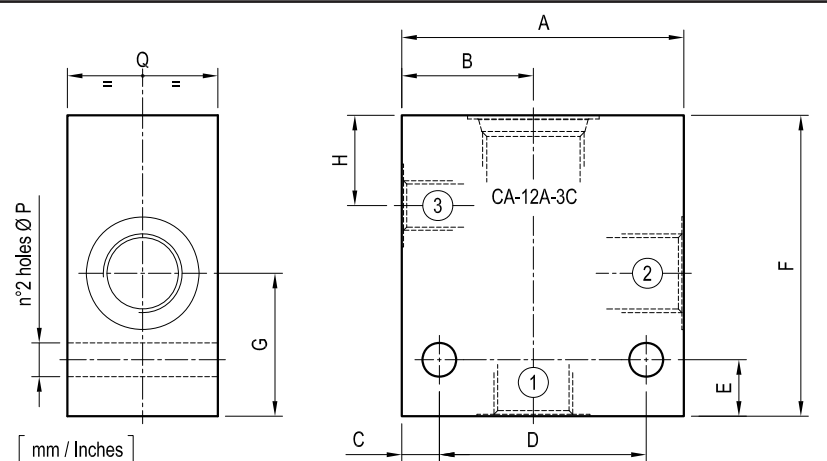
	Ordering code	Ports		Weight kg (lbs)
		1-2		
Aluminium	OC1009280 R934000241	G 1/2		0.47 (1.04)
	OC1009213 R934000174	G 3/4		0.52 (1.15)
	OC1009215 R934000176	G 1		0.64 (1.41)
Steel	OC1009281 R934000242	G 1/2		1.51 (3.33)
	OC1009214 R934000175	G 3/4		1.46 (3.22)
	OC1009216 R934000177	G 1		1.79 (3.95)



70 (2.76)	40 (1.58)	10 (0.39)	50 (1.97)	20 (0.79)	75 (2.95)	48.5 (1.91)	-	-	-	-	-	-	-	9 (0.35)	40 (1.58)	-	-	G 1/2
80 (3.15)	35 (1.38)	10 (0.39)	60 (2.36)	20 (0.79)	75 (2.95)	48.5 (1.91)	-	-	-	-	-	-	-	9 (0.35)	40 (1.58)	-	-	G 3/4
80 (3.15)	35 (1.38)	10 (0.39)	60 (2.36)	20 (0.79)	75 (2.95)	48.5 (1.91)	-	-	-	-	-	-	-	9 (0.35)	50 (1.97)	-	-	G 1
A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	PORTS	

CAVITY: CA-12A-3C

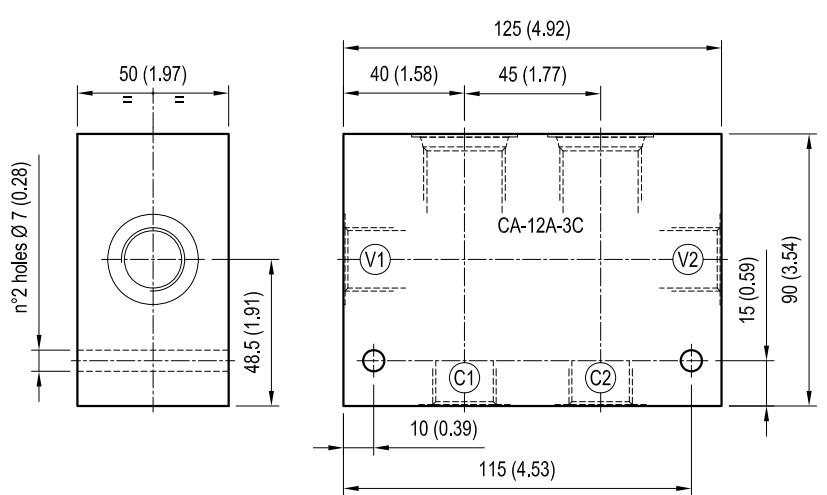
	Ordering code	Ports		Weight kg (lbs)
		1-2	3	
Aluminium	OC1009268 R934000229	G 1/2	G 1/4	0.54 (1.19)
	OC1009270 R934000231	G 3/4	G 1/4	0.59 (1.30)
Steel	OC1009269 R934000230	G 1/2	G 1/4	1.51 (3.33)
	OC1009271 R934000232	G 3/4	G 1/4	1.65 (3.64)



75 (2.95)	35 (1.38)	10 (0.39)	55 (2.17)	15 (0.59)	80 (3.15)	38 (1.50)	24 (0.95)	-	-	-	-	-	-	9 (0.35)	40 (1.58)	-	-	G 1/2
75 (2.95)	35 (1.38)	10 (0.39)	55 (2.17)	15 (0.59)	90 (3.54)	48 (1.89)	24 (0.95)	-	-	-	-	-	-	9 (0.35)	40 (1.58)	-	-	G 3/4
A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	PORTS	

CAVITY: CA-12A-3C  
(DOUBLE CAVITY)

	Ordering code	Ports		Weight kg (lbs)
		V1-V2-C1-C2		
Aluminium	OC1009191 R934000152	G 1/2		1.31 (2.89)
	OC1009193 R934000154	G 3/4		1.26 (2.78)
Steel	OC1009190 R934000151	G 1/2		3.69 (8.14)
	OC1009192 R934000153	G 3/4		3.54 (7.80)



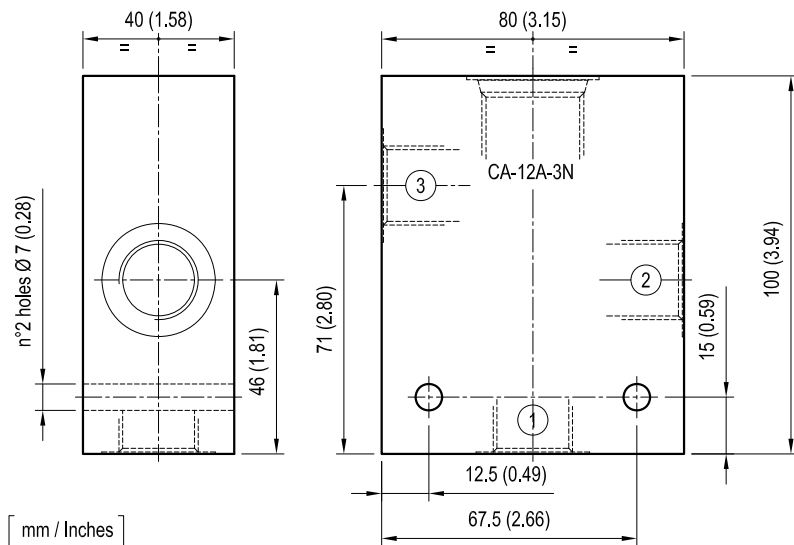
[ mm / Inches ]



### Standard manifolds - Common cavity Size 12 - Aluminium / Steel

CAVITY: CA-12A-3N

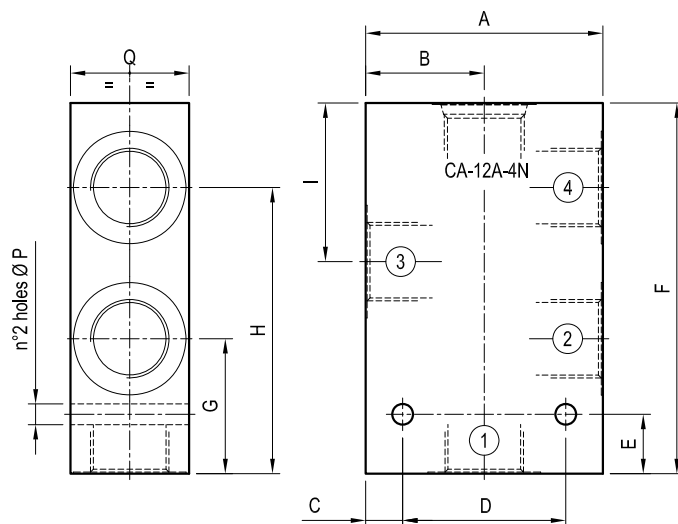
	Ordering code	Ports 1-2-3	Weight kg (lbs)
Aluminium	OC1009205 R934000166	G 1/2	0.73 (1.61)
	OC1009208 R934000169	G 3/4	0.69(1.52)
Steel	OC1009206 R934000167	G 1/2	2.04 (4.50)
	OC1009207 R934000168	G 3/4	1.93 (4.26)



[ mm / Inches ]

CAVITY: CA-12A-4N

	Ordering code	Ports 1-2-3-4	Weight kg (lbs)
Aluminium	OC1009240 R934000201	G 3/4	0.85 (1.87)
	OC1009242 R934000203	G 1	1.26 (2.78)
Steel	OC1009241 R934000202	G 3/4	2.40 (5.29)
	OC1009243 R934000204	G 1	3.53 (7.78)



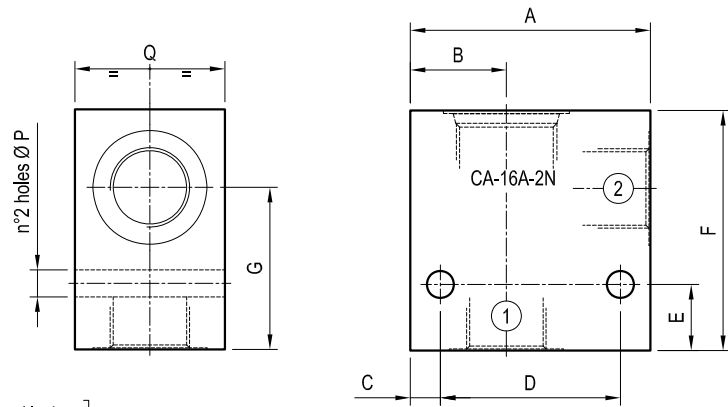
[ mm / Inches ]

80	40	12.5	55	20	125	45.5	96.5	53.5	-	-	-	-	7	40	-	-	G 3/4
(3.15)	(1.58)	(0.49)	(2.17)	(0.79)	(4.92)	(1.79)	(3.80)	(2.11)	-	-	-	-	(0.28)	(1.58)	-	-	
90	45	17.5	55	20	130	50.5	101.5	53.5	-	-	-	-	7	50	-	-	G 1
(3.54)	(1.77)	(0.69)	(2.17)	(0.79)	(5.12)	(1.99)	(3.40)	(2.11)	-	-	-	-	(0.28)	(1.97)	-	-	
A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	PORTS

## Standard manifolds - Common cavity Size 16 - Aluminium / Steel

CAVITY: CA-16A-2N

	Ordering code	Ports 1-2	Weight kg (lbs)
Aluminium	OC1009217 R934000178	G 3/4	0.69 (1.52)
	OC1009219 R934000180	G 1	0.75 (1.65)
Steel	OC1009218 R934000179	G 3/4	1.94 (4.28)
	OC1009220 R934000181	G 1	2.11 (4.65)

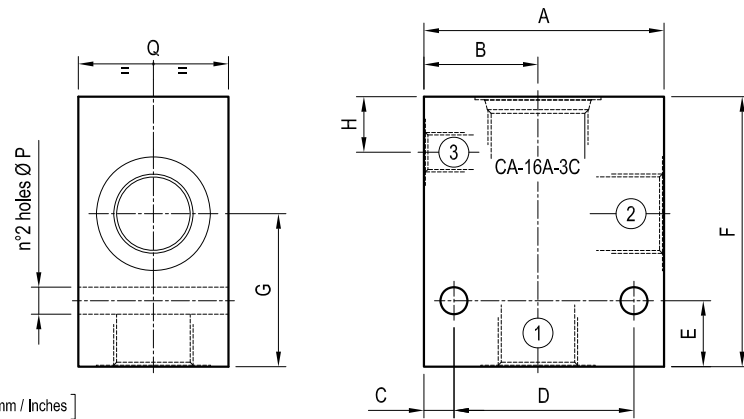


[ mm / Inches ]

80 (3.15)	32 (1.26)	10 (0.39)	60 (2.36)	22 (0.87)	80 (3.15)	54 (2.13)	-	-	-	-	-	-	-	9 (0.35)	50 (1.97)	-	-	-	G 3/4
90 (3.54)	37 (1.46)	10 (0.39)	60 (2.36)	22 (0.87)	80 (3.15)	54 (2.13)	-	-	-	-	-	-	9 (0.35)	50 (1.97)	-	-	-	-	G 1
A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	PORTS		

CAVITY: CA-16A-3C

	Ordering code	Ports 1-2	3	Weight kg (lbs)
Aluminium	OC1009274 R934000235	G 3/4	G 1/4	0.80 (1.76)
	OC1009272 R934000233	G 1	G 1/4	0.87 (1.92)
Steel	OC1009275 R934000236	G 3/4	G 1/4	2.23 (4.92)
	OC1009273 R934000234	G 1	G 1/4	2.45 (5.40)

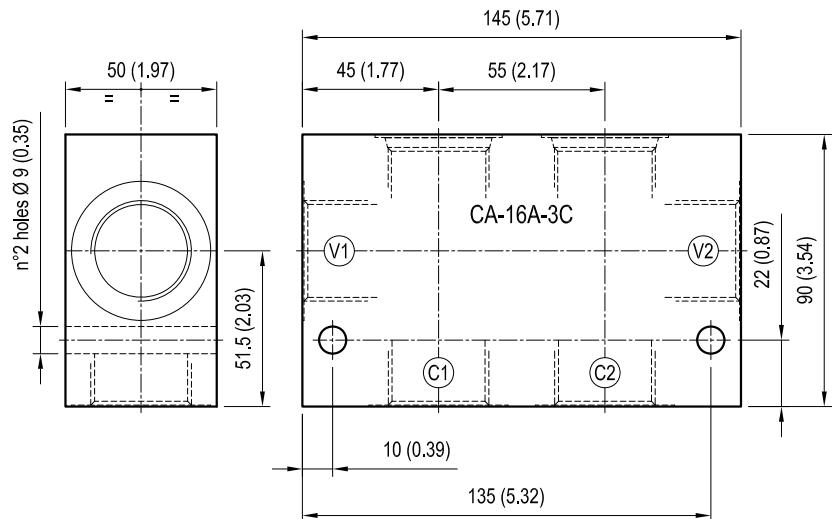


[ mm / Inches ]

80 (3.15)	38 (1.50)	10 (0.39)	60 (2.36)	22 (0.87)	90 (3.54)	51 (2.01)	18.5 (0.73)	-	-	-	-	-	9 (0.35)	50 (1.97)	-	-	-	G 3/4	
90 (3.54)	40 (1.58)	10 (0.39)	70 (2.76)	22 (0.87)	90 (3.54)	51 (2.01)	18.5 (0.73)	-	-	-	-	-	9 (0.35)	50 (1.97)	-	-	-	G 1	
A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	PORTS		

CAVITY: CA-16A-3C  
(DOUBLE CAVITY)

	Ordering code	Ports V1-V2-C1-C2	Weight kg (lbs)
Aluminium	OC1009195 R934000156	G 1	1.34 (2.95)
Steel	OC1009194 R934000155	G 1	3.74 (8.25)



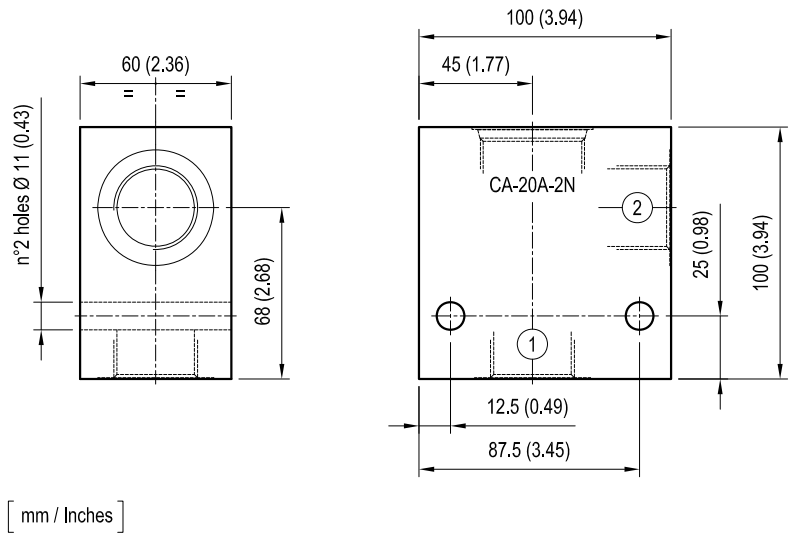
[ mm / Inches ]



## Standard manifolds - Common cavity Size 20 - Aluminium / Steel

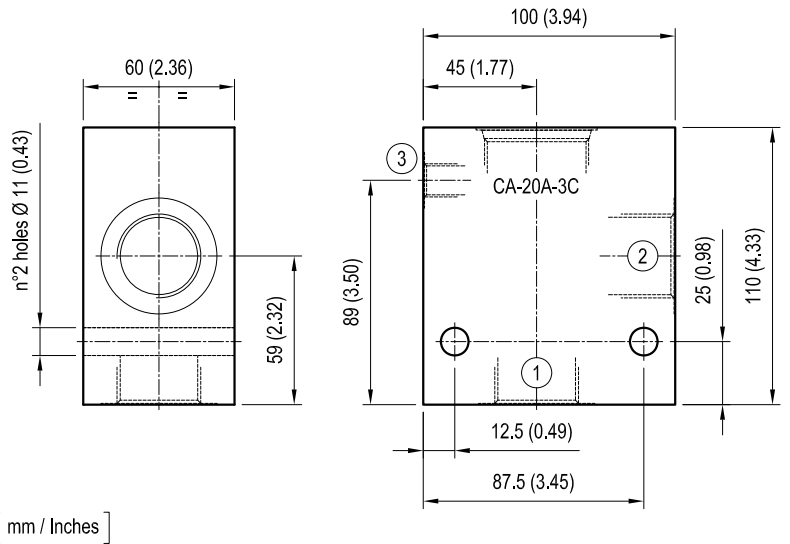
CAVITY: CA-20A-2N

	Ordering code	Ports 1-2	Weight kg (lbs)
Aluminium	OC1009223 R934000184	G 1	1.3 (2.87)
	OC1009221 R934000182	G 1-1/4	1.21 (2.67)
Steel	OC1009224 R934000185	G 1	3.65 (8.05)
	OC1009222 R934000183	G 1-1/4	3.40 (3.50)



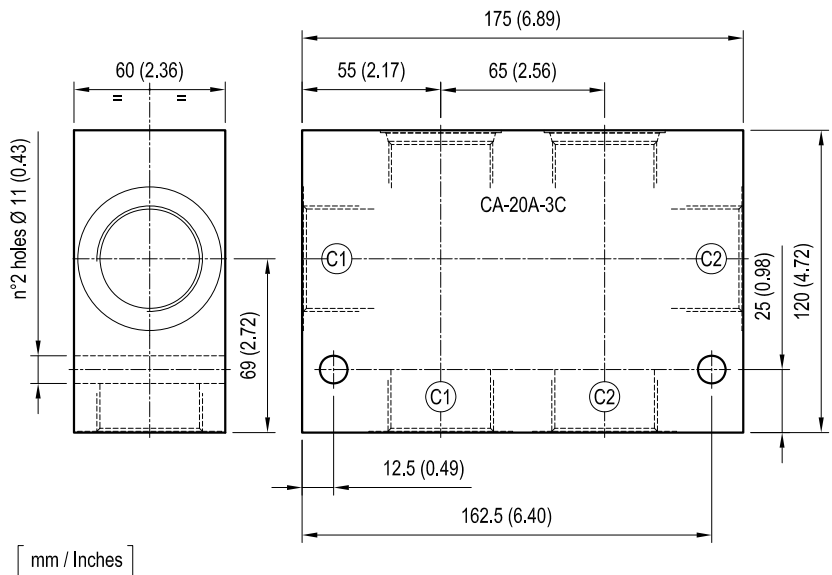
CAVITY: CA-20A-3C

	Ordering code	Ports 1-2	3	Weight kg (lbs)
Aluminium	OC1009278 R934000239	G 1	G 1/4	1.43 (3.15)
	OC1009276 R934000237	G 1-1/4	G 1/4	1.35 (2.98)
Steel	OC1009279 R934000240	G 1	G 1/4	4.02 (8.86)
	OC1009277 R934000238	G 1-1/4	G 1/4	3.78 (8.33)



CAVITY: CA-20A-3C  
(DOUBLE CAVITY)

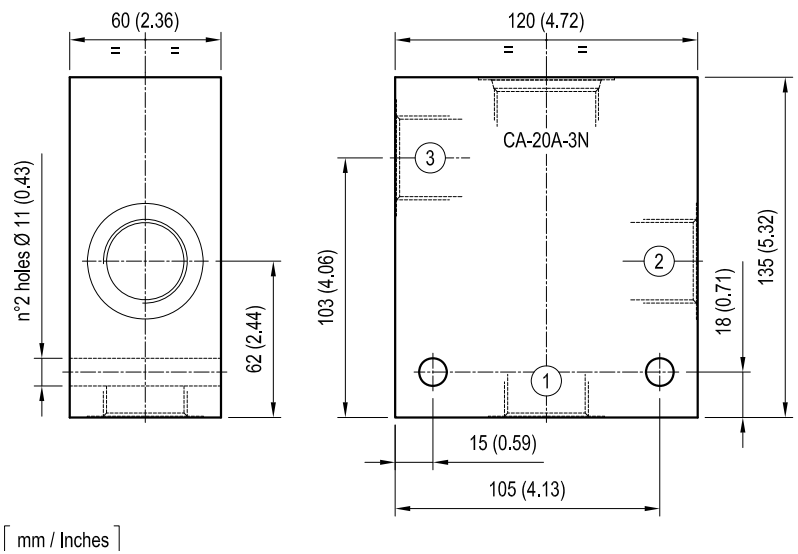
	Ordering code	Ports V1-V2-C1-C2	Weight kg (lbs)
Aluminium	OC1009197 R934000158	G 1-1/4	2.53 (5.58)
Steel	OC1009196 R934000157	G 1-1/4	7.11 (15.68)



### Standard manifolds - Common cavity Size 20 - Aluminium / Steel

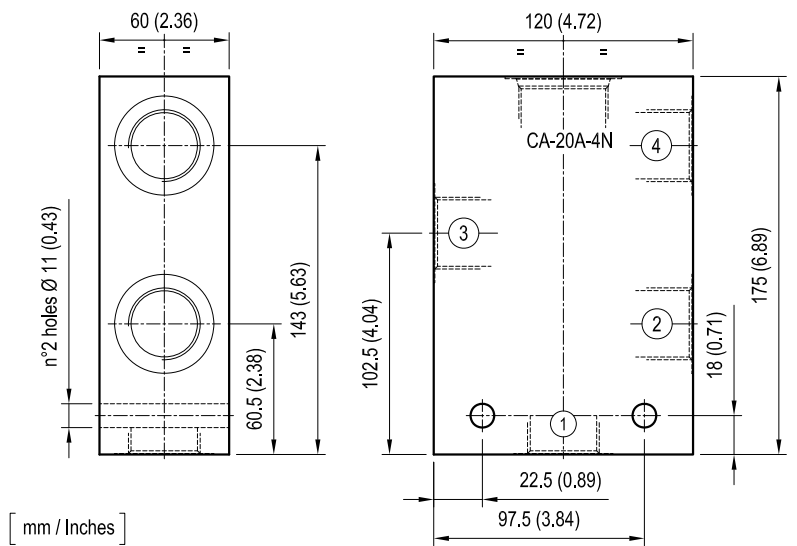
CAVITY: CA-20A-3N

	Ordering code	Ports 1-2-3	Weight kg (lbs)
Aluminium	OC1009234 R934000195	G 1	2.15 (1.61)
	OC1009232 R934000193	G 1-1/4	2.02(1.52)
Steel	OC1009235 R934000196	G 1	6.02 (4.50)
	OC1009233 R934000194	G 1-1/4	5.66 (4.26)



CAVITY: CA-20A-4N

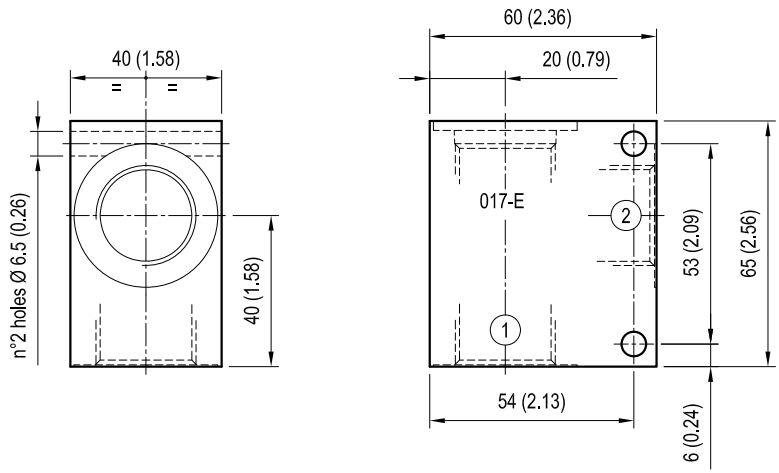
	Ordering code	Ports 1-2-3-4	Weight kg (lbs)
Aluminium	OC1009248 R934000209	G 1	2.78 (6.13)
	OC1009250 R934000211	G 1-1/4	2.60 (5.73)
Steel	OC1009249 R934000210	G 1	7.80 (17.20)
	OC1009251 R934000212	G 1-1/4	7.30 (16.10)



## Standard manifolds - Special cavity Aluminium / Steel

CAVITY: 017-E

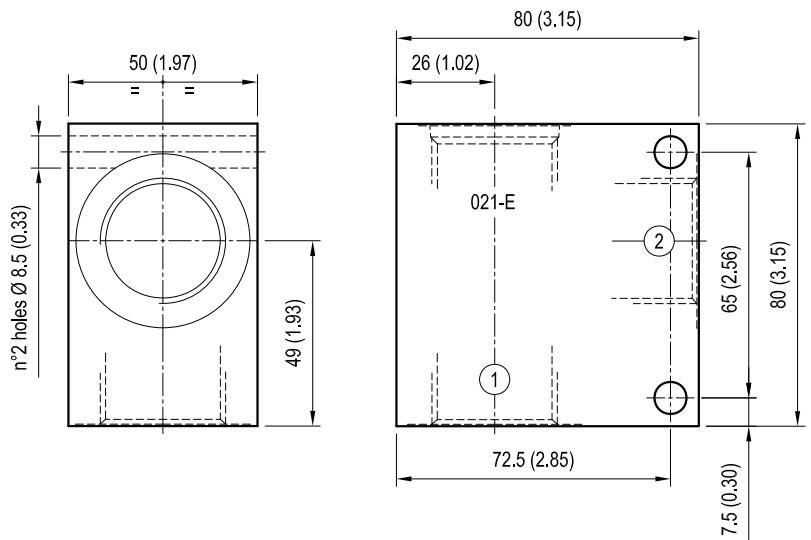
	Ordering code	Ports 1-2	Weight kg (lbs)
Aluminium	OC1009015 R901180260	G 1/2	0.32 (0.71)
	OC1009012 R900990630	G 3/4	0.30 (0.66)
Steel	OC1009074 R988004951	G 1/2	0.90 (1.98)
	OC1009073 R901184887	G 3/4	0.83 (1.83)



[ mm / Inches ]

CAVITY: 021-E

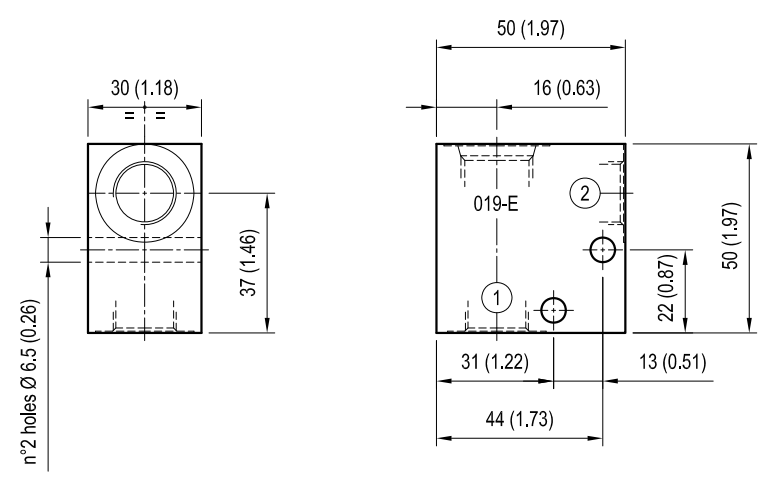
	Ordering code	Ports 1-2	Weight kg (lbs)
Aluminium	OC1009017 R934000102	G 3/4	0.68 (1.50)
	OC1009019 R900068903	G 1	0.65 (1.43)
Steel	OC1009075 R900766822	G 3/4	1.89 (4.17)
	OC1009076 R901132883	G 1	1.78 (3.92)



[ mm / Inches ]

CAVITY: 019-E

	Ordering code	Ports 1-2	Weight kg (lbs)
Aluminium	OC1009103 R901090812	G 1/4	0.17 (0.38)
	OC1009054 R901090792	G 3/8	0.16 (0.35)
Steel	OC1009102 R901090811	G 1/4	0.46 (1.01)
	OC1009101 R901090810	G 3/8	0.44 (0.97)

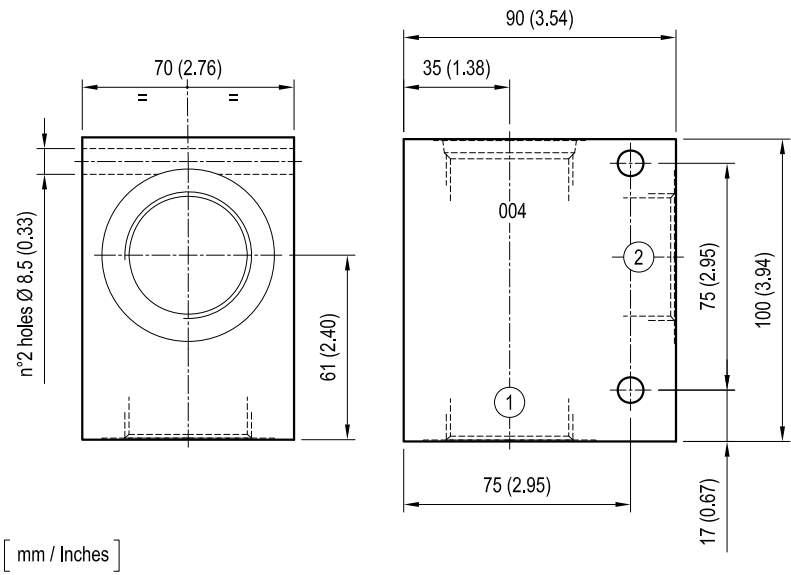


[ mm / Inches ]

# Standard manifolds - Special cavity Aluminium / Steel

CAVITY: 004

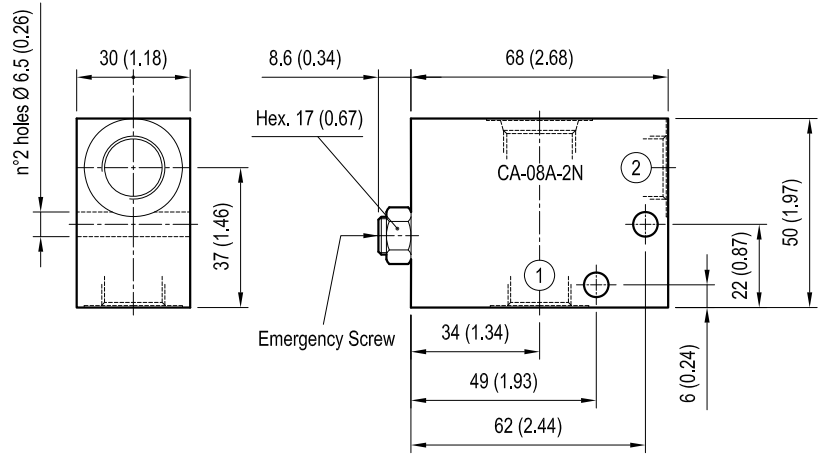
	Ordering code	Ports 1-2	Weight kg (lbs)
Aluminium	OC1009040 R901090789	G 1	1.35 (2.98)
	OC1009041 R901090791	G 1-1/4	1.28 (2.82)
Steel	OC1009122 R901090813	G 1	3.74 (8.25)
	OC1009056 R901090794	G 1-1/4	3.52 (7.76)



# Manifolds with emergency screw Aluminium / Steel

CAVITY: CA-08A-2N

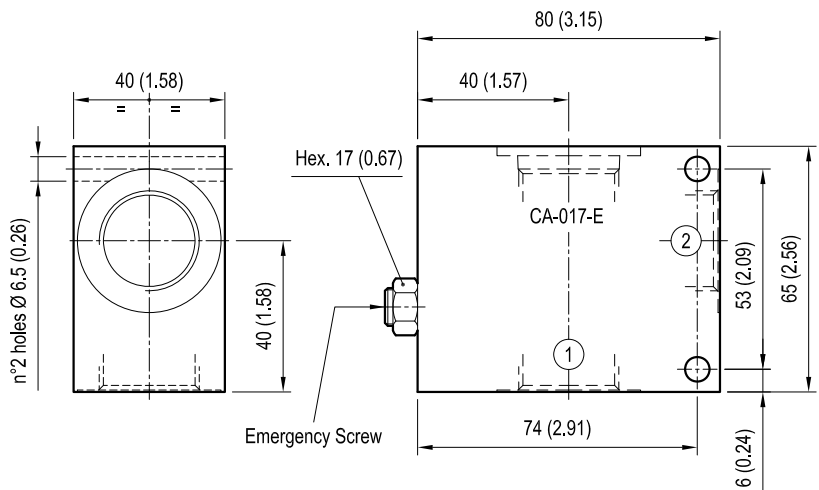
	Ordering code	Ports 1-2	Weight kg (lbs)
Aluminium	OE150009 R934001566	G 1/4	0.26 (0.57)
	OE150002 R934001554	G 3/8	0.25 (0.55)
Steel	OE1500090055 R934001567	G 1/4	0.69 (1.52)
	OE1500020055 R934001555	G 3/8	0.66 (1.46)



[ mm / Inches ]

CAVITY: 017-E

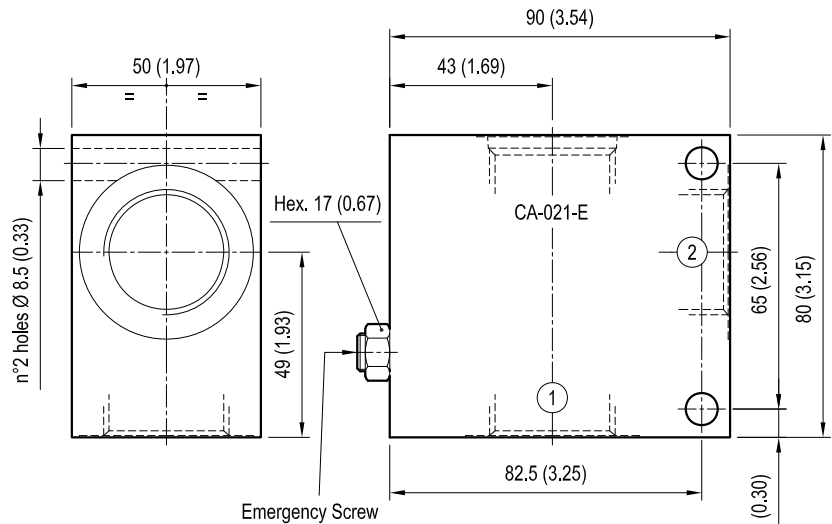
	Ordering code	Ports 1-2	Weight kg (lbs)
Aluminium	OE150003 R934001557	G 1/2	0.48 (1.06)
	OE150004 R901121824	G 3/4	0.47 (1.04)
Steel	OE1500030055 R934001558	G 1/2	1.32 (2.91)
	OE1500040055 R934001561	G 3/4	1.24 (2.73)



[ mm / Inches ]

CAVITY: 021-E

	Ordering code	Ports 1-2	Weight kg (lbs)
Aluminium	OE150005 R934001563	G 1	0.77 (1.70)
Steel	OE1500050055 R934001564	G 1	2.10 (4.63)



[ mm / Inches ]







# Cavities

<b>Designation</b>		<b>Data sheet</b>	<b>Page</b>
Common cavities and tooling		18325-70	1663
Special cavities		18325-75	1669
Cavity plugs		18325-71	1681



## Common cavities and tooling

2-way

3-way / 3-way short

4-way

### Summary

Description	Page
Common cavity <b>2-way</b>	
CA-08A-2N	2
CA-10A-2N	2
CA-12A-2N	2
CA-16A-2N	2
CA-20A-2N	2
Tools	2
Common cavity <b>3-way short</b>	
CA-08A-3C	3
CA-10A-3C	3
CA-12A-3C	3
CA-16A-3C	3
CA-20A-3C	3
Tools	3

Description	Page
Common cavity <b>3-way</b>	
CA-08A-3N	4
CA-10A-3N	4
CA-12A-3N	4
CA-16A-3N	4
CA-20A-3N	4
Tools	4
Common cavity <b>4-way</b>	
CA-08A-4N	5
CA-10A-4N	5
CA-12A-4N	5
CA-16A-4N	5
CA-20A-4N	5
Tools	5



### Common cavities - Tools 3-way short

1 mm = 0.03937 in  
1 in = 25.4 mm

THREE WAY SHORT		CA-08A-3C	CA-10A-3C	CA-12A-3C	CA-16A-3C	CA-20A-3C
<p>General tolerance : ± 0.3 mm</p> <p>Surface finish symbols: <math>\text{Ra} 0.03</math>, <math>\text{Rz} 0.02</math></p>	A	3/4-16 UNF-2B	7/8-14 UNF-2B	1-1/16 12 UN-2B	1-5/16 12 UN-2B	1-5/8 12 UN-2B
	B	26	30	35	42	48
	C	20.6 <sup>+0.1</sup> <sub>-0</sub>	23.9 <sup>+0.1</sup> <sub>-0</sub>	29.2 <sup>+0.1</sup> <sub>-0</sub>	35.5 <sup>+0.1</sup> <sub>-0</sub>	43.5 <sup>+0.1</sup> <sub>-0</sub>
	D1	15.87 <sup>+0.05</sup> <sub>-0</sub>	19.05 <sup>+0.05</sup> <sub>-0</sub>	23.80 <sup>+0.05</sup> <sub>-0</sub>	28.60 <sup>+0.05</sup> <sub>-0</sub>	36.52 <sup>+0.05</sup> <sub>-0</sub>
	D2	14.27 <sup>+0.05</sup> <sub>-0</sub>	17.47 <sup>+0.05</sup> <sub>-0</sub>	22.22 <sup>+0.05</sup> <sub>-0</sub>	25.42 <sup>+0.05</sup> <sub>-0</sub>	33.35 <sup>+0.05</sup> <sub>-0</sub>
	E	2.6 <sup>+0.3</sup> <sub>-0</sub>	2.6 <sup>+0.3</sup> <sub>-0</sub>	3.3 <sup>+0.3</sup> <sub>-0</sub>	3.3 <sup>+0.3</sup> <sub>-0</sub>	3.4 <sup>+0.3</sup> <sub>-0</sub>
	F	12	13	21	16.5	20
	G	8	14	14	15	28
	G1	3	4	5	5	7
	G2	12	15	19	24	30
	H1	12.5	14	22.5	17.5	20
	H2	26.5	31.5	40.5	38	50
	L1	16	18	26.5	22	25.5
	L2	32	40	49.5	47.5	65.5
	L3	40	49	60	58	78
	M	-	-	-	2	-
	M1	-	-	-	2	-

TOOLS (ALUMINIUM/STEEL *)	ORDERING CODE				
<b>DRILL</b> 	Ø G1	Ø G1	Ø G1	Ø G1	Ø G1
<b>FORM DRILL</b> 	P-CA-08A-3N	P-CA-10A-3N	P-CA-12A-3N	P-CA-16A-3N	P-CA-20A-3N
<b>FORM REAMER</b> 	A-CA-08A-3N	A-CA-10A-3N	A-CA-12A-3N	A-CA-16A-3N	A-CA-20A-3N
<b>PLUG TAP</b> 	M-CA-08A	M-CA-10A	M-CA-12A	M-CA-16A	M-CA-20A

\* NOTE: tools only suitable for small series production.

### Common cavities - Tools 3-way

1 mm = 0.03937 in  
1 in = 25.4 mm

THREE WAY		CA-08A-3N	CA-10A-3N	CA-12A-3N	CA-16A-3N	CA-20A-3N
<p>General tolerance : ± 0.3 mm</p> <p>⊙ (0.03) ⊥ (0.02)</p>	A	3/4-16 UNF-2B	7/8-14 UNF-2B	1-1/16 12 UN-2B	1-5/16 12 UN-2B	1-5/8 12 UN-2B
	B	26	30	35	42	54
	C	20.6 <sup>+0.1</sup> <sub>-0</sub>	23.9 <sup>+0.1</sup> <sub>-0</sub>	29.2 <sup>+0.1</sup> <sub>-0</sub>	35.5 <sup>+0.1</sup> <sub>-0</sub>	43.5 <sup>+0.1</sup> <sub>-0</sub>
	D1	15.87 <sup>+0.05</sup> <sub>-0</sub>	17.47 <sup>+0.05</sup> <sub>-0</sub>	23.80 <sup>+0.05</sup> <sub>-0</sub>	28.60 <sup>+0.05</sup> <sub>-0</sub>	36.52 <sup>+0.05</sup> <sub>-0</sub>
	D2	14.27 <sup>+0.05</sup> <sub>-0</sub>	15.87 <sup>+0.05</sup> <sub>-0</sub>	22.22 <sup>+0.05</sup> <sub>-0</sub>	27.00 <sup>+0.05</sup> <sub>-0</sub>	33.35 <sup>+0.05</sup> <sub>-0</sub>
	E	2.6 <sup>+0.3</sup> <sub>-0</sub>	2.6 <sup>+0.3</sup> <sub>-0</sub>	3.3 <sup>+0.3</sup> <sub>-0</sub>	3.3 <sup>+0.3</sup> <sub>-0</sub>	3.4 <sup>+0.3</sup> <sub>-0</sub>
	F	13	14	20	20	22
	G	6	8	14	17	25
	G1	12	15	19	24	30
	H1	15	18	28	25.5	31
	H2	29	34	53	54	72
	L1	19.5	23.5	36.5	35.5	46
	L2	33.5	39.5	61.5	64	87.5
	L3	43	48.5	73	75	100
	M	-	(1.5)	-	-	-
	M1	-	-	-	-	-
	*	-	-	-	-	25.5

TOOLS (ALUMINIUM/STEEL *)	ORDERING CODE				
<b>DRILL</b> 	Ø G1	Ø G1	Ø G1	Ø G1	Ø G1
<b>FORM DRILL</b> 	P-CA-08A-3N	P-CA-10A-3N	P-CA-12A-3N	P-CA-16A-3N	P-CA-20A-3N
<b>FORM REAMER</b> 	A-CA-08A-3N	A-CA-10A-3N	A-CA-12A-3N	A-CA-16A-3N	A-CA-20A-3N
<b>PLUG TAP</b> 	M-CA-08A	M-CA-10A	M-CA-12A	M-CA-16A	M-CA-20A

\* NOTE: tools only suitable for small series production.



# Common cavities - Tools

## 4-way

1 mm = 0.03937 in  
1 in = 25.4 mm

FOUR WAY		CA-08A-4N	CA-10A-4N	CA-12A-4N	CA-16A-4N	CA-20A-4N
	A	3/4-16 UNF-2B	7/8-14 UNF-2B	1-1/16 12 UN-2B	1-5/16 12 UN-2B	1-5/8 12 UN-2B
	B	26	30	35	42	48
	C	20.6 <sup>+0.1</sup> <sub>-0</sub>	23.9 <sup>+0.1</sup> <sub>-0</sub>	29.2 <sup>+0.1</sup> <sub>-0</sub>	35.5 <sup>+0.1</sup> <sub>-0</sub>	43.5 <sup>+0.1</sup> <sub>-0</sub>
	D1	15.87 <sup>+0.05</sup> <sub>-0</sub>	19.05 <sup>+0.05</sup> <sub>-0</sub>	23.80 <sup>+0.05</sup> <sub>-0</sub>	28.60 <sup>+0.05</sup> <sub>-0</sub>	36.52 <sup>+0.05</sup> <sub>-0</sub>
	D2	14.27 <sup>+0.05</sup> <sub>-0</sub>	17.47 <sup>+0.05</sup> <sub>-0</sub>	22.22 <sup>+0.05</sup> <sub>-0</sub>	27.00 <sup>+0.05</sup> <sub>-0</sub>	33.35 <sup>+0.05</sup> <sub>-0</sub>
	D3	12.70 <sup>+0.05</sup> <sub>-0</sub>	15.87 <sup>+0.05</sup> <sub>-0</sub>	20.62 <sup>+0.05</sup> <sub>-0</sub>	25.42 <sup>+0.05</sup> <sub>-0</sub>	31.75 <sup>+0.05</sup> <sub>-0</sub>
	E	2.6 <sup>+0.3</sup> <sub>-0</sub>	2.6 <sup>+0.3</sup> <sub>-0</sub>	3.3 <sup>+0.3</sup> <sub>-0</sub>	3.3 <sup>+0.3</sup> <sub>-0</sub>	3.4 <sup>+0.3</sup> <sub>-0</sub>
	F	13	15	19	20	22
	G	6	8	14	16	25
	G1	12	15	19	24	30
	H1	15	18	28	25	32
	H2	29	34	53	53.5	72
	H3	43	50	78	82	114
	L1	19.5	23.5	36.5	35.5	46
L2	33.5	39.5	61.5	64	87	
L3	47.5	55.5	87.5	92.5	128.5	
L4	56	64.5	99	104	142	
M	-	-	-	-	-	
M1	-	-	-	-	-	
M2	-	-	-	-	-	

General tolerance : ± 0.012 (0,3 mm)

⊙ 0.002 (0.03)  
⊥ 0.008 (0.02)

TOOLS (ALUMINIUM/STEEL *)	ORDERING CODE				
<b>DRILL</b> 	Ø G1	Ø G1	Ø G1	Ø G1	Ø G1
<b>FORM DRILL</b> 	P-CA-08A-4N	P-CA-10A-4N	P-CA-12A-4N	P-CA-16A-4N	P-CA-20A-4N
<b>FORM REAMER</b> 	A-CA-08A-4N	A-CA-10A-4N	A-CA-12A-4N	A-CA-16A-4N	A-CA-20A-4N
<b>PLUG TAP</b> 	M-CA-08A	M-CA-10A	M-CA-12A	M-CA-16A	M-CA-20A

\* NOTE: tools only suitable for small series production.



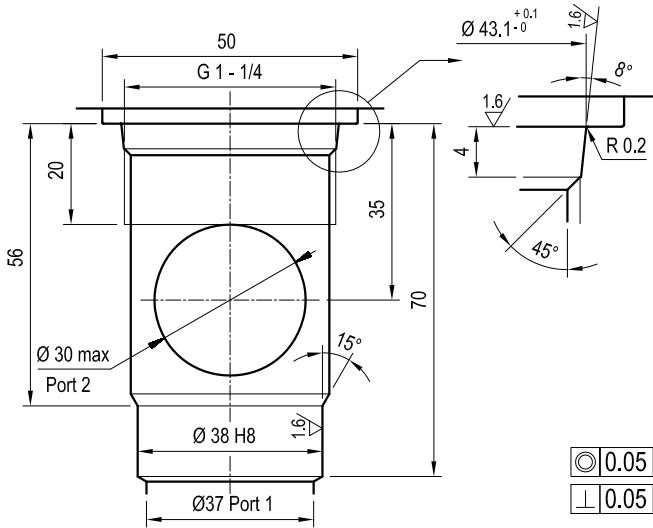
## Special cavities

004 - 008 - 009 - 065 - 308 - 348 - 690  
 730 - 730-A - 808 - 869 - 870 - 871 - 924  
 CA-07A-3N - CA-04A-3Y - CA-04A-2N - CA-16A-5C -  
 CA-20B-6C - 017-E - 019-E - 021-E - 076-E - 081-E - FB  
 FC - LG - CA-10A-5N - HYDAC 06020

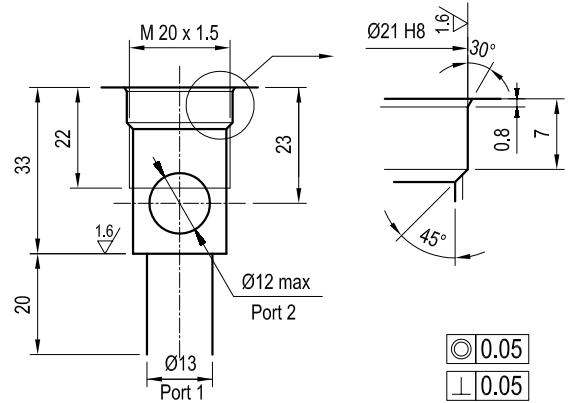
### Summary

Description	Page	Description	Page
Cavity 004	2	Cavity 924	4
Cavity 008	2	Cavity CA-07A-3N	4
Cavity 009	2	Cavity CA-04A-3Y	4
Cavity 065	2	Cavity CA-04A-2N	4
Cavity 348	2	Cavity 308	4
Cavity 690	2	Cavity CA-20B-6C	5
Cavity 730	3	Cavity 017-E	6
Cavity 730-A	3	Cavity 019-E	6
Cavity 808	3	Cavity 021-E	6
Cavity 869	3	Cavity 076-E	6
Cavity 870	3	Cavity 081-E	6
Cavity 871	3	Cavity CA-16A-5C	7
		Cavity FB	8
		Cavity FC	9
		Cavity LG	10
		Cavity CA-10A-5N	11
		Cavity Hydac 06020	12

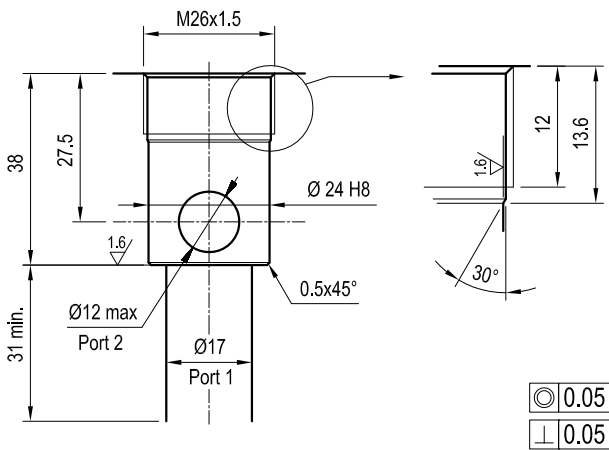
### Special cavity 004



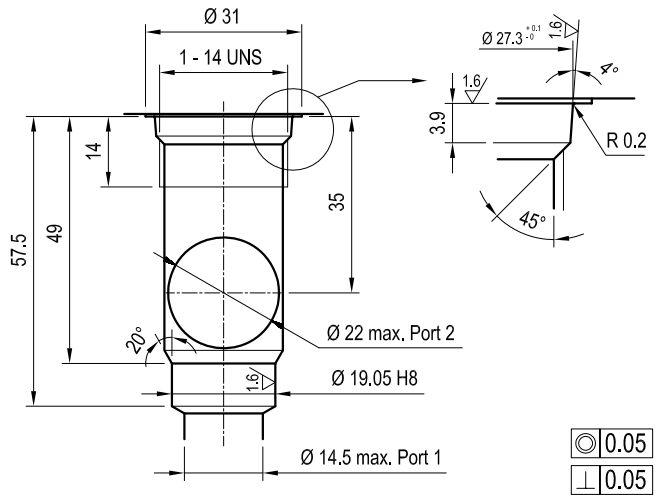
### Special cavity 008



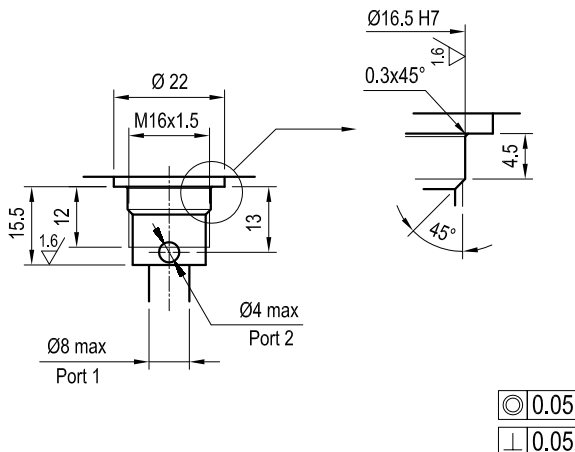
### Special cavity 009



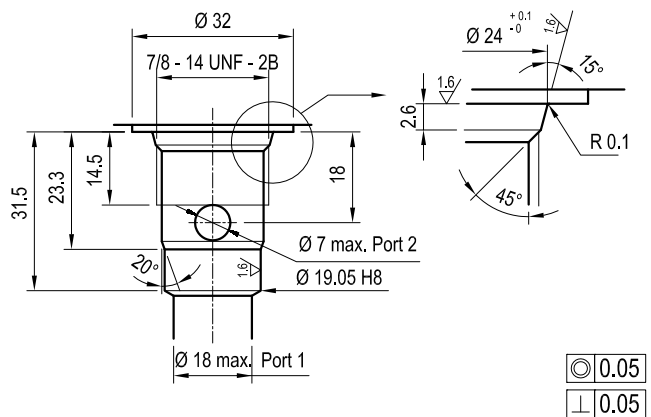
### Special cavity 065



### Special cavity 348



### Special cavity 690

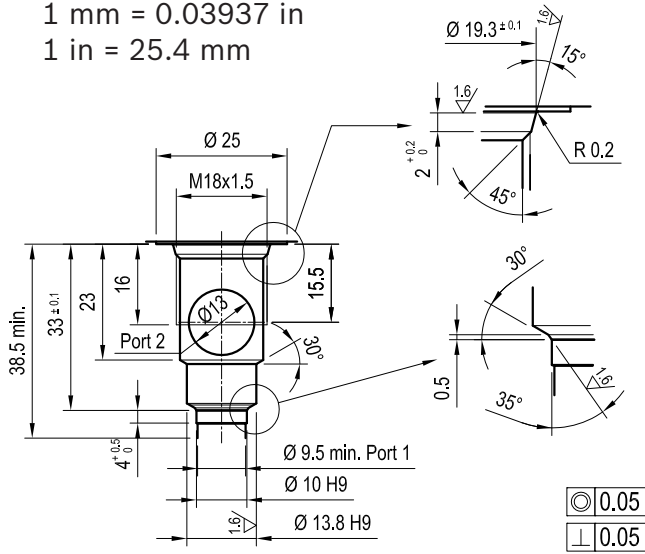


1 mm = 0.03937 in  
1 in = 25.4 mm

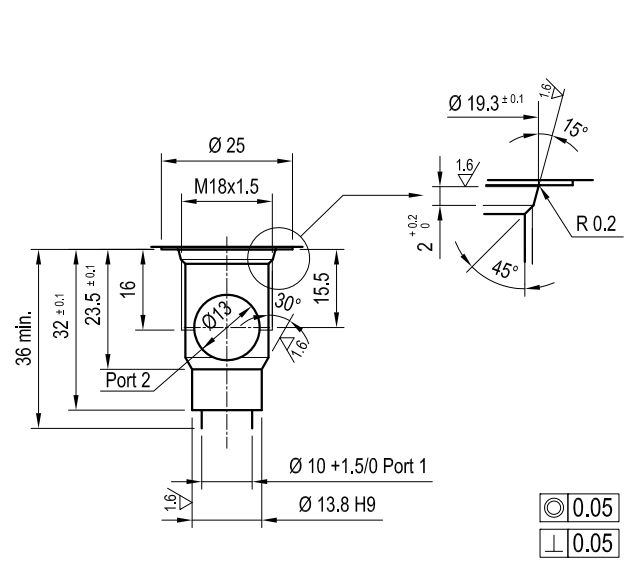
Note: For further details please consult factory

### Special cavity 730

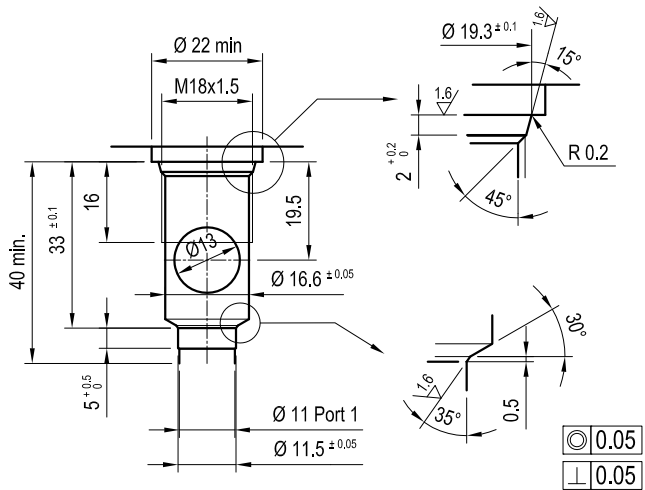
1 mm = 0.03937 in  
1 in = 25.4 mm



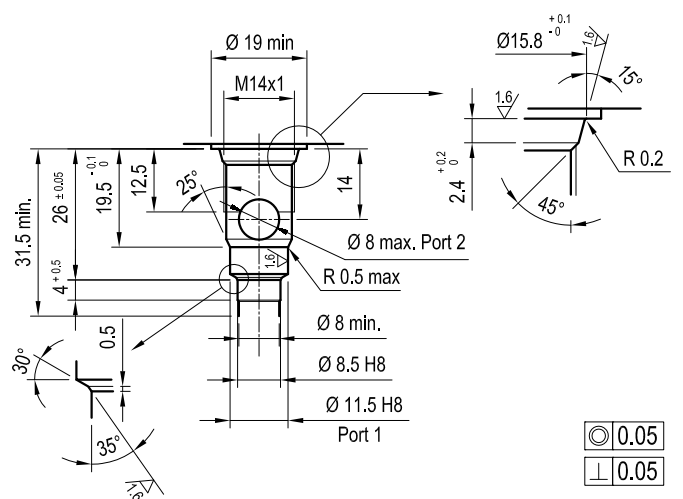
### Special cavity 730-A



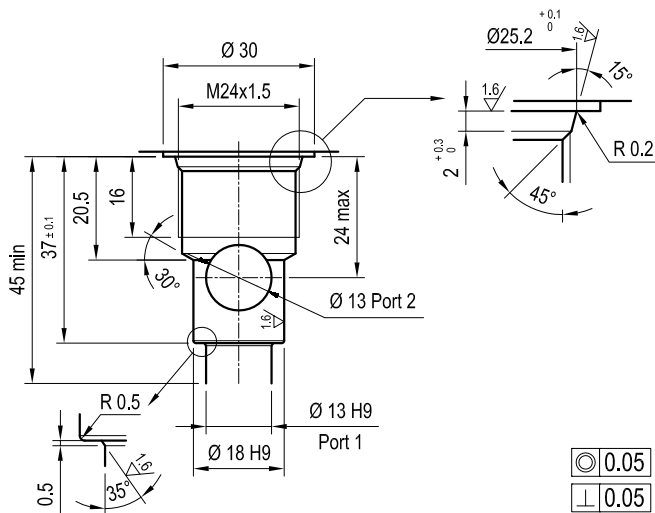
### Special cavity 808



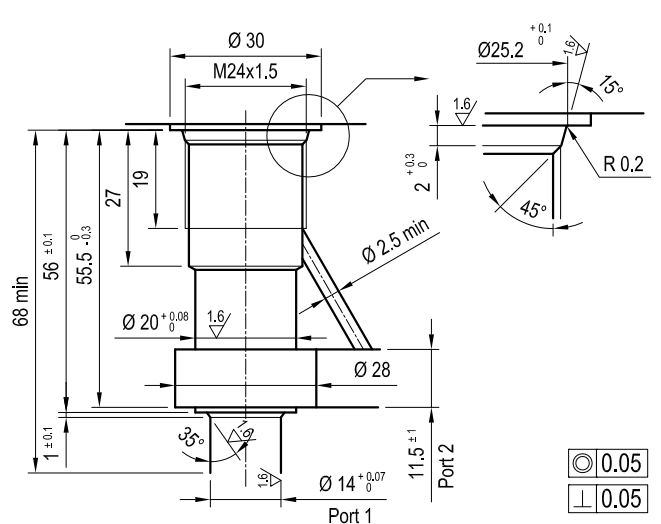
### Special cavity 869



### Special cavity 870

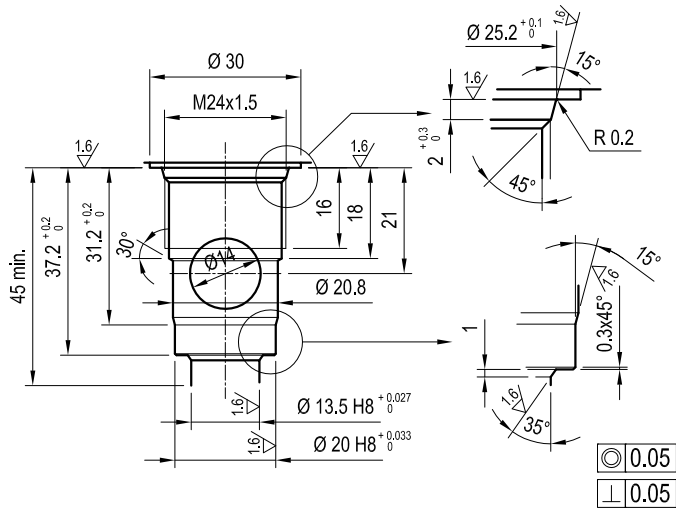


### Special cavity 871

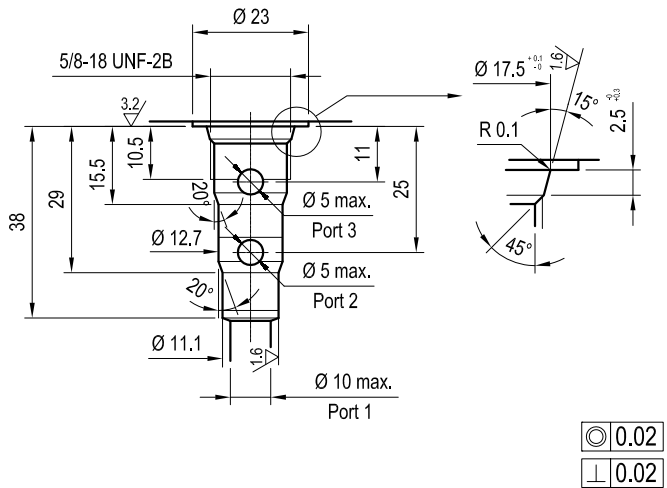


Note: For further details please consult factory

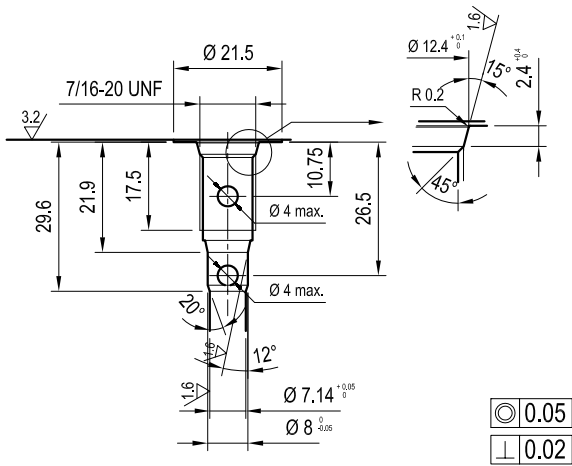
### Special cavity 924



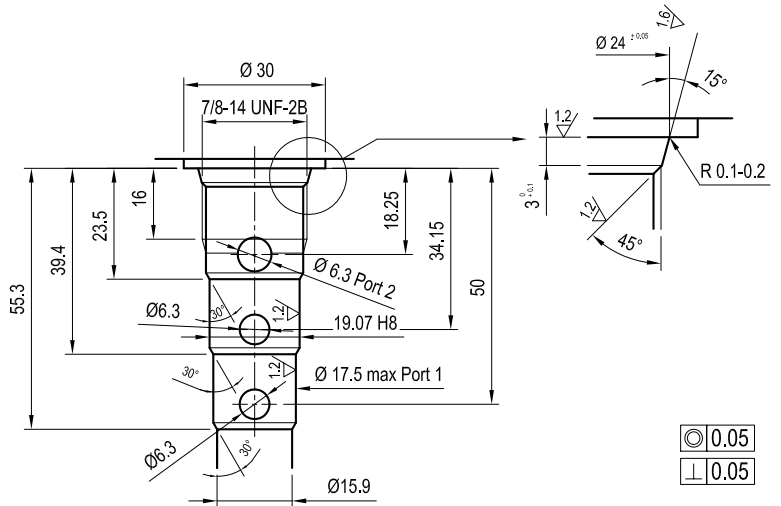
### Special cavity CA-07A-3N



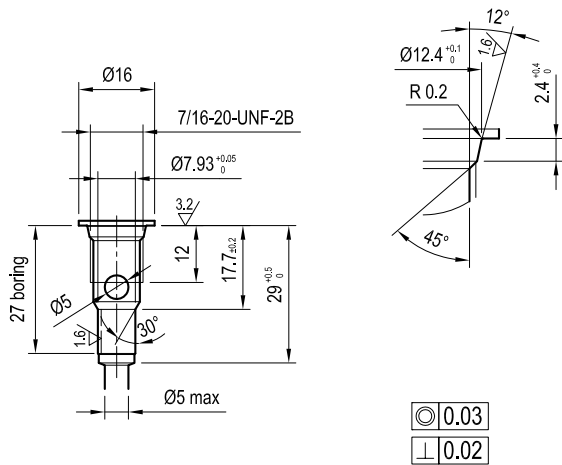
### Special cavity CA-04A-3Y



### Special cavity 308



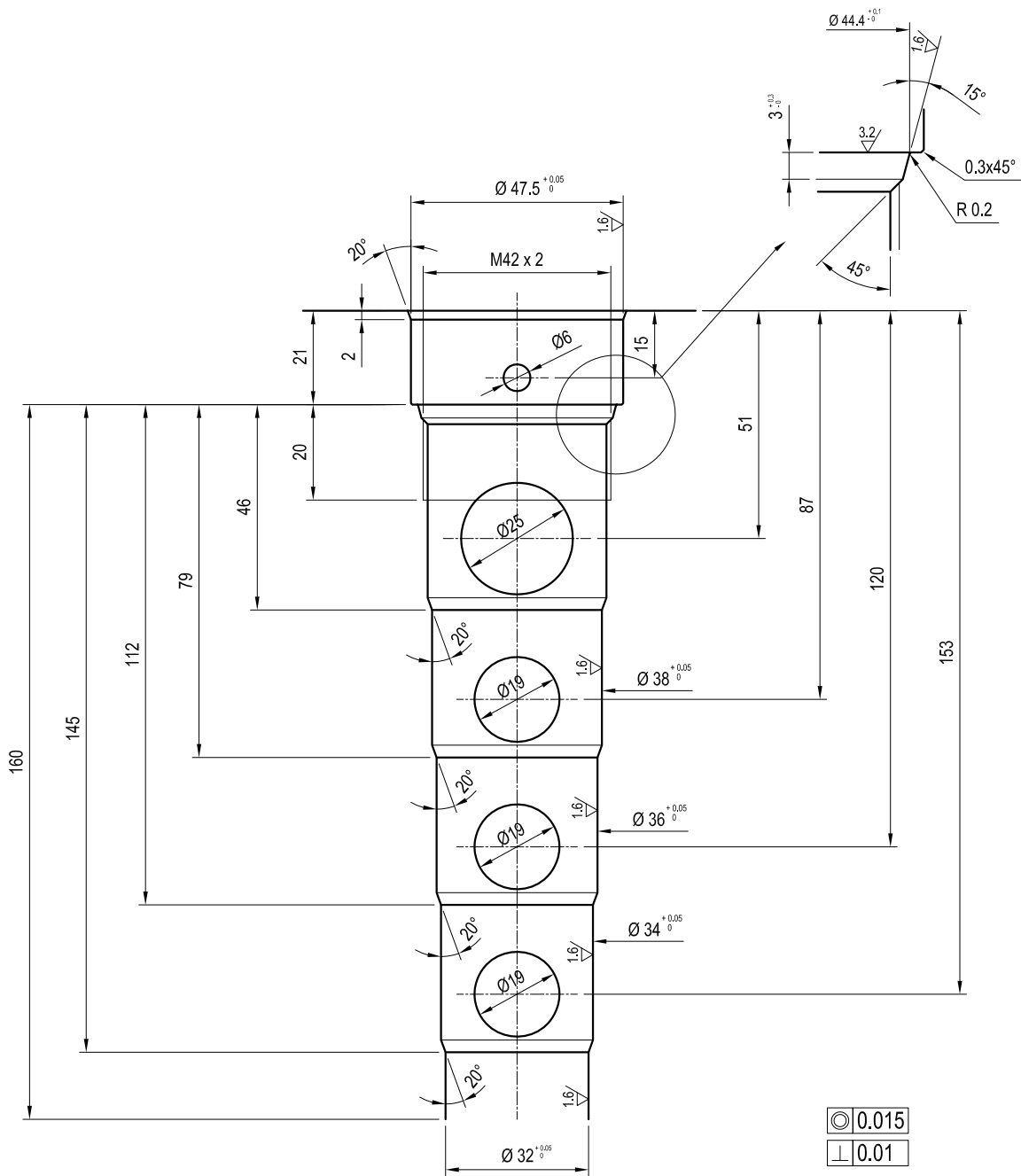
### Special cavity CA-04A-2N



Note: For further details please consult factory

1 mm = 0.03937 in  
1 in = 25.4 mm

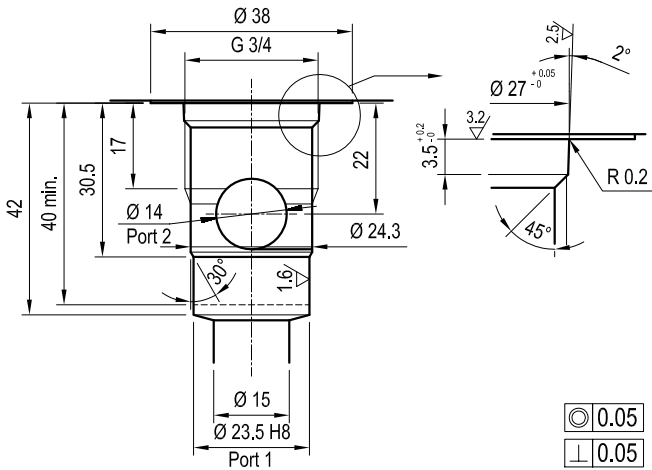
# Special cavity CA-20B-6C



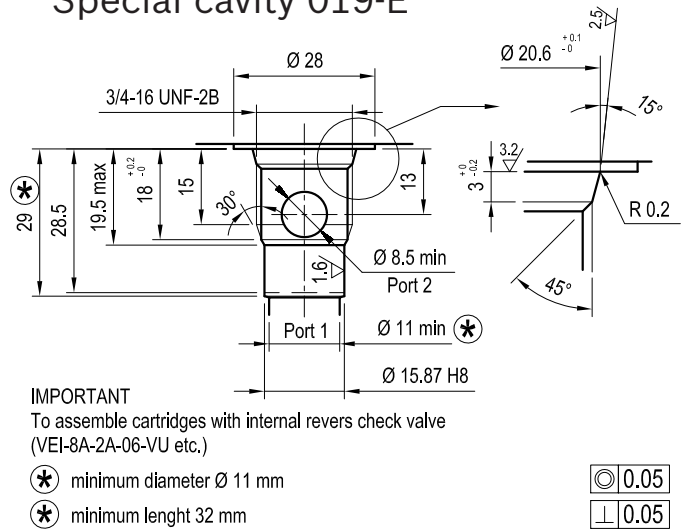
Note: For further details please consult factory

1 mm = 0.03937 in  
 1 in = 25.4 mm

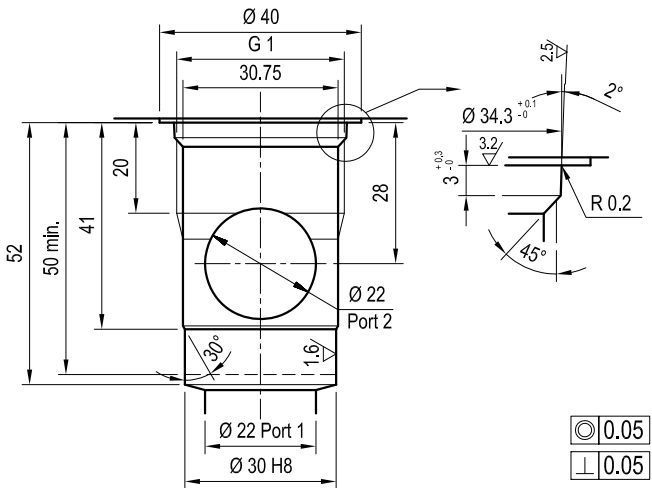
### Special cavity 017-E



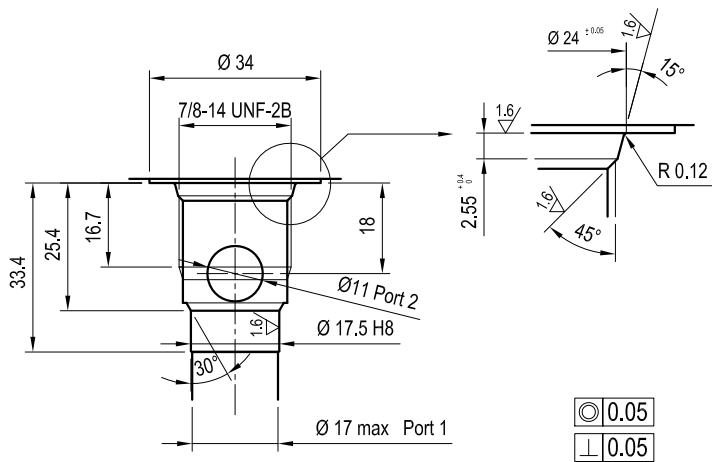
### Special cavity 019-E



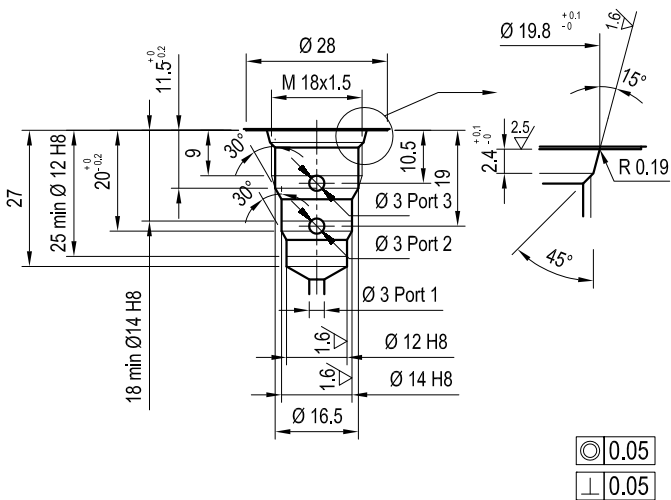
### Special cavity 021-E



### Special cavity 076-E



### Special cavity 081-E

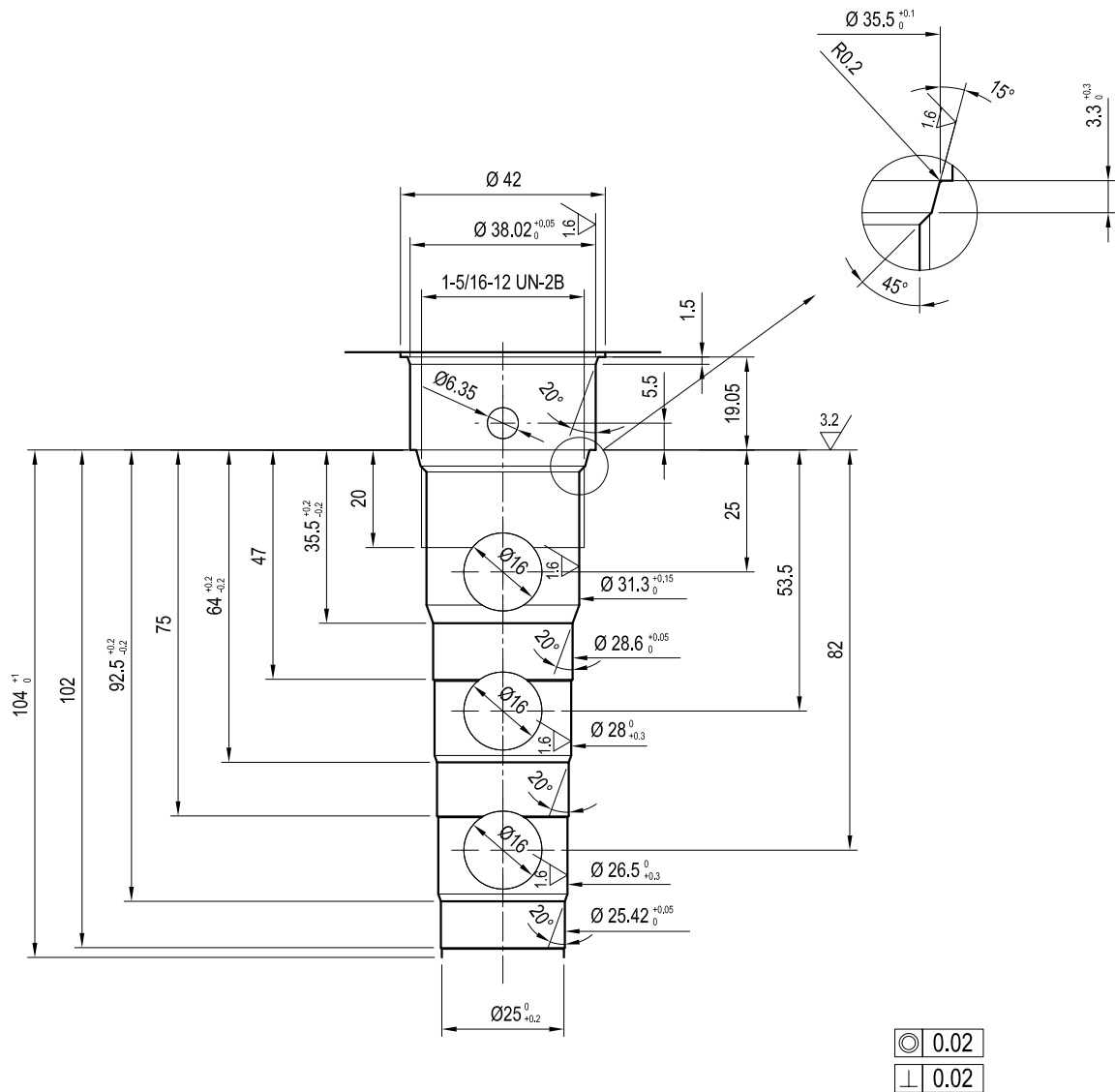


1 mm = 0.03937 in  
1 in = 25.4 mm

Note: For further details please consult factory



# Special cavity CA-16A-5C

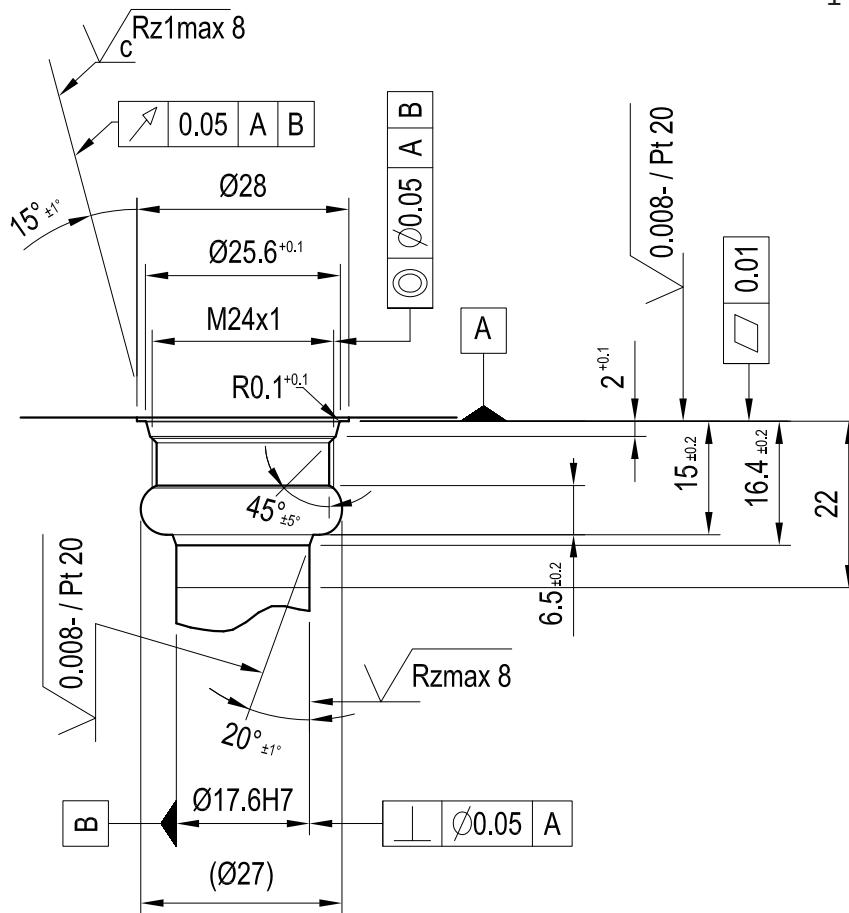


1 mm = 0.03937 in  
 1 in = 25.4 mm

Note: For further details please consult factory

# Special cavity FB

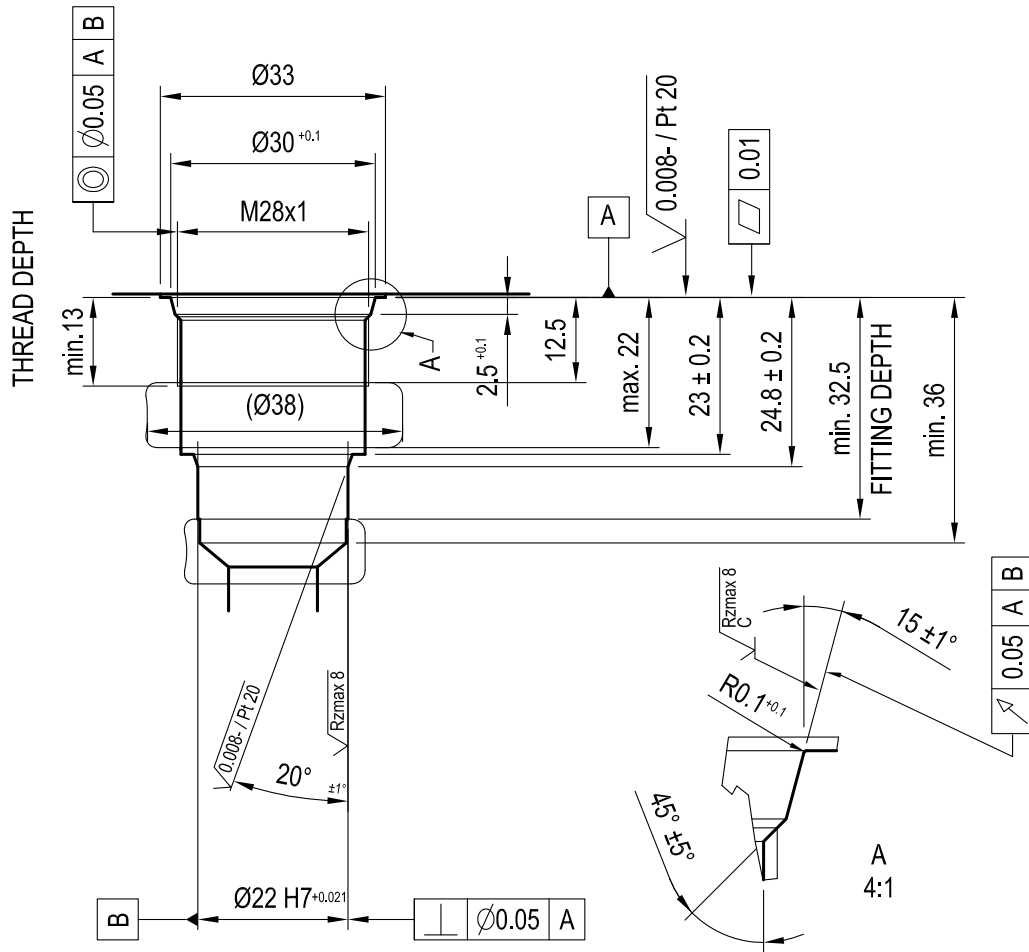
1 mm = 0.03937 in  
 1 in = 25.4 mm



Note: For further details please consult factory

Special cavity FC

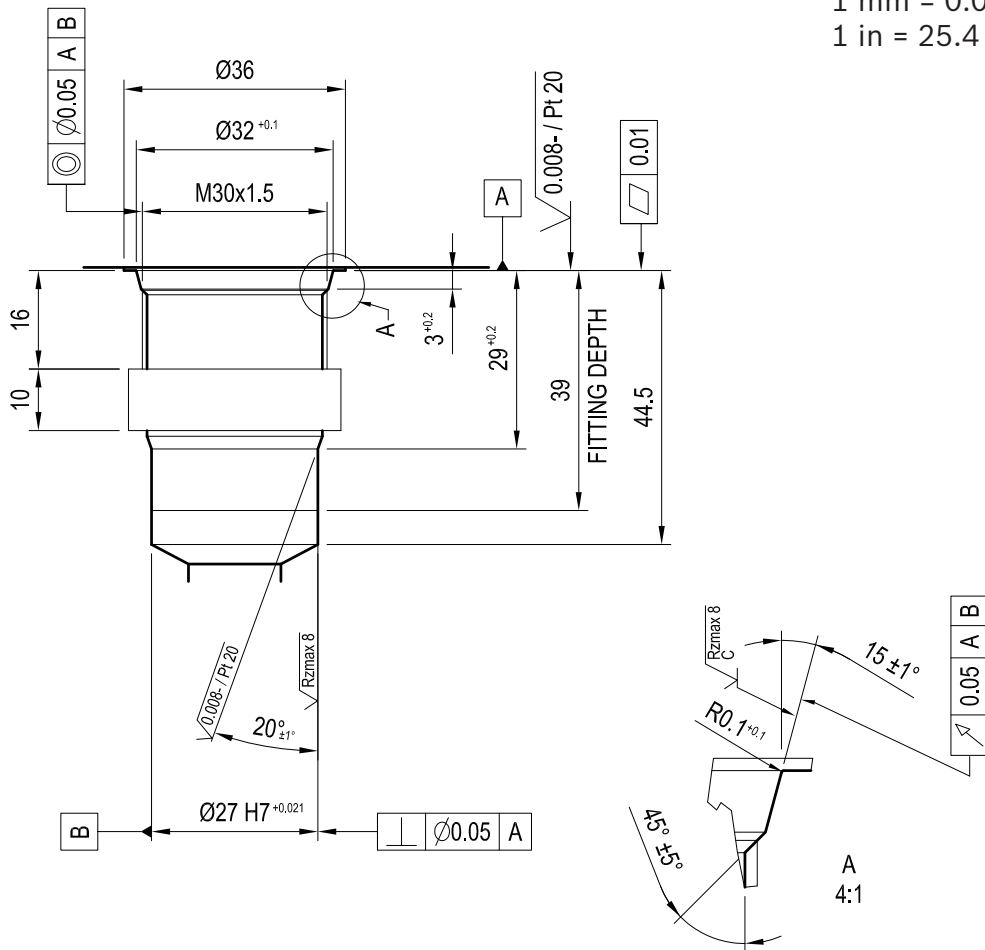
1 mm = 0.03937 in  
 1 in = 25.4 mm



Note: For further details please consult factory

# Special cavity LG

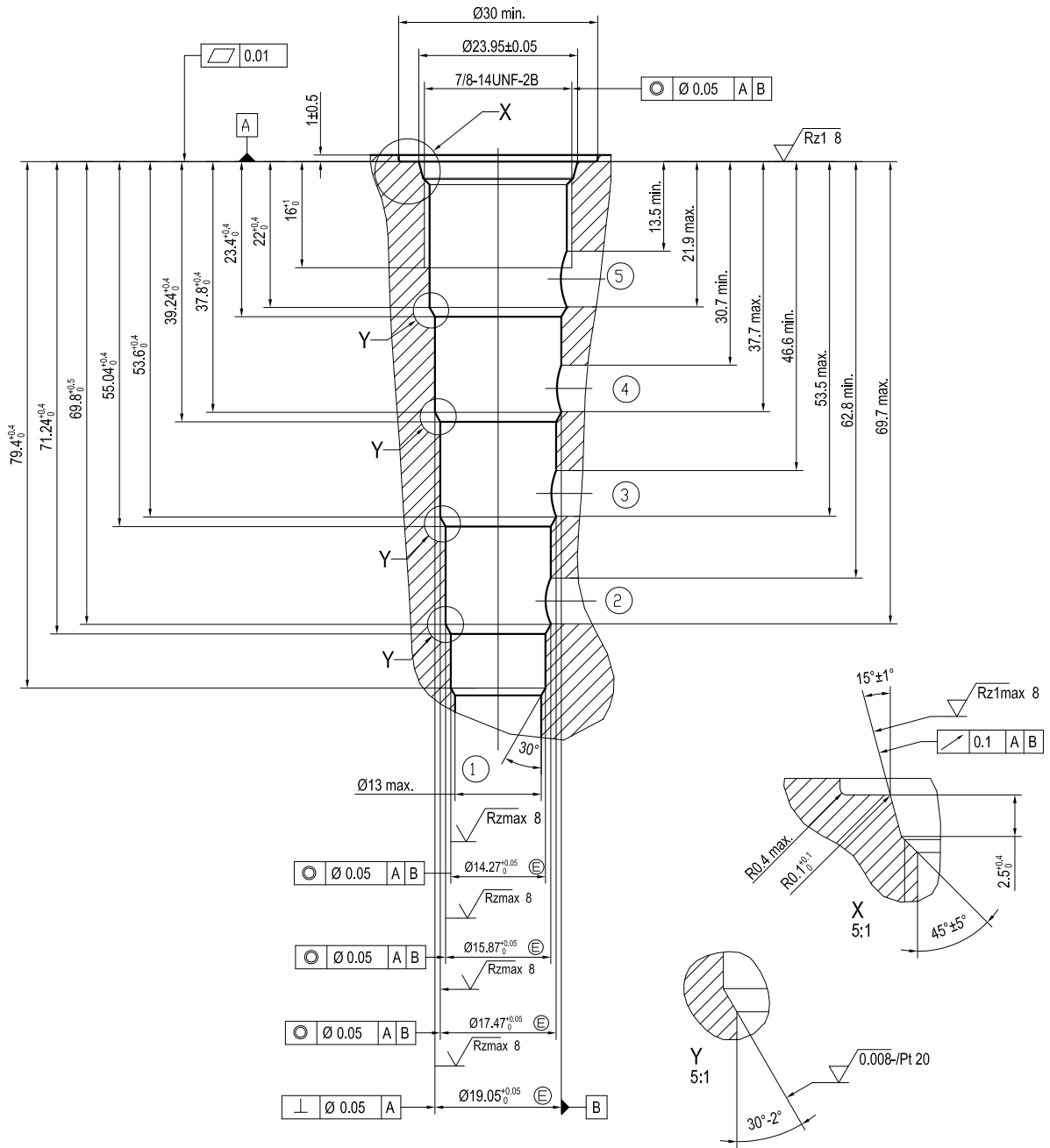
1 mm = 0.03937 in  
 1 in = 25.4 mm



Note: For further details please consult factory

# Special cavity CA-10A-5N (R/UNF-10-05-0-08)

1 mm = 0.03937 in  
 1 in = 25.4 mm



Note: For further details please consult factory

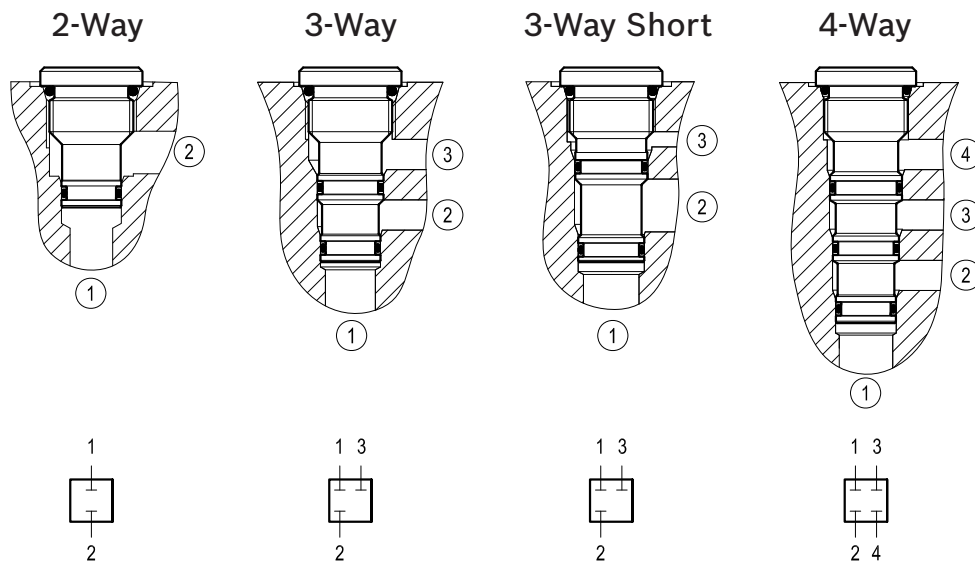


# All ports blocked cavity plugs



Common cavities

04.89 - X - 00 - Y - 00



## Technical data

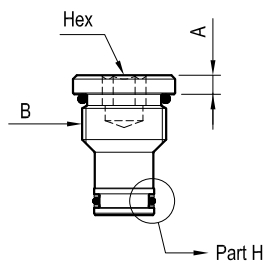
### Hydraulic

Max pressure	bar (psi)	350 (5000) for all ports
Installation torque		see next page
Weight		see next page
O-Ring material		NBR 70

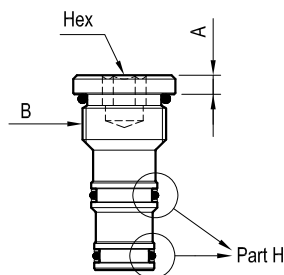
These cavity plugs block all ports

### Dimensions

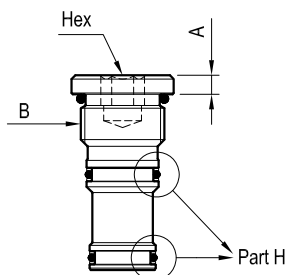
2-Way



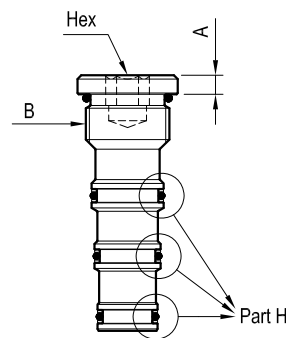
3-Way



3-Way Short

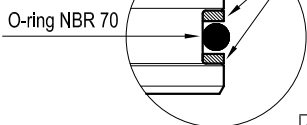


4-Way



Part H

Double back-up ring



	Dimensions				Weight kg (lbs)			
	A mm (inches)	Hex mm (inches)	Inst. Torque Nm (ft-lbs)	Thread B	2 Way	3 Way	3 Way short	4 Way
Size 8	4 (0.16)	8 (0.32)	34-41 (25-30)	3/4-16 UNF-2A	0.05 (0.11)	0.07 (0.15)	0.07 (0.15)	0.08 (0.18)
Size 10	5 (0.20)	10 (0.39)	41-47 (30-35)	7/8-14 UNF-2A	0.08 (0.18)	0.10 (0.23)	0.11 (0.24)	0.13 (0.29)
Size 12	5 (0.20)	12 (0.47)	81-95 (60-70)	1-1/16-12 UN-2A	0.16 (0.35)	0.23 (0.51)	0.20 (0.44)	0.28 (0.62)
Size 16	5 (0.20)	16 (0.63)	108-122 (80-90)	1-5/16-12 UN-2A	0.24 (0.53)	0.34 (0.75)	0.27 (0.60)	0.43 (0.95)
Size 20	5 (0.20)	20 (0.79)	128-149 (95-110)	1-5/8-12 UN-2A	0.46 (1.01)	0.72 (1.59)	0.57 (1.26)	0.92 (2.03)

### Ordering code

04.89	X	00	Y	00
-------	---	----	---	----

Cavity plug (all ports closed)

Cavity size

Cavity type

= A2 2 Way

= A3 3 Way

= A9 3 Way Short

= A4 4 Way

= 56 Size 08

= 85 Size 10

= 57 Size 12

= 27 Size 16

= 58 Size 20

Type	Material number
0489A2002700000	R930000801
0489A2005600000	R901175335
0489A2005700000	R930000824
0489A2005800000	R930000819
0489A2008500000	R930000805
0489A3002700000	R930000799
0489A3005600000	R930000823
0489A3005700000	R930000825
0489A3005800000	R930000820
0489A3008500000	R930000808

Type	Material number
0489A4002700000	R930000798
0489A4005600000	R930001104
0489A4005700000	R930000829
0489A4005800000	R930000821
0489A4008500000	R930000814
0489A9002700000	R930000796
0489A9005600000	R930001105
0489A9005700000	R930000830
0489A9005800000	R930000822
0489A9008500000	R930000344



# Technical data for:

Mechanical and Solenoid cartridge valves,  
Hydraulic integrated circuits,  
Load holding / Motion control valves,  
Compact power modules.

## Introduction:

Do not apply the below technical data to the following sections:

- High pressure cartridge valves and Proportional pressure reducing valves & Remote control manifolds (RE 90010-05 chapter 5 and 6). Please refer to the information included on the individual data sheet and/or contact the sales network indicated on it for any doubts.
- Compact Directional Valves (RE 90010-06 chapters 2, 3, 4 and 5). Please refer to the information included on the dedicated data sheet RE 18350-49 and/or contact the sales network indicated on the individual data sheet for any doubts.

For Compact Power Modules (RE 90010-06 chapter 6), please refer to the information included on this data sheet (see page 11) and on the individual data sheet for technical and usage details. In case of doubt, contact the sales network indicated.

## 1. General

Bosch Rexroth Product Area 2 - Compact Hydraulics (CH) proposes a wide range of hydraulic components for applications in hydraulic circuits of mobile machinery. Detailed information about product performance, selection, installation and technical data can be obtained from our Customer Service Organization; here you may find a summary of general specifications which apply to all our CH hydraulic products with the aim to provide general guidance only. All our CH hydraulic products may be installed in hydraulic circuits of industrial machinery: however it is strongly recommended to contact in advance our Customer Service Organization.

## 2. Hydraulic fluids

Mineral oil based hydraulic fluids suitable for hydraulic systems can be used; they should have physical lubricating and chemical properties as specified by:

- MINERAL OIL BASED HYDRAULIC FLUIDS HL (DIN 51524 part 1)
- MINERAL OIL BASED HYDRAULIC FLUIDS HLP (DIN 51524 part 2).

For use of environmentally friendly fluids (vegetable or polyglycol base), or other fluids, please consult CH.

### 2.1 Fluid viscosity

When not differently specified in the individual data sheet, the fluid viscosity should remain within the range 3 to 400 cSt (centistokes). Hydraulic fluids are available in different viscosity classes identified by the ISO VG number, which corresponds to the kinematic viscosity at 40°C (104°F). Here is a table showing typical viscosity changes between 0°C and 100°C (32°F and 212°F) for mineral oil based fluids having various viscosity classes. The fluid should be selected with the aim to achieve an appropriate operating viscosity at the expected working temperatures.

VISCOSITY CLASS	KINEMATIC VISCOSITY - (cSt)		
	MAX at 0°C (32°F)	MED at 40°C (104°F)	MIN at 100°C (212°F)
ISO VG 10	90	10	2.4
ISO VG 22	300	22	4.1
ISO VG 32	420	32	5
ISO VG 46	780	46	6.1
ISO VG 68	1400	68	7.8
ISO VG 100	2560	100	9.9

Note: all main performance curves and specifications shown in CH technical literature are obtained using mineral based fluid ISO VG 46, i.e. 46 cSt at 40°C (104°F), with an oil temperature of 30-40°C (86-104°F).

More detailed technical characteristics are available at CH.

## 2.2 Fluid temperature recommendation

CH components are generally equipped with BUNA-N seals and, for this reason, the fluid temperature should remain within the -30°C and +100°C range (-22°F and +212°F). In case of temperatures outside this range, consult CH.

**Warning: be careful! During operation the valve can heat up to oil temperature!**

## 2.3 Fluid cleanliness requirements

The cause of malfunctions in hydraulic systems and components is often found to be excessive fluid contamination. The hard contaminant particles in the fluid wear the hydraulic components and prevent the poppets from re-seating, with consequent internal leakage and system inefficiency. For the correct operation of CH components it is necessary to adopt filtration methods which guarantee for life the specified fluid cleanliness level. It is important to ensure that hydraulic fluids are brought to the appropriate cleanliness level prior filling up the systems, and, when in doubt, also to flush the hydraulic components prior to installation. Fluid filtration must comply with recommended fluid contamination indicated on each single valve datasheet.

**ISO 4406:1999** presently is the preferred standard; it defines the fluid cleanliness by three numbers respectively representing the maximum number of particles larger than **4µm**, **6µm** and **14µm** contained in one ml of fluid.

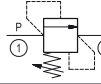

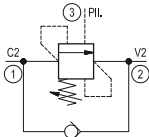
## 3. Internal leakage

Here is a table with general information about the sealing properties of CH valves and components with leak proof seat design; the allowed leakage tolerance may change depending on the design, number of poppets and valve size; this general information is given for guidance only and, for many valves, specific details about the permissible leakage tolerance can be found in the relevant data sheet.

The LEAKAGE for different valve families is expressed in cm<sup>3</sup>/min, or drops/min and is measured in the specified test conditions.

The ratio between cm<sup>3</sup> and drops is approximately:  
1 cm<sup>3</sup> (or 0.06 in<sup>3</sup>) = 15 – 18 drops.

For pressure relief valves the leakage is indicated at re-seating conditions, identified as X% of pressure relief setting.

CHART OF SEALING PROPERTIES	
HYDRAULIC FUNCTION	Max leakage
<b>Pressure relief</b> 	15 drops at 80% of std pressure setting
<b>Check valve</b> 	5 drops/min
<b>Pilot assisted counterbalance</b> 	15 drops/min at 70% of pressure setting in re-seating conditions (cracking pressure)

## 4. Pressure setting

CH valves are supplied pre-set at the standard pressure setting shown by the relevant catalogue sheet. Whenever the application requires a re-adjustment, please ensure that the limits of the indicated pressure range and maximum working pressure are never exceeded.

## 5. Sealing of valve adjusters

Special plastic sealing caps for service are available for most CH valves and cartridges. Upon request, valves can be supplied factory sealed.

## 6. Storage of new components

The components shall not be exposed to direct sun light nor to sources of heat or ozone (like electric motors running), and should be stored in their original, protective packing at ambient temperature within the range -20°C and +50°C (-4°F and 122°F).

## 7. Ports

G type ports (ISO 228-1) are often standard on components with body for line connection; SAE sizes (straight thread), JIS or metric ports can be manufactured upon request.

## 8. Body materials

- Valves and integrated manifolds for high pressure and/or heavy duty applications are manufactured with high quality leaded steel, zinc plated with yellow trivalent chrome treatment.
- Valves and integrated manifolds for medium working pressure (up to 210 bar) can be made of high strength wrought aluminium, black anodized upon request.
- Housings for modular, solenoid operated directional valves and flow diverters are made of high strength cast iron, zinc plated with yellow trivalent chrome treatment.

## 9. Seals

O-Rings: Buna N (acrylonitrile butadiene), also named NBR (according to ASTM), compatible with fluids having mineral oil base, water-in-oil emulsions, and water-glycol fluids. These seals are standard for temperatures within the range -30°C and +100°C (-22°F and +212°F).

Back-up rings and Slide rings: strengthened PTFE (Politetrafluoroetilene like Teflon®, Lubriflon®, Ecoflon®, or similar).

Special FPM (Viton®) seals are available on request.

Note: the seal materials are compatible with the fluids normally used in hydraulic systems; in case of special fluids, if you suspect incompatibility between the fluid used and the standard seals, contact the CH service network.

### 9.1 Seal kits

- for cartridge valves: the kits include all the external seals;
- for components assembled as parts in bodies or housings: the kits include all external seals for flange fitting, or for matching different units together.
- in general seal kits contain seals for 10 valves.

## 10. Installation

- Only trained and competent personnel may carry out any work on Bosch Rexroth Oil Control valves.
- During any operation on Bosch Rexroth Oil Control valves, it is recommended to pay attention to valves surfaces temperature.
- Ensure that all matching surfaces are clean, without contamination.
- Ensure that all seals and back-up rings for the matching surfaces are flawless and correctly placed.
- Do not put any sealing material other than the standard seals.
- During the assembly of the valve and/or the group of valves, refer to the hydraulic scheme and to the name assigned to each port.
- Do not hang the valves and/or the group of valves to the hydraulics pipes, but always use the specific fixing holes.
- In case of use of screw and push and twist overrides, the command must be removed before starting the machine.
- Place in position the valve, then, by hand, insert the fittings and the locating screws.
- In case of cartridge valve, check that the cavity is clean, without sharp edges or chips. Dip the cartridge in clean oil, then insert it into the cavity and screw it in by hand, until you begin to compress the top O-Ring.
- Finally tighten with a calibrated torque wrench and torque up to the specifications shown in the catalogue.
- Use gloves in order to avoid accidental injuries during installation or maintenance.
- Do not grab / handle product from moving parts (i.e. cables, levers, upper side of cartridges,...etc).
- All valves or groups of valves are attributable to pressure vessels. It's always recommended to place the components in a closed but ventilated compartment, able to protect the environment and users in case of accidental ejection of material under pressure (fittings, pipes, plugs expander ... etc.)
- Do not tamper with the valve. Only the substitution of the valve itself, the coil or permitted seals (part ok Bosch Rexroth seal kit) are generally allowed.
- Before removing or disassembling the valve or allowed parts ( as pressure gauge ports, purge plugs, ...etc) it is strongly recommended to vent all hydraulic pressure from the system.
- Remove tension from the coils before any kind of maintenance / installation operation.
- Check the connections and the cable section with reference to the coils nominal current.
- During the first start of the machine, please ensure that the grounding system is connected and stay away from moving parts.
- In case of allowed adjustments on the valve, any maximum protrusion or other admissible maximum value indicated in valve datasheet must not be exceeded.

## 11. Cavities for screw-in cartridges

CH has developed a complete range of cartridges which fit the cavity patterns with UN/UNF threads, according to SAE standards, nominal sizes 08-10-12-16-20. Internal parts of cartridges are designed with a global view of our comprehensive variety of hydraulic products; accordingly, our technology has been optimized in order to employ few basic parts for many different valves for best reliability, cost effectiveness and availability. Further, we can propose our cartridges in different versions, with a variety of external shells in order to fit other cavity patterns, such as ISO/METRIC, or special industrial patterns.

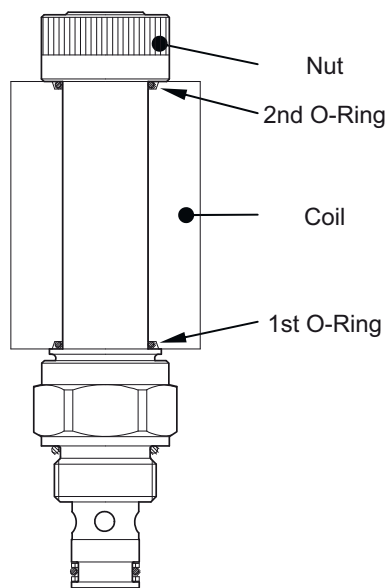
## 12. Coils

### 12.1 Coil installation on solenoid cartridges

#### COIL INSTALLATION

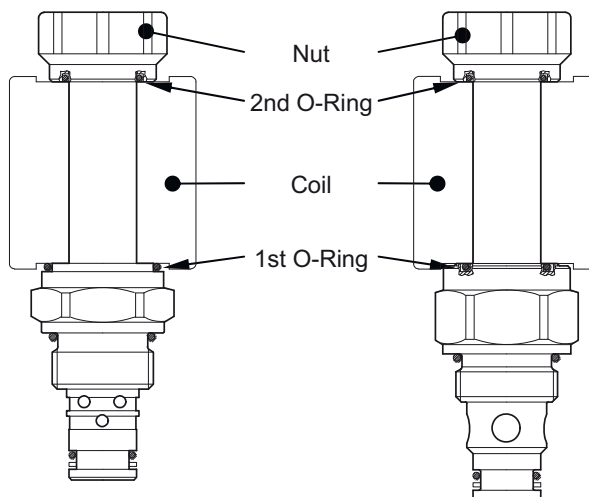
##### COIL WITH O-RING SEATS (S7-S5-R7)

- It is recommended to follow these steps:
- Insert 1st O-Ring (see drawing)
- Insert coil
- Insert 2nd O-Ring (see drawing)
- Tighten **BY HAND** coil retaining nut (in any case do not exceed the torque specified in the catalogue page).



##### COIL WITHOUT O-RING SEATS (S8-356)

- It is recommended to follow these steps:
- Insert 1st O-Ring (see drawing)
- Insert coil
- Tighten **BY HAND** coil retaining nut to the torque specified in the cartridge catalogue page. The 2nd O-Ring is fixed inside the nut.



**IMPORTANT:** O-Rings are the only protection against water infiltration between tube and coil, which may lead in short time to coil failure. The proper mounting of both O-Rings is therefore necessary to ensure normal life of coils. Bosch Rexroth Oil Control cannot guarantee any IP protection degree if both O-Rings are not properly mounted on coils.

### 12.2 Working duty (DIN VDE 0580)

The working duty ED of a coil is the ratio between energized time **ti** and full cycle time **tc** where **tc = ti + tr**, and **tr** = de-energized time.

$$ED = ( ti / tc ) \cdot 100\%$$

All CH coils are rated for **ED = 100%** (i.e. always energized), provided that the temperature limits of their insulation classes are not exceeded.

### 12.3 Protection rating (DIN 40050 - Part 9 IEC 60529)

Protection class is designated by the letter IP followed by two digits: the first digit refers to resistance against penetration of surrounding or foreign solid objects, the second against penetration of water. Protection class doesn't apply to explosion risks or to conditions such as moisture, corrosive agents, mildew etc.

- **IP65** means water protection against **LOW PRESSURE JETS**: water at 0.3 bar (43.5 psi) pressure sprayed from a distance of 2.5 – 3 m (8.2 – 9.8 ft) from every direction  
**IP65 coils CANNOT BE PLUNGED INTO WATER OR REMAIN UNDER WATER.**
- **IP67** means water protection against **30 MINUTES IMMERSION** under water 1 m (3.3 ft) deep.
- **IP69K** means water protection against **HIGH PRESSURE JETS**: water at high pressure and temperature, 80-100 bar (1160–1450 psi) and 75-85°C (167°F-185°F), sprayed from a distance of 100–150 mm (3.9–5.9 in) from every direction.

## 12.4 Coil resistance to thermal shock dunk test

This test, well known and commonly applied in the construction, agricultural and mobile equipment markets, includes several steps :

- 1) Coil is maintained energized for 1 hour at nominal voltage and ambient temperature 25°C (77°F), or is not energized but heated for 2 hours in oven at 105°C (221°F).
- 2) Coil is immediately immersed in water at 20 - 25°C (68 – 77°F) for 30 minutes, at minimum depth 300 mm (11.8 in).
- 3) Coil, when still wet, is tested for moisture ingress and dielectric breakdown with a dielectric tester, like the “Hypot”. With this tester, a voltage differential of 500V DC is applied between the winding and the coil external surface in order to measure the current leakage which must not exceed 100µA (micro-amps).
- 4) The complete test is performed on samples of 10 coils minimum, and is repeated at least five times.

*All coils with EN 175301-803 (ex DIN 43650) connector correctly mounted comply with IP65 protection class.*

*Coils with integrated Deutsch DT04-2P connector have IP69K protection class, and pass the thermal shock dunk test.*

## 12.5 Heat insulation (DIN VDE 0580)

The actual coil temperature **T** is the result of (**TA + ΔT**), where:

TA = ambient temperature, and ΔT = temperature rise due to coil operation.

Example: with TA = 40°C (104°F) and ΔTmax = 115°C (239°F), **T = 155°C (311°F)**; with TA = 40°C (104°F) and ΔTmax = 140°C (284°F), **T = 180°C (365°F)**.

The coil ΔT is determined following a standard procedure (DIN VDE 0580):

- the coil is mounted on a standard cartridge, inserted in a standard steel manifold placed on a wooden surface.
- the coil is maintained energized for 1 hour at nominal voltage, with ambient temperature TA = 20-25°C (68-77°F) and with natural ventilation.

**CLASS H** coils are rated for **T max = 180°C (356°F)**:

if ambient temperature exceeds the value **Tx = 180°C (356°F) - ΔT**, a class H coil cannot be used under continuous duty cycle (ED = 100%); the coil must be periodically de-energized to prevent exceeding the MAX temperature.

In any case, for the correct operation of coils, it is always necessary to provide means for heat dissipation and, at least, natural ventilation.

**Caution:** when energized, the coil surface temperature can reach quickly (in few minutes of continuous operation) temperature levels of 80-100°C (176-212°F), which is not directly related to the coil ΔT: **care should be taken to avoid any accidental contact of people with the coil surface.**

## 12.6 AC Service

All CH solenoid valves are designed to operate exclusively with DC power supply. All coil windings are DC.

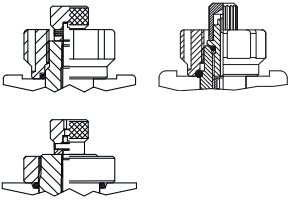
AC operation is possible using EN 175301-803 (ex DIN 43650) connectors with rectifier.

## 12.7 Optional manual emergency for solenoid cartridges

Upon request, the solenoid cartridges can be equipped with tubes incorporating a manual emergency device for valve operation when the coil cannot be energized, like in case of voltage shortage.

**IMPORTANT: manual emergency must always be released before the re-start of the machine!**  
Here is a summary of the different options available:

### SCREW-OUT KNOB STYLE



#### AVAILABLE ON FOLLOWING MODELS:

- 2 way 2 position pilot operated normally closed series 8A / 8I
- 2 way 2 position direct acting poppet style normally closed series 8I
- 2 way 2 position direct acting double lock normally open series 8I
- 3 way 2 position spool style series 8I / 7I
- 4 way 2 position spool style series 8I / 7I

#### OPERATION

To operate manual override, screw out the knob turning it counterclockwise.  
To return to normal valve operation, turn the knob clockwise.

### SCREW-IN STYLE



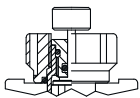
#### AVAILABLE ON FOLLOWING MODELS:

- Proportional valves series 5A

#### OPERATION

To operate manual override, screw in the pin turning it clockwise with wrench.  
To return to normal valve operation, turn the bolt counterclockwise.

### PUSH STYLE



#### AVAILABLE ON FOLLOWING MODELS:

- 2 way 2 position pilot operated normally open series 8A / 8I
- 2 way 2 position direct acting poppet style normally open series 8I
- 2 way 2 position direct acting double lock normally closed series 8I

#### OPERATION

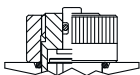
To operate manual override, push and hold override button.  
To return to normal valve operation, simply release the button.

#### AVAILABLE ON FOLLOWING MODELS:

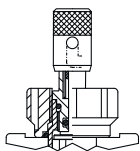
- 2 way 2 position direct acting double lock normally closed series 7A
- 3 way 2 position direct acting poppet style series 7A

#### OPERATION

To operate manual override, push and hold override button with tool.  
To return to normal valve operation, simply release the button.



### PUSH AND TWIST STYLE



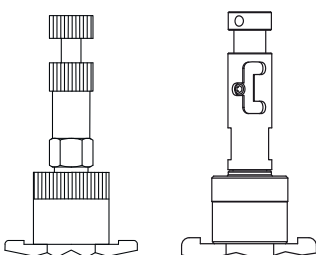
#### AVAILABLE ON FOLLOWING MODELS:

- 2 way 2 position pilot operated normally open series 8A / 8I
- 2 way 2 position direct acting poppet style normally open series 8I
- 2 way 2 position direct acting double lock normally closed series 8I

#### OPERATION

To operate manual override button, turn clockwise and release.  
To return to normal valve operation, push override button, turn counterclockwise and release.

### PUSH AND PULL STYLE



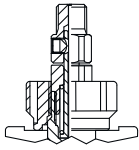
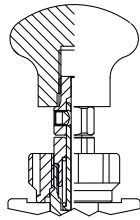
#### AVAILABLE ON FOLLOWING MODELS:

- 4 way 3 position spool style series 8A / 7I

#### OPERATION

To operate manual override, push to override S2 coil or pull to override S1 coil and hold override button.  
To return to normal valve operation, simply release the button.



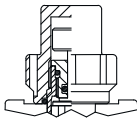
**SCREW-OUT KNOB STYLE****CABLE OPERATED****HAND OPERATED****AVAILABLE ON FOLLOWING MODELS:**

- 2 way 2 position pilot operated normally closed series 8A size 06

**OPERATION**

To operate manual override, pull and hold the knob. This override is not detented. Force required to operate is approximately 50 N (11.2 lbs).

This override can also be remote operated by a cable fixed to the M8 thread. In this case the spring may not provide enough force to overcome internal cable friction and the user must provide an external means of returning the cable.

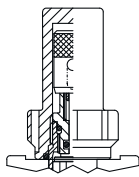
**SAFETY PUSH STYLE****AVAILABLE ON FOLLOWING MODELS:**

- 2 way 2 position pilot operated normally open series 8A / 8I
- 2 way 2 position direct acting poppet style normally open series 8I
- 2 way 2 position direct acting double lock normally closed series 8I

**OPERATION**

To operate manual override, screw out the knob protection after removing wire-locking and push and hold override button.

To return to normal valve operation, simply release the button.

**SAFETY PUSH AND TWIST STYLE****AVAILABLE ON FOLLOWING MODELS:**

- 2 way 2 position pilot operated normally open series 8A / 8I
- 2 way 2 position direct acting poppet style normally open series 8I
- 2 way 2 position direct acting double lock normally closed series 8I

**OPERATION**

To operate manual override, screw out the knob protection after removing wire-locking and turn clockwise and release override button.

To return to normal valve operation, push override button, turn counterclockwise and release.

### 13. Technical data for Proportional valves CH

#### GLOSSARY OF TERMS AND DEFINITIONS

**Current** is the flow of electrons in a conductor, measured in Amperes (A) or milli-amperes (mA) and abbreviated "I".

**Voltage** is the potential for current flow in an electrical circuit. It is measured in Volts (V) and abbreviated "V."

**Resistance** is a material's opposition to the flow of electrical current. It depends on physical properties as well as temperature, size and shape of the material. It is measured in Ohms ( $\Omega$ ) and abbreviated "R". The tolerance allowed on resistance at ambient temperature 20-25°C (68 - 77°F) is  $\pm 7\%$ .

**Hysteresis** is the difference in regulated hydraulic parameter (flow / pressure) at a fixed current level when current is increasing vs. when current is decreasing. It is normally expressed as a percentage of the total change in regulated hydraulic parameter (flow / pressure).

Example: With 900 mA input current and increasing current, 20 bar (290 psi) regulated pressure is achieved. With 900 mA input current and decreasing current, 20.8 bar (302 psi) regulated pressure is achieved. There is a 0.8 bar (12 psi) difference in regulated pressure achieved with the same current depending on whether current is increasing or decreasing.

If Maximum Regulated Pressure = 25 bar (363 psi) and Minimum Regulated Pressure = 4 bar (58 psi), the total regulated parameter change is 25 (363) - 4 (58) = 21 bar (305 psi).

Hysteresis =  $(0.8 / 21) \times 100 = 3.8\%$ .

**Proportional Controller** is a device that converts a low-power input signal into an output signal that is capable of operating the valve. This output signal can be modified to include PWM, ramping, etc. Pulse Width Modulation (PWM) is a method used to vary the average current induced in a coil using a square wave of fixed frequency, and variable ratios of on/off times.

**Dither** is a method used to reduce hysteresis by applying a square or triangle wave to the coil voltage. It can be applied to straight DC or PWM.

**Maximum Control Current** is the point where increasing current input no longer results in an increase in regulated hydraulic parameter (flow / pressure).

**I-Min and I-Max** represent the minimum and maximum control current induced into a proportional valve coil. The tolerance allowed is  $\pm 10\%$  and depends largely from coil's resistance tolerance.

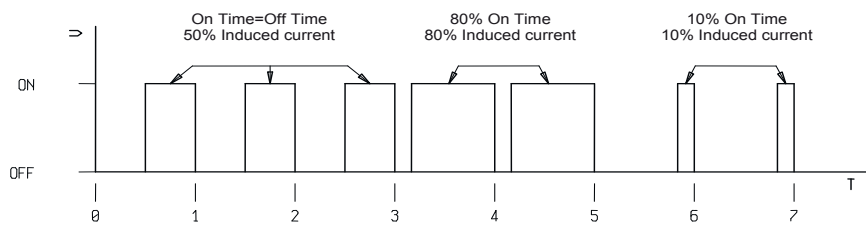
**Ramping** is the ability to control the rate of change of the output of an electronic controller.

#### VERY IMPORTANT:

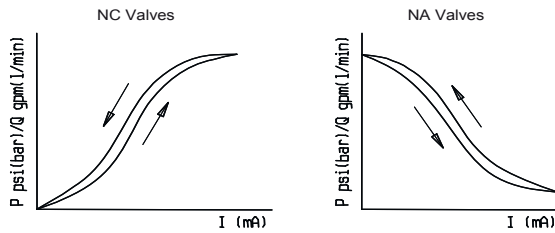
- a. It is strongly recommended to use pulse-width-modulation (PWM) as input signal to coils rather than straight DC. Our tests indicate that PWM input signal allows best valve performance, significantly reducing hysteresis and response times of all our proportional valves. All features shown and explained in next pages are available from many industry-common electronic controllers, including Proportional Controllers described in this catalogue.
- b. CH recommends to use always 12 V DC coils in combination with 24 V DC supply voltage to the electronic controller. This allows to use a much wider control current range independently from coil temperature, since anyway current is regulated by the electronic controller and there is no coil overheating risk.



**PULSE WIDTH MODULATION**

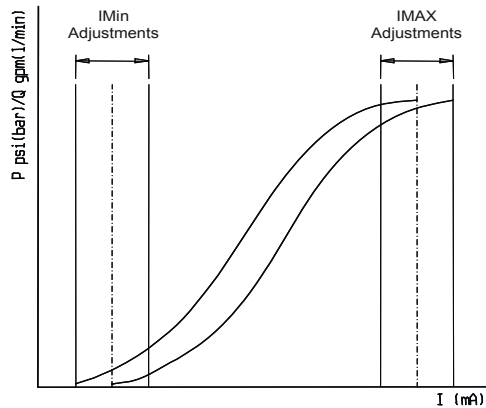


**HYSTERESIS CHARACTERISTIC WITH 120 Hz PWM**



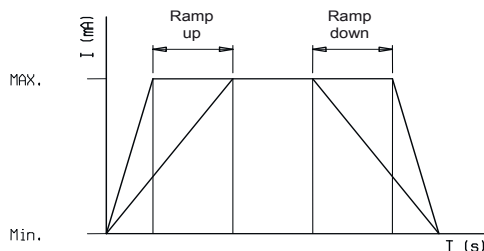
For normally closed proportional valves, the hysteresis curve with increasing current is always lower than the curve with decreasing current. The opposite is true for normally open proportional valves as shown.

**REPEATABILITY RANGE**



An important control feature of electronic controllers is I-Min / I-Max adjustment. This feature allows control of the regulated hydraulic parameter across the full range of the electronic controller by eliminating deadband.

**RAMP SLOPE CONTROL**



Many commercially available controllers also offer a ramping control feature. This feature allows to adjust the current rate of change between the I-Min and I-Max setpoints.

**14. European machine directive 2006/42/CE**

The CH valves or components described in this catalogue can be employed in machinery or systems which need to comply with the European Machine Directive. In such case, the CH valves, manifolds, components and assemblies must be fitted in compliance with all the relevant technical data sheet applicable to the product, and shall not be operated, adjusted or disassembled before the complete machinery where they are incorporated has been declared to be in compliance with the Machine Directive 2006/42/CE.

## 15. General technical data for compact power modules

Through the years DCOC has developed a highly evolved modular system resulting in powerful, flexible and cost effective power pack range, identified as “**compact power modules**”. In its easier configuration, a “compact power module” is an assembly of electric motor, central manifold with valves, pump, oil tank and a few connection elements. The central manifold, with its built-in valves, allows to achieve a large variety of hydraulic control circuits. If more complex circuits are needed, modular integrated blocks can be added by flange mounting, or interfacing, to the central manifold to extend its capabilities.

### 15.1 Power module selection

- Choose the circuit which meets your application requirements.
- Take note of all dimensions resulting from the basic components chosen for your application.  
NOTE: dimensions may vary slightly and should be confirmed by DCOC, if the assembly is to be installed in a space with narrow clearance.
- The tank capacity and the tank dimensions need to be large enough to assure proper pump suction: there must always be a reserve of oil in the tank when all cylinders are fully extended and avoid overflow when cylinders are fully retracted.
- The tank must be evaluated also for best separation of air from oil, and for settling down oil contamination. It should be placed in a space with, at least, natural ventilation and it should permit enough heat dissipation to prevent fluid temperature from exceeding 60°C (140°F).
- Select the electric motor by evaluating the power needed and the motor compliance with the heat developed during the expected run time (or “duty cycle”).  
Motor performance diagrams for “continuous running” (S1), “short time running” (S2) or “intermittent periodic running” (S3) are available in the catalogue. In case of doubt, consult the factory.

### 15.2 Power module installation

The mounting position is basically un-restricted; just avoid installations that could compromise the pump suction. It is recommended to support the power module on vibration dampening blocks when the mounting structure is expected to vibrate.

### 15.3 Hydraulic fluid for power module

It should meet all specifications given for the other DCOC valves and components, except that:

- **the viscosity** should remain within the range 10 to 300 cSt (centistokes); best 15 to 120 cSt.
- **the temperature** should remain within the range -15°C and +80°C (5°F and 176°F). In fact, these are the temperature limits generally recommended for the gaskets employed in these power modules.

### 15.4 Cleaning and maintenance

All components of the hydraulic circuit, including hoses and actuators, must be flushed clean before assembling, because the power module only has a suction filter.

The hydraulic fluid should be replaced after the first 100 hours, and then every 3000 hours, or, at least, once a year.

### 15.5 Wiring and starting-up

The wiring between battery and electric motor should be selected in order to avoid excessive voltage drop (recommended less than 1 V).

**It is strictly forbidden to allow the backwards rotation of the pump** even at the first starting: to prevent reverse rotation, **the wiring polarities must be correctly connected.**

**Caution:** when energized, the surface temperature of the electric motor could reach temperature levels of 60–80°C (140–176°F): **care should be taken to avoid any accidental contact of people with the motor surface.**

## Code Index - Product Catalog Mobile Hydraulics Part 5

Compact Hydraulics: mechanical, solenoid and proportional cartridge valves, hydraulic integrated circuits

Code	Description	Data sheet	Page
043138002000	VUCN-08F	18319-04	129
049405005600	SELB-08A	18319-80	183
049407005400	SELC-04A	18319-82	181
049409008500	SELB-10A	18319-79	187
0 532...	0 532...	25860	965
040103X5600	STVU-08A	18321-10	279
040105X8500	STVU-10A	18321-11	281
040106X5600	STFU-08A	18321-09	283
0402010056Z	VRFA-08A	18321-12	287
0402010085Z	VRFA-10A-TF	18321-13	289
040201X85Z	VRFA-10A	18321-15	291
040202X85Z	VRFB-10A	18321-16	293
0402030057Z	VRFA-12A-TF	18321-14	295
0404010085Z	VRFC-10A-TF	18321-18	299
040401X85Z	VRFC-10A	18321-17	301
040402X85Z	VRFD-10A	18321-20	303
0404030057Z	VRFC-12A-TF	18321-19	305
0404040085Z	DSDN-10A	18321-22	309
040404X57Z	VRFD-12A	18321-21	307
0405010085Z	DRFN-10A	18321-24	313
0405020027Z	DRFN-16A	18321-25	315
0405030027Z	DSDN-16A	18321-23	311
040701X57Z	VRFE-12A	18321-30	297
041105X99Z	VS-80	18318-25	53
041118X09Z	VS-30-NCF	18318-24	51
041118X99Z	VS-30	18318-23	49
041127X99Z	VS-30-CC	18318-26	65
041148X56Z	VSAN-08A	18318-01	41
041149X20Z	VSBN-08F	18318-18	45
041149X56Z	VSBN-08A	18318-04	43
041155X85Z	VSBN-10A	18318-05	47
041156X85Z	VSBG-10A	18318-06	55
041157X99Z	VS-5-CF	18318-20	39
041158X99Z	VS-5-CN	18318-19	37
041159X85Z	VSNB-10A	18318-07	63
041208X85Z	VSPN-10A	18318-08	67
041209X85Z	VSPC-10A	18318-11	73
041210X57Z	VSPN-12A	18318-09	69
041211X27Z	VSPN-16A	18318-10	71
041305X85Z	VSPY-10A	18318-12	83
041307X57Z	VSPY-12A	18318-13	85
041308X57Z	VSPX-12A	18318-14	87
041504X99Z	VSD-350	18318-22	61
041522X56Z	VSDN-08A	18318-02	57

Code	Description	Data sheet	Page
041523X85Z	VSDN-10A	18318-03	59
041801X99Z	VSP-CC-150	18318-27	91
041803X85Z	VSP-10A	18318-39	89
0431190099Z	VU-N-38	18318-99	125
0431200056Z	VUCN-08A	18318-89	127
0431210056Z	VURN-08A	18318-96	143
0431230085Z	VUCN-10A	18318-90	131
0431250027Z	VUCN-16A	18318-92	135
0431270085Z	VURN-10A	18318-97	145
0431280057Z	VUCN-12A	18318-91	133
0431310054Z	VUCN-04A	18318-88	123
0431320058Z	VUCN-20A	18318-93	137
0431360057Z	VURN-12A	18318-98	147
043137X57Z	VUCN-12A-TR	18318-95	141
043137X85Z	VUCN-10A-TR	18318-94	139
043305X85Z	VSON-10A	18319-31	157
043306X20Z	VSON-08U	18319-39	159
043306X56Z	VSON-08A	18319-30	155
043307X57Z	VSON-12A	18319-32	161
043307X86Z	VSON-12U	18319-40	163
043308X27Z	VSON-16A	18319-33	165
043309X47Z	VSON-16U	18319-41	167
043310X56Z	VSOA-08A	18319-34	169
043310X85Z	VSOA-10A	18319-35	171
043404X50Z	VUPC-25U	18319-29	179
043404X57Z	VUPC-12A	18319-37	177
043404X85Z	VUPC-10A	18319-36	175
043603X85Z	VSOD-10A	18319-38	173
0439010056Z	VUDN-08A	18319-83	191
0443010000Z	VU-DT-D7-CM	18318-87	193
045220X56Z	VBSN-08AA	18320-01	199
045225X58Z	VBSN-20A	18320-05	219
045228X57Z	VBSN-12A	18320-03	209
045229X27Z	VBSN-16A	18320-04	213
045231X85Z	VBSN-10A	18320-02	203
045237X20Z	VBSN-08U-TF	18319-98	207
045241X58Z	VBSZ-20A	18319-99	223
045242X20Z	VBSN-08UU-RS	18320-16	201
045243X20Z	VBSN-08U-RS	18320-17	205
045244X86Z	VBSN-12U-RS	18320-18	211
045245X47Z	VBSN-16U-RS	18320-19	215
045246X50Z	VBSN-25U-RS	18320-29	221

Code	Description	Data sheet	Page
045247X47Z	VBSN-16U-RF	18320-31	217
045250X18Z	VBSN-07HH-TF	18320-33	197
045404X56Z	VBSP-08AA	18320-06	225
045408X57Z	VBSP-12A	18320-08	231
045409X85Z	VBPS-10A	18320-07	227
045410X27Z	VBSP-16A	18320-09	235
045413X58Z	VBSP-20A	18320-10	241
045415X20Z	VBSP-08U-RS	18320-20	229
045416X86Z	VBPS-12U-RS	18320-21	233
045417X47Z	VBSP-16U-RS	18320-22	237
045418X50Z	VBSP-25U-RS	18320-30	243
045419X47Z	VBSP-16U-RF	18320-32	239
045908X56Z	VBST-08AA	18320-11	245
045916X85Z	VBST-10A	18320-12	247
045918X58Z	VBST-20A	18320-15	259
045926X57Z	VBST-12A	18320-13	251
045927X27Z	VBST-16A	18320-14	255
045929X20Z	VBST-08U-RS	18320-23	249
045930X86Z	VBST-12U-RS	18320-24	253
045931X47Z	VBST-16U-RS	18320-25	257
045932X20Z	VBSY-08U-RS	18320-26	261
045933X86Z	VBSY-12U-RS	18320-27	263
045934X47Z	VBSY-16U-RS	18320-28	265
045935X50Z	VBSY-25U-RS	18320-36	267
047510X99Z	VMSP-78	18318-17	95
047521X56Z	VMSN-08A	18318-16	93
047717X85Z	VDSR-10A-6	18320-82	397
047719X27Z	VDSJ-16A	18320-81	421
047719X85Z	VDSJ-10A	18320-87	419
047720X27Z	VDSC-16A	18320-78	405
047721X57Z	VDSC-12A	18320-91	403
047721X85Z	VDSC-10A	18320-77	401
047722X27Z	VDSD-16A	18320-80	409
047722X85Z	VDSD-10A	18320-79	407
047723X85Z	VDSB-10A-6	18320-74	391
047725X27Z	VDSH-16A	18320-85	413
047725X85Z	VDSH-10A	18320-75	411
047726X27Z	VDSK-16A	18320-86	417
047726X85Z	VDSK-10A	18320-76	415
047729X85Z	VDSA-10A-6	18320-73	385
047732X27Z	VDSA-16A	18320-92	389
047732X85Z	VDSA-10A	18320-83	387

Code	Description	Data sheet	Page
047733X27Z	VDSB-16A	18320-93	395
047733X85Z	VDSB-10A	18320-84	393
047735X93Z	VDSP-20B	18320-89	425
047736X93Z	VDSP-20B-R	18320-90	427
047737X85Z	VDSE-10A-6	18320-88	399
047742X27Z	VDSJ-16A-RN	18320-94	423
048401X27Z	VLST-16A	18321-62	323
048401X57Z	VLST-12A	18321-61	321
048401X58Z	VLST-20A	18321-63	325
048401X85Z	VLST-10A	18321-60	319
048402X27Z	VLSC-16A	18321-69	341
048402X57Z	VLSC-12A	18321-59	339
048402X58Z	VLSC-20A	18321-70	343
048402X85Z	VLSC-10A	18321-68	335
048403X27Z	VLSP-16A	18321-66	331
048403X57Z	VLSP-12A	18321-65	329
048403X58Z	VLSP-20A	18321-67	333
048403X85Z	VLSP-10A	18321-64	327
048404X27Z	VLSR-16A	18321-74	349
048404X57Z	VLSR-12A	18321-73	347
048404X58Z	VLSR-20A	18321-75	351
048404X85Z	VLSR-10A	18321-72	345
048405X27Z	VLSQ-16A	18321-79	357
048405X57Z	VLSQ-12A	18321-78	355
048405X85Z	VLSQ-10A	18321-77	353
048406X27Z	VCSQ-16A	18321-82	363
048406X57Z	VCSQ-12A	18321-81	361
048406X85Z	VCSQ-10A	18321-80	359
048407X85Z	VLDT-10A	18321-76	381
0484090027Z	VRLA-16A-S	18321-88	369
0484090057Z	VRLA-12A-S	18321-87	367
0484090058Z	VRLA-20A-S	18321-89	371
0484090085Z	VRLA-10A-S	18321-86	365
048410X27Z	VRLA-16A-D	18321-84	377
048410X57Z	VRLA-12A-D	18321-83	375
048410X58Z	VRLA-20A-D	18321-85	379
048410X85Z	VRLA-10A-D	18321-90	373
048412X85Z	VLSC-10A-8-TF	18321-71	337
049306X85Z	VRPP-10A	18318-50	113
049307X85Z	VRPX-10A	18318-56	117
049308X57Z	VRPP-12A	18318-51	115
049406X5600	SELC-08A	18319-81	185

Code	Description	Data sheet	Page
049410X99Z	SELO-10M	18320-95	189
049504X85Z	VRPR-10A	18318-53	103
049507X85Z	VRPE-10A	18318-58	119
049508X99Z	VRPR-07A	18318-59	99
0495098385Z	VRPR-10A-8	18318-54	111
049509X99Z	VRPR-07A-S	18318-60	109
0495118356Z	VRPR-08A	18318-52	101
049806X99Z	VEM-5-SA	18320-71	537
051204XYZ	VSDC-350	18331-43	1479
051301XYZ	VSC-30	18331-40	1471
051302XYZ	VSC-80	18331-41	1475
0532 VA ...	0532 VA ...	50153	977
0TF10100YZ	SFC1	18329-75	571
0TF1020009Z	IFC2	18329-70	573
0TF301XYZ	VCD1	18329-80	567
0TF401XYZ	VPN1	18329-85	575
0TM201X99ZW	VSA1.050	18329-01	543
0TM405X99ZW	VMA1.025	18329-11	545
0TM406X99ZW	VMA1.050	18329-12	547
0TM407X99ZW	VMA1.060	18329-13	549
0TM408X99ZW	VMA1.080	18329-14	551
0TM409X99ZW	VMA1.180	18329-16	555
0TM410X99ZW	VMA1.130	18329-15	553
0TM601X99Z	VRA1.025	18329-31	557
0TM602X99Z	VRA1.050	18329-32	559
0TM603X99Z	VRA1.060	18329-33	561
0TM604X99Z	VRA1.080	18329-34	563
0TU30100YZ	VUB1	18329-65	593
0TU50100YZ	VUH1	18329-61	591
0TU6010099Z	VUM1.050	18329-52	587
0TU6020099Z	VUM1.060	18329-53	589
0TU6030099Z	VUM1.025	18329-51	585
2Y01KXYZW	VSO-DE-C	18330-71	1387
2Y02KXYZW	VBSN-DE-C	18330-73	1395
2Y03KXYZW	VBSP-DE-C	18330-75	1403
2Y04KXYZW	VBST-DE-C	18330-77	1411
CA	CA	18316-35	657
CAB	CAB	18316-45	667
EM	EM	18316-75	689
EMT	EMT	18316-76	691
FO	FO	18316-09	609
FTDRE 2	FTDRE 2	58032	1261

Code	Description	Data sheet	Page
FTDRE 4	FTDRE 4	58038	1285
FTDRE2K-044	FTDRE2K-044	58034	1273
FTWE 2	FTWE 2	58007	1295
FTWE 4	FTWE 4	58008	1303
GSU	GSU	18316-02	599
GSU1_	GSU1	18329-83	579
HICFP	HICFP	64663	1313
KBPS.8A	KBPS.8A	18139-04	1127
KBPS.8B	KBPS.8B	18139-05	1141
KBVS.1A	KBVS.1A	18160	1155
KBVS.1B	KBVS.1B	18152	1167
KBVS.3A	KBVS.3A	18139-08	1179
KBVS.3B	KBVS.3B	18139-07	1191
KKDER 1	KKDER 1	18136-06	1095
KKDER 1	KKDER 1	18136-04	1105
KKDER 1	KKDER 1	18136-05	1115
KKDER 8	KKDER 8	18136-08	1075
KKDER 8	KKDER 8	18136-09	1085
KSDE 0	KSDE 0	18136-23	1051
KSDE U/R 1	KSDE U/R 1	18136-20	1059
KSDE U/R 1	KSDE U/R 1	18136-21	1067
KSDE U/R 8	KSDE U/R 8	18136-12	1041
KSVSR0AA/F-Y-V	KSVS.0	18323-72	915
KSVSR1AA/F-Y-V	KSVS.1	18323-73	919
KSVSR2AA/F-Y-V	KSVS.2	18323-74	923
KSVSR3AA/F-Y-V	KSVS.3	18323-75	927
KTVS.1A	KTVS.1A	18166	1203
KUDSR.3	KUDSR.3	18702	1217
LCA 13 / 19	LCA 13 / 19	18316-39	665
LCA 7 / 10	LCA 7 / 10	18316-38	663
MH2FR 04,,,	MH2FR	18321-31	285
MHDBL+MHDBB	MHDBL+MHDBB	64612	1015
MHDBN	MHDBN	64602	1005
MHDBN-Y-02	MHDBN-Y-02	64599	995
MHDBV	MHDBV	64606	985
MHDRDB 04...	MHDRDB	18318-55	105
MHDRE 06	MHDRE 06	64655	1241
MHDRE 06 FK	MHDRE 06 FK	64656	1251
MHSU	MHSU	18205	1033
MHSV	MHSV	64609	1025
OD1131186Y00	VEDT-08A-A-16-NC	18324-03	821
OD113118Y00	VEDT-08A-A-12.7-NC	18324-01	817



Code	Description	Data sheet	Page
OD11X18Y00	VED-8I-NC	18324-06	809
OD11X18Y00	VED-8I-NA	18324-07	813
OD11X40Y00	VEDT-08F-A-16	18324-04	825
OD130151Y00	VEDT-08A-32	18324-05	829
OD13X12Y00	VEDS-12A-32	18324-56	861
OD13X51YZ	VED-8I-32	18324-61	833
OD13X77Y00	VED-10A-32	18324-58	845
OD144W78Y00	VED-10A-42	18324-59	849
OD14X58YZ	VED-8I-42	18324-62	837
OD14X58YZ	VED-8I-43	18324-63	841
OD14X78KK2Y00	VEDS-10A-43	18324-64	853
OD14X78KP2Y00	VEPS-10A-43	18324-66	931
OD150304YS0	VEI-8A-2B-16-NC-NSS	18323-15	731
OD150404YS0	VEI-8A-2B-16-NA-NSS	18323-16	767
OD1505176504Z	VESP-12G-16A/00-2A05-N7	18325-04	799
OD15051841YZ	VESP-08A-12A/00-2A05-N7	18325-03	795
OD15052165YZ	VESP-16G-16A/00-2A-N7	18325-05	803
OD1506171DS0Z	VEI-8A-2A-09-NA-S-M-NSS	18325-09	779
OD1506182DS2Z	VEI-8A-2A-06-NA-S-M-NSS	18325-07	771
OD1506211DS2Z	VEI-8A-2A-12-NA-S-M-NSS	18325-10	783
OD1506761DS2Z	VEI-8A-2A-09-NA-S-M-NSS	18325-08	775
OD1532171DS2Z	VEI-8A-2T-09-NA-S-M-NSS	18325-15	791
OD1532181DS2Z	VEI-8A-2T-06-NA-S-M-NSS	18325-16	787
OD15X17YS0	VEI-8A-09-NA	18323-07	751
OD15X17YZ	VEI-8A-09-NC	18323-03	715
OD15X183CZ	VEI-8A-06-NC-ET	18323-09	707
OD15X18YS0	VEI-8I-06-NC	18323-01	695
OD15X18YS0	VEI-8I-06-NA	18323-05	735
OD15X19Z	VEI-8A-06-NC (019-E)	18323-20	703
OD15X19Z	VEI-8A-06-NA	18323-21	743
OD15X21YS0	VEI-8A-12-NA	18323-08	759
OD15X21YZ	VEI-8A-12-NC	18323-04	723
OD15X36YS0	VEI-8A-10-NA	18323-12	747
OD15X36YZ	VEI-8A-10-NC	18323-11	711
OD15X75YS0	VEI-8A-16A-NC	18323-17	727
OD15X75YS0	VEI-8A-16A-NA	18323-18	763
OD15X89YS0	VEI-8A-12A-NA	18323-14	755
OD15X89YZ	VEI-8A-12A-NC	18323-13	719
OD15XYZS	VEI-8A-06-NC	18323-02	699
OD15XYZS0	VEI-8A-06-NA	18323-06	739
OD2101X36	ST-C-10	18321-27	273
OD2101X56	ST-C-06	18321-26	271

Code	Description	Data sheet	Page
OD2101X75	ST-C-16	18321-29	277
OD2101X89	ST-C-12	18321-28	275
OD53X54KK2Y00	VEDS-10A-53	18324-65	857
OD53X54KP2Y00	VEPS-10A-53	18324-67	935
OD55111937Z	VMI-8A-2A-06-NC-VU	18326-02	435
OD55121917Z	VMI-8A-2A-06-NA-VU	18326-04	451
OD55X171700	VMI-8A-2A-09-NA	18326-06	455
OD55X1737Z	VMI-8A-2A-09-NC	18326-05	439
OD55X181700	VMI-8A-2A-06-NA	18326-03	447
OD55X1837Z	VMI-8A-2A-06-NC	18326-01	431
OD55X211700	VMI-8A-2A-12-NA	18326-08	459
OD55X2137Z	VMI-8A-2A-12-NC	18326-07	443
OD6511191400	VPI-8A-2A-06-NC-VU	18326-71	503
OD6512191400	VPI-8A-2A-06-NA-VU	18326-73	519
OD6512211400	VPI-8A-2A-12-NA-VU	18326-78	531
OD65X171400	VPI-8A-2A-09-NC	18326-74	507
OD65X171400	VPI-8A-2A-09-NA	18326-75	523
OD65X181400	VPI-8A-2A-06-NC	18326-70	499
OD65X181400	VPI-8A-2A-06-NA	18326-72	515
OD65X211400	VPI-8A-2A-12-NC	18326-76	511
OD65X211400	VPI-8A-2A-12-NA	18326-77	527
OD751119Y00	VOI-8A-2A-06-NC-VU	18326-41	469
OD751219Y00	VOI-8A-2A-06-NA-VU	18326-43	485
OD75X17Y00	VOI-8A-2A-09-NC	18326-44	473
OD75X17Y00	VOI-8A-2A-09-NA	18326-45	489
OD75X18Y00	VOI-8A-2A-06-NC	18326-40	465
OD75X18Y00	VOI-8A-2A-06-NA	18326-42	481
OD75X21Y00	VOI-8A-2A-12-NC	18326-46	477
OD75X21Y00	VOI-8A-2A-12-NA	18326-47	493
OD910177Y00	VEP-5A-3R-06	18323-60	879
OD910677Y00	VEP-5A-2R-06-P	18323-61	883
OD920277YZ	VEP-5A-2Q-09	18323-64	899
OD92X12Y00	VEP-5A-2Q-14	18323-62	895
OD92X77YZ	VEP-5A-2Q-09	18323-63	891
OD940118YZ	VEP-5B-2S-D	18323-65	867
OD940536YZ	VEP-5B-2S-10A-P	18323-66	871
OD940561YZ	VEP-5B-2S-P	18323-67	875
OD9506897200	VEPN-12A	18323-69	903
OD95311854Y00	VEPN-08A-16	18323-70	907
OD953118Y00	VEP-5A-2T-06-NC	18323-68	887
OD95311954Y00	VEPN-19E-16	18323-71	911
OE11K18YZW	VED-CE-7A/8I-06	18332-10	1547

Code	Description	Data sheet	Page
OE15K17YZW	VEI-CE-8A-09	18332-14	1563
OE15K18YZW	VEI-CE-8A/8I-06	18332-11	1551
OE15K21YZW	VEI-CE-8A-12	18332-13	1559
OE17K18YZW	VEI-CN-8A/8I-06	18332-12	1555
OL17K18YZW	VEI-VCDCBL-8A-06	18332-45	1589
OLKYZW00_19_20_VS30	VEI8A-VS30	18332-41	1573
OLKYZW00_19_20_VSBN	VEI8A-VSBN-08A	18332-40	1569
OLKYZW00_27_28	VSP-19-VEI8A	18332-42	1577
OLKYZW00_29_30	VSP-25-VEI8A	18332-43	1581
OLKYZW00_51_52_ST-06	VEI8A-VU-VS-ST-06	18332-44	1585
ON01KXY00W	ST-C-06-C	18331-01	1415
ON02KXY00W	ST-C-C	18331-02	1419
ON03KXY00W	STVU-08A	18331-03	1423
ON05KXYZW	VRFB-10A-C / VRFE-12A-C	18331-05	1431
ON06KXYZW	VRFD-10A-C / VRFD-12A-C	18331-06	1439
ON07K00YZW	DSDN-C	18331-07	1443
ON08K00YZW	DRFN-C	18331-08	1447
ON09KXY00W	STVU-10A	18331-04	1427
ON10KXYZW	VRFC-10A-C	18331-10	1435
OP0101X29Z	EM-VS30-CETOP 3	18332-73	1607
OP0201X29Z	EM-VSBN-08A-CETOP 3	18332-75	1615
OP14K1829Y	EM-VEI8A/8I-CETOP 3-A	18332-70	1595
OP15K1829Y	EM-VEI8A/8I-CETOP 3-A/B	18332-72	1603
OP16K1829Y	EM-VEI8A/8I-CETOP 3-B	18332-71	1599
OP35KX29Y	EM-VEI8A/8I-VSBN-CETOP 3	18332-74	1611
OP60KX29Y	EM-VEI8A/8I-ST-CETOP 3-T	18332-81	1639
OP61KX29Y	EM-VEI8A/8I-ST-CETOP 3-A1	18332-77	1623
OP62KX29Y	EM-VEI8A/8I-ST-CETOP 3-B1	18332-79	1631
OP63KX29Y	EM-VEI8A/8I-ST-CETOP 3-P1	18332-76	1619
OP64KX29Y	EM-VEI8A/8I-ST-CETOP 3-B	18332-80	1635
OP65KX29Y	EM-VEI8A/8I-ST-CETOP 3-A	18332-78	1627
OR01KXYZW	VSAN-08A-C / VSBN-08A-C	18330-01	1331
OR02KXYZW	VSBN-10A-C	18330-02	1335
OR03KXYZW	VSNG-10A-C	18330-03	1347
OR04KXYZW	VSPN-C	18330-04	1351
OR05KXYZW	VSPC-10A-C	18330-05	1355
OR06KXYZW	VSPY-10A-C / VSPY-12A-C	18330-06	1359
OR07KXYZW	VRPP-C	18330-07	1367
OR08KXYZW	VRPR-C	18330-08	1363
OR09KXYZW	VRPX-10A-C	18330-09	1371
OR1027XYZ	VSC-30-CC	18331-44	1483
OR12KXYZW	VSDN-08A-C	18330-10	1339

Code	Description	Data sheet	Page
OR13KXYZW	VSDN-10A-C	18330-11	1343
OS11K18YZW	VED-CS-7A/8I-06	18331-70	1489
OS13K51YZW	VED-CS-8I-32-06	18331-75	1509
OS13K77YZW	VED-CS-7I-32-06	18331-76	1513
OS14K58YZW	VED-CS-8I-42-06	18331-77	1517
OS14K58YZW	VED-CS-8I-43-06	18331-79	1525
OS14K78YZW	VED-CS-7I-42-09	18331-78	1521
OS14K78YZW	VED-CS-7I-43-09	18331-80	1529
OS15K17YZW	VEI-CS-8A-09	18331-82	1537
OS15K18YZW	VEI-CS-8A/8I-06	18331-71	1493
OS15K19YZW	VEI-CS-8A-06	18331-81	1533
OS15K21YZW	VEI-CS-7A/8A-12	18331-83	1541
OS15K36YZW	VEI-CS-8A-10A	18331-72	1497
OS15K75YZW	VEI-CS-7A/8A-16A	18331-74	1505
OS15K89YZW	VEI-CS-8A-12A	18331-73	1501
OU01K00YZW	VUCN-08A-C	18330-40	1375
OU02K00YZW	VUCN-C	18330-41	1379
OU05K00YZW	VRLA-D-C	18330-42	1459
OU06K00YZW	VRLA-S-C	18330-43	1455
OU07K00YZW	VDS-D-C	18330-44	1463
OU08K00YZW	VDSH-C	18330-45	1467
OU09K00YZW	VLSP-C	18330-46	1451
OV	OV	18316-50	669
OVP	OVP	18316-51	671
OY01KXYZW	VSON-C	18330-70	1383
OY02KXYZW	VBSN-C	18330-72	1391
OY03KXYZW	VBSP-C	18330-74	1399
OY04KXYZW	VBST-C	18330-76	1407
PM5110001800	PM-06	18321-95	539
RD	RD	18316-04	603
RDF	RDF	18316-05	605
RU	RU	18316-10	615
RUF	RUF	18316-11	617
SD	SD	18316-06	607
SF	SF	18316-03	601
SFC-FF	SFC-FF	18316-12	619
SFC-MF	SFC-MF	18316-13	621
SU	SU	18316-08	611
SUM38	SUM38	18316-07	613
VCDC-H-MC	VCDC-H-MC	18316-14	623
VCDC-H-MC	VCDC-H-MC	18316-15	625
VCDC-H-MF	VCDC-H-MF	18316-16	627

Code	Description	Data sheet	Page
VCDC-H-MF	VCDC-H-MF	18316-17	629
VCD-RU	VCD-RU	18316-21	637
VCST 1/2	VCST 1/2	18316-20	635
VCST 1/4	VCST 1/4	18316-18	631
VCST 3/8	VCST 3/8	18316-19	633
VF-MF	VF-MF	18316-01	597
VMP1.100.NG	VMP1-16	18318-36	75
VMR1.100.NG	VMR1-16	18318-35	77
VMR2.240.LG	VMR2-22-LG	18318-38	81
VMR2.240.NG	VMR2-22-FC	18318-37	79
VPN-FF	VPN-FF	18316-85	639
VPN-FF	VPN-FF	18316-86	641
VPN-MF	VPN-MF	18316-87	643
VPN-MF	VPN-MF	18316-88	645
VSQ-20-LM	VSQ-20-LM	18316-60	675
VSQ-30-LM	VSQ-30-LM	18316-62	677
VSQ-30-LM	VSQ-30-LM	18316-63	681
VSQ-60-LM	VSQ-60-LM	18316-61	679
VSQ-CC-LM	VSQ-CC-LM	18316-64	683
VSQ-CC-LM	VSQ-CC-LM	18316-65	685
VT-SSPA	VT-SSPA	30116	1231
VUH-FF	VUH-FF	18316-33	649
VUH-MF	VUH-MF	18316-34	651
VULN-FF	VULN-FF	18316-31	653
VULN-MF	VULN-MF	18316-32	655
VU-MF	VU-MF	18316-36	659
VU-MF	VU-MF	18316-37	661
VUR1.100.00	VUR1-16	18319-01	149
VUR2.240.FC	VUR2-22-FC	18319-02	151
VUR2.240.LG	VUR2-22-LG	18319-03	153



**По вопросам продаж и поддержки обращайтесь:**

Алматы (7273)495-231	Казань (843)206-01-48	Новокузнецк (3843)20-46-81	Смоленск (4812)29-41-54
Архангельск (8182)63-90-72	Калининград (4012)72-03-81	Новосибирск (383)227-86-73	Сочи (862)225-72-31
Астрахань (8512)99-46-04	Калуга (4842)92-23-67	Омск (3812)21-46-40	Ставрополь (8652)20-65-13
Барнаул (3852)73-04-60	Кемерово (3842)65-04-62	Орел (4862)44-53-42	Сургут (3462)77-98-35
Белгород (4722)40-23-64	Киров (8332)68-02-04	Оренбург (3532)37-68-04	Тверь (4822)63-31-35
Брянск (4832)59-03-52	Краснодар (861)203-40-90	Пенза (8412)22-31-16	Томск (3822)98-41-53
Владивосток (423)249-28-31	Красноярск (391)204-63-61	Пермь (342)205-81-47	Тула (4872)74-02-29
Волгоград (844)278-03-48	Курск (4712)77-13-04	Ростов-на-Дону (863)308-18-15	Тюмень (3452)66-21-18
Вологда (8172)26-41-59	Липецк (4742)52-20-81	Рязань (4912)46-61-64	Ульяновск (8422)24-23-59
Воронеж (473)204-51-73	Магнитогорск (3519)55-03-13	Самара (846)206-03-16	Уфа (347)229-48-12
Екатеринбург (343)384-55-89	Москва (495)268-04-70	Санкт-Петербург (812)309-46-40	Хабаровск (4212)92-98-04
Иваново (4932)77-34-06	Мурманск (8152)59-64-93	Саратов (845)249-38-78	Челябинск (351)202-03-61
Ижевск (3412)26-03-58	Набережные Челны (8552)20-53-41	Севастополь (8692)22-31-93	Череповец (8202)49-02-64
Иркутск (395)279-98-46	Нижний Новгород (831)429-08-12	Симферополь (3652)67-13-56	Ярославль (4852)69-52-93
Россия (495)268-04-70	Киргизия (996)312-96-26-47	Казахстан (7172)727-132	