

# ABPAC, ActiveAssist, ActiveShuttle, CytroPac, IMS, A, RFID, XDK

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# Standard power unit

## ABPAC

IoT Gateway

**configurable**

**connectable**

**efficient**





**Filter cooler unit**

**IoT gateway rack**

**Variable-speed motor-pump assembly**

**Mechanical basic elements**

**Accumulator station with accumulator shut-off block**

The ABPAC is a smart standard power unit for all areas in which hydraulic solutions are used and a pressure supply unit is required – for example, in general mechanical engineering, metal-cutting machine tools, as well as in presses and material handling.

**Tank**

**Return flow filter**

**Multifunctional block with pressure filter**

# An individual hydraulic power unit efficiently produced as a serial product: tailored, cost-effective, intelligent

**Hydraulic power units for mechanical engineering are subject to stricter requirements than ever before: they should be powerful, energy-efficient, and quickly available, yet also intelligent, flexible, and of course cost-effective at the same time. With the ABPAC standard power units, Bosch Rexroth has come up with a convincing answer. The online configurator enables you to find your individual solution in no time. Your entry into Industry 4.0?**

## Short delivery times, faster startup

The portfolio of components defined in the modular system can reproduce a wide range of customer-specific power unit solutions via the convenient online configurator. The configurator immediately provides you with all the necessary information – from technical data through to prices. Everything is comprehensively documented. If you require individual solutions outside the modular system, your usual Rexroth contact will be happy to assist you at all times.

Delivery times are drastically reduced due to the use of standard components from Bosch Rexroth's GoTo program, standardized manufacturing processes, and a flexible steel construction concept without welding.

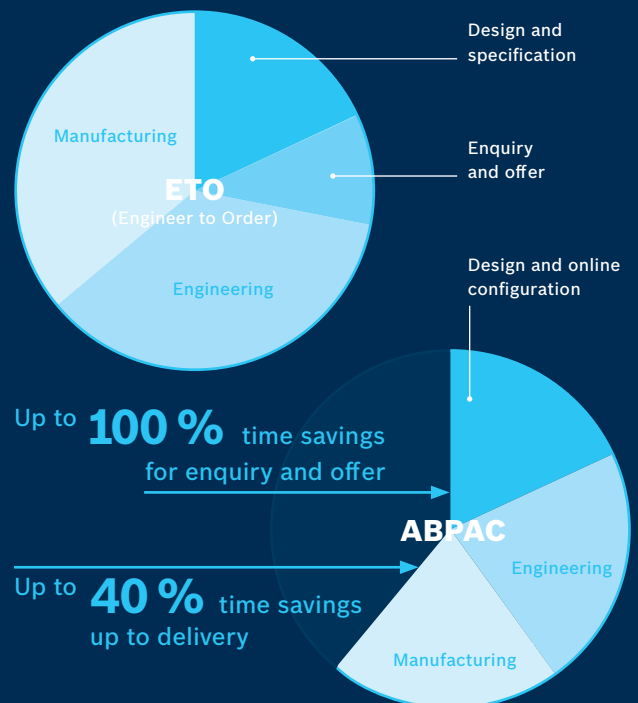
## Ready for IoT

The IoT gateway software offers you transparency for your machine and process data. Real-time monitoring of process data, such as temperature, pressure and vibration, ensures consistently high quality in production. Rule-based evaluation of specific information simplifies predictive maintenance of your systems.

## SPECIAL PROPERTIES

- ▶ Browser-based configuration
- ▶ Rapid design and transparency
- ▶ Visualization via web app
- ▶ Open interfaces
- ▶ Integration of a variety of different data sources
- ▶ Interface to big data systems (e.g. ODin)

## POWER UNITS IN A FLASH



The online configurator delivers time savings of up to 100 % at the enquiry and offer stage; standard modules reduce engineering and production outlay by up to 40 %.



# Consistently modular: never before was a standard power unit so easy to individualize and so efficient to produce.



## **Multifunctional block: with all basic functions and with variable interfaces**

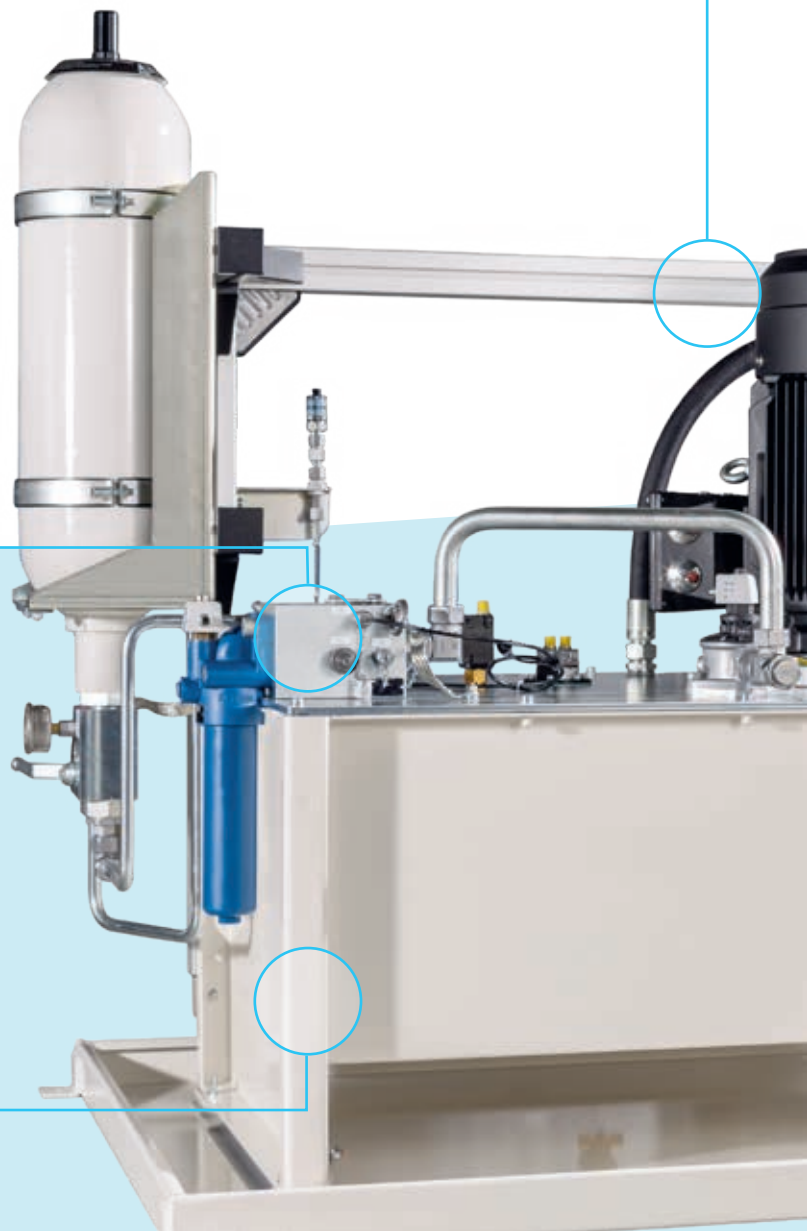
The extremely compact multifunctional block contains all the standard basic functions you need – from pressure filtration through to the bypass for FcP/SvP applications. It is the central interface to advanced hydraulic control systems. This saves space, reduces the piping work and gives you the option to integrate the hydraulic control either in the ABPAC or in the machine. There are four designs available in two sizes (with/without pressure filtration as well as with/without mounting option for the standard hydraulic control IH20).

## **Clever design: screws instead of welding**

The steel construction and tank concept provide unprecedented flexibility. The standardized basic tanks require no welded-on elements and are available in tank capacities between 100 and 630 liters. The variance is in the assembly instead of the steel construction as is usual, which considerably reduces delivery and commissioning times. Individual adjustments can be made without any problems via the screwed cover. The ratio between hydraulic power and tank capacities can be easily optimized, depending on the application.

## **Mechanical basic elements: flexible set-ups, extensions, adjustments**

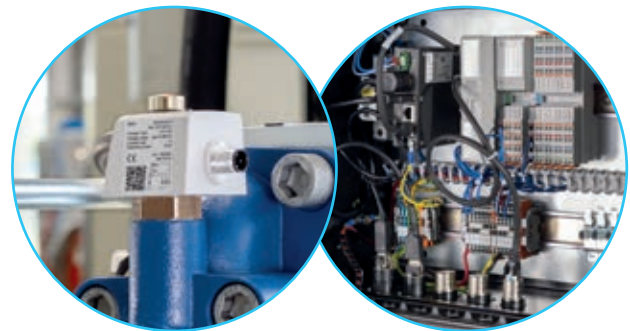
The Rexroth mechanical basic elements fit anywhere on each side of the tank. The dimensions are variable in this respect, with the variance arising only in assembly. This offers a high degree of flexibility and allows customer-specific add-ons to realize easily.





**Save energy:  
with variable-speed Sytronix drives**

You can save a lot of energy and money when you optionally use drives from the Sytronix modular system. The FcP 5020 and SvP 7020 variable-speed drives are not only particularly powerful and quiet, more importantly, they save up to 80 % energy!



**Connectable:  
i4.0-ready thanks to comprehensive sensor package**

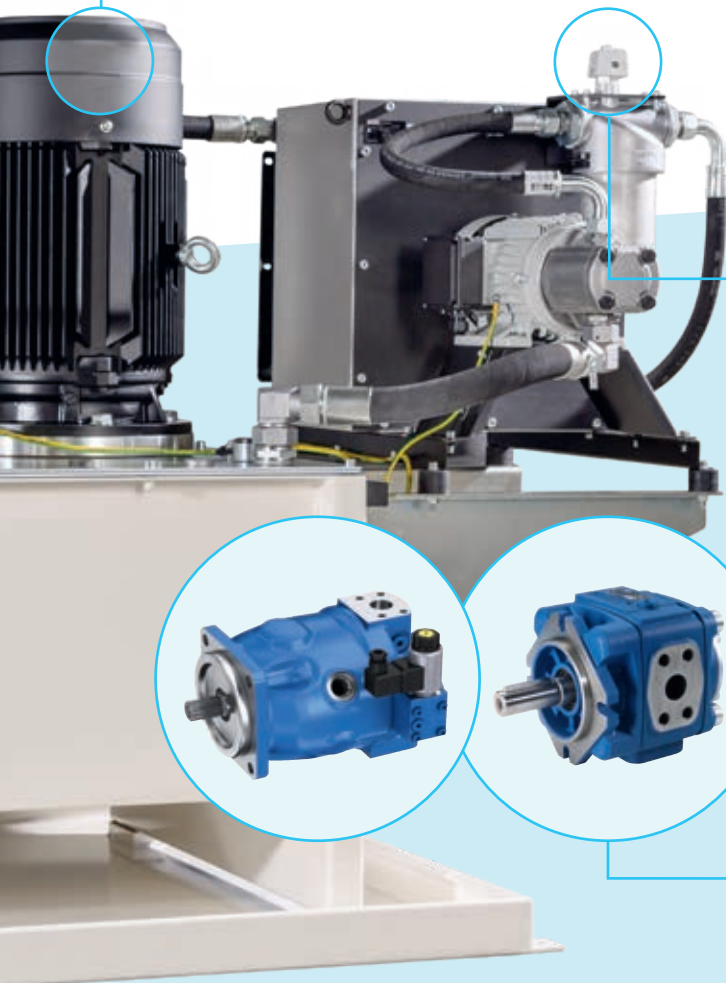
A comprehensive and universal sensor package continuously records all relevant system states, such as oil quality, efficiency, pressures, filling levels and temperatures. Pre-evaluation and forwarding via the IoT gateway enable predictive condition monitoring. The ABPAC can be connected vertically and horizontally. Visualization of power unit states can be performed simply by means of an intuitive web browser interface. The IoT gateway concept therefore requires minimal effort for commissioning and offers optimally convenient operation.

**Individual:  
the right drive for every application**

With the different fixed and variable displacement pumps you can easily implement your individual drive concept. And in the smallest space – with the same performance range. The current motor standards (IE3 as standard) are thereby complied with at all times.

Available pumps:

- ▶ Internal gear pumps (PGH, PGF, fixed displacement pumps installed vertically)
- ▶ External gear pumps (AZPJ [Silence Plus])
- ▶ Axial piston pumps (A10VSO/31, variable displacement pumps installed horizontally)



# ABPAC Marine – for applications on the high seas

## THE ADVANTAGES AT A GLANCE



### Efficient

- ▶ Price savings owing to standardization, for example as a result of pre-defined parts list with fewer variants
- ▶ Shorter development time thanks to simple configuration



### Fast

- ▶ Reduced delivery times due to standardized components – for example from the GoTo program
- ▶ Binding offer within a matter of days



### Simple

- ▶ Application-specific online configuration instead of the former engineer-to-order process



### Certified

- ▶ Approved by Lloyd's Register for Marine & Offshore
- ▶ Further certifications on request



### Environmentally friendly

- ▶ Use of environmentally acceptable hydraulic fluids possible



**The ABPAC Marine power unit design has been optimized especially for applications on board of ships in order to ensure long-term pressure supply under deck.**

### Special technical features

- ▶ Choice of components for marine and offshore conditions: relative air humidity of 50% to 90%, temperature range of 0 °C to +45 °C
- ▶ High-efficiency marine motors of energy-efficiency class IE3
- ▶ Fluid tanks approved by Lloyd's Register with bolted tank covers
- ▶ Slosh-proof tank breathing, mounted on extension pipe
- ▶ High-quality corrosion protection of all surfaces (based on ISO 12944-2; C4 medium)
- ▶ Lifting eyes for all tank sizes
- ▶ Larger bending radii for pressure lines (3 x OD)

### Options

- ▶ Certifications by other classification societies on request
- ▶ Customer-specific adaptations possible at any time – for example redundant motor-pump groups
- ▶ Operation with environmentally acceptable hydraulic fluids in accordance with ISO 15380
- ▶ Tank made of stainless chrome-nickel steel
- ▶ Water-absorbing tank breathing filter
- ▶ Fluid measuring rod
- ▶ Filter made of cast iron or steel
- ▶ Cleaning opening with steel cover
- ▶ Additional fluid drip tray
- ▶ Fluid/seawater heat exchanger
- ▶ Terminal box with marine-specific cabling



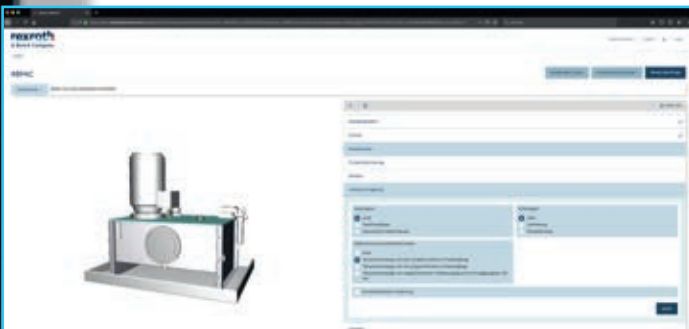
ABPAC Marine Power Units are type approved from Lloyd's Register (LR). This saves time and costs during subsequent approval of the complete machine. Rexroth standard power units are used both in non-essential and in essential equipment.



# Easy to configure online: get your own solution with just a few clicks



The ABPAC is consistently modular in design and can be configured in a few clicks with the online configurator based on the requirements and hydraulic assemblies required. The software tool guides you clearly through the process. It queries the hydraulic and technical key data, such as working pressure, flow, and the type of actuator, and proposes the appropriate assemblies.



As soon as the configuration is complete, the program produces a complete documentation package with initial information on installation dimensions, parts lists, price, and delivery time. You can quickly and easily jump to customer-specific adaptations at any time. Additional assemblies such as coolers or control systems can also be configured. You can therefore design a customized power unit more easily than ever before.



## ADVANTAGES AT A GLANCE

- + **Online configurator** for customized power units including documentation
- + Intelligent **condition monitoring** via standardized bus interface and advanced sensor technology
- + User-driven, platform-neutral **visualizations** on smart devices
- + Sytronix FcP and SvP (optional) for increased **energy efficiency** and **noise reduction**
- + Basic functions integrated in the **multifunctional block**
- + **Interface** to additional hydraulic control concepts
- + Wide **area of applications**: metal-cutting machine tools, wood processing, presses, plastics processing machines, etc.
- + Products from the GoTo program for **optimized delivery times**

# Configurations

## TECHNICAL KEY DATA

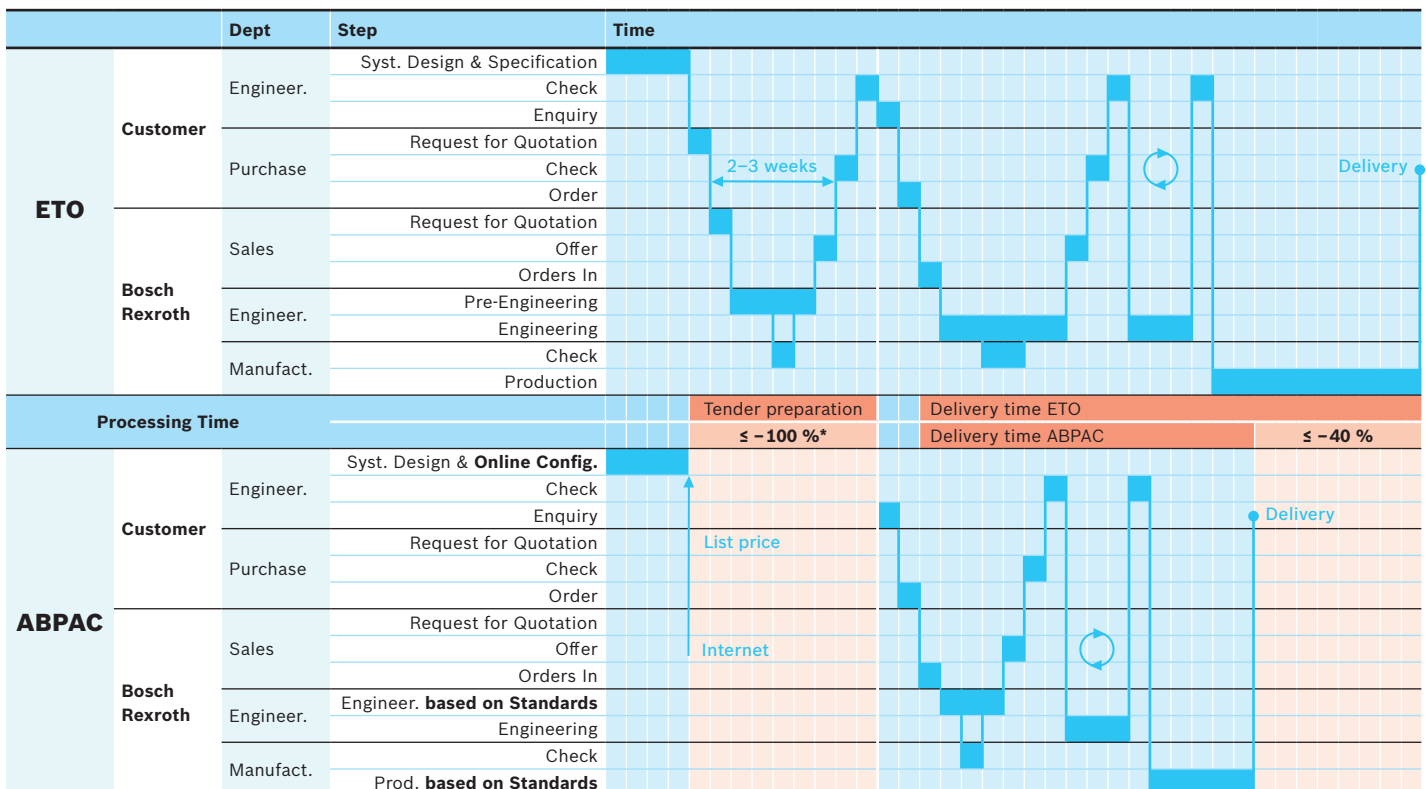
- ▶ Tank capacity: 100 to 630 liters
- ▶ Flow: max. 200 l/min
- ▶ Operating pressure: max. 315 bar
- ▶ Multifunctional block: in 4 designs
- ▶ Sytronix modular system: optionally FcP 5020
- ▶ Design: simplified, flexible steel construction

Power unit variants	Pump types	Q <sub>thmax</sub> l/min 1,450 rpm	Pressure Tank	Nominal power electric motor [kW]													
				3	4	5,5	7,5	11	15	18,5	22	30	37	45	55	75	
with fixed displacement pump	PGF2-2X/019	27	p [bar] Size	<b>82</b> 100	<b>112</b> 100 160	<b>153</b> 100 160	<b>210</b> 160 250										
	PGF3-3X/020	29	p [bar] Size	<b>67</b> 100	<b>94</b> 100 160	<b>130</b> 100 160	<b>195</b> 160 250	<b>210</b> 160 250									
	PGF3-3X/025	36	p [bar] Size	<b>53</b> 160	<b>76</b> 160	<b>105</b> 160	<b>156</b> 160 250	<b>210</b> 160 250									
	PGF3-3X/032	47	p [bar] Size		<b>65</b> 160	<b>89</b> 160	<b>132</b> 160 250	<b>180</b> 160 250	<b>210</b> 250 400								
	PGF3-3X/040	58	p [bar] Size			<b>63</b> 250	<b>97</b> 250	<b>135</b> 250	<b>169</b> 250 400	<b>180</b> 250 400							
	PGH4-X/020	29	p [bar] Size					<b>203</b> 160 250	<b>280</b> 160 250	<b>315</b> 250 400							
	PGH4-X/025	36	p [bar] Size					<b>161</b> 160 250	<b>221</b> 160 250	<b>274</b> 250 400	<b>315</b> 250 400						
	PGH4-X/032	47	p [bar] Size						<b>173</b> 160 250	<b>212</b> 250 400	<b>252</b> 250 400	<b>315</b> 250 400					
	PGH4-X/040	58	p [bar] Size							<b>174</b> 250 400	<b>207</b> 250 400	<b>281</b> 250 400	<b>315</b> 400				
	PGH4-X/050	73	p [bar] Size							<b>142</b> 250 400	<b>170</b> 250 400	<b>233</b> 250 400	<b>250</b> 400	<b>250</b> 400			
PGH5-X/063	93	p [bar] Size								<b>127</b> 400	<b>175</b> 400	<b>216</b> 400	<b>265</b> 400				
with external gear pump	AZPJ-22-016	22	p [bar] Size	<b>67</b> 100	<b>91</b> 100	<b>127</b> 100 160	<b>174</b> 100 160	<b>250</b> 160 250									
	AZPJ-22-019	27	p [bar] Size	<b>57</b> 100	<b>77</b> 100	<b>107</b> 100 160	<b>147</b> 100 160	<b>215</b> 160 250	<b>250</b> 160 250								
	AZPJ-22-022	31	p [bar] Size		<b>64</b> 100 160	<b>89</b> 100 160	<b>123</b> 100 160	<b>181</b> 160 250	<b>210</b> 160 250								
	AZPJ-22-025	35	p [bar] Size			<b>81</b> 160	<b>111</b> 160	<b>165</b> 160 250	<b>185</b> 160 250								
	AZPJ-22-028	39	p [bar] Size			<b>71</b> 160	<b>98</b> 160	<b>130</b> 160 250									
with control pump and DFR1 controller	A10VSO 18	26	p [bar] Size	<b>90</b> 100	<b>110</b> 100	<b>138</b> 100	<b>228</b> 160	<b>280</b> 160									
	A10VSO 28	40	p [bar] Size		<b>70</b> 160	<b>95</b> 160	<b>132</b> 160 250	<b>180</b> 160 250	<b>222</b> 250	<b>280</b> 250							
	A10VSO 45	65	p [bar] Size			<b>60</b> 250	<b>81</b> 250	<b>111</b> 250	<b>137</b> 250 400	<b>162</b> 250 400	<b>222</b> 400 630	<b>280</b> 400 630					
	A10VSO 71	102	p [bar] Size						<b>72</b> 400	<b>89</b> 400	<b>106</b> 400	<b>144</b> 400 630	<b>178</b> 400 630	<b>220</b> 400 630	<b>280</b> 630		
	A10VSO 100	145	p [bar] Size							<b>61</b> 400	<b>73</b> 400	<b>99</b> 400 630	<b>136</b> 400 630	<b>170</b> 400 630	<b>205</b> 630	<b>280</b> 630	
	A10VSO 140	203	p [bar] Size										<b>119</b> 630	<b>146</b> 630	<b>200</b> 630		
with control pump and DFLR controller	A10VSO 45	65	p max [bar] Size				<b>280</b> 250										
	A10VSO 71	102	p max [bar] Size					<b>280</b> 400	<b>280</b> 400	<b>280</b> 400							
	A10VSO 100	145	p max [bar] Size							<b>280</b> 400	<b>280</b> 400						

**ABPAC hydraulic power unit configurations with Sytronix FCP 5020**

Pumps						Motors					
$n_{max} = 3,000$ (PGH); $3,600$ (PGF) rpm						4	5,5	7,5	11	15	$P_{nom}$ [kW]
Typ	Size	$p_{cont}$ [bar]	$p_{max}$ [bar]	$Q_{peff}$ [l/min]	$Q_{max}$ [l/min]	4,000	4,000	4,000	3,800	3,800	$n_{max}$ [rpm]
PGF2	8.0	210	250	19	29	139					p <sub>eff</sub> [bar] (without efficiency)
Tank Size						100					
PGF2	13.0	210	250	31	47		119				
Tank Size							100 160				
PGF2	19.0	210	250	46	68		84	114			
Tank Size							160	160 250			
PGH2	8.0	315	350	19	24	143	198	269			
Tank Size						100	100	100			
PGH3	13.0	315	350	31	39	88	122	166	244		
Tank Size						100 160	100 160	100 160	160		
PGH4	20.0	315	350	48	60		79	108	158	216	
Tank Size							160	160 250	160 250	160 250	
PGH4	32.0	315	350	77	98				99	135	
Tank Size									250	250 400	
PGH4	50.0	250	310	120	152					86	
Tank Size										400	

**Reduced delivery times due to online configuration and standard components**



\* In case of special requests, processing time extends accordingly





## ActiveAssist

The assistance system for

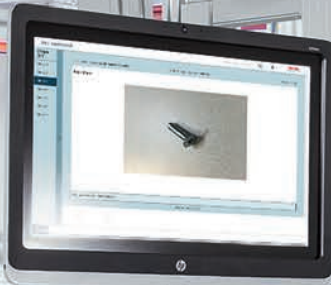
multi-variant assembly tasks





ActiveAssist

ActiveAssist



**WE MOVE.  
YOU WIN.**

# The freely configurable all-in-one system: modular, networked, interactive

**With the ActiveAssist interactive assembly system, Rexroth concentrates its years of experience in the fields of lean production and ergonomic workstation design – and is expanding on this with pioneering Industry 4.0 intelligence.**

**At the heart of ActiveAssist is a freely configurable software that connects physical assembly workstations with the virtual world: completely networked, modularly extendable, easily integrated, and above all, extremely quick and easy to learn.**

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6	The software
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## **13 ActiveAssist MODULES**

14	ActiveAssist basic set
16	ActiveAssist projection module
19	ActiveAssist hand-tracking module

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## **23 ActiveAssist INTERFACES**

24	ECI – Interface for external communication
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## **25 ActiveAssist EXTENSION MODULES**

26	Tool control unit extension module
28	Tool integration extension module
29	Tool localization extension module
33	Product identification, bar code scanner

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## **35 ActiveAssist ACCESSORIES**

36	Label projection 45°
37	HEAP connection kit
38	Input unit push button

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# How can you assemble, order pick and produce multiple variants easily today?



# How can you plan and configure more effectively and keep an overview?





**How do you ensure productivity with a batch size of 1 or steadily increasing variant diversity?**

**How do you respond to poor process reliability during manual assembly?**

**The answer: through flexible production systems with extremely short conversion times. Ideally globally networked and throughout all phases, from creating users through to compiling interactive work instructions.**

#### **THE PERFECT ASSISTANCE - FOR ASSEMBLY WORKERS AND PRODUCTION PLANNERS**

The development of ActiveAssist was based on everyday practice. The sophisticated software will enable you to quickly achieve a highly flexible and easy-to-use step by step assistance system for your employees.

#### **INTUITIVE LEARNING AND APPLICATION**

Assembly workers intuitively learn the assembly processes, are precisely led through the individual work steps and made aware of their errors. This allows the objective of "Single-Piece-Flow" to be easily achieved.

#### **INTEGRATED PLANNING AND CONTROL**

With ActiveAssist, planners are provided with a comfortable software tool to ensure the highest process reliability even with product changes at short notice. Using standard interfaces, ActiveAssist can easily be integrated with customer networks.

Get to know a highly effective system which, in its basic package, includes all the ideal features to enhance the quality and productivity of your assembly process. Introducing ActiveAssist.

# ActiveAssist - in essence, a software that delivers an all-in-one solution



**Configure the ActiveAssist all-in-one system according to your individual requirements: be it with just the basic set, with extensions for visualization and hand-tracking, or with additional extension modules.**



**Interactive work instruction**



**Visualization**



**Hand-tracking**



**MES/ERP connectivity**



**Tool control**



**Tool integration**



**Tool localization**



**Bar code scanner**



**Product identification HF**



**Pick-to-light**

## YOUR ADVANTAGES AT A GLANCE



### Increased process reliability

Quickly and easily create standardized processes that are constantly checked by the software. The product can also identify itself. This gives you increased process reliability, even with a high degree of product variation – key factors for cost-efficient assembly.



### Easy configuration

Web-based start - without programming - is possible; in this way, you benefit from a short implementation time as compared to classic pick-to-light sensors.



### Precise interaction

The intuitive step-by-step guidance guides employees safely and precisely even through more demanding assembly tasks. By incorporating touchscreens, 3D cameras and projectors, various interactive assistance functions can be realized: from the projection of work instructions and light pulse guidance right through to the integration of tightening systems.



### Optimum networking

Thanks to the web-based software with standardized interfaces, ActiveAssist is a completely flexible and open system. This enables you to seamlessly network all systems and assembly stations. And gives you worldwide access to your data within a network. Assembly 4.0, so to speak.



### Improved ergonomics

The intuitive operation and individual support given to employees increases motivation, performance and efficiency. This reduces stress, errors, and downtimes, improving both the quality of the work and the product.



### Built-in future-proof functionality

The modular design with continuously expandable functions ensures you also have the flexibility to address all the future requirements of tomorrow.



### Summed up: higher efficiency

At last you can also produce manual assembly batch sizes of 1 economically with minimized waste and maximum quality.

# Assembly assistance 4.0: Reach your target faster, completely networked with the ActiveAssist software

**For improved planning, administration, and assembly: ActiveAssist provides continuous support for planners and workers, from the creation of users to the interactive employee guidance. Everything already included in the basic set.**

## ORDER MANAGEMENT

- ▶ Status display of production orders
- ▶ Connection to MES/ERP systems via XML file folder or REST API
- ▶ Create, pause and continue orders

## USER MANAGEMENT

- ▶ Create and manage users and user groups
- ▶ Store user settings in a personal account (e.g. language, font size, etc.)

**Manage your manual production, networked and with a complete overview!**

**Give every user the appropriate functions and content!**





### DEVICE MANAGEMENT

- ▶ Create a virtual image of the physical workstation
- ▶ Configure the material supply
- ▶ Configure additional devices such as pick-to-light, input unit, etc.
- ▶ Integrate open-protocol-enabled screwdrivers/tools
- ▶ Precise control of the tightening process via ultrasonic positioning technology

**Configure each workstation quickly and easily!**

### WORK PLAN MANAGEMENT

- ▶ Quickly create work places by means of standardized templates
- ▶ Insert media data such as photos, videos, drawings, and PDFs
- ▶ Create, configure and place illuminated marks by means of Drag&Drop (geometric forms as well as images of components)
- ▶ Create, configure, and place step-based text projections
- ▶ Modify and copy work plans to quickly and easily create documentation for individual product variants

**Create transparency and support your employees in a variant-specific manner by means of standardization!**

### EMPLOYEE GUIDANCE

- ▶ The correct variant documentation for the product is always available
- ▶ The employee is interactively and precisely guided through the process step by step
- ▶ The content and depth of the work instruction information can be individually adapted to the complexity of the process

**Support your assembly workers in their daily work!**



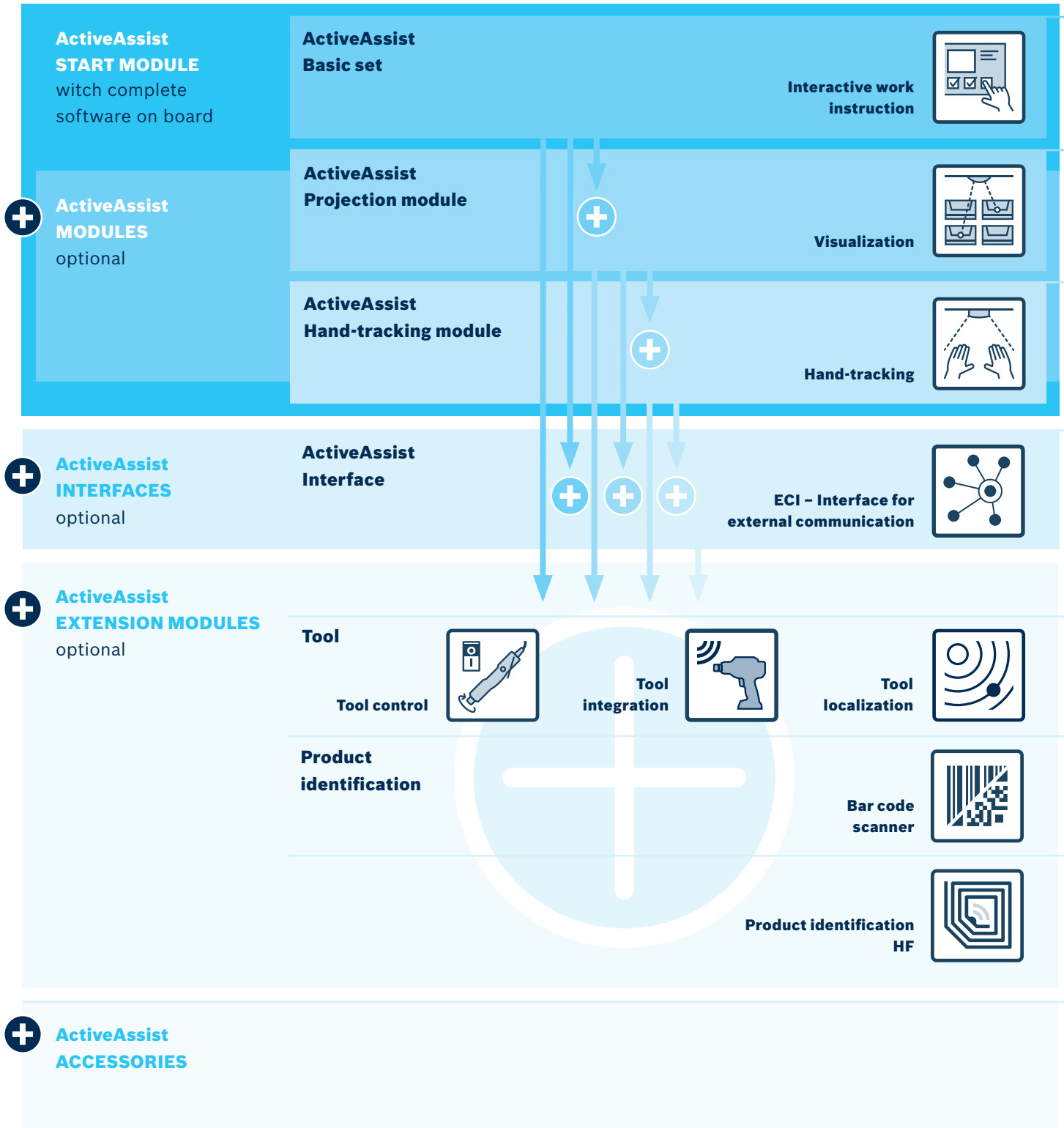
**OPERATIVE ASSEMBLY - PRODUCTION**

### THE RESULT?

**Interactive assembly assistance that is perfectly adapted to the individual requirements!**

# ActiveAssist product structure

## MODULES



## ActiveAssist HARDWARE AND SOFTWARE

<b>ActiveAssist basic set</b>	3 842 557 <b>968</b>	Complete ActiveAssist software, control cabinet incl. industrial PC, touchscreen 23", monitor bracket (swivel mounting)
<b>ActiveAssist projection module</b>	3 842 558 <b>335</b>	Projector unit
<b>ActiveAssist hand-tracking module</b>	3 842 558 <b>436</b>	3D camera module
<b>ECI – Interface for external communication</b>	3 842 562 <b>139</b>	Software license
<b>Tool control unit extension module</b>	3 842 558 <b>447</b>	Tool control
<b>Tool integration extension module</b>	3 842 558 <b>603</b>	License stick
<b>Tool localization extension module</b>	3 842 558 <b>448</b>	Ultrasonic receiver / transmitter, mounting plate
<b>Bar code scanner product ident 433</b>	3 842 558 <b>437</b>	based on 433 Hz
<b>Bar code scanner product ident BT</b>	3 842 558 <b>578</b>	based on Bluetooth
		on request
<b>Label projection 45°</b>	3 842 558 <b>560</b>	
<b>HEAP connection kit</b>	3 842 558 <b>344</b>	
<b>Input unit push button</b>	3 842 558 <b>439</b>	Button unit with three push buttons



# ActiveAssist modules

2



<b>ActiveAssist basic set</b>	<b>14</b>
<b>ActiveAssist projection module</b>	<b>16</b>
<b>ActiveAssist hand-tracking module</b>	<b>19</b>

# ActiveAssist basic set



The ActiveAssist basic set is the basis for every ActiveAssist system. The ActiveAssist basic set is used for the digitization and standardization of manual assembly processes.

## ACCESSORIES

### Required accessories

- ▶ Country-specific mains cable

## DELIVERY INFORMATION

### Scope of delivery

- ▶ ActiveAssist software key for Release 2.0
- ▶ Control cabinet (incl. industrial PC)
- ▶ 23" touchscreen incl. monitor bracket
- ▶ Data bar (3x USB connections, 2x network connections)
- ▶ Incl. required cables

- ▶ For setting up the software and managing the assembly workstation using a planning menu:
  - User management
  - Order management
  - Device manager
  - Work plan management
- ▶ Work plans created in the planning menu are displayed to the production employee as step-by-step instructions on the supplied touchscreen
- ▶ Process steps can be manually confirmed by touching the monitor or using the input unit push button
- ▶ Operation and configuration is performed via the supplied touchscreen
- ▶ With a Modbus interface for integrating sensors, such as pick-to-light modules (available on request, technology: Modbus TCP, PNP switching)

### Notice:

- ▶ Unless otherwise specified, the ActiveAssist software is only compatible with hardware components from Bosch Rexroth
- ▶ The ActiveAssist basic set comes with Release 2.0 of the ActiveAssist software. Future versions are not included in the product scope
- ▶ The latest version of the ActiveAssist software can be downloaded in the product download area

### Recommended accessories

- ▶ Input unit push button
- ▶ For comfortable operation, a keyboard / mouse combination is recommended (not included in the scope of delivery)

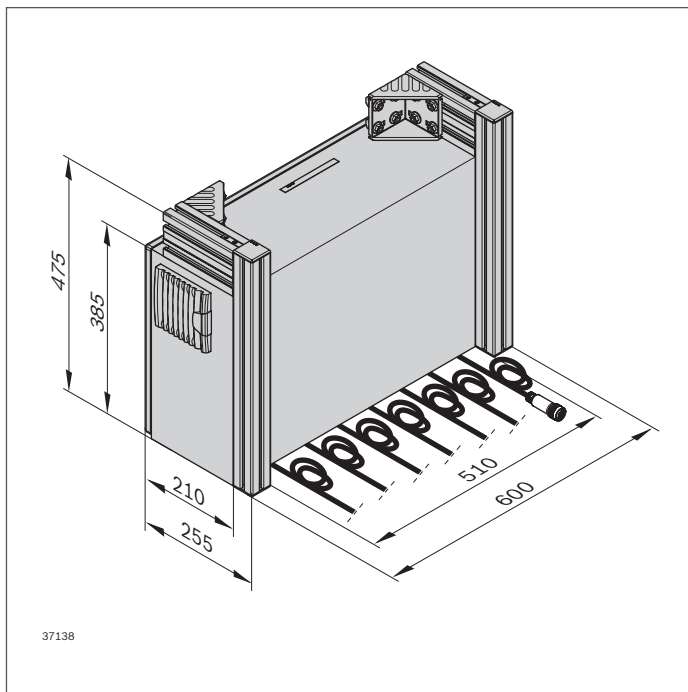
**ORDERING INFORMATION**

Product designation		Material number	
ActiveAssist basic set		3 842 557 968	

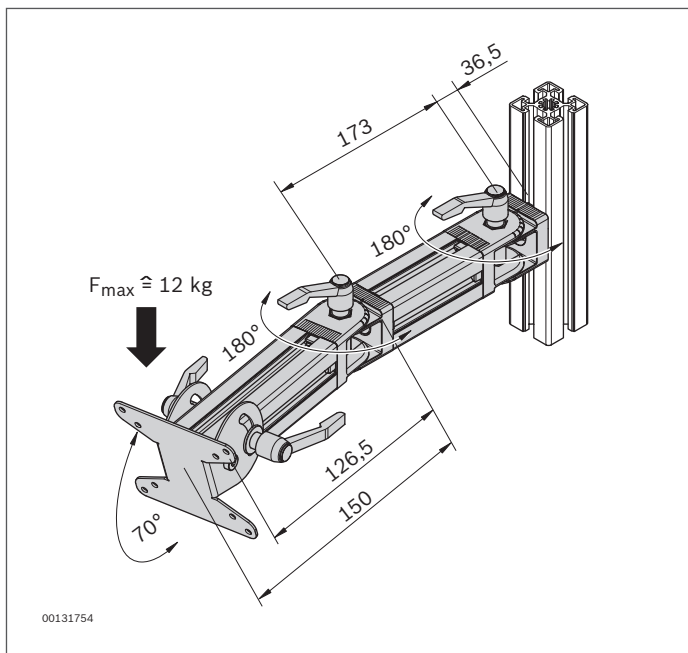
  

Product designation	Country	L (m)	Material number
Mains cable*	D/F	5	3 842 517 045
	GB	5	3 842 522 585
	CH	5	3 842 523 910
	open end	5	3 842 517 201

\* HD mains cables can be found in the Manual Production Systems catalog

**TECHNICAL DATA**

Material number		3 842 557 968
<b>Control cabinet properties</b>		
Weight	kg	27.4
<b>Control cabinet dimensions</b>		
Width	mm	650
Height	mm	500
Depth	mm	260
Slot		10
<b>Monitor properties</b>		
Weight	kg	6.5
<b>Monitor dimensions</b>		
Screen diagonal	"	23
Width	mm	517.5
Height	mm	313.5
Depth	mm	65
Slot		10
<b>Additional information</b>		
Certification		CE



# ActiveAssist projection module



The ActiveAssist projection module guides employees through the assembly process by means of projected instructions and illuminated marks and symbols.

## ACCESSORIES

### Required accessories

- ▶ ActiveAssist basic set

## DELIVERY INFORMATION

### Scope of delivery

- ▶ Projection module incl. fastening kit and required cables (e.g. control cable for beamer)

## ORDERING INFORMATION

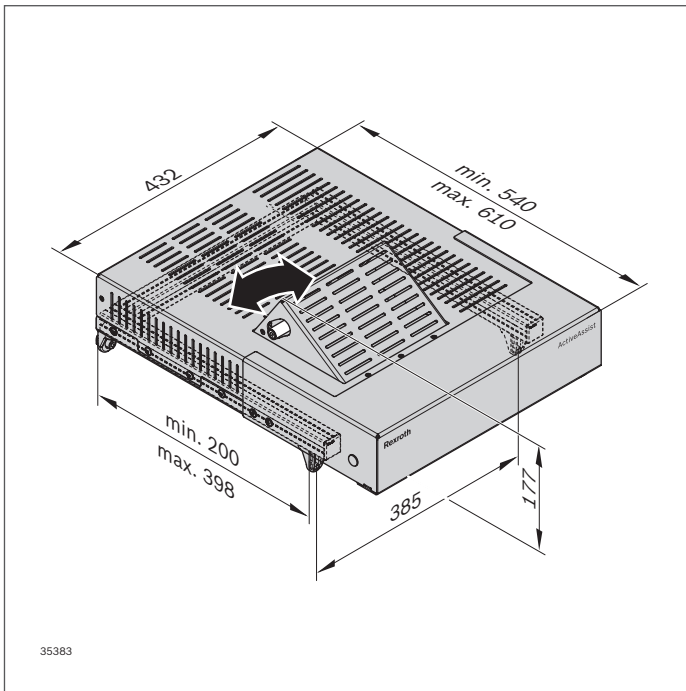
Product designation	Material number
ActiveAssist projection module	3 842 558 335

- ▶ In addition to the touch monitor, work steps are projected directly onto the table surface by the projection module, thus ensuring optimum ergonomics in the workstation
- ▶ Illuminated marks can be projected onto the product features or tightening positions, giving the employee full process guidance
- ▶ The color and shape of the illuminated marks are freely selectable and can be scaled and placed in the work area using drag and drop
- ▶ The quantity of parts to be taken from the grab containers can be displayed on labels projection 45° (see Section ActiveAssist accessories)
- ▶ The work steps are manually confirmed by touching the monitor or using the input unit push button (accessories)
- ▶ In cooperation with the hand-tracking module, the correct grab containers from which the material is to be grabbed are illuminated
- ▶ Easy set-up of the beamer settings via the Industrial PC

### Recommended accessories

- ▶ Input unit push button
- ▶ Label projection 45°



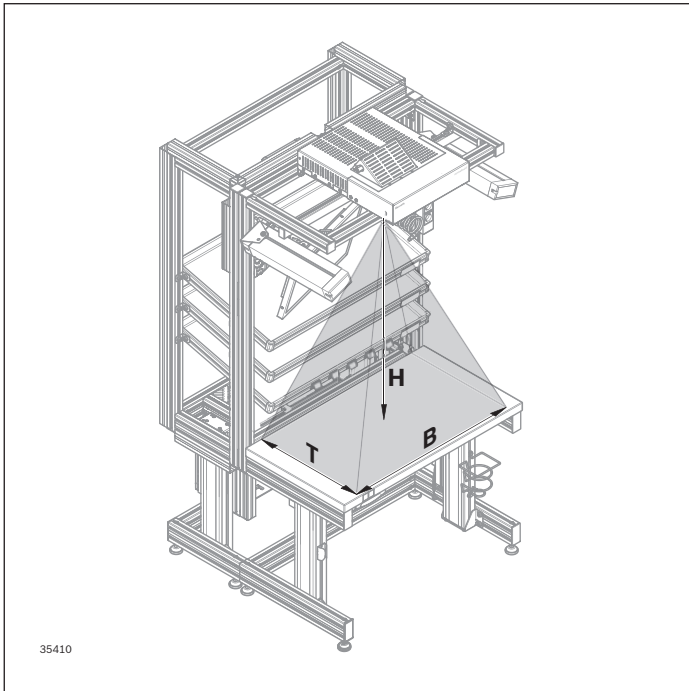
**TECHNICAL DATA****Notice:**

The ActiveAssist system can be used on a height-adjustable workstation. Since the areas projected by the projector are always taught in at a certain height, it is important that the table surface and the parts storage (accessory upright) or the roller sections with the boxes are always adjusted simultaneously and at a height relative to the projection module. If, for example, the height of the projection module remains the same and the table surface and accessory upright are adjusted after teaching the projections, the geometry of the projections will be incorrect and the system will have to be reconfigured.

2

<b>Material number</b>	<b>3 842 558 335</b>	
<b>Properties</b>		
Weight	kg	8.8
<b>Optical properties</b>		
Projection adjustment range	°	±5
<b>Dimensions</b>		
Slot		8; 10
<b>Additional information</b>		
Certification		CE

## PROJECT PLANNING NOTES



### Projection range

<b>H (mm)</b>	<b>T ≈ 0.5 x H + 65 D (mm)</b>	<b>B ≈ 0.9 x H + 100 W (mm)</b>
700	445	721
800	499	810
900	553	899
1000	607	988
1100	662	1077
1200	716	1166
1300	770	1255
1400	824	1344
1500	878	1433

- H** Height of projection area (vertical distance to the projector)
- D** Depth of projection area
- W** Width of projection area

# ActiveAssist hand-tracking module



2



- ▶ By means of the 3D camera's depth sensor, the hand-tracking module checks the correct component selection in the material supply or the correct hand position of the operator in the assembly area. This determines if the process is being followed correctly, according to the work plan, and can then automatically move on to the next process step if required
- ▶ With the aid of freely scalable and placeable virtual buttons on the work surface, process steps are confirmed by a hand gesture and the next step is automatically visually displayed in the work plan

The ActiveAssist hand-tracking module increases process reliability by matching the employee's hand movements with the specified work plans.

## ACCESSORIES

### Required accessories

- ▶ ActiveAssist basic set
- ▶ ActiveAssist projection module

### Recommended accessories

- ▶ Label projection 45°

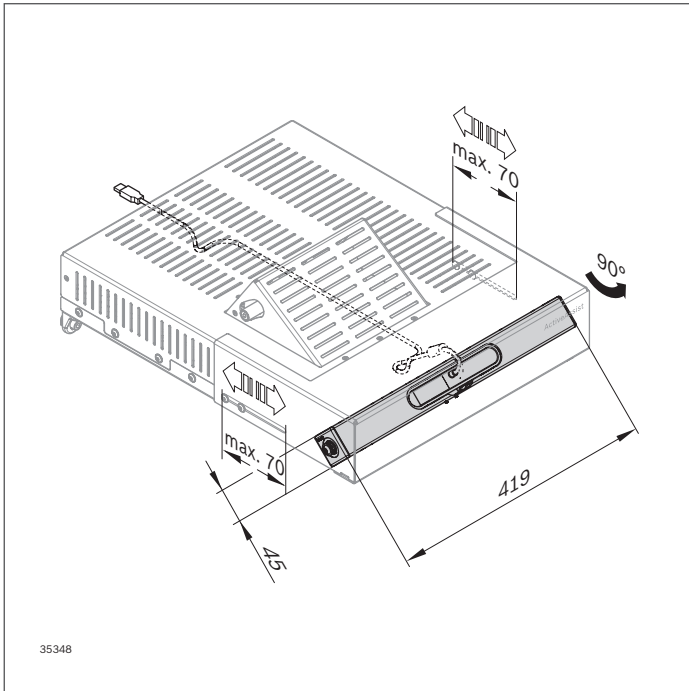
## DELIVERY INFORMATION

### Scope of delivery

- ▶ Hand-tracking module incl. fastening kit and required cables

## ORDERING INFORMATION

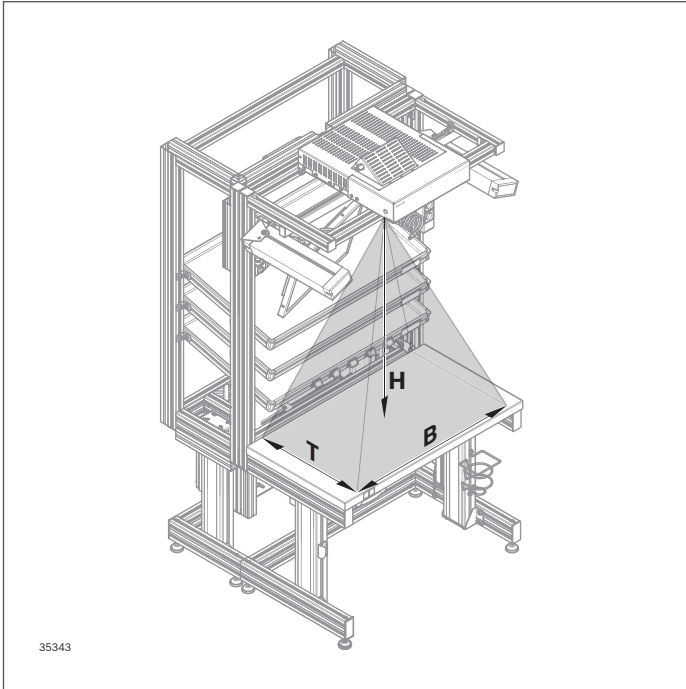
Product designation	Material number
ActiveAssist hand-tracking module	3 842 558 436

**TECHNICAL DATA****Notice:**

The ActiveAssist system can be used on a height-adjustable workstation. Since the areas checked by the depth-sensing camera are always taught in at a certain height, it is important that the table surface and the parts storage (accessory upright) or the roller sections with the boxes are always adjusted simultaneously and at a height relative to the hand-tracking module. If, for example, the height of the hand-tracking module remains the same and the table surface and accessory upright are adjusted after teaching in the coordinates, the depth coordinates will be incorrect and the system will have to be reconfigured.

<b>Material number</b>		<b>3 842 558 436</b>
<b>Properties</b>		
Weight	kg	1.8
Total weight incl. projection module	kg	10.6
<b>Optical properties</b>		
Camera module offset	mm	70
Rotary adjustment range	°	90
<b>Additional information</b>		
Certification		CE



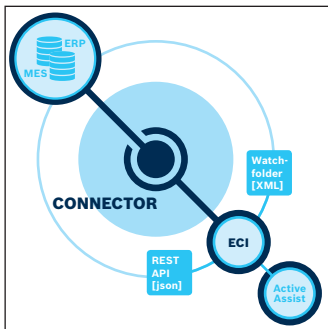
**PROJECT PLANNING NOTES****Camera detection range**

<b>H (mm)</b>	<b>T <math>\approx 0.9 \times H</math> D (mm)</b>	<b>W <math>\approx 1.1 \times H</math> W (mm)</b>
700	663	808
800	746	924
900	839	1039
1000	993	1156
1100	1026	1270
1200	1119	1386
1300	1212	1501
1400	1306	1617
1500	1399	1732

- H** Height of detection area (vertical distance to the camera)
- D** Depth of detection area
- W** Width of detection area

# ActiveAssist interfaces

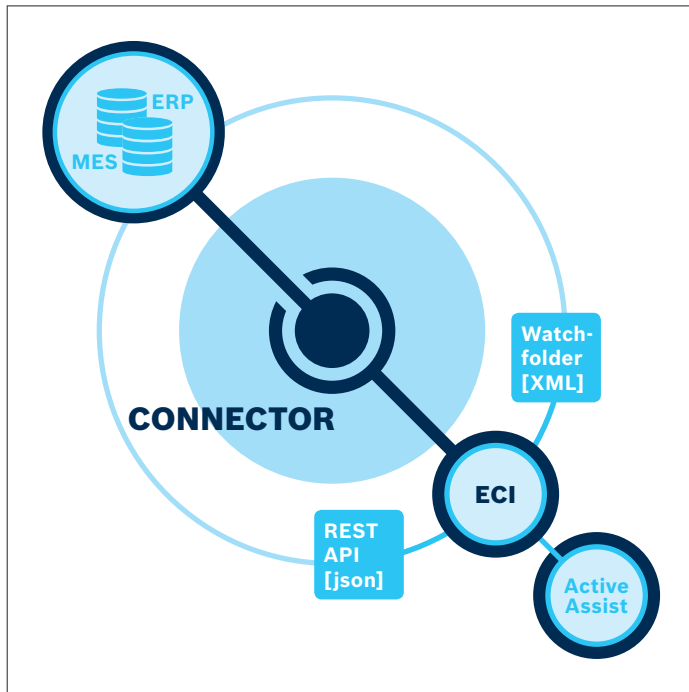
3



## ECI – Interface for external communication

24

# ECI – Interface for external communication



- ▶ Interface for connecting to higher level production IT systems (MES/ERP system)
- ▶ ECI software module offers two standardized interfaces for connection:
  - XML file folder
  - REST API
- ▶ The following applications can be realized using the interface:
  - Serial number upload
  - Production order upload
  - Starting new production orders
  - Continuation of existing production orders (with and without specified production order number)
  - Feedback by Push & Pull of the current processing status

The interface for external communication allows for data exchange with higher level systems for the order processing.

## ACCESSORIES

### Required accessories

- ▶ ActiveAssist basic set with Release 2.0 of the ActiveAssist software

## DELIVERY INFORMATION

### Scope of delivery

- ▶ License document incl. access authorization for interface specification

## ORDERING INFORMATION

Product designation	Material number
Software license AA ECI (interface for external communication)	3 842 562 139

# ActiveAssist Extension modules

4



<b>Tool control unit extension module</b>	<b>26</b>
<b>Tool integration extension module</b>	<b>28</b>
<b>Tool localization extension module</b>	<b>29</b>
Ultrasonic transmitter, Programming device	31
Adapter for ultrasonic transmitter to Nexø	32
<b>Product identification, bar code scanner</b>	<b>33</b>



# Tool control unit extension module



- ▶ For improving process reliability by enabling the correct nutrunner at the correct process step
- ▶ The torque is defined by the functionality of the nutrunner
- ▶ It is possible to control a maximum of 4 nutrunners
- ▶ As an addition to all ActiveAssist modules

The tool control unit extension module is used to integrate nutrunners and improve process reliability.

## ACCESSORIES

### Required accessories

- ▶ ActiveAssist basic set
- ▶ Nutrunner from the line: Bosch C-Exact

### Recommended accessories

- ▶ ActiveAssist projection module

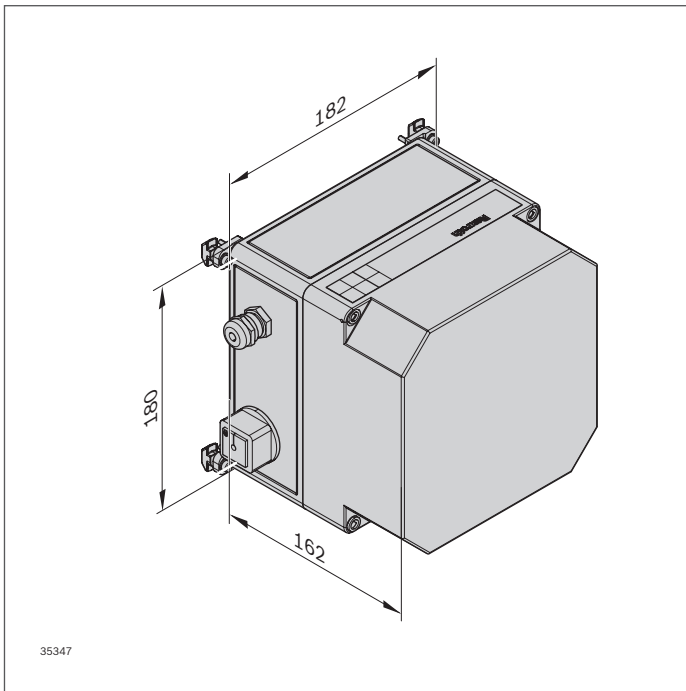
## DELIVERY INFORMATION

### Scope of delivery

- ▶ Tool control incl. fastening kit

## ORDERING INFORMATION

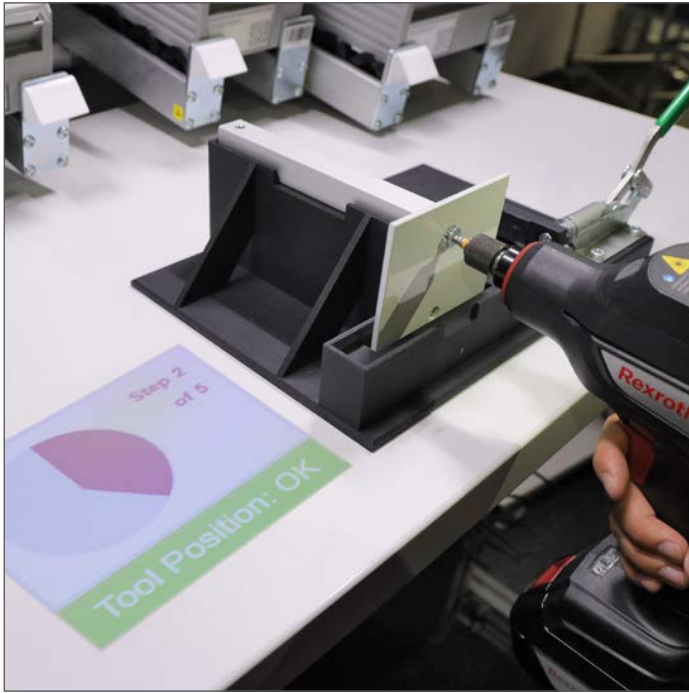
Product designation	Material number
Tool control unit extension module	3 842 558 447

**TECHNICAL DATA**

4

<b>Material number</b>	<b>3 842 558 447</b>	
<b>Properties</b>		
Weight	kg	3.2
<b>Type</b>		
Line voltage	V AC	100 ... 240
Mains frequency	Hz	50/60
Connection	4x M25 (36 V DC)	
<b>Dimensions</b>		
Slot	10	
<b>Additional information</b>		
Certification	CE	

# Tool integration extension module



- ▶ For the integration of open protocol-enabled tightening solutions into the ActiveAssist system
- ▶ Tightening parameters for each specific operation and process step are transmitted over Ethernet or WLAN
- ▶ After successful completion of the tightening process, there is an automatic forwarding to the next process step
- ▶ The tightening status can be projected into the ergonomic view of the employee on the table surface
- ▶ Easy integration of Rexroth tightening systems (see catalog Rexroth Tightening Systems, systems of external providers on request)

#### Notice:

- ▶ Software module is available for download in the product download area.
- ▶ Software module only functional in connection with license stick

The tool integration extension modules allows for the integration of intelligent tightening systems by means of Open Protocol ensuring that the correct tightening

parameter is transmitted to the tightening system in the correct process step.

## ACCESSORIES

### Required accessories

- ▶ ActiveAssist basic set with Release 2.0 of the ActiveAssist software

## DELIVERY INFORMATION

### Scope of delivery

- ▶ License stick

## ORDERING INFORMATION

Product designation	Material number
Tool integration extension module	3 842 558 603



# Tool localization extension module



- ▶ For determining the position and angle in 3D space of screwdrivers and other tools within an assembly by means of ultrasonic technology
- ▶ Release of the screwdriver at the correct tightening position by means of ultrasonic transmitter
- ▶ For the connection of more screwdrivers/tools, additional ultrasonic transmitters can be added (a maximum of 3 tools).

4

The tool localization extension module allows for the dynamic enabling of intelligent screwdrivers / tools.

## ACCESSORIES

### Required accessories

- ▶ ActiveAssist basic set with Release 2.0 of the ActiveAssist software
- ▶ Tool integration extension module

## DELIVERY INFORMATION

### Scope of delivery

- ▶ Ultrasonic receiver, ultrasonic transmitter with pre-configured frequency, charging adapter, fastening kit

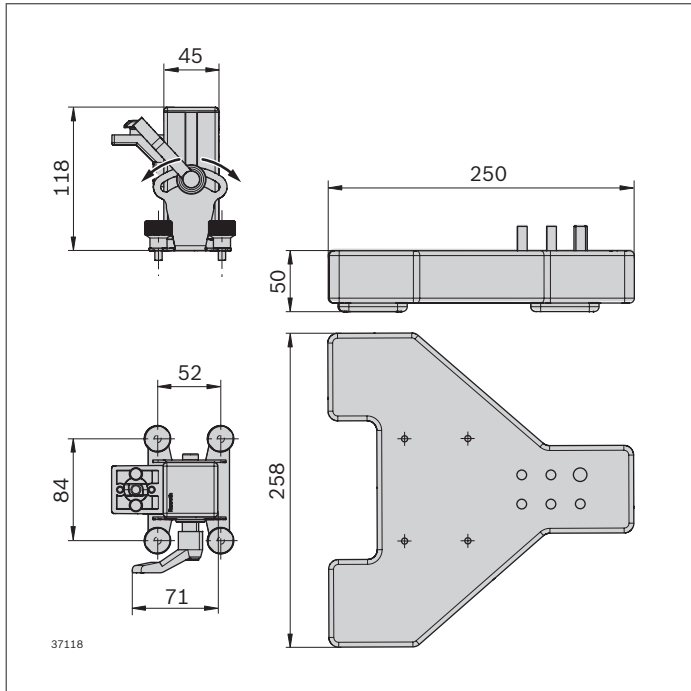
### Recommended accessories

- ▶ ActiveAssist projection module

## ORDERING INFORMATION

Product designation	Material number
Tool localization extension module	3 842 558 448

## DIMENSIONS





## Ultrasonic transmitter



- ▶ For the connection of more screwdrivers/tools, one additional ultrasonic transmitter is in each case required

4

### DELIVERY INFORMATION

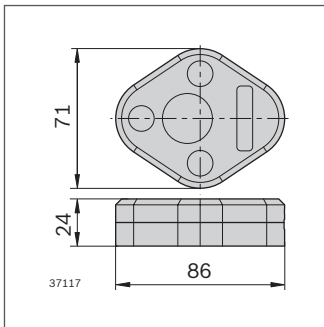
#### Scope of delivery

- ▶ Ultrasonic transmitter

### ORDERING INFORMATION

Product designation	Material number
Ultrasonic transmitter	3 842 555 854

### DIMENSIONS



## Programming device

- ▶ If several tools are used, a programming device is required to change the pre-configured frequency range of the ultrasonic transmitter

### DELIVERY INFORMATION

#### Scope of delivery

- ▶ Programming device (cable to connect screwdriver (micro USB) and computer (USB))

### ORDERING INFORMATION

Product designation	Material number
Programming device	3 842 558 342

## Adapter for ultrasonic transmitter to Nexo



- ▶ For attaching the ultrasonic transmitters to the screwdrivers of the Rexroth Nexo product series
- ▶ Easy removal of the ultrasonic transmitter for the charging process

### DELIVERY INFORMATION

#### Scope of delivery

- ▶ Adapter for Nexo (angular nutrunner or handheld nutrunner) incl. fastening kit

### ORDERING INFORMATION

Product designation	Material number
Adapter NXP (Nexo handheld nutrunner)	3 842 558 616
Adapter NXA (Nexo angular nutrunner)	3 842 558 617

### TECHNICAL DATA

Material number	3 842 558 616	3 842 558 617
<b>Properties</b>		
Material	3D printing; black	3D printing; black

# Product identification, bar code scanner



- ▶ Product identification ensures that the correct variant work plan (with the correct process data) is started
- ▶ The accumulated process data is stored in the production data base
- ▶ The following technologies can be used for product identification:
  - Teaching in RFID tags (available on request)
  - Scanning in of bar or data matrix codes using a bar code scanner

4



## Bar code scanner

- ▶ Determines the product variant by scanning in bar codes (bar and data matrix codes)
- ▶ Automatically retrieves the correct work plan (variant documentation)
- ▶ Plug-and-play commissioning due to the predefined system configuration
- ▶ Different frequency ranges are available:
  - Bar code scanning based on a frequency of 433 MHz
  - Bar code scanning based on Bluetooth technology
- ▶ As an addition to all ActiveAssist modules

## DELIVERY INFORMATION

### Scope of delivery

- ▶ Bar code scanner incl. charging cradle

## ORDERING INFORMATION

Product designation	Material number
Bar code scanner product ident 433	3 842 558 437
Bar code scanner product ident Bluetooth	3 842 558 578

## TECHNICAL DATA

Material number	3 842 558 437	3 842 558 578
<b>Additional information</b>		
Frequency	MHz	433
		Bluetooth

# ActiveAssist accessories



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**Label projection 45°**

**36**

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**HEAP connection kit**

**37**

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**Input unit push button**

**38**

# Label projection 45°



- ▶ For visualizing the projection of the projector on the material supply
- ▶ Can be mounted on the material shelf (in slot) or on the stop plate of the roller section (magnetic)

## DELIVERY INFORMATION

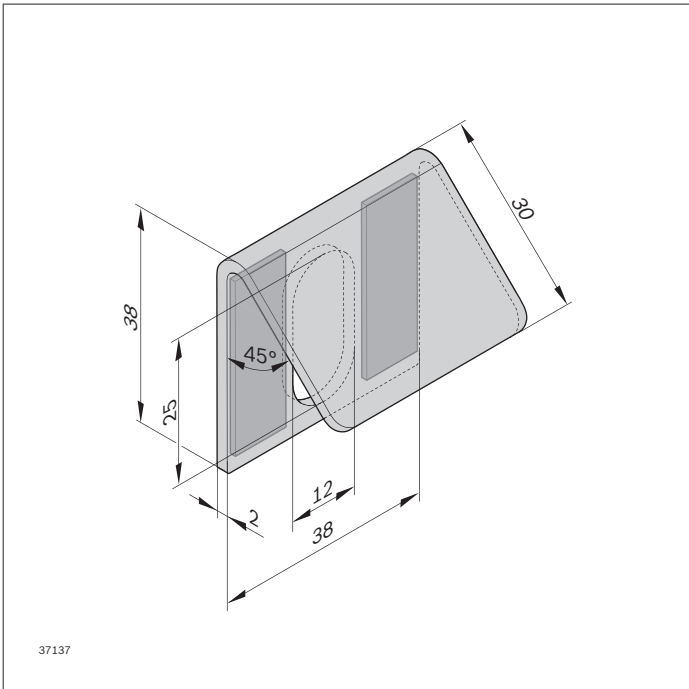
### Scope of delivery

- ▶ Bracket, incl. fastening kit for material shelves and roller sections

## ORDERING INFORMATION

Product designation	Packaging unit	Material number
Label projection 45°	10	3 842 558 560

## TECHNICAL DATA



<b>Material number</b>	<b>3 842 558 560</b>
<b>Properties</b>	
Material	Metal; powder-coated, RAL 9010



# HEAP connection kit



- For the mechanical connection of the accessory upright (material supply) to the work table on height adjustable workstations

### Notice:

Height-adjustable workstations may only be used if the workstation and accessory upright (parts supply) can be moved synchronously.

5

## DELIVERY INFORMATION

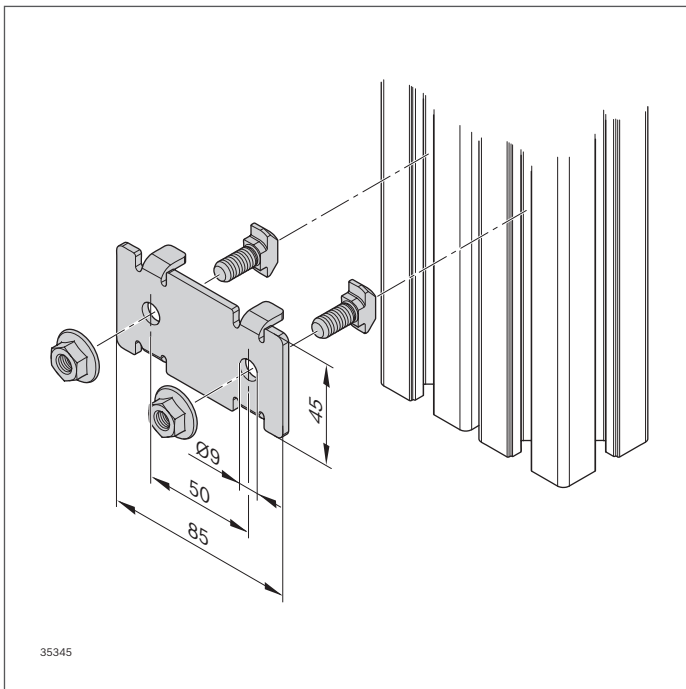
### Scope of delivery

- Connection kit, incl. fastening kit

## ORDERING INFORMATION

Product designation	Packaging unit	Material number
HEAP connection kit	4	3 842 558 344

## TECHNICAL DATA



<b>Material number</b>	<b>3 842 558 344</b>
<b>Dimensions</b>	
Slot	10

# Input unit push button



- ▶ For the manual confirmation of work steps in the ergonomic range of motion
- ▶ Incl. forward/backward function
- ▶ For mounting below the table top within the ergonomic range of motion of the operator

## ACCESSORIES

### Required accessories

- ▶ ActiveAssist basic set

## DELIVERY INFORMATION

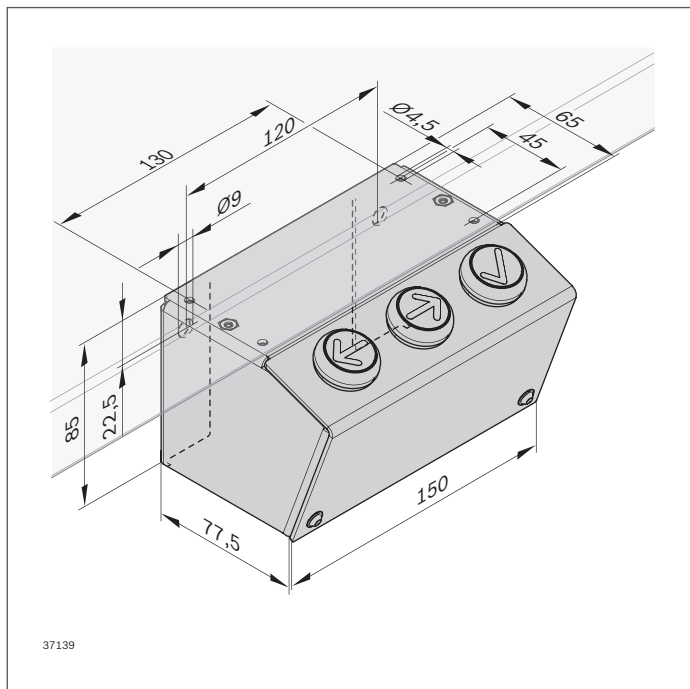
### Scope of delivery

- ▶ Input unit incl. fastening kit

## ORDERING INFORMATION

Product designation	Material number
Input unit push button	3 842 558 439

## TECHNICAL DATA



37139

<b>Material number</b>	<b>3 842 558 439</b>
<b>Dimensions</b>	
Slot	10

# Technical data

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**Sample configurations**

**40**

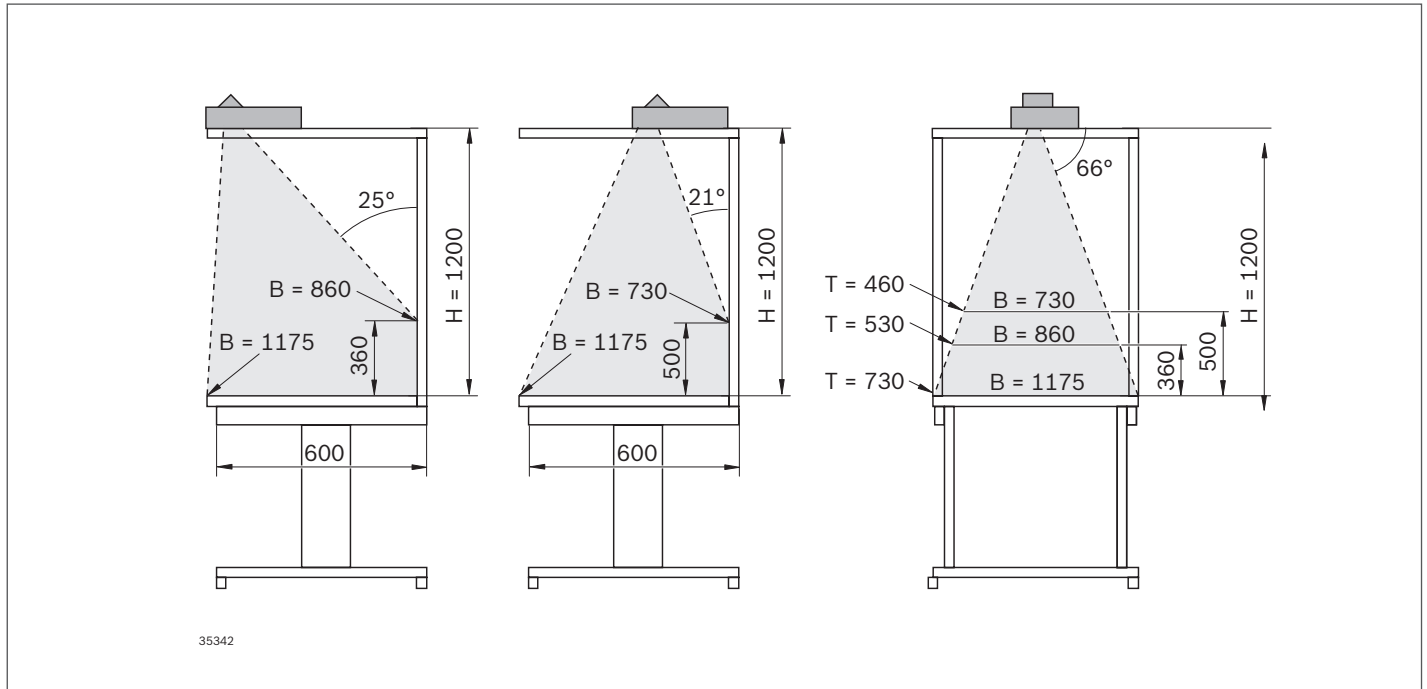
**6**

# Sample configurations

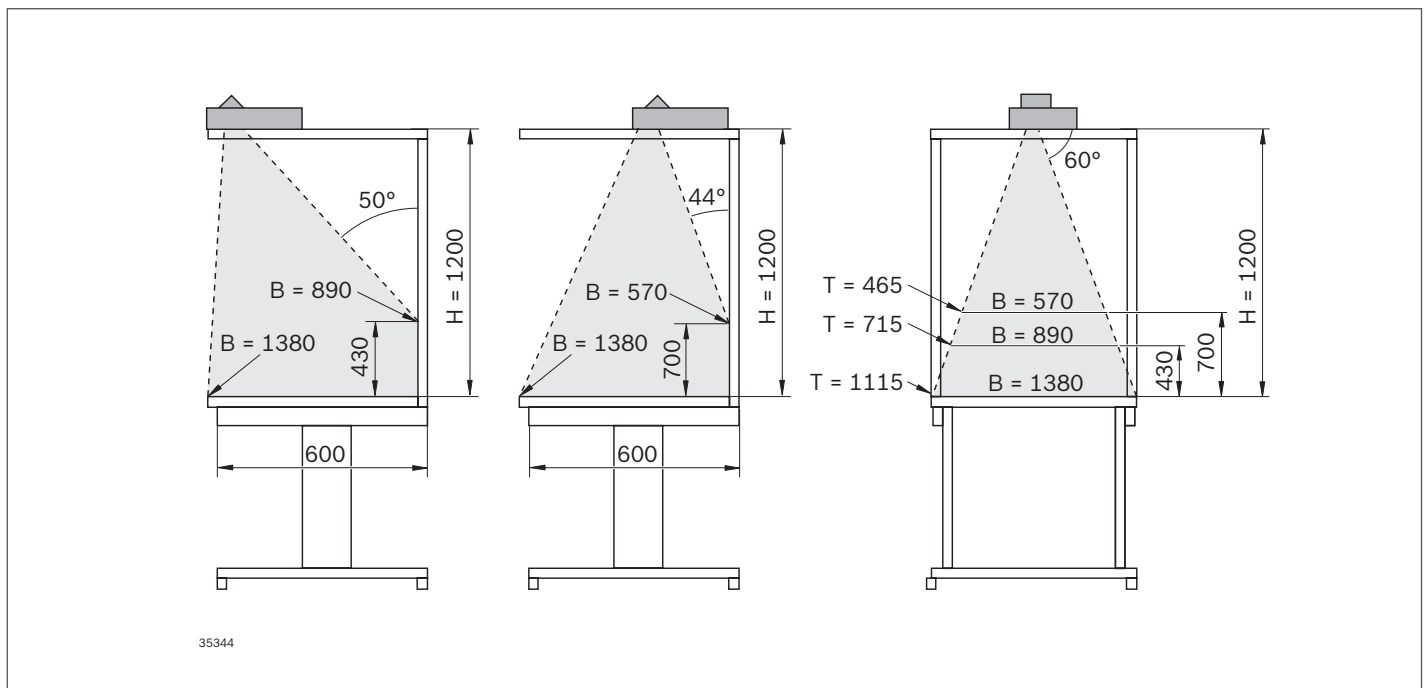
Notice:

Height-adjustable workstations may only be used if the workstation and accessory upright (parts supply) can be moved synchronously.

## Projection module with maximum projector zoom and middle mirror position (all dimensions in mm)



## Hand-tracking module (all dimensions in mm)



# ActiveShuttle:

# Setting your intralogistics

**in motion**



**With Plug & Go start quickly  
and move safely**





**WE MOVE.  
YOU WIN.**



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**4 THE CHALLENGE OF INTRALOGISTICS**

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**6 ACTIVE SHUTTLE:  
THE ADVANTAGES – YOUR BENEFITS**

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**8 THE APPLICATION OF ACTIVE SHUTTLE**

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**10 COMPONENTS AND FEATURES**

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**12 THE ACTIVE SHUTTLE  
MANAGEMENT SYSTEM (AMS)**

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**14 THE PRODUCT STRUCTURE**





# ActiveShuttle provides answers to the questions of Intralogistics 4.0

Increasingly more individualized products, more component diversity, fluctuating production figures – the competitive pressure in intralogistics is increasing. Autonomous transport systems create the necessary flexibility and transparency.

With ActiveShuttle, Bosch Rexroth sets a new standard: The system ensures a robust and efficient transport of loads up to 260 kg. Fully automatically. Transparently controlled with the ActiveShuttle Management System (AMS). This is Intralogistics 4.0!

## Factory of the Future

Now. Next. Beyond.

### REQUIREMENT

! Minimum installation work

! Transparent material movements

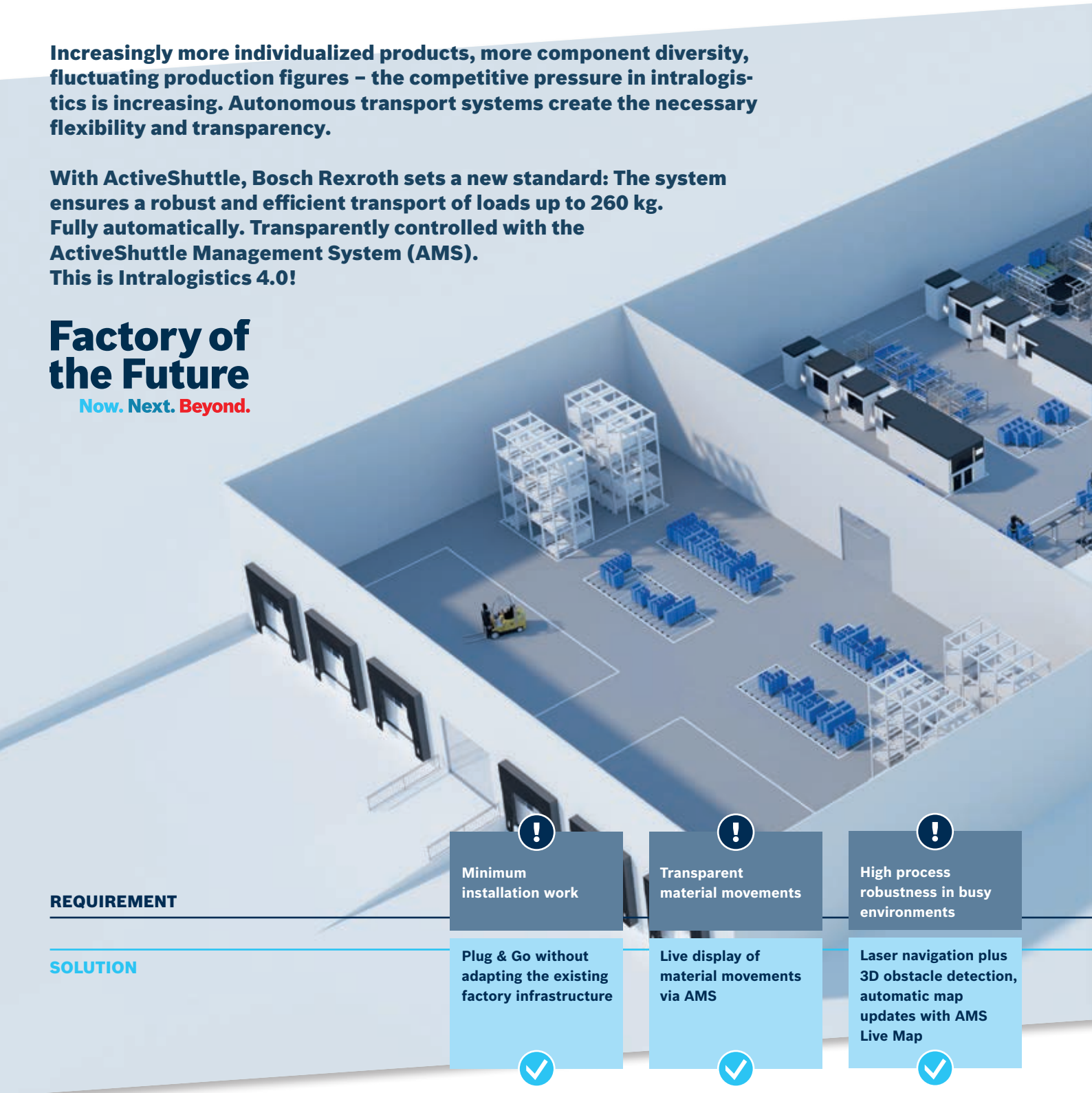
! High process robustness in busy environments

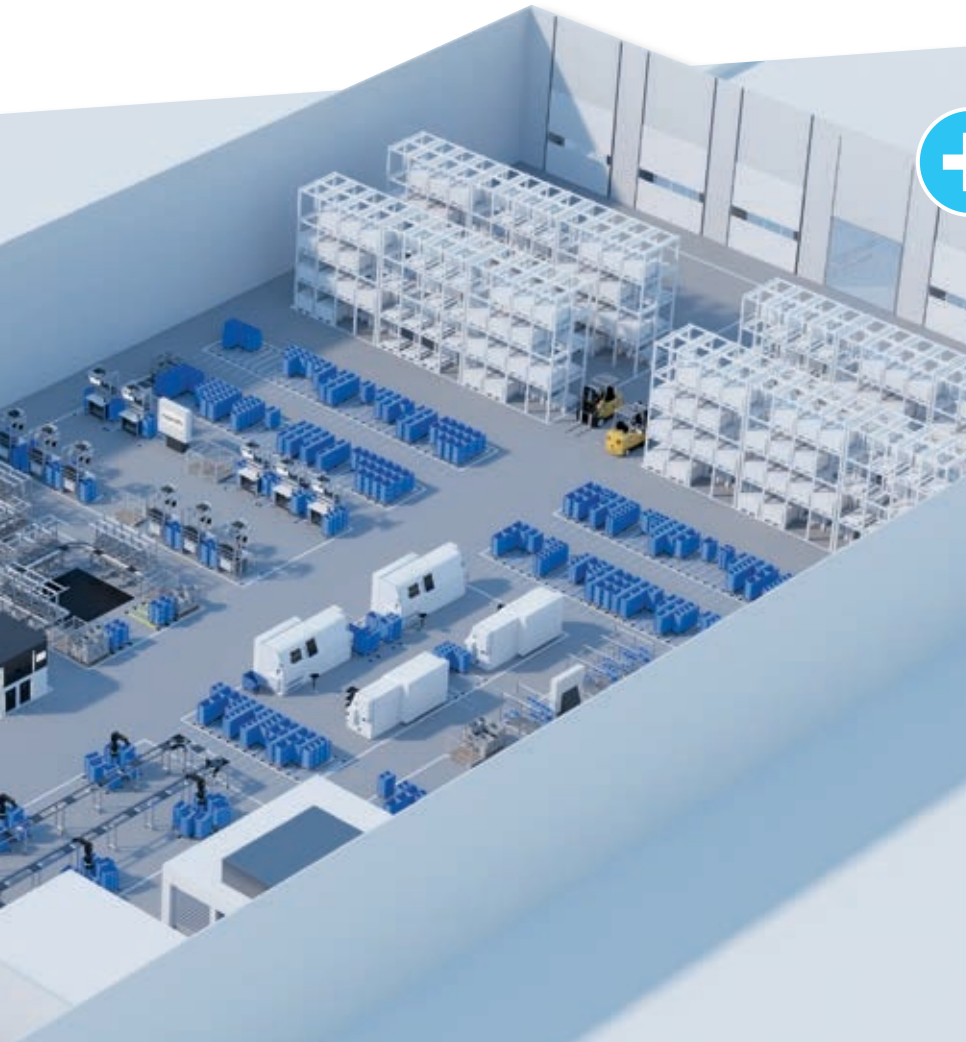
### SOLUTION

Plug & Go without adapting the existing factory infrastructure

Live display of material movements via AMS

Laser navigation plus 3D obstacle detection, automatic map updates with AMS Live Map





### YOUR BENEFITS

- ▶ Plug & Go – quick and easy to implement without adapting the existing factory infrastructure
- ▶ Automated materials transport with fully automated loading and unloading
- ▶ Easy, intuitive operation of the entire system
- ▶ Navigate safely around obstacles
- ▶ Easily create and configure logistics scenarios using AMS
- ▶ Return on Investment (ROI) within two years
- ▶ Comprehensive safety concept, designed for continuous 24/7 mixed operation with people and machines
- ▶ Employee relief
- ▶ Standard interface for connecting to third-party systems
- ▶ Increase in transparency
- ▶ Reduction of surfaces and materials



Easy integration



Reduction of manual handling steps



Less safety stocks and storage requirements

Standard interfaces for connecting to third-party systems

Fully automated materials transport

Flexible, requirement-oriented material supply, efficient order management



# Automate your flow of materials and goods – it has never been easier

**The ActiveShuttle autonomous transport system is already making the transition to the factory of the future possible today: It is quick to implement without any need to adapt your existing factory infrastructure, intuitive and easy to operate, fully connected and safe for use around people! Create transparent and efficient internal processes using ActiveShuttle.**

## SIMPLE



### Plug & Go

The autonomous transport system can be quickly and easily integrated into intralogistics via Plug and Go. Infrastructure adjustments are not required thanks to the reliable laser navigation.

### Intuitive operation

Configure your application in the ActiveShuttle Management System (AMS) according to your intralogistics requirements in next to no time. And via the intuitive touchscreen you can operate the ActiveShuttle directly at any time.

## FLEXIBLE



### Full flexibility

Jobs can be fed in manually or fully automatically thanks to the standard interfaces provided (sensor, PLC, MES/ERP etc.). Transport requirements are assigned to available ActiveShuttles via the AMS.

### A wide range of supply principles

With the AMS, a wide range of supply principles can be realized – from cyclic transport to requirement-oriented material deliveries.

### Variable job templates

With easy-to-configure job templates, you can achieve a wide range of transport concepts.

## SECURE



### Safety concept

The safety concept designed in cooperation with the German Social Accident Insurance (DGUV) ensures a secure continuous 24/7 mixed operation with people and machines.

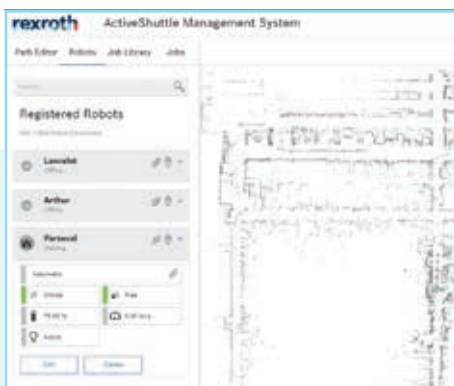
### Performance Level d

The safety laser scanners used provide the highest reliability in continuous 24/7 operation.





## ADAPTIVE



### AMS-Live Map

The ActiveShuttle fleet immediately records occurring changes in the production environment and automatically updates the reference map. Therefore, manual re-mapping belongs to the past.

### Quick and flexible adaptation

Short-term changes can be made during live operation with a few clicks in the AMS.

### Traffic management

If a number of ActiveShuttles are in use, they communicate with each other wirelessly via the AMS and inform each other about changes in the environment in order to be able to react prematurely to bottlenecks.

## ROBUST



### Obstacle management

The integrated obstacle management enables braking in time and a safe passing of occurring obstacles on the road.

### 3D obstacle detection

In addition to the safety laser scanner, stereo cameras scan the room in 3D. As a result, even objects protruding into the ActiveShuttle's path are recognized.

### Robust transport

The robust construction and the use of tested navigation and sensor technologies ensure high reliability in dynamic production environments.

## EFFICIENT



### Zero Manual Handling

With the lifting platform, dollies are loaded and unloaded fully automatically – with no need for manual intervention!

### Straightforward order management

The prioritization and optimum distribution of pending transport orders to the ActiveShuttle fleet is done via the order management.

### Long-term optimization

Reduce surfaces and materials and therefore throughput times significantly by using the ActiveShuttle.

### Tightening the value chain

Optimize your intralogistics by automating your flow of materials and goods using the ActiveShuttle.

# ActiveShuttle – the autonomous transport system for future intralogistics system

**Taxi instead of service bus: The ActiveShuttle driverless transport system moves dollies, which are loaded with small load carriers (SLC), autonomously and quickly from A to B, for example from the goods warehouse directly to the point of use.**

The material flow in modern production plants is complex, the points of use are versatile, and ways can be far. With the ActiveShuttle, manual material transport belongs to the past. With its robust and reliable laser navigation and 3D obstacle detection, the ActiveShuttle can move freely in the plant with no need for changes to the factory infrastructure and thus automates the flow of materials and goods.

In practice, compatible dollies with a surface of 600 x 400 mm or 400 x 400 mm are driven under automatically and slightly lifted with the integrated lifting platform. These dollies can be loaded with a number of load carriers: Small load carriers (SLC), blister packs or other containers.

As soon as a transport order was assigned to an available ActiveShuttle via the AMS, the ActiveShuttle approaches its destination and puts down the transported material. In this way, the material flow between various sources/dips in the value stream can be realized, and the dollies are ready for the following process step.

► **Dollies as a flexible basis for a wide range of load carriers**





### KEY TECHNICAL DATA

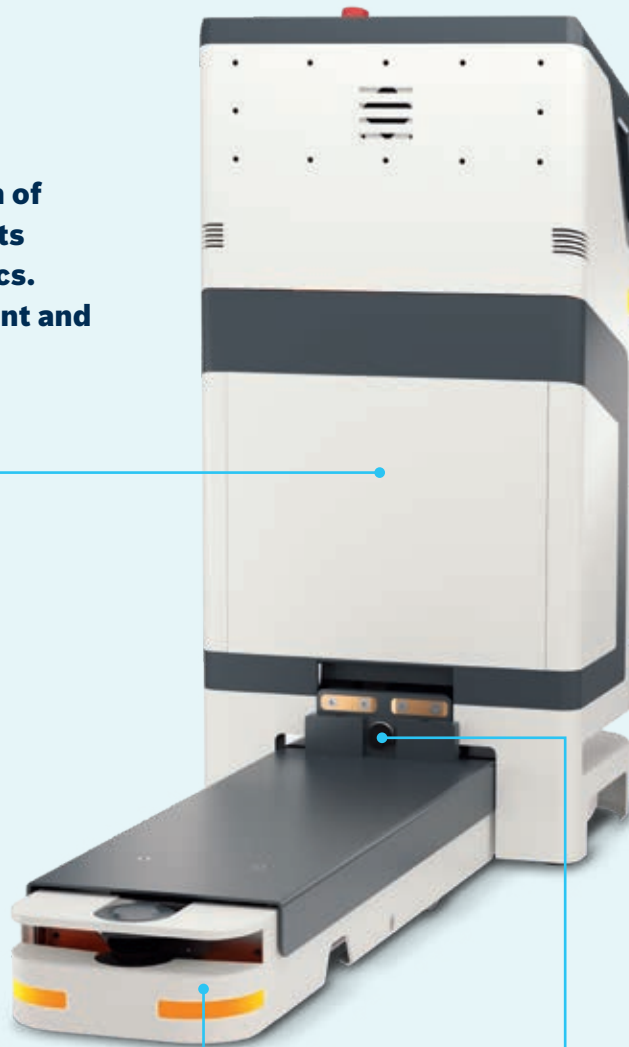
- ▶ Load dimensions (L x W x H): 600 x 400 x 1200 mm
- ▶ Navigation technology: Laser navigation
- ▶ ActiveShuttle dimensions: (L x W x H): 1,015 x 405 x 900 mm
- ▶ Transport weight: Max 260 kg
- ▶ Drive speed: Max 1 m/s
- ▶ Mobile gradients: Yes
- ▶ Laser type: Safety laser scanner, type 3, SIL2, performance level d
- ▶ 3D obstacle detection: 2 stereo cameras
- ▶ Touchscreen display: 10.1 inch, 1,280 x 800 pixels
- ▶ Power supply: Lithium-ion battery (48 V, 17 Ah)
- ▶ WLAN: IEEE 802.11.ac/a/b/g/n
- ▶ ESD (electrostatic discharge)
- ▶ Conformity: CE





# ActiveShuttle: smarte und clevere Features

**Sophisticated technology, practical details, perfect interaction of form and function – ActiveShuttle fits seamlessly into existing intralogistics. And makes them faster, more efficient and future-proof. Find out for yourself.**



**ESD**  
Also use the ActiveShuttle in ESD areas.

**Direction indicator**  
Full transparency on the respective vehicle status thanks to clearly visible light signals.

**Dolly detection**  
With the inductive safety sensor, dollies are detected safely and loaded.

ActiveShuttle  
**+ ADVANCED  
INTERACTION**



**WLAN communication**  
For direct communication with the ActiveShuttle Management System (AMS).

**Control panel**  
On/Off button, acknowledgment button, hole for the safety flag, port for the manual control unit, emergency stop function – everything is available centrally.

**Touchscreen display**  
For direct interaction in the factory – straightforward and intuitive.

**3D obstacle detection**  
For detecting objects outside the laser scanner level.

**Blue Spot**  
For improved visibility of the ActiveShuttles and maximum protection of the employees.



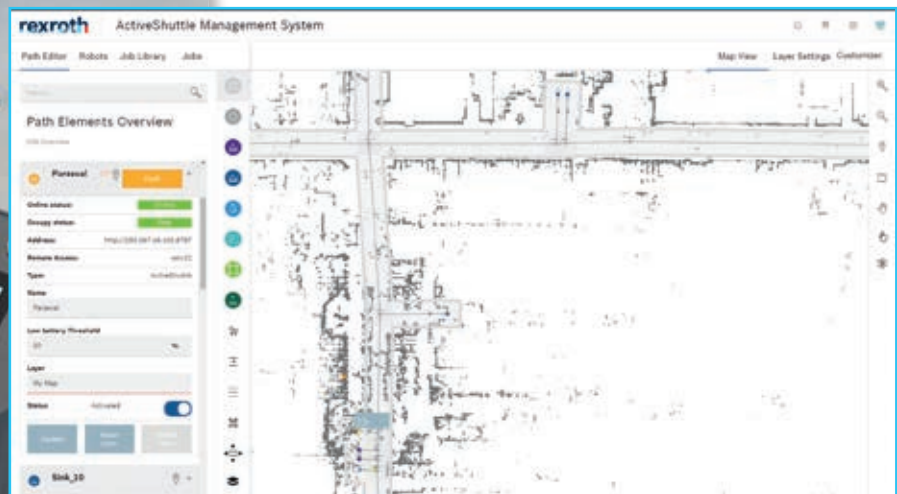
**Lifting platform**  
The lifting platform loads and unloads the dollies fully automatically.

**Brake release**  
Integrated into the handles.

**Laser scanner**  
Integrated safety laser scanners (front/rear) ensure safe mixed-mode operation.

# ActiveShuttle Management System (AMS): Control intelligently, configure flexibly

The ActiveShuttle Management System (AMS) is the heart of the entire system and centralizes control of the complete ActiveShuttle fleet. As the control software, AMS displays the live status of your fleet, assigns pending transport orders to the available vehicles and lets the user control and configure the logistics scenarios.



- ▲ For a highly flexible order management, you have all processes in view and can intervene at all times

VDA5050  
ready



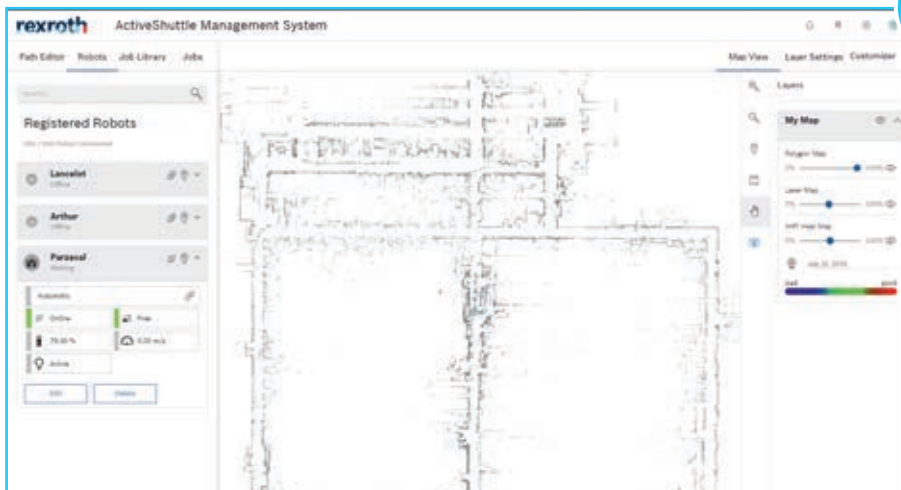
## THE AMS TAKES ON ALL ASPECTS OF FLEET AND ORDER MANAGEMENT

### You remain fully flexible and informed at all times

Users can realize a wide range of supply principles – from cyclic transports to a requirement-oriented material supply. Via the web-based user interface, you can enter transport orders manually, e.g. using a tablet, or fully automatically thanks to the interfaces provided. Higher-level IT systems such as MES or ERP systems send details of transport requirements to the AMS which in turn assigns a transport order to an available ActiveShuttle.

### The system steers itself

Once it is set up, the system steers itself to various destinations fully automatically – even in the event of volatile material requirements. The traffic management ensures smooth and coordinated transport operation. Even in case of environmental changes, the overall system remains stable thanks to automatic map updates (AMS Live Map). Changes are automatically detected by the vehicles during live operation and communicated to the entire ActiveShuttle fleet. In this way, the map is always up-to-date and manual re-mapping is no longer required.



### Connection to shop floor infrastructure

Machines, robots and sensors (such as dash buttons) can also be integrated into the AMS in order to communicate with the ActiveShuttle. If a shortage of materials is imminent, details of transport requirements are directly transmitted to the ActiveShuttle Management System (AMS). As a result, assembly and logistics can be linked together even more closely. This sets intralogistics in motion. And it is a further step towards the factory of the future.



### AMS-FUNKTIONEN

- ▶ Order management: Prioritizing and distributing transport jobs to available ActiveShuttles
- ▶ Job templates: Easy configuration of your transport concepts
- ▶ Traffic management: Transport control center ensures coordinated and smooth transport operation
- ▶ Obstacle management: Navigate safely around obstacles
- ▶ AMS Live Map: Changes in the factory environment are automatically detected by the operating vehicles and communicated to the entire ActiveShuttle fleet
- ▶ Energy management: Fully automated charging process
- ▶ Web application: Intuitive and user-friendly user interface

# Intralogistics next level: ActiveShuttle product structure

**Compile your perfect package for your intralogistics 4.0.  
Or test ActiveShuttle in your environment first –  
we are ready for you in no time.**

<b>ACTIVE SHUTTLE</b>	ActiveShuttle	3842 560 <b>131</b>
	ActiveShuttle charging station	3842 560 <b>422</b>
<b>ACTIVE SHUTTLE ACCESSORIES</b>	Manual control unit	3842 560 <b>106</b>
	Optical track guidance	3842 560 <b>612</b>
	Battery	3842 560 <b>101</b>
<b>ACTIVE SHUTTLE MANAGEMENT SYSTEM (AMS)</b>	ActiveShuttle Management System (AMS) – rental license (1 year) including updates	3842 560 <b>814</b>
	ActiveShuttle Management System (AMS) – purchase license including 2 years' updates	3842 560 <b>815</b>
	ActiveShuttle Management System (AMS) – update service (current release)	3842 560 <b>816</b>
<b>SERVICES</b>	Training, application, commissioning, IT deployment	on request
<b>TEST/DEMO</b>	<b>Test or live demo? Sure! Contact us!</b>	▶▶▶

# Test it!



**With its plug and go concept, ActiveShuttle can be used straight away without making changes to the factory environment.**

**Test it live in your production environment: we offer various test and demo scenarios – contact us!**



The Drive & Control Company

**Rexroth**  
Bosch Group

## CytroPac – The Power Unit Revolution!

compact | complete | connected



Half Size.  
Full Performance.

# The compact revolution for hydraulic power units: completely equipped and integrated.

Rexroth has started the hydraulic power unit revolution. Lack of installation space is no longer a reason to go without hydraulic power: The new CytroPac power unit provides maximum power in the smallest space with everything you need for fast installation – including an economical Sytronix drive, completely wired frequency converter and Industry 4.0 compatibility. With powerful 4 KW and pressure of 240 bar in 50 percent less installation space. Furthermore, CytroPac also complies with the EU Ecodesign Directive 2009/125/EC. Simply connect power, fluid and interface and go.

A small revolution!



**i4.0**

CONNECTED  
INDUSTRY

**4EE**

ENERGY  
EFFICIENCY



MULTI-  
ETHERNET



### **Extremely compact**

The revolutionary space-saving design is ideally suited not only for machine tools. With a height of 60 cm and a diameter of 36 cm, CytroPac requires over 50% less installation space than comparable power units.

### **Highly efficient**

The variable speed Sytronix drive generates demand-based power – and saves up to 80% energy in this way. State-of-the-art heat pipe technology makes water cooling easier and further reduces the installation space.

### **Integrated**

The integrated frequency converter is completely wired and optionally equipped with Multi-Ethernet interface. This saves up to 100% control cabinet space!

### **Convenient**

The comprehensive sensor technology (pressure, temperature, fluid level, filter) allows for preventive condition monitoring in real time. Integration and commissioning are as easy as can be.

### **Extra low-noise**

The specifically designed enclosure of all noise sources makes CytroPac extremely low-noise.

### **Sustainable**

CytroPac complies with the EU Ecodesign Directive 2009/125/EC by lowering power consumption and CO<sub>2</sub> emissions.

### **Future-proof**

Designed for use in i4.0 concepts, CytroPac can be easily integrated in existing and planned systems.

The Drive & Control Company

**Rexroth**  
Bosch Group

CytroPac –  
die Aggregat-Revolution!

kompakt | komplett | vernetzt



Halbe Größe.  
Volle Leistung.


# Die Kompakt-Revolution bei Hydraulik-Aggregaten: alles drin, alles dran, alles vernetzt.

Rexroth hat das Thema Hydraulik-Aggregate radikal neu gedacht. Fehlender Bauraum ist ab heute kein Grund mehr, auf Hydraulik-Power zu verzichten: Das neue CytroPac Aggregat ist auf kleinstem Raum vollgepackt mit allem, was Sie zum schnellen Einbauen brauchen – inklusive sparsamem Sytronix-Antrieb, mit verdrahtetem Frequenzumrichter und bereit für Industrie 4.0. Mit kraftvollen 4 KW und 240 bar Druck auf 50 Prozent weniger Bauraum. Und dazu erfüllt CytroPac auch noch die EU-Ökodesign-Richtlinie 2009/125/EC. Einfach Strom, Fluid und Datenschnittstelle anschließen und loslegen. Eine kleine Revolution!



**i4.0**  
CONNECTED  
INDUSTRY

**4EE**  
ENERGY  
EFFICIENCY

  
MULTI-  
ETHERNET

## **Ultrakompakt**

Das revolutionäre platzsparende Design ist ideal nicht nur für Werkzeugmaschinen. Nur 60 cm hoch, 36 cm im Durchmesser – CytroPac benötigt über 50 % weniger Bauraum als vergleichbare Aggregate.

## **Hocheffizient**

Der drehzahlvariable Sytronix-Antrieb erzeugt die Leistung bedarfsgerecht – das spart bis zu 80 % Energie. Neuste Heatpipe-Technologie ermöglicht eine vereinfachte Wasserkühlung und reduziert den Bauraum weiter.

## **Vernetzt**

Der integrierte Frequenzumrichter ist komplett verdrahtet und optional mit Multi-Ethernet-Schnittstelle ausgestattet. Das spart Schalt-schrankplatz bis zu 100 %!

## **Praktisch**

Die umfassende Sensorik (Druck, Temperatur, Füllstand, Filter) erlaubt vorbeugendes Condition-Monitoring in Echtzeit. Integration und Inbetriebnahme sind konkurrenzlos einfach.

## **Extraleise**

Die speziell entwickelte Einhausung aller Geräuschquellen macht CytroPac extrem leise.

## **Nachhaltig**

CytroPac erfüllt die EU-Ökodesign-Richtlinie 2009/125/EC durch Senkung von Energieverbrauch und CO<sub>2</sub>-Emission.

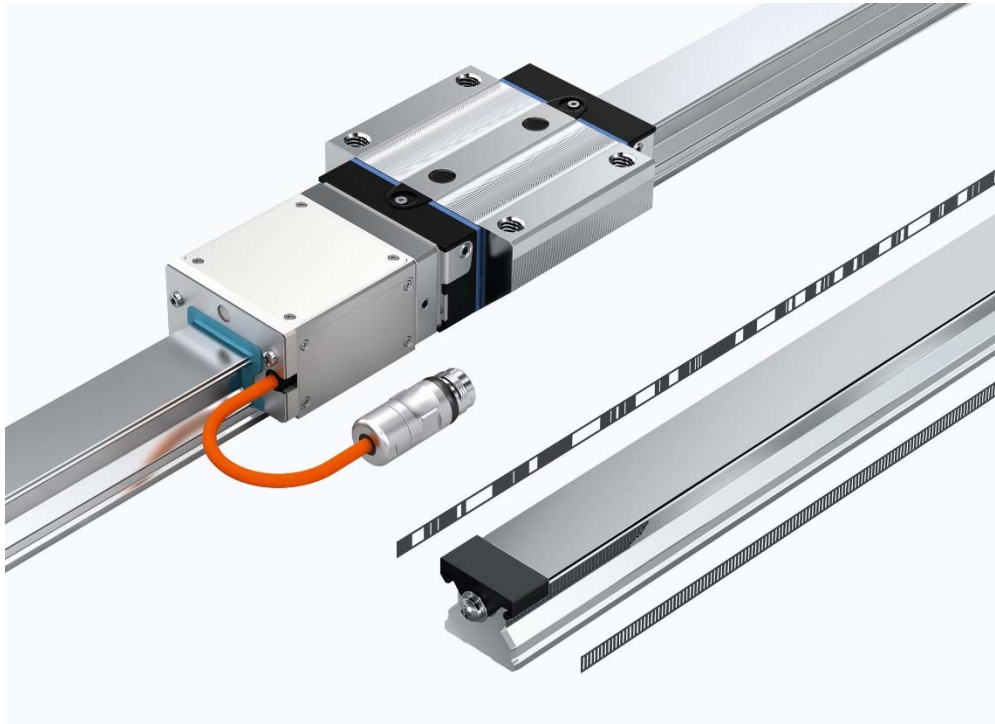
## **Zukunftssicher**

Ausgelegt für den Einsatz in i4.0-Konzepten lässt sich CytroPac einfach in bestehende und geplante Anlagen integrieren.

## Press Release

### **Absolute, Robust and Precise: IMS-A Integrated Measuring System from Rexroth**

Inductive absolute value measurement integrated in linear guides



Guide and measuring device in one: The IMS-A integrated measuring system detects the absolute position and works with high precision, even in a rugged environment.

**The new Rexroth IMS-A measuring system integrated in linear guides detects the absolute position of the axis to +/- 4 micrometers. What's more, the measuring system is immune to contamination, vibrations, shocks and magnetic interference and needs no buffer batteries in the event of a power failure. Additional temperature and motion sensors are installed in anticipation of future requirements in terms of Industry 4.0.**

When machines are switched back on following a power failure, the controllers in many applications need to know the position of each axis immediately. The new integrated IMS-A measuring system from Rexroth immediately recognizes the absolute position of the axis with a high degree of precision when the machine is switched on and reports them to the controller without carrying out a reference run. For this, the system does not require buffer batteries that need to be replaced regularly.

Thanks to the inductive measuring principle, the IMS-A operates without physical contact and is therefore a wear-free assembly. The measuring scale cannot be interfered with or destroyed by external magnetic fields. The IMS-A



## Press Release

is not sensitive to vibrations up to 10 G and shocks up to 50 G. The sensors and evaluation electronics are located in protective housing on the end face of the runner block. With the IMS-A, position detection takes place very close to the tool center point, an important prerequisite for high precision, and thus surface quality in machining. The position resolution of the IMS-A is up to 0.025 µm.

The functional integration of guiding and measuring in an assembly minimizes installation times. No adjustment of the measuring system is necessary. With the IMS-A, engineers can use several runner blocks on an up to 4,500 mm long profile rail independently and without any accuracy limitations.

### **Prepared for Industry 4.0**

The integration of additional temperature and motion sensors makes this measuring system prepared for the future requirements of Industry 4.0. The sensor data forms the basis for future approaches to predictive maintenance. The user can record and evaluate operating states online.

*Economical, precise, safe, and energy efficient: drive and control technology from Bosch Rexroth moves machines and systems of any size. The company bundles global application experience in the market segments of Mobile Applications, Machinery Applications and Engineering, and Factory Automation to develop innovative components as well as tailored system solutions and services. Bosch Rexroth offers its customers hydraulics, electric drives and controls, gear technology, and linear motion and assembly technology all from one source. With locations in over 80 countries, more than 33,700 associates generated sales revenue of approximately 5.6 billion euros in 2014.*

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*The Bosch Group is a leading global supplier of technology and services. It employs roughly 375,000 associates worldwide (as of December 31, 2015). According to preliminary figures, the company generated sales of more than 70 billion euros in 2015. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiaries and regional companies in some 60 countries. If its sales and service partners are included, then Bosch is represented in roughly 150 countries. This worldwide development, manufacturing, and sales network is the foundation for further growth. In 2015, Bosch applied for some 5,400 patents worldwide. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life."*



**BOSCH**

Invented for life

## Nexeed Production Performance Manager

[bosch-connected-industry.com/nexeed-ppm](https://bosch-connected-industry.com/nexeed-ppm)

The industry 4.0 software solution for systematic production improvements







## Systematic production improvements

The systematic, sustainable optimization of production – this is the goal of the Nexeed Production Performance Manager. The software helps quality and maintenance management staff in decision-making and makes their everyday work easier. They are supported by individual modules with functions that are specific to certain areas, such as predictive maintenance or real-time process monitoring.

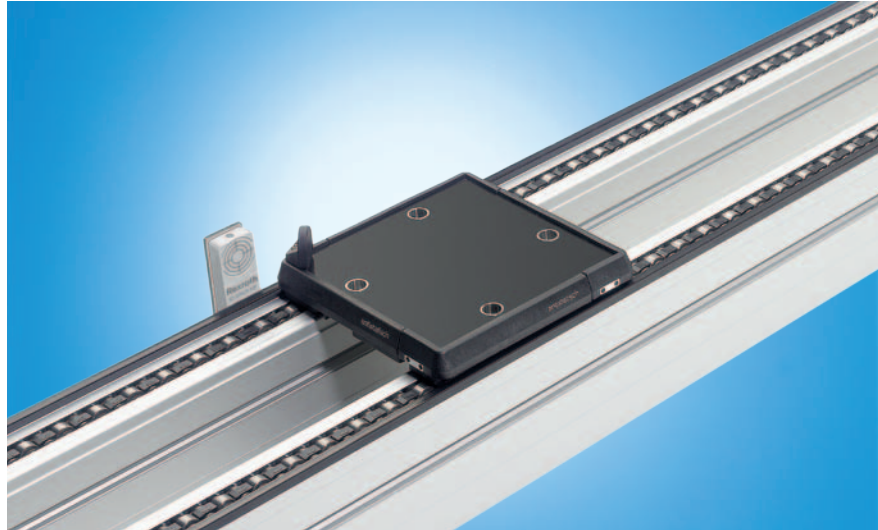
RFID system ID 200

# RFID system ID 200



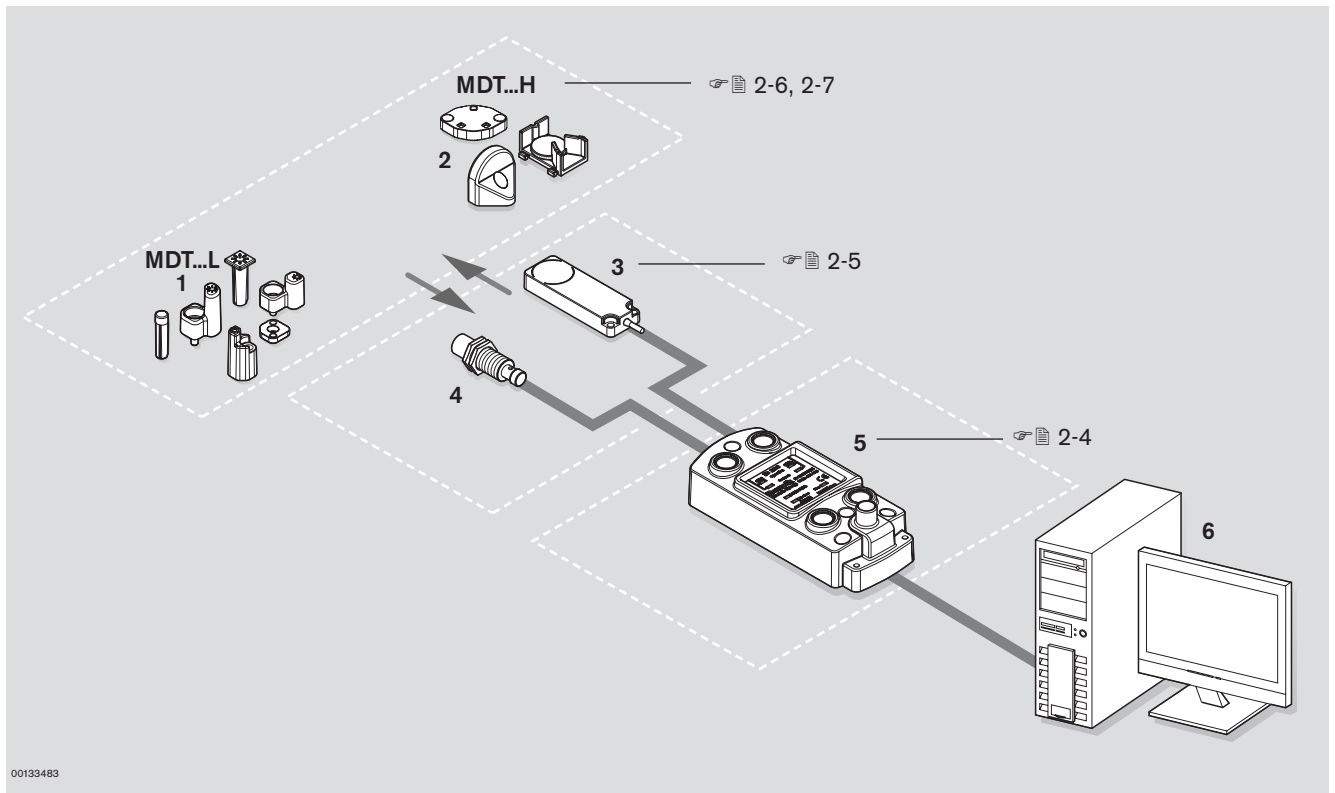
The RFID system ID 200 is a modular identification system developed for industrial use in production environments. The system consists of mobile data tags, antennas and communication modules. It is characterized by the robust and compact construction of its components, as well as by particularly interference-resistant and safe data transmission.

ID 200 is ideal for applications with central or decentralized data storage. The mobile data tags with cost-effective EEPROM memory are very small and suitable for applications with low data volume. The design with FRAM memory is able to store larger data quantities decentrally and can be read/written almost an indefinite number of times. They are preferable for applications with short transmission times. Antennas are available in various construction designs and transmission frequencies. This allows the best design to be selected for each application and installation location. The communication modules connect the antennas and the master control system. They can control up to two antennas simultaneously, even with different frequencies. The interface to the control system can be either PROFIBUS DP or Ethernet.



00133431

RFID system ID 200



1 Mobile data tags MDT...L for 125 kHz.  
2 Mobile data tags MDT...H for 13.56 MHz

3 Flat antennas A...F for 125 kHz or 13.56 MHz.  
4 Round antennas A...R for 125 kHz or 13.56 MHz

5 Communication module C-... for PROFIBUS or Ethernet.  
6 Control system

00133483

RFID system ID 200

# Communication module ID 200/C-...



00133453

The communication module connects the antennas with the control system. There are plug-in connections for up to two antennas, which can be simultaneously active and are able to work with different frequencies. A digital sensor can optionally be connected at each antenna connection. Parameterization and diagnosis are performed via the integrated web server.

## ID 200/C-PDP

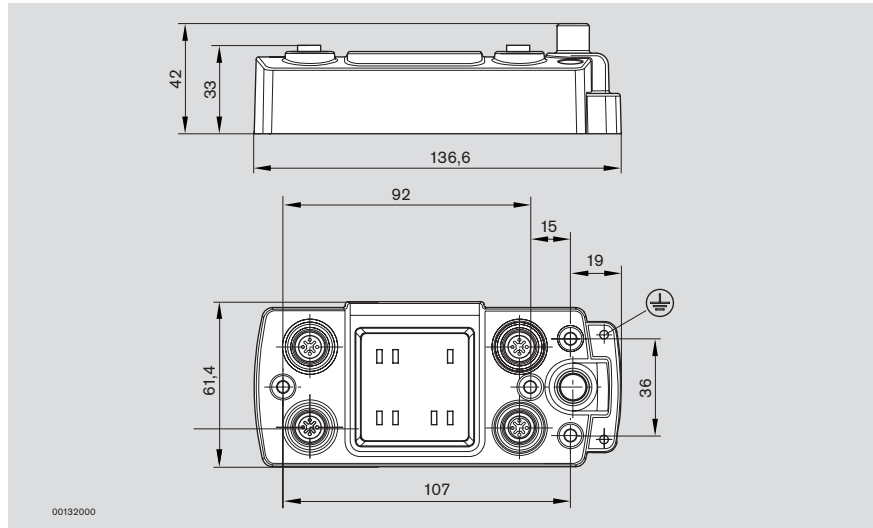
The connection to the control system is established via PROFIBUS-DPV0. The integrated web server can be reached via a separate RS-232 interface.

## ID 200/C-ETH

The connection to the control system is established via Ethernet. Ethernet protocols PROFINET/IO, Modbus/TCP and EtherNet/IP are available in addition to TCP/IP. An integrated switch allows cabling in line structure as well as the classical Ethernet star-form cabling.

Communication module ID 200/C-...

	No.
ID 200/C-PDP	3 842 410 061
ID 200/C-ETH	3 842 410 060



00132000

<b>Operating voltage</b>	20 to 30 VDC, PELV
<b>Ripple</b>	≤ 10%
<b>Power consumption</b>	Max. 1.5 A (incl. 2 antennas)
<b>Status displays</b>	7 LEDs
<b>Connections</b>	RS232 ID 200/C-PDP PROFIBUS-DPV0 PROFINET ID 200/C-ETH Ethernet/IP Modbus/TCP TCP/IP
<b>Protection class</b>	IP65
<b>Housing material</b>	Aluminum, powder coated RAL 7035
<b>Ambient temperature</b>	-25 to +70°C
<b>Storage temperature</b>	-30 to +80°C
<b>Humidity</b>	Max. 96%
<b>Vibration resistance</b>	3.5 mm (10 to 55 Hz); 20 g (55 to 2000 Hz)
<b>Shock and impact resistance</b>	70 g/6 ms, 18 cycles
<b>Approvals</b>	EN 300330, ETS 300683, CE, FCC
<b>Mass</b>	0.5 kg





# Cross Domain Development Kit | XDK

## Start your Sensor X - perience

### The universal programmable sensor device & prototyping platform for any IoT use case you can imagine!

Make use of the power to monitor, control and analyze your product remotely over Bluetooth or Wireless Network. In this way, devices, products or machines become connective and smarter. XDK is now released for 24/7 usage giving you the freedom to use it either for short-term proof of concepts or long-term projects. Inclusive of multiple Micro-Electromechanical Systems (MEMS) sensors, various parameters for condition monitoring or predictive maintenance get recorded.

You can decide between a rapid prototyping kit (XDK110) and as a professional bundle (XDK Node) in a package of 10 pieces. The **XDK110** device was designed for rapid prototyping and allows users an easy transition from prototype to mass production by providing a clear road to product development.

The **XDK Node** – Professional Bundle includes 10 pieces of XDK110 devices with an optimized scope of delivery which enables a cost effective deployment for larger projects and simplifies the installation.

#### BUILT-IN SENSORS



Accelerometer



Acoustic sensor



Digital light sensor



Gyroscope



Humidity sensor



Magnetometer



Pressure sensor



Temperature sensor

#### APPLICATION ADVANTAGES

- ▶ All-in-one sensor kit: no need for component selection, hardware assembly, or deployment of a real-time operating system
- ▶ Algorithm library
- ▶ Example code in open source licensing
- ▶ Drivers for all system components included
- ▶ Secure data protocol
- ▶ Small form factor (Length 60 mm x Width 40 mm x Height 22 mm; Weight 54 g)
- ▶ Built-in lithium ion rechargeable battery
- ▶ Functional extendibility via the included extension board
- ▶ High-level API for the standard user and low-level API for the power user
- ▶ PC and MAC based development tools for Windows, LINUX and MacOS make it an easy to work with tool for any developer
- ▶ CE, FCC, IC, IMDA, ACMA, NTC and NBTC certified | further on request



#### INCLUDED IN DELIVERY

##### XDK110 - Rapid Prototyping Kit

- ▶ XDK Development Kit
- ▶ “XDK Gateway” extension board for easy access to additional MCU functionality
- ▶ 10 cm connector cable
- ▶ Micro USB 2.0 connector cable
- ▶ Mounting plate and screws

##### XDK Node – Professional Bundle

- ▶ Bundle of 10 XDK110 devices (without “XDK Gateway” and without 10 cm connector cable)
- ▶ Micro USB 2.0 connector cable
- ▶ Mounting plate and screws

## MAIN COMPONENTS

- ▶ Bluetooth 4.0 low energy IEEE 802.15.1
- ▶ Wireless LAN IEEE 802.11b/g/n
- ▶ 32-Bit microcontroller (ARM Cortex M3), 1MB Flash, 128 kB RAM
- ▶ Internal Li-Ion rechargeable battery 560 mAh
- ▶ Integrated antennas



**BOSCH**  
Invented for life

## OPERATING CONDITIONS

- ▶ Indoor use
- ▶ Operating temperature range -20 °C ... 60 °C, (0 °C ... 45 °C for battery charging)
- ▶ Storage temperature range -20 °C ... 60 °C
- ▶ Humidity range 10...90 %rH (non-condensing)
- ▶ IP Rating IP 30 (IEC 60529)
- ▶ Supply Voltage 5 V DC

## MEASUREMENT RANGES

- ▶ Accelerometer  $\pm 2 \dots \pm 16$  g (programmable)
- ▶ Gyroscope  $\pm 125$  °/s ...  $\pm 2000$  °/s (programmable)
- ▶ Magnetic field strength  $\pm 1300$   $\mu$ T (X,Y-Axis);  $\pm 2500$   $\mu$ T (Z-Axis)
- ▶ Light sensor 0.045 lux ... 188,000 lux ; 22-bit
- ▶ Temperature -20 °C ... 60 °C [limited by XDK operating conditions]
- ▶ Pressure 300...1100 hPa
- ▶ Humidity 10...90 %rH (non-condensing)  
[limited by XDK operating conditions]

## SAMPLING RATE

- ▶ Accelerometer BMA280 2000 Hz
- ▶ Gyroscope BMG160 2000 Hz
- ▶ Magnetometer BMM150 300 Hz
- ▶ Hum./Press./Temp. BME280 182 Hz
- ▶ Inertial Measurement Unit 1600 Hz (Accelerometer);  
BMI160 3200 Hz (Gyroscope)

## SOFTWARE

Free software download for XDK110 & XDK Node from the website (<https://xdk.io/software-downloads>)

- ▶ Integrated development environment supplied with XDK Workbench (Eclipse)
- ▶ LWM2M communication protocol
- ▶ Extensive libraries and modular source code enable the developer to fully understand the system
- ▶ Datagram Transport Layer Security (DTLS)

## USER INTERFACE

- ▶ Power switch
- ▶ Green system LED to display the state of charging
- ▶ 3 programmable status LEDs (red, orange, yellow)
- ▶ 2 programmable push-buttons
- ▶ Micro SD card slot
- ▶ Interface for J-Link Debug-probe
- ▶ Interface for extension board

**По вопросам продаж и поддержки обращайтесь:**

Алматы (7273)495-231  
Архангельск (8182)63-90-72  
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Барнаул (3852)73-04-60  
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Оренбург (3532)37-68-04  
Пенза (8412)22-31-16  
Пермь (342)205-81-47  
Ростов-на-Дону (863)308-18-15  
Рязань (4912)46-61-64  
Самара (846)206-03-16  
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Симферополь (3652)67-13-56  
Казахстан (7172)727-132

Смоленск (4812)29-41-54  
Сочи (862)225-72-31  
Ставрополь (8652)20-65-13  
Сургут (3462)77-98-35  
Тверь (4822)63-31-35  
Томск (3822)98-41-53  
Тула (4872)74-02-29  
Тюмень (3452)66-21-18  
Ульяновск (8422)24-23-59  
Уфа (347)229-48-12  
Хабаровск (4212)92-98-04  
Челябинск (351)202-03-61  
Череповец (8202)49-02-64  
Ярославль (4852)69-52-93