

# Control Technology, I/O Systems and Automation Infrastructure

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8





### **PCB connection technology and electronics housing**

- PCB terminal blocks and plug-in connectors
- Electronics housing



### **Connection technology for field devices**

- Plug-in connectors
- Cables and connectors



### **Modular terminal blocks**

- Modular terminal blocks



### **Sensor/actuator cabling and industrial plug-in connectors**

- Sensor/actuator cabling
- Cables and connectors
- Plug-in connectors



### **Marking systems, tools, and mounting material**

- Marking and labeling
- Tools
- Installation and mounting material



### **Surge protection and power supply units**

- Lightning monitoring system
- Surge protection and interference filters
- Power supply units and UPS
- Protective devices



### **Interface technology and switching devices**










- Electronic switching devices and motor control
- Measurement and control technology • Monitoring
- Relay modules • System cabling for controllers



## **Control technology, I/O systems and automation infrastructure**



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# Ethernet networks

Make the most of all the options offered by your Ethernet network.

Phoenix Contact offers you more real-time, more wireless, more safety, and more reliability.

Industrial Ethernet from Phoenix Contact can be easily integrated in your automation infrastructure - because we make Ethernet easy.

Benefit from our experience in automation which spans decades and the experience we have gained in industrial Ethernet networks over the past ten plus years.

We know and understand the expectations and demands placed on automation. This is evident and embodied in our products and solutions.

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### Factoryline Wired – switches

<b>Type</b>	<b>FL SWITCH SFNB ...</b>	<b>FL SWITCH SFN ... FL SWITCH SFN ... GT ...</b>	<b>FL SWITCH SFNT ...</b>	<b>FL SWITCH SF ...</b>	<b>FL SWITCH 1000 ...</b>
<b>Description</b>	Standard switches with basic functions, up to 8 ports (RJ45/FO)	Standard switches with up to 16 ports and standard Gigabit switches with 8 ports (RJ45/FO)	Standard switches with wide temperature range, up to 16 ports (RJ45/FO)	Standard switches with flat design with up to 16 ports (RJ45/FO)	Industrial unmanaged switches with up to 24 ports (RJ45/FO)
<b>Page</b>	6	10	14	16	18
<b>Type</b>	<b>FL SWITCH 3000 ...</b>	<b>FL SWITCH 4000 ...</b>	<b>FL SWITCH LM ...</b>	<b>FL SWITCH SMCS ...</b>	<b>FL SWITCH IRT ...</b>
<b>Description</b>	Industrial managed switches with up to 16 ports (RJ45/FO)	Industrial managed Gigabit switches with up to 16 ports (RJ45/FO)	Lean Managed Switches with up to 8 ports (RJ45/FO)	Smart Managed Compact Switches with up to 16 ports (RJ45/FO)	PROFINET realtime switch with 4 ports (RJ45/SCRJ)
<b>Page</b>	16	22	24	28	32
<b>Type</b>	<b>FL NAT SMN 8TX</b>	<b>FL SWITCH SMN 6TX/2POF-PN</b>	<b>FL MC ETH/FO 660 T</b>	<b>FL SWITCH GHS...</b>	<b>FL SWITCH 1605 M12</b>
<b>Description</b>	NAT switch with 1:1 NAT router function with 8 ports (RJ45)	Smart Narrow Switch with 8 ports (RJ45/SCRJ)	Media converter with 2 SCRJ and 2 RJ45 ports	Gigabit Modular Switches with up to 28 ports (RJ45/FO)	Standard switch with IP67 protection with 5 ports (M12)
<b>Page</b>	32	33	33	34	38






### Interface modules

### Hubs

### Power over Ethernet





<b>Type</b>	<b>FL IF ...</b>	<b>FL SFP ...</b>	<b>FL MEM PLUG ...</b>	<b>FL HUB ... TX-ZF</b>	<b>FL PSE 2TX</b>
<b>Description</b>	Media modules for Modular Managed Switch system	Plug-in I/O modules for transmission ranges up to 80 km	Replaceable configuration memory for easy device replacement and startup	Ethernet hubs with 8/16 RJ45 ports	Power over Ethernet module (PSE) with 2 PoE ports
<b>Page</b>	36	37	37	39	39

Factoryline Security – secure networks

					
<b>Type</b>	FL MGuard RS ...	FL MGuard GT/GT ...	FL MGuard SMART2 ...	PCI 4000	TC MGuard RS 4000 3G
<b>Description</b>	Firewall/router in metal housing	Gigabit router with firewall, replaceable memory	Router with firewall for mobile use	Router with firewall for PCI	Mobile phone VPN router See Section: industrial communication technology
<b>Page</b>	40	41	41	45	425

Software

Services

				
<b>Type</b>	FL SNMP OPC SERVER	FL VIEW	FL MGuard DM ...	Services
<b>Description</b>	Monitoring/configuration of SNMP-compatible devices in HMI and SCADA systems	Diagnostic software for graphical representation of Ethernet networks	Central management software for FL MGuard devices	Service packages for Industrial Ethernet
<b>Page</b>	507	44	45	46

Wireless Ethernet

					
<b>Type</b>	FL WLAN 5100	FL WLAN ...	FL WLAN EPA ...	FL BT EPA ...	Accessories
<b>Description</b>	WLAN access point for control cabinet mounting	WLAN access point for wall mounting	WLAN Ethernet adapter	Bluetooth access point and Ethernet adapter	Antennae, adapter cables, and surge protection
<b>Page</b>	48	50	51	52	54

Gateways/proxies

Media converters

COM server

Isolator

Accessories

					
<b>Type</b>	FL NP PND...	FL MC ...	FL COMSERVER ...	FL ISOLATOR ...	Patch fields and cables
<b>Description</b>	PROFINET proxies function as a link between PROFINET networks and other fieldbus systems	Conversion of 10/100Base-T(X) Ethernet to fiber optics	Device servers for converting serial interfaces	4 kV Ethernet ISOLATOR for electrical isolation	Patch fields, cables, tools, and fiber optic connector plugs
<b>Page</b>	60	406	411	414	from 416

See Section: industrial communication technology



#### Standard switches with basic functions

- FL SWITCH SFNB...** unmanaged switches are optimized for basic and entry level applications where low installation costs with full industrialization are required.
- 5 to 8 ports in a narrow, metal housing
  - Optional SC and ST fiber optic ports
  - For longer distances, multi-mode and single-mode fiber connections are available
  - RJ45 ports provide 10/100 Mbps speeds ; fiber optic ports operate at 100 Mbps
  - Autonegotiation and autocross recognition provide easy installation and setup
  - LED indicators provide local diagnostics
  - Cable locking security options

#### Ethernet



5 RJ45 ports



#### Technical data

<b>Ethernet interface</b>	
Number of ports	5 (RJ45 ports)
Transmission speed	10/100 Mbps
Connection method	RJ45
<b>Fiber optic interface</b>	
Number of ports	-
Transmission speed	-
Connection method	-
Transmission length	-
<b>Function</b>	
Basic functions	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode
Status and diagnostic indicators	LEDs: U <sub>s</sub> , link and activity per port
<b>Network expansion parameters</b>	
Cascading depth	Network, linear, and star structure: any
Maximum conductor length (twisted pair)	100 m
<b>Power supply</b>	
Supply voltage	24 V DC
Residual ripple	3,6 V <sub>pp</sub>
Supply voltage range	12 V DC ... 48 V DC
Typical current consumption	185 mA (@24 V DC)
<b>General data</b>	
Weight	205 g
Width	28 mm
Height	110 mm
Depth	70 mm
Degree of protection	IP20
Ambient temperature (operation)	-10 °C ... 60 °C
Permissible humidity (operation)	5% ... 95% (no condensation)
Noise emission	EN 61000-6-4
Noise immunity	EN 61000-6-2

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Ethernet switch</b> - 5 RJ45 ports - 8 RJ45 ports - 4 RJ45 ports, 1 SC FO port - 4 RJ45 ports, 1 ST FO port	<b>FL SWITCH SFNB 5TX</b>	<b>2891001</b>	<b>1</b>



Ethernet



8 RJ45 ports

Ethernet



4 RJ45 ports and 1 fiber optic port (multi mode)

Ethernet



4 RJ45 ports and 1 fiber optic port (single mode)



Technical data

8 (RJ45 ports)  
10/100 Mbps  
RJ45

-  
-  
-

Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode

LEDs: U<sub>S</sub>, link and activity per port

Network, linear, and star structure: any  
100 m

24 V DC  
3.6 V<sub>PP</sub>  
9 V DC ... 32 V DC  
140 mA (@24 V DC)

320 g  
50 mm  
110 mm  
70 mm  
IP20  
-10 °C ... 60 °C  
5% ... 95% (no condensation)  
EN 61000-6-4  
EN 61000-6-2:2005

Ordering data

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNB 8TX	2891002	1

Technical data

FL SWITCH SFNB 4TX/FX    FL SWITCH SFNB 4TX/FX ST

4 (RJ45 ports)  
10/100 Mbps  
RJ45

1 (FO port)  
100 Mbps (SC-D, full duplex)    100 Mbps (ST multi mode)  
SC    ST  
12.1 km (fiberglass with F-G 62.5/125 0.7 dB/km F1000)

Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode

LEDs: U<sub>S</sub>, link and activity per port

Network, linear, and star structure: any  
100 m

24 V DC  
3.6 V<sub>PP</sub>  
12 V DC ... 48 V DC  
185 mA (@24 V DC)    175 mA (@24 V DC)

205 g  
28 mm  
110 mm  
70 mm  
IP20  
0 °C ... 60 °C    -10 °C ... 60 °C  
5% ... 95% (no condensation)  
EN 61000-6-4  
EN 61000-6-2

Ordering data

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNB 4TX/FX	2891027	1
FL SWITCH SFNB 4TX/FX ST	2891028	1

Technical data

4 (RJ45 ports)  
10/100 Mbps  
RJ45

1 (FO port)  
100 Mbps (SC single mode)  
SC  
25 km (fiberglass with F-G 9/125 0.5 dB/km)

Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode

LEDs: U<sub>S</sub>, link and activity per port

Network, linear, and star structure: any  
100 m

24 V DC  
3.6 V<sub>PP</sub>  
12 V DC ... 48 V DC  
175 mA (@24 V DC)

205 g  
28 mm  
110 mm  
70 mm  
IP20  
-10 °C ... 60 °C  
5% ... 95% (no condensation)  
EN 61000-6-4  
EN 61000-6-2

Ordering data

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNB 4TX/FX SM20	2891029	1

## Switches

### Unmanaged switches

#### Standard switches with up to 8 ports

**FL SWITCH SFN...** unmanaged switches have a wide range of configurations and features for general purpose applications.

- 5 to 8 ports in a narrow, metal housing
- Optional SC and ST fiber optic ports
- DC and AC power supply options
- Quality of Service (QoS) prioritized messages
- RJ45 ports provide 10/100 Mbps speeds ; fiber optic ports operate at 100 Mbps
- Autonegotiation and autocross recognition provide easy installation and setup
- LED indicators provide local diagnostics
- Switch-mounted cable locking and port blocking options

**Notes:**  
1) EMC: Class A product, see page 553

### Ethernet



5/8 RJ45 ports



<b>Ethernet interface</b>	
Number of ports	
Transmission speed	
Connection method	
<b>Fiber optic interface</b>	
Number of ports	
Transmission speed	
Wavelength	
Transmission length	
<b>Function</b>	
Basic functions	
Status and diagnostic indicators	
<b>Network expansion parameters</b>	
Cascading depth	
Maximum conductor length (twisted pair)	
<b>Power supply</b>	
Supply voltage	
Residual ripple	
Supply voltage range	
Typical current consumption	
<b>General data</b>	
Weight	
Width	
Height	
Depth	
Degree of protection	
Ambient temperature (operation)	
Permissible humidity (operation)	
Noise emission	
Noise immunity	

Technical data		
	FL SWITCH SFN 5TX	FL SWITCH SFN 8TX
Number of ports	5 (RJ45 ports)	8 (RJ45 ports)
Transmission speed	10/100 Mbps	
Connection method	RJ45	
Number of ports	-	
Transmission speed	-	
Wavelength	-	
Transmission length	-	
Basic functions	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode	
Status and diagnostic indicators	LEDs: U <sub>S</sub> , link and activity per port	LEDs: U <sub>S1</sub> , link and activity per port
Cascading depth	Network, linear, and star structure: any	
Maximum conductor length (twisted pair)	100 m	
Supply voltage	24 V DC	
Residual ripple	3.6 V <sub>PP</sub>	
Supply voltage range	9 V DC ... 30.2 V DC	
Typical current consumption	90 mA (at 24 V DC)	Typ. 140 mA
Weight	265 g	365 g
Width	30 mm	50 mm
Height	120 mm	
Depth	70 mm	
Degree of protection	IP20	
Ambient temperature (operation)	0 °C ... 60 °C	
Permissible humidity (operation)	5% ... 95% (no condensation)	
Noise emission	EN 61000-6-4	
Noise immunity	EN 61000-6-2:2005	

<b>Description</b>
<b>Ethernet switch</b>
- 5 RJ45 ports
- 8 RJ45 ports
- 8 RJ45 ports, flow control disabled
- 4 RJ45 ports, 1 SC FO port
- 4 RJ45 ports, 1 ST FO port
- 7 RJ45 ports, 1 SC FO port
- 7 RJ45 ports, 1 ST FO port
- 7 RJ45 ports, 1 SC FO port, flow control disabled
- 6 RJ45 ports, 2 SC FO ports
- 6 RJ45 ports, 2 ST FO ports
- 6 RJ45 ports, 2 SC FO ports, flow control disabled

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 5TX	2891152	1
FL SWITCH SFN 8TX	2891929	1
FL SWITCH SFN 8TX-NF <sup>1)</sup>	2891022	1

Layer-1 security elements

**Accessories**  
FL PLUG GUARD...

Ethernet



5/8 RJ45 ports with AC supply

Ethernet



4/7 RJ45 ports and 1 FO port

Ethernet



6 RJ45 ports and 2 FO ports



Technical data	
FL SWITCH SFN 5TX-24VAC	FL SWITCH SFN 8TX-24VAC
5 (RJ45 ports)	8 (RJ45 ports)
10/100 Mbps RJ45	
-	-
-	-
-	-
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode	
LEDs: U <sub>S</sub> , link and activity per port	LEDs: U <sub>S1</sub> , link and activity per port
Network, linear, and star structure: any	
100 m	
24 V AC	
3.6 V <sub>PP</sub>	
20 V AC ... 28 V AC	
Typ. 114 mA	Typ. 189 mA
277 g	340 g
30 mm	50 mm
120 mm	
70 mm	
IP20	
0 °C ... 60 °C	
5% ... 95% (no condensation)	
EN 61000-6-4	
EN 61000-6-2:2005	

Technical data	
FL SWITCH SFN 4TX/FX	FL SWITCH SFN 7TX/FX
4 (RJ45 ports)	7 (RJ45 ports)
10/100 Mbps RJ45	
1 (FO port)	
100 Mbps (SC-D, full duplex)	
1300 nm/1310 nm	
2000 m (fiberglass 50/125)	
2000 m (fiberglass 62.5/125)	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode	
LEDs: U <sub>S</sub> , link and activity per port	
Network, linear, and star structure: any	
100 m	
24 V DC	
3.6 V <sub>PP</sub>	
9 V DC ... 30.2 V DC	
Typ. 140 mA	Typ. 190 mA
265 g	365 g
30 mm	50 mm
120 mm	
70 mm	
IP20	
0 °C ... 60 °C	
5% ... 95% (no condensation)	
EN 61000-6-4	
EN 61000-6-2:2005	

Technical data	
FL SWITCH SFN 6TX/2FX	FL SWITCH SFN 6TX/2FX ST
10/100 Mbps	6 (RJ45 ports)
	10/100 Mbps (RJ45)
	RJ45
	2 (FO ports)
100 Mbps (SC-D, full duplex)	100 Mbps (ST, full duplex)
	1300 nm
	2000 m (fiberglass 50/125)
	2000 m (fiberglass 62.5/125)
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode	
LEDs: U <sub>S</sub> , link and activity per port	
Network, linear, and star structure: any	
100 m	
24 V DC	
3.6 V <sub>PP</sub>	
9 V DC ... 30.2 V DC	
Typ. 230 mA	
365 g	
50 mm	
120 mm	
70 mm	
IP20	
0 °C ... 60 °C	
5% ... 95% (no condensation)	
EN 61000-6-4	
EN 61000-6-2:2005	

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 5TX-24VAC	2891021	1
FL SWITCH SFN 8TX-24VAC	2891020	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 4TX/FX	2891851	1
FL SWITCH SFN 4TX/FX ST	2891453	1
FL SWITCH SFN 7TX/FX	2891097	1
FL SWITCH SFN 7TX/FX ST	2891110	1
FL SWITCH SFN 7TX/FX-NF <sup>1)</sup>	2891023	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 6TX/2FX	2891314	1
FL SWITCH SFN 6TX/2FX ST	2891411	1
FL SWITCH SFN 6TX/2FX-NF <sup>1)</sup>	2891024	1

Accessories
FL PLUG GUARD...

Accessories
FL PLUG GUARD...

Accessories
FL PLUG GUARD...

## Switches

### Unmanaged switches

#### Standard switches with up to 16 ports

**FL SWITCH SFN(T)...** 16-port unmanaged switches provide high-density Ethernet connections for large or higher-level applications.

- 16 ports in a narrow housing with redundant power supply
- Optional SC fiber optic ports
- Standard temperature (0°C... 60°C) and wide temperature (-40°C... 75°C) devices available
- RJ45 ports provide 10/100 Mbps speeds ; fiber optic ports operate at 100 Mbps
- Autonegotiation and autocross recognition provide easy installation and setup
- LED indicators provide local diagnostics
- Cable locking security options

#### Ethernet



16 RJ45 ports



Ethernet interface	
Number of ports	16 (RJ45 ports)
Transmission speed	10/100 Mbps
Connection method	RJ45
Fiber optic interface	
Number of ports	-
Wavelength	-
Transmission length	-
Function	
Basic functions	Unmanaged switch / auto negotiation, complies with IEEE 802.3, store-and-forward switching mode, includes alarm contacts
Status and diagnostic indicators	
	LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port, voltage alarm
Network expansion parameters	
Cascading depth	Network, linear, and star structure: any
Maximum conductor length (twisted pair)	100 m
Power supply	
Supply voltage	24 V DC (redundant)
Residual ripple	3.6 V <sub>pp</sub>
Supply voltage range	12 V DC ... 48 V DC
Typical current consumption	350 mA (at 24 V DC)
General data	
Weight	870 g
Width	70 mm
Height	135 mm
Depth	110 mm
Degree of protection	IP20
Ambient temperature (operation)	0 °C ... 60 °C                      -40 °C ... 75 °C
Permissible humidity (operation)	5% ... 95% (no condensation)
Noise emission	EN 61000-6-4
Noise immunity	EN 61000-6-2

#### Technical data

FL SWITCH SFN 16TX	FL SWITCH SFNT 16TX
	16 (RJ45 ports)
	10/100 Mbps
	RJ45
	-
	-
	-
	Unmanaged switch / auto negotiation, complies with IEEE 802.3, store-and-forward switching mode, includes alarm contacts
	LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port, voltage alarm
	Network, linear, and star structure: any
	100 m
	24 V DC (redundant)
	3.6 V <sub>pp</sub>
	12 V DC ... 48 V DC
	350 mA (at 24 V DC)
	870 g
	70 mm
	135 mm
	110 mm
	IP20
	0 °C ... 60 °C                      -40 °C ... 75 °C
	5% ... 95% (no condensation)
	EN 61000-6-4
	EN 61000-6-2

Description
<b>Ethernet switch</b>
16 RJ45 ports
15 RJ45 ports, 1 FO port
14 RJ45 ports, 2 FO ports
<b>Ethernet switch, wide temperature</b>
16 RJ45 ports
15 RJ45 ports, 1 FO port
14 RJ45 ports, 2 FO ports

#### Ordering data

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 16TX	2891933	1
FL SWITCH SFNT 16TX	2891952	1

Ethernet



15 RJ45 ports and 1 FO port

Ethernet



14 RJ45 ports and 2 FO ports



Technical data

Technical data

FL SWITCH SFN 15TX/FX      FL SWITCH SFNT 15TX/FX

FL SWITCH SFN 14TX/2FX      FL SWITCH SFNT 14TX/2FX

15 (RJ45 ports)  
10/100 Mbps  
RJ45

14 (RJ45 ports)  
10/100 Mbps  
RJ45

1 (FO port)  
1300 nm  
12.1 km (fiberglass with F-G 62.5/125 0.7 dB/km F1000)

2 (FO port)  
1300 nm  
12.1 km (fiberglass with F-G 62.5/125 0.7 dB/km F1000)

Unmanaged switch / auto negotiation, complies with IEEE 802.3, store-and-forward switching mode, includes alarm contacts

Unmanaged switch / auto negotiation, complies with IEEE 802.3, store-and-forward switching mode, includes alarm contacts

LEDs: U<sub>S1</sub>, U<sub>S2</sub> (redundant voltage supply), link and activity per port, voltage alarm

LEDs: U<sub>S1</sub>, U<sub>S2</sub> (redundant voltage supply), link and activity per port, voltage alarm

Network, linear, and star structure: any  
100 m

Network, linear, and star structure: any  
100 m

24 V DC (redundant)  
3.6 V<sub>PP</sub>  
12 V DC ... 48 V DC  
350 mA (at 24 V DC)

24 V DC (redundant)  
3.6 V<sub>PP</sub>  
12 V DC ... 48 V DC  
350 mA (at 24 V DC)

870 g  
70 mm  
135 mm  
110 mm  
IP20

870 g  
70 mm  
135 mm  
110 mm  
IP20

0 °C ... 60 °C      -40 °C ... 75 °C

0 °C ... 60 °C      -40 °C ... 75 °C

5% ... 95% (no condensation)

5% ... 95% (no condensation)

EN 61000-6-4  
EN 61000-6-2

EN 61000-6-4  
EN 61000-6-2

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 15TX/FX	2891934	1
FL SWITCH SFNT 15TX/FX	2891953	1

Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 14TX/2FX	2891935	1
FL SWITCH SFNT 14TX/2FX	2891954	1

## Switches

### Unmanaged switches

#### Standard Gigabit switches

**FL SWITCH SFN...** Gigabit unmanaged switches have a wide range of fiber and copper port configurations for high performance applications.

- 8 ports in a narrow, metal housing with redundant power supply
- All ports provide 1000 Mbps speeds
- Autonegotiation and autocross recognition provide easy installation and setup
- **FL SWITCH SFN 6GT/2LX** provides a transmission length of up to 10 km with 2 single-mode fiber ports
- **FL SWITCH SFN 6GT/2LX-20** provides a transmission length of up to 20 km with 2 single-mode fiber ports
- LED indicators provide local diagnostics
- Relay contact

#### Ethernet



8 RJ45 ports



#### Technical data

Ethernet interface	
Number of ports	8 (RJ45 ports)
Transmission speed	10/100/1000 Mbps (RJ45)
Connection method	RJ45
Fiber optic interface	
Number of ports	-
Connection method	-
Wavelength	-
Transmission length	-
Other connections	
Potential-free signaling contact	Plug-in/screw connection via COMBICON
Function	
Basic functions	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode
Status and diagnostic indicators	LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port
Network expansion parameters	
Cascading depth	Network, linear, and star structure: any
Maximum conductor length (twisted pair)	100 m
Power supply	
Supply voltage	24 V DC (redundant)
Residual ripple	3.6 V <sub>PP</sub>
Supply voltage range	9 V DC ... 30.2 V DC
Typical current consumption	Typ. 430 mA
General data	
Weight	395 g
Width	50 mm
Height	120 mm
Depth	70 mm
Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 75 °C
Permissible humidity (operation)	5% ... 95% (no condensation)
Noise emission	EN 61000-6-4
Noise immunity	EN 61000-6-2:2005

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Ethernet switch</b>			
- 8 RJ45 ports			
- 7 RJ45 ports, 1 SC FO port (multi mode)			
- 6 RJ45 ports, 2 SC FO ports (multi mode)			
- 6 RJ45 ports, 2 SC FO ports (single mode) with 10 km range			
- 6 RJ45 ports, 2 SC FO ports (single mode) with 20 km range			
	<b>FL SWITCH SFN 8GT</b>	<b>2891673</b>	<b>1</b>

#### Accessories

Layer-1 security elements	FL PLUG GUARD...
---------------------------	------------------



Ethernet



7 RJ45 ports and  
1 fiber optic port (multi mode)

Ethernet



6 RJ45 ports and  
2 fiber optic ports (multi mode)

Ethernet



6 RJ45 ports and  
2 fiber optic ports (single mode)



Ex:



Ex:



Ex:

Technical data
7 (RJ45 ports) 10/100/1000 Mbps RJ45
1 (FO port) SC 850 nm 220 m (fiberglass 62.5/125)
Plug-in/screw connection via COMBICON
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port
Network, linear, and star structure: any 100 m
24 V DC (redundant) 3.6 V <sub>PP</sub> 9 V DC ... 30.2 V DC Typ. 320 mA
415 g 50 mm 120 mm 70 mm IP20 -25 °C ... 75 °C
5% ... 95% (no condensation) EN 61000-6-4 EN 61000-6-2:2005

Technical data
6 (RJ45 ports) 10/100/1000 Mbps RJ45
2 (FO ports) SC 850 nm 220 m (fiberglass 62.5/125)
Plug-in/screw connection via COMBICON
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port
Network, linear, and star structure: any 100 m
24 V DC (redundant) 3.6 V <sub>PP</sub> 9 V DC ... 30.2 V DC Typ. 350 mA
425 g 50 mm 120 mm 70 mm IP20 -25 °C ... 60 °C (75 °C in preparation)
5% ... 95% (no condensation) EN 61000-6-4 EN 61000-6-2:2005

Technical data
FL SWITCH SFN 6GT/2LX      FL SWITCH SFN 6GT/2LX-20
6 (RJ45 ports) 10/100/1000 Mbps RJ45
2 (FO ports) SC 1310 nm 10000 m (fiberglass 9/125)      20000 m (fiberglass 9/125)
Plug-in/screw connection via COMBICON
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port
Network, linear, and star structure: any 100 m
24 V DC (redundant) 3.6 V <sub>PP</sub> 9 V DC ... 30.2 V DC Typ. 360 mA
435 g 50 mm 120 mm 70 mm IP20 -25 °C ... 60 °C      0 °C ... 60 °C (75 °C in preparation)
5% ... 95% (no condensation) EN 61000-6-4 EN 61000-6-2:2005

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 7GT/SX	2891518	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 6GT/2SX	2891398	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SFN 6GT/2LX	2891987	1
FL SWITCH SFN 6GT/2LX-20	2891563	1

Accessories
FL PLUG GUARD...

Accessories
FL PLUG GUARD...

Accessories
FL PLUG GUARD...

## Switches

### Unmanaged switches

#### Standard switches with wide temperature range

- FL SWITCH SFNT...** unmanaged switches are optimized for use in extreme environments and marine applications.
- 5 to 8 ports in a narrow, metal housing with redundant power supply
  - Optional SC and ST fiber optic ports
  - RJ45 ports provide 10/100 Mbps speeds ; fiber optic ports operate at 100 Mbps
  - Wide operating temperature range (-40°C... 75°C)
  - Autonegotiation and autocross recognition provide easy installation and setup
  - Quality of Service (QoS) prioritized messages
  - LED indicators provide local diagnostics
  - Alarm contact provides power and link status diagnostics
  - Switch-mounted cable locking and port blocking options

<b>Notes:</b>
1) EMC: Class A product, see page 553

### Ethernet



5/8 RJ45 ports

UL US ABS BSH CE RoHS Recycle ClassNK  
Ex: (UL)

<b>Ethernet interface</b>
Number of ports
Transmission speed
Connection method
<b>Fiber optic interface</b>
Number of ports
Transmission speed
Connection method
Transmission length
<b>Function</b>
Basic functions
<b>Status and diagnostic indicators</b>
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port, alarm (power and link down)
<b>Network expansion parameters</b>
Cascading depth
Maximum conductor length (twisted pair)
<b>Power supply</b>
Supply voltage
Residual ripple
Supply voltage range
Typical current consumption
<b>General data</b>
Weight
Width
Height
Depth
Degree of protection
Ambient temperature (operation)
Permissible humidity (operation)
Noise emission
Noise immunity

Technical data		
	FL SWITCH SFNT 5TX	FL SWITCH SFNT 8TX
Number of ports	5 (RJ45 ports)	8 (RJ45 ports)
Transmission speed	10/100 Mbps	
Connection method	RJ45	
Number of ports	-	
Transmission speed	-	
Connection method	-	
Transmission length	-	
Basic functions	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode, includes QoS and alarm contact	
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port, alarm (power and link down)		
Network structure	Network, linear, and star structure: any	
Maximum conductor length (twisted pair)	100 m	
Supply voltage	24 V DC (redundant)	
Residual ripple	3.6 V <sub>pp</sub>	
Supply voltage range	9 V DC ... 32 V DC	
Typical current consumption	125 mA (@24 V DC)	155 mA (@24 V DC)
Weight	275 g	460 g
Width	30 mm	50 mm
Height	130 mm	
Depth	100 mm	
Degree of protection	IP20	
Ambient temperature (operation)	-40 °C ... 75 °C	
Permissible humidity (operation)	5% ... 95% (no condensation)	
Noise emission	EN 61000-6-4	
Noise immunity	EN 61000-6-2	

<b>Description</b>
<b>Ethernet switch, wide temperature</b>
- 5 RJ45 ports
- 8 RJ45 ports
- 4 RJ45 ports, 1 SC FO port
- 7 RJ45 ports, 1 SC FO port
- 7 RJ45 ports, 1 ST FO port
- 6 RJ45 ports, 2 SC FO ports
- 6 RJ45 ports, 2 ST FO ports
<b>Ethernet switch, wide temperature, conformal coating for harsh environments</b>
- 5 RJ45 ports
- 8 RJ45 ports
- 4 RJ45 ports, 1 SC FO port
- 7 RJ45 ports, 1 SC FO port
- 7 RJ45 ports, 1 ST FO port
- 6 RJ45 ports, 2 SC FO ports
- 6 RJ45 ports, 2 ST FO ports

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>FL SWITCH SFNT 5TX</b>	<b>2891003</b>	1
<b>FL SWITCH SFNT 8TX</b>	<b>2891005</b>	1
<b>FL SWITCH SFNT 5TX-C</b>	<b>2891043</b>	1
<b>FL SWITCH SFNT 8TX-C</b>	<b>2891045</b>	1

<b>Mounting plate, for 5- and 8-port SFNT switches</b>
--

Accessories		
Type	Order No.	Pcs. / Pkt.
<b>FL PA SFNT 5-8</b>	<b>2891012</b>	1

Ethernet



4 RJ45 ports and 1 FO port

Ethernet



7 RJ45 ports and 1 FO port

Ethernet



6 RJ45 ports and 2 FO ports

UL US ABS BSH CE ClassNK  
Ex:

UL US ABS BSH CE ClassNK  
Ex:

UL US  
Ex:

Technical data
4 (RJ45 ports) 10/100 Mbps RJ45
1 (FO port) 100 Mbps (SC-D, full duplex) SC 12.1 km (fiberglass with F-G 62.5/125 0.7 dB/km F1000)
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode, includes QoS and alarm contact
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port, alarm (power and link down)
Network, linear, and star structure: any 100 m
24 V DC (redundant) 3.6 V <sub>PP</sub> 9 V DC ... 32 V DC 180 mA (@24 V DC)
280 g 30 mm 130 mm 100 mm IP20 -40 °C ... 75 °C 5% ... 95% (no condensation) EN 61000-6-4 EN 61000-6-2

Technical data
FL SWITCH SFNT 7TX/FX    FL SWITCH SFNT 7TX/FX ST
7 (RJ45 ports) 10/100 Mbps RJ45
1 (FO port) 100 Mbps (SC-D, full duplex)    100 Mbps (ST, full duplex) SC    ST 12.1 km (fiberglass with F-G 62.5/125 0.7 dB/km F1000)
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode, includes QoS and alarm contact
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port, alarm (power and link down)
Network, linear, and star structure: any 100 m
24 V DC (redundant) 3.6 V <sub>PP</sub> 9 V DC ... 32 V DC 180 mA (@24 V DC)
470 g 50 mm 130 mm 100 mm IP20 -40 °C ... 75 °C 5% ... 95% (no condensation) EN 61000-6-4 EN 61000-6-2

Technical data
FL SWITCH SFNT 6TX/2FX <sup>1)</sup> FL SWITCH SFNT 6TX/2FX ST <sup>1)</sup>
6 (RJ45 ports) 10/100 Mbps RJ45
2 (FO port) 100 Mbps (SC-D, full duplex)    100 Mbps (ST, full duplex) SC    ST 12.1 km (fiberglass with F-G 62.5/125 0.7 dB/km F1000)
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode, includes QoS and alarm contact
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port, alarm (power and link down)
Network, linear, and star structure: any 100 m
24 V DC (redundant) 3.6 V <sub>PP</sub> 9 V DC ... 32 V DC 250 mA (@24 V DC)
484 g 50 mm 130 mm 100 mm IP20 -40 °C ... 75 °C 5% ... 95% (no condensation) EN 61000-6-4 EN 61000-6-2

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNT 4TX/FX	2891004	1
FL SWITCH SFNT 4TX/FX-C	2891044	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNT 7TX/FX FL SWITCH SFNT 7TX/FX ST	2891006 2891007	1 1
FL SWITCH SFNT 7TX/FX-C FL SWITCH SFNT 7TX/FX ST-C	2891046 2891047	1 1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SFNT 6TX/2FX <sup>1)</sup> FL SWITCH SFNT 6TX/2FX ST <sup>1)</sup>	2891025 2891026	1 1
FL SWITCH SFNT 6TX/2FX-C FL SWITCH SFNT 6TX/2FX ST-C	2891048 2891049	1 1

Accessories		
FL PA SFNT 5-8	2891012	1

Accessories		
FL PA SFNT 5-8	2891012	1

Accessories		
FL PA SFNT 5-8	2891012	1

## Switches

### Unmanaged switches

#### Standard SF switches

**FL SWITCH SF...** unmanaged switches have a wide variety of port configurations in a low-profile, metal housing for general-purpose applications.

- Up to 16 ports in a low-profile, metal housing with redundant power supply
- Optional SC and ST fiber optic ports
- RJ45 ports provide 10/100 Mbps speeds ; fiber optic ports operate at 100 Mbps
- Autonegotiation and autocross recognition provide easy installation and setup
- LED indicators provide local diagnostics
- Relay contact provides power status alarming
- Cable locking security options

**Notes:**  
1) EMC: Class A product, see page 553



8/16 RJ45 ports



Ethernet interface	
Number of ports	
Transmission speed	
Connection method	
Fiber optic interface	
Number of ports	
Connection method	
Wavelength	
Transmission length	
Other connections	
Potential-free signaling contact	
Function	
Basic functions	
Status and diagnostic indicators	
Network expansion parameters	
Cascading depth	
Maximum conductor length (twisted pair)	
Power supply	
Supply voltage	
Residual ripple	
Supply voltage range	
Typical current consumption	
General data	
Weight	
Width	
Height	
Depth	
Degree of protection	
Ambient temperature (operation)	
Permissible humidity (operation)	
Noise emission	
Noise immunity	

Technical data	
FL SWITCH SF 8TX <sup>1)</sup>	FL SWITCH SF 16TX
8 (RJ45 ports)	16 (RJ45 ports)
	10/100 Mbps RJ45
	-
	-
	-
	Plug-in/screw connection via COMBICON
	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode
	LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port
	Network, linear, and star structure: any 100 m
	24 V DC 3.6 V <sub>pp</sub> 18.5 V DC ... 30.2 V DC
Typ. 200 mA	Typ. 300 mA
260 g	380 g
135 mm	205 mm
	94.3 mm
	30 mm
	IP20
	0 °C ... 55 °C
	5% ... 95% (no condensation)
	EN 61000-6-4
	EN 61000-6-2:2005

Description
<b>Ethernet switch</b>
- 8 RJ45 ports
- 16 RJ45 ports
- 7 RJ45 ports, 1 SC FO port
- 7 RJ45 ports, 1 ST FO port
- 15 RJ45 ports, 1 SC FO port
- 6 RJ45 ports, 2 SC FO ports
- 6 RJ45 ports, 2 ST FO ports
- 14 RJ45 ports, 2 SC FO ports
- 4 RJ45 ports, 3 ST FO ports

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SF 8TX <sup>1)</sup>	2832771	1
FL SWITCH SF 16TX	2832849	1

Ethernet



7/15 RJ45 ports and 1 FO port

Ethernet



6/14 RJ45 ports and 2 FO ports

Ethernet



4 RJ45 ports and 3 FO ports



Technical data	
FL SWITCH SF 7TX/FX	FL SWITCH SF 15TX/FX
7 (RJ45 ports)	15 (RJ45 ports)
	10/100 Mbps RJ45
	1 (FO port) SC 1300 nm
	6400 m (fiberglass with F-G 50/125 0.7 dB/km F1200)
Plug-in/screw connection via COMBICON	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode	
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port	
Network, linear, and star structure: any 100 m	
24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC	
Typ. 220 mA	Typ. 330 mA
260 g 135 mm	380 g 205 mm
115.3 mm 30 mm IP20 0 °C ... 55 °C 5% ... 95% (no condensation) EN 61000-6-4 EN 61000-6-2:2005	

Technical data	
FL SWITCH SF 6TX/2FX	FL SWITCH SF 14TX/2FX
6 (RJ45 ports)	14 (RJ45 ports)
	10/100 Mbps RJ45
	2 (FO ports) SC 1300 nm
	6400 m (fiberglass with F-G 50/125 0.7 dB/km F1200)
Plug-in/screw connection via COMBICON	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode	
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port	
Network, linear, and star structure: any 100 m	
24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC	
Typ. 240 mA	Typ. 360 mA
260 g 135 mm	380 g 205 mm
115.3 mm 30 mm IP20 0 °C ... 55 °C 5% ... 95% (no condensation) EN 61000-6-4 EN 61000-6-2:2005	

Technical data	
4 (RJ45 ports)	10/100 Mbps RJ45
3 (FO ports) ST 1300 nm	6400 m (fiberglass with F-G 50/125 0.7 dB/km F1200)
Plug-in/screw connection via COMBICON	
Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode	
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port	
Network, linear, and star structure: any 100 m	
24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC	
Typ. 240 mA	
140 g 135 mm	115.3 mm 30 mm IP20 0 °C ... 55 °C 5% ... 95% (no condensation) EN 61000-6-4 EN 61000-6-2:2005

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SF 7TX/FX	2832726	1
FL SWITCH SF 7TX/FX ST	2832577	1
FL SWITCH SF 15TX/FX	2832661	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SF 6TX/2FX	2832933	1
FL SWITCH SF 6TX/2FX ST	2832674	1
FL SWITCH SF 14TX/2FX	2832593	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SF 4TX/3FX ST	2832603	1

## Switches

### Unmanaged switches

#### FL SWITCH 1008E

##### industrial unmanaged switch

The FL SWITCH 1008E industrial unmanaged switch is designed for use in energy technology. With its robust design, it can be used in environments subject to high levels of EMI around switchgear that have been designed according to the new IEC 61850 standard.

##### Features:

- 8 RJ45 ports in metal housing with DIN rail adapter
- Wide operating temperature range (-40°C... 75°C)
- Redundant power supply with a wide range from 12 ... 57 V DC (24, 36, 48 V DC)
- Robust design for high EMC requirements, such as electrostatic discharge with 15 kV air discharge and 8 kV contact discharge ; surge withstand capability (surge) and fast transients (burst) up to 4 kV
- Floating alarm contact for power supply monitoring and diagnostics
- Link monitoring of every port for diagnostics via alarm LED and alarm contact can be configured via DIP switches

##### Notes:

A media converter which meets the same requirements that are required for switchgear and transformer substations in energy technology can be found on page 409



8 RJ45 ports

N

Technical data	
<b>Ethernet interface</b>	
Number of ports	8 (RJ45 ports)
Transmission speed	10/100 Mbps
Connection method	RJ45
<b>Function</b>	
Basic functions	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode, includes QoS and alarm contact. Meets IEC 61850-3 and IEEE 1613 standards
Status and diagnostic indicators	LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port
<b>Network expansion parameters</b>	
Cascading depth	Network, linear, and star structure: any
Maximum conductor length (twisted pair)	100 m
<b>Power supply</b>	
Supply voltage	24 V DC (redundant)
Residual ripple	3,6 V <sub>PP</sub>
Supply voltage range	12 V DC ... 57 V DC
Typical current consumption	440 mA (@24 V DC)
<b>General data</b>	
Weight	660 g
Width	54.4 mm
Height	146.4 mm
Depth	125 mm
Degree of protection	IP20
Ambient temperature (operation)	-40 °C ... 75 °C
Permissible humidity (operation)	5% ... 95% (no condensation)
Noise emission	EN 61000-6-4
Noise immunity	EN 61000-6-2:2005

Ordering data			
Description	Type	Order No.	Pcs. / Pkt.
<b>Ethernet switch</b> - 8 RJ45 ports	<b>FL SWITCH 1008E</b>	<b>2891065</b>	<b>1</b>



Unmanaged switches



FL SWITCH 1824 and 1924 rack mount switches provide 24 twisted pair ports (RJ45) of 10/100 or 10/100/1000 mbps and are optimized for large scale or 19" rack mount preferred applications.

Features:

- Fully industrial switches with high IEC 61000-4 noise immunity and 0-60c operation
- Wide input AC voltage range for flexible use - AC powered 100 - 240 V AC

Ethernet



24 RJ45 Ports

Ethernet



24 RJ45 Ports



	Technical data			Technical data		
Ethernet interface						
Number of ports	24 (RJ45 ports)			24 (RJ45 ports)		
Transmission speed	10/100 Mbps			10/100/1000 Mbps		
Connection method	RJ45			RJ45		
Function						
Basic functions	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode			Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode		
Status and diagnostic indicators	LEDs: U <sub>S</sub> , link and activity per port			LEDs: U <sub>S</sub> , link and activity per port		
Network expansion parameters						
Cascading depth	Network, linear, and star structure: any			Network, linear, and star structure: any		
Maximum conductor length (twisted pair)	100 m			100 m		
Power supply						
Supply voltage	120 V AC			120 V AC		
Supply voltage range	100 V AC ... 240 V AC			100 V AC ... 240 V AC		
Typical current consumption	270 mA (100 V AC)			312 mA (100 V AC)		
General data						
Weight	2110 g			2730 g		
Width	440 mm			440 mm		
Height	44 mm			44 mm		
Depth	173 mm			210 mm		
Degree of protection	IP20			IP20		
Ambient temperature (operation)	0 °C ... 60 °C			0 °C ... 60 °C		
Permissible humidity (operation)	5% ... 95% (no condensation)			5% ... 95% (no condensation)		
Noise emission	EN 61000-6-4			EN 61000-6-4		
Noise immunity	EN 61000-6-2:2005			EN 61000-6-2:2005		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Ethernet switch	FL SWITCH 1824	2891041	1	FL SWITCH 1924	2891057	1

## Switches

### Managed switches

The FL SWITCH 3000 industrial managed switches provide scalable power for application flexibility and ease of use.

#### Features:

- Standard (-10°C... 60°C) and wide temperature (-40°C... 75°C) devices available
- Extended Ring Redundancy provides a 15 ms recovery time
- Extensive IEEE and security functions

N

#### Ethernet



5/8 RJ45 ports

#### Ethernet



16 RJ45 ports

	Technical data		Technical data	
	FL SWITCH 3005	FL SWITCH 3008T	FL SWITCH 3016	FL SWITCH 3016T
<b>Ethernet interface</b>				
Number of ports	5 (RJ45 ports)	8 (RJ45 ports)	16 (RJ45 ports)	
Transmission speed	10/100 Mbps (with autonegotiation)		10/100 Mbps (with autonegotiation)	
Connection method	RJ45			
<b>Fiber optic interface</b>				
Number of ports	-		-	
Transmission speed	-		-	
Connection method	-		-	
Transmission length	-		-	
<b>Function</b>				
Basic functions	Managed switch			
Status and diagnostic indicators	LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port		LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port	
<b>Network expansion parameters</b>				
Cascading depth	Network, linear, and star structure: any		Network, linear, and star structure: any	
Maximum conductor length (twisted pair)	100 m		100 m	
<b>Power supply</b>				
Supply voltage	24 V DC		24 V DC	24 V DC (redundant)
Residual ripple	3.6 V <sub>pp</sub>		3.6 V <sub>pp</sub>	
Supply voltage range	12 V DC ... 48 V DC		12 V DC ... 48 V DC	
Typical current consumption	200 mA (24 V DC)	210 mA (24 V DC)	312 mA (24 V DC)	
<b>General data</b>				
Weight	920 g	940 g	1245 g	
Width	54.4 mm		66 mm	
Height	146.4 mm		173 mm	
Depth	125 mm		140 mm	
Degree of protection	IP20			
Ambient temperature (operation)	-10 °C ... 60 °C	-40 °C ... 75 °C	-10 °C ... 60 °C	-40 °C ... 75 °C
Permissible humidity (operation)	5% ... 95% (no condensation)		5% ... 95% (no condensation)	
Noise emission	EN 61000-6-4		EN 61000-6-4	
Noise immunity	EN 61000-6-2:2005		EN 61000-6-2:2005	

	Ordering data			Ordering data		
	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Ethernet switch</b>						
- 5 RJ45 ports	FL SWITCH 3005	2891030	1			
- 8 RJ45 ports	FL SWITCH 3008	2891031	1			
- 16 RJ45 ports				FL SWITCH 3016	2891058	1
<b>Ethernet switch, wide temperature</b>						
- 5 RJ45 ports	FL SWITCH 3005T	2891032	1			
- 8 RJ45 ports	FL SWITCH 3008T	2891035	1			
- 16 RJ45 ports				FL SWITCH 3016T	2891059	1
- 4 RJ45 ports, 1 SC FO port						
- 4 RJ45 ports, 1 ST FO port						
- 6 RJ45 ports, 2 SC FO ports						
- 6 RJ45 ports, 2 ST FO ports						

	Accessories	Accessories
Patch cable, CAT5, pre-assembled (see page 418)	FL CAT5 PATCH ...	FL CAT5 PATCH ...



### Managed switches

The **FL SWITCH 4000** infrastructure managed switches provide gigabit trunk ports and can be flexibly scaled in their performance while maintaining ease of operation.

#### Features:

- 2 Gigabit ports for high performance data trunk lines
- Wide temperature range for harsh environments (-40 °C ... 75 °C)
- 15 ms recovery time with extended ring redundancy
- Extensive IEEE and security functions
- Flexible fiber interface options

N

### Ethernet



8 RJ45 ports and 2 SFP ports

Technical data		
<b>Ethernet interface</b>		
Number of ports	8 (RJ45 ports)	
Transmission speed	10/100 Mbps	
Connection method	RJ45	
<b>Gigabit Ethernet interface</b>		
Number of ports	-	
Transmission speed	-	
Connection method	-	
<b>Fiber optic interface</b>		
Number of ports	2 (SFP ports)	
Transmission speed	1000 Mbps (full duplex)	
Connection method	SFP ports	
Transmission length	Up to 80 km (depending on the fiber/SFP module used)	
<b>Function</b>		
Basic functions	Managed switch	
Status and diagnostic indicators	LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port	
<b>Network expansion parameters</b>		
Cascading depth	Network, linear, and star structure: any	
Maximum conductor length (twisted pair)	100 m	
<b>Power supply</b>		
Supply voltage	24 V DC (redundant)	
Residual ripple	3.6 V <sub>PP</sub>	
Supply voltage range	12 V DC ... 48 V DC	
Typical current consumption	278 mA (24 V DC)	
<b>General data</b>		
Weight	965 g	
Width	66 mm	
Height	173 mm	
Depth	140 mm	
Degree of protection	IP20	
Ambient temperature (operation)	-40 °C ... 75 °C	
Permissible humidity (operation)	5% ... 95% (no condensation)	
Noise emission	EN 61000-6-4	
Noise immunity	EN 61000-6-2:2005	
<b>Description</b>		
<b>Ethernet switch, wide temperature</b>		
<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
FL SWITCH 4008T-2SFP	2891062	1
<b>Accessories</b>		
Patch cable, CAT5, pre-assembled (see page 418)	FL CAT5 PATCH ...	



Ethernet



10 RJ45 ports and  
4 fiber optic ports (single mode)

Ethernet



14 RJ45 ports and  
2 fiber optic ports (multi mode)

Technical data
8 (RJ45 ports) 10/100 Mbps RJ45
2 (RJ45 ports) 10/100/1000 Mbps RJ45
4 (SC single mode) 100 Mbps (SC-D, full duplex) SC -
Managed switch LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port
Network, linear, and star structure: any 100 m
24 V DC (redundant) 3.6 V <sub>pp</sub> 12 V DC ... 48 V DC 488 mA (24 V DC)
1300 g 66 mm 173 mm 140 mm IP20 -40 °C ... 75 °C 5% ... 95% (no condensation) EN 61000-6-4 EN 61000-6-2:2005

Technical data
12 (RJ45 ports) 10/100 Mbps RJ45
2 (RJ45 ports) 10/100/1000 Mbps RJ45
2 (SC multi mode) 100 Mbps (SC-D, full duplex) SC -
Managed switch LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port
Network, linear, and star structure: any 100 m
24 V DC (redundant) 3.6 V <sub>pp</sub> 12 V DC ... 48 V DC 474 mA (24 V DC)
1285 g 66 mm 173 mm 140 mm IP20 -40 °C ... 75 °C 5% ... 95% (no condensation) EN 61000-6-4 EN 61000-6-2:2005

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH 4008T-2GT-4FX SM	2891061	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH 4012T-2GT-2FX	2891063	1

Accessories
FL CAT5 PATCH ...

Accessories
FL CAT5 PATCH ...

## Switches

### Managed switches

#### Lean Managed Switches

Maximum possible diagnostics in a minimum amount of space. The compact FO-compatible and managed Ethernet switches can be optimally incorporated in a wide range of applications thanks to their connection properties.

They have all the necessary standard functions for operating an Ethernet network that is both flexible and rugged.

#### Features:

- -40°C ... 70°C operating temperature
- Comprehensive fiber optic versions
- Compact housing
- Configurable alarm contact

Notes:
1) EMC: Class A product, see page 553

### Ethernet



5 RJ45 ports



<b>Ethernet interface</b>	
Number of ports	5 (RJ45 ports)
Transmission speed	10/100 Mbps
<b>Fiber optic interface</b>	
Number of ports	-
Wavelength	-
Transmission length	-
<b>Other connections</b>	
Serial (V.24 (RS-232))	V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)
<b>Function</b>	
Basic functions	Store-and-forward switch complies with IEEE 802.3 2, priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), DHCP server
Supported browsers	Internet Explorer 5.5 or higher
SNMP – Simple Network Management Protocol	Supported SNMP-MIBs: Enterprise, MIB II, Bridge
Redundancy	Rapid Spanning Tree 802.1w, Fast Ring Detection
Status and diagnostic indicators	Per Ethernet 2 status LEDs: LINK and status activity, 100, full duplex, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage)
<b>Network expansion parameters</b>	
Cascading depth	Network, linear, and star structure: any
Maximum conductor length (twisted pair)	100 m
<b>Power supply</b>	
Supply voltage	24 V DC
Residual ripple	3.6 V <sub>pp</sub>
Supply voltage range	18.5 V DC ... 30.5 V DC
Typical current consumption	250 mA (at $U_S = 24$ V DC)
<b>General data</b>	
Weight	230 g
Width	45 mm
Height	99 mm
Depth	112 mm
Degree of protection	IP20
Ambient temperature (operation)	-40 °C ... 70 °C
Permissible humidity (operation)	30% ... 95% (no condensation)
Noise emission	EN 61000-6-3/-4
Noise immunity	EN 61000-6-2:2005

Technical data		
<b>Technical data</b>		
Store-and-forward switch complies with IEEE 802.3 2, priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), DHCP server		
Internet Explorer 5.5 or higher		
Supported SNMP-MIBs: Enterprise, MIB II, Bridge		
Rapid Spanning Tree 802.1w, Fast Ring Detection		
Per Ethernet 2 status LEDs: LINK and status activity, 100, full duplex, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage)		
<b>Network expansion parameters</b>		
Network, linear, and star structure: any		
100 m		
<b>Power supply</b>		
24 V DC		
3.6 V <sub>pp</sub>		
18.5 V DC ... 30.5 V DC		
250 mA (at $U_S = 24$ V DC)		
<b>General data</b>		
230 g		
45 mm		
99 mm		
112 mm		
IP20		
-40 °C ... 70 °C		
30% ... 95% (no condensation)		
EN 61000-6-3/-4		
EN 61000-6-2:2005		

Description
<b>Lean Managed Switch</b>
- 5 RJ45 ports
- 8 RJ45 ports
- 4 RJ45 ports, 1 SC FO port
- 4 RJ45 ports, 1 ST FO port
<b>Lean Managed Switch, preconfigured for EtherNet/IP™</b>
- 5 RJ45 ports
- 8 RJ45 ports
- 4 RJ45 ports, 1 SC FO port
- 4 RJ45 ports, 1 ST FO port

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>FL SWITCH LM 5TX<sup>1</sup></b>	<b>2989527</b>	1
<b>FL SWITCH LM 5TX-E<sup>1</sup></b>	<b>2989336</b>	1



Ethernet



8 RJ45 ports

Ethernet



4 RJ45 ports and 1 fiber optic port (multi mode)

Ethernet



4 RJ45 ports and 1 fiber optic port (single mode)



Technical data
8 (RJ45 ports) 10/100 Mbps
-
-
-
-
-
V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)
Store-and-forward switch complies with IEEE 802.3.2, priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), DHCP server
Internet Explorer 5.5 or higher Supported SNMP MIBs: Enterprise, MIB II, Bridge
Rapid Spanning Tree 802.1w, Fast Ring Detection
Per Ethernet 2 status LEDs: LINK and status activity, 100, full duplex, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage)

Technical data
4 (RJ45 ports) 10/100 Mbps
1 (SC multi mode) 1300 nm 11000 m (fiberglass with F-G 62.5/125 0.7 dB/km F1000) 6400 m (fiberglass with F-G 50/125 0.7 dB/km F1200) 3000 m (fiberglass with F-G 62.5/125 2.6 dB/km F600) 2800 m (fiberglass with F-G 50/125 1.6 dB/km F800)
V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)
Store-and-forward switch complies with IEEE 802.3.2, priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), DHCP server
Internet Explorer 5.5 or higher Supported SNMP-MIBs: Enterprise, MIB II, Bridge
Rapid Spanning Tree 802.1w, Fast Ring Detection
Per Ethernet 2 status LEDs: LINK and status activity, 100, full duplex, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage)

Technical data
4 (RJ45 ports) 10/100 Mbps
1 (SC single mode) 1300 nm 36000 m (fiberglass with F-G 9/125 0.36 dB/km) 32000 m (fiberglass with F-G 9/125 0.4 dB/km) 26000 m (fiberglass with F-G 9/125 0.5 dB/km) -
V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)
Store-and-forward switch complies with IEEE 802.3.2, priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), DHCP server
Internet Explorer 5.5 or higher Supported SNMP-MIBs: Enterprise, MIB II, Bridge
Rapid Spanning Tree 802.1w, Fast Ring Detection
Per Ethernet 2 status LEDs: LINK and status activity, 100, full duplex, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage)

Network, linear, and star structure: any 100 m
24 V DC 3.6 V <sub>pp</sub> 18.5 V DC ... 30.5 V DC 250 mA (at $U_s = 24$ V DC)
230 g 45 mm 99 mm 112 mm IP20 -40 °C ... 70 °C 30% ... 95% (no condensation) EN 61000-6-3/-4 EN 61000-6-2:2005

Network, linear, and star structure: any 100 m
24 V DC 3.6 V <sub>pp</sub> 18.5 V DC ... 30.5 V DC 400 mA (at $U_s = 24$ V DC)
230 g 45 mm 99 mm 112 mm IP20 -40 °C ... 70 °C 30% ... 95% (no condensation) EN 61000-6-3/-4 EN 61000-6-2:2005

Network, linear, and star structure: any 100 m
24 V DC 3.6 V <sub>pp</sub> 18.5 V DC ... 30.5 V DC 400 mA (at $U_s = 24$ V DC)
230 g 45 mm 99 mm 112 mm IP20 -40 °C ... 70 °C 30% ... 95% (no condensation) EN 61000-6-3/-4 EN 61000-6-2:2005

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 8TX <sup>1)</sup>	2832632	1
FL SWITCH LM 8TX-E <sup>1)</sup>	2891466	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/1FX <sup>1)</sup>	2989624	1
FL SWITCH LM 4TX/1FX ST <sup>1)</sup>	2989721	1
FL SWITCH LM 4TX/1FX-E <sup>1)</sup>	2989433	1
FL SWITCH LM 4TX/1FX ST-E <sup>1)</sup>	2989530	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/1FX SM <sup>1)</sup>	2989828	1
FL SWITCH LM 4TX/1FX SM ST <sup>1)</sup>	2989925	1
FL SWITCH LM 4TX/1FX SM-E <sup>1)</sup>	2989637	1
FL SWITCH LM 4TX/1FX SM ST-E <sup>1)</sup>	2989734	1

## Switches

### Managed switches

#### Lean Managed Switches

Maximum possible diagnostics in a minimum amount of space. The compact FO-compatible and managed Ethernet switches can be optimally incorporated in a wide range of applications thanks to their comprehensive software.

They have all the necessary standard functions for operating an Ethernet network that is both flexible and rugged.

#### Features:

- RSTP with fast switch-over
- Port mirroring
- Configuration can be stored externally
- Web-based management, SNMP

<b>Notes:</b>
1) EMC: Class A product, see page 553

### Ethernet



**4 RJ45 ports and  
2 fiber optic ports (multi mode)**



<b>Ethernet interface</b>	
Number of ports	4 (RJ45 ports)
Transmission speed	10/100 Mbps
<b>Fiber optic interface</b>	
Number of ports	2 (SC multi mode)
Wavelength	1300 nm
Transmission length	11000 m (fiberglass with F-G 62.5/125 0.7 dB/km F1000) 6400 m (fiberglass with F-G 50/125 0.7 dB/km F1200) 3000 m (fiberglass with F-G 62.5/125 2.6 dB/km F600) 2800 m (fiberglass with F-G 50/125 1.6 dB/km F800)
<b>Other connections</b>	
Serial (V.24 (RS-232))	V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)
<b>Function</b>	
Basic functions	store-and-forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)
<b>Supported browsers</b>	Internet Explorer 5.5 or higher
SNMP – Simple Network Management Protocol	Supported SNMP-MIBs: Enterprise, MIB II, Bridge
<b>Redundancy</b>	Rapid Spanning Tree 802.1w, Fast Ring Detection
<b>Status and diagnostic indicators</b>	Per Ethernet 2 status LEDs: LINK and status activity, 100, full duplex, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage)
<b>Network expansion parameters</b>	
Cascading depth	Network, linear, and star structure: any
Maximum conductor length (twisted pair)	100 m
<b>Power supply</b>	
Supply voltage	24 V DC
Residual ripple	3.6 V <sub>PP</sub>
Supply voltage range	18.5 V DC ... 30.5 V DC
Typical current consumption	400 mA (at $U_S = 24$ V DC)
<b>General data</b>	
Weight	230 g
Width	45 mm
Height	99 mm
Depth	112 mm
Degree of protection	IP20
Ambient temperature (operation)	-40 °C ... 70 °C
Permissible humidity (operation)	30% ... 95% (no condensation)
Noise emission	EN 61000-6-3/-4
Noise immunity	EN 61000-6-2:2005

Technical data		
4 (RJ45 ports)		
10/100 Mbps		
2 (SC multi mode)		
1300 nm		
11000 m (fiberglass with F-G 62.5/125 0.7 dB/km F1000)		
6400 m (fiberglass with F-G 50/125 0.7 dB/km F1200)		
3000 m (fiberglass with F-G 62.5/125 2.6 dB/km F600)		
2800 m (fiberglass with F-G 50/125 1.6 dB/km F800)		
V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)		
store-and-forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)		
Internet Explorer 5.5 or higher		
Supported SNMP-MIBs: Enterprise, MIB II, Bridge		
Rapid Spanning Tree 802.1w, Fast Ring Detection		
Per Ethernet 2 status LEDs: LINK and status activity, 100, full duplex, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage)		
Network, linear, and star structure: any		
100 m		
24 V DC		
3.6 V <sub>PP</sub>		
18.5 V DC ... 30.5 V DC		
400 mA (at $U_S = 24$ V DC)		
230 g		
45 mm		
99 mm		
112 mm		
IP20		
-40 °C ... 70 °C		
30% ... 95% (no condensation)		
EN 61000-6-3/-4		
EN 61000-6-2:2005		

Description
<b>Lean Managed Switch</b> - 4 RJ45 ports, 2 SC FO ports - 4 RJ45 ports, 2 ST FO ports
<b>Lean Managed Switch</b> , preconfigured for EtherNet/IP™  - 4 RJ45 ports, 2 SC FO ports - 4 RJ45 ports, 2 ST FO ports

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>FL SWITCH LM 4TX/2FX<sup>1)</sup></b>	<b>2832658</b>	1
<b>FL SWITCH LM 4TX/2FX-E<sup>1)</sup></b>	<b>2891660</b>	1

Ethernet



4 RJ45 ports and 2 fiber optic ports (single mode)

Ethernet



4 RJ45 ports and 2 fiber optic ports in ST format (multi mode)

Ethernet



4 RJ45 ports and 2 fiber optic ports in ST format (single mode)



Technical data
4 (RJ45 ports) 10/100 Mbps
2 (SC single mode) 1300 nm 36000 m (fiberglass with F-G 9/125 0.36 dB/km) 32000 m (fiberglass with F-G 9/125 0.4 dB/km) 26000 m (fiberglass with F-G 9/125 0.5 dB/km) -
V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)
store-and-forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, Rapid Spanning Tree (RSTP)
Internet Explorer 5.5 or higher Supported SNMP-MIBs: Enterprise, MIB II, Bridge
Rapid Spanning Tree 802.1w, Fast Ring Detection
Per Ethernet 2 status LEDs: LINK and status activity, 100, full duplex, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage)

Technical data
4 (RJ45 ports) 10/100 Mbps
2 (ST multi mode) 1300 nm 11000 m (fiberglass with F-G 62.5/125 0.7 dB/km F1000) 6400 m (fiberglass with F-G 50/125 0.7 dB/km F1200) 3000 m (fiberglass with F-G 62.5/125 2.6 dB/km F600) 2800 m (fiberglass with F-G 50/125 1.6 dB/km F800)
V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)
Store-and-forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP)
Internet Explorer 5.5 or higher Supported SNMP-MIBs: Enterprise, MIB II, Bridge
Rapid Spanning Tree 802.1w, Fast Ring Detection
Per Ethernet 2 status LEDs: LINK and status activity, 100, full duplex, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage)

Technical data
4 (RJ45 ports) 10/100 Mbps
2 (ST single mode) 1300 nm 36000 m (fiberglass with F-G 9/125 0.36 dB/km) 32000 m (fiberglass with F-G 9/125 0.4 dB/km) 26000 m (fiberglass with F-G 9/125 0.5 dB/km) -
V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)
Store-and-forward switch complies with IEEE 802.3 2 priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP)
Internet Explorer 5.5 or higher Supported SNMP-MIBs: Enterprise, MIB II, Bridge
Rapid Spanning Tree 802.1w, Fast Ring Detection
Per Ethernet 2 status LEDs: LINK and status activity, 100, full duplex, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage)

Network, linear, and star structure: any 100 m
24 V DC 3.6 V <sub>pp</sub> 18.5 V DC ... 30.5 V DC 400 mA (at $U_S = 24$ V DC)
230 g 45 mm 99 mm 112 mm IP20 -40 °C ... 70 °C 30% ... 95% (no condensation) EN 61000-6-3/-4 EN 61000-6-2:2005

Network, linear, and star structure: any 100 m
24 V DC 3.6 V <sub>pp</sub> 18.5 V DC ... 30.5 V DC 400 mA (at $U_S = 24$ V DC)
230 g 45 mm 99 mm 112 mm IP20 -40 °C ... 70 °C 30% ... 95% (no condensation) EN 61000-6-3/-4 EN 61000-6-2:2005

Network, linear, and star structure: any 100 m
24 V DC 3.6 V <sub>pp</sub> 18.5 V DC ... 30.5 V DC 400 mA (at $U_S = 24$ V DC)
230 g 45 mm 99 mm 112 mm IP20 -40 °C ... 70 °C 30% ... 95% (no condensation) EN 61000-6-3/-4 EN 61000-6-2:2005

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/2FX SM-E1	2891916	1
FL SWITCH LM 4TX/2FX SM-E1	2891864	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/2FX ST-E1	2989132	1
FL SWITCH LM 4TX/2FX ST-E1	2989831	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH LM 4TX/2FX SM ST-E1	2989239	1
FL SWITCH LM 4TX/2FX SM ST-E1	2989938	1

## Switches

### Managed switches

#### Smart Managed Switches

Smart Managed Switches offer both excellent realtime properties and high data throughput.

The industrial DIN rail switches support Fast Ethernet or Gigabit on all ports and are ideal for use in the PROFINET RT or EtherNet/IP™ environment.

The **FL SWITCH SMCS 8GT** and **6GT/2SFP** Gigabit versions also have maritime approvals GL, BV, ABS, LR, and DNV.

All eight-port versions of the SMCS switches can be used in Ex Zone II.

### Ethernet



8 RJ45 ports



#### All devices support:

- RSTP
- MRP (client and master)
- VLANs
- SNMP

Ethernet interface	
Number of ports	8 (RJ45 ports)
Transmission speed	10/100/1000 Mbps
Fiber optic interface	
Number of ports	-
Wavelength	-
Transmission length	-
Other connections	
Serial (V.24 (RS-232))	V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)
Function	
Basic functions	Store-and-forward switch complies with IEEE 802.3 2 priority classes as per IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), PROFINET IO Device, media redundancy protocol (MRP).
Status and diagnostic indicators	
	Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full duplex, supply voltage $U_{s1}$ and $U_{s2}$ (redundant supply voltage), and FAIL
Network expansion parameters	
Cascading depth	Network, linear, and star structure: any
Maximum conductor length (twisted pair)	100 m
Power supply	
Supply voltage	24 V DC
Residual ripple	3.6 V <sub>pp</sub>
Supply voltage range	18 V DC ... 32 V DC
Typical current consumption	600 mA (at $U_s = 24$ V DC)
General data	
Weight	650 g
Width	128 mm
Height	110 mm
Depth	69 mm
Degree of protection	IP20
Ambient temperature (operation)	0 °C ... 55 °C (no condensation)
Permissible humidity (operation)	5% ... 95% (no condensation)
Noise emission	EN 61000-6-3 +A11
Noise immunity	EN 61000-6-2:2005

#### Technical data

	FL SWITCH SMCS 8GT	FL SWITCH SMCS 8TX
Number of ports	8 (RJ45 ports)	
Transmission speed	10/100/1000 Mbps	10/100 Mbps
Fiber optic interface	-	
Number of ports	-	
Wavelength	-	
Transmission length	-	

#### Other connections

V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)

Store-and-forward switch complies with IEEE 802.3 2 priority classes as per IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), PROFINET IO Device, media redundancy protocol (MRP).

Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full duplex, supply voltage  $U_{s1}$  and  $U_{s2}$  (redundant supply voltage), and FAIL

#### Network expansion parameters

Network, linear, and star structure: any

100 m

#### Power supply

24 V DC

3.6 V<sub>pp</sub>

18 V DC ... 32 V DC

600 mA (at  $U_s = 24$  V DC)

#### General data

650 g

128 mm

110 mm

69 mm

IP20

0 °C ... 55 °C (no condensation)

5% ... 95% (no condensation)

EN 61000-6-3 +A11

EN 61000-6-2:2005

#### Ordering data

Type	Order No.	Pcs. / Pkt.
FL SWITCH SMCS 8TX	2989226	1
FL SWITCH SMCS 8GT	2891123	1

Description
<b>Smart Managed Compact Switch</b>
- 8 RJ45 ports
- 8 RJ45 ports, 1000 Mbps
- 6 RJ45 ports, 2 SFP fiber optics ports
- 6 RJ45 ports, 2 SFP fiber optics ports, 1000 Mbps
- 16 RJ45 ports
- 14 RJ45 ports, 2 SC fiber optics ports (multi mode)
- 14 RJ45 ports, 2 SC FO ports (single mode)



Ethernet



6 RJ45 ports and 2 SFP slots

Ethernet



16 RJ45 ports

Ethernet



14 RJ45 ports and 2 FO ports



Technical data	
FL SWITCH SMCS 6GT/2SFP	FL SWITCH SMCS 6TX/2SFP
6 (RJ45 ports)	
10/100/1000 Mbps	10/100 Mbps
2 (SFP ports)	
Up to 80 km (depending on the fiber/SFP module used)	
V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)	
Store-and-forward switch complies with IEEE 802.3 2 priority classes as per IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), PROFINET IO Device, media redundancy protocol (MRP).	
Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full duplex, supply voltage $U_{s1}$ and $U_{s2}$ (redundant supply voltage), and FAIL	
Network, linear, and star structure: any	
100 m	
24 V DC	
3.6 V <sub>PP</sub>	
18 V DC ... 32 V DC	
650 mA (at $U_S = 24$ V DC)	
650 g	
128 mm	
110 mm	
69 mm	
IP20	
0 °C ... 55 °C	
5% ... 95% (no condensation)	
EN 61000-6-3 +A11	
EN 61000-6-2:2005	

Technical data	
FL SWITCH SMCS 16TX	
16 (RJ45 ports)	
10/100 Mbps	
-	
-	
-	
-	
V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)	
Store-and-forward switch complies with IEEE 802.3 2 priority classes as per IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), PROFINET IO Device, media redundancy protocol (MRP).	
Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full duplex, supply voltage $U_{s1}$ and $U_{s2}$ (redundant supply voltage), and FAIL	
Network, linear, and star structure: any	
100 m	
24 V DC	
3.6 V <sub>PP</sub>	
18 V DC ... 32 V DC	
190 mA (at $U_S = 24$ V DC)	
1035 g	
214 mm	
110 mm	
69 mm	
IP20	
-40 °C ... 70 °C (no condensation)	
5% ... 95% (no condensation)	
EN 61000-6-3	
EN 61000-6-2:2005	

Technical data	
FL SWITCH SMCS 14TX/2FX	FL SWITCH SMCS 14TX/2FX-SM
14 (RJ45 ports)	
10/100 Mbps	
2 (SC multi mode)	2 (SC single mode)
1310 nm	
10000 m (depending on the fiber used)	36000 m (fiberglass with F-G 9/125 0.36 dB/km)
6400 m (fiberglass with F-G 50/125 0.7 dB/km F1200)	32000 m (fiberglass with F-G 9/125 0.4 dB/km)
V.24 (RS-232-C), 6-pos. MINI-DIN socket (PS/2)	
Store-and-forward switch complies with IEEE 802.3 2 priority classes as per IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), PROFINET IO Device, media redundancy protocol (MRP).	
Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full duplex, supply voltage $U_{s1}$ and $U_{s2}$ (redundant supply voltage), and FAIL	
Network, linear, and star structure: any	
100 m	
24 V DC	
3.6 V <sub>PP</sub>	
18 V DC ... 32 V DC	
260 mA (at $U_S = 24$ V DC)	
1035 g	
214 mm	
110 mm	
69 mm	
IP20	
-40 °C ... 70 °C (no condensation)	
5% ... 95% (no condensation)	
EN 61000-6-3	
EN 61000-6-2:2005	

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SMCS 6TX/2SFP	2989323	1
FL SWITCH SMCS 6GT/2SFP	2891479	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SMCS 16TX	2700996	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SMCS 14TX/2FX	2700997	1
FL SWITCH SMCS 14TX/2FX-SM	2701466	1

## Switches

### Managed switches

#### PROFINET realtime switches

The new IRT switches are particularly suitable for high-performance PROFINET networks.

The FL SWITCH IRT switches use built-in ERTEC (Enhanced Real Time Ethernet Controller) technology to forward PROFINET data packets at the fastest possible speeds via the cut through process.

In addition, PROFINET data packets are always delivered with the highest priority to the receiver independently of other data traffic.

The FL SWITCH IRT switches can be fully configured and monitored via STEP 7 and PC Worx.

#### Features:

- Easy integration into a PROFINET network
- Extended temperature range (-25°C...60°C)
- POF interfaces for use in areas heavily affected by EMC
- Path length measurement
- Fiber optic diagnostics
- MRP client

<b>Notes:</b>
1) EMC: Class A product, see page 553

N

### Ethernet



4 RJ45 Ports

<b>Ethernet interface</b>	
Number of ports	4 (RJ45 ports)
Transmission speed	10/100 Mbps
<b>Fiber optic interface</b>	
Number of ports	-
Transmission speed	-
Wavelength	-
Transmission length	-
<b>Function</b>	
Basic functions	Cut-through/store-and-forward switch complies with IEEE 802.3 2 priority classes in accordance with IEEE802.1 P, TCP/IP protocol, DCP capable, integrated web server function, PROFINET IO device.
Status and diagnostic indicators	2 status LEDs per Ethernet port: LINK and activity, supply voltage U <sub>s1</sub> and U <sub>s2</sub> (redundant supply voltage) as well as BF
<b>Network expansion parameters</b>	
Cascading depth	Line and star structure: as desired
Maximum conductor length (twisted pair)	100 m
<b>Power supply</b>	
Supply voltage	24 V DC
Residual ripple	3.6 V <sub>PP</sub>
Supply voltage range	18.5 V DC ... 30.2 V DC
Typical current consumption	165 mA (at U <sub>S</sub> = 24 V DC)
<b>General data</b>	
Weight	450 g
Width	127 mm
Height	95 mm
Depth	69 mm
Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 60 °C
Permissible humidity (operation)	5% ... 95% (no condensation)

#### Technical data

<b>Technical data</b>		
Cut-through/store-and-forward switch complies with IEEE 802.3 2 priority classes in accordance with IEEE802.1 P, TCP/IP protocol, DCP capable, integrated web server function, PROFINET IO device.		
2 status LEDs per Ethernet port: LINK and activity, supply voltage U <sub>s1</sub> and U <sub>s2</sub> (redundant supply voltage) as well as BF		
Line and star structure: as desired		
100 m		
24 V DC		
3.6 V <sub>PP</sub>		
18.5 V DC ... 30.2 V DC		
165 mA (at U <sub>S</sub> = 24 V DC)		
450 g		
127 mm		
95 mm		
69 mm		
IP20		
-25 °C ... 60 °C		
5% ... 95% (no condensation)		

<b>Description</b>
<b>Ethernet switch</b> for PROFINET applications
- 4 RJ45 ports
- 2 RJ45 ports, 2 POF SCRJ ports
- 1 RJ45 port, 3 POF SCRJ ports
<b>Ethernet switch</b> for PROFINET applications
- 1 RJ45 port, 3 POF SCRJ ports

#### Ordering data

Type	Order No.	Pcs. / Pkt.
FL SWITCH IRT 4TX	2700689	1

<b>Configuration memory, replaceable</b>
Patch cable, CAT6, pre-assembled (see page 418)

#### Accessories

FL MEM PLUG <sup>1)</sup>	2891259	1
FL CAT6 PATCH ...		

Ethernet



2 RJ45 ports and 2 POF SCRJ ports

Ethernet



1 RJ45 port and 3 POF SCRJ ports

Ethernet



1 RJ45 port and 3 POF SCRJ ports, for wall mounting

Technical data
2 (RJ45 ports) 10/100 Mbps
2 (SCRJ) 100 Mbps (full duplex) 650 nm Up to 250 m (depending on the fiber used)
Cut-through/store-and-forward switch complies with IEEE 802.3 2 priority classes in accordance with IEEE802.1 P, TCP/IP protocol, DCP capable, integrated web server function, PROFINET IO device. 2 status LEDs per Ethernet port: LINK and activity, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage) as well as BF
Line and star structure: as desired 100 m
24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC 235 mA (at $U_S = 24$ V DC)
450 g 127 mm 95 mm 69 mm IP20 -25 °C ... 60 °C 5% ... 95% (no condensation)

Technical data
1 (RJ45 ports) 10/100 Mbps
3 (SCRJ) 100 Mbps (full duplex) 650 nm Up to 250 m (depending on the fiber used)
Cut-through/store-and-forward switch complies with IEEE 802.3 2 priority classes in accordance with IEEE802.1 P, TCP/IP protocol, DCP capable, integrated web server function, PROFINET IO device. 2 status LEDs per Ethernet port: LINK and activity, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage) as well as BF
Line and star structure: as desired 100 m
24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC 270 mA (at $U_S = 24$ V DC)
450 g 127 mm 95 mm 69 mm IP20 -25 °C ... 60 °C 5% ... 95% (no condensation)

Technical data
1 (RJ45 ports) 10/100 Mbps
3 (SCRJ) 100 Mbps (full duplex) 650 nm Up to 250 m (depending on the fiber used)
Cut-through/store-and-forward switch complies with IEEE 802.3 2 priority classes in accordance with IEEE802.1 P, TCP/IP protocol, DCP capable, integrated web server function, PROFINET IO device. 2 status LEDs per Ethernet port: LINK and activity, supply voltage $U_{S1}$ and $U_{S2}$ as well as BF
Line and star structure: as desired 100 m
24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC 260 mA (at $U_S = 24$ V DC)
1850 g 176 mm 112 mm 99 mm IP67 -25 °C ... 60 °C 5% ... 95% (no condensation)

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH IRT 2TX 2POF <sup>1)</sup>	2700691	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH IRT TX 3POF <sup>1)</sup>	2700692	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH IRT IP TX/3POF	2700697	1

Accessories		
FL MEM PLUG <sup>1)</sup>	2891259	1
FL CAT6 PATCH ...		

Accessories		
FL MEM PLUG <sup>1)</sup>	2891259	1
FL CAT6 PATCH ...		

Accessories		
FL MEM PLUG <sup>1)</sup>	2891259	1
FL CAT6 PATCH ...		



## Switches

### Smart Managed Switches

The NAT switch combines the functions of a NAT router and a switch in a single device. Thanks to 1:1 NAT or virtual NAT, the **FL NAT SMN 8TX** enables individual machines or systems to always be assigned the same IP addresses and for these IP addresses to then be implemented in the IP address area of the higher-level company network.

The **FL SWITCH SMN 6TX/2POF-PN** Smart Managed Narrow switch is an Ethernet switch suitable for industrial applications with six Fast Ethernet ports in RJ45 format and two fiber optic ports in POF-SCRJ format. The switch has PROFINET mode activated by default.

The Ethernet T-coupler allows easy system conversion from fieldbus to industrial Ethernet. Thanks to the number of ports, it is particularly suitable for the distributed integration of field devices in a POF line or ring structure.

<b>Notes:</b>
1) EMC: Class A product, see page 553

### Ethernet



NAT switch with 8 RJ45 ports

<b>Ethernet interface</b>	
Number of ports	8 (RJ45 ports)
Transmission speed	10/100 Mbps
<b>Fiber optic interface</b>	
Number of ports	-
Transmission length	-
<b>Function</b>	
Basic functions	store-and-forward switch, complies with IEEE 802.3 2, priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, integrated web server function, Rapid Spanning Tree (RSTP), router, 1:1 NAT router

Technical data	
store-and-forward switch, complies with IEEE 802.3 2, priority classes in acc. with IEEE 802.1 P TCP/IP protocol, BootP-capable, integrated web server function, Rapid Spanning Tree (RSTP), router, 1:1 NAT router	

Status and diagnostic indicators

Per Ethernet 2 status LEDs: LINK and status activity with switch-over, 100, full duplex, supply voltage  $U_{s1}$  and  $U_{s2}$  (redundant supply voltage), and FAIL

<b>Network expansion parameters</b>	
Cascading depth	Network, linear, and star structure: any
<b>Maximum conductor length (twisted pair)</b>	100 m
<b>Power supply</b>	
Supply voltage	24 V DC
Residual ripple	3.6 V <sub>pp</sub>
Supply voltage range	18 V DC ... 32 V DC
Typical current consumption	600 mA (at $U_S = 24$ V DC)
<b>General data</b>	
Weight	650 g
Width	58 mm
Height	133 mm
Depth	130 mm
Degree of protection	IP20
Ambient temperature (operation)	0 °C ... 55 °C
Permissible humidity (operation)	5% ... 95% (no condensation)
Noise emission	EN 61000-6-3 +A11
Noise immunity	EN 61000-6-2:2005

Network, linear, and star structure: any	
100 m	
24 V DC	
3.6 V <sub>pp</sub>	
18 V DC ... 32 V DC	
600 mA (at $U_S = 24$ V DC)	
650 g	
58 mm	
133 mm	
130 mm	
IP20	
0 °C ... 55 °C	
5% ... 95% (no condensation)	
EN 61000-6-3 +A11	
EN 61000-6-2:2005	

<b>Description</b>
<b>Smart Managed Narrow NAT switch with 1:1 NAT router function</b>
- 8 RJ45 ports
<b>Smart Managed Narrow Switch</b>
- 6 RJ45 ports, 2 POF FO ports
<b>FO T coupler</b> , for converting 10/100BASE-T to polymer or HCS fiber, (660 nm), SCRJ connection

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>FL NAT SMN 8TX</b>	<b>2989365</b>	1

Configuration memory, replaceable

Accessories		
<b>FL MEM PLUG<sup>1)</sup></b>	<b>2891259</b>	1



Ethernet



6 RJ45 ports and 2 POF SCRJ ports



Ethernet



Ethernet fiber optics T-coupler for polymer and HCS fibers



Technical data
6 (RJ45 ports) 10/100 Mbps
2 (SCRJ) Up to 250 m (depending on the fiber used)
Store-and-forward switch complies with IEEE 802.3 2 priority classes as per IEEE 802.1 P TCP/IP protocol, BootP-capable, port-mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP), PROFINET IO Device, media redundancy protocol (MRP).
2 status LEDs per Ethernet port: LINK and selection of Status Activity, 100, full duplex, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage), and FAIL. FD/FO LED indicates duplex mode for twisted pair ports and the system reserve for optical interfaces.
Network, linear, and star structure: any
100 m
24 V DC 3.6 $V_{PP}$ 18 V DC ... 32 V DC 320 mA (at $U_S = 24$ V DC)
720 g 56 mm 133 mm 125 mm IP20 0 °C ... 55 °C 5% ... 95% (no condensation) EN 61000-6-3 +A11 EN 61000-6-2:2005

Technical data
2 (RJ45 ports) 10/100 Mbps
2 (SCRJ) Up to 250 m (depending on the fiber used)
Store-and-forward media converter standard-compliant IEEE 802.3 2, priority classes according to IEEE 802.1 P, TCP/IP protocol, BootP-capable, port mirroring, integrated web server function, multicast filtering, IGMP snooping, VLAN, Rapid Spanning Tree (RSTP)
2 status LEDs per Ethernet: activity and duplex mode, supply voltage $U_{S1}$ and $U_{S2}$ (redundant supply voltage) as well as LED BAR GRAPH for FO ports for displaying the system reserve for each optical interface.
Line, star, tree, and redundant ring ; any cascading depth
100 m
24 V DC 3.6 $V_{PP}$ 18.5 V DC ... 30.5 V DC 400 mA (at $U_S = 24$ V DC)
230 g 45 mm 99 mm 123 mm IP20 -20 °C ... 55 °C 10% ... 95% (no condensation) EN 61000-6-3/-4 EN 61000-6-2:2005

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH SMN 6TX/2POF-PN <sup>1)</sup>	2700290	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL MC ETH/FO 660 T <sup>1)</sup>	2313164	1

Accessories		
FL MEM PLUG <sup>1)</sup>	2891259	1

Accessories		

## Switches

### Gigabit Modular Switches

The high-performance Gigabit Modular Switch can be extended to up to 28 ports with any transmission medium.

#### Features:

- Up to 12 integrated ports with 1000 Mbps data transmission
- Connection of connection media that can be assembled in the field, such as POF, HCS, and GI HCS
- Connection of Gigabit fiberglass via FL SFP plug-in modules
- Quick and easy local configuration options with the new operator/display interface
- Security in the automation network according to IEEE 802.1X
- Optional Layer 3 functions can be activated

#### Notes:

1) EMC: Class A product, see page 553

**PROFI  
NET**

EtherNet/IP



Head station, 8 - 16 ports

PROFinergy PROFINET

#### Technical data

<b>SFP interface</b>	
Description	Ethernet (combo)
Number of ports	4 (SFP ports or RJ45 ports)
Transmission speed	1000 Mbps (full duplex)
Transmission physics	FO Copper
<b>Copper interface</b>	
Description	Ethernet (RJ45)
Number of ports	4
Transmission speed	10/100 Mbps
Transmission physics	Copper
<b>Interface extension</b>	
Description	Ethernet
Number of ports	2 (per interface module)
Note on connection method	Max. 4 interface modules (without extension)
Transmission speed	10/100 Mbps (full duplex)
Transmission physics	Multi-mode fiberglass Single-mode fiberglass POF-SCRJ GI-HCS fibers Copper PoE
<b>Function</b>	
Basic functions	Store-and-forward switch, smart mode, port mirroring, multicast filtering, IGMP snooping, VLAN, Media Redundancy Protocol (MRP according to IEC 62439), Rapid Spanning Tree (RSTP), Fast Ring Detection (FRD), Large Tree Support, IEEE 802.1X security, port security, PROFINET IO device, GMRP, GVRP, SNTp, 2 digital inputs
<b>Power supply</b>	
Supply voltage	24 V DC
Supply voltage range	18.5 V DC ... 30.2 V DC
Typical current consumption	800 mA (up to 2.5 A, depends on the configuration)
<b>General data</b>	
Weight	2700 g
Width	287 mm
Height	125 mm
Depth	115 mm
Degree of protection	IP20
Ambient temperature (operation)	-20 °C ... 55 °C (no condensation)
Noise emission	EN 61000-6-3/-4
Noise immunity	EN 61000-6-2:2005

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Gigabit Modular Switch</b>			
- 4 Gigabit ports and 12 Fast Ethernet ports	FL SWITCH GHS 4G/12 <sup>1</sup> )	2700271	1
- 12 Gigabit ports and 8 Fast Ethernet ports	FL SWITCH GHS 4G/12-L3 <sup>1</sup> )	2700786	1
<b>Extension</b>			
- 8 Ethernet ports			

#### Accessories

Parameterization memory, replaceable	SD FLASH 512MB	2988146	1
Parameterization memory, can be replaced, with MRM function	FL SD FLASH/MRM	2700270	1
Parameterization memory, can be replaced, with MRM and Layer 3 function	FL SD FLASH/L3/MRM	2700607	1



Head station, 12 - 20 ports

Ethernet



Extension, 8 ports

PROFINET

PROFINET

Technical data
Ethernet (SFP) 4 (SFP ports) 1000 Mbps (full duplex) FO
Ethernet (RJ45) 8 10/100/1000 Mbps Copper
Ethernet 2 (per interface module) Max. 4 interface modules (without extension) 10/100 Mbps (full duplex) Multi-mode fiberglass Single-mode fiberglass POF-SCRJ GI-HCS fibers Copper PoE
Store-and-forward switch, smart mode, port mirroring, multicast filtering, IGMP snooping, VLAN, Media Redundancy Protocol (MRP according to IEC 62439), Rapid Spanning Tree (RSTP), Fast Ring Detection (FRD), Large Tree Support, IEEE 802.1X security, port security, PROFINET IO device, GMRP, GVRP, SNTP, 2 digital inputs
24 V DC 18.5 V DC ... 30.2 V DC 800 mA (up to 2.7 A, depends on the configuration)
2700 g 287 mm 125 mm 115 mm IP20 -20 °C ... 55 °C (no condensation) EN 61000-6-3/-4 EN 61000-6-2:2005

Technical data
- - - -
- - - -
Ethernet 2 (per interface module) Max. 4 interface modules 10/100 Mbps (full duplex) Multi-mode fiberglass Single-mode fiberglass POF-SCRJ GI-HCS fibers Copper PoE
Extension module for Modular Managed Switch
- - (via head station)
650 g 127 mm 125 mm 115 mm IP20 -20 °C ... 55 °C (no condensation) EN 61000-6-3/-4 EN 61000-6-2:2005

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH GHS 12G/8 <sup>1)</sup>	2989200	1
FL SWITCH GHS 12G/8-L3 <sup>1)</sup>	2700787	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL FXT <sup>1)</sup>	2989307	1

Accessories		
SD FLASH 512MB	2988146	1
FL SD FLASH/MRM	2700270	1
FL SD FLASH/L3/MRM	2700607	1

Accessories		

## Switches

### Interface modules

Highly modular 2-port interface modules allow a flexible cable exit: either downward or to the front, depending on the requirements of the installation and location. There are interface modules for twisted pairs, fiberglass or the cost effective Ethernet installation with polymer and HCS fibers, all designed to carry out the particular job at hand.

**Notes:**

1) EMC: Class A product, see page 553

### Ethernet



**TX ports**



Ex:

### Ethernet



**FO ports**



Ex:

**Technical data**

	FL IF 2TX VS-RJ-F <sup>1)</sup>	FL IF 2PSE-F <sup>1)</sup>
Ethernet interface		
Number of ports	2 (RJ45 ports)	2 (PoE ports)
Transmission speed	10/100 Mbps (connection direction forwards)	
Fiber optic interface		
Number of ports	-	-
Wavelength	-	-
Transmission length	-	-
Function		
Basic functions	Media module for Modular Managed Switch	Media module for Modular Managed Switch with Power over Ethernet IEEE802.3af, Power Source Equipment (PSE)
Power supply	From FL SWITCH GHS or FXT (via head station) (internal / 48 V DC for PoE)	
Power supply connection		
Supply voltage	10 mA	10 mA (max. 900 mA)
Typical current consumption		
General data		
Weight		70 g
Width		31 mm
Height	75.7 mm	84.7 mm
Depth		75.5 mm
Degree of protection		IP20
Ambient temperature (operation)	-20 °C ... 55 °C (no condensation)	
Permissible humidity (operation)	10% ... 95% (no condensation)	
Noise emission	EN 61000-6-3/-4	
Noise immunity	EN 61000-6-2:2005	

**Technical data**

	FL IF 2FX SC-F <sup>1)</sup>	FL IF 2FX ST-D <sup>1)</sup>
Ethernet interface		
Number of ports	2	2
Transmission speed	-	-
Fiber optic interface		
Number of ports	2 (SC multi mode)	2 (ST multi mode)
Wavelength	1300 nm	
Transmission length	2800 m (fiberglass with F-G 50/125 1.6 dB/km F800) 6400 m (fiberglass with F-G 50/125 0.7 dB/km F1200)	10000 m (fiberglass with F-G 62.5/125 0.7 dB/km F1000) 2800 m (fiberglass with F-G 62.5/125 2.6 dB/km F600)
Function		
Basic functions	Media module for Modular Managed Switch	
Power supply	From FL SWITCH GHS or FXT (via head station)	
Power supply connection		
Supply voltage	200 mA	
Typical current consumption		
General data		
Weight		80 g
Width		31 mm
Height	75.7 mm	83 mm
Depth	72.5 mm	72.5 mm
Degree of protection		IP20
Ambient temperature (operation)	0 °C ... 55 °C (no condensation)	
Permissible humidity (operation)	10% ... 95% (no condensation)	
Noise emission	EN 61000-6-3/-4	
Noise immunity	EN 61000-6-2:2005	

**Ordering data**

Type	Order No.	Pcs. / Pkt.
FL IF 2TX VS-RJ-F <sup>1)</sup>	2832344	1
FL IF 2TX VS-RJ-D <sup>1)</sup>	2832357	1
FL IF 2PSE-F <sup>1)</sup>	2832904	1

**Ordering data**

Type	Order No.	Pcs. / Pkt.
FL IF 2FX SC-F <sup>1)</sup>	2832412	1
FL IF 2FX SC-D <sup>1)</sup>	2832425	1
FL IF 2FX ST-D <sup>1)</sup>	2884033	1
FL IF 2FX SM SC-D <sup>1)</sup>	2832205	1

<b>Interface module</b> for Modular Managed Switch system
- Exit to the front
- Exit downward
- Power-over-Ethernet, exit to the front
<b>Fiber optics media module</b> for connecting 100Base FX multi mode fiberglass (1300 nm)
- Exit to the front
- Exit downward
- Exit downward
<b>Interface modules</b> , 2 ports, SCRJ for POF/HCS, diagnosis-capable
Slot module for synchronization port
- Wavelength 850 nm (short)
- Wavelength 1300 nm (long)
- Wavelength 1550 nm (longhaul)
<b>Configuration memory</b> , replaceable
- MRM function

Ethernet



POF-SCRJ ports



SFP modules for transmission ranges up to 80 km



Configuration memory and MRP manager function



Technical data
-
2 (SCRJ) 650 nm 50 m (including 3 dB system reserve, polymer fiber with F-K 980/1000 230 dB/km) 100 m (HCS fiber with F-S 200/230 10 dB/km) 300 m (GI HCS fiber with F-S 200/300, with 15 dB/km)
Media module for Modular Managed Switch with FO diagnosis
From FL SWITCH GHS or FXT (via head station) 200 mA
80 g 31 mm 73.5 mm 72.5 mm IP20 0 °C ... 55 °C (no condensation) 10% ... 95% (no condensation) EN 61000-6-3/-4 EN 61000-6-2:2005

Technical data	
FL SFP SX	FL SFP LX
-	-
1 (LC multi mode) 850 nm 550 m (fiberglass 50/125) 300 m (fiberglass 62.5/125)	1 (LC single mode) 1310 nm 30 km (fiberglass 9/125) 250 m (fiberglass 62.5/125)
SFP module as FO port	
Via SFP slot	
-40 °C ... 85 °C (no condensation) 30% ... 95% (no condensation)	

Technical data	
FL MEM PLUG <sup>1)</sup>	FL MEM PLUG/MRM <sup>1)</sup>
-	-
Configuration memory (plug-in)	Configuration memory and manager for the media redundancy protocol (MRP)
From FL SWITCH MCS/SMCS	
25 g 16 mm 57 mm	IP20 0 °C ... 55 °C (no condensation) 10% ... 95% (no condensation) EN 61000-6-3/-4 EN 61000-6-2:2005

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL IF 2POF SCRJ-D <sup>1)</sup>	2891084	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SFP SX	2891754	1
FL SFP LX	2891767	1
FL SFP LH	2989912	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL MEM PLUG <sup>1)</sup>	2891259	1
FL MEM PLUG/MRM <sup>1)</sup>	2891275	1

## IP67 switches, hub, and Power over Ethernet

### IP67 switch, hub, and Power over Ethernet

The **FL SWITCH 1605** was developed for use in harsh environments. Thanks to its degree of protection and compact design, it is ideal for use directly in the machine.

The **FL HUB 8/16TX ZF** is particularly flexible for use in applications where hubs are required. It is ideal for special automation protocols, such as Powerlink or FL Net.

### Power over Ethernet solutions

Power over Ethernet enables the combined transmission of power and data.

### FL PSE 2TX power source equipment

Thanks to the use of the Power over Ethernet standard IEEE 802.3af, the following termination devices can be operated, for example:

- WLAN access points
- IP phones
- IP cameras

### FL SWITCH 1001T-4POE

The **FL SWITCH 1001T-4POE** 5-port unmanaged switch provides four Power over Ethernet connections with 10/100 Mbps. Save time and money when installing industrial devices such as WLAN access points or security cameras.

### Features:

- Flexible use of POE devices thanks to powerful 30 W POE ports (IEEE 801.1at)
- Extended temperature range (–40°C ... +75°C) for harsh environments
- Redundant supply with alarm contact for maximum network availability

**Notes:**  
1) EMC: Class A product, see page 553

## Ethernet



Standard switch, IP67 protection



### Technical data

Ethernet interface	
Number of ports	5 (M12 socket)
Transmission speed	10/100 Mbps
Connection method	M12
Function	
Basic functions	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store-and-forward switching mode
Status and diagnostic indicators	LEDs: U <sub>s</sub> (voltage supply), link and activity per port
Network expansion parameters	
Cascading depth	Network, linear, and star structure: any
Maximum conductor length (twisted pair)	100 m
Power supply	
Supply voltage	24 V DC (M12 plug-in connector)
Residual ripple	3.6 V <sub>pp</sub>
Supply voltage range	18 V DC ... 32 V DC
Typical current consumption	40 mA (24 V DC)
General data	
Weight	220 g
Width	30 mm
Height	200 mm
Depth	41 mm
Degree of protection	IP65/IP66/IP67
Ambient temperature (operation)	–40 °C ... 70 °C
Permissible humidity (operation)	10% ... 95%

### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Ethernet switch</b> - 5 Ethernet ports in M12 format	<b>FL SWITCH 1605 M12</b>	<b>2700200</b>	<b>1</b>
<b>Ethernet hub</b> - 8 RJ45 ports - 16 RJ45 ports			
<b>Power over Ethernet module (PSE)</b>			
<b>Power over Ethernet switch</b>			

Ethernet



Hub with RJ45 ports

Ethernet



Power Source Equipment



Power over Ethernet switch



Technical data	
FL HUB 8TX-ZF <sup>1)</sup>	FL HUB 16TX-ZF <sup>1)</sup>
8 (RJ45)	16 (RJ45)
10/100 Mbps	
RJ45 socket	
Hub/repeater, compliance with IEEE 802.3	
LEDs: UL (communications voltage), COL (collision) link and receive LED per port	
4 hubs 10 Mbps / 2 hubs 100 Mbps	
100 m	
24 V DC (via COMBICON ; max. conductor cross section 2.5 mm <sup>2</sup> )	
3.6 V <sub>PP</sub>	
18.5 V DC ... 30.5 V DC	
Typ. 144 mA (to U <sub>S</sub> )	
140 g	280 g
45 mm	90 mm
	99 mm
	112 mm
	IP20
0 °C ... 60 °C	0 °C ... 55 °C
30% ... 95% (no condensation)	

Technical data	
2 (PoE ports)	
10/100 Mbps	
8-pos. RJ45 socket	
PSE/midspan, complies with IEEE 802.3af	
LEDs: US, PoE detection per port	
-	
100 m	
24 V DC (via COMBICON ; max. conductor cross section 2.5 mm <sup>2</sup> )	
3.6 V <sub>PP</sub>	
18.5 V DC ... 30.5 V DC	
Typ. 100 mA (during no load ; approx. 1800 mA at 24 V at the input with maximum load and 25 °C ambient temperature)	
320 g	
45 mm	
99 mm	
112 mm	
IP20	
0 °C ... 55 °C	
30% ... 95% (no condensation)	

Technical data	
5 (4x POE ports, 1x 10/100 port)	
10/100 Mbps	
RJ45 socket	
PSE, complies with IEEE 802.3af	
LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply) ; alarm ; LNK/ACT, POE, 100 Mbps per port	
-	
100 m	
24 V DC	
3.6 V <sub>PP</sub>	
18 V DC ... 57 V DC	
-	
685 g	
55 mm	
117 mm	
78 mm	
IP20	
-40 °C ... 75 °C	
5% ... 95% (no condensation)	

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL HUB 8TX-ZF <sup>1)</sup>	2832551	1
FL HUB 16TX-ZF <sup>1)</sup>	2832564	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL PSE 2TX <sup>1)</sup>	2891013	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SWITCH 1001T-4POE	2891064	1

## Security routers and firewalls

### Security routers for DIN rails

The compact and fanless DIN rail devices in metal housing suitable for industrial applications have an SD card slot at the front for configuration memory. The SD cards can be used for starting up or replacing the devices quickly and easily.

The devices feature an extended temperature range and contain a buffered realtime clock and trusted platform module (TPM) for secure and reliable key generation and management.

The FL MGUARD RS4000 ... devices provide high-availability high-end security for industry and a remote maintenance infrastructure for the secure and reliable connection of machines and systems.

The FL MGUARD RS2000 ... devices are designed for price-sensitive applications with fewer complex requirements and allow secure and reliable remote maintenance of machines and systems in the field via the Internet. In this context, they are used as industrial remote service routers with a simplified configuration.

### Secure networks also with Gigabit

The new router generation for top-class security:

- Replaceable configuration memory
- Comprehensive connection options
- Flexible routing
- Intelligent stateful inspection firewall
- Secure remote services (VPN) according to IPsec standard
- Central management tool available

<b>Notes:</b>
1) EMC: Class A product, see page 553



Router with intelligent firewall



Technical data	
Ethernet interface	2 (RJ45)
Number of ports	10/100 Mbps
Transmission speed	
Function	Router with intelligent firewall (VPN, 10 tunnels as an option, up to 250 with additional license), CIFS Integrity Monitoring (as an option), metal housing, slot for SD memory card, extended temperature range, high-performance firewall/VPN (as an option): up to 124 Mbps/40 Mbps (as an option)
Basic functions	
SNMP – Simple Network Management Protocol	SNMPv1, v2, v3
Security functions	
VPN throughput	max. 40 Mbps (router mode, VPN bidirectional throughput)
Number of VPN tunnels	0 (as an option, 10 tunnels up to 250 tunnels, with additional license FL MGUARD LIC VPN-10/ Order No. 2700194 or FL MGUARD LIC VPN-250/ Order No. 2700193 or 2700192)
Encryption methods	DES, 3DES, AES-128, -192, -256
Internet Protocol Security (IPsec) mode	-
Authentication	-
Data integrity	-
1:1 Network Address Translation (NAT) in the VPN	-
Firewall data throughput	max. 124 Mbps (router mode, default firewall rules, bidirectional throughput)
Firewall rules	Configurable stateful inspection firewall with full scope of functions
Filtering	MAC and IP addresses, ports, protocols
Protection against	IP spoofing, DoS and SYN Flood Protection
Routing	Standard routing, NAT, 1:1-NAT, port forwarding
Power supply	
Supply voltage	24 V DC
Typical current consumption	100 mA
General data	
Width	45 mm
Ambient temperature (operation)	-20 °C ... 60 °C

Ordering data		
Type	Order No.	Pcs. / Pkt.
Router/firewall, replaceable memory - 2 x WAN interface (1 x RJ45, 1 x V.24/RS-232), 1 x LAN interface (RJ45)	2700634	1
Router/firewall with VPN, replaceable memory - 2 x WAN interface (1 x RJ45, 1 x V.24/RS-232), 1 x LAN interface (RJ45) - 1 x WAN interface (RJ45), 1 x LAN interface (RJ45)		

Accessories			
Parameterization memory, replaceable	SD FLASH 512MB	2988146	1
License to configure and operate 10 VPN tunnels on FL MGUARD	FL MGUARD LIC VPN-10	2700194	1
License to configure and operate 250 VPN tunnels on FL MGUARD	FL MGUARD LIC VPN-250	2700193	1
License to configure any number of tunnels and operate 250 VPN tunnels on FL MGUARD	FL MGUARD LIC VPN-250 GROUP	2700192	1

Central device management software for FL MGUARD devices	FL MGUARD DM ... (see software)
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Router with intelligent firewall and VPN



Router with simplified 2-click firewall and VPN



Gigabit router with firewall, replaceable memory



**Technical data**

**Technical data**

**Technical data**

2 (RJ45)  
10/100 Mbps

2 (RJ45)  
10/100 Mbps

FL MGuard GT/GT      FL MGuard GT/GT VPN  
2 (Combo ports)  
10/100/1000 Mbps (SFP module: 1000 Mbps)

Router with intelligent firewall and VPN for 10 tunnels (up to 250 supported with optional additional license), CIFS Integrity Monitoring (as an option), metal housing, slot for SD memory card, extended temperature range, high-performance firewall/VPN: up to 124 Mbps/40 Mbps

Router with simplified 2-click firewall and VPN for 2 tunnels (fixed), metal housing, slot for any SD memory card, extended temperature range, high-performance firewall/VPN: up to 124 Mbps/40 Mbps

Router with intelligent firewall and Gigabit connectivity      Router with intelligent firewall and Gigabit connectivity and VPN

SNMPv1, v2, v3

SNMPv1, v2, v3

SNMPv1, v2, v3

max. 40 Mbps (router)

max. 40 Mbps (router mode, VPN bidirectional throughput)

-      max. 101 Mbps (router mode, VPN bidirectional throughput)  
-      10 (up to 250 with license possible)

10 (as an option, up to 250, with additional license  
FL MGuard LIC VPN-250/ Order No. 2700193 or 2700192)

2 (Fixed, Ipsec (IETF standard))

DES, 3DES, AES-128, -192, -256

DES, 3DES, AES-128, -192, -256

-      DES, 3DES, AES-128, -192, -256

ESP-Tunnel / ESP-Transport  
X.509v3 certificates with RSA or PSK

ESP-Tunnel / ESP-Transport  
X.509v3 certificates with RSA or PSK

-      ESP-Tunnel / ESP-Transport  
-      X.509v3 certificates with RSA or PSK

MD5, SHA-1  
Supported  
max. 124 Mbps (router mode, default firewall rules, bidirectional throughput)

MD5, SHA-1  
Supported  
max. 124 Mbps (router mode, default firewall rules, bidirectional throughput)

-      MD5, SHA-1  
-      Supported  
max. 398 Mbps (router mode, VPN bidirectional throughput)      max. 398 Mbps (router mode, default firewall rules, bidirectional throughput)

Configurable stateful inspection firewall with full scope of functions

Simplified 2-click stateful inspection firewall

Configurable stateful inspection firewall

MAC and IP addresses, ports, protocols  
IP spoofing, DoS and Syn Flood Protection  
Standard routing, NAT, 1:1-NAT, port forwarding

Incoming or outgoing traffic  
-  
Standard routing, NAT, 1:1-NAT, port forwarding

MAC and IP addresses, ports, protocols  
IP spoofing, DoS and Syn Flood Protection  
Standard routing, NAT, 1:1-NAT, port forwarding

24 V DC  
100 mA

24 V DC  
100 mA

24 V DC  
270 mA

45 mm  
-20 °C ... 60 °C

45 mm  
-20 °C ... 60 °C

128 mm  
-20 °C ... 60 °C

**Ordering data**

**Ordering data**

**Ordering data**

Type	Order No.	Pcs. / Pkt.
FL MGuard RS4000 TX/TX VPN <sup>1)</sup>	2200515	1

Type	Order No.	Pcs. / Pkt.
FL MGuard RS2000 TX/TX VPN <sup>1)</sup>	2700642	1

Type	Order No.	Pcs. / Pkt.
FL MGuard GT/GT	2700197	1
FL MGuard GT/GT VPN	2700198	1

**Accessories**

**Accessories**

**Accessories**

SD FLASH 512MB	2988146	1
FL MGuard LIC VPN-250	2700193	1
FL MGuard LIC VPN-250 GROUP	2700192	1

SD FLASH 512MB	2988146	1
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FL MGuard LIC VPN-10	2700194	1
FL MGuard LIC VPN-250	2700193	1
FL MGuard LIC VPN-250 GROUP	2700192	1

FL MGuard DM ... (see software)

FL MGuard DM ... (see software)

FL MGuard DM ... (see software)

### Firewall/router for office-based/mobile use

The FL MGuard SMART2 features maximum possible security and performance in a minimum amount of space.

With its rugged housing and uncomplicated power supply via any USB port, the FL MGuard SMART2 is the ideal solution for the mobile protection of critical company resources.

The device is particularly suitable for the mobile and stationary protection of workstations and environments close to the production process with low requirements for industrial hardening.

It can be used as a secure firewall between office and production networks, as a remote maintenance client or as a security router for small workgroups.



Router with firewall for mobile use

Ethernet interface	
Number of ports	2 (RJ45)
Transmission speed	10/100 Mbps
Function	
Basic functions	
SNMP – Simple Network Management Protocol	SNMPv1, v2, v3
VLAN – Virtual Local Area Network	As per 802.1Q
Security functions	
Dynamic Host Configuration Protocol (DHCP) support	Server or Relay Agent
Network Time Protocol (NTP) client	Client
Link Layer Discovery Protocol (LLDP)	As per protocol 802.2
Remote syslog logging	On external server
VPN throughput	max. 40 Mbps (router mode, VPN bidirectional throughput)
Number of VPN tunnels	- 10 (up to 250 possible with license)
Encryption methods	DES, 3DES, AES-128, -192, -256
Internet Protocol Security (IPsec) mode	- ESP-Tunnel / ESP-Transport
Authentication	- X.509v3 certificates with RSA or PSK
Data integrity	- MD5, SHA-1
1:1 Network Address Translation (NAT) in the VPN	- Supported
Firewall data throughput	max. 124 Mbps (Router mode, default firewall rules, bidirectional throughput)
Firewall rules	Configurable stateful inspection firewall
Filtering	MAC and IP addresses, ports, protocols
Protection against	IP spoofing, DoS and Syn Flood Protection
Routing	NAT, 1:1-NAT, Port Forwarding
Power supply	
Supply voltage	5 V DC (from USB interface)
General data	
Width	77 mm
Degree of protection	IP30
Ambient temperature (operation)	0 °C ... 40 °C

Technical data	
FL MGuard SMART2	FL MGuard SMART2 VPN
2 (RJ45)	
10/100 Mbps	
Firewall/router for office use or mobile service technicians	
SNMPv1, v2, v3	
As per 802.1Q	
Server or Relay Agent	
Client	
As per protocol 802.2	
On external server	
max. 40 Mbps (router mode, VPN bidirectional throughput)	
-	10 (up to 250 possible with license)
DES, 3DES, AES-128, -192, -256	
-	ESP-Tunnel / ESP-Transport
-	X.509v3 certificates with RSA or PSK
-	MD5, SHA-1
-	Supported
max. 124 Mbps (Router mode, default firewall rules, bidirectional throughput)	
Configurable stateful inspection firewall	
MAC and IP addresses, ports, protocols	
IP spoofing, DoS and Syn Flood Protection	
NAT, 1:1-NAT, Port Forwarding	
5 V DC (from USB interface)	
77 mm	
IP30	
0 °C ... 40 °C	

Description
<b>Router with firewall for mobile use</b>
- With VPN

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL MGuard SMART2	2700640	1
FL MGuard SMART2 VPN	2700639	1

License to configure and operate 10 VPN tunnels on FL MGuard
License to configure and operate 250 VPN tunnels on FL MGuard
License to configure any number of tunnels and operate 250 VPN tunnels on FL MGuard
License for lifetime software update of FL MGuard field devices
Central device management software for FL MGuard devices

Accessories		
Type	Order No.	Pcs. / Pkt.
FL MGuard LIC VPN-10	2700194	1
FL MGuard LIC VPN-250	2700193	1
FL MGuard LIC VPN-250 GROUP	2700192	1
FL MGuard LIC LIFETIME FW	2700184	1
FL MGuard DM ... (see software)		



**Security routers without DIN rail mounting**

Security is fundamental for PC-based automation. Do not leave any room for attack.

Distributed protection concepts where automation cells are protected individually provide maximum security.

In order to protect your PC reliably and easily in the network, PCI bus-based **FL MGuard PCI** cards are the ideal choice. mGuard technology features:

- Maximum security
- Optimum performance
- Central management



**Router with firewall for PCI**

Ethernet interface
Number of ports
Transmission speed
Function
Basic functions

SNMP – Simple Network Management Protocol
Security functions
Dynamic Host Configuration Protocol (DHCP) support
Network Time Protocol (NTP) client
Link Layer Discovery Protocol (LLDP)
VPN throughput

Number of VPN tunnels
-----------------------

Encryption methods
Internet Protocol Security (IPsec) mode
Authentication
Data integrity
1:1 Network Address Translation (NAT) in the VPN
Firewall data throughput

Firewall rules
Filtering
Protection against
Routing

General data
Ambient temperature (operation)

Description
<b>Router with firewall</b>
- With VPN

License to configure and operate <b>10 VPN tunnels</b> on FL MGuard
License to configure and operate <b>250 VPN tunnels</b> on FL MGuard
License to configure <b>any number of tunnels</b> and operate <b>250 VPN tunnels</b> on FL MGuard
License for <b>lifetime software update</b> of FL MGuard field devices

<b>Parameterization memory</b> , replaceable
Central <b>device management software</b> for FL MGuard devices

**Technical data**

FL MGuard PCI4000	FL MGuard PCI4000 VPN
2 (RJ45)	
10/100 Mbps	

Router with intelligent firewall (VPN, 10 tunnels as an option, up to 250 with additional license), CIFS Integrity Monitoring (as an option), metal housing, slot for SD memory card, extended temperature range, high-performance firewall/VPN (as an option): up to 124 Mbps/40 Mbps (as an option)	Router with intelligent firewall and VPN for 10 tunnels (up to 250 supported with optional additional license), CIFS Integrity Monitoring (as an option), metal housing, slot for SD memory card, extended temperature range, high-performance firewall/VPN: up to 124 Mbps/40 Mbps
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SNMPv1, v2, v3
----------------

Server or Relay Agent Client
As per protocol 802.2

max. 40 Mbps (Router mode, VPN bidirectional throughput)	max. 40 Mbps (Router)
0 (as an option, 10 tunnels up to 250 tunnels, with additional license FL MGuard LIC VPN-10/Order No. 2700194 or FL MGuard LIC VPN-250/Order No. 2700193 or 2700192)	10 (as an option, up to 250, with additional license FL MGuard LIC VPN-250/Order No. 2700193 or 2700192)

DES, 3DES, AES-128, -192, -256	ESP-Tunnel / ESP-Transport
-	X.509v3 certificates with RSA or PSK
-	MD5, SHA-1
-	Supported

max. 124 Mbps (router mode, default firewall rules, bidirectional throughput)
Configurable stateful inspection firewall with full scope of functions

MAC and IP addresses, ports, protocols
IP spoofing, DoS and Syn Flood Protection
Standard routing, NAT, 1:1-NAT, port forwarding

0 °C ... 70 °C
----------------

**Ordering data**

Type	Order No.	Pcs. / Pkt.
FL MGuard PCI4000	2701274	1
FL MGuard PCI4000 VPN	2701275	1

**Accessories**

FL MGuard LIC VPN-10	2700194	1
FL MGuard LIC VPN-250	2700193	1
FL MGuard LIC VPN-250 GROUP	2700192	1
FL MGuard LIC LIFETIME FW	2700184	1
SD FLASH 512MB	2988146	1
FL MGuard DM ... (see software)		

**FL VIEW** scans the Ethernet TCP/IP (PROFINET) network and automatically detects all the devices in the network and their connections. Using various display methods, IP addresses, devices or locations can be shown in the topology with the corresponding image files.

**Features:**

- Status display of network connections and network devices using different colors - you can identify a faulty device or an overloaded connection immediately
- Detection of the imminent failure of network components, e.g., through detection of the increasing ping error rate and its display



<b>Hardware requirements</b>
CPU
Main memory (RAM)
Hard disk memory
Optical drive
Interfaces
<b>Software requirements</b>
Operating systems
<b>Basic functions</b>
<b>Languages supported</b>

Technical data	
> 1 GHz	
512 MB	
min. 150 Mbyte (for help and video files, an additional 650 MB is needed)	
CD-ROM	
Ethernet Port	
32-bit system: Windows XP SP3, 32-bit and 64-bit system: Windows 7, Windows 2003, Windows 2008 server	
FL VIEW is a software product for detecting and monitoring industrial Ethernet TCP/IP networks with advanced features for PROFINET applications.	
FL VIEW automatically detects the topology and status of the networks and devices and transmits this in an animated realtime graphic.	
English	

<b>Description</b>
<b>Network monitoring software</b> , for nodes in different subnetworks
- For 64 nodes
- For 256 nodes
- For 512 nodes
<b>Network monitoring software</b> , for 32 nodes in one subnetwork

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL VIEW 64	2701472	1
FL VIEW 256	2701473	1
FL VIEW 512	2701474	1
FL VIEW 32 LITE	2701744	1

### Device Manager for FL MGuard devices

The Device Manager simplifies the management of FL MGuard security appliances.

The tool features a template mechanism that enables the user to configure and manage all FL MGuard devices centrally – from a few hundred devices to several thousand.

**Features:**

- Central configuration of several thousand appliances
- Template-based management tool
- Suitable for remote maintenance applications



Central management software for FL MGuard

Hardware requirements	CPU Main memory (RAM) Hard disk memory
Optical drive	
Interfaces	
Software requirements	Operating systems
Basic functions	
Languages supported	

Technical data	
> 1 GHz	512 MB
4 Gbyte (free memory space (server), 500 MB free memory space (client))	CD-ROM
Ethernet Port	
MS Windows 2000 SP2 or later, Windows XP, Linux	
Central management software for up to 100 FL MGuard devices	
-	

Description
Central <b>device management software</b> for FL MGuard devices, for <b>100 devices</b> in the field, for installation on a PC. Additional service FL MGuard PROF SERVICE2 required.
Central <b>device management software</b> for FL MGuard devices, for <b>any number of devices</b> in the field, for installation on a PC. Additional service FL MGuard PROF SERVICE 2 required.

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL MGuard DM 100	2700183	1
FL MGuard DM UNLIMITED	2981974	1

Device Manager software update, for both FL MGuard DM 100 and FL MGuard DM UNLIMITED.
Upgrade license from FL MGuard DM 100 to FL MGuard DM UNLIMITED.
Startup and induction for FL MGuard DM.

Accessories		
Type	Order No.	Pcs. / Pkt.
FL MGuard DM UPD	2700222	1
FL MGuard DM DEVICE UPGRADE	2700223	1
FL MGuard PROF SERVICE 2	2700185	1



### **In addition to products, we also offer you support whenever you need it.**

We offer on-demand professional support, from consultation, network analysis, and design to configuration support and startup. We not only support you over the phone or by e-mail, but also directly on site, if you so desire. Contact us for more information.

### **We support you in the design and planning of your network.**

We will develop custom solutions for you that are tailored to your specific requirements. Whether you need failsafe network structures, concepts for protecting or remotely maintaining your machinery or high-performance wireless networks, we will find the right solution for you.

### **FL START-UP SUPPORT**

#### **Order No. 2701426**

Description:

- Startup of network components from Phoenix Contact
- Support regarding analysis, consultation/planning or configuration/startup together with a responsible person employed by the initiator

#### **Services offered in the following areas:**

##### **“Analysis”**

- Assessment of existing network environment
- Analysis of network in relation to requirements
- Measurement of wireless field
- Measurement of data throughput
- Determining frequency band use
- Checking the network security concept

##### **“Planning/consultation”**

- Advice on the selection of wireless technology and antenna technology
- Planning/creation and development of a network security concept
- Planning/creation and development of a redundancy concept
- Planning/creation and development of a diagnostics concept
- Advice on the selection of technology and corresponding components
- Planning/creation and development of an Ethernet network including documentation

##### **“Configuration/startup”**

- Support with configuration/startup of Ethernet networks
- Support with configuration/startup of WLAN/Bluetooth connections
- Support with configuration/startup of VPN connections

### **We will turn you into an automation network specialist - if you so desire.**

Do you want to gain a better insight into network technology for yourself or your staff?

We offer individual and practical training courses that are tailor-made to suit your requirements and needs.

### **FL TRAINING**

#### **Order No. 2701427**

Description:

- Training with network components from Phoenix Contact covering network standards, Ethernet security or wireless

##### **“Ethernet security” training**

- The design and implementation of sophisticated Ethernet security and remote service solutions.
- Put your theoretical knowledge to the test on an industrial Ethernet network with components from Phoenix Contact

##### **“Wireless” training**

- Learn how important wireless technology is and how it is used in automation
- Detailed explanation of the basics of wireless technology such as wireless LAN (WLAN) and Bluetooth
- Creation of wireless networks in practical exercises



**Our specialists are also on hand to offer practical support on site.**

We offer support during the configuration and startup phases. We measure and assess the performance, availability, and security of your network. We also show you how it can be optimized.

What's more, if your network is not working according to your expectations, we will eliminate any faults.

**FL MAINTENANCE SUPPORT  
Order No. 2701424**

Description:

- Troubleshooting in an Ethernet communication network with components from Phoenix Contact together with a responsible person employed by the initiator

**Services offered:**

- Support with troubleshooting
- Support with the hardware check
- Network analysis
- Configuration check
- Provision of high-quality measuring instruments
- Service report with complete documentation

**Services for functional safety can be found on page 114.**

**Services for automation can be found on page 546.**



The latest generation of WLAN modules offers maximum reliability, data throughput, and range.

#### Faster

- The new high-speed WLAN 5100 brings WLAN 802.11n to industrial applications and with it a data rate of up to 300 Mbps

#### Configuration

- Central cluster management enables the entire wireless network to be set up in just minutes

#### More reliable

- MiMo technology with three antennas for wireless communication that is more robust, faster, and covers a wider range

## WLAN



**WLAN access point/2.4 GHz, 5 GHz client  
802.11 a/b/g/n**

Technical data													
Wireless interface	IEEE 802.11												
Wireless standard	2.4 GHz / 5 GHz												
Frequency band	max. 23 dBm (EIRP)												
Transmission power	RSMA (female)												
Antenna connection method	3												
Number	Antennas not included in scope of supply												
Antenna													
Assembly instructions													
Ethernet interfaces													
Number	2												
Connection method	RJ45 socket												
Power supply for module electronics													
Supply voltage	24 V DC												
Connection method	Via COMBICON												
Supply voltage range	10 V DC ... 36 V DC												
Supply current	200 mA												
Security	802.11i WPA PSK (preshared key) WPA2 AES TKIP Supports 802.1X/RADIUS MAC filter												
Function	Access point/client adapter/repeater/WDS bridge												
Operating modes													
Basic functions	SNMP (V2/V3), CLI, WPS, DHCP, DCP, BootP, HTTP, HTTPS, syslog, fast roaming, SD card, dual FW image, 1 x DI, 1 x DO, 2 x Ethernet 10/100 Mbit, auto crossover, auto negotiation, MODE button												
Configuration	Cluster management, web-based management, WPS												
General data													
Wireless licenses	EU, more countries in e-shop												
Weight	418 g												
Width	40 mm												
Height	109 mm												
Depth	109 mm												
Degree of protection	IP20												
Ambient temperature (operation)	-25 °C ... 60 °C (extended temperature range on request)												
Permissible humidity (operation)	10% ... 95% (no condensation)												
Air pressure (operation)	800 hPa ... 1080 hPa (up to 2000 m above mean sea level)												
Shock in acc. with IEC 60068-2-27:1997	30 g												
Vibration (operation) in acc. with IEC 60068-2-6:1982	5g												
<table border="1"> <thead> <tr> <th colspan="3">Ordering data</th> </tr> <tr> <th>Type</th> <th>Order No.</th> <th>Pcs. / Pkt.</th> </tr> </thead> <tbody> <tr> <td><b>FL WLAN 5100</b></td> <td><b>2700718</b></td> <td>1</td> </tr> <tr> <td><b>FL WLAN 5101</b></td> <td><b>2701093</b></td> <td>1</td> </tr> </tbody> </table>		Ordering data			Type	Order No.	Pcs. / Pkt.	<b>FL WLAN 5100</b>	<b>2700718</b>	1	<b>FL WLAN 5101</b>	<b>2701093</b>	1
Ordering data													
Type	Order No.	Pcs. / Pkt.											
<b>FL WLAN 5100</b>	<b>2700718</b>	1											
<b>FL WLAN 5101</b>	<b>2701093</b>	1											
<table border="1"> <thead> <tr> <th colspan="3">Accessories</th> </tr> <tr> <th>SD FLASH 512MB</th> <th>2988146</th> <th>1</th> </tr> </thead> </table>		Accessories			SD FLASH 512MB	2988146	1						
Accessories													
SD FLASH 512MB	2988146	1											
Description	<p><b>Wireless LAN Access Point</b> - WLAN 802.11 a,b,g,n, frequency 2.4 GHz, 5 GHz, IP20 - Approval for the USA and Canada</p>												
Parameterization memory, replaceable													



**Control box sets**

Control box set for the FL WLAN 5100 access point for use directly in industrial environments or in protected outdoor areas.

**Features:**

- IP66 control box
- Mounting suitable for industrial use
- Bore holes, screw connections already included
- Various sets, suitable for the most common applications



General data	
Set contents	
Width	174 mm
Height	254 mm
Depth	137 mm
Degree of protection	IP66

Technical data	
FL RUGGED BOX OMNI-1	FL RUGGED BOX DIR-1
Control box (with bore holes incl. sealing plugs, screw connections, and DIN rail), 3 omnidirectional antennas incl. antenna cable and RJ45 plug for field assembly	Control box (with bore holes incl. sealing plugs, screw connections, and DIN rail), panel antenna incl. antenna cable and 100 ... 240 V AC power supply unit incl. terminal block base

Description
<b>Control cabinet set</b> , IP66, including DIN rail, plugs, and screw connections
- With 3 omnidirectional antennas and antenna cables
- With 3 omnidirectional antennas, antenna cables, and 100 ... 240 V AC power supply
- With one panel antenna, antenna cable, and 100 ... 240 V AC power supply

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>FL RUGGED BOX</b>	2701204	1
<b>FL RUGGED BOX OMNI-1</b>	2701430	1
<b>FL RUGGED BOX OMNI-2</b>	2701439	1
<b>FL RUGGED BOX DIR-1</b>	2701440	1

Set for mast mounting of the FL RUGGED BOX housing, including screw clamps for masts up to 89 mm in diameter
--

Accessories		
<b>FL RUGGED BOX POLE SET</b>	2701205	1

## Wireless Ethernet

### Industrial WLAN

Factoryline WLAN devices have been developed specifically for use under harsh industrial conditions.

#### Features:

- Maximum security according to IEEE 802.11i with AES encryption
- 2.4 GHz and 5 GHz supported
- High resistance to vibration, shock, and EMI
- Range of several hundred meters\*

#### Notes:

\* The range may be significantly above or below that stated, and depends on the environment, antenna technology and the product used.

Please visit [www.phoenixcontact.com](http://www.phoenixcontact.com), for more information on the prevailing country-specific approvals for the relevant product.



WLAN

WLAN access point

		Technical data	
		FL WLAN 24 AP 802-11	FL WLAN 24 DAP 802-11
<b>Wireless interface</b>			
Wireless standard		IEEE 802.11	
Frequency band		ISM 2.4 GHz / 5 GHz ISM	
Transmission power		20 dBm (EIRP)	
Antenna connection method		RSMA (female)	
<b>Antenna</b>			
Connection method		RSMA (male)	
Assembly instructions		External OMNI omnidirectional antenna, the antennas can be exchanged	
<b>Ethernet interfaces</b>			
Connection method		RJ45 socket	
<b>Power supply for module electronics</b>			
Supply voltage		24 V DC (PoE)	
Connection method		Via COMBICON	
Supply voltage range		18.5 V DC ... 30.5 V DC	
Supply current		400 mA (recommended protection 2AT)	
<b>Security</b>			
		WEP 64 bit/128 bit WEPplus WPA TKIP 802.11i WPA2 (RSN, AES) WPA PSK (presared key) WPA group & master rekeying	
<b>Function</b>			
Operating modes		Access Point	
<b>Configuration</b>		Multilingual web-based interface (German/English) under http or https, with password protection	
<b>General data</b>			
Wireless licenses		Europe, additional countries in the e-shop	
Weight		1300 g	
Width		159 mm	
Height		250 mm	
Depth		65 mm	
Degree of protection		IP65	
Ambient temperature (operation)		-20 °C ... 55 °C	
Permissible humidity (operation)		10% ... 85% (no condensation)	
Air pressure (operation)		795 hPa ... 1080 hPa (up to 2000 m above mean sea level)	
Shock in acc. with IEC 60068-2-27:1997		25g	
Vibration (operation) in acc. with IEC 60068-2-6:1982		5g	
Mounting type		Adapter plate	
<b>Description</b>			
<b>Wireless LAN Access Point</b>			
- One wireless interface, two antennas			
- Two wireless interfaces, four antennas			
<b>Wireless LAN Ethernet port adapter</b>			
- Internal 2.4 GHz panel antenna			
- Internal 5 GHz panel antenna			
- External RSMA antenna connection (female)			
<b>Replaceable configuration memory for WLAN modules</b>			
<b>Mounting material, for wall or mast mounting</b>			
<b>Mounting material, for DIN rail mounting</b>			
<b>Ordering data</b>			
Type	Order No.	Pcs. / Pkt.	
FL WLAN 24 AP 802-11	2884075	1	
FL WLAN 24 DAP 802-11	2884279	1	
<b>Accessories</b>			
FL WLAN SIM	2692539	1	



**WLAN Ethernet adapter with internal panel antenna 2.4/5 GHz**



**WLAN Ethernet adapter with external antenna connection**

Technical data	
FL WLAN EPA	FL WLAN EPA 5N
IEEE 802.11	
2.4 GHz max. 20 dBm (EIRP)	5 GHz max. 14 dBm (EIRP)
(Internal)	
Permanently installed Internal circularly polarized panel antenna	
M 12 plug-in connectors (D-coded, female)	
24 V DC M12 plug-in connector (A-coded, male) 9 V DC ... 30 V DC 76 mA (at 24 V DC)	
802.11i WPA PSK (preshared key) WPA2 PSK AES WEP 64 bit/128 bit TKIP Supports 802.1X/RADIUS	
Ethernet client adapter	
Web interface, MODE button, AT commands (TCP/IP), SSC	
Europe, USA, Canada, additional countries in the e-shop	
120 g 66 mm 91 mm 34 mm IP65 -40 °C ... 65 °C 5% ... 90% (no condensation) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level)	
Wall mounting	

Technical data	
IEEE 802.11	
2.4 GHz/5 GHz max. 20 dBm (EIRP) RSMA (female)	
RSMA (male) External OMNI omnidirectional antenna supplied as standard, antennas can be exchanged	
M 12 plug-in connectors (D-coded, female)	
24 V DC M12 plug-in connector (A-coded, male) 9 V DC ... 30 V DC 76 mA (at 24 V DC)	
802.11i WPA PSK (preshared key) WPA2 PSK AES WEP 64 bit/128 bit TKIP Supports 802.1X/RADIUS	
Ethernet client adapter	
Web interface, MODE button, AT commands (TCP/IP), SSC	
Europe, USA, Canada, additional countries in the e-shop	
120 g 66 mm 91 mm 34 mm IP65 -40 °C ... 65 °C 5% ... 90% (no condensation) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level)	
Wall mounting	

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL WLAN EPA	2692791	1
FL WLAN EPA 5N	2700488	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL WLAN EPA RSMA	2701169	1

Accessories		
Type	Order No.	Pcs. / Pkt.
FL EPA WMS	2701134	1
FL EPA RMS	2701133	1

Accessories		
Type	Order No.	Pcs. / Pkt.
FL EPA WMS	2701134	1
FL EPA RMS	2701133	1

### Industrial Bluetooth

Bluetooth modules for the wireless integration of Ethernet-capable devices in the control network. Optimized for use in PROFINET/PROFIsafe networks.

#### Features:

- Protocol-transparent communication on Layer 2
- WLAN coexistence functions AFH, LEM, black channel listing
- Integrated special antenna (EPA)
- Range\* of up to 200 m
- Reliable wireless transmission of safety-related data signals using SafetyBridge technology

#### Notes:

\* The range may be significantly above or below that stated, and depends on the environment, antenna technology and the product used.

Please visit [www.phoenixcontact.com](http://www.phoenixcontact.com) for more information on the prevailing country-specific approvals for the relevant product.



Bluetooth access point

Technical data	
Wireless interface	Bluetooth 2.1 + EDR
Wireless standard	2.402 GHz ... 2.48 GHz (ISM bandwidth)
Frequency range	max. 12 dBm (EIRP)
Transmission power	7
Wireless modules that can be connected	PAN
Profiles supported	RSMA (female)
Antenna connection method	RSMA (male)
Antenna	External OMNI omnidirectional antenna supplied as standard, antennas can be exchanged
Connection method	M 12 plug-in connectors (D-coded, female)
Assembly instructions	24 V DC
Ethernet interfaces	M12 plug-in connector (A-coded, male)
Connection method	9 V DC ... 30 V DC
Power supply for module electronics	46 mA (at 24 V DC)
Supply voltage	128-bit data encryption
Connection method	Authentication
Supply voltage range	PIN
Current consumption	Non-discoverable
Security	BT access point
Function	P2P
Operating modes	Client
Function	Access point
Configuration	Web interface, MODE button, AT commands (TCP/IP), SSC
General data	Europe, additional countries in the e-shop
Wireless licenses	120 g
Weight	66 mm
Width	91 mm
Height	34 mm
Depth	IP65
Degree of protection	III, IEC 61140, EN 61140, VDE 0140-1
Protection class	-40 °C ... 65 °C
Ambient temperature (operation)	5% ... 90% (no condensation)
Permissible humidity (operation)	795 hPa ... 1080 hPa (up to 2000 m above mean sea level)
Air pressure (operation)	

Description
<b>Bluetooth Access Point</b>
<b>Bluetooth Ethernet Client adapter</b>
Protocol-transparent Ethernet wireless path

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL BT EPA MP	2701416	1

<b>Mounting material</b> , for wall or mast mounting
<b>Mounting material</b> , for DIN rail mounting

Accessories		
Type	Order No.	Pcs. / Pkt.
FL EPA WMS	2701134	1
FL EPA RMS	2701133	1



Bluetooth Ethernet adapter



Solution set, including cable

Technical data
Bluetooth 2.1 + EDR 2.402 GHz ... 2.48 GHz (ISM bandwidth) max. 15 dBm (EIRP) 1 PAN (Internal)
Permanently installed Internal circularly polarized panel antenna
M 12 plug-in connectors (D-coded, female)
24 V DC M12 plug-in connector (A-coded, male) 9 V DC ... 30 V DC 46 mA (at 24 V DC)
128-bit data encryption Authentication PIN Non-discoverable
Ethernet client adapter P2P Client
Web interface, MODE button, AT commands (TCP/IP), SSC
Europe, additional countries in the e-shop 120 g 66 mm 91 mm 34 mm IP65 III, IEC 61140, EN 61140, VDE 0140-1 -40 °C ... 65 °C 5% ... 90% (no condensation) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level)

Technical data
Bluetooth 2.1 + EDR 2.402 GHz ... 2.48 GHz (ISM bandwidth) max. 15 dBm (EIRP) 1 PAN (Internal)
Permanently installed Internal circularly polarized panel antenna
M 12 plug-in connectors (D-coded, female)
24 V DC M12 plug-in connector (A-coded, male) 9 V DC ... 30 V DC 46 mA (per module at 24 V DC)
128-bit data encryption Authentication PIN Non-discoverable
Ethernet client adapter P2P Bridge
Web interface, MODE button, AT commands (TCP/IP), SSC
Europe, additional countries in the e-shop 490 g 66 mm 91 mm 34 mm IP65 III, IEC 61140, EN 61140, VDE 0140-1 -40 °C ... 65 °C 5% ... 90% (no condensation) 795 hPa ... 1080 hPa (up to 2000 m above mean sea level)

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL BT EPA	2692788	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL BT EPA AIR SET	2693091	1

Accessories		
Type	Order No.	Pcs. / Pkt.
FL EPA WMS	2701134	1
FL EPA RMS	2701133	1

Accessories		
Type	Order No.	Pcs. / Pkt.
FL EPA WMS	2701134	1
FL EPA RMS	2701133	1

## Wireless Ethernet

### 2.4 GHz/5 GHz accessories

#### Omnidirectional antennas

Omnidirectional antennas to increase gain.

- Standard omnidirectional antennas



Gain 2 dBi (2.4 GHz)



Gain 2.5 dBi (2.4 GHz)/5 dBi (5 GHz)

Ambient temperature (operation)  
Degree of protection  
Gain

Impedance  
Connection method  
Horizontal / vertical apex angle

Dimensions W / H  
Frequency range

Technical data	
Ambient temperature (operation)	-20 °C ... 65 °C
Degree of protection	IP65
Gain	2 dBi
Impedance	50 Ω
Connection method	RSMA (male)
Horizontal / vertical apex angle	360 ° / 75 °
Dimensions W / H	7.8 mm / 82.5 mm
Frequency range	2.4 GHz

Technical data	
Ambient temperature (operation)	-40 °C ... 70 °C
Degree of protection	IP68
Gain	2.5 dBi (2.4 GHz) 5 dBi (5 GHz)
Impedance	50 Ω
Connection method	N (male)
Horizontal / vertical apex angle	360 ° (at 2.4 GHz) / 30 ° (at 2.4 GHz) 360 ° (at 5 GHz) / 16 ° (at 5 GHz)
Dimensions W / H	23 mm / 180 mm
Frequency range	2.4 GHz ... 2.5 GHz / 5.15 GHz ... 5.83 GHz

Description
<b>Omnidirectional antenna</b> With connection RSMA (male) With N connection (male)

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>RAD-ISM-2400-ANT-OMNI-2-1-RSMA</b>	<b>2701362</b>	<b>1</b>

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>ANT-OMNI-2459-02</b>	<b>2701408</b>	<b>1</b>

### 2.4 GHz/5 GHz accessories

#### Omnidirectional antennas

Omnidirectional antennas to increase gain.

- With vandalism protection thanks to increased impact strength



Gain 3 dBi (2.4 GHz)



Dual band,  
gain up to 6 dBi (2.4 GHz)/up to 8 dBi (5 GHz)

Ambient temperature (operation)  
Degree of protection  
Gain

Impedance  
Connection method  
Horizontal / vertical apex angle

Dimensions W / H  
Frequency range

Technical data	
Ambient temperature (operation)	-40 °C ... 80 °C
Degree of protection	IP55
Gain	3 dBi
Impedance	50 Ω
Connection method	RSMA (male)
Horizontal / vertical apex angle	360 ° / 85 °
Dimensions W / H	86 mm / 43 mm
Frequency range	2.4 GHz

Technical data	
Ambient temperature (operation)	-40 °C ... 80 °C
Degree of protection	IP68
Gain	6 dBi (2.4 GHz, when mounted on metal surface) 3 dBi (2.4 GHz, no metal surface) 8 dBi (5.6 GHz, when mounted on metal surface) 5 dBi (5.6 GHz, no metal surface)
Impedance	50 Ω
Connection method	N (female)
Horizontal / vertical apex angle	360 ° / -
Dimensions W / H	92 mm / 51 mm
Frequency range	2.4 GHz / 5.15 GHz ... 5.83 GHz

Description
<b>Omnidirectional antenna</b> With connection RSMA (male) With adapter cable N (male) -> SMA (male)

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>RAD-ISM-2400-ANT-VAN-3-0-RSMA</b>	<b>2701358</b>	<b>1</b>

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>RAD-ISM-2459-ANT-FOOD-6-0</b>	<b>2692526</b>	<b>1</b>

## 2.4 GHz/5 GHz accessories

## Omnidirectional antennas

Omnidirectional antennas to increase gain.

- High-quality omnidirectional antennas for wall and mast mounting



Gain 6 dBi (2.4 GHz)



Gain 5 dBi (5 GHz)

Ambient temperature (operation)  
Degree of protection  
Gain  
Impedance  
Connection method  
Horizontal / vertical apex angle  
Dimensions W / H  
Frequency range  
Scope of delivery

-40 °C ... 75 °C  
IP55  
6 dBi  
50 Ω  
N (female)  
360 ° / 30 °  
22 mm / 250 mm  
2.4 GHz ... 2.5 GHz  
Incl. mounting material

-45 °C ... 70 °C  
IP64  
5 dBi  
50 Ω  
N (female)  
360 ° / 25 °  
16 mm / 130 mm  
5.15 GHz ... 5.875 GHz  
Incl. mounting material

Description

**Omnidirectional antenna**  
With connection N (female)

## Ordering data

Type	Order No.	Pcs. / Pkt.
RAD-ISM-2400-ANT-OMNI-6-0	2885919	1

## Technical data

## Ordering data

Type	Order No.	Pcs. / Pkt.
ANT-OMNI-5900-01	2701347	1

## 2.4 GHz/5 GHz accessories

N

N

## Directional wireless antennas

Directional wireless antennas with high gain for transmission over longer distances.

- Linear polarized
- For wall or mast mounting



Dual band, gain up to 9 dBi (2.4/5 GHz)



with 2 radiators, gain 9 dBi (5 GHz)

Ambient temperature (operation)  
Degree of protection  
Gain  
Impedance  
Connection method  
Horizontal / vertical apex angle

-40 °C ... 80 °C  
IP67  
9 dBi  
50 Ω  
N (female)  
75 ° (at 2.4 GHz) / 55 ° (at 2.4 GHz)  
55 ° (at 5 GHz) / 55 ° (at 5 GHz)  
80 mm / 101 mm  
2.4 GHz ... 2.5 GHz / 5.15 GHz ... 5.875 GHz  
Incl. mounting material

-40 °C ... 80 °C  
IP67  
9 dBi  
50 Ω  
N (female)  
70 ° (at 5 GHz) / 60 ° (at 5 GHz)

Dimensions W / H  
Frequency range  
Scope of delivery

80 mm / 101 mm  
5.15 GHz ... 5.875 GHz  
Incl. mounting material

Description

**PANEL directional wireless antenna** (without cable)  
With connection N (female)

## Ordering data

Type	Order No.	Pcs. / Pkt.
ANT-DIR-2459-01	2701186	1

## Ordering data

Type	Order No.	Pcs. / Pkt.
ANT-DIR-5900-01	2701348	1

#### Directional wireless antennas, linear polarized

Directional wireless antennas with high gain for transmission over long distances.



18 dBi gain



22 dBi gain

Ambient temperature (operation)  
Degree of protection  
Gain  
Impedance  
Connection method  
Horizontal / vertical apex angle  
Dimensions W / H  
Frequency range  
Scope of delivery

Technical data		
Ambient temperature (operation)	-40 °C ... 70 °C	
Degree of protection	IP55	
Gain	18 dBi	
Impedance	50 Ω	
Connection method	N (female)	
Horizontal / vertical apex angle	18 ° / 18 °	
Dimensions W / H	152.4 mm / 152.4 mm	
Frequency range	5.25 GHz ... 5.85 GHz	
Scope of delivery	Incl. mounting material	

Technical data		
Ambient temperature (operation)	-40 °C ... 70 °C	
Degree of protection	IP55	
Gain	22 dBi	
Impedance	50 Ω	
Connection method	N (female)	
Horizontal / vertical apex angle	12 ° / 12 °	
Dimensions W / H	304.8 mm / 304.8 mm	
Frequency range	5.25 GHz ... 5.85 GHz	
Scope of delivery	Incl. mounting material	

Description
<b>Parabolic antenna</b>
Gain 18 dBi
Gain 22 dBi

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>RAD-ISM-5000-ANT-PAR-18-N</b>	<b>5606613</b>	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>RAD-ISM-5000-ANT-PAR-22-N</b>	<b>5606174</b>	1

#### Antenna cable

Extension cable for positioning antennas at a distance: leading out of the control cabinet, connection to an antenna mounted somewhere else.

- Extension or adaptation of wireless module for antenna
- Cable with low attenuation:  
Approximately 0.54 dB/m at 2.4 GHz  
Approximately 0.97 dB/m at 5 GHz

#### Notes:

Keep the connection from the wireless module to the antenna as short as possible, as every cable leads to attenuation.



N (male) -> N (male)

Ambient temperature (operation)  
Impedance

Technical data		
Ambient temperature (operation)	-40 °C ... 105 °C	
Impedance	50 Ω	

Description
<b>Antenna extension cable</b>
3 m
5 m
10 m
15 m

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>RAD-CAB-EF393- 3M</b>	<b>2867649</b>	1
<b>RAD-CAB-EF393- 5M</b>	<b>2867652</b>	1
<b>RAD-CAB-EF393-10M</b>	<b>2867665</b>	1
<b>RAD-CAB-EF393-15M</b>	<b>2885634</b>	1



Antenna cable



Cables and pigtails for connecting the antennas to the wireless module.

- Attenuation for **RAD-PIG-RSMA/N...**:  
Approximately 0.80 dB/m at 2.4 GHz  
Approximately 1.10 dB/m at 5 GHz
- Attenuation for **RAD-PIG-EF316-N...**:  
Approximately 1.52 dB/m at 2.4 GHz  
Approximately 2.45 dB/m at 5 GHz



RSMA (male) -> N (male)



RSMA (male) -> N (female)

Technical data

Ambient temperature (operation)

-40 °C ... 85 °C

Technical data

-40 °C ... 70 °C

Ordering data

Description
<b>Antenna adapter cable</b>
0.5 m long
1 m long
2 m long
3 m long
<b>Antenna adapter cable</b>
0.5 m long

Type	Order No.	Pcs. / Pkt.
RAD-PIG-RSMA/N-0.5	2903263	1
RAD-PIG-RSMA/N-1	2903264	1
RAD-PIG-RSMA/N-2	2903265	1
RAD-PIG-RSMA/N-3	2903266	1

Ordering data

Type	Order No.	Pcs. / Pkt.
RAD-PIG-EF316-N-RSMA	2701402	1

Adapters and surge protection

Adapter for connecting SMA antenna cables.

Outdoor surge protection for 2.4 GHz and 5 GHz.



Adapter



Surge protection (2.4/5 GHz)

Technical data

Ambient temperature (operation)

-65 °C ... 165 °C

Technical data

-40 °C ... 90 °C

Ordering data

Description
<b>Adapter</b>
RSMA (male) -> SMA (female)
<b>COAXTRAB</b> , protective adapter for antenna connections
N (female) -> N (female)
N (male) -> N (female)

Type	Order No.	Pcs. / Pkt.
RAD-ADP-RSMA/F-SMA/F	2884538	1

Ordering data

Type	Order No.	Pcs. / Pkt.
CN-LAMBDA/4-5.9-BB	2838490	1
CN-LAMBDA/4-5.9-SB	2800023	1

## Wireless Ethernet

### Leaky cable and accessories

The leaky cable is a cable that acts as an antenna, which emits continuously along its length. It ensures a continuous wireless connection when using track-guided systems, even in angled or difficult to reach spaces.



Leaky cable



	Technical data			Technical data		
Ambient temperature (operation)	-40 °C ... 85 °C			-		
Impedance	50 Ω			50 Ω		
Cable, attenuation	19.8 dB/100 m, longitudinal attenuation (2.4 GHz)			-		
Connection method	Open end			N (female)		
Frequency range	2.4 GHz ... 2.6 GHz			2.4 GHz ... 6 GHz		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Leaky cables</b>	FL LCX CABLE METER	2884774	1	FL LCX CON-N/F	2884965	1
<b>Connectors for leaky cable</b>				FL LCX PIG-EF142-N-N	2700677	1
<b>Antenna cables for leaky cables</b> 1 m long, N (male) -> N (male)				FL LCX 50-OHM	2884978	1
<b>Termination resistors for leaky cable</b> N (male)						

### Accessories for leaky cable

Cable fastenings are required for mounting the leaky cable and an alignment tool is required for mounting the connector for connecting the wireless unit.



Planing tool



Cable tie

	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Alignment tool for leaky cable</b>	FL LCX TOOL	2884981	1	FL LCX CLAMP	2884994	100
<b>Cable tie for leaky cable</b>						

## Weather protection

### Sealing tape

- Provides additional weather protection for adapters, splitters, cable connections, etc.
- Self-vulcanizing



General data		Technical data		
Ambient temperature range		-40 °C ... 90 °C		
Properties		Self-vulcanizing		
Width		19 mm		
Length		3 m		
Thickness		0.75 mm		
Description		Ordering data		
Weather protection tape		Type	Order No.	Pcs. / Pkt.
		RAD-TAPE-SV-19-3	2903182	1

## FL WST Basic – Wireless simulations software

Wireless planning in a few steps that provides important information about the material requirements and later installation:

- How many access points are required to provide wireless coverage for the area?
- Where is the best installation position from the wireless perspective?
- What are the benefits of using special antennas?



Wireless simulation software

Description		Ordering data		
Simulation software to support the planning of wireless systems in industrial environments		Type	Order No.	Pcs. / Pkt.
		FL WST BASIC	2692254	1

### PROFINET proxies

Gateways and proxies from Phoenix Contact are the intelligent solution for integrating networks into other networks.

#### Your advantages:

- 1:1 integration of networks or segments, thanks to proxy technology
- Easy system modernization with transparent communication over multiple bus systems
- Versatile diagnostics: thanks to topology detection and manufacturer-independent diagnostic concepts
- Fast device replacement with optional CF card as parameterization memory

#### Proxy for INTERBUS

Do you want to integrate an INTERBUS application into a PROFINET network? Then the FL NP PND-4TX IB is the ideal solution. Simply parameterize the device using your corresponding programming tool. Use the integrated switch in the control cabinet as an uplink to the higher-level control system or in the field for series connection.

#### Proxy for PROFIBUS

Integrate controllers, I/O stations, and other automation devices seamlessly into a PROFIBUS network. Each PROFIBUS device can be configured and diagnosed directly using the FL NP PND-4TX PB. I/O signals of PROFIBUS devices are linked directly to program variables from the application. The PROFIBUS proxy is operated exclusively using PC Worx.

#### Additional features:

- Data exchange, diagnostics, and parameterization are via the PROFINET protocol
- They can be integrated and parameterized in any controller using the PROFINET functionality
- LLDP support for topology detection
- PROFINET IO update rates  $\geq 1$  ms

#### Notes:

1) EMC: Class A product, see page 553



PROFINET INTERBUS proxy

PROFIBUS

Technical data			
PROFINET IO	PROFINET IO RT, spec. 3.2		
Specification	B		
Conformance class	min. 1 ms		
Update rate	Diagnostics software: DIAG+, version 2.0 or higher Configuration software: using the GSDML file or PC Worx Version 5.0 or higher		
Software			
Ethernet	RJ45 socket		
Connection method	10/100 Mbps		
Transmission speed	INTERBUS		
Interface	INTERBUS (Master)		
Connection method	9-pos. D-SUB female		
Number	1		
Number of I/O nodes	8192		
Number of devices with parameter channel (PCP)	max. 126 (512 words)		
Transmission speed	500 kbaud/2 Mbaud, can be selected		
PROFIBUS	-		
Interface	-		
Connection method	-		
Number	-		
Transmission speed	-		
Number of supported devices	max. 512 (depending on the control class and data direction)		
Number of supported devices			
Power supply	24 V DC		
Supply voltage	18.5 V DC ... 30.2 V DC		
Supply voltage range	Typ. 350 mA		
Typical current consumption	General data		
General data	Width		
Width	128 mm		
Height	95 mm		
Depth	69 mm		
Ambient temperature (operation)	-25 °C ... 60 °C		
Ambient temperature (storage/transport)	-25 °C ... 70 °C		
Ordering data			
Description	Type	Order No.	Pcs. / Pkt.
Proxy for PROFINET IO	FL NP PND-4TX IB <sup>1)</sup>	2985974	1
- INTERBUS			
- INTERBUS FO			
- PROFIBUS			
Accessories			
Parameterization memory	CF FLASH 256MB	2988780	1



**PROFINET INTERBUS fiber optic proxy**



**PROFINET PROFIBUS proxy for PC Worx control systems**

UL= PROFIBUS

EL

Technical data
PROFINET IO RT, spec. 3.2
B
min. 1 ms
Diagnostics software: DIAG+, version 2.0 or higher Configuration software: using the GSDML file or PC Worx Version 5.0 or higher
RJ45 socket 10/100 Mbps
INTERBUS (Master)
F-SMA connector
1
8192
max. 126 (512 words)
500 kbaud/2 Mbaud, can be selected
-
-
-
max. 512 (depending on the control class and data direction)
24 V DC
18.5 V DC ... 30.2 V DC
Typ. 350 mA
128 mm
95 mm
69 mm
-25 °C ... 60 °C
-25 °C ... 70 °C

Technical data
PROFINET-IO RT, spec. 2.1
B
min. 1 ms
Diagnostics software: DIAG+, version 2.0 or higher Configuration software PC Worx Version 5.20, Service Pack 3 or higher
RJ45 socket 10/100 Mbps
-
-
-
-
-
PROFIBUS DP V0/V1 class 2 master
9-pos. D-SUB female
1
to 12 Mbps
max. 125
24 V DC
18.5 V DC ... 30.2 V DC
350 mA
128 mm
95 mm
69 mm
-25 °C ... 55 °C
-25 °C ... 70 °C

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL NP PND-4TX IB-LK <sup>1)</sup>	2985929	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL NP PND-4TX PB	2985071	1

Accessories		
CF FLASH 256MB	Order No.	Pcs. / Pkt.
CF FLASH 256MB	2988780	1

Accessories		
CF FLASH 256MB	Order No.	Pcs. / Pkt.
CF FLASH 256MB	2988780	1

### Accessories

The reliability of networks is becoming more and more important and is a decisive factor for the future of entire companies. Independent studies show that more than 70% of network errors and crashes are due to faulty cabling infrastructure and manipulation of the connecting cables.

With the new accessories for Factoryline patch cables, the various safety requirements for automation are comprehensively met.



**Dust protection**  
for SFN switches and patch fields



**Security lock**  
for SFN switches and patch fields

Description	Ordering data			Ordering data		
	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Dust protection with color marking</b> , for SFN switch and angled patch connector - Black - Blue - Brown - Yellow - Gray - Green - Red - Violet - White	FL DUST CVR BK FL DUST CVR BU FL DUST CVR BN FL DUST CVR YE FL DUST CVR GY FL DUST CVR GN FL DUST CVR RD FL DUST CVR VT FL DUST CVR WH	2891107 2891204 2891301 2891408 2891505 2891602 2891709 2891806 2891903	10 10 10 10 10 10 10 10 10			
<b>Security frame</b> for SFN switch and patch fields - Green - Red - White				FL PLUG GUARD GN FL PLUG GUARD RD FL PLUG GUARD WH	2891615 2891712 2891819	20 20 20
<b>Locking element</b> for FL PLUG GUARD... security frame - Locking element - Key				FL PORT GUARD FL PLUG GUARD KEY	2891220 2891327	20 1
<b>Color marking</b> for FL CAT ...patch... - Black - Blue - Brown - Yellow - Gray - Green - Red - Violet						
<b>Security element</b> for FL CAT ...patch... - Security element - Security element, lockable - Key						
<b>Dust protection cap</b> for RJ45 socket						





Color coding for RJ45 FL patch cables



Security element for RJ45 FL patch cables



Dust protection for RJ45 sockets

Ordering data			Ordering data			Ordering data		
Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
FL PATCH CCODE BK	2891194	20	FL PATCH SAFE CLIP	2891246	20	FL RJ45 PROTECT CAP	2832991	10
FL PATCH CCODE BU	2891291	20	FL PATCH GUARD	2891424	20			
FL PATCH CCODE BN	2891495	20	FL PATCH GUARD KEY	2891521	1			
FL PATCH CCODE YE	2891592	20						
FL PATCH CCODE GY	2891699	20						
FL PATCH CCODE GN	2891796	20						
FL PATCH CCODE RD	2891893	20						
FL PATCH CCODE VT	2891990	20						







# Functional safety

## Safety devices

- Modules for all common applications such as emergency stop, safety doors, light grids, etc.
- Modules for monitoring various speeds during operation and downtime
- Modules for coupling digital output signals from failsafe controllers to I/O devices

## Configurable safety modules

- Multifunctional evaluation module with 20 safe inputs and 4 safe outputs
- Multifunctional extendable safety module
- Monitoring of all the safety-related functions of a machine, such as emergency stop, safety doors, light grids, etc.
- Flexible extension with safe digital I/O modules
- Easy configuration using the SAFECNF software

## Network safety solutions

- SafetyBridge I/O modules exchange safe signals via an automation network
- Flexible use: compatible with all common bus systems
- Easy configuration using the SAFECNF software


## Safe control technology

- With high-performance safety controllers, proxies, and gateways, you can also reliably integrate functional safety in your PROFINET networks.
- Controls even large numbers of I/Os reliably, thanks to high-performance technology
  - Reduced wiring effort, thanks to the joint transmission of control and safety protocols via a single Ethernet cable
  - Uniform configuration worldwide, thanks to standardized programming according to IEC 61131

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<hr/>	
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<hr/>	
<b>Configurable safety modules</b>	
PSR-TRISAFE-S	<b>101</b>
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### Safety devices

#### Safety relays

					
Type	<b>PSR-ESA2 PSR-ESAM2</b>	<b>PSR-ESAM4</b>	<b>PSR-ESD-30 PSR-ESD-300</b>	<b>PSR-ESL4</b>	<b>PSR-THC4</b>
Description	Single-channel emergency stop and safety door monitoring	Two-channel emergency stop and safety door monitoring	Single and two-channel emergency stop, safety door, and light grid monitoring with time function	Single and two-channel light grid monitoring	Two-channel monitoring of two-hand controls and safety doors
Page	69	70	73	75	76

#### Safety relays

#### Modular safety system




#### Speed and downtime monitors

					
Type	<b>PSR-URM4</b>	<b>PSR-SDC4</b>	<b>PSR-URM PSR-URD3</b>	<b>PSR-MOTIONSTOP</b>	<b>PSR-RSM4</b>
Description	Contact extensions	Multifunctional master module	Extension modules	Speed monitor can be parameterized via the operator interface and display unit	Speed monitor can be parameterized via software
Page	77	81	81	87	88

#### Safe coupling relays

				
Type	<b>PSR-FSP</b>	<b>PSR-ETP</b>	<b>Termination carrier</b>	<b>PSR-URM</b>
Description	Emergency stop coupling relays for failsafe controllers in the process industry	SIL coupling relays for F&G applications	Termination carriers for the alignment and easy mounting of suitable coupling relays	Forcibly guided coupling relays
Page	91	95	96	97

### Configurable safety modules

			
Type	<b>PSR-TRISAFE-S</b>	<b>PSR-TRISAFE modular</b>	<b>PSR-...TS/SDI8/SDIO4</b>
Description	Configurable safety module, cannot be extended	Configurable safety module, can be extended	Extension module with safe I/Os
Page	101	102	103



Network safety solutions

				
Type	<b>IB IL 24 LPSDO 8</b>	<b>IB IL 24 PSDO</b>	<b>IB IL 24 PSDOR 4-PAC</b>	<b>IB IL 24 PSDI</b>
Description	Safety-related digital logic modules	Safety-related digital output modules	Safety-related relay output module	Safety-related digital input modules
Page	105	106	107	108

Software

Safe control technology

					
Type	<b>SAFECONF</b>	<b>SAFETYPROG</b>		<b>FL PN/PN SDIO-2TX/2TX</b>	<b>RFC 470S PN 3TX</b>
Description	Configuration software for PSR-TRISAFE and SafetyBridge modules	Programming software for INTERBUS-Safety systems and PROFIsafe controllers		Safe PROFINET gateway	High-performance controller with integrated safety controller
Page	110	111		112	113

Services for functional safety

Detailed consulting

Presentation

Safety engineering

Safety service

Individual safety training

					
Type	<b>DETAILED CONSULTING</b> 2700502	<b>MODERATION</b> 2700504	<b>SAFETY ENGINEERING</b> 2692089	<b>SAFETY SERVICE</b> 2851202	<b>INDIVIDUAL SAFETY TRAINING</b> 2700513
Description	Individual consultation from the initial planning phase to startup	Intensive consultation at every stage of development	Support from the initial planning phase to startup and system modernization	Free 24-hour safety hotline for general queries about functions of components and for on-site assistance	Design of individual training courses
Page	114				

# Functional safety

## Safety devices

### Safety solutions from Phoenix Contact: simplicity means safety



Our PSR safety devices demonstrate that innovative safety solutions do not necessarily have to be complex in order to meet the high requirements of machine building and systems manufacturing.

As well as offering easy integration and handling, the modules are characterized by their compact, space-saving design as well as their high quality, safety, and reliability.

PSR safety devices offer you solutions for all common applications such as monitoring the following protective tasks:

- Emergency stop
- Safety door
- Light grid
- Solenoid switch
- Two-hand control devices
- Enable switch

#### Convenient connection technology

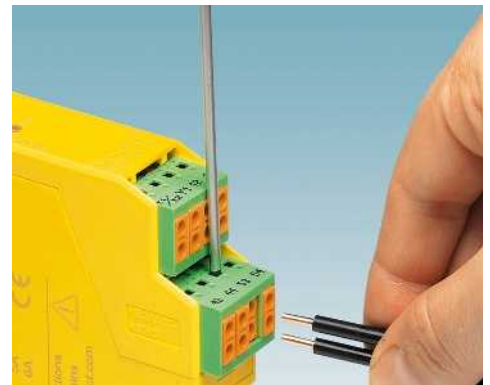
All PSR safety devices are available with plug-in screw or spring-cage connection technology. The twin spring-cage plugs provide enough space for two cables per terminal point.

#### Quick extension

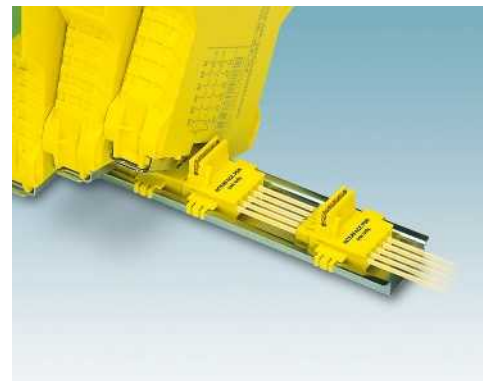
The modular safety systems allow additional extension modules to be integrated easily using the PSR-TBUS DIN rail connector. As a result, there is no longer any need to install cross-wiring for additional output contacts.

#### Numerous approvals

PSR safety devices conform to all applicable safety standards such as EN ISO 13849-1 and IEC 61508. In addition, modules with GL approval or certification according to EN 50156 are also available.



User-friendly connection technology



Quick extension



Numerous approvals

### Safety relay for single-channel emergency stop and safety door monitoring

- Single-channel control
- 3 or 4 enabling current paths, 1 signaling current path
- Basic insulation
- Activation (depending on type): Manual/automatic or manually monitored/automatic
- Up to Cat. 1/PL c according to EN ISO 13849-1, SILCL 2 according to IEC 62061, SIL 2 according to IEC 61508

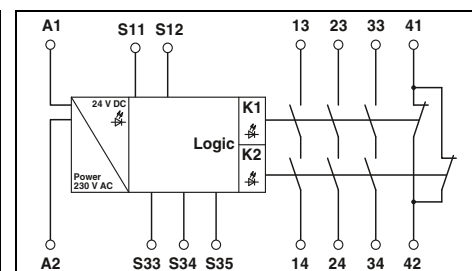
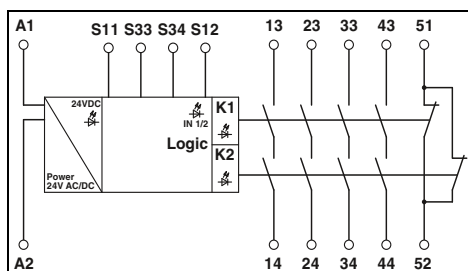


Manual and automatic activation, 24 V AC/DC



Manually monitored and automatic activation, 230 V AC

**Notes:**  
1) EMC: Class A product, see page 553



<b>Input data</b>	
Nominal input voltage $U_N$	24 V AC/DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	140 mA AC / 65 mA DC
Typ. response time (K1, K2) at $U_N$	65 ms
Typ. release time (K1, K2) at $U_N$	45 ms
<b>Recovery time</b>	
	1 s
<b>Output data</b>	
<b>Contact type</b>	
Contact material	4 enabling current paths 1 signaling current path AgSnO <sub>2</sub> + 0.2 μm Au
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	6 A (N/O contact), 3 A (N/C contact)
Max. / min. inrush current	6 A / 25 mA
Min. switching power	0.4 W
Switching capacity (360/h cycles)	4 A (24 V DC) ; 4 A (230 V AC)
Switching capacity (3600/h cycles)	2.5 A (24 V (DC13)) ; 3 A (230 V (AC 15))
Short-circuit protection of the output circuits	6 A fast-blow, C6 (24 V AC/DC) automatic device
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / basic insulation (safe isolation, reinforced insulation, and 6 kV between input circuit/N/C contacts and enabling current paths)
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	22.5 mm / 112 mm / 114.5 mm

<b>Technical data</b>		
24 V AC/DC		
0.85 ... 1.1		
140 mA AC / 65 mA DC		
65 ms		
45 ms		
1 s		
<b>Technical data</b>		
230 V AC		
0.85 ... 1.1		
22 mA		
50 ms (manual start) / 300 ms (automatic start)		
20 ms (when controlled via S11/S12) / 150 ms (when controlled via A1)		
1 s		
<b>Technical data</b>		
3 enabling current paths 1 signaling current path AgSnO <sub>2</sub> , gold-flashed 250 V AC/DC / 10 V AC/DC		
6 A (N/O contact), 5 A (N/C contact)		
6 A / 10 mA		
100 mW		
6 A (24 V DC) ; 5 A (230 V AC)		
3 A (24 V (DC13)) ; 3 A (230 V (AC 15))		
10 A gL/gG NEOZED (enabling current paths), 6 A gL/gG NEOZED (signaling current paths)		
<b>Technical data</b>		
-25 °C ... 55 °C		
DIN EN 50178/VDE 0160		
4 kV / basic insulation (safe isolation, reinforced insulation, and 6 kV between A1-A2/logic/enabling and signaling current paths)		
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12		
0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16		
22.5 mm / 99 mm / 114.5 mm		
22.5 mm / 112 mm / 114.5 mm		

<b>Description</b>	
<b>Emergency stop and safety door monitoring, single-channel, activation: manual and automatic</b>	
With screw connection	PSR-SCP- 24UC/ESA2/4X1/1X2/B <sup>1</sup> )
With spring-cage connection	PSR-SPP- 24UC/ESA2/4X1/1X2/B <sup>1</sup> )
<b>Emergency stop and safety door monitoring, single-channel, activation: manually monitored and automatic</b>	
With screw connection	PSR-SCP-230AC/ESAM2/3X1/1X2/B <sup>1</sup> )
With spring-cage connection	PSR-SPP-230AC/ESAM2/3X1/1X2/B <sup>1</sup> )

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
PSR-SCP- 24UC/ESA2/4X1/1X2/B <sup>1</sup> )	2963802	1
PSR-SPP- 24UC/ESA2/4X1/1X2/B <sup>1</sup> )	2963954	1
<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
PSR-SCP-230AC/ESAM2/3X1/1X2/B <sup>1</sup> )	2901430	1
PSR-SPP-230AC/ESAM2/3X1/1X2/B <sup>1</sup> )	2901431	1

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
PSR-SCP-230AC/ESAM2/3X1/1X2/B <sup>1</sup> )	2901430	1
PSR-SPP-230AC/ESAM2/3X1/1X2/B <sup>1</sup> )	2901431	1

## Safety devices

### Safety relay for two-channel emergency stop and safety door monitoring

- Single and two-channel control
- 2 enabling current paths,  
1 signaling current path
- Reinforced insulation
- Manually monitored and automatic activation in one device
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508

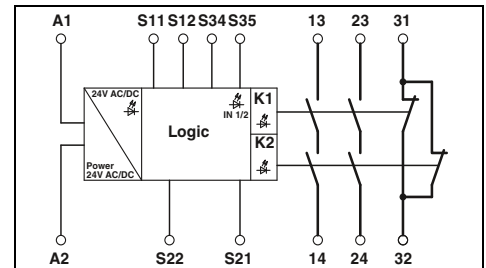
#### Notes:

Additional PSR safety relays with either automatically or manually monitored activation (PSR-ESA4 and PSR-ESM4) are available in the e-shop.

1) EMC: Class A product, see page 553



Manually monitored and automatic activation, reinforced insulation



#### Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V AC/DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	140 mA AC / 65 mA DC
Typ. response time (K1, K2) at $U_N$	20 ms (manual start) / 150 ms (automatic start)
Typ. release time (K1, K2) at $U_N$	45 ms (single-channel) / 10 ms (two-channel)
Recovery time	1 s
<b>Output data</b>	
Contact type	2 enabling current paths 1 signaling current path
Contact material	AgSnO <sub>2</sub> + 0.2 μm Au
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	6 A (N/O contact)
Max. / min. inrush current	6 A / 25 mA
Min. switching power	0.4 W
Switching capacity (360/h cycles)	6 A (24 V DC) ; 5 A (230 V AC)
Switching capacity (3600/h cycles)	3 A (24 V (DC13)) ; 3 A (230 V (AC 15))
Short-circuit protection of the output circuits	10 A gL/gG NEOZED (N/O contact), 6 A gL/gG NEOZED (N/C contact)
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	6 kV / safe isolation, increased insulation
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	22.5 mm / 112 mm / 114.5 mm
	Screw version
	Spring-cage version

#### Ordering data

<b>Description</b>	
<b>Emergency stop and safety door monitoring</b> , single and two-channel, activation: automatic and manually monitored	
With screw connection	
With spring-cage connection	

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24UC/ESAM4/2X1/1X2'1)	2900525	1
PSR-SPP- 24UC/ESAM4/2X1/1X2'1)	2900526	1



**Safety relay for two-channel emergency stop and safety door monitoring**

- Single and two-channel control
- 3 enabling current paths, 1 signaling current path
- Basic insulation
- Manually monitored and automatic activation in one device
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508

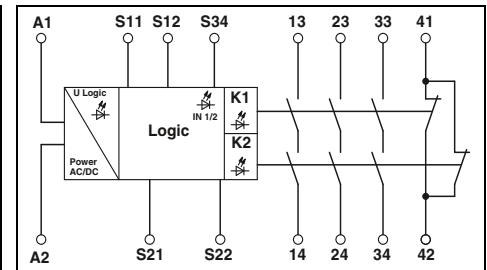
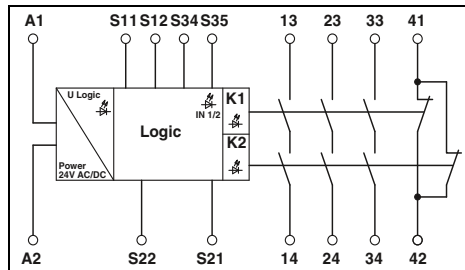


Basic insulation, 24 V AC/DC



Basic insulation, 42 - 48 V, 60 V, 120 V, 230 V AC/DC

**Notes:**  
Additional PSR safety relays with either automatically or manually monitored activation (PSR-ESA4 and PSR-ESM4) are available in the e-shop.  
1) EMC: Class A product, see page 553



<b>Input data</b>	
Nominal input voltage $U_N$	24 V AC/DC
Nominal input voltage range	-
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. power consumption (with reference to $U_N$ )	3.36 VA / 1.56 W
Typ. response time (K1, K2) at $U_N$	20 ms (man. start)
Typ. release time (K1, K2) at $U_N$	45 ms (single-channel) / 10 ms (two-channel)
<b>Recovery time</b>	
	1 s
<b>Output data</b>	
<b>Contact type</b>	
	3 enabling current paths 1 signaling current path
<b>Contact material</b>	
	AgSnO <sub>2</sub> + 0.2 μm Au
<b>Max. / min. switching voltage</b>	
	250 V AC/DC / 10 V AC/DC
<b>Limiting continuous current</b>	
	6 A (N/O contact), 5 A (N/C contact)
<b>Max. / min. inrush current</b>	
	6 A / 10 mA
<b>Min. switching power</b>	
	100 mW
<b>Switching capacity (3600/h cycles)</b>	
	6 A (24 V DC) ; 5 A (230 V AC)
<b>Switching capacity (3600/h cycles)</b>	
	3 A (24 V (DC13)) ; 3 A (230 V (AC 15))
<b>Short-circuit protection of the output circuits</b>	
	10 A gL/gG NEOZED (N/O contact), 6 A gL/gG NEOZED (N/C contact)
<b>General data</b>	
<b>Ambient temperature range</b>	
	-20 °C ... 55 °C
<b>Air and creepage distances between the circuits</b>	
	DIN EN 50178/VDE 0160
<b>Rated surge voltage / insulation</b>	
	4 kV / basic insulation, (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling current paths)
<b>Screw connection solid/stranded/AWG</b>	
	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
<b>Spring-cage connection solid/stranded/AWG</b>	
	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
<b>Dimensions</b>	
	22.5 mm / 99 mm / 114.5 mm
<b>W / H / D</b>	
	22.5 mm / 112 mm / 114.5 mm

**Technical data**

**Technical data**

<b>Technical data</b>	
	24 V AC/DC
	-
	0.85 ... 1.1
	3.36 VA / 1.56 W
	20 ms (man. start)
	45 ms (single-channel) / 10 ms (two-channel)
<b>Recovery time</b>	
	1 s
<b>Output data</b>	
<b>Contact type</b>	
	3 enabling current paths 1 signaling current path
<b>Contact material</b>	
	AgSnO <sub>2</sub> + 0.2 μm Au
<b>Max. / min. switching voltage</b>	
	250 V AC/DC / 10 V AC/DC
<b>Limiting continuous current</b>	
	6 A (N/O contact), 5 A (N/C contact)
<b>Max. / min. inrush current</b>	
	6 A / 10 mA
<b>Min. switching power</b>	
	100 mW
<b>Switching capacity (3600/h cycles)</b>	
	6 A (24 V DC) ; 5 A (230 V AC)
<b>Switching capacity (3600/h cycles)</b>	
	3 A (24 V (DC13)) ; 3 A (230 V (AC 15))
<b>Short-circuit protection of the output circuits</b>	
	10 A gL/gG NEOZED (N/O contact), 6 A gL/gG NEOZED (N/C contact)
<b>General data</b>	
<b>Ambient temperature range</b>	
	-20 °C ... 55 °C
<b>Air and creepage distances between the circuits</b>	
	DIN EN 50178/VDE 0160
<b>Rated surge voltage / insulation</b>	
	4 kV / basic insulation, (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling current paths)
<b>Screw connection solid/stranded/AWG</b>	
	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
<b>Spring-cage connection solid/stranded/AWG</b>	
	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
<b>Dimensions</b>	
	22.5 mm / 99 mm / 114.5 mm
<b>W / H / D</b>	
	22.5 mm / 112 mm / 114.5 mm

<b>Technical data</b>	
	230 V AC/DC
	42 V AC/DC ... 48 V AC/DC
	0.85 ... 1.1
	4.5 VA / 2 W
	40 ms (man. start)
	90 ms (when controlled via A1) / 20 ms (when controlled via S11/S12 and S21/S22)
	150 ms (when controlled via A1) / 20 ms (when controlled via S11/S12 and S21/S22)
<b>Recovery time</b>	
	1 s
<b>Output data</b>	
<b>Contact type</b>	
	3 enabling current paths 1 signaling current path
<b>Contact material</b>	
	AgSnO <sub>2</sub> + 0.2 μm Au
<b>Max. / min. switching voltage</b>	
	250 V AC/DC / 10 V AC/DC
<b>Limiting continuous current</b>	
	6 A (N/O contact), 5 A (N/C contact)
<b>Max. / min. inrush current</b>	
	6 A / 10 mA
<b>Min. switching power</b>	
	100 mW
<b>Switching capacity (3600/h cycles)</b>	
	6 A (24 V DC) ; 5 A (230 V AC)
<b>Switching capacity (3600/h cycles)</b>	
	3 A (24 V (DC13)) ; 3 A (230 V (AC 15))
<b>Short-circuit protection of the output circuits</b>	
	10 A gL/gG NEOZED (N/O contact), 6 A gL/gG NEOZED (N/C contact)
<b>General data</b>	
<b>Ambient temperature range</b>	
	-25 °C ... 55 °C
<b>Air and creepage distances between the circuits</b>	
	DIN EN 50178/VDE 0160
<b>Rated surge voltage / insulation</b>	
	4 kV / basic insulation, (safe isolation, reinforced insulation, and 6 kV between A1-A2/logic/enabling and signaling current paths)
<b>Screw connection solid/stranded/AWG</b>	
	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
<b>Spring-cage connection solid/stranded/AWG</b>	
	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
<b>Dimensions</b>	
	22.5 mm / 114.5 mm / 99 mm
<b>W / H / D</b>	
	22.5 mm / 114.5 mm / 112 mm

**Ordering data**

**Ordering data**

<b>Description</b>	<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
<b>Emergency stop and safety door monitoring</b> , single and two-channel, activation: automatic and manually monitored <b>with screw connection</b>	<b>PSR-SCP- 24UC/ESAM4/3X1/1X2/B<sup>1</sup>)</b>	<b>2900509</b>	<b>1</b>
24 V AC/DC nominal input voltage			
42 - 48 V AC/DC nominal input voltage			
60 V AC/DC nominal input voltage			
120 V AC/DC nominal input voltage			
230 V AC/DC nominal input voltage			
<b>Emergency stop and safety door monitoring</b> , single and two-channel, activation: automatic and manually monitored <b>with spring-cage connection</b>	<b>PSR-SPP- 24UC/ESAM4/3X1/1X2/B<sup>1</sup>)</b>	<b>2900510</b>	<b>1</b>
24 V AC/DC nominal input voltage			
42 - 48 V AC/DC nominal input voltage			
60 V AC/DC nominal input voltage			
120 V AC/DC nominal input voltage			
230 V AC/DC nominal input voltage			

<b>Description</b>	<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
<b>Emergency stop and safety door monitoring</b> , single and two-channel, activation: automatic and manually monitored <b>with screw connection</b>	<b>PSR-SCP- 24UC/ESAM4/3X1/1X2/B<sup>1</sup>)</b>	<b>2900509</b>	<b>1</b>
24 V AC/DC nominal input voltage			
42 - 48 V AC/DC nominal input voltage			
60 V AC/DC nominal input voltage			
120 V AC/DC nominal input voltage			
230 V AC/DC nominal input voltage			
<b>Emergency stop and safety door monitoring</b> , single and two-channel, activation: automatic and manually monitored <b>with spring-cage connection</b>	<b>PSR-SPP- 24UC/ESAM4/3X1/1X2/B<sup>1</sup>)</b>	<b>2900510</b>	<b>1</b>
24 V AC/DC nominal input voltage			
42 - 48 V AC/DC nominal input voltage			
60 V AC/DC nominal input voltage			
120 V AC/DC nominal input voltage			
230 V AC/DC nominal input voltage			

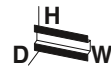
<b>Description</b>	<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
<b>Emergency stop and safety door monitoring</b> , single and two-channel, activation: automatic and manually monitored <b>with screw connection</b>	<b>PSR-SCP- 24UC/ESAM4/3X1/1X2/B<sup>1</sup>)</b>	<b>2900509</b>	<b>1</b>
24 V AC/DC nominal input voltage			
42 - 48 V AC/DC nominal input voltage			
60 V AC/DC nominal input voltage			
120 V AC/DC nominal input voltage			
230 V AC/DC nominal input voltage			
<b>Emergency stop and safety door monitoring</b> , single and two-channel, activation: automatic and manually monitored <b>with spring-cage connection</b>	<b>PSR-SPP- 24UC/ESAM4/3X1/1X2/B<sup>1</sup>)</b>	<b>2900510</b>	<b>1</b>
24 V AC/DC nominal input voltage			
42 - 48 V AC/DC nominal input voltage			
60 V AC/DC nominal input voltage			
120 V AC/DC nominal input voltage			
230 V AC/DC nominal input voltage			

## Safety devices

### Safety relay for two-channel emergency stop and safety door monitoring

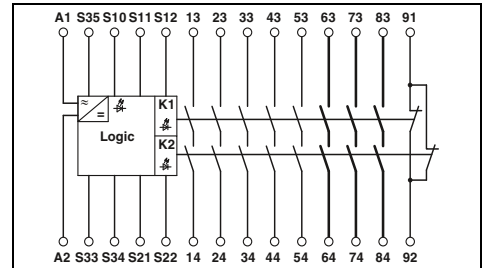
- Single and two-channel control
- 8 enabling current paths, 1 signaling current path
- Manually monitored and automatic activation in one device
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061

**Notes:**  
1) EMC: Class A product, see page 553



**Reinforced insulation, 8 enabling current paths**

BG ETEM



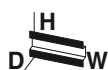
Input data	
Nominal input voltage $U_N$	24 V AC/DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	210 mA AC / 120 mA DC
Typ. response time (K1, K2) at $U_N$	60 ms (man. start) / 250 ms (auto-start)
Typ. release time (K1, K2) at $U_N$	20 ms
Recovery time	1 s
Output data	
Contact type	8 enabling current paths 1 signaling current path
Contact material	AgSnO <sub>2</sub> + 0.2 μm Au
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	6 A
Max. / min. inrush current	6 A / 25 mA
Min. switching power	0.4 W
Switching capacity (360/h cycles)	4 A (24 V DC) ; 4 A (230 V AC)
Switching capacity (3600/h cycles)	2.5 A (24 V (DC13)) ; 3 A (230 V (AC 15))
Short-circuit protection of the output circuits	6 A fast-blow, C6 (24 V AC/DC) automatic device
General data	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / Basic insulation, (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling current paths (63/64, 73/74, 83/84) and between 63/64, 73/74, 83/84 between each other.)
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	45 mm / 99 mm / 114.5 mm
W / H / D	45 mm / 112 mm / 114.5 mm

Technical data		
24 V AC/DC		
0.85 ... 1.1		
210 mA AC / 120 mA DC		
60 ms (man. start) / 250 ms (auto-start)		
20 ms		
1 s		
8 enabling current paths 1 signaling current path		
AgSnO <sub>2</sub> + 0.2 μm Au		
250 V AC/DC / 15 V AC/DC		
6 A		
6 A / 25 mA		
0.4 W		
4 A (24 V DC) ; 4 A (230 V AC)		
2.5 A (24 V (DC13)) ; 3 A (230 V (AC 15))		
6 A fast-blow, C6 (24 V AC/DC) automatic device		
-20 °C ... 55 °C		
DIN EN 50178/VDE 0160		
4 kV / Basic insulation, (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling current paths (63/64, 73/74, 83/84) and between 63/64, 73/74, 83/84 between each other.)		
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12		
0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16		
45 mm / 99 mm / 114.5 mm		
45 mm / 112 mm / 114.5 mm		

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>Emergency stop and safety door monitoring</b> , single and two-channel, with/without cross-circuit detection, activation: manually monitored and automatic		
With screw connection	<b>PSR-SCP- 24UC/ESAM4/8X1/1X2<sup>1</sup></b>	1
With spring-cage connection	<b>PSR-SPP- 24UC/ESAM4/8X1/1X2<sup>1</sup></b>	1

Safety relay with time functions

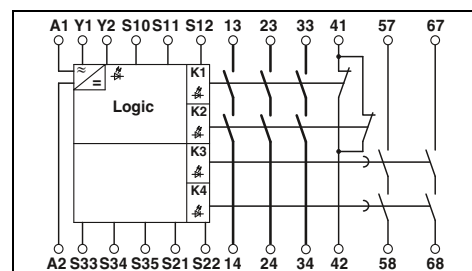
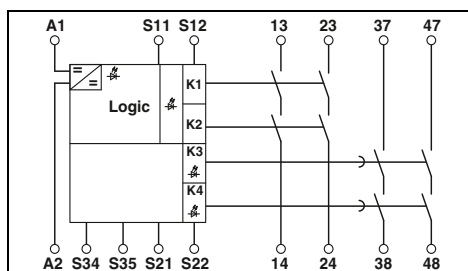
- For emergency stop and safety door monitoring and for evaluation of light grids (suitable light grids on request)
- Single and two-channel control
- Manually monitored and automatic activation
- Max. 3 undelayed and 2 dropout delayed contacts
- Delay times delay from 0.1 s to 30 s (PSR-ESD-30) or 0.2 s to 300 s (PSR-ESD-300)
- Protection labels against manipulation of the set time (PSR-ESD-300) or electronic manipulation protection (PSR-ESD-30)
- Up to Cat. 3/4 and PL d/e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508



Adjustable release delay time  
0.1 - 30 s



Adjustable release delay time  
0.2 - 300 s



Notes:  
1) EMC: Class A product, see page 553

Input data

Nominal input voltage  $U_N$   
Permissible range (with reference to  $U_N$ )  
Typ. current consumption (with reference to  $U_N$ )  
Typ. response time (K1, K2) at  $U_N$   
Typ. release time (K1, K2) at  $U_N$

Typ. release time range  
Recovery time

Output data

Contact type  
Contact material  
Max. / min. switching voltage  
Limiting continuous current  
Max. / min. inrush current  
Min. switching power  
Switching capacity (3600/h cycles)  
Switching capacity (3600/h cycles)  
Short-circuit protection of the output circuits

General data

Ambient temperature range  
Air and creepage distances between the circuits  
Rated surge voltage / insulation

Screw connection solid/stranded/AWG  
Spring-cage connection solid/stranded/AWG  
Dimensions  
W / H / D

Technical data

24 V DC  
0.85 ... 1.1  
75 mA DC  
150 ms (monitored/manual and auto-start)  
20 ms (undelayed contacts) / 100 ms (delayed contacts)

0.1 s ... 30 s  
330 ms (restart)

2 undelayed enabling current paths  
2 enabling current paths delayed  
AgSnO<sub>2</sub>  
250 V AC/DC / 15 V AC/DC  
6 A (N/O contact)  
6 A / 25 mA  
0.4 W  
(on request) ; -  
3 A (24 V (DC13)) ; 3 A (230 V (AC15))  
10 A gL/gG NEOZED (N/O contact)

-20 °C ... 45 °C  
DIN EN 60947-1  
4 kV / basic insulation

0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
0.2 - 1.5 mm<sup>2</sup> / 0.2 - 1.5 mm<sup>2</sup> / 24 - 16  
22.5 mm / 99 mm / 114.5 mm  
22.5 mm / 112 mm / 114.5 mm

Technical data

24 V DC  
0.85 ... 1.1  
155 mA DC  
70 ms (manual start) / 600 ms (auto-start)  
20 ms (undelayed contacts)

0.2 s ... 300 s  
1 s

3 enabling current paths undelayed  
2 enabling current paths delayed  
AgSnO<sub>2</sub>  
250 V AC/DC / 15 V AC/DC  
6 A (N/O contact), 3 A (N/C contact)  
6 A / 25 mA  
0.4 W  
4 A (24 V DC) ; 4 A (230 V AC)  
2.5 A (24 V (DC13)) ; 3 A (230 V (AC15))  
6 A fast-blow (undelayed), 10 A gL/gG NEOZED (delayed)

-20 °C ... 55 °C  
DIN EN 50178/VDE 0160  
4 kV / basic insulation, (safe isolation, reinforced insulation, and 6 kV between the enabling current paths (13/14, 23/24, 33/34) and the remaining current paths and between 13/14, 23/24, 33/34 between each other.)

0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
0.2 - 1.5 mm<sup>2</sup> / 0.2 - 1.5 mm<sup>2</sup> / 24 - 16  
45 mm / 99 mm / 114.5 mm  
45 mm / 112 mm / 114.5 mm

Description

**Emergency stop, safety door and light grid monitoring**, with delayed and undelayed contacts, single and two-channel, adjustable from 0.1 s to 30 s, with/without cross-circuit detection, activation: manually monitored and automatic

With screw connection  
With spring-cage connection

**Emergency stop and safety door monitoring**, with delayed and undelayed contacts, single and two-channel, adjustable from 0.2 s to 300 s, with/without cross-circuiting detection, activation: manually monitored and automatic

With screw connection  
With spring-cage connection

Ordering data

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/ESD/4X1/30 <sup>1)</sup>	2981800	1
PSR-SPP- 24DC/ESD/4X1/30 <sup>1)</sup>	2981813	1

Ordering data

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/ESD/5X1/1X2/300 <sup>1)</sup>	2981428	1
PSR-SPP- 24DC/ESD/5X1/1X2/300 <sup>1)</sup>	2981431	1

# Functional safety

## Safety devices

### Safety relay with time functions

- For emergency stop and safety door monitoring and for evaluation of light grids (suitable light grids on request)
- Single and two-channel control
- Manually monitored and automatic activation
- 3 undelayed and 2 dropout delayed contacts
- Fixed delay times of 0.5 s ... 30 s (see ordering data)
- Up to Cat. 3/4 and PL d/e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508

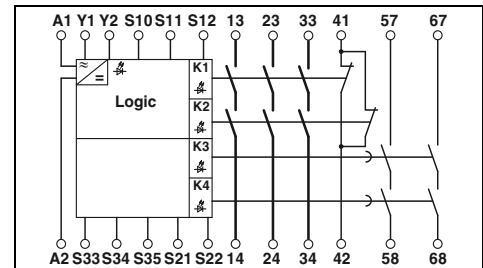
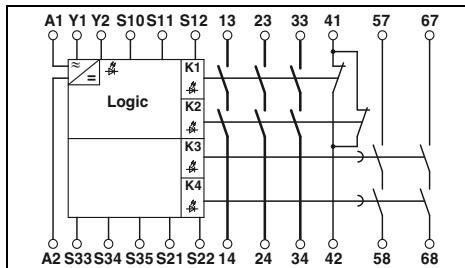


Fixed release delay time (versions), screw connection



Fixed release delay time (versions), spring-cage connection

<b>Notes:</b>
Other time options available on request
1) EMC: Class A product, see page 553



#### Input data

Nominal input voltage  $U_N$   
 Permissible range (with reference to  $U_N$ )  
 Typ. current consumption (with reference to  $U_N$ )  
 Typ. response time (K1, K2) at  $U_N$   
 Typ. release time (K1, K2) at  $U_N$   
 Recovery time

#### Output data

Contact type

#### Contact material

Max. / min. switching voltage  
 Limiting continuous current  
 Max. / min. inrush current  
 Min. switching power  
 Switching capacity (360/h cycles)  
 Switching capacity (3600/h cycles)  
 Short-circuit protection of the output circuits

#### General data

Ambient temperature range  
 Air and creepage distances between the circuits  
 Rated surge voltage / insulation

#### Dimensions

Screw connection solid/stranded/AWG

#### Technical data

24 V DC  
 0.85 ... 1.1  
 150 mA DC  
 70 ms (manual start) / 600 ms (auto-start)  
 20 ms (undelayed contacts)  
 1 s

3 enabling current paths undelayed  
 2 enabling current paths delayed  
 1 signaling current path undelayed  
 AgSnO<sub>2</sub>  
 250 V AC/DC / 15 V AC/DC  
 6 A  
 6 A / 25 mA  
 0.4 W  
 4 A (24 V DC) ; 4 A (230 V AC)  
 2.5 A (24 V (DC13)) ; 3 A (230 V (AC 15))  
 6 A fast-blow (undelayed),  
 C6 (24 V AC/DC) automatic device (undelayed),  
 10 A gL/gG NEOZED (delayed)

-20 °C ... 55 °C  
 DIN EN 50178/VDE 0160  
 4 kV / basic isolation, (safe isolation, reinforced insulation, and 6 kV between the enabling current paths (13/14, 23/24, 33/34) and the remaining current paths and between 13/14, 23/24, 33/34 between each other.)

45 mm / 99 mm / 114.5 mm  
 0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12

#### Technical data

24 V DC  
 0.85 ... 1.1  
 150 mA DC  
 70 ms (manual start) / 600 ms (auto-start)  
 20 ms (undelayed contacts)  
 1 s

3 enabling current paths undelayed  
 2 enabling current paths delayed  
 1 signaling current path undelayed  
 AgSnO<sub>2</sub>  
 250 V AC/DC / 15 V AC/DC  
 6 A  
 6 A / 25 mA  
 0.4 W  
 4 A (24 V DC) ; 4 A (230 V AC)  
 2.5 A (24 V (DC13)) ; 3 A (230 V (AC 15))  
 6 A fast-blow (undelayed),  
 C6 (24 V AC/DC) automatic device (undelayed),  
 10 A gL/gG NEOZED (delayed)

-20 °C ... 55 °C  
 DIN EN 50178/VDE 0160  
 4 kV / basic isolation, (safe isolation, reinforced insulation, and 6 kV between the enabling current paths (13/14, 23/24, 33/34) and the remaining current paths and between 13/14, 23/24, 33/34 between each other.)

45 mm / 112 mm / 114.5 mm  
 0.2 - 1.5 mm<sup>2</sup> / 0.2 - 1.5 mm<sup>2</sup> / 24 - 16

#### Ordering data

#### Description

**Emergency stop and safety door monitoring**  
 Delay time 0.5 s  
 Delay time 1 s  
 Delay time 3 s  
 Delay time 5 s  
 Delay time 10 s  
 Delay time 30 s

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/ESD/5X1/1X2/0T 5 <sup>1</sup> )	2981101	1
PSR-SCP- 24DC/ESD/5X1/1X2/ T 1 <sup>1</sup> )	2981143	1
PSR-SCP- 24DC/ESD/5X1/1X2/ T 3 <sup>1</sup> )	2981224	1
PSR-SCP- 24DC/ESD/5X1/1X2/ T 5 <sup>1</sup> )	2981266	1
PSR-SCP- 24DC/ESD/5X1/1X2/ T10 <sup>1</sup> )	2981088	1
PSR-SCP- 24DC/ESD/5X1/1X2/ T30 <sup>1</sup> )	2981347	1

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSR-SPP- 24DC/ESD/5X1/1X2/0T 5 <sup>1</sup> )	2981130	1
PSR-SPP- 24DC/ESD/5X1/1X2/ T 1 <sup>1</sup> )	2981156	1
PSR-SPP- 24DC/ESD/5X1/1X2/ T 3 <sup>1</sup> )	2981237	1
PSR-SPP- 24DC/ESD/5X1/1X2/ T 5 <sup>1</sup> )	2981279	1
PSR-SPP- 24DC/ESD/5X1/1X2/ T10 <sup>1</sup> )	2981091	1
PSR-SPP- 24DC/ESD/5X1/1X2/ T30 <sup>1</sup> )	2981350	1

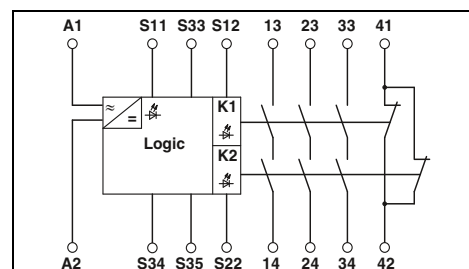
### Safety relay for light grid, emergency stop and safety door monitoring

- Single and two-channel control
- Manually monitored and automatic activation
- 1 enabling and 1 signaling current path
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508

<b>Notes:</b>
The PSR-SDC4 is also suitable for light grid monitoring, see page 81
1) EMC: Class A product, see page 553



Also ideal for light grid monitoring



#### Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V AC/DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	150 mA AC / 70 mA DC
Typ. response time (K1, K2) at $U_N$	25 ms (manual start) / 100 ms (automatic start)
Typ. release time (K1, K2) at $U_N$	10 ms
Recovery time	1 s
<b>Output data</b>	
Contact type	3 enabling current paths 1 signaling current path
Contact material	AgSnO <sub>2</sub> , + 0.2 μm Au
Max. / min. switching voltage	250 V / 15 V AC/DC
Limiting continuous current	6 A
Max. / min. inrush current	6 A / 25 mA
Min. switching power	0.4 W
Switching capacity (360/h cycles)	6 A (24 V DC) ; 5 A (230 V AC)
Switching capacity (3600/h cycles)	3 A (24 V (DC13)) ; 3 A (230 V (AC 15))
Short-circuit protection of the output circuits	10 A gL/gG NEOZED (N/O contact)
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / basic isolation, (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling current paths)
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	22.5 mm / 112 mm / 114.5 mm
	Screw version
	Spring-cage version

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Optical data link emergency stop and safety door monitoring,</b> single and two-channel, activation: manually monitored and automatic			
With screw connection	PSR-SCP- 24UC/ESL4/3X1/1X2/B1)	2981059	1
With spring-cage connection	PSR-SPP- 24UC/ESL4/3X1/1X2/B1)	2981062	1

## Safety devices

### Safety relays for two-hand controls and for safety door monitoring

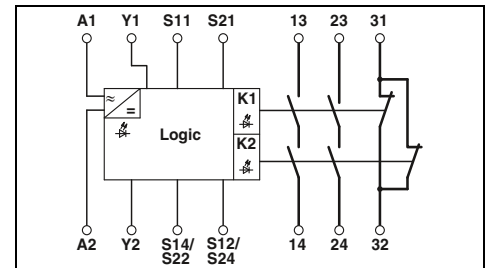
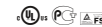
- Two-channel control
- Automatic activation
- For two-hand control devices as per EN 574 type IIIC
- Concurrence monitoring < 0.5 s
- 2 enabling and 1 signaling current path
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508

#### Notes:

1) EMC: Class A product, see page 553



Also ideal for two-hand controls



#### Technical data

##### Input data

Nominal input voltage  $U_N$   
 Permissible range (with reference to  $U_N$ )  
 Typ. current consumption (with reference to  $U_N$ )  
 Typ. response time (K1, K2) at  $U_N$   
 Typ. release time (K1, K2) at  $U_N$   
 Recovery time

24 V AC/DC  
 0.85 ... 1.1  
 125 mA AC / 60 mA DC  
 50 ms  
 20 ms  
 1 s

##### Output data

Contact type  
 Contact material  
 Max. / min. switching voltage  
 Limiting continuous current  
 Max. / min. inrush current  
 Min. switching power  
 Switching capacity (360/h cycles)  
 Switching capacity (3600/h cycles)  
 Short-circuit protection of the output circuits

2 enabling current paths  
 1 signaling current path  
 AgSnO<sub>2</sub> + 0.2 μm Au  
 250 V AC/DC / 15 V AC/DC  
 6 A  
 6 A / 25 mA  
 0.4 W  
 4 A (24 V DC) ; 4 A (230 V AC)  
 2.5 A (24 V (DC13)) ; 3 A (230 V (AC 15))  
 10 A gL/gG NEOZED (N/O contact),  
 6 A gL/gG NEOZED (N/C contact)

##### General data

Ambient temperature range  
 Air and creepage distances between the circuits  
 Rated surge voltage / insulation

-20 °C ... 55 °C  
 DIN EN 50178/VDE 0160  
 6 kV / safe isolation, increased insulation

Screw connection solid/stranded/AWG  
 Spring-cage connection solid/stranded/AWG  
 Dimensions  
 W / H / D

Screw version  
 Spring-cage version

0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
 0.2 - 1.5 mm<sup>2</sup> / 0.2 - 1.5 mm<sup>2</sup> / 24 - 16  
 22.5 mm / 99 mm / 114.5 mm  
 22.5 mm / 112 mm / 114.5 mm

#### Ordering data

##### Description

**Two-hand control units and safety door monitoring**, two-channel, with cross-circuiting detection, activation: automatic

With screw connection  
 With spring-cage connection

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24UC/THC4/2X1/1X2 <sup>1</sup> )	2963721	1
PSR-SPP- 24UC/THC4/2X1/1X2 <sup>1</sup> )	2963983	1

Extension module

- Single and two-channel control
- 5 enabling, 1 signaling, and 1 confirmation current path
- Option of basic insulation or reinforced insulation
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508

**Notes:**  
1) EMC: Class A product, see page 553

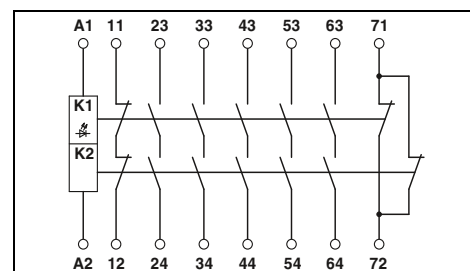
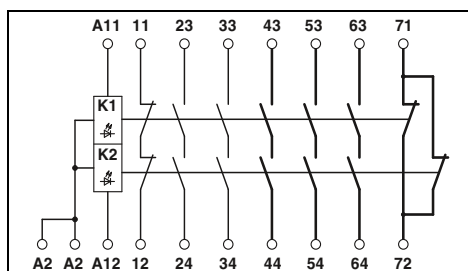


Contact extension with reinforced insulation



Contact extension with basic insulation

Applied for: functional safety



Technical data

Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V AC/DC
Permissible range (with reference to $U_N$ )	0.8 ... 1.1
Typ. current consumption (with reference to $U_N$ )	47 mA (per channel)
Typ. response time (K1, K2) at $U_N$	20 ms
Typ. release time (K1, K2) at $U_N$	20 ms
<b>Output data</b>	
<b>Contact type</b>	
Contact material	5 enabling current paths
Max. / min. switching voltage	1 signaling current path
Limiting continuous current	1 confirmation current path
Max. / min. inrush current	AgSnO <sub>2</sub> + 0.2 μm Au
Min. switching power	250 V AC/DC / 15 V AC/DC
Switching capacity (360/h cycles)	6 A (N/O contact), 3 A (N/C contact 11/12)
Switching capacity (3600/h cycles)	6 A, 3 A (N/C contact 11/12) / 25 mA
Short-circuit protection of the output circuits	0.4 W
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / basic insulation, (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling current paths (43/44, 53/54, 63/64, 71/72) and between 43/44, 53/54, 63/64, 71/72 each other)
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	35 mm / 99 mm / 114.5 mm
W / H / D	35 mm / 112 mm / 114.5 mm

<b>Technical data</b>	
Nominal input voltage $U_N$	24 V AC/DC
Permissible range (with reference to $U_N$ )	0.8 ... 1.1
Typ. current consumption (with reference to $U_N$ )	92 mA
Typ. response time (K1, K2) at $U_N$	20 ms
Typ. release time (K1, K2) at $U_N$	20 ms
<b>Output data</b>	
<b>Contact type</b>	
Contact material	5 enabling current paths
Max. / min. switching voltage	1 signaling current path
Limiting continuous current	1 confirmation current path
Max. / min. inrush current	AgSnO <sub>2</sub> + 0.2 μm Au
Min. switching power	250 V AC/DC / 15 V AC/DC
Switching capacity (360/h cycles)	6 A (N/O contact), 3 A (N/C contact)
Switching capacity (3600/h cycles)	6 A (N/O contact), 3 A (N/C contact) / 25 mA
Short-circuit protection of the output circuits	0.4 W
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / basic isolation (safe isolation, increased isolation and 6 kV between A1/A2, 11/12, 23/24, 71/72 and 33/34, 43/44, 53/54, 63/64)
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	22.5 mm / 112 mm / 114.5 mm

Ordering data

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Extension module</b> with single or two-channel control			
With screw connection	PSR-SCP- 24UC/URM4/5X1/2X2	2963734	1
With spring-cage connection	PSR-SPP- 24UC/URM4/5X1/2X2	2964005	1
<b>Extension module</b> , with single-channelcontrol			
With screw connection			
With spring-cage connection			

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24UC/URM4/5X1/2X2/B <sup>1</sup>	2981033	1
PSR-SPP- 24UC/URM4/5X1/2X2/B <sup>1</sup>	2981046	1

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24UC/URM4/5X1/2X2/B <sup>1</sup>	2981033	1
PSR-SPP- 24UC/URM4/5X1/2X2/B <sup>1</sup>	2981046	1



### Extension module

- Contact extension for light grids with OSSD signals
- 3 enabling current paths, 1 signaling current path
- Basic insulation
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061

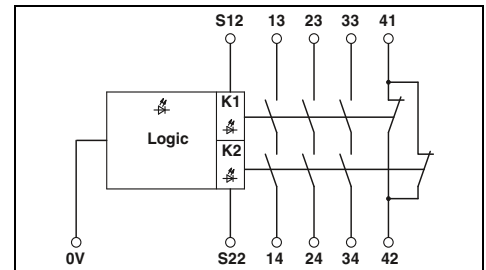
**Notes:**  
1) EMC: Class A product, see page 553



N

Contact extension for light grid

FA



Input data	
Nominal input voltage $U_N$	24 V DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	70 mA DC
Typ. response time (K1, K2) at $U_N$	25 ms (man. start)
Typ. release time (K1, K2) at $U_N$	10 ms
Output data	
Contact type	3 enabling current paths 1 signaling current path
Contact material	AgSnO <sub>2</sub>
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	6 A (N/C contact / N/O contact)
Max. / min. inrush current	6 A / 25 mA
Min. switching power	0.4 W
Switching capacity (360/h cycles)	6 A (24 V DC) ; 5 A (230 V AC)
Switching capacity (3600/h cycles)	3 A (24 V (DC13)) ; 3 A (230 V (AC 15))
Short-circuit protection of the output circuits	10 A gL/gG NEOZED (N/O contact), 4 A gL/gG NEOZED (signaling current path)
General data	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / basic insulation, (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling current paths)
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	Screw version Spring-cage version

### Technical data

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSR-SCP-24DC/URML4/3X1/1X2/B <sup>1</sup> )	2903583	1
PSR-SPP-24DC/URML4/3X1/1X2/B <sup>1</sup> )	2903584	1

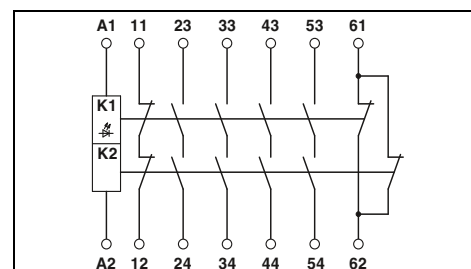
Description
<b>Extension module</b> , for electrosensitive protective equipment, with single or two-channel control
With screw connection
With spring-cage connection

## Extension module

- Contact extension with 42 ... 230 V wide range input
- 4 enabling current paths, 1 confirmation current path, 1 signaling current path
- Basic insulation
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061

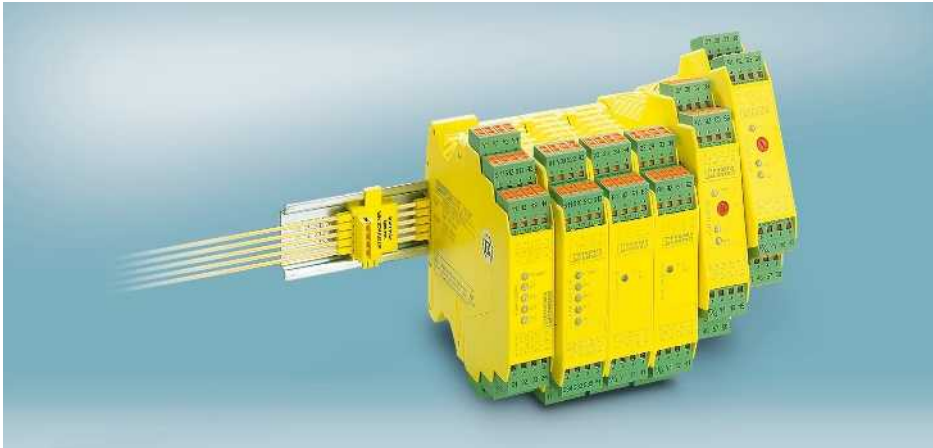


Contact extension with wide range input



## Technical data

<b>Input data</b>		
Nominal input voltage range		42 V AC/DC ... 230 V AC/DC
Permissible range (with reference to $U_N$ )		0.85 ... 1.1
Typ. release time (K1, K2) at $U_N$		20 ms (Control via A1 at 42 V DC) / 20 ms (Control via A1 at 48 V DC)
<b>Output data</b>		
Contact type		4 enabling current paths 1 signaling current path 1 confirmation current path
Contact material		AgSnO <sub>2</sub> , + 0.2 μm Au
Max. / min. switching voltage		250 V AC/DC / 15 V AC/DC
Limiting continuous current		6 A (N/O contact), 6 A (N/C contact)
Max. / min. inrush current		8 A / 25 mA
Min. switching power		0.4 W
Switching capacity (360/h cycles)		4 A (24 V (DC13)) ; 4 A (230 V (AC 15))
Switching capacity (3600/h cycles)		2.5 A (24 V (DC13)) ; 3 A (230 V (AC 15))
Short-circuit protection of the output circuits		6 A gL/gG NEOZED (enabling current paths), 6 A gL/gG NEOZED (enabling current paths), (Miniature circuit breaker C6 (24 V / 20 A power supply unit))
<b>General data</b>		
Ambient temperature range		-20 °C ... 55 °C
Air and creepage distances between the circuits		DIN EN 50178/VDE 0160
Rated surge voltage / insulation		4 kV/basic isolation (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling, signaling and confirmation current paths)
Screw connection solid/stranded/AWG		0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG		0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	Screw version	22.5 mm / 99 mm / 114.5 mm
W / H / D	Spring-cage version	22.5 mm / 112 mm / 114.5 mm
<b>Ordering data</b>		
<b>Description</b>	<b>Type</b>	<b>Order No.</b> <b>Pcs. / Pkt.</b>
<b>Extension module, with wide range input</b>		
With screw connection	PSR-SCP-42-230UC/URM4/4X1/2X2B	2902935 1
With spring-cage connection	PSR-SPP-42-230UC/URM4/4X1/2X2B	2902936 1



The PSR safety relay system reduces planning effort, simplifies wiring, and minimizes storage costs.

The PSR-SDC4 multifunctional master (can also be used as a stand-alone component) monitors the various safety-related signals - without the need for programming or additional switch settings. The relevant safety equipment (emergency stop buttons, safety door/solenoid switches, and light grids) is simply connected to the module.

If required, the PSR-URM4/B and PSR-URD3 extension devices can be used to integrate additional undelayed and dropout delayed contacts via the PSR-TBUS DIN rail connector.

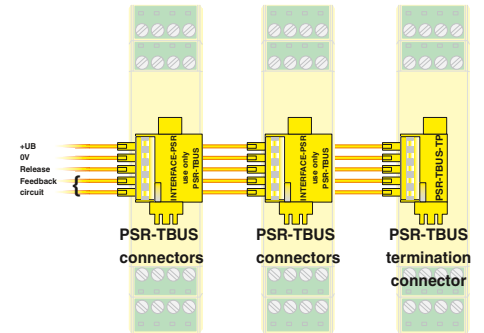
The PSR-SIM4 interface module and PSR-SACB sensor box are suitable for wiring several safety switches with N/C or N/O contacts (e.g., in the case of multiple safety doors or safety flaps). The individual switches are automatically linked to one another and connected to the PSR-SDC4 master.

Additional signal outputs enable precise diagnostics.

- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508 (extension modules with adjustable release time up to Cat. 3/PL d according to EN ISO 13849-1, SILCL 2 according to IEC 62061, SIL 2 according to IEC 61508)

#### Notes:

1) EMC: Class A product, see page 553



The TBUS connectors carry out the cross-wiring between the modules.

#### Input data

Nominal input voltage  $U_N$   
Permissible range (with reference to  $U_N$ )  
Typ. current consumption (with reference to  $U_N$ )  
Typ. response time (K1, K2) at  $U_N$

Typ. release time (K1, K2) at  $U_N$   
Typ. release time range

Recovery time

#### Output data

Contact type

Contact material

Max. / min. switching voltage

Limiting continuous current

Max. / min. inrush current

Min. switching power

Switching capacity (360/h cycles)

Switching capacity (3600/h cycles)

Short-circuit protection of the output circuits

#### General data

Ambient temperature range

Air and creepage distances between the circuits

Rated surge voltage / insulation

Screw connection solid/stranded/AWG

Spring-cage connection solid/stranded/AWG

Dimensions

W / H / D

Screw version

Spring-cage version

#### Description

**Master module for emergency stop, protective door, light grid and magnetic switch**, single-channel and two-channel, with/without cross-circuit detection, activation: manually monitored and automatic

With screw connection

With spring-cage connection

**Extension module**, with single-channel control

With screw connection

With spring-cage connection

**PSR-TBUS DIN rail connector**, for supplying/controlling/monitoring (depending on the module)

**PSR TBUS dummy plug**



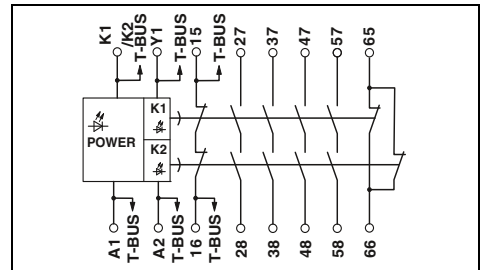
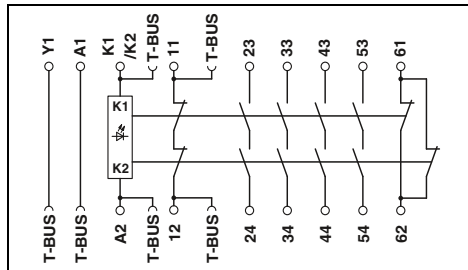
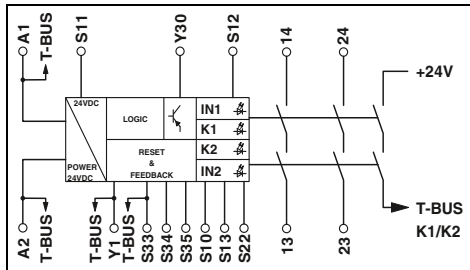
Multifunctional master module



Extension module with 4 additional enabling current paths



Extension module with dropout delayed contacts (adjustable up to a max. of 3 s)



**Technical data**

**Technical data**

**Technical data**

24 V DC  
0.85 ... 1.1  
70 mA  
20 ms (manual start) / 150 ms (automatic start)

10 ms  
-  
1 s

2 enabling current paths  
1 semiconductor signaling output  
AgSnO<sub>2</sub>  
250 V AC/DC / 15 V AC/DC  
6 A (N/O contact), 100 mA (signal output)  
6 A / 25 mA  
0.4 W  
6 A (24 V DC) ; 5 A (230 V (AC15))  
3 A (24 V (DC13)) ; 3 A (230 V (AC15))  
10 A gL/gG NEOZED (N/O contact),  
(Miniature circuit breaker C6 (24 V / 20 A power supply unit))

-20 °C ... 55 °C  
DIN EN 50178/VDE 0160  
4 kV / basic isolation, (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling current paths)

0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
0.2 - 1.5 mm<sup>2</sup> / 0.2 - 1.5 mm<sup>2</sup> / 24 - 16  
22.5 mm / 99 mm / 114.5 mm  
22.5 mm / 112 mm / 114.5 mm

24 V DC  
0.9 ... 1.1  
42 mA  
10 ms

10 ms  
-  
1 s

4 enabling current paths  
1 signaling current path  
AgSnO<sub>2</sub>  
250 V AC/DC / 15 V AC/DC  
6 A (N/O contact), 3 A (N/C contact)  
6 A (N/O contact), 3 A (N/C contact) / 25 mA  
0.4 W  
6 A (24 V DC) ; 5 A (230 V AC)  
3 A (24 V (DC13)) ; 3 A (230 V (AC15))  
10 A gL/gG NEOZED (N/O contact),  
4 A gL/gG NEOZED (N/C contact)

-20 °C ... 55 °C  
DIN EN 50178/VDE 0160  
4 kV / basic isolation (safe isolation, reinforced insulation, and 6 kV between input circuit/N/C contacts and enabling current paths).

0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
0.2 - 1.5 mm<sup>2</sup> / 0.2 - 1.5 mm<sup>2</sup> / 24 - 16  
22.5 mm / 99 mm / 114.5 mm  
22.5 mm / 112 mm / 114.5 mm

24 V DC  
0.85 ... 1.1  
84 mA  
20 ms

-  
0.3 s ... 3 s  
1 s

4 delayed enabling current paths  
1 delayed signaling current path  
AgSnO<sub>2</sub>  
250 V AC/DC / 15 V AC/DC  
6 A (N/O contact), 3 A (N/C contact)  
6 A (N/O contact), 3 A (N/C contact) / 25 mA  
0.4 W  
6 A (24 V DC) ; 5 A (230 V AC)  
3 A (24 V (DC13)) ; 3 A (230 V (AC15))  
10 A gL/gG NEOZED (N/O contact),  
4 A gL/gG NEOZED (N/C contact)

-20 °C ... 55 °C  
DIN EN 50178/VDE 0160  
4 kV / basic isolation (safe isolation, reinforced insulation, and 6 kV between input circuit/N/C contacts and enabling current paths).

0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
0.2 - 1.5 mm<sup>2</sup> / 0.2 - 1.5 mm<sup>2</sup> / 24 - 16  
22.5 mm / 99 mm / 114.5 mm  
22.5 mm / 112 mm / 114.5 mm

**Ordering data**

**Ordering data**

**Ordering data**

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/SDC4/2X1/B <sup>1)</sup>	2981486	1
PSR-SPP- 24DC/SDC4/2X1/B <sup>1)</sup>	2981499	1

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/URM4/4X1/2X2/B	2981677	1
PSR-SPP- 24DC/URM4/4X1/2X2/B	2981680	1

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/URD3/4X1/2X2/3 <sup>1)</sup>	2981732	1
PSR-SPP- 24DC/URD3/4X1/2X2/3 <sup>1)</sup>	2981745	1

**Accessories**

**Accessories**

**Accessories**

PSR-TBUS	2890425	50
PSR-TBUS-TP	2981716	50

PSR-TBUS	2890425	50
PSR-TBUS-TP	2981716	50

PSR-TBUS	2890425	50
PSR-TBUS-TP	2981716	50

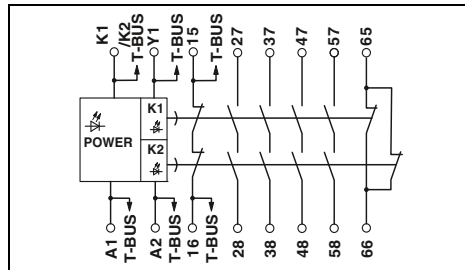
### Modular safety relay system

- Single-channel control
- With 4 enabling, 1 signaling and 1 confirmation current path each, all dropout delayed
- Up to Cat. 3/PL d according to EN ISO 13849-1, SILCL 2 according to IEC 62061, SIL 2 according to IEC 61508

**Notes:**  
1) EMC: Class A product, see page 553



**Extension module with dropout delayed contacts (adjustable up to a max. of 30 s)**



#### Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	84 mA
Typ. response time (K1, K2) at $U_N$	20 ms
Typ. release time (K1, K2) at $U_N$	-
Typ. release time range	0.5 s ... 38 s $\pm$ 20% (BG rating to max. 30 s)
<b>Recovery time</b>	1 s
<b>Output data</b>	
Contact type	4 delayed enabling current paths 1 delayed signaling current path 1 delayed confirmation current path
Contact material	AgSnO <sub>2</sub>
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	6 A (N/O contact), 3 A (N/C contact)
Max. / min. inrush current	6 A (N/O contact), 3 A (N/C contact) / 25 mA
Min. switching power	0.4 W
Switching capacity (3600/h cycles)	6 A (24 V DC) ; 5 A (230 V AC)
Switching capacity (3600/h cycles)	3 A (24 V (DC13)) ; 3 A (230 V (AC15))
Short-circuit protection of the output circuits	10 A gL/gG NEOZED (N/O contact), 4 A gL/gG NEOZED (N/C contact)
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / basic isolation (safe isolation, reinforced insulation, and 6 kV between input circuit/N/C contacts and enabling current paths).
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	Screw version: 22.5 mm / 112 mm / 114.5 mm Spring-cage version: 22.5 mm / 112 mm / 114.5 mm

#### Ordering data

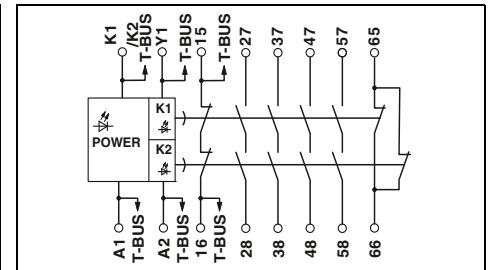
Description	Type	Order No.	Pcs. / Pkt.
<b>Extension module</b> with drop-out delayed contacts, single-channel control			
With screw connection	PSR-SCP- 24DC/URD3/4X1/2X2 <sup>1</sup> )	2981512	1
With spring-cage connection	PSR-SPP- 24DC/URD3/4X1/2X2 <sup>1</sup> )	2981525	1

#### Accessories

<b>PSR-TBUS DIN rail connector</b> , for supplying/controlling/monitoring (depending on the module)	PSR-TBUS	2890425	50
<b>PSR TBUS dummy plug</b>	PSR-TBUS-TP	2981716	50



**Extension module with dropout delayed contacts (permanently set to 2 seconds)**



#### Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	84 mA
Typ. response time (K1, K2) at $U_N$	20 ms
Typ. release time (K1, K2) at $U_N$	2 s
Typ. release time range	-
<b>Recovery time</b>	1 s
<b>Output data</b>	
Contact type	4 delayed enabling current paths 1 delayed signaling current path 1 delayed confirmation current path
Contact material	AgSnO <sub>2</sub>
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	6 A (N/O contact), 3 A (N/C contact)
Max. / min. inrush current	6 A (N/O contact), 3 A (N/C contact) / 25 mA
Min. switching power	0.4 W
Switching capacity (3600/h cycles)	6 A (24 V DC) ; 5 A (230 V AC)
Switching capacity (3600/h cycles)	3 A (24 V (DC13)) ; 3 A (230 V (AC15))
Short-circuit protection of the output circuits	10 A gL/gG NEOZED (N/O contact), 4 A gL/gG NEOZED (N/C contact)
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / basic isolation (safe isolation, reinforced insulation, and 6 kV between input circuit/N/C contacts and enabling current paths).
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	22.5 mm / 112 mm / 114.5 mm

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Extension module</b> with drop-out delayed contacts, single-channel control			
With screw connection	PSR-SCP- 24DC/URD3/4X1/2X2/T 2 <sup>1</sup> )	2981703	1
With spring-cage connection	PSR-SPP- 24DC/URD3/4X1/2X2/T 2 <sup>1</sup> )	2981729	1

#### Accessories

<b>PSR-TBUS DIN rail connector</b> , for supplying/controlling/monitoring (depending on the module)	PSR-TBUS	2890425	50
<b>PSR TBUS dummy plug</b>	PSR-TBUS-TP	2981716	50

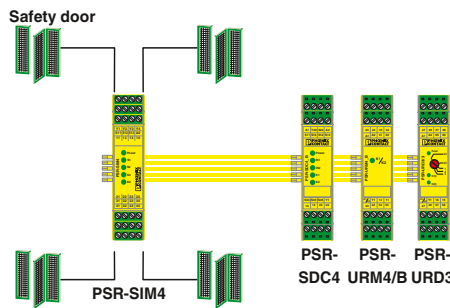
### Modular safety relay system

In machines and systems, connecting several two-channel safety switches to the evaluating safety relay is often time-consuming and requires a lot of wiring.

The PSR-SIM4 interface module can be used to connect up to two safety sensors or switches with one N/O or N/C combination each to the PSR-SDC4 safety relay easily and conveniently.

If more than four safety switches are required, several PSR-SIM4 modules can be quickly and easily interconnected via the PSR-TBUS DIN rail connector and evaluated by the PSR-SDC4 master safety relay.

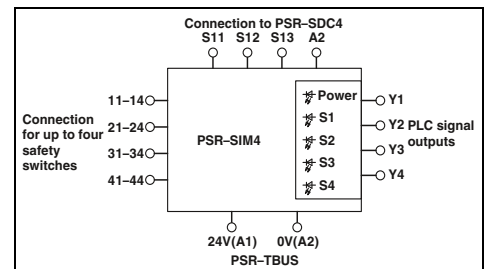
- Four two-channel N/O or N/C inputs
- Four LEDs as the status indicator of the relevant sensor/switch
- Four PLC diagnostics outputs for evaluating the switching status of the safety sensors
- PSR-TBUS connection
- Up to Cat. 3/PL d according to EN ISO 13849-1, SILCL 2 according to IEC 62061, SIL 2 according to IEC 61508 (in conjunction with the PSR-SDC4 master)



Up to 4 safety door switches can be connected to one PSR-SIM4.



Interface module for safety sensors and switches



#### Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V DC (from PSR)
Input voltage range in reference to $U_N$	0.85 ... 1.1
Max. permissible current	100 mA (per signal output)
Max. permissible total current	100 mA (alarm outputs)
Status display	Green LED
<b>General data</b>	
Ambient temperature (operation)	-20 °C ... 55 °C
Nominal operating mode	100% operating factor
Degree of protection	IP20
Mounting position	Any
Mounting	In rows with zero spacing
Air and creepage distances	DIN EN 50178
Rated insulation voltage	50 V DC
Rated surge voltage	0.8 kV
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 106 mm
W / H / D	22.5 mm / 117 mm / 106 mm
	Screw version
	Spring-cage version

24 V DC (from PSR)
0.85 ... 1.1
100 mA (per signal output)
100 mA (alarm outputs)
Green LED

-20 °C ... 55 °C
100% operating factor
IP20
Any
In rows with zero spacing
DIN EN 50178
50 V DC
0.8 kV
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
22.5 mm / 99 mm / 106 mm
22.5 mm / 117 mm / 106 mm

<b>Description</b>	
<b>Interface module</b> , for up to four safety sensors/switches with N/O or N/C contacts	
With screw connection	
With spring-cage connection	

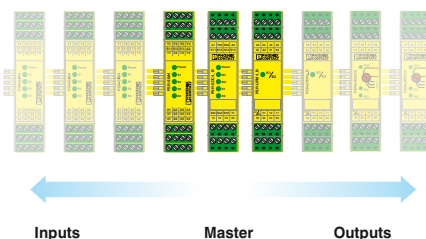
#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/SIM4	2981936	1
PSR-SPP- 24DC/SIM4	2981949	1

<b>PSR-TBUS DIN rail connector</b> , for supplying/controlling/monitoring (depending on the module)	
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#### Accessories

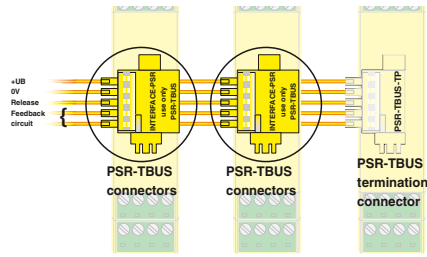
PSR-TBUS	2890425	50
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Additional inputs are aligned on the left of the PSR-SDC4, outputs are to its right.

### Modular safety relay system

The safety-related wiring between the individual PSR modules is established automatically by the PSR-TBUS DIN rail connector. In addition to the supply voltage, an enable signal and the confirmation current path of the extension modules are routed via the connector. The dummy plug (see below) closes the checkback circuit in the system.



PSR-TBUS DIN rail connector

#### Description

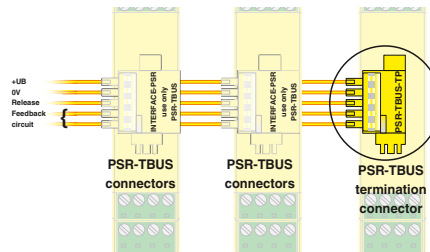
**PSR-TBUS DIN rail connector**, for supplying/controlling/monitoring (depending on the module)

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSR-TBUS	2890425	50

### Modular safety relay system

When structuring a modular safety relay system, the PSR-TBUS-TP is mounted under the module that completes the entire module on the right side. This closes the confirmation circuit of the system.



PSR-TBUS-TP dummy plug

#### Description

**PSR TBUS dummy plug**

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSR-TBUS-TP	2981716	50



### Modular safety relay system

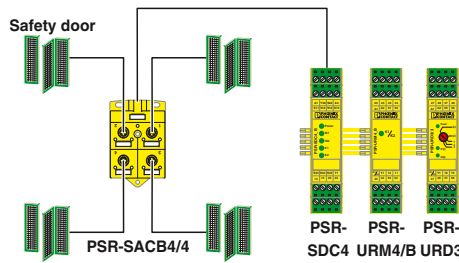
#### PSR-SACB sensor box with M12 slots

The PSR-SACB box for safety limit switches supports space-saving installation. It safely connects four connected limit switches, each with an N/C contact and an N/O contact, to a safety relay combination, e.g., PSR-SDC4. The N/C contacts are connected in series and the N/O contacts in parallel, which means that safe evaluation according to Cat. 3/PL d of EN ISO 13849-1 is ensured. Unused slots are bridged using dummy plugs.

The LEDs are used for signaling. In addition, four signal outputs (Y1-Y4) are also available and they can be evaluated in the control unit. The boxes are suitable for a rough industrial environment, correspond to the requirements of the IP65/67 degree of protection and are supplied with either 5 m or 10 m cable length.

The appropriate connection cables for connection with sensors are available from a comprehensive range of products, see the PLUSCON catalog.

– Up to Cat. 3/PL d according to EN ISO 13849-1, SILCL 2 according to IEC 62061, SIL 2 according to IEC 61508 (in conjunction with the PSR-SDC4 master)



Signals of up to 4 safety door switches can be switched together directly in the field.



Sensor box, with connected master cable, with LED



#### Technical data

Nominal input voltage $U_N$	24 V DC (from PSR)
Input voltage range in reference to $U_N$	0.8 ... 1.1
Max. permissible current	100 mA (per signal output)
Max. permissible total current	100 mA (alarm outputs)
Status display	Yellow LED
Number of positions per slot	4
Master cable (flexible cable conduit-capable)	
Signal line cross section, stranded	6x 0.34 mm <sup>2</sup>
Power supply cross section, stranded	2x 0.75 mm <sup>2</sup>
External diameter	8.2 mm
Ambient temperature (operation)	-30 °C ... 70 °C (for fixed installation) -5 °C ... 70 °C (for flexible installation)

Nominal input voltage $U_N$	24 V DC (from PSR)
Input voltage range in reference to $U_N$	0.8 ... 1.1
Max. permissible current	100 mA (per signal output)
Max. permissible total current	100 mA (alarm outputs)
Status display	Yellow LED
Number of positions per slot	4
Master cable (flexible cable conduit-capable)	
Signal line cross section, stranded	6x 0.34 mm <sup>2</sup>
Power supply cross section, stranded	2x 0.75 mm <sup>2</sup>
External diameter	8.2 mm
Ambient temperature (operation)	-30 °C ... 70 °C (for fixed installation) -5 °C ... 70 °C (for flexible installation)

#### General data

Ambient temperature (operation)	-20 °C ... 70 °C
Degree of protection	IP65/67
Mounting position	Any
Mounting	In rows with zero spacing
Interfaces	Master cable suitable for flexible cable conduit / M12 socket

Air and creepage distances	DIN EN 50178
Rated insulation voltage	50 V DC
Rated surge voltage	0.8 kV
Insulation material (housing)	PA 6.6
Inflammability class in acc. with UL 94	V0
Dimensions	54 mm / 82 mm / 19 mm

W / H / D

#### Ordering data

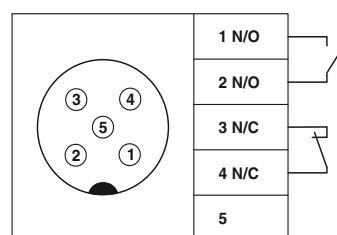
Type	Order No.	Pcs. / Pkt.
PSR-SACB-4/4-L- 5,0PUR-SD	2981871	1
PSR-SACB-4/4-L-10,0PUR-SD	2981884	1

#### Accessories

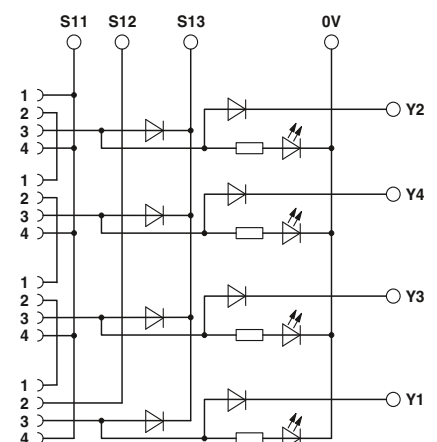
SAC-2P-M12MS ASI TR	1539570	5
ZBN 18:UNBEDRUCKT	2809128	10

Description	
Sensor box, with markers, for magnet limit switch with N/C / N/O contacts	
Length of cable: 5 m	
Length of cable: 10 m	

Dummy plug, for free slots	
Labeling material	



Wiring of the M12 contacts (open safety door)



Block diagram



### Two-channel downtime and speed monitors



The parameterizable PSR-MOTIONSTOP downtime and speed monitor is used to monitor hazardous movements of a machine or system - and, in the event of an error, safely shut down the machine or system.

#### Essential safety-related functions according to EN 61800-5-2 covered

The integrated safe torque off (STO) safety function enables shutdown to be performed by immediately disabling the power to the drive units of a machine. Other safety-related movement functions can be implemented with PSR-MOTIONSTOP:

- SLS: safe limited speed
- SMS: safe speed monitoring
- SDI: safe direction

Depending on the external wiring, applications can be implemented up to Cat. 4/PL e according to EN ISO 13849-1 and SIL 3 according to IEC 61508.

#### Motor feedback via conventional encoder systems

The following sensors are suitable for movement acquisition:

- Incremental encoders (HTL and TTL)
- Sin/cos encoders
- Safe (certified) SIL encoders
- Proximity switches (2- and 3-wire initiators)

Existing motor feedback systems can be easily and quickly connected with PSR-MOTIONSTOP via pre-assembled cable adapters.

#### Removable operating and display unit

The removable operating and display unit (PSR-OP-UNIT) can be used for convenient parameterization of the basic device. During operation, the actual values and diagnostic information can be shown on the illuminated LCD display. The operating and display unit is not required to operate the basic device; in the case of a remote PSR-OP-UNIT, this ensures maximum protection against manipulation. One operating and display unit can be used to parameterize as many basic devices as required.

#### Option to connect mode selector switch and safety doors

One device can be used to monitor up to three different operating states (speeds) as well as downtime. In addition, safety doors or safety switches which enable and disable the monitoring function using secure monitoring inputs can be reliably evaluated.

#### Seamless service concept

Parameters can also be saved on the memory module (IFS-CONFSTICK), which is available as an accessory. In order for the right parameters to be made available quickly if service work needs to be carried out, the module is stored in the IFS-CONFSTICK storage area of the basic device.

#### Safe relay and semiconductor outputs

Relay and semiconductor outputs quickly and safely disable hazardous movements in the event of an error.

### Speed and downtime monitors

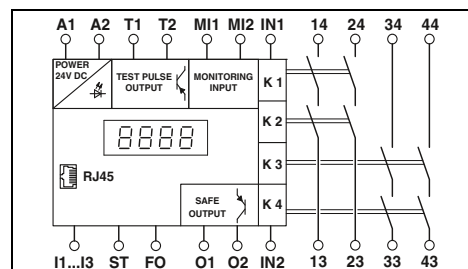
- Option to connect encoders and proximity switches
- With 4 safe relay outputs, 2 safe semiconductor outputs, 1 signal output
- Monitors up to 3 different speeds plus downtime
- Safe monitoring function (safety door connection) for activating/deactivating overspeed monitoring
- Manually monitored and automatic activation
- Narrow 35 mm housing
- Can be parameterized via the PSR-OP-UNIT operating and display unit
- Can be ordered with or without PSR-OP-UNIT operating and display unit
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508

<b>Notes:</b>
Pre-assembled cable adapters are available for connecting PSR-MOTIONSTOP to the motor feedback system (of the controller) - order number on request.
1) EMC: Class A product, see page 553



Can be parameterized via the operating and display unit

Applied for:  
cUL / UL / functional safety



<b>Input data</b>	
Nominal input voltage $U_N$	24 V DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	150 mA
Typ. response time (K1, K2) at $U_N$	30 ms
Typ. release time (K1, K2) at $U_N$	20 ms
Recovery time	1 s
<b>Output data</b>	
Contact type	4 enabling current paths 3 semiconductor outputs
Contact material	AgSnO <sub>2</sub>
Max. / min. switching voltage	250 V AC/DC / 5 V AC/DC
Limiting continuous current	5 A (N/O contact), 500 mA (semiconductor output)
Max. / min. inrush current	6 A (N/O contact) / 10 mA
Min. switching power	0.24 W
Switching capacity (360/h cycles)	6 A (at 24 V) ; 5 A (at 230 V)
Switching capacity (3600/h cycles)	3 A (at 24 V) ; 3 A (at 230 V)
Short-circuit protection of the output circuits	10 A gL/gG NEOZED (N/O contact)
<b>General data</b>	
Ambient temperature range	-20 °C ... 45 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	35 mm / 112 mm / 125 mm
W / H / D	35 mm / 117.5 mm / 125 mm
	Screw version
	Spring-cage version

#### Technical data

<b>Technical data</b>	
Nominal input voltage $U_N$	24 V DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	150 mA
Typ. response time (K1, K2) at $U_N$	30 ms
Typ. release time (K1, K2) at $U_N$	20 ms
Recovery time	1 s
<b>Output data</b>	
Contact type	4 enabling current paths 3 semiconductor outputs
Contact material	AgSnO <sub>2</sub>
Max. / min. switching voltage	250 V AC/DC / 5 V AC/DC
Limiting continuous current	5 A (N/O contact), 500 mA (semiconductor output)
Max. / min. inrush current	6 A (N/O contact) / 10 mA
Min. switching power	0.24 W
Switching capacity (360/h cycles)	6 A (at 24 V) ; 5 A (at 230 V)
Switching capacity (3600/h cycles)	3 A (at 24 V) ; 3 A (at 230 V)
Short-circuit protection of the output circuits	10 A gL/gG NEOZED (N/O contact)
<b>General data</b>	
Ambient temperature range	-20 °C ... 45 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	35 mm / 112 mm / 125 mm
W / H / D	35 mm / 117.5 mm / 125 mm
	Screw version
	Spring-cage version

#### Ordering data

<b>Description</b>
<b>Downtime and speed monitor</b> , 2-channel, 4 safe relay outputs, 2 safe semiconductor outputs, 1 error message output, including PSR-OP-UNIT operating and display unit
With screw connection
With spring-cage connection
<b>Downtime and speed monitor</b> , 2-channel, 4 safe relay outputs, 2 safe semiconductor outputs, 1 error message output, basic device without PSR-OP-UNIT
With screw connection
With spring-cage connection

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/MSTO/D/4X1	2902363	1
PSR-SPP- 24DC/MSTO/D/4X1	2902364	1
PSR-SCP- 24DC/MSTO/4X1	2902786	1
PSR-SPP- 24DC/MSTO/4X1	2902787	1

#### Accessories

<b>Operating and display unit</b> for entering parameters and displaying actual values, can be directly snapped onto PSR-MOTION-STOP basic devices
<b>Multi-functional memory block</b> for the INTERFACE system

Accessories	Order No.	Pcs. / Pkt.
PSR-OP-UNIT	2902578	1
IFS-CONFSTICK <sup>1)</sup>	2986122	1

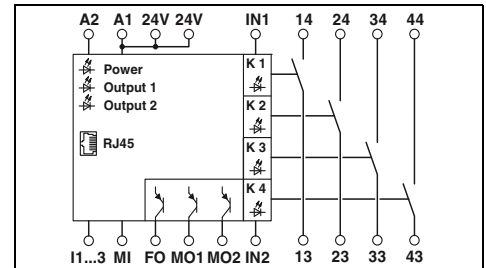
### Speed and downtime monitors

- Option to connect encoders (TTL, HTL, SIN/COS) and proximity switches
- Monitors up to three different speeds plus downtime
- Can be parameterized using free PSR-CONF-WIN configuration software
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508

Notes:
Pre-assembled cable adapters are available for connecting the PSR-RSM4 safe speed and downtime monitor to the motor feedback system (of the controller) - order No. on request.
The necessary PSR-CONF-WIN configuration software can be downloaded free of charge from <a href="http://www.phoenixcontact.com">www.phoenixcontact.com</a> .
1) EMC: Class A product, see page 553



Can be parameterized via software



#### Technical data

Input data	
Nominal input voltage $U_N$	24 V DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	100 mA
Typ. response time (K1, K2) at $U_N$	15 ms
Typ. release time (K1, K2) at $U_N$	12 ms
Recovery time	1 s
Output data	
Contact type	4 enabling current paths
Contact material	AgNi10, + 5 $\mu$ m Au
Max. / min. switching voltage	250 V AC/DC / 100 mV AC/DC
Limiting continuous current	5 A, 100 mA (alarm outputs)
Max. / min. inrush current	6 A / 1 mA
Min. switching power	1 mW
Switching capacity (3600/h cycles)	2 A (24 V (DC13)) ; 3 A (230 V (AC15))
Short-circuit protection of the output circuits	6 A gL
General data	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	EN 60664/VDE 0110
Rated surge voltage / insulation	4 kV / basic isolation, (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling current paths)
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	45 mm / 99 mm / 114.5 mm
W / H / D	45 mm / 112 mm / 114.5 mm

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/RSM4/4X1 <sup>1</sup> )	2981538	1
PSR-SPP- 24DC/RSM4/4X1 <sup>1</sup> )	2981541	1

#### Accessories

Cable adapter for PSR-RSM4, cable length 2.5 m, for control unit:			
Lenze	CABLE- 9/8/250/RSM/LENZE	2981826	1
Siemens Heidenhain, 15/8-pos.	CABLE-15/8/250/RSM/SIMO611D	2981606	1
Siemens Heidenhain, 25/8-pos.	CABLE-25/8/250/RSM/SIMO611D	2981583	1
Further types on request			
PSR configuration software with connecting cable, language: German, English, French, Italian, and Spanish	PSR-CONF-WIN1.0	2981554	1

**PLC series**

**Terminal block with integrated test pulse and EMC filter**

The **PSR-FTB** filter terminal block is used in the event of problems with 24 V signals affected by EMI and test-pulse-sensitive loads.

- Filtering of test-pulse-safe electronic outputs
- EMC filter for constant 24 V signals
- Easy wiring using push-in connection technology

**Notes:**  
The selection of the filter terminal block depends on several parameters (load resistance/current, voltage drop, accepted shut-down time). The parameters can be determined with the aid of more detailed documentation, see [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products).



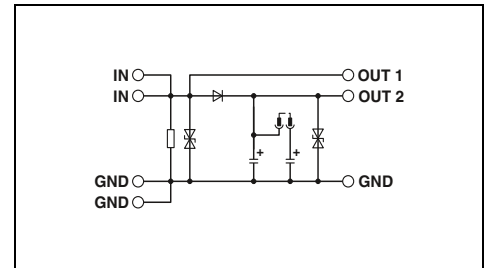
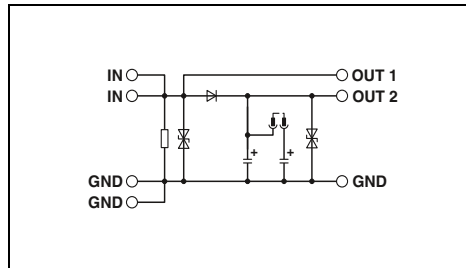
For low loads up to a maximum of 65 mA

N



For high loads up to a maximum of 530 mA

N



<b>Input data</b>	
Nominal input voltage $U_N$	
<b>Typ. input current at <math>U_N</math></b>	
Protective circuit	
<b>General data</b>	
Ambient temperature range	
Air and creepage distances between the circuits	
Rated surge voltage / insulation	
<b>Dimensions</b>	W / H / D
Spring-cage connection Solid/stranded/AWG	

Technical data	
24 V DC $\pm$ 20% (Control voltage $U_{ST}$ right/left)	
max. 15 mA	
Surge protection	
-25 °C ... 50 °C	
EN 61131	
1.5 kV / basic insulation	
6.2 mm / 94 mm / 80 mm	
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	

Technical data	
24 V DC $\pm$ 20% (Control voltage $U_{ST}$ right/left)	
max. 20 mA	
Surge protection	
-25 °C ... 50 °C	
EN 61131	
1.5 kV / basic insulation	
6.2 mm / 94 mm / 80 mm	
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	

<b>Description</b>	
PLC filter terminal block, with integrated test pulse and EMC filter	

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSR-FTB/1.5/11.5	2904476	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSR-FTB/20/86	2904477	1



Termination carriers are compact solutions for conveniently and smoothly connecting standard DIN rail devices from the PSR range to output modules of automation systems.

Both safety-related circuit interrupts and safe switch on are becoming increasingly important. These modules for electrically isolating actuators and power adaptation are used in the process industry in particular.

The PSR-ETP from Phoenix Contact is a coupling relay that has been specially developed for this purpose and is SIL 3 certified.

This means that PSR-SIL coupling relays are now available for both ESD and F&G applications.

#### Easy diagnostics

The optionally connectable line/load monitoring function, which can be configured according to the load, enables end-to-end diagnostics from the controller to the actuator.

Diagnostic messages about open circuits or missing/incorrect loads are sent via the existing wiring. This eliminates the need for additional installation time and other digital inputs required for actuator readback.

#### Compatible with a range of different higher-level control systems

Test pulses from safe controllers can often cause premature wear of the relays. The integrated test pulse filter and adapted current control circuit ensure both a long service life and a high level of compatibility between all PSR-SIL coupling relays and the various higher-level control systems.

#### High level of availability and safety

Particular emphasis is always placed on carefully selecting the relay used. The combination of the relay and application-specific design create the ideal conditions for a high level of availability and safety.



Select PSR-SIL coupling relay



Select termination carrier TC... termination carrier



Select controller-specific front adapter and system cable

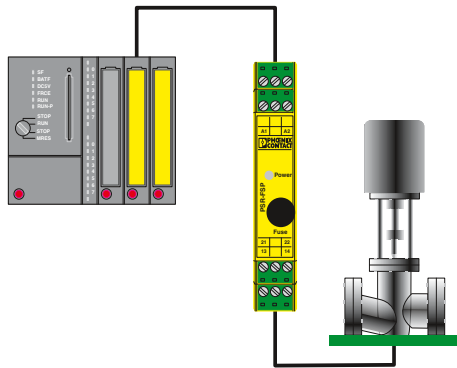


Solutions also available for MACX and MINI Analog



Safe coupling relays

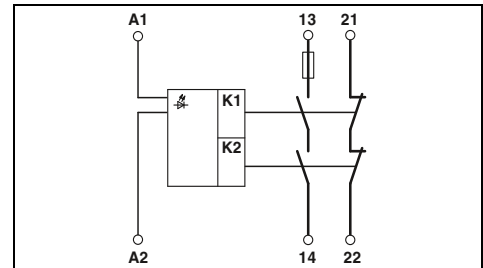
- Couples digital output signals from failsafe controllers to I/O devices (valves, etc.) for electrical isolation and power adaptation
- 1 enabling current path
- 17.5 mm narrow housing
- Long service life thanks to filtering of controller test pulses
- With installed and replaceable fuse in the enabling current path
- Forcibly guided contacts according to EN 50205
- Simple proof test as per IEC 61508 due to integrated signaling contact
- Up to SIL 3 according to IEC 61508



Example of electrical isolation of a safety PLC output from the field.



Safe coupling relay  
SIL 3 according to IEC 61508



**Notes:**

Can be used for system cabling with the termination carrier. For further information, see page 96

Additional products for SIL applications can be found on page 71

1) EMC: Class A product, see page 553

Technical data

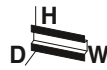
<b>Input data</b>	
Nominal input voltage $U_N$	24 V DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	55 mA
Typ. response time (K1, K2) at $U_N$	50 ms
Typ. release time (K1, K2) at $U_N$	50 ms
Recovery time	1 s
<b>Output data</b>	
Contact type	1 undelayed enabling current path 1 undelayed confirmation current path
Contact material	AgCuNi, + 0.2 $\mu$ m Au
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	5 A (N/O contact, pay attention to the derating), 100 mA (N/C contact)
Max. / min. inrush current	5 A / 5 mA
Min. switching power	75 mW
Switching capacity (3600/h cycles)	5 A (24 V (DC13)) ; 5 A (230 V (AC15))
Short-circuit protection of the output circuits	5 A T fuse
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178
Rated surge voltage / insulation	6 kV / safe isolation, increased insulation
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	17.5 mm / 99 mm / 114.5 mm
W / H / D	Screw version 17.5 mm / 112 mm / 114.5 mm Spring-cage version

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Emergency stop coupling relay</b> for failsafe controllers in process engineering, with secured enabling current path			
With screw connection	PSR-SCP- 24DC/FSP/1X1/1X2 <sup>1</sup> )	2981978	1
With spring-cage connection	PSR-SPP- 24DC/FSP/1X1/1X2 <sup>1</sup> )	2981981	1

### Safe coupling relays

- Couples digital output signals from failsafe controllers to I/O devices (valves, etc.) for electrical isolation and power adaptation
- 2 enabling current paths
- 17.5 mm narrow housing
- Long service life thanks to filtering of controller test pulses
- Forcibly guided contacts according to EN 50205
- Simple proof test as per IEC 61508 due to integrated signaling contact
- Up to SIL 3 according to IEC 61508

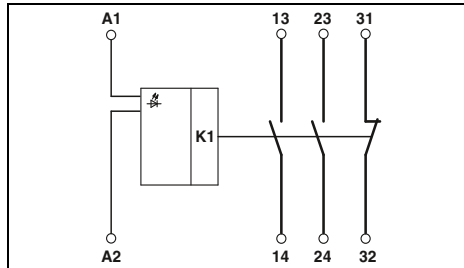


Safe coupling relay,  
SIL 2 according to IEC 61508



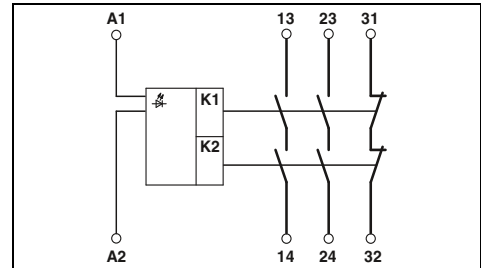
Safe coupling relay,  
SIL 3 according to IEC 61508

<b>Notes:</b>
Can be used for system cabling with the termination carrier. For further information, see page 96
Additional products for SIL applications can be found on page 71
1) EMC: Class A product, see page 553



#### Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	55 mA
Typ. response time (K1, K2) at $U_N$	50 ms
Typ. release time (K1, K2) at $U_N$	50 ms
<b>Output data</b>	
Contact type	2 undelayed enabling current paths 1 undelayed confirmation current path
Contact material	AgCuNi, + 0.2 $\mu$ m Au
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	5 A (N/O contact), 100 mA (N/C contact)
Max. / min. inrush current	5 A / 5 mA
Min. switching power	75 mW
Switching capacity (3600/h cycles)	5 A (24 V (DC13)) ; 5 A (230 V (AC15))
Short-circuit protection of the output circuits	10 A gL/gG (N/O contact), 6 A gL/gG (N/C contact)
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	6 kV / safe isolation, increased insulation
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	17.5 mm / 99 mm / 114.5 mm
W / H / D	17.5 mm / 112 mm / 114.5 mm



#### Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	55 mA
Typ. response time (K1, K2) at $U_N$	50 ms
Typ. release time (K1, K2) at $U_N$	50 ms
<b>Output data</b>	
Contact type	2 undelayed enabling current paths 1 undelayed confirmation current path
Contact material	AgCuNi, + 0.2 $\mu$ m Au
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	5 A (N/O contact), 100 mA (N/C contact)
Max. / min. inrush current	5 A / 5 mA
Min. switching power	75 mW
Switching capacity (3600/h cycles)	5 A (24 V (DC13)) ; 5 A (230 V (AC15))
Short-circuit protection of the output circuits	10 A gL/gG (N/O contact), 6 A gL/gG (N/C contact)
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	6 kV / safe isolation, increased insulation
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	17.5 mm / 99 mm / 114.5 mm
W / H / D	17.5 mm / 112 mm / 114.5 mm

#### Ordering data

<b>Description</b>	
<b>Emergency stop coupling relay</b> , for failsafe controllers, two enabling current paths, <b>SIL 2 according to IEC 61508</b>	
With screw connection	
With spring-cage connection	
<b>Emergency stop coupling relay</b> , for failsafe controllers, two enabling current paths, <b>SIL 3 according to IEC 61508</b>	
With screw connection	
With spring-cage connection	

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/FSP2/2X1/1X2 <sup>1)</sup>	2986575	1
PSR-SPP- 24DC/FSP2/2X1/1X2 <sup>1)</sup>	2986588	1

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/FSP/2X1/1X2 <sup>1)</sup>	2986960	1
PSR-SPP- 24DC/FSP/2X1/1X2 <sup>1)</sup>	2986957	1



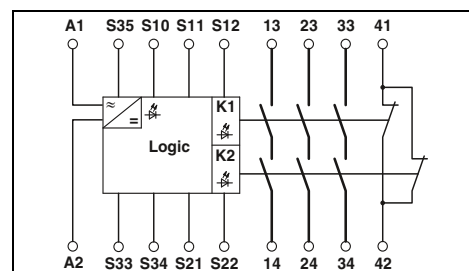
Safe coupling relays

<b>Notes:</b>
Additional products for SIL applications can be found on page 71
1) EMC: Class A product, see page 553

- Single and two-channel control
- Manual and automatic activation
- Max. 3 enabling current paths
- With wide range input
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508



Wide-range input (24 - 230 V), manually monitored with automatic activation



Technical data

<b>Input data</b>			
Nominal input voltage range	24 V AC/DC ... 230 V AC/DC		
Permissible range (with reference to $U_N$ )	0.85 ... 1.1		
Typ. current consumption (with reference to $U_N$ )	120 mA (at 24 V DC) / 20 mA (for 120 V AC)		
Typ. response time (K1, K2) at $U_N$	50 ms (manual start) / 60 ms (automatic start)		
Typ. release time (K1, K2) at $U_N$	20 ms (when controlled via S11/S12 and S21/S22) / 500 ms (when controlled via A1)		
Recovery time	1 s		
<b>Output data</b>			
Contact type	3 enabling current paths 1 signaling current path		
Contact material	AgSnO <sub>2</sub> , + 0.2 μm Au		
Max. / min. switching voltage	250 V AC/DC / 10 V AC/DC		
Limiting continuous current	6 A		
Max. / min. inrush current	6 A / 10 mA		
Min. switching power	360 mW		
Switching capacity (360/h cycles)	4 A (24 V DC) ; 4 A (230 V AC)		
Switching capacity (3600/h cycles)	2.5 A (24 V (DC13)) ; 3 A (230 V (AC 15))		
Short-circuit protection of the output circuits	6 A gL/gG NEOZED (enabling current paths), 6 A gL/gG NEOZED (signaling current paths)		
<b>General data</b>			
Ambient temperature range	-20 °C ... 55 °C		
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160		
Rated surge voltage / insulation	6 kV/safe isolation, reinforced insulation, and 6 kV between input circuits and output contact current paths (13/14, 23/24, 33/34), as well as between output contact current paths (13/14, 23/24, 33/34)		
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12		
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16		
Dimensions	45 mm / 99 mm / 114.5 mm		
W / H / D	45 mm / 112 mm / 114.5 mm		
	Screw version		
	Spring-cage version		
<b>Ordering data</b>			
<b>Description</b>	<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
<b>Emergency stop and safety door monitoring</b> , single and two-channel, with/without cross-circuit detection, activation: manually monitored and automatic			
With screw connection	PSR-SCP-24-230UC/ESAM4/3X1/1X2 <sup>1</sup> )	2981114	1
With spring-cage connection	PSR-SPP-24-230UC/ESAM4/3X1/1X2 <sup>1</sup> )	2981127	1

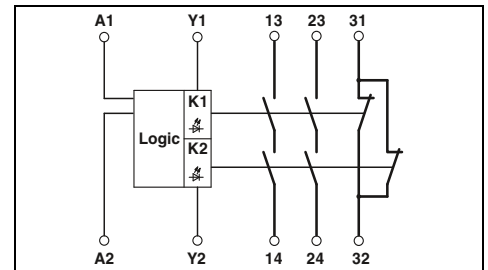
### Safe coupling relays

- Single and two-channel control
- Manual and automatic activation
- Max. 3 enabling current paths
- With inrush current reduction, therefore suitable for coupling to failsafe controllers
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508

**Notes:**  
1) EMC: Class A product, see page 553



**24 V DC, manual and automatic activation**



#### Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V AC/DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	50 mA DC
Typ. response time (K1, K2) at $U_N$	60 ms (automatic/manual start)
Typ. release time (K1, K2) at $U_N$	20 ms
Recovery time	Approx. 1 s
<b>Output data</b>	
Contact type	
Contact material	
Max. / min. switching voltage	250 V AC/DC / 10 V
Limiting continuous current	6 A (N/O contact/N/C contact, high demand), 4 A (N/O contact/N/C contact, low demand)
Max. / min. inrush current	6 A / 10 mA
Min. switching power	0.2 W
Switching capacity (360/h cycles)	5 A (24 V DC) ; 5 A (230 V AC)
Switching capacity (3600/h cycles)	5 A (24 V (DC13)) ; 5 A (230 V (AC 15))
Short-circuit protection of the output circuits	6 A gL/gG NEOZED (high demand), 4 A gL/gG NEOZED (low demand)
<b>General data</b>	
Ambient temperature range	
Air and creepage distances between the circuits	-20 °C ... 55 °C
Rated surge voltage / insulation	DIN EN 50178/VDE 0160 6 kV / safe isolation, increased insulation
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	22.5 mm / 112 mm / 114.5 mm
	Screw version
	Spring-cage version

#### Ordering data

<b>Description</b>	
<b>Process technology, emergency stop and safety door monitoring, one-channel, activation: manual and automatic</b>	
With screw connection	
With spring-cage connection	

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/ESP4/2X1/1X2 <sup>1</sup> )	2981020	1
PSR-SPP- 24DC/ESP4/2X1/1X2 <sup>1</sup> )	2981017	1

Safe coupling relays

PSR-SIL coupling relay for F&G applications

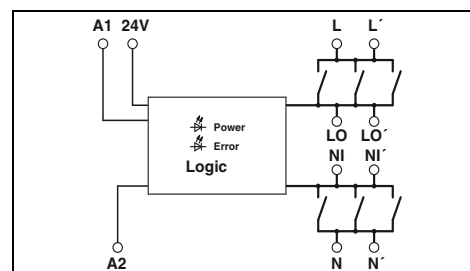
- Couples digital output signals to I/O devices (valves, etc.) for electrical isolation and power adaptation
- Long service life, thanks to integrated test pulse filters
- Connectable, configurable open circuit and load monitoring
- Special design for avoiding spurious trips
- 1 enabling current path
- 17.5 mm narrow housing
- Up to SIL 3 according to IEC 61508 (low demand)

<b>Notes:</b>
Can be used for system cabling with the termination carrier. For further information, see page 96
1) EMC: Class A product, see page 553



Coupling relay for safe switch-on certified according to SIL 3

Applied for: cUL / UL



Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	75 mA
Typ. response time at $U_N$	30 ms
Recovery time	1 s
<b>Output data</b>	
Contact type	1 enabling current path
Contact material	AgNi, gold-flashed
Max. / min. switching voltage	250 V AC / 15 V AC/DC
Limiting continuous current	5 A (N/O contact, pay attention to the derating)
Max. / min. inrush current	5 A / 100 mA
Min. switching power	1.5 W
Short-circuit protection of the output circuits	-
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178
Rated surge voltage / insulation	6 kV/safe isolation (through protective impedance)
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	17.5 mm / 99 mm / 114.5 mm
W / H / D	17.5 mm / 112 mm / 114.5 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>F&amp;G coupling relay for failsafe controllers</b> , one enabling current path, SIL 3 according to IEC 61508 (low demand)			
With screw connection	PSR-SCP- 24DC/ETP/1X1 <sup>1)</sup>	2986711	1
With spring-cage connection	PSR-SPP- 24DC/ETP/1X1 <sup>1)</sup>	2986562	1

## Safety devices

### Termination carriers for safe coupling relays

- Convenient and faultless connection using pre-assembled system cables
- 1:1 signal allocation to a 37-pos. D-SUB connector
- Redundant power supply, decoupled from diode and protected against polarity reversal
- Integrated undervoltage detection with separate signal path



Termination carrier  
for up to 16 PSR-FSP modules



Termination carrier  
for up to 16 PSR-ETP modules

<b>Notes:</b>
Cable and jumper plugs are not supplied as standard with the termination carriers.
1) EMC: Class A product, see page 553

<b>General data</b>	
Connection to the control system level	D-SUB pin strip
Number of positions	37
Max. operating voltage	< 50 V DC (per signal/channel)
Max. permissible current	1 A (signal/channel)
Rated insulation voltage	50 V
Surge voltage category	II
Pollution degree	2
Ambient temperature range	-20 °C ... 80 °C
Inflammability class in acc. with UL 94	V0
Dimensions W / H / D	304 / 170 / 160 mm
<b>Supply</b>	
Input voltage range	21.1 V DC ... 26.4 V DC
Redundant supply	Yes, decoupled from diodes
Polarization and surge protection	Yes
Fuse	2.5 A slow-blow
Status indication	2 x green LEDs (PWR1 and PWR2)
Undervoltage monitoring	At < 18 V (alarm contact, 1 N/O contact)

Housing width 304 mm

<b>Technical data</b>		
D-SUB pin strip		
37		
< 50 V DC (per signal/channel)		
1 A (signal/channel)		
50 V		
II		
2		
-20 °C ... 80 °C		
V0		
304 / 170 / 160 mm		
<b>Supply</b>		
21.1 V DC ... 26.4 V DC		
Yes, decoupled from diodes		
Yes		
2.5 A slow-blow		
2 x green LEDs (PWR1 and PWR2)		
At < 18 V (alarm contact, 1 N/O contact)		

Housing width 304 mm

<b>Technical data</b>		
D-SUB pin strip		
37		
< 50 V DC (per signal/channel)		
1 A (signal/channel)		
50 V		
II		
2		
-20 °C ... 80 °C		
V0		
304 / 170 / 160 mm		
<b>Supply</b>		
21.1 V DC ... 26.4 V DC		
Yes, decoupled from diodes		
Yes		
2.5 A slow-blow		
2 x green LEDs (PWR1 and PWR2)		
At < 18 V (alarm contact, 1 N/O contact)		

<b>Description</b>
<b>Termination carrier</b> for 16 coupling relays For safety-related <b>switching off</b> For safety-related <b>switching on</b>

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
TC-2D37SUB-DO16-ESD-AR-UNI <sup>1)</sup>	2902913	1

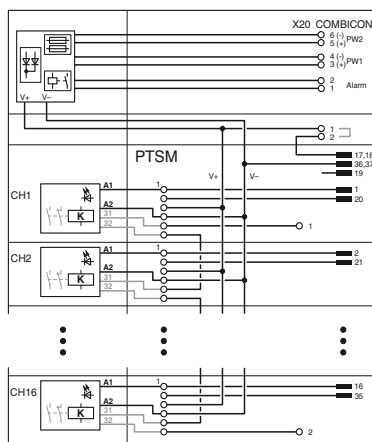
<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
TC-2D37SUB-DO16-F&G-AR-UNI <sup>1)</sup>	2902914	1

<b>Cable set</b> without use of confirmation contact, suitable for PSR-FSP/Order No.: 2981978
<b>Cable set</b> with use of confirmation contact, suitable for PSR-FSP/Order No.: 2986960 and 2986575

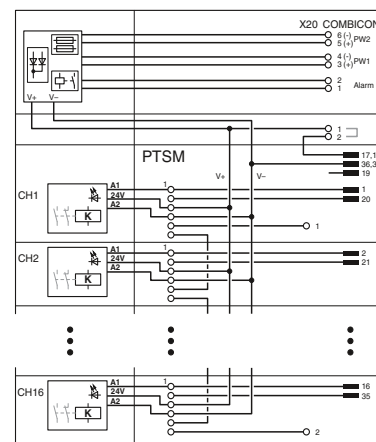
<b>Accessories</b>		
TC-C-PSR3-SC-A10000A20000	2903389	16
TC-C-PSR3-SC-A10000A23132	2903390	16
TC-C-PTSM-50-0000000J1J1	2903388	8

<b>Accessories</b>		
TC-C-PSR3-SC-A100V+A20000	2903391	16

<b>Jumper plug</b> for occupying unused module slots, suitable for PSR-FSP/Order No.: 2986960 and 2986575
<b>Cable set</b> with 24 V module supply, suitable for PSR-ETP/Order No.: 2986711



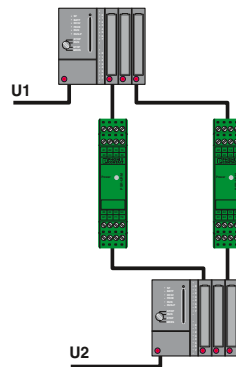
TC-2D37SUB-DO16-ESD-AR-UNI connection scheme



TC-2D37SUB-DO16-F&G-AR-UNI connection scheme

**Forcibly guided coupling relays**

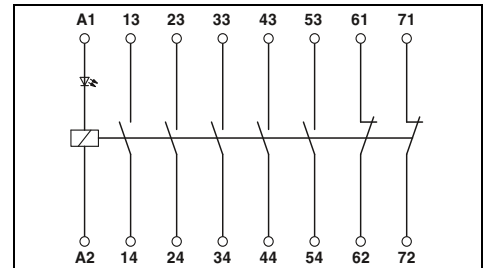
- Single-channel control
- Forcibly guided contacts according to EN 50205



Reliable signal exchange between two systems with confirmation function.



Forcibly guided coupling relay, 5 N/O contacts, 2 N/C contacts



**Technical data**

<b>Input data</b>	
Nominal input voltage $U_N$	24 V AC/DC
Permissible range (with reference to $U_N$ )	0.8 ... 1.1
Typ. current consumption (with reference to $U_N$ )	47 mA
Typ. response time (K1, K2) at $U_N$	20 ms
Typ. release time (K1, K2) at $U_N$	20 ms
<b>Output data</b>	
Contact type	5 N/O contacts 2 N/C contacts
Contact material	AgSnO <sub>2</sub> , + 0.2 µm Au
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	6 A
Max. / min. inrush current	6 A / 25 mA
Min. switching power	0.4 W
Switching capacity (360/h cycles)	4 A (24 V DC) ; 4 A (230 V AC)
Switching capacity (3600/h cycles)	2.5 A (24 V (DC13)) ; 3 A (230 V (AC 15))
Short-circuit protection of the output circuits	6 A fast-blow, C6 (24 V AC/DC) automatic device
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / basic insulation
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	Screw version 22.5 mm / 112 mm / 114.5 mm Spring-cage version

**Ordering data**

<b>Description</b>	
<b>Coupling relay</b> , with forcibly guided contacts	
With screw connection for 24 V AC/DC	
With spring-cage connection for 24 V AC/DC	
<b>Coupling relay</b> , with forcibly guided contacts	
With screw connection for 120 V AC/DC	
With spring-cage connection for 120 V AC/DC	

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24UC/URM/5X1/2X2	2963747	1
PSR-SPP- 24UC/URM/5X1/2X2	2963970	1
PSR-SCP-120UC/URM/5X1/2X2	2981402	1
PSR-SPP-120UC/URM/5X1/2X2	2981415	1

### Forcibly guided coupling relays

- Single-channel control
- Forcibly guided contacts according to EN 50205

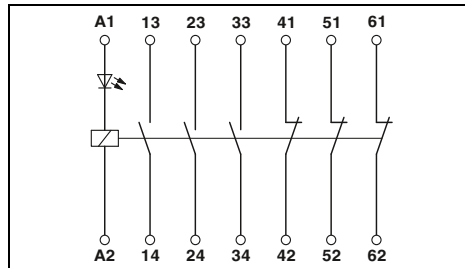
<b>Notes:</b>
For marking systems and mounting material see Catalog 5
1) EMC: Class A product, see page 553



**Forcibly guided coupling relay, 3 N/O contacts, 3 N/C contacts**

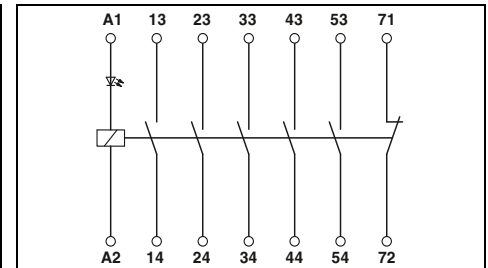


**Forcibly guided coupling relay, 5 N/O contacts, 1 N/C contact**



#### Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V AC/DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	45 mA
Typ. response time (K1, K2) at $U_N$	15 ms
Typ. release time (K1, K2) at $U_N$	15 ms
<b>Output data</b>	
Contact type	3 N/O contacts 3 N/C contacts
Contact material	AgSnO <sub>2</sub>
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	6 A (N/O contact), 6 A (N/C contact)
Max. / min. inrush current	6 A / 25 mA
Min. switching power	0.4 W
Switching capacity (360/h cycles)	6 A (24 V DC) ; 5 A (230 V AC)
Switching capacity (3600/h cycles)	3 A (24 V (DC13)) ; 3 A (230 V (AC15))
Short-circuit protection of the output circuits	10 A gL/gG NEOZED (N/O contact), 4 A gL/gG NEOZED (N/C contact)
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178/VDE 0160
Rated surge voltage / insulation	4 kV / Basic isolation (safe isolation, reinforced insulation, and 6 kV between the input circuit and the output (13/14, 23/24, 33/34).)
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	Screw version Spring-cage version



#### Technical data

<b>Input data</b>	
Nominal input voltage $U_N$	24 V AC/DC
Permissible range (with reference to $U_N$ )	0.8 ... 1.1
Typ. current consumption (with reference to $U_N$ )	47 mA
Typ. response time (K1, K2) at $U_N$	20 ms
Typ. release time (K1, K2) at $U_N$	20 ms
<b>Output data</b>	
Contact type	5 enabling current paths 1 signaling current path
Contact material	AgSnO <sub>2</sub> , + 0.2 μm Au
Max. / min. switching voltage	250 V AC/DC / 15 V AC/DC
Limiting continuous current	6 A
Max. / min. inrush current	6 A / 25 mA
Min. switching power	0.4 W
Switching capacity (360/h cycles)	4 A (24 V DC) ; 4 A (230 V AC)
Switching capacity (3600/h cycles)	2.5 A (24 V (DC13)) ; 3 A (230 V (AC15))
Short-circuit protection of the output circuits	6 A fast-blow (N/O contact), 6 A fast-blow (N/C contact)
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Air and creepage distances between the circuits	DIN EN 50178
Rated surge voltage / insulation	4 kV / basic isolation (safe isolation, reinforced isolation and 6 kV between A1/A2, 53/54, 71/72 and 13/14, 23/24, 33/34, 43/44.)
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	22.5 mm / 112 mm / 114.5 mm

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Coupling relay, with forcibly guided contacts</b>			
With screw connection	PSR-SCP- 24UC/URM/3X1/3X2	2981839	1
With spring-cage connection	PSR-SPP- 24UC/URM/3X1/3X2	2981842	1
<b>Coupling relay, with forcibly guided contacts</b>			
With screw connection for 120 V AC/DC			
With spring-cage connection for 120 V AC/DC			
<b>Relay, with forcibly guided contacts, suitable for PR1 relay base</b>			

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Coupling relay, with forcibly guided contacts</b>			
With screw connection	PSR-SCP- 24UC/URM/5X1/1X2	2981952	1
With spring-cage connection	PSR-SPP- 24UC/URM/5X1/1X2	2981965	1



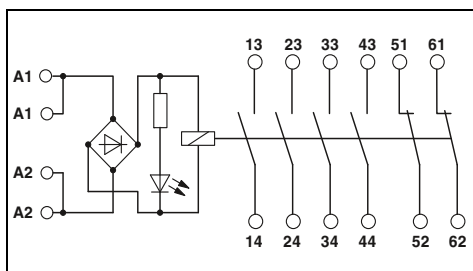
Forcibly guided coupling relay, 4 N/O contacts, 2 N/C contacts



Forcibly guided coupling relay, 2 PDTs



Safety relay with forcibly guided contacts, as per EN 50205, application type B



Technical data

24 V AC/DC	120 V AC/DC
0.8 ... 1.1	0.8 ... 1.1
52 mA	12 mA
10 ms	10 ms
10 ms	10 ms

4 N/O contacts  
2 N/C contacts  
AgSnO<sub>2</sub>  
250 V AC/DC / 15 V AC/DC  
6 A (total current on request)  
6 A / 10 mA  
0.4 W  
6 A (24 V DC) ; 5 A (230 V AC)

3 A (24 V (DC13)) ; 3 A (230 V (AC15))

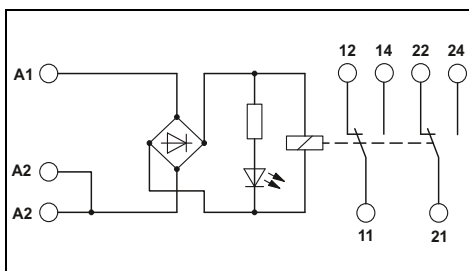
10 A gL/gK NEOZED (N/O contact),  
4 A gL/gK NEOZED (N/C contact)

-20 °C ... 55 °C  
DIN EN 50178/VDE 0160  
4 kV / basic isolation, (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling current paths)

0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
40 mm / 111 mm / 56 mm  
40 mm / 111 mm / 56 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
PSR-SCF- 24UC/URM/4X1/2X2 <sup>1)</sup>	2981444	1
PSR-SPF- 24UC/URM/4X1/2X2 <sup>1)</sup>	2981457	1
PSR-SCF-120UC/URM/4X1/2X2 <sup>1)</sup>	2981460	1
PSR-SPF-120UC/URM/4X1/2X2 <sup>1)</sup>	2981473	1



Technical data

24 V AC/DC	120 V AC/DC
0.85 ... 1.1	0.85 ... 1.1
30 mA	9 mA
10 ms	10 ms
10 ms	10 ms

2 PDT  
AgNi  
250 V AC/DC / 15 V AC/DC  
5 A (N/O contact), 3.5 A (N/C contact)  
6 A / 10 mA  
0.24 W  
6 A (24 V DC ; N/O contact) ; 3 A (230 V AC ; N/O contact)

2 A (24 V (DC13)) ; N/O contact) ; 3 A (230 V (AC15)) ; N/O contact)

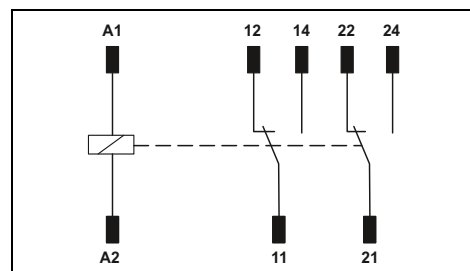
6 A gL/gK NEOZED (N/O contact),  
4 A gL/gK NEOZED (N/C contact)

-20 °C ... 50 °C  
DIN EN 50178/VDE 0160  
4 kV / basic isolation, (safe isolation, reinforced insulation, and 6 kV between input circuit and enabling current paths)

0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
-  
17.5 mm / 75 mm / 60.5 mm  
-

Ordering data

Type	Order No.	Pcs. / Pkt.
PSR-SCF- 24UC/URM/2X21 <sup>1)</sup>	2981363	10
PSR-SCF-120UC/URM/2X21 <sup>1)</sup>	2981376	10



Technical data

24 V DC
(on request)
29 mA
10 ms
4 ms

2 PDT  
AgNi  
250 V AC/DC / 15 V  
6 A (N/O contact), 6 A (N/C contact)  
6 A / 10 mA  
0.24 W  
6 A (24 V DC ; N/O contact) ; 3 A (230 V AC ; N/O contact)

2 A (24 V (DC13)) ; N/O contact) ; 3 A (230 V (AC15)) ; N/O contact)

-  
-25 °C ... 70 °C  
DIN EN 50178  
6 kV / safe isolation, increased insulation

-  
-  
12.6 mm / 29 mm / 25.5 mm  
-

Ordering data

Type	Order No.	Pcs. / Pkt.
REL-SR- 24DC/2X21	2961574	10



# Functional safety

## Configurable safety modules

### PSR-TRISAFE system



PSR-TRISAFE can meet all safety function requirements quickly and easily.

#### **PSR-TRISAFE offers many advantages:**

- Multifunctional use for a wide range of safety functions
- Flexible extension with safe inputs and outputs
- Easy graphical configuration instead of complex programming
- Quick startup thanks to user-friendly simulation and test options

#### **Flexible extension of master module**

The configurable safety module is supplied with 20 safe inputs, 4 safe outputs, and 4 alarm outputs integrated as standard.

If more inputs and outputs are required, up to 10 extension modules can be connected alongside the extendable PSR-TRISAFE-M safety module. Safe digital I/O modules are available for flexible system expansion.

#### **Integration in a bus system**

Adaptable fieldbus gateways, available as an option, can be used to integrate the PSR-TRISAFE system in a bus system such as a PROFIBUS DP network. This enables communication with the higher-level control system for diagnostic and visualization purposes.

#### **INTERFACE TBUS DIN rail**

The INTERFACE TBUS DIN rail provides the link between extension modules and the safety module.

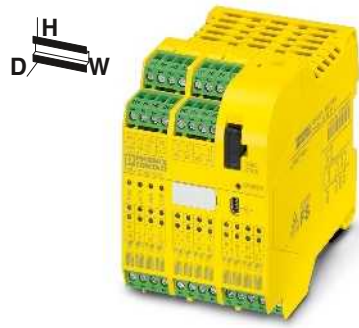
#### **Easy device configuration**

Functions are easy to configure using drag & drop in the free SAFECONF software.

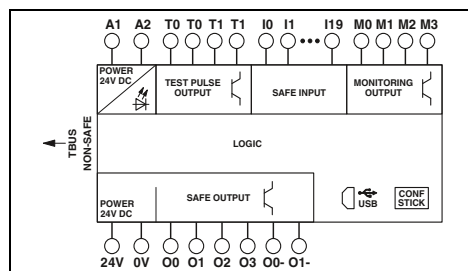
**PSR-TRISAFE-S**

- Freely configurable safety module for monitoring emergency stop, safety doors, light grids, etc.
- With 20 safe inputs, 4 safe outputs, 4 alarm outputs, and 2 clock outputs on a design width of just 67.5 mm
- Easily graphically configurable with the SAFECONF software
- Quick commissioning by means of comprehensive simulation and test functions
- Option for connecting fieldbus gateways for diagnostics and signaling functions
- Incl. IFS-CONFSTICK memory stick for easy storage and backup of the configuration
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508

<b>Notes:</b>
The necessary SAFECONF configuration software can be downloaded free of charge from <a href="http://www.phoenixcontact.com">www.phoenixcontact.com</a> .
Further information on the SAFECONF configuration software can be found on page 110
Further information on fieldbus gateways can be found in the "Motor management" section of Catalog 7 or at <a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a> .
1) EMC: Class A product, see page 553



Configurable safety module, cannot be extended



**Technical data**

<b>Module data</b>	24 V DC
Nominal input voltage $U_N$	0.85 ... 1.1
Permissible range (with reference to $U_N$ )	110 mA
Typ. current consumption (with reference to $U_N$ )	< 30 ms
Max. response time	USB
<b>Interfaces</b>	
<b>Input data</b>	
Number of safe inputs	20
Nominal voltage	24 V DC
<b>Output data</b>	
Safe semiconductor outputs	4 (Cat. 4 / ISO 13849)
Nominal voltage	24 V DC
Limiting continuous current	2 A (see derating curve)
Ground switching outputs	2
Clock outputs	2
Alarm outputs	4
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	67.5 mm / 99 mm / 114.5 mm
W / H / D	67.5 mm / 112 mm / 114.5 mm
	Screw version
	Spring-cage version

**Ordering data**

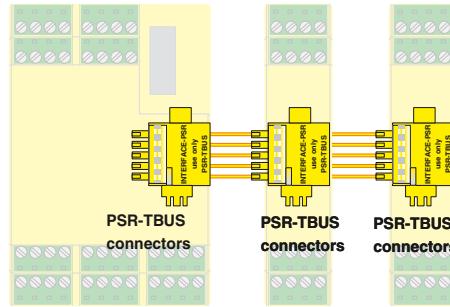
Description	Type	Order No.	Pcs. / Pkt.
<b>Freely configurable safety module</b> , for monitoring emergency stop, safety doors, light grids, etc., with 20 safe inputs and 4 safe outputs, 4 signaling and 2 cycle outputs			
With screw connection	PSR-SCP- 24DC/TS/S <sup>1</sup> )	2986229	1
With spring-cage connection	PSR-SPP- 24DC/TS/S <sup>1</sup> )	2986232	1

**Accessories**

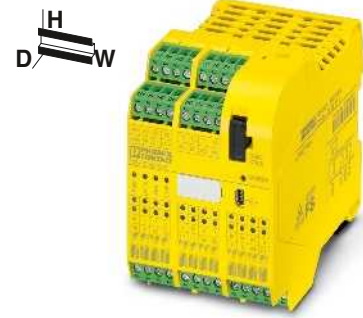
<b>Configuration package</b> for the PSR-TRISAFE safety module, consists of SAFECONF software, USB connecting cable, and quick start guide			
German	PSR-SAFECONF-BOX-DE	2986151	1
English	PSR-SAFECONF-BOX-EN	2986164	1
<b>Starter kit</b> for the PSR-TRISAFE safety module, consists of PSR-TRISAFE demo board (with inputs and outputs), SAFECONF software, USB connecting cable (3 m), power supply with international plug adapters, quick start guide	PSR-TRISAFE STARTER KIT	2986300	1
<b>Multi-functional memory block</b> for the INTERFACE system	IFS-CONFSTICK <sup>1</sup> )	2986122	1
<b>PSR-TBUS DIN rail connector</b> , for supplying/controlling/monitoring (depending on the module)	PSR-TBUS	2890425	50

### PSR-TRISAFE modular

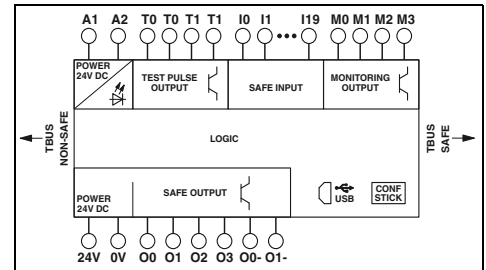
- Freely configurable safety module for monitoring emergency stop, safety doors, light grids, etc.
- Safe and standard extension via INTERFACE DIN rail TBUS
- With 20 safe inputs, 4 safe outputs, 4 alarm outputs, and 2 clock outputs on a design width of just 67.5 mm
- Easily graphically configurable with the SAFECONF software
- Option for connecting fieldbus gateways for diagnostics and signaling functions
- Incl. IFS-CONFSTICK memory stick for easy storage and backup of the configuration
- Incl. PSR-TBUS connector (DIN rail connector) for adapting safe extension modules
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508



The TBUS connectors carry out the cross-wiring between the modules.



Configurable safety module, can be extended



<b>Notes:</b>
For extension modules for PSR-TRISAFE modular, see page 103
The necessary SAFECONF configuration software can be downloaded free of charge from <a href="http://www.phoenixcontact.com">www.phoenixcontact.com</a> .
Further information on the SAFECONF configuration software can be found on page 110
Further information on fieldbus gateways can be found in the "Motor management" section of Catalog 7 or at <a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a> .
1) EMC: Class A product, see page 553

<b>Module data</b>	
Nominal input voltage $U_N$	24 V DC
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	110 mA
Max. response time	< 30 ms
Interfaces	USB
<b>Input data</b>	
Number of safe inputs	20
Nominal voltage	24 V DC
<b>Output data</b>	
Safe semiconductor outputs	4 (Cat.4 / ISO 13849)
Nominal voltage	24 V DC
Limiting continuous current	2 A (see derating curve)
Ground switching outputs	2
Clock outputs	2
Alarm outputs	4
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	67.5 mm / 99 mm / 114.5 mm
W / H / D	Screw version 67.5 mm / 112 mm / 114.5 mm Spring-cage version

#### Technical data

24 V DC
0.85 ... 1.1
110 mA
< 30 ms
USB
20
24 V DC
4 (Cat.4 / ISO 13849)
24 V DC
2 A (see derating curve)

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/TS/M <sup>1)</sup>	2986012	1
PSR-SPP- 24DC/TS/M <sup>1)</sup>	2986025	1

#### Accessories

Accessories	Order No.	Pcs. / Pkt.
PSR-SAFECONF-BOX-DE	2986151	1
PSR-SAFECONF-BOX-EN	2986164	1
PSR-TRISAFE STARTER KIT	2986300	1
IFS-CONFSTICK <sup>1)</sup>	2986122	1
PSR-TBUS	2890425	50

<b>Description</b>
<b>Freely configurable master module</b> , for monitoring emergency stops, safety doors, light grids, etc., with 20 safe inputs and 4 safe outputs, 4 alarm outputs and 2 clock outputs, safe and standard extension, including memory stick and PSR-TBUS connector
With screw connection
With spring-cage connection

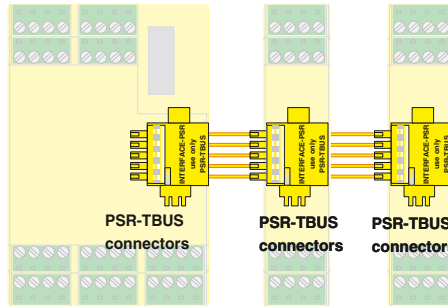
<b>Configuration package</b> for the PSR-TRISAFE safety module, consists of SAFECONF software, USB connecting cable, and quick start guide
German
English
<b>Starter kit</b> for the PSR-TRISAFE safety module, consists of PSR-TRISAFE demo board (with inputs and outputs), SAFECONF software, USB connecting cable (3 m), power supply with international plug adapters, quick start guide

<b>Multi-functional memory block</b> for the INTERFACE system
<b>PSR-TBUS DIN rail connector</b> , for supplying/controlling/monitoring (depending on the module)

PSR-TRISAFE modular

- I/O extension for PSR-TRISAFE-M
- I/O extension for PSR-TRISAFE-M
- 8 safe digital inputs
- 4 safe digital outputs or 4 additional digital inputs (that can be configured using SAFECONF)
- 2 alarm outputs or 2 clock outputs (that can be configured using SAFECONF)
- Narrow 22.5 mm housing
- Including PSR-TBUS connector (DIN rail connector) for adapting to the PSR-TRISAFE-M master module
- Up to Cat. 4/PL e according to EN ISO 13849-1, SILCL 3 according to IEC 62061, SIL 3 according to IEC 61508

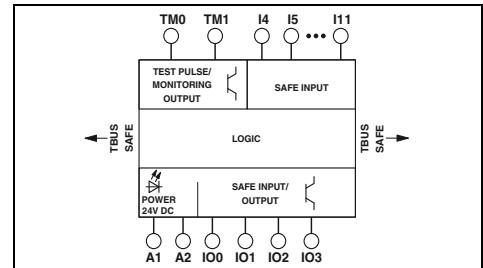
<b>Notes:</b>
For PSR-TRISAFE-M master module, see page 102
1) EMC: Class A product, see page 553



The TBUS connectors carry out the cross-wiring between the modules.



Extension module with 8 safe inputs, plus 4 safe inputs or outputs



<b>Module data</b>	
Nominal input voltage $U_N$	24 V DC (A1 / A2)
Permissible range (with reference to $U_N$ )	0.85 ... 1.1
Typ. current consumption (with reference to $U_N$ )	100 mA
Max. response time	< 30 ms
Interfaces	TBUS DIN rail for connection to the master module, supplied as standard
<b>Input data</b>	
Number of safe inputs	12 (of which 4 can be configured as input or output)
Nominal voltage	24 V DC
<b>Output data</b>	
Safe semiconductor outputs	4 (if the four parameterizable inputs/outputs are used as outputs)
Nominal voltage	24 V DC
Limiting continuous current	4x 0.5 A (see derating curve)
Cycle/alarm outputs	2
<b>General data</b>	
Ambient temperature range	-20 °C ... 55 °C
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Spring-cage connection solid/stranded/AWG	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	22.5 mm / 99 mm / 114.5 mm
W / H / D	22.5 mm / 112 mm / 114.5 mm
	Screw version
	Spring-cage version

**Technical data**

<b>Technical data</b>	
24 V DC (A1 / A2)	
0.85 ... 1.1	
100 mA	
< 30 ms	
TBUS DIN rail for connection to the master module, supplied as standard	
12 (of which 4 can be configured as input or output)	
24 V DC	
4 (if the four parameterizable inputs/outputs are used as outputs)	
24 V DC	
4x 0.5 A (see derating curve)	
2	
-20 °C ... 55 °C	
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12	
0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16	
22.5 mm / 99 mm / 114.5 mm	
22.5 mm / 112 mm / 114.5 mm	
	Screw version
	Spring-cage version

<b>Description</b>	
<b>Extension module</b> , 8 safe inputs and 4 safe freely parameterizable channels (as safe inputs or outputs), including PSR-TBUS connector	
With screw connection	
With spring-cage connection	
<b>PSR-TBUS DIN rail connector</b> , for supplying/controlling/monitoring (depending on the module)	

**Ordering data**

Type	Order No.	Pcs. / Pkt.
PSR-SCP- 24DC/TS/SDI8/SDIO4 <sup>1)</sup>	2986038	1
PSR-SPP- 24DC/TS/SDI8/SDIO4 <sup>1)</sup>	2986041	1

**Accessories**

PSR-TBUS	2890425	50
----------	---------	----



SafetyBridge technology is the controller type and network-independent safety concept from Phoenix Contact.

It can be used to easily integrate functional safety in your machine or system and therefore eliminates the need for a safety controller.

SafetyBridge technology is integrated in the proven Inline I/O system. This means that additional installation guidelines do not have to be observed when installing SafetyBridge modules.

The safe modules can be used in an I/O station and distributed at any point in the network.

The SafetyBridge system is approved for PROFIBUS, PROFINET, EtherNet/IP™, sercos III, INTERBUS, DeviceNet™, Modbus, and CANopen® bus systems. The system is therefore completely controller and network-independent, and can therefore be used flexibly.

The input and output modules exchange safe signals with the logic module via the relevant automation network. The standard control system and the existing network are then only used as a transport medium and do not perform any safety-related tasks.

In this safety system, the safe logic module performs the task of generating and monitoring the SafetyBridge protocol.

The safety logic is also processed directly in the safe logic module. The configuration of the safety function and the parameterization of the safe SafetyBridge modules is performed seamlessly using SAFECONF software.

The new third generation SafetyBridge logic module supports connection to a maximum of 16 safe input and output modules.



## Logic modules

The IB IL 24 LPSDO 8 V3-PAC logic module extends the possible field of application of the system significantly. In addition to the 16 possible connections for remote safe I/O modules, it also supports direct communication between the logic modules.

### Features:

- Generation and monitoring of the SafetyBridge protocol
- Processing of the parameterized safety logic
- Control of 8 safe outputs onboard



Connection of up to 5 safe input/output modules



Connection of up to 16 safe input/output modules



<b>Notes:</b>
Further information on the SAFECONF configuration software can be found on page 110
1) EMC: Class A product, see page 553

	Technical data	Technical data
Local bus interface		
Connection method	Inline data jumper	Inline data jumper
Transmission speed	500 kbaud/2 Mbaud, can be selected	500 kbaud/2 Mbaud, can be selected
Power supply for module electronics		
Supply voltage	24 V DC (via voltage jumper)	24 V DC (via voltage jumper)
Supply voltage range	19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC
Digital outputs		
Connection technology	2, 3, 4-wire	2, 3, 4-wire
Maximum number of outputs	8	8
Maximum output current per channel	2 A	2 A
Protective circuit	Overload protection, short-circuit protection of outputs	Overload protection, short-circuit protection of outputs
SafetyBridge properties		
Connection to I/O modules	max. 5 (safe digital I/O modules)	max. 16 (safe digital I/O modules)
Logic memory	24 kbyte	60 kbyte
General data		
Connection method	Spring-cage connection	Spring-cage connection
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	200 g	200 g
Width	48.8 mm	48.8 mm
Ambient temperature (operation)	-25 °C ... 55 °C	-25 °C ... 55 °C

	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Safety-related digital logic module</b>						
- Connection to a maximum of five safe I/O modules	IB IL 24 LPSDO 8 V2-PAC <sup>1)</sup>	2700606	1			
- Connection to a maximum of 16 safe I/O modules				IB IL 24 LPSDO 8 V3-PAC	2701625	1

	Accessories			Accessories		
	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Plug set</b> , consisting of four Inline plugs with integrated discharge electronics	IB IL 24 PSDO 8-PLSET/CP/R <sup>1)</sup>	2700722	1	IB IL 24 PSDO 8-PLSET/CP/R <sup>1)</sup>	2700722	1
<b>Configuration software for SafetyBridge and PSR-TRISAFE modules</b> , can be downloaded free of charge at <a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a>	SAFECONF	2986119	1	SAFECONF	2986119	1
<b>Starter kit</b> , including ILC 130 ETH, LPSDO and PSDI SafetyBridge modules, control panel, power supply unit, plus accessories with preconfigured safety application	ILC 130 SBT V2 STARTERKIT	2700993	1			
<b>Zack marker strip, flat</b> (see Catalog 5)	ZBF 6...			ZBF 6...		

### Safe I/O modules

The safe I/O modules can be used universally. The modules can be used in INTERBUS-Safety systems, PROFIsafe systems via PROFIBUS or PROFINET, and SafetyBridge systems.

The product range consists of safe input modules, positive wired output modules, positive/negative wired output modules, and floating output modules with integrated relay contacts.

An Inline station can be made up of safe and standard modules here, whereby a variety of function terminals are available to the user. The station is configured with high granularity with digital and analog inputs or outputs.

Within the relevant safety system, safety functions can be implemented in accordance with the following requirements:

- SIL 3 according to IEC 61508/EN 61508
- SILCL 3 according to IEC 62061/EN 62061
- PL e according to EN ISO 13849-1

#### Notes:

Further information on the SAFECONF configuration software can be found on page 110

1) EMC: Class A product, see page 553



Digital output module

△ FS

<b>Local bus interface</b>	
Fieldbus system	INTERBUS
Connection method	Inline data jumper
Transmission speed	500 kbaud/2 Mbaud, can be selected
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC (via voltage jumper)
Supply voltage range	19.2 V DC ... 30 V DC
<b>Digital outputs</b>	
Connection method	2, 3, 4-wire
Number of outputs	4 (with two-channel assignment)
Maximum output current per channel	2 A
Protective circuit	Overload protection, short-circuit protection of outputs
<b>General data</b>	
Weight	200 g
Width	48.8 mm
Ambient temperature (operation)	-25 °C ... 55 °C

Technical data	
INTERBUS	
Inline data jumper	
500 kbaud/2 Mbaud, can be selected	
24 V DC (via voltage jumper)	
19.2 V DC ... 30 V DC	
2, 3, 4-wire	
4 (with two-channel assignment)	
2 A	
Overload protection, short-circuit protection of outputs	
200 g	
48.8 mm	
-25 °C ... 55 °C	

Description
<b>Fail-safe digital output module</b>
- 8 outputs
<b>Fail-safe relay output module</b>
- 4 outputs
<b>Safety digital output module, +/- switching</b>
- 4 outputs
<b>Plug set, consisting of four Inline plugs with integrated discharge electronics</b>
<b>Zack marker strip, flat</b> (see Catalog 5)

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24 PSDO 8-PAC <sup>1)</sup>	2985631	1
Accessories		
IB IL 24 PSDO 8-PLSET/CP/R <sup>1)</sup>	2700722	1
ZBF 6...		





Relay output module



Digital output module, +/- wired



Technical data
INTERBUS Inline data jumper 500 kbaud/2 Mbaud, can be selected
24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC
2, 3, 4-wire 4 (safety relays) 4 A -
310 g 73.2 mm -25 °C ... 55 °C

Technical data
INTERBUS Inline data jumper 500 kbaud/2 Mbaud, can be selected
24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC
2, 3, 4-wire 4 (for two-channel assignment, +/- switching) 2 A Overload protection, short-circuit protection of outputs
200 g 48.8 mm -25 °C ... 55 °C

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24 PSDOR 4-PAC <sup>1)</sup>	2985864	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24 PSDO 4/4-PAC <sup>1)</sup>	2916493	1

Accessories		
ZBF 6...		

Accessories		
IB IL 24 PSDO 4/4-PLSET/CP/R <sup>1)</sup>	2700721	1
ZBF 6...		

### Safe I/O modules

The safe input modules can be used universally. The modules can be used in INTERBUS-Safety systems, PROFIsafe systems via PROFIBUS or PROFINET, and SafetyBridge systems.

Within the relevant safety system, safety functions can be implemented in accordance with the following requirements:

- SIL 3 according to IEC 61508/EN 61508
- SILCL 3 according to IEC 62061/EN 62061
- PL e according to EN ISO 13849-1

<b>Notes:</b>
Further information on the SAFECONF configuration software can be found on page 110
1) EMC: Class A product, see page 553

N



Digital input module, 16 inputs



Digital input module, 8 inputs

Applied for:  
Functional safety



Local bus interface	
Fieldbus system	
Connection method	
Transmission speed	
Power supply for module electronics	
Supply voltage	
Supply voltage range	
Digital inputs	
Connection method	
Number of inputs	
General data	
Weight	
Width	
Ambient temperature (operation)	

Technical data		
Local bus		
Inline data jumper		
500 kbaud/2 Mbaud, can be selected		
Supply voltage	24 V DC (via voltage jumper)	
Supply voltage range	19.2 V DC ... 30 V DC	
Connection method	2, 3, 4-wire	
Number of inputs	8 / 16 (two channel/one channel)	
Weight	225 g	
Width	48.8 mm	
Ambient temperature (operation)	-25 °C ... 55 °C	

Technical data		
Fieldbus system	INTERBUS	
Connection method	Inline data jumper	
500 kbaud/2 Mbaud, can be selected		
Supply voltage	24 V DC (via voltage jumper)	
Supply voltage range	19.2 V DC ... 30 V DC	
Connection method	2, 3, 4-wire	
Number of inputs	4 / 8 (two channel/one channel)	
Weight	200 g	
Width	48.8 mm	
Ambient temperature (operation)	-25 °C ... 55 °C	

<b>Description</b>
<b>Fail-safe digital input module</b>
- 16 inputs
- 8 inputs

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24 PSDI 16-PAC	2700994	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24 PSDI 8-PAC <sup>1)</sup>	2985688	1

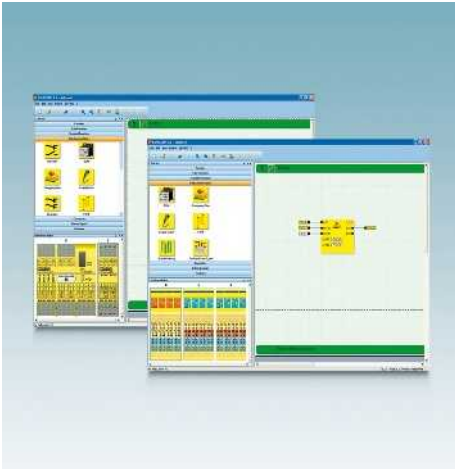
<b>Plug set</b> , consisting of four Inline plugs with integrated discharge electronics
<b>Zack marker strip, flat</b> (see Catalog 5)

Accessories		
ZBF 6...		

Accessories		
IB IL 24 PSDI 8-PLSET/CP/R <sup>1)</sup>	2700720	1
ZBF 6...		



### SAFECONF – configuration software



The software implements the consistent configuration of the safety function and the parameterization of the safe SafetyBridge and PSR-TRISAFE modules.

Instead of being programmed, the required functions and components are simply dragged to the connection editor, where they can be linked. It takes just three steps to create a project, test it, and transfer it to the safety module.

When using SafetyBridge modules, you can create the safe configuration regardless of the controller and automation network used.



Configuration software for PSR-TRISAFE and SafetyBridge modules



#### Technical data

##### Hardware requirements

CPU  
Main memory (RAM)

Hard disk memory  
Optical drive  
Operating equipment  
Monitor resolution

##### Software requirements

Operating systems

##### Supported browsers

Basic functions

##### Languages supported

Pentium, 2 GHz (recommended), 1 GHz (min.)  
(Under Windows 7/Windows Vista: 2 Gbytes (recommended) or 1 Gbyte (minimum), under Windows XP/2000: 1 Gbyte (recommended) or 512 Mbytes (minimum))

min. 250 MB  
CD-ROM  
Keyboard, mouse  
800x600

MS Windows 2000 (SP4), MS Windows XP (SP2), MS Windows Vista, MS Windows 7  
Internet Explorer 5.0 or higher

Configuration software for PSR-TRISAFE and SafetyBridge technology

German, English, French, Spanish, Italian, Japanese

#### Ordering data

##### Description

**Configuration software for SafetyBridge and PSR-TRISAFE modules**, can be downloaded free of charge at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products)

##### Type

##### Order No.

##### Pcs. / Pkt.

SAFECONF

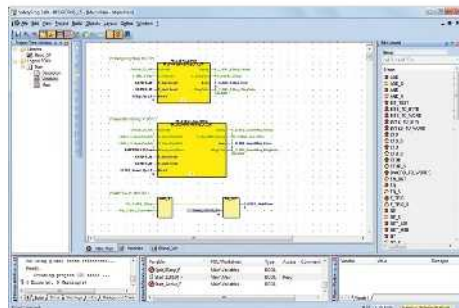
2986119

1

## SAFETYPROG – programming software

### Notes:

Further information on the safe PROFIsafe controller can be found on page 113



SAFETYPROG can be used to develop safe applications with safety controllers - using PROFIsafe or INTERBUS-Safety networks.

The TÜV-certified programming tool guides you through the various development phases of a safety application:

- IEC 61131-compliant programming in function block diagram (FBD), ladder diagram (LD), and structured text (ST)
- Compiling the project
- Sending the project to the safety controller
- Controlling the safety controller, e.g., start, stop or reset
- Performing function tests
- Monitoring the safety controller and debugging the safety application
- Project documentation
- Printing project documentation

SAFETYPROG contains a comprehensive library with 20 certified function blocks for safety technology, all in accordance with PLCopen safety specification 1.0.

### Useful tools

SAFETYPROG offers many innovative tools, which enable you to integrate functional safety in your automation system:

- User management
- Bus configuration project for importing process and diagnostic data
- Bus navigator
- Code editor and Edit wizard
- Coupling of safe and standard PLC
- Project tree
- Cross-reference and message windows
- Controller simulation
- Variable editor



Programming software for  
INTERBUS-Safety systems  
and PROFIsafe controllers

### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<p><b>Programming software for INTERBUS-Safety systems and PROFIsafe controllers</b>, with graphical user interface according to IEC 61131-3 in function block diagram (FBD) and ladder diagram (LD).</p> <p><b>One library</b> from the corresponding <b>PLCopen libraries</b> can be used per project.</p>	SAFETYPROG BASIC	2700443	1
<p><b>Programming software for INTERBUS-Safety systems and PROFIsafe controllers</b>, with graphical user interface according to IEC 61131-3 in function block diagram (FBD) and ladder diagram (LD).</p> <p><b>Three of the libraries</b> from the corresponding <b>PLCopen libraries</b> can be used per project.</p>	SAFETYPROG ADVANCED	2700441	1
<p><b>Programming software for INTERBUS-Safety systems and PROFIsafe controllers</b>, with graphical user interface according to IEC 61131-3 in function block diagram (FBD) and ladder diagram (LD).</p> <p><b>All of the libraries</b> from the corresponding <b>PLCopen libraries</b> can be used per project.</p>	SAFETYPROG PROFESSIONAL	2700442	1

# Functional safety

## Safe control technology

### Safe PROFINET gateway

The safe PROFINET gateway from Phoenix Contact enables secure communication between two PROFINET networks. This means that you can implement system-wide and manufacturer-independent functional safety, such as emergency stop concepts.

#### Your advantages:

- Coupling of two PROFINET systems
- Transmission of standard I/O data via PROFINET
- Transmission of safe I/O data via PROFIsafe
- Redundant power supply
- Control-independent

#### Within a PROFIsafe system, the safety functions associated with the following requirements are supported:

- SIL 3 according to IEC 61508
- SILCL 3 according to EN 62061
- PL e according to EN ISO 13849-1

<b>Notes:</b>
1) EMC: Class A product, see page 553



Safe PROFINET gateway

PROFIBUS PROFIsafe

<b>Supply</b>
Supply voltage
Supply voltage range
Max. current consumption
<b>Programming data</b>
IN and OUT process data
<b>General data</b>
Weight
Width
Height
Depth
Ambient temperature (operation)

#### Technical data

24 V DC
18.5 V DC ... 30 V DC (including ripple)
max. 250 mA
128 Byte (2 - 11 bytes of safe IO process data)
550 g
130 mm
27 mm
145 mm
-25 °C ... 55 °C

<b>Description</b>
Safe PROFINET gateway

#### Ordering data

Type	Order No.	Pcs. / Pkt.
FL PN/PN SDIO-2TX/2TX <sup>1</sup> )	2700651	1

<b>Color marking</b> for FL CAT ...patch...
- Blue
- Red
<b>Lockable security element</b> for FL PATCH...
<b>Key</b> for FL PATCH GUARD
<b>Security element</b> for FL CAT ...patch...

#### Accessories

	Order No.	Pcs. / Pkt.
FL PATCH CCODE BU	2891291	20
FL PATCH CCODE RD	2891893	20
FL PATCH GUARD	2891424	20
FL PATCH GUARD KEY	2891521	1
FL PATCH SAFE CLIP	2891246	20

## Safe PROFIsafe controller

The RFC 470S is the safety version of the most powerful high-end PLC and offers all the features of the class 400 high-performance controller. In addition, it has an integrated safety controller. This combination can be used to integrate safety functions up to SIL 3 into existing systems.

### Your advantages:

- The use of PROFIsafe reduces wiring effort and installation time
- Thanks to the integrated PROFINET interface, the RFC 470S communicates directly with PROFIsafe modules
- The safety function is programmed using the SAFETYPROG software

### Depending on the parameterization of the I/O modules and the programming, the RFC 470S can meet the following requirements:

- SIL 3 according to IEC 61508
- SILCL 3 according to EN 62061
- PL e according to EN ISO 13849-1

Notes:
Further information on class 400 high-performance controllers can be found in the "Controllers" section of this catalog.
Further information on the SAFETYPROG programming software can be found on page 111
1) EMC: Class A product, see page 553



Class 400 high-performance controller with integrated safety controller

Functional safety

Interfaces
INTERBUS (Master)
Ethernet
Parameterization/operation/diagnostics
INTERBUS master
Number of possible parameter channels
Number of I/O nodes
Number of supported devices
Direct I/Os
Connection method
Number of inputs
Number of outputs
IEC-61131 runtime system
Processing speed
Program memory
Data memory
Retentive data memory
Number of data blocks
Number of timers, counters
Number of control tasks
Realtime clock
Power supply
Power supply connection
Supply voltage
Supply voltage range
Typical current consumption
General data
Width
Height
Depth
Degree of protection
Ambient temperature (operation)

Technical data
D-SUB-9 socket
3x RJ45 sockets
V.24 (RS-232-C), D-SUB plug, 10/100 Ethernet (RJ45), 2x USB
max. 126
max. 8192
max. 512 (of which 254 are remote bus devices/bus segments)
14-pos. FLK pin strip
5
3
0.005 ms (1 K mix instructions)
1 µs (1 K bit instructions)
Typ. 8 Mbyte (680 K instructions (IL))
16 Mbyte
240 kbyte (NVRAM)
(depends on data memory)
(depends on data memory)
16
Integrated (battery backup)
Screw terminal blocks, plug-in
24 V DC
19.2 V DC ... 30 V DC (including ripple)
1 A
124 mm
185 mm
190 mm
IP20
0 °C ... 55 °C (from 45°C only with fan module)

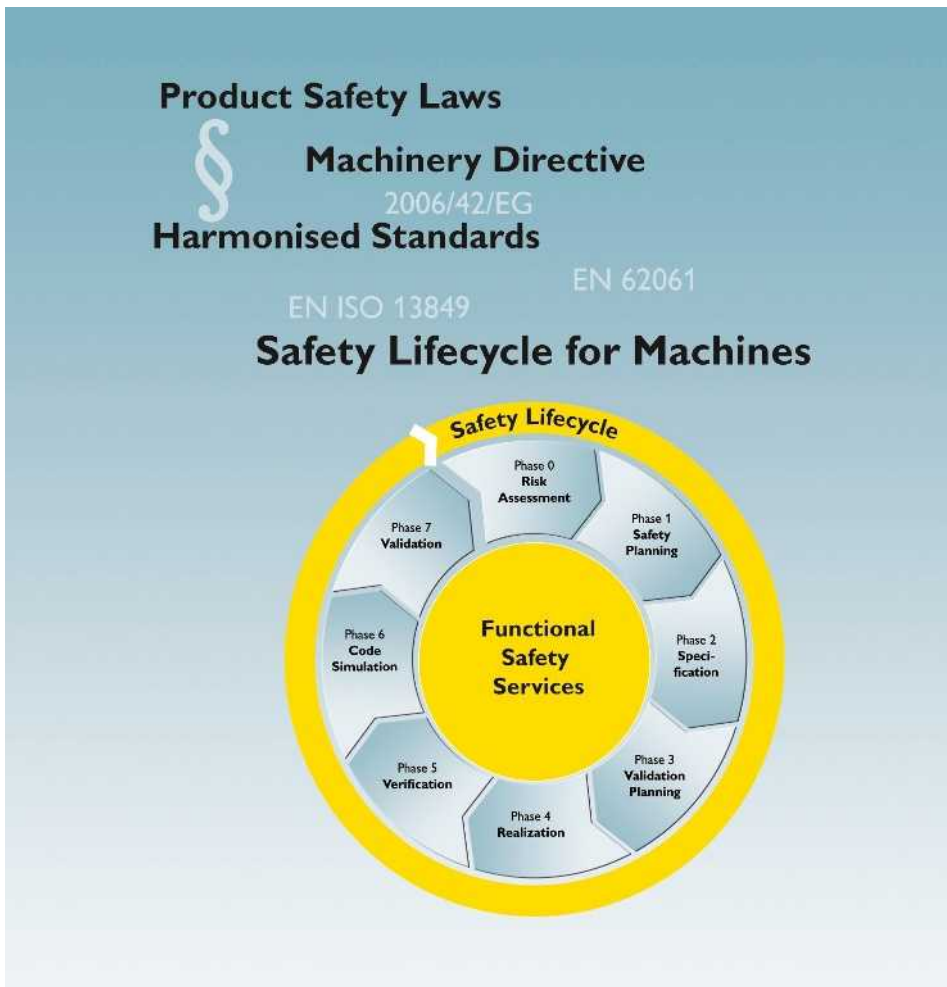
Description
<b>Safety controller</b>

<b>Parameterization memory</b>
- 256 MB
- 2 GB
<b>Programming cable</b> , to connect the controller boards to the PC (V.24 (RS-232-C)), length 3 m
<b>V.24 (RS-232) null modem adapter</b>
- 9-pos. socket to 9-pos. plug
<b>Fan module</b> for Remote Field Controller
<b>AX OPC SERVER</b> , communication interface for OPC-compatible visualization with PC Worx-based controllers
<b>SAFETYPROG programming software</b>
- Basic
- Advanced
- Professional
Engineering software

Ordering data		
Type	Order No.	Pcs. / Pkt.
RFC 470S PN 3TX <sup>1)</sup>	2916794	1

Accessories		
Type	Order No.	Pcs. / Pkt.
CF FLASH 256MB	2988780	1
CF FLASH 2GB	2701185	1
IBS PRG CAB	2806862	1
PSM-AD-D9-NULLMODEM	2708753	1
RFC DUAL-FAN <sup>1)</sup>	2730239	1
AX OPC SERVER	2985945	1
SAFETYPROG BASIC	2700443	1
SAFETYPROG ADVANCED	2700441	1
SAFETYPROG PROFESSIONAL	2700442	1
PC Worx ... (see "Software" section)		





### Safety lifecycle

Based on the harmonized standards of the Machinery Directive, Phoenix Contact has developed a phase model, which represents the safety lifecycle. This structured procedure assists in the application of and conformance with the harmonized standards of the Machinery Directive.

The safety lifecycle represents a specific process for the design and manufacture of machinery, which fully includes the requirements for functional safety. The phase-specific verification documentation already includes the contents required in order to demonstrate CE conformance. This is a legal requirement for placing items on the market in the European Economic Area.

### Expert support

With our services for functional safety, we focus on the safety lifecycle for machines. This means that as the person responsible, you can be sure that all systematic errors will be eliminated on your machine and all requirements of standards will be met.

We are on hand to assist you throughout the entire lifecycle of your application: we provide support from the initial risk assessment, drafting the concept, implementation, startup, and operation right up to system modernization.

The choice is yours:

- Appoint one of our safety experts for consultation, process assistance, engineering or service activities
- Ask us to train and qualify your employees

### Your advantages from our safety services

- Time saved by transferring safety requirements
- Maximum legal certainty
- Optimum technical safety solution
- Sophisticated process management
- Target-oriented project management
- Traceable, legal protection thanks to consistent documentation

### First aid

If queries arise during startup and operation, in addition to your local specialists you can also contact our free 24-hour safety hotline at any time (+ 49 5281 9-462777) or e-mail us on [safety-service@phoenixcontact.com](mailto:safety-service@phoenixcontact.com).



### Detailed consulting

We are here to advise you from the initial planning of your safety-related application right up to startup.

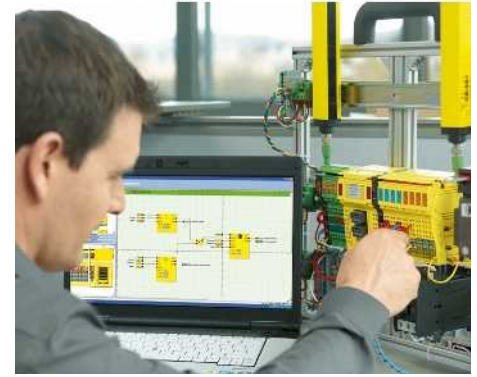
Individual consultation sessions focusing on your specific requirements are a solid basis for further measures.



### Presentation

Our safety specialists provide support by consulting with your company's design experts.

Through intensive consultation, we will work with you at each stage to develop the ideal solution for your requirements.



### Safety engineering

Our safety specialists support you from the initial planning of your safety-related application right up to startup and system modernization.



### Safety service

Use our range of safety services for start-up, operation or system modernization.

Should you have any general queries about the functions of components, use our free 24-hour safety hotline and we will assist you directly on site while the process is running.



### Individual safety training

If you require specialist knowledge for your safety environment and wish to arrange the training location and schedule yourself, then we can create an individual training course for you.

**Services for Industrial Ethernet can be found on page 46.**

**Services for automation can be found on page 546.**



# HMI and industrial PCs

HMI and industrial PCs are the key to the efficient operation and monitoring of your systems and machines. You can work with a portable Bluetooth tablet PC directly on site – or design detailed user interfaces as the interface to your system using a powerful HMI device.

Industrial PCs and HMIs from Phoenix Contact are so versatile and flexible that they do not present any restrictions for your operation and monitoring concepts. Visu+ and WebVisit are the corresponding visualization software tools. In addition to the wide range of products, we also provide worldwide service.

## HMI






Human-machine interfaces, or HMIs for short, represent cost-effective automation based on efficient input and monitoring. Depending on your requirements, you can select devices for basic, standard or high-end applications. Whether directly on site, centrally in the control center, high performance or multifunctional: it is you who determines the features of the HMIs.






## Industrial PCs






Industrial PCs, or IPCs for short, combine the computing capacity of modern processors with the robustness and reliability of industrial components. Together with the right software, IPCs are efficient and versatile solutions for controlling, operating, and monitoring systems and machines.






<b>Product overview</b>	<b>118</b>
<hr/>	
<b>HMI</b>	
HMI for basic applications	120
HMI for standard applications	122
HMI for high-end applications	124
HMI for maritime applications	126
<hr/>	
<b>Industrial PCs</b>	
Box PCs	128
Monitors with touch function	132
Panel PCs	134
Tablet PCs	142









	Minitouch	Web panels			
					
Type	TD 1030T	WP 04T WP 06T	WP 10T WP 15T	WP 07T/WS WP 09T/WS	WP 06T/XC WP 07T/XC
Description	2.8" color TFT display	3.5"/5.7" color TFT display	10.4" ... 15" color TFT display	Widescreen 7" ... 9" color TFT display	Outdoor 5.7" ... 7" color TFT display
Page	120	120	121	121	121

Touch panels					
					
Type	TP 3057M ...	TP 3xxxT ...	TP 5xxxT	TP 5xxxC	TP .../M 201
Description	5.7" monochrome display	5.7" ... 12.1" color TFT display PROFIBUS DP, MPI, CANopen® or serial interface as an option	12.1" ... 17" color TFT display Intel Atom CPU	12.1" ... 17" color TFT display Celeron M CPU	7" ... 15" display Touch panel for maritime applications
Page	122	122	124	124	126

Box PCs					
					
Type	VL BPC MINI	VL BPC 1000	VL BPC 1001	VALUELINE IPC	VL IPC P7000
Description	Box PC for DIN rail mounting	Box PC for DIN rail mounting	Box PC for DIN rail mounting	Configurable box PC for wall mounting without/with PCI extension	Configurable box PC for wall mounting
Page	128	129	129	130	131

Monitors with touch function					
					
Type	VL FPM 12(U)	VL FPM 15(U)	VL FPM 17(U)	VL FPM 19U	Accessories
Description	12.1" color TFT display, optional USB port on front	15" color TFT display, optional USB port on front	17" color TFT display, optional USB port on front	19" color TFT display, with USB port on front	Transparent, silicon-free protective foil for 15" touch screen
Page	132	133	133	133	133

Panel PCs

					
<b>Type</b>	<b>EL PPC7 1000</b> <b>EL PPC9 1000</b>	<b>EL PPC12 1000</b> <b>EL PPC15 1000</b>	<b>VALUeline IPC</b>	<b>VL IPC P7000</b>	<b>Accessories</b>
<b>Description</b>	Configurable panel PC with 7" ... 9" widescreen display	Configurable panel PC with 12" ... 15.4" widescreen display	Configurable panel PC with 12" ... 24" display without/with PCI extension	Configurable panel PC with 12" ... 24" display	Mounting kit, protective foil for 15" touch screen
<b>Page</b>	134	135	134	134	

IP65 panel PCs





					
<b>Type</b>	<b>DL PPC15 1000</b>	<b>DL PPC15M 1000</b>	<b>VMT 30xx</b>	<b>VMT 30xx EXP SUN</b>	<b>Accessories</b>
<b>Description</b>	Configurable panel PC with IP65 protection with touch screen, 15" display	Configurable panel PC with IP65 protection with multi-touch screen, 15" display	Configurable panel PC with IP65 protection with touch screen, 8" ... 15" display	Panel PC with IP65 protection with touch screen, 10.4" ... 12.1" sunlight readable display	Brackets, external power supply unit
<b>Page</b>	138	139	140	141	140

Tablet PCs

		
<b>Type</b>	<b>TPC 6013...</b>	<b>Accessories</b>
<b>Description</b>	Mobile tablet PC with touch screen, 13.3" display	3-point belt, hand strap, touch pen, mechanical docking with lock, replacement battery
<b>Page</b>	142	142

Software

Software PLC

				
<b>Type</b>	<b>WEBVISIT ...</b>	<b>VISU+ 2 ...</b>	<b>PORTICO</b>	<b>PC WORX RT BASIC</b>
<b>Description</b>	Development software for all web panels	Development software for all touch panels and operator terminals	Remote control of networked IPCs	The software PLC transforms your PC into a controller
<b>Page</b>		See "Software" section		See "Controllers" section

Web panel and minitouch devices are inexpensive operator panels for basic operation and monitoring tasks.

**Features:**

- Tailor-made for class 100 compact controllers
- Fast startup thanks to plug & play
- **Minitouch:** alphanumeric 4-color display
- **Web panel:** full graphic color display for clear representation
- Quick and user-friendly representation of your control variables using PC Worx EXPRESS and WebVisit software tools
- Multi-user operation thanks to server/client structure
- Easy device replacement, as the project is saved on the PLC



**Minitouch**  
7.1 cm (2.8") TFT color display



**Web panel**  
8.9 cm (3.5")/14.5 cm (5.7")  
TFT color display



**Notes:**  
1) EMC: Class A product, see page 553

Technical data	
Display data	
Display	7.1 cm/2.8" TFT active
Monitor resolution	320 x 240 Pixel (QVGA)
Display lighting type	LED
Brightness	280 cd/m <sup>2</sup> , typical (adjustable)
Display backlight MTBF	40000 h
Color spectrum	4 colors
Touch screen	Resistive industrial touch screen
Computer data	
Operating systems	Keil RTX (RTOS)
Processor	Cortex™-M3 120 MHz
Main memory	96 kB SRAM
Data memory	512 kB flash memory
Interfaces	None
External dimensions	
Width	96 mm
Height	72 mm
Depth	60 mm
Installation dimensions	
Width	92.8 mm
Height	68.7 mm
Installation depth	53.5 mm
General data	
Degree of protection	IP54 (front), IP20 (back)
Ambient temperature (operation)	0 °C ... 50 °C
Mounting type	Installation in front plate
Vibration (operation)	DIN EN 60068-2-6
Shock	DIN EN 60068-2-27

Technical data	
WP 04T <sup>1)</sup>	WP 06T <sup>1)</sup>
8.9 cm/3.5" TFT active	14.5 cm/5.7" TFT active
320 x 240 Pixel (QVGA)	320 x 240 Pixel (QVGA)
LED	LED
350 cd/m <sup>2</sup> , typical (adjustable)	380 cd/m <sup>2</sup> , typical (adjustable)
40000 h	40000 h
65,536 colors	65,536 colors
Resistive industrial touch screen	Resistive industrial touch screen
Windows CE 5.0	Windows CE 5.0
RISC ARM9™ CPU ; 200 MHz	RISC ARM9™ CPU ; 200 MHz
64 Mbyte SDRAM	64 Mbyte SDRAM
32 Mbyte flash memory	32 Mbyte flash memory
2x USB Host 2.0	2x USB Host 2.0
120 mm	168 mm
90 mm	126 mm
	5 mm
112 mm	160 mm
82 mm	118 mm
35 mm	42 mm
IP65 (front), IP20 (back)	IP65 (front), IP20 (back)
0 °C ... 50 °C	0 °C ... 50 °C
Installation in front plate	Installation in front plate
DIN EN 60068-2-6	DIN EN 60068-2-6
DIN EN 60068-2-27	DIN EN 60068-2-27

Ordering data	
Description	
<b>Minitouch</b>	
- 7.1 cm (2.8") display	
<b>Web panel</b>	
- 8.9 cm (3.5") display	
- 14.5 cm (5.7") display	
- 26.4 cm (10.5") display	
- 38.1 cm (15") display	
<b>Widescreen web panel</b>	
- 17.8 cm (7") display	
- 22.9 cm (9") display	
<b>Web panel, extended temperature range</b>	
- 14.5 cm (5.7") display	
- 17.8 cm (7") display	

Ordering data		
Type	Order No.	Pcs. / Pkt.
TD 1030T	2701257	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
WP 04T <sup>1)</sup>	2913632	1
WP 06T <sup>1)</sup>	2913645	1





**Web panel**  
26.4 cm (10.4")/38.1 cm (15")  
TFT color display



**Widescreen web panel**  
17.8 cm (7")/22.9 cm (9")  
TFT color display



**Outdoor web panel**  
14.5 cm (5.7")/17.8 cm (7")  
TFT color display



Technical data	
WP 10T <sup>1)</sup>	WP 15T <sup>1)</sup>
26.4 cm/10.4" TFT active 800 x 600 Pixel (SVGA)	38.1 cm/15" TFT active 1024 x 768 Pixel (XGA)
LED	
330 cd/m <sup>2</sup>	480 cd/m <sup>2</sup>
50000 h 65,536 colors	
Resistive industrial touch screen	
Windows CE 5.0 RISC ARM9™ CPU ; 200 MHz 64 Mbyte SDRAM 32 Mbyte flash memory 2x USB Host 2.0	
295 mm 220 mm	400 mm 329 mm
5 mm	
287 mm 212 mm 55 mm	374 mm 303 mm 60 mm
IP65 (front), IP20 (back) 0 °C ... 50 °C Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27	

Technical data	
WP 07T/WS <sup>1)</sup>	WP 09T/WS <sup>1)</sup>
17.8 cm/7" TFT active 800 x 480 Pixel (WVGA)	22.9 cm/9" TFT active 800 x 480 Pixel (WVGA)
CCFL	
400 cd/m <sup>2</sup> , typical (adjustable)	240 cd/m <sup>2</sup> , typical (adjustable)
50000 h 65,536 colors	
Resistive industrial touch screen	
Windows CE 5.0 RISC ARM9™ CPU ; 200 MHz 64 Mbyte SDRAM 32 Mbyte flash memory 2x USB Host 2.0	
203 mm 147 mm	260 mm 172 mm
5 mm	
195 mm 139 mm	252 mm 164 mm
54 mm	
IP65 (front), IP20 (back) 0 °C ... 50 °C Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27	

Technical data	
WP 06T/XC	WP 07T/XC
14.5 cm/5.7" TFT active 320 x 240 Pixel (QVGA)	17.8 cm/7" TFT active 800 x 480 Pixel (WVGA)
LED	
400 cd/m <sup>2</sup> , typical (adjustable)	350 cd/m <sup>2</sup> , typical (adjustable)
40000 h 65,536 colors	
Resistive industrial touch screen	
Windows CE 5.0 RISC ARM9™ CPU ; 184 MHz 128 Mbyte SDRAM 64 Mbyte flash memory 2x USB Host 2.0	
195 mm 153 mm	234 mm 173 mm
5 mm	
161 mm 119 mm	200 mm 140 mm
42 mm	
IP67 (front), IP20 (back) -20 °C ... 70 °C Installation in front plate DIN EN 60068-2-6 DIN EN 60068-2-27	

Ordering data		
Type	Order No.	Pcs. / Pkt.
WP 10T <sup>1)</sup>	2700934	1
WP 15T <sup>1)</sup>	2700935	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
WP 07T/WS <sup>1)</sup>	2700307	1
WP 09T/WS <sup>1)</sup>	2700309	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
WP 06T/XC	2701555	1
WP 07T/XC	2701556	1

## HMI for standard applications

### Touch panels

Thanks to the numerous interfaces, drivers, and display sizes, touch panels from Phoenix Contact can be optimally adapted to your requirements. Licenses are already included for the Visu+ software and the OPC server.

#### Your advantages:

- Save costs and increase service life, thanks to LED backlighting that can be adjusted directly via buttons
- Increase system availability, thanks to temperature and voltage monitoring
- Quick response in the event of an alarm with integrated buzzer (85 dB)
- Global use: additional fonts are easy to install
- Available with PROFIBUS DP, MPI, CANopen®, and serial interface as an option
- Expansion with external flash mass storage



14.5 cm (5.7") monochrome display



14.5 cm (5.7") TFT color display

**Notes:**  
1) EMC: Class A product, see page 553

Display data	
Display	14.5 cm/5.7" TFT active
Monitor resolution	320 x 240 Pixel (QVGA)
Display lighting type	LED
Brightness	250 cd/m <sup>2</sup> , typical (adjustable)
Display backlight MTBF	40000 h
Color spectrum	256-step grayscale
Touch screen	Resistive industrial touch screen
Computer data	
Operating systems	Windows CE 6.0
Processor	Xscale® PXA320, 806 MHz
Main memory	128 Mbyte SDRAM
Data memory	1 GB flash memory
Interfaces	2x USB Host 1.1, 1x Compact Flash®
External dimensions	
Width	203 mm
Height	147 mm
Depth	5 mm
Installation dimensions	
Width	195 mm
Height	139 mm
Installation depth	49 mm
General data	
Degree of protection	IP65 (front), IP20 (back)
Ambient temperature (operation)	0 °C ... 50 °C
Mounting type	Installation in front plate
Vibration (operation)	DIN EN 60068-2-6
Shock	DIN EN 60068-2-27

Technical data		
Display	14.5 cm/5.7" TFT active	
Monitor resolution	320 x 240 Pixel (QVGA)	
Display lighting type	LED	
Brightness	250 cd/m <sup>2</sup> , typical (adjustable)	
Display backlight MTBF	40000 h	
Color spectrum	256-step grayscale	
Touch screen	Resistive industrial touch screen	
Computer data		
Operating systems	Windows CE 6.0	
Processor	Xscale® PXA320, 806 MHz	
Main memory	128 Mbyte SDRAM	
Data memory	1 GB flash memory	
Interfaces	2x USB Host 1.1, 1x Compact Flash®	
External dimensions		
Width	203 mm	
Height	147 mm	
Depth	5 mm	
Installation dimensions		
Width	195 mm	
Height	139 mm	
Installation depth	49 mm	
	55 mm, approximately with fieldbus interface	
General data		
Degree of protection	IP65 (front), IP20 (back)	
Ambient temperature (operation)	0 °C ... 50 °C	
Mounting type	Installation in front plate	
Vibration (operation)	DIN EN 60068-2-6	
Shock	DIN EN 60068-2-27	

Technical data		
Display	14.5 cm/5.7" TFT active	
Monitor resolution	320 x 240 Pixel (QVGA)	
Display lighting type	LED	
Brightness	350 cd/m <sup>2</sup> , typical (adjustable)	
Display backlight MTBF	40000 h	
Color spectrum	65,536 colors	
Touch screen	Resistive industrial touch screen	
Computer data		
Operating systems	Windows CE 6.0	
Processor	Xscale® PXA320, 806 MHz	
Main memory	128 Mbyte SDRAM	
Data memory	1 GB flash memory	
Interfaces	2x USB Host 1.1, 1x Compact Flash®	
External dimensions		
Width	203 mm	
Height	147 mm	
Depth	5 mm	
Installation dimensions		
Width	195 mm	
Height	139 mm	
Installation depth	49 mm	
	55 mm, approximately with fieldbus interface	
General data		
Degree of protection	IP65 (front), IP20 (back)	
Ambient temperature (operation)	0 °C ... 50 °C	
Mounting type	Installation in front plate	
Vibration (operation)	DIN EN 60068-2-6	
Shock	DIN EN 60068-2-27	

Ordering data	
Type	Order No.
<b>Touch panel</b> with graphics-capable TFT display, 1 x Ethernet, 2 x USB, and integrated runtime of the Visu+ visualization software	
- Without fieldbus interface	
<b>Touch panel</b> with graphics-capable TFT display, 1 x Ethernet, 2 x USB, and integrated runtime of the Visu+ visualization software	
- PROFIBUS DP interface	
- MPI interface	
- CANopen® interface	
- RS-232 interface	

Ordering data		
Type	Order No.	Pcs. / Pkt.
TP 3057M <sup>1)</sup>	2700901	1
TP 3057M PB <sup>1)</sup>	2700902	1
TP 3057M MPI <sup>1)</sup>	2700903	1
TP 3057M CO <sup>1)</sup>	2700904	1
TP 3057M SER <sup>1)</sup>	2700905	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
TP 3057T <sup>1)</sup>	2700906	1
TP 3057T PB <sup>1)</sup>	2700907	1
TP 3057T MPI <sup>1)</sup>	2700908	1
TP 3057T CO <sup>1)</sup>	2700909	1
TP 3057T SER <sup>1)</sup>	2700910	1

Accessories	
Type	Order No.
<b>Mounting kit</b> , including hardware for installation	
- Panel installation	

Accessories		
Type	Order No.	Pcs. / Pkt.
HMI SCB MOUNTING KIT 6	2701385	1

Accessories		
Type	Order No.	Pcs. / Pkt.
HMI SCB MOUNTING KIT 6	2701385	1



17.8 cm (7") TFT color display



26.4 cm (10.4") TFT color display



30.7 cm (12.1") TFT color display



### Technical data

17.8 cm/7" TFT active  
800 x 480 Pixel (WVGA)  
LED  
350 cd/m<sup>2</sup>, typical (adjustable)  
40000 h  
65,536 colors  
Resistive industrial touch screen

Windows CE 6.0  
Xscale® PXA320, 806 MHz  
128 Mbyte SDRAM  
1 GB flash memory  
2x USB Host 1.1, 1x Compact Flash®

203 mm  
147 mm  
5 mm

195 mm  
139 mm  
49 mm  
55 mm, approximately with fieldbus interface

IP65 (front), IP20 (back)  
0 °C ... 50 °C  
Installation in front plate  
DIN EN 60068-2-6  
DIN EN 60068-2-27

### Technical data

26.4 cm/10.4" TFT active  
800 x 600 Pixel (SVGA)  
LED  
350 cd/m<sup>2</sup>, typical (adjustable)  
50000 h  
65,536 colors  
Resistive industrial touch screen

Windows CE 6.0  
Xscale® PXA320, 806 MHz  
128 Mbyte SDRAM  
1 GB flash memory  
2x USB Host 1.1, 1x Compact Flash®

295 mm  
220 mm  
5 mm

287 mm  
212 mm  
56 mm  
61 mm, approximately with fieldbus interface

IP65 (front), IP20 (back)  
0 °C ... 50 °C  
Installation in front plate  
DIN EN 60068-2-6  
DIN EN 60068-2-27

### Technical data

30.7 cm/12.1" TFT active  
800 x 600 Pixel (SVGA)  
LED  
300 cd/m<sup>2</sup>, typical (adjustable)  
50000 h  
65,536 colors  
Resistive industrial touch screen

Windows CE 6.0  
Xscale® PXA320, 806 MHz  
128 Mbyte SDRAM  
1 GB flash memory  
2x USB Host 1.1, 1x Compact Flash®

340 mm  
270 mm  
5 mm

315 mm  
243.5 mm  
60 mm  
65 mm, approximately with fieldbus interface

IP65 (front), IP20 (back)  
0 °C ... 50 °C  
Installation in front plate  
DIN EN 60068-2-6  
DIN EN 60068-2-27

### Ordering data

Type	Order No.	Pcs. / Pkt.
TP 3070T <sup>1)</sup>	2700911	1
TP 3070T PB <sup>1)</sup>	2700912	1
TP 3070T MPI <sup>1)</sup>	2700913	1
TP 3070T CO <sup>1)</sup>	2700914	1
TP 3070T SER <sup>1)</sup>	2700915	1

### Ordering data

Type	Order No.	Pcs. / Pkt.
TP 3105T <sup>1)</sup>	2700916	1
TP 3105T PB <sup>1)</sup>	2700917	1
TP 3105T MPI <sup>1)</sup>	2700918	1
TP 3105T CO <sup>1)</sup>	2700919	1
TP 3105T SER <sup>1)</sup>	2700920	1

### Ordering data

Type	Order No.	Pcs. / Pkt.
TP 3121T <sup>1)</sup>	2700921	1
TP 3121T PB <sup>1)</sup>	2700922	1
TP 3121T MPI <sup>1)</sup>	2700923	1
TP 3121T CO <sup>1)</sup>	2700924	1
TP 3121T SER <sup>1)</sup>	2700925	1

### Accessories

Accessories	Order No.	Pcs. / Pkt.
HMI SCB MOUNTING KIT 6	2701385	1

### Accessories

Accessories	Order No.	Pcs. / Pkt.
HMI SCB MOUNTING KIT 8	2701387	1

### Accessories

Accessories	Order No.	Pcs. / Pkt.
HMI SCB MOUNTING KIT 8	2701387	1

### Touch panels

Powerful touch panels with PC platform are the ideal solution for graphics-intensive visualization applications. The devices in the 5000 series are ideal for use in large networked machines and systems. Thanks to technical properties such as the X86 platform with Windows CE, the HMIs offer a fair price/performance ratio. You can therefore even implement intelligent operating concepts in complex systems.

#### Additional features:

- Cost-effective solution, since there are no additional costs for SCADA runtime: unlimited runtime license for VISU+ RT and AX OPC SERVER included
- Ethernet-based drivers available for connection to third-party systems
- Additional monitor connection possible by using the VGA interface (multi-user function)
- Remote access to user interface via web-capable devices thanks to Visu+ web client functionality
- Easy to maintain thanks to external data backup and event-oriented e-mail/SMS messaging
- High system availability thanks to OPC with redundancy support
- Particularly reliable thanks to integrated connection for uninterruptible power supply (UPS)

N



30.7 cm (12.1") TFT color display

		Technical data	
		TP 5120T	TP 5120C
<b>Display data</b>			
Display		30.7 cm/12.1" TFT active	
Monitor resolution		800 x 600 Pixel (SVGA)	
Display lighting type		CCFL	
Brightness		400 cd/m <sup>2</sup> , typical (adjustable)	
Display backlight MTBF		50000 h	
Color spectrum		65,536 colors	
Touch screen		Resistive industrial touch screen	
<b>Computer data</b>			
Operating systems		Windows CE 6.0	
Processor		Atom™ 1.6 GHz	Celeron® M 1.01 GHz
Main memory		1 GB DDR	
Data memory		CompactFlash®, 2 GB	
Interfaces		COM 1 (RS-232), 1x VGA, 4x USB, 2x CompactFlash®	
<b>External dimensions</b>			
Width		365 mm	
Height		282 mm	
Depth		10 mm	
<b>Installation dimensions</b>			
Width		334 mm	
Height		253 mm	
Installation depth		94 mm	
<b>General data</b>			
Degree of protection		IP65 (front), IP20 (back)	
Ambient temperature (operation)		-20 °C ... 55 °C	
Mounting type		Installation in front plate	
Vibration (operation)		DIN EN 60068-2-6	
Shock		15g, 11 ms in accordance with IEC 60068-2-27	
<b>Description</b>			
<b>Touch panel</b>			
- Atom 1.6 GHz			
- Celeron M 1.01 GHz processor			
<b>Stylus for touch screens</b>			
<b>USB flash memory</b>			
<b>Mounting kit, including hardware for installation</b>			
- Panel installation			
		Ordering data	
		Type	Order No.
		TP 5120T	2700621
		TP 5120C	2701719
			Pcs. / Pkt.
			1
			1
		Accessories	
		TOUCH PEN	2701379
			1
		2 GB USB STICK	2701382
			1
		VL PANEL MOUNTING KIT	2913159
			1



N

38.1 cm (15") color TFT display



N

43.2 cm (17") TTF color display

**Technical data**

TP 5150T	TP 5150C
38.1 cm/15" TFT active 1024 x 768 Pixel (XGA) CCFL 350 cd/m <sup>2</sup> , typical (adjustable) 50000 h 65,536 colors Resistive industrial touch screen	
Windows CE 6.0 Atom™ 1.6 GHz Celeron® M 1.01 GHz 1 GB DDR CompactFlash®, 2 GB COM 1 (RS-232), 1x VGA, 4x USB, 2x CompactFlash®	
410 mm 309 mm 10 mm	
386.6 mm 285 mm 96 mm	
IP65 (front), IP20 (back) -20 °C ... 55 °C Installation in front plate DIN EN 60068-2-6 15g, 11 ms in accordance with IEC 60068-2-27	

**Technical data**

TP 5170T	TP 5170C
43.2 cm/17" TFT active 1280 x 1024 Pixel (SXGA) CCFL 350 cd/m <sup>2</sup> , typical (adjustable) 50000 h 65,536 colors Resistive industrial touch screen	
Windows CE 6.0 Atom™ 1.6 GHz Celeron® M 1.01 GHz 1 GB DDR CompactFlash®, 2 GB COM 1 (RS-232), 1x VGA, 4x USB, 2x CompactFlash®	
452 mm 356.5 mm 10 mm	
424 mm 329.5 mm 99 mm	
IP65 (front), IP20 (back) -20 °C ... 50 °C Installation in front plate DIN EN 60068-2-6 15g, 11 ms in accordance with IEC 60068-2-27	

**Ordering data**

Type	Order No.	Pcs. / Pkt.
TP 5150T	2700622	1
TP 5150C	2701720	1

**Ordering data**

Type	Order No.	Pcs. / Pkt.
TP 5170T	2700623	1
TP 5170C	2701721	1

**Accessories**

Accessories	Order No.	Pcs. / Pkt.
TOUCH PEN	2701379	1
2 GB USB STICK	2701382	1
VL PANEL MOUNTING KIT	2913159	1

**Accessories**

Accessories	Order No.	Pcs. / Pkt.
TOUCH PEN	2701379	1
2 GB USB STICK	2701382	1
VL PANEL MOUNTING KIT	2913159	1

### Touch panels

HMI devices for maritime applications are the reliable and robust solution for demanding applications on ships. The devices are specifically tested and approved for ship-building.

#### Your advantages:

- Tested quality - certified according to GL, LR, BV, DNV, and ABS
- Flexible communication, even with third-party systems, thanks to numerous drivers
- Save costs and increase service life, thanks to LED backlighting that can be adjusted directly via buttons
- Increase system availability, thanks to temperature and voltage monitoring
- Save costs for acoustic signaling devices: integrated buzzer
- Global use: additional fonts are easy to install
- Cost-effective solution, since there are no additional costs for SCADA runtime: unlimited runtime license for VISU+ RT and AX OPC SERVER included

<b>Notes:</b>
1) EMC: Class A product, see page 553



17.8 cm (7") TFT color display



<b>Display data</b>	
Display	17.8 cm/7" TFT active
Monitor resolution	800 x 480 Pixel (WVGA)
Display lighting type	CCFL
Brightness	400 cd/m <sup>2</sup> , typical (adjustable)
Display backlight MTBF	50000 h
Color spectrum	65,536 colors
Touch screen	Resistive industrial touch screen
<b>Computer data</b>	
Operating systems	Windows CE 5.0
Processor	RISC ARM9™ CPU ; 200 MHz
Main memory	64 Mbyte SDRAM
Data memory	32 Mbyte flash memory
Interfaces	2x USB Host 2.0
<b>External dimensions</b>	
Width	203 mm
Height	165 mm
Depth	5 mm
<b>Installation dimensions</b>	
Width	195 mm
Height	157 mm
Installation depth	56 mm
<b>General data</b>	
Degree of protection	IP65 (front), IP20 (back)
Ambient temperature (operation)	0 °C ... 50 °C
Mounting type	Installation in front plate
Vibration (operation)	DIN EN 60068-2-6
Shock	DIN EN 60068-2-27

Technical data		
17.8 cm/7" TFT active		
800 x 480 Pixel (WVGA)		
CCFL		
400 cd/m <sup>2</sup> , typical (adjustable)		
50000 h		
65,536 colors		
Resistive industrial touch screen		
Windows CE 5.0		
RISC ARM9™ CPU ; 200 MHz		
64 Mbyte SDRAM		
32 Mbyte flash memory		
2x USB Host 2.0		
IP65 (front), IP20 (back)		
0 °C ... 50 °C		
Installation in front plate		
DIN EN 60068-2-6		
DIN EN 60068-2-27		

<b>Description</b>
<b>Touch panel</b> with graphic-capable display
- 7" TFT display
- 10.4" TFT display
- 12.1" TFT display
- 15.1" TFT display

Ordering data		
Type	Order No.	Pcs. / Pkt.
TP 07T/M 201 <sup>1)</sup>	2913234	1

<b>Stylus</b> for touch screens
<b>USB flash memory</b>
<b>CMOS battery</b>
<b>Mounting kit</b> , including hardware for installation
- Panel installation
<b>Protective foil</b> for touch screen

Accessories		
	Order No.	Pcs. / Pkt.
TOUCH PEN	2701379	1
2 GB USB STICK	2701382	1
HMI BATTERY	2701383	1
HMI SCB MOUNTING KIT 6	2701385	1
7" DISPLAY PROTECTIVE FOIL	2701374	1



26.4 cm (10.4") TFT color display



30.7 cm (12.1") TFT color display



38.1 cm (15") color TFT display



Technical data
26.4 cm/10.4" TFT active
640 x 480 Pixel (VGA)
LED
350 cd/m <sup>2</sup> , typical (adjustable)
50000 h
65,536 colors
Resistive industrial touch screen
Windows CE 5.0
Xscale® PXA320, 806 MHz
64 Mbyte SDRAM
1 GB flash memory
2x USB Host 1.1, 1x Compact Flash®
328 mm
265 mm
5 mm
303 mm
238 mm
57 mm
IP65 (front), IP20 (back)
0 °C ... 50 °C
Installation in front plate
DIN EN 60068-2-6
DIN EN 60068-2-27

Technical data
30.7 cm/12.1" TFT active
800 x 600 Pixel (SVGA)
LED
300 cd/m <sup>2</sup> , typical (adjustable)
50000 h
65,536 colors
Resistive industrial touch screen
Windows CE 5.0
Xscale® PXA320, 806 MHz
64 Mbyte SDRAM
1 GB flash memory
2x USB Host 1.1, 1x Compact Flash®
340 mm
285 mm
5 mm
315 mm
259 mm
62 mm
IP65 (front), IP20 (back)
0 °C ... 50 °C
Installation in front plate
DIN EN 60068-2-6
DIN EN 60068-2-27

Technical data
38.1 cm/15" TFT active
1024 x 768 Pixel (XGA)
LED
480 cd/m <sup>2</sup>
50000 h
256 colors
Resistive industrial touch screen
Windows CE 5.0
Xscale® PXA320, 806 MHz
64 Mbyte SDRAM
1 GB flash memory
2x USB Host 1.1, 1x Compact Flash®
400 mm
338 mm
5 mm
373 mm
312 mm
62 mm
IP65 (front), IP20 (back)
0 °C ... 50 °C
Installation in front plate
DIN EN 60068-2-6
DIN EN 60068-2-27

Ordering data		
Type	Order No.	Pcs. / Pkt.
TP 10T/M 201 <sup>1)</sup>	2913247	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
TP 12T/M 201 <sup>1)</sup>	2913250	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
TP 15T/M 201 <sup>1)</sup>	2913263	1

Accessories		
	Order No.	Pcs. / Pkt.
TOUCH PEN	2701379	1
2 GB USB STICK	2701382	1
HMI BATTERY	2701383	1
HMI SCB MOUNTING KIT 8	2701387	1
10,4" DISPLAY PROTECTIVE FOIL	2701376	1

Accessories		
	Order No.	Pcs. / Pkt.
TOUCH PEN	2701379	1
2 GB USB STICK	2701382	1
HMI BATTERY	2701383	1
HMI SCB MOUNTING KIT 8	2701387	1
12,1" DISPLAY PROTECTIVE FOIL	2701377	1

Accessories		
	Order No.	Pcs. / Pkt.
TOUCH PEN	2701379	1
2 GB USB STICK	2701382	1
HMI BATTERY	2701383	1
HMI SCB MOUNTING KIT 8	2701387	1
15,1" DISPLAY PROTECTIVE FOIL	2701378	1



## Industrial PCs

### Box PC for DIN rail mounting

Box PCs are compact, easy to maintain, and powerful. They impress above all in sophisticated applications such as the measurement, control, and testing of process and machine data or distributed visualizations in conjunction with remote monitors. The numerous mounting options and scalable performance make box PCs the ideal platform for machine building and systems manufacturing.

#### Your advantages:

- High system availability, thanks to a fanless design which is suitable for industrial applications and the absence of moving parts
- Versatile use, thanks to various mounting options, e.g., on the DIN rail
- Energy-efficient Intel® ATOM™ processors
- Large-scale compatibility, thanks to open IT standards, numerous interfaces and operating systems
- Particularly easy to maintain, thanks to easily accessible components in the IPC housing
- Can be used in harsh environments, thanks to the extended temperature range (-40°C to +65°C) and shock resistance up to 20g

#### Additional features:

- Configurable based upon customer requirements
- One CF card slot with option for industrial CompactFlash up to 32 GB (no HDD support)
- System protection through the use of embedded operating systems

<b>Notes:</b>
1) EMC: Class A product, see page 553



Box PC with extended temperature range

<b>Computer data</b>
Operating systems
Processor (configuration option)
Main memory (configuration option)
Data memory (configuration option)
Interfaces
Slots
Monitor output
Network
Power supply unit
<b>General data</b>
Degree of protection
Ambient temperature (operation)
Permissible humidity (operation)
Mounting type
Vibration (operation)
Shock

<b>Technical data</b>
Windows Embedded Standard 2009
Atom™ 1.1 GHz Z510PT
1 GB DDR2 SODIMM
CompactFlash®
COM 1 (RS-232/ RS-422/ RS-485 selectable), 6x USB, 1x VGA
None
VGA
2x Ethernet (10/100/1000 Mbps), RJ45
24 V DC ±20%
IP20
-40 °C ... 65 °C
0% ... 95% (no condensation)
Wall or DIN rail
DIN EN 60068-2-6
20g, 11 ms in accordance with IEC 60068-2-27

<b>Description</b>
<b>Industrial computer</b>

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
VL BPC MINI	2700773	1

<b>CompactFlash® card</b>
- 1 GB
- 2 GB
- 4 GB
- 8 GB

<b>Accessories</b>		
VL 1 GB CF	2913155	1
VL 2 GB CF	2913156	1
VL 4 GB CF	2913157	1
VL 8 GB CF	2913158	1



Configurable box PC

N



Box PC

N

Technical data
Windows Embedded Standard 7
Atom™ 1.66 GHz N455
2 GB DDR3 SODIMM
CompactFlash®
1x COM (RS-232/ RS-422/ RS-485 selectable), 2x COM (RS-232), 4x USB, 1x VGA
None
VGA
2x Ethernet (10/100/1000 Mbps), RJ45
24 V DC ±20%
IP20
0 °C ... 50 °C
5% ... 95%
Wall or DIN rail
DIN EN 60068-2-6
15g, 11 ms in accordance with IEC 60068-2-27

Technical data
No operating system
Atom™ 1.66 GHz N455
2 GB DDR3 SODIMM
Empty CompactFlash® slot
1x COM (RS-232/ RS-422/ RS-485 selectable), 2x COM (RS-232), 4x USB, 1x VGA
None
VGA
2x Ethernet (10/100/1000 Mbps), RJ45
24 V DC ±20%
IP20
0 °C ... 50 °C
5% ... 95%
Wall mount
DIN EN 60068-2-6
15g, 11 ms in accordance with IEC 60068-2-27

Ordering data		
Type	Order No.	Pcs. / Pkt.
VL BPC 1000 <sup>1)</sup>	2701291	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
VL BPC 1001 <sup>1)</sup>	2701290	1

Accessories		
	Order No.	Pcs. / Pkt.
VL 1 GB CF	2913155	1
VL 2 GB CF	2913156	1
VL 4 GB CF	2913157	1
VL 8 GB CF	2913158	1

Accessories		
	Order No.	Pcs. / Pkt.
VL 1 GB CF	2913155	1
VL 2 GB CF	2913156	1
VL 4 GB CF	2913157	1
VL 8 GB CF	2913158	1

## Industrial PCs

### Box PCs for “book” and wall mounting

The box PCs for “book” and wall mounting offer all the technical features and functions of DIN rail box PCs.

#### Additional features:

- Energy-efficient Intel® Atom™, Celeron® M and Core™2 Duo processors
- Mounting in “book” form or wall mounting
- Easily removable HDD (hard disk drive) and SSD (solid state drive)
- Large-scale compatibility, thanks to open IT standards, numerous interfaces and operating systems
- Two CF card slots with option for industrial CompactFlash up to 32 GB
- Optional expansion slots for installation of PCI cards

**Notes:**  
1) Configuration options can affect the operating temperature. See user manual for details.



Box PC with or without PCI



<b>Computer data</b>	
Processor (configuration option)	
Main memory (configuration option)	
Data memory (configuration option)	
Optical drive (configuration option)	
<b>Interfaces</b>	
Slots	
Monitor output	
Network	
Power supply unit	
<b>General data</b>	
Degree of protection	
Ambient temperature (operation)	
Permissible humidity (operation)	
Mounting type	
Vibration (operation)	
Shock	

<b>Technical data</b>	
Processor	Atom™ 1.6 GHz N270 Celeron® M 1.01 GHz Core™2 Duo 1.5 GHz
Main memory	512 MB DDR SODIMM 1 GB DDR SODIMM 2 GB DDR SODIMM 3 GB DDR SODIMM
Data memory	2.5 in. SATA hard drive 2.5 in. SATA solid-state drive
Optical drive	DVD-RW
Interfaces	COM 1 (RS-232), 1x VGA, 4x USB, 2x CompactFlash®
Slots	2x PCI
Monitor output	VGA, DVI-D
Network	2x Ethernet (10/100/1000 Mbps), RJ45
Power supply unit	24 V DC ±20%
<b>General data</b>	
Degree of protection	IP65 (front), IP20 (back)
Ambient temperature (operation)	-20 °C ... 55 °C <sup>1)</sup>
Permissible humidity (operation)	5% ... 95% (no condensation)
Mounting type	Panel mount for control cabinet, wall mount, or bookshelf mount
Vibration (operation)	DIN EN 60068-2-6
Shock	15g, 11 ms in accordance with IEC 60068-2-27

<b>Description</b>
<b>Industrial computer</b>

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
VALUELINE IPC	2913108	1

<b>Mounting kit, including hardware for installation</b>
- For bookshelf installation
- Bookshelf installation with PCI expansion slots
<b>Removable hard drive tray</b>
<b>2.5" SATA solid state drive kit, including tray</b>
- 16 GB
- 32 GB
<b>CompactFlash® card</b>
- 512 MB
- 1 GB
- 2 GB
- 4 GB
- 8 GB

<b>Accessories</b>		
<b>VL BOOKSHELF MOUNTING KIT</b>	2913160	1
<b>VL BOOKSHELF MOUNTING KIT/EXPANSION</b>	2913164	1
<b>HDD TRAY KIT</b>	2913185	1
<b>VL 16 GB SSD (SLC) KIT</b>	2913199	1
<b>VL 32 GB SSD (SLC) KIT</b>	2913200	1
<b>VL 512 MB CF</b>	2913154	1
<b>VL 1 GB CF</b>	2913155	1
<b>VL 2 GB CF</b>	2913156	1
<b>VL 4 GB CF</b>	2913157	1
<b>VL 8 GB CF</b>	2913158	1

### Box PCs for “book” and wall mounting

The latest generation of box PCs for “book” and wall mounting offer maximum computing capacity thanks to their powerful Intel® Core™ i7 processors. In addition, the box PC does not require an internal fan – cooling is ensured with just one external convection fan.

#### Additional features:

- Energy efficient and powerful Intel® i7 1.33 GHz and i7 2.53 GHz Core processors.
- Mounting in “book” form or wall mounting
- Easily removable HDD (hard disk drive) and SSD (solid state drive)
- One CF card slot with option for industrial CompactFlash up to 32 GB (no HDD support)

<b>Notes:</b>
1) EMC: Class A product, see page 553



Box PC with Intel® i7 technology

<b>Computer data</b>	
Processor (configuration option)	
Main memory (configuration option)	
Data memory (configuration option)	
Interfaces	
Monitor output	
Network	
Power supply unit	
<b>General data</b>	
Degree of protection	
Ambient temperature (operation)	
Permissible humidity (operation)	
Mounting type	
Vibration (operation)	
Shock	

Technical data	
Intel® Core™ i7-660UE (4 MB L2 cache, 1.33 GHz)	
Intel® Core™ i7-610E (4 MB L2 cache, 2.53 GHz)	
2 GB DDR3-1066 SODIMM	
4 GB DDR3-1066 SODIMM	
8 GB DDR3-1066 SODIMM	
2.5 in. SATA hard drive	
2.5 in. SATA solid-state drive	
CompactFlash®	
COM 1 (RS-232), 1x DVI-I, 4x USB, 1x Compact Flash®	
DVI-I	
2x Ethernet (10/100/1000 Mbps), RJ45	
24 V DC ±20%	
IP65 (front), IP20 (back)	
0 °C ... 45 °C	
5% ... 95% (no condensation)	
Panel mount for control cabinet, wall mount, or bookshelf mount	
DIN EN 60068-2-6	
15g, 11 ms in accordance with IEC 60068-2-27	

Description
<b>Industrial computer</b> , high performance with Intel® i7 processor

Ordering data		
Type	Order No.	Pcs. / Pkt.
VL IPC P7000 <sup>1)</sup>	2701127	1

<b>Mounting kit</b> , including hardware for installation
- For bookshelf installation
- For wall installation
<b>Removable hard drive tray</b>
<b>2.5" SATA HDD kit</b> , including tray
- 250 GB
- 320 GB
<b>2.5" SATA solid state drive kit</b> , including tray
- 80 GB
- 160 GB
<b>CompactFlash® card</b>
- 1 GB
- 2 GB
- 4 GB
- 8 GB

Accessories		
VL BOOKSHELF MOUNTING KIT	2913160	1
VL WALL MOUNTING KIT	2913161	1
VL I7 HDD TRAY	2701015	1
VL I7 250 GB HDD KIT	2701011	1
VL I7 320 GB HDD KIT	2701012	1
VL I7 80 GB SSD KIT	2701013	1
VL I7 160 GB SSD KIT	2701014	1
VL 1 GB CF	2913155	1
VL 2 GB CF	2913156	1
VL 4 GB CF	2913157	1
VL 8 GB CF	2913158	1

### Monitors with touch function

Monitors with touch function are the ideal extension to the industrial PC: operation and monitoring without mouse and keyboard. The robust LCD devices can be used directly on the machine, e.g., as a remote operating solution. Thanks to their numerous interfaces, they provide the best possible connection to your industrial PC.

#### Your advantages:

- Intuitive operation without mouse or keyboard, thanks to touch function
- High shock resistance and electromagnetic compatibility, thanks to robust housing suitable for industrial applications
- Large-scale compatibility, thanks to open IT standards and numerous interfaces
- Individual solutions, thanks to customer-specific hardware adaptations

#### Additional features:

- Monitors in various display sizes for connection to any industrial PC with VGA or DVI port
- Optional front USB interface provides additional connection options for I/O devices



30.7 cm (12.1") touch screen

<b>Display data</b>
Display
Monitor resolution
Display lighting type
Brightness
Display backlight MTBF
Touch screen
<b>General data</b>
Degree of protection
Ambient temperature (operation)
Permissible humidity (operation)
Mounting type
Vibration (operation)
Shock

Technical data		
30.7 cm/12.1" TFT active		
800 x 600 Pixel (SVGA)		
CCFL		
400 cd/m <sup>2</sup> , typical (adjustable)		
> 50000 h		
Resistive industrial touch screen		
IP65 (front), IP20 (back)		
0 °C ... 55 °C		
5% ... 95%		
Panel cutout or VESA mount		
DIN EN 60068-2-6		
15g, 11 ms in accordance with IEC 60068-2-27		

Description
<b>Flat panel monitor</b> with resistive touch screen
- Without front USB port
<b>Flat panel monitor</b> with resistive touch screen
- With front USB port

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>VL FPM 12</b>	2913015	1
<b>VL FPM 12U</b>	2913016	1

<b>Mounting kit</b> , including hardware for installation
- Panel installation
- Panel installation for 15- and 17-in. displays in heavier gauge panels
<b>Protective cover</b> for 15-in touchscreen

Accessories		
<b>VL PANEL MOUNTING KIT</b>	2913159	1
<b>VL PANEL+ MOUNTING KIT</b>	2701177	1



38.1 cm (15") touch screen



43.2 cm (17") touch screen



48 cm (19") touch screen

Technical data
38.1 cm/15" TFT active 1024 x 768 Pixel (XGA) CCFL 350 cd/m <sup>2</sup> , typical (adjustable) > 50000 h Resistive industrial touch screen
IP65 (front), IP20 (back) 0 °C ... 55 °C 5% ... 95% Panel cutout or VESA mount DIN EN 60068-2-6 15g, 11 ms in accordance with IEC 60068-2-27

Technical data
43.2 cm/17" TFT active 1280 x 1024 Pixel (SXGA) CCFL 350 cd/m <sup>2</sup> , typical (adjustable) > 50000 h Resistive industrial touch screen
IP65 (front), IP20 (back) 0 °C ... 50 °C 5% ... 95% Panel cutout or VESA mount DIN EN 60068-2-6 15g, 11 ms in accordance with IEC 60068-2-27

Technical data
48.3 cm/19" TFT active 1280 x 1024 Pixel (SXGA) CCFL 300 cd/m <sup>2</sup> , typical (adjustable) > 50000 h Resistive industrial touch screen
IP65 (front), IP20 (back) 0 °C ... 55 °C 5% ... 95% Panel cutout or VESA mount DIN EN 60068-2-6 15g, 11 ms in accordance with IEC 60068-2-27

Ordering data		
Type	Order No.	Pcs. / Pkt.
VL FPM 15	2913017	1
VL FPM 15U	2913018	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
VL FPM 17	2913019	1
VL FPM 17U	2913020	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
VL FPM 19U	2913021	1

Accessories		
Type	Order No.	Pcs. / Pkt.
VL PANEL MOUNTING KIT	2913159	1
VL PANEL+ MOUNTING KIT	2701177	1
VL 15" DISPLAY PROTECTIVE FOIL	2913165	1

Accessories		
Type	Order No.	Pcs. / Pkt.
VL PANEL MOUNTING KIT	2913159	1
VL PANEL+ MOUNTING KIT	2701177	1

Accessories		
Type	Order No.	Pcs. / Pkt.
VL PANEL MOUNTING KIT	2913159	1
VL PANEL+ MOUNTING KIT	2701177	1

The EL 1000 series consists of configurable embedded panel PCs with widescreen display and appropriate design. When it comes to automating simple applications in restricted spaces, they are the ideal solution: narrow, fanless, and with comprehensive functions. Depending on your requirements, use Intel® Atom™ processors or – for graphics-intensive applications – processors from the AMD G series.

**Additional features:**

- Front plate made from anodized aluminum
- Can be configured according to customer requirements
- Widescreen displays from 7" to 15.4"
- With Windows Embedded Standard 7 as an option



17.8 cm (7") widescreen display

<b>Display data</b>	
Display	
Monitor resolution	
Display lighting type	
Brightness	
Display backlight MTBF	
Touch screen	
<b>Computer data</b>	
Processor (configuration option)	
Main memory (configuration option)	
Data memory (configuration option)	
Optical drive (configuration option)	
<b>Interfaces</b>	
Slots	
Monitor output	
Network	
Power supply unit	
<b>General data</b>	
Degree of protection	
Ambient temperature (operation)	
Permissible humidity (operation)	
Mounting type	
Vibration (operation)	
Shock	

Technical data	
17.8 cm/7" TFT active	
800 x 480 Pixel (WVGA)	
LED	
350 cd/m <sup>2</sup> typical (adjustable)	
40000 h	
Resistive industrial touch screen	
Atom™ 1.6 GHz Z530	
AMD Embedded G-Series (T40R), 1.0 GHz	
1 GB DDR2 RAM	
2 GB DDR3 RAM	
Flash SSD 8 GB	
Flash SSD 16 GB	
Flash SSD 32 GB	
None	
4 x USB host 2.0	
SD card	
None	
2x Ethernet (10/100/1000 Mbps), RJ45	
24 V DC +/- 20%	
IP65 (front), IP20 (back)	
0 °C ... 50 °C	
20% ... 85% (no condensation)	
Panel PC for mounting in the front panel	
DIN EN 60068-2-6	
DIN EN 60068-2-27	

Description
<b>Panel PC</b>

Ordering data		
Type	Order No.	Pcs. / Pkt.
EL PPC7 1000	2701481	1

Mounting kit, including hardware for installation	
- Panel installation	
Stylus for touch screens	
<b>Protective foil for touch screen</b>	

Accessories		
Type	Order No.	Pcs. / Pkt.
HMI SCB MOUNTING KIT 4	2701384	1
TOUCH PEN	2701379	1
7" DISPLAY PROTECTIVE FOIL	2701374	1



N



22.9 cm (9") widescreen display

N



30.5 cm (12.1") widescreen display

N



39.05 cm (15.4") widescreen display

Technical data
22.9 cm/9" TFT active
800 x 480 Pixel (WVGA)
LED
360 cd/m <sup>2</sup> typical (adjustable)
70000 h
Resistive industrial touch screen
Atom™ 1.6 GHz Z530
AMD Embedded G-Series (T40R), 1.0 GHz
1 GB DDR2 RAM
2 GB DDR3 RAM
Flash SSD 8 GB
Flash SSD 16 GB
Flash SSD 32 GB
None
4 x USB host 2.0
SD card
None
2x Ethernet (10/100/1000 Mbps), RJ45
24 V DC +/- 20%
IP65 (front), IP20 (back)
0 °C ... 50 °C
20% ... 85% (no condensation)
Panel PC for mounting in the front panel
DIN EN 60068-2-6
DIN EN 60068-2-27

Technical data
30.5 cm/12" TFT active
1280 x 800 Pixel (WXGA)
LED
320 cd/m <sup>2</sup> typical (adjustable)
50000 h
Resistive industrial touch screen
Atom™ 1.6 GHz Z530
AMD Embedded G-Series (T40R), 1.0 GHz
1 GB DDR2 RAM
2 GB DDR3 RAM
Flash SSD 8 GB
Flash SSD 16 GB
Flash SSD 32 GB
None
4 x USB host 2.0
SD card
None
2x Ethernet (10/100/1000 Mbps), RJ45
24 V DC +/- 20%
IP65 (front), IP20 (back)
0 °C ... 50 °C
20% ... 85% (no condensation)
Panel PC for mounting in the front panel
DIN EN 60068-2-6
DIN EN 60068-2-27

Technical data
39.05 cm/15.4" TFT active
1280 x 800 Pixel (WXGA)
LED
360 cd/m <sup>2</sup> typical (adjustable)
50000 h
Resistive industrial touch screen
Atom™ 1.6 GHz Z530
AMD Embedded G-Series (T40R), 1.0 GHz
1 GB DDR2 RAM
2 GB DDR3 RAM
Flash SSD 8 GB
Flash SSD 16 GB
Flash SSD 32 GB
None
4 x USB host 2.0
SD card
None
2x Ethernet (10/100/1000 Mbps), RJ45
24 V DC +/- 20%
IP65 (front), IP20 (back)
0 °C ... 50 °C
20% ... 85% (no condensation)
Panel PC for mounting in the front panel
DIN EN 60068-2-6
DIN EN 60068-2-27

Ordering data		
Type	Order No.	Pcs. / Pkt.
EL PPC9 1000	2701482	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
EL PPC12 1000	2701484	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
EL PPC15 1000	2701485	1

Accessories		
Type	Order No.	Pcs. / Pkt.
HMI SCB MOUNTING KIT 6	2701385	1
TOUCH PEN	2701379	1
9" DISPLAY PROTECTIVE FOIL	2701375	1

Accessories		
Type	Order No.	Pcs. / Pkt.
HMI SCB MOUNTING KIT 8	2701387	1
TOUCH PEN	2701379	1

Accessories		
Type	Order No.	Pcs. / Pkt.
HMI SCB MOUNTING KIT 8	2701387	1
TOUCH PEN	2701379	1

## Industrial PCs

### Panel PCs

Panel PCs combine the advantages of a modern industrial PC with the operation and monitoring functions of a touch monitor. They are designed for installation in the front of the control cabinet or for use at field level. This means that you benefit from high-performance PC technology directly on site.

#### Your advantages:

- High system availability, thanks to a fanless design which is suitable for industrial applications and the absence of moving parts
- Processor performance suited to the application: with energy-efficient Intel® Core™ i7, Intel® Core™ 2 Duo or Intel® Atom™ processors
- Operating systems for every application, such as Windows XP, Windows 7, Windows Embedded Standard 2009 or Windows Embedded Standard 7
- Individual solutions thanks to customer-specific adaptations to hardware and software
- Particularly easy to maintain thanks to easily accessible components in the appropriately designed PC housing
- Large-scale compatibility, thanks to open IT standards and numerous interfaces
- Display diagonals from 12" to 24"
- Optional expansion slots for installation of PCI cards

Notes:
1) Configuration options can affect the operating temperature. See user manual for details.
2) EMC: Class A product, see page 553



Configurable panel PC



<b>Display data</b>	Display (configuration option)
<b>Computer data</b>	Processor (configuration option)
	Main memory (configuration option)
	Data memory (configuration option)
	Optical drive (configuration option)
	Interfaces
	Slots
	Monitor output
	Network
	Power supply unit
<b>General data</b>	Degree of protection
	Ambient temperature (operation)
	Permissible humidity (operation)
	Mounting type
	Vibration (operation)
	Shock

Technical data	
	Without
	30.7 cm/12.1" TFT active
	38.1 cm/15" TFT active
	43.2 cm/17" TFT active
	48.3 cm/19" TFT active
	60.9 cm/24" - TFT active
	Atom™ 1.6 GHz N270
	Celeron® M 1.01 GHz
	Core™2 Duo 1.5 GHz
	512 MB DDR SODIMM
	1 GB DDR SODIMM
	2 GB DDR SODIMM
	3 GB DDR SODIMM
	2.5 in. SATA hard drive
	2.5 in. SATA solid-state drive
	DVD-RW
	COM 1 (RS-232), 1x VGA, 4x USB, 2x CompactFlash®
	2x PCI
	VGA, DVI-D
	2x Ethernet (10/100/1000 Mbps), RJ45
	24 V DC ±20%
	IP65 (front), IP20 (back)
	-20 °C ... 55 °C <sup>1)</sup>
	5% ... 95% (no condensation)
	Panel mount for control cabinet, wall mount, or bookshelf mount
	DIN EN 60068-2-6
	15g, 11 ms in accordance with IEC 60068-2-27

Description
<b>Industrial computer</b>
<b>Industrial computer</b> , high performance with Intel® i7 processor

Ordering data		
Type	Order No.	Pcs. / Pkt.
VALUELINE IPC	2913108	1

Mounting kit, including hardware for installation
- Panel installation
- Panel installation for 15- and 17-in. displays in heavier gauge panels
<b>Protective cover</b> for 15-in touchscreen

Accessories		
Type	Order No.	Pcs. / Pkt.
VL PANEL MOUNTING KIT	2913159	1
VL PANEL+ MOUNTING KIT	2701177	1
VL 15" DISPLAY PROTECTIVE FOIL	2913165	1



**Configurable panel PC  
with Intel® i7 technology**

**Technical data**

Without  
 30.7 cm/12.1" TFT active  
 38.1 cm/15" TFT active  
 43.2 cm/17" TFT active  
 48.3 cm/19" TFT active  
 60.9 cm/24" - TFT active

Intel® Core™ i7-660UE (4 MB L2 cache, 1.33 GHz)  
 Intel® Core™ i7-610E (4 MB L2 cache, 2.53 GHz)

2 GB DDR3-1066 SODIMM  
 4 GB DDR3-1066 SODIMM  
 8 GB DDR3-1066 SODIMM

2.5 in. SATA hard drive  
 2.5 in. SATA solid-state drive  
 CompactFlash®  
 None  
 COM 1 (RS-232), 1x DVI-I, 4x USB, 1x Compact Flash®

None  
 DVI-I  
 2x Ethernet (10/100/1000 Mbps), RJ45  
 24 V DC ±20%

IP65 (front), IP20 (back)  
 0 °C ... 45 °C  
 5% ... 95% (no condensation)  
 Panel mount for control cabinet, wall mount, or bookshelf mount

DIN EN 60068-2-6  
 15g, 11 ms in accordance with IEC 60068-2-27

**Ordering data**

Type	Order No.	Pcs. / Pkt.
VL IPC P7000 <sup>2)</sup>	2701127	1

**Accessories**

VL PANEL MOUNTING KIT	2913159	1
VL PANEL+ MOUNTING KIT	2701177	1
VL 15" DISPLAY PROTECTIVE FOIL	2913165	1

## Industrial PCs

### IP65 panel PCs

The panel PCs of the DL 1000 series combine high-performance technology and attractive design. They are narrow, feature IP65 protection, multi-touch capability, and are always close to the action as they can be installed quickly and easily directly on the machine.

Thanks to their fanless and energy-efficient design, they are the ideal solution for future operating concepts in industrial systems: easy maintenance, custom configuration, and robust.

#### Additional features:

- Single or multi-touch screen
- Energy-efficient Intel® ATOM™ E series processors
- Can be configured individually
- Fully enclosed housing with IP65 protection
- Extended temperature range of -20°C to +55°C
- User-friendly handling thanks to the attractive and practical industrial design
- Easy access to all important components

#### Notes:

1) Configuration options can affect the operating temperature. See user manual for details.



**Panel PC in IP65,  
37.8 cm (15") display**

N

<b>Display data</b>
Display
Monitor resolution
Display lighting type
Brightness
Display backlight MTBF
Touch screen
<b>Computer data</b>
Processor (configuration option)
Main memory (configuration option)
Data memory (configuration option)
Optical drive (configuration option)
Interfaces
Slots
Monitor output
Network
Power supply unit
<b>General data</b>
Degree of protection
Ambient temperature (operation)
Permissible humidity (operation)
Mounting type
Vibration (operation)
Shock

Technical data	
37.8 cm/15 in. TFT	
1024 x 768 Pixel (XGA)	
LED	
400 cd/m <sup>2</sup> , typical (adjustable)	
50000 h	
Resistive industrial touch screen	
Atom™ 1.6 GHz E680T	
2 GB DDR2 800	
2.5 in. SATA hard drive	
None	
1x COM selectable (RS-232, RS-485, RS-422), 5x USB 2.0, 1x audio	
None	
None	
2x Ethernet (10/100/1000 Mbps), RJ45	
24 V DC ±20%	
IP65	
-20 °C ... 55 °C <sup>1)</sup>	
5% ... 95%	
VESA MIS-D (100 x 100)	
1g according to EN 60068-2-6	
15g, 11 ms in accordance with IEC 60068-2-27	

Description
IPC with IP65 protection with touch screen, enclosed housing
IPC with IP65 protection with touch screen, enclosed housing

Ordering data		
Type	Order No.	Pcs. / Pkt.
DL PPC15 1000	2701665	1



**Panel PC in IP65,  
37.8 cm (15") display  
Multi-touch**

**Technical data**

37.8 cm/15 in. TFT  
1024 x 768 Pixel (XGA)  
LED  
400 cd/m<sup>2</sup>, typical (adjustable)  
50000 h  
Resistive industrial touch screen

Atom™ 1.6 GHz E680T  
2 GB DDR2 800  
2.5 in. SATA hard drive  
None  
1x COM selectable (RS-232, RS-485, RS-422), 5x USB 2.0,  
1x audio  
None  
None  
2x Ethernet (10/100/1000 Mbps), RJ45  
24 V DC ±20%

IP65  
-20 °C ... 55 °C<sup>1)</sup>  
5% ... 95%  
VESA MIS-D (100 x 100)  
1g according to EN 60068-2-6  
15g, 11 ms in accordance with IEC 60068-2-27

**Ordering data**

Type	Order No.	Pcs. / Pkt.
DL PPC15M 1000	2701666	1

## Industrial PCs

### IP65 panel PCs

The compact and robust panel PCs with IP65 protection allow you to use reliable PC technology directly on the machine. Thanks to WLAN capability, the devices can be installed without any time-consuming or costly wiring – a huge advantage for machines used in various locations. High-performance wireless technology allows you to transmit even large volumes of data reliably and quickly.

#### Additional features:

- Optimum network connection by means of Gigabit Ethernet or WLAN
- Energy-efficient Intel® ATOM™ processors
- High system availability, thanks to a fanless design which is suitable for industrial applications and the absence of moving parts
- Fully enclosed housing with IP65 protection
- Extended temperature range of -20°C to +55°C
- Comprehensive range of accessories including practical brackets that allow you to install your panel PC in a space-saving and reliable manner.

Notes:
1) EMC: Class A product, see page 553



20.3 cm (8") display

<b>Display data</b>	
Display	20.3 cm/8" TFT active
Monitor resolution	800 x 480 Pixel (WVGA)
Display lighting type	LED
Brightness	400 cd/m <sup>2</sup> , typical (adjustable)
Display backlight MTBF	> 50000 h
Touch screen	Resistive industrial touch screen
<b>Computer data</b>	
Processor (configuration option)	Atom™ 1.1 GHz Z510
Main memory (configuration option)	1 GB DDR2 RAM 2 GB DDR2 RAM
Data memory (configuration option)	Flash SSD 1 GB Flash SSD 2 GB Flash SSD 4 GB Flash SSD 8 GB
<b>Interfaces</b>	
Optional interfaces	COM 1 (RS-232), 3 x USB 2.0, 1 x on the front (can be deactivated via software), 1 x PS/2 keyboard/mouse
Graphics card	Wireless LAN
Network	Intel® SCH US15W with integrated graphics
Power supply unit	2x Ethernet (10/100/1000 Mbit), RJ45
<b>External dimensions</b>	24 V DC +/- 20%
Width	254 mm
Height	182 mm
Depth	62 mm
<b>General data</b>	
Degree of protection	IP65
Ambient temperature (operation)	-20 °C ... 55 °C
Permissible humidity (operation)	10% ... 85% (no condensation)
Mounting type	Depends on the configuration
Vibration (operation)	DIN EN 60068-2-6
Shock	DIN EN 60068-2-27

#### Technical data

<b>Display data</b>	
Display	20.3 cm/8" TFT active
Monitor resolution	800 x 480 Pixel (WVGA)
Display lighting type	LED
Brightness	400 cd/m <sup>2</sup> , typical (adjustable)
Display backlight MTBF	> 50000 h
Touch screen	Resistive industrial touch screen
<b>Computer data</b>	
Processor (configuration option)	Atom™ 1.1 GHz Z510
Main memory (configuration option)	1 GB DDR2 RAM 2 GB DDR2 RAM
Data memory (configuration option)	Flash SSD 1 GB Flash SSD 2 GB Flash SSD 4 GB Flash SSD 8 GB
<b>Interfaces</b>	
Optional interfaces	COM 1 (RS-232), 3 x USB 2.0, 1 x on the front (can be deactivated via software), 1 x PS/2 keyboard/mouse
Graphics card	Wireless LAN
Network	Intel® SCH US15W with integrated graphics
Power supply unit	2x Ethernet (10/100/1000 Mbit), RJ45
<b>External dimensions</b>	24 V DC +/- 20%
Width	254 mm
Height	182 mm
Depth	62 mm
<b>General data</b>	
Degree of protection	IP65
Ambient temperature (operation)	-20 °C ... 55 °C
Permissible humidity (operation)	10% ... 85% (no condensation)
Mounting type	Depends on the configuration
Vibration (operation)	DIN EN 60068-2-6
Shock	DIN EN 60068-2-27

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Panel PC in IP65 with touchscreen, configurable			
Panel PC with IP65 protection with touch screen, sunlight readable display, closed housing	VMT 3008 <sup>1)</sup>	2913852	1

#### Accessories

Connector	Accessories	Order No.	Pcs. / Pkt.
External power supply unit	FMC 1,5/ 4-STF-3,81 BD:PE-24V	1701307	50
Table stand	VMT 300X EXT PS	2913881	1
Support bracket left/right	VMT TISCHFUSS	2900946	1
Bracket connection adapter	VMT HALTEWINKEL LI/RE	2900933	1
Bracket according to VESA standard	VMT GALGENANSCHLUSSADAPTER	2900962	1
	VMT HALTERUNG VESA	2900959	1



**26.4 cm (10.4")  
Sunlight readable display**



**30.7 cm (12.1")  
Sunlight readable display**



**38.1 cm (15") display**

Technical data	
VMT 3010	VMT 3010 EXP SUN <sup>1)</sup>
26.4 cm/10.4" TFT active 1024 x 768 Pixel (XGA) LED	
400 cd/m <sup>2</sup> , typical (adjustable)	Optical bonding > 50000 h
Resistive industrial touch screen	
Atom™ 1.1 GHz Z510 Atom™ 1.6 GHz Z530	Atom™ 1.6 GHz Z530
1 GB DDR2 RAM 2 GB DDR2 RAM	2 GB DDR2 RAM
Flash SSD 1 GB Flash SSD 2 GB Flash SSD 4 GB Flash SSD 8 GB 2.5" SSD 8 GB 2.5" SSD 16 GB 2.5" SSD 32 GB	2.5" HDD, min. 80 GB, 24 x 7 Automotive
2.5" HDD, min. 80 GB, 24 x 7 Automotive	
COM 1 (RS-232), 3 x USB 2.0, 1 x on the front (can be deactivated via software), 1 x PS/2 keyboard/mouse	
Wireless LAN -	
Intel® SCH US15W with integrated graphics 2x Ethernet (10/100/1000 MBit), RJ45 24 V DC +/- 20%	
294 mm	
244 mm	
62 mm	
IP65 -20 °C ... 55 °C 10% ... 85% (no condensation) Depends on the configuration DIN EN 60068-2-6 DIN EN 60068-2-27	

Technical data	
VMT 3012 <sup>1)</sup>	VMT 3012 EXP SUN <sup>1)</sup>
30.7 cm/12.1" TFT active 800 x 600 Pixel (SVGA) CCFL	
400 cd/m <sup>2</sup> , typical (adjustable)	Optical bonding > 50000 h
Resistive industrial touch screen	
Atom™ 1.1 GHz Z510 Atom™ 1.6 GHz Z530	Atom™ 1.6 GHz Z530
1 GB DDR2 RAM 2 GB DDR2 RAM	2 GB DDR2 RAM
Flash SSD 1 GB Flash SSD 2 GB Flash SSD 4 GB Flash SSD 8 GB 2.5" SSD 8 GB 2.5" SSD 16 GB 2.5" SSD 32 GB	2.5" HDD, min. 80 GB, 24 x 7 Automotive
2.5" HDD, min. 80 GB, 24 x 7 Automotive	
COM 1 (RS-232), 3 x USB 2.0, 1 x on the front (can be deactivated via software), 1 x PS/2 keyboard/mouse	
Wireless LAN -	
Intel® SCH US15W with integrated graphics 2x Ethernet (10/100/1000 MBit), RJ45 24 V DC +/- 20%	
338 mm	
261 mm	
62 mm	
IP65 -20 °C ... 55 °C 10% ... 85% (no condensation) Depends on the configuration DIN EN 60068-2-6 DIN EN 60068-2-27	

Technical data	
VMT 3015 <sup>1)</sup>	
38.1 cm/15" TFT active 1024 x 768 Pixel (XGA) LED	
400 cd/m <sup>2</sup> , typical (adjustable)	Optical bonding > 50000 h
Resistive industrial touch screen	
Atom™ 1.1 GHz Z510 Atom™ 1.6 GHz Z530	Atom™ 1.6 GHz Z530
1 GB DDR2 RAM 2 GB DDR2 RAM	2 GB DDR2 RAM
Flash SSD 1 GB Flash SSD 2 GB Flash SSD 4 GB Flash SSD 8 GB 2.5" SSD 8 GB 2.5" SSD 16 GB 2.5" SSD 32 GB	2.5" HDD, min. 80 GB, 24 x 7 Automotive
2.5" HDD, min. 80 GB, 24 x 7 Automotive	
COM 1 (RS-232), 3 x USB 2.0, 1 x on the front (can be deactivated via software), 1 x PS/2 keyboard/mouse	
Wireless LAN -	
Intel® SCH US15W with integrated graphics 2x Ethernet (10/100/1000 MBit), RJ45 24 V DC +/- 20%	
400 mm	
305 mm	
65 mm	
IP65 -20 °C ... 55 °C 10% ... 85% (no condensation) Depends on the configuration DIN EN 60068-2-6 DIN EN 60068-2-27	

Ordering data		
Type	Order No.	Pcs. / Pkt.
VMT 3010	2701003	1
VMT 3010 EXP SUN <sup>1)</sup>	2700969	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
VMT 3012 <sup>1)</sup>	2913959	1
VMT 3012 EXP SUN <sup>1)</sup>	2700878	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
VMT 3015 <sup>1)</sup>	2913674	1

Accessories		
MC 1,5/ 4-STF-3,81 BD:PE-24VSO	1771240	50
VMT 301X EXT PS	2913933	1
VMT TISCHFUSS	2900946	1
VMT HALTEWINKEL LI/RE	2900933	1
VMT GALGENANSCHLUSSADAPTER	2900962	1
VMT HALTERUNG VESA	2900959	1

Accessories		
MC 1,5/ 4-STF-3,81 BD:PE-24VSO	1771240	50
VMT 301X EXT PS	2913933	1
VMT TISCHFUSS	2900946	1
VMT HALTEWINKEL LI/RE	2900933	1
VMT GALGENANSCHLUSSADAPTER	2900962	1
VMT HALTERUNG VESA	2900959	1

Accessories		



Benefit from the advantages of modern networks and work with your portable industrial PC directly on site. The robust tablet PCs from Phoenix Contact are the ideal solution for performing mobile tasks and processes professionally, from both inside and outside the factory.

#### Your advantages:

- High system availability, thanks to a fanless design which is suitable for industrial applications and the absence of moving parts
- Energy-efficient Intel® ATOM™ or dual core processors
- Large-scale compatibility, thanks to open IT standards and numerous interfaces
- User-friendly handling thanks to the attractive and practical industrial design
- All-round protection against dust and splash water provided by IP54 housing with IP65 front
- Wireless connection via WLAN or Bluetooth
- Independence from the mains thanks to battery operation
- Comprehensive range of accessories



**Tablet PC with 33.8 cm (13.3") display and Windows 7**

Technical data	
Display data	
Display	33.8 cm/13.3" TFT active
Monitor resolution	1280 x 800 Pixel (WXGA)
Display lighting type	CCFL
Brightness	400 cd/m <sup>2</sup> , typical (adjustable)
Display backlight MTBF	> 50000 h
Touch screen	Resistive industrial touch screen
Computer data	
Operating systems	Windows 7 32-bit Ultimate (multi-language)
Processor	Atom™ 1.6 GHz Z530P
Main memory	2 GB DDR2 RAM
Data memory	2.5" HDD, min. 160 Gbyte (PATA)
Interfaces	2x USB 2.0, 1x USB 2.0 recessed, WLAN 802.11 a/b/g, Bluetooth 2.0 Class 1 or Class 2
Network	1 x Ethernet (10/100/1000 Mbit), RJ45
Power supply unit	115/230 V AC/20 V DC external power supply unit
General data	
Degree of protection	IP65 (front), IP54 (back)
Ambient temperature (operation)	0 °C ... 40 °C
Permissible humidity (operation)	10% ... 85% (no condensation)
Mounting type	Mobile application

Description
<b>Mobile tablet PC</b> with touch screen, enclosed housing
- Atom 1.6 GHz
- 1.2 GHz dual core

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>TPC 6013</b>	<b>2700740</b>	1

<b>Hand strap</b> for tablet PC
<b>3-point belt</b> for tablet PC
<b>Mechanical docking station</b> for tablet PC
<b>Replacement battery</b> for TPC 6013
<b>Touch pens</b> for tablet PC
<b>Docking station</b> for tablet PC
<b>ODU to V.24 (RS-232) cable</b> for tablet PC

Accessories		
Type	Order No.	Pcs. / Pkt.
<b>TPC 6013 HAND STRAP</b>	<b>2700613</b>	1
<b>TPC 6013 THREE-POINT BELT</b>	<b>2700614</b>	1
<b>TPC 6013 MECHANICAL DOCKING</b>	<b>2700615</b>	1
<b>TPC 6013 SPARE RECHARGEABLE BA</b>	<b>2700744</b>	1
<b>TPC 6013 TOUCH PENS</b>	<b>2700616</b>	1
<b>PORT REPLICATOR</b>	<b>2701343</b>	1



**Tablet PC with 33.8 cm (13.3") display and Windows Embedded Standard 7**



**Tablet PC with 33.8 cm (13.3") display and Windows XP**

Technical data
33.8 cm/13.3" TFT active 1280 x 800 Pixel (WXGA) CCFL 400 cd/m <sup>2</sup> , typical (adjustable) > 50000 h Resistive industrial touch screen
Windows Embedded Standard 7 Atom™ 1.6 GHz Z530P 2 GB DDR2 RAM 2.5" SSD, 16 Gbytes, minimum 2x USB 2.0, 1x USB 2.0 recessed, WLAN 802.11 a/b/g, Bluetooth 2.0 Class 1 or Class 2
1 x Ethernet (10/100/1000 Mbit), RJ45 20 V/3.5 A external
IP65 (front), IP54 (back) 0 °C ... 40 °C 10% ... 85% (no condensation) Mobile application

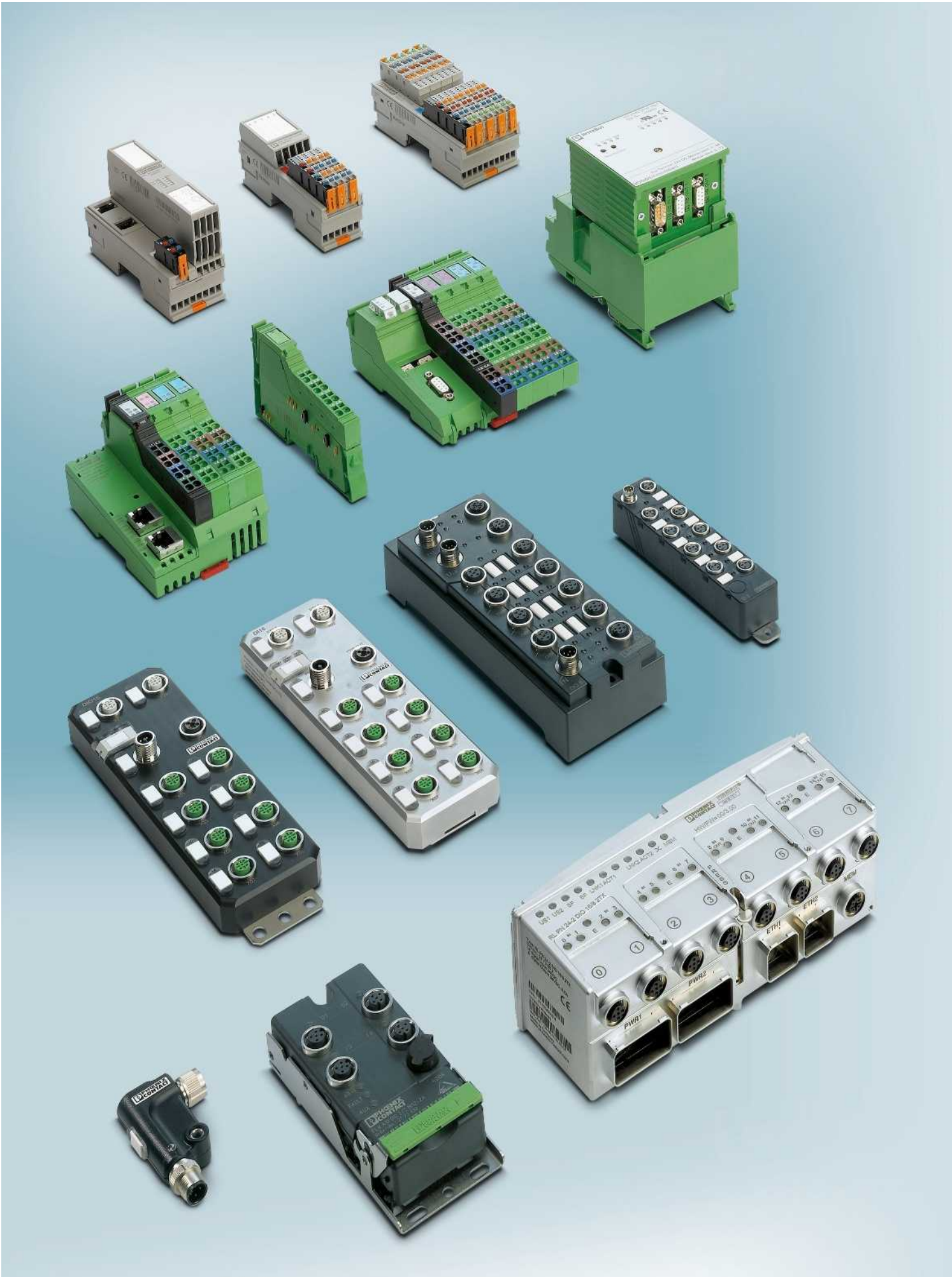
Technical data
33.8 cm/13.3" TFT active 1280 x 800 Pixel (WXGA) CCFL 400 cd/m <sup>2</sup> , typical (adjustable) > 50000 h Resistive industrial touch screen
Windows XP-Multi Dual Core™ 1.2 GHz 2 GB DDR2 RAM 2.5" HDD, min. 120 Gbyte (SATA) 2x USB 2.0, 1x USB 2.0 recessed, RS-232 to ODU plug, WLAN 802.11 a/b/g, Bluetooth 2.0 Class 1 or Class 2, 1x headphone out, 1x MIC IN, 2-megapixel autofocus camera
1x Ethernet (10/100 Mbps), RJ45 115/230 V AC/20 V DC external power supply unit
IP65 (front), IP54 (back) 0 °C ... 40 °C 10% ... 85% (no condensation) Mobile application

Ordering data		
Type	Order No.	Pcs. / Pkt.
TPC 6013 S W7E	2701316	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
TPC 6013 P	2700611	1

Accessories		
TPC 6013 HAND STRAP	2700613	1
TPC 6013 THREE-POINT BELT	2700614	1
TPC 6013 MECHANICAL DOCKING	2700615	1
TPC 6013 SPARE RECHARGEABLE BA	2700744	1
TPC 6013 TOUCH PENS	2700616	1
PORT REPLICATOR	2701343	1

Accessories		
TPC 6013 HAND STRAP	2700613	1
TPC 6013 THREE-POINT BELT	2700614	1
TPC 6013 MECHANICAL DOCKING	2700615	1
TPC 6013 SPARE RECHARGEABLE BA	2700744	1
TPC 6013 TOUCH PENS	2700616	1
TPC 6013 CABLE ODU TO RS232	2700619	1



# I/O systems

I/O systems from Phoenix Contact are the perfect solution for control cabinet engineering or field installation.

## Axioline F

Axioline F is Phoenix Contact's I/O system for the control cabinet of the Ethernet generation.

Open to all Ethernet-based communication protocols and PROFIBUS, Axioline F enables the shortest response times, fast installation, and is characterized by its particularly robust design and easy handling.

## Inline

Inline, our I/O automation kit, can be used to connect sensors and actuators with a maximum range of functions.

These I/Os can also be found in safety applications or potentially explosive areas.

## INTERBUS Smart Terminals

INTERBUS Smart Terminals are perfect for connecting medium to high numbers of sensors and actuators to INTERBUS.

## Axioline E

Axioline E is Phoenix Contact's I/O system for field installation of the Ethernet generation.

The I/O system features a fast response time, robust design, and easy handling.

The comprehensive portfolio with optional plastic or zinc die-cast housing enables use in a wide range of environments.

## Fieldline

The devices in the Fieldline product range with IP65/IP67 protection are optimized for use in machine building and systems manufacturing directly in the field.

## AS-Interface

The digital I/O devices in the Fieldline Extension AS-Interface product range offer significant installation advantages thanks to their innovative connection technology.

## Ruggedline

With fiber optic technology and zinc die-cast housing with IP65/IP67 protection, the robust devices support installation in particularly harsh industrial environments.

### For the control cabinet (IP20)

#### Axioline F

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#### Inline

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#### INTERBUS Smart Terminals

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### For field installation (IP67)

#### Axioline E

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#### Fieldline

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#### AS-Interface

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#### Ruggedline

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### Product overview

#### Bus couplers



		Modbus/TCP (UDP)			
148	149	149	150	151	152

#### Input and output terminals



Digital input			Digital output		
16 channels	32 channels	64 channels	16 channels	32 channels	
155	155	155	157	157	
Analog input		Analog output		Incremental encoder input	
8 channels		8 channels		2 channels	
158		159		163	

#### Open and closed-loop control



Temperature recording		Counter	
8 channels (RTD)	8 channels (UTH)	2 channels	
160	161	163	

#### Communication modules

#### Acquisition modules



Serial communication module	Position detection module
RS-485/422 or RS-232 input and output channel	1 SSI interface, 1 analog output
162	164

#### General accessories



<b>STARTUP+</b> Software for starting up and diagnosing Axioline stations	<b>AXL SHIELD SET</b> Axioline shield connection set	<b>VIP-CAB-FLK14/AXIO/0,14...</b> Relay adapter cable	<b>...-CABLE-...</b> Corresponding cables and plugs can be found in our online catalog

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<b>ZB 20,3 AXL UNPRINTED</b> Zack marker strip (device labeling) unprinted	<b>ZBF 10/5,8 AXL UNPRINTED</b> Zack strip, flat, (plug/slot labeling) unprinted
<b>EMT (35x...)R</b> Marking label rolls, unprinted	

Page [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products)

**General technical data**

<b>Ambient conditions</b>	
Temperature range (operation)	-25°C ... +60°C
Relative humidity (operation)	5% < RH < 95% (no condensation)
Relative humidity (storage)	5% to 95% (no condensation)
Vibration	5g according to EN 60068-2-6
Shock	25g according to EN 60068-2-27
Continuous shock	10g according to EN 60068-2-29
Degree of protection	IP20
<b>Electromagnetic compatibility</b>	
Noise emission	Class B according to EN 61000-6-3
Noise immunity	According to EN 61000-4
<b>Supply voltage</b>	
Nominal value	24 V DC
Ripple	±5% according to EN 61131-2
Permissible range	19.2 V ... 30.0 V
<b>System times</b>	
System bus cycle time	2 µs
Offset per module	1 µs



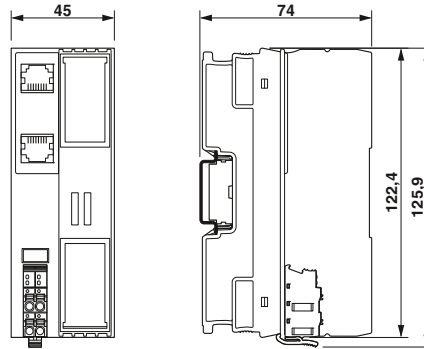
Bus coupler

The Axioline bus coupler is the link between the Axioline system and the higher-level EtherCAT® network.

For startup tests, the Axioline station can be started up independently of the higher-level network via an Ethernet port on the bus coupler using the Startup+ software.

Features:

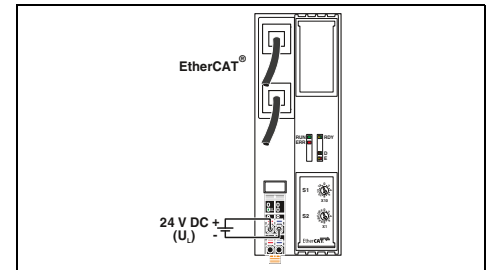
- Minimum cycle time of EtherCAT is 50 µs
- 2 RJ45 connections (with integrated switch)
- Supported mailbox protocols CoE, FoE
- Up to 63 additional Axioline devices can be connected
- Typical cycle time of the Axioline system bus is around 10 µs
- Runtime in bus coupler is negligible (almost 0 µs)
- Firmware can be updated
- Diagnostic and status indicators
- Automatic and manual addressing



EtherCAT Technology Group



EtherCAT® bus coupler



Technical data

<b>Interface</b>	
Fieldbus system	EtherCAT®
Connection method	RJ45 socket, auto negotiation and autocrossing
Number	2
Transmission speed	100 Mbps (full duplex)
Transmission length	max. 100 m
<b>Local bus interface</b>	
Name	Axio bus
Connection method	Connection for bus base module
Transmission speed	100 Mbps
Number of supported devices	max. 63 (per station)
<b>Power supply for module electronics</b>	
Supply of communications power $U_L$	24 V DC
Maximum permissible voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Communications power $U_{bus}$	5 V DC (via bus base module)
Current supply at $U_{bus}$	2 A
Protective circuit	Surge protection of the supply voltage Polarity reversal protection of the supply voltage
<b>General data</b>	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	177 g

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL F BK EC	2688899	1

Accessories

AXL BS BK	2701422	5
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<b>Description</b>	
Axioline bus coupler - For EtherCAT®	
Axioline bus base module (replacement part)	



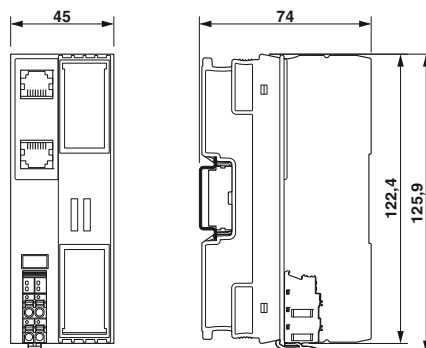
## Bus coupler

The Axioline bus coupler is the link between the Axioline system and the higher-level Ethernet network.

For startup tests, the Axioline station can be started up independently of the higher-level network via an Ethernet port on the bus coupler using the Startup+ software.

### Features:

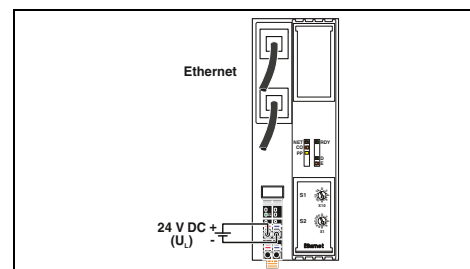
- Supports Modbus/TCP, Modbus/UDP
- Two rotary coding switches for address assignment
- 2 RJ45 connections (with integrated switch)
- Up to 63 additional Axioline devices can be connected
- Typical cycle time of the Axioline system bus is around 10  $\mu$ s
- Runtime in bus coupler is negligible (almost 0  $\mu$ s)
- Software interfaces for access via TCP/IP:
  - Device Driver Interface (DDI)
  - High-Level Language Fieldbus Interface (HFI)
- Firmware can be updated
- Diagnostic and status indicators



Modbus/TCP (UDP)



Ethernet bus coupler



### Technical data

Interface	Ethernet
Fieldbus system	RJ45 socket, auto negotiation and autocrossing
Connection method	2
Number	100 Mbps (full duplex)
Transmission speed	max. 100 m
Transmission length	
Local bus interface	
Name	Axio bus
Connection method	Connection for bus base module
Transmission speed	100 Mbps
Number of supported devices	max. 63 (per station)
Power supply for module electronics	
Supply of communications power $U_L$	24 V DC
Maximum permissible voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Communications power $U_{bus}$	5 V DC (via bus base module)
Current supply at $U_{bus}$	2 A
Protective circuit	Surge protection of the supply voltage Polarity reversal protection of the supply voltage
General data	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	177 g

### Ordering data

Type	Order No.	Pcs. / Pkt.
AXL F BK ETH	2688459	1

### Accessories

AXL BS BK	2701422	5
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Interface
Fieldbus system
Connection method
Number
Transmission speed
Transmission length
Local bus interface
Name
Connection method
Transmission speed
Number of supported devices
Power supply for module electronics
Supply of communications power $U_L$
Maximum permissible voltage range
Communications power $U_{bus}$
Current supply at $U_{bus}$
Protective circuit
General data
Connection method
Connection data solid/stranded/AWG
Weight

Description
<b>Axioline bus coupler</b>
- For Ethernet

<b>Axioline bus base module</b> (replacement part)
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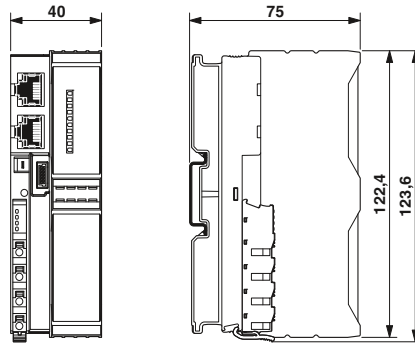
Bus coupler

The Axioline bus coupler is the link between the Axioline system and the higher-level Ethernet system.

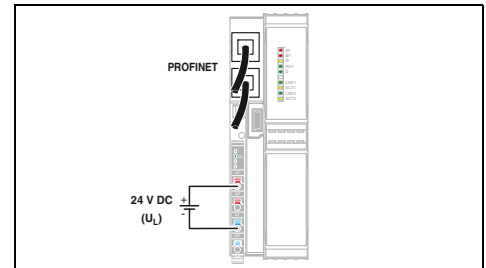
For startup tests, the Axioline station can be started up independently of the higher-level network via an Ethernet port on the bus coupler using the Startup+ software.

**PROFINET bus coupler features:**

- PROFINET RT
- Minimum cycle time of PROFINET for RT is 250 μs
- MRP implemented
- Module replacement without software
- 2 RJ45 connections (with integrated switch)
- Up to 63 additional Axioline devices can be connected
- Typical cycle time of the Axioline system bus is around 10 μs
- Runtime in bus coupler is negligible (almost 0 μs)
- Firmware can be updated
- Diagnostic and status indicators



PROFINET bus coupler



**Technical data**

<b>Interface</b>	
Fieldbus system	PROFINET
Connection method	RJ45 socket, auto negotiation and autocrossing
Number	2
Transmission speed	100 Mbps (full duplex)
Transmission length	max. 100 m
<b>PROFINET IO</b>	
Device function	PROFINET IO device
Update rate	250 μs
<b>Local bus interface</b>	
Name	Axio bus
Connection method	Connection for bus base module
Transmission speed	100 Mbps
Number of supported devices	max. 63 (per station)
<b>Power supply for module electronics</b>	
Supply of communications power $U_L$	24 V DC
Maximum permissible voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Communications power $U_{bus}$	5 V DC (via bus base module)
Current supply at $U_{bus}$	2 A
Protective circuit	Surge protection of the supply voltage Polarity reversal protection of the supply voltage
<b>General data</b>	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	173 g

**Ordering data**

Type	Order No.	Pcs. / Pkt.
AXL BK PN	2688019	1

**Accessories**

AXL BS BK	2701422	5
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<b>Description</b>
<b>Axioline bus coupler</b> - For PROFINET IO
<b>Axioline bus base module</b> (replacement part)

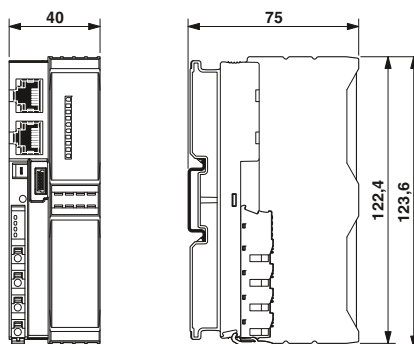
## Bus coupler

The Axioline bus coupler is the link between the Axioline system and the higher-level sercos network.

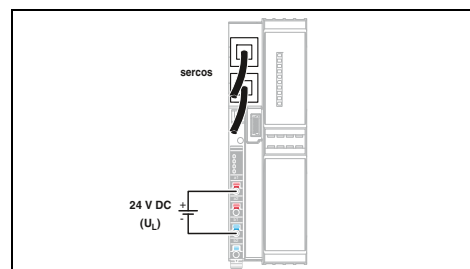
For startup tests, the Axioline station can be started up independently of the higher-level network via an Ethernet port on the bus coupler using the Startup+ software.

### Features:

- sercos specification V1.3
- Minimum sercos cycle time of 31.25  $\mu$ s
- 2 RJ45 connections (with integrated switch)
- Up to 63 additional Axioline devices can be connected
- Typical cycle time of the Axioline system bus is around 10  $\mu$ s
- Runtime in bus coupler is negligible (almost 0  $\mu$ s)
- Firmware can be updated
- Diagnostic and status indicators



sercos III bus coupler



### Technical data

<b>Interface</b>	
Fieldbus system	sercos
Connection method	RJ45 socket, auto negotiation
Number	2
Transmission speed	100 Mbps (full duplex)
Transmission length	max. 100 m
<b>sercos</b>	
Device profile	FSP_IO
Equipment type	sercos slave
Update rate	31.25 $\mu$ s
<b>Local bus interface</b>	
Name	Axio bus
Connection method	Connection for bus base module
Transmission speed	100 Mbps
Number of supported devices	max. 63 (per station)
<b>Power supply for module electronics</b>	
Supply of communications power $U_L$	24 V DC
Maximum permissible voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
<b>Communications power <math>U_{bus}</math></b>	
Current supply at $U_{bus}$	5 V DC (via bus base module)
Protective circuit	2 A
	Surge protection of the supply voltage
	Polarity reversal protection of the supply voltage
<b>General data</b>	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	174 g

### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Axioline bus coupler</b> - For sercos	AXL BK S3	2688116	1

### Accessories

<b>Axioline bus base module</b> (replacement part)	AXL BS BK	2701422	5
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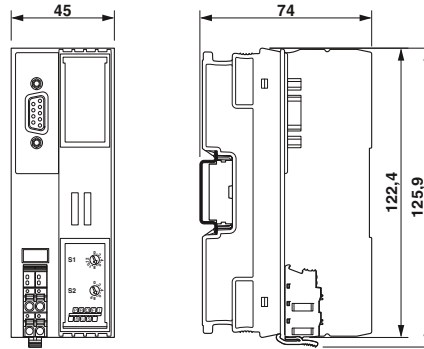
Bus coupler

The Axioline bus coupler is the link between the Axioline system and the higher-level PROFIBUS network.

The address can be easily set using two rotary coding switches and the fieldbus is connected via a 9-pos. D-SUB socket.

Features:

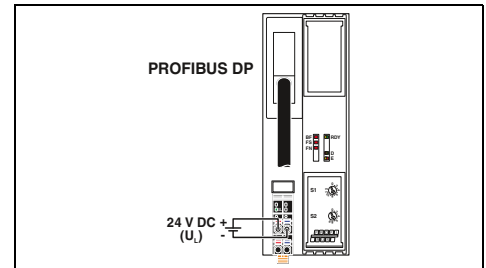
- 9-pos. D-SUB socket connection
- Up to 63 additional Axioline devices can be connected
- Typical cycle time of the Axioline system bus is around 10 µs
- Runtime in bus coupler is negligible (almost 0 µs)
- I&M functions
- Diagnostic and status indicators



PROFIBUS



PROFIBUS bus coupler



<b>Interface</b>	
Fieldbus system	PROFIBUS DP
Connection method	9-pos. D-SUB (socket)
Number	1
Transmission speed	9.6 kbps ... 12 Mbps
<b>Local bus interface</b>	
Name	Axio bus
Connection method	Connection for bus base module
Transmission speed	100 Mbps
Number of supported devices	max. 63 (per station)
<b>Power supply for module electronics</b>	
Supply of communications power $U_L$	24 V DC
Maximum permissible voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Communications power $U_{bus}$	5 V DC (via bus base module)
Current supply at $U_{bus}$	2 A
Protective circuit	Surge protection of the supply voltage Polarity reversal protection of the supply voltage
<b>General data</b>	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	175 g

Technical data

<b>Technical data</b>		
PROFIBUS DP	PROFIBUS DP	
9-pos. D-SUB (socket)	9-pos. D-SUB (socket)	
1	1	
9.6 kbps ... 12 Mbps	9.6 kbps ... 12 Mbps	
<b>Local bus interface</b>		
Name	Axio bus	
Connection method	Connection for bus base module	
Transmission speed	100 Mbps	
Number of supported devices	max. 63 (per station)	
<b>Power supply for module electronics</b>		
Supply of communications power $U_L$	24 V DC	
Maximum permissible voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
Communications power $U_{bus}$	5 V DC (via bus base module)	
Current supply at $U_{bus}$	2 A	
Protective circuit	Surge protection of the supply voltage Polarity reversal protection of the supply voltage	
<b>General data</b>		
Connection method	Spring-cage connection with direct plug-in method	
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
Weight	175 g	

<b>Description</b>	
<b>Axioline bus coupler</b> - For PROFIBUS	

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL BK PB	2688530	1

<b>Axioline bus base module</b> (replacement part)	
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Accessories

AXL BS BK	2701422	5
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Digital input modules

These modules are designed for use with in an Axioline station.

The digital input modules are used to connect 24 V DC sensors. Sensors with up to four wires can be connected.

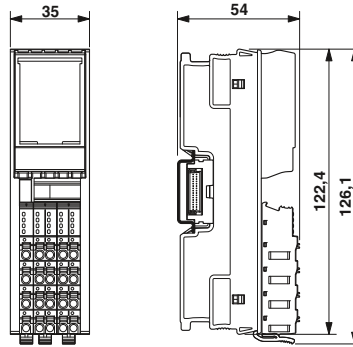
The filter times can be adjusted on the module.

Features:

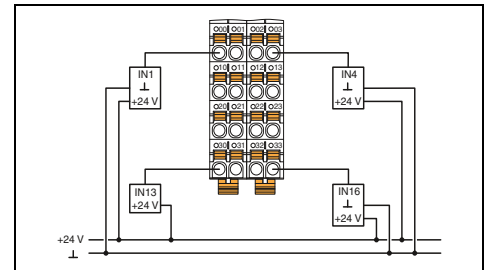
- 16 digital inputs according to EN 61131-2 type 1 and type 3
- 24 V DC/2.4 mA
- Connection of sensors in single, 2, 3, and 4-wire technology
- Minimum update time < 100 µs, bus synchronous
- Filter times can be set in three increments: < 100 µs, 1000 µs or 3000 µs
- Maximum input frequency: 5 kHz
- Stored device rating plate
- Diagnostic and status indicators

AXL DI 16/1 HS features:

- Minimum update time of 5 µs, bus-synchronous



16 inputs



Local bus interface	
Name	Axioline
Connection method	Spring-cage connection with direct plug-in method
Power supply for module electronics	
Communications power $U_{bus}$	5 V DC (via bus base module)
Current consumption from $U_{bus}$	max. 120 mA
I/O supply	
Supply of digital input modules $U_i$	24 V DC
Supply voltage range $U_i$	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Current consumption from $U_i$	20 mA
Protective circuit	Surge protection of the supply voltage Polarity reversal protection of the supply voltage
Digital inputs	
Connection technology	1-wire
Maximum number of inputs	16
Description of the inputs	EN 61131-2 types 1 and 3
Nominal input voltage $U_{IN}$	24 V DC
Nominal input current at $U_{IN}$	2.4 mA
Input filter time	< 100 µs
	1000 µs
	3000 µs (default)
	< 5 µs (no filter, default)
	1000 µs
	3000 µs
Protective circuit	Polarity reversal protection of the inputs
General data	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	133 g
Width	35 mm
Height	126.1 mm
Depth	54 mm

Technical data	
AXL DI 16/1	AXL DI 16/1 HS
Axioline	
Bus base module	
5 V DC (via bus base module)	
max. 120 mA	
24 V DC	
19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
20 mA	
Surge protection of the supply voltage	
Polarity reversal protection of the supply voltage	
1-wire	
16	
EN 61131-2 types 1 and 3	
24 V DC	
2.4 mA	2.3 mA
< 100 µs	< 5 µs (no filter, default)
1000 µs	1000 µs
3000 µs (default)	3000 µs
Polarity reversal protection of the inputs	
Spring-cage connection with direct plug-in method	
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
133 g	
35 mm	
126.1 mm	
54 mm	

Description	Axioline digital input module, complete with accessories (bus base module)
	- 16 inputs
	- 16 inputs
	- 32 inputs
	- 64 inputs

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXL DI 16/1	2688310	1
AXL DI 16/1 HS	2701722	1

Axioline bus base module (replacement part)
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Accessories		
AXL BS S	2700992	5



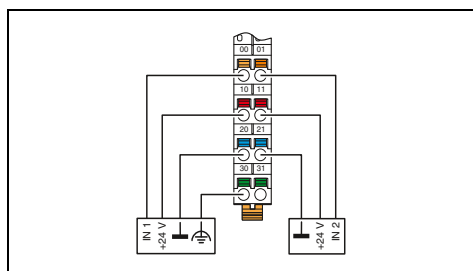
16 inputs



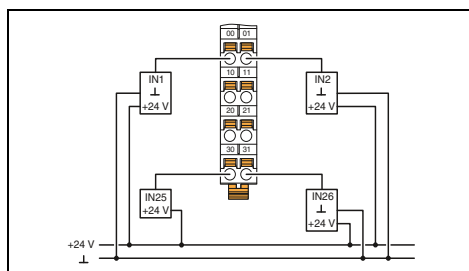
32 inputs



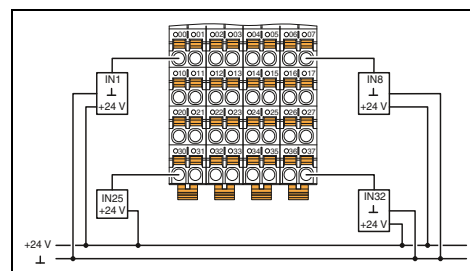
64 inputs



Technical data



Technical data



Technical data

Axio bus Bus base module		
5 V DC (via bus base module) max. 120 mA		
24 V DC 19.2 V DC ... 30 V DC (including all tolerances, including ripple)		
max. 4 A (2 A or each group of 8 inputs) Surge protection of the supply voltage Polarity reversal protection of the supply voltage		
2, 3, 4-wire 16 EN 61131-2 types 1 and 3 24 V DC 2.4 mA 500 µs (default) < 100 µs		
Polarity reversal protection of the inputs		
Spring-cage connection with direct plug-in method 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16 231 g 53.6 mm 129.9 mm 54 mm		

Axio bus Bus base module		
5 V DC (via bus base module) max. 120 mA		
24 V DC 19.2 V DC ... 30 V DC (including all tolerances, including ripple)		
max. 50 mA Surge protection of the supply voltage Polarity reversal protection of the supply voltage		
1-wire 32 EN 61131-2 types 1 and 3 24 V DC 2.4 mA 3000 µs (default) 1000 µs < 100 µs		
Polarity reversal protection of the inputs		
Spring-cage connection with direct plug-in method 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16 167 g 53.6 mm 126.1 mm 54 mm		

Axio bus Bus base module		
5 V DC (via bus base module) max. 120 mA		
24 V DC 19.2 V DC ... 30 V DC (including all tolerances, including ripple)		
60 mA Surge protection of the supply voltage Polarity reversal protection of the supply voltage		
1-wire 64 EN 61131-2 types 1 and 3 24 V DC 2.4 mA 3000 µs (default) 1000 µs < 100 µs		
Polarity reversal protection of the inputs		
Spring-cage connection with direct plug-in method 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16 231 g 53.6 mm 129.9 mm 54 mm		

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXL DI 16/4	2688022	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXL DI 32/1	2688035	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXL DI 64/1	2701450	1

Accessories		
AXL BS	2688129	5

Accessories		
AXL BS	2688129	5

Accessories		
AXL BS	2688129	5



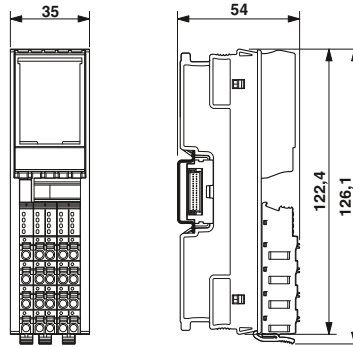
### Digital output modules

These modules are designed for use within an Axioline station.

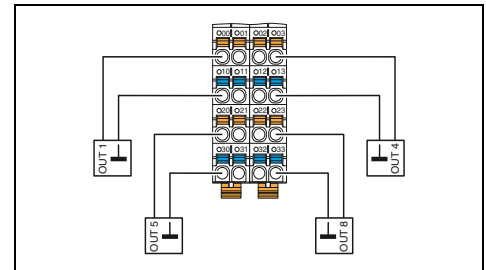
The digital output modules are used to output digital 24 V DC signals. Actuators with up to 3 wires can be connected.

#### Features:

- Short-circuit-proof outputs
- Local single-channel diagnostics
- Output behavior can be adjusted for when local bus communication is aborted



8 outputs, 2 A



Local bus interface	
Name	Axio bus
Connection method	Bus base module
Power supply for module electronics	
Communications power $U_{bus}$	5 V DC (via bus base module)
Current consumption from $U_{bus}$	max. 150 mA
I/O supply	
Supply of digital output modules $U_o$	24 V DC
Supply voltage range $U_o$	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Current consumption from $U_o$	16 A (external fuse)
Protective circuit	Surge protection of the supply voltage Polarity reversal protection of the supply voltage
Digital outputs	
Connection technology	2-wire
Maximum number of outputs	8
Output voltage	24 V
Maximum output current per channel	2 A
Maximum output current per module	16 A (external fuse)
Behavior with overload	Shutdown with automatic restart
Protective circuit	Short-circuit protection, overload protection of the outputs
General data	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	136 g
Width	35 mm
Height	126.1 mm
Depth	54 mm

#### Technical data

Axio bus  
Bus base module  
5 V DC (via bus base module)  
max. 150 mA  
24 V DC  
19.2 V DC ... 30 V DC (including all tolerances, including ripple)  
16 A (external fuse)  
Surge protection of the supply voltage  
Polarity reversal protection of the supply voltage  
2-wire  
8  
24 V  
2 A  
16 A (external fuse)  
Shutdown with automatic restart  
Short-circuit protection, overload protection of the outputs

Description
<b>Axioline digital output module</b> , complete with accessories (bus base module)
- 8 outputs
- 16 outputs
- 32 outputs

**Axioline bus base module** (replacement part)

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXL DO 8/2-2A	2688381	1

Accessories		
AXL BS S	2700992	5



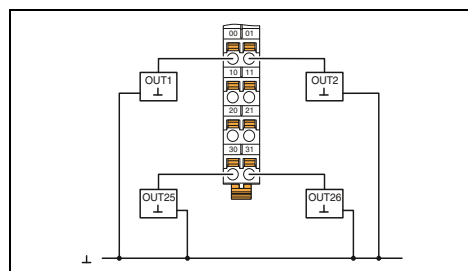
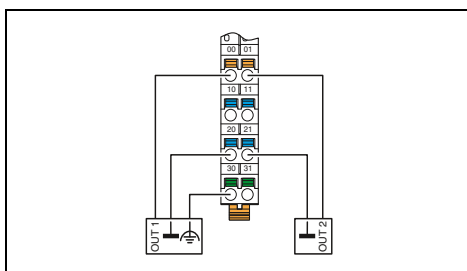
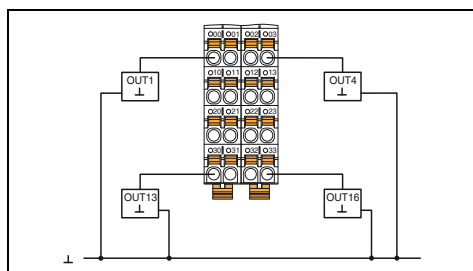
16 outputs



16 outputs



32 outputs



**Technical data**

**Technical data**

**Technical data**

Axio bus
Bus base module
5 V DC (via bus base module) max. 180 mA
24 V DC 19.2 V DC ... 30 V DC (including all tolerances, including ripple)
8 A (external fuse) Surge protection of the supply voltage Polarity reversal protection of the supply voltage
1-wire 16 24 V 500 mA 8 A (external fuse) Shutdown with automatic restart Short-circuit protection, overload protection of the outputs

Axio bus
Bus base module
5 V DC (via bus base module) max. 120 mA
24 V DC 19.2 V DC ... 30 V DC (including all tolerances, including ripple)
8 A (external fuse) Surge protection of the supply voltage Polarity reversal protection of the supply voltage
2, 3-wire 16 24 V 500 mA 8 A (external fuse) Shutdown with automatic restart Short-circuit protection, overload protection of the outputs

Axio bus
Bus base module
5 V DC (via bus base module) max. 180 mA
24 V DC 19.2 V DC ... 30 V DC (including all tolerances, including ripple)
8 A (external fuse) Surge protection of the supply voltage Polarity reversal protection of the supply voltage
1-wire 32 24 V 500 mA 8 A (external fuse) Shutdown with automatic restart Short-circuit protection, overload protection of the outputs

Spring-cage connection with direct plug-in method 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
134 g
35 mm
126.1 mm
54 mm

Spring-cage connection with direct plug-in method 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
234 g
53.6 mm
129.9 mm
54 mm

Spring-cage connection with direct plug-in method 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
191 g
53.6 mm
126.1 mm
54 mm

**Ordering data**

**Ordering data**

**Ordering data**

Type	Order No.	Pcs. / Pkt.
AXL DO 16/1	2688349	1

Type	Order No.	Pcs. / Pkt.
AXL DO 16/3	2688048	1

Type	Order No.	Pcs. / Pkt.
AXL DO 32/1	2688051	1

**Accessories**

**Accessories**

**Accessories**

AXL BS S	2700992	5
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AXL BS	2688129	5
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AXL BS	2688129	5
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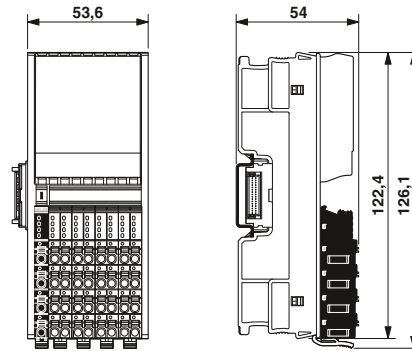
### Analog input modules

These modules are designed for use within an Axioline station.

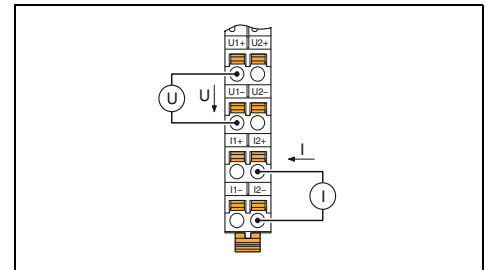
They are used to acquire standard analog current and voltage signals. Connection is via 2-wire technology and a shield connection.

#### Features:

- 8 analog differential signal inputs
- Current and voltage measuring ranges
- Input filter selection
- Minimum update time of 250  $\mu$ s, bus synchronous
- 16-bit measured value representation
- Stored device rating plate
- Integrated sensor supply



8 inputs



<b>Local bus interface</b>	
Name	Axio bus
Connection method	Bus base module
<b>Power supply for module electronics</b>	
Communications power $U_{bus}$	5 V DC (via bus base module)
Current consumption from $U_{bus}$	max. 130 mA
<b>I/O supply</b>	
Supply of analog modules $U_A$	24 V DC
Protective circuit	Surge protection Protection against polarity reversal Transient protection
<b>Analog inputs</b>	
Connection technology	2-wire (shielded, twisted pair)
Number of inputs	max. 8 (differential inputs, voltage or current can be chosen separately)
Voltage input signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
<b>Characteristics</b>	
Measured value representation	16 bits (15 bits + sign bit)
Input filter	30 Hz, 12 kHz, and mean-value generation (can be parameterized)
Precision	0.1% (of measuring range final value for active mean-value generation and 30 Hz filter)
<b>General data</b>	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	204 g

#### Technical data

<b>Technical data</b>	
Name	Axio bus
Connection method	Bus base module
Communications power $U_{bus}$	5 V DC (via bus base module)
Current consumption from $U_{bus}$	max. 130 mA
I/O supply	24 V DC
Protective circuit	Surge protection Protection against polarity reversal Transient protection
Connection technology	2-wire (shielded, twisted pair)
Number of inputs	max. 8 (differential inputs, voltage or current can be chosen separately)
Voltage input signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Characteristics	16 bits (15 bits + sign bit)
Input filter	30 Hz, 12 kHz, and mean-value generation (can be parameterized)
Precision	0.1% (of measuring range final value for active mean-value generation and 30 Hz filter)
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	204 g

<b>Description</b>	
<b>Axioline analog input module</b> , complete with accessories (bus base module)	
- 8 inputs	
<b>Axioline analog input module</b> , complete with accessories (bus base module)	
<b>Axioline shield connection set</b>	

#### Ordering data

Type	Order No.	Pcs. / Pkt.
<b>AXL AI 8</b>	<b>2688064</b>	1

#### Accessories

<b>AXL AI 8</b>	<b>2688064</b>	1
<b>AXL SHIELD SET</b>	<b>2700518</b>	1

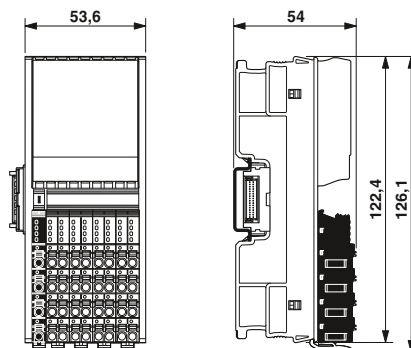
### Analog output modules

These modules are designed for use within an Axioline station.

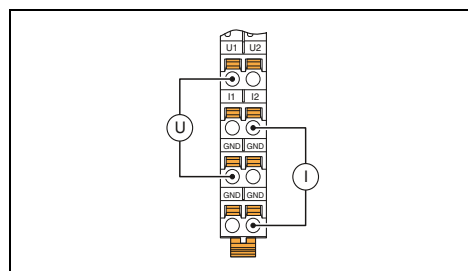
They are used to output standard analog current and voltage signals. Connection is via 2-wire technology and a shield connection.

#### Features:

- 8 analog bipolar outputs
- Current and voltage ranges
- Minimum update time of 250 μs, bus synchronous
- 16-bit output value
- Overload and short-circuit protected
- Stored device rating plate



8 outputs



Technical data	
Local bus interface	Axio bus
Name	Bus base module
Connection method	
Power supply for module electronics	
Communications power $U_{bus}$	5 V DC (via bus base module)
Current consumption from $U_{bus}$	max. 130 mA
I/O supply	
Supply of analog modules $U_A$	24 V DC
Analog outputs	
Connection technology	2-wire (shielded, twisted pair)
Number of outputs	8
Voltage output signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current output signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Load/output load current output	to 500 Ω
Protective circuit	Short-circuit and overload protection Transient protection
Characteristics	
Representation of output values	16 bits (15 bits + sign)
Precision	Typ. 0.1% (of output range final value)
General data	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	260 g

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXL AO 8	2688080	1

Accessories		
Type	Order No.	Pcs. / Pkt.
AXL BS	2688129	5
AXL SHIELD SET	2700518	1

Description	<b>Axioline analog output module</b> , complete with accessories (bus base module) - 8 outputs
Axioline bus base module (replacement part)	
Axioline shield connection set	

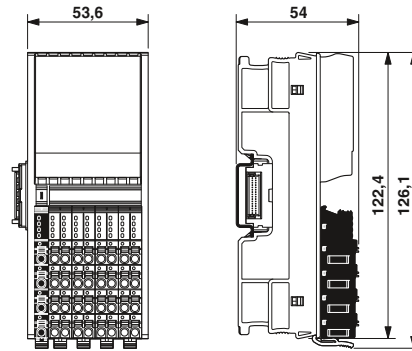
Temperature recording modules

This module is designed for use within an Axioline station.

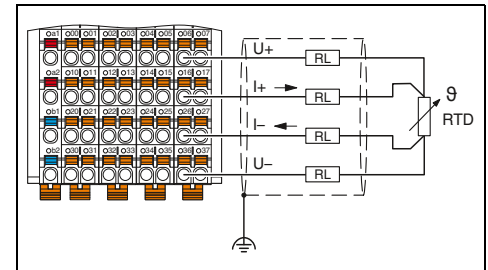
It is used to record resistive temperature sensors. Connection is via 2, 3 or 4-wire technology and a shield connection.

RTD features:

- 8 inputs for temperature shunts
- 500 Ω and 5 kΩ linear inputs
- Programmable filters
- Short-circuit-proof inputs
- Stored device rating plate



8 RTD inputs



Technical data

Local bus interface	Axio bus
Name	Bus base module
Connection method	
Power supply for module electronics	5 V DC (via bus base module)
Communications power $U_{bus}$	max. 180 mA
Current consumption from $U_{bus}$	
I/O supply	24 V DC
Supply of analog modules $U_A$	Surge protection
Protective circuit	Protection against polarity reversal
	Transient protection
Analog inputs	2, 3, 4-wire (shielded)
Connection technology	8 (for resistance temperature detectors)
Number of inputs	Short-circuit protection, overload protection of the inputs
Protective circuit	Transient protection of inputs
	Transient protection of sensor supplies
Sensor types (RTD) that can be used	Pt, Ni, KTY, Cu sensors
Linear resistance measuring range	0 Ω ... 500 Ω / 0 kΩ ... 5 kΩ
Characteristics	16 bits (15 bits + sign bit)
Measured value representation	40 ms / 60 ms / 100 ms / 120 ms (adjustable)
Input filter time	Typ. ± 0.1 K (Pt100 with 3-wire termination)
Accuracy	
General data	Spring-cage connection with direct plug-in method
Connection method	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Connection data solid/stranded/AWG	197 g
Weight	

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL RTD 8	2688077	1

Accessories

Accessories	Order No.	Pcs. / Pkt.
AXL BS	2688129	5
AXL SHIELD SET	2700518	1

Description

**Axioline analog input module**, complete with accessories (bus base module)

- 8 inputs for connecting temperature shunts

**Axioline bus base module** (replacement part)

**Axioline shield connection set**

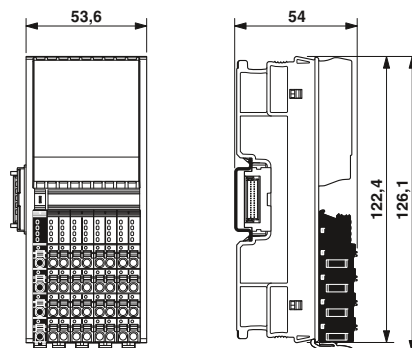
## Temperature recording modules

This module is designed for use within an Axioline station.

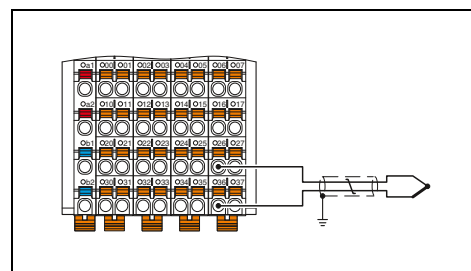
It is used to acquire data from thermocouples. Connection is via 2-wire technology and a shield connection.

### Features of UTH:

- 8 inputs for thermocouples
- Linear voltages from -100 mV to +100 mV
- 1 input from -5 V to +5 V
- 4 Pt 100 inputs (external cold junction)
- Configurable cold junction type
- Stored device rating plate



8 UTH inputs



### Technical data

Local bus interface	Axio bus
Name	Bus base module
Connection technology	
Power supply for module electronics	
Communications power $U_{bus}$	5 V DC (via bus base module)
Current consumption from $U_{bus}$	max. 180 mA
I/O supply	
Supply of analog modules $U_A$	24 V DC
Protective circuit	Surge protection of the supply voltage Polarity reversal protection of the supply voltage
Analog inputs	
Connection technology	2-wire (shielded)
Number of inputs	8 + 1 (8 inputs for thermocouples or linear voltage, plus 1 input -5 V to +5 V)
Protective circuit	Short-circuit protection, overload protection of the inputs Transient protection of inputs
Sensor types (RTD) that can be used	Pt 100 (4 external cold junctions, can also be used as a sensor input)
Linear voltage range	-100 mV ... 100 mV
Characteristics	
Measured value representation	16 bits (15 bits + sign bit)
Input filter time	40 ms / 60 ms / 100 ms / 120 ms (adjustable)
Accuracy	Typ. $\pm 0.19$ K (thermocouple type K, plus tolerance of cold junction)
General data	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	203 g

### Ordering data

Type	Order No.	Pcs. / Pkt.
AXL UTH 8	2688417	1

### Accessories

Axioline bus base module (replacement part)	AXL BS	2688129	5
Axioline shield connection set	AXL SHIELD SET	2700518	1

Serial communication module

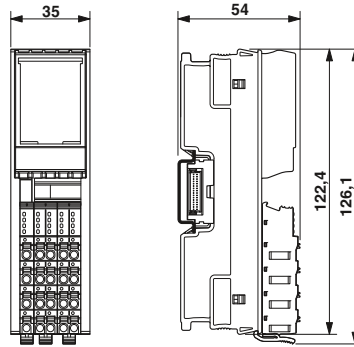


This module is designed for use within an Axioline station.

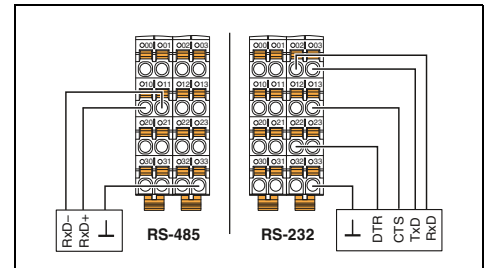
It is used to connect devices with a serial interface, e.g., barcode scanners.

Features:

- Baud rates of up to 250 kbaud
- Communication via acyclic services or process data
- Support of various protocols (e.g., end-to-end protocol)
- 5 RS-232 hardware handshake signals with status indication via LEDs
- Integrated RS-485/RS-422 termination resistor



1 serial input and output channel as RS-485/422 or RS-232 version



Local bus interface	
Name	Axio bus
Connection method	Bus base module
Serial port	
Interface	RS-232, RS-485, RS-422
Connection method	Spring-cage connection with direct plug-in method
Power supply for module electronics	
Communications power $U_{bus}$	5 V DC (via bus base module)
Current consumption from $U_{bus}$	Typ. 200 mA
Serial input/output channel	
Input buffer	4 kbyte
Output buffer	1 kbyte
Transmission speed	110 bit/s ... 250000 bit/s (configurable)
Data bits	5 ... 8
Stop bits	1 or 2
Parity	Even, odd or no parity
Transmission type	Transparent mode, end-to-end mode, XON/XOFF, Modbus RTU
General data	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	135 g
Ambient temperature (operation)	-25 °C ... 60 °C

Technical data		
Axio bus		
Bus base module		
RS-232, RS-485, RS-422		
Spring-cage connection with direct plug-in method		
5 V DC (via bus base module)		
Typ. 200 mA		
4 kbyte		
1 kbyte		
110 bit/s ... 250000 bit/s (configurable)		
5 ... 8		
1 or 2		
Even, odd or no parity		
Transparent mode, end-to-end mode, XON/XOFF, Modbus RTU		
Spring-cage connection with direct plug-in method		
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16		
135 g		
-25 °C ... 60 °C		

Description	
<b>Axioline communication module</b> , complete with accessories (bus base module)	
- 1 serial input and output channel as RS-485/RS-422 or RS-232 version	
Axioline bus base module (replacement part)	
Axioline shield connection set	

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXL F RS UNI 1H	2688666	1

Accessories		
AXL BS S	2700992	5
AXL SHIELD SET	2700518	1



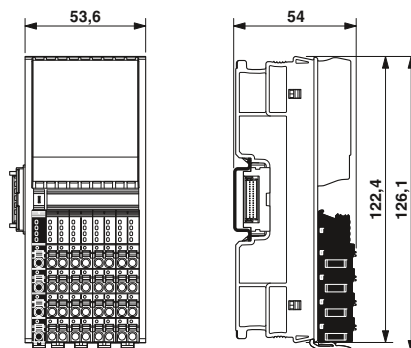
**Special function module**

This module is designed for use within an Axioline station.

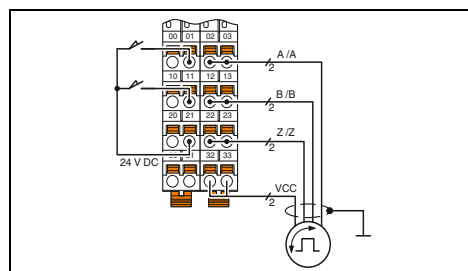
It is used for counting pulses and for position detection using incremental encoders.

**Features:**

- Two counter inputs (32-bit)
- Two incremental encoder interfaces (32-bit)
- Symmetrical or asymmetrical encoders can be connected
- Maximum frequency of 300 kHz
- Eight digital inputs (gate, direction signal, latch, home position switch)
- Two digital outputs
- 5 V and 24 V sensor/encoder supply
- Encoder monitoring
- Rotary axis function
- Ten homing methods



**2 counter inputs,  
2 incremental encoder interfaces**



Technical data	
Local bus interface	Axio bus
Name	Bus base module
Connection method	
Power supply for module electronics	5 V DC (via bus base module)
Communications power $U_{bus}$	Typ. 100 mA
Current consumption from $U_{bus}$	
I/O supply	24 V DC
Supply of digital input modules $U_i$	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply voltage range $U_i$	
Protective circuit	Surge protection Polarity reversal protection of the supply voltage
Counter input	
Number of inputs	2 (S1, S2)
Input frequency	max. 300 kHz /150 kHz (depending on the input voltage)
Input voltage	24 V DC
Encoder inputs	
Number of inputs	2 (A1, /A1, B1, /B1, Z1, /Z1 ; A2, /A2, B2, /B2, Z2, /Z2)
Encoder signals	Symmetrical and asymmetrical encoders
Input frequency	max. 300 kHz /150 kHz (depending on the input voltage)
Digital inputs	
Connection technology	1-wire (optionally 2, 3-wire)
Number of inputs	8 (CNT: G1, G2, Dir1, Dir2 ; INC: Ref1, Ref2, L1, L2)
Description of the inputs	EN 61131-2, type 3
Nominal input voltage $U_{IN}$	24 V DC
Nominal input current at $U_{IN}$	2.5 mA (per channel)
Digital outputs	
Number of outputs	2 (Out1, Out2)
Output voltage	24 V DC
Maximum output current per channel	500 mA
Protective circuit	Short-circuit protection, overload protection of the outputs
General data	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	205 g

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>AXL CNT 2/INC 2</b>	<b>2688093</b>	<b>1</b>

Accessories		
AXL BS	2688129	5
AXL SHIELD SET	2700518	1

**Axioline bus base module** (replacement part)  
**Axioline shield connection set**

**Axioline position detection module**

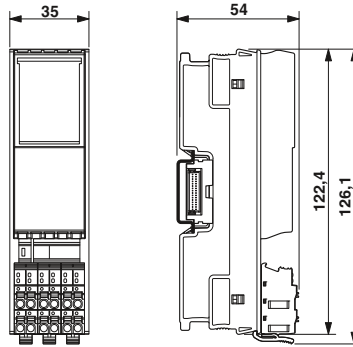
This module is designed for use within an Axioline station.

It is used to detect positions using an absolute encoder with an SSI interface.

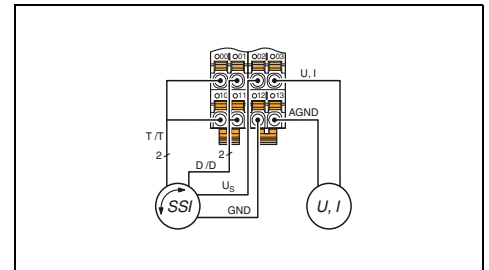
At the same time, an analog output can be used for defining the setpoint of a drive controller, for example.

**Features:**

- Position detection using absolute encoders with SSI interface
- Encoder resolution up to 56 bits
- Transmission frequency of up to 2 MHz
- Gray or binary code
- Reversal of direction of rotation
- Synchronized transmission of encoder values
- Detailed encoder diagnostics
- Current and voltage measuring ranges
- 16-bit resolution of the analog output value
- D/A conversion time typically 5 μs



**1 SSI interface for absolute encoder, 1 analog output**



<b>Local bus interface</b>	
Name	Axiobus
Connection method	Bus base module
<b>Power supply for module electronics</b>	
Communications power $U_{bus}$	5 V DC (via bus base module)
Current consumption from $U_{bus}$	max. 140 mA
<b>I/O supply</b>	
Supply $U_i$	24 V DC 19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Protective circuit	Surge protection Protection against polarity reversal Transient protection
<b>Encoder inputs</b>	
Input name	SSI interface
Number of inputs	1
Transmission frequency	2 MHz
Adjustable resolution	8 ... 56
<b>Analog outputs</b>	
Connection technology	2-wire (shielded, twisted pair)
Number of outputs	1
Voltage output signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current output signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Load/output load current output	max. 500 Ω
Protective circuit	Surge protection Short-circuit and overload protection Transient protection
Precision	Typ. 0.1% (of output range final value)
<b>Characteristics</b>	
Representation of output values	16 bits (15 bits + sign)
<b>General data</b>	
Connection method	Spring-cage connection with direct plug-in method
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	135 g
Ambient temperature (operation)	-25 °C ... 60 °C

**Technical data**

<b>Technical data</b>		
Axiobus		
Bus base module		
5 V DC (via bus base module)		
max. 140 mA		
24 V DC 19.2 V DC ... 30 V DC (including all tolerances, including ripple)		
Surge protection		
Protection against polarity reversal		
Transient protection		
SSI interface		
1		
2 MHz		
8 ... 56		
2-wire (shielded, twisted pair)		
1		
0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V		
0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA		
max. 500 Ω		
Surge protection		
Short-circuit and overload protection		
Transient protection		
Typ. 0.1% (of output range final value)		
16 bits (15 bits + sign)		
Spring-cage connection with direct plug-in method		
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16		
135 g		
-25 °C ... 60 °C		

<b>Description</b>	
<b>Axioline special function module</b>	
- 1 SSI interface for absolute encoder, 1 analog output	

**Ordering data**

Type	Order No.	Pcs. / Pkt.
<b>AXL SSI 1/AO 1</b>	<b>2688433</b>	<b>1</b>

<b>Axioline bus base module (replacement part)</b>	
<b>Axioline shield connection set</b>	





**Accessories**

<b>AXL BS S</b>	<b>2700992</b>	<b>5</b>
<b>AXL SHIELD SET</b>	<b>2700518</b>	<b>1</b>



### Product overview


#### Bus couplers

											
168	170	172	174	178	180	182	192	169	188	193	


#### Power, segment, and accessory terminals

	Power terminals			Boost terminals	Segment terminals	Potential distributor terminals	
24 V DC	120 V AC	230 V AC			24 V DC	24 V DC	GND
194	195	195	196	198	199	199	


#### Input and output terminals

	Digital input					
1 channel	2 channels	4 channels	8 channels	16 channels	32 channels	
204	200	200	201	200	201	
Digital output						
1 channel	2 channels	4 channels	8 channels	16 channels	32 channels	
210	206	206	206	206	207	
Analog input		Strain gauge		Analog output		
2 channels	4 channels	8 channels	2 channels	1 channel	2 channels	8 channels
212	214	213	216	220	220	221
Temperature measurement terminals						
1 channel (TC)	2 channels (UTH/RTD)	4/8 channels (RTD)				
219	218	219				

#### Machine Edition (ME)

	Digital input	Digital output	Analog input	Analog output
4/16 channels	4/16 channels	2 channels	2 channels	
222	222	223	223	


#### Building automation

	DALI terminals	EnOcean wireless receiver
224	225	

#### Branch terminals

	Remote bus branch, Fieldline extension, line skipping
226	


#### Communication terminals

	Serial communication terminals		Master terminals			
RS-232	RS-485	INTERFACE system bus	CAN	IO-Link	PROFIBUS	
228	229	230	231	232	233	


#### Measurement terminals

	Position detection terminals
238	


#### Open and closed-loop control

	Temperature controller terminals		Function terminals		Positioning control terminals	
RTD sensors	UTH sensors	Counter terminal	Pulse width terminal	INC	SSI	
<a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a>		234	235	237	237	

#### Power-level terminals

	Servo amplifier EC motors	Direct starter	Reversing load starter
240	242	242	

#### Intrinsically safe terminals (Ex-i)

	PWR	DIO	AIO	TEMP
24 V	4/4 channels	4/4 channels	4 channels (RTD/TC)	
490	491	492	493	

**PC Worx programmable terminals – Inline controllers**



	Performance class		
	100	200	300
	532	<a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a>	538

**Safety terminals**



Logic modules	Safety-related I/Os	
8 channels	8 channels	4 channels
105	108	107

**General accessories**

<b>IB IL FIELD ...</b> Marking fields	<b>ESL 62X...</b> Labeling sheets	<b>ZBF 6-...</b> Zack marker strip labeling	<b>IL CP</b> Coding profile	<b>CLIPFIX 35-5</b> Standard end clamp	<b>CLIPFIX 35</b> End clamp for CANopen® and DeviceNet™™ bus couplers	<b>E/AL-NS 35</b> End clamp for use in the event of vibrations

[www.phoenixcontact.net/products](http://www.phoenixcontact.net/products)

<b>FLKM 14-PA-INLINE/...</b> VARIOFACE front adapters	<b>PSM-SET-FSMA/4-...</b> F-SMA plugs for INTERBUS FO	<b>IBS DSUB 9/...</b> D-SUB 9 plug-in connectors	<b>SUBCON ...</b> SUBCON plug-in connectors	<b>I-L ATP GN</b> End cover plate	<b>...-CABLE-...</b>	<b>PROJECT+</b> Software for planning the I/O configuration

[www.phoenixcontact.net/products](http://www.phoenixcontact.net/products)

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**General technical data**

**Ambient conditions**

Operating temperature range	-25°C ... +55°C
Storage temperature	-25°C ... +85°C
Relative humidity (operation)	5% to 95% (no condensation)
Relative humidity (storage)	5% to 95% (no condensation)
Vibration	5g, 2 hours in each space direction according to IEC 60068-2-6
Shock	25g, over 11 ms according to IEC 60068-2-6
Degree of protection	IP20 (according to IEC 60529)

**Electromagnetic compatibility**

Noise emission	EN 61000-6-3
Noise emission of housing	EN 55011 Class A
Noise immunity	EN 61000-6-2

**Supply voltage**

Nominal value	24 V DC
Ripple	±5%
Permissible range	19.2 V ... 30.0 V

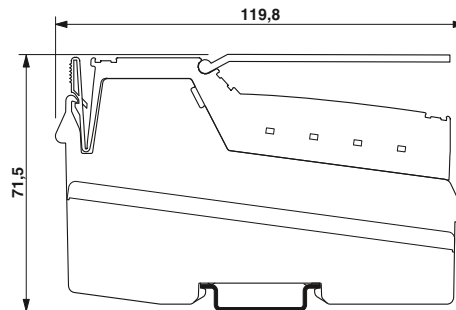
### EtherNet/IP™ bus coupler

The EtherNet/IP™ bus coupler offers the following special features:

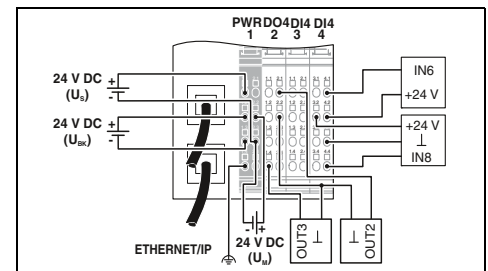
- EtherNet/IP™, Version 1.2
- 2 RJ45 connections
- 8 digital inputs, 4 digital outputs onboard
- Automatic speed detection of the system bus
- Up to 61 terminals (16 PCP devices) can be connected
- Web-based management
- Design width of 80 mm

**Notes:**

1) EMC: Class A product, see page 553



**2-port copper connection,  
8 digital inputs and 4 digital outputs**



#### Technical data

Interface	
Fieldbus system	EtherNet/IP™
Connection method	RJ45 socket, auto negotiation
Number	2
Transmission speed	10/100 Mbps
Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Max. current consumption	max. 0.98 A (from U <sub>BK</sub> )
Power supply at U <sub>L</sub>	max. 0.8 A DC
Power supply at U <sub>ANA</sub>	max. 0.5 A DC
Digital inputs	
Connection technology	2, 3-wire
Maximum number of inputs	8
Typical response time	Approx. 500 µs
Protective circuit	Protection against polarity reversal
Digital outputs	
Connection technology	2, 3-wire
Maximum number of outputs	4
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
INTERBUS data	
Number of local bus devices that can be connected	61 (on board I/Os are two devices)
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	320 g
Width	80 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IL EIP BK DI8 DO4 2TX-PAC <sup>1)</sup>	2897758	1

#### Accessories

IL BKDIO-PLSET	2878599	1
----------------	---------	---

Description
<b>Ethernet bus coupler</b> , EtherNet/IP™-capable, complete with accessories (connector and marking field)

<b>Connector set</b> for bus coupler
--------------------------------------

## Modbus/RTU (ASCII) bus coupler

The bus coupler for Modbus/RTU (ASCII) can insert an Inline station at any point in the Modbus/RTU network.

The address can be easily set using two rotary coding switches and the fieldbus is connected via a 9-pos. D-SUB socket.

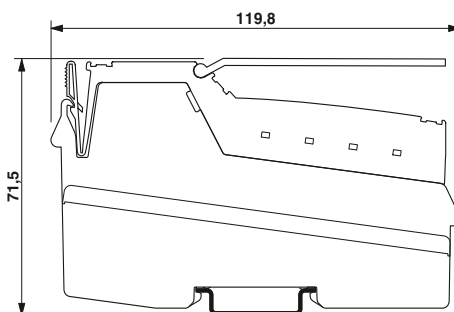
The bus coupler automatically detects 500 kbaud or 2 Mbaud terminals. Including the integration of up to 8 PCP devices, the maximum configuration for this bus coupler is 61 devices.

### Features:

- 8 inputs, 24 V DC
- 4 outputs, 24 V DC, 500 mA
- Maximum of 61 devices (including 8 PCP)
- Shipbuilding and UL approvals
- Design width of 80 mm

### Notes:

1) EMC: Class A product, see page 553

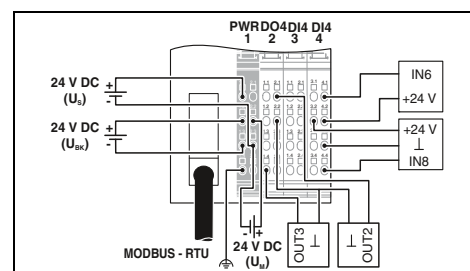


Modbus/RTU



D-SUB connection,  
8 digital inputs and 4 digital outputs

ABS   
Ex:



### Technical data

Interface	Modbus RTU
Fieldbus system	D-SUB-9 socket
Connection method	1.2 kbps ... 115.2 kbps
Transmission speed	
Local bus interface	Inline data jumper
Connection method	
Power supply for module electronics	24 V DC (via Inline connector)
Supply voltage	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply voltage range	
Max. current consumption	max. 0.98 A (from U <sub>BK</sub> )
Power supply at U <sub>L</sub>	max. 0.8 A DC
Power supply at U <sub>ANA</sub>	max. 0.5 A DC
Digital inputs	
Connection technology	2, 3-wire
Maximum number of inputs	8
Typical response time	Approx. 500 µs
Protective circuit	Polarity reversal
Digital outputs	
Connection technology	2, 3-wire
Maximum number of outputs	4
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
INTERBUS data	
Number of local bus devices that can be connected	61 (on board I/Os are two devices)
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	320 g
Width	80 mm
Ambient temperature (operation)	-25 °C ... 60 °C

### Ordering data

Type	Order No.	Pcs. / Pkt.
IL MOD BK DI8 DO4-PAC <sup>1)</sup>	2878696	1

### Accessories

IL BKDIO-PLSET	2878599	1
SUBCON-PLUS-Modbus/IL/BK	2310808	1

Description
<b>Modbus/RTU(ASCII) bus coupler</b> , complete with accessories (connector and marking field)

<b>Connector set</b> for bus coupler
<b>D-SUB plug</b> , 9-pos with two cable infeeds, for <b>Inline Modular-Modbus RTU/ASCII bus couplers</b> (termination resistance can be connected via slide switch)



## For the control cabinet (IP20) – Inline

### Ethernet (Modbus/TCP (UDP)) bus coupler

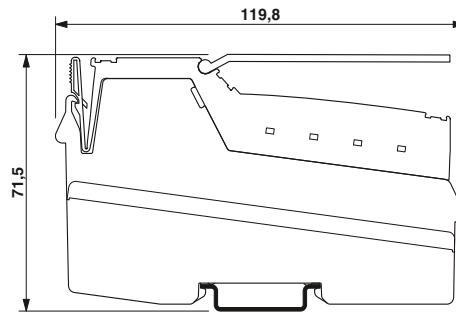
The Modbus/TCP (UDP) bus coupler can insert an Inline station at any point in the Modbus/TCP (UDP) network.

#### Features:

- 2 RJ45 connections
- 8 digital inputs, 4 digital outputs onboard
- Automatic speed detection of the system bus
- Up to 61 terminals (16 PCP devices) can be connected
- Web-based management
- Software interfaces for access via TCP/IP:
  - Device Driver Interface (DDI)
  - High-Level Language Fieldbus Interface (HFI)
- Can be programmed with C, C++, C#, Visual Basic or other high-level languages
- Data exchange via OPC server supported
- Design width of 80 mm

#### Notes:

1) EMC: Class A product, see page 553

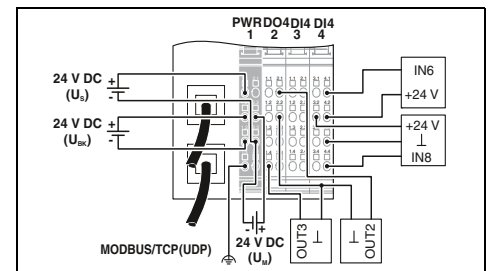


Modbus/TCP (UDP)



2-port copper connection, 8 digital inputs and 4 digital outputs

ABS, UL, CE, RoHS, Ex: Ex



#### Technical data

Interface	Modbus/TCP (UDP)
Fieldbus system	RJ45 socket, auto negotiation
Connection method	2
Number	10/100 Mbps
Transmission speed	Inline data jumper
Local bus interface	24 V DC (via Inline connector)
Connection method	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Power supply for module electronics	max. 0.98 A (from $U_{BK}$ )
Supply voltage	max. 0.8 A DC
Supply voltage range	max. 0.5 A DC
Max. current consumption	2, 3-wire
Power supply at $U_L$	8
Power supply at $U_{ANA}$	Approx. 500 $\mu$ s
Digital inputs	Protection against polarity reversal
Connection technology	2, 3-wire
Maximum number of inputs	4
Typical response time	500 mA
Protective circuit	Short-circuit and overload protection
Digital outputs	61 (on board I/Os are two devices)
Connection technology	Spring-cage connection
Maximum number of outputs	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Maximum output current per channel	375 g
Protective circuit	80 mm
INTERBUS data	-25 °C ... 55 °C
Number of local bus devices that can be connected	
General data	
Connection method	
Connection data solid/stranded/AWG	
Weight	
Width	
Ambient temperature (operation)	

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IL ETH BK DI8 DO4 2TX-PAC <sup>1)</sup>	2703981	1

#### Accessories

IL BKDIO-PLSET	2878599	1
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Description
<b>Modbus/TCP(UDP) bus coupler</b> - Complete with accessories (connector and marking field)

<b>Connector set for bus coupler</b>
--------------------------------------

### Ethernet (Modbus/TCP) Block IO

This Inline Block IO module can be operated directly in an Ethernet network.

Thanks to the integrated switch, it is possible to connect an additional module and thereby implement a linear structure.

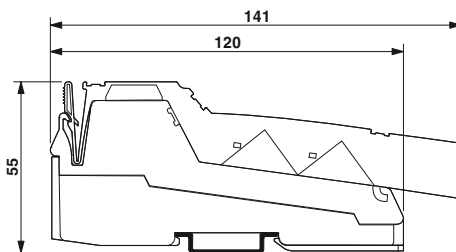
**Features:**

- 2 RJ45 sockets angled 45°
- 16/32 inputs, 24 V DC
- 16 outputs, 24 V DC, 500 mA

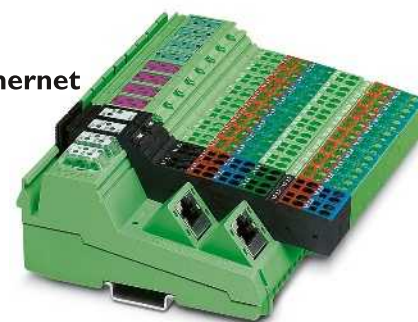
**Supported network/application protocols:**

- BootP
- http (Web server)
- SNMP
- Modbus/TCP
- DDI

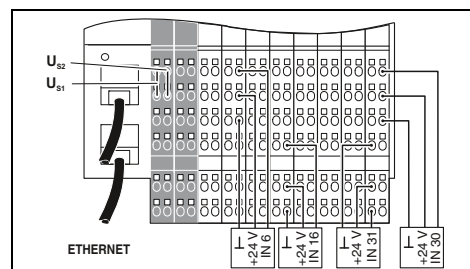
**Notes:**  
1) EMC: Class A product, see page 553



### Ethernet



16 inputs and 16 selectable channels (input or output)



Technical data	
Interface	Modbus TCP/IP
Fieldbus system	RJ45 socket
Connection method	2
Number	10/100 Mbps (with autonegotiation)
Transmission speed	
Power supply for module electronics	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply current	60 mA
Digital inputs	
Connection technology	2, 3-wire
Number of inputs	32
Description of the input	16 fixed and 16 freely selectable
Typical response time	Approx. 500 µs
Protective circuit	Short-circuit protection, overload protection of the sensor supply
Digital outputs	
Connection technology	2-wire
Number of outputs	16
Output description	Freely selectable
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	500 g
Degree of protection	IP20
Width	156 mm

Description
<b>Inline Block I/O digital input/output module</b>
- 16 fixed inputs, 16 freely selectable inputs/outputs

Ordering data		
Type	Order No.	Pcs. / Pkt.
ILB ETH 24 DI16 DIO16-2TX <sup>1)</sup>	2832962	1

### PROFINET bus coupler

PROFINET bus couplers offers the following special features:

- 2 RJ45 or 2 SCRJ connections
- 8 digital inputs, 4 digital outputs onboard
- Automatic speed detection of the system bus
- Up to 61 terminals (16 PCP devices) can be connected
- Approved for PROFIsafe applications
- Design width of 80 mm

#### Notes:

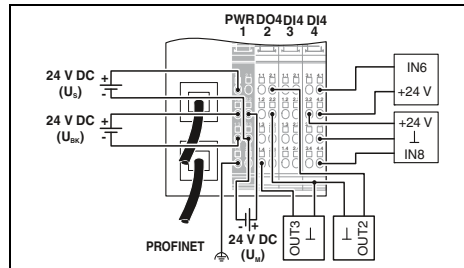
1) EMC: Class A product, see page 553

**PROFI  
NET**



**2-port copper connection,  
8 digital inputs and 4 digital outputs**

UL ABS TÜV SÜD PROFIBUS  
Ex: Ex



#### Technical data

Interface	
Fieldbus system	PROFINET
Connection method	RJ45 socket, auto negotiation
Number	2
Transmission speed	100 Mbps (acc. to PROFINET standard)
PROFINET IO	
Device function	PROFINET IO device
Update rate	min. 1 ms (depending on the size of the bus system)
Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via Inline connector)
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Max. current consumption	Typ. 138 mA (from U <sub>BK</sub> )
Power supply at U <sub>L</sub>	max. 0.8 A DC
Power supply at U <sub>ANA</sub>	max. 0.5 A DC
Digital inputs	
Connection technology	2, 3-wire
Maximum number of inputs	8
Typical response time	Approx. 500 µs
Protective circuit	Protection against polarity reversal
Digital outputs	
Connection technology	2, 3-wire
Maximum number of outputs	4
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
INTERBUS data	
Number of local bus devices that can be connected	61 (on board I/Os are two devices)
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	375 g
Ambient temperature (operation)	-25 °C ... 55 °C (observe derating)

#### Ordering data

Description	
<b>PROFINET bus coupler</b> , complete with accessories (connector and marking field)	
- RJ45 connection	
- SCRJ connection	

#### Accessories

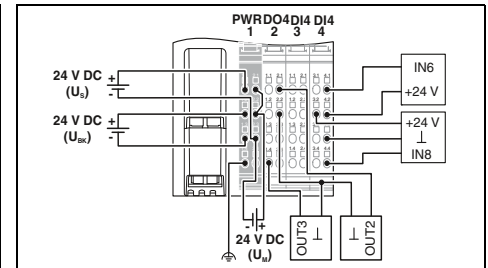
Connector set for bus coupler	IL BKDIO-PLSET	2878599	1
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**PROFI  
NET**



**2-port SCRJ connection,  
8 digital inputs and 4 digital outputs**

UL PROFIBUS  
Ex: Ex



#### Technical data

Interface	
Fieldbus system	PROFINET
Connection method	SCRJ socket
Number	2
Transmission speed	100 Mbps (acc. to PROFINET standard)
PROFINET IO	
Device function	PROFINET IO device
Update rate	min. 1 ms (depending on the size of the bus system)
Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via Inline connector)
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Max. current consumption	max. 0.83 A DC (from U <sub>BK</sub> )
Power supply at U <sub>L</sub>	max. 0.8 A DC
Power supply at U <sub>ANA</sub>	max. 0.5 A DC
Digital inputs	
Connection technology	2, 3-wire
Maximum number of inputs	8
Typical response time	Approx. 500 µs
Protective circuit	Protection against polarity reversal
Digital outputs	
Connection technology	2, 3-wire
Maximum number of outputs	4
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
INTERBUS data	
Number of local bus devices that can be connected	61 (on board I/Os are two devices)
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	280 g
Ambient temperature (operation)	-25 °C ... 55 °C (observe derating)

#### Ordering data

Description	
<b>PROFINET bus coupler</b> , complete with accessories (connector and marking field)	
- RJ45 connection	
- SCRJ connection	

#### Accessories

Connector set for bus coupler	IL BKDIO-PLSET	2878599	1
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## PROFINET Block IO

This Inline Block IO module can be operated directly in a PROFINET network.

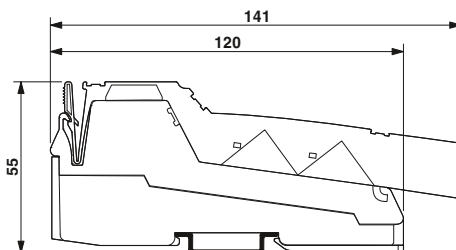
Thanks to the integrated switch, it is possible to connect an additional module and thereby implement a linear structure.

### Features:

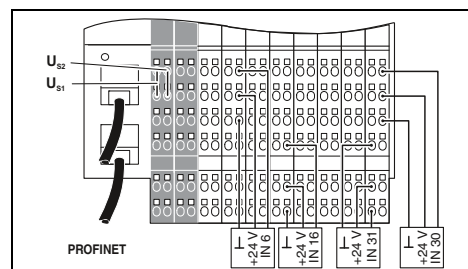
- 2 RJ45 sockets angled 45°
- 16/32 inputs, 24 V DC
- 16 outputs, 24 V DC, 500 mA

### Notes:

- 1) EMC: Class A product, see page 553



16 inputs and 16 selectable channels  
(input or output)



### Technical data

<b>Interface</b>	
Fieldbus system	PROFINET
Connection method	RJ45 socket
Number	2
Transmission speed	10/100 Mbps (with autonegotiation)
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply current	60 mA
<b>Digital inputs</b>	
Connection technology	2, 3-wire
Number of inputs	32
Description of the input	16 fixed and 16 freely selectable
Typical response time	Approx. 500 µs
Protective circuit	Short-circuit protection, overload protection of the sensor supply
<b>Digital outputs</b>	
Connection technology	2-wire
Number of outputs	16
Output description	Freely selectable
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	500 g
Degree of protection	IP20
Width	156 mm

### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline Block I/O digital input/output module for PROFINET</b>			
- 16 fixed inputs, 16 freely selectable inputs/outputs	ILB PN 24 DI16 DIO16-2TX <sup>1)</sup>	2878146	1

### sercos bus couplers

The sercos bus coupler enables the integration of the flexible Inline automation kit in sercos networks. This means that I/Os in motion control applications whose drives are networked via sercos can be integrated without having to use an additional bus system for the I/Os.

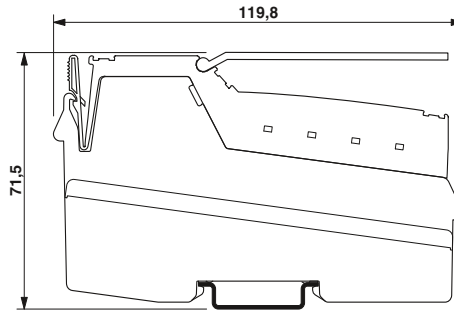
The input and output data is mapped to the input and output data containers defined in the FSP IO (function-specific profile IO).

#### Features:

- sercos specification V1.1.2
- sercos LED
- 2 RJ45 connections
- Minimum sercos cycle time of 250  $\mu$ s
- Maximum of 6 realtime connections
- 8 digital inputs, 4 digital outputs onboard
- Automatic speed detection of the system bus
- Up to 61 Inline terminals (16 PCP devices) can be connected

#### Notes:

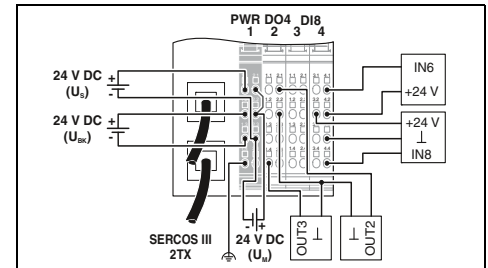
1) EMC: Class A product, see page 553



**sercos**  
the automation bus



2-port copper connection



#### Technical data

Interface	sercos
Fieldbus system	RJ45 socket, auto negotiation
Connection method	2
Number	100 Mbps
Transmission speed	Inline data jumper
Local bus interface	24 V DC (via Inline connector)
Connection method	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Power supply for module electronics	max. 1.05 A (from $U_{BK}$ )
Supply voltage	max. 0.8 A DC
Supply voltage range	max. 0.5 A DC
Max. current consumption	2, 3-wire
Power supply at $U_L$	8
Power supply at $U_{ANA}$	Approx. 500 $\mu$ s
Digital inputs	Protection against polarity reversal
Connection technology	2, 3-wire
Maximum number of inputs	4
Typical response time	500 mA
Protective circuit	Short-circuit and overload protection
Digital outputs	
Connection technology	61 (on board I/Os are two devices)
Maximum number of outputs	Spring-cage connection
Maximum output current per channel	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Protective circuit	375 g
INTERBUS data	80 mm
Number of local bus devices that can be connected	-25 °C ... 60 °C
General data	
Connection method	
Connection data solid/stranded/AWG	
Weight	
Width	
Ambient temperature (operation)	

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IL S3 BK Di8 DO4 2TX-PAC <sup>1)</sup>	2692380	1

#### Accessories

IB IL SCN-8-CP	2727608	10
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Description	sercos bus coupler, complete with accessories (connector and marking field) - sercos
Inline connector	

**sercos Block IO**

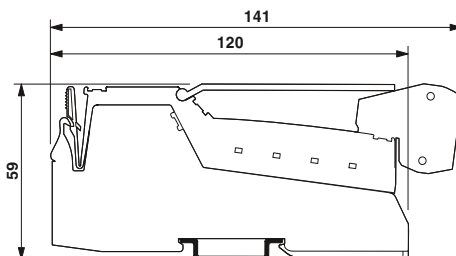
The Inline Block IO module can be operated directly in a sercos network as a sercos slave.

The module is used to acquire and output analog signals.

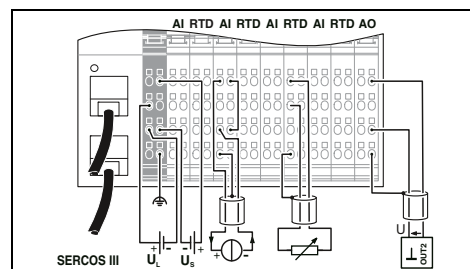
The compact unit enables quick and easy integration of I/Os into the sercos solution.

**Features:**

- 4 shielded differential analog signal inputs or 4 universal RTD inputs
- 4 voltage measuring ranges and 3 current measuring ranges
- Connection of sensors in 2, 3, and 4-wire technology
- Sensor supply with channel-specific integrated short-circuit and overload protection
- Adjustable filter times
- 2 shielded analog signal outputs with 4 voltage and 3 current ranges
- Connection of actuators in 2-wire technology
- Short-circuit-proof outputs



4 analog inputs and 2 analog outputs



**Notes:**  
1) EMC: Class A product, see page 553

<b>Interface</b>
Fieldbus system
Connection method
Transmission speed
<b>Power supply for module electronics</b>
Supply voltage
Supply voltage range
<b>Supply current</b>
<b>Analog inputs</b>
Connection technology
Number of inputs
Voltage input signal
Current input signal
Sensor types (RTD) that can be used
Linear resistance measuring range
Protective circuit for voltage input
Protective circuit for current input
<b>Analog outputs</b>
Connection technology
Number of outputs
Voltage output signal
Current output signal
Protective circuit
<b>Process data</b>
Measured value resolution
Input filter time
Data formats
<b>General data</b>
Connection method
Connection data solid/stranded/AWG
Weight
Degree of protection
Width

**Technical data**

sercos
RJ45 socket, shielded
100 Mbps
24 V DC
19.2 V DC ... 30 V DC (including all tolerances, including ripple)
-
2, 3, 4-wire (shielded)
max. 4 (differential inputs, voltage or current can be chosen separately)
0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Pt100, Pt500, Pt1000, Ni100, Ni1000, Ni1000 L&G
0 Ω ... 3200 Ω / 0 Ω ... 9500 Ω
Overload protection, short-circuit protection of sensor supply
Short-circuit protection for the sensor supply
2-wire (shielded)
2
0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Short-circuit protection of outputs
16 bits (15 bits + sign bit)
1.1 ms (or 4.5 ms per channel)
-
Spring-cage connection
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
465 g
IP20
156 mm

<b>Description</b>
<b>Inline Block I/O analog input/output module</b>
- For sercos

**Ordering data**

Type	Order No.	Pcs. / Pkt.
ILB S3 AI4 AO2-2TX <sup>1)</sup>	2692076	1



### sercos Block IO

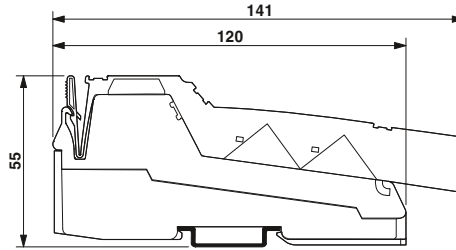
The Inline Block IO module can be operated directly in a sercos network as a sercos slave.

The module is used to acquire and output digital signals.

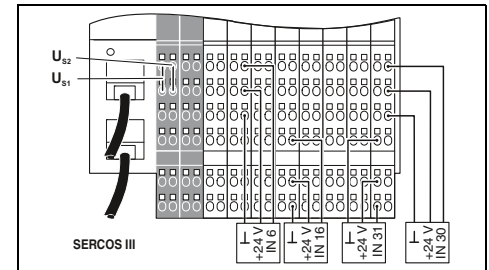
#### Features:

- 16 digital inputs
- 16 channels that can be used as digital I/Os
- The combined I/Os are configured by simply selecting the actuator or sensor connection ; no parameterization is required
- Connection of sensors in 2 and 3-wire technology
- Connection of actuators in 2-wire technology
- Very low delay times
- Short-circuit and overload protected outputs

**Notes:**  
1) EMC: Class A product, see page 553



16 inputs and 16 selectable channels (input or output)



<b>Interface</b>	
Fieldbus system	sercos
Connection method	RJ45 socket
Number	2
Transmission speed	100 Mbps
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC
Supply current	70 mA
<b>Digital inputs</b>	
Connection technology	2, 3-wire
Number of inputs	32
Description of the input	16 fixed and 16 freely selectable
Typical response time	50 µs
Protective circuit	Short-circuit protection, overload protection of the sensor supply
<b>Digital outputs</b>	
Connection technology	2-wire
Number of outputs	16
Output description	Freely selectable
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	500 g
Degree of protection	IP20
Width	156 mm

#### Technical data

sercos
RJ45 socket
2
100 Mbps
24 V DC
19.2 V DC ... 30 V DC
70 mA
2, 3-wire
32
16 fixed and 16 freely selectable
50 µs
Short-circuit protection, overload protection of the sensor supply
2-wire
16
Freely selectable
500 mA
Short-circuit and overload protection

<b>Description</b>
<b>Inline Block I/O digital input/output module</b>
- 16 fixed inputs, 16 freely selectable inputs/outputs

#### Ordering data

Type	Order No.	Pcs. / Pkt.
ILB S3 24 DI16 DIO16-2TX <sup>1)</sup>	2897570	1



**sercos Block IO**

**Positioning controller for two axes**

The Inline Block IO module can be operated directly in a sercos network as a sercos slave.

The module handles the motion control of two drive axes and offers the following functions:

- Point-to-point positioning controller
- Position controller
- Speed controller
- Cam controller
- Homing
- Probe function

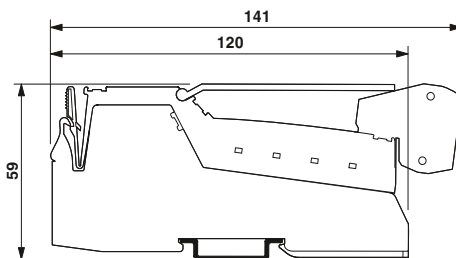
For each axis, one drive controller (using +/-10 V signal) and one position encoder (using incremental signal) can be connected to the digital I/Os for the limit and home position switches.

The module integrates motion functions in sercos systems where there are no control electronics with sercos interface, e.g.:

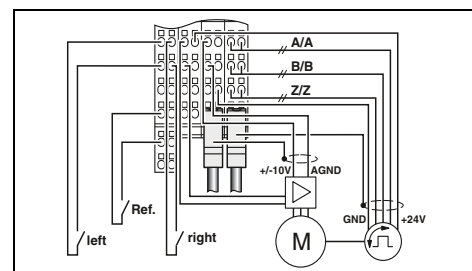
- Proportional valves for pneumatic or hydraulic cylinders
- Drive amplifier for electrical low-power motors
- Simple frequency inverter

**Notes:**

1) EMC: Class A product, see page 553



**8 digital inputs and 4 outputs,  
2 analog outputs,  
2 incremental encoder inputs**



**Technical data**

<b>Interface</b>	sercos
Fieldbus system	RJ45 socket
Connection method	2
No. of channels	100 Mbps
Transmission speed	
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply current	70 mA
<b>Encoder inputs</b>	
Input name	Encoder input, 2 square-wave signals with 90 degree offset
Description of the input	Position detection with incremental signal from rotary/linear encoder
Number of inputs	2
Input frequency	to 300 kHz
<b>Digital inputs</b>	
Connection method	2, 3-wire
Number of inputs	8
Nominal input voltage $U_{IN}$	24 V DC
<b>Digital outputs</b>	
Connection technology	2-wire
Number of outputs	4
Output voltage	24 V DC
Maximum output current per channel	500 mA
<b>Analog outputs</b>	
Connection technology	2-wire
Number of outputs	2
Voltage output signal	-10 V ... 10 V
D/A resolution	10 bit
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	405 g
Width	156 mm
Ambient temperature (operation)	-25 °C ... 60 °C

**Ordering data**

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline Block motion control</b> for sercos			
- 2 axes, drive control via speed setpoint, position detection with incremental signal from rotary/linear encoder	<b>ILB S3 24 DI8 DO4 AO2 INC-IN2<sup>1)</sup></b>	<b>2700174</b>	<b>1</b>

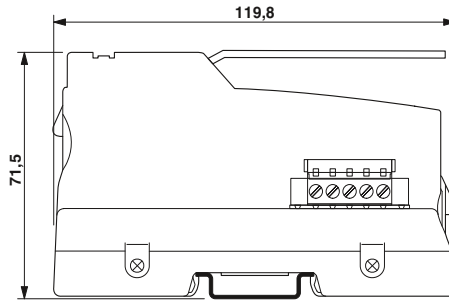
**CANopen® bus coupler**

The CANopen® bus coupler enables the flexible Inline automation kit to be operated at any point within the CANopen® network.

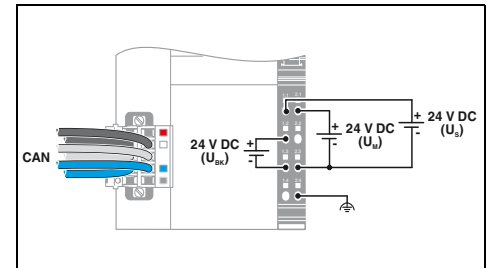
**Features:**

- Slave function in CANopen® network
- Address can be set via DIP switches
- CANopen® connection via TWIN-COMBICON connector
- 63 terminals can be connected

**Notes:**  
1) EMC: Class A product, see page 553



**MINI-COMBICON connection**



<b>Interface</b>	
Fieldbus system	CANopen®
Connection method	2x 5-pos. TWIN-COMBICON connectors
Transmission speed	1 Mbaud, 500 kbaud, 250 kbaud, 125 kbaud, 50 kbaud, 20 kbaud, 10 kbaud (can be set via DIP switch or programmed)
<b>Local bus interface</b>	
Connection method	Inline data jumper
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC
Max. current consumption	max. 1.25 A (from U <sub>BK</sub> )
Power supply at U <sub>L</sub>	max. 2 A DC
Power supply at U <sub>ANA</sub>	max. 0.5 A DC
<b>INTERBUS data</b>	
Number of local bus devices that can be connected	63
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	240 g
Width	85 mm
Ambient temperature (operation)	-25 °C ... 55 °C

**Technical data**

<b>Technical data</b>		
CANopen®		
2x 5-pos. TWIN-COMBICON connectors		
1 Mbaud, 500 kbaud, 250 kbaud, 125 kbaud, 50 kbaud, 20 kbaud, 10 kbaud (can be set via DIP switch or programmed)		
Inline data jumper		
24 V DC		
19.2 V DC ... 30 V DC		
max. 1.25 A (from U <sub>BK</sub> )		
max. 2 A DC		
max. 0.5 A DC		
Number of local bus devices that can be connected		
63		
Connection method		
Spring-cage connection		
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16		
Weight		
240 g		
Width		
85 mm		
Ambient temperature (operation)		
-25 °C ... 55 °C		

<b>Description</b>	
CANopen® bus coupler, complete with accessories (connector and marking field)	

**Ordering data**

Type	Order No.	Pcs. / Pkt.
IL CAN BK-TC-PAC <sup>1)</sup>	2718701	1

**Inline connector**

Accessories		
IB IL SCN-8-CP	2727608	10

### CANopen® Block IO

This Inline Block IO module can be connected directly to the CANopen® network as a slave.

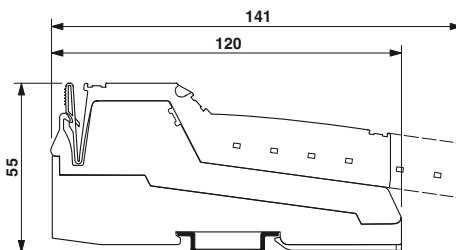
The bus address and the data transmission rate are easily set using the DIP switches on the module. Automatic detection of transmission speeds can also be set.

**Features:**

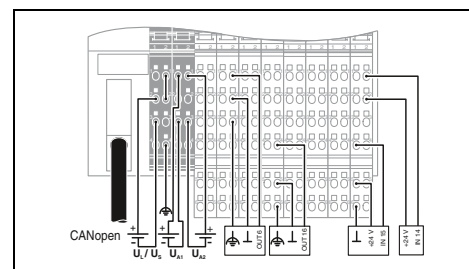
- D-SUB bus connection
- 16 inputs, 24 V DC
- 16 outputs, 24 V DC, 500 mA

**Notes:**

1) EMC: Class A product, see page 553



16 digital inputs and 16 digital outputs



**Technical data**

<b>Interface</b>	
Fieldbus system	CANopen®
Connection method	D-SUB-9 socket
Transmission speed	10 kbps ... 1 Mbps
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply current	25 mA
<b>Digital inputs</b>	
Connection technology	2, 3-wire
Number of inputs	16
Description of the input	EN 61131-2 type 1
Typical response time	Approx. 500 µs
Protective circuit	Short-circuit protection, overload protection of the sensor supply
<b>Digital outputs</b>	
Connection technology	2, 3-wire
Number of outputs	16
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	500 g
Degree of protection	IP20
Width	156 mm

**Ordering data**

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline Block I/O digital input/output module</b>			
- 16 inputs, 16 outputs	ILB CO 24 DI16 DO16 <sup>1)</sup>	2862592	1

### DeviceNet™ bus coupler

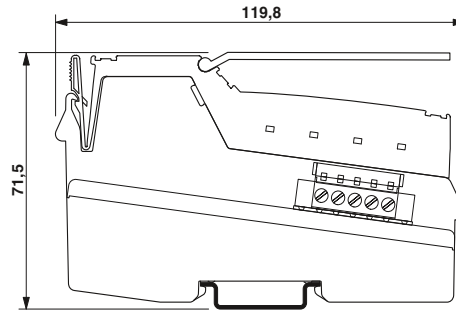
The DeviceNet™ bus coupler enables the flexible Inline automation kit to be operated at any point within the DeviceNet™ network.

#### Features:

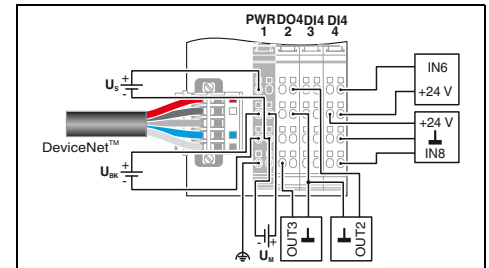
- Slave function in DeviceNet™ network
- Address can be set via DIP switches or software
- DeviceNet™ connection via TWIN-COMBICON connector
- Automatic speed detection of the system bus
- 61 terminals can be connected

#### Notes:

1) EMC: Class A product, see page 553



**MINI-COMBICON connection, 8 digital inputs and 4 digital outputs**



#### Technical data

<b>Interface</b>	Fieldbus system Connection method Transmission speed	DeviceNet™ 2x 5-pos. TWIN-COMBICON connectors 500 kbaud, 250 kbaud, 125 kbaud (can be set via DIP switch or programmed)
<b>Local bus interface</b>	Connection method	Inline data jumper
<b>Power supply for module electronics</b>	Supply voltage Supply voltage range	24 V DC (via Inline connector) 19.2 V DC ... 30 V DC (including all tolerances, including ripple)
<b>Max. current consumption</b>	Power supply at U <sub>L</sub> Power supply at U <sub>ANA</sub>	max. 0.9 A (from U <sub>BK</sub> ) max. 0.8 A DC max. 0.5 A DC
<b>Digital inputs</b>	Connection technology Maximum number of inputs Typical response time Protective circuit	2, 3-wire 8 Approx. 500 μs Protection against polarity reversal
<b>Digital outputs</b>	Connection technology Maximum number of outputs Maximum output current per channel Protective circuit	2, 3-wire 4 500 mA Short-circuit and overload protection
<b>INTERBUS data</b>	Number of local bus devices that can be connected	61 (on board I/Os are two devices)
<b>General data</b>	Connection method Connection data solid/stranded/AWG Weight Width Ambient temperature (operation)	Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 320 g 80 mm -25 °C ... 55 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>DeviceNet™ bus coupler</b> , complete with accessories (connector and marking field)	IL DN BK DI8 DO4-PAC <sup>1)</sup>	2897211	1

#### Accessories

<b>Connector set</b> for bus coupler	IL BKDIO-PLSET	2878599	1
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## DeviceNet™ Block IO

This Inline Block IO module can be connected directly to the DeviceNet™ fieldbus system as a slave.

In the case of DeviceNet™, the remote bus is connected via the TWIN-COMBICON connector provided.

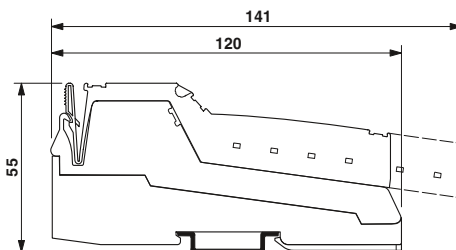
The bus address and the data transmission rate are easily set using the DIP switches on the module. Automatic detection of transmission speeds can also be set.

### Features:

- 2 x 5-pos. TWIN-COMBICON connector
- 16 inputs, 24 V DC
- 16 outputs, 24 V DC, 500 mA

### Notes:

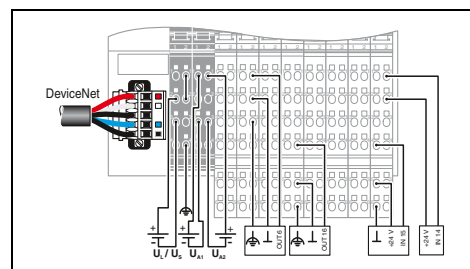
- 1) EMC: Class A product, see page 553



16 digital inputs and 16 digital outputs



Ex: (U)



### Technical data

<b>Interface</b>	
Fieldbus system	DeviceNet™
Connection method	2x 5-pos. TWIN-COMBICON connectors
Transmission speed	125 kbps ... 500 kbps
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply current	70 mA
<b>Digital inputs</b>	
Connection technology	2, 3-wire
Number of inputs	16
Description of the input	EN 61131-2 type 1
Typical response time	Approx. 500 µs
Protective circuit	Short-circuit protection, overload protection of the sensor supply
<b>Digital outputs</b>	
Connection technology	2, 3-wire
Number of outputs	16
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	500 g
Degree of protection	IP20
Width	156 mm

### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline Block I/O digital input/output module</b>			
- 16 inputs, 16 outputs	ILB DN 24 DI16 DO16 <sup>1)</sup>	2862602	1

## For the control cabinet (IP20) – Inline

### INTERBUS bus coupler for copper cables

The INTERBUS bus coupler connects the terminals of an Inline station with the INTERBUS network.

Various bus couplers can be selected to connect to the INTERBUS remote branch via a copper connection. Inline or D-SUB connectors are used accordingly to establish the connection.

#### The bus coupler performs the following functions within an Inline station:

- Refreshing the INTERBUS remote bus signals
- Decoupling the outgoing remote bus or the connected I/O terminals via software commands
- Supplying the connected I/O modules by means of an integrated power supply unit (IBS IL 24 BK-T/U-PAC)

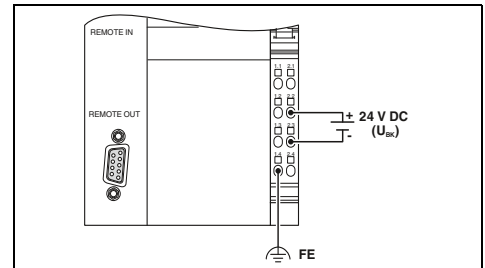
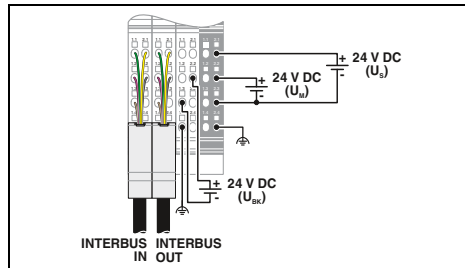
**Notes:**  
1) EMC: Class A product, see page 553



Inline shield connector connection



D-SUB connection



#### Technical data

Interface	INTERBUS remote bus
Name	2x 6-pos. Inline shield connectors
Connection method	Inline data jumper
Local bus interface	
Connection method	
Power supply for module electronics	24 V DC (via Inline connector)
Supply voltage	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply voltage range	
Typical current consumption	Typ. 100 mA (without connected Inline I/O terminals)
Power supply at U <sub>L</sub>	max. 2 A DC (observe derating)
Power supply at U <sub>ANA</sub>	max. 0.5 A DC (observe derating)
INTERBUS data	
Number of local bus devices that can be connected	63
Maximum distance to the next remote bus device	400 m

#### Technical data

Interface	INTERBUS remote bus
Name	D-SUB-9 socket/plug
Connection method	Inline data jumper
Local bus interface	
Connection method	
Power supply for module electronics	24 V DC (via Inline connector)
Supply voltage	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply voltage range	
Typical current consumption	Typ. 100 mA (without connected Inline I/O terminals)
Power supply at U <sub>L</sub>	max. 2 A DC (observe derating)
Power supply at U <sub>ANA</sub>	max. 0.5 A DC (observe derating)
INTERBUS data	
Number of local bus devices that can be connected	63
Maximum distance to the next remote bus device	400 m

#### Programmable functions

- Local bus branch disable
- Local bus reset
- Local bus disable
- Remote bus disable
- Remote bus reset

- Local bus branch disable
- Local bus reset
- Local bus disable
- Remote bus disable
- Remote bus reset

#### General data

Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	214 g
Width	48.8 mm
Ambient temperature (operation)	-25 °C ... 55 °C

Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	210 g
Width	85 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
INTERBUS bus coupler, complete with accessories (connector and marking field)			
- Inline shield connector connection	IBS IL 24 BK-T/U-PAC <sup>1)</sup>	2861580	1
- D-SUB connection			

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
INTERBUS bus coupler, complete with accessories (connector and marking field)			
- D-SUB connection	IBS IL 24 BK-DSUB-PAC <sup>1)</sup>	2861593	1

#### Accessories

Connector set for bus terminal, copper, color-coded	IB IL BK-PLSET/CP	2860374	1
Inline connector			

#### Accessories

Inline connector	IB IL SCN-8-CP	2727608	10
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### INTERBUS bus coupler for fiber-optic cable

The INTERBUS bus coupler connects the terminals of an Inline station with the INTERBUS network.

Various bus couplers can be selected for the FO connection to the INTERBUS remote bus. The connection is always made using an Inline F-SMA connector (optical fiber).

The IBS IL 24 BK-LK/45 has a 45° angled INTERBUS fiber optic connection. The angled design means that the bus coupler and Inline station can also be mounted in very shallow terminal boxes without violating the required minimum bending radii for fiber optic cables.

The IBS IL 24 BK RB-LK bus coupler offers the additional option of connecting a (fiber optic) remote bus branch.

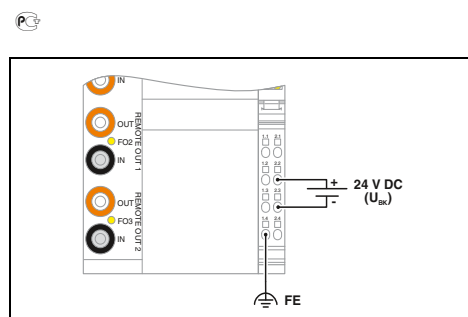
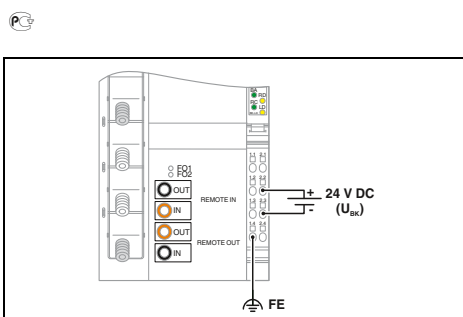
**Notes:**  
1) EMC: Class A product, see page 553



45° angled fiber optic connection



90° FO connection and FO remote bus branch



<b>Interface</b>	
Name	INTERBUS remote bus
Connection method	4x F-SMA angled connectors
Local bus interface	Inline data jumper
Connection method	24 V DC (via Inline connector) 19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Power supply for module electronics	Typ. 90 mA (without connected Inline I/O terminals)
Supply voltage	max. 2 A DC (observe derating)
Supply voltage range	max. 0.5 A DC (observe derating)
<b>Typical current consumption</b>	
Power supply at U <sub>L</sub>	63
Power supply at U <sub>ANA</sub>	400 m
<b>INTERBUS data</b>	
Number of local bus devices that can be connected	63
Maximum distance to the next remote bus device	400 m
<b>Programmable functions</b>	
General data	Local bus branch disable Local bus reset Local bus disable Remote bus disable Remote bus reset
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	210 g
Width	85 mm
Ambient temperature (operation)	-25 °C ... 55 °C

<b>Technical data</b>	
Interface	INTERBUS remote bus
Name	4x F-SMA angled connectors
Connection method	Inline data jumper
Local bus interface	24 V DC (via Inline connector) 19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Connection method	Typ. 90 mA (without connected Inline I/O terminals)
Power supply for module electronics	max. 2 A DC (observe derating)
Supply voltage	max. 0.5 A DC (observe derating)
Supply voltage range	63
Typical current consumption	400 m
Power supply at U <sub>L</sub>	Local bus branch disable Local bus reset Local bus disable Remote bus disable Remote bus reset
Power supply at U <sub>ANA</sub>	Spring-cage connection
INTERBUS data	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Number of local bus devices that can be connected	210 g
Maximum distance to the next remote bus device	85 mm
Programmable functions	-25 °C ... 55 °C

<b>Technical data</b>	
Interface	INTERBUS remote bus
Name	6x F-SMA connectors
Connection method	Inline data jumper
Local bus interface	24 V DC (via Inline connector) 19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Connection method	Typ. 120 mA (without connected Inline I/O terminals)
Power supply for module electronics	max. 2 A DC (observe derating)
Supply voltage	max. 0.5 A DC (observe derating)
Supply voltage range	63
Typical current consumption	400 m
Power supply at U <sub>L</sub>	Local bus branch disable Local bus reset Local bus disable Remote bus disable Remote bus reset
Power supply at U <sub>ANA</sub>	Spring-cage connection
INTERBUS data	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Number of local bus devices that can be connected	235 g
Maximum distance to the next remote bus device	85 mm
Programmable functions	-25 °C ... 55 °C

<b>Description</b>	
INTERBUS bus coupler, complete with accessories (connector and marking field)	
- 45° angled fiber optic connection	
- FO connection and FO remote bus branch	

<b>Ordering data</b>		
Type	Order No.	Pcs. / Pkt.
IBS IL 24 BK-LK/45-PAC <sup>1)</sup>	2862165	1

<b>Ordering data</b>		
Type	Order No.	Pcs. / Pkt.
IBS IL 24 BK RB-LK-PAC <sup>1)</sup>	2861506	1

<b>Inline connector</b>	
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<b>Accessories</b>		
IB IL SCN-8-CP	2727608	10

<b>Accessories</b>		
IB IL SCN-8-CP	2727608	10



**INTERBUS Block IO**

This Inline Block IO module can be connected to the INTERBUS fieldbus system.

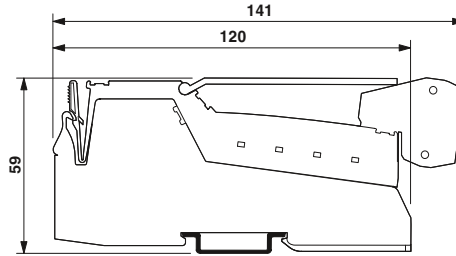
In order to prevent the adverse effects of interference due to compensating currents, the inputs are galvanically decoupled and have adjustable filter times. The current inputs are overload-protected in these devices and the integrated sensor supply provides short-circuit protection.

The output behavior can be set for a bus reset and thereby provides safety for the machine. In addition, all channels are equipped with shield connections as standard. This directly increases the immunity to EMI in the system.

**Features:**

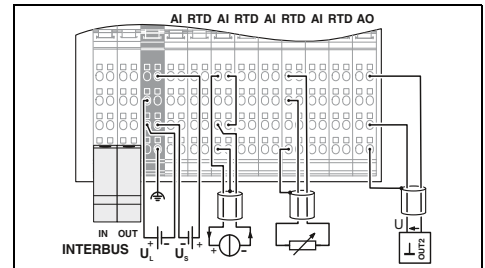
- 4 analog inputs (shielded)
- Difference measurement or resistance thermometer (RTD)
- 2 analog outputs (shielded)

**Notes:**  
1) EMC: Class A product, see page 553



**4 analog inputs and 2 analog outputs**

INTERBUS CLUB



<b>Interface</b>	
Fieldbus system	INTERBUS
Connection method	Inline connectors
Transmission speed	500 kbps
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Current consumption	Typ. 95 mA
<b>Analog inputs</b>	
Connection technology	2, 3, 4-wire (shielded)
Number of inputs	max. 4 (differential inputs, voltage or current can be chosen separately)
Description of the input	Differential input, incl. sensor supply (24 V DC)
Voltage input signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Sensor types (RTD) that can be used	Pt100, Pt500, Pt1000, Ni100, Ni1000, Ni1000 L&G
Linear resistance measuring range	0 Ω ... 3200 Ω / 0 Ω ... 9500 Ω
Protective circuit for voltage input	Electronic short-circuit protection
Protective circuit for current input	Electronic short-circuit protection
<b>Analog outputs</b>	
Connection technology	2-wire (shielded)
Number of outputs	2
Voltage output signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current output signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Protective circuit	Short-circuit protection of outputs, electronic
<b>Process data</b>	
Measured value resolution	16 bits (15 bits + sign bit)
Input filter time	1.1 ms (Or 4.5 ms per channel)
Data formats	IB IL, IB ST, IB RT, standardized representation, S7 compatible
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	465 g
Degree of protection	IP20
Width	156 mm

**Technical data**

<b>Technical data</b>	
INTERBUS	
Inline connectors	
500 kbps	
24 V DC	
19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
Typ. 95 mA	
2, 3, 4-wire (shielded)	
max. 4 (differential inputs, voltage or current can be chosen separately)	
Differential input, incl. sensor supply (24 V DC)	
0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V	
0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA	
Pt100, Pt500, Pt1000, Ni100, Ni1000, Ni1000 L&G	
0 Ω ... 3200 Ω / 0 Ω ... 9500 Ω	
Electronic short-circuit protection	
Electronic short-circuit protection	
2-wire (shielded)	
2	
0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V	
0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA	
Short-circuit protection of outputs, electronic	
16 bits (15 bits + sign bit)	
1.1 ms (Or 4.5 ms per channel)	
IB IL, IB ST, IB RT, standardized representation, S7 compatible	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
465 g	
IP20	
156 mm	

**Ordering data**

Description	<b>Inline Block I/O analog input/output module</b>
	- For INTERBUS

Type	Order No.	Pcs. / Pkt.
ILB IB AI4 AO2 <sup>1)</sup>	2878777	1



**INTERBUS Block IO**

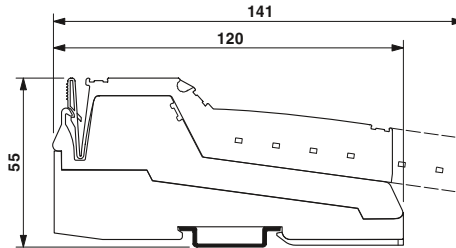
These Inline Block IO modules can be connected to the INTERBUS fieldbus system.

Depending on the module version, they offer various combinations of inputs and outputs.

**Features:**

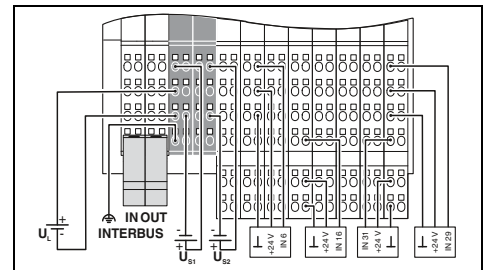
- Inline or D-SUB bus connection
- 8 ... 32 inputs, 24 V DC
- 8 ... 32 outputs, 24 V DC, 500 mA

**Notes:**  
1) EMC: Class A product, see page 553



16/32 digital inputs

INTERBUS CLUB  
Ex: (U)



<b>Interface</b>	
Fieldbus system	
Connection method	
Transmission speed	
<b>Power supply for module electronics</b>	
Supply voltage	
Supply voltage range	
Supply current	
<b>Digital inputs</b>	
Connection technology	
Number of inputs	
Description of the input	
Typical response time	
Protective circuit	
<b>Digital outputs</b>	
Connection technology	
Number of outputs	
Maximum output current per channel	
Protective circuit	
<b>General data</b>	
Connection method	
Connection data solid/stranded/AWG	
Weight	
Degree of protection	
Width	

Technical data	
ILB IB 24 DI16 <sup>1)</sup>	ILB IB 24 DI32 <sup>1)</sup>
INTERBUS Inline connectors 500 kbps	
24 V DC 19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
80 mA	60 mA
16	32
2, 3-wire EN 61131-2 type 1 Approx. 500 µs Short-circuit protection, overload protection of the sensor supply	
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
300 g	405 g
IP20	
95 mm	156 mm

Description
<b>Inline Block I/O digital input module</b> - 16 inputs - 32 inputs
<b>Inline Block I/O digital output module</b> - 16 outputs - 32 outputs
<b>Inline Block I/O digital input/output module</b>  - 8 inputs, 8 outputs - 16 inputs, 16 outputs - 16 inputs, 16 outputs, D-SUB bus connection

Ordering data		
Type	Order No.	Pcs. / Pkt.
ILB IB 24 DI16 <sup>1)</sup>	2862330	1
ILB IB 24 DI32 <sup>1)</sup>	2862343	1



16/32 digital outputs



8 digital inputs and 8 digital outputs

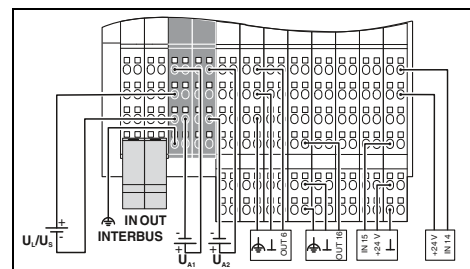
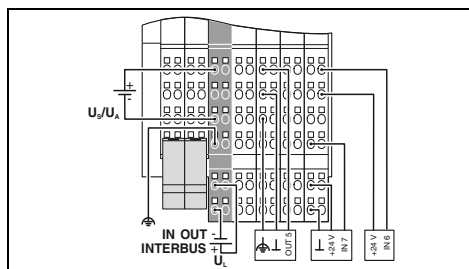


16 digital inputs and 16 digital outputs

eA<sup>®</sup> IS INTERBUS CLUB  
Ex:

eA<sup>®</sup> IS INTERBUS CLUB  
Ex:

eA<sup>®</sup> IS PC INTERBUS CLUB  
Ex:



Technical data

Technical data

Technical data

ILB IB 24 DO16<sup>1)</sup>      ILB IB 24 DO32<sup>1)</sup>

INTERBUS  
Inline connectors  
500 kbps

INTERBUS  
Inline connectors  
500 kbps

INTERBUS  
Inline connectors  
500 kbps

24 V DC

24 V DC

24 V DC

19.2 V DC ... 30 V DC (including all tolerances, including ripple)

80 mA

85 mA

60 mA

80 mA

-

2, 3-wire

2, 3-wire

-

8

16

-

EN 61131-2 type 1

EN 61131-2 type 1

-

Approx. 500 µs

Approx. 500 µs

-

Short-circuit protection, overload protection of the sensor supply

Short-circuit protection, overload protection of the sensor supply

16

2, 3-wire

32

2, 3-wire

2, 3-wire

500 mA

500 mA

500 mA

Short-circuit and overload protection

Short-circuit and overload protection

Short-circuit and overload protection

Spring-cage connection

0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16

300 g

510 g

Spring-cage connection

0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16

350 g

Spring-cage connection

0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16

500 g

95 mm

IP20

156 mm

95 mm

156 mm

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
ILB IB 24 DO16 <sup>1)</sup>	2862356	1
ILB IB 24 DO32 <sup>1)</sup>	2862369	1

Type	Order No.	Pcs. / Pkt.
ILB IB 24 DI 8 DO 8 <sup>1)</sup>	2862372	1

Type	Order No.	Pcs. / Pkt.
ILB IB 24 DI16 DO16 <sup>1)</sup>	2862385	1
ILB IB 24 DI16 DO16-DSUB	2878625	1

### PROFIBUS bus coupler

The bus couplers for PROFIBUS DP can insert an Inline station at any point in the PROFIBUS DP network.

The address can be easily set using two rotary coding switches or via DIP switches. The fieldbus is connected via a 9-pos. D-SUB socket.

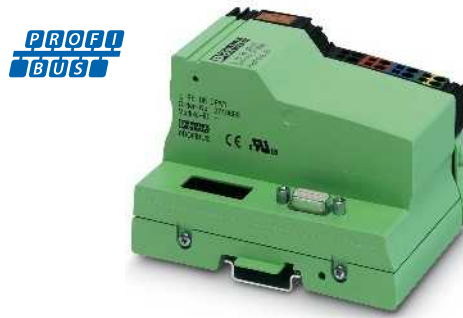
The bus couplers can be used in many applications with their UL approvals and the additional Ex Zone 2 manufacturer's declaration.

#### IL PB BK DI8 DO4/EF-PAC

- 8 inputs, 24 V DC
- 4 outputs, 24 V DC, 500 mA
- Operation of PROFI-safe devices
- IO-Link calls supported

#### Notes:

- 1) EMC: Class A product, see page 553



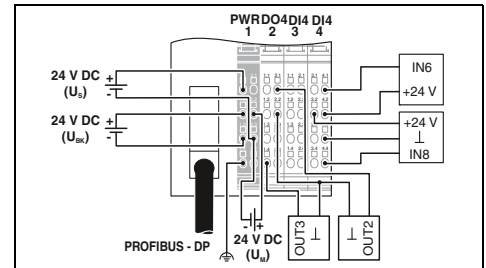
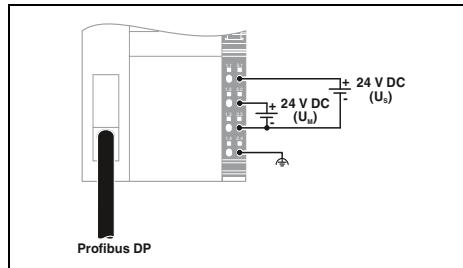
D-SUB connection



D-SUB connection, 8 digital inputs and 4 digital outputs



Ex:



#### Technical data

Interface	PROFIBUS DP
Fieldbus system	D-SUB-9 socket
Connection method	9.6 kbps ... 12 Mbps
Transmission speed	
Local bus interface	Inline data jumper
Connection method	24 V DC (via Inline connector)
Power supply for module electronics	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply voltage	
Supply voltage range	
Max. current consumption	max. 1.25 A
Power supply at $U_L$	max. 2 A DC
Power supply at $U_{ANA}$	max. 0.5 A DC
Digital inputs	
Connection technology	-
Maximum number of inputs	-
Protective circuit	-
Digital outputs	
Connection technology	-
Maximum number of outputs	-
Maximum output current per channel	-
Protective circuit	-
INTERBUS data	
Number of local bus devices that can be connected	63
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	240 g
Width	85 mm
Ambient temperature (operation)	0 °C ... 55 °C
Permissible humidity (operation)	85% (no condensation)

#### Technical data

Interface	PROFIBUS DP
Fieldbus system	D-SUB-9 socket
Connection method	9.6 kbps ... 12 Mbps
Transmission speed	
Local bus interface	Inline data jumper
Connection method	24 V DC (via Inline connector)
Power supply for module electronics	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply voltage	
Supply voltage range	
Max. current consumption	max. 0.98 A (from $U_{BK}$ )
Power supply at $U_L$	max. 0.8 A DC
Power supply at $U_{ANA}$	max. 0.5 A DC
Digital inputs	
Connection technology	2, 3-wire
Maximum number of inputs	8
Protective circuit	Protection against polarity reversal
Digital outputs	
Connection technology	2, 3-wire
Maximum number of outputs	4
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
INTERBUS data	
Number of local bus devices that can be connected	61 (on board I/Os are two devices)
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	320 g
Width	80 mm
Ambient temperature (operation)	-25 °C ... 55 °C
Permissible humidity (operation)	10% ... 95% (according to DIN EN 61131-2)

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>PROFIBUS bus coupler, DP/V1, complete with accessories (connector and marking field)</b>	<b>IL PB BK DP/V1-PAC<sup>1)</sup></b>	<b>2862246</b>	<b>1</b>
- With advanced functions, PROFI-safe			

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>PROFIBUS bus coupler, DP/V1, complete with accessories (connector and marking field)</b>	<b>IL PB BK DI8 DO4/EF-PAC<sup>1)</sup></b>	<b>2692322</b>	<b>1</b>

#### Accessories

Accessories	Order No.	Pcs. / Pkt.
<b>IL BKDIO-PLSET</b>	<b>2878599</b>	<b>1</b>
<b>SUBCON-PLUS-PROFIB</b>	<b>2744348</b>	<b>1</b>

#### Accessories

Accessories	Order No.	Pcs. / Pkt.
<b>IL BKDIO-PLSET</b>	<b>2878599</b>	<b>1</b>
<b>SUBCON-PLUS-PROFIB</b>	<b>2744348</b>	<b>1</b>

## PROFIBUS Block IO

This Inline Block IO module can be connected to the PROFIBUS fieldbus system as a slave.

The bus address is set using rotary coding switches on the module.

In order to prevent the adverse effects of interference due to compensating currents, the inputs are galvanically decoupled and have adjustable filter times. The current inputs are overload-protected in these devices and the integrated sensor supply provides short-circuit protection.

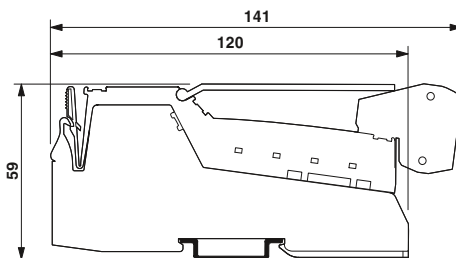
The output behavior can be set for a bus reset and thereby provides safety for the machine. In addition, all channels are equipped with shield connections as standard. This directly increases the immunity to EMI in the system.

### Features:

- 4 analog inputs (shielded)
- Difference measurement or resistance thermometer (RTD)
- 2 analog outputs (shielded)

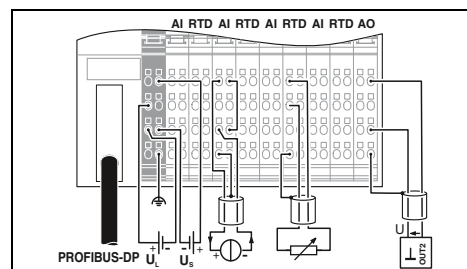
#### Notes:

1) EMC: Class A product, see page 553



4 analog inputs and 2 analog outputs

PROFIBUS



### Technical data

<b>Interface</b>	
Fieldbus system	PROFIBUS DP
Connection method	D-SUB-9 socket
Transmission speed	„6 kbps ... 12 Mbps
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
<b>Current consumption</b>	Typ. 95 mA
<b>Analog inputs</b>	
Connection technology	2, 3, 4-wire (shielded)
Number of inputs	max. 4 (differential inputs, voltage or current can be chosen separately)
Description of the input	Differential input, incl. sensor supply (24 V DC)
Voltage input signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Sensor types (RTD) that can be used	Pt100, Pt500, Pt1000, Ni100, Ni1000, Ni1000 L&G
Linear resistance measuring range	0 Ω ... 3200 Ω / 0 Ω ... 9500 Ω
Protective circuit for voltage input	Overload protection, short-circuit protection of sensor supply
Protective circuit for current input	Electronic short-circuit protection
<b>Analog outputs</b>	
Connection technology	2-wire (shielded)
Number of outputs	2
Voltage output signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current output signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Protective circuit	Short-circuit protection of outputs
<b>Process data</b>	
Measured value resolution	16 bits (15 bits + sign bit)
Input filter time	1.1 ms (Or 4.5 ms per channel)
Data formats	IB IL
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	465 g
Degree of protection	IP20
Width	156 mm

### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline Block I/O analog input/output module</b>			
For PROFIBUS	ILB PB AI4 AO2 <sup>1)</sup>	2878874	1

### PROFIBUS Block IO

These Inline Block IO modules can be connected directly to the PROFIBUS fieldbus system as slaves.

The bus address is set using rotary coding switches on the module.

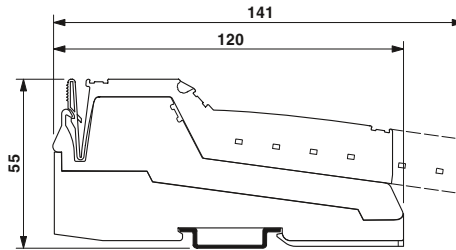
Depending on the module version, they offer various combinations of inputs and outputs.

#### Features:

- D-SUB bus connection
- 8 ... 32 inputs, 24 V DC
- 8 ... 32 outputs, 24 V DC, 500 mA

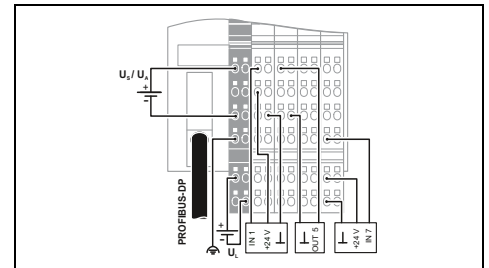
#### Notes:

- 1) EMC: Class A product, see page 553



**8 inputs and 8 selectable channels (input or output)**

PROFIBUS



#### Technical data

<b>Interface</b>	
Fieldbus system	PROFIBUS DP
Connection method	D-SUB-9 socket
Transmission speed	9.6 kbps ... 12 Mbps
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply current	60 mA
<b>Digital inputs</b>	
Connection method	2, 3-wire
Number of inputs	16
Description of the input	8 fixed and 8 freely selectable
Typical response time	Approx. 500 µs
Protective circuit	Short-circuit protection, overload protection of the sensor supply
<b>Digital outputs</b>	
Connection method	2, 3-wire
Number of outputs	8
Output description	Freely selectable
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	350 g
Degree of protection	IP20
Width	95 mm

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline Block I/O digital input/output module</b>			
- Eight inputs, eight inputs or outputs			
- 16 inputs, 16 outputs			
<b>Inline Block I/O digital input module</b>			
- 32 inputs			
<b>Inline Block I/O digital output module</b>			
- 32 outputs	<b>ILB PB 24 DI 8 DIO8<sup>1)</sup></b>	<b>2863562</b>	<b>1</b>





16 digital inputs and 16 digital outputs



32 digital inputs

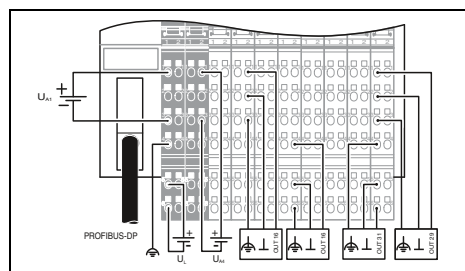
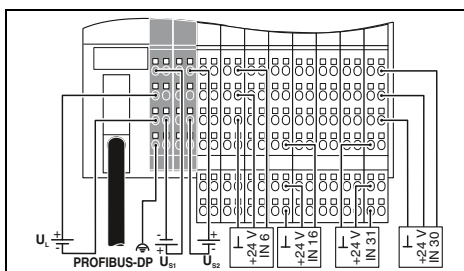
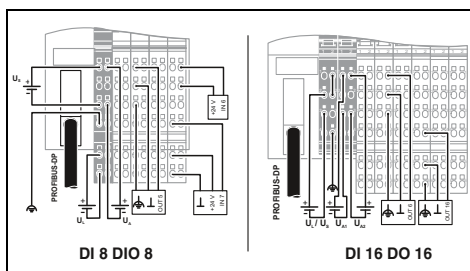


32 digital outputs

PROFIBUS  
Ex:

PROFIBUS  
Ex:

PROFIBUS  
Ex:



**Technical data**

**Technical data**

**Technical data**

PROFIBUS DP  
D-SUB-9 socket  
9.6 kbps ... 12 Mbps

PROFIBUS DP  
D-SUB-9 socket  
9.6 kbps ... 12 Mbps

PROFIBUS DP  
D-SUB-9 socket  
9.6 kbps ... 12 Mbps

24 V DC  
19.2 V DC ... 30 V DC (including all tolerances, including ripple)

24 V DC  
19.2 V DC ... 30 V DC (including all tolerances, including ripple)

24 V DC  
19.2 V DC ... 30 V DC (including all tolerances, including ripple)

70 mA

50 mA

70 mA

2, 3-wire  
16  
EN 61131-2 type 1

2, 3-wire  
32  
EN 61131-2 type 1

-  
-  
-

Approx. 500 µs  
Short-circuit protection, overload protection of the sensor supply

Approx. 500 µs  
Short-circuit protection, overload protection of the sensor supply

-  
-

2, 3-wire  
16  
-  
500 mA  
Short-circuit and overload protection

-  
-  
-  
-

2, 3-wire  
32  
-  
500 mA  
Short-circuit and overload protection

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
500 g  
IP20  
156 mm

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
510 g  
IP20  
156 mm

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
510 g  
IP20  
156 mm

**Ordering data**

**Ordering data**

**Ordering data**

Type	Order No.	Pcs. / Pkt.
ILB PB 24 DI16 DO16 <sup>1)</sup>	2862411	1

Type	Order No.	Pcs. / Pkt.
ILB PB 24 DI32 <sup>1)</sup>	2862398	1

Type	Order No.	Pcs. / Pkt.
ILB PB 24 DO32 <sup>1)</sup>	2862408	1

### Meatrolink bus coupler

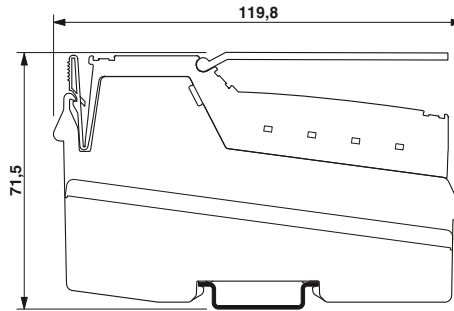
The Mechatrolink bus coupler is the link between the Mechatrolink network and the extensive Inline Modular product range.

#### Features:

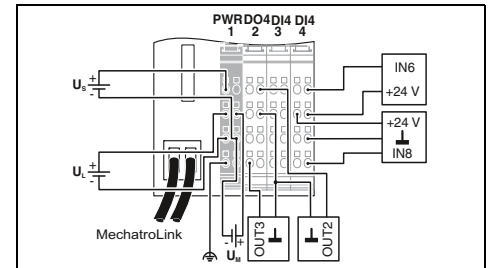
- Mechatrolink network connection
- Data transmission speed: 10 Mbps (MII) and 4 Mbps (MI)
- Slave address, baud rate, and Mechatrolink data width can be set via DIP switches
- Meets Mechatrolink II intelligent I/O specification
- Supports high-speed I/O scanner

#### Notes:

1) EMC: Class A product, see page 553



**USB connection,  
8 digital inputs and 4 digital outputs**



#### Technical data

<b>Interface</b>	
Fieldbus system	Mechatrolink
Connection method	USB type A, socket
Number	2
Transmission speed	max. 10 Mbps
<b>Local bus interface</b>	
Connection method	Inline data jumper
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC (via Inline connector)
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Max. current consumption	max. 0.9 A (from $U_{BK}$ )
Power supply at $U_L$	max. 0.8 A DC
Power supply at $U_{ANA}$	max. 0.5 A DC
<b>Digital inputs</b>	
Connection method	2, 3-wire
Maximum number of inputs	8
Typical response time	Approx. 500 $\mu$ s
Protective circuit	Protection against polarity reversal
<b>Digital outputs</b>	
Connection method	2, 3-wire
Maximum number of outputs	4
Maximum output current per channel	500 mA
Protective circuit	Short-circuit and overload protection
<b>INTERBUS data</b>	
Number of local bus devices that can be connected	61 (on board I/Os are two devices)
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	320 g
Width	80 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IL MII BK DI8 DO4-PAC <sup>1)</sup>	2884619	1

#### Accessories

IL BKDIO-PLSET	2878599	1
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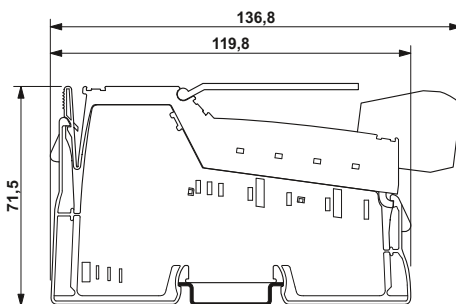
Description	<b>Mechatrolink bus coupler</b> , complete with accessories (connector and marking field)
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Connector set for bus coupler	
-------------------------------	--

### Field multiplexer

The simple field multiplexer principle:

- Sensors and actuators in the field
- Wired with Inline I/O terminals
- Connect the I/O terminals to the field multiplexer
- Connect the field multiplexer to the remote station (up to 12 km away) using a 2-wire cable. Alternatively, transmission is also possible via fiber optics, a telephone line or wirelessly using electrical optical interface converters.
- Apply 24 V and you're done!



The field multiplexer, together with the connected I/O terminals forms one station. The system consists of two such stations. It must be designed in such a way that one particular output terminal at the other end is assigned to each input terminal and vice versa. There is one output per input and one input per output.

In terms of the system configuration, all that is required is the complementary arrangement of the I/O terminals in the station and remote station. Configuration software is not required.

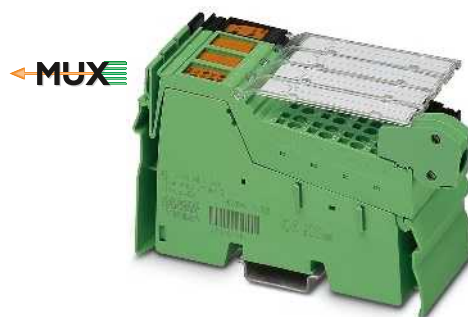
#### Features:

- Up to 63 I/O terminals can be connected
- Up to 512 digital or 32 analog I/Os (or a mixture) can be connected
- Data transmission time:  
 $t_{Cu} = n \times 6.8 \text{ ms/byte} + 78 \text{ ms}$   
 $t_{FO} = n \times 1.37 \text{ ms/byte} + 10 \text{ ms}$   
 $n = 1 \dots 64 \text{ bytes}$

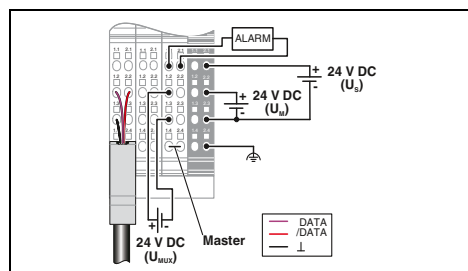
#### Notes:

1) EMC: Class A product, see page 553

**Digital and analog Inline I/O terminals that can be used on the field multiplexer are indicated in this catalog by the adjacent logo.**



Copper connection



#### Technical data

<b>Interfaces</b>	Fieldbus system Connection method Local bus interface Connection method Power supply for module electronics Supply voltage Supply voltage range	Inline remote bus Inline shield connector Inline data jumper
Typical current consumption	< 60 mA (without connected I/O terminal blocks (24 V DC supply)) 1.25 A (with max. number of connected I/O terminal blocks (24 V DC supply)) 8 A (If this value is exceeded, further power or segment terminals must be used!)	
<b>Field multiplexer system data</b>	Remote bus Remote bus length	Max. 12 km via 2-wire copper cable (depending on the type of cable and the environmental conditions with regard to EMC) ; max. 3.8 km via optical fiber converter with fiberglass cable
<b>Interface</b>	Transmission protocol Local bus Maximum number of inputs and outputs Number of INTERBUS Inline I/O terminals that can be connected	RS-485, modified Special telecontrol protocol
<b>Update time of all input and output data</b>	Transmission protocol	512 digital or 32 analog I/Os, can be mixed 32
<b>General data</b>	Connection method Connection data solid/stranded/AWG Weight Width Ambient temperature (operation)	1 s INTERBUS Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 212 g 48.8 mm -25 °C ... 55 °C

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 MUX MA-PAC <sup>1)</sup>	2861205	1

#### Accessories

IB IL MUX-PLSET	2836036	1
IB IL MUX-CAB PSI	2878476	1

Description
<b>Inline field multiplexer</b> , complete with accessories (connector and marking field)
<b>Connector set</b> for Inline field multiplexer
<b>Adapter cable</b> , Inline field multiplexer on PSI-MOS module

### Power terminals

Inline power terminals are used to supply, protect, and diagnose the individual voltage routing within an Inline station.

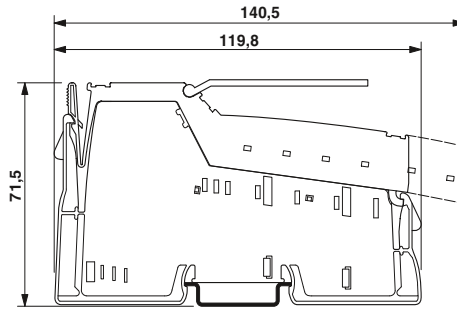
Depending on the terminal type, various functions can be implemented.

#### Supply of:

- Main circuit ( $U_M$ ) up to 8 A
- Segment circuit ( $U_S$ ) for the I/O supply up to 8 A

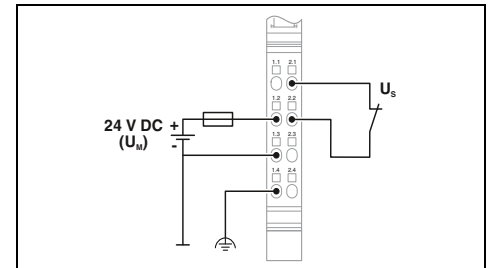
#### Notes:

1) EMC: Class A product, see page 553



24 V

UL 1875 PCE ABS BSH Ex:



#### Technical data

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
Connection method	-
I/O voltage	24 V DC
I/O voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Main circuit supply $U_M$	24 V DC
Power supply at $U_M$	8 A
Communications power $U_L$	7.5 V DC $\pm$ 5% (via voltage jumper)
Power supply at $U_L$	-
Current consumption from $U_L$	-
I/O supply voltage $U_{ANA}$	-
Power supply at $U_{ANA}$	-
Segment supply voltage $U_S$	24 V DC
Power supply at $U_S$	8 A
Fuse	-
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Protective circuit	Polarity protection, surge protection
Weight	59 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline power terminal</b> , complete with accessories (connector and marking field)	<b>IB IL 24 PWR IN-PAC<sup>1)</sup></b>	<b>2861331</b>	<b>1</b>
- With fuse			
- With fuse and diagnostics			
- With fuse and fuse diagnostics			
- 120 V AC			
- 230 V AC			
- 230 V AC, with fuse and diagnostics			

#### Accessories

<b>Inline distance terminal</b>		
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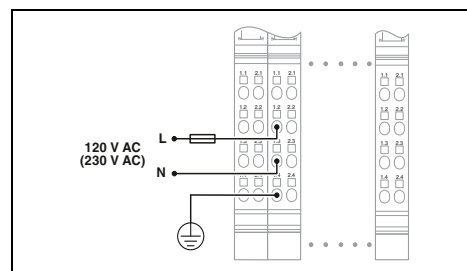
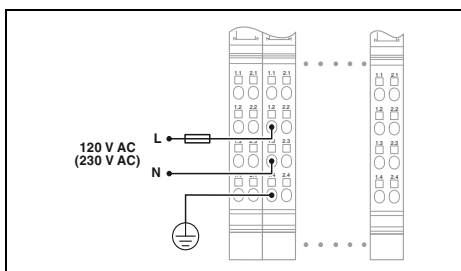
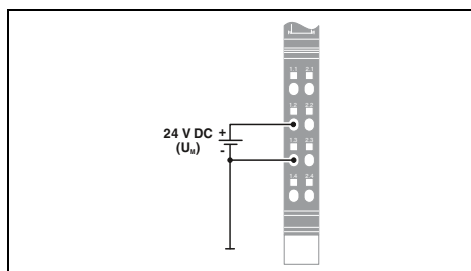
24 V with fuse and diagnostics



120 V



230 V with/without diagnostics



Technical data

IB IL 24 PWR IN/2-F-PAC<sup>1)</sup> IB IL 24 PWR IN/2-F-D-PAC<sup>1)</sup>

Inline data jumper

8-pos. Inline power plug

24 V DC  
19.2 V DC ... 30 V DC (including all tolerances, including ripple)

24 V DC  
6 A 4 A  
7.5 V DC ±5% (via voltage jumper)

0 A DC 25 mA

24 V DC  
6 A 4 A  
SI 5 x 20 6, 300 AT (in scope of delivery)

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
Polarity protection, surge protection  
59 g 44 g  
12.2 mm  
-25 °C ... 55 °C

Technical data

Inline data jumper

8-pos. Inline power plug

120 V AC  
108 V AC ... 135 V AC (including all tolerances, including ripple)

120 V AC  
8 A

-  
-  
-  
-  
-  
-  
-

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
Surge protection  
80 g  
36.6 mm  
-25 °C ... 55 °C

Technical data

IB IL 230 PWR IN-PAC<sup>1)</sup> IB IL 230 PWR IN/F-D-PAC<sup>1)</sup>

Inline data jumper

8-pos. Inline power plug

230 V AC  
207 V AC ... 253 V AC (including all tolerances, including ripple)

230 V AC  
8 A  
7.5 V DC (via voltage jumper)

25 mA

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
Surge protection  
80 g  
36.6 mm  
-25 °C ... 55 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 PWR IN/2-F-PAC <sup>1)</sup>	2862136	1
IB IL 24 PWR IN/2-F-D-PAC <sup>1)</sup>	2862152	1
IB IL 24 PWR IN/2F-DF-PAC <sup>1)</sup>	2863779	1

Accessories

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 120 PWR IN-PAC <sup>1)</sup>	2861454	1

Accessories

IB IL DOR LV-SET-PAC <sup>1)</sup>	2861645	1
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Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 230 PWR IN-PAC <sup>1)</sup>	2861535	1
IB IL 230 PWR IN/F-D-PAC <sup>1)</sup>	2878971	1

Accessories

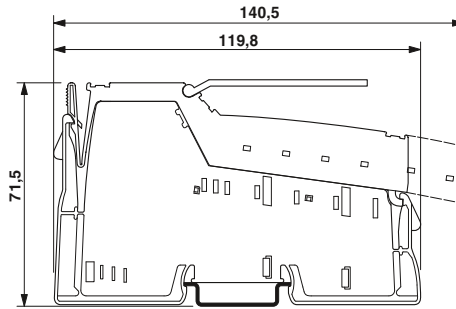
IB IL DOR LV-SET-PAC <sup>1)</sup>	2861645	1
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### Boost terminal

The IB IL 24 PWR IN/R-PAC Inline boost terminal is used to boost the following voltages:

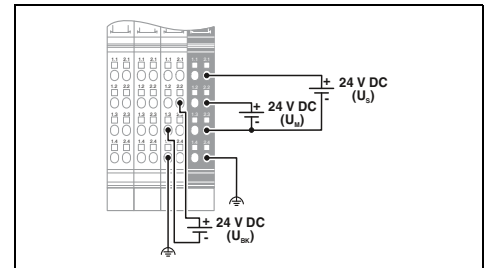
- Main circuit ( $U_M$ ) up to 8 A
- Segment circuit ( $U_S$ ) for the I/O supply up to 8 A
- Analog supply ( $U_{ANA}$ ) up to 0.5 A
- Communications power ( $U_L$ ) up to 2 A

**Notes:**  
1) EMC: Class A product, see page 553



$U_M, U_S, U_L, U_{ANA}$

UL, CE, ABS BSH, Ex: Ex



<b>Local bus interface</b>	
Connection method	Inline data jumper
<b>Power supply for module electronics</b>	
I/O voltage	24 V DC
I/O voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Main circuit supply $U_M$	24 V DC
Power supply at $U_M$	8 A
Communications power $U_L$	7.5 V DC $\pm 5\%$ (via voltage jumper)
Power supply at $U_L$	max. 2 A DC
I/O supply voltage $U_{ANA}$	24 V DC
Power supply at $U_{ANA}$	0.5 A DC
Segment supply voltage $U_S$	24 V DC
Power supply at $U_S$	8 A DC
Fuse	(electrical/thermal overload protection, included in scope of delivery)
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Protective circuit	Surge protection (segment supply, main supply, 24 V supply) input protective diodes (can be destroyed by permanent overload) pulse loads up to 1500 W are short circuited by the input protective diode.
Weight	192 g
Width	48.8 mm
Ambient temperature (operation)	-25 °C ... 55 °C

<b>Technical data</b>		
Inline data jumper		
24 V DC		
19.2 V DC ... 30 V DC (including all tolerances, including ripple)		
24 V DC		
8 A		
7.5 V DC $\pm 5\%$ (via voltage jumper)		
max. 2 A DC		
24 V DC		
0.5 A DC		
24 V DC		
8 A DC		
(electrical/thermal overload protection, included in scope of delivery)		
Spring-cage connection		
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16		
Surge protection (segment supply, main supply, 24 V supply) input protective diodes (can be destroyed by permanent overload) pulse loads up to 1500 W are short circuited by the input protective diode.		
192 g		
48.8 mm		
-25 °C ... 55 °C		

<b>Description</b>	
Inline power terminal or boost terminal, complete with accessories (connector and marking field)	
<b>Connector set, for power terminal, color-coded</b>	

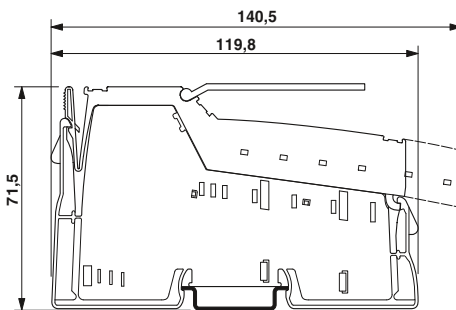
<b>Ordering data</b>		
Type	Order No.	Pcs. / Pkt.
IB IL 24 PWR IN/R-PAC <sup>1)</sup>	2861674	1
<b>Accessories</b>		
IB IL PWR IN/R-PLSET	2860620	1

**Boost terminal**

The IB IL 24 PWR IN/R/L-0.8A-PAC Inline boost terminal is used to boost the following voltage:

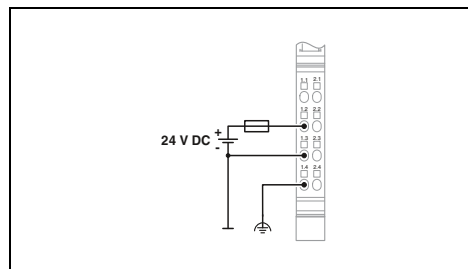
- Communications power ( $U_L$ ) up to 0.8 A

**Notes:**  
1) EMC: Class A product, see page 553



$U_L$

UL ABS BSH TÜV SÜD Ex: Ex



Local bus interface
Connection method
Power supply for module electronics
I/O voltage
I/O voltage range
Communications power $U_L$
Power supply at $U_L$
Fuse
General data
Connection method
Connection data solid/stranded/AWG
Protective circuit
Weight
Width
Ambient temperature (operation)

Technical data	
Inline data jumper	
24 V DC	
19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
7.5 V DC $\pm 5\%$ (via voltage jumper)	
max. 0.8 A DC	
(electrical/thermal overload protection, included in scope of delivery)	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
Surge protection input protective diodes (can be destroyed by permanent overload) pulse loads up to 1500 W are short circuited by the input protective diode.	
65 g	
12.2 mm	
-25 °C ... 55 °C	

Description
<b>Inline boost terminal</b> , complete with accessories (connector and marking field)
- For the communications power $U_L$ of 0.8 A

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24 PWR IN/R/L-0.8A-PAC <sup>1)</sup>	2693020	1

Connector for power and segment terminals
---

Accessories		
IB IL SCN-PWR IN-CP	2727637	10



### Segment terminals

Inline segment terminals can be used to create several segment circuits ( $U_S$ ) within the main circuit ( $U_M$ ). The signal and initiator voltages for digital I/Os are always tapped from the segment circuit  $U_S$ .

**Depending on the terminal type, various functions can be implemented:**

- Segmentation without fuse
- Segmentation with fine fuse
- Segmentation with fine fuse and diagnostics
- Segmentation with electronic fuse and diagnostics

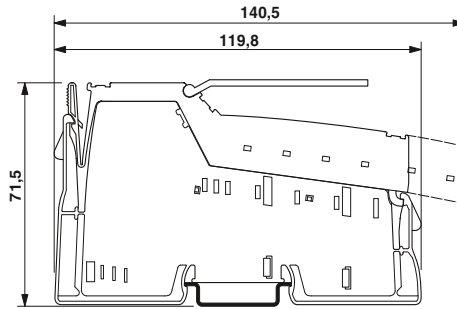
When combined with the IB IL PD 24V-PAC potential distributor terminal, 24 V supplies with electronic fuse protection and remote diagnostics can be provided in the field, for example. However, the potential distributor terminals are also suitable for the economical return wiring of sensor and actuator cables when using digital Inline terminals with single-conductor connection technology.

The IB IL DOR LV-SET-PAC distance terminal set creates the specified creepage distance when using AC terminals (gray housing). For example, when using IB IL 24/230 DOR 4/W-PAC relay terminals, the two end terminals interrupt all 24 V circuits as well as GND and functional earth ground.

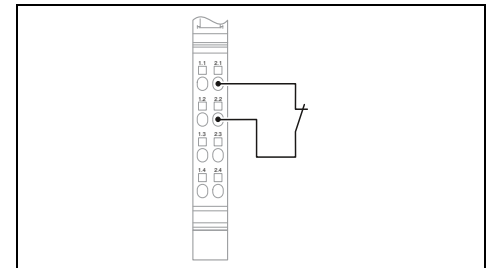
AC power terminals for 120 V AC or 230 V AC already include distance terminals.

**Notes:**

1) EMC: Class A product, see page 553



24 V



**Technical data**

<b>Local bus interface</b>	
Connection method	Inline data jumper
<b>Power supply for module electronics</b>	
Connection method	Inline potential distributor
Communications power $U_L$	-
Current consumption from $U_L$	-
Segment supply voltage $U_S$	24 V DC
Power supply at $U_S$	8 A
Fuse	-
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Protective circuit	Overload protection fuse
Weight	42 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

<b>Technical data</b>	
Connection method	Inline data jumper
<b>Power supply for module electronics</b>	
Connection method	Inline potential distributor
Communications power $U_L$	-
Current consumption from $U_L$	-
Segment supply voltage $U_S$	24 V DC
Power supply at $U_S$	8 A
Fuse	-
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Protective circuit	Overload protection fuse
Weight	42 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

**Ordering data**

<b>Description</b>
<b>Inline segment terminal</b> , complete with accessories (connector and marking field)
- With fuse
- With fuse and diagnostics
<b>Inline potential distributor terminal</b> , complete with accessories (connector and marking field)
- 24 V
- GND

Type	Order No.	Pcs. / Pkt.
IB IL 24 SEG-PAC <sup>1)</sup>	2861344	1



24 V with fuse and diagnostics



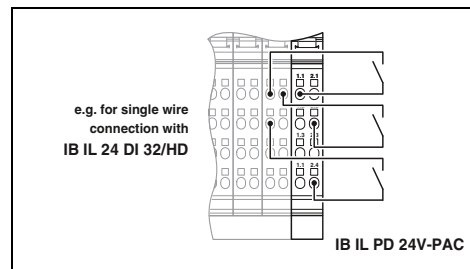
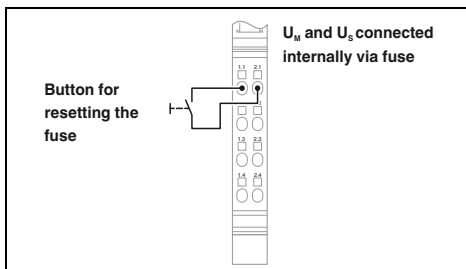
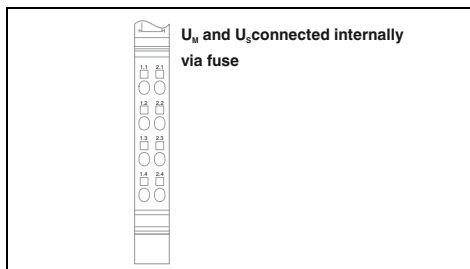
24 V with electronic fuse



Potential distributor

UL US PC ABS BSH BUL Lloyd Register Ex: (UL)

UL US PC Ex: (UL)



Technical data

Technical data

Technical data

Inline data jumper
Inline potential distributor
-
24 V DC
6 A
SI 5 x 20 6, 300 AT (in scope of delivery)
Spring-cage connection
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Overload protection fuse
59 g
12.2 mm
-25 °C ... 55 °C

Inline data jumper
Inline potential distributor
7.5 V DC (via voltage jumper)
30 mA
24 V DC
2.5 A
2.5 A (electronic)
Spring-cage connection
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Overload protection
44 g
12.2 mm
-25 °C ... 55 °C

IB IL PD 24V-PAC <sup>1)</sup>	IB IL PD GND-PAC <sup>1)</sup>
Inline data jumper	
Inline potential distributor	
24 V DC	-
-	-
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
-	-
44 g	-
12.2 mm	-
-25 °C ... 55 °C	-

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 SEG/F-PAC <sup>1)</sup>	2861373	1
IB IL 24 SEG/F-D-PAC <sup>1)</sup>	2861904	1

Type	Order No.	Pcs. / Pkt.
IB IL 24 SEG-ELF-PAC <sup>1)</sup>	2861409	1

Type	Order No.	Pcs. / Pkt.
IB IL PD 24V-PAC <sup>1)</sup>	2862987	1
IB IL PD GND-PAC <sup>1)</sup>	2862990	1

### Digital input terminals

Digital Inline input terminals are designed to connect digital signals, such as those supplied by buttons, limit switches or proximity switches.

#### Features, depending on the selected device:

- 2 to 32-channel
- According to EN 61131-2 Type 1 or 3
- 1, 2, 3 or 4-wire connection technology
- Maximum permissible load current per sensor: 250 mA

#### Notes:

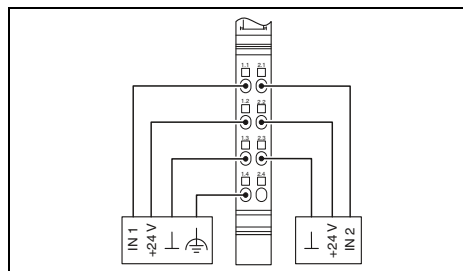
1) EMC: Class A product, see page 553



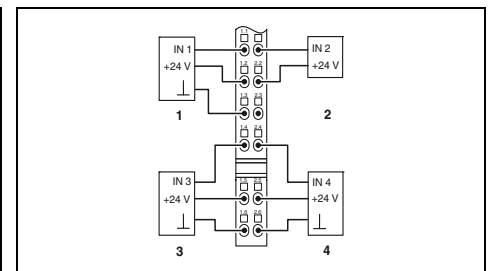
2 inputs



4 inputs



Technical data



Technical data

Local bus interface
Connection method
Power supply for module electronics
Supply voltage
Supply voltage range
Current consumption from U <sub>L</sub>
Digital inputs
Connection method
Connection technology
Maximum number of inputs
Description of the inputs
Typical response time
General data
Connection method
Connection data solid/stranded/AWG
Weight
Width
Ambient temperature (operation)

Inline data jumper
24 V DC (via voltage jumper)
19.2 V DC ... 30 V DC (including all tolerances, including ripple)
max. 35 mA
Spring-cage connection
2, 3, 4-wire
2
EN 61131-2 type 1
< 1 ms
Spring-cage connection
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
38 g
12.2 mm
-25 °C ... 55 °C

Inline data jumper
24 V DC (via voltage jumper)
19.2 V DC ... 30 V DC (including all tolerances, including ripple)
max. 40 mA
Spring-cage connection
2, 3-wire
4
EN 61131-2 type 1
< 1 ms
Spring-cage connection
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
66 g
12.2 mm
-25 °C ... 55 °C

Description
<b>Inline digital input terminal</b> , complete with accessories (connector and marking field)
- 2 inputs
- 8 inputs

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 2-PAC <sup>1)</sup>	2861221	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 4-PAC <sup>1)</sup>	2861234	1

Connector set for IB IL DI/DO 8
Connector set for IB IL DI 16, color-coded
Inline connector

Accessories		
Type	Order No.	Pcs. / Pkt.
IB IL SCN-8-CP	2727608	10

Accessories		
Type	Order No.	Pcs. / Pkt.
IB IL SCN-12-ICP	2727611	10



8 inputs



16 inputs

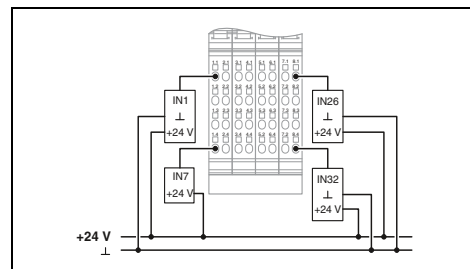
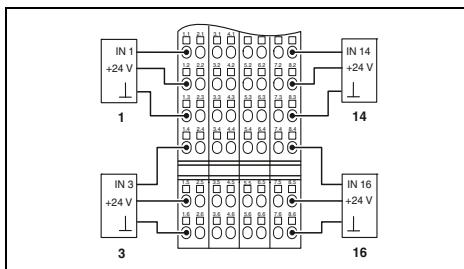
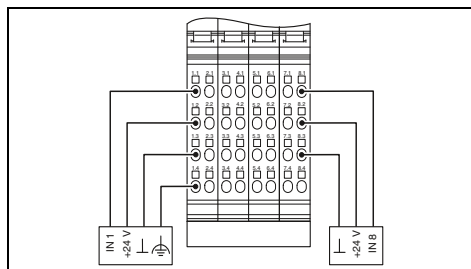


32 inputs

UL US PC ABS BSH CE Marking Ex:

UL US PC ABS BSH CE Marking Ex:

UL US PC ABS BSH CE Marking Ex:



Technical data

Technical data

Technical data

IB IL 24 DI 8-PAC<sup>1)</sup> IB IL 24 DI8/HD-PAC<sup>1)</sup>

Inline data jumper

Inline data jumper

Inline data jumper

24 V DC (via voltage jumper)

24 V DC (via voltage jumper)

24 V DC (via voltage jumper)

19.2 V DC ... 30 V DC (including all tolerances, including ripple)

19.2 V DC ... 30 V DC (including all tolerances, including ripple)

19.2 V DC ... 30 V DC (including all tolerances, including ripple)

max. 50 mA

max. 30 mA DC

max. 60 mA

max. 90 mA

Spring-cage connection

Spring-cage connection

Spring-cage connection

2, 3, 4-wire

8

1-wire

2, 3-wire

1-wire

EN 61131-2 type 1

< 1 ms

EN 61131-2 types 1 and 3

1 ms

EN 61131-2 type 1

< 1 ms

EN 61131-2 type 1

2 ms

Spring-cage connection

Spring-cage connection

Spring-cage connection

0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16

0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16

0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16

118 g

60 g

210 g

185 g

48.8 mm

12.2 mm

48.8 mm

48.8 mm

-25 °C ... 55 °C

-25 °C ... 55 °C

-25 °C ... 55 °C

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 8-PAC <sup>1)</sup>	2861247	1
IB IL 24 DI8/HD-PAC <sup>1)</sup>	2700173	1

Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 16-PAC <sup>1)</sup>	2861250	1

Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 32/HD-PAC <sup>1)</sup>	2862835	1

Accessories

Accessories

Accessories

IB IL DI/DO 8-PLSET/CP	2860963	1
IB IL SCN-8	2726337	10

IB IL DI16-PLSET/ICP	2860989	1
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IB IL DI/DO 8-PLSET	2860950	1
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## For the control cabinet (IP20) – Inline

### Digital input terminals

The digital Inline input terminals are used to acquire digital input signals. They are designed for use within an Inline station.

#### NPN terminal features:

- 2 to 32-channel

#### T2 terminal features:

- According to EN 61131-2 Type 2

#### S0 terminal features:

- Connection of S0 pulse encoders
- 32-bit counter range

#### Pulse counter:

- Maximum counting frequency of up to 150 Hz

#### Operating hours counter:

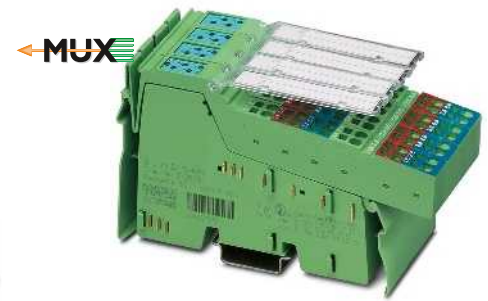
- 1 s resolution
- Counter enabled on active or inactive input (configurable)

#### Notes:

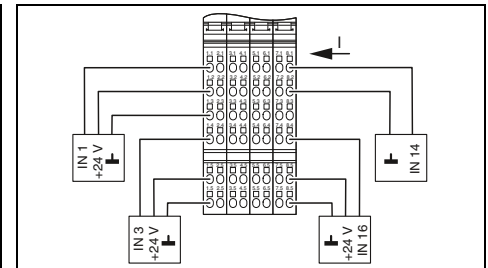
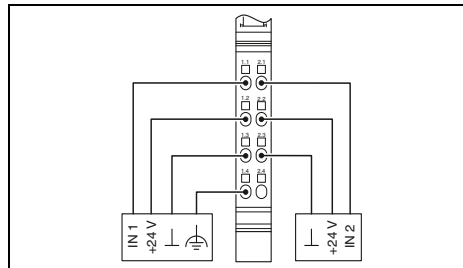
- 1) EMC: Class A product, see page 553



2 inputs, NPN-wired



16 inputs, NPN-wired



#### Technical data

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via voltage jumper)
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Current consumption from U <sub>L</sub>	max. 35 mA
Digital inputs	
Connection method	Spring-cage connection
Connection technology	2, 3, 4-wire
Maximum number of inputs	2
Description of the inputs	EN 61131-2 type 1
Typical response time	< 1 ms
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	41 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Technical data

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via voltage jumper)
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Current consumption from U <sub>L</sub>	max. 60 mA
Digital inputs	
Connection method	Spring-cage connection
Connection technology	2, 3-wire
Maximum number of inputs	16
Description of the inputs	EN 61131-2 type 1
Typical response time	< 1 ms
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	122 g
Width	48.8 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 2-NPN-PAC <sup>1)</sup>	2861483	1

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 16-NPN-PAC <sup>1)</sup>	2863520	1

#### Accessories

Accessories	Order No.	Pcs. / Pkt.
IB IL SCN-8-CP	2727608	10

#### Accessories

Accessories	Order No.	Pcs. / Pkt.
IB IL SCN-12-ICP	2727611	10

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via voltage jumper)
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Current consumption from U <sub>L</sub>	max. 35 mA
Digital inputs	
Connection method	Spring-cage connection
Connection technology	2, 3, 4-wire
Maximum number of inputs	2
Description of the inputs	EN 61131-2 type 1
Typical response time	< 1 ms
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	41 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

Description	
<b>Inline digital input terminal</b> , complete with accessories (connector and marking field)	
- NPN-wired	
- Input in acc. with EN 61131-2/Type 2	
- S0 counter	

Connector set for IB IL DI/DO 8	
<b>Inline connector</b>	



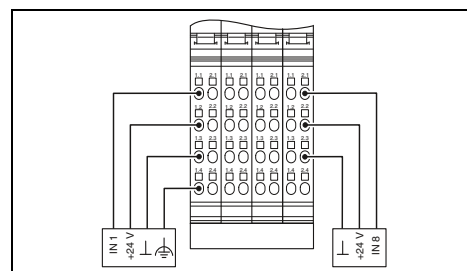
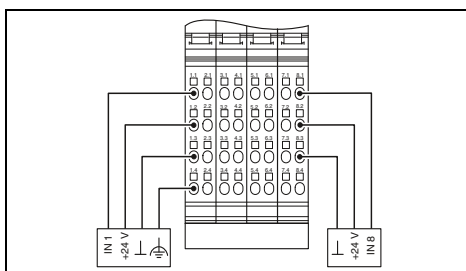
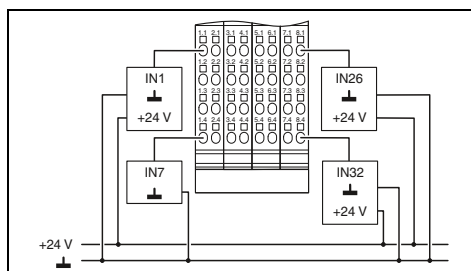
32 inputs, NPN-wired



8 inputs, EN 61131-2/Type 2



8 S<sub>0</sub> counter inputs



Technical data

Inline data jumper

24 V DC (via voltage jumper)  
19.2 V DC ... 30 V DC (including all tolerances, including ripple)

max. 90 mA

Spring-cage connection  
1-wire  
32  
EN 61131-2 type 1  
< 1 ms

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
125 g  
48.8 mm  
-25 °C ... 55 °C

Technical data

Inline data jumper

24 V DC (via voltage jumper)  
19.2 V DC ... 30 V DC (including all tolerances, including ripple)

max. 50 mA

Spring-cage connection  
2, 3, 4-wire  
8  
EN 61131-2 type 2  
< 1 ms

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
118 g  
48.8 mm  
-25 °C ... 55 °C

Technical data

Inline data jumper

24 V DC (via voltage jumper)  
19.2 V DC ... 30 V DC

max. 50 mA

Spring-cage connection  
2, 3, 4-wire  
8  
According to DIN 43864  
-

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
118 g  
48.8 mm  
-25 °C ... 55 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 32/HD-NPN-PAC <sup>1)</sup>	2878243	1

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 DI 8/T2-PAC <sup>1)</sup>	2862204	1

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL DI 8/S0-PAC <sup>1)</sup>	2897020	1

Accessories

IB IL DI/DO 8-PLSET	2860950	1
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Accessories

IB IL DI/DO 8-PLSET/CP	2860963	1
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Accessories

IB IL SCN-8-CP	2727608	10
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### Digital input terminals

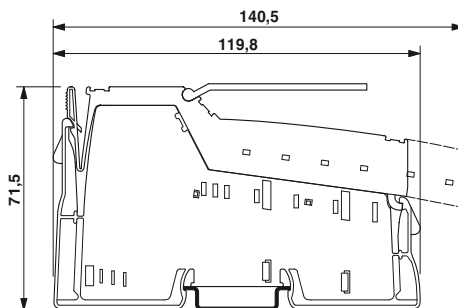
The terminals are designed for use within an Inline station. They are used to acquire digital input signals in the 120 V AC or 230 V AC voltage range.

#### Features:

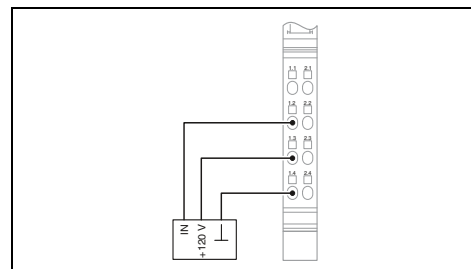
- Connections for one digital sensor
- Maximum permissible load current: 500 mA

#### Notes:

1) EMC: Class A product, see page 553



1 input, 120 V



Local bus interface	
Connection method	
Power supply for module electronics	
Supply voltage	
Supply voltage range	
Current consumption from $U_L$	
Digital inputs	
Connection method	
Connection technology	
Maximum number of inputs	
Description of the inputs	
General data	
Connection method	
Connection data solid/stranded/AWG	
Weight	
Width	
Ambient temperature (operation)	

#### Technical data

Inline data jumper	
120 V AC (via voltage jumper)	
108 V AC ... 135 V AC	
max. 30 mA	
Spring-cage connection	
2, 3-wire	
1	
EN 61131-2 type 1	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
39 g	
12.2 mm	
-25 °C ... 55 °C	

Description	
<b>Inline digital input terminal</b> , complete with accessories (connector and marking field)	
- 120 V AC	
- 230 V AC	

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 120 DI 1-PAC <sup>1)</sup>	2861917	1

<b>Inline distance terminal</b>	
<b>Connector</b> for Inline input terminals with AC voltage, color-coded	

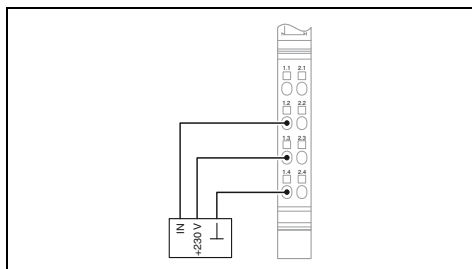
#### Accessories

IB IL DOR LV-SET-PAC <sup>1)</sup>	2861645	1
IB IL SCN-8-AC-ICP	2740261	10





1 input, 230 V



#### Technical data

Inline data jumper

230 V AC (via voltage jumper)  
12 V AC ... 253 V AC  
max. 30 mA

Spring-cage connection  
2, 3-wire  
1  
EN 61131-2 type 1

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
39 g  
12.2 mm  
-25 °C ... 55 °C

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 230 DI 1-PAC <sup>1)</sup>	2861548	1

#### Accessories

IB IL DOR LV-SET-PAC <sup>1)</sup>	2861645	1
IB IL SCN-8-AC-ICP	2740261	10

### Digital output terminals

Digital Inline output terminals are designed for the connection of digital actuators, such as electromagnetic valves, contactors or visual indicators.

#### Features, depending on the selected device:

- 2 to 32-channel
- Connection of actuators in single, 2, 3, and 4-wire technology
- Nominal current per output: 500 mA
- Short-circuit and overload protected outputs



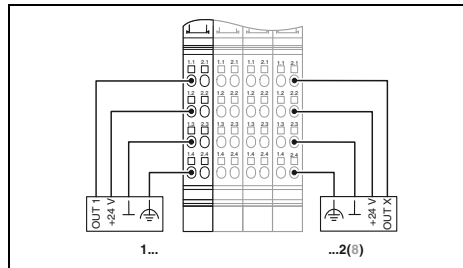
2 outputs



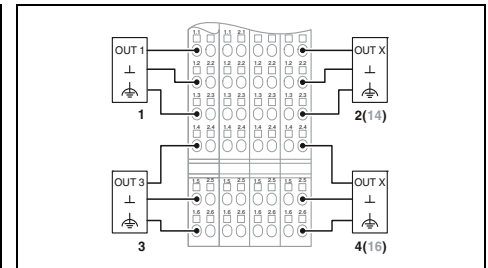
4 outputs



**Notes:**  
1) EMC: Class A product, see page 553



Technical data



Technical data

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	24 V DC (via voltage jumper)
Supply voltage	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply voltage range	
Current consumption from U <sub>L</sub>	max. 33 mA
Digital outputs	2, 3, 4-wire
Connection method	2
Maximum number of outputs	500 mA
Maximum output current per channel	Overload protection, short-circuit protection of outputs
Protective circuit	
General data	
Connection technology	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	41 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	24 V DC (via voltage jumper)
Supply voltage	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply voltage range	
Current consumption from U <sub>L</sub>	max. 44 mA
Digital outputs	2, 3-wire
Connection method	4
Maximum number of outputs	500 mA
Maximum output current per channel	Overload protection, short-circuit protection of outputs
Protective circuit	
General data	
Connection technology	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	66 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

**Description**  
**Inline digital output terminal**, complete with accessories (connector and marking field)  
  
- Single-conductor connection technology

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 2-PAC <sup>1)</sup>	2861470	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 4-PAC <sup>1)</sup>	2861276	1

**Connector set for IB IL DI/DO 8**  
**Inline connector**

Accessories		
Type	Order No.	Pcs. / Pkt.
IB IL SCN-8-CP	2727608	10

Accessories		
Type	Order No.	Pcs. / Pkt.
IB IL SCN-12-OCP	2727624	10



8 outputs



16 outputs

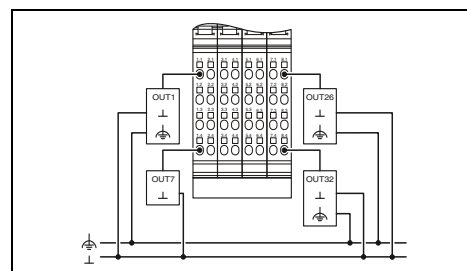
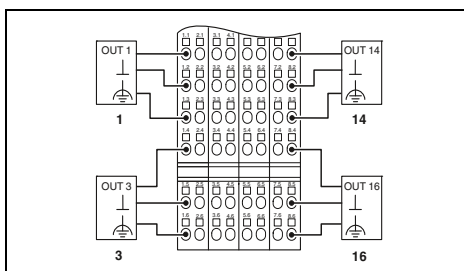
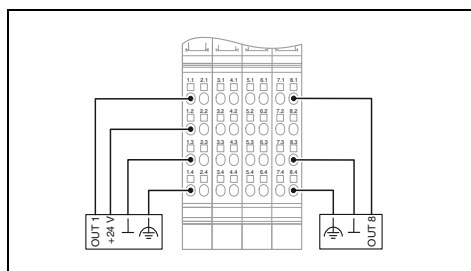


32 outputs

UL US PC ABS BSH CE Marking Ex:

UL US PC ABS BSH CE Marking Ex:

UL US PC ABS BSH CE Marking Ex:



Technical data

IB IL 24 DO 8-PAC<sup>1)</sup> IB IL 24 DO8/HD-PAC<sup>1)</sup>

Inline data jumper

24 V DC (via voltage jumper)

19.2 V DC ... 30 V DC (including all tolerances, including ripple)

max. 60 mA

max. 45 mA

2, 3, 4-wire

8

1-wire

500 mA

Overload protection, short-circuit protection of outputs

Spring-cage connection

0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16

130 g

60 g

48.8 mm

12.2 mm

-25 °C ... 55 °C

Technical data

Inline data jumper

24 V DC (via voltage jumper)

19.2 V DC ... 30 V DC (including all tolerances, including ripple)

max. 90 mA

2, 3-wire

16

500 mA

Overload protection, short-circuit protection of outputs

Spring-cage connection

0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16

218 g

48.8 mm

-25 °C ... 55 °C

Technical data

Inline data jumper

24 V DC (via voltage jumper)

19.2 V DC ... 30 V DC (including all tolerances, including ripple)

max. 140 mA

1-wire

32

500 mA

Overload protection, short-circuit protection of outputs

Spring-cage connection

0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16

195 g

48.8 mm

-25 °C ... 55 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 8-PAC <sup>1)</sup>	2861289	1
IB IL 24 DO8/HD-PAC <sup>1)</sup>	2700172	1

Accessories

IB IL DI/DO 8-PLSET/CP	2860963	1
IB IL SCN-8	2726337	10

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 16-PAC <sup>1)</sup>	2861292	1

Accessories

IB IL DO16-PLSET/OCF	2860992	1
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Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 32/HD-PAC <sup>1)</sup>	2862822	1

Accessories

IB IL DI/DO 8-PLSET	2860950	1
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### Digital output terminals

The terminals are designed for use within an Inline station. They are used to output digital signals.

#### NPN terminal features:

- NPN-wired
- 2 to 32-channel
- Connection of sensors in 1, 2, 3, and 4-wire technology
- Maximum permissible load current per actuator: 500 mA
- Short-circuit and overload protected outputs

#### 2 A module features:

- 2 to 8-channel
- Connection of sensors in 2, 3, and 4-wire technology
- Maximum permissible load current per actuator: 2 A
- Short-circuit and overload protected outputs

#### Notes:

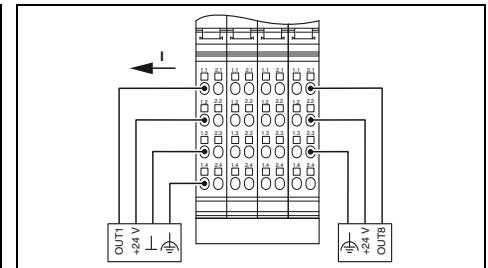
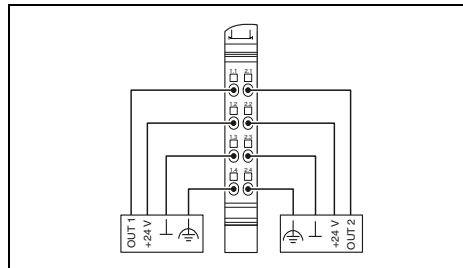
1) EMC: Class A product, see page 553



2 outputs, NPN-wired



8 outputs, NPN-wired



#### Technical data

Local bus interface	Inline data jumper
Connection method	24 V DC (via voltage jumper)
Power supply for module electronics	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply voltage	max. 32 mA
Supply voltage range	2, 3, 4-wire
Current consumption from $U_L$	2
Digital outputs	500 mA
Connection technology	Overload protection, short-circuit protection of outputs
Maximum number of outputs	
Maximum output current per channel	
Protective circuit	

#### Technical data

Local bus interface	Inline data jumper
Connection method	24 V DC (via voltage jumper)
Power supply for module electronics	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Supply voltage	max. 60 mA
Supply voltage range	2, 3, 4-wire
Current consumption from $U_L$	8
Digital outputs	1 A
Connection technology	Overload protection, short-circuit protection of outputs
Maximum number of outputs	
Maximum output current per channel	
Protective circuit	

#### General data

Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	42 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	130 g
Width	48.8 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 2-NPN-PAC <sup>1)</sup>	2861496	1

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 8-NPN-PAC <sup>1)</sup>	2863546	1

#### Accessories

Connector set for IB IL DI/DO 8	IB IL SCN-8-CP	2727608	10
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#### Accessories

Connector set for IB IL DI/DO 8-PLSET/CP	IB IL DI/DO 8-PLSET/CP	2860963	1
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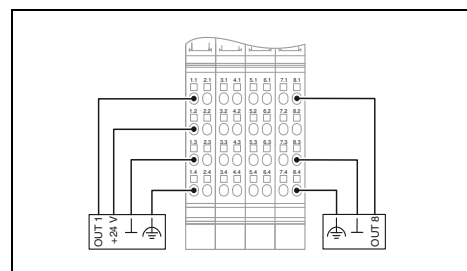
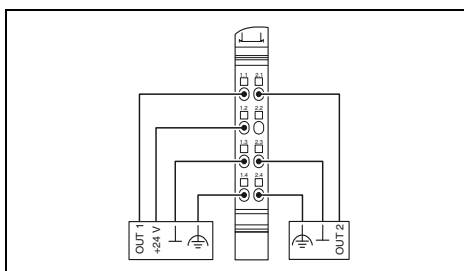
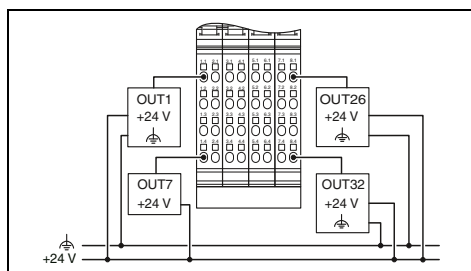
32 outputs, NPN-wired



2 outputs, 2 A



8 outputs, 2 A



Technical data

Technical data

Technical data

Inline data jumper

Inline data jumper

Inline data jumper

24 V DC (via voltage jumper)  
19.2 V DC ... 30 V DC (including all tolerances, including ripple)

24 V DC (via voltage jumper)  
19.2 V DC ... 30 V DC (including all tolerances, including ripple)

24 V DC (via voltage jumper)  
19.2 V DC ... 30 V DC (including all tolerances, including ripple)

max. 140 mA

max. 35 mA

max. 60 mA

1-wire  
32  
500 mA  
Overload protection, short-circuit protection of outputs

2, 3, 4-wire  
2  
2 A  
Overload protection, short-circuit protection of outputs

2, 3, 4-wire  
8  
2 A  
Overload protection, short-circuit protection of outputs

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
135 g  
48.8 mm  
-25 °C ... 55 °C

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
46 g  
12.2 mm  
-25 °C ... 55 °C

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
130 g  
48.8 mm  
-25 °C ... 55 °C

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 32/HD-NPN-PAC <sup>1)</sup>	2878340	1

Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 2-2A-PAC <sup>1)</sup>	2861263	1

Type	Order No.	Pcs. / Pkt.
IB IL 24 DO 8-2A-PAC <sup>1)</sup>	2861603	1

Accessories

Accessories

Accessories

IB IL DI/DO 8-PLSET	2860950	1
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IB IL SCN-8-CP	2727608	10
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IB IL DI/DO 8-PLSET/CP	2860963	1
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### Digital output terminals

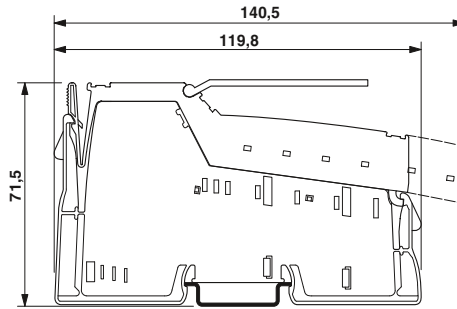
Digital Inline output terminals are designed for the connection of digital actuators, such as electromagnetic valves, contactors or visual indicators.

Inline relay terminals make it possible to switch any I/O voltage up to a maximum of 230 V AC.

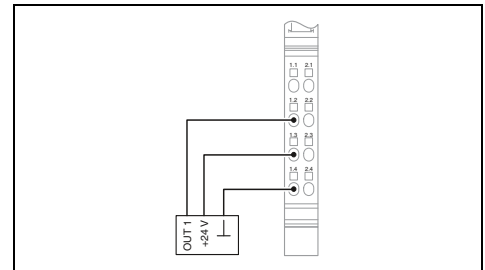
Differing relay contact materials ensure low contact resistance for small loads and lamp loads in the ...W versions, while the ...W/PC versions are designed for capacitive loads.

The IB IL 24/48 DOR 2/W-PAC module is a relay module for small signals.

**Notes:**  
1) EMC: Class A product, see page 553



1/4 outputs, 12 - 253 V AC



Local bus interface
Connection method
Power supply for module electronics
Supply voltage
Supply voltage range
Current consumption from U <sub>L</sub>
Digital outputs
Connection method
Connection technology
Maximum number of outputs
Maximum output current per channel
General data
Connection method
Connection data solid/stranded/AWG
Weight
Width
Ambient temperature (operation)

Technical data	
IB IL DO 1 AC-PAC <sup>1)</sup>	IB IL DO 4 AC-1A-PAC <sup>1)</sup>
Inline data jumper	
24 V DC (nominal value)	
19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
max. 35 mA	max. 45 mA
Spring-cage connection	
3-wire	
1	4
500 mA	1 A
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
45 g	130 g
12.2 mm	48.8 mm
-25 °C ... 55 °C	

Description
<b>Inline digital output terminal</b> , complete with accessories (connector and marking field)
- 1 output
- 4 outputs 1 A
- 1 SPDT relay contact
- 2 SPDT relay contacts
- 4 SPDT relay contacts
- 4 SPDT relay contacts, 10 A, high inrush current

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL DO 1 AC-PAC <sup>1)</sup>	2861920	1
IB IL DO 4 AC-1A-PAC <sup>1)</sup>	2861658	1

Inline distance terminal
Connector for digital Inline output terminals, color-coded
Connector for digital Inline terminals with AC voltage

Accessories		
Type	Order No.	Pcs. / Pkt.
IB IL DOR LV-SET-PAC <sup>1)</sup>	2861645	1
IB IL SCN-8-AC-OCP	2740274	10



1/4 relay outputs, 5 - 253 V AC, gold contacts



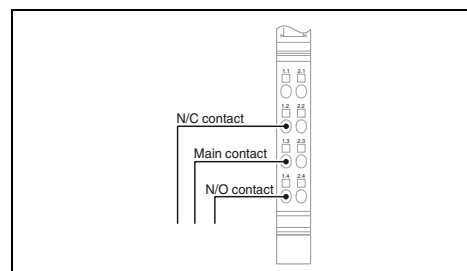
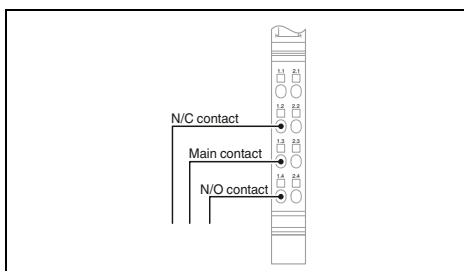
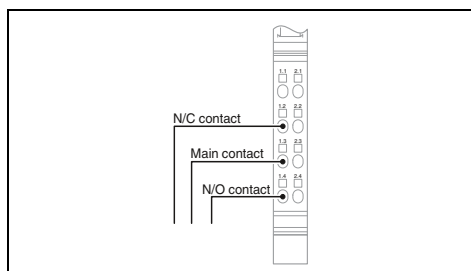
1/4 relay outputs, 5 - 253 V AC



2 relay outputs, 5 - 50 V AC, 5 - 120 V DC

UL US PC ABS BSH CE RoHS Ex:

UL US PC



Technical data	
IB IL 24/230 DOR1/W-PAC <sup>1)</sup>	IB IL 24/230 DOR4/W-PAC <sup>1)</sup>
Inline data jumper	
24 V DC (nominal value)	
19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
max. 60 mA	max. 187 mA
Spring-cage connection	
Floating SPDT relay contact	
1	4
3 A	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
46 g	138 g
12.2 mm	48.8 mm
-25 °C ... 55 °C	

Technical data	
IB IL 24/230 DOR1/W-PC-PAC <sup>1)</sup>	IB IL 24/230 DOR4/W-PC-PAC <sup>1)</sup>
Inline data jumper	Via data marshalling
24 V DC (nominal value)	
19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
max. 60 mA	max. 187 mA
Spring-cage connection	
Floating SPDT relay contact	
1	4
2.6 A	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
46 g	138 g
12.2 mm	48.8 mm
-25 °C ... 55 °C	

Technical data	
Inline data jumper	
24 V DC (nominal value)	
19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
max. 30 mA	
Spring-cage connection	
Floating SPDT relay contact	
2	2 A
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
63 g	
12.2 mm	
-25 °C ... 55 °C	

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24/230 DOR1/W-PAC <sup>1)</sup>	2861881	1
IB IL 24/230 DOR4/W-PAC <sup>1)</sup>	2861878	1
IB IL 24/230 DOR4/HC-PAC <sup>1)</sup>	2897716	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24/230 DOR1/W-PC-PAC <sup>1)</sup>	2862178	1
IB IL 24/230 DOR4/W-PC-PAC <sup>1)</sup>	2862181	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL 24/48 DOR 2/W-PAC <sup>1)</sup>	2863119	1

Accessories		
IB IL DOR LV-SET-PAC <sup>1)</sup>	2861645	1
IB IL SCN-8-AC-REL	2740290	10

Accessories		
IB IL DOR LV-SET-PAC <sup>1)</sup>	2861645	1
IB IL SCN-8-AC-REL	2740290	10

Accessories		



### Analog input terminals

Inline Analog input terminals are suitable for connecting standard sensors for acquiring current and voltage signals.

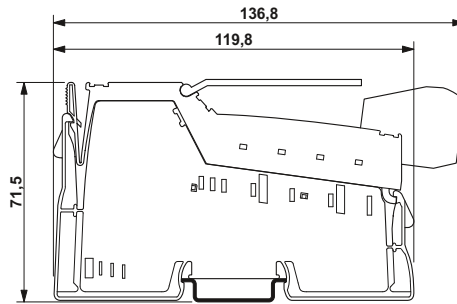
Terminals with 2, 4 or 8 channels are available.

#### Features:

- Single-ended and differential inputs
- Connection of sensors in 2 or 3-wire technology
- Measured value acquisition with 13 or 16-bit resolution
- High level of measuring accuracy
- Excellent interference and common mode suppression
- Overload-protected current inputs
- Integrated short-circuit-proof sensor supply

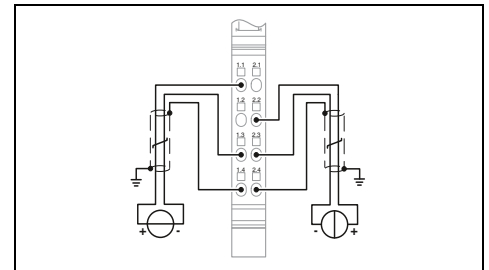
#### Notes:

1) EMC: Class A product, see page 553



2 inputs

UL 1503, PG, ABS, BSH, Ex: Ex, U<sub>11</sub>



#### Technical data

Local bus interface	Inline data jumper
Connection method	24 V DC
Power supply for module electronics	max. 18 mA
I/O supply voltage $U_{ANA}$	7.5 V DC (via voltage jumper)
Current consumption from $U_{ANA}$	max. 60 mA
Communications power $U_L$	
Current consumption from $U_L$	
Analog inputs	
Connection technology	2-wire (shielded)
Number of inputs	max. 2 (single ended)
Voltage input signal	0 V ... 10 V / -10 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Process data	
Measured value resolution	16 bits (15 bits + sign bit)
Process data update	Typ. 1.5 ms
Data formats	IL, IB ST, IB RT, standardized display
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	69 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline analog input terminal</b> , complete with accessories (connector and marking field) - 2 inputs	<b>IB IL AI 2/SF-PAC<sup>1)</sup></b>	<b>2861302</b>	<b>1</b>
- 8 inputs, initiator with supply outputs			

#### Accessories

Shield connector	IB IL SCN 6-SHIELD-TWIN	2740245	5
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**N**



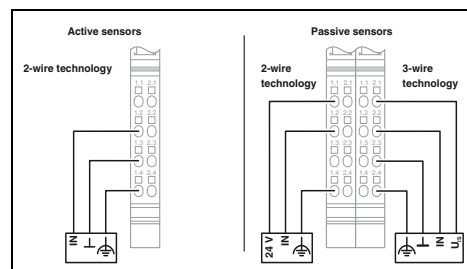
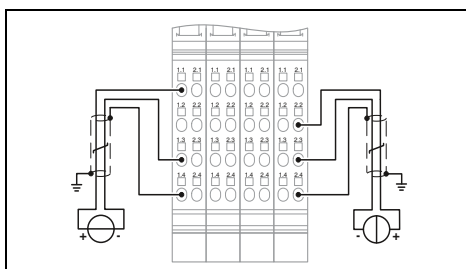
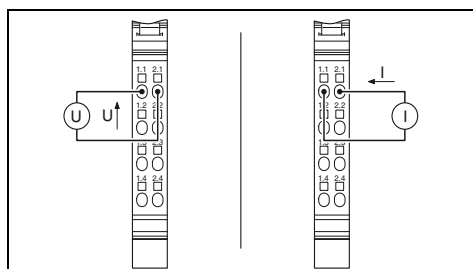
4 inputs



8 inputs



8 inputs, with initiator supply



Technical data	
IB IL AI 4/U-PAC <sup>1)</sup>	IB IL AI 4/I-PAC <sup>1)</sup>
Inline data jumper	
24 V DC Typ. 30 mA	
7.5 V DC (via voltage jumper) Typ. 55 mA	
2-wire	
4 (differential inputs, voltage)	4 (differential inputs, current)
0 V ... 10 V (default) / -10 V ... 10 V	-
-	0 mA ... 20 mA (default) / 4 mA ... 20 mA
12 bits (11 bits + sign bit)	13 bits (12 bits + sign bit)
Typ. 250 µs (all channels)	
IB IL, S7-compatible	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
66 g	
12.2 mm	
-25 °C ... 55 °C	

Technical data	
Inline data jumper	
24 V DC max. 35 mA	
7.5 V DC (via voltage jumper) max. 55 mA	
2-wire (shielded)	
max. 8 (single ended)	
0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V	
0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA	
16 bits (15 bits + sign bit)	
Typ. 1 ms (bus-synchronous)	
IL, IB ST, IB RT, standardized representation, PIO format	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
213 g	
48.8 mm	
-25 °C ... 55 °C	

Technical data	
Inline data jumper	
24 V DC max. 40 mA	
7.5 V DC (via voltage jumper) max. 65 mA	
2-wire (shielded)	
max. 8 (single ended)	
-	
0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA	
16 bits (15 bits + sign bit)	
Typ. 1 ms (bus-synchronous)	
IBS IL, IBS ST, IBS RT, standardized representation, PIO format	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
125 g	
48.8 mm	
-25 °C ... 55 °C	

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL AI 4/U-PAC <sup>1)</sup>	2700459	1
IB IL AI 4/I-PAC <sup>1)</sup>	2700458	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL AI 8/SF-PAC <sup>1)</sup>	2861412	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL AI 8/IS-PAC <sup>1)</sup>	2861661	1

Accessories		

Accessories		
IB IL SCN 6-SHIELD-TWIN	2740245	5

Accessories		
IB IL SCN 6-SHIELD-TWIN	2740245	5

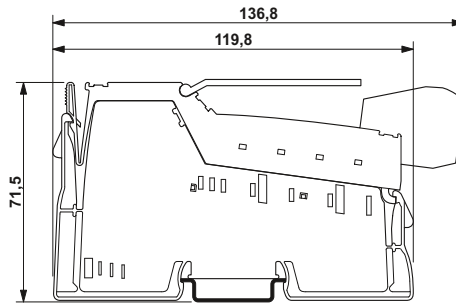
### Analog input terminals

The IB IL AI 4/EF (EF...Extended Functions) analog Inline terminal is suitable for connecting standard sensors for acquiring current and voltage signals.

#### Features:

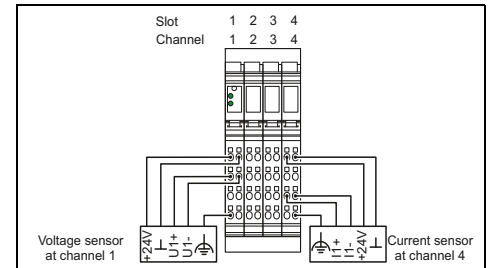
- 4 differential signal inputs
- Connection of sensors in 2, 3, and 4-wire technology
- Measured value acquisition with 16-bit resolution
- Sensor supply with channel-specific integrated short-circuit and overload protection
- Short update time of < 1 ms, maximum for all channels
- Bus-synchronous provision of input values with very low jitter (< 10 μs)

**Notes:**  
The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.  
1) EMC: Class A product, see page 553



4 inputs, with extended functions

UL MS ABS BSH  
Ex: (UL)



#### Technical data

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
I/O supply voltage $U_{ANA}$	24 V DC
Current consumption from $U_{ANA}$	max. 20 mA
Communications power $U_L$	7.5 V DC (via voltage jumper)
Current consumption from $U_L$	max. 100 mA
Analog inputs	
Connection technology	2, 3-wire
Number of inputs	max. 4 (differential inputs, voltage or current can be chosen separately)
Description of the input	Differential input, including sensor supply (24 V DC)
Voltage input signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Process data	
Measured value resolution	16 bits (15 bits + sign bit)
Process data update	Typ. 1 ms (bus-synchronous)
Data formats	IL, IB ST, standardized display, S7 compatible
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	210 g
Width	48.8 mm

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Inline analog input terminal, complete with accessories (connector and marking field)	IB IL AI 4/EF-PAC <sup>1)</sup>	2878447	1

#### Accessories

Shield connector	IB IL SCN 6-SHIELD-TWIN	2740245	5
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### Analog input terminal with HART functionality

The Inline terminal offers the option of communicating with intelligent field devices using the standardized HART communication protocol.

It enables both analog and digital communication. The analog signal transmits the process information; the digital modulated signal also permits bidirectional communication with the HART-compatible sensor.

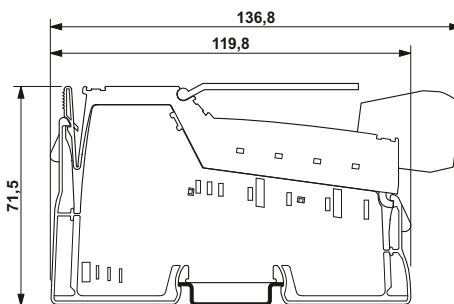
#### Features:

- Two differential signal inputs for current sensors
- Sensor connection with 2-wire connection technology
- Measured value acquisition with 16-bit resolution
- Point-to-point and multi-drop connections possible
- Polling and burst modes
- A maximum of 5 HART devices can be connected per channel
- A hand-held operator panel can be connected
- FDT/DTM support

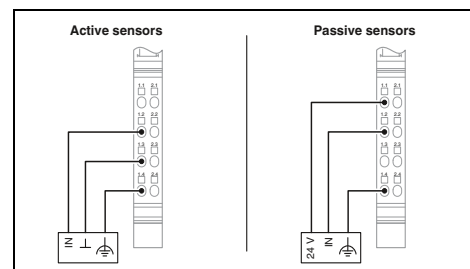
#### Notes:

The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.

1) EMC: Class A product, see page 553



2 HART inputs



#### Technical data

Inline data jumper

24 V DC  
max. 150 mA  
7.5 V DC  
max. 110 mA

2-wire (shielded)  
max. 2 (differential inputs, current)  
0 mA ... 25 mA / 4 mA ... 20 mA

16 bits (15 bits + sign bit)  
Typ. 1 ms (bus-synchronous)  
IL, standardized display

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
134 g  
48.8 mm

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL AI 2-HART-PAC <sup>1)</sup>	2862149	1

#### Accessories

IB IL SCN 6-SHIELD-TWIN	2740245	5
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Local bus interface
Connection method
Power supply for module electronics
I/O supply voltage $U_{ANA}$
Current consumption from $U_{ANA}$
Communications power $U_L$
Current consumption from $U_L$
Analog inputs
Connection technology
Number of inputs
Current input signal
Process data
Measured value resolution
Process data update
Data formats
General data
Connection method
Connection data solid/stranded/AWG
Weight
Width

Description
Inline analog input terminal, complete with accessories (connector and marking field)
- HART functionality

Shield connector
------------------

### Strain gauge measurement terminals

Inline strain gauge measurement terminals enable the connection of load cells, force transducers, mass force transducers, and similar instruments, based on strain gauges.

#### IB IL SGI 2/F-PAC features:

- 2 fast inputs for strain gauge
- Bus-synchronous process data update with  $\geq 1$  ms (depending on the local bus cycle time)
- Typical deviation of the measuring range final value of  $\pm 0.1\%$  (unipolar) or  $\pm 0.2\%$  (bipolar)
- Optional: 16-sample mean-value generation

#### IB IL SGI 2/P-PAC features:

- 2 high-precision inputs for strain gauge
- Typical deviation of the measuring range final value of  $\pm 0.01\%$
- Serial interface for external weight displays
- Zero point, tare, and standstill display
- Optional: 4, 16, and 32-sample mean-value generation

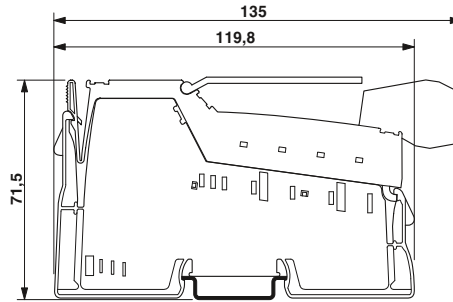
#### IB IL SGI 1/CAL features:

- 1 input for strain gauge
- Can be verified by EC type approval according to standards EN 45501 and OIML R76
- Electronic evaluating device to set up non-automatic weighing instruments (NAWI)
- Up to 3000 division counts
- Serial interface for external weight displays
- Zero point, tare, and standstill display
- Alibi memory for up to 65,536 measurement protocols
- Parameterization and calibration using FDT/DTM technology
- Various filter settings
- Calibration set for calibration required (Order No. 2700165)

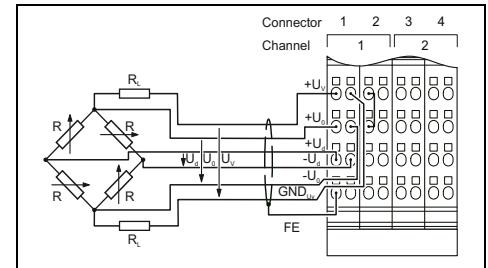
#### Notes:

The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.

1) EMC: Class A product, see page 553



2 fast inputs



Local bus interface	Connection method	Power supply for module electronics	I/O supply voltage $U_{ANA}$	Current consumption from $U_{ANA}$
Communications power $U_L$	Current consumption from $U_L$	Analog inputs	Connection technology	Number of inputs
Description of the inputs	Bridge difference $U_d$	Bridge voltage $U_0$	Analog outputs	Description of the outputs
Number of outputs	Impedance	Maximum output current	Characteristics	Unipolar
Bipolar	Measured value representation	Process data update	General data	Connection method
Connection data solid/stranded/AWG	Weight	Width	Description	Inline analog strain gauge input terminal, complete with accessories (connector and marking field)
- Fast inputs	- Precise inputs	- Can be verified, precise input	Calibration set, approval-related	Shield connector

Technical data		
Inline data jumper	24 V DC	Typ. 32 mA (With maximum load 60 $\Omega$ at $U_V = 5$ V)
7.5 V DC	max. 85 mA	6 or 4-wire, twisted pair shielded cable
2	Input channels for strain gauge	Measuring range specified by selecting the characteristic and the bridge voltage
3.3 V / 5 V	Voltage output	2
> 59 $\Omega$ (typical)	max. 85 mA (with $U_V = 5$ V)	+1 mV/V, +2 mV/V, +3 mV/V, +4 mV/V
$\pm 1$ mV/V, $\pm 2$ mV/V, $\pm 3$ mV/V, $\pm 4$ mV/V	15 bit + sign bit	1 x per local bus cycle
Spring-cage connection	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	190 g
48.8 mm	Ordering data	
Type	Order No.	Pcs. / Pkt.
IB IL SGI 2/F-PAC <sup>1)</sup>	2878638	1
Accessories		
IB IL SCN 6-SHIELD-TWIN	2740245	5



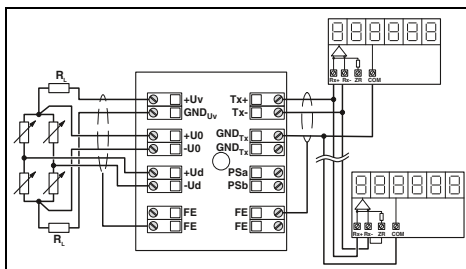
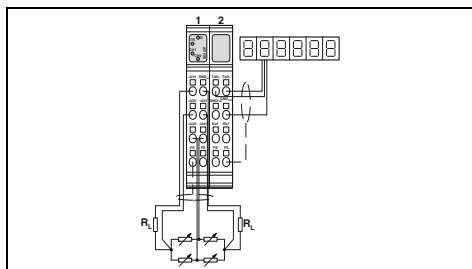
2 precise inputs



1 input that can be verified

UL Ex: Ex

PTB-BG



Technical data

Technical data

Inline data jumper

Inline data jumper

24 V DC  
max. 100 mA

24 V DC  
max. 50 mA

7.5 V DC  
max. 100 mA

7.5 V DC  
Typ. 80 mA

6 or 4-wire, twisted pair shielded cable

6-wire, twisted pair shielded cable

2  
Input channels for strain gauge  
Measuring range specified by selecting the characteristic

1  
Input channel for strain gauge  
Measuring range specified by selecting the characteristic

5 V

5 V

Voltage output  
2  
> 55 Ω (per channel)  
max. 90 mA (per channel)

Voltage output  
1  
> 55 Ω  
max. 90 mA

±1 mV/V, ±2 mV/V, ±3 mV/V, ±3.33 mV/V, ±4 mV/V, ±5 mV/V

±1 mV/V, ±2 mV/V, ±3 mV/V, ±3.33 mV/V, ±4 mV/V, ±5 mV/V

15 bits + sign bit (process data); 15 bits + sign bit and measured display value in the ASCII character set (PCP)

Process data: status bits and measured value including decimal places of the gross/net display

Typ. 100 ms (12.5 ms, depends on the configuration)

Typ. 100 ms

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
220 g  
48.8 mm

Spring-cage connection  
0.08 ... 1.5 mm<sup>2</sup> / 0.08 ... 1.5 mm<sup>2</sup> / 28 - 16  
160 g  
48.8 mm

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL SGI 2/P-PAC <sup>1)</sup>	2884907	1

Type	Order No.	Pcs. / Pkt.
IB IL SGI 1/CAL <sup>1)</sup>	2700064	1

Accessories

Accessories

IB IL SCN 6-SHIELD-TWIN	2740245	5
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IB IL SGI EU CALSET	2700165	1
IB IL SCN-6 SHIELD	2726353	5

## For the control cabinet (IP20) – Inline

### Temperature measurement terminals

These Inline terminals can be used to connect thermocouples (UTH) and resistive temperature sensors (RTD).

#### Features of UTH inputs:

- Connection of thermocouples according to DIN EN 60584-1 and DIN 43710
- Absolute and differential temperature measurement (configurable)
- Measured value acquisition with 16-bit resolution
- -15 mV to +85 mV linear input
- Internal and external cold junction

#### Features of RTD inputs:

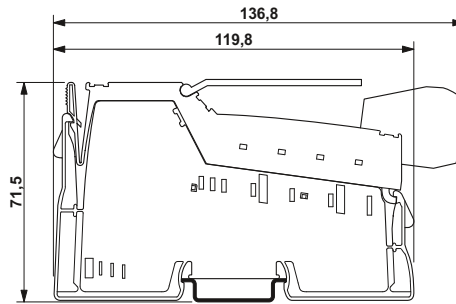
- Pt, Ni, Cu, KTY sensor types according to DIN and SAMA
- Connection of sensors in 2, 3, and 4-wire technology
- Measured value acquisition with 16-bit resolution
- Channel scout for optical channel identification

The IB IL 24 TC Inline thermistor terminal is used for the evaluation of PTC thermistors. It makes it possible to monitor the temperature of motors and can be used in conjunction with Inline motor starters.

#### Notes:

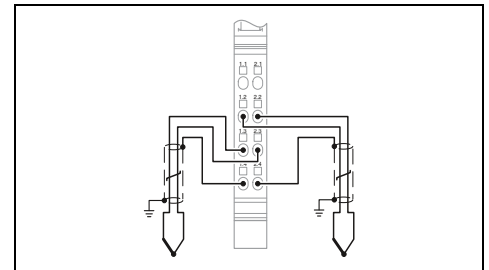
The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.

1) EMC: Class A product, see page 553



2 UTH inputs

UL 1875 PCE ABS BSH 8 1000000000  
Ex: Ex, U



#### Technical data

Local bus interface	Inline data jumper		
Connection method	24 V DC		
Power supply for module electronics	max. 18 mA		
I/O supply voltage $U_{ANA}$	7,5 V DC (via voltage jumper)		
Current consumption from $U_{ANA}$	max. 60 mA		
Communications power $U_L$			
Current consumption from $U_L$			
Analog inputs	2-wire (shielded)		
Connection technology	2		
Number of inputs	Typ. $\pm 0,6 \text{ }^\circ\text{C}$		
Precision	Inputs for thermocouples or linear voltage		
Description of the input			
Linear resistance measuring range	-		
Sensor types (RTD) that can be used	-		
Sensor types that can be used (TC)	U, T, L, J, E, K, N, S, R, B, C, W, HK		
Measuring principle	Successive approximation		
Process data update	30 ms (for both channels)		
General data	Spring-cage connection		
Connection method	0,08 ... 1,5 mm <sup>2</sup> / 0,08 ... 1,5 mm <sup>2</sup> / 28 - 16		
Connection data solid/stranded/AWG	67 g		
Weight	12,2 mm		
Width			
<b>Ordering data</b>			
Description	Type	Order No.	Pcs. / Pkt.
Inline analog input terminal, complete with accessories (connector and marking field)	IB IL TEMP 2 UTH-PAC <sup>1)</sup>	2861386	1
- With extended functions			
<b>Accessories</b>			
Shield connector	IB IL SCN 6-SHIELD-TWIN	2740245	5





2 RTD inputs



4 or 8 RTD inputs

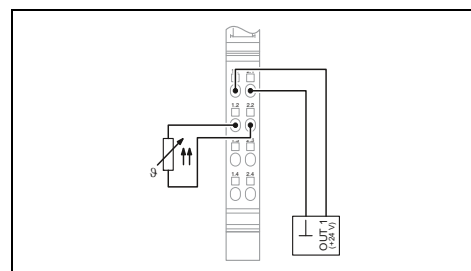
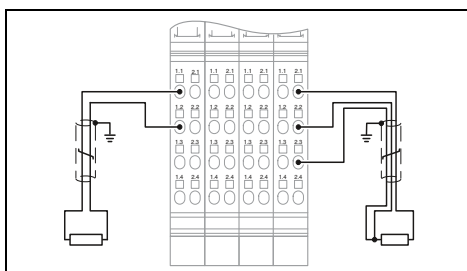
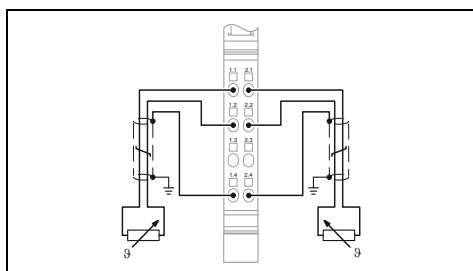


1 thermistor input

UL US ABS BSH CE RoHS  
Ex: Ex

UL ABS BSH CE RoHS

UL



**Technical data**

**Technical data**

**Technical data**

Inline data jumper
24 V DC max. 18 mA 7.5 V DC (via voltage jumper) max. 60 mA
2, 3-wire 2 Typ. $\pm 0.26\text{ }^{\circ}\text{C}$ Input for resistive temperature sensors
0 $\Omega$ ... 400 $\Omega$ / 0 $\Omega$ ... 4 k $\Omega$
Pt, Ni, KTY, Cu sensors, linear resistors
-
Successive approximation
30 ms
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 67 g 12.2 mm

IB IL TEMP 4/8 RTD-PAC <sup>1)</sup>		IB IL TEMP 4/8 RTD/EF-PAC <sup>1)</sup>	
Inline data jumper			
24 V DC			
Typ. 28 mA	7.5 V DC (via voltage jumper)		Typ. 6 mA
Typ. 75 mA			Typ. 95 mA
2, 3-wire	8	4-wire	
Typ. $\pm 0.5\text{ }^{\circ}\text{C}$			Typ. $\pm 0.05\text{ }^{\circ}\text{C}$
Input for resistive temperature sensors			
0 $\Omega$ ... 400 $\Omega$ / 0 $\Omega$ ... 20 k $\Omega$	0 $\Omega$ ... 500 $\Omega$ / 0 $\Omega$ ... 5 k $\Omega$		
Pt, Ni, KTY, Cu sensors, linear resistors	Pt, Ni, KTY sensors, linear resistors		
-			
Successive approximation	Sigma/Delta process		
6 ms (up to 230 ms possible depending on operating mode)	1.8 s (up to 3.3 s possible depending on operating mode)		
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 190 g 48.8 mm			

Inline data jumper
24 V DC 0 A DC 7.5 V DC (via voltage jumper) max. 60 mA
2-wire 1 - Input for PTC thermistor
2.7 k $\Omega$ ... 3.5 k $\Omega$ (shutdown range, total resistance) / 50 $\Omega$ ... 2.25 k $\Omega$ (operating range, total resistance)
PTC thermistor according to DIN 44081 or DIN 44082
-
-
-
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 50 g 12.2 mm

**Ordering data**

**Ordering data**

**Ordering data**

Type	Order No.	Pcs. / Pkt.
IB IL TEMP 2 RTD-PAC <sup>1)</sup>	2861328	1

Type	Order No.	Pcs. / Pkt.
IB IL TEMP 4/8 RTD-PAC <sup>1)</sup>	2863915	1
IB IL TEMP 4/8 RTD/EF-PAC <sup>1)</sup>	2897402	1

Type	Order No.	Pcs. / Pkt.
IB IL 24 TC-PAC <sup>1)</sup>	2861360	1

**Accessories**

**Accessories**

**Accessories**

IB IL SCN 6-SHIELD-TWIN	2740245	5
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IB IL SCN 6-SHIELD-TWIN	2740245	5
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IB IL SCN-6 SHIELD	2726353	5
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### Analog output terminals

These Inline terminals are used in applications in which analog actuators are to be controlled.

With these terminals, common current and voltage output ranges can be configured individually and channel-specifically.

#### Features:

- Connection of sensors in 2-wire technology
- Measured value output with 16-bit resolution
- Load of up to 500 Ω
- Bipolar outputs
- Short-circuit-proof current outputs
- Short update time of < 1 ms

#### Notes:

The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.

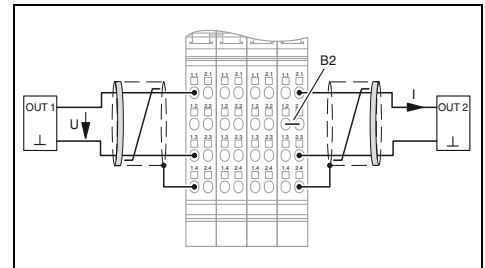
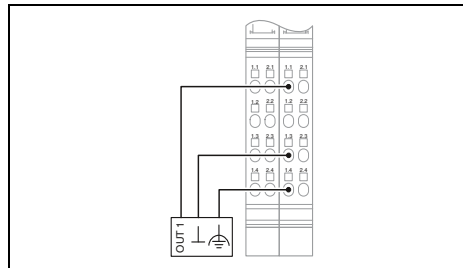
1) EMC: Class A product, see page 553



1 output



2 outputs



#### Technical data

Local bus interface	Inline data jumper
Connection method	24 V DC max. 65 mA
Power supply for module electronics	7.5 V DC (via voltage jumper) max. 40 mA
I/O supply voltage $U_{ANA}$	2-wire (shielded)
Current consumption from $U_{ANA}$	1
Communications power $U_L$	0 V ... 10 V
Current consumption from $U_L$	> 2 kΩ 0.05%
Analog outputs	0 mA ... 20 mA / 4 mA ... 20 mA
Connection technology	> 500 Ω
Number of outputs	Transient protection of outputs
Voltage output signal	
Load/output load voltage output	
Current output signal	
Load/output load current output	
Protective circuit	

#### Technical data

Local bus interface	Inline data jumper
Connection method	24 V DC max. 95 mA
Power supply for module electronics	7.5 V DC (via voltage jumper) max. 45 mA
I/O supply voltage $U_{ANA}$	2-wire (shielded)
Current consumption from $U_{ANA}$	2
Communications power $U_L$	0 V ... 10 V
Current consumption from $U_L$	> 2 kΩ 0.03%
Analog outputs	0 mA ... 20 mA / 4 mA ... 20 mA
Connection technology	> 500 Ω
Number of outputs	Short-circuit protection of outputs
Voltage output signal	
Load/output load voltage output	
Current output signal	
Load/output load current output	
Protective circuit	

#### Characteristics

Representation of output values	16 bits (15 bits + sign)
Process data update	< 1 ms
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	126 g
Width	24.4 mm

#### Characteristics

Representation of output values	16 bits (15 bits + sign)
Process data update	< 1 ms
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	125 g
Width	48.8 mm

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Inline analog output terminal, complete with accessories (connector and marking field)	IB IL AO 1/SF-PAC <sup>1)</sup>	2861315	1

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Inline analog output terminal, complete with accessories (connector and marking field)	IB IL AO 2/SF-PAC <sup>1)</sup>	2863083	1

#### Accessories

Connector set	Type	Order No.	Pcs. / Pkt.
Shield connector for analog Inline terminals	IB IL AO/CNT-PLSET	2732664	1
Connectors			

#### Accessories

Connector set	Type	Order No.	Pcs. / Pkt.
Shield connector for analog Inline terminals	IB IL SCN-6 SHIELD	2726353	5
Connectors			



2 outputs, bipolar

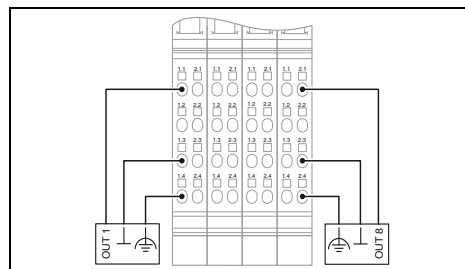
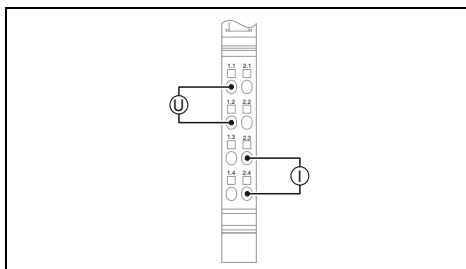
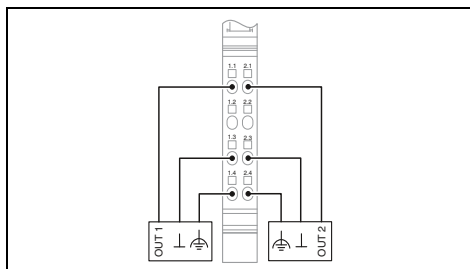


2 outputs, multifunctional



4/8 outputs, bipolar

UL US PC ABS BSH CE RoHS Ex:



Technical data
Inline data jumper
24 V DC max. 35 mA 7.5 V DC (via voltage jumper) max. 40 mA
2-wire (shielded) 2 0 V ... 10 V / -10 V ... 10 V > 2 kΩ 0.05%
- - Transient protection of outputs
16 bits (15 bits + sign) < 2 ms
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 48 g 12.2 mm

Technical data
Inline data jumper
24 V DC Typ. 24 mA (idling) 7.5 V DC (via voltage jumper) Typ. 55 mA
2-wire (shielded, twisted pair) 2 0 V ... 10 V / -10 V ... 10 V > 1 kΩ 0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA ≤ 450 Ω Short-circuit and overload protection Transient protection
12 bits (11 bits + sign bit) (bus-synchronous)
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 66 g 12.2 mm

Technical data
Inline data jumper
24 V DC Typ. 72 mA 7.5 V DC (via voltage jumper) Typ. 80 mA
2, 3-wire 8 0 V ... 10 V / -10 V ... 10 V / 0 V ... 5 V / -5 V ... 5 V > 2 kΩ 0.05%
- - Transient protection of outputs
16 bits (15 bits + sign) < 2 ms (depends on operating mode)
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 215 g 48.8 mm

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL AO 2/U/BP-PAC <sup>1)</sup>	2861467	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL AO 2/UI-PAC <sup>1)</sup>	2700775	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL AO 4/8/U/BP-PAC <sup>1)</sup>	2878036	1

Accessories		
IB IL SCN 6-SHIELD-TWIN	2740245	5

Accessories		

Accessories		
IB IL SCN-8	2726337	10

### Machine Edition (ME)

The Inline ME versions (Machine Edition) are designed to be used in a space-saving and inexpensive way, for example with machine applications, if minimum connection technology is possible.

The digital Inline input terminal is designed for the connection of digital signals, such as those that are emitted from control switches, limit switches or proximity switches, and the digital Inline output terminals are designed for the connection of digital actuators, such as electromagnetic valves, contactors or visual indicators.

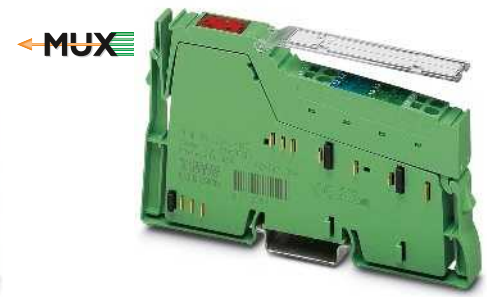
The digital ME variants are only available in packages of 4.

#### Notes:

1) EMC: Class A product, see page 553

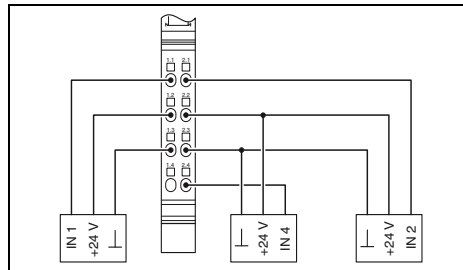


4/16 digital inputs

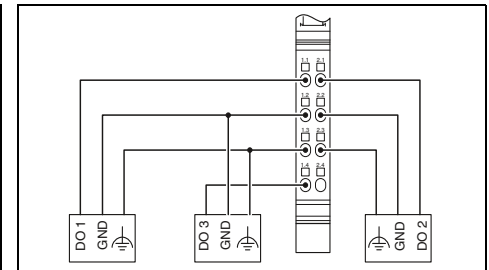


4/16 digital outputs

UL US  
Ex: (UL)



UL US  
Ex: (UL)



#### Technical data

IB IL 24 DI 4-ME <sup>1)</sup>	IB IL 24 DI 16-ME <sup>1)</sup>
Inline data jumper	
24 V DC (via voltage jumper)	
19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
40 mA	

#### Technical data

IB IL 24 DO 4-ME <sup>1)</sup>	IB IL 24 DO 16-ME <sup>1)</sup>
Inline data jumper	
24 V DC (nominal value)	
19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
44 mA	90 mA

Local bus interface	
Connection method	
Power supply for module electronics	
Supply voltage	
Supply voltage range	
Supply current	
Digital inputs	
Connection method	Spring-cage connection
Connection technology	2, 3-wire
Maximum number of inputs	4 16
Description of the inputs	EN 61131-2 type 1
Typical response time	< 1 ms
Digital outputs	
Connection method	-
Connection technology	-
Maximum number of outputs	-
Maximum output current per channel	-
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	44 g 122 g
Width	12.2 mm 48.8 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline digital input terminal</b> , Machine Edition variant, complete with accessories (connector plug and marking field)			
- 4 inputs	IB IL 24 DI 4-ME <sup>1)</sup>	2863928	4
- 16 inputs	IB IL 24 DI 16-ME <sup>1)</sup>	2897156	4

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline digital output terminal</b> , Machine Edition variant, complete with accessories (connector plug and marking field)			
- 4 outputs	IB IL 24 DO 4-ME <sup>1)</sup>	2863931	4
- 16 outputs	IB IL 24 DO 16-ME <sup>1)</sup>	2897253	4

**Machine Edition (ME)**

The IB IL AI 2/SF-ME analog Inline terminal is suitable for connecting standard sensors for acquiring current and voltage signals.

The IB IL AO 2/U/BP-ME analog Inline terminal supplies the typical voltage signals 0 ... 10 V and ±10 V as manipulated variables.

Both terminals can be used to implement cost-optimized applications.

**Features:**

- Connection of sensors in 2 or 3-wire technology
- Measured value acquisition with 12-bit resolution

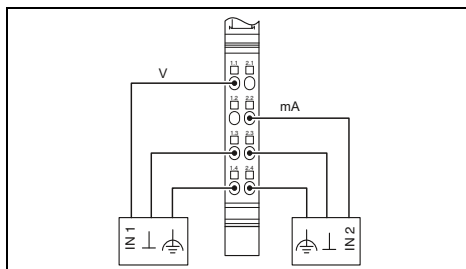
**Notes:**  
1) EMC: Class A product, see page 553



2 analog inputs

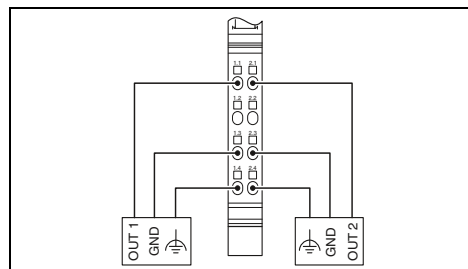


2 analog outputs



**Technical data**

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	24 V DC
I/O supply voltage U <sub>ANA</sub>	max. 18 mA
Current consumption from U <sub>ANA</sub>	
Analog inputs	
Connection technology	2, 3-wire
Number of inputs	max. 2 (single ended)
Voltage input signal	0 V ... 10 V / -10 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Measured value resolution	13 bits (12 bits + sign bit)
Process data update	Typ. 1.5 ms
Data formats	IL, IB ST, IB RT, standardized display
Analog outputs	
Connection method	-
Number of outputs	-
Voltage output signal	-
Current output signal	-
Representation of output values	-
Process data update	-
Data formats	-
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	47 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C



**Technical data**

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	24 V DC
I/O supply voltage U <sub>ANA</sub>	max. 35 mA
Current consumption from U <sub>ANA</sub>	
Analog outputs	
Connection technology	-
Number of outputs	-
Voltage output signal	-
Current output signal	-
Representation of output values	-
Process data update	-
Data formats	-
General data	
Connection method	2-wire
Connection data solid/stranded/AWG	2
Weight	0 V ... 10 V / -10 V ... 10 V
Width	-
Ambient temperature (operation)	13 bits (12 bits + sign bit)
	< 1 ms
	IL, IB ST
	Spring-cage connection
	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
	48 g
	12.2 mm
	-25 °C ... 55 °C

<b>Technical data</b>	
Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	24 V DC
I/O supply voltage U <sub>ANA</sub>	max. 18 mA
Current consumption from U <sub>ANA</sub>	
Analog inputs	
Connection technology	2, 3-wire
Number of inputs	max. 2 (single ended)
Voltage input signal	0 V ... 10 V / -10 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Measured value resolution	13 bits (12 bits + sign bit)
Process data update	Typ. 1.5 ms
Data formats	IL, IB ST, IB RT, standardized display
Analog outputs	
Connection method	-
Number of outputs	-
Voltage output signal	-
Current output signal	-
Representation of output values	-
Process data update	-
Data formats	-
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	47 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

<b>Ordering data</b>	
Description	
<b>Inline analog input terminal, Machine Edition variant, complete with accessories (connector plug and marking field)</b>	
<b>Inline analog output terminal, Machine Edition variant, complete with accessories (connector plug and marking field)</b>	

<b>Ordering data</b>		
Type	Order No.	Pcs. / Pkt.
IB IL AI 2/SF-ME <sup>1)</sup>	2863944	1

<b>Ordering data</b>		
Type	Order No.	Pcs. / Pkt.
IB IL AO 2/U/BP-ME <sup>1)</sup>	2863957	1

### DALI terminals

Up to 64 DALI devices can be connected via the DALI master.

The IB IL DALI/PWR-PAC terminal is a DALI master, which in addition to DALI communication also provides the DALI bus supply, without having to connect an external DALI power supply unit. This terminal can be easily extended with up to three IB IL DALI-PAC devices, each of which represents another DALI master.

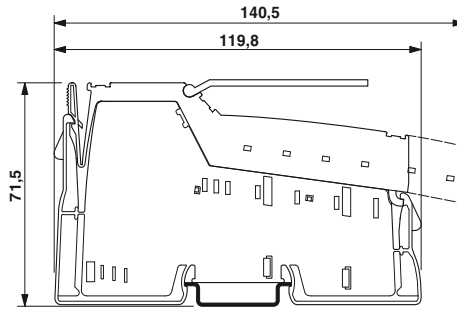
#### Features:

- Up to 64 DALI devices per master terminal
- Safe electrical isolation of the DALI bus
- Protection of the DALI bus against accidental connection of the mains voltage (up to 250 V AC)
- Diagnosis, transmitting and receiving display
- Function blocks for PC Worx are available

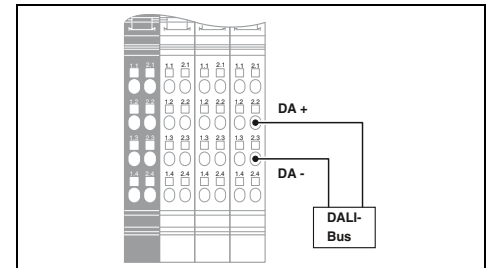
#### EnOcean wireless receiver

The SRC-RS485 EVC EnOcean wireless receiver is used to connect EnOcean sensors to the controller.

An Inline RS-485 communication terminal (IB IL RS485/422-PRO-PAC) is used to connect to the I/O station.



DALI master



Local bus interface	
Connection method	
Power supply for module electronics	
Supply voltage	24 V DC (nominal value)
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption from U <sub>L</sub>	≤ 38 mA
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	194 g
Width	48.8 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Technical data

Inline data jumper	
Supply voltage	24 V DC (nominal value)
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption from U <sub>L</sub>	≤ 38 mA
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	194 g
Width	48.8 mm
Ambient temperature (operation)	-25 °C ... 55 °C

Description	<p><b>1-channel DALI-master</b>, complete with accessories (connection plug and marking field)</p> <ul style="list-style-type: none"> <li>- Integrated DALI power supply unit</li> <li>- Extension for IB IL DALI/PWR-PAC</li> </ul> <p><b>EnOcean wireless receiver</b> for connection with IB IL RS 485/422-PRO-PAC</p>
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#### Ordering data

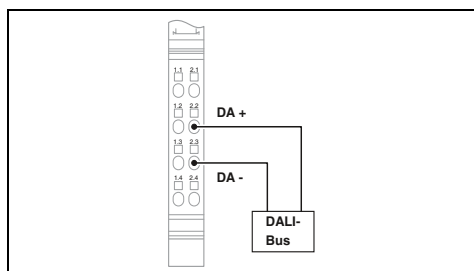
Type	Order No.	Pcs. / Pkt.
IB IL DALI/PWR-PAC	2897813	1



Extension for DALI master



EnOcean wireless receiver



Technical data
Inline data jumper
24 V DC (nominal value) 19.2 V DC ... 30 V DC ≤ 38 mA
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 57 g 12.2 mm -25 °C ... 55 °C

Technical data
-
24 V DC (nominal value) 15 V DC ... 24 V DC -
Screw connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 - 70 mm -20 °C ... 60 °C

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL DALI-PAC	2897910	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
SRC-RS485 EVC	2897237	1



## For the control cabinet (IP20) – Inline

### Branch terminals

The IBS IL 24 RB-T-PAC and IBS IL 24 RB-LK-PAC branch terminals make it possible to add more system levels to an INTERBUS network. A total of up to 15 levels can be operated in the network.

The IBS IL 24 RB-T terminal uses a copper cable as the transmission medium. The IBS IL 24 RB-LK terminal uses fiber optics as the outgoing remote bus interface.

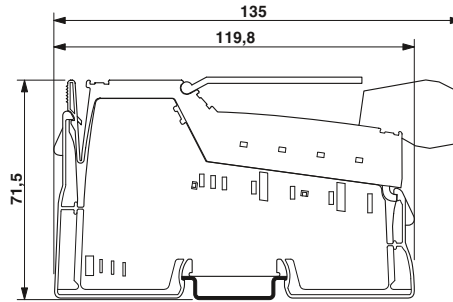
The IB IL 24 FLM-PAC Inline branch terminal enables the direct connection of Fieldline Modular M8 and M12 local bus devices to an Inline Modular station.

When combined with the IB IL 24 LSKIP-PAC local bus extension terminal, it is possible to jump between two rows within an Inline station. This means that the Inline station can extend onto another DIN rail without having to use a new bus coupler.

In contrast to the IB IL 24 FLM-PAC, the IB IL 24 FLM MUL-TI-PAC branch terminal enables the integration of several Fieldline Modular M8 local buses in an Inline station.

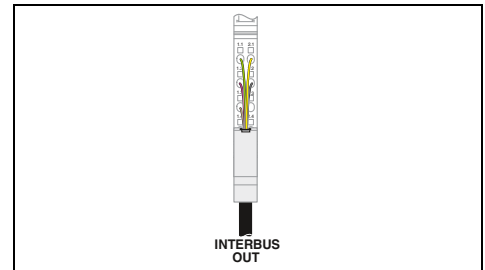
#### Notes:

1) EMC: Class A product, see page 553



Remote bus branch

UL 100 V PC ABS BSH B Low Voltage Ex: (U)



#### Technical data

Interface	
Connection method	Inline shield connector
Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via voltage jumper)
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Max. current consumption	-
Current consumption from $U_L$	-
Current consumption from $U_{ANA}$	Typ. 29 mA
Power supply at $U_L$	-
Power supply at $U_{ANA}$	-
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	67 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IBS IL 24 RB-T-PAC <sup>1)</sup>	2861441	1

#### Accessories

IB IL SCN-6 SHIELD	2726353	5
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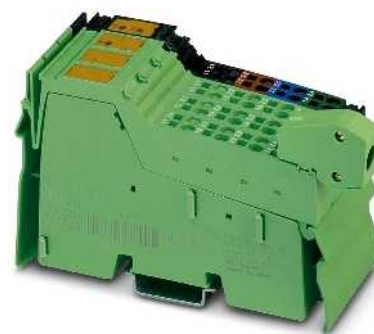
Description
<b>Inline branch terminal</b> , complete with accessories (connector and marking field)
<b>Inline segment terminal</b> , complete with accessories (connector and marking field)
<b>Shield connector</b> for analog Inline terminals



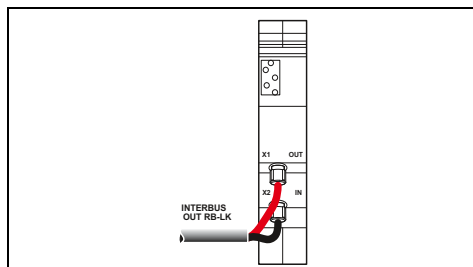
Fiber optic remote bus branch



Fieldline Modular extension

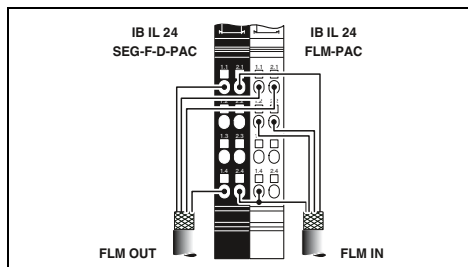


Local bus extension terminal



Technical data

FSMA plugs
Inline data jumper
24 V DC (via voltage jumper)
19.2 V DC ... 30 V DC (including all tolerances, including ripple)
-
-
Typ. 42 mA
-
-
FSMA plugs
- ... - / - ... - / -
89 g
24.4 mm
-25 °C ... 55 °C



Technical data

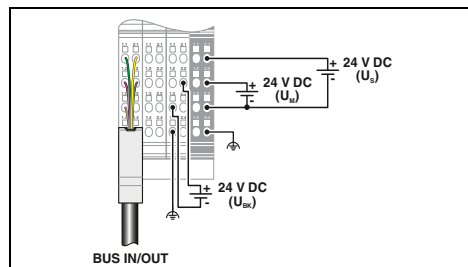
IB IL 24 FLM-PAC <sup>1)</sup>	IB IL 24 FLM MULTI-PAC <sup>1)</sup>
Inline shield connector	
Inline data jumper	
110 mA	50 mA
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
43 g	
12.2 mm	
-25 °C ... 55 °C	

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 FLM-PAC <sup>1)</sup>	2736903	1
IB IL 24 FLM MULTI-PAC <sup>1)</sup>	2737009	1

Accessories

Accessories	Order No.	Pcs. / Pkt.
IB IL 24 SEG/F-PAC <sup>1)</sup>	2861373	1
IB IL SCN-6 SHIELD	2726353	5



Technical data

Inline shield connector
Inline data jumper
24 V DC
19.2 V DC ... 30 V DC
max. 1.25 A (with max. number of connected I/O terminals)
-
-
max. 2 A DC (observe derating)
max. 0.5 A DC (observe derating)
Spring-cage connection
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
207 g
48.8 mm
-25 °C ... 55 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL 24 LSKIP-PAC	2897457	1

Accessories

Accessories	Order No.	Pcs. / Pkt.

## For the control cabinet (IP20) – Inline

### Serial communication terminals

Inline communication terminals can be used to connect devices with a serial interface (e.g., barcode scanners).

#### Features:

- V.24 (RS-232) or RS-485/RS-422 interface depending on the version
- Support of various protocols (e.g., end-to-end protocol)
- Baud rates of up to 250 kbaud
- Communication via acyclic services (PCP) or process data (PRO versions)

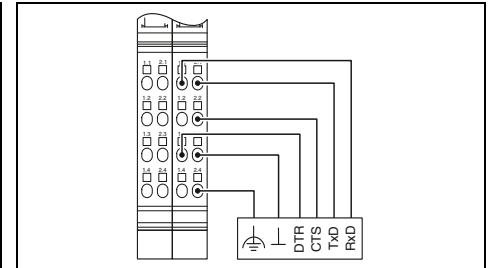
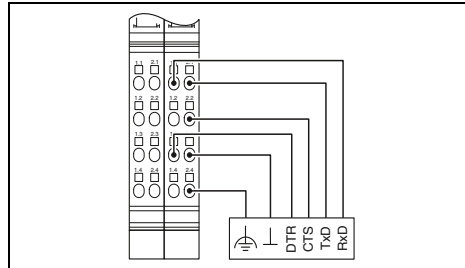


1 serial V.24 (RS-232) interface, PCP communication



1 serial V.24 (RS-232) interface, process data communication

**Notes:**  
The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.  
1) EMC: Class A product, see page 553



Local bus interface
Connection method
Serial port
Interface
Connection method
Power supply for module electronics
I/O voltage
I/O voltage range
Communications power $U_L$
Current consumption from $U_L$
Serial input/output channel
Input buffer
Output buffer
Transmission speed
Data bits
Stop bits
Parity
Transmission type
General data
Connection method
Connection data solid/stranded/AWG
Weight
Width
Ambient temperature (operation)

Technical data	
Inline data jumper	
V.24 (RS-232)	
Spring-cage connection	
24 V DC (via voltage jumper)	
19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
7.5 V (via voltage jumper)	
Typ. 155 mA	
4 kbyte	
1 kbyte	
110 bit/s ... 38400 bit/s (configurable)	
7 or 8	
1 or 2	
Even, odd or no parity	
Transparent mode, end-end mode, dual buffer mode, 3964R, XON/XOFF	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
135 g	
24.4 mm	
-25 °C ... 55 °C	

Technical data	
Inline data jumper	
V.24 (RS-232)	
Spring-cage connection	
24 V DC (via voltage jumper)	
19.2 V DC ... 30 V DC (including all tolerances, including ripple)	
7.5 V (via voltage jumper)	
Typ. 155 mA	
4 kbyte	
1 kbyte	
110 bit/s ... 38400 bit/s (configurable)	
7 or 8	
1 or 2	
Even, odd or no parity	
Transparent mode, end-end mode, dual buffer mode, 3964R, XON/XOFF	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
135 g	
24.4 mm	
-25 °C ... 55 °C	

Description
<b>Inline communication channel</b> , complete with accessories (connector and marking field) - 1 serial input and output channel as RS-485/RS-422 or RS-232 version

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL RS 232-PAC <sup>1)</sup>	2861357	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL RS 232-PRO-PAC <sup>1)</sup>	2878722	1

Connector set
IB IL AO/CNT-PLSET

Accessories		
IB IL AO/CNT-PLSET	2732664	1

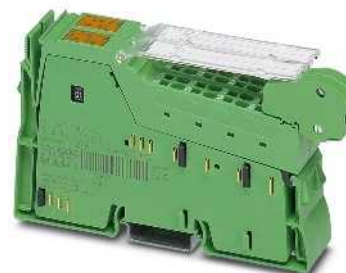
Accessories		
IB IL AO/CNT-PLSET	2732664	1



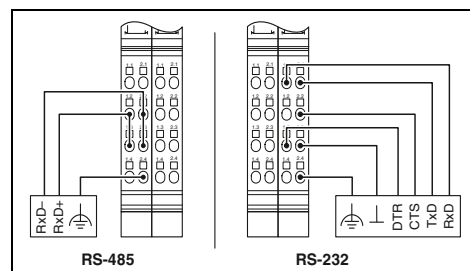
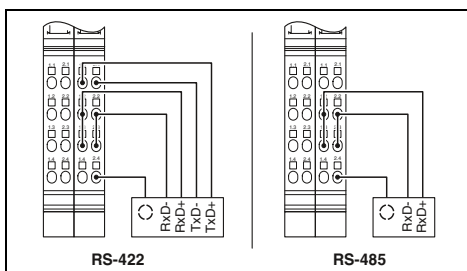
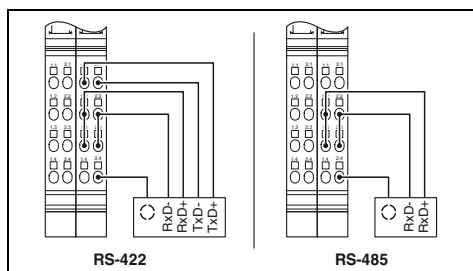
1 serial RS-485/RS-422 interface, PCP communication



1 serial RS-485/RS-422 interface, process data communication



1 serial RS-485/422 or RS-232 interface, process data communication



Technical data
Inline data jumper
RS-422/485 Spring-cage connection
24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC (including all tolerances, including ripple)
7.5 V (via voltage jumper) Typ. 170 mA
4 kbyte 1 kbyte 110 bit/s ... 38400 bit/s (configurable) 7 or 8 1 or 2 Even, odd or no parity Transparent mode, end-end mode, dual buffer mode, 3964R, XON/XOFF, Modbus RTU / ASCII
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 135 g 24.4 mm -25 °C ... 55 °C

Technical data
Inline data jumper
RS-422/485 Spring-cage connection
24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC (including all tolerances, including ripple)
7.5 V (via voltage jumper) Typ. 170 mA
4 kbyte 1 kbyte 110 bit/s ... 38400 bit/s (configurable) 7 or 8 1 or 2 Even, odd or no parity Transparent mode, end-end mode, dual buffer mode, 3964R, XON/XOFF, MOVILINK protocol
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 135 g 24.4 mm -25 °C ... 55 °C

Technical data
Inline data jumper
RS-232, RS-485, RS-422 Spring-cage connection
24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC (including all tolerances, including ripple)
7.5 V (via voltage jumper) Typ. 78 mA
4 kbyte 1 kbyte 110 bit/s ... 250000 bit/s (configurable) 5 ... 8 1 or 2 Even, odd or no parity Transparent mode, end-to-end mode, XON/XOFF
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 135 g 24.4 mm -25 °C ... 55 °C

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL RS 485/422-PAC	2861933	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL RS 485/422-PRO-PAC	2863627	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL RS UNI-PAC <sup>1)</sup>	2700893	1

Accessories		
IB IL AO/CNT-PLSET	2732664	1

Accessories		
IB IL AO/CNT-PLSET	2732664	1

Accessories		
IB IL AO/CNT-PLSET	2732664	1

### INTERFACE system bus master terminal

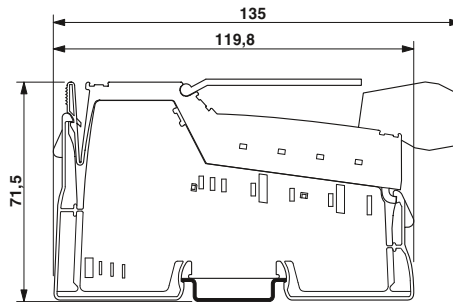
The Inline terminal can be used to connect INTERFACE modules to the Inline station and thereby the higher-level bus system via the INTERFACE system bus.

#### Features:

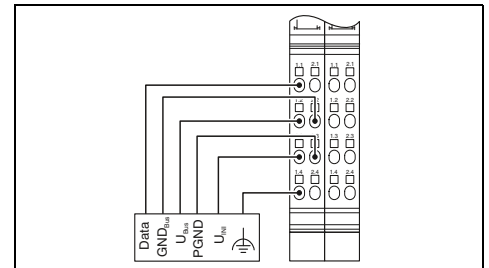
- Easy integration of up to 8 INTERFACE EMM and EEM modules with firmware 1.03 or later
- User-friendly parameterization, configuration, and diagnostics using DTMs (Device Type Managers)
- Serial interface (S port) including a memory stick for saving the configuration
- Acquisition and output of up to 31 measured values and 16 manipulated variables
- Application: motor and energy data management

#### Notes:

1) EMC: Class A product, see page 553



INTERFACE system bus master



#### Technical data

Local bus interface	
Connection method	Inline data jumper
Communication interface	
Interface	INTERFACE system bus
Connection method	Inline shield connector
Programming interface	
Interface	Programming interface (S port)
Connection method	IFS-USB-PROG-ADAPTER
Power supply for module electronics	
Communications power $U_L$	7.5 V (via voltage jumper)
Current consumption from $U_L$	Typ. 66 mA
Supply of the connected INTERFACE modules	
<b>9 V supply</b>	
Voltage range	8.1 V ... 9.9 V
Type of protection	Short-circuit protection, electronic
Max. current carrying capacity	300 mA
<b>24 V supply (EEM, EMM)</b>	
Voltage range	19.2 V ... 30 V (including ripple)
Type of protection	Short-circuit protection, electronic and thermal
Max. current carrying capacity	4 A
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	130 g
Width	24.4 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline Modular communication terminal</b> , complete with accessories (connector plug and marking field)			
- For connecting the INTERFACE system bus	IB IL IFS-MA-PAC <sup>1)</sup>	2692720	1

#### Accessories

Accessories	Order No.	Pcs. / Pkt.
Connector set	2732664	1
Programming adapter with USB interface	2811271	1
Multi-functional memory block for the INTERFACE system	2986122	1
Assembled connecting cable, IL-IFS, 2 m in length	1784729	1

### CAN master terminal

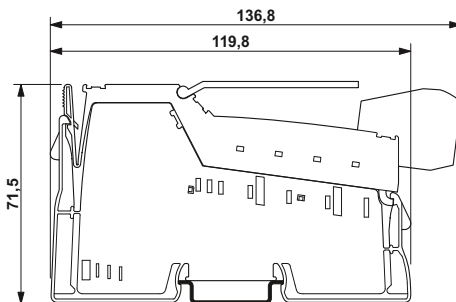
The Inline terminal can be used to connect a lower-level CAN network. Within the Inline station, the terminal acts as a CAN master for the CAN system.

Any CAN frames with 11-bit or 29-bit identifier can be transmitted via the terminal by the PLC to all types of CAN devices, regardless of the CAN protocol present there.

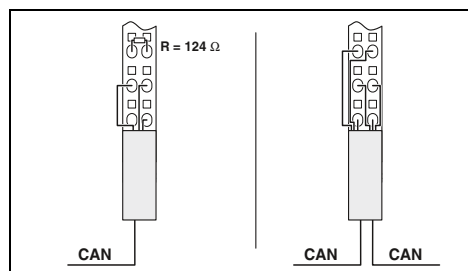
**Features:**

- Transparent mode
- CAN 2.0A (11-bit identifier ; standard frame)
- CAN 2.0B (29-bit identifier ; extended frame)
- Transmission speed of 10 kbps to 1 Mbps
- Maximum data width:  
126 bytes + 2-byte command/status word
- User-friendly controller-independent software tool for configuring the CAN network
- Serial interface (S port) including a memory stick for saving the configuration

**Notes:**  
The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.  
1) EMC: Class A product, see page 553



CAN master



Local bus interface
Connection method
Communication interface
Interface
Connection method
Programming interface
Interface
Connection method
Power supply for module electronics
Communications power $U_L$
Current consumption from $U_L$
General data
Connection method
Connection data solid/stranded/AWG
Weight
Width
Ambient temperature (operation)

**Technical data**

Inline data jumper
CAN bus
Inline shield connector
CAN bus
Inline shield connector
7.5 V (via voltage jumper)
Typ. 110 mA
Spring-cage connection
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
75 g
12.2 mm
-25 °C ... 55 °C

Description
<b>Inline Modular communication terminal</b> , complete with accessories (connector and marking field)
- For connecting a CAN bus system

**Ordering data**

Type	Order No.	Pcs. / Pkt.
IB IL CAN-MA-PAC <sup>1)</sup>	2700196	1

<b>Shield connector</b>
<b>Multi-functional memory block</b> for the INTERFACE system
<b>Configuration cable</b> for IB IL CAN-MA-PAC

**Accessories**

Type	Order No.	Pcs. / Pkt.
IB IL SCN 6-SHIELD-TWIN	2740245	5
IFS-CONFSTICK <sup>1)</sup>	2986122	1
IB IL CAN-MA CONF-CAB	2700620	1

### IO-Link master terminal

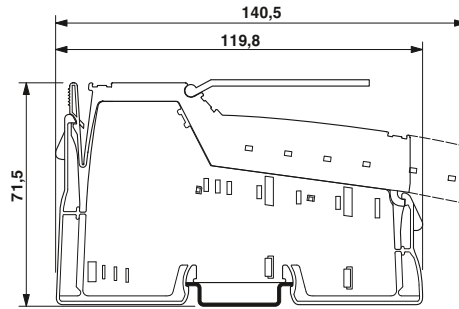
The Inline IO-Link master enables the connection of IO-Link-compatible sensors and actuators (IO-Link devices).

#### Features:

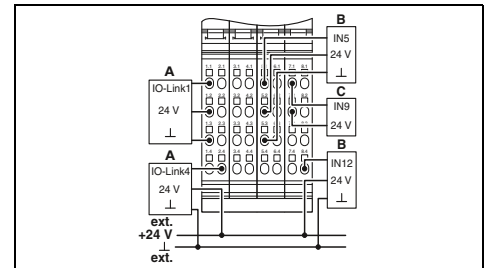
- 4 type A IO-Link ports
- Transmission speeds  
COM1: 4.8 kbaud  
COM2: 38.4 kbaud  
COM3: 230.4 kbaud
- Optional use of the IO-Link ports in SIO mode as standard inputs or standard outputs
- Connections for 12 digital sensors

#### Notes:

1) EMC: Class A product, see page 553



4 IO-Link ports, 12 digital inputs



#### Technical data

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
Communications power $U_L$	7.5 V (via voltage jumper)
Current consumption from $U_L$	max. 100 mA
Digital inputs	
Connection technology	2, 3-wire
Maximum number of inputs	12
IO-Link ports	
Connection technology	2, 3-wire
Number of ports	4
IO-Link port supply	
I/O supply voltage	min. $U_S - 1$ V
Nominal current for every IO-Link port	max. 200 mA
Nominal current per device	max. 800 mA
Digital inputs in the SIO mode	
Number of inputs	max. 4
Input voltage	24 V DC
Input voltage range	0 V DC ... 30 V DC
Nominal input current	5.5 mA (at 24 V DC)
Current flow	linear in the range of 0 V ... 7 V, constant in the range of 7 V ... 30 V
Signal delay	3 ms
Digital outputs in the SIO mode	
Number of outputs	max. 4
Nominal output voltage	$U_S - 3$ V ( $U_{OUT}$ at $I_{CO} \leq 200$ mA)
Nominal current per channel	max. 200 mA ( $I_{Nominal}$ )
Maximum total current consumption	max. 800 mA
Protective circuit	Short-circuit protection integrated per channel
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	200 g
Width	48.8 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Inline IO-Link master, complete with accessories (connector plug and marking field)	IB IL 24 IOL 4 DI 12-PAC <sup>1)</sup>	2692717	1



## PROFIBUS terminal

The PROFIBUS terminal enables connection of PROFIBUS modules to a PC Worx controller via INTERBUS or PROFINET.

Likewise, a PC Worx controller can be integrated into an existing PROFIBUS system.

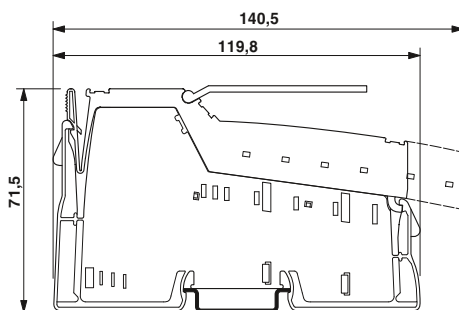
The terminal supports both the master and slave functions.

### Features:

- PROFIBUS DP V0 master for a maximum of ten PROFIBUS slaves with up to 48 data words of input and output data.
- PROFIBUS DP V0 master for a maximum of three PROFIBUS slaves with up to 56 data words of input and output data.
- PROFIBUS DP slave with a maximum of 56 data words
- user-friendly parameterization via PC Worx
- local plug-in memory for backing up the configuration

### Notes:

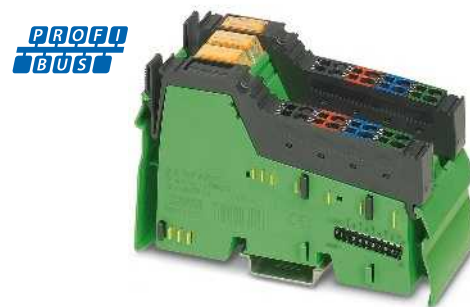
1) EMC: Class A product, see page 553



Local bus interface	
Connection method	Inline data jumper
Communication interface	
Interface	
Connection method	PROFIBUS DP V0 master/slave
Power supply for module electronics	
Communications power $U_L$	9-pos. D-SUB socket
Current consumption from $U_L$	7.5 V (via voltage jumper)
General data	
Connection method	Typ. 98 mA
Weight	9-pos. D-SUB socket
Width	200 g
Ambient temperature (operation)	48.8 mm
	-25 °C ... 55 °C

Description	
Inline PROFIBUS master, complete with accessories (connector plug and marking field)	

PROFIBUS connector plug (D-SUB)



PROFIBUS master/slave



### Technical data

Local bus interface	
Connection method	Inline data jumper
Communication interface	
Interface	
Connection method	PROFIBUS DP V0 master/slave
Power supply for module electronics	
Communications power $U_L$	9-pos. D-SUB socket
Current consumption from $U_L$	7.5 V (via voltage jumper)
General data	
Connection method	Typ. 98 mA
Weight	9-pos. D-SUB socket
Width	200 g
Ambient temperature (operation)	48.8 mm
	-25 °C ... 55 °C

### Ordering data

Type	Order No.	Pcs. / Pkt.
IB IL PB MA-PAC <sup>1)</sup>	2700630	1

### Accessories

SUBCON-PLUS-PROFIB	2744348	1
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### Counter terminal

The Inline counter terminal detects and processes fast pulse sequences from sensors.

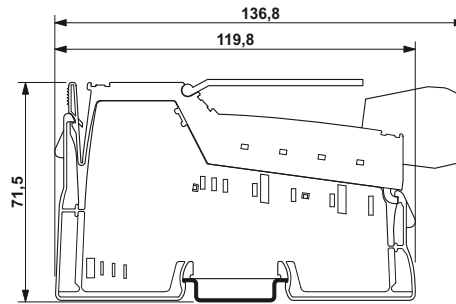
#### Features:

- 1 counter
- 24 V sensor supply including monitoring
- Processing of 5 V or 24 V signals
- Input frequency of up to 100 kHz
- Gate input
- Four operating modes:  
Event counting, time or state-controlled frequency measurement, time measurement (period or pulse length), and pulse generator
- 24-bit counter value for event counting and frequency measurement
- 16-bit counter value for time measurement
- Time measurement resolutions:  
2  $\mu$ s, 1 ms, and 10 ms
- Frequency measurement resolution of up to 0.1 Hz
- 24 V onboard output switches when relation condition is met
- Start and final value can be modified during counting

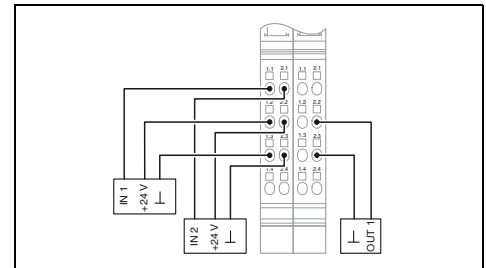
#### Notes:

The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.

1) EMC: Class A product, see page 553



1 counter input



#### Technical data

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
I/O voltage	24 V DC (via voltage jumper)
I/O voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Communications power $U_L$	7.5 V DC
Current consumption from $U_L$	max. 50 mA
Counter input	
Operating modes	Event counting, frequency/time measurement, pulse generator
Input frequency	max. 100 kHz
Input voltage	24 V DC / 5 V DC
Input current	5 mA (typical)
Control input	
Connection method	2, 3-wire
Input voltage	24 V DC / 5 V DC
Input current	5 mA (typical)
Digital outputs	
Number of outputs	1
Connection method	2-wire
Output voltage	24 V
Output current	500 mA
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	130 g
Width	24.4 mm
Ambient temperature (operation)	-25 °C ... 55 °C

#### Ordering data

Description	Order No.	Pcs. / Pkt.
<b>Inline counter terminal</b> , complete with accessories (connector and marking field)		
<b>IB IL CNT-PAC<sup>1)</sup></b>	<b>2861852</b>	<b>1</b>

#### Accessories

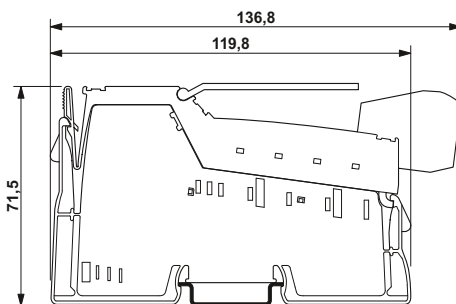
<b>Connector set</b>	<b>IB IL AO/CNT-PLSET</b>	<b>2732664</b>	<b>1</b>
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**Pulse width terminal**

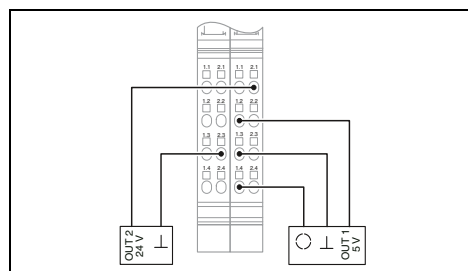
The Inline PWM terminal outputs signals ; depending on the operating mode, either the pulse length, period length or frequency can be set.

**Features:**

- 2 independent channels
- Output of 5 V or 24 V signals
- Maximum frequency of 50 kHz
- Pulse width modulation (period length can be set in increments from 100 μs to 10 s, duty factor in 0.39% increments)
- Frequency output (frequency can be set between 0 and 50 kHz)
- Single pulse output (pulse length of 10 μs to 25.5 s can be set)
- Pulse/direction signal output without integrated ramp function to control step motor power sections



**Pulse width modulation, frequency generator or step motor control**



**Notes:**  
 The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.  
 1) EMC: Class A product, see page 553

Local bus interface
Connection method
Power supply for module electronics
I/O voltage
I/O voltage range
Communications power $U_L$
Current consumption from $U_L$
Digital outputs
Number of outputs
Connection method
Output voltage
Output current
General data
Connection method
Connection data solid/stranded/AWG
Weight
Width
Ambient temperature (operation)

<b>Technical data</b>
Inline data jumper
24 V DC (via voltage jumper)
19.2 V DC ... 30 V DC (including all tolerances, including ripple)
7.5 V (via voltage jumper)
max. 130 mA
2
2-wire (shielded)
24 V / 5 V
10 mA (5 V) ; 500 mA (24 V)
Spring-cage connection
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
130 g
24.4 mm
-25 °C ... 55 °C

Description
<b>Inline function terminal</b> , complete with accessories (connector and marking field)

<b>Ordering data</b>		
Type	Order No.	Pcs. / Pkt.
IB IL PWM/2-PAC <sup>1)</sup>	2861632	1

<b>Connectors</b>
Shield connector

<b>Accessories</b>		
IB IL SCN-8	2726337	10
IB IL SCN 6-SHIELD-TWIN	2740245	5

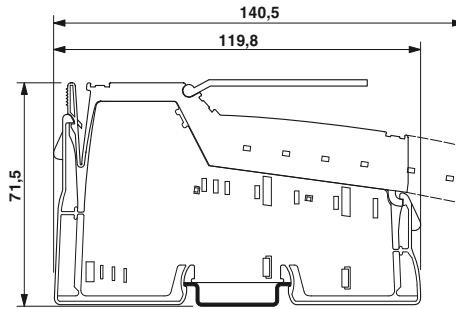
**Power measurement terminal**

This module is designed for use within an Inline station.

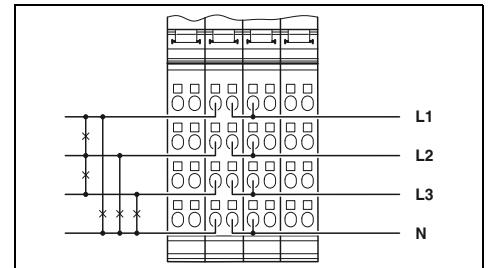
The power measurement terminal enables you to analyze AC power grids and is used in applications where conventional analog meters in distribution systems no longer meet growing requirements. This is particularly true in cases where it is important to analyze distortions and harmonics as well as measuring current, voltage, and power.

**Features:**

- 3 phases plus neutral conductor, connectable
- Direct current detection, 1 A or 5 A
- Line-to-line voltage up to 690 V AC (L-L)
- Specification according to EN 61010-1:2001:
  - Measurement category 3 (300 V AC (L-N))
  - Measurement category 2 (400 V AC (L-N))
- Network variables:
  - Phase currents and neutral conductor current
  - Phase and phase conductor voltages
  - Real, reactive, and apparent powers
  - Power factors of phases
  - Power flow directions
  - Frequency
- Operating modes:
  - Basic measured values
  - Scanning measured values (64 scans/full wave)
- Synchronization
- Triggers for measurement intervals can be freely defined
- Harmonic analysis up to 31st harmonic
- Determination of maximum value
- Operating hours counter
- Power meter
- Bimetal filtering



Analysis of AC power grids



<b>Local bus interface</b>	
Name	Inline local bus
Connection method	Inline data jumper
<b>Power supply for module electronics</b>	
Communications power $U_L$	7.5 V (via voltage jumper)
Current consumption from $U_L$	Typ. 130 mA
<b>Current measuring input</b>	
Nominal current $I_N$	5 A AC (1 A AC, depending on parameterization)
Overload	140% continuous ; 150 A for 10 ms
Precision	0.25% (of the nominal value)
Scanning rate	22.4 k samples/50 Hz
<b>Voltage measuring input</b>	
Nominal voltage $U_N$	400 V AC (Nominal phase voltage)
Nominal voltage $U_N$	0 V AC ... 690 V AC (phase conductor voltage)
Overload	120% of the nominal value
Precision	0.25% (of the nominal value)
Scanning rate	22.4 k samples/50 Hz
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Weight	200 g
Width	48.8 mm
Ambient temperature (operation)	-25 °C ... 60 °C

Technical data		
Name		
Connection method		
Power supply for module electronics		
Communications power $U_L$	7.5 V (via voltage jumper)	
Current consumption from $U_L$	Typ. 130 mA	
<b>Current measuring input</b>		
Nominal current $I_N$	5 A AC (1 A AC, depending on parameterization)	
Overload	140% continuous ; 150 A for 10 ms	
Precision	0.25% (of the nominal value)	
Scanning rate	22.4 k samples/50 Hz	
<b>Voltage measuring input</b>		
Nominal voltage $U_N$	400 V AC (Nominal phase voltage)	
Nominal voltage $U_N$	0 V AC ... 690 V AC (phase conductor voltage)	
Overload	120% of the nominal value	
Precision	0.25% (of the nominal value)	
Scanning rate	22.4 k samples/50 Hz	
<b>General data</b>		
Connection method	Spring-cage connection	
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
Weight	200 g	
Width	48.8 mm	
Ambient temperature (operation)	-25 °C ... 60 °C	

<b>Description</b>
Inline power measurement terminal, complete with accessories (connector plug and marking field)

Ordering data		
<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
IB IL PM 3P/N/EF-PAC	2700965	1

<b>Marking field, width: 12.2 mm</b>
<b>Marking field, width: 48.8 mm</b>

Accessories		
<b>IB IL FIELD 2</b>	<b>2727501</b>	10
<b>IB IL FIELD 8</b>	<b>2727515</b>	10

### Positioning control terminal

The Inline positioning control system is suitable for point-to-point positioning of binary-controlled drives, e.g., pole-changing AC motors, in accordance with the rapid motion/creeping motion principle and supports the positioning of rotary and linear axes.

It can be used to perform simple positioning tasks, such as positioning:

- Transportation equipment
- Format adjustments (adjustable axes)
- Tools

It is not necessary to set control parameters here. After specifying a target position, the terminal automatically, and therefore independently of the bus, assumes control of the drive by specifying both the traversing rate (rapid motion/creeping motion) and the traversing direction via four binary outputs and signaling when the target point has been reached.

#### IB IL INC-PAC:

- Position detection via symmetrical or asymmetrical incremental encoder with or without Z trace

#### IB IL SSI-PAC:

- Position detection using absolute encoders with SSI interface

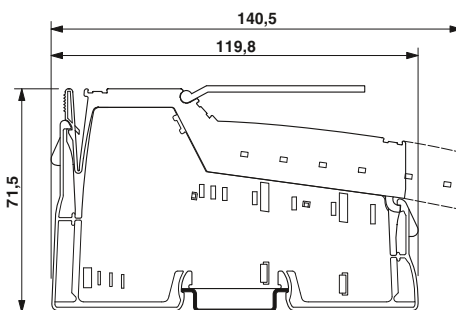
#### Features:

- 5 V and 24 V encoder supply including monitoring
- 24 V sensor supply including monitoring
- 3 digital inputs
- 4 digital outputs
- Software limit switch
- Integrated monitoring functions
- Gear ratio can be parameterized
- Backlash and friction compensation
- Startup using hand-held operator panel mode

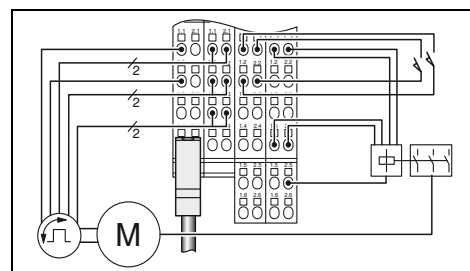
#### Notes:

The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.

1) EMC: Class A product, see page 553



With incremental encoder interface or SSI interface for absolute encoders



Local bus interface	
Connection method	
Power supply for module electronics	
Communications power $U_L$	
Current consumption from $U_L$	
Encoder supply voltage	
Encoder supply current	
Drawing encoder supply voltage	
Drawing initiator supply	
Incremental encoder input	
Number of inputs	
Description of the input	
Input frequency (24 V)	
Input frequency (5 V)	
Absolute position encoder input	
Number of inputs	
Transmission frequency	
Adjustable resolution	
Digital inputs	
Number of inputs	
Input voltage range "0" signal	
Input voltage range "1" signal	
Digital outputs	
Number of outputs	
Connection method	
Output voltage	
Output current	
General data	
Connection method	
Connection data solid/stranded/AWG	
Weight	
Width	
Ambient temperature (operation)	

**Inline positioning terminal**, complete with accessories (connector plug and marking field)

- Incremental encoder input
- Absolute encoder input

**Connecting plug**  
**Shield connector** for analog Inline terminals

Technical data	
IB IL INC-PAC <sup>1)</sup>	IB IL SSI-PAC <sup>1)</sup>
Inline data jumper	
7.5 V (via voltage jumper)	
max. 110 mA	max. 60 mA
5 V DC (sym. / asym.) / 24 V DC	5 V DC / 24 V DC
(Only asymmetrical encoders)	
500 mA	
Main circuit $U_M$	
Main circuit $U_M$	
1	-
Symmetrical (RS-422) or asymmetrical (4.5 V - 30 V)	-
0 Hz ... 50 kHz (asymmetrical)	-
0 kHz ... 500 kHz (symmetrical)	-
-	1
-	400 kHz
-	26 bit (maximum)
3	
-30 V DC ... 5 V DC	
13 V DC ... 30 V DC	
4	
-	
24 V DC	-
2 A	-
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
210 g	
48.8 mm	
-25 °C ... 55 °C	

Ordering data		
IB IL INC-PAC <sup>1)</sup>	2861849	1
IB IL SSI-PAC <sup>1)</sup>	2861865	1

Accessories		
IB IL SCN-12-ICP	2727611	10
IB IL SCN-6 SHIELD	2726353	5

Position measurement terminals

Inline position detection terminals can be used to detect the position with incremental encoders, absolute encoders with SSI interface or magnetostrictive encoders with start/stop interface.

**IB IL INC-IN-PAC features:**

- Symmetrical and asymmetrical incremental encoders with or without Z trace can be connected
- Shield connection
- Maximum input frequency of 300 kHz
- Single, double or quadruple evaluation
- 25-bit actual position value
- 5 V and 24 V encoder supply including monitoring
- 3 digital inputs to connect two limit switches and one home position switch
- 5 homing functions
- Direction of rotation indicator via LED
- Open circuit detection

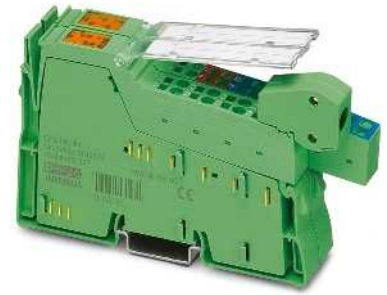
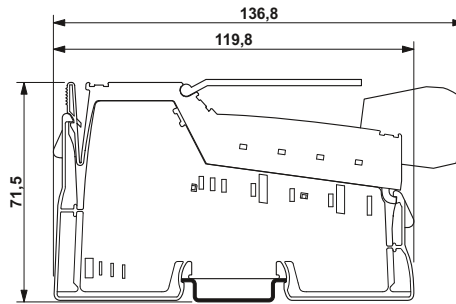
**IB IL SSI-IN-PAC features:**

- 1 single or multi-turn encoder with up to 25-bit resolution can be connected
- Transmission frequency of up to 1 MHz
- 5 V encoder supply including monitoring
- Gray or binary code
- Parity monitoring
- Reversal of direction of rotation
- Shield connection

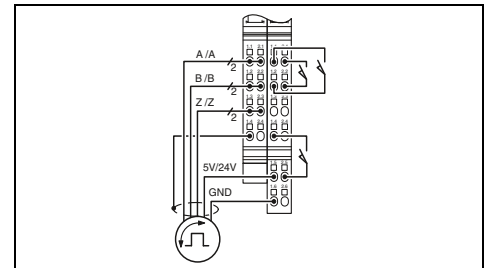
**IB IL IMPULSE-IN-PAC features:**

- 1 magnetostrictive encoder can be connected
- Evaluation of the position of a magnet
- Length measuring range of up to 3.85 m
- Position resolution of 5 µm
- Ultrasonic encoder speed of 2500 m/s to 2999.99 m/s
- 24 V encoder supply including monitoring
- Shield connection

**Notes:**  
 The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.  
 1) EMC: Class A product, see page 553



Input for incremental encoder with square-wave signal (symmetrical or asymmetrical)



<b>Local bus interface</b>	
Connection method	Inline data jumper
<b>Power supply for module electronics</b>	
Communications power $U_L$	7.5 V (via voltage jumper)
Current consumption from $U_L$	max. 70 mA
Encoder supply voltage	5 V DC / 24 V DC
Encoder supply current	max. 250 mA
Drawing encoder supply voltage	Main circuit $U_M$
Drawing initiator supply	Main circuit $U_M$
<b>Incremental encoder input</b>	
Number of inputs	1
Description of the input	Symmetrical (RS-422) or asymmetrical (3.5 V to -27 V)
Input frequency (24 V)	0 Hz ... 300 kHz
<b>Absolute position encoder input</b>	
Number of inputs	-
Transmission frequency	-
Adjustable resolution	-
<b>Input for magnetostrictive encoders</b>	
Length measuring range	-
Ultra-sound speed (gradient)	-
<b>Digital inputs</b>	
Number of inputs	3
Input voltage range "0" signal	-30 V DC ... 5 V DC
Input voltage range "1" signal	15 V DC ... 30 V DC
<b>General data</b>	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	143 g
Width	24.4 mm
Ambient temperature (operation)	-25 °C ... 55 °C

Technical data		
Inline data jumper		
7.5 V (via voltage jumper)		
max. 70 mA		
5 V DC / 24 V DC		
max. 250 mA		
Main circuit $U_M$		
Main circuit $U_M$		
1		
Symmetrical (RS-422) or asymmetrical (3.5 V to -27 V)		
0 Hz ... 300 kHz		
-		
-		
-		
-		
-		
-		
3		
-30 V DC ... 5 V DC		
15 V DC ... 30 V DC		
Spring-cage connection		
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16		
143 g		
24.4 mm		
-25 °C ... 55 °C		

**Inline position measurement terminal**, complete with accessories (connector plug and marking field)

Ordering data		
IB IL INC-IN-PAC	2861755	1

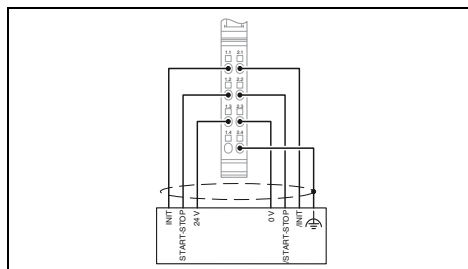
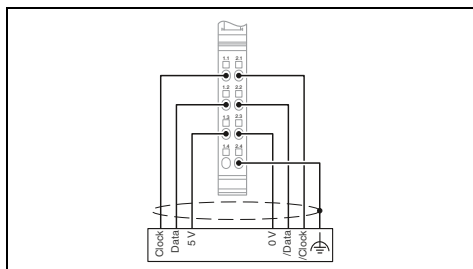
**Connecting plug**  
**Shield connector** for analog Inline terminals

Accessories		
IB IL SCN-12-ICP	2727611	10
IB IL SCN-6 SHIELD	2726353	5



Input for absolute rotation or travel measuring systems with SSI interface

Input for magnetostrictive encoder with start/stop interface



Technical data
Inline data jumper
7.5 V (via voltage jumper) max. 28 mA 5 V DC max. 250 mA Main circuit $U_M$ -
-
-
-
1 100 kHz / 200 kHz / 400 kHz / 800 kHz / 1 MHz 25 bit (maximum)
-
-
-
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 71 g 12.2 mm -25 °C ... 55 °C

Technical data
Inline data jumper
7.5 V max. 70 mA 24 V max. 250 mA Main circuit $U_M$ -
-
-
-
> 0 mm ... 3850 mm (resolution: 5 µm) 2500.00 m/s ... 2999.99 m/s (Firmware 1.22 and higher) 2750.00 m/s ... 2898.00 m/s (Firmware 1.21 and higher)
-
-
-
Spring-cage connection 0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16 71 g 12.2 mm -25 °C ... 55 °C

Ordering data		
IB IL SSI-IN-PAC <sup>1)</sup>	2819574	1
Accessories		
IB IL SCN-6 SHIELD	2726353	5

Ordering data		
IB IL IMPULSE-IN-PAC <sup>1)</sup>	2861768	1
Accessories		
IB IL SCN-6 SHIELD	2726353	5



### Servo controller for EC motors

The IB IL EC AR 48/10A Inline servo controller is a universal power output module with a 4 quadrant function for permanently excited DC motors with brushgears or electronically commutated DC motors (EC motors) with up to 450 W power output.

#### Features:

- Variable frequency drive with positioning function
- Electronic commutation with Hall sensors
- Point-to-point positioning function
- Speed profile: trapezoid or S curve
- Position, speed, and torque control
- Position detection with incremental encoder
- Homing
- Max. 48 V/10 A
- 97.6 mm design width
- Software tool for operation and startup including oscilloscope function
- Cycle time of the position controller: 1 ms
- For single and multi-axis applications

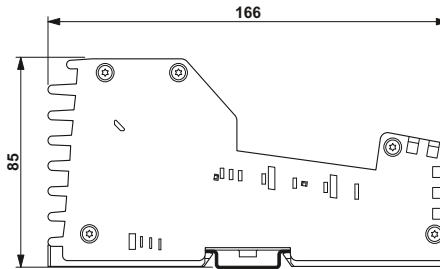
#### Applications:

- Handling machines in the semiconductor industry, in small parts protection, in the electronics industry, and in test engineering
- Assembly machines in small appliance production
- Bearing and conveying technology for small loads
- Format adjustment in processing machines and packaging machines
- Laboratory technology

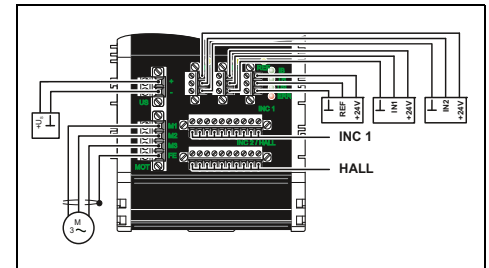
#### Notes:

The driver function blocks can be obtained free of charge on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products) under Download on the product page of the corresponding module.

1) EMC: Class A product, see page 553



Servo controller for 24 V motors with positioning and homing function



<b>Interface</b>	
Inline local bus	Startup and diagnostics
Power supply for module electronics	
Communications power $U_L$	Current consumption from $U_L$
Power supply	
Connection method	Supply voltage range
<b>Motor output</b>	
Output name	
Connection method	Nominal current range
Nominal motor power	Function
<b>Incremental encoder input</b>	
Symmetrical incremental encoders	
Input frequency (5 V)	Asymmetrical incremental encoders
Input frequency (5 V) / Input frequency (24 V)	
<b>Digital inputs</b>	
Number of inputs	Connection method
Connection technology	
<b>General data</b>	
Connection method	Connection data solid/stranded/AWG Front MSTB
Connection data solid/stranded/AWG Front MC	
Weight	Width
Ambient temperature (operation)	

<b>Technical data</b>		
Inline data jumper		
RS-232		
7.5 V DC (via voltage jumper)		
Typ. 30 mA		
2-pos. COMBICON connector		
12 V DC ... 48 V DC $\pm 15\%$ (surge voltage shutdown $U_S > 60$ V DC)		
1 permanently excited DC motor with or without brushgear		
4-pos. COMBICON plug with shield connection clamp		
max. 10 A (starting/continuous current)		
450 W (power consumption)		
4 quadrant servo controller		
max. 1 MHz		
max. 500 kHz (at 4 V voltage level) / max. 100 kHz (at 20 V voltage level)		
3		
MINI COMBICON		
3-wire (signal, $U_S$ , GND)		
Screw connection		
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12		
0.14 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 28 - 16		
880 g		
97.6 mm		
-25 °C ... 55 °C		

<b>Description</b>
<b>Inline variable frequency drive</b> , including connector plug
- For DC motors with brushgear and EC motors (without brushgear)

<b>Startup and diagnostic software</b> , including cable for connecting to the RS-232 interface of a PC
<b>Connector set</b> , including shield connection clamps

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
<b>IB IL EC AR 48/10A-PAC<sup>1)</sup></b>	<b>2819587</b>	<b>1</b>

<b>Accessories</b>		
<b>EC AR CAB SW TOOL</b>	<b>2819545</b>	<b>1</b>
<b>IB IL ECAR-PLSET</b>	<b>2819561</b>	<b>1</b>



### Power-level terminals

The single-channel power-level terminals for direct and reversing starters and the electromechanical version with electronic motor protection enable a three-phase asynchronous motor to be switched, protected, and monitored via a bus system.

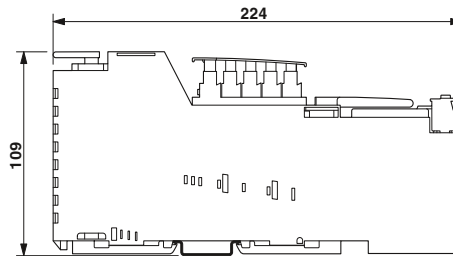
The power-level terminals are designed for use within the 24 V area of an Inline station.

#### Features:

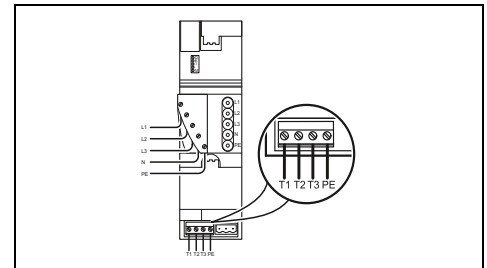
- Integrated electronic motor protection in accordance with IEC 60947-4
- Connection option for an external passive brake module
- Manual local operation
- Safe isolation between mains voltage and 24 V supply voltage according to EN 50178
- Diagnostic and status indicators
- Motor current monitoring
- Motor control via OUT process data

#### Notes:

1) EMC: Class A product, see page 553



Electronic direct or reversing load starter, up to 1.5 kW/400 V AC



#### Technical data

Interface	
Inline local bus	
Power supply for module electronics	
Communications power $U_L$	7.5 V
Current consumption from $U_L$	max. 45 mA
Motor starter, output	
Connection method	(3-phase), via COMBICON
Output voltage range	200 V AC ... 400 V AC (50 Hz ... 60 Hz)
Nominal current range	0.2 A ... 3.6 A
Power factor	0.3
Switching rate	Max. 30 per minute (observe derating)
Motor monitoring	
Tripping class	Based on class 10 A of IEC 60947-4: 1990
Overspeed tripping	$\geq 20$ A (after 0.3 seconds)
Output	
Maximum switching voltage	-
Max. switching current	-
Switch-off delay	-
Switch-on delay	-
General data	
Connection method	Screw connection
Connection data solid/stranded/AWG motor circuit connector	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Width	63 mm

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline power-level terminals</b> , incl. motor circuit connector plug			
- Electronic direct starter	IB IL 400 ELR 1-3A <sup>1)</sup>	2727352	1
- Electronic reversing load starter	IB IL 400 ELR R-3A <sup>1)</sup>	2727378	1
- Electromechanical direct starter			
<b>Inline brake module</b> , for brake control in connection with Inline power-level terminals			
- For 24 V DC brakes			
- For 440 V AC/DC brakes			

#### Accessories

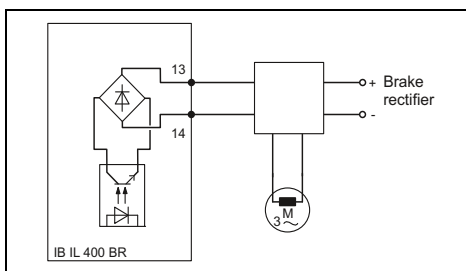
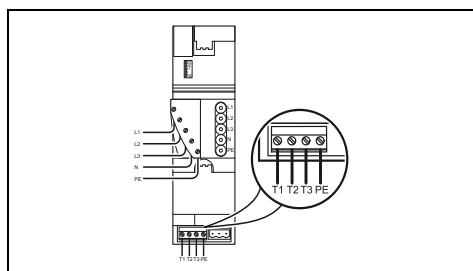
<b>Inline thermistor terminal</b> , complete with accessories (connector plug and marking field)	IB IL 24 TC-PAC <sup>1)</sup>	2861360	1
<b>Hand-held operator panel</b> , for motor starters and variable frequency drives	IBS HVO	2836052	1
<b>Power plug</b> for Inline power-level terminals	IB IL 400 CN-PWR-IN	2836078	1
<b>Power bridge</b> , for Inline power-level terminals	IB IL 400 CN-BRG	2836081	1
<b>Motor-circuit connector</b> for Inline power-level terminals	GMVSTBW 2,5 HV/ 4-ST-7,62 NZIL	1893957	10



**Electronic direct starter,  
up to 3.7 kW/400 V AC**



**Extension module,  
for brake control of power-level terminals**



**Technical data**

**Technical data**

Inline data jumper	
7.5 V max. 45 mA	
(3-phase), via COMBICON 200 V AC ... 600 V AC (50 Hz ... 60 Hz) 0.2 A ... 8 A 0.3 Max. 5 cycles per minute	
Based on class 10 A of IEC 60947-4: 1990	
≥ 40 A (after 0.3 seconds)	
-	
-	
-	
-	
Screw connection 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
63 mm	

	IB IL 24 BR/DC <sup>1)</sup>	IB IL 400 BR <sup>1)</sup>
	-	-
	-	-
	-	-
	-	-
	-	-
	-	-
	-	-
	-	-
	-	-
	31 V DC	440 V AC/DC
	3 A DC	300 mA AC/DC
	< 15 ms	< 1 ms
	< 2 ms	< 4 ms
	55 mm	55 mm

**Ordering data**

**Ordering data**

Type	Order No.	Pcs. / Pkt.
IB IL 400 MLR 1-8A <sup>1)</sup>	2727365	1

Type	Order No.	Pcs. / Pkt.
IB IL 24 BR/DC <sup>1)</sup>	2742036	1
IB IL 400 BR <sup>1)</sup>	2727394	1

**Accessories**

**Accessories**

IB IL 24 TC-PAC <sup>1)</sup>	2861360	1
IBS HVO	2836052	1
IB IL 400 CN-PWR-IN	2836078	1
IB IL 400 CN-BRG	2836081	1
GMVSTBW 2,5 HV/ 4-ST-7,62 NZIL	1893957	10


### Product overview

#### Bus terminals



246



247

#### Input and output modules



Digital input		Digital output			Digital input/output
16 channels	32 channels	8 channels	16 channels	32 channels	8/8 channels
248	248	249	249	249	249
Analog input		Analog output			
2 channels	4 channels	8 channels	4 channels	8 channels	
250	250	251	251	251	

#### Special function modules



Counter

4 channels

Communication

RS-232/RS-485/RS-422

[www.phoenixcontact.net/products](http://www.phoenixcontact.net/products)

#### Accessories



Corresponding cables and plugs can be found in our online catalog.

[www.phoenixcontact.net/products](http://www.phoenixcontact.net/products)

**General technical data**

<b>Ambient conditions</b>	
Ambient temperature (operation)	0°C to +55°C
Ambient temperature (storage)	-25°C to +75°C
Relative humidity (operation)	30% to 75% (no condensation)
Relative humidity (storage)	30% to 95% (no condensation)
Degree of protection	IP20 according to IEC 60529
Vibration according to IEC 60068-2-6	2g
Shock according to IEC 60068-2-27	15g
Air and creepage distances	IEC 60664/IEC 60664A/ DIN VDE 0110:1989-01, and DIN VDE 0160:1988-05
<b>Electromagnetic compatibility</b>	
Noise emission	DIN EN 55022 Class A (industrial applications)
<b>Supply voltage</b>	
Nominal value	24 V DC
Permissible range	18.5 V DC to 30.5 V DC (ripple included)

### INTERBUS bus terminal modules

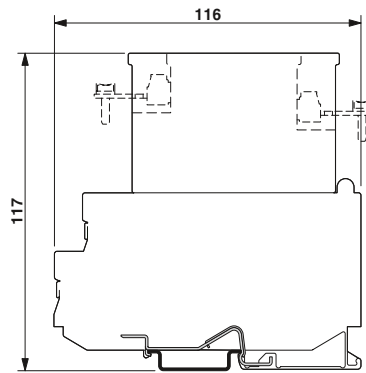
INTERBUS bus terminal modules connect the I/O modules of an ST station to the INTERBUS network.

#### Features:

- Copper or fiber optic connection
- Up to 4 or 8 I/O modules can be connected
- Additional remote/local bus branches
- Additional I/Os onboard

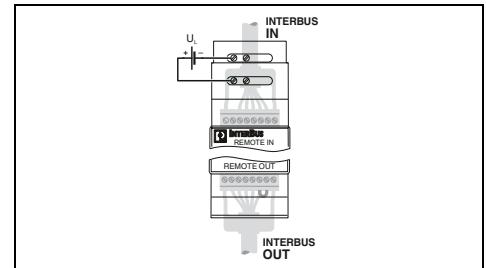
#### Notes:

1) EMC: Class A product, see page 553



Basic function

INTERBUS CLUB



#### Technical data

Interface	IBS ST 24 BKM-T <sup>1)</sup>	IBS ST 24 BKM-LK-OPC <sup>1)</sup>
Name	INTERBUS remote bus	
Connection method	8-pos. mini Combicon plug	F-SMA plug
Power supply for module electronics		
Supply voltage	24 V DC	
Supply voltage range	20 V DC ... 30 V DC (including ripple)	
Digital inputs		
Connection method	Screw connection	
Maximum number of inputs	-	
Protective circuit	-	
Digital outputs		
Connection method	-	
Maximum number of outputs	-	
Maximum output current per channel	-	
Maximum output current per module / terminal block	-	
Protective circuit	-	
General data		
Connection method	MINI COMBICON	Screw connection
Connection data solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
Weight	200 g	

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>INTERBUS-ST bus terminal module</b> , consisting of: terminal part with screw connection and module electronics - MINI-COMBICON plug, 8-pos. - 9-pos. D-SUB plug - Additional remote bus branch, D-SUB plug  - Additional local bus branch	IBS ST 24 BKM-T <sup>1)</sup>	2750154	1
<b>INTERBUS-ST bus terminal module</b> , consisting of: terminal part with screw connection and module electronics - Fiber optics F-SMA plug, optical path diagnostics	IBS ST 24 BKM-LK-OPC <sup>1)</sup>	2728665	1

#### Accessories

<b>Replacement shield point</b> , for INTERBUS-ST BKM-... bus terminal block	IBS RB-SHIELD	2722742	1
<b>Replacement remote bus connector set</b> , for INTERBUS-ST BKM-... bus terminal block	IBS RB PLSET/MC 1,5/8	2722755	1
<b>Replacement local bus cable</b>	IB ST LBC	2836492	10
<b>Insertion bridges</b> , divisible, insulated spine, blue, 84-pos.	EB 84 IB ST BU	2836269	5
<b>Insertion bridges</b> , divisible, insulated spine, red, 84-pos.	EB 84 IB ST RD	2836272	5



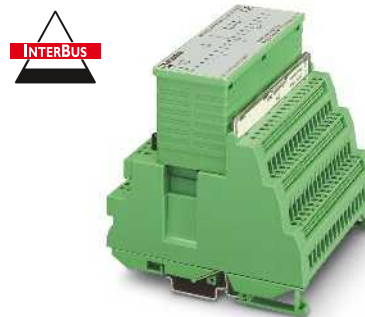
For the control cabinet (IP20) – INTERBUS Smart Terminals



Standard function

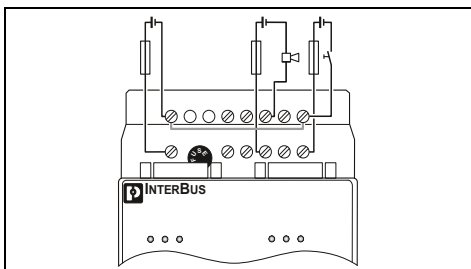


With bus branch



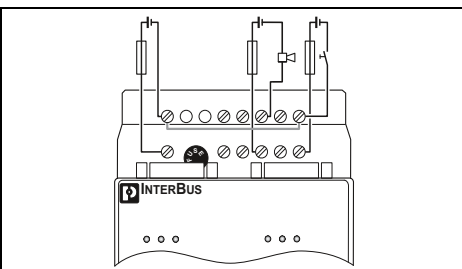
With integrated I/Os

IBS INTERBUS CLUB



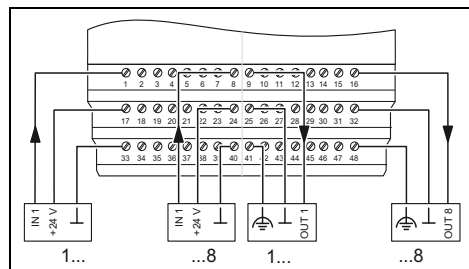
Technical data

IBS INTERBUS CLUB



Technical data

IBS INTERBUS CLUB



Technical data

INTERBUS remote bus  
9-pos. D-SUB plug/socket

24 V DC  
18.5 V DC ... 30.5 V DC (including ripple)

Screw connection

- 
- 
- 
- 
- 
- 

Screw connection  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
470 g

INTERBUS remote bus  
9-pos. D-SUB plug/socket

24 V DC  
20 V DC ... 30 V DC (including ripple)

Screw connection

- 
- 
- 
- 
- 
- 

Screw connection  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
470 g

INTERBUS remote bus  
9-pos. D-SUB plug/socket

24 V DC  
18.5 V DC ... 30.5 V DC (including ripple)

3-wire

8  
Overload protection

3-wire  
8  
500 mA  
4 A  
Short-circuit protection  
Overload protection

Screw connection  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
690 g

Ordering data

Type	Order No.	Pcs. / Pkt.
IBS ST 24 BK-T1)	2754341	1

Ordering data

Type	Order No.	Pcs. / Pkt.
IBS ST 24 BK RB-T1)	2753504	1
IBS ST 24 BK LB-T1)	2753232	1

Ordering data

Type	Order No.	Pcs. / Pkt.
IBS ST 24 BK DIO 8/8/3-T1)	2752411	1

Accessories

IB ST LBC	2836492	10
EB 84 IB ST BU	2836269	5
EB 84 IB ST RD	2836272	5

Accessories

IB ST LBC	2836492	10
EB 84 IB ST BU	2836269	5
EB 84 IB ST RD	2836272	5

Accessories

IB ST LBC	2836492	10
EB 84 IB ST BU	2836269	5
EB 84 IB ST RD	2836272	5

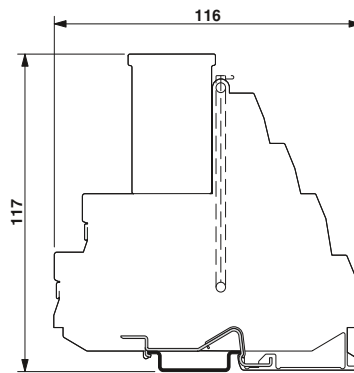
### Digital input and output modules

The digital ST I/O modules are available in various versions:

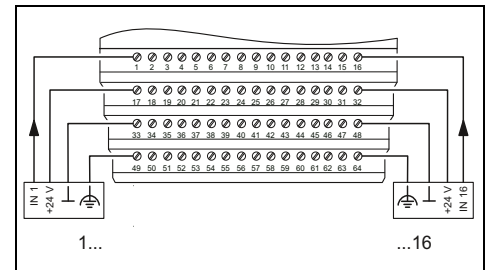
- Digital inputs with basic functions (BDI)
- Digital inputs with extended functions (DI)
- Digital outputs with basic functions (BDO)
- Digital outputs with extended functions (DO)
- Relay outputs (DO..R)
- Digital I/O modules (inputs and outputs)

**Notes:**

1) EMC: Class A product, see page 553



16/32 inputs



Local bus interface	
Name	
Connection method	
Power supply for module electronics	
Supply voltage	
Supply voltage range	
Digital inputs	
Connection technology	
Maximum number of inputs	
Typical response time	
Protective circuit	
Digital outputs	
Connection technology	
Maximum number of outputs	
Maximum output current per channel	
Maximum output current per module / terminal block	
Protective circuit	
General data	
Connection method	
Connection data solid/stranded/AWG	
Weight	
Width	

Technical data	
IB ST 24 BDI 16/4 <sup>1)</sup>	IB ST 24 DI32/2 <sup>1)</sup>
ST local bus ST local bus plug	
24 V DC 20 V DC ... 30 V DC (including ripple)	
4-wire	2-wire
16	32
50 µs	3 ms (typical)
-	-
-	-
-	-
-	-
Screw connection	
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
755 g	740 g
118 mm	

Description
<b>INTERBUS-ST digital input module</b> , consisting of: terminal part with screw connection and module electronics
- 16 inputs, basic function
- 16 inputs
- 32 inputs
<b>INTERBUS-ST digital output module</b> , consisting of: terminal part with screw connection and module electronics
- Eight outputs, 2 A
- 16 outputs, 500 mA
- 32 outputs
- 32 outputs
- 16 relay N/O contact outputs
<b>INTERBUS-ST digital input/output module</b> , consisting of: terminal part with screw connection and module electronics
- Eight inputs, eight relay PDT outputs
- Eight inputs, eight outputs, 2 A

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB ST 24 BDI 16/4 <sup>1)</sup>	2750170	1
IB ST 24 DI 16/4 <sup>1)</sup>	2754338	1
IB ST 24 DI32/2 <sup>1)</sup>	2754927	1



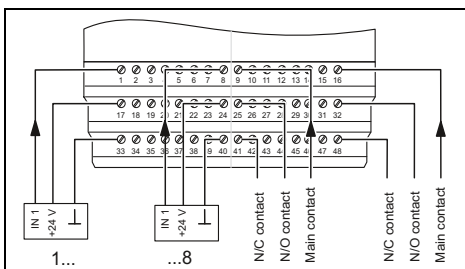
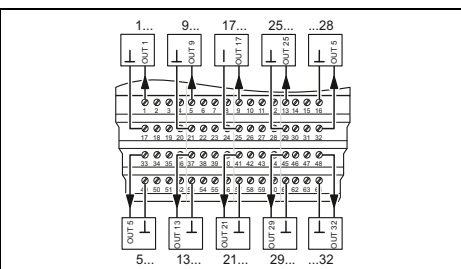
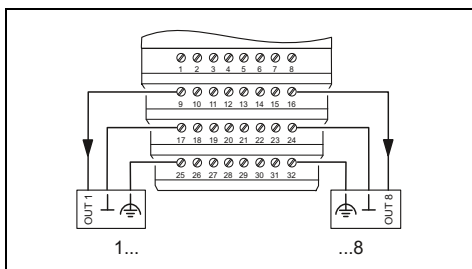
8/16 outputs



16/32 outputs



8 inputs and 8 outputs



Technical data	
IB ST 24 DO 8/3-2A <sup>1)</sup>	IB ST 24 DO16/3 <sup>1)</sup>
ST local bus ST local bus plug	
24 V DC 20 V DC ... 30 V DC (including ripple)	
-	-
-	-
-	-
8	16
2 A	500 mA
10 A	8 A
Short-circuit protection	
Screw connection 0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12 770 g	
118 mm	

Technical data	
IB ST 24 BDO 32/2 <sup>1)</sup>	IB ST 24 DO16R/S <sup>1)</sup>
ST local bus ST local bus plug	
24 V DC 20 V DC ... 30 V DC (including ripple)	
-	-
-	-
-	-
2-wire	3-wire
32	16
500 mA	3 A
16 A	-
Short-circuit protection	Short-circuit protection
Current limit for 8 channels	
Screw connection 0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12 770 g	
118 mm	

Technical data	
IB ST 24 DIO 8/8/3 <sup>1)</sup>	IB ST 24 DIO 8/8/3-2A <sup>1)</sup>
ST local bus ST local bus plug	
24 V DC 20 V DC ... 30 V DC (including ripple)	
3-wire	8
3 ms (typ.)	
Overload protection	Overload protection
Short-circuit protection	
3 A	2 A
-	16 A
Short-circuit protection	Short-circuit protection
	Overload protection
Screw connection 0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12 770 g	
118 mm	

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB ST 24 DO 8/3-2A <sup>1)</sup>	2754891	1
IB ST 24 DO16/3 <sup>1)</sup>	2754914	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB ST 24 BDO 32/2 <sup>1)</sup>	2750824	1
IB ST 24 DO32/2 <sup>1)</sup>	2754325	1
IB ST 24 DO16R/S <sup>1)</sup>	2721112	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB ST 24 DIO 8/8/3 <sup>1)</sup>	2751849	1
IB ST 24 DIO 8/8/3-2A <sup>1)</sup>	2753708	1

### Analog input and output modules

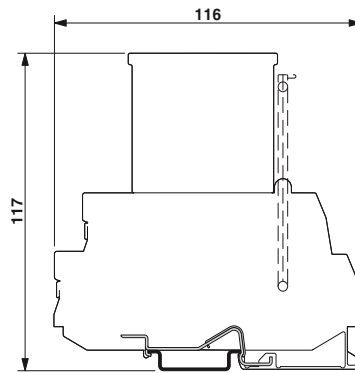
The analog I/O modules offer different functions depending on the module type.

#### Features:

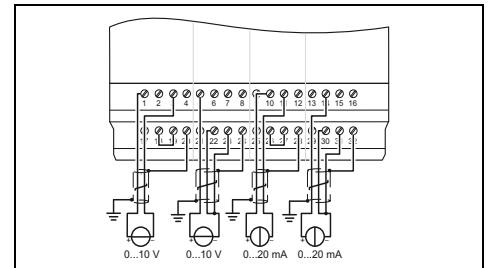
- 2, 4 or 8 channels
- Standard signal types (voltage and current)
- Temperature measurement modules

#### Notes:

1) EMC: Class A product, see page 553



2/4 inputs



#### Technical data

IB ST 24 BAI 2/SF<sup>1)</sup>      IB ST 24 AI 4/SF<sup>1)</sup>

ST local bus  
ST local bus plug

± 24 V DC 5% (ripple)  
20 V DC ... 30 V DC

2, 3-wire	2, 3, 4-wire
2	4

-

-

-

Screw connection

0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12

370 g      600 g

81 mm      118 mm

#### Ordering data

Interface
Name
Connection method
Power supply for module electronics
Supply voltage
Supply voltage range
Analog inputs
Connection technology
Number of inputs
Description of the inputs
Analog outputs
Connection technology
Number of outputs
General data
Connection method
Connection data solid/stranded/AWG
Weight
Width

Description	<p><b>INTERBUS-ST analog input module</b>, consisting of: terminal part with screw connection and module electronics</p> <ul style="list-style-type: none"> <li>- Two inputs, 0 - 20 mA, 4 - 20 mA, 0 - 10 V</li> <li>- Four inputs, 0 - 20 mA, 0 - 10 V</li> <li>- Four inputs, 4 - 20 mA, 0 - 10 V</li> <li>- Four inputs, 4 - 20 mA, ±10 V</li> <li>- Four inputs, 0 - 20 mA, 4 - 20 mA, 0 - 10 V</li> <li>- Eight inputs, 0 - 5 V, 0 - 10 V, 0 - 25 V, 0 - 50 V</li> <li>- Eight inputs, 0 - 20 mA, 4 - 20 mA, 0 - 40 mA, 0 - 60 mA</li> </ul> <p><b>INTERBUS-ST analog input module</b> for temperature and resistance measurement, consisting of: terminal part with screw connection and module electronics</p> <ul style="list-style-type: none"> <li>- Four inputs, RTD</li> </ul> <p><b>INTERBUS-ST analog output module</b>, consisting of: terminal part with screw connection and module electronics</p> <ul style="list-style-type: none"> <li>- Four outputs, 0 - 20 mA, 0 - 10 V</li> <li>- Four outputs, 4 - 20 mA, 0 - 10 V</li> <li>- Four outputs, 0 - 10 V</li> <li>- Eight outputs, 0 - 10 V, ±10 V, ±12 V</li> </ul>
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Type	Order No.	Pcs. / Pkt.
IB ST 24 BAI 2/SF <sup>1)</sup>	2722771	1
IB ST 24 AI 4/SF <sup>1)</sup>	2754309	1
IB ST 24 AI 4/SF <sup>1)</sup>	2750565	1
IB ST 24 AI 4/BP <sup>1)</sup>	2751564	1



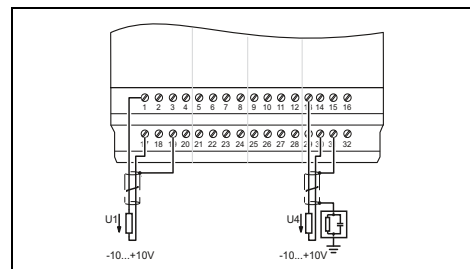
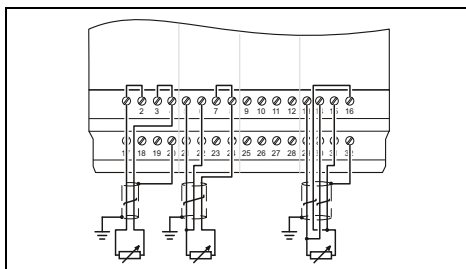
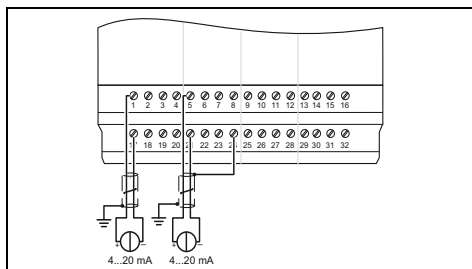
4/8 inputs



4 RTD inputs



4/8 outputs



Technical data		
IB ST 24 AI 4/I <sup>1)</sup>	IB ST 24 BAI 8/U <sup>1)</sup>	
ST local bus ST local bus plug		
± 24 V DC 5% (ripple) 18.5 V DC ... 30.2 V DC		
2-wire		
4		8
Differential input		-
-		
Screw connection 0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12		
465 g		600 g
118 mm		

Technical data		
ST local bus ST local bus plug		
24 V DC 18.5 V DC ... 30.2 V DC		
2, 3, 4-wire		
4		-
-		-
Screw connection 0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12		
540 g		118 mm

Technical data		
IB ST 24 AO 4/SF <sup>1)</sup>	IB ST 24 BAO 8/U <sup>1)</sup>	
ST local bus ST local bus plug		
24 V DC 18.5 V DC ... 30.5 V DC		
± 24 V DC 5% (ripple) 18.5 V DC ... 30.2 V DC		
-		
-		
-		
2-wire		
4		8
Screw connection 0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12		
600 g		118 mm

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB ST 24 AI 4/I <sup>1)</sup>	2719629	1
IB ST 24 BAI 8/U <sup>1)</sup>	2721015	1
IB ST 24 BAI 8/I <sup>1)</sup>	2721028	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB ST 24 PT100 4/I <sup>1)</sup>	2752767	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB ST 24 AO 4/SF <sup>1)</sup>	2754312	1
IB ST 24 AO 4/SF4 <sup>1)</sup>	2750578	1
IB ST 24 AO 4/BP <sup>1)</sup>	2752521	1
IB ST 24 BAO 8/U <sup>1)</sup>	2721044	1

### Product overview

#### Axioline I/O modules, metal, M12







	Digital input	Digital input/output		IO-Link
	16 channels	16 configurable channels	8/8 channels	8/4 channels
EtherCAT	Page 254			Page 255
EtherNet/IP	Page 258			Page 259
Modbus/TCP (UDP)	Page 262			Page 263
PROFINET	Page 266			Page 267
Sercos	Page 270			Page 271
PROFIBUS	Page 274			Page 275

#### Axioline I/O modules, plastic, M12



	Digital input	Digital input/output		IO-Link
	16 channels	16 configurable channels	8/8 channels	8/4 channels
EtherCAT	Page 256			Page 257
EtherNet/IP	Page 260			Page 261
Modbus/TCP (UDP)	Page 264			Page 265
PROFINET	Page 268			Page 269
Sercos	Page 272			Page 273
PROFIBUS	Page 276			Page 277

Axioline I/O M12 link devices					
 	Analog input		Analog output		Temperature recording
	1 channel Current input	1 channel Voltage input	1 channel Current output	1 channel Voltage output	1 channel RTD
	Page 278		Page 279		

Axioline I/O M12 link devices					
 	Analog input		Analog output		Temperature recording
	1 channel Current input	1 channel Voltage input	1 channel Current output	1 channel Voltage output	1 channel RTD
	Page 280		Page 281		



## For field installation (IP67) – Axioline E

### EtherCAT® Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

#### Features:

- Rugged metal housing
- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device

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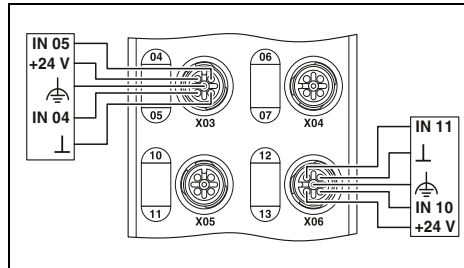


16 digital inputs

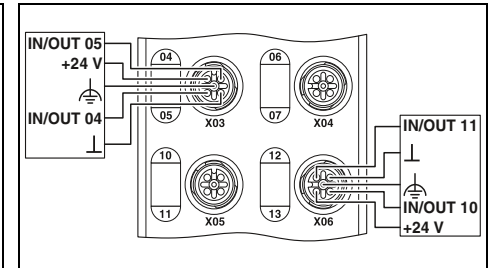
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16 configurable inputs or outputs



Technical data



Technical data

Interface
Fieldbus system
Connection method
Transmission speed
Power supply for module electronics
Supply voltage
Connection method
Supply voltage range

EtherCAT®
M12, D-coded
100 Mbps
24 V DC
M12 plug-in connector (T-coded)
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

EtherCAT®
M12, D-coded
100 Mbps
24 V DC
M12 plug-in connector (T-coded)
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

Digital inputs
Connection method
Connection technology
Maximum number of inputs
Filter time
Input characteristic curve
Protective circuit

M12 plug-in connector, double occupancy
2, 3, 4-wire
16
1 ms
IEC 61131-2 type 1 and type 3
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy
2, 3, 4-wire
16
1 ms
IEC 61131-2 type 1 and type 3
Overload protection, short-circuit protection of sensor supply

Digital outputs
Connection method
Connection technology
Maximum number of outputs
Maximum output current per channel
Protective circuit

-
-
-
-
-

M12 plug-in connector, double occupancy
2, 3-wire
16
500 mA
Overload protection, short-circuit protection of outputs

IO-Link ports
Connection method
Connection technology
Number of ports
IO-Link port supply
I/O supply voltage
Nominal current for every IO-Link port
Protective circuit

-
-
-
-
-
-
-

-
-
-
-
-
-
-

General data
Weight
Drill hole spacing
Width
Height
Depth
Degree of protection
Ambient temperature (operation)

750 g
198.5 mm
59.8 mm
185 mm
37.8 mm
IP65/67
-25 °C ... 60 °C

750 g
198.5 mm
59.8 mm
185 mm
37.8 mm
IP65/67
-25 °C ... 60 °C

#### Ordering data

Description
<b>Axioline I/O device</b>
- Digital inputs
- Digital inputs/outputs
- IO-Link ports and digital inputs

Type	Order No.	Pcs. / Pkt.
<b>AXL E EC DI16 M12 6M</b>	<b>2701526</b>	1

#### Ordering data

Type	Order No.	Pcs. / Pkt.
<b>AXL E EC DIO16 M12 6M</b>	<b>2701528</b>	1

N



8 digital inputs and 8 digital outputs

N

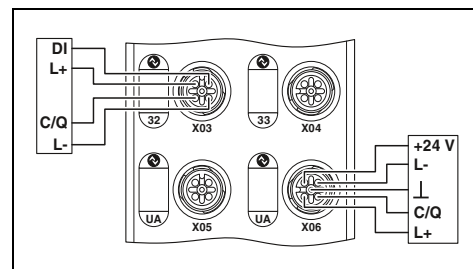
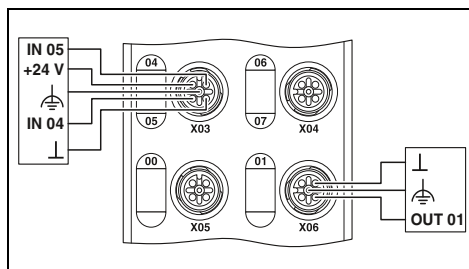
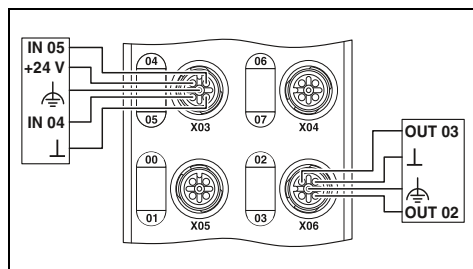


8 digital inputs and 4 digital outputs

N



8 IO-Link ports, 4 digital inputs



Technical data

Technical data

Technical data

EtherCAT®  
M12, D-coded  
100 Mbps

EtherCAT®  
M12, D-coded  
100 Mbps  
24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

EtherCAT®  
M12, D-coded  
100 Mbps  
24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Overload protection, short-circuit protection of outputs

M12 plug-in connector, (A-coded)  
2, 3-wire  
4  
2 A  
Overload protection, short-circuit protection of outputs

M12 plug-in connector  
3, 5-wire  
8  
24 V DC  
200 mA  
Overload protection, electronic in the device

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E EC DI8 DO8 M12 6M	2701525	1

Type	Order No.	Pcs. / Pkt.
AXL E EC DI8 DO4 2A M12 6M	2701529	1

Type	Order No.	Pcs. / Pkt.
AXL E EC IOL8 DI4 M12 6M	2701531	1

## For field installation (IP67) – Axioline E

### EtherCAT® Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

#### Features:

- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device

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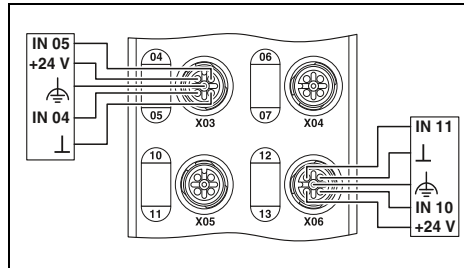


16 digital inputs

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Technology Group



16 configurable inputs or outputs



#### Technical data

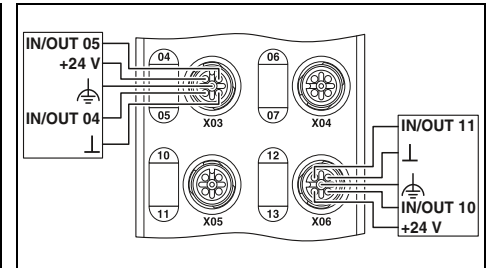
Interface	
Fieldbus system	EtherCAT®
Connection method	M12, D-coded
Transmission speed	100 Mbps
Power supply for module electronics	
Supply voltage	24 V DC
Connection method	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)

Digital inputs	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire
Maximum number of inputs	16
Filter time	1 ms
Input characteristic curve	IEC 61131-2 type 1 and type 3
Protective circuit	Overload protection, short-circuit protection of sensor supply

Digital outputs	
Connection method	-
Connection method	-
Maximum number of outputs	-
Maximum output current per channel	-
Protective circuit	-

IO-Link ports	
Connection method	-
Connection method	-
Number of ports	-
IO-Link port supply	-
I/O supply voltage	-
Nominal current for every IO-Link port	-
Protective circuit	-

General data	
Weight	480 g
Drill hole spacing	198.5 mm
Width	59.8 mm
Height	204.6 mm
Depth	31.3 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C



#### Technical data

Interface	
Fieldbus system	EtherCAT®
Connection method	M12, D-coded
Transmission speed	100 Mbps
Power supply for module electronics	
Supply voltage	24 V DC
Connection method	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)

Digital inputs	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire
Maximum number of inputs	16
Filter time	1 ms
Input characteristic curve	IEC 61131-2 type 1 and type 3
Protective circuit	Overload protection, short-circuit protection of sensor supply

Digital outputs	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3-wire
Maximum number of outputs	16
Maximum output current per channel	500 mA
Protective circuit	Overload protection, short-circuit protection of outputs

IO-Link ports	
Connection method	-
Connection method	-
Number of ports	-
IO-Link port supply	-
I/O supply voltage	-
Nominal current for every IO-Link port	-
Protective circuit	-

General data	
Weight	480 g
Drill hole spacing	198.5 mm
Width	59.8 mm
Height	204.6 mm
Depth	31.3 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Axioline I/O device</b>			
- Digital inputs	<b>AXL E EC DI16 M12 6P</b>	<b>2701521</b>	<b>1</b>
- Digital inputs/outputs			
- IO-Link ports and digital inputs			

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Axioline I/O device</b>			
- Digital inputs	<b>AXL E EC DIO16 M12 6P</b>	<b>2701522</b>	<b>1</b>
- Digital inputs/outputs			
- IO-Link ports and digital inputs			

For field installation (IP67) – Axioline E



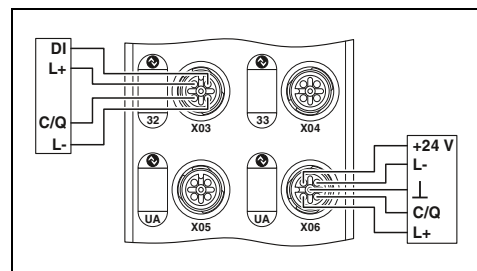
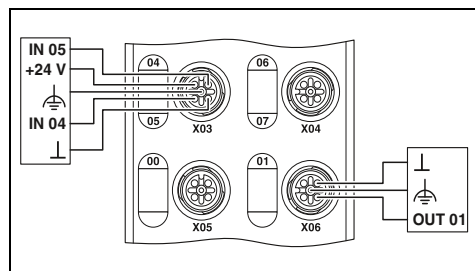
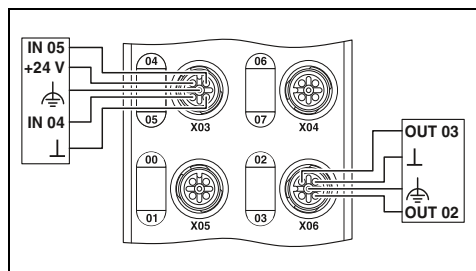
8 digital inputs and 8 digital outputs



8 digital inputs and 4 digital outputs



8 IO-Link ports, 4 digital inputs



Technical data
EtherCAT® M12, D-coded 100 Mbps
24 V DC M12 plug-in connector (T-coded) 18 V DC ... 31.2 V DC (including all tolerances, including ripple)
M12 plug-in connector, double occupancy 2, 3, 4-wire 8 1 ms IEC 61131-2 type 1 and type 3 Overload protection, short-circuit protection of sensor supply
M12 plug-in connector, double occupancy 2, 3-wire 8 500 mA Overload protection, short-circuit protection of outputs
-
-
-
480 g 198.5 mm 59.8 mm 204.6 mm 31.3 mm IP65/67 -25 °C ... 60 °C

Technical data
EtherCAT® M12, D-coded 100 Mbps
24 V DC M12 plug-in connector (T-coded) 18 V DC ... 31.2 V DC (including all tolerances, including ripple)
M12 plug-in connector, double occupancy 2, 3, 4-wire 8 1 ms IEC 61131-2 type 1 and type 3 Overload protection, short-circuit protection of sensor supply
M12 plug-in connector, (A-coded) 2, 3-wire 4 2 A Overload protection, short-circuit protection of outputs
-
-
-
480 g 198.5 mm 59.8 mm 204.6 mm 31.3 mm IP65/67 -25 °C ... 60 °C

Technical data
EtherCAT® M12, D-coded 100 Mbps
24 V DC M12 plug-in connector (T-coded) 18 V DC ... 31.2 V DC (including all tolerances, including ripple)
M12 plug-in connector, double occupancy 2, 3, 4-wire 4 3 ms IEC 61131-2 type 1 Protection against polarity reversal
-
-
-
M12 plug-in connector 3, 5-wire 8
24 V DC 200 mA Overload protection, electronics in the device
480 g 198.5 mm 59.8 mm 204.6 mm 31.3 mm IP65/67 -25 °C ... 60 °C

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXLE EC DI8 DO8 M12 6P	2701520	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXLE EC DI8 DO4 2A M12 6P	2701523	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXLE EC IOL8 DI4 M12 6P	2701524	1

## For field installation (IP67) – Axioline E

### EtherNet/IP™ Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

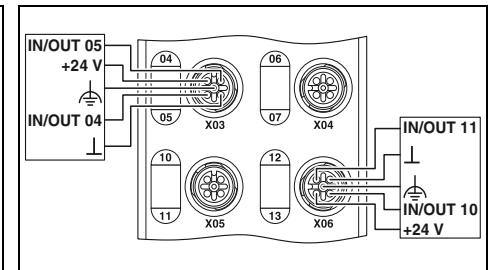
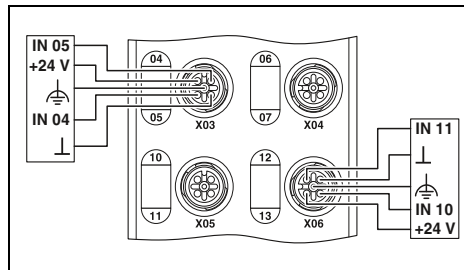
#### Features:

- Rugged metal housing
- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device



#### Technical data

#### Technical data

Interface
Fieldbus system
Connection method
Transmission speed
Power supply for module electronics
Supply voltage
Connection method
Supply voltage range

EtherNet/IP™
M12 plug-in connectors, D-coded
10/100 Mbps, autonegotiation
24 V DC
M12 plug-in connector (T-coded)
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

EtherNet/IP™
M12 plug-in connectors, D-coded
10/100 Mbps, autonegotiation
24 V DC
M12 plug-in connector (T-coded)
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

Digital inputs
Connection method
Connection method
Maximum number of inputs
Filter time
Input characteristic curve
Protective circuit

M12 plug-in connector, double occupancy
2, 3, 4-wire
16
1 ms
IEC 61131-2 type 1 and type 3
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy
2, 3, 4-wire
16
1 ms
IEC 61131-2 type 1 and type 3
Overload protection, short-circuit protection of sensor supply

Digital outputs
Connection method
Connection method
Maximum number of outputs
Maximum output current per channel
Protective circuit

-
-
-
-
-

M12 plug-in connector, double occupancy
2, 3-wire
16
500 mA
Overload protection, short-circuit protection of outputs

IO-Link ports
Connection method
Connection method
Number of ports
IO-Link port supply
I/O supply voltage
Nominal current for every IO-Link port
Protective circuit

-
-
-
-
-
-
-

-
-
-
-
-
-
-

General data
Weight
Drill hole spacing
Width
Height
Depth
Degree of protection
Ambient temperature (operation)

750 g
198.5 mm
59.8 mm
185 mm
37.8 mm
IP65/67
-25 °C ... 60 °C

750 g
198.5 mm
59.8 mm
185 mm
37.8 mm
IP65/67
-25 °C ... 60 °C

#### Ordering data

#### Ordering data

Description
<b>Axioline I/O device</b>
- Digital inputs
- Digital inputs/outputs
- IO-Link ports and digital inputs

Type	Order No.	Pcs. / Pkt.
<b>AXL E EIP DI16 M12 6M</b>	<b>2701488</b>	1

Type	Order No.	Pcs. / Pkt.
<b>AXL E EIP DIO16 M12 6M</b>	<b>2701489</b>	1

N



8 digital inputs and 8 digital outputs

N

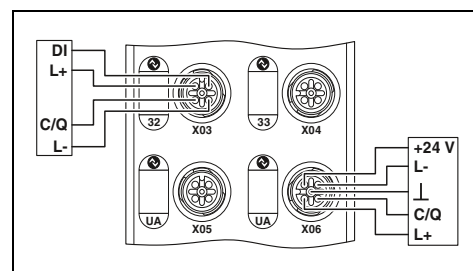
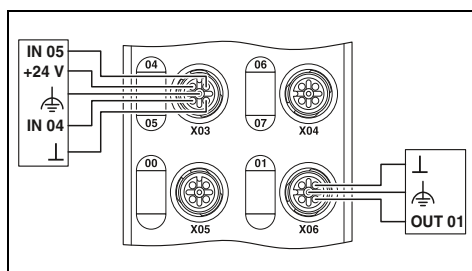
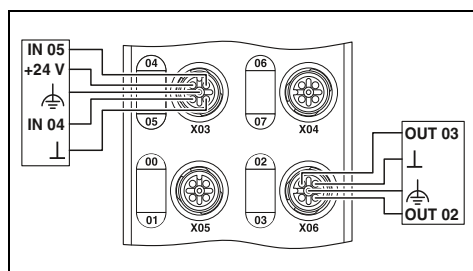


8 digital inputs and 4 digital outputs

N



8 IO-Link ports, 4 digital inputs



Technical data

Technical data

Technical data

EtherNet/IP™  
M12 plug-in connectors, D-coded  
10/100 Mbps, autonegotiation

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

EtherNet/IP™  
M12 plug-in connectors, D-coded  
10/100 Mbps, autonegotiation

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

EtherNet/IP™  
M12 plug-in connectors, D-coded  
10/100 Mbps, autonegotiation

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Overload protection, short-circuit protection of outputs

M12 plug-in connector, (A-coded)  
2, 3-wire  
4  
2 A  
Overload protection, short-circuit protection of outputs

-  
-  
-

M12 plug-in connector  
3, 5-wire  
8  
24 V DC  
200 mA  
Overload protection, electronics in the device

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E EIP DI8 DO8 M12 6M	2701487	1

Type	Order No.	Pcs. / Pkt.
AXL E EIP DI8 DO4 2A M12 6M	2701490	1

Type	Order No.	Pcs. / Pkt.
AXL E EIP IOL8 DI4 M12 6M	2701491	1

## For field installation (IP67) – Axioline E

### EtherNet/IP™ Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

#### Features:

- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

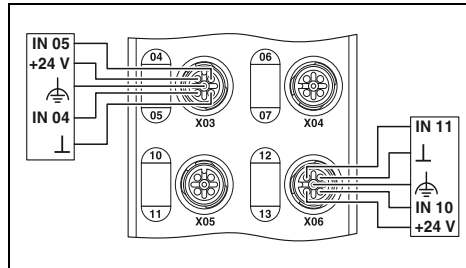
- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device



16 digital inputs

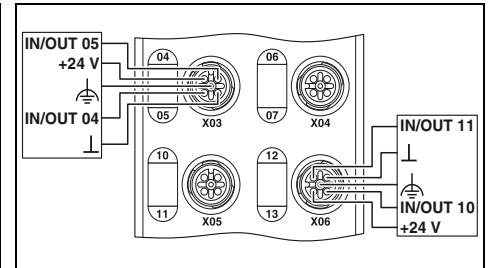


16 configurable inputs or outputs



#### Technical data

Interface	EtherNet/IP™
Fieldbus system	M12 plug-in connectors, D-coded
Connection method	10/100 Mbps, autonegotiation
Transmission speed	
Power supply for module electronics	
Supply voltage	24 V DC
Connection method	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)



#### Technical data

Interface	EtherNet/IP™
Fieldbus system	M12 plug-in connectors, D-coded
Connection method	10/100 Mbps, autonegotiation
Transmission speed	
Power supply for module electronics	
Supply voltage	24 V DC
Connection method	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)

Digital inputs	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire
Maximum number of inputs	16
Filter time	1 ms
Input characteristic curve	IEC 61131-2 type 1 and type 3
Protective circuit	Overload protection, short-circuit protection of sensor supply

Digital inputs	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire
Maximum number of inputs	16
Filter time	1 ms
Input characteristic curve	IEC 61131-2 type 1 and type 3
Protective circuit	Overload protection, short-circuit protection of sensor supply

Digital outputs	
Connection method	-
Connection method	-
Maximum number of outputs	-
Maximum output current per channel	500 mA
Protective circuit	Overload protection, short-circuit protection of outputs

IO-Link ports	
Connection method	-
Connection method	-
Number of ports	-
IO-Link port supply	-
I/O supply voltage	-
Nominal current for every IO-Link port	-
Protective circuit	-

General data	
Weight	480 g
Drill hole spacing	198.5 mm
Width	59.8 mm
Height	204.6 mm
Depth	31.3 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Axioline I/O device</b>			
- Digital inputs			
- Digital inputs/outputs			
- IO-Link ports and digital inputs	<b>AXL E EIP DI16 M12 6P</b>	<b>2701493</b>	1

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Axioline I/O device</b>			
- Digital inputs			
- Digital inputs/outputs			
- IO-Link ports and digital inputs	<b>AXL E EIP DIO16 M12 6P</b>	<b>2701494</b>	1



N



8 digital inputs and 8 digital outputs

N

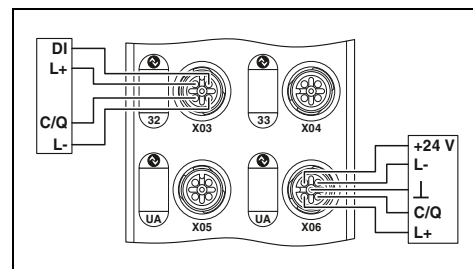
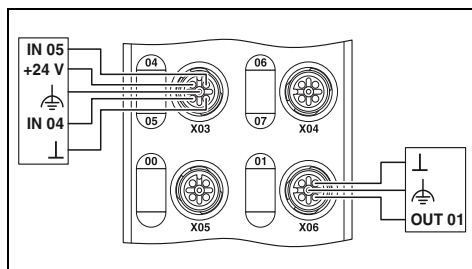
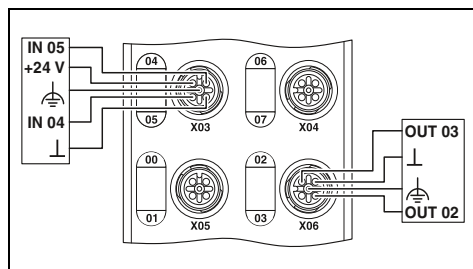


8 digital inputs and 4 digital outputs

N



8 IO-Link ports, 4 digital inputs



Technical data

EtherNet/IP™  
M12 plug-in connectors, D-coded  
10/100 Mbps, autonegotiation

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Overload protection, short-circuit protection of outputs

-  
-  
-

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E EIP DI8 DO8 M12 6P	2701492	1

Technical data

EtherNet/IP™  
M12 plug-in connectors, D-coded  
10/100 Mbps, autonegotiation

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, (A-coded)  
2, 3-wire  
4  
2 A  
Overload protection, short-circuit protection of outputs

-  
-  
-

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E EIP DI8 DO4 2A M12 6P	2701495	1

Technical data

EtherNet/IP™  
M12 plug-in connectors, D-coded  
10/100 Mbps, autonegotiation

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

-  
-  
-

M12 plug-in connector  
3, 5-wire  
8  
24 V DC  
200 mA  
Overload protection, electronic in the device

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E EIP IOL8 DI4 M12 6P	2701496	1

### Modbus TCP Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

#### Features:

- Rugged metal housing
- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device

Modbus/TCP (UDP)

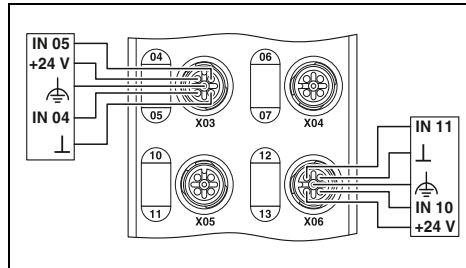


16 digital inputs

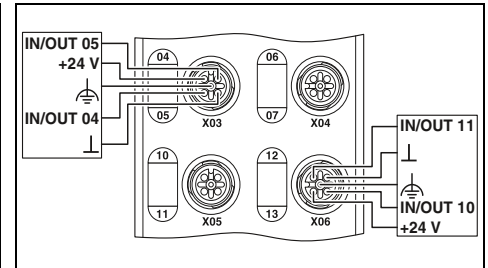
Modbus/TCP (UDP)



16 configurable inputs or outputs



Technical data



Technical data

Interface
Fieldbus system
Connection method
Transmission speed
Power supply for module electronics
Supply voltage
Connection method
Supply voltage range

Ethernet
M12, D-coded
100 Mbps
24 V DC
M12 plug-in connector (T-coded)
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

Ethernet
M12, D-coded
100 Mbps
24 V DC
M12 plug-in connector (T-coded)
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

Digital inputs
Connection method
Connection method
Maximum number of inputs
Filter time
Input characteristic curve
Protective circuit

M12 plug-in connector, double occupancy
2, 3, 4-wire
16
1 ms
IEC 61131-2 type 1 and type 3
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy
2, 3, 4-wire
16
1 ms
IEC 61131-2 type 1 and type 3
Overload protection, short-circuit protection of sensor supply

Digital outputs
Connection method
Connection method
Maximum number of outputs
Maximum output current per channel
Protective circuit

-
-
-
-
-

M12 plug-in connector, double occupancy
2, 3-wire
16
500 mA
Overload protection, short-circuit protection of outputs

IO-Link ports
Connection method
Connection method
Number of ports
IO-Link port supply
I/O supply voltage
Nominal current for every IO-Link port
Protective circuit

-
-
-
-
-
-
-

-
-
-
-
-
-
-

General data
Weight
Drill hole spacing
Width
Height
Depth
Degree of protection
Ambient temperature (operation)

750 g
198.5 mm
59.8 mm
185 mm
37.8 mm
IP65/67
-25 °C ... 60 °C

750 g
198.5 mm
59.8 mm
185 mm
37.8 mm
IP65/67
-25 °C ... 60 °C

Ordering data

Description
<b>Axioline I/O device</b>
- Digital inputs
- Digital inputs/outputs
- IO-Link ports and digital inputs

Type	Order No.	Pcs. / Pkt.
<b>AXL E ETH DI16 M12 6M</b>	<b>2701538</b>	1

Ordering data

Type	Order No.	Pcs. / Pkt.
<b>AXL E ETH DIO16 M12 6M</b>	<b>2701539</b>	1

N



Modbus/TCP (UDP)

8 digital inputs and 8 digital outputs

N



Modbus/TCP (UDP)

8 digital inputs and 4 digital outputs

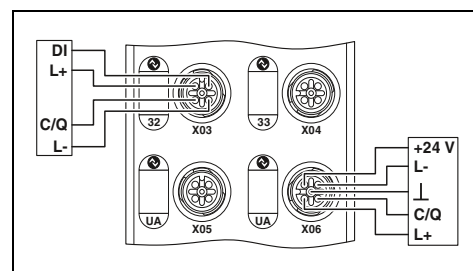
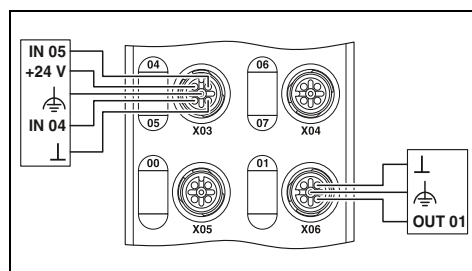
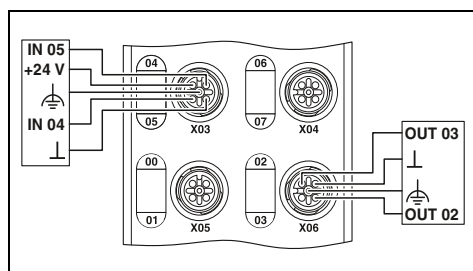
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Modbus/TCP (UDP)

IO-Link

8 IO-Link ports, 4 digital inputs



Technical data

Ethernet  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Overload protection, short-circuit protection of outputs

-  
-  
-

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E ETH DI8 DO8 M12 6M	2701537	1

Technical data

Ethernet  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, (A-coded)  
2, 3-wire  
4  
2 A  
Overload protection, short-circuit protection of outputs

-  
-  
-

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E ETH DI8 DO4 2A M12 6M	2701540	1

Technical data

Ethernet  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

-  
-  
-  
-

M12 plug-in connector  
3, 5-wire  
8  
24 V DC  
200 mA  
Overload protection, electronics in the device

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E ETH IOL8 DI4 M12 6M	2701541	1

### Modbus TCP Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

#### Features:

- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device

Modbus/TCP (UDP)

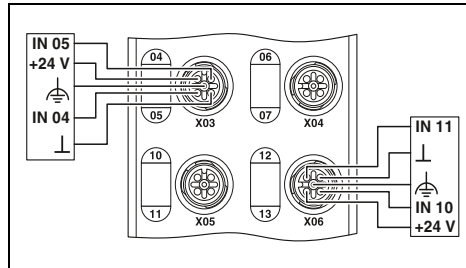


16 digital inputs

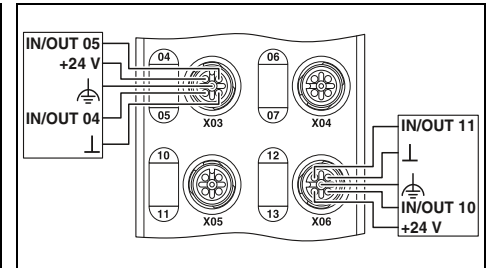
Modbus/TCP (UDP)



16 configurable inputs or outputs



Technical data



Technical data

<b>Interface</b>	
Fieldbus system	Ethernet
Connection method	M12, D-coded
Transmission speed	100 Mbps
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Connection method	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)
<b>Digital inputs</b>	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire
Maximum number of inputs	16
Filter time	1 ms
Input characteristic curve	IEC 61131-2 type 1 and type 3
Protective circuit	Overload protection, short-circuit protection of sensor supply
<b>Digital outputs</b>	
Connection method	-
Connection method	-
Maximum number of outputs	-
Maximum output current per channel	-
Protective circuit	-
<b>IO-Link ports</b>	
Connection method	-
Connection method	-
Number of ports	-
IO-Link port supply	-
I/O supply voltage	-
Nominal current for every IO-Link port	-
Protective circuit	-
<b>General data</b>	
Weight	480 g
Drill hole spacing	198.5 mm
Width	59.8 mm
Height	204.6 mm
Depth	31.3 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

<b>Technical data</b>		
Ethernet		
M12, D-coded		
100 Mbps		
<b>Power supply for module electronics</b>		
24 V DC		
M12 plug-in connector (T-coded)		
18 V DC ... 31.2 V DC (including all tolerances, including ripple)		
<b>Digital inputs</b>		
M12 plug-in connector, double occupancy		
2, 3, 4-wire		
16		
1 ms		
IEC 61131-2 type 1 and type 3		
Overload protection, short-circuit protection of sensor supply		
<b>Digital outputs</b>		
-		
-		
-		
-		
-		
<b>IO-Link ports</b>		
-		
-		
-		
-		
-		
-		
<b>General data</b>		
480 g		
198.5 mm		
59.8 mm		
204.6 mm		
31.3 mm		
IP65/67		
-25 °C ... 60 °C		

<b>Technical data</b>		
Ethernet		
M12, D-coded		
100 Mbps		
<b>Power supply for module electronics</b>		
24 V DC		
M12 plug-in connector (T-coded)		
18 V DC ... 31.2 V DC (including all tolerances, including ripple)		
<b>Digital inputs</b>		
M12 plug-in connector, double occupancy		
2, 3, 4-wire		
16		
1 ms		
IEC 61131-2 type 1 and type 3		
Overload protection, short-circuit protection of sensor supply		
<b>Digital outputs</b>		
M12 plug-in connector, double occupancy		
2, 3-wire		
16		
500 mA		
Overload protection, short-circuit protection of outputs		
<b>IO-Link ports</b>		
-		
-		
-		
-		
-		
-		
<b>General data</b>		
480 g		
198.5 mm		
59.8 mm		
204.6 mm		
31.3 mm		
IP65/67		
-25 °C ... 60 °C		

<b>Ordering data</b>	
Description	
<b>Axioline I/O device</b>	
- Digital inputs	
- Digital inputs/outputs	
- IO-Link ports and digital inputs	

Type	Order No.	Pcs. / Pkt.
AXL E ETH DI16 M12 6P	2701533	1

Type	Order No.	Pcs. / Pkt.
AXL E ETH DIO16 M12 6P	2701534	1

N



Modbus/TCP (UDP)

8 digital inputs and 8 digital outputs

N



Modbus/TCP (UDP)

8 digital inputs and 4 digital outputs

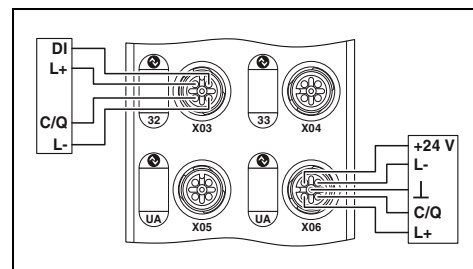
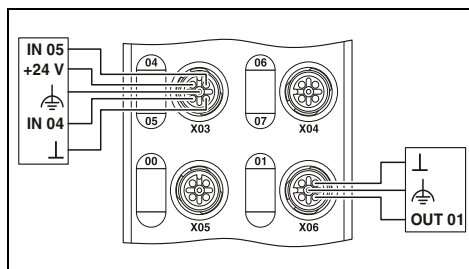
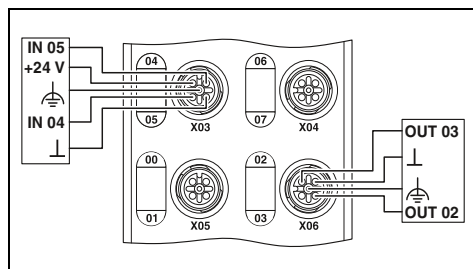
N



Modbus/TCP (UDP)

IO-Link

8 IO-Link ports, 4 digital inputs



Technical data

Ethernet  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Overload protection, short-circuit protection of outputs

-  
-  
-

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E ETH DI8 DO8 M12 6P	2701532	1

Technical data

Ethernet  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, (A-coded)  
2, 3-wire  
4  
2 A  
Overload protection, short-circuit protection of outputs

-  
-  
-

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E ETH DI8 DO4 2A M12 6P	2701535	1

Technical data

Ethernet  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

-  
-  
-  
-

M12 plug-in connector  
3, 5-wire  
8  
24 V DC  
200 mA  
Overload protection, electronics in the device

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E ETH IOL8 DI4 M12 6P	2701536	1

### PROFINET Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

#### Features:

- Rugged metal housing
- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

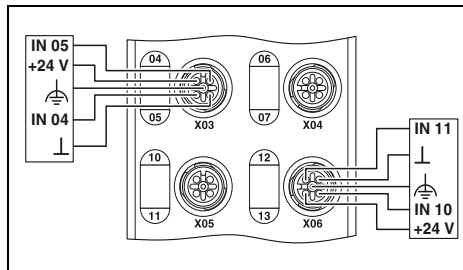
- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device



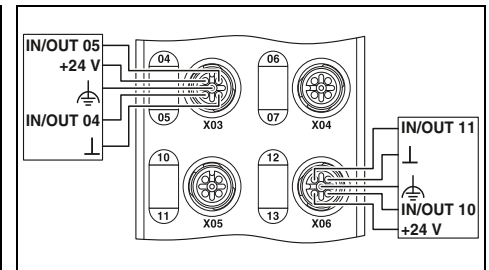
16 digital inputs



16 configurable inputs or outputs



Technical data



Technical data

Interface
Fieldbus system
Connection method
Transmission speed
Power supply for module electronics
Supply voltage
Connection method
Supply voltage range

PROFINET
M12, D-coded
100 Mbps
24 V DC
M12 plug-in connector (T-coded)
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

PROFINET
M12, D-coded
100 Mbps
24 V DC
M12 plug-in connector (T-coded)
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

Digital inputs
Connection method
Connection method
Maximum number of inputs
Filter time
Input characteristic curve
Protective circuit

M12 plug-in connector, double occupancy
2, 3, 4-wire
16
1 ms
IEC 61131-2 type 1 and type 3
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy
2, 3, 4-wire
16
1 ms
IEC 61131-2 type 1 and type 3
Overload protection, short-circuit protection of sensor supply

Digital outputs
Connection method
Connection method
Maximum number of outputs
Maximum output current per channel
Protective circuit

-
-
-
-
-

M12 plug-in connector, double occupancy
2, 3-wire
16
500 mA
Overload protection, short-circuit protection of outputs

IO-Link ports
Connection method
Connection method
Number of ports
IO-Link port supply
I/O supply voltage
Nominal current for every IO-Link port
Protective circuit

-
-
-
-
-
-
-

-
-
-
-
-
-
-

General data
Weight
Drill hole spacing
Width
Height
Depth
Degree of protection
Ambient temperature (operation)

750 g
198.5 mm
59.8 mm
185 mm
37.8 mm
IP65/67
-25 °C ... 60 °C

750 g
198.5 mm
59.8 mm
185 mm
37.8 mm
IP65/67
-25 °C ... 60 °C

Ordering data

Description
<b>Axioline I/O device</b>
- Digital inputs
- Digital inputs/outputs
- IO-Link ports and digital inputs

Type	Order No.	Pcs. / Pkt.
AXL E PN DI16 M12 6M	2701516	1

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E PN DIO16 M12 6M	2701517	1

PROFINET



8 digital inputs and 8 digital outputs

PROFINET



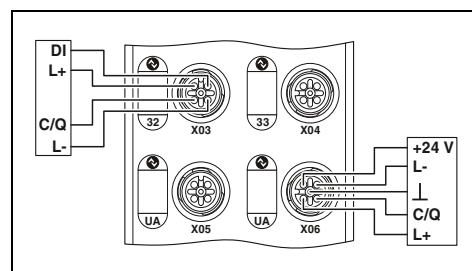
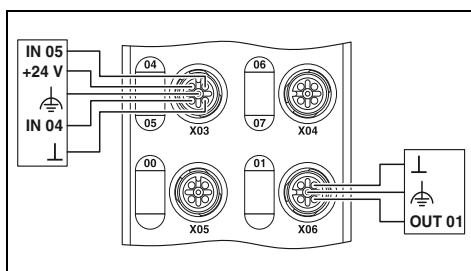
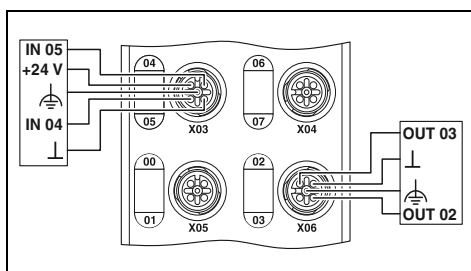
8 digital inputs and 4 digital outputs

PROFINET

IO-Link



8 IO-Link ports, 4 digital inputs



Technical data

PROFINET  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Overload protection, short-circuit protection of outputs

-  
-  
-  
-  
-

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E PN DI8 DO8 M12 6M	2701515	1

Technical data

PROFINET  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, (A-coded)  
2, 3-wire  
8  
2 A  
Overload protection, short-circuit protection of outputs

-  
-  
-  
-  
-

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E PN DI8 DO4 2A M12 6M	2701518	1

Technical data

PROFINET  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

-  
-  
-  
-

M12 plug-in connector  
3, 5-wire  
8  
24 V DC  
200 mA  
Overload protection, electronics in the device

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E PN IOL8 DI4 M12 6M	2701519	1



### PROFINET Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

#### Features:

- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

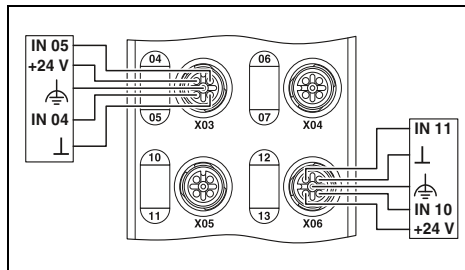
- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device



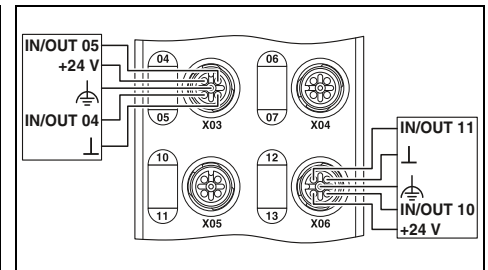
16 digital inputs



16 configurable inputs or outputs



Technical data



Technical data

<b>Interface</b>	
Fieldbus system	PROFINET
Connection method	M12, D-coded
Transmission speed	100 Mbps
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Connection method	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)
<b>Digital inputs</b>	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire
Maximum number of inputs	16
Filter time	1 ms
Input characteristic curve	IEC 61131-2 type 1 and type 3
Protective circuit	Overload protection, short-circuit protection of sensor supply
<b>Digital outputs</b>	
Connection method	-
Connection method	-
Maximum number of outputs	-
Maximum output current per channel	-
Protective circuit	-
<b>IO-Link ports</b>	
Connection method	-
Connection method	-
Number of ports	-
IO-Link port supply	-
I/O supply voltage	-
Nominal current for every IO-Link port	-
Protective circuit	-
<b>General data</b>	
Weight	480 g
Drill hole spacing	198.5 mm
Width	59.8 mm
Height	204.6 mm
Depth	31.3 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

<b>Technical data</b>		
PROFINET		
M12, D-coded		
100 Mbps		
<b>Power supply for module electronics</b>		
24 V DC		
M12 plug-in connector (T-coded)		
18 V DC ... 31.2 V DC (including all tolerances, including ripple)		
<b>Digital inputs</b>		
M12 plug-in connector, double occupancy		
2, 3, 4-wire		
16		
1 ms		
IEC 61131-2 type 1 and type 3		
Overload protection, short-circuit protection of sensor supply		
<b>Digital outputs</b>		
-		
-		
-		
-		
-		
<b>IO-Link ports</b>		
-		
-		
-		
-		
-		
<b>General data</b>		
480 g		
198.5 mm		
59.8 mm		
204.6 mm		
31.3 mm		
IP65/67		
-25 °C ... 60 °C		

<b>Technical data</b>		
PROFINET		
M12, D-coded		
100 Mbps		
<b>Power supply for module electronics</b>		
24 V DC		
M12 plug-in connector (T-coded)		
18 V DC ... 31.2 V DC (including all tolerances, including ripple)		
<b>Digital inputs</b>		
M12 plug-in connector, double occupancy		
2, 3, 4-wire		
16		
1 ms		
IEC 61131-2 type 1 and type 3		
Overload protection, short-circuit protection of sensor supply		
<b>Digital outputs</b>		
M12 plug-in connector, double occupancy		
2, 3-wire		
16		
500 mA		
Overload protection, short-circuit protection of outputs		
<b>IO-Link ports</b>		
-		
-		
-		
-		
-		
<b>General data</b>		
480 g		
198.5 mm		
59.8 mm		
204.6 mm		
31.3 mm		
IP65/67		
-25 °C ... 60 °C		

<b>Ordering data</b>	
Description	
<b>Axioline I/O device</b>	
- Digital inputs	
- Digital inputs/outputs	
- IO-Link ports and digital inputs	

<b>Ordering data</b>		
Type	Order No.	Pcs. / Pkt.
AXL E PN DI16 M12 6P	2701510	1

<b>Ordering data</b>		
Type	Order No.	Pcs. / Pkt.
AXL E PN DIO16 M12 6P	2701511	1



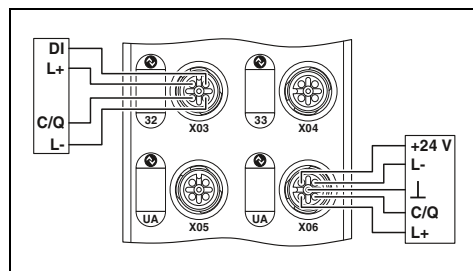
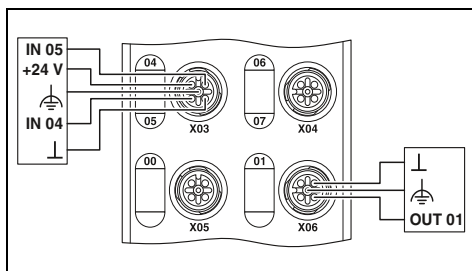
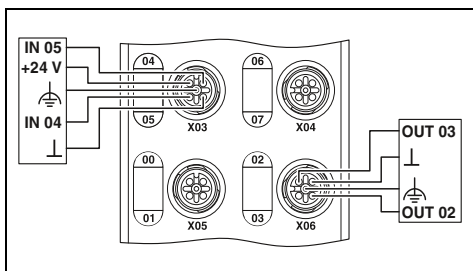
8 digital inputs and 8 digital outputs



8 digital inputs and 4 digital outputs



8 IO-Link ports, 4 digital inputs



**Technical data**

**Technical data**

**Technical data**

PROFINET  
M12, D-coded  
100 Mbps

PROFINET  
M12, D-coded  
100 Mbps

PROFINET  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Overload protection, short-circuit protection of outputs

M12 plug-in connector, (A-coded)  
2, 3-wire  
4  
2 A  
Overload protection, short-circuit protection of outputs

-  
-  
-  
-  
-

-  
-  
-

M12 plug-in connector  
3, 5-wire  
8  
24 V DC  
200 mA  
Overload protection, electronics in the device

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

**Ordering data**

**Ordering data**

**Ordering data**

Type	Order No.	Pcs. / Pkt.
AXLE PN DI8 DO8 M12 6P	2701509	1

Type	Order No.	Pcs. / Pkt.
AXLE PN DI8 DO4 2A M12 6P	2701512	1

Type	Order No.	Pcs. / Pkt.
AXLE PN IOL8 DI4 M12 6P	2701513	1

### sercos Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

#### Features:

- Rugged metal housing
- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device

**sercos**  
the automation bus

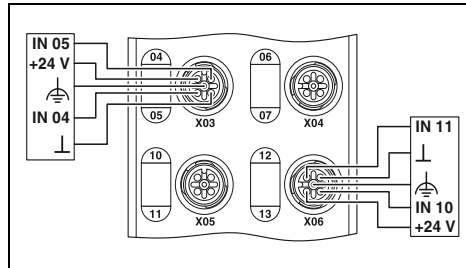


16 digital inputs

**sercos**  
the automation bus

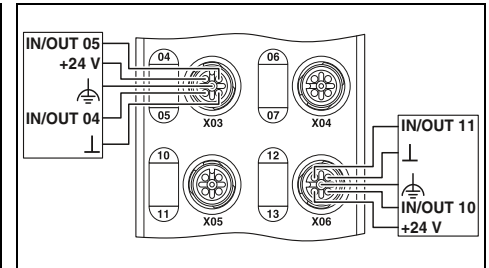


16 configurable inputs or outputs



#### Technical data

Interface	sercos
Fieldbus system	M12, D-coded
Connection method	100 Mbps
Transmission speed	
Power supply for module electronics	
Supply voltage	24 V DC
Connection method	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)



#### Technical data

Interface	sercos
Fieldbus system	M12, D-coded
Connection method	100 Mbps
Transmission speed	
Power supply for module electronics	
Supply voltage	24 V DC
Connection method	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)

Interface	
Fieldbus system	
Connection method	
Transmission speed	
Power supply for module electronics	
Supply voltage	
Connection method	
Supply voltage range	
Digital inputs	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire
Maximum number of inputs	16
Filter time	1 ms
Input characteristic curve	IEC 61131-2 type 1 and type 3
Protective circuit	Overload protection, short-circuit protection of sensor supply
Digital outputs	
Connection method	-
Connection method	-
Maximum number of outputs	-
Maximum output current per channel	-
Protective circuit	-
IO-Link ports	
Connection method	-
Connection method	-
Number of ports	-
IO-Link port supply	
I/O supply voltage	-
Nominal current for every IO-Link port	-
Protective circuit	-
General data	
Weight	750 g
Drill hole spacing	198.5 mm
Width	59.8 mm
Height	185 mm
Depth	37.8 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

Interface	sercos
Fieldbus system	M12, D-coded
Connection method	100 Mbps
Transmission speed	
Power supply for module electronics	
Supply voltage	24 V DC
Connection method	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)
Digital inputs	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire
Maximum number of inputs	16
Filter time	1 ms
Input characteristic curve	IEC 61131-2 type 1 and type 3
Protective circuit	Overload protection, short-circuit protection of sensor supply
Digital outputs	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3-wire
Maximum number of outputs	-
Maximum output current per channel	500 mA
Protective circuit	Overload protection, short-circuit protection of outputs
IO-Link ports	
Connection method	-
Connection method	-
Number of ports	-
IO-Link port supply	
I/O supply voltage	-
Nominal current for every IO-Link port	-
Protective circuit	-
General data	
Weight	750 g
Drill hole spacing	198.5 mm
Width	59.8 mm
Height	185 mm
Depth	37.8 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXL E S3 DI16 M12 6M	2701549	1
Ordering data		
Type	Order No.	Pcs. / Pkt.
AXL E S3 DIO16 M12 6M	2701550	1

Description	
<b>Axioline I/O device</b>	
- Digital inputs	
- Digital inputs/outputs	
- IO-Link ports and digital inputs	

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXL E S3 DI16 M12 6M	2701549	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXL E S3 DIO16 M12 6M	2701550	1

N

**SERCOS**  
the automation bus



8 digital inputs and 8 digital outputs

N

**SERCOS**  
the automation bus



8 digital inputs and 4 digital outputs

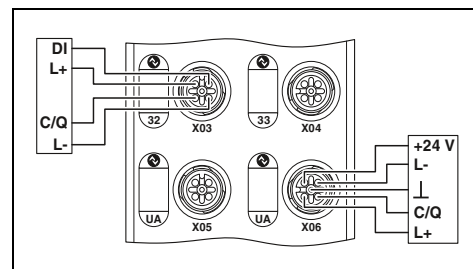
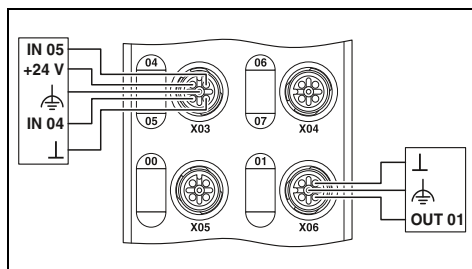
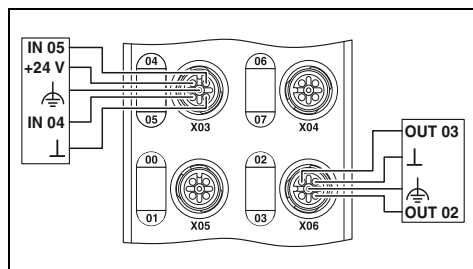
N

**SERCOS**  
the automation bus

**IO-Link**



8 IO-Link ports, 4 digital inputs



**Technical data**

Sercos  
M12, D-coded  
100 Mbps  
  
24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3-wire  
-  
500 mA  
Overload protection, short-circuit protection of outputs

-  
-  
-

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

**Ordering data**

Type	Order No.	Pcs. / Pkt.
AXL E S3 DI8 DO8 M12 6M	2701548	1

**Technical data**

Sercos  
M12, D-coded  
100 Mbps  
  
24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, (A-coded)  
2, 3-wire  
-  
2 A  
Overload protection, short-circuit protection of outputs

-  
-  
-

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

**Ordering data**

Type	Order No.	Pcs. / Pkt.
AXL E S3 DI8 DO4 2A M12 6M	2701551	1

**Technical data**

Sercos  
M12, D-coded  
100 Mbps  
  
24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

-  
-  
-  
-

M12 plug-in connector  
3, 5-wire  
8  
  
24 V DC  
200 mA  
Overload protection, electronics in the device

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

**Ordering data**

Type	Order No.	Pcs. / Pkt.
AXL E S3 IOL8 DI4 M12 6M	2701552	1

### sercos Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

#### Features:

- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device

**sercos**  
the automation bus

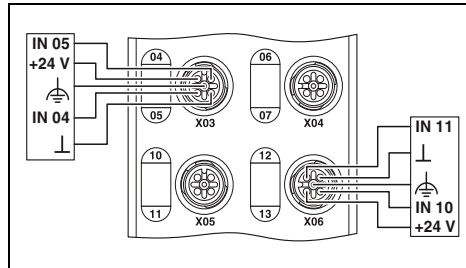


16 digital inputs

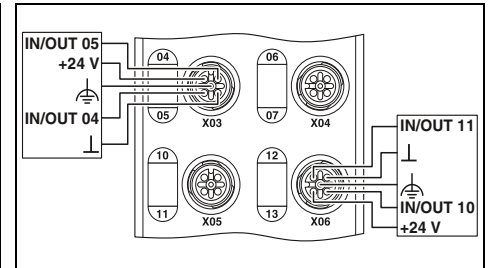
**sercos**  
the automation bus



16 configurable inputs or outputs



Technical data



Technical data

	Technical data	Technical data				
<b>Interface</b>						
Fieldbus system	sercos	sercos				
Connection method	M12, D-coded	M12, D-coded				
Transmission speed	100 Mbps	100 Mbps				
<b>Power supply for module electronics</b>						
Supply voltage	24 V DC	24 V DC				
Connection method	M12 plug-in connector (T-coded)	M12 plug-in connector (T-coded)				
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)	18 V DC ... 31.2 V DC (including all tolerances, including ripple)				
<b>Digital inputs</b>						
Connection method	M12 plug-in connector, double occupancy	M12 plug-in connector, double occupancy				
Connection method	2, 3, 4-wire	2, 3, 4-wire				
Maximum number of inputs	16	16				
Filter time	1 ms	1 ms				
Input characteristic curve	IEC 61131-2 type 1 and type 3	IEC 61131-2 type 1 and type 3				
Protective circuit	Overload protection, short-circuit protection of sensor supply	Overload protection, short-circuit protection of sensor supply				
<b>Digital outputs</b>						
Connection method	-	M12 plug-in connector, double occupancy				
Connection method	-	2, 3-wire				
Maximum number of outputs	-	16				
Maximum output current per channel	-	500 mA				
Protective circuit	-	Overload protection, short-circuit protection of outputs				
<b>IO-Link ports</b>						
Connection method	-	-				
Connection method	-	-				
Number of ports	-	-				
IO-Link port supply	-	-				
I/O supply voltage	-	-				
Nominal current for every IO-Link port	-	-				
Protective circuit	-	-				
<b>General data</b>						
Weight	480 g	480 g				
Drill hole spacing	198.5 mm	198.5 mm				
Width	59.8 mm	59.8 mm				
Height	204.6 mm	204.6 mm				
Depth	31.3 mm	31.3 mm				
Degree of protection	IP65/67	IP65/67				
Ambient temperature (operation)	-25 °C ... 60 °C	-25 °C ... 60 °C				
	<b>Ordering data</b>	<b>Ordering data</b>				
<b>Description</b>	<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>	<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
<b>Axioline I/O device</b>	<b>AXL E S3 DI16 M12 6P</b>	<b>2701544</b>	<b>1</b>	<b>AXL E S3 DIO16 M12 6P</b>	<b>2701545</b>	<b>1</b>
- Digital inputs						
- Digital inputs/outputs						
- IO-Link ports and digital inputs						



N



N

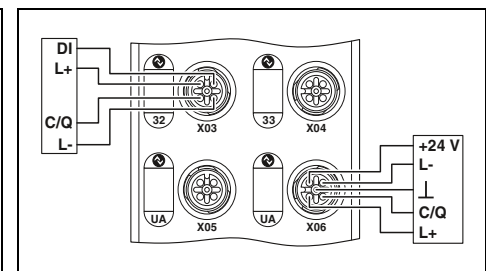
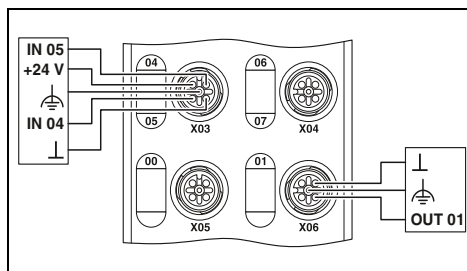
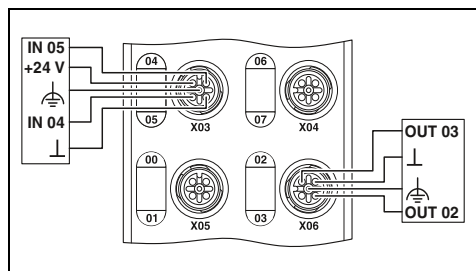


N

8 digital inputs and 8 digital outputs

8 digital inputs and 4 digital outputs

8 IO-Link ports, 4 digital inputs



Technical data

Technical data

Technical data

sercos  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Overload protection, short-circuit protection of outputs

-  
-  
-

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E S3 DI8 DO8 M12 6P	2701542	1

sercos  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, (A-coded)  
2, 3-wire  
4  
2 A  
Overload protection, short-circuit protection of outputs

-  
-  
-

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E S3 DI8 DO4 2A M12 6P	2701546	1

sercos  
M12, D-coded  
100 Mbps

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

-  
-  
-

M12 plug-in connector  
3, 5-wire  
8  
24 V DC  
200 mA  
Overload protection, electronics in the device

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E S3 IOL8 DI4 M12 6P	2701547	1

### PROFIBUS DP Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

#### Features:

- Rugged metal housing
- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

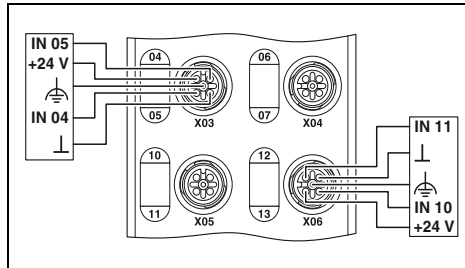
- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device



16 digital inputs

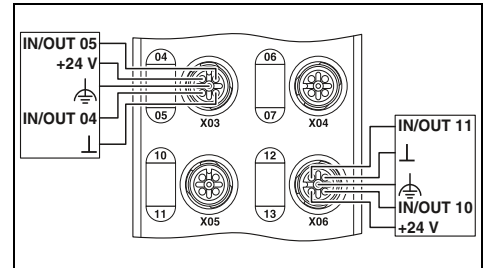


16 configurable inputs or outputs



#### Technical data

PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection



#### Technical data

PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection

Interface		
Fieldbus system	PROFIBUS DP	PROFIBUS DP
Connection method	2x M12 plug-in connectors, B-coded	2x M12 plug-in connectors, B-coded
Transmission speed	9.64 kbaud to 12 Mbaud automatic detection	9.64 kbaud to 12 Mbaud automatic detection
Power supply for module electronics		
Supply voltage	24 V DC	24 V DC
Connection method	M12 plug-in connector (T-coded)	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)	18 V DC ... 31.2 V DC (including all tolerances, including ripple)
Digital inputs		
Connection method	M12 plug-in connector, double occupancy	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire	2, 3, 4-wire
Maximum number of inputs	16	16
Filter time	1 ms	1 ms
Input characteristic curve	IEC 61131-2 type 1 and type 3	IEC 61131-2 type 1 and type 3
Protective circuit	Overload protection, short-circuit protection of sensor supply	Overload protection, short-circuit protection of sensor supply
Digital outputs		
Connection method	-	M12 plug-in connector, double occupancy
Connection method	-	2, 3-wire
Maximum number of outputs	-	16
Maximum output current per channel	-	500 mA
Protective circuit	-	Overload protection, short-circuit protection of outputs
IO-Link ports		
Connection method	-	-
Connection method	-	-
Number of ports	-	-
IO-Link port supply		
I/O supply voltage	-	-
Nominal current for every IO-Link port	-	-
Protective circuit	-	-
General data		
Weight	750 g	750 g
Drill hole spacing	198.5 mm	198.5 mm
Width	59.8 mm	59.8 mm
Height	185 mm	185 mm
Depth	37.8 mm	37.8 mm
Degree of protection	IP65/67	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C	-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Axioline I/O device</b>			
- Digital inputs	<b>AXL E PB DI16 M12 6M</b>	<b>2701505</b>	<b>1</b>
- Digital inputs/outputs			
- IO-Link ports and digital inputs			

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Axioline I/O device</b>			
- Digital inputs/outputs	<b>AXL E PB DIO16 M12 6M</b>	<b>2701506</b>	<b>1</b>
- IO-Link ports and digital inputs			



N

PROFIBUS



8 digital inputs and 8 digital outputs

N

PROFIBUS



8 digital inputs and 4 digital outputs

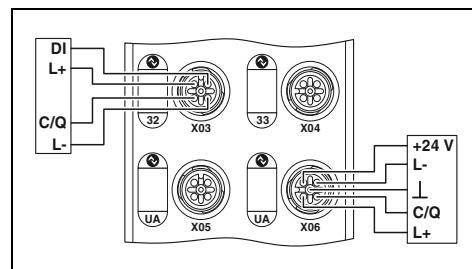
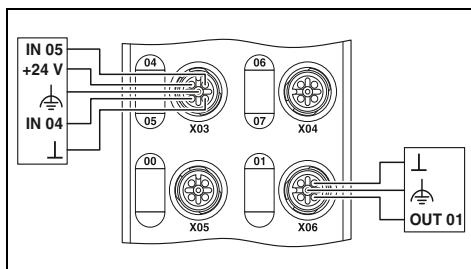
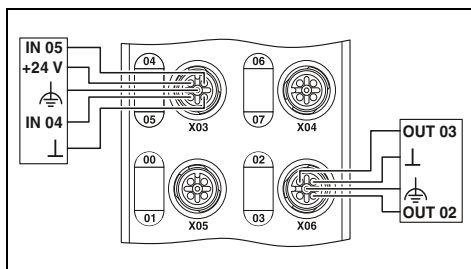
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PROFIBUS

IO-Link



8 IO-Link ports, 4 digital inputs



Technical data

PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Overload protection, short-circuit protection of outputs

-  
-  
-

-  
-  
-

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E PB DI8 DO8 M12 6M	2701504	1

Technical data

PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, (A-coded)  
2, 3-wire  
4  
2 A  
Overload protection, short-circuit protection of outputs

-  
-  
-

-  
-  
-

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E PB DI8 DO4 2A M12 6M	2701507	1

Technical data

PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

-  
-  
-  
-

M12 plug-in connector  
3, 5-wire  
8

24 V DC  
200 mA  
Overload protection, electronics in the device

750 g  
198.5 mm  
59.8 mm  
185 mm  
37.8 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E PB IOL8 DI4 M12 6M	2701508	1

### PROFIBUS DP Digital I/O devices – Stand-Alone

The I/O devices with a block design are used to acquire and output various signals.

#### Features:

- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Maximum current carrying capacity of the supply 12 A
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Additional features

##### IO-Link master:

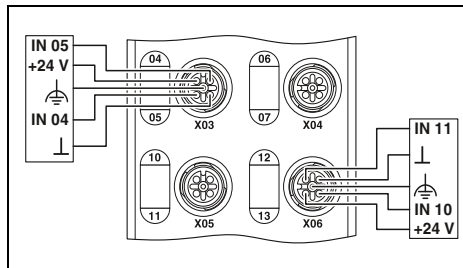
- According to specification 1.1
- 4 digital inputs, 4 IO-Link ports Class A, 4 IO-Link ports Class B on one device



16 digital inputs

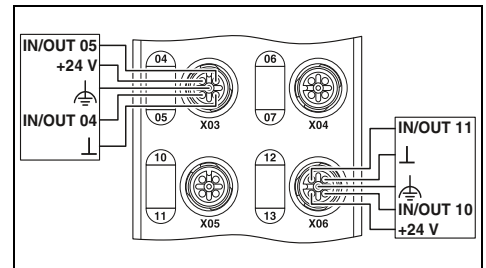


16 configurable inputs or outputs



#### Technical data

PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection



#### Technical data

PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection  
24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

Interface	
Fieldbus system	PROFIBUS DP
Connection method	2x M12 plug-in connectors, B-coded
Transmission speed	9.64 kbaud to 12 Mbaud automatic detection
Power supply for module electronics	
Supply voltage	24 V DC
Connection method	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)
Digital inputs	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire
Maximum number of inputs	16
Filter time	1 ms
Input characteristic curve	IEC 61131-2 type 1 and type 3
Protective circuit	Overload protection, short-circuit protection of sensor supply
Digital outputs	
Connection method	-
Connection method	-
Maximum number of outputs	-
Maximum output current per channel	-
Protective circuit	-
IO-Link ports	
Connection method	-
Connection method	-
Number of ports	-
IO-Link port supply	
I/O supply voltage	-
Nominal current for every IO-Link port	-
Protective circuit	-
General data	
Weight	480 g
Drill hole spacing	198.5 mm
Width	59.8 mm
Height	204.6 mm
Depth	31.3 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

Interface	
Fieldbus system	PROFIBUS DP
Connection method	2x M12 plug-in connectors, B-coded
Transmission speed	9.64 kbaud to 12 Mbaud automatic detection
Power supply for module electronics	
Supply voltage	24 V DC
Connection method	M12 plug-in connector (T-coded)
Supply voltage range	18 V DC ... 31.2 V DC (including all tolerances, including ripple)
Digital inputs	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire
Maximum number of inputs	16
Filter time	1 ms
Input characteristic curve	IEC 61131-2 type 1 and type 3
Protective circuit	Overload protection, short-circuit protection of sensor supply
Digital outputs	
Connection method	M12 plug-in connector, double occupancy
Connection method	2, 3-wire
Maximum number of outputs	16
Maximum output current per channel	500 mA
Protective circuit	Overload protection, short-circuit protection of outputs
IO-Link ports	
Connection method	-
Connection method	-
Number of ports	-
IO-Link port supply	
I/O supply voltage	-
Nominal current for every IO-Link port	-
Protective circuit	-
General data	
Weight	480 g
Drill hole spacing	198.5 mm
Width	59.8 mm
Height	204.6 mm
Depth	31.3 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Axioline I/O device</b>			
- Digital inputs	<b>AXL E PB DI16 M12 6P</b>	<b>2701498</b>	<b>1</b>
- Digital inputs/outputs			
- IO-Link ports and digital inputs			

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Axioline I/O device</b>			
- Digital inputs/outputs	<b>AXL E PB DIO16 M12 6P</b>	<b>2701499</b>	<b>1</b>
- IO-Link ports and digital inputs			

N

PROFIBUS



8 digital inputs and 8 digital outputs

PROFIBUS



8 digital inputs and 4 digital outputs

N

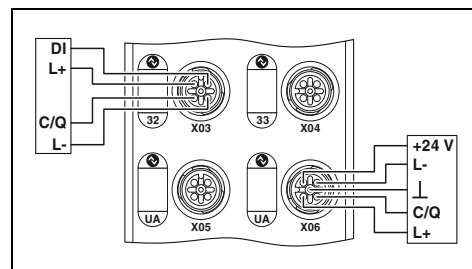
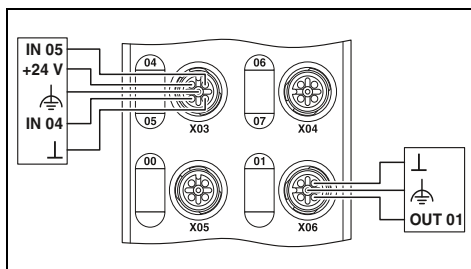
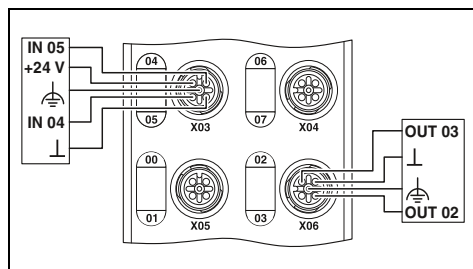
PROFIBUS

IO-Link



8 IO-Link ports, 4 digital inputs

N



Technical data

Technical data

Technical data

PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection

PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection

PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

24 V DC  
M12 plug-in connector (T-coded)  
18 V DC ... 31.2 V DC (including all tolerances, including ripple)

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
8  
1 ms  
IEC 61131-2 type 1 and type 3  
Overload protection, short-circuit protection of sensor supply

M12 plug-in connector, double occupancy  
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Overload protection, short-circuit protection of outputs

M12 plug-in connector, (A-coded)  
2, 3-wire  
4  
2 A  
Overload protection, short-circuit protection of outputs

-  
-  
-  
-  
-  
M12 plug-in connector  
3, 5-wire  
8  
24 V DC  
200 mA  
Overload protection, electronics in the device

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

480 g  
198.5 mm  
59.8 mm  
204.6 mm  
31.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
AXLE PB DI8 DO8 M12 6P	2701497	1

Type	Order No.	Pcs. / Pkt.
AXLE PB DI8 DO4 2A M12 6P	2701502	1

Type	Order No.	Pcs. / Pkt.
AXLE PB IOL8 DI4 M12 6P	2701503	1

### IO-Link/analog converter



IO-Link/analog converters are used to convert analog input or output signals to the IO-Link interface. You can connect the converters directly in the field.

#### Features:

- Large variety of analog functions
- Tailored combination of analog functions
- High transmission reliability
- Reduced cabling

IO-Link

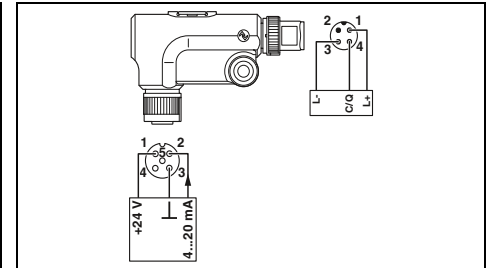
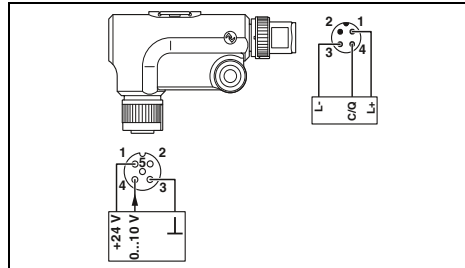


1 analog input (0 ... 10 V)

IO-Link



1 analog input (4 ... 20 mA)



#### Technical data

#### Technical data

IO-Link ports
Connection method
Connection technology
Number of ports
IO-Link port supply
I/O supply voltage

M12 plug-in connector, A-coded
3-wire
1
24 V DC (This supply voltage is provided via the IO-Link interface of the IO-Link master.)

M12 plug-in connector, A-coded
3-wire
1
24 V DC (This supply voltage is provided via the IO-Link interface of the IO-Link master.)

Nominal current for every IO-Link port
Protective circuit

max. 100 mA
Protection against polarity reversal
Short-circuit protection
Overload protection

max. 100 mA
Protection against polarity reversal
Short-circuit protection
Overload protection

Analog inputs
Connection method
Connection technology
Number of inputs
Voltage input signal
Current input signal

M12 plug-in connector, A-coded
3-wire
1 (voltage)
0 V ... 10 V
-

M12 plug-in connector, A-coded
3-wire
1 (current)
-
4 mA ... 20 mA

Analog outputs
Connection method
Connection technology
Number of outputs
Voltage output signal
Current output signal

-
-
-
-
-
-

-
-
-
-
-
-

Temperature input
Connection method
Connection technology
Number of inputs
Sensor types (RTD) that can be used
Linear resistance measuring range

-
-
-
-
-
-

-
-
-
-
-
-

General data
Weight
Width
Height
Depth
Degree of protection
Ambient temperature (operation)

34 g
16.6 mm
42 mm
66.5 mm
IP65/67
-25 °C ... 60 °C

34 g
16.6 mm
42 mm
66.5 mm
IP65/67
-25 °C ... 60 °C

#### Ordering data

#### Ordering data

Description
<b>IO-Link/analog converter</b>
- Analog input
- Analog output
- RTD input

Type	Order No.	Pcs. / Pkt.
AXL E IOL AI1 U M12 R	2700273	1

Type	Order No.	Pcs. / Pkt.
AXL E IOL AI1 I M12 R	2700275	1

N

N

N

IO-Link



1 analog output (0 ... 10 V)

IO-Link

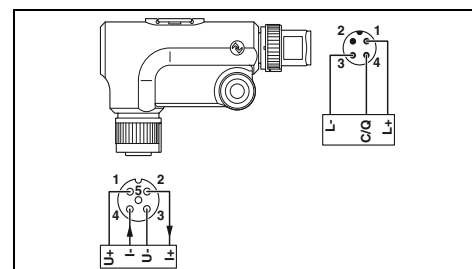
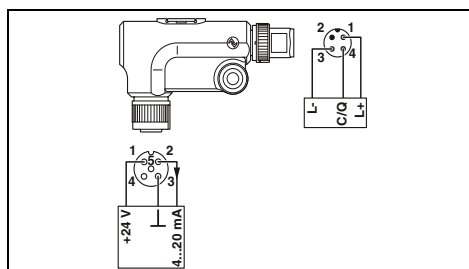
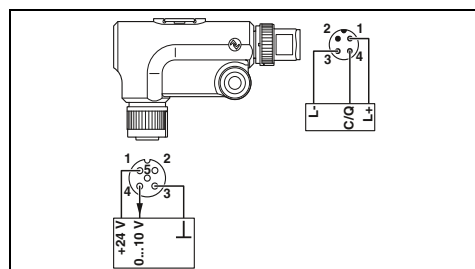


1 analog output (4 ... 20 mA)

IO-Link



1 RTD input



Technical data	
M12 plug-in connector, A-coded	
3-wire	
1	
24 V DC (This supply voltage is provided via the IO-Link interface of the IO-Link master.)	
max. 100 mA	
Protection against polarity reversal	
Short-circuit protection	
Overload protection	
-	
-	
-	
-	
M12 plug-in connector, A-coded	
3-wire	
1 (voltage)	
0 V ... 10 V	
-	
-	
-	
-	
34 g	
16.6 mm	
42 mm	
66.5 mm	
IP65/67	
-25 °C ... 60 °C	

Technical data	
M12 plug-in connector, A-coded	
3-wire	
1	
24 V DC (This supply voltage is provided via the IO-Link interface of the IO-Link master.)	
max. 100 mA	
Protection against polarity reversal	
Short-circuit protection	
Overload protection	
-	
-	
-	
-	
M12 plug-in connector, A-coded	
3-wire	
1 (current)	
-	
4 mA ... 20 mA	
-	
-	
-	
-	
34 g	
16.6 mm	
42 mm	
66.5 mm	
IP65/67	
-25 °C ... 60 °C	

Technical data	
M12 plug-in connector, A-coded	
3-wire	
1	
24 V DC (This supply voltage is provided via the IO-Link interface of the IO-Link master.)	
max. 100 mA	
Protection against polarity reversal	
Short-circuit protection	
Overload protection	
-	
-	
-	
-	
M12 plug-in connector, A-coded	
4-wire	
1 (for resistance temperature detectors)	
Pt 100, Pt 1000	
0 Ω ... 500 Ω / 0 Ω ... 5 kΩ	
-	
34 g	
16.6 mm	
42 mm	
66.5 mm	
IP65/67	
-25 °C ... 60 °C	

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXLE IOL AO1 U M12 R	2700278	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXLE IOL AO1 I M12 R	2700282	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXLE IOL RTD1 M12 R	2700305	1

### IO-Link/analog converter

N

N

IO-Link/analog converters are used to convert analog input or output signals to the IO-Link interface. You can connect the converters directly in the field.

#### Features:

- Large variety of analog functions
- Tailored combination of analog functions
- High transmission reliability
- Reduced cabling

IO-Link

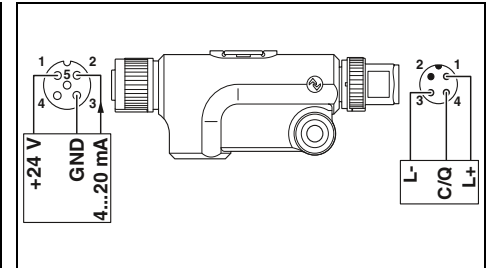
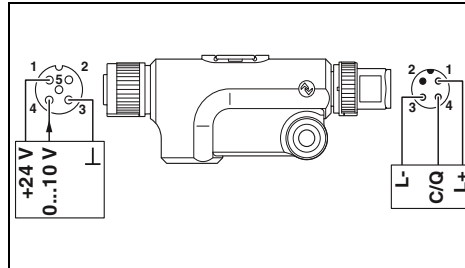


1 analog input (0 ... 10 V)

IO-Link



1 analog input (4 ... 20 mA)



#### Technical data

IO-Link ports	
Connection method	M12 plug-in connector, A-coded
Connection technology	3-wire
Number of ports	1
IO-Link port supply	
I/O supply voltage	24 V DC (This supply voltage is provided via the IO-Link interface of the IO-Link master.)
Nominal current for every IO-Link port	max. 100 mA
Protective circuit	Protection against polarity reversal Short-circuit protection Overload protection

#### Technical data

IO-Link ports	
Connection method	M12 plug-in connector, A-coded
Connection technology	3-wire
Number of ports	1
IO-Link port supply	
I/O supply voltage	24 V DC (This supply voltage is provided via the IO-Link interface of the IO-Link master.)
Nominal current for every IO-Link port	max. 100 mA
Protective circuit	Protection against polarity reversal Short-circuit protection Overload protection

<b>Analog inputs</b>	
Connection method	M12 plug-in connector, A-coded
Connection technology	3-wire
Number of inputs	1 (voltage)
Voltage input signal	0 V ... 10 V
Current input signal	-
<b>Analog outputs</b>	
Connection method	-
Connection technology	-
Number of outputs	-
Voltage output signal	-
Current output signal	-
<b>Temperature input</b>	
Connection method	-
Connection technology	-
Number of inputs	-
Sensor types (RTD) that can be used	-
Linear resistance measuring range	-
<b>General data</b>	
Weight	34 g
Width	16.6 mm
Height	29 mm
Depth	79.5 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

<b>Analog inputs</b>	
Connection method	M12 plug-in connector, A-coded
Connection technology	3-wire
Number of inputs	1 (current)
Voltage input signal	-
Current input signal	4 mA ... 20 mA
<b>Analog outputs</b>	
Connection method	-
Connection technology	-
Number of outputs	-
Voltage output signal	-
Current output signal	-
<b>Temperature input</b>	
Connection method	-
Connection technology	-
Number of inputs	-
Sensor types (RTD) that can be used	-
Linear resistance measuring range	-
<b>General data</b>	
Weight	34 g
Width	16.6 mm
Height	29 mm
Depth	79.5 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>IO-Link/analog converter</b>			
- Analog input	AXL E IOL AI1 U M12 S	2700336	1
- Analog output			
- RTD input			

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>IO-Link/analog converter</b>			
- Analog input	AXL E IOL AI1 I M12 S	2700338	1
- Analog output			
- RTD input			

N

N

N

IO-Link



1 analog output (0 ... 10 V)

IO-Link

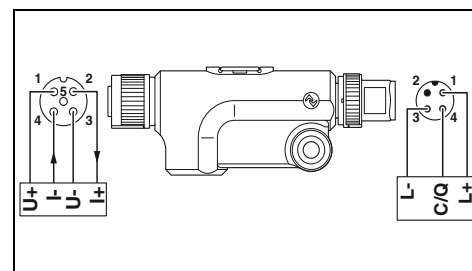
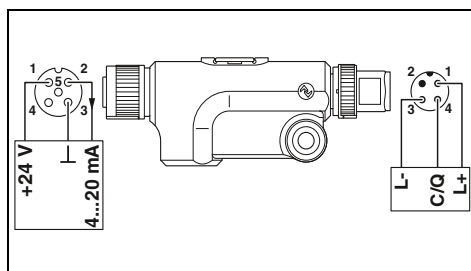
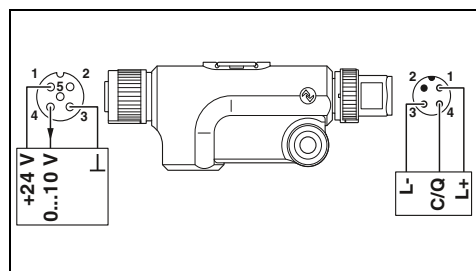


1 analog output (4 ... 20 mA)

IO-Link



1 RTD input



Technical data

Technical data

Technical data

M12 plug-in connector, A-coded  
3-wire  
1

M12 plug-in connector, A-coded  
3-wire  
1

M12 plug-in connector, A-coded  
3-wire  
1

24 V DC (This supply voltage is provided via the IO-Link interface of the IO-Link master.)

24 V DC (This supply voltage is provided via the IO-Link interface of the IO-Link master.)

24 V DC (This supply voltage is provided via the IO-Link interface of the IO-Link master.)

max. 100 mA  
Protection against polarity reversal  
Short-circuit protection  
Overload protection

max. 100 mA  
Protection against polarity reversal  
Short-circuit protection  
Overload protection

max. 100 mA  
Protection against polarity reversal  
Short-circuit protection  
Overload protection

M12 plug-in connector, A-coded  
3-wire  
1 (voltage)  
0 V ... 10 V

M12 plug-in connector, A-coded  
3-wire  
1 (current)  
4 mA ... 20 mA

M12 plug-in connector, A-coded  
4-wire  
1 (for resistance temperature detectors)  
Pt 100, Pt 1000  
0 Ω ... 500 Ω / 0 Ω ... 5 kΩ

34 g  
16.6 mm  
29 mm  
79.5 mm  
IP65/67  
-25 °C ... 60 °C

34 g  
16.6 mm  
29 mm  
79.5 mm  
IP65/67  
-25 °C ... 60 °C

34 g  
16.6 mm  
29 mm  
79.5 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
AXL E IOL AO1 U M12 S	2700350	1

Type	Order No.	Pcs. / Pkt.
AXL E IOL AO1 I M12 S	2700351	1

Type	Order No.	Pcs. / Pkt.
AXL E IOL RTD1 M12 S	2700352	1



# I/O systems

For field installation (IP67) – Fieldline

## Product overview

### Digital I/O devices – stand-alone



				
284	286	288	290	292

### Bus couplers – modular



					<b>Ethernet</b>
294	295	295	296	297	297

### M12 I/O devices – modular



<b>Digital input</b>		<b>Digital input/output</b>			<b>Digital output</b>
8 channels	16 channels	4/4 channels	8/8 channels	16/16 channels	8 channels
298	298	299	299	299	299
<b>IO-Link master</b>		<b>Analog input</b>	<b>Analog output</b>	<b>Analog input</b>	
4 IO-Link ports		4 channels	4 channels	4 channels (RTD)	
300		301	301	301	

### M8 I/O devices – modular



<b>Digital input</b>	<b>Digital input/output</b>	<b>Digital output</b>	
8 channels	8 channels	4 channels	8 channels
302	303	303	303

## Accessories

					
<b>FLM ADAP M12/M8</b> Fieldline Modular M12/M8 adapter	<b>IB IL 24 FLM ...-PAC</b> Inline Modular branch terminal	<b>SAC...2XM12...</b> M12 bus system T-connector	<b>SAC-5P-M12MS ... TR</b> Termination resistor, M12, PROFIBUS and DeviceNet™/CANopen®	<b>SAC-3P-M12Y/2XM12FS PE</b> M12 Y-distributor/connector	<b>FLM MP...</b> Mounting plates
304	304	305	305	305	304
					
<b>PROT-M12 / M8 ...</b> Sealing caps	<b>ZBF 12 ... / ZBF 8 ...</b> Marking material	<b>...</b> Bus and power cable with M12 plug-in connector	<b>SAC-4P-M ...</b> Bus and power cable with M8 plug-in connector	<b>SACC-M12... / SACC-M8...</b> M12/M8 plug-in connectors that can be assembled	<b>PROJECT+</b> Software for planning the I/O configuration
305	305	306	308	309	514

### INTERBUS digital I/O devices – stand-alone

The compact I/O devices are used to acquire and output digital signals in an INTERBUS system.

#### Features:

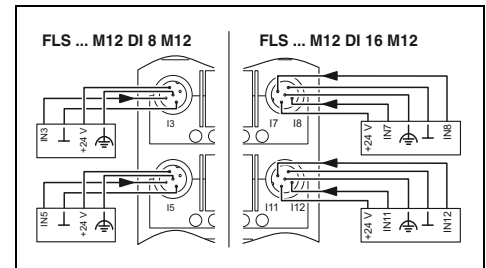
- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Flexible power supply concept
- Diagnostic and status indicators
- Short-circuit and overload protection

Notes:
A comprehensive range of installation materials for field installation can be found on page 304
1) EMC: Class A product, see page 553



8/16 digital inputs

**INTERBUS CLUB**  
 Ex:



<b>Interface</b>	
Fieldbus system	INTERBUS
Name	Remote bus
Connection method	2x M12 plug-in connectors, B-coded
Transmission speed	500 kbaud
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Connection method	M12 plug-in connector, (A-coded)
Supply voltage range	18 V DC ... 30 V DC IEC 61131-2 (including ripple)
<b>Digital inputs</b>	
Connection method	
Connection method	M12 plug-in connector
Maximum number of inputs	8
Filter time	3 ms
Input characteristic curve	IEC 61131-2 type 1
Protective circuit	Protection against polarity reversal
<b>Digital outputs</b>	
Connection method	
Connection method	-
Maximum number of outputs	-
Maximum output current per channel	-
Protective circuit	-
<b>General data</b>	
Weight	310 g
Drill hole spacing	151 mm
Width	60 mm
Height	161 mm
Depth	44.5 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

<b>Technical data</b>	
FLS IB M12 DI 8 M12 <sup>1)</sup>	FLS IB M12 DI 16 M12 <sup>1)</sup>
INTERBUS Remote bus	
2x M12 plug-in connectors, B-coded	
500 kbaud	
24 V DC	
M12 plug-in connector, (A-coded)	
18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
M12 plug-in connector	M12 plug-in connector, double occupancy
2, 3, 4-wire	
8	16
3 ms	1 ms
IEC 61131-2 type 1	
Protection against polarity reversal	
-	-
-	-
-	-
-	-
-	-
<b>General data</b>	
310 g	
151 mm	
60 mm	
161 mm	
44.5 mm	
IP65/67	
-25 °C ... 60 °C	

Description
<b>Fieldline Stand-Alone input device, INTERBUS M12</b>
- 8 inputs
- 16 inputs
<b>Fieldline Stand-Alone I/O device, INTERBUS M12</b>
- 4 inputs, 4 outputs
- 8 inputs, 8 outputs
<b>Fieldline Stand-Alone output device, INTERBUS M12</b>
- 8 outputs

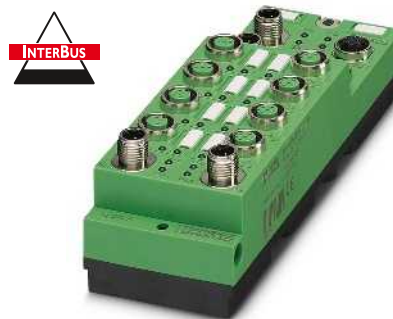
<b>Ordering data</b>		
Type	Order No.	Pcs. / Pkt.
FLS IB M12 DI 8 M12 <sup>1)</sup>	2736013	1
FLS IB M12 DI 16 M12 <sup>1)</sup>	2736314	1



4 digital inputs and 4 digital outputs



8 digital inputs and 8 digital outputs

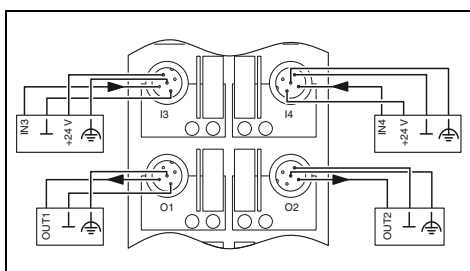


8 digital outputs

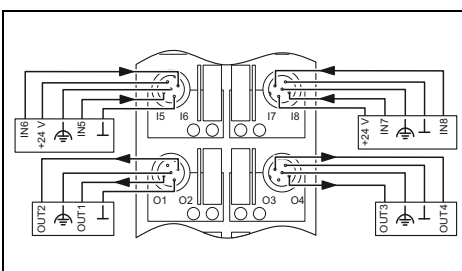
INTERBUS CLUB  
Ex:

INTERBUS CLUB  
Ex:

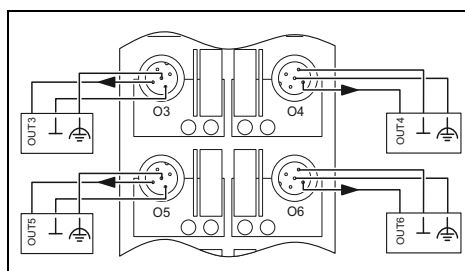
INTERBUS CLUB  
Ex:



Technical data



Technical data



Technical data

INTERBUS  
Remote bus  
2x M12 plug-in connectors, B-coded  
500 kbaud

INTERBUS  
Remote bus  
2x M12 plug-in connectors, B-coded  
500 kbaud

INTERBUS  
Remote bus  
2 M12 plug-in connectors, B-coded  
500 kbaud

24 V DC  
M12 plug-in connector, (A-coded)  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

24 V DC  
M12 plug-in connector, (A-coded)  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

24 V DC  
M12 plug-in connector, (A-coded)  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

M12 plug-in connector

M12 plug-in connector, double occupancy

-

2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

2, 3, 4-wire  
8  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

-

M12 plug-in connector  
2, 3-wire  
4  
2 A  
Short-circuit protection

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Short-circuit protection

M12 plug-in connector  
2, 3-wire  
8  
2 A  
Short-circuit protection

340 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

340 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

350 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
FLS IB M12 DIO 4/4 M12-2A <sup>1)</sup>	2736026	1

Ordering data

Type	Order No.	Pcs. / Pkt.
FLS IB M12 DIO 8/8 M12 <sup>1)</sup>	2736385	1

Ordering data

Type	Order No.	Pcs. / Pkt.
FLS IB M12 DO 8 M12-2A <sup>1)</sup>	2736039	1

### PROFIBUS digital I/O devices – stand-alone

The compact I/O devices are used to acquire and output digital signals in a PROFIBUS DP system.

#### Features:

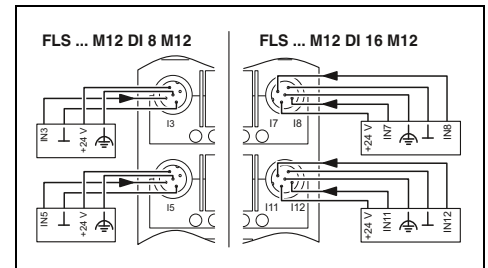
- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Directly accessible address coding switch
- Flexible power supply concept
- Diagnostic and status indicators
- Short-circuit and overload protection

Notes:
A comprehensive range of installation materials for field installation can be found on page 304
1) EMC: Class A product, see page 553



8/16 digital inputs

PROFIBUS  
Ex: PROFIBUS



#### Technical data

	FLS PB M12 DI 8 M12 <sup>1)</sup>	FLS PB M12 DI 16 M12 <sup>1)</sup>
<b>Interface</b>	PROFIBUS DP	
Fieldbus system	PROFIBUS DP	
Name	2x M12 plug-in connectors, B-coded	
Connection method	9.64 kbaud to 12 Mbaud automatic detection	
Transmission speed	1 ... 99, can be set	
<b>Address area assignment</b>	1 ... 99, can be set	
<b>Power supply for module electronics</b>	24 V DC	
Supply voltage	M12 plug-in connector, (A-coded)	
Connection method	18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
Supply voltage range		
<b>Digital inputs</b>		
Connection method	M12 plug-in connector	M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire	
Maximum number of inputs	8	16
Filter time	3 ms	1 ms
Input characteristic curve	IEC 61131-2 type 1	
Protective circuit	Protection against polarity reversal	
<b>Digital outputs</b>		
Connection method	-	
Connection method	-	
Maximum number of outputs	-	
Maximum output current per channel	-	
Protective circuit	-	
<b>General data</b>		
Weight	310 g	
Drill hole spacing	151 mm	
Width	60 mm	
Height	161 mm	
Depth	44.5 mm	
Degree of protection	IP65/67	
Ambient temperature (operation)	-25 °C ... 60 °C	

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Fieldline Stand-Alone input device, PROFIBUS M12</b>			
- 8 inputs	FLS PB M12 DI 8 M12 <sup>1)</sup>	2736123	1
- 16 inputs	FLS PB M12 DI 16 M12 <sup>1)</sup>	2736220	1
<b>Fieldline Stand-Alone I/O device, PROFIBUS M12</b>			
- 4 inputs, 4 outputs			
- 8 inputs, 8 outputs			
<b>Fieldline Stand-Alone output device, PROFIBUS M12</b>			
- 8 outputs			



4 digital inputs and 4 digital outputs

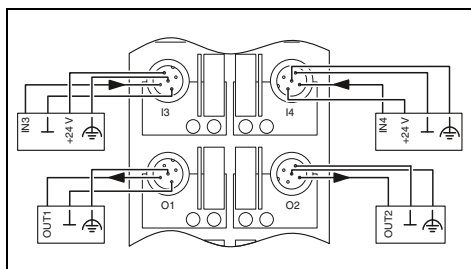


8 digital inputs and 8 digital outputs



8 digital outputs

PROFIBUS  
Ex: PROFIBUS



Technical data

PROFIBUS DP  
PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection

1 ... 99, can be set

24 V DC  
M12 plug-in connector, (A-coded)  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

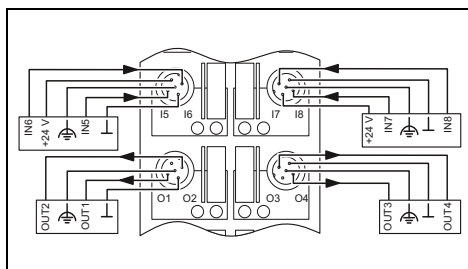
M12 plug-in connector

2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

M12 plug-in connector  
2, 3-wire  
4  
2 A  
Short-circuit protection

340 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

PROFIBUS  
Ex: PROFIBUS



Technical data

PROFIBUS DP  
PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection

1 ... 99, can be set

24 V DC  
M12 plug-in connector, (A-coded)  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

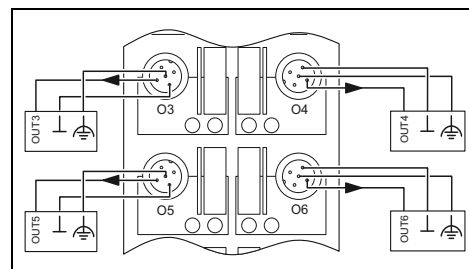
M12 plug-in connector, double occupancy

2, 3, 4-wire  
8  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Short-circuit protection

340 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

PROFIBUS  
Ex: PROFIBUS



Technical data

PROFIBUS DP  
PROFIBUS DP  
2x M12 plug-in connectors, B-coded  
9.64 kbaud to 12 Mbaud automatic detection

1 ... 99, can be set

24 V DC  
M12 plug-in connector, (A-coded)  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

-

-  
-  
-  
-  
-

M12 plug-in connector  
2, 3-wire  
8  
2 A  
Short-circuit protection

350 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
FLS PB M12 DIO 4/4 M12-2A <sup>1)</sup>	2736107	1

Ordering data

Type	Order No.	Pcs. / Pkt.
FLS PB M12 DIO 8/8 M12 <sup>1)</sup>	2736372	1

Ordering data

Type	Order No.	Pcs. / Pkt.
FLS PB M12 DO 8 M12-2A <sup>1)</sup>	2736110	1

## For field installation (IP67) – Fieldline

### PROFIBUS IO-Link masters – stand-alone

IO-Link masters enable the easy integration of IO-Link devices in a PROFIBUS DP system.

#### Features:

- Up to 8 IO-Link ports
- Support of PROFIBUS DP/V1 services
- Seamless connection via M12 connectors
- Directly accessible address coding switch
- Flexible power supply concept
- Diagnostic and status indicators
- Short-circuit and overload protection

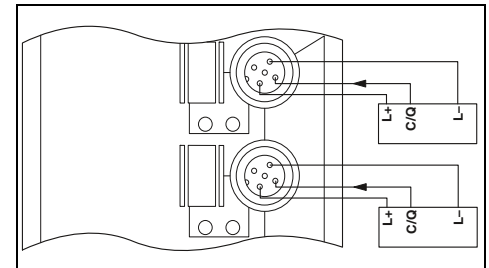
Notes:
A comprehensive range of installation materials for field installation can be found on page 304
1) EMC: Class A product, see page 553

**PROFIBUS**

**IO-Link**



4 IO-Link ports and 4 digital inputs



#### Technical data

<b>Interface</b>	
Name	PROFIBUS DP
Connection method	M12 plug-in connector, B-coded
Transmission speed	9.64 kbaud to 12 Mbaud automatic detection
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Connection method	M12 plug-in connector
Supply voltage range	18 V DC ... 30 V DC IEC 61131-2 (including ripple)
<b>Digital inputs</b>	
Connection method	-
Connection method	3-wire
Maximum number of inputs	-
<b>IO-Link ports</b>	
Connection method	M12 plug-in connector
Connection method	3-wire
Number of ports	4
<b>IO-Link port supply</b>	
Sensor supply voltage	min. $U_S - 1$ V
Nominal current for every IO-Link port	200 mA
Nominal current per device	800 mA
Protective circuit	Overload protection, electronics in the device Short-circuit protection, electronics in the device
<b>General data</b>	
Weight	280 g
Drill hole spacing	168 mm
Width	70 mm
Height	178 mm
Depth	49.3 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

#### Ordering data

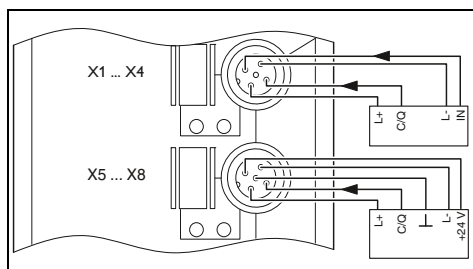
Description	Type	Order No.	Pcs. / Pkt.
<b>Fieldline stand-alone device, PROFIBUS M12</b>			
- IO-Link master with four 4 IO-Link ports			
- IO-Link master with 8 IO-Link ports, 4 digital inputs, and separate actuator supply	FLS PB M12 IOL 4 M12 <sup>1)</sup>	2736987	1







8 IO-Link ports, 4 digital inputs,  
and separate power supply



#### Technical data

PROFIBUS DP  
M12 plug-in connector, B-coded  
9.64 kbaud to 12 Mbaud automatic detection

24 V DC  
M12 plug-in connector  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

M12 plug-in connector  
2, 3-wire  
4

M12 plug-in connector  
3, 5-wire  
8

min.  $U_S$  - 2 V  
200 mA  
4 A  
Overload protection, electronics in the device  
Short-circuit protection, electronics in the device

340 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

#### Ordering data

Type	Order No.	Pcs. / Pkt.
FLS PB M12 IOL 8 DI 4 M12-B <sup>1)</sup>	2773380	1

### DeviceNet™ digital I/O devices – stand-alone

The compact I/O devices are used to acquire and output digital signals in a DeviceNet™ system.

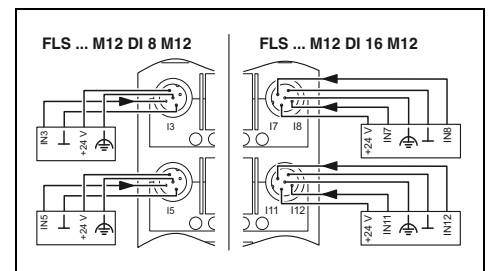
#### Features:

- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Directly accessible address coding switch
- Flexible power supply concept
- Diagnostic and status indicators
- Short-circuit and overload protection

Notes:
A comprehensive range of installation materials for field installation can be found on page 304
1) EMC: Class A product, see page 553



8/16 digital inputs



<b>Interface</b>	
Fieldbus system	DeviceNet™
Connection method	2 M12 plug connectors, A-coded
Transmission speed	125 kbaud, 250 kbaud, 500 kbaud automatic detection
Address area assignment	0 ... 63, can be set
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Connection method	M12 plug-in connector, (A-coded)
Supply voltage range	11 V DC ... 30 V DC IEC 61131-2 (including ripple) 12 V DC ... 30 V DC IEC 61131-2 (including ripple)
<b>Digital inputs</b>	
Connection method	M12 plug-in connector M12 plug-in connector, double occupancy
Connection method	2, 3, 4-wire
Maximum number of inputs	8 16
Filter time	3 ms 1 ms
Input characteristic curve	IEC 61131-2 type 1
Protective circuit	Protection against polarity reversal
<b>Digital outputs</b>	
Connection method	-
Connection method	-
Maximum number of outputs	-
Maximum output current per channel	-
Protective circuit	-
<b>General data</b>	
Weight	310 g
Drill hole spacing	151 mm
Width	60 mm
Height	161 mm
Depth	44,5 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

Technical data		
FLS DN M12 DI 8 M12 <sup>1)</sup>	FLS DN M12 DI 16 M12 <sup>1)</sup>	
	DeviceNet™	
	2 M12 plug connectors, A-coded	
	125 kbaud, 250 kbaud, 500 kbaud automatic detection	
	0 ... 63, can be set	
	24 V DC	
	M12 plug-in connector, (A-coded)	
	11 V DC ... 30 V DC IEC 61131-2 (including ripple) 12 V DC ... 30 V DC IEC 61131-2 (including ripple)	
	M12 plug-in connector	M12 plug-in connector, double occupancy
		2, 3, 4-wire
	8	16
	3 ms	1 ms
	IEC 61131-2 type 1	
	Protection against polarity reversal	
	-	-
	-	-
	-	-
	-	-
	-	-
		310 g
		151 mm
		60 mm
		161 mm
		44,5 mm
		IP65/67
		-25 °C ... 60 °C

Description
<b>Fieldline Stand-Alone input device, DeviceNet™ M12</b>
- 8 inputs
- 16 inputs
<b>Fieldline Stand-Alone I/O device, DeviceNet™ M12</b>
- 4 inputs, 4 outputs
- 8 inputs, 8 outputs
<b>Fieldline Stand-Alone output device, DeviceNet™ M12</b>
- 8 outputs

Ordering data		
Type	Order No.	Pcs. / Pkt.
FLS DN M12 DI 8 M12 <sup>1)</sup>	2736068	1
FLS DN M12 DI 16 M12 <sup>1)</sup>	2736327	1



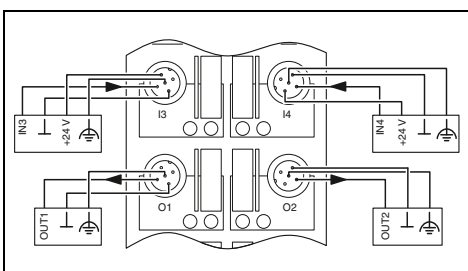
4 digital inputs and 4 digital outputs



8 digital inputs and 8 digital outputs



8 digital outputs



Technical data

DeviceNet™  
2 M12 plug connectors, A-coded  
125 kbaud, 250 kbaud, 500 kbaud automatic detection

0 ... 63, can be set

24 V DC  
M12 plug-in connector, (A-coded)  
12 V DC ... 30 V DC IEC 61131-2 (including ripple)

M12 plug-in connector

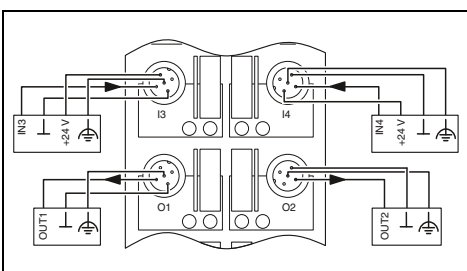
2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

M12 plug-in connector  
2, 3-wire  
4  
2 A  
Short-circuit protection

340 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
FLS DN M12 DIO 4/4 M12-2A <sup>1)</sup>	2736042	1



Technical data

DeviceNet™  
2 M12 plug connectors, A-coded  
125 kbaud, 250 kbaud, 500 kbaud automatic detection

0 ... 63, can be set

24 V DC  
M12 plug-in connector, (A-coded)  
12 V DC ... 30 V DC IEC 61131-2 (including ripple)

M12 plug-in connector, double occupancy

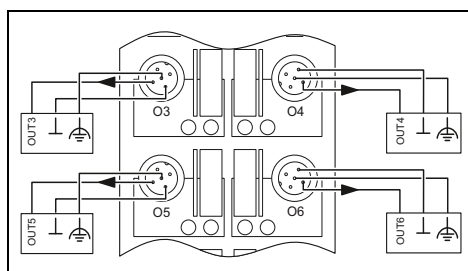
2, 3, 4-wire  
8  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Short-circuit protection

340 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
FLS DN M12 DIO 8/8 M12 <sup>1)</sup>	2736398	1



Technical data

DeviceNet™  
2 M12 plug connectors, A-coded  
125 kbaud, 250 kbaud, 500 kbaud automatic detection

0 ... 63, can be set

24 V DC  
M12 plug-in connector, (A-coded)  
12 V DC ... 30 V DC IEC 61131-2 (including ripple)

-

-  
-  
-  
-  
-

M12 plug-in connector  
2, 3-wire  
8  
2 A  
Short-circuit protection

350 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
FLS DN M12 DO 8 M12-2A <sup>1)</sup>	2736055	1

### CANopen® digital I/O devices – stand-alone

The compact I/O devices are used to acquire and output digital signals in a CANopen® system.

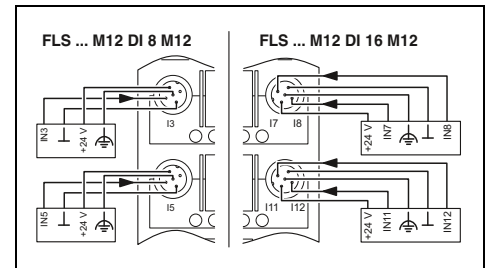
#### Features:

- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Directly accessible address coding switch
- Flexible power supply concept
- Diagnostic and status indicators
- Short-circuit and overload protection

Notes:
A comprehensive range of installation materials for field installation can be found on page 304
1) EMC: Class A product, see page 553



8/16 digital inputs



<b>Interface</b>
Fieldbus system
Connection method
Transmission speed
Address area assignment
<b>Power supply for module electronics</b>
Supply voltage
Connection method
Supply voltage range
<b>Digital inputs</b>
Connection method
Connection method
Maximum number of inputs
Filter time
Input characteristic curve
Protective circuit
<b>Digital outputs</b>
Connection method
Connection method
Maximum number of outputs
Maximum output current per channel
Protective circuit
<b>General data</b>
Weight
Drill hole spacing
Width
Height
Depth
Degree of protection
Ambient temperature (operation)

Technical data	
FLS CO M12 DI 8 M12 <sup>1)</sup>	FLS CO M12 DI 16 M12 <sup>1)</sup>
CANopen®	
2 M12 plug connectors, A-coded	
Maximum 1 Mbaud automatic detection	
1 ... 126, adjustable	
24 V DC	
M12 plug-in connector, (A-coded)	
18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
M12 plug-in connector	M12 plug-in connector, double occupancy
2, 3, 4-wire	
8	16
3 ms	1 ms
IEC 61131-2 type 1	
Protection against polarity reversal	
-	-
-	-
-	-
-	-
-	-
310 g	
151 mm	
60 mm	
161 mm	
44.5 mm	
IP65/67	
-25 °C ... 60 °C	

<b>Description</b>
<b>Fieldline Stand-Alone input device, CANopen® M12</b>
- 8 inputs
- 16 inputs
<b>Fieldline Stand-Alone I/O device, CANopen® M12</b>
- 4 inputs, 4 outputs
- 8 inputs, 8 outputs
<b>Fieldline Stand-Alone output device, CANopen® M12</b>
- 8 outputs

Ordering data		
Type	Order No.	Pcs. / Pkt.
FLS CO M12 DI 8 M12 <sup>1)</sup>	2736097	1
FLS CO M12 DI 16 M12 <sup>1)</sup>	2736479	1

CANopen



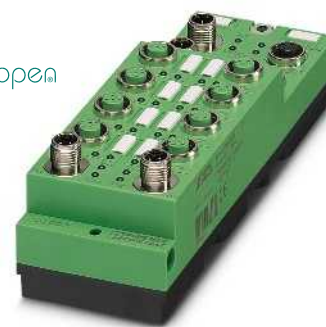
4 digital inputs and 4 digital outputs

CANopen



8 digital inputs and 8 digital outputs

CANopen



8 digital outputs



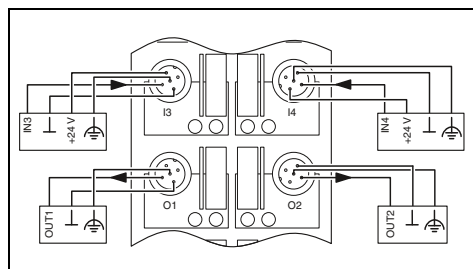
Ex: c



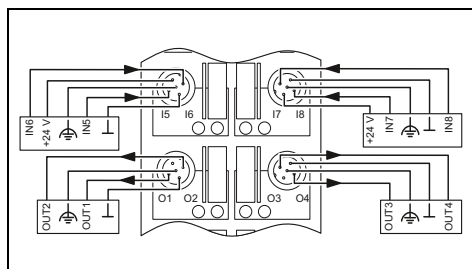
Ex: c



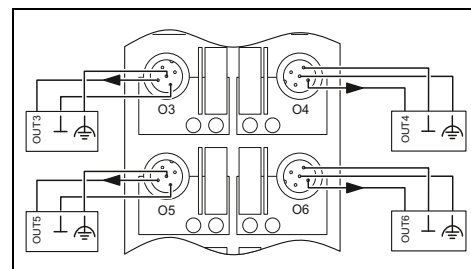
Ex: c



Technical data



Technical data



Technical data

CANopen®  
2 M12 plug connectors, A-coded  
Maximum 1 Mbaud automatic detection  
1 ... 126, adjustable

24 V DC  
M12 plug-in connector, (A-coded)  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

M12 plug-in connector

2, 3, 4-wire  
4  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

M12 plug-in connector  
2, 3-wire  
4  
2 A  
Short-circuit protection

340 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

CANopen®  
2 M12 plug connectors, A-coded  
Maximum 1 Mbaud automatic detection  
1 ... 126, adjustable

24 V DC  
M12 plug-in connector, (A-coded)  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

M12 plug-in connector, double occupancy

2, 3, 4-wire  
8  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

M12 plug-in connector, double occupancy  
2, 3-wire  
8  
500 mA  
Short-circuit protection

350 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

CANopen®  
2 M12 plug connectors, A-coded  
Maximum 1 Mbaud automatic detection  
1 ... 126, adjustable

24 V DC  
M12 plug-in connector, (A-coded)  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

-

-  
-  
-  
-

M12 plug-in connector  
2, 3-wire  
8  
2 A  
Short-circuit protection

350 g  
168 mm  
60 mm  
178 mm  
49.3 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
FLS CO M12 DIO 4/4 M12-2A <sup>1)</sup>	2736071	1

Ordering data

Type	Order No.	Pcs. / Pkt.
FLS CO M12 DIO 8/8 M12 <sup>1)</sup>	2736482	1

Ordering data

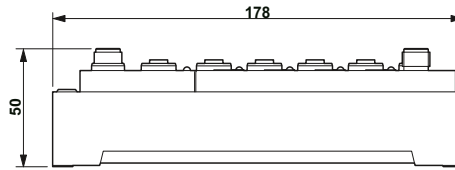
Type	Order No.	Pcs. / Pkt.
FLS CO M12 DO 8 M12-2A <sup>1)</sup>	2736084	1

### Bus couplers – modular

The bus couplers open a high-performance local bus with up to 16 devices.

The following protocols are supported:

- INTERBUS
- PROFINET
- PROFIBUS
- DeviceNet™
- EtherNet/IP™
- Modbus TCP

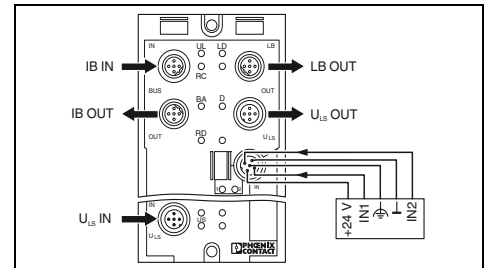


INTERBUS

**Notes:**

A comprehensive range of installation materials for field installation can be found on page 304

1) EMC: Class A product, see page 553



#### Technical data

<b>Interface</b>	Fieldbus system Connection method Number of positions Transmission speed	INTERBUS M12 plug-in connector, B-coded 5 500 kbaud/2 Mbaud, can be selected
<b>Address area assignment</b>	-	-
<b>Power supply for module electronics</b>	Supply voltage Connection method Supply voltage range	24 V DC M12 plug-in connector 18 V DC ... 30 V DC IEC 61131-2 (including ripple)
<b>Local bus gateway</b>	Transmission speed Connection method Max. number of local bus devices Max. length of local bus	500 kbaud/2 Mbaud, can be selected M12 plug-in connector, B-coded 16 20 m
<b>Digital inputs</b>	Connection method Connection method Maximum number of inputs Filter time Input characteristic curve Protective circuit	M12 plug-in connector 2, 3, 4-wire 8 3 ms IEC 61131-2 type 1 Protection against polarity reversal
<b>General data</b>	Weight Drill hole spacing Width Degree of protection Ambient temperature (operation)	280 g 168 mm 70 mm IP65/67 -25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Fieldline Modular M12 bus coupler</b> - INTERBUS M12 - PROFINET M12 - PROFIBUS M12	FLM BK IB M12 DI 8 M12 <sup>1)</sup>	2736301	1



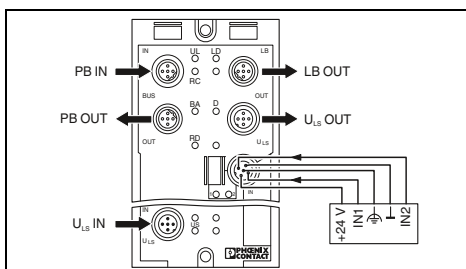
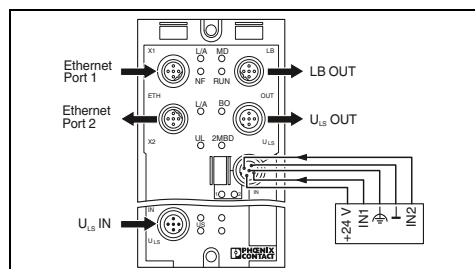
PROFINET



PROFIBUS



PROFIBUS  
Ex:



Technical data

PROFINET  
M12 plug-in connectors, D-coded  
4  
100 Mbps, autonegotiation  
-  
24 V DC  
M12 plug-in connector  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)  
-  
500 kbaud/2 Mbaud, can be selected  
M12 plug-in connector, B-coded  
16  
20 m  
M12 plug-in connector  
2, 3, 4-wire  
8  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal  
280 g  
168 mm  
70 mm  
IP65/67  
-25 °C ... 55 °C

Technical data

PROFIBUS DP  
M12 plug-in connector, B-coded  
5  
9.64 kbaud to 12 Mbaud automatic detection  
1 ... 126, adjustable  
24 V DC  
M12 plug-in connector  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)  
-  
500 kbaud/2 Mbaud, can be selected  
M12 plug-in connector, B-coded  
16  
20 m  
M12 plug-in connector  
2, 3, 4-wire  
8  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal  
280 g  
168 mm  
70 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
FLM BK PN M12 DI 8 M12-2TX <sup>1)</sup>	2736741	1

Ordering data

Type	Order No.	Pcs. / Pkt.
FLM BK PB M12 DI 8 M12 <sup>1)</sup>	2736330	1

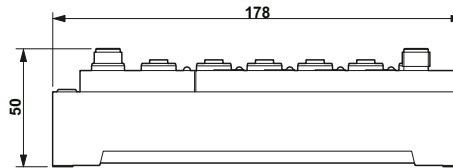


### Bus couplers – modular

The bus couplers open a high-performance local bus with up to 16 devices.

The following protocols are supported:

- INTERBUS
- PROFINET
- PROFIBUS
- DeviceNet™
- EtherNet/IP™
- Modbus TCP



DeviceNet™

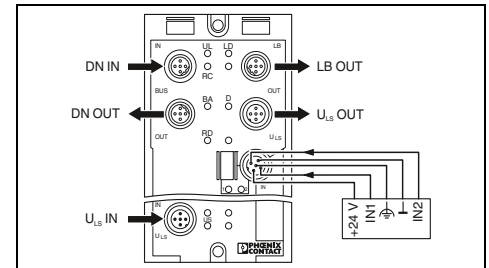
**Notes:**

A comprehensive range of installation materials for field installation can be found on page 304

1) EMC: Class A product, see page 553



EX: c UL US



#### Technical data

<b>Interface</b>	DeviceNet™ M12 plug-in connector, A-coded 5 125 kbaud, 250 kbaud, 500 kbaud automatic detection
Fieldbus system	0 ... 63, can be set
Connection method	24 V DC
Number of positions	M12 plug-in connector
Transmission speed	18 V DC ... 30 V DC IEC 61131-2 (including ripple)
Address area assignment	
Power supply for module electronics	
Supply voltage	
Connection method	
Supply voltage range	
<b>Local bus gateway</b>	500 kbaud/2 Mbaud, can be selected
Transmission speed	M12 plug-in connector, B-coded
Connection method	16
Max. number of local bus devices	20 m
Max. length of local bus	
<b>Digital inputs</b>	M12 plug-in connector
Connection method	2, 3, 4-wire
Connection method	8
Maximum number of inputs	3 ms
Filter time	IEC 61131-2 type 1
Input characteristic curve	Protection against polarity reversal
Protective circuit	
<b>General data</b>	
Weight	280 g
Drill hole spacing	178 mm
Width	70 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Fieldline Modular M12 bus coupler</b> - DeviceNet™ M12 - EtherNet/IP™ M12 - Ethernet M12	FLM BK DN M12 DI 8 M12 <sup>1)</sup>	2736343	1

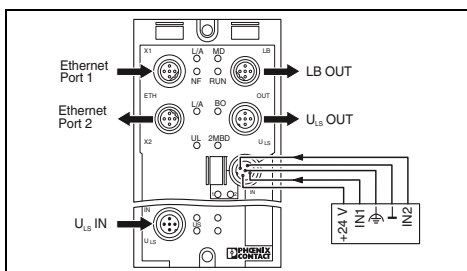
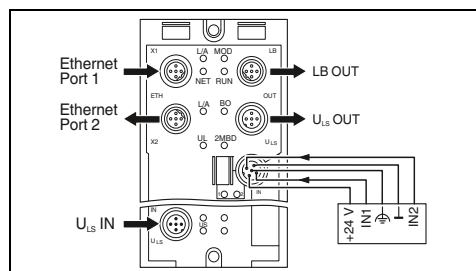


EtherNet/IP™

Ethernet



Modbus TCP



Technical data

Technical data

EtherNet/IP™

M12 plug-in connectors, D-coded  
4  
10/100 Mbps, autonegotiation

24 V DC  
M12 plug-in connector  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

500 kbaud/2 Mbaud, can be selected  
M12 plug-in connector, B-coded  
16  
20 m

M12 plug-in connector  
2, 3, 4-wire  
8  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

280 g  
178 mm  
70 mm  
IP65/67  
-25 °C ... 60 °C

Ethernet

M12 plug-in connectors, D-coded  
4  
10/100 Mbps, autonegotiation

24 V DC  
M12 plug-in connector  
18 V DC ... 30 V DC IEC 61131-2 (including ripple)

500 kbaud/2 Mbaud, can be selected  
M12 plug-in connector, B-coded  
16  
20 m

M12 plug-in connector  
2, 3, 4-wire  
8  
3 ms  
IEC 61131-2 type 1  
Protection against polarity reversal

280 g  
178 mm  
70 mm  
IP65/67  
-25 °C ... 60 °C

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
FLM BK EIP M12 DI 8 M12-2TX	2773322	1

Type	Order No.	Pcs. / Pkt.
FLM BK ETH M12 DI 8 M12-2TX	2736916	1

### Digital I/O devices M12 – modular

The local bus devices are used to acquire and output digital signals in a Fieldline Modular station.

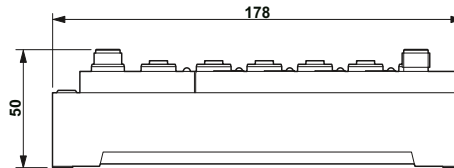
#### Features:

- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Flexible power supply concept
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Notes:

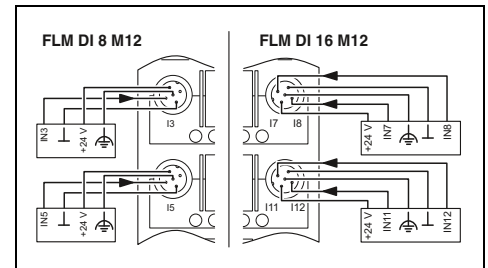
A comprehensive range of installation materials for field installation can be found on page 304

1) EMC: Class A product, see page 553



8/16 digital inputs

CE  
Ex: CE



#### Technical data

	FLM DI 8 M12 <sup>1)</sup>	FLM DI 16 M12
<b>Interface</b>		
Name		Local bus
Connection method		M12 plug-in connector, B-coded
Transmission speed		500 kbaud/2 Mbaud, can be selected
<b>Power supply for module electronics</b>		
Supply voltage		24 V DC
Connection method		M12 plug-in connector
Supply voltage range		18 V DC ... 30 V DC IEC 61131-2 (including ripple)
<b>Digital inputs</b>		
Connection method		M12 plug-in connector
Connection method		2, 3, 4-wire
Maximum number of inputs	8	16
Filter time		3 ms
Input characteristic curve		IEC 61131-2 type 1
Protective circuit		Protection against polarity reversal
<b>Digital outputs</b>		
Connection method		-
Connection method		-
Maximum number of outputs		-
Maximum output current per channel		-
Protective circuit		-
<b>General data</b>		
Weight	290 g	310 g
Drill hole spacing		168 mm
Width		70 mm
Degree of protection		IP65/67
Ambient temperature (operation)		-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Fieldline Modular M12 digital input device</b>			
- 8 inputs	FLM DI 8 M12 <sup>1)</sup>	2736288	1
- 16 inputs	FLM DI 16 M12	2736835	1
<b>Fieldline Modular M12 digital I/O device</b>			
- 4 inputs, 4 outputs, 2 A			
- 8 inputs, 8 outputs			
- 16 inputs, 16 outputs			
<b>Fieldline Modular M12 digital output device</b>			
- 8 outputs			



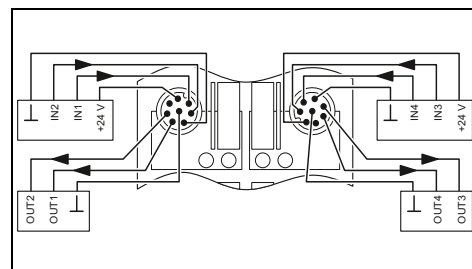
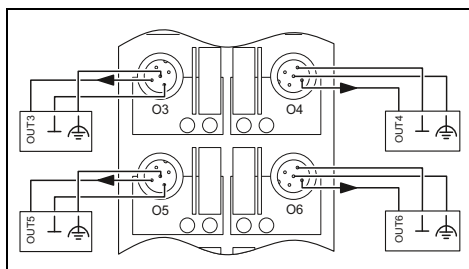
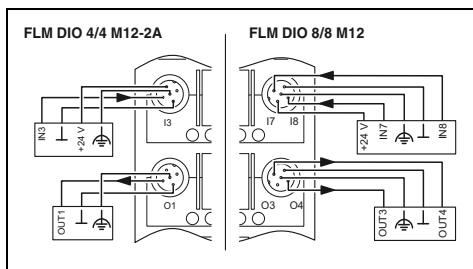
4/8 digital inputs and 4/8 digital outputs



8 digital outputs



16 digital inputs, 16 digital outputs, and extended diagnostics



Technical data		
FLM DIO 4/4 M12-2A <sup>1)</sup>	FLM DIO 8/8 M12	
Local bus		
M12 plug-in connector, B-coded		
500 kbaud/2 Mbaud, can be selected		
24 V DC		
M12 plug-in connector		
18 V DC ... 30 V DC IEC 61131-2 (including ripple)		
M12 plug-in connector		
2, 3, 4-wire		
4		8
3 ms		
IEC 61131-2 type 1		
Protection against polarity reversal		
M12 plug-in connector		
2, 3-wire		
4		8
2 A		500 mA
Short-circuit protection		
315 g		330 g
168 mm		
70 mm		
IP65/67		
-25 °C ... 60 °C		

Technical data		
Local bus		
M12 plug-in connector, B-coded		
500 kbaud/2 Mbaud, can be selected		
24 V DC		
M12 plug-in connector		
18 V DC ... 30 V DC IEC 61131-2 (including ripple)		
M12 plug-in connector		
2, 3-wire		
4		8
500 mA		
Short-circuit protection		
310 g		330 g
168 mm		
70 mm		
IP65/67		
-25 °C ... 60 °C		

Technical data		
Local bus		
M12 plug-in connector, B-coded		
500 kbaud/2 Mbaud, can be selected		
24 V DC		
M12 plug-in connector		
18 V DC ... 30 V DC IEC 61131-2 (including ripple)		
M12 plug-in connector, 8-pos.		
2, 3-wire		
16		16
3 ms		
IEC 61131-2 type 1		
Protection against polarity reversal		
M12 plug-in connector, 8-pos.		
2-wire		
16		16
500 mA		500 mA
Short-circuit protection, overload protection of the sensor supply		
400 g		400 g
168 mm		
70 mm		
IP65/67		
-25 °C ... 60 °C		

Ordering data		
Type	Order No.	Pcs. / Pkt.
FLM DIO 4/4 M12-2A <sup>1)</sup>	2736369	1
FLM DIO 8/8 M12	2736848	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FLM DO 8 M12 <sup>1)</sup>	2736291	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FLM DIO 16/16 M12-8-DIAG <sup>1)</sup>	2736738	1

### M12 IO-Link master – modular

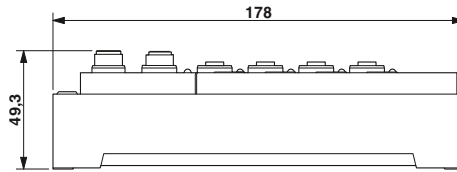
The IO-Link master enables the easy integration of IO-Link devices in a Fieldline Modular station.

#### Features:

- 4 IO-Link ports and 4 digital inputs
- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Flexible power supply concept
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Notes:

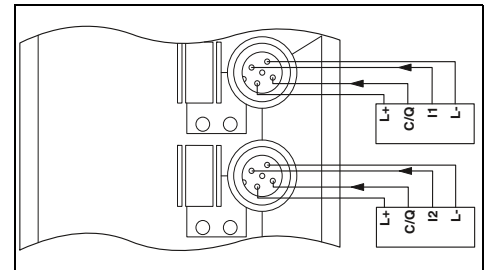
A comprehensive range of installation materials for field installation can be found on page 304



IO-Link



4 IO-Link ports and 4 digital inputs



#### Technical data

<b>Interface</b>	
Name	Local bus
Connection method	M12 plug-in connector, B-coded
Transmission speed	500 kbaud/2 Mbaud, can be selected
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Connection method	M12 plug-in connector
Supply voltage range	18 V DC ... 30 V DC IEC 61131-2 (including ripple)
<b>IO-Link ports</b>	
Connection method	M12 plug-in connector
Connection technology	3-wire
Number of ports	4
<b>IO-Link port supply</b>	
Sensor supply voltage	min. $U_S - 1$ V
Nominal current for every IO-Link port	max. 200 mA
Nominal current per device	800 mA
Protective circuit	Overload protection, electronics in the device Short-circuit protection, electronics in the device
<b>Digital inputs</b>	
Connection method	M12 plug connection
Connection technology	2, 3-wire
Number of inputs	4
Input filter time	Typ. 3 ms
Input characteristic curve	IEC 61131-2 type 1
Protective circuit	Protection against polarity reversal
<b>General data</b>	
Weight	280 g
Drill hole spacing	168 mm
Width	70 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Fieldline Modular M12 I/O device</b> - IO-Link master with four IO-Link ports and four digital inputs	<b>FLM IOL4 DI4 M12</b>	<b>2736990</b>	<b>1</b>

### M12 analog I/O devices – modular

The local bus devices are used to acquire and output analog signals in a Fieldline Modular station.

#### Features:

- Seamless connection via M12 connectors
- SPEEDCON rapid interlock system
- Flexible power supply concept
- Diagnostic and status indicators
- Short-circuit and overload protection

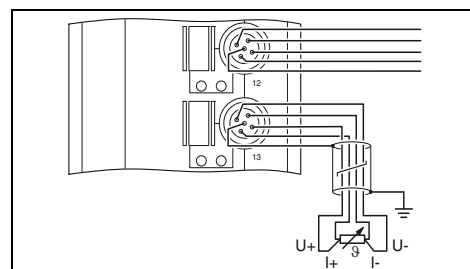
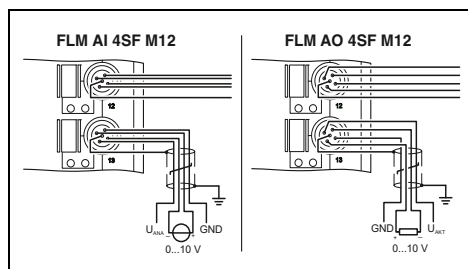
**Notes:**  
 A comprehensive range of installation materials for field installation can be found on page 304  
 1) EMC: Class A product, see page 553



4 analog inputs/outputs



4 temperature inputs for resistive sensors



Technical data	
FLM AI 4 SF M12 <sup>1)</sup>	FLM AO 4 SF M12 <sup>1)</sup>
Local bus	
M12 plug-in connector, B-coded	
500 kbps / 2Mbps	500 kbps / 2Mbps switchable
24 V DC	
18 V DC ... 30 V DC (including ripple)	
Analog inputs	
Connection technology	2, 4-wire
Number of inputs	max. 4 (differential inputs, voltage or current)
Voltage input signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Protective circuit for voltage input	Protection against polarity reversal
Process data update	-
Analog outputs	
Connection technology	2, 4-wire
Number of outputs	4
Voltage output signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
Current output signal	0 mA ... 20 mA / 4 mA ... 20 mA
Protective circuit	Short-circuit protection
General data	
Connection method	M12 plug-in connector
Weight	280 g
Drill hole spacing	168 mm
Width	70 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

Technical data	
Local bus	
M12 plug-in connector, B-coded	
500 kbps / 2 Mbps	
24 V DC	
18 V DC ... 30 V DC (including ripple)	
Analog inputs	
Connection technology	2, 3, 4-wire (shielded)
Number of inputs	max. 4 (for resistance temperature detectors)
Voltage input signal	-
Current input signal	-
Protective circuit for voltage input	-
Process data update	(Dependent on the connection method)
Analog outputs	
Connection technology	-
Number of outputs	-
Voltage output signal	-
Current output signal	-
Protective circuit	-
General data	
Connection method	M12 plug-in connector
Weight	280 g
Drill hole spacing	168 mm
Width	70 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>Fieldline Modular M12 analog input device</b> - 4 inputs	<b>FLM AI 4 SF M12<sup>1)</sup></b>	<b>2736453</b>
<b>Fieldline Modular M12 analog output device</b> - 4 outputs	<b>FLM AO 4 SF M12<sup>1)</sup></b>	<b>2736466</b>

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>Fieldline Modular M12 analog input device</b> - 4 inputs	<b>FLM TEMP 4 RTD M12<sup>1)</sup></b>	<b>2736819</b>

Interface	Name	Local bus
	Connection method	M12 plug-in connector, B-coded
	Transmission speed	500 kbps / 2Mbps
Power supply for module electronics	Supply voltage	24 V DC
	Supply voltage range	18 V DC ... 30 V DC (including ripple)
Analog inputs	Connection technology	2, 4-wire
	Number of inputs	max. 4 (differential inputs, voltage or current)
	Voltage input signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
	Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
	Protective circuit for voltage input	Protection against polarity reversal
	Process data update	-
Analog outputs	Connection technology	2, 4-wire
	Number of outputs	4
	Voltage output signal	0 V ... 5 V / -5 V ... 5 V / 0 V ... 10 V / -10 V ... 10 V
	Current output signal	0 mA ... 20 mA / 4 mA ... 20 mA
	Protective circuit	Short-circuit protection
General data	Connection method	M12 plug-in connector
	Weight	280 g
	Drill hole spacing	168 mm
	Width	70 mm
	Degree of protection	IP65/67
	Ambient temperature (operation)	-25 °C ... 60 °C

<b>Fieldline Modular M12 analog input device</b> - 4 inputs	<b>FLM AI 4 SF M12<sup>1)</sup></b>	<b>2736453</b>	<b>1</b>
<b>Fieldline Modular M12 analog output device</b> - 4 outputs	<b>FLM AO 4 SF M12<sup>1)</sup></b>	<b>2736466</b>	<b>1</b>

### Digital I/O devices M8 – modular

The narrow local bus devices are particularly suitable for use on machines close to the process.

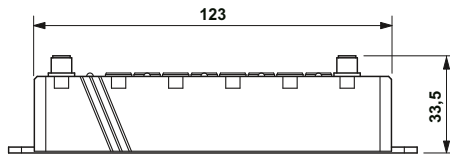
#### Features:

- Seamless connection via M8 connectors
- Optimized for 30 mm mounting profile
- Can also be connected to an Inline station
- Diagnostic and status indicators
- Short-circuit and overload protection

#### Notes:

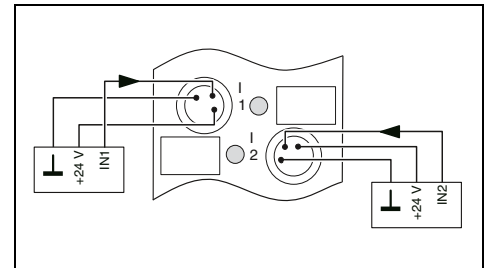
A comprehensive range of installation materials for field installation can be found on page 304

1) EMC: Class A product, see page 553



8 digital inputs

UL US  
Ex: c UL US



#### Technical data

<b>Interface</b>	
Name	Local bus
Connection method	M8 plug-in connector
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Connection method	M8 plug-in connector
Supply voltage range	18 V DC ... 30 V DC IEC 61131-2 (including ripple)
<b>Digital inputs</b>	
Connection method	M8 plug-in connector
Connection technology	2, 3-wire
Maximum number of inputs	8
Description of the inputs	-
Filter time	3 ms
Input characteristic curve	IEC 61131-2 type 1
Protective circuit	Protection against polarity reversal
<b>Digital outputs</b>	
Connection method	-
Connection technology	-
Maximum number of outputs	-
Description of the outputs	-
Maximum output current per channel	-
Protective circuit	-
<b>General data</b>	
Weight	137 g
Drill hole spacing	133 mm
Width	29.8 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Fieldline Modular M8 digital input device</b>			
- 8 inputs, 500 kBD			
<b>Fieldline Modular M8 digital I/O device</b>			
- 4 inputs fixed, 4 inputs/outputs freely selectable, 500 kBD	<b>FLM DI 8 M8</b>	<b>2773348</b>	<b>1</b>
<b>Fieldline Modular M8 digital output device</b>			
- 4 outputs, 2 A, 500 kBD			
- 8 outputs, 500 kBD			





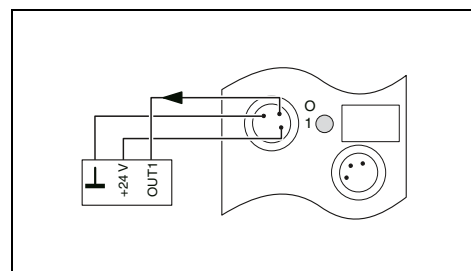
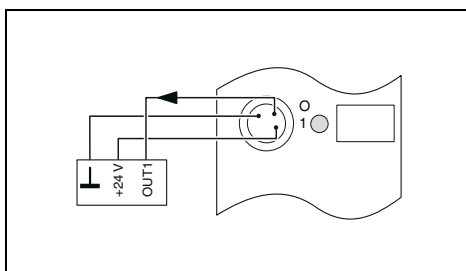
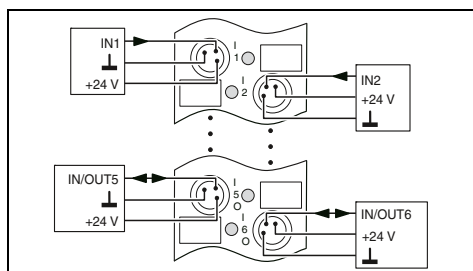
4 digital inputs and 4 digital inputs or outputs



4 digital outputs



8 digital outputs



Technical data	
Local bus	
M8 plug-in connector	
24 V DC	
M8 plug-in connector	
18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
M8 plug-in connector	
2, 3-wire	
8	
4 fixed, 4 freely selectable	
3 ms	
IEC 61131-2 type 1	
Protection against polarity reversal	
M8 plug-in connector	
2, 3-wire	
4	
Can also be used as inputs	
500 mA	
Short-circuit protection	
144 g	
133 mm	
29.8 mm	
IP65/67	
-25 °C ... 60 °C	

Technical data	
Local bus	
2 M8 plug-in connector	
24 V DC	
M8 plug-in connector	
18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
M8 plug-in connector	
2, 3-wire	
4	
-	
2 A	
Short-circuit protection	
137 g	
133 mm	
29.8 mm	
IP65/67	
-25 °C ... 60 °C	

Technical data	
Local bus	
M8 plug-in connector	
24 V DC	
M8 plug-in connector	
18 V DC ... 30 V DC IEC 61131-2 (including ripple)	
M8 plug-in connector	
2, 3-wire	
8	
-	
500 mA	
Short-circuit protection	
137 g	
133 mm	
29.8 mm	
IP65/67	
-25 °C ... 60 °C	

Ordering data		
Type	Order No.	Pcs. / Pkt.
FLM DIO 8/4 M8 <sup>1)</sup>	2773351	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FLM DO 4 M8-2A <sup>1)</sup>	2736932	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FLM DO 8 M8 <sup>1)</sup>	2736893	1

### Coupling options

Various adapters are available for connecting two systems.

- Connection of Fieldline Modular M8 to Fieldline Modular M12
- Connection of Fieldline Modular M8 or M12 to Inline Modular

<b>Notes:</b>
1) EMC: Class A product, see page 553



**Fieldline Modular M12/M8/Inline adapter**

Local bus interface
Interface
Connection method
Local bus interface
Interface
Connection method

Technical data	
Fieldline Modular M12 local bus	M12 plug-in connector, B-coded
Fieldline Modular M8 local bus	2 M8 plug-in connectors

<b>Description</b>
<b>Adapter piece</b> for coupling Fieldline Modular M8 local bus devices to a Fieldline Modular M12 local bus
<b>Inline Modular branch terminal</b> for coupling one Fieldline Modular M8 local bus at the end of an Inline station
<b>Inline Modular branch terminal</b> for coupling one Fieldline Modular M8 local bus to any location on each Inline station

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>FLM ADAP M12/M8</b>	<b>2736961</b>	1
<b>IB IL 24 FLM-PAC<sup>1)</sup></b>	<b>2736903</b>	1
<b>IB IL 24 FLM MULTI-PAC<sup>1)</sup></b>	<b>2737009</b>	1

### Mounting plates

Up to seven Fieldline Modular M12 devices can be mounted on the mounting plates.



**Mounting plate for up to 5 or 7 Fieldline Modular devices**

<b>General data</b>
Width
Depth
Height
Hole diameter
Note on dimensions
Assembly instructions
Material
Weight

Technical data		
	FLM MP 5	FLM MP 7
	360 mm	502 mm
		11 mm
		185 mm
		8.50 mm
	For fastening the mounting plate	
	For mounting	For mounting
	5 Fieldline Modular devices	7 Fieldline Modular devices
	Chromated aluminum	
	650 g	900 g

<b>Description</b>
<b>Fieldline Modular mounting plate</b>
- For five Fieldline Modular M12 devices
- For seven Fieldline Modular M12 devices

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>FLM MP 5</b>	<b>2736660</b>	1
<b>FLM MP 7</b>	<b>2736673</b>	1

## System components

Various system components with M12 plug-in connectors enable the easy creation of different topologies.

- T-connectors
- Termination resistors
- Y-distributors for power and signal connections



Distributors and termination resistors

		Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	
<b>Bus system T-connector</b> , 5-pos., M12 - PROFIBUS - DeviceNet™/CANopen®	SAC-M12T/2XM12 PBDP	1458884	1	
	SAC-5P-M12T/2XM12 VP	1541186	1	
<b>Termination resistor</b> , M12 plug - PROFIBUS - DeviceNet™/CANopen®	SAC-5P-M12MS PB TR	1507803	5	
	SAC-5P-M12MS CAN TR	1507816	5	
<b>Power cable</b> , 4-pos., PUR/PVC black, straight Y connector M12 on 2x straight socket M12, length: 0.3 m				
<b>M12 Y-distributor/connector</b> , with M12 socket M12 pin to 2 x M12 sockets	SAC-4P-M12Y/2X0,3-PUR/M12FS VP	1510722	1	
	SAC-3P-M12Y/2XM12FS PE	1683455	5	

## Installation material

- Sealing caps with external or inner thread
- Printed marking labels or marking labels without color print



Sealing caps and marking material

		Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	
<b>M12 screw plug</b> for non-assigned M12 sensor/actuator connections  for unoccupied M12 connectors of the sensor/actuator cable, flush-type plug-in connectors, and I/O devices in the field	PROT-M12	1680539	5	
	PROT-M12 FS	1560251	5	
<b>M8 screw plug</b> for unoccupied M8 sockets of the sensor/actuator cable, boxes, and flush-type plug-in connectors	PROT-M8	1682540	5	
<b>Zack marker strip, flat, 5-section, without color print</b> 5-section	ZBF 12:UNBEDRUCKT	0809735	10	
	ZBF 8:UNBEDRUCKT	0808781	10	
5-section	ZBF 12 CUS	0825018	1	
	ZBF 8 CUS	0825030	1	

## For field installation (IP67) – Fieldline

### Bus and power cable with M12 plug-in connector

Phoenix Contact offers a complete range of bus and power cables for the Fieldline system.



INTERBUS bus cable



PROFINET bus cable

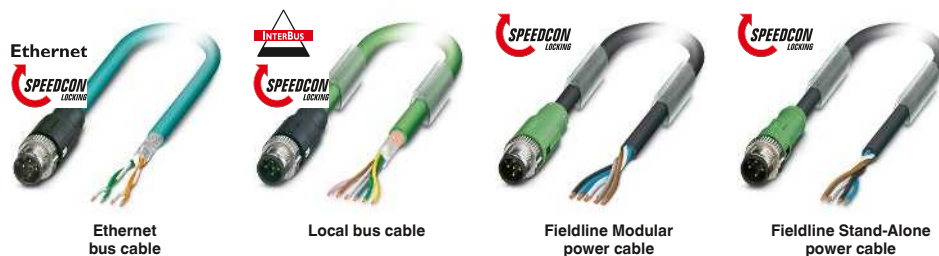


PROFIBUS bus cable



DeviceNet™/CANopen® bus cable

Description	Length of cable	Ordering data		Ordering data		Ordering data		Ordering data	
		Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.
<b>Pre-assembled bus cable</b>									
M12 pin, straight, shielded, free conductor end									
	1 m			1407495	1				
	2 m	1517877	1	1407496	1	1518025	1	1518177	1
	5 m	1517880	1	1407497	1	1518038	1	1518180	1
	10 m	1517893	1	1407498	1	1518041	1	1518193	1
	15 m	1517903	1	1524336	1	1518054	1	1518203	1
<b>Pre-assembled bus cable</b>									
M12 socket, straight, shielded, free conductor end									
	1 m			1407528	1				
	2 m	1517916	1	1407529	1	1518067	1	1518216	1
	5 m	1517929	1	1407530	1	1518070	1	1518229	1
	10 m	1517932	1	1407531	1	1518083	1	1518232	1
	15 m	1517945	1			1518096	1	1518245	1
<b>Pre-assembled bus cable</b>									
M12 pin, straight, shielded, M12 socket, straight, shielded									
	0.3 m	1517958	1			1518106	1	1518258	1
	0.5 m	1517961	1			1518119	1	1518261	1
	1 m	1517974	1	1407553	1	1518122	1	1518274	1
	2 m	1517987	1	1407554	1	1518135	1	1518287	1
	5 m	1517990	1	1407555	1	1518148	1	1518290	1
	10 m	1518009	1	1407556	1	1518151	1	1518300	1
	15 m	1518012	1			1518164	1	1518313	1
<b>Pre-assembled bus cable</b>									
M12 pin, straight, shielded, M12 pin, straight, shielded									
	0.3 m			1524349	1				
	0.5 m			1524352	1				
	1 m			1407524	1				
	2 m			1407525	1				
	5 m			1407526	1				
	10 m			1407527	1				
	15 m			1524404	1				



Description	Length of cable	Ordering data		Ordering data		Ordering data		Ordering data	
		Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.	Order No.	Pcs. / Pkt.
<b>Pre-assembled bus cable</b> M12 pin, straight, shielded, free conductor end	1 m	1407356	1						
	2 m	1407357	1	1517877	1				
	5 m	1407358	1	1517880	1				
	10 m	1407359	1	1517893	1				
	15 m	1569427	1	1517903	1				
<b>Pre-assembled bus cable</b> M12 socket, straight, shielded, free conductor end	1 m	1407380	1						
	2 m	1407381	1	1517916	1				
	5 m	1407382	1	1517929	1				
	10 m	1407383	1	1517932	1				
	15 m			1517945	1				
<b>Pre-assembled bus cable</b> M12 pin, straight, shielded, M12 socket, straight, shielded	0.13 m			1518478	1				
	0.3 m			1517958	1				
	0.5 m			1517961	1				
	1 m	1407400	1	1517974	1				
	2 m	1407401	1	1517987	1				
	5 m	1407402	1	1517990	1				
	10 m	1407403	1	1518009	1				
	15 m			1518012	1				
<b>Pre-assembled bus cable</b> M12 pin, straight, shielded, M12 pin, straight, shielded	0.3 m	1569430	1						
	0.5 m	1569443	1						
	1 m	1407376	1						
	2 m	1407377	1						
	5 m	1407378	1						
	10 m	1407379	1						
	15 m	1569498	1						
<b>Pre-assembled power cable</b> M12 pin, straight, free conductor end	2 m					1518326	1	1555606	1
	5 m					1518339	1	1555619	1
	10 m					1518342	1	1555622	1
	15 m					1518355	1	1555635	1
<b>Pre-assembled power cable</b> M12 socket, straight, free conductor end	2 m					1518368	1	1555648	1
	5 m					1518371	1	1555651	1
	10 m					1518384	1	1555664	1
	15 m					1518397	1	1555677	1
<b>Pre-assembled power cable</b> M12 pin, straight, M12 socket, straight	0.13 m			1518481	1				
	0.3 m			1518407	1			1555680	1
	0.5 m			1518410	1			1555693	1
	1 m			1518423	1			1555703	1
	2 m			1518436	1			1555716	1
	5 m			1518449	1			1555729	1
	10 m			1518452	1			1555732	1
	15 m			1518465	1			1555745	1

## For field installation (IP67) – Fieldline

### Bus and power cable with M8 plug-in connector

The following assembled cables are available for connecting Fieldline Modular M8 devices:

- System cables for the supply voltage and bus signal
- Power cables for the actuator voltage



Straight connector



Angled connector

Description	Length of cable	Ordering data			Ordering data		
		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Pre-assembled system cable</b> M8 pin, straight, shielded, free conductor end	2 m 5 m 10 m 20 m	SAC-4P-M 8MS/ 2,0-950 SAC-4P-M 8MS/ 5,0-950 SAC-4P-M 8MS/10,0-950 SAC-4P-M 8MS/20,0-950	1543249 1543252 1543265 1543281	1 1 1 1			
<b>Pre-assembled system cable</b> M8 pin, angled, shielded, free conductor end	2 m 5 m 10 m 20 m				SAC-4P-M 8MR/ 2,0-950 SAC-4P-M 8MR/ 5,0-950 SAC-4P-M 8MR/10,0-950 SAC-4P-M 8MR/20,0-950	1550850 1550863 1550876 1550892	1 1 1 1
<b>Pre-assembled system cable</b> M8 socket, straight, shielded, free conductor end	2 m 5 m 10 m 20 m	SAC-4P- 2,0-950/M 8FS SAC-4P- 5,0-950/M 8FS SAC-4P-10,0-950/M 8FS SAC-4P-20,0-950/M 8FS	1543294 1543304 1543317 1543333	1 1 1 1			
<b>Pre-assembled system cable</b> M8 socket, angled, shielded, free conductor end	2 m 5 m 10 m 20 m				SAC-4P- 2,0-950/M 8FR SAC-4P- 5,0-950/M 8FR SAC-4P-10,0-950/M 8FR SAC-4P-20,0-950/M 8FR	1550902 1550915 1550928 1550944	1 1 1 1
<b>Pre-assembled system cable</b> M8 pin, straight, shielded, M8 socket, straight, shielded	0.13 m 0.3 m 0.5 m 1 m 2 m 5 m 10 m 20 m	SAC-4P-M 8MS/ 0,13-950/M 8FS SAC-4P-M 8MS/ 0,3-950/M 8FS SAC-4P-M 8MS/ 0,5-950/M 8FS SAC-4P-M 8MS/ 1,0-950/M 8FS SAC-4P-M 8MS/ 2,0-950/M 8FS SAC-4P-M 8MS/ 5,0-950/M 8FS SAC-4P-M 8MS/10,0-950/M 8FS SAC-4P-M 8MS/20,0-950/M 8FS	1543346 1543511 1543524 1543537 1543359 1543362 1543375 1543391	1 1 1 1 1 1 1 1			
<b>Pre-assembled system cable</b> M8 pin, angled, shielded, M8 socket, angled, shielded	0.13 m 0.3 m 0.5 m 1 m 2 m 5 m 10 m 20 m				SAC-4P-M 8MR/ 0,13-950/M 8FR SAC-4P-M 8MR/ 0,3-950/M 8FR SAC-4P-M 8MR/ 0,5-950/M 8FR SAC-4P-M 8MR/ 1,0-950/M 8FR SAC-4P-M 8MR/ 2,0-950/M 8FR SAC-4P-M 8MR/ 5,0-950/M 8FR SAC-4P-M 8MR/10,0-950/M 8FR SAC-4P-M 8MR/20,0-950/M 8FR	1550957 1550960 1550973 1550986 1550999 1551008 1551011 1551037	1 1 1 1 1 1 1 1
<b>Pre-assembled power cable</b> M8 socket, straight, free conductor end, 4 x 0.34 mm <sup>2</sup>	2 m 5 m 10 m 20 m	SAC-4P- 2,0-PUR/M 8FS 0,34 SAC-4P- 5,0-PUR/M 8FS 0,34 SAC-4P-10,0-PUR/M 8FS 0,34 SAC-4P-20,0-PUR/M 8FS 0,34	1543582 1534818 1543595 1543618	1 5 1 1			
<b>Pre-assembled power cable</b> M8 socket, angled, free conductor end, 4 x 0.34 mm <sup>2</sup>	2 m 5 m 10 m 20 m				SAC-4P- 2,0-PUR/M 8FR 0,34 SAC-4P- 5,0-PUR/M 8FR 0,34 SAC-4P-10,0-PUR/M 8FR 0,34 SAC-4P-20,0-PUR/M 8FR 0,34	1553077 1553080 1553093 1553116	1 1 1 1

## Mountable plug-in connectors

Connectors that can be assembled enable the flexible cabling of Fieldline devices.

- M12 or M8 connection method
- Shielded or unshielded
- Spring-cage, QUICKON or Piercecon connection



M12 plug-in connector



M8 plug-in connector



Description	Ordering data			Ordering data		
	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>M12 plug-in connector, shielded</b> M12 pin, 5-pos., A-coded, spring-cage connection	SACC-M12MS-5SC SH	1512555	1			
M12 pin, 5-pos., B-coded, spring-cage connection	SACC-M12MSB-5SC SH	1513570	1			
M12 pin, 4-pos., D-coded, QUICKON connection	SACC-M12MSD-4Q SH	1543223	1			
M12 socket, 5-pos., A-coded, spring-cage connection	SACC-M12FS-5SC SH	1512571	1			
M12 socket, 5-pos., B-coded, spring-cage connection	SACC-M12FSB-5SC SH	1513596	1			
<b>M8 plug-in connector, shielded</b> M8 pin, 4-pos., screw connection M8 socket, 4-pos., screw connection				SACC-M 8MS-4CON-M-0,34-SH	1542897	1
<b>M12 plug-in connector, unshielded</b> M12 pin, 4-pos., A-coded, QUICKON connection method, cross section 0.14 - 0.34 mm <sup>2</sup> , SPEEDCON quick locking system	SACC-MS-4QO-0,34-M SCO	1521575	1	SACC-M 8FS-4CON-M-0,34-SH	1542910	1
M12 socket, 4-pos., A-coded, QUICKON connection method, cross section 0.14 - 0.34 mm <sup>2</sup> , SPEEDCON quick locking system	SACC-FS-4QO-0,34-M SCO	1521588	1			
M12 pin, 4-pos., A-coded, QUICKON connection method, cross section 0.34 - 0.75 mm <sup>2</sup> , SPEEDCON quick locking system	SACC-MS-4QO-0,75-M SCO	1521591	1			
M12 socket, 4-pos., A-coded, QUICKON connection method, cross section 0.34 - 0.75 mm <sup>2</sup> , SPEEDCON quick locking system	SACC-FS-4QO-0,75-M SCO	1521601	1			
M12 pin, 5-pos., A-coded, spring-cage connection	SACC-M12MS-5SC M	1508187	1			
M12 socket, 5-pos., A-coded, spring-cage connection	SACC-M12FS-5SC M	1508200	1			
<b>M8 plug-in connector, unshielded</b> M8 pin, 3-pos., Piercecon® connection M8 socket, 4-pos., Piercecon® connection				SACC-M 8MS-3PCON	1506752	1
				SACC-M 8FS-4PCON	1506781	1



# I/O systems

## For field installation (IP67) – AS-Interface

### Product overview

#### M12 I/O devices



Digital input 4 channels	2/2 channels	Digital input/output 4/3 channels	4/4 channels	Digital output 8 channels
312	313	313	313	312

#### M8 I/O devices



Digital input 4 channels	Digital output 4/4 channels
314	314

#### I/O devices in ME housing



Digital input/output		Digital output
4/4 channels	4/3 channels	4 channels
315	315	315

#### Gateways



PROFIBUS DP	
Standard function	Extended function
316	316



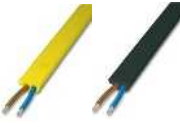










Inline Modular Standard function
317

#### Power supply units



Primary-switched	
2.4 A	4.8 A
318	318

## Accessories – installation material

						
<b>VS-ASI-FC-...</b> Flat-ribbon conductors	<b>...ASI-...-FIX</b> Mounting material	<b>Q 1,5/...-ASI BK</b> Panel feed-throughs	<b>HC-M-KV-...</b> Screw connections	<b>VS-ASI-J-Y...</b> Distributors	<b>VS-ASI-...-PUR-...M12...</b> Distributors with M12 round cable	<b>VS-ASI-J-Y-...</b> Distributors with M12 connection
319	319	319	319	320	320	321
						
<b>SAC-4P-...</b> M12 round cables	<b>ASI CC ADR</b> Manual addressing device for AS-i modules	<b>ASI CC ADR CAB CINCH</b> Cinch connecting cable, for addressing FLX ASI M12 devices	<b>PB ECO LINK</b> PROFIBUS ECO Link, RS-232 (V24) PROFIBUS converter			
307	<a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a>					

### Digital I/O devices with M12 connection technology

The innovative locking mechanism enables quick and easy installation of the I/O devices.

#### Features:

- Optimized for direct mounting and DIN rail mounting
- Tool-free connection to AS-Interface using penetration technique
- M12 connection technology with SPEED-CON rapid interlock system for the I/Os

#### Notes:

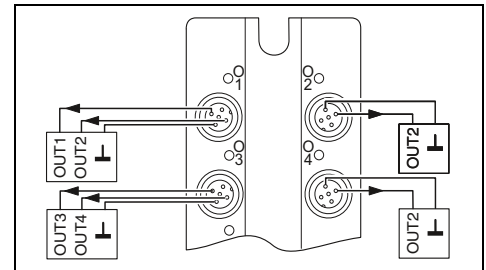
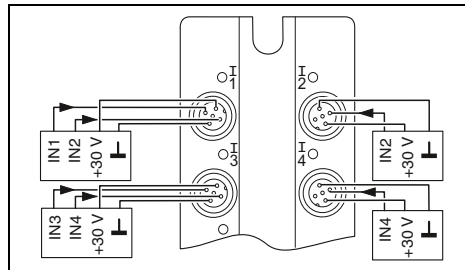
1) EMC: Class A product, see page 553



4 digital inputs



4 digital outputs



#### Technical data

#### Technical data

Interface	
Fieldbus system	AS-i
Connection method	Flat-ribbon cable penetration technique
AS-Interface	
AS-i specification	2.1
Required master specification	>= 2.0
AS-i profile	S-0.A.2
Digital inputs	
Connection method	M12 plug-in connector
Connection technology	2, 3-wire
Maximum number of inputs	4
Input characteristic curve	IEC 61131-2 type 2
Digital outputs	
Connection method	-
Connection technology	-
Maximum number of outputs	-
Maximum output current per channel	-
Maximum output current per module / terminal block	-
General data	
Weight	195 g
Drill hole spacing	108 mm
Width	58 mm
Height	118 mm
Depth	35 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 70 °C

Interface	
Fieldbus system	AS-i
Connection method	Flat-ribbon cable penetration technique
AS-Interface	
AS-i specification	2.0
Required master specification	>= 2.0
AS-i profile	S-8.1
Digital inputs	
Connection method	-
Connection technology	-
Maximum number of inputs	-
Input characteristic curve	-
Digital outputs	
Connection method	M12 plug-in connector
Connection technology	2-wire
Maximum number of outputs	4
Maximum output current per channel	2 A
Maximum output current per module / terminal block	4 A
General data	
Weight	195 g
Drill hole spacing	108 mm
Width	58 mm
Height	118 mm
Depth	35 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 70 °C

#### Ordering data

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Fieldline Extension AS-i digital input device</b>			
- 4 inputs	FLX ASI DI 4 M12 <sup>1)</sup>	2773429	1
<b>Fieldline Extension AS-i digital output device</b>			
- Four outputs, 2 A			
<b>Fieldline Extension AS-i digital I/O device</b>			
- 2 inputs, 2 outputs, 2 A			
- Four inputs, three outputs, 2 A			
- 4 inputs, 4 outputs, 2 A			

Type	Order No.	Pcs. / Pkt.
FLX ASI DI 4 M12 <sup>1)</sup>	2773429	1
FLX ASI DO 4 M12-2A <sup>1)</sup>	2773458	1

Type	Order No.	Pcs. / Pkt.
FLX ASI DO 4 M12-2A <sup>1)</sup>	2773458	1

#### Accessories

#### Accessories

<b>M12 screw plug</b>	PROT-M12	1680539	5
<b>Label sheet</b> for laser printers, 64 x 16 mm, color: white	BMKL 64X16 WH	0821807	2
<b>Label sheet</b> for laser printers, 108 x 16 mm, color: white			
<b>Manual addressing device</b> , for AS-Interface devices	ASI CC ADR	2741338	1
<b>Programming cable</b> , for addressing the AS-i devices	ASI CC ADR CAB CINCH	2741341	1

PROT-M12	1680539	5
BMKL 64X16 WH	0821807	2
ASI CC ADR	2741338	1
ASI CC ADR CAB CINCH	2741341	1

PROT-M12	1680539	5
BMKL 64X16 WH	0821807	2
ASI CC ADR	2741338	1
ASI CC ADR CAB CINCH	2741341	1



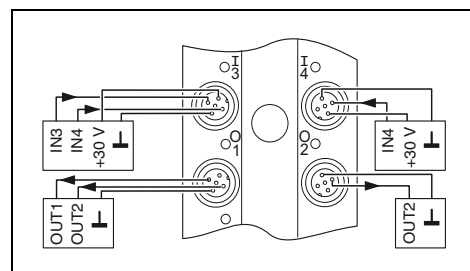
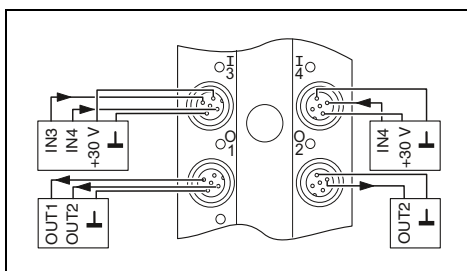
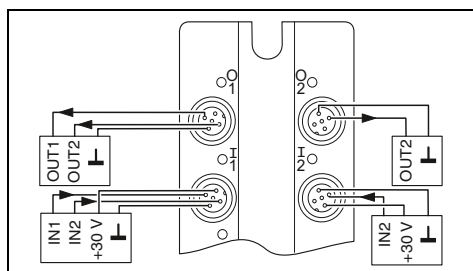
2 digital inputs and 2 digital outputs



4 digital inputs and 3 digital outputs



4 digital inputs and 4 digital outputs



Technical data

AS-i  
Flat-ribbon cable penetration technique

2.1  
≥ 2.0  
S-B.A.2

M12 plug-in connector  
2, 3-wire  
2  
IEC 61131-2 type 2

M12 plug-in connector  
2-wire  
2  
2 A  
4 A

195 g  
108 mm  
58 mm  
118 mm  
35 mm  
IP65/67  
-25 °C ... 70 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
FLX ASI DIO 2/2 M12-2A <sup>1)</sup>	2773432	1

Accessories

PROT-M12	1680539	5
BMKL 64X16 WH	0821807	2
ASI CC ADR	2741338	1
ASI CC ADR CAB CINCH	2741341	1

Technical data

AS-i  
Flat-ribbon cable penetration technique

2.1  
≥ 2.0  
S-7.A.2

M12 plug-in connector  
2, 3-wire  
4  
IEC 61131-2 type 2

M12 plug-in connector  
2-wire  
3  
2 A  
4 A

245 g  
108 mm  
58 mm  
150 mm  
35 mm  
IP65/67  
-25 °C ... 70 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
FLX ASI DIO 4/3 M12-2A <sup>1)</sup>	2773445	1

Accessories

PROT-M12	1680539	5
BMKL 11,5 (108X16) WH	0821797	2
ASI CC ADR	2741338	1
ASI CC ADR CAB CINCH	2741341	1

Technical data

AS-i  
Flat-ribbon cable penetration technique

3.0  
≥ 3.0  
S-7.A.7

M12 plug-in connector  
2, 3-wire  
4  
IEC 61131-2 type 2

M12 plug-in connector  
2-wire  
4  
2 A

245 g  
108 mm  
58 mm  
150 mm  
35 mm  
IP65/67  
-25 °C ... 70 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
FLX ASI 3.0 DIO 4/4 M12-2A <sup>1)</sup>	2773474	1

Accessories

PROT-M12	1680539	5
BMKL 11,5 (108X16) WH	0821797	2
ASI CC ADR	2741338	1
ASI CC ADR CAB CINCH	2741341	1

### Digital I/O devices with M8 connection technology

The digital I/O devices are particularly suitable for use in machines close to the process.

#### Features:

- Optimized for 30 mm mounting profile
- M12 connection technology with SPEED-CON rapid interlock system for the AS-Interface connection
- M8 connection technology for the I/Os

#### Notes:

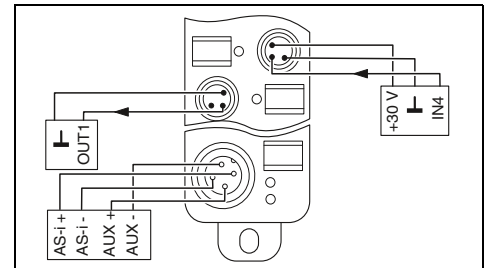
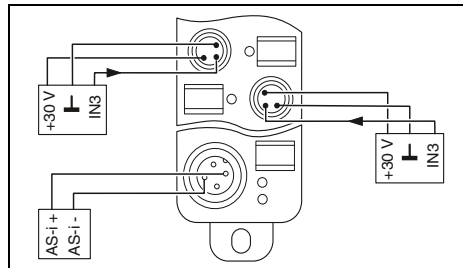
1) EMC: Class A product, see page 553



4 digital inputs



4 digital inputs and 4 digital outputs



#### Technical data

#### Technical data

Interface	
Fieldbus system	AS-i
Connection method	M12 plug-in connector, (A-coded)
AS-Interface	
AS-i specification	2.0
Required master specification	>= 2.0
AS-i profile	S-0.0
Digital inputs	
Connection method	M8 plug-in connector
Connection technology	2, 3-wire
Maximum number of inputs	4
Input characteristic curve	IEC 61131-2 type 2
Digital outputs	
Connection method	-
Connection technology	-
Maximum number of outputs	-
Maximum output current per channel	-
Maximum output current per module / terminal block	-
General data	
Weight	85 g
Drill hole spacing	93 mm
Width	30 mm
Height	26 mm
Depth	103 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 70 °C

Interface	
Fieldbus system	AS-i
Connection method	M12 plug-in connector, (A-coded)
AS-Interface	
AS-i specification	2.0
Required master specification	>= 2.0
AS-i profile	S-7.0
Digital inputs	
Connection method	M8 plug-in connector
Connection technology	2, 3-wire
Maximum number of inputs	4
Input characteristic curve	IEC 61131-2 type 2
Digital outputs	
Connection method	M8 plug-in connector
Connection technology	2-wire
Maximum number of outputs	4
Maximum output current per channel	1 A
Maximum output current per module / terminal block	4 A
General data	
Weight	125 g
Drill hole spacing	133 mm
Width	30 mm
Height	26 mm
Depth	143 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-25 °C ... 70 °C

#### Ordering data

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Fieldline Extension AS-i digital input device			
- 4 inputs	FLX ASI DI 4 M8 <sup>1)</sup>	2773403	1
Fieldline Extension AS-i digital I/O device			
- 4 inputs, 4 outputs, 1 A			

Type	Order No.	Pcs. / Pkt.
FLX ASI DI 4 M8 <sup>1)</sup>	2773403	1
FLX ASI DIO 4/4 M8-1A <sup>1)</sup>	2773416	1

#### Accessories

#### Accessories

Accessories	Order No.	Pcs. / Pkt.
PROT-M8	1682540	5
Zack marker strip, flat, 10-section, without color print	0808781	10
Manual addressing device, for AS-Interface devices	2741338	1

Accessories	Order No.	Pcs. / Pkt.
PROT-M8	1682540	5
ZBF 8:UNBEDRUCKT	0808781	10
ASI CC ADR	2741338	1

## Digital I/O devices with COMBICON connection technology

The narrow digital I/O devices in the ME range are particularly suitable for use in the control cabinet.

### Features:

- 12.5 mm design width
- Optimized for DIN rail mounting
- COMBICON connection technology for AS-Interface
- COMBICON connection technology for the I/Os



4 digital outputs



4 digital inputs and 3/4 digital outputs

### Notes:

1) EMC: Class A product, see page 553



Interface	
Fieldbus system	AS-i
Connection method	COMBICON plug-in connectors
AS-Interface	
AS-i specification	2.1
Required master specification	>= 2.0
AS-i profile	S-0.A.0
Digital inputs	
Connection method	COMBICON plug-in connectors
Connection method	2, 3-wire
Maximum number of inputs	4
Digital outputs	
Connection method	-
Connection method	-
Maximum number of outputs	-
Maximum output current per channel	-
Maximum output current per module / terminal block	-
General data	
Weight	150 g
Width	22.5 mm
Height	102 mm
Depth	105 mm
Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 60 °C

Technical data	
Interface	AS-i
Connection method	COMBICON plug-in connectors
AS-i specification	2.1
Required master specification	>= 2.0
AS-i profile	S-0.A.0
Digital inputs	
Connection method	COMBICON plug-in connectors
Connection method	2, 3-wire
Maximum number of inputs	4
Digital outputs	
Connection method	-
Connection method	-
Maximum number of outputs	-
Maximum output current per channel	-
Maximum output current per module / terminal block	-
General data	
Weight	150 g
Width	22.5 mm
Height	102 mm
Depth	105 mm
Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 60 °C

Technical data		
ASI IO ME DIO 4/4 AB <sup>1)</sup>	ASI IO ME DIO 4/3 AB <sup>1)</sup>	
Interface	AS-i	
Connection method	COMBICON plug-in connectors	
AS-i specification	3.0	2.1
Required master specification	>= 3.0	>= 2.0
AS-i profile	S-7.A.7	S-7.A.0
Digital inputs		
Connection method	COMBICON plug-in connectors	
Connection method	2, 3-wire	
Maximum number of inputs	4	
Digital outputs		
Connection method	COMBICON plug-in connectors	
Connection method	2-wire	2, 3-wire
Maximum number of outputs	4	3
Maximum output current per channel	0.7 A	1.5 A
Maximum output current per module / terminal block	2.8 A	6 A
General data		
Weight	150 g	
Width	22.5 mm	
Height	102 mm	
Depth	105 mm	
Degree of protection	IP20	
Ambient temperature (operation)	-25 °C ... 60 °C	

Description	
Fieldline Extension AS-i digital input device, including COMBICON plug	
- 4 inputs	
Fieldline Extension AS-i digital I/O device, including COMBICON plug	
- 4 inputs, 4 outputs	
- 4 inputs, 3 outputs	

Ordering data		
Type	Order No.	Pcs. / Pkt.
ASI IO ME DI 4 AB <sup>1)</sup>	2741671	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
ASI IO ME DIO 4/4 AB <sup>1)</sup>	2773542	1
ASI IO ME DIO 4/3 AB <sup>1)</sup>	2741668	1

Manual addressing device, for AS-Interface devices	ASI CC ADR	2741338	1
Programming cable, for addressing the AS-i devices	ASI CC ADR CAB CINCH	2741341	1

Accessories		
Type	Order No.	Pcs. / Pkt.
ASI CC ADR	2741338	1
ASI CC ADR CAB CINCH	2741341	1

Accessories		
Type	Order No.	Pcs. / Pkt.
ASI CC ADR	2741338	1
ASI CC ADR CAB CINCH	2741341	1

### Gateways for PROFIBUS DP

Fieldline Extension AS-Interface gateways enable the easy integration of AS-Interface in a PROFIBUS DP system.

#### Features:

- AS-Interface specification 3.0
- For one or two AS-Interface networks
- Stainless steel housing
- IP20 protection

#### Notes:

- 1) EMC: Class A product, see page 553



Standard function



Extended function, double master



	Technical data	Technical data	
<b>Interfaces</b>			
PROFIBUS DP remote bus	1x D-SUB-9 plug	1x D-SUB-9 plug	
AS-Interface	2-pos. COMBICON plug	2 x 2-pos. COMBICON plug	
<b>Power supply</b>			
Typical current consumption	Approx. 200 mA (from the AS-i network)	Approx. 200 mA (from AS-i circuit 1)	
<b>Indicators</b>			
Operating voltage, electronics module (UL)	Green LED	Green LED	
Operating voltage AS-i (U ASI)	Green LED	Green LED	
AS-i transmission (ASI ACTIVE)	Green LED	Green LED	
Programming mode active, automatic slave programming possible	Green LED	Green LED	
Configuration mode active (PRJ Enable)	Yellow LED	Yellow LED	
AS-i configure error (CONFIG ERR)	Red LED	Red LED	
<b>AS-Interface</b>			
Number of AS-i slaves	62	62	
AS-i specification	3.0	3.0	
<b>Operating elements</b>			
Keys	2 buttons (Mode/Set) for configuring the AS-i network	4 buttons (Mode/Set/ESC/OK) for configuring the AS-i network	
<b>General data</b>			
Weight	300 g	460 g	
Width	45 mm	75 mm	
Height	120 mm	120 mm	
Depth	44 mm	83 mm	
Degree of protection	IP20	IP20	
Ambient temperature (operation)	0 °C ... 55 °C	0 °C ... 55 °C	
Ambient temperature (storage/transport)	-25 °C ... 85 °C	-25 °C ... 85 °C	
	<b>Ordering data</b>	<b>Ordering data</b>	
<b>Description</b>	<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
<b>Fieldline Extension AS-i gateway for PROFIBUS DP</b>			
- With standard function	<b>FLX ASI MA PB SF<sup>1)</sup></b>	<b>2773597</b>	<b>1</b>
- With extended function, double master			
	<b>FLX ASI MA 2 PB EF<sup>1)</sup></b>	<b>2773607</b>	<b>1</b>
	<b>Accessories</b>	<b>Accessories</b>	
<b>PROFIBUS ECO Link, RS-232 (V.24) PROFIBUS converter, incl. software for PC</b>	<b>PB ECO LINK<sup>1)</sup></b>	<b>2741480</b>	<b>1</b>
	<b>PB ECO LINK<sup>1)</sup></b>	<b>2741480</b>	<b>1</b>



### Gateway for Inline Modular

When used in combination with an appropriate Inline bus coupler, the AS-Interface gateway for Inline enables universal integration in the following networks,

- INTERBUS
- PROFINET
- PROFIBUS
- CANopen®
- DeviceNet™
- EtherNet/IP™

<b>Notes:</b>
The driver function blocks can be obtained free of charge on the Internet at <a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a> under Download on the product page of the corresponding module.
1) EMC: Class A product, see page 553



Standard function

<b>Interfaces</b>
Local bus
AS-Interface
<b>Power supply</b>
Typical current consumption
<b>Indicators</b>
Local bus diagnostics
Operating voltage AS-i (U ASI)
PCP communication
Automatic address programming active
Configuration mode active (PRJ Enable)
AS-i configure error (CONFIG ERR)
<b>AS-Interface</b>
Number of AS-i slaves
AS-i specification
<b>Operating elements</b>
Keys
<b>General data</b>
Number of PCP data
Weight
Width
Height
Depth
Degree of protection
Ambient temperature (operation)
Ambient temperature (storage/transport)

Technical data	
Inline data jumper	
Inline connectors	
Typical current consumption	200 mA (from the AS-i network)
Local bus diagnostics	Green LED
Operating voltage AS-i (U ASI)	Green LED
PCP communication	Green LED
Automatic address programming active	Green LED
Configuration mode active (PRJ Enable)	Yellow LED
AS-i configure error (CONFIG ERR)	Red LED
Number of AS-i slaves	62
AS-i specification	2.1
Keys	2 buttons (Mode/Set) for configuring the AS-i network
Number of PCP data	1 word
Weight	210 g
Width	73.2 mm
Height	119.8 mm
Depth	71.5 mm
Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 55 °C
Ambient temperature (storage/transport)	-25 °C ... 85 °C

<b>Description</b>
<b>Fieldline Extension AS-i gateway</b> for Inline Modular

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>ASI MA IL UNI<sup>1)</sup></b>	<b>2736628</b>	<b>1</b>

### Power supply units

The power supply units specially designed for AS-Interface offer the following features:

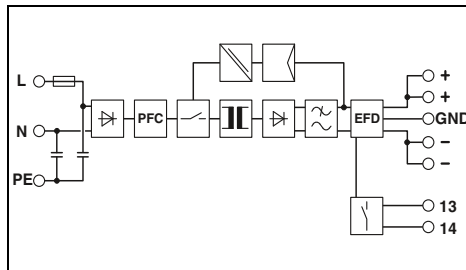
- 2.4 A or 4.8 A nominal output current
- Integrated ground fault detector
- Wide-range input for operation on all common AC and DC networks



2.4 A

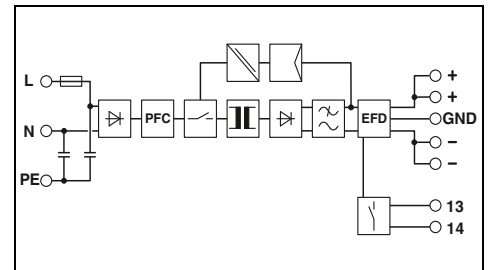


4.8 A



#### Technical data

Input data	
Nominal input voltage range	100 V AC ... 240 V AC
Frequency range	45 Hz ... 65 Hz / 0 Hz
Current consumption (nominal load)	Approx. 1 A (120 V AC) / 0.5 A (230 V AC)
Inrush current limitation at 25°C (typ.) / I <sub>st</sub>	< 15 A / 2.2 A <sup>2</sup> s
Mains buffering (I <sub>N</sub> , typ.)	> 20 ms (120 V AC) / > 80 ms (230 V AC)
Switch-on time after applying the mains voltage	< 0.5 s
Input fuse	5 A (slow-blow, internal)
Output data	
Nominal output voltage	30.1 V DC ±1.5%
Output current	2.4 A / 3 A
Output current / max. output current	2.4 A / - 3 A
Max. power dissipation (no load / nominal load)	3 W / 11 W
Residual ripple	< 30 mV <sub>pp</sub>
Signaling	
Signaling DC OK	LED
Signaling EFD	LED, relay contact
General data	
Weight / dimensions W x H x D	0.75 kg / 55 x 145 x 125 mm
Installation position	horizontal DIN rail NS 35, EN 60715
Spacing when mounting	Can be aligned: horizontally 0 mm, vertically 50 mm
Connection method	Plug-in spring-cage connection
Degree of protection / protection class	IP20 / I, IEC 61140, EN 61140, VDE 0140-1
MTBF (EN 29500, 40°C)	> 500000 h
Type of housing	AluNox (AlMg1)
Ambient temperature (operation)	-25 °C ... 70 °C (> 60 °C derating)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
UL approvals	UL/C-UL listed UL 508, UL/C-UL Recognized UL 60950



#### Technical data

Input data	
Nominal input voltage range	100 V AC ... 240 V AC
Frequency range	45 Hz ... 65 Hz / 0 Hz
Current consumption (nominal load)	Approx. 1.8 A (120 V AC) / 1 A (230 V AC)
Inrush current limitation at 25°C (typ.) / I <sub>st</sub>	< 15 A / 2.2 A <sup>2</sup> s
Mains buffering (I <sub>N</sub> , typ.)	> 60 ms (120 V AC) / > 100 ms (230 V AC)
Switch-on time after applying the mains voltage	< 0.5 s
Input fuse	5 A (slow-blow, internal)
Output data	
Nominal output voltage	30.1 V DC ±1.5%
Output current	4.8 A / 6 A
Output current / max. output current	4.8 A / - 6 A
Max. power dissipation (no load / nominal load)	4 W / 16 W
Residual ripple	< 30 mV <sub>pp</sub>
Signaling	
Signaling DC OK	LED
Signaling EFD	LED, relay contact
General data	
Weight / dimensions W x H x D	0.9 kg / 70 x 145 x 125 mm
Installation position	horizontal DIN rail NS 35, EN 60715
Spacing when mounting	Can be aligned: horizontally 0 mm, vertically 50 mm
Connection method	Plug-in spring-cage connection
Degree of protection / protection class	IP20 / I, IEC 61140, EN 61140, VDE 0140-1
MTBF (EN 29500, 40°C)	> 500000 h
Type of housing	AluNox (AlMg1)
Ambient temperature (operation)	-25 °C ... 70 °C (> 60 °C derating)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
UL approvals	UL/C-UL listed UL 508, UL/C-UL Recognized UL 60950

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Power supply unit, primary-switched	ASI QUINT 100-240/2.4 EFD	2736686	1

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Power supply unit, primary-switched	ASI QUINT 100-240/4.8 EFD	2736699	1

## Flat-ribbon conductors, flat-ribbon conductor connectors and panel feed-throughs

Applications can be implemented in a wide range of fields thanks to the four different flat-ribbon conductor materials.

Components, e.g., with QUICKON fast connection technology, are available to connect or feed through these flat-ribbon conductors.



Flat-ribbon conductors and accessories



Flat-ribbon conductors and panel feed-throughs with QUICKON fast connection technology



			Technical data			Technical data		
			VS-ASI-FC-PVC...	VS-ASI-FC-PUR...		Q 1,5/4IDC	Q 1,5/4M20	
Mechanical data								
No. of pos.			2	2		4	4	
Degree of protection			-	-		IP65/67	IP65/67	
Cable data								
Outer sheath material			PVC	PUR		-	-	
Conductor cross section			1.5 mm <sup>2</sup>	1.5 mm <sup>2</sup>		-	-	
Connector data QUICKON connection								
Conductor cross section [mm <sup>2</sup> ]			- ... -	- ... -		0.75 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>	0.75 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>	
Conductor cross section [AWG]			- ... -	- ... -		18 ... 16	18 ... 16	
Temperature data								
Plug / socket			[°C]	-	-	-25 ... 80	-25 ... 80	
Cable, fixed installation			[°C]	-30 ... 90	-40 ... 85	-	-	
Cable, flexible installation			[°C]	-20 ... 90	-30 ... 85	-	-	
			Ordering data			Ordering data		
Description			Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>AS-Interface EPDM flat-ribbon conductor, 2 x 1.5 mm<sup>2</sup></b>								
Yellow	100 m		VS-ASI-FC-EPDM-YE 100M	1432402	1			
Yellow	1000 m		VS-ASI-FC-EPDM-YE 1000M	1434646	1			
Black	100 m		VS-ASI-FC-EPDM-BK 100M	1432415	1			
Black	1000 m		VS-ASI-FC-EPDM-BK 1000M	1434659	1			
<b>AS-Interface PVC flat-ribbon conductor acc. to UL, 2 x 1.5 mm<sup>2</sup></b>								
Yellow	100 m		VS-ASI-FC-PVC-UL-YE 100M	1404906	1			
Yellow	1000 m		VS-ASI-FC-PVC-UL-YE/1000	1404867	1			
Black	100 m		VS-ASI-FC-PVC-UL-BK 100M	1404919	1			
Black	1000 m		VS-ASI-FC-PVC-UL-BK/1000	1404870	1			
<b>AS-Interface TPE flat-ribbon conductor acc. to UL, 2 x 1.5 mm<sup>2</sup></b>								
Yellow	100 m		VS-ASI-FC-TPE-UL-YE 100M	1404922	1			
Yellow	1000 m		VS-ASI-FC-TPE-UL-YE 1000M	1434662	1			
Black	100 m		VS-ASI-FC-TPE-UL-BK 100M	1404935	1			
Black	1000 m		VS-ASI-FC-TPE-UL-BK 1000M	1434675	1			
<b>AS-Interface PUR flat-ribbon conductor, 2 x 1.5 mm<sup>2</sup></b>								
Yellow	100 m		VS-ASI-FC-PUR-YE 100M	1404883	1			
Yellow	1000 m		VS-ASI-FC-PUR-YE/1000	1404841	1			
Black	100 m		VS-ASI-FC-PUR-BK 100M	1404896	1			
Black	1000 m		VS-ASI-FC-PUR-BK/1000	1404854	1			
<b>Flat connector, 4-pos., for connecting one or two AS-i flat-ribbon conductors</b>								
<b>Panel feed-through, for accommodating one or two AS-i flat-ribbon conductors, on the rear side with manual solder/slip-on connection 4.8 x 0.8 mm</b>						Q 1,5/4IDC/24-24KU-KU-ASI-BK	1585058	1
<b>Panel feed-through, for accommodating one or two AS-Interface flat-ribbon conductors, on the rear side with four individual 1.5 mm<sup>2</sup> wires</b>						Q 1,5/4FL/24-M20KU-ESA-ASI BK	1437261	1
<b>Metal gland, for AS-Interface flat-ribbon conductor</b>						Q 1,5/4A50/24-M20KU-ESA-ASI BK	1437274	1
Thread type: M20						HC-M-KV-M20(1ASI)	1584017	10
Thread type: M25						HC-M-KV-M25(1ASI)	1584020	10

## For field installation (IP67) – AS-Interface

### Distributor with spring-cage connection and with round conductors

Thanks to the distributors, it is extremely easy to create various topologies.

The following combinations are available:

- Flat-ribbon conductor to spring-cage terminal block
- Flat-ribbon conductor to flat-ribbon conductor
- Flat-ribbon conductor to round cable



Flat-ribbon conductor distributors and distributors with spring-cage connection



Distributor with round cable and molded M12 plug-in connector with SPEEDCON

		Technical data		Technical data			
		SAC-ASI-J-Y-B...	VS-ASI-J-Y-Y-N	SAC-ASI-J-Y-N...	SAC-ASI-J-Y-B...		
Electrical data							
Rated voltage		≤ 35 V	≤ 35 V	≤ 35 V	≤ 35 V		
Rated current		≤ 6 A	≤ 8 A	≤ 4 A	≤ 4 A		
Material specifications for exit							
Material of grip		-	-	TPU	TPU		
Material specifications for distributor							
Housing material		PA-GF	PA-GF	PA-GF	PA-GF		
Mechanical data							
No. of pos.		4	4	2	4		
Degree of protection		IP20	IP65/IP67/IP69K	IP65/67	IP65/67		
Connection data for spring-cage terminal blocks							
Conductor cross section		0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>	-	-	-		
Connection cross section AWG		24 ... 16	-	-	-		
Cable data							
Outer sheath material		-	-	PUR	PUR		
External cable diameter		-	-	4.70 mm	4.70 mm		
Conductor cross section		-	-	0.34 mm <sup>2</sup>	0.34 mm <sup>2</sup>		
Temperature data							
Plug / socket	[°C]	-25 ... 75	-25 ... 75	-25 ... 75	-25 ... 75		
Cable, fixed installation	[°C]	-	-	-25 ... 75	-25 ... 75		
Cable, flexible installation	[°C]	-	-	-5 ... 75	-5 ... 75		
		Ordering data		Ordering data			
Description	Cable length	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>AS-Interface distributor</b> with IP20 degree of protection for <b>two flat-ribbon conductors</b> , 4-pos., with <b>spring-cage terminal blocks</b>		<b>VS-ASI-J-Y-B-FFKDS</b>	<b>1404498</b>	<b>1</b>			
<b>AS-Interface H distributors</b> with high degree of protection, for distribution from one to two flat-ribbon conductors		<b>VS-ASI-J-Y-Y-N</b>	<b>1404508</b>	<b>1</b>			
<b>AS-Interface distributors</b> with IP67 protection for <b>one flat-ribbon conductor</b> , with <b>PUR</b> round cable and molded, <b>straight</b> , A-coded, <b>2-pos.</b> M12 socket with SPEEDCON	1 m 2 m				<b>VS-ASI-J-Y-N-PUR-1,0-M12FS SCO</b> <b>VS-ASI-J-Y-N-PUR-2,0-M12FS SCO</b>	<b>1404430</b> <b>1404443</b>	<b>1</b> <b>1</b>
<b>AS-Interface distributors</b> with IP67 protection for <b>two flat-ribbon conductors</b> , with <b>PUR</b> round cable and molded, <b>straight</b> , A-coded, <b>4-pos.</b> M12 socket with SPEEDCON	1 m 2 m				<b>VS-ASI-J-Y-B-PUR-1,0-M12FS SCO</b> <b>VS-ASI-J-Y-B-PUR-2,0-M12FS SCO</b>	<b>1404456</b> <b>1404472</b>	<b>1</b> <b>1</b>
<b>AS-Interface distributors</b> with IP67 protection for <b>two flat-ribbon conductors</b> , with <b>PUR</b> round cable and molded, <b>angled</b> , A-coded, <b>4-pos.</b> M12 socket with SPEEDCON	1 m 2 m				<b>VS-ASI-J-Y-B-PUR-1,0-M12FR SCO</b> <b>VS-ASI-J-Y-B-PUR-2,0-M12FR SCO</b>	<b>1404469</b> <b>1404485</b>	<b>1</b> <b>1</b>

**Distributors with M12 sockets, with screw connection, pre-assembled round conductors**

Thanks to the distributors, it is extremely easy to create various topologies.

The following combinations are available:

- Flat-ribbon conductor to M12 socket
- Flat-ribbon conductor to screw connection



**Distributors with M12 slot and with screw connection**



**PUR round conductors with molded M12-SPEEDCON plug-in connectors**



Technical data	
VS-ASI-J-Y-N-M12FS	VS-ASI-J-Y-N-SWA-LC
Material data	
Housing material	PA-GF
Material of grip body	-
No. of pos.	2
Degree of protection	IP65/IP67/IP69K
Connection data for screw connection	
Conductor cross section	-
Connection cross section AWG	0.14 mm <sup>2</sup> ... 1 mm <sup>2</sup> (solid)
Conductor cross section	26 ... 17 (solid)
Conductor cross section	0.14 mm <sup>2</sup> ... 0.75 mm <sup>2</sup> (With ferrules)
Connection cross section AWG	26 ... 18 (With ferrules)
Cable data	
Conductor cross section	-
Temperature data	
Plug / socket	[°C] -25 ... 75
Cable, fixed installation	[°C] -25 ... 70
Cable, flexible installation	[°C] -

Technical data	
-	-
Material data	
Housing material	TPU, hardly inflammable, self-extinguishing
No. of pos.	4
Degree of protection	IP65/IP68/IP69K
Connection data for screw connection	
Conductor cross section	-
Connection cross section AWG	-
Conductor cross section	-
Connection cross section AWG	-
Cable data	
Conductor cross section	0.75 mm <sup>2</sup>
Temperature data	
Plug / socket	[°C] -25 ... 90
Cable, fixed installation	[°C] -25 ... 80
Cable, flexible installation	[°C] -5 ... 80

Ordering data		
Type	Order No.	Pcs. / Pkt.
AS-Interface distributor for flat-ribbon conductors, with straight, A-coded M12 socket		
oneflat-ribbon conductor, 2-pos.	VS-ASI-J-Y-N-M12FS	1404414
two flat-ribbon conductors, 4-pos.	VS-ASI-J-Y-B-M12FS	1404427
AS-Interface distributor, with straight, A-coded M12 socket		
oneflat-ribbon conductor 2-pos.	VS-ASI-J-Y-N-M12FS-LC	1433155
AS-Interface distributor, with screw connection, angled		
one flat-ribbon conductor, 2-pos.	VS-ASI-J-Y-N-SWA-LC	1433168
Pre-assembled round conductor		
M12 pin, straight, free conductor end		
2 m		
5 m		
10 m		
15 m		
Pre-assembled round conductor		
M12 socket, straight, free conductor end		
2 m		
5 m		
10 m		
15 m		
Pre-assembled round conductor		
M12 pin, straight, M12 socket, straight		
0.3 m		
0.5 m		
1 m		
2 m		
5 m		
10 m		
15 m		

Ordering data		
Type	Order No.	Pcs. / Pkt.
SAC-4P-MS/ 2,0-186 SCO	1555606	1
SAC-4P-MS/ 5,0-186 SCO	1555619	1
SAC-4P-MS/10,0-186 SCO	1555622	1
SAC-4P-MS/15,0-186 SCO	1555635	1
SAC-4P- 2,0-186/FS SCO	1555648	1
SAC-4P- 5,0-186/FS SCO	1555651	1
SAC-4P-10,0-186/FS SCO	1555664	1
SAC-4P-15,0-186/FS SCO	1555677	1
SAC-4P-MS/ 0,3-186/FS SCO	1555680	1
SAC-4P-MS/ 0,5-186/FS SCO	1555693	1
SAC-4P-MS/ 1,0-186/FS SCO	1555703	1
SAC-4P-MS/ 2,0-186/FS SCO	1555716	1
SAC-4P-MS/ 5,0-186/FS SCO	1555729	1
SAC-4P-MS/10,0-186/FS SCO	1555732	1
SAC-4P-MS/15,0-186/FS SCO	1555745	1

#### System components



**Monitoring device  
PROFINET**  
324



**Digital input  
16 channels**  
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#### Digital I/O devices

Digital input/output	
16/8 channels	8/8 channels
325	325

#### PROFINET accessories

**Marking labels**  
 2732729 IBS RL MARKER-SET  
 2734727 IBS RL MARKER-G-SET  
 2734730 IBS RL MARKER-K-SET

**Welding protection**  
 2734976 IBS RL COVER

**Mounting plate**  
 2731128 IBS RL AP

PWR1  
PWR2  
ETH1  
ETH2

**Plug for PROFINET**  
 1405141 VS-PPC-C1-RJ45-MNNA-PG9-4Q5-B  
 1608032 VS-PPC-C1-SCRJ-MNNA-PG9-A4D-C

**Plug for supply voltage**  
 1608074 VS-PPC-C2-MSTB-P13-A5-SP

**Assembled PROFINET cables**  
 RJ45 push/pull plug-in connector, metal housing

1 m, stranded	1608333
2 m, stranded	1608346
5 m, stranded	1608359
Variable, stranded	1608362
1 m, highly stranded	1608579
2 m, highly stranded	1608582
5 m, highly stranded	1608595
Variable, highly stranded	1608605

**Assembled supply voltage cables**  
 Push/pull plug-in connector, metal housing

1 m, 5 x 2.5 mm <sup>2</sup>	1609170
2 m, 5 x 2.5 mm <sup>2</sup>	1609183
5 m, 5 x 2.5 mm <sup>2</sup>	1609196
Variable, 5 x 2.5 mm <sup>2</sup>	1609206
1 m, 5 x 1.5 mm <sup>2</sup>	1609219
2 m, 5 x 1.5 mm <sup>2</sup>	1609222
5 m, 5 x 1.5 mm <sup>2</sup>	1609235
Variable, 5 x 1.5 mm <sup>2</sup>	1609248

Product overview for INTERBUS devices

System components



**Bus terminals  
INTERBUS**  
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**Monitoring devices  
INTERBUS**  
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Digital I/O devices



**Digital input  
16 channels**  
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**Digital output  
16 channels**  
327

**8 channels**  
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**Digital input/output  
4/2 channels**  
329

**8/8 channels**  
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Relay devices



**Relay N/O contact outputs  
5 channels**  
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**8 channels**  
330

Motor starters



**Single-channel, reversing-load operation  
400 V**  
331

**480 V**  
331

INTERBUS accessories

**Marking labels**  
2732729 IBS RL MARKER-SET  
2734727 IBS RL MARKER-G-SET  
2734730 IBS RL MARKER-K-SET

**Welding protection**  
2734976 IBS RL COVER

**Adapter plug**  
2725037 IBS RL 24 ADAP-T/LK  
2725040 IBS RL 24 ADAP-LK/T  
2734109 IBS RL 24 ADAP-M23/T  
2734112 IBS RL 24 ADAP-T/M23

**Mounting plate**  
2731128 IBS RL AP

**M12 filler plug**  
1680539 PROT-M12

**Ruggedline dust protection plug**  
2819969 IBS RL PROT LK  
(Not an IP67 plug)

**Plug for fiber optic bus**  
2731076 IBS RL PLUG-LK/POF  
2734183 IBS RL PLUG-LK/POF-F

**Plug for copper bus**  
2731898 IBS RL PLUG-T  
2734196 IBS RL PLUG-T-F

**Pre-assembled cables**  
2733029 IBS RL CONNECTION-LK  
2733061 IBS RL CONNECTION-T  
2819956 IBS RL CABLE POF1/Y

**Supply cables**  
2820000 IBS PWR/5  
2731775 IBS PWR/5 HD/F

**Fiber optic bus cable:**  
2744319 PSM-LWL/KDHEAVY-980/1000  
2744322 PSM-LWL/RUGGED-980/1000  
2744335 PSM-LWL/RUGGED-FLEX-980/1000

**Copper bus cable:**  
2806286 IBS RBC METER-T  
2723123 IBS RBC METER-F-T

**Fiber cutter for FO plug assembly**  
2725147 IBS RL FOC

**Ordering example for pre-assembled cable sets:**

Quantity	Order No.	Cable type	Length [m]
1	2819956	C78	1.1
1 plug, 2 cables	Standard	C78 = RL plug/open end, FO + voltage	1 m - 1.5 m
	Stranded	C79 = RL plug/open end, FO + voltage, stranded	(in 0.1 m increments)
2 plugs, 2 cables	Standard	C80 = RL plug/RL plug, FO + voltage	
	Stranded	C81 = RL plug/RL plug, FO + voltage, stranded	
1 plug, 1 cable (voltage)	Standard	C82 = RL plug/open end, FO + voltage	2 m - 50 m
	Stranded	C83 = RL plug/open end, voltage only, stranded	(in 1 m increments)
2 plugs, 1 cable (voltage)	Standard	C84 = RL plug/RL plug, voltage only	
	Stranded	C85 = RL plug/RL plug, voltage only, stranded	



### PROFINET monitoring and digital I/O devices

<b>Notes:</b>
1) EMC: Class A product, see page 553

N

The rugged I/O devices are particularly suitable for use in harsh industrial environments, such as in welding applications.

**Features:**

- Rugged metal housing
- Push/pull connector for PROFINET, either with fiber optic or twisted pair
- Push/pull connector for supply voltage
- M12 plug-in connector for I/O devices
- Comprehensive diagnostic functions



**Monitoring device,  
2 FO network connections**

		Technical data		
<b>Interface</b>				
Fieldbus system		PROFINET		
<b>Power supply for module electronics</b>				
Supply voltage		24 V DC		
Supply voltage range		18.5 V DC ... 30 V DC (including ripple)		
Ripple		Max 3.6 V <sub>SS</sub> within the permissible voltage range		
<b>Digital inputs</b>				
Connection technology		-		
Maximum number of inputs		-		
Protective circuit		-		
<b>Digital outputs</b>				
Connection technology		-		
Maximum number of outputs		-		
Maximum output current per channel		-		
Protective circuit		-		
<b>General data</b>				
Weight		1180 g		
Width		182.5 mm		
Height		71.5 mm		
Depth		79.8 mm		
Degree of protection		IP65/67		
Ambient temperature (operation)		-20 °C ... 55 °C		
Permissible humidity (operation)		100%		
		Ordering data		
<b>Description</b>		<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
<b>Ruggedline monitoring device</b> - Fiber optics connection		RL PN 24-2 OC 2SCRJ <sup>1)</sup>	2700654	1
<b>Ruggedline digital input device</b> - 2 power plugs				
<b>Ruggedline digital I/O device</b> - 2 power plugs				
		Accessories		
<b>Plug-in connector, IP67, with push/pull interlocking</b>				
- Fiber optic, SCRJ		VS-PPC-C1-SCRJ-MNNA-PG9-A4D-C	1608032	1
- Twisted pair, RJ45		VS-PPC-C2-MSTB-MNNA-P13-A5-SP	1608074	1
- Power, COMBICON		IBS RL AP	2731128	10
<b>Ruggedline mounting plate</b>				



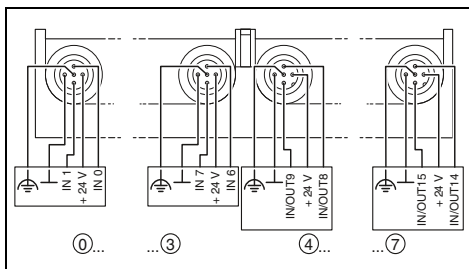
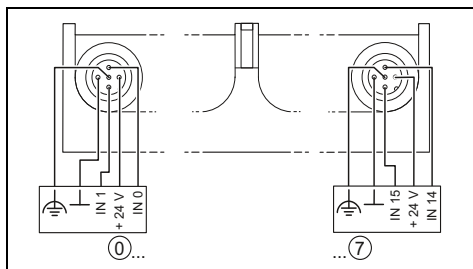
16 digital inputs,  
2 TX network connections



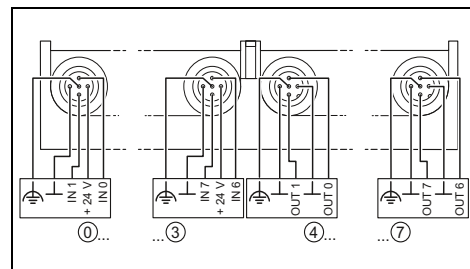
8 digital inputs, 8 digital I/Os,  
2 TX network connections



8 digital inputs, 8 digital outputs,  
2 FO network connections



PROFIBUS



Technical data

PROFINET  
24 V DC  
18.5 V DC ... 30 V DC (including ripple)  
Max 3.6 V<sub>SS</sub> within the permissible voltage range

2, 3, 4-wire  
16  
Electronic short-circuit/overload protection for each group

-  
-  
-

1180 g  
182.5 mm  
71.5 mm  
79.8 mm  
IP65/67  
-20 °C ... 55 °C  
100%

Technical data

PROFINET  
24 V DC  
18.5 V DC ... 30 V DC (including ripple)  
Max 3.6 V<sub>SS</sub> within the permissible voltage range

2, 3, 4-wire  
16  
Electronic short-circuit/overload protection for each group

2, 3-wire  
8  
500 mA  
Electronic short-circuit/overload protection for each channel

1180 g  
182.5 mm  
71.5 mm  
79.8 mm  
IP65/67  
-20 °C ... 55 °C  
100%

Technical data

PROFINET  
24 V DC  
18.5 V DC ... 30 V DC (including ripple)  
Max 3.6 V<sub>SS</sub> within the permissible voltage range

2, 3, 4-wire  
8  
Electronic short-circuit/overload protection for each group

2, 3-wire  
8  
500 mA  
Electronic short-circuit/overload protection for each channel

1180 g  
182.5 mm  
71.5 mm  
79.8 mm  
IP65/67  
-20 °C ... 55 °C  
100%

Ordering data

Type	Order No.	Pcs. / Pkt.
RL PN 24-2 DI 16 2TX <sup>1)</sup>	2773665	1

Ordering data

Type	Order No.	Pcs. / Pkt.
RL PN 24-2 DIO 16/8 2TX <sup>1)</sup>	2773652	1

Ordering data

Type	Order No.	Pcs. / Pkt.
RL PN 24-2 DIO 8/8 2SCRJ <sup>1)</sup>	2773513	1

Accessories

Accessories	Order No.	Pcs. / Pkt.
VS-PPC-C1-RJ45-MNNA-PG9-4Q5-B	1405141	1
VS-PPC-C2-MSTB-MNNA-P13-A5-SP	1608074	1
IBS RL AP	2731128	10

Accessories

Accessories	Order No.	Pcs. / Pkt.
VS-PPC-C1-RJ45-MNNA-PG9-4Q5-B	1405141	1
VS-PPC-C2-MSTB-MNNA-P13-A5-SP	1608074	1
IBS RL AP	2731128	10

Accessories

Accessories	Order No.	Pcs. / Pkt.
VS-PPC-C1-SCRJ-MNNA-PG9-A4D-C	1608032	1
VS-PPC-C2-MSTB-MNNA-P13-A5-SP	1608074	1
IBS RL AP	2731128	10

### INTERBUS bus terminals, monitoring, and digital I/O devices

The rugged devices are particularly suitable for use in harsh industrial environments, such as in welding applications.

#### Features:

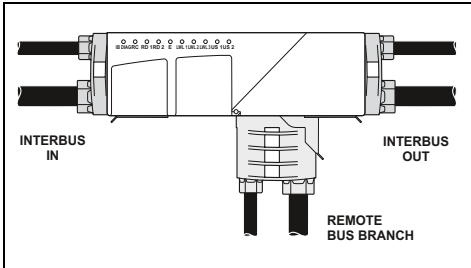
- Rugged metal housing
- Ruggedline connector for INTERBUS, either with fiber optic or twisted pair, and supply voltage
- M12 plug-in connector for I/O devices
- Comprehensive diagnostic functions

<b>Notes:</b>
1) EMC: Class A product, see page 553



Bus terminal module

PHOENIX CONTACT INTERBUS CLUB



<b>Interface</b>	
Fieldbus system	INTERBUS
Name	Remote bus
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	18.5 V DC ... 32 V DC (including ripple)
Ripple	Max 3.6 V <sub>SS</sub> within the permissible voltage range
<b>Digital inputs</b>	
Connection method	QUICKON connection
Maximum number of inputs	-
Protective circuit	-
<b>Digital outputs</b>	
Connection method	-
Maximum number of outputs	-
Maximum output current per channel	-
Protective circuit	-
<b>General data</b>	
Weight	610 g
Width	179 mm
Height	67 mm
Depth	71 mm
Degree of protection	IP65/67
Ambient temperature (operation)	0 °C ... 55 °C
Permissible humidity (operation)	100%

#### Technical data

Interface	INTERBUS
Name	Remote bus
Power supply for module electronics	24 V DC
Supply voltage	18.5 V DC ... 32 V DC (including ripple)
Supply voltage range	Max 3.6 V <sub>SS</sub> within the permissible voltage range
Ripple	

<b>Description</b>
<b>Ruggedline bus terminal module</b>
- Fiber optics connection
- Fiber optics connection, transmission speed 2 Mbps
- Twisted pair connection
<b>Ruggedline monitoring device</b>
- Fiber optics connection
- Fiber optics connection, transmission speed 2 Mbps
<b>Ruggedline digital I/O device</b>
- Fiber optics connection
- Fiber optics connection, transmission speed 2 Mbps
- Twisted pair connection

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IBS RL 24 BK RB-LK-LK <sup>1)</sup>	2725024	1
IBS RL 24 BK RB-LK-LK-2MBD <sup>1)</sup>	2731597	1
IBS RL 24 BK RB-T-T <sup>1)</sup>	2731063	1

<b>Bus connector</b>	
- QUICKON fiber optic connection method	
- QUICKON twisted pair connection method	
<b>Ruggedline mounting plate</b>	

#### Accessories

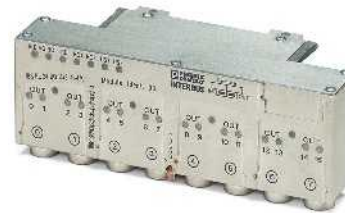
IBS RL PLUG-LK/POF	2731076	1
IBS RL PLUG-T	2731898	1
IBS RL AP	2731128	10



Monitoring device



16 digital inputs

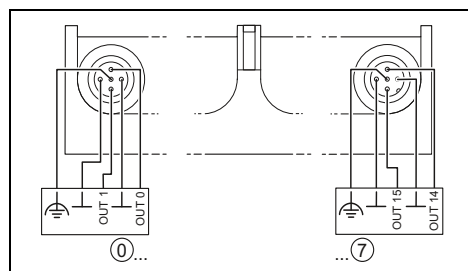
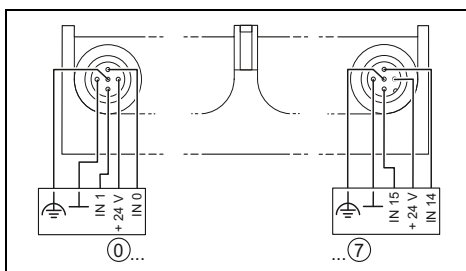
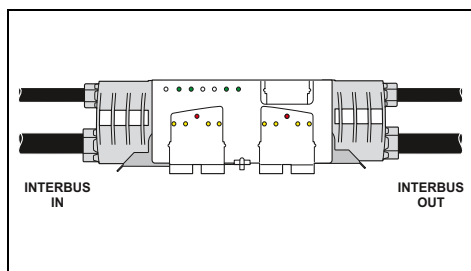


16 digital outputs that can be read

IBS INTERBUS CLUB

IBS INTERBUS CLUB

IBS INTERBUS CLUB



Technical data

Technical data

Technical data

INTERBUS  
Remote bus  
24 V DC  
18.5 V DC ... 32 V DC (including ripple)  
Max 3.6 V<sub>SS</sub> within the permissible voltage range

INTERBUS  
Remote bus  
24 V DC  
18.5 V ... 32 V (including ripple)  
Max 3.6 V<sub>SS</sub> within the permissible voltage range

INTERBUS  
Remote bus  
24 V DC  
18.5 V DC ... 32 V DC (including ripple)  
Max 3.6 V<sub>SS</sub> within the permissible voltage range

-  
-  
-

2, 3, 4-wire  
16  
Electronic short-circuit/overload protection for each group

-  
-  
-  
2, 3-wire  
16  
500 mA  
Electronic short-circuit/overload protection for each channel

640 g  
127 mm  
67 mm  
71 mm  
IP65/67  
0 °C ... 55 °C  
100%

720 g  
179 mm  
67 mm  
71 mm  
IP65/67  
0 °C ... 55 °C  
100%

810 g  
179 mm  
67 mm  
71 mm  
IP65/67  
-20 °C ... 55 °C  
100%

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
IBS RL 24 OC-LK <sup>1)</sup>	2819972	1
IBS RL 24 OC-LK-2MBD <sup>1)</sup>	2732499	1

Type	Order No.	Pcs. / Pkt.
IBS RL 24 DI 16/8-LK <sup>1)</sup>	2724850	1
IBS RL 24 DI 16/8-LK-2MBD <sup>1)</sup>	2731584	1
IBS RL 24 DI 16/8-T <sup>1)</sup>	2836463	1

Type	Order No.	Pcs. / Pkt.
IBS RL 24 DO 16/8-R-LK <sup>1)</sup>	2734170	1
IBS RL 24 DO 16/8-R-LK-2MBD <sup>1)</sup>	2734507	1

Accessories

Accessories

Accessories

IBS RL PLUG-LK/POF	2731076	1
IBS RL AP	2731128	10

IBS RL PLUG-LK/POF	2731076	1
IBS RL PLUG-T	2731898	1
IBS RL AP	2731128	10

IBS RL PLUG-LK/POF	2731076	1
IBS RL AP	2731128	10

### INTERBUS digital I/O devices

**Notes:**  
1) EMC: Class A product, see page 553

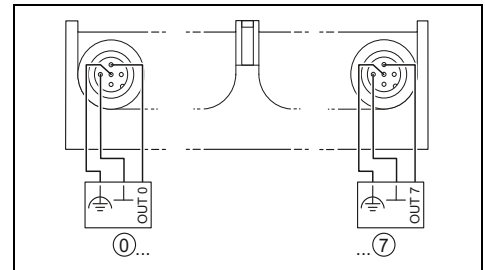
The rugged I/O devices are particularly suitable for use in harsh industrial environments, such as in welding applications.

**Features:**

- Rugged metal housing
- Ruggedline connector for INTERBUS, either with fiber optic or twisted pair, and supply voltage
- M12 plug-in connector for I/O devices
- Comprehensive diagnostic functions



8 digital outputs



<b>Interface</b>	
Fieldbus system	INTERBUS
Name	Remote bus
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	18.5 V DC ... 32 V DC (including ripple)
Ripple	Max 3.6 V <sub>SS</sub> within the permissible voltage range
<b>Digital inputs</b>	
Connection technology	-
Maximum number of inputs	-
Protective circuit	-
<b>Digital outputs</b>	
Connection technology	2, 3-wire
Maximum number of outputs	8
Maximum output current per channel	2 A
Protective circuit	Electronic short-circuit/overload protection for each channel
<b>General data</b>	
Weight	720 g
Width	179 mm
Height	67 mm
Depth	71 mm
Degree of protection	IP65/67
Ambient temperature (operation)	-20 °C ... 55 °C
Permissible humidity (operation)	100%

**Technical data**

Interface	INTERBUS
Name	Remote bus
Power supply for module electronics	24 V DC
Supply voltage	18.5 V DC ... 32 V DC (including ripple)
Supply voltage range	Max 3.6 V <sub>SS</sub> within the permissible voltage range
Ripple	

<b>Description</b>	
<b>Ruggedline digital output device</b>	
- Fiber optics connection	
- Fiber optics connection, transmission speed 2 Mbps	
- Twisted pair connection	
<b>Ruggedline digital I/O device</b>	
- Fiber optics connection	
- Fiber optics connection, transmission speed 2 Mbps	
- Twisted pair connection	

**Ordering data**

Type	Order No.	Pcs. / Pkt.
IBS RL 24 DO 8/8-2A-LK <sup>1)</sup>	2731034	1
IBS RL 24 DO 8/8-2A-LK-2MBD <sup>1)</sup>	2731827	1
IBS RL 24 DO 8/8-2A-T <sup>1)</sup>	2731856	1

<b>Bus connector</b>	
- QUICKON fiber optic connection method	
- QUICKON twisted pair connection method	
<b>Ruggedline mounting plate</b>	

**Accessories**

IBS RL PLUG-LK/POF	2731076	1
IBS RL PLUG-T	2731898	1
IBS RL AP	2731128	10



4 digital inputs and 2 digital outputs



8 digital inputs and 8 digital outputs

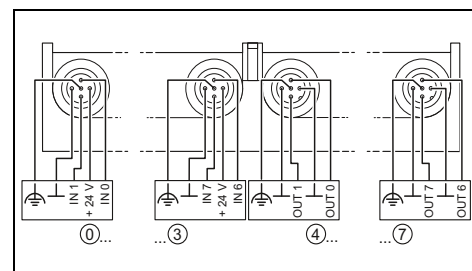
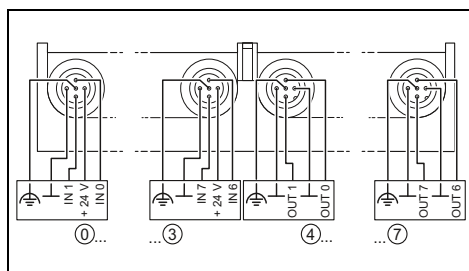
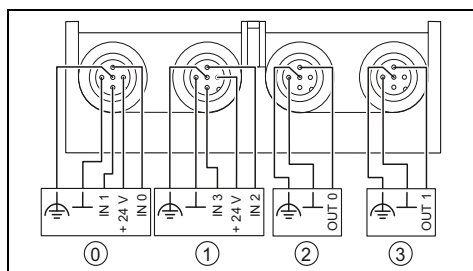


8 digital inputs and 8 digital outputs that can be read

IBS INTERBUS CLUB

IBS INTERBUS CLUB

IBS INTERBUS CLUB



Technical data

Technical data

Technical data

INTERBUS  
Remote bus  
24 V DC  
18.5 V DC ... 32 V DC (including ripple)  
Max 3.6 V<sub>SS</sub> within the permissible voltage range

INTERBUS  
Remote bus  
24 V DC  
18.5 V DC ... 32 V DC (including ripple)  
Max 3.6 V<sub>SS</sub> within the permissible voltage range

INTERBUS  
Remote bus  
24 V DC  
18.5 V DC ... 32 V DC (including ripple)  
Max 3.6 V<sub>SS</sub> within the permissible voltage range

2, 3, 4-wire  
4  
Electronic short-circuit/overload protection for each group

2, 3, 4-wire  
8  
Electronic short-circuit/overload protection for each group

2, 3, 4-wire  
8  
Electronic short-circuit/overload protection for each group

2, 3-wire  
2  
500 mA  
Electronic short-circuit/overload protection for each channel

2, 3-wire  
8  
500 mA  
Electronic short-circuit/overload protection for each channel

2, 3-wire  
8  
500 mA  
Electronic short-circuit/overload protection for each channel

650 g  
127 mm  
67 mm  
71 mm  
IP65/67  
0 °C ... 55 °C  
100%

720 g  
179 mm  
67 mm  
71 mm  
IP65/67  
0 °C ... 55 °C  
100%

790 g  
179 mm  
67 mm  
71 mm  
IP65/67  
-20 °C ... 55 °C  
100%

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
IBS RL 24 DIO 4/2/4-LK <sup>1)</sup>	2819985	1
IBS RL 24 DIO 4/2/4-LK-2MBD <sup>1)</sup>	2732486	1

Type	Order No.	Pcs. / Pkt.
IBS RL 24 DIO 8/8/8-LK <sup>1)</sup>	2724847	1
IBS RL 24 DIO 8/8/8-LK-2MBD <sup>1)</sup>	2731571	1
IBS RL 24 DIO 8/8/8-T <sup>1)</sup>	2836476	1

Type	Order No.	Pcs. / Pkt.
IBS RL 24 DIO 8/8/8-R-LK <sup>1)</sup>	2734167	1
IBS RL 24 DIO 8/8/8-R-LK-2MBD <sup>1)</sup>	2734510	1

Accessories

Accessories

Accessories

IBS RL PLUG-LK/POF	2731076	1
IBS RL AP	2731128	10

IBS RL PLUG-LK/POF	2731076	1
IBS RL PLUG-T	2731898	1
IBS RL AP	2731128	10

IBS RL PLUG-LK/POF	2731076	1
IBS RL AP	2731128	10

**INTERBUS relay devices**

<b>Notes:</b>
1) EMC: Class A product, see page 553



**8 digital inputs and 5/8 relay outputs**

The relay devices are used, for example, on electric overhead conveyor systems to monitor and disconnect block sections.

**Features:**

- Rugged metal housing
- Ruggedline connector for INTERBUS with fiber optic and supply voltage
- M12 plug-in connector for digital inputs
- COMBICON plug-in connector for relay outputs
- Comprehensive diagnostic functions

INTERBUS CLUB

<b>Interface</b>	
Fieldbus system	INTERBUS
Name	Remote bus
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	18.5 V DC ... 32 V DC (including ripple)
Ripple	Max 3.6 V <sub>SS</sub> within the permissible voltage range
<b>Digital inputs</b>	
Connection technology	2, 3, 4-wire
Maximum number of inputs	6
Number of inputs 230 V	2
Protective circuit	Electronic short-circuit/overload protection
<b>Digital outputs</b>	
Maximum number of outputs	5
Output name	Relay output
Maximum output current per channel	2 A
Maximum switching voltage	440 V AC
Minimum switching voltage	12 V AC
<b>General data</b>	
Weight	3.5 kg
Width	185 mm
Height	193 mm
Depth	138 mm
Degree of protection	IP65/67
Ambient temperature (operation)	0 °C ... 55 °C
Permissible humidity (operation)	100%
Air pressure (operation)	860 hPa ... 1080 hPa (up to 1500 m above mean sea level)

Technical data		
IBS RL 24 DIO 8/5-RS-LK-2MBD <sup>1)</sup>	IBS RL 24 DIO 8/8/8 RS-LK-2MBD <sup>1)</sup>	
Fieldbus system		
INTERBUS		
Name		
Remote bus		
Power supply for module electronics		
Supply voltage		
24 V DC		
Supply voltage range		
18.5 V DC ... 32 V DC (including ripple)		
Ripple		
Max 3.6 V <sub>SS</sub> within the permissible voltage range		
Connection technology		
2, 3, 4-wire		
Maximum number of inputs		
6		8
Number of inputs 230 V		
2		-
Protective circuit		
Electronic short-circuit/overload protection		
Maximum number of outputs		
5		8
Output name		
	Relay output	
Maximum output current per channel		
2 A		-
Maximum switching voltage		
440 V AC		250 V AC
Minimum switching voltage		
	12 V AC	
Weight		
	3.5 kg	
Width		
	185 mm	
Height		
	193 mm	
Depth		
	138 mm	
Degree of protection		
	IP65/67	
Ambient temperature (operation)		
0 °C ... 55 °C		-20 °C ... 55 °C
Permissible humidity (operation)		
	100%	
Air pressure (operation)		
	860 hPa ... 1080 hPa (up to 1500 m above mean sea level)	

<b>Description</b>
<b>Ruggedline relay device</b> , with fiber optics connection
- Five relay N/O contact outputs, transmission speed 2 Mbps
- Eight relay N/O contact outputs, transmission speed 2 Mbps

Ordering data		
Type	Order No.	Pcs. / Pkt.
IBS RL 24 DIO 8/5-RS-LK-2MBD <sup>1)</sup>	2734905	1
IBS RL 24 DIO 8/8/8 RS-LK-2MBD <sup>1)</sup>	2731733	1

<b>Bus connector</b>
- QUICKON fiber optic connection method
- Spring-cage fiber optic connection method
<b>Ruggedline mounting plate</b>
<b>Connector set</b> , connector and Pg screw connection for Ruggedline IBS RL 24 DIO 8/5-RS-LK... relay device
<b>Connector set</b> , connector and Pg screw connection for Ruggedline IBS RL 24 DIO 8/8/8-RS-LK... relay device

Accessories		
Type	Order No.	Pcs. / Pkt.
IBS RL PLUG-LK/POF	2731076	1
IBS RL PLUG-LK/POF-F	2734183	1
IBS RL AP	2731128	10
IBS RL PLSET DIO 8/5-RS-LK	2737452	1
IBS RL PLSET DIO 8/8/8-RS-LK	2740465	1



## INTERBUS motor starters

The motor starters are used in systems manufacturing and conveying technology, e.g., on tool platforms or roller conveyors.

### Features:

- Rugged metal housing
- Ruggedline plug-in connector for INTERBUS with fiber optic and supply voltage
- M12 plug-in connector for digital inputs
- COMBICON plug-in connector for motor output
- Comprehensive diagnostic functions including motor current monitoring
- Emergency operation on the device or via external operating elements

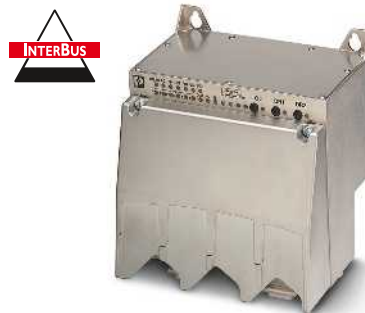
#### Notes:

1) EMC: Class A product, see page 553

Interface	
Fieldbus system	INTERBUS
Name	Remote bus
Power supply for module electronics	
Supply voltage	24 V DC
Supply voltage range	18.5 V DC ... 32 V DC (including ripple)
Power supply for sensors	
Minimum voltage	$U_{IN} = U_{S1}$ minus 1 V
Nominal current per sensor	50 mA
Digital inputs	
Number of inputs	6
Connection method	M12 plug-in connector
Typical input current per channel	5 mA (for $U_{S1} = 24$ V)
Digital outputs	
Number of outputs	1
Connection method	M12 plug-in connector
Minimum output voltage with nominal current	$U_{S1}$ minus 2 V
Output current	0.5 A
Type of protection	Electronic short-circuit/overload protection
Motor starter, output	
Number	1
Connection method	POWER-COMBICON
Operating voltage	200 V AC ... 440 V AC      230 V AC ... 480 V AC
Nominal current range	0.2 A ... 8 A (parameterizable, observe derating)
Frequency range	50 Hz ... 60 kHz
Power factor	0.3
Switching rate	5 cycles per minute, maximum
Motor starter, brake	
Type of contact	Mechanical relay contact
Continuous load current	max. 1 A
Connection voltage	12 V AC/DC ... 440 V AC/DC      12 V AC/DC ... 480 V AC/DC
General data	
Weight	3.8 kg
Degree of protection	IP65/67
Width	185.1 mm
Height	193 mm
Depth	138 mm

Description
<b>Ruggedline motor starter</b> , with fiber optics connection
- 400 V
- 400 V, transmission speed 2 Mbps
<b>Ruggedline motor starter</b> , with fiber optics connection
- 480 V
- 480 V, transmission speed 2 Mbps

<b>Bus connector</b>
- QUICKON fiber optic connection method
- Spring-cage fiber optic connection method
<b>Ruggedline mounting plate</b>
<b>Set of accessories</b> (connector and Pg screw connections)
<b>Hand-held operator panel</b> , for motor starters and variable frequency drives



Single-channel, reversing-load operation, 6 digital inputs, and 1 digital output

INTERBUS CLUB

### Technical data

IBS RL 400 MLR R DIO6/1 LK<sup>1)</sup>    IBS RL 480 MLR R DIO6/1-LK<sup>1)</sup>

Fieldbus system	INTERBUS
Name	Remote bus
Power supply for module electronics	
Supply voltage	24 V DC
Supply voltage range	18.5 V DC ... 32 V DC (including ripple)
Power supply for sensors	
Minimum voltage	$U_{IN} = U_{S1}$ minus 1 V
Nominal current per sensor	50 mA
Digital inputs	
Number of inputs	6
Connection method	M12 plug-in connector
Typical input current per channel	5 mA (for $U_{S1} = 24$ V)
Digital outputs	
Number of outputs	1
Connection method	M12 plug-in connector
Minimum output voltage with nominal current	$U_{S1}$ minus 2 V
Output current	0.5 A
Type of protection	Electronic short-circuit/overload protection
Motor starter, output	
Number	1
Connection method	POWER-COMBICON
Operating voltage	200 V AC ... 440 V AC      230 V AC ... 480 V AC
Nominal current range	0.2 A ... 8 A (parameterizable, observe derating)
Frequency range	50 Hz ... 60 kHz
Power factor	0.3
Switching rate	5 cycles per minute, maximum
Motor starter, brake	
Type of contact	Mechanical relay contact
Continuous load current	max. 1 A
Connection voltage	12 V AC/DC ... 440 V AC/DC      12 V AC/DC ... 480 V AC/DC
General data	
Weight	3.8 kg
Degree of protection	IP65/67
Width	185.1 mm
Height	193 mm
Depth	138 mm

### Ordering data

Type	Order No.	Pcs. / Pkt.
IBS RL 400 MLR R DIO6/1 LK <sup>1)</sup>	2734769	1
IBS RL 400 MLR R DIO6/1 LK2MBD <sup>1)</sup>	2731830	1
IBS RL 480 MLR R DIO6/1-LK <sup>1)</sup>	2737384	1
IBS RL 480 MLR R DIO6/1-LK2MBD <sup>1)</sup>	2734497	1

### Accessories

IBS RL PLUG-LK/POF	2731076	1
IBS RL PLUG-LK/POF-F	2734183	1
IBS RL AP	2731128	10
IBS RL MLR PLSET R-8A	2740504	1
IBS HVO/M12	2837006	1

### Connectors

Ruggedline connector technology combines communication and supply voltage. Connection is by means of separate cables.

#### Features:

- Fiber optic or twisted pair version
- QUICKON or spring-cage connection method
- Polymer fibers do not need to be polished



Plugs

Description
<b>Bus connector</b> - QUICKON fiber optic connection method - QUICKON twisted pair connection method <b>Bus connector</b> - Spring-cage fiber optic connection method - Twisted pair connection
<b>Plug-in connector, with plastic knurl</b> <b>M12 Y-distributor</b>
Further distributors and cables can be found on the Internet at <a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a> .

Ordering data		
Type	Order No.	Pcs. / Pkt.
IBS RL PLUG-LK/POF	2731076	1
IBS RL PLUG-T	2731898	1
IBS RL PLUG-LK/POF-F	2734183	1
IBS RL PLUG-T-F	2734196	1
Accessories		
SACC-M12MS-4QO-0,75	1641769	1
SAC-3P-M12Y/2XM12FS PE	1683455	5

### Adapter

The adapters can be used to switch between fiber optic and copper as the transmission medium or to convert to an M23 plug-in connector.

Notes:
1) EMC: Class A product, see page 553



Adapter

Description
<b>Converter of the remote bus connection, from circular plug-in connector to fiber optics</b>
<b>Copper bus connector with M23 circular plug-in connector, connection of incoming remote bus and supply voltage</b>
<b>Solder connection for bus plug-in connector set (plug/socket) M23</b> <b>Power supply plug-in connectors (socket/solder connection) M23</b> <b>Power plug-in connectors (pin/solder connection) M23</b>
Further distributors and cables can be found on the Internet at <a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a> .

Ordering data		
Type	Order No.	Pcs. / Pkt.
IBS RL 24 ADAP-T/LK <sup>1)</sup>	2725037	1
IBS RL 24 ADAP-LK/T <sup>1)</sup>	2725040	1
IBS RL 24 ADAP-M23/T	2734109	1
IBS RL 24 ADAP-T/M23	2734112	1
Accessories		
IBS CCO-R/L	2759883	1
IBS CCO-PSF/L	2780878	1
IBS CCO-PSM/L	2759906	1

## Accessories

Pre-assembled cables for fast installation.

Corresponding materials and tools are available for cable assembly.

## Notes:

1) EMC: Class A product, see page 553



Cabling



Installation material and tools

Description	Ordering data			Ordering data		
	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Assembled cable bridge</b> , as a short connection between two Ruggedline devices, 30 cm						
- Fiber optics bus connector	IBS RL CONNECTION-LK	2733029	1			
- Copper bus connector	IBS RL CONNECTION-T	2733061	1			
<b>Pre-assembled cable sets with fiber optics bus connectors</b> , by the meter						
	IBS RL CABLE POF/	2819956	1			
<b>Remote bus cable</b> , by the meter,						
- Fixed installation	IBS RBC METER-T	2806286	1			
- Flexible application	IBS RBC METER/F-T	2723123	1			
<b>Polymer fiber cable POF</b> , duplex, 980/1000 µm, medium-weight standard version, for permanent indoor installation						
- By the meter <b>w/o</b> plug	PSM-LWL-KDHEAVY-980/1000	2744319	1			
<b>Polymer fiber cable POF</b> , duplex, 980/1000 µm, heavy-weight standard version, for permanent indoor installation						
- By the meter <b>w/o</b> plug	PSM-LWL-RUGGED-980/1000	2744322	1			
<b>Polymer fiber cable POF</b> , duplex 980/1000 µm, heavy-weight, highly flexible standard version for flexible power conduit applications						
- By the meter <b>w/o</b> plug	PSM-LWL-RUGGED-FLEX-980/1000	2744335	1			
<b>Supply cable</b> , gray, welding-splash-resistant in standard applications, 5 x 1.5 mm <sup>2</sup> , by the meter						
- Standard	IBS PWR/5	2820000	1			
- Highly flexible	IBS PWR/5HD/F	2731775	1			
<b>INTERBUS/fiber optic converter</b> , for converting the remote OUT interface to fiber optic cables				IBS OPTOSUB-MA/M/R-LK-OPC <sup>1)</sup>	2732635	1
<b>Transport protection</b> for fiber optics bus connection				IBS RL PROT-LK	2819969	50
<b>M12 screw plug</b> for non-assigned M12 sensor/actuator connections				PROT-M12	1680539	5
<b>Marking labels</b> - Set of 50 small and 50 large labels				IBS RL MARKER-SET	2732729	1
- Set of 100 large labels				IBS RL MARKER-G-SET	2734727	1
- Set of 100 small labels				IBS RL MARKER-K-SET	2734730	1
<b>Fiber cutter</b> , for quick and easy mounting of fiber optic cables with the Ruggedline connector				IBS RL FOC	2725147	1
<b>Stripping tool</b> , for stripping wires (especially fiber optics wires) of 4 – 16-mm-Ø				WIREFOX-D 16	1212173	1
<b>Fiber optic measuring case</b> , comprising an optical power meter, F-SMA and B-FOC (ST <sup>®</sup> ) coupling, reference fibers, and operating instructions				PSM-FO-POWERMETER	2799539	1
<b>Measuring device adapter</b> , for INTERBUS-RL modules				IBS RL ADAP FO	2725121	1
<b>Polymer fiber DIY Case</b> , consisting of: stripping knife, stripping pliers, polishing wheel for F-SMA and SCRJ quick mounting connectors, polishing pad and emery paper				PSM-POF-KONFTOOL	2744131	1



# Industrial lighting and signaling

LED machine lights and signal towers from Phoenix Contact are the perfect solution for illuminating machinery and for signaling machine states.

## LED machine lights

The LED machine lights from the PLD (Phoenix Lighting Devices) range from Phoenix Contact provide efficient, homogenous, and glare-free illumination of your machinery during startup, maintenance, and fault clearance, as well as during the production process thanks to LED technology and integrated optics. You can easily adjust the brightness to the relevant conditions inside your machine (e.g., reflections) and to the machine states by means of dimming.

If required, several lights can be connected in series and you can thereby save cabling material and time. Further savings can be made with regard to maintenance costs thanks to the long LED service life of 65,000 hours.

Would you like to integrate machine lighting directly in your machine control system? No problem with the communication modules which can be connected upstream.

## Signal towers

Early detection of problems affecting machinery and systems is key to reducing downtimes and avoiding any resulting unnecessary costs.

Thanks to the considerable signal diversity of the modular signal towers in the PSD (Phoenix Signaling Devices) product range from Phoenix Contact, you can implement unambiguous signaling of your machine and system states.

Would you like to transmit the state wirelessly? No problem thanks to the WIN (Wireless Information Network) signal tower wireless system.

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Wireless elements	347
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### PLD machine lights

Communication modules			LED machine lights		
					
Type	PLD CM 360 PB...	PLD CM 360 PN	PLD M 360 W...200	PLD M 360 W...365	PLD M 360 W...695
Description	Communication module for PROFIBUS	Communication module for PROFINET	LED machine light, Length 200 mm	LED machine light, Length 365 mm	LED machine light, Length 695 mm
Page	338	339	340	341	341

### PSD signal towers

Optical and audible signal elements			Wireless elements			
						
Type	PSD-S OE ...	PSD-S AE...	PSD-S AE V15/1	PSD-S WIN ...	PSD-S WIN STARTERKIT	PSD-S MUX SET
Description	Optical signal elements Colors: Red, yellow, green, clear, blue	Audible signal elements Buzzers, sirens	Voice output element	Master/slave for wireless system	Starter kit for wireless system	Wireless multiplexer
Page	342	344	345	347	347	347

### Connection and mounting elements

### Accessories

						
PSD-S CE-SM(TM) ...	PSD-S ME...	PSD-S ME ...	PSD-S AS BULB 5W	PSD-S AS CABLE GLAND...	PSD-S AS LABEL BOARD	PSD-S AS END COVER
Connection elements for base and tube mounting	Mounting elements for base and tube mounting	Mounting feet and tubes	Light bulb for PSD-S OE ... 5 W, 24 V permanent light element	M16 x 1.5 mm cable gland	Marking field for towers with tube mounting	End cover (replacement part)
348	348	349	342	348	342	342



**PSD signal towers**

**Erecting a tower**

A signal tower can be erected or extended without using any tools in a matter of seconds by simply placing the individual signal elements on top of each other and turning the bayonet locking system.

This automatically establishes an electrical connection between the elements. The control lines are then connected to screw or spring-cage terminal blocks in the connection element (bottom element).

**Optical signal elements**

The optical elements are available in a choice of five colors with various different signal types.

**Audible signal elements**

Signaling can also be supported by an audible element.

**Wireless elements**

Wireless elements enable the wireless transmission of signal states to a PC or the mirroring of the state of one tower to another.

**Mounting elements**

The signal tower portfolio is completed by a wide range of mounting elements, which ensure optimum mounting of the signal towers according to the conditions.

**Assembling the signal tower**

To assemble your signal tower, proceed as follows:

- ① Select the appropriate mounting method for your signal tower application: base or tube mounting.
- ② If applicable, select the mounting bracket or junction box.
- ③ If applicable, select the foot and the required tube length: 110 mm ... 1000 mm.
- ④ Select the appropriate connection element for the mounting type: screw or spring-cage connection.
- ⑤ Select the required optical signal elements and, if applicable, the audible signal element or wireless element.





The communication modules enable the direct integration of machine lighting in the machine control system.

This PROFIBUS communication module enables PLD machine lights to be parameterized and controlled directly via a PROFIBUS DP network.

**Features:**

- PROFIBUS DP slave
- Data transmission speed of 9.6 kbps to 12 Mbps
- PROFIBUS address can be set via two rotary coding switches
- Two PWM outputs for controlling the PLD machine lights
- Adjustable brightness, flashing frequency, and flashing duration
- Specification of the failsafe state for controlled lights
- A digital input for error messages from the controlled lights
- Diagnostic and status indicators
- Resistant to flying chips and sparks
- Resistant to cooling lubricants



**PROFIBUS DP**

Technical data			
Interface	PROFIBUS DP		
Fieldbus system	M12 plug-in connector, B-coded		
Connection method	9.6 kbps ... 12 Mbps		
Transmission speed			
Power supply for module electronics			
Supply voltage	24 V DC		
Supply voltage range	19.2 V DC ... 28.8 V DC		
Digital inputs			
Number of inputs	1 (error signal from the light(s))		
Description of the inputs	EN 61131-2 type 1		
Nominal input voltage $U_{IN}$	24 V DC		
Digital outputs			
Number of outputs	2 (PWM signal)		
Output voltage	24 V DC		
Maximum output current per channel	500 mA		
Type of protection	Short-circuit protection, overload protection of the outputs		
General data			
Connection method	M12 plug-in connector		
Weight	450 g		
Degree of protection	IP67		
Width	60 mm		
Height	144 mm		
Depth	35 mm		
Note on dimensions	Height without M12 plug-in connector		
Mounting position	Any		
Ambient temperature (operation)	-25 °C ... 60 °C		
Ordering data			
Description	Type	Order No.	Pcs. / Pkt.
Communication module, for PLD machine lights	PLD CM 360 PB	2701695	1
- PROFIBUS DP interface			

Communication modules

The communication modules enable the direct integration of machine lighting in the machine control system.

This PROFINET communication module enables PLD machine lights to be parameterized and controlled directly via a PROFINET network.

Features:

- PROFINET I/O device
- PROFINET RT
- Two PROFINET ports with integrated switch
- Two PWM outputs for controlling the PLD machine lights
- Adjustable brightness, flashing frequency, and flashing duration
- Specification of the failsafe state for controlled lights
- A digital input for error messages from the controlled lights
- Diagnostic and status indicators
- Resistant to flying chips and sparks
- Resistant to cooling lubricants



PROFINET

Technical data	
<b>Interface</b>	
Fieldbus system	PROFINET
Connection method	M12 plug-in connectors, D-coded
Transmission speed	100 Mbps
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 28.8 V DC
<b>Digital inputs</b>	
Number of inputs	1 (Error signal from the light(s))
Description of the inputs	EN 61131-2 type 1
Nominal input voltage $U_N$	24 V DC
<b>Digital outputs</b>	
Number of outputs	2 (PWM signal)
Output voltage	24 V DC
Maximum output current per channel	500 mA
Type of protection	Short-circuit protection, overload protection of the outputs
<b>General data</b>	
Connection method	M12 plug-in connector
Weight	450 g
Degree of protection	IP67
Width	60 mm
Height	144 mm
Depth	35 mm
Note on dimensions	Height without M12 plug-in connector
Mounting position	Any
Ambient temperature (operation)	-25 °C ... 60 °C

Ordering data			
Description	Type	Order No.	Pcs. / Pkt.
Communication module, for PLD machine lights			
- PROFINET interface	PLD CM 360 PN	2701696	1

These LED lights are designed for use inside machinery. They provide surface illumination of the interior of the machine.

**Features:**

- 50° and 100° emission angle
- Light lengths of 200 mm, 365 mm or 695 mm
- Can be connected and controlled in series with M12-SPEEDCON cabling
- Optional control via communication module or I/O station
- Steady light or flashing light
- Can be switched on and off when under no load
- Can be continuously dimmed with PWM signal
- Flashing light control with PWM signal
- Protective functions against polarity reversal, excessively high supply voltage, and overtemperature
- Error indication via digital output
- Resistant to flying chips and sparks
- Resistant to cooling lubricants
- Glare suppression thanks to integrated optics
- Highly efficient thanks to LED technology
- LED service life of 65,000 hours
- High color rendering index



Length 200 mm

Power supply for module electronics	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 28.8 V DC
Current consumption	Typ. 0.23 A (at 24 V DC)      Typ. 0.375 A (at 24 V DC)
Power consumption	Typ. 5.5 W      Typ. 9 W
Light properties	
Source of light type	LED
Service life, lighting appliance	65,000 h
Number of LEDs	4
Light color	Neutral white
Color temperature	5000 K ±5%
Color rendering index	Ra ≥ 80
Illumination	max. 2350 lx (50 cm distance)      max. 680 lx (50 cm distance)
Average illumination	330 lx (1 m x 1 m measuring field with 50 cm distance)
Glare suppression	
Can be dimmed	Thanks to integrated optics Via PWM signal
General data	
Connection method	M12 plug-in connector, (A-coded)
Weight	550 g
Degree of protection	IP67
Width	60 mm
Height	35 mm
Length	200.00 mm
Note on dimensions	Length without M12 flush-type plug-in connector
Mounting position	Any
Ambient temperature (operation)	-25 °C ... 60 °C

Technical data	
PLD M 360 W-50 200	PLD M 360 W-100 200
24 V DC	
19.2 V DC ... 28.8 V DC	
Typ. 0.23 A (at 24 V DC)	Typ. 0.375 A (at 24 V DC)
Typ. 5.5 W	Typ. 9 W
LED	
65,000 h	
4	
Neutral white	
5000 K ±5%	
Ra ≥ 80	
max. 2350 lx (50 cm distance)	max. 680 lx (50 cm distance)
330 lx (1 m x 1 m measuring field with 50 cm distance)	
Thanks to integrated optics Via PWM signal	
M12 plug-in connector, (A-coded)	
550 g	
IP67	
60 mm	
35 mm	
200.00 mm	
Length without M12 flush-type plug-in connector	
Any	
-25 °C ... 60 °C	

Description
<b>LED machine light</b>
- 50° emission angle
- 100° emission angle

Ordering data		
Type	Order No.	Pcs. / Pkt.
PLD M 360 W-50 200	2701689	1
PLD M 360 W-100 200	2701692	1



Length 365 mm



Length 695 mm

**Technical data**

PLD M 360 W-50 365      PLD M 360 W-100 365

24 V DC  
19.2 V DC ... 28.8 V DC  
Typ. 0.46 A (at 24 V DC)      Typ. 0.75 A (at 24 V DC)  
Typ. 11 W      Typ. 18 W

LED  
65,000 h  
8

Neutral white  
5000 K ±5%  
Ra ≥ 80

max. 3800 lx (50 cm distance)      max. 1200 lx (50 cm distance)  
660 lx (1 m x 1 m measuring field with 50 cm distance)      630 lx (1 m x 1 m measuring field with 50 cm distance)

Thanks to integrated optics  
Via PWM signal

M12 plug-in connector, (A-coded)

1000 g  
IP67  
60 mm  
35 mm  
365.00 mm

Length without M12 flush-type plug-in connector

Any  
-25 °C ... 60 °C

**Technical data**

PLD M 360 W-50 695      PLD M 360 W-100 695

24 V DC  
19.2 V DC ... 28.8 V DC  
Typ. 0.92 A (at 24 V DC)      Typ. 1.5 A (at 24 V DC)  
Typ. 22 W      Typ. 36 W

LED  
65,000 h  
16

Neutral white  
5000 K ±5%  
Ra ≥ 80

max. 5200 lx (50 cm distance)      max. 2000 lx (50 cm distance)  
1200 lx (1 m x 1 m measuring field with 50 cm distance)      1100 lx (1 m x 1 m measuring field with 50 cm distance)

Thanks to integrated optics  
Via PWM signal

M12 plug-in connector, (A-coded)

1950 g  
IP67  
60 mm  
35 mm  
695.00 mm

Length without M12 flush-type plug-in connector

Any  
-25 °C ... 60 °C

**Ordering data**

Type	Order No.	Pcs. / Pkt.
PLD M 360 W-50 365	2701690	1
PLD M 360 W-100 365	2701693	1

**Ordering data**

Type	Order No.	Pcs. / Pkt.
PLD M 360 W-50 695	2701691	1
PLD M 360 W-100 695	2701694	1

## PSD signal towers

### Optical signal elements

The optical signal elements enable clear optical indication of the machine or system state.

- 5 signal types to choose from
- Can be freely combined
- High light and color intensity
- Minimum LED service life of 50,000 h
- All elements for a minimum of 24 V DC
- Tool-free lamp change
- Random flashing beacon ensures display cannot be ignored



Optical signal element, red



Optical signal element, yellow

**Notes:**

1) At 240 V, 5 W lighting



**PSD electrical data**

Input voltage						
Nominal input voltage range	[V AC/DC]	12 ... 240				
Maximum inrush current	[mA]	211)	200	500	200	500
Current consumption	[mA]	211)	125	30	35	350 40

**General data**

Material		Polycarbonate PC				
Weight	[g]	55	73	58	59	72 78 65
Height	[mm]	66				
Diameter	[mm]	70				
Degree of protection		IP65, when installed or with cover				
Ambient temperature (operation)	[°C]	-20 ... 60	-20 ... 50			

**Mounting position**

Any

**Technical data**

①	②	③	④	⑤	⑥	⑦
	24 V DC	24 V AC/DC		24 V DC		24 V AC/DC
12 ... 240						
211)	200	500	200	500		
211)	125	30	35	350	40	

**General data**

Material		Polycarbonate PC				
Weight	[g]	55	73	58	59	72 78 65
Height	[mm]	66				
Diameter	[mm]	70				
Degree of protection		IP65, when installed or with cover				
Ambient temperature (operation)	[°C]	-20 ... 60	-20 ... 50			

Any

**Ordering data**

Description	Type	Order No.	Pcs. / Pkt.
<b>Permanent light element</b> , without light bulb	① PSD-S OE RD	2700096	1
<b>Flashing light element</b> , Xenon flash tube	② PSD-S OE FL RD	2700101	1
<b>LED permanent light element</b>	③ PSD-S OE LED RD	2700107	1
<b>LED blinking light element</b>	④ PSD-S OE LED BL RD	2700114	1
<b>LED flashing light element</b> , double flash	⑤ PSD-S OE LED FL RD	2700115	1
<b>LED random flashing beacon element</b>	⑥ PSD-S OE LED RFL RD	2700118	1
<b>LED rotating light element</b>	⑦ PSD-S OE LED RL RD	2700116	1

**Ordering data**

Description	Type	Order No.	Pcs. / Pkt.
<b>Permanent light element</b> , without light bulb	PSD-S OE YE	2700098	1
<b>Flashing light element</b> , Xenon flash tube	PSD-S OE FL YE	2700103	1
<b>LED permanent light element</b>	PSD-S OE LED YE	2700122	1
<b>LED blinking light element</b>	PSD-S OE LED BL YE	2700123	1
<b>LED flashing light element</b> , double flash	PSD-S OE LED FL YE	2700124	1
<b>LED random flashing beacon element</b>	PSD-S OE LED RFL YE	2700126	1
<b>LED rotating light element</b>	PSD-S OE LED RL YE	2700125	1

**Accessories**

<b>Light bulb</b> for PSD-S OE ... permanent light element, 5 W, 24 V, BA15d base	PSD-S AS BULB 5W	2700142	1
<b>End cover</b> , black (replacement part)	PSD-S AS END COVER	2700148	1
<b>Marking field</b> for towers with tube mounting, complete with assembly material	PSD-S AS LABEL BOARD	2700147	1

**Accessories**

<b>Light bulb</b> for PSD-S OE ... permanent light element, 5 W, 24 V, BA15d base	PSD-S AS BULB 5W	2700142	1
<b>End cover</b> , black (replacement part)	PSD-S AS END COVER	2700148	1
<b>Marking field</b> for towers with tube mounting, complete with assembly material	PSD-S AS LABEL BOARD	2700147	1



Optical signal element, green



Optical signal element, clear



Optical signal element, blue



Technical data			
①	②	③	④
	24 V DC	24 V AC/DC	
12 ... 240			
21 <sup>1)</sup>	200	500	
21 <sup>1)</sup>	125	25	
Polycarbonate PC			
55	73	58	59
		66	
		70	
IP65, when installed or with cover			
-20 ... 60		-20 ... 50	
Any			

Technical data					
①	②	③	④	⑤	⑥
	24 V DC	24 V AC/DC		24 V DC	
12 ... 240					
21 <sup>1)</sup>	200	500	200	500	
21 <sup>1)</sup>	125	25	35	250	
Polycarbonate PC					
55	73	58	59	72	78
			66		
			70		
IP65, when installed or with cover					
-20 ... 60			-20 ... 50		
Any					

Technical data					
①	②	③	④	⑤	⑥
	24 V DC	24 V AC/DC		24 V DC	
12 ... 240					
21 <sup>1)</sup>	200	500	200	500	
21 <sup>1)</sup>	125	25	35	250	
Polycarbonate PC					
55	73	58	59	72	78
			66		
			70		
IP65, when installed or with cover					
-20 ... 60			-20 ... 50		
Any					

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSD-S OE GN	2700097	1
PSD-S OE FL GN	2700102	1
PSD-S OE LED GN	2700119	1
PSD-S OE LED BL GN	2700121	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSD-S OE CL	2700099	1
PSD-S OE FL CL	2700105	1
PSD-S OE LED CL	2700127	1
PSD-S OE LED BL CL	2700128	1
PSD-S OE LED FL CL	2700129	1
PSD-S OE LED RFL CL	2700130	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSD-S OE BU	2700100	1
PSD-S OE FL BU	2700106	1
PSD-S OE LED BU	2700131	1
PSD-S OE LED BL BU	2700132	1
PSD-S OE LED FL BU	2700134	1
PSD-S OE LED RFL BU	2700135	1

Accessories		
Type	Order No.	Pcs. / Pkt.
PSD-S AS BULB 5W	2700142	1
PSD-S AS END COVER	2700148	1
PSD-S AS LABEL BOARD	2700147	1

Accessories		
Type	Order No.	Pcs. / Pkt.
PSD-S AS BULB 5W	2700142	1
PSD-S AS END COVER	2700148	1
PSD-S AS LABEL BOARD	2700147	1

Accessories		
Type	Order No.	Pcs. / Pkt.
PSD-S AS BULB 5W	2700142	1
PSD-S AS END COVER	2700148	1
PSD-S AS LABEL BOARD	2700147	1

## PSD signal towers

### Audible signal elements

The audible signal elements enable clear audible indication of the machine or system state.

**They offer the following features:**

- Buzzer and siren elements
- Minimum volume of 80 dB(A)
- Adjustable volume
- Multi-tone siren signaling depending on the situation
- Multilingual signaling thanks to voice output



**Buzzer element, continuous/pulse tone**



**Siren element, alternating**



	Technical data			Technical data		
<b>PSD electrical data</b>						
Input voltage	-			24 V DC		
Nominal input voltage range	12 V AC/DC ... 30 V AC/DC			-		
Maximum inrush current	max. 200 mA			max. 500 mA		
Current consumption	25 mA			150 mA		
<b>Signaling</b>						
Type of acoustic signal	Continuous/pulse tone			Continuous tone, alternating		
Signal frequency	Approx. 1 Hz			-		
Tone frequency	Approx. 1.75 kHz			Approx. 2.5 kHz		
Volume	85 dB(A)			105 dB(A)		
<b>General data</b>						
Material	Polycarbonate PC			Polycarbonate PC		
Weight	73 g			106 g		
Height	72 mm			79 mm		
Diameter	70 mm			70 mm		
Degree of protection	IP65, when installed			IP40, when installed		
Ambient temperature (operation)	-20 °C ... 50 °C			-20 °C ... 50 °C		
Electromagnetic compatibility	Conformance with EMC Directive 2004/108/EC			Conformance with EMC Directive 2004/108/EC		
Mounting position	Any			Any		
	Ordering data			Ordering data		
<b>Description</b>	<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>	<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
<b>Buzzer element, continuous/pulse tone</b>	<b>PSD-S AE BM2-1 85DB</b>	<b>2700136</b>	<b>1</b>			
<b>Siren element</b> - Alternating - Pulse tone, automatic volume control - 8 tones, tone selection via DIP switches - 7 tones, tone selection via 3 signal cables				<b>PSD-S AE SC1-2 105DB</b>	<b>2700139</b>	<b>1</b>
<b>Voice output element, up to 15 sound sequences, maximum play time of 60 minutes</b>						





Siren element, pulse tone



Siren element, tones can be selected



Voice output element



Technical data		
PSD-S AE SP1-3 100DB/2		
24 V DC		
-		
max. 500 mA		
150 mA		
Pulse tone, automatic volume control		
Approx. 1 Hz		
Approx. 2.5 kHz		
-		
Polycarbonate PC		
122 g		
110 mm		
71.5 mm		
IP65, when installed		
-20 °C ... 50 °C		
Conformance with EMC Directive 2004/108/EC		
Any		

Technical data		
PSD-S AE SM8-5 100DB/1    PSD-S AE SM7-4 100DB/3		
24 V AC/DC		
-		
max. 500 mA		
80 mA		
8 tones, adjustable volume		
7 tones, remotely controlled		
Approx. 1 Hz (pulse tone)		
Approx. 1.6 kHz		
max. 100 dB(A) (for continuous and pulse tone of 3.4 kHz)		
Polycarbonate PC		
81 g		
72 mm		
70 mm		
IP65, when installed		
-20 °C ... 50 °C		
Conformance with EMC Directive 2004/108/EC		
Any		

Technical data		
PSD-S AE V15/1		
24 V DC		
-		
max. 3 A (for approximately 2 ms)		
< 50 mA (in standby mode)		
Voice, max. 15 texts, max. 1 complete h		
-		
-		
Approx. 88 dB(A)		
Polycarbonate PC		
184 g		
110 mm		
71.5 mm		
IP65, when installed		
-20 °C ... 50 °C		
Conformance with EMC Directive 2004/108/EC		
Any		

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSD-S AE SP1-3 100DB/2	2700137	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSD-S AE SM8-5 100DB/1	2700138	1
PSD-S AE SM7-4 100DB/3	2700141	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSD-S AE V15/1	2700140	1

## PSD signal towers

### Wireless elements

The WIN (Wireless Information Network) wireless system enables the wireless transmission of the signal states of several signal towers.

The wireless elements (slaves) integrated in the signal towers transmit the signal states of the relevant signal tower to a receiver unit (master), which is connected to the USB connection of a PC.

The signal states are displayed and evaluated via software.

#### The wireless system offers the following additional features:

- Range of a wireless element with a free line of sight of up to 300 m
- Repeater for increasing the range integrated in each wireless element
- Simultaneous detection of up to 50 wireless elements
- Existing signal towers can be extended without additional wiring
- Can be operated parallel to other wireless applications
- Error messages can be sent via e-mail

In addition to creating a complete wireless system, it is also possible to mirror the state of **one** signal tower wirelessly to another signal tower located within the line of sight.

- Range with a free line of sight of up to 300 m
- Existing signal tower can be extended without additional wiring

Both the WIN wireless system and the wireless multiplexer are available in versions with C-UL-US approval.



WIN slave/WIN master

	Technical data	
	PSD-S WIN SL	PSD-S WIN MA
<b>Electrical data, master</b>		
Input voltage	-	5 V DC (USB ; only use USB cables with a maximum length of 3 m.)
Maximum inrush current	-	100 mA
Current consumption	-	max. 100 mA
<b>Interface</b>		USB
<b>Electrical data, slave</b>		
Input voltage	24 V AC/DC	-
Maximum inrush current	430 mA	-
Current consumption	max. 40 mA	-
Interface	USB, for configuration	-
<b>Wireless interface</b>		
Transmission power	10 dBm (at 50 ohm)	
Transmission speed	38.4 kbps (can be adjusted via WIN software) 76.8 kbps (default) 300 m, maximum	
<b>Range</b>		Up to 50
Wireless modules that can be connected	-	(2700681 PSD-S WIN SL)
<b>General data</b>		
Material	Polycarbonate PC	Acrylonitrile butadiene styrene (ABS)
Weight	80 g	106 g
Height	65.5 mm	188 mm
Width	-	77 mm
Depth	-	117 mm
Diameter	70 mm	-
Degree of protection	IP65, when installed or with cover	IP20
Ambient temperature (operation)	-20 °C ... 50 °C	
Mounting position	The slave is the bottom element in the signal tower	
Scope of delivery	1 slave	1 master with antenna including accessories, USB cable (3 m), software CD
Additional product required	PSD-S WIN MA...	PSD-S WIN SL...

Description	Ordering data		
	Type	Order No.	Pcs. / Pkt.
<b>WIN slave</b>			
- 868 MHz frequency	PSD-S WIN SL	2700681	1
- 915 MHz frequency, with C-UL-US approval	PSD-S WIN SL/UL	2701565	1
<b>WIN master</b>			
- 868 MHz frequency	PSD-S WIN MA	2700682	1
- 915 MHz frequency, with C-UL-US approval	PSD-S WIN MA/UL	2701664	1
<b>WIN set</b>			
- 868 MHz frequency			
- 915 MHz frequency, with C-UL-US approval			
<b>WIN starter kit</b>			
- 868 MHz frequency			
- 915 MHz frequency, with C-UL-US approval			
<b>Wireless multiplexer set</b>			
- 868 MHz frequency			
- 915 MHz frequency, with C-UL-US approval			



**WIN set**



**WIN starter kit**



**Wireless multiplexer set**

Technical data	Technical data	Technical data
-	-	24 V DC (pos. + neg. logic)
-	-	430 mA
-	-	max. 40 mA (own current consumption)
-	-	max. 860 mA (total current of the elements above the master)
-	-	USB, for configuration
-	-	24 V AC/DC
-	-	430 mA
-	-	max. 40 mA
-	-	USB, for configuration
-	-	10 dBm (at 50 ohm)
-	-	38.4 kbps
-	-	300 m, maximum
-	-	-
-	-	Polycarbonate PC
-	-	184 g
-	-	65.5 mm
-	-	-
-	-	70 mm
-	-	IP65, when installed or with cover
-	-	-20 °C ... 50 °C
-	-	The master and slave are the bottom element in the signal tower
1 master with antenna including accessories, 3 slaves, USB cable (3 m), software CD	1 master with antenna including accessories, 3 slaves, 9 LED steady-light optical elements (3 red, 3 yellow, 3 green), 3 bases with integrated tube, 3 connection elements (spring-cage), USB cable (3 m), software CD	1 transmitter module (slave) and 1 receiver module (master)

Ordering data			Ordering data			Ordering data		
Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
PSD-S WIN SET-1MA-3SL PSD-S WIN SET-1MA-3SL/UL	2700679 2701563	1 1	PSD-S WIN STARTERKIT PSD-S WIN STARTERKIT/UL	2700680 2701564	1 1	PSD-S MUX SET PSD-S MUX SET/UL	2700683 2701566	1 1

## PSD signal towers

### Connection elements for base and tube mounting

The cables for controlling the optical and/or audible elements are connected to the connection element. They can either be mounted directly on a surface or on a tube.

**The following connection methods are available:**

- Screw terminal blocks
- Spring-cage terminal blocks



Connection elements for base mounting



Connection elements for tube mounting

#### PSD electrical data

Nominal input voltage range

12 V AC/DC ... 240 V AC/DC

#### General data

Material

PA-GF

Weight

83 g

Height

27 mm

Diameter

69 mm

Degree of protection

IP65, when installed

Ambient temperature (operation)

-20 °C ... 50 °C

#### Technical data

12 V AC/DC ... 240 V AC/DC

PA-GF

84 g

27 mm

69 mm

IP65, when installed

-20 °C ... 50 °C

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSD-S CE-SM SCREW	2700093	1
PSD-S CE-SM SPRING	2700091	1

#### Accessories

PSD-S AS CABLE GLAND M16X1,5	2700145	1
------------------------------	---------	---

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSD-S CE-TM SCREW	2700095	1
PSD-S CE-TM SPRING	2700092	1

#### Accessories

Cable gland, M16 x 1.5 mm, black

### Mounting elements for base mounting

For base mounting, the mounting foot of the connection element can be mounted on a junction box or an angled connector as an option.

**The options are as follows:**

- Without concealed cable routing
- With concealed cable routing
- Two-sided mounting for up to 10 signal elements



Outlet box and angled connector for base mounting



Angled connector with concealed cable routing for base mounting

#### Technical data

PSD-S ME OB

PSD-S ME BR-SM

#### General data

Material

PA-GF

PA A3 x 2G5

Weight

73 g

40 g

Ambient temperature (operation)

-30 °C ... 60 °C

-20 °C ... 50 °C

Mounting type

Base mounting

Base mounting

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSD-S ME OB	2700153	1
PSD-S ME BR-SM	2700144	1

#### Technical data

PSD-S ME BR-SM/1S

PSD-S ME BR-SM/2S

PA A3 x 2G5

PA A3 x 2G5

78 g

71 g

-20 °C ... 60 °C

-20 °C ... 60 °C

Base mounting

Base mounting

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSD-S ME BR-SM/1S	2700160	1
PSD-S ME BR-SM/2S	2700161	1

Description

Junction box with lateral cable entry

- For base mounting

**Angled connector**

- With visible cable routing

**Angled connector** with concealed cable routing

- For single-sided base mounting

- For two-sided base mounting

**Mounting feet and tubes**

For tube mounting, the connection element is mounted directly on a tube.

**The options are as follows:**

- Plastic foot for short tubes
- Metal foot for long tubes
- Foot with integrated tube
- Foldaway base for vertical alignment with angled surfaces
- Adapter for single hole mounting



Adapter and mounting foot with tube



Mounting feet and tubes

Description	Ordering data			Ordering data		
	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Adapter</b> for single hole mounting	PSD-S ME A-SH M18	2700150	1			
<b>Foot with integrated tube</b> - 110 mm long	PSD-S ME BT 110	2700156	1			
<b>Foot for tube, Ø 25 mm</b> - Plastic - Metal				PSD-S ME B-P PSD-S ME B-M	2700163 2700164	1 1
<b>Tube, Ø 25 mm</b> - 250 mm long - 400 mm long - 1000 mm long				PSD-S ME T-M 250 PSD-S ME T-M 400 PSD-S ME T-M 1000	2700157 2700158 2700154	1 1 1
<b>Foldaway base</b> - 7.5° pitch				PSD-S ME FB	2700151	1
<b>Tube, for direct mounting on the foldaway base</b> - 45 mm long				PSD-S ME T-P 45	2700152	1

**Mounting elements for tube mounting**

For tube mounting, the mounting foot can be mounted on a junction box or an angled connector as an option.

**The options are as follows:**

- Without concealed cable routing
- With concealed cable routing
- Magnetic base for tool-free mounting on metal surfaces



Junction boxes for tube mounting



Angled connector for tube mounting

General data	Technical data		Technical data	
	PSD-S ME OB	PSD-S ME OB/MB	PSD-S ME BR-BM/HCR	PSD-S ME BR-BM
Material	PA-GF	PA-GF	ABS-PC	PA A3 x 2G5
Weight	73 g	299 g	80 g	60 g
Ambient temperature (operation)	-30 °C ... 60 °C		-20 °C ... 60 °C	
Mounting type	Base mounting		Base mounting, concealed cable routing	

Description	Ordering data			Ordering data		
	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Outlet box</b> with lateral cable entry						
- For base mounting - With magnetic base	PSD-S ME OB PSD-S ME OB/MB	2700153 2700155	1 1			
<b>Angled connector</b> - With concealed cable routing - With visible cable routing				PSD-S ME BR-BM/HCR PSD-S ME BR-BM	2700149 2700143	1 1





# Industrial communication technology

As modern systems and machines become increasingly automated, ever larger amounts of information need to be processed. The higher data volumes, coupled with the integration of complex field devices, is demanding more and more in terms of the performance capabilities of the communication networks used.

The “main arteries” of these networks consist of various types of serial data link, which are neither inter-compatible nor capable of satisfying the increasingly stringent requirements with regard to immunity to interference, range, and speed. Even in harsh industrial environments, our products ensure interference-free and high-performance data transmission.

## Copper transmission

High-performance isolators, repeaters, and converters are available for all leading networks. The devices excel thanks to their high insulation voltages between the interfaces, which effectively prevent faults and compensating currents.

## Fiber optic transmission

Fiber optic data transmission has become the norm, particularly in critical applications with very high requirements regarding availability. Whether immunity to interference, high performance, electrical isolation or network expansion, the use of fiber optic technology is unavoidable.

## Remote communication

Global networking of machines and systems. Alarm generation, remote maintenance, and continual data acquisition. From classic analog modems to fast mobile phone routers: the right system for every application.











## Wireless

Signals from measuring and monitoring stations often have to be transmitted over long distances. Modern wireless systems are a flexible, extendable, and low-cost alternative. Depending on the distance to be covered and the signals to be transmitted, various wireless technologies are available such as Trusted Wireless, Bluetooth or WLAN.





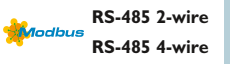
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### Copper transmission

	Repeaters	Active bus termination	Isolators + converters	Patch panels	Segment couplers
					
System					
Description	For electrical isolation and increasing the range	Termination resistor, for active bus termination	Interface isolators and converters, for electrical isolation	Passive mini patch panels, with various connection options	Device coupler, See section: Process infrastructure
Page	355	356	360	452	483










### Fiber optic transmission

	FO converters	FO converters	FO converters	FO converters	FO converters
					
System					
Description	For PROFIBUS, Termination devices and T-couplers	For ControlNet™, DeviceNet™, CANopen®, Termination devices and T-couplers	For INTERBUS, Termination devices and T-couplers	For RS-485 2-wire and RS-485 4-wire systems, Termination devices and T-couplers	For RS-422 and RS-232 up to 115.2 kbps Termination devices and T-couplers
Page	365	369	372	371	373












### Ethernet networks

	Media converters	COMSERVER	Isolator	Switches	Secure networks
					
System					
Description	Conversion of 10/100Base-T(X) Ethernet to fiber optics WDM technology	Device servers for converting serial interfaces	4 kV Ethernet ISOLATOR for electrical isolation	Switches, INTERFACE modules, hubs, Power over Ethernet module	Router with firewall for control cabinet, for mobile use, PCI
				See section: Ethernet networks	See section: Ethernet networks
Page	451	460	414	6	40

Remote communication

	Mobile phone network		Public network		Private network
					
System	 I/O	 UMTS/3G Ethernet	ADSL Annex A, B Ethernet/RS-232	V.34 (analog)  Ethernet/RS-232	Ethernet  RS-232/RS-422/RS-485
Description	GSM/SMS relays, 6 analog/digital inputs, 4 digital outputs	Industrial mobile phone router, for GPRS/EDGE and UMTS/HSPA	DSL broadband router/modem, with firewall, VPN and serial device server	Analog modem, for dial-up line/permanent line operation	Extender (SHDSL) for in-house cables
Page	421	423	427	428	431

Fieldbus components and systems

	Controller boards		Radioline	Bluetooth/WirelessHART	RAD-Line (900 MHz)
					
System			 RS-232 RS-422 RS-485	 Bluetooth  WirelessHART	 Ethernet
Description	PC master/slave controller boards	Master controller boards for SIMATIC S7-300/400	Radioline wireless modules 2.4 GHz and 900 MHz with I/O extension modules	Wireless-MUX WirelessHART gateway/adaptor Bluetooth interface converter	Unidirectional and bidirectional wireless systems
Page	434	436	From page 448		

Fast connection technology

	SUBCON		Accessories		
	SUBCON		Cables, plugs, and tools		
					
System	 CANopen	RS-232 RS-422 RS-485 		Ethernet	FO
Description	D-SUB fast connection for PROFIBUS, CANopen®, and SafetyBUSp	D-SUB fast connection for Modbus, INTERBUS, RS-232, RS-422, RS-485	PROFIBUS cable, type A Fast Connect and quick stripping tool	CAT5e cable SF/UTP, RJ45 plug, crimping pliers, patch cable	Fiber optic cables, plugs, and tools
Page	440	444	439	417	378

## Copper transmission

### Repeater for PROFIBUS DP and RS-485 2-wire systems

The performance and availability of bus systems can be significantly increased by using repeaters. Segmenting the bus with repeaters makes it possible to increase the permissible extent of the network many times over and to extend the number of devices. Bus cable short circuits only affect the relevant segment.

The **PSI-REP-PROFIBUS/12MB** modular repeater has been specially developed for the requirements of PROFIBUS systems. As stipulated by the PROFIBUS installation guidelines, the PROFIBUS network is connected using D-SUB connectors.

- Automatic data rate detection or fixed data rate setting via DIP switches
- Suitable for all data rates of up to 12 Mbps
- High-quality 4-way electrical isolation between all interfaces (PROFIBUS (A) // PROFIBUS (B) // power supply // DIN rail connector)
- Bit oversampling for reliable detection of sporadic disturbances
- Bit retiming for unrestricted cascading of devices
- Filtering of faulty telegrams based on start delimiter detection
- Routing of supply voltage and data signals through DIN rail connectors
- Can be combined with PSI-MOS FO converters in a modular way using DIN rail connectors

As a modular repeater, the **PSI-REP-RS485W2** can be used in RS-485 2-wire bus systems. The device supports bus systems that rely on the UART/NRZ data format with a character length of 10 or 11 bits.

- Suitable for data rates of up to 500 kbps (adjustable via DIP switches)
- High-quality 4-way isolation between all interfaces (RS-485 (A) // RS-485 (B) // power supply // DIN rail connector)
- Bit oversampling for reliable detection of sporadic disturbances
- Bit retiming for unrestricted cascading of devices
- Can be combined with PSI-MOS FO converters in a modular way using DIN rail connectors

The **PSM-ME-RS485/RS485-P** compact repeater is designed for universal use in RS-485 2-wire bus systems.

- Transmission speeds of up to 1.5 Mbps
- Space-saving narrow 22.5 mm device
- High-quality 3-way isolation (RS-485 (A) // RS-485 (B) // power supply)
- Shipbuilding approval according to DNV

#### Notes:

1) EMC: Class A product, see page 553



Supply	
Supply voltage	
Nominal current consumption	
RS-485 interface	
Data format/coding	
Data direction switching	
Termination resistor	
Transmission speed	
Transmission length	
Connection method	
General data	
Bit distortion, input	
Bit distortion, output	
Bit delay	
Alarm output	
Test voltage	
Ambient temperature range	
Electrical isolation	
Dimensions	W / H / D
Conformance / approvals	
ATEX	
UL, USA / Canada	

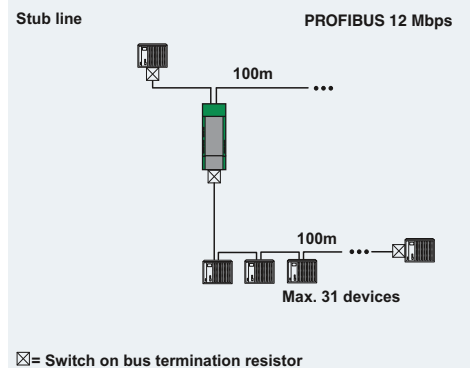
**Description**

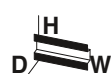
**Repeater**, for electrical isolation and increased range

for PROFIBUS up to 12 Mbps, 4-way isolation, modular expansion possible  
 for RS-485-2-wire bus systems, 4-way isolation, modular expansion possible  
 for RS-485-2-wire bus systems, 3-way isolation

**DIN rail connector** (optional), for routing through the supply voltage and data signal, two pieces are required per device

**System power supply unit**, primary-switched





Repeater for PROFIBUS



RS-485



Repeater for RS-485 2-wire systems



RS-485



Basic repeater for RS-485 2-wire systems

Ex // Applied for: cUL / UL

Ex // Applied for: cUL / UL

Ex // Applied for: cUL / UL

**Technical data**

24 V DC ±20%  
 90 mA (24 V DC)  
 PROFIBUS acc. to IEC 61158, RS-485 2-conductor

UART (11 bit, NRZ)  
 Automatic control, min. station response time 2 bits

(external)  
 Manual and automatic adjustment: 9.6/19.2/45.45/93.75/187.5/500 kbps ; 1.5/3/6/12 Mbps

max. 1200 m (depends on transmission speed and cable type)

D-SUB-9 socket

**Technical data**

24 V DC ±20%  
 75 mA (24 V DC)  
 RS-485 interface, in acc. with EIA/TIA-485, DIN 66259-4/RS-485 2-wire

UART (11/10 bit switchable ; NRZ)  
 Automatic control, min. station response time 2 bits

390 Ω / 180 Ω / 390 Ω (can be connected)  
 Can be set manually:  
 4,8/9,6/19,2/38,4/57,6/75/93,75/115,2/136/187,5/375/500 Kbps

max. 1200 m (depends on transmission speed, bus system and cable type)  
 Plug-in screw connection

**Technical data**

24 V AC/DC ±20%  
 90 mA (24 V DC)  
 RS-485 interface, in acc. with EIA/TIA-485, DIN 66259-4/RS-485 2-wire

UART (11/10 bit switchable ; NRZ)  
 Automatic control, min. station response time 1 bits

390 Ω / 220 Ω / 390 Ω (can be connected)  
 4.8/ 9.6/ 19.2/ 38.4/ 57.6/ 75/ 93.75/ 115.2/ 136/ 187.5/ 375/ 500/ 1500 kbps

max. 1200 m (depends on transmission speed, bus system and cable type)  
 Plug-in screw connection

Max. ± 35%  
 < 6.25%  
 < 1 bit  
 60 V DC / 42 V AC, 1 A  
 1.5 kV  
 -20 °C ... 60 °C  
 (VCC // TBUS // PROFIBUS (A) // PROFIBUS (B))  
 35 mm / 99 mm / 105 mm

Ex II 3 G Ex nAC IIC T4 X  
 508 recognized

Max. ± 35%  
 < 6.25%  
 < 1 bit  
 -  
 1.5 kV  
 -20 °C ... 60 °C  
 (VCC // TBUS // RS-485 (A) // RS-485 (B))  
 35 mm / 99 mm / 105 mm

Ex II 3 G Ex nA II T4 X  
 508 recognized

Max. ± 35%  
 < 3.6%  
 < 200 ns  
 -  
 2 kV  
 0 °C ... 55 °C  
 (VCC // RS-485 (A) // RS-485 (B))  
 22.5 mm / 99 mm / 114.5 mm

-  
 508 recognized  
 Class I, Div. 2, Groups A, B, C, D

**Ordering data**

Type	Order No.	Pcs. / Pkt.
PSI-REP-PROFIBUS(12MB <sup>1</sup> )	2708863	1

**Ordering data**

Type	Order No.	Pcs. / Pkt.
PSI-REP-RS485W2 <sup>1</sup> )	2313096	1

**Ordering data**

Type	Order No.	Pcs. / Pkt.
PSM-ME-RS485/RS485-P <sup>1</sup> )	2744429	1

**Accessories**

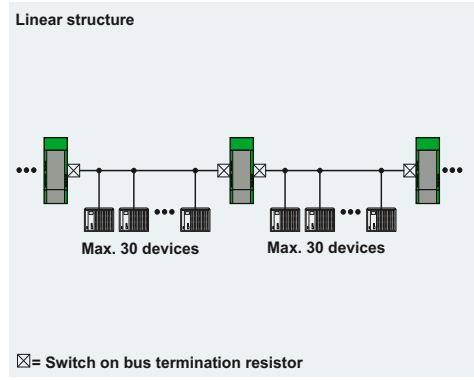
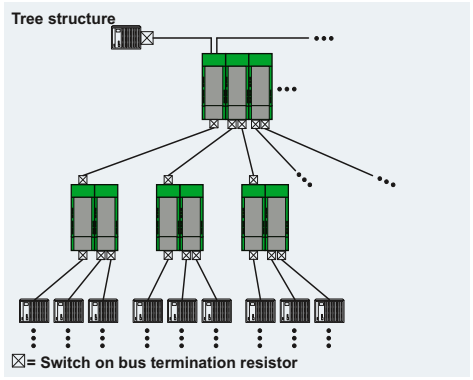
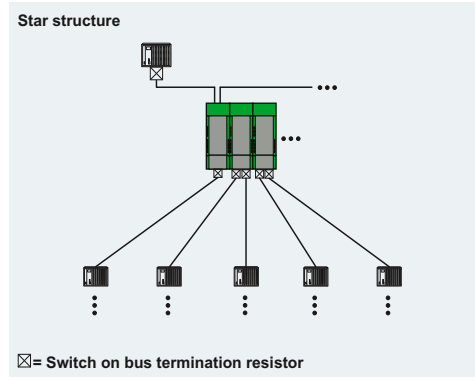
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

**Accessories**

ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

**Accessories**

--	--	--



## Copper transmission

### Active bus termination for PROFIBUS DP and RS-485 networks

PROFIBUS and RS-485 networks can be actively terminated using the PSI-TERMINATOR-PB.

This device relies on permanent termination to ensure interference-free communication, particularly in applications that involve alternating bus devices. The bus cable can be connected using either a plug-in double spring terminal block or a D-SUB socket.

Active programming and diagnostic devices are supplied with power via the D-SUB connection. This also makes the device ideal for use as a defined service and measuring connection within a bus system.

#### Properties:

- Interference-free bus communication thanks to active termination
- Fixed programming interface on the network
- Electrical isolation of supply and data interface
- Redundant power supply
- Diagnostic LEDs for voltage and data activity
- Extended temperature range of -20° ... +65°C
- Termination can be activated externally
- Compact housing type
- DIN rail mounting

#### Application:

##### Motor Control Center (MCC)

- Replacement of MCC racks

##### Automatic vehicles

- Mobile industrial trucks that are regularly coupled to and uncoupled from machining stations

##### Changeover tools

- Robot tools with bus interface

##### Service, programming, and diagnostics

- Fixed programming interface in the bus system

#### Notes:

1) EMC: Class A product, see page 553



Active bus termination



Ex: // Applied for: cUL / UL

#### Technical data

Supply	Supply voltage	24 V DC ± 20% (via plug-in COMBICON screw terminal block)
Nominal current consumption		45 mA (24 V DC)
RS-485 interface		PROFIBUS acc. to IEC 61158, RS-485 2-conductor
Termination resistor		390 Ω / 220 Ω / 390 Ω (can be connected)
Transmission speed		≤ 12 Mbps
Transmission length		≤ 1200 m (depends on transmission speed and cable type)
Nominal output voltage		5 V DC
Strain relief		Shield connection clamp in spring-cage terminal block
Connection method		D-SUB 9, COMBICON
General data		
Test voltage		1.5 kV
Ambient temperature range		-20 °C ... 65 °C
Electrical isolation		DIN EN 50178 (RS-485 // VCC)
Dimensions	W / H / D	22.5 mm / 99 mm / 56 mm
Conformance / approvals		II 3 G Ex nA IIC T4 Gc X 508 listed

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSI-TERMINATOR-PB <sup>1)</sup>	2313944	1

#### Accessories

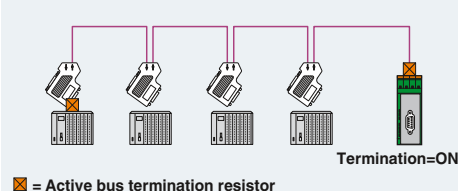
SUBCON-PLUS-PROFIB/90/DC	2313672	1
SUBCON-PLUS-PROFIB/90/SC	2313698	1
PSM-CABLE-PROFIB/FC	2744652	1

Supply	
Supply voltage	
Nominal current consumption	
RS-485 interface	
Termination resistor	
Transmission speed	
Transmission length	
Nominal output voltage	
Strain relief	
Connection method	
General data	
Test voltage	
Ambient temperature range	
Electrical isolation	
Dimensions	W / H / D
Conformance / approvals	
ATEX	
UL, USA / Canada	

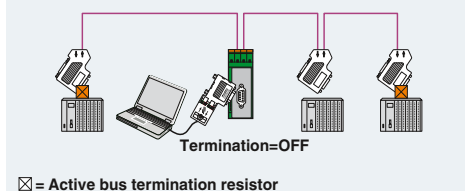
Description
<b>Active termination resistor</b> , for PROFIBUS and RS-485 bus systems, compact design, electrical isolation, bus termination that can be activated, programming interface

<b>PROFIBUS connector</b> , up to 12 Mbps, integrated termination resistor which can be switched on externally, 9-pos. D-SUB pin, pin assignment 3, 5, 6, 8 - Angled 90°, IDC connection - Angled 90°, screw connection
<b>PROFIBUS cable, Fast Connect type</b> , up to 12 Mbps, for permanent connection (02YSY (ST)CY 1X2X22 AWG) (Length in meters as per customer specifications)

#### Termination operation



#### Programming access





### Repeater for ControlNet™

**Notes:**  
1) EMC: Class A product, see page 553

The **PSI-REP-CNET** modular repeater has been specially developed for the requirements of ControlNet™ systems. The ControlNet™ connection is established using standard BNC connectors.

The performance and availability of bus systems can be significantly increased by using repeaters. Segmenting the bus with repeaters makes it possible to increase the permissible extent of the network many times over and to extend the number of devices. Another advantage is that bus cable short circuits are restricted to the relevant segment.

- High-quality electrical isolation between all interfaces (ControlNet™ (A) // ControlNet™ (B) // power supply // DIN rail connector)
- Bit retiming for unrestricted cascading of devices
- Routing of supply voltage and data signals through DIN rail connectors
- Redundant power supply supported in the form of optional system power supply unit
- All connections can be plugged in using BNC connectors or a COMBICON screw terminal block
- Can be combined with the PSI-MOS FO converters in a modular way using DIN rail connectors
- Approved for use in zone 2

<b>Supply</b>	
Supply voltage	24 V DC
Nominal current consumption	38 mA (24 V DC)
<b>ControlNet™ interface</b>	
Transmission speed	ControlNet™ interface, according to EN 50170
Transmission length	5 Mbps
Connection method	≤ 1000 m
<b>General data</b>	
Bit distortion, input	± 35%
Bit distortion, output	< 6.25%
Bit delay	< 3 bit
Test voltage	1.5 kV <sub>ms</sub> (50 Hz, 1 min.)
Ambient temperature range	-20 °C ... 60 °C
Electrical isolation	(VCC // CNET // CNET)
Dimensions	35 mm / 108 mm / 117 mm
<b>Conformance / approvals</b>	
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada	508 listed

<b>Description</b>
<b>Repeater</b> for electrical isolation and increasing the range

<b>DIN rail connector</b> (optional), for routing through the supply voltage and data signal, two pieces are required per device
<b>System power supply unit</b> , primary-switched



Repeater for ControlNet™



#### Technical data

<b>Supply</b>	24 V DC
Nominal current consumption	38 mA (24 V DC)
<b>ControlNet™ interface</b>	
Transmission speed	ControlNet™ interface, according to EN 50170
Transmission length	5 Mbps
Connection method	≤ 1000 m
<b>General data</b>	
Bit distortion, input	± 35%
Bit distortion, output	< 6.25%
Bit delay	< 3 bit
Test voltage	1.5 kV <sub>ms</sub> (50 Hz, 1 min.)
Ambient temperature range	-20 °C ... 60 °C
Electrical isolation	(VCC // CNET // CNET)
Dimensions	35 mm / 108 mm / 117 mm
<b>Conformance / approvals</b>	
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada	508 listed

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSI-REP-CNET <sup>1)</sup>	2313737	1

#### Accessories

ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

## Copper transmission

### Repeaters, segment couplers, and bridge for DeviceNet™ and CANopen®

The infrastructure components for CAN-based transmission systems (DeviceNet™ and CANopen®) can be used to implement interference-free and high-performance networks. Important requirements such as segmentation, electrical isolation, and expansion of the network coverage can now be implemented as easily as almost any network structures. The use of active infrastructure components increases network availability significantly.

Depending on the transmission speed, the signal runtimes in cables and devices limit the maximum achievable network coverage, as the CSMA/CA method typical of CAN only works in a limited time slot. Repeaters and segment couplers can be configured to eliminate these restrictions.

The **PSI-REP-DNET CAN** modular repeater provides an electrically isolated connection between two segments with the same data rate.

- Automatic data rate detection or fixed data rate setting via DIP switches
- Data rates of up to 1 Mbps
- High-quality 4-way isolation between all interfaces (CAN (A) // CAN (B) // power supply // DIN rail connector)
- Can be combined with PSI-MOS FO converters in a modular way using DIN rail connectors

The **PSI-SC-DNET CAN** modular segment coupler connects two segments with different data rates. The segment coupler is configured using the PSI-CONF software that is supplied as standard so that only data telegrams with specific addresses (identifiers) are transmitted to the other segment. A segment coupler can be used to connect remote network segments using a slower CAN data rate.

- Data rates of up to 1 Mbps
- High-quality 4-way isolation between all interfaces (CAN (A) // CAN (B) // power supply // DIN rail connector)
- Can be combined with PSI-MOS FO converters in a modular way using DIN rail connectors

The **PSI-BRIDGE-DNET CAN** modular bridge connects two segments of a network via different infrastructure solutions. The segments can operate at the same or different data rates. Modem/DSL paths, wireless connections or Ethernet networks can be used as alternative transmission technologies via the FL COMSERVER. An RS-422 interface is integrated as standard for connecting the desired infrastructure.

The bridge is configured using the PSI-CONF software that is supplied as standard so that only data telegrams with specific addresses (identifiers) are transmitted via the RS-422. The advantage of the bridge is that it can be used to combine CAN-based networks with alternative infrastructure solutions.

- CAN data rates of up to 1 Mbps
- RS-422 data rates of up to 500 kbps
- High-quality 4-way isolation (CAN // RS-422 // power supply // DIN rail connector)
- Can be combined with PSI-MOS FO converters in a modular way using DIN rail connectors

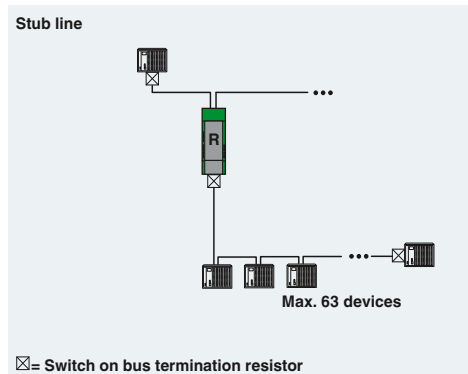
#### Notes:

1) EMC: Class A product, see page 553

Supply	
Supply voltage	
Nominal current consumption	
RS-422 interface	
Termination resistor	
Transmission speed	
Transmission length	
Connection method	
CAN interface	
Termination resistor	
Transmission speed	
Transmission length	
Connection method	
General data	
Bit distortion, input	
Bit distortion, output	
Bit delay	
Test voltage	
Ambient temperature range	
Electrical isolation	
Dimensions	W / H / D
Conformance / approvals	
ATEX	
UL, USA / Canada	

Description
<b>Modular repeater</b> for electrical isolation and increasing the range
<b>Modular segment coupler</b> for connecting slow network segments
<b>Modular bridge</b> that allows the use of alternative transmission technologies

#### System power supply unit, primary-switched







**Repeater for DeviceNet™ and CANopen®**



**Segment coupler for DeviceNet™ and CANopen®**



**Bridge for DeviceNet™ and CANopen®**



Technical data
24 V DC 55 mA (24 V DC)
- - -
CAN interface, in accordance with ISO/IS 11898 for DeviceNet™, CAN, CANopen® 124 Ω (integrated and ready to be switched) ≤ 1000 kbps ≤ 5000 m (dependent on the data rate and the protocol used)
COMBICON plug-in screw terminal block
± 35% < 6.25% < 1 bit (configurable) 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C (VCC // CAN A // CAN B) 35 mm / 107 mm / 121 mm
Ex II 3 G Ex nA IIC T4 Gc X 508 listed

Technical data
24 V DC 55 mA (24 V DC)
- - -
CAN interface, in accordance with ISO/IS 11898 for DeviceNet™, CAN, CANopen® 124 Ω (integrated and ready to be switched) ≤ 1000 kbps ≤ 5000 m (dependent on the data rate and the protocol used)
COMBICON plug-in screw terminal block
± 35% < 6.25% ≤ 108 bit 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C (VCC // CAN A // CAN B) 35 mm / 107 mm / 121 mm
Ex II 3 G Ex nA IIC T4 Gc X 508 listed

Technical data
24 V DC 55 mA (24 V DC) RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1
150 Ω ≤ 500 kbps ≤ 1200 m (dependent on the data rate) COMBICON plug-in screw terminal block CAN interface, in accordance with ISO/IS 11898 for DeviceNet™, CAN, CANopen® 124 Ω (integrated and ready to be switched) ≤ 1000 kbps ≤ 5000 m (dependent on the data rate and the protocol used)
COMBICON plug-in screw terminal block
± 35% < 6.25% - 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C (VCC // CAN // RS-422) 35 mm / 107 mm / 121 mm
Ex II 3 G Ex nA IIC T4 Gc X 508 listed

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-REP-DNET CAN <sup>1)</sup>	2313423	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-SC-DNET CAN <sup>1)</sup>	2313449	1

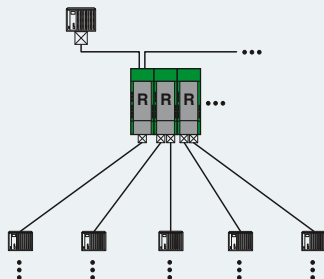
Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-BRIDGE-DNET CAN <sup>1)</sup>	2313533	1

Accessories		
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

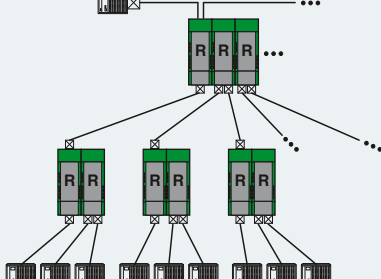
Accessories		
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Star structure



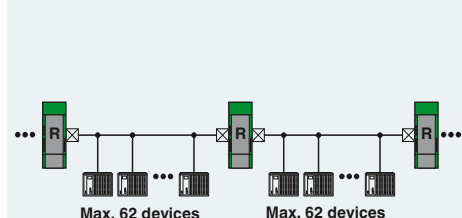
☒ = Switch on bus termination resistor

Tree structure



☒ = Switch on bus termination resistor

Linear structure



☒ = Switch on bus termination resistor

## Copper transmission

### Interface isolator

#### RS-232 / RS-232 interface isolator

The V.24 (RS-232) interface is an asymmetric voltage interface (common signal ground for all signals). As well as having a very low signal power, the signal ground is connected to ground potential. This results in very little immunity to interference and a maximum range of 15 m.

A considerably higher level of immunity to interference can be achieved in industrial applications by using V.24 (RS-232) isolator modules. The high-quality 3-way isolation results in an electrically isolated and interference-proof V.24 (RS-232) interface. This decoupling also protects the expensive terminal devices against damage.

#### Features:

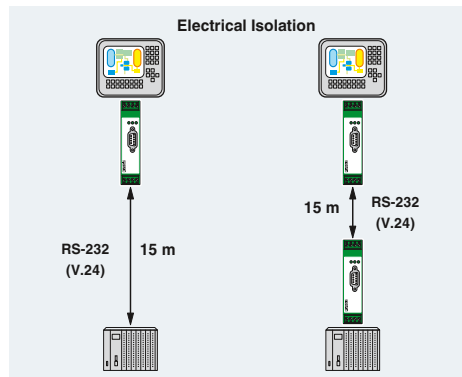
- High-quality 3-way isolation up to 2 kV (VCC // V.24 (RS-232) // V.24 (RS-232))
- Max. transmission rate of up to 115.2 kbps
- 24 V DC or AC power supply suitable for control cabinet
- Mounting on standard EN DIN rails
- Integrated surge protection with transient discharge to the DIN rail
- In the case of variable cable lengths, the V.24 (RS-232) connection on the field side can be established conveniently using plug-in screw terminal blocks
- Transmission of TxD/RxD data channels and RTS/CTS control lines
- Active data transmission indicated by separate data indicators for the transmit and receive channels

#### Application:

- Higher level of immunity to interference for industrial conditions
- Compensating currents avoided through electrical isolation
- Protection of expensive terminal devices through decoupling
- Optimum protection of both interface sides thanks to two V.24 (RS-232)/V.24 (RS-232) interface isolators

#### Notes:

1) EMC: Class A product, see page 553



<b>Supply</b>	
Supply voltage	24 V AC/DC ±20%
Nominal current consumption	40 mA (24 V DC)
<b>V.24 (RS-232) interface</b>	
Transmission speed	V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1
Transmission length	115.2 kbps
Connection method	15 m (twisted pair)
<b>General data</b>	
Bit distortion	D-SUB-9 plug
Bit delay	Plug-in screw connection
Test voltage	< 5%
Ambient temperature range	< 3 µs
Housing material	2 kV
Transmission channels	0 °C ... 55 °C
Electrical isolation	PA
Dimensions	4 (2/2), RxD, TxD, RTS, CTS ; full duplex
Conformance / approvals	(VCC // V.24 (RS-232) (A) // V.24 (RS-232) (B))
UL, USA / Canada	22.5 mm / 99 mm / 118.6 mm

<b>Description</b>	
<b>Interface isolator</b> , for electrical isolation of RS-232 (V.24) interfaces, four channels, rail-mountable	

<b>RS-232-D-SUB cable</b> , length: 2 m	
- 9-pos. socket on 25-pos. socket	
- 9-pos. socket on 9-pos. socket	



RS-232



V.24 (RS-232) interface isolator



Ex: cUL us // Applied for: cUL / UL

#### Technical data

<b>Technical data</b>	
Supply voltage	24 V AC/DC ±20%
Nominal current consumption	40 mA (24 V DC)
<b>V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1</b>	
Transmission speed	115.2 kbps
Transmission length	15 m (twisted pair)
Connection method	D-SUB-9 plug
Plug-in screw connection	
<b>General data</b>	
Bit distortion	< 5%
Bit delay	< 3 µs
Test voltage	2 kV
Ambient temperature range	0 °C ... 55 °C
Housing material	PA
Transmission channels	4 (2/2), RxD, TxD, RTS, CTS ; full duplex
Electrical isolation	(VCC // V.24 (RS-232) (A) // V.24 (RS-232) (B))
Dimensions	22.5 mm / 99 mm / 118.6 mm
<b>Conformance / approvals</b>	
508 recognized	
Class I, Div. 2, Groups A, B, C, D	

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSM-ME-RS232/RS232-P <sup>1)</sup>	2744461	1

#### Accessories

PSM-KA 9 SUB 25/BB/2METER	2761059	1
PSM-KA9SUB9/BB/2METER	2799474	1

Interface converters

RS-232 / TTY interface converter

This converter converts a V.24 (RS-232) interface into a 20 mA TTY current loop interface bidirectionally.

The interference immune TTY signal allows problem-free data transmission over distances of up to 1000 m using a twisted-pair and shielded 4-wire cable.

Features:

- Conversion of V.24 (RS-232) Tx/D/RxD full duplex data signals into the TTY current loop standard
- Semi-active, active or passive TTY operating mode, depending on pin assignment
- Transmission speed of up to 19.2 kbps
- Transmission distances of up to 1000 m in active TTY mode
- 24 V DC or AC power supply suitable for control cabinet
- Active data transmission indicated by separate data indicators for the transmit and receive channels
- Convenient connection for variable cable lengths, enabling the TTY connection on the field side to be established via plug-in screw terminal blocks
- V.24 (RS-232) connection via D-SUB 9 and standard V.24 (RS-232) cable
- High-quality 3-way isolation up to 2 kV (VCC // V.24 (RS-232) // TTY)
- Mounting on standard EN DIN rails
- Integrated surge protection with transient discharge to the DIN rail

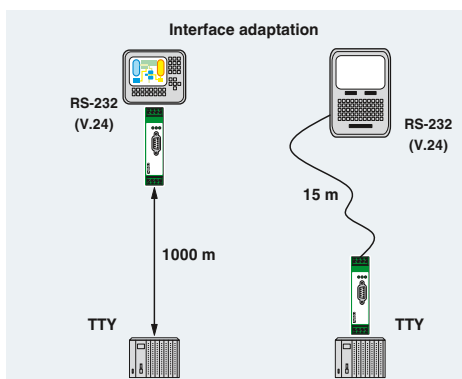
Application:

The following tasks are generally solved with the converters (see illustration):

- Interface adaptation between V.24 (RS-232) and TTY interfaces
- Increased range of up to 1000 m
- Programming connection between PC (V.24 (RS-232)) and, for example, S5 controllers with TTY programming interface for temporary coupling

Notes:

1) EMC: Class A product, see page 553



<b>Supply</b>	
Supply voltage	24 V AC/DC ±20%
Nominal current consumption	75 mA (24 V DC)
<b>V.24 (RS-232) interface</b>	
Transmission speed	≤ 19.2 kbps
Transmission length	15 m (twisted pair)
Connection method	D-SUB-9 plug
<b>TTY interface</b>	
Transmission speed	≤ 19.2 kbps
Transmission length	1000 m (twisted pair)
Connection method	Plug-in screw connection
Operating mode	Active, semi active, passive
Load	≤ 500 Ω
<b>General data</b>	
Bit distortion	< 5%
Bit delay	< 3 μs
Test voltage	2 kV
Ambient temperature range	0 °C ... 55 °C
Housing material	PA
Transmission channels	2 (1/1), Rx/D, Tx/D, full duplex
Electrical isolation	(VCC // V.24 (RS-232) // TTY)
Dimensions	22.5 mm / 99 mm / 118.6 mm
Conformance / approvals	
UL, USA / Canada	

Description	<b>Interface converter</b> , for conversion from RS-232 (V.24) to TTY, with electrical isolation, two channels, rail-mountable	
-------------	--	--

<b>RS-232-D-SUB cable</b> , length: 2 m		
- 9-pos. socket on 25-pos. socket		
- 9-pos. socket on 9-pos. socket		



TTY

RS-232



TTY converter, 2 channels



Ex: cULus // Applied for: cUL / UL

Technical data

<b>Supply</b>	
Supply voltage	24 V AC/DC ±20%
Nominal current consumption	75 mA (24 V DC)
<b>V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1</b>	
Transmission speed	≤ 19.2 kbps
Transmission length	15 m (twisted pair)
Connection method	D-SUB-9 plug
<b>TTY interface, CL2 in acc. with DIN 66348-1</b>	
Transmission speed	≤ 19.2 kbps
Transmission length	1000 m (twisted pair)
Connection method	Plug-in screw connection
Operating mode	Active, semi active, passive
Load	≤ 500 Ω
<b>General data</b>	
Bit distortion	< 5%
Bit delay	< 3 μs
Test voltage	2 kV
Ambient temperature range	0 °C ... 55 °C
Housing material	PA
Transmission channels	2 (1/1), Rx/D, Tx/D, full duplex
Electrical isolation	(VCC // V.24 (RS-232) // TTY)
Dimensions	22.5 mm / 99 mm / 118.6 mm
Conformance / approvals	
508 recognized	
Class I, Div. 2, Groups A, B, C, D	

Ordering data

Type	Order No.	Pcs. / Pkt.
PSM-ME-RS232/TTY-P <sup>1)</sup>	2744458	1

Accessories

PSM-KA 9 SUB 25/BB/2METER	2761059	1
PSM-KA9SUB9/BB/2METER	2799474	1

## Copper transmission

### Interface converters

**RS-232 (V.24) / RS-422 (V.11)**

**RS-232 (V.24) / RS-485**

The RS-422 standard can be used to set up rapid, interference-free point-to-point connections in industrial applications. Connections covering a distance of up to 1200 m can be established using a twisted-pair and shielded 4-wire cable.

The RS-485 standard allows more than two devices to communicate with one another. Converting the V.24 (RS-232) point-to-point interface into the bus-capable RS-485 standard makes it possible to network up to 32 devices via a 2 or 4-wire cable.

### PSM-ME-RS232/RS485-P

This interface converter converts TxD/RxD data signals with speeds of up to 115.2 kbps on the V.24 (RS-232) interface bidirectionally into either RS-422 or RS-485 signals. The V.24 (RS-232) connection is established via a 9-pos. D-SUB, and the RS-422/RS-485 field connection is established using COMBICON plug-in screw terminal blocks.

#### Features:

- RS-422 4-wire point-to-point mode
- RS-485 2-wire mode, half duplex
- RS-485 4-wire mode, full duplex
- Automatic RS-485 transmit/receive changeover
- Transmission speed between 4.8 kbps and 115.2 kbps
- Integrated data indicator for dynamic indication of send and receive data
- High-quality 3-way isolation between power supply, V.24 (RS-232), and RS-422/485 for reliable decoupling of the potentials with 2 kV
- Integrated surge protection with transient discharge to the DIN rail

#### Applications:

- Fast and interference-free point-to-point connection between two V.24 (RS-232) interfaces via RS-422
- Increase in range or remote transmission up to 1200 m
- Programming or parameterizing link between PC (V.24 (RS-232)) and a piece of equipment such as a PLC or variable frequency drive with an RS-422 connection
- A temporary programming or parameterizing link can be set up between a PC (V.24 (RS-232)) and a piece of equipment such as a PLC or variable frequency drive with an RS-485 connection

### PSM-EG-RS 232/RS 422-P/4K

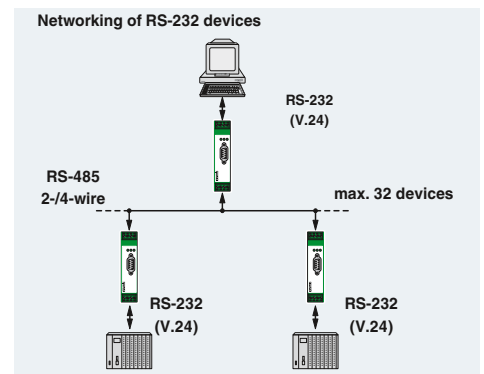
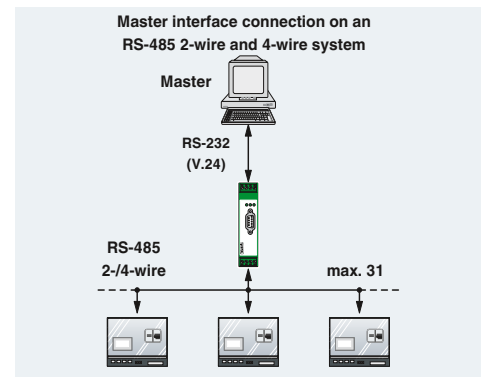
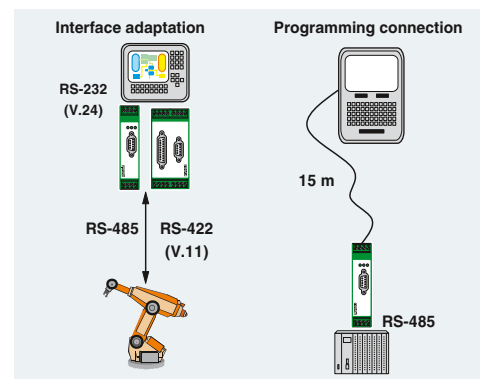
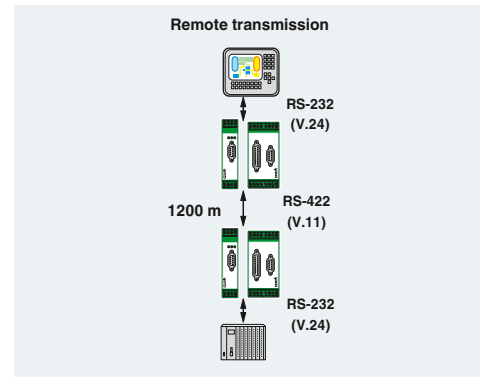
The PSM-EG... control cabinet module also converts the V.24 (RS-232) signals in full duplex mode with a data rate of up to 64 kbps to the powerful RS-422 standard. However, in addition to the TxD/RxD transmit and receive channels, the converter also provides two further channels for transmitting RTS and CTS control lines.

#### Features:

- RS-422 4-wire point-to-point mode
- High-quality 3-way isolation between power supply, V.24 (RS-232), and RS-422 for reliable electrical isolation of the potentials with 2.5 kV
- Integrated surge protection with transient discharge to the DIN rail
- Transmission speed of up to 64 kbps

#### Applications:

- Fast and interference-free point-to-point connection between two V.24 (RS-232) interfaces via RS-422
- Programming or parameterizing link between PC (V.24 (RS-232)) and a piece of equipment such as a PLC or variable frequency drive with an RS-422 connection
- Increased range of up to 1200 m, incl. control cables



**Notes:**  
1) EMC: Class A product, see page 553



**V.24 (RS-232) converter for RS-422 and RS-485, 2 channels**



**V.24 (RS-232) converter for RS-422, 4 channels**

Ex: // Applied for: cUL / UL

	Technical data	Technical data
Supply		
Supply voltage	24 V AC/DC ±20%	24 V DC ±20%
Nominal current consumption	85 mA (24 V DC)	130 mA (24 V DC)
V.24 (RS-232) interface	V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1	V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1
Transmission speed	115.2 kbps	64 kbps
Connection method	D-SUB-9 plug	D-SUB-9 plug
RS-422 interface	RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1	RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1
Termination resistor	390 Ω / 180 Ω / 390 Ω (can be connected)	510 Ω / 150 Ω / 510 Ω (can be connected)
Transmission speed	115.2 kbps	64 kbps
Transmission length	1200 m (twisted pair)	1200 m (twisted pair)
Connection method	Plug-in screw connection	D-SUB-15 plug
RS-485 interface	RS-485 interface in acc. with EIA/TIA-485, DIN 66259-1	
Data direction switching	Automatic control or via RTS/CTS	-
Termination resistor	390 Ω / 180 Ω / 390 Ω (can be connected)	-
Transmission length	1200 m (twisted pair)	-
Connection method	Plug-in screw connection	-
General data		
Bit distortion	≤ 5%	≤ 5%
Bit delay	≤ 3 μs	≤ 3 μs
Test voltage	2 kV	2.5 kV
Ambient temperature range	0 °C ... 55 °C	0 °C ... 50 °C
Housing material	PA	ABS
Transmission channels	2 (1/1), Rx/D, Tx/D, full duplex	4 (2/2), Rx/D, Tx/D, RTS, CTS ; full duplex
Electrical isolation	(VCC // V.24 (RS-232) // RS-485)	(VCC // V.24 (RS-232) // RS-422)
Dimensions	22.5 mm / 99 mm / 118.6 mm	45 mm / 75 mm / 110 mm
Conformance / approvals		
UL, USA / Canada	508 recognized Class I, Div. 2, Groups A, B, C, D	cUL 508 recognized

	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Interface converter</b> , for conversion from RS-232 (V.24) to RS-485, with electrical isolation, rail-mountable, changeover of data direction self-controlling or through RTS/CTS						
- 2 channels	<b>PSM-ME-RS232/RS485-P1)</b>	<b>2744416</b>	<b>1</b>			
<b>Interface converter</b> , for conversion from RS-232 (V.24) to RS-422 (V.11), with electrical isolation, rail-mountable						
- 4 channels				<b>PSM-EG-RS232/RS422-P/4K1)</b>	<b>2761266</b>	<b>1</b>
	Accessories			Accessories		
<b>RS-232-D-SUB cable</b> , length: 2 m						
- 9-pos. socket on 25-pos. socket	<b>PSM-KA 9 SUB 25/BB/2METER</b>	<b>2761059</b>	<b>1</b>	<b>PSM-KA 9 SUB 25/BB/2METER</b>	<b>2761059</b>	<b>1</b>
- 9-pos. socket on 9-pos. socket	<b>PSM-KA9SUB9/BB/2METER</b>	<b>2799474</b>	<b>1</b>	<b>PSM-KA9SUB9/BB/2METER</b>	<b>2799474</b>	<b>1</b>

### FO converters for PROFIBUS

The **PSI-MOS-PROFIB/FO...** devices convert copper-based PROFIBUS interfaces to fiber optics.

The integrated optical diagnostics allow permanent monitoring of the FO paths during installation and also during operation. The floating switch contact is activated when the signal output on the fiber optic paths drops to a critical level.

Depending on which wavelength is used in conjunction with the corresponding fibers, transmission distances of 70 m to 45 km can be achieved between two devices. Depending on the wavelength, devices can be used with polymer, HCS, and fiberglass.

- Automatic data rate detection or fixed data rate setting via DIP switches
- Suitable for all data rates of up to 12 Mbps
- Integrated optical diagnostics for continuous monitoring of fiber optic paths
- Floating switch contact for leading alarm generation in relation to critical fiber optic paths
- High-quality electrical isolation between all interfaces (PROFIBUS // fiber optic ports // power supply // DIN rail connector)
- Bit retiming for any cascading depth
- Routing of supply voltage and data signals through DIN rail connectors
- Redundant power supply supported in the form of optional system power supply unit
- Can be combined with the PSI copper repeater for PROFIBUS in a modular way using DIN rail connectors

The **PSI-MOS-PROFIB/FO... E** terminal devices convert a PROFIBUS interface to a **FO cable**. They are ideal for point-to-point connections.

The **PSI-MOS-PROFIB/FO... T** T-couplers allow the interface to be converted to two **FO cables**. They can be used to create linear structures and ring structures for increased system availability.

#### Notes:

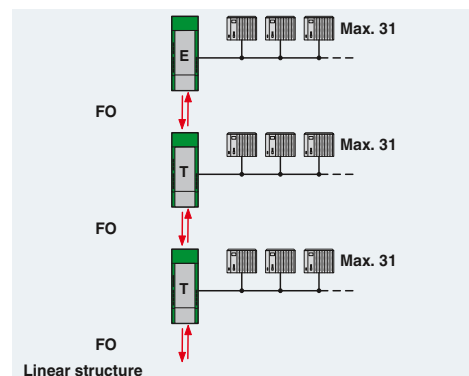
1) EMC: Class A product, see page 553

Supply	
Supply voltage range	
Nominal current consumption	
RS-485 interface	
Data format/coding	
Transmission speed	
Transmission length	
Connection method	
Optical interface	
Connection	
Wavelength	
Transmission length incl. 3 dB system reserve	
General data	
Bit delay	
Ambient temperature range	
Dimensions	W / H / D
Conformance / approvals	
ATEX	
UL, USA / Canada	

Description	
<b>Terminal device</b> , for converting data signals from PROFIBUS FMS/DP to an FO cable	
<b>T-coupler</b> , for converting data signals from PROFIBUS FMS/DP to two FO cables	

<b>DIN rail connector</b> (optional), for routing through the supply voltage and data signal, two pieces are required per device	
<b>DIN rail connector</b> , (optional), for routing through the supply voltage, 2 required per device	

<b>System power supply unit</b> , primary-switched	
--	--







**PROFIBUS**  
polymer and HCS fibers



**PROFIBUS**  
HCS and fiberglass  
(multi mode)



**PROFIBUS**  
fiberglass  
(multi mode and single mode)



Technical data
18 V DC ... 30 V DC 100 mA (24 V DC) PROFIBUS acc. to IEC 61158, RS-485 2-wire, half duplex, automatic control UART (11 bit, NRZ) ≤ 12 Mbps ≤ 1200 m (depending on the data rate, with shielded, twisted pair data cable) D-SUB-9 socket
F-SMA 660 nm 70 m (with F-P 980/1000 230 dB/km with quick mounting connector) 400 m (with F-K 200/230 10 dB/km with quick mounting connector)
< 1 bit -20 °C ... 60 °C 35 mm / 99 mm / 106 mm
<ul style="list-style-type: none"> <li>Ex II 3 G Ex nAC IIC T4 X</li> <li>Ex II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U)</li> <li>Class I, Zone 2, AEx nc IIC T5</li> <li>Class I, Zone 2, Ex nC nL IIC T5 X</li> <li>Class I, Div. 2, Groups A, B, C, D</li> </ul>

Technical data
18 V DC ... 30 V DC 120 mA (24 V DC) PROFIBUS acc. to IEC 61158, RS-485 2-wire, half duplex, automatic control UART (11 bit, NRZ) ≤ 12 Mbps ≤ 1200 m (depending on the data rate, with shielded, twisted pair data cable) D-SUB-9 socket
B-FOC (ST®) 850 nm 2600 m (with F-G 50/125 2.5 dB/km) 3300 m (with F-G 62.5/125 3.0 dB/km) 800 m (with F-K 200/230 10 dB/km with quick mounting connector)
< 1 bit -20 °C ... 60 °C 35 mm / 99 mm / 106 mm
<ul style="list-style-type: none"> <li>Ex II 3 G Ex nAC IIC T4 X</li> <li>Ex II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U)</li> <li>Class I, Zone 2, AEx nc IIC T5</li> <li>Class I, Zone 2, Ex nC nL IIC T5 X</li> <li>Class I, Div. 2, Groups A, B, C, D</li> </ul>

Technical data
18 V DC ... 32 V DC 170 mA (24 V DC) PROFIBUS acc. to IEC 61158, RS-485 2-wire, half duplex, automatic control UART (11 bit, NRZ) ≤ 12 Mbps ≤ 1200 m (depending on the data rate, with shielded, twisted pair data cable) D-SUB-9 socket
SC duplex 1300 nm 25 km (with F-G 50/125 0.7 dB/km at 1300 nm) 22 km (with F-G 62.5/125 0.8 dB/km at 1300 nm) 45 km (with F-E 9/125 0.4 dB/km at 1300 nm)
< 1 bit -20 °C ... 60 °C 35 mm / 105 mm / 106 mm
<ul style="list-style-type: none"> <li>Ex II 3 G Ex nA nC IIC T4 Gc X</li> </ul> <p>508 listed 508 recognized</p>

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-PROFIB/FO 660 E <sup>1)</sup>	2708290	1
PSI-MOS-PROFIB/FO 660 T <sup>1)</sup>	2708287	1

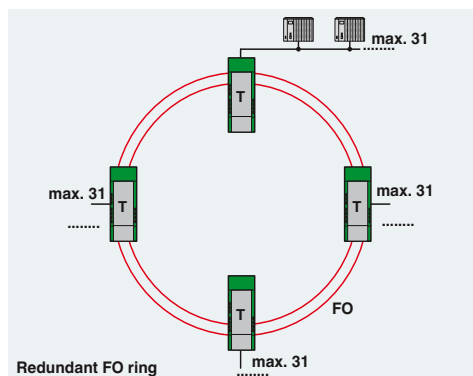
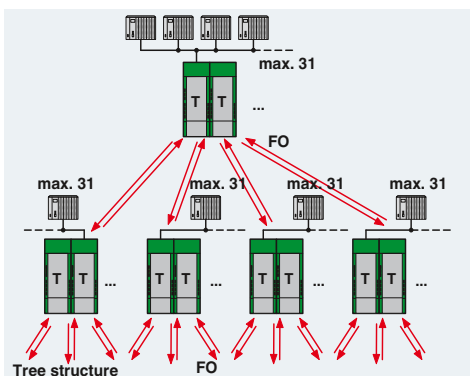
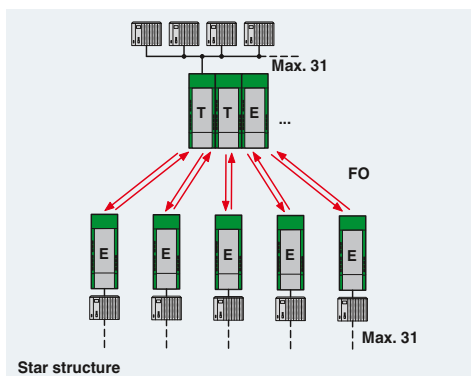
Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-PROFIB/FO 850 E <sup>1)</sup>	2708274	1
PSI-MOS-PROFIB/FO 850 T <sup>1)</sup>	2708261	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-PROFIB/FO1300 E <sup>1)</sup>	2708559	1
PSI-MOS-PROFIB/FO1300 T <sup>1)</sup>	2708892	1

Accessories		
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1





## Fiber optics transmission

### FO converters for ControlNet™

With the infrastructure components for ControlNet™, copper-based and fiber optic networks can benefit from the advantages of active devices. The main advantage is the electrically isolated connection of bus devices, which means that the negative effects of voltage equalization currents and electromagnetic interference on the bus cables are a thing of the past. In addition, bus cable short circuits only affect the specific potential segment concerned. In addition to interference-free and electrically isolated networking, the use of fiber optic technology also enables longer branch lines and star and tree structures to be created.

- Integrated optical diagnostics for continuous monitoring of fiber optic paths
- Floating switch contact for leading alarm generation in relation to critical fiber optic paths
- High-quality electrical isolation between all interfaces (ControlNet™ // fiber optic ports // power supply // DIN rail connector)
- Routing of supply voltage and data signals through DIN rail connectors
- Redundant power supply supported in the form of optional system power supply unit
- Can be combined with the PSI copper repeater in a modular way using DIN rail connectors

The **PSI-MOS-CNET/FO... E** terminal device converts a PROFIBUS interface to a **fiber optic cable**. It is ideal for point-to-point connections.

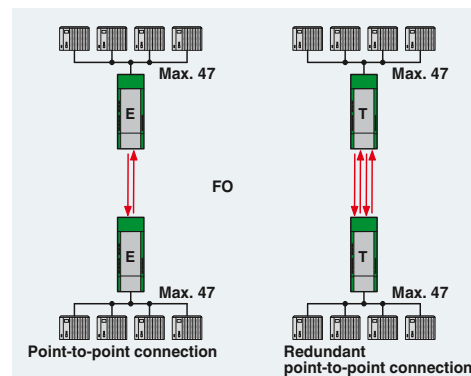
The **PSI-MOS-CNET/FO... T** T-coupler allows the interface to be converted to **two FO cables**. This device can be used to create redundant network structures for increased system availability.

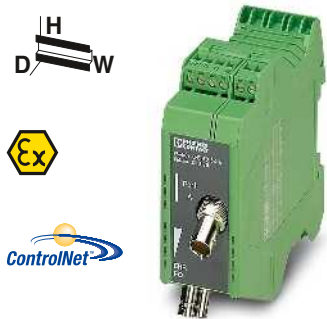
#### Notes:

1) EMC: Class A product, see page 553

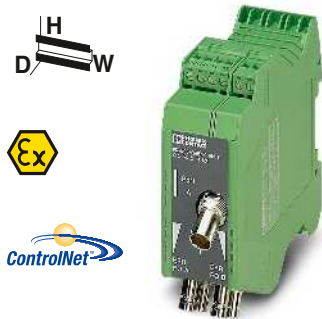
Supply	
Supply voltage range	
Nominal current consumption	
ControlNet™ interface	
Transmission speed	
Transmission length	
Connection method	
Optical interface	
Connection	
Wavelength	
Transmission length incl. 3 dB system reserve	
General data	
Bit delay	
Alarm output	
Test voltage	
Ambient temperature range	
Electrical isolation	
Dimensions	
Conformance / approvals	
ATEX	
UL, USA / Canada	

Description	
<b>Fiber optic converter</b> , termination device for converting data signals to a fiber optic cable	
<b>Fiber optic converter</b> , T-coupler for converting data signals to two fiber optic cables	
<b>DIN rail connector</b> (optional), for routing through the supply voltage and data signal, two pieces are required per device	
<b>System power supply unit</b> , primary-switched	





**ControlNet™,  
one optical channel**



**ControlNet™,  
two optical channels**

Ex:

Ex:

Technical data	
18 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)	
100 mA (24 V DC)	
ControlNet™ interface, according to EN 50170	
5 Mbps	
≤ 1000 m	
BNC 75 Ω	
B-FOC (ST®)	
850 nm	
1200 m (with F-K 200/230 8 dB/km with quick mounting connector)	
3100 m (with F-G 50/125 2.5 dB/km)	
3000 m (with F-G 62.5/125 3.0 dB/km)	
< 3 bit	
18 V DC ... 30 V DC, 500 mA	
1.5 kV <sub>rms</sub> (50 Hz, 1 min.)	
-20 °C ... 60 °C	
(VCC // ControlNet™)	
35 mm / 105 mm / 117 mm	
II (2) D [Ex op is Db] IIIC (PTB 06 ATEX 2042 U)	
II (2) G [Ex op is Gb] IIC (PTB 06 ATEX 2042 U)	
II 3 G Ex nA IIC T4 Gc X	
508 listed	

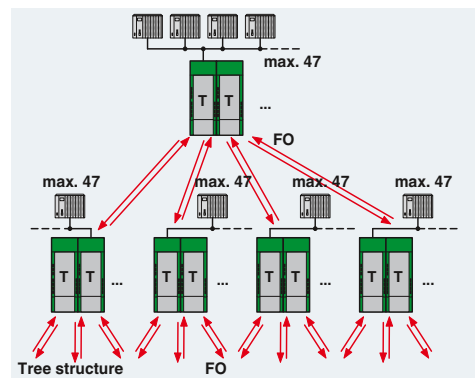
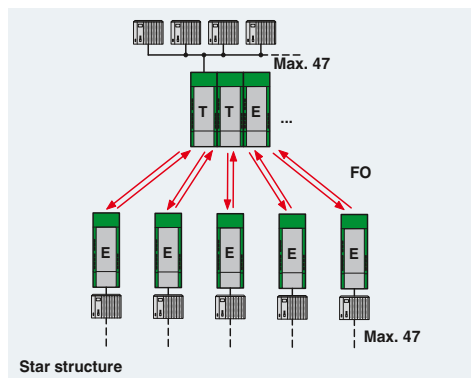
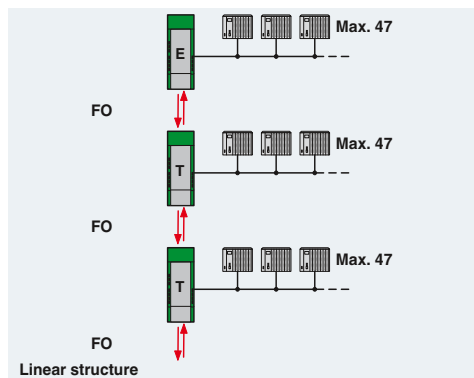
Technical data	
18 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)	
100 mA (24 V DC)	
ControlNet™ interface, according to EN 50170	
5 Mbps	
≤ 1000 m	
BNC 75 Ω	
B-FOC (ST®)	
850 nm	
1200 m (with F-K 200/230 8 dB/km with quick mounting connector)	
3100 m (with F-G 50/125 2.5 dB/km)	
3000 m (with F-G 62.5/125 3.0 dB/km)	
< 3 bit	
18 V DC ... 30 V DC, 500 mA	
1.5 kV <sub>rms</sub> (50 Hz, 1 min.)	
-20 °C ... 60 °C	
(VCC // ControlNet™)	
35 mm / 105 mm / 117 mm	
II (2) D [Ex op is Db] IIIC (PTB 06 ATEX 2042 U)	
II (2) G [Ex op is Gb] IIC (PTB 06 ATEX 2042 U)	
II 3 G Ex nA IIC T4 Gc X	
508 listed	

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-CNET/FO 850 E <sup>1)</sup>	2313711	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-CNET/FO 850 T <sup>1)</sup>	2313724	1

Accessories		
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1



## Fiber optics transmission

### FO converters for DeviceNet™ and CANopen®

The PSI-MOS-DNET... fiber optic transmission system enables DeviceNet™ and CANopen® users to benefit from simple and interference-free networking based on fiber optics. In addition, bus cable short circuits only affect the specific potential segment concerned. This increases overall availability, and improves flexibility when designing the bus topology. The use of fiber optic technology enables branch lines and star and tree structures to be created.

The 22.5 mm space-saving devices from the **PSI-MOS-DNET CAN/FO...** series feature an internal backplane. The maximum network expansion that can be achieved (sum total of copper and fiber optic cables) essentially depends on the data rate used.

- Data rates of up to 800 kbps, set via DIP switches
- Integrated optical diagnostics for continuous monitoring of fiber optic paths
- Floating switch contact in basic module for leading alarm generation in relation to critical fiber optic paths
- High-quality electrical isolation between all interfaces (DeviceNet™ // fiber optic port // power supply // backplane)
- Integrated backplane for routing through the supply voltage and data signals

Thanks to extended functions, the modular devices in the **PSI-MOS-DNET/FO...** series support network expansion that is not dependent on the data rate.

- Automatic data rate detection or fixed data rate setting via DIP switches
- Data rates of up to 1000 kbps
- Integrated optical diagnostics for continuous monitoring of fiber optic paths
- Floating switch contact for leading alarm generation in relation to critical fiber optic paths
- High-quality electrical isolation between all interfaces (DeviceNet™ // fiber optic ports // power supply // DIN rail connector)
- Routing of supply voltage and data signals through DIN rail connectors
- Redundant power supply supported in the form of optional system power supply unit
- Can be combined with the PSI copper repeater in a modular way using DIN rail connectors

#### Notes:

1) EMC: Class A product, see page 553

Supply	
Supply voltage range	
Nominal current consumption	
CAN interface	
Termination resistor	
Transmission speed	
Transmission length	
Connection method	
Optical interface	
Connection	
Wavelength	
Transmission length incl. 3 dB system reserve	
General data	
Bit delay	
Alarm output	
Test voltage	
Ambient temperature range	
Dimensions	
Conformance / approvals	
ATEX	

W / H / D

UL, USA / Canada

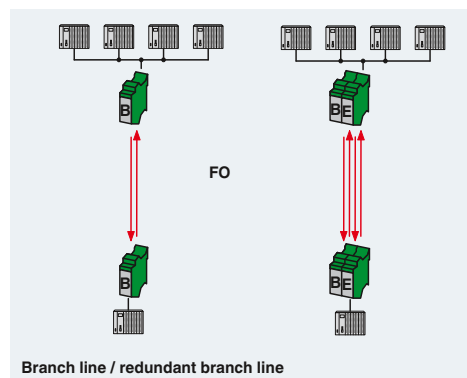
#### Description

**Basic module** for conversion of the CAN-based interface to a fiber optics interface

**Extension module** with a fiber optics interface

**FO converter**, terminal device for converting a CAN-based interface to a fiber optic cable

**FO converter**, T-coupler for converting a CAN-based interface to two fiber optic cables

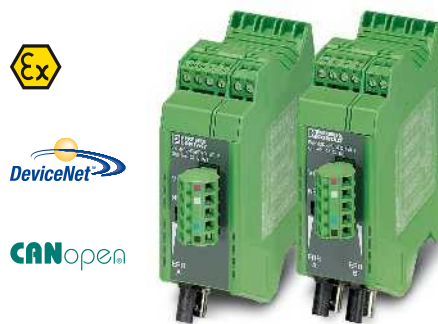




DeviceNet™ and CANopen® Polymer and HCS fibers



DeviceNet™ and CANopen® HCS and fiberglass (multi mode)



DeviceNet™ and CANopen® HCS and fiberglass (multi mode) external backplane

Ex:

Ex:

Ex:

Technical data
10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
100 mA (24 V DC)
CAN interface, in accordance with ISO/IS 11898 for DeviceNet™, CAN, CANopen®
120 Ω (can be connected)
≤ 800 kbps
≤ 5000 m (dependent on the data rate and the protocol used)
Plug-in screw connection
F-SMA
660 nm
100 m (with F-P 980/1000 230 dB/km with quick mounting connector)
800 m (with F-K 200/230 10 dB/km with quick mounting connector)
< 1 bit
60 V DC / 42 V AC, 0.46 A
1.5 kV <sub>rms</sub> (50 Hz, 1 min.)
-20 °C ... 60 °C
22.5 mm / 99 mm / 114.5 mm
II 3 G Ex nAC IIC T4 X
II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U)
Class I, Zone 2, AEx nc IIC T5
Class I, Div. 2, Groups A, B, C, D

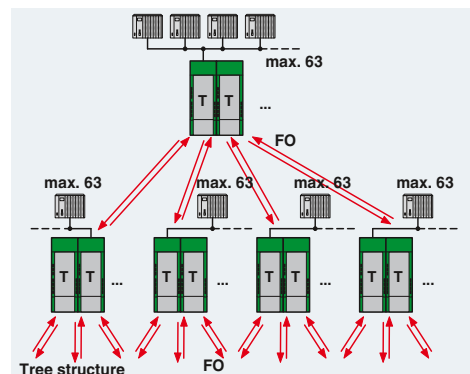
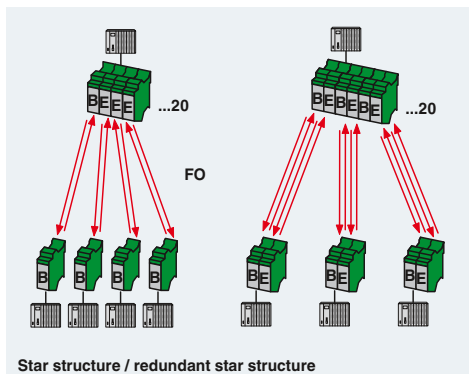
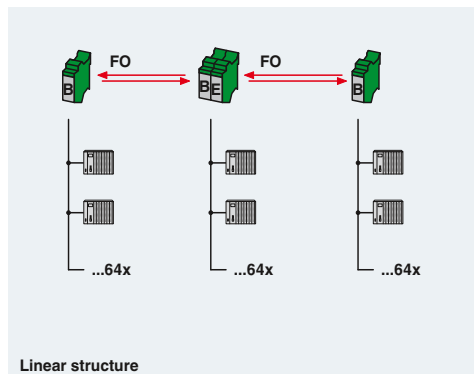
Technical data
10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
100 mA (24 V DC)
CAN interface, in accordance with ISO/IS 11898 for DeviceNet™, CAN, CANopen®
120 Ω (can be connected)
≤ 800 kbps
≤ 5000 m (dependent on the data rate and the protocol used)
Plug-in screw connection
B-FOC (ST®)
850 nm
2800 m (with F-K 200/230 8 dB/km with quick mounting connector)
4800 m (with F-G 50/125 2.5 dB/km)
4200 m (with F-G 62.5/125 3.0 dB/km)
< 1 bit
60 V DC / 42 V AC, 0.46 A
1.5 kV <sub>rms</sub> (50 Hz, 1 min.)
-20 °C ... 60 °C
22.5 mm / 99 mm / 114.5 mm
II 3 G Ex nAC IIC T4 X
II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U)
Class I, Zone 2, AEx nc IIC T5
Class I, Div. 2, Groups A, B, C, D

Technical data
11 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
130 mA (24 V DC)
CAN interface, in accordance with ISO/IS 11898 for DeviceNet™, CAN, CANopen®
124 Ω (integrated and ready to be switched)
≤ 1000 kbps
≤ 5000 m (dependent on the data rate and the protocol used)
COMBICON plug-in screw terminal block
B-FOC (ST®)
850 nm
1800 m (with F-K 200/230 8 dB/km with quick mounting connector)
4600 m (with F-G 50/125 2.5 dB/km)
4200 m (with F-G 62.5/125 3.0 dB/km)
< 1 bit (configurable)
-
1.5 kV <sub>rms</sub> (50 Hz, 1 min.)
-20 °C ... 60 °C
35 mm / 102 mm / 119 mm
II (2) D [Ex op is Db] IIC (PTB 06 ATEX 2042 U)
II (2) G [Ex op is Gb] IIC (PTB 06 ATEX 2042 U)
II 3 G Ex nA IIC T4 Gc X
508 listed

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-DNET CAN/FO 660/BM <sup>1)</sup>	2708054	1
PSI-MOS-DNET CAN/FO 660/EM <sup>1)</sup>	2708067	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-DNET CAN/FO 850/BM <sup>1)</sup>	2708083	1
PSI-MOS-DNET CAN/FO 850/EM <sup>1)</sup>	2708096	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-DNET/FO 850 E <sup>1)</sup>	2313999	1
PSI-MOS-DNET/FO 850 T <sup>1)</sup>	2313986	1



## Fiber optics transmission

### Fiber optic converters for RS-485 2-wire bus systems

The RS-485 2-wire interface is the most widely used interface in the field of automation technology. Well-known bus systems, such as SUCONET K, Modbus ASCII, Modbus RTU, S-BUS, and DH-485, are all based on this interface, as are many other company-specific bus systems.

The **PSI-MOS-RS485W2/FO... FO** converters convert the electrical data signal into an optical one by protocol transparent means.

The integrated optical diagnostics allow permanent monitoring of the FO paths during installation and also during operation. The floating switch contact is activated when the signal output on the fiber optic paths drops to a critical level.

Depending on which wavelength is used in conjunction with the corresponding fibers, distances of 100 m to 45 km can be achieved between two devices.

- Automatic data rate detection or fixed data rate setting via DIP switches
- Suitable for data rates of up to 500 kbps
- Integrated optical diagnostics for continuous monitoring of fiber optic paths
- Floating switch contact for leading alarm generation in relation to critical fiber optic paths
- High-quality electrical isolation between all interfaces (RS-485 // fiber optic ports // power supply // DIN rail connector)
- Routing of supply voltage and data signals through DIN rail connectors
- Redundant power supply supported in the form of optional system power supply unit
- Can be combined with the PSI copper repeater in a modular way using DIN rail connectors

The **PSI-MOS-RS485W2/FO... E** termination devices convert an RS-485 interface to a fiber optic cable. They are ideal for point-to-point connections.

The **PSI-MOS-RS485W2/FO... T** couplers allow the interface to be converted to **two FO cables**. They can be used to create linear structures and redundant structures for increased system availability.

#### Notes:

1) EMC: Class A product, see page 553

Supply voltage range  
Nominal current consumption  
RS-485 interface  
Data format/coding  
Termination resistor  
Transmission speed  
Transmission length

Connection method  
Optical interface  
Connection  
Wavelength  
Transmission length incl. 3 dB system reserve

General data  
Bit delay  
Alarm output  
Test voltage  
Ambient temperature range  
Dimensions W / H / D  
Conformance / approvals  
ATEX  
UL, USA / Canada

#### Description

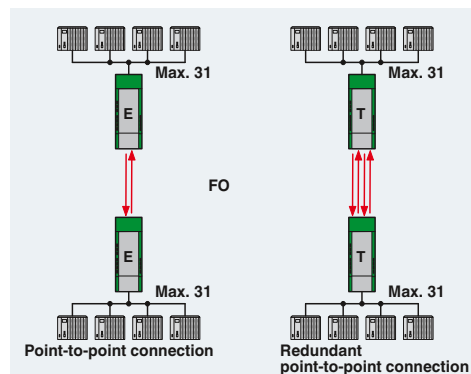
**Terminal device**, for converting data signals from RS-485 2-wire to an FO cable

**T-coupler**, for converting data signals from RS-485 2-wire to two FO cables

**DIN rail connector** (optional), for routing through the supply voltage and data signal, two pieces are required per device

**DIN rail connector**, (optional), for routing through the supply voltage, 2 required per device

**System power supply unit**, primary-switched

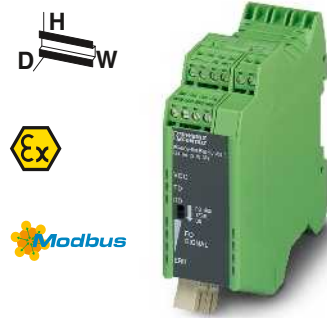




RS-485 2-wire  
polymer and HCS fibers



RS-485 2-wire  
HCS and fiberglass  
(multi mode)



RS-485 2-wire  
fiberglass  
(multi mode and single mode)

UL/ULX/Ex

UL/ULX/Ex

UL/ULX/Ex

Technical data	
18 V DC ... 30 V DC	100 mA (24 V DC)
RS-485 interface, 2-wire	
UART (11/10 bit switchable ; NRZ), slip-tolerant	
390 Ω / 220 Ω / 390 Ω (can be connected)	
4,8/ 9,6/ 19,2/ 38,4/ 57,6/ 75/ 93,75/ 115,2/ 136/ 187,5/ 375/ 500	
≤ 1200 m (depending on the data rate, with shielded, twisted data cable)	
Plug-in screw connection	
F-SMA	
660 nm	
100 m (with F-P 980/1000 230 dB/km with quick mounting connector)	
800 m (with F-K 200/230 10 dB/km with quick mounting connector)	
< 1 bit	
60 V DC / 42 V AC, 0,46 A	
1,5 kV <sub>rms</sub> (50 Hz, 1 min.)	
-20 °C ... 60 °C	
35 mm / 99 mm / 105 mm	
Ex II 3 G Ex nAC IIC T4 X Ex II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U) Class I, Zone 2, AEx nc IIC T5 Class I, Zone 2, Ex nC nL IIC T5 X Class I, Div. 2, Groups A, B, C, D	

Technical data	
18 V DC ... 30 V DC	120 mA (24 V DC)
RS-485 interface, 2-wire	
UART (11/10 bit switchable ; NRZ), slip-tolerant	
390 Ω / 220 Ω / 390 Ω (can be connected)	
4,8/ 9,6/ 19,2/ 38,4/ 57,6/ 75/ 93,75/ 115,2/ 136/ 187,5/ 375/ 500	
≤ 1200 m (depending on the data rate, with shielded, twisted data cable)	
Plug-in screw connection	
B-FOC (ST®)	
850 nm	
2800 m (with F-K 200/230 8 dB/km with quick mounting connector)	
4200 m (with F-G 50/125 2.5 dB/km)	
3300 m (with F-G 62.5/125 3.0 dB/km)	
< 1 bit	
60 V DC / 42 V AC, 0,46 A	
1,5 kV <sub>rms</sub> (50 Hz, 1 min.)	
-20 °C ... 60 °C	
35 mm / 99 mm / 105 mm	
Ex II 3 G Ex nAC IIC T4 X Ex II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U) Class I, Zone 2, AEx nc IIC T5 Class I, Zone 2, Ex nC nL IIC T5 X Class I, Div. 2, Groups A, B, C, D	

Technical data	
18 V DC ... 32 V DC	170 mA (24 V DC)
RS-485 interface, 2-wire	
UART (11/10 bit switchable ; NRZ), slip-tolerant	
390 Ω / 220 Ω / 390 Ω (can be connected)	
4,8/ 9,6/ 19,2/ 38,4/ 57,6/ 75/ 93,75/ 115,2/ 136/ 187,5/ 375/ 500	
≤ 1200 m (depending on the data rate, with shielded, twisted data cable)	
Plug-in screw connection	
SC duplex	
1300 nm	
25 km (with F-G 50/125 0.7 dB/km at 1300 nm)	
22 km (with F-G 62.5/125 0.8 dB/km at 1300 nm)	
45 km (with F-E 9/125 0.4 dB/km at 1300 nm)	
< 1 bit	
60 V DC / 42 V AC, 1 A	
1,5 kV <sub>rms</sub> (50 Hz, 1 min.)	
-20 °C ... 60 °C	
35 mm / 99 mm / 105 mm	
Ex II 3 G Ex nA nC IIC T4 Gc X  508 listed 508 recognized	

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS485W2/FO 660 E <sup>1)</sup>	2708313	1
PSI-MOS-RS485W2/FO 660 T <sup>1)</sup>	2708300	1

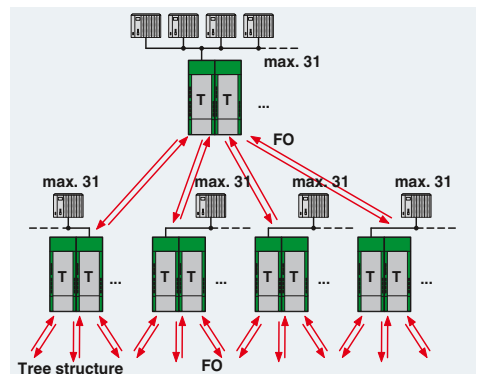
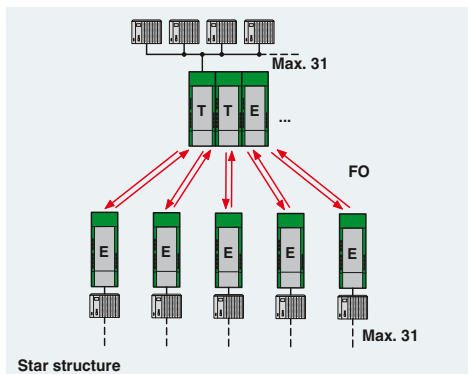
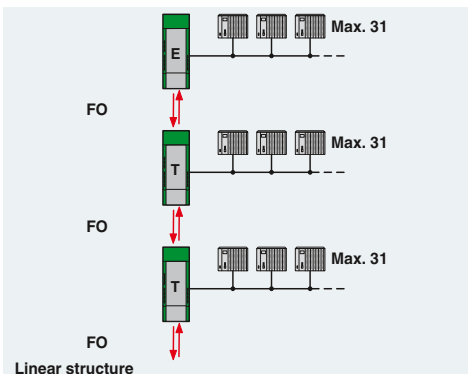
Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS485W2/FO 850 E <sup>1)</sup>	2708339	1
PSI-MOS-RS485W2/FO 850 T <sup>1)</sup>	2708326	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS485W2/FO1300 E <sup>1)</sup>	2708562	1

Accessories		
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1



### Fiber optic converter for INTERBUS

The **PSI-MOS-RS422/FO...** devices are used for converting INTERBUS interfaces to fiber optics. The conversion is performed using a transparent protocol for all data rates up to max. 2 Mbps. The integrated optical diagnostics allow permanent monitoring of the FO paths during installation and also during operation. The floating switch contact is activated when the signal output on the fiber optic paths drops to a critical level. This early alarm generation enables critical system states to be diagnosed before they result in failure.

- Automatic data rate detection for all data rates up to 2 Mbps
- Integrated optical diagnostics for continuous monitoring of fiber optic paths
- Floating switch contact for leading alarm generation in relation to critical fiber optic paths
- High-quality electrical isolation between all interfaces (INTERBUS // fiber optic ports // power supply // DIN rail connector)
- Connections can be plugged in using a COMBICON screw terminal block
- Redundant power supply supported in the form of optional system power supply unit
- Routing through of the supply voltage via the DIN rail connector
- Approved for use in zone 2
- Intrinsically safe FO interface (Ex op is) for direct connection to devices in zone 1 (all 660 and 850 nm versions)

INTERBUS lines are constructed with the **PSI-MOS-RS422...E terminal devices**. The **PSI-MOS-RS422...T T-couplers** also allow redundant **INTERBUS connections** via fiber optics.

#### Notes:

1) EMC: Class A product, see page 553

Supply voltage range  
Nominal current consumption  
RS-422 interface

Transmission length

Connection method

Optical interface

Connection

Wavelength

Transmission length incl. 3 dB system reserve

General data

Bit delay

Alarm output

Test voltage

Ambient temperature range

Dimensions

W / H / D

Conformance / approvals

ATEX

UL, USA / Canada

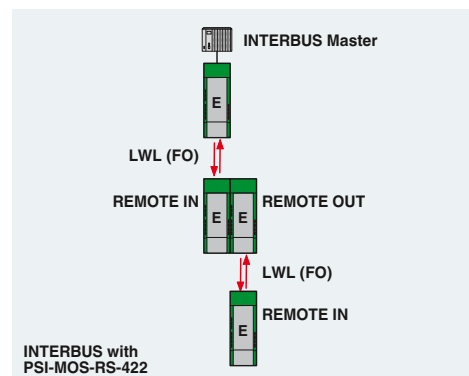
Description

**Terminal device**, for converting data signals from RS-422 (V.11) /RS-485 4-wire to an FO cable

**T-coupler**, for converting data signals from RS-422 (V.11) /RS-485 4-wire to two FO cables

**DIN rail connector**, (optional), for routing through the supply voltage, 2 required per device

**System power supply unit**, primary-switched



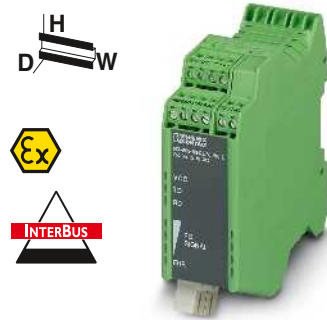




**INTERBUS**  
polymer and HCS fibers



**INTERBUS**  
HCS and fiberglass  
(multi mode)



**INTERBUS**  
fiberglass  
(multi mode and single mode)



Technical data
18 V DC ... 30 V DC 100 mA (24 V DC) RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1
≤ 1000 m (depending on the data rate, with shielded, twisted data cable) Plug-in screw connection
F-SMA 660 nm 100 m (with F-P 980/1000 230 dB/km with quick mounting connector) 800 m (with F-K 200/230 10 dB/km with quick mounting connector)
< 1 bit 60 V DC / 42 V AC, 0.46 A 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C 35 mm / 99 mm / 103 mm
<ul style="list-style-type: none"> <li> II 3 G Ex nAC IIC T4 X</li> <li> II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U)</li> <li>Class I, Zone 2, AEx nc IIC T5</li> <li>Class I, Zone 2, Ex nC nL IIC T5 X</li> <li>Class I, Div. 2, Groups A, B, C, D</li> </ul>

Technical data
18 V DC ... 30 V DC 120 mA (24 V DC) RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1
≤ 1000 m (depending on the data rate, with shielded, twisted data cable) Plug-in screw connection
B-FOC (ST®) 850 nm 2800 m (with F-K 200/230 8 dB/km with quick mounting connector) 4200 m (with F-G 50/125 2.5 dB/km) 4800 m (with F-G 62.5/125 3.0 dB/km)
< 1 bit 60 V DC / 42 V AC, 0.46 A 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C 35 mm / 99 mm / 103 mm
<ul style="list-style-type: none"> <li> II 3 G Ex nAC IIC T4 X</li> <li> II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U)</li> <li>Class I, Zone 2, AEx nc IIC T5</li> <li>Class I, Zone 2, Ex nC nL IIC T5 X</li> <li>Class I, Div. 2, Groups A, B, C, D</li> </ul>

Technical data
18 V DC ... 32 V DC 110 mA (24 V DC) RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1
≤ 1000 m (depending on the data rate, with shielded, twisted data cable) Plug-in screw connection
SC duplex 1300 nm 27 km (with F-G 50/125 0.7 dB/km at 1300 nm) 22 km (with F-G 62.5/125 0.8 dB/km at 1300 nm) 45 km (with F-E 9/125 0.4 dB/km at 1300 nm)
< 1 bit 60 V DC / 42 V AC, 1 A 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C 35 mm / 105 mm / 103 mm
<ul style="list-style-type: none"> <li> II 3 G Ex nA nC IIC T4 Gc X</li> </ul>
508 listed 508 recognized

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS422/FO 660 E <sup>1)</sup>	2708342	1
PSI-MOS-RS422/FO 660 T <sup>1)</sup>	2708384	1

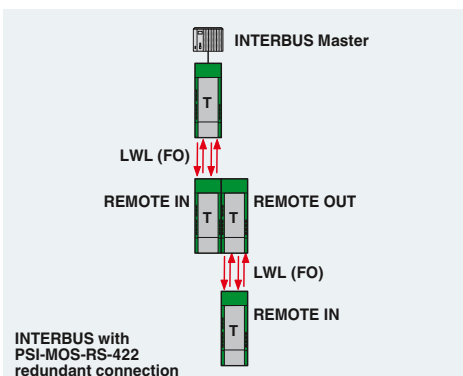
Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS422/FO 850 E <sup>1)</sup>	2708355	1
PSI-MOS-RS422/FO 850 T <sup>1)</sup>	2708397	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS422/FO1300 E <sup>1)</sup>	2708575	1

Accessories		
Accessories	Order No.	Pcs. / Pkt.
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
Accessories	Order No.	Pcs. / Pkt.
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
Accessories	Order No.	Pcs. / Pkt.
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1



## Fiber optics transmission

### FO converters for RS-422 and RS-485 4-wire bus systems

Data transfer via copper cables reaches its limits very quickly in an industrial environment. Particularly in applications with a high level of electromagnetic interference, interference-free communication can only be achieved with great complexity in terms of shielding and surge protection. The **PSI-MOS-RS422/FO...** devices convert copper for fiber optics. A transparent protocol is used for conversion.

- Automatic data rate detection for all data rates up to 2 Mbps
- Integrated optical diagnostics for continuous monitoring of fiber optic paths
- Floating switch contact for leading alarm generation in relation to critical fiber optic paths
- High-quality electrical isolation between all interfaces (RS-422 // fiber optic ports // power supply // DIN rail connector)
- Connections can be plugged in using a COMBICON screw terminal block
- Redundant power supply supported in the form of optional system power supply unit
- Routing of supply voltage and data signals through DIN rail connectors
- Approved for use in zone 2
- Intrinsically safe FO interface (Ex op is) for direct connection to devices in zone 1 (all 660 and 850 nm versions)

If RS-422 terminal devices are used, only one terminal device can be connected to each PSI-MOS-RS422/FO... device. If devices with an RS-485 4-wire interface are used, it is possible to create a network with up to 31 slave devices connected to one FO converter. In both cases, a suitable communication protocol capable of terminal device addressing is required (e.g., Modbus RTU).

#### Notes:

1) EMC: Class A product, see page 553

Supply voltage range  
Nominal current consumption  
RS-422 interface

Transmission length

Connection method

Optical interface

Connection

Wavelength

Transmission length incl. 3 dB system reserve

General data

Bit delay

Alarm output

Test voltage

Ambient temperature range

Dimensions

W / H / D

Conformance / approvals

ATEX

UL, USA / Canada

Description

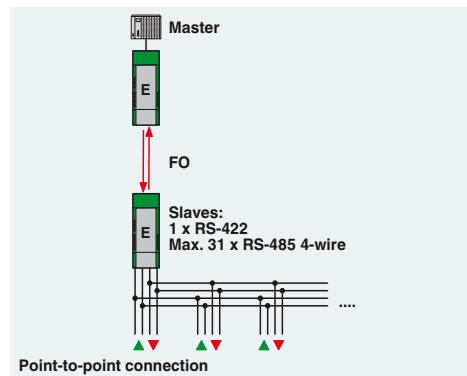
**Terminal device**, for converting data signals from RS-422 (V.11) /RS-485 4-wire to an FO cable

**T-coupler**, for converting data signals from RS-422 (V.11) /RS-485 4-wire to two FO cables

**DIN rail connector** (optional), for routing through the supply voltage and data signal, two pieces are required per device

**DIN rail connector**, (optional), for routing through the supply voltage, 2 required per device

**System power supply unit**, primary-switched

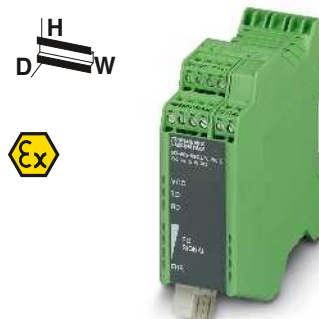




RS-422/RS-485 4-wire polymer and HCS fibers



RS-422/RS-485 4-wire HCS and fiberglass (multi mode)



RS-422/RS-485 4-wire fiberglass (multi mode and single mode)



Technical data
18 V DC ... 30 V DC 100 mA (24 V DC) RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1
≤ 1000 m (depending on the data rate, with shielded, twisted data cable) Plug-in screw connection
F-SMA 660 nm 100 m (with F-P 980/1000 230 dB/km with quick mounting connector) 800 m (with F-K 200/230 10 dB/km with quick mounting connector)
< 1 bit 60 V DC / 42 V AC, 0.46 A 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C 35 mm / 99 mm / 103 mm
Ex II 3 G Ex nAC IIC T4 X Ex II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U) Class I, Zone 2, AEx nc IIC T5 Class I, Zone 2, Ex nC nL IIC T5 X Class I, Div. 2, Groups A, B, C, D

Technical data
18 V DC ... 30 V DC 120 mA (24 V DC) RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1
≤ 1000 m (depending on the data rate, with shielded, twisted data cable) Plug-in screw connection
B-FOC (ST®) 850 nm 2800 m (with F-K 200/230 8 dB/km with quick mounting connector) 4200 m (with F-G 50/125 2.5 dB/km) 4800 m (with F-G 62.5/125 3.0 dB/km)
< 1 bit 60 V DC / 42 V AC, 0.46 A 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C 35 mm / 99 mm / 103 mm
Ex II 3 G Ex nAC IIC T4 X Ex II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U) Class I, Zone 2, AEx nc IIC T5 Class I, Zone 2, Ex nC nL IIC T5 X Class I, Div. 2, Groups A, B, C, D

Technical data
18 V DC ... 32 V DC 110 mA (24 V DC) RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1
≤ 1000 m (depending on the data rate, with shielded, twisted data cable) Plug-in screw connection
SC duplex 1300 nm 27 km (with F-G 50/125 0.7 dB/km at 1300 nm) 22 km (with F-G 62.5/125 0.8 dB/km at 1300 nm) 45 km (with F-E 9/125 0.4 dB/km at 1300 nm)
< 1 bit 60 V DC / 42 V AC, 1 A 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C 35 mm / 105 mm / 103 mm
Ex II 3 G Ex nA nC IIC T4 Gc X 508 listed 508 recognized

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS422/FO 660 E <sup>1)</sup>	2708342	1
PSI-MOS-RS422/FO 660 T <sup>1)</sup>	2708384	1

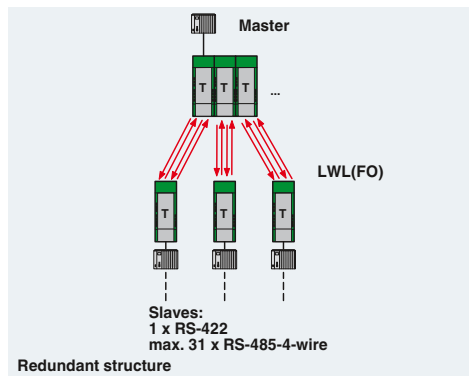
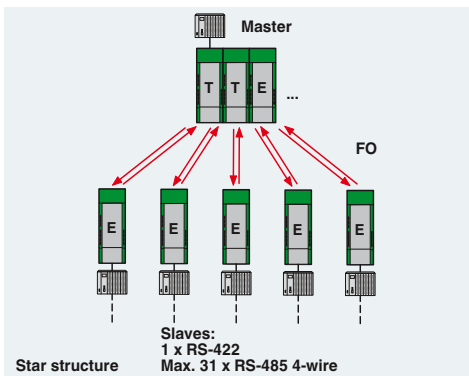
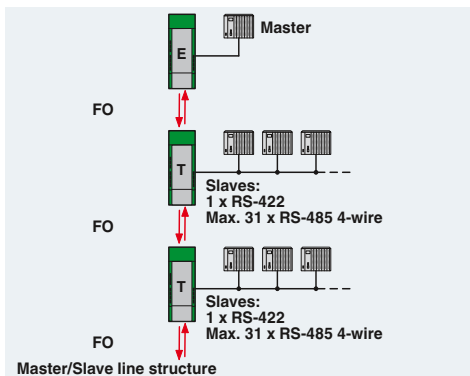
Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS422/FO 850 E <sup>1)</sup>	2708355	1
PSI-MOS-RS422/FO 850 T <sup>1)</sup>	2708397	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS422/FO1300 E <sup>1)</sup>	2708575	1

Accessories		
Part No.	Description	Pcs. / Pkt.
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
Part No.	Description	Pcs. / Pkt.
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
Part No.	Description	Pcs. / Pkt.
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1



## Fiber optics transmission

### Fiber optic converters for RS-232 (V.24)

Due to its electrical properties, the V.24 (RS-232) is very susceptible to EMC influences and potential differences. For this reason, it can only be used for short distances of up to max. 15 m. FO transmission technology is, therefore, the first choice for longer transmission distances and for eliminating EMC influences. The **PSI-MOS-RS232/FO...** devices convert the V.24 (RS-232) interface for fiber optics. A transparent protocol is used for conversion. If addressable V.24 (RS-232) devices and a suitable communication protocol are used, even multi-point networks can be constructed. These can be implemented as linear, star, and even redundant star structures.

- Automatic data rate detection for all data rates up to 115.2 kbps
- Integrated optical diagnostics for continuous monitoring of fiber optic paths
- Floating switch contact for leading alarm generation in relation to critical fiber optic paths
- High-quality electrical isolation between all interfaces (V.24 (RS-232) // fiber optic ports // power supply // DIN rail connector)
- Redundant power supply supported in the form of optional system power supply unit
- Connections can be plugged in using a COMBICON screw terminal block
- Routing of supply voltage and data signals through DIN rail connectors
- Approved for use in zone 2
- Intrinsically safe FO interface (Ex op is) for direct connection to devices in zone 1 (all 660 and 850 nm versions)

#### Notes:

1) EMC: Class A product, see page 553

Supply voltage range  
Nominal current consumption  
V.24 (RS-232) interface

Transmission length  
Connection method  
Optical interface  
Connection  
Wavelength  
Transmission length incl. 3 dB system reserve

#### General data

Bit delay  
Alarm output  
Test voltage  
Ambient temperature range  
Dimensions W / H / D  
Conformance / approvals  
ATEX

UL, USA / Canada

#### Description

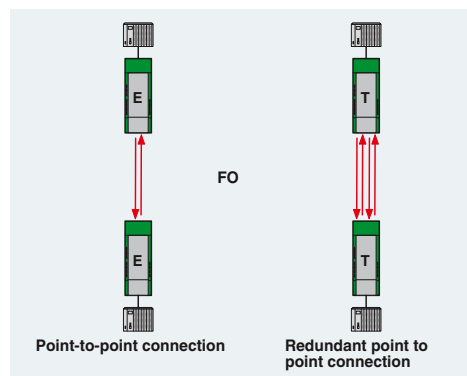
**Terminal equipment**, for converting data signals from RS-232 (V.24) to an FO cable

**T-coupler**, for converting data signals from RS-232 (V.24) to two FO cables

**DIN rail connector** (optional), for routing through the supply voltage and data signal, two pieces are required per device

**DIN rail connector**, (optional), for routing through the supply voltage, 2 required per device

**System power supply unit**, primary-switched





RS-232

V.24 (RS-232)  
polymer and HCS fibers



RS-232

V.24 (RS-232)  
HCS and fiberglass  
(multi mode)



RS-232

V.24 (RS-232)  
fiberglass  
(multi mode and single mode)



Technical data
18 V DC ... 30 V DC 100 mA (24 V DC) V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1 ≤ 15 m D-SUB-9 plug
F-SMA 660 nm 100 m (with F-P 980/1000 230 dB/km with quick mounting connector) 800 m (with F-K 200/230 10 dB/km with quick mounting connector)
< 1 bit 60 V DC / 42 V AC, 0.46 A 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C 35 mm / 99 mm / 105 mm
Ex II 3 G Ex nAC IIC T4 X Ex II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U) Class I, Zone 2, AEx nc IIC T5 Class I, Zone 2, Ex nC nL IIC T5 X Class I, Div. 2, Groups A, B, C, D

Technical data
18 V DC ... 30 V DC 120 mA (24 V DC) V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1 ≤ 15 m D-SUB-9 plug
B-FOC (ST®) 850 nm 2800 m (with F-K 200/230 8 dB/km with quick mounting connector) 4200 m (with F-G 50/125 2.5 dB/km) 4800 m (with F-G 62.5/125 3.0 dB/km)
< 1 bit 60 V DC / 42 V AC, 0.46 A 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C 35 mm / 99 mm / 105 mm
Ex II 3 G Ex nAC IIC T4 X Ex II (2) GD [Ex op is] IIC (PTB 06 ATEX 2042 U) Class I, Zone 2, AEx nc IIC T5 Class I, Zone 2, Ex nC nL IIC T5 X Class I, Div. 2, Groups A, B, C, D

Technical data
18 V DC ... 32 V DC 100 mA (24 V DC) V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1 ≤ 15 m D-SUB-9 plug
SC duplex 1300 nm 27 km (with F-G 50/125 0.7 dB/km at 1300 nm) 22 km (with F-G 62.5/125 0.8 dB/km at 1300 nm) 45 km (with F-E 9/125 0.4 dB/km at 1300 nm)
< 1 bit 60 V DC / 42 V AC, 1 A 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) -20 °C ... 60 °C 35 mm / 99 mm / 105 mm
Ex II 3 G Ex nA nC IIC T4 Gc X  508 listed 508 recognized

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS232/FO 660 E <sup>1)</sup>	2708368	1
PSI-MOS-RS232/FO 660 T <sup>1)</sup>	2708410	1

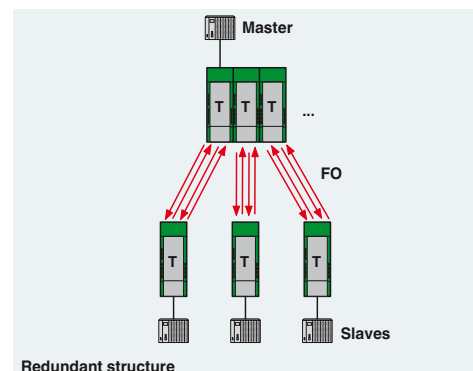
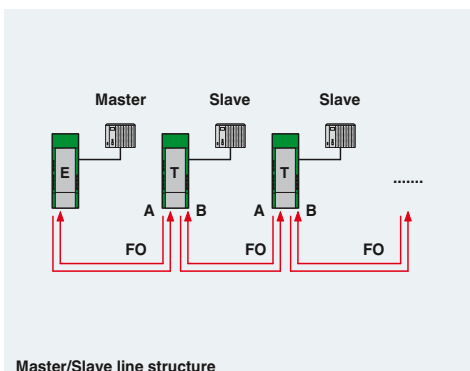
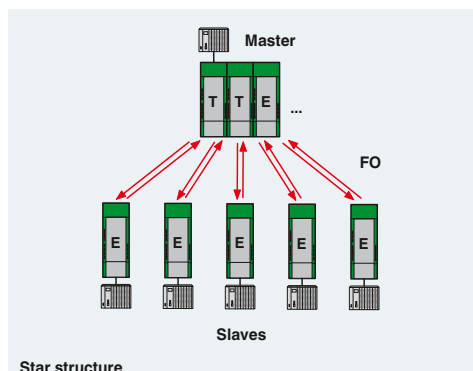
Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS232/FO 850 E <sup>1)</sup>	2708371	1
PSI-MOS-RS232/FO 850 T <sup>1)</sup>	2708423	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MOS-RS232/FO1300 E <sup>1)</sup>	2708588	1

Accessories		
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

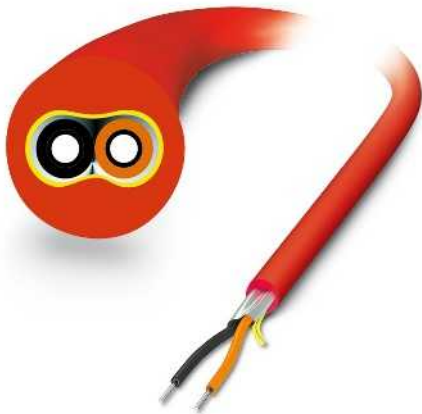
Accessories		
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
ME 17,5 TBUS 1,5/PP000-3,81 BK	2890014	10
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1



## Fiber optics transmission

### Universal POF cable for assembly, type KDHEAVY-1011



- Universal installation cable for fixed installation indoors
- 2.2 mm single wires made from extremely hard-wearing polyamide chloride (PA)
- Halogen-free, ozone and UV resistant
- Rugged polyurethane (PUR) outer cable sheath

	free end	FSMA connector, IP20	SCRJ connector, IP20
	OE	FSMA	SCRJ
	Ordering data	Ordering data	Ordering data
	Order No.	Order No.	Order No.
free end			
	OE		
FSMA connector, IP20			
	FSMA		
SCRJ connectors, IP20			
	SCRJ		
B-FOC (ST®) connector, IP20			
	BFOC		
SCRJ connector, IP67			
	IP67		
Push/pull SCRJ, plastic			
	PPCPL		
Push/pull SCRJ, metal			
	PPCME		
	By the meter	2744319	
	Variable	2901553	Variable
	Variable	2901553	Variable
	Variable	2901553	Variable
	Variable	2901553	Variable
	Variable	2901553	Variable
	Variable	2901553	Variable
	Variable	2901553	Variable
	Variable	1402188	Variable
	Variable	1402188	Variable
	Variable	1402188	Variable
	Variable	1402188	Variable
	Variable	1402188	Variable

### Ordering example for configured cable:

For a POF cable, fitted with an SCRJ plug at one end and a plastic SCRJ push/pull plug-in connector at the other end, and 15 m in length, the ordering data is as follows:

Order No.	Plug 1	Plug 2	Length [m]
1402188	SCRJ	PPCPL	15





Length:	Min. 0.5 m	
	Max. 100 m	
Increment:	0.25 m	1 m ... 5 m
	1 m	5 m ... 100 m

### Ordering example for cable sold by the meter:

For a POF cable 70 m in length, the ordering data is as follows:

Order No.	Length [m]
2744319	70

Length:	Min. 0.5 m	
	Max. 500 m/cable drum	
Increment:	0.25 m	1 m ... 5 m
	1 m	5 m ... 500 m

<b>B-FOC (ST®) connector, IP20</b>	<b>SCRJ connector, IP67</b>	<b>Push/pull SCRJ, plastic</b>	<b>Push/pull SCRJ, metal</b>
			
<b>BFOC</b>	<b>IP67</b>	<b>PPCPL</b>	<b>PPCME</b>
<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>
<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>

Variable <b>2901553</b>	Variable <b>1402188</b>	Variable <b>1402188</b>	Variable <b>1402188</b>
Variable <b>2901553</b>	Variable <b>1402188</b>	Variable <b>1402188</b>	Variable <b>1402188</b>

Variable <b>2901553</b>	Variable <b>1402188</b>	Variable <b>1402188</b>	Variable <b>1402188</b>
Variable <b>2901553</b>	Variable <b>1402188</b>	Variable <b>1402188</b>	Variable <b>1402188</b>

Variable <b>1402188</b>	Variable <b>1402188</b>	Variable <b>1402188</b>	Variable <b>1402188</b>
Variable <b>1402188</b>	Variable <b>1402188</b>	Variable <b>1402188</b>	Variable <b>1402188</b>

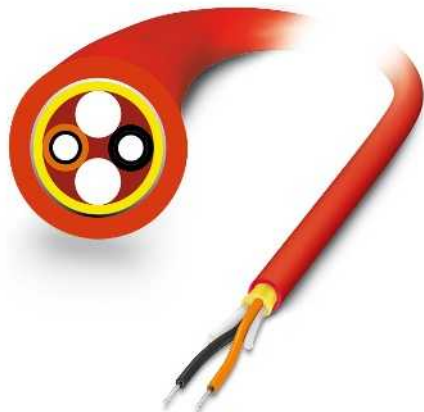
Variable <b>1402188</b>	Variable <b>1402188</b>	Variable <b>1402188</b>	Variable <b>1402188</b>
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	<b>Technical data</b>
<b>Cable data</b>	
Cable abbreviation in accordance with IEC 61977:2010	J-V11Y 4Y2P 980/1000 160A 10
Fibers	Polymer fiber, 980/1000 µm
Attenuation, typical	230 dB/km (at 660 nm)
<b>Outer sheath</b>	
Material	PUR
Color	red
Diameter	5.5 - 6.5 mm
Strain relief elements	Non-metallic, aramid fiber
<b>Single wire</b>	
Material	PA
Color	black/orange
Diameter	2.2 mm ±0.07 mm
<b>General data</b>	
Weight	33 kg/km
Ambient temperature (operation)	-20 °C ... 70 °C
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Ambient temperature (installation)	-5 °C ... 50 °C
Halogen-free as per:	According to IEC 60754-2



## Fiber optics transmission

### Rugged POF cable for free assembly, type RUGGED-1012



- Rugged installation cable for fixed installation indoors
- Dimensioned for higher requirements in respect of tensile load and lateral pressure
- 2.2 mm single wires made from extremely hard-wearing polyamide chloride (PA)
- Halogen-free, ozone and UV resistant
- Reinforced polyurethane (PUR) outer cable sheath

	free end	FSMA connector, IP20	SCRJ connector, IP20
	OE	FSMA	SCRJ
	Ordering data	Ordering data	Ordering data
	Order No.	Order No.	Order No.
free end			
OE			
FSMA connector, IP20			
FSMA			
SCRJ connectors, IP20			
SCRJ			
B-FOC (ST®) connector, IP20			
BFOC			
SCRJ connector, IP67			
IP67			
Push/pull SCRJ, plastic			
PPCPL			
Push/pull SCRJ, metal			
PPCME			
By the meter	2744322	Variable	2901548
Variable	2901548	Variable	2901548
Variable	2901548	Variable	2901548
Variable	2901548	Variable	2901548
Variable	2901548	Variable	2901548
Variable	2901548	Variable	2901548
Variable	2901548	Variable	2901548
Variable	1402185	Variable	1402185
Variable	1402185	Variable	1402185
Variable	1402185	Variable	1402185
Variable	1402185	Variable	1402185

### Ordering example for configured cable:

For a POF cable, fitted with an SCRJ plug at one end and a plastic SCRJ push/pull plug-in connector at the other end, and 15 m in length, the ordering data is as follows:

Order No.	Plug 1	Plug 2	Length [m]
1402185	SCRJ	PPCPL	15





Length:	Min. 0.5 m		
	Max. 100 m		
Increment:	0.25 m	1 m ... 5 m	
	1 m	5 m ... 100 m	

### Ordering example for cable sold by the meter:

For a POF cable 70 m in length, the ordering data is as follows:

Order No.	Length [m]
2744322	70

Length:	Min. 0.5 m		
	Max. 500 m/cable drum		
Increment:	0.25 m	1 m ... 5 m	
	1 m	5 m ... 500 m	

<b>B-FOC (ST®) connector, IP20</b>	<b>SCRJ connector, IP67</b>	<b>Push/pull SCRJ, plastic</b>	<b>Push/pull SCRJ, metal</b>
			
<b>BFOC</b>	<b>IP67</b>	<b>PPCPL</b>	<b>PPCME</b>
<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>
<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>

Variable <b>2901548</b>	Variable <b>1402185</b>	Variable <b>1402185</b>	Variable <b>1402185</b>
Variable <b>2901548</b>	Variable <b>1402185</b>	Variable <b>1402185</b>	Variable <b>1402185</b>

Variable <b>2901548</b>	Variable <b>1402185</b>	Variable <b>1402185</b>	Variable <b>1402185</b>
Variable <b>2901548</b>	Variable <b>1402185</b>	Variable <b>1402185</b>	Variable <b>1402185</b>

Variable <b>1402185</b>	Variable <b>1402185</b>	Variable <b>1402185</b>	
Variable <b>1402185</b>		Variable <b>1402185</b>	

Variable <b>1402185</b>			Variable <b>1402185</b>
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	<b>Technical data</b>
<b>Cable data</b>	
Cable abbreviation in accordance with IEC 61977:2010	J-V11Y 4Y2P 980/1000 160A 10
Fibers	Polymer fiber, 980/1000 µm
Attenuation, typical	230 dB/km (at 660 nm)
<b>Outer sheath</b>	
Material	PUR
Color	red
Diameter	7.5 - 8.5 mm
Strain relief elements	Non-metallic, aramid fiber
<b>Single wire</b>	
Material	PA
Color	black/orange
Diameter	2.2 mm ±0.07 mm
<b>General data</b>	
Weight	54 kg/km
Ambient temperature (operation)	-20 °C ... 70 °C
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Ambient temperature (installation)	-5 °C ... 50 °C
Halogen-free as per:	According to IEC 60754-2

## Fiber optics transmission

### Highly flexible POF cable for free assembly, type RUGGED-FLEX-1013



- Highly flexible round cable for use in trailing cables or drag chains
- Dimensioned for an alternating bending frequency of up to 5,000,000 cycles
- 2.2 mm single wires made from extremely hard-wearing polyamide chloride (PA)
- Halogen-free, ozone and UV resistant
- Rugged polyurethane (PUR) outer cable sheath

	free end	FSMA connector, IP20	SCRJ connector, IP20
	OE	FSMA	SCRJ
	Ordering data	Ordering data	Ordering data
	Order No.	Order No.	Order No.
free end			
	OE		
FSMA connector, IP20			
	FSMA		
SCRJ connectors, IP20			
	SCRJ		
B-FOC (ST®) connector, IP20			
	BFOC		
SCRJ connector, IP67			
	IP67		
Push/pull SCRJ, plastic			
	PPCPL		
Push/pull SCRJ, metal			
	PPCME		
	By the meter	2744335	
	Variable	2901549	Variable
	Variable	2901549	Variable
	Variable	2901549	Variable
	Variable	2901549	Variable
	Variable	2901549	Variable
	Variable	2901549	Variable
	Variable	2901549	Variable
	Variable	1402187	Variable
	Variable	1402187	Variable
	Variable	1402187	Variable
	Variable	1402187	Variable
	Variable	1402187	Variable

### Ordering example for configured cable:

For a POF cable, fitted with an SCRJ plug at one end and a plastic SCRJ push/pull plug-in connector at the other end, and 15 m in length, the ordering data is as follows:

Order No.	Plug 1	Plug 2	Length [m]
1402187	SCRJ	PPCPL	15





Length:	Min. 0.5 m		
	Max. 100 m		
Increment:	0.25 m	1 m ... 5 m	
	1 m	5 m ... 100 m	

### Ordering example for cable sold by the meter:

For a POF cable 70 m in length, the ordering data is as follows:

Order No.	Length [m]
2744335	70

Length:	Min. 0.5 m		
	Max. 500 m/cable drum		
Increment:	0.25 m	1 m ... 5 m	
	1 m	5 m ... 500 m	

<b>B-FOC (ST®) connector, IP20</b>	<b>SCRJ connector, IP67</b>	<b>Push/pull SCRJ, plastic</b>	<b>Push/pull SCRJ, metal</b>
			
<b>BFOC</b>	<b>IP67</b>	<b>PPCPL</b>	<b>PPCME</b>
<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>
<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>

Variable <b>2901549</b>	Variable <b>1402187</b>	Variable <b>1402187</b>	Variable <b>1402187</b>
Variable <b>2901549</b>	Variable <b>1402187</b>	Variable <b>1402187</b>	Variable <b>1402187</b>

Variable <b>2901549</b>	Variable <b>1402187</b>	Variable <b>1402187</b>	Variable <b>1402187</b>
Variable <b>2901549</b>	Variable <b>1402187</b>	Variable <b>1402187</b>	Variable <b>1402187</b>

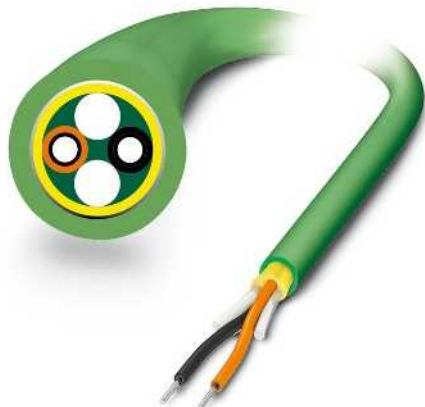
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Variable <b>1402187</b>	Variable <b>1402187</b>	Variable <b>1402187</b>	Variable <b>1402187</b>

Variable <b>1402187</b>	Variable <b>1402187</b>	Variable <b>1402187</b>	Variable <b>1402187</b>
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	<b>Technical data</b>
<b>Cable data</b>	
Cable abbreviation in accordance with IEC 61977:2010	J-V11Y 4Y2P 980/1000 180A 10
Fibers	Polymer fiber, 980/1000 µm
Attenuation, typical	275 dB/km (at 660 nm)
<b>Outer sheath</b>	
Material	PUR
Color	red
Diameter	7.5 - 8.5 mm
Strain relief elements	Non-metallic, aramid fiber
<b>Single wire</b>	
Material	PA
Color	black/orange
Diameter	2.2 mm ±0.07 mm
<b>General data</b>	
Weight	54 kg/km
Ambient temperature (operation)	-20 °C ... 70 °C
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Ambient temperature (installation)	-5 °C ... 50 °C
Halogen-free as per:	According to IEC 60754-2

## Fiber optics transmission

### PROFINET B POF cable for free assembly, type PN-B-1000



- Universal installation cable for fixed installation indoors
- 2.2 mm single wires made from extremely hard-wearing polyamide chloride (PA)
- Halogen-free, ozone and UV resistant
- Rugged polyurethane (PUR) outer cable sheath
- PROFINET type B

### Ethernet



free end



**OE**

FSMA connector, IP20

**FSMA**

SCRJ connectors, IP20

**SCRJ**

B-FOC (ST®) connector, IP20

**BFOC**

Push/pull SCRJ, plastic

**PPCPL**

Push/pull SCRJ, metal

**PPCME**

	free end	FSMA connector, IP20	SCRJ connector, IP20
	<b>OE</b>	<b>FSMA</b>	<b>SCRJ</b>
	Ordering data	Ordering data	Ordering data
	Order No.	Order No.	Order No.
	By the meter 2313397	Variable 2901551	Variable 2901551
	Variable 2901551	Variable 2901551	Variable 2901551
	Variable 2901551	Variable 2901551	Variable 2901551
	Variable 2901551	Variable 2901551	Variable 2901551
	Variable 1402172	Variable 1402172	Variable 1402172
	Variable 1402172	Variable 1402172	Variable 1402172

### Ordering example for configured cable:

For a POF cable, fitted with an SCRJ plug at one end and a plastic SCRJ push/pull plug-in connector at the other end, and 15 m in length, the ordering data is as follows:

Order No.	Plug 1	Plug 2	Length [m]
1402172	SCRJ	PPCPL	15

Length:	Min. 0.5 m Max. 100 m	
Increment:	0.25 m 1 m	1 m ... 5 m 5 m ... 100 m

### Ordering example for cable sold by the meter:

For a POF cable 70 m in length, the ordering data is as follows:

Order No.	Length [m]
2313397	70

Length:	Min. 0.5 m Max. 500 m/cable drum	
Increment:	0.25 m 1 m	1 m ... 5 m 5 m ... 500 m

B-FOC (ST®) connector, IP20

Push/pull SCRJ, plastic

Push/pull SCRJ, metal



BFOC

PPCPL

PPCME

Ordering data

Ordering data

Ordering data

Order No.

Order No.

Order No.

Variable 2901551

Variable 1402172

Variable 1402172

Variable 2901551

Variable 1402172

Variable 1402172

Variable 2901551

Variable 1402172

Variable 1402172

Variable 2901551

Variable 1402172

Variable 1402172

Variable 1402172

Variable 1402172

Variable 1402172

**Cable data**

Cable abbreviation in accordance with IEC 61977:2010

Fibers

Attenuation, typical

**Outer sheath**

Material

Color

Diameter

Strain relief elements

**Single wire**

Material

Color

Diameter

**General data**

Weight

Ambient temperature (operation)

Ambient temperature (storage/transport)

Ambient temperature (installation)

Halogen-free as per:

**Technical data**

J-V11Y 4Y2P 980/1000 160A  
10

Polymer fiber, 980/1000 µm

230 dB/km (at 660 nm)

PUR

Green

7.5 - 8.5 mm

Non-metallic, aramid fiber

PA

Black and orange with arrow labeling

2.2 mm ±0.07 mm

49 kg/km

-20 °C ... 70 °C

-40 °C ... 80 °C

5 °C ... 50 °C

According to IEC 60754-2

## Fiber optics transmission

### Highly flexible PROFINET C POF cable for free assembly, type PN-C-1003



- Highly flexible round cable for use in trailing cables or drag chains
- Dimensioned for an alternating bending frequency of up to 5,000,000 cycles
- 2.2 mm single wires made from extremely hard-wearing polyamide chloride (PA)
- Halogen-free, ozone and UV resistant
- Rugged polyurethane (PUR) outer cable sheath
- PROFINET type C

### Ethernet



free end



OE

FSMA connector, IP20



FSMA

SCRJ connectors, IP20



SCRJ

B-FOC (ST®) connector, IP20



BFOC

Push/pull SCRJ, plastic



PPCPL

Push/pull SCRJ, metal



PPCME

	free end	FSMA connector, IP20	SCRJ connector, IP20
	OE	FSMA	SCRJ
	Ordering data	Ordering data	Ordering data
	Order No.	Order No.	Order No.
By the meter	2313407	Variable	Variable
		2901552	2901552
Variable	2901552	Variable	2901552
Variable	2901552	Variable	2901552
Variable	2901552	Variable	2901552
Variable	2901552	Variable	2901552
Variable	2901552	Variable	2901552
Variable	1402175	Variable	Variable
		1402175	1402175
Variable	1402175	Variable	1402175
Variable	1402175	Variable	1402175

### Ordering example for configured cable:

For a POF cable, fitted with an SCRJ plug at one end and a plastic SCRJ push/pull plug-in connector at the other end, and 15 m in length, the ordering data is as follows:

Order No.	Plug 1	Plug 2	Length [m]
1402175	SCRJ	PPCPL	15

Length:	Min. 0.5 m	
	Max. 100 m	
Increment:	0.25 m	1 m ... 5 m
	1 m	5 m ... 100 m

### Ordering example for cable sold by the meter:

For a POF cable 70 m in length, the ordering data is as follows:

Order No.	Length [m]
2313407	70

Length:	Min. 0.5 m
	Max. 500 m/cable drum
Increment:	0.25 m
	1 m
	5 m ... 500 m



B-FOC (ST®) connector, IP20



BFOC

Ordering data

Order No.

Push/pull SCRJ, plastic



PPCPL

Ordering data

Order No.

Push/pull SCRJ, metal



PPCME

Ordering data

Order No.

Variable 2901552

Variable 1402175

Variable 1402175

Variable 2901552

Variable 1402175

Variable 1402175

Variable 2901552

Variable 1402175

Variable 1402175

Variable 2901552

Variable 1402175

Variable 1402175

Variable 1402175

Variable 1402175

Variable 1402175

**Cable data**

Cable abbreviation in accordance with IEC 61977:2010

Fibers

Attenuation, typical

**Outer sheath**

Material

Color

Diameter

Strain relief elements

**Single wire**

Material

Color

Diameter

**General data**

Weight

Ambient temperature (operation)

Ambient temperature (storage/transport)

Ambient temperature (installation)

Halogen-free as per:

**Technical data**

J-V11Y 4Y2P 980/1000 180A  
10

Polymer fiber, 980/1000 µm

275 dB/km (at 660 nm)

PUR  
Green  
7.5 - 8.5 mm  
Non-metallic, aramid fiber

PA  
Black and orange with arrow labeling  
2.2 mm ±0.07 mm

51 kg/km  
-20 °C ... 70 °C  
-40 °C ... 80 °C  
5 °C ... 50 °C  
According to IEC 60754-2

## Fiber optics transmission

### Universal PROFINET B HCS cable for free assembly, type PN-B-HCS-1018



- Universal installation cable for fixed installation indoors
- 2.2 mm single wires made from extremely hard-wearing polyvinyl chloride (PVC)
- Halogen-free, ozone and UV resistant
- PVC outer cable sheath
- PROFINET type B

### Ethernet



free end



OE

FSMA connector, IP20



FSMA

SCRJ connectors, IP20



SCRJ

SC duplex connector, IP20



SCDUP

B-FOC (ST®) connector, IP20



BFOC

LC connector



LC

Push/pull SCRJ, plastic



PPCPL

Push/pull SCRJ, metal



PPCME






	free end	FSMA connector, IP20	SCRJ connector, IP20
	OE	FSMA	SCRJ
	Ordering data	Ordering data	Ordering data
	Order No.	Order No.	Order No.
By the meter	2313766	Variable	Variable
		2901556	2901556
Variable	2901556	Variable	2901556
Variable	2901556	Variable	2901556
Variable	2901556	Variable	2901556
Variable	2901556	Variable	2901556
Variable	2901556	Variable	2901556
Variable	2901556	Variable	2901556
Variable	2901556	Variable	2901556
Variable	2901556	Variable	2901556
Variable	1402190	Variable	Variable
		1402190	1402190
Variable	1402190	Variable	1402190
Variable	1402190	Variable	1402190

### Ordering example:

For an HCS cable with two SCRJ plugs with IP20 protection and 70 m in length, the ordering data is as follows:

Order No.	Length [m]
1408466	70

Length:	Min. 1 m	
	Max. 2000 m/cable drum	
Increment:	0.25 m	1 m ... 5 m
	1 m	5 m ... 2000 m

<b>SC duplex connector, IP20</b>	<b>B-FOC (ST®) connector, IP20</b>	<b>LC connector</b>	<b>Push/pull SCRJ, plastic</b>	<b>Push/pull SCRJ, metal</b>
				
<b>SCDUP</b>	<b>BFOC</b>	<b>LC</b>	<b>PPCPL</b>	<b>PPCME</b>
<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>
<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>

Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>1402190</b>	Variable <b>1402190</b>
Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>1402190</b>	Variable <b>1402190</b>

Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>1402190</b>	Variable <b>1402190</b>
Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>1402190</b>	Variable <b>1402190</b>

Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>1402190</b>	Variable <b>1402190</b>
Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>2901556</b>	Variable <b>1402190</b>	Variable <b>1402190</b>

Variable <b>1402190</b>	Variable <b>1402190</b>	Variable <b>1402190</b>	Variable <b>1402190</b>	Variable <b>1402190</b>
Variable <b>1402190</b>	Variable <b>1402190</b>	Variable <b>1402190</b>	Variable <b>1402190</b>	Variable <b>1402190</b>

Technical data	
<b>Cable data</b>	
Cable abbreviation in accordance with IEC 61977:2010	AT-V(ZN)YY 2K200/230 HCS
Fibers	HCS, 200/230 µm
Attenuation, typical	10 dB/km (at 660 nm), 8 dB/km (at 850 nm)
<b>Outer sheath</b>	
Material	PVC
Color	Green
Diameter	6.7 - 7.7 mm
Strain relief elements	Non-metallic, aramid fiber
<b>Single wire</b>	
Material	PVC
Color	Black and orange with arrow labeling
Diameter	2.2 mm ±0.1 mm
Strain relief elements	Non-metallic, aramid fibers
<b>General data</b>	
Weight	45 kg/km
Ambient temperature (operation)	-40 °C ... 90 °C
Ambient temperature (storage/transport)	-40 °C ... 90 °C
Ambient temperature (installation)	-5 °C ... 50 °C
Halogen-free as per:	-

## Fiber optics transmission

### PROFINET C HCS broadband cable (GI) for free assembly, type PN-C-HCS-GI-1005



- Highly flexible round cable for use in trailing cables or drag chains
- Rugged installation cable for indoor use
- Gradient index fiber for maximum power requirements in respect of transmission bandwidth
- Can be used in 10/100/1000 Mbps Ethernet systems
- 2.2 mm single wires made from polyvinyl chloride (PVC)
- Halogen-free, ozone and UV resistant
- Rugged polyurethane (PUR) outer cable sheath
- Highly tear-resistant aramid strain relief elements
- PROFINET type C

### Ethernet



free end



OE

FSMA connector, IP20



FSMA

SCRJ connectors, IP20



SCRJ

SC duplex connector, IP20



SCDUP

B-FOC (ST®) connector, IP20



BFOC

LC connector



LC

Push/pull SCRJ, plastic



PPCPL

Push/pull SCRJ, metal



PPCME

	free end	FSMA connector, IP20	SCRJ connector, IP20
	OE	FSMA	SCRJ
	Ordering data	Ordering data	Ordering data
	Order No.	Order No.	Order No.
By the meter	2313410	Variable	Variable
		2901554	2901554
Variable	2901554	Variable	2901554
		2901554	2901554
Variable	2901554	Variable	2901554
		2901554	2901554
Variable	2901554	Variable	2901554
		2901554	2901554
Variable	2901554	Variable	2901554
		2901554	2901554
Variable	2901554	Variable	2901554
		2901554	2901554
Variable	1402189	Variable	1402189
		1402189	1402189
Variable	1402189	Variable	1402189
		1402189	1402189

### Ordering example for configured cable:

For an HCS cable 15 m in length equipped with an SCRJ connector at one end and an SCRJ push/pull plastic connector at the other end, the order data is as follows:

Order No.	Connector 1	Connector 2	Length [m]
1402189	SCRJ	PPCPL	15






Length:	Min. 1 m		
	Max. 2000 m		
Increment:	0.25 m	1 m ... 5 m	
	1 m	5 m ... 2000 m	

### Ordering example for cable sold by the meter:

For an HCS cable 70 m in length, the order data is as follows:

Order No.	Length [m]
2313410	70

Length:	Min. 1 m		
	Max. 2000 m/cable drum		
Increment:	0.25 m	1 m ... 5 m	
	1 m	5 m ... 2000 m	

<b>SC duplex connector, IP20</b>	<b>B-FOC (ST®) connector, IP20</b>	<b>LC connector</b>	<b>Push/pull SCRJ, plastic</b>	<b>Push/pull SCRJ, metal</b>
				
<b>SCDUP</b>	<b>BFOC</b>	<b>LC</b>	<b>PPCPL</b>	<b>PPCME</b>
<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>
<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>

Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>1402189</b>	Variable <b>1402189</b>
Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>1402189</b>	Variable <b>1402189</b>

Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>1402189</b>	Variable <b>1402189</b>
Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>1402189</b>	Variable <b>1402189</b>

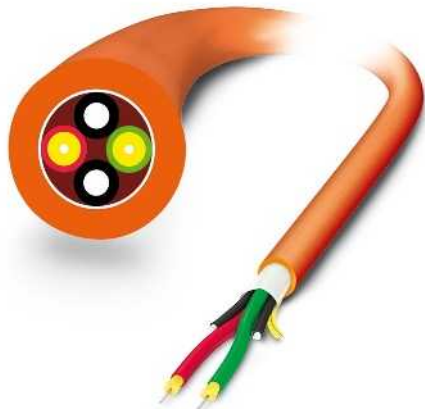
Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>1402189</b>	Variable <b>1402189</b>
Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>2901554</b>	Variable <b>1402189</b>	Variable <b>1402189</b>

Variable <b>1402189</b>	Variable <b>1402189</b>	Variable <b>1402189</b>	Variable <b>1402189</b>	Variable <b>1402189</b>
Variable <b>1402189</b>	Variable <b>1402189</b>	Variable <b>1402189</b>	Variable <b>1402189</b>	Variable <b>1402189</b>

Technical data	
<b>Cable data</b>	
Cable abbreviation in accordance with IEC 61977:2010	J-V(ZN)12Y(ZN)11Y 2GK200/230 GI-HCS
Fibers	HCS gradient index, 200/230 μm
Attenuation, typical	18 dB/km (at 660 nm), 12 dB/km (at 850 nm)
<b>Outer sheath</b>	
Material	PUR
Color	Green
Diameter	7.5 - 8.5 mm
Strain relief elements	Non-metallic, aramid fiber
<b>Single wire</b>	
Material	PVC
Color	Black and orange with arrow labeling
Diameter	2.2 mm ±0.1 mm
Strain relief elements	Non-metallic, aramid fibers
<b>General data</b>	
Weight	52 kg/km
Ambient temperature (operation)	-20 °C ... 70 °C
Ambient temperature (storage/transport)	-40 °C ... 70 °C
Ambient temperature (installation)	-5 °C ... 50 °C
Halogen-free as per:	According to IEC 60754-2

## Fiber optics transmission

### Rugged HCS cable for free assembly, type HCS-RUGGED-1014



- Rugged installation cable for indoor use
- Highly tear-resistant aramid strain relief elements
- 2.9 mm single wires made from highly flexible FRNC material
- Halogen-free, ozone and UV resistant
- Rugged polyurethane (PUR) outer cable sheath

	free end	FSMA connector, IP20	SCRJ connector, IP20
	OE	FSMA	SCRJ
	Ordering data	Ordering data	Ordering data
	Order No.	Order No.	Order No.
free end	By the meter 2799885	Variable 2901555	Variable 2901555
FSMA connector, IP20			
FSMA	Variable 2901555	Variable 2901555	Variable 2901555
SCRJ connectors, IP20			
SCRJ	Variable 2901555	Variable 2901555	Variable 2901555
SC duplex connector, IP20			
SCDUP	Variable 2901555	Variable 2901555	Variable 2901555
B-FOC (ST®) connector, IP20			
BFOC	Variable 2901555	Variable 2901555	Variable 2901555
LC connector			
LC	Variable 2901555	Variable 2901555	Variable 2901555
Push/pull SCRJ, plastic			
PPCPL	Variable 1402191	Variable 1402191	Variable 1402191
Push/pull SCRJ, metal			
PPCME	Variable 1402191	Variable 1402191	Variable 1402191
SCRJ connector, IP67			
IP67	Variable 1402191	Variable 1402191	Variable 1402191

### Ordering example for configured cable:

For an HCS cable 15 m in length equipped with an SCRJ connector at one end and an SCRJ push/pull plastic connector at the other end, the order data is as follows:

Order No.	Connector 1	Connector 2	Length [m]
1402191	SCRJ	PPCPL	15







Length:	Min. 1 m Max. 2000 m	
Increment:	0.25 m 1 m	1 m ... 5 m 5 m ... 2000 m

### Ordering example for cable sold by the meter:

For an HCS cable 70 m in length, the order data is as follows:

Order No.	Length [m]
2799885	70

Length:	Min. 1 m Max. 2000 m/cable drum	
Increment:	0.25 m 1 m	1 m ... 5 m 5 m ... 2000 m

<b>SC duplex connector, IP20</b>	<b>B-FOC (ST®) connector, IP20</b>	<b>LC connector</b>	<b>Push/pull SCRJ, plastic</b>	<b>Push/pull SCRJ, metal</b>	<b>SCRJ connector, IP67</b>
					
<b>SCDUP</b>	<b>BFOC</b>	<b>LC</b>	<b>PPCPL</b>	<b>PPCME</b>	<b>IP67</b>
<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>
<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>

Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>
Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>

Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>
Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>

Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>
Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>2901555</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>

Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>
Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>

Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>	Variable <b>1402191</b>
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	<b>Technical data</b>
<b>Cable data</b>	
Cable abbreviation in accordance with IEC 61977:2010	I-VH11Y 2K200/230 HCS
Fibers	HCS, 200/230 μm
Attenuation, typical	10 dB/km (at 660 nm), 8 dB/km (at 850 nm)
<b>Outer sheath</b>	
Material	PUR
Color	orange
Diameter	7.5 - 8.5 mm
<b>Single wire</b>	
Material	FRNC material
Color	Red/green
Diameter	2.9 mm ±0.1 mm
Strain relief elements	Non-metallic, aramid fibers
<b>General data</b>	
Weight	54 kg/km
Ambient temperature (operation)	-40 °C ... 70 °C
Ambient temperature (storage/transport)	-40 °C ... 70 °C
Ambient temperature (installation)	-20 °C ... 60 °C



## Fiber optics transmission

### Outdoor cables for free assembly, type HCSO-1015



- Rugged round cable for laying outdoors
- Longitudinally water-tight
- Integrated vapor barrier and rodent-proof scrim
- 2.9 mm single wires made from highly flexible FRNC material
- Ozone and UV resistant
- Extremely rugged polyethylene outer cable sheath

	free end	FSMA connector, IP20	SCRJ connector, IP20
	OE	FSMA	SCRJ
	Ordering data	Ordering data	Ordering data
	Order No.	Order No.	Order No.
free end			
	OE		
FSMA connector, IP20			
	FSMA		
SCRJ connectors, IP20			
	SCRJ		
SC duplex connector, IP20			
	SCDUP		
B-FOC (ST®) connector, IP20			
	BFOC		
LC connector			
	LC		
By the meter	2799445	Variable	2901557
Variable	2901557	Variable	2901557
Variable	2901557	Variable	2901557
Variable	2901557	Variable	2901557
Variable	2901557	Variable	2901557
Variable	2901557	Variable	2901557
Variable	2901557	Variable	2901557
Variable	2901557	Variable	2901557

### Ordering example for configured cable:

For an HCS cable 15 m in length equipped with an SCRJ connector at one end and a B-FOC(ST®) connector, IP20 at the other end, the order data is as follows:

Order No.	Connector 1	Connector 2	Length [m]
2901557	SCRJ	BFOC	15




Length:	Min. 1 m	Max. 1000 m
Increment:	0.25 m	1 m ... 5 m
	1 m	5 m ... 1000 m

### Ordering example for cable sold by the meter:

For an HCS cable 70 m in length, the order data is as follows:

Order No.	Length [m]
2799445	70

Length:	Min. 1 m	Max. 1000 m/cable drum
Increment:	0.25 m	1 m ... 5 m
	1 m	5 m ... 1000 m

SC duplex connector, IP20	B-FOC (ST®) connector, IP20	LC connector
		
<b>SCDUP</b>	<b>BFOC</b>	<b>LC</b>
Ordering data	Ordering data	Ordering data
Order No.	Order No.	Order No.

Variable	2901557	Variable	2901557	Variable	2901557
Variable	2901557	Variable	2901557	Variable	2901557

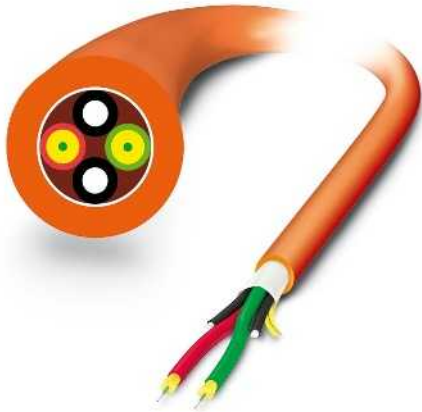
Variable	2901557	Variable	2901557	Variable	2901557
Variable	2901557	Variable	2901557	Variable	2901557

Variable	2901557	Variable	2901557	Variable	2901557
Variable	2901557	Variable	2901557	Variable	2901557

	Technical data
<b>Cable data</b>	
Cable abbreviation in accordance with IEC 61977:2010	AT-VQHB2Y 2K200/230 10A17+8B20
Fibers	HCS, 200/230 µm
Attenuation, typical	10 dB/km (at 660 nm), 8 dB/km (at 850 nm)
<b>Outer sheath</b>	
Material	PE
Color	black
Diameter	10 - 11 mm
Strain relief elements	Non-metallic, aramid fiber
Rodent protection	Glass fibers
Lengthwise waterproofing	IEC 60794-1-2
<b>Single wire</b>	
Material	FRNC material
Color	Red/green
Diameter	2.9 mm ±0.1 mm
Strain relief elements	Non-metallic, aramid fibers
<b>General data</b>	
Weight	97 kg/km
Ambient temperature (operation)	-20 °C ... 70 °C
Ambient temperature (storage/transport)	-25 °C ... 70 °C
Ambient temperature (installation)	-5 °C ... 50 °C
Halogen-free as per:	According to IEC 60754-2

## Fiber optics transmission

### Multi-mode fiberglass cables for free assembly, type GDM-RUGGED-1016



- Rugged installation cable for indoor use
- Highly tear-resistant aramid strain relief elements
- 2.9 mm single wires made from highly flexible FRNC material
- Halogen-free, ozone and UV resistant
- Rugged polyurethane (PUR) outer cable sheath

	free end	FSMA connector, IP20	SCRJ connector, IP20
	<b>OE</b>	<b>FSMA</b>	<b>SCRJ</b>
	Ordering data	Ordering data	Ordering data
	Order No.	Order No.	Order No.
<b>free end</b>			
<b>OE</b>			
<b>FSMA connector, IP20</b>			
<b>FSMA</b>			
<b>SCRJ connectors, IP20</b>			
<b>SCRJ</b>			
<b>SC duplex connector, IP20</b>			
<b>SCDUP</b>			
<b>B-FOC (ST®) connector, IP20</b>			
<b>BFOC</b>			
<b>LC connector</b>			
<b>LC</b>			
<b>Push/pull SCRJ, plastic</b>			
<b>PPCPL</b>			
<b>Push/pull SCRJ, metal</b>			
<b>PPCME</b>			
<b>SCRJ connector, IP67</b>			
<b>IP67</b>			

#### Ordering example for configured cable:

For a glass fiber cable 15 m in length equipped with an SCRJ connector at one end and an SCRJ push/pull plastic connector at the other end, the order data is as follows:

Order No.	Connector 1	Connector 2	Length [m]
1402193	SCRJ	PPCPL	15







Length	Min. 1 m Max. 1000 m
Increment:	1 m     1 m ... 1000 m

#### Ordering example for cable sold by the meter:

For a glass fiber cable 70 m in length, the order data is as follows:

Order No.	Length [m]
2799322	70

Length	Min. 1 m Max. 1000 m/cable drum
Increment:	1 m     1 m ... 1000 m

SC duplex connector, IP20	B-FOC (ST®) connector, IP20	LC connector	Push/pull SCRJ, plastic	Push/pull SCRJ, metal	SCRJ connector, IP67
					
<b>SCDUP</b>	<b>BFOC</b>	<b>LC</b>	<b>PPCPL</b>	<b>PPCME</b>	<b>IP67</b>
<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>
Order No.	Order No.	Order No.	Order No.	Order No.	Order No.

Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>
Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>

Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>
Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>

Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>
Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>2901558</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>

Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>
Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>

Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>	Variable <b>1402193</b>
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	Technical data
<b>Cable data</b>	
Cable abbreviation in accordance with IEC 61977:2010	I-V(ZN)H11Y 2G50/125 2,5B600+0,7F1200
Fibers	Fiberglass, 50/125 µm
Attenuation, typical	2.5 dB/km (at 850 nm), 0.7 dB/km (at 1300 nm)
<b>Outer sheath</b>	
Material	PUR
Color	orange
Diameter	7.5 - 8.5 mm
<b>Single wire</b>	
Material	FRNC material
Color	Red/green
Diameter	2.9 mm ±0.1 mm
<b>General data</b>	
Weight	50 kg/km
Ambient temperature (operation)	-20 °C ... 70 °C
Ambient temperature (storage/transport)	-25 °C ... 70 °C
Ambient temperature (installation)	-5 °C ... 50 °C
Halogen-free as per:	According to IEC 60754-2

## Fiber optics transmission

### Outdoor multi-mode fiberglass cables for free assembly, type GDO-1017



- Rugged round cable for laying outdoors
- Longitudinally water-tight
- Integrated vapor barrier and rodent-proof scrim
- 2.9 mm single wires made from highly flexible FRNC material
- Ozone and UV resistant
- Extremely rugged polyethylene outer cable sheath

	free end	FSMA connector, IP20	SCRJ connector, IP20
	OE	FSMA	SCRJ
	Ordering data	Ordering data	Ordering data
	Order No.	Order No.	Order No.
free end			
	OE		
FSMA connector, IP20			
	FSMA		
SCRJ connectors, IP20			
	SCRJ		
SC duplex connector, IP20			
	SCDUP		
B-FOC (ST®) connector, IP20			
	BFOC		
LC connector			
	LC		
By the meter	2799432	Variable	2901559
Variable	2901559	Variable	2901559
Variable	2901559	Variable	2901559
Variable	2901559	Variable	2901559
Variable	2901559	Variable	2901559
Variable	2901559	Variable	2901559
Variable	2901559	Variable	2901559
Variable	2901559	Variable	2901559

### Ordering example for configured cable:




For a glass fiber cable 15 m in length equipped with an SCRJ connector at one end and a B-FOC(ST®) connector, IP20 at the other end, the order data is as follows:

Order No.	Connector 1	Connector 2	Length [m]
2901559	SCRJ	BFOC	15
Length:	Min. 1 m Max. 1000 m		
Increment:	1 m      1 m ... 1000 m		

### Ordering example for cable sold by the meter:

For a glass fiber cable 70 m in length, the order data is as follows:

Order No.	Length [m]
2799432	70
Length:	Min. 1 m Max. 1000 m/cable drum
Increment:	1 m      1 m ... 1000 m

SC duplex connector, IP20	B-FOC (ST®) connector, IP20	LC connector
		
<b>SCDUP</b>	<b>BFOC</b>	<b>LC</b>
<b>Ordering data</b>	<b>Ordering data</b>	<b>Ordering data</b>
<b>Order No.</b>	<b>Order No.</b>	<b>Order No.</b>

Variable <b>2901559</b>	Variable <b>2901559</b>	Variable <b>2901559</b>
Variable <b>2901559</b>	Variable <b>2901559</b>	Variable <b>2901559</b>

Variable <b>2901559</b>	Variable <b>2901559</b>	Variable <b>2901559</b>
Variable <b>2901559</b>	Variable <b>2901559</b>	Variable <b>2901559</b>

Variable <b>2901559</b>	Variable <b>2901559</b>	Variable <b>2901559</b>
Variable <b>2901559</b>	Variable <b>2901559</b>	Variable <b>2901559</b>

	Technical data
<b>Cable data</b>	
Cable abbreviation in accordance with IEC 61977:2010	AT-VQH(BN)2Y 2G50/125 2,5B600+0,7F1200
Fibers	Fiberglass, 50/125 µm
Attenuation, typical	2.5 dB/km (at 850 nm), 0.7 dB/km (at 1300 nm)
<b>Outer sheath</b>	
Material	PE
Color	black
Diameter	10 - 11 mm
Strain relief elements	Non-metallic, aramid fiber
Rodent protection	Glass fibers
Lengthwise waterproofing	IEC 60794-1-2
<b>Single wire</b>	
Material	FRNC material
Color	Red/green
Diameter	2.9 mm ±0.1 mm
Strain relief elements	Non-metallic, aramid fibers
<b>General data</b>	
Weight	97 kg/km
Ambient temperature (operation)	-25 °C ... 70 °C
Ambient temperature (storage/transport)	-30 °C ... 70 °C
Ambient temperature (installation)	-5 °C ... 50 °C
Halogen-free as per:	According to IEC 60754-2

## Fiber optics transmission

### Fiber optics patch cables

For fast integration of fiber optic devices into existing fiber optic networks, it is best to use preassembled patch cables. Patch cables can be ordered in lengths of one, two, and five meters for the following connector formats: SCRJ, SC duplex, LC, and B-FOC (ST®). Both single- and multi-mode fiberglass options are available.

Developed specifically for industrial applications, the preassembled patch cables feature a rugged design. The strong outer cable sheath and connector transitions with bending protection sleeve mean that they can be safely used inside control cabinets.

The extremely rugged patch cables are suitable for all fiber optic devices with an optical interface that supports single- and/or multi-mode fiberglass.

#### Connectors:

- LC
- SC duplex
- SCRJ
- B-FOC (ST®)

#### Fixed lengths:

- 1 m
- 2 m
- 5 m

#### Fiber types:

- Multi-mode fiberglass (MM)
- Single-mode fiberglass (SM)

#### Sheath colors:

- Multi-mode: orange
- Single mode: yellow

#### Technical data:

- Halogen-free
- Flame-retardant
- No corrosive or toxic fumes
- External dimensions: 2.8 mm x 5.7 mm



LC connector

Cable, properties	
Single wire diameter	2.8 mm
Outer sheath, material	FRNC
External sheath, strain relief elements	Non-metallic, aramid fiber
Lateral pressure, long-term	60 N/cm
Tensile strength short-term/long-term	600 N
Halogen-free	According to IEC 60754-2
General data	
Ambient temperature (storage/transport)	-25 °C ... 70 °C
Ambient temperature (installation)	-5 °C ... 50 °C
Ambient temperature (operation)	-5 °C ... 70 °C

Technical data		
2.8 mm		
FRNC		
Non-metallic, aramid fiber		
60 N/cm		
600 N		
According to IEC 60754-2		
-25 °C ... 70 °C		
-5 °C ... 50 °C		
-5 °C ... 70 °C		

Description	Length of cable
FO patch cable with <b>multi-mode fiberglass (OM2)</b> - LC connector to LC, SC duplex, B-FOC or SCRJ connector	1 m 2 m 5 m
FO patch cable with <b>multi-mode fiberglass (OM2)</b> - SC duplex connector to SC duplex, B-FOC or SCRJ connector	1 m 2 m 5 m
FO patch cable with <b>multi-mode fiberglass (OM2)</b> - B-FOC connector to B-FOC or SCRJ connector	1 m 2 m 5 m
FO patch cable with <b>multi-mode fiberglass (OM2)</b> - SCRJ connector to SCRJ connector	1 m 2 m 5 m
FO patch cable with <b>single-mode fiberglass (OS1)</b> - LC connector to LC, SC duplex or B-FOC connector	1 m 2 m 5 m
FO patch cable with <b>single-mode fiberglass (OS1)</b> - SC duplex connector to SC duplex or B-FOC connector	1 m 2 m 5 m
FO patch cable with <b>single-mode fiberglass (OS1)</b> - B-FOC connector to B-FOC connector	1 m 2 m 5 m

Ordering data			
Type	Order No.	Pcs. / Pkt.	
FL MM PATCH 1,0 LC-LC	2989158	1	
FL MM PATCH 2,0 LC-LC	2989255	1	
FL MM PATCH 5,0 LC-LC	2901799	1	
FL SM PATCH 1,0 LC-LC	2989187	1	
FL SM PATCH 2,0 LC-LC	2989284	1	
FL SM PATCH 5,0 LC-LC	2901826	1	





SC duplex connector



B-FOC connector



SCRJ connector

Technical data
2.8 mm
FRNC
Non-metallic, aramid fiber
60 N/cm
600 N
According to IEC 60754-2
-25 °C ... 70 °C
-5 °C ... 50 °C
-5 °C ... 70 °C

Technical data
2.8 mm
FRNC
Non-metallic, aramid fiber
60 N/cm
600 N
According to IEC 60754-2
-25 °C ... 70 °C
-5 °C ... 50 °C
-5 °C ... 70 °C

Technical data
2.8 mm
FRNC
Non-metallic, aramid fiber
60 N/cm
600 N
According to IEC 60754-2
-25 °C ... 70 °C
-5 °C ... 50 °C
-5 °C ... 70 °C

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL MM PATCH 1,0 LC-SC	2989161	1
FL MM PATCH 2,0 LC-SC	2989268	1
FL MM PATCH 5,0 LC-SC	2901800	1
FL MM PATCH 1,0 SC-SC	2901805	1
FL MM PATCH 2,0 SC-SC	2901807	1
FL MM PATCH 5,0 SC-SC	2901808	1
FL SM PATCH 1,0 LC-SC	2989190	1
FL SM PATCH 2,0 LC-SC	2989297	1
FL SM PATCH 5,0 LC-SC	2901827	1
FL SM PATCH 1,0 SC-SC	2901829	1
FL SM PATCH 2,0 SC-SC	2901830	1
FL SM PATCH 5,0 SC-SC	2901831	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL MM PATCH 1,0 LC-ST	2989174	1
FL MM PATCH 2,0 LC-ST	2989271	1
FL MM PATCH 5,0 LC-ST	2901801	1
FL MM PATCH 1,0 SC-ST	2901809	1
FL MM PATCH 2,0 SC-ST	2901810	1
FL MM PATCH 5,0 SC-ST	2901811	1
FL MM PATCH 1,0 ST-ST	2901815	1
FL MM PATCH 2,0 ST-ST	2901816	1
FL MM PATCH 5,0 ST-ST	2901817	1
FL SM PATCH 1,0 LC-ST	2989242	1
FL SM PATCH 2,0 LC-ST	2989349	1
FL SM PATCH 5,0 LC-ST	2901828	1
FL SM PATCH 1,0 SC-ST	2901832	1
FL SM PATCH 2,0 SC-ST	2901833	1
FL SM PATCH 5,0 SC-ST	2901834	1
FL SM PATCH 1,0 ST-ST	2901836	1
FL SM PATCH 2,0 ST-ST	2901837	1
FL SM PATCH 5,0 ST-ST	2901838	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL MM PATCH 1,0 LC-SCRJ	2901802	1
FL MM PATCH 2,0 LC-SCRJ	2901803	1
FL MM PATCH 5,0 LC-SCRJ	2901804	1
FL MM PATCH 1,0 SC-SCRJ	2901812	1
FL MM PATCH 2,0 SC-SCRJ	2901813	1
FL MM PATCH 5,0 SC-SCRJ	2901814	1
FL MM PATCH 1,0 ST-SCRJ	2901820	1
FL MM PATCH 2,0 ST-SCRJ	2901821	1
FL MM PATCH 5,0 ST-SCRJ	2901822	1
FL MM PATCH 1,0 SCRJ-SCRJ	2901823	1
FL MM PATCH 2,0 SCRJ-SCRJ	2901824	1
FL MM PATCH 5,0 SCRJ-SCRJ	2901825	1

#### Quick mounting connectors for polymer fiber cable

These connectors are easy to assemble and allow fast and simple self-assembly on site. They correspond to the international F-SMA and SCRJ standards, although their quick mounting mechanism makes them stand out from conventional connectors. The stripped fiber is simply pushed into the connector and tightened with the knurled screw. To ensure optimum performance, the end face is then polished. The tools required are also available as a complete DIY case (PSM-POF-KONFTOOL).

#### Quick mounting connector for HCS (PCF) cables

The PSM-SET-...HCS connector sets for the 200/230 μm fibers make it possible to enjoy the benefits of self-assembly for the kinds of distances that could otherwise only be achieved by using cables made purely from fiberglass. The F-SMA, B-FOC (ST®), SCRJ, and SC duplex connector types are internationally standardized, although their quick mounting mechanism makes them stand out from conventional connectors. This new patented clamping device eliminates all time-consuming tasks such as crimping, sticking, and polishing operations. All that is required is to strip the fibers, slide and screw on the connector, and score and break off the protruding fibers. All the tools required, including the fiber scoring tool, are included in the PSM-HCS-KONFTOOL... tool set. Other connector-specific fiber cleaving tools can be added on request.

Connectors with a diameter of 2.9 mm must be used for our standard HCS fibers. In the case of our PROFINET-compliant fibers, connectors with a diameter of 2.2 mm should be used. Please refer to the following table and to the data sheets for our FO cables.



Quick mounting connector for polymer and HCS fibers

- Insertion attenuation
- F-SMA connector
  - B-FOC (ST®)
  - SCRJ connector
  - SC duplex connector

Description
<b>Connector set for polymer fibers</b> (diameter of the individual elements: 2.2 mm), for self-assembly, with bend protection
- F-SMA set, 4 connectors
- SCRJ set, 2 duplex connectors
<b>Connector set for HCS fibers</b> (diameter of the individual elements: 2.9 mm), for self-assembly, with bend protection
- F-SMA set, 4 connectors
- B-FOC (ST®) set, 4 connectors
- SCRJ set, 2 duplex connectors
<b>Connector set for PROFINET HCS fibers</b> (diameter of the individual elements: 2.2 mm), for self-assembly, with bend protection
- B-FOC (ST®) set, 4 connectors
- SCRJ set, 2 duplex connectors
- SC duplex set, 2 duplex connectors

**Polymer fiber DIY case**, consisting of: stripping knife, stripping pliers, polishing wheel for F-SMA and SCRJ quick mounting connectors, polishing pad and emery paper

**Polymer fiber polishing set** for quick mounting connectors, comprising polishing pads and polishing disks

- For F-SMA connectors
- For SCRJ connectors

**HCS DIY case** for F-SMA quick mounting connectors, comprising stripping blade, stripping pliers, aramid yarn scissors, fiber stripper, fiber cleaving tool, and microscope

- For F-SMA connectors
- For B-FOC (ST®) connectors
- For SCRJ/SC duplex connectors

Technical data	
Polymer fiber	HCS fiber
< 1.5 dB	< 2 dB
-	< 2 dB
< 1.5 dB	< 2 dB
-	< 2 dB

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSM-SET-FSMA/4-KT	2799720	1
PSM-SET-SCRJ-DUP/2-POF	2708656	1
PSM-SET-FSMA/4-HCS	2799487	1
PSM-SET-B-FOC/4-HCS	2708481	1
PSM-SET-SCRJ-DUP/2-HCS	2313070	1
PSM-SET-B-FOC/4-HCS/PN	2313782	1
PSM-SET-SCRJ-DUP/2-HCS/PN	2313546	1
PSM-SET-SC-DUPLEX/2-HCS/PN	2313779	1

Accessories		
PSM-POF-KONFTOOL	2744131	1
PSM-SET-FSMA-POLISH	2799348	1
VS-SCRJ-POF-POLISH	1656673	1
PSM-HCS-KONFTOOL	2799526	1
PSM-HCS-KONFTOOL/B-FOC	2708465	1
PSM-HCS-KONFTOOL/SC-RJ	2708876	1

Permissible combinations of fiber optic cables and connector sets			
Fiber optic cable		Connector set	
2799885	PSM-LWL-HCS-RUGGED-200/230	2799487	PSM-SET-FSMA/4-HCS
2799445	PSM-LWL-HCSO-200/230	2708481	PSM-SET-B-FOC/4-HCS
		2313070	PSM-SET-SCRJ-DUP/2-HCS
2313410	FL FOC PN-C-HCS-GI-200/230	2313779	PSM-SET-SC-DUPLEX/2-HCS/PN
2313766	FL FOC PN-B-HCS-200/230	2313782	PSM-SET-B-FOC/4-HCS/PN
		2313546	PSM-SET-SCRJ-DUP/2-HCS/PN

**Assembly case for quick mounting connector**

The DIY cases for polymer and HCS cables are designed for practical on-site assembly. These cases contain the complete tool range for assembly of the appropriate quick mounting connectors.

Polymer fiber cables are assembled quickly and easily using the PSM-POF-KONFTOOL DIY case. The F-SMA or SCRJ connectors are used in this context.

Various PSM-HCS-KONFTOOL... tool sets are available for fitting connectors to the powerful HCS fibers, as the HCS fibers can be connected to F-SMA, B-FOC (ST®), SCRJ, and SC duplex connectors, depending on the application and device concerned. An individual fiber cleaving tool (cleave tool) is required for this due to the different connector receptacles.

All fiber cleaving tools can also be ordered separately to allow the existing DIY cases to be upgraded if required. Similarly, all the tools in the DIY case can be ordered individually as replacement parts.

We will also provide you with our tool sets temporarily for a low rental rate on request. Please contact us for an individual quote.



**Assembly case for quick mounting connector**



Description
<b>Polymer fiber DIY case</b> , consisting of: stripping knife, stripping pliers, polishing wheel for F-SMA and SCRJ quick mounting connectors, polishing pad and emery paper
<b>HCS DIY case</b> for F-SMA quick mounting connectors, comprising stripping blade, stripping pliers, aramid yarn scissors, fiber stripper, fiber cleaving tool, and microscope
<b>HCS (GI) DIY case</b> for B-FOC (ST®) quick mounting connectors, stripping blade, stripping pliers, aramid yarn scissors, fiber stripper, fiber cleaving tool, and microscope
<b>HCS (GI) DIY case</b> for SCRJ and SC duplex quick mounting connectors, stripping blade, stripping pliers, aramid yarn scissors, fiber stripper, fiber cleaving tool, and microscope

<b>Fiber cleaning tool for HCS fiber</b> , pin arrangement F-SMA
<b>Fiber cleaning tool for HCS (GI) fiber</b> , pin arrangement B-FOC (ST®)
<b>Fiber cleaning tool for HCS (GI) fiber</b> , pin arrangement SCRJ/SC duplex

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSM-HCS-KONFTOOL/B-FOC	2708465	1
PSM-HCS-KONFTOOL	2799526	1
PSM-HCS-KONFTOOL/B-FOC	2708465	1
PSM-HCS-KONFTOOL/SC-RJ	2708876	1

Accessories		
Type	Order No.	Pcs. / Pkt.
PSM-HCS-CLEAVETOOL	2744995	1
PSM-HCS-CLEAVETOOL/B-FOC	2708478	1
PSM-HCS-CLEAVETOOL/SCRJ	2313122	1

## Fiber optics transmission

### Measurement technology for fiber optics

The PSM-FO-POWERMETER fiber optic measuring case is used for carrying out optical power measurements. It provides a straightforward method for determining path attenuations and the remaining system reserves in fiber optic transmission systems with 660 nm and 850 nm.

The case contains a power meter and all the necessary reference cables and couplings for checking polymer, HCS, and fiberglass paths with an F-SMA or B-FOC (ST®) connection. An optional set can be ordered for terminal devices with an SCRJ connection.

- The power meter can be switched over between the following wavelengths: 660 nm, 780 nm, and 850 nm
- Suitable for terminal devices with an F-SMA, B-FOC (ST®), and SCRJ connection
- Reference cables with polymer, HCS, and fiberglass



Universal fiber optics measuring case



Measuring instrument	
Receiver	Large-format silicon element
Wavelength	660 nm, 780 nm, 850 nm
Measuring range	-70 dB ... 6 dB
Accuracy	± 0.25 dB
Resolution	0.01 dB
Ambient temperature range	0 °C ... 45 °C
Relative humidity	max. 95%
Weight	180 g
Dimensions L / W / H	115 mm / 70 mm / 25 mm
Reference fibers, fiber optic measuring case	
Insertion attenuation in accordance with IEC874-1 method 7	
Polymer fiber 980/1000 µm F-SMA	1.5 dB ... 2 dB
HCS fiber 200/230 µm F-SMA	1.5 dB ... 2 dB
HCS fiber 200/230 µm B-FOC (ST®)	1.5 dB ... 2 dB
Fiberglass 50/125 µm B-FOC (ST®)	1.5 dB ... 2 dB
Reference fibers, Powermeter supplementary set	
Insertion attenuation in accordance with IEC874-1 method 7	
Polymer fiber 980/1000 µm SC/F-SMA	1.5 dB ... 2 dB
HCS GI fiber 200/230 µm SC/BFOC (ST®)	1.5 dB ... 2 dB

Technical data	
Large-format silicon element	
660 nm, 780 nm, 850 nm	
-70 dB ... 6 dB	
± 0.25 dB	
0.01 dB	
0 °C ... 45 °C	
max. 95%	
180 g	
115 mm / 70 mm / 25 mm	
Reference fibers, fiber optic measuring case	
Insertion attenuation in accordance with IEC874-1 method 7	
Polymer fiber 980/1000 µm F-SMA	1.5 dB ... 2 dB
HCS fiber 200/230 µm F-SMA	1.5 dB ... 2 dB
HCS fiber 200/230 µm B-FOC (ST®)	1.5 dB ... 2 dB
Fiberglass 50/125 µm B-FOC (ST®)	1.5 dB ... 2 dB
Reference fibers, Powermeter supplementary set	
Insertion attenuation in accordance with IEC874-1 method 7	
Polymer fiber 980/1000 µm SC/F-SMA	1.5 dB ... 2 dB
HCS GI fiber 200/230 µm SC/BFOC (ST®)	1.5 dB ... 2 dB

Description
<b>Fiber optic measuring case</b> , comprising an optical power meter, F-SMA and B-FOC (ST®) coupling, reference fibers, and operating instructions
<b>Powermeter supplementary set</b> for devices with SCRJ interface, comprising one-meter polymer reference fiber (SC Simplex connector to F-SMA connector), one-meter HCS GI reference fiber (SC Simplex connector to B-FOC (ST®) connector), and SCRJ coupling

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSM-FO-POWERMETER	2799539	1
PSM-FO-POWERMETER SCRJ-SET	2901560	1

**Couplings for fiber optics**

Couplings are used to connect two FO connectors with the same pin arrangement. Couplings are used when a cable needs to be extended or when creating a non-permanent panel feed-through. However, the extra transitional attenuation (< 2 dB for all couplings) must be taken into consideration when planning the path resources. The sets include two F-SMA couplings or two B-FOC (ST®) couplings for connecting duplex cables. The SCRJ duplex, SC duplex, and LC couplings are supplied separately.

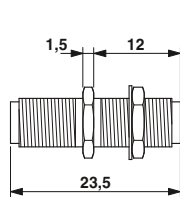
**Notes:**  
**Key:**  
 B-FOC ≙ ST® (registered trademark of AT&T)



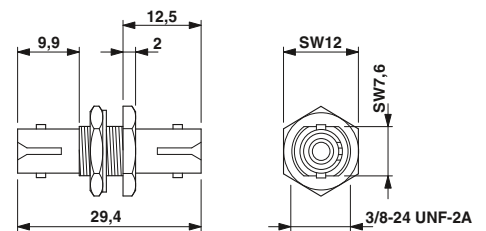
**Couplings for connecting FO cables**

Description
<b>Coupling</b> ; set, consisting of: - 2x F-SMA/F-SMA - 2x B-FOC (ST®)/B-FOC (ST®) - 1x SCRJ/SCRJ (duplex) - 1 x LC/LC (duplex, multi-mode fiber) - 1 x LC/LC (duplex, single-mode fiber) - 1x SC duplex/SC duplex

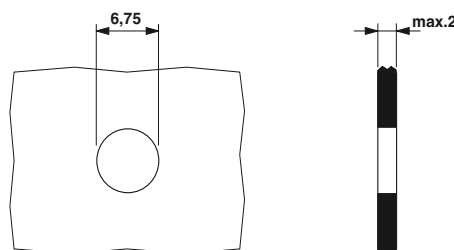
Ordering data		
Type	Order No.	Pcs. / Pkt.
PSM-SET-FSMA-LINK/2	2799416	1
PSM-SET-BFOC-LINK/2	2799429	1
VS-SCRJ-GOF-BU/BU	1652978	1
FL MM PATCH COUPLER LC-LC	2700312	1
FL SM PATCH COUPLER LC-LC	2700313	1
FL COUPLER SC-DUPLEX	2901788	1



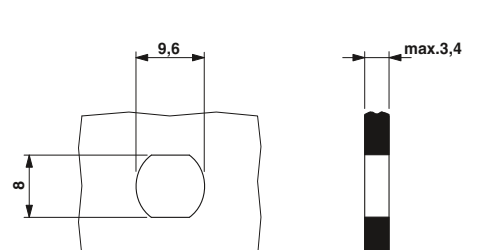
Dimensional drawing F-SMA coupling



Dimensional drawing B-FOC coupling



Drilling diagram F-SMA panel feed-through



Drilling diagram B-FOC panel feed-through

## Ethernet networks: media converter

### Media converters for converting 10/100 BASE-T(X) Ethernet to fiber optics

#### Devices with 1300 nm wavelength

The FL MC EF 1300... media converters convert the Ethernet interface to fiber optics. This provides maximum immunity to interference and maximum transmission ranges in industrial Ethernet applications.

Ethernet interface:

- RJ45 socket
- 10/100 Mbps
- Auto negotiation
- Auto-MDI/MDI-X
- Link fault pass through
- Signal LEDs for activity, link status, 10/100 Mbps

Fiber optic interface:

- B-FOC (ST®) or SC-DUPLEX
- Multi-mode or single-mode cable
- Signal LEDs for link status and far end fault signaling

Features:

- Backplane bus contact (DIN rail connector), enabling alternative or redundant 24 V power supply
- Link fault pass through (LFP) and far end fault (FEF) functions for easy connection monitoring. The connection status between the devices is monitored and signaled.

#### Devices with WDM technology

The FL MC EF WDM... media converters enable full duplex communication with a single glass fiber via WDM technology (Wavelength Division Multiplex).

Features:

- 1310 nm and 1550 nm wavelengths for transmitting and receiving
- Single-mode fiberglass
- SC simplex connection

Application:

- Single-fiber transmission of optical signals in rotating applications with optical slip rings, e.g., wind power or automotive industry
- Doubling of the bandwidth or establishment of separate networks in existing wiring (separate outgoing/return line)

<b>Notes:</b>
1) EMC: Class A product, see page 553

## Ethernet



### Single-fiber transmission WDM technology



<b>Supply</b>	
Supply voltage	18 V DC ... 30 V DC (screw connection)
Supply voltage	18 V DC ... 30 V DC (as an alternative or redundant, via backplane bus contact and system current supply)
	≤ 100 mA (24 V DC)
<b>Nominal current consumption</b>	
<b>FO interface</b>	
Wavelength	1310 / 1550 nm
Transmission length incl. 3 dB system reserve	38 km (with F-E 9/125 0.36 dB/km) 34 km (with F-E 9/125 0.4 dB/km) 28 km (with F-E 9/125 0.5 dB/km)
<b>Signal LEDs</b>	Far end fault (red LED), link status (yellow LED)
<b>Ethernet interface</b>	
Connection method	RJ45 socket, shielded
Transmission speed	10/100 Mbps
Auto-negotiation modes	Auto
Transmission length	100 m (twisted pair, shielded)
Link through	Link fault pass through
MDI-/MDI-X switchover	Auto-MDI(X)
Signal LEDs	Activity, link status, 10/100 Mbps
<b>General data</b>	
Ambient temperature (operation)	-40 °C ... 65 °C
Electrical isolation	(VCC // FE // Ethernet)
Test voltage	1.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Dimensions	22.5 mm / 99 mm / 114.5 mm
<b>Conformance / approvals</b>	
ATEX	Ex II 3 G Ex nA IIC T4 Gc X

Technical data	
Supply	18 V DC ... 30 V DC (screw connection) 18 V DC ... 30 V DC (as an alternative or redundant, via backplane bus contact and system current supply)
Nominal current consumption	≤ 100 mA (24 V DC)
FO interface	1310 / 1550 nm 38 km (with F-E 9/125 0.36 dB/km) 34 km (with F-E 9/125 0.4 dB/km) 28 km (with F-E 9/125 0.5 dB/km)
Signal LEDs	Far end fault (red LED), link status (yellow LED)
Ethernet interface	RJ45 socket, shielded 10/100 Mbps Auto 100 m (twisted pair, shielded) Link fault pass through Auto-MDI(X) Activity, link status, 10/100 Mbps
General data	-40 °C ... 65 °C (VCC // FE // Ethernet) 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) 22.5 mm / 99 mm / 114.5 mm
Conformance / approvals	Ex II 3 G Ex nA IIC T4 Gc X

Description
<b>FO converter</b> , for converting 10/100 BASE-TX to a single-mode optical fiber, WDM technology
WDM set with devices A and B, SC simplex connection
WDM device A, SC simplex connection
WDM device B, SC simplex connection
<b>FO converter</b> , for converting 10/100 BASE-TX to:
Multi-mode fiberglass (1300 nm), SC duplex connection
<b>FO converter</b> , for converting 10/100 BASE-TX to:
Single-mode fiberglass (1300 nm), SC duplex connection
<b>FO converter</b> , for converting 10/100 BASE-TX to:
Multi-mode fiberglass (1300 nm), B-FOC (ST®) connection

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>FL MC EF WDM-SET SC</b>	2902660	1
<b>FL MC EF WDM-A SC<sup>1)</sup></b>	2902658	1
<b>FL MC EF WDM-B SC<sup>1)</sup></b>	2902659	1

<b>DIN rail connector</b>	<b>ME 22,5 TBUS 1,5/ 5-ST-3,81 GN</b>	2707437	50
<b>System power supply unit</b> , primary-switched	<b>MINI-SYS-PS-100-240AC/24DC/1.5</b>	2866983	1
<b>Fiberglass single mode patch cable</b>	<b>FL SM PATCH 2,0 SC-SC</b>	2901830	1
<b>PROFINET HCS GI cable</b> , duplex, 200/230 µm, for indoor installation			
<b>Connector set for PROFINET HCS fibers</b> (diameter of the individual elements: 2.2 mm), for self-assembly, with bend protection			

Accessories			
<b>ME 22,5 TBUS 1,5/ 5-ST-3,81 GN</b>	<b>2707437</b>		50
<b>MINI-SYS-PS-100-240AC/24DC/1.5</b>	<b>2866983</b>		1
<b>FL SM PATCH 2,0 SC-SC</b>	<b>2901830</b>		1

Ethernet



Multi-mode fiberglass SC duplex connection

Ethernet



Single-mode fiberglass SC duplex connection

Ethernet



Multi-mode fiberglass B-FOC (ST<sup>®</sup>) connection



Technical data

18 V DC ... 30 V DC (screw connection)  
18 V DC ... 30 V DC (as an alternative or redundant, via backplane bus contact and system current supply)

≤ 100 mA (24 V DC)

1310 nm  
6.4 km (with F-G 50/125 0,7 dB/km F 1000)  
2.8 km (with F-G 50/125 1,6 dB/km F 800)  
10 km (with F-G 62.5/125 0,7 dB/km F 1000)  
3 km (with F-G 62.5/125 2,6 dB/km F 600)  
2 km (with 2GK200/230 GI-HCS)  
Far end fault (red LED), link status (yellow LED)

RJ45 socket, shielded  
10/100 Mbps  
Auto  
100 m (twisted pair, shielded)  
Link fault pass through  
Auto-MDI(X)  
Activity, link status, 10/100 Mbps

-40 °C ... 65 °C  
(VCC // FE // Ethernet)  
1.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
22.5 mm / 99 mm / 114.5 mm

Ex II 3 G Ex nA IIC T4 Gc X  
Ex II (2) D [Ex op is Db] IIC (PTB 06 ATEX 2042 U)  
Ex II (2) G [Ex op is Gb] IIC (PTB 06 ATEX 2042 U)

Technical data

18 V DC ... 30 V DC (screw connection)  
18 V DC ... 30 V DC (as an alternative or redundant, via backplane bus contact and system current supply)

≤ 100 mA (24 V DC)

1310 nm  
36 km (with F-E 9/125 0,36 dB/km)  
32 km (with F-E 9/125 0,4 dB/km)  
26 km (with F-E 9/125 0,5 dB/km)  
Far end fault (red LED), link status (yellow LED)

RJ45 socket, shielded  
10/100 Mbps  
Auto  
100 m (twisted pair, shielded)  
Link fault pass through  
Auto-MDI(X)  
Activity, link status, 10/100 Mbps

-40 °C ... 65 °C  
(VCC // FE // Ethernet)  
1.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
22.5 mm / 99 mm / 114.5 mm

Ex II 3 G Ex nA IIC T4 Gc X

Technical data

18 V DC ... 30 V DC (screw connection)  
18 V DC ... 30 V DC (as an alternative or redundant, via backplane bus contact and system current supply)

≤ 100 mA (24 V DC)

1310 nm  
6.4 km (with F-G 50/125 0,7 dB/km F 1000)  
2.8 km (with F-G 50/125 1,6 dB/km F 800)  
10 km (with F-G 62.5/125 0,7 dB/km F 1000)  
3 km (with F-G 62.5/125 2,6 dB/km F 600)  
2 km (with 2GK200/230 GI-HCS)  
Far end fault (red LED), link status (yellow LED)

RJ45 socket, shielded  
10/100 Mbps  
Auto  
100 m (twisted pair, shielded)  
Link fault pass through  
Auto-MDI(X)  
Activity, link status, 10/100 Mbps

-40 °C ... 65 °C  
(VCC // FE // Ethernet)  
1.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
22.5 mm / 99 mm / 114.5 mm

Ex II 3 G Ex nA IIC T4 Gc X  
Ex II (2) D [Ex op is Db] IIC (PTB 06 ATEX 2042 U)  
Ex II (2) G [Ex op is Gb] IIC (PTB 06 ATEX 2042 U)

Ordering data

Type	Order No.	Pcs. / Pkt.
FL MC EF 1300 MM SC <sup>1)</sup>	2902853	1

Ordering data

Type	Order No.	Pcs. / Pkt.
FL MC EF 1300 SM SC <sup>1)</sup>	2902856	1

Ordering data

Type	Order No.	Pcs. / Pkt.
FL MC EF 1300 MM ST <sup>1)</sup>	2902854	1

Accessories

Accessories	Order No.	Pcs.
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
FL FOC PN-C-HCS-GI-200/230	2313410	1
PSM-SET-SC-DUPLEX/2-HCS/PN	2313779	1

Accessories

Accessories	Order No.	Pcs.
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
FL SM PATCH 2,0 SC-SC	2901830	1

Accessories

Accessories	Order No.	Pcs.
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
FL FOC PN-C-HCS-GI-200/230	2313410	1
PSM-SET-B-FOC/4-HCS/PN	2313782	1



## Ethernet networks: media converter

### Media converters for converting 10/100 BASE-T(X) Ethernet to fiber optics

#### Devices with 660 nm wavelength

The FL MC 10/100BASE-T/FO 660 media converter converts the 10/100Base-T(X) Ethernet interface to fiber optics. This allows maximum immunity to interference and maximum transmission ranges in industrial Ethernet applications.

Integrated fiber optic diagnostics continuously signal the receiving capacity by means of an LED bar graph and two floating switching outputs.

#### Applications:

- Increased transmission range in industrial Ethernet applications
- Immunity to electromagnetic interference

#### Ethernet interface:

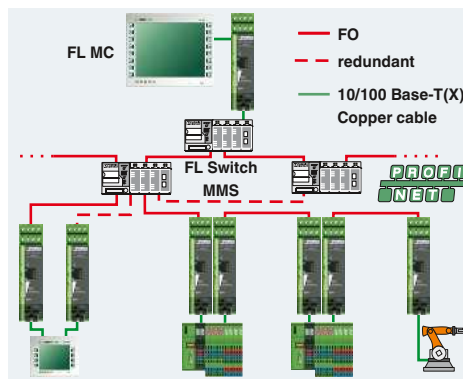
- RJ45 socket
- 10/100 Mbps
- Auto negotiation
- MDI/MDI-X switchover
- Signal LEDs for activity, link status, and 100 Mbps

#### Fiber optic interface

- SCRJ connection
- Polymer and HCS (PCF) fibers
- Transmission distance of up to 300 m at 100 Mbps with HCS GI fibers
- 660 nm wavelength
- Signal LEDs for link status
- LED bar graph for signaling the receiving capacity

#### Features:

- Backplane bus contact (TBUS), enabling alternative or redundant 24 V power supply
- Link through function for easy connection monitoring. The availability of the connected cable connection and devices is monitored and indicated.
- Choice between local or transparent auto negotiation function for maximum transmission capacity



Ethernet



For polymer and HCS fibers



Supply	
Supply voltage	18 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
Supply voltage	23 V DC ... 25 V DC (as an alternative or redundant, via backplane bus contact and system current supply)
Nominal current consumption	≤ 100 mA (24 V DC)
FO interface	
Wavelength	660 nm
Transmission length incl. 3 dB system reserve	70 m (polymer fiber with F-P 980/1000 230 dB/km at 10 Mbps) 300 m (HCS fiber with F-K 200/230 8 dB/km at 10 Mbps) 50 m (polymer fiber with F-P 980/1000 230 dB/km at 100 Mbps) 100 m (HCS fiber with F-K 200/230 8 dB/km at 100 Mbps) 300 m (HCS GI fiber with F-GK 200/230 at 100 Mbps) 400 m (HCS GI fiber with F-GK 200/230 at 10 Mbps)
Signal LEDs	Optical receiver power: very good (green), good (green), critical (yellow), fault (red) Two floating relay outputs
Switching output	
Ethernet interface	
Connection method	RJ45 socket, shielded
Transmission speed	10/100 Mbps
Auto-negotiation modes	Optionally transparent via TP and FO (default) or locally on TP
Transmission length	100 m (twisted pair, shielded)
Link through	Link down is automatically forwarded to the second connection
MDI/MDI-X switchover	Built-in switch for line (1:1) and crossover connection
Signal LEDs	Activity (yellow), link status (green, UL flashing), 100 Mbps (green)
General data	
Ambient temperature (operation)	-20 °C ... 60 °C
Electrical isolation	(VCC // Ethernet)
Test voltage	1.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Dimensions	22.5 mm / 99 mm / 114.5 mm
Conformance / approvals	
ATEX	Ex II 3 G Ex nA nC IIC T4 Gc X
UL, USA / Canada	508 recognized

#### Technical data

Supply	
Supply voltage	18 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
Supply voltage	23 V DC ... 25 V DC (as an alternative or redundant, via backplane bus contact and system current supply)
Nominal current consumption	≤ 100 mA (24 V DC)
FO interface	
Wavelength	660 nm
Transmission length incl. 3 dB system reserve	70 m (polymer fiber with F-P 980/1000 230 dB/km at 10 Mbps) 300 m (HCS fiber with F-K 200/230 8 dB/km at 10 Mbps) 50 m (polymer fiber with F-P 980/1000 230 dB/km at 100 Mbps) 100 m (HCS fiber with F-K 200/230 8 dB/km at 100 Mbps) 300 m (HCS GI fiber with F-GK 200/230 at 100 Mbps) 400 m (HCS GI fiber with F-GK 200/230 at 10 Mbps)
Signal LEDs	Optical receiver power: very good (green), good (green), critical (yellow), fault (red) Two floating relay outputs
Switching output	
Ethernet interface	
Connection method	RJ45 socket, shielded
Transmission speed	10/100 Mbps
Auto-negotiation modes	Optionally transparent via TP and FO (default) or locally on TP
Transmission length	100 m (twisted pair, shielded)
Link through	Link down is automatically forwarded to the second connection
MDI/MDI-X switchover	Built-in switch for line (1:1) and crossover connection
Signal LEDs	Activity (yellow), link status (green, UL flashing), 100 Mbps (green)
General data	
Ambient temperature (operation)	-20 °C ... 60 °C
Electrical isolation	(VCC // Ethernet)
Test voltage	1.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Dimensions	22.5 mm / 99 mm / 114.5 mm
Conformance / approvals	
ATEX	Ex II 3 G Ex nA nC IIC T4 Gc X
UL, USA / Canada	508 recognized

#### Ordering data

Type	Order No.	Pcs. / Pkt.
FL MC 10/100BASE-T/FO-660	2708193	1

#### Accessories

Type	Order No.	Pcs. / Pkt.
FL FOC PN-B-980/1000	2313397	1
FL FOC PN-C-FLEX-980/1000	2313407	1
FL FOC PN-C-HCS-GI-200/230	2313410	1
PSM-SET-SCRJ-DUP/2-POF	2708656	1
PSM-SET-SCRJ-DUP/2-HCS/PN	2313546	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Description	
FO converter, for converting 10/100Base-T to polymer or HCS fiber, (660 nm) SC-RJ connection	
Polymer fiber cable POF, duplex, 980/1000 μm, heavy-duty PROFINET version, for permanent indoor installation	
- By the meter w/o plug - By the meter w/o plug	
PROFINET HCS GI cable, duplex, 200/230 μm, for indoor installation	
- By the meter w/o plug	
Plug set for polymer fibers, for self-assembly, with bend protection	
DIN rail connector	
System power supply unit, primary-switched	

**Media converters for converting 10/100 BASE-T(X) Ethernet to fiber optics**

**Device with 1300 nm wavelength**

The FL MC 2000E LC media converter is designed for use in energy technology. With its robust design, it can be used in environments subject to high levels of EMI around switchgear that have been designed according to the new IEC 61850 standard.

**Features:**

- 1300 nm wavelength
- Connection via multi-mode fiberglass cable with LC duplex plug
- Pass through mode with short latency for time-critical applications
- Link fault pass through (LFP) function for easy connection monitoring. The connection status between the devices is monitored and signaled.
- Wide operating temperature range (-40°C... 75°C)
- Redundant power supply with a wide range from 12 ... 57 V DC (24, 36, 48 V DC)
- Robust design for high EMC requirements
- Floating alarm contact for power supply monitoring and diagnostics and link monitoring

**Notes:**  
An unmanaged switch which meets the same requirements that are required for switchgear and transformer substations in energy technology can be found on page 18

Ethernet



**Multi-mode fiberglass LC duplex connection**

<b>Supply</b>	
Supply voltage	12 V DC ... 57 V DC
Nominal current consumption	110 mA (24 V DC)
<b>FO interface</b>	
Wavelength	1300 nm
Transmission length incl. 3 dB system reserve	8 km (fiberglass with F-G 62.5/125 0.7 dB/km F1000) 3.3 km (fiberglass with F-G 62.5/125 2.6 dB/km F600) 9.6 km (fiberglass with F-G 50/125 0.7 dB/km F1200) 5.3 km (fiberglass with F-G 50/125 1.6 dB/km F800) 2 km (HCS GI fiber with F-GK 200/230)
<b>Signal LEDs</b>	
Switching output	LNK/ACT
<b>Ethernet interface</b>	
Connection method	RJ45 socket, shielded
Transmission speed	100 Mbps
Auto-negotiation modes	Auto
Transmission length	100 m (twisted pair, shielded)
Link through	Link fault pass through
MDI-/MDI-X switchover	Auto-MDI(X)
Signal LEDs	LNK/ACT, 100
<b>General data</b>	
Ambient temperature (operation)	-40 °C ... 75 °C
Electrical isolation	(VCC // FE // Ethernet)
Test voltage	500 V DC
Dimensions	30 mm / 130 mm / 100 mm
<b>Conformance / approvals</b>	
ATEX	-
UL, USA / Canada	-

**Technical data**

<b>Technical data</b>		
12 V DC ... 57 V DC		
110 mA (24 V DC)		
1300 nm		
8 km (fiberglass with F-G 62.5/125 0.7 dB/km F1000)		
3.3 km (fiberglass with F-G 62.5/125 2.6 dB/km F600)		
9.6 km (fiberglass with F-G 50/125 0.7 dB/km F1200)		
5.3 km (fiberglass with F-G 50/125 1.6 dB/km F800)		
2 km (HCS GI fiber with F-GK 200/230)		
LNK/ACT		
Floating relay output		
RJ45 socket, shielded		
100 Mbps		
Auto		
100 m (twisted pair, shielded)		
Link fault pass through		
Auto-MDI(X)		
LNK/ACT, 100		
-40 °C ... 75 °C		
(VCC // FE // Ethernet)		
500 V DC		
30 mm / 130 mm / 100 mm		
-		
-		

<b>Description</b>
<b>FO converter</b> , for converting 100 BASE-TX to:
Multi-mode fiberglass (1300 nm), LC duplex connection

**Ordering data**

Type	Order No.	Pcs. / Pkt.
FL MC 2000E LC	2891056	1

### Device servers for converting serial interfaces



The **FL COMSERVER...232/422/485** products are used to integrate serial V.24 (RS-232)/RS-422/RS-485 interfaces into existing Ethernet networks. This provides an easy way of implementing functions such as cable replacement, network integration or a Modbus gateway.

#### Cable replacement

Two devices in combination tunnel serial connections via Ethernet, using either the TCP or UDP protocol.

#### Network integration

You can integrate automation devices such as controllers or frequency inverters into a network using corresponding programming and diagnostics software. COM diversion software creates a virtual COM port on the PC and transmits the data to the FL COMSERVER.

#### Modbus gateway

The integrated Modbus gateway function provided in FL COMSERVER UNI converts serial Modbus ASCII or RTU data into Modbus TCP. Naturally, the conversion process also works in the opposite direction.

#### Features common to all devices:

- Serial interfaces, V.24 (RS-232), RS-422, RS-485
- 10/100 Base-T(X) interface
- Software for virtual COM ports supplied as standard
- Extended temperature range of -25°C to +60°C
- Redundant power supply and modular station structure with TBUS connectors
- 3-way electrical isolation VCC // V.24 (RS-232)/RS-422/RS-485 // network
- Integration into network management tools and visualization systems with the support of SNMP services
- LED diagnostic indicators
- Configuration via web-based management

#### FL COMSERVER UNI...

- Supports TCP, UDP, Modbus TCP/RTU/ASCII
- Can be used exactly as required on Modbus master or slave

#### FL COMSERVER BASIC...

- Best-value version
- Supports TCP and UDP

#### FL COMSERVER MPI-SET:

- For programming S7 controllers remotely over Ethernet
- Preconfigured FL COMSERVER BASIC...
- MPI adapter and V.24 (RS-232) cable supplied as standard

#### Notes:

1) EMC: Class A product, see page 553

<b>Supply</b>	
Supply voltage	
Supply voltage	
Nominal current consumption	
<b>Serial port</b>	
<b>Interfaces</b>	
Connection method	V.24 (RS-232) RS-422 RS-485
Data format/coding	
Data flow control/protocols	
Transmission speed	
Termination resistor	
<b>Ethernet interface</b>	
Connection method	
Transmission speed	
Transmission length	
Supported protocols	
Auxiliary protocols	
<b>Functions</b>	
<b>Management</b>	
<b>General data</b>	
Ambient temperature (operation)	
Electrical isolation	
Test voltage	
Electromagnetic compatibility	
Dimensions	W / H / D
<b>Conformance / approvals</b>	
UL, USA / Canada	

#### Description

**FL COMSERVER...232/422/485**, for converting serial interfaces to Ethernet. COM port redirector software and additional software supplied as standard

TCP, UDP, Modbus, PPP

**FL COM SERVER**, to convert a serial interface to Ethernet, incl. CD-ROM with drivers, additional software and user documentation (PDF)

TCP, UDP

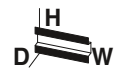
**MPI programming set**, pre-configured, for coupling to the programming interface of a Siemens S7-300/400 controller, consisting of COM server, MPI adapter, and RS-232 cable

**RS-232-D-SUB cable**, length: 2 m

- 9-pos. socket on 9-pos. socket
- 9-pos. socket on 25-pos. socket

**DIN rail connector**

**System power supply unit**, primary-switched



Ethernet



Universal device - Modbus gateway between RTU/ASCII and TCP

Ex: // Applied for: cUL / UL



Ethernet



Basic version for redirector operation - TCP and UDP

Ex: // Applied for: cUL / UL



MPI-SET device server, V.24 (RS-232) cable, and MPI adapter



Technical data
24 V AC/DC ±20% (via plug-in COMBICON screw terminal block)
24 V DC ±5% (as an alternative or redundant, via backplane bus contact and system current supply)
100 mA (24 V DC)
V.24 (RS-232), RS-422, RS-485 D-SUB-9 plug Plug-in/screw connection via COMBICON Plug-in/screw connection via COMBICON UART/NRZ: 7/8 bit data, 1/2 bit stop, 1 bit parity
Software handshake, Xon/Xoff, or hardware handshake RTS/CTS // 3964 R compatible, Modbus RTU/ASCII
0.3; 0.6; 1.2; 2.4; 4.8; 7.2; 9.6; 19.2; 38.4; 57.6; 115.2; 187.5; 230.4 kbps 390 Ω / 180 Ω / 390 Ω (configurable)
RJ45 socket, shielded 10/100 Mbps, autonegotiation ≤ 100 m (shielded twisted pair) TCP/IP, UDP, Modbus (TCP, RTU/ASCII), PPP ARP, DHCP, BOOTP, SNMP, RIP, RARP, HTTP, TFTP
Web-based management, SNMP, emergency exit with Telnet and serial
-25 °C ... 60 °C DIN EN 50178 (VCC // Ethernet // Serial) 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) Conformance with EMC Directive 2004/108/EC 22.5 mm / 99 mm / 116 mm
508 listed

Technical data
24 V AC/DC ±20% (via plug-in COMBICON screw terminal block)
24 V DC ±5% (as an alternative or redundant, via backplane bus contact and system current supply)
100 mA (24 V DC)
V.24 (RS-232), RS-422, RS-485 D-SUB-9 plug Plug-in/screw connection via COMBICON Plug-in/screw connection via COMBICON UART/NRZ: 7/8 bit data, 1/2 bit stop, 1 bit parity
Software handshake, Xon/Xoff or hardware handshake RTS/CTS
0.3; 0.6; 1.2; 2.4; 4.8; 7.2; 9.6; 19.2; 38.4; 57.6; 115.2; 187.5; 230.4 kbps 390 Ω / 180 Ω / 390 Ω (configurable)
RJ45 socket, shielded 10/100 Mbps, autonegotiation ≤ 100 m (shielded twisted pair) TCP/IP, UDP ARP, DHCP, BOOTP, SNMP, RIP, RARP, HTTP, TFTP
Web-based management, SNMP, emergency exit with Telnet and serial
-25 °C ... 60 °C DIN EN 50178 (VCC // Ethernet // Serial) 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) Conformance with EMC Directive 2004/108/EC 22.5 mm / 99 mm / 116 mm
508 listed

Technical data
24 V DC ±20% (via plug-in COMBICON screw terminal block)
24 V DC ±5% (as an alternative or redundant, via backplane bus contact and system current supply)
100 mA (24 V DC)
V.24 (RS-232) D-SUB-9 plug - - Serially asynchronous UART/NRZ, 8 data, 1 stop, odd parity, 11 bit character length Hardware handshake RTS/CTS
19200, 38400 bit/s, adjustable via web-based management
-
RJ45 socket, shielded 10/100 Mbps, autonegotiation 100 m (shielded twisted pair) TCP/IP, UDP ARP, DHCP, BOOTP, SNMP, RIP, RARP, HTTP, TFTP
Web-based management, SNMP, emergency exit with Telnet and serial
-25 °C ... 60 °C DIN EN 50178 (VCC // Ethernet // Serial) 1.5 kV <sub>rms</sub> (50 Hz, 1 min.) Conformance with EMC Directive 2004/108/EC 22.5 mm / 99 mm / 116 mm
-

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL COMSERVER UNI 232/422/485 <sup>1)</sup>	2313452	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL COMSERVER BASIC 232/422/485 <sup>1)</sup>	2313478	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL COMSERVER-MPI-SET	2313588	1

Accessories		
PSM-KA9SUB9/BB/2METER	2799474	1
PSM-KA 9 SUB 25/BB/2METER	2761059	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
PSM-KA9SUB9/BB/2METER	2799474	1
PSM-KA 9 SUB 25/BB/2METER	2761059	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

Accessories		
PSM-KA9SUB9/BB/2METER	2799474	1
PSM-KA 9 SUB 25/BB/2METER	2761059	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

## Ethernet networks: COMSERVER

### Device servers for converting serial interfaces

#### FL COMSERVER PRO...

Individual solutions that cannot be implemented with the the standard devices can be created with this freely programmable version. To do this, users program their own application program.

#### Features:

- Freely programmable version
- Programming in BCL (similar to BASIC)
- Integrated web server for visualization
- Pre-processing of data stream
- Adaptation of old protocols for compatibility with modern systems

A PCL program is required for operation. In addition, an HTML visualization can be saved on the web server in order to make settings in the BCL program or to display states.

#### Example applications when supplied as standard

Some program samples are available free of charge. These samples can be adapted and developed further as required.

- IP scanner: monitoring of network devices via ping
- TCP multicast: program for sending data to multiple devices across the network using the TCP protocol
- Modbus I/O monitor: in combination with a Modbus bus coupler, I/O data can be processed, controlled, and visualized

#### Software development kit (SDK)

A BCL program can be created using any editor. The SDK provides support when transferring the BCL program and for HTML visualization in the form of batch files.

The current version of the SDK together with samples can be found on our website.

Notes:
1) EMC: Class A product, see page 553



Freely programmable device server with HTTP server



Ex // Applied for: cUL / UL

<b>Supply</b>	
Supply voltage	
Supply voltage	
<b>Nominal current consumption</b>	
<b>Serial port</b>	
Interfaces	
Connection method	V.24 (RS-232) RS-422 RS-485
Data format/coding	
Data flow control/protocols	
Transmission speed	
Termination resistor	
<b>Ethernet interface</b>	
Connection method	
Transmission speed	
Transmission length	
Supported protocols	
Auxiliary protocols	
<b>Functions</b>	
Management	
<b>General data</b>	
Ambient temperature (operation)	
Electrical isolation	
Test voltage	
Electromagnetic compatibility	
Dimensions	W / H / D

Technical data	
24 V AC/DC ±20% (via plug-in COMBICON screw terminal block)	
24 V DC ±5% (as an alternative or redundant, via backplane bus contact and system current supply)	
100 mA (24 V DC)	
V.24 (RS-232), RS-422, RS-485	
D-SUB-9 plug	
Plug-in/screw connection via COMBICON	
Plug-in/screw connection via COMBICON	
UART/NRZ: 7/8 bit data, 1/2 bit stop, 1 bit parity	
Software handshake, Xon/Xoff or hardware handshake RTS/CTS	
0.3; 0.6; 1.2; 2.4; 4.8; 7.2; 9.6; 19.2; 38.4; 57.6; 115.2; 187.5; 230.4 kbps	
390 Ω / 180 Ω / 390 Ω (configurable)	
RJ45 socket, shielded	
10/100 Mbps, autonegotiation	
≤ 100 m (shielded twisted pair)	
TCP/IP, UDP	
ARP, DHCP, BOOTP, SNMP, RIP, RARP, HTTP, TFTP	
Web-based management, SNMP, serial emergency access	
-25 °C ... 60 °C	
DIN EN 50178 (VCC // Ethernet // Serial)	
1.5 kV <sub>ms</sub> (50 Hz, 1 min.)	
Conformance with EMC Directive 2004/108/EC	
22.5 mm / 99 mm / 116 mm	

Description
<b>FL COMSERVER PRO...</b> , freely programmable version. Similar to BASIC. HTTP server for visualization. Software development kit containing examples and documentation supplied as standard

<b>RS-232-D-SUB cable</b> , length: 2 m
- 9-pos. socket on 9-pos. socket
- 9-pos. socket on 25-pos. socket
<b>DIN rail connector</b>
<b>System power supply unit</b> , primary-switched

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL COMSERVER PRO 232/422/485 <sup>1)</sup>	2313465	1

Accessories		
Type	Order No.	Pcs. / Pkt.
PSM-KA9SUB9/BB/2METER	2799474	1
PSM-KA 9 SUB 25/BB/2METER	2761059	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

**Device servers  
for converting serial interfaces**

The **FL COMSERVER WLAN 232/422/485** enables wireless connection of serial interfaces for machine and system access. This means that controllers and control panels can be integrated into wireless LAN networks via these device servers.

This device is ideal for use in all mobile and industrial mobile applications involving serial interfaces.

Easy cable replacement is performed in ad-hoc or infrastructure operating mode. Serial devices can be directly connected to each other or integrated into the network via access points.

Comprehensive diagnostics displays and an LED bar graph for displaying the wireless reception performance are integrated. They ensure straightforward startup and continuous monitoring during operation. In addition, the current signal strength can be read digitally and processed externally.

**Interfaces:**

- V.24 (RS-232), RS-422, RS-485, and USB
- 54 Mbps WLAN interface according to IEEE 802.11 b/g
- External SMA antenna connection

**Security:**

- WEP, up to 128 bits
- WPA / WPA2 (AES / TKIP)
- LED bar graph for displaying wireless reception performance

**Features:**

- Ad-hoc or infrastructure operation
- Software for virtual COM ports supplied as standard
- Extended temperature range of -25°C to +60°C
- Redundant power supply and modular station structure with TBUS connectors
- 3-way electrical isolation VCC // V.24 (RS-232)/RS-422/RS-485 // network
- LED diagnostic indicators
- Straightforward configuration software

**Applications:**

- Replacement of cables with wireless connections
- Network integration, wireless integration of automation devices and serial devices
- Remote maintenance



WLAN

RS-232



Serial device server for 802.11 Wireless LAN



**Technical data**

Supply	
Supply voltage	10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
Supply voltage	24 V DC ±20% (as an alternative or redundant, via backplane bus contact and system current supply)
Nominal current consumption	≤ 100 mA (24 V DC)
Serial port	
Interfaces	V.24 (RS-232), RS-422, RS-485
Connection method	D-SUB-9 plug Plug-in/screw connection via COMBICON Plug-in/screw connection via COMBICON
Data format/coding	Serial asynchronous UART/NRZ, 7/8 data, 1/2 stop, 1 parity, 10/11-bit character length
Data flow control/protocols	Software handshake, Xon/Xoff or hardware handshake RTS/CTS
Transmission speed	0.3; 1.2; 2.4; 4.8; 7.2; 9.6; 19.2; 31.25; 38.4; 57.6; 75; 93.75; 115.2 kbps
Termination resistor	390 Ω / 180 Ω / 390 Ω (can be connected)
Wireless interface	
Interfaces	WLAN as per IEEE 802.11 b/g
Function	Infrastructure mode, ad-hoc mode
Transmission speed	≤ 54 Mbps
Security	802.11i, WPA PSK (preshared key), WPA2 PSK, AES, WEP 64 bit/128 bit, TKIP
Antenna connection	External
Transmission power	-28 dBm to 20 dBm (can be set via software)
Receiver sensitivity	-85.00 dBm
Frequencies	2.402 GHz ... 2.48 GHz (ISM bandwidth)
Supported protocols	TCP/IP, UDP
General data	
Ambient temperature (operation)	-25 °C ... 60 °C
Electrical isolation	(VCC // WLAN, RS-232, RS-422, RS-485, USB)
Test voltage	1.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Electromagnetic compatibility	Conformance with EMC Directive 2004/108/EC
Dimensions	22.5 mm / 99 mm / 121 mm

**Ordering data**

Description	Type	Order No.	Pcs. / Pkt.
Serial device server, to convert a serial interface to 802.11 WLAN, incl. CD-ROM with drivers, additional software and user documentation			
TCP, UDP	FL COMSERVER WLAN 232/422/485	2313559	1

**Accessories**

Description	Type	Order No.	Pcs. / Pkt.
RS-232-D-SUB cable, length: 2 m			
- 9-pos. socket on 9-pos. socket	PSM-KA9SUB9/BB/2METER	2799474	1
- 9-pos. socket on 25-pos. socket	PSM-KA 9 SUB 25/BB/2METER	2761059	1
DIN rail connector	ME 22.5 TBUS 1.5/ 5-ST-3.81 GN	2707437	50
System power supply unit, primary-switched	MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
OMNI omni-directional antenna with protection against vandalism	RAD-ISM-2400-ANT-VAN- 3-0-SMA	2885867	1
PANEL directional wireless antenna (without cable)	RAD-ISM-2400-ANT-PAN- 8-0	2867610	1
Antenna extension cable	RAD-CAB-EF393- 3M	2867649	1



### 4 kV Ethernet ISOLATOR for electrical isolation

The **FL ISOLATOR** is used for electrical isolation in copper-based Ethernet networks.

In industrial environments, potential differences pose a constant problem with regard to interference-free data transmission.

The high-quality isolation for up to 4 kV provides reliable protection for Ethernet devices and interfaces. This results in considerably higher immunity to interference in industrial applications.

The **FL ISOLATOR 100-M12** has been specifically developed for use in the railway industry. Featuring M12 connection technology and optional wall mounting, this network isolator can be used flexibly.

#### Features:

- Electrical isolation of data cables and cable shielding
- Dielectric strength up to 4 kV
- Transmission speed of up to 1000 Mbps, device-specific
- No power supply required
- Protection against aggressive environmental influences, particularly harsh industrial environments, thanks to coated PCB
- Approval for railway applications (rolling stock) according to EN 50155 and EN 50121
- Extended temperature range

<b>Ethernet interface</b>	
Connection method	RJ45 socket, shielded
Transmission speed	10/100/1000 Mbps
Transmission length	≤ 100 m (total length across both ports (dependent on data rate and cable used))
<b>General data</b>	
Ambient temperature (operation)	-25 °C ... 75 °C
Electrical isolation	(Ethernet // Ethernet)
Test voltage	4 kV AC (50 Hz, 1 min.)
Electromagnetic compatibility	Conformance with EMC Directive 2004/108/EC
Standards/regulations	EN 50121 and EN 50155 (for railway applications)
Dimensions	22.5 mm / 99 mm / 92 mm
Conformance / approvals	508 listed
UL, USA / Canada	

<b>Description</b>	
<b>Passive network isolator</b> , for electrical isolation in Ethernet networks. For protection against potential differences of up to 4 kV.	
<ul style="list-style-type: none"> <li>- For transmission speeds of up to 1 Gbps, connection: 2x RJ45 sockets</li> <li>- For transmission speeds of up to 100 Mbps, connection: 2x RJ45 sockets</li> <li>- For transmission speeds of up to 100 Mbps, connection: 1x RJ45 socket and COMBICON plug-in screw terminal block</li> </ul>	
<b>Passive network isolator</b> , for electrical isolation in Ethernet networks. For protection against potential differences of up to 4 kV.	
<ul style="list-style-type: none"> <li>- For transmission speeds of up to 100 Mbps, connection: two M12 sockets (D-coded)</li> </ul>	

<b>Mounting material</b> , for DIN rail mounting	
<b>M12 connector, straight</b>	
<b>Bus system cable</b> , Ethernet, 4-pos., PUR, halogen-free, RAL 5021 (water blue), shielded, straight M12 plug (D-coded) to free cable end, cable length: free input (0.2 ... 40.0 m)	
<b>Patch cable</b> , CAT5, preassembled	
0.5 m	<b>FL CAT5 PATCH 0,5</b>
1 m	<b>FL CAT5 PATCH 1,0</b>
2 m	<b>FL CAT5 PATCH 2,0</b>
3 m	<b>FL CAT5 PATCH 3,0</b>
<b>Patch cable</b> , CAT6, preassembled	
0.5 m	<b>FL CAT6 PATCH 0,5</b>
1 m	<b>FL CAT6 PATCH 1,0</b>
2 m	<b>FL CAT6 PATCH 2,0</b>
3 m	<b>FL CAT6 PATCH 3,0</b>

Ethernet

PROFI  
NET

Modbus



Transmission speeds up to 1 Gbps, two RJ45 connections



#### Technical data

<b>Technical data</b>	
RJ45 socket, shielded	
10/100/1000 Mbps	
≤ 100 m (total length across both ports (dependent on data rate and cable used))	
<b>General data</b>	
-25 °C ... 75 °C	
(Ethernet // Ethernet)	
4 kV AC (50 Hz, 1 min.)	
Conformance with EMC Directive 2004/108/EC	
EN 50121 and EN 50155 (for railway applications)	
22.5 mm / 99 mm / 92 mm	
508 listed	

#### Ordering data

Type	Order No.	Pcs. / Pkt.
<b>FL ISOLATOR 1000-RJ/RJ</b>	<b>2313915</b>	1

#### Accessories

Type	Order No.	Pcs. / Pkt.
<b>FL CAT5 PATCH 0,5</b>	<b>2832263</b>	10
<b>FL CAT5 PATCH 1,0</b>	<b>2832276</b>	10
<b>FL CAT5 PATCH 2,0</b>	<b>2832289</b>	10
<b>FL CAT5 PATCH 3,0</b>	<b>2832292</b>	10
<b>FL CAT6 PATCH 0,5</b>	<b>2891288</b>	10
<b>FL CAT6 PATCH 1,0</b>	<b>2891385</b>	10
<b>FL CAT6 PATCH 2,0</b>	<b>2891589</b>	10
<b>FL CAT6 PATCH 3,0</b>	<b>2891686</b>	10



Ethernet



Transmission speeds up to 100 Mbps,  
two RJ45 connections

Ethernet



Transmission speeds up to 100 Mbps  
RJ45 and screw connection

Ethernet



Transmission speeds up to 100 Mbps  
M12 connection



Technical data
RJ45 socket, shielded 10/100 Mbps ≤ 100 m (total length across both ports (dependent on data rate and cable used))
-25 °C ... 75 °C (Ethernet // Ethernet) 4 kV AC (50 Hz, 1 min.) Conformance with EMC Directive 2004/108/EC EN 50121 and EN 50155 (for railway applications) 22.5 mm / 99 mm / 92 mm
508 listed

Technical data
RJ45 socket, shielded 10/100 Mbps ≤ 100 m (total length across both ports (dependent on data rate and cable used))
-25 °C ... 75 °C (Ethernet // Ethernet) 4 kV AC (50 Hz, 1 min.) Conformance with EMC Directive 2004/108/EC EN 50121 and EN 50155 (for railway applications) 22.5 mm / 99 mm / 92 mm
508 listed

Technical data
M 12 plug-in connectors (D-coded, female) 10/100 Mbps ≤ 100 m (total length across both ports (dependent on data rate and cable used))
-40 °C ... 75 °C (Port X1//port X2) 4 kV AC (50 Hz, 1 min.) Conformance with EMC Directive 2004/108/EC EN 50121 and EN 50155 (for railway applications) 66 mm / 91 mm / 34 mm
UL applied for

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL ISOLATOR 100-RJ/RJ	2313931	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL ISOLATOR 100-RJ/SC	2313928	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL ISOLATOR 100-M12	2902985	1

Accessories		
Type	Order No.	Pcs. / Pkt.
FL CAT5 PATCH 0,5	2832263	10
FL CAT5 PATCH 1,0	2832276	10
FL CAT5 PATCH 2,0	2832289	10
FL CAT5 PATCH 3,0	2832292	10
FL CAT6 PATCH 0,5	2891288	10
FL CAT6 PATCH 1,0	2891385	10
FL CAT6 PATCH 2,0	2891589	10
FL CAT6 PATCH 3,0	2891686	10

Accessories		
Type	Order No.	Pcs. / Pkt.
FL CAT5 PATCH 0,5	2832263	10
FL CAT5 PATCH 1,0	2832276	10
FL CAT5 PATCH 2,0	2832289	10
FL CAT5 PATCH 3,0	2832292	10
FL CAT6 PATCH 0,5	2891288	10
FL CAT6 PATCH 1,0	2891385	10
FL CAT6 PATCH 2,0	2891589	10
FL CAT6 PATCH 3,0	2891686	10

Accessories		
Type	Order No.	Pcs. / Pkt.
FL EPA RMS	2701133	1
VS-M12MS-IP20-93E-LI/2,0	1406056	1
NBC-MSD SCO/.../...	1408713	1

### Passive patch panel for the DIN rail

The mini patch panels provide a convenient alternative to on-site assembly of RJ45 connectors.

The cross-control-cabinet field cabling is simply connected to screw, spring-cage or LSA connection terminal blocks, depending on which option is selected. The connection to the terminal devices is then completed using pre-assembled RJ45 patch cables.

The completely shielded cable routing ensures transmission quality of up to 1000 Mbps.

#### General features

- CAT5e
- 10/100 Mbps
- Mounted on DIN rails
- Safe shield connection to ground potential

#### FL CAT 5 TERMINAL BOX

- RJ45 socket
- Screw terminal blocks
- 4-pin assignment: 1, 2, 3, 6
- Clearly labeled with PROFINET cable colors

#### FL-PP-RJ45-SCC

- RJ45 socket
- Spring-cage connection terminal blocks
- 8-pin assignment: 1:1
- Option of shield contacting on DIN rail via jumpers

#### FL-PP-RJ45-SC

- RJ45 socket
- Screw terminal blocks
- 8-pin assignment: 1:1
- Option of shield contacting on DIN rail via jumpers

#### FL-PP-RJ45-LSA

- RJ45 socket
- LSA connection terminal blocks
- 8-pin assignment: 1:1
- Option of shield contacting on DIN rail via jumpers

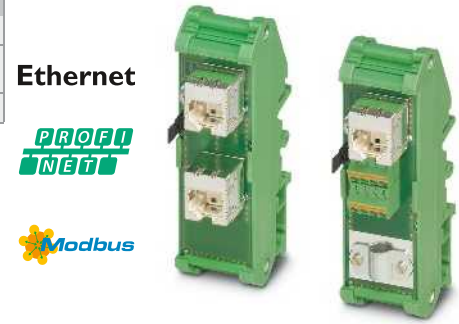
#### FL-PP-RJ45/RJ45

- RJ45 socket
- RJ45 socket
- 8-pin assignment: 1:1
- Option of shield contacting on DIN rail via jumpers

Notes:
For mini patch panel with electrical isolation, see page 414
For Ethernet cables and corresponding crimping pliers, see page 417
For RJ45 patch cables, see page 418

Cable impedance	100 Ω
Transmission speed	10/100 Mbps
Connection line	Twisted pair, shielded, CAT5 or better
Transmission length	100 m (including patch cables)
Plug connection	RJ45 CAT5e
Insertion/withdrawal cycles	≤ 2500
Cable cross section (max./min.)	10 mm / 6 mm
Screw connection solid/stranded/AWG	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1 mm <sup>2</sup> / 26 - 16
Ambient temperature (operation)	-25 °C ... 70 °C
Housing material	PVC/PA
Weight	39 g
Dimensions W / H / D	25 mm / 90 mm / 52 mm

Description
<b>Patch panel, one RJ45 socket to 4 screw connection terminal blocks</b> (assignment 1, 2, 3, 6), CAT5e, 10/100 Mbps, DIN rail mounting, IP20, shield contacting on DIN rail
<b>Patch panel, one RJ45 socket to 8 spring-cage connection terminal blocks</b> (1:1 assignment), CAT5e, 10/100/1000 Mbps, DIN rail mounting, IP20, option of shield contacting on DIN rail via jumpers
<b>Patch panel, one RJ45 socket to 8 screw connection terminal blocks</b> (1:1 assignment), CAT5e, 10/100/1000 Mbps, DIN rail mounting, IP20, option of shield contacting on DIN rail via jumpers
<b>Patch panel, one RJ45 socket to 8 IDC connection terminal blocks</b> (1:1 assignment), CAT5e, 10/100/1000 Mbps, DIN rail mounting, IP20, option of shield contacting on DIN rail via jumpers
<b>Patch panel, two RJ45 sockets</b> (1:1 assignment), CAT5e, 10/100/1000 Mbps, DIN rail mounting, IP20, option of shield contacting on DIN rail via jumpers



Mini patch panel with various connection options



#### Technical data

Cable impedance	100 Ω
Transmission speed	10/100 Mbps
Connection line	Twisted pair, shielded, CAT5 or better
Transmission length	100 m (including patch cables)
Plug connection	RJ45 CAT5e
Insertion/withdrawal cycles	≤ 2500
Cable cross section (max./min.)	10 mm / 6 mm
Screw connection solid/stranded/AWG	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1 mm <sup>2</sup> / 26 - 16
Ambient temperature (operation)	-25 °C ... 70 °C
Housing material	PVC/PA
Weight	39 g
Dimensions W / H / D	25 mm / 90 mm / 52 mm

#### Ordering data

Type	Order No.	Pcs. / Pkt.
FL CAT5 TERMINAL BOX	2744610	1
FL-PP-RJ45-SCC	2901642	1
FL-PP-RJ45-SC	2901643	1
FL-PP-RJ45-LSA	2901645	1
FL-PP-RJ45/RJ45	2901646	1

**Ethernet cables, plugs, tools**

The Ethernet cables of category 5e (up to 125 Mbps) which have been developed especially for industrial applications round off the range to form a complete industrial installation concept.

The installation cable **FL CAT 5 HEAVY...** with solid twisted pair conductors, is particularly suitable for permanent installation outside the control cabinet or switch box. It is characterized by a highly durable second outer sheath made of polyurethane (PUR). With an external diameter of 7.5 mm, the cable has a high degree of mechanical load carrying capacity and fits perfectly through standard cable screw connections. Inside the control cabinet, the second outer sheath is simply removed (Ø 5.75 mm). The cable can therefore be assembled directly with the RJ45 connector and connected to the modules. In line with CAT 5e, cable lengths up to 100 m are permissible.

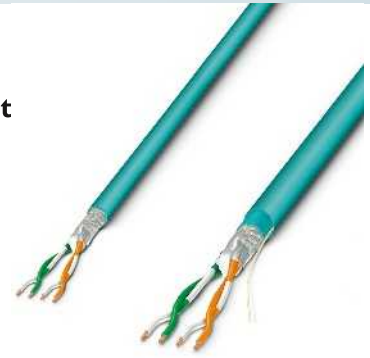
The flexible and lightweight design **FL CAT5 FLEX...** is used for wiring inside the control cabinet (e.g., as patch cable between switch and terminal device). Flexible single wires and a cable diameter of 5.75 mm facilitate installation where space is restricted. The permissible cable length with these highly flexible cables is 50 m.

Both cable types can be supplied ready assembled with RJ45 connector if required (see order sample).

**Ethernet plugs and tools**

The **FL PLUG...** connectors and matching crimping pliers are available for on-site assembly. The connectors comply with category 5e (up to 125 MHz) due to an extremely low cross-talk behavior. Therefore, the connectors can be used in 10/100 Mbps systems as well as in 1000Base-T-systems. For connections that are not crossed, it is recommended that you use the connector set (two connectors) with gray bend protection sleeve and for connections that are crossed, the connector set with green bend protection sleeve.

**Ethernet**



**Ethernet-cable, 2-pair, CAT5/CAT5e in solid and stranded**

Ordering data			
Description	Type	Order No.	Pcs. / Pkt.
<b>CAT5e-SF/UTP cable</b> (J-02YS(ST)C HP 2 x 2 x 24 AWG), heavy duty installation cable 2 x 2 x 0.22 mm <sup>2</sup> , solid conductor, shielded, Outer sheath: 7.5 mm Ø ±0.3 mm Inner sheath: 5.75 mm Ø ±0.15 mm (Length in meters as per customer specifications)	<b>FL CAT5 HEAVY</b>	2744814	1
<b>CAT5e-SF/UTP cable</b> , same as before, however, assembled with RJ45 connector (refer to the order sample) on both sides	<b>FL CAT5 HEAVY CONF/</b>	2744827	1
<b>CAT5e-SF/UTP cable</b> (J-LI02YS(ST)C H 2 x 2 x 26 AWG), light duty stranded installation cable 2 x 2 x 0.14 mm <sup>2</sup> , fine strand conductor, shielded, Outer sheath: 5.75 mm Ø ±0.15 mm (Length in meters as per customer specifications)	<b>FL CAT5 FLEX</b>	2744830	1
<b>CAT5e-SF/UTP cable</b> , same as before, however, assembled with RJ45 connector (refer to the order sample) on both sides	<b>FL CAT5 FLEX CONF/</b>	2744843	1
Accessories			
<b>RJ45 connector</b> , shielded, with bend protection sleeve, x 2			
- Gray for straight cables	<b>FL PLUG RJ45 GR/2</b>	2744856	1
- Green for crossed cables	<b>FL PLUG RJ45 GN/2</b>	2744571	1
<b>Crimping pliers</b> , for assembling the RJ45 connectors	<b>FL CRIMPTOOL</b>	2744869	1

**Ordering example for cable with connector**

Light-weight and flexible installation cable, assembled with RJ45 connectors, crossover assignment, 3.5 m long

Quantity	Order No.	Connection	Length [m] <sup>1)</sup>
1	2744843	CO CO ≙ Crossover LI ≙ Line	3.5

<sup>1)</sup> min. 0.25 m  
max. 50 m with FL CAT5 Flex  
max. 100 m with FL CAT5 Heavy  
step width: 0.25 m

**Ordering example for cable without connector**

Heavy-duty installation cable, 20 m long

Cable length	Order No.	Order designation
20 In meters	2744814	FL CAT5 HEAVY

### RJ45 patch cables

The preassembled patch cables have been specially developed for industrial use.

They are suitable for the quick installation of Ethernet components and patch fields or termination devices within a control cabinet. They form the link to a seamless high quality Ethernet system.

The patch cables are characterized by a new bend protection and are available in graded lengths from 0.3 to 20 m.

All patch cables are designed as 1:1 cable. They come with four pairs of conductors and are assembled with RJ45 plugs according to IEC 603-7/Class A. Each cable is tested separately for its transmission properties.

With their high, universal wiring quality across the active and passive infrastructure, the patch cables fulfill the requirements of the standards for CAT5/CAT6.

#### Notes:

Additional accessories for network installation can be found in the "Ethernet networks" section on page 62

### Ethernet



RJ45 patch cables for IP20 applications

Cable, properties
External diameter
Single wire, material
Single wires per module
Single wire, cross section
Outer sheath, material
Smallest bending radius, fixed installation
Shielding
Connector
Volume resistance
General data
Ambient temperature (operation)

Technical data	
FL CAT5 PATCH 0,3	FL CAT6 PATCH 0,3
5.5 mm	5.5 mm
Cu litz wire	Cu litz wire
8	8
0.14 mm <sup>2</sup>	0.14 mm <sup>2</sup>
LSFROH	LSFROH
30 mm	30 mm
SF/UTP	S/FTP
≤ 0.003 Ω (IEC 60603-7)	≤ 0.003 Ω (IEC 60603-7)
-10 °C ... 60 °C	-10 °C ... 60 °C

Description	Length of cable
<b>Patch cable, CAT5, preassembled</b>	0.3 m
	0.5 m
	1 m
	1.5 m
	2 m
	3 m
	5 m
	7.5 m
	10 m
	<b>Patch cable, CAT6, preassembled</b>
0.5 m	
1 m	
1.5 m	
2 m	
3 m	
5 m	
7.5 m	
10 m	
12.5 m	
15 m	
20 m	

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL CAT5 PATCH 0,3	2832250	10
FL CAT5 PATCH 0,5	2832263	10
FL CAT5 PATCH 1,0	2832276	10
FL CAT5 PATCH 1,5	2832221	10
FL CAT5 PATCH 2,0	2832289	10
FL CAT5 PATCH 3,0	2832292	10
FL CAT5 PATCH 5,0	2832580	10
FL CAT5 PATCH 7,5	2832616	10
FL CAT5 PATCH 10,0	2832629	10
FL CAT6 PATCH 0,3	2891181	10
FL CAT6 PATCH 0,5	2891288	10
FL CAT6 PATCH 1,0	2891385	10
FL CAT6 PATCH 1,5	2891482	10
FL CAT6 PATCH 2,0	2891589	10
FL CAT6 PATCH 3,0	2891686	10
FL CAT6 PATCH 5,0	2891783	10
FL CAT6 PATCH 7,5	2891880	10
FL CAT6 PATCH 10	2891877	10
FL CAT6 PATCH 12,5	2891369	5
FL CAT6 PATCH 15,0	2891372	5
FL CAT6 PATCH 20,0	2891576	5







### Product overview

#### Mobile phone network

	SMS relay	Modem	Industrial mobile phone router	Industrial mobile phone router	MGUARD security router
System	 I/O	 GPRS RS-232	 GPRS/EDGE Ethernet	 UMTS/HSPA Ethernet	 UMTS/HSPA/CDMA Ethernet
Description	GSM/SMS relays, 6 analog/digital inputs, 4 digital outputs	Quadband modem, for GPRS and GSM	Industrial mobile phone router, for GPRS/EDGE	Industrial mobile phone router, for UMTS/HSPA with GPRS/EDGE fallback	MGUARD security router
Page	421	423	423	423	425




#### Public network

	DSL broadband router	DSL broadband router	Analog modem
System	 ADSL Annex A, B Ethernet	 ADSL Annex A, B Ethernet/RS-232	 V.34 (analog) Ethernet/RS-232 
Description	DSL broadband router/modem, with firewall	DSL broadband router/modem, with firewall, VPN, and serial device server	Analog modem, for dial-up line/permanent line operation
Page	427	427	428

#### Private network

	SHDSL
System	 Ethernet RS-232/RS-422/RS-485 
Description	Extender (SHDSL) for in-house cables
Page	431

#### Accessories

System	 PSI-GSM/UMTS-ANT-OMNI... PSI-GSM/UMTS-QB-ANT	 PSI-CAB-GSM/UMTS... CSMA-LAMBDA/4-2.0-BS-SET	 PSI-MPI/RS232-PC PSI-MODEM-MPI-SET1	 PSI-MODEM-SPLITTER PSI-CA-MODEM-SPLITTER	 DT-TELE-RJ45
Description	Multiband antennae for UMTS and quadband GSM	Antenna extension cables and surge protection for UMTS and quadband GSM	Programming adapter and programming set for remote maintenance	Interface converter RS-232 flat-ribbon connecting cable	SHDSL surge protection
Page	432	432	433	433	433

**Mobile phone network/  
SMS relay modules**

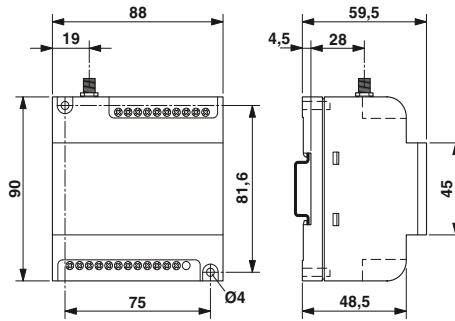
The PSI-MODEM-SMS-REL... is a compact remote control and signaling system. Six digital or configurable analog/digital inputs and four relay outputs with PDT contacts are monitored and controlled using SMS messages via any GSM mobile phone network.

**Product features:**

- Installation component device as per DIN 43880
- For worldwide use
- Message via SMS in case of status change at the input
- Alarming in case of voltage failure via SMS
- Switching on call
- SMS remote control of the outputs
- Switching of outputs for a predefined time
- SMS status query of all inputs and outputs
- Password protection
- Integrated phone book for up to 50 numbers
- Max. 5 recipients per SMS
- Configuration software and programming cable supplied as standard
- Easy configuration on the PC without programming knowledge

**Possible areas of application for the  
PSI-MODEM-SMS-REL... are:**

- Building and system monitoring
- Switching of pumps
- Monitoring of levels and temperatures
- Alarm and domestic engineering
- Climate and ventilation engineering



<b>Supply</b>	
Supply voltage	12 V DC ... 48 V DC
Nominal current consumption	15 mA
<b>Input data</b>	
Switching input	Digital: 6 x U <sub>N</sub> switching threshold 9.5 V DC Analog: 0 - 10 V
<b>Output data</b>	
Contact type	Single contact, 4x1 PDT contact
Max. switching voltage	250 V AC/DC
Min. switching voltage	12 V AC/DC
Limiting continuous current	10 A
<b>GSM</b>	
Frequencies	850 MHz (2 W (EGSM)) / 900 MHz (2 W (EGSM)) / 1800 MHz (1 W (EGSM)) / 1900 MHz (1 W (EGSM))
<b>SIM interface</b>	
Antenna connection	3 volt SIM card 50 Ω impedance SMA antenna socket
<b>General data</b>	
Ambient temperature (operation)	-25 °C ... 55 °C
Electromagnetic compatibility	Conformance with R&TTE directive 1999/5/EC
Dimensions	88 mm / 90 mm / 60 mm

Description	Voltage U <sub>N</sub>
SMS relay with six analog or digital configurable inputs and four relay outputs	12 V DC ... 48 V DC
SMS relay with six digital inputs and four relay outputs	110 V AC ... 240 V AC

<b>Multi-band antenna</b> for UMTS and quad band GSM, with omnidirectional characteristic, 2 m antenna cable with SMA round connector, degree of protection: IP65, dimensions: 76 x 20 mm
<b>Multiband antenna</b> for external panel and external mast mounting for UMTS and quad-band GSM, with omnidirectional characteristics, 5 m antenna cable with SMA round connector
<b>Antenna extension cable</b> for UMTS and quad-band GSM, 5 m long, antenna cable with SMA connector and SMA coupling
<b>Antenna extension cable</b> for UMTS and quad-band GSM, 10 m long, antenna cable with SMA connector and SMA coupling
<b>Surge protection</b> for UMTS and quad-band GSM antenna, with SMA connector and SMA coupling
<b>Connection cable</b> , D-9-SUB to USB, with adapter D-9-SUB to D-25-SUB



**SMS remote and signaling system  
with six inputs and four relay outputs**



Technical data	
12 V DC ... 48 V DC	110 V AC ... 240 V AC
15 mA	10 mA
Digital: 6 x U <sub>N</sub> switching threshold 9.5 V DC Analog: 0 - 10 V	Digital: 6 x U <sub>N</sub> switching threshold 85 V AC Analog: -
Single contact, 4x1 PDT contact	
250 V AC/DC	
12 V AC/DC	
10 A	
850 MHz (2 W (EGSM)) / 900 MHz (2 W (EGSM)) / 1800 MHz (1 W (EGSM)) / 1900 MHz (1 W (EGSM))	
3 volt SIM card	
50 Ω impedance SMA antenna socket	
-25 °C ... 55 °C	
Conformance with R&TTE directive 1999/5/EC	
88 mm / 90 mm / 60 mm	

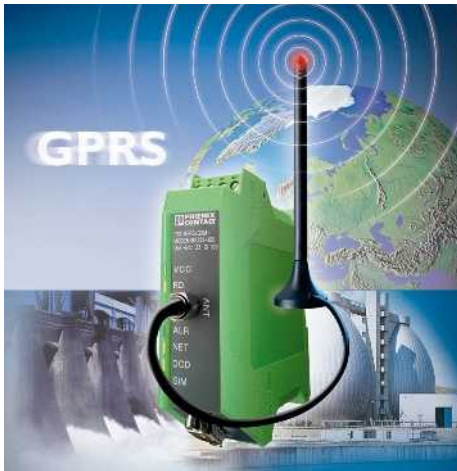
Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MODEM-SMS-REL/6ADI/4DO/DC	2313520	1
PSI-MODEM-SMS-REL/6 DI/4DO/AC	2313513	1

Accessories		
PSI-GSM/UMTS-QB-ANT	2313371	1
PSI-GSM/UMTS-ANT-OMNI-2-5	2900982	1
PSI-CAB-GSM/UMTS- 5M	2900980	1
PSI-CAB-GSM/UMTS-10M	2900981	1
CSMA-LAMBDA/4-2.0-BS-SET	2800491	1
CM-KBL-RS232/USB	2881078	1



## Remote communication

### Mobile phone network/ serial quad band modem for GPRS and GSM



Send V.24 (RS-232) data all around the world via mobile phone network

#### Mobile phone network:

- GSM mobile phone networks: 850, 900, 1800, and 1900 MHz
- For worldwide use

#### GPRS TCP/IP connection:

- Connection established via IP addresses
- Client/server functionality
- IPT compatible
- Integrated TCP/IP stack for TCP and UDP connections
- Data rates of up to 53.6 kbps
- Security:
  - Firewall

#### GSM dial-up connection:

- Connection established via data phone number (CSD)
- Security:
  - Connection established with password protection
  - Selective call acceptance
  - Callback function

#### V.24 (RS-232) interface:

- Freely parameterizable (baud rate, data bits, parity, stop bit, flow control)

#### Digital I/Os:

- Two digital switching inputs: sending of freely configurable text messages (SMS, FAX, e-mail)
- One switching output on the backplane

#### Additional features:

- Encryption of SIM card PINs
- Can be used regardless of controller manufacturer
- High electromagnetic compatibility
- Electrical isolation
- NEW: convenient configuration software
- Configuration via SMS

#### Notes:

1) EMC: Class A product, see page 553



### Quad-band modem for GPRS and GSM with RS-232 interface, integrated TCP/IP stack and 2 alarm inputs



#### Technical data

Supply	
Supply voltage	10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
Supply voltage	24 V DC $\pm$ 5% (as an alternative or redundant, via backplane bus contact and system current supply)
Nominal current consumption	< 350 mA (24 V DC)
Stand-by current consumption	< 80 mA
V.24 (RS-232) interface	
Connection method	D-SUB-9 plug
Data format/coding	Serial asynchronous UART/NRZ, 7/8 data, 1/2 stop, 1 parity, 10/11-bit character length
Data flow control/protocols	Software handshake, Xon/Xoff or hardware handshake RTS/CTS
Transmission speed	Automatic data rate detection (default) or fixed setting to 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps, can be set via software
Mobile phone network	
Frequencies	850 MHz (2 W (EGSM)) / 900 MHz (2 W (EGSM)) / 1800 MHz (1 W (EGSM)) / 1900 MHz (1 W (EGSM))
SIM interface	1.8 volt, 3 volt
GPRS compatibility	Class 10, Class B
Network function	4 time slots for receiving data, 2 time slots for transmitting data. The PIN is saved in the modem. After a voltage interruption, there is automatic redialing into the network Integrated TCP/IP stack, independent connection establishment.
Network check	LED to show data signal quality
Antenna connection	50 $\Omega$ impedance SMA antenna socket
Input/output	
Switching input	2 x U <sub>Nom</sub> 24 V DC / 5 mA, input range 9...60 V DC
Switching output	On the backplane (10 V DC ... 30 V DC / 80 mA at 24 V DC)
General data	
Ambient temperature (operation)	-25 °C ... 60 °C
Electrical isolation	(VCC // V.24 (RS-232) // GSM)
Test voltage	1.5 kV
Approvals for countries	EU, USA, Canada, other countries in preparation
Electromagnetic compatibility	Conformance with R&TTE directive 1999/5/EC
Dimensions	22.5 mm / 99 mm / 118.6 mm

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PSI-GPRS/GSM-MODEM/RS232-QB <sup>1)</sup>	2313106	1

#### Accessories

PSI-GSM/UMTS-QB-ANT	2313371	1
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
PSM-KA9SUB9/BB/2METER	2799474	1
PSM-KA9SUB9/BB/0,5METER	2708520	1

Description	W / H / D
Industrial GPRS/GSM modem with RS-232 interface, scope of supply: modem, CD with configuration software and user manual	
Multi-band antenna for UMTS and quad band GSM, with omnidirectional characteristic, 2 m antenna cable with SMA round connector, degree of protection: IP65, dimensions: 76 x 20 mm	
System power supply unit, primary-switched	
DIN rail connector	
RS-232-D-SUB cable, length: 2 m	
RS-232-D-SUB cable, length: 0.5 m	

**Mobile phone network/  
mobile phone routers  
with firewall and VPN**

Mobile phone routers support high-performance remote connections to remote Ethernet networks. These connections can be used to transmit sensitive data securely over mobile phone networks.

The integrated firewall and VPN (Virtual Private Network) support reliably protect the application against unauthorized access. The Ethernet connection can be used for system-wide communication between all connected components in the network, such as drives, controllers, control panels or visualization PCs.

**Mobile TCP/IP connection:**

- Connection established via IP addresses
- GPRS/EDGE data rates of up to 210 kbps
- UMTS/HSPA data rates of up to 7.2 Mbps
- Security:
  - Firewall
  - NAT table

**VPN (virtual private network):**

- IPsec and OpenVPN support
- Up to three VPN tunnels simultaneously
- Authentication with X.509 certificates and via pre-shared key (PSK)
- VPN remote start via call or SMS
- 1:1 NAT in the VPN

**Digital I/Os:**

- 6 digital switching inputs: Sending of freely configurable text messages (SMS, FAX, e-mail) and starting of user-defined functions
- Four switching outputs: can be activated via SMS and Ethernet and for GSM and connection diagnostics

**Additional features:**

- Configuration via web-based management
- Upload and download configuration
- Configurable daily restart
- Continuous connection monitoring
- High electromagnetic compatibility
- Electrical isolation

**Notes:**  
1) EMC: Class A product, see page 553

<b>Supply</b>	Supply voltage
	Nominal current consumption
	Stand-by current consumption
<b>Ethernet interface</b>	Connection method
	Transmission speed
	Transmission length
<b>Functions</b>	Management
	Mobile phone network
	Frequencies
<b>SIM interface</b>	GPRS compatibility
	Network check
	Antenna connection
<b>Input/output</b>	Switching input
	Switching output
<b>General data</b>	Ambient temperature (operation)
	Electrical isolation
	Test voltage
	Approvals for countries
<b>Electromagnetic compatibility</b>	
<b>Dimensions</b>	W / H / D

**Description**

**Industrial mobile phone router**, with integrated firewall and VPN, 6 digital inputs and 4 outputs, and continuous connection monitoring

- For UMTS/HSPA with GPRS/EDGE fallback and dual SIM for backup provider
- For GPRS/EDGE quad band, 35 mm housing width

- Multi-band antenna** for UMTS and quad band GSM, with omnidirectional characteristic, 2 m antenna cable with SMA round connector, degree of protection: IP65, dimensions: 76 x 20 mm
- Multiband antenna** for external panel and external mast mounting for UMTS and quad-band GSM, with omnidirectional characteristics, 5 m antenna cable with SMA round connector
- Antenna extension cable** for UMTS and quad-band GSM, 5 m long, antenna cable with SMA connector and SMA coupling
- Antenna extension cable** for UMTS and quad-band GSM, 10 m long, antenna cable with SMA connector and SMA coupling



**GPRS/EDGE and UMTS/HSPA mobile phone routers for worldwide network access**



Technical data	
<b>Supply</b>	10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
	< 200 mA (24 V DC)
	< 90 mA (stand by)
<b>Ethernet interface</b>	RJ45 socket, shielded
	10/100 Mbps, autonegotiation
	100 m (shielded twisted pair)
<b>Functions</b>	Web-based management, SNMP
<b>Frequencies</b>	850 MHz (2 W (EGSM)) / 900 MHz (2 W (EGSM)) / 1800 MHz (1 W (EGSM)) / 1900 MHz (1 W (EGSM)) / 850 MHz (0.25 W (UMTS)) / 1900 MHz (0.25 W (UMTS)) / 2100 MHz (0.25 W (UMTS))
	1.8 volt, 3 volt
	Class 12, Class B
	LED bar graph to display receive quality
	50 Ω impedance SMA antenna socket
<b>Input/output</b>	6 x U <sub>Nom</sub> , input range 10 V DC ... 30 V DC/5 mA
	4 x U <sub>Nom</sub> , input range 10 V DC ... 30 V DC/50 mA, short-circuit-proof
<b>General data</b>	-25 °C ... 65 °C (not aligned)
	(VCC // UMTS // Ethernet // PE)
	1 kV (50 Hz, 1 min.)
	EU, USA, Canada, other countries in preparation
<b>Electromagnetic compatibility</b>	Conformance with R&TTE directive 1999/5/EC
<b>Dimensions</b>	45 mm / 99 mm / 114.5 mm

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>PSI-MODEM-3G/ROUTER</b>	2314008	1
<b>PSI-MODEM-GSM/ETH<sup>1</sup></b>	2313355	1

Accessories		
Type	Order No.	Pcs. / Pkt.
<b>PSI-GSM/UMTS-QB-ANT</b>	2313371	1
<b>PSI-GSM/UMTS-ANT-OMNI-2-5</b>	2900982	1
<b>PSI-CAB-GSM/UMTS- 5M</b>	2900980	1
<b>PSI-CAB-GSM/UMTS-10M</b>	2900981	1

### Mobile phone network/ MGUARD security routers



Industrial mobile phone routers featuring mGuard technology for global communication via UMTS and CDMA networks.

Thanks to the integrated high-speed mobile phone interface and 4-port switch in compact metal housing, the new **TC MGUARD RS2/4000 VPN** security appliances create a system for global, secure industrial remote communication.

They have an SD card slot at the front for configuration memory. The SD cards can be used for starting up or replacing the devices quickly and easily. The devices feature an extended temperature range and have a buffered realtime clock and trusted platform module (TPM) for secure key generation and management. They support precise time synchronization and positioning, specifically for mobile applications, via GPS and GLONASS.

The **TC MGUARD RS4000 3G** devices provide high-availability high-end security for industry and a remote maintenance infrastructure for the secure connection of machines and systems. For maximum availability, an additional external network is supported redundantly alongside the internal network (LAN) and the external network (WAN) in the form of the mobile phone interface. The integrated 4-port switch offers management features and supports EtherNet/IP™.

The **TC MGUARD RS2000 3G** devices are designed for applications with fewer complex requirements and allow secure remote maintenance of machines and systems in the field via the Internet. In this context, they are used as industrial remote service routers with a simplified configuration. The integrated 4-port switch saves valuable space on the DIN rail.

Both versions have all the necessary standard functions for operating an Ethernet network that is both flexible and robust.

#### Features:

- Port mirroring
- Configuration can be stored externally
- Web-based management, SNMP
- Replaceable configuration memory
- Comprehensive connection options
- Flexible routing
- Intelligent stateful inspection firewall
- Secure remote services (VPN) according to IPsec standard

#### Serial device server included

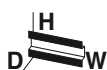
The integrated COMSERVER function is used to integrate serial RS-232 interfaces into Ethernet networks. This provides an easy way of implementing functions such as cable replacement or network integration.

- Cable replacement: two devices in combination tunnel serial connections via Ethernet
- Network integration: you can integrate automation devices such as controllers or frequency inverters into a network using corresponding programming and diagnostics software

#### Device Manager

The Device Manager simplifies the management of MGUARD security appliances. The tool features a template mechanism that enables the user to configure and manage all MGUARD devices centrally – from a few hundred devices to several thousand.

**Notes:**  
Central device management software, the Device Manager for FL MGUARD devices, can be found on page 45



**UMTS/HSPA mobile phone router with firewall and VPN, manageable 4-port switch, DMZ port and second WAN interface**



**UMTS/HSPA mobile phone router with firewall and VPN, integrated 4-port switch**

Technical data	
Supply	
Supply voltage	10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
Nominal current consumption	< 200 mA (24 V DC)
Ethernet interface	
Connection method	RJ45 socket, shielded
Transmission speed	10/100 Mbps, autonegotiation
Transmission length	100 m (shielded twisted pair)
Functions	
Management	Web-based management, SNMP
Basic functions	Router with intelligent firewall and VPN for 10 tunnels (up to 250 supported with optional additional license), CIFS Integrity Monitoring (as an option), metal housing, slot for SD memory card
Security functions	
Number of VPN tunnels	10 (as an option, up to 250, with additional license FL MGUARD LIC VPN-250/ Order No. 2700193 or 2700192)
Encryption methods	DES, 3DES, AES-128, -192, -256
Internet Protocol Security (IPsec) mode	ESP-Tunnel / ESP-Transport
Authentication	X.509v3 certificates with RSA or PSK
Firewall rules	Configurable stateful inspection firewall with full scope of functions
Routing	Standard routing, NAT, 1:1-NAT, port forwarding
Mobile phone network	
Frequencies	850 MHz (2 W (EGSM)) / 900 MHz (2 W (EGSM)) / 1800 MHz (1 W (EGSM)) / 1900 MHz (1 W (EGSM)) / 800 MHz (0.25 W (UMTS)) / 850 MHz (0.25 W (UMTS)) / 900 MHz (0.25 W (UMTS)) / 1900 MHz (0.25 W (UMTS)) / 2100 MHz (0.25 W (UMTS)) / 800 MHz (CDMA2000 EV-DO) / 1900 MHz (CDMA2000 EV-DO)
SIM interface	1.8 volt, 3 volt
GPRS compatibility	Class 12, Class B
Network check	LED bar graph to display receive quality
Antenna connection	50 Ω impedance SMA antenna socket
Input/output	
Switching input	3 x U <sub>Nom</sub> , input range: 10 V DC ... 30 V DC/5 mA
Switching output	3 x U <sub>Nom</sub> , input range: 10 V DC ... 30 V DC/250 mA, short-circuit-proof
General data	
Ambient temperature (operation)	-20 °C ... 60 °C
Electrical isolation	(VCC // PE)
Test voltage	1 kV (50 Hz, 1 min.)
Dimensions	45 mm / 130 mm / 114 mm

Technical data	
Supply	
Supply voltage	10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
Nominal current consumption	< 200 mA (24 V DC)
Ethernet interface	
Connection method	RJ45 socket, shielded
Transmission speed	10/100 Mbps, autonegotiation
Transmission length	100 m (shielded twisted pair)
Functions	
Management	Web-based management, SNMP
Basic functions	Router with simplified 2-click firewall and VPN for 2 tunnels (fixed), metal housing, slot for any SD memory card
Security functions	
Number of VPN tunnels	2 (fixed, Ipsec (IETF standard))
Encryption methods	DES, 3DES, AES-128, -192, -256
Internet Protocol Security (IPsec) mode	ESP-Tunnel / ESP-Transport
Authentication	X.509v3 certificates with RSA or PSK
Firewall rules	Simplified 2-click stateful inspection firewall
Routing	Standard routing, NAT, 1:1-NAT, port forwarding
Mobile phone network	
Frequencies	850 MHz (2 W (EGSM)) / 900 MHz (2 W (EGSM)) / 1800 MHz (1 W (EGSM)) / 1900 MHz (1 W (EGSM)) / 800 MHz (0.25 W (UMTS)) / 850 MHz (0.25 W (UMTS)) / 900 MHz (0.25 W (UMTS)) / 1900 MHz (0.25 W (UMTS)) / 2100 MHz (0.25 W (UMTS)) / 800 MHz (CDMA2000 EV-DO) / 1900 MHz (CDMA2000 EV-DO)
SIM interface	1.8 volt, 3 volt
GPRS compatibility	Class 12, Class B
Network check	LED bar graph to display receive quality
Antenna connection	50 Ω impedance SMA antenna socket
Input/output	
Switching input	3 x U <sub>Nom</sub> , input range: 10 V DC ... 30 V DC/5 mA
Switching output	3 x U <sub>Nom</sub> , input range: 10 V DC ... 30 V DC/250 mA, short-circuit-proof
General data	
Ambient temperature (operation)	-20 °C ... 60 °C
Electrical isolation	(VCC // PE)
Test voltage	1 kV (50 Hz, 1 min.)
Dimensions	45 mm / 130 mm / 114 mm

Ordering data			
Type	Order No.	Pcs. / Pkt.	
TC MGUARD RS4000 3G VPN	2903440	1	

Ordering data			
Type	Order No.	Pcs. / Pkt.	
TC MGUARD RS2000 3G VPN	2903441	1	

Accessories			
	Order No.	Pcs. / Pkt.	
SD FLASH 256MB	2988120	1	
FL MGUARD LIC VPN-250	2700193	1	
FL MGUARD LIC VPN-250 GROUP	2700192	1	

Accessories			
	Order No.	Pcs. / Pkt.	
SD FLASH 256MB	2988120	1	

**Parameterization memory**  
License to configure and operate **250 VPN tunnels** on FL MGUARD  
License to configure **any number of tunnels** and operate **250 VPN tunnels** on FL MGUARD





#### **Industrial ADSL broadband router - supports ADSL/ADSL2/ADSL2+ according to Annex A and B**

The **TC DSL ROUTER** range supports the high-speed connection of industrial Ethernet or RS-232 devices to the Internet using high-availability ADSL technology. Machines, systems or complete Ethernet networks can therefore be accessed from anywhere in the world at any time using a broadband Internet connection.

Developed specifically for use in industrial environments, the TC DSL ROUTERS are suitable both for short-term high-speed access in the case of servicing and for the permanent connection of remote stations to a central company network when used in combination with the integrated security functions.

#### **Remote maintenance (short-term high-speed access)**

- Quick and easy remote access to machines, systems or Ethernet networks

#### **Remote control (VPN tunnel)**

- Permanent connection of substations to the control room for cyclic data acquisition and monitoring
- Highly secure broadband alternative to analog permanent line applications

#### **Alarm generation and remote control**

- High-availability alarm generation via e-mail
- Individual configuration of switching outputs, such as worldwide remote control of switching outputs or indication of a DSL connection abort, etc.

#### **Features:**

The DSL broadband routers are designed for worldwide and flexible use, there is no need for the application/provider requirements to be clarified in advance. This enables individual and fast startup on site.

#### **One universal device type**

- All common ADSL standards are supported (ADSL/ADSL2/ADSL2+)
- Integrated Annex A/B switchover

Note: the specifications for the standard and frequency range used (Annex) depend on the provider and are included in the access data sent by the provider.

- Annex A: DSL operation parallel to analog telephony (in most of the world)
- Annex B: DSL operation parallel to ISDN (in Germany and neighboring countries)

#### **Individual function selection between modem or router function**

- DSL modem: converter from DSL to LAN - the router/firewall function is performed by a separate router, e.g., FL MGuard
- DSL router: DSL modem plus integrated router functions, e.g., firewall, VPN, NAT, etc.

All TC DSL routers offer increased resistance to typical industrial influences, such as temperature and EMI, and therefore increased fault tolerance and application availability.

#### **TC DSL ROUTER X400 A/B**

- Quick and easy startup
- Optimized to the key functions of an industrial DSL broadband router/modem
- Integrated firewall

#### **TC DSL ROUTER X500 A/B**

- Multifunctional for highly secure network access
- Suitable for special applications
- DSL broadband router/modem
- VPN tunneling:
  - IPsec (client and server)
  - Open VPN (client)
- NAT table
- Serial device server for 10/100Base-T(X) with RS-232
- Alarm inputs: send e-mails
- Switching outputs: set by WBM local/remote, VPN service, connection lost, DSL/Internet link



Ethernet



DSL router/modem with firewall



Ethernet



DSL router/modem with firewall, VPN, serial device server, inputs/outputs

	Technical data	Technical data
Supply		
Supply voltage	10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)	10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
Nominal current consumption	< 150 mA (24 V DC)	< 150 mA (24 V DC)
Stand-by current consumption	< 135 mA (stand by)	< 135 mA (stand by)
V.24 (RS-232) interface		
Connection method	-	D-SUB-9 plug
Transmission speed	-	0.3; 1.2; 2.4; 4.8; 9.6; 19.2; 38.4; 57.6; 115.2 kbps
Transmission length	-	15 m
Ethernet interface		
Connection method	8P8C RJ45 socket, shielded	8P8C RJ45 socket, shielded
Transmission speed	10/100 Mbps, autonegotiation	10/100 Mbps, autonegotiation
Transmission length	≤ 100 m (shielded twisted pair)	≤ 100 m (shielded twisted pair)
Supported protocols	TCP/IP, UDP/IP, FTP, HTTP	TCP/IP, UDP/IP, FTP, HTTP
Auxiliary protocols	ARP, DHCP, PING (ICMP), SNMP V1, SMTP	ARP, DHCP, PING (ICMP), SNMP V1, SMTP
DSL interface		
Connection method	6P2C RJ11 socket, shielded COMBICON plug-in screw terminal block	6P2C RJ11 socket, shielded COMBICON plug-in screw terminal block
Transmission speed	≤ 25 Mbps (downstream from Internet) ≤ 1 Mbps (upstream to Internet)	≤ 25 Mbps (downstream from Internet) ≤ 1 Mbps (upstream to Internet)
Transmission length	≤ 5 km	≤ 5 km
Functions		
Management	Web-based management	Web-based management
Security functions		
Number of VPN tunnels	-	3
Firewall rules	Stateful inspection firewall	Stateful inspection firewall
Input/output		
Switching input	-	6 x U <sub>Nom</sub> , input range 10 V DC ... 30 V DC/5 mA
Switching output	-	4 x U <sub>Nom</sub> , input range 10 V DC ... 30 V DC/50 mA, short-circuit-proof
General data		
Ambient temperature (operation)	-20 °C ... 60 °C	-20 °C ... 60 °C
Electrical isolation	(VCC//ADSL//Ethernet//FE)	(VCC + IO + RS-232//ADSL//Ethernet//FE)
Test voltage	1.5 kV <sub>rms</sub> (50 Hz, 1 min.)	1.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Approvals for countries	EU, other countries in preparation	EU, other countries in preparation
Electromagnetic compatibility	Conformance with R&TTE directive 1999/5/EC	Conformance with R&TTE directive 1999/5/EC
Dimensions	W / H / D 45 mm / 99 mm / 112 mm	45 mm / 99 mm / 112 mm
Degree of protection	IP20	IP20

	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Industrial ADSL broadband router, according to Annex A and B						
	TC DSL ROUTER X400 A/B	2902709	1	TC DSL ROUTER X500 A/B	2902710	1

	Accessories			Accessories		
System power supply unit, primary-switched	MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1	MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
DATATRAB, surge protection for two signal pairs of the analog and digital (DSL) telecommunication interface	DT-TELE-RJ45	2882925	1	DT-TELE-RJ45	2882925	1
DATATRAB adapter, protective adapters for inserting into the data line	DT-LAN-CAT.6+	2881007	1	DT-LAN-CAT.6+	2881007	1

## Remote communication

### Public network/ analog modems



These analog modems are specifically designed to meet industrial requirements for worldwide remote maintenance and alarm generation. Serial connections on the public, analog phone network with speeds of up to 33.6 kbps are supported, as is dial-up to the GSM mobile phone network.

### Remote maintenance via dial-up connection:

- Direct access to remotely located controllers for software updates and remote diagnostics

### Remote control via permanent line:

- Substations permanently connected to control room for the purpose of monitoring and controlling remote system components

### Automatic alarm messaging:

- Individual, configurable SMS and e-mail messaging functions for quick resolution of faults

### Features:

#### PSI-MODEM/ETH

- Dial-up line modem for accessing a remote Ethernet network
- Permanent 128-bit authentication
- CHAP protocol

#### PSI-DATA/FAX-MODEM/RS232

- Dial-up/permanent line modem with advanced alarm generation functions for remote control, remote maintenance, and alarm generation applications
- 1x switching input/output

#### PSI-DATA/BASIC-MODEM/RS232

- Dial-up line modem for remote maintenance of systems with a V.24 (RS-232) interface

#### PSI-MODEM-BASIC/USB

- Dial-up line modem for remote maintenance of systems with USB interface
- 5 V DC supply via USB interface

### All devices feature:

- For interference-proof operation, including under harsh EMI conditions:
  - High-quality electrical isolation
  - Integrated surge protection
- Comprehensive security functions that prevent unauthorized access by means of
  - Configurable, selective call acceptance
  - Connection establishment with password protection
  - Callback function

#### Notes:

- EMC: Class A product, see page 553



### Ethernet



Modem for dial-up operation with Ethernet connection (LAN)



### Technical data

Supply	
Supply voltage	10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
Supply voltage	-
Supply voltage	24 V DC ±5% (as an alternative or redundant, via backplane bus contact and system current supply)
Nominal current consumption	< 100 mA (24 V DC)
Stand-by current consumption	< 70 mA
Serial port	
Connection method	RJ45 socket, shielded
Data format/coding	-
Data flow control/protocols	TCP/IP, UDP, TFTP, HTTP, Modbus TCP, PPP, PROFINET, Ether-Net IP, CHAP
Transmission speed	10/100 Mbps, autonegotiation
PSTN port (a/b line)	
Connection method	RJ12, 6-pos.
Dialing procedure	Multiple frequency/pulse dialing, configuration via software
Input/output	
Switching input	-
Switching output	-
General data	
Ambient temperature (operation)	0 °C ... 55 °C
Electrical isolation	(VCC // PSTN // Ethernet)
Test voltage	1.5 kV
Approvals for countries	EU, USA, Canada, other countries in preparation
Electromagnetic compatibility	Conformance with EMC Directive 2004/108/EC
Dimensions	45 mm / 99 mm / 114.5 mm

### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Industrial, analog Ethernet modem</b> , Scope of supply: modem, RJ12/RJ12 cable, TAE adapter			
<b>Industrial analog modem</b> , scope of delivery: modem, CD with configuration software, manual and RJ12/RJ12 cable	PSI-MODEM/ETH <sup>1)</sup>	2313300	1
<b>Industrial analog modem with USB connection</b> , scope of supply: modem, driver CD with manual, USB cable and RJ12/RJ12 cable			

### Accessories

System power supply unit, primary-switched	MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
<b>DIN rail connector</b>	ME 22.5 TBUS 1.5/ 5-ST-3,81 GN	2707437	50
<b>MPI adapter</b> for coupling to the programming interface of a Siemens SIMATIC® S7-300/400 controller			
<b>Interface converter</b> for switching between two RS-232 interfaces			
<b>RS-232-D-SUB cable</b> , length: 2 m			
<b>RS-232-D-SUB cable</b> , length: 0.5 m			





RS-232



Modem for dial-up/permanent line operation  
With V.24 (RS-232) connection and 1 DI/DO



RS-232



Modem for dial-up operation  
with V.24 (RS-232) connection



Modem for dial-up operation  
with USB connection



Ex:



Ex:

Technical data
10 V DC ... 60 V DC (via plug-in COMBICON screw terminal block)
16 V AC ... 40 V AC (via plug-in COMBICON screw terminal block)
24 V DC $\pm 5\%$ (as an alternative or redundant, via backplane bus contact and system current supply)
< 100 mA (24 V DC) < 40 mA
D-SUB-9 plug Serial asynchronous UART/NRZ, 7/8 data, 1/2 stop, 1 parity, 10/11-bit character length Software handshake, Xon/Xoff, direct mode or hardware handshake RTS/CTS Automatic data rate detection (default) or fixed setting to 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps, can be set via software
RJ12, 6-pos., or plug-in COMBICON screw terminal block
Multiple frequency/pulse dialing, configuration via software
$U_{Nom}$ 24 V DC / 5 mA, input range 9...48 V DC, floating
Miniature switching relay 60 V DC / 1 A ; 42 V AC / 1 A, N/O contact
0 °C ... 55 °C (VCC // PSTN // V.24 (RS-232)) 1.5 kV EU, USA, Canada, Australia, other countries in preparation
Conformance with EMC Directive 2004/108/EC 35 mm / 99 mm / 114.5 mm

Technical data
10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
-
24 V DC $\pm 5\%$ (as an alternative or redundant, via backplane bus contact and system current supply)
< 100 mA (24 V DC) < 40 mA
D-SUB-9 plug Serial asynchronous UART/NRZ, 7/8 data, 1/2 stop, 1 parity, 10/11-bit character length Software handshake, Xon/Xoff or hardware handshake RTS/CTS Automatic data rate detection 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bits/s
RJ12, 6-pos.
Multiple frequency/pulse dialing, configuration via software
-
-
0 °C ... 55 °C (VCC // PSTN // V.24 (RS-232)) 1.5 kV EU, USA, Canada, other countries in preparation
Conformance with EMC Directive 2004/108/EC 22.5 mm / 99 mm / 114.5 mm

Technical data
-
-
5 V DC (via mini USB type B)
< 100 mA (for 5 V DC, nominal operation) < 40 mA (for 5 V DC, sleep mode)
Mini USB type B
-
-
-
RJ12, 6-pos.
Multiple frequency/pulse dialing, configuration via software
-
-
0 °C ... 55 °C (PSTN // USB) 1.5 kV EU, USA, Canada, other countries in preparation
Conformance with EMC Directive 2004/108/EC 22.5 mm / 99 mm / 114.5 mm

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-DATA/FAX-MODEM/RS232	2708203	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-DATA/BASIC-MODEM/RS232 <sup>1)</sup>	2313067	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MODEM-BASIC/USB <sup>1)</sup>	2313436	1

Accessories		
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
PSI-MPI/RS232-PC	2313148	1
PSI-MODEM-SPLITTER	2708766	1
PSM-KA9SUB9/BB/2METER	2799474	1
PSM-KA9SUB9/BB/0,5METER	2708520	1

Accessories		
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
PSI-MPI/RS232-PC	2313148	1
PSM-KA9SUB9/BB/2METER	2799474	1
PSM-KA9SUB9/BB/0,5METER	2708520	1

Accessories		

### Private network/ extender



Network devices that are up to 20 km away from each other via existing copper cables, e.g., using in-house telephone lines. Special Ethernet or fiberglass cables are not required.

#### Ethernet:

- Plug and play
  - Distances up to 20 km
  - Data rates of up to 30 Mbps (4-wire)
  - Data rates of up to 15.3 Mbps (2-wire)
  - Robust modulation method (SHDSL)
  - Via in-house cables, not via the public telephone network
- Ethernet interface:
- Plug and play
  - No IP configuration required
  - Protocol transparent (IPv4 and IPv6)
  - RSTP (Rapid Spanning Tree Protocol) support
  - PROFINET (strict priority)

#### Topologies:

- Point-to-point
- Line structure
- Ring structure
- Redundancy operation

#### Additional features:

- Two digital outputs for status transmission
- Configuration software for extended functionality
- Online diagnostics
- Logbook function
- Saving and printing of project and device configurations

#### PROFIBUS:

- Distances up to 20 km
  - Data rates of up to 1.5 Mbps (point-to-point)
  - Data rates of up to 500 kbps (line structure - up to 30 devices)
  - Via in-house cables, not via the public telephone network
  - Robust modulation method (SHDSL)
  - Redundancy operation supported
- Configuration software
- Easy, guided configuration
  - Calculation of the maximum PROFIBUS data rate
  - Calculation of the slot time
  - Online diagnostics
  - Mixed operation of copper cables and fiber optics

#### RS-232/RS-422/RS-485:

- RS-232 interface (9-pos. D-SUB):
  - Data rates of up to 230.4 kbps
  - Automatic DCE/DTE switchover
- RS-422/RS-485 W2 interface (COMBI-CON plug):
  - Data rates of up to 2000 kbps
  - Termination resistor, can be enabled/disabled (RS-485 W2)

Additional information can be found in the relevant data sheets/user manuals.

#### Notes:

1) EMC: Class A product, see page 553

Supply	
Supply voltage	
Supply voltage	
Nominal current consumption	
V.24 (RS-232) interface	
Connection method	
Transmission speed	
RS-422 interface	
Connection method	
Transmission speed	
RS-485 interface	
Connection method	
Transmission speed	
Ethernet interface	
Connection method	
Transmission speed	
SHDSL interface	
Connection method	
Transmission speed	
USB interface	
Connection method	
Transmission length	
Functions	
Management	
Input/output	
Switching output	
General data	
Ambient temperature (operation)	
Electrical isolation	
Test voltage	
Electromagnetic compatibility	
Dimensions	W / H / D

#### Description

**SHDSL permanent line modem**, for point-to-point, linear, and star structures on in-house 2- and 4-wire cables

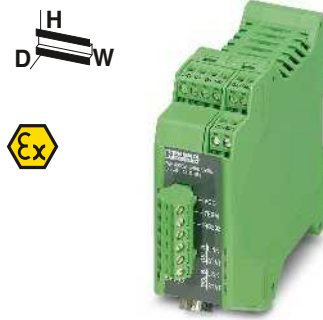
#### System power supply unit, primary-switched

**DIN rail connector** (optional), for routing through the supply voltage and data signal, two pieces are required per device

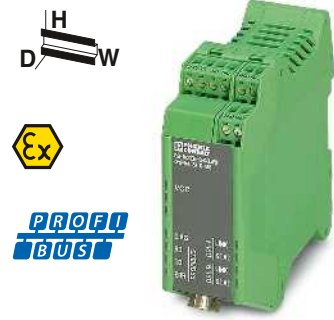
**DATATRAB**, surge protection for two signal pairs of the analog and digital (DSL) telecommunication interface



Ethernet extender



Serial extender



PROFIBUS extender

UL15  
Ex: Ex

UL15  
Ex: Ex

UL15  
Ex: Ex

Technical data
18 V DC ... 30 V DC 24 V DC $\pm 5\%$ (as an alternative or redundant, via backplane bus contact and system current supply)
< 180 mA (24 V DC)
-
-
RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1
Plug-in/screw connection via COMBICON 1.2/2.4/4.8/7.0/9.6/19.2/38.4/57.6/75/93.75/115.2/136/187.5/375/500/1500/2000 kbps, NRZ
RS-485 interface, in acc. with EIA/TIA-485, DIN 66259-4/RS-485 2-wire
Plug-in/screw connection via COMBICON 1.2/2.4/4.8/7.0/9.6/19.2/38.4/57.6/75/93.75/115.2/136/187.5/375/500/1500/2000 kbps, NRZ
RJ45 socket, shielded 10/100 Mbps, autonegotiation SHDSL interface according to ITU-T G.991.2.bis 2 x 2-pos. COMBICON plug-in screw terminal blocks 4-wire operation: 64 kbps ... 30 Mbps 2-wire operation: 32 kbps ... 15.3 Mbps USB 2.0 Mini-USB type B, 5-pos. max. 5 m (only for configuration and diagnostics)
Plug and play, user-friendly software: diagnostic functions, log book, individual configuration
2 x $U_{Nom}/150$ mA (the digital outputs cannot be used for power supply via the TBUS), short-circuit-proof
-20 °C ... 60 °C (freestanding (40 mm spacing to the right and left), no supply of other modules via the device)
DIN EN 50178 (VCC // Ethernet // DSL (A) // DSL (B))
1.5 kV <sub>me</sub> (50 Hz, 1 min.) Conformance with EMC Directive 2004/108/EC 35 mm / 99 mm / 114.5 mm

Technical data
18 V DC ... 30 V DC 24 V DC $\pm 5\%$ (as an alternative or redundant, via backplane bus contact and system current supply)
< 180 mA (24 V DC)
-
D-SUB-9 plug 0.11/0.3/1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2/230.4 kbps, NRZ
RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1
Plug-in/screw connection via COMBICON 1.2/2.4/4.8/7.0/9.6/19.2/38.4/57.6/75/93.75/115.2/136/187.5/375/500/1500/2000 kbps, NRZ
RS-485 interface, in acc. with EIA/TIA-485, DIN 66259-4/RS-485 2-wire
Plug-in/screw connection via COMBICON 1.2/2.4/4.8/7.0/9.6/19.2/38.4/57.6/75/93.75/115.2/136/187.5/375/500/1500/2000 kbps, NRZ
SHDSL interface according to ITU-T G.991.2.bis 2 x 2-pos. COMBICON plug-in screw terminal blocks 4-wire operation: 64 kbps ... 30 Mbps 2-wire operation: 32 kbps ... 15.3 Mbps USB 2.0 Mini-USB type B, 5-pos. max. 5 m (only for configuration and diagnostics)
User-friendly software: guided configuration, plausibility checks, diagnostic functions, log book
2 x $U_{Nom}/150$ mA (the digital outputs cannot be used for power supply via the TBUS), short-circuit-proof
-20 °C ... 60 °C (for derating, see technical documentation)
DIN EN 50178 (VCC // RS-422, RS-485 // DSL Port A // DSL Port B // FE)
1.5 kV <sub>me</sub> (50 Hz, 1 min.) Conformance with EMC Directive 2004/108/EC 35 mm / 99 mm / 114.5 mm

Technical data
18 V DC ... 30 V DC 24 V DC $\pm 5\%$ (as an alternative or redundant, via backplane bus contact and system current supply)
< 180 mA (24 V DC)
-
-
PROFIBUS acc. to IEC 61158, RS-485 2-wire, half duplex, automatic control D-SUB-9 socket 9.6/19.2/45.45/93.75/187.5/500/1500 kbps, set via configuration software
PROFIBUS acc. to IEC 61158, RS-485 2-wire, half duplex, automatic control D-SUB-9 socket 9.6/19.2/45.45/93.75/187.5/500/1500 kbps, set via configuration software
SHDSL interface according to ITU-T G.991.2.bis 2 x 2-pos. COMBICON plug-in screw terminal blocks 4-wire operation: 64 kbps ... 30 Mbps 2-wire operation: 32 kbps ... 15.3 Mbps USB 2.0 Mini-USB type B, 5-pos. max. 5 m (Only for configuration and diagnostics)
User-friendly software: guided configuration, plausibility checks, diagnostic functions, log book
2 x $U_{Nom}/150$ mA (the digital outputs cannot be used for power supply via the TBUS), short-circuit-proof
-20 °C ... 60 °C (for derating, see technical documentation)
DIN EN 50178 (VCC // PROFIBUS // DSL (A) // DSL (B))
1.5 kV <sub>me</sub> (50 Hz, 1 min.) Conformance with EMC Directive 2004/108/EC 35 mm / 99 mm / 114.5 mm

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MODEM-SHDSL/ETH <sup>1)</sup>	2313643	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MODEM-SHDSL/SERIAL <sup>1)</sup>	2313669	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MODEM-SHDSL/PB <sup>1)</sup>	2313656	1

Accessories		
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
DT-TELE-RJ45	2882925	1

Accessories		
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
DT-TELE-RJ45	2882925	1

Accessories		
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
DT-TELE-RJ45	2882925	1

## Remote communication

### Antennas

The PSI-GSM/UMTS-ANT-OMNI-2-5 and PSI-GSM/UMTS-QB-ANT multiband antenna are suitable for GSM networks operating at 850 MHz, 900 MHz, 1800 MHz, and 1900 MHz, as well as for UMTS networks.

The PSI-GSM/UMTS-ANT-OMNI-2-5 antenna is suitable for external panel and external mast mounting. The PSI-GSM/UMTS-QB-ANT antenna is ideal for mounting on a control cabinet or control box.



External antenna



Control cabinet antenna

Description	Ordering data			Ordering data		
	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Multiband antenna</b> for external panel and external mast mounting for UMTS and quad-band GSM, with omnidirectional characteristics, 5 m antenna cable with SMA round connector	PSI-GSM/UMTS-ANT-OMNI-2-5	2900982	1			
<b>Multi-band antenna</b> for UMTS and quad band GSM, with omnidirectional characteristic, 2 m antenna cable with SMA round connector, degree of protection: IP65, dimensions: 76 x 20 mm				PSI-GSM/UMTS-QB-ANT	2313371	1

### Antenna extension cables and surge protection

The 5 m and 10 m long antenna extension cables allow greater flexibility when installing antennas. The surge protection is suitable for GSM networks operating at 850 MHz, 900 MHz, 1800 MHz, and 1900 MHz, as well as for UMTS networks.



Antenna extension cable



Protective adapter set with SMA connection, grounded shield

Description	Ordering data			Ordering data		
	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Antenna extension cable</b> for UMTS and quad-band GSM, 5 m long, antenna cable with SMA connector and SMA coupling	PSI-CAB-GSM/UMTS- 5M	2900980	1			
<b>Antenna extension cable</b> for UMTS and quad-band GSM, 10 m long, antenna cable with SMA connector and SMA coupling	PSI-CAB-GSM/UMTS-10M	2900981	1			
<b>Surge protection</b> for UMTS and quad-band GSM antenna, with SMA connector and SMA coupling				CSMA-LAMBDA/4-2.0-BS-SET	2800491	1

**Programming adapter**

The MPI adapter makes it possible to convert a V.24 (RS-232) interface to the MPI bus (19.2 or 187.5 kbps). It is used to couple modems, Bluetooth converters, and FL COM servers to the programming interface of a Siemens SIMATIC®S7 300/400 controller.



Programming adapter



Programming set

Description
<b>MPI adapter</b> for coupling to the programming interface of a Siemens SIMATIC® S7-300/400 controller
<b>Programming set</b> , for remote monitoring of Siemens-SIMATIC® S7-300/400 controllers, consisting of pre-configured analog modem, RS-232 cable, and MPI adapter

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MPI/RS232-PC	2313148	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MODEM-MPI-SET1	2313261	1

**Interface converter and SHDSL surge protection**

**Interface converter**

Makes it possible to switch over to a second terminal device with a V.24 (RS-232) interface.

**SHDSL surge protection**

Surge protection for broadband communication devices.



Interface converter



SHDSL surge protection

Description
<b>Interface converter</b> for switching between two RS-232 interfaces
<b>RS-232 flat-ribbon connecting cable</b> between the modem and the PSI-MODEM-SPLITTER
<b>DATATRAB</b> , surge protection for two signal pairs of the analog and digital (DSL) telecommunication interface

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-MODEM-SPLITTER	2708766	1
PSI-CA-MODEM-SPLITTER	2311425	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
DT-TELE-RJ45	2882925	1

### INTERBUS PC master/slave controller boards

Generation 4 master controller boards from Phoenix Contact are intelligent solutions for connecting INTERBUS systems. They feature a compatible structure:

- Compatible driver
- Parameterization and diagnostics with Diag+
- Access to high-level language applications via HFI
- Direct integration in OPC-based visualization systems via OPC server

The slave controller boards are plug-in boards which integrate a PC in an INTERBUS system as a remote bus device.

#### Features:

- Access to INTERBUS system data and controller data via visualization stations
- Installation of several boards in a PC with monitoring of multiple INTERBUS lines
- Number of data words can range from 1 to 24
- INTERBUS parameter channel (PCP) supported
- External 24 V DC power supply

<b>Notes:</b>
1) EMC: Class A product, see page 553



PCI master



<b>Interfaces</b>	
Host system	INTERBUS remote bus
INTERBUS remote bus, incoming	Parameterization/operation/diagnostics
Direct I/Os	INTERBUS master
Number of devices with parameter channel (PCP)	Number of I/O nodes
Number of supported devices	Number of process data
Supported transmission speed	Supported transmission speed
Direct I/Os	Number of inputs
Number of outputs	Number of outputs
Software interfaces	Software driver
Application interface	
Power supply	
Power supply connection	Supply voltage
Supply voltage range	Typical current consumption
General data	
Weight	Format
Ambient temperature (operation)	Ambient temperature (storage/transport)

#### Technical data

PCI bus, 32 bit, 33 MHz, 5 V
9-pos. D-SUB socket strip, with electrical isolation
-
RS-232-C, Mini-DIN socket
14-pos. FLK pin strip
max. 126 (512 words)
max. 8192
max. 512 (of which 254 are remote bus devices/bus segments)
-
-
6
2
Windows NT / Windows 2000 / Windows XP / Windows 7 / Venturcom RTX 5.x / further types on request
HFI
OPC
DDI
Via PCI bus
5 V DC
± 5% (including ripple)
0.7 A
150 g
Short plug-in card, 1-slot
0 °C ... 55 °C (in acc. with EN 60204-1)
-25 °C ... 75 °C (in acc. with EN 60204-1)

<b>Description</b>
<b>PC controller board</b>
<b>Slave controller board</b> , with external voltage supply
- Copper connection
- Fiber optics connection
<b>Diag+ full version</b> , for INTERBUS diagnostics (ActiveX Control with programming interface)
<b>INTERBUS OPC server</b> , data interface between distributed INTERBUS and Ethernet networks and visualization systems

#### Ordering data

Type	Order No.	Pcs. / Pkt.
IBS PCI SC/I-T <sup>1</sup> )	2725260	1

#### Accessories

DIAG+	2730307	1
IBS OPC SERVER	2729127	1





PCI slave



PCI/104 master



PC/104 master



Technical data	
IBS PCI RI/I-T <sup>1)</sup>	IBS PCI RI-LK <sup>1)</sup>
PCI slot in acc. with PCI specification 2.1 or higher, PCI bus, 32 bits, 33 MHz, 3.3/5 V	
9-pos. D-SUB socket strip	FSMA plugs
9-pos. D-SUB pin strip	FSMA plugs
-	-
-	-
-	-
Max. 24 data words	
500 kbps / 2Mbps (can be switched)	
-	-
Windows NT / Windows 2000 / Windows XP	
DDI OPC-DA server	
Via PCI bus or 2-pos. MINI-COMBICON	
3.3 V DC (internal)	
5 V DC (internal)	
24 V DC (external)	
18 V DC ... 30 V DC	
1 A	
130 g	
Short plug-in card, 1-slot	
0 °C ... 55 °C	
-20 °C ... 70 °C	

Technical data	
PCI-104 bus, 32 bits, 33 MHz, 5 V	
10-pos. DIL pin strip	
-	
RS-232-C, 10-pos. DIL pin strip	
-	
max. 126 (512 words)	
max. 8192	
max. 512 (of which 254 are remote bus devices/bus segments)	
-	
-	
-	
Windows NT / Windows 2000 / Windows XP / Venturcom RTX 5.x / further types on request	
HFI OPC DDI	
Via PCI-104 bus	
5 V DC	
± 5% (including ripple)	
0.7 A	
80 g	
PCI-104	
0 °C ... 55 °C (in acc. with EN 60204-1)	
-25 °C ... 75 °C (in acc. with EN 60204-1)	

Technical data	
PC-104 bus	
10-pos. DIL pin strip	
-	
RS-232-C, 10-pos. DIL pin strip	
-	
max. 62 (512 words)	
max. 8192	
max. 512 (of which 254 are remote bus devices/bus segments)	
-	
-	
-	
Windows NT / Windows 2000 / Windows 95/98 / DOS / further types on request	
OPC DDI	
Via PC/104 bus	
5 V DC	
± 5% (including ripple)	
0.4 A	
80 g	
PC/104	
0 °C ... 55 °C (in acc. with EN 60204-1)	
-25 °C ... 75 °C (in acc. with EN 60204-1)	

Ordering data		
Type	Order No.	Pcs. / Pkt.
IBS PCI RI/I-T <sup>1)</sup>	2730129	1
IBS PCI RI-LK <sup>1)</sup>	2704045	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IBS PCI 104 SC-T <sup>1)</sup>	2737494	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
IBS PC 104 SC-T <sup>1)</sup>	2721701	1

Accessories		
Type	Order No.	Pcs. / Pkt.
DIAG+	2730307	1
IBS OPC SERVER	2729127	1

Accessories		
Type	Order No.	Pcs. / Pkt.
DIAG+	2730307	1
IBS OPC SERVER	2729127	1

Accessories		
Type	Order No.	Pcs. / Pkt.
DIAG+	2730307	1
IBS OPC SERVER	2729127	1



## Fieldbus components and systems

### INTERBUS master controller boards for Simatic S7-300/400

INTERBUS master controller boards enable INTERBUS to be used as the fieldbus directly at the SIMATIC S7-300/400 controller.

The boards can easily read in INTERBUS and start it directly or parameterize it with the Config+ software.

The IBS S7 400 ETH DSC/I-T board enables direct access to INTERBUS from an Ethernet network, without having to route the information through the control program.

A STEP 7 block library is available for positioning tasks, drives, and other tasks.

#### Features:

- INTERBUS with up to 8192 I/O points per controller board
- Maximum INTERBUS transmission speed of 2 Mbaud
- Blocks for STEP 7 simplify integration

<b>Notes:</b>
1) EMC: Class A product, see page 553



INTERBUS master for S7-300 systems



<b>Interfaces</b>
Control system
INTERBUS remote bus
Ethernet
Parameterization/operation/diagnostics
<b>INTERBUS master</b>
Number of possible parameter channels
Number of I/O nodes
Number of supported devices
Supported transmission speed
<b>Software interfaces</b>
Application interface
Programming tool
<b>Power supply</b>
Power supply connection
Supply voltage
Typical current consumption
<b>General data</b>
Weight
Format
Width
Height
Depth
Ambient temperature (operation)
Ambient temperature (storage/transport)

Technical data	
SIMATIC® S7-300 I/O bus	
9-pos. D-SUB socket strip	
-	
RS-232-C, D-SUB plug	
-	
max. 8192	
max. 512 (of which 254 are remote bus devices/bus segments)	
500 kbps / 2 Mbps	
S7 I/O driver	
S7 function blocks	
STEP 7 from version 5.x	
External power supply	
24 V DC	
-	
500 g	
1 slot	
80 mm	
125 mm	
110 mm	
0 °C ... 60 °C (0°C to 40°C (vertical installation))	
-25 °C ... 65 °C	

<b>Description</b>
<b>Controller board</b> for Siemens SIMATIC® controllers
- S7-300
- S7-400

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>IBS S7 300 DSC-T1)</b>	<b>2719975</b>	<b>1</b>

<b>Config + full version</b> for configuration and diagnosis of networks
<b>Diag+ full version</b> , for INTERBUS diagnostics (ActiveX Control with programming interface)
<b>Programming cable</b> , to connect the controller boards to the PC (V.24 (RS-232-C)), length 3 m
<b>Program and configuration memory</b>
- 2 MB

Accessories		
Type	Order No.	Pcs. / Pkt.
<b>CONFIG+</b>	<b>2868059</b>	<b>1</b>
<b>DIAG+</b>	<b>2730307</b>	<b>1</b>
<b>IBS PRG CAB</b>	<b>2806862</b>	<b>1</b>
<b>IBS MC FLASH 2MB</b>	<b>2729389</b>	<b>1</b>



INTERBUS master for S7-400 systems



INTERBUS master for S7-400 systems with Ethernet interface



**Technical data**

SIMATIC® S7-400 P bus  
 9-pos. D-SUB socket strip  
 -  
 RS-232-C, D-SUB plug  
 -  
 max. 8192  
 max. 512 (of which 254 are remote bus devices/bus segments)  
 500 kbps / 2 Mbps  
 S7 I/O driver  
 S7 function blocks  
 STEP 7 from version 5.x  
 Via SIMATIC I/O bus  
 5 V DC  
 0.9 A  
 800 g  
 2 slots  
 50 mm  
 290 mm  
 210 mm  
 0 °C ... 60 °C  
 -25 °C ... 65 °C

**Technical data**

SIMATIC® S7-400 P bus  
 9-pos. D-SUB socket strip  
 10/100Base-T via RJ45  
 RS-232-C, D-SUB plug  
 -  
 max. 8192  
 max. 512 (of which 254 are remote bus devices/bus segments)  
 500 kbps / 2 Mbps  
 S7 I/O driver  
 S7 function blocks  
 STEP 7 from version 5.x  
 Via SIMATIC I/O bus  
 5 V DC  
 2.5 A  
 1200 g  
 2 slots  
 50 mm  
 290 mm  
 210 mm  
 0 °C ... 60 °C  
 -25 °C ... 65 °C

**Ordering data**

Type	Order No.	Pcs. / Pkt.
IBS S7 400 DSC/I-T <sup>1)</sup>	2719962	1

**Ordering data**

Type	Order No.	Pcs. / Pkt.
IBS S7 400 ETH DSC/I-T <sup>1)</sup>	2731102	1

**Accessories**

CONFIG+	2868059	1
DIAG+	2730307	1
IBS PRG CAB	2806862	1
IBS MC FLASH 2MB	2729389	1

**Accessories**

CONFIG+	2868059	1
DIAG+	2730307	1
IBS PRG CAB	2806862	1
IBS MC FLASH 2MB	2729389	1

### SUBCON.../SUBCON-PLUS... D-SUB fast connection connector



#### Convenient connection technology

An idea has taken hold - absolutely no soldering or crimping tools: the SUBCON... D-SUB connectors can be connected quickly and conveniently in field conditions. The connector contacts are clearly routed onto consecutively numbered screw terminal blocks. This means clarity during wiring and it simplifies every startup.

#### High EMI shielding effect

The SUBCON... connector range, trimmed to the smallest dimensions, provides a high level of shielding against EMI influences in industrial environments by virtue of its metallic housing.

#### Optional cable infeed

The connection block can be inserted in either the upper or lower shell. This allows the cable to be fed in at 0° to 90° from right or left.

This allows on-site configuration of the cable infeed and requires only an order number with the order.

#### A wide product range

Irrespective of whether the application requires 9, 15 or 25-pos. connectors with one or two cable entries for point-to-point or RS-485 bus connections, a suitable version is available for each and every application. Optimized designs for PROFIBUS, CANopen® and SafetyBUSp with the right cables and tools complete the comprehensive range.

#### Customer-specific solutions

Does your application need an exclusive solution? We would be pleased to provide you with an offer using our know-how. Of course, space can be made for your own company logo in the plastic parts.

**PROFIBUS cables and fast connection tools for SUBCON-PLUS-PROFIBUS**

If the Fast Connect PSM-CABLE-PROFIB/FC cable is used, work is reduced to a minimum by using the quick stripping tool, **PSM-STRIP-FC/PROFIB**:

- Strip cables and single wires
- Insert them into the connector, and
- Close the housing cover.



PROFIBUS cable, type Fast Connect



Quick stripping tool for SUBCON-PLUS-PROFIBUS connectors

Cable cross section (max./min.)  
 Ambient temperature (operation)  
 Loop resistance  
 Working capacitance  
 Wave impedance  
 Conductor  
 Cross section  
 Outer sheath, material  
 External sheath, color  
 Behavior in fire  
 Resistance to oil  
 Cable type  
 Operations per knife block

Technical data	
Cable cross section (max./min.)	8.4 mm / 7.6 mm
Ambient temperature (operation)	-40 °C ... 60 °C
Loop resistance	≤ 110 Ω (per kilometer)
Working capacitance	28.5 nF (per kilometer)
Wave impedance	150 Ω ±15%
Conductor	Solid copper wire, bare
Cross section	0.34 mm <sup>2</sup> / AWG 22
Outer sheath, material	PVC FR VI
External sheath, color	Violet
Behavior in fire	Flame-resistant as per IEEE and IEC 60 332-3 test type C
Resistance to oil	Limited resistance to mineral oils and greases
Cable type	PROFIBUS in acc. with IEC 61158, Type A
Operations per knife block	-

Technical data	
Cable cross section (max./min.)	-
Ambient temperature (operation)	-
Loop resistance	-
Working capacitance	-
Wave impedance	-
Conductor	-
Cross section	-
Outer sheath, material	-
External sheath, color	-
Behavior in fire	-
Resistance to oil	-
Cable type	-
Operations per knife block	-
	PUR cable: max. 300 per knife block
	PVC cable: max. 3000 per knife block

Description	
<b>PROFIBUS cable, Fast Connect type</b> , up to 12 Mbps, for permanent connection (02YSY (ST)CY 1X2X22 AWG) (Length in meters as per customer specifications)	
<b>Quick stripping tool</b> for PROFIBUS cable, Fast Connect type	

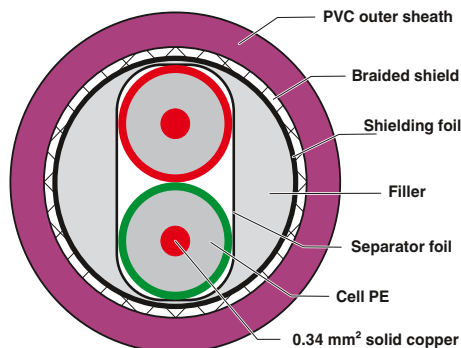
Ordering data		
Type	Order No.	Pcs. / Pkt.
PSM-CABLE-PROFIB/FC	2744652	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSM-STRIP-FC/PROFIB	2744623	1

<b>Spare knife block</b> for quick stripping tool	blue
<b>Stripping tool</b> , for conductors and cables	black

Accessories		
Type	Order No.	Pcs. / Pkt.
QUICK WIREFOX 6	1204384	1

Accessories		
Type	Order No.	Pcs. / Pkt.
PSM-STRIP-KNIFEBLOCK	2744636	1
QUICK WIREFOX 6	1204384	1



## Fast connection technology

### SUBCON-PLUS-PROFIBUS D-SUB fast connection

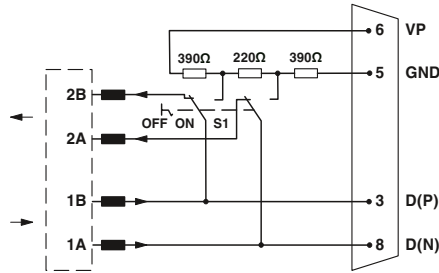
#### PROFIBUS connectors with fast connection

The SUBCON-PLUS-PROFIBUS/... and D-UFB-PB D-SUB series have been specially designed for use in PROFIBUS systems up to 12 Mbps. Under field conditions, they allow convenient and fast connection of the incoming and outgoing bus cable. The series includes six fast connection connectors - the perfect solution for every PROFIBUS application:

- 35° and 90° angled cable entry
- Axial cable entry
- With an additional programming interface
- Integrated surge protection

The connectors can be used for PROFIBUS cables with solid as well as with stranded copper wires (...FC 90 only for solid conductors. For permissible cable types, see the data sheet). The terminating resistor is already integrated in all versions. It can be connected externally by means of a slide switch. At the same time, the outgoing bus segment is switched off. This makes it easy to start up segment by segment while incorrect terminations are avoided. In addition, the connector housing with high-quality shielding guarantees high immunity to interference even at maximum transmission speeds. A special feature of the 35° angled connector is that the internal connection unit can be turned round. Whether the cable is to be inserted from the right or left can therefore be decided on-site. If it is not possible to use the angled version, the SUBCON-PLUS.../AX compact connector with axial cable entry can be used instead. The connectors have been designed for all standard PROFIBUS cables with an outside diameter of 8 mm (type A and B).

**Notes:**  
A 35° plug with built-in surge protection can be found under designation D-UFB-PB in Catalog 6 or at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products).



Functional diagram of the connector range SUBCON-PLUS-PROFIBUS/...

- Cable entry
- Pin assignment
- Connection cross section (solid/stranded/AWG)
- Insertion/withdrawal cycles
- Cable cross section (max./min.)
- Ambient temperature (operation)
- Degree of protection
- Housing material
- Termination resistor
- SUBCON fixing

Description
<b>PROFIBUS connector</b> , up to 12 Mbps, integrated termination resistor which can be activated externally, 9-pos. pin, pin assignment 3, 5, 6, 8
- Angled 35°, screw connection
- Angled 35°, screw connection with second D-SUB socket
- Angled 90°, screw connection
- Angled 90°, screw connection with second 9-pos. D-SUB socket
- Angled 90°, IDC connection
- Angled 90°, IDC connection with second 9-pos. D-SUB socket
- Axial cable entry, screw connection

**PROFIBUS cable, Fast Connect type**, up to 12 Mbps, for permanent connection (02YSY (ST)CY 1X2X22 AWG) (Length in meters as per customer specifications)  
**Quick stripping tool** for PROFIBUS cable, Fast Connect type

- Stripping tool**, for conductors and cables
- Screwdriver**
- Screwdriver**



35° PROFIBUS connector, screw connection, reversible cable entry



#### Technical data

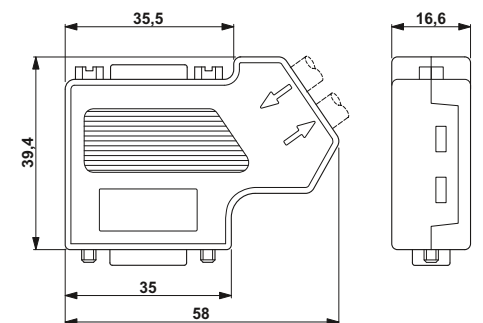
- 35° (right or left)
- 3, 5, 6, 8
- 0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1 mm<sup>2</sup> / 26 - 16
- > 200
- 8.4 mm / 7.6 mm
- 20 °C ... 75 °C
- IP40
- ABS, metal-plated
- 390 Ω - 220 Ω - 390 Ω (switchable)
- 4-40 UNC 0.4 Nm

#### Ordering data

Type	Order No.	Pcs. / Pkt.
SUBCON-PLUS-PROFIB/SC2	2708232	1
SUBCON-PLUS-PROFIB/PG/SC2	2708245	1

#### Accessories

PSM-CABLE-PROFIB/FC	2744652	1
PSM-STRIP-FC/PROFIB	2744623	1
QUICK WIREFOX 6	1204384	1
SZK PH1 VDE	1205150	10
SZF 0-0,4X2,5	1204504	10







90° PROFIBUS connector,  
screw connection



90° PROFIBUS connector,  
IDC insulation displacement connection method



Axial PROFIBUS connector,  
screw connection



Technical data	
90° (left)	
3, 5, 6, 8	
0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1 mm <sup>2</sup> / 26 - 16	
> 200	
8.4 mm / 7.6 mm	
-20 °C ... 75 °C	
IP40	
ABS, metal-plated	
390 Ω - 220 Ω - 390 Ω (switchable)	
4-40 UNC 0.4 Nm	

Technical data	
90° (left)	
3, 5, 6, 8	
0.32 - 1 mm <sup>2</sup> / 0.32 - 1 mm <sup>2</sup> / 22 - 18	
> 200	
8.4 mm / 7.6 mm	
-20 °C ... 75 °C	
IP40	
ABS, metal-plated	
390 Ω - 220 Ω - 390 Ω (switchable)	
4-40 UNC 0.4 Nm	

Technical data	
180° (axial)	
3, 5, 6, 8	
0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1 mm <sup>2</sup> / 26 - 16	
> 200	
8.4 mm / 7.6 mm	
-20 °C ... 75 °C	
IP40	
ABS, metal-plated	
390 Ω - 220 Ω - 390 Ω (switchable)	
4-40 UNC 0.4 Nm	

Ordering data		
Type	Order No.	Pcs. / Pkt.
SUBCON-PLUS-PROFIB/90/SC	2313698	1
SUBCON-PLUS-PROFIB/90/PG/SC	2313708	1

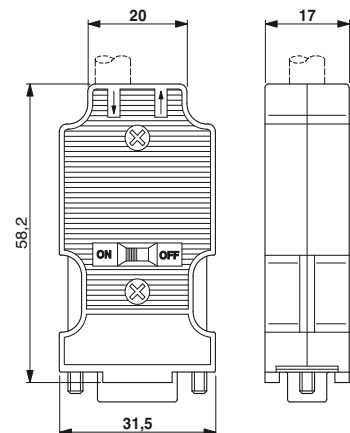
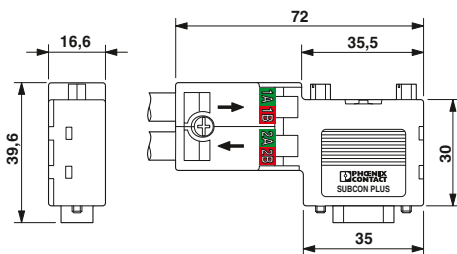
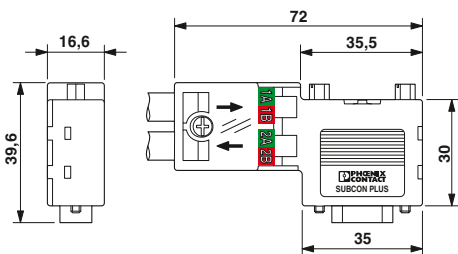
Ordering data		
Type	Order No.	Pcs. / Pkt.
SUBCON-PLUS-PROFIB/90/IDC	2313672	1
SUBCON-PLUS-PROFIB/90/PG/IDC	2313685	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
SUBCON-PLUS-PROFIB/AX/SC	2744380	1

Accessories		
Accessories	Order No.	Pcs. / Pkt.
PSM-CABLE-PROFIB/FC	2744652	1
PSM-STRIP-FC/PROFIB	2744623	1
QUICK WIREFOX 6	1204384	1
SZK PH1 VDE	1205150	10

Accessories		
Accessories	Order No.	Pcs. / Pkt.
PSM-CABLE-PROFIB/FC	2744652	1
PSM-STRIP-FC/PROFIB	2744623	1
QUICK WIREFOX 6	1204384	1
SZK PH1 VDE	1205150	10

Accessories		
Accessories	Order No.	Pcs. / Pkt.
PSM-CABLE-PROFIB/FC	2744652	1
PSM-STRIP-FC/PROFIB	2744623	1
QUICK WIREFOX 6	1204384	1
SZK PH1 VDE	1205150	10
SZF 0-0,4X2,5	1204504	10



## Fast connection technology

### SUBCON-PLUS-CAN D-SUB fast connection connector

The SUBCON-PLUS-CAN/... D-SUB series is specially designed for use in CAN systems. Under field conditions, it enables the quick and easy connection of the incoming and outgoing bus cable.

The terminating resistor is already integrated in all versions. It can be connected externally by means of a slide switch. At the same time, the outgoing bus segment is switched off. This makes it easy to start up segment by segment while incorrect terminations are avoided. In addition, the connector housing with high-quality shielding guarantees high immunity to interference even at maximum transmission speeds.

A special feature of the angled plug is that the internal connection unit can be turned round. Whether the cable is to be inserted from the right or left can therefore be decided on-site. If it is not possible to use the angled design, a compact connector with axial cable entry is available with the SUBCON-PLUS-CAN/AX type.

#### Features:

- Assembled under field conditions
- Separate terminal blocks for bus cables
- Termination resistor can be connected
- Segment-by-segment startup
- High transmission speed
- High level of EMC
- Flexibility in terms of cable entry selection
- Suitable for bus cables as per the CiA Draft Recommendation 303-1 with an outside diameter of 8 mm
- For special cables, there is a version with a variable cable entry

#### Versions:

- Angled with programming interface
- Angled without programming interface
- Axial cable entry

Cable entry	35° (right or left)
Pin assignment	2, 3, 7, 9
Nominal voltage $U_N$	50 V
Nominal current $I_N$	100 mA
Connection cross section (solid/stranded/AWG)	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1 mm <sup>2</sup> / 26 - 16
Insertion/withdrawal cycles	> 200
Cable cross section (max./min.)	8.4 mm / 7.6 mm
Ambient temperature (operation)	-20 °C ... 75 °C
Degree of protection	IP40
Housing material	ABS, metal-plated
Termination resistor	120 Ω (can be connected externally)
SUBCON fixing	4-40 UNC 0.4 Nm

#### Description

**CAN, CANopen®, SafetyBUS p connector**, integrated termination resistor that can be activated from the outside, with screw connection, 9-pos., socket

- Angled 35°
- Angled 35°, with second D-SUB connection
- Angled 35°, for variable cable diameters

**CAN, CANopen®, SafetyBUS p connector**, integrated termination resistor that can be activated from the outside, with screw connection, 9-pos., socket

- Axial cable entry

#### Screwdriver

CANopen

SafetyBUS p



35° D-SUB connector (socket), screw connection, two cable entries



#### Technical data

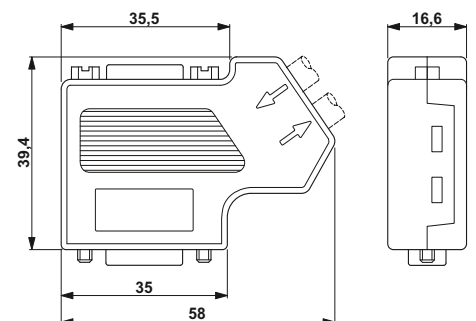
Cable entry	35° (right or left)
Pin assignment	2, 3, 7, 9
Nominal voltage $U_N$	50 V
Nominal current $I_N$	100 mA
Connection cross section (solid/stranded/AWG)	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1 mm <sup>2</sup> / 26 - 16
Insertion/withdrawal cycles	> 200
Cable cross section (max./min.)	8.4 mm / 7.6 mm
Ambient temperature (operation)	-20 °C ... 75 °C
Degree of protection	IP40
Housing material	ABS, metal-plated
Termination resistor	120 Ω (can be connected externally)
SUBCON fixing	4-40 UNC 0.4 Nm

#### Ordering data

Type	Order No.	Pcs. / Pkt.
SUBCON-PLUS-CAN/SC2	2708999	1
SUBCON-PLUS-CAN/PG	2708119	1

#### Accessories

SZS 0,4X2,5 VDE	1205037	10
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CANopen

SafetyBUS p



35° D-SUB connector (socket), variable cable diameter

CANopen

SafetyBUS p



Axial D-SUB connector (socket), two cable entries



Technical data

35° (right or left)  
2, 3, 7  
50 V  
100 mA  
0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1 mm<sup>2</sup> / 26 - 16  
> 200  
10 mm / 6 mm  
-20 °C ... 75 °C  
IP40  
ABS, metal-plated  
120 Ω (can be connected externally)  
4-40 UNC 0.4 Nm

Technical data

180° (axial)  
2, 3, 7  
50 V  
100 mA  
0.14 - 0.5 mm<sup>2</sup> / 0.14 - 0.5 mm<sup>2</sup> / 26 - 20  
> 200  
8.4 mm / 7.6 mm  
-20 °C ... 75 °C  
IP40  
ABS, metal-plated  
120 Ω (can be connected externally)  
4-40 UNC 0.4 Nm

Ordering data

Type	Order No.	Pcs. / Pkt.
SUBCON-PLUS-CAN	2744694	1

Ordering data

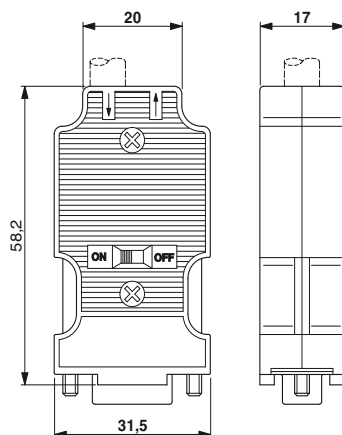
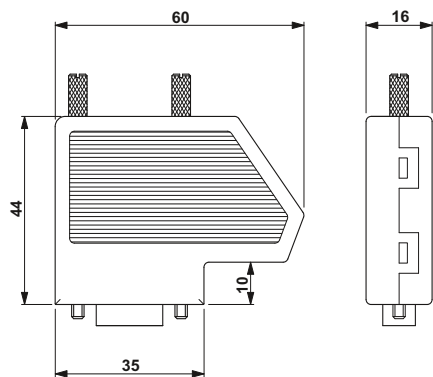
Type	Order No.	Pcs. / Pkt.
SUBCON-PLUS-CAN/AX	2306566	1

Accessories

SZS 0,4X2,5 VDE	1205037	10
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Accessories

SZS 0,4X2,5 VDE	1205037	10
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### SUBCON-PLUS

#### D-SUB fast connection connector

#### Field bus connector with screw connection

Two cable infeeds are often required on the D-SUB connectors used in order to build fieldbus systems with RS-485 interfaces. The SUBCON-PLUS connectors range fulfills this requirement and routes the connection to screw terminal blocks – however, duplicated – for two cables. This means clarity during wiring and it simplifies every startup. These connectors are of course also shielded against EMI influences with a metallized housing. In addition, by placing the connection block in either the upper or lower shell, it is possible to select the cable infeed on site from the right or left.

#### Features:

- For universal use
- Assembly under field conditions
- Separate terminal blocks for each cable
- High transmission speed
- High level of EMC
- Flexibility in terms of cable entry selection
- Straightforward assembly thanks to knurled screws

#### Versions:

- Bus-specific types with matching partial assignment
- Universal type with full assignment
- Short mounting screw as an accessory for when space is at a premium

Nominal voltage  $U_N$   
 Nominal current  $I_N$   
 Connection cross section (solid/stranded/AWG)  
 Insertion/withdrawal cycles  
 Cable cross section (max./min.)  
 Ambient temperature (operation)  
 Degree of protection  
 Housing material  
 SUBCON fixing



RS-485



With two cable entries,  
35° angled and axial



#### Technical data

50 V  
 100 mA  
 0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1 mm<sup>2</sup> / 26 - 18  
 > 200  
 10 mm / 6 mm  
 -20 °C ... 75 °C  
 IP20  
 ABS, metal-plated  
 4-40 UNC 0.4 Nm

#### Ordering data

Type	Order No.	Pcs. / Pkt.
SUBCON-PLUS M1	2761826	1
SUBCON-PLUS F1	2744267	1
SUBCON-PLUS M2	2761839	1
SUBCON-PLUS F2	2799490	1
SUBCON-PLUS F5	2744102	1
SUBCON-PLUS 9/M	2744018	1
SUBCON-PLUS 9/F	2744241	1
SUBCON-PLUS-M/AX 9	2904467	1
SUBCON-PLUS-F/AX 9	2311797	1

#### Description

**D-SUB connector, with two cable entries for Modbus, Modbus-PLUS, BITBUS, ARCNET, MULT/MININET (B&R), SYSTEM 2003 (B&R), P-NET, pin assignment 1,2,3,5,6,8**  
 - Angled 35°, 9-pos., pin  
 - Angled 35°, 9-pos., socket

**D-SUB connector, with two cable entries for SUCONET K1, K2 (EATON/Moeller), S-BUS (Saia), J-BUS (Merlin Gerin), pin assignment 2, 3, 4, 5, 7, 9**  
 - Angled 35°, 9-pos., pin  
 - Angled 35°, 9-pos., socket

**D-SUB connector, with two cable entries for Modbus, CEGELEC, pin assignment 1,1,2,3,6,7**  
 - Angled 35°, 9-pos., socket

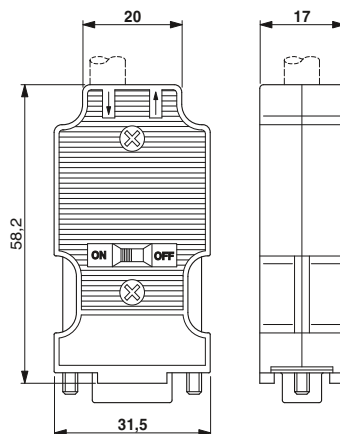
**D-SUB connector, with two cable entries, universal type, pin assignment 1,2,3,4,5,6,7,8,9 on every screw terminal block**  
 - Angled 35°, 9-pos., pin  
 - Angled 35°, 9-pos., socket  
 - Axial, 9-pos., pin  
 - Axial, 9-pos., socket

#### Optional mounting screw, short (without knurl)

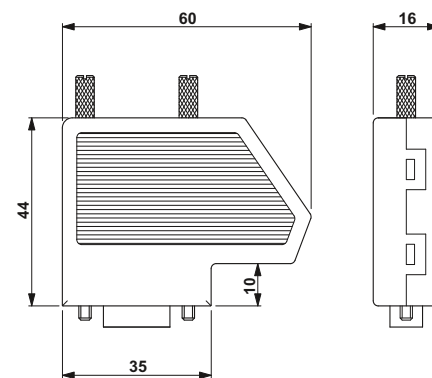
#### Screwdriver

#### Accessories

SUBCON-SHORT-SCREW	2799694	1
SZS 0,4X2,5 VDE	1205037	10



Dimensional drawing SUBCON-PLUS-.../AX...



Dimensional drawing SUBCON-PLUS...

**SUBCON**

**D-SUB fast connection connector**

The 9-pos. version of the SUBCON-... connector range is not just suitable for INTERBUS, but is positively ideal. A whole host of further applications are opened up by having all the connections assigned to their own 1 mm<sup>2</sup> screw terminal block.

The range covers SUBCON connectors for point-to-point connections with a cable infeed in 9, 15 and 25-pos. pin or socket versions.

Installing the connection block either in the upper or lower shell makes it possible to introduce the cable at an angle of 0° to 90° from the right or the left. The completely metallized housing also ensures a high degree of shielding against EMI influences.

The optional SUBCON-SHORT-SCREW fastening screw is available as an accessory for narrow installation conditions. The screw is completely integrated into the housing by not having a knurl.

**Features:**

- For universal use
- Assembly under field conditions
- High level of EMC
- Flexibility in terms of cable entry selection
- Straightforward assembly thanks to knurled screws

**Versions:**

- 9-, 15-, and 25-pos. versions
- Short mounting screw as an accessory for when space is at a premium

Cable entry
Pin assignment
Nominal voltage U <sub>N</sub>
Nominal current I <sub>N</sub>
Connection cross section (solid/stranded/AWG)
Insertion/withdrawal cycles
Cable cross section (max./min.)
Ambient temperature (operation)
Degree of protection
Housing material
SUBCON fixing

Description
<b>D-SUB connector, with screw connection</b>
- 9-pos., socket
- 9-pos., pin
<b>D-SUB connector, with screw connection</b>
- 15-pos., socket
- 15-pos., pin
<b>D-SUB connector, with screw connection</b>
- 25-pos., socket
- 25-pos., pin

<b>Optional mounting screw, short (without knurl)</b>
<b>Screwdriver</b>



RS-232

RS-422



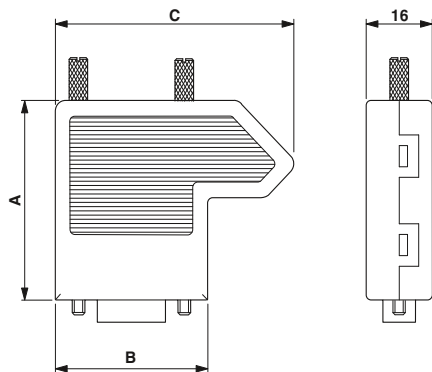
With one cable entry



Technical data	
35° (right or left)	
All connections are 1:1 on the screw terminal block	
50 V	
100 mA	
0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1 mm <sup>2</sup> / 26 - 16	
> 200	
10 mm / 4 mm	
-20 °C ... 75 °C	
IP20	
ABS, metal-plated	
4-40 UNC 0.4 Nm	

Ordering data		
Type	Order No.	Pcs. / Pkt.
SUBCON 9/F-SH	2761499	1
SUBCON 9/M-SH	2761509	1
SUBCON 15/F-SH	2761596	1
SUBCON 15/M-SH	2761606	1
SUBCON 25/F-SH	2761619	1
SUBCON 25/M-SH	2761622	1

Accessories		
Type	Order No.	Pcs. / Pkt.
SUBCON-SHORT-SCREW	2799694	1
SZS 0,4X2,5 VDE	1205037	10



Dimensional drawing SUBCON...-SH

Dimensions [mm] of the D-SUB plug-in connectors (SUBCON)

	A	B	C
9-pos.	44.5	36.0	56.4
15-pos.	44.5	44.3	64.7
25-pos.	49.5	58.0	78.7

## Fast connection technology

### V.24 (RS-232) cables

A permanent cause of annoyance are the two connection standards, 9 and 25-pin for the RS-232 interface. The plug-in "9 to 2-pos." D-SUB adapters solve the problem without complicated resoldering of the cable connections.

The 0.5 and 2 meter standard RS-232 cables can be used to connect the rail-mountable control cabinet modules. Individual lengths can be created quickly and simply with the screw-type D-SUB plug, SUBCON.

#### Null modem adapter

In order to connect two RS-232 interfaces of the same type, the zero modem connector crosses the data and control lines.

Thanks to the small "Gender Changer" type, it can be plugged at any interface directly and therefore does not change the existing connector design through the socket/connector combination.



V.24 (RS-232) connecting cable

Description
<b>RS-232-D-SUB cable</b> , length: 0.5 m - 9-pos. socket on 9-pos. socket
<b>RS-232-D-SUB cable</b> , length: 2 m - 9-pos. socket on 9-pos. socket
<b>RS-232-D-SUB cable</b> , length: 2 m - 9-pos. socket on 25-pos. socket

<b>V.24 (RS-232) null modem adapter</b> - 9-pos. socket to 9-pos. plug
<b>D-SUB gender changer</b> - 9-pos., pin/pin - 9-pos., socket/socket - 25-pos., pin/pin - 25-pos., socket/socket

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSM-KA9SUB9/BB/0,5METER	2708520	1
PSM-KA9SUB9/BB/2METER	2799474	1
PSM-KA 9 SUB 25/BB/2METER	2761059	1

Accessories		
Type	Order No.	Pcs. / Pkt.
PSM-AD-D9-NULLMODEM	2708753	1
VS-09-GC-ST/ST	1652651	10
VS-09-GC-BU/BU	1688722	10
VS-25-GC-ST/ST	1652693	10
VS-25-GC-BU/BU	1652680	10

### USB cable adapter

Two adapter cables with a length of 1 m and 3 m are available for connecting controllers, PCs, and other automation devices with USB-A connections to devices with Mini-USB-B connections.



USB cable (USB-A to mini-USB)

Description
<b>USB cable</b> , from USB-A to Mini-USB-B, 5-pos.
- Length: 1 m
<b>Connecting cable</b> (single) for configuration of the PSR-TRISAFE system
- Length: 3 m
<b>USB cable</b> , for diagnostics and extended configuration

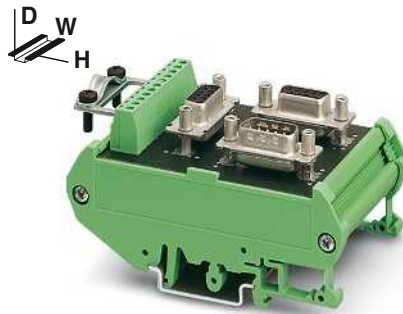
Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-CA-USB A/MINI B/1METER	2313575	1
CABLE-USB/MINI-USB-3,0M	2986135	1
RAD-CABLE-USB	2903447	1

**RS-485 connection distributor**

If spur connections or a star distribution are to be made in a bus system, the RS-485 connection distributors come to your aid.

**PSM-PTK**, the DIN rail-mountable T-adaptor equipped with three 9-pin 1:1 connected D-SUB connections, makes for clear and tidy wiring with just one spur connection.

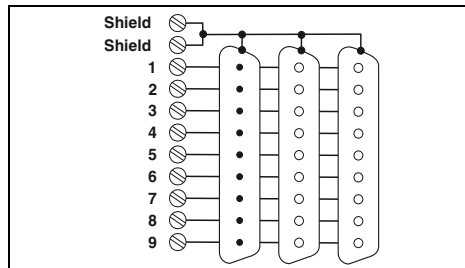
As many as four branch lines can be picked off from one bus line in the PSM-PTK 4 version. Here too, all six D-SUB connections (9-pos.) are connected through 1:1. Both versions are mounted by snapping them onto conventional EN DIN rails.



**RS-485 T-distributor (4-way),  
D-SUB and screw connection**

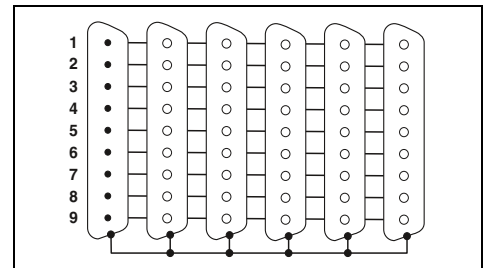


**RS-485 T-distributor (6-way),  
D-SUB connection**



**Technical data**

Plug connection	Incoming	D-SUB-9 plug
	Outgoing	D-SUB-9 socket
	Branching	D-SUB-9 socket
		1x 11-pos. PCB terminal block
Nominal voltage $U_N$		60 V AC/DC
Nominal current $I_N$		1 A
Test voltage		500 V AC (50 Hz, 1 min, rms)
Shield connection		D-SUB frame or shield connector
Screw connection	solid	0.14 mm <sup>2</sup> - 1 mm <sup>2</sup>
	stranded	0.14 mm <sup>2</sup> - 1.5 mm <sup>2</sup>
	AWG	26 - 16
Torque		0.4 Nm
Ambient temperature (operation)		-25 °C ... 70 °C
Housing material		PVC
Pin assignment		all 1:1
Dimensions W / H / D		56 mm / 89.6 mm / 48 mm



**Technical data**

		D-SUB-9 plug
		D-SUB-9 socket
		4 x D-SUB-9 socket
		-
Nominal voltage $U_N$		60 V AC/DC
Nominal current $I_N$		1 A
Test voltage		500 V AC (50 Hz, 1 min, rms)
Shield connection		D-SUB frame
Screw connection		-
		-
		-
Ambient temperature (operation)		-25 °C ... 70 °C
Housing material		PVC
Pin assignment		all 1:1
Dimensions W / H / D		89.8 mm / 89.6 mm / 39 mm

**Ordering data**

Description	Type	Order No.	Pcs. / Pkt.
<b>Passive RS-485 T-distributor</b> , fitted with a 9 pos. D-SUB pin strip and <b>two</b> 9-pos. D-SUB socket strips, as well as a 9-pos. PCB terminal block with shield connector	PSM PTK	2760623	1

**Ordering data**

Description	Type	Order No.	Pcs. / Pkt.
<b>Passive RS-485 T-distributor</b> , fitted with one 9-pos. D-SUB pin strip and <b>five</b> 9-pos. D-SUB socket strips	PSM PTK-4	2799364	1







**Accessories**

Screwdriver	Accessories	Order No.	Pcs. / Pkt.
	SZS 0,4X2,5 VDE	1205037	10

**Accessories**

Screwdriver	Accessories	Order No.	Pcs. / Pkt.
	SZS 0,4X2,5 VDE	1205037	10

### Wireless I/O (2400 MHz / 900 MHz)

	Radioline 2400 MHz	Radioline 900 MHz	Radioline I/O extension modules		
					
Type	<b>RAD-2400-IFS</b>	<b>RAD-900-IFS</b>	<b>RAD-DAIO6-IFS</b>	<b>RAD-DI4-IFS/RAD-DOR4-IFS RAD-DI8-IFS/RAD-DO8-IFS</b>	<b>RAD-AI4-IFS/RAD-AO4-IFS RAD-PT100-4-IFS</b>
Description	Wireless transceiver, for serial interfaces (RS-232, RS-485), can be extended with I/O extension modules	Wireless transceiver, for serial interfaces (RS-232, RS-485), can be extended with I/O extension modules	Analog/digital I/O module, 2 digital inputs/outputs and 1 analog input/output	Digital I/O modules, 4 inputs or 4 relay outputs 8 inputs or 8 transistor outputs	Analog I/O modules, 4 inputs or 4 outputs  Temperature I/O module 4 Pt 100 inputs
Page	451	451	452	452	454


### Wireless IO (2400 MHz)

### WirelessHART

	Wireless MUX	Fieldline I/O		WirelessHART	
 					
Type	<b>ILB BT ADIO MUX-OMNI...</b>	<b>FLM BT...</b>	<b>ILB BT ADIO 2/2/16/16</b>	<b>RAD-WHG/WLAN-XD</b>	<b>RAD-WHA-1/2NPT</b>
Description	Bluetooth multiplexer, with omnidirectional antennae	Fieldline Modular Bluetooth base station, with up to three Wireless I/O devices	Inline Block, Bluetooth device	WirelessHART gateway with up to three	WirelessHART adapter
Page	456	457	457	458	459

### Wireless Serial (2400 MHz / 900 MHz / GPRS/GSM)

### Accessories





	Radioline	PSI-WL...Bluetooth	PSI Modem Line	2400 MHz	900 MHz
  					
Type	<b>RAD-2400-IFS RAD-900-IFS</b>	<b>PSI-WL...</b>	<b>PSM-Modem...</b>		
Description	Wireless transceiver, for serial interfaces (RS-232, RS-485), can be extended with I/O extension modules	Bluetooth converter, for converting RS-232 (V24), RS-422 or RS-485 2-wire to Bluetooth wireless transmission, e.g., Modbus, PROFIBUS	Industrial GPRS/GSM modems, for all GMS networks (850/900/1800/1900), switching inputs and outputs, password protection	Antennae, adapters, extension cables for 2400 MHz products	Antennae, adapters, extension cables for 900 MHz products
Page	451	460	422	462	474







Wireless IO (900 MHz)

	RAD-Line IO unidirectional		RAD-Line serial		
					
Type	RAD-ISM-900-SET-UD-ANT	RAD-ISM-900-SET-...UD	RAD-ISM-900-DATA-BD-BUS	RAD-ISM-900-DATA-BD	RAD-ISM-900-DATA-BD-PLUS
Description	Unidirectional wireless system, with Trusted Wireless, transmitter and receiver in IP20 housing	Unidirectional wireless system, with Trusted Wireless, transmitter (IP65) and receiver (IP20)	Wireless transceiver, with Trusted Wireless, for serial interfaces (RS-232, RS-422/RS-485), can be extended with IO extension modules	Wireless transceiver, with Trusted Wireless, for serial interfaces (RS-232, RS-422/RS-485)	Wireless transceiver, with Trusted Wireless, for serial interfaces (RS-232, RS-422/RS-485), with integrated inputs/outputs
Page	466	467	469	468	469

Wireless IO (900 MHz)

	RAD-Line IO extension modules			
				
Type	RAD-IN-4A-I RAD-OUT-4A-I	RAD-IN-8D RAD-OUT-8D-REL	RAD-IN+OUT-2D-1A-I	RAD-IN-2D-CNT RAD-OUT-2D-CNT
Description	Analog module, for four inputs or four outputs	Digital module, for eight inputs or eight outputs	Analog/digital module, for two digital inputs/outputs and one analog input/output	Digital module, for two counter/frequency inputs or two counter/frequency outputs
Page	472	472	472	472

Wireless Ethernet (900 MHz/2400 MHz)

	RAD-Line Ethernet	WLAN COM server	Industrial WLAN	Industrial Bluetooth
				
Type	RAD-ISM-900-EN-BD(-BUS)	RAD-80211-XD-HP(-BUS)	FL COMSERVER WLAN 232/422/485	
Description	Wireless transceiver, with Trusted Wireless, for Ethernet (900 MHz), can be extended with IO extension modules	Wireless transceiver, with WLAN 802.11b/g, for Ethernet (2400 MHz), can be extended with IO extension modules	Serial device server, for serial interfaces (RS-232, RS-422/RS-485) on Wireless LAN	For further information on Industrial WLAN, see  Section: Ethernet networks
Page	470	471	413	48



### Easy startup with I/O mapping - the Radioline wireless system



Easy installation - Setting up, extending or replacing a wireless station in the control cabinet



Easy addressing - Only one turn on the thumbwheel of the wireless station

Radioline is the new wireless system for large systems and networks. Special features include extremely easy assignment of inputs and outputs by simply turning the thumbwheel - without any programming.

Radioline transmits I/O signals as well as serial data and is therefore very versatile. In addition, you can implement various network structures: from a simple point-to-point connection to complex mesh networks.

Thanks to the latest Trusted Wireless technology, Radioline is the ideal choice for industrial use.

#### Network applications

- I/O data mode: simple I/O signal distribution in the network
- PLC/Modbus RTU mode: I/O integration in the control level using the Modbus protocol
- Serial data mode: networking of controllers and serial I/O devices, simple RS-232/RS-485 cable replacement

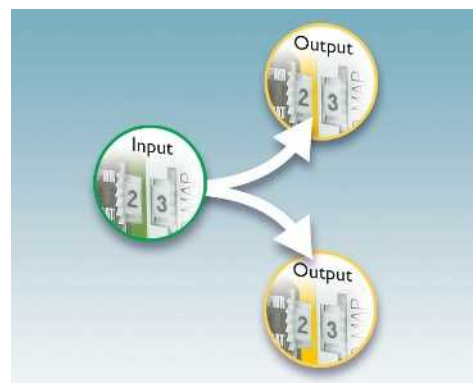
#### What advantages does I/O mapping offer?

I/O mapping makes it considerably easier to assign input and output signals in your systems. With a slight turn of the thumbwheel, you can distribute and multiply I/O signals freely in your network – without the need for any complex programming.

#### Trusted Wireless

Trusted Wireless technology is specifically designed for the reliable transmission of data and signals over long distances.

The new Version 2.0 also offers functions such as adjustable data rates, encryption, extended diagnostics, and parallel operation of multiple networks.



Easy distribution - Assigning inputs and outputs using the thumbwheel

**Radioline wireless modules**  
**2.4 GHz and 900 MHz**

- New Trusted Wireless 2.0 technology
- Distribute signals at the turn of a switch (I/O mapping)
- Unique network addressing via plug-in configuration memory for secure, parallel operation of multiple networks



**2.4 GHz wireless transceiver, can be extended with I/O extension modules, for worldwide use**



**900 MHz wireless transceiver, can be extended with I/O extension modules, for the US market**

**Notes:**  
The latest country registrations for the relevant product can be found on the Internet at [www.phoenixcontact.com](http://www.phoenixcontact.com).  
1) EMC: Class A product, see page 553

Ex: Housing width 17.5 mm

Technical data	
Wireless path	Bi-directional
Direction	2.4002 GHz ... 2.4785 GHz
Frequency range	16 kbps / 125 kbps / 250 kbps
Data rate (adjustable)	
Transmission power	max. 100 mW (adjustable)
Number of channels	8 x 55
Security	128-bit data encryption
Connection method	RSMA (female)
Serial port	RS-232                      RS-485
Connection method	COMBICON plug-in screw terminal block      COMBICON plug-in screw terminal block
Serial transmission speed	0,3 ... 115,2 kbps                      0,3...115,2 kbps
Termination resistor (switchable via DIP switches)	-    390 Ω / 150 Ω / 390 Ω
Analog output	RSSI voltage output
Signal range	0 V ... 3 V
Digital output	RF link relay output
Contact type	PDT
Switching voltage	30 V AC / 60 V DC
Switching current	500 mA
General data	
Supply voltage	19.2 V DC ... 30.5 V DC
Current consumption	max. 65 mA (at 24 V DC, at 25°C)
Degree of protection	IP20
Ambient temperature range	-40 °C ... 70 °C
Permissible humidity (operation)	20% ... 85%
Housing material	PA 6.6-FR
Dimensions W / H / D	17.5 / 99 / 114.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Conformance / approvals	
Conformance	CE compliance (R&TTE directive 1999/5/EC) FCC Directive, Part 15.247 ISC Directive RSS 210 II 3 G Ex nA nC IIC T4 Gc X Applied for UL applied for

Housing width 35 mm

Technical data	
Wireless path	Bi-directional
Direction	902 MHz ... 928 MHz
Frequency range	16 kbps / 125 kbps / 250 kbps / 500 kbps
Data rate (adjustable)	
Transmission power	max. 1 W (adjustable)
Number of channels	-
Security	128-bit data encryption
Connection method	RSMA (female)
Serial port	RS-232                      RS-485
Connection method	COMBICON plug-in screw terminal block      COMBICON plug-in screw terminal block
Serial transmission speed	0,3 ... 115,2 kbps                      0,3...115,2 kbps
Termination resistor (switchable via DIP switches)	-    390 Ω / 150 Ω / 390 Ω
Analog output	RSSI voltage output
Signal range	0 V ... 3 V
Digital output	RF link relay output
Contact type	PDT
Switching voltage	30 V AC / 60 V DC
Switching current	500 mA
General data	
Supply voltage	19.2 V DC ... 30.5 V DC
Current consumption	
Degree of protection	IP20
Ambient temperature range	-40 °C ... 70 °C
Permissible humidity (operation)	20% ... 85%
Housing material	PA 6.6-FR
Dimensions W / H / D	35 / 99 / 114.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Conformance / approvals	
Conformance	FCC Directive, Part 15.247 ISC Directive RSS 210 - - -

ATEX  
IECEX  
UL, USA / Canada

Ordering data		
Type	Order No.	Pcs. / Pkt.
Wireless module		
RAD-2400-IFS <sup>1)</sup>	2901541	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
Wireless module		
RAD-900-IFS	2901540	1

Accessories		
	Order No.	Pcs. / Pkt.
Conf. stick, configuration memory for network addressing		
RF band 3	RAD-CONF-RF3	2902814      1
RF band 5	RAD-CONF-RF5	2902815      1
RF band 7	RAD-CONF-RF7	2902816      1
Memory stick, for saving custom configuration data	RAD-MEMORY	2902828      1
USB cable, for diagnostics and extended configuration	RAD-CABLE-USB	2903447      1

Accessories		
	Order No.	Pcs. / Pkt.
Conf. stick, configuration memory for network addressing		
Memory stick, for saving custom configuration data	RAD-MEMORY	2902828      1
USB cable, for diagnostics and extended configuration	RAD-CABLE-USB	2903447      1

### I/O extension modules

- Easy I/O mapping via thumbwheel
- Digital wide-range inputs (0...250 V AC/DC)
- 0 ... 100 Hz digital pulse inputs
- Relay or transistor outputs
- Easy module replacement even during operation (hot swap)
- Extended temperature range -40°C to +70°C



I/O extension module,  
2 digital inputs/outputs and  
1 analog input/output



I/O extension module,  
4 digital inputs

**Notes:**  
1) EMC: Class A product, see page 553

Ex: Housing width 17.5 mm

#### Technical data

<b>Analog input</b>	
Number of inputs	1
Resolution	16 (Bit)
Signal range (configurable using the DIP switch)	0 mA ... 20 mA / 4 mA ... 20 mA
Accuracy	≤ 0.02% (@25°C)
Supply voltage for passive sensors (via terminal PWR1, +11)	≥ 12 V DC
<b>Digital input</b>	
Number of inputs	2
Switching level	1 signal ("H") 10 V AC/DC ... 50 V AC/DC (low-voltage input) 50 V AC/DC ... 250 V AC/DC (high-voltage input)
Switching level	0 signal ("L") 0 V AC/DC ... 4 V AC/DC (low-voltage input) 0 V AC/DC ... 20 V AC/DC (high-voltage input)
Input frequency	≤ 2 Hz
<b>Pulse input</b>	
Number of inputs	-
Signal range	-
Input frequency	-
Pulse length	-
<b>Analog output</b>	
Number of outputs	1
Signal range	0 mA ... 20 mA      0 V ... 10 V 4 mA ... 20 mA
Accuracy	≤ 0.02% (@25°C)      Typ. 0.5%
Load R <sub>B</sub>	≤ 500 Ω      ≥ 10 kΩ
<b>Digital output</b>	
Contact type	2 x relay output
Switching voltage	250 V AC 24 V DC
Switching current	min./max. ≥ 10 mA / 2 A
Switching frequency	2 Hz
<b>General data</b>	
Supply voltage	19.2 V DC ... 30.5 V DC (T-connector)
Current consumption	max. 95 mA (at 24 V DC, at 25°C)
Degree of protection	IP20
Ambient temperature range	-40 °C ... 70 °C
Housing material	PA 6.6-FR
Dimensions W / H / D	17.5 / 99 / 114.5 mm
<b>Conformance / approvals</b>	
Conformance	CE-compliant
ATEX	II 3 G Ex nA nC IIC T4 Gc X
IECEX	Applied for
UL, USA / Canada	UL applied for

Ex: Housing width 17.5 mm

#### Technical data

<b>Analog input</b>	
Number of inputs	-
Resolution	-
Signal range (configurable using the DIP switch)	-
Accuracy	-
Supply voltage for passive sensors (via terminal PWR1, +11)	-
<b>Digital input</b>	
Number of inputs	4
Switching level	10 V AC/DC ... 50 V AC/DC (low-voltage input) 50 V AC/DC ... 250 V AC/DC (high-voltage input)
Switching level	0 V AC/DC ... 4 V AC/DC (low-voltage input) 0 V AC/DC ... 20 V AC/DC (high-voltage input)
Input frequency	≤ 2 Hz
<b>Pulse input</b>	
Number of inputs	-
Signal range	-
Input frequency	-
Pulse length	-
<b>Analog output</b>	
Number of outputs	-
Signal range	-
Accuracy	-
Load R <sub>B</sub>	-
<b>Digital output</b>	
Contact type	-
Switching voltage	-
Switching current	-
Switching frequency	-
<b>General data</b>	
Supply voltage	19.2 V DC ... 30.5 V DC (T-connector)
Current consumption	max. 11 mA (at 24 V DC, at 25°C)
Degree of protection	IP20
Ambient temperature range	-40 °C ... 70 °C
Housing material	PA 6.6-FR
Dimensions W / H / D	17.5 / 99 / 114.5 mm
<b>Conformance / approvals</b>	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
IECEX	Applied for
UL, USA / Canada	UL applied for

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Analog/digital I/O module	RAD-DAIO6-IFS <sup>1)</sup>	2901533	1
Digital input module			
Digital relay output module			
Digital/pulse input module			
Digital transistor output module			

#### Accessories

Analog/digital I/O module	RAD-DAIO6-IFS <sup>1)</sup>	2901533	1
Digital relay output module			
Digital input module			
Digital transistor output module			
Digital/pulse input module			

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Digital input module	RAD-DI4-IFS <sup>1)</sup>	2901535	1
Digital relay output module			
Digital/pulse input module			
Digital transistor output module			

#### Accessories

Digital input module	RAD-DOR4-IFS <sup>1)</sup>	2901536	1
Digital relay output module			
Digital/pulse input module			
Digital transistor output module			



### I/O extension modules

- Easy I/O mapping via thumbwheel
- Analog inputs (0/4 ... 20 mA)
- Temperature inputs for Pt 100 sensors
- Analog outputs (0/4 ... 20 mA or 0 ... 10 V)
- Easy module replacement even during operation (hot swap)
- Extended temperature range -40°C to +70°C



I/O extension module, 4 analog current inputs



Temperature I/O extension module, 4 temperature inputs

N

**Notes:**  
1) EMC: Class A product, see page 553

Ex: Housing width 17.5 mm

Housing width 17.5 mm

Technical data	
Analog input	
Number of inputs	4
Resolution	16 (Bit)
Signal range (configurable using the DIP switch)	0 mA ... 20 mA / 4 mA ... 20 mA
Accuracy	≤ 0.02% (@25°C)
Supply voltage for passive sensors (via terminal PWR1, +11)	≥ 12 V DC
Analog input	
Description of the input	-
Number of inputs	-
Temperature measuring range	-
Analog output	
Number of outputs	-
Signal range	-
Accuracy	-
Load R <sub>B</sub>	-
General data	
Supply voltage	19.2 V DC ... 30.5 V DC (T-connector)
Current consumption	max. 120 mA (at 24 V DC, at 25°C)
Degree of protection	IP20
Ambient temperature range	-40 °C ... 70 °C
Housing material	PA 6.6-FR
Dimensions W / H / D	17.5 / 99 / 114.5 mm
Conformance / approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
IECEX	Applied for
UL, USA / Canada	UL applied for

Technical data	
Analog input	
Number of inputs	-
Resolution	-
Signal range (configurable using the DIP switch)	-
Accuracy	-
Supply voltage for passive sensors (via terminal PWR1, +11)	-
Analog input	
Description of the input	Pt 100 input
Number of inputs	4
Temperature measuring range	-50 °C ... 250 °C
Analog output	
Number of outputs	-
Signal range	-
Accuracy	-
Load R <sub>B</sub>	-
General data	
Supply voltage	19.2 V DC ... 30.5 V DC (T-connector)
Current consumption	max. 45 mA (at 24 V DC, at 25°C)
Degree of protection	IP20
Ambient temperature range	-40 °C ... 70 °C
Housing material	PA 6.6-FR
Dimensions W / H / D	17.5 / 99 / 114.5 mm
Conformance / approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
IECEX	Applied for
UL, USA / Canada	UL applied for

Ordering data		
Type	Order No.	Pcs. / Pkt.
ANALOG INPUT MODULE	2901537	1
TEMPERATURE INPUT MODULE	2904035	1
ANALOG OUTPUT MODULE		
Accessories		
ANALOG OUTPUT MODULE	2901538	1
ANALOG INPUT MODULE		
TEMPERATURE INPUT MODULE		

Ordering data		
Type	Order No.	Pcs. / Pkt.
ANALOG INPUT MODULE	2901537	1
TEMPERATURE INPUT MODULE	2904035	1
ANALOG OUTPUT MODULE		
Accessories		
ANALOG OUTPUT MODULE	2901538	1
ANALOG INPUT MODULE		
TEMPERATURE INPUT MODULE		

Ordering data		
Type	Order No.	Pcs. / Pkt.
ANALOG INPUT MODULE	2901537	1
TEMPERATURE INPUT MODULE	2904035	1
ANALOG OUTPUT MODULE		
Accessories		
ANALOG OUTPUT MODULE	2901538	1
ANALOG INPUT MODULE		
TEMPERATURE INPUT MODULE		

Ordering data		
Type	Order No.	Pcs. / Pkt.
ANALOG INPUT MODULE	2901537	1
TEMPERATURE INPUT MODULE	2904035	1
ANALOG OUTPUT MODULE		
Accessories		
ANALOG OUTPUT MODULE	2901538	1
ANALOG INPUT MODULE		
TEMPERATURE INPUT MODULE		



**I/O extension module,  
4 analog current/voltage outputs**

Ex:   
Housing width 17.5 mm

**Technical data**

-  
-  
-  
-

4  
0 mA ... 20 mA                      0 V ... 10 V  
4 mA ... 20 mA  
≤ 0.02% (@25°C)                      Typ. 0.5%  
≤ 500 Ω                                      ≥ 10 kΩ

19.2 V DC ... 30.5 V DC (T-connector)  
max. 115 mA (at 24 V DC, at 25°C)  
IP20  
-40 °C ... 70 °C  
PA 6.6-FR  
17.5 / 99 / 114.5 mm

CE-compliant  
 II 3 G Ex nA IIC T4 Gc X  
Applied for  
UL applied for

**Ordering data**

Type	Order No.	Pcs. / Pkt.
RAD-AO4-IFS <sup>1)</sup>	2901538	1

**Accessories**

RAD-AI4-IFS <sup>1)</sup>	2901537	1
RAD-PT100-4-IFS	2904035	1

## Wireless data communication

### Wireless I/O

#### Wireless MUX - the wireless signal cable

The Wireless MUX transmits 16 digital and 2 analog signals bidirectionally. The Wireless MUX is supplied ready to use: unpack – connect – switch on – and you have a working wireless path.

– Range\*:

With omnidirectional antenna, 50 m to 100 m in halls, up to 200 m outdoors.

With PANEL antennas, up to 400 m outdoors.

#### Fieldline I/O for wireless fieldbus extension

The Bluetooth I/O system integrates I/O signals into a fieldbus or an Ethernet network via Bluetooth.

##### Advantages of Bluetooth technology:

- Extremely rugged and reliable
- Simple and fast commissioning
- WLAN coexistence functions AFH, LEM, black channel listing
- Parallel operation of several Bluetooth systems
- Range\*:  
20 m to 50 m in industrial halls, up to over 100 m outdoors.

#### Notes:

\* The range may be significantly above or below that stated, and depends on the environment, antenna technology, and the product used.

1) EMC: Class A product, see page 553



Wireless set, including antennae



#### Technical data

Wireless interface	
Wireless standard	Bluetooth 1.2
Frequency range	2.402 GHz ... 2.48 GHz (ISM bandwidth)
Transmission power	16 dBm (40 mW, controlled automatically)
Wireless modules that can be connected	-
Antenna connection method	MCX (female)
Fieldbus interface	
Name	-
Transmission speed	-
Power supply for module electronics	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including ripple)
Digital inputs	
Connection technology	1-wire
Number of inputs	16
Digital outputs	
Connection technology	1-wire
Number of outputs	16
Analog inputs	
Number of inputs	2
Voltage input signal	0 V ... 10 V
Current input signal	0 mA ... 20 mA
Measured value resolution	12 bits
Analog outputs	
Number of outputs	2
Voltage output signal	0 V ... 10 V
Current output signal	0 mA ... 20 mA
DAC resolution	12 bit
General data	
Width	95 mm
Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Wireless MUX set</b> , consisting of two modules including antennas, each with 16 digital and 2 analog inputs and outputs			
- With OMNI antennas, 16 dBm transmission power	<b>ILB BT ADIO MUX-OMNI</b>	<b>2884208</b>	1
- With OMNI antennas, 8 dBm transmission power, maritime approvals	<b>ILB BT ADIO MUX-OMNI 8/M<sup>1</sup>)</b>	<b>2693185</b>	1
- With PANEL antennas, 12 dBm transmission power, 8 dBi antenna gain	<b>ILB BT ADIO MUX-PANEL</b>	<b>2884509</b>	1
<b>Fieldline Modular Wireless IO base station</b> for up to three wireless IO devices			
- Adjustable transmission power			
<b>Fieldline Modular wireless I/O device</b>			
- Adjustable transmission power			
- 16 inputs			
<b>Inline Block wireless I/O device</b>			
- Adjustable transmission power			





Fieldline local bus base station,  
Incl. OMNI antenna



I/O wireless module,  
incl. OMNI antenna



I/O wireless module,  
incl. OMNI antenna



Technical data

Bluetooth 1.2 2.402 GHz ... 2.48 GHz (ISM bandwidth) 8 dBm (6.3 mW, controlled automatically)
Up to 3 SMA (female)
Fieldline Modular local bus 500 kbaud / 2 Mbaud (data rate can be changed via pin 5 (voltage supply ULS))
24 V DC 19.2 V DC ... 30 V DC (including ripple)
-
-
-
-
-
-
-
-
-
-
70.5 mm IP65 -25 °C ... 60 °C



Technical data

FLM BT DIO 8/8 M12 <sup>1)</sup>	FLM BT DI 16 M12 <sup>1)</sup>
Bluetooth 1.2 2.402 GHz ... 2.48 GHz (ISM bandwidth) 8 dBm (6.3 mW, controlled automatically)	
1 (FLM BT BS 3, FL BT MOD IO AP) SMA (female)	
-	-
24 V DC	
19.2 V DC ... 30 V DC (including ripple)	19.2 V DC ... 32 V DC (including ripple)
2, 3-wire	2 or 3-wire (optionally 4-wire)
8	16
2, 3-wire	-
8	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
70.5 mm IP65 -25 °C ... 60 °C	70.5 mm IP65 -25 °C ... 60 °C



Technical data

Bluetooth 1.2 2.402 GHz ... 2.48 GHz (ISM bandwidth) 16 dBm (can be set between 0 dBm/1 mW and 16 dBm/39.8 mW in 4 dB increments) 1 (FLM BT BS 3, FL BT MOD IO AP) SMA (female)
-
24 V DC 19.2 V DC ... 30 V DC (including ripple)
1-wire
16
1-wire
16
2
0 V ... 10 V
0 mA ... 20 mA
12 bits
2
0 V ... 10 V
0 mA ... 20 mA
12 bit
117 mm IP20 -25 °C ... 60 °C

Ordering data

Type	Order No.	Pcs. / Pkt.
FLM BT BS 3 <sup>1)</sup>	2736770	1

Ordering data

Type	Order No.	Pcs. / Pkt.
FLM BT DIO 8/8 M12 <sup>1)</sup>	2736767	1
FLM BT DI 16 M12 <sup>1)</sup>	2693208	1

Ordering data

Type	Order No.	Pcs. / Pkt.
ILB BT ADIO 2/2/16/16 <sup>1)</sup>	2884282	1

## Wireless data communication

### WirelessHART gateway

The **RAD-WHG/WLAN-XD** is a WirelessHART gateway with integrated 802.11b/g WLAN transceiver. It converts HART data to Modbus TCP for easy integration into almost any host system.

- Simple programming and diagnostics using an embedded web server or HART programmer
- WirelessHART gateway supports 250 WirelessHART devices
- 802.11b/g client can be used as WirelessHART backhaul connection with 802.11i (WPA2) 128-bit AES encryption
- Fully meshed routing (self-organizing and self-healing network) with WirelessHART
- WirelessHART uses "channel hopping" as a means of tolerating interference

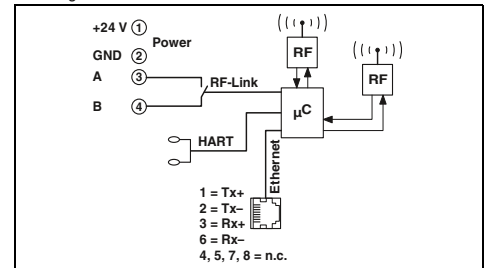


WirelessHART



WirelessHART gateway

Ex:   
Housing width 45 mm

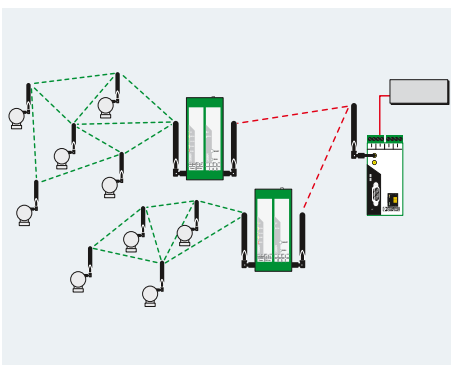


#### Technical data

Wireless path		WLAN as per IEEE 802.11 b/g
Interface description		Bi-directional
Direction		2.4 GHz ... 2.472 GHz
Frequency range		0 ... 20 dBm
Transmission power		13
Number of channels		Socket
Connection method		
Wireless path		WirelessHART
Interface description		2.4 GHz ... 2.4835 GHz
Frequency range		0 ... 10 dBm
Transmission power		15
Number of channels		Socket
Connection method		
Ethernet interface		
Connection method		RJ45
Transmission speed		10/100 Mbps
General data		
Supply voltage		9 V DC ... 30 V DC
Current consumption		typ. / max. 125 mA (at 24 V DC) / 300 mA (at 24 V DC)
Degree of protection		IP20
Ambient temperature range		-40 °C ... 70 °C
Housing material		Polyamide PA non-reinforced
Dimensions W / H / D		45 / 99 / 114.5 mm
Screw connection solid/stranded/AWG		0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Conformance / approvals		
Conformance		CE-compliant FCC Directive, Part 15.247 Class I, Zone 2, Group IIC ; AEx nA IIC T4 Class I, Division 2 Groups A,B,C,D Ex nA IIC T4
CSA, USA		
CSA, Canada		

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
WirelessHART gateway	RAD-WHG/WLAN-XD	2900178	1

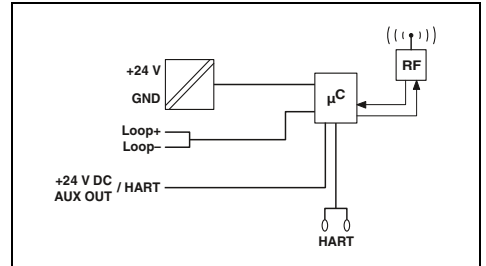


**WirelessHART adapter**

- The **RAD-WHA-1/2NPT** is an adapter that allows up to 4 HART devices to be on a WirelessHART network.
- Allows wired HART devices to transfer data on a WirelessHART network
  - Connect up to 4 HART device to one adapter
  - Allows connection of one standard 4... 20 mA signal for easy integration of non-HART devices into a WirelessHART network
  - 1/2-in. NPT fitting allows remote mounting or direct connection to instrument
  - Removable antenna for connection of coaxial cable and high gain antenna



Housing width 87.2 mm



**Technical data**

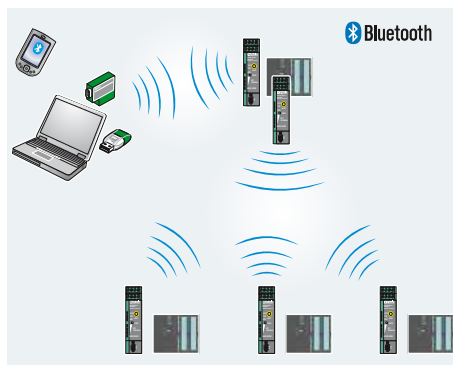
Wireless path	WirelessHART
Interface description	Bi-directional
Direction	2.4 GHz ... 2.4835 GHz
Frequency range	0 ... 10 dBm
Transmission power	15
Number of channels	N (female)
Connection method	
Analog input	
Number of inputs	1
Signal range	4 mA ... 20 mA
General data	
Supply voltage	11 V DC ... 30 V DC
Current consumption	max. 95 mA
Degree of protection	IP67
Ambient temperature range	-40 °C ... 70 °C
Housing material	Aluminum, die-cast, corrosion resistant, powder-coated
Dimensions W / H / D	87.2 / 161 / 65.3 mm
Connection method	Flying leads, 20 AWG
Conformance / approvals	
Conformance	-

**Ordering data**

Description	Type	Order No.	Pcs. / Pkt.
<b>WirelessHART adapter</b>	<b>RAD-WHA-1/2NPT</b>	<b>2900100</b>	<b>1</b>

## Wireless data communication

### Bluetooth interface converter for V.24 (RS-232), RS-422, RS-485 2-wire



**Bluetooth converter, universal for V.24 (RS-232), RS-422, RS-485 2-wire**

#### Applications:

The Bluetooth converter is used to convert V.24 (RS-232), RS-422, and RS-485 2-wire or USB interfaces to the licence-free Bluetooth wireless standard. It serves as a straightforward and flexible substitute for a cable in order, for example, to perform programming/diagnostics tasks via a notebook or as a cost-effective alternative to slip rings, drag chains or fieldbus cables, such as Modbus, PROFIBUS, etc.

#### Topology:

- Point-to-point
- Multipoint with up to seven slaves

#### Features:

#### Flexible parameterization/application options:

- Can be used for V.24 (RS-232)/RS-422/RS-485-2 2-wire interfaces up to 187.5 kbps
- Transceiver for distances of up to 150 m

#### High transmission reliability:

- Secure and tamper-proof data transmission thanks to password protection, encryption, plus fixed and invisible device pairing
- Coexistence with other wireless systems thanks to adaptive frequency hopping (AFH) method

#### Easy installation:

- Wireless path diagnostics based on integrated bar graphs and 2 digital outputs
- Installation of parallel wireless paths thanks to 24 V DC and RS-485 cross-wiring
- Local configuration via USB interface without separate power supply unit

Technical data	
Supply	
Supply voltage	10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
Supply voltage	19 V AC ... 29 V AC
Supply voltage	24 V DC $\pm$ 20% (as an alternative or redundant, via backplane bus contact and system current supply)
Nominal current consumption	$\leq$ 100 mA (24 V DC)
Serial port	
Connection method	D-SUB-9 plug Plug-in screw connection
Transmission speed	0.3; 1.2; 2.4; 4.8; 7.2; 9.6; 19.2; 31.25; 38.4; 57.6; 75; 93.75; 115.2 kbps 0.3; 1.2; 2.4; 4.8; 7.2; 9.6; 19.2; 31.25; 38.4; 57.6; 75; 93.75; 115.2; 136; 187.5 kbps
Wireless interface	
Antenna connection	External
Transmission power	-28 dBm to 14 dBm (can be set via software)
Receiver sensitivity	-91.00 dBm
Frequencies	2.402 GHz ... 2.48 GHz (ISM bandwidth)
Range depending on spatial conditions	$\leq$ 150 m (14 dBm)
Bluetooth Multidrop master / slave	1/7
General data	
Ambient temperature (operation)	-20 °C ... 60 °C
Electromagnetic compatibility	Conformance with R&TTE directive 1999/5/EC
Dimensions	22.5 mm / 99 mm / 116 mm

Description
<b>PSI Bluetooth converter</b> , MCX connection for external antenna
- Device with 2x diagnostic outputs - Device with HazLoc approval
<b>PSI Bluetooth PROFIBUS-SET</b> , supplied as standard: 2x PSI Bluetooth converters, 2x OMNI omnidirectional antennas
<b>PSI Bluetooth USB adapter</b> , internal antenna

<b>RS-232-D-SUB cable</b> , length: 2 m
- 9-pos. socket on 9-pos. socket
<b>Omnidirectional antenna</b>
<b>PANEL directional wireless antenna</b> (without cable)
<b>Antenna adapter cable</b>
<b>System power supply unit</b> , primary-switched
<b>DIN rail connector</b>

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>PSI-WL-RS232-RS485/BT/2DO</b>	2313805	1
<b>PSI-WL-RS232-RS485/BT/HL</b>	2313795	1

Accessories		
	Order No.	Pcs. / Pkt.
<b>PSM-KA9SUB9/BB/2METER</b>	2799474	1
<b>RAD-ISM-2400-ANT-OMNI-2-1</b>	2867461	1
<b>RAD-ISM-2400-ANT-PAN- 8-0</b>	2867610	1
<b>RAD-PIG-EF316-MCX-SMA</b>	2867678	1
<b>MINI-SYS-PS-100-240AC/24DC/1.5</b>	2866983	1
<b>ME 22.5 TBUS 1,5/ 5-ST-3,81 GN</b>	2707437	50



Bluetooth

PROFIBUS



Bluetooth



Bluetooth set

Pre-configured for PROFIBUS connections

Bluetooth USB adapter

Technical data
10 V DC ... 30 V DC (via plug-in COMBICON screw terminal block)
19 V AC ... 29 V AC (via plug-in COMBICON screw terminal block)
24 V DC $\pm$ 20% (as an alternative or redundant, via backplane bus contact and system current supply)
$\leq$ 100 mA (24 V DC)
COMBICON screw terminal block
Preconfigured

Technical data
-
-
5 V DC (directly via the USB interface)
100 mA (5 V DC)
USB type A, plug
Up to 2.1 Mbps

External
14 dBm
-91.00 dBm
2.402 GHz ... 2.48 GHz (ISM bandwidth)
$\leq$ 150 m (14 dBm)
-
-20 °C ... 60 °C
Conformance with R&TTE directive 1999/5/EC
22.5 mm / 99 mm / 116 mm

Internal
20 dBm
-80.00 dBm
2.402 GHz ... 2.48 GHz (ISM bandwidth)
20 dBm (100 mW) = 80 m ... 150 m
-
0 °C ... 70 °C
Conformance with R&TTE directive 1999/5/EC
18 mm / 58 mm / 8 mm

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-WL-PROFIB/BT-SET/2DO	2313876	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
PSI-WL-PLUG-USB/BT	2313083	1

Accessories		
Type	Order No.	Pcs. / Pkt.
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50

Accessories		
Type	Order No.	Pcs. / Pkt.

## Wireless data communication

### Accessories

#### Omnidirectional antennas

- For mobile or point-to-multipoint applications with a small range
- Version with higher impact strength that is not immediately recognizable as an antenna



2 dBi gain



3 dBi gain, higher impact strength

General data	
Ambient temperature range	-20 °C ... 65 °C
Degree of protection	IP65
Impact strength	-
Gain	2 dBi
Impedance	50 Ω
Acceptance angle	75 ° / 360 °
Dimensions W / H	7.8 / 82.5 mm
Frequency range	2.4 GHz
Scope of supply	Incl. mounting material

Technical data		

Technical data		

Ordering data	
Description	
<b>Omnidirectional antenna</b>	
With connection MCX (male)	
With connection RSMA (male)	
With SMA connection (male)	
Mounting material for wall mounting	

Type	Order No.	Pcs. / Pkt.
<b>RAD-ISM-2400-ANT-OMNI-2-1</b>	<b>2867461</b>	1
<b>RAD-ISM-2400-ANT-OMNI-2-1-RSMA</b>	<b>2701362</b>	1

Type	Order No.	Pcs. / Pkt.
<b>RAD-ISM-2400-ANT-VAN-3-1-MCX</b>	<b>2885702</b>	1
<b>RAD-ISM-2400-ANT-VAN-3-0-RSMA</b>	<b>2701358</b>	1
<b>RAD-ISM-2400-ANT-VAN-3-0-SMA</b>	<b>2885867</b>	1
<b>RAD-ANT-VAN-MKT</b>	<b>2885870</b>	1

#### Omnidirectional Antennas

- For mobile applications with a longer range



6 dBi gain



Gain up to 6 dBi/8 dBi, Dual band

General data	
Ambient temperature range	-40 °C ... 75 °C
Degree of protection	IP55
Gain	6 dBi
Impedance	50 Ω
Acceptance angle	30 ° / 360 °
Dimensions W / H	22 mm / 250 mm
Frequency range	2.4 GHz
Scope of supply	Incl. mounting material

Technical data		

Technical data		

Ordering data	
Description	
<b>Omnidirectional antenna</b>	
With connection N (female)	
With connection N (female), salt water resistant	
<b>Dual band omnidirectional antenna with vandalism protection</b>	
With adapter cable N (male) -> SMA (male)	
With adapter cable N (male) -> MCX (male)	

Type	Order No.	Pcs. / Pkt.
<b>RAD-ISM-2400-ANT-OMNI-6-0</b>	<b>2885919</b>	1
<b>RAD-2400-ANT-OMNI-6-0-SW</b>	<b>2903219</b>	1

Type	Order No.	Pcs. / Pkt.
<b>RAD-ISM-2459-ANT-FOOD-6-0</b>	<b>2692526</b>	1
<b>RAD-ISM-2459-ANT-FOOD-6-0-MCX</b>	<b>2700674</b>	1

**Accessories**

**Directional wireless antennas**

– For large distances with line of sight



8 dBi gain



19 dBi gain

Technical data	
General data	ANT-DIR-2459-01      RAD-...PAN-8-0
Ambient temperature range	-40 °C ... 80 °C      -40 °C ... 75 °C
Degree of protection	IP67      IP55
Gain	9 dBi      8 dBi
Impedance	50 Ω      50 Ω
Acceptance angle	55 ° (at 2.4 GHz) / 75 ° (at 2.4 GHz)      70 ° / 75 °
Dimensions W / H	80 / 101 mm      80 / 100 mm
Frequency range	2.4 GHz      2.3 GHz
Scope of supply	Incl. mounting material      Incl. mounting material

Technical data	
General data	RAD-ISM-2400-ANT-PAN-8-0
Ambient temperature range	-40 °C ... 70 °C
Degree of protection	IP65
Gain	19 dBi
Impedance	50 Ω
Acceptance angle	11 ° / 17 °
Dimensions W / H	610 / 419 mm
Frequency range	2.4 GHz
Scope of supply	Incl. mounting material

Ordering data			
Description	Type	Order No.	Pcs. / Pkt.
<b>PANEL directional wireless antenna</b> (without cable)	<b>ANT-DIR-2459-01</b>	<b>2701186</b>	<b>1</b>
With connection N (female)			
With connection SMA (female)	<b>RAD-ISM-2400-ANT-PAN- 8-0</b>	<b>2867610</b>	<b>1</b>

Ordering data			
Description	Type	Order No.	Pcs. / Pkt.
<b>Parabolic antenna</b>	<b>RAD-ISM-2400-ANT-PAR-19-0</b>	<b>2867885</b>	<b>1</b>
With connection N (female)			

**Weather protection**

**Sealing tape**

- Provides additional weather protection for adapters, splitters, cable connections, etc.
- Self-vulcanizing



General data	
Ambient temperature range	-40 °C ... 90 °C
Properties	Self-vulcanizing
Width	19 mm
Length	3 m
Thickness	0.75 mm

Technical data	
Ambient temperature range	-40 °C ... 90 °C
Properties	Self-vulcanizing
Width	19 mm
Length	3 m
Thickness	0.75 mm

Ordering data			
Description	Type	Order No.	Pcs. / Pkt.
<b>Weather protection tape</b>	<b>RAD-TAPE-SV-19-3</b>	<b>2903182</b>	<b>1</b>

Ordering data			
Description	Type	Order No.	Pcs. / Pkt.
<b>Weather protection tape</b>	<b>RAD-TAPE-SV-19-3</b>	<b>2903182</b>	<b>1</b>



## Wireless data communication

### Accessories

#### Antenna splitter

- For connecting two panel antennas for repeater applications

#### Surge protection

- For installing the antenna outside buildings from a cable length of 3 m



Antenna splitter, 2-way



Protection adapter for coaxial connections

General data	
Ambient temperature range	-40 °C ... 85 °C
Degree of protection	IP20
Attenuation per branch	3 dB
Connection method	2x SMA (female), 1x SMA (male)
Frequency range	2.3 GHz ... 2.5 GHz
Scope of supply	2-way splitter, adapter from N (female) to SMA (female), 4 strips of self-vulcanizing weather protection tape

Technical data		
-40 °C ... 85 °C		
IP20		
3 dB		
2x SMA (female), 1x SMA (male)		
2.3 GHz ... 2.5 GHz		
2-way splitter, adapter from N (female) to SMA (female), 4 strips of self-vulcanizing weather protection tape		

Technical data		
-40 °C ... 90 °C		
IP68		
Typ. 0.05 dB (≤ 0.15 dB)		
-		
2.4 GHz ... 5.9 GHz		
-		

Description	
<b>Antenna splitter</b>	
Double	
COAXTRAB, protection adapter for antenna connections with Lambda/4 technology, 2.4 to 5.9 GHz	
N (female) -> N (female)	
N(male) -> N(female)	

Ordering data		
Type	Order No.	Pcs. / Pkt.
RAD-ISM-2400-SPL-2-SMA	2885595	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
CN-LAMBDA/4-5.9-BB	2838490	1
CN-LAMBDA/4-5.9-SB	2800023	1

### Accessories

#### Adapter cable

- For adaptation of wireless module for antenna
- Attenuation:  
Approximately 0.55 dB/m at 900 MHz  
Approximately 0.80 dB/m at 2.4 GHz  
Approximately 1.10 dB/m at 5 GHz



Antenna adapter cable, N (male) -> RSMA (male)



Adapter

General data	
Ambient temperature range	-40 °C ... 85 °C
Degree of protection	-
Impedance	50 Ω

Technical data		
-40 °C ... 85 °C		
-		
50 Ω		

Technical data		
-65 °C ... 165 °C		
IP20		
50 Ω		

Description	
<b>Antenna adapter cable</b>	
0.5 m long	
1 m long	
2 m long	
3 m long	
<b>Adapter</b>	
N (female) -> N (female)	
N (male) -> SMA (female)	
RSMA (female) -> SMA (female)	
SMA (female) -> SMA (female)	
SMA (female) -> SMA (female), perpendicular	

Ordering data		
Type	Order No.	Pcs. / Pkt.
RAD-PIG-RSMA/N-0.5	2903263	1
RAD-PIG-RSMA/N-1	2903264	1
RAD-PIG-RSMA/N-2	2903265	1
RAD-PIG-RSMA/N-3	2903266	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
RAD-ADP-N/F-N/F	2867843	1
RAD-ADP-N/M-SMA/F	2917036	1
RAD-ADP-RSMA/F-SMA/F	2884538	1
RAD-ADP-SMA/F-SMA/F	2884541	1
RAD-ADP-SMA/F-SMA/M-90	2917324	1

**Accessories**

**Adapter/extension cables**

– Extension or adaptation of wireless module for antenna

**Notes:**

Keep the connection from the wireless module to the antenna as short as possible, as every cable leads to attenuation.



Antenna adapter cable

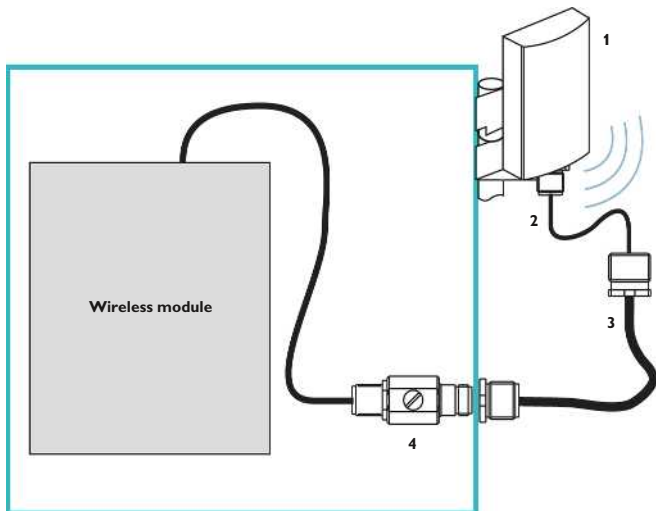


Antenna cable for longer connections

Technical data				Technical data		
General data				General data		
Ambient temperature range				-40 °C ... 70 °C		
Attenuation / impedance (at 2400 MHz)				approx. 1.5 dB/m / 50 Ω		
Ordering data				Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Antenna adapter cable</b>						
1 m long, MCX (male) -> SMA (male)	RAD-PIG-EF316-MCX-SMA	2867678	1			
50 cm long, MCX (male) -> N (male)	RAD-PIG-EF316-MCX-N	2867681	1			
30 cm long, N (female) -> SMA (male)	RAD-PIG-EF316-N-SMA	2867694	1			
50 m long, N (female) -> N (male)	RAD-PIG-EF316-N-N	2867704	1			
50 cm long, SMA (male) -> SMA (male)	RAD-PIG-EF316-SMA-SMA	2885618	1			
<b>Antenna extension cable</b>						
3 m long, N connection at both ends (male)				RAD-CAB-EF393- 3M	2867649	1
5 m long, N connection at both ends (male)				RAD-CAB-EF393- 5M	2867652	1
10 m long, N connection at both ends (male)				RAD-CAB-EF393-10M	2867665	1
15 m long, N connection at both ends (male)				RAD-CAB-EF393-15M	2885634	1
3 m long, SMA connection at both ends (male)				RAD-CAB-EF142-3M	2884512	1
5 m long, SMA connection at both ends (male)				RAD-CAB-EF142-5M	2884525	1

**Control cabinet/switch box**

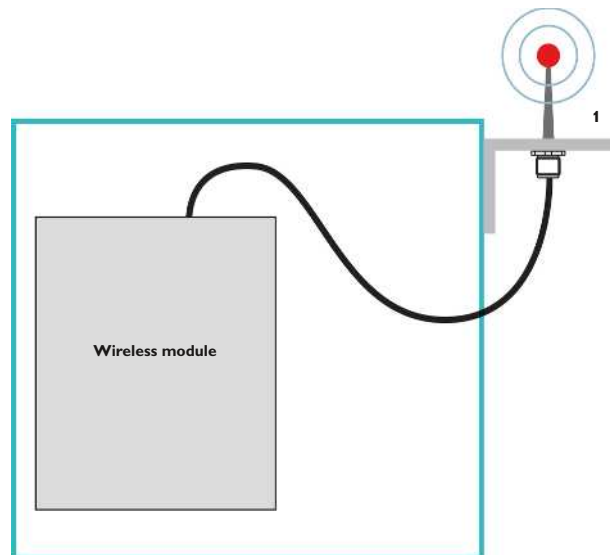
– For antennas with extension cable, with surge protection



- 1 Antenna
- 2 Antenna adapter cable (pigtail)
- 3 Antenna extension cable
- 4 Surge protection

**Control cabinet/switch box**

– For antennas without extension cable, without surge protection



## Wireless data communication (900 MHz)

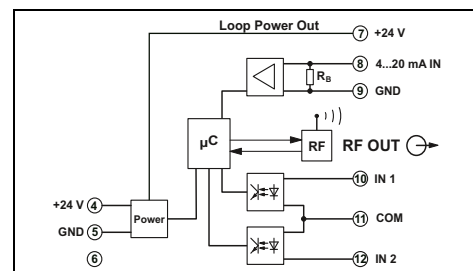
### RAD-Line IO - UD wireless system with Trusted Wireless

- The **RAD-ISM-900-SET...UD...** uni-directional wireless radio system consists of
- Two transceivers preconfigured to communicate to one another
  - Two omnidirectional antennas
  - Operates in the license-free 902-928 MHz ISM band
  - Frequency-hopping spread spectrum technology
  - Transmitter can be DIN rail mounted ME housing or IP65 conduit style
  - Conduit-style transmitters can be either 24 V DC or 120/240 V AC powered
  - Receiver is DIN rail mounted ME housing, 24 V DC powered
- Integrated I/O allows connection directly to analog and digital inputs/outputs

**Notes:**  
The products are offered exclusively for export outside the European Economic Area (EEA).



Set consisting of transmitter, receiver and two antennas with connecting cables

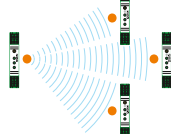


		Technical data		
		America	Australia	New Zealand
Wireless path		Uni-directional	Uni-directional	Uni-directional
Direction		902 ... 928	915.1 ... 927.8	921.4 ... 927.7 [MHz]
Frequency range		1 W	1 W	1 W
Transmission power		4 x 63	2 x 63	1 x 63
Number of channels		Analog input		
Analog input		Number of inputs / signal range		
Number of inputs / signal range		1 x 4 mA ... 20 mA		
Input resistance		< 150 Ω		
Digital input		Number of inputs / signal range		
Number of inputs / signal range		2 x 5 V AC/DC ... 30 V AC/DC		
Switching level	1 signal ("H") 0 signal ("L")	min. 5 V DC max. 1.5 V DC		
Analog output		Number of outputs / Signal range		
Number of outputs / Signal range		1 x 4 mA ... 20 mA		
Load R <sub>B</sub>		700 Ω (at U <sub>B</sub> = 24 V, R <sub>B</sub> = [U <sub>B</sub> -10 V] / 20 mA)		
Digital output		3 floating PDT contacts		
Switching voltage		30 V DC / 120 V AC		
Switching current		0.5 A		
General data		Transmitter (TX)		Receiver (RX)
Supply voltage		12 V DC ... 30 V DC		12 V DC ... 30 V DC
Current consumption	Typ./max.	75 mA / 350 mA		85 mA / 125 mA
Degree of protection		-		-
Ambient temperature range		-40 °C ... 70 °C		-40 °C ... 70 °C
Housing material		Polyamide PA non-reinforced		Polyamide PA non-reinforced
Dimensions W / H / D		17.5 / 99 / 114.5 mm		17.5 / 99 / 114.5 mm
Conformance / approvals		FCC Directive, Part 15.247 ISC Directive RSS 210 Class I, Div. 2, Groups A, B, C, D		
Conformance		UL, USA / Canada		

Point-to-point



Point-to-multipoint



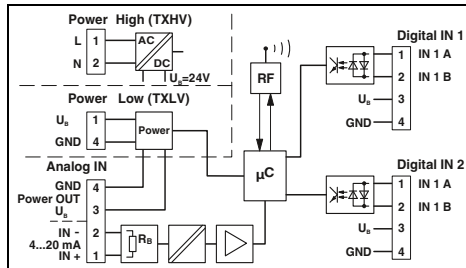
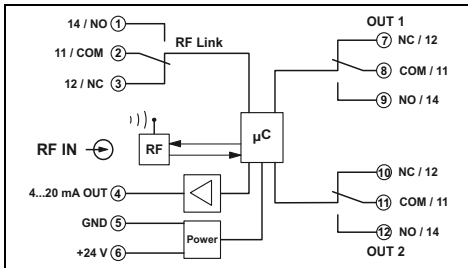
		Ordering data		
Description		Type	Order No.	Pcs. / Pkt.
Wireless set (transmitter, receiver, including antennas)				
	America	RAD-ISM-900-SET-UD-ANT	2867102	1
		RAD-ISM-900-RX	2867047	1
Wireless set (transmitter, receiver, including antennas)				
	Australia	RAD-ISM-900-SET-UD-ANT-AU	2867416	1
		RAD-ISM-900-RX-AU	2867445	1
Wireless set (transmitter, receiver, including antennas)				
	New Zealand	RAD-ISM-900-SET-UD-ANT-NZ	2885029	1
		RAD-ISM-900-RX-NZ	2885058	1



Set, consisting of transmitter for the mains connection (IP65) and receiver (IP20) including antennas



Set, consisting of transmitter for the low-voltage range (IP65) and receiver (IP20) including antennas



Technical data

America	Australia	New Zealand
Uni-directional	Uni-directional	Uni-directional
902 ... 928	915.1 ... 927.8	921.4 ... 927.7
[MHz]		
1 W	1 W	1 W
4 x 63	2 x 63	1 x 63
1 x 4 mA ... 20 mA		
< 170 Ω		
2 x 85 V AC ... 240 V AC		
-		
1 x 4 mA ... 20 mA		
700 Ω (at U <sub>B</sub> = 24 V, R <sub>B</sub> = [U <sub>B</sub> -10 V] / 20 mA)		
3 floating PDT contacts		
30 V DC / 120 V AC		
0.5 A		
Transmitter (TX)		Receiver (RX)
100 V AC ... 240 V AC		12 V DC ... 30 V DC
57 mA / 109 mA		85 mA / 125 mA
-		-
-40 °C ... 70 °C		-40 °C ... 70 °C
5052H32AL PBT		Polyamide PA non-reinforced
57 / 57 / 280 mm		17.5 / 99 / 114.5 mm

Technical data

America	Australia	New Zealand
Uni-directional	Uni-directional	Uni-directional
902 ... 928	915.1 ... 927.8	921.4 ... 927.7
[MHz]		
1 W	1 W	1 W
4 x 63	2 x 63	1 x 63
1 x 4 mA ... 20 mA		
< 170 Ω		
2 x 5 V AC/DC ... 30 V AC/DC		
min. 5 V DC		
max. 1.5 V DC		
1 x 4 mA ... 20 mA		
700 Ω (at U <sub>B</sub> = 24 V, R <sub>B</sub> = [U <sub>B</sub> -10 V] / 20 mA)		
3 floating PDT contacts		
30 V DC / 120 V AC		
0.5 A		
Transmitter (TX)		Receiver (RX)
9 V DC ... 30 V DC		12 V DC ... 30 V DC
75 mA / 350 mA		85 mA / 125 mA
-		-
-40 °C ... 70 °C		-40 °C ... 70 °C
5052H32AL PBT		Polyamide PA non-reinforced
57 / 57 / 280 mm		17.5 / 99 / 114.5 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
RAD-ISM-900-SET-AC-UD	2867021	1
RAD-ISM-900-SET-AC-UD-AU	2867429	1
RAD-ISM-900-SET-AC-UD-NZ	2885032	1

Ordering data

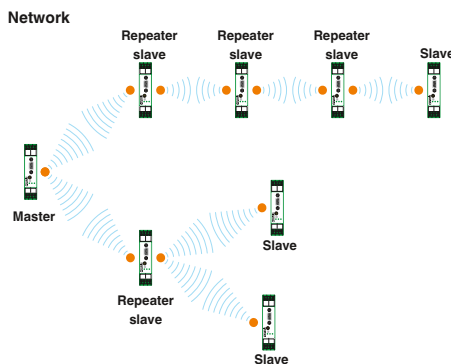
Type	Order No.	Pcs. / Pkt.
RAD-ISM-900-SET-DC-UD	2867034	1
RAD-ISM-900-SET-DC-UD-AU	2867432	1
RAD-ISM-900-SET-DC-UD-NZ	2885045	1

## Wireless data communication (900 MHz)

### RAD-Line Serial IO - BD wireless system for transmission of serial data and I/O signals

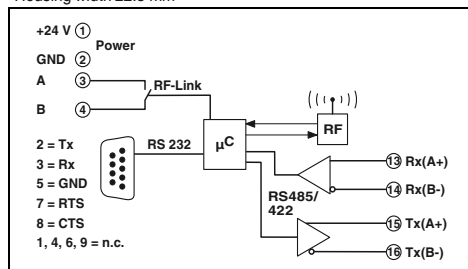
The **RAD-ISM-900-DATA-BD-BUS...** bi-directional wireless radio allows wireless connection of several decentralized controllers and the reception and output of I/O signals from the field to a central location (controller).

- Operates in the license-free 902-928 MHz ISM band
- Frequency-hopping spread spectrum technology
- Provides an interface for transfer of I/O data between 900 MHz wireless and RS-232, RS-422, and RS-485 interfaces
- Programmable for point-to-point, point-to-multipoint and multipoint-to-point configurations
- Integrated bus foot allows connection to additional I/O modules
- Individual modules can be configured as master, slave or repeater
- Up to 254 slaves may operate from a single master



Wireless transceiver for serial interfaces (RS-232, RS-422/RS-485)

Ex: Housing width 22.5 mm



**Notes:**  
The basic software for the configuration and diagnostics of two network devices can be downloaded free of charge at [www.phoenixcontact.com](http://www.phoenixcontact.com). A software license is required to perform the diagnostic functions for multiple network devices.  
The products are offered exclusively for export outside the European Economic Area (EEA).

<b>Wireless path</b>	
Direction	
Frequency range	
Transmission power	
Number of channels	
<b>Serial port</b>	
Connection method	
Serial transmission speed	
Data format/coding	
Data flow control/protocols	
<b>Analog input</b>	
Number of inputs	
Signal range	
Input resistance	
<b>Digital input</b>	
Number of inputs	
Switching level	
Pulse input	
Switching level	
Pulse time	
<b>Digital output</b>	
Switching voltage	
Switching current	
<b>General data</b>	
Supply voltage	9 V DC ... 30 V DC
Current consumption	110 mA / 180 mA
Degree of protection	IP20
Ambient temperature range	-40 °C ... 70 °C
Housing material	Polyamide PA non-reinforced
Dimensions W / H / D	
Screw connection solid/stranded/AWG	
<b>Conformance / approvals</b>	
Conformance	
UL, USA / Canada	

Technical data		
America	Australia	New Zealand
Bi-directional	Bi-directional	Bi-directional
902 ... 928	915.1 ... 927.8	921.4 ... 927.7 [MHz]
1 W	1 W	1 W
4 x 63	2 x 63	1 x 63
RS-232		RS-485/RS-422
9-pos. D-SUB (socket)		COMBICON plug-in screw terminal block
1,2 / 2,4 / 9,6 / 19,2 / 38,4 kbps		1,2 / 2,4 / 9,6 / 19,2 / 38,4 kbps
Asynchronous		
RTS/CTS		
<b>Ordering data</b>		
FCC Directive, Part 15.247		
ISC Directive RSS 210		
Class I, Div. 2, Groups A, B, C, D		

Description	
Wireless module with serial interface	America
Wireless module with serial interface	Australia
Wireless module with serial interface	New Zealand

Type	Order No.	Pcs. / Pkt.
RAD-ISM-900-DATA-BD	2867131	1
RAD-ISM-900-DATA-BD-AU	2867953	1
RAD-ISM-900-DATA-BD-NZ	2885155	1



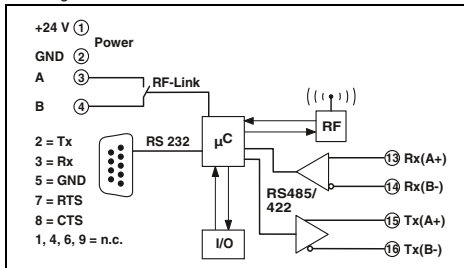
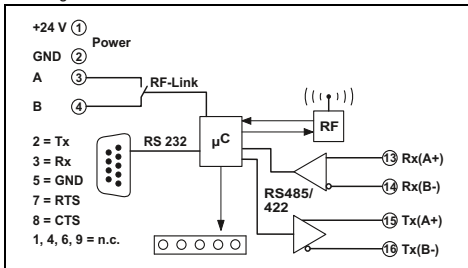
Wireless transceiver for serial interfaces (RS-232, RS-422/RS-485), can be extended



Wireless transceiver for serial interfaces (RS-232, RS-422/RS-485), with integrated inputs/outputs

Ex: Housing width 22.5 mm

Housing width 64 mm



Technical data

Technical data

America	Australia	New Zealand
Bi-directional	Bi-directional	Bi-directional
902 ... 928	915.1 ... 927.8	921.4 ... 927.7 [MHz]
1 W	1 W	1 W
4 x 63	2 x 63	1 x 63
RS-232	RS-485/RS-422	
9-pos. D-SUB (socket)	COMBICON plug-in screw terminal block	
1,2 / 2,4 / 9,6 / 19,2 / 38,4 kbps	1,2 / 2,4 / 9,6 / 19,2 / 38,4 kbps	
Asynchronous		
RTS/CTS		
-		
-		
-		
-		
-		
-		
-		
-		
9 V DC ... 30 V DC	12 V DC ... 30 V DC	
110 mA / 180 mA	- / 4.1 A	
IP20	IP20	
-40 °C ... 70 °C	-40 °C ... 70 °C	
Polyamide PA non-reinforced	Polyamide PA non-reinforced with aluminum heatsink	
22.5 / 99 / 114.5 mm	64 / 99 / 114.5 mm	
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
FCC Directive, Part 15.247	FCC Directive, Part 15.247	
ISC Directive RSS 210		
Class I, Div. 2, Groups A, B, C, D		

Bi-directional	RS-232	RS-485/RS-422
902 MHz ... 928 MHz	9-pos. D-SUB (socket)	COMBICON plug-in screw terminal block
1 W	1,2 / 2,4 / 9,6 / 19,2 / 38,4 kbps	1,2 / 2,4 / 9,6 / 19,2 / 38,4 kbps
4 x 63	Asynchronous	Asynchronous
	RTS/CTS	RTS/CTS
8		
0 V ... 5 V		
10 kΩ		
8		
≥ 2.6 V DC		
≤ 2.4 V DC		
≥ 2.6 V DC		
≤ 2.4 V DC		
5 ms (minimum)		
Digital outputs		
40 V DC		
500 mA (sinking)		

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
RAD-ISM-900-DATA-BD-BUS	2867296	1
RAD-ISM-900-DATA-BD-BUS-AU	2867996	1
RAD-ISM-900-DATA-BD-BUS-NZ	2885168	1

Type	Order No.	Pcs. / Pkt.
RAD-ISM-900-DATA-BD-PLUS	2902277	1

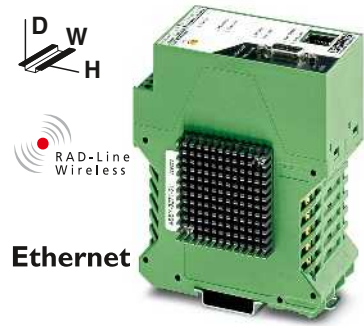
### RAD-Line Ethernet with Trusted Wireless

The **RAD-ISM-900-EN-BD...** industrial wireless radio allows a wireless connection of several decentralized controllers to a central location (controller) via an Ethernet or serial connection.

- Operates in the license-free 902-928 MHz ISM band
- Frequency-hopping spread spectrum technology
- Provides an interface for transfer of data between 900 MHz wireless and Ethernet, RS-232, RS-422 or RS-485 interfaces
- Contains an adjustable 10 mW... 1 W transmitter
- Supports TCP/IP, UDP and IP v4 protocols
- Programmable for point-to-point, point-to-multipoint and multipoint-to-point configurations
- Incorporates security using selectable 128/192/256-bit AES encryption
- **RAD-ISM-900-EN-BD-BUS** features an integrated bus foot to connect I/O modules (addressable via Modbus)
- Individual modules can be configured as master, slave or repeater using integrated web browser interface
- **RAD-ISM-900-EN-BD/B** is a dedicated slave radio with no Ethernet ports

#### Notes:

The products are offered exclusively for export outside the European Economic Area (EEA).

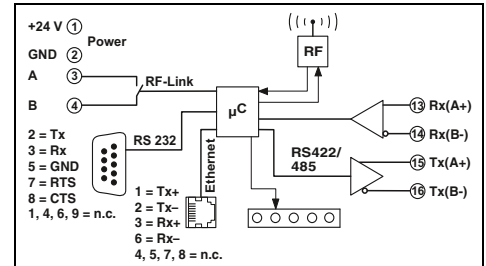


Ethernet

Wireless transceiver for Ethernet and serial interfaces V.24 (RS-232, RS-422/RS-485)

Ex:

Housing width 52 mm



#### Technical data

Wireless path	Bi-directional
Direction	902 MHz ... 928 MHz
Frequency range	10 ... 30 dBm
Transmission power	RS-232
Serial port	9-pos. D-SUB (socket)
Connection method	COMBICON plug-in screw terminal block
Serial transmission speed	300 ... 57,6 kbps
Data format/coding	Asynchronous
Data flow control/protocols	RTS/CTS
General data	
Supply voltage	11 V DC ... 30 V DC
Current consumption	250 mA (at 24 V DC)
Degree of protection	IP20
Ambient temperature range	-40 °C ... 65 °C
Housing material	Polyamide PA non-reinforced with aluminum heatsink
Dimensions W / H / D	52 / 99 / 115 mm
Screw connection solid/stranded/AWG	0,2 ... 4 mm <sup>2</sup> / 0,2 ... 2,5 mm <sup>2</sup> / 24 - 14
Conformance / approvals	FCC Directive, Part 15.247
Conformance	ISC Directive RSS 210
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Wireless module with optional Ethernet and serial interfaces	RAD-ISM-900-EN-BD-BUS	2900017	1
Bus foot for I/O extension modules	RAD-ISM-900-EN-BD	2900016	1
Cannot be extended	RAD-ISM-900-EN-BD/B	2901205	1
Without serial ports			



**RAD-Line Ethernet with 400 mW WLAN**

- High-power Ethernet industrial wireless radio transceivers that conform to IEEE standard 802.11b/g.
- Operates in the license-free 2.4 GHz ISM band
- Features a 400 mW industrial radio transceiver
- Selectable 802.11i high security with 128/192/256-bit AES encryption and optional 802.1x authentication
- Supports TCP/IP, UDP, and IP v4 protocols
- Individual modules can be configured as point, bridge or client modes using integrated web browser interface
- Bridge mode allows for a network of up to 40 nodes on a single network resulting in a highly reliable network
- Provides an interface for transfer of data between legacy serial devices (RS-232, RS-422, RS-485 interfaces) onto an Ethernet network
- Programmable for point-to-point, point-to-multipoint and multipoint-to-point configurations
- Optional integrated bus foot for connection to RAD-Line extension modules
- Can be used as a Modbus RTU/TCP gateway

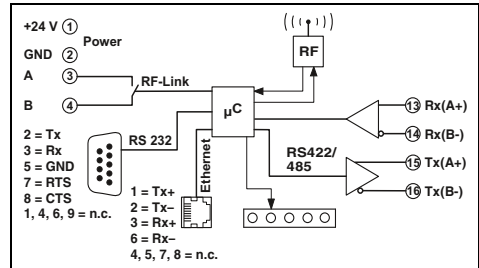
**Notes:**  
The products are offered exclusively for export outside the European Economic Area (EEA).



**Ethernet**

**WLAN wireless transceiver for Ethernet and serial interfaces (RS-232, RS-422/RS-485), can be extended with I/O extension modules**

Ex: Housing width 45 mm



<b>Wireless path</b>	
Direction	
Frequency range	
Transmission power	
<b>Serial port</b>	
Connection method	
Serial transmission speed	
Data format/coding	
Data flow control/protocols	
<b>General data</b>	
Supply voltage	
Current consumption	typ. / max.
Degree of protection	
Ambient temperature range	
Housing material	
Dimensions W / H / D	
Screw connection solid/stranded/AWG	
<b>Conformance / approvals</b>	
Conformance	
UL, USA / Canada	

Technical data	
Bi-directional	
2.4032 GHz ... 2.4799 GHz	
400 mW	
RS-232	RS-485/RS-422
9-pos. D-SUB (socket)	
COMBICON plug-in screw terminal block	
300 ... 57,6 kbps	300 ... 57,6 kbps
Asynchronous	
RTS/CTS	
12 V DC ... 30 V DC	
230 mA / 280 mA	
IP20	
-40 °C ... 60 °C	
Polyamide PA non-reinforced	
45 / 99 / 115 mm	
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
FCC Directive, Part 15.247	
ISC Directive RSS 210	
Class I, Div. 2, Groups A, B, C, D	

<b>Description</b>	
<b>WLAN wireless module</b> , high power transceiver with Ethernet and serial interface	
Bus foot for I/O extension modules	
Cannot be extended	

Ordering data		
Type	Order No.	Pcs. / Pkt.
RAD-80211-XD/HP-BUS	2900047	1
RAD-80211-XD/HP	2900046	1

### Extension modules

RAD-Line extension modules provide additional inputs and outputs for bi-directional RAD-Line IO and RAD-Line serial wireless systems.

- Easily installed via an integrated bus foot
- Bus provides power supply voltage
- Data transferred to transceiver module via bus
- Up to 8 modules can be connected to a single transceiver
- A maximum of 33 analog or 66 digital signals can be configured, depending on the selection of modules

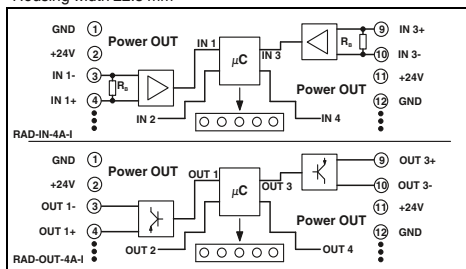


Analog components for 4 inputs or 4 outputs

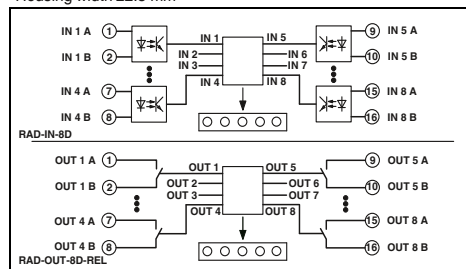


Digital components for 8 inputs or 8 outputs

Ex:   
Housing width 22.5 mm



Ex:   
Housing width 22.5 mm



#### Technical data

	RAD-IN-4A-I	RAD-OUT-4A-I
Analog input	4	-
Number of inputs	4	-
Signal range	4 mA ... 20 mA	-
Input resistance	< 170 Ω	-
Digital input		
Number of inputs	-	-
Signal range	-	-
Switching level	1 signal ("H") 0 signal ("L")	-
Input frequency	-	-
Pulse length	-	-
Analog output		
Number of outputs	-	4
Signal range	-	-
Load $R_B$	-	700 Ω (at $U_B = 24 V$ , $R_B = [U_B \cdot 10 V] / 20 mA$ )
Digital output		
Contact type	-	-
Switching voltage	-	-
Switching current	-	-
Clock frequency	-	-
Frequency output	-	-
General data		
Supply voltage	9 V DC ... 30 V DC (via bus foot)	9 V DC ... 30 V DC (via bus foot)
Current consumption	Typ./max. 100 mA / 130 mA	100 mA / 130 mA
Degree of protection	IP20	IP20
Ambient temperature range	-20 °C ... 65 °C	-20 °C ... 65 °C
Housing material	Polyamide PA non-reinforced	Polyamide PA non-reinforced
Dimensions W / H / D	22.5 / 99 / 114.5 mm	22.5 / 99 / 114.5 mm
Conformance / approvals		
Conformance	CE-compliant	CE-compliant
ATEX	II 3 G EEx nL IIC	II 3 G EEx nL IIC
IECEX	Ex nL IIC	Ex nL IIC
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D	Class I, Div. 2, Groups A, B, C, D

#### Technical data

	RAD-IN-8D	RAD-OUT-8D-REL
Number of inputs	8	-
Signal range	5 V AC/DC ... 30 V AC/DC	-
min. 5 V DC	-	-
max. 1.5 V DC	-	-
max. 1 Hz	-	-
Number of outputs	-	8 x relay output
Signal range	-	30 V AC/DC (EC Declaration of Conformity)
Load $R_B$	-	30 V DC (with UL approval)
Switching voltage	-	250 V AC (with UL approval)
Switching current	-	0.5 A (EC Declaration of Conformity)
Clock frequency	-	2 A (with UL approval)
Frequency output	-	-
General data		
Supply voltage	9 V DC ... 30 V DC (via bus foot)	9 V DC ... 30 V DC (via bus foot)
Current consumption	25 mA / 30 mA	100 mA / 160 mA
Degree of protection	IP20	IP20
Ambient temperature range	-20 °C ... 65 °C	-20 °C ... 65 °C
Housing material	Polyamide PA non-reinforced	Polyamide PA non-reinforced
Dimensions W / H / D	22.5 / 99 / 114.5 mm	22.5 / 99 / 114.5 mm
Conformance / approvals		
Conformance	CE-compliant	CE-compliant
ATEX	II 3 G EEx nL IIC	II 3 G EEx nL IIC
IECEX	Ex nL IIC	Ex nL IIC
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D	Class I, Div. 2, Groups A, B, C, D

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Extension module	Analog IN	RAD-IN-4A-I	2867115
Extension module	Analog OUT	RAD-OUT-4A-I	2867128
Extension module	Digital IN		
Extension module	Digital OUT		
Extension module	Mixed I/O		

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Extension module	Digital IN	RAD-IN-8D	2867144
Extension module	Digital OUT	RAD-OUT-8D-REL	2867157



Analog/digital module for 2 digital inputs/outputs and 1 analog input/output

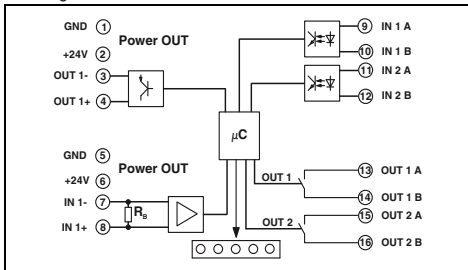


Digital module for two counter/frequency inputs



Digital module for two counter/frequency outputs

Ex:   
Housing width 22.5 mm



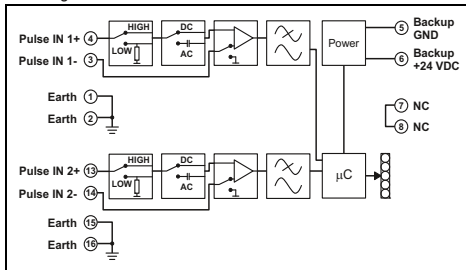
Technical data

1	4 mA ... 20 mA	< 170 Ω
2	5 V AC/DC ... 30 V AC/DC	min. 5 V DC max. 1.5 V DC
-	-	-
1	4 mA ... 20 mA	700 Ω (at $U_B = 24\text{ V}$ , $R_B = [U_B - 10\text{ V}] / 20\text{ mA}$ )
2 x relay output	30 V AC/DC (EC Declaration of Conformity)	30 V DC (with UL approval)
	250 V AC (with UL approval)	-
0.5 A (EC Declaration of Conformity)	2 A (with UL approval)	-
-	-	-
9 V DC ... 30 V DC (via bus foot)	70 mA / 110 mA	IP20
	-20 °C ... 65 °C	Polyamide PA non-reinforced
CE-compliant	II 3 G EEx nL IIC	Ex nL IIC T5
	Class I, Div. 2, Groups A, B, C, D	-

Ordering data

Type	Order No.	Pcs. / Pkt.
RAD-IN+OUT-2D-1A-I	2867322	1

Ex:   
Housing width 22.5 mm



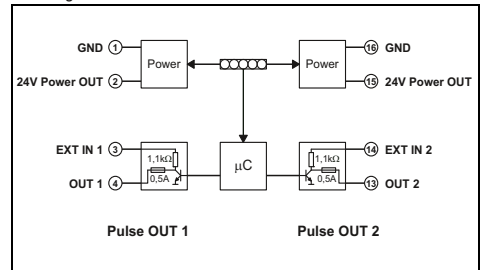
Technical data

-	-	-
-	-	-
2	0.1 V AC/DC ... 30 V AC/DC	(Common mode 3.6 V DC) / (differential mode 100 mV <sub>pp</sub> )
-	-	-
(0.1 Hz ... 10 kHz (50% Duty Cycle))	(High time 50 µs)	-
-	-	-
-	-	-
9 V DC ... 30 V DC (via bus foot)	35 mA / 45 mA	IP20
	-20 °C ... 65 °C	Polyamide PA non-reinforced
CE-compliant	II 3 G EEx nL IIC	-
	Class I, Div. 2, Groups A, B, C, D	-

Ordering data

Type	Order No.	Pcs. / Pkt.
RAD-IN-2D-CNT	2885223	1

Ex:   
Housing width 22.5 mm



Technical data

-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
Transistor output, passive	-	-
-	-	-
Approx. 27 mA (Terminal 3/14)	Approx. 25 mA (Terminal 4/13)	-
(High Speed 10 kHz with 50% Duty Cycle)	(Low speed 10 Hz with 50% duty cycle)	(0.1 Hz ... 10 kHz (50% Duty Cycle))
-	-	-
9 V DC ... 30 V DC (via bus foot)	90 mA / 115 mA	IP20
	-20 °C ... 65 °C	Polyamide PA non-reinforced
CE-compliant	II 3 G EEx nL IIC	-
	Class I, Div. 2, Groups A, B, C, D	-

Ordering data

Type	Order No.	Pcs. / Pkt.
RAD-OUT-2D-CNT	2885236	1

## Wireless data communication (900 MHz)

### Accessories

#### Omnidirectional antennas

- Mobile or stationary applications
- Point-to-multipoint configurations
- Small antennas are suitable for applications with a shorter range
- Large antennas are suitable for applications requiring longer range



2.15 dBi gain



7 dBi gain

		Technical data			Technical data		
General data							
Ambient temperature range		-40 °C ... 75 °C			-40 °C ... 80 °C		
Degree of protection		IP65			IP65		
Gain		2.15 dBi			7 dBi		
Impedance		50 Ω			50 Ω		
Connection method		MCX (male)			N (female)		
Acceptance angle	vertical / horizontal	(N/A) / 360 °			17 ° / 100 °		
Dimensions W / H		3 / 89 mm			3 / 609 mm		
Frequency range		900 MHz			900 MHz		
Scope of supply		Incl. mounting material			Incl. mounting material		
		Ordering data			Ordering data		
Description		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Omnidirectional antenna		RAD-ISM-900-ANT-OMNI-0-6	2867160	1	RAD-ISM-900-ANT-OMNI-5	2867199	1

### Accessories

#### Omnidirectional antennas

- Mobile or stationary applications
- Point-to-multipoint configurations
- Small antennas are suitable for applications with a shorter range
- Large antennas are suitable for applications requiring longer range



5 dBi gain



8 dBi gain

		Technical data			Technical data		
General data							
Ambient temperature range		-40 °C ... 80 °C			-40 °C ... 80 °C		
Degree of protection		IP65			IP65		
Gain		5.15 dBi			8 dBi		
Impedance		50 Ω			50 Ω		
Connection method		N (female)			N (female)		
Acceptance angle	vertical / horizontal	28 ° / 360 °			15 ° / 360 °		
Dimensions W / H		60.452 / 1123.95 mm			60.5 / 1803.4 mm		
Frequency range		902 MHz			900 MHz		
Scope of supply		Incl. mounting material			Incl. mounting material		
		Ordering data			Ordering data		
Description		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Omnidirectional antenna		RAD-ISM-900-ANT-OMNI-FG-3-N	2867791	1	RAD-ISM-900-ANT-OMNI-FG-6-N	2885579	1

**Accessories**

**Directional (YAGI) antennas**

- Stationary applications
- Point-to-point configurations for line of sight
- Longer ranges than omnidirectional antennas



5 dBi gain,  
with 0.6 m connecting cable



8.5 dBi gain,  
with 0.6 m connecting cable

		Technical data			Technical data		
General data							
Ambient temperature range		-40 °C ... 80 °C			-40 °C ... 80 °C		
Degree of protection		IP65			IP65		
Gain		5 dBi			8.5 dBi		
Impedance		50 Ω			50 Ω		
Connection method		N (female) with cable (0.6 m)			N (female) with cable (0.6 m)		
Acceptance angle	vertical / horizontal	78 ° / 168 °			62 ° / 100 °		
Dimensions W / H		60 / 170 mm			60 / 170 mm		
Frequency range		900 MHz			900 MHz		
Scope of supply		Incl. mounting material			Incl. mounting material		
		Ordering data			Ordering data		
Description		Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Directional antenna		RAD-ISM-900-ANT-YAGI-3-N	2867801	1	RAD-ISM-900-ANT-YAGI-6.5-N	2867814	1

**Accessories**

**Surge protection**

- For externally mounted installations
- Installed between antenna and radio for surge protection
- Replaceable, gas-filled arrestor



With N connector, grounded shield

		Technical data		
General data				
Ambient temperature range		-40 °C ... 80 °C		
Degree of protection		IP55		
Attenuation	(at 900 MHz)	Typ. 0.2 dB (≤ 2.2 GHz)		
Impedance		50 Ω		
		Ordering data		
Description		Type	Order No.	Pcs. / Pkt.
COAXTRAB, attachment plug with surge protection for coaxial cables				
N connector, plug-socket		CN-UB-280DC-SB	2818148	1
N connector socket/socket		CN-UB-280DC-BB	2818850	1

### Antenna splitter

- Allows multiple radios in an enclosure to share an antenna



General data		Technical data		
Ambient temperature range		-40 °C ... 85 °C		
Degree of protection		IP20		
Attenuation per branch	(at 900 MHz)	3 dB		
Impedance		50 Ω		
Connection method		Type MCX (female)		
Description		Ordering data		
<b>Antenna splitter</b>		<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
		<b>RAD-ISM-900-ANT-4</b>	<b>2867050</b>	<b>1</b>

### Accessories Adapter cable

- Various cables for connection of different antennas



General data		Technical data			Technical data		
Ambient temperature range		-40 °C ... 75 °C			-40 °C ... 85 °C		
Attenuation	(at 900 MHz)	0.89 dB/m			approx. 1.5 dB/m		
Impedance		50 Ω			50 Ω		
Conformance / approvals		-			Class I, Div. 1, 2, Groups A, B, C, D Class II, Div. 1, 2, Groups F, G		
UL, USA / Canada		-					
Description		Ordering data			Ordering data		
<b>Antenna adapter cable</b>		<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>	<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
1.2 m long, MCX (male) -> N (female)		<b>RAD-CON-MCX-N-SB</b>	<b>2867717</b>	<b>1</b>			
1.2 m long, 90° MCX (male) -> N (female)		<b>RAD-CON-MCX90-N-SS</b>	<b>2885207</b>	<b>1</b>			
1.2 m long, SMA (male) -> N (female)		<b>RAD-CON-SMA-N-SS</b>	<b>2867403</b>	<b>1</b>			
30 cm long, MCX (male) -> MCX (male)		<b>RAD-CON-MCX-MCX-SS</b>	<b>2867607</b>	<b>1</b>			
<b>Antenna adapter cable for Ex-zone 1</b>							
90 cm long, MCX (male) -> RPSMA (male)					<b>RAD-CON-MCX-RPSMA-EX</b>	<b>2885621</b>	<b>1</b>

**Accessories**  
**Adapter cable**

- Various cables for connection of different antennas



**Antenna adapter cable,  
N (male) -> RSMA (male)**

General data	
Ambient temperature range	(at 900 MHz)
Attenuation	(at 900 MHz)
Impedance	

**Technical data**

-40 °C ... 85 °C
0.37 dB @ 915 MHz
50 Ω

Description
<b>Antenna adapter cable</b>
0.5 m long
1 m long
2 m long
3 m long

**Ordering data**

Type	Order No.	Pcs. / Pkt.
RAD-PIG-RSMA/N-0.5	2903263	1
RAD-PIG-RSMA/N-1	2903264	1
RAD-PIG-RSMA/N-2	2903265	1
RAD-PIG-RSMA/N-3	2903266	1

**Extension cable**

- Various cables to extend distance between the radio and antenna
- Distance should remain as short as possible for reduced attenuation



General data	
Ambient temperature range	
Impedance	

**Technical data**

-40 °C ... 75 °C
50 Ω

Description
<b>Antenna extension cable, N connection at both ends (male)</b>
3 m long, attenuation (at 900 MHz) 0.5 dB/m
6 m long, attenuation (at 900 MHz) 0.5 dB/m
7 m long, attenuation (at 900 MHz) 0.25 dB/m
12 m long, attenuation (at 900 MHz) 0.25 dB/m
15 m long, attenuation (at 900 MHz) 0.25 dB/m
18 m long, attenuation (at 900 MHz) 0.13 dB/m
24 m long, attenuation (at 900 MHz) 0.13 dB/m
30 m long, attenuation (at 900 MHz) 0.13 dB/m
45 m long, attenuation (at 900 MHz) 0.08 dB/m
60 m long, attenuation (at 900 MHz) 0.06 dB/m

**Ordering data**

Type	Order No.	Pcs. / Pkt.
RAD-CAB-RG58-10	2867364	1
RAD-CAB-RG58-20	2867212	1
RAD-CAB-RG213-25	2867597	1
RAD-CAB-RG213-40	2867377	1
RAD-CAB-RG213-50	2867225	1
RAD-CAB-LMR400-60	2867380	1
RAD-CAB-LMR400-80	2867393	1
RAD-CAB-LMR400-100	2867238	1
RAD-CAB-LMR600-150	2885184	1
RAD-CAB-LMR900-200	2885197	1





# Process infrastructure

Process infrastructure connects the control level to the field level via modern fieldbuses, I/O modules, and wireless communication systems.


Modern process technology, including WirelessHART, FOUNDATION Fieldbus, PROFIBUS PA, and I/O solutions for potentially explosive areas can be used in numerous different industries, including mining, water/waste water, and oil and gas. Phoenix Contact offers flexible solutions for all applications and customer requirements.

- Process infrastructure is suitable for all applications and environments
- Failure times are reduced thanks to high integrity and hot swapping
- Multifunctional remote I/Os enable greater flexibility
- Remote access to error diagnostics means that hazardous areas do not have to be entered
- Approvals for all applications

<b>Product overview</b>	<b>480</b>
<hr/>	
<b>Process fieldbus</b>	
Field connection boxes	<b>483</b>
Device couplers for the field	<b>485</b>
Power supply	<b>487</b>
Field diagnostic modules	<b>488</b>
Accessories	<b>489</b>
<hr/>	
<b>I/Os for the Ex area</b>	<b>490</b>

### Process fieldbus

#### Field connection boxes

					
Type	<b>FB-9-SS</b>	<b>FB-15-SS</b>	<b>FB-8-AL</b>	<b>FB-15-AL</b>	
Description	Field connection boxes in stainless steel 9 ports	Field connection boxes in stainless steel 15 ports	Field connection boxes in aluminum 8 ports	Field connection boxes in aluminum 15 ports	
Page	483	483	483	483	

#### Device couplers for the field





					
Type	<b>FB-ET</b>	<b>FB-2SP</b>	<b>FB-ISO</b>		
Description	Device coupler with TBUS for trunk connection and termination	Device coupler with TBUS for two spur connections	Device coupler with TBUS for an electrically isolated spur connection		
Page	485	485	485		





#### Power supply





#### Field diagnostics modules






					
Type	<b>FB-PS-PLUG-24DC/28DC/0.5/EX</b>	<b>FB-PS-BASE/EX</b>	<b>FB-PS-25/0.36A</b>	<b>FB-DIAG/FF/LI</b>	<b>FB-DIAG/FF/NC</b>
Description	Power supply plug	Power supply base	1-channel power supply	Field diagnostics module with connection for FF power supply and/or block coupler applications	Field diagnostics module for device coupler with TBUS
Page	487	487	487	488	488

#### Accessories

					
Type	<b>S-PT-EX-24DC PT ...</b>	<b>ME 22,5 TBUS 1,5/5-ST-3,81 GN</b>	<b>CLIPFIX 35 E-ME TBUS... / UT 2,5</b>	<b>WMS 9,5 (30X16)R UC-TM...16</b>	
Description	Double wire protection for floating signal circuits	TBUS plug	Terminals and terminal blocks	Marking materials	
Page	489	489	489	489	

I/Os for the Ex area				
	Power	Digital I/O	Analog I/O	Temperature
				
Type	IB IL EX-IS PWR IN-PAC	IB IL EX-IS DIO 4/NAM-PAC	IB IL EX-IS AIO 4/EF-PAC	IB IL EX-IS TEMP 4 RTD/TC-PAC
Description	Intrinsically safe power supply terminal (Ex i)	Intrinsically safe digital I/O terminal (Ex i)	Intrinsically safe analog I/O terminal (Ex i)	Intrinsically safe temperature input terminal (Ex i)
Page	490	491	492	493

Wireless data communication				
				
Type	RAD-WHG/WLAN-XD	RAD-WHA-1/2NPT	RAD-...-IFS	RAD-ISM-900-EN-BD...
Description	WirelessHART gateway	WirelessHART adapter	Radioline wireless modules 2.4 GHz and 900 MHz with I/O extension modules	RAD-Line Ethernet - with Trusted Wireless (900 MHz)
See section: industrial communication technology				
Page	458	459	451	470

Surge protection			Isolating amplifiers		
					
Type	MCR-PLUGTRAB PT LINETRAB LIT	TERMITRAB	SURGETRAB	MACX Analog Ex	MCR-FL-(HT-)T(S)-(LP-)I-EX
Description	Surge protection for Ex i circuits	Modular terminal blocks (intrinsically safe) with multi-stage surge protection	Surge protection field devices directly in the sensor head (intrinsically safe)	Ex-i isolating amplifiers with functional safety	Ex i 2-wire field devices
Surge protection for measurement and control technology			Measurement and control technology		
Page	See Catalog 6			See Catalog 7	



The FB... line of modular fieldbus components offers connectivity from the process controller to the field devices. Together with redundant bulk power, surge protection, and cabling cordsets, a complete connection architecture is provided.

The line includes device couplers for use with both FOUNDATION Fieldbus and PROFIBUS PA. These couplers provide short-circuit protection to ensure that a fault on a spur does not disrupt the entire segment. They also offer energy limited outputs, intrinsic safety, and electrical isolation.

Also available are redundant and simplex power supplies. Each electrically isolated supply provides power while allowing digital communications to one segment. Passive power conditioning allows for high reliability, and high efficiency eliminates derating in any mounting configuration.

Field junction boxes provide a ready to install solution. These boxes, in either stainless steel or aluminum, are specifically designed to accommodate the modular device couplers and ease wiring considerations.

Based on the T-bus connection system, the field components are hot-swappable and allow easy system expansion. Single-loop-integrity can be achieved by connection of a single module to a single instrument. With the limited width on the rail,

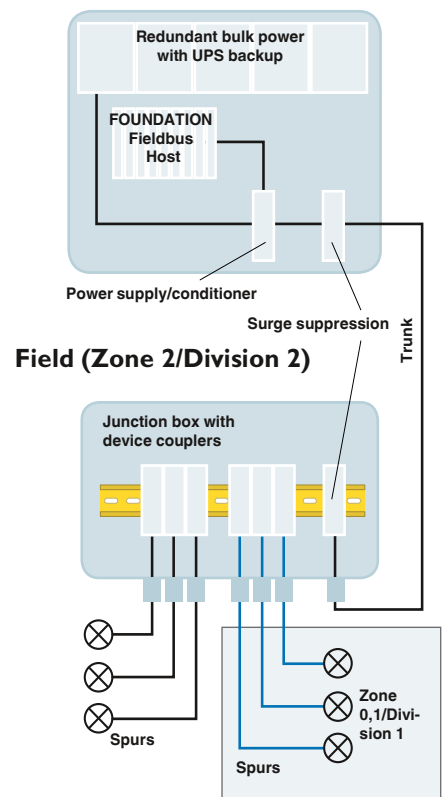
the size and weight of the associated field enclosure is minimized.

The FB... line was designed specifically to meet the tough requirements of the process environment. This includes various approvals for installation in Zone 2 or Division 2 hazardous locations.

All components include built-in status LEDs. Integrated terminators in the power supplies, together with a connector-mounted version in the field, reduce the opportunity for segment termination error.

### Typical FOUNDATION Fieldbus H1-Segment

#### Control Cabinet



**Field connection boxes**

- Designed specifically for field device coupler systems
- Includes trunk module FB-ET and allows installation of additional couplers and PT plug
- Bus bar and shield clamps
- Entries for trunk in, out, and breather connections
- Each enclosure is equipped with M20 ports and can be configured as desired
- Cable glands, plugs, and breather ordered separately

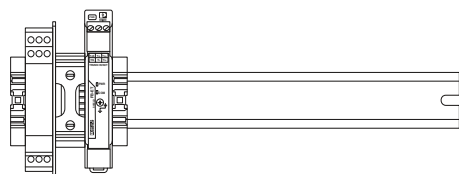
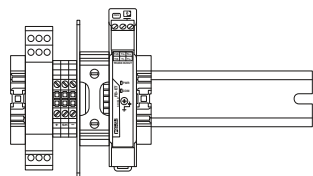


**Stainless steel enclosure**



**Aluminum enclosure**

	Technical data			Technical data		
<b>General data</b>	FB-9-SS	FB-15-SS		FB-8-AL	FB-15-AL	
Housing material	Stainless steel, 316L, electropolished			Aluminum, die-cast, corrosion resistant, powder-coated		
DIN rail, material	NS35, galvanized, passivated			NS35, galvanized, passivated		
Weight	3500 g	4680 g		3220 g	4140 g	
Dimensions	W / H / D 235 mm / 260 mm / 121 mm		325 mm / 300 mm / 121 mm	202 mm / 232 mm / 111 mm		330 mm / 230 mm / 111 mm
Mounting position	Vertical			Vertical		
Degree of protection	IP66 / NEMA 4X			IP66 / NEMA 4X		
Ambient temperature (operation)	-40 °C ... 85 °C			-40 °C ... 85 °C		
Conformance / approvals	Ex II 2 G/2 D			Ex II 2 G/2 D		
ATEX	Ex II 2 G/2 D			Ex II 2 G/2 D		
	Ordering data			Ordering data		
<b>Description</b>	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Enclosure, stainless steel</b>						
- 9 ports	FB-9-SS	2316213	1			
- 15 ports	FB-15-SS	2316190	1			
<b>Enclosure, aluminum</b>						
- 8 ports	FB-8-AL	2316200	1			
- 15 ports	FB-15-AL	2316187	1			
	Accessories			Accessories		
<b>Cable gland, M20, includes nut</b>	FB-M-KV-M20-EX	2900197	1	FB-M-KV-M20-EX	2900197	1
<b>Stopping plug, M20, includes nut</b>	FB-M-BS-M20-EX	2900209	10	FB-M-BS-M20-EX	2900209	10
<b>Breather plug, M20, includes nut</b>	FB-M-BD-M20-EX	2901859	1	FB-M-BD-M20-EX	2901859	1



DIN rail components, small enclosure vs. large enclosure





The fieldbus device couplers are suitable for FOUNDATION Fieldbus and PROFIBUS PA. They provide an interface between the fieldbus trunk line and field devices. The compact width on the DIN rail reduces the required dimensions and weight of the field housing.

#### FB-ET

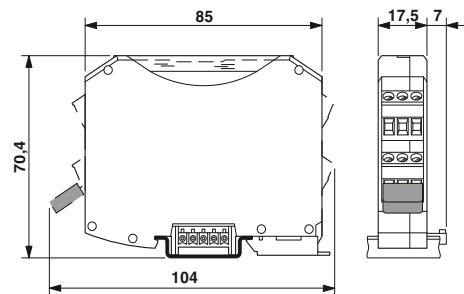
- Connects to the trunk and provides voltage limiting
- Includes a pre-installed external terminator, ensuring termination is always available
- A selector switch is provided to select the correct shield/ground connection
- Diagnostic LEDs include DC OK, low voltage warning, and communication on the segment. External terminator includes a connection LED

#### FB-2SP and FB-ISO

- Couple field devices and provide short-circuit current limiting with a user-selectable setpoint
- Voltage and communication are routed via the ME 17,5 TBUS... connectors installed on the DIN rail
- Provide non-incendive, FISCO ic and FNICCO spur connections
- Hot-swappable and scalable
- Single-sided connector configuration simplifies wiring in field housing
- Can be installed together in the same field housing
- Diagnostic LEDs indicate DC OK and errors at the spur connection

#### FB-ISO only

- Comprehensive channel-to-channel electrical isolation
- Provides an intrinsically safe, FISCO connection
- Single-loop integrity is achieved by the connection of a single FB-ISO coupler to a single device. With dedicated circuitry for each device, the redundancy achieved by the segment power supply is not compromised



Supply  
Supply voltage range

Rated current

Nominal current consumption

Fieldbus interface

Rated voltage

Rated current

Electrical isolation

Termination resistor

Surge protection

General data

Screw connection solid/stranded/AWG

Dimensions

W / H / D

Weight

Degree of protection

Ambient temperature (operation)

Max. permissible relative humidity (operation)

Conformance / approvals

Conformance

NE

ATEX

IECEX

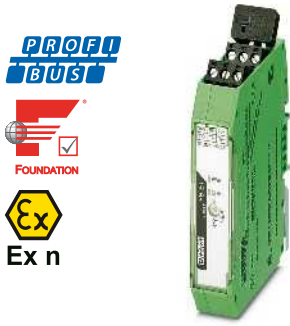
CSA, USA/Canada

Fieldbus Foundation

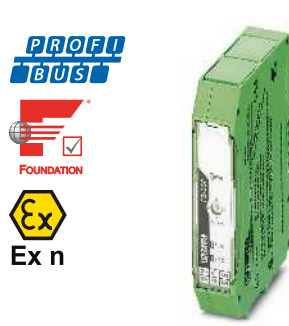
Description

**Device coupler**, for FOUNDATION Fieldbus and PROFIBUS PA

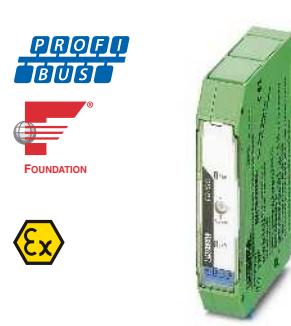




Device coupler with TBUS for trunk line connection and termination



Device coupler with TBUS for 2 spurs



Device coupler with TBUS for 1 electrically isolated spur connection

Ex:

Ex:

Applied for:  
ATEX

Technical data
10.3 V DC ... 32 V DC (input on trunk line side)
≤ 1 A (trunk line input side to TBUS)
8 mA (without termination resistor)
-
-
100 Ω, external removable connector included Active if voltage exceeds 39 V (typ.) or 41 V (max.)
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12 17.5 mm / 99.1 mm / 70.4 mm 66 g IP20 -40 °C ... 85 °C
95% (no condensation)
CE-compliant, additionally EN 61326 NAMUR NE 21 
Ex nA IIC T4 Gc
Class I, Zone 2, AEx nA IIC T4 Class I, Division 2, Groups A,B,C,D FF-846

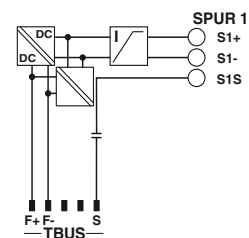
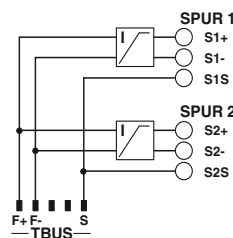
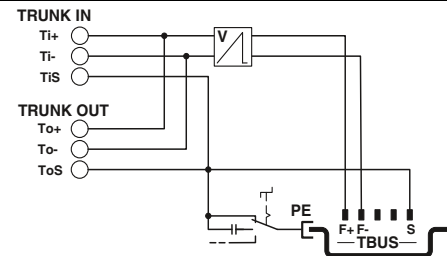
Technical data
10.3 V DC ... 32 V DC (input on trunk line side)
-
6 mA
≤ 32 V (each spur) 15 mA (each spur, adjustable via selector switch, -40...85°C) 25 mA (each spur, adjustable via selector switch, -40...80°C) 35 mA (each spur, adjustable via selector switch, -40...75°C) 45 mA (each spur, adjustable via selector switch, -40...70°C)
-
-
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12 17.5 mm / 89.7 mm / 70.4 mm 64 g IP20 -40 °C ... 85 °C (depending on set rated current)
95% (no condensation)
CE-compliant, additionally EN 61326 NAMUR NE 21   
Ex nA [nL Gc] IIB T4 Gc, FNICO spurs Ex nA [ic Gc] IIB T4 Gc, FISCO ic spurs
Class I, Zone 2, AEx nA[nL] IIB T4 Class I, Division 2, Groups C, D FF-846

Technical data
17 V DC ... 32 V DC (input on trunk line side)
-
10 mA
≥ 10 V (each spur) 15 mA (each spur, adjustable via selector switch) 25 mA (each spur, adjustable via selector switch) 35 mA (each spur, adjustable via selector switch)
500 V AC (between input and output, routine test)
-
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12 17.5 mm / 89.7 mm / 70.4 mm 96 g IP20 -40 °C ... 70 °C
95% (no condensation)
CE-compliant, additionally EN 61326 NAMUR NE 21   
Ex nA [nL Gc] IIC T4 Gc, FNICO power supply (spur) Ex nA [ia Ga Da] IIC T4 Gc, FISCO power supply (spur)
CSA applied for
-

Ordering data		
Type	Order No.	Pcs. / Pkt.
FB-ET	2316048	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FB-2SP	2316051	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FB-ISO	2316064	1





Each DIN rail-mounted fieldbus power supply provides high-integrity power for one H1 segment. Built-in output impedance allows digital communication and DC power to co-exist on a pair of wires.

- Electrically isolated
- Integrated termination resistor
- Passive filtering allows for low heat dissipation and long service life
- Plug-in connectors and local diagnostic LEDs permit easy installation and troubleshooting

#### FB-PS... modular redundant power supply

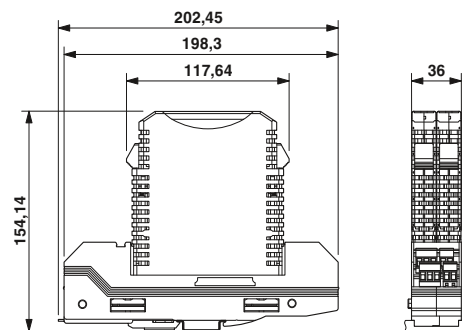
- Modular base, one per segment, eliminates unused capacity
- Swappable bases for increased plant integrity
- Compact width optimizes critical enclosure space
- Redundant power modules, with common conditioning in the base, provide maximum system performance and reliability
- Quick-latch modules and base
- Preventative function monitoring: self diagnostics with output relay integrated in each power module. Eliminates need for separate diagnostics and contact module
- Dedicated relay connection per base
- Bussable power and relay through plug-in side-base connectors
- Redundant host connections to common segment
- Redundant built power connections feed each power module separately
- Auto Current Balance technology enhances product life by closely sharing power between modules
- High efficiency including MOSFET outputs

#### FB-PS... simplex power supply

- Connections for redundant bulk power
- Power is bussed to the power supply through the TBUS
- No space required between modules to optimize enclosure size

#### Notes:

1) EMC: Class A product, see page 553



#### Input data

DC input voltage range  
Nominal current range

#### Output data

Output voltage range  
Output current  
Can be connected in parallel / series

Max. power dissipation

#### Signaling

Signaling DC OK  
Signaling alarm  
Signaling overload  
Redundancy indication OK

#### General data

Weight / Dimensions W x H x D  
Degree of protection / protection class  
Ambient temperature (operation)  
Ambient temperature (storage/transport)  
Max. permissible relative humidity (operation)  
Conformance / approvals  
ATEX  
UL, USA / Canada

NE

EN

Fieldbus Foundation

#### Description

**Power supply, modular redundant**

- Plug, 28 V DC, 500 mA

- Base

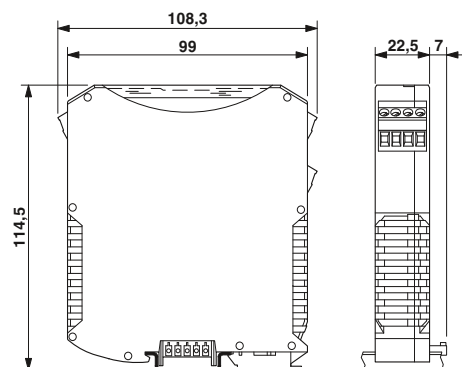
**Power supply, simplex, with built-in 100 Ω termination**

- 25 V DC, 360 mA

PCB connector, 5.0 mm pitch, color: black

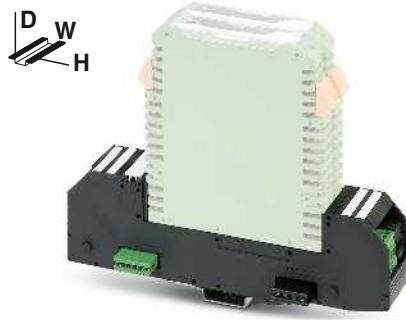
PCB connector, 3.5 mm pitch, color: green

#### End cap





Power supply plug



Power supply base



Simplex power supply

Technical data
18.5 V DC ... 30.5 V DC 700 mA ... 1100 mA
27 V DC ... 30 V DC (on the trunk) 500 mA Yes / No 4 W (typical)
Green LED Yellow LED - Green LED
181 g / 17.5 x 117.6 x 115 mm IP20 / - -40 °C ... 60 °C -40 °C ... 85 °C 95% (no condensation)
- -
NAMUR NE 21 EN 61326 FF-831

Technical data
- ... 30.5 V DC -
- - - / - -
- - - -
259 g / 36 x 202.5 x 61.5 mm IP20 / - -40 °C ... 70 °C -40 °C ... 85 °C 95% (no condensation)
- -
NAMUR NE 21 EN 61326 FF-831

Technical data
19.2 V DC ... 35 V DC 340 mA ... 630 mA
25 V DC ... 27 V DC (on the trunk) 360 mA - / - 2 W (typical)
Green LED - Red LED -
210 g / 22.5 x 114.5 x 108.3 mm IP20 / - -40 °C ... 60 °C -40 °C ... 85 °C 95% (no condensation)
Ex II 3 G Ex nA II T4 X Class I, Zone 2, Group IIC T4 Class I, Div. 2, Groups A, B, C, D, T4 NAMUR NE 21 EN 61326, EN 60068-2-27, EN 60068-2-6 FF-831

Ordering data		
Type	Order No.	Pcs. / Pkt.
FB-PS-PLUG-24DC/28DC/0.5/EX	2316132	1

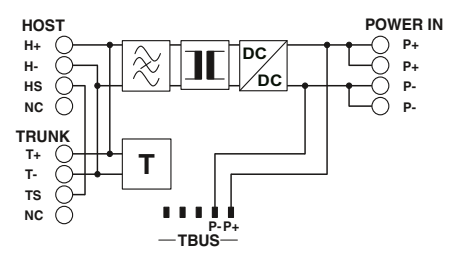
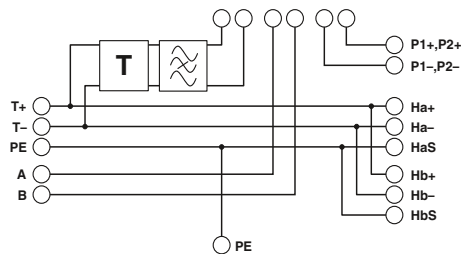
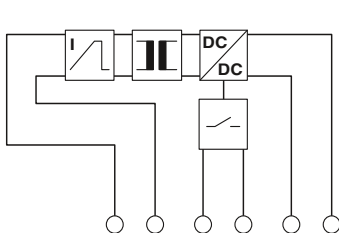
Ordering data		
Type	Order No.	Pcs. / Pkt.
FB-PS-BASE/EX <sup>1)</sup>	2316145	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FB-PS-25/0.36A	2316035	1

Accessories		

Accessories		
ZEC 1,5/ 4-LPV-5,0 C2,4 BK	1793260	50
ZEC 1,0/ 6-LPV-3,5 C1	1915699	50
D-FB-PS	2316226	10

Accessories		



## Process fieldbus

### Field diagnostic modules for FOUNDATION Fieldbus

- Reads physical layer diagnostics in the field
- Segment voltage, noise, and signal can be monitored
- Easy control system integration with DD and EDDL
- Adjustable alarm condition thresholds allow for precision monitoring and trending
- Diagnostics data for up to 24 field devices
- Two module types for easy integration across all system platforms



With terminal block for FF power supply and/or block coupler applications

N



For modular device couplers mounted on TBUS

N

	Technical data			Technical data		
Supply						
Supply voltage range	9 V DC ... 32 V DC			9 V DC ... 32 V DC		
Nominal current consumption	27 mA			27 mA		
Fieldbus interface						
Rated voltage	≤ 32 V			≤ 32 V		
Rated current	29 mA			29 mA		
General data						
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12			0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12		
<b>Dimensions</b>	W / H / D	17.5 mm / 91.7 mm / 70.4 mm		W / H / D	17.5 mm / 85 mm / 70.4 mm	
Weight	65.2 g			63.8 g		
Degree of protection	IP20			IP20		
Ambient temperature (operation)	-40 °C ... 85 °C			-40 °C ... 85 °C		
Max. permissible relative humidity (operation)	95% (no condensation)			95% (no condensation)		
Conformance / approvals						
Fieldbus Foundation	FF-830			FF-830		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Field diagnostic module, for FOUNDATION Fieldbus	FB-DIAG/FF/LI	2316284	1	FB-DIAG/FF/NC	2316297	1

Accessories

- Surge protection in input
- The ME 22.5 TBUS DIN rail connector bridges input power between several simplex power supplies (FB-PS-25/0.36A).
- Note: the modular device couplers already include the required ME 17.5 TBUS connector, so a separate order is not necessary.



Double conductor protection for floating signal circuits



TBUS connector

Description	
<b>SURGETRAB</b> protective adapter for installation on measuring sensors for Ex protection zones Outer thread: M20 x 1.5	
<b>PLUGTRAB</b> , plug-in surge protection for FOUNDATION Fieldbus	
Protective plug Base element with bridge between 3/4 (±) and 9/10	
Base element with gas-filled surge arrester between 3/4 (±) and 9/10	
<b>DIN rail connector</b>	

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>S-PT-EX-24DC</b>	<b>2800034</b>	1
<b>PT 2X2-FF-ST</b>	<b>2800755</b>	10
<b>PT 4-BE</b>	<b>2839402</b>	10
<b>PT 4+F-BE</b>	<b>2839415</b>	10

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>ME 22,5 TBUS 1,5/ 5-ST-3,81 GN</b>	<b>2707437</b>	50

Accessories

- End clamp, ground and shield clamps (CLIPLINE)
- Terminal block bases that can be lined up next to each other in order to set up any number of positions
- Marking material



Clamps and terminal blocks



Marking materials

Description	Color
<b>End clamp</b> , to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...	gray
<b>Terminal block</b> , for mounting on NS 35...	gray
<b>Cover</b> , width 2.2 mm	gray
<b>Shrink sleeve</b> , for conductor diameters 3.2 - 9.5 mm	gray
1 roll = 500 markers, each 30 mm long	white
<b>UniCard sheets</b> , for labeling of terminal blocks with a zack marker strip groove, 32-section, can be labeled with the BLUEMARK and CMS-P1-PLOTTER	white
<b>UniCard materials</b> , for labeling terminal blocks with a flat marker groove, 32-section, can be labeled with BLUEMARK and CMS-P1-PLOTTER	white

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>CLIPFIX 35</b>	<b>3022218</b>	50
<b>E/ME TBUS NS35 GY</b>	<b>2713780</b>	50
<b>UT 2,5</b>	<b>3044076</b>	50
<b>D-UT 2,5/10</b>	<b>3047028</b>	50

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>WMS 9,5 (30X16)R</b>	<b>0800377</b>	1
<b>UC-TM 16</b>	<b>0819217</b>	10
<b>UC-TMF 16</b>	<b>0819262</b>	10

### Power supply for intrinsically safe I/O terminals

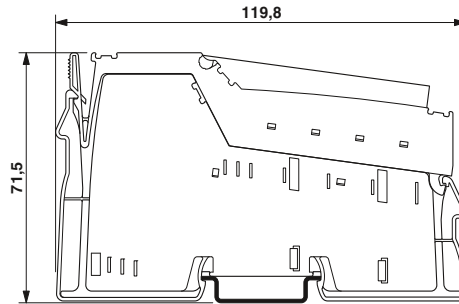
The Inline **IB IL EX-IS PWR IN-PAC** terminal allows the implementation of intrinsically safe I/O modules in the modular Inline I/O system. Intrinsically safe (blue) I/O terminals can only operate with the specific voltage levels provided by the IL EX-IS PWR IN-PAC terminal.

#### Features

- Provides electrical isolation between standard Inline I/O station and intrinsically safe I/O terminals
- Diagnostic LEDs (standard load, heavy load, overload) provide immediate user feedback regarding the loading
- Design incorporates required 50 mm spacing between intrinsically safe and non-intrinsically safe connections
- Electronically protected against overload
- 1000 mA for logic circuit supply ( $U_L$ )
- 1000 mA for I/O circuit supply ( $U_{EX}$ )

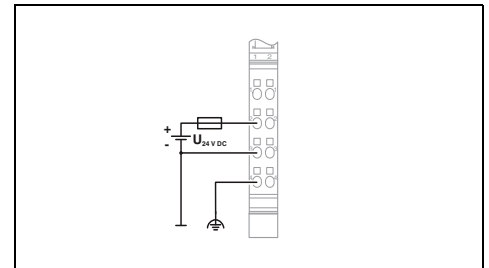
#### Notes:

1) EMC: Class A product, see page 553



Power terminal

Ex:



#### Technical data

Local bus interface	
Connection method	
Power supply for module electronics	
Supply for main circuit $U_{EX}$	
Power supply at $U_{EX}$	
Communications power $U_L$	
Power supply at $U_L$	
General data	
Connection method	
Connection data solid/stranded/AWG	
Weight	
Width	
Ambient temperature (operation)	

Inline data jumper	
28 V DC $\pm 5\%$	
1000 mA (max.)	
5 V DC (via voltage jumper)	
1000 mA (max.)	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
292 g	
48.8 mm	
-25 °C ... 60 °C	

#### Ordering data

Description	
<b>Inline power terminal for intrinsically safe terminals, complete with accessories (connector and marking field)</b>	

Type	Order No.	Pcs. / Pkt.
<b>IB IL EX-IS PWR IN-PAC<sup>1)</sup></b>	<b>2869910</b>	<b>1</b>

### Intrinsically safe digital I/O terminal (Ex-i)

The **IB IL EX-IS DIO 4/NAM-PAC** terminal allows connection of intrinsically safe sensors/actuators as well as NAMUR sensors located in Zone 1 or Zone 0 Ex areas. The terminal has 4 channels that can be configured as either an input or output.

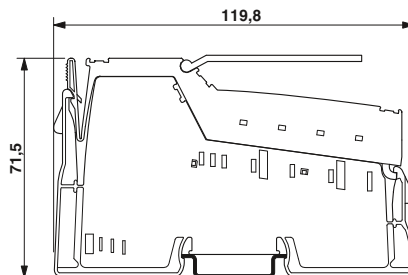
- LEDs indicate the channel status, such as:
- Configuration (input or output)
  - Activation (ON/OFF)
  - Error (short-circuit, etc.)
  - Logic state (high or low)

NAMUR sensor parameters can be read and transmitted as process data through the fieldbus network to the master.

#### Features

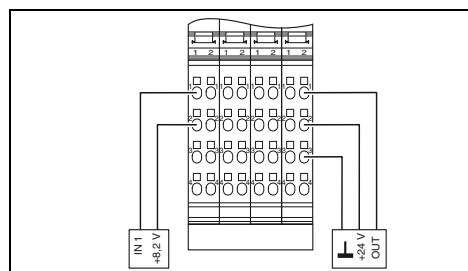
- 4 configurable I/O channels
- NAMUR sensor support (EN 60947-5-6).
- Individual channel diagnostics
- 8.2 V sensor power supply.

**Notes:**  
1) EMC: Class A product, see page 553



4 selectable channels, input (also NAMUR) or output

Ex:



Local bus interface
Connection method
Power supply for module electronics
Supply for main circuit $U_{Ex}$
Current consumption from $U_{Ex}$
Communications power $U_L$
Current consumption from $U_L$
Digital inputs
Connection technology
Maximum number of inputs
Description of the inputs
Input circuit
Protective circuit
Digital outputs
Connection technology
Maximum number of outputs
Description of the outputs
General data
Connection method
Connection data solid/stranded/AWG
Weight
Width
Ambient temperature (operation)

Technical data	
Inline data jumper	
28 V DC	
max. 190 mA	
5 V DC (via voltage jumper)	
max. 50 mA	
2-wire	
4	
Can be configured as input or output	
Floating contacts and 2-wire NAMUR proximity sensor (EN 60947-5-6)	
Polarity protection, surge protection	
3-wire	
4	
Digital passive output	
Spring-cage connection	
0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16	
204 g	
48.8 mm	
-25 °C ... 60 °C	

Description
<b>Inline digital I/O terminal, Ex-i, complete with accessories (connector and marking field)</b>
4-channel DIO

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL EX-IS DIO 4/NAM-PAC <sup>1)</sup>	2869911	1



### Intrinsically safe analog I/O terminal (Ex-i)

The **IB IL EX-IS AIO 4/EF-PAC** terminal allows connection of intrinsically safe analog sensors and actuators located in Ex areas like Zone 1 or Zone 0.

The terminal has 4 channels that can be configured as either an input or output.

All parameters can be read and transmitted using FDT technology across the fieldbus network to the master.

LEDs indicate the channel status, such as:

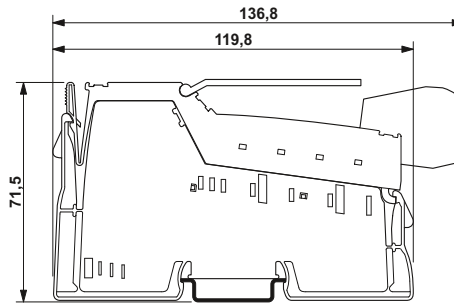
- Configuration (input or output)
- Activation (ON/OFF)
- Error (short-circuit, etc.)

#### Features:

- 4 configurable I/O channels
- Input: 0... 10 V ; 0/4... 20 mA
- Output: 0/4... 20 mA
- Optional passive output
- Module-based electrical isolation
- Individual channel diagnostics

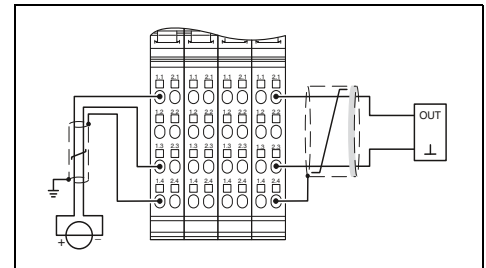
#### Notes:

- 1) EMC: Class A product, see page 553



4 selectable channels, input or output

Ex:



#### Technical data

Local bus interface	
Connection method	Inline data jumper
Power supply for module electronics	
Supply for main circuit $U_{Ex}$	28 V DC
Current consumption from $U_{Ex}$	max. 187 mA
Communications power $U_L$	5 V DC (via voltage jumper)
Current consumption from $U_L$	max. 50 mA
Analog inputs	
Connection method	Inline shield connector
Connection technology	2, 3-wire
Number of inputs	4
Voltage input signal	0 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA
Analog outputs	
Connection method	Inline shield connector
Connection technology	2-wire
Number of outputs	4 (can be configured as input or output)
Current output signal	0 mA ... 20 mA / 4 mA ... 20 mA
Protective circuit	Polarity protection, surge protection
General data	
Connection method	Spring-cage connection
Connection data solid/stranded/AWG	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
Weight	222 g
Width	48.8 mm
Ambient temperature (operation)	-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Inline analog I/O terminal, Ex-i, complete with accessories (plug connector and marking field)</b>			
4-channel AIO	<b>IB IL EX-IS AIO 4/EF-PAC<sup>1)</sup></b>	<b>2869912</b>	<b>1</b>

### Intrinsically safe temperature input terminal (Ex-i)

The **IB IL EX-IS TEMP 4 RTD/TCPAC** terminal allows connection of resistance temperature detectors (RTD) and thermocouples (TC) located in zone 1 or zone 0 Ex areas. The terminal has 4 channels that can be configured for either an RTD or TC sensor.

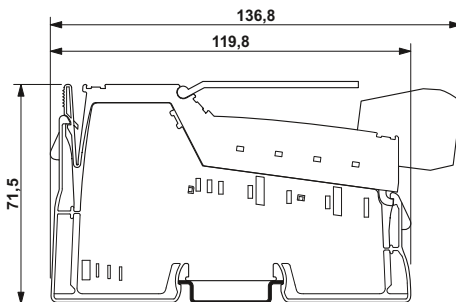
All parameters can be read and transmitted using FDT technology across the field-bus network to the master.

- LEDs indicate the channel status, such as:
- Configuration (RTD or TC)
  - Activation (ON/OFF)
  - Error (open circuit, etc.)

#### Features:

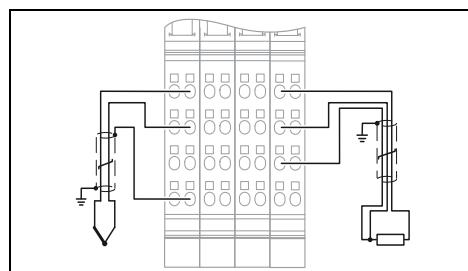
- 4 configurable I/O channels
- RTD inputs: PT100, etc.
- TC inputs: J, K, E, etc.
- 2 or 3-wire RTD sensors
- Module-based electrical isolation
- Individual channel diagnostics

**Notes:**  
1) EMC: Class A product, see page 553



4 selectable inputs, RTD or TC

Ex:

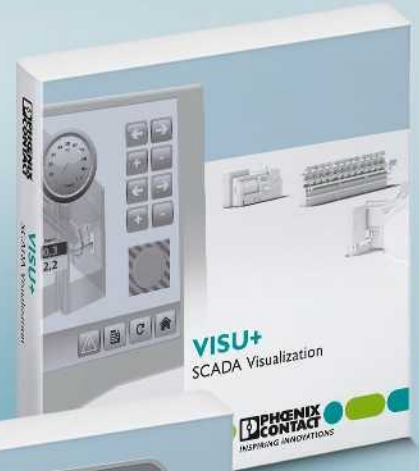
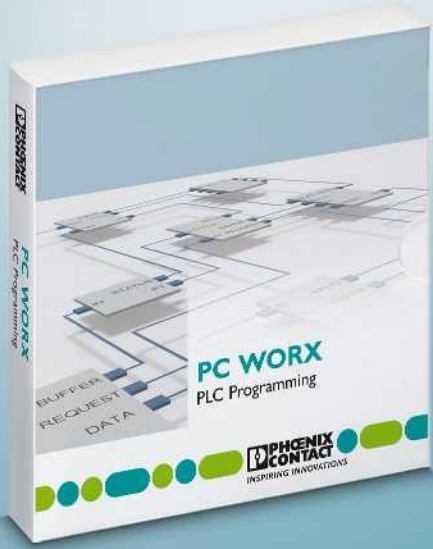


Local bus interface	Connection method
Power supply for module electronics	Supply for main circuit $U_{Ex}$
Current consumption from $U_{Ex}$	Communications power $U_L$
Current consumption from $U_L$	Analog inputs
Connection method	Connection technology
Number of inputs	Linear resistance measuring range
Sensor types (RTD) that can be used	Sensor types (TC)
Sensor types that can be used (TC)	Measured value resolution
Data formats	Protective circuit
General data	Connection method
Connection data solid/stranded/AWG	Weight
Width	Ambient temperature (operation)

Technical data	
Inline data jumper	28 V DC max. 80 mA
	5 V DC (via voltage jumper) max. 50 mA
Inline shield connector	2, 3-wire 4
	0 Ω ... 800 Ω / 0 Ω ... 5000 Ω 2 and 3-wire, Pt, Ni (DIN 100, 200, 500, 1000)
	J, K, E, R, S, T 16 bit (15 bit + sign bit) IB IL, S7-compatible Polarity protection, surge protection
Spring-cage connection	0.08 ... 1.5 mm <sup>2</sup> / 0.08 ... 1.5 mm <sup>2</sup> / 28 - 16
	222 g 48.8 mm -25 °C ... 60 °C

Description
Inline analog input terminal, Ex-i, complete with accessories (connector and marking field)
4-channel temperature input

Ordering data		
Type	Order No.	Pcs. / Pkt.
IB IL EX-IS TEMP 4 RTD/TC-PAC <sup>1)</sup>	2869913	1



# Software

Software is the key to more efficient automation. Phoenix Contact offers software from configuration to system operation – intelligent solutions that guide you through every stage of the value added chain of your automation solution. All products interact perfectly and impress with their innovative functions and intuitive, user-friendly operation. In addition, a wide range of ready-to-use block libraries is also available.

## Programming

Software products for programming, from clear tasks with compact controllers to complex system automation with high-end PLCs.

## Visualization

Intelligent tools for designing operation and monitoring interfaces – in the control room or directly in the machine.

## Drivers and interfaces

Everything you need to connect additional systems to your automation solution.

## Configuration, monitoring, diagnostics

Software tools for fast startup, constant monitoring, and reliable diagnostics.

## Planning and configuration

Expert support with the planning and configuration of technical components. So that everything works together perfectly.

## Remote control

Flexible solutions for controlling distributed automation units.

## Device parameterization

Central and efficient – parameterize your field devices from the comfort of your PC.






## System simulation






Startup and testing made easy – in a completely virtual environment.





## Marking software





Software tools for efficient marking – even in series production.



<b>Product overview</b>	<b>496</b>
<b>Programming</b>	
PC Worx EXPRESS/PC Worx	499
Function blocks/libraries	501
nanoNavigator	502
<b>Visualization</b>	
WebVisit	503
Visu+	505
<b>Drivers and interfaces</b>	
OPC/ODP server	506
<b>Configuration, monitoring, diagnostics</b>	
Config+	509
Diag+	511
<b>Device parameterization</b>	
Startup+	512
AutomationXplorer+	513
<b>Planning and configuration</b>	
Project+	514
<b>Remote control</b>	
Portico	515
Resy+	501

Programming					
	PC Worx	Steeplechase VLC	Function blocks	nanoNavigator	SAFETYPROG
					
Type	PC Worx ...	VLC- ... -P/USB	...	NLC-NAV-...	SAFETYPROG ...
Description	Software package for Phoenix Contact controllers programmed according to IEC 61131	Development environment with flowchart programming and hardware key	Function and industry-specific software and drivers	Programming software for the Nanoline product range	Programming software for INTERBUS-Safety systems and PROFIsafe controllers  See section: Functional safety
Page	499	<a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a>	501	502	111

Visualization			Drivers and interfaces		
	WebVisit	Visu+	OPC server	ODP server	SNMP OPC ...
					
Type	WEBVISIT ...	VISU+ 2 ...	... OPC SERVER	AX ODP SERVER ... FU	FL SNMP OPC SERVER V3 FL SNMP OPC AGENT V3
Description	Development software for web-based visualizations	SCADA visualization, development and runtime licenses	Communication interface for OPC-compatible visualizations	ODP communication interface for OPC-compatible visualizations	Monitoring/configuration of SNMP-compatible devices in HMI and SCADA systems / integration of OPC-based solutions in management systems
Page	503	505	506	507	507



Configuration, monitoring, diagnostics				
	Config+	Diag+	Diag+ NetScan	FL VIEW
				
Type	CONFIG+ ...	DIAG+ ...	DIAG+ NETSCAN ...	FL VIEW
Description	Tool for fieldbus and network configuration	Diagnostics software for INTERBUS, PROFINET, and Ethernet networks	Diagnostics software for cyclic INTERBUS diagnostics	Network diagnostics software  See section: Ethernet networks
Page	509	511	511	44

Device parameterization				
	Startup+	AutomationXplorer+	SAFECONF	MGUARD DM
				
Type	STARTUP+	AX+ BASIC		FL MGUARD DM ...
Description	Software for starting up and parameterizing AxioLine I/O stations	FDT application for device parameterization	Configuration software for SafetyBridge modules  <b>See section: Functional safety</b>	Central management software for FL MGUARD devices  <b>See section: Ethernet networks</b>
Page	512	513	110	45

Planning and configuration		
	Project+	FL WST BASIC
		
Type	PROJECT+	FL WST BASIC
Description	Software for planning the I/O configuration	Simulation software for planning wireless systems in industrial environments  <b>See section: industrial communication technology</b>
Page	514	59

Marking

CLIP PROJECT ...
See Catalog 3,  Section: Marking

Remote control		
	Portico	Resy+
		
Type	VL PORTICO SERVER ...	RESY+ ...
Description	Remote control of networked IPCs	Function blocks for extending standard control and I/O components with remote control protocols
Page	515	501

System simulation	
Software	Hardware
	
WINMOD AX ...	IB EMULATOR
WinMOD system software including INTERBUS/PROFINET IO simulation software	Required in order to simulate INTERBUS configurations with the WinMOD software
<a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a>	



### PC Worx and PC WORX EXPRESS

#### Programming with PC Worx

PC Worx is the consistent engineering software for all controllers from Phoenix Contact. It combines programming according to IEC 61131, fieldbus configuration, and system diagnostics – in a single software solution. This provides optimum interaction between hardware and software.

The PC Worx engineering tool can be used in all areas of industry. From the outset the software has been developed and optimized as a uniform and user-friendly engineering environment for all controller classes.

The software includes all the programming languages defined in IEC 61131-3:

- Instruction List (IL)
- Function Block Diagram (FBD)
- Ladder Diagram (LD)
- Sequential Function Chart (SFC)
- Structured text (ST)

#### Efficient programming

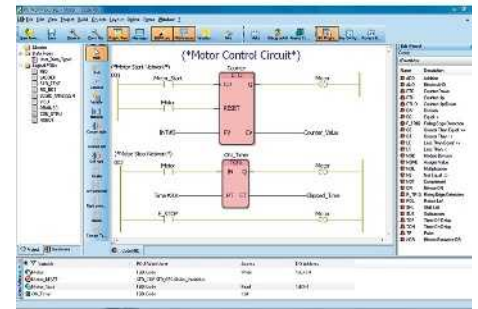
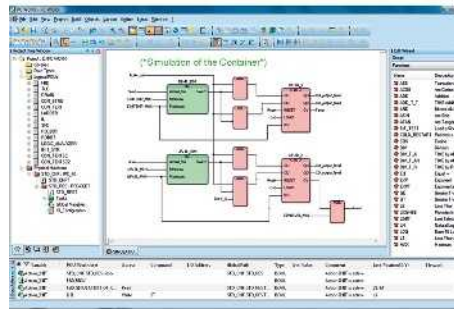
The PC Worx interface can be customized to your individual requirements with clearly arranged workspaces and toolbars. The basic languages of IEC 61131 (LD, FBD, and IL) can be directly and freely cross compiled. Structured text can be converted into any of the three basic languages.

All editors use assistants, which support and monitor the addition of data types, function blocks, operators, and variable declarations for quicker and more user-friendly editing. For text editors, another assistant is available for keywords and their command structures.

#### Startup and maintenance

During controller operation, the following functions round off IEC 61131 programming:

- Cross-references for editing
- Online and offline program comparison by all IEC editors and configuration data
- Startup functions
- Debug functions such as:
  - Logic analysis in realtime
  - Breakpoints
  - Address debugging
  - Step-by-step mode
  - Overwriting and forcing of variables



In order to test the program code, there is a powerful simulation tool for all INTEL®-compatible controllers. This shortens the startup times of the real system.

All data configured in PC Worx can be easily reused for visualization purposes via standard interfaces such as the AX OPC server or an integrated web server. The OPC and web server variables are selected by clicking with the mouse.

#### Worldwide use assured

You can switch between numerous languages in the interface. Program comments can be exported and imported for translation. You can therefore save projects together with their comments in various languages.

Integrated password handling supports various protection models, such as saving the project, protecting individual POUs (program organization units) against write or read access (expertise protection) or disabling actions such as controller start/stop.

#### I/O configuration

Network structures such as PROFINET, INTERBUS, PROFIBUS, and Modbus/TCP can be configured in PC Worx via an integrated bus configurator. A device catalog lists all components in clear groupings; the components can be applied in the hardware configuration using drag & drop.

In connection view, the program variables are connected to the inputs and outputs of the network components. The variables are addressed automatically.

#### Diagnostics

The integrated Diag+ diagnostics tool is used to handle the diagnostics of all system components in the INTERBUS and PROFINET network. This tool enables precise error localization in the entire system.

Preventive diagnostic functions such as monitoring the transmission quality of fiber optic paths in INTERBUS systems increase system availability. Diagnostic data, causes of malfunctions, and solutions are displayed directly in plain text.

#### Programming environment for controller class 100

With PC Worx EXPRESS, Phoenix Contact provides a free engineering tool that can be used to easily program class 100 compact controllers. This is achieved, for example, thanks to an even clearer user interface.

PC WORX EXPRESS offers numerous proven functions such as project creation, fast application development, plus easy download, monitoring, and startup of the PLC program. Intelligent automated functions such as the automatic insertion of program instances in the task or simplified variable handling speed up programming.

PC WORX EXPRESS can be downloaded free of charge:

[www.phoenixcontact.net/products](http://www.phoenixcontact.net/products)

If the application requires the advanced functions of PC Worx, the project created with PC WORX EXPRESS can be opened with the standard programming environment in order to transfer the created data to PC Worx - as a result no data is lost.





Free programming environment for the 100 series controller class



Software package for Phoenix Contact controllers programmed as per IEC 61131

	Technical data	Technical data
Hardware requirements		
CPU	Pentium 4/Celeron 1.6 GHz, minimum	Pentium 4/Celeron 1.6 GHz, minimum
Main memory (RAM)	min. 1 Gbyte (2 Gbyte for Windows Vista and Windows 7)	min. 1 Gbyte (2 Gbyte for Windows Vista and Windows 7)
Hard disk memory	min. 2 Gbyte	min. 2 Gbyte
Optical drive	DVD-ROM	DVD-ROM
Operating equipment	Keyboard, mouse	Keyboard, mouse
Monitor resolution	XGA (1024 x 768)	XGA (1024 x 768)
Software requirements		
Operating systems	MS Windows XP SP3, MS Windows Vista Business SP2, MS Windows 7 Professional (32/64-bit) SP1	MS Windows XP SP3, MS Windows Vista Business SP2, MS Windows 7 Professional (32/64-bit) SP1
Supported browsers	Internet Explorer Version 7 or later	Internet Explorer Version 7 or later
Basic functions	Configuring an automation system, parameterizing INTERBUS devices, operating INTERBUS, programming an automation system according to IEC 61131-3, communication according to IEC 61131-5  IEC 61131 includes the following programming languages: - Function block diagram (FBD), - Ladder diagram (LD), - Structured text (ST)  Network configuration (functionality of Config+)  Network diagnostics (functionality of Diag+)  - 128 kbytes of I/O data (mixed)	Planning an automation system, parameterizing the INTERBUS and PROFINET devices, operating INTERBUS and PROFINET, programming an automation system in acc. with IEC 61131-3, communication in acc. with IEC 61131-5  IEC 61131 includes the following programming languages: -Instruction list (IL), -Function block diagram (FBD), -Ladder diagram (LD), -Structured text (ST), -Symbolic flowchart (SFC)  Add-on to IEC 61131: Fixed Format Ladder Editor (FFLD) and Machine Sequential Function Chart language MSFC (from the license PC Worx PRO LIC onwards) Network configuration (functionality of Config+)  Network diagnostics (functionality of Diag+) 128 kbytes of I/O data (mixed) (full license)
Languages supported	German, English, French, Italian, Spanish, Chinese	German, English, French, Italian, Spanish, Chinese

	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>Free programming version</b> without license mechanism for controller class 100, 128 Kbyte I/O data	PC Worx EXPRESS	2988670	1			
<b>Demo software with Quick Start Guide</b> , 16 byte input/output data, Diag+ limited to 5 devices				PC Worx DEMO	2985725	1
<b>Basic license</b> with 256 byte input/output data, without MSFC compiler				PC Worx BASIC LIC	2985275	1
<b>Full license</b> with 128 Kbyte input/output data, with MSFC compiler included				PC Worx PRO LIC	2985385	1
<b>Low-cost upgrade</b> of existing basic license to a full license				PC Worx BASIC-PRO LIC	2985259	1

Function blocks from Phoenix Contact can be used to integrate functions such as energy measurement or motor management quickly and easily in your system and so transform them into a fully-fledged part of your control system.

### Block libraries – useful grouping of functions

Our function blocks are grouped by theme as libraries, e.g., for PC Worx and STEP 7, which are optimally tailored to the relevant development environment. Free blocks for parameterization, monitoring, and signal conditioning are available for connecting analog and digital I/O terminals. Blocks for function terminals contain control functions and communication options.

Technology blocks offer functions such as database access, network monitoring or ready-made applications for embedding the controller in its surroundings. Some of these blocks require a paid license, such as APPLIC A or PDPI, on the controller where the memory cards are located. All function blocks that require a license can also be used unrestricted for six hours without a license.

### Your advantages:

- High quality for every application, thanks to documented and tested program parts
- Fast startup of I/O components and error-free configuration, thanks to specially adapted blocks
- Ready-made function blocks reduce programming effort and help prevent programming errors
- Function blocks even for complex applications such as controllers
- Unlimited communication, as network protocols can be accessed from the control program
- Easy infrastructure integration
- Maximum safety, thanks to the support and ongoing development of products by Phoenix Contact

### Memory cards with and without license

Memory cards are used to configure the parameterization memory of controllers. You can choose between 512 MB or 2 GB for SD cards or between 256 MB and 2 GB for CF cards.

Furthermore, memory cards are also available in versions that come with a license; these are indicated with the extension APPLIC A, PDPI BASIC or PDPI PRO. For blocks that require a license, use memory cards with the extension APPLIC A.

### Control technology

The **ControlTechnology** library contains free function blocks and function blocks that require a license for control technology. For an overview of how to use the blocks, please refer to the documentation included in the library.

### Network protocols

The blocks in the **IT** library support conventional protocols from the IT world. You can therefore integrate controllers into the IT environment for production and ensure consistent communication from field level to control level.

In addition, the library contains ready-made function blocks for the following protocols – as a client function:

- FTP (File Transfer Protocol)
- Dynamic Host Control Protocol (DHCP)
- Domain Name Service (DNS)
- Simple Network Time Protocol (SNTP)
- Simple Mail Transfer Protocol (SMTP)

### IT security

The **IT-Security** library contains universal function blocks for protecting your data – when stored in a file system or while being transmitted in the network.

The integrity of data, i.e., the detection of corrupted data, can be ensured directly from the application thanks to the Secure Hash Algorithm (SHA). With the Keyed-Hash Message Authentication Code (HMAC) extension, SHA can also be used to authenticate your data.

In addition, you can protect data from being read without authorization using encryption methods such as the Advanced Encryption Standard (AES).

### Network management

Here you'll find function blocks for all aspects of the Simple Network Management Protocol (SNMP). The SNMP library enables you to link your controllers to network management even deeper with SNMP Version v2c.

- The **SNMP Agent** block can be used to provide access to diagnostic messages, process values or control parameters from the control environment.
- The **SNMP Client** block enables access to the network components from the control program; the controller can therefore request the status of a device or even change parameters.
- The **Trap Sender** block enables the controller to send event messages.
- To receive messages, use the **Trap Receiver** block.

The SNMP Agent, Trap Sender, and Trap Receiver blocks are also available for protocol Version 3. This means that you can also meet increased security requirements by authenticating or encrypting the user data that is to be transmitted.

### Databases

The **SQL** block library enables you to transfer data directly from the controller to an MS SQL or MySQL database. With the aid of function blocks a database connection is established from the control program. The integrated user management of the database governs the assignment of access rights. The application program uses standardized SQL commands to write to database tables directly or to query the database.

### CAN bus

The **CAN-Technology** library contains function blocks for CAN bus. You can therefore integrate the IB IL CAN-MA In-line terminal in your control program.

In the library you have direct access to the messages of the serial fieldbus. In addition, ready-made blocks are available for higher-level application protocols such as CANopen®, J1939 or NMEA 2000.

**Resy+ software**

With the Resy+ remote control libraries from Phoenix Contact you can monitor and control system parts that are in separate locations, such as pumping stations or elevated tanks. You are therefore kept informed of all the generic measured values of your external stations at any given time.

The libraries contain preprogrammed examples which can be used directly. Otherwise you can combine ready-made blocks to create your own solution. Thanks to special remote control protocols such as ODP, IEC 60870-5-101 and -104, the control commands are sent directly from a central control room and process data is transmitted securely over wide area networks.

You can therefore design modern and efficient remote control technology: simply combine the Resy+ remote control software with our automation components.

**Your advantages:**

- Secure, event-oriented, and inexpensive monitoring of all distributed plants via Ethernet as well as via serial interfaces
- Standardized protocols – for integrating your remote control station into existing networks
- Versatile – data transmission via Ethernet, wireless technology, GSM, GPRS/EDGE/3G, and Industrial Wireless
- Highly modular – the stations can be created flexibly and you can combine various transmission paths, i.e., optimum adaptation

**Controller function blocks with self-optimization: PDPI BASIC or PDPI PRO**

Blocks for applications in control technology are grouped together in the **PDPI-BASIC** and **PDPI-PRO** libraries.

- Automatic identification of control parameters
- Control for binary, motor step, and continuous actuators
- Special functions for numerous areas of application, such as startup circuit, heating channel control or water cooling

The block for the self-tuning controller for temperature control requires the PDPI Basic license:

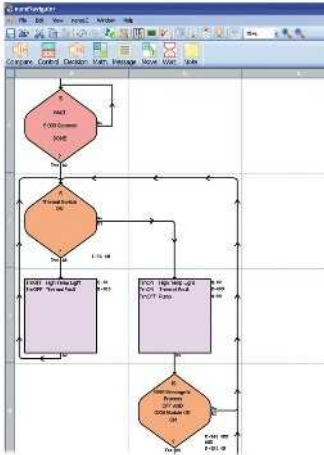
The block for the self-tuning controller for special functions in process automation requires the PDPI Pro license.



CF and SD memory card with function block licenses

Description
<b>Parameterization memory</b> , Flash card without license
- 2 GB
- 2 GB
- 512 MB
- 256 MB
<b>Function block libraries for IT applications</b> , for MS SQL/MY SQL communication and for PID controllers, <b>Flash card with license for activation</b>
- 2 GB, with license code
- 2 GB
- 512 MB, with license code
- 256 MB
<b>Controller function blocks with self-optimization</b> for temperature control, <b>Flash card with license for activation</b>
- 512 MB
- 256 MB
<b>Controller function blocks with self-optimization</b> , extended with special functions for process automation, <b>Flash card with license for activation</b>
- 512 MB
- 256 MB
<b>License key function block library for remote control technology</b>

Ordering data			
Type	Order No.	Pcs. / Pkt.	
SD FLASH 2GB	2988162	1	
CF FLASH 2GB	2701185	1	
SD FLASH 512MB	2988146	1	
CF FLASH 256MB	2988780	1	
SD FLASH 2GB APPLIC A	2701190	1	
CF FLASH 2GB APPLIC A	2701189	1	
SD FLASH 512MB APPLIC A	2701799	1	
CF FLASH 256MB APPLIC A	2988793	1	
SD FLASH 512MB PDPI BASIC	2701800	1	
CF FLASH 256MB PDPI BASIC	2700549	1	
SD FLASH 512MB PDPI PRO	2701801	1	
CF FLASH 256MB PDPI PRO	2700550	1	
RESY-DATA-A LIC	2876847	1	



The nanoNavigator software is the ideal solution for all setup, programming, and maintenance tasks relating to the Nanoline programmable logic module and can be downloaded free of charge.

Connect your PC to the programmable logic module via one of the serial connections. It takes just four steps to create a control program with the software, which you can also start and stop from the PC. At the same time, you can monitor the progress of the program and data such as inputs, outputs, registers, flags or timers in online mode.

The programming languages offered by the software include flowchart and ladder diagram, which is used in electrical engineering in particular. In general, development tasks can be performed quickly with the nanoNavigator software, as you can also modify data elements and monitor their execution from the PC, and you also have the option of simulating the application.

nanoNavigator can be used intuitively and without detailed prior knowledge. Together with the Nanoline programmable logic module, the system represents a user-friendly and cost-effective solution for editing clear control tasks efficiently.



Software for programming and maintenance tasks relating to the Nanoline programmable logic module

<b>Hardware requirements</b>
CPU
Main memory (RAM)
Hard disk memory
Optical drive
Interfaces
Operating equipment
Monitor resolution
<b>Software requirements</b>
Operating systems
<b>Basic functions</b>
<b>Languages supported</b>

<b>Technical data</b>		
Pentium > 400 MHz		
512 Mbyte (1 GB for Windows Vista)		
128 Mbyte		
CD-ROM		
COM port or USB port		
Keyboard, mouse		
SVGA (800 x 600)		
<b>Software requirements</b>		
MS Windows 2000, Windows XP, Windows Vista (32- and 64-bit), Windows 7 (32- and 64-bit)		
<b>Basic functions</b>		
Programming with flowcharts		
Programming with ladder diagram		
Project configuration		
Project simulation		
Execution monitoring		
<b>Languages supported</b>		
German, English, French, Spanish, Italian		

<b>Description</b>
<b>Programming software</b>

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
NLC-NAV-01	2701221	1

## WebVisit

You can now also benefit from the advantages of web-based visualization when controlling your automation systems. Visualize your networks, devices or processes with WebVisit – the inexpensive engineering tool from Phoenix Contact. With intuitive operation and without programming effort, you can create graphical interfaces for clear and straightforward work.

All Phoenix Contact controllers offer an integrated web server which forwards control data. Use this data and design visualization pages for your system using WebVisit. The big advantage for you is that WebVisit is a graphical editor – i.e., you do not need any Java or HTML programming knowledge.

WebVisit visualization pages can be displayed in any standard browser and on all of our web panels with integrated runtime environment. When you use WebVisit you only pay for the engineering once and create any number of pages.



Development software for web-based visualizations

### Hardware requirements

CPU  
Main memory (RAM)

Hard disk memory  
Optical drive  
Operating equipment

Monitor resolution  
Software requirements

Operating systems

Supported browsers

Basic functions

### Technical data

Pentium 4/Celeron 1.6 GHz, minimum  
min. 1 Gbyte (2 GB for Windows Vista and Windows 7)

min. 2 Gbyte  
DVD-ROM  
Keyboard, mouse  
XGA (1024 x 768)

MS Windows XP SP3, MS Windows Vista Business SP2,  
MS Windows 7 Professional (32/64-bit) SP1  
Internet Explorer Version 7 or later

WebVisit is the engineering tool used to create web visualizations for all controllers with integrated web server.

The user interface has a functional design and even the basic version offers numerous graphic basic elements and functions.

The Pro version includes functions such as alarm lists, trends, a simple user management feature, URL jumps, and other popular functions.

WebVisit enables you to create suitable user interfaces for your application quickly and easily.

### Languages supported

English

### Description

Development software for web-based visualizations

**WebVisit**, development software for web-based visualisations, with alarming, trending and language selection

**WebVisit**, free development software for up to three web-based visualization pages

Upgrade license for upgrading from WEBVISIT 6 BASIC to WEBVISIT 6 PRO

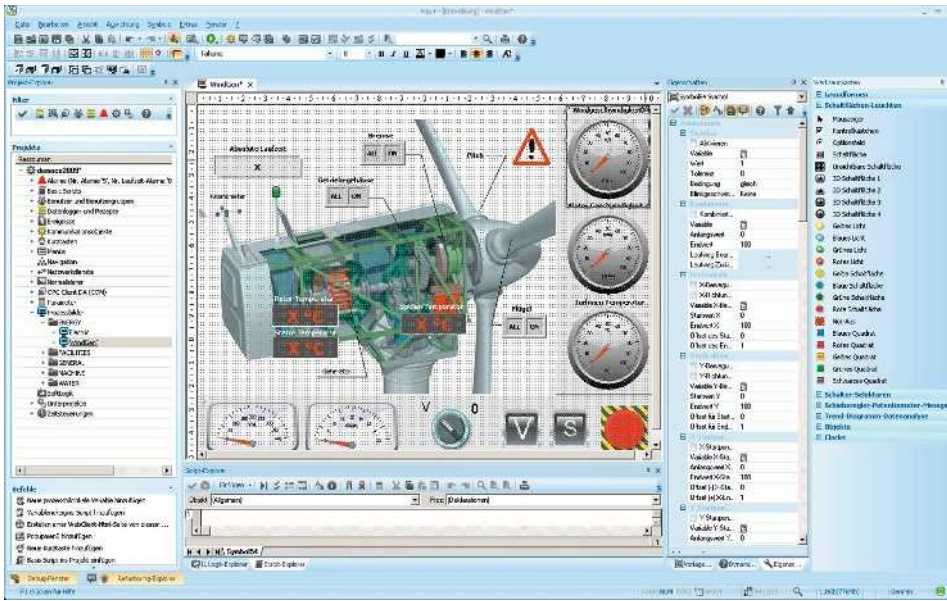
### Ordering data

Type	Order No.	Pcs. / Pkt.
WEBVISIT 6 BASIC	2700948	1
WEBVISIT 6 PRO	2700949	1
WEBVISIT 6 EXPRESS	2700954	1

### Accessories

WEBVISIT 6 BASIC-PRO	2700950	1
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Visu+ is the visualization software with SCADA functionality for computer-aided control and monitoring of technical processes. Visu+ is suitable for any application: from a compact HMI device to an industrial PC.

#### Your advantages:

- Operation and monitoring of systems and machines
- Thanks to the central monitoring of a system, previously used indicators such as switches or signaling devices can be eliminated.
- Trending: e.g., for plotting curves with measured data
- Alarming: monitoring process values for permissible and impermissible states, and notification via modem or web link, plus SMS, voice, and fax messages
- Data logging: recording data in a database for later analysis or graphical representation
- User management: assignment and restriction of user rights
- Reporting: analysis of collected data and representation of data in the form of a report
- Optional web clients provide access to operational data via the Internet or Intranet

Visualization projects created with Visu+ can be used on all PCs with Windows operating systems as well as on Windows CE-based HMI devices from the TP and OT ranges. A runtime license is required for Windows 2000/XP/Vista.

#### Licenses

An engineering license is required in order to use Visu+. This license can be used to create projects for both HMI devices and PCs. A demo license is available for the initial steps. Unlike the PC runtime licenses, the runtime licenses for HMI devices are functionally restricted by Windows CE.

The runtime licenses for PCs (Windows) can be ordered individually. Two basic versions are available, Visu+ RT and Visu+ RT-D, where the number of I/O bytes can be selected in stages or as an unlimited option. These basic licenses can be extended individually with options such as networking, web clients or redundancy.

In addition to the OPC interface, the Visu+ RT-D licenses feature a direct driver connection to certain controllers, e.g., Siemens S7.

Phoenix Contact HMI devices already have a runtime license for Visu+. The visualization images are vector-based and stored in XML format. During runtime, only the file that is currently being displayed is disabled, all other screen pages can be replaced during project runtime. This means that in most cases, changes can be made to the project online.

Due to its Unicode capability, Visu+ can also display foreign character sets, such as Asian fonts. Machines that are designed for worldwide export, for example, benefit from this feature. Similarly, in multilingual projects, languages can be switched online.

Scripting similar to VBA (Visual Basic for Applications) is available for individual adjustments. Another version of scripting supports creation of a PLC-like instruction list (IL).

#### Visu+ options:

Combine options freely with a runtime license. Order numbers for your combination are available on request.

#### Visu+ 2 alarm statistics

- For statistical evaluations of alarms and their reports (reporting)

#### Visu+ 2 OPC server

- Operates as an OPC DA server or OPC XML DA server to connect OPC DA clients such as MES systems

#### Visu+ 2 redundancy

- For parallel operation on two PCs in order to enable continued operation in the event that one PC fails
- A license with redundancy function is required for each PC

#### Visu+ 2 alarm dispatcher

- For alarm distribution on various systems such as SMS, voice message, fax, modem or e-mail

#### Visu+ 2 networking

- For data exchange between multiple Visu+ runtime systems

#### Visu+ 2 web client xx

- For using the Visu+ runtime as the server for the selected number of clients
- **xx** = number of web clients:  
1, 2, 3, 4, 5, 10, 15, 20 up to a maximum of 64 web clients supported



**Development and runtime licenses for Visu+ (without drivers)**



**Runtime licenses for Visu+ with 2 direct drivers**

**Notes:**  
Further licenses can be found on the Internet at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products).  
**1) Note:** Unlike version 1.xx, Visu+ 2 ... XT... products now no longer offer a web client function ; this can be purchased optionally.

Technical data	
Hardware requirements	Pentium/Celeron, 1.6 GHz min. 1 Gbyte (2 GB for Windows Vista and Windows 7)
CPU	
Main memory (RAM)	
Hard disk memory	min. 1 Gbyte (recommended: 2 GB)
Optical drive	DVD-ROM
Operating equipment	Keyboard, mouse
Monitor resolution	XGA (1024 x 768)
Software requirements	
Operating systems	MS Windows XP SP3, MS Windows Vista Business SP2, MS Windows 7 Professional (32/64-bit) SP1 Internet Explorer 5.5 or higher
Supported browsers	
Basic functions	Full SCADA (Supervisory Control And Data Acquisition) functionality with visualization, trending, and alarm management  Multilingualism of software and projects (incl. Unicode support and online toggling)  Know-How protection and safety through coding of projects  Control coupling with OPC  Access protection with user management Fully scalable process diagrams for using one design on different devices and monitor sizes  Realtime database coupling with ODBC to MS ACCESS, MS EXCEL, and SQL server Automatic data recording and recipe management  Scripts can be created in VBA and IL FDA CFR 21 Part 11 compatible
Options	Statistical alarm function Web client capability Redundancy function Advanced alarm management with SMS, FAX, e-mail and voice mail function Networking
Languages supported	German, English, French, Italian

Technical data	
Hardware requirements	Pentium/Celeron, 1.6 GHz min. 1 Gbyte (2 GB for Windows Vista and Windows 7)
CPU	
Main memory (RAM)	
Hard disk memory	min. 1 Gbyte (recommended: 2 GB)
Optical drive	DVD-ROM
Operating equipment	Keyboard, mouse
Monitor resolution	XGA (1024 x 768)
Software requirements	
Operating systems	MS Windows XP SP3, MS Windows Vista Business SP2, MS Windows 7 Professional (32/64-bit) SP1 Internet Explorer 5.5 or higher
Supported browsers	
Basic functions	Full SCADA (Supervisory Control And Data Acquisition) functionality with visualization, trending, and alarm management  Multilingualism of software and projects (incl. Unicode support and online toggling)  Know-How protection and safety through coding of projects  Control coupling with OPC and 2 direct drivers  Access protection with user management Fully scalable process diagrams for using one design on different devices and monitor sizes  Realtime database coupling with ODBC to MS ACCESS, MS EXCEL, and SQL server Automatic data recording and recipe management  Scripts can be created in VBA and IL FDA CFR 21 Part 11 compatible
Options	Statistical alarm function Web client capability Redundancy function Advanced alarm management with SMS, FAX, e-mail and voice mail function Networking
Languages supported	German, English, French, Italian

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>VISU+ 2</b>	<b>2988544</b>	<b>1</b>
<b>VISU+ 2 RT 64</b>	<b>2988683</b>	<b>1</b>
<b>VISU+ 2 RT 128</b>	<b>2988586</b>	<b>1</b>
<b>VISU+ 2 RT 256</b>	<b>2988609</b>	<b>1</b>
<b>VISU+ 2 RT 512</b>	<b>2988612</b>	<b>1</b>
<b>VISU+ 2 RT 1024</b>	<b>2988641</b>	<b>1</b>
<b>VISU+ 2 RT 2048</b>	<b>2988528</b>	<b>1</b>
<b>VISU+ 2 RT 4096</b>	<b>2988531</b>	<b>1</b>
<b>VISU+ 2 RT 8192</b>	<b>2988557</b>	<b>1</b>
<b>VISU+ 2 RT UNLIMITED</b>	<b>2988654</b>	<b>1</b>
<b>VISU+ 2 RT 2048 NETWORKING</b>	<b>2701143</b>	<b>1</b>

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>VISU+ 2 RT-D 64</b>	<b>2988751</b>	<b>1</b>
<b>VISU+ 2 RT-D 128</b>	<b>2988696</b>	<b>1</b>
<b>VISU+ 2 RT-D 256</b>	<b>2988719</b>	<b>1</b>
<b>VISU+ 2 RT-D 512</b>	<b>2988722</b>	<b>1</b>
<b>VISU+ 2 RT-D 1024</b>	<b>2988735</b>	<b>1</b>
<b>VISU+ 2 RT-D 2048</b>	<b>2988764</b>	<b>1</b>
<b>VISU+ 2 RT-D 4096</b>	<b>2988913</b>	<b>1</b>
<b>VISU+ 2 RT-D 8192</b>	<b>2988573</b>	<b>1</b>
<b>VISU+ 2 RT-D UNLIMITED</b>	<b>2988748</b>	<b>1</b>
<b>VISU+2 RT-D 2048 NETWORK</b>	<b>2701670</b>	<b>1</b>

Description
<b>Development license for Visu+ projects</b>
<b>Runtime license for Visu+,</b> where the I/O data and variables in scripting are limited - Limited to 64 bytes - Limited to 128 bytes - Limited to 256 bytes - Limited to 512 bytes - Limited to 1024 bytes - Limited to 2048 bytes - Limited to 4096 bytes - Limited to 8192 bytes
<b>Runtime license for Visu+,</b> without limitation for I/O data and variables in scripting
<b>Runtime license for Visu+,</b> including networking function where the I/O data and variables in scripting are limited - Limited to 2048 bytes



OPC/ODP server

Implement data exchange quickly and reliably between the following devices using OPC servers:

- PC Worx programmable controllers and OPC-compatible devices
- SNMP-compatible devices

Your advantages:

- Flexible integration in numerous higher-level systems, thanks to open, standardized interfaces such as OPC or SNMP
  - Fast parameterization of signals in the project only needs to be carried out once: the AX OPC server is configured automatically
  - User-friendly communication with I/O devices from a high-level language application, thanks to the HFI driver interface
- Using this Windows®-based, globally standardized technology, control hardware and visualization software can be easily combined, without the need for special drivers. Visualization software can therefore read or write data from a PLC without programming and represent this graphically.

AX OPC SERVER

The OPC interface is used for data exchange and offers a manufacturer-neutral way of connecting visualizations to the control technology.

AX ODP SERVER

The ODP (Open Data Port) server enables you to communicate openly with your Phoenix Contact controllers via Ethernet, DSL or GPRS.

SNMP OPC server V3

SNMP OPC servers gather device and network information, which can be read via SNMP. In this way, you can integrate your SNMP-compatible devices in OPC-based process control systems (SCADA) or in HMI systems.

SNMP OPC agent V3

The SNMP OPC agent enables seamless vertical integration. This means that OPC-based automation systems can be integrated into existing SNMP management structures. You can therefore monitor the operating states of Ethernet components with the central management system, for example.

<b>Hardware requirements</b>
CPU Main memory (RAM)
Hard disk memory Optical drive Operating equipment Supported interface connections
<b>Software requirements</b>
Operating systems
<b>Basic functions</b>
<b>Languages supported</b>
<b>Description</b>
<b>AX OPC SERVER</b> , communication interface for OPC-compatible visualization with PC Worx-based controllers
<b>INTERBUS OPC server</b> , data interface between distributed INTERBUS and Ethernet networks and visualization systems
<b>AX ODP SERVER</b> , Open Data Port server, communication interface for ODP-compatible visualization with PC Worx-based control systems. - For 5 remote control substations - For 8 remote control substations - For 10 remote control substations - For 15 remote control substations - For 20 remote control substations - For 25 remote control substations - For 30 remote control substations - For 50 remote control substations - For 75 remote control substations - For 100 remote control substations - For 150 remote control substations - For 200 remote control substations - For 250 remote control substations
<b>SNMP-OPC server</b> , German and English, for monitoring and configuration of SNMP-capable equipment in HMI and SCADA systems - For a maximum of 100 devices
<b>SNMP-OPC agent</b> , German and English, for integrating OPC-based automation solutions in company-wide network management systems - For a maximum of 100 devices
<b>Extension license</b> , for 100 additional devices



Communication interface for OPC-capable visualization

Technical data		
Pentium 4/Celeron 1.6 GHz, minimum min. 1 Gbyte (2 GB for Windows Vista and Windows 7)		
min. 2 Gbyte DVD-ROM Keyboard, mouse Embedded Controller (INTERBUS controller boards are supported only by the IBS OPC SERVER.)		
MS Windows XP SP3, MS Windows Vista Business SP2, MS Windows 7 Professional (32/64-bit) SP1		
Supports OPC standard functions and all the optional interfaces (in accordance with OPC spec. DA 1.0a and DA 2.04/2.05)		
Simultaneous support to several controllers		
Integrated OPC testing and diagnostics client		
German, English		
Ordering data		
Type	Order No.	Pcs. / Pkt.
AX OPC SERVER	2985945	1
IBS OPC SERVER	2729127	1
Accessories		



GPRS-based communication for OPC-compatible visualization



Monitoring/configuration of SNMP-compatible devices in HMI and SCADA systems



Integration of OPC-based solutions in management systems

Technical data
Pentium 4/Celeron, 2 GHz 1024 Mbyte
2048 Mbyte (Recommended 1 Gbyte) DVD-ROM Keyboard, mouse ILC 1xx, ILC 3xx, RFC 470
MS Windows XP, MS Windows 2003/2008 Server, MS Windows Vista
The ODP (Open Data Port) server enables the user to communicate openly with supported controllers based on GPRS. Data is transmitted either online or as buffered historical values in the controller with time stamp.
Upgrade licenses are available
German, English

Technical data
PC Pentium > 266 MHz -
min. 20 Mbyte CD-ROM Keyboard, mouse recommended -
Windows XP SP3, Windows Vista, Windows 7, Windows 2003 Server SP1, Windows 2008 Server
Monitoring and configuration of 100 SNMP-compatible devices in HMI/SCADA systems, SNMP Version v1 and v2c supported ; OPC clients OPC Data Access 1.0A/2.0 or OPC Alarm and Events supported, integrated MIB browser, import/export and creation of device profiles supported, online and remote configuration possible via remote PCs Network monitoring with HMI/SCADA systems
German, English

Technical data
PC Pentium > 266 MHz min. 32 Mbyte
min. 20 Mbyte CD-ROM Keyboard, mouse recommended -
Windows XP SP3, Windows Vista, Windows 7, Windows 2003 Server SP1, Windows 2008 Server
Monitoring of OPC server, access to OPC server, SNMP proxy agent, SNMP Version v1 and v2c supported
Network monitoring with HMI/SCADA systems
German, English

Ordering data		
Type	Order No.	Pcs. / Pkt.
AX ODP SERVER 5FU	2700391	1
AX ODP SERVER 8FU	2700392	1
AX ODP SERVER 10FU	2700393	1
AX ODP SERVER 15FU	2700394	1
AX ODP SERVER 20FU	2700396	1
AX ODP SERVER 25FU	2700397	1
AX ODP SERVER 30FU	2700399	1
AX ODP SERVER 50FU	2700400	1
AX ODP SERVER 75FU	2700401	1
AX ODP SERVER 100FU	2700402	1
AX ODP SERVER 150FU	2700403	1
AX ODP SERVER 200FU	2700404	1
AX ODP SERVER 250FU	2700406	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SNMP OPC SERVER V3	2701139	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
FL SNMP OPC AGENT V3	2701136	1

Accessories		

Accessories		
FL SNMP OPC SERVER V3 LIC 100	2701138	1

Accessories		
FL SNMP OPC AGENT V3 LIC 100	2701135	1

### Config+

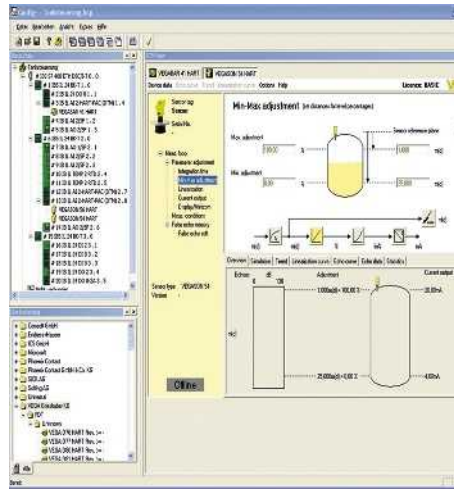
Config+ from Phoenix Contact is the ideal software solution for configuring INTERBUS networks.

The clear user interface allows you to assign addresses using drag & drop and to configure even complex topologies. In addition, the Ethernet devices used can also be mapped and diagnosed. For reliable troubleshooting in INTERBUS networks, the integrated Diag+ diagnostics tool can be used.

#### Numerous functions for efficient configuration

In Config+, you can use a wide range of functions to efficiently configure systems with INTERBUS networks.

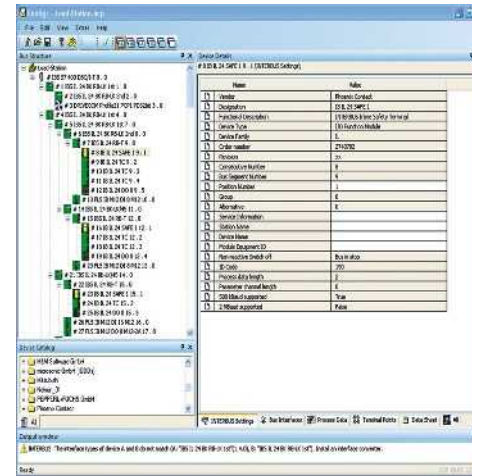
- Reading and comparing real and planned topology
- Address assignment via drag & drop or completely automatic
- Parameterization of several master boards and controller boards in one project
- Configuration of subsystems, e.g., lower-level robot systems
- Assignment and calling of external operating tools for intelligent devices
- Use of various (e.g., user-defined) device catalogs
- Import and export of device catalogs
- IP address assignment via BootP server
- Non-proprietary device parameterization using the FDT (field device technology) concept
- Parameterization of multiple devices with the MDC wizard (multiple device configuration assistant)
- Monitoring function for wiring checks
- Topology data transfer to the SAFETYPROG safe programming tool



#### Comprehensive diagnostics for INTERBUS networks

Reliable diagnostics are essential for high system availability. INTERBUS networks can be diagnosed reliably with the Diag+ diagnostics tool integrated in Config+.

- Graphical display of error location in the network topology
- Output of plain text messages with tips for error removal
- Online display of device statuses
- Evaluation of statistical data for transmission quality
- Saving comments about error messages



#### Integrated diagnostics for Ethernet devices

With Diag+, you can also view additional diagnostic information on the Ethernet devices used in the network.

- Receive traps by means of the integrated trap receiver
- Graphical display of the Ethernet topology (2D view) showing the availability of devices
- Display of port statistics, error information on the devices, as well as other properties that can be read via SNMP
- Calling of device web pages

**Notes:**  
1) EMC: Class A product, see page 553



Tool for fieldbus and network configuration

Technical data																													
Hardware requirements	Pentium 4/Celeron 1.6 GHz, minimum min. 1 Gbyte (2 GB for Windows Vista and Windows 7)																												
CPU																													
Main memory (RAM)	min. 2 Gbyte																												
Hard disk memory	DVD-ROM																												
Optical drive	Serial interface, Ethernet, PCI																												
Interfaces	Keyboard, mouse																												
Operating equipment	XGA (1024 x 768)																												
Monitor resolution																													
Software requirements	MS Windows XP SP3, MS Windows Vista Business SP2, MS Windows 7 Professional (32/64-bit) SP1 Internet Explorer Version 7 or later																												
Operating systems																													
Supported browsers																													
Termination boards supported	<table border="1"> <tbody> <tr><td>IBS S7 400 ETH SDSC/I-T</td><td>2819558</td></tr> <tr><td>IBS S7 400 ETH DSC/I-T<sup>1)</sup></td><td>2731102</td></tr> <tr><td>IBS S7 400 DSC/I-T<sup>1)</sup></td><td>2719962</td></tr> <tr><td>IBS S7 300 DSC-T<sup>1)</sup></td><td>2719975</td></tr> <tr><td>IBS PCI SC/RI/I-T<sup>1)</sup></td><td>2730080</td></tr> <tr><td>IBS PCI SC/RI-LK</td><td>2730187</td></tr> <tr><td>IBS PCI SC/I-T<sup>1)</sup></td><td>2725260</td></tr> <tr><td>IBS PCI SC-LK<sup>1)</sup></td><td>2700318</td></tr> <tr><td>FL IL 24 BK-B-PAC<sup>1)</sup></td><td>2862327</td></tr> <tr><td>FL IL 24 BK-PAC<sup>1)</sup></td><td>2862314</td></tr> <tr><td>FL NP PND-4TX IB<sup>1)</sup></td><td>2985974</td></tr> <tr><td>FL NP PND-4TX IB-LK<sup>1)</sup></td><td>2985929</td></tr> <tr><td>FLM BK ETH M12 DI 8 M12-2TX</td><td>2736916</td></tr> <tr><td>IL ETH BK DI8 DO4 2TX-PAC<sup>1)</sup></td><td>2703981</td></tr> </tbody> </table>	IBS S7 400 ETH SDSC/I-T	2819558	IBS S7 400 ETH DSC/I-T <sup>1)</sup>	2731102	IBS S7 400 DSC/I-T <sup>1)</sup>	2719962	IBS S7 300 DSC-T <sup>1)</sup>	2719975	IBS PCI SC/RI/I-T <sup>1)</sup>	2730080	IBS PCI SC/RI-LK	2730187	IBS PCI SC/I-T <sup>1)</sup>	2725260	IBS PCI SC-LK <sup>1)</sup>	2700318	FL IL 24 BK-B-PAC <sup>1)</sup>	2862327	FL IL 24 BK-PAC <sup>1)</sup>	2862314	FL NP PND-4TX IB <sup>1)</sup>	2985974	FL NP PND-4TX IB-LK <sup>1)</sup>	2985929	FLM BK ETH M12 DI 8 M12-2TX	2736916	IL ETH BK DI8 DO4 2TX-PAC <sup>1)</sup>	2703981
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FLM BK ETH M12 DI 8 M12-2TX	2736916																												
IL ETH BK DI8 DO4 2TX-PAC <sup>1)</sup>	2703981																												
Basic functions	Project transfer to SAFETYPROG (software tool for programming INTERBUS Safety) Project planning of Ethernet configurations Planning of the address assignment Transfer of the address settings (address ranges, assignment list) from STEP 7® Project planning of multimaster projects (several bus configurations in one project) Comparison between real and planned bus configuration  Online display of device data sheets Comprehensive diagnostic functions, including optical diagnostics with Diag+ Network diagnostics (functionality of Diag+)																												
Languages supported	German, English, French, Italian, Spanish, Chinese																												
<b>Ordering data</b>																													
Description	<table border="1"> <thead> <tr> <th>Type</th> <th>Order No.</th> <th>Pcs. / Pkt.</th> </tr> </thead> <tbody> <tr> <td>CONFIG+ DEMO</td> <td>2868046</td> <td>1</td> </tr> <tr> <td>CONFIG+</td> <td>2868059</td> <td>1</td> </tr> </tbody> </table>	Type	Order No.	Pcs. / Pkt.	CONFIG+ DEMO	2868046	1	CONFIG+	2868059	1																			
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CONFIG+ DEMO	2868046	1																											
CONFIG+	2868059	1																											
<p><b>Config+ demo version</b> with restricted range of functions (it is not possible to save projects)</p> <p><b>Config + full version</b> for configuration and diagnosis of networks</p>																													
<b>Accessories</b>																													
<p><b>Copy license</b>, allows you to install the software multiple times. A full version is also required. Please specify the number of licenses required when ordering.</p>	<table border="1"> <tbody> <tr> <td>CONFIG+ CPY</td> <td>2868062</td> <td>1</td> </tr> </tbody> </table>	CONFIG+ CPY	2868062	1																									
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### Diag+

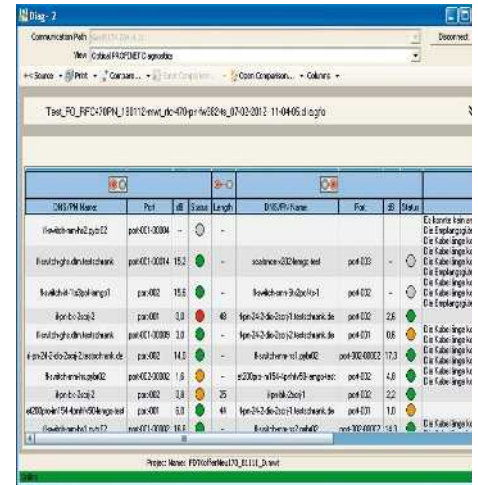
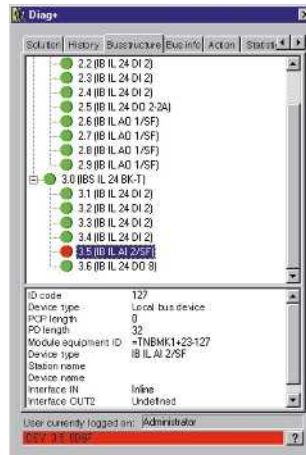
#### Diag+ – comprehensive diagnostics for PROFINET and INTERBUS networks

Diag+ is a special diagnostics software tool that has been adapted to PROFINET and INTERBUS and indicates both network errors and the current states of controllers and devices. Preventive diagnostic functions such as monitoring the transmission quality of fiber optic (FO) paths in PROFINET and INTERBUS increase system availability.

#### Wide range of functions for reliable diagnostics

Status information, operating functions, plain text messages, and overviews ensure fast startup, error localization, and easy orientation in PROFINET and INTERBUS systems.

- Start and stop of INTERBUS data traffic
- Acknowledgment of INTERBUS error messages
- Bridging, switch on, and switch off of INTERBUS devices
- Display of error messages with tips for error removal and detailed information on the device type and device state
- Display of color symbols for errors and device states
- Preventive diagnostics such as monitoring transmission quality in FO paths
- Comparison and evaluation of FO diagnostic data records at varying times
- Generation of acceptance reports as PDF files
- Integration in other software tools such as visualizations
- Display of stored messages from the message archive of the controller
- Overview for the topology of Ethernet/PROFINET devices in a 2D graphic
- Specification of the accessibility of Ethernet/PROFINET devices
- Use of the configuration data and comments created with Config+ or PC Worx during the configuration phase (e.g., equipment IDs, station names)
- Management of individual rights of use for various users



#### Diag+ NetScan – software for cyclic INTERBUS network diagnostics

Diag+ NetScan enables simultaneous monitoring of INTERBUS networks with several controller boards/controllers. The transmission quality of all FO paths in an entire system is thereby monitored permanently. Even lower-level buses connected using system couplers can be included in monitoring.

#### Ordering example 1:

The Diag+ software is to be used on ten different PCs of a system for PROFINET/INTERBUS network diagnostics.

- Items required:
- 1x DIAG+
  - 9x DIAG+ CPY

#### Ordering example 2:

Ethernet-networked INTERBUS controller boards (x 60) are to be monitored from a control room. In the event of an error, detailed diagnostic data should be displayed.

- Items required:
- 1 x DIAG+ NETSCAN



Diagnostics software for INTERBUS, PROFINET and Ethernet networks



Diagnostics software for cyclic INTERBUS diagnostics

	Technical data	Technical data
Hardware requirements		
CPU	Pentium 4/Celeron 1.6 GHz, minimum	Pentium 4/Celeron 1.6 GHz, minimum
Main memory (RAM)	min. 1 Gbyte (2 GB for Windows Vista and Windows 7)	min. 1 Gbyte (2 GB for Windows Vista and Windows 7)
Hard disk memory	min. 2 Gbyte	min. 2 Gbyte
Optical drive	DVD-ROM	DVD-ROM
Interfaces	Serial interface, Ethernet, PCI	Serial interface, Ethernet, PCI
Supported interface connections	INTERBUS controller board of the 4th generation, PROFINET I/O Controller (Phoenix Contact only)	INTERBUS Generation 4 controller board
Software requirements		
Operating systems	MS Windows XP SP3, MS Windows Vista Business SP2, MS Windows 7 Professional (32/64-bit) SP1	MS Windows XP SP3, MS Windows Vista Business SP2, MS Windows 7 Professional (32/64-bit) SP1
Basic functions	<p>Executing important commands (start/stop/...)</p> <p>Reading in the installed bus structure</p> <p>Detecting/representing error states (plain text from knowledge database)</p> <p>Saving diagnostics data in flash memory or parameterizing memory of the controller board</p> <p>Diagnostics of INTERBUS FO paths (transmission quality)</p> <p>Can be linked into other 32-bit applications as ActiveX Control including programming interface for further processing of all diagnostic data</p> <p>Configuration comparison of Ethernet topologies (parameterized with real topology)</p> <p>Reading out the Controller Diagnose Archive</p>	<p>Executing important commands (start/stop/...)</p> <p>Reading in the installed bus structure</p> <p>Detecting/representing error states (plain text from knowledge database)</p> <p>Saving diagnostics data in flash memory or parameterizing memory of the controller board</p> <p>Diagnostics of FO paths (transmission quality)</p> <p>Can be integrated into other 32-bit applications as ActiveX Control</p> <p>-</p> <p>-</p>
Expanded functionality	-	<p>Cyclical readout of diagnostic data from all INTERBUS controller boards/controllers in the network overview (the number of controller boards is not limited)</p> <p>Network overview: all INTERBUS controller boards/controllers in a system are clearly shown in a tree view ; detailed diagnostics can be called up by clicking on the corresponding item</p> <p>Monitoring function: simultaneous monitoring of up to 10 INTERBUS controller boards/controllers maximum</p>
Languages supported	German, English, French, Italian, Spanish, Chinese	German, English, French, Italian, Spanish, Chinese

	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
<b>DIAG+ demo</b> , limited scope of functions (only valid for the first five stations)	<b>DIAG+ DEMO</b>	2730734	1			
<b>DIAG+ full version</b> , for INTERBUS diagnostics (ActiveX Control with programming interface)	<b>DIAG+</b>	2730307	1			
<b>DIAG+ NetScan-Demo</b> , limited scope of functions (cannot open or save projects)				<b>DIAG+ NETSCAN DEMO</b>	2868091	1
<b>DIAG+ NetScan full version</b> , for cyclic and simultaneous network diagnostics (ActiveX Control)				<b>DIAG+ NETSCAN</b>	2868075	1
	Accessories			Accessories		
<b>Copy license</b> , allows you to install the software multiple times. A full version is also required. Please specify the number of licenses required when ordering.	<b>DIAG+ CPY</b>	2730404	1	<b>DIAG+ NETSCAN CPY</b>	2868088	1



### Startup+

Startup+ software is specifically tailored to the Axioline system. It can be used to test the wiring of I/O stations and parameterize the I/O modules used. Startup+ can be used to display and operate your Axioline station during startup without having to connect the station to a higher-level network.

Startup+ offers many useful functions for all aspects of the Axioline I/O system:

- Reading and writing input and output signals
- Comprehensive diagnostics during operation
- User-friendly connection of software to an Axioline I/O station via the fieldbus or service interface
- Support in connecting to the Axioline station by means of a wizard
- Software is open for connection to TCI interfaces – for DTM integration in engineering systems

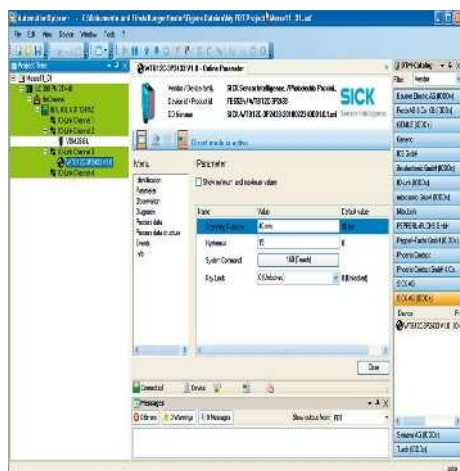


Software for startup and parameterization of Axioline I/O stations

Technical data		
Hardware requirements	Pentium/Celeron, 1.6 GHz 1 Gbyte 100 Mbyte DVD-ROM Ethernet port Keyboard, mouse	
CPU		
Main memory (RAM)		
Hard disk memory		
Optical drive		
Interfaces		
Operating equipment		
Software requirements	MS Windows XP SP3, MS Windows 7 (32 bit)	
Operating systems		
Basic functions	I/O check Diagnostics Offline/online parameterization Can be called via TCI interface	
Languages supported	German, English, French, Spanish, Italian	
Ordering data		
Type	Order No.	Pcs. / Pkt.
STARTUP+	2700636	1
Description	Startup+, for checking the wiring of Axioline stations and parameterizing devices	



## AutomationXplorer+



## Notes:

AutomationXplorer+ can be downloaded free of charge, including a selection of different communication and device DTMs for Ethernet and INTERBUS (PROFINET IO available on request) from the Phoenix Contact homepage at [www.phoenixcontact.com](http://www.phoenixcontact.com).



FDT frame application  
for device parameterization

Central and manufacturer-independent device parameterization is a crucial advantage in complex automation systems. Using AutomationXplorer+ for the parameterization of devices based on FDT (field device technology), you can easily set sensors and actuators remotely, for example. Devices no longer have to be parameterized locally, saving you time and money.

FDT specifies a uniform, standardized interface between software interfaces and communication drivers for various network protocols. FDT represents a control or engineering system that integrates device user interfaces – so-called DTMs (Device Type Managers).

AutomationXplorer+ is a type of FDT framework application in which DTMs from various manufacturers can be integrated freely. Point-to-point communication, even beyond network boundaries, enables user-friendly parameterization of devices as well as sensors and actuators. This takes place, for example, via several protocols used in a system, such as Ethernet, PROFINET, INTERBUS, and the IO-Link protocol. Changes do not have to be made to the installed basic devices.

AutomationXplorer+ can be called via the TCI interface (tool calling interface) to connect device-specific user interfaces as a DTM to an engineering system without FDT interface, e.g., to the Siemens engineering system. AutomationXplorer+ handles the integration of the DTM instead of the engineering system. Device-specific user interfaces can therefore be started directly from the engineering system.

## Hardware requirements

CPU  
Main memory (RAM)  
Hard disk memory  
Optical drive  
Operating equipment  
Monitor resolution

## Software requirements

Operating systems

## Basic functions

## Languages supported

## Description

FDT container for integrating DTM devices

## Technical data

Pentium 4/Celeron, 1 GHz  
1 Gbyte  
50 Mbyte (without DTM)  
CD-ROM  
Keyboard, mouse  
1024x768

MS Windows XP SP3, MS Windows 7 (32 bit)

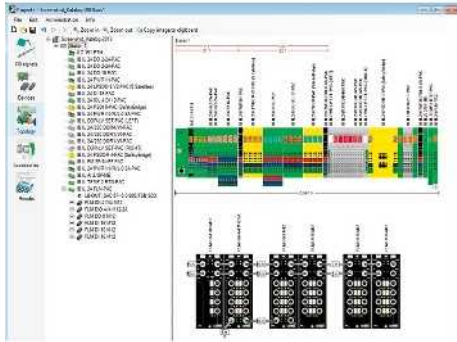
Integration and call up of DTM  
Can be called up via TC interface with assistant support for automatic creation of projects

German, English, French, Spanish, Italian

## Ordering data

Type	Order No.	Pcs. / Pkt.
AX+ BASIC	2985068	1

Project+



Project+ is a tool that provides support when planning and configuring an I/O station as part of the automation setup of a system, machine or property. With no training required, you can create a functional I/O station according to your specifications very quickly with Project+. The station provides functions for connecting sensors and actuators and corresponds to the technical configuration rules of the selected I/O system.

Workflow: enter the required I/O signals for connecting sensors and actuators in your application. Project+ then determines the optimum product selection from the Inline and Fieldline product ranges from Phoenix Contact - the selected devices are combined to create a station according to the configuration rules. You are immediately provided with a graphical structure plan and a parts list including item descriptions.

Thanks to various export functions, the configured I/O stations can be implemented directly for the subsequent engineering process.

Your advantages:

- Automated creation of the I/O station in accordance with the technical configuration rules
- Representation of the configured I/O station as a graphical structure plan
- Extension of your automation setup using additional items from the Phoenix Contact product range
- Option of data export to CLIP PROJECT, PC Worx, Excel, and Word
- Full version can be downloaded for free [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products)



License-free software for planning Inline and Fieldline I/O stations

Hardware requirements
CPU
Main memory (RAM)
Hard disk memory
Optical drive
Operating equipment
Software requirements
Operating systems

Software requirements
Basic functions

Languages supported
---------------------

Description
Software for planning the I/O configuration

Technical data

CPU	Pentium/Celeron, 1.6 GHz
Main memory (RAM)	1 Gbyte (1 GB for Windows Vista)
Hard disk memory	min. 300 Mbyte
Optical drive	DVD-ROM
Operating equipment	Keyboard, mouse
Software requirements	MS Windows® 7 Home Premium (32-bit/64-bit) / MS Windows® 7 Professional (32-bit/64-bit) / MS Windows® Vista Business / MS Windows® XP Professional (SP-4 recommended)
Operating systems	MS WORD 2003 or a higher version

Automated structure of the Inline and Fieldline I/O stations	
Consideration of technical configuration rules	
Automatic addition of accessories required by the system	
Graphical representation of the planned station structure as a structure plan	
Phoenix Contact complete catalog as accessories	
Project report via MS WORD	
Export functions for ClipProject and PC Worx	
Consideration of release lists	
Languages supported	German, English, Spanish, French, Italian, Dutch, Russian

Ordering data

Type	Order No.	Pcs. / Pkt.
PROJECT+	2988667	1

## Portico

Optimally tailor your operating concept to the requirements of your system. With the Portico software, you can install up to 16 thin clients exactly where you need them. If multiple employees based in various locations need to access the machine, you can design individual solutions in this way.

Portico is a remote control software tool that allows you to view and fully interact with the desktop of another industrial PC over a network. The software uses a client/server architecture that either supports point-to-point connection between a server and client or allows communication to be established between a server and multiple clients. Thanks to the unique assignment of access rights, your system is also protected against unauthorized access.

Portico can also be used in a production environment to visualize or control a machine or process at a remote location in the system.

### Your advantages:

- Individual operation and monitoring concepts with up to 16 clients
- Simultaneous display of IPC screen information at several operating stations without server operating system
- Inexpensive, thanks to the use of thin clients
- Configuration tool for user-friendly management of access rights
- Fast screen and input response, thanks to communication via TCP/IP network protocol
- Low memory usage by server and client

### System requirements:

- CPU type/class: x86
- Minimum CPU clock rate: 1.0 GHz
- Minimum RAM: 512 MB
- Minimum memory required for server: 100 MB
- Minimum memory required for client: 100 MB
- LAN rate: 100 Mbps
- Graphics requirements: unlimited



Remote control software

#### Hardware requirements

CPU  
Main memory (RAM)  
Hard disk memory

#### Software requirements

Operating systems  
Basic functions

#### Languages supported

#### Description

**Remote control**  
- 1 client  
- 4 clients  
- 16 clients

#### Technical data

Atom™ or above  
≥ 512 MB (minimum)  
≥ 100 MB (minimum (client and server))

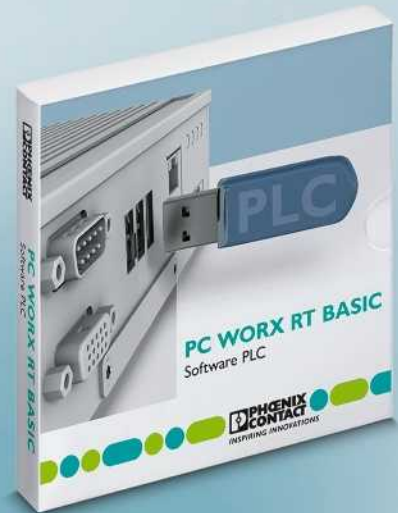
Windows XP SP3 / Windows 7

Remote control software

German, English, French, Spanish, Italian

#### Ordering data

Type	Order No.	Pcs. / Pkt.
VL PORTICO SERVER 1 CLIENT	2701453	1
VL PORTICO SERVER 4 CLIENT	2701455	1
VL PORTICO SERVER 16 CLIENT	2701456	1



# Controllers

## Suitable for all requirements

From distributed water supply to highly complex painting lines in the automotive industry – reliable and cost-effective automation with controllers from Phoenix Contact. The broad spectrum offers innovative control solutions from programmable logic modules to high-end controllers.

## Programmable logic modules

Minimal effort with maximum benefits – for Nanoline programmable logic modules the focus is on simplicity and flexibility. Control basic applications reliably with Nanoline.

## Compact controllers

Class 100 programmable logic controllers impress with their high function density at low prices. They support all common communication paths and can be easily extended. In short, they are ideal for simple requirements, even in distributed systems.

## Axiocontrol controllers

Axiocontrol controllers are fast, robust, and user-friendly, i.e., they are all designed for maximum performance, easy handling, and use in harsh industrial environments.

## High-performance controllers

Automation at the highest level: class 300 and 400 PLCs are high-performance high-end controllers for moderate to demanding tasks.

## Software PLC

Two devices in one: utilize the available resources of your industrial PC and transform it into a powerful controller using the software PLC.

## Compact controller system - Easy Automation

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# Controllers

## Compact controller system – Easy Automation – product overview

### Class 100 compact controllers

						
Type Order No.	ILC 131 ETH 2700973	ILC 151 ETH 2700974	ILC 171 ETH 2TX 2700975	ILC 191 ETH 2TX 2700976	ILC 151 GSM/GPRS 2700977	ILC 131 STARTERKIT 2701835
Description	Class 100 compact controllers are at the heart of the Easy Automation system from Phoenix Contact. As the interface between the control center and I/O level, they efficiently control the data flow within your system.					Starter kit for easy entry into the world of automation
Page	532	533	533	533	534	544





### Software

						
Type Order No.	PC Worx EXPRESS 2988670	PROJECT+ 2988667	WEBVISIT 6 EXPRESS 2700954	SAFECONF 2986119	SD FLASH 2GB APPLIC A 2701190	SD FLASH 256MB PDPI BASIC 2700551
Type Order No.					SD FLASH 2GB 2988162	SD FLASH 256MB PDPI PRO 2700552
Description	Engineering software, for programming according to IEC 61131	Software for I/O configuration	Software for web-based visualizations	Configuration software for SafetyBridge modules	SD card with license for IT and controller function blocks	SD card with license for controller function blocks with self-optimization
Page	499	514	503	110	501	501


### Industrial network technology

						
Type Order No.	FL SWITCH SFN 5TX 2891152	FL SWITCH SFN 4TX/FX 2891851	FL BT EPA AIR SET 2693091	FL WLAN EPA 2692791	PSI-MODEM/ETH 2313300	PSI-MODEM-3G/ROUTER 2314008
Type Order No.	FL SWITCH SFN 8TX 2891929	FL SWITCH SFN 6TX/2FX 2891314				
Description	Standard switches	Standard switches with fiber optics	Bluetooth transmission of an Ethernet connection	WLAN transmission of an Ethernet connection	Connection via a telephone line	Connection via a mobile phone network
Page	8	9	53	51	428	423

### Panels for operation and monitoring

					
Type Order No.	TD 1030T 2701257	WP 04T 2913632	WP 06T 2913645	WP 07T/WS 2700307	WP09T/WS 2700309
Description	4:3 7.1 cm (2.8") display	4:3 8.9 cm (3.5") display	4:3 14.5 cm (5.7") display	Widescreen 17.8 cm (7") display	Widescreen 22.9 cm (9") display
Page	120	120	120	121	121

### I/O systems for the control cabinet (IP20)

	Digital input					
	1 channel	2 channels	4 channels	8 channels	16 channels	32 channels
	IB IL 120 DI 1-PAC 2861917	IB IL 24 DI 2-PAC 2861221	IB IL 24 DI 4-PAC 2861234	IB IL 24 DI 8-PAC 2861247	IB IL 24 DI 16-PAC 2861250	IB IL 24 DI 32/HD-PAC 2862835
	IB IL 230 DI 1-PAC 2861548	IB IL 24 DI 2-NPN-PAC 2861483	IB IL 24 DI 4-ME 2863928	IB IL 24 DI 8/T2-PAC 2862204	IB IL 24 DI 16-NPN-PAC 2863520	IB IL 24 DI 32/HD-NPN-PAC 2878243
From page	204	200	200	201	200	201


Digital output						Security
1 channel	2 channels	4 channels	8 channels	16 channels	32 channels	
IB IL DO 1 AC-PAC 2861920	IB IL 24 DO 2-PAC 2861276	IB IL 24 DO 4-PAC 2861276	IB IL 24 DO 8-PAC 2861289	IB IL 24 DO 16-PAC 2861292	IB IL 24 DO 32/HD-PAC 2862822	See section: functional safety
	IB IL 24 DO 2-2A-PAC 2861263	IB IL 24 DO 4-ME 2863931	IB IL 24 DO 8-2A-PAC 2861603	IB IL 24 DO 16-ME 2897253	IB IL 24 DO 32/HD-NPN-PAC 2878340	
	IB IL 24 DO 2-NPN-PAC 2861496	IB IL DO 4-AC-1A-PAC 2861658	IB IL 24 DO 8-NPN-PAC 2863546			
			IB IL 24 DO8/HD-PAC 2700172			
210	206	206	206	206	207	105


Relay output terminals (PDT contacts)			Analog input		Analog output	
1 PDT	2 PDTs	4 PDTs	2 channels	8 channels	1 channel	4 or 8 channels
IB IL 24/230 DOR1/W-PAC 2861881	IB IL 24/48 DOR 2/W-PAC 2863119	IB IL 24/230 DOR4/W-PAC 2861878	IB IL AI 2/SF-PAC 2861302	IB IL AI 8/SF-PAC 2861412	IB IL AO 1/SF-PAC 2861315	IB IL AO 4/8/U/BP-PAC 2878036
IB IL 24/230 DOR1/W-PC-PAC 2862178		IB IL 24/230 DOR4/W-PC-PAC 2862181	IB IL AI 2/SF-ME 2863944	IB IL AI 8/S-PAC 2861661	IB IL AO 1/U/SF-PAC 2861399	
		IB IL 24/230 DOR4/HC-PAC 2897716				
211	211	211	212	213	220	221

Strain gauge		Temperature recording			
2 channels	2 channels	1 channel	2 channels	2 channels	4/8 channels
IB IL SGI 2/F-PAC 2878638	IB IL SGI 2/P-PAC 2884907	IB IL 24 TC-PAC 2861360	IB IL TEMP 2 UTH-PAC 2861386	IB IL TEMP 2 RTD-PAC 2861328	IB IL TEMP 4/8 RTD/EF-PAC 2897402
					IB IL TEMP 4/8 RTD-PAC 2863915
216	216	219	218	219	219

Communication		Position detection	Function	Motor starter	Intrinsically safe I/Os for Ex applications	
IB IL RS 232-PAC 2861357	IBS IL 24 RB-T-PAC 2861441	IB IL INC-IN-PAC 2861755	IB IL PWM/2-PAC 2861632	IB IL 400 ELR 1-3A 2727352	IB IL EX-IS PWR IN-PAC 2869910	IB IL EX-IS AIO 4/EF-PAC 2869912
IB IL RS 232-PRO-PAC 2878722	IB IL 24 IOL 4 DI 12-PAC 2692717	IB IL SSI-IN-PAC 2819574	IB IL CNT-PAC 2861852	IB IL 400 MLR 1-8A 2727365	IB IL EX-IS DIO 4/NAM-PAC 2869911	IB IL EX-IS TEMP 4 RTD/TC-PAC 2869913
IB IL RS 485/422-PAC 2861933	IB IL IFS-MA-PAC 2692720			IB IL 400 ELR R-3A 2727378		
228	226	238	234	242	490	492






### I/O systems for field installation (IP65/IP67)

	Digital input		Digital input/output			Digital output terminals
	8 channels	16 channels	4/4 channels	8/8 channels	16/16 channels	8 channels
	FLM DI 8 M12 2736288	FLM DI 16 M12 2736835	FLM DIO 4/4 M12-2A 2736369	FLM DIO 8/8 M12 2736848	FLM DIO 16/16 M12/8-DIAG 2736738	FLM DO 8 M12 2736291
	298	298	299	299	299	299
Analog input		Temperature recording	Wireless			
4 channels	4 channels	Base station	8/8 channels	16 channels		
FLM AI 4 SF M12 2736453	FLM TEMP 4 RTD M12 2736819	FLM BT BS 3 2736770	FLM BT DIO 8/8 M12 2736767	FLM BT DI 16 M12 2693208		
301	301	457	457	457		

	Digital input		Digital input/output		Digital output terminals	
	8 channels	4(8)/4 channels	4 channels	8 channels		
	FLM DI 8 M8 2773348	FLM DIO 8/4 M8 2773351	FLM DO 4 M8-2A 2736932	FLM DO 8 M8 2736893		
	302	303	303	303		







### Programmable logic modules

					
<b>Type</b>	<b>NLC-055-...</b>	<b>NLC-IO-...</b>	<b>NLC-COM-...</b>	<b>NLC-OP1-...</b>	<b>NLC-MOD-...</b>
<b>Description</b>	Basic unit with digital inputs and outputs	I/O extension modules with digital inputs and outputs, relay outputs, and analog inputs	Communication extension modules for Ethernet and GSM networks	Control panel for interactions with the Nanoline system	Slot 1 option module, extension modules for serial communication
<b>Page</b>	524	526	528	529	530

### Programmable logic modules

### Steeplechase VLC

				
<b>Type</b>	<b>NLC-MOD-...</b>	<b>NLC-START-...</b>	<b>ILC 150 VLC</b>	<b>ILC 350 VLC</b>
<b>Description</b>	Slot 2 option module, Realtime clock, memory module	Starter kit, for easy entry into the Nanoline controller range	Steeplechase VLC offers a scalable solution for controlling your applications. The ILC 150 VLC and ILC 350 VLC are cost-effective PLCs with integrated VLC runtime and easy-to-operate onboard I/Os	
<b>Page</b>	531	526	<a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a>	

### Compact controllers






#### Class 100

					
<b>Type</b>	<b>ILC 131/151 ...</b>	<b>ILC 171/191 ...</b>	<b>ILC 131/151 XC</b>	<b>ILC 151 GSM/GPRS</b>	<b>ILC 191 ME/INC, .../AN</b>
<b>Description</b>	Class 100 compact controllers impress thanks to their high function density at low prices		Class 100 compact controller with extended temperature range	Class 100 compact controller with integrated GSM/GPRS modem	Class 100 compact controller for easy drive control
<b>Page</b>	532	533	532	534	535






#### Class 100






#### Class 200

				
<b>Type</b>	<b>ILC 131 STARTERKIT</b>	<b>PSK DL ...</b>	<b>ILC 200 UNI-PAC</b>	<b>ILC 200 IB-PAC</b>
<b>Description</b>	Starter kit for easy entry into the world of automation	Complete packages for data logging See section: <b>Monitoring</b>	Class 200 rounds off the controller hardware within the compact controller class with integrated special functions, tailored to machine building applications	
<b>Page</b>	544	See Catalog 7	<a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a>	

	Axioccontrol controllers		High-performance controllers		
	Class 1000	Class 3000	Class 300		
					
Type	AXC 1050	AXC 3050	ILC 330/350 ...	ILC 370/390 ...	PROFINET STARTERKIT 3.0
Description	Axioccontrol compact controllers with particularly robust housing and integrated UPS	Axioccontrol high-performance controllers for the automation of challenging applications	Class 300 high-performance controllers offer significantly higher performance thanks to more powerful hardware		Find out how is easy it is to create and start up PROFINET IO networks
Page	536	537	538	539	545

	Class 400				
					
Type	RFC 470(S) PN 3TX	RFC 460R PN 3TX	RFC 430/450 ETH-IB	S-MAX 400 CE PN ...	S-MAX 41x CE PN
Description	Powerful class 400 high-performance controllers offer maximum performance and functionality				
Page	540	541	<a href="http://www.phoenixcontact.net/products">www.phoenixcontact.net/products</a>		

	Software PLC	Box PCs	System cabling	Memory card	
					
Type	PC Worx SRT	PC Worx RT BASIC	Valuline IPC	SD FLASH... / CF FLASH...	
Description	Software PLC without realtime extension	Software PLC with realtime extension	See section: HMI's and industrial PCs	See section: System cabling for controllers	See section: Software
Page	542	543	130	See Catalog 7	501

	Services for automation			Software for control technology	
	Service	Training	Engineering		
					
Type				PC Worx EXPRESS	PC Worx
Description	Hotline Onsite service Startup support Professional workshops	Individual training concepts Training	Configuration Programming Visualization Coaching	See section: Software	
Page		546		499	

# Controllers

## Programmable logic modules

### Nanoline logic module

Minimal effort with maximum benefits – for Nanoline programmable logic modules the focus is on simplicity and flexibility. This means a modular and adaptable design with optimum networking options. For tailored use, optionally connect a logic module to other modules: I/O expansion module, communication module, operator panel, real-time clock.

#### Your advantages:

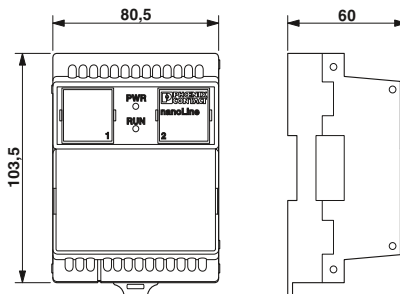
- Save time – by intelligently controlling basic tasks
- Easy use without prior knowledge, thanks to intuitive programming with flowcharts
- Versatile communication with numerous integration and networking options
- Maximum flexibility, thanks to the modular design

#### Additional features:

- Modules for different operating voltages, available in 24 V DC, 12 V DC or 110 ... 240 V AC
- Supports 4 mathematical functions and includes 2 high-speed counters and 2 analog inputs.
- Integrated digital I/Os
- Add up to 3 additional digital and analog I/O expansion modules for a maximum of 44 I/O points
- An operator panel can be optionally integrated in the logic module or installed remotely on a panel
- Integrated realtime clock (RTC)
- Optional USB, RS-232 or RS-485 modules for connection to a PC for configuration download
- Optional RS-232 and RS-485 allow you to use your logic module as a Modbus/RTU server
- Intuitive programming language with options for flowcharts and ladder diagrams.

#### Notes:

1) EMC: Class A product, see page 553



24 V DC, 8 digital inputs, 2 analog inputs and 4 relay outputs



#### Technical data

<b>Power supply</b>	
Supply voltage	24 V DC (power available to the I/O and communications modules)
Supply voltage range	19.2 V DC ... 30 V DC
Typical current consumption	150 mA
Max. current consumption	250 mA
<b>Digital inputs</b>	
Number of inputs	8
Description of the inputs	EN 61131-2 type 1 NPN/PNP
Typical response time	20 ms (on)
<b>Digital outputs</b>	
Number of outputs	4
Description of the outputs	Relay output
Maximum output current per channel	5 A
Maximum output current per module / terminal block	20 A
Protective circuit	External protection required
<b>Analog_input</b>	
Number of inputs	2
Voltage input signal	0 V DC ... 10 V DC
<b>Counter input</b>	
Number of inputs	2
Input frequency	6 kHz
<b>Software interfaces</b>	
Programming tool	nanoNavigator 3 or above
Realtime clock	Yes (battery-backed)
Precision	±2 s/day @ 25°C ±4 s/day @ -20°C... +60°C
<b>General data</b>	
Connection method	Screw connection
Weight	262 g
Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 60 °C

#### Ordering data

Description	Type	Order No.	Pcs. / Pkt.
<b>Nanoline controller</b> , requires nanoNavigator 3 or above			
- 8 digital inputs, 2 analog inputs, 4 DC relay outputs	<b>NLC-055-024D-08I-04QRD-05A</b>	<b>2700464</b>	1
- 8 digital inputs, 2 analog inputs and 4 PNP digital outputs			
- 8 digital inputs and 4 relay outputs			

#### Accessories

Accessories	Order No.	Pcs. / Pkt.
<b>Cover</b> , replacement		
Operator panel	<b>NLC-OP1-COVER</b>	2701276 1
<b>Cap</b> , replacement		
Slot 1	<b>NLC-MOD-CAP</b>	2701289 1
<b>Cap</b> , replacement		
Slot 2	<b>NLC-MOD-CAP-PXC</b>	2701292 1



12 V DC, 8 digital inputs,  
2 analog inputs and 4 relay outputs



24 V DC, 8 digital inputs,  
2 analog inputs and 4 PNP digital outputs



100...240 V AC, 8 digital inputs  
and 4 relay outputs

Technical data		
12 V DC (power available to the I/O and communications modules)		
9 V DC ... 15 V DC 250 mA 400 mA		
8 EN 61131-2 type 1 NPN/PNP 20 ms (on)		
4 Relay output 5 A 20 A External protection required		
2 0 V DC ... 10 V DC		
2 6 kHz		
nanoNavigator 3 or above Yes (battery-backed) ±2 s/day @ 25°C ±4 s/day @ -20°C... +60°C		
Screw connection 248 g IP20 -25 °C ... 60 °C		

Technical data		
24 V DC (power available to the I/O and communications modules)		
19.2 V DC ... 30 V DC 100 mA 250 mA		
8 EN 61131-2 type 1 NPN/PNP 60 µs (on)		
4 PNP outputs 500 mA 2 A Short-circuit and overload protection		
2 0 V DC ... 10 V DC		
2 6 kHz		
nanoNavigator 3 or above Yes (battery-backed) ±2 s/day @ 25°C ±4 s/day @ -20°C... +60°C		
Screw connection 178 g IP20 -25 °C ... 60 °C		

Technical data		
240 V AC (power available to the I/O and communications modules)		
- 50 mA (at 230 V AC) 70 mA (at 110 V AC)		
8 EN 61131-2 type 1 NPN/PNP 20 ms (on)		
4 Relay output 5 A 20 A External protection required		
-		
-		
-		
-		
nanoNavigator 3 or above Yes (battery-backed) ±2 s/day @ 25°C ±4 s/day @ -20°C... +60°C		
Screw connection 150 g IP20 -25 °C ... 60 °C		

Ordering data		
Type	Order No.	Pcs. / Pkt.
NLC-055-012D-081-04QRD-05A	2700486	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
NLC-055-024D-081-04QTP-00A1)	2700453	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
NLC-055-100A-081-04QRA-05A	2700487	1

Accessories		
Type	Order No.	Pcs. / Pkt.
NLC-OP1-COVER	2701276	1
NLC-MOD-CAP	2701289	1
NLC-MOD-CAP-PXC	2701292	1

Accessories		
Type	Order No.	Pcs. / Pkt.
NLC-OP1-COVER	2701276	1
NLC-MOD-CAP	2701289	1
NLC-MOD-CAP-PXC	2701292	1

Accessories		
Type	Order No.	Pcs. / Pkt.
NLC-OP1-COVER	2701276	1
NLC-MOD-CAP	2701289	1
NLC-MOD-CAP-PXC	2701292	1

# Controllers

## Programmable logic modules

### Nanoline logic module

Minimal effort with maximum benefits – for Nanoline programmable logic modules the focus is on simplicity and flexibility. This means a modular and adaptable design with optimum networking options. For tailored use, optionally connect a logic module to other modules: I/O expansion module, communication module, operator panel, real-time clock.

#### Your advantages:

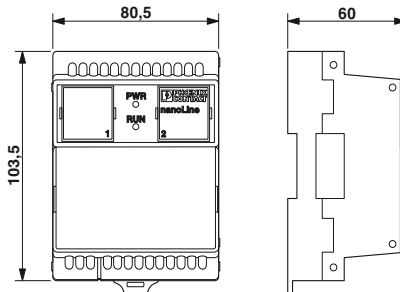
- Save time – by intelligently controlling basic tasks
- Easy use without prior knowledge, thanks to intuitive programming with flowcharts
- Versatile communication with numerous integration and networking options
- Maximum flexibility, thanks to the modular design

#### Additional features:

- Modules for different operating voltages, available in 24 V DC, 24 V AC/DC or 110 ... 240 V AC
- Integrated digital I/Os
- Add up to 3 additional digital and analog I/O extension modules for a maximum of 42 I/O points
- An operator panel can be optionally integrated in the logic module or installed remotely on a panel
- Integrated real-time clock (RTC)
- Optional USB, RS-232 or RS-485 modules for connection to a PC for configuration download
- Optional RS-232 and RS-485 allow you to use your logic module as a Modbus/RTU server
- Intuitive programming language with options for flowcharts and ladder diagrams.

#### Notes:

1) EMC: Class A product, see page 553



24 V DC, 6 digital inputs and 4 NPN/PNP outputs



<b>Power supply</b>	Supply voltage	24 V DC (power available to the I/O and communications modules)
	Supply voltage range	19.2 V DC ... 30 V DC
	Typical current consumption	92 mA
	Max. current consumption	250 mA
<b>Digital inputs</b>	Number of inputs	6
	Description of the inputs	EN 61131-2 type 1 NPN/PNP
	Typical response time	60 μs (on)
<b>Digital outputs</b>	Number of outputs	4
	Description of the outputs	NPN outputs                      PNP outputs
	Maximum output current per channel	500 mA
	Maximum output current per module / terminal block	2 A
	Protective circuit	Short-circuit and overload protection
<b>Software interfaces</b>	Programming tool	nanoNavigator 1 or 2
	Realtime clock	Optional module
	Precision	
<b>General data</b>	Connection method	Screw connection
	Weight	240 g
	Degree of protection	IP20
	Ambient temperature (operation)	-25 °C ... 60 °C

Technical data		
NLC-050-024D-06I-04QTN-00A <sup>1)</sup>	NLC-050-024D-06I-04QTP-00A	
24 V DC (power available to the I/O and communications modules)		
		19.2 V DC ... 30 V DC
		92 mA
		250 mA
<b>Digital inputs</b>		6
		EN 61131-2 type 1 NPN/PNP
		60 μs (on)
<b>Digital outputs</b>		4
		NPN outputs                      PNP outputs
		500 mA
		2 A
		Short-circuit and overload protection
<b>Software interfaces</b>		nanoNavigator 1 or 2
		Optional module
<b>General data</b>		Screw connection
		240 g
		IP20
		-25 °C ... 60 °C

<b>Description</b>	Nanoline controller, requires nanoNavigator 1 or 2
	- 6 digital inputs, 4 NPN outputs
	- 6 digital inputs, 4 PNP outputs
	- 6 digital inputs, 4 DC relay outputs
	- 8 digital inputs, 4 AC/DC relay outputs
	- 8 digital inputs, 4 AC/DC relay outputs

Ordering data		
Type	Order No.	Pcs. / Pkt.
NLC-050-024D-06I-04QTN-00A <sup>1)</sup>	2701030	1
NLC-050-024D-06I-04QTP-00A	2701027	1

<b>Cover</b> , replacement	
Operator panel	
<b>Cap</b> , replacement	
Slot 1	
<b>Cap</b> , replacement	
Slot 2	

Accessories		
NLC-OP1-COVER	2701276	1
NLC-MOD-CAP	2701289	1
NLC-MOD-CAP-PXC	2701292	1



24 V DC, 6 digital inputs and 4 relay outputs



24 V AC/DC, 8 digital inputs and 4 relay outputs



100 - 240 V AC, 8 digital inputs and 4 relay outputs



Technical data

Technical data

Technical data

24 V DC (power available to the I/O and communications modules)  
 19.2 V DC ... 30 V DC  
 150 mA  
 250 mA

6  
 EN 61131-2 type 1 NPN/PNP  
 60 µs (on)

4  
 Relay output  
 5 A  
 20 A  
 Short-circuit and overload protection

nanoNavigator 1 or 2  
 Optional module

Screw connection  
 260 g  
 IP20  
 -25 °C ... 60 °C

24 V AC/DC (power available to the I/O and communications modules)  
 19 V DC ... 30 V DC  
 150 mA (@ 24 V AC/DC)  
 250 mA

8  
 EN 61131-2 type 1 NPN/PNP  
 20 ms

4  
 Relay output  
 5 A  
 20 A  
 Short-circuit and overload protection

nanoNavigator 1 or 2  
 Optional module

Screw connection  
 248 g  
 IP20  
 -25 °C ... 60 °C

100 V AC  
 240 V AC (power available to the I/O and communications modules)  
 100 V AC ... 240 V AC  
 70 mA (@ 230 V AC)  
 -

8  
 EN 61131-2 type 1 NPN/PNP  
 20 ms

4  
 Relay output  
 5 A  
 20 A  
 Short-circuit and overload protection

nanoNavigator 1 or 2  
 Optional module

Screw connection  
 268 g  
 IP20  
 -25 °C ... 55 °C

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs. / Pkt.
NLC-050-024D-06I-04QRD-05A1)	2701043	1

Type	Order No.	Pcs. / Pkt.
NLC-050-024X-08I-04QRX-05A	2701056	1

Type	Order No.	Pcs. / Pkt.
NLC-050-100A-08I-04QRA-05A	2701069	1

Accessories

Accessories

Accessories

NLC-OP1-COVER	2701276	1
NLC-MOD-CAP	2701289	1
NLC-MOD-CAP-PXC	2701292	1

NLC-OP1-COVER	2701276	1
NLC-MOD-CAP	2701289	1
NLC-MOD-CAP-PXC	2701292	1

NLC-OP1-COVER	2701276	1
NLC-MOD-CAP	2701289	1
NLC-MOD-CAP-PXC	2701292	1



# Controllers

## Programmable logic modules

### Nanoline starter kits

The Nanoline starter kit provides everything needed to get started with the Nanoline controller:

- Logic module
- Operator panel
- Input simulator (24 V AC or 24 V DC versions available)
- Output simulator (24 V AC or 24 V DC versions available)
- Serial USB module
- USB cable
- Quick start guide



Nanoline starter kit

Description
<b>Starter kit</b> , consisting of: Base unit, operator panel, USB serial module and USB cable, input and output simulators - Logic module (2701030 NLC-050-024D-06I-04QTN-00A) with 6 digital inputs and 4 NPN digital outputs - Logic module (2701027 NLC-050-024D-06I-04QTP-00A) with 6 digital inputs and 4 PNP digital outputs - Logic module (2700464 NLC-055-024D-08I-04QRD-05A) with 8 digital inputs, 2 analog inputs and 4 relay outputs
<b>Deluxe starter kit</b> , consisting of: Logic module (2700453 NLC-055-024D-08I-04QTP-00A) with 8 digital inputs, 2 analog inputs and 4 PNP digital outputs, operator panel, USB serial module and USB cable, input and output simulators, PNP digital expansion, I/O module, Ethernet module, STEP POWER power supply unit

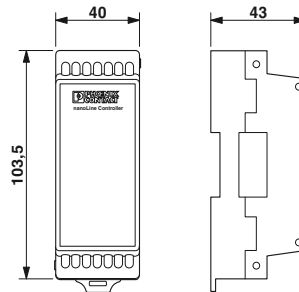
Ordering data		
Type	Order No.	Pcs. / Pkt.
NLC-START-01	2701399	1
NLC-START-02	2701425	1
NLC-START-03	2701467	1
NLC-START-04	2701483	1

### Nanoline digital I/O expansion module

Depending on the required I/Os, you can extend your Nanoline logic module with additional I/O expansion modules. The combination of digital and analog I/Os may vary.

Digital I/O expansion modules provide additional inputs and outputs beyond what is available on the logic module:

- Up to 3 modules can be added to the right side of a logic module
- Automatically recognized by nanoNavigator
- I/O modules are electrically isolated
- Can be powered from a secondary power supply



3/6 inputs, 4 PNP/NPN outputs

**Notes:**  
1) EMC: Class A product, see page 553

Power supply for module electronics
Supply voltage
Digital inputs
Maximum number of inputs
Description of the inputs
Digital outputs
Maximum number of outputs
Maximum output current per channel
Maximum output current per module / terminal block

Technical data		
	NLC-IO-06I-04QTP-01A	NLC-IO-03I-04QRD-05A
Supply voltage	24 V DC	24 V AC/DC
Digital inputs	6	3
Description of the inputs	PNP/NPN	
Digital outputs	4	
Maximum number of outputs	4	
Maximum output current per channel	500 mA	5 A
Maximum output current per module / terminal block	2 A	20 A

Description
<b>Nanoline controllers</b> , I/O expansion module - 6 digital inputs, 4 PNP outputs - 6 digital inputs, 4 NPN outputs - 3 digital inputs, 4 DC relay outputs

Ordering data		
Type	Order No.	Pcs. / Pkt.
NLC-IO-06I-04QTP-01A	2701072	1
NLC-IO-06I-04QTN-01A <sup>1)</sup>	2701085	1
NLC-IO-03I-04QRD-05A	2701328	1

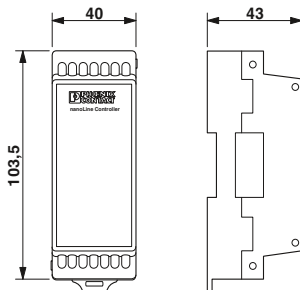


**Nanoline  
analog I/O expansion module**

Analog I/O expansion modules provide additional inputs and outputs beyond what is available on the logic module:

- A system may have up to 8 analog inputs and 8 analog outputs.
- Configuration options for 0 ... 10 V DC, ±10 V DC, 4 ... 20 mA, and 0 ... 20 mA inputs.
- Configuration options for 0 ... 10 V DC, 4 ... 20 mA, and 0 ... 20 mA outputs.
- Up to 3 modules can be added to the right side of a logic module
- Automatically recognized by nanoNavigator
- I/O modules are electrically isolated
- Can be powered from a secondary power supply

**Notes:**  
1) EMC: Class A product, see page 553



Analog I/O extension module

<b>Power supply for module electronics</b>	
Supply voltage	
<b>Analog inputs</b>	
Connection method	
Number of inputs	
Description of the input	
Precision	
Voltage input signal	
Current input signal	
Resolution A/D	
Limit frequency (3 dB)	
<b>Analog outputs</b>	
Connection method	
Number of outputs	
Precision	
D/A resolution	
Voltage output signal	
Load/output load voltage output	
Current output signal	
Load/output load current output	
<b>General data</b>	
Connection method	
Ambient temperature (operation)	

Technical data	
NLC-IO-2AI-2AO-01 <sup>1)</sup>	NLC-IO-4AI <sup>1)</sup>
24 V DC	
Screw connection	
2 (voltage or current can be chosen separately)	4 (voltage or current can be chosen separately)
Single ended	
1%	
0 V ... 10 V / -10 V ... 10 V	
0 mA ... 20 mA / 4 mA ... 20 mA	
12 bit	
5 Hz	
Screw connection	
2	-
1%	-
12 bit	-
0 V ... 10 V	-
1000 Ω	-
0 mA ... 20 mA / 4 mA ... 20 mA	-
500 Ω	-
Screw connection	
-25 °C ... 60 °C	

Description
<b>Nanoline controllers, I/O expansion module</b>
2 analog inputs, 2 analog outputs
4 analog inputs

Ordering data		
Type	Order No.	Pcs. / Pkt.
NLC-IO-2AI-2AO-01 <sup>1)</sup>	2701040	1
NLC-IO-4AI <sup>1)</sup>	2701098	1

# Controllers

## Programmable logic modules

### Nanoline Ethernet communication expansion module

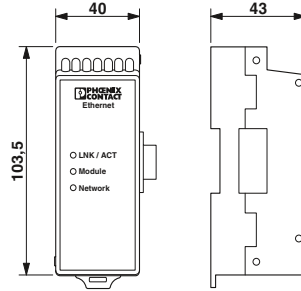
The Ethernet expansion module enables optimum integration of Nanoline in your network. In combination with the Ethernet expansion module, you can also use your Nanoline logic module as a Modbus/TCP server.

You can therefore read and write I/O points, registers, timers, counters, and program and system flags – independently of the program and from any location.

- Read only or read/write access control
- Watchdog timer monitors communication, providing either a warning or fault

**Note:** one of the serial connection option modules is required to configure and program the Nanoline controller.

**Notes:**  
1) EMC: Class A product, see page 553



10/100 Mbps, Modbus TCP server

<b>Interface</b>	
Interface	Ethernet 10/100Base T
Connection method	RJ45
Transmission speed	10/100 Mbps (autonegotiation)
Transmission length	100 m
Signal LEDs	LNK/ACT; module; network
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC (Power available via logic module)
Typical current consumption	110 mA

#### Technical data

Ethernet 10/100Base T  
RJ45  
10/100 Mbps (autonegotiation)  
100 m  
LNK/ACT; module; network

24 V DC (Power available via logic module)  
110 mA

<b>Description</b>	
Nanoline controllers, communication module Ethernet module for Modbus@ TCP Server functionality	

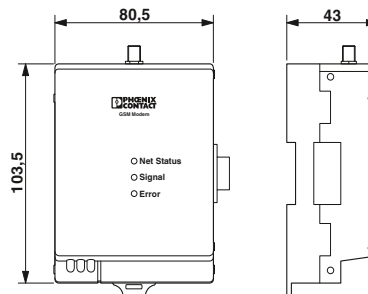
#### Ordering data

Type	Order No.	Pcs. / Pkt.
NLC-COM-ENET-MB1 <sup>1)</sup>	2701124	1

### Nanoline communication expansion module

The GSM module provides remote access to the Nanoline controller through SMS messaging:

- Allows access to read and write registers, flags, timers and counters.
- Switch outputs on and off
- Read inputs
- Sends system faults and warning messages
- Password protected to allow selective access or broadcast to an onboard address book



GSM communication

<b>Wireless interface</b>	
Wireless standard	GSM-SMS
Frequency band	850/900/1800/1900 MHz
Antenna connection method	SMA (female)
<b>Power supply for module electronics</b>	
Supply voltage range	12 V DC ... 24 V DC (9.6...28.8 V DC)
<b>General data</b>	
Wireless licenses	R&TTE, FCC, AT&T, PTCRB

#### Technical data

GSM-SMS  
850/900/1800/1900 MHz  
SMA (female)  
12 V DC ... 24 V DC (9.6...28.8 V DC)

R&TTE, FCC, AT&T, PTCRB

<b>Description</b>	
GSM communication expansion module	

#### Ordering data

Type	Order No.	Pcs. / Pkt.
NLC-COM-GSM	2701344	1

<b>Multi-band antenna for UMTS and quad band GSM, with omnidirectional characteristics</b>	
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#### Accessories

PSI-GSM/UMTS-QB-ANT	2313371	1
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### Nanoline operator panel

**Notes:**  
1) EMC: Class A product, see page 553

The operator panel is your interface for interacting with the Nanoline system. Read the status of all I/O points, registers, timers, counters, and program and system flags directly. In addition, the application program sends prompts and instructions to the display.

Unique feature: the operator panel offers numerical (0 - 9), direction (up, down, left, right), and input keys. In addition, each of the 14 keys on the operator panel can be used to create user-specific menus in a flow-chart.

**Additional features:**

- The operator panel can be integrated in the logic module or installed remotely on a panel (1 m distance)
- The hot-swappable design enables use as a service tool
- Variable text sizes for enhanced readability of custom messages (4 x 20 or 2 x 10 or a combination)

<b>Display data</b>	Display data Display
<b>Interfaces</b>	Operator Panel Transmission length
<b>Power supply for module electronics</b>	Supply voltage Connection method Typical current consumption Max. current consumption
<b>General data</b>	Programming tool Mounting type
<b>Keys</b>	11
<b>Height</b>	46 mm
<b>Width</b>	76 mm
<b>Depth</b>	31.5 mm
<b>Degree of protection</b>	IP67/IP20
<b>Ambient temperature (operation)</b>	0 °C ... 50 °C
<b>Ambient temperature (storage/transport)</b>	0 °C ... 60 °C

Description
<b>Operator panel</b>

Remote mounting kit, for Operator panel	
Base module for remote mounting Operator panel (included in nLC-OP1-MKT)	
Bracket for remote mounting Operator panel (included in nLC-OP1-MKT)	
Cable, RJ45 to RJ45	



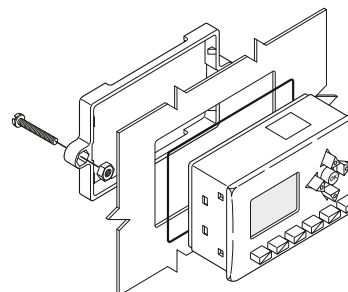
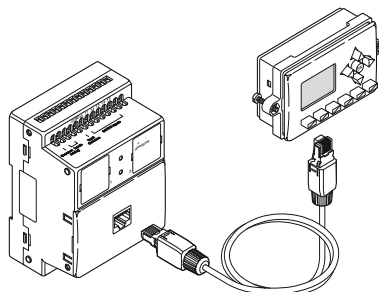
User interface for Nanoline controllers



Technical data	
Backlit LC display, monochrome, 4 lines with 20 characters or 2 lines with 10 characters	
RJ45 max. 1 m	
(Power available via logic module) RJ45 32 mA 50 mA	
nanoNavigator In logic module or with remote mounting kit	
11	
46 mm	
76 mm	
31.5 mm	
IP67/IP20	
0 °C ... 50 °C	
0 °C ... 60 °C	

Ordering data		
Type	Order No.	Pcs. / Pkt.
NLC-OP1-LCD-032-4X20 <sup>1)</sup>	2701137	1

Accessories		
NLC-OP1-MKT <sup>1)</sup>	2701140	1
NLC-OP1-MKT-BASE	2701250	1
NLC-OP1-MKT-BRACKET	2701263	1
NLC-OP1-MKT-CBL	2701438	1



## Programmable logic modules

### Serial Nanoline RS-232/RS-485 and USB connection modules

With its serial communication modules, the Nanoline system sets new standards in connectivity. This results in easy integration and distributed monitoring and control.

Read and write I/O points, registers, timers, counters, and program and system flags – With the RS-232 module, you can use your Nanoline logic module as a Modbus/RTU server.

- Password control can limit access (read only or read/write)
- Watchdog timer monitors communication, providing either a warning or fault

**Note:** one of the serial connection option modules is required to configure and program the Nanoline controller.

Use the RS-232 or USB module to connect the logic module to your PC. From here you can carry out configuration with the nanoNavigator software.

#### Notes:

1) EMC: Class A product, see page 553



Serial connection for data transmission or software configuration



Connection data	
Connection method	Installs in slot 1 of logic module
Power supply for module electronics	
Supply voltage	24 V DC (Power available via logic module)
Typical current consumption	10 mA
Max. current consumption	18 mA
General data	
Ambient temperature (operation)	-25 °C ... 60 °C

#### Technical data

Installs in slot 1 of logic module	
24 V DC (Power available via logic module)	
10 mA	
18 mA	
-25 °C ... 60 °C	

Description	
<b>Serial connection module, for data transfer</b>	
RS-232 layer, USB Type B connector	
RS-232 layer, RJ11 connector	
RS-485 layer, RJ11 connector	

#### Ordering data

Type	Order No.	Pcs. / Pkt.
NLC-MOD-USB	2701195	1
NLC-MOD-RS232 <sup>1)</sup>	2701179	1
NLC-MOD-RS485	2701182	1

Serial cable, USB Type A to Type B	
Serial cable, DB-9 to RJ11/12	
<b>RS-485 cable, RJ11 to open cable end</b>	

#### Accessories

NLC-PC/USB-CBL 2M	2701247	1
NLC-PC/SERIAL-CBL 1M	2701234	1
NLC-RS485-CBL-5M	2701073	1

### Nanoline realtime clock

<b>Notes:</b>
1) EMC: Class A product, see page 553

For applications that require time or date functions, you can extend your Nanoline logic module with a realtime clock.

Configuration is via the nanoNavigator software or operator panel. In this way, you can integrate numerous functions into your Nanoline system:

- Optional on NLC-050... logic modules, standard on NLC-055... logic modules
- Compare time and date information in flowcharts
- Calculate even and odd days
- Adjust the time and date with other time components in the system

The realtime clock supports the following date formats:

- North American (month-day-year)
- European (day-month-year)
- International (year-month-day)



Realtime clock for Nanoline controllers

<b>Power supply</b>
Supply voltage
Typical current consumption
Max. current consumption
<b>Realtime clock</b>
Realtime clock
Precision
<b>Battery</b>
<b>General data</b>
Ambient temperature (operation)

Technical data	
24 V DC (Power available via logic module)	
4 mA	
10 mA	
Yes (battery-backed)	
2 s/day at 25 °C	
4.5 s/day overall (60°C)	
Life 5 years	
-25 °C ... 60 °C	

Description
<b>Realtime clock</b>

Ordering data		
Type	Order No.	Pcs. / Pkt.
NLC-MOD-RTC <sup>1)</sup>	2701153	1

### Nanoline memory module

Use the memory module to transmit projects:

- From a PC to one or more Nanoline controllers without a direct connection
- From one controller to another without a direct connection
- From a controller to a replacement controller



Memory module for Nanoline controllers

<b>Power supply</b>
Supply voltage
Typical current consumption
Max. current consumption
<b>General data</b>
Ambient temperature (operation)

Technical data	
-	
15 mA	
20 mA	
-25 °C ... 60 °C	

Description
<b>Memory module, for data transfer</b>

Ordering data		
Type	Order No.	Pcs. / Pkt.
NLC-MOD-MEM 032K	2701166	1

# Controllers

## Compact controllers

### Class 100 controllers

Class 100 programmable logic controllers impress with their high function density at low prices. They support all common communication paths, such as Ethernet, mobile phone or fixed-line network.

The controllers can be easily extended with Inline I/O modules and offer an integrated web server. As the interface between the control center and I/O level, they efficiently control the data flow of your system. In short, they are ideal for small to medium-sized applications, even in distributed systems.

#### Your advantages:

- Maximum flexibility - numerous I/Os and special function modules can be mounted side by side
- Cost-effective solution, thanks to the excellent price/performance ratio with high function density
- Optimum communication - with integrated, freely programmable web server for visualization with the WebVisit software
- Versatile use, as all common IT protocols are supported

#### Additional features:

- Modbus/TCP is integrated in the firmware - this increases performance and simplifies configuration. This makes communication with other Modbus devices even easier
- SD card slot: for quick memory expansion and easy enabling of software blocks
- FTP server
- Flash file system
- Complete fieldbus master (4096 I/O points)
- Numerous protocols supported such as: HTTP, FTP, SNT, SNMP, SMTP, SQL, MySQL, etc.
- Intuitive programming using PC Worx or using the free PC Worx EXPRESS software
- The XC versions are also suitable for increased temperature requirements (-40°C to +60°C)

#### Notes:

1) EMC: Class A product, see page 553



Compact controller – basic device



<b>Interfaces</b>	
INTERBUS local bus (master)	
Ethernet	
Parameterization/operation/diagnostics	
<b>INTERBUS master</b>	
Number of possible parameter channels	
Number of I/O nodes	
Number of supported devices	
<b>Direct I/Os</b>	
Number of inputs	
Number of outputs	
<b>IEC-61131 runtime system</b>	
Programmable under	
Processing speed	
<b>Program memory</b>	
Data memory	
Retentive data memory	
Number of data blocks	
Number of timers, counters	
Number of control tasks	
Realtime clock	
<b>Power supply</b>	
Supply voltage	
Supply voltage range	
Typical current consumption	
<b>General data</b>	
Width	
Height	
Depth	
Degree of protection	
Ambient temperature (operation)	

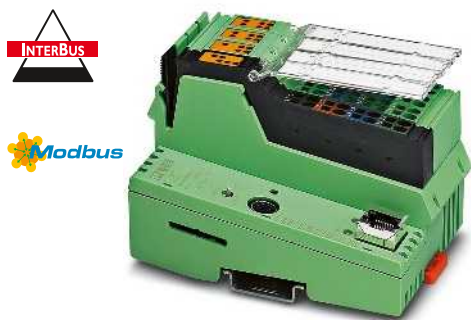
Technical data	
ILC 131 ETH <sup>1)</sup>	ILC 131 ETH/XC <sup>1)</sup>
	Inline data jumper RJ45 socket RS-232-C, 6-pos. MINI-DIN socket (PS/2), Ethernet 10/100 (RJ45)
	max. 8 max. 4096 max. 63
	8 4
	PC WorX in IEC 61131 1.7 ms (1 K mix instructions) 90 µs (1 K bit instructions) 192 kbyte (16 K instructions (IL)) 192 kbyte 8 kbyte (NVRAM) (depends on data memory) (depends on data memory) 8 Yes
	24 V DC 19.2 V DC ... 30 V DC 210 mA
	80 mm 119.8 mm 71.5 mm IP20
	-25 °C ... 55 °C      -40 °C ... 60 °C

Description
<b>Compact controller</b> , complete with accessories (connector plug and marking field)

Ordering data		
Type	Order No.	Pcs. / Pkt.
ILC 131 ETH <sup>1)</sup>	2700973	1
ILC 131 ETH/XC <sup>1)</sup>	2701034	1

<b>Programming cable</b>
<b>Parameterization memory</b> , replaceable
- 256 MB
- 2 GB
- 512 MB
- 2 GB, with license code
- 512 MB, with license code
<b>AX OPC SERVER</b> , communication interface for OPC-compatible visualization with PC Worx-based controllers

Accessories		
Type	Order No.	Pcs. / Pkt.
<b>PRG CAB MINI DIN</b>	2730611	1
<b>SD FLASH 2GB</b>	2988162	1
<b>SD FLASH 512MB</b>	2988146	1
<b>SD FLASH 2GB APPLIC A</b>	2701190	1
<b>SD FLASH 512MB APPLIC A</b>	2701799	1
<b>AX OPC SERVER</b>	2985945	1



Compact controller with remote bus support



Compact controller with two Ethernet ports



High-performance compact controller with integrated floating-point arithmetic

UL Ex: Ex

UL

UL

Technical data	
ILC 151 ETH <sup>1)</sup>	ILC 151 ETH/XC <sup>1)</sup>
Inline data jumper RJ45 socket RS-232-C, 6-pos. MINI-DIN socket (PS/2), Ethernet 10/100 (RJ45)	
max. 16 max. 4096 max. 128	
8 4	
PC WorX in IEC 61131 1.5 ms (1 K mix instructions) 90 µs (1 K bit instructions) 256 kbyte (21 K instructions (IL)) 256 kbyte 8 kbyte (NVRAM) (depends on data memory) (depends on data memory) 8 Yes	
24 V DC 19.2 V DC ... 30 V DC 210 mA	
80 mm 119.8 mm 71.5 mm IP20	
-25 °C ... 55 °C      -40 °C ... 60 °C	

Technical data	
Inline data jumper RJ45 socket RS-232-C, 6-pos. MINI-DIN socket (PS/2), Ethernet 10/100 (RJ45)	
max. 24 max. 4096 max. 128	
8 4	
PC WorX in IEC 61131 1.5 ms (1 K mix instructions) 90 µs (1 K bit instructions) 512 kbyte (43 K instructions (IL)) 512 kbyte 48 kbyte (NVRAM) (depends on data memory) (depends on data memory) 8 Yes	
24 V DC 19.2 V DC ... 30 V DC 210 mA	
80 mm 119.8 mm 71.5 mm IP20	
-25 °C ... 55 °C	

Technical data	
Inline data jumper RJ45 socket RS-232-C, 6-pos. MINI-DIN socket (PS/2), Ethernet 10/100 (RJ45)	
max. 24 max. 4096 max. 128	
8 4	
PC WorX in IEC 61131 1.3 ms (1 K mix instructions) 90 µs (1 K bit instructions) 1 Mbyte (86 K instructions (IL)) 1 Mbyte 48 kbyte (NVRAM) (depends on data memory) (depends on data memory) 8 Yes	
24 V DC 19.2 V DC ... 30 V DC 210 mA	
80 mm 119.8 mm 71.5 mm IP20	
-25 °C ... 55 °C	

Ordering data		
Type	Order No.	Pcs. / Pkt.
ILC 151 ETH <sup>1)</sup>	2700974	1
ILC 151 ETH/XC <sup>1)</sup>	2701141	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
ILC 171 ETH 2TX	2700975	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
ILC 191 ETH 2TX	2700976	1

Accessories		
	Order No.	Pcs. / Pkt.
PRG CAB MINI DIN	2730611	1
SD FLASH 2GB	2988162	1
SD FLASH 512MB	2988146	1
SD FLASH 2GB APPLIC A	2701190	1
SD FLASH 512MB APPLIC A	2701799	1
AX OPC SERVER	2985945	1

Accessories		
	Order No.	Pcs. / Pkt.
PRG CAB MINI DIN	2730611	1
SD FLASH 256MB	2988120	1
SD FLASH 2GB	2988162	1
SD FLASH 512MB	2988146	1
SD FLASH 2GB APPLIC A	2701190	1
SD FLASH 512MB APPLIC A	2701799	1
AX OPC SERVER	2985945	1

Accessories		
	Order No.	Pcs. / Pkt.
PRG CAB MINI DIN	2730611	1
SD FLASH 256MB	2988120	1
SD FLASH 2GB	2988162	1
SD FLASH 512MB	2988146	1
SD FLASH 2GB APPLIC A	2701190	1
SD FLASH 512MB APPLIC A	2701799	1
AX OPC SERVER	2985945	1



# Controllers

## Compact controllers

### Class 100 controllers with integrated modem

These compact controllers offer all the functions of our 1x1 controllers.

In addition, they have an integrated mobile phone modem and more memory. This makes them the ideal solution for remote control and remote maintenance. The corresponding remote control software is: Resy+.



N

**Compact controller with integrated GSM/GPRS modem**

		Technical data		
<b>Interfaces</b>				
INTERBUS local bus (master)		Inline data jumper		
Ethernet		RJ45 socket		
Parameterization/operation/diagnostics		Ethernet 10/100 (RJ45)		
<b>INTERBUS master</b>				
Number of possible parameter channels		max. 16		
Number of I/O nodes		max. 4096		
Number of supported devices		max. 128		
<b>Direct I/Os</b>				
Number of inputs		16		
Number of outputs		4		
<b>IEC-61131 runtime system</b>				
Programmable under		PC WorX in IEC 61131		
Processing speed		1.5 ms (1 K mix instructions) 90 µs (1 K bit instructions)		
<b>Program memory</b>		512 kbyte (43 K instructions (IL))		
Data memory		512 kbyte		
Retentive data memory		48 kbyte (NVRAM)		
Number of data blocks		(depends on data memory)		
Number of timers, counters		(depends on data memory)		
Number of control tasks		8		
Realtime clock		Yes		
<b>Power supply</b>				
Supply voltage		24 V DC		
Supply voltage range		19.2 V DC ... 30 V DC		
Typical current consumption		210 mA		
<b>General data</b>				
Width		85 mm		
Height		119.8 mm		
Depth		71.5 mm		
Degree of protection		IP20		
Ambient temperature (operation)		-25 °C ... 55 °C		
		<b>Ordering data</b>		
<b>Description</b>		<b>Type</b>	<b>Order No.</b>	<b>Pcs. / Pkt.</b>
<b>Compact controller</b> , complete with accessories (connector plug and marking field)		ILC 151 GSM/GPRS	2700977	1
		<b>Accessories</b>		
<b>Parameterization memory</b> , Flash card without license		SD FLASH 2GB	2988162	1
- 2 GB		SD FLASH 512MB	2988146	1
- 512 MB		SD FLASH 2GB APPLIC A	2701190	1
- 2 GB, with license code		SD FLASH 512MB APPLIC A	2701799	1
- 512 MB, with license code		PRG CAB MINI DIN	2730611	1
<b>Programming cable</b>		AX OPC SERVER	2985945	1
<b>AX OPC SERVER</b> , communication interface for OPC-compatible visualization with PC Worx-based controllers				



**Class 100 controllers for machine building**

The ME versions of our compact controllers have been specifically developed for the requirements of machine building. For example, for addressing drives via step motor drivers or frequency inverters.

The compact controllers offer all the functions of the ILC 1x1 and come with pre-installed functions for machine building. This means that various drive types can be controlled and sensors can be connected without any additional external modules.

Depending on the version, analog or incremental input channels can be used for position detection.



**Compact controller For easy drive control**

<b>Interfaces</b>	
INTERBUS local bus (master)	
Ethernet	
Parameterization/operation/diagnostics	
<b>INTERBUS master</b>	
Number of possible parameter channels	
Number of I/O nodes	
Number of supported devices	
<b>Direct I/Os</b>	
Number of inputs	
Number of outputs	
<b>Analog inputs/outputs</b>	
Number of inputs	
Number of outputs	
<b>Counter inputs</b>	
Number of inputs	
Input frequency	
<b>IEC-61131 runtime system</b>	
Programmable under	
Processing speed	
<b>Program memory</b>	
Data memory	
Retentive data memory	
Number of data blocks	
Number of timers, counters	
Number of control tasks	
Realtime clock	
<b>Power supply</b>	
Supply voltage	
Supply voltage range	
Typical current consumption	
<b>General data</b>	
Width	
Height	
Depth	
Degree of protection	
Ambient temperature (operation)	

Technical data	
ILC 191 ME/AN	ILC 191 ME/INC
Inline data jumper	
RJ45 socket	
RS-232-C, 6-pos. MINI-DIN socket (PS/2), Ethernet 10/100 (RJ45)	
max. 24	
max. 4096	
max. 128	
8	
4	
2	-
2	-
-	2
-	200 kHz
PC WorX in IEC 61131	
1.3 ms (1 K mix instructions)	
90 µs (1 K bit instructions)	
1 Mbyte (86 K instructions (IL))	
1 Mbyte	
48 kbyte (NVRAM)	
(depends on data memory)	
(depends on data memory)	
8	
Yes	
24 V DC	
19.2 V DC ... 30 V DC	
310 mA	350 mA
164 mm	
119.8 mm	
71.5 mm	
IP20	
-25 °C ... 55 °C	

<b>Description</b>
<b>Compact controller</b> , complete with accessories (connector plug and marking field)
- Analog inputs/outputs
- Counter inputs

Ordering data		
Type	Order No.	Pcs. / Pkt.
ILC 191 ME/AN	2700074	1
ILC 191 ME/INC	2700075	1

<b>Parameterization memory</b> , Flash card without license
- 2 GB
- 512 MB
- 2 GB, with license code
- 512 MB, with license code
<b>Programming cable</b>

Accessories		
SD FLASH 2GB	2988162	1
SD FLASH 512MB	2988146	1
SD FLASH 2GB APPLIC A	2701190	1
SD FLASH 512MB APPLIC A	2701799	1
PRG CAB MINI DIN	2730611	1

<b>AX OPC SERVER</b> , communication interface for OPC-compatible visualization with PC Worx-based controllers
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AX OPC SERVER	2985945	1
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# Controllers

## Axioccontrol controllers

### Class 1000 controllers

The AXC 1050 Axioccontrol controllers are fast, robust, and user-friendly, i.e., they are all designed for maximum performance, easy handling, and use in harsh industrial environments.

Together with the Axioline I/O systems they form a high-performance, flexible, and particularly resistant automation system for every requirement.

Thanks to the integrated UPS, you can respond promptly to any voltage failures. Push-in connection technology simplifies wiring noticeably and also saves time.

#### Your advantages:

- Maximum flexibility - numerous I/Os and special function modules can be mounted side by side
- Cost-effective solution, thanks to the excellent price/performance ratio with high function density
- Optimum communication - with integrated, freely programmable web server for visualization with the WebVisit software
- Versatile use, as all common IT protocols are supported

#### Additional features:

- Continuous shock-resistant up to 10g
- Increased EMC robustness
- Micro USB interface: for fast startup or changing the PLC settings without knowing the IP address
- Modbus/TCP is integrated in the firmware - this increases performance and simplifies configuration. This makes communication with other Modbus devices even easier
- SD card slot: for quick memory expansion and easy enabling of software blocks
- FTP server
- Flash file system
- Complete Axiobus master
- Integration of IT standards such as FTP, HTTP, SNMP, SMTP, SQL, ODP, OPC, and many more
- Intuitive programming using PC Worx or using the free PC WORX EXPRESS software (IEC 61131-3)
- The XC versions are also suitable for increased temperature requirements (-40°C to +60°C)



N

Axioccontrol compact controller

<b>Interfaces</b>	
AXIOBUS local bus	
Ethernet	
Parameterization/operation/diagnostics	
<b>AXIOBUS master</b>	
Number of supported devices	
IEC-61131 runtime system	
Programmable under	
Processing speed	
<b>Program memory</b>	
Data memory	
Retentive data memory	
Number of data blocks	
Number of timers, counters	
Number of control tasks	
Realtime clock	
<b>Power supply</b>	
Supply voltage	
Supply voltage range	
Typical current consumption	
<b>General data</b>	
Width	
Height	
Depth	
Degree of protection	
Ambient temperature (operation)	

<b>Description</b>	
Axioccontrol, complete with accessories (connector plug and marking field)	

<b>Parameterization memory, Flash card without license</b>	
- 2 GB	
- 512 MB	
- 2 GB, with license code	
- 512 MB, with license code	
<b>Programming cable</b>	

Technical data	
AXC 1050	AXC 1050/XC
	Bus base module
	RJ45 socket
	Micro USB type B
	max. 63
	PC WorX in IEC 61131
	1.3 ms (1 K mix instructions)
	90 µs (1 K bit instructions)
	1 Mbyte
	2 Mbyte
	48 kbyte (NVRAM)
	(depends on data memory)
	(depends on data memory)
	16
	Yes
	24 V DC
	19.2 V DC ... 30 V DC
	125 mA
	45 mm
	125.9 mm
	74 mm
	IP20
	-25 °C ... 60 °C
	-40 °C ... 60 °C

Ordering data		
Type	Order No.	Pcs. / Pkt.
AXC 1050	2700988	1
AXC 1050/XC	2701295	1

Accessories		
Type	Order No.	Pcs. / Pkt.
SD FLASH 2GB	2988162	1
SD FLASH 512MB	2988146	1
SD FLASH 2GB APPLIC A	2701190	1
SD FLASH 512MB APPLIC A	2701799	1
CAB-USB A/MICRO USB B/2,0M	2701626	1



**Class 3000 controllers**

The AXC 3050 is the high-end controller in the Axioccontrol range. It offers all the EMC, shock, and vibration properties of the AXC 1050, as well as push-in connection technology and intelligent functions for sophisticated automation.

Thanks to the powerful processor and technology functions such as fast counters and event tasks, you can even implement complex applications reliably and efficiently.

**Your advantages:**

- Highly flexible, thanks to expansion with numerous I/O modules
- Communication in realtime via PROFINET
- Optimum connection, with integrated web server and support for all common IT standards
- Maximum performance, thanks to high processor speed

**Additional features:**

- Micro USB interface: for fast startup or changing the PLC settings without knowing the IP address
- 3 integrated Ethernet interfaces for implementing different topologies
- Modbus/TCP is integrated in the firmware - this increases performance and simplifies configuration. This makes communication with other Modbus devices even easier
- USB A interface for easy firmware update using a USB stick
- Integrated web server for visualization with WebVisit
- FTP server
- Flash file system
- Numerous protocols supported such as: HTTP, FTP, SNMP, SMTP, SQL, MySQL, etc.
- Complete Axiobus master
- Integrated PROFINET IO controller and integrated PROFINET IO device



**Axioccontrol high-performance controller**

<b>Interfaces</b>	
AXIOBUS local bus	
Ethernet	
Parameterization/operation/diagnostics	
<b>AXIOBUS master</b>	
Number of supported devices	
IEC-61131 runtime system	
Programmable under	
Processing speed	
Program memory	
Data memory	
Retentive data memory	
Number of data blocks	
Number of timers, counters	
Number of control tasks	
Realtime clock	
<b>Power supply</b>	
Supply voltage	
Supply voltage range	
Typical current consumption	
<b>General data</b>	
Width	
Height	
Depth	
Degree of protection	
Ambient temperature (operation)	

Technical data	
Bus base module	
RJ45 socket	
Micro USB type B	
max. 63	
PC WorX in IEC 61131	
0.01 ms (1 K mix instructions)	
4 Mbyte	
8 Mbyte	
128 kbyte	
(depends on data memory)	
(depends on data memory)	
16	
Yes	
24 V DC	
19.2 V DC ... 30 V DC	
480 mA	
100 mm	
125.9 mm	
74 mm	
IP20	
-25 °C ... 60 °C	

Description
<b>Axioccontrol</b> , complete with accessories (connector plug and marking field)

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>AXC 3050</b>	<b>2700989</b>	<b>1</b>

Parameterization memory, Flash card without license
- 2 GB
- 512 MB
- 2 GB, with license code
- 512 MB, with license code
Programming cable

Accessories		
	Order No.	Pcs. / Pkt.
<b>SD FLASH 2GB</b>	<b>2988162</b>	<b>1</b>
<b>SD FLASH 512MB</b>	<b>2988146</b>	<b>1</b>
<b>SD FLASH 2GB APPLIC A</b>	<b>2701190</b>	<b>1</b>
<b>SD FLASH 512MB APPLIC A</b>	<b>2701799</b>	<b>1</b>
<b>CAB-USB A/MICRO USB B/2,0M</b>	<b>2701626</b>	<b>1</b>

# Controllers

## High-performance controllers

### Class 300 controllers

Class 300 high-performance controllers can be used in complex applications where a high level of performance is required.

Thanks to consistent PROFINET connection and expansion with Inline I/O modules, the controllers are particularly flexible.

#### Your advantages:

- Highly flexible, thanks to expansion with numerous I/O modules
- Communication in realtime via PROFINET
- Optimum connection, with integrated web server and support for all common IT standards

#### Additional features:

- Integrated Ethernet interface
- Integrated web server for visualization with WebVisit
- FTP server
- Flash file system
- Numerous protocols supported such as: HTTP, FTP, SNMP, SMTP, SQL, MySQL, etc.
- Complete fieldbus master (8192 I/O points)
- Integrated PROFINET IO controller and integrated PROFINET IO device
- Engineering with PC Worx (IEC 61131-3)

<b>Notes:</b>
1) EMC: Class A product, see page 553



High-performance controller – basic device



<b>Interfaces</b>	
INTERBUS (master)	
Higher-level INTERBUS (slave)	
Ethernet	
Parameterization/programming/diagnostics	
<b>INTERBUS master</b>	
Number of possible parameter channels	
Number of I/O nodes	
Number of supported devices	
<b>INTERBUS slave</b>	
Amount of process data	
<b>Direct I/Os</b>	
Number of inputs	
Description of the input	
Number of outputs	
<b>IEC-61131 runtime system</b>	
Processing speed	
<b>Program memory</b>	
Data memory	
Retentive data memory	
Number of data blocks	
Number of timers, counters	
Number of control tasks	
Realtime clock	
<b>Power supply</b>	
Supply voltage	
Supply voltage range	
Typical current consumption	
<b>General data</b>	
Width	182 mm
Height	140.5 mm
Depth	71.5 mm
Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 55 °C

#### Technical data

Inline data jumper	-
RJ45 socket	RS-232-C, 6-pos. MINI-DIN socket (PS/2), Ethernet 10/100 (RJ45)
max. 62	
max. 8192	
max. 512 (in total, of which 254 are remote bus devices/bus segments)	
	-
	12
	Eight fast inputs, interrupt input
	4
	0.7 ms (1 K mix instructions)
	11 μs (1 K bit instructions)
	Typ. 750 kbyte (64 K instructions (IL))
	1.5 Mbyte
	64 kbyte (NVRAM)
	(depends on data memory)
	(depends on data memory)
	16
	Integrated (battery backup)
	24 V DC ±5%
	20.4 V DC ... 30 V DC
	250 mA (no local bus device connected during idling, bus inactive)

<b>Description</b>
<b>Inline controller</b> , complete with accessories (connector and marking field) and PROFINET I/O controllers
- PROFINET IO controller
- PROFINET IO controller, GL rating

<b>Parameterization memory</b>
- 256 MB
- 2 GB
<b>Programming cable</b>

<b>AX OPC SERVER</b> , communication interface for OPC-compatible visualization with PC Worx-based controllers
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#### Ordering data

Type	Order No.	Pcs. / Pkt.
ILC 330 PN	2988191	1

#### Accessories

Accessories	Order No.	Pcs. / Pkt.
CF FLASH 256MB	2988780	1
CF FLASH 2GB	2701185	1
PRG CAB MINI DIN	2730611	1
AX OPC SERVER	2985945	1



High-performance controller with larger memory capacity



High-performance controller with INTERBUS slave interface



Maximum performance high-performance controller with INTERBUS slave interface



Technical data
Inline data jumper
-
RJ45 socket
RS-232-C, 6-pos. MINI-DIN socket (PS/2), Ethernet 10/100 (RJ45)
max. 62
max. 8192
max. 512 (in total, of which 254 are remote bus devices/bus segments)
-
12
Eight fast inputs, interrupt input
4
0.5 ms (1 K mix instructions)
9 µs (1 K bit instructions)
Typ. 1 Mbyte (85 K instructions (IL))
2 Mbyte
64 kbyte (NVRAM)
(depends on data memory)
(depends on data memory)
16
Integrated (battery backup)
24 V DC ±5%
20.4 V DC ... 30 V DC
250 mA (no local bus device connected during idling, bus inactive)
182 mm
140.5 mm
71.5 mm
IP20
-25 °C ... 55 °C

Technical data
Inline data jumper
D-SUB-9 female/D-SUB-9 male
RJ45 socket
RS-232-C, 6-pos. MINI-DIN socket (PS/2), Ethernet 10/100 (RJ45)
max. 62
max. 8192
max. 512 (in total, of which 254 are remote bus devices/bus segments)
0...32 words (configurable)
12
Eight fast inputs, interrupt input
4
0.3 ms (1 K mix instructions)
7 µs (1 K bit instructions)
Typ. 2 Mbyte (170 K instructions (IL))
4 Mbyte
96 kbyte (NVRAM)
(depends on data memory)
(depends on data memory)
16
Integrated (battery backup)
24 V DC ±5%
20.4 V DC ... 30 V DC
250 mA (no local bus device connected during idling, bus inactive)
182 mm
140.5 mm
71.5 mm
IP20
-25 °C ... 55 °C

Technical data
Inline data jumper
D-SUB-9 female/D-SUB-9 male
RJ45 socket
RS-232-C, 6-pos. MINI-DIN socket (PS/2), Ethernet 10/100 (RJ45)
max. 62
max. 8192
max. 512 (in total, of which 254 are remote bus devices/bus segments)
0...32 words (configurable)
12
Eight fast inputs, interrupt input
4
0.2 ms (1 K mix instructions)
6 µs (1 K bit instructions)
Typ. 2 Mbyte (170 K instructions (IL))
4 Mbyte
96 kbyte (NVRAM)
(depends on data memory)
(depends on data memory)
16
Integrated (battery backup)
24 V DC ±5%
20.4 V DC ... 30 V DC
250 mA (no local bus device connected during idling, bus inactive)
182 mm
140.5 mm
71.5 mm
IP20
-25 °C ... 55 °C

Ordering data		
Type	Order No.	Pcs. / Pkt.
ILC 350 PN	2876928	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
ILC 370 PN 2TX-IB	2876915	1
ILC 370 PN 2TX-IB/M	2985576	1

Ordering data		
Type	Order No.	Pcs. / Pkt.
ILC 390 PN 2TX-IB <sup>1)</sup>	2985314	1

Accessories		
	Order No.	Pcs. / Pkt.
CF FLASH 256MB	2988780	1
CF FLASH 2GB	2701185	1
PRG CAB MINI DIN	2730611	1
AX OPC SERVER	2985945	1

Accessories		
	Order No.	Pcs. / Pkt.
CF FLASH 256MB	2988780	1
CF FLASH 2GB	2701185	1
PRG CAB MINI DIN	2730611	1
AX OPC SERVER	2985945	1

Accessories		
	Order No.	Pcs. / Pkt.
CF FLASH 256MB	2988780	1
CF FLASH 2GB	2701185	1
PRG CAB MINI DIN	2730611	1
AX OPC SERVER	2985945	1



# Controllers

## High-performance controllers

### Class 400 controllers

More memory, more speed, more power. The class 400 PROFINET-compatible controllers are the most powerful embedded PLCs from Phoenix Contact. Control demanding automation tasks with maximum performance and intelligent features.

#### Your advantages:

- Highly flexible, thanks to expansion with numerous I/O modules
- Communication in realtime via PROFINET
- Optimum connection, with integrated web server and support for all common IT standards
- Maximum performance, thanks to high processor speed

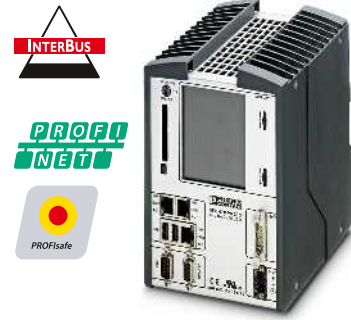
#### Additional features:

- Control and fieldbus system status messages are easily read via the diagnostics display
- Thanks to the powerful processor, comprehensive automation tasks can be processed at maximum speed
- Integrated Ethernet interface
- Integrated web server for visualization with WebVisit
- FTP server
- Flash file system
- Numerous protocols supported such as: HTTP, FTP, SNMP, SMTP, SQL, MySQL, etc.
- Integrated INTERBUS master
- Integrated PROFINET IO controller and PROFINET device
- Engineering with PC Worx (IEC 61131-3)

The **safety version** offers all the properties of the RFC 470 PN controller and also has an integrated safety controller. This combination can be used to integrate safety functions up to SIL 3 into existing systems.

The use of PROFIsafe reduces wiring effort and installation time.

<b>Notes:</b>
Further information on safety versions can be found in the "Functional safety" section on page 113
1) EMC: Class A product, see page 553



PLC, with optional integrated safety controller



<b>Interfaces</b>	INTERBUS (master) Ethernet Parameterization/operation/diagnostics
<b>INTERBUS master</b>	Number of possible parameter channels Number of I/O nodes Number of supported devices
<b>Direct I/Os</b>	Connection method Number of inputs Number of outputs
<b>IEC-61131 runtime system</b>	Processing speed
<b>Program memory</b>	Data memory Retentive data memory Number of data blocks Number of timers, counters Number of control tasks
<b>Realtime clock</b>	
<b>Power supply</b>	Supply voltage Supply voltage range
<b>Typical current consumption</b>	
<b>General data</b>	Width Height Depth Degree of protection Ambient temperature (operation)

#### Technical data

D-SUB-9 socket 3x RJ45 sockets V.24 (RS-232-C), D-SUB plug, 10/100 Ethernet (RJ45), 2x USB
max. 126 max. 8192 512 (of which 254 are remote bus devices/bus segments)
14-pos. FLK pin strip 5 3
0.005 ms (1 K mix instructions) 1 µs (1 K bit instructions) Typ. 8 Mbyte (680 K instructions (IL)) 16 Mbyte 240 kbyte (NVRAM) (depends on data memory) (depends on data memory) 16 Integrated (battery backup)
24 V DC 19.2 V DC ... 30 V DC (including ripple)
1 A
124 mm 185 mm 190 mm IP20 0 °C ... 55 °C (from 45°C only with fan module)

<b>Description</b>	<b>Remote Field Controller with INTERBUS master</b> - 3 x 10/100 Ethernet, PROFINET IO controller
<b>Safety controller</b>	

#### Ordering data

Type	Order No.	Pcs. / Pkt.
RFC 470 PN 3TX <sup>1)</sup>	2916600	1
RFC 470S PN 3TX <sup>1)</sup>	2916794	1

<b>Parameterization memory</b>	- 256 MB - 2 GB
<b>Programming cable</b> , to connect the controller boards to the PC (V.24 (RS-232-C)), length 3 m	
<b>USB memory stick</b> , USB 2.0 IP20	
<b>V.24 (RS-232) null modem adapter</b> - 9-pos. socket to 9-pos. plug	
<b>Fan module</b> for Remote Field Controller	
<b>AX OPC SERVER</b> , communication interface for OPC-compatible visualization with PC Worx-based controllers	

#### Accessories

	Order No.	Pcs. / Pkt.
CF FLASH 256MB	2988780	1
CF FLASH 2GB	2701185	1
IBS PRG CAB	2806862	1
VS-04-MS-IP20	1402490	1
PSM-AD-D9-NULLMODEM	2708753	1
RFC DUAL-FAN <sup>1)</sup>	2730239	1
AX OPC SERVER	2985945	1



**Class 400 controllers**

Uninterrupted processes are vital in complex systems and large plants. Ensure the continuous operation of your automation - with the PROFINET redundancy controllers from Phoenix Contact.

The high-performance PLCs establish a redundant system automatically thanks to AutoSync technology.

**Your advantages:**

- Fast startup and automatic configuration of all redundancy functions, thanks to AutoSync technology
- Uninterrupted process in the event of failure or when a controller is replaced
- Optimum device integration, thanks to PROFINET standards ; redundancy for your future-proof Ethernet network
- A distance of up to 80 km between the controllers via fiber optics ; cost-optimized thanks to plug-in SFP modules
- High-resolution display for displaying status and error messages in plain text
- Uninterrupted visualization - thanks to redundancy-capable OPC server

**Notes:**  
1) EMC: Class A product, see page 553



**Redundancy PLC**

<b>Interfaces</b>
Ethernet
Synchronization interface
Other interfaces
<b>IEC-61131 runtime system</b>
Processing speed
<b>Program memory</b>
Data memory
Retentive data memory
Number of data blocks
Number of timers, counters
Number of control tasks
Realtime clock
<b>Power supply</b>
Supply voltage
Supply voltage range
<b>Typical current consumption</b>
<b>General data</b>
Width
Height
Depth
Degree of protection
Ambient temperature (operation)



Technical data	
<b>3x RJ45 sockets</b>	
SFP port	
2 x USB	
0.007 ms (1 K mix instructions)	
2 µs (1 K bit instructions)	
Typ. 8 Mbyte (680 K instructions (IL))	
16 Mbyte	
120 kbyte (NVRAM)	
(depends on data memory)	
(depends on data memory)	
16	
Integrated (battery backup)	
<b>24 V DC</b>	
19.2 V DC ... 30 V DC (including ripple)	
<b>1 A</b>	
124 mm	
185 mm	
190 mm	
IP20	
0 °C ... 55 °C (from 45°C only with fan module)	

Description
High-availability <b>remote field controller</b> , thanks to redundancy function
- 3 x 10/100 Ethernet, PROFINET IO controller

Ordering data		
Type	Order No.	Pcs. / Pkt.
<b>RFC 460R PN 3TX<sup>1)</sup></b>	<b>2700784</b>	<b>1</b>

Parameterization memory
- 256 MB
- 2 GB
<b>USB memory stick, USB 2.0</b>
IP20
Slot module for synchronization port
- Distances of up to 550 m
- Distances of up to 30 km
- Distances of up to 80 km
<b>Synchronization cable for FL SFP SX</b>
- Length 1 m
- Length 2 m
- Length 5 m
<b>Fan module for Remote Field Controller</b>
<b>AX OPC SERVER</b> , communication interface for OPC-compatible visualization with PC Worx-based controllers

Accessories		
<b>CF FLASH 256MB</b>	<b>2988780</b>	<b>1</b>
<b>CF FLASH 2GB</b>	<b>2701185</b>	<b>1</b>
<b>VS-04-MS-IP20</b>	<b>1402490</b>	<b>1</b>
<b>FL SFP SX</b>	<b>2891754</b>	<b>1</b>
<b>FL SFP LX</b>	<b>2891767</b>	<b>1</b>
<b>FL SFP LH</b>	<b>2989912</b>	<b>1</b>
<b>FL MM PATCH 1,0 LC-LC</b>	<b>2989158</b>	<b>1</b>
<b>FL MM PATCH 2,0 LC-LC</b>	<b>2989255</b>	<b>1</b>
<b>FL MM PATCH 5,0 LC-LC</b>	<b>2901799</b>	<b>1</b>
<b>RFC DUAL-FAN<sup>1)</sup></b>	<b>2730239</b>	<b>1</b>
<b>AX OPC SERVER</b>	<b>2985945</b>	<b>1</b>

### PC Worx SRT

PC Worx SRT is a software PLC that can be installed directly on a Windows PC.

It only makes low demands on the PC hardware profile and can therefore be installed on almost all Windows PCs. PC WORX SRT is therefore the ideal solution for small to medium-sized automation tasks without realtime requirements.

Programming is quick and easy using the PC Worx or PC Worx EXPRESS software.

#### Your advantages:

- Save costs, as separate PLC hardware is not required
- Easy and inexpensive visualization, thanks to integrated web server
- Maximum Ethernet openness, as all common protocols are supported

#### Additional features:

- Modbus/TCP is integrated in the firmware - this increases performance and simplifies configuration. This makes communication with other Modbus devices even easier.
- OPC support using AX OPC server
- FTP server
- Integrated PROFINET IO controller and PROFINET device

#### Hardware requirements

CPU  
Main memory (RAM)  
Hard disk memory  
Optical drive  
Interfaces  
Operating equipment  
Monitor resolution

#### Software requirements

Operating systems

#### Basic functions

#### IEC-61131 runtime system

Programmable under  
Processing speed  
Program memory  
Data memory  
Retentive data memory  
Number of data blocks  
Number of timers, counters  
Number of control tasks

#### Description

**Software PLC**, without realtime extension

#### Industrial computer

**AX OPC SERVER**, communication interface for OPC-compatible visualization with PC Worx-based controllers



N

**Software PLC  
without realtime extension**

#### Technical data

x86 architecture  
min. 512 Mbyte  
min. 1 Gbyte  
-

Ethernet port  
Keyboard, mouse recommended  
XGA (1024 x 768)

MS Windows XP Professional SP3, MS Windows 7 (32/64-bit), MS Windows Embedded 2009, MS Windows Embedded Standard 7

#### Complete PLC

Non-realtime-capable software PLC for installation on a standard PC with integrated Modbus TCP, plus PROFINET IO controller and device functionality

PC WorX in IEC 61131  
(depends on PC processor and settings)  
1 Mbyte  
1 Mbyte  
48 kbyte  
(depends on data memory)  
(depends on data memory)  
8

#### Ordering data

Type	Order No.	Pcs. / Pkt.
PC Worx SRT	2701680	1

#### Accessories

VALUELINE IPC	2913108	1
AX OPC SERVER	2985945	1

**PC Worx RT BASIC**

<b>Notes:</b>
1) EMC: Class A product, see page 553

Make use of the available resources of your industrial PC and transform it into a fully-fledged PLC.

The PC Worx RT BASIC software PLC system is as reliable and stable as a traditional PLC and can be used in applications where a medium to high level of performance is required.

**Your advantages:**

- Save costs, as separate PLC hardware is not required
- Stable and reliable, thanks to operating system extension
- Easy and inexpensive visualization, thanks to integrated web server
- Maximum Ethernet openness, as all common protocols are supported

**Additional features:**

- Optimally integrated into the PROFINET system
- Easy installation on Valueline industrial PCs
- Modbus/TCP is integrated in the firmware - this increases performance and simplifies configuration. This makes communication with other Modbus devices even easier
- OPC support using AX OPC server
- FTP server
- Numerous protocols supported such as: HTTP, FTP, SNMP, SMTP, SQL, MySQL, etc.
- Integrated PROFINET IO controller and PROFINET device
- INTERBUS connection via PC controller board
- Engineering with PC Worx (IEC 61131-3)

<b>Hardware requirements</b>
CPU
Main memory (RAM)
Hard disk memory
Optical drive
Interfaces
Operating equipment
Monitor resolution
<b>Software requirements</b>
Operating systems
Supported browsers
<b>Basic functions</b>

<b>IEC-61131 runtime system</b>
Programmable under
Processing speed
Program memory
Data memory
Retentive data memory
Number of data blocks
Number of timers, counters
Number of control tasks

<b>Description</b>
<b>Software PLC, with realtime extension</b>

<b>Industrial computer</b>
<b>PC controller board</b>
<b>AX OPC SERVER</b> , communication interface for OPC-compatible visualization with PC Worx-based controllers



**Software PLC with realtime extension**

**Technical data**

INTEL Core2™ Duo 1.5 GHz recommended
min. 2 Gbyte
min. 1 Gbyte
DVD-ROM
Ethernet port, USB port
Keyboard, mouse recommended
XGA (1024 x 768)

MS Windows XP SP3, MS Windows 7 (32 bit)
Internet Explorer 5.5 or higher

Complete PLC
PROFINET IO controller and device functionality only in conjunction with a Valueline PC
INTERBUS functionality only in conjunction with an INTERBUS master controller board

PC Worx in IEC 61131
0.001 ms (1 K mixed instructions, Core2™ Duo 1.5 GHz)
0.7 µs (1 K bit instructions, Core2™ Duo 1.5 GHz)

8 Mbyte
16 Mbyte
240 kbyte
(depends on data memory)
(Depends on data memory)
16

**Ordering data**

Type	Order No.	Pcs. / Pkt.
PC Worx RT BASIC	2700291	1

**Accessories**

VALUELINE IPC	2913108	1
IBS PCI SC/I-T1	2725260	1
AX OPC SERVER	2985945	1

# Controllers

## Starter kits

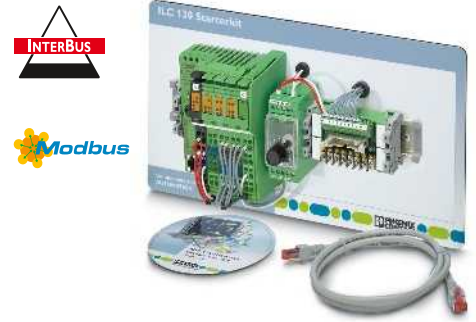
### ILC 131 starter kit

The ILC 131 starter kit provides an easy introduction to our controllers. Learn about control technology with the aid of a pre-assembled test structure with programmed examples. Then use the PC WORX EXPRESS programming software to create custom solutions.

Begin by starting up the controller, configuring it, and parameterizing the bus structure. With the test structure, enter the world of IEC 61131-3-compliant programming.

#### Controller performance data at a glance:

- Supply voltage: 24 V DC
- Integrated inputs /outputs: 8 / 4
- Processing time per 1000 instructions: 90 µs (bit data types), 1.7 ms (mixed data types)
- Program / data memory: 192 kB / 192 kB
- Remanent data memory: 8 kB



Pre-assembled test structure for quick entry

Description
<b>ILC 131 starter kit</b> , incl. ILC 131 ETH, analog input module, control panel, power supply unit, plus accessories and cables with test application set up

Programming cable
<b>AX OPC SERVER</b> , communication interface for OPC-compatible visualization with PC Worx-based controllers

#### Technical data

See ILC 131 ETH on page 532

#### Ordering data

Type	Order No.	Pcs. / Pkt.
ILC 131 STARTERKIT	2701835	1

#### Accessories

PRG CAB MINI DIN	2730611	1
AX OPC SERVER	2985945	1

**PROFINET starter kit**

Try out the reliable operation, easy handling, and high performance of PROFINET. With the new PROFINET starter kit 3.0, Phoenix Contact provides a system with all the necessary components for creating a test application.

In order to provide a quick and easy introduction, we have created a pre-configured project based on the current version of our PC Worx software.

**Controller performance data at a glance:**

- Supply voltage: 24 V DC
- Integrated I/Os: 12/4
- Operating time per 1000 instructions: 0.5 ms
- Program/data memory: 1 MB/2 MB
- Retentive data memory: 64 KB



**PROFINET starter kit**

Description
<b>PROFINET starter kit 3.0</b> , includes a PROFINET IO controller, bus terminal modules, I/O modules, managed switch, power supply unit, plus accessories and cables for creating a PROFINET test application. An example project and PC Worx 6 license key are also included.
<b>AX OPC SERVER</b> , communication interface for OPC-compatible visualization with PC Worx-based controllers

**Technical data**

See ILC 350 PN on page 539

**Ordering data**

Type	Order No.	Pcs. / Pkt.
<b>PROFINET STARTERKIT 3.0</b>	2988395	1

**Accessories**

<b>AX OPC SERVER</b>	2985945	1
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Whatever your automation task: our specialists in the AUTOMATIONWORX Competence Center are available to answer any questions you may have. This is made possible by our flexible service concept.

Based on the typical phases of a project, we work with you at each stage. With our expertise and years of experience we provide support that is tailored to your industry and the specific phase of your project.

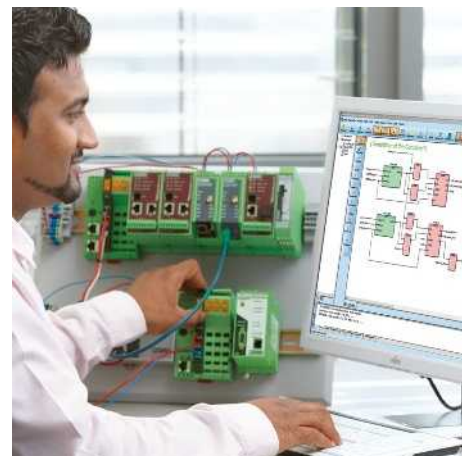
### Your advantages:

- Save time by transferring automation tasks to Phoenix Contact
- Optimum automation solution thanks to comprehensive technology and product expertise
- Sophisticated process management thanks to the consistent consideration of all requirements
- Target-oriented project management with optimally coordinated process steps
- Traceable, legal protection thanks to consistent documentation

**Services for functional safety can be found on page 114.**

**Services for Industrial Ethernet can be found on page 46.**





### Service

You can rely on our support for the smooth operation of your application. Our experts deal with queries encountered in practical applications every day. They draw on their experience of all sectors and knowledge of the components and technologies used.

Our service specialists will be happy to support you with the following services:

- Hotline
- On-site service
- Startup support
- Professional workshops

If queries arise during startup and operation, in addition to your local specialists you can also contact our free 24-hour hotline at any time (+ 49 5281 9-462888) or e-mail us on [automation-service@phoenixcontact.com](mailto:automation-service@phoenixcontact.com).

We will be happy to answer general questions regarding the functionality of individual components or the system. If this is not sufficient, our startup support team and on-site service will be there to provide assistance.

### Training

Discover the added value our individual training concepts and training services offer. With our tailor-made concepts, we help you and your employees to make optimum use of the control and I/O systems from Phoenix Contact.

With our free consultation service, you can arrange the content, duration, location, and date of your individual training session with us.

Should you have any queries regarding our training services and qualification concepts, please contact your local contact person or contact our Back Office Training team directly (+ 49 5281 9-462161 or e-mail us on [automation-training@phoenixcontact.com](mailto:automation-training@phoenixcontact.com)).

We will happily advise you on the implementation of your qualification requirements and work with you to create your own individual training program.

### Engineering

Whatever your automation task: our engineering specialists are available to answer any questions you may have. Based on the typical phases of a project, we work with you at each stage.

With our expertise and years of experience we provide support that is tailored to your industry and the specific phase of your project.

Simply give us an outline of the applications you would like to implement and we will provide you with a technical concept that includes suitable hardware and software.

- Configuration
- Programming
- Visualization
- Coaching

If queries arise in the run-up to or during a project, in addition to your local specialists you can also contact us at any time on + 49 5281 9-462166 or e-mail us on [projectconsulting@phoenixcontact.com](mailto:projectconsulting@phoenixcontact.com).



### Quality in quantity



#### Integrated management system

The aim of the Phoenix Contact integrated management system is to coordinate all the requirements regarding products, processes, and organization.

Statutory and regulatory requirements, as well as those of international standards and our customers, are met and, in some cases, even exceeded in all phases of the product life cycle.

In the Phoenix Contact management system, the integration of quality, environmental protection, and safety in the workplace is monitored each year for conformance by internationally recognized independent bodies. Certification in accordance with international standards ISO 9001, ISO 14001, and BS OHSAS 18001 is the result of our corporate philosophy of meeting the needs of our customers, staff, and environment as best as possible. They serve as the basis for innovative products with the familiar high Phoenix quality standard, actively practiced environmental protection, and responsibility in the field of occupational health and safety. Of course, we integrate all further requirements of standards, international approvals or special customer requirements into company processes.

This system provides a building block for the success of the Phoenix Contact Group and its products and services.

#### CE marking

The CE mark was introduced as an important instrument for the free movement of goods and services within the single European market. By attaching the mark to a product, the manufacturer confirms that it complies with all applicable European Union (EU) directives. EC directives describe the product properties with regard to device safety and avoiding danger. These are legally binding regulations of the European Union (EU). In other words, compliance with the requirements is a **statutory condition for marketing the product within the EU.**

Where applicable, the products that our company currently manufactures fall within the scope of the following directives:

- 2006/95/EC  
Electrical equipment designed for use within certain voltage limits (Low Voltage Directive)
- 2004/108/EC  
Electromagnetic compatibility (EMC Directive)
- 2006/42/EC  
Safety of machinery (Machinery Directive)
- 94/9/EC  
Equipment and protective systems intended for use in potentially explosive areas (ATEX Directive 100a)
- 1999/5/EC  
Radio and telecommunications terminal equipment (R&TTE)

The standards upon which the specified directives are based have been part of our standard of development for a long time. This guarantees conformance with European directives. The numbers of the directives indicate their version at the time of publication. In the event of changes to directives and/or standards, our products will undergo conformity assessment again in good time and a new declaration of conformity will be issued promptly. The current declarations for each product can also be found in our Download Center.

The EMC Directive occupies a special place among the European directives listed. It defines electromagnetic compatibility as a fundamental property of devices based on mandatory guidelines. European Law therefore acknowledges the electromagnetic compatibility of devices and systems as an important condition for error-free operation of machinery and systems. Phoenix Contact is one of the leading international companies in surge protection, and therefore possesses broad expertise in EMC. This expertise and the experience gained over years of developing and applying industrial interface and communication technology have resulted in our products having an extremely high standard of quality with regard to electromagnetic compatibility. It was with a view to providing other companies with this expertise that our associate company, Phoenix Testlab, was founded. Phoenix Testlab GmbH is an independent, accredited service provider offering EMC testing that conforms to European standards. At Phoenix Testlab, devices are also tested with regard to their electrical safety, mechanical influences, and their behavior in relation to environmental influences. Furthermore, Phoenix Testlab is a “Notified Body” in accordance with EMC Directive 2004/108/EC and according to R&TTE Directive 1999/5/EC for radio and telecom-

munications terminal equipment. As a “Telecom Certification Body” (TCB), Phoenix Testlab may also approve these products for markets in the USA, Canada, and Japan.

#### Standards and regulations

All relevant standards and regulations are used as the basis for the development and maintenance of our products.

International standards are subject to continuous changes as a result of harmonization and new developments. In line with this process, the current version of all standards that are relevant to our products is documented in the product area on our website at [www.phoenixcontact.net/products](http://www.phoenixcontact.net/products).

#### Online product information service on the web

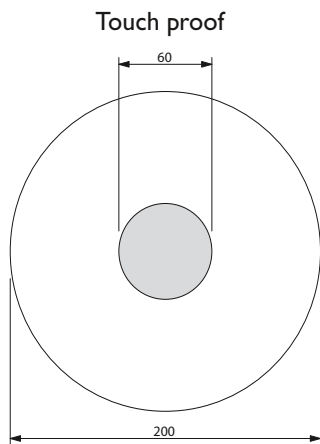
Phoenix Contact's product range is growing constantly.

Due to our commitment to product monitoring, all products are subject to improvement.

The Internet is an ideal platform to quickly communicate new product developments and improvements to the market.

You can quickly access the relevant Phoenix Contact website for your region via [www.phoenixcontact.com](http://www.phoenixcontact.com). Here, you will always find the latest overview of products, solutions, and services from Phoenix Contact. This includes technical documents, such as data sheets and user manuals, the latest driver and demo software, plus a means of contacting the appropriate contact person directly.

## Shock protection



Back of hand safety

### Example: pressure actuation

The accident prevention regulations BGV A 2 issued by the German employer's liability insurance association for precision mechanics and electrical engineering apply to the operators of electrical systems and are aimed at the prevention of electrical accidents by means of special safety requirements.

These regulations contain specifications regarding the safety distances for work, operation, and occasional handling in the proximity of "live parts" in low-voltage systems up to 1000 V ~ or 1500 V –.

- Work with live parts is only permitted once they have been de-energized. Operational activities are only permitted in the vicinity of live parts if these parts are de-energized or are protected against direct contact (§ 6). The following safety measures apply when working in the vicinity of active components:
- Provision of the de-energized state for the duration of the work
- Ensure shock protection is in place in the form of covers or barriers during the work
- Assurance that proximity limits will not be violated (§ 7)

The term "occasional handling" has been introduced for the operation of elements such as pushbuttons, rocker arms or rotary buttons in the proximity of live parts.

In VDE 0105-1, this is covered by "operation with partial protection against direct contact".

Detailed specifications for "occasional handling" can be found in DIN VDE 0106-100. This specifies to what degree live parts in the proximity of operating elements are to be protected against contact. The basis for this is the definition of a "protection area for occasional handling"; this is the area into which the user must reach in order to handle the machine.

The most important thing is that an area formed by an even envelope curve 30 mm in radius must surround the live parts. This area must be **touch proof**, i.e., the live parts of the electrical device must not be within reach of the VDE test finger in accordance with IEC 60529/DIN VDE 0470-1 (test finger).

Back of hand safety is specified for the "rest of the area" up to 100 mm around the operating element. **Back of hand safety** means that when a force of 50 N is applied to a ball with a diameter of 50 mm, this does not come into contact with the live parts of the



equipment. No special measures for shock protection are provided outside this area.

Note: systems and equipment that are operated with SELV up to 25 V ~ or 60 V – are considered to be protected against direct contact.

According to § 5, Subsection 4 of the BGV A 2 regulations, there is no need to test the condition of the system prior to initial startup if the company has confirmation from the manufacturer or installer that the electrical



systems and equipment conform to BGV A 2. The confirmation required relates to systems and equipment that have been installed and are ready for operation and can only be issued

by the installer or installation company. The manufacturer of the electrical equipment can only issue a confirmation that products have been produced in accordance with the relevant electrotechnical DIN VDE regulations stipulated in BGV A 2. The installer must bear this in mind when selecting the equipment to be used.

In the field of connection technology, Phoenix Contact offers a wide range of products that are touch proof or that can be protected against contact using covers. Depending on the conditions, all of this must be taken into account when selecting the individual types of terminal block and accessories.

### Quality features of insulating housing

#### Thermoplastics

The majority of our insulating housing is made from thermoplastic materials. Roughly speaking, these can be divided into amorphous and semi-crystalline substances. Thermoplastics are processed using the efficient and environmentally-friendly injection molding process. They have good recycling properties and can be re-used. We use many materials that are modified in different ways to meet the demanding requirements that electrical and electronic modules, devices, and systems have to meet with regard to their mechanical, thermal, and electrical properties.

#### Behavior of plastics under the influence of temperature (operating temperatures, mechanical influences)

All plastics undergo a process referred to as thermal aging when they are subjected to heat over long periods. This process causes changes in the mechanical and electrical properties of the material. External influences, e.g., radiation, additional mechanical, chemical or electrical stresses, amplify this effect. Special tests on samples can yield characteristic data which provides a good means of drawing comparisons between different plastics. However, applying these characteristics to an evaluation of molded plastic parts is only possible to a limited extent, and can only give the designer a rough guide when it comes to selecting a plastic material. This catalog uses the following assessment criteria: the **RTI value** according to UL746B/ANSI 746 B (elec. based on dielectric strength) and the **Ti value** according to IEC 60216-1 (based on a 50% reduction in tensile strength after 20,000 hours).

IEC 60947-7-1/EN 60947-7-1 specifies a permissible temperature increase of 45 K for modular terminal blocks under nominal load. Phoenix Contact terminal blocks meet this requirement.

The properties of plastics are not only affected by the influence of heat as described above ; they also undergo changes as a result of cold influences. When subjected to cold as well as low levels of humidity, plastics become increasingly brittle with the result that they are no longer capable of withstanding the same mechanical loads. As the table on the right shows, the plastics concerned can be used down to a temperature of -40°C, but only without a mechanical load. As far as the products presented in the catalog are concerned, it is the ambient temperature specified in each case that is to be regarded as definitive for operation. Regardless of the plastics used, this may be subject to further restrictions (e.g., limited to -20°C) as a result of the components used or other restrictive parameters.

At very low temperatures, this means that any form of mechanical load on the plastic components must be avoided (e.g., mounting of products on/removal of products from the DIN rail, actuation of terminal points, locking/ejection of relays from bases, prizing out of plug-in bridges, bending of cables and lines, etc.), as there is always an associated risk of damage. Unless otherwise indicated, it is recommended that you carry out the specified mounting/operational tasks in a temperature range from -10°C to +40°C.

#### Inflammability characteristics of plastics (UL 94)

Inflammability tests for plastics have been defined by Underwriters Laboratories (USA) in regulation UL 94. This applies to all areas of application, but in particular to electrical engineering. A horizontal or vertical test is carried out at the test laboratory to determine the inflammability of the plastic material with a naked flame. In order of increasing resistance to combustion, the evaluation classes are HB, V2, V1, V0, and 5V. Test results are recorded on "yellow cards" and are published annually in the **Recognized Component Directory**.

#### Thermoplastics: non-reinforced polyamide, PA

We use the modern, semi-crystalline polyamide insulation material, which has now become an essential component in electrical engineering and electronics. It has long occupied a leading position and is authorized for use by the relevant approval authorities such as the CSA, NEMKO, KEMA, PTB, SEV, UL, VDE, etc.

Polyamide also has excellent electrical, mechanical, chemical, and other properties, even at high operating temperatures. Brief peak temperatures up to approximately 200°C are permitted as a result of heat aging stabilization. Depending on the type (PA 4.6, 6.6, 6.10, etc.), its melting point is in the region of 215°C to 295°C.

Polyamide absorbs moisture from its surroundings, on average 2.8%. However, this moisture is not in the form of crystallization water in the plastic itself, but chemically bonded H<sub>2</sub>O groups in the molecule structure. This makes the plastic flexible and resistant to breakage, even at temperatures as low as -40°C. According to UL 94, PA belongs to inflammability class V2 to V0.

#### Thermoplastics: polyester, PBT

We use the semi-crystalline thermoplastic polyester in non-reinforced and fiberglass-reinforced variants for special applications which require increased dimensional and form stability.

In addition to the high operating temperature, the material is characterized by excellent mechanical strength and hardness, and does not absorb moisture from its surroundings. PBT is therefore particularly suitable for strips, for example, which are soldered onto PCBs and subsequently have to pass a burn-in test while they are subjected to heat. According to UL 94, PBT belongs to inflammability class V2 to V0.

**Thermoplastics: polycarbonate, PC**

Polycarbonate combines many advantages such as rigidity, impact strength, transparency, dimensional stability, good insulation properties, and resistance to heat.

This amorphous material only absorbs moisture to a very limited degree, and is used for items such as large, rigid electronic component housing.

In its transparent form, polycarbonate is particularly suitable for use as cover profiles or marking materials.

PC has good resistance properties against mineral acids, saturated aliphatic hydrocarbons, gasoline, greases, and oils.

The material is less resistant to solvents, benzene, lyes, acetone, and ammonia. Strain cracks may result from contact with certain chemicals.

According to UL 94, PC belongs to inflammability class V2 to V0.

**Thermoplastics: polycarbonate fiber-reinforced, PC-F**

Compared to non-reinforced materials, fiber-reinforced polycarbonates feature greater rigidity, impact strength, and operating temperature. In other respects, their properties are largely identical to those of non-reinforced polycarbonate.

**Thermoplastics: ABS**

We use the thermoplastic molding compound ABS for products which must have good impact and notched impact properties in addition to high mechanical stability and rigidity. The products are resistant to chemicals and stress cracking due to their special surface quality and hardness.

The characteristic thermal properties provide good dimensional stability at both low and high temperatures. Products made from ABS can be coated with metallic surfaces, e.g., nickel.

According to UL 94, the molding compound used belongs to inflammability class HB to V0.

**Dimensions: width / height / depth**

The dimensions for “width / height / depth” are defined as follows for all DIN-rail-mountable products in the INTERFACE range:

- Width: measurement taken along the DIN rail
- Height: measurement taken across the DIN rail
- Depth: measurement taken starting from the mounting plate and including the NS 35/7,5 DIN rail (EN 60715)

The width, height, and depth never change, even if the products shown in this catalog happen to be photographed from two different perspectives (horizontal or vertical).

To make things easier for you, one of the following two symbols has been included next to each product photo:



Properties	Unit/level	Polyamide PA	Polyester PBT	Polycarbonate PC	Polycarbonate PC-F	ABS
Operating temperature RTI **	°C	≤ 105	≤ 105	≤ 125	≤ 120	≤ 80
Minimum temperature (without mechanical load)	°C	-40	-40	-40	-40	-40
Dielectric strength acc. to IEC 60243-1/DIN VDE 0303-21	kV/cm	600	400	> 300		850
Creep resistance	CTI...M	550	225	175		200
IEC 60112/DIN VDE 0303-1	CTI...	600	225	175	175	600
Tropical and termite resistance		Good	Good	Good		
Specific contact resistance IEC 60093/VDE 0303 Part 30 ; IEC 60167/VDE 0303 Part 31	Ω cm	10 <sup>12</sup>	10 <sup>16</sup>	> 10 <sup>16</sup>	> 10 <sup>14</sup>	10 <sup>14</sup>
Surface resistance IEC 60093/VDE 0303 Part 30 ; IEC 60167/VDE 0303 Part 31	Ω	10 <sup>10</sup>	10 <sup>13</sup>	> 10 <sup>14</sup>		10 <sup>13</sup>
Inflammability class according to UL 94		V2 - V0	V0	V2 - V0	V0	HB - V0

\* According to UL 746 B/ANSI 746 B (elec.)      \*\* Minimum value



## Connection cross section

The rated cross section of modular terminal blocks must be specified by the manufacturer in accordance with IEC 60947-7-1. The rated cross section is the maximum conductor cross section that can be connected in single-, multi- or fine-strand versions subject to specific thermal, mechanical, and electrical requirements.

The manufacturer must also specify the **rated connection capacity**, i.e., the area of the conductor that can be connected, as well as the number of conductors that can be connected simultaneously and the necessary preparation of the conductor ends. The conductors can be **solid (single or multi-**

**strand) or stranded (fine-strand).**

These values can be found in the product-specific technical data.

The rated connection capacity of Phoenix Contact modular terminal blocks usually exceeds standard requirements, which specify that it must only be possible to connect one conductor with one of the two next smallest cross sections, excluding the rated cross section (standardized for the cross section range from 0.2 to 35 mm<sup>2</sup>).

In addition, conductors with a rated cross section can usually be wired with ferrules with plastic sleeve.

Phoenix Contact modular terminal blocks

are designed to allow copper conductors to be connected to them untreated. "Special treatment" or the use of ferrules – both permitted according to IEC 60947-7-1 – is not required. If ferrules are nevertheless used to protect stranded conductors against splicing, the connection capacity of the stranded conductor is generally reduced by one level.

Structure and dimensions of connecting cables													
Cross section [mm <sup>2</sup> ]	Single-strand		Multi-strand		Fine-strand		American Wire Gauge [AWG]						
	Diameter max. dimension	Number of wires	Diameter max. dimension	Number of wires (minimum number)	Diameter max. dimension	Number of wires (guide value)	Gauge No.	Solid wires			Stranded wires		
							AWG	[Ø mm]	[circ. mils]	[mm <sup>2</sup> ]	[Ø mm]	[circ. mils]	[mm <sup>2</sup> ]
0.2	0.5	1	–	–	–	–	24	0.51	404	0.21	–	–	–
0.5	0.9	1	1.1	7	1.1	16	20	0.81	1022	0.52	0.97	1111	0.56
0.75	1.0	1	1.2	7	1.3	24	18	1.02	1620	0.82	1.16	1600	0.82
1	1.2	1	1.4	7	1.5	32	(17)	1.15	2050	1.04			
–	–	–	–	–	–	–	16	1.29	2580	1.31	1.50	2580	1.32
1.5	1.5	1	1.7	7	1.8	30	(15)	1.45	3260	1.65			
–	–	–	–	–	–	–	14	1.63	4110	2.08	1.85	4100	2.09
2.5	1.9	1	2.2	7	2.3	50	(13)	1.83	5180	2.63			
–	–	–	–	–	–	–	12	2.05	6530	3.31	2.41	6500	3.32
4	2.4	1	2.7	7	2.9	56	(11)	2.30	8230	4.17			
–	–	–	–	–	–	–	10	2.59	10380	5.26	2.95	10530	5.37
6	2.9	1	3.3	7	3.9	84	(9)	2.91	13100	6.63			
–	–	–	–	–	–	–	8	3.26	16510	8.37	3.73	16625	8.48

## Tightening torque of terminal block screws

IEC 60947-1/EN 60947-1, modified, Table 4 specifies tightening torques for screw connections based on the screw size for electrical and mechanical type tests.

Extract from IEC 60 947-1/EN 60 947-1, Table 4  
The torque according to IEC and the recommended tightening torque for Phoenix Contact terminal blocks are specified.

Thread	Head screw with slot	
	Torque [Nm]	Recommended tightening torque [Nm]
M2.5 (M2.6)	0.4	0.4 - 0.5
M3	0.5	0.5 - 0.6
M3.5	0.8	0.8 - 1.0
M4	1.2	1.2 - 1.5









































## Current carrying capacity

Standard IEC 60947-7-1/EN 60947-7-1/DIN VDE 0611-1 specifies the test currents for the individual conductor cross sections listed in the adjacent table. The corresponding currents are listed with the connection data for the individual terminal blocks. The type tests for modular terminal blocks are based on this data.

## Test currents according to IEC 60947-7-1/EN 60947-7-1, Table 5

Rated cross section	[mm <sup>2</sup> ]	0.2	0.5	0.75	1.0	1.5	2.5	4	6	10	16
Test current	[A]	4	6	9	13.5	17.5	24	32	41	57	76

Overview of certification bodies and safety marks

Certification bodies and approvals		Country code	Explosion protection		Country code	Ship classification societies		Country code
	IECEE CB Scheme (in combination with certifying body)	International		FM Approvals	US		Bureau Veritas	FR
CCA	CENELEC Certification Agreement (CCA inspection report) (in combination with certifying body)	EU		DEKRA Certification B.V.	NL		Germanischer Lloyd AG	DE
	Canadian Standards Association (CSA)	CA		Physikalisch-Technische Bundesanstalt	DE		Lloyd's Register EMEA	GB
 	Underwriters Laboratories Inc. (UL)	US		QS Schaffhausen	CH		Nippon Kaiji Kyokai	JP
 	Underwriters Laboratories Inc. (UL) - UL approval for Canada -	CA		VTT Expert Services Oy	FI		Det Norske Veritas	NO
  	Underwriters Laboratories Inc. (UL) Combined logo - UL approval for the USA and Canada -	US CA		IBExU Institut für Sicherheitstechnik GmbH	DE		Polski Rejestr Statków	PL
	INSIEME PER LA QUALITA'E LA SICUREZZA	IT		TÜV Rheinland do Brasil	BR		Russian Maritime Register of Shipping	RU
	Gosudarstvennoe Komitet Standartov (GOST)	RU	 	Underwriters Laboratories Inc. (UL)	US		Korean Register of Shipping	KR
	DEKRA Certification B.V.	NL		TÜV Nord	DE		American Bureau of Shipping	US
	Österreichischer Verband für Elektrotechnik	AT		DEKRA EXAM GmbH	DE			
	South African Bureau of Standards	ZA						
	electrosuisse SEV Verband für Elektro-, Energie- und Informationstechnik	CH						
 	Verband Deutscher Elektrotechniker e.V. (VDE) - Approval of drawings - Reports with production monitoring	DE						
 	Berufsgenossenschaft (BG) GS - Geprüfte Sicherheit	DE						
	TÜV Rheinland Industrie Service GmbH	DE						

**EMC: Class A product:**

In accordance with statutory regulations, our products are indicated with this footnote if they are intended for use in industrial environments. This means that the permissible limit values for residential applications may be exceeded in the event of conducted and emitted interference. In such cases, the operator may have to take additional safety measures in order to ensure electromagnetic compatibility in residential applications.

**Note:**

Subject to changes that serve the purpose of technical progress.

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10.4" DISPLAY PROTECTIVE FOIL	2701376	127	AXL E EIP DIO16 M12 6P	2701494	260	CF FLASH 256MB	2988780	501	FL CAT5 HEAVY CONF/	2744827	417
12.1" DISPLAY PROTECTIVE FOIL	2701377	127	AXL E EIP IOL8 DI4 M12 6M	2701491	259	CF FLASH 256MB APPLIC A	2988793	501	FL CAT5 PATCH 0,3	2832250	418
15.1" DISPLAY PROTECTIVE FOIL	2701378	127	AXL E EIP IOL8 DI4 M12 6P	2701496	261	CF FLASH 256MB PDPI BASIC	2700549	501	FL CAT5 PATCH 0,5	2832263	418
2 GB USB STICK	2701382	124	AXL E ETH DI16 M12 6M	2701538	262	CF FLASH 256MB PDPI PRO	2700550	501	FL CAT5 PATCH 1,0	2832276	418
7" DISPLAY PROTECTIVE FOIL	2701374	126	AXL E ETH DI16 M12 6P	2701533	264	CF FLASH 2GB	2701185	501	FL CAT5 PATCH 1,5	2832221	418
9" DISPLAY PROTECTIVE FOIL	2701375	135	AXL E ETH DI8 DO8 M12 6M	2701540	263	CF FLASH 2GB APPLIC A	2701189	501	FL CAT5 PATCH 10,0	2832269	418
			AXL E ETH DI8 DO4 2A M12 6P	2701535	265	CLPIFF 35	3022218	489	FL CAT5 PATCH 2,0	2832289	418
			AXL E ETH DI8 DO8 M12 6M	2701537	263	CM-KBL-RS232/USB	2881078	421	FL CAT5 PATCH 3,0	2832292	418
			AXL E ETH DI8 DO8 M12 6P	2701532	265	CN-LAMBDA/4-5-9-BB	2838490	57	FL CAT5 PATCH 5,0	2832580	418
			AXL E ETH DIO16 M12 6M	2701539	262	CN-LAMBDA/4-5-9-SB	2800023	57	FL CAT5 PATCH 7,5	2832616	418
			AXL E ETH DIO16 M12 6P	2701534	264	CN-UB-280DC-BB	2818850	475	FL CAT5 TERMINAL BOX	2744610	416
			AXL E ETH IOL8 DI4 M12 6M	2701541	263	CN-UB-280DC-SB	2818148	475	FL CAT6 PATCH 0,3	2891181	418
			AXL E ETH IOL8 DI4 M12 6P	2701536	265	CONFIG+	2868059	509	FL CAT6 PATCH 0,5	2891288	418
			AXL E IOL AH1 I M12 R	2700275	278	CONFIG+ CPY	2868062	509	FL CAT6 PATCH 1,0	2891385	418
			AXL E IOL AH1 I M12 S	2700338	280	CONFIG+ DEMO	2868046	509	FL CAT6 PATCH 1,5	2891482	418
ANT-DIR-2459-01	2701186	55	AXL E IOL AH1 U M12 R	2700273	278	CSMA-LAMBDA/4-2,0-BS-SET	2800491	432	FL CAT6 PATCH 10	2891877	418
ANT-DIR-5900-01	2701348	55	AXL E IOL AH1 U M12 S	2700336	280				FL CAT6 PATCH 12,5	2891369	418
ANT-OMNI-2459-02	2701408	54	AXL E IOL AO1 I M12 R	2700282	279				FL CAT6 PATCH 15,0	2891372	418
ANT-OMNI-5900-01	2701347	55	AXL E IOL AO1 I M12 S	2700351	281				FL CAT6 PATCH 2,0	2891589	418
ASI CC ADR	2741338	312	AXL E IOL AO1 U M12 R	2700278	279				FL CAT6 PATCH 20,0	2891576	418
ASI CC ADR CAB CINCH	2741341	312	AXL E IOL AO1 U M12 S	2700350	280				FL CAT6 PATCH 3,0	2891686	418
ASI IO ME DI 4 AB	2741671	315	AXL E IOL RTD1 M12 R	2700305	279				FL CAT6 PATCH 5,0	2891783	418
ASI IO ME DIO 4/3 AB	2741668	315	AXL E IOL RTD1 M12 S	2700352	281				FL CAT6 PATCH 7,5	2891880	418
ASI IO ME DIO 4/4 AB	2773542	315	AXL E PB DI16 M12 6M	2701505	274	D-FB-PS	2316226	487	FL COMSERVER BASIC 232/422/485	2313478	411
ASI MA IL UNI	2736628	317	AXL E PB DI16 M12 6P	2701498	276	D-UT 2,5/10	3047028	489	FL COMSERVER PRO 232/422/485	2313465	412
ASI QUINT 100-240/2.4 EFD	2736686	318	AXL E PB DI8 DO4 2A M12 6M	2701507	275	DIAG+	2730307	511	FL COMSERVER UNI 232/422/485	2313452	411
ASI QUINT 100-240/4.8 EFD	2736699	318	AXL E PB DI8 DO4 2A M12 6P	2701502	277	DIAG+ CPY	2730404	511	FL COMSERVER WLAN 232/422/485	2313559	413
AX ODP SERVER 100FU	2700402	507	AXL E PB DI8 DO8 M12 6M	2701504	275	DIAG+ DEMO	2730734	511	FL COMSERVER-MPI-SET	2313588	411
AX ODP SERVER 10FU	2700393	507	AXL E PB DI8 DO8 M12 6P	2701497	277	DIAG+ NETSCAN	2868075	511	FL COUPLER SC-DUPLEX	2901788	405
AX ODP SERVER 150FU	2700403	507	AXL E PB DIO16 M12 6M	2701506	274	DIAG+ NETSCAN CPY	2868088	511	FL CRIMP TOOL	2744689	417
AX ODP SERVER 15FU	2700394	507	AXL E PB DIO16 M12 6P	2701499	276	DIAG+ NETSCAN DEMO	2868091	511	FL DUST CVR BK	2891107	62
AX ODP SERVER 200FU	2700404	507	AXL E PB IOL8 DI4 M12 6M	2701508	275	DL PPC15 1000	2701665	138	FL DUST CVR BN	2891301	62
AX ODP SERVER 20FU	2700396	507	AXL E PB IOL8 DI4 M12 6P	2701503	277	DL PPC15M 1000	2701666	139	FL DUST CVR BU	2891204	62
AX ODP SERVER 250FU	2700406	507	AXL E PN DI16 M12 6M	2701516	266	DT-LAN-CAT.6+	2881007	427	FL DUST CVR CN	2891602	62
AX ODP SERVER 25FU	2700397	507	AXL E PN DI16 M12 6P	2701510	268	DT-TELE-RJ45	2882925	433	FL DUST CVR GY	2891505	62
AX ODP SERVER 30FU	2700399	507	AXL E PN DI8 DO4 2A M12 6M	2701518	267				FL DUST CVR RD	2891709	62
AX ODP SERVER 50FU	2700400	507	AXL E PN DI8 DO4 2A M12 6P	2701512	269				FL DUST CVR VT	2891806	62
AX ODP SERVER 5FU	2700391	507	AXL E PN DI8 DO8 M12 6M	2701515	267				FL DUST CVR WH	2891903	62
AX ODP SERVER 75FU	2700401	507	AXL E PN DI8 DO8 M12 6P	2701509	269				FL DUST CVR YE	2891408	62
AX ODP SERVER 8FU	2700392	507	AXL E PN DIO16 M12 6M	2701517	266				FL EPA RMS	2701133	51
AX OPC SERVER	2985945	506	AXL E PN DIO16 M12 6P	2701511	268				FL EPA WMS	2701134	51
Ax+ BASIC	2985068	513	AXL E PN IOL8 DI4 M12 6M	2701519	267				FL FOC PN-B-980/1000	2313397	384
AXC 1050	2700988	536	AXL E PN IOL8 DI4 M12 6P	2701513	269				FL FOC PN-B-HCS-200/230	2313766	388
AXC 1050/XC	2701295	536	AXL E S3 DI16 M12 6M	2701549	270	E/ME TBUS NS35 GY	2713780	489	FL FOC PN-C-FLEX-980/1000	2313407	386
AXC 3050	2700989	537	AXL E S3 DI16 M12 6P	2701544	272	EB 84 IB ST BU	2836269	246	FL FOC PN-C-HCS-GI-200/230	2313410	390
AXL AI 8	2688064	158	AXL E S3 DI8 DO4 2A M12 6M	2701551	271	EB 84 IB ST RD	2836272	246	FL FXT	2989307	35
AXL AO 8	2688080	159	AXL E S3 DI8 DO4 2A M12 6P	2701546	273	EC AR CAB SW TOOL	2819545	240	FL HUB 16TX-ZF	2832564	39
AXL BK PB	2688530	152	AXL E S3 DI8 DO8 M12 6M	2701548	271	EL PPC12 1000	2701484	135	FL HUB 8TX-ZF	2832551	39
AXL BK PN	2688019	150	AXL E S3 DI8 DO8 M12 6P	2701542	273	EL PPC15 1000	2701485	135	FL IF 2FX SC-D	2832425	36
AXL BK S3	2688116	151	AXL E S3 DIO16 M12 6M	2701550	270	EL PPC7 1000	2701481	134	FL IF 2FX SC-F	2832412	36
AXL BS	2688129	155	AXL E S3 DIO16 M12 6P	2701545	272	EL PPC9 1000	2701482	135	FL IF 2FX SM SC-D	2832205	36
AXL BS BK	2701422	148	AXL E S3 IOL8 DI4 M12 6M	2701552	271				FL IF 2FX ST-D	2884033	36
AXL BS S	2700992	154	AXL E S3 IOL8 DI4 M12 6P	2701547	273				FL IF 2POF SCRJ-D	2891084	37
AXL CNT 2/INC 2	2688093	163	AXL F BK EC	2688899	148				FL IF 2PSE-F	2832904	36
AXL DI 16/1	2688310	154	AXL F BK ETH	2688459	149				FL IF 2TX VS-RJ-D	2832357	36
AXL DI 16/1 HS	2701722	154	AXL F RS UNI 1H	2688666	162				FL IF 2TX VS-RJ-F	2832344	36
AXL DI 16/4	2688022	155	AXL RTD 8	2688077	160				FL ISOLATOR 100-RJ/RJ	2313931	415
AXL DI 32/1	2688035	155	AXL SHIELD SET	2700518	158				FL ISOLATOR 100-RJ/JSC	2313928	415
AXL DI 64/1	2701450	155	AXL SSI 1/AO 1	2688433	164				FL ISOLATOR 100-M12	2902985	415
AXL DO 16/1	2688349	157	AXL UTH 8	2688417	161	FB-15-AL	2316187	483	FL ISOLATOR 1000-RJ/RJ	2313915	414
AXL DO 16/3	2688048	157				FB-15-SS	2316190	483	FL LCX 50-OHM	2884978	58
AXL DO 32/1	2688051	157				FB-2SP	2316051	485	FL LCX CABLE METER	2884774	58
AXL DO 8/2-2A	2688381	156				FB-8-AL	2316200	483	FL LCX CLAMP	2884994	58
AXL E EC DI16 M12 6M	2701526	254				FB-9-SS	2316213	483	FL LCX CON-N/F	2884965	58
AXL E EC DI16 M12 6P	2701521	256				FB-DIAG/FF/LI	2316284	488	FL LCX PIG-EF142-N-N	2700677	58
AXL E EC DI8 DO4 2A M12 6M	2701529	255				FB-DIAG/FF/NC	2316297	488	FL LCX TOOL	2884981	58
AXL E EC DI8 DO4 2A M12 6P	2701523	257				FB-ET	2316048	485	FL MC 10/100BASE-T/FO-660	2708193	408
AXL E EC DI8 DO8 M12 6M	2701525	255				FB-ISO	2316064	485	FL MC 2000E LC	2891056	409
AXL E EC DI8 DO8 M12 6P	2701520	257	BMKL 11,5 (108X16) WH	0821797	313	FB-M-BD-M20-EX	2901859	483	FL MC EF 1300 MM SC	2902853	407
AXL E EC DIO16 M12 6M	2701528	254	BMKL 64X16 WH	0821807	312	FB-M-BS-M20-EX	2900209	483	FL MC EF 1300 MM ST	2902854	407
AXL E EC DIO16 M12 6P	2701522	256				FB-M-KV-M20-EX	2900197	483	FL MC EF 1300 MM SC	2902856	407
AXL E EC IOL8 DI4 M12 6M	2701531	255				FB-PS-25/0.36A	2316035	487	FL MC EF WDM-A SC	2902658	406
AXL E EC IOL8 DI4 M12 6P	2701524	257				FB-PS-BASE/EX	2316145	487	FL MC EF WDM-B SC	2902659	406
AXL E EIP DI16 M12 6M	2701488	258				FB-PS-PLUG-24DC/28DC/0.5/EX	2316132	487	FL MC EF WDM-SET SC	2902660	406
AXL E EIP DI16 M12 6P	2701493	260				FL BT EPA	2692788	53	FL MC ETH/FO 660 T	2313164	33
AXL E EIP DI8 DO4 2A M12 6M	2701490	259	CAB-USB A/MICRO USB B/2,0M	2701626	536	FL BT EPA AIR SET	2693091	53	FL MEM PLUG	2891259	37
AXL E EIP DI8 DO4 2A M12 6P	2701495	261	CABLE- 9/8/250/RSM/LENZE	2981826	88	FL BT EPA MP	2701416	52	FL MEM PLUG/MRM	2891275	37
AXL E EIP DI8 DO8 M12 6M	2701487	259	CABLE-15/8/250/RSM/SIMO611D	2981606	88	FL CAT5 FLEX	2744830	417	FL MGuard DM 100	2700183	45
AXL E EIP DI8 DO8 M12 6P	2701492	261	CABLE-25/8/250/RSM/SIMO611D	2981583	88	FL CAT5 FLEX CONF/	2744843	417	FL MGuard DM DEVICE UPGRADE	2700223	45



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FL MGUARD LIC VPN-10	2700194	40	FL SM PATCH 1.0 LC-ST	2989242	401	FL SWITCH SFN 4TX/FX	2891851	9	FLM DIO 16/16 M12/8-DIAG	2736738	299
FL MGUARD LIC VPN-250	2700193	40	FL SM PATCH 1.0 SC-SC	2901829	401	FL SWITCH SFN 4TX/FX ST	2891453	9	FLM DIO 4/4 M12-2A	2736369	299
FL MGUARD LIC VPN-250 GROUP	2700192	40	FL SM PATCH 1.0 SC-ST	2901832	401	FL SWITCH SFN 5TX	2891152	8	FLM DIO 8/4 M8	2773351	303
FL MGUARD PCI4000	2701274	43	FL SM PATCH 1.0 ST-ST	2901836	401	FL SWITCH SFN 5TX-24VAC	2891021	9	FLM DIO 8/8 M12	2736848	299
FL MGUARD PCI4000 VPN	2701275	43	FL SM PATCH 5.0 LC-LC	2989284	400	FL SWITCH SFN 6GT/2LX	2891987	13	FLM DIO 4 M8-2A	2736932	303
FL MGUARD PROF SERVICE 2	2700185	45	FL SM PATCH 2.0 LC-SC	2989297	401	FL SWITCH SFN 6GT/2LX-20	2891563	13	FLM DO 8 M12	2736291	299
FL MGUARD RS2000 TX/TX VPN	2700642	41	FL SM PATCH 2.0 LC-ST	2989349	401	FL SWITCH SFN 6GT/2SX	2891398	13	FLM DO 8 M8	2736893	303
FL MGUARD RS4000 TX/TX	2700634	40	FL SM PATCH 2.0 SC-SC	2901830	401	FL SWITCH SFN 6TX/2FX	2891314	9	FLM IOL4 DI4 M12	2736990	300
FL MGUARD RS4000 TX/TX VPN	2200515	41	FL SM PATCH 2.0 SC-ST	2901833	401	FL SWITCH SFN 6TX/2FX ST	2891411	9	FLM MP 5	2736660	304
FL MGUARD SMART2	2700640	42	FL SM PATCH 2.0 ST-ST	2901837	401	FL SWITCH SFN 6TX/2FX-NF	2891024	9	FLM MP 7	2736673	304
FL MGUARD SMART2 VPN	2700639	42	FL SM PATCH 5.0 LC-LC	2901826	400	FL SWITCH SFN 7GT/SX	2891518	13	FLM TEMP 4 RTD M12	2736819	301
FL MM PATCH 1.0 LC-LC	2989158	400	FL SM PATCH 5.0 LC-SC	2901827	401	FL SWITCH SFN 7TX/FX	2891097	9	FLS CO M12 DI 16 M12	2736479	292
FL MM PATCH 1.0 LC-SC	2989161	401	FL SM PATCH 5.0 LC-ST	2901828	401	FL SWITCH SFN 7TX/FX ST	2891110	9	FLS CO M12 DI 8 M12	2736097	292
FL MM PATCH 1.0 LC-SCRJ	2901802	401	FL SM PATCH 5.0 SC-SC	2901831	401	FL SWITCH SFN 7TX/FX-NF	2891023	9	FLS CO M12 DIO 4/4 M12-2A	2736071	293
FL MM PATCH 1.0 LC-ST	2989174	401	FL SM PATCH 5.0 SC-ST	2901834	401	FL SWITCH SFN 8GT	2891673	12	FLS CO M12 DIO 8/8 M12	2736482	293
FL MM PATCH 1.0 SC-SC	2901805	401	FL SM PATCH 5.0 ST-ST	2901838	401	FL SWITCH SFN 8TX	2891929	8	FLS CO M12 DO 8 M12-2A	2736084	293
FL MM PATCH 1.0 SC-SCRJ	2901812	401	FL SM PATCH COUPLER LC-LC	2700313	405	FL SWITCH SFN 8TX-24VAC	2891020	9	FLS DN M12 DI 8 M12	2736027	290
FL MM PATCH 1.0 SC-ST	2901809	401	FL SNMP OPC AGENT V3	2701136	507	FL SWITCH SFN 8TX-NF	2891022	8	FLS DN M12 DI 8 M12	2736068	290
FL MM PATCH 1.0 SCRJ-SCRJ	2901823	401	FL SNMP OPC AGENT V3 LIC 100	2701135	507	FL SWITCH SFNB 4TX/FX	2891027	7	FLS DN M12 DIO 4/4 M12-2A	2736042	291
FL MM PATCH 1.0 ST-SCRJ	2901820	401	FL SNMP OPC SERVER V3	2701139	507	FL SWITCH SFNB 4TX/FX SM20	2891029	7	FLS DN M12 DIO 8/8 M12	2736398	291
FL MM PATCH 1.0 ST-ST	2901815	401	FL SNMP OPC SERVER V3 LIC 100	2701138	507	FL SWITCH SFNB 4TX/FX ST	2891028	7	FLS DN M12 DO 8 M12-2A	2736055	291
FL MM PATCH 2.0 LC-LC	2989255	400	FL SWITCH 1001T-4POE	2891064	39	FL SWITCH SFNB 5TX	2891001	6	FLS IB M12 DI 16 M12	2736314	284
FL MM PATCH 2.0 LC-SC	2989268	400	FL SWITCH 1008E	2891065	18	FL SWITCH SFNB 8TX	2891002	7	FLS IB M12 DI 8 M12	2736013	284
FL MM PATCH 2.0 LC-SCRJ	2901803	401	FL SWITCH 1605 M12	2700200	38	FL SWITCH SFNT 14TX/2FX	2891954	11	FLS IB M12 DIO 4/4 M12-2A	2736026	285
FL MM PATCH 2.0 LC-ST	2989271	401	FL SWITCH 1824	2891041	19	FL SWITCH SFNT 15TX/FX	2891953	11	FLS IB M12 DIO 8/8 M12	2736385	285
FL MM PATCH 2.0 SC-SC	2901807	401	FL SWITCH 1924	2891057	19	FL SWITCH SFNT 16TX	2891952	10	FLS IB M12 DO 8 M12-2A	2736039	285
FL MM PATCH 2.0 SC-SCRJ	2901813	401	FL SWITCH 3004T-FX	2891033	21	FL SWITCH SFNT 4TX/FX	2891004	15	FLS PB M12 DI 16 M12	2736110	287
FL MM PATCH 2.0 SC-ST	2901810	401	FL SWITCH 3004T-FX ST	2891034	21	FL SWITCH SFNT 4TX/FX-C	2891044	15	FLS PB M12 DI 8 M12	2736123	286
FL MM PATCH 2.0 SCRJ-SCRJ	2901824	401	FL SWITCH 3005	2891030	20	FL SWITCH SFNT 5TX	2891003	14	FLS PB M12 DIO 4/4 M12-2A	2736107	287
FL MM PATCH 2.0 ST-SCRJ	2901821	401	FL SWITCH 3005T	2891032	20	FL SWITCH SFNT 5TX-C	2891043	14	FLS PB M12 DIO 8/8 M12	2736372	287
FL MM PATCH 2.0 ST-ST	2901816	401	FL SWITCH 3006T-2FX	2891036	21	FL SWITCH SFNT 6TX/2FX	2891025	15	FLS PB M12 DO 8 M12-2A	2736110	287
FL MM PATCH 5.0 LC-LC	2901799	400	FL SWITCH 3006T-2FX SM	2891060	21	FL SWITCH SFNT 6TX/2FX ST	2891026	15	FLS PB M12 IOL 4 M12	2736987	288
FL MM PATCH 5.0 LC-SC	2901800	401	FL SWITCH 3006T-2FX ST	2891037	21	FL SWITCH SFNT 6TX/2FX ST-C	2891049	15	FLS PB M12 IOL 8 DI 4 M12-B	2773380	289
FL MM PATCH 5.0 LC-SCRJ	2901804	401	FL SWITCH 3008	2891031	20	FL SWITCH SFNT 6TX/2FX-C	2891048	15	FLX ASI 3.0 DIO 4/4 M12-2A	2773474	313
FL MM PATCH 5.0 LC-ST	2901801	401	FL SWITCH 3008T	2891035	20	FL SWITCH SFNT 7TX/FX	2891006	15	FLX ASI 3.0 DI 4 M12	2773429	312
FL MM PATCH 5.0 SC-SC	2901808	401	FL SWITCH 3016	2891058	20	FL SWITCH SFNT 7TX/FX ST	2891007	15	FLX ASI DI 4 M8	2773403	314
FL MM PATCH 5.0 SC-SCRJ	2901814	401	FL SWITCH 3016T	2891059	20	FL SWITCH SFNT 7TX/FX ST-C	2891047	15	FLX ASI DIO 2/2 M12-2A	2773432	313
FL MM PATCH 5.0 SC-ST	2901811	401	FL SWITCH 4008T-2GT-4FX SM	2891061	23	FL SWITCH SFNT 7TX/FX-C	2891046	15	FLX ASI DIO 4/3 M12-2A	2773445	313
FL MM PATCH 5.0 SCRJ-SCRJ	2901825	401	FL SWITCH 4008T-2SFP	2891062	22	FL SWITCH SFNT 8TX	2891005	14	FLX ASI DIO 4/4 M8-1A	2773416	314
FL MM PATCH 5.0 ST-SCRJ	2901822	401	FL SWITCH 4012T-2GT-2FX	2891063	23	FL SWITCH SFNT 8TX-C	2891045	14	FLX ASI DO 4 M12-2A	2773458	312
FL MM PATCH 5.0 ST-ST	2901817	401	FL SWITCH GHS 12G/8	2989200	35	FL SWITCH SMCS 14TX/2FX	2700997	29	FLX ASI MA 2 PB EF	2773607	316
FL MM PATCH COUPLER LC-LC	2700312	405	FL SWITCH GHS 12G/8-L3	2700787	35	FL SWITCH SMCS 14TX/2FX-SM	2701466	29	FLX ASI MA PB SF	2773597	316
FL NAT SMN 8TX	2989365	32	FL SWITCH GHS 4G/12	2700271	34	FL SWITCH SMCS 16TX	2700996	29	FMC 1.5/ 4-STF-3.81 BD:PE-24V	1701307	140
FL NP PND-4TX IB	2985974	60	FL SWITCH GHS 4G/12-L3	2700786	34	FL SWITCH SMCS 6GT/2SFP	2891479	29	FOC-GDM-RUGGED-1016/...	1402193	397
FL NP PND-4TX IB-LK	2985929	61	FL SWITCH IRT 2TX 2POF	2700691	31	FL SWITCH SMCS 6TX/2SFP	2989323	29	FOC-GDM-RUGGED-1016/IP20/...	2901558	396
FL NP PND-4TX PB	2985071	61	FL SWITCH IRT 4TX	2700689	30	FL SWITCH SMCS 8GT	2891123	28	FOC-GDO-1017/IP20/...	2901559	398
FL PA SFNT 5-8	2891012	14	FL SWITCH IRT IP TX/3POF	2700697	31	FL SWITCH SMCS 8TX	2989226	28	FOC-HCS-RUGGED-1014/...	1402191	393
FL PATCH CCODE BK	2891194	63	FL SWITCH IRT TX 3POF	2700692	31	FL SWITCH SMN 6TX/2POF-PN	2700290	33	FOC-HCS-RUGGED-1014/IP20/...	2901555	392
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						PSI-MOS-CNET/FO 850 E	2313711	367	PSM-STRIP-KNIFEBLOCK	2744636	439	
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						PSI-MOS-DNET CAN/FO 850/BM	2708083	369	PSR-OP-UNIT	2902578	87	
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						PSI-MOS-DNET/FO 850 E	2313999	369	PSR-SACB-4/4-L-10,0PUR-SD	2981884	85	
						PSI-MOS-DNET/FO 850 T	2313986	369	PSR-SAFECONF-BOX-DE	2986151	101	
						PSI-MOS-PROFIB/FO 660 E	2708290	365	PSR-SAFECONF-BOX-EN	2986164	101	
						PSI-MOS-PROFIB/FO 660 T	2708287	365	PSR-SCF- 24UC/URM/2X21	2981363	99	
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						PSI-MOS-PROFIB/FO1300 E	2708559	365	PSR-SCF-120UC/URM/4X1/2X2	2981460	99	
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PSR-SPF-24UC/URM/4X1/2X2	2981457	99	RAD-ADP-SMA/F-SMA/F	2884541	464	RAD-ISM-900-SET-UD-ANT-NZ	2885029	466	SAC-4P-M 8MR/5,0-950	1550863	308
PSR-SPF-120UC/URM4/5X1/2X2	2981473	99	RAD-ADP-SMA/F-SMA/M-90	2917324	464	RAD-MEMORY	2902828	451	SAC-4P-M 8MR/5,0-950/M 8FR	1551008	308
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PSR-SPP-24DC/ESD/5X1/1X2/T30	2981350	74	RAD-CAB-EF393-3M	2867649	56	RAD-PIG-EF316-N	2867704	465	SAC-4P-M 8MS/0,3-950/M 8FS	1543511	308
PSR-SPP-24DC/ESD/5X1/1X2/OT 5	2981130	74	RAD-CAB-EF393-5M	2867652	56	RAD-PIG-EF316-N-RSMA	2701402	57	SAC-4P-M 8MS/0,5-950/M 8FS	1543524	308
PSR-SPP-24DC/ESD/5X1/1X2/300	2981431	73	RAD-CAB-EF393-10M	2867665	56	RAD-PIG-EF316-N-SMA	2867694	465	SAC-4P-M 8MS/1,0-950/M 8FS	1543537	308
PSR-SPP-24DC/ESP4/2X1/1X2	2981017	94	RAD-CAB-EF393-15M	2885634	56	RAD-PIG-EF316-SMA-SMA	2885618	465	SAC-4P-M 8MS/2,0-950	1543249	308
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PSR-SPP-24DC/FSP/1X1/1X2	2981981	91	RAD-CAB-LMR400-60	2867380	477	RAD-PIG-RSMA/N-1	2903264	57	SAC-4P-M 8MS/5,0-950	1543252	308
PSR-SPP-24DC/FSP/2X1/1X2	2986957	92	RAD-CAB-LMR400-80	2867393	477	RAD-PIG-RSMA/N-2	2903265	57	SAC-4P-M 8MS/5,0-950/M 8FS	1543362	308
PSR-SPP-24DC/FSP/2X1/1X2	2986588	92	RAD-CAB-LMR600-150	2885184	477	RAD-PIG-RSMA/N-3	2903266	57	SAC-4P-M 8MS/10,0-950	1543265	308
PSR-SPP-24DC/MSTO/4X1	2902787	87	RAD-CAB-LMR900-200	2885197	477	RAD-PT100-4-IFS	2904035	454	SAC-4P-M 8MS/10,0-950/M 8FS	1543375	308
PSR-SPP-24DC/MSTO/D/4X1	2902364	87	RAD-CAB-RG213-25	2867597	477	RAD-TAPE-SV-19-3	2903182	59	SAC-4P-M 8MS/20,0-950	1543281	308
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PSR-SPP-24DC/URD3/4X1/2X2/3	2981745	81	RAD-CON-MCX-RPSMA-EX	2885621	476	RFC DUAL-FAN	2730239	113	SAC-4P-M12MSD/15,0-933	1524336	306
PSR-SPP-24DC/URD3/4X1/2X2/T 2	2981729	82	RAD-CON-MCX90-N-SS	2885207	476	RL PN 24-2 DI 16 2TX	2773665	325	SAC-4P-M12MSD/15,0-933/M12MSD	1524404	306
PSR-SPP-24DC/URM4/4X1/2X2/B	2981680	81	RAD-CON-SMA-N-SS	2867403	476	RL PN 24-2 DIO 16/8 2TX	2773652	325	SAC-4P-M12Y/2X0,3-PUR/M12FS VP	1510722	305
PSR-SPP-24UC/ESA2/4X1/1X2/B	2963954	69	RAD-CONF-RF3	2902814	451	RL PN 24-2 DIO 8/8 2SCRJ	2773513	325	SAC-4P-MS/0,3-186/FS SCO	1555680	307
PSR-SPP-24UC/ESAM4/2X1/1X2	2900526	70	RAD-CONF-RF5	2902815	451	RL PN 24-2 OC 2SCRJ	2700654	324	SAC-4P-MS/0,5-186/FS SCO	1555693	307
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PSR-SPP-24UC/ESAM4/8X1/1X2	2963996	72	RAD-DAIO6-IFS	2901533	452				SAC-4P-MS/2,0-186 SCO	1555606	307
PSR-SPP-24UC/ESL4/3X1/1X2/B	2981062	75	RAD-DI4-IFS	2901535	452				SAC-4P-MS/2,0-186/FS SCO	1555716	307
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PSR-SPP-24UC/URM/3X1/3X2	2981842	98	RAD-DO8-IFS	2902811	453				SAC-4P-MS/5,0-186/FS SCO	1555729	307
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SAC-5P-MS/1,0-920/FS SCO	1518274	306	SUBCON-PLUS-PROFIB/90/DC	2313672	441	VS-ASI-FC-EPDM-BK 1000M	1434659	319	VS-ASI-FC-EPDM-BK 1000M	1434659	319
SAC-5P-MS/2,0-186 SCO	1518326	307	SUBCON-PLUS-PROFIB/90/PG/DC	2313685	441	VS-ASI-FC-EPDM-BK 100M	1432415	319	VS-ASI-FC-EPDM-BK 100M	1432415	319
SAC-5P-MS/2,0-186/FS SCO	1518436	307	SUBCON-PLUS-PROFIB/90/PG/SC	2313708	441	VS-ASI-FC-EPDM-YE 1000M	1434646	319	VS-ASI-FC-EPDM-YE 1000M	1434646	319
SAC-5P-MS/2,0-920 SCO	1518177	306	SUBCON-PLUS-PROFIB/90/SC	2313698	441	VS-ASI-FC-EPDM-YE 100M	1432402	319	VS-ASI-FC-EPDM-YE 100M	1432402	319
SAC-5P-MS/2,0-920/FS SCO	1518287	306	SUBCON-PLUS-PROFIB/AX/SC	2744380	441	VS-ASI-FC-PUR-BK 100M	1404896	319	VS-ASI-FC-PUR-BK 100M	1404896	319
SAC-5P-MS/5,0-186 SCO	1518339	307	SUBCON-PLUS-PROFIB/PG/SC2	2708245	440	VS-ASI-FC-PUR-BK/1000	1404854	319	VS-ASI-FC-PUR-BK/1000	1404854	319
SAC-5P-MS/5,0-186/FS SCO	1518449	307	SUBCON-PLUS-PROFIB/SC2	2708232	440	VS-ASI-FC-PUR-YE 100M	1404883	319	VS-ASI-FC-PUR-YE 100M	1404883	319
SAC-5P-MS/5,0-920 SCO	1518180	306	SUBCON-SHORT-SCREW	2799694	444	VS-ASI-FC-PUR-YE/1000	1404841	319	VS-ASI-FC-PUR-YE/1000	1404841	319
SAC-5P-MS/5,0-920/FS SCO	1518290	306	SZF 0-0,4X2,5	1204504	440	VS-ASI-FC-PVC-UL-BK 100M	1404919	319	VS-ASI-FC-PVC-UL-BK 100M	1404919	319
SAC-5P-MS/10,0-186 SCO	1518342	307	SZK PH1 VDE	1205150	440	VS-ASI-FC-PVC-UL-BK/1000	1404870	319	VS-ASI-FC-PVC-UL-BK/1000	1404870	319
SAC-5P-MS/10,0-186/FS SCO	1518452	307	SZS 0,4X2,5 VDE	1205037	442	VS-ASI-FC-PVC-UL-YE 100M	1404906	319	VS-ASI-FC-PVC-UL-YE 100M	1404906	319
SAC-5P-MS/10,0-920 SCO	1518193	306				VS-ASI-FC-PVC-UL-YE/1000	1404867	319	VS-ASI-FC-PVC-UL-YE/1000	1404867	319
SAC-5P-MS/10,0-920/FS SCO	1518300	306				VS-ASI-FC-TPE-UL-BK 1000M	1434675	319	VS-ASI-FC-TPE-UL-BK 1000M	1434675	319
SAC-5P-MS/15,0-186 SCO	1518355	307				VS-ASI-FC-TPE-UL-BK 100M	1404935	319	VS-ASI-FC-TPE-UL-BK 100M	1404935	319
SAC-5P-MS/15,0-186/FS SCO	1518465	307				VS-ASI-FC-TPE-UL-YE 1000M	1434662	319	VS-ASI-FC-TPE-UL-YE 1000M	1434662	319
SAC-5P-MS/15,0-920 SCO	1518203	306	<b>T</b>			VS-ASI-FC-TPE-UL-YE 100M	1404922	319	VS-ASI-FC-TPE-UL-YE 100M	1404922	319
SAC-5P-MS/15,0-920/FS SCO	1518313	306	TC DSL ROUTER X400 A/B	2902709	427	VS-ASI-J-Y-B-FFKDS	1404498	320	VS-ASI-J-Y-B-FFKDS	1404498	320
SAC-5P-MSB/0,3-900/FSB SCO	1517958	306	TC DSL ROUTER X500 A/B	2902710	427	VS-ASI-J-Y-B-M12FS	1404427	321	VS-ASI-J-Y-B-M12FS	1404427	321
SAC-5P-MSB/0,5-900/FSB SCO	1517961	306	TC DSL ROUTER X500 A/B	2902710	427	VS-ASI-J-Y-N-PUR-1,0-M12FR SCO	1404469	320	VS-ASI-J-Y-N-PUR-1,0-M12FR SCO	1404469	320
SAC-5P-MSB/1,0-900/FSB SCO	1517974	306	TC MGUARD RS2000 3G VPN	2903441	425	VS-ASI-J-Y-B-PUR-1,0-M12FS SCO	1404456	320	VS-ASI-J-Y-B-PUR-1,0-M12FS SCO	1404456	320
SAC-5P-MSB/2,0-900 SCO	1517877	306	TC MGUARD RS4000 3G VPN	2903440	425	VS-ASI-J-Y-B-PUR-2,0-M12FR SCO	1404485	320	VS-ASI-J-Y-B-PUR-2,0-M12FR SCO	1404485	320
SAC-5P-MSB/2,0-900/FSB SCO	1517987	306	TC-2D37SUB-DO16-ESD-AR-UNI	2902913	96	VS-ASI-J-Y-B-PUR-2,0-M12FS SCO	1404472	320	VS-ASI-J-Y-B-PUR-2,0-M12FS SCO	1404472	320
SAC-5P-MSB/5,0-900 SCO	1517880	306	TC-2D37SUB-DO16-F&G-AR-UNI	2902914	96	VS-ASI-J-Y-N-M12FS	1404414	321	VS-ASI-J-Y-N-M12FS	1404414	321
SAC-5P-MSB/5,0-900/FSB SCO	1517990	306	TC-C-PSR3-SC-A10000A20000	2903389	96	VS-ASI-J-Y-N-M12FS-LC	1433155	321	VS-ASI-J-Y-N-M12FS-LC	1433155	321
SAC-5P-MSB/0,13-PUR/FSB SCO SH	1518478	307	TC-C-PSR3-SC-A10000A23132	2903390	96	VS-ASI-J-Y-N-PUR-1,0-M12FS SCO	1404430	320	VS-ASI-J-Y-N-PUR-1,0-M12FS SCO	1404430	320
SAC-5P-MSB/10,0-900 SCO	1517893	306	TC-C-PSR3-SC-A1000V+A20000	2903391	96	VS-ASI-J-Y-N-PUR-2,0-M12FS SCO	1404443	320	VS-ASI-J-Y-N-PUR-2,0-M12FS SCO	1404443	320
SAC-5P-MSB/10,0-900/FSB SCO	1518009	306	TC-C-PTSM-50-0000000J1J1	2903388	96	VS-ASI-J-Y-N-SWA-LC	1433168	321	VS-ASI-J-Y-N-SWA-LC	1433168	321
SAC-5P-MSB/15,0-900 SCO	1517903	306	TD 1030T	2701257	120	VS-ASI-J-Y-Y-N	1404508	320	VS-ASI-J-Y-Y-N	1404508	320
SAC-5P-MSB/15,0-900/FSB SCO	1518012	306	TOUCH PEN	2701379	124	VS-M12MS-IP20-93E-LI/2,0	1406056	415	VS-M12MS-IP20-93E-LI/2,0	1406056	415
SAC-M12T/2XM12 PBPD	1458884	305	TP 07T/M 201	2913234	126	VS-PPC-C1-RJ45-MNNA-PG9-4Q5-B	1405141	325	VS-PPC-C1-RJ45-MNNA-PG9-4Q5-B	1405141	325
SACC-FS-4QO-0,34-M SCO	1521588	309	TP 10T/M 201	2913247	127	VS-PPC-C1-SCRJ-MNNA-PG9-A4D-C 1608032	1608032	324	VS-PPC-C1-SCRJ-MNNA-PG9-A4D-C 1608032	1608032	324
SACC-FS-4QO-0,75-M SCO	1521601	309	TP 12T/M 201	2913250	127	VS-PPC-C2-MSTB-MNNA-P13-A5-SP	1608074	324	VS-PPC-C2-MSTB-MNNA-P13-A5-SP	1608074	324
SACC-M 8FS-4CON-M-0,34-SH	1542910	309	TP 15T/M 201	2913263	127	VS-SCRJ-GOF-BU/BU	1652978	405	VS-SCRJ-GOF-BU/BU	1652978	405
SACC-M 8FS-4PCON	1506781	309	TP 3057M	2700901	122	VS-SCRJ-POF-POLISH	1656673	402	VS-SCRJ-POF-POLISH	1656673	402
SACC-M 8MS-3PCON	1506752	309	TP 3057M CO	2700904	122						
SACC-M 8MS-4CON-M-0,34-SH	1542897	309	TP 3057M MPI	2700903	122						
SACC-M12FS-5SC M	1508200	309	TP 3057M PB	2700902	122						
SACC-M12FS-5SC SH	1512571	309	TP 3057M SER	2700905	122						
SACC-M12FSB-5SC SH	1513596	309	TP 3057T	2700906	122						
SACC-M12MS-4QO-0,75	1641769	332	TP 3057T CO	2700909	122						
SACC-M12MS-5SC M	1508187	309	TP 3057T MPI	2700908	122						
SACC-M12MS-5SC SH	1512555	309	TP 3057T PB	2700907	122						
SACC-M12MSB-5SC SH	1513570	309	TP 3057T SER	2700910	122						
SACC-M12MSD-4Q SH	1543223	309	TP 3070T	2700911	123						
SACC-MS-4QO-0,34-M SCO	1521575	309	TP 3070T CO	2700914	123						
SACC-MS-4QO-0,75-M SCO	1521591	309	TP 3070T MPI	2700913	123						
SAFECONIF	2986119	110	TP 3070T PB	2700912	123						
SAFETYPROG ADVANCED	2700441	111	TP 3070T SER	2700915	123						
SAFETYPROG BASIC	2700443	111	TP 3105T	2700916	123						
SAFETYPROG PROFESSIONAL	2700442	111	TP 3105T CO	2700919	123						
SD FLASH 256MB	2988120	425	TP 3105T MPI	2700918	123						
SD FLASH 2GB	2988162	501	TP 3105T PB	2700917	123						
SD FLASH 2GB APPLIC A	2701190	501	TP 3105T SER	2700920	123						
SD FLASH 512MB	2988146	501	TP 3121T	2700921	123						
SD FLASH 512MB APPLIC A	2701799	501	TP 3121T CO	2700924	123						
SD FLASH 512MB PDPI BASIC	2701800	501	TP 3121T MPI	2700923	123						
SD FLASH 512MB PDPI PRO	2701801	501	TP 3121T PB	2700922	123						
SRC-RS485 EVC	2897237	225	TP 3121T SER	2700925	123						
STARTUP+	2700636	512	TP 5120C	2701719	124						
SUBCON 9/F-SH	2761499	445	TP 5120T	2700621	124						
SUBCON 9/M-SH	2761509	445	TP 5150C	2701720	125						
SUBCON 15/F-SH	2761596	445	TP 5150T	2700622	125						
SUBCON 15/M-SH	2761606	445	TP 5170C	2701721	125						
SUBCON 25/F-SH	2761619	445	TP 5170T	2700623	125						
SUBCON 25/M-SH	2761622	445	TPC 6013	2700740	142						
SUBCON-PLUS 9/F	2744241	444	TPC 6013 CABLE ODU TO RS232	2700619	143						
SUBCON-PLUS 9/M	2744018	444	TPC 6013 HAND STRAP	2700613	142						
SUBCON-PLUS F1	2744267	444	TPC 6013 MECHANICAL DOCKING	2700615	142						
SUBCON-PLUS F2	2799490	444	TPC 6013 P	2700611	143						
SUBCON-PLUS F5	2744102	444	TPC 6013 S W7E	2701316	143						
SUBCON-PLUS M1	2761826	444	TPC 6013 SPARE RECHARGEABLE BA2700744	2700613	142						
SUBCON-PLUS M2	2761839	444	TPC 6013 THREE-POINT BELT	2700614	142						
SUBCON-PLUS-CAN	2744694	443	TPC 6013 TOUCH PENS	2700616	142						
SUBCON-PLUS-CAN/AX	2306566	443									
SUBCON-PLUS-CAN/PG	2708119	442									
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SUBCON-PLUS-F/AX 9	2311797	444									
UC-TM 16	0819217	489									
UC-TMF 16	0819262	489									
UT 2,5	3044076	489									
VALUELINE IPC	2913108	130									
VISU+ 2	2988544	505									
VISU+ 2 RT 1024	2988641	505									
VISU+ 2 RT 128	2988586	505									
VISU+ 2 RT 2048	2988528	505									
VISU+ 2 RT 2048 NETWORKING	2701143	505									
VISU+ 2 RT 256	2988609	505									
VISU+ 2 RT 4096	2988531	505									
VISU+ 2 RT 512	2988612	505									
VISU+ 2 RT 64	2988683	505									
VISU+ 2 RT 8192	2988557	505									
VISU+ 2 RT UNLIMITED	2988654	505									
VISU+ 2 RT-D 1024	2988735	505									
VISU+ 2 RT-D 128	2988696	505									
VISU+ 2 RT-D 2048	2988764	505									
VISU+ 2 RT-D 256	2988719	505									
VISU+ 2 RT-D 4096	2988913	505									
VISU+ 2 RT-D 512	2988722	505									
VISU+ 2 RT-D 64	2988751	505									
VISU+ 2 RT-D 8192	2988573	505									
VISU+ 2 RT-D UNLIMITED	2988748	505									
VISU+2 RT-D 2048 NETWORK	2701670	505									
VL 1 GB CF	2913155	128									





Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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