

# Process Control Equipment for Hazardous Locations



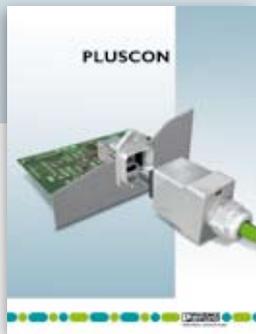
# Process Control Equipment for use in Hazardous Locations



## Process Control Equipment for use in Hazardous Locations

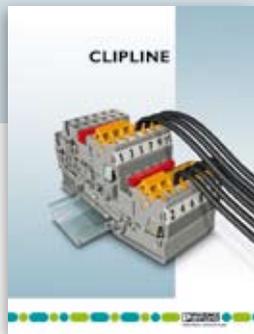
The range of products highlighted in this catalog are approved by UL for use in hazardous locations categorized as Class I, Division 2, Groups A, B, C, D.

Additional approval information can be found at [www.PhoenixContact.com](http://www.PhoenixContact.com) or contact your local sales office.



### PLUSCON

The PLUSCON catalog documents industrial connectors for data, signal and power cables, as well as for fiber optics. The complete offer for the sensor/ actuator cabling makes this catalog a standard for field wiring.



### CLIPLINE

From the modular terminal block to the assembly material and tools and through to the complete PC-aided project planning and marking system, the CLIPLINE catalog has everything that you need for perfect control cabinet wiring.



### TRABTECH

With professional surge protection structured according to surge protection for power supply units, data interfaces and MCR applications, Phoenix Contact provides one of the most comprehensive programs on the market.



### INTERFACE

With interface modules for binary, serial and analog signals, power supply units, PLC system cabling and electronic load relays, the INTERFACE catalog provides all components around the industrial control.



### AUTOMATION

From the serial sensor/ actuator box, through to PC-based control technology, right down to visualization software, the AUTOMATION catalog provides the latest automation components and systems from Phoenix Contact.

# Table of contents

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<b>TRABTECH</b> The comprehensive surge protection concept	<b>2</b>
<b>AUTOMATION</b> High-quality components for control and monitoring	<b>14</b>
<b>INTERFACE</b> Signal conditioning for the control system	<b>56</b>
<b>Index</b>	<b>146</b>

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## Surge protection for the power supply

MAINS-PLUGTRAB 4

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## Surge protection for measuring and control technology

MCR-PLUGTRAB 6  
MCR-PLUGTRAB PT  
TERMITRAB  
DATA-PLUGTRAB  
SURGETRAB

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Capturing and safely controlling transients can be a difficult task, and is all the more important when operating in a hazardous location.

The TRABTECH combination of high-quality protective devices and innovative arrester technology ensures a high degree of system availability and safety in all areas of electrical engineering.

### Device protection MAINS-PLUGTRAB

MAINS-PLUGTRAB are designed in two parts, consisting of a base element and a plug. These arresters are the practical solution of the third protection stage for single and multiple phase power supply units in distribution boxes and control cabinets.



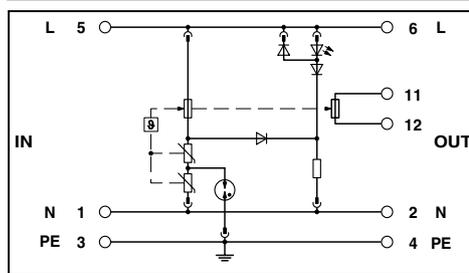
### PT 2-PE/S...ST

Replacement plug with surge protection for single-phase power supply



Total width 17.7

Ex: us



Description	Voltage $U_N$	Type	Order No.	Pcs. Pkt.
<b>MAINS-PLUGTRAB plug</b>				
	24 V AC	<b>PT 2-PE/S- 24AC-ST</b>	<b>2839318</b>	10
	60 V AC	<b>PT 2-PE/S- 60AC-ST</b>	<b>2839321</b>	10
	120 V AC	<b>PT 2-PE/S-120AC-ST</b>	<b>2839334</b>	10
<b>MAINS-PLUGTRAB base element, with universal foot for mounting on </b>		<b>PT-BE/FM</b>	<b>2839282</b>	10
<b>Technical data</b>		PT 2-PE/S-24AC-ST	PT 2-PE/S-60AC-ST	PT 2-PE/S-120AC-ST
IEC category / EN type		III / T3	III / T3	III / T3
Nominal voltage $U_N$		24 V AC	60 V AC	120 V AC
Highest continuous voltage $U_C$	AC/DC	34 V AC / 44 V DC	100 V AC / 95 V DC	150 V AC / 130 V DC
Nominal load current $I_L$		26 A (30°C)	26 A (30°C)	26 A (30°C)
Nominal discharge surge current $I_n$ (8/20) $\mu$ s		1 kA	2.5 kA	2.5 kA
Max. discharge surge current $I_{max}$ (8/20) $\mu$ s		2 kA	6.5 kA	10 kA
Combined surge $U_{OC}$		2 kV	4 kV	6 kV
Residual voltage at 5 kA		-	-	-
Protection level $U_p$	L-N/L(N)-PE	$\leq 180$ V / $\leq 550$ V	$\leq 400$ V / $\leq 700$ V	$\leq 620$ V / $\leq 850$ V
Response time $t_A$	L-N/L(N)-PE	$\leq 25$ ns / $\leq 100$ ns	$\leq 25$ ns / $\leq 100$ ns	$\leq 25$ ns / $\leq 100$ ns
Backup fuse max. in acc. with IEC		25 A (gL)		
Temperature range		-40 °C ... 85 °C		
Degree of protection in acc. with IEC 60529/ EN 60529		IP20		
Insulation housing		PA 6.6		
Inflammability class in acc. with UL 94		V0		
Test standards		IEC 61643-1 / EN 61643-11 / UL 1449		
Remote indication contact		N/C contact		
Max. operating voltage		250 V AC		
Max. operating current (inductive)		3 A AC		

**Pluggable surge protection cascade for EEx ia circuits MCR-PLUGTRAB**

PT...EX(I)... are surge arresters which are adapted to the special conditions in intrinsically safe circuits. They are designed in two parts, consisting of a base element and a plug. The plug is available for two types of circuits.

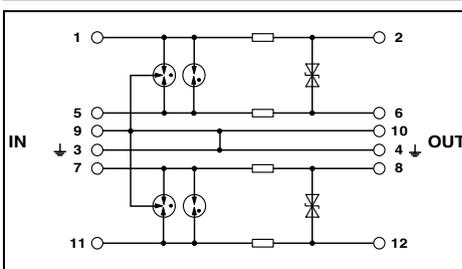
PT 2xEX(I)- 24DC for the protection of two mutually independent intrinsically safe circuits.



**PT 2xEX(I)**

Double conductor protection for two intrinsically safe circuits

Total width 17.7 Ex:



Description	Voltage U <sub>N</sub>	Type	Order No.	Pcs. Pkt.
<b>PLUGTRAB plug</b> , with protection circuit for plugging into base element PT	24 V DC	<b>PT 2XEX(I)-24DC-ST</b>	<b>2838225</b>	10
<b>PLUGTRAB base element</b> , for mounting on		<b>PT 2XEX(I)-BE</b>	<b>2839279</b>	10
<b>Shield fast connection</b> For Ø 3-6 mm For Ø 5-10 mm		<b>SSA 3-6</b> <b>SSA 5-10</b>	<b>2839295</b> <b>2839512</b>	10 10
<b>Zack marker strip</b> , 10-section, white		<b>refer to catalog CLIPLINE 2007</b>		
<b>Technical data</b>				
IEC category / EN type		C1 / C2 / C3 / D1		
Highest continuous voltage U <sub>C</sub>	DC/AC	30 V DC / 21 V AC		
Lightning test curr. I <sub>imp</sub> (10/350)µs	Per path	2.5 kA		
Nominal current I <sub>N</sub>		450 mA		
Nominal discharge surge current I <sub>n</sub> (8/20) µs	Core-Core	10 kA		
	Core-ground	10 kA		
Total surge current (8/20)µs		20 kA		
Output voltage limitation at 1 kV/µs	Core-Core / Core-Ground	≤ 45 V / ≤ 1 kV		
Residual voltage at I <sub>n</sub>	Core-Core / Core-Ground	≤ 45 V / -		
Response time t <sub>A</sub>	Core-Core	≤ 1 ns		
	Core-ground	≤ 100 ns		
Input attenuation a <sub>i</sub>	Symmetrical in the 50 Ω system	0.5 dB (< 900 kHz)		
Cut-off frequency f <sub>g</sub> (3dB)	Symmetrical in the 50 Ω system	Typ. 4.5 MHz		
Resistance per path		2.2 Ω		
Temperature range		-40 °C ... 85 °C		
Degree of protection in acc. with IEC 60529/ EN 60529		IP20		
Inflammability class in acc. with UL 94		V0		
Test standards		IEC 61643-21 / EN 50020 / UL 497B /		
<b>Safety data</b>				
Effective inner inductance L <sub>i</sub>		≤ 1 µH		
Effective inner capacitance C <sub>i</sub>		≤ 1.3 nF		
Max. permissible power P <sub>r</sub>		≤ 3 W		

### Pluggable surge protection cascade MCR-PLUGTRAB PT

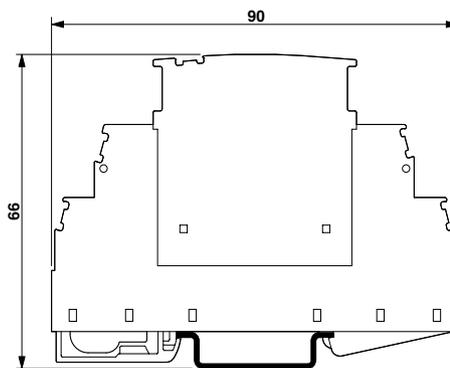
**PLUGTRAB PT...** is the practical solution for the requirements of the market. The two-piece construction provides the user with the utmost convenience when it comes to maintenance. The base element always remains an integral part of the installation. There is no need for complex operations during overhaul work, for example. Whether two, three or four-conductor measurement technology, PLUGTRAB PT offers the perfect solution for all applications. When dealing with cable shields, either direct or indirect connection to local ground is possible, depending on the choice of base element.

**PT 2x2...** is a surge protection device for two separate floating signal circuits. A fine protection element guarantees a low voltage threshold in conjunction with fast response between the corresponding conductors. The high arrest capacity is achieved by using gas-filled surge arresters. PT 2x2 is installed together with the PT 2x2...-BE base element.

**PT 4x1...** is a surge protection device for four signal lines with a common reference potential. Fine protection elements guarantee a low voltage threshold in conjunction with fast response times. The high arrest capacity is achieved by using gas-filled surge arresters between conductors and the common reference potential. PT 4x1 is installed together with the PT 4x1-BE base element (reference potential grounded) or PT 4x1+F-BE (reference potential ungrounded).

**\*Note:**

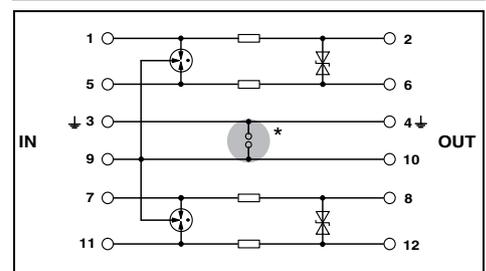
Areas marked with an "\*" in circuit diagrams indicate the different grounding options of the base elements. When the **PT.x.-BE** base elements are used, the connections 9/10 (GND) are directly connected to the DIN rail through the metal mounting foot. In the base elements **PT.x.+F-BE**, the connections 9/10 (GND) are connected to the mounting foot through a gas-filled surge arrester.



**PT 2x2...DC**

Double conductor protection for two floating signal circuits

Total width 17.7



Description	Voltage U <sub>N</sub>	Type	Order No.	Pcs. Pkt.
<b>PLUGTRAB plug</b> , with protection circuit for plugging into base element PT	5 V DC 12 V DC 24 V DC 12 V AC 24 V AC	<b>PT 2X2- 5DC-ST</b> <b>PT 2X2-12DC-ST</b> <b>PT 2X2-24DC-ST</b>	<b>2838241</b> <b>2838254</b> <b>2838228</b>	10 10 10
<b>PLUGTRAB base element</b> , for mounting on  with bridge between the connections 3/4 (±) and 9/10 with gas-filled surge arrester between the connections 3/4 (±) and 9/10		<b>PT 2X2-BE</b> <b>PT 2X2+F-BE</b>	<b>2839208</b> <b>2839224</b>	10 10
<b>Shield fast connection</b> For Ø 3-6 mm For Ø 5-10 mm		<b>SSA 3-6</b> <b>SSA 5-10</b>	<b>2839295</b> <b>2839512</b>	10 10
<b>Zack marker strip</b> , 10-section, white		<b>refer to catalog CLIPLINE 2007</b>		
<b>Technical data</b>		PT 2X2- 5DC-ST	PT 2X2-12DC-ST	PT 2X2-24DC-ST
IEC category / EN type		C1 / C2 / C3 / D1	C1 / C2 / C3 / D1	C1 / C2 / C3 / D1
Highest continuous voltage U <sub>c</sub>	DC/AC	6 V DC / 4 V AC	13 V DC / 9 V AC	28 V DC / 20 V AC
Lightning test curr. I <sub>imp</sub> (10/350)µs	Per path	2.5 kA	2.5 kA	2.5 kA
Nominal current I <sub>N</sub>		450 mA	450 mA	450 mA
Nominal discharge surge current I <sub>n</sub> (8/20) µs	Core-Core Core-ground	10 kA 10 kA	10 kA 10 kA	10 kA 10 kA
Total surge current (8/20)µs		20 kA	20 kA	20 kA
Output voltage limitation at 1 kV/µs	Core-Core Core-ground	≤ 10 V ≤ 450 V	≤ 18 V ≤ 450 V	≤ 40 V ≤ 450 V
Residual voltage at I <sub>n</sub>	Core-Core Core-ground	≤ 10 V -	≤ 18 V -	≤ 40 V -
Response time t <sub>A</sub>	Core-Core Core-ground	≤ 1 ns ≤ 100 ns	≤ 1 ns ≤ 100 ns	≤ 1 ns ≤ 100 ns
Input attenuation a <sub>i</sub>	Symmetrical in the 50 Ω system Asymmetrical in the 50 Ω system	0.5 dB (≤ 200 kHz)	0.5 dB (≤ 600 kHz)	0.5 dB (≤ 1 MHz)
Cut-off frequency f <sub>g</sub> (3dB)	Symmetrical in the 50 Ω system Asymmetrical in the 50 Ω system	Typ. 1 MHz	Typ. 3 MHz	Typ. 6 MHz
Resistance per path		2.2 Ω	2.2 Ω	2.2 Ω
Temperature range		-40 °C ... 85 °C		
Degree of protection in acc. with IEC 60529/ EN 60529		IP20		
Inflammability class in acc. with UL 94		V0		
Test standards		IEC 61643-21 / DIN EN 61643-21 / UL 497B		



**PT 2x2...AC**

Double conductor protection for two floating signal circuits



**PT 4x1...DC**

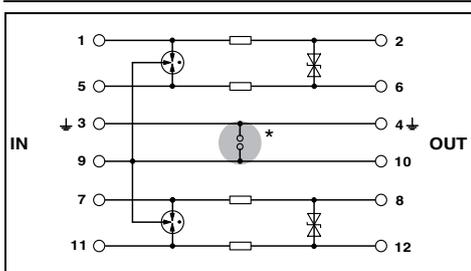
Protection for four conductors with a common reference potential



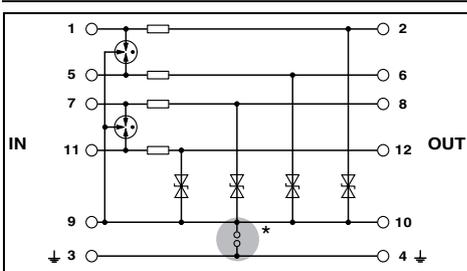
**PT 4x1...AC**

Protection for four conductors with a common reference potential

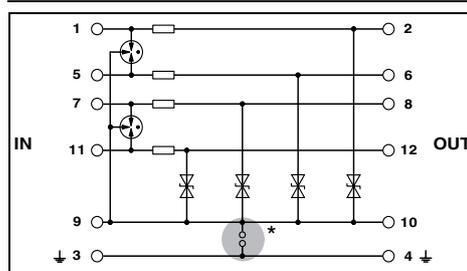
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Type	Order No.	Pcs. Pkt.
PT 2X2-12AC-ST	2838270	10
PT 2X2-24AC-ST	2838283	10
PT 2X2-BE	2839208	10
PT 2X2+F-BE	2839224	10
SSA 3-6	2839295	10
SSA 5-10	2839512	10

refer to catalog CLIPLINE 2007

Type	Order No.	Pcs. Pkt.
PT 4X1-5DC-ST	2838306	10
PT 4X1-12DC-ST	2838319	10
PT 4X1-24DC-ST	2838322	10
PT 4X1-BE	2839363	10
PT 4X1+F-BE	2839376	10
SSA 3-6	2839295	10
SSA 5-10	2839512	10

refer to catalog CLIPLINE 2007

Type	Order No.	Pcs. Pkt.
PT 4X1-12AC-ST	2838348	10
PT 4X1-24AC-ST	2838351	10
PT 4X1-BE	2839363	10
PT 4X1+F-BE	2839376	10
SSA 3-6	2839295	10
SSA 5-10	2839512	10

refer to catalog CLIPLINE 2007

PT 2X2-12AC-ST	PT 2X2-24AC-ST
C1 / C2 / C3 / D1	C1 / C2 / C3 / D1
18 V DC / 13 V AC	40 V DC / 28 V AC
2.5 kA	2.5 kA
450 mA	450 mA
10 kA	10 kA
10 kA	10 kA
20 kA	20 kA
≤ 25 V	≤ 55 V
≤ 450 V	≤ 450 V
≤ 25 V	≤ 55 V
-	-
≤ 1 ns	≤ 1 ns
≤ 100 ns	≤ 100 ns
Typ. 0.5 dB (≤ 700 kHz)	Typ. 0.5 dB (≤ 1.5 MHz)
-	-
Typ. 4 MHz	Typ. 8 MHz
-	-
2.2 Ω	2.2 Ω
-40 °C ... 85 °C	-40 °C ... 85 °C
IP20	IP20
V0	V0
IEC 61643-21 / DIN EN 61643-21 / UL 497B	IEC 61643-21 / DIN EN 61643-21 / UL 497B

PT 4X1-5DC-ST	PT 4X1-12DC-ST	PT 4X1-24DC-ST
C1 / C2 / C3 / D1	C1 / C2 / C3 / D1	C1 / C2 / C3 / D1
6 V DC / 4 V AC	13 V DC / 9 V AC	28 V DC / 20 V AC
2.5 kA	2.5 kA	2.5 kA
300 mA	300 mA	300 mA
-	-	-
10 kA	10 kA	10 kA
20 kA	20 kA	20 kA
≤ 10 V	≤ 18 V	≤ 40 V
≤ 10 V	≤ 18 V	≤ 40 V
≤ 1 ns	≤ 1 ns	≤ 1 ns
-	-	-
0.5 dB (≤ 200 kHz)	0.5 dB (≤ 600 kHz)	0.5 dB (≤ 1 MHz)
-	-	-
Typ. 1 MHz	Typ. 3 MHz	Typ. 6 MHz
4.7 Ω	4.7 Ω	4.7 Ω
-40 °C ... 85 °C	-40 °C ... 85 °C	-40 °C ... 85 °C
IP20	IP20	IP20
V0	V0	V0
IEC 61643-21	IEC 61643-21	IEC 61643-21

PT 4X1-12AC-ST	PT 4X1-24AC-ST
C1 / C2 / C3 / D1	C1 / C2 / C3 / D1
18 V DC / 13 V AC	40 V DC / 28 V AC
2.5 kA	2.5 kA
300 mA	300 mA
-	-
10 kA	10 kA
20 kA	20 kA
≤ 25 V	≤ 55 V
≤ 31 V	≤ 55 V
≤ 1 ns	≤ 1 ns
-	-
0.5 dB (≤ 700 kHz)	0.5 dB (≤ 1.5 MHz)
-	-
Typ. 4 MHz	Typ. 8 MHz
4.7 Ω	4.7 Ω
-40 °C ... 85 °C	-40 °C ... 85 °C
IP20	IP20
V0	V0
IEC 61643-21 / DIN EN 61643-21 / UL 497B	IEC 61643-21 / DIN EN 61643-21 / UL 497B

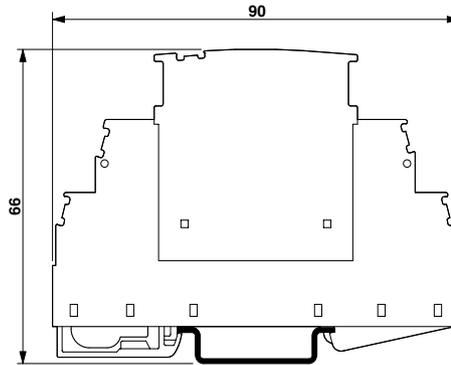
**Pluggable surge protection cascade  
MCR-PLUGTRAB PT**

Besides servicing convenience, **PLUGTRAB PT...** also offers a suitable arrester for every application. The shield fast connection SSA is available as an accessory to the PLUGTRAB product range. The shield can be integrated into the grounding concept reliably and comfortably.

**PT 1x2...** is the single-channel version and protects a pair of signal conductors ungrounded at the point of installation. PT 1x2 is installed together with the PT 1x2 ...-BE base element.

**\*Note:**

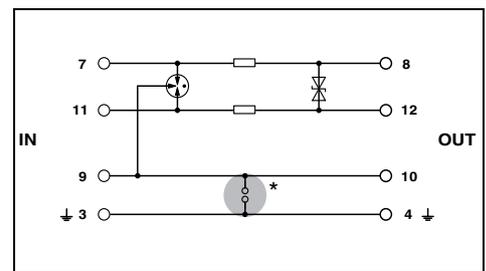
Areas marked with an "\*" in circuit diagrams indicate the different grounding options of the base elements. When the **PT.x.-BE** base elements are used, the connections 9/10 (GND) are directly connected to the DIN rail through the metal mounting foot. In the base elements **PT.x.+F-BE**, the connections 9/10 (GND) are connected to the mounting foot through a gas-filled surge arrester.



**PT 1x2..DC**

Double conductor protection for a floating signal circuit

Total width 17.7



Description	Voltage U <sub>N</sub>	Type	Order No.	Pcs. Pkt.
<b>PLUGTRAB plug</b> , with protection circuit for plugging into base element PT	5 V DC 12 V DC 24 V DC 12 V AC 24 V AC	<b>PT 1X2- 5DC-ST</b> <b>PT 1X2-12DC-ST</b> <b>PT 1X2-24DC-ST</b>	<b>2856016</b> <b>2856029</b> <b>2856032</b>	10 10 10
<b>PLUGTRAB base element</b> , for mounting on  with bridge between the connections 3/4 (⊥) and 9/10		<b>PT 1X2-BE</b>	<b>2856113</b>	10
with gas-filled surge arrester between the connections 3/4 (⊥) and 9/10		<b>PT 1X2+F-BE</b>	<b>2856126</b>	10
<b>Shield fast connection</b> For Ø 3-6 mm For Ø 5-10 mm		<b>SSA 3-6</b> <b>SSA 5-10</b>	<b>2839295</b> <b>2839512</b>	10 10
<b>Zack marker strip</b> , 10-section, white		<b>refer to catalog CLIPLINE 2007</b>		
<b>Technical data</b>		PT 1X2- 5DC-ST C1 / C2 / C3 / D1 6 V DC / 4 V AC 2.5 kA 450 mA 10 kA 10 kA 20 kA ≤ 10 V ≤ 450 V ≤ 10 V - ≤ 1 ns ≤ 100 ns 0.5 dB (≤ 200 kHz) -	PT 1X2-12DC-ST C1 / C2 / C3 / D1 13 V DC / 9 V AC 2.5 kA 450 mA 10 kA 10 kA 20 kA ≤ 18 V ≤ 450 V ≤ 18 V - ≤ 1 ns ≤ 100 ns 0.5 dB (≤ 600 kHz) -	PT 1X2-24DC-ST C1 / C2 / C3 / D1 28 V DC / 20 V AC 2.5 kA 450 mA 10 kA 10 kA 20 kA ≤ 40 V ≤ 450 V ≤ 40 V - ≤ 1 ns ≤ 100 ns 0.5 dB (≤ 1 MHz) -
IEC category / EN type				
Highest continuous voltage U <sub>c</sub>	DC/AC			
Lightning test curr. I <sub>imp</sub> (10/350)µs	Per path			
Nominal current I <sub>N</sub>				
Nominal discharge surge current I <sub>n</sub> (8/20) µs	Core-Core Core-ground			
Total surge current (8/20)µs				
Output voltage limitation at 1 kV/µs	Core-Core Core-ground			
Residual voltage at I <sub>n</sub>	Core-Core Core-ground			
Response time t <sub>A</sub>	Core-Core Core-ground			
Input attenuation a <sub>i</sub>	Symmetrical in the 50 Ω system Asymmetrical in the 50 Ω system			
Cut-off frequency f <sub>g</sub> (3dB)	Symmetrical in the 50 Ω system Asymmetrical in the 50 Ω system			
Resistance per path				
Temperature range				
Degree of protection in acc. with IEC 60529/ EN 60529				
Inflammability class in acc. with UL 94				
Test standards				



**PT 1x2..AC**

Double conductor protection for a floating signal circuit



**PT 2x1..DC**

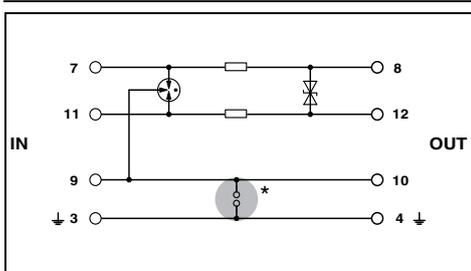
Protection for two conductors with a common reference potential



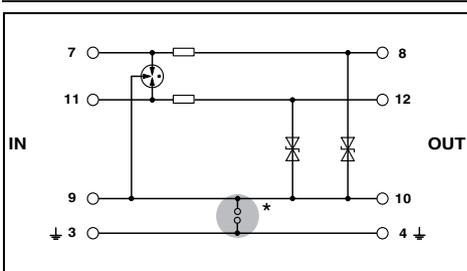
**PT 2x1..AC**

Protection for two conductors with a common reference potential

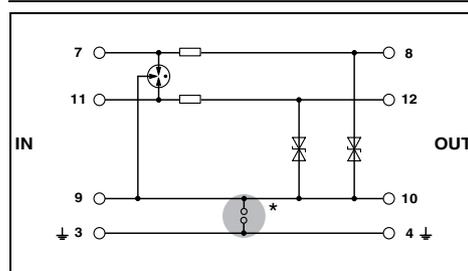
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Type	Order No.	Pcs. Pkt.
PT 1X2-12AC-ST	2856045	10
PT 1X2-24AC-ST	2856058	10
PT 1X2-BE	2856113	10
PT 1X2+F-BE	2856126	10
SSA 3-6	2839295	10
SSA 5-10	2839512	10
refer to catalog CLIPLINE 2007		

Type	Order No.	Pcs. Pkt.
PT 2X1-5DC-ST	2856061	10
PT 2X1-12DC-ST	2856074	10
PT 2X1-24DC-ST	2856087	10
PT 2X1-BE	2856139	10
PT 2X1+F-BE	2856142	10
SSA 3-6	2839295	10
SSA 5-10	2839512	10
refer to catalog CLIPLINE 2007		

Type	Order No.	Pcs. Pkt.
PT 2X1-12AC-ST	2856090	10
PT 2X1-24AC-ST	2856100	10
PT 2X1-BE	2856139	10
PT 2X1+F-BE	2856142	10
SSA 3-6	2839295	10
SSA 5-10	2839512	10
refer to catalog CLIPLINE 2007		

PT 1X2-12AC-ST	PT 1X2-24AC-ST
C1 / C2 / C3 / D1	C1 / C2 / C3 / D1
18 V DC / 13 V AC	40 V DC / 28 V AC
2.5 kA	2.5 kA
450 mA	450 mA
10 kA	10 kA
10 kA	10 kA
20 kA	20 kA
≤ 25 V	≤ 55 V
≤ 450 V	≤ 450 V
≤ 25 V	≤ 55 V
-	-
≤ 1 ns	≤ 1 ns
≤ 100 ns	≤ 100 ns
0.5 dB (≤ 700 kHz)	0.5 dB (≤ 1.5 MHz)
-	-
Typ. 4 MHz	Typ. 8 MHz
-	-
2.2 Ω	2.2 Ω
-40 °C ... 85 °C	-40 °C ... 85 °C
IP20	IP20
V0	V0
IEC 61643-21 / DIN EN 61643-21 / UL 497B	IEC 61643-21 / DIN EN 61643-21 / UL 497B

PT 2X1-5DC-ST	PT 2X1-12DC-ST	PT 2X1-24DC-ST
C1 / C2 / C3 / D1	C1 / C2 / C3 / D1	C1 / C2 / C3 / D1
6 V DC / 4 V AC	13 V DC / 9 V AC	28 V DC / 20 V AC
2.5 kA	2.5 kA	2.5 kA
300 mA	300 mA	300 mA
-	-	-
10 kA	10 kA	10 kA
20 kA	20 kA	20 kA
≤ 10 V	≤ 18 V	≤ 40 V
≤ 10 V	≤ 18 V	≤ 40 V
≤ 1 ns	≤ 1 ns	≤ 1 ns
-	-	-
0.5 dB (≤ 200 kHz)	0.5 dB (≤ 600 kHz)	0.5 dB (≤ 1 MHz)
-	-	-
Typ. 1 MHz	Typ. 3 MHz	Typ. 6 MHz
4.7 Ω	4.7 Ω	4.7 Ω
-40 °C ... 85 °C	-40 °C ... 85 °C	-40 °C ... 85 °C
IP20	IP20	IP20
V0	V0	V0
IEC 61643-21 / DIN EN 61643-21 / UL 497B	IEC 61643-21 / DIN EN 61643-21 / UL 497B	IEC 61643-21 / DIN EN 61643-21 / UL 497B

PT 2X1-12AC-ST	PT 2X1-24AC-ST
C1 / C2 / C3 / D1	C1 / C2 / C3 / D1
18 V DC / 13 V AC	40 V DC / 28 V AC
2.5 kA	2.5 kA
300 mA	300 mA
-	-
10 kA	10 kA
20 kA	20 kA
≤ 25 V	≤ 55 V
-	-
≤ 31 V	≤ 55 V
≤ 1 ns	≤ 1 ns
-	-
0.5 dB (≤ 700 kHz)	0.5 dB (≤ 1.5 MHz)
-	-
Typ. 4 MHz	Typ. 8 MHz
4.7 Ω	4.7 Ω
-40 °C ... 85 °C	-40 °C ... 85 °C
IP20	IP20
V0	V0
IEC 61643-21 / DIN EN 61643-21 / UL 497B	IEC 61643-21 / DIN EN 61643-21 / UL 497B

### Modular terminal blocks with multiple stage surge protection TERMITRAB

TERMITRAB TT... are modular terminal blocks with multi-stage surge protection.

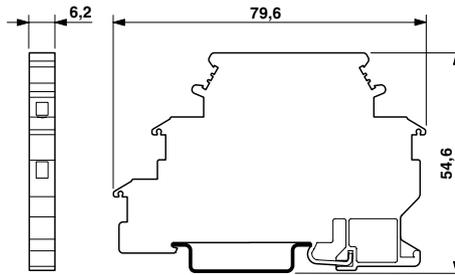
The slim design and the good price/performance ratio make this product particularly interesting for applications in which numerous signal interfaces for automation technology have to be protected in a confined space. It is thus possible to build up a connection level in the control cabinet which is both space-saving and resistant to surge voltages.

An electric surge voltage resistant connection is made automatically between the ground reference point of the protective circuit and the DIN rail when the protective terminal block is snapped on. To provide ground connection for a complete row of terminal blocks, only the DIN rail needs be grounded. Floating reference potentials can also be applied to the DIN rail if the DIN rail is designed with isolation to earth. In this case, an additional protective device with an integrated gas-filled surge arrester as common mode voltage coarse protection must be connected from the DIN rail to earth.

There are three designs available:

- **TT-2-PE-24DC** protects one floating double conductor, e.g. 0-20 mA or 0-10 V signals.
- **TT-2/2-24DC** protects two signal conductors with a common reference potential, e.g. binary signals from position encoders.
- **TT-EX(I)- 24DC** protects one floating double conductor at a time, e.g. a 0-20 mA current loop, taking the needs of intrinsically safe circuits into consideration. The surge arrester TT-EX(I)- 24 DC is used in Ex protection zones 0, 1 and 2.

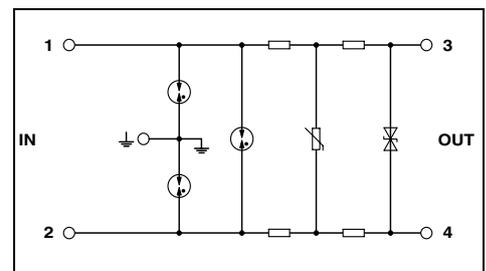
To set the end of a TERMITRAB TT... row, there are D-DEK 1, 5 covers available in the corresponding colors.



**TT-2-PE...**

Double conductor protection for a floating signal circuit

Total width 6.2



Description	Voltage $U_N$	Type	Order No.	Pcs. Pkt.
<b>TERMITRAB</b> , modular terminal block with surge protection for a floating double conductor, separate PE connection, for mounting on	24 V DC	<b>TT-2-PE- 24DC</b>	<b>2838186</b>	10
<b>TERMITRAB</b> , modular terminal block with surge protection for two signal conductors with common reference potential, separate PE connection, for mounting on	24 V DC			
<b>TERMITRAB</b> , modular terminal block with surge protection for a floating EEx ia signal circuit, separate PE connection, for mounting on	24 V DC			
<b>Cover</b> Black <b>Zack marker strip</b> , 10-section, white		<b>D-DEK 1,5 BK</b> <b>refer to catalog CLIPLINE 2007</b>	<b>2838995</b>	50
<b>Technical data</b>				
IEC category / EN type		C1 / C2 / C3 / D1		
Highest continuous voltage $U_C$		30 V DC / 21 V AC		
Lightning test curr. $I_{imp}$ (10/350) $\mu$ s		500 A		
Nominal current $I_N$		300 mA		
Nominal discharge surge current $I_n$ (8/20) $\mu$ s		5 kA		
		5 kA		
		10 kA		
Total surge current (8/20) $\mu$ s				
Output voltage limitation at 1 kV/ $\mu$ s				
		Core-Core $\leq 44$ V		
		Core-ground $\leq 650$ V		
Residual voltage at $I_n$		Core-Core $\leq 50$ V		
		Core-ground -		
Response time $t_A$		Core-Core $\leq 1$ ns		
		Core-ground $\leq 100$ ns		
Input attenuation $a_i$		Symmetrical in the 50 $\Omega$ system 0.8 dB ( $\leq 400$ kHz)		
		Asymmetrical in the 50 $\Omega$ system -		
Cut-off frequency $f_g$ (3dB)		Symmetrical in the 50 $\Omega$ system Typ. 3 MHz		
		Asymmetrical in the 50 $\Omega$ system -		
Resistance per path		3.7 $\Omega$		
Temperature range		-40 $^{\circ}$ C ... 85 $^{\circ}$ C		
Degree of protection in acc. with IEC 60529/ EN 60529		IP20		
Inflammability class in acc. with UL 94		V2		
Test standards		IEC 61643-21		



**TT-2/2-24DC**

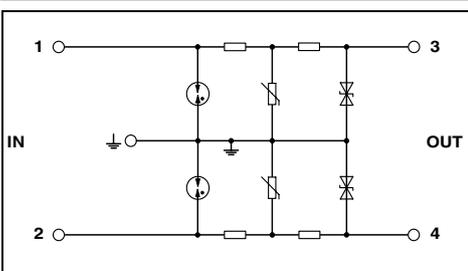
Protection for two conductors with a common reference potential



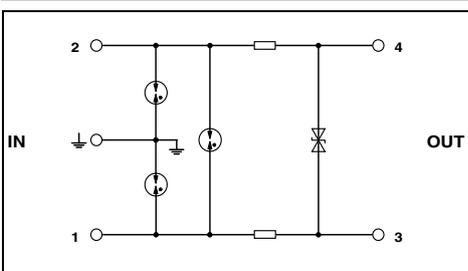
**TT-EX(I)-24DC**

Double conductor protection for an intrinsically safe circuit

Total width 6.2  Ex: 



Total width 6.2  Ex:   



Type	Order No.	Pcs. Pkt.
TT-2/2- 24DC	2838173	10
D-DEK 1,5 BK refer to catalog CLIPLINE 2007	2838995	50

Type	Order No.	Pcs. Pkt.
TT-EX(I)- 24DC	2832124	10
D-DEK 1,5 BK refer to catalog CLIPLINE 2007	2838995	50

C1 / C2 / C3 / D1	C1 / C2 / C3 / D1
30 V DC / 21 V AC	30 V DC / 21 V AC
500 A	500 A
300 mA	250 mA
-	5 kA
5 kA	5 kA
10 kA	-
-	≤ 44 V
≤ 42 V	≤ 1.5 kV
-	≤ 40 V
-	-
-	≤ 1 ns
≤ 1 ns	≤ 100 ns
-	1 dB (≤ 1 MHz)
0.7 dB (≤ 300 kHz)	-
-	Typ. 6 MHz
Typ. 2 MHz	-
6.6 Ω	4.7 Ω
-40 °C ... 85 °C	-40 °C ... 85 °C
IP20	IP20
V2	V2
IEC 61643-21	IEC 61643-21 / EN 50020

C1 / C2 / C3 / D1	C1 / C2 / C3 / D1
30 V DC / 21 V AC	30 V DC / 21 V AC
500 A	500 A
300 mA	250 mA
-	5 kA
5 kA	5 kA
10 kA	-
-	≤ 44 V
≤ 42 V	≤ 1.5 kV
-	≤ 40 V
-	-
-	≤ 1 ns
≤ 1 ns	≤ 100 ns
-	1 dB (≤ 1 MHz)
0.7 dB (≤ 300 kHz)	-
-	Typ. 6 MHz
Typ. 2 MHz	-
6.6 Ω	4.7 Ω
-40 °C ... 85 °C	-40 °C ... 85 °C
IP20	IP20
V2	V2
IEC 61643-21	IEC 61643-21 / EN 50020

### Pluggable surge protection cascade DATA-PLUGTRAB

DATA-PLUGTRAB **PT 2x2-HF** is a two-part surge protection device for two separate floating signal circuits.

This two-piece construction provides the user with the utmost comfort when it comes to maintenance. The base element always remains an integral part of the installation. There is no need for complex operations during overhaul work, for example. The protective elements in the plug are un-meshed and the functionality of each individual protective element can thus be checked with the TRABTECH tester, CHECKMASTER.

DATA-PLUGTRABs allow four signal conductors or two double conductors and one GND to be protected against surge voltages over a single pitch (17.5 mm).

When dealing with cable shields, either a direct or an indirect connection to local equipotential bonding is possible, depending on the choice of base element.

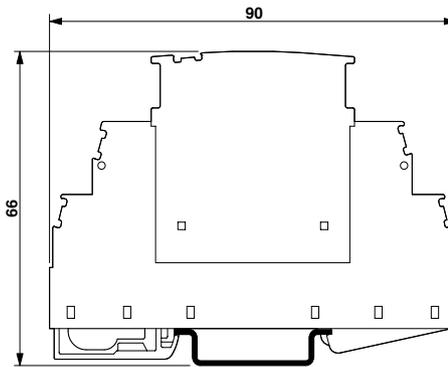
Arranging suppressor diodes between the signal conductors creates fine protection in conjunction with a fast response. Due to the low-capacity coupling of the suppressor diodes to the signal lines, high data transmission rates are possible. The use of gas-filled surge arresters ensures a high surge arrest capacity.

If the GND or shield may not be grounded, PLUGTRAB must be installed in combination with the PT 2x2+F-BE base element.

The cable shield can be elegantly connected with the shield fast connection SSA.

#### \*Note:

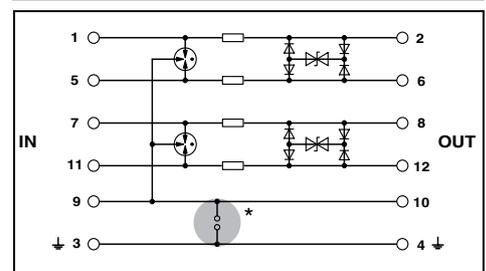
Areas marked with an "\*" in circuit diagrams indicate the different grounding options of the base elements. When the **PT.x.-BE** base elements are used, the connections 9/10 (GND) are directly connected to the DIN rail through the metal mounting foot. In the base elements **PT.x.+F-BE**, the connections 9/10 (GND) are connected to the mounting foot through a gas-filled surge arrester.



### PT 2x2-HF...

Surge protection for floating signal circuits

Total width 17.7



Description	Voltage $U_N$	Type	Order No.	Pcs. Pkt.
<b>PLUGTRAB plug</b> , with protection circuit for plugging into base element PT	5 V DC 12 V DC 24 V DC	<b>PT 2X2-HF- 5 DC-ST</b> <b>PT 2X2-HF-12 DC-ST</b> <b>PT 2X2-HF-24 DC-ST</b>	<b>2839567</b> <b>2839570</b> <b>2839729</b>	10 10 10
<b>PLUGTRAB base element</b> , for mounting on  with bridge between the connections 3/4 (↓) and 9/10		<b>PT 2X2-BE</b>	<b>2839208</b>	10
<b>Shield fast connection</b> For $\varnothing$ 3-6 mm For $\varnothing$ 5-10 mm		<b>SSA 3-6</b> <b>SSA 5-10</b>	<b>2839295</b> <b>2839512</b>	10 10
<b>Zack marker strip</b> , 10-section, white		refer to catalog <b>CLIPLINE 2007</b>		
<b>Technical data</b>		PT 2X2-HF- 5 DC-ST C1 / C2 / C3 / D1	PT 2X2-HF-12 DC-ST C1 / C2 / C3 / D1	PT 2X2-HF-24 DC-ST C1 / C2 / C3 / D1
IEC category / EN type		5.2 V DC / 3.6 V AC	13 V DC / 9 V AC	28 V DC / 19.8 V AC
Highest continuous voltage $U_C$	DC/AC	2.5 kA	2.5 kA	2.5 kA
Lightning test curr. $I_{imp}$ (10/350) $\mu$ s	Per path	450 mA	450 mA	450 mA
Nominal current $I_N$		10 kA	10 kA	10 kA
Nominal discharge surge current $I_n$ (8/20) $\mu$ s	Core-Core Core-ground	10 kA	10 kA	10 kA
Total surge current (8/20) $\mu$ s		20 kA	20 kA	20 kA
Output voltage limitation at 1 kV/ $\mu$ s	Core-Core Core-ground	$\leq 15$ V $\leq 450$ V	$\leq 25$ V $\leq 450$ V	$\leq 45$ V $\leq 450$ V
Residual voltage at $I_n$	Core-Core Core-ground	$\leq 12$ V -	$\leq 25$ V -	$\leq 40$ V -
Response time $t_A$	Core-Core Core-ground	$\leq 500$ ns $\leq 500$ ns	$\leq 500$ ns $\leq 500$ ns	$\leq 500$ ns $\leq 500$ ns
Input attenuation $a_i$	Symmetrical in the 100 $\Omega$ system	0.2 dB ( $\leq 5$ MHz)	0.2 dB ( $\leq 5$ MHz)	0.2 dB ( $\leq 5$ MHz)
Cut-off frequency $f_g$ (3dB)	Symmetrical in the 100 $\Omega$ system	Typ. 70 MHz	Typ. 70 MHz	Typ. 70 MHz
Resistance per path		2.2 $\Omega$	2.2 $\Omega$	2.2 $\Omega$
Temperature range		-40 °C ... 85 °C		
Degree of protection in acc. with IEC 60529/ EN 60529		IP20		
Inflammability class in acc. with UL 94		V0		
Test standards		IEC 61643-1		

**Surge Voltage Protection for Conduit Systems**

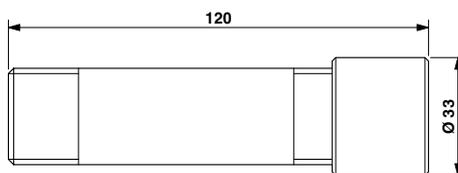
**SURGETRAB**

The surge voltage protection device, SURGETRAB **S-PT1-2PE-24DC**, has been specially developed for installation in conduit systems.

A pipe with two 3/4" threaded ends serves as housing for the PCB with protective circuit. The pipe has a screw cover on one end. With a T-element and, if necessary, appropriate nipples to adapt to other thread sizes, this protection unit can be integrated into any common installation conduit system.

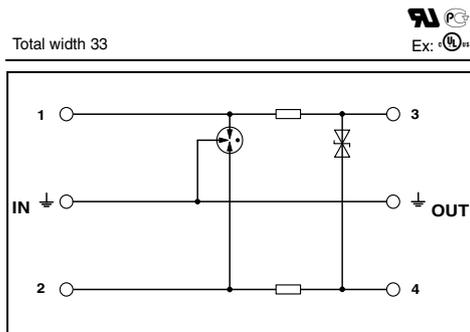
The two-stage protective circuit is designed for a floating wire signal conductor. A powerful gas-filled 3-electrode surge arrester and a low limiting suppressor diode are decoupled by ohmic resistors. This means that the surge current is distributed to fine and coarse protection stages according to the power. The signal line is connected on the input and output sides via two PCB terminal blocks each. A grounding wire with a spring washer is guided directly out of the PCB as equipotential bonding. A conducting connection to the potential of the conduit system is created when the screw cover is pushed over the spring washer and screwed onto the pipe.

It is advisable to ground the conduit system additionally at the point of installation of the surge protection so that surge currents which occur during an arresting process are not guided unnecessarily far through the conduit system.

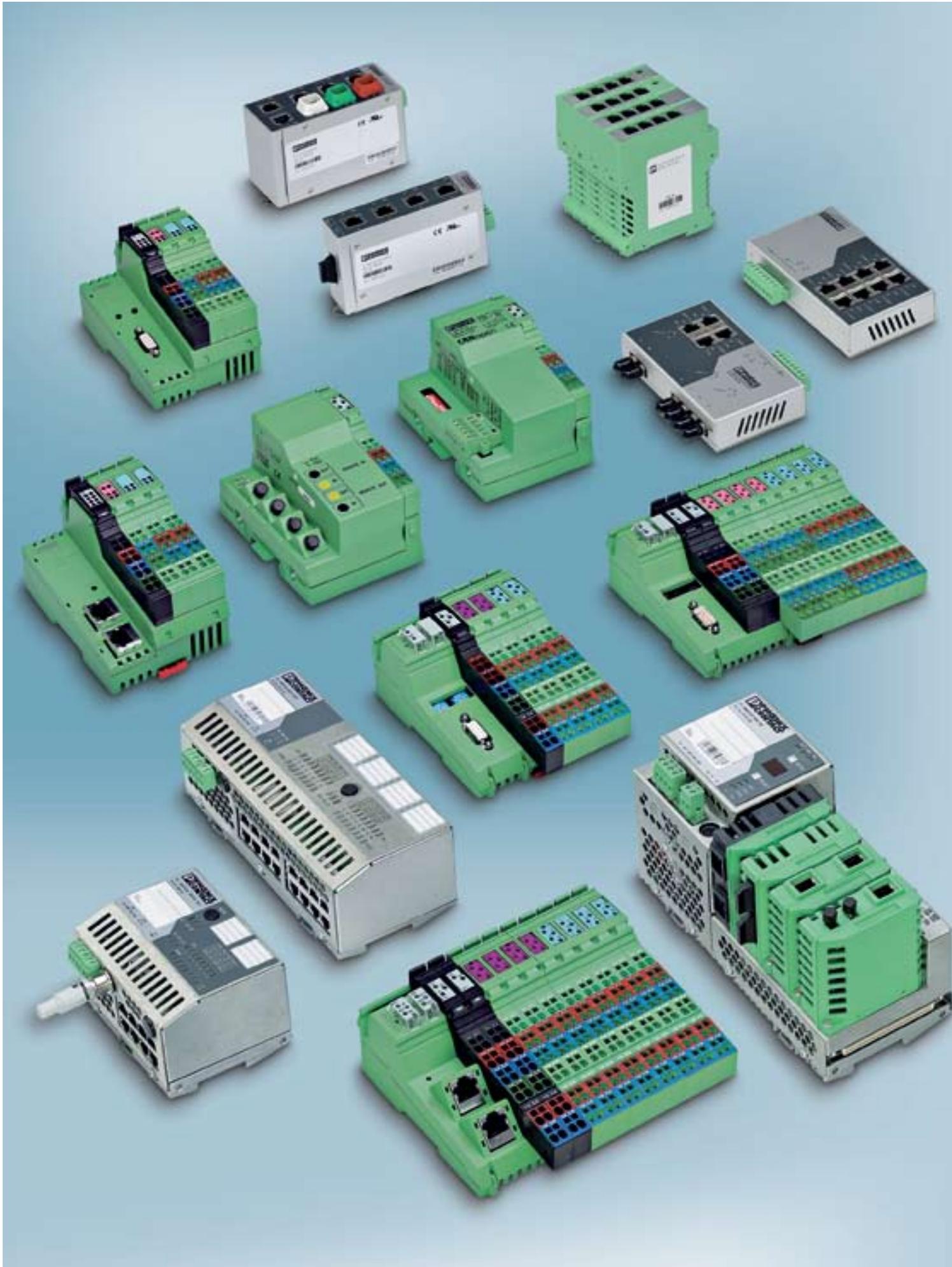


**S-PT1-2PE-24DC**

Two conductor protection in floating signal circuits



Description	Voltage U <sub>N</sub>	Type	Order No.	Pcs. Pkt.
<b>SURGETRAB</b> , Pipe stub with integrated PCB	24 V DC	<b>S-PT1-2PE-24DC</b>	<b>2818122</b>	1
<b>Spare PCB</b> , without pipe stub	24 V DC	<b>S-PT1-2PE-24DC/P</b>	<b>2818216</b>	10
<b>Technical data</b>				
IEC category / EN type		C1 / C2 / C3 / D1		
Highest continuous voltage U <sub>C</sub>	DC/AC	28 V DC / 20 V AC		
Lightning test curr. I <sub>imp</sub> (10/350)µs	Per path	-		
Nominal current I <sub>N</sub>		250 mA		
Nominal discharge surge current I <sub>n</sub> (8/20) µs	Core-Core	10 kA		
	Core-ground	10 kA		
Total surge current (8/20)µs		20 kA		
Output voltage limitation at 1 kV/µs	Core-Core	≤ 60 V		
	Core-ground	-		
Residual voltage at I <sub>n</sub>	Core-Core	≤ 40 V		
	Core-ground	≤ 60 V		
Response time t <sub>A</sub>	Core-Core	≤ 1 ns		
	Core-ground	≤ 100 ns		
Input attenuation a <sub>i</sub>		≤ 1.6 dB (up to 500 kHz, 50 Ω system)		
Cut-off frequency f <sub>g</sub> (3dB)	Symmetrical in the 100 Ω system	-		
	Symmetrical in the 100 Ω system	-		
Resistance per path		10 Ω		
Temperature range		-40 °C ... 80 °C		
Degree of protection in acc. with IEC 60529/ EN 60529		IP40		
Inflammability class in acc. with UL 94		-		
Test standards		IEC 61643-21		



The term automation means different things to different people. At PHOENIX CONTACT, it means quality products that do what you need them to do where you need them to do it.

Phoenix Contact has a wide range of products listed for use in hazardous locations. When its deep in a refinery, we can help integrate your sensitive data into systems you're familiar with.

## **I/O systems in the IP20 cabinet**

Modbus/TCP bus coupler without I/O	<b>16</b>
Ethernet/IP bus coupler without I/O	
DeviceNet™ bus coupler without I/O	
CANopen bus coupler	
Power terminals	
Digital output terminals	
Digital input terminals	
Analog input terminals	
Analog output terminals	
Digital input terminals – ME	
Analog input terminals – ME	
Inline block IO PROFINET	
Inline block IO Ethernet	
Inline block IO CANopen	
Inline block IO INTERBUS	
Inline block IO PROFIBUS/DeviceNet™	

## **Industrial Ethernet solutions**

Managed switch	<b>42</b>
Interface modules for modular managed switch	
Interface modules and POE solutions	
Unmanaged switches and hubs	
Switch with gigabit support	
SFN switches	
Standard switches	

### Modbus/TCP bus coupler without I/Os on board

The Factory Line Ethernet bus couplers are the links between the Ethernet and the I/O level. With the Ethernet-compatible bus couplers up to 63 functional units such as digital and analog inputs and outputs, counters, circuit breakers, pneumatics etc. can be combined.

Both the standard coupler FL IL 24 BK-B and its extended version FL IL 24 BK provide full Inline functionality in process data mode and can be easily configured with the aid of the web based management.

In addition to the standard coupler, the FL IL 24 BK allows operation with up to 8 Inline terminals with PCP communication and on-site firmware updates. The bus couplers work with all current operating systems and support communication via the MODBUS/TCP protocol. They support the use of static and dynamic Modbus tables here.

The universal device driver interface (DDI) and the high-level language fieldbus interface (HFI) can be used as software interfaces for access via TCP/IP.

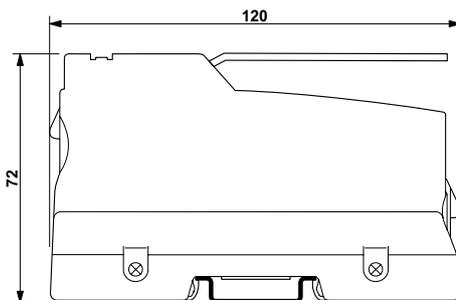
This integration enables the user to create convenient and easy-to-handle applications. This interface forms the link between the Factory Line Ethernet bus couplers and the programming languages. Users can develop programs in C, C++, C#, Visual Basic or other high-level languages.

Additionally, data can be exchanged via an OPC server.

In order to read data through many security mechanisms, e.g. firewalls, communication via XML is possible.

Due to the convenient terminal detection with the aid of the "plug & play" mode integrated in both bus couplers, it is easily possible to complete the terminal configuration within a few minutes.

The Factory Manager and the Factory Line IO configurator make it possible to assign the IP address to the bus couplers as well as to configure the network and terminals quickly.



Connection data	solid	stranded	AWG
	[mm <sup>2</sup> ]		
Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16

Description
<b>Ethernet bus coupler</b> , MODBUS/TCP, OPC, DDI and XML, complete with accessories (connectors and labeling field) - Basic
<b>CD-ROM</b> with user documentation in PDF format, driver software and sample programs, IO configurator
<b>Factory Manager</b> , multilingual configuration and diagnostics software for ETHERNET networks in automation
<b>INTERBUS OPC server</b> , data interface between distributed INTERBUS and Ethernet networks and visualization systems
<b>Inline connector</b>
<b>Labeling area</b> , width: 12.2 mm
<b>Marking sheet</b>
<b>Flat-ribbon labeling</b> (see CLIPLINE catalog)

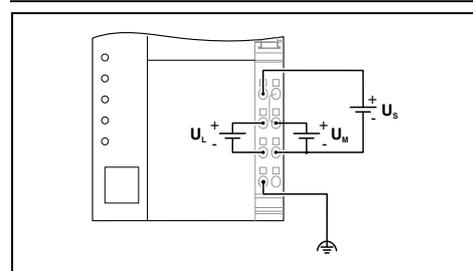
Technical data
<b>Interface</b>
Fieldbus system
No.
Type of connection
Transmission speed
Local bus interface
Type of connection
<b>Power supply</b>
Supply voltage
Range of supply voltages
Max. current consumption
Power supply for U <sub>L</sub>
Power supply for U <sub>ANA</sub>
<b>INTERBUS data</b>
Number of connectable local bus devices
<b>General data</b>
Weight
Width
Ambient temperature (operation)

### Ethernet



### FL IL 24 BK...-PAC

Inline Modular Ethernet bus coupler



Type	Order No.	Pcs. Pkt.
<b>FL IL 24 BK-B-PAC</b>	<b>2862327</b>	1
<b>FL IL 24 BK-PAC</b>	<b>2862314</b>	1
<b>FL IL 24 BK-PN-PAC</b>	<b>2878816</b>	1
<b>CD FL IL 24 BK</b>	<b>2832069</b>	1
<b>FL SWT</b>	<b>2831044</b>	1
<b>IBS OPC SERVER</b>	<b>2729127</b>	1
<b>IB IL SCN-8-CP</b>	<b>2727608</b>	10
<b>IB IL FIELD 2</b>	<b>2727501</b>	10
<b>ESL 62X10</b>	<b>0809492</b>	1
<b>ZBF...</b>		

Ethernet
1
RJ45 socket, autonegotiation
10/100 MBit
Inline data jumper
24 V DC (via Inline connector)
18.5 V DC ... 30 V DC
1.25 A
Max. 2 A DC (observe derating)
Max. 0.5 A DC (observe derating)
63
270 g
85 mm
0 °C ... 55 °C

## Ethernet/IP bus coupler without I/Os on board

The Factory Line Ethernet bus coupler FL IL 24 BK-ETH/IP is the link between the Ethernet/IP and the Inline automation kit.

With the EtherNet/IP-compatible bus couplers, up to 63 functional units such as digital and analog inputs and outputs, counters, circuit breakers, pneumatics etc. can be combined.

The bus coupler FL IL 24 BK-ETH/IP offers the full Inline functionality in the process data operation and can be easily configured using the web-based management.

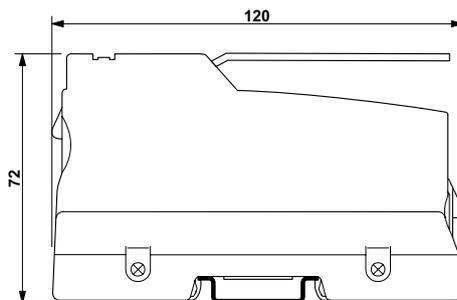
As a supplement to standard communication, the FL IL 24 BK-ETH/IP allows operation with up to 8 Inline terminals with PCP communication and allows firmware updates to be carried out on site.

Thanks to the convenient station detection using the integrated "plug & play" mode and the Inline-specific LEDs, the station set-up is completed after a few minutes. The 2-digit 7-segment display and the supplementary LEDs allow for quick set-up and easy maintenance, even when access via PC, laptop or web sites isn't possible.

The graphics and figures on the web sites allow a point-exact diagnosis, such as the bus coupler status, the status of the individual station modules and the display of application errors, e.g. excessive traffic load. The integrated error log saves the last 10 status changes of recently occurring errors.

The XML interface allows the user to create and reuse his own web pages without having to buy expensive HMI software packages.

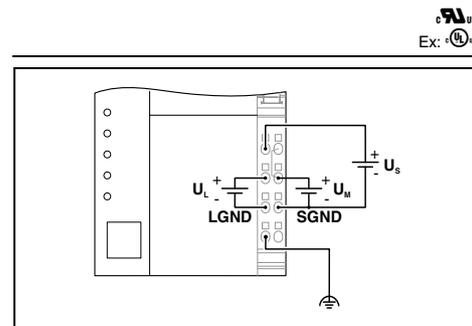
Unique COS masks and input lock mechanisms maximize the system throughput for high-performance applications. In keeping with Phoenix Contact's commitment to quality, the Ethernet/IP bus coupler was tested and certified by ODVA after the last Ethernet/IP conformance test.



**FL IL 24 BK ETH/IP-PAC**

Inline modular Ethernet/IP bus coupler

	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors	0.2-1.5	0.2-1.5	24-16
Spring-cage connection			



Description
<b>Ethernet bus coupler</b> , Ethernet/IP-capable, complete with accessories (plug connector and labeling field)
<b>Inline connector</b>
<b>Labeling area</b> , width: 12.2 mm
<b>Marking sheet</b>
<b>Fiat-ribbon labeling</b> (see CLIPLINE catalog)

Type	Order No.	Pcs. Pkt.
<b>FL IL 24 BK ETH/IP-PAC</b>	<b>2863986</b>	1
<b>IB IL SCN-8-CP</b>	<b>2727608</b>	10
<b>IB IL FIELD 2</b>	<b>2727501</b>	10
<b>ESL 62X10</b>	<b>0809492</b>	1
<b>ZBF...</b>		

Technical data
<b>Interface</b>
Fieldbus system
No.
Type of connection
Transmission speed
<b>Local bus interface</b>
Type of connection
<b>Power supply</b>
Supply voltage
Range of supply voltages
Max. current consumption
Power supply for U <sub>L</sub>
Power supply for U <sub>ANA</sub>
<b>INTERBUS data</b>
Number of connectable local bus devices
<b>General data</b>
Weight
Width
Ambient temperature (operation)

Ethernet
1
RJ45 socket, autonegotiation
10/100 MBit/s
<b>Inline data jumper</b>
24 V DC (via Inline connector)
18.5 V DC ... 30.2 V DC
1.25 A
Max. 2 A DC (observe derating)
Max. 0.5 A DC (observe derating)
63
270 g
85 mm
0 °C ... 55 °C

### DeviceNet™ bus coupler without I/Os on board

The DeviceNet™ bus coupler enables the flexible Inline automation kit to be operated with DeviceNet™ as well.

An Inline station can be inserted at any point in a DeviceNet™ network using the bus coupler. The bus coupler acts as a slave in the DeviceNet™ and a master in the lower-level Inline local bus.

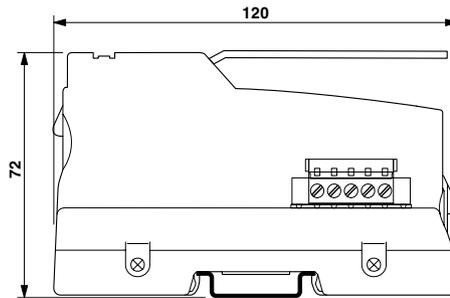
The address and the transmission rate of the DeviceNet™ slave can be set either from outside by means of a DIP switch or via software.

DeviceNet™ is connected via an Inline connector. The operating voltage for the bus coupler and the electronics of the connected automation terminals is supplied using separate power connectors.

For DeviceNet™ project planning, an EDS file with product-specific device data is available for downloading at [www.phoenixcontact.com](http://www.phoenixcontact.com).

#### Please note the following when you configure the system:

The total logic current of all the terminals connected to a DeviceNet™ bus coupler must not exceed the maximum permissible total current. A boost terminal of the type IB IL 24 PWR IN/R must be used if necessary in order to obtain the maximum station configuration of 63 devices.

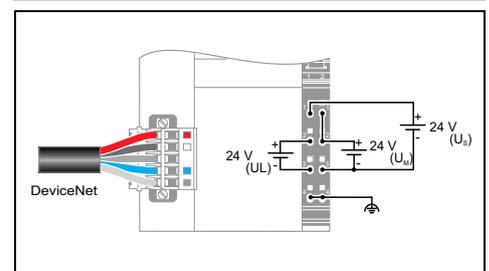


**IL DN BK3-PAC**

Inline Modular DeviceNet™ bus coupler



	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



Description
<b>DeviceNet™ bus coupler</b> , complete with accessories (connector and labeling field)
<b>Inline connector</b>
<b>Labeling area</b> , width: 12.2 mm
<b>Marking sheet</b>
<b>Flat-ribbon labeling</b> (see CLIPLINE catalog)

Type	Order No.	Pcs. Pkt.
IL DN BK3-PAC	2718785	1
IB IL SCN-8-CP	2727608	10
IB IL FIELD 2	2727501	10
ESL 62X10	0809492	1
ZBF...		

Technical data
<b>Interfaces</b>
Fieldbus system
Type of connection
Local bus interface
Type of connection
<b>Power supply for module electronics</b>
Supply voltage
Range of supply voltages
Max. current consumption
Power supply for U <sub>L</sub>
Power supply for U <sub>ANA</sub>
<b>INTERBUS data</b>
Number of connectable local bus devices
<b>General data</b>
Weight
Width
Ambient temperature (operation)

DeviceNet™ (incoming and outgoing internally connected)
2 x 5-pos. TWIN-COMBICON connectors
<b>Inline data jumper</b>
24 V DC
19 V DC ... 30 V DC
1.25 A (with max. number of connected I/O terminal blocks (24 V DC supply))
Max. 2 A DC (observe derating)
Max. 0.5 A DC (observe derating)
63
239 g
85 mm
-25 °C ... 55 °C

## CANopen bus coupler

The CANopen bus coupler enables the flexible Inline automation kit to be operated with CANopen as well.

An Inline station can be inserted at any point in a CANopen network using the bus coupler. The device acts as a slave in the CANopen bus and a master in the lower-level Inline local bus. The address of the CANopen slave can easily be set via DIP switches from outside.

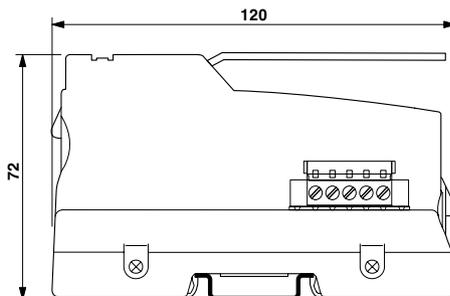
The CANopen bus is connected using a TWIN-COMBICON connector (e.g. TWIN-COMBICON connector from Phoenix Contact).

The operating voltage for the bus coupler and the electronics of the connected automation terminals can be supplied using a separate power connector.

For project planning with CANopen, Phoenix Contact provides an EDS file with product-specific device data that can be downloaded from the Internet. The CANopen bus coupler supports the proven Inline diagnostics as well as the typical CANopen standards. Local LEDs enable precise diagnostics.

### Please note the following when you configure the system:

The total logic current of all the terminals connected to a CANopen bus coupler must not exceed the maximum permissible total current. A boost terminal of the type IB IL 24 PWR IN/R must be used if necessary in order to obtain the maximum station configuration of 63 devices.

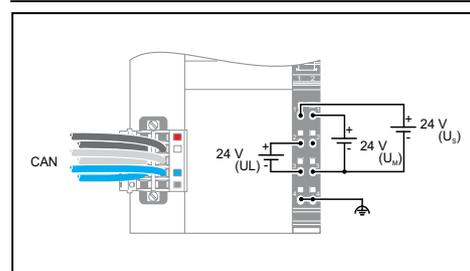


CANopen



### IL CAN BK-TC-PAC

Inline Modular CANopen bus coupler



	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors	0.2-1.5	0.2-1.5	24-16
Spring-cage connection			

Description	
<b>CANopen bus coupler</b> , complete with accessories (connector and labeling field)	
<b>Inline connector</b>	
Labeling area, width: 12.2 mm	
Marking sheet	
Flat-ribbon labeling (see CLIPLINE catalog)	
<b>Technical data</b>	
Interfaces	
Fieldbus system	
Type of connection	
Transmission speed	
Local bus interface	
Type of connection	
Power supply for module electronics	
Supply voltage	
Range of supply voltages	
Max. current consumption	
Power supply for U <sub>L</sub>	
Power supply for U <sub>ANA</sub>	
INTERBUS data	
Number of connectable local bus devices	
General data	
Weight	
Width	
Ambient temperature (operation)	
Permissible humidity (operation)	

Type	Order No.	Pcs. Pkt.
IL CAN BK-TC-PAC	2718701	1
IB IL SCN-8-CP	2727608	10
IB IL FIELD 2	2727501	10
ESL 62X10	0809492	1
ZBF...		

CANopen (incoming and outgoing internally connected)	
2 x 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 V DC ... 30 V DC	
< 100 mA (without connected I/O terminal blocks (24 V DC supply))	
Max. 2 A DC (observe derating)	
Max. 0.5 A DC (observe derating)	
63	
239 g	
85 mm	
-25 °C ... 55 °C	
95 % (no condensation)	

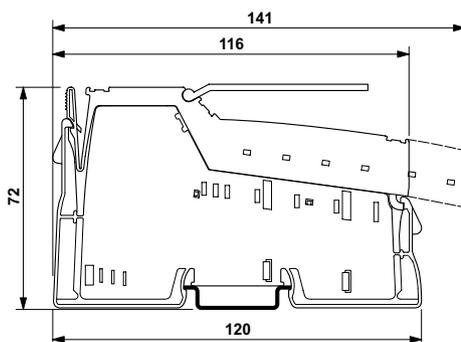
### Power terminals

The voltage supply for the main circuit  $U_M$  is fed in with the aid of the Inline power terminals. This means that electrically isolated I/O circuits can be configured within an Inline station. Various types of power terminals are available.

IB IL 24 PWR IN is the standard Inline power terminal and can also be selected with fusing (...-F). Fuses should not be cascaded within an Inline station. The maximum routing current within an Inline station is 8 A.

You can find more details in the technical description of Inline Modular.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

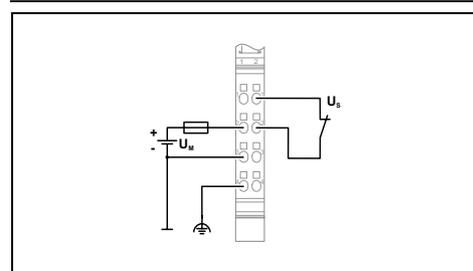


**IB IL 24 PWR IN-PAC**

Inline Modular power terminal, 24 V DC



	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



Description	Type	Order No.	Pcs. Pkt.
<b>Inline power terminal</b> , complete with accessories (plug connector and labeling field)	<b>IB IL 24 PWR IN-PAC</b>	<b>2861331</b>	<b>1</b>
<b>Inline power terminal</b> , without accessories	<b>IB IL 24 PWR IN</b>	<b>2726311</b>	<b>1</b>
<b>Technical data</b>			
Local bus interface	Inline data jumper		
Inline local bus			
Power supply for module electronics	8-pos. Inline power connector		
Type of connection	24 V DC		
Supply for main circuit $U_M$	8 A		
Power supply for $U_M$	7.5 V DC $\pm 5\%$ (via voltage jumper)		
Communications voltage $U_L$	24 V DC		
Segment power supply voltage $U_S$	8 A		
Power supply for $U_S$	SI 5 x 20 6, 300 AT (in scope of delivery)		
Fuse			
<b>General data</b>	Polarity protection, surge protection		
Protective circuitry	44 g		
Weight	12.2 mm		
Width			

## Digital output terminals

Digital Inline output terminals are designed for the connection of digital actuators, such as electromagnetic valves, contactors or visual indicators.

All the typical applications are covered by the standard automation terminals.

The peripheral equipment is connected with a simple Inline connector. The multi-conductor connection system is available for this purpose.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.



**IB IL 24 DO 2-NPN-PAC**

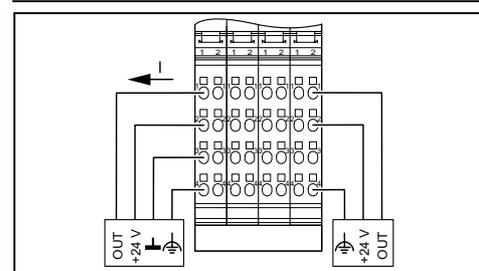
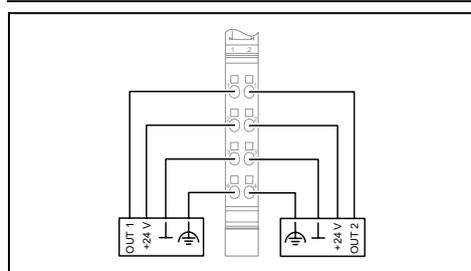
Inline Modular digital output terminal,  
 Outputs: 24 V DC, 500 mA, 2, 3 and 4-conductor connection method, NPN-wired



**IB IL 24 DO 8-NPN-PAC**

Inline Modular digital output terminal,  
 Outputs: 24 V DC, 500 mA, 2 and 3-conductor connection method, NPN-wired

	solid	stranded	AWG
	[mm <sup>2</sup> ]		
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



Description
<b>Inline digital output terminal</b> , complete with accessories (plug connector and labeling field) - NPN-wired
<b>Inline digital output terminal</b> , without accessories - NPN-wired
<b>Inline connector</b>
<b>Labeling area</b> , width: 12.2 mm
<b>Marking sheet</b>
<b>Flat-ribbon labeling</b> (see CLIPLINE catalog)

Type	Order No.	Pcs. Pkt.
<b>IB IL 24 DO 2-NPN-PAC</b>	<b>2861496</b>	1
<b>IB IL 24 DO 2-NPN</b>	<b>2740119</b>	1
<b>IB IL SCN-8-CP</b>	<b>2727608</b>	10
<b>IB IL FIELD 2</b>	<b>2727501</b>	10
<b>ESL 62X10</b>	<b>0809492</b>	1
<b>ZBF...</b>		

Type	Order No.	Pcs. Pkt.
<b>IB IL 24 DO 8-NPN-PAC</b>	<b>2863546</b>	1
<b>IB IL 24 DO 8-NPN</b>	<b>2863533</b>	1
<b>IB IL SCN-8-CP</b>	<b>2727608</b>	10
<b>IB IL FIELD 2</b>	<b>2727501</b>	10
<b>ESL 62X10</b>	<b>0809492</b>	1
<b>ZBF...</b>		

Technical data	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (via voltage jumper)
Range of supply voltages	19.2 V DC ... 30 V DC
Current consumption from U <sub>L</sub>	Max. 32 mA
Digital outputs	
Type of connection	Spring-cage connection
Connection system	2, 3, 4-wire
Number of outputs	2
Description of the outputs	With negative logic
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
General data	
Weight	42 g
Width	-
Ambient temperature (operation)	-25 °C ... 55 °C

Technical data	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (nominal value)
Range of supply voltages	19.2 V DC ... 30 V DC
Current consumption from U <sub>L</sub>	Max. 60 mA
Digital outputs	
Type of connection	Spring-cage connection
Connection system	2, 3, 4-wire
Number of outputs	8
Description of the outputs	With negative logic
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
General data	
Weight	130 g
Width	-
Ambient temperature (operation)	-25 °C ... 55 °C

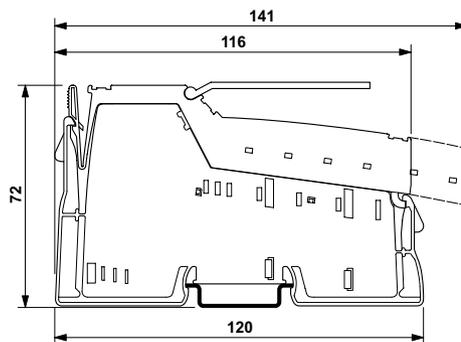
Technical data	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
Supply voltage	24 V DC (nominal value)
Range of supply voltages	19.2 V DC ... 30 V DC
Current consumption from U <sub>L</sub>	Max. 60 mA
Digital outputs	
Type of connection	Spring-cage connection
Connection system	2, 3, 4-wire
Number of outputs	8
Description of the outputs	With negative logic
Maximum output current per channel	500 mA
Protective circuitry	Short circuit and overload protection
General data	
Weight	130 g
Width	-
Ambient temperature (operation)	-25 °C ... 55 °C

### Digital output terminals

Digital Inline output terminal blocks are designed for the connection of digital actuators, such as electromagnetic valves, contactors or visual indicators.

The I/O equipment is connected either by a simple or an expanded Inline connector, depending on the number of channels. The multi-wire connection method is used in both cases.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

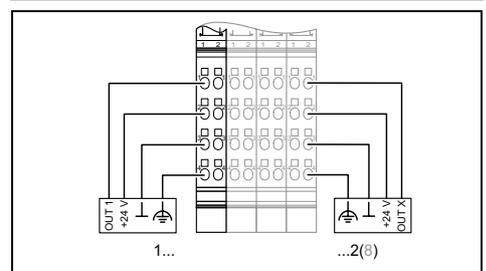


### IB IL 24 DO 2(8)-PAC

Inline Modular digital output terminal,  
Outputs: 24 V DC, 500 mA, 4-conductor connection method



	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



Description	Type	Order No.	Pcs. Pkt.
<b>Inline digital output terminal</b> , complete with accessories (plug connector and labeling field)	<b>IB IL 24 DO 2-PAC</b>	<b>2861470</b>	1
- Outputs 2 A	<b>IB IL 24 DO 8-PAC</b>	<b>2861289</b>	1
<b>Inline digital output terminal</b> , without accessories	<b>IB IL 24 DO 2</b>	<b>2740106</b>	1
- Outputs 2 A	<b>IB IL 24 DO 8</b>	<b>2726269</b>	1
<b>Connector set</b> for IB IL DI/DO 8	<b>IB IL DI/DO 8-PLSET/CP</b>	<b>2860963</b>	1
<b>Connector set</b> for IB IL DO 16, color-coded	<b>IB IL SCN-8-CP</b>	<b>2727608</b>	10
<b>Inline connector</b>	<b>IB IL FIELD 2</b>	<b>2727501</b>	10
<b>Labeling area</b> , width: 12.2 mm	<b>IB IL FIELD 8</b>	<b>2727515</b>	10
<b>Labeling area</b> , width: 48.8 mm	<b>ESL 62X10</b>	<b>0809492</b>	1
<b>Marking sheet</b>	<b>ESL 62X46</b>	<b>0809502</b>	5
<b>Marking sheet</b>	<b>ZBF...</b>		
<b>Flat-ribbon labeling</b> (see CLIPLINE catalog)			
<b>Technical data</b>	IB IL 24 DO 2-PAC	IB IL 24 DO 8-PAC	
Local bus interface			
Type of connection	Inline data jumper	Inline data jumper	
Power supply for module electronics			
Supply voltage	24 V DC (via voltage jumper)	24 V DC (via voltage jumper)	
Range of supply voltages	19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC	
Current consumption from U <sub>L</sub>	Max. 33 mA	Max. 60 mA	
Digital outputs			
Connection system	2, 3, 4-wire	2, 3, 4-wire	
Number of outputs	2	8	
Maximum output current per channel	500 mA	500 mA	
Protective circuitry	Overload protection, short circuit protection of outputs	Overload protection, short circuit protection of outputs	



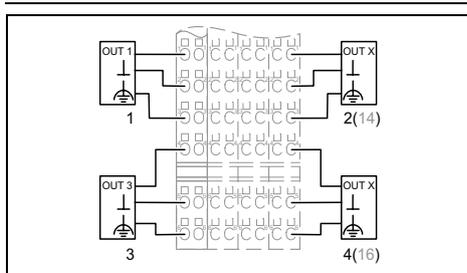
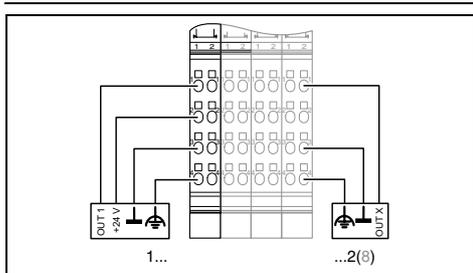
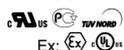
### IB IL 24 DO 2(8)-2A-PAC

Inline Modular digital output terminal,  
Outputs: 24 V DC, 2 A, 4-conductor connection method



### IB IL 24 DO 4(16)-PAC

Inline Modular digital output terminal,  
Outputs: 24 V DC, 500 mA, 3-conductor connection method



Type	Order No.	Pcs. Pkt.
IB IL 24 DO 2-2A-PAC	2861263	1
IB IL 24 DO 2-2A	2726243	1
IB IL DI/DO 8-PLSET/CP	2860963	1
IB IL SCN-8-CP	2727608	10
IB IL FIELD 2	2727501	10
IB IL FIELD 8	2727515	10
ESL 62X10	0809492	1
ESL 62X46	0809502	5
ZBF...		

Type	Order No.	Pcs. Pkt.
IB IL 24 DO 4-PAC	2861276	1
IB IL 24 DO 16-PAC	2861292	1
IB IL 24 DO 4	2726256	1
IB IL 24 DO 16	2726272	1
IB IL DO16-PLSET/OCF	2860992	1
IB IL SCN-12-OCF	2727624	10
IB IL FIELD 2	2727501	10
IB IL FIELD 8	2727515	10
ESL 62X10	0809492	1
ESL 62X46	0809502	5
ZBF...		

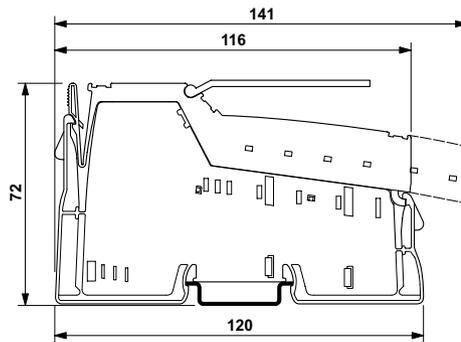
IB IL 24 DO 2-2A-PAC	
Inline data jumper	
24 V DC (via voltage jumper)	
19.2 V DC ... 30 V DC	
Max. 35 mA	
2, 3, 4-wire	-
2	-
2 A	-
Overload protection, short circuit protection of outputs	-

IB IL 24 DO 4-PAC		IB IL 24 DO 16-PAC	
Inline data jumper		Inline data jumper	
24 V DC (via voltage jumper)		24 V DC (via voltage jumper)	
19.2 V DC ... 30 V DC		19.2 V DC ... 30 V DC	
Max. 44 mA		Max. 90 mA	
2, 3-wire		2, 3-wire	
4		16	
500 mA		500 mA	
Overload protection, short circuit protection of outputs		Overload protection, short circuit protection of outputs	

### Digital input terminals

Digital Inline input terminals are designed for the connection of digital signals, such as are emitted from control switches, limit switches or proximity switches.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

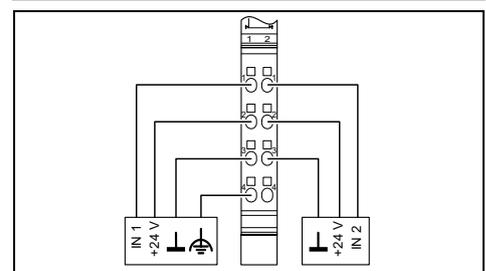


### IB IL 24 DI 2-PAC

Inline Modular digital input terminal,  
Inputs: 24 V DC, 4-conductor connection method

UL US P C UL ABS  
Ex: // Applied for: BV

	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



Description	Type	Order No.	Pcs. Pkt.
<b>Inline digital input terminal</b> , complete with accessories (plug connector and labeling field)	<b>IB IL 24 DI 2-PAC</b>	<b>2861221</b>	1
- NPN-wired	<b>IB IL 24 DI 2-NPN-PAC</b>	<b>2861483</b>	1
<b>Inline digital input terminal</b> , without accessories	<b>IB IL 24 DI 2</b>	<b>2726201</b>	1
- NPN-wired	<b>IB IL 24 DI 2-NPN</b>	<b>2740112</b>	1
<b>Connector set</b> for IB IL DI/DO 8	<b>IB IL SCN-8-CP</b>	<b>2727608</b>	10
<b>Connector set</b> for IB IL DI 16, color-coded	<b>IB IL FIELD 2</b>	<b>2727501</b>	10
<b>Inline connector</b>	<b>ESL 62X10</b>	<b>0809492</b>	1
<b>Labeling area</b> , width: 12.2 mm	<b>ZBF...</b>		
<b>Labeling area</b> , width: 48.8 mm			
<b>Marking sheet</b>			
<b>Marking sheet</b>			
<b>Flat-ribbon labeling</b> (see CLIPLINE catalog)			
<b>Technical data</b>			
Local bus interface			
Type of connection	Inline data jumper		
Power supply for module electronics			
Supply voltage	24 V DC (via voltage jumper)		
Range of supply voltages	19.2 V DC ... 30 V DC		
Current consumption from U <sub>L</sub>	Max. 35 mA		
Digital inputs			
Type of connection	Spring-cage connection		
Connection system	2, 3, 4-wire		
Number of inputs	2		
Description of the inputs	EN 61131-2 type 1		
Typical response time	< 1 ms		
General data			
Weight	38 g		
Width	-		
Ambient temperature (operation)	-25 °C ... 55 °C		



### IB IL 24 DI 8...-PAC

Inline Modular digital input terminal,  
Inputs: 24 V DC, 4-conductor connection method



### IB IL 24 DI 4(16)-PAC

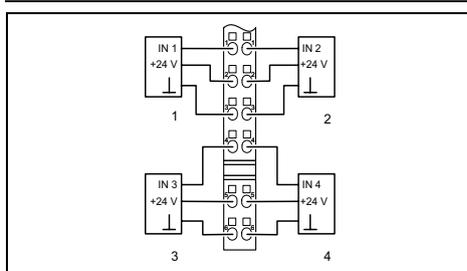
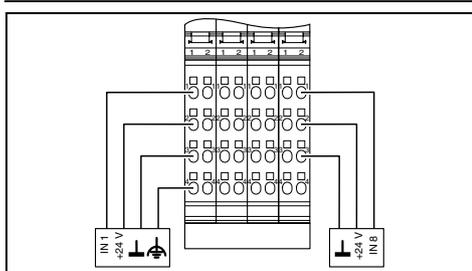
Inline Modular digital input terminal,  
Inputs: 24 V DC, 2 and 3-conductor connection method



Ex:



Ex:



Type	Order No.	Pcs. Pkt.	Type	Order No.	Pcs. Pkt.
IB IL 24 DI 8-PAC	2861247	1	IB IL 24 DI 4-PAC IB IL 24 DI 16-PAC	2861234 2861250	1 1
IB IL 24 DI 8	2726227	1	IB IL 24 DI 4 IB IL 24 DI 16	2726214 2726230	1 1
IB IL DI/DO 8-PLSET/CP	2860963	1	IB IL DI16-PLSET/CP	2860989	1
IB IL SCN-8-CP	2727608	10	IB IL SCN-12-ICP	2727611	10
IB IL FIELD 2	2727501	10	IB IL FIELD 2	2727501	10
IB IL FIELD 8	2727515	10	IB IL FIELD 8	2727515	10
ESL 62X10	0809492	1	ESL 62X10	0809492	1
ESL 62X46	0809502	5	ESL 62X46	0809502	5
ZBF...			ZBF...		

IB IL 24 DI 4-PAC	IB IL 24 DI 16-PAC
Inline data jumper	Inline data jumper
24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC Max. 50 mA	24 V DC (via voltage jumper) 19.2 V DC ... 30 V DC Max. 60 mA
Spring-cage connection 2, 3, 4-wire 8 EN 61131-2 type 1 < 1 ms	Spring-cage connection 2, 3-wire 16 EN 61131-2 type 1 < 1 ms
118 g	44 g
-	122 g
-25 °C ... 55 °C	-25 °C ... 55 °C

### Analog input terminals

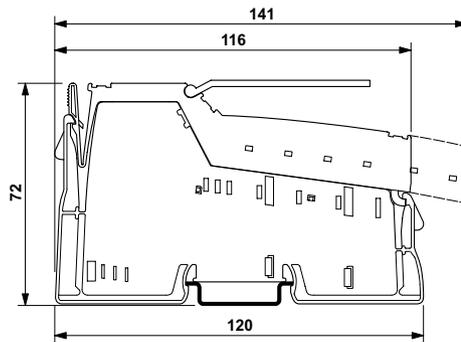
Measured value acquisition with 16-bit resolution combined with excellent interference suppression and common mode rejection is characteristic of Inline analog terminals. The ability to connect the shield directly on the terminal offers maximum protection even in EMC-critical environments.

The analog Inline input terminals are suited for connecting conventional sensors for the acquisition of current and voltage signals.

#### Software library CD

"CD AX SOFTWARE LIB" contains function blocks and sample programs for analog value processing.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

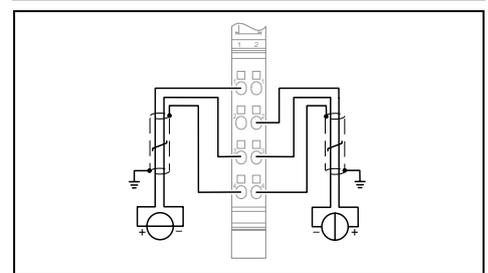


### IB IL AI 2/SF...-PAC

Inline Modular analog input terminal,  
Inputs: 0-20 mA, 4-20 mA,  $\pm 20$  mA, 0-10 V,  $\pm 10$  V,  
2-conductor connection method



	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16

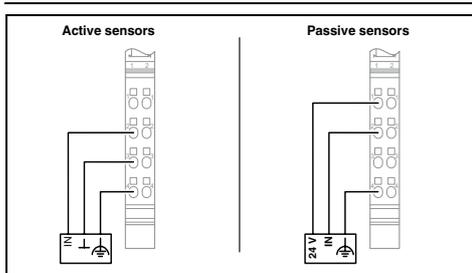


Description	Type	Order No.	Pcs. Pkt.
<b>Inline analog input terminal</b> , complete with accessories (connector and labeling field)	<b>IB IL AI 2/SF-PAC</b>	<b>2861302</b>	<b>1</b>
- HART functionality			
<b>Inline analog input terminal</b> , without accessories	<b>IB IL AI 2/SF</b>	<b>2726285</b>	<b>1</b>
- HART functionality			
<b>Software library</b> (CD-ROM, without license key), collection of function blocks, program examples, drivers and freeware function blocks	<b>CD AX SOFTWARE LIB</b>	<b>2819749</b>	<b>1</b>
<b>Shield connector</b>	<b>IB IL SCN 6-SHIELD-TWIN</b>	<b>2740245</b>	<b>5</b>
<b>Labeling area</b> , width: 12.2 mm	<b>IB IL FIELD 2</b>	<b>2727501</b>	<b>10</b>
<b>Labeling area</b> , width: 48.8 mm			
<b>Marking sheet</b>	<b>ESL 62X10</b>	<b>0809492</b>	<b>1</b>
<b>Flat-ribbon labeling</b> (see CLIPLINE catalog)	<b>ZBF...</b>		
<b>Technical data</b>			
Local bus interface			
Type of connection	Inline data jumper		
Power supply for module electronics			
I/O supply voltage $U_{ANA}$	24 V DC		
Current consumption from $U_{ANA}$	Max. 18 mA		
Communications voltage $U_L$	7.5 V DC		
Current consumption from $U_L$	Max. 60 mA		
Analog inputs			
Connection system	2-wire (shielded)		
Number of inputs	2		
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)		
Process data update	< 3 ms		
Data formats	IBS IL, IBS ST, IBS RT, standardized representation		
General data			
Weight	47 g		
Width	12.2 mm		



## IB IL AI 2-HART-PAC

Inline Modular analog input terminal.  
 Inputs: 0-25 mA, 4-20 mA, HART functionality and protocol transmission, 2-conductor connection method



Type	Order No.	Pcs. Pkt.
IB IL AI 2-HART-PAC	2862149	1
IB IL AI 2-HART	2860264	1
CD AX SOFTWARE LIB	2819749	1
IB IL SCN 6-SHIELD-TWIN	2740245	5
IB IL FIELD 8	2727515	10
ESL 62X10	0809492	1
ZBF...		

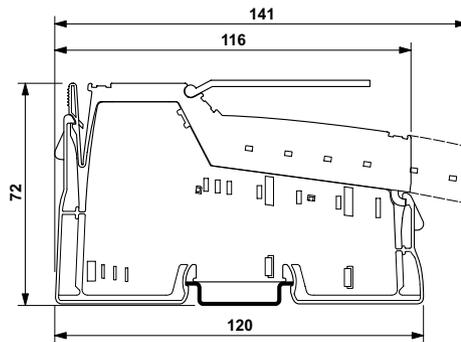
Inline data jumper
24 V DC Max. 150 mA
7.5 V DC Max. 110 mA
2-wire (shielded)
2
-
0 mA ... 25 mA / 4 mA ... 20 mA
16 bits (15 bits + sign)
< 3 ms
IB IL, standardized display
134 g
48.8 mm

### Analog input terminals

Measured value acquisition with a 16-bit resolution combined with excellent interference suppression and common mode rejection are characteristic of Inline analog modules. The ability to connect the shield directly on the terminal offers maximum protection even in EMC-critical environments.

Thermocouple measurement terminals (UTH) can also be optimally adapted in line with the given operating conditions using IB UTH CAL SWT calibration software for path alignment.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

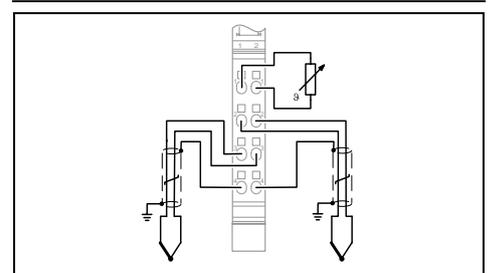


### IB IL TEMP 2 UTH-PAC

Inline Modular analog input terminal,  
Inputs: TC (thermocouple), 2-conductor connection method

UL US PC BL ABS  
Ex: Ex UL // Applied for: BV

	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



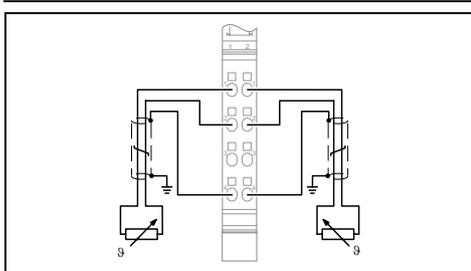
Description	Type	Order No.	Pcs. Pkt.
<b>Inline analog input terminal</b> , complete with accessories (connector and labeling field)	<b>IB IL TEMP 2 UTH-PAC</b>	<b>2861386</b>	<b>1</b>
<b>Inline analog input terminal</b> , without accessories	<b>IB IL TEMP 2 UTH</b>	<b>2727763</b>	<b>1</b>
<b>Software library</b> (CD-ROM, without license key), collection of function blocks, program examples, drivers and freeware function blocks	<b>CD AX SOFTWARE LIB</b>	<b>2819749</b>	<b>1</b>
<b>Shield connector</b>	<b>IB IL SCN 6-SHIELD-TWIN</b>	<b>2740245</b>	<b>5</b>
<b>Labeling area</b> , width: 12.2 mm	<b>IB IL FIELD 2</b>	<b>2727501</b>	<b>10</b>
<b>Marking sheet</b>	<b>ESL 62X10</b>	<b>0809492</b>	<b>1</b>
<b>Flat-ribbon labeling</b> (see CLIPLINE catalog)	<b>ZBF...</b>		
<b>Technical data</b>			
Local bus interface			
Inline local bus	Inline data jumper		
Power supply for module electronics			
I/O supply voltage $U_{ANA}$	24 V DC		
Current consumption from $U_{ANA}$	Max. 18 mA		
Communications voltage $U_L$	7.5 V DC		
Current consumption from $U_L$	Max. 60 mA		
Analog inputs			
Connection system	2-wire (shielded)		
Number of inputs	2		
Description of the input			
Linear resistance measuring range			
Sensor types which can be used	J,K,L,U,B,E,N,R,S,T,C,W,HK		
Measuring principle	Successive approximation		
Representation of measured value	16 bits two's complement and other		
Measured value resolution	16 bits		
Process data update	20 ms		
Data formats			
<b>General data</b>			
Weight	46 g		
Width	12.2 mm		
Ambient temperature (operation)	-25 °C ... 55 °C		



## IB IL TEMP 2 RTD-PAC

Inline Modular analog input terminal;  
 Inputs: RTD (resistance sensor); 2, 3, 4-conductor connection  
 method

Ex: // Applied for: BV



Type	Order No.	Pcs. Pkt.
IB IL TEMP 2 RTD-PAC	2861328	1
IB IL TEMP 2 RTD	2726308	1
CD AX SOFTWARE LIB	2819749	1
IB IL SCN 6-SHIELD-TWIN	2740245	5
IB IL FIELD 2	2727501	10
ESL 62X10	0809492	1
ZBF...		

Inline data jumper

24 V DC  
 Max. 18 mA  
 7.5 V DC  
 Max. 60 mA

2, 3, 4-wire (shielded)  
 2

0 Ω ... 400 Ω / 0 Ω ... 4000 Ω  
 PT, NI 10-2000 (DIN/SAMA), Cu 10/50/53 KTY 81, KTY 84  
 Successive approximation  
 16 bits two's complement and other  
 16 bits (15 bits + sign)  
 30 ms

46 g  
 12.2 mm  
 -25 °C ... 55 °C

### Analog output terminals

These output terminals are used in applications in which analog actuators are to be addressed.

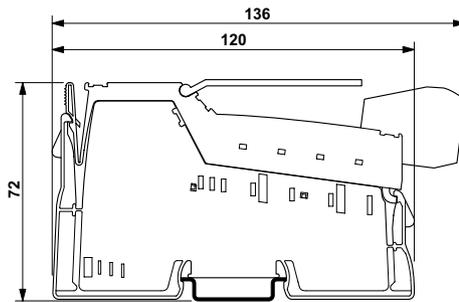
With these terminals, common current and voltage output ranges can be configured individually and channel-specifically. The analog signals are made available with a resolution of 16 bits. Each module is galvanically isolated from the supply voltage and the bus interface connection.

With Inline, all the analog current outputs are short-circuit proof.

The analog Inline output terminal IB IL AO 2/SF offers handling advantages such as "genuine" 4...20 mA outputs, which guarantee safe switch-on behavior. Separate contacts are available for 0...20 mA and the voltage output. Furthermore, the output behavior of this terminal can be parameterized, i.e. the output behavior in the event of a fault on the bus or in the control system can be predefined. The universal application capability is perfected by the fast reaction speed combined with a high degree of accuracy.

Software library CD "CD AX SOFTWARE LIB" contains function blocks and sample programs for analog value processing.

The Inline terminals can be labeled using hinged labeling fields. The fields have marking sheets that can be labeled individually to suit the application. The Zack marker strip ZBF 6... or Zack marker sheet ZBFM 6... can also be used for labeling the terminal points.

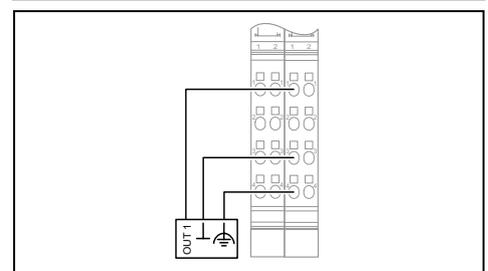


### IB IL AO 1/SF-PAC

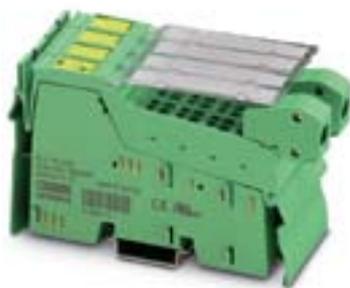
Inline Modular analog output terminal, Output: 0-20 mA, 4-20 mA, 0-10 V, 2-conductor connection method



Connection data	solid	stranded	AWG
	[mm <sup>2</sup> ]		
Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



Description	Type	Order No.	Pcs. Pkt.
<b>Inline analog output terminal</b> , complete with accessories (connector and labeling field)	<b>IB IL AO 1/SF-PAC</b>	<b>2861315</b>	<b>1</b>
<b>Inline analog output terminal</b> , without accessories	<b>IB IL AO 1/SF</b>	<b>2726298</b>	<b>1</b>
- Transmission rate 2 Mbps			
<b>Software library</b> (CD-ROM, without license key), collection of function blocks, program examples, drivers and freeware function blocks	<b>CD AX SOFTWARE LIB IB IL AO/CNT-PLSET</b>	<b>2819749 2732664</b>	<b>1 1</b>
<b>Connector set</b>	<b>IB IL FIELD 2</b>	<b>2727501</b>	<b>10</b>
<b>Shield connector</b> for analog Inline terminal blocks	<b>ESL 62X10</b>	<b>0809492</b>	<b>1</b>
<b>Labeling area</b> , width: 12.2 mm	<b>ZBF...</b>		
<b>Marking sheet</b>			
<b>Flat-ribbon labeling</b> (see CLIPLINE catalog)			
<b>Technical data</b>			
Local bus interface			
Type of connection	Inline data jumper		
Power supply for module electronics			
I/O supply voltage $U_{ANA}$	24 V DC		
Current consumption from $U_{ANA}$	Max. 65 mA		
Communications voltage $U_L$	7.5 V DC		
Current consumption from $U_L$	Max. 40 mA		
Analog outputs			
Connection system	2-wire		
Number of outputs	1		
Voltage output signal	0 V ... 10 V		
Load/output load voltage output	> 2 k $\Omega$		
Voltage output quantization	0.15 mV		
Current output signal	4 mA ... 20 mA / 0 A ... 20 mA		
Load/output load current output	< 500 $\Omega$		
Quantization current output	0.24 $\mu$ A		
Characteristics			
Representation of output values	16 bits		
DAC resolution	16 bits		
Process data update	< 1 ms		
General data			
Weight	90 g		
Width	24.4 mm		
Ambient temperature (operation)	-25 $^{\circ}$ C ... 55 $^{\circ}$ C		



### IB IL AO 2/SF-PAC

Inline Modular analog output terminal,  
Output: 0-20 mA, 4-20 mA, 0-10 V, 2-conductor connection method



### IB IL AO 1/U/SF-PAC

Inline Modular analog output terminal,  
Output: 0-10 V, 2-conductor connection method



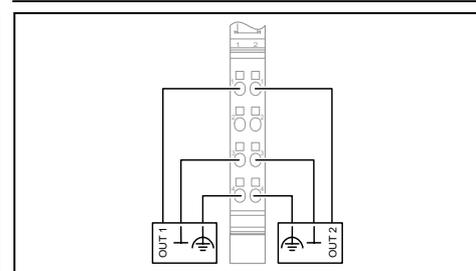
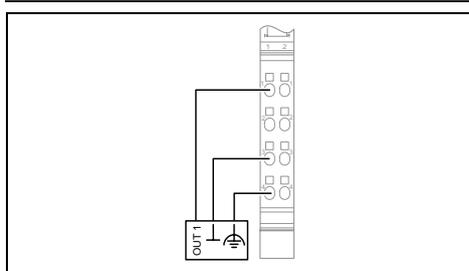
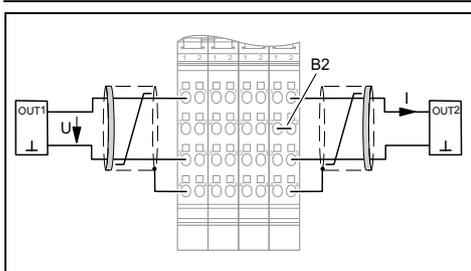
### IB IL AO 2/U/BP-PAC

Inline Modular analog output terminal,  
Output: 0-10 V, ±10 V, 2-conductor connection method

UL US CE RoHS ABS  
Ex: // Applied for: BV

UL US CE RoHS  
Ex:

UL US CE RoHS  
Ex:



Type	Order No.	Pcs. Pkt.
IB IL AO 2/SF-PAC	2863083	1
IB IL AO 2/SF	2862806	1
IB IL AO 2/SF-2MBD	2860426	1
CD AX SOFTWARE LIB	2819749	1
IB IL SCN-6 SHIELD	2726353	5
IB IL FIELD 2	2727501	10
ESL 62X10	0809492	1
ZBF...		

Type	Order No.	Pcs. Pkt.
IB IL AO 1/U/SF-PAC	2861399	1
IB IL AO 1/U/SF	2727776	1
CD AX SOFTWARE LIB	2819749	1
IB IL SCN 6-SHIELD-TWIN	2740245	5
IB IL FIELD 2	2727501	10
ESL 62X10	0809492	1
ZBF...		

Type	Order No.	Pcs. Pkt.
IB IL AO 2/U/BP-PAC	2861467	1
IB IL AO 2/U/BP	2732732	1
CD AX SOFTWARE LIB	2819749	1
IB IL SCN-6 SHIELD	2726353	5
IB IL FIELD 2	2727501	10
ESL 62X10	0809492	1
ZBF...		

Inline data jumper
24 V DC Max. 95 mA 7.5 V DC Max. 45 mA
2-wire (shielded) 2 0 V ... 10 V > 2 kΩ 2.441 mV 4 mA ... 20 mA / 0 A ... 20 mA < 500 Ω 0.53 μA
16 bits 16 bits < 1 ms
125 g 48.8 mm -25 °C ... 55 °C

Inline data jumper
24 V DC Max. 20 mA 7.5 V DC Max. 40 mA
2-wire (shielded) 1 0 V ... 10 V > 2 kΩ 0.15 mV - -
16 bits 16 bits < 1 ms
46 g 12.2 mm -25 °C ... 55 °C

Inline data jumper
24 V DC Max. 35 mA 7.5 V DC Max. 40 mA
2-wire (shielded) 2 0 V ... 10 V / -10 V ... 10 V > 2 kΩ 0.33 mV - > 2 kΩ -
16 bits 13 bits < 2 ms
46 g 12.2 mm -25 °C ... 55 °C

# I/O systems in the IP20 control cabinet

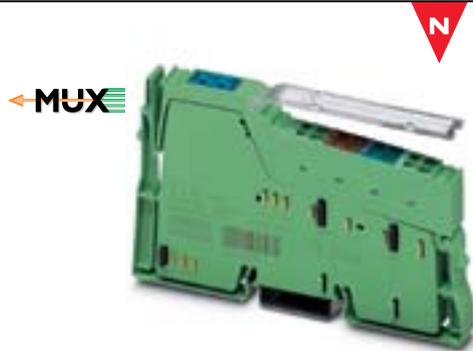
## Inline Modular

### Digital input terminals 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.

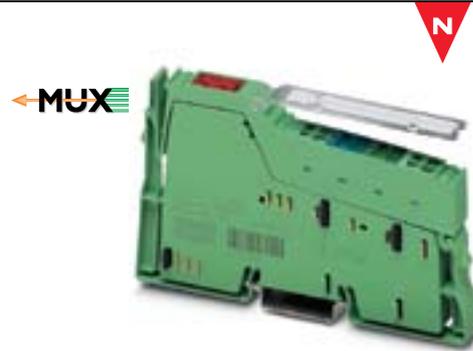
The digital Inline input terminal is designed for the connection of digital signals, such as are emitted from control switches, limit switches or proximity switches, and the digital Inline output terminals are designed for the connection of digital actuators, such as electromagnetic valves, contactors or visual indicators.

The digital ME variants are only available in packages of 4.



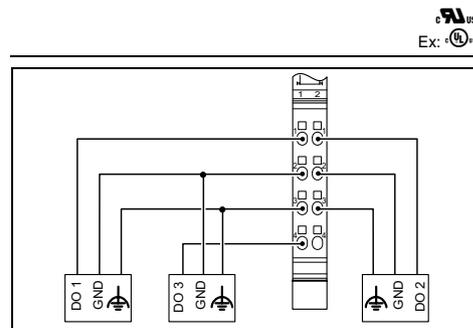
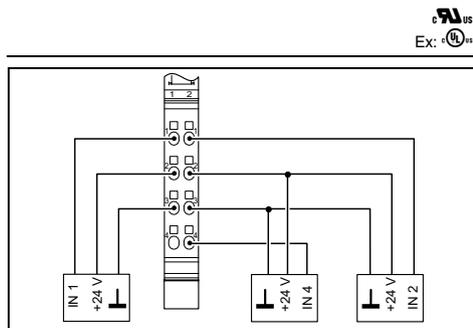
**IB IL 24 DI ...-ME**

Inline Modular digital input terminal (Machine Edition),  
Inputs: 24 V DC, 3-conductor connection method



**IB IL 24 DO ...-ME**

Inline Modular digital output terminal (Machine Edition),  
Outputs: 24 V DC, 3-conductor connection method



Description
<b>Inline digital input terminal</b> , Machine Edition variant, complete with accessories (connector and labeling field) - 4 inputs
<b>Inline digital output terminal</b> , Machine Edition variant, complete with accessories (connector and labeling field) - 4 outputs
<b>Labeling area</b> , width: 12.2 mm
<b>Marking sheet</b>
<b>Flat-ribbon labeling</b> (see CLIPLINE catalog)
<b>Technical data</b>
Local bus interface
Type of connection
Power supply for module electronics
Supply voltage
Range of supply voltages
Supply current
<b>Digital inputs</b>
Type of connection
Connection system
Number of inputs
Description of the inputs
Typical response time
<b>Digital outputs</b>
Type of connection
Connection system
Number of outputs
Maximum output current per channel
<b>General data</b>
Weight
Width
Ambient temperature (operation)

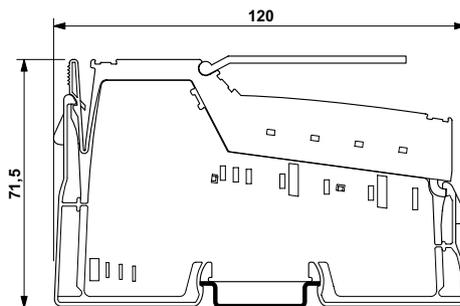
Type	Order No.	Pcs. Pkt.
<b>IB IL 24 DI 4-ME</b>	<b>2863928</b>	4
<b>IB IL FIELD 2</b>	<b>2727501</b>	10
<b>ESL 62X10</b>	<b>0809492</b>	1
<b>ZBF...</b>		
IB IL 24 DI 4-ME		
Inline data jumper		
24 V DC (via voltage jumper)		
19.2 V DC ... 30 V DC		
40 mA		
Spring-cage connection	-	
3-conductor	-	
4	-	
EN 61131-2 type 1	-	
< 1 ms	-	
-	-	
-	-	
-	-	
-	-	
44 g		
-25 °C ... 55 °C		

Type	Order No.	Pcs. Pkt.
<b>IB IL 24 DO 4-ME</b>	<b>2863931</b>	4
<b>IB IL FIELD 2</b>	<b>2727501</b>	10
<b>ESL 62X10</b>	<b>0809492</b>	1
<b>ZBF...</b>		
IB IL 24 DO 4-ME		
Inline data jumper		
24 V DC (nominal value)		
19.2 V DC ... 30 V DC		
44 mA		
-	-	
-	-	
-	-	
-	-	
-	-	
Spring-cage connection	-	
2, 3-wire	-	
4	-	
500 mA	-	
44 g		
-25 °C ... 55 °C		

**Analog input terminals  
 Machine Edition (ME)**

The IB IL AI 2/SF-ME analog input terminal provides, all common signals for current and voltage sensors, with a 12-bit resolution.

The analog ME variants can be individually ordered, unlike the digital ME variants.

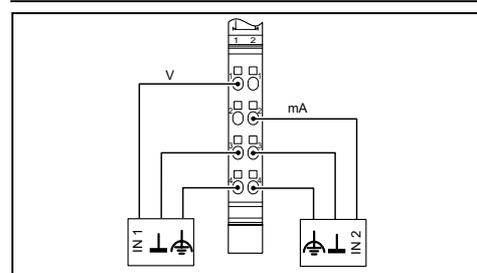


**IB IL AI 2/SF-ME**

Inline Modular analog input terminal (Machine Edition),  
 Inputs: 0-20 mA, 4-20 mA, ±20 mA, 0-10 V, ±10 V, 2-conductor connection method



	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



Description	<b>Inline analog input terminal</b> , Machine Edition variant, complete with accessories (connector and labeling field)	
Labeling area, width: 12.2 mm		
Marking sheet		
Flat-ribbon labeling (see CLIPLINE catalog)		

Type	Order No.	Pcs. Pkt.
IB IL AI 2/SF-ME	2863944	1
IB IL FIELD 2	2727501	10
ESL 62X10	0809492	1
ZBF...		

<b>Technical data</b>	
Local bus interface	
Type of connection	Inline data jumper
Power supply for module electronics	
I/O supply voltage U <sub>ANA</sub>	24 V DC
Current consumption from U <sub>ANA</sub>	Max. 18 mA
<b>Analog inputs</b>	
Connection system	2, 3-wire
Number of inputs	2
Voltage input signal	-10 V ... 10 V (± 10 V) / 0 V ... 10 V
Current input signal	0 mA ... 20 mA / 4 mA ... 20 mA / -20 mA ... 20 mA
Measured value resolution	12 bits
Process data update	< 3 ms
Data formats	IBS IL, IBS ST, IBS RT, standardized representation
<b>General data</b>	
Weight	47 g
Width	12.2 mm
Ambient temperature (operation)	-25 °C ... 55 °C

### Inline Block IO PROFINET

This Inline Block IO module can be operated directly in a PROFINET network. It provides 16 inputs and 16 channels that can be used as inputs or outputs. Connection takes place by simply selecting the connection for an actuator or sensor. The connection to the Ethernet is established with RJ45 connectors. Two ports are found on the module. Due to the integrated switch, it is possible to connect an additional module and thus to implement a line structure.

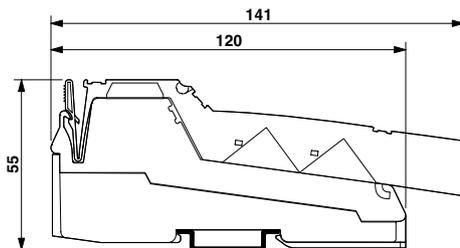
The transmission rate is 10 or 100 Mbps and is automatically selected by the module (autonegotiation).

The various supply voltages and the I/Os are connected with supplied and assembled Inline connectors. The connectors can be coded to prevent them from being accidentally mismatched. The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-conductor system. These Inline Block IO modules thus form a compact unit for the direct connection of inputs and outputs to the network.

Diagnostic LEDs on the module and comprehensive diagnostic messages via the Ethernet provide support if service becomes necessary and guarantee a high degree of system availability.

The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the module, and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.

Matching accessories, such as dust protection covers and safety systems for RJ45 connectors, are found in our Factory Line range.

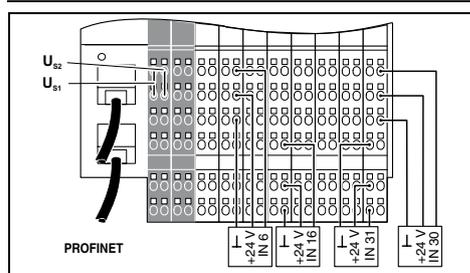


### ILB PN 24 DI16 DIO16-2TX

Inline Block IO digital input/output module, PROFINET  
Inputs: 24 V DC, outputs: 24 V DC, 500 mA,  
2 and 3-conductor connection method



	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



Description	Type	Order No.	Pcs. Pkt.
<b>Inline Block IO digital input/output module</b> for PROFINET - 16 fixed inputs, 16 freely selectable inputs/outputs	<b>ILB PN 24 DI16 DIO16-2TX</b>	<b>2878146</b>	<b>1</b>
<b>Technical data</b>			
<b>Interface</b>			
Fieldbus system	PROFINET		
Type of connection	RJ45 female connector		
No.	2		
Transmission speed	10/100 MBit/s (with autonegotiation)		
<b>Power supply for module electronics</b>			
Supply voltage	24 V DC		
Range of supply voltages	19.2 V DC ... 30 V DC		
Supply current	60 mA		
<b>Digital inputs</b>			
Type of connection	Spring-cage connection		
Connection system	2, 3-wire		
Number of inputs	32		
Description of the input	16 fixed and 16 freely selectable		
Typical response time	Approx. 500 µs		
Protective circuitry	Short circuit protection, overload protection of the sensor supply		
<b>Digital outputs</b>			
Type of connection	Spring-cage connection		
Connection system	2-wire		
Number of outputs	16		
Output description	Freely selectable		
Maximum output current per channel	500 mA		
Protective circuitry	Short circuit and overload protection		
<b>General data</b>			
Weight	500 g		
Degree of protection	IP20		
Width	156 mm		

**Inline Block IO Ethernet**

This Inline Block IO module can be operated directly in an Ethernet network. It provides 16 inputs and 16 channels that can be used as inputs or outputs. Connection takes place by simply selecting the connection for an actuator or sensor. The connection to the Ethernet is established with RJ45 connectors. Two ports are found on the module. Due to the integrated switch, it is possible to connect an additional module and thus to implement a line structure.

The modules support the network/application protocols:

- BootP
- http (Web server)
- SNMP
- Modbus/TCP
- DDI

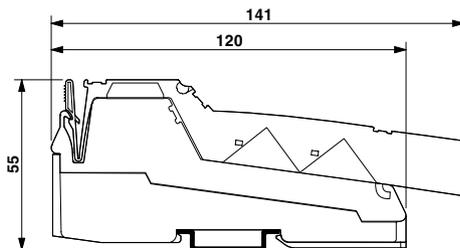
The transmission rate is 10 or 100 Mbps and is automatically selected by the module (autonegotiation).

The various supply voltages and the I/Os are connected with supplied and assembled Inline connectors. The connectors can be coded to prevent them from being accidentally mismatched. The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-conductor system. These Inline Block IO modules thus form a compact unit for the direct connection of inputs and outputs to the network.

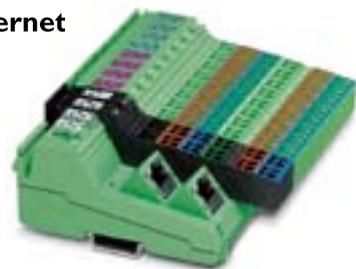
Diagnostic LEDs on the module and comprehensive diagnostic messages via the Ethernet provide support if service becomes necessary and guarantee a high degree of system availability.

The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the modules and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.

Matching accessories, such as dust protection covers and safety systems for RJ45 connectors, are found in our Factory Line range.



**Ethernet**

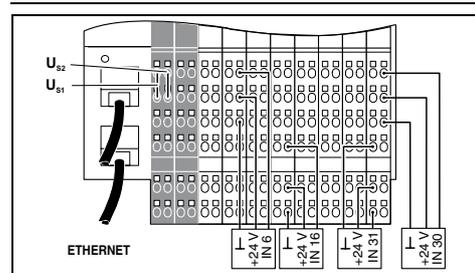


**ILB ETH 24 DI16 DIO16-2TX**

Inline Block IO digital input/output module, Modbus TCP/IP  
 Inputs: 24 V DC, outputs: 24 V DC, 500 mA,  
 2 and 3-conductor connection method



	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



Description
<b>Inline Block IO digital input/output module</b> - 16 fixed inputs, 16 freely selectable inputs/outputs
<b>Technical data</b>
<b>Interface</b>
Fieldbus system
Type of connection
No.
Transmission speed
<b>Power supply for module electronics</b>
Supply voltage
Range of supply voltages
Supply current
<b>Digital inputs</b>
Type of connection
Connection system
Number of inputs
Description of the input
Typical response time
Protective circuitry
<b>Digital outputs</b>
Type of connection
Connection system
Number of outputs
Output description
Maximum output current per channel
Protective circuitry
<b>General data</b>
Weight
Degree of protection
Width

Type	Order No.	Pcs. Pkt.
<b>ILB ETH 24 DI16 DIO16-2TX</b>	<b>2832962</b>	<b>1</b>
<b>Modbus TCP/IP</b>		
RJ45 female connector		
2		
10/100 MBit/s (with autonegotiation)		
<b>24 V DC</b>		
19.2 V DC ... 30 V DC		
60 mA		
<b>Spring-cage connection</b>		
2, 3-wire		
32		
16 fixed and 16 freely selectable		
Approx. 500 µs		
Short circuit protection, overload protection of the sensor supply		
<b>Spring-cage connection</b>		
2-wire		
16		
Freely selectable		
500 mA		
Short circuit and overload protection		
<b>500 g</b>		
<b>IP20</b>		
<b>156 mm</b>		

### Inline Block IO CANopen

This Inline Block IO module can be coupled directly to the CANopen network as a slave. It provides inputs and outputs on 16 channels.

The remote bus is connected via a 9-pos. D-Sub connector, e.g. the SUBCON-PLUS-CAN from Phoenix Contact.

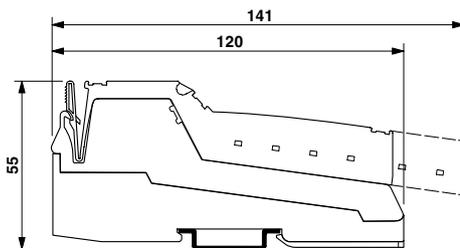
The supplied and mounted Inline connectors are used to connect the various supply voltages and the I/Os. The connectors can be coded to prevent them from being accidentally mismatched. The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-conductor system. These Inline Block IO modules thus form a compact unit for the direct connection of inputs and outputs to the network.

The bus address is easy to set using DIP switches on the module. Data transmission rates are automatically detected and set.

Diagnostic LEDs on the module and comprehensive diagnostic messages via the fieldbus support the user if service becomes necessary and guarantee a high degree of system availability.

The required device master data EDS file can be downloaded from the Internet ([www.phoenixcontact.com](http://www.phoenixcontact.com)) for configuration purposes.

The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the module and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.



Connection data	solid stranded		AWG
	[mm <sup>2</sup> ]		
Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16

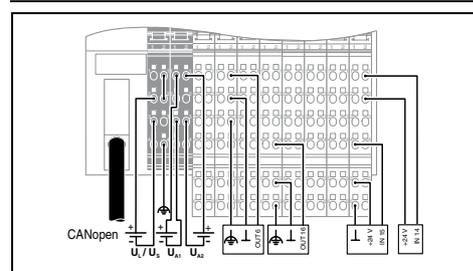
Description	
<b>Inline Block IO digital input/output module</b> - 16 inputs, 16 outputs	
Technical data	
Interface	
Fieldbus system	CANopen
Type of connection	D-SUB-9 female connector
Transmission speed	10 kBit/s bis 1 MBit/s
Power supply for module electronics	
Supply voltage	24 V DC
Range of supply voltages	19.2 V DC ... 30 V DC
Supply current	25 mA
Digital inputs	
Type of connection	Spring-cage connection
Connection system	2, 3-wire
Number of inputs	16
Description of the input	EN 61131-2 type 1
Typical response time	Approx. 500 µs
Protective circuitry	Short circuit protection, overload protection of the sensor supply
Digital outputs	
Type of connection	Spring-cage connection
Connection system	2, 3-wire
Number of outputs	16
Maximum output current per channel	500 mA
Protective circuitry	Short circuit/overload protection
General data	
Weight	500 g
Degree of protection	IP20
Width	156 mm

CANopen



### ILB CO 24 DI16 DO16

Inline Block IO digital input/output module, CANopen,  
Inputs: 24 V DC, outputs: 24 V DC, 500 mA,  
2 and 3-conductor connection method



Type	Order No.	Pcs. Pkt.
<b>ILB CO 24 DI16 DO16</b>	<b>2862592</b>	<b>1</b>
CANopen		
D-SUB-9 female connector		
10 kBit/s bis 1 MBit/s		
Power supply for module electronics		
Supply voltage	24 V DC	
Range of supply voltages	19.2 V DC ... 30 V DC	
Supply current	25 mA	
Digital inputs		
Type of connection	Spring-cage connection	
Connection system	2, 3-wire	
Number of inputs	16	
Description of the input	EN 61131-2 type 1	
Typical response time	Approx. 500 µs	
Protective circuitry	Short circuit protection, overload protection of the sensor supply	
Digital outputs		
Type of connection	Spring-cage connection	
Connection system	2, 3-wire	
Number of outputs	16	
Maximum output current per channel	500 mA	
Protective circuitry	Short circuit/overload protection	
General data		
Weight	500 g	
Degree of protection	IP20	
Width	156 mm	



### Inline Block IO INTERBUS

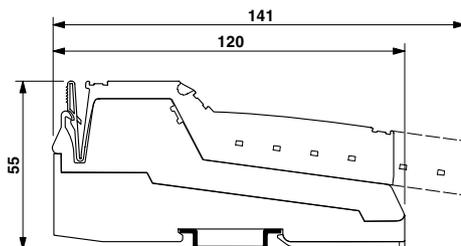
These Inline Block IO modules can be coupled to the INTERBUS fieldbus system. Depending on the version of the module, they offer various combinations of inputs and outputs with 16 or 32 channels.

The remote bus is connected with the familiar Inline connectors using the spring-cage connection method. Inline connectors are also used to connect the various supply voltages and the I/Os. All connectors are included in the scope of supply. The connectors can be coded to prevent them from being accidentally swapped.

The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-conductor system. The Inline Block IO modules thus form a compact unit for the direct connection of inputs and outputs to the INTERBUS remote bus.

Diagnostic LEDs on the module and comprehensive diagnostic messages via the fieldbus support the user if service becomes necessary and guarantee a high degree of system availability.

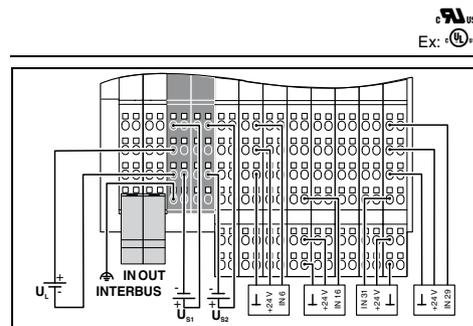
The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the module and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.



### ILB IB 24 DI...

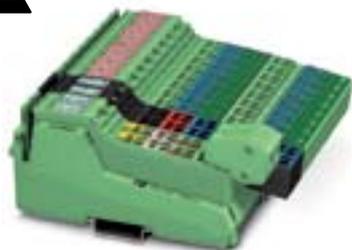
Inline Block IO digital input module, INTERBUS, Inputs: 24 V DC, 2 and 3-conductor connection method

	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



Description
<b>Inline Block IO digital input module</b> - 16 inputs - 32 inputs
<b>Inline Block IO digital output module</b> - 16 outputs - 32 outputs
<b>Inline Block IO digital input/output module</b> - Eight inputs, eight outputs - 16 inputs, 16 outputs
<b>Technical data</b>
<b>Interface</b>
Fieldbus system
Type of connection
Transmission speed
<b>Power supply for module electronics</b>
Supply voltage
Range of supply voltages
Supply current
<b>Digital inputs</b>
Type of connection
Connection system
Number of inputs
Description of the input
Typical response time
Protective circuitry
<b>Digital outputs</b>
Type of connection
Connection system
Number of outputs
Maximum output current per channel
Protective circuitry
<b>General data</b>
Weight
Degree of protection
Width

Type	Order No.	Pcs. Pkt.
ILB IB 24 DI16	2862330	1
ILB IB 24 DI32	2862343	1
ILB IB 24 DI16	ILB IB 24 DI32	
INTERBUS	INTERBUS	
Inline connectors	Inline connectors	
500 kBit/s	500 kBit/s	
24 V DC	24 V DC	
19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC	
80 mA	60 mA	
Spring-cage connection	Spring-cage connection	
2, 3-wire	2, 3-wire	
16	32	
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	
-	-	
-	-	
-	-	
-	-	
-	-	
300 g	405 g	
IP20	IP20	
95 mm	156 mm	



### ILB IB 24 DO...

Inline Block IO digital output module, INTERBUS,  
Outputs: 24 V DC, 500 mA, 2 and 3-conductor connection method



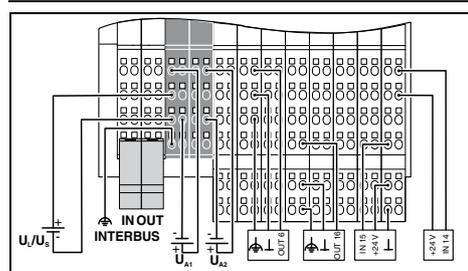
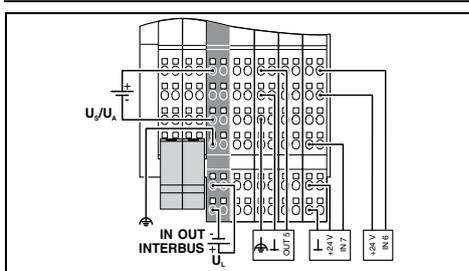
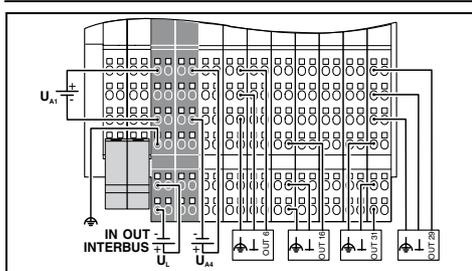
### ILB IB 24 DI 8 DO 8

Inline Block IO digital input/output module, INTERBUS,  
Inputs: 24 V DC, outputs: 24 V DC, 500 mA,  
2 and 3-conductor connection method



### ILB IB 24 DI16 DO16

Inline Block IO digital input/output module, INTERBUS,  
Inputs: 24 V DC, outputs: 24 V DC, 500 mA,  
2 and 3-conductor connection method



Type	Order No.	Pcs. Pkt.
ILB IB 24 DO16	2862356	1
ILB IB 24 DO32	2862369	1

Type	Order No.	Pcs. Pkt.
ILB IB 24 DI 8 DO 8	2862372	1

Type	Order No.	Pcs. Pkt.
ILB IB 24 DI16 DO16	2862385	1

ILB IB 24 DO16	ILB IB 24 DO32
INTERBUS	INTERBUS
Inline connectors	Inline connectors
500 kBit/s	500 kBit/s
24 V DC	24 V DC
19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC
80 mA	85 mA
-	-
-	-
-	-
-	-
-	-
-	-
Spring-cage connection	Spring-cage connection
2, 3-wire	2, 3-wire
16	32
500 mA	500 mA
Short circuit/overload protection	Short circuit/overload protection
300 g	510 g
IP20	IP20
95 mm	156 mm

INTERBUS
Inline connectors
500 kBit/s
24 V DC
19.2 V DC ... 30 V DC
60 mA
Spring-cage connection
2, 3-wire
8
EN 61131-2 type 1
Approx. 500 µs
Short circuit protection, overload protection of the sensor supply
Spring-cage connection
2, 3-wire
8
500 mA
Short circuit/overload protection
350 g
IP20
95 mm

INTERBUS
Inline connectors
500 kBit/s
24 V DC
19.2 V DC ... 30 V DC
80 mA
Spring-cage connection
2, 3-wire
16
EN 61131-2 type 1
Approx. 500 µs
Short circuit protection, overload protection of the sensor supply
Spring-cage connection
2, 3-wire
16
500 mA
Short circuit/overload protection
500 g
IP20
156 mm

### Inline Block IO PROFIBUS/DeviceNet™

These Inline Block IO modules can be directly connected to the respective fieldbus system as slaves. They offer various combinations of inputs and outputs with 16 or 32 channels depending on the version of the module.

In the PROFIBUS variant, the remote bus is connected via a 9-pos. D-Sub connector, e.g. the SUBCON-PLUS-PROFIB from Phoenix Contact. In the case of the DeviceNet™ version, the remote bus is connected with the TWIN-COMBICON connector supplied.

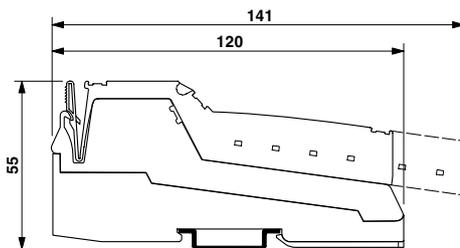
The various supply voltages and the I/Os are connected with supplied and assembled Inline connectors. The connectors can be coded to prevent them from being accidentally mated. The different color-coded jumpering levels on the module allow sensors and actuators to be connected using the multi-conductor system. These Inline Block IO modules thus form a compact unit for the direct connection of inputs and outputs to the network.

The bus address is easily set using DIP switches on the module or, in case of DeviceNet™, using the software. Data transmission rates are automatically detected and set.

Diagnostic LEDs on the module and comprehensive diagnostic messages via the fieldbus support the user if service becomes necessary and guarantee a high degree of system availability.

The required device master data or EDS file can be downloaded from the Internet ([www.phoenixcontact.com](http://www.phoenixcontact.com)) for configuration purposes.

The modules can be labeled using hinged labeling fields. The clearly identifiable terminal point designations printed on the module and the additional options for marking with the Zack marker strip provide valuable support during configuration and installation.

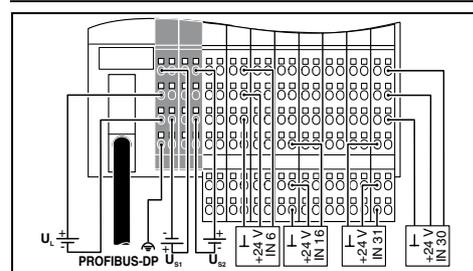


### ILB PB 24 DI(DO) 32

Inline Block IO digital input/output module, PROFIBUS,  
Inputs: 24 V DC, outputs: 24 V DC, 500 mA,  
2 and 3-conductor connection method



	solid	stranded	
	[mm <sup>2</sup> ]		AWG
Connection data Inline connectors			
Spring-cage connection	0.2-1.5	0.2-1.5	24-16



Description	Type	Order No.	Pcs. Pkt.
<b>Inline Block IO digital input module</b> - 32 inputs	ILB PB 24 DI32	2862398	1
<b>Inline Block IO digital output module</b> - 32 outputs	ILB PB 24 DO32	2862408	1
<b>Inline Block IO digital input/output module</b> - 16 inputs, 16 outputs - Eight inputs, eight inputs or outputs			
<b>Technical data</b>			
<b>Interface</b>			
Fieldbus system	PROFIBUS	PROFIBUS	
Type of connection	D-SUB-9 female connector	D-SUB-9 female connector	
Transmission speed	9,6 kBit/s bis 12 MBit/s	9,6 kBit/s bis 12 MBit/s	
<b>Power supply for module electronics</b>			
Supply voltage	24 V DC	24 V DC	
Range of supply voltages	19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC	
Supply current	50 mA	70 mA	
<b>Digital inputs</b>			
Type of connection	Spring-cage connection	-	
Connection system	2, 3-wire	-	
Number of inputs	32	-	
Description of the input	EN 61131-2 type 1	-	
Typical response time	Approx. 500 µs	-	
Protective circuitry	Short circuit protection, overload protection of the sensor supply	-	
<b>Digital outputs</b>			
Type of connection	-	Spring-cage connection	
Connection system	-	2, 3-wire	
Number of outputs	-	32	
Output description	-	-	
Maximum output current per channel	-	500 mA	
Protective circuitry	-	Short circuit/overload protection	
<b>General data</b>			
Weight	510 g	510 g	
Degree of protection	IP20	IP20	
Width	156 mm	156 mm	



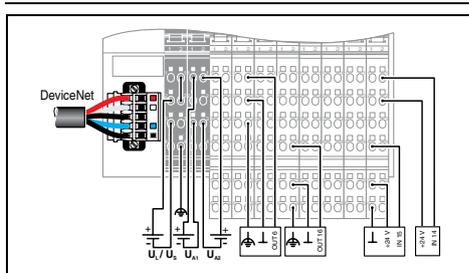
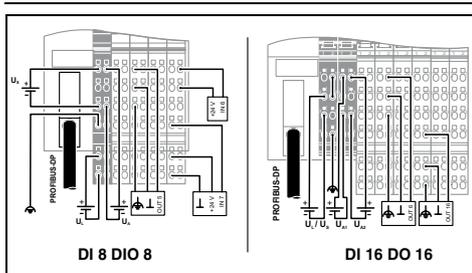
### ILB PB 24 DI... D(I)O...

Inline Block IO digital input/output module, PROFIBUS,  
Inputs: 24 V DC, outputs: 24 V DC, 500 mA,  
2 and 3-conductor connection method



### ILB DN 24 DI... D(I)O...

Inline Block IO digital input/output module, DeviceNet™,  
Inputs: 24 V DC, outputs: 24 V DC, 500 mA,  
2 and 3-conductor connection method



Type	Order No.	Pcs. Pkt.
ILB PB 24 DI16 DO16	2862411	1
ILB PB 24 DI 8 DIO8	2863562	1

Type	Order No.	Pcs. Pkt.
ILB DN 24 DI16 DO16	2862602	1

ILB PB 24 DI16 DO16	ILB PB 24 DI 8 DIO8
PROFIBUS D-SUB-9 female connector 9,6 kBit/s bis 12 MBit/s	PROFIBUS D-SUB-9 female connector 9,6 kBit/s bis 12 MBit/s
24 V DC 19.2 V DC ... 30 V DC 70 mA	24 V DC 19.2 V DC ... 30 V DC 60 mA
Spring-cage connection 2, 3-wire 16 EN 61131-2 type 1 Approx. 500 µs Short circuit protection, overload protection of the sensor supply	Spring-cage connection 2, 3-wire 16 8 fixed and 8 freely selectable Approx. 500 µs Short circuit protection, overload protection of the sensor supply
Spring-cage connection 2, 3-wire 16 - 500 mA Short circuit/overload protection	Spring-cage connection 2, 3-wire 8 Freely selectable 500 mA Short circuit/overload protection
500 g IP20 156 mm	350 g IP20 95 mm

ILB DN 24 DI16 DO16
DeviceNet™ 2 x 5-pos. TWIN-COMBICON connectors 125 kBit/s bis 500 kBit/s
24 V DC 19.2 V DC ... 30 V DC 70 mA
Spring-cage connection 2, 3-wire 16 EN 61131-2 type 1 Approx. 500 µs Short circuit protection, overload protection of the sensor supply
Spring-cage connection 2, 3-wire 16 - 500 mA Short circuit/overload protection
500 g IP20 156 mm

**Managed switch**

**Always the right solution: Modular managed Factory Line switches**

Customized to the particular connection requirements in respect to: the number of ports, connectors and transmission medium. Factory Line modular switches solve the toughest Ethernet installation problems: the Factory Line Modular Managed Switch is the first industrial switch that can be expanded from 8 ports to 24 ports all the way through.

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, glass fiber or the cost effective Ethernet installation with polymer and HCS fibers, all designed to carry out the particular job at hand.

The switches are ideal for PROFINET realtime and EtherNet/IP applications and support the management functions required for this. Powerful full wire speed switching fabric provides high data throughput and top time response.

Redundant network structures are possible via the rapid spanning tree IEEE 802.1w protocol or fast ring detection. Isolated switching of redundant PROFINET networks is possible.



**FL SWITCH MM HS**

Modular managed switch, head station



Description	Type	Order No.	Pcs. Pkt.
<b>Modular switch system</b> , head station can be expanded to 24 Ethernet ports	<b>FL SWITCH MM HS</b>	<b>2832328</b>	<b>1</b>
<b>Expansion</b> , 8 Ethernet ports			
<b>Programming cable</b>	<b>PRG CAB MINI DIN</b>	<b>2730611</b>	<b>1</b>
<b>Labeling field</b>	<b>FL M LABEL</b>	<b>2891055</b>	<b>1</b>
<b>Technical data</b>			
<b>Ethernet interface</b>			
Number of ports	8 can be expanded to a maximum of 24 ports		
Transmission speed	10/100 MBit/s		
Type of connection	8 ports via FL IF (interface) modules		
<b>Fiber optic interface</b>			
Number of ports	8 can be expanded to a maximum of 24 ports		
Type of connection	Via interface modules		
Wave length	-		
Transmission length	Up to 10000 m (depending on the fiber used)		
<b>Other connections</b>			
Serial (RS-232)	RS-232-C, 6-pos. MINI-DIN female connector (PS/2)		
<b>Function</b>			
Basic functionality	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), port security, Profinet IO device, DHCP option 82 relay agent		
	MIBs supported: SNMP (Enterprise, MIB II, Bridge, RMON, IF MIB), RMON MIB with the following groups: 1-statistics, 2-history, 3-alarm and 9-event		
	32 port-based, dynamic via GVRP		
	Spanning Tree 802.1d, Rapid Spanning Tree 802.1w, Fast Ring Detection		
	Per Ethernet 2 status LEDs: LINK and switch-over Status Activity, 100, full-duplex, supply voltage $U_{S1}$ und $U_{S2}$ (redundant supply voltage) and FAIL, two-digit 7-segment display		
	SNMP – Simple Network Management Protocol		
	VLAN – Virtual Local Area Network		
	Redundancy		
	Status and diagnostics displays		
<b>Network extension parameters</b>			
Cascading depth	Network, line 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>		
Range of supply voltages	18.5 V DC ... 30.2 V DC		
Typical current consumption	350 mA (Up to 3500 mA, depending on the configuration)		
<b>General data</b>			
Weight	1350 g		
Width	214 mm		
Height	95 mm		
Depth	115 mm		
Degree of protection	IP20		
Ambient temperature (operation)	0 °C ... 55 °C (non-condensing)		
Ambient temperature (storage/transport)	-20 °C ... 70 °C		
Permissible humidity (operation)	10 % ... 95 % (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-3/-4		
Immunity to interference	EN 61000-6-2		

Ethernet



**FL MXT**  
Expansion



Type	Order No.	Pcs. Pkt.
FL MXT	2832331	1
FL M LABEL	2891055	1

-  
10/100 MBit/s  
8 ports via FL IF (interface) modules

-  
Via interface modules

-  
Up to 10000 m (depending on the fiber used)

-  
Expansion module for modular managed switch

Via head station

-  
LEDs for media modules

-  
-  
-  
-  
-  
(via head station)

550 g  
127 mm  
95 mm  
115 mm  
IP20  
0 °C ... 55 °C (non-condensing)  
-20 °C ... 70 °C  
10 % ... 95 % (non-condensing)  
Conformance with EMC directive 89/336/EEC  
EN 61000-6-3/-4  
EN 61000-6-2

**Interface modules for modular managed switch**

The Modular Managed Switch (MMS) adapts to the particular connection requirements via the 2-port interface modules:

There are modules for double twisted pair 10/100Base-T(X), double glass fiber 100Base FX (multimode and single-mode) or two polymer fibers 10/100 Mbit.

The 2-port glass fiber module for the modular managed switch offers maximum flexibility when it comes to connecting switches over long distances. Variants are available for multimode and single-mode fibers and can bridge over distances of up to 36 km. The multimode variants have either an SC or an ST connector for connection to all conventional conductors and testers.

**Ethernet**



**FL IF 2TX VS-RJ-F**

Interface module twisted pair



Description	Type	Order No.	Pcs. Pkt.
<b>Interface module</b> with two twisted pair ports for the modular managed switch system, outlet to the front	<b>FL IF 2TX VS-RJ-F</b>	<b>2832344</b>	<b>1</b>
<b>FO media module</b> for connecting 100Base-FX multimode glass fibers (1300 nm), connection direction forwards			
<b>FO media module</b> for connecting 100Base-FX multimode glass fibers (1300 nm), connection direction downwards			
<b>FO media module</b> for connecting single-mode (mono-mode) glass fibers (1300 nm), downward exit			
<b>Flat-ribbon labeling</b> (see CLIPLINE catalog)	<b>ZBF...</b>		
<b>Technical data</b>			
<b>Ethernet interface</b>			
Number of ports	2		
Transmission speed	10/100 Mbit/s (connection direction forwards)		
Type of connection	RJ45 female connector		
<b>Fiber optic interface</b>			
Number of ports	-		
Type of connection	-		
Wave length	-		
Transmission length	-		
<b>Function</b>			
Basic functionality	Media module for modular managed switch		
<b>Power supply</b>			
Supply voltage	(via head station)		
Typical current consumption	10 mA		
<b>General data</b>			
Weight	70 g		
Width	31 mm		
Height	75.7 mm		
Depth	75.5 mm		
Degree of protection	IP20		
Ambient temperature (operation)	0 °C ... 55 °C (non-condensing)		
Ambient temperature (storage/transport)	-20 °C ... 70 °C		
Permissible humidity (operation)	10 % ... 95 % (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-3/-4		
Immunity to interference	EN 61000-6-2		

Ethernet



**FL IF 2FX SC-...**

Interface module, glass fiber

Ethernet



**FL IF 2FX SM SC-D**

Interface module, glass fiber



Ex:



Ex:

Type	Order No.	Pcs. Pkt.
FL IF 2FX SC-F	2832412	1
FL IF 2FX SC-D	2832425	1
ZBF...		

Type	Order No.	Pcs. Pkt.
FL IF 2FX SM SC-D	2832205	1
ZBF...		

2		
100 MBit/s		
SC connector		
2		
SC connector		
1300 nm		
2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)		
6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)		
3000 m (glass fiber with F-G 62.5/125 2.6 dB/km F600)		
2800 m (glass fiber with F-G 50/125 1.6 dB/km F800)		
Media module for modular managed switch		
(via head station)		
200 mA		
80 g		
31 mm		
75.7 mm		
72.5 mm		
IP20		
0 °C ... 55 °C (non-condensing)		
-20 °C ... 70 °C		
10 % ... 95 % (non-condensing)		
Conformance with EMC directive 89/336/EEC		
EN 61000-6-3/-4		
EN 61000-6-2		

2		
100 MBit/s		
SC connector		
2		
SC connector		
-		
36000 m (glass fiber with F-G 9/125 0.36 dB/km)		
32000 m (glass fiber with F-G 9/125 0.4 dB/km)		
26000 m (glass fiber with F-G 9/125 0.5 dB/km)		
-		
Media module for modular managed switch		
(via head station)		
200 mA		
80 g		
31 mm		
85 mm		
72.5 mm		
IP20		
0 °C ... 55 °C (non-condensing)		
-20 °C ... 70 °C		
10 % ... 95 % (non-condensing)		
Conformance with EMC directive 89/336/EEC		
EN 61000-6-3/-4		
EN 61000-6-2		

**Interface modules and Power-over-Ethernet solutions**

**Power over Ethernet solutions**

For the first time, the Power over Ethernet interface modules FL IF 2PSE-F and the power source equipment FL PSE 2TX enable common transmission of power and data in the industrial environment through the Ethernet Medium (LAN).

The Power over Ethernet standard IEEE 802.3af is used. This means that end devices such as WLAN access points, Bluetooth access points, IP telephones and IP cameras, which are being increasingly used in industrial areas, can be connected quickly and economically.

In the case of installation in difficult-to-reach places such as walls or ceilings, a separate supply connection can be dispensed with – power and data are made available through the LAN connection. The investment costs for any power supply units and the associated installation costs for the power supply to termination devices can be eliminated entirely. Even the fault tolerance of the termination devices can be increased by using a central uninterrupted power supply (UPS).

The FL IF 2PSE-F offers 2 Power over Ethernet ports for the modular managed switch. Depending on the requirement, the user can combine 8 to 24 ports in twisted pair, Power over Ethernet and various glass fiber media. Termination devices with Power over Ethernet can be monitored by the higher-level management system and switched on/off remotely.

The FL PSE 2TX allows existing Ethernet networks to be extended by 2 PoE ports. The FL PSE 2TX is also operated by the 24 V supply voltage here, so that other power supply units are not necessary.

**Ethernet**



**FL IF 2PSE-F**

Interface module Power over Ethernet



Description	Type	Order No.	Pcs. Pkt.
<b>Interface module</b> Power over Ethernet	<b>FL IF 2PSE-F</b>	<b>2832904</b>	<b>1</b>
<b>Power-over-Ethernet module (PSE)</b>			
<b>Flat-ribbon labeling</b> (see CLIPLINE catalog)	<b>ZBF...</b>		
<b>Technical data</b>			
<b>Ethernet interface</b>			
Number of ports	2 PoE ports		
Transmission speed	10/100 Mbit/s (connection direction forwards)		
Type of connection	RJ45 female connector		
<b>Fiber optic interface</b>			
Number of ports	-		
Type of connection	-		
Wave length	-		
Transmission length	-		
<b>Function</b>			
Basic functionality	Media module for Modular Managed Switch with Power over Ethernet IEEE802.3af, Power Source Equipment (PSE)		
<b>Power supply</b>			
Supply voltage	(Internal / 48 V DC for PoE)		
Residual ripple	-		
Range of supply voltages	45.5 V DC ... 53 V DC		
Typical current consumption	10 mA (Max. 900 mA)		
<b>General data</b>			
Weight	70 g		
Width	31 mm		
Height	84.7 mm		
Depth	75.5 mm		
Degree of protection	IP20		
Ambient temperature (operation)	0 °C ... 55 °C (non-condensing)		
Ambient temperature (storage/transport)	-20 °C ... 70 °C		
Permissible humidity (operation)	10 % ... 95 % (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-3/-4		
Immunity to interference	EN 61000-6-2		

Ethernet



**FL PSE 2TX**

Power-over-Ethernet modules (midspan)



Ex:

Type	Order No.	Pcs. Pkt.
FL PSE 2TX	2891013	1

2 PoE ports  
10/100 MBit/s  
8-pos. RJ45 female connector

-  
-  
-  
-

PSE/midspan, complies with IEEE 802.3af

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  
-20 °C ... 70 °C  
30 % ... 95 % (non-condensing)  
Conformance with EMC directive 89/336/EEC  
EN 61000-6-4  
EN 61000-6-2

**Unmanaged switches and hubs**

**Unmanaged switch with 5/8 TP RJ45 ports**

The FL SWITCH 5TX and FL SWITCH 8TX Ethernet switches allow the network to be expanded fast and cost-effectively.

They have a redundant power supply and a floating alarm contact. The devices are particularly suitable for distributed network solutions.

With a width of just 45 mm, and simple, configuration-free assembly, they are the Ethernet connections of choice for the control cabinet. Further net segments can be connected to the 5 or 8 ports.

The switch supports 10 Mbps and 100 Mbps even when operated together.

**Ethernet hub with eight RJ45 ports**

The hub is used for quick and cost-effective Ethernet network expansion. It has eight/sixteen twisted pair ports, which can be connected to additional network segments or termination devices. It is especially suited for special automation protocols, such as the FL Net.

The FL HUB 8 TX-ZF supports both Ethernet with 10 mbps and with 100 mbps. The hub regenerates the received data telegrams and sends them to the remaining ports.

For port 5, a port assignment switch is located on the hub. The transmit and receive cables are exchanged at port 5 by actuating the switch, while polarity is maintained. Cross-over cables for connecting network nodes can thus be omitted.

**Ethernet**



**FL SWITCH 4TX/FX**

Ethernet switch with RJ45 and FO ports



Description	Type	Order No.	Pcs. Pkt.
<b>Ethernet switch</b> , 4 TP-RJ45 ports 10/100 Mbit and 1 FO port, DIN rail mountable	<b>FL SWITCH 4TX/FX</b>	<b>2832810</b>	<b>1</b>
<b>Ethernet switch</b> , 5 front Ethernet ports in RJ45 format, DIN rail mountable			
<b>Ethernet switch</b> , 8 front Ethernet ports in RJ45 format, DIN rail mountable			
<b>Ethernet hub with eight RJ45 ports</b>			
<b>Technical data</b>			
Ethernet interface			
Number of ports	4		
Transmission speed	10/100 Mbit/s (RJ45)		
Type of connection	4 ports 10/100BaseT(X), autonegotiation and autocrossing		
Other connections			
Potential-free signaling contact	Plug-in/screw connection via COMBICON		
Function			
Basic functionality	Unmanaged switch/full duplex, 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		
Status and diagnostics displays			
<b>Network extension parameters</b>			
Cascading depth	Network, line 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>		
Range of supply voltages	18.5 V DC ... 30.2 V DC		
Typical current consumption	180 mA (to US)		
<b>General data</b>			
Weight	225 g		
Width	45 mm		
Height	99 mm		
Depth	112 mm		
Degree of protection	IP20		
Ambient temperature (operation)	0 °C ... 55 °C (non-condensing)		
Ambient temperature (storage/transport)	-20 °C ... 70 °C ( )		
Permissible humidity (operation)	30 % ... 95 % (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-4		
Immunity to interference	EN 61000-6-2		

Ethernet



**FL SWITCH 5TX**

Ethernet switch with RJ45 ports

Ethernet



**FL SWITCH 8TX**

Ethernet switch with RJ45 ports

Ethernet



**FL HUB 8TX-ZF**

Ethernet hub with RJ45 ports



Type	Order No.	Pcs. Pkt.
FL SWITCH 5TX	2832085	1

Type	Order No.	Pcs. Pkt.
FL SWITCH 8TX	2832218	1

Type	Order No.	Pcs. Pkt.
FL HUB 8TX-ZF	2832551	1

5	8	8
10/100 Mbit/s	10/100 Mbit/s	10/100 Mbit/s
RJ45	RJ45	RJ45 female connector
Plug-in/screw connection via COMBICON	Plug-in/screw connection via COMBICON	-
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	Hub/repeater, compliance with IEEE 802.3
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	LEDs: UL (communications voltage), COL (collision) link and receive LED per port
Network, line and star structure: any	Network, line and star structure: any	4 hubs 10 Mbps / 2 hubs 100 Mbps
100 m	100 m	100 m
24 V DC	24 V DC	24 V DC (via COMBICON; max. conductor cross section 2.5 mm <sup>2</sup> )
3.6 V <sub>PP</sub>	3.6 V <sub>PP</sub>	3.6 V <sub>PP</sub>
18.5 V DC ... 30.2 V DC	18.5 V DC ... 30.2 V DC	18.5 V DC ... 30.5 V DC
125 mA (to US)	125 mA (to US)	Typ. 144 mA (to US)
225 g	225 g	140 g
45 mm	45 mm	45 mm
99 mm	99 mm	99 mm
112 mm	112 mm	112 mm
IP20	IP20	IP20
0 °C ... 55 °C	0 °C ... 55 °C	0 °C ... 60 °C
-20 °C ... 70 °C ( )	-20 °C ... 70 °C ( )	-25 °C ... 70 °C
30 % ... 95 % (non-condensing)	30 % ... 95 % (non-condensing)	30 % ... 95 % (non-condensing)
Conformance with EMC directive 89/336/EEC	Conformance with EMC directive 89/336/EEC	Conformance with EMC directive 89/336/EEC
EN 61000-6-4	EN 61000-6-4	EN 61000-6-4
EN 61000-6-2	EN 61000-6-2	EN 61000-6-2

5	8	8
10/100 Mbit/s	10/100 Mbit/s	10/100 Mbit/s
RJ45	RJ45	RJ45 female connector
Plug-in/screw connection via COMBICON	Plug-in/screw connection via COMBICON	-
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	Hub/repeater, compliance with IEEE 802.3
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	LEDs: UL (communications voltage), COL (collision) link and receive LED per port
Network, line and star structure: any	Network, line and star structure: any	4 hubs 10 Mbps / 2 hubs 100 Mbps
100 m	100 m	100 m
24 V DC	24 V DC	24 V DC (via COMBICON; max. conductor cross section 2.5 mm <sup>2</sup> )
3.6 V <sub>PP</sub>	3.6 V <sub>PP</sub>	3.6 V <sub>PP</sub>
18.5 V DC ... 30.2 V DC	18.5 V DC ... 30.2 V DC	18.5 V DC ... 30.5 V DC
125 mA (to US)	125 mA (to US)	Typ. 144 mA (to US)
225 g	225 g	140 g
45 mm	45 mm	45 mm
99 mm	99 mm	99 mm
112 mm	112 mm	112 mm
IP20	IP20	IP20
0 °C ... 55 °C	0 °C ... 55 °C	0 °C ... 60 °C
-20 °C ... 70 °C ( )	-20 °C ... 70 °C ( )	-25 °C ... 70 °C
30 % ... 95 % (non-condensing)	30 % ... 95 % (non-condensing)	30 % ... 95 % (non-condensing)
Conformance with EMC directive 89/336/EEC	Conformance with EMC directive 89/336/EEC	Conformance with EMC directive 89/336/EEC
EN 61000-6-4	EN 61000-6-4	EN 61000-6-4
EN 61000-6-2	EN 61000-6-2	EN 61000-6-2

5	8	8
10/100 Mbit/s	10/100 Mbit/s	10/100 Mbit/s
RJ45	RJ45	RJ45 female connector
Plug-in/screw connection via COMBICON	Plug-in/screw connection via COMBICON	-
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	Hub/repeater, compliance with IEEE 802.3
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	LEDs: UL (communications voltage), COL (collision) link and receive LED per port
Network, line and star structure: any	Network, line and star structure: any	4 hubs 10 Mbps / 2 hubs 100 Mbps
100 m	100 m	100 m
24 V DC	24 V DC	24 V DC (via COMBICON; max. conductor cross section 2.5 mm <sup>2</sup> )
3.6 V <sub>PP</sub>	3.6 V <sub>PP</sub>	3.6 V <sub>PP</sub>
18.5 V DC ... 30.2 V DC	18.5 V DC ... 30.2 V DC	18.5 V DC ... 30.5 V DC
125 mA (to US)	125 mA (to US)	Typ. 144 mA (to US)
225 g	225 g	140 g
45 mm	45 mm	45 mm
99 mm	99 mm	99 mm
112 mm	112 mm	112 mm
IP20	IP20	IP20
0 °C ... 55 °C	0 °C ... 55 °C	0 °C ... 60 °C
-20 °C ... 70 °C ( )	-20 °C ... 70 °C ( )	-25 °C ... 70 °C
30 % ... 95 % (non-condensing)	30 % ... 95 % (non-condensing)	30 % ... 95 % (non-condensing)
Conformance with EMC directive 89/336/EEC	Conformance with EMC directive 89/336/EEC	Conformance with EMC directive 89/336/EEC
EN 61000-6-4	EN 61000-6-4	EN 61000-6-4
EN 61000-6-2	EN 61000-6-2	EN 61000-6-2

**Switch with gigabit support**

Gigabit switches offer excellent realtime properties with high data throughput at the same time. Not only does the network backbone profit from this, but also the powerful termination devices, such as data servers or camera applications.

**SFN switch with gigabit support**

The FL SWITCH SFN ... range of Factory Line switches with standard functions in their versions can be used for quick and cost-effective Ethernet network expansion. The switches have 8 ports, up to two of which are multimode/single-mode glass fiber ports.

The switches support transmission rates of 10/100/1000 Mbps at the twisted-pair ports, and 1000 Mbps at the glass fiber ports.

**Ethernet**



**FL SWITCH SFN 8GT**

Ethernet switch with RJ45 ports



Description	Type	Order No.	Pcs. Pkt.
<b>Ethernet switch</b> , eight RJ45 ports	<b>FL SWITCH SFN 8GT</b>	<b>2891673</b>	<b>1</b>
<b>Ethernet switch</b> , seven RJ45 ports, one FO port			
<b>Ethernet switch</b> , six RJ45 ports, two FO ports			
<b>Ethernet switch</b> , six RJ45 ports, two FO ports, single-mode			
<b>Ethernet switch</b> , six RJ45 ports, two FO ports, single-mode			
Layer-1 security elements	<b>FL PLUG GUARD...</b>		
<b>Technical data</b>			
<b>Ethernet interface</b>			
Number of ports	8 RJ45 ports		
Transmission speed	10/100/1000 Mbit/s (RJ45)		
Type of connection	RJ45 socket, autonegotiation and autocrossing		
<b>Fiber optic interface</b>			
Number of ports	-		
Type of connection	-		
Wave length	-		
Transmission length	-		
<b>Other connections</b>			
Potential-free signaling contact	Plug-in/screw connection via COMBICON		
<b>Function</b>			
Basic functionality	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
Status and diagnostics displays	LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port		
<b>Network extension parameters</b>			
Cascading depth	Network, line 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>		
Range of supply voltages	9 V DC ... 30.2 V DC		
Typical current consumption	Typ. 430 mA		
<b>General data</b>			
Weight	395 g		
Width	50 mm		
Height	120 mm		
Depth	70 mm		
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529		
Ambient temperature (operation)	-25 °C ... 60 °C (75°C in preparation)		
Ambient temperature (storage/transport)	-35 °C ... 85 °C		
Permissible humidity (operation)	10 % ... 95 % (non-condensing)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Emitted interference	EN 61000-6-4		
Immunity to interference	EN 61000-6-2		

Ethernet



**FL SWITCH SFN 7GT/SX**

Ethernet switch with RJ45 and FO ports

Ethernet



**FL SWITCH SFN 6GT/2LX(-20)**

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. Pkt.
FL SWITCH SFN 7GT/SX	2891518	1
FL SWITCH SFN 6GT/2SX	2891398	1
FL SWITCH SFN 6GT/2LX-20	2891563	1
FL PLUG GUARD...		



Type	Order No.	Pcs. Pkt.
FL SWITCH SFN 6GT/2LX	2891987	1
FL PLUG GUARD...		



7 RJ45 ports  
10/100/1000 Mbit/s (RJ45)  
RJ45 socket, autonegotiation and autocrossing

1 FO port  
SC duplex  
850 nm  
220 m (Glass fiber 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, line 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 in acc. with DIN 40050/IEC 60529  
-25 °C ... 60 °C (75°C in preparation)  
-35 °C ... 85 °C  
10 % ... 95 % (non-condensing)  
Conformance with EMC directive 89/336/EEC  
EN 61000-6-4  
EN 61000-6-2

6 RJ45 ports  
10/100/1000 Mbit/s (RJ45)  
RJ45 socket, autonegotiation and autocrossing

2 FO ports  
SC duplex  
1310 nm  
10000 m (Glass fiber 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, line 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 in acc. with DIN 40050/IEC 60529  
-25 °C ... 60 °C (75°C in preparation)  
-35 °C ... 85 °C  
10 % ... 95 % (non-condensing)  
Conformance with EMC directive 89/336/EEC  
EN 61000-6-4  
EN 61000-6-2

**SFN switch**

**Factory Line switches with standard functions in slim housing design**

The FL SWITCH SFN ... range of Factory Line switches with standard functions in numerous versions can be used for quick and cost-effective Ethernet network expansion. The switches have 5 or 8 ports, up to two of which are designed in multimode/single-mode glass fiber ports in SC or ST format. The switches support transmission rates of 10 and 100 Mbps at the Twisted-Pair-Ports. The glass fiber ports exclusively support 100 Mbps.

The switches regenerate received data telegrams and send them to the port to which the device is connected with the corresponding target address.

Unassigned ports of the FL SWITCH SFN can be locked mechanically for protection against unauthorized use. Assigned ports meet the requirements of LAN security level 1, as they can be locked against unauthorized removal of the network connection.

**Features and fields of application**

- Increased network performance by filtering the data traffic.
  - Local data traffic remains local.
  - Amount of data in the network segments is reduced.
- Simple network extension without configuration of the switches.
- Coupling of copper network segments with different transmission rates with automatic detection of data transmission rate of 10 or 100 Mbps.
- Auto negotiation: Each copper port establishes a half or full duplex connection with 10 or 100 Mbps.
- Auto crossing: It is not necessary to make a distinction between 1:1 or crossover Ethernet copper cables.
- Electrical isolation of network segments using up to two fiber optic ports.
- Option to attach layer 1 security elements to the RJ45 ports.



**FL SWITCH SFN 5(8)TX**

Ethernet switch with RJ45 ports

Description	Type	Order No.	Pcs. Pkt.
<b>Ethernet switch</b> , five RJ45 ports	<b>FL SWITCH SFN 5TX</b>	<b>2891152</b>	<b>1</b>
<b>Ethernet switch</b> , eight RJ45 ports	<b>FL SWITCH SFN 8TX</b>	<b>2891929</b>	<b>1</b>
<b>Ethernet switch</b> , four RJ45 ports, one FO port in SC format			
<b>Ethernet switch</b> , seven RJ45 ports, one FO port in SC format			
<b>Ethernet switch</b> , four RJ45 ports, one FO port in ST format			
<b>Ethernet switch</b> , seven RJ45 ports, one FO port in ST format			
<b>Ethernet switch</b> , six RJ45 ports, two FO ports in SC format			
<b>Ethernet switch</b> , six RJ45 ports, two FO ports in ST format			
Layer-1 security elements	<b>FL PLUG GUARD...</b>		
<b>Technical data</b>	FL SWITCH SFN 5TX	FL SWITCH SFN 8TX	
<b>Ethernet interface</b>	5 RJ45 ports	8 RJ45 ports	
Number of ports	10/100 Mbit/s (RJ45)	10/100 Mbit/s (RJ45)	
Transmission speed	RJ45 socket, autonegotiation and autocrossing	RJ45 socket, autonegotiation and autocrossing	
Type of connection	-	-	
<b>Fiber optic interface</b>	-	-	
Number of ports	-	-	
Type of connection	-	-	
Wave length	-	-	
Transmission length	-	-	
<b>Function</b>	Unmanaged switch / autonegotiation, complies with IEEE 802.3, store and forward switching mode		
Basic functionality	LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port		
Status and diagnostics displays	LEDs: U <sub>S1</sub> , U <sub>S2</sub> (redundant voltage supply), link and activity per port		
<b>Network extension parameters</b>	Network, line and star structure: any		
Cascading depth	100 m		
Maximum conductor length ((twisted pair)	100 m		
<b>Power supply</b>	24 V DC		
Supply voltage	3.6 V <sub>pp</sub>		
Residual ripple	18.5 V DC ... 30.2 V DC		
Range of supply voltages	Typ. 90 mA		
Typical current consumption	24 V DC		
<b>General data</b>	365 g		
Weight	30 mm		
Width	120 mm		
Height	70 mm		
Depth	IP20 in acc. with DIN 40050/IEC 60529		
Degree of protection	0 °C ... 60 °C		
Ambient temperature (operation)	-20 °C ... 70 °C		
Ambient temperature (storage/transport)	10 % ... 95 % (non-condensing)		
Permissible humidity (operation)	Conformance with EMC directive 89/336/EEC		
Electromagnetic compatibility	EN 61000-6-4		
Emitted interference	EN 61000-6-2		
Immunity to interference			



Ethernet



**FL SWITCH SFN 4(7)TX/FX**

Ethernet switch with RJ45 and FO ports

Ethernet



**FL SWITCH SFN 4(7)TX/FX ST**

Ethernet switch with RJ45 and FO ports

Ethernet



**FL SWITCH SFN 6TX/2FX (ST)**

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. Pkt.
FL SWITCH SFN 4TX/FX	2891851	1
FL SWITCH SFN 7TX/FX	2891097	1
<b>FL PLUG GUARD...</b>		
FL SWITCH SFN 4TX/FX	FL SWITCH SFN 7TX/FX	
4 RJ45 ports 10/100 Mbit/s (RJ45) 4 ports 10/100 BaseT(X), autonegotiation and autocrossing	7 RJ45 ports 10/100 Mbit/s (RJ45) RJ45 socket, autonegotiation and autocrossing	
1 FO port SC-DUPLEX 1300 nm/1310 nm 2000 m (Glass fiber 50/125) 2000 m (Glass fiber 62.5/125)	1 FO port SC-DUPLEX 1300 nm/1310 nm 2000 m (Glass fiber 50/125) 2000 m (Glass fiber 62.5/125)	
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	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, line and star structure: any 100 m	Network, line and star structure: any 100 m	
24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC Typ. 140 mA	24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC Typ. 190 mA	
265 g 30 mm 120 mm 70 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 60 °C -20 °C ... 70 °C 10 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	365 g 50 mm 120 mm 70 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 60 °C -20 °C ... 70 °C 10 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	

Type	Order No.	Pcs. Pkt.
FL SWITCH SFN 4TX/FX ST	2891453	1
FL SWITCH SFN 7TX/FX ST	2891110	1
<b>FL PLUG GUARD...</b>		
FL SWITCH SFN 4TX/FX ST	FL SWITCH SFN 7TX/FX ST	
4 RJ45 ports 10/100 Mbit/s (RJ45) 4 ports 10/100 BaseT(X), autonegotiation and autocrossing	7 RJ45 ports 10/100 Mbit/s (RJ45) RJ45 socket, autonegotiation and autocrossing	
1 FO port ST format 1300 nm/1310 nm 2000 m (Glass fiber 50/125) 2000 m (Glass fiber 62.5/125)	1 FO port ST format 1300 nm/1310 nm 2000 m (Glass fiber 50/125) 2000 m (Glass fiber 62.5/125)	
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	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, line and star structure: any 100 m	Network, line and star structure: any 100 m	
24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC 140 mA	24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC Typ. 190 mA	
265 g 30 mm 131 mm 70 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 60 °C -20 °C ... 70 °C 10 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	365 g 50 mm 120 mm 70 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 60 °C -20 °C ... 70 °C 10 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	

Type	Order No.	Pcs. Pkt.
FL SWITCH SFN 6TX/2FX	2891314	1
FL SWITCH SFN 6TX/2FX ST	2891411	1
<b>FL PLUG GUARD...</b>		
FL SWITCH SFN 6TX/2FX	FL SWITCH SFN 6TX/2FX ST	
6 RJ45 ports 10/100 Mbit/s (RJ45) RJ45 socket, autonegotiation and autocrossing	6 RJ45 ports 10/100 Mbit/s (RJ45) RJ45 socket, autonegotiation and autocrossing	
2 FO ports SC-DUPLEX 1300 nm 2000 m (Glass fiber 50/125) 2000 m (Glass fiber 62.5/125)	2 FO ports ST format 1300 nm 2000 m (Glass fiber 50/125) 2000 m (Glass fiber 62.5/125)	
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	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, line and star structure: any 100 m	Network, line and star structure: any 100 m	
24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC Typ. 230 mA	24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC Typ. 230 mA	
365 g 50 mm 120 mm 70 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 60 °C -20 °C ... 70 °C 30 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	365 g 50 mm 120 mm 70 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 60 °C -20 °C ... 70 °C 30 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	

**Standard switches**

The Factory Line standard range of switches FL SWITCH SF makes it possible to expand networks quickly and inexpensively, in terminal boxes and on the plant floor level as well. Their low-profile housing design and high port densities means they can be used in universal, distributed applications in control cabinets and flat terminal boxes.

The FL SWITCH SF series supports the autonegotiation function for transmission rates of 10/100 Mbps in mixed mode. This takes care of the coupling of network segments or terminal devices with the same or different data transmission rates. It is no longer necessary to differentiate between the 1:1 or crossover cables due to the autocrossing function. The switches automatically detect whether Ethernet cables are occupied and set themselves accordingly. The segment length of the network can be increased to up to 10 km thanks to the FO ports, especially for bridging over rough surroundings.

The switches have redundant electrical power supply and an electrically isolated alarm contact. With full suitability for industrial applications, the FL SWITCH SF series with TX variants makes it extremely economical to set up Ethernet networks in the industrial environment.

**Wide choice of connection options**

Select the connection variant to exactly suit your applications from the SF switch range. While the copper cables are connected to the twisted pair ports with standard RJ45 connectors, the fiber optic cables are connected via SC or ST connectors.

**Ethernet**



**FL SWITCH SF 8(16)TX**

Ethernet switch with RJ45 ports



Description	Type	Order No.	Pcs. Pkt.
<b>Ethernet switch</b> , eight RJ45 ports	<b>FL SWITCH SF 8TX</b>	<b>2832771</b>	<b>1</b>
<b>Ethernet switch</b> , 16 RJ45 ports	<b>FL SWITCH SF 16TX</b>	<b>2832849</b>	<b>1</b>
<b>Ethernet switch</b> , 7 RJ45 ports, 1 FO port in SC-D format			
<b>Ethernet switch</b> , 15 RJ45 ports, 1 FO port in SC-D format			
<b>Ethernet switch</b> , 6 RJ45 ports, 2 FO ports in SC-D format			
<b>Ethernet switch</b> , 14 RJ45 ports, 2 FO ports in SC-D format			
<b>Ethernet switch</b> , six RJ45 ports, two FO ports in ST format			
<b>Ethernet switch</b> , seven RJ45 ports, one FO port in ST format			
<b>Ethernet switch</b> , four RJ45 ports, three FO ports in ST format			
<b>Technical data</b>	FL SWITCH SF 8TX	FL SWITCH SF 16TX	
<b>Ethernet interface</b>			
Number of ports	8 RJ45 ports	16 RJ45 ports	
Transmission speed	10/100 Mbit/s (RJ45)	10/100 Mbit/s (RJ45)	
Type of connection	RJ45 socket, autonegotiation and autocrossing	RJ45 socket, autonegotiation and autocrossing	
<b>Fiber optic interface</b>			
Number of ports	-	-	
Type of connection	-	-	
Wave length	-	-	
Transmission length	-	-	
<b>Other connections</b>			
Potential-free signaling contact	Plug-in/screw connection via COMBICON	Plug-in/screw connection via COMBICON	
<b>Function</b>			
Basic functionality	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 diagnostics displays	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 extension parameters</b>			
Cascading depth	Network, line and star structure: any	Network, line 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	
Residual ripple	3.6 V <sub>pp</sub>	3.6 V <sub>pp</sub>	
Range of supply voltages	18.5 V DC ... 30.2 V DC	18.5 V DC ... 30.2 V DC	
Typical current consumption	Typ. 200 mA	Typ. 300 mA	
<b>General data</b>			
Weight	260 g	380 g	
Width	135 mm	205 mm	
Height	94.3 mm	94.3 mm	
Depth	30 mm	30 mm	
Degree of protection	IP20 in acc. with DIN 40050/IEC 60529	IP20 in acc. with DIN 40050/IEC 60529	
Ambient temperature (operation)	0 °C ... 55 °C	0 °C ... 55 °C	
Ambient temperature (storage/transport)	-20 °C ... 70 °C	-20 °C ... 70 °C	
Permissible humidity (operation)	30 % ... 95 % (non-condensing)	30 % ... 95 % (non-condensing)	
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC	Conformance with EMC directive 89/336/EEC	
Emitted interference	EN 61000-6-4	EN 61000-6-4	
Immunity to interference	EN 61000-6-2	EN 61000-6-2	

Ethernet



**FL SWITCH SF 7(15)TX/FX**

Ethernet switch with RJ45 and FO ports

Ethernet



**FL SWITCH SF 6(14)TX/2FX**

Ethernet switch with RJ45 and FO ports

Ethernet



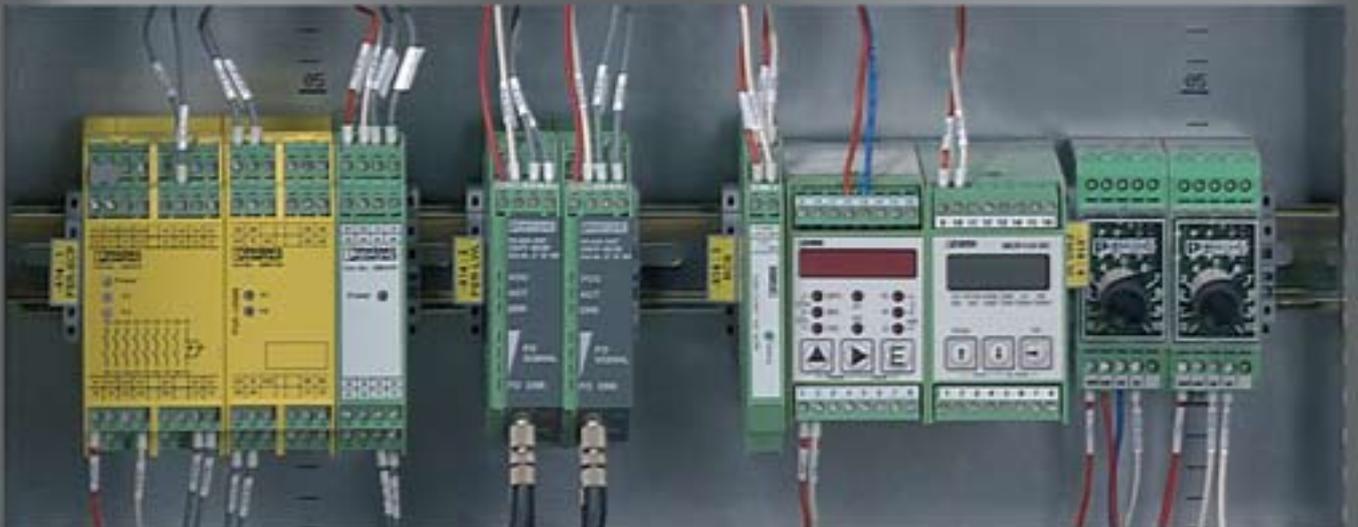
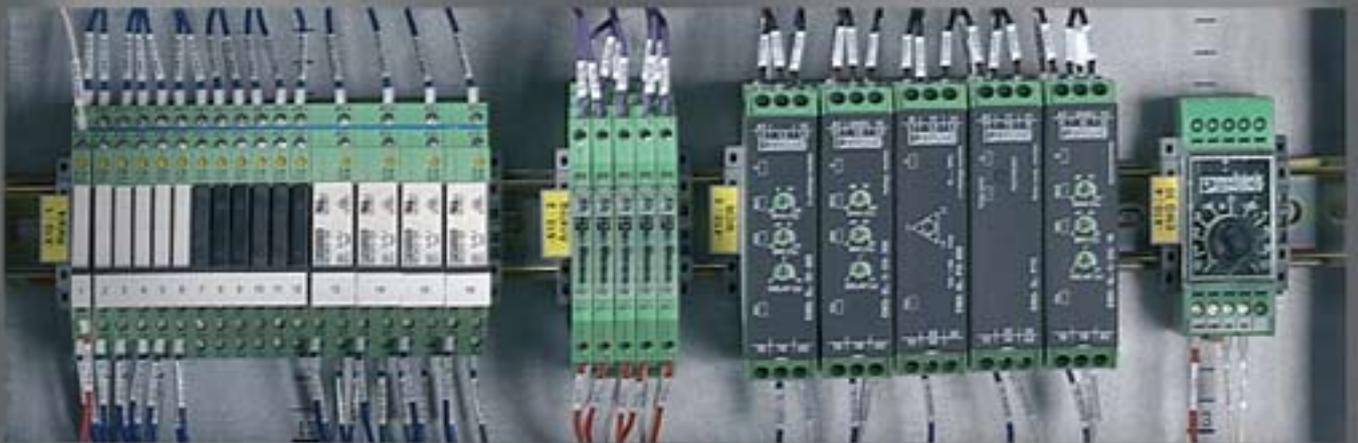
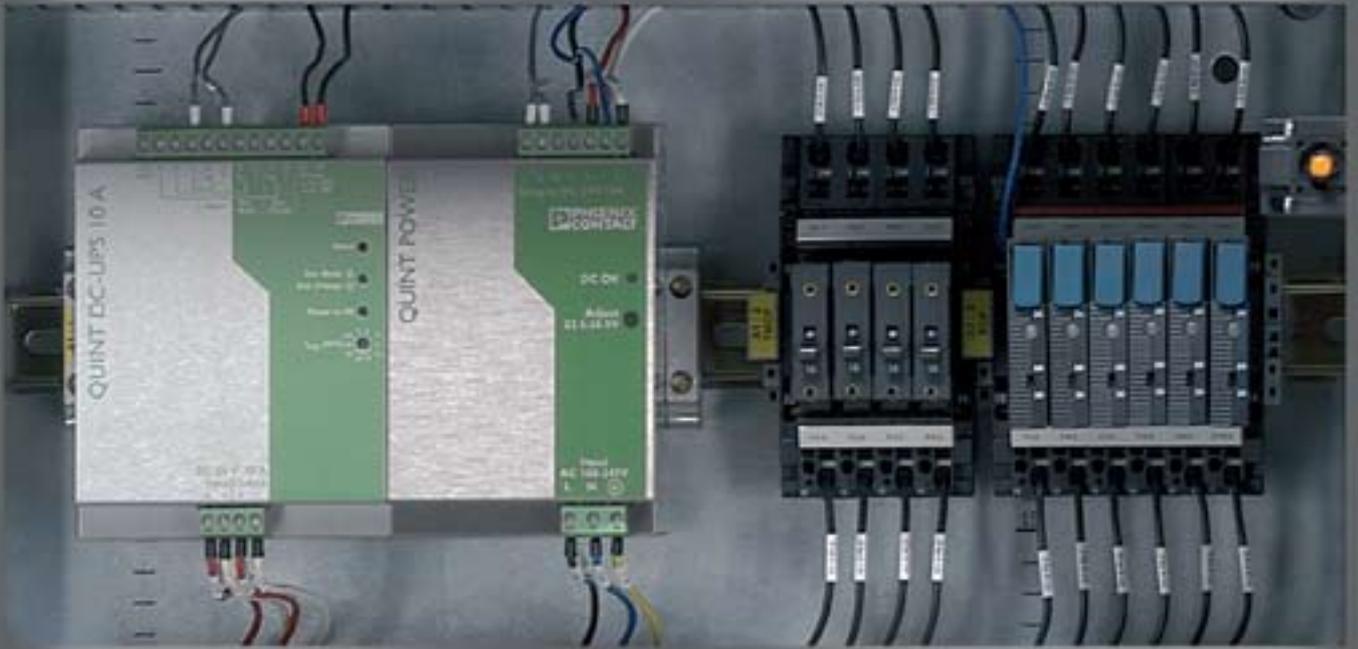
**FL SWITCH SF ...TX/...FX ST**

Ethernet switch with RJ45 and FO ports

Type	Order No.	Pcs. Pkt.
FL SWITCH SF 7TX/FX	2832726	1
FL SWITCH SF 15TX/FX	2832661	1
FL SWITCH SF 7TX/FX	FL SWITCH SF 15TX/FX	
7 RJ45 ports 10/100 Mbit/s (RJ45) RJ45 socket, autonegotiation and autocrossing	15 RJ45 ports 10/100 Mbit/s (RJ45) RJ45 socket, autonegotiation and autocrossing	
1 FO port SC-DUPLEX 1300 nm 6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	1 FO port SC-DUPLEX 1300 nm 6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	
Plug-in/screw connection via COMBICON	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	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, line and star structure: any 100 m	Network, line 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	24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC Typ. 330 mA	
260 g 135 mm 115.3 mm 30 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 55 °C -20 °C ... 70 °C 30 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	380 g 205 mm 115.3 mm 30 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 55 °C -20 °C ... 70 °C 30 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	

Type	Order No.	Pcs. Pkt.
FL SWITCH SF 6TX/2FX	2832933	1
FL SWITCH SF 14TX/2FX	2832593	1
FL SWITCH SF 6TX/2FX	FL SWITCH SF 14TX/2FX	
6 RJ45 ports 10/100 Mbit/s (RJ45) RJ45 socket, autonegotiation and autocrossing	14 RJ45 ports 10/100 Mbit/s (RJ45) RJ45 socket, autonegotiation and autocrossing	
2 FO ports SC duplex 1300 nm 6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	2 FO ports ST format 1300 nm 6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	
Plug-in/screw connection via COMBICON	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	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, line and star structure: any 100 m	Network, line 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	24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC Typ. 360 mA	
260 g 135 mm 115.3 mm 30 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 55 °C -20 °C ... 70 °C 30 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	380 g 205 mm 115.3 mm 30 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 55 °C -20 °C ... 70 °C 30 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	

Type	Order No.	Pcs. Pkt.
FL SWITCH SF 6TX/2FX ST	2832674	1
FL SWITCH SF 7TX/FX ST	2832577	1
FL SWITCH SF 4TX/3FX ST	2832603	1
FL SWITCH SF 6TX/2FX ST	FL SWITCH SF 7TX/FX ST	
6 RJ45 ports 10/100 Mbit/s (RJ45) RJ45 socket, autonegotiation and autocrossing	7 RJ45 ports 10/100 Mbit/s (RJ45) RJ45 socket, autonegotiation and autocrossing	
2 FO ports ST format 1300 nm 6400 m (glass fiber with F-G 50/125 0.7 dB/km F1200)	1 FO port ST format 1300 nm 2000 m (Glass fiber 50/125)	
Plug-in/screw connection via COMBICON	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	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, line and star structure: any 100 m	Network, line 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	24 V DC 3.6 V <sub>PP</sub> 18.5 V DC ... 30.2 V DC Typ. 220 mA	
140 g 135 mm 115.3 mm 30 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 55 °C -20 °C ... 70 °C 30 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	140 g 135 mm 115.3 mm 30 mm IP20 in acc. with DIN 40050/IEC 60529 0 °C ... 55 °C -20 °C ... 70 °C 30 % ... 95 % (non-condensing) Conformance with EMC directive 89/336/EEC EN 61000-6-4 EN 61000-6-2	



INTERFACE technology ensures smooth communication between the process and control system. It is characterized by varied tasks. INTERFACE products from PHOENIX CONTACT provide signal conditioning of digital, analog, serial and power signals for the whole control system.

With a wide variety of INTERFACE products listed for use in hazardous locations, PHOENIX CONTACT can condition your signal right into where you need it to be.

<b>PLC Relay</b>	
Universal PLC series with PDT relay	<b>58</b>
Universal PLC series with solid-state relay	
<b>MINI Analog</b>	
Configurable 3-way isolating amplifiers	<b>60</b>
Standard signal 3-way isolating amplifiers	
Configurable signal duplicator	
Repeater power supply	
One and two-channel passive isolators	
Configurable temperature measuring transducer for PT100	
Configurable limit value switch	
Power terminals	
Configurable loop-powered temperature measuring transducer for PT100	
Configurable temperature measuring transducer for Type J and K thermocouples	
<b>Analog Isolation</b>	
Configurable 3-way isolating amplifiers	<b>72</b>
Configurable signal multiplier	
Configurable loop-powered isolator	
Programmable temperature transducers	
Programmable loop-powered temperature transducer	
Programmable loop-powered temperature measuring transducer for connection heads	
Active current measuring transducer	
Current measuring transducers for AC current up to 400 A	
Programmable frequency transducers	
<b>Process Interface</b>	
Analog IN	<b>90</b>
Base elements	
<b>Process Interface-PI-ME</b>	
Analog IN	<b>94</b>
Analog OUT	
Digital IN	
Digital OUT	
Temperature measuring transducers	
Programmable loop-powered temperature measuring transducer	
<b>Serial Data Transmission</b>	
Copper-bound transmission	<b>108</b>
Optical fiber transmission	
Industrial modems	
Wireless transmission	
<b>Power supply</b>	
Primary switched-mode units	<b>128</b>
UPS switched mode units	
<b>Wireless</b>	
2400 MHz	<b>134</b>
900 MHz	
Industrial wireless LAN	

# INTERFACE Relay

## PLC series

### Universal PLC series with PDT relay

The PLC-R...21 is a relay series that can be used universally and consists of basic terminal blocks and pluggable miniature relays with PDT contact. It offers the following advantages:

- Functional plug-in bridges
- Screw connection method

The PLC interfaces are supplied with a relay or solid-state relay.

Type of housing:  
Polyamide PA non-reinforced, color: green.

For marking systems and mounting material, see CLIPLINE catalog.

Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....

If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



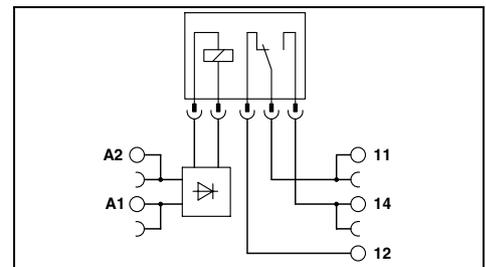
## PLC-R...21

Equipped with plug-in power contact relay  
1 PDT (21)

Terminal width 6.2



Connection data	solid stranded		AWG
	[mm <sup>2</sup> ]		
Screw connection	0.14-2.5	0.14-2.5	26-14



Description	Input voltage U <sub>N</sub>
PLC INTERFACE, with screw connection	
①	12 V DC
②	24 V DC
③	120 V AC (110 V DC)
④	230 V AC (220 V DC)

Type	Order No.	Pcs. Pkt.
PLC-RSC- 12DC/21-C1D2	5606331	10
PLC-RSC- 24DC/21-C1D2	5603154	10
PLC-RSC-120UC/21-C1D2	5603157	10
PLC-RSC-230UC/21-C1D2	5607072	10

#### Technical data

##### Input data

Permissible range (based on U<sub>N</sub>)

Typ. input current at U <sub>N</sub>	[mA]
15.3	9
5	5
8	8

Typ. response time at U <sub>N</sub>	[ms]
5	5
6	6
7	7

Typ. release time at U <sub>N</sub>	[ms]
8	8
15	15
15	15

Input circuit DC

Input circuit AC/DC

Max. interrupting rating, ohmic load	
24 V DC	140 W
48 V DC	20 W
60 V DC	18 W
110 V DC	23 W
220 V DC	40 W
250 V AC	1500 VA

##### General data

Test voltage input/output	4 kV AC (50 Hz, 1 min)
Ambient temperature range	-25 °C ... 60 °C
Inflammability class in acc. with UL 94	V0
Mechanical service life	2 x 10 <sup>7</sup> cycles
Dimensions	W / H / D 6.2 mm / 94 mm / 80 mm

##### Conformance / approvals

Conformity	CE compliant
UL, USA / Canada	Class I, Zone 2, AEx nC IIC T6, Ex nC IIC T6

① ② ③ ④

See diagram

15.3 9 3.5 3.2

5 5 6 7

8 8 15 15

Yellow LED , Polarity protection , Polarity protection

Yellow LED , Bridge rectifier

Single contact, 1-PDT

AgSnO

250 V AC/DC

12 V AC/DC

6 A

10 mA

140 W

20 W

18 W

23 W

40 W

1500 VA

## Robust miniature relay

PLC-R... is equipped with a robust miniature relay. Its main features include:

- RT III degree of protection,
- Environmentally friendly, cadmium-free contact material,
- Available gold layer for small switching capacities,



**PLC-O...48DC/100**

Equipped with pluggable input solid-state relay

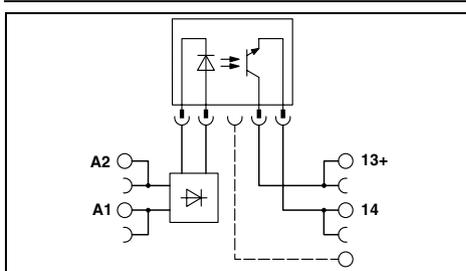


**PLC-O...24DC/2**

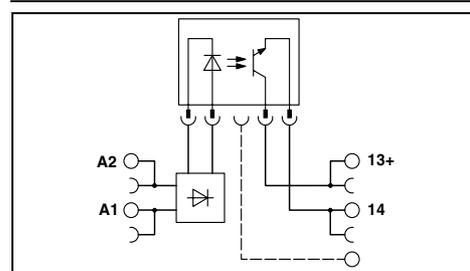
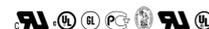
Equipped with pluggable power solid-state relay

Connection data	solid	stranded	AWG
	[mm <sup>2</sup> ]		
Screw connection	0.14-2.5	0.14-2.5	26-14

Terminal width 6.2



Terminal width 6.2



Description	Input voltage $U_N$
<b>PLC INTERFACE, with screw connection</b>	
①	24 V DC
②	120 V AC (110 V DC)

### Technical data

<b>Input data</b>	
Permissible range (based on $U_N$ )	
Switching level	1 signal ("H") 0 signal ("L")
Typ. input current at $U_N$	[mA]
Typ. turn-on time for $U_N$	[ms]
Typ. turn-off time at $U_N$	[ms]
Transmission frequency $f_{limit}$	[Hz]
Input circuit DC	
Input circuit AC/DC	
<b>Output data</b>	
Max. switching voltage	48 V DC
Min. switching voltage	3 V DC
Limiting continuous current	100 mA
Output circuit	2-conductor floating
Output protection	Polarity protection , Surge protection
Voltage drop at max. limiting continuous current	≤ 1 V
<b>General data</b>	
Test voltage input/output	2.5 kV (50 Hz, 1 min)
Ambient temperature range	-25 °C ... 60 °C
Rated operating mode	100% operating factor
Inflammability class in acc. with UL 94	V0
Pollution degree/surge voltage category	2 / III
Assembly position/mounting	Any / In rows with zero spacing
Dimensions	6.2 mm / 94 mm / 80 mm
<b>Conformance / approvals</b>	
Conformity	CE compliant
ATEX approval	-
UL, USA / Canada	Class I, Zone 2, AEx nC IIC T6, Ex nC IIC T6
GL	-

Type	Order No.	Pcs. Pkt.
①		
②		
PLC-OSC-24DC/48DC/100-C1D2	5603261	10
PLC-OSC-120UC/48DC/100-C1D2	5603263	10

<b>Input data</b>	
Permissible range (based on $U_N$ )	0.8 - 0.9 - 1.2 1.1
Switching level	1 signal ("H") ≥ 0.8 ≥ 0.9 0 signal ("L") ≤ 0.4 ≤ 0.3
Typ. input current at $U_N$	[mA] 8.5 3.5
Typ. turn-on time for $U_N$	[ms] 0.02 3
Typ. turn-off time at $U_N$	[ms] 0.3 4
Transmission frequency $f_{limit}$	[Hz] 300 10
Input circuit DC	Yellow LED , Polarity protection , Free-wheeling diode
Input circuit AC/DC	Yellow LED , Bridge rectifier
<b>Output data</b>	
Max. switching voltage	48 V DC
Min. switching voltage	3 V DC
Limiting continuous current	100 mA
Output circuit	2-conductor floating
Output protection	Polarity protection , Surge protection
Voltage drop at max. limiting continuous current	≤ 1 V
<b>General data</b>	
Test voltage input/output	2.5 kV (50 Hz, 1 min)
Ambient temperature range	-25 °C ... 60 °C
Rated operating mode	100% operating factor
Inflammability class in acc. with UL 94	V0
Pollution degree/surge voltage category	2 / III
Assembly position/mounting	Any / In rows with zero spacing
Dimensions	6.2 mm / 94 mm / 80 mm
<b>Conformance / approvals</b>	
Conformity	CE compliant
ATEX approval	-
UL, USA / Canada	Class I, Zone 2, AEx nC IIC T6, Ex nC IIC T6
GL	-

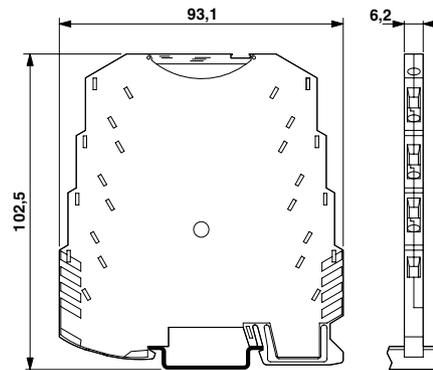
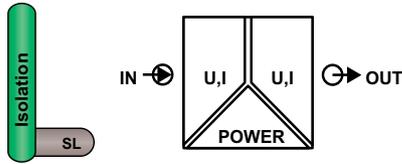
Type	Order No.	Pcs. Pkt.
①		
②		
PLC-OSC-24DC/24DC/2-C1D2	5603260	10
PLC-OSC-120UC/24DC/2-C1D2	5603262	10

<b>Input data</b>	
Permissible range (based on $U_N$ )	0.8 - 0.9 - 1.2 1.1
Switching level	1 signal ("H") ≥ 0.8 ≥ 0.8 0 signal ("L") ≤ 0.4 ≤ 0.3
Typ. input current at $U_N$	[mA] 8.5 3.5
Typ. turn-on time for $U_N$	[ms] 0.02 3.5
Typ. turn-off time at $U_N$	[ms] 0.3 7
Transmission frequency $f_{limit}$	[Hz] 300 10
Input circuit DC	Yellow LED , Polarity protection , Free-wheeling diode
Input circuit AC/DC	Yellow LED , Bridge rectifier
<b>Output data</b>	
Max. switching voltage	33 V DC
Min. switching voltage	3 V DC
Limiting continuous current	3 A
Output circuit	2-conductor floating
Output protection	Polarity protection , Surge protection
Voltage drop at max. limiting continuous current	≤ 200 mV
<b>General data</b>	
Test voltage input/output	2.5 kV (50 Hz, 1 min)
Ambient temperature range	-25 °C ... 60 °C
Rated operating mode	100% operating factor
Inflammability class in acc. with UL 94	V0
Pollution degree/surge voltage category	2 / III
Assembly position/mounting	Any / In rows with zero spacing
Dimensions	6.2 mm / 94 mm / 80 mm
<b>Conformance / approvals</b>	
Conformity	CE compliant
ATEX approval	-
UL, USA / Canada	Class I, Zone 2, AEx nC IIC T6, Ex nC IIC T6
GL	-

# INTERFACE Analog

## MINI Analog

### Configurable 3-way isolating amplifiers



### MINI MCR-SL-UI-UI-NC

Configurable 3-way isolating amplifiers

- Zero alignment
- Configurable input and output signals
- 3-way isolation
- Low power consumption
- Power supply possible through the foot element (T-Connector)

The **MINI MCR-SL-UI-UI** three-way isolating amplifiers are used for electrical isolation, conversion, amplification and filtering of standard signals.

The devices that can be adjusted via DIP switches are electrically isolated from each other in the input, output and supply circuit.

A new type of connection concept makes the devices very low-loss with regard to their power consumption. This is expressed in low self-heating and has a significant influence on the service life.

Thanks to the possibility of power bridging via the foot element, the devices can be connected to the power supply both simply and quickly.

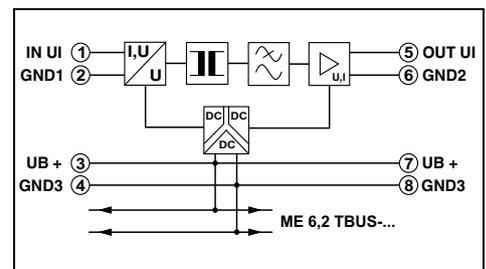
The desired configuration of the input and output signal can be stated in the order (refer to the order key). If the customer order details are incorrect or missing, the devices are supplied with the standard configuration (input signal 0...10 V, output signal 0...20 mA).

	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Screw connection	0.14-2.5	0.2-2.5	26-12	M3
Spring-cage conn.	0.2-2.5	0.2-2.5	24-12	

Description	
<b>MCR 3-way isolating amplifier</b> , for electrical isolation of analog signals,	
Unconfigured	Screw connection
Configured	Spring-cage conn.

Technical data	
<b>Input data</b>	
Input data	
Input signal	
<b>Input resistance</b>	
Input resistance	Approx. 100 kΩ
<b>Output data</b>	
Output data	
Output signal	
<b>Maximum output signal</b>	
No-load voltage	Approx. 12.5 V
Short-circuit current	28 mA
Load R <sub>B</sub>	Approx. 50 Ω
Ripple	< 20 mV <sub>PP</sub>
<b>General data</b>	
Supply voltage U <sub>B</sub>	19.2 V DC ... 30 V DC
Nominal supply voltage	24 V DC
Current consumption	< 9 mA (Voltage output, at 24 V DC incl. load) < 19 mA (Current output, at 24 V DC incl. load)
Power consumption	< 200 mW (Voltage output) < 450 mW (Current output)
Transmission error, max.	≤ 0.1 % (of end value)
Temperature coefficient	< 0.01 %/K, Typ. < 0.002 %/K
Limit frequency (3 dB)	Approx. 100 Hz
Step response (10-90%)	Approx. 3.2 ms
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-20 °C ... 65 °C
Assembly	Any
Housing material	PBT
<b>Conformance / approvals</b>	
Conformity	CE compliant
ATEX approval	Ex II 3 G Ex nA II T4 X
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D or non-hazardous locations
GL	Germanischer Lloyd

Housing width 6.2



Type	Order No.	Pcs. Pkt.
<b>MINI MCR-SL-UI-UI-NC</b>	<b>2864150</b>	1
<b>MINI MCR-SL-UI-UI-SP</b>	<b>2864710</b>	1

U input		I input
0 ... 5 V / 1 ... 5 V	0 ... 20 mA / 4 ... 20 mA	
0 ... 10 V / 2 ... 10 V		
Approx. 100 kΩ	Approx. 50 Ω	
<b>U output</b>		<b>I output</b>
0 ... 5 V / 1 ... 5 V	0 ... 20 mA / 4 ... 20 mA	
0 ... 10 V / 2 ... 10 V		
Approx. 12.5 V	28 mA	
Approx. 22 mA	Approx. 12.5 V	
≥ 10 kΩ	< 500 Ω (at 20 mA)	
< 20 mV <sub>PP</sub>	< 20 mV <sub>PP</sub>	
<b>U output</b>		<b>I output</b>
19.2 V DC ... 30 V DC		
24 V DC		
< 9 mA (Voltage output, at 24 V DC incl. load)	< 19 mA (Current output, at 24 V DC incl. load)	
< 200 mW (Voltage output)	< 450 mW (Current output)	
≤ 0.1 % (of end value)		
< 0.01 %/K, Typ. < 0.002 %/K		
Approx. 100 Hz		
Approx. 3.2 ms		
1.5 kV (50 Hz, 1 min.)		
IP20		
-20 °C ... 65 °C		
Any		
PBT		
<b>CE compliant</b>		
Ex II 3 G Ex nA II T4 X		
Class I, Div. 2, Groups A, B, C, D or non-hazardous locations		
Germanischer Lloyd		

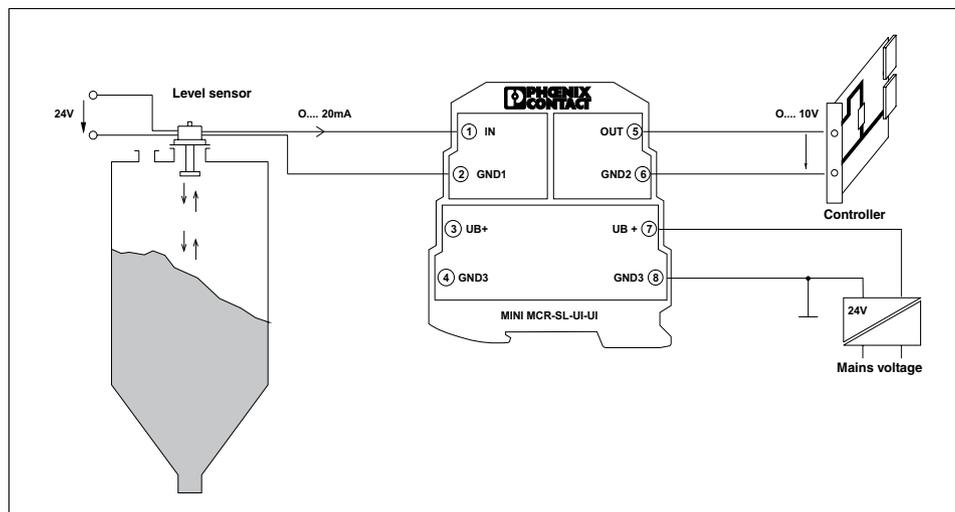
Order key MINI MCR-SL-UI-UI (Standard configuration entered as example)

Order No.	Input	Output	Factory calibration certificate
<b>2864383</b>	<b>IN03</b>	<b>OUT01</b>	<b>NONE</b>
2864383 ≙ ...-UI-UI	IN01 ≙ 0...20 mA IN02 ≙ 4...20 mA IN03 ≙ 0...10 V IN04 ≙ 2...10 V IN05 ≙ 0...5 V IN06 ≙ 1...5 V	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA OUT03 ≙ 0...10 V OUT04 ≙ 2...10 V OUT05 ≙ 0...5 V OUT06 ≙ 1...5 V	NONE ≙ without factory YES ≙ with factory calibration certificate (fee) YESPLUS ≙ Factory calibration certificate with 5 measuring points (fee)

Configuration table for input and output signals

Input	Output	DIP switch SW 2						DIP switch SW 1	
		DIP 1	DIP 2	DIP 3	DIP 4	DIP 5	DIP 6	DIP 1	DIP 2
0 - 10 V	0 - 20 mA	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	4 - 20 mA	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
	0 - 10 V	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
	2 - 10 V	ON	OFF	ON	OFF	OFF	OFF	ON	OFF
	0 - 5 V	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
	1 - 5 V	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
2 - 10 V	0 - 20 mA	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
	4 - 20 mA	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	0 - 10 V	ON	OFF	ON	ON	ON	OFF	OFF	OFF
	2 - 10 V	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
	0 - 5 V	ON	ON	OFF	ON	ON	OFF	OFF	OFF
	1 - 5 V	ON	ON	OFF	ON	ON	OFF	ON	OFF
0 - 5 V	0 - 20 mA	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
	4 - 20 mA	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
	0 - 10 V	ON	OFF	ON	OFF	OFF	OFF	ON	OFF
	2 - 10 V	ON	OFF	ON	OFF	OFF	OFF	ON	OFF
	0 - 5 V	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
	1 - 5 V	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
1 - 5 V	0 - 20 mA	OFF	OFF	OFF	ON	ON	OFF	ON	OFF
	4 - 20 mA	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
	0 - 10 V	ON	OFF	ON	ON	ON	OFF	ON	OFF
	2 - 10 V	ON	OFF	ON	OFF	OFF	OFF	ON	OFF
	0 - 5 V	ON	ON	OFF	ON	ON	OFF	ON	OFF
	1 - 5 V	ON	ON	OFF	ON	ON	OFF	ON	OFF
0 - 20 mA	0 - 20 mA	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
	4 - 20 mA	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
	0 - 10 V	ON	OFF	ON	OFF	OFF	OFF	OFF	ON
	2 - 10 V	ON	OFF	ON	OFF	OFF	OFF	ON	ON
	0 - 5 V	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
	1 - 5 V	ON	ON	OFF	OFF	OFF	OFF	ON	ON
4 - 20 mA	0 - 20 mA	OFF	OFF	OFF	ON	ON	OFF	OFF	ON
	4 - 20 mA	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
	0 - 10 V	ON	OFF	ON	ON	ON	OFF	OFF	ON
	2 - 10 V	ON	OFF	ON	OFF	OFF	OFF	OFF	ON
	0 - 5 V	ON	ON	OFF	ON	ON	OFF	OFF	ON
	1 - 5 V	ON	ON	OFF	OFF	OFF	OFF	OFF	ON

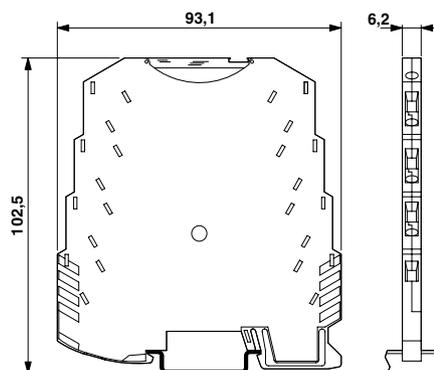
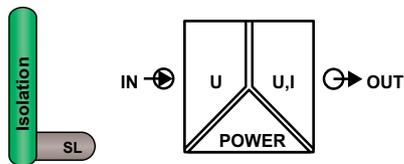
Application example: Level measurement



# INTERFACE Analog

## MINI Analog

### Configurable 3-way isolating amplifiers



**MINI MCR-SL-U-UI**  
Configurable 3-way isolating amplifiers

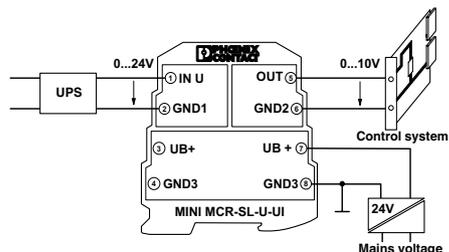
- Processing voltages of up to 30 V
- Configurable input and output signals
- 3-way isolation
- Low power consumption
- Power supply possible through the foot element (T-Connector)

The **MINI MCR-SL-U-UI** 3-way isolating amplifiers are used for electrical isolation, conversion, amplification and filtering of voltages up to 30 V. These can be the output voltages of power supply units or UPS.

The devices that can be adjusted via DIP switches are electrically isolated from each other in the input, output and supply circuit. This 3-way isolation prevents different sensor circuits interfering with each other and thereby improves the quality of your measuring circuit.

#### Accessories:

For information about system supply, MINI analog system adapter, T-connector and marking options.

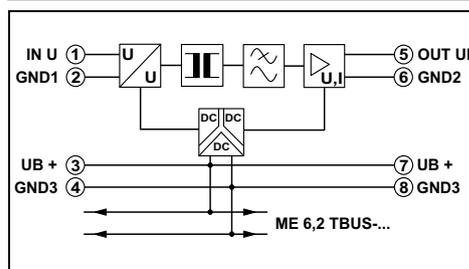


	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Screw connection	0.14-2.5	0.2-2.5	26-12	M3
Spring-cage conn.	0.2-2.5	0.2-2.5	24-12	

Description		
<b>MCR 3-way isolating amplifier</b> , for electrical isolation of analog signals,		
	Screw connection	
	Spring-cage conn.	

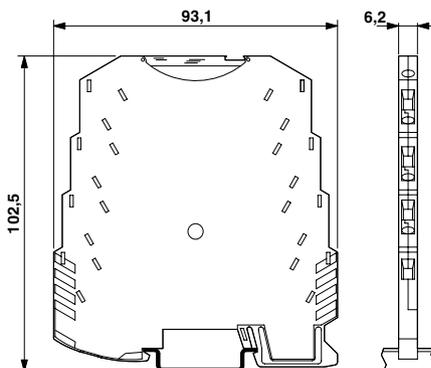
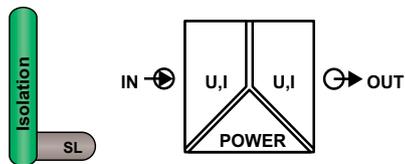
Technical data	
<b>Input data</b>	
Input signal	0 ... 24 V / 0 ... 30 V
Input resistance	Approx. 125 kΩ
<b>Output data</b>	
Output signal (configurable using the DIP switch)	U output
	0 ... 5 V / 1 ... 5 V
	0 ... 10 V / 2 ... 10 V
	≤ 12.5 V
	28 mA
	≤ 12.5 V
	≤ 22 mA
	> 10 kΩ
	< 20 mV <sub>pp</sub>
	< 500 Ω (at 20 mA)
	< 20 mV <sub>pp</sub>
<b>General data</b>	
Supply voltage U <sub>B</sub>	19.2 V DC ... 30 V DC
Nominal supply voltage	24 V DC
Current consumption	< 19 mA (at 24 V DC incl. load)
Power consumption	< 450 mW
Transmission error, max.	< 0.1 % (of end value)
Temperature coefficient	< 0.01 %/K, Typ. < 0.002 %/K
Limit frequency (3 dB)	100 Hz
Step response (10-90%)	Approx. 3.5 ms
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-20 °C ... 65 °C
Assembly	Any
Housing material	PBT
<b>Conformance / approvals</b>	
Conformity	CE compliant
ATEX approval	Ex II 3 G Ex nA II T4 X
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D or non-hazardous locations
GL	Germanischer Lloyd

Housing width 6.2



Type	Order No.	Pcs. Pkt.
<b>MINI MCR-SL-U-UI-NC</b>	2865007	1
<b>MINI MCR-SL-U-UI-SP-NC</b>	2810078	1

Standard signal 3-way isolating amplifiers



MINI MCR-SL-I-I

- Processing standard signals
- Fixed setting of input and output signals
- 3-way isolation
- Low power consumption
- Power supply possible through the foot element (T-Connector)

The MINI MCR-SL 3-way isolating amplifiers are used for electrical isolation, conversion, amplification and filtering of analog standard signals.

The devices are electrically isolated from each other in the input, output and supply circuit.

A new type of connection concept makes the devices very low-loss with regard to their power consumption. This is expressed in low self-heating and has a significant influence on the service life.

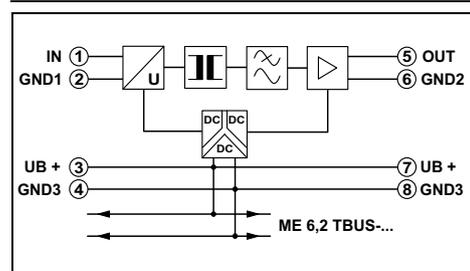
Thanks to the possibility of power bridging via the foot element, the devices can be connected to the power supply both simply and quickly.

Connection data	stranded			Screw
	[mm <sup>2</sup> ]			
Screw connection	0.14-2.5	0.2-2.5	26-12	M3

Description	Input signal	Output signal
<b>MCR 3-way isolating amplifier</b> , for electrical isolation of analog signals,		
Screw connection	0 ... 20 mA 4 ... 20 mA 0 ... 20 mA 4 ... 20 mA	0 ... 20 mA 4 ... 20 mA 0 ... 10 V -10 ... 10 V 0 ... 10 V -10 ... 10 V

Technical data	
<b>Input data</b>	
Input resistance	Approx. 100 kΩ
<b>Output data</b>	
Maximum output signal	12.5 V
No-load voltage	Approx. 12.5 V
Short-circuit current	Approx. 2 mA
Load R <sub>B</sub>	≥ 10 kΩ
Ripple	< 20 mV <sub>pp</sub>
<b>General data</b>	
Supply voltage U <sub>B</sub>	19.2 V DC ... 30 V DC
Nominal supply voltage	24 V DC
Current consumption	< 20 mA
Transmission error, max.	≤ 0.1 % (of end value)
Temperature coefficient	< 0.01 %/K, Typ. < 0.002 %/K
Limit frequency (3 dB)	Approx. 100 Hz
Step response (10-90%)	Approx. 3.2 ms
Degree of protection	IP20
Test voltage, input/output/supply	
Ambient temperature (operation)	-20 °C ... 65 °C
Assembly	Any
Housing material	PBT

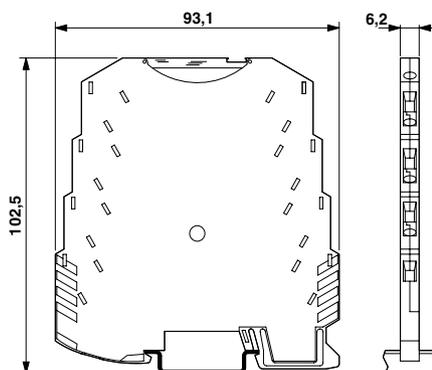
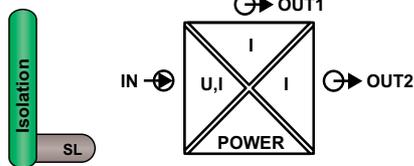
Housing width 6.2



Type	Order No.	Pcs. Pkt.
MINI MCR-SL-I-I	2864406	1
MINI MCR-SL-I-I-SP	2864723	1
MINI MCR-SL-U-U	2864684	1
MINI MCR-SL-U-U-SP	2864697	1

Technical data	
U input	I input
Approx. 100 kΩ	Approx. 50 Ω
U output	I output
12.5 V	28 mA
	Approx. 12.5 V
Approx. 2 mA	
≥ 10 kΩ	< 500 Ω (at 20 mA)
< 20 mV <sub>pp</sub>	< 20 mV <sub>pp</sub> (at 500 Ω)
<b>General data</b>	
19.2 V DC ... 30 V DC	
24 V DC	
< 20 mA	
≤ 0.1 % (of end value)	
< 0.01 %/K, Typ. < 0.002 %/K	
Approx. 100 Hz	
Approx. 3.2 ms	
IP20	
-20 °C ... 65 °C	
Any	
PBT	

**Configurable signal duplicator**



**MINI MCR-SL-UI-2I-NC**  
Configurable signal duplicator

- Configurable input and output signals
- 4-way isolation
- Two current output signals
- Power supply possible through the foot element (T-Connector)

The **MINI MCR-SL-UI-2I** 4-way signal duplicators are used for electrical isolation, duplicating and filtering of analog standard signals.

The devices are electrically isolated from each other in the input, output and supply circuit. 4-way isolation prevents different sensor circuits interfering with each other and thereby improves the quality of your measuring circuit.

The input signal can be switched over between the current and voltage signal via a DIP switch and the two current output signals can be switched independently between 0...20 mA and 4...20 mA.

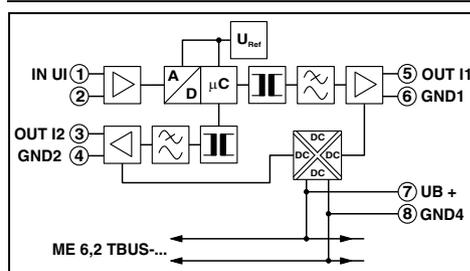
Thanks to the possibility of power bridging via the foot element, the devices can be connected to the power supply both simply and quickly.

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Screw connection	0.14-2.5	0.2-2.5	26-12	M3
Spring-cage conn.	0.2-2.5	0.2-2.5	24-12	

Description	
<b>MCR signal duplicator</b> , for duplicating and electrical isolation of analog signals	
Unconfigured	Screw connection
Unconfigured	Spring-cage conn.

Technical data	
<b>Input data</b>	
Input signal	U input
Maximum input signal	I input
Input resistance	0 ... 10 V / 1 ... 5 V
	0 ... 20 mA / 4 ... 20 mA
	30 V
	50 mA
	Approx. 100 kΩ
	Approx. 50 Ω
<b>Output data</b>	
Output signal (configurable using the DIP switch)	2x ; 0 ... 20 mA / 4 ... 20 mA
Maximum output signal	24 mA
No-load voltage	9 V
Load R <sub>B</sub>	≤ 250 Ω (at 20 mA)
Ripple	< 20 mV <sub>pp</sub>
<b>General data</b>	
Supply voltage U <sub>B</sub>	19.2 V DC ... 30 V DC
Nominal supply voltage	24 V DC
Current consumption	< 25 mA (at 24 V DC incl. load)
Power consumption	< 600 mW
Transmission error, max.	≤ 0.2 % (of end value) , Typ. < 0.1 %
Temperature coefficient	< 0.01 %/K , Typ. < 0.004 %/K
Limit frequency (3 dB)	Approx. 35 Hz
Step response (10-90%)	Approx. 10 ms
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-20 °C ... 60 °C
Housing material	PBT
<b>Conformance / approvals</b>	
Conformity	CE compliant
ATEX approval	Ex II 3 G Ex nA II T4 X
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D or non-hazardous locations
GL	Germanischer Lloyd

Housing width 6.2



Type	Order No.	Pcs. Pkt.
<b>MINI MCR-SL-UI-2I-NC</b>	<b>2864176</b>	1
<b>MINI MCR-SL-UI-2I-SP-NC</b>	<b>2864189</b>	1

U input		I input
0 ... 10 V / 1 ... 5 V	0 ... 20 mA / 4 ... 20 mA	
30 V	50 mA	
Approx. 100 kΩ	Approx. 50 Ω	
2x ; 0 ... 20 mA / 4 ... 20 mA		
24 mA		
9 V		
≤ 250 Ω (at 20 mA)		
< 20 mV <sub>pp</sub>		
19.2 V DC ... 30 V DC		
24 V DC		
< 25 mA (at 24 V DC incl. load)		
< 600 mW		
≤ 0.2 % (of end value) , Typ. < 0.1 %		
< 0.01 %/K , Typ. < 0.004 %/K		
Approx. 35 Hz		
Approx. 10 ms		
1.5 kV (50 Hz, 1 min.)		
-20 °C ... 60 °C		
PBT		
CE compliant		
Ex II 3 G Ex nA II T4 X		
Class I, Div. 2, Groups A, B, C, D or non-hazardous locations		
Germanischer Lloyd		

Order key MINI MCR-SL-UI-2I (Standard configuration entered as example)

Order No.	Input	Output combination <sup>1)</sup>	Behavior of the analog outputs	Factory calibration certificate
2864794	IN03	A	0	NONE
2864794 ≙ ...-UI-2I	IN01 ≙ 0...20 mA IN02 ≙ 4...20 mA IN03 ≙ 0...10 V IN06 ≙ 1...5 V	A B C	0 ≙ Analog behavior  1 ≙ Limit	NONE ≙ without factory YES ≙ with factory calibration certificate (fee) YESPLUS ≙ Factory calibration certificate with 5 measuring points (fee)
2864804 ≙ ...-UI-2I-SP				

Explanation of the output combination:

	Output 1	Output 2
A	0...20 mA	0...20 mA
B	0...20 mA	4...20 mA
C	4...20 mA	4...20 mA

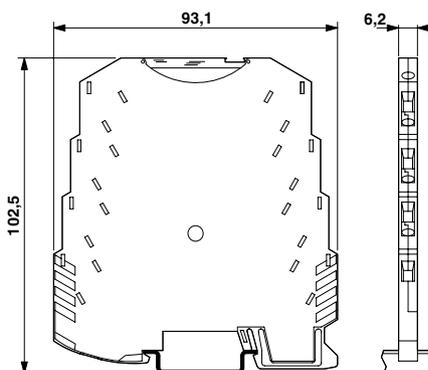
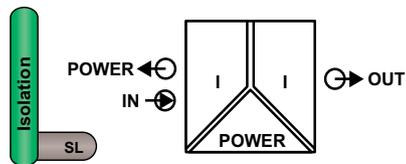
<sup>1)</sup> For explanations see adjacent text on the right, for further details see data sheet: [www.phoenixcontact.com](http://www.phoenixcontact.com)

**Repeater Power Supply**



**MINI MCR-SL-RPS-I-I-SP**

Repeater power supply for supplying 2 and 3-conductor transmitters.

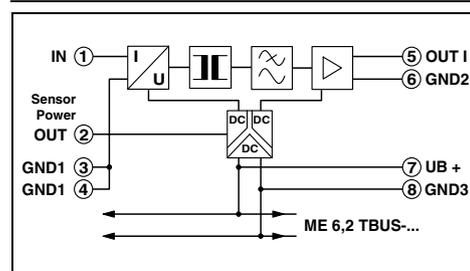


- 3-way isolation
- Supplying of 2 or 3-conductor transmitters
- Alternatively bidirectional HART transmission
- Power supply possible through the foot element (T-Connector)

The **MINI MCR-SL-RPS(S)-I-I** repeater power supplies have the task of supplying 2 or 3-conductor transmitters located in the field and transmitting the analog signals electrically isolated from the transmitter.

Both devices are electrically isolated from each other in the input, output and supply circuit.

Housing width 6.2



	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Spring-cage conn.	0.2-2.5	0.2-2.5	24-12	

Description	
<b>MCR repeater power supplies</b>	
with HART® protocol	Spring-cage conn. Spring-cage conn.

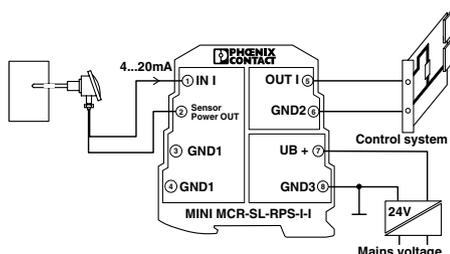
Technical data	
<b>Input data</b>	
Input signal	
Input resistance	
Transmitter supply voltage	
<b>Output data</b>	
Output signal	
Maximum output signal	
No-load voltage	
Load R <sub>B</sub>	
Ripple	
<b>General data</b>	
Supply voltage U <sub>B</sub>	
Nominal supply voltage	
Power consumption	
Transmission error, max.	
Temperature coefficient	
Limit frequency (3 dB)	
Communication	

Type	Order No.	Pcs. Pkt.
<b>MINI MCR-SL-RPS-I-I-SP</b>	<b>2864752</b>	1
<b>MINI MCR-SL-RPSS-I-I-SP</b>	<b>2810230</b>	1

0 ... 20 mA, isolator operation / 4 ... 20 mA
Approx. 50 Ω
14.7 V DC ... 25.5 V DC (U <sub>B</sub> max. 4.5 V for load 0...20 mA)
0 ... 20 mA / 4 ... 20 mA
28 mA
Approx. 12.5 V
≤ 500 Ω (at I = 20 mA)
< 20 mV <sub>rms</sub>
19.2 V DC ... 30 V DC
24 V DC
< 900 mW (at 24 V DC and in repeater power supply operation)
≤ 0.2 % (of end value) , Typ. ≤ 0.1 % (of end value)
< 0.01 %/K , Typ. < 0.002 %/K
Approx. 100 Hz
-

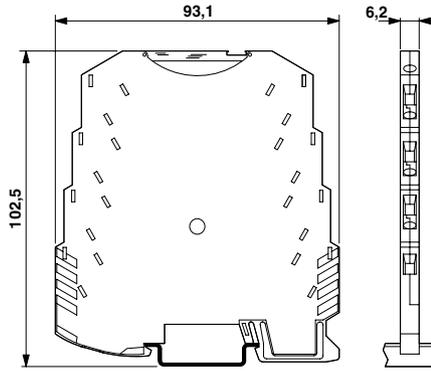
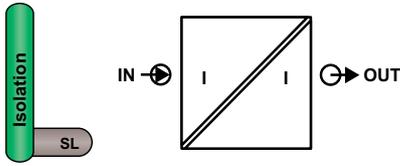
HART specification in both operating modes (RPSS isolator / RPSS repeater power supply)

Step response (10-90%)	Approx. 3.5 ms
Test voltage, input/output/supply	
Degree of protection	IP20
Ambient temperature (operation)	-20 °C ... 60 °C
Assembly	Any
Housing material	PBT
<b>Conformance / approvals</b>	
Conformity	CE compliant
ATEX approval	Ex II 3 G Ex nA II T4 X
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D or non-hazardous locations
GL	Germanischer Lloyd



Repeater power supply operation with a passive sensor

**One and two-channel passive isolators**



**MINI MCR-SL-...CP-I-I**

One or two-channel passive isolators

- Electrical isolation without additional auxiliary power supply
- Current signals 0(4)...20 mA
- One and two-channel versions

The **MINI MCR-SL-...CP-I-I** passive isolators are used for electrical isolation and filtering of analog 0(4)...20 mA standard signals.

The devices perform electrical isolation between the control electronics and process peripherals. Furthermore, interference signal parts above 75 Hz are effectively suppressed.

Input and output circuits do not require separate auxiliary power, the modules obtain it from the input signal.

When passive loop-powered isolators are used, one must make sure that the current sourcing voltage of the measuring transducer  $U_B$  is sufficient to drive the maximum current of 20 mA via the passive loop-powered isolator with the voltage drop  $U_V = 1.7$  V and the load  $R_B$ .

This means:

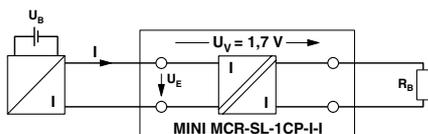
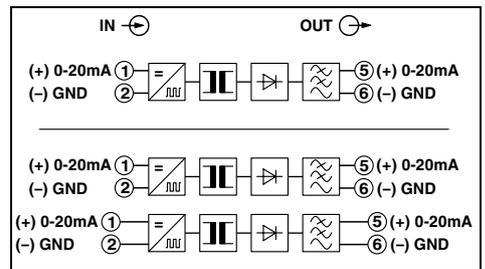
$$U_B \geq U_E = 1.7 \text{ V} + 20 \text{ mA} \times R_B$$

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Screw connection	0.14-2.5	0.2-2.5	26-12	M3
Spring-cage conn.	0.2-2.5	0.2-2.5	24-12	

Description	Type	Order No.	Pcs. Pkt.	
<b>MCR passive isolator</b> , for electrical isolation of current signals without auxiliary power				
two-channel	Screw connection	<b>MINI MCR-SL-2CP-I-I</b>	2864655	1
single-channel	Screw connection	<b>MINI MCR-SL-1CP-I-I</b>	2864419	1
two-channel	Spring-cage conn.	<b>MINI MCR-SL-2CP-I-I-SP</b>	2864781	1

Technical data	
<b>Input data</b>	
Input signal	0 ... 20 mA / 4 ... 20 mA
Voltage drop	1.7 V (at I = 20 mA)
Response current	Approx. 190 µA
Maximum input current / overload	40 mA
Maximum input voltage	18 V
<b>Output data</b>	
Output signal	0 ... 20 mA / 4 ... 20 mA
Load $R_B$	600 Ω (at I = 20 mA output signal)
Ripple	< 10 mV <sub>rms</sub>
<b>General data</b>	
Transmission error, max.	≤ 0.1 % (of end value)
Additional error per 100 Ω load	0.03 % (of measured value / 100 Ω load)
Temperature coefficient	≤ 0.002 %/K (of measured value / 100 Ω load)
Limit frequency (3 dB)	75 Hz
Step response (10-90%)	5 ms (At 600 Ω load)
Test voltage input/output	1.5 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-20 °C ... 65 °C
Assembly	Any
Housing material	PBT
<b>Conformance / approvals</b>	
Conformity	CE compliant
ATEX approval	Ex II 3 G Ex nA II T4 X
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D or non-hazardous locations
GL	Germanischer Lloyd

Housing width 6.2

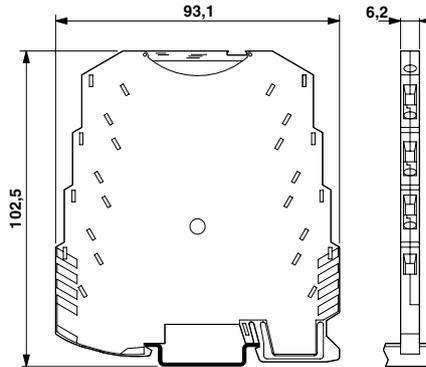
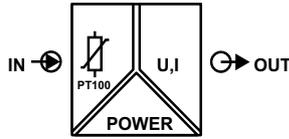


**Configurable temperature measuring transducer for Pt 100**



**MINI MCR-SL-PT100-UI-NC**

Configurable temperature measuring transducer for Pt 100 temperature sensors for measuring ranges of -150°C ... 850°C



- Measuring ranges from -150°C to 850°C
- 2, 3 or 4-conductor Pt 100 sensors
- Configurable output signals
- 3-way isolation
- Diagnostics LED and fault evaluation
- Power supply possible through the foot element (T-Connector)

The **MINI MCR-SL-PT100-UI** temperature measuring transducers convert the measured values of Pt 100 sensors (IEC 60751/EN 60751) into analog standard signals. These temperature measuring transducers are optimized for measuring ranges of -150 to 850°C.

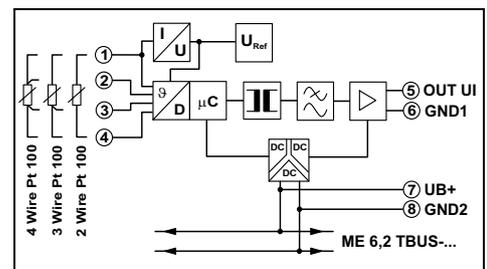
2, 3 and 4-conductor Pt 100 sensors can be connected to the input. The DIP switches are accessible at the side of the housing and allow the following parameters to be configured: Connection method, temperature span to be measured, output signal, and type of error evaluation.

	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Screw connection	0.14-2.5	0.2-2.5	26-12	M3

Description	
<b>MCR temperature measuring transducer</b> , for PT100 temperature sensors	
Unconfigured	Screw connection
Unconfigured	Spring-cage conn.

Technical data	
<b>Input data</b>	
Input signal (configurable via DIP switch)	
Temperature range	
Measuring range span	
<b>Output data</b>	
Output signal (configurable via DIP switch)	
Maximum output signal	
Load R <sub>B</sub>	
Ripple	
<b>General data</b>	
Supply voltage U <sub>B</sub>	
Current consumption	
Power consumption	
Transmission error for the full/set measurement range	
Temperature coefficient	
Step response (10-90%)	
Test voltage, input/output/supply	
Ambient temperature (operation)	
Housing material	
<b>Conformance / approvals</b>	
Conformity	
ATEX approval	
UL, USA / Canada	
GL	

Housing width 6.2



Type	Order No.	Pcs. Pkt.
<b>MINI MCR-SL-PT100-UI-NC</b>	<b>2864273</b>	1
<b>MINI MCR-SL-PT100-UI-SP-NC</b>	<b>2864286</b>	1

Pt 100 (IEC 60751/EN 60751) : 2, 3, 4-wire	
-150 °C ... 850 °C (configurable)	
Min. 50 K	
<b>I output</b>	<b>U output</b>
0 ... 20 mA / 4 ... 20 mA	0 ... 5 V / 1 ... 5 V
20 ... 0 mA / 20 ... 4 mA	0 ... 10 V / 10 ... 0 V
23 mA	Approx. 12.5 V
< 500 Ω (at 20 mA)	≥ 10 kΩ
< 20 mV <sub>PP</sub>	< 20 mV <sub>PP</sub>
19.2 V DC ... 30 V DC	
< 21 mA (for 24 V DC)	
< 500 mW	
≤ 0.2 % / ((100 K / set measurement range [K]) + 0.1) %	
< 0.02 %/K	
< 30 ms	
1.5 kV (50 Hz, 1 min.)	
-20 °C ... 65 °C	
PBT	
CE compliant	
Ex II 3 G Ex nA II T4 X	
Class I, Div. 2, Groups A, B, C, D or non-hazardous locations	
Germanischer Lloyd	

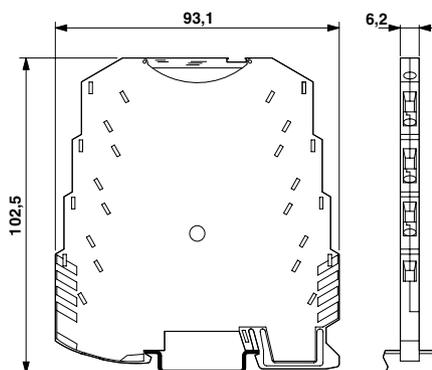
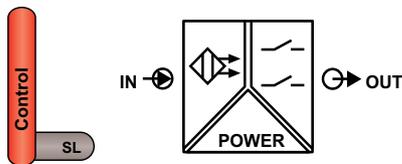
Order key MINI MCR-SL-PT100-UI (Standard configuration entered as example)

Order No.	Connection method	Measuring range [°C]	Output	Failure information 1)	Factory calibration certificate
2864435	3	0 / 100	OUT01	A	NONE
2864435 ≙ ...-PT100-UI	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	0 -10 -20 -30 0...100 (5 K)	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA OUT03 ≙ 0...10 V OUT05 ≙ 0...5 V	A B C D	NONE ≙ without factory YES ≙ with factory certification certificate (fee) YESPLUS ≙ Factory calibration certificate with 5 measuring points (fee)
2864736 ≙ ...-PT100-UI-SP		-40 -50 -100 -150	OUT06 ≙ 1...5 V OUT07 ≙ 20...0 mA OUT08 ≙ 20...4 mA OUT09 ≙ 10...0 V		
		110...300 (10 K) 320...700 (20 K) 750...850 (50 K)			

Failure information (depends on the output signal range):						
Measured value overrange			Open circuit			
0...20 mA	4...20 mA	0...10 V	0...20 mA	4...20 mA	0...10 V	
A	20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
B	20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
C	20 mA	20 mA	10 V	21 mA	21 mA	10.5 V
D	20 mA	20 mA	10 V	0 mA	4 mA	0 V
Measured value under-range			Short circuit			
0...20 mA	4...20 mA	0...10 V	0...20 mA	4...20 mA	0...10 V	
A	0 mA	4 mA	0 V	0 mA	4 mA	0 V
B	0 mA	3.5 mA	0 V	0 mA	3 mA	0 V
C	0 mA	4 mA	0 V	21 mA	21 mA	10.5 V
D	0 mA	4 mA	0 V	0 mA	4 mA	0 V

1) For explanations see adjacent text on the right, for further details see data sheet: www.phoenixcontact.com

**Configurable limit value switch**



**MINI MCR-SL-UI-REL**  
Threshold value switch with relay output

- 3-way isolation
- Adjustable limit values, hysteresis and delay time
- Operating current / Quiescent current switchover
- Power supply possible through the foot element (T-Connector)

The **MINI MCR-SL-UI-REL limit value switches** are used for monitoring standard signals.

The devices that can be adjusted via DIP switches and potentiometers are electrically isolated from each other in the input, output and supply circuit.

The limit value of the analog input signal 0...10 V or 0(4)...20 mA can be preselected approximately with the DIP switch and precisely set via a potentiometer. If the input signal reaches the limit value, a PDT relay contact is actuated at the output. If necessary, a DIP switch can be used to switch a four-stage hysteresis around the limit value.

The response behavior of the PDT relay can also be set via a DIP switch using the operating current or quiescent current principle.

Two LEDs signal the relay status (yellow) and alarm (red).

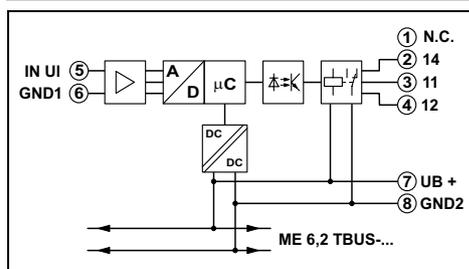
**Accessories:**  
For information about system supply, MINI analog system adapter, T-connector and marking options.

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Screw connection	0.14-2.5	0.2-2.5	26-12	M3
Spring-cage conn.	0.2-2.5	0.2-2.5	24-12	

Description	Type	Order No.	Pcs. Pkt.
<b>MCR threshold value switch</b>			
	Screw connection	<b>MINI MCR-SL-UI-REL</b>	<b>2864480</b>

Technical data	
<b>Input data</b>	
Input signal (configurable via DIP switch)	U input
Maximum permissible input level	0 ... 20 mA
Input resistance	0 ... 10 V
Specification of the switching point	100 mA
<b>Switching output</b>	
Relay output	50 Ω
Contact material	> 100 kΩ
Max. switching voltage	With 25-speed potentiometer
Limiting continuous current	1 PDT
Hysteresis (configurable using the DIP switch)	AgSnO <sub>2</sub> , hard gold-plated
Operating and closed circuit current behavior	250 V AC
Setting range of the response delay (configurable using the DIP switch)	2 A
<b>General data</b>	
Supply voltage U <sub>B</sub>	(0.1 %; 1 %; 2.5 %; 5 %)
Nominal supply voltage	Switchable using DIP switch
Current consumption	0 s ... 10 s (0 s; 1 s; 2 s; 3 s; 4 s; 6 s; 8 s; 10 s)
Power consumption	19.2 V DC ... 30 V DC
Linearity error	24 V DC
Temperature coefficient	< 14 mA (for 24 V DC)
Step response (10-90%)	< 330 mW (for 24 V DC)
Test voltage input/power supply	< 0.05 % (of end value)
Degree of protection	< 0.02 %/K
Ambient temperature (operation)	< 35 ms
Assembly	1.5 kV AC (50 Hz, 1 min.)
Housing material	IP20
Conformance / approvals	-20 °C ... 65 °C
Conformity	Any
ATEX approval	PBT
UL, USA / Canada	CE compliant
GL	Ex II 3 G Ex nAC IIC T4 X
	-
	Germanischer Lloyd

Housing width 6.2

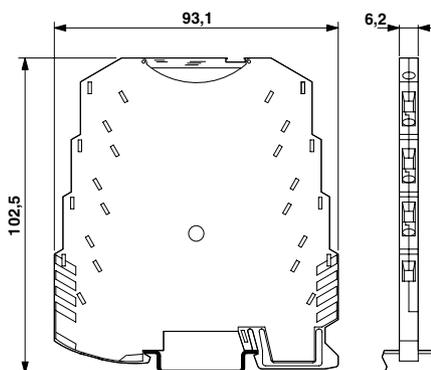
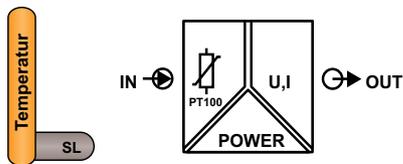




# INTERFACE Analog

## MINI Analog

### Configurable temperature measuring transducer for Pt 100



**MINI MCR-SL-PT100-UI-200-NC**

- Measuring ranges from  $-50^{\circ}\text{C}$  to  $200^{\circ}\text{C}$
- 2, 3 or 4-conductor Pt 100 sensors
- Configurable output signals
- 3-way isolation
- Diagnostics LED and fault evaluation
- Power supply possible through the foot element (T-Connector)

The **MINI MCR-SL-PT100-UI-200** temperature measuring transducers convert the measured values of Pt 100 sensors (IEC 60751/EN 60751) into analog standard signals. These temperature measuring transducers are optimized for measuring ranges of  $-50$  to  $200^{\circ}\text{C}$ .

2, 3 and 4-conductor Pt 100 sensors can be connected to the input. The DIP switches are accessible at the side of the housing and allow the following parameters to be configured: Connection method, temperature span to be measured, output signal, and type of error evaluation.

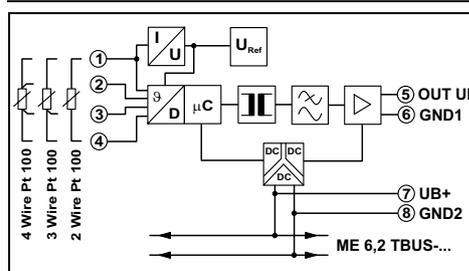
	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Screw connection	0.14-2.5	0.2-2.5	26-12	M3
Spring-cage conn.	0.2-2.5	0.2-2.5	24-12	

Description	
Unconfigured	Screw connection
Unconfigured	Spring-cage conn.

#### Technical data

<b>Input data</b>	
Input signal (configurable via DIP switch)	
Temperature range	
Measuring range span	
<b>Output data</b>	
Output signal (configurable via DIP switch)	
Maximum output signal	
Load $R_B$	
Ripple	
<b>General data</b>	
Supply voltage $U_B$	
Current consumption	
Power consumption	
Transmission error for the full/set measurement range	
Temperature coefficient	
Step response (10-90%)	
Test voltage, input/output/supply	
Ambient temperature (operation)	
Housing material	
<b>Conformance / approvals</b>	
Conformity	
ATEX approval	
UL, USA / Canada	
GL	

Housing width 6.2



Type	Order No.	Pcs. Pkt.
<b>MINI MCR-SL-PT100-UI-200-NC</b>	<b>2864370</b>	1
<b>MINI MCR-SL-PT100-UI-200-SP-NC</b>	<b>2864202</b>	1

Pt 100 (IEC 60751/EN 60751) : 2, 3, 4-wire  
 $-50^{\circ}\text{C}$  ...  $200^{\circ}\text{C}$  (configurable)  
 Min. 50 K

I output	U output
0 ... 20 mA / 4 ... 20 mA	0 ... 5 V / 1 ... 5 V
20 ... 0 mA / 20 ... 4 mA	0 ... 10 V / 10 ... 0 V
23 mA	Approx. 12.5 V
< 500 $\Omega$ (at 20 mA)	> 10 k $\Omega$

19.2 V DC ... 30 V DC  
 < 21 mA (for 24 V DC)  
 < 500 mW  
 < 0.3 % / ((50 K /  $\Delta$  Temp) + 0.05)%  
 < 0.02 %/K  
 < 200 ms  
 1.5 kV (50 Hz, 1 min.)  
 $-20^{\circ}\text{C}$  ...  $65^{\circ}\text{C}$   
 PBT

CE compliant  
 Ex II 3 G Ex nA II T4 X  
 Class I, Div. 2, Groups A, B, C, D or non-hazardous locations  
 Germanischer Lloyd

Order key MINI MCR-SL-PT100-UI-200 (Standard configuration entered as example)

Order No.	Connection method	Measuring range [ $^{\circ}\text{C}$ ]		Output	Failure information <sup>1)</sup>	Factory calibration certificate
		Start	End			
<b>2864309</b>	<b>3</b>	<b>0</b>	<b>100</b>	<b>OUT01</b>	<b>A</b>	<b>NONE</b>
2864309 $\cong$	2 $\cong$ 2-	0	Range (increment)	OUT01 $\cong$ 0...20 mA	A	NONE $\cong$ without factory
...PT100-UI-200	3 $\cong$ 3-	-5		OUT02 $\cong$ 4...20 mA	B	YES $\cong$ with factory
	4 $\cong$ 4-	-10		OUT03 $\cong$ 0...10 V	C	calibration
		-15		OUT04 $\cong$ 0...5 V	D	certificate (fee)
		-20		OUT05 $\cong$ 1...5 V		YESPLUS $\cong$ Factory calibration
2864192 $\cong$		-30	OUT06 $\cong$ 20...0 mA		certificate with	
...PT100-UI-200-SP		-40	OUT07 $\cong$ 20...4 mA		5 measuring points	
		-50	OUT08 $\cong$ 10...0 V		(fee)	

Failure information (depends on the output signal range):

Measured value overrange			Open circuit		
0...20 mA	4...20 mA	0...10 V	0...20 mA	4...20 mA	0...10 V
A 20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
B 20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
C 20 mA	20 mA	10 V	21 mA	21 mA	10.5 V
D 20 mA	20 mA	10 V	0 mA	4 mA	0 V
Measured value underrange			Short circuit		
0...20 mA	4...20 mA	0...10 V	0...20 mA	4...20 mA	0...10 V
A 0 mA	4 mA	0 V	0 mA	4 mA	0 V
B 0 mA	3.5 mA	0 V	0 mA	3 mA	0 V
C 0 mA	4 mA	0 V	21 mA	21 mA	10.5 V
D 0 mA	4 mA	0 V	0 mA	4 mA	0 V

<sup>1)</sup> For explanations see adjacent text on the right, for further details see data sheet: [www.phoenixcontact.com](http://www.phoenixcontact.com)

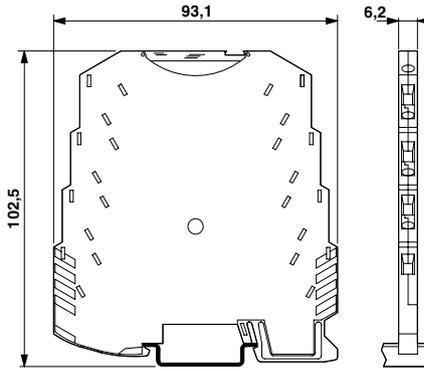
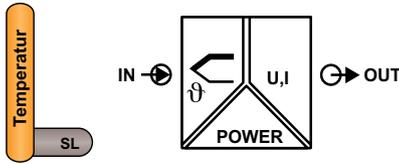
**Configurable temperature measuring transducer for Type J and K thermocouples**



**MINI MCR-SL-TC-UI-NC**

Configurable temperature measuring transducer for thermocouples for measuring ranges of -150...1350 °C

Housing width 6.2

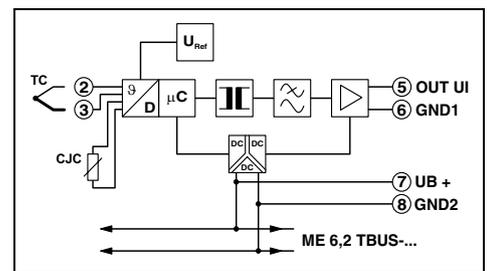


- Measuring ranges from -150°C to 1350°C
- Configurable output signals
- 3-way isolation
- Diagnostics LED and fault evaluation
- Power supply possible through the foot element (T-Connector)

The **MINI MCR-SL-TC-UI** temperature measuring transducers convert the measured values of thermocouple sensors (IEC 60584-1/ EN 60584-1) of types J and K into analog standard signals.

Both type J and type K thermocouples can be connected at the input. The DIP switches are accessible at the side of the housing and allow the following parameters to be configured: Connection method, temperature span to be measured, output signal, and type of error evaluation.

	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Screw connection	0.14-2.5	0.2-2.5	26-12	M3



Description	
Unconfigured	Screw connection
Technical data	
Input data	
Input signal (configurable via DIP switch)	
Temperature range	
Measuring range span	
Output data	
Output signal (configurable via DIP switch)	
Maximum output signal	
No-load voltage	
Short-circuit current	
Load R <sub>B</sub>	
Ripple	
General data	
Supply voltage U <sub>B</sub>	
Current consumption	
Power consumption	
Transmission error for the full/set measurement range	
Cold point errors	
Temperature coefficient	
Step response (10-90%)	
Test voltage, input/output/supply	
Ambient temperature (operation)	
Housing material	
Conformance / approvals	
Conformity	
ATEX approval	
UL, USA / Canada	
GL	

Type	Order No.	Pcs. Pkt.
<b>MINI MCR-SL-TC-UI-NC</b>	<b>2864299</b>	<b>1</b>
Thermocouples type J, K (IEC 584-1)		
Typ J : -150 °C ... 1200 °C (configurable)		
Typ K : -150 °C ... 1350 °C		
Min. 50 K		
I output	U output	
0 ... 20 mA / 4 ... 20 mA	0 ... 5 V / 1 ... 5 V	
20 ... 0 mA / 20 ... 4 mA	0 ... 10 V / 10 ... 0 V	
23 mA	12.5 V	
Approx. 12.5 V		
≤ 500 Ω (at 20 mA)	Approx. 10 mA	
	≥ 10 kΩ	
19.2 V DC ... 30 V DC		
< 21 mA (for 24 V DC)		
< 500 mW		
≤ 0.2 % / ((150 K / set measurement range [K]) + 0.1) %		
< 3 K ( Typ. < 2 K )		
< 0.02 %/K		
< 30 ms		
1.5 kV (50 Hz, 1 min.)		
-20 °C ... 65 °C		
PBT		
CE compliant		
Ex II 3 G Ex nA II T4 X		
Class I, Div. 2, Groups A, B, C, D or non-hazardous locations		
Germanischer Lloyd		

Order key MINI MCR-SL-TC-UI (Standard configuration entered as example)

Order No.	Sensor type	Measuring range [°C]	Output	Failure information 1)	Factory calibration certificate
2864448	3	0 1000	OUT01	A	NONE
	J ≙ Type J	-10	OUT01 ≙ 0...20 mA	A	NONE ≙ without factory
		-20	OUT02 ≙ 4...20 mA	B	YES ≙ with factory
	K ≙ Type K	-30	OUT03 ≙ 0...10 V	C	certification (fee)
		-40	OUT04 ≙ 0...5 V	D	certification (fee)
		-50	OUT05 ≙ 0...5 V		YESPLUS ≙ Factory calibration
		-100	OUT06 ≙ 1...5 V		certificate with
		-150	OUT07 ≙ 20...0 mA		5 measuring points
			OUT08 ≙ 20...4 mA		(fee)
			OUT09 ≙ 10...0 V		

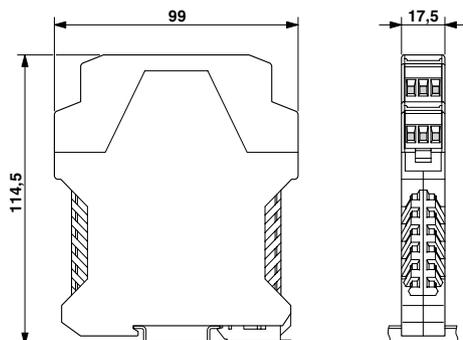
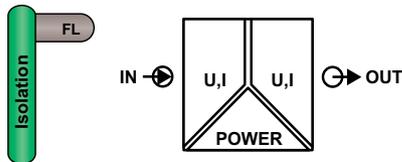
Failure information (depends on the output signal range):						
Measured value overrange			Open circuit			
0...20 mA	4...20 mA	0...10 V	0...20 mA	4...20 mA	0...10 V	
A	20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
B	20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
C	20 mA	20 mA	10 V	21 mA	21 mA	10.5 V
D	20 mA	20 mA	10 V	0 mA	4 mA	0 V
Measured value underrange						
0...20 mA	4...20 mA	0...10 V				
A	0 mA	4 mA	0 V			
B	0 mA	3.5 mA	0 V			
C	0 mA	4 mA	0 V			
D	0 mA	4 mA	0 V			

1) For explanations see adjacent text on the right, for further details see data sheet: [www.phoenixcontact.com](http://www.phoenixcontact.com)

# INTERFACE Analog

## Isolation

### Configurable 3-way isolating amplifiers



### MCR-C-UI-UI-DCI

Configurable 3-way isolating amplifiers with more than 225 signal conversion functions



Housing width 17.5

- 3-way isolation
- Configurable input and output signals
- Alternatively limit frequency 30 Hz or 450 Hz

The **MCR-C-UI-UI-DCI** 3-way isolating amplifiers are used for electrical isolation and conversion of standard analog signals.

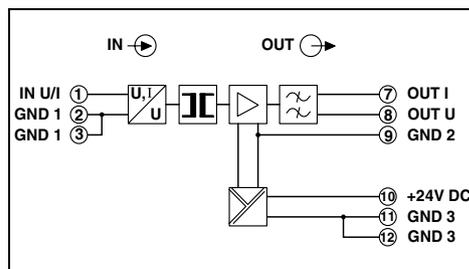
3-way isolation prevents different sensor circuits interfering with each other and thereby improves the quality of your measuring circuit.

DIP switches enable the inputs and outputs of the isolating amplifier to be reconfigured, allowing more than 225 signal conversions to be set.

The desired configuration of the input and output signal can be stated in the order (refer to the order key and the combination table). If the customer order details are incorrect or missing, the devices are supplied with the standard configuration (input signal 0...10 V, output signal 0...10 V).

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Pluggable COM-BICON screw connection	0.2-2.5	0.2-2.5	24-14	M 3

Description	Type	Order No.	Pcs. Pkt.
<b>MCR 3-way isolating amplifier</b> , for electrical isolation of analog signals, with a limit frequency (3 dB) 30 Hz	<b>MCR-C-UI-UI-DCI</b>	<b>2810913</b>	<b>1</b>
<b>Technical data</b>			
<b>Input data</b>	<b>U input</b>	<b>I input</b>	
Input signal (configurable using the DIP switch)	0 ... 10 V , please indicate any different setting when ordering		
Maximum input signal	30 V	50 mA	
Input resistance	1 MΩ	50 Ω	
<b>Output data</b>	<b>U output</b>	<b>I output</b>	
Output signal (configurable using the DIP switch)	0 ... 10 V , please indicate any different setting when ordering		
Maximum output signal	15 V	30 mA	
Load R <sub>B</sub>	≥ 10 kΩ	≤ 500 Ω	
<b>General data</b>			
Supply voltage U <sub>B</sub>	18 V DC ... 30 V DC		
Current consumption	< 30 mA (without load)		
Transmission error, max.	≤ 0.1 % (of end value)		
Temperature coefficient	0.0075 %/K		
ZERO / SPAN adjustment	± 2 % / ± 2 %		
Limit frequency (3 dB)	30 Hz		
Step response (10-90%)	11 ms		
Test voltage input/output	1.5 kV (50 Hz, 1 min.)		
Test voltage power supply/signal	1 kV (50 Hz, 1 min.)		
Degree of protection	IP20		
Ambient temperature (operation)	-20 °C ... 65 °C		
Assembly	Any		
Housing material	Polyamide PA non-reinforced		
<b>Conformance / approvals</b>			
Conformity	CE compliant		
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D or non-hazardous locations		
GL	Germanischer Lloyd		



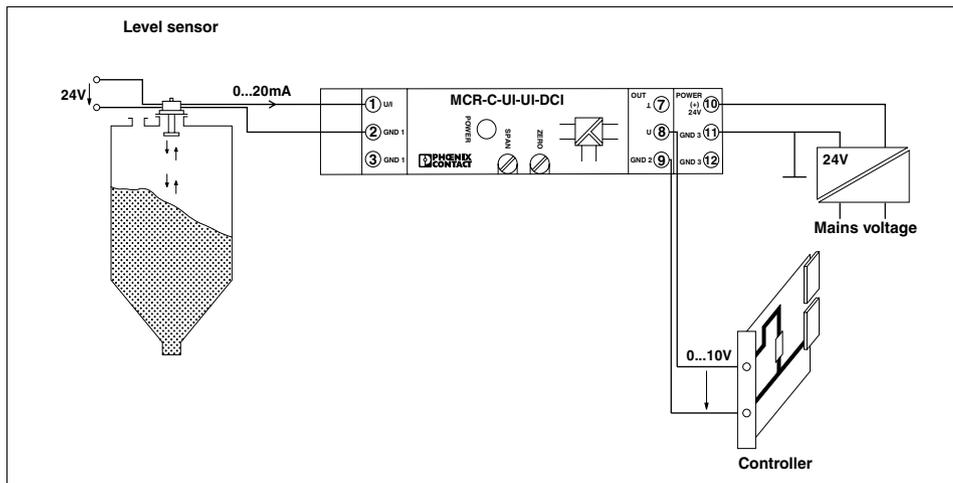
Order key MCR-C-UI-UI-...-DCI (Standard configuration entered as example)

Order No.	Input	Output	Factory calibration certificate		
<b>2810913</b>	<b>IN03</b>	<b>OUT03</b>	<b>NONE</b>		
2810913 ≙ MCR-C-UI-UI-DCI	IN01 ≙ 0...20 mA IN02 ≙ 4...20 mA IN03 ≙ 0...10 V IN05 ≙ 0...5 V IN06 ≙ 1...5 V IN13 ≙ -60...+60 mV IN14 ≙ -100...+100 mV IN15 ≙ -200...+200 mV IN16 ≙ -300...+300 mV IN17 ≙ -500...+500 mV	IN18 ≙ -1...+1 V IN19 ≙ -2...+2 V IN20 ≙ -2.5...+2.5 V IN21 ≙ -5...+5 V IN22 ≙ -10...+10 V IN23 ≙ -20...+20 V IN24 ≙ 0...60 mV IN25 ≙ 0...100 mV IN26 ≙ 0...200 mV IN27 ≙ 0...300 mV IN28 ≙ 0...500 mV	IN29 ≙ 0...1 V IN30 ≙ 0...2 V IN31 ≙ 0...2.5 V IN32 ≙ 0...20 V IN33 ≙ -5...+5 mA IN34 ≙ -10...+10 mA IN35 ≙ -20...+20 mA IN36 ≙ 0...5 mA IN37 ≙ 0...10 mA	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA OUT03 ≙ 0...10 V OUT05 ≙ 0...5 V OUT06 ≙ 1...5 V OUT13 ≙ -5...+5 V OUT14 ≙ -10...+10 V OUT15 ≙ 0...5 mA OUT16 ≙ 0...10 mA	NONE ≙ without fact. calibr. certif. YES ≙ with factory calibration certificate (fee) YESPLUS ≙ Factory calibration certificate with 5 measuring points (fee)

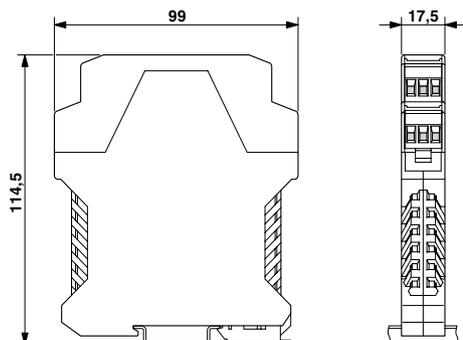
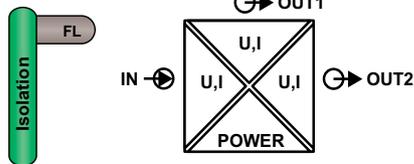
Combination table for input and output signals

Input	Voltage output					Current output			
	0 - 10 V	± 10 V	0 - 5 V	± 5 V	1 - 5 V	0 - 5 mA	0 - 10 mA	0 - 20 mA	4 - 20 mA
0 - 60 mV	x	x	x	x	x	x	x	x	x
0 - 100 mV	x	x	x	x	x	x	x	x	x
0 - 200 mV	x	x	x	x	x	x	x	x	x
0 - 300 mV	x	x	x	x	x	x	x	x	x
0 - 500 mV	x	x	x	x	x	x	x	x	x
0 - 1 V	x	x	x	x	x	x	x	x	x
0 - 2 V	x	x	x	x	x	x	x	x	x
0 - 2,5 V	x	x	x	x	x	x	x	x	x
0 - 5 V	x	x	x	x	x	x	x	x	x
0 - 10 V	x	x	x	x	x	x	x	x	x
0 - 20 V	x	x	x	x	x	x	x	x	x
± 60 mV	x	x	x	x			x	x	
± 100 mV	x	x	x	x			x	x	
± 200 mV	x	x	x	x			x	x	
± 300 mV	x	x	x	x			x	x	
± 500 mV	x	x	x	x			x	x	
± 1 V	x	x	x	x			x	x	
± 2 V	x	x	x	x			x	x	
± 2,5 V	x	x	x	x			x	x	
± 5 V	x	x	x	x			x	x	
± 10 V	x	x	x	x			x	x	
± 20 V	x	x	x	x			x	x	
0 - 5 mA	x	x	x	x	x	x	x	x	x
0 - 10 mA	x	x	x	x	x	x	x	x	x
0 - 20 mA	x	x	x	x	x	x	x	x	x
± 5 mA	x	x	x	x			x	x	
± 10 mA	x	x	x	x			x	x	
± 20 mA	x	x	x	x			x	x	
1 - 5 V	x	x	x	x	x		x	x	x
4 - 20 mA	x	x	x	x	x		x	x	x

Application Example: Level measurement



### Configurable signal multiplier



**MCR-FL-C-UI-2UI-DCI**

Signal multiplier with configurable input and two outputs

- 4-way isolation
- Configurable input and output signals
- Balanced signal combinations

The **MCR-C-UI-2UI-DCI** signal multiplier is used for electrical isolation and conversion of analog signals.

Module input, both outputs, and supply are electrically isolated from one another. Modules can therefore be used for electrical isolation, signal conversion, and signal amplifier on site as well as near the controller. A green power LED indicates that supply voltage is present.

Each of the two outputs has one current output and one voltage output which can be used in parallel.

It is possible to switch between a signal selected within the limits of the order key or the signal conversions listed in the configuration table, using DIP switches.

It is not necessary to calibrate after re-configuration because each transmission type has already been calibrated and stored in the device.

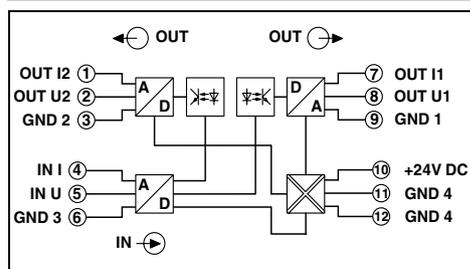
The desired configuration of the input and output signal can be stated in the order (refer to the order key and the combination table). If the customer order details are incorrect or missing, the devices are supplied with the standard configuration (input signal 0...20 mA, output signal 0...20 mA).

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Pluggable COM-BICON screw connection	0.2-2.5	0.2-2.5	24-14	M 3

Description
<b>MCR signal multiplier</b> , for multiplying and electrical isolation of analog signals.
Configured
Unconfigured

Technical data
<b>Input data</b>
Input data
Input signal
Measuring range span
Maximum input signal
Input resistance
<b>Output data</b>
Output signal (configurable using the DIP switch)
Maximum output signal
Load $R_B$
<b>General data</b>
Supply voltage $U_B$
Current consumption
Transmission error, max.
Temperature coefficient
Limit frequency (3 dB)
Step response (10-90%)
Test voltage, input/output/supply
Degree of protection
Ambient temperature (operation)
Assembly
Housing material
<b>Conformance / approvals</b>
Conformity
UL, USA / Canada

Housing width 17.5



Type	Order No.	Pcs. Pkt.
<b>MCR-FL-C-UI-2UI-DCI</b>	2814854	1
<b>MCR-FL-C-UI-2UI-DCI-NC</b>	2814867	1

U input	I input
0 V ... 12 V (freely selectable in 0.1 V steps)	0 mA ... 24 mA (freely selectable in 0.1 mA steps)
Min. 4 V	Min. 8 mA
30 V	50 mA
200 kΩ	50 Ω
U output	I output
refer to the order key	refer to the order key
15 V	35 mA
≥ 10 kΩ	≤ 600 Ω

20 V DC ... 30 V DC
< 25 mA
≤ 0.2 % (of end value), Typ. 0.1 % (of end value)
< 0.015 %/K, Typ. 0.0075 %/K
30 Hz
12 ms
1.5 kV (50 Hz, 1 min.)
IP20
-25 °C ... 55 °C
Any
Polyamide PA non-reinforced

CE compliant
Class I, Div. 2, Groups A, B, C, D or non-hazardous locations

Order key MCR-FL-C-UI-2UI-DCI (Standard configuration entered as example)

Order No.	Input signal	Input signal range (standard and special signals)		Output signal (standard signals)		Factory calibration certificate
		Initial value	End value	Output 1	Output 2	
2814854	I I ≙ Current U ≙ Voltage	0.0	20.0	OUT01	OUT01	NONE
		I ≙ 0.0 mA I : freely selectable between  U : freely selectable between 0.0...12.0 V	I ≙ 20.0 mA I : freely selectable between  U : freely selectable between 0.0...12.0 V	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA OUT03 ≙ 0...10 V OUT04 ≙ 2...10 V OUT05 ≙ 0...5 V OUT06 ≙ 1...5 V OUT16 ≙ 0...10 mA	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA OUT03 ≙ 0...10 V OUT04 ≙ 2...10 V OUT05 ≙ 0...5 V OUT06 ≙ 1...5 V OUT16 ≙ 0...10 mA	NONE ≙ w/o fac. cal. cert. YES ≙ with factory calibration certificate (fee) YESPLUS ≙ Factory calibration certificate with 5 measuring points (fee)
Measuring range span min. 8.0 mA/4.0 V Increment 0.1 mA / 0.1 V						

Ordering examples:

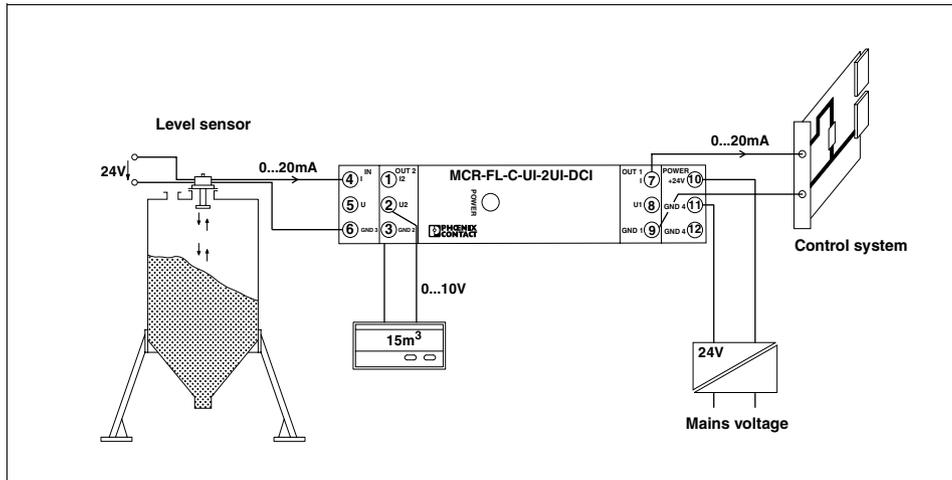
Ordering examples:	Input signal	Input signal range (standard and special signals)		Output signal (standard signals)		Factory calibration certificate
		Initial value	Final value	Output 1	Output 2	
2814854	I I ≙ Current	5,3	13,3	OUT01	OUT01	NONE
		I ≙ 5.3 mA	I ≙ 13.3 mA	OUT01 ≙ 0...20 mA	OUT01 ≙ 0...20 mA	NONE ≙ w/o fac. cal. cert.
Measuring range span 8.0 mA, i.e. order is possible						

Ordering examples:	Input signal	Input signal range (standard and special signals)		Output signal (standard signals)		Factory calibration certificate
		Initial value	Final value	Output 1	Output 2	
2814854	U U ≙ Voltage	7,8	11,8	OUT01	OUT03	NONE
		U ≙ 7.8 V	U ≙ 11.8 V	OUT01 ≙ 0...20 mA	OUT03 ≙ 0...10 V	NONE ≙ w/o fac. cal. cert.
Measuring range span 4.0 V, i.e. order is possible.						

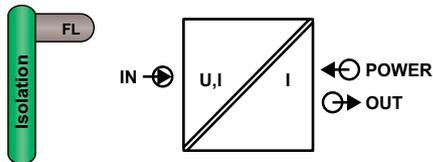
Combination table for input and output signals set with DIP switches

Input	Output 1							Output 2						
	0 - 20 mA	4 - 20 mA	0 - 10 mA	0 - 10 V	0 - 5 V	1 - 5 V	2 - 10 V	0 - 20 mA	4 - 20 mA	0 - 10 mA	0 - 10 V	0 - 5 V	1 - 5 V	2 - 10 V
0 - 20 mA	x	x	x	x	x	x	x	x	x	x	x	x	x	x
4 - 20 mA	x	x	x	x	x	x	x	x	x	x	x	x	x	x
0 - 10 mA	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2 - 10 mA	x	x	x	x	x	x	x	x	x	x	x	x	x	x
0 - 10 V	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2 - 10 V	x	x	x	x	x	x	x	x	x	x	x	x	x	x
0 - 5 V	x	x	x	x	x	x	x	x	x	x	x	x	x	x
1 - 5 V	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Application example: Filling level measurement with subsequent signal multiplication



### Configurable loop-powered isolator



- No separate voltage supply
- Electrically isolated input
- Configurable input
- 4...20 mA output
- Zero/span adjustment ( $\pm 2\%$ )

The **MCR-CLP-UI-I-4** loop-powered isolator is used for electrical isolation and signal conditioning in analog signal circuits.

On the input side, more than 25 different signal ranges can be set using DIP switches.

On the output side, the isolator is operated in a 4...20 mA current loop, which simultaneously provides the power supply for the module necessary for signal conversion.

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Pluggable COM-BICON screw connection	0.2-2.5	0.2-2.5	24-14	M 3

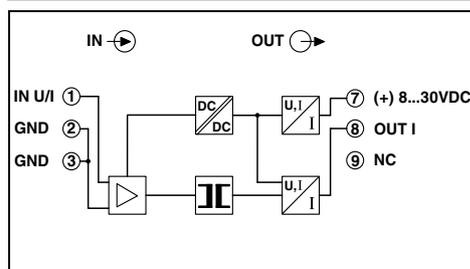
Description	Type	Order No.	Pcs. Pkt.
<b>MCR loop-powered isolator</b> , for electrical isolation of analog signals, Unconfigured	<b>MCR-CLP-UI-I-4-NC</b>	<b>2814252</b>	<b>1</b>
<b>Technical data</b>			
<b>Input data</b>	U input	I input	
Input signal (configurable using the DIP switch)	4 ... 20 mA , please indicate any different setting when ordering		
Maximum input signal	30 V	50 mA	
Input resistance	1 M $\Omega$	50 $\Omega$	
<b>Output data</b>			
Output signal	4 ... 20 mA		
Maximum output signal	35 mA		
Load R <sub>B</sub>	$\leq 800 \Omega$ (At U <sub>B</sub> = 24 V; (U <sub>B</sub> - 8 V) / 20 mA)		
<b>General data</b>			
Supply voltage U <sub>B</sub>	8 V DC ... 30 V DC		
Transmission error, max.	$\leq 0.1\%$ (of end value) , Typ. 0.05 %		
Temperature coefficient	$\leq 0.01\%/K$ , Typ. 0.005 %/K		
ZERO / SPAN adjustment	$\pm 2\%$ (of end value) / $\pm 2\%$ (of end value)		
Limit frequency (3 dB)	30 Hz		
Step response (10-90%)	11 ms		
Test voltage input/output	1.5 kV (50 Hz, 1 min.)		
Ambient temperature (operation)	-25 °C ... 65 °C		
Assembly	Any		
Housing material	Polyamide PA non-reinforced		
<b>Conformance / approvals</b>			
Conformity	CE compliant		
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D or non-hazardous locations		



**MCR-CLP-UI-I-4-NC**

Loop-powered isolator with a configurable input

Housing width 17.5

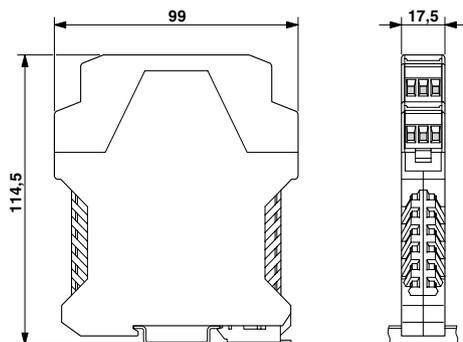
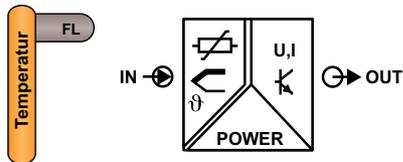




# INTERFACE Analog

## Temperature

### Programmable Temperature Transducers



### MCR-T-UI-E

Programmable temperature measuring transducers for resistance thermometers and thermocouples



Housing width 17.5

- For resistance thermometers and thermocouples
- Freely programmable via MCR-PI-CONF-WIN
- Optional with electrical isolation

The programmable **MCR-T-UI** temperature measuring transducers convert temperature signals from resistance thermometers and thermocouples as well as from sensors with linear mV characteristic curves into standard analog signals.

As an option, two thermocouples can be connected to measure the differential temperature.

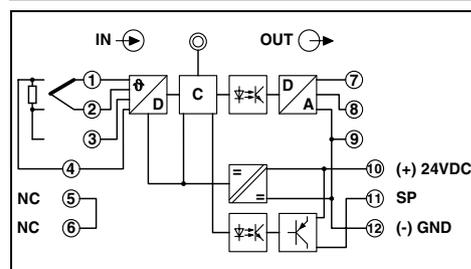
A downstream analog stage converts the signal, electrically isolated as an option, into 0(4)...20 mA, 0...(5)10 V, ± (5)10 V or its inverse signals.

The MCR-T modules also have an electronic switching output (PNP transistor output 100 mA/24 V).

The transmission behavior of the temperature measuring transducer is stated in the order or set with the configuration software MCR/PI-CONF-WIN.

The MCR-T modules are delivered unconfigured or with order-specific configuration on the basis of the order key.

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Pluggable COM-BICON screw connection	0.2-2.5	0.2-2.5	24-14	M 3



Description
<b>MCR temperature measuring transducers</b> , for resistance thermometers and thermocouple sensors, with electrical isolation of input/output and input/supply voltage
Configured
Unconfigured

Technical data
<b>Input data</b>
Resistance thermometers
Thermocouple sensors
Resistor
Voltage
Temperature range
Sensor input current
<b>Output data</b>
Output signal
Maximum output signal
Resolution D/A
Load R <sub>B</sub>
Ripple
Output signal with open circuit
Measuring range overrange/underrange
<b>Switching output</b>

Type	Order No.	Pcs. Pkt.
<b>MCR-T-UI-E</b>	<b>2814113</b>	1
<b>MCR-T-UI-E-NC</b>	<b>2814126</b>	1

General data
Supply voltage U <sub>B</sub>
Current consumption
Transmission error, max.
Cold point errors
Temperature coefficient
Test voltage input/output
Test voltage input/power supply
Ambient temperature (operation)
Assembly
Housing material
<b>Conformance / approvals</b>
Conformity
UL, USA / Canada
GL

Pt, Ni, Cu sensors : 2, 3, 4-wire	U, T, L, J, E, K, N, S, R, B, C, W, HK
0 Ω ... 8000 Ω (freely adjustable)	-20 mV ... 2400 mV (freely adjustable)
(Depending on sensor type used)	250 μA (resistance thermometer)
<b>U output</b>	<b>I output</b>
0 ... 5 V / 0 ... 10 V	0 ... 20 mA / 4 ... 20 mA
-5 ... 5 V / -10 ... 10 V	-
± 12 V	24 mA
± 12 Bit	± 12 Bit
≥ 10 kΩ	≤ 500 Ω
< 20 mV <sub>pp</sub>	
-12 V ... 12 V	0 A ... 24 mA
-12 V ... 12 V	0 A ... 24 mA
<b>Transistor output, pnp</b>	
Can carry a load of 100 mA, switches supply voltage (not protected against short circuit); locked in case of order-specific configuration, otherwise freely programmable through MCR/PI-CONF-WIN	
18 V DC ... 30 V DC	
≤ 60 mA , Typ. 40 mA	
≤ 0.1 % (of end value, + 6 mV or 12 μA at output)	
≤ 3 K , Typ. 1.5 K	
≤ 0.01 %/K , Typ. 0.005 %/K	
1 kV (50 Hz, 1 min.)	
1 kV (50 Hz, 1 min.)	
-20 °C ... 65 °C	
Any	
Polyamide PA non-reinforced	
<b>CE compliant</b>	
Class I, Div. 2, Groups A, B, C, D or non-hazardous locations	
Germanischer Lloyd	

Order key MCR-T-UI(-E)/... (Standard configuration entered as example)

Order No.	Sensor type	Input characteristic curve	Connection method	Measuring range: Start	End	Unit of measur.	Output	Output charact. curve	Factory calibration certificate
2814113	PT100	D	3	-200,0	+850,0	C	OUT02	N	NONE
2814113 ≙ MCR-T-UI-E	Refer to tables under "sensor type"	D ≙ DIN S ≙ SAMA (see table)	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	at 0 mA (e.g. -200.0 °C)	at 20 mA (e.g.: +850.0 °C)	C ≙ °C F ≙ °F V ≙ mV O ≙ Ω P ≙ %	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA OUT03 ≙ 0...10 V OUT05 ≙ 0...5 V OUT13 ≙ -5...+5 V OUT14 ≙ -10...+10 V	N ≙ Normal I ≙ Inverse	NONE ≙ without fact. cal. certif. C YES ≙ with factory calibration certificate (fee) YESPLUS ≙ Factory calibration certificate with 5 measuring points (fee)
2814090 ≙ MCR-T-UI		0 ≙ For thermocouple, Resistor, Potentiometer, Voltage, Ni1000 (Landis&Gyr) Cu10, KTY 81-110, Cu50, Cu53	0 ≙ For Thermocouple, Resistor, Potentiometer, Voltage						

Order examples with various input versions:

**Resistance thermometer**    2814113 / PT100 / D / 3 / -200,0 / +850,0 / C / OUT02 / N / NONE

(Configuration for 3-conductor PT 100 sensor; according to DIN from -200.0 °C to +850.0 °C with a 4...20 mA output characteristic curve)

**Thermocouple**    2814113 / J / 0 / 0 / -346 / +2192 / F / OUT02 / I / NONE

(Configuration for thermocouple type J from -346F to +2192F with 20...4 mA output characteristic curve)

**Voltage**    2814113 / V01 / 0 / 0 / -10 / 1200 / V / OUT03 / I / NONE

(Configuration for voltage input from -10 mV to +1200 mV with 10...0 V output characteristic curve)

**Resistor**    2814113 / RES / 0 / 0 / 0 / 7500 / O / OUT05 / N / NONE

(2-conductor connection)

(Configuration for connecting a resistor varying between 0 Ω and 7500 Ω. The output signal is 0...5 V.)

**Potentiometer**    2814113 / POT / 0 / 0 / 10 / 90 / P / OUT02 / N / NONE

(3-conductor connection)

(Configuration for connecting a 3-conductor potentiometer, whereby 10... 90% of the range is used. The output signal is 4...20 mA.)

### Resistance thermometer

(Temperature ranges in accordance with IEC 60751/EN 60751 or DIN 43760 SAMA RC 21-4-1966 with 2, 3 or 4-conductor wiring)

Sensor type 1)	Measuring range	Standard	Smallest measuring range span
Pt sensors	-200 °C ... 850 °C	(DIN/SAMA)	0.4 K
Ni sensors	-60 °C ... 180 °C	(DIN/SAMA)	0.4 K
Ni 1000	-50 °C ... 160 °C	(Landis & Gyr)	0.4 K
Cu 10	-70 °C ... 500 °C	(SAMA)	0.4 K
Cu 50	-50 °C ... 200 °C	-	0.4 K
Cu 53	-50 °C ... 180 °C	-	0.4 K
KTY81	-55 °C ... 150 °C	(Philips)	0.4 K
KTY84	-40 °C ... 300 °C	-	0.4 K

1) Note: Pt sensors in increments of 10, 20, ...100 and 100, 200, ...1000, 2000. Further types and characteristic curves on request.

### Thermocouples

Sensor type	Thermocouple	Measuring range	Smallest measuring range span
U	Cu-CuNi	-200 °C ... 600 °C	> 1 K
T 2)	Cu-CuNi	-200 °C ... 400 °C	> 1 K
L	Fe-CuNi	-200 °C ... 900 °C	> 1 K
J 2)	Fe-CuNi	-210 °C ... 1200 °C	> 1 K
E 2)	NiCr-CuNi	-226 °C ... 1000 °C	> 1 K
K 2)	NiCr-Ni	-200 °C ... 1372 °C	> 1 K
N 2)	NiCrSi-NiSi	-200 °C ... 1300 °C	> 1 K
S 2)	Pt10Rh-Pt	-50 °C ... 1768 °C	> 4 K
R 2)	Pt13Rh-Pt	-50 °C ... 1768 °C	> 4 K
B 2)	Pt30Rh-Pt6Rh	500 °C ... 1820 °C	> 10 K
C	-	-18 °C ... 2316 °C	> 4 K
W	-	-18 °C ... 2316 °C	> 4 K
HK	-	-200 °C ... 800 °C	> 1 K

2) Thermocouples in acc. with IEC 60584/EN 60584. Further types and characteristic curves on request.

### Resistors, potentiometers, mV-voltages

Sensor type	Input	Measuring range	Smallest measuring range span
RES	Resistor	0 Ω ... 8000 Ω (2-conductor)	2 Ω
POT	Potentiometer (max. 8 kΩ)	0 ... 100 % (3-conductor)	0,2 %
V01	Voltage	-20 mV ... +2400 mV	2 mV

### Conversion aid for temperature from °C to °F:

$$T [°F] = \frac{9}{5} T [°C] + 32$$

### Application Examples:

**Resistance thermometer: 2-conductor connection method**

Output: Current signal 0(4)...20 mA

Application:

- For short distances (< 10 m)

Note the following:

- Cable resistances  $R_{L1}$  and  $R_{L2}$  are incorporated in the measurement result directly and falsify the result accordingly (Example Pt 100:  $0.385 \Omega \approx 1 K$ ). Compensation of  $\pm 5\%$  is possible.

**Resistance thermometer: 3-conductor connection method**

Output: Voltage signal 0...(5)10 V,  $\pm(5)10 V$

Application:

- For long distances between the PT 100 sensor and the MCR module ( $R_{L1}, R_{L2}, R_{L3} \leq 25 \Omega$ ).

Note the following:

- The value of all cable resistances must be exactly the same in order to balance out the sensor cable resistances ( $R_{L1} = R_{L2} = R_{L3}$ ).

**Resistance thermometer: 4-conductor connection method**

Output: Switching output

Application:

- For long distances between a PT 100 sensor and the MCR module and different cable resistances ( $R_{L1} \neq R_{L2} \neq R_{L3} \neq R_{L4}$ )

Note the following:

- The conductor resistance ( $R_{L2} + R_{L4}$ ) must not exceed a value of  $50 \Omega$ .

**Potentiometer**

Application:

- For short distances and slow changes!

Note the following:

- Cable resistances  $R_{L1}$  and  $R_{L2}$  are incorporated in the measurement result directly and falsify the result accordingly. Compensation of  $\pm 5\%$  is possible.

**Thermocouple: Absolute temperature measurement**

Application:

- Connecting a thermocouple or an mV signal.

Note:

- Activate cold point compensation for the device with thermocouple measurements.

**Thermocouple: Differential temperature measurement**

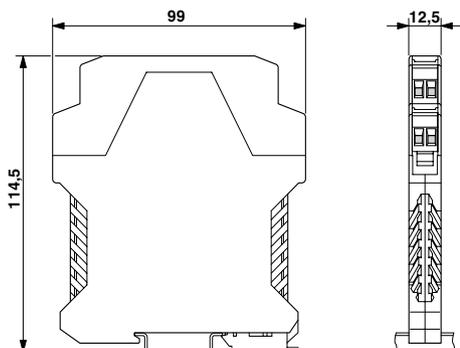
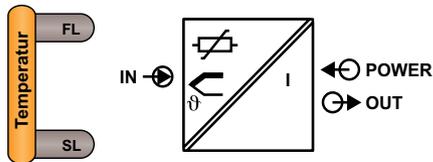
Application:

- Differential temperature measurement with thermocouples.
- Deactivate cold point compensation for the device.

# INTERFACE Analog

## Temperature

### Programmable loop-powered temperature transducer



**MCR-...T(PT100)-LP-I**

Programmable loop-powered temperature transducer

- For resistance thermometers, thermocouples, resistance-type and voltage sensors (MCR-FL-T-LP-I)
- For Pt 100 resistance thermometers (MCR-SL-PT100-LP-I)
- Freely programmable via MCR-PI-CONF-WIN

The universal PC-programmable temperature measuring transducers convert temperature signals from resistance thermometers and thermocouples as well as from sensors with linear mV characteristic curves into analog 4...20 mA signals.

On the output side, the temperature transducers are operated in a 4...20 mA current loop, which simultaneously provides the power supply for the modules, necessary for signal conversion.

Failure data in the event of sensor break or sensor short-circuit, that can be set in acc. with NE 43, and a high degree of accuracy in the entire ambient temperature range are the distinguishing features of the electrically isolated measurement transducers.

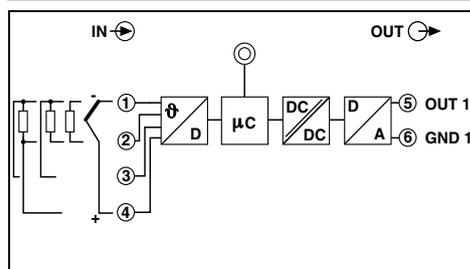
The devices are supplied in the standard configuration: Pt 100 sensor, 0...100 °C measuring range, 3-conductor connection.

Using the MCR-PAC-T programming adapter and the MCR/PI-CONF-WIN configuration software, it is possible to implement client-specific measurement range settings, linearizations and characteristic curve adaptations or set with the configuration software MCR/PI-CONF-WIN.

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Pluggable COM-BICON screw connection	0.2-2.5	0.2-2.5	24-14	M 3

Description		
<b>MCR temperature measuring transducer</b> , loop-powered for resistance thermometers, thermocouples, resistance-type and voltage sensors for Pt 100 resistance thermometer		
<b>Technical data</b>		
<b>Input data</b>		
Resistance thermometers		
Thermocouple sensors		
Resistor		
Voltage		
<b>Output data</b>		
Output signal	4 ... 20 mA / 20 ... 4 mA	
Maximum output signal	≤ 23 mA	
Load R <sub>B</sub>	(Max (V <sub>supply</sub> - 12 V) / 0.023 A (current output))	
Output signal with open circuit	≤ 3.6 mA or ≥ 21 mA (adjustable)	
Output signal with short circuit	≤ 3.6 mA or ≥ 21 mA (adjustable, not for thermocouples)	
Measuring range overrange/underrange	≤ 20.5 mA / ≥ 3.8 mA (linear increase/decrease)	
<b>General data</b>		
Supply voltage U <sub>B</sub>	12 V DC ... 35 V DC	12 V DC ... 35 V DC
Current consumption	< 3.5 mA	< 3.5 mA
Transmission error	Resistance thermometers	0.2 K (Pt 100, Ni 100), 0.5 K (Pt 500, Ni 500), 0.3 K (Pt 1000, Ni 1000)
	Thermocouple sensors	Type 0.5 K (K, J, T, E, L, U), 1.0 K (N, C, D), 2.0 K (S, B, R)
	Resistance-type sensors	± 0.1 Ω (10...400 Ω), ± 1.5 Ω (10...2000 Ω)
	Voltage sensor	± 20 μV (-10...100 mV)
Step response (10-90%)	< 2 s	< 2 s
Pickup delay	4 s	4 s
Test voltage input/output	2 kV (50 Hz, 1 min.)	2 kV (50 Hz, 1 min.)
Degree of protection	IP20	IP20
Ambient temperature (operation)	-40 °C ... 85 °C	-40 °C ... 85 °C
Assembly	Any	Any
Housing material	Polyamide PA non-reinforced	Polyamide PA non-reinforced
<b>Conformance / approvals</b>		
Conformity	CE compliant	
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D	

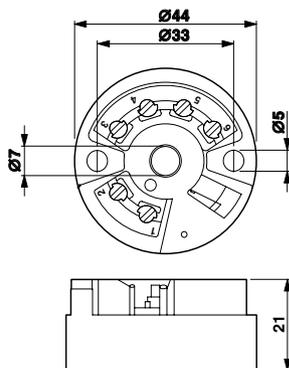
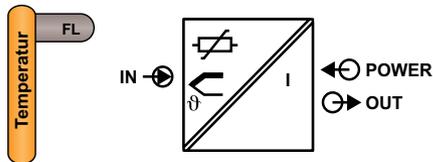
Housing width 12.5





# INTERFACE Analog Temperature

## Programmable loop-powered temperature measuring transducers for connection heads



### MCR-FL-HT-T-I

Programmable loop-powered temperature transducer

- For resistance thermometers, thermocouples, resistance-type and voltage sensors
- For mounting in the connecting head, form B
- Freely programmable via MCR-PI-CONF-WIN

The universal PC-programmable temperature measuring transducers convert temperature signals from resistance thermometers and thermocouples as well as from sensors with linear mV characteristic curves into analog 4...20 mA signals.

On the output side, the temperature transducers are operated in a 4...20 mA current loop, which simultaneously provides the power supply for the modules, necessary for signal conversion.

Failure data in the event of sensor break or sensor short-circuit, that can be set in acc. with NE 43, and a high degree of accuracy in the entire ambient temperature range are the distinguishing features of the measurement transducers.

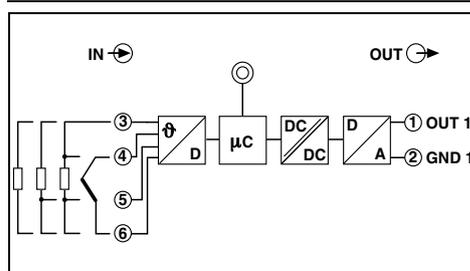
The devices are supplied in the standard configuration: Pt 100 sensor, 0...100 °C measuring range, 3-conductor connection.

Using the MCR-PAC-T programming adapter and the MCR/PI-CONF-WIN configuration software, it is possible to implement client-specific measurement range settings, linearizations and characteristic curve adaptations or set with the configuration software MCR/PI-CONF-WIN.

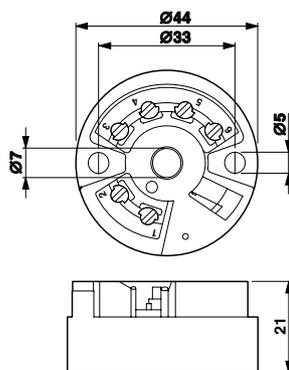
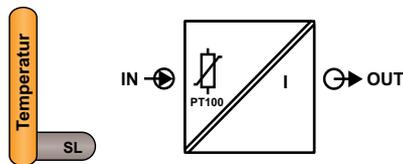
	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Screw connection	0.2-1.75	0.2-1.75	24-15	M 3

Description	Type	Order No.	Pcs. Pkt.
<b>MCR temperature measuring transducer</b> , loop-powered for resistance thermometers, thermocouples, resistance-type and voltage sensors	<b>MCR-FL-HT-T-I</b>	<b>2864529</b>	<b>1</b>
<b>Technical data</b>			
<b>Input data</b>			
Resistance thermometers	Pt, Ni (100, 500, 1000); minimum measurement range 10 K : 2, 3, 4-wire		
Thermocouple sensors	B, C, D, E, J, K, L, N, R, S, T, U; minimum measurement range 50 K/500 K		
Resistor	(Resistance-type sensor from 10 Ω to 400 Ω and from 10 Ω to 2000 Ω; minimum measurement range 10 Ω/100 Ω)		
Voltage	-10 mV ... 75 mV (min. measurement range 5 mV)		
<b>Output data</b>			
Output signal	4 ... 20 mA / 20 ... 4 mA		
Maximum output signal	≤ 25 mA		
Load R <sub>B</sub>	(Max (V <sub>supply</sub> - 8 V) / 0.025 A (current output))		
Output signal with open circuit	≤ 3.6 mA or ≥ 21 mA (adjustable)		
Output signal with short circuit	≤ 3.6 mA or ≥ 21 mA (adjustable, not for thermocouples)		
Measuring range overrange/underrange	≤ 20.5 mA / ≥ 3.8 mA (linear increase/decrease)		
<b>General data</b>			
Supply voltage U <sub>B</sub>	8 V DC ... 35 V DC		
Current consumption	< 3.5 mA		
Transmission error	Resistance thermometers 0.2 K (Pt 100, Ni 100), 0.5 K (Pt 500, Ni 500), 0.3 K (Pt 1000, Ni 1000)		
	Thermocouple sensors Type 0.5 K (K, J, T, E, L, U), 1.0 K (N, C, D), 2.0 K (S, B, R)		
	Resistance-type sensors ± 0.1 Ω (10...400 Ω), ± 1.5 Ω (10...2000 Ω)		
	Voltage sensor ± 20 μV (-10...100 mV)		
Step response (10-90%)	< 2 s		
Pickup delay	6 s		
Test voltage input/output	2 kV (50 Hz, 1 min.)		
Degree of protection	IP00, IP66 (integrated in the connecting head)		
Ambient temperature (operation)	-40 °C ... 85 °C		
Assembly	Any		
Housing material	Polycarbonate PC		
<b>Conformance / approvals</b>			
Conformity	CE compliant		
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D		

Housing width



**Programmable loop-powered temperature measuring transducers for connection heads**



**MCR-SL-HT-PT 100-I**

Programmable loop-powered temperature transducer

- For Pt 100 resistance thermometers
- For mounting in the connecting head, form B
- Freely programmable via MCR-PI-CONF-WIN

The universal PC-programmable temperature measuring transducers convert temperature signals from resistance thermometers into analog 4...20 mA signals.

On the output side, the temperature transducers are operated in a 4...20 mA current loop, which simultaneously provides the power supply for the modules, necessary for signal conversion.

Failure data in the event of sensor break or sensor short-circuit, that can be set in acc. with NE 43, and a high degree of accuracy in the entire ambient temperature range are the distinguishing features of the measurement transducers.

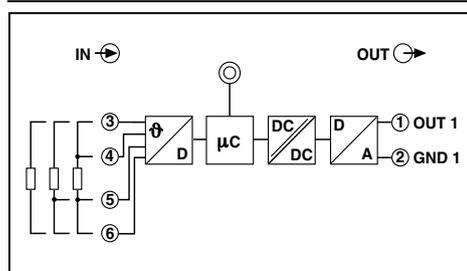
The devices are supplied in the standard configuration: Pt 100 sensor, 0...100 °C measuring range, 3-conductor connection.

Using the MCR-PAC-T programming adapter and the MCR/PI-CONF-WIN configuration software, it is possible to implement client-specific measurement range settings, linearizations and characteristic curve adaptations or set with the configuration software MCR/PI-CONF-WIN.

	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Screw connection	0.2-1.75	0.2-1.75	24-15	M 3

Description	
<b>MCR temperature measuring transducer</b> , loop-powered for Pt 100 resistance thermometer	
Technical data	
Input data	
Resistance thermometers	
Output data	
Output signal	
Maximum output signal	
Load $R_B$	
Output signal with open circuit	
Output signal with short circuit	
Measuring range overrange/underrange	
General data	
Supply voltage $U_B$	
Current consumption	
Transmission error	
Step response (10-90%)	
Pickup delay	
Degree of protection	
Ambient temperature (operation)	
Assembly	
Housing material	
Conformance / approvals	
Conformity	
UL, USA / Canada	

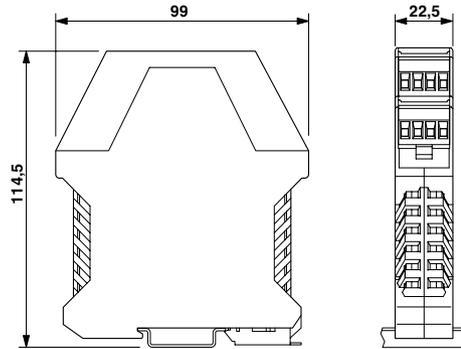
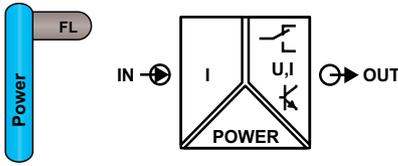
Housing width



Type	Order No.	Pcs. Pkt.
<b>MCR-SL-HT-PT 100-I</b>	<b>2864516</b>	<b>1</b>

Pt 100 ; minimum measurement range 10 K ; 2, 3, 4-wire	
4 ... 20 mA / 20 ... 4 mA	
≤ 23 mA	
(Max (V <sub>supply</sub> - 10 V) / 0.023 A (current output))	
≤ 3.6 mA or ≥ 21 mA (adjustable)	
≤ 3.6 mA or ≥ 21 mA (adjustable)	
≤ 20.5 mA / ≥ 3.8 mA (linear increase/decrease)	
10 V DC ... 35 V DC	
< 3.5 mA	
0.2 K	
< 2 s	
4 s	
IP00, IP54 (integrated in the connecting head)	
-40 °C ... 85 °C	
Any	
Polycarbonate PC	
CE compliant	
Class I, Div. 2, Groups A, B, C, D	

### Active current measuring transducer up to 11 A, programmable and configurable



**MCR-S-1-5-UI-SW-DCI-NC**

- Progressive adjustment of measuring range
- True r.m.s. value measurement
- 3-way isolation
- With optional relay and transistor output

The **MCR-S-1-5-UI(-SW)-DCI** current measuring transducers record direct, alternating and distorted currents.

The **MCR-S-1-5-UI(-SW)-DCI** module provides not only the standardized 1 A and 5 A input signals, but also the option of setting current ranges of 0...0.2 A to 0...11 A progressively.

In addition to an analog output, these current measuring transducers also have an optional transistor and relay output for alarm triggering for example.

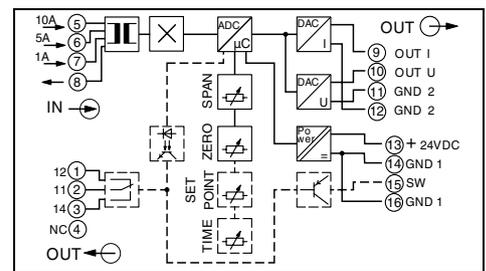
You also have an option to order a pre-configured device, to execute a configuration yourself using the DIP switch or to program using the MCR/PI-CONF-WIN configuration software.

The desired configuration must be specified in the order (refer to the order key). If customer order details are missing or faulty, devices with the standard configuration will be supplied.

	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Screw connection	0.2-2.5	0.2-2.5	24-14	M 3

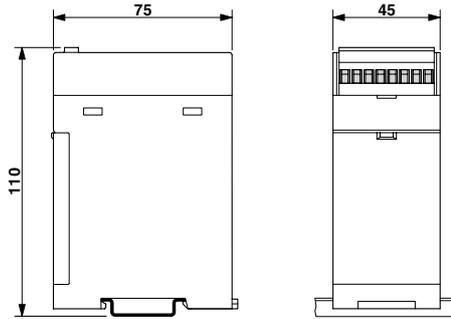
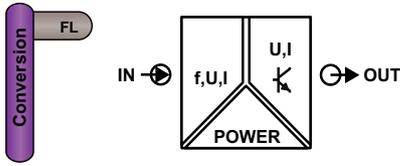
Description	MCR current measuring transducer for measuring AC, DC, and distorted currents with relay and transistor switching output	
Unconfigured	unconfigured, without switching output	
Technical data		
Input data		
Input current	0 A ... 11 A	
Operate threshold	(2% of measuring range nominal value 1/5/10 A)	
Frequency range	15 Hz ... 400 Hz	
Curve type	AC, DC or distorted currents	
Overload capacity	2 x I <sub>N</sub> (continuous)	
Surge strength	20 x I <sub>N</sub> (1 s)	
Connection method	Screw connection	
Output data		
Output signal (normal and inverse)	U output	I output
	0 ... 5 V / 1 ... 5 V / 0 ... 10 V	0 ... 20 mA / 4 ... 20 mA
	2 ... 10 V / -5 ... 5 V / -10 ... 10 V	
	> 10 kΩ	< 500 Ω
Switching output		
Relay output	Contact material	1 PDT / AgSnO, hard gold-plated
	Max. switching current	50 mA
		2 A (when the gold layer is destroyed)
	Output voltage	19 V ... 29 V (supply voltage - 1 V)
	Continuous load current	80 mA (Not short-circuit proof)
		1 % ... 110 %
	Response delay	0.1 s ... 20 s
	Status indication	Yellow LED
General data		
Supply voltage U <sub>B</sub>	20 V DC ... 30 V DC	
Current consumption	< 50 mA (without load)	
Transmission error, max.	< 0.5 % (of range nominal value under nominal conditions)	
Temperature coefficient	Typ. < 0.025 %/K	
Step response (10-90%)	200 ms (for AC / DC)	
Safe isolation	-	
	Rated insulation voltage	300 V AC (to earth)
Surge voltage category / pollution degree	III / 2	
Test voltage input/output	4 kV (50 Hz, 1 min.)	
Test voltage input/power supply	4 kV (50 Hz, 1 min.)	
Test voltage output/power supply	500 V (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature range	-20 °C ... 60 °C	
Housing material	Polyamide PA non-reinforced	
Conformance / approvals		
Conformity	CE compliant	
UL, USA / Canada	Class I, Zone 2, AEx nC IIC T6, Ex nC IIC T6	

Housing width 22.5





**Current measuring transducers for sinusoidal and non-sinusoidal alternating currents up to 400 A**



**MCR-SL-S-...00-U**

Current measuring transducer for sinusoidal and non-sinusoidal alternating currents with voltage output 0...(5) 10 V

- True /r.m.s. value measurement from 30...6000 Hz
- Measuring range selection with slide switch
- Can be retrofitted with the open-up Rogowski coil
- Through connection 18.5 mm Ø
- Electrical isolation of input and output side

The **MCR-SL-S-...-U** current measuring transducers convert sinusoidal and non-sinusoidal alternating currents up to 400 A into analog standard signals of 0...5 V or 0...10 V. The measuring ranges for input and output can be selected via a switch.

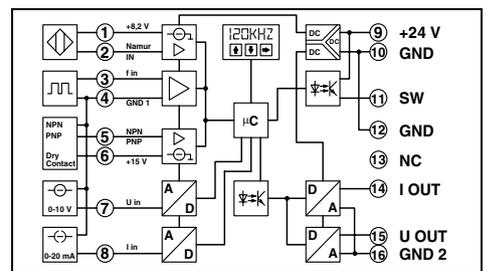
The open up Rogowski coil enables the user to retrofit the current measuring transducer in an existing system without interruption. Insulated conductors on the primary side with a diameter of up to 18.5 mm can be covered.

	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Pluggable screw connection	0.2-2.5	0.2-2.5	24-14	M 3

Description
<b>MCR current measuring transducers</b> for sinusoidal and non-sinusoidal alternating currents
Input current range: 0...50/75/100 A
Input current range: 0...0.100/150/200 A
Input current range: 0...0.200/300/400 A

Technical data
Input data
Input current
Operate threshold
Frequency range
Curve type
Overload capacity
Impact overload capacity
Connection method
Output data
Output signal
Maximum output signal
Load R <sub>B</sub>
General data
Supply voltage U <sub>B</sub>
Current consumption
Transmission error, max.
Cable position error
Temperature coefficient
Step response (10-90%)
Safe isolation
Rated insulation voltage
Surge voltage category / pollution degree
Test voltage input/output
Degree of protection
Ambient temperature range
Housing material
Conformance / approvals
Conformity
UL, USA / Canada

Housing width 55 Ex:

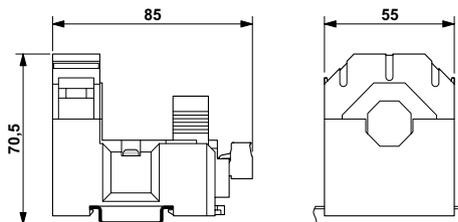
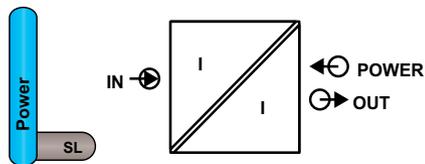


Type	Order No.	Pcs. Pkt.
<b>MCR-SL-S-100-U</b>	<b>2813457</b>	1
<b>MCR-SL-S-200-U</b>	<b>2813460</b>	1
<b>MCR-SL-S-400-U</b>	<b>2813473</b>	1

...-S-100-U	...-S-200-U	...-S-400-U
0 ... 100 A	0 ... 200 A	0 ... 400 A
1% (of end value)		
30 Hz ... 6000 Hz		
Sinusoidal and non-sinusoidal		
No limitation (permanent)		
No limitation (for 1s)		
Clamp-on cable design, diameter 18.5 mm		
0 ... 5 V / 0 ... 10 V		
((0 V ... 10 V) 14 V, (0 V ... 5 V) 7 V)		
≥ 10 kΩ		
20 V DC ... 30 V DC		
< 30 mA		
< 1% (of end value)		
< 0.63 %		
< 0.035 %/K		
< 340 ms		
acc. to EN 50178		
300 V AC (to earth)		
III / 2		
5 kV (50 Hz, 1 min.)		
IP20		
-20 °C ... 60 °C		
Polyamide PA non-reinforced		
CE compliant		
cULus		

Mains voltage

**Passive current measuring transducers for sinusoidal and non-sinusoidal alternating currents up to 400 A**



**MCR-SL-S-...00-I-LP**

Current measuring transducer for sinusoidal and non-sinusoidal alternating currents with current output 4...20 mA (Loop-powered)

- True /r.m.s. value measurement from 30...6000 Hz
- Measuring range selection with slide switch
- Loop-powered
- Can be retrofitted with the open-up Rogowski coil
- Through connection 18.5 mm Ø
- Electrical isolation of input and output side

The **MCR-SL-S-...-I-LP** current measuring transducers convert sinusoidal and non-sinusoidal alternating currents up to 400 A into the analog standard signal of 4...20 mA. The measuring range on the output is set with a switch. On the output side, the current measuring transducers are operated in a 4...20 mA current loop, which simultaneously provides the power supply for the modules, necessary for signal conversion.

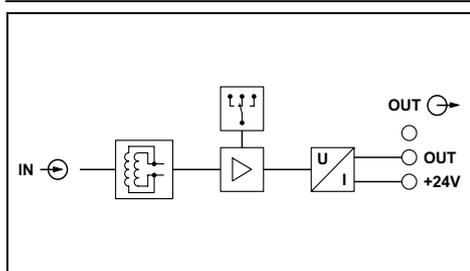
The open up Rogowski coil enables the user to retrofit the current measuring transducer in an existing system without interruption. Insulated conductors on the primary side with a diameter of up to 18.5 mm can be covered.

	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Pluggable screw connection	0.2-2.5	0.2-2.5	24-14	M 3

Description
<b>MCR current measuring transducers</b> for sinusoidal and non-sinusoidal alternating currents
Input current range: 0...50/75/100 A
Input current range: 0...0.100/150/200 A
Input current range: 0...0.200/300/400 A

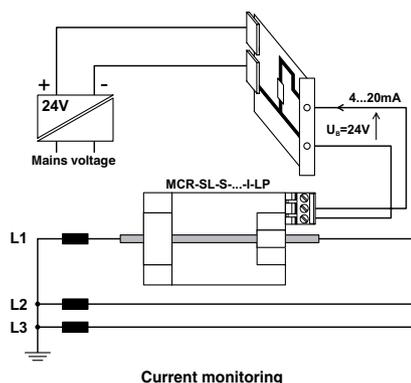
Technical data
<b>Input data</b>
Input current
Operate threshold
Frequency range
Curve type
Overload capacity
Impact overload capacity
Connection method
<b>Output data</b>
Output signal
Maximum output signal
Load $P_B$
<b>General data</b>
Supply voltage $U_B$
Transmission error, max.
Cable position error
Temperature coefficient
Step response (10-90%)
Safe isolation
Rated insulation voltage
Surge voltage category / pollution degree
Test voltage input/output
Degree of protection
Ambient temperature range
Housing material
<b>Conformance / approvals</b>
Conformity
UL, USA / Canada

Housing width 55 Ex:

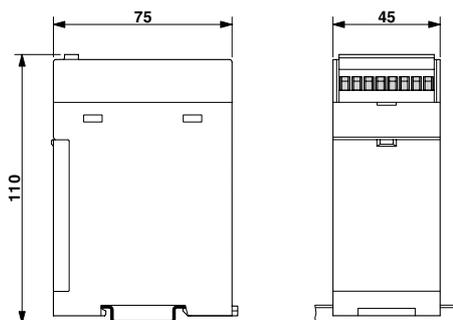
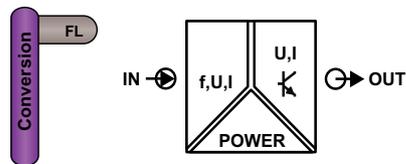


Type	Order No.	Pcs. Pkt.
<b>MCR-SL-S-100-I-LP</b>	<b>2813486</b>	1
<b>MCR-SL-S-200-I-LP</b>	<b>2813499</b>	1
<b>MCR-SL-S-400-I-LP</b>	<b>2813509</b>	1

...S-100-I-LP	...S-200-I-LP	...S-400-I-LP
0 ... 100 A	0 ... 200 A	0 ... 400 A
1% (of end value)		
30 Hz ... 6000 Hz		
Sinusoidal and non-sinusoidal		
No limitation (permanent)		
No limitation (for 1s)		
Clamp-on cable design, diameter 18.5 mm		
4 ... 20 mA		
< 25 mA		
(( $U_B - 12 V$ )/20 mA)		
20 V DC ... 30 V DC		
< 1 % (of end value)		
< 0.63 %		
< 0.025 %/K		
< 340 ms		
acc. to EN 50178		
300 V AC (to earth)		
III / 2		
5 kV (50 Hz, 1 min.)		
IP20		
-20 °C ... 60 °C		
Polyamide PA non-reinforced		
CE compliant		
cULus		



## Programmable frequency transducers



### MCR-F-UI-DC

Programmable frequency transducer for frequencies up to 120 kHz

- Frequencies up to 120 kHz
- Analog and switching output
- 3-way isolation
- Programmable using membrane keypad or software
- Display of input or output signal

The **MCR-F-UI-DC** programmable frequency measuring transducer is a module for displaying and to converting frequencies up to 120 kHz into analog standard signals.

The transmission behavior of the frequency measuring transducer can be set on the front using the membrane keypad or the MCR/PI-CONF-WIN configuration software.

Either the input value for the measured frequency or the standard output signals can be read off on the front LC display.

All common frequency generator signals with 2, 3 or 4-wire technology and the signals of incremental rotary transducers can be recorded on the input side, e.g.:

- NAMUR sensors
- Frequency generators
- Floating contacts
- NPN/PNP transistor outputs

In addition, there is also a PNP transistor switching output with a maximum carrying capacity of 100 mA, for alarm processing, for example (not short-circuit proof).

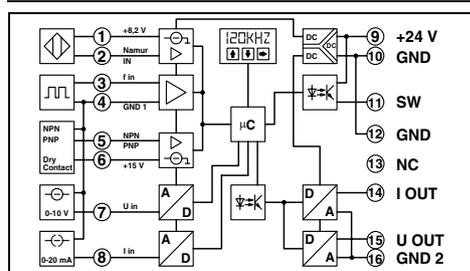
Specially for rotational speed measurement, it is possible to both enter the measuring range start and end value in revolutions per minute (RPM), and to observe the revolutions in RPM on the LCD display.

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Pluggable COM-BICON screw connection	0.2-2.5	0.2-2.5	24-14	M 3

Description
<b>MCR frequency measuring transducer</b> , for conversion of frequencies into analog signals 0(4)...20 mA, 0...(5)10 V and their inverse signals

Technical data
<b>Input data</b>
Frequency range
Input sources
<b>Transducer supply</b>
Signal level
<b>Maximum input signal</b>
Signal form
Pulse length
Resolution
Signal conversion time
<b>Input data</b>
Input signal (can be set freely)
Maximum input signal
Input resistance
Resolution
Step response (10-90%)
<b>Output data</b>
Output signal (normal and inverse)
Maximum output signal
Load R <sub>B</sub>
Ripple
<b>Switching output</b>
<b>General data</b>
Supply voltage U <sub>B</sub>
Current consumption
Transmission error, max.
Temperature coefficient
ZERO / SPAN adjustment
Test voltage, input/output/supply
Ambient temperature (operation)
Status indication
Operating elements
Housing material
<b>Conformance / approvals</b>
Conformity
UL, USA / Canada
GL

Housing width 45 Ex:



Type	Order No.	Pcs. Pkt.
<b>MCR-F-UI-DC</b>	<b>2814605</b>	<b>1</b>

<b>Frequency input</b>	0.1 Hz ... 120 kHz
<b>NPN/PNP transistor outputs</b>	NAMUR initiators
<b>Floating relay contact (dry contact)</b>	Frequency generator
<b>Frequency generator</b>	Approx. 15 V DC / Max. 25 mA (constant)
	2 V ((typ. 1.5 V) at square 0 Hz ... 120 kHz)
	2 V ((typ. 1.8 V) at sine 1.0 Hz ... 120 kHz)
	30 V (incl. DC voltage)
<b>Any</b>	≥ 1 μs
	> 12 bit
	≤ 32 ms
<b>Isolating amplifier function</b>	0 ... 10 V
	0 ... 20 mA
	12 V
	24 mA
	95 kΩ
	200 Ω
	14 bit (full-scale)
	14 bit (full-scale)
	< 25 ms
	< 25 ms
<b>U output</b>	I output
0 ... 5 V / 0 ... 10 V	0 ... 20 mA / 4 ... 20 mA
12.5 V	25 mA
≥ 500 Ω	≤ 500 Ω
< 20 mV <sub>PP</sub>	< 20 mV <sub>PP</sub>
<b>Transistor output, pnp</b>	Switches supply voltage to terminal block SW, can carry a load of 100 mA, not protected against short circuit
<b>20 V DC ... 30 V DC</b>	< 60 mA (without load, without switching output)
	≤ 0.15 % (of measured value), Typ. 0.1 %
	0.015 %/K, Typ. 0.01 %/K
	± 25 % / ± 25 %
	1.5 kV (50 Hz, 1 min.)
	-20 °C ... 65 °C (for specified data)
	LC display
	Membrane keypad with 3 keys and LCD display
	ASA-PC (V0)
<b>CE compliant</b>	Class I, Div. 2, Groups A, B, C, D or non-hazardous locations
	Germanischer Lloyd



# INTERFACE EX

## PROCESS INTERFACE PI

### Analog IN

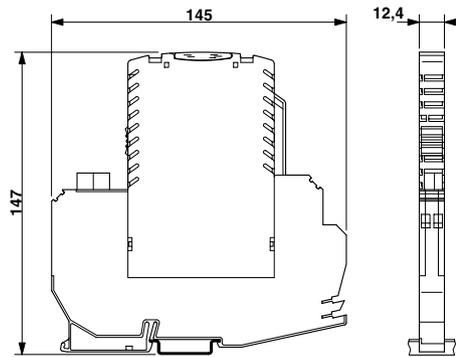
#### Repeater power supply, Ex i

- 1-channel
- HARTable
- Input 4...20 mA, [Ex ia] IIC
- Output 4...20 mA
- Supply 20...35 V DC
- Galvanic 3-way isolation

The repeater power supply **PI-EX-RPSS-I/I** feeds intrinsically safe 4...20 mA 2 or 3-conductor measuring transducers in the Ex area and transmits the analog signal to a control unit in the safe area.

In addition to this basic function, the device is capable of transmitting the HART protocol bidirectionally. The digital data communication signals of HART communication are superimposed on the analog current signal and are used to transfer changes in the measuring range, maintenance, and diagnostic data, and also for transmitting further process data.

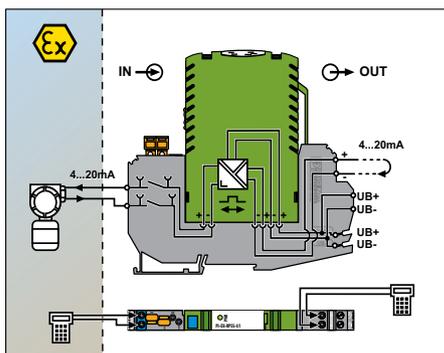
Manual configuration devices can be connected on the Ex side or the non-Ex side. Sockets are integrated in the basic terminal blocks for this.



### PI-EX-RPSS-I/I

Intrinsically safe repeater power supply

Description	Type	Order No.	Pcs. Pkt.
<b>Repeater power supply, smart, input intrinsically safe</b>	<b>PI-EX-RPSS-I/I</b>	<b>2835011</b>	<b>1</b>
<b>Technical data</b>			
<b>Measuring input</b>			
Input signal	4 mA ... 20 mA		
Transmitter supply voltage	16.5 V (at 20 mA)		
Transmitter supply current	≤ 24 mA		
<b>Measuring output</b>			
Output signal range	4 mA ... 20 mA		
Load	≤ 600 Ω		
Output ripple	< 40 μA <sub>pp</sub> (For 600 Ω)		
Short-circuit current	Approx. 40 mA (current limitation)		
Output current with open circuit	0 mA		
<b>General data</b>			
Supply voltage range	20 V DC ... 35 V DC		
Current consumption	75 mA (at 24 V)		
Power dissipation	Max. 1.3 W (at 24 V)		
Temperature coefficient	< 0.005 %/K		
Step response (10-90%)	< 40 μs		
Transmission error	≤ 0.05 % (Of end value (at 20°C))		
Electrical isolation input / output	375 V (Peak value, in acc. with EN 50020)		
Electrical isolation input / supply	375 V (Peak value, in acc. with EN 50020)		
Electrical isolation output / supply	1.5 kV (50 Hz, 1 min., test voltage)		
Ambient temperature range	Max. -20 °C ... 60 °C (See data sheet)		
Status indication	Green LED (supply voltage)		
Signal bandwidth	10 Hz ... 20 kHz		
Protocols supported	HART, Honeywell DE, Foxboro (others on request)		
Degree of protection	IP20		
Housing material	PBT and polyamide PA non-reinforced		
Inflammability class in acc. with UL 94	V0		
<b>Safety data as per ATEX</b>			
Max. voltage U <sub>o</sub>	28 V		
Max. current I <sub>o</sub>	93 mA		
Max. power P <sub>o</sub>	650 mW		
Gas group	II A II B II C		
- max. external inductivity L <sub>o</sub>	[mH]	36.02	17.72 4.3
- max. external capacity C <sub>o</sub>	[μF]	2.15	0.65 0.083
Maximum voltage U <sub>m</sub>	250 V AC		
<b>Conformance / approvals</b>			
Conformity	CE compliant		
ATEX approval	Ex II (1)GD, [Ex ia] IIC, BAS 97 ATEX 1209		
UL, USA / Canada	cULus		





# INTERFACE EX

## PROCESS INTERFACE PI

### Base elements

#### Basic Terminal Blocks

- 1-channel
- and also with cold junction compensation
- Ex-i and non Ex versions
- integrated sockets
- integrated disconnect plugs

The modular basic terminal blocks PI-...-TB serve as the basic element for wiring the pluggable PROCESS INTERFACE PI modules.

The base elements can be snapped onto the conventional EN DIN rails. The point of installation is the safe area. The signal cables are connected to the module safely using screw connections.

With the help of the integrated sockets and the disconnect plugs, devices for measurements, loop-checks and calibration activities can be coupled into the current loop without interrupting the signal path.

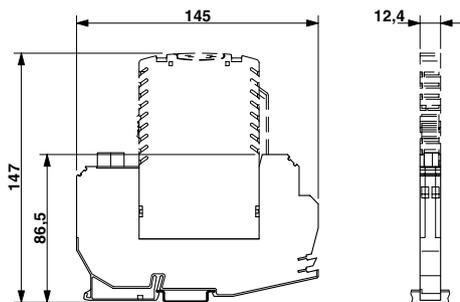
The basic terminal block **PI-EX-TB** is required for applications with intrinsically safe signals.

The basic terminal block **PI-EX-TB-T** has built-in cold junction compensation and is therefore the base element for the temperature measuring transducer PI-EX-THC-I (order no.:2835079).

The basic terminal block **PI-TB** can be used for applications not requiring intrinsically safe signals.

#### Accessories:

Information about partition plate, bridging module, plug-in bridges, test connectors and labeling material.



### PI-EX-TB(T)

Intrinsically safe basic terminal block, voltage supply bridgeable

Description	Type	Order No.	Pcs. Pkt.
<b>Ex basic terminal block</b> , intrinsically safe, with isolating connectors and test connections Standard Additionally with integrated temperature measurement of the input terminal blocks for cold point compensation	<b>PI-EX-TB</b> <b>PI-EX-TB/T</b>	<b>2835901</b> <b>2835927</b>	10 10
<b>Basic terminal block</b> , not intrinsically safe, with isolating connectors and test connections	<b>PI-TB</b>	<b>2835943</b>	10
<b>Technical data</b>			
<b>General data</b>			
Connection data solid / stranded / AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14		
Ambient temperature range	-20 °C ... 60 °C		
Degree of protection	IP20		
Housing material	PBT		
Inflammability class in acc. with UL 94	V0		
<b>Conformance / approvals</b>			
Conformity	CE compliant		
ATEX approval for intrinsically safe base elements	Ex II (1)GD, [EEx ia] IIC, KEMA 01 ATEX 1231 Ex II 3 G Ex nA II T4 X		
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D		



**Base elements**

**Basic terminal blocks with surge protection**

- 1-channel
- Surge protection integrated
- and also with cold junction compensation
- Ex-i and non Ex versions
- integrated sockets
- integrated disconnect plugs

The modular basic terminal blocks **TT-PI-...-TB** serve as the basic element for wiring of the pluggable PROCESS INTERFACE PI modules. They contain a powerful and multi-stage protective circuit on the input side comprising gas-filled surge arresters and suppressor diodes. These circuit versions ensure a quick response and a high arrest capacity. Surge voltage resistant contacting to the DIN rail is created by snapping them on to it.

The surge protection circuits of the Ex variants take into account the requirements in intrinsically safe circuits by creating a respect distance of 500 V to all metal installations and other circuits.

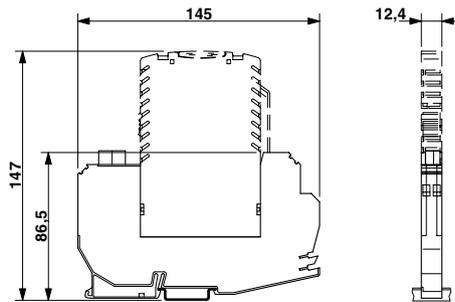
The base elements can be snapped onto the conventional EN DIN rails. The point of installation is the safe area. The signal cables are connected to the module safely using screw connections.

With the help of the integrated sockets and the disconnect plugs, devices for measurements, loop-checks and calibration activities can be coupled into the current loop without interrupting the signal path.

For applications with intrinsically safe signals, the basic terminal block **TT-PI-EX-TB** is required.

The basic terminal block **TT-PI-EX-TB-T** has built-in cold junction compensation and is therefore the base element for the temperature measuring transducer PI-EX-THC-I (order no.:2835079).

For applications not requiring intrinsically safe signals, the basic terminal block **TT-PI-TB** can be used.



**TT-PI-EX-TB(T)**

Intrinsically safe basic terminal block with surge protection for Process Interface modules of the PI series

Description	Voltage U <sub>N</sub>
<b>Ex basic terminal block</b> , intrinsically safe, with isolating connectors, test connections and surge protection	
Standard	24 V DC
Additionally with integrated temperature measurement of the input terminal blocks for cold point compensation	24 V DC
<b>Basic terminal block</b> , not intrinsically safe, with isolating connectors, test connections and surge protection	
	24 V AC

Technical data	
Surge protection - TRABTECH	
IEC category / EN type	
Highest continuous voltage U <sub>C</sub>	DC/AC
Lightning test curr. I <sub>imp</sub> (10/350)µs	Per path
Nominal current I <sub>N</sub>	
Nominal discharge surge current I <sub>n</sub> (8/20) µs	Core-Core
Total surge current (8/20)µs	
Output voltage limitation at 1 kV/µs	Core-Core
Response time t <sub>A</sub>	Core-Core
Resistance per path	
Test standards	
General data	
Connection data solid / stranded / AWG	
Ambient temperature range	
Degree of protection in acc. with IEC 60529/ EN 60529	
Housing material	
Inflammability class in acc. with UL 94	
Conformance / approvals	
Conformity	
ATEX approval for intrinsically safe base elements	
UL, USA / Canada	

Type	Order No.	Pcs. Pkt.
<b>TT-PI-EX-TB</b>	<b>2858386</b>	10
<b>TT-PI-EX-TB/T</b>	<b>2858344</b>	10
<b>TT-PI-TB</b>	<b>2858373</b>	10

TT-PI-EX-TB	TT-PI-TB
C1 / C2 / C3 / D1	C1 / C2 / C3 / D1
30 V DC / 21 V AC	45 V DC / 31 V AC
1 kA	1 kA
250 mA	250 mA
5 kA	5 kA
10 kA	10 kA
≤ 45 V	≤ 70 V
≤ 1 ns	≤ 1 ns
4.7 Ω	4.7 Ω
IEC 61643-21 / EN 50020	IEC 61643-21 / EN 50020
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
-20 °C ... 60 °C	
IP20	IP20
PA 6.6	PA 6.6
V2	V2
CE compliant	
Ex II (1)GD, [EEx ia] IIC, KEMA 01 ATEX 1231	
-	

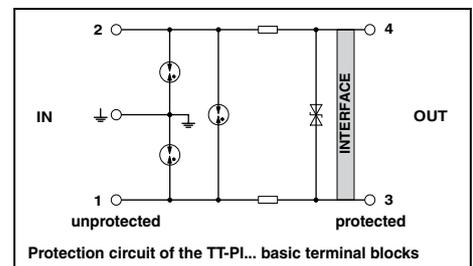
**Surge voltages**

Surge voltages, an annoying topic when it is a question of maintaining the functions of an electrical system. An increasing degree of automation in conjunction with ever more powerful electronic components is the recipe for higher sensitivity to transient surge voltages. These interferences are disturbing pulses that quickly change through time and can reach amplitudes of several kV in a few microseconds.

The most frequent cause for the occurrence of surge voltages is not lightning, as generally supposed, but switching operations in the customer installation. Electrostatic is also a considerable cause in many areas.

Once surge voltage has occurred, the result is often control errors, temporary interruptions of the functions, or at worst, failure of functions due to destruction.

Surge protection appliances help to get the upper hand over these threats and therefore increase the availability of the protected system.



The functional principle can be easily explained using the example of voltage-controlled switches.

- Surge voltage on: Close switch,
- Surge voltage off: Open switch.

## INTERFACE EX PROCESS INTERFACE PI-ME



**PROCESS INTERFACE PI-ME** is distinguished by a large selection of high-quality one and two-channel Ex-i isolating amplifiers in modular DIN rail housings. The ME housings have a universal width of 22.5 mm and are equipped with plug-in COMBICON screw connectors that can be coded for easy-to-service conductor connections.

Head-mounted temperature measuring transducers **MCR-FL-HT-...-EX** were developed especially for on-site use in environments with an explosion hazard. These intrinsically safe head-mounted measuring transducers can be operated up to Zone 0 when installed in housing by which an especially high signal quality can be obtained. The signal from the sensor is converted into an intrinsically safe 4...20 mA signal. An Ex-i repeater power supply forms the end of the intrinsically safe circuit.

### Product overview

Range	Description	Designation	1-channel	2-channel
Analog IN	Repeater power supply with HART	PI-EX-ME-RPSS-I/I	✓	
	Repeater power supply without HART	PI-EX-ME-RPS-I/I	✓	
Analog OUT	Output isolating amplifier with HART	PI-EX-ME-IDS-I/I		
	Output isolating amplifier without HART	PI-EX-ME-ID-I/I	✓	
	Output isolating amplifier without HART	PI-EX-ME-2IDL-I/I		✓
Digital IN	NAMUR switching amplifier with relay output	PI-EX-ME-2NAM/COC-24VDC		✓
		PI-EX-ME-2NAM/COC-120VAC		✓
		PI-EX-ME-2NAM/COC-230VAC		✓
	NAMUR switching amplifier with transistor output	PI-EX-ME-2NAM/TO		✓
		PI-EX-ME-2NAM/TO-A		✓
Digital OUT	Solenoid driver	PI-EX-ME-SD/24/65-C	✓	
		PI-EX-ME-2SD/24/65-C		✓
Temperature	Temperature measuring transducer	PI-EX-ME-RTD-I	✓	
	Temperature measuring transducer	PI-EX-ME-THC-I	✓	
	Temperature measuring transducer with HART	MCR-FL-TS-LP-I-Ex	✓	
	Temperature measuring transducer without HART	MCR-FL-T-LP-I-Ex	✓	
	Head measuring transducer with HART	MCR-FL-HT-TS-I-Ex	✓	
	Head measuring transducer without HART	MCR-FL-HT-T-I-Ex	✓	

**Analog IN**

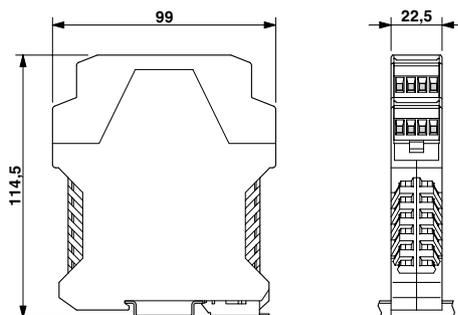
**Repeater power supply, Ex i**

- 1-channel
- for 2 and 3-conductor measuring transducers
- HART-capable (PI-EX-ME-RPSS-I/I)
- Input 0/4...20 mA, [EEx ia] IIC
- Output 0/4...20 mA
- Supply 20...30 V DC
- Galvanic 3-way isolation
- ZERO/SPAN adjustment

The repeater power supplies **PI-EX-ME-RPSS-I/I** and **PI-EX-ME-RPS-I/I** feed intrinsically safe 4...20 mA measuring transducers with 2 or 3-conductor technology in the Ex area and transmit the signal to a load in the safe area.

In addition, both the devices are also suitable as non-feeding input isolating amplifiers for transmission of an intrinsically safe active 0/4...20 mA signal from the measuring transducers with external power supply in the Ex-area.

In addition to this basic function, the **PI-EX-ME-RPSS-I/I** is also capable of transmitting different data protocols of intelligent transmitters (HART and protocols with higher frequencies) bidirectionally.



**PI-EX-ME-RPS(S)-I/I**

Intrinsically safe repeater power supply

Connection data	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
	0.2-2.5	0.2-2.5	24-14	M 3
Torque	0.5...0.6 Nm			



Description	
<b>Repeater power supply, smart</b> , input intrinsically safe	
<b>Repeater power supply</b> , input intrinsically safe	
<b>Loop bridge</b> , 50-pos., divisible, max. bridging distance 60 mm, 0.5 mm <sup>2</sup>	
	blue
	black
	gray

Type	Order No.	Pcs. Pkt.
<b>PI-EX-ME-RPSS-I/I</b>	<b>2835422</b>	1
<b>PI-EX-ME-RPS-I/I</b>	<b>2835435</b>	1
<b>DB 50-90 BU</b>	<b>2821180</b>	1
<b>DB 50-90 BK</b>	<b>2820916</b>	1
<b>DB 50-90 GY</b>	<b>2820929</b>	1

Technical data	
Measuring input	
Input signal	
Transmitter supply voltage	
Measuring output	
Output signal range	
Load	
Line monitoring	
General data	
Supply voltage range	
Current consumption	
Power consumption	
Temperature coefficient	
Step response (10-90%)	
Transmission error	
Test voltage input/output	
Electrical isolation input / output / supply	
Ambient temperature range	
Max. permissible relative humidity (operation)	
Status indication	
SMART communication	
Signal bandwidth	
Protocols supported	
Housing material	
Inflammability class in acc. with UL 94	
Standards/regulations	
Safety data as per ATEX	
Max. voltage U <sub>o</sub>	28 V
Max. current I <sub>o</sub>	93 mA
Max. power P <sub>o</sub>	650 mW
Gas group	II B II C
- max. external inductivity L <sub>o</sub>	14 2
- max. external capacity C <sub>o</sub>	0.65 0.083
Maximum voltage U <sub>m</sub>	250 V
Conformance / approvals	
Conformity	
ATEX approval	
UL, USA / Canada	

PI-EX-ME-RPSS-I/I		PI-EX-ME-RPS-I/I	
2-wire measuring transducers, 4...20 mA			
3-wire measuring transducers, 4...20 mA			
Active 0/4...20 mA signals (fed from the field side)			
17 V (at 20 mA)			
0 mA ... 20 mA / 4 mA ... 20 mA	0 mA ... 20 mA / 4 mA ... 20 mA	0 mA ... 20 mA / 4 mA ... 20 mA	0 mA ... 20 mA / 4 mA ... 20 mA
800 Ω (550 Ω with SMART)	1000 Ω	1000 Ω	1000 Ω
-	NE 21	NE 21	NE 21
20 V DC ... 30 V DC	20 V DC ... 30 V DC	20 V DC ... 30 V DC	20 V DC ... 30 V DC
< 90 mA (at 24 V DC/20 mA)	< 90 mA (at 24 V DC/20 mA)	< 90 mA (at 24 V DC/20 mA)	< 90 mA (at 24 V DC/20 mA)
2.2 W	2.2 W	2.2 W	2.2 W
< 0.01 %/K	< 0.01 %/K	< 0.01 %/K	< 0.01 %/K
2.2 ms	2.2 ms	2.2 ms	2.2 ms
≤ 0.1 % (of end value)	≤ 0.1 % (of end value)	≤ 0.1 % (of end value)	≤ 0.1 % (of end value)
1.5 kV (50 Hz, 1 min)	1.5 kV (50 Hz, 1 min)	1.5 kV (50 Hz, 1 min)	1.5 kV (50 Hz, 1 min)
375 V (Peak value, in acc. with EN 50020)	375 V (Peak value, in acc. with EN 50020)	375 V (Peak value, in acc. with EN 50020)	375 V (Peak value, in acc. with EN 50020)
-20 °C ... 60 °C	-20 °C ... 60 °C	-20 °C ... 60 °C	-20 °C ... 60 °C
< 75 % (annual average)	< 75 % (annual average)	< 75 % (annual average)	< 75 % (annual average)
< 95 % (30 days/year, no condensation)	< 95 % (30 days/year, no condensation)	< 95 % (30 days/year, no condensation)	< 95 % (30 days/year, no condensation)
Green LED (supply voltage)	Green LED (supply voltage)	Green LED (supply voltage)	Green LED (supply voltage)
yes, parallel to the load or through sockets on the front plate.	-	-	-
0 Hz ... 12 kHz	-	-	-
HART, Foxboro, Yokogawa Brain, further types on request	-	-	-
Polyamide PA non-reinforced V0	Polyamide PA non-reinforced V0	Polyamide PA non-reinforced V0	Polyamide PA non-reinforced V0
NAMUR recommendation NE 21	NAMUR recommendation NE 21	NAMUR recommendation NE 21	NAMUR recommendation NE 21
28 V	28 V	28 V	28 V
93 mA	93 mA	93 mA	93 mA
650 mW	650 mW	650 mW	650 mW
II B II C	II B II C	II B II C	II B II C
14 2	14 2	14 2	14 2
0.65 0.083	0.65 0.083	0.65 0.083	0.65 0.083
250 V	250 V	250 V	250 V
CE compliant			
Ex II (1)GD, [EEx ia] IIC, TÜV 00 ATEX 1522			
cULus			

# INTERFACE EX

## PROCESS INTERFACE PI-ME

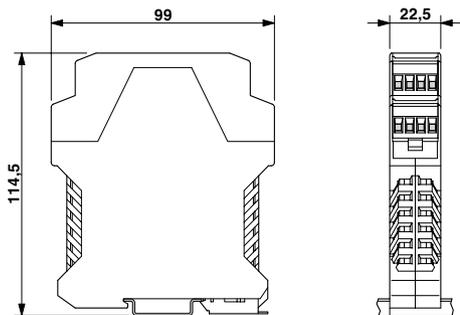
### Analog OUT

#### Output isolating amplifier, Ex-i

- 1-channel
- HART-capable (PI-EX-ME-IDS-I/I)
- Input 0/4...20 mA
- Output 0/4...20 mA, [EEx ia] IIC
- Supply 20...30 V DC
- Galvanic 3-way isolation

The output isolating amplifiers **PI-EX-ME-IDS-I/I** and **PI-EX-ME-ID-I/I** are designed to operate intrinsically safe I/P converters, control valves and indicators in the Ex area. They isolate and transmit 0/4...20 mA signals to a load of up to 750 Ω in the Ex area.

In addition to this basic function, the **PI-EX-ME-IDS-I/I** is also capable of transmitting different data protocols of intelligent transmitters (HART and protocols with higher frequencies) bidirectionally.



### PI-EX-ME-ID(S)-I/I

Intrinsically safe output isolating amplifier

Connection data	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
	0.2-2.5	0.2-2.5	24-14	M 3
Torque	0.5...0.6 Nm			



Description	Type	Order No.	Pcs. Pkt.
<b>Output isolating amplifier, smart</b> , output intrinsically safe	<b>PI-EX-ME-IDS-I/I</b>	<b>2835451</b>	<b>1</b>
<b>Output isolating amplifier</b> , output intrinsically safe	<b>PI-EX-ME-ID-I/I</b>	<b>2835448</b>	<b>1</b>
<b>Loop bridge</b> , 50-pos., divisible, max. bridging distance 60 mm, 0.5 mm <sup>2</sup>	<b>DB 50-90 BU</b> <b>DB 50-90 BK</b> <b>DB 50-90 GY</b>	<b>2821180</b> <b>2820916</b> <b>2820929</b>	<b>1</b> <b>1</b> <b>1</b>
	blue black gray		
<b>Technical data</b>	PI-EX-ME-IDS-I/I	PI-EX-ME-ID-I/I	
<b>Measuring input</b>			
Input signal	0 mA ... 20 mA / 4 mA ... 20 mA	0 mA ... 20 mA / 4 mA ... 20 mA	
Input resistance	250 Ω (dynamic) 50 Ω (static)	100 Ω	
Input voltage limitation	5 V (at 50 mA)	5 V (at 50 mA)	
<b>Measuring output</b>			
Output signal range	0 mA ... 20 mA / 4 mA ... 20 mA	0 mA ... 20 mA / 4 mA ... 20 mA	
Load	750 Ω	500 Ω	
<b>General data</b>			
Supply voltage range	20 V DC ... 30 V DC	20 V DC ... 30 V DC	
Current consumption	< 60 mA (at 24 V DC/20 mA)	< 60 mA (at 24 V DC/20 mA)	
Power consumption	< 1.4 W	< 1.4 W	
Temperature coefficient	< 0.01 %/K	< 0.01 %/K	
Step response (10-90%)	2.2 ms	100 ms	
Transmission error	≤ 0.1 % (of end value)	≤ 0.1 % (of end value)	
Test voltage input/output	1.5 kV (50 Hz, 1 min)	1.5 kV (50 Hz, 1 min)	
Electrical isolation input / output / supply	375 V (Peak value, in acc. with EN 50020)	375 V (Peak value, in acc. with EN 50020)	
Ambient temperature range	-20 °C ... 60 °C	-20 °C ... 60 °C	
Max. permissible relative humidity (operation)	< 75 % (annual average) < 95 % (30 days/year, no condensation)	< 75 % (annual average) < 95 % (30 days/year, no condensation)	
Status indication	Green LED (supply voltage)	Green LED (supply voltage)	
SMART communication	Yes	-	
Signal bandwidth	0.5 kHz ... 40 kHz (Bidirectional within 3 dB)	-	
Protocols supported	HART	-	
Housing material	Polyamide PA non-reinforced	Polyamide PA non-reinforced	
Inflammability class in acc. with UL 94	V0	V0	
Standards/regulations	NAMUR recommendation NE 21	NAMUR recommendation NE 21	
<b>Safety data as per ATEX</b>			
Max. voltage U <sub>o</sub>	27.3 V	12.6 V	
Max. current I <sub>o</sub>	93 mA	87 mA	
Max. power P <sub>o</sub>	635 mW	670 mW	
Gas group	II B II C	II B II C	
- max. external inductivity L <sub>o</sub>	14.8 [mH]	4.5 1.2	
- max. external capacity C <sub>o</sub>	0.683 [µF]	0.83 0.25	
Maximum voltage U <sub>m</sub>	250 V	250 V	
<b>Conformance / approvals</b>			
Conformity	CE compliant	CE compliant	
ATEX approval	Ex II (1)GD, [EEx ia] IIC, TÜV 00 ATEX 1524	Ex II (1)GD, [EEx ia] IIC, TÜV 00 ATEX 1523	
UL, USA / Canada	cULus	cULus	

**Analog OUT**

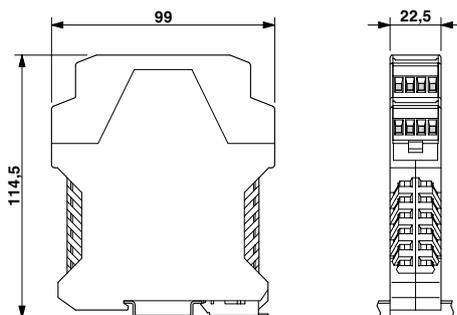
**Output isolating amplifier, Ex-i**

- 2-channel
- Loop-powered
- Input 0/4...20 mA
- Output 0/4...20 mA, [EEx ia] IIC
- Galvanic 2-way isolation

The output isolating amplifier **PI-EX-ME-2IDLP-I/I** is designed for the operation of intrinsically safe I/P converters, control valves and indicators in the Ex area.

The output isolating amplifier functions without any additional supply voltage. This is obtained by the isolator from the 0/...20 mA signal. The current dissipation that occurs is so small, that a linearization error of less than 0.1% of E (end value) is attained. The voltage dissipation in the 0/...20 mA signal loop, necessary to operate the isolator, must be taken into account in the output circuit of the operational regulator or the PLS output. Input and field side are electrically isolated from one another.

The **PI-EX-ME-2IDLP-I/I** has two channels electrically isolated from one another.



**PI-EX-ME-2IDLP-I/I**

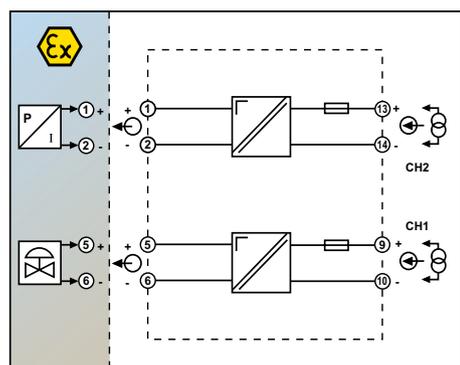
Intrinsically safe output isolating amplifier, loop-powered

Connection data	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
	0.2-2.5	0.2-2.5	24-14	M 3
Torque	0.5...0.6 Nm			



Type	Order No.	Pcs. Pkt.
<b>PI-EX-ME-2IDLP-I/I</b>	<b>2835464</b>	<b>1</b>

Description	
<b>Passive output isolating amplifier, 2-channel, output: Intrinsically safe</b>	
Technical data	
Measuring input	
Input signal	0 mA ... 20 mA / 4 mA ... 20 mA
Input voltage	8.4 V + 0.02 x load x (V/Ω)
Measuring output	
Output signal range	0 mA ... 20 mA / 4 mA ... 20 mA
Load	500 Ω
General data	
Supply voltage range	8.4 V DC ... 30 V DC (from the current loop of the input, no separate auxiliary power supply necessary)
Number of channels	2
Temperature coefficient	< 0.01 %/K
Linearity error	< 0.1 % (of end value)
Test voltage input/output	1.5 kV (50 Hz, 1 min)
Electrical isolation input / output	375 V (Peak value, in acc. with EN 50020)
Ambient temperature range	-20 °C ... 60 °C
Max. permissible relative humidity (operation)	< 75 % (annual average) < 95 % (30 days/year, no condensation)
Housing material	
Inflammability class in acc. with UL 94	V0
Standards/regulations	
Safety data as per ATEX	
Max. voltage U <sub>o</sub>	12.6 V
Max. current I <sub>o</sub>	95 mA
Max. power P <sub>o</sub>	475 mW
Gas group	
- max. external inductivity L <sub>o</sub>	[mH] 5 1.5
- max. external capacity C <sub>o</sub>	[μF] 1.06 0.38
Maximum voltage U <sub>m</sub>	250 V
Conformance / approvals	
Conformity	
ATEX approval	
UL, USA / Canada	



# INTERFACE EX

## PROCESS INTERFACE PI-ME

### Digital IN

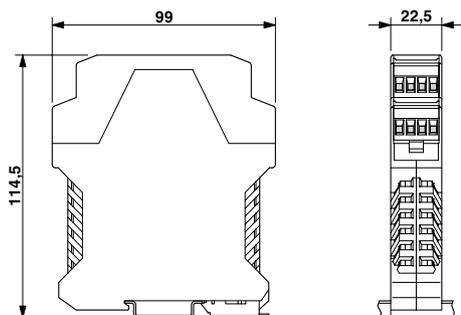
### NAMUR isolating amplifier, Ex i

- 2-channel
- Input for NAMUR proximity initiator or switch, [EEx ia] IIC
- Output relay
- Supply 20...30 V DC, 120 V AC or 230 V AC
- Galvanic 3-way isolation
- Option of phase reversal
- Line fault detection (LF)

The NAMUR isolating amplifiers **PI-EX-ME-2NAM/COC...** are designed for the operation of proximity initiators and switches in the Ex-area. The signals coming from the Ex area are transmitted via a relay output to the controller installed in the safe area.

The devices are designed with 2 channels. They have one line error detection per channel, which can be switched on and off depending on the application.

Two switches on the front panel of the housing allow the user to choose between normal and reverse switching behavior for each channel.



### PI-EX-ME-2NAM/COC-...

Intrinsically safe NAMUR isolating amplifier with relay output

Connection data	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
	0.2-2.5	0.2-2.5	24-14	M 3
Torque	0.5...0.6 Nm			



Ex: Ex i

Description	Type	Order No.	Pcs. Pkt.
<b>NAMUR isolating amplifier</b> , 2-channel, input intrinsically safe, output: Changeover contact Supply: 24 V DC Supply: 120 V AC Supply: 230 V AC	<b>PI-EX-ME-2NAM/COC-24VDC</b> <b>PI-EX-ME-2NAM/COC-120VAC</b> <b>PI-EX-ME-2NAM/COC-230VAC</b>	<b>2835493</b> <b>2835781</b> <b>2835503</b>	<b>1</b> <b>1</b> <b>1</b>
<b>Loop bridge</b> , 50-pos., divisible, max. bridging distance 60 mm, 0.5 mm <sup>2</sup>	<b>DB 50-90 BU</b> <b>DB 50-90 BK</b> <b>DB 50-90 GY</b>	<b>2821180</b> <b>2820916</b> <b>2820929</b>	<b>1</b> <b>1</b> <b>1</b>

#### Technical data

##### Measuring input

Input signal

NAMUR proximity sensors (EN 60947-5-6)  
Floating switching contacts  
Switching contacts with resistance circuit

##### Control circuit

No-load voltage

Switching points

8.5 V DC

< 1.55 mA (Disabling)

> 1.75 mA (Conducting)

Can be disconnected by bridging X1, X2 or X5, X6

##### Line error detection

##### Switching output

Contact type

Limiting continuous current

Max. switching capacity

Min. contact current

Service life mechanical

Switching behavior

Max. switching frequency

Relay output

1 PDT per channel

5 A (250 V AC) 2 A (100 V DC)

100 VA (250 V AC) 50 W (100 V DC)

1 mA

10<sup>7</sup> cycles

can be inverted via a switch in the front of the housing

20 Hz

##### General data

Supply voltage range

PI...-24 V DC PI...-120 V AC PI...-230 V AC

20 ... 30 V DC 120 V AC ±10 230 V AC ±10

% % %

Current consumption

< 50 mA (24 V DC) < 50 mA < 20 mA (230 V AC)

Power consumption (per channel)

0.55 W 2.2 VA 2.2 VA

Number of channels

2

Test voltage input/output

1.5 kV (50 Hz, 1 min)

Electrical isolation input / output / supply

375 V (Peak value, in acc. with EN 50020)

Ambient temperature range

-20 °C ... 60 °C

Max. permissible relative humidity (operation)

< 75 % (annual average)

< 95 % (30 days/year, no condensation)

##### Status indication

Green LED (supply voltage)

LED yellow (switching state)

Red LED (line errors)

##### Housing material

Polyamide PA non-reinforced

Inflammability class in acc. with UL 94

V0

##### Standards/regulations

NAMUR recommendation NE 21

##### Safety data as per ATEX

Max. voltage U<sub>o</sub>

10.5 V

10.5 V

Max. current I<sub>o</sub>

26 mA

26 mA

Max. power P<sub>o</sub>

67 mW

67 mW

Gas group

II B II C

II B II C

- max. external inductivity L<sub>o</sub>

[mH]

160 45

160 45

- max. external capacity C<sub>o</sub>

[µF]

16.8 2.41

16.8 2.41

Maximum voltage U<sub>m</sub>

250 V

250 V

##### Conformance / approvals

Conformity

CE compliant

ATEX approval

Ex II (1)GD, [EEx ia] IIC, TÜV 00 ATEX 1528

UL, USA / Canada

cULus

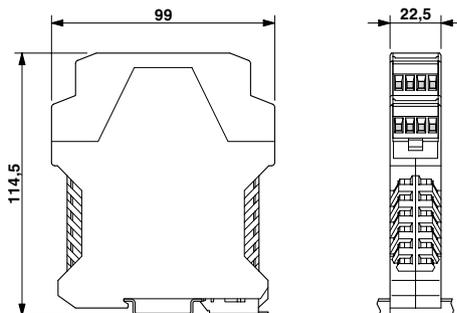
**Digital IN**  
**NAMUR isolating amplifier, Ex i**

- 2-channel
- Input for NAMUR proximity initiator or switch, [EEx ia] IIC
- Output transistor npn or pnp (passive)
- Supply 20...30 V DC
- Galvanic 3-way isolation
- Option of phase reversal
- Line fault detection (LF)

The NAMUR isolating amplifier **PI-EX-ME-2NAM/TO** is designed for the operation of proximity initiators and switches in the Ex-area. The signals coming from the Ex area are transmitted via a loop-powered transistor output to the controller installed in the safe area.

The device is designed with 2 channels. It has one line error detection per channel, which can be switched on and off depending on the application.

Two switches on the front panel of the housing allow the user to choose between normal and reverse switching behavior for each channel.



**PI-EX-ME-2NAM/TO**

Intrinsically safe NAMUR isolating amplifier with passive transistor output

Connection data	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
	0.2-2.5	0.2-2.5	24-14	M 3
Torque	0.5...0.6 Nm			

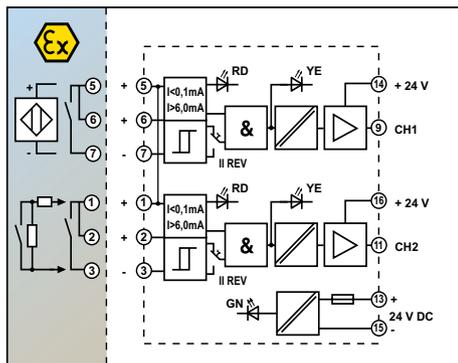


Description
<b>NAMUR isolating amplifier</b> , 2-channel, input intrinsically safe, output: TO Transistor output Passive
<b>Loop bridge</b> , 50-pos., divisible, max. bridging distance 60 mm, 0.5 mm <sup>2</sup>
blue
black
gray

Type	Order No.	Pcs. Pkt.
<b>PI-EX-ME-2NAM/TO</b>	<b>2835480</b>	1
<b>DB 50- 90 BU</b>	<b>2821180</b>	1
<b>DB 50- 90 BK</b>	<b>2820916</b>	1
<b>DB 50- 90 GY</b>	<b>2820929</b>	1

Technical data
Measuring input Input signal
Control circuit No-load voltage Switching points
Line error detection
Switching output Voltage Continuous load current Switching behavior Max. switching frequency
General data Supply voltage range Current consumption Power consumption Number of channels Test voltage input/output Electrical isolation input / output / supply Ambient temperature range Max. permissible relative humidity (operation)
Status indication
Housing material Inflammability class in acc. with UL 94 Standards/regulations
Safety data as per ATEX Max. voltage U <sub>o</sub> Max. current I <sub>o</sub> Max. power P <sub>o</sub> Gas group - max. external inductivity L <sub>o</sub> [mH] - max. external capacity C <sub>o</sub> [µF] Maximum voltage U <sub>m</sub>
Conformance / approvals Conformity ATEX approval UL, USA / Canada

NAMUR proximity sensors (EN 60947-5-6) Floating switching contacts Switching contacts with resistance circuit
8.5 V DC < 1.55 mA (Disabling) > 1.75 mA (Conducting) Can be disconnected by bridging X1, X2 or X5, X6 Transistor output, npn or pnp, passive 24 V DC (Max. 30 V DC, external) Max. 100 mA (short circuit resistant) can be inverted via a switch in the front of the housing 700 Hz
20 V DC ... 30 V DC < 45 mA (24 V DC) 0.5 W (per channel) 2 1.5 kV (50 Hz, 1 min) 375 V (Peak value, in acc. with EN 50020) -20 °C ... 60 °C < 75 % (annual average) < 95 % (30 days/year, no condensation) Green LED (supply voltage) LED yellow (switching state) Red LED (line errors) Polyamide PA non-reinforced V0 NAMUR recommendation NE 21
10.5 V 26 mA 67 mW II B II C 160 45 16.8 2.41 250 V AC
CE compliant Ex i I (1)GD, [EEx ia] IIC, TÜV 00 ATEX 1527 cULus



# INTERFACE EX

## PROCESS INTERFACE PI-ME

### Digital OUT

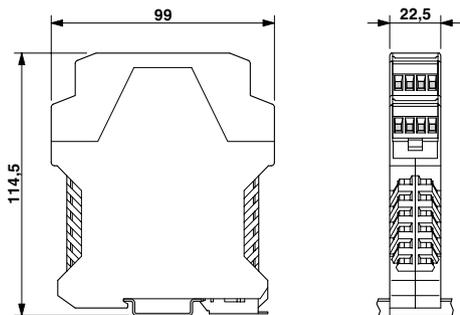
#### Solenoid driver, Ex i

- 1 or 2-channel
- Loop-powered
- Output [EEx ia] IIC
- Galvanic 2-way isolation

The solenoid driver **PI-EX-ME-(2)SD/24/65-C** connects a switch or a voltage source installed in the safe area to a device located in the Ex-area.

Intrinsically safe solenoid valves, alarm modules or other intrinsically safe devices can be connected, and simple electrical devices such as LEDs can be operated.

The device is operated in a loop-powered manner and supplies a maximum current of 65 mA at the intrinsically safe output.



### PI-EX-ME-2SD/24/65-C

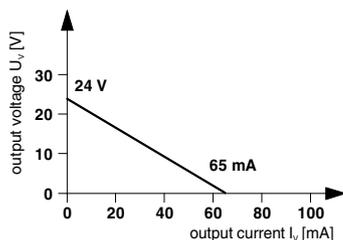
Intrinsically safe solenoid driver, loop-powered

Connection data	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
	0.2-2.5	0.2-2.5	24-14	M 3
Torque	0.5...0.6 Nm			



Description	Type	Order No.	Pcs. Pkt.
Solenoid driver, loop-powered, output intrinsically safe two-channel	PI-EX-ME-2SD/24/65-C	2835752	1

Technical data	
<b>Measuring input</b>	
Input signal	18 V DC ... 30 V DC (from the control circuit)
Input current	1.2 ... 2 (x I <sub>v</sub> , depending on the design)
Input voltage	no separate supply voltage necessary
<b>Measuring output</b>	
Output characteristic curve	24 V (Guaranteed voltage U <sub>v</sub> ) 370 Ω (Internal resistance R <sub>i</sub> ) I <sub>v</sub> = U <sub>v</sub> / (R <sub>i</sub> + R <sub>sv</sub> )
Output current (coil current) I <sub>v</sub>	20 ms
Response time t <sub>A</sub>	
<b>General data</b>	
Power consumption	Approx. 1 W (with power matching of the output circuit)
Test voltage input/output	2.5 kV AC
Electrical isolation input / output	375 V (Peak value, in acc. with EN 50020)
Ambient temperature range	-20 °C ... 60 °C
Max. permissible relative humidity (operation)	< 75 % (annual average) < 95 % (30 days/year, no condensation)
Status indication	LED yellow (switching state)
Housing material	Polyamide PA non-reinforced
Inflammability class in acc. with UL 94	V0
Standards/regulations	NAMUR recommendation NE 21
<b>Safety data as per ATEX</b>	
Max. voltage U <sub>o</sub>	27.3 V
Max. current I <sub>o</sub>	96 mA
Max. power P <sub>o</sub>	650 mW
Gas group	II B II C
- max. external inductivity L <sub>o</sub>	[mH] 13.5 2
- max. external capacity C <sub>o</sub>	[µF] 0.683 0.088
Maximum voltage U <sub>m</sub>	250 V
<b>Conformance / approvals</b>	
Conformity	CE compliant
ATEX approval	Ex II (1)GD, [EEx ia] IIC, TÜV 00 ATEX 1526
UL, USA / Canada	cULus





# INTERFACE EX

## PROCESS INTERFACE PI-ME

### Temperature measuring transducer for resistance thermometers, Ex i

- 1-channel
- Input for Pt 100 sensors and resistance-type sensors, [EEx ia] IIC
- Output 4...20 mA
- Supply 20...30 V DC
- Galvanic 3-way isolation
- Configuration using software

The temperature measuring transducer **PI-EX-ME-RTD-I** is designed for operation of the temperature sensors located in the Ex-area. It converts temperature signals from resistance thermometers as well as from sensors with resistance characteristic curves into a 4...20 mA signal.

The temperature measuring transducer is supplied with a standard configuration.

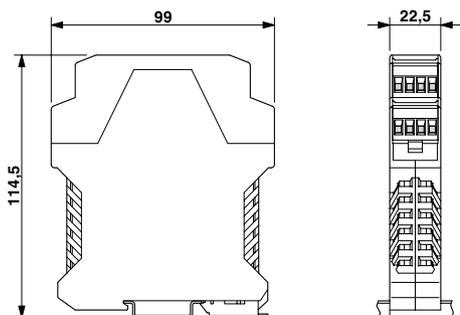
- Measuring unit: °C
- Connection method: 4-conductor
- Measuring range: 0...100°C
- Cable monitoring: 0 mA
- Line resistance: 0,0

#### Notes:

For a deviating configuration, the adapter cable PI-ME-RJ is required.

You can download the configuration software from the Internet ([www.phoenixcontact.com](http://www.phoenixcontact.com)). Notes on configuration are included in the documentation provided.

Possible sensor types, measuring ranges and configurations.



### PI-EX-ME-RTD-I

Intrinsically safe temperature measuring transducers for resistance thermometers

Connection data	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
	0.2-2.5	0.2-2.5	24-14	M 3
Torque	0.5...0.6 Nm			



Ex: Ex i, Ex ii

Description	Type	Order No.	Pcs. Pkt.
<b>Temperature measuring transducers for resistance thermometers</b> , input intrinsically safe Standard configured	<b>PI-EX-ME-RTD-I</b>	<b>2835794</b>	1
<b>Adapter cable</b> , for programming PI-EX-ME... modules (SUB-D 25-pos. and USB to western connector, 1.6 m length)	<b>PI-ME-RJ</b>	<b>2865612</b>	1
<b>Loop bridge</b> , 50-pos., divisible, max. bridging distance 60 mm, 0.5 mm <sup>2</sup>	<b>DB 50-90 BU</b>	<b>2821180</b>	1
	<b>DB 50-90 BK</b>	<b>2820916</b>	1
	<b>DB 50-90 GY</b>	<b>2820929</b>	1

#### Technical data

##### Measuring input

Resistance thermometers  
Cable resistance  
Sensor input current  
Input filter  
Min. measuring range  
Resolution

##### Measuring output

Output signal range  
Load  
Line monitoring  
Short-circuit current  
No-load voltage

##### General data

Supply voltage range  
Power consumption  
Temperature coefficient  
Step response (10-90%)  
Test voltage input/output  
Test voltage input/power supply  
Test voltage output/power supply  
Electrical isolation input / output / supply  
Ambient temperature range  
Max. permissible relative humidity (operation)

##### Status indication

Housing material  
Inflammability class in acc. with UL 94  
Standards/regulations

##### Safety data as per ATEX

Max. voltage  $U_o$   
Max. current  $I_o$   
Max. power  $P_o$   
Gas group  
- max. external inductivity  $L_o$  [mH]  
- max. external capacity  $C_o$  [ $\mu$ F]  
Maximum voltage  $U_m$

##### Conformance / approvals

Conformity  
ATEX approval  
UL, USA / Canada

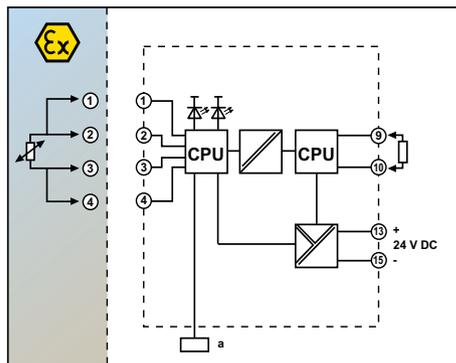
2, 3 or 4-conductor Pt 100 sensors and resistance-type sensors  
Max. 50  $\Omega$  / conductor  
200  $\mu$ A  
PT1 filter  
20  $\Omega$  (= approx. 50 K)  
10 m $\Omega$  (= approx. 0.026 K)

4 mA ... 20 mA  
< 750  $\Omega$   
NE 43  
25 mA  
20 V

20.4 V DC ... 30 V DC  
< 1.5 W  
< 0.01 %/K  
(< 150 ms ... 350 ms depending on the measuring mode)  
2.5 kV  
2.5 kV  
0.5 kV  
375 V (Peak value, in acc. with EN 50020)  
-20 °C ... 60 °C  
< 75 % (annual average)  
< 95 % (30 d/a, no condensation)  
LED green (supply)  
LED red (line monitoring)  
Polyamide PA non-reinforced  
V0  
NAMUR recommendation NE 21

2.7 V  
11 mA  
21 mW  
II B II C  
50 50  
30 2  
250 V

CE compliant  
Ex i II (1)GD, [EEx ia] IIC, TÜV 01 ATEX 1750  
cULus



**Temperature measuring transducer for thermocouples, Ex i**

- 1-channel
- Input for thermocouples and mV-sources, [EEx ia] IIC
- Output 4...20 mA
- Supply 20...30 V DC
- Galvanic 3-way isolation
- Configuration using software
- Automatic cold junction compensation

The temperature measuring transducer **PI-EX-ME-THC-I** is designed for operation of the temperature sensors located in the Ex-area. It converts temperature signals from thermocouples as well as from sensors with linear mV characteristic curves into a 4...20 mA signal.

The temperature measuring transducer is supplied with a standard configuration.

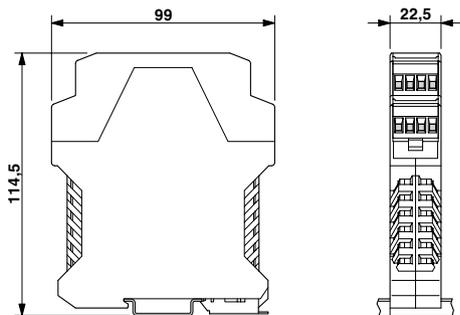
- Measuring unit: °C
- Sensor type: Thermocouple type K
- Measuring range: 0...100°C
- Cable monitoring: 0 mA
- Reference junction: Internal

**Notes:**

For a deviating configuration, the adapter cable PI-ME-RJ is required.

You can download the configuration software from the Internet ([www.phoenixcontact.com](http://www.phoenixcontact.com)). Notes on configuration are included in the documentation provided.

Possible sensor types, measuring ranges and configurations.



**PI-EX-ME-THC-I**

Intrinsically safe temperature measuring transducers for thermocouples and mV sources

Connection data	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
	0.2-2.5	0.2-2.5	24-14	M 3
Torque	0.5...0.6 Nm			

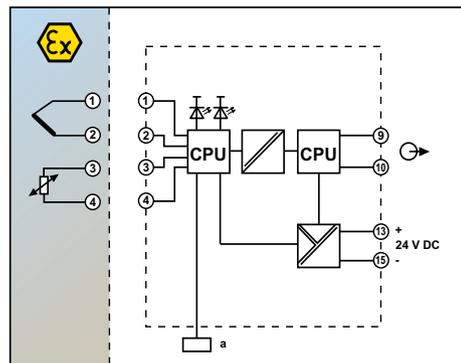


Ex:

Description	Type	Order No.	Pcs. Pkt.
<b>Temperature measuring transducers for thermocouples</b> , input intrinsically safe Standard configured	<b>PI-EX-ME-THC-I</b>	<b>2835707</b>	<b>1</b>
<b>Adapter cable</b> , for programming PI-EX-ME... modules (SUB-D 25-pos. and USB to western connector, 1.6 m length)	<b>PI-ME-RJ</b>	<b>2865612</b>	<b>1</b>
<b>Loop bridge</b> , 50-pos., divisible, max. bridging distance 60 mm, 0.5 mm <sup>2</sup>	<b>DB 50-90 BU</b> <b>DB 50-90 BK</b> <b>DB 50-90 GY</b>	<b>2821180</b> <b>2820916</b> <b>2820929</b>	<b>1</b> <b>1</b> <b>1</b>

**Technical data**

<b>Measuring input</b>	
Thermocouple sensors	thermocouples, types: J, K, T, E, R, S, B, N, L, U, mV input
Input filter	PT1 filter
Min. measuring range	5 mV (For 0.1%)
Input impedance	> 5 MΩ
Resolution	Approx. 2.3 mV
<b>Measuring output</b>	
Output signal range	4 mA ... 20 mA
Load	< 750 Ω
Line monitoring	NE 43
Short-circuit current	30 mA
No-load voltage	25.2 V
<b>General data</b>	
Supply voltage range	20.4 V DC ... 30 V DC
Power consumption	< 1.5 W
Temperature coefficient	< 0.01 %/K
Step response (10-90%)	(< 150 ms ... 600 ms depending on the measuring mode)
Cold point errors	± 1 K
Test voltage input/output	2.5 kV
Test voltage input/power supply	2.5 kV
Test voltage output/power supply	0.5 kV
Electrical isolation input / output / supply	375 V (Peak value, in acc. with EN 50020)
Ambient temperature range	-20 °C ... 60 °C
Max. permissible relative humidity (operation)	< 75 % (annual average) < 95 % (30 d/a, no condensation)
Status indication	
Housing material	LED green (supply) LED red (line monitoring)
Inflammability class in acc. with UL 94	Polyamide PA non-reinforced
Standards/regulations	V0
Safety data as per ATEX	
Max. voltage U <sub>0</sub>	1.8 V
Max. current I <sub>0</sub>	22 mA
Max. power P <sub>0</sub>	32 mW
Gas group	II B II C
- max. external inductivity L <sub>0</sub>	50 [mH]
- max. external capacity C <sub>0</sub>	49 [µF]
Maximum voltage U <sub>m</sub>	250 V
<b>Conformance / approvals</b>	
Conformity	CE compliant
ATEX approval	II (1)GD, [EEx ia] IIC, TÜV 01 ATEX 1750
UL, USA / Canada	cULus





**Programmable loop-powered temperature measuring transducers with connection heads, Ex i**

- 1-channel
- Loop-powered
- Input for resistance thermometers, thermocouples and linear mV signals, EEx ia IIC
- Output 4...20 mA/20...4 mA
- Can be installed in zone 0
- Galvanic 2-way isolation
- HARTable
- Configuration using software

The universal temperature measuring transducers for connection heads convert intrinsically safe temperature signals from resistance thermometers and thermocouples as well as from sensors with linear mV characteristic curves into analog 4...20 mA signals.

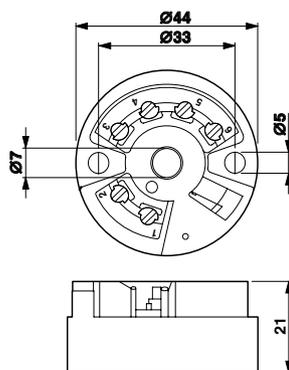
The temperature measuring transducers for connection heads can be installed in Ex-zone 0.

The devices are supplied in the standard configuration: Pt 100 sensor, 0...100 °C measuring range, 3-conductor connection.

**Note:**  
A different configuration is possible using the configuration software MCR-PI-CONF-WIN.

The configuration is also possible using the Hart® protocol.

Possible sensor types, measuring ranges and configurations.



**MCR-FL-HT-TS-I-EX**

Intrinsically safe temperature measuring transducer, loop-powered, for installation in connecting head DIN 43729 Form B

Connection data	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Torque	0.2-1.75	0.2-1.75	24-15	M 3
	0.5...0.6 Nm			

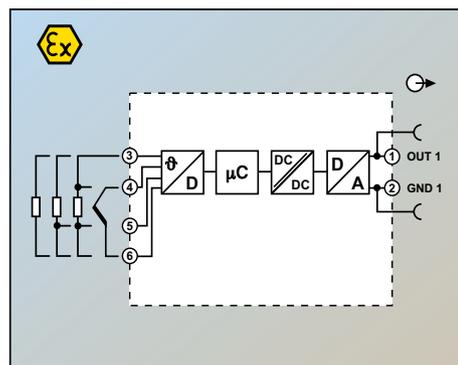


Ex: Ex i PTB

Description	Type	Order No.	Pcs. Pkt.
<b>MCR temperature measuring transducer, smart</b> , for resistance thermometers, thermocouples, resistance-type sensors and voltage sensors			
	<b>MCR-FL-HT-TS-I-EX</b>	<b>2864545</b>	<b>1</b>

Technical data	
<b>Measuring input</b>	
Resistance thermometers	
Thermocouple sensors	
Resistor	
Voltage	
Configuration	
<b>Measuring output</b>	
Output signal range	
Maximum output signal	
Load	
Line monitoring	
Short-circuit current	
Output current with open circuit	
Output current, measuring range overrange/underrange	
<b>General data</b>	
Supply voltage range	
Current consumption	
Step response (10-90%)	
Transmission error	Resistance thermometers
	Thermocouple sensors
	Resistance-type sensors
	Voltage sensor
Test voltage input/output	
Switch on delay time	
Degree of protection	
Mounting position	
Connection	
Housing material	
Inflammability class in acc. with UL 94	
Standards/regulations	
<b>Safety data as per ATEX</b>	
Max. voltage U <sub>i</sub>	30 V
Max. current I <sub>i</sub>	100 mA
Max. power P <sub>i</sub>	750 mW
Max. voltage U <sub>o</sub>	5 V DC
Max. current I <sub>o</sub>	5.4 mA
Max. power P <sub>o</sub>	6.6 mW
Gas group	II A II B II C
- max. external inductivity L <sub>o</sub>	100 [mH]
- max. external capacity C <sub>o</sub>	9.9 [µF]
Max. ambient temperature	
Maximum voltage U <sub>m</sub>	
<b>Conformance / approvals</b>	
Conformity	
ATEX approval	
UL, USA / Canada	

Pt, Ni (100, 500, 1000); min. measurement range 10 K
B, C, D, E, J, K, L, N, R, S, T, U; min. measurement range 50 K/500 K
10 Ω ... 400 Ω (min. measurement range 10 Ω)
10 Ω ... 2000 Ω (min. measurement range 100 Ω)
-10 mV ... 75 mV (min. measurement range 5 mV)
Yes, programmable
4 mA ... 20 mA / 20 mA ... 4 mA
± 23 mA
Max. 630 Ω (At UV = 24 V; U <sub>supply</sub> - 10 V / 0.023 A)
NE 43
± 3.6 mA or ≥ 21 mA (adjustable, not for thermocouples)
± 3.6 mA or ≥ 21 mA (adjustable)
3.8 mA ... 20.5 mA (linear increase/decrease)
12 V DC ... 30 V DC
< 3.5 mA
< 2 s
0.2 K (Pt 100, Ni 100), 0.5 K (Pt 500, Ni 500), 0.3 K (Pt 1000, Ni 1000)
Type 0.5 K (K, J, T, E, L, U), 1.0 K (N, C, D), 2.0 K (S, B, R)
± 0.1 Ω (10...400 Ω), ± 1.5 Ω (10...2000 Ω)
± 20 µV (-10...75 mV)
2 kV AC (50 Hz, 1 min)
6 s
IP00, IP66 (integrated in the connecting head)
Connecting head in acc. with DIN 43729 form B
Installation in connection head according to DIN 43729 form B
Polycarbonate PC
V0
NAMUR recommendation NE 21
30 V
100 mA
750 mW
5 V DC
5.4 mA
6.6 mW
II A II B II C
100 100 100
9.9 9.9 2
Category 1: T4 = 60°C, T5 = 50°C, T6 = 40°C
Category 2: T4 = 85°C, T5 = 70°C, T6 = 55°C
250 V
CE compliant
Ex II 1G or II 2G, EEx ia IIC T6/T5/T4, PTB 02 ATEX 2028
cULus



# INTERFACE EX

## PROCESS INTERFACE PI-ME

### Programmable loop-powered temperature measuring transducers with connection heads, Ex i

- 1-channel
- Loop-powered
- Input for resistance thermometers, thermocouples and linear mV signals, EEx ia IIC
- Output 4...20 mA/20...4 mA
- Can be installed in zone 0
- Galvanic 2-way isolation
- Configuration using software

The universal temperature measuring transducers for connection heads convert intrinsically safe temperature signals from resistance thermometers and thermocouples as well as from sensors with linear mV characteristic curves into analog 4...20 mA signals.

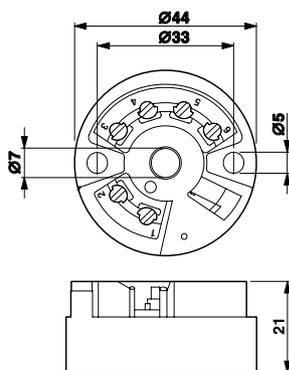
The temperature measuring transducers for connection heads can be installed in Ex-zone 0.

The devices are supplied in the standard configuration: Pt 100 sensor, 0...100 °C measuring range, 3-conductor connection.

#### Note:

A different configuration is possible using the configuration software MCR-PI-CONF-WIN.

Possible sensor types, measuring ranges and configurations.



### MCR-FL-HT-T-I-EX

Intrinsically safe temperature measuring transducer, loop-powered, for installation in connecting head DIN 43729 Form B

Connection data	solid		stranded	
	[mm <sup>2</sup> ]		AWG	Screw
	0.2-1.75	0.2-1.75	24-15	M 3
Torque	0.5...0.6 Nm			



Ex: ZELM

Description	Type	Order No.	Pcs. Pkt.
<b>MCR temperature measuring transducer</b> , for resistance thermometers, thermocouples, resistance-type sensors and voltage sensors		<b>2864532</b>	<b>1</b>

#### Technical data

##### Measuring input

Resistance thermometers  
Thermocouple sensors

Resistor

Voltage

Configuration

##### Measuring output

Output signal range

Maximum output signal

Load

Line monitoring

Short-circuit current

Output current with open circuit

Output current, measuring range overrange/underrange

##### General data

Supply voltage range

Current consumption

Step response (10-90%)

Transmission error

Resistance thermometers

Thermocouple sensors

Resistance-type sensors

Voltage sensor

Test voltage input/output

Switch on delay time

Degree of protection

Mounting position

Connection

Housing material

Inflammability class in acc. with UL 94

Standards/regulations

##### Safety data as per ATEX

Max. voltage  $U_i$

Max. current  $I_i$

Max. power  $P_i$

Max. voltage  $U_o$

Max. current  $I_o$

Max. power  $P_o$

Gas group

- max. external inductivity  $L_o$

- max. external capacity  $C_o$

Max. ambient temperature

Maximum voltage  $U_m$

##### Conformance / approvals

Conformity

ATEX approval

UL, USA / Canada

Pt, Ni (100, 500, 1000); min. measurement range 10 K  
B, C, D, E, J, K, L, N, R, S, T, U; min. measurement range 50 K/500 K

10 Ω ... 400 Ω (min. measurement range 10 Ω)

10 Ω ... 2000 Ω (min. measurement range 100 Ω)

-10 mV ... 100 mV (min. measurement range 5 mV)

Yes, programmable

4 mA ... 20 mA / 20 mA ... 4 mA

≤ 25 mA

Max. 720 Ω (For  $U_v = 24$  V;  $U_{supply} = 8$  V / 0.025 A)

NE 43

≤ 3.6 mA or ≥ 21 mA (adjustable, not for thermocouples)

≤ 3.6 mA or ≥ 21 mA (adjustable)

3.8 mA ... 20.5 mA (linear increase/decrease)

8 V DC ... 30 V DC

< 3.5 mA

< 2 s

0.2 K (Pt 100, Ni 100), 0.5 K (Pt 500, Ni 500), 0.3 K (Pt 1000, Ni 1000)

Type 0.5 K (K, J, T, E, L, U), 1.0 K (N, C, D), 2.0 K (S, B, R)

± 0.1 Ω (10...400 Ω), ± 1.5 Ω (10...2000 Ω)

± 20 μV (-10...100 mV)

2 kV AC (50 Hz, 1 min)

6 s

IP00, IP66 (integrated in the connecting head)

Connecting head in acc. with DIN 43729 form B

Installation in connection head according to DIN 43729 form B

Polycarbonate PC

V0

NAMUR recommendation NE 21

30 V

100 mA

750 mW

8.2 V DC

4.6 mA

9.35 mW

II B II C

8.5 4.5

1.9 0.974

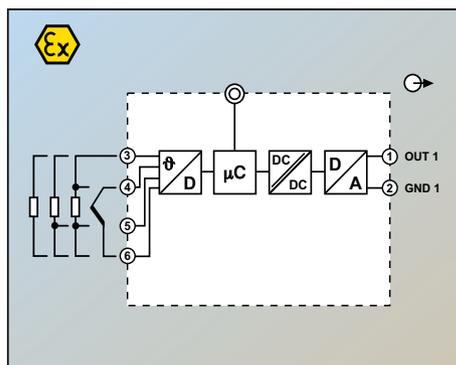
T4 = 85 °C, T5 = 70 °C, T6 = 55 °C

250 V

##### CE compliant

II 1G, EEx ia IIC T6, ZELM 02 ATEX 0075X

cULus



**Ex-temperature transducer PI-EX-ME-RTD-I**

**Sensor types and measuring ranges**

PI-EX-ME-RTD-I		
Input	Measuring range	Smallest measuring range span
Pt 100 sensors according to IEC 60751/EN 60751 or DIN 43760	-200 °C...850 °C	30 K
Resistor	0...400 Ω (2-conductor)	10 Ω

Conversion aid for temperature from °C to °F:

$$T [°F] = \frac{9}{5} T [°C] + 32$$

**Supply configuration and configuration options for temperature transducer PI-EX-ME-RTD-I**

Order No.	Measuring point designation	Unit of measurement	Connection method	Measuring range:		Line monitoring	Cable resistance
				Start	End		
2835794	Default	C	4	0,0	100,0	0	0,0
PI-EX-ME-RTD-I	15 character of text (optional)	C ≙ °C F ≙ °F Ω ≙ Ω	Pt 100 or resistance measurement 2 = 2-conductor 3 = 3-conductor 4 = 4-conductor	Beginning measuring range value at 4 mA (e.g. 0 °C)	Measuring range end value at 20 mA (e.g. 100 °C)	off ≙ off 0 ≙ 0 mA 3,6 ≙ 3.6 mA 21 ≙ 21 mA f ≙ freeze  freely selectable between 0...25 mA	Only for 2-conductor connection!  Specification in Ω

**Ex-temperature transducer PI-EX-ME-THC-I**

**Sensor types and measuring ranges**

PI-EX-ME-THC-I			
Sensor type	Thermocouple	Measuring range	Smallest measuring range span
B 1)	Pt30Rh-Pt16Rh	50 °C...1800 °C	> 50 K or 3 mV
E 1)	NiCr-CuNi	-270 °C...1000 °C	
J 1)	Fe-CuNi	-210 °C...1200 °C	
K 1)	NiCr-Ni	-200 °C...1370 °C	
L 2)	Fe-CuNi	-200 °C... 900 °C	
N 1)	NiCrSi-NiSi	-200 °C...1300 °C	
R 1)	Pt13Rh-Pt	-50 °C...1769 °C	
S 1)	Pt10Rh-Pt	0 °C...1700 °C	
T 1)	Cu-CuNi	-270 °C... 400 °C	
U 2)	Cu-CuNi	-200 °C... 600 °C	
Pallaplat 1)		-100 °C... 750 °C	> 50 K or 3 mV
Voltage (mV)		-75 mV...+75 mV	3 mV

1) Thermocouples in acc. with IEC 60584/EN 60584.  
2) Thermocouples according to DIN 43710

**Supply configuration and configuration options for temperature transducer PI-EX-ME-THC-I**

Order No.	Measuring point designation	Unit of measurement	Connection method	Measuring range:		Line monitoring	Reference point VST
				Start	End		
2835707	Default	C	K	0,0	100,0	0	i
PI-EX-ME-THC-I	15 characters of text (optional)	C ≙ °C F ≙ °F mV ≙ mV	B E J K L R S T U N Pallaplat mV = millivolt voltage measurement (-75...+75 mV)	Beginning measuring range value at 4 mA (e.g. 0 °C)	Measuring range end value at 20 mA (e.g. 100 °C)	off ≙ off 0 ≙ 0 mA 3,6 ≙ 3.6 mA 21 ≙ 21 mA f ≙ freeze  freely selectable between 0...25 mA	i ≙ internal  0,0 ≙ external  Information in °C for external reference point, other values can also be given

**Programmable loop-powered temperature transducer MCR-FL-T(S)-LP-I-EX**  
**Programmable loop-powered temperature transducer MCR-FL-HT-T(S)-I-EX**

**Sensor types and measuring ranges**

for MCR-FL-...T(S)-...-I-EX

Input	Measuring range	Smallest measuring range span
Resistance thermometer		
Pt 100	-200 °C...850 °C	10 K
Pt 500	-200 °C...250 °C	10 K
Pt 1000	-200 °C...250 °C	10 K
Ni 100	-60 °C...180 °C	10 K
Ni 500	-60 °C...150 °C	10 K
Ni 1000	-60 °C...150 °C	10 K
Resistor	10...400 Ω	10 Ω / 100 Ω
linear mV signals: MCR-...TS-... MCR-...T-...	-10 ... +75 mV -10 ... +100 mV	5 mV 5 mV

Conversion aid for temperature from °C to °F:

$$T [°F] = \frac{9}{5} T [°C] + 32$$

for MCR-FL-T(S)-LP-I-EX

Input	Measuring range	Smallest measuring range
Thermocouples		
B Pt30Rh-Pt16Rh	400 °C...1820 °C	500 K
C W5Re-W26Re	500 °C...2320 °C	500 K
D W3Re-W25Re	500 °C...2495 °C	500 K
E NiCr-CuNi	-200 °C...1000 °C	50 K
J Fe-CuNi	-200 °C...1200 °C	50 K
K NiCr-Ni	-200 °C...1372 °C	50 K
L Fe-CuNi	-200 °C... 900 °C	50 K
N NiCrSi-NiSi	-100 °C...1300 °C	50 K
R Pt13Rh-Pt	-50 °C...1768 °C	500 K
S Pt10Rh-Pt	-50 °C...1768 °C	500 K
T Cu-CuNi	-270 °C... 400 °C	50 K
U Cu-CuNi	-200 °C... 600 °C	50 K

for MCR-FL-HT-T(S)-I-EX

Sensor type	Thermocouple	Measuring range	Smallest measuring range span
Thermocouples			
B	Pt30Rh-Pt16Rh	50 °C...1820 °C	500 K
C	W5Re-W26Re	0 °C...2320 °C	500 K
D	W3Re-W25Re	0 °C...2495 °C	500 K
E 3)	NiCr-CuNi	-270 °C...1000 °C	50 K
E 4)	NiCr-CuNi	-200 °C...915 °C	50 K
J 3)	Fe-CuNi	-210 °C...1200 °C	50 K
J 4)	Fe-CuNi	-200 °C...1200 °C	50 K
K 3)	NiCr-Ni	-270 °C...1372 °C	50 K
K 4)	NiCr-Ni	-200 °C...1372 °C	50 K
L 5)	Fe-CuNi	-200 °C... 900 °C	50 K
N	NiCrSi-NiSi	-200 °C...1300 °C	50 K
R 3)	Pt13Rh-Pt	-50 °C...1768 °C	500 K
R 4)	Pt13Rh-Pt	0 °C...1768 °C	500 K
S 3)	Pt10Rh-Pt	-50 °C...1768 °C	500 K
S 4)	Pt10Rh-Pt	0 °C...1768 °C	500 K
T 3)	Cu-CuNi	-270 °C... 400 °C	50 K
T 4)	Cu-CuNi	-200 °C... 400 °C	50 K
U 5)	Cu-CuNi	-200 °C... 600 °C	50 K

3) for MCR-FL-HT-TS-I-EX  
4) for MCR-FL-H-T-T-I-EX  
5) Thermocouples according to DIN 43710

**Supply configuration**

**Connection method**

**Sensor**

**Measuring range:**

MCR-FL-TS-LP-I-EX (Order No.: 2864587)	3-conductor	Pt 100	0...100 °C
MCR-FL-T-LP-I-EX (Order No.: 2864574)	3-conductor	Pt 100	0...100 °C
MCR-FL-HT-TS-I-EX (Order No.: 2864545)	3-conductor	Pt 100	0...100 °C
MCR-FL-HT-T-I-EX (Order No.: 2864532)	3-conductor	Pt 100	0...100 °C

# INTERFACE Serial

## Copper-bound transmission

### Repeaters for PROFIBUS up to 12 mbps and RS-485 2-wire systems

#### PSM-ME... repeater

The compact repeater **PSM-ME-RS485/RS485-P** is developed for the requirements in RS485-2-wire bus systems up to 1.5 mbps. The 22.5 mm slim module has high-grade 3-way isolation and integrated surge protection.



### PSM-ME-RS485/RS485-P

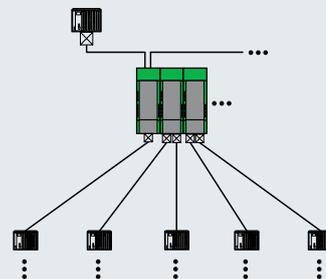
Repeater for RS-485 2-conductor systems



Housing width 22.5

Description	Type	Order No.	Pcs. Pkt.
<b>Repeater</b> , for electrical isolation and increased range for RS-485-2-wire bus systems, 3-way isolation	<b>PSM-ME-RS485/RS485-P</b>	<b>2744429</b>	<b>1</b>
<b>Technical data</b>			
<b>Power supply</b>	24 V AC/DC ±20 % Approx. 90 mA		
Supply voltage	RS-485 interface, in acc. with EIA/TIA-485, DIN 66259-4/RS-485 2-wire		
Nominal current consumption	UART (11/10 bit switchable; NRZ)		
<b>RS-485 interface</b>	Automatic control, min. station response time 1 bits		
Data format/coding	220 Ω		
Data direction switching	4.8/ 9.6/ 19.2/ 38.4/ 57.6/ 75/ 93.75/ 115.2/ 136/ 187.5/ 375/ 500/ 1500 kbps		
Termination resistor	1200 m (depends on transmission rate, bus system and cable type)		
Transmission speed	Pluggable COMBICON screw connection		
Transmission length			
Connection method			
<b>General data</b>			
Bit distortion output	< 3.6 %		
Bit delay	< 200 ns		
Test voltage	2 kV		
Ambient temperature range	0 °C ... 55 °C		
Transmission channels	2 (1/1), TD, RD, half duplex		
Electrical isolation	RS-485 (A) // RS-485 (B) // supply		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
- Noise emission	EN 50 081-1		
- Immunity to interference	EN 61000-6-2		
Dimensions	W / H / D	22.5 mm / 114.5 mm / 99 mm	

#### Star structure



☒ = Switch on bus termination resistor

**Interface isolator and  
Interface converters**

**RS-232 / TTY interface converter**

The converters are used to convert an RS-232 interface bidirectionally into a 20 mA TTY current loop interface. With the interference-free TTY signal, the data can be transmitted without difficulty over a distance of up to 1000 m via a twisted pair or shielded 4-wire cables.

The following tasks are generally solved with the converters (see illustration):

- Interface conversion between RS-232 and TTY interfaces, range 1000 m.
- Programming connection between PC (RS-232) and, for example, control systems with TTY programming interface for temporary coupling.

The compact control cabinet module, **PSM-ME...**, designed for industrial applications, converts the TxD/RxD RS-232 data signals full duplex to the TTY current loop standard. Transmission rates of up to 19.2 kbps and transmission distances of up to 1000 m can be achieved in active TTY mode. The 22.5 mm slim module is snapped onto standard EN mounting rails and supplied with 24 V AC or DC. The RS-232 connection is made via SUB-D9 and standard RS-232 cable. An integrated data indicator provides a dynamic display of transmit and receive data. The TTY field connection is made with pluggable COMBICON screw terminal blocks. Depending on the choice of pin configuration, the TTY operating mode can be chosen to be semi-active, active or passive.

High-grade, 3-way isolation between the supply, RS-232 and TTY interface ensures reliable decoupling of the potentials with 2 kV. Additional protection is provided by the integrated surge protection that discharges transient interference effectively to ground potential via the self-contacting snap-on foot.



**PSM-ME-RS232/TTY-P**

For TTY, two channels



Housing width 22.5

Description		Type	Order No.	Pcs. Pkt.
<b>Interface converter</b> , for conversion from RS-232 (V.24) to TTY, with electrical isolation, two channels, rail-mountable		<b>PSM-ME-RS232/TTY-P</b>	<b>2744458</b>	<b>1</b>
<b>RS-232-SUB-D cable</b> , length: 2 m - 9-pos. socket on 25-pos. socket - 9-pos. socket on 9-pos. socket		<b>PSM-KA 9 SUB 25/BB/2METER</b>	<b>2761059</b>	<b>1</b>
<b>RS-232-SUB-D cable</b> , length: 2 m - 9-pos. socket on 9-pos. socket		<b>PSM-KA9SUB9/BB/2METER</b>	<b>2799474</b>	<b>1</b>
Technical data				
<b>Power supply</b>		24 V AC/DC ±20 % Typ. 75 mA		
Supply voltage		RS-232 interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1		
Nominal current consumption		19.2 kbps		
<b>RS-232 Interface</b>		1000 m (twisted pair) D-SUB-9 male connector		
Transmission speed		TTY interface, CL2 in acc. with DIN 66348-1		
Transmission length		19.2 kbps		
Connection method		1000 m (twisted pair)		
<b>TTY interface</b>		Pluggable COMBICON screw connection		
Transmission speed		Active, semi active, passive		
Transmission length		≤ 500 Ω		
Connection method		< 5 %		
Operating mode		< 3 μs		
Load		2 kV		
<b>General data</b>		0 °C ... 55 °C		
Bit distortion		PA		
Bit delay		2 (1/1), RxD, TxD, full duplex		
Test voltage		RS-232 // TTY // supply		
Ambient temperature range		Conformance with EMC directive 89/336/EEC		
Housing material		EN 50 081-1		
Transmission channels		EN 61000-6-2		
Electrical isolation		22.5 mm / 118.6 mm / 99 mm		
Electromagnetic compatibility				
- Noise emission				
- Immunity to interference				
Dimensions		W / H / D		

# INTERFACE Serial

## Copper-bound transmission

### Interface converters

#### RS-232 (V.24) / RS-422 (V.11)

#### RS-232 (V.24) / RS-485

The RS-422 standard is used to create an interference-free and fast point-to-point connection between two terminals via a shielded 4-wire conductor in twisted pairs.

The following tasks can be solved with the converter:

- Fast and interference-free point-to-point connection between two RS-232 interfaces.
- Interface conversion between RS-232 and RS-422 interfaces.
- Programming and parameterizing link between PC (RS-232) and PLC or drive regulators, for example, with an RS-422 connection.

### PSM-ME... control cabinet module

The interface converter **PSM-ME...** realizes the bi-directional RS-232 interface conversion of the TxD/RxD data signals up to 115.2 kbps. The device, which is only 22.5 mm wide, is simply snapped onto standard EN mounting rails and supplied with 24 V AC or DC. The RS-232 connection is made via SUB-D9, and the RS-422/RS-485 field connection is made using pluggable COMBICON screw terminal blocks. The integrated data indicator displays transmit and receive data dynamically. High-grade 3-way isolation between supply, RS-232 and RS-422/RS-485 interface ensures reliable decoupling of the potentials with 2 kV. The integrated surge protection provides additional protection. Transient interference is discharged effectively to ground potential via the self-contacting snap-on foot.

The manifold configuration options make the device suitable for universal applications:

- RS-485 2-wire mode, half-duplex
- RS-485 4-wire mode, full-duplex
- RS-422 4-wire point-to-point mode
- Transmission rate between 4.8 kbit/s and 115.2 kbit/s
- Automatic RS-485 transmit/receive changeover

The RS-485 standard is used when more than two devices have to communicate with each other.

Converting the point-to-point interface, RS-232, to the bus-capable RS-485 standard makes it possible to network up to 32 devices via a 2 or 4-wire line.

The following tasks can be solved with the converter:

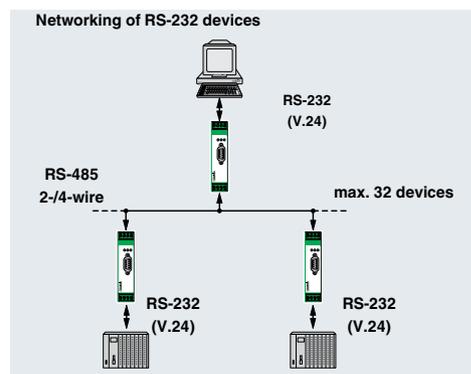
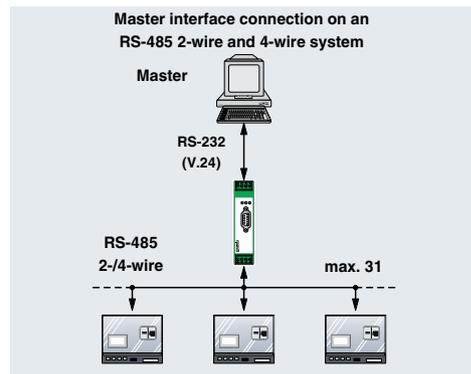
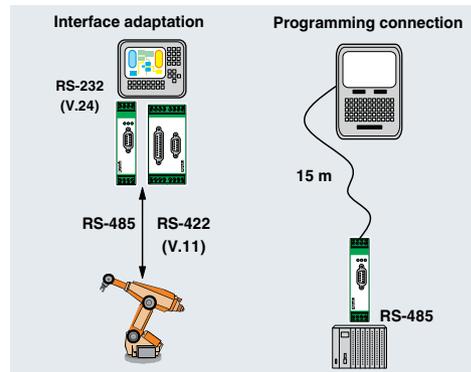
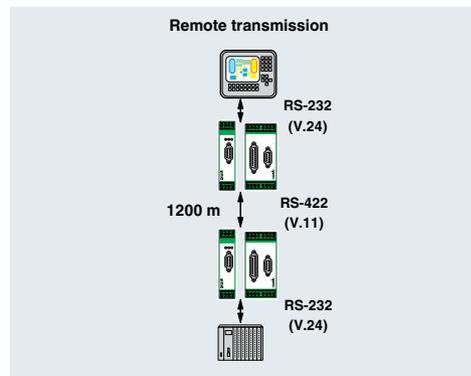
- Coupling an RS-232 master interface to an RS-485 bus system.
- Integrating an RS-232 terminal in an RS-485 bus system.
- Networking of up to 32 RS-232 interfaces via the RS-485 standard (provided they

can be addressed).

- Setting up a temporary programming and parameterizing link between PC (RS-232) and PLC or drive regulators, for example, with an RS-485 connection.

This enables the converter to be used for point-to-point remote transfer with RS-422 and for networking in all common RS-485 2-wire and 4-wire bus systems.

Examples of this are: MODBUS, PPI (Siemens), SUCONET-K (Moeller), DH 485 (Allen Bradley), RACKBUS (Endress & Hauser), UNI-TELWAY (Telemecanique), J-BUS (Merlin Gerin), RS BUS (Staefa), JETWAY (Jetter) and many others.





## PSM-ME-RS232/RS485-P

for RS-422 and RS-485, 2 channels



Housing width 22.5

Ex: cULus

Description	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 - two channels <b>RS-232-SUB-D cable</b> , length: 2 m - 9-pos. socket on 25-pos. socket - 9-pos. socket on 9-pos. socket	<b>PSM-ME-RS232/RS485-P</b>  <b>PSM-KA 9 SUB 25/BB/2METER</b> <b>PSM-KA9SUB9/BB/2METER</b>	  <b>2744416</b>  <b>2761059</b> <b>2799474</b>	  1  1 1
<b>Technical data</b>			
Power supply	24 V AC/DC ±20 %		
Supply voltage	Approx. 85 mA		
Nominal current consumption	RS-232 interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1		
RS-232 Interface	115.2 kbps		
Transmission speed	D-SUB-9 male connector		
Connection method	RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1		
RS-422 interface	150 Ω can be connected; pull up/down 390 Ω		
Termination resistor	115.2 kbps		
Transmission speed	1200 m (twisted pair)		
Transmission length	Pluggable COMBICON screw connection		
Connection method	RS-485 interface in acc. with EIA/TIA-485, DIN 66259-1		
RS-485 interface	Automatic control or via RTS/CTS		
Data direction switching	150 Ω can be connected; pull up/down 390 Ω		
Termination resistor	1200 m (twisted pair)		
Transmission length	Pluggable COMBICON screw connection		
Connection method			
<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), RxD, TxD, full duplex		
Electrical isolation	RS-232 // RS-422 // supply		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
- Noise emission	EN 50 081-1		
- Immunity to interference	EN 61000-6-2		
Dimensions	W / H / D	22.5 mm / 118.6 mm / 99 mm	

# INTERFACE Serial

## Optical fiber transmission

### FO converter for PROFIBUS up to 12 Mbps

Above all else, system availability and security in bus systems depends on selecting the suitable transmission medium. Networking using fiber optics represents the best choice and offers a significant improvement in resistance to interference and performance:

- Maximum resistance to interference, even when exposed to extreme electromagnetic influences.
- High-grade electrical isolation between the devices.
- Transmission distances of up to several kilometers
- Maximum transmission speeds
- Maximum number of devices without any limitation due to the electrical properties of PROFIBUS.

These advantages have made fiber optic conductors almost a standard feature in modern industrial systems. They have not just come to replace expensive, lightning current absorbing data cables outdoors, but they also save on extra surge arresters.

The PSI-MOS-PROFIB/FO... devices were specially developed for use in demanding industrial applications. They convert copper-bound PROFIBUS interfaces on fiber optics. The conversion is made protocol-transparent for all data rates up to max. 12 mbps. The integrated optical diagnostics allows permanent monitoring of the FO paths during installation and also during operation. If the signal efficiency on the fiber optic paths drops to a critical level, the floating switching contact is activated. This early alarm allows diagnosis of critical system states even before a failure occurs.

The **terminal devices PSI-MOS-PROFIB/FO... E** convert a PROFIBUS interface to **an FO cable**. They are preferably used for point-to-point connections. With the **PSI-MOS-PROFIB/FO... T-couplers T**, conversion to **two FO cables** becomes possible. With them it is possible to realize line structures and redundant ring structures for greater system availability.

Modular assembly of star distributors is also possible using both device variants. In this case, the required devices are snapped onto DIN rail connectors, which ensure that the supply voltage and data signals are routed through.

The integrated bit retiming allows almost any cascable star and tree structures to be constructed, the only limits to which are the maximum permissible signal run time of the respective application. In this way, the user can bypass the restriction to pure line structures that exists when copper data cables are used.

Within a star coupler, devices with the different transmission technologies polymer, HCS and glass fiber can be mixed, but mixed connections are not possible. This gives the user a modular, scalable transmission technology for ranges of up to 30 km that can be optimally configured to meet needs.

The **PSI-MOS-PROFIB/FO 660...** devices are networked for distances **of up to 70 m with polymer fiber cables** and with HCS fiber cables for distances **of up to 400 m**. The connection is made using F-SMA fast connection connectors that can be directly assembled on site within a few minutes. For longer distances, the **PSI-MOS-PROFIB/FO 850...** devices are available, allowing distances **of up to 800 m with HCS fiber** and fast connection technology, **and distances of up to 3300 m with multimode glass fiber**.

#### Description

**Terminal device**, for converting data signals from PROFIBUS FMS/DP to **an FO line**

- for polymer/HCS fiber
- for HCS / glass fiber (MM)

**T-coupler**, for converting data signals from PROFIBUS FMS/DP to **two FO lines**

- for polymer/HCS fiber
- for HCS / glass fiber (MM)

**DIN rail connector** (optional), for routing through of the supply voltage and data signal, two pieces are required per device

**DIN rail connector**, (optional), for routing through of the supply voltage, 2 required per device

**System power supply**, primary switched-mode

#### Technical data

Supply voltage

Nominal current consumption

RS-485 interface

Data format/coding  
Transmission speed

Transmission length

Connection method

Optical interface

Transmission protocol

Connection

Wavelength

Transmission length Incl. 3 dB system reserve

#### General data

Bit delay in standard operation

Alarm output

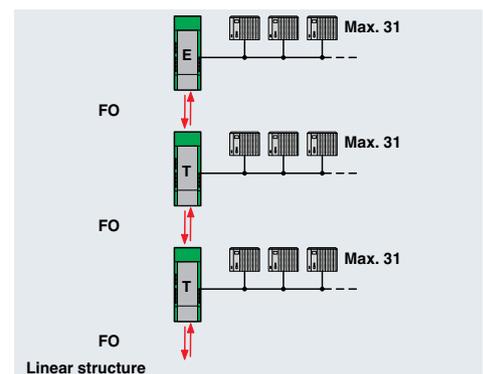
Test voltage

Ambient temperature range

Housing material

Dimensions

W / H / D





**PSI-MOS-PROFIB/FO 660...**

for PROFIBUS up to 12 mbps



**PSI-MOS-PROFIB/FO 850...**

for PROFIBUS up to 12 mbps

Housing width 35 Ex:

Type	Order No.	Pcs. Pkt.
PSI-MOS-PROFIB/FO 660 E	2708290	1
PSI-MOS-PROFIB/FO 660 T	2708287	1
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

24 V DC  $\pm$  25%  
85 mA  
PROFIBUS acc. to IEC 61158, RS-485 2-wire, half-duplex, auto-  
matic control  
UART (11 Bit, NRZ)  
9.6/19.2/45.45/93.75/187.5/500/1500/3000/6000/12000 kbps, au-  
tomatic detection, optional setting using a DIP switch  
Max. 1200 m (With shielded, twisted-pair data line depending on  
the data rate )  
D-SUB-9 female connector

Protocol-transparent to the RS-485 interface  
F-SMA  
660 nm  
Min. 70 m (With F-K 980/1000 230 dB/km with a quick mounting  
connector)  
Min. 400 m (with F-S 200/230 10 dB/km with quick mounting plug)

< 1 Bit  
60 V DC / 42 V AC , 1 A  
1.5 kV<sub>rms</sub> (50 Hz, 1 min)  
-20 °C ... 60 °C  
PA V0, color green  
35 mm / 105 mm / 99 mm

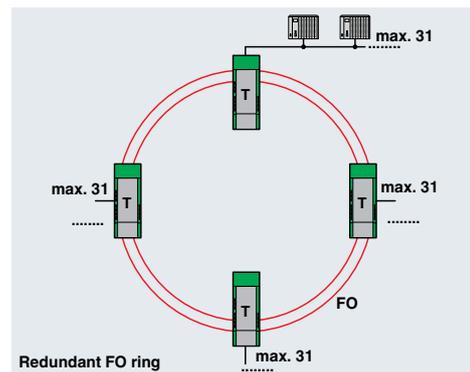
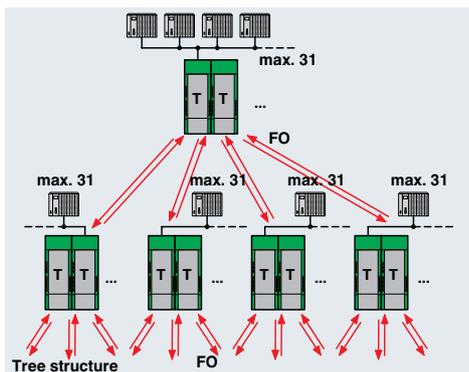
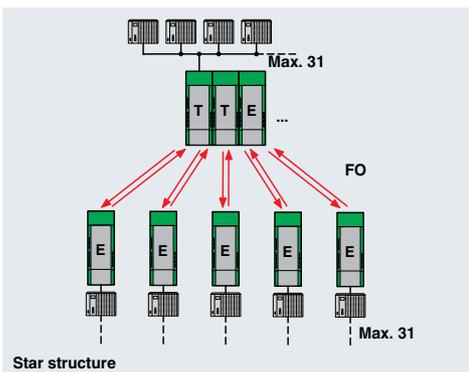
Housing width 35 Ex:

Type	Order No.	Pcs. Pkt.
PSI-MOS-PROFIB/FO 850 E	2708274	1
PSI-MOS-PROFIB/FO 850 T	2708261	1
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

24 V DC  $\pm$  25%  
100 mA  
PROFIBUS acc. to IEC 61158, RS-485 2-wire, half-duplex, auto-  
matic control  
UART (11 Bit, NRZ)  
9.6/19.2/45.45/93.75/187.5/500/1500/3000/6000/12000 kbps, au-  
tomatic detection, optional setting using a DIP switch  
Max. 1200 m (With shielded, twisted-pair data line depending on  
the data rate )  
D-SUB-9 female connector

Protocol-transparent to the RS-485 interface  
B-FOC  
850 nm  
Min. 800 m (with F-S 200/230 10 dB/km with quick mounting plug)  
Min. 2600 m (with F-G 50/125 2.5 dB/km)  
Min. 3300 m (with F-G 62,5/125 3.0 dB/km)

< 1 Bit  
60 V DC / 42 V AC , 1 A  
1.5 kV<sub>rms</sub> (50 Hz, 1 min)  
-20 °C ... 60 °C  
PA V0, color green  
35 mm / 105 mm / 99 mm



## INTERFACE Serial

### Optical fiber transmission

#### Fiber optic converters for RS-485 2-wire bus systems

FO data transfer is the first choice in demanding industrial applications if there is a need for maximum interference immunity and efficiency. In this way, high data rates combined with maximum distances are possible even where there is strong EMC interference. The data lines are also automatically protected against surge voltages and equalizing currents. If necessary, redundant networking topologies can also be realized for increased system availability.

- **SUCONET K**
- **MODBUS/MODBUS RTU,**
- **S-BUS**
- **DH-485**
- **and over 70 other proprietary bus systems.**

The conversion is made protocol-transparent for all common data rates up to max. 500 kbps. The integrated optical diagnostics allows permanent monitoring of the FO paths during installation and also during operation. If the signal efficiency on the fiber optic paths drops to a critical level, the floating switching contact is activated. This early alarm allows diagnosis of critical system states even before a failure occurs.

The **PSI-MOS-RS485W2/FO... termination devices E** realize conversion of an RS-485 interface to an **FO cable**. They are the ideal choice for point-to-point connections. With the **FO T-couplers PSI-MOS-RS 485W2/FO... T**, conversion to **two FO cables** becomes possible. This enables the realization of, for example, redundant point-to-point connections for increased system availability.

Modular assembly of star distributors is also possible using both device variants. In this case, the required devices are snapped onto DIN rail connectors, which ensure that the supply voltage and data signals are routed through.

The integrated bit retiming allows almost any desired cascable star and tree structures to be constructed, if necessary also in a redundant configuration. In this way, the user can bypass the restriction to pure line structures that exists when copper data cables are used.

Within a star coupler, devices with the different transmission technologies polymer, HCS and glass fiber can be mixed, but mixed connections are not possible. This gives the user a modular, scalable transmission technology for ranges of up to 30 km that can be optimally configured to meet needs.

The **PSI-MOS-RS485W2/FO 660...** devices are networked for distances of up to **100 m with polymer fiber cables** and for distances of up to **800 m with HCS fi-**

**ber cables**. The connection is made using F-SMA fast connection connectors that can be directly assembled on site within a few minutes. For longer distances, the **PSI-MOS RS485W2/FO 850...** devices are available, allowing distances of up to **2800 m with HCS fiber** and B-FOC fast connection technology, and **distances of up to 4200 m with multi-mode glass fiber**.

#### Description

**Terminal device**, for converting data signals from RS-485 2-wire to an **FO line**

- for polymer/HCS fiber
- for HCS / glass fiber (MM)

**T-coupler**, for converting data signals from RS-485 2-wire to **two FO lines**

- for polymer/HCS fiber
- for HCS / glass fiber (MM)

**DIN rail connector** (optional), for routing through of the supply voltage and data signal, two pieces are required per device

**DIN rail connector**, (optional), for routing through of the supply voltage, 2 required per device

**System power supply**, primary switched-mode

#### Technical data

Supply voltage

Nominal current consumption

RS-485 interface

Data format/coding

Termination resistor

Transmission speed

Transmission length

Connection method

Optical interface

Transmission protocol

Connection

Wavelength

Transmission length Incl. 3 dB system reserve

#### General data

Bit delay in standard operation

Alarm output

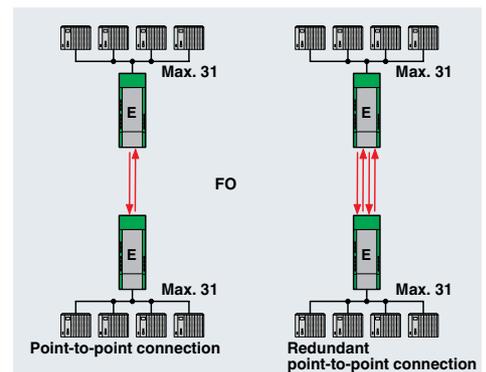
Test voltage

Ambient temperature range

Housing material

Dimensions

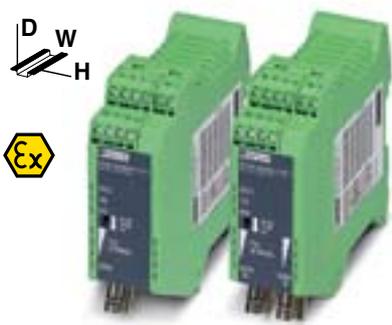
W / H / D





**PSI-MOS-RS485W2/FO 660...**

for RS-485 2-wire systems



**PSI-MOS-RS485W2/FO 850...**

for RS-485 2-wire systems

Housing width 35 Ex:

Type	Order No.	Pcs. Pkt.
PSI-MOS-RS485W2/FO 660 E	2708313	1
PSI-MOS-RS485W2/FO 660 T	2708300	1
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

24 V DC  $\pm$  25%  
85 mA  
RS-485 interface, 2-wire  
UART (11/10 bit switchable; NRZ), slip-tolerant  
220  $\Omega$  can be connected; pull up/down 390  $\Omega$   
4,8/ 9,6/ 19,2/ 38,4/ 57,6/ 75/ 93,75/ 115,2/ 136/ 187,5/ 375/ 500  
Max. 1200 m (depending on the data rate, with shielded, twisted data cable)  
Pluggable COMBICON screw connection

Protocol-transparent to the RS-485 interface  
F-SMA  
660 nm  
Min. 100 m (With F-K 980/1000 230 dB/km with a quick mounting connector)  
Min. 800 m (with F-S 200/230 10 dB/km with quick mounting plug)

< 1 Bit  
60 V DC / 42 V AC , 1 A  
1.5 kV<sub>rms</sub> (50 Hz, 1 min)  
-20 °C ... 60 °C  
PA V0, color green  
35 mm / 105 mm / 99 mm

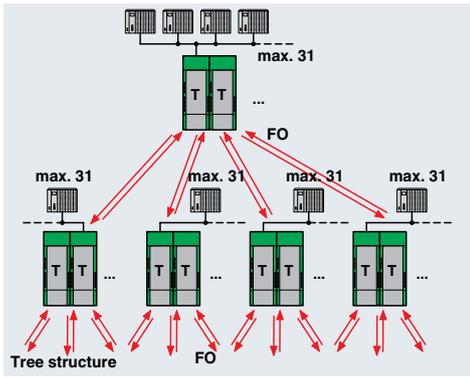
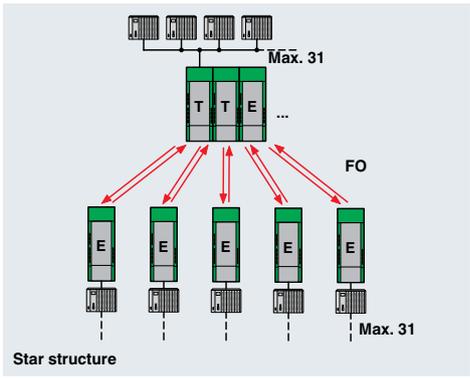
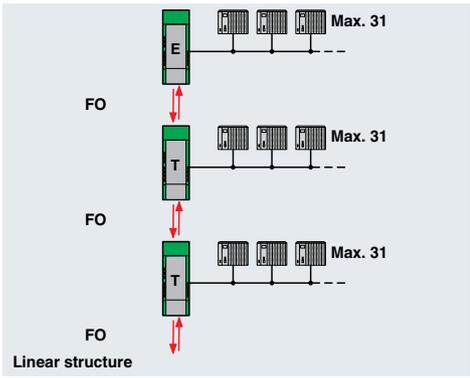
Housing width 35 Ex:

Type	Order No.	Pcs. Pkt.
PSI-MOS-RS485W2/FO 850 E	2708339	1
PSI-MOS-RS485W2/FO 850 T	2708326	1
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

24 V DC  $\pm$  25%  
100 mA  
RS-485 interface, 2-wire  
UART (11/10 bit switchable; NRZ), slip-tolerant  
220  $\Omega$  can be connected; pull up/down 390  $\Omega$   
4,8/ 9,6/ 19,2/ 38,4/ 57,6/ 75/ 93,75/ 115,2/ 136/ 187,5/ 375/ 500  
Max. 1200 m (depending on the data rate, with shielded, twisted data cable)  
Pluggable COMBICON screw connection

Protocol-transparent to the RS-485 interface  
B-FOC  
850 nm  
Min. 2800 m (With F-S 200/230 8 dB/km with quick mounting plug)  
Min. 4200 m (with F-G 50/125 2.5 dB/km)  
Min. 3300 m (with F-G 62,5/125 3.0 dB/km)

< 1 Bit  
60 V DC / 42 V AC , 1 A  
1.5 kV<sub>rms</sub> (50 Hz, 1 min)  
-20 °C ... 60 °C  
PA V0, color green  
35 mm / 105 mm / 99 mm



# INTERFACE Serial

## Optical fiber transmission

### FO converters for RS-422 (V.11), RS-485 4-wire

Data transfer via copper cables reaches its limits very quickly in an industrial environment. Particularly in applications with a high level of EMC interference, interference-free communication can only be achieved with great complexity in terms of shielding and surge protection.

Furthermore, for reasons of principle, the transmission range is limited at higher data rates, a fact which is an unacceptable limitation in many applications. Due to the electrical connection between the communication stations, transients and equalizing currents can occur across the data lines, which interfere with communication and, in extreme cases, can even cause damage to the connected devices.

For this reason, FO data transfer is the first choice in demanding industrial applications if there is a need for maximum interference immunity and efficiency. In this way, high rates combined with maximum distances are possible even where there is strong EMC interference. The data lines are also automatically protected against surge voltages and equalizing currents. If necessary, redundant networking topologies can also be realized for increased system availability.

The PSI-MOS-RS422/FO... devices convert the RS-422 interfaces to fiber optics. The conversion is made protocol-transparent for all data rates up to max. 2 mbps. The integrated optical diagnostics allows permanent monitoring of the FO paths during installation and also during operation. If the signal efficiency on the fiber optic paths drops to a critical level, the floating switching contact is activated. This early alarm allows diagnosis of critical system states even before a failure occurs.

The **termination devices PSI-MOS-RS422/FO...E** convert an RS-422 interface to an **FO cable**. They are the ideal choice for point-to-point connections. With the **T-couplers PSI-MOS-RS422/FO...T**, conversion to **two FO cables** becomes possible. This enables the realization of, for example, redundant point-to-point connections.

Multipoint networks can also be established. These can be configured as line, star and even redundant star structures. The star distributors can be put together as modules from PSI-MOS-RS422/FO...T T-couplers and PSI-MOS-RS422/FO...E terminal devices to precisely match the channels. In this case, the required devices are snapped onto DIN rail connectors, which automatically ensure that the supply voltage and data signals are routed through.

The supply voltage can also be fed in redundantly if necessary. The system power

supply MINI-SYS-PS 100-240AC/24DC/1.5 is available as an option for this purpose and can be seamlessly integrated into the modular star coupler concept. If RS-422 terminal devices are used, a terminal device can be connected to every PSI-MOS-RS422/FO... device with the RS-422 interface. If devices with an RS-485 4-wire interface are used, it is even possible to connect up to 31 slave devices to an FO converter in the form of a master-slave network. In both cases of course, a suitable communication protocol is required (e.g. MODBUS) that realizes addressing of the end stations.

Within a star coupler, devices with the different transmission technologies polymer, HCS and glass fiber can be mixed, but mixed connections are not possible. This gives the user a modular, scalable transmission technology for ranges of up to 30 km that can be optimally configured meet needs.

The **PSI-MOS-RS422/FO 660...** devices are networked for distances of up to **100 m with polymer fiber cables** and with HCS fiber cables for distances of up to **800 m**. The connection is made using F-SMA fast connection connectors that can be directly assembled on site within a few minutes. For longer distances, the **PSI-MOS-RS422/FO 850...** devices are available, allowing distances of up to **2800 m with HCS fiber** and B-FOC fast connection technology, and **distances of up to 4800 m with multimode glass fiber**.

#### Description

**Terminal device**, for converting data signals from RS-422 (V.11) /RS-485 4-wire to an **FO line**

- for polymer/HCS fiber
- for HCS / glass fiber (MM)

**T-coupler**, for converting data signals from RS-422 (V.11) /RS-485 4-wire to **two FO lines**

- for polymer/HCS fiber
- for HCS / glass fiber (MM)

**DIN rail connector** (optional), for routing through of the supply voltage and data signal, two pieces are required per device

**DIN rail connector**, (optional), for routing through of the supply voltage, 2 required per device

**System power supply**, primary switched-mode

#### Technical data

Supply voltage

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 in standard operation

Alarm output

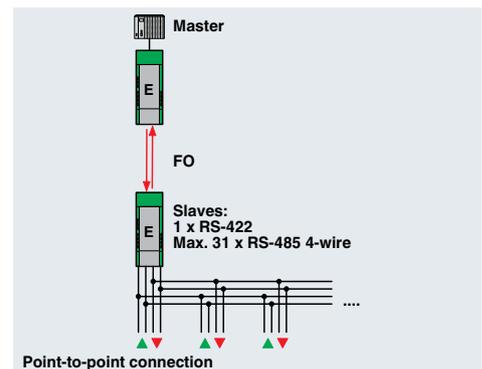
Test voltage

Ambient temperature range

Housing material

Dimensions

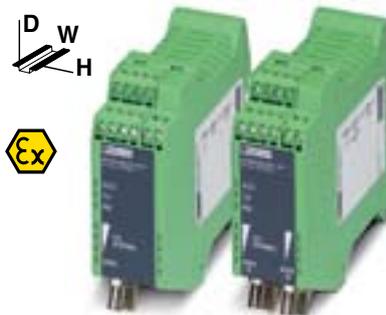
W / H / D





**PSI-MOS-RS422/FO 660...**

for RS-422, RS-485-4-wire



**PSI-MOS-RS422/FO 850...**

for RS-422, RS-485-4-wire

Housing width 35 Ex:

Type	Order No.	Pcs. Pkt.
PSI-MOS-RS422/FO 660 E	2708342	1
PSI-MOS-RS422/FO 660 T	2708384	1
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

24 V DC  $\pm$  25%  
Max. 130 mA  
RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1  
Max. 1000 m (depending on the data rate, with shielded, twisted data cable)  
Pluggable COMBICON screw connection

F-SMA  
660 nm  
Min. 100 m (With F-K 980/1000 230 dB/km with a quick mounting connector)  
Min. 800 m (with F-S 200/230 10 dB/km with quick mounting plug)

< 1 Bit  
60 V DC / 42 V AC , 1 A  
1.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-20 °C ... 60 °C  
PA V0, color green  
35 mm / 105 mm / 99 mm

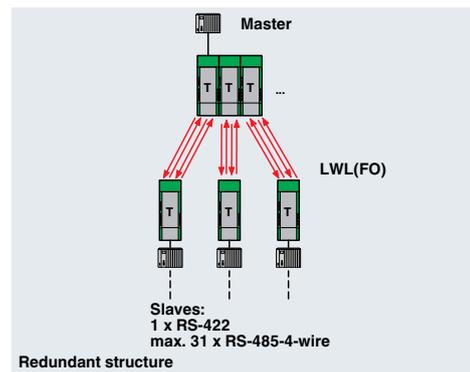
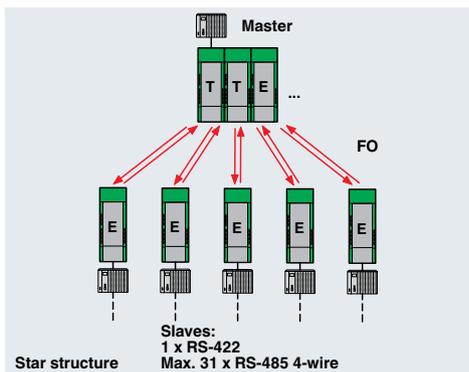
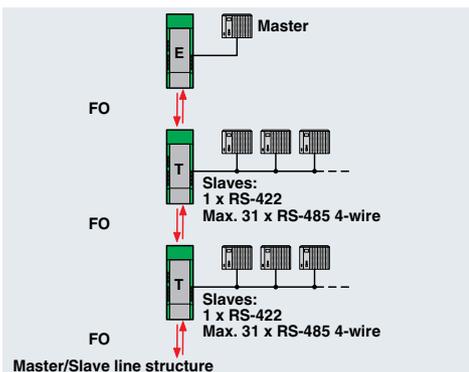
Housing width 35 Ex:

Type	Order No.	Pcs. Pkt.
PSI-MOS-RS422/FO 850 E	2708355	1
PSI-MOS-RS422/FO 850 T	2708397	1
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

24 V DC  $\pm$  25%  
Max. 130 mA  
RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1  
Max. 1000 m (depending on the data rate, with shielded, twisted data cable)  
Pluggable COMBICON screw connection

B-FOC  
850 nm  
Min. 2800 m (With F-S 200/230 8 dB/km with quick mounting plug)  
Min. 4200 m (with F-G 50/125 2.5 dB/km)  
Min. 4800 m (with F-G 62,5/125 3.0 dB/km)

< 1 Bit  
60 V DC / 42 V AC , 1 A  
1.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-20 °C ... 60 °C  
PA V0, color green  
35 mm / 105 mm / 99 mm



## INTERFACE Serial

### Optical fiber transmission

#### Fiber optic converters for RS-232 (V.24)

The RS-232 is one of the most widespread serial communication interfaces. It is used very often as a programming and parameterization interface in controllers, I/O modules and various other applications.

Due to its electrical properties, however, the 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 RS-232 interface to fiber optics. The conversion is made protocol-transparent for all data rates up to 115.2 kbps. They were developed specially for industrial conditions. The integrated optical diagnostics allows permanent monitoring of the fiber optic paths during installation and also during operation. If the signal efficiency on the fiber optic paths drops to a critical level, the floating switching contact is activated. This early alarm allows diagnosis of critical system states even before a failure occurs.

The **termination devices PSI-MOS-RS232/FO...E** convert an RS-232 interface to **one FO cable**. They are the ideal choice for point-to-point connections. With the **FO T-couplers PSI-MOS-RS232/FO...T**, conversion to **two FO cables** becomes possible. This enables the realization of, for example, redundant point-to-point connections.

When addressable RS-232 devices are used (e.g. mini PLCs) along with a suitable communication protocol (e.g. MODBUS), it is also possible to establish multipoint networks. These can be implemented as line, star and even redundant star structures. The star distributors can be put together as a module from PSI-MOS-RS232/FO...T T-couplers and PSI-MOS-RS232/FO...E termination devices to precisely match the channels. In this case, the required devices are snapped onto DIN rail connectors, which ensure that the supply voltage and data signals are routed through.

The supply voltage can also be fed in redundantly if necessary. The system power supply MINI-SYS-PS 100-240AC/24DC/1.5 is available as an option for this purpose and can be seamlessly integrated into the modular star coupler concept.

Within a star coupler, devices with the different transmission technologies polymer, HCS and glass fiber can be mixed, but mixed connections are not possible. This gives the user a modular, scalable transmission technology for ranges of up to 30 km

that can be optimally configured meet needs.

The **PSI-MOS-RS232/FO 660...** devices are networked for distances of **up to 100 m with polymer fiber cables** and with HCS fiber cables for distances of **up to 800 m**. The connection is made using F-SMA fast connection connectors that can be directly assembled on site within a few minutes.

For longer distances, the **PSI-MOS-RS232/FO 850...** devices are available, allowing distances of **up to 2800 m with HCS fiber** and B-FOC fast connection technology and **distances of up to 4800 m with multimode glass fiber**.

The **PSI-MOS-RS232/FO 1300 E** device is used for maximum distances. With the **multi-mode glass fiber, distances of up to 15 km** and with the **single-mode fiber, distances of up to 30 km** can be attained.

#### Description

**Terminal equipment**, for converting data signals from RS-232 (V.24) to an FO line

- for polymer/HCS fiber
- for HCS / glass fiber (MM)

**T-coupler**, for converting data signals from RS-232 (V.24) to two FO lines

- for polymer/HCS fiber
- for HCS / glass fiber (MM)

**DIN rail connector** (optional), for routing through of the supply voltage and data signal, two pieces are required per device

**DIN rail connector**, (optional), for routing through of the supply voltage, 2 required per device

**System power supply**, primary switched-mode

#### Technical data

Supply voltage

Nominal current consumption

RS-232 Interface

Transmission length

Connection method

Optical interface

Connection

Wavelength

Transmission length Incl. 3 dB system reserve

#### General data

Bit delay in standard operation

Alarm output

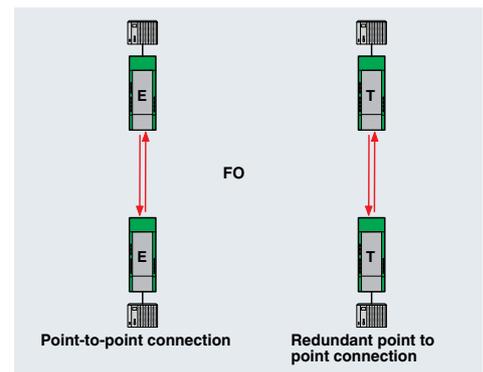
Test voltage

Ambient temperature range

Housing material

Dimensions

W / H / D





**PSI-MOS-RS232/FO 660....**

For RS-232 up to 115.2 kbps



**PSI-MOS-RS232/FO 850...**

For RS-232 up to 115.2 kbps

Housing width 35 Ex:

Type	Order No.	Pcs. Pkt.
PSI-MOS-RS232/FO 660 E	2708368	1
PSI-MOS-RS232/FO 660 T	2708410	1
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

24 V DC  $\pm$  25%  
85 mA  
RS-232 interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1  
15 m  
D-SUB-9 male connector

F-SMA  
660 nm  
Min. 100 m (With F-K 980/1000 230 dB/km with a quick mounting connector)  
Min. 800 m (with F-S 200/230 10 dB/km with quick mounting plug)

< 1 Bit  
60 V DC / 42 V AC , 1 A  
1.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-20 °C ... 60 °C  
PA V0, color green  
35 mm / 105 mm / 99 mm

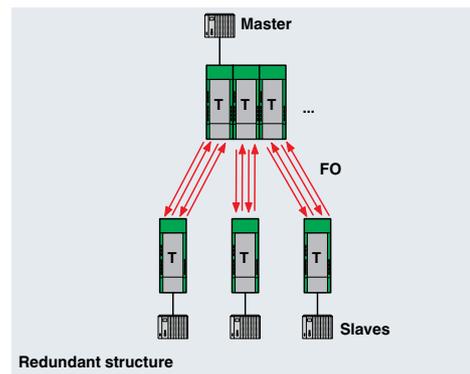
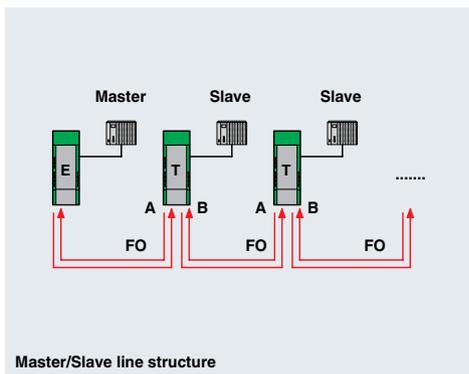
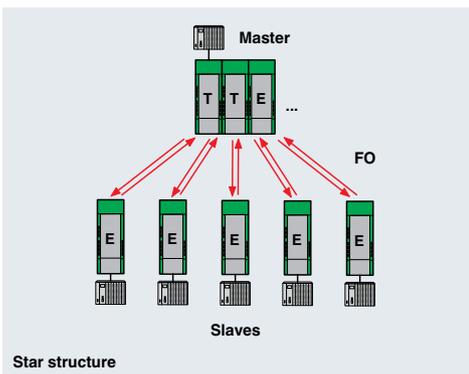
Housing width 35 Ex:

Type	Order No.	Pcs. Pkt.
PSI-MOS-RS232/FO 850 E	2708371	1
PSI-MOS-RS232/FO 850 T	2708423	1
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

24 V DC  $\pm$  25%  
100 mA  
RS-232 interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1  
15 m  
D-SUB-9 male connector

B-FOC  
850 nm  
Min. 2800 m (With F-S 200/230 8 dB/km with quick mounting plug)  
Min. 4200 m (with F-G 50/125 2.5 dB/km)  
Min. 4800 m (with F-G 62,5/125 3.0 dB/km)

< 1 Bit  
60 V DC / 42 V AC , 1 A  
1.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-20 °C ... 60 °C  
PA V0, color green  
35 mm / 105 mm / 99 mm



**FO converter for DeviceNet, CAN and CANopen**

With the PSI-MOS... fiber optics transmission system, simple and interference-free networking through fiber optics is possible for DeviceNet, CAN and CANopen users. The particular advantage is the floating connection of the bus devices. Mutual interference due to compensating currents and electromagnetic interference on the bus cables is thus a thing of the past. Even bus line short circuits now only affect the particular potential segment. This means: increased overall availability plus higher flexibility in the design of the bus topology. The use of fiber optic technology enables the realization of longer branch lines, as well as star and tree structures.

**The concept**

The new PSI-MOS... fiber optic transmission system is a modular system. PSI-MOS allows the configuration of a fiber optic star coupler to be adapted to the required number of channels. This can be individually assembled from up to 20 modules. The cross connection between the modules is created automatically by aligning them via the integrated system foot.

**The basic module PSI-MOS.../BM**

is used both as a head station in a modular fiber optics star coupler as well as in a stand-alone operation at the end of the star line. In addition, a pure point-to-point connection can be established between two bus devices with this module.

The basic module has one interface in acc. with ISO/IS 11898 for all CAN-based bus systems. The bus connection is made using a pluggable screw terminal block. The bus termination resistor is already integrated and can be connected. Two device versions are available: For fiber optics connections up to 800 m, we recommend using the cheaper version PSI-MOS...FO 660/BM. The optical interface offers ranges up to 100 m using polymer fiber and up to 800 m using HCS fiber. Both fibers are characterized by their particularly easy, fast connection method following the international F-SMA standard.

To cover fiber optics distances up to several kilometers, the basic module PSI-MOS...FO 850/BM is used. With the easy-to-assemble HCS fibers, it also enables ranges of up to 2800 m and – with multimode glass fibers – up to 4800 m. The connection method here is the B-FOC (ST®) standard.

The devices are selected on the basis of the fiber optics transmission distance and speed to be attained.

The device is supplied with 10 V DC to 48 V DC using a pluggable screw terminal block.

**Network expansion**

The maximum possible network expansion basically depends on the data rate used. Besides, the maximum network expansion must correspond to the sum of all copper and fiber optics lines. Other project planning guidelines are given in the data sheet of the modules.

**The extension module PSI-MOS.../EM**

in combination with a basic module makes it possible to vary the structure of a fiber optic star coupler with up to 20 fiber optic ports. Again, two versions are available for polymer, HCS and glass fiber depending on the desired range: PSI-MOS...FO 660/EM for distances up to 800 m and PSI-MOS...FO 850/EM for distances up to 4800 m. Both versions can be operated together in a star coupler arrangement. However, the remote station (at the end of the star line) must be designed with a basic module equipped with the same technology (660 nm or 850nm).

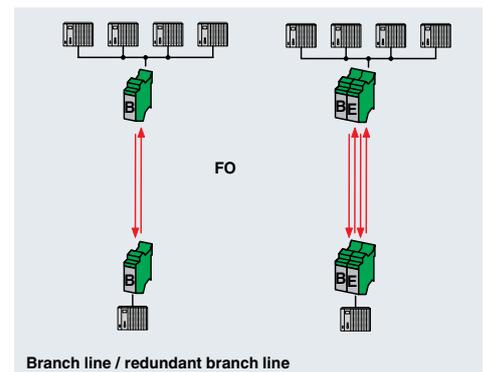
**FO path monitoring and diagnostics**

The path diagnostics function integrated in all modules is a particular advantage when it comes to operational reliability and system availability. It gives detailed information about the signal quality of the FO path. The optical "performance budget" is displayed as an LED bar graph. Continuous monitoring not only simplifies the startup – calibration of the fiber optics paths becomes unnecessary – it also provides permanent information about remaining system reserves during operation. Once the performance limit is reached, an early warning is emitted via a floating switching output.

**Redundancy**

Where very high system availability is required, the system makes it possible for the first time to design CAN-based transmission systems redundantly. Redundancy applies to both the fiber optic devices and the fiber optic cables. If one fiber optics path fails, the function is automatically performed by the neighboring fiber optics path. If it is also necessary to integrate the voltage supply in the redundancy concept, a second source of supply must be simply connected to an extension module of the star coupler arrangement.

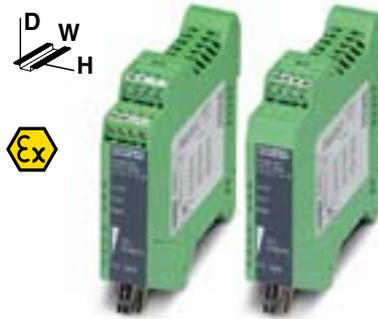
Description	
<b>Basic module</b> for conversion of the CAN-based interface to a <b>fiber optics interface</b>	
- for polymer/HCS fiber	
- for HCS / glass fiber (MM)	
<b>Extension module</b> with a fiber optics interface	
- for polymer/HCS fiber	
- for HCS / glass fiber (MM)	
<b>Technical data</b>	
Supply 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	
<b>General data</b>	
Bit delay in standard operation	
Alarm output	
Test voltage	
Ambient temperature range	
Housing material	
Dimensions	W / H / D





**PSI-MOS-DNET CAN/FO 660/...**

For DeviceNet, CAN, CANopen



**PSI-MOS-DNET CAN/FO 850/...**

For DeviceNet, CAN, CANopen

Housing width 22.5

Ex:

Type	Order No.	Pcs. Pkt.
PSI-MOS-DNET CAN/FO 660/BM	2708054	1
PSI-MOS-DNET CAN/FO 660/EM	2708067	1

10 V DC ... 48 V DC  
Max. 100 mA  
CAN interface, in accordance with ISO/IS 11898 for DeviceNet, CAN, CANopen  
120 Ω, integrated connection in the basic module  
Maximum 800 kbps  
Max. 5000 m (Dependent on the data rate and the protocol used)  
Pluggable COMBICON screw connection

F-SMA  
660 nm  
Min. 100 m (With F-K 980/1000 230 dB/km with a quick mounting connector)  
Min. 800 m (with F-S 200/230 10 dB/km with quick mounting plug)

< 1 Bit  
60 V DC / 42 V AC , 1 A  
1.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-20 °C ... 60 °C  
PA 6.6-FR  
22.5 mm / 114.5 mm / 99 mm

Housing width 22.5

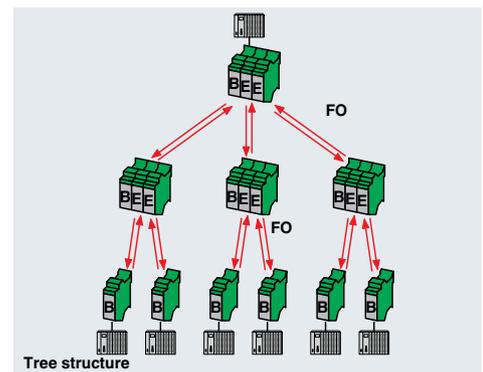
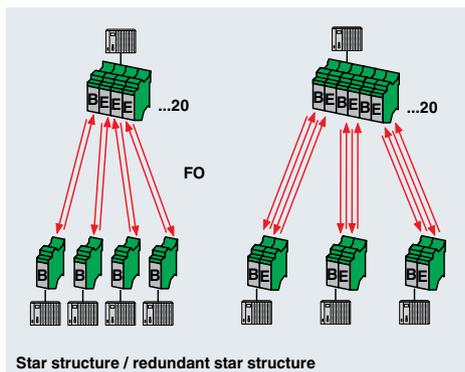
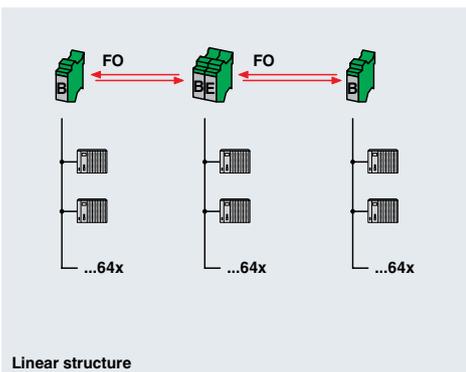
Ex:

Type	Order No.	Pcs. Pkt.
PSI-MOS-DNET CAN/FO 850/BM	2708083	1
PSI-MOS-DNET CAN/FO 850/EM	2708096	1

10 V DC ... 48 V DC  
100 mA  
CAN interface, in accordance with ISO/IS 11898 for DeviceNet, CAN, CANopen  
120 Ω, integrated connection in the basic module  
Maximum 800 kbps  
Max. 5000 m (Dependent on the data rate and the protocol used)  
Pluggable COMBICON screw connection

B-FOC  
850 nm  
Min. 2800 m (With F-S 200/230 8 dB/km with quick mounting plug)  
Min. 4200 m (with F-G 50/125 2.5 dB/km)  
Min. 4800 m (with F-G 62,5/125 3.0 dB/km)

< 1 Bit  
60 V DC / 42 V AC , 1 A  
1.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-20 °C ... 60 °C  
PA 6.6-FR  
22.5 mm / 114.5 mm / 99 mm



# INTERFACE Serial

## Factory Line Ethernet infrastructure

### Ethernet Factory Line COM SERVER



With the new **FL COM SERVER...**, serial RS-232/485 interfaces that are not network-capable can be linked to existing 10/100 BASE-T(X) Ethernet networks simply and conveniently.

With just one device it is possible to realize a wide range of possible applications. The main ones are:

- Network integration of serial devices via sockets or free COM redirector software for programming, visualizing and for data acquisition.

The COM redirector software redirects the application programs on Windows PCs, that are only able to communicate via serial COM ports, to the network card. It is thus possible to address automation units that are not network-capable via the network as if these devices were connected directly to the serial port of the PC.

- A substitute for cables for serial point-to-point connections without having to take into account any restrictions regarding the range,
- Modbus-TCP networking of Modbus masters/slaves with ASCII or RTU protocol,
- Networking of RS-232/RS-485 devices using variable address evaluation,
- Remote Access in remote networks or telephone connections (long-distance data transmission).

This means that remote servicing and diagnostics of distant network devices becomes as simple as dialing into Internet at home.

With the variant **FL COM SERVER...PRO**, the user can solve special application tasks himself with the help of the programmable operating system. With a few lines of program code, versatile application options can be developed, e.g.:

- Preprocessing the data current and handing over, e.g. the min./max. values,
- Preparation and making available data on web pages with the integrated web server,

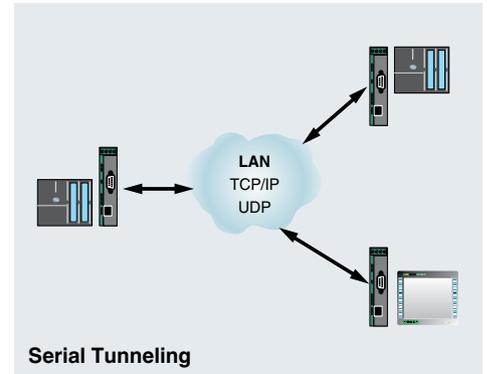
- Local solution of small control tasks with MODBUS-I/Os,
- Protocol adaptation of old serial devices to modern systems,
- Monitoring and controlling the connected serial devices with SNMP.

The programming is done with BCL, a BASIC variant with special functions for serial data transmission, the possibility to read and write MODBUS registers as well as a Universal MIB with 1000 Integer values.

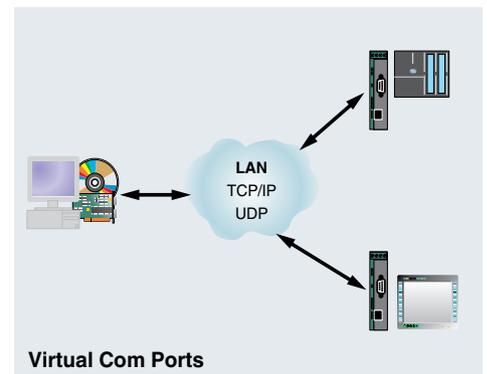
For managing programming tasks, contact to a software partner can be arranged on request.

The **FL COM SERVER...** has been specially developed for industrial applications in the control cabinet. It is characterized by the following features:

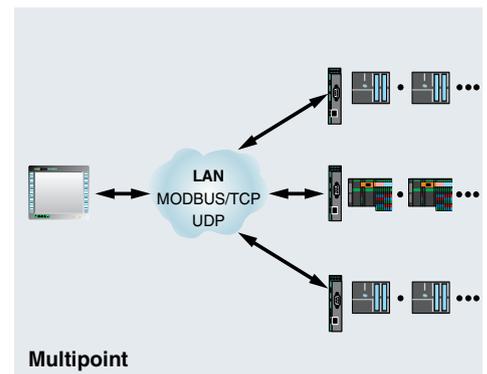
- Redundant voltage supply and modular station configuration possible with DIN rail connector,
- High-grade 3-way electrical isolation VCC // RS-232/485 // Ethernet,
- Integration in network management tools and visualization systems with the support of SNMP services,
- Comprehensive diagnostics displays,
- Simple configuration with web-based management, incl. password protection,
- Configuration settings for serial applications can be carried out by upload or download.



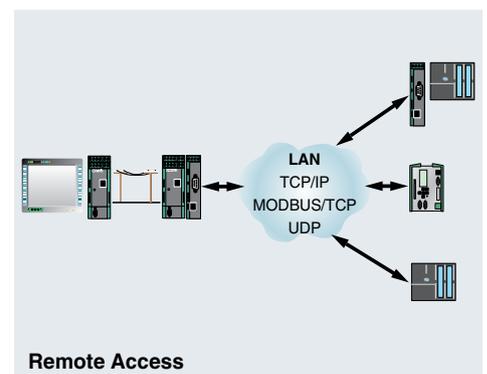
Serial Tunneling



Virtual Com Ports



Multipoint



Remote Access



Ethernet



### FL COM SERVER RS232

Serial RS-232 device server for 10/100Base-T(X)



Ethernet



### FL COM SERVER RS485

Serial device server for 10/100Base-T(X)

Description		Housing width 22.5		
Type	Order No.	Pcs. Pkt.	Ex:	
<b>FL COM SERVER</b> , to convert a serial interface to Ethernet, incl. CD-ROM with drivers, additional software and user documentation (PDF) RS-232	<b>FL COM SERVER RS232</b>	<b>2744490</b>	<b>1</b>	
<b>FL COM SERVER</b> , to convert a serial interface to Ethernet, incl. CD-ROM with drivers, additional software and user documentation (PDF) RS-485				
<b>RS-232-SUB-D cable</b> , length: 2 m - 9-pos. socket on 9-pos. socket - 9-pos. socket on 25-pos. socket	<b>PSM-KA9SUB9/BB/2METER</b> <b>PSM-KA 9 SUB 25/BB/2METER</b>	<b>2799474</b> <b>2761059</b>	<b>1</b> <b>1</b>	
<b>SUB-D connector</b> , with screw connection - 9-pos., socket - 9-pos., pin	<b>SUBCON 9/F-SH</b> <b>SUBCON 9/M-SH</b>	<b>2761499</b> <b>2761509</b>	<b>1</b> <b>1</b>	
<b>RS-232 zero modem connector</b>	<b>PSM-AD-D9-NULLMODEM</b>	<b>2708753</b>	<b>1</b>	
<b>DIN rail connector</b>	<b>ME 22,5 TBUS 1,5/ 5-ST-3,81 GN</b>	<b>2707437</b>	<b>50</b>	
<b>System power supply</b> , primary switched-mode	<b>MINI-SYS-PS-100-240AC/24DC/1.5</b>	<b>2866983</b>	<b>1</b>	
<b>Technical data</b>				
<b>Power supply</b>				
Supply voltage	24 V DC $\pm 20\%$ (via pluggable 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	Max. 100 mA			
<b>Serial port</b>				
Interfaces	RS-232			
Connection method	SUB-D 9 (male)			
Data format/coding	Serial asynchronous UART/NRZ, 7/8 Data, 1/2 Stop, 1 Parity, 10/11 bits character length			
Data flow control/protocols	Software handshake, Xon/Xoff, or hardware handshake RTS/CTS // 3964 R compatible, Modbus RTU/ASCII			
Transmission speed	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 187500 Bit/s, can be set with web-based management			
Termination resistor	-			
<b>Ethernet interface</b>				
Connection method	RJ45 female connector, shielded			
Transmission speed	10/100 MBit/s			
Transmission length	100 m (shielded twisted pair)			
Supported protocols	TCP/IP, UDP, TFTP, HTTP, MODBUS TCP, PPP			
Auxiliary protocols	ARP, DHCP, BOOTP, SNMP, RIP, RARP			
<b>Functions</b>				
Management	Web-based management, SNMP or Factory Manager Software FL SWT			
Diagnostic and Status Indicators	LEDs: UL (communication voltage), AC (data activity RS-232), FD (full duplex): 100 (100Base-T (X) operation), COL (collision) link and receive LED for Ethernet port			
<b>General data</b>				
Ambient temperature (operation)	0 °C ... 55 °C			
Electrical isolation	Supply // Ethernet (TP) // RS-232			
Test voltage	1.5 kV <sub>rms</sub> (50 Hz, 1 min.)			
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC			
Dimensions	W / H / D 22.5 mm / 118.6 mm / 99 mm			

Description		Housing width 22.5		
Type	Order No.	Pcs. Pkt.	Ex:	
<b>FL COM SERVER</b>	<b>FL COM SERVER RS485</b>	<b>2708740</b>	<b>1</b>	
<b>PSM-KA9SUB9/BB/2METER</b> <b>PSM-KA 9 SUB 25/BB/2METER</b>	<b>2799474</b> <b>2761059</b>	<b>1</b> <b>1</b>		
<b>SUBCON 9/F-SH</b> <b>SUBCON 9/M-SH</b>	<b>2761499</b> <b>2761509</b>	<b>1</b> <b>1</b>		
<b>PSM-AD-D9-NULLMODEM</b>	<b>2708753</b>	<b>1</b>		
<b>ME 22,5 TBUS 1,5/ 5-ST-3,81 GN</b>	<b>2707437</b>	<b>50</b>		
<b>MINI-SYS-PS-100-240AC/24DC/1.5</b>	<b>2866983</b>	<b>1</b>		
<b>Technical data</b>				
<b>Power supply</b>				
Supply voltage	24 V DC $\pm 20\%$ (via pluggable 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	Max. 100 mA			
<b>Serial port</b>				
Interfaces	RS-485 2-wire			
Connection method	SUB-D 9 (male)			
Data format/coding	Serial asynchronous UART/NRZ, 7/8 Data, 1/2 Stop, 1 Parity, 10/11 bits character length			
Data flow control/protocols	Automatic control // Modbus RTU/ASCII			
Transmission speed	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 187500 Bit/s, can be set with web-based management			
Termination resistor	390 $\Omega$ - 180 $\Omega$ - 390 $\Omega$ (can be connected)			
<b>Ethernet interface</b>				
Connection method	RJ45 female connector, shielded			
Transmission speed	10/100 MBit/s			
Transmission length	100 m (shielded twisted pair)			
Supported protocols	TCP/IP, UDP, TFTP, HTTP, MODBUS TCP, PPP			
Auxiliary protocols	ARP, DHCP, BOOTP, SNMP, RIP, RARP			
<b>Functions</b>				
Management	Web-based management, SNMP or Factory Manager Software FL SWT			
Diagnostic and Status Indicators	LEDs: UL (communication voltage), AC (data activity RS-485), FD (full duplex): 100 (100Base-T (X) operation), COL (collision) link and receive LED for Ethernet port			
<b>General data</b>				
Ambient temperature (operation)	0 °C ... 55 °C			
Electrical isolation	Supply // Ethernet (TP) // RS-485			
Test voltage	1.5 kV <sub>rms</sub> (50 Hz, 1 min.)			
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC			
Dimensions	W / H / D 22.5 mm / 118.6 mm / 99 mm			

**Analog Modems**



The analog V.92 modem **PSI-DATA/BASIC-MODEM/RS232** and the analog V.34 modem **PSI-DATA/FAX-MODEM/RS232** have been specially tailored to the industrial requirements of remote maintenance and alarm messaging.

The **PSI-DATA/...** DIN rail mountable analog modems allow worldwide access to machines and systems using dial-up line connections. The wide range of security functions, such as adjustable selective acceptance of calls, connection establishment with password protection, and call back function, protect the system against unauthorized access.

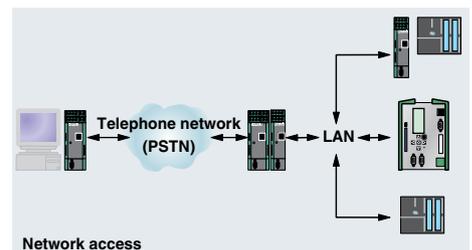
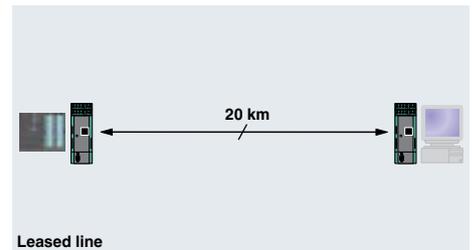
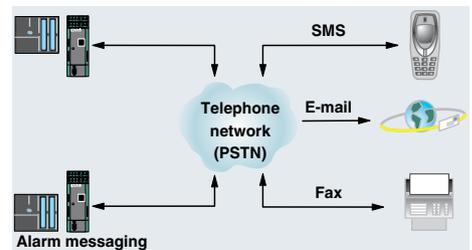
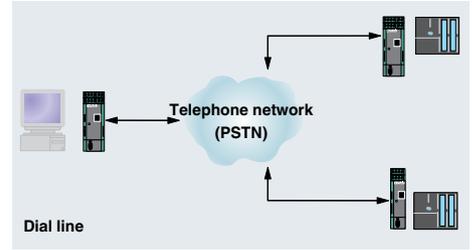
To guarantee interference-free operation even under difficult EMC conditions, the devices have high-grade galvanic isolation and integrated surge protection. The universal use of the modems is complemented by the integrated automatic battery-saving "Sleep" function and the particularly wide range of supply voltages.

Particularly valuable for remote system monitoring is the configurable warning or fault warning input of the **PSI-DATA/FAX-MODEM/RS232** modem. If this input is activated, the modem calls a user-defined number and sends a stored text message by fax or SMS.

The analog modems are approved for operation in the public telephone networks in Europe, USA and Canada. Further certifications are currently in preparation.

Startup of all modems is simple with Plug & Play and a convenient configuration software. The modems have been tested with the most common PLCs from various manufacturers and industrial PCs in numerous applications for remote monitoring.

The modems can be combined perfectly with the FL COM SERVER for remote control of Ethernet networks.





## PSI-DATA/FAX-MODEM

Analog modem for dial and leased line operation with alarm input and output

Housing width 35

Ex:

Description	Type	Order No.	Pcs. Pkt.
<b>Industrial analog modem</b> , scope of delivery: Modem, CD with configuration software, manual and RJ12/RJ12 cable	<b>PSI-DATA/FAX-MODEM/RS232</b>	<b>2708203</b>	<b>1</b>
<b>System power supply</b> , primary switched-mode	<b>MINI-SYS-PS-100-240AC/24DC/1.5</b>	<b>2866983</b>	<b>1</b>
<b>DIN rail connector</b> (optional), for routing through of the supply voltage and data signal, two pieces are required per device	<b>ME 17,5 TBUS 1,5/ 5-ST-3,81 GN</b>	<b>2709561</b>	<b>10</b>
<b>MPI adapter</b> for coupling to the programming interface of a Siemens-SIMATIC® S7 -300/400 control unit	<b>PSI-MPI/RS232-PC</b>	<b>2313148</b>	<b>1</b>
<b>Interface converter</b> for switching between two RS-232 interfaces	<b>PSI-MODEM-SPLITTER</b>	<b>2708766</b>	<b>1</b>
<b>RS-232-SUB-D cable</b> , length: 2 m	<b>PSM-KA9SUB9/BB/2METER</b>	<b>2799474</b>	<b>1</b>
<b>RS-232-SUB-D cable</b> , length: 0.5 m	<b>PSM-KA9SUB9/BB/0,5METER</b>	<b>2708520</b>	<b>1</b>
<b>Technical data</b>			
Power supply			
Supply voltage	10.8 V DC ... 60 V DC (via pluggable COMBICON screw terminal block)		
Supply voltage	16 V AC ... 40 V AC (via pluggable COMBICON screw terminal block)		
Supply voltage	24 V DC ±5% (as an alternative or redundant, via backplane bus contact and system current supply)		
Nominal current consumption	< 100 mA (at 24 V)		
Stand-by current consumption	< 40 mA		
<b>RS-232 Interface</b>			
Connection method	D-SUB-9 pin strip		
Data format/coding	Serial asynchronous UART/NRZ, 7/8 Data, 1/2 Stop, 1 Parity, 10/11 bits character length		
Data flow control/protocols	Software handshake, Xon/Xoff, direct mode 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		
<b>PSTN port (A/B line)</b>			
Connection method	RJ12, 6-pos., or pluggable COMBICON screw terminal block		
Dialing procedure	Multiple frequency/pulse dialing, configuration via software		
<b>Input/output</b>			
Switching input	U <sub>Nom</sub> 24 V DC / 5 mA, input range 9...48 V DC, floating		
Switching output	Miniature switching relay 60 V / 1 A, N/O contact		
<b>General data</b>			
Ambient temperature (operation)	0 °C ... 55 °C		
Electrical isolation	Supply // PSTN // RS-232		
Test voltage	1.5 kV		
Approvals for countries	EU, USA, Canada, other countries in preparation		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Dimensions	35 mm / 114.5 mm / 99 mm		

W / H / D

# INTERFACE Serial

## Wireless transmission

### PSI line

#### Bluetooth interface converter for RS-232, RS-422, RS-485 and USB



Wireless data transfer is particularly suitable for flexible and temporary data connections to changing communication modules or for addressing moving or mobile system components.

The international license-free radio standard Bluetooth™ is suitable for applications in industrial environments. Depending on the system concept, it is possible to realize wireless connections across distances of up to 150 m or more. This radio standard fulfills the requirements for interference-free data transfer via the so-called frequency hopping system (FHSS) in the 2.4 GHz ISM band. The permissible transmission capacity here is 100 mW (20 dBm).

The **PSI-WL Bluetooth interface converters** are used for converting the serial interfaces RS-232, RS-422, RS-485 or USB. With the Bluetooth converters, point-to-point and multipoint connections can be realized. Thus, they function as an economical, alternative, flexible cable substitute or as access point for Bluetooth-capable end devices for handling programming, parameterizing or diagnosis tasks via notebook.

The high demands on transmission security with relation to immunity to interference or manipulation will be ensured with the frequency hopping, password protection, data encryption, favorites lists etc.

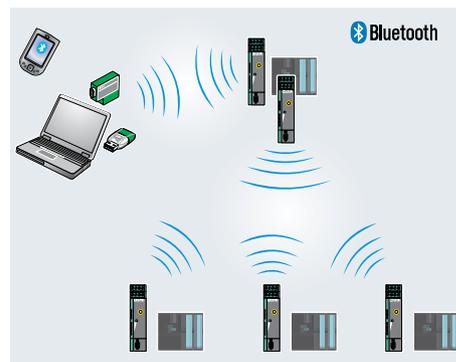
As early as when the radio link is established, the Bluetooth path diagnostics shows the quality of the connection. The transmission capacity can also be adjusted in PSI-WL-RS232-RS485/BT via a supplied software tool in order to adapt the spatial extent of the radio cell to meet individual requirements.

The **PSI-WL Bluetooth interface converters** are available in various device designs. The Bluetooth converter **PSI-WL-RS232-RS485/BT** is suitable for universal application and is the preferred solution in the control cabinet, using an external

antenna, and is characterized by the following performance characteristics:

- Mounting on EN mounting rail,
- Supply of 24 V DC or AC,
- Transmission rate up to 187.5 kbps,
- RS-232, RS-422, RS-485 adjustable,
- Supports all popular 10/11-bit UART data formats,
- 3964R-compatible,
- Range up to 150 m (with omnidirectional antenna),
- Bluetooth access protected by password, fixed device pairing or device access list,
- Scalable transmission capacity (-28...20 dBm) for specific, spatial limits of the radio cell,
- Integrated Bluetooth path diagnosis in the form of a bar chart display.

The PSI Bluetooth adapter **PSI-WL-PLUG-RS232/BT** and **PSI-WL-PLUG-USB/BT** are plugged directly into the serial interface and are supplied with 5 V through a separate plug-in power supply unit or directly through the USB connection. With the compact design and integrated antenna, these Bluetooth adapters are preferably used for mobile, temporary maintenance and diagnostic connections and offer excellent support as a quick and easy addition to the PSI Bluetooth adapter.



#### Description

**PSI-Bluetooth converter**, MCX connection for external antenna.  
**Scope of Supply:** PSI Bluetooth converter, CD with configuration software and user manual

**RS-232-SUB-D cable**, length: 2 m

- 9-pos. socket on 9-pos. socket
- 9-pos. socket on 25-pos. socket

**OMNI omnidirectional antenna**

**PANEL directional wireless antenna** (without cable)

**Antenna adapter cable**

**System power supply**, primary switched-mode

**DIN rail connector**

#### Technical data

Power supply

Supply voltage

Supply voltage

Supply voltage

Nominal current consumption

Serial port

Interfaces

Connection method

Data format/coding

Data flow control/protocols

Transmission speed

Termination resistor

Bluetooth interface

Interfaces

Antenna connection

Transmission power

Receiver sensitivity

Frequencies

Range depending on spatial conditions

Bluetooth Multidrop master / slave

General data

Ambient temperature (operation)

Electromagnetic compatibility

Dimensions

W / H / D



## PSI-WL-RS232-RS485/BT

PSI Bluetooth converter for DIN rail mounting, for wireless transmission of RS-232, RS-422 and RS-485 interfaces.

Housing width 22.5  Ex: 

Type	Order No.	Pcs. Pkt.
PSI-WL-RS232-RS485/BT	2708517	1
PSM-KA9SUB9/BB/2METER	2799474	1
PSM-KA 9 SUB 25/BB/2METER	2761059	1
RAD-ISM-2400-ANT-OMNI-2-1	2867461	1
RAD-ISM-2400-ANT-PAN-8-0	2867610	1
RAD-PIG-EF316-MCX-SMA	2867678	1
MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50

10 V DC ... 30 V DC (via pluggable COMBICON screw terminal block)

19 V AC ... 29 V AC (via pluggable COMBICON screw terminal block)

24 V DC  $\pm 20\%$  (as an alternative or redundant, via backplane bus contact and system current supply)

40 mA (for 24 V DC)

RS-232 RS-422, RS-485 2-wire

D-SUB-9 pin strip

Pluggable COMBICON screw terminal block

Serial asynchronous UART/NRZ, 7/8 Data, 1/2 Stop, 1 Parity, 10/11 bits character length

Software handshake, Xon/Xoff, or hardware handshake RTS/CTS, 3964 compatible

300, 1200, 2400, 4800, 7200, 9600, 19200, 31250, 38400, 57600, 75000, 93750, 115200, 136000, 187500 bps

390  $\Omega$  - 150  $\Omega$  - 390  $\Omega$  (can be connected)

Specification 2.0, class 1

External

-28 dBm to 20 dBm (adjustable)

-83.00 dBm

2.402 GHz ... 2.48 GHz (ISM bandwidth)

20 dBm (100 mW) = 80 m to 150 m

1/7

-20 °C ... 60 °C

Conformance with R&TTE directive 1999/5/EEC

22.5 mm / 114.5 mm / 99 mm

# INTERFACE Power Supply

## QUINT POWER

### Primary switched-mode power supply units

#### QUINT POWER 1~

The field of plant and special engineering offers tailor-made solutions for special application purposes. There are frequent system expansions during the course of the project in cooperation with the end customer. Of course the construction follows the specifications, but the customer calls for a high degree of flexibility in the project planning phase to be able to adapt the application ideally to his requirements. QUINT POWER with its comprehensive range of products is ideal as a universal power supply unit.



**QUINT 24 V DC/2.5 A**

1 AC



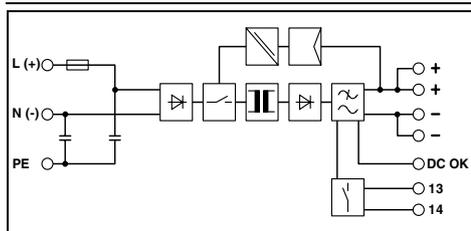
**QUINT 24 V DC/5 A**

1 AC



Width 55 mm

Ex:

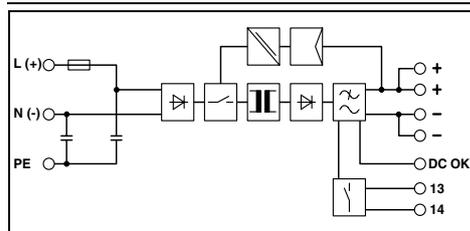


Connection data	solid [mm <sup>2</sup> ]	stranded [mm <sup>2</sup> ]	AWG	
Input	0.2-2.5	0.2-2.5	24-12	M 3
Output	0.2-2.5	0.2-2.5	24-12	M 3
Signal	0.2-2.5	0.2-2.5	24-12	M 3



Width 55 mm

Ex:



Connection data	solid [mm <sup>2</sup> ]	stranded [mm <sup>2</sup> ]	AWG	
Input	0.2-2.5	0.2-2.5	24-12	M 3
Output	0.2-2.5	0.2-2.5	24-12	M 3
Signal	0.2-2.5	0.2-2.5	24-12	M 3

Description
<b>Power supply unit</b> , primary switched-mode

Technical data
<b>Input data</b>
Input nominal voltage range
Input voltage range
Frequency range
Current consumption (nominal load)
Inrush current limitation at 25°C (typ.) / I <sub>pt</sub>
Mains buffering (I <sub>N</sub> , typ.)
Input fuse
Recommended backup fuse, LS switch
<b>Output data</b>
Nominal output voltage
Setting range of the output voltage
Output current / POWER BOOST
Can be connected in parallel / series
Max. power dissipation (idling/nominal load)
Efficiency (typ.)
Residual ripple
<b>Signaling</b>
Signaling DC OK
<b>General data</b>
Weight / Dimensions W x H x D
Installation position
Type of connection
Degree of protection / Class of protection
MTBF (at nominal load, 40°C)
Ambient temperature (operation)
<b>Standards/regulations</b>
Insulation voltage input/output
Electromagnetic compatibility
Electrical safety, safety transformer
Electronic equipm. for electrical power installations
Safe isolation
UL approvals
Limitation of harmonic line currents

Type	Order No.	Pcs. Pkt.
<b>QUINT-PS-100-240AC/24DC/2.5</b>	<b>2938578</b>	<b>1</b>

100 V AC ... 240 V AC
85 V AC ... 264 V AC / 90 V DC ... 350 V DC
45 Hz ... 65 Hz / 0 Hz
Approx. 0.86 A (120 V AC) / Approx. 0.47 A (230 V AC)
< 15 A / < 2.2 A <sup>2</sup> s
> 30 ms (120 V AC) / > 130 ms (230 V AC)
5 A (slow-blow, internal)
6 A, 10 A, 16 A -
24 V DC ±1%
22.5 V DC ... 28.5 V DC ( 60 W )
2.5 A / 3.75 A
Yes / Yes
2 W / 8 W
> 86 %
< 10 mV <sub>pp</sub>
LED, active switching output, relay contact
0.85 kg / 55 x 130 x 125 mm
Horizontal DIN rail NS 35, EN 60715
Can be aligned: Horizontal 0 cm, vertical 5 cm
COMBICON screw/plug connection
IP20 / I, with PE connection
> 500 000 h in acc. with IEC 61709 (SN 29500)
-25 °C ... 70 °C (> 60°C derating)
2 kV AC (routine test) / 4 kV AC (type test)
Conformance with EMC directive 89/336/EEC
EN 60950/VDE 0805 (SELV), EN 61558-2-17
EN 50178/VDE 0160 (PELV)
DIN VDE 0100-410, DIN VDE 0106-1010
UL/C-UL Recognized UL 60950, UL/C-UL listed UL 508, UL/C-UL Listed UL 1604 Class I, Division 2, Groups A, B, C, D
EN 61000-3-2

Type	Order No.	Pcs. Pkt.
<b>QUINT-PS-100-240AC/24DC/5</b>	<b>2938581</b>	<b>1</b>

100 V AC ... 240 V AC
85 V AC ... 264 V AC / 90 V DC ... 350 V DC
45 Hz ... 65 Hz / 0 Hz
Approx. 1.6 A (120 V AC) / Approx. 0.84 A (230 V AC)
< 15 A / < 2.5 A <sup>2</sup> s
> 30 ms (120 V AC) / > 130 ms (230 V AC)
5 A (slow-blow, internal)
6 A, 10 A, 16 A -
24 V DC ±1%
22.5 V DC ... 28.5 V DC ( 120 W )
5 A / 7.5 A
Yes / Yes
2 W / 14 W
> 89 %
< 10 mV <sub>pp</sub>
LED, active switching output, relay contact
0.83 kg / 55 x 130 x 125 mm
Horizontal DIN rail NS 35, EN 60715
Can be aligned: Horizontal 0 cm, vertical 5 cm
COMBICON screw/plug connection
IP20 / I, with PE connection
> 500 000 h in acc. with IEC 61709 (SN 29500)
-25 °C ... 70 °C (> 60°C derating)
2 kV AC (routine test) / 4 kV AC (type test)
Conformance with EMC directive 89/336/EEC
EN 60950/VDE 0805 (SELV), EN 61558-2-17
EN 50178/VDE 0160 (PELV)
DIN VDE 0100-410, DIN VDE 0106-1010
UL/C-UL Recognized UL 60950, UL/C-UL listed UL 508, UL/C-UL Listed UL 1604 Class I, Division 2, Groups A, B, C, D
EN 61000-3-2



## QUINT 24 V DC/10 A

1 AC



## QUINT 24 V DC/20 A

1 AC



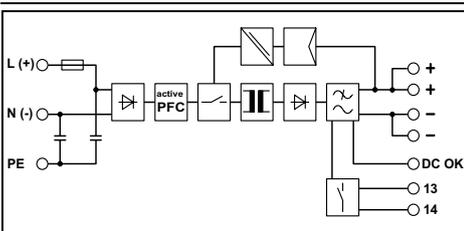
## QUINT 24 V DC/40 A

1 AC



Width 85 mm

Ex:



Connection data	solid [mm <sup>2</sup> ]	stranded [mm <sup>2</sup> ]	AWG	
Input	0.2-2.5	0.2-2.5	24-12	M 3
Output	0.2-2.5	0.2-2.5	24-12	M 3
Signal	0.2-2.5	0.2-2.5	24-12	M 3

Type	Order No.	Pcs. Pkt.
QUINT-PS-100-240AC/24DC/10	2938604	1

100 V AC ... 240 V AC  
85 V AC ... 264 V AC / 90 V DC ... 350 V DC  
45 Hz ... 65 Hz / 0 Hz  
Approx. 2.34 A (120 V AC) / Approx. 1.2 A (230 V AC)  
< 15 A / < 1.5 A<sup>2</sup>s  
> 50 ms (120 V AC) / > 50 ms (230 V AC)  
6.3 A (slow-blow, internal)  
10 A, 16 A -

24 V DC ±1%  
22.5 V DC ... 28.5 V DC (240 W)  
10 A / 15 A  
Yes / Yes  
2 W / 24 W  
> 91 %  
< 10 mV<sub>pp</sub>

LED, active switching output, relay contact

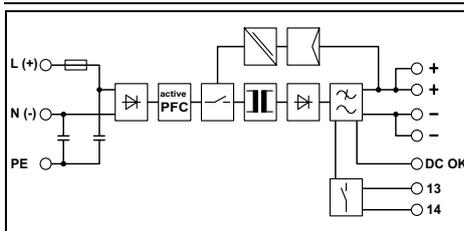
1.3 kg / 85 x 130 x 125 mm  
Horizontal DIN rail NS 35, EN 60715  
Can be aligned: Horizontal 0 cm, vertical 5 cm  
COMBICON screw/plug connection  
IP20 / I, with PE connection  
> 500 000 h in acc. with IEC 61709 (SN 29500)  
-25 °C ... 70 °C (> 60°C derating)

2 kV AC (routine test) / 4 kV AC (type test)  
Conformance with EMC directive 89/336/EEC  
EN 60950/VDE 0805 (SELV), EN 61558-2-17  
EN 50178/VDE 0160 (PELV)  
DIN VDE 0100-410, DIN VDE 0106-1010  
UL/C-UL Recognized UL 60950, UL/C-UL listed UL 508, UL/C-UL Listed UL 1604 Class I, Division 2, Groups A, B, C, D  
EN 61000-3-2



Width 157 mm

Ex:



Connection data	solid [mm <sup>2</sup> ]	stranded [mm <sup>2</sup> ]	AWG	
Input	0.2-6	0.2-4	24-10	M 3
Output	0.5-16	0.5-10	20-6	M 4
Signal	0.5-16	0.5-10	20-6	M 4

Type	Order No.	Pcs. Pkt.
QUINT-PS-100-240AC/24DC/20	2938620	1

100 V AC ... 240 V AC  
85 V AC ... 264 V AC / 90 V DC ... 350 V DC  
45 Hz ... 65 Hz / 0 Hz  
Approx. 4.76 A (120 V AC) / Approx. 2.3 A (230 V AC)  
< 15 A / < 3.2 A<sup>2</sup>s  
> 25 ms (120 V AC) / > 25 ms (230 V AC)  
12 A (slow-blow, internal)  
10 A, 16 A -

24 V DC ±1%  
22.5 V DC ... 28.5 V DC (480 W)  
20 A / 26 A  
Yes / Yes  
3 W / 44 W  
> 92 %  
< 10 mV<sub>pp</sub>

LED, active switching output, relay contact

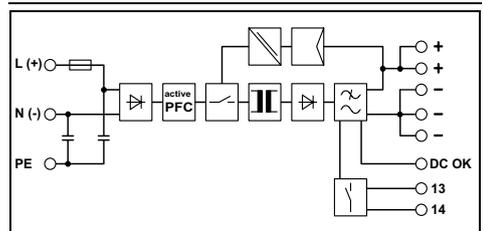
2.5 kg / 157 x 130 x 125 mm  
Horizontal DIN rail NS 35, EN 60715  
Can be aligned: Horizontal 0 cm, vertical 5 cm  
Screw connection  
IP20 / I, with PE connection  
> 500 000 h in acc. with IEC 61709 (SN 29500)  
-25 °C ... 70 °C (> 60°C derating)

2 kV AC (routine test) / 4 kV AC (type test)  
Conformance with EMC directive 89/336/EEC  
EN 60950/VDE 0805 (SELV), EN 61558-2-17  
EN 50178/VDE 0160 (PELV)  
DIN VDE 0100-410, DIN VDE 0106-1010  
UL/C-UL listed UL 508, UL/C-UL Recognized UL 60950, UL/C-UL Listed UL 1604 Class I, Division 2, Groups A, B, C, D  
EN 61000-3-2



Width 240 mm

Ex:



Connection data	solid [mm <sup>2</sup> ]	stranded [mm <sup>2</sup> ]	AWG	
Input	0.2-6	0.2-4	24-10	M 3
Output	0.5-16	0.5-10	20-6	M 4
Signal	0.2-6	0.2-4	24-10	M 3

Type	Order No.	Pcs. Pkt.
QUINT-PS-100-240AC/24DC/40	2938879	1

110 V AC ... 240 V AC  
85 V AC ... 264 V AC / 90 V DC ... 350 V DC  
45 Hz ... 65 Hz / 0 Hz  
Approx. 11 A (120 V AC) / Approx. 4.5 A (230 V AC)  
< 15 A / < 3.2 A<sup>2</sup>s  
> 20 ms (120 V AC) / > 20 ms (230 V AC)  
20 A (fast blow, internal)  
16 A, 25 A -

24 V DC ±1%  
22.5 V DC ... 29.5 V DC (960 W)  
40 A / 45 A  
Yes / Yes  
28 W / 80 W  
> 92 %  
< 30 mV<sub>pp</sub>

LED, active switching output, relay contact

3.5 kg / 240 x 130 x 125 mm  
Horizontal DIN rail NS 35, EN 60715  
Can be aligned: Horizontal 0 cm, vertical 5 cm  
Screw connection  
IP20 / I, with PE connection  
> 500 000 h in acc. with IEC 61709 (SN 29500)  
-25 °C ... 70 °C (> 60°C derating)

2 kV AC (routine test) / 3 kV AC (type test)  
Conformance with EMC directive 89/336/EEC  
EN 60950/VDE 0805 (SELV), EN 61558-2-17  
EN 50178/VDE 0160 (PELV)  
DIN VDE 0100-410, DIN VDE 0106-1010  
UL/C-UL listed UL 508, UL/C-UL Recognized UL 60950, UL/C-UL Listed UL 1604 Class I, Division 2, Groups A, B, C, D  
EN 61000-3-2

# INTERFACE Power Supply

## QUINT POWER

### Primary switched-mode power supply units

#### QUINT POWER 3~

Starting heavy loads with high inrush currents reliably using POWER BOOST power reserve.

The loads to be supplied are not always known during project planning. As this may involve capacitive loads with high inrush currents, the power reserve of the power supply units is advantageous. This starts the consumer with high inrush currents without a voltage dip and is available permanently at an ambient temperature of up to 40 °C and for a few minutes at 60 °C.

High system availability of all 3-phase devices, even if one phase fails permanently.

Permanent 2-phase operation increases the operational reliability of the 3-phase devices. If the input of the current supply is provided with only two phases, QUINT POWER provides the entire output power permanently.



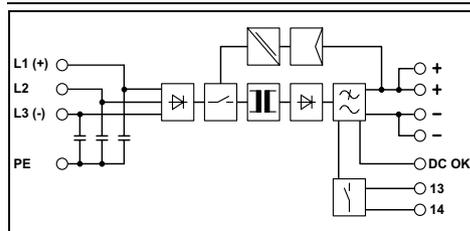
**QUINT 24 V DC/5 A**

3 AC



Width 70 mm

Ex:



Connection data	solid	stranded	AWG	
	[mm <sup>2</sup> ]			
Input	0.2-2.5	0.2-2.5	24-12	M 3
Output	0.2-2.5	0.2-2.5	24-12	M 3
Signal	0.2-2.5	0.2-2.5	24-12	M 3

Description	Type	Order No.	Pcs. Pkt.
<b>Power supply unit, primary switched-mode</b>	<b>QUINT-PS-3X400-500AC/24DC/5</b>	<b>2938594</b>	<b>1</b>
<b>Technical data</b>			
<b>Input data</b>			
Input nominal voltage range	3 x 400 V AC ... 500 V AC		
Input voltage range	320 V AC ... 575 V AC / 450 V DC ... 800 V DC		
Frequency range	45 Hz ... 65 Hz / 0 Hz		
Current consumption (nominal load)	Approx. 3x 0.36 A (400 V AC) / 3x 0.34 A (480 V AC)		
Inrush current limitation at 25°C (typ.) / I <sup>2</sup> t	< 15 A / 3 A <sup>2</sup> s		
Mains buffering (I <sub>N</sub> , typ.)	> 50 ms (400 V AC) / > 50 ms (480 V AC)		
Input fuse	5 A (slow-blow, internal)		
Recommended backup fuse, LS switch	6 A, 10 A, 16 A -		
<b>Output data</b>			
Nominal output voltage	24 V DC ±1%		
Setting range of the output voltage	22.5 V ... 28.5 V ( 120 W )		
Output current / POWER BOOST	5 A / 7.5 A		
Can be connected in parallel / series	Yes / Yes		
Max. power dissipation (idling/nominal load)	3 W / 17 W		
Efficiency (typ.)	> 88 %		
Residual ripple	< 10 mV <sub>pp</sub>		
<b>Signaling</b>			
Signaling DC OK	LED, active switching output, relay contact		
<b>General data</b>			
Weight / Dimensions W x H x D	0.95 kg / 70 x 130 x 125 mm		
Installation position	Horizontal DIN rail NS 35, EN 60715		
-	Can be aligned: Horizontal 0 cm, vertical 5 cm		
Type of connection	Screw connection		
Degree of protection / Class of protection	IP20 / I, with PE connection		
MTBF (at nominal load, 40°C)	> 500 000 h in acc. with IEC 61709 (SN 29500)		
Ambient temperature (operation)	-25 °C ... 70 °C (> 60°C derating)		
<b>Standards/regulations</b>			
Insulation voltage input/output	2 kV AC (routine test) / 4 kV AC (type test)		
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC		
Electrical safety, safety transformer	EN 60950/VDE 0805 (SELV), EN 61558-2-17		
Electronic equipm. for electrical power installations	EN 50178/VDE 0160 (PELV)		
Safe isolation	DIN VDE 0100-410, DIN VDE 0106-1010		
UL approvals	UL/C-UL listed UL 508, UL/C-UL Recognized UL 60950, UL/C-UL Listed UL 1604 Class I, Division 2, Groups A, B, C, D		
Limitation of harmonic line currents	EN 61000-3-2		



### QUINT 24 V DC/10 A

3 AC



### QUINT 24 V DC/20 A

3 AC



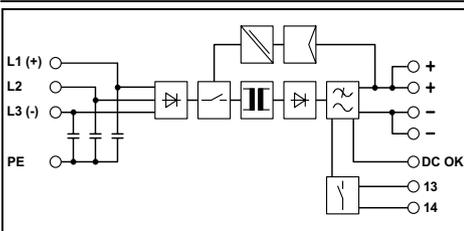
### QUINT 24 V DC/40 A

3 AC



Width 85 mm

Ex:



Connection data	solid	stranded	AWG	
	[mm <sup>2</sup> ]			
Input	0.2-2.5	0.2-2.5	24-12	M 3
Output	0.2-2.5	0.2-2.5	24-12	M 3
Signal	0.2-2.5	0.2-2.5	24-12	M 3

Type	Order No.	Pcs. Pkt.
<b>QUINT-PS-3X400-500AC/24DC/10</b>	<b>2938617</b>	<b>1</b>

3 x 400 V AC ... 500 V AC  
320 V AC ... 575 V AC / 450 V DC ... 800 V DC  
45 Hz ... 65 Hz / 0 Hz  
Approx. 3x 0.63 A (400 V AC) / 3x 0.57 A (480 V AC)  
< 15 A / 1 A<sup>2</sup>s  
> 40 ms (400 V AC) / > 40 ms (480 V AC)  
5 A (slow-blow, internal)  
6 A , 10 A , 16 A -

24 V DC ±1%  
22.5 V ... 28.5 V ( 240 W )  
10 A / 15 A  
Yes / Yes  
4 W / 28 W  
> 90 %  
< 20 mV<sub>pp</sub>

LED, active switching output, relay contact

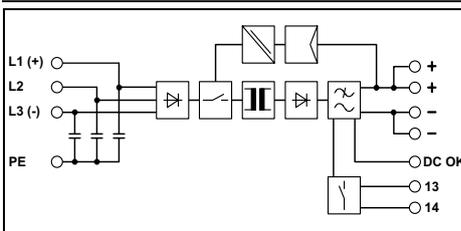
1.1 kg / 85 x 130 x 125 mm  
Horizontal DIN rail NS 35, EN 60715  
Can be aligned: Horizontal 0 cm, vertical 5 cm  
Screw connection  
IP20 / I, with PE connection  
> 500 000 h in acc. with IEC 61709 (SN 29500)  
> 25 °C ... 70 °C (> 60°C derating)

2 kV AC (routine test) / 4 kV AC (type test)  
Conformance with EMC directive 89/336/EEC  
EN 60950/VDE 0805 (SELV) , EN 61558-2-17  
EN 50178/VDE 0160 (PELV)  
DIN VDE 0100-410 , DIN VDE 0106-1010  
UL/C-UL listed UL 508 , UL/C-UL Recognized UL 60950 , UL/C-UL Listed UL 1604 Class I, Division 2, Groups A, B, C, D  
EN 61000-3-2



Width 160 mm

Ex:



Connection data	solid	stranded	AWG	
	[mm <sup>2</sup> ]			
Input	0.2-6	0.2-4	24-10	M 3
Output	0.5-16	0.5-10	20-6	M 4
Signal	0.5-16	0.5-10	20-6	M 4

Type	Order No.	Pcs. Pkt.
<b>QUINT-PS-3X400-500AC/24DC/20</b>	<b>2938727</b>	<b>1</b>

3 x 400 V AC ... 500 V AC  
320 V AC ... 575 V AC / 450 V DC ... 800 V DC  
45 Hz ... 65 Hz / 0 Hz  
Approx. 3x 1.1 A (400 V AC) / 3x 1 A (480 V AC)  
< 15 A / 1 A<sup>2</sup>s  
> 23 ms (400 V AC) / > 25 ms (480 V AC)  
-  
6 A , 10 A , 16 A -

24 V DC ±1%  
22.5 V ... 28.5 V ( 480 W )  
20 A / 27 A  
Yes / Yes  
7 W / 47 W  
> 91 %  
< 10 mV<sub>pp</sub>

LED, active switching output, relay contact

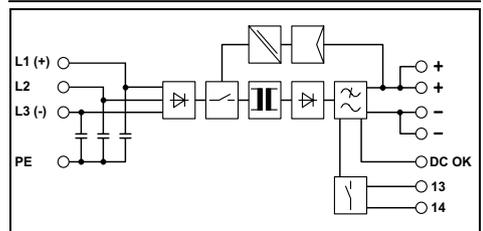
1.93 kg / 160 x 130 x 125 mm  
Horizontal DIN rail NS 35, EN 60715  
Can be aligned: Horizontal 0 cm, vertical 5 cm  
Screw connection  
IP20 / I, with PE connection  
> 500 000 h in acc. with IEC 61709 (SN 29500)  
> 25 °C ... 70 °C (> 60°C derating)

2 kV AC (routine test) / 4 kV AC (type test)  
Conformance with EMC directive 89/336/EEC  
EN 60950/VDE 0805 (SELV) , EN 61558-2-17  
EN 50178/VDE 0160 (PELV)  
DIN VDE 0100-410 , DIN VDE 0106-1010  
UL/C-UL listed UL 508 , UL/C-UL Recognized UL 60950 , UL/C-UL Listed UL 1604 Class I, Division 2, Groups A, B, C, D  
EN 61000-3-2



Width 240 mm

Ex:



Connection data	solid	stranded	AWG	
	[mm <sup>2</sup> ]			
Input	0.2-6	0.2-4	24-10	M 3
Output	0.5-16	0.5-10	20-6	M 4
Signal	0.5-16	0.5-10	20-6	M 4

Type	Order No.	Pcs. Pkt.
<b>QUINT-PS-3X400-500AC/24DC/40</b>	<b>2938646</b>	<b>1</b>

3 x 400 V AC ... 500 V AC  
320 V AC ... 575 V AC / 450 V DC ... 800 V DC  
45 Hz ... 65 Hz / 0 Hz  
Approx. 3x 1.9 A (400 V AC) / Approx. 3x 1.7 A (480 V AC)  
< 15 A / 1 A<sup>2</sup>s  
> 20 ms (400 V AC) / > 20 ms (480 V AC)  
-  
6 A , 10 A , 16 A -

24 V DC ±1%  
22.5 V ... 28.5 V ( 960 W )  
40 A / 45 A  
Yes / Yes  
14 W / 80 W  
> 91 %  
< 10 mV<sub>pp</sub>

LED, active switching output, relay contact

3.5 kg / 240 x 130 x 125 mm  
Horizontal DIN rail NS 35, EN 60715  
Can be aligned: Horizontal 0 cm, vertical 5 cm  
Screw connection  
IP20 / I, with PE connection  
> 500 000 h in acc. with IEC 61709 (SN 29500)  
> 25 °C ... 70 °C (> 60°C derating)

2 kV AC (routine test) / 4 kV AC (type test)  
Conformance with EMC directive 89/336/EEC  
EN 60950/VDE 0805 (SELV) , EN 61558-2-17  
EN 50178/VDE 0160 (PELV)  
DIN VDE 0100-410 , DIN VDE 0106-1010  
UL/C-UL listed UL 508 , UL/C-UL Recognized UL 60950 , UL/C-UL Listed UL 1604 Class I, Division 2, Groups A, B, C, D  
EN 61000-3-2

# INTERFACE Power Supply DC-USV

## Uninterruptible Primary Switched-Mode Power Supply Units

### UPS

If the supply voltage fails, uninterruptible power supply units guarantee supply with 24 V DC voltage for all connected loads.

### QUINT UPS

An integrated diode decouples loads and extends the buffer time for critical loads.

### MINI USV

The power supply unit and the uninterruptible power supply are accommodated in a housing such that space is saved.

### Note:

On the basis of the required load current and the buffer time, select the appropriate solution from the table.



**BUFFER/20 A**

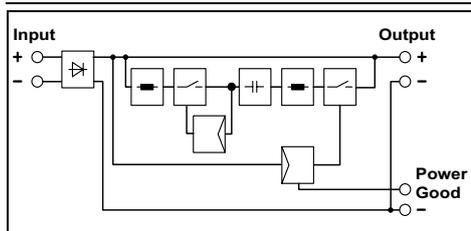
Buffer module, with maintenance-free capacitor-based power storage device



**DC-UPS/10 A**

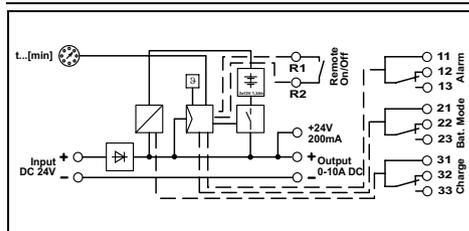
DC-USV module, with integrated 1.3 Ah rechargeable battery module

Width 64 mm Ex:



Connection data	solid	stranded	AWG	
	[mm <sup>2</sup> ]			
Input	0.5-16	0.5-10	20-6	M 4
Output	0.5-16	0.5-10	20-6	M 4
Signal	0.2-2.5	0.2-2.5	24-12	M 3

Width 100 mm Ex:



Connection data	solid	stranded	AWG	
	[mm <sup>2</sup> ]			
Input	0.2-2.5	0.2-2.5	24-12	M 3
Output	0.2-2.5	0.2-2.5	24-12	M 3
Signal	0.2-2.5	0.2-2.5	24-12	M 3

Description	<b>Power supply, uninterruptible</b>
-------------	--------------------------------------

Technical data	
<b>Input data</b>	
Nominal input voltage	24 V DC
Input nominal voltage range	-
Input voltage range	- / 22.5 V DC ... 30 V DC
Current consumption (idling/charging process/max.)	Approx. 0.1 A / 0.6 A / 20.6 A
Connect threshold (fixed, variable)	< 22 V DC, (U <sub>IN</sub> - 1 V)/0.1 s
Buffer period	0.2 s (20 A) / 4 s (1 A)
Input fuse	-
Recommended backup fuse, LS switch	-
<b>Output data</b>	
Nominal output voltage	24 V DC (depending on the input voltage)
<b>Output current</b>	
Output current	20 A
Can be connected in parallel / series	Yes / No
Max. power dissipation (Standby / buffer mode)	2.5 W / 9.8 W
Efficiency (typ.)	> 95 %
<b>Signaling</b>	
Signaling DC OK	LED, active switching output
Signaling alarm	-
Signaling battery charge	-
Signaling battery mode	-
<b>General data</b>	
Storage medium	Internal, capacity
Weight / Dimensions W x H x D	1 kg / 64 x 130 x 125 mm
Installation position	Horizontal DIN rail NS 35, EN 60715
-	Can be aligned: Horizontal 0 cm, vertical 5 cm
Type of connection	Screw connection
Degree of protection / Class of protection	IP20 / III, without PE connection
MTBF (at nominal load, 40°C)	> 500 000 h in acc. with IEC 61709 (SN 29500)
Ambient temperature (operation)	-25 °C ... 70 °C
<b>Standards/regulations</b>	
Insulation voltage input/output	1 kV (type test) / 1 kV (routine test)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC
Electrical safety, safety transformer	EN 60950/VDE 0805 (SELV), EN 61558-2-17
Electronic equipm. for electrical power installations	EN 50178/VDE 0160 (PELV)
UL approvals	UL/C-UL listed UL 508, UL/C-UL Recognized UL 60950, UL/C-UL Listed UL 1604 Class I, Division 2, Groups A, B, C, D

Type	<b>QUINT-BUFFER/24DC/20</b>	Order No.	<b>2866213</b>	Pcs. Pkt.	<b>1</b>
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Type	<b>QUINT-DC-UPS/24DC/10</b>	Order No.	<b>2866226</b>	Pcs. Pkt.	<b>1</b>
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<b>Input data</b>	
Nominal input voltage	24 V DC
Input nominal voltage range	-
Input voltage range	- / 22.5 V DC ... 30 V DC
Current consumption (idling/charging process/max.)	Approx. 0.1 A / 0.5 A / 10.5 A
Connect threshold (fixed, variable)	< 22 V DC, (U <sub>IN</sub> - 1 V)/0.1 s
Buffer period	1.5 min (10 A) / 20 min (2 A)
Input fuse	15 A (slow-blow, internal)
Recommended backup fuse, LS switch	-
<b>Output data</b>	
Nominal output voltage	24 V DC (Normal operation: U <sub>IN</sub> - 0.5 V DC, buffer mode: 27.9 to 19.2 V DC)
<b>Output current</b>	
Output current	10 A
Can be connected in parallel / series	No / No
Max. power dissipation (Standby / buffer mode)	20 W / 8 W
Efficiency (typ.)	> 91 %
<b>Signaling</b>	
Signaling DC OK	-
Signaling alarm	LED, relay contact
Signaling battery charge	LED, relay contact
Signaling battery mode	LED, relay contact
<b>General data</b>	
Storage medium	Internal, battery 1.3 Ah
Weight / Dimensions W x H x D	1.8 kg / 100 x 130 x 125 mm
Installation position	Horizontal DIN rail NS 35, EN 60715
-	Can be aligned: Horizontal 0 cm, vertical 5 cm
Type of connection	COMBICON screw/plug connection
Degree of protection / Class of protection	IP20 / II (in an enclosed control cabinet)
MTBF (at nominal load, 40°C)	> 500 000 h in acc. with IEC 61709 (SN 29500)
Ambient temperature (operation)	0 °C ... 50 °C
<b>Standards/regulations</b>	
Insulation voltage input/output	4 kV (type test) / 2 kV (routine test)
Electromagnetic compatibility	Conformance with EMC directive 89/336/EEC
Electrical safety, safety transformer	EN 60950/VDE 0805 (SELV), EN 61558-2-17
Electronic equipm. for electrical power installations	EN 50178/VDE 0160 (PELV)
UL approvals	UL/C-UL listed UL 508, UL/C-UL Recognized UL 60950, UL/C-UL Listed UL 1604 Class I, Division 2, Groups A, B, C, D



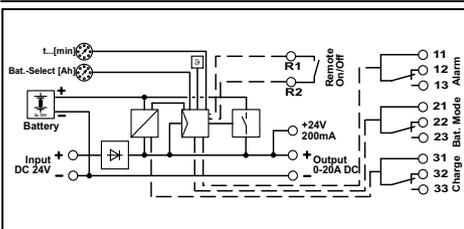
## DC-UPS/20 A

DC-USV module, external rechargeable battery module QUINT-BAT  
24 V DC / 3.4 Ah, 7.2 Ah, 12 Ah



Width 66 mm

Ex:



Connection data	solid		stranded	
	[mm <sup>2</sup> ]		AWG	
Input	0.5-16	0.5-10	20-6	M 4
Output	0.5-16	0.5-10	20-6	M 4
Signal	0.2-4	0.2-2.5	24-12	M 3

Type	Order No.	Pcs. Pkt.
QUINT-DC-UPS/24DC/20	2866239	1

24 V DC

- / 22.5 V DC ... 30 V DC

Approx. 0.1 A / 2 A / 22 A

< 22 V DC, (U<sub>IN</sub> - 1 V)/0.1 s

(depending on the storage medium, refer to the selection table)

25 A (slow-blow, internal)

24 V DC (Normal operation: U<sub>IN</sub>- 0.5 V DC, buffer mode: 27.9 to 19.2 V DC)

20 A

No / No

15 W / 20 W

> 95 %

LED, relay contact

LED, relay contact

LED, relay contact

external, battery 3.4 Ah/7.2 Ah/12 Ah

0.8 kg / 66 x 130 x 125 mm

Horizontal DIN rail NS 35, EN 60715

Can be aligned: Horizontal 0 cm, vertical 5 cm

Screw connection

IP20 / II (in an enclosed control cabinet)

> 500 000 h in acc. with IEC 61709 (SN 29500)

-25 °C ... 70 °C

4 kV (type test) / 2 kV (routine test)

Conformance with EMC directive 89/336/EEC

EN 60950/VDE 0805 (SELV), EN 61558-2-17

EN 50178/VDE 0160 (PELV)

UL/C-UL listed UL 508, UL/C-UL Recognized UL 60950, UL/C-UL

Listed UL 1604 Class I, Division 2, Groups A, B, C, D

# INTERFACE Wireless RAD-Line (2400 MHz)

## Extension modules

Analog and digital extension modules as well as modules for pulse counting and frequency transmission are available for extension of the bidirectional RAD-Line IO wireless system.

The extension modules can be aligned easily using the laterally integrated bus foot. Signal data and supply voltage are routed through using the bus foot. With up to eight modules, the system can be extended to a maximum of 33 analog or 66 digital signals.



Analog components for 4 inputs or 4 outputs

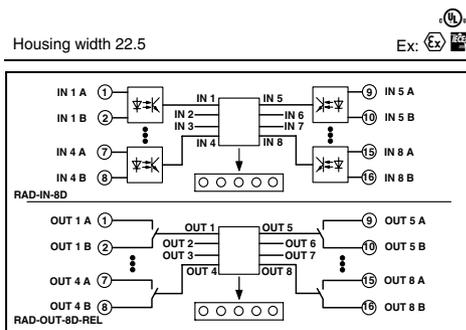
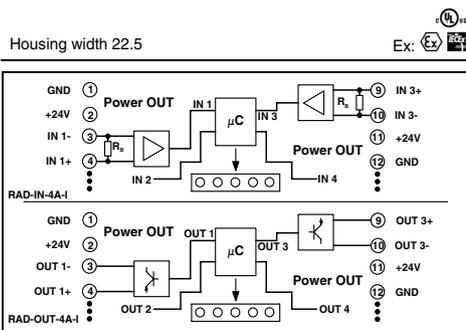


Digital components for 8 inputs or 8 outputs

	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Screw connection	0.2-4	0.2-2.5	24-14	M3

Description	Type	Order No.	Pcs. Pkt.	
Extension module	Analog IN	<b>RAD-IN-4A-I</b>	2867115	1
Extension module	Analog OUT	<b>RAD-OUT-4A-I</b>	2867128	1
Extension module	Digital IN			
Extension module	Digital OUT			
Extension module	Mixed I/O			

Technical data	RAD-IN-4A-I	RAD-OUT-4A-I
Conformance / approvals	CE compliant Ex II 3 G Ex nAC IIC T5 X Ex nL IIC T5 Class I, Div. 2, Groups A, B, C, D	



Type	Order No.	Pcs. Pkt.
<b>RAD-IN-8D</b>	<b>2867144</b>	1
<b>RAD-OUT-8D-REL</b>	<b>2867157</b>	1

Technical data	RAD-IN-8D	RAD-OUT-8D-REL
Conformance / approvals	CE compliant Ex II 3 G Ex nAC IIC T5 X Ex nL IIC T5 Class I, Div. 2, Groups A, B, C, D	



Ex n



Analog/digital module for 2 digital inputs/outputs and 1 analog input/output



Ex n



Digital module for two counter/frequency inputs

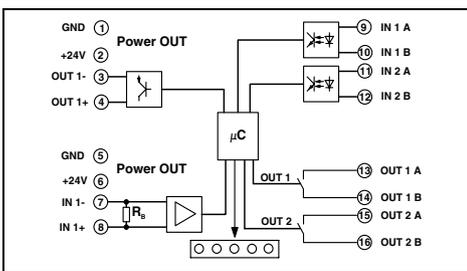


Ex n



Digital module for two counter/frequency outputs

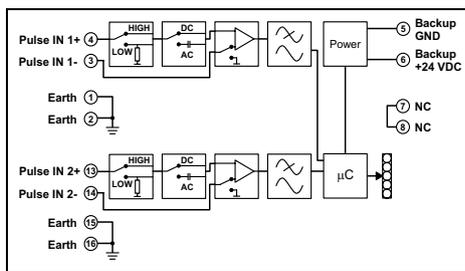
Housing width 22.5  Ex:  



Type	Order No.	Pcs. Pkt.
<b>RAD-IN+OUT-2D-1A-I</b>	<b>2867322</b>	<b>1</b>

CE compliant  
 II 3 G Ex nAC IIC T5 X  
 Ex nL IIC T5  
 Class I, Div. 2, Groups A, B, C, D

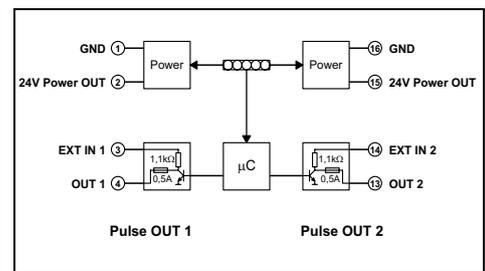
Housing width 22.5  Ex: 



Type	Order No.	Pcs. Pkt.
<b>RAD-IN-2D-CNT</b>	<b>2885223</b>	<b>1</b>

CE compliant  
 II 3 G Ex nAC IIC T5 X  
 -  
 Class I, Div. 2, Groups A, B, C, D

Housing width 22.5  Ex: 



Type	Order No.	Pcs. Pkt.
<b>RAD-OUT-2D-CNT</b>	<b>2885236</b>	<b>1</b>

CE compliant  
 II 3 G Ex nAC IIC T5 X  
 -  
 Class I, Div. 2, Groups A, B, C, D



**RAD-Line IO - BD wireless system with Trusted Wireless**

The bidirectional wireless system **RAD-ISM-900-SET-BD-BUS-ANT** offers a safe and reliable signal path in the license-free ISM band 900 MHz. The approval for use in class 1, division 2 extends the range of possible applications.

The radio system consists of two transceivers (transmitter and receiver). The wireless connection – following the frequency hopping system – is established automatically after applying the operating voltage on both devices. No parameterization or programming is necessary. The status of the radio link can be diagnosed via a relay (RF link).

Two digital signals in the range from 5...30 V AC/DC, as well as an analog current signal (4..20 mA), can be transmitted in both directions. The integrated bus foot allows additional I/O modules to be connected in rows.

Individual transceivers are available for multi-receiver systems (point-to-multi-point) or repeater solutions.

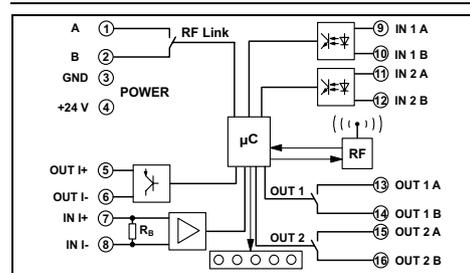


**RAD-ISM-900-SET-BD-BUS-ANT**

Set comprising 2 transceivers (transmitter and receiver) and two antennas with connecting cables

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Screw connection	0.2-4	0.2-2.5	24-14	M3

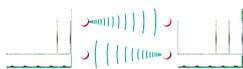
Housing width 22.5 UL Ex:



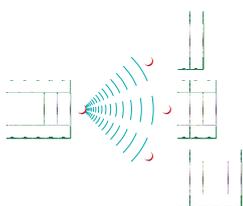
Description	Type	Order No.	Pcs. Pkt.
<b>Wireless set</b> (2 transceivers, 2 antennas)	<b>RAD-ISM-900-SET-BD-BUS-ANT</b>	<b>2867270</b>	<b>1</b>
<b>Wireless set</b> (two transceivers)	<b>RAD-ISM-900-SET-BD-BUS</b>	<b>2867089</b>	<b>1</b>
<b>Transceiver</b> (individual)	<b>RAD-ISM-900-BD-BUS</b>	<b>2867092</b>	<b>1</b>

Technical data	
Spark gap	
Direction	Bi-directional
Frequency range	902 MHz ... 928 MHz
Transmission capacity	1 W
Number of channels	4 x 63
Analog input	
Number of inputs	1
Signal range	4 mA ... 20 mA
Input resistance	< 170 Ω
Digital input	
Number of inputs	2
Signal range	5 V AC/DC ... 30 V AC/DC
Switching level	1 signal ("H") 0 signal ("L")
Analog output	
Number of outputs	1
Signal range	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	
Contact type	3 floating N/O contacts
Switching voltage	30 V DC / 250 V AC
Switching current	2 A
General data	
Supply voltage	9 ... 30 V AC/DC
Current consumption	75 mA / 200 mA
Degree of protection	IP20
Ambient temperature range	-40 °C ... 70 °C
Housing material	Polyamide PA non-reinforced
Dimensions W / H / D	22.5 / 99 / 114.5 mm
Conformance / approvals	
Conformity	FCC directive, Part 15.247 ISC directive RSS 210 Class I, Div. 2, Groups A, B, C, D
UL, USA / Canada	

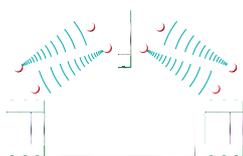
Point-to-point



Point-to-multipoint



Repeater



# INTERFACE Wireless

## RAD-Line (900 MHz)

### RAD-Line IO - XD wireless system with Trusted Wireless

The bidirectional wireless system **RAD-ISM-900-XD-BUS** offers a safe and reliable signal path in the license-free ISM band 900 MHz bandwidth.

The wireless system enables structuring of systems with up to eight transmitting stations in the field (multipoint-to-point). Thus, no programming or parameterization is necessary. The signals of the field stations are output to the master station again.

**Note:** You can find accurate order options and documentations on [www.phoenixcon.com](http://www.phoenixcon.com).



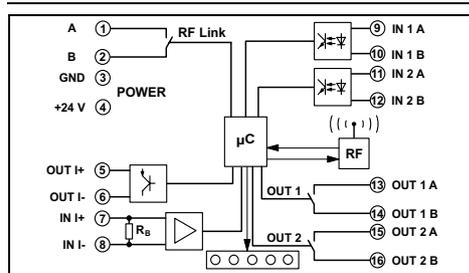
### RAD-ISM-900-XD-BUS

Transceiver (transmitter and receiver) for setting up multi-transmitter systems (multi-point-to-point)

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Screw connection	0.2-4	0.2-2.5	24-14	M3

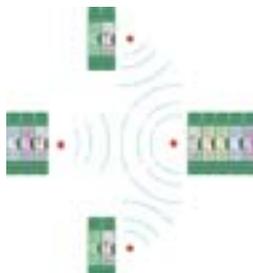
Housing width 22.5

Ex:



Description	Type	Order No.	Pcs. Pkt.
<b>Wireless system</b> , visit <a href="http://www.phoenixcon.com">www.phoenixcon.com</a> for more information	<b>RAD-ISM-900-XD-BUS</b>	<b>2885605</b>	<b>1</b>
<b>Technical data</b>			
Spark gap			
Direction	Bi-directional		
Frequency range	902 MHz ... 928 MHz		
Transmission capacity	1 W		
Number of channels	4 x 63		
<b>Analog input</b>			
Number of inputs	1		
Signal range	4 mA ... 20 mA		
Input resistance	< 170 Ω		
<b>Digital input</b>			
Number of inputs	2		
Signal range	5 V AC/DC ... 30 V AC/DC		
Switching level	Min. 5 V DC Max. 1.5 V DC		
<b>Analog output</b>			
Number of outputs	1		
Signal range	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)		
<b>Digital output</b>			
Contact type	3 floating N/O contacts		
Switching voltage	30 V DC / 250 V AC		
Switching current	2 A		
<b>General data</b>			
Supply voltage	9 ... 30 V AC/DC		
Current consumption	Typ./max. 75 mA / 200 mA		
Degree of protection	IP20		
Ambient temperature range	-40 °C ... 70 °C		
Housing material	Polyamide PA non-reinforced		
Dimensions W / H / D	22.5 / 99 / 114.5 mm		
<b>Conformance / approvals</b>			
Conformity	FCC directive, Part 15.247 ISC directive RSS 210 UL applied for		
UL, USA / Canada			

Multipoint-to-point



**RAD-Line serial - BD wireless system for transmission of serial data**

The bidirectional data transmission systems **RAD-ISM-900-RS232-BD...** (RS-232) for serial interfaces transport RS-232 data over medium and large distances using the tried-and-tested Trusted Wireless wireless technology.

Control units can be internetworked and remote serial periphery can be connected. The operating modes point-to-point, point-to-multipoint and multipoint to-point are possible.

An individual module can be parameterized as master, slave or repeater using easy-to-use software. Up to 254 slaves can operate on a master. The transmission is transparent and does not depend on the protocol. The convenient diagnostics software tool can be used to modify wireless parameters of the network devices and to monitor the network for its transmission quality.

**Note:** You can download the basic software for configuration and diagnostics of two network devices on [www.phoenixcon.com](http://www.phoenixcon.com) free of cost. A software license is required for the diagnostic functions of several network devices.



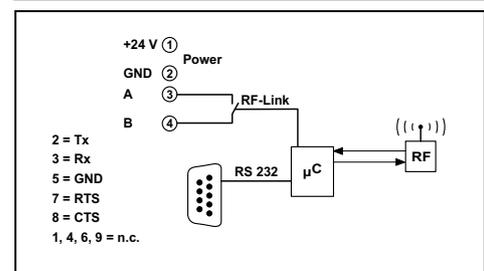
**RAD-ISM-900-RS232-BD**

Wireless transceiver for serial interfaces (RS-232)

Housing width 22.5

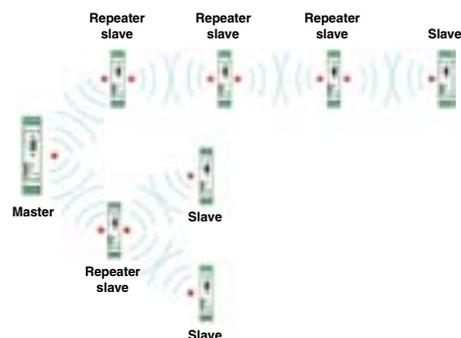
Ex:

	solid	stranded		
	[mm <sup>2</sup> ]		AWG	Screw
Screw connection	0.2-4	0.2-2.5	24-12	M3



Description	Type	Order No.	Pcs. Pkt.
<b>Radio module</b> with serial interface <span style="float: right;">America</span>	<b>RAD-ISM-900-RS232-BD</b>	<b>2867555</b>	<b>1</b>
<b>Technical data</b>			
Spark gap			
Direction	Bi-directional		
Frequency range	902 MHz ... 928 MHz		
Transmission capacity	1 W		
Number of channels	4 x 63		
Serial port	RS-232		
Connection method	SUB-D 9 (socket)		
Serial transmission rate	1,2 / 2,4 / 9,6 / 19,2 / 38,4 kBit/s		
Data format/coding	Asynchronous		
Data flow control/protocols	RTS/CTS		
<b>General data</b>			
Supply voltage	9 ... 30 V AC/DC		
Current consumption	Typ./max. 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	22.5 / 75 / 107.5 mm		
Conformance / approvals			
Conformity	FCC directive, Part 15.247 ISC directive RSS 210 Class I, Div. 2, Groups A, B, C, D		
UL, USA / Canada			

**Network**



# INTERFACE Wireless

## RAD-Line (900 MHz)

### RAD-Line serial - BD wireless system for transmission of serial data

The bidirectional data transmission systems **RAD-ISM-900-DATA-BD...** (RS-232, RS-422/RS-485) for serial interfaces transport RS-232, RS-422 or RS-485 data over medium and large distances using the tried-and-tested Trusted Wireless wireless technology.

Control units can be internetworked and remote serial periphery can be connected. The operating modes point-to-point, point-to-multipoint and multipoint to-point are possible.

An individual module can be parameterized as master, slave or repeater using easy-to-use software. Up to 254 slaves can operate on a master. The transmission is transparent and does not depend on the protocol. The convenient diagnostics software tool can be used to modify wireless parameters of the network devices and to monitor the network for its transmission quality.

**Note:** You can download the basic software for configuration and diagnostics of two network devices on [www.phoenixcon.com](http://www.phoenixcon.com) free of cost. A software license is required for the diagnostic functions of several network devices.

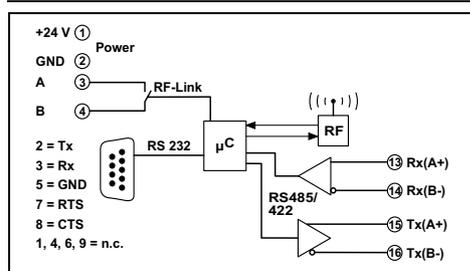


### RAD-ISM-900-DATA-BD

Wireless transceiver for serial interfaces (RS-232, RS-422/RS-485)

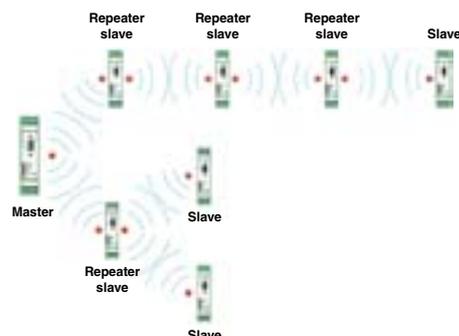
Housing width 22.5 UL, Ex: CE

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Screw connection	0.2-4	0.2-2.5	24-12	M3



Description	Type	Order No.	Pcs. Pkt.
<b>Radio module</b> with serial interface <span style="float: right;">America</span>	<b>RAD-ISM-900-DATA-BD</b>	<b>2867131</b>	<b>1</b>
<b>Technical data</b>			
Spark gap			
Direction	Bi-directional		
Frequency range	902 MHz ... 928 MHz		
Transmission capacity	1 W		
Number of channels	4 x 63		
Serial port	RS-232		
Connection method	SUB-D 9 (socket) <span style="float: right;">RS-485/RS-422 Pluggable COMBICON screw terminal block</span>		
Serial transmission rate	1,2 / 2,4 / 9,6 / 19,2 / 38,4 kBit/s <span style="float: right;">1,2 / 2,4 / 9,6 / 19,2 / 38,4 kBit/s</span>		
Data format/coding	Asynchronous		
Data flow control/protocols	RTS/CTS		
<b>General data</b>			
Supply voltage	9 ... 30 V AC/DC		
Current consumption	110 mA / 180 mA <span style="float: right;">Typ./max.</span>		
Degree of protection	IP20		
Ambient temperature range	-40 °C ... 70 °C		
Housing material	Polyamide PA non-reinforced		
Dimensions W / H / D	22.5 / 99 / 114.5 mm		
<b>Conformance / approvals</b>			
Conformity	FCC directive, Part 15.247 ISC directive RSS 210 Class I, Div. 2, Groups A, B, C, D		
UL, USA / Canada			

### Network



## RAD-Line serial - BD wireless system for transmission of serial data and IO signals

The bidirectional data transmission systems **RAD-ISM-900-DATA-BD-BUS...** allow wireless connection of several decentral controllers and the reception and output of I/O signals from the field to a central location (controller).

Besides the RS-232, RS-422/RS-485 interface, extension modules from the bidirectional wireless system can also be connected through the lateral bus foot. This enables sensors and actuators in the field to be acquired and connected via radio to a controller. The operating modes point-to-point, point-to-multipoint and multipoint-to-point are possible.

An individual module can be parameterized as master, slave or repeater using easy-to-use software. Up to 254 slaves can operate on a master. The transmission is transparent and does not depend on the protocol. The convenient diagnostics software tool can be used to modify wireless parameters of the network devices and to monitor the network for its transmission quality.

**Note:** You can download the basic software for configuration and diagnostics of two network devices on [www.phoenixcon.com](http://www.phoenixcon.com) free of cost. A software license is required for the diagnostic functions of several network devices.



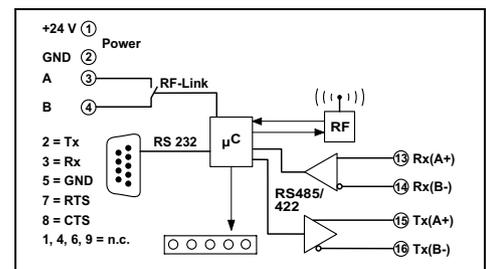
## RAD-ISM-900-DATA-BD-BUS

Wireless transceiver for serial interfaces (RS-232, RS-422/RS-485), can be extended

Housing width 22.5

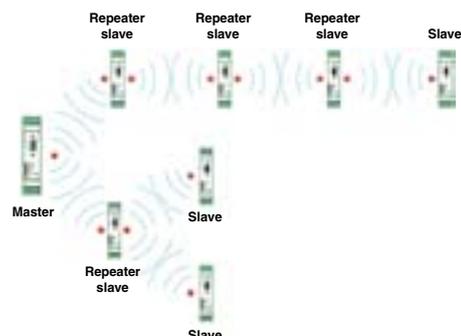
Ex:

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Screw connection	0.2-4	0.2-2.5	24-12	M3



Description	Type	Order No.	Pcs. Pkt.
<b>Radio module</b> with serial interface	<b>RAD-ISM-900-DATA-BD-BUS</b>	<b>2867296</b>	<b>1</b>
<b>Technical data</b>			
Spark gap			
Direction	Bi-directional		
Frequency range	902 MHz ... 928 MHz		
Transmission capacity	1 W		
Number of channels	4 x 63		
Serial port	RS-232	RS-485/RS-422	
Connection method	SUB-D 9 (socket)	Pluggable COMBICON screw terminal block	
Serial transmission rate	1,2 / 2,4 / 9,6 / 19,2 / 38,4 kBit/s		
Data format/coding	Asynchronous		
Data flow control/protocols	RTS/CTS		
<b>General data</b>			
Supply voltage	9 ... 30 V AC/DC		
Current consumption	Typ./max. 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	22.5 / 99 / 114.5 mm		
<b>Conformance / approvals</b>			
Conformity	FCC directive, Part 15.247 ISC directive RSS 210 Class I, Div. 2, Groups A, B, C, D		
UL, USA / Canada			

## Network



# INTERFACE Wireless

## RAD-Line (900 MHz)

### RAD-Line IO - UD wireless system with Trusted Wireless

The unidirectional wireless systems **RAD-ISM-900-SET...UD...** consist of a transmitter (transmitter, TX) in an IP20 or IP65 housing and a receiver (receiver, RX) in IP20 housing.

In the license-free ISM band 900 MHz, a safe and reliable signal path is prepared when using the frequency hopping method.

The so-called PIPE modules **RAD-ISM-900-SET-AC-UD** or **RAD-ISM-900-SET-DC-UD** can be installed directly outdoors. Thus, no additional switch box is required. The convenient connection of the power supply unit and the sensors or actuators is established in a simple, rugged and quick manner.

Devices for the direct mains connection (100...240 V AC) as well as for the low-voltage range (9...30 V DC) are available. These devices can be easily supplied using extremely small batteries or solar systems.

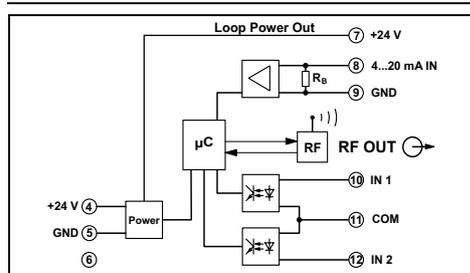


### RAD-ISM-900-SET-UD-ANT

Set consisting of transmitter, receiver and two antennas with connecting cables

Ex:

	solid	stranded	AWG	Screw
	[mm <sup>2</sup> ]			
Screw connection	0.2-2.5	0.2-2.5	24-14	M3

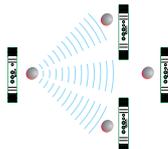


Description	Type	Order No.	Pcs. Pkt.
<b>Wireless set</b> (transmitter, receiver, including antennas)	<b>RAD-ISM-900-SET-UD-ANT</b>	<b>2867102</b>	<b>1</b>
<b>Receiver</b> (individual)	<b>RAD-ISM-900-RX</b>	<b>2867047</b>	<b>1</b>
<b>Technical data</b>			
Spark gap			
Direction	Uni-directional		
Frequency range	902 MHz ... 928 MHz		
Transmission capacity	1 W		
Number of channels	4 x 63		
<b>Analog input</b>			
Number of inputs / signal range	1 x 4 mA ... 20 mA		
<b>Digital input</b>			
Number of inputs / signal range	2 x 5 V AC/DC ... 30 V AC/DC		
<b>Analog output</b>			
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)		
<b>Digital output</b>			
Switching voltage	3 floating PDT contacts		
Switching current	30 V DC / 120 V AC		
<b>General data</b>			
Supply voltage	Transmitter (TX) 12 V DC ... 30 V DC	Receiver (RX) 12 V DC ... 30 V DC	
Current consumption	75 mA / 350 mA	85 mA / 125 mA	
Degree of protection	IP20	IP20	
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	
<b>Conformance / approvals</b>			
Conformity	FCC directive, Part 15.247 ISC directive RSS 210 Class I, Div. 2, Groups A, B, C, D		
UL, USA / Canada			

Point-to-point



Point-to-multipoint





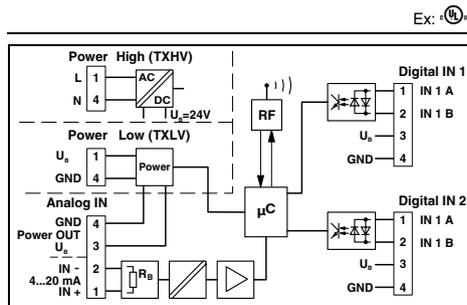
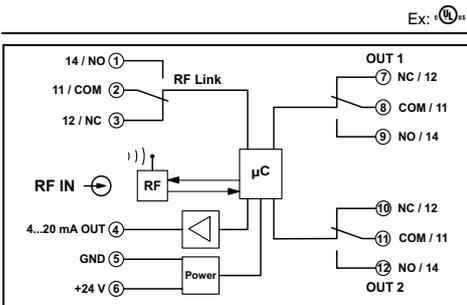
**RAD-ISM-900-SET-AC-UD**

Set, consisting of transmitter for the mains connection (IP65) and receiver (IP20) including antennas



**RAD-ISM-900-SET-DC-UD**

Set, consisting of transmitter for the low-voltage range (IP65) and receiver (IP20) including antennas



Type	Order No.	Pcs. Pkt.
RAD-ISM-900-SET-AC-UD	2867021	1

Type	Order No.	Pcs. Pkt.
RAD-ISM-900-SET-DC-UD	2867034	1

Uni-directional	902 MHz ... 928 MHz	1 W	4 x 63
1 x 4 mA ... 20 mA	2 x 85 V AC ... 240 V AC	1 x 4 mA ... 20 mA	700 Ω (at $U_B = 24 V$ , $R_B = [U_B - 10 V] / 20 mA$ )
3 floating PDT contacts	30 V DC / 120 V AC	0.5 A	Transmitter (TX)
100 V AC ... 240 V AC	57 mA / 109 mA	IP65	-40 °C ... 70 °C
5052H32AL PBT	57 / 280 / 57 mm	Receiver (RX)	12 V DC ... 30 V DC
		85 mA / 125 mA	IP20
		-40 °C ... 70 °C	Polyamide PA non-reinforced
		17.5 / 99 / 114.5 mm	
FCC directive, Part 15.247	ISC directive RSS 210	Class I, Div. 2, Groups A, B, C, D	

Uni-directional	902 MHz ... 928 MHz	1 W	4 x 63
1 x 4 mA ... 20 mA	2 x 5 V AC/DC ... 30 V AC/DC	1 x 4 mA ... 20 mA	700 Ω (at $U_B = 24 V$ , $R_B = [U_B - 10 V] / 20 mA$ )
3 floating PDT contacts	30 V DC / 120 V AC	0.5 A	Transmitter (TX)
9 V DC ... 30 V DC	75 mA / 350 mA	IP65	-40 °C ... 70 °C
12 V DC ... 30 V DC	85 mA / 125 mA	IP20	Polyamide PA non-reinforced
	-40 °C ... 70 °C		17.5 / 99 / 114.5 mm
FCC directive, Part 15.247	ISC directive RSS 210	Class I, Div. 2, Groups A, B, C, D	

### Industrial Wireless LAN (802.11)

The products are especially developed for industrial use in rough environments. The field of application is in the configuration of wireless networks in acc. with the IEEE standard 802.11 a/b/g in industrial production halls and warehouses.

The products includes the following additional convincing features:

- Dual band radio receiver for 802.11 b/g (2.4 GHz band) and 802.11 a/h (5 GHz band)
- Highest security thanks to the support of the security standard IEEE 802.11i

### WLAN



### RAD-80211-XD(-WM)

Wireless LAN Access Point  
For the b, g and a wireless standards

Ex:

Description	Type	Order No.	Pcs. Pkt.
<b>Wireless LAN Access Point</b>			
- One wireless interface, antennas as accessories	<b>RAD-80211-XD</b>	<b>2885728</b>	1
- One wireless interface, two antennas	<b>RAD-80211-XD-WM</b>	<b>2885715</b>	1
<b>Technical data</b>			
<b>Wireless interface</b>			
Wireless standard	IEEE 802.11 a/b/g		
Frequency band	ISM 2.4 GHz / 5 GHz		
Transmission capacity	20 dBm (EIRP)		
Antenna connection method	MCX (female)		
<b>Antenna</b>			
<b>Ethernet interfaces</b>			
Type of connection	RJ45 female connector		
<b>Serial port</b>			
Type of connection	D-SUB 9, COMBICON		
Protocols supported	RS-232, RS-485, RS-422		
<b>Power supply for module electronics</b>			
Supply voltage	24 V DC		
Type of connection	Via COMBICON		
Range of supply voltages	12 V DC ... 30 V DC		
Supply current	300 mA		
<b>Security</b>			
	WEP 64 bit/128 bit		
	WPA TKIP		
	802.11i WPA2 (AES)		
<b>Function</b>			
Operating modes	Access point, client, bridge		
Configuration	Web-based management		
Automatic channel selection	Yes		
<b>General data</b>			
Radio (wireless) certifications	FCC ID NKRCM9		
Width	45 mm		
Height	99 mm		
Depth	115 mm		
Degree of protection	IP20		
Ambient temperature (operation)	0 °C ... 65 °C		
Permissible humidity (operation)	5 % ... 90 % (non-condensing)		
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	DIN rail mounting		
<b>Conformance / approvals</b>			
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D		





Type	Order no.	Page	Type	Order no.	Page	Type	Order no.	Page
QUINTPS-3X400-500AC/24DC/10	2938617	131						
QUINTPS-3X400-500AC/24DC/20	2938727	131						
QUINTPS-3X400-500AC/24DC/40	2938646	131						
QUINTPS-3X400-500AC/24DC/5	2938594	130						

## R

RAD-80211-XD	2885728	144
RAD-80211-XD-WM	2885715	144
RAD-IN+OUT-2D-1A-I	2867322	135
RAD-IN-2D-CNT	2885223	135
RAD-IN-4A-I	2867115	134
RAD-IN-8D	2867144	134
RAD-ISM-2400-ANTFOMNI-2-1	2867461	127
RAD-ISM-2400-ANTPAN-8-0	2867610	127
RAD-ISM-900-BD-BUS	2867092	137
RAD-ISM-900-DATA-BD	2867131	140
RAD-ISM-900-DATA-BD-BUS	2867296	141
RAD-ISM-900-RS232-BD	2867555	139
RAD-ISM-900-FX	2867047	142
RAD-ISM-900-SET-AC-UD	2867021	143
RAD-ISM-900-SET-BD-BUS	2867089	137
RAD-ISM-900-SET-BD-BUS-ANT	2867270	137
RAD-ISM-900-SET-DC-UD	2867034	143
RAD-ISM-900-SET-UD-ANT	2867102	142
RAD-ISM-900-XD-BUS	2885605	138
RAD-OUT-2D-CNT	2885236	135
RAD-OUT-4A-I	2867128	134
RAD-OUT-8D-REL	2867157	134
RAD-PIG-EF316-MCX-SMA	2867678	127

## S

S-PT1-2PE-24DC	2818122	13
S-PT1-2PE-24DC/P	2818216	13
SSA 3-6	2839295	5
SSA 5-10	2839512	5
SUBCON 9/F-SH	2761499	123
SUBCON 9/M-SH	2761509	123

## T

TT-2-PE- 24DC	2838186	10
TT-2- 24DC	2838173	11
TT-EX(I)- 24DC	2832124	11
TT-PI-EX-TB	2858386	93
TT-PI-EX-TB/T	2858344	93
TT-PI-TB	2858373	93



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