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# Interface Technology and Switching Devices

2017/2018



# Interface technology and switching devices



## Terminal blocks

- Terminal blocks



## Power supplies, surge protection and device circuit breakers

- Surge protection and interference suppression filters
- Power supplies and UPS
- Protective devices



## Sensor/actuator cabling and connectors

- Sensor/actuator cabling
- Cables and lines
- Connectors



## Automation

- Lighting and signaling
- Fieldbus components and systems
- Functional safety
- HMIs and industrial PCs
- I/O systems
- Industrial cloud computing
- Industrial communication technology
- Software
- Controllers



## Marking systems, tools and mounting material

- Marking and labeling
- Tools
- Installation and mounting material



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# Complete overview

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# Complete overview

## Product range overview

### Relay modules



RIFLINE complete

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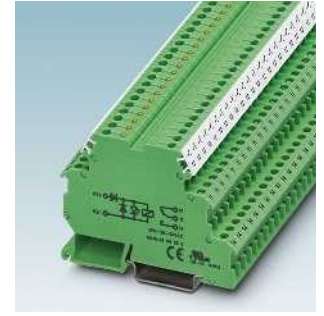
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# Electronic switching devices and motor control

Switching devices for starting, reversing, and protecting electric motors rank among the components used in automation technology. These components are designed redundantly for safety-sensitive applications. When it comes to reducing installation time and space requirements, CONTACTRON hybrid motor starters are the state-of-the-art alternative.

This is because CONTACTRON hybrid motor starters combine up to four functions in a single device. They are integrated into popular fieldbus systems via the Interface system connection or via the SmartWire-DT™ wiring system.

For protection of the entire system, the product range now includes the electronic motor manager (EMM). In addition to typical measured values such as voltage and current, the behavior of the system is monitored and protected by means of real power measurement. The process data in all popular fieldbus systems can be supplied with the gateway and evaluated by a controller.

## Product range overview

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## Product overview

### Motor management



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### Hybrid motor starters



Network-capable hybrid motor starters with  
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Hybrid motor starters with reversing function  
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Network-capable hybrid motor starters with  
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Hybrid motor starters with direct start  
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Semiconductor reversing contactor with  
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### IP67 motor starters



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### Electronic motor management (EMM)

The electronic motor management modules offer all the advantages of modern real power monitoring.

The measuring and evaluation electronics for all performance classes. EMM offers the same functionality for all performance classes, only without a power section.

#### Power within limits

Monitoring is based on freely parameterizable switching and signaling thresholds for overload and underload detection. Identical or separate settings can be made for the thresholds for both directions of rotation. The real power consumed, calculated from three currents, voltages, and the phase angle, is used for parameterization. As it is independent of voltage fluctuations and drive load, the parameterization is thus much more precise than when only the current is taken into consideration. If a switching threshold is violated, an emergency shutdown of the motor is initiated immediately or with an adjustable “delay time”. In addition, a message is sent via an output.

This state can only be deactivated via a defined reset. If the real power consumed is determined as being above or below the message thresholds, all that occurs is that a

check-back is returned for the duration for which the module was addressed.

In addition, signals are generated by the module for the recognition of the direction of rotation. Asymmetry and phase failures are detected and signalized.

Permanent status monitoring with high scanning rates and the fast semiconductor switch enable complete system protection, including motor protection.

Without any extra wiring - and with just a single device - pumps, actuating drives, fans, and tools are monitored for proper functioning, contamination (filter or similar), and wear. The adjustable “inrush suppression” time can be used to mask out the switching operation from the monitoring process.

### Interface system

The Interface system (IFS) consists of devices which can be connected to each other via the DIN rail connector. A gateway with up to 32 IFS devices forms the head of Interface system. The station is managed by the gateway.

Interface system properties:

- Use of the Interface system via the DIN rail connector for the purpose of parameterization, diagnostics, and the exchange of data with each other
- Compatible with defined IFS accessories
- 24 V supply of the devices (e.g., EMM...IFS, ELR...IFS, EM-GATEWAY-IFS) via the DIN rail connector



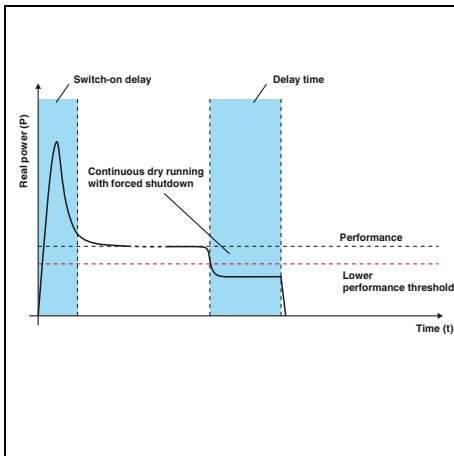
Protection against dry running, blocking, and cavitation, warning thresholds to indicate filter contamination.



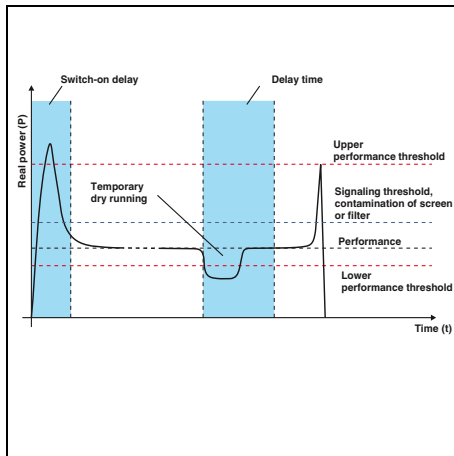
Protection against blocking, warning thresholds for bearing wear and other cases that trigger overload.



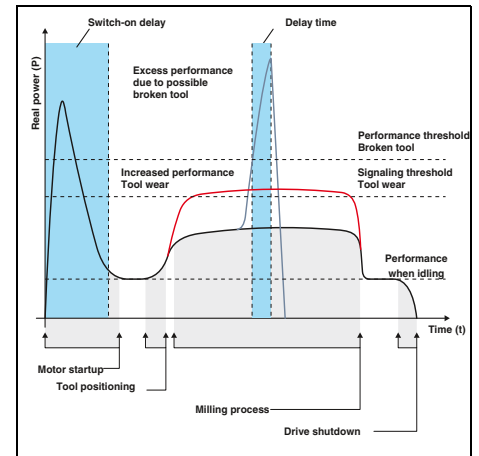
Protection against blocking and broken tools, warning thresholds for tool and bearing wear.



In the case of motor-driven pumps, the lower performance threshold provides reliable protection against hazardous dry running.



Forced shutdown of the drive is delayed by the “delay time”. This prevents forced shutdown in the event of air bubbles.



Machine tools are monitored and protected in a similar way when drilling, milling or grinding. If the feed value on a milling machine is set too high, a tool may break in the “worst-case” scenario. The power threshold, parameterized accordingly, can be used to resolve this issue.

Additionally, a message threshold signals tool wear in advance.

## Motor management

### Electronic motor management

EMM motor management (with or without current transformer) for all performance classes monitors and protects 3-phase loads, such as electrical drives.

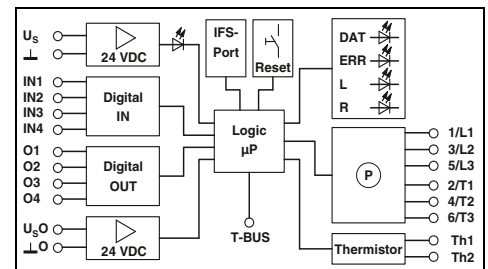
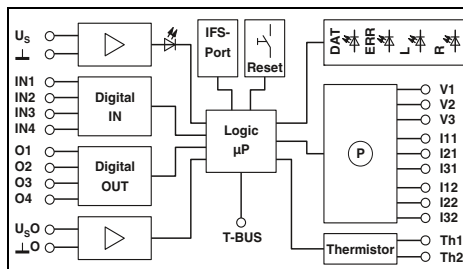
- Freely parameterizable signaling or switching thresholds
- Digital outputs control external switching elements
- Optional connection to the Interface system (e.g., IFS gateways) via DIN rail connector



Allows the use of external current transformers



With integrated current transformers



#### Technical data

Input data	24 V DC	230 V AC
Rated control supply voltage $U_s$	19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
Control supply voltage range	25 mA	10 mA
Rated control supply current $I_s$ at $U_s$	EMM 3- 24DC/500AC-IFS	EMM 3-230AC/500AC-IFS
Input data of digital inputs	4 (IN1 - IN4)	4 (IN1 - IN4)
Number of inputs	24 V DC	230 V AC
Rated actuating voltage $U_c$	3.3 mA	3.5 mA
Rated actuating current $I_c$		
Power measurement		
Voltage measuring input	42 V AC ... 575 V AC	42 V AC ... 575 V AC
Nominal current, voltage measuring input	< 0.5 mA	< 0.5 mA
Current measuring input	5 A (Secondary external converter)	5 A (Secondary external converter)
Output data for confirmation contacts		
O1 - O4 in the case of 1 signal	24 V DC (semiconductor output) / 500 mA	230 V AC (Relay output) / 500 mA
General data		
Rated insulation voltage	500 V	
Rated surge voltage	6 kV	6 kV
Ambient temperature (operation)	-25 °C ... 70 °C	
Standards/regulations	DIN EN 50178 / EN 60947 / EN 60947-4-2	
Degree of protection in acc. with IEC 60529/EN 60529	IP20	
Mounting position	Vertical (horizontal DIN rail)	
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
Dimensions	22.5 mm / 99 mm / 114.5 mm	
EMC note	Class A product, see page 605	

#### Technical data

Input data	24 V DC	230 V AC
Rated control supply voltage $U_s$	19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
Control supply voltage range	25 mA	10 mA
Rated control supply current $I_s$ at $U_s$	EMM 3- 24DC/500AC-16-IFS	EMM 3-230AC/500AC-16-IFS
Input data of digital inputs	4 (IN1 - IN4)	4 (IN1 - IN4)
Number of inputs	24 V DC	230 V AC
Rated actuating voltage $U_c$	3.3 mA	3.5 mA
Rated actuating current $I_c$		
Power measurement		
Voltage measuring input	42 V AC ... 575 V AC	42 V AC ... 575 V AC
Nominal current, voltage measuring input	< 0.5 mA	< 0.5 mA
Current measuring input	max. 16 A	max. 16 A
Output data for confirmation contacts		
O1 - O4 in the case of 1 signal	24 V DC (semiconductor output) / 500 mA	230 V AC (Relay output) / 500 mA
General data		
Rated insulation voltage	500 V	
Rated surge voltage	6 kV	6 kV
Ambient temperature (operation)	-25 °C ... 70 °C	
Standards/regulations	DIN EN 50178 / EN 60947 / EN 60947-4-2	
Degree of protection in acc. with IEC 60529/EN 60529	IP20	
Mounting position	Vertical (horizontal DIN rail)	
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
Dimensions	22.5 mm / 99 mm / 114.5 mm	
EMC note	Class A product, see page 605	

#### Ordering data

Description			
Electronic motor management	Type	Order No.	Pcs./ Pkt.
	EMM 3- 24DC/500AC-IFS	2297497	1
	EMM 3-230AC/500AC-IFS	2297507	1

#### Ordering data

Description			
Electronic motor management	Type	Order No.	Pcs./ Pkt.
	EMM 3- 24DC/500AC-16-IFS	2297523	1
	EMM 3-230AC/500AC-16-IFS	2297536	1

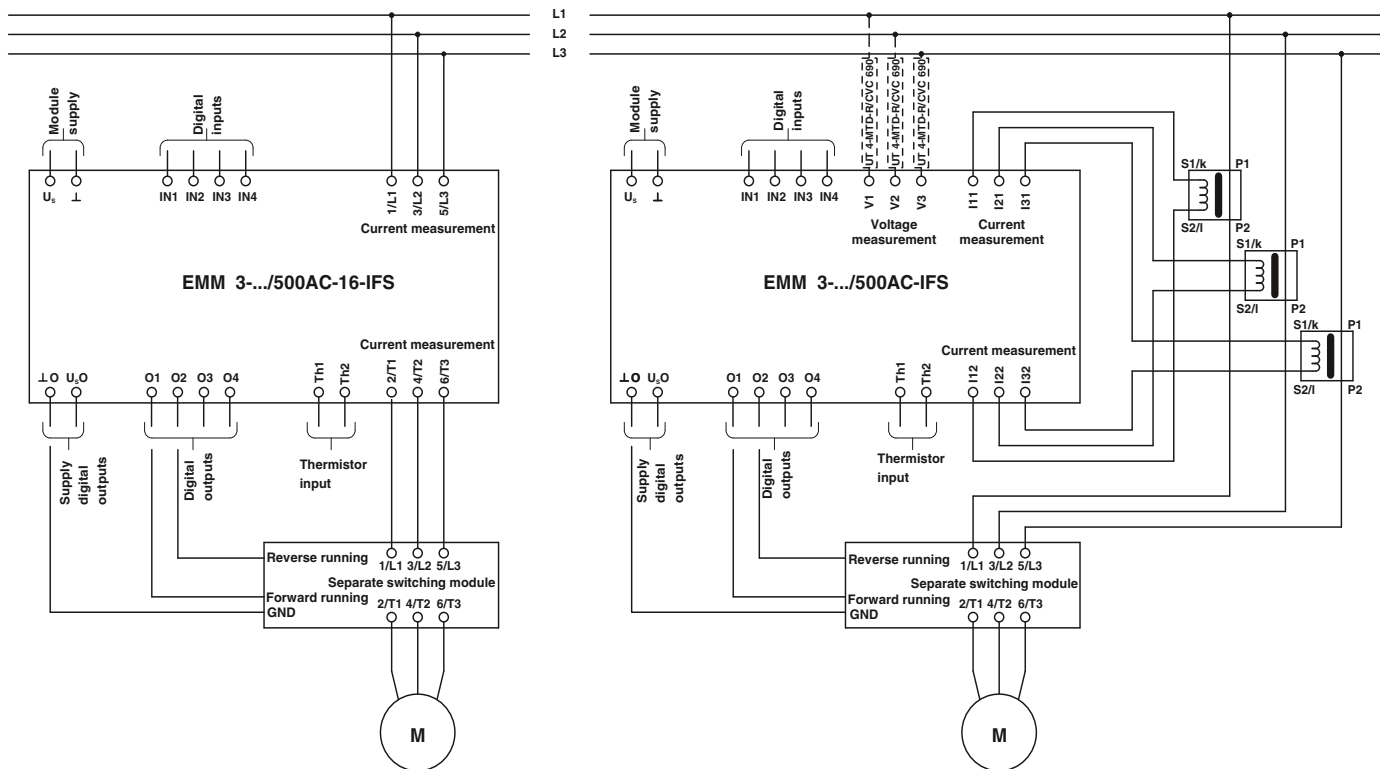
#### Accessories

Configuration package for the EMM...IFS, comprising CONTACTRON-DTM-IFS, USB programming adapter, and user manual on CD	MM-CONF-SET	2297992	1
Programming adapter for configuring modules with S-PORT interface	IFS-USB-PROG-ADAPTER	2811271	1
DIN rail connector	ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
Voltage transducer for 690 V, for EMM 3-.../500AC-IFS, comprising 3 terminal blocks and cover	UT 4-MTD-R/CVC 690/SET	2901667	1
Multi-functional memory module for the Interface system			
- Flat design	IFS-CONFSTICK	2986122	1
- Tall design	IFS-CONFSTICK-L	2901103	1
MINI COMBICON connectors			
- Female contact	MC 1,5/ 5-ST-3,81	1803604	250
- Male contact	IMC 1,5/ 5-ST-3,81	1857919	50

#### Accessories

Configuration package for the EMM...IFS, comprising CONTACTRON-DTM-IFS, USB programming adapter, and user manual on CD	MM-CONF-SET	2297992	1
Programming adapter for configuring modules with S-PORT interface	IFS-USB-PROG-ADAPTER	2811271	1
DIN rail connector	ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
Voltage transducer for 690 V, for EMM 3-.../500AC-IFS, comprising 3 terminal blocks and cover	UT 4-MTD-R/CVC 690/SET	2901667	1
Multi-functional memory module for the Interface system			
- Flat design	IFS-CONFSTICK	2986122	1
- Tall design	IFS-CONFSTICK-L	2901103	1
MINI COMBICON connectors			
- Female contact	MC 1,5/ 5-ST-3,81	1803604	250
- Male contact	IMC 1,5/ 5-ST-3,81	1857919	50

Electronic motor management



The electronic motor management modules (EMM) offer all the advantages of modern real power monitoring. Every 6.6 ms, the real power consumed of a drive system or another 3-phase load is determined based on three currents, voltages, and the phase angle. Currents up to 16 A are directly acquired and currents >16 A are fed through external converters. Separate mechanical or electronic switching elements, which take care of the actual load switching, are controlled via digital outputs. The EMM is designed to reliably protect connected loads - irrespective of their power consumption - against overload and underload, and to provide continuous status monitoring.

Up to 8 freely parameterizable switching, message thresholds and up to four freely configurable inputs and outputs enable the protection of electrical drives and the system.

The EMM modules can record the following data:

- Apparent, real, and reactive power
- Currents and voltages
- Phase angle
- Switching-cycle and operating-hours
- Power meter

Additional functions:

- Adjustable bimetal function class 5-30
- Thermistor monitor
- Recording measured values
- GATEWAY connection via DIN rail connector
- Pre-configured motor feeders such as reversing starters, star-delta starters, etc.

With the EMM modules, complete "driving curves" are recorded, which can be used for the system documentation, for example.

With the forward running, reverse running, reversing, and limit switch (with integrated restart lock) operating modes, actuators and control drives, pumps and similar are switched and monitored for wear.

**Current transformer**

The external converters should be selected with a secondary nominal current of 5 A. The primary current is determined by the current consumption of the load (refer to connection diagram). For suitable current transformers, see Interface catalog.

**DIN rail connectors**

The DIN rail connectors (Order No. 2707437) are used to supply several EMMs with 24 V DC or to couple up to 32 EMMs (for example) to the PROFIBUS-GATEWAY-IFS.

**Switching element**

Depending on the requirements for the actual load switching, an electromechanical contactor or a reversing contactor combination or a solid-state contactor/solid-state reversing contactor is used. These switching elements are controlled via the digital outputs of the EMM modules.

## Motor management

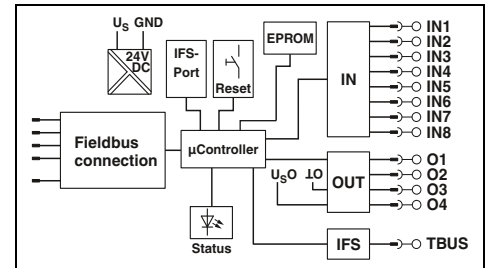
### IFS gateways for Interface system devices

EM...GATEWAY-IFS for connecting Interface system devices (IFS) to popular bus systems: PROFIBUS DP, Modbus, Modbus/TCP, DeviceNet™, CANopen®, and PROFINET, EtherNet/IP™.

- Communication via DIN rail connector with up to 32 Interface system devices, such as EMM...IFS- and ELR...IFS modules
- Equipped with freely parameterizable digital inputs and outputs
- Digital switching outputs for direct control



IFS gateways



#### Technical data

<b>Input data</b>	
Rated control supply voltage $U_s$	24 V DC -20 % ... +25 %
Rated control supply current $I_s$	85 mA (plus load current of the outputs)
Input circuit	Reverse polarity protection
<b>Digital inputs</b>	
Number of inputs	8
Rated actuating voltage $U_C$	24 V DC $\pm 20$ %
Rated actuating current $I_C$	3 mA
Input circuit	Reverse polarity protection
<b>Digital outputs</b>	
Number of outputs	4
Maximum switching voltage	23 V DC ( $U_B - U_{resid.}$ of the output)
Max. switching current	500 mA
Residual voltage	1 V
Output protection	Parallel protection against polarity reversal, pay attention to the fuse
<b>General data</b>	
Ambient temperature (operation)	-35 °C ... 50 °C
Nominal operating mode	100% operating factor
Standards/regulations	EN 50178
Degree of protection	IP20
Mounting position/mounting	any / In rows with zero spacing
Connection data solid/stranded/AWG	0.2 ... 2 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 12 - 24
Dimensions	22.5 mm / 99 mm / 114.5 mm
EMC note	Class A product, see page 605

#### Ordering data

Description	Type	Order No.	Pcs./Pkt.
<b>IFS gateway</b> for PROFIBUS DP	EM-PB-GATEWAY-IFS	2297620	1
RS-232	EM-RS232-GATEWAY-IFS	2901526	1
RS-485	EM-RS485-GATEWAY-IFS	2901527	1
Modbus/TCP	EM-MODBUS-GATEWAY-IFS	2901528	1
DeviceNet™	EM-DNET-GATEWAY-IFS	2901529	1
CANopen®	EM-CAN-GATEWAY-IFS	2901504	1
PROFINET	EM-PNET-GATEWAY-IFS	2904472	1
EtherNet/IP™	EM-ETH-GATEWAY-IFS	2901988	1

#### Accessories

<b>Configuration package</b> for the EMM...IFS, comprising CONTACTRON-DTM-IFS, USB programming adapter, and user manual on CD	MM-CONF-SET	2297992	1
<b>Programming adapter</b> for configuring modules with S-PORT interface	IFS-USB-PROG-ADAPTER	2811271	1
<b>DIN rail connector</b>	ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
<b>MINI COMBICON connectors</b>	MC 1,5/ 5-ST-3,81	1803604	250
- Female contact	IMC 1,5/ 5-ST-3,81	1857919	50
- Male contact			



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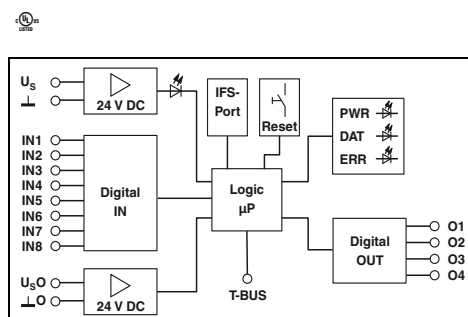
### IFS extension module for the Interface system

EM-D-8/4... IFS digital extension module for the Interface system (IFS). For more complex applications, in order to process additional signals in the field.

- Communication with an IFS gateway via DIN rail connector as the slave
- Freely configurable digital inputs and outputs



IFS extension module



#### Technical data

<b>Input data</b>	
Rated control supply voltage $U_s$	24 V DC -20 % ... +25 %
Rated control supply current $I_s$	85 mA (plus load current of the outputs)
Input circuit	Reverse polarity protection
<b>Digital inputs</b>	
Number of inputs	8
Rated actuating voltage $U_c$	24 V DC $\pm 20$ %
Rated actuating current $I_c$	3 mA
Input circuit	Reverse polarity protection
<b>Digital outputs</b>	
Number of outputs	4
Maximum switching voltage	23 V DC ( $U_B - U_{resid.}$ of the output)
Max. switching current	500 mA (per output)
Residual voltage	1 V
Output protection	Parallel protection against polarity reversal, pay attention to the fuse
<b>General data</b>	
Ambient temperature (operation)	-35 °C ... 50 °C
Nominal operating mode	100% operating factor
Standards/regulations	EN 61131-2
Degree of protection	IP20
Mounting position/mounting	any / In rows with zero spacing
Connection data solid/stranded/AWG	0.2 ... 2 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 12 - 24
Dimensions	22.5 mm / 99 mm / 114.5 mm

#### Ordering data

Description	Type	Order No.	Pcs./Pkt.
IFS extension module, with 8 digital inputs and 4 digital outputs	EM-D-8/4-24DC-IFS	2904473	1

#### Accessories

<b>Configuration package</b> for the EMM...IFS, comprising CONTACTRON-DTM-IFS, USB programming adapter, and user manual on CD	MM-CONF-SET	2297992	1
<b>Programming adapter</b> for configuring modules with S-PORT interface	IFS-USB-PROG-ADAPTER	2811271	1
<b>DIN rail connector</b>	ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
<b>MINI COMBICON connectors</b>			
- Female contact	MC 1,5/ 5-ST-3,81	1803604	250
- Male contact	IMC 1,5/ 5-ST-3,81	1857919	50



The CONTACTRON hybrid motor starters combine up to four functions in one device: motor starter, reversing function, motor protection against overload, and emergency stop.

In addition to standard devices for parallel wiring, network-capable versions, which can be integrated into fieldbus environments, are also available.

CONTACTRON hybrid motor starter technology is a microprocessor-controlled combination of wear-free solid-state technology and robust relay technology. The semiconductors execute the wear-prone on and off switching procedures, while the relays only conduct low-loss current. This enables soft switching and considerably reduces the load on the relay contacts.

Switch motors safely and reliably with compact hybrid motor starters.

The devices are used wherever three-phase asynchronous motors, from 50 W to 3 kW, need to be reversed and protected. The product range of hybrid motor starters consists of direct and reversing starters, which are available with various functions such as emergency stop and motor protection.



Hybrid motor starter with up to four functions in one device: forward running, reverse running, motor protection, and emergency stop.



Short-circuit-proof hybrid motor starter with integrated fuses, for mounting on 35 mm DIN rail and 60 mm busbar systems.



Connection of hybrid motor starters in a bus system via SmartWire-DT™. Gateways are available for the most important bus systems: PROFIBUS, Modbus/TCP, EtherNet/IP™, and CANopen®.



Connection of the hybrid motor starter to a bus system via the IFS Interface system. Gateways are available for the most important bus systems: PROFIBUS DP, Modbus/TCP, EtherNet/IP™, CANopen®, DeviceNet™, PROFINET, etc.

## Hybrid motor starters

### Network-capable hybrid motor starter with reversing function

These 3-phase hybrid motor starters offer up to four functions: forward running, reverse running, motor protection, and emergency stop up to SIL3 / PL e.

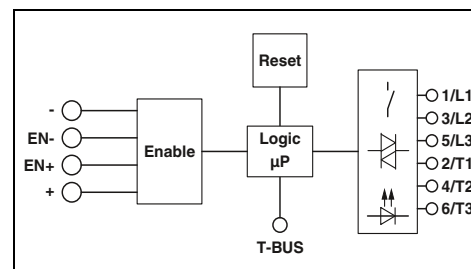
They offer the following advantages:

- Bus connection via Interface system (IFS) or via IO-Link
- Reduction in wiring
- Bi-metal function, adjustable up to 9 A
- Long service life
- Space-saving
- 3-phase loop bridging
- Safety level according to:
  - IEC 61508-1: SIL3
  - ISO 13849: PL e

Notes:
Type of housing: Polyamide PA, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3



Motor protection, emergency stop, and Interface system support



#### Technical data

<b>Input data</b>	
Rated control supply voltage $U_s$	24 V DC
Control supply voltage range	19.2 V DC ... 30 V DC
Rated control supply current $I_c$ at $U_s$	60 mA
Rated actuating voltage $U_c$ EN+	24 V DC
Actuating voltage range	19.2 V DC ... 30 V DC
Rated actuating current $I_c$ at $U_c$	7 mA
Input circuit	Reverse polarity protection, Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED
<b>Output data load side</b>	
Operating voltage range	42 V AC ... 550 V AC
Output protection	Surge protection
<b>General data</b>	
Rated insulation voltage	550 V
Rated surge voltage	6 kV
Ambient temperature (operation)	-5 °C ... 60 °C (observe derating)
Standards/regulations	IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849
Mounting position	vertical (horizontal DIN rail, motor output below)
<b>Mounting</b>	
Connection data solid/stranded/AWG	alignable, for spacing see derating
Dimensions	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14 22.5 mm / 99 mm / 114.5 mm

Rated control supply voltage $U_s$	24 V DC
Control supply voltage range	19.2 V DC ... 30 V DC
Rated control supply current $I_c$ at $U_s$	60 mA
Rated actuating voltage $U_c$ EN+	24 V DC
Actuating voltage range	19.2 V DC ... 30 V DC
Rated actuating current $I_c$ at $U_c$	7 mA
Input circuit	Reverse polarity protection, Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED
<b>Output data load side</b>	
Operating voltage range	42 V AC ... 550 V AC
Output protection	Surge protection
<b>General data</b>	
Rated insulation voltage	550 V
Rated surge voltage	6 kV
Ambient temperature (operation)	-5 °C ... 60 °C (observe derating)
Standards/regulations	IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849
Mounting position	vertical (horizontal DIN rail, motor output below)
<b>Mounting</b>	
Connection data solid/stranded/AWG	alignable, for spacing see derating
Dimensions	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14 22.5 mm / 99 mm / 114.5 mm

#### Ordering data

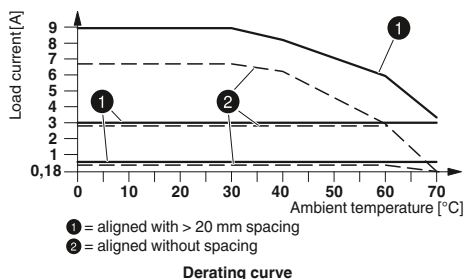
Description
<b>Load current 0.075 A ... 0.6 A</b>
Screw connection
Push-in connection
<b>Load current 0.18 A ... 3 A</b>
Screw connection
Push-in connection
<b>Load current 1.5 A ... 9 A</b>
Screw connection
Push-in connection

Type	Order No.	Pcs./Pkt.
ELR H5-IES-SC/500AC-06-IFS	2905151	1
ELR H5-IES-PT/500AC-06-IFS	2905138	1
ELR H5-IES-SC/500AC-3-IFS	2905152	1
ELR H5-IES-PT/500AC-3-IFS	2905139	1
ELR H5-IES-SC/500AC-9-IFS	2905153	1
ELR H5-IES-PT/500AC-9-IFS	2905140	1

#### Accessories

DIN rail connector
ME 22.5 TBUS 1,5/ 5-ST-3,81 GN

ME 22.5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
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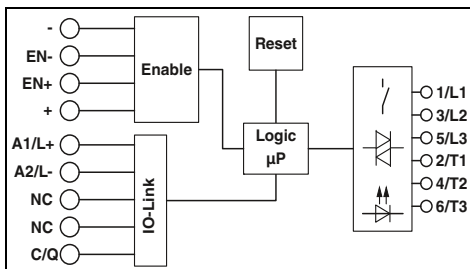
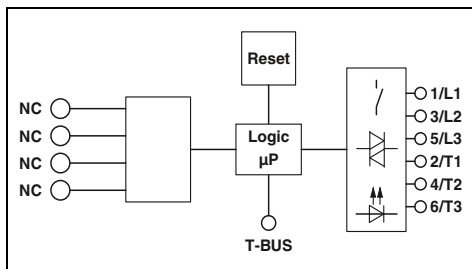


Motor protection and Interface system support



Motor protection, emergency stop, and IO-Link support

new



**Technical data**

**Technical data**

24 V DC  
 19.2 V DC ... 30 V DC  
 60 mA  
 -  
 -  
 -  
 Reverse polarity protection , Surge protection  
 Green LED / Yellow LED / Red LED

---

42 V AC ... 550 V AC  
 Surge protection

---

550 V  
 6 kV  
 -5 °C ... 60 °C (observe derating)  
 IEC 60947-1 / EN 60947-4-2  
 vertical (horizontal DIN rail, motor output below)

---

alignable, for spacing see derating  
 0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
 22.5 mm / 99 mm / 114.5 mm

24 V DC  
 19.2 V DC ... 30 V DC  
 65 mA  
 24 V DC  
 19.2 V DC ... 30 V DC  
 7 mA  
 Reverse polarity protection , Surge protection  
 Green LED / Yellow LED / Red LED

---

42 V AC ... 550 V AC  
 Surge protection

---

550 V  
 6 kV  
 -5 °C ... 55 °C (observe derating)  
 IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849  
 vertical (horizontal DIN rail, motor output below)

---

alignable, for spacing see derating  
 0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
 22.5 mm / 99 mm / 114.5 mm

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./ Pkt.
ELR H5-I-SC/500AC-06-IFS	2905157	1
ELR H5-I-PT/500AC-06-IFS	2905144	1
ELR H5-I-SC/500AC-3-IFS	2905159	1
ELR H5-I-PT/500AC-3-IFS	2905146	1
ELR H5-I-SC/500AC-9-IFS	2905160	1
ELR H5-I-PT/500AC-9-IFS	2905147	1

Type	Order No.	Pcs./ Pkt.
ELR H5-IES-PT/500AC-3-IOL	2908669	1
ELR H5-IES-PT/500AC-9-IOL	2908670	1

**Accessories**

**Accessories**

ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
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## Hybrid motor starters

### Network-capable hybrid motor starter with reversing function

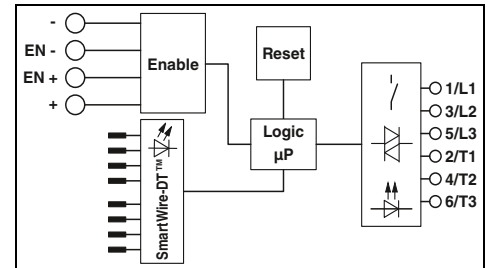
These 3-phase hybrid motor starters offer up to four functions: forward running, reverse running, motor protection, and emergency stop up to SIL3 / PL e.

They offer the following advantages:

- Connection to SmartWire-DT™ (SWD)
- 22.5 mm wide
- Reduction in wiring
- Bi-metal function, adjustable up to 9 A
- Long service life
- Space-saving
- 3-phase loop bridging
- Safety level according to:
  - IEC 61508-1: SIL3
  - ISO 13849: PL e



Motor protection, emergency stop, and SmartWire-DT™ support



#### Technical data

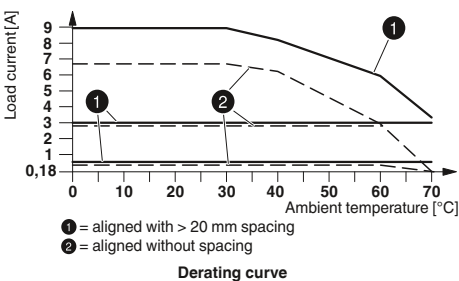
<b>Input data</b>	Rated supply voltage $U_s$	24 V DC
Control supply voltage range	19.2 V DC ... 30 V DC	
Rated control supply current $I_c$ at $U_s$	60 mA	
Rated actuating voltage $U_c$ EN+	24 V DC	
Actuating voltage range	19.2 V DC ... 30 V DC	
Rated actuating current $I_c$ at $U_c$	7 mA	
Input circuit	Reverse polarity protection, Surge protection	
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED	
<b>Output data load side</b>		
Operating voltage range	42 V AC ... 550 V AC	
Output protection	Surge protection	
<b>General data</b>		
Rated insulation voltage	550 V	
Rated surge voltage	6 kV	
Ambient temperature (operation)	-5 °C ... 55 °C (observe derating)	
Standards/regulations	IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849	
Mounting position	vertical (horizontal DIN rail, motor output below)	
Mounting	alignable, for spacing see derating	
Connection data solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
Dimensions	22.5 mm / 99 mm / 114.5 mm	

#### Ordering data

Description	Type	Order No.	Pcs./Pkt.
<b>Load current 0.075 A ... 0.6 A</b> Push-in connection	ELR H5-IES-PT-SWD/500AC-06	2903933	1
<b>Load current 0.18 A ... 2.4 A</b> Push-in connection	ELR H5-IES-PT-SWD/500AC-3	2903934	1
<b>Load current 1.5 A ... 9 A</b> Push-in connection	ELR H5-IES-PT-SWD/500AC-9	2903935	1

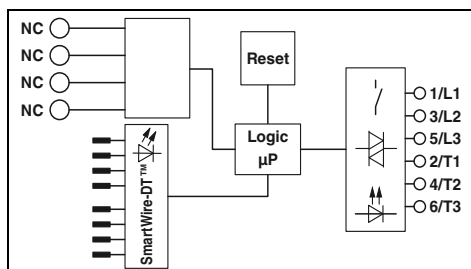
#### Accessories

<b>Device plug, 8-pos.</b>	SWD4-8SF2-5 PXC	2903107	10
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**Motor protection and SmartWire-DT™ support**



**Technical data**

24 V DC  
19.2 V DC ... 30 V DC  
60 mA

-  
-  
-  
Reverse polarity protection , Surge protection  
Green LED / Yellow LED / Red LED

42 V AC ... 550 V AC  
Surge protection

550 V  
6 kV  
-5 °C ... 55 °C (observe derating)  
IEC 60947-1 / EN 60947-4-2  
vertical (horizontal DIN rail, motor output below)

alignable, for spacing see derating  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
22.5 mm / 99 mm / 114.5 mm

**Ordering data**

Type	Order No.	Pcs./ Pkt.
ELR H5-I-PT-SWD/500AC-06	2905073	1
ELR H5-I-PT-SWD/500AC-3	2905074	1
ELR H5-I-PT-SWD/500AC-9	2905075	1

**Accessories**

SWD4-8SF2-5 PXC	2903107	10
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## Hybrid motor starters

### Hybrid motor starters with reversing function

These 3-phase hybrid motor starters offer up to four functions: forward running, reverse running, motor protection, and emergency stop up to SIL3 / PL e.

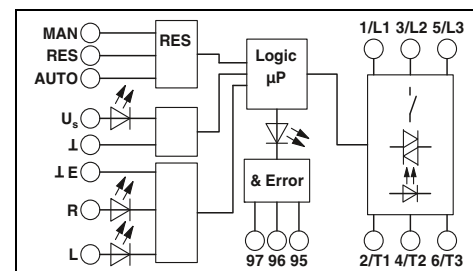
They offer the following advantages:

- 22.5 mm wide
- Reduction in wiring
- Bi-metal function, adjustable up to 9 A
- Long service life
- Space-saving
- 3-phase loop bridging
- Safety level according to:
  - IEC 61508-1: SIL3
  - ISO 13849: PL e

Notes:
Type of housing: Polyamide PA, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3

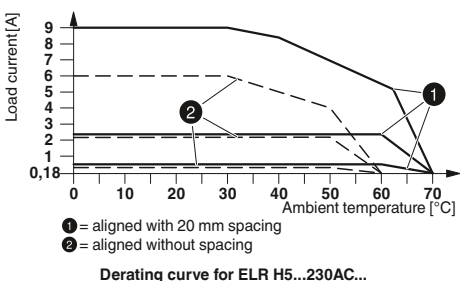
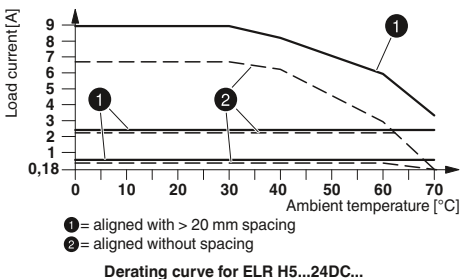


**Motor protection and emergency stop**



Input data
Rated control supply voltage $U_s$
Control supply voltage range
Rated control supply current $I_s$ at $U_s$
Rated actuating voltage $U_c$ R/L
Actuating voltage range
Rated actuating current $I_c$ at $U_c$
Input circuit
Operating voltage / status / error indicator
Output data load side
Operating voltage range
Output protection
General data
Rated insulation voltage
Rated surge voltage
Ambient temperature (operation)
Standards/regulations
Mounting position
Mounting
Connection data solid/stranded/AWG
Dimensions

Technical data	
24 V DC	230 V AC (50/60 Hz)
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
40 mA	4 mA
24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
5 mA	7 mA
Reverse polarity protection , Surge protection	Surge protection
Green LED / Yellow LED / Red LED	
42 V AC ... 550 V AC	42 V AC ... 550 V AC
Surge protection	
500 V	
6 kV	4 kV
-25 °C ... 70 °C (observe derating)	
IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849 vertical (horizontal DIN rail, motor output below)	
alignable, for spacing see derating	
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
22.5 mm / 99 mm / 114.5 mm	



Description
<b>Load current 0.075 A ... 0.6 A</b>
Screw connection
Push-in connection
<b>Load current 0.18 A ... 2.4 A</b>
Screw connection
Push-in connection
Screw connection
<b>Load current 1.5 A ... 9 A</b>
Screw connection
Push-in connection
Screw connection
<b>Load current 0 A ... 9 A</b>
Screw connection
Screw connection

Ordering data		
Type	Order No.	Pcs./ Pkt.
ELR H5-IES-SC- 24DC/500AC-0,6	2900582	1
ELR H5-IES-PT- 24DC/500AC-0,6	2903902	1
ELR H5-IES-SC- 24DC/500AC-2	2900414	1
ELR H5-IES-PT- 24DC/500AC-2	2903904	1
ELR H5-IES-SC-230AC/500AC-2	2900420	1
ELR H5-IES-SC- 24DC/500AC-9	2900421	1
ELR H5-IES-PT- 24DC/500AC-9	2903906	1
ELR H5-IES-SC-230AC/500AC-9	2900422	1

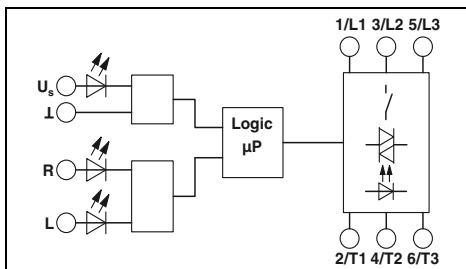
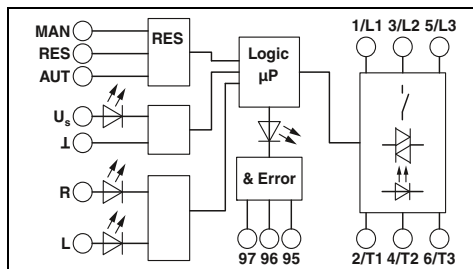




Motor protection



Reversing function only



Technical data

24 V DC	230 V AC (50/60 Hz)
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
40 mA	4 mA
24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
5 mA	7 mA
Reverse polarity protection , Surge protection	Surge protection

Green LED / Yellow LED / Red LED

42 V AC ... 550 V AC	42 V AC ... 550 V AC
Surge protection	

500 V  
6 kV  
-25 °C ... 70 °C (observe derating)  
IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849  
vertical (horizontal DIN rail, motor output below)

alignable, for spacing see derating  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
22.5 mm / 99 mm / 114.5 mm

Technical data

24 V DC	230 V AC (50/60 Hz)
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
40 mA	4 mA
24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
5 mA	7 mA
Reverse polarity protection , Surge protection	Surge protection

Green LED / Yellow LED / Red LED

42 V AC ... 550 V AC	42 V AC ... 550 V AC
Surge protection	

500 V  
6 kV  
-25 °C ... 70 °C (observe derating)  
IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849  
vertical (horizontal DIN rail, motor output below)

alignable, for spacing see derating  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
22.5 mm / 99 mm / 114.5 mm

Ordering data

Type	Order No.	Pcs./ Pkt.
ELR H5-I-SC- 24DC/500AC-0,6	2900573	1
ELR H5-I-PT- 24DC/500AC-0,6	2903908	1
ELR H5-I-SC- 24DC/500AC-2	2900574	1
ELR H5-I-PT- 24DC/500AC-2	2903910	1
ELR H5-I-SC-230AC/500AC-2	2900575	1
ELR H5-I-SC- 24DC/500AC-9	2900576	1
ELR H5-I-PT- 24DC/500AC-9	2903912	1
ELR H5-I-SC-230AC/500AC-9	2900578	1

Ordering data

Type	Order No.	Pcs./ Pkt.
ELR H5-SC- 24DC/500AC-9	2900538	1
ELR H5-SC-230AC/500AC-9	2900539	1



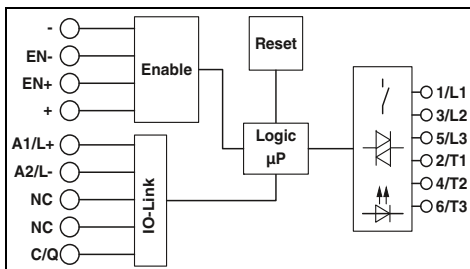
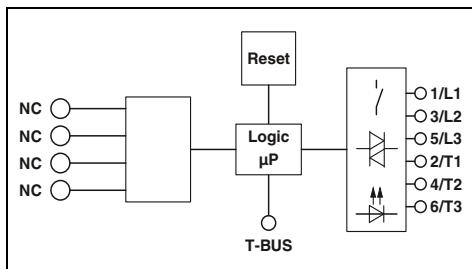


Motor protection and Interface system support



Motor protection, emergency stop, and IO-Link support

new



**Technical data**

**Technical data**

24 V DC  
 19.2 V DC ... 30 V DC  
 60 mA  
 -  
 -  
 -  
 Reverse polarity protection , Surge protection  
 Green LED / Yellow LED / Red LED

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42 V AC ... 550 V AC  
 Surge protection

---

550 V  
 6 kV  
 -5 °C ... 60 °C (observe derating)  
 IEC 60947-1 / EN 60947-4-2  
 vertical (horizontal DIN rail, motor output below)

---

alignable, for spacing see derating  
 0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
 22.5 mm / 99 mm / 114.5 mm

24 V DC  
 19.2 V DC ... 30 V DC  
 65 mA  
 24 V DC  
 19.2 V DC ... 30 V DC  
 7 mA  
 Reverse polarity protection , Surge protection  
 Green LED / Yellow LED / Red LED

---

42 V AC ... 550 V AC  
 Surge protection

---

550 V  
 6 kV  
 -5 °C ... 55 °C (observe derating)  
 IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849  
 vertical (horizontal DIN rail, motor output below)

---

alignable, for spacing see derating  
 0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
 22.5 mm / 99 mm / 114.5 mm

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./ Pkt.
ELR H3-I-SC/500AC-06-IFS	2905162	1
ELR H3-I-PT/500AC-06-IFS	2905148	1
ELR H3-I-SC/500AC-3-IFS	2905163	1
ELR H3-I-PT/500AC-3-IFS	2905149	1
ELR H3-I-SC/500AC-9-IFS	2905164	1
ELR H3-I-PT/500AC-9-IFS	2905150	1

Type	Order No.	Pcs./ Pkt.
ELR H3-IES-PT/500AC-3-IOL	2908671	1
ELR H3-IES-PT/500AC-9-IOL	2908672	1

**Accessories**

**Accessories**

ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
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## Hybrid motor starters

### Network-capable hybrid motor starter with direct start function

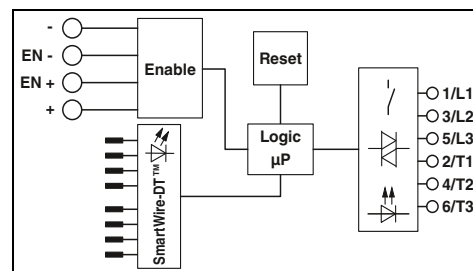
These 3-phase hybrid motor starters offer up to three functions: forward running, motor protection, and emergency stop up to SIL3 / PL e.

They offer the following advantages:

- Connection to SmartWire-DT™ (SWD)
  - 22.5 mm wide
  - Reduction in wiring
  - Bi-metal function, adjustable up to 9 A
  - Long service life
  - Space-saving
  - 3-phase loop bridging
- Safety level according to:
- IEC 61508-1: SIL3
  - ISO 13849: PL e



Motor protection, emergency stop, and SmartWire-DT™ support



#### Technical data

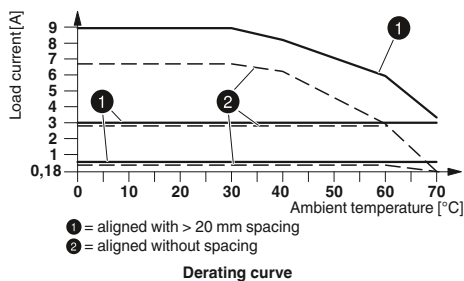
<b>Input data</b>	
Rated supply voltage $U_s$	24 V DC
Control supply voltage range	19.2 V DC ... 30 V DC
Rated control supply current $I_c$ at $U_s$	60 mA
Rated actuating voltage $U_c$ EN+	24 V DC
Actuating voltage range	19.2 V DC ... 30 V DC
Rated actuating current $I_c$ at $U_c$	7 mA
Input circuit	Reverse polarity protection, Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED
<b>Output data load side</b>	
Operating voltage range	42 V AC ... 550 V AC
Output protection	Surge protection
<b>General data</b>	
Rated insulation voltage	550 V
Rated surge voltage	6 kV
Ambient temperature (operation)	-5 °C ... 55 °C (observe derating)
Standards/regulations	IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849
Mounting position	vertical (horizontal DIN rail, motor output below)
Mounting	alignable, for spacing see derating
Connection data solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
Dimensions	22.5 mm / 99 mm / 114.5 mm

#### Ordering data

Description	Type	Order No.	Pcs./Pkt.
<b>Load current 0.075 A ... 0.6 A</b> Push-in connection	ELR H3-IES-PT-SWD/500AC-06	2903936	1
<b>Load current 0.18 A ... 2.4 A</b> Push-in connection	ELR H3-IES-PT-SWD/500AC-3	2903937	1
<b>Load current 1.5 A ... 9 A</b> Push-in connection	ELR H3-IES-PT-SWD/500AC-9	2903938	1

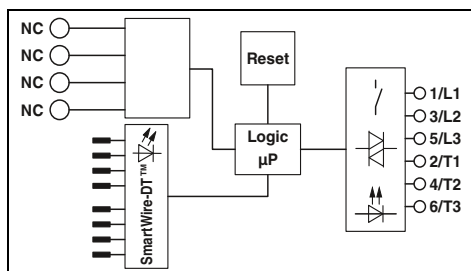
#### Accessories

<b>Device plug, 8-pos.</b>	SWD4-8SF2-5 PXC	2903107	10
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**Motor protection and SmartWire-DT™ support**



**Technical data**

24 V DC  
19.2 V DC ... 30 V DC  
60 mA

-  
-  
Reverse polarity protection , Surge protection  
Green LED / Yellow LED / Red LED

42 V AC ... 550 V AC  
Surge protection

550 V  
6 kV  
-5 °C ... 55 °C (observe derating)  
IEC 60947-1 / EN 60947-4-2  
vertical (horizontal DIN rail, motor output below)

alignable, for spacing see derating  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
22.5 mm / 99 mm / 114.5 mm

**Ordering data**

Type	Order No.	Pcs./ Pkt.
ELR H3-I-PT-SWD/500AC-06	<a href="#">2905076</a>	1
ELR H3-I-PT-SWD/500AC-3	<a href="#">2905078</a>	1
ELR H3-I-PT-SWD/500AC-9	<a href="#">2905079</a>	1

**Accessories**

SWD4-8SF2-5 PXC	<a href="#">2903107</a>	10
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## Hybrid motor starters

### Hybrid motor starters with direct start function

These 3-phase hybrid motor starters offer up to three functions: forward running, motor protection, and emergency stop up to SIL3 / PL e.

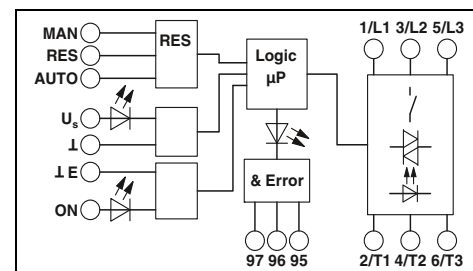
They offer the following advantages:

- 22.5 mm wide
- Reduction in wiring
- Bi-metal function, adjustable up to 9 A
- Long service life
- Space-saving
- 3-phase loop bridging
- Safety level according to:
  - IEC 61508-1: SIL3
  - ISO 13849: PL e

<b>Notes:</b>
Type of housing: Polyamide PA, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3



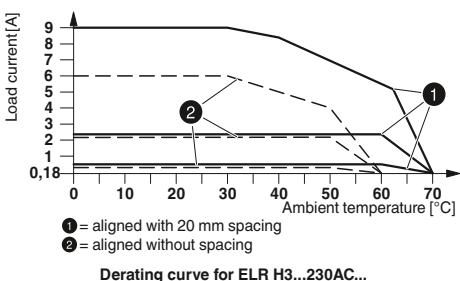
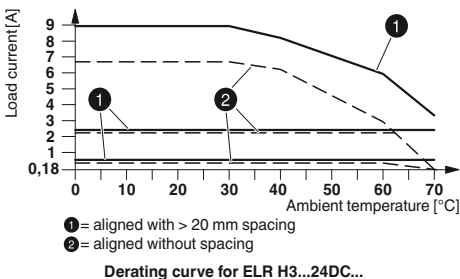
**Motor protection and emergency stop**



### Technical data

<b>Input data</b>	
Rated control supply voltage $U_s$	24 V DC
Control supply voltage range	19.2 V DC ... 30 V DC
Rated control supply current $I_s$ at $U_s$	40 mA
Rated actuation voltage $U_c$ ON	24 V DC
Actuating voltage range	19.2 V DC ... 30 V DC
Rated actuating current $I_c$ at $U_c$	5 mA
Input circuit	
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED
<b>Output data load side</b>	
Operating voltage range	42 V AC ... 550 V AC
Output protection	Surge protection
<b>General data</b>	
Rated insulation voltage	500 V
Rated surge voltage	6 kV
Ambient temperature (operation)	-25 °C ... 70 °C (observe derating)
Standards/regulations	IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849
Mounting position	vertical (horizontal DIN rail, motor output below)
<b>Mounting</b>	
Connection data solid/stranded/AWG	alignable, for spacing see derating 0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
Dimensions	W / H / D 22.5 mm / 99 mm / 114.5 mm

Rated control supply voltage $U_s$	230 V AC (50/60 Hz)
Control supply voltage range	85 V AC ... 253 V AC
Rated control supply current $I_s$ at $U_s$	4 mA
Rated actuation voltage $U_c$ ON	230 V AC
Actuating voltage range	85 V AC ... 253 V AC
Rated actuating current $I_c$ at $U_c$	7 mA
Input circuit	Reverse polarity protection , Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED
<b>Output data load side</b>	
Operating voltage range	42 V AC ... 550 V AC
Output protection	Surge protection
<b>General data</b>	
Rated insulation voltage	500 V
Rated surge voltage	6 kV
Ambient temperature (operation)	-25 °C ... 70 °C (observe derating)
Standards/regulations	IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849
Mounting position	vertical (horizontal DIN rail, motor output below)
<b>Mounting</b>	
Connection data solid/stranded/AWG	alignable, for spacing see derating 0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
Dimensions	W / H / D 22.5 mm / 99 mm / 114.5 mm



<b>Description</b>
<b>Load current 0.075 A ... 0.6 A</b>
Screw connection
Push-in connection
<b>Load current 0.18 A ... 2.4 A</b>
Screw connection
Push-in connection
Screw connection
<b>Load current 1.5 A ... 9 A</b>
Screw connection
Push-in connection
Screw connection
<b>Load current 0 A ... 9 A</b>
Screw connection
Screw connection

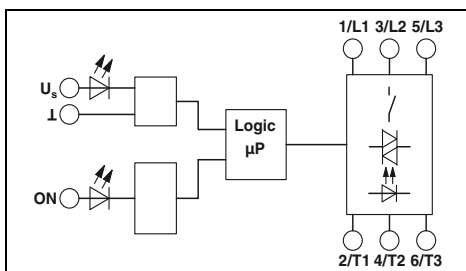
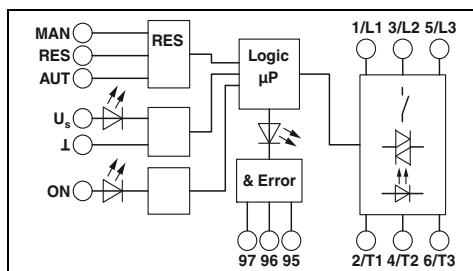
Ordering data		
Type	Order No.	Pcs./ Pkt.
ELR H3-IES-SC- 24DC/500AC-0,6	2900566	1
ELR H3-IES-PT- 24DC/500AC-0,6	2903914	1
ELR H3-IES-SC- 24DC/500AC-2	2900567	1
ELR H3-IES-PT- 24DC/500AC-2	2903916	1
ELR H3-IES-SC-230AC/500AC-2	2900568	1
ELR H3-IES-SC- 24DC/500AC-9	2900569	1
ELR H3-IES-PT- 24DC/500AC-9	2903918	1
ELR H3-IES-SC-230AC/500AC-9	2900570	1



Motor protection



Direct start function only



**Technical data**

**Technical data**

24 V DC	230 V AC (50/60 Hz)
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
40 mA	4 mA
24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
5 mA	7 mA
Reverse polarity protection , Surge protection	Surge protection
Green LED / Yellow LED / Red LED	

24 V DC	230 V AC (50/60 Hz)
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
40 mA	4 mA
24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
5 mA	7 mA
Reverse polarity protection , Surge protection	Surge protection
Green LED / Yellow LED / Red LED	

42 V AC ... 550 V AC	42 V AC ... 550 V AC
Surge protection	

42 V AC ... 550 V AC	42 V AC ... 550 V AC
Surge protection	

500 V  
6 kV  
-25 °C ... 70 °C (observe derating)  
IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849  
vertical (horizontal DIN rail, motor output below)

500 V  
6 kV  
-25 °C ... 70 °C (observe derating)  
IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849  
vertical (horizontal DIN rail, motor output below)

alignable, for spacing see derating  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
22.5 mm / 99 mm / 114.5 mm

alignable, for spacing see derating  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
22.5 mm / 99 mm / 114.5 mm

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./ Pkt.
ELR H3-I-SC- 24DC/500AC-0,6	2900542	1
ELR H3-I-PT- 24DC/500AC-0,6	2903920	1
ELR H3-I-SC- 24DC/500AC-2	2900543	1
ELR H3-I-PT- 24DC/500AC-2	2903922	1
ELR H3-I-SC-230AC/500AC-2	2900544	1
ELR H3-I-SC- 24DC/500AC-9	2900545	1
ELR H3-I-PT- 24DC/500AC-9	2903924	1
ELR H3-I-SC-230AC/500AC-9	2900546	1

Type	Order No.	Pcs./ Pkt.
ELR H3-SC- 24DC/500AC-9	2900530	1
ELR H3-SC-230AC/500AC-9	2900531	1

## Hybrid motor starters

### Hybrid motor starters with short-circuit protection



These short-circuit-proof 3-phase hybrid motor starters for mounting on 35 mm DIN rails or 60 mm power busbars combine four functions in one device: forward running, reverse running, motor protection, and emergency stop up to SIL3 / PL e.

- They offer the following advantages:
- 22.5 mm wide
  - Bi-metal function can be set up to 9 A
  - Long service life
  - Space-saving
  - Reduction in wiring
  - 3-phase loop bridging
  - Plug-in motor output terminal block
  - Coordination type 2 according to IEC/EN 60947-4-2
  - IEC 61508-1: SIL3
  - ISO 13849: PL e

#### Input data

Rated control supply voltage  $U_s$   
 Control supply voltage range  
 Rated control supply current  $I_s$  at  $U_s$   
 Rated actuating voltage  $U_c$  R/L  
 Actuating voltage range  
 Rated actuating current  $I_c$  at  $U_c$   
 Input circuit  
 Operating voltage / status / error indicator  
 Output data load side  
 Operating voltage range  
 Load current range

#### Output protection

General data  
 Rated insulation voltage  
 Rated surge voltage  
 Ambient temperature (operation)  
 Standards/regulations  
 Mounting position

#### Mounting

Screw connection solid/stranded/AWG

#### Dimensions

W / H / D

#### Description

##### Short-circuit-proof hybrid motor starter

Hybrid motor starter  
 DIN rail adapter  
 Busbar adapter, 160 mm  
 Busbar adapter, 200 mm

##### Set consisting of short-circuit-proof hybrid motor starter and adapter

- with DIN rail adapter
- with busbar adapter, 160 mm
- with busbar adapter, 200 mm

#### Fuse

Coordination type 2 to 10 kA/500 V  
 Coordination type 2 to 5 kA/400 V  
 Coordination type 1 to 30 kA/500 V





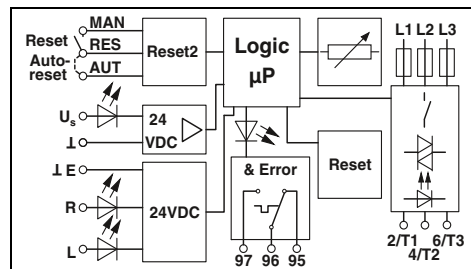
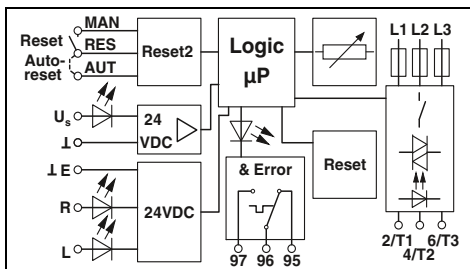
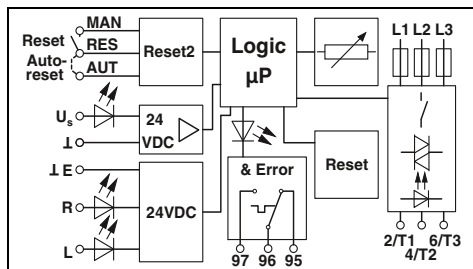
For reversing 3~ AC motors up to 550 V AC/3 x 0.6 A



For reversing 3~ AC motors up to 550 V AC/3 x 2.4 A



For reversing 3~ AC motors up to 550 V AC/3 x 9 A



Technical data

Technical data

Technical data

24 V DC  
19.2 V DC ... 30 V DC  
40 mA  
24 V DC  
19.2 V DC ... 30 V DC  
5 mA  
Reverse polarity protection, Surge protection  
Green LED / Yellow LED / Red LED

24 V DC  
19.2 V DC ... 30 V DC  
40 mA  
24 V DC  
19.2 V DC ... 30 V DC  
5 mA  
Reverse polarity protection, Surge protection  
Green LED / Yellow LED / Red LED

24 V DC  
19.2 V DC ... 30 V DC  
40 mA  
24 V DC  
19.2 V DC ... 30 V DC  
5 mA  
Reverse polarity protection, Surge protection  
Green LED / Yellow LED / Red LED

42 V AC ... 550 V AC  
75 mA ... 600 mA (see derating)

42 V AC ... 550 V AC  
180 mA ... 2.4 A (see derating)

42 V AC ... 550 V AC  
1.5 A ... 9 A (see derating)

Surge protection, Short-circuit protection

Surge protection, Short-circuit protection

Surge protection, Short-circuit protection

500 V  
6 kV  
-25 °C ... 70 °C (observe derating)  
IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849  
vertical (horizontal DIN rail, motor output below)

500 V  
6 kV  
-25 °C ... 70 °C (observe derating)  
IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849  
vertical (horizontal DIN rail, motor output below)

500 V  
6 kV  
-25 °C ... 70 °C (observe derating)  
IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849  
vertical (horizontal DIN rail, motor output below)

alignable, for spacing see derating  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
22.5 mm / 160 mm / 114.5 mm

alignable, for spacing see derating  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
22.5 mm / 160 mm / 114.5 mm

alignable, for spacing see derating  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
22.5 mm / 160 mm / 114.5 mm

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
ELR H51-IESSC-24DC500AC-06	2902746	1
EM RD-ADAPTER	2902747	1
EM RI-ADAPTER COMPACT	2902748	1
EM RI-ADAPTER CLASSIC	2902831	1
ELR H51-0.6-DIN-RAIL-SET	2902952	1
ELR-H51-0,6-BUSBAR-COMPACT-SET	2904333	1
ELR-H51-0,6-BUSBAR-CLASSIC-SET	2904334	1

Type	Order No.	Pcs./ Pkt.
ELR H51-IESSC-24DC500AC-2	2902744	1
EM RD-ADAPTER	2902747	1
EM RI-ADAPTER COMPACT	2902748	1
EM RI-ADAPTER CLASSIC	2902831	1
ELR H51-2.4-DIN-RAIL-SET	2902953	1
ELR-H51-2,4-BUSBAR-COMPACT-SET	2904335	1
ELR-H51-2,4-BUSBAR-CLASSIC-SET	2904336	1

Type	Order No.	Pcs./ Pkt.
ELR H51-IESSC-24DC500AC-9	2902745	1
EM RD-ADAPTER	2902747	1
EM RI-ADAPTER COMPACT	2902748	1
EM RI-ADAPTER CLASSIC	2902831	1
ELR H51-9-DIN-RAIL-SET	2902954	1
ELR-H51-9-BUSBAR-COMPACT-SET	2904337	1
ELR-H51-9-BUSBAR-CLASSIC-SET	2904338	1

Accessories

Accessories

Accessories

FUSE-10X38-16A-GR	2903126	10
FUSE-10X38-20A-GR	2903384	10
FUSE-10X38-30A-MR	2903119	10

FUSE-10X38-16A-GR	2903126	10
FUSE-10X38-20A-GR	2903384	10
FUSE-10X38-30A-MR	2903119	10

FUSE-10X38-16A-GR	2903126	10
FUSE-10X38-20A-GR	2903384	10
FUSE-10X38-30A-MR	2903119	10

## Hybrid motor starters

### Continuous bridge for hybrid motor starters

The flexible CONTACTRON loop bridge (BRIDGE-...) simplifies the supply and looping through of phases L1, L2, and L3. It is available in 2 to 10-way versions for modules in the CONTACTRON family with 22.5 mm housing width.

Features of the 3-phase loop bridge:

- Considerable reduction in wiring
- Suitable for CONTACTRON series
  - ELR H3...
  - ELR H5...
  - ELR (W)3...
  - EMM...IFS
- Bridging of 2 to 10 devices with maximum module spacing of 22.5 mm
- Up to 575 V AC/3 x 25 A
- Additional bridge versions available on request



0.3 m connecting cable for hybrid motor starter with screw connection

ERC

General data	
Nominal voltage $U_N$	42 V AC ... 575 V AC
Nominal current at $U_N$	≤ 25 A
Cross section	2.5 mm <sup>2</sup>

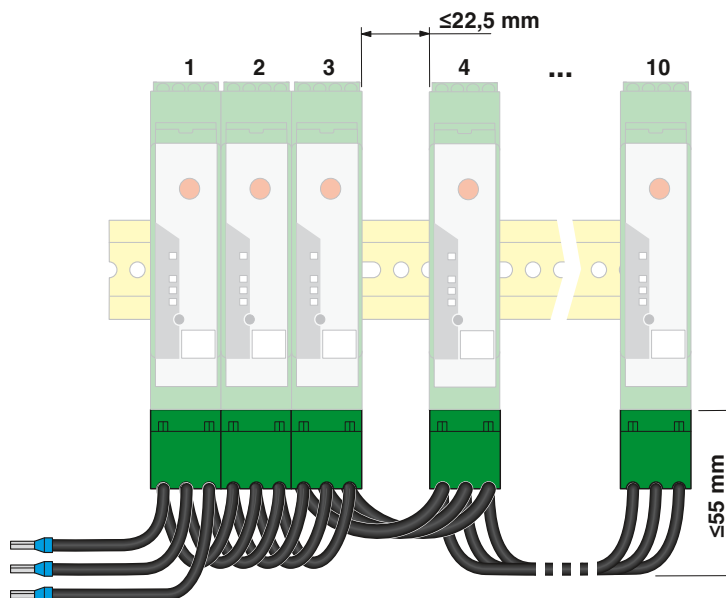
Technical data		
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Description	
<b>3-phase loop bridge</b>	
2-way	
3-way	
4-way	
5-way	
6-way	
7-way	
8-way	
9-way	
10-way	

Ordering data		
Type	Order No.	Pcs./Pkt.
BRIDGE- 2	2900746	1
BRIDGE- 3	2900747	1
BRIDGE- 4	2900748	1
BRIDGE- 5	2900749	1
BRIDGE- 6	2900750	1
BRIDGE- 7	2900751	1
BRIDGE- 8	2900752	1
BRIDGE- 9	2900753	1
BRIDGE-10	2900754	1

Covering hood for unused connectors	
-------------------------------------	--

Accessories		
BRIDGE COVER	2906240	10





3 m connecting cable for hybrid motor starter with screw connection



3 m connecting cable for hybrid motor starter with Push-in connection

ERC

ERC

Technical data
42 V AC ... 575 V AC
≤ 25 A
2.5 mm <sup>2</sup>

Technical data
42 V AC ... 575 V AC
≤ 25 A
2.5 mm <sup>2</sup>

Ordering data		
Type	Order No.	Pcs./Pkt.
BRIDGE- 2-3M	2901543	1
BRIDGE- 3-3M	2901656	1
BRIDGE- 4-3M	2901659	1
BRIDGE- 5-3M	2901545	1
BRIDGE- 6-3M	2901697	1
BRIDGE- 7-3M	2901698	1
BRIDGE- 8-3M	2901700	1
BRIDGE- 9-3M	2901701	1
BRIDGE-10-3M	2901702	1

Ordering data		
Type	Order No.	Pcs./Pkt.
BRIDGE-PT 2	2904490	1
BRIDGE-PT 3	2904491	1
BRIDGE-PT 4	2904492	1
BRIDGE-PT 5	2904493	1
BRIDGE-PT 6	2904494	1
BRIDGE-PT 7	2904495	1
BRIDGE-PT 8	2904496	1
BRIDGE-PT 9	2904497	1
BRIDGE-PT 10	2904498	1

Accessories		
Type	Order No.	Pcs./Pkt.
BRIDGE COVER	2906240	10

Accessories		
Type	Order No.	Pcs./Pkt.
BRIDGE COVER	2906240	10

## Hybrid motor starters

### SmartWire-DT™ accessories

Devices are integrated seamlessly into the fieldbus world via SmartWire-DT™ with the SmartWire-DT™ “EM SWD-ADAPTER” adapter for CONTACTRON 24 V DC devices. Corresponding gateways are available for the following bus systems:

- PROFIBUS DP
- CANopen®
- Modbus/TCP / EtherNet/IP™



SmartWire-DT™ adapter



Technical data			
<b>Input data</b>			
Supply voltage $U_{AUX}$	-		
Rated current $I_{AUX}$	-		
Supply voltage $U_{POW}$	-		
Rated current $I_{POW}$	-		
<b>Input data</b>			
Description	Enable input		
Input voltage	24 V DC		
Input current	5 mA		
<b>Output data</b>			
Description	-		
Output supply	-		
Output current	-		
<b>SmartWire-DT interface</b>			
Connection method	Pin strip, 8-pos.		
Data rate	125 kBd / 250 kBd		
Current consumption $I_{AUX}$	120 mA		
Current consumption $I_{POW}$	25 mA		
<b>General data</b>			
Ambient temperature (operation)	-25 °C ... 55 °C		
Standards/regulations	IEC 60947-1 / EN 60947-1		
Degree of protection in acc. with IEC 60529/EN 60529	IP20		
Mounting position	any		
Mounting	On CONTACTRON hybrid motor starter		
Connection data solid/stranded/AWG	0.14 - 1 mm <sup>2</sup> / 0.14 - 1 mm <sup>2</sup> / 26 - 18		
Dimensions	22.5 mm / 165 mm / 114.5 mm		
	W / H / D		
Ordering data			
Description	Type	Order No.	Pcs./Pkt.
<b>SmartWire-DT™ adapter</b>			
<b>Gateways</b>			
CANopen®			
PROFIBUS			
Ethernet			
<b>I/O modules</b>			
Digital, 4 inputs, 4 outputs			
Digital, 4 inputs			
Digital, 8 outputs			
Analog, 2 inputs, 2 outputs			
<b>Power feed module</b> for supplying further SmartWire-DT™ devices			
		<b>2902776</b>	1



Gateways



I/O modules



Power feed

Technical data	
24 V DC -15 % ... +20 %	-
3 A	-
24 V DC -15 % ... +20 %	-
700 mA	-
-	-
-	-
-	-
-	-
Pin strip, 8-pos. 125 kBd / 250 kBd	-
-	-
-	-
-25 °C ... 55 °C	-25 °C ... 55 °C
EN 50178	EN 50178
IP20	IP20
any	any
-	-
0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
35 mm / 90 mm / 127 mm	35 mm / 90 mm / 101 mm

Technical data	
-	-
-	-
-	-
-	-
Digital inputs 24 V DC typ. 4 mA	Analog inputs -
Digital outputs 24 V DC -15 % ... +20 % typ. 500 mA	Analog outputs -
Pin strip, 8-pos. 125 kBd / 250 kBd	Pin strip, 8-pos. 125 kBd / 250 kBd
-	-
-	-
-25 °C ... 55 °C	-25 °C ... 55 °C
EN 50178	EN 50178
IP20	IP20
any	any
-	-
0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
35 mm / 90 mm / 101 mm	

Technical data	
24 V DC -15 % ... +20 %	-
3 A	-
24 V DC -15 % ... +20 %	-
700 mA	-
-	-
-	-
-	-
-	-
Pin strip, 8-pos. 125 kBd / 250 kBd	-
-	-
-	-
-25 °C ... 55 °C	-25 °C ... 55 °C
EN 50178	EN 50178
IP20	IP20
any	any
-	-
0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16	0.2 - 1.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 24 - 16
35 mm / 90 mm / 124 mm	

Ordering data		
Type	Order No.	Pcs./ Pkt.
EU5C-SWD-CAN PXC	2903098	1
EU5C-SWD-DP PXC	2903100	1
EU5C-SWD-EIP-MODTCP PXC	2903244	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
EU5E-SWD-4D4D PXC	2903101	1
EU5E-SWD-4DX PXC	2903102	1
EU5E-SWD-X8D PXC	2903103	1
EU5E-SWD-2A2A PXC	2903104	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
EU5C-SWD-PF2-1 PXC	2903113	1

## Hybrid motor starters

### SmartWire-DT™ accessories



Plug tools



Flat-ribbon cable, 8-pos.

		Ordering data			Ordering data		
Description	Color	Type	Order No.	Pcs./ Pkt.	Type	Order No.	Pcs./ Pkt.
Pliers for device plugs		SWD4-CRP-1 PXC	2903110	1			
Pliers for flat plugs		SWD4-CRP-2 PXC	2903114	1			
Flat-ribbon cable, 8-pos., 100 m					SWD4-100LF-8-24 PXC	2903111	1
Flat-ribbon cable, assembled with 2 flat plugs, 8-pos., 3 m					SWD4-3LF8-24-2S PXC	2903112	1

### SmartWire-DT™ accessories

Accessories for SmartWire-DT™ and SmartWire-DT™ devices for connecting digital and analog input and output signals.

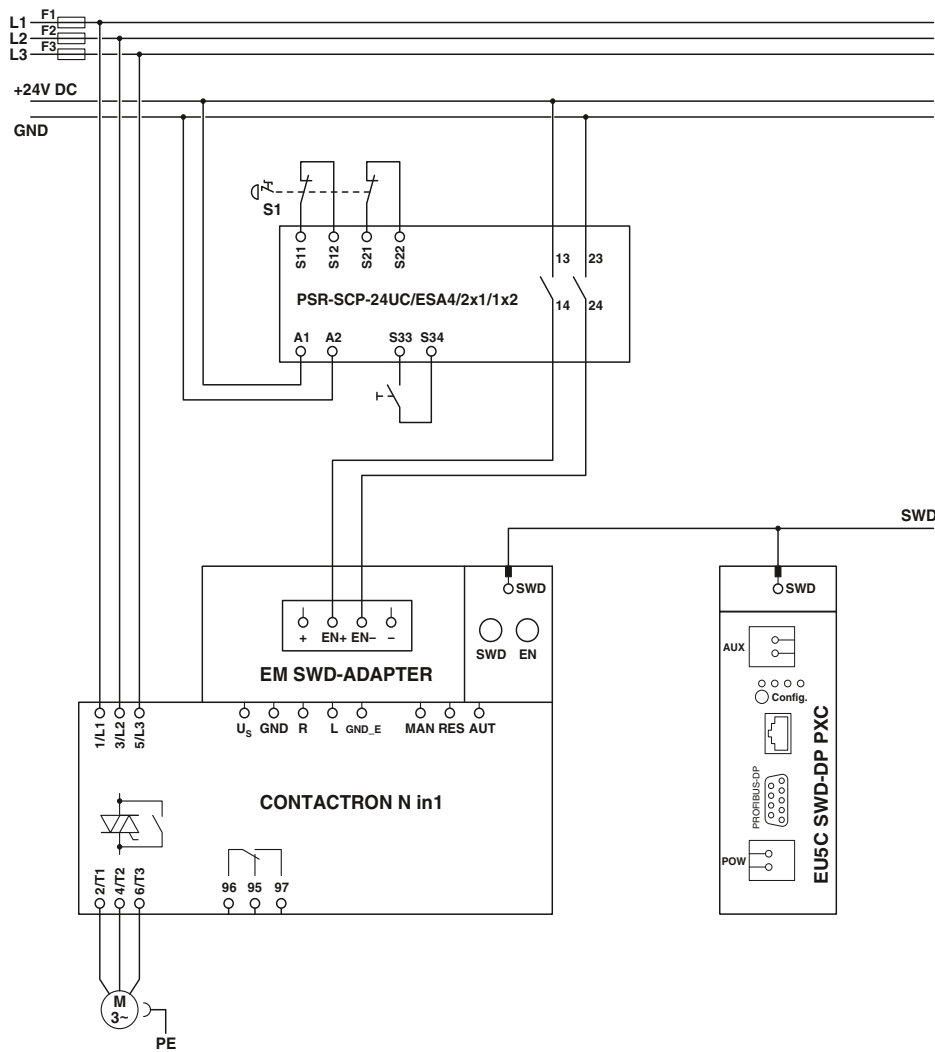


Plug and coupling

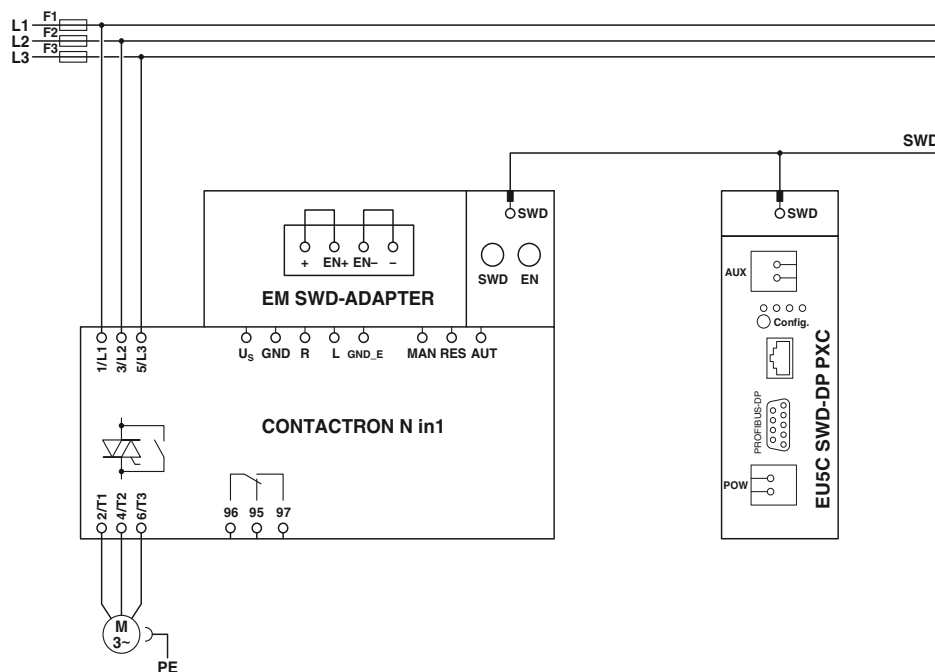


Programming adapter

		Ordering data			Ordering data		
Description	Color	Type	Order No.	Pcs./ Pkt.	Type	Order No.	Pcs./ Pkt.
<b>Plug and coupling</b>							
Network dummy plug		SWD4-RC8-10 PXC	2903106	1			
Device plug, 8-pos.		SWD4-8SF2-5 PXC	2903107	10			
Flat plug, 8-pos.		SWD4-8MF2 PXC	2903108	10			
Coupling for 8-pos. flat plug		SWD4-8SFF2-5 PXC	2903109	1			
<b>Programming adapter</b>					EU4A-RJ45-USB-CAB1 PXC	2903465	1



Emergency stop wiring example (two-channel)



Wiring example without emergency stop

### Intended use

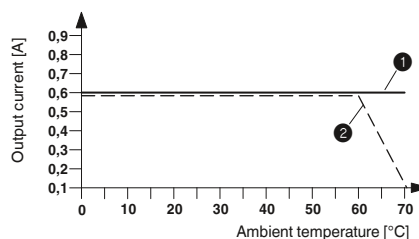
The SmartWire-DT™ adapter is approved exclusively for use in conjunction with the following CONTACTRON hybrid motor starters. If other switching devices are used, correct operation, in particular of the safety function, cannot be ensured.

### Motor protection and safe shutdown

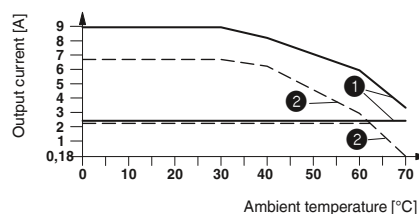
2900582	ELR H5-IES-SC-24DC/500AC-0,6
2900414	ELR H5-IES-SC-24DC/500AC-2
2900421	ELR H5-IES-SC-24DC/500AC-9
2900566	ELR H3-IES-SC-24DC/500AC-0,6
2900567	ELR H3-IES-SC-24DC/500AC-2
2900569	ELR H3-IES-SC-24DC/500AC-9
2297031	ELR W3- 24DC/500AC-2I
2297057	ELR W3- 24DC/500AC-9I
2902952	ELR H51-0,6-DINRAIL-SET
2902953	ELR H51-2,4-DINRAIL-SET
2902954	ELR H51-9-DINRAIL-SET
2902746	ELR H51-IESSC-24DC500AC-06
2902744	ELR H51-IESSC-24DC500AC-2
2902745	ELR H51-IESSC-24DC500AC-9

### Motor protection only

2900573	ELR H5-I-SC-24DC/500AC-0,6
2900574	ELR H5-I-SC-24DC/500AC-2
2900576	ELR H5-I-SC-24DC/500AC-9
2900542	ELR H3-I-SC-24DC/500AC-0,6
2900543	ELR H3-I-SC-24DC/500AC-2
2900545	ELR H3-I-SC-24DC/500AC-9



ELR H5-IES-SC-SWD/500AC-0,6 derating curve  
100% operating time



ELR H5-IES-SC-SWD/500AC-2 and  
ELR H5-IES-SC-SWD/500AC-9 derating curve  
100% operating time

- ① Aligned with > 20 mm spacing
- ② Aligned without spacing

## Solid-state contactors

### 3-phase solid-state reversing contactors

The 3-phase solid-state reversing contactors with integrated locking circuit and load wiring are the ideal match for applications such as:

- Control valves
- Slides
- Switches
- Ship steering gear

The power spectrum ranges from 575 V AC/3 x 2 A to 575 V AC/3 x 37 A. This corresponds to 1 kW to 18.5 kW.

Advantages of 3-phase solid-state reversing contactor:

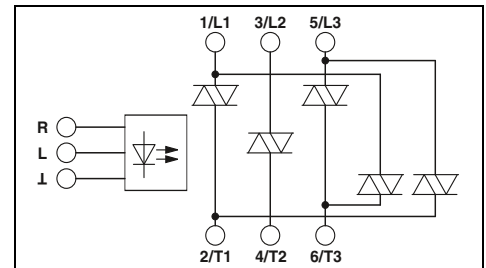
- Noise-free and wear-free switching
- Integrated protective circuit
- Stable and short switching times
- Long service life
- High switching frequency
- Integrated locking and load wiring
- Thermal fuse optional

Notes:
Type of insulation housing: <b>ELR W 3...2, ELR W 3...9</b> Polyamide PA, non-reinforced, color: green
<b>ELR W 3...16, ELR W 3...37</b> Polyester PBT, non-reinforced, color: green
Marking systems and mounting material See Catalog 3



For reversing 3~ AC motors up to 575 V AC/3 x 2 A

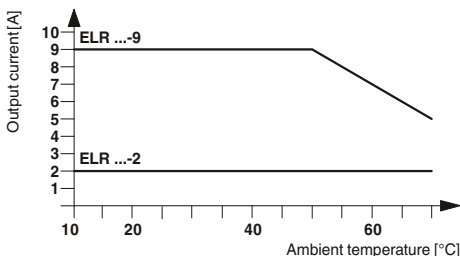
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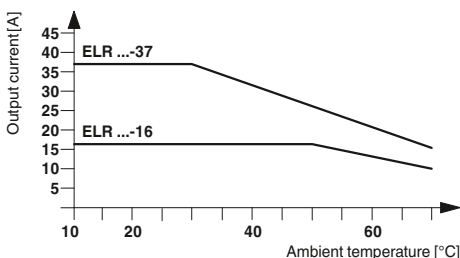
#### Technical data

Input data	
Rated actuating voltage $U_c$ R/L	24 V DC
Actuating voltage range	19.2 V DC ... 30 V DC
Rated actuating current $I_c$ at $U_c$	12.7 mA
Input circuit	Reverse polarity protection, Surge protection
Operating voltage / status / error indicator	- / Yellow LED / Red LED
Output data load side	
Operating voltage range	48 V AC ... 575 V AC
Periodic peak reverse voltage	1200 V
Load current range	100 mA ... 2 A (see derating)
Residual voltage	< 1.5 V
Leakage current	6 mA
Max. load value $I^2 \times t$ (t = 10 ms)	250 A <sup>2</sup> s
Output protection	RCV circuit
General data	
Rated insulation voltage	500 V
Rated surge voltage	6 kV
Insulation	Basic insulation
Reversing frequency	≤ 10 Hz
Switching frequency	max. 5 Hz
Ambient temperature (operation)	-25 °C ... 70 °C
Standards/regulations	DIN EN 50178 / EN 60947
Degree of protection in acc. with IEC 60529/EN 60529	IP20
Mounting position	Vertical (horizontal DIN rail)
Mounting	Can be aligned with spacing = 20 mm
Screw connection solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
- Control side	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
- Load side	40 mm / 99 mm / 114.5 mm
Dimensions	W / H / D

230 V AC	92 V AC ... 253 V AC
11.2 mA	11.2 mA
48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
100 mA ... 2 A (see derating)	100 mA ... 2 A (see derating)
< 1.5 V	< 1.5 V
6 mA	6 mA
250 A <sup>2</sup> s	250 A <sup>2</sup> s
RCV circuit	
6 kV	6 kV
Basic insulation	Basic insulation
≤ 10 Hz	≤ 2 Hz
max. 5 Hz	max. 1 Hz
-25 °C ... 70 °C	
DIN EN 50178 / EN 60947	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
40 mm / 99 mm / 114.5 mm	



Load current as a function of the ambient temperature  
Operating time: 100% operating factor



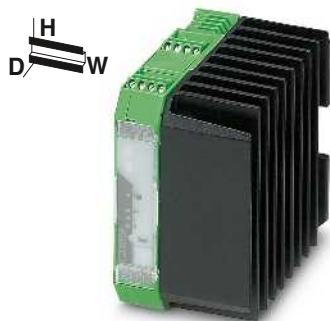
Load current as a function of the ambient temperature  
Operating time: 100% operating factor

Description	3-phase solid-state reversing contactor
Thermal fuse	

Ordering data		
Type	Order No.	Pcs./ Pkt.
ELR W3- 24DC/500AC- 2	2297293	1
ELR W3-230AC/500AC- 2	2297303	1

Accessories		
THERMAL FUSE TF104	2900796	1

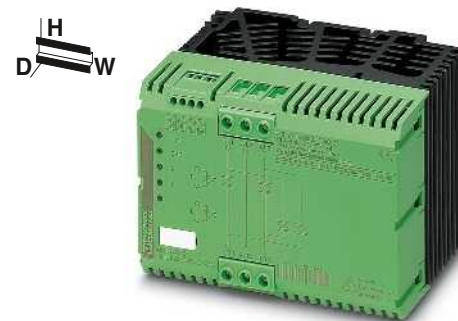




For reversing 3~ AC motors up to 575 V AC/3 x 9 A



For reversing 3~ AC motors up to 575 V AC/3 x 16 A

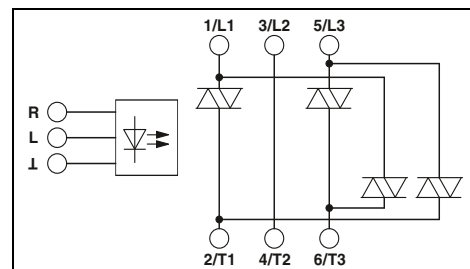
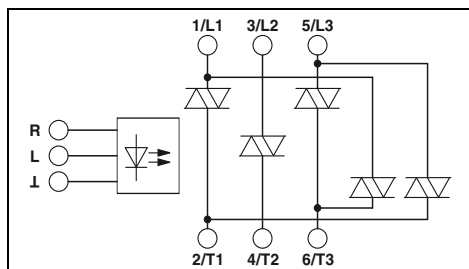
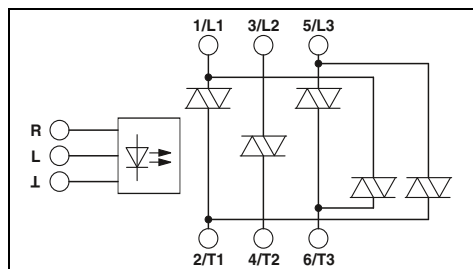


For reversing 3~ AC motors up to 575 V AC/3 x 37 A

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**Technical data**

**Technical data**

**Technical data**

24 V DC	230 V AC
19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
12.7 mA	11.2 mA
Reverse polarity protection, Surge protection	Surge protection
- / Yellow LED / Red LED	

24 V DC	230 V AC
19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
12.7 mA	11.2 mA
Reverse polarity protection, Surge protection	Surge protection
- / Yellow LED / Red LED	

24 V DC	230 V AC
19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
12.7 mA	11.2 mA
Reverse polarity protection, Surge protection	Surge protection
- / Yellow LED / Red LED	

48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
100 mA ... 9 A (see derating)	100 mA ... 9 A (see derating)
< 1.5 V	< 1.5 V
6 mA	6 mA
580 A <sup>2</sup> s	580 A <sup>2</sup> s
RCV circuit	

48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
100 mA ... 16 A (see derating)	100 mA ... 16 A (see derating)
< 1.5 V	< 1.5 V
6 mA	6 mA
580 A <sup>2</sup> s	580 A <sup>2</sup> s
RCV circuit	

48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
200 mA ... 37 A (see derating)	200 mA ... 37 A (see derating)
< 1.5 V	< 1.5 V
6 mA	6 mA
9000 A <sup>2</sup> s	9000 A <sup>2</sup> s
RCV circuit	

500 V	6 kV
Basic insulation	6 kV
≤ 10 Hz	≤ 2 Hz
max. 5 Hz	max. 1 Hz
-25 °C ... 70 °C	
DIN EN 50178 / EN 60947	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
67.5 mm / 99 mm / 114.5 mm	

500 V	6 kV
Basic insulation	6 kV
≤ 10 Hz	≤ 2 Hz
max. 5 Hz	max. 1 Hz
-25 °C ... 70 °C	
DIN EN 50178 / EN 60947	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 40 mm	
0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12	
0.5 - 16 mm <sup>2</sup> / 0.5 - 16 mm <sup>2</sup> / 20 - 6	
147.5 mm / 99 mm / 114.5 mm	

500 V	6 kV
Basic insulation	6 kV
≤ 10 Hz	≤ 2 Hz
max. 5 Hz	max. 1 Hz
-25 °C ... 70 °C	
DIN EN 50178 / EN 60947	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 40 mm	
0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12	
0.5 - 16 mm <sup>2</sup> / 0.5 - 16 mm <sup>2</sup> / 20 - 6	
147.5 mm / 99 mm / 114.5 mm	

**Ordering data**

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./ Pkt.
ELR W3-24DC/500AC-9	2297316	1
ELR W3-230AC/500AC-9	2297329	1

Type	Order No.	Pcs./ Pkt.
ELR W3-24DC/500AC-16	2297332	1
ELR W3-230AC/500AC-16	2297345	1

Type	Order No.	Pcs./ Pkt.
ELR W2+1-24DC/500AC-37	2297374	1
ELR W2+1-230AC/500AC-37	2297387	1

**Accessories**

**Accessories**

**Accessories**

THERMAL FUSE TF104	2900796	1
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THERMAL FUSE TF104	2900796	1
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THERMAL FUSE TF104	2900796	1
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## Solid-state contactors

### 3-phase semiconductor contactor

The 3-phase solid-state contactors are an ideal match for applications such as:

- Mixers
- Machine tools
- Conveying systems
- Pumps
- Fans

The power spectrum ranges from 575 V AC/3 x 2 A to 575 V AC/3 x 37 A. This corresponds to 1 kW to 18.5 kW.

Advantages of 3-phase semiconductor contactor:

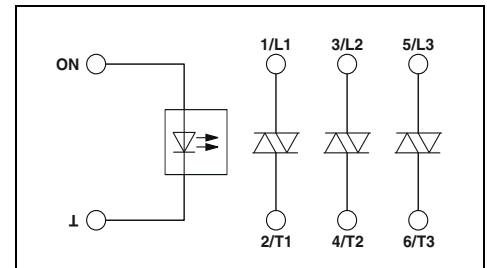
- Noise-free and wear-free switching
- Integrated protective circuit
- Stable and short switching times
- Long service life
- High switching frequency
- Thermal fuse optional

Notes:
Type of insulation housing: <b>ELR 3...2, ELR 3...9</b> Polyamide PA, non-reinforced, color: green
<b>ELR 3...16, ELR 3...37</b> Polyester PBT, non-reinforced, color: green
Marking systems and mounting material See Catalog 3



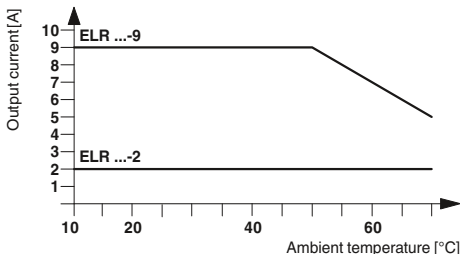
For switching 3~ AC motors up to 575 V AC/3 x 2 A

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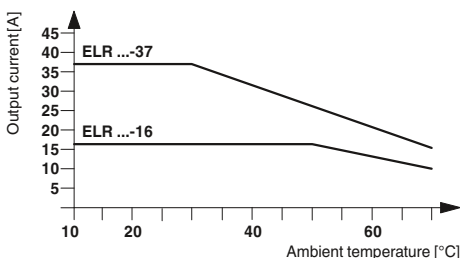


#### Technical data

<b>Input data</b>	24 V DC	230 V AC
Rated actuation voltage $U_c$ ON	19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
Actuating voltage range	8.3 mA	12.5 mA
Rated actuating current $I_c$ at $U_c$	Reverse polarity protection, Surge protection	Surge protection
Input circuit	- / Yellow LED / Red LED	
Operating voltage / status / error indicator		
<b>Output data load side</b>		
Operating voltage range	48 V AC ... 575 V AC	48 V AC ... 575 V AC
Periodic peak reverse voltage	1200 V	1200 V
Load current range	100 mA ... 2 A (see derating)	100 mA ... 2 A (see derating)
Residual voltage	< 1.5 V	< 1.5 V
Leakage current	6 mA	6 mA
Max. load value $I^2 \times t$ (t = 10 ms)	250 A <sup>2</sup> s	250 A <sup>2</sup> s
Output protection	RCV circuit	
<b>General data</b>		
Rated insulation voltage	500 V	
Rated surge voltage	6 kV	6 kV
Insulation	Basic insulation	
Switching frequency	≤ 10 Hz	≤ 1 Hz
Ambient temperature (operation)	-25 °C ... 70 °C	
Standards/regulations	DIN EN 50178 / EN 60947	
Degree of protection in acc. with IEC 60529/EN 60529	IP20	
Mounting position	Vertical (horizontal DIN rail)	
Mounting	Can be aligned with spacing = 20 mm	
Screw connection solid/stranded/AWG		
- Control side	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
- Load side	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
Dimensions	40 mm / 99 mm / 114.5 mm	



Load current as a function of the ambient temperature  
Operating time: 100% operating factor



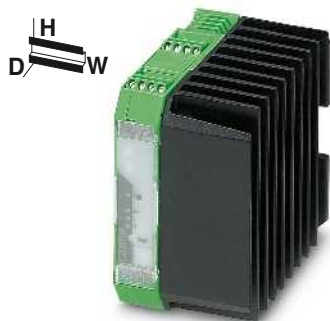
Load current as a function of the ambient temperature  
Operating time: 100% operating factor

Description
3-phase semiconductor contactor

Thermal fuse

Ordering data		
Type	Order No.	Pcs./ Pkt.
ELR 3- 24DC/500AC- 2	2297196	1
ELR 3-230AC/500AC- 2	2297206	1

Accessories		
THERMAL FUSE TF104	2900796	1



For switching 3~ AC motors up to 575 V AC/3 x 9 A



For switching 3~ AC motors up to 575 V AC/3 x 16 A

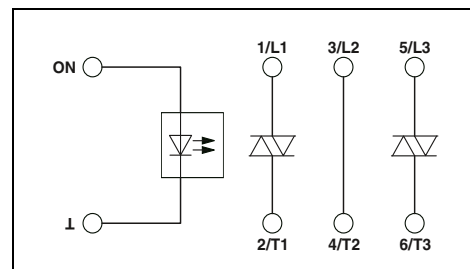
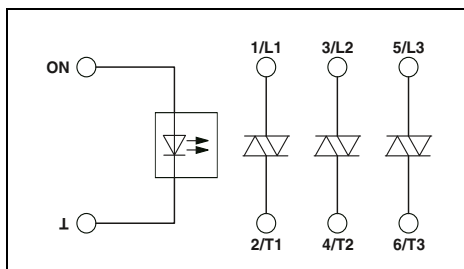
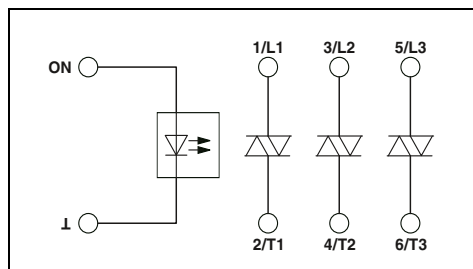


For switching 3~ AC motors up to 575 V AC/3 x 37 A

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**Technical data**

**Technical data**

**Technical data**

24 V DC	230 V AC
19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
8.3 mA	12.5 mA
Reverse polarity protection, Surge protection	Surge protection
- / Yellow LED / Red LED	

24 V DC	230 V AC
19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
8.3 mA	12.5 mA
Reverse polarity protection, Surge protection	Surge protection
- / Yellow LED / Red LED	

24 V DC	230 V AC
19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
8.3 mA	12.5 mA
Reverse polarity protection, Surge protection	Surge protection
- / Yellow LED / Red LED	

48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
100 mA ... 9 A (see derating)	100 mA ... 9 A (see derating)
< 1.5 V	< 1.5 V
6 mA	6 mA
580 A <sup>2</sup> s	580 A <sup>2</sup> s
RCV circuit	

48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
100 mA ... 16 A (see derating)	100 mA ... 16 A (see derating)
< 1.5 V	< 1.5 V
6 mA	6 mA
580 A <sup>2</sup> s	580 A <sup>2</sup> s
RCV circuit	

48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
200 mA ... 37 A (see derating)	200 mA ... 37 A (see derating)
< 1.5 V	< 1.5 V
6 mA	6 mA
9000 A <sup>2</sup> s	9000 A <sup>2</sup> s
RCV circuit	

500 V	6 kV
Basic insulation	6 kV
≤ 10 Hz	≤ 1 Hz
-25 °C ... 70 °C	
DIN EN 50178 / EN 60947	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14	
67.5 mm / 99 mm / 114.5 mm	

500 V	6 kV
Basic insulation	6 kV
≤ 10 Hz	≤ 1 Hz
-25 °C ... 70 °C	
DIN EN 50178 / EN 60947	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 40 mm	
0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12	
0.5 - 16 mm <sup>2</sup> / 0.5 - 16 mm <sup>2</sup> / 20 - 6	
147.5 mm / 99 mm / 114.5 mm	

500 V	6 kV
Basic insulation	6 kV
≤ 10 Hz	≤ 1 Hz
-25 °C ... 70 °C	
DIN EN 50178 / EN 60947	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 40 mm	
0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12	
0.5 - 16 mm <sup>2</sup> / 0.5 - 16 mm <sup>2</sup> / 20 - 6	
147.5 mm / 99 mm / 114.5 mm	

**Ordering data**

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./ Pkt.
ELR 3- 24DC/500AC- 9	2297219	1
ELR 3-230AC/500AC- 9	2297222	1

Type	Order No.	Pcs./ Pkt.
ELR 3- 24DC/500AC-16	2297235	1
ELR 3-230AC/500AC-16	2297248	1

Type	Order No.	Pcs./ Pkt.
ELR 2+1- 24DC/500AC-37	2297277	1
ELR 2+1-230AC/500AC-37	2297280	1

**Accessories**

**Accessories**

**Accessories**

THERMAL FUSE TF104	2900796	1
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THERMAL FUSE TF104	2900796	1
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THERMAL FUSE TF104	2900796	1
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## Solid-state contactors

### Semiconductor reversing contactor with soft starter

With the ELR W 3/9-400 S soft switch, you can extend the service life of a 3-phase asynchronous motor.

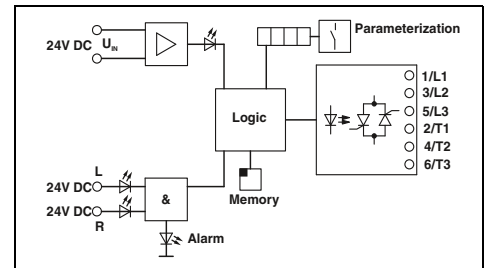
- Parameterization takes place via display and keypad directly on the device
- Friction time
- Torque, start
- Start up time
- Stop time
- Torque, stop
- Braking time
- Braking torque
- Drive can be controlled locally via keypad

Notes:
Type of housing: Polycarbonate PC, color: green.
Marking systems and mounting material See Catalog 3



**Solid-state reversing contactor with soft starter**

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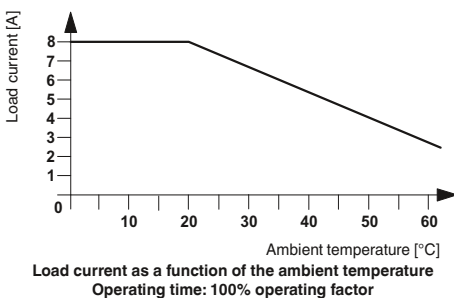


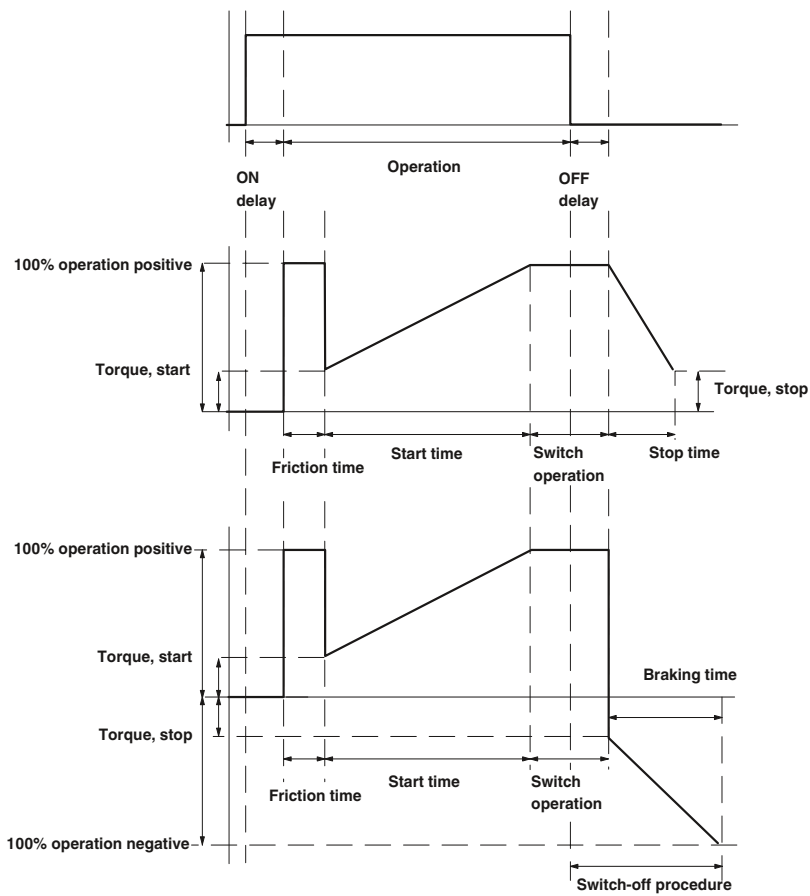
#### Technical data

<b>Input data</b>	
Supply nominal voltage $U_{VN}$	24 V DC
Supply voltage range with reference to $U_{VN}$	0.8 ... 1.2
Quiescent current	85 mA
Control voltage $U_{ST}$ right/left	24 V DC
Control voltage range in reference to $U_{ST}$	0.8 ... 1.2
Typ. input current at $U_N$	5 mA
Input circuit	Reverse polarity protection, surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED
<b>Output data load side</b>	
Max. switching voltage	440 V AC (L1/T1) 440 V AC (L2/T2) 440 V AC (L3/T3) 110 V AC ... 433 V AC 1000 V
Operating voltage range	150 mA ... 8 A (at 20 °C $T_A$ , see derating)
Periodic peak reverse voltage	
Load current range	
Residual voltage	typ. 1.5 V (For $I_L$ )
Leakage current	5 mA ( $I_{L1}$ , in switched-off state)
Output protection	RC element, surge protection
<b>General data</b>	
Test voltage input/output	2.5 kV
Ambient temperature (operation)	-20 °C ... 60 °C
Standards/regulations	DIN EN 50178
Degree of protection in acc. with IEC 60529/EN 60529	IP20
Mounting position	Vertical (horizontal DIN rail)
Mounting	Can be aligned with > 20 mm spacing
Screw connection solid/stranded/AWG	0.2 - 6 mm <sup>2</sup> / 0.2 - 4 mm <sup>2</sup> / 24 - 10
Dimensions	62 mm / 94 mm / 122 mm
EMC note	Class A product, see page 605

Ordering data		
Type	Order No.	Pcs./Pkt.
ELR W3/ 9-400 S	2963569	1

Description
<b>Solid-state reversing contactor, with integrated soft switch</b>





The figure shows the control of the reversing load relay with a soft starter and the operation of a three-phase current load.

## Solid-state contactors

### Electronic reversing load relay for DC motors

The ELR-DC electronic reversing load relays allow mechanically commutated DC motors to be switched. They reverse and reduce the speed of DC motors up to 24 V/6 A in a wear-free manner. A short-circuit, surge-voltage and overload-proof output guarantees reliable use in the plant.

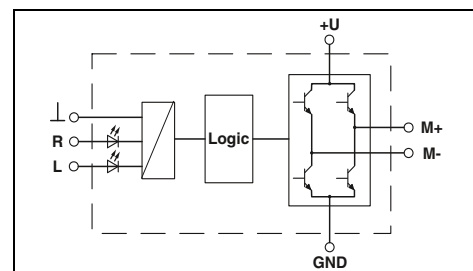
When a 24 V DC signal is applied at the “left” input, the output supplies the motor with voltage. When the “right” output is activated, the polarity of the voltage at the output is reversed. If the signal is applied at both inputs, i.e., “right” and “left”, the motor is short-circuited internally via the ELR-DC and reduces the speed.

Thanks to the internal interlocking circuit and load wiring, wiring is reduced to a minimum.

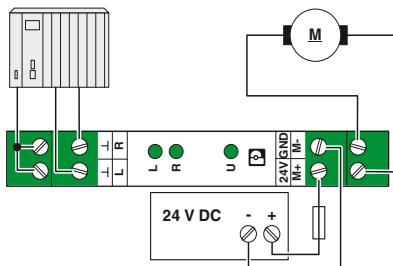
<b>Notes:</b>
Type of housing: Polycarbonate PC, color: green.
Marking systems and mounting material See Catalog 3
PWM = Pulse Width Modulation



Electronic reversing load relay for DC motors



#### Application example

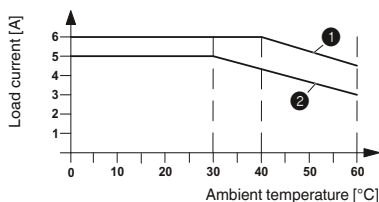


#### Status table

Input		Output	
Right	Left	M +	M -
0	0	High resistance	High resistance
1	0	+ 24 V	GND
0	1	GND	+ 24 V
1	1	GND	GND

#### Load current depending on ambient temperature

Operating time: 100% (ED)



- ① Stand-alone device
- ② Aligned without spacing

<b>Input data</b>	
Control voltage $U_{ST}$ right/left	24 V DC
Control voltage range in reference to $U_{ST}$	0.8 ... 1.2
Typ. input current at $U_N$	3 mA
Input circuit	Reverse polarity protection, surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / -
<b>Output data load side</b>	
Operating voltage range	10 V DC ... 30 V DC
Load current	2 A (Mounted in rows with zero spacing) approx. 7 mA (When switched off)
Quiescent current	approx. 7 mA (When switched off)
Current limitation at short-circuits	15 A
Output protection	20 A
Operating voltage / status / error indicator	Reverse polarity protection, surge protection Green LED / - / -
<b>General data</b>	
Test voltage input/output	2.5 kV AC
Ambient temperature (operation)	-20 °C ... 60 °C
Nominal operating mode	100% operating factor
Standards/regulations	EN 50178
Degree of protection in acc. with IEC 60529/EN 60529	IP20
Mounting position	Vertical (horizontal DIN rail)
Screw connection solid/stranded/AWG	0.2 - 6 mm <sup>2</sup> / 0.2 - 4 mm <sup>2</sup> / 24 - 10
Dimensions	12.5 mm / 99 mm / 114.5 mm
EMC note	Class A product, see page 605

Technical data	
24 V DC	24 V DC
0.8 ... 1.2	0.8 ... 1.2
3 mA	3 mA
Reverse polarity protection, surge protection Green LED / Yellow LED / -	
10 V DC ... 30 V DC	10 V DC ... 30 V DC
2 A (Mounted in rows with zero spacing)	6 A (see derating)
approx. 7 mA (When switched off)	approx. 7 mA (When switched off)
15 A	20 A
Reverse polarity protection, surge protection Green LED / - / -	
2.5 kV AC	
-20 °C ... 60 °C	
100% operating factor	
EN 50178	
IP20	
Vertical (horizontal DIN rail)	
0.2 - 6 mm <sup>2</sup> / 0.2 - 4 mm <sup>2</sup> / 24 - 10	
12.5 mm / 99 mm / 114.5 mm	
Class A product, see page 605	

<b>Description</b>
<b>Electronic reversing load relay, for controlling DC motors</b>

Ordering data		
Type	Order No.	Pcs./ Pkt.
ELR W1/ 2-24DC	2963598	1
ELR W1/ 6-24DC	2982090	1



## Solid-state contactors

### Single-phase solid-state contactors

Single-phase solid-state contactors are used in AC voltage networks, where silent switching, high switching frequencies, and practically unlimited service life are required.

The robust power semi-conductors switch to zero voltage crossing. In doing so, they do not generate any additional high-frequency interfering impulses. The modules are resistant to shock and vibration, they can even be used without problem in aggressive environments containing harmful substances.

They offer the following advantages:

- High switching frequency
- Wear-free and bounce-free
- Input voltage versions 24 V DC and 230 V AC

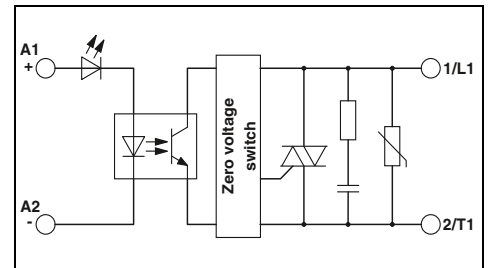
The areas of application are:

- Production machines
- Temperature controllers
- Conveyor equipment
- Light and lighting systems

Notes:	
Type of housing:	Polycarbonate PC, color: green.
Marking systems and mounting material	See Catalog 3



For switching 1~ AC motors up to 660 V AC/20 A

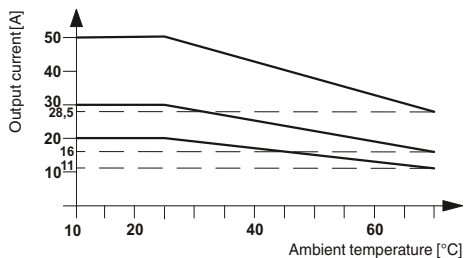


#### Technical data

<b>Input data</b>		4 V DC ... 32 V DC	24 V AC ... 275 V AC
Actuating voltage range		12 mA	17 mA
Rated actuating current $I_C$ at $U_C$		$\geq 4$ V DC ("1" signal)	$\geq 22$ V AC ("1" signal)
Switching level	1 signal ("H") 0 signal ("L")	$\leq 1$ V DC ("0" signal)	$\leq 6$ V AC ("0" signal)
Transmission frequency $f_{limit}$		25 Hz	6 Hz
Operating voltage / status / error indicator			Green LED / - / -
<b>Output data load side</b>		42 V AC ... 660 V AC (45/65 Hz)	42 V AC ... 660 V AC (45/65 Hz)
Operating voltage range		1200 V	1200 V
Periodic peak reverse voltage		350 mA ... 20 A (see derating)	350 mA ... 20 A (see derating)
Load current range			
Residual voltage		< 1.6 V	< 1.6 V
Leakage current		< 3 mA (In off state)	< 3 mA (In off state)
Phase angle (cos $\phi$ )		0.5	0.5
Max. load value $I^2 \times t$ ( $t = 10$ ms)		525 A <sup>2</sup> s	525 A <sup>2</sup> s
Output protection			RCV circuit
<b>General data</b>		4 kV <sub>rms</sub>	
Test voltage input/output		Basic insulation	
Insulation		-30 °C ... 70 °C	
Ambient temperature (operation)		EN 61000-4-2 / EN 61000-4-3 / EN 61000-4-4 / EN 61000-4-5 / EN 61000-4-6 / EN 55011	
Standards/regulations		Vertical (horizontal DIN rail)	
Mounting position		Can be aligned with $\geq 22.5$ mm spacing	
Mounting		0.5 - 2.5 mm <sup>2</sup> / 0.5 - 2.5 mm <sup>2</sup> / 20 - 14	
Screw connection solid/stranded/AWG		0.5 - 4 mm <sup>2</sup> / 0.5 - 4 mm <sup>2</sup> / 20 - 12	
- Control side		22.5 mm / 103 mm / 103 mm	
- Load side			
Dimensions	W / H / D		

#### Ordering data

Description	Type	Order No.	Pcs./ Pkt.
Single-phase electronic load relay	ELR 1- 24DC/600AC-20	2297138	1
	ELR 1-230AC/600AC-20	2297141	1



Load current as a function of the ambient temperature  
Operating time: 100% operating factor

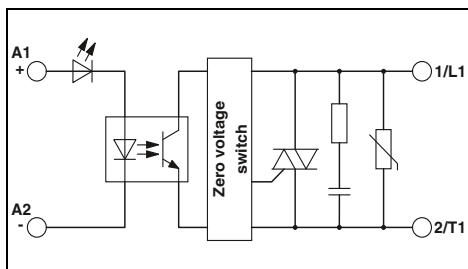
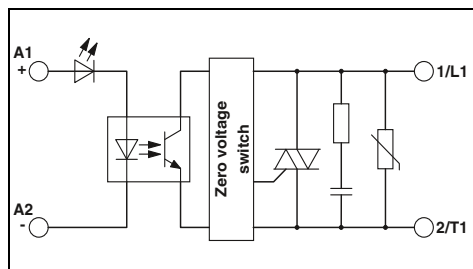




For switching 1~ AC motors up to 660 V AC/30 A



For switching 1~ AC motors up to 660 V AC/50 A



Technical data

Technical data

4 V DC ... 32 V DC  
12 mA  
≥ 4 V DC ("1" signal)  
≤ 1 V DC ("0" signal)  
25 Hz  
24 V AC ... 275 V AC  
17 mA  
≥ 22 V AC ("1" signal)  
≤ 6 V AC ("0" signal)  
6 Hz  
Green LED / - / -

4 V DC ... 32 V DC  
12 mA  
≥ 4 V DC ("1" signal)  
≤ 1 V DC ("0" signal)  
25 Hz  
24 V AC ... 275 V AC  
17 mA  
≥ 22 V AC ("1" signal)  
≤ 6 V AC ("0" signal)  
6 Hz  
Green LED / - / -

42 V AC ... 660 V AC (45/65 Hz)  
1200 V  
150 mA ... 30 A (see derating)  
< 1.6 V  
< 3 mA (In off state)

42 V AC ... 660 V AC (45/65 Hz)  
1200 V  
150 mA ... 50 A (see derating)  
< 1.6 V  
< 3 mA (In off state)

0.5  
1800 A²s  
RCV circuit

0.5  
18000 A²s  
RCV circuit

4 kV<sub>rms</sub>  
Basic insulation  
-30 °C ... 70 °C  
EN 61000-4-2 / EN 61000-4-3 / EN 61000-4-4 / EN 61000-4-5 / EN 61000-4-6 / EN 55011  
Vertical (horizontal DIN rail)  
Can be aligned with ≥ 22.5 mm spacing

4 kV<sub>rms</sub>  
Basic insulation  
-30 °C ... 70 °C  
EN 61000-4-2 / EN 61000-4-3 / EN 61000-4-4 / EN 61000-4-5 / EN 61000-4-6 / EN 55011  
Vertical (horizontal DIN rail)  
Can be aligned with ≥ 22.5 mm spacing

0.5 - 2.5 mm² / 0.5 - 2.5 mm² / 20 - 14  
0.5 - 4 mm² / 0.5 - 4 mm² / 20 - 12  
22.5 mm / 103 mm / 103 mm

0.5 - 4 mm² / 0.5 - 4 mm² / 20 - 14  
4 - 25 mm² / 4 - 25 mm² / 12 - 3  
45 mm / 103 mm / 103 mm

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
ELR 1- 24DC/600AC-30	2297154	1
ELR 1-230AC/600AC-30	2297167	1

Type	Order No.	Pcs./ Pkt.
ELR 1- 24DC/600AC-50	2297170	1
ELR 1-230AC/600AC-50	2297183	1

## IP67 motor starters

### PROFINET motor starter

Motor starters in robust stainless steel housing (IP67) can be used directly in the system as a compact function unit. This eliminates the complex wiring of individual functions in the control cabinet.

The motor starter can be used to control three-phase asynchronous motors in two directions of rotation, completely via PROFINET. Distributed sensors and actuators can be directly connected to PROFINET without the need for further intermediate stations or additional cabling. A complete PROFINET motor starter consists of three products. For example:

- ELR 5011 IP PN
- IBS IP 400 MBH-F
- IBS PG SET

#### Additional features:

- Performance classes: 1.1 kW to 3.0 kW
- One and two-motor reversing starters (CONTACTRON hybrid motor starter)
- Easy assembly
- Plug-in connection system
- Exchangeable module electronics
- Status and diagnostic indicators on the module
- 10 digital inputs for connecting sensors
- 4 digital outputs for connecting actuators



Electronic motor starters,  
1 x 1.1 kW and 2 x 1.1 kW

ERC CB

Interface	
Fieldbus system	PROFINET
Connection method	8-pos. RJ45 socket on motor starter
Power supply for module electronics	
Supply voltage	24 V DC ( $U_{S1}$ / $U_{S2}$ )
Supply voltage range	20 V DC ... 30 V DC (including ripple)
Power supply for sensors	
Minimum voltage	$U_{MI} = U_{S1}$ minus 1 V
Nominal current per sensor	500 mA
Type of protection	Short-circuit/overload protection
Digital inputs	
Number of inputs	10
Connection method	M12 connector
Connection method	2, 3, 4-wire
Digital outputs	
Number of outputs	4
Connection method	M12 connector
Connection method	2-wire
Output current	max. 500 mA (per channel)
Motor starter, output	
Connection method	POWER-COMBICON
Operating voltage	360 V AC ... 550 V AC (line voltage 50/60 Hz)
Nominal current range	0.18 A ... 2.4 A
Frequency range	50 Hz ... 60 Hz (mains frequency)
Nominal motor power	1.1 kW (at $U_{mains} = 400$ V AC)
Motor monitoring	
Parameterization range	0.2 A ... 2.4 A
Tripping class	Based on class 10 A of IEC 60947
General data	
Weight	2115 g   2425 g
Degree of protection	IP67 in acc. with IEC 60529
Ambient temperature (operation)	-25 °C ... 50 °C (non-condensing)
EMC note	

Technical data		
	ELR 5011 IP PN	ELR 5011-2 IP PN
	PROFINET	
	8-pos. RJ45 socket on motor starter	
	24 V DC ( $U_{S1}$ / $U_{S2}$ )	
	20 V DC ... 30 V DC (including ripple)	
	$U_{MI} = U_{S1}$ minus 1 V	
	500 mA	
	Short-circuit/overload protection	
	10	
	M12 connector	
	2, 3, 4-wire	
	4	
	M12 connector	
	2-wire	
	max. 500 mA (per channel)	
	POWER-COMBICON	
	360 V AC ... 550 V AC (line voltage 50/60 Hz)	
	0.18 A ... 2.4 A	
	50 Hz ... 60 Hz (mains frequency)	
	1.1 kW (at $U_{mains} = 400$ V AC)	
	0.2 A ... 2.4 A	
	Based on class 10 A of IEC 60947	
	2115 g	2425 g
	IP67 in acc. with IEC 60529	
	-25 °C ... 50 °C (non-condensing)	

Description
<b>PROFINET motor starter</b> - 1-channel reversing starter, 1.1 kW - 2-channel reversing starter, 1.1 kW
<b>PROFINET motor starter</b> - 1-channel reversing starter, 3.0 kW - 2-channel reversing starter, 3.0 kW
<b>Lower part of the housing</b> , high-grade steel - Standard version
<b>Pg screw connection</b> , plastic (IP67), for INTERBUS and PROFINET motor starters and variable frequency drives.

Description
<b>RJ45 connector</b> , shielded, with bend protection sleeve, x 2 - gray for straight cables - green for crossed cables
<b>Bus system cable</b>
<b>Crimping pliers</b> , for assembling the RJ45 connectors

Ordering data			
Type	Order No.	Pcs./ Pkt.	
ELR 5011 IP PN	2700745	1	
ELR 5011-2 IP PN	2701007	1	
IBS IP 400 MBH-F	2732868	1	
IBS PG SET	2836599	1	

Accessories			
Description	Order No.	Pcs./ Pkt.	
FL PLUG RJ45 GR/2	2744856	1	
FL PLUG RJ45 GN/2	2744571	1	
VS-937/...	1402611	1	
FL CRIMPTOOL	2744869	1	



## IP20 frequency inverters

### Inline frequency inverters

Inline frequency inverters for the control cabinet are the compact solution for extending your Easy Automation solution to include electronic speed regulation for asynchronous motors. The devices seamlessly integrate into the Inline system and have IP20 protection. Depending on the drive task, you can select frequency inverters from various performance classes, up to a maximum of 4 kW. In order to connect to the Inline system via the Fieldline local bus, you just need the IB IL 24 FLM-PAC Inline module. The Inline frequency inverter can be connected to a Phoenix Contact controller via the Inline module.

#### Additional features:

- Max. motor power  
0.75 kW, 1.5 kW, 2.2 kW, and 4.0 kW
- 3 x 400 V mains input ( $\pm 15\%$ ) 50/60 Hz
- DTM for parameterization and diagnostics
- 8 freely programmable parameter records
- PTC evaluation for  
2.2 kW and 4.0 kW versions
- Integrated line filter
- U/f linear and U/f square operating modes
- S-ramp function
- Motor protection function ( $I^2t$ )
- Connection of a braking resistor
- DC braking
- Evaluation of the temperature switch in the motor
- Voltage boost
- 1 x analog input, 1 x analog output,  
1 x relay output



Frequency inverter for a maximum motor power of up to 0.75 kW

<b>Interface</b>	
Designation	Fieldline local bus
Connection method	9-pos. D-SUB connector/socket
<b>Power supply for module electronics</b>	
Supply voltage	24 V DC $\pm 15\%$
Supply voltage range	20.4 V DC ... 27.6 V DC $\pm 15\%$
<b>Digital inputs</b>	
Number of inputs	5
Connection method	COMBICON
Connection method	Plug-in screw connection
<b>Analog inputs</b>	
Number of inputs	1
Connection method	COMBICON
Connection method	Plug-in screw connection
<b>Analog outputs</b>	
Number of inputs	1
Connection method	COMBICON
Connection method	Plug-in screw connection
<b>Frequency inverter output</b>	
Rated current	2.6 A +20 %
Frequency range	0 Hz ... 400 Hz
Parameterization	Via INTERBUS
Tripping class	5.6 A OC tripping current
<b>General data</b>	
Weight	1400 g
Degree of protection	IP20 in acc. with IEC 60529/ EN 60529
Width	90 mm
Height	173 mm
Depth	153.5 mm

Technical data		
<b>Interface</b>		
Designation		
Connection method		
<b>Power supply for module electronics</b>		
Supply voltage		
Supply voltage range		
<b>Digital inputs</b>		
Number of inputs		
Connection method		
Connection method		
<b>Analog inputs</b>		
Number of inputs		
Connection method		
Connection method		
<b>Analog outputs</b>		
Number of inputs		
Connection method		
Connection method		
<b>Frequency inverter output</b>		
Rated current		
Frequency range		
Parameterization		
Tripping class		
<b>General data</b>		
Weight		
Degree of protection		
Width		
Height		
Depth		

Description
<b>Inline frequency inverter</b> for the control cabinet
<b>Inline Modular branch terminal</b> for coupling one Fieldline Modular M8 local bus at the end of an Inline station
<b>Remote bus cable</b> , highly flexible, 3 x 2 x 0.25 mm <sup>2</sup>

Ordering data		
Type	Order No.	Pcs./ Pkt.
VFD 5007 IL IB	2701054	1

Accessories		
Type	Order No.	Pcs./ Pkt.
IB IL 24 FLM-PAC	2736903	1
IBS RBC/F-T/	2740151	1



Frequency inverter for a maximum motor power of up to 1.5 kW



Frequency inverter for a maximum motor power of up to 2.2 kW



Frequency inverter for a maximum motor power of up to 4.0 kW

Technical data
Fieldline local bus 9-pos. D-SUB connector/socket
24 V DC $\pm 15\%$ 20.4 V DC ... 27.6 V DC $\pm 15\%$
5 COMBICON Plug-in screw connection
1 COMBICON Plug-in screw connection
1 COMBICON Plug-in screw connection
4.1 A $+20\%$ 0 Hz ... 400 Hz Via INTERBUS 8.8 A OC tripping current
1400 g IP20 in acc. with IEC 60529/ EN 60529 90 mm 173 mm 153.5 mm

Technical data
Fieldline local bus 9-pos. D-SUB connector/socket
24 V DC $\pm 15\%$ 20.4 V DC ... 27.6 V DC $\pm 15\%$
5 COMBICON Plug-in screw connection
1 COMBICON Plug-in screw connection
1 COMBICON Plug-in screw connection
5.8 A $+20\%$ 0 Hz ... 400 Hz Via INTERBUS 12.5 A OC tripping current
2200 g IP20 in acc. with IEC 60529/ EN 60529 117 mm 173 mm 174.5 mm

Technical data
Fieldline local bus 9-pos. D-SUB connector/socket
24 V DC $\pm 15\%$ 20.4 V DC ... 27.6 V DC $\pm 15\%$
5 COMBICON Plug-in screw connection
1 COMBICON Plug-in screw connection
1 COMBICON Plug-in screw connection
9.5 A $+20\%$ 0 Hz ... 400 Hz Via INTERBUS 21 A OC tripping current
2200 g IP20 in acc. with IEC 60529/ EN 60529 117 mm 173 mm 174.5 mm

Ordering data		
Type	Order No.	Pcs./ Pkt.
VFD 5015 IL IB	2701055	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VFD 5022 IL IB	2701057	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VFD 5040 IL IB	2701058	1

Accessories		
Type	Order No.	Pcs./ Pkt.
IB IL 24 FLM-PAC	2736903	1
IBS RBC/F-T/	2740151	1

Accessories		
Type	Order No.	Pcs./ Pkt.
IB IL 24 FLM-PAC	2736903	1
IBS RBC/F-T/	2740151	1

Accessories		
Type	Order No.	Pcs./ Pkt.
IB IL 24 FLM-PAC	2736903	1
IBS RBC/F-T/	2740151	1



# Measurement and control technology

From highly compact 6 mm signal conditioners and functionally safe signal conditioners to signal isolators for intrinsically safe circuits in the Ex area: our signal conditioner range and process indicators offer a solution for all applications in analog signal conditioning.

We offer the following product ranges:

## Highly compact signal conditioners with plug-in connection technology – MINI Analog Pro

For maximum convenience during installation and servicing

- Overall width of just 6.2 mm
- Current measurement, without disconnection
- Safe electrical isolation

## Signal conditioners with SIL functional safety – MACX Analog

For maximum signal safety

- Consistent SIL certification
- Safe electrical isolation

## Signal conditioners with PL functional safety – MACX Safety

The proven MACX range for safety applications according to the Machinery Directive

## Ex i signal conditioners with SIL functional safety – MACX Analog Ex

For intrinsically safe circuits in the Ex area

- Maximum explosion protection for all Ex zones and gas groups
- Safe electrical isolation

## Ex i signal conditioners with PL functional safety – MACX Safety Ex

The proven MACX EX range for safety applications according to the Machinery Directive

## Process indicators and field devices – Field Analog

- Monitoring and display of analog and temperature signals
- Control via digital and analog inputs and outputs
- Record and convert temperatures directly in the field

## Product range overview

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## Product overview

### Highly compact signal conditioners with plug-in connection technology



MINI Analog Pro

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MINI Analog Pro gateways

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System cabling, Termination Carriers

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Accessories for MINI Analog Pro

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### Multiplexers



Multiplexer for HART signals

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### MACX Analog accessories



Supply components, marking material

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System cabling, Termination Carriers

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### Process indicators and field devices



Process indicators and field devices

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### Current measurement



PACT current transformers

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PACT RCP current transformers for retrofitting

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AC current transducers, AC/DC, AC current protector

Page 240



Test disconnect terminal blocks

See Catalog 1

### Controllers



Controllers  
See Catalog 6

### Surge protection



Surge protection for measurement and control technology  
See Catalog 4



**Signal conditioners with SIL functional safety**



MACX Analog

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**Signal conditioners with PL functional safety**



MACX Safety

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**Ex i signal conditioners with SIL functional safety**



MACX Analog Ex

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**Ex i signal conditioners with PL functional safety**



MACX Safety Ex

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**Energy and power measurement**



Process indicators

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EMpro energy meters, function and communication modules

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Software for usage data acquisition

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PSK compressed air meters

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**Monitoring and diagnostics**



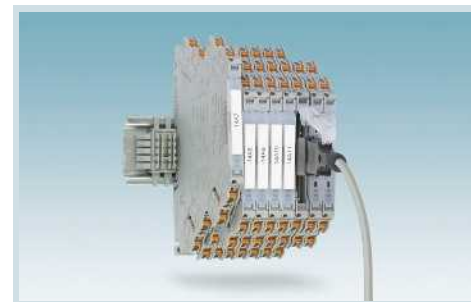
SOLARCHECK PV string monitoring

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EMD-BL Compact monitoring relays

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Highly compact signal conditioners –  
MINI Analog Pro

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**Process indicators and field devices –  
Field Analog**

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Signal conditioners with SIL functional safety – MACX Analog

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Signal conditioners with PL functional safety – MACX Safety



Ex i signal conditioners with SIL functional safety – MACX Analog Ex



Ex i signal conditioners with PL functional safety – MACX Safety Ex

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## Input

### Maximum input signal

The maximum input signal describes the value achieved before any damage occurs to the module and the signal generator. If these values are exceeded, suppresser diodes can be triggered to short circuit this input when a surge voltage is detected. The transmission range of the analog signals is located exclusively within the specified input ranges.

### Input resistance

The input resistance of a signal conditioner or measuring transducer is determined in such a way as to ensure that the input signal is loaded only slightly. This results in a low-resistance input for current inputs and a high-resistance input for voltage inputs.

### Voltage drop

In the case of passive isolators, the input voltage drop occurs as a result of the voltage drop of the operational load and the auxiliary power consumption of the module. The greater the auxiliary power consumption of the passive isolator, the smaller the operational output load is allowed to be. Low auxiliary power consumption is regarded as an indicator of device quality.

### Common mode rejection

In the case of signal conditioners, operational amplifiers are used internally for transmission purposes. In theory, operational amplifiers should display ideal transmission and amplification behavior. However, it is a different matter in practice. When both input voltages are changed concordantly, i.e., exactly the same voltage to ground is applied to both input terminal blocks, this leads to an unintended output signal. Theoretically, if the operational amplifier is ideal, no output signal should appear since the differential input signal is "0 V". Common mode rejection indicates the factor (in dB) by which the common input voltage at both inputs is amplified to a lesser extent than the difference in voltage between the two inputs.

## Analog output

### Maximum output signal

During uninterrupted operation of the devices, an overload at the input cannot cause greater values than at the output.

### Zero/span adjustment

When the zero point is set, the zero point of an analog output is adjusted and set in relation to the input signal.

When the "amplification" span is set, the analog output is adjusted in relation to the input signal. In this case, the output characteristic curve is increased or decreased by an amplification factor.

### Load

The load on the output side indicates the load-carrying capacity of a measuring transducer or a signal conditioner. Current outputs can drive a maximum of 500  $\Omega$ . Voltage outputs have a load-carrying capacity of up to at least 10 k $\Omega$ .

### Residual ripple/ripple

A superimposed ripple can appear on the output signal due to signal conditioning required by the circuit. The residual ripple is indicated in mV<sub>pp</sub> or mV<sub>rms</sub>.

### Open-circuit behavior

With some measuring transducers, the input signal is permanently monitored for possible open circuits in the signal line. If the signal exceeds or falls below a tolerance limit, an open circuit is detected and a defined output signal is sent. With programmable devices, the output signals can be freely selected.

## Digital output

### Relays

Many of the products with a relay output that are shown in the catalog feature hard gold-plated relay contact material. The voltage range has an important role to play in terms of how this contact material can be used. Up to 50 mA can be switched with voltage ranges of up to 30 V AC/36 V DC. Even very small currents are transmitted perfectly. If the aforementioned voltage range is exceeded and values of up to 250 V AC/DC are processed, currents of up to 2 A can flow. However, in this case the subsequent transmission of small currents can no longer be guaranteed.

### Transistor

A PNP transistor switching output can be used to transmit 24 V DC switching signals up to approximately 100 mA.

## General data

### Supply voltage

The product range includes DC and AC power supply units for specific products. There is a standard power supply unit available in the form of a 24 V DC version that operates within a voltage range of 20 to 30 V DC. For other supply voltages, please refer to the technical data.

### Current consumption

The value specified here describes the self-consumption of the devices. It also includes the output current and, where applicable, the switching output load.

### Transmission errors

The transmission precision is a gauge of the quality of a measuring transducer. It is the deviation from the ideal transmission characteristic curve and includes linearity, span, and offset errors.

### Non-linearity

Non-linearity is the deviation from the ideal transmission precision without including span and offset errors.

The non-linearity of a signal makes it possible to evaluate the course from zero to endpoint. Normally, the linearity errors are expressed as a percentage that indicates the extent of deviation from the ideal transmission characteristic curve.

### Temperature coefficient

The temperature coefficient provides an assessment of the extent to which precision deviates when the ambient temperature around a signal conditioner or measuring transducer changes. In many cases this is specified as a percentage. An alternative definition is ppm/K (parts per million/Kelvin).

Example: 250 ppm/K = 0.025%/K.

### Cut-off frequency

Signal conditioners are basically designed to transmit DC signals. However, signal changes call for a dynamic form of behavior so that small AC quantities (normally: 30 Hz) can also be transmitted. This is achieved by defining a cut-off frequency. At the same time, a low cut-off frequency can be used to suppress higher-frequency AC components.

### Step response

The step response indicates the response time of the output signal when an input signal step occurs (10 to 90%). The step response is inversely proportional to the cut-off frequency. This means that the response time decreases as the cut-off frequency increases.

### Test voltage

The test voltage indicates the electric strength of an isolated distance and is determined by type tests. In this test, a 50 Hz voltage is applied for one minute; it describes the value achieved before a disruptive discharge to another potential level occurs in the device.

### Safe isolation

“Safe isolation” is defined as protection against hazardous shock currents. When module specifications are provided in accordance with EN 61010, a distinction is made between error-free operation and operation under fault conditions. With error-free operation, nominal supply voltages of 30 V AC/60 V DC are applicable.

### Ambient temperature range

The temperature limits specified here relate exclusively to operation. These limits do not apply to storage and transport. It is here where the temperature limits of the materials used are the decisive factor. If the devices are outside of the specified temperature range during assembly, they must be brought back within the specified temperature range prior to system startup. It is important to make sure that no condensation occurs.

### Protective circuit

In order to protect the measurement and control modules against surge voltages, suppressor diodes are connected upstream of the signal and supply paths. These diodes behave in a similar manner to conventional Zener diodes. Except for the fact that suppressor diodes have faster response times and a higher maximum current.

### Information on directives and standards

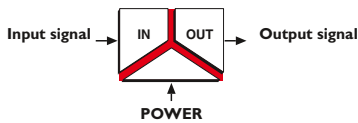
When carrying out further processing of non-independent items of equipment (components), the applicable regulations pertaining to installation must be observed.

The relevant device-specific regulations also apply with regard to installation in devices.  
(Standards applicable at the time of going to print)

Directives	EU	International
EMC Directive (electromagnetic compatibility)	2004/108/EC	-
Low Voltage Directive	2006/95/EC	-
Ex Directive (ATEX)	94/9/EC	-
<b>Product standards</b>		
Electronic equipment for use in power installations	EN 50178:1997	-
Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements	EN 61010-1:2001	IEC 61010-1:2004
Programmable logic controllers - Part 2: Equipment requirements and tests	EN 61131-2:2007	IEC 61131-2:2007
<b>EMC</b>		
EMC - Part 6-2: Generic standards - Immunity for industrial environments	EN 61000-6-2:2005	IEC 61000-6-2:2005
EMC - Part 6-4: Generic standards - Emission standard for industrial environments	EN 61000-6-4:2007	IEC 61000-6-4:2006
Electrical equipment for measurement, control, and laboratory use EMC requirements	EN 61326-1:2006	IEC 61326-1:2005
<b>ATEX</b>		
Electrical apparatus for explosive gas atmospheres - Part 0: General requirements	EN 60079-0:2006	IEC 60079-0:2007
Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"	EN 60079-11:2007	IEC 60079-11:2006
Electrical apparatus for explosive gas atmospheres - Part 15: Construction, test, and marking of type of protection "n" electrical apparatus	EN 60079-15:2005	IEC 60079-15:2005
<b>Environmental tests</b>		
Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1:2007	IEC 60068-2-1:2007
Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2:2007	IEC 60068-2-2:2007
Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6:2008	IEC 60068-2-6:2008

### Active isolation

#### 3-way isolation

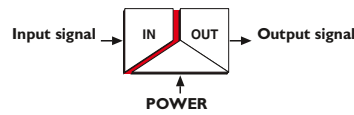


In the case of modules with this isolation method, all components that are connected to the input, output or power supply are protected against interference from each other. All three directions (input, output, and power supply) are electrically isolated from one another accordingly.

The 3-way isolation provides electrical isolation between the measurement sensor and the controller as well as between the controller and the actuating element.

On the input side, the modules need active signals. On the output side, they provide a filtered and amplified signal.

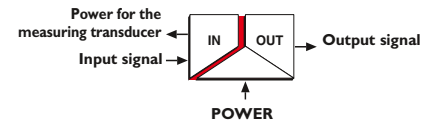
#### Input isolation



In the case of modules with this isolation method, the electronics connected on the output side (e.g., the controller) are to be protected from interference from the field. For this reason, only the input is electrically isolated from the output and the power supply which are at the same potential.

On the input side, the modules need active signals (e.g., from measurement sensors). On the output side, they provide a filtered and amplified signal (e.g., from the controller).

#### Repeater power supply



Repeater power supplies use the signal input side not only for measured value acquisition, but also to provide the necessary power to the passive measurement sensors connected on the input side.

On the output side, they provide a filtered and amplified signal (e.g., from the controller).

The isolation method used by these modules is input isolation.

### Passive isolation

#### Passive isolation, supplied on the input side



The modules draw the power needed for signal transmission and electrical isolation from the active input circuit. On the output side, a conditioned current signal is provided to the controller or to actuating elements.

This passive isolation allows signal conditioning (interruption of ground loops) and filtering without an additional power supply.

#### Passive isolation, supplied on the output side (loop-powered)

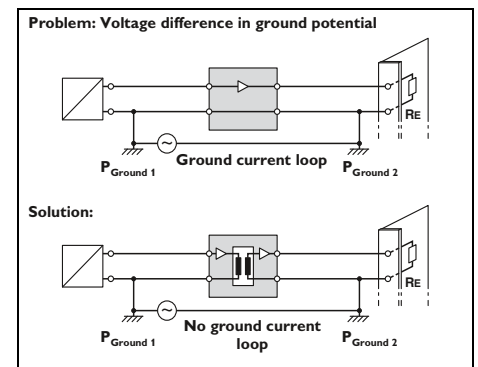
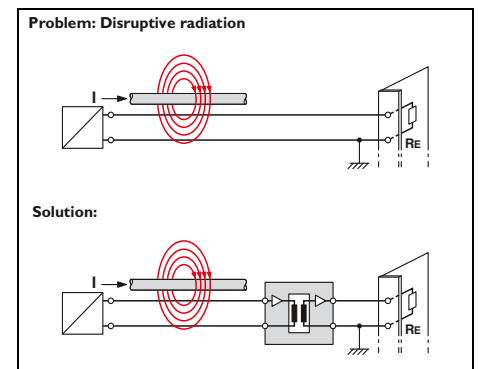


The modules draw the power needed for signal transmission and electrical isolation from the active output circuit, ideally from a PLC input card that supplies power.

On the output side, the loop-powered modules operate with a 4 to 20 mA standard signal. On the input side, the passive isolator processes active signals.

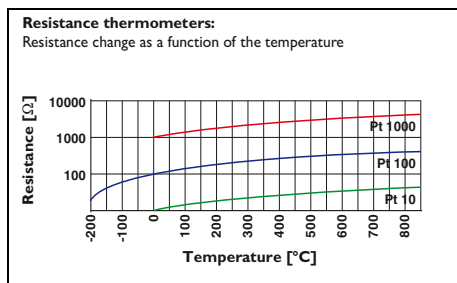
When this isolation method is used, it is important to make sure that the active signal source connected on the output side (e.g., an active PLC input card) is able to supply the passive isolator with power, as well as operate its load.

### Applications





## Resistance thermometers

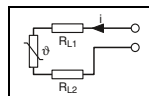


Resistance thermometers (e.g., Pt 100, Ni 1000) change their resistance value depending on the temperature. The measurement and control temperature transducers detect this change and convert it into a proportional analog signal.

To avoid unwanted self-heating of the sensor, the constant measured current used is kept as low as possible (MCR-T-UI... → 250 mA).

### Two-conductor connection technology

The resistance thermometer is connected to the measurement and control measuring transducer using a two-wire cable. Please note that the supply cable resistances are added to the measured resistance and consequently distort the result.

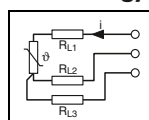


A distance of 10 m should not be exceeded.

**Example:** a 50 meter long copper cable with a cross section of 0.5 mm<sup>2</sup> has a specific resistance of 3.4 Ω. A Pt 100 sensor has a resistance change of 0.384 Ω for every 1 K temperature change. This corresponds to an error of 8.8°C.

### Three-conductor connection technology

Three-conductor technology is normally used to minimize the effect of cable resistances. An additional cable is connected to the resistance thermometer, so that the latter can be measured using two measuring circuits, one of which acts as a reference. In this way, it is possible to compensate for the cable resistance.



Identical cable lengths and an identical ambient temperature are essential here.

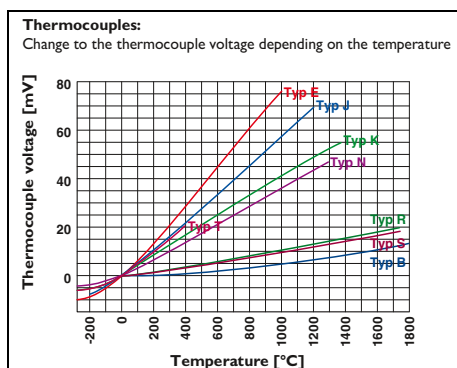
Since this is more or less the case in the majority of applications, three-conductor technology is the most commonly encountered today. Line compensation is not necessary.

### Four-conductor connection technology

Four-conductor connection technology is an ideal connection technology for resistance thermometers.

The measurement result is affected neither by cable resistances nor by their temperature-dependent fluctuations. The voltage drop on the supply and return lines can therefore be measured and compensated for separately. Line compensation is not necessary.

## Thermocouples

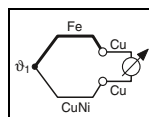


In contrast to resistance thermometers, thermocouples are active sources that generate a voltage in the microvolt range. The temperature difference measured between the measurement junction and the cold junction is converted into an absolute temperature with the help of cold junction compensation.

### Operating principle:

If different metals are joined together, a thermal voltage is produced in the metal atoms as a result of the different binding energies of the electrons. This voltage is dependent firstly on the metals themselves and secondly on the temperature.

If the same temperature prevails at the measuring junction ( $\vartheta_1$ ) and the cold junction ( $\vartheta_2$ ), no current will flow because the generated partial voltages cancel each other out. However, if the temperatures at the measuring junction and the cold junction are different, different voltages are produced. These voltages do not completely cancel each other out, and thus current flows.



A thermocouple thus always measures only one temperature difference. This is derived from the difference between the thermal voltages at the measuring junction and at the cold junction.

The voltage produced by the thermoelectric effect is very low; only a few microvolts per Kelvin.

**Example:** if a type J thermocouple (Fe-CuNi) is connected to a copper terminal, thermal voltages with opposite signs will be generated (at the iron-copper and copper-constantan transitions) and cancel each other out.

Therefore, only the difference in the thermal voltages between constantan (Cu-Ni) and iron is of relevance.

The temperature at the terminal point is also significant. If it is known, the temperature at the measuring junction can be derived by adding the thermal voltage measured at the same junction.

The MCR temperature transducers for thermocouples therefore detect the temperature at the terminal points and compensate this value, which is also referred to as the reference junction or the cold junction.

This process is sometimes called cold junction compensation.

## Digital displays

### Use of the freely programmable characteristic curve

The freely programmable characteristic curve, i.e., the assignment of the displayed value to the input value, is important in process applications for indicating flow rates or liquid levels.

The purpose of level measurements is very often not to determine how much liquid is still inside the tank, but rather to establish how much has been drawn out of it. In this case, the characteristic curve can simply be inverted in order to display the required value.

### Parameterization of the characteristic curve using interpolation points

With non-linear input signals, the received analog values can be assigned to the value to be displayed by means of a programmable characteristic curve. This curve can consist of up to 24 interpolation points. This allows flow sensors with a non-linear characteristic curve to be adapted, for instance. The analog signal digital displays in the Function Line additionally feature a summing function which - to take a typical example from bottling technology - allows you to switch over at the touch of a button from the instantaneous value (= flow rate in l/min) to

the total flow integrated in the background, which can be displayed in any unit. This saves space and money, because there is no need for a second digital display.

Limit values can also be called at the touch of a button. Limit values 1 and 2 can be assigned to either the actual value or the cumulative value. If this value is exceeded, one of the two output relays is activated.

Other applications include indicating liquid levels, pressures, and temperatures. With servo motors, the analog output signals (0 to 10 V) generated by the tachometer can be supplied to the input of the digital display in order to indicate the motor speed.

**Application:**  
Pressure measurement and display on MCR-SL-D-U-1

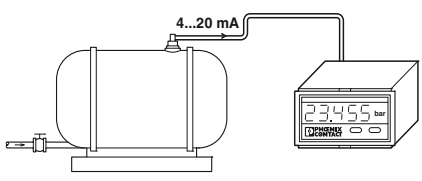
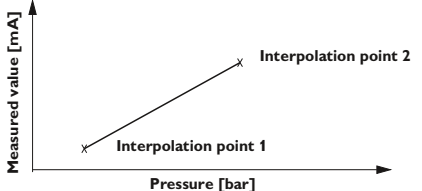


Table:	Analog signal	Display value
Interpolation point 1	4 mA	15 bar
Interpolation point 2	20 mA	30 bar

**Characteristic curve:**



### Switching behavior of relay or transistor outputs:

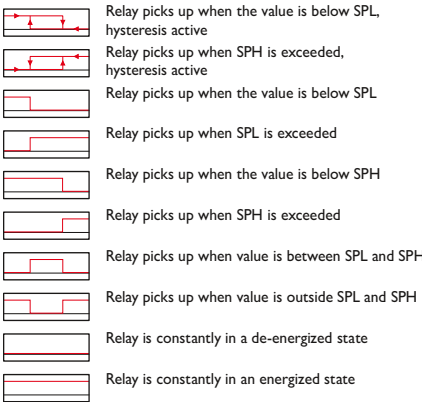
A different kind of switching behavior can be defined for each relay or each transistor when it reaches a preset switching point.

All the possible settings for the switching behavior are shown and explained in the list:

- The first two options include hysteresis, i.e., the behavior of the relay depends on the direction from which a switching point is reached.
- For the remaining options, with the exception of the last two (“on” and “off”), a switching tolerance is taken into account to prevent the relay contact from “chattering”. The relay is not switched until the switching point plus switching tolerance has been reached.

- In the “on” state, the relay is permanently picked up. It only responds if there is an open circuit and it has been set to drop out when this happens.
- In the “off” state, the relay only responds if there is an open circuit and it has been set to pick up when this happens.

**Possible settings for the switching behavior**



SPL = Set Point Low (lower switching point)  
SPH = Set Point High (upper switching point)

## Non-intrinsically-safe signal transmission in potentially explosive areas

Electrical equipment operated in systems with potentially explosive areas is subject to different usage requirements, depending on the application.

For example, electrical equipment could be used in the following locations when analog signals are being transmitted:

- Sensors and actuators can be located in Zone 0, Zone 1 or Zone 2.
- Signal transmitters can be located in Zone 1, Zone 2 or the safe area.
- The controller, e.g., PLC, is in the safe area.

For examples of the kinds of electrical devices that can be installed for the purpose of transmitting signals, please see the figure.

Devices must be designed to offer a suitable protection type if they are to be used in Zone 2. The MINI Analog Pro, MINI Analog, and MACX Analog ranges are designed to provide “n” protection for this

purpose and must be installed in Zone 2 in suitable and approved housing (EN 60079-15 and EN 60079-0) with at least IP54 protection class.

### Example:

A sensor/actuator with protection type “n” can be connected to an isolator from the MINI Analog Pro, MINI Analog or MACX Analog ranges in Zone 2.

When selecting suitable devices for Zone 2, it must be ensured that the electrical data of the sensors and actuators is not exceeded.

If the sensors and actuators are mounted in flameproof enclosure housing or if they have their own flameproof enclosure housing, they can also be installed in Zone 1.

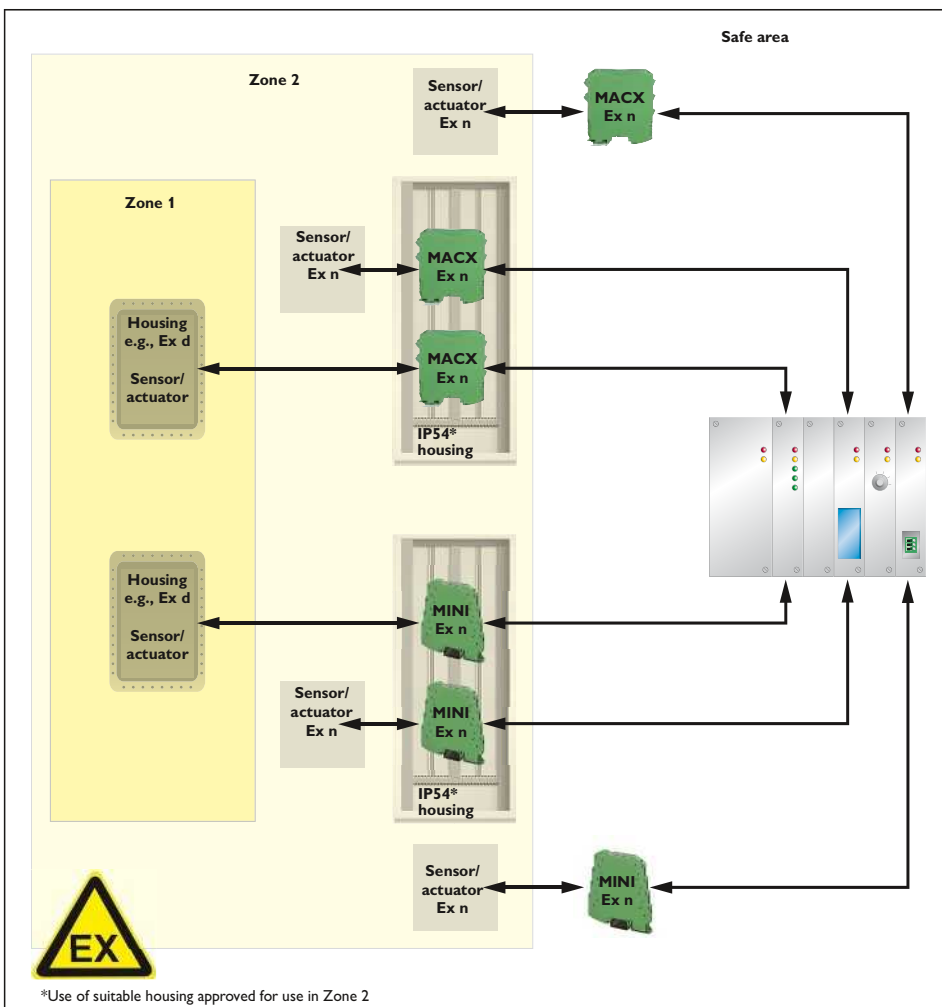
### Installation requirements

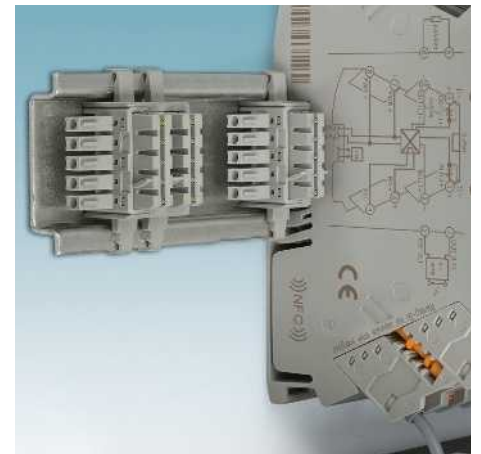
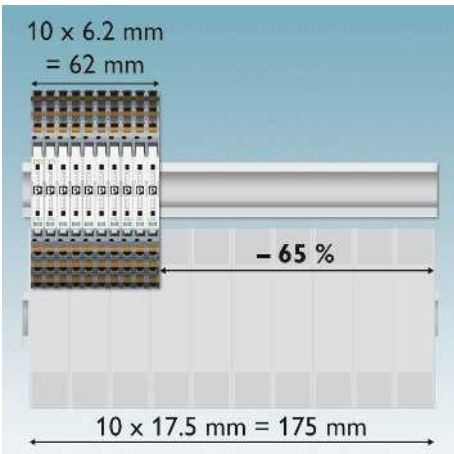
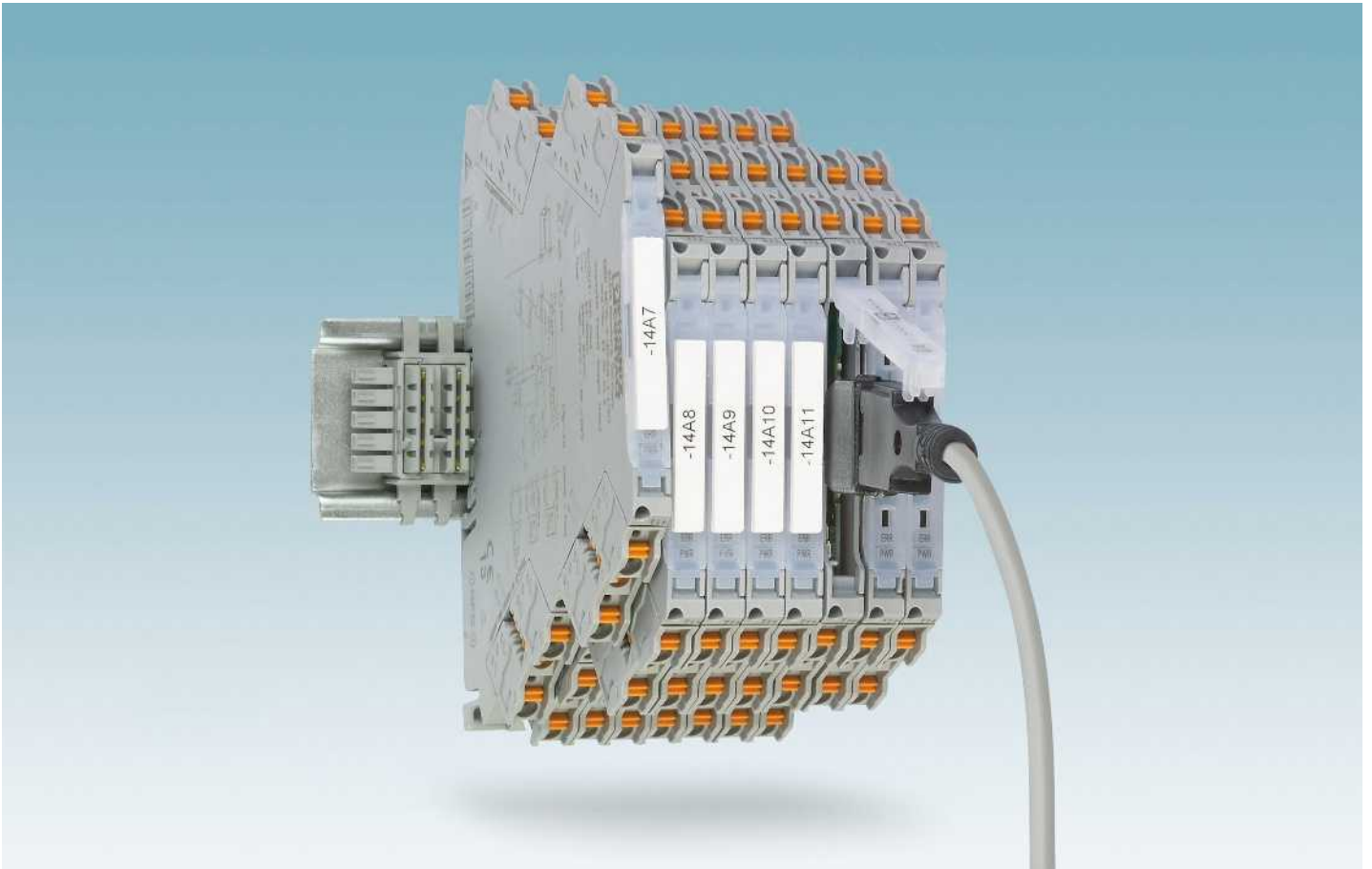
The figure shows a range of options for installing electrical devices in areas with a danger of gas explosions. Special requirements regarding the configuration, selection, and installation of electrical systems in areas with a danger of gas explosions can be found in EN 60079-14.

In the 2008 edition, relevant content from EN 61241-14 was incorporated in EN 60079-14.

EN 61241-14 must still be observed when installing electrical equipment in areas containing combustible dust. Other important factors when it comes to running systems in potentially explosive areas are inspection, maintenance, and repairs. Specifications regarding these matters can be found in EN 60079-17 and EN 60079-19.

### Installation of electrical devices for signal transmission





### Easier than ever but as slim as before

- MINI Analog Pro offers you the easiest installation and startup in confined spaces.
- Space savings of up to 65%

### Select from the following categories

- Analog IN/OUT
- Temperature
- Frequency
- Potentiometers
- Digital IN
- Limit values
- Accessories

### Easy installation

- Easily visible and accessible terminal points and FASTCON Pro plug-in connection terminal blocks

### Power bridging and fault monitoring

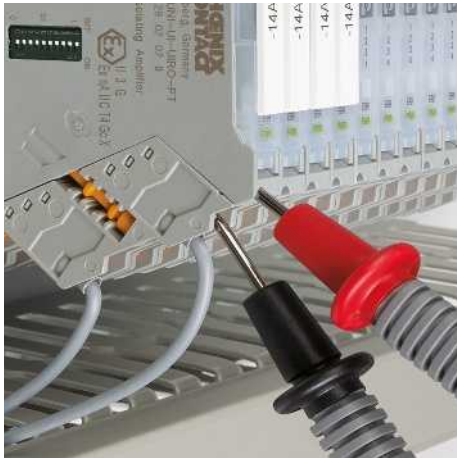
- The DIN rail connector simplifies supply and enables remote diagnostics by means of group error monitoring



#### DIN-rail-connector-compatible

The DIN rail connector enables modular bridging of the 24 V supply voltage.

Highly compact signal conditioners with plug-in connection technology – MINI Analog Pro



**Measure current signals during operation**

Measure signals conveniently for startup and servicing during operation, thanks to integrated knife disconnect terminal blocks.

- The circuit does not have to be disconnected in order to integrate the measuring device in the signal circuit
- By setting the connector to the disconnect position, signal circuits can be easily interrupted during servicing and startup



**Numerous parameterization options**

– Via DIP, PC or smartphone app

App functions via NFC communication



**Access to information**

- Call module information



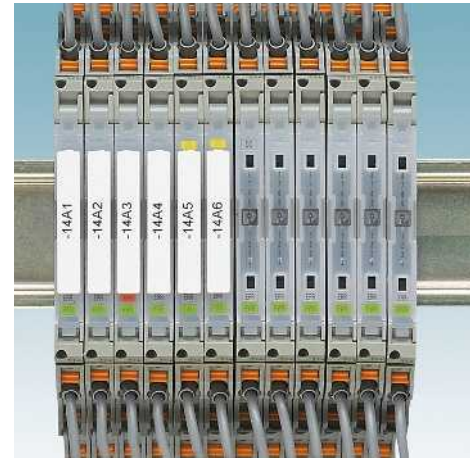
**DIP switch setting help**

- Call module information
- Display DIP switch setting help on the smartphone



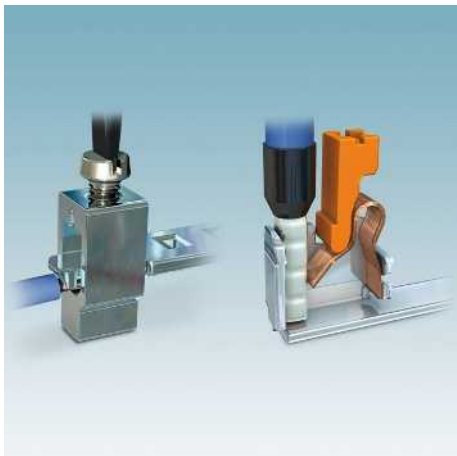
**Configuration via NFC**

- Call module information
- Display DIP switch setting help
- Wireless configuration via smartphone



**Service-friendly**

- Large-surface marking areas for complete loop identification using standard marking material as well as permanently visible status LEDs on each module



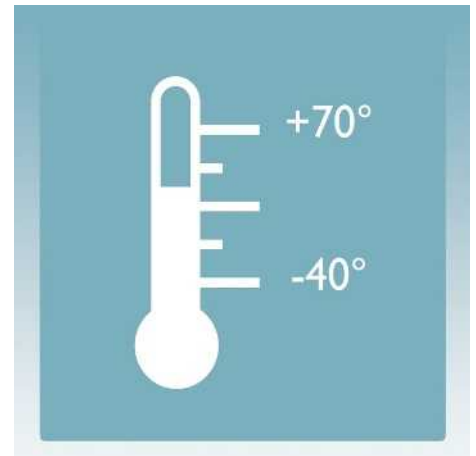
**Choice of connection technology**

- Wiring with screw connection or fast and tool-free with Push-in connection technology



**Optimum signal quality**

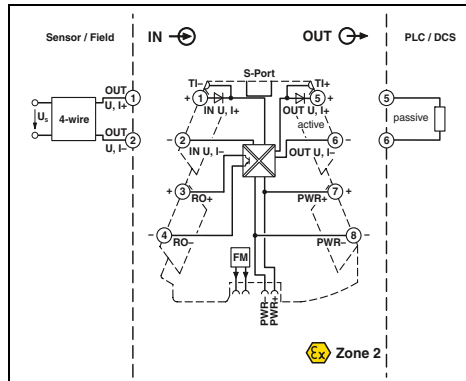
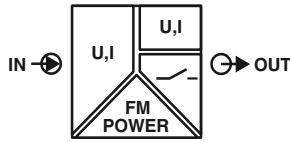
- The latest transmission technology and safe electrical isolation between input, output, and supply with 3 kV test voltage



**Suitable for any application**

- Extended supply voltage and temperature range as well as multifunctional device types

Analog IN/Analog OUT  
4-way signal conditioner



Ex n



Universal 4-way signal conditioner with switching output, configurable



Ex:

Housing width 6.2 mm

- Universally configurable, highly compact signal conditioner with switching output for electrical isolation, conversion, amplification, and filtering of standard analog signals
- Plug-in connection system
- Safe 4-way isolation
- Standard signal combinations configurable via DIP switches
- Freely configurable with software or smartphone app
- Power supply and fault monitoring possible via DIN rail connector
- Limiting behavior at the output configurable
- Status and error indicator LEDs

Notes:
The configuration software can be downloaded from the Internet: <a href="http://phoenixcontact.net/products">phoenixcontact.net/products</a> .
Information on the programming adapters can be found on page 105
Information on MINI Analog Pro accessories can be found from page 101
To order a product with an order configuration, please enter the desired configuration by referring to the order key.

<b>Input data</b>	Input signal (configurable via DIP switch or freely via software)
<b>Input resistance</b>	> 120 kΩ
<b>Output data</b>	Output signal (configurable via DIP switch or freely via software)
<b>Maximum output signal</b>	Load $R_B$
<b>Ripple</b>	
<b>Switching output</b>	Relay output Max. switching voltage Maximum switching current
<b>General data</b>	Supply voltage range Nominal supply voltage Current consumption Power consumption
<b>Maximum transmission error</b>	Temperature coefficient Step response (10-90%)
<b>Electrical isolation</b>	Test voltage, input/output/supply Ambient temperature (operation) Dimensions W/H/D EMC note
<b>Conformance/Approvals</b>	Conformance ATEX UL, USA/Canada
GL	

Technical data

<b>U input</b>	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 1 V ... 5 V 10 V ... 0 V 10 V ... 2 V 5 V ... 0 V 5 V ... 1 V 0 V ... 12 V	<b>I input</b>	0 mA ... 20 mA 4 mA ... 20 mA 0 mA ... 10 mA 2 mA ... 10 mA 20 mA ... 0 mA 20 mA ... 4 mA 10 mA ... 0 mA 10 mA ... 2 mA 0 mA ... 24 mA
			approx. 50 Ω (+ 0.7 V for test diode)
<b>U output</b>	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 1 V ... 5 V 0 V ... 10.5 V approx. 12.3 V ≥ 10 kΩ < 20 mV <sub>pp</sub> (at 600 Ω)	<b>I output</b>	0 mA ... 20 mA 4 mA ... 20 mA 0 mA ... 10 mA 2 mA ... 10 mA 0 mA ... 21 mA 24.6 mA
			≤ 600 Ω (at 20 mA) < 20 mV <sub>pp</sub> (at 600 Ω)
<b>1 N/O contact</b>	30 V DC 100 mA (at 30 V)	<b>U output</b>	9.6 V DC ... 30 V DC 24 V DC
		<b>I output</b>	63 mA (12 V DC) ≤ 1 W (at I <sub>OUT</sub> = 20 mA, 9.6 V DC, 600 Ω load)
			0.1 % (of final value) 0.01 %/K, typ. 0.01 %/K approx. 140 ms (15 Hz sample rate) approx. 45 ms (60 Hz sample rate) approx. 25 ms (240 Hz sample rate) Reinforced insulation in accordance with IEC 61010-1 3 kV (50 Hz, 1 min.) -40 °C ... 70 °C 6.2 / 110.5 / 120.5 mm Class A product, see page 605
			CE-compliant Ex II 3 G Ex nA IIC T4 Gc X UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6 GL applied for

Ordering data

Type	Order No.	Pcs./Pkt.
MINI MCR-2-UNI-UI-UIRO-PT	2902028	1
MINI MCR-2-UNI-UI-UIRO	2902026	1
MINI MCR-2-UNI-UI-UIRO-PT-C	2902027	1
MINI MCR-2-UNI-UI-UIRO-C	2902024	1

Accessories

IFS-USB-PROG-ADAPTER	2811271	1
NFC-USB-PROG-ADAPTER	2900013	1
IFS-BT-PROG-ADAPTER	2905872	1

Description	Push-in connection	Screw connection
<b>4-way signal conditioner with switching output</b> , for electrical isolation of analog signals		
Standard configuration	Push-in connection	Screw connection
Standard configuration	Screw connection	Push-in connection
Order configuration	Push-in connection	Screw connection
Order configuration	Screw connection	Push-in connection

<b>Programming adapter</b> for configuring modules with S-PORT interface	
<b>Programming adapter</b> for configuring modules with NFC interface	
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface	

Highly compact signal conditioners with plug-in connection technology – MINI Analog Pro

Order key for MINI MCR-2-UNI-UI-UIRO(-PT)(-C) 4-way signal conditioners (standard configuration entered as an example)

Order No.	Input		Sample rate		Output		Output limitation	
	Input signal	Start	End	Output signal	Start	End		
<b>2902024</b>	I	0.0	20.0	15	I	0.0	20.0	0
2902024 ≙ MINI MCR-2- UNI-UI-UIRO-C	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 24 mA U: freely selectable between 0.0 ... 12 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 24 mA U: freely selectable between 0.0 ... 12 V	15 ≙ 15 Hz 60 ≙ 60 Hz 240 ≙ 240 Hz	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	0 ≙ OFF 1 ≙ ON
2902027 ≙ MINI MCR-2- UNI-UI-UIRO-PT-C								

Measuring range span at least 0.5 V / 1 mA  
Increment 0.1 V / 0.1 mA

Output signal span at least 0.5 V / 1 mA  
Increment 0.1 V / 0.1 mA

Failure information

Behavior in the event of an error

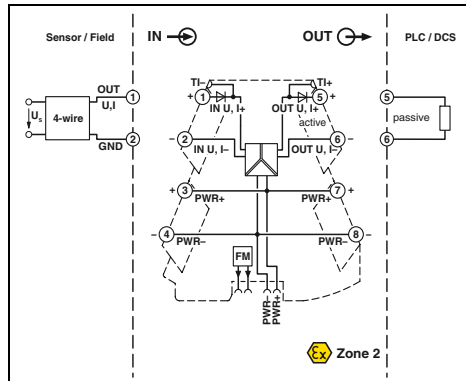
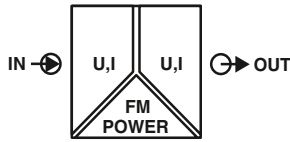
Open circuit/short circuit

Measured value overrange

Measured value underrange

NE43DO	0.0	0.0	0.0
FD ≙ Freely definable	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (free definition only for unlimited output) (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (free definition only for unlimited output) (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (free definition only for unlimited output) (signal type corresponds to selected output signal)
<b>Note: Failure information according to NE 43 can only be selected for 4 ... 20 mA output</b>			
NE43UP ≙ NE 43 upscale NE43DO ≙ NE 43 downscale NE430 ≙ NE 43 0 mA NE43UD ≙ NE 43 upscale/downscale	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA

Analog IN/Analog OUT  
3-way signal conditioner



Ex n



3-way signal conditioner for standard signals, configurable

Housing width 6.2 mm

- Configurable, ultra-compact signal conditioner for electrical isolation, conversion, amplification, and filtering of standard analog signals
- Plug-in connection system
- Safe 3-way isolation
- Standard signal combinations configurable via DIP switches
- Power supply and fault monitoring possible via DIN rail connector
- Status LED

**Notes:**  
Information on MINI Analog Pro accessories can be found from page 101  
To order a product with an order configuration, please enter the desired configuration by referring to the order key.

<b>Input data</b>	Input signal (configurable using the DIP switch)
<b>Output data</b>	Output signal (configurable using the DIP switch)
<b>Maximum output signal</b>	No-load voltage Short-circuit current Load $R_B$ Ripple
<b>General data</b>	Supply voltage range Nominal supply voltage Current consumption
<b>Power consumption</b>	
<b>Maximum transmission error</b>	Temperature coefficient Limit frequency (3 dB) Step response (10-90%) Electrical isolation Test voltage, input/output/supply Degree of protection Ambient temperature (operation) Mounting Housing material Dimensions W/H/D Push-in connection solid/stranded/AWG Screw connection solid/stranded/AWG EMC note
<b>Conformance/Approvals</b>	Conformance ATEX UL, USA/Canada
<b>DNV GL</b>	

**Technical data**

<b>U input</b>	0 V ... 5 V 1 V ... 5 V -5 V ... 5 V 0 V ... 10 V 2 V ... 10 V -10 V ... 10 V 0 V ... 20 V 4 V ... 20 V -20 V ... 20 V 0 V ... 24 V 4.8 V ... 24 V -24 V ... 24 V 0 V ... 30 V 6 V ... 30 V -30 V ... 30 V > 1000 k $\Omega$	<b>I input</b>	0 mA ... 20 mA 4 mA ... 20 mA -20 mA ... 20 mA
<b>U output</b>	0 V ... 5 V 1 V ... 5 V -5 V ... 5 V 0 V ... 10 V 2 V ... 10 V -10 V ... 10 V	<b>I output</b>	0 mA ... 20 mA 4 mA ... 20 mA
<b>Supply voltage range</b>	9.6 V DC ... 30 V DC 24 V DC	<b>Current consumption</b>	25 mA (Current output, at 24 V DC incl. load) 54 mA (Current output, at 12 V DC incl. load) $\leq 800$ mW (at $I_{OUT} = 20$ mA, 9.6 V DC, 600 $\Omega$ load)
<b>Maximum transmission error</b>	$\leq 0.1$ % (of final value) 0.01 %/K, typ. 0.01 %/K 30 Hz (via DIP switch) < 8.5 ms (with 30 Hz filter)	<b>Electrical isolation</b>	Reinforced insulation in accordance with IEC 61010-1 3 kV (50 Hz, 1 min.) IP20 -40 °C ... 70 °C
<b>Conformance/Approvals</b>	CE-compliant II 3 G Ex nA IIC T4 Gc X UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6 C, EMC2		

**Ordering data**

<b>Description</b>	<b>3-way signal conditioner</b> , for electrical isolation of analog signals
Standard configuration	Push-in connection
Standard configuration	Screw connection
Order configuration	Push-in connection
Order configuration	Screw connection

Type	Order No.	Pcs./ Pkt.
MINI MCR-2-UI-UI-PT	2902040	1
MINI MCR-2-UI-UI	2902037	1
MINI MCR-2-UI-UI-PT-C	2902039	1
MINI MCR-2-UI-UI-C	2902036	1



## Highly compact signal conditioners with plug-in connection technology – MINI Analog Pro

Order key for MINI MCR-2-UI-UI(-PT)(-C) 3-way signal conditioners (standard configuration entered as an example)

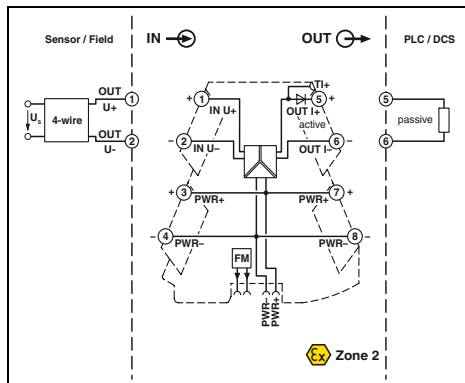
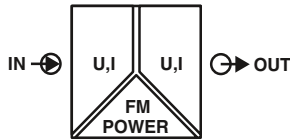
Order No.      Input      Output      Cut-off frequency

2902036	IN03	OUT01	5K
2902036 ≙ MINI MCR-2- UI-UI-C	IN 01 ≙ 0 ... 20 mA IN 02 ≙ 4 ... 20 mA IN 03 ≙ 0 ... 10 V IN 04 ≙ 2 ... 10 V IN 05 ≙ 0 ... 5 V IN 06 ≙ 1 ... 5 V IN 21 ≙ -5 ... 5 V IN 22 ≙ -10 ... 10 V IN 23 ≙ -20 ... 20 V IN 32 ≙ 0 ... 20 V IN 35 ≙ -20 ... 20 mA IN 38 ≙ 0 ... 24 V IN 39 ≙ 0 ... 30 V IN 80 ≙ -30 ... 30 V IN 93 ≙ -24 ... 24 V IN 94 ≙ 4.8 ... 24 V IN 95 ≙ 6 ... 30 V IN 96 ≙ 4 ... 20 V	OUT 01 ≙ 0 ... 20 mA OUT 02 ≙ 4 ... 20 mA OUT 03 ≙ 0 ... 10 V OUT 04 ≙ 2 ... 10 V OUT 05 ≙ 0 ... 5 V OUT 06 ≙ 1 ... 5 V OUT 13 ≙ -5 ... 5 V OUT 14 ≙ -10 ... 10 V	30 Hz 5 kHz
2902039 ≙ MINI MCR-2- UI-UI-PT-C			

Signal combinations for MINI MCR-2-UI-UI(-PT)(-C) signal conditioners

Input	Output							
	0 ... 20 mA	4 ... 20 mA	0 ... 5 V	1 ... 5 V	-5 ... 5 V	0 ... 10 V	2 ... 10 V	-10 ... 10 V
0 ... 20 mA	X	X	X	X	X	X	X	X
4 ... 20 mA	X	X	X	X	X	X	X	X
-20 ... 20 mA	X	X	X	X	X	X	X	X
0 ... 5 V	X	X	X	X	X	X	X	X
1 ... 5 V	X	X	X	X	X	X	X	X
-5 ... 5 V	X	X	X	X	X	X	X	X
0 ... 10 V	X	X	X	X	X	X	X	X
2 ... 10 V	X	X	X	X	X	X	X	X
-10 ... 10 V	X	X	X	X	X	X	X	X
0 ... 20 V	X	X	X	X	X	X	X	X
4 ... 20 V	X	X	X	X	X	X	X	X
-20 ... 20 V	X	X	X	X	X	X	X	X
0 ... 24 V	X	X	X	X	X	X	X	X
4.8 ... 24 V	X	X	X	X	X	X	X	X
-24 ... 24 V	X	X	X	X	X	X	X	X
0 ... 30 V	X	X	X	X	X	X	X	X
6 ... 30 V	X	X	X	X	X	X	X	X
-30 ... 30 V	X	X	X	X	X	X	X	X

Analog IN/Analog OUT  
3-way signal conditioner



3-way signal conditioner with fixed signal combinations



- Highly compact signal conditioner for electrical isolation, conversion, amplification, and filtering of standard analog signals
- Fixed signal combinations
- Plug-in connection system
- Safe 3-way isolation
- Power supply and fault monitoring possible via DIN rail connector
- Status LED

**Notes:**  
Information on MINI Analog Pro accessories can be found from page 101

<b>Input data</b>	Input resistance
<b>Output data</b>	Maximum output signal No-load voltage Short-circuit current Load $R_B$ Ripple
<b>General data</b>	Supply voltage $U_B$ Nominal supply voltage Typ. current consumption Maximum transmission error Temperature coefficient Limit frequency (3 dB) Step response (10-90%) Degree of protection Electrical isolation Test voltage, input/output/supply Ambient temperature (operation) Housing material Dimensions W/H/D Push-in connection solid/stranded/AWG Screw connection solid/stranded/AWG EMC note
<b>Conformance/Approvals</b>	Conformance ATEX UL, USA/Canada

DNV GL

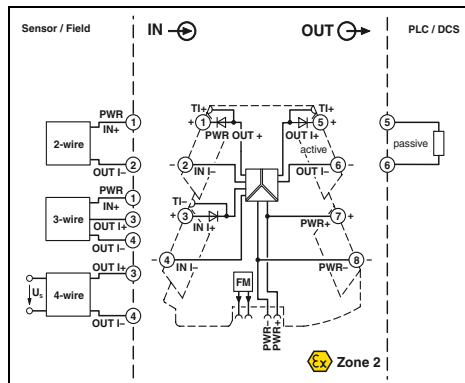
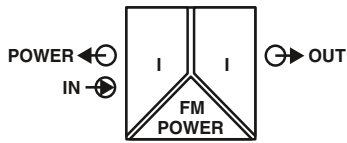
**Technical data**

<b>U input</b>	approx. 1 M $\Omega$	<b>I input</b>	approx. 63 $\Omega$ (+ 0.7 V for test diode)
<b>U output</b>	11 V	<b>I output</b>	22 mA < 17 V
	< 15 mA		
	$\geq 10$ k $\Omega$		$\leq 600$ $\Omega$ (at 20 mA)
	< 20 mV <sub>pp</sub> (at 10 k $\Omega$ )		< 20 mV <sub>pp</sub> (at 600 $\Omega$ )
<b>General data</b>			
9.6 V DC ... 30 V DC		24 V DC	
25 mA (24 V DC)		0.1 % (of final value)	
0.01 %/K, typ. 0.01 %/K		approx. 30 Hz	
approx. 10 ms		IP20	
Reinforced insulation in accordance with IEC 61010-1			
3 kV (50 Hz, 1 min.)		-40 °C ... 70 °C	
PBT			
6.2 / 110.5 / 120.5 mm		0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12	
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12		Class A product, see page 605	
<b>Conformance/Approvals</b>			
CE-compliant			
Ex II 3 G Ex nA IIC T4 Gc X			
UL 508 Listed			
Class I, Div. 2, Groups A, B, C, D T6			
Class I, Zone 2, Group IIC T6			
C, EMC2			

**Ordering data**

Description	Input signal	Output signal	Type	Order No.	Pcs./Pkt.
<b>3-way signal conditioner, for electrical isolation of analog signals</b>					
Push-in connection	0 ... 10 V	0 ... 20 mA	MINI MCR-2-U-I0-PT	2902023	1
Screw connection	0 ... 10 V	0 ... 20 mA	MINI MCR-2-U-I0	2902022	1
Push-in connection	0 ... 10 V	4 ... 20 mA	MINI MCR-2-U-I4-PT	2902030	1
Screw connection	0 ... 10 V	4 ... 20 mA	MINI MCR-2-U-I4	2902029	1
Push-in connection	0 ... 20 mA	0 ... 10 V	MINI MCR-2-I0-U-PT	2902001	1
Screw connection	0 ... 20 mA	0 ... 10 V	MINI MCR-2-I0-U	2902000	1
Push-in connection	4 ... 20 mA	0 ... 10 V	MINI MCR-2-I4-U-PT	2902003	1
Screw connection	4 ... 20 mA	0 ... 10 V	MINI MCR-2-I4-U	2902002	1
Push-in connection	0 ... 20 mA, 4 ... 20 mA	0 ... 20 mA, 4 ... 20 mA	MINI MCR-2-I-I-PT	2901999	1
Screw connection	0 ... 20 mA, 4 ... 20 mA	0 ... 20 mA, 4 ... 20 mA	MINI MCR-2-I-I	2901998	1
Push-in connection	0 ... 10 V, -10 ... 10 V	0 ... 10 V, -10 ... 10 V	MINI MCR-2-U-U-PT	2902043	1
Screw connection	0 ... 10 V, -10 ... 10 V	0 ... 10 V, -10 ... 10 V	MINI MCR-2-U-U	2902042	1

**Analog IN/Analog OUT**  
**3-way repeater power supply**



3-way repeater power supply



EX:

Housing width 6.2 mm

**Technical data**

**Input data**

Input signal

Input resistance  
Transmitter supply voltage

**Output data**

Output signal  
Maximum output signal  
No-load voltage  
Load  $R_B$   
Ripple

**General data**

Supply voltage range  
Nominal supply voltage  
Current consumption  
Power consumption

Maximum transmission error

Temperature coefficient  
Limit frequency (3 dB)  
Step response (10-90%)

**Electrical isolation**

Test voltage, input/output/supply  
Degree of protection  
Ambient temperature (operation)

**Mounting**

Housing material  
Dimensions W/H/D  
Push-in connection solid/stranded/AWG  
Screw connection solid/stranded/AWG

**EMC note**

**Conformance/Approvals**

Conformance  
ATEX  
UL, USA/Canada

DNV GL

0 ... 20 mA, isolator operation /  
4 ... 20 mA, repeater power supply and isolator operation  
approx. 68  $\Omega$  (+ 0.7 V for test diode)  
> 19.5 V

0 ... 20 mA / 4 ... 20 mA  
24 mA  
< 20 V  
 $\leq$  600  $\Omega$  (at 20 mA)  
< 20 mV<sub>PP</sub> (at 600  $\Omega$ )

9.6 V DC ... 30 V DC  
24 V DC  
25 mA (at 24 V DC and in isolator operation)  
 $\leq$  1400 mW (at  $I_{OUT} = 20$  mA, 9.6 V DC, 600  $\Omega$  load)

0.1 % (of final value)  
0.01 %/K, typ. 0.01 %/K  
> 1.75 kHz (typ.)  
< 200  $\mu$ s (typ.)

Reinforced insulation in accordance with IEC 61010-1  
3 kV (50 Hz, 1 min.)  
IP20  
-40 °C ... 70 °C

any  
PBT  
6.2 / 110.5 / 120.5 mm  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 24 - 12  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 12  
Class A product, see page 605

CE-compliant  
 II 3 G Ex nA IIC T4 Gc X  
UL 508 Listed  
Class I, Div. 2, Groups A, B, C, D T5  
Class I, Zone 2, Group IIC T5  
C, EMC2

**Ordering data**

**Description**

3-way repeater power supply

Push-in connection  
Screw connection

**Type**

MINI MCR-2-RPSS-I-I-PT  
MINI MCR-2-RPSS-I-I

**Order No.**

2902015  
2902014

**Pcs./ Pkt.**

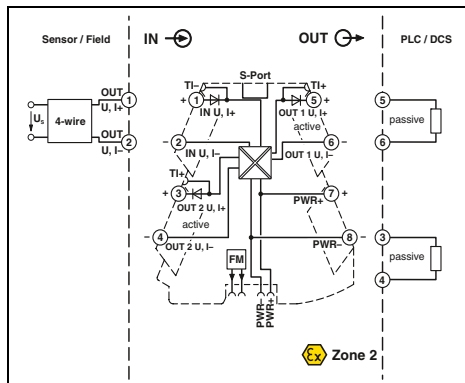
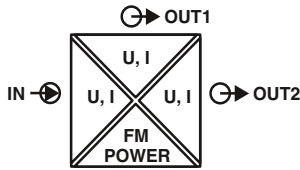
1  
1

- Highly compact repeater power supply for electrical isolation, conversion, amplification, and filtering of standard analog signals
- Supply of 2-wire and passive 3-wire sensors
- Can also be used as an isolator without supply
- Plug-in connection system
- Safe 3-way isolation
- Power supply and fault monitoring possible via DIN rail connector
- Status LED

**Notes:**

Information about power bridging, system cabling, and marking components can be found from page 98

Analog IN/Analog OUT  
4-way signal duplicator



4-way signal duplicator



Housing width 6.2 mm

- Universally configurable, highly compact 4-way signal duplicator
- For electrical isolation, conversion, amplification, and filtering of standard signals
- Independently adjustable outputs
- Input side for current signals from 0 to 24 mA or voltage signals from 0 to 12 V
- Supports fault monitoring
- Plug-in connection system
- Safe 4-way isolation
- Standard behavior can be configured via DIP switches
- Freely configurable via software or smartphone app
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

**Notes:**  
To order a product with an order configuration, enter the required configuration by referring to the adjacent order key.

<b>Input data</b>	Input signal (configurable via DIP switch or freely via software)
Maximum input signal	12 V
Input resistance	> 120 kΩ
<b>Output data</b>	Output signal (configurable via DIP switch or freely via software)
Maximum output signal	12 V
No-load voltage	12 V
Short-circuit current	24 mA
Load R <sub>B</sub>	approx. 50 Ω
Ripple	(+ 0.7 V for test diode)
<b>General data</b>	
Supply voltage range	9.6 V DC ... 30 V DC
Nominal supply voltage	24 V DC
Current consumption	55 mA (24 V DC)
Power consumption	110 mA (12 V DC)
Maximum transmission error	0.1 % (of final value)
Temperature coefficient	0.01 %/K
Step response (10-90%)	approx. 140 ms (15 Hz sample rate) approx. 45 ms (60 Hz sample rate) approx. 25 ms (240 Hz sample rate)
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1
Test voltage, input/output/supply	3 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-40 °C ... 70 °C
Mounting	any
Housing material	PBT
Dimensions W/H/D	6.2 / 110.5 / 120.5 mm
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12
Screw connection solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12
EMC note	Class A product, see page 605
<b>Conformance/Approvals</b>	
Conformance	CE-compliant
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6 GL applied for

**Technical data**

<b>U input</b>	0 V ... 10 V	<b>I input</b>	0 mA ... 20 mA
	2 V ... 10 V		4 mA ... 20 mA
	0 V ... 5 V		0 mA ... 10 mA
	1 V ... 5 V		20 mA ... 0 mA
	0 V ... 12 V		0 mA ... 24 mA
	12 V		24 mA
	> 120 kΩ		approx. 50 Ω (+ 0.7 V for test diode)
<b>U output</b>	0 V ... 10 V	<b>I output</b>	0 mA ... 20 mA
	2 V ... 10 V		4 mA ... 20 mA
	0 V ... 5 V		0 mA ... 10 mA
	1 V ... 5 V		20 mA ... 0 mA
	0 V ... 10.5 V		0 mA ... 21 mA
	approx. 12.3 V		24.6 mA
	≤ 25 mA		≤ 18.5 V
	≥ 10 kΩ		≤ 600 Ω (per channel)
	< 20 mV <sub>PP</sub> (at 600 Ω)		< 20 mV <sub>PP</sub> (at 600 Ω)
<b>U output</b>	9.6 V DC ... 30 V DC	<b>I output</b>	
	24 V DC		
	55 mA (24 V DC)		110 mA (12 V DC)
			1.5 W (at I <sub>OUT</sub> = 20 mA, 9.6 V DC, 600 Ω load)
	0.1 % (of final value)		
	0.01 %/K		
	approx. 140 ms (15 Hz sample rate)		
	approx. 45 ms (60 Hz sample rate)		
	approx. 25 ms (240 Hz sample rate)		
	Reinforced insulation in accordance with IEC 61010-1		
	3 kV (50 Hz, 1 min.)		
	IP20		
	-40 °C ... 70 °C		
	any		
	PBT		
	6.2 / 110.5 / 120.5 mm		
	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12		
	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12		
	Class A product, see page 605		
	CE-compliant		
	Ex II 3 G Ex nA IIC T4 Gc X		
	UL 508 Listed		
	Class I, Div. 2, Groups A, B, C, D T6		
	Class I, Zone 2, Group IIC T6		
	GL applied for		

**Ordering data**

Type	Order No.	Pcs./ Pkt.
MINI MCR-2-UNI-UI-2UI-PT	2905028	1
MINI MCR-2-UNI-UI-2UI	2905026	1
MINI MCR-2-UNI-UI-2UI-PT-C	2905027	1
MINI MCR-2-UNI-UI-2UI-C	2905025	1

**Accessories**

IFS-USB-PROG-ADAPTER	2811271	1
NFC-USB-PROG-ADAPTER	2900013	1
IFS-BT-PROG-ADAPTER	2905872	1

Description	
4-way signal duplicator, with independently adjustable outputs	
Standard configuration	Push-in connection
Standard configuration	Screw connection
Order configuration	Push-in connection
Order configuration	Screw connection

<b>Programming adapter</b> for configuring modules with S-PORT interface
<b>Programming adapter</b> for configuring modules with NFC interface
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface

Highly compact signal conditioners with plug-in connection technology – MINI Analog Pro

Order key for MINI MCR-2-UNI-UI-2UI(-PT)(-C) 4-way signal duplicators (standard configuration entered as an example)

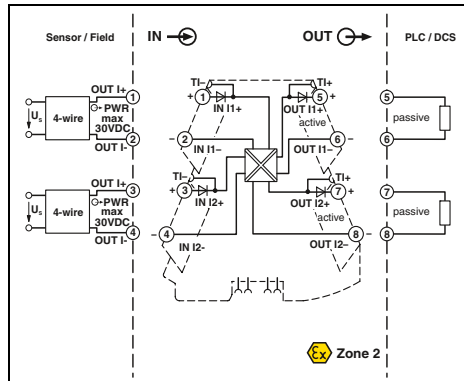
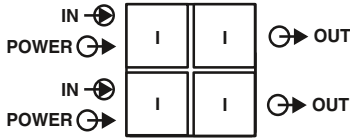
Order No.	Input			Output		Output limitation
	Input signal	Start	End	Output 1	Output 2	
<b>2905025</b>	<b>I</b>	<b>0.0</b>	<b>20.0</b>	<b>I</b>	<b>0.0</b>	<b>0</b>
2905025 ≙ MINI MCR-2-UNI-UI-2UI-C	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 24 mA	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 24 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 OUT07 ≙ 20 ... 0 mA OUT08 ≙ 20 ... 4 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 OUT07 ≙ 20 ... 0 mA OUT08 ≙ 20 ... 4 mA	0 ≙ OFF 1 ≙ ON
2905027 ≙ MINI MCR-2-UNI-UI-2UI-PT-C		U: freely selectable between 0.0 ... 12 V	U: freely selectable between 0.0 ... 12 V			

Measuring range span at least 0.5 V / 1 mA  
Increment 0.1 V / 0.1 mA

Output signal span at least 0.5 V / 1 mA  
Increment 0.1 V / 0.1 mA

### Analog IN/Analog OUT 2-way passive isolator, input loop-powered

new



Either 1 or 2-channel



Housing width 6.2 mm

- Highly compact 2-way repeater power supply
- Input loop-powered
- Does not require any additional auxiliary voltage
- For electrical isolation and filtering of analog signals
- Powered via the current loop of the sensor
- Input signal = output signal 0(4) to 20 mA
- Plug-in connection system
- Status LED

**Notes:**

Information on MINI Analog Pro accessories can be found from page 101

**Input data**

Input signal  
Input voltage limitation  
Voltage drop  
Response current

**Output data**

Output signal  
Load  $R_B$   
Transmission behavior

**General data**

Maximum transmission error  
Additional error per 100  $\Omega$  load  
Temperature coefficient  
Limit frequency (3 dB)  
Electrical isolation  
Test voltage, input/output/supply  
Degree of protection  
Ambient temperature (operation)  
Mounting  
Housing material  
Dimensions W/H/D  
Push-in connection solid/stranded/AWG  
Screw connection solid/stranded/AWG

**Conformance/Approvals**

Conformance  
ATEX  
UL, USA/Canada

GL

**Technical data**

0 ... 20 mA / 4 ... 20 mA  
30 V  
3.1 V ( $I = 20$  mA)  
approx. 200  $\mu$ A

0 ... 20 mA / 4 ... 20 mA  
< 600  $\Omega$  (at  $I = 20$  mA output signal)  
1:1 to input signal

$\leq 0.1$  % (of final value)  
< 0.075 % (of measured value / 100  $\Omega$  load)  
 $\leq 0.002$  %/K (of measured value / 100  $\Omega$  load)  
100 Hz  
Reinforced insulation in accordance with IEC 61010-1  
3 kV (50 Hz, 1 min.)  
IP20  
-40 °C ... 70 °C  
any  
PBT  
6.2 / 110.5 / 120.5 mm  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 24 - 12  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 12

CE-compliant  
Ex II 3 G Ex nA IIC T4 Gc X  
UL 508 Listed  
Class I, Div. 2, Groups A, B, C, D T6  
Class I, Zone 2, Group IIC T6  
GL applied for

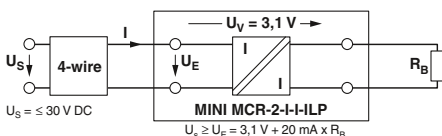
**Ordering data**

**Description**

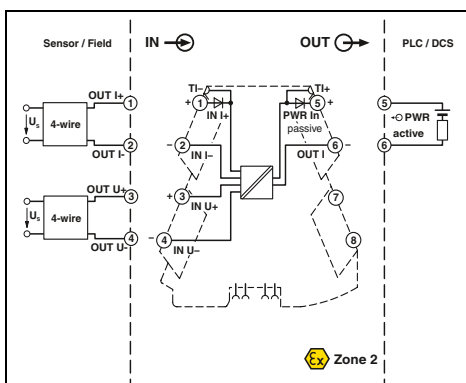
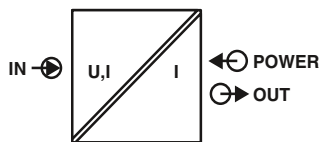
**Input loop-powered 2-way isolator**, for isolating current signals without auxiliary power

single-channel	Push-in connection
single-channel	Screw connection
two-channel	Push-in connection
two-channel	Screw connection

Type	Order No.	Pcs./Pkt.
MINI MCR-2-I-I-ILP-PT	2901995	1
MINI MCR-2-I-I-ILP	2901994	1
MINI MCR-2-2I-2I-ILP-PT	2901997	1
MINI MCR-2-2I-2I-ILP	2901996	1



**Analog IN/Analog OUT**  
**2-way passive isolator,**  
**output loop-powered**



Ex n



**Configurable,**  
**up to 74 signal combinations**



Housing width 6.2 mm

- Highly compact passive isolator for electrical isolation and filtering of standard analog signals
- Safe 2-way isolation
- Output loop-powered
- Does not require any additional auxiliary voltage
- Up to 74 signal combinations can be configured using DIP switches
- Plug-in connection system
- Voltage input from mV voltages up to 30 V
- Current input from 2 to 40 mA
- Status LED

**Notes:**

To order a product with an order configuration, please enter the desired configuration by referring to the order key.

Information on MINI Analog Pro accessories can be found from page 101

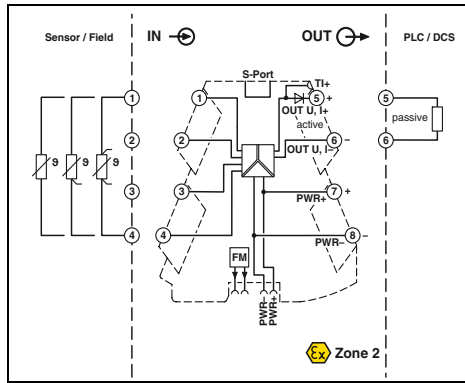
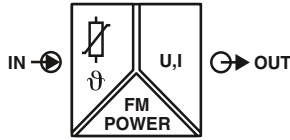
Input data	U input	I input
Input signal (configurable using the DIP switch)	2 ... 10 V , additional areas can be configured, see table	
Maximum input signal	< 30 V	50 mA (Dielectric strength up to 30 V)
Input resistance	approx. 100 kΩ (At ≤ 1 V, otherwise approximately 1 MΩ)	25 Ω (+ 0.7 V for test diode)
Output data		
Output signal	4 ... 20 mA	
Maximum output signal	32 mA	
Load R <sub>B</sub>	(U <sub>B</sub> - 8 V) / 22 mA	
Ripple	< 10 mV <sub>rms</sub> (at 600 Ω)	
General data		
Current consumption	≤ 20 mA	
Maximum transmission error	≤ 0.1 % (of final value)	
Temperature coefficient	0.01 %/K, typ. 0.005 %/K	
Limit frequency (3 dB)	approx. 30 Hz	
Step response (10-90%)	20 ms	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
Test voltage, input/output/supply	3 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature (operation)	-40 °C ... 70 °C	
Housing material	PBT	
Dimensions W/H/D	6.2 / 110.5 / 120.5 mm	
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12	
Screw connection solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12	
EMC note	Class A product, see page 605	
Conformance/Approvals		
Conformance	CE-compliant	
ATEX	Ex II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC T5	

Description	Ordering data		
	Type	Order No.	Pcs./Pkt.
<b>Output loop-powered 2-way isolator</b> , for isolating current signals without auxiliary power			
Standard configuration	Push-in connection	<b>MINI MCR-2-UI-I-OLP-PT</b>	2902063
Standard configuration	Screw connection	<b>MINI MCR-2-UI-I-OLP</b>	2902061
Order configuration	Push-in connection	<b>MINI MCR-2-UI-I-OLP-PT-C</b>	2902062
Order configuration	Screw connection	<b>MINI MCR-2-UI-I-OLP-C</b>	2902060

**Order key for MINI MCR-2-UI-I-OLP-(PT)-(C)**

Order No.	Input						
<b>2902060</b>	<b>0 mV ... 1000 mV</b>						
2902060 ≙	0 mV ... 1000 mV	0 V ... 10 V	-1000 mV ... 1000 mV	-10 V ... 10 V	0 mA ... 40 mA	-2 mA ... 2 mA	
MINI MCR-2-UI-I-OLP-C	0 mV ... 750 mV	0 V ... 7.5 V	-750 mV ... 750 mV	-7.5 V ... 7.5 V	0 mA ... 30 mA	-3 mA ... 3 mA	
	0 mV ... 500 mV	0 V ... 5 V	-500 mV ... 500 mV	-5 V ... 5 V	0 mA ... 20 mA	-10 mA ... 10 mA	
	0 mV ... 300 mV	0 V ... 3 V	-300 mV ... 300 mV	-3 V ... 3 V	0 mA ... 12 mA	-15 mA ... 15 mA	
2902062 ≙	0 mV ... 250 mV	0 V ... 2.5 V	-250 mV ... 250 mV	-2.5 V ... 2.5 V	0 mA ... 10 mA	-20 mA ... 20 mA	
MINI MCR-2-UI-I-OLP-PT-C	0 mV ... 200 mV	0 V ... 2 V	-200 mV ... 200 mV	-2 V ... 2 V	0 mA ... 8 mA	-30 mA ... 30 mA	
	0 mV ... 150 mV	0 V ... 1.5 V	-125 mV ... 125 mV	-1.25 V ... 1.25 V	0 mA ... 7.5 mA	-40 mA ... 40 mA	
	0 mV ... 125 mV	0 V ... 1.25 V	-120 mV ... 120 mV	-1.2 V ... 1.2 V	0 mA ... 5 mA		
	0 mV ... 120 mV	0 V ... 1.2 V	-150 mV ... 150 mV	-1.5 V ... 1.5 V	0 mA ... 6 mA		
	0 mV ... 100 mV	0 V ... 30 V	-100 mV ... 100 mV	-30 V ... 30 V	0 mA ... 4 mA		
	0 mV ... 75 mV	0 V ... 25 V	-75 mV ... 75 mV	-25 V ... 25 V	0 mA ... 3 mA		
	0 mV ... 60 mV	0 V ... 20 V	-60 mV ... 60 mV	-20 V ... 20 V	0 mA ... 2.5 mA		
	0 mV ... 50 mV	0 V ... 12.5 V	-50 mV ... 50 mV	-12.5 V ... 12.5 V	0 mA ... 2 mA		
		0 V ... 12 V		-12 V ... 12 V	4 mA ... 20 mA		
		0 V ... 15 V		-15 V ... 15 V	2 mA ... 10 mA		
		2 V ... 10 V		1 V ... 5 V	1 mA ... 5 mA		

Temperature  
Temperature transducer  
for resistance thermometers



Universal temperature transducer for resistance thermometers



Housing width 6.2 mm

- Universally configurable, highly compact temperature transducer for electrical isolation, conversion, amplification, and filtering of resistance thermometer and remote resistance-type sensor signals
- For 2, 3 or 4-wire sensors according to IEC 751, JIS, GOST

- Plug-in connection system
- Safe 3-way isolation
- Standard signal combinations configurable via DIP switches
- Freely configurable with software or smartphone app
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

Notes:
The configuration software can be downloaded from the Internet: <a href="http://phoenixcontact.net/products">phoenixcontact.net/products</a> .
Information on the programming adapters can be found on page 105
Information on MINI Analog Pro accessories can be found from page 101
To order a product with an order configuration, please enter the desired configuration by referring to the order key.

<b>Input data</b>
Input signal (can be configured using DIP switches)
Temperature range
<b>Measuring range span</b>
Linear resistance measuring range
<b>Output data</b>
Output signal (configurable via DIP switch or freely via software)
<b>Maximum output signal</b>
No-load voltage
Short-circuit current
Load $R_B$
Ripple
<b>General data</b>
Supply voltage range
Current consumption
Power consumption
<b>Transmission error</b>
Temperature coefficient
Step response (0–99%)
<b>Electrical isolation</b>
Test voltage, input/output/supply
Ambient temperature (operation)
Housing material
Dimensions W/H/D
Push-in connection solid/stranded/AWG
Screw connection solid/stranded/AWG
EMC note
<b>Conformance/Approvals</b>
Conformance
ATEX
UL, USA/Canada
<b>DNV GL</b>

Technical data	
Pt, Ni, Cu sensors : 2, 3, 4-wire	
-200 °C ... 850 °C (Range depends on sensor type, range can be set freely via software or in increments from -150°C to 850°C via DIP switches)	
≥ 20 K	
0 Ω ... 4000 Ω (Minimum measuring span: 10% of the selected measuring range)	
U output	I output
0 ... 5 V / 1 ... 5 V	0 ... 20 mA / 4 ... 20 mA
0 ... 10 V / 10 ... 0 V	20 ... 0 mA / 20 ... 4 mA
approx. 12.3 V	24.6 mA
< 31.5 mA	< 17.5 V
≥ 10 kΩ	≤ 600 Ω (at 20 mA)
< 10 mV <sub>rms</sub>	< 10 mV <sub>rms</sub> (at 600 Ω)
9.6 V DC ... 30 V DC	
32 mA (24 V DC)	
≤ 850 mW (at I <sub>OUT</sub> = 20 mA, 9.6 V DC, 600 Ω load)	
0.1 % * 350 K / set measuring range; 0.1 % > 350 K (Pt/Ni)	
0.3 % * 200 K / set measuring range; 0.3 % > 200 K (Cu)	
0.01 %/K	
typ. 200 ms (2-wire)	
typ. 500 ms (3-wire)	
typ. 500 ms (4-wire)	
Reinforced insulation in accordance with IEC 61010-1	
3 kV (50 Hz, 1 min.)	
-40 °C ... 70 °C	
PBT	
6.2 / 110.5 / 120.5 mm	
0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12	
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12	
Class A product, see page 605	
CE-compliant	
Ex II 3 G Ex nA IIC T4 Gc X	
UL 508 Listed	
Class I, Div. 2, Groups A, B, C, D T6	
Class I, Zone 2, Group IIC T6	
C, EMC2	

Description
<b>Temperature transducer for resistance thermometers</b>
Standard configuration Push-in connection
Standard configuration Screw connection
Order configuration Push-in connection
Order configuration Screw connection

Ordering data		
Type	Order No.	Pcs./Pkt.
MINI MCR-2-RTD-UI-PT	2902052	1
MINI MCR-2-RTD-UI	2902049	1
MINI MCR-2-RTD-UI-PT-C	2902051	1
MINI MCR-2-RTD-UI-C	2902048	1

<b>Programming adapter</b> for configuring modules with S-PORT interface
<b>Programming adapter</b> for configuring modules with NFC interface
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface

Accessories		
Type	Order No.	Pcs./Pkt.
IFS-USB-PROG-ADAPTER	2811271	1
NFC-USB-PROG-ADAPTER	2900013	1
IFS-BT-PROG-ADAPTER	2905872	1



Highly compact signal conditioners with plug-in connection technology – MINI Analog Pro

Order key for MINI MCR-2-RTD-UI(-PT)(-C) temperature transducers (standard configuration entered as example)

Order No.	Sensor type	Connection technology	Measuring range		Measuring unit	Output	Output signal	Start	End
			Start	End					
<b>2902048</b>	<b>PT100</b>	<b>3</b>	<b>-50</b>	<b>150</b>	<b>C</b>	<b>I</b>	<b>4.0</b>	<b>20.0</b>	/ ...
2902048 ≙ MINI MCR-2-RTD-UI-C	PT100 ≙ Pt 100 IEC 751 PT200 ≙ Pt 200 IEC 751 PT500 ≙ Pt 500 IEC 751 PT1000 ≙ Pt 1000 IEC 751 PT100G ≙ Pt 100 GOST 6651-2009 (α = 0.00394) PT1000G ≙ Pt 1000 GOST 6651-2009 (α = 0.00394) PT100J ≙ Pt 100 JIS C1604/1997 PT1000J ≙ Pt 1000 JIS C1604/1997 Ni100 ≙ Ni 100 DIN 43760 Ni1000 ≙ Ni 1000 DIN 43760 Cu50 ≙ Cu 50 GOST 6651-2009 (α = 0.00428) Cu100 ≙ Cu 100 GOST 6651-2009 (α = 0.00428) Cu53 ≙ Cu 53 GOST 6651-2009 (α = 0.00426)	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	freely selectable between -200°C ... 850°C (measuring range limits depend on sensor type)	freely selectable between -200°C ... 850°C (measuring range limits depend on sensor type)	C ≙ °C F ≙ °F	I ≙ I U ≙ U	I: freely selectable between 0.0 ... 21 mA  U: freely selectable between 0.0 ... 10.5 V	I: freely selectable between 0.0 ... 21 mA  U: freely selectable between 0.0 ... 10.5 V	
2902051 ≙ MINI MCR-2-RTD-UI-PT-C									

Minimum measuring span 20 K

Output signal span at least 0.5 V / 1 mA  
Increment 0.1 V / 0.1 mA

Failure information

Behavior in the event of an error

Open circuit

Short circuit

Measured value overrange

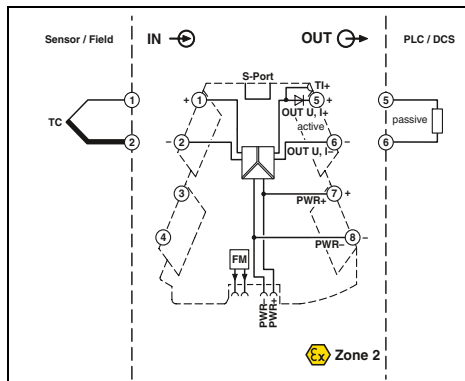
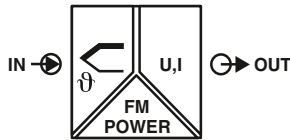
Measured value underrange

...	<b>NE43DO</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
FD ≙ Freely definable	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)
<b>Note: Failure information according to NE 43 can only be selected for 4 ... 20 mA output</b>					
NE43UP ≙ NE 43 upscale NE43DO ≙ NE 43 downscale NE430 ≙ NE 43 0 mA NE43UD ≙ NE 43 upscale/downscale	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA

Sensor types and measuring ranges for MINI MCR-2-RTD-UI(-PT)(-C) temperature transducers

Sensor type	Standard	Measuring range	Smallest measuring span	Adjustable using:
Pt 100	IEC 751 = GOST 6651-2009 (α = 0.00385)	-200°C to +850°C	20 K	DIP switches
Pt 200	IEC 751 = GOST 6651-2009 (α = 0.00385)	-200°C to +850°C	20 K	DIP switches
Pt 500	IEC 751 = GOST 6651-2009 (α = 0.00385)	-200°C to +850°C	20 K	Software or smartphone app
Pt 1000	IEC 751 = GOST 6651-2009 (α = 0.00385)	-200°C to +850°C	20 K	Software or smartphone app
Pt 100	GOST 6651-2009 (α = 0.00391)	-200°C to +850°C	20 K	Software or smartphone app
Pt 1000	GOST 6651-2009 (α = 0.00391)	-200°C to +850°C	20 K	Software or smartphone app
Pt 100	JIS C1604-1997	-200°C to +850°C	20 K	Software or smartphone app
Pt 1000	JIS C1604-1997	-200°C to +850°C	20 K	Software or smartphone app
Ni100	DIN 43760	-60°C to +250°C	20 K	Software or smartphone app
Ni 1000	DIN 43760	-60°C to +250°C	20 K	Software or smartphone app
Cu50	GOST 6651-2009 (α = 0.0428)	-180°C to +200°C	20 K	Software or smartphone app
Cu100	GOST 6651-2009 (α = 0.0428)	-180°C to +200°C	20 K	Software or smartphone app
Cu53	GOST 6651-2009 (α = 0.0426)	-50°C to +180°C	20 K	Software or smartphone app
Customer-specific characteristic curves		-200°C to +850°C	20 K	Software or smartphone app

Temperature  
Temperature transducer for  
thermocouples



Ex n



Universal temperature transducer  
for thermocouples



Housing width 6.2 mm

- Universally configurable, highly compact temperature transducer for electrical isolation, conversion, amplification, and filtering of thermocouple signals
- For thermocouples according to IEC 584 and GOST
- Internal cold junction compensation
- Plug-in connection system
- Safe 3-way isolation
- Standard signal combinations configurable via DIP switches
- Freely configurable with software or smartphone app
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

Notes:
The configuration software can be downloaded from the Internet: <a href="http://phoenixcontact.net/products">phoenixcontact.net/products</a> .
Information on the programming adapters can be found on page 105
Information on MINI Analog Pro accessories can be found from page 101
To order a product with an order configuration, please enter the desired configuration by referring to the order key.

<b>Input data</b>	Input signal (can be configured using DIP switches) Temperature range
<b>Measuring range span</b>	
<b>Output data</b>	Output signal (configurable via DIP switch or freely via software)
<b>Maximum output signal</b>	No-load voltage Short-circuit current Load $R_B$ Ripple
<b>General data</b>	Supply voltage range Current consumption Power consumption
<b>Transmission error</b>	
<b>Cold junction errors</b>	Temperature coefficient Step response (0–99%) Electrical isolation Test voltage, input/output/supply Ambient temperature (operation) Housing material Dimensions W/H/D Push-in connection solid/stranded/AWG Screw connection solid/stranded/AWG EMC note
<b>Conformance/Approvals</b>	Conformance ATEX UL, USA/Canada
<b>DNV GL</b>	

Technical data	
B, C, E, J, K, N, R, S, T, L, U, A-1, A-2, A-3, M, L -250 °C ... 2500 °C (Range depends on sensor type, range can be set freely via software or in increments from -150°C to 1350°C via DIP switches)	
min. 50 K	
<b>U output</b>	<b>I output</b>
0 ... 5 V / 1 ... 5 V	0 ... 20 mA / 4 ... 20 mA
0 ... 10 V / 10 ... 0 V approx. 12.3 V	20 ... 0 mA / 20 ... 4 mA 24.6 mA < 17.5 V
< 31.5 mA ≥ 10 kΩ < 10 mV <sub>rms</sub>	≤ 600 Ω (at 20 mA) < 10 mV <sub>rms</sub> (at 600 Ω)
9.6 V DC ... 30 V DC 32.7 mA (24 V DC) ≤ 850 mW (at I <sub>OUT</sub> = 20 mA, 9.6 V DC, 600 Ω load)	
0.1% * 600 K / set measuring range; 0.1% > 600 K (C, E, J, K, N, T, L, U, M Gost, L Gost) 0.2% * 600 K / set measuring range; 0.2% > 600 K (B, R, S, A1, A2, A3) 0.2% * 600 K / set measuring range; 0.2% > 600 K (E, J, K, N, T, L, U, M Gost, L Gost); Highspeed Mode 0.4% * 600 K / set measuring range; 0.4% > 600 K (B, R, S, A1, A2, A3); Highspeed Mode - ( typ. 2 K (2 K + (0.2 K * ΔT)) ) ≤ 0.01 %/K typ. 400 ms (Highspeed Mode: typ. 150 ms) Reinforced insulation in accordance with IEC 61010-1 3 kV (50 Hz, 1 min.) -40 °C ... 70 °C PBT 6.2 / 110.5 / 120.5 mm 0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12 Class A product, see page 605	
CE-compliant Ex II 3 G Ex nA IIC T4 Gc X UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6 C, EMC2	

Description	
<b>Temperature transducer for thermocouples</b>	
Standard configuration	Push-in connection
Standard configuration	Screw connection
Order configuration	Push-in connection
Order configuration	Screw connection

Ordering data		
Type	Order No.	Pcs./Pkt.
MINI MCR-2-TC-UI-PT	2905249	1
MINI MCR-2-TC-UI	2902055	1
MINI MCR-2-TC-UI-PT-C	2905248	1
MINI MCR-2-TC-UI-C	2902053	1

<b>Programming adapter</b> for configuring modules with S-PORT interface	
<b>Programming adapter</b> for configuring modules with NFC interface	
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface	

Accessories		
Type	Order No.	Pcs./Pkt.
IFS-USB-PROG-ADAPTER	2811271	1
NFC-USB-PROG-ADAPTER	2900013	1
IFS-BT-PROG-ADAPTER	2905872	1

Highly compact signal conditioners with plug-in connection technology – MINI Analog Pro

Order key for MINI MCR-2-TC-UI(-PT)(-C) temperature transducers (standard configuration entered as an example)

Order No.	Sensor type	Cold junction error compensation	Measuring range		Measuring unit	Output	Output signal		...
			Start	End			Start	End	
<b>2902053</b>	<b>J</b>	<b>1</b>	<b>-200</b>	<b>1200</b>	<b>C</b>	<b>I</b>	<b>4.0</b>	<b>20.0</b>	...
2902053 ≙ MINI MCR-2-TC-UI-C	B ≙ B IEC 584-1 (Pt130Rh-Pt6Rh) E ≙ E IEC 584-1 (NiCr-CuNi) J ≙ J IEC 584-1 (Fe-CuNi) K ≙ K IEC 584-1 (NiCr-Ni) N ≙ N IEC 584-1 (NiCrSi-NiSi) R ≙ R IEC 584-1 (Pt13Rh-Pt) S ≙ S IEC 584-1 (Pt10Rh-Pt) T ≙ T IEC 584-1 (Cu-CuNi) L ≙ L DIN 43760 (Fe-CuNi) U ≙ U DIN 43760 (Cu-CuNi) A1G ≙ A-1 GOST 8.585-2001 A2G ≙ A-2 GOST 8.585-2001 A3G ≙ A-3 GOST 8.585-2001 MG ≙ M GOST 8.585-2001 LG ≙ L GOST 8.585-2001	0 ≙ OFF 1 ≙ ON	freely selectable between -250°C ... 2500°C (measuring range limits depend on sensor type)	freely selectable between -250°C ... 2500°C (measuring range limits depend on sensor type)	C ≙ °C F ≙ °F	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	

Minimum measuring span 50 K

Output signal span at least 0.5 V / 1 mA  
Increment 0.1 V / 0.1 mA

Failure information

Behavior in the event of an error

Open circuit

Measured value overrange

Measured value underrange

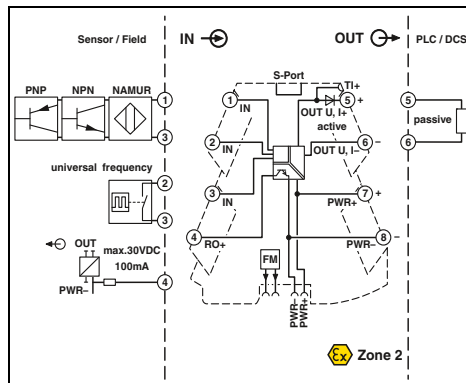
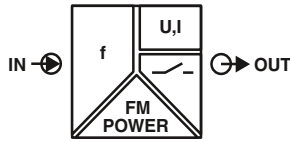
...	<b>NE43DO</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
FD ≙ Freely definable	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)
<b>Note: Failure information according to NE 43 can only be selected for 4 ... 20 mA output</b>				
NE43UP ≙ NE 43 upscale NE43DO ≙ NE 43 downscale NE430 ≙ NE 43 0 mA NE43UD ≙ NE 43 upscale/downscale	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA

Sensor types and measuring ranges for MINI MCR-2-TC-UI(-PT)(-C) temperature transducers

Sensor type	Standard	Measuring range	Smallest measuring span	Adjustable using:
B	IEC 584-1	+500°C ... +1820°C	50 K	Software or smartphone app
E	IEC 584-1	-230°C ... +1000°C	50 K	Software or smartphone app
J	IEC 584-1	-210°C ... +1200°C	50 K	DIP switches
K	IEC 584-1	-250°C ... +1372°C	50 K	DIP switches
N	IEC 584-1	-200°C ... +1300°C	50 K	Software or smartphone app
R	IEC 584-1	-50°C ... +1768°C	50 K	Software or smartphone app
S	IEC 584-1	-50°C ... +1768°C	50 K	Software or smartphone app
T	IEC 584-1	-200°C ... +400°C	50 K	Software or smartphone app
L	DIN 43710	-200°C ... +900°C	50 K	Software or smartphone app
U	DIN 43710	-200°C ... +600°C	50 K	Software or smartphone app
A-1	GOST 8.585	0°C ... +2500°C	50 K	Software or smartphone app
A-2	GOST 8.585	0°C ... +1800°C	50 K	Software or smartphone app
A-3	GOST 8.585	0°C ... +1800°C	50 K	Software or smartphone app
M	GOST 8.585	-200°C ... +100°C	50 K	Software or smartphone app
L	GOST 8.585	-200°C ... +800°C	50 K	Software or smartphone app
Customer-specific characteristic curves		-250°C ... +2500°C	50 K	Software or smartphone app

Frequency  
Universal frequency transducer

new



Configurable,  
Universal frequency or PWM input

Housing width 6.2 mm

Technical data

- Universally configurable, highly compact 3-way isolated frequency transducer with transistor switching output
- Suitable for the connection of NAMUR proximity sensors (IEC 60947-5-6 and EN 50227) as well as for sensors with NPN and PNP outputs that generate a frequency signal
- For electrical isolation, conversion, amplification, and filtering of frequency and PWM signals
- Frequency signals in the range from 0.002 to 200 kHz and PWM signals up to 20 kHz
- Supports fault monitoring
- Plug-in connection system
- Safe 3-way isolation
- Standard behavior can be configured via DIP switches
- Freely configurable via software or smartphone app
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

<b>Input data</b>	Input sources PNP NPN NAMUR universal frequency max. 30VDC 100mA
<b>Frequency measuring range</b>	Maximum input signal PWM (range)
<b>Output data</b>	Output signal Maximum output signal Load $R_B$ Ripple
<b>Switching output</b>	Relay output Max. switching voltage Maximum switching current Minimum switching current
<b>General data</b>	Supply voltage range Current consumption Power consumption Maximum transmission error Temperature coefficient Step response (0–99%) Electrical isolation Test voltage, input/output/supply Ambient temperature (operation) Dimensions W/H/D Push-in connection solid/stranded/AWG Screw connection solid/stranded/AWG EMC note
<b>Conformance/Approvals</b>	Conformance ATEX UL, USA/Canada
<b>GL</b>	

<b>NAMUR initiators</b>	NPN/PNP transistor outputs Floating contact (dry contact) Frequency generator Incremental encoder (speed only) HTL encoders
<b>0 Hz ... 200 kHz</b>	30 V (incl. DC voltage) 0.002 Hz ... 60 Hz (Duty cycle 2 ... 98 %) 60 Hz ... 300 Hz (Duty cycle 5 ... 95 %) 300 Hz ... 600 Hz (Duty cycle 10 ... 90 %) 600 Hz ... 1000 Hz (Duty cycle 20 ... 80 %)
<b>U output</b>	<b>I output</b>
0 ... 10 V / 2 ... 10 V	0 ... 20 mA / 4 ... 20 mA
0 ... 5 V / 1 ... 5 V	0 ... 10 mA / 2 ... 10 mA
approx. 12.3 V	24.6 mA
$\geq 10 \text{ k}\Omega$	$\leq 600 \Omega$ (at 20 mA)
$< 20 \text{ mV}_{PP}$ (at 600 $\Omega$ )	$< 20 \text{ mV}_{PP}$ (at 600 $\Omega$ )
<b>1 N/O contact</b>	
<b>30 V DC</b>	
<b>100 mA (30 V)</b>	
<b>100 <math>\mu\text{A}</math></b>	
<b>9.6 V DC ... 30 V DC</b>	
<b>32 mA (24 V DC)</b>	
<b>63 mA (12 V DC)</b>	
<b><math>\leq 1 \text{ W}</math> (at <math>I_{OUT} = 20 \text{ mA}</math>, 9.6 V DC, 600 <math>\Omega</math> load)</b>	
<b>0.1 % (Frequency)</b>	
<b>1 % (PWM signal)</b>	
<b>0.01 %/K, typ. 0.01 %/K</b>	
<b><math>&lt; 35 \text{ ms}</math> (<math>f &gt; 500 \text{ Hz}</math>)</b>	
<b>Reinforced insulation in accordance with IEC 61010-1</b>	
<b>3 kV (50 Hz, 1 min.)</b>	
<b>-40 °C ... 70 °C</b>	
<b>6.2 / 110.5 / 120.5 mm</b>	
<b>0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 24 - 12</b>	
<b>0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 12</b>	
<b>Class A product, see page 605</b>	
<b>CE-compliant</b>	
<b>II 3 G Ex nA IIC T4 Gc X</b>	
<b>UL 508 Listed</b>	
<b>Class I, Div. 2, Groups A, B, C, D T6</b>	
<b>Class I, Zone 2, Group IIC T6</b>	
<b>GL applied for</b>	

**Notes:**  
The configuration software can be downloaded from the Internet: phoenixcontact.net/products.  
Information on the programming adapters can be found on page 105

<b>Description</b>	
<b>MCR frequency transducer</b>	Push-in connection Screw connection

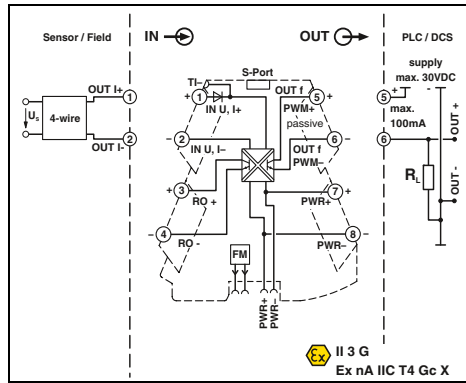
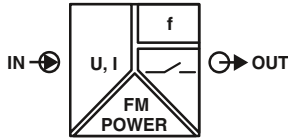
<b>Programming adapter</b> for configuring modules with S-PORT interface	
<b>Programming adapter</b> for configuring modules with NFC interface	
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface	

Ordering data		
Type	Order No.	Pcs./Pkt.
<b>MINI MCR-2-F-UI-PT</b>	<b>2902058</b>	1
<b>MINI MCR-2-F-UI</b>	<b>2902056</b>	1

Accessories		
<b>IFS-USB-PROG-ADAPTER</b>	<b>2811271</b>	1
<b>NFC-USB-PROG-ADAPTER</b>	<b>2900013</b>	1
<b>IFS-BT-PROG-ADAPTER</b>	<b>2905872</b>	1



Frequency  
Analog frequency transducer



Configurable, frequency, PWM or switching output

Housing width 6.2 mm

- Universally configurable highly compact analog-to-frequency measuring transducer for electrical isolation, amplification, conversion and filtering of standard analog signals to frequencies or PWM signals
- Plug-in connection system
- Safe 3-way isolation
- Additional switching output
- Frequency output can be used as second switching output
- Standard signal combinations configurable via DIP switches
- Freely configurable with software or smartphone app
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

**Notes:**

The configuration software can be downloaded from the Internet: <a href="http://phoenixcontact.net/products">phoenixcontact.net/products</a> .
Information on the programming adapters can be found on page 105
Information on MINI Analog Pro accessories can be found from page 101
To order a product with an order configuration, enter the required configuration by referring to the adjacent order key.

<b>Input data</b>	Input signal (configurable via DIP switch or freely via software)
Maximum input signal	12 V
Input resistance	> 120 kΩ
<b>Output data</b>	Output signal (configurable via DIP switch or freely via software)
Minimum load	100 mA
Load current maximum	24 mA
Maximum switching voltage	30 V
Overrange/underrange	Can be set (via software)
<b>General data</b>	Supply voltage range Nominal supply voltage Current consumption
Power consumption	≤ 350 mW (9.6 V DC)
Transmission error, maximum	≤ 0.1 % (> 7 kHz ≤ 0.2 %)
Temperature coefficient	< 0.01 %/K, typ. 0.01 %/K
Step response (0–99%)	120 ms (15 Hz sample rate)
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1
Test voltage, input/output/supply	3 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-40 °C ... 70 °C
Dimensions W/H/D	6.2 / 110.5 / 120.5 mm
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12
Screw connection solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12
EMC note	Class A product, see page 605
<b>Conformance/Approvals</b>	CE-compliant Ex II 3 G Ex nA IIC T4 Gc X UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6 GL applied for
GL	

Technical data	
<b>U input</b>	<b>I input</b>
0 V ... 10 V	0 mA ... 20 mA
2 V ... 10 V	4 mA ... 20 mA
0 V ... 5 V	0 mA ... 10 mA
1 V ... 5 V	2 mA ... 10 mA
10 V ... 0 V	20 mA ... 0 mA
10 V ... 2 V	20 mA ... 4 mA
5 V ... 0 V	10 mA ... 0 mA
5 V ... 1 V	10 mA ... 2 mA
0 V ... 12 V	0 mA ... 24 mA
12 V	24 mA
	approx. 50 Ω (+ 0.7 V for test diode)
<b>Frequency output</b>	<b>PWM output</b>
0 Hz ... 10 kHz / 0 Hz ... 5 kHz	15.6 kHz (10 bit) / 1.9 kHz (10 bit)
0 Hz ... 2.5 kHz / 0 Hz ... 1 kHz	3.9 kHz (12 bit) / 488 Hz (12 bit)
0 Hz ... 500 Hz / 0 Hz ... 250 Hz	977 Hz (14 bit) / 122 Hz (14 bit)
0 Hz ... 100 Hz / 0 Hz ... 50 Hz	244 Hz (16 bit) / 31 Hz (16 bit)
4 mA ≤ (U <sub>L</sub> / R <sub>L</sub> ) ≤ 100 mA	12 mA ≤ (U <sub>L</sub> / R <sub>L</sub> ) ≤ 100 mA
100 mA	
30 V	
Can be set (via software)	
9.6 V DC ... 30 V DC	
24 V DC	
27 mA (12 V DC)	
13.5 mA (24 V DC)	
≤ 350 mW (9.6 V DC)	
≤ 0.1 % (> 7 kHz ≤ 0.2 %)	
< 0.01 %/K, typ. 0.01 %/K	
120 ms (15 Hz sample rate)	
Further values can be set via software	
Reinforced insulation in accordance with IEC 61010-1	
3 kV (50 Hz, 1 min.)	
IP20	
-40 °C ... 70 °C	
6.2 / 110.5 / 120.5 mm	
0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12	
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12	
Class A product, see page 605	
CE-compliant	
Ex II 3 G Ex nA IIC T4 Gc X	
UL 508 Listed	
Class I, Div. 2, Groups A, B, C, D T6	
Class I, Zone 2, Group IIC T6	
GL applied for	

Description	
<b>Analog frequency transducer with limit value function</b>	
Standard configuration	Push-in connection
Standard configuration	Screw connection
Order configuration	Push-in connection
Order configuration	Screw connection

<b>Programming adapter</b> for configuring modules with S-PORT interface	
<b>Programming adapter</b> for configuring modules with NFC interface	
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface	

Ordering data		
Type	Order No.	Pcs./Pkt.
MINI MCR-2-UI-FRO-PT	2902032	1
MINI MCR-2-UI-FRO	2902031	1
MINI MCR-2-UI-FRO-PT-C	2906202	1
MINI MCR-2-UI-FRO-C	2906201	1

Accessories		
Type	Order No.	Pcs./Pkt.
IFS-USB-PROG-ADAPTER	2811271	1
NFC-USB-PROG-ADAPTER	2900013	1
IFS-BT-PROG-ADAPTER	2905872	1

Highly compact signal conditioners with plug-in connection technology – MINI Analog Pro

Order key for MINI MCR-2-UI-FRO(-PT)(-C) analog frequency transducers (standard configuration entered as example)

Order No.	Input		Sample rate			Output		Output limitation	
	Input signal	Start	End	Start	End	Output signal	Carrier frequency	Start	End
<b>2906201</b>	I	0.0	20.0	15	I	0	0	1000	15
2906201 ≙ MINI MCR-2-UI-FRO-C	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 24 mA U: freely selectable between 0.0 ... 12 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 24 mA U: freely selectable between 0.0 ... 12 V	15 Hz ≙ 15 Hz 60 Hz ≙ 60 Hz 240 Hz ≙ 240 Hz	f ≙ f	0 ≙ at frequency output 15.6 k ≙ 15.6 kHz 15.6 kHz (10 bits) 1.9 kHz (10 bits) 7.8 kHz (11 bits) 977 Hz (11 bits) 3.9 kHz (12 bits) 488 Hz (12 bits) 1.9 kHz (13 bits) 244 Hz (13 bits) 977 Hz (14 bits) 122 Hz (14 bits) 488 Hz (15 bits) 61 Hz (15 bits) 244 Hz (16 bits) 31 Hz (16 bits)	0 ≙ 0 Hz f: freely selectable between 0 ... 10 kHz D: freely selectable between 0.0 ... 100%	10000 ≙ 10 kHz f: freely selectable between 0 ... 10 kHz D: freely selectable between 0.0 ... 100%	0 ≙ off 1 ≙ on
2906202 ≙ MINI MCR-2-UI-FRO-PT-C					PWM ≙ PWM				

Measuring range span at least 0.5 V / 1 mA  
Increment 0.1 V / 0.1 mA

Output signal span at least 10 Hz / 1%  
Increment 1 Hz / 0.1%

Failure information

Behavior in the event of an error

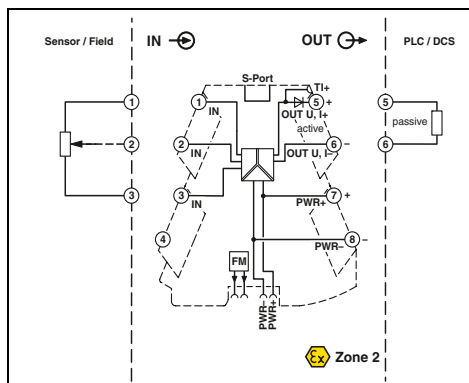
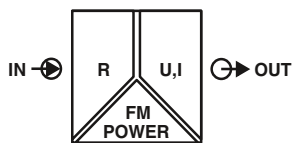
Open circuit/short circuit

Measured value overrange

Measured value underrange

FD	0	0	0
FD ≙ Freely definable Failure information only adjustable for unlimited output	0 ≙ 0 Hz f: freely selectable between 0 ... 11 kHz D: freely selectable between 0.0 and 100%  (free definition only for unlimited output) (signal type corresponds to selected output signal)	0 ≙ 0 Hz f: freely selectable between 0 ... 11 kHz D: freely selectable between 0.0 and 100%  (free definition only for unlimited output) (signal type corresponds to selected output signal)	0 ≙ 0 Hz f: freely selectable between 0 ... 11 kHz D: freely selectable between 0.0 and 100%  (free definition only for unlimited output) (signal type corresponds to selected output signal)

### Potentiometer Potiposition transducer



Ex n



Potiposition transducer,  
Configurable



Housing width 6.2 mm

- Universally configurable, highly compact potiposition transducer for electrical isolation, conversion, amplification, and filtering of potentiometer signals
- For potentiometers from 100 Ω to 100 kΩ
- Automatic potentiometer detection without manual adjustment
- Plug-in connection system
- Safe 3-way isolation
- Standard signal combinations configurable via DIP switches
- Freely configurable with software or smartphone app
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

Notes:
The configuration software can be downloaded from the Internet: <a href="http://phoenixcontact.net/products">phoenixcontact.net/products</a> .
Information on the programming adapters can be found on page 105
Information on MINI Analog Pro accessories can be found from page 101
To order a product with an order configuration, please enter the desired configuration by referring to the order key.

<b>Input data</b>	Potentiometer
<b>Output data</b>	Output signal (configurable via DIP switch or freely via software)
Maximum output signal	No-load voltage
Short-circuit current	Load $R_B$
Ripple	Behavior in the event of a sensor error
<b>General data</b>	Supply voltage range
Nominal supply voltage	Current consumption
Power consumption	Maximum transmission error
Temperature coefficient	Step response (0–99%)
Electrical isolation	Test voltage, input/output/supply
Degree of protection	Ambient temperature (operation)
Mounting	Housing material
Dimensions W/H/D	Push-in connection solid/stranded/AWG
Screw connection solid/stranded/AWG	EMC note
<b>Conformance/Approvals</b>	Conformance
ATEX	UL, USA/Canada
DNV GL	

### Technical data

100 Ω ... 100 kΩ	U output	I output
1 ... 5 V / 10 ... 0 V	0 ... 5 V / 0 ... 10 V	0 ... 20 mA / 4 ... 20 mA
approx. 12.3 V	approx. 12.3 V	20 ... 0 mA / 20 ... 4 mA
< 31.5 mA	< 20 mV <sub>PP</sub> (at 10 kΩ)	24.6 mA
≥ 10 kΩ	configurable	< 17.5 V
≤ 600 Ω (at 20 mA)	9.6 V DC ... 30 V DC	< 20 mV <sub>PP</sub>
≤ 850 mW (at I <sub>OUT</sub> = 20 mA, 9.6 V DC, 600 Ω load)	24 V DC	
< 0.1 % (R < 240 Ω = < 0,2 %)	33 mA (24 V DC)	
0.01 %/K, typ. 0.01 %/K	≤ 850 mW (at I <sub>OUT</sub> = 20 mA, 9.6 V DC, 600 Ω load)	
< 60 ms	Reinforced insulation in accordance with IEC 61010-1	
3 kV (50 Hz, 1 min.)	IP20	
IP20	-40 °C ... 70 °C	
any	any	
PBT	6.2 / 110.5 / 120.5 mm	
0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12	
Class A product, see page 605	CE-compliant	
CE-compliant	Ex II 3 G Ex nA IIC T4 Gc X	
UL 508 Listed	UL 508 Listed	
Class I, Div. 2, Groups A, B, C, D T5	Class I, Div. 2, Groups A, B, C, D T5	
Class I, Zone 2, Group IIC T5	C, EMC2	

### Ordering data

Description	Connection
<b>Potiposition transducer</b>	
Standard configuration	Push-in connection
Standard configuration	Screw connection
Order configuration	Push-in connection
Order configuration	Screw connection

Type	Order No.	Pcs./Pkt.
MINI MCR-2-POT-UI-PT	2902017	1
MINI MCR-2-POT-UI	2902016	1
MINI MCR-2-POT-UI-PT-C	2905006	1
MINI MCR-2-POT-UI-C	2905005	1

### Accessories

<b>Programming adapter</b> for configuring modules with S-PORT interface	IFS-USB-PROG-ADAPTER	2811271	1
<b>Programming adapter</b> for configuring modules with NFC interface	NFC-USB-PROG-ADAPTER	2900013	1
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface	IFS-BT-PROG-ADAPTER	2905872	1

IFS-USB-PROG-ADAPTER	2811271	1
NFC-USB-PROG-ADAPTER	2900013	1
IFS-BT-PROG-ADAPTER	2905872	1



Highly compact signal conditioners with plug-in connection technology – MINI Analog Pro

Order key for MINI MCR-2-POT-UI(-PT)(-C) potipotentiometer transducers (standard configuration entered as an example)

Order No.	Automatic potentiometer detection	Output			Filter	Open circuit detection	...
		Output signal	Start	End			
<b>2905005</b>	<b>AUTO</b>	<b>I</b>	<b>4.0</b>	<b>20.0</b>	<b>1</b>	<b>ON</b>	
2905005 ≙ MINI MCR-2- POT-UI-C	AUTO ≙ ON OFF ≙ OFF	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21 mA  U: freely selectable between 0.0 ... 10.5 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 21 mA  U: freely selectable between 0.0 ... 10.5 V	1 2 3 4 5 6 7 8 9 10	ON ≙ ON OFF ≙ OFF	

Output signal span at least 0.5 V / 1 mA  
Increment 0.1 V / 0.1 mA

**Failure information**

Behavior in the event of an error

Open circuit slider

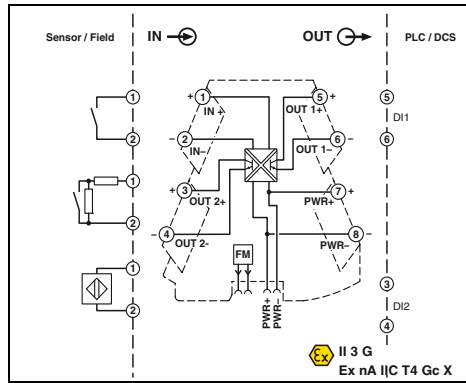
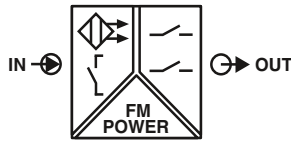
Input open (no potentiometer connected)

Measured value overrange

Measured value underrange

...	<b>NE43DO</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
FD ≙ Freely definable	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (only if open circuit detection is on) (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)
<b>Note: Failure information according to NE 43 can only be selected for 4 ... 20 mA output</b>					
NE43UP ≙ NE 43 upscale NE43DO ≙ NE 43 downscale NE430 ≙ NE 43 0 mA NE43UD ≙ NE 43 upscale/downscale	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA

Digital IN  
Signal conditioner



Ex n



Configurable,  
for NAMUR sensors and  
floating contacts



Housing width 6.2 mm

- Highly compact signal conditioner for electrical isolation, amplification, and duplication of proximity sensor signals
- For proximity sensors in accordance with IEC 60947-5-6 and EN 50227
- Floating contacts and contacts with resistance circuit can be connected
- Plug-in connection system
- Input and output signals can be configured via DIP switches
- Transistor switching contacts on the output
- Second output can be used as a duplicator or error signaling output
- Safe 3-way isolation
- Switchover between operating current and quiescent current (inverted switching behavior)
- Power supply and fault monitoring possible via DIN rail connector
- Status LEDs

**Notes:**  
Information on MINI Analog Pro accessories can be found from page 101

<b>Input data</b>	Input signal
<b>Control circuit</b>	No-load voltage Switching points (in acc. with IEC 60947-5-6)
<b>Line fault detection</b>	
<b>Switching output</b>	Transistor output Max. switching voltage Max. switching current Switching frequency
<b>General data</b>	Supply voltage range Nominal supply voltage Current consumption
<b>Power consumption</b>	Electrical isolation Test voltage, input/output/supply Degree of protection Ambient temperature (operation) Mounting Housing material Dimensions W/H/D Push-in connection solid/stranded/AWG Screw connection solid/stranded/AWG EMC note
<b>Conformance/Approvals</b>	Conformance ATEX UL, USA/Canada
<b>GL</b>	

**Technical data**

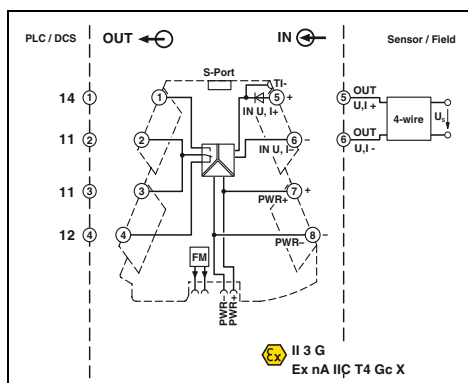
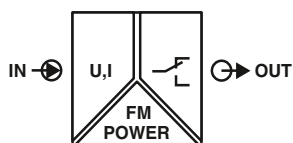
NAMUR proximity sensors (EN 60947-5-6) open circuit switch contacts Switch contacts with resistance circuit
8.2 V DC ±10 % < 1.2 mA (blocking) > 2.1 mA (conductive) > 6 mA (in the event of a short-circuit) < 0.35 mA (With wire break)
2 N/O contacts 30 V DC 50 mA 5 kHz
9.6 V DC ... 30 V DC 24 V DC 18 mA (24 V DC) 35 mA (12 V DC) 450 mW (9.6 V DC) Reinforced insulation in accordance with IEC 61010-1 3 kV (50 Hz, 1 min.) IP20 -40 °C ... 70 °C any PBT 6.2 / 110.5 / 120.5 mm 0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12 Class A product, see page 605
CE-compliant Ex II 3 G Ex nA IIC T4 Gc X UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6 GL applied for

**Ordering data**

<b>Description</b>			
<b>NAMUR signal conditioner</b>			
	Push-in connection	<b>MINI MCR-2-NAM-2RO-PT</b>	
	Screw connection	<b>MINI MCR-2-NAM-2RO</b>	
		<b>Order No.</b>	<b>Pcs./ Pkt.</b>
		2902005	1
		2902004	1

Limit values

Threshold value switch



Ex n



Configurable, with relay PDT output



Ex:

Housing width 6.2 mm

Technical data

<b>Input data</b>	U input Input signal (configurable using the DIP switch) Maximum input signal Input resistance
	0 ... 10 V / 0 ... 12 V 12 V > 120 kΩ
	I input 0 ... 20 mA / 0 ... 24 mA 24 mA approx. 50 Ω (+ 0.7 V for test diode)
	Can be set via software or in steps via DIP switches
<b>Switching output</b>	Relay output Contact material Max. switching voltage Limiting continuous current Hysteresis (configurable using the DIP switch) Setting range of the response delay (configurable using the DIP switch)
	1 PDT AgSnO <sub>2</sub> , hard gold-plated 250 V AC 6 A can be set freely via software 0 s ... 10 s (can be set freely via software)
<b>General data</b>	Supply voltage range Nominal supply voltage Current consumption
	9.6 V DC ... 30 V DC 24 V DC 40 mA (12 V DC) 20 mA (24 V DC) ≤ 0.5 W
<b>Power consumption</b>	Maximum transmission error Temperature coefficient Step response (0–99%) Electrical isolation Test voltage, input/output/supply Degree of protection Ambient temperature (operation) Mounting Housing material Dimensions W/H/D Push-in connection solid/stranded/AWG Screw connection solid/stranded/AWG EMC note
	0.1 % (of final value) 0.01 %/K typ. 140 ms (Can be set via software) Reinforced insulation in accordance with IEC 61010-1 3 kV (50 Hz, 1 min.) IP20 -40 °C ... 70 °C any PBT 6.2 / 110.5 / 120.5 mm 0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12 Class A product, see page 605
<b>Conformance/Approvals</b>	Conformance ATEX UL, USA/Canada
	CE-compliant II 3 G Ex nA nC IIC T4 Gc X UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4A Class I, Zone 2, Group IIC T4A GL applied for
<b>GL</b>	

- Universally configurable highly compact threshold value switch for switching analog limit values
- Plug-in connection system
- Safe 3-way isolation
- Standard switching behavior can be configured via DIP switches
- Freely configurable with software or smartphone app
- PDT relay at output
- Limiting continuous current up to 6 A
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

<b>Notes:</b>
The configuration software can be downloaded from the Internet: <a href="http://phoenixcontact.net/products">phoenixcontact.net/products</a> .
Information on the programming adapters can be found on page 105
Information on MINI Analog Pro accessories can be found from page 101

<b>Description</b>	
<b>Threshold value switch with relay PDT output, standard configuration</b>	
	Push-in connection Screw connection

<b>Programming adapter</b> for configuring modules with S-PORT interface
<b>Programming adapter</b> for configuring modules with NFC interface
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface

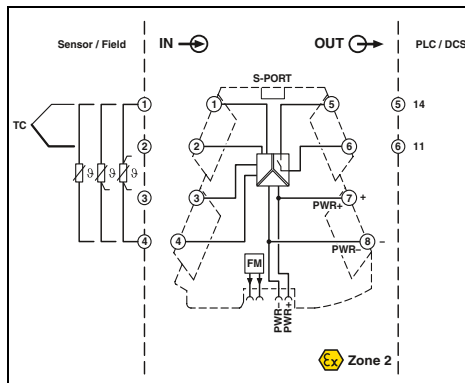
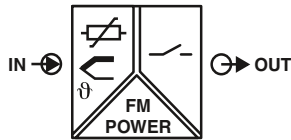
Ordering data

Type	Order No.	Pcs./Pkt.
MINI MCR-2-UI-REL-PT	2902035	1
MINI MCR-2-UI-REL	2902033	1

Accessories

IFS-USB-PROG-ADAPTER	2811271	1
NFC-USB-PROG-ADAPTER	2900013	1
IFS-BT-PROG-ADAPTER	2905872	1

Limit values  
Temperature



Ex n



Configurable, temperature transducer with N/O relay output



Housing width 6.2 mm

Technical data

- Universally configurable, highly compact temperature limit value switch for switching analog limit values from resistance thermometers and remote resistance-type sensor signals
- For 2, 3 or 4-wire RTD sensors according to IEC 751, JIS, GOST
- For thermocouples according to IEC 584 and GOST
- Internal cold junction compensation
- Plug-in connection system
- Safe 3-way isolation
- Standard behavior can be configured via DIP switches
- Freely configurable via software or smartphone app
- N/O relay output (N/C function can be set via software)
- Limiting continuous current up to 6 A
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

Input data

Input signal (can be configured using DIP switches)  
Temperature range  
Measuring range span  
Linear resistance measuring range

Switching output

Relay output  
Contact material  
Max. switching voltage  
Maximum switching current  
Minimum switching current  
Limiting continuous current  
Hysteresis  
Setting range of the response delay

General data

Supply voltage range  
Current consumption

Switching point accuracy  
Power consumption  
Temperature coefficient  
Step response (0–99%)

Electrical isolation

Test voltage, input/output/supply  
Ambient temperature (operation)  
Housing material  
Dimensions W/H/D  
Push-in connection solid/stranded/AWG  
Screw connection solid/stranded/AWG  
EMC note

Conformance/Approvals

Conformance  
ATEX  
UL, USA/Canada

Pt, Ni, Cu sensors : 2, 3, 4-wire  
-250 °C ... 2500 °C  
min. 20 K  
0 Ω ... 4000 Ω

1 N/O contact  
AgSnO<sub>2</sub>, hard gold-plated  
250 V AC  
6 A (for 250 V AC)  
100 mA (12 V DC)  
6 A  
can be set freely via software  
0 s ... 10 s (can be set freely via software)

9.6 V DC ... 30 V DC  
44 mA (12 V DC)  
22 mA (24 V DC)  
< 0.1 %  
570 mW  
0.01 %/K  
typ. 300 ms  
typ. 570 ms  
typ. 380 ms  
typ. 300 ms  
typ. 570 ms  
Reinforced insulation in accordance with IEC 61010-1  
3 kV (50 Hz, 1 min.)  
-40 °C ... 70 °C  
PBT  
6.2 / 110.5 / 120.5 mm  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 24 - 12  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 12  
Class A product, see page 605

CE-compliant  
Ex II 3 G Ex nA nC IIC T4 Gc X  
UL 508 Listed  
Class I, Div. 2, Groups A, B, C, D T4A  
Class I, Zone 2, Group IIC T4A  
GL applied for

**Notes:**  
The configuration software can be downloaded from the Internet: phoenixcontact.net/products.  
Information on the programming adapters can be found on page 105

GL

Description
<b>Temperature limit value switch</b>
Push-in connection Screw connection

<b>Programming adapter</b> for configuring modules with S-PORT interface
<b>Programming adapter</b> for configuring modules with NFC interface
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface

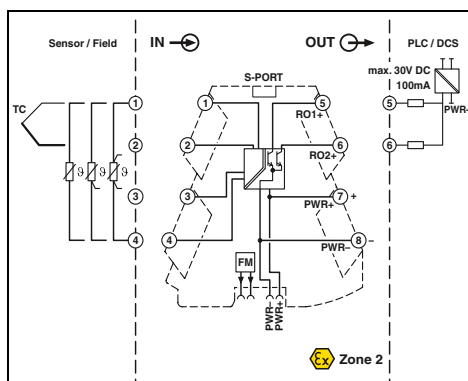
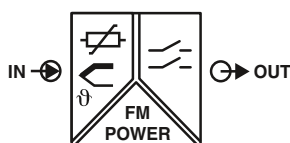
Ordering data

Type	Order No.	Pcs./Pkt.
MINI MCR-2-T-REL-PT	2905633	1
MINI MCR-2-T-REL	2905632	1

Accessories

IFS-USB-PROG-ADAPTER	2811271	1
NFC-USB-PROG-ADAPTER	2900013	1
IFS-BT-PROG-ADAPTER	2905872	1

Limit values  
Temperature



Configurable, temperature transducer with transistor output



Housing width 6.2 mm

- Universally configurable, highly compact temperature limit value switch for switching analog limit values from resistance thermometers and remote resistance-type sensor signals
- For 2, 3 or 4-wire RTD sensors according to IEC 751, JIS, GOST
- For thermocouples according to IEC 584 and GOST
- Internal cold junction compensation
- Plug-in connection system
- Safe 3-way isolation
- Standard behavior can be configured via DIP switches
- Freely configurable via software or smartphone app
- 2 transistor switching contacts on the output
- Maximum switching current 30 V / 100 mA
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

Input data

Input signal (can be configured using DIP switches)  
Temperature range  
Measuring range span  
Linear resistance measuring range

Switching output

Transistor output  
Max. switching voltage  
Maximum switching current

General data

Supply voltage range  
Current consumption

Switching point accuracy  
Power consumption  
Temperature coefficient  
Step response (0–99%)

Electrical isolation

Test voltage, input/output/supply  
Ambient temperature (operation)  
Housing material  
Dimensions W/H/D  
Push-in connection solid/stranded/AWG  
Screw connection solid/stranded/AWG  
EMC note

Conformance/Approvals

Conformance  
ATEX  
UL, USA/Canada

GL

Technical data

Pt, Ni, Cu sensors : 2, 3, 4-wire  
-250 °C ... 2500 °C  
min. 20 K  
0 Ω ... 4000 Ω

2 N/O contacts  
30 V DC  
100 mA (30 V (≤ 50 °C))

9.6 V DC ... 30 V DC  
20 mA (12 V DC)  
10 mA (24 V DC)

< 0.1 %  
350 mW  
0.01 %/K  
typ. 300 ms  
typ. 570 ms  
typ. 380 ms  
typ. 300 ms  
typ. 570 ms

Reinforced insulation in accordance with IEC 61010-1  
3 kV (50 Hz, 1 min.)  
-40 °C ... 70 °C

PBT  
6.2 / 110.5 / 120.5 mm  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 24 - 12  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 12  
Class A product, see page 605

CE-compliant  
Ex II 3 G Ex nA IIC T4 Gc X  
UL 508 Listed  
Class I, Div. 2, Groups A, B, C, D T6  
Class I, Zone 2, Group IIC T6  
GL applied for

**Notes:**  
The configuration software can be downloaded from the Internet: phoenixcontact.net/products.  
Information on the programming adapters can be found on page 105

Description
Temperature limit value switch
Push-in connection
Screw connection

<b>Programming adapter</b> for configuring modules with S-PORT interface
<b>Programming adapter</b> for configuring modules with NFC interface
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface

Ordering data

Type	Order No.	Pcs./ Pkt.
MINI MCR-2-T-2RO-PT	2906877	1
MINI MCR-2-T-2RO	2906876	1

Accessories

IFS-USB-PROG-ADAPTER	2811271	1
NFC-USB-PROG-ADAPTER	2900013	1
IFS-BT-PROG-ADAPTER	2905872	1



Safely isolated from field to network. MINI Analog Pro signal conditioners with bus and network connections combine the benefits of safe electrical isolation with those of digital communication. With an overall width of less than 50 mm, you can transmit, free of interference, up to eight field signals to industrial networks, without the need for signal-specific input cards.

#### Further advantages:

- Gateways for different protocols: Modbus RTU, Modbus TCP, and PROFIBUS DP
- Interference-free signal transmission from the field level to the CPU, thanks to safe electrical isolation
- Fast, fault-free wiring, by bundling the signals in one network cable

Highly compact signal conditioners with plug-in connection technology – MINI Analog Pro



**No need for input cards**

- Cost and space savings, as signal-specific input cards are no longer needed



**Modular and space-saving**

- Space-saving network integration of freely combinable signal conditioners by means of plug-in gateways



**Flexible configuration**

- Quick parameterization via rotary coding switch, software, web server or app



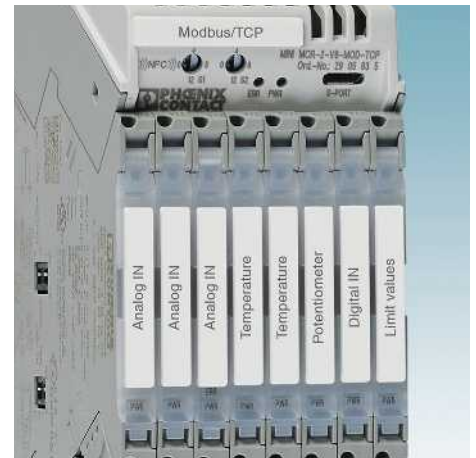
**Smart configuration and monitoring**

- Carry out on-site configuration and read current values directly off a smartphone with the MINI Analog Pro app



**Easy startup and servicing**

- Measure current signals during operation, without disconnecting current loops



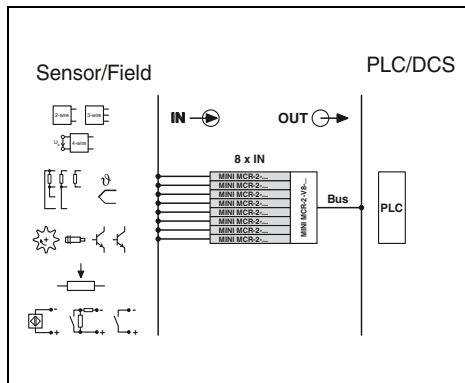
**Easy maintenance**

- Large-surface marking areas for standard marking material as well as permanently visible status and error LEDs on each module

MINI Analog Pro gateways

- Easy integration of up to eight field signals in the bus systems
- Any combination of signal conditioners is possible (standard signal, temperature, etc.)
- Easy attachment to the output side of MINI Analog Pro modules
- Huge savings in terms of input cards and bus couplers
- Safe channel-to-channel electrical isolation right through to the CPU
- Versions with PROFIBUS DP, Modbus/RTU or Modbus/TCP are available
- Can be configured via software or smartphone app

**Notes:**  
 The configuration software can be downloaded from the Internet: phoenixcontact.net/products.  
 Information on the programming adapters can be found on page 105



new



Gateways for bus and network connection

Ex:   
 Housing width 51.1 mm

Input data	
Number of inputs	8
Configurable/programmable	Yes
Current input signal	4 mA ... 20 mA
Maximum input current	24 mA
Input resistance of current input	50 Ω
Maximum input voltage	5 V
Output data	
Number of outputs	1
Data update rate	15 ms
General data	
Nominal supply voltage range	12 V ... 24 V
Supply voltage range	9.6 V ... 30 V
Power consumption	< 1000 mW
Maximum transmission error	0.1 %
Temperature coefficient	0.01 %
Test voltage, input/output/supply	0.5 kV
Ambient temperature (operation)	-40 °C ... 65 °C
Housing material	PBT 7% GF V0
Dimensions W/H/D	51.1 / 104.1 / 56.8 mm
EMC note	Class A product, see page 605
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC T5

Technical data

Ordering data		
Type	Order No.	Pcs./Pkt.
MINI MCR-2-V8-MOD-RTU	2905634	1
MINI MCR-2-V8-MOD-TCP	2905635	1
MINI MCR-2-V8-PB-DP	2905636	1
Accessories		
IFS-USB-PROG-ADAPTER	2811271	1
NFC-USB-PROG-ADAPTER	2900013	1
IFS-BT-PROG-ADAPTER	2905872	1

Description
<b>Gateways for bus and network connection</b>
Modbus/RTU
Modbus/TCP
PROFIBUS DP

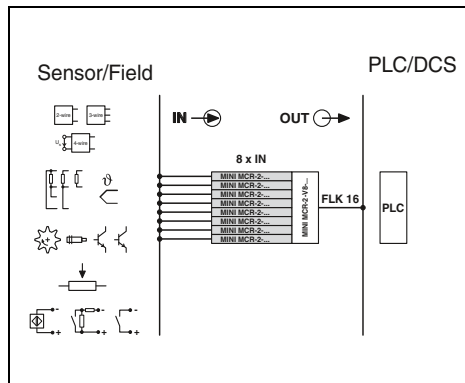
<b>Programming adapter</b> for configuring modules with S-PORT interface
<b>Programming adapter</b> for configuring modules with NFC interface
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface



**MINI Analog Pro system adapter**

new

- Time-saving wiring solution thanks to unique plug-in concept
- System cabling on PLC side
- Plug-and-Play
- For up to eight channels
- Reduced wiring effort and errors
- Easy attachment to the output side of MINI Analog Pro modules
- Especially easy to maintain, thanks to interruption-free current measurement function



System cabling adapter



Housing width 51.1 mm

**Technical data**

<b>Input data</b>	
Number of inputs	8
Configurable/programmable	no
Maximum input current	4 A (500 mA per ch.)
Maximum input voltage	30 V
<b>Output data</b>	
Number of outputs	8
Connection method	IDC/FLK pin strip
Configurable/programmable	no
<b>General data</b>	
Test voltage input/output	0.5 kV
Rated insulation voltage	50 V <sub>rms</sub>
Degree of protection	IP20
Overvoltage category / Degree of pollution	II / 2
Ambient temperature (operation)	-40 °C ... 70 °C
Humidity	5 % ... 95 %
Maximum altitude for use above sea level	4000 m
Housing material	PBT 7% GF V0
Dimensions W/H/D	51.1 / 104.1 / 56.8 mm
<b>Conformance/Approvals</b>	
Conformance	CE-compliant
ATEX	Ex II 3 G Ex nA IIC Gc U
UL, USA/Canada	UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC T5
GL	GL applied for

**Ordering data**

Description	Type	Order No.	Pcs./Pkt.
<b>System cabling adapter</b> for MINI Analog Pro modules	MINI MCR-2-V8-FLK 16	2901993	1

### Termination Carrier for MINI Analog Pro signal conditioner



**TC... Termination Carriers** are compact solutions for conveniently and smoothly connecting standard DIN rail signal conditioners from the MINI Analog Pro series to input and output cards of automation systems using system cabling.

The most compact signal conditioners combined with the most compact and flexible module carriers on the market enable you to achieve a hitherto unparalleled packing density in your control cabinet together with professional system cabling.

#### Compact

- The compact design associated with MINI Analog saves up to 65% of space in the control cabinet

#### Robust and reliable

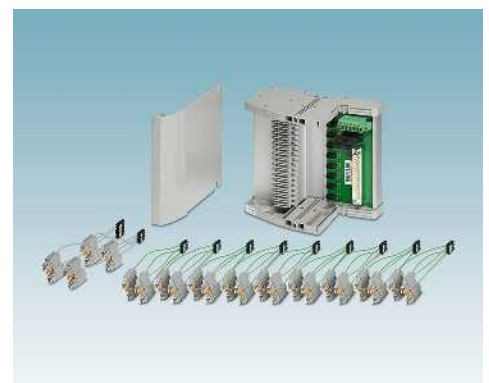
- Stable, vibration-resistant aluminum carrier device profile
- PCB is completely decoupled from signal conditioners
- PCB without active electronics
- Redundant supply via separate DIN rail module
- Horizontal or vertical DIN rail mounting

#### Flexible

- Profile sections without pitch markings
- Quick and safe module connection with plug-in cable sets
- Horizontal or vertical DIN rail mounting
- Can be flexibly adapted to suit any controller or higher-level control system
- Solutions tailored to your requirements on request
- Available pre-assembled with modules and wired, or for self-assembly



Select standard DIN rail device



Select module carrier



Select controller-specific front adapter and system cable



Solutions are also available for MACX Analog, MACX Analog Ex, and Safety

**Termination Carrier for MINI Analog Pro signal conditioner**

The **TC-D37SUB-ADIO16-MP-P-UNI** universal Termination Carrier is a compact solution which connects signal conditioners from the MINI Analog Pro series to analog or binary input and output cards of automation systems.

The **TC-D37SUB-AIO16-MP-PS-UNI** Termination Carrier design, when combined with the MACX MCR-S-MUX HART multiplexer, also enables communication between HART-capable field devices and a management system.

- Connection of up to 16 single-channel signal conditioners
- Universal 1:1 signal routing to a 37-pos. D-SUB connector
- For system cables with D-SUB socket and open ends for universal connection
- Redundant supply and monitoring via separate MINI MCR-2-PTB-PT power terminal and MINI MCR-2-FM-RC-PT fault signaling module

**Notes:**  
 Contact us: together, we can develop optimum solutions for your automation system with the Termination Carrier for MINI Analog Pro.  
 TC-D37SUB-ADIO16-MP-P-UNI (Order No. 2906639) is not a class A product.



Ex: Housing width 136 mm

General data	
Connection to the control system level	
Number of positions	
Maximum operating voltage	
Maximum permissible current	
Rated insulation voltage	
Degree of pollution	
Overvoltage category	
Rated surge voltage	
Air clearances and creepage distances	
Ambient temperature range	
Shock	
Vibration (operation)	
Dimensions W/H/D	
Power supply via power module	
Input voltage range	
Redundant supply	
Polarization and surge protection	
Fuse	
Status indication	
Switching output	

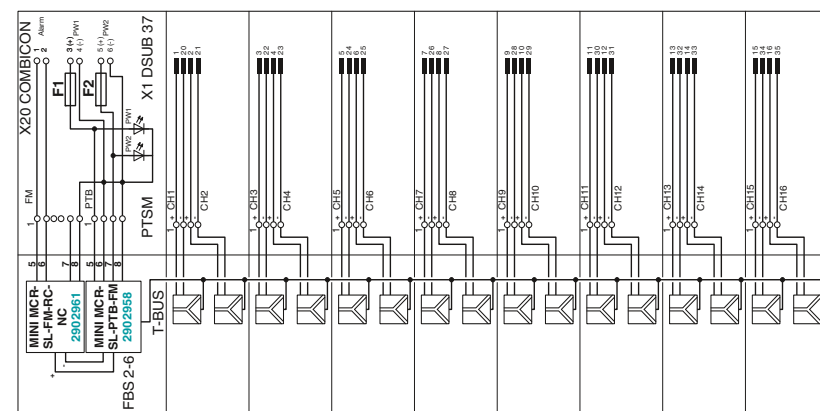
Technical data	
D-SUB pin strip	
37	
< 30 V DC (Per signal/channel)	
23 mA (Signal/channel)	
50 V	
2	
II	
0.5 kV	
DIN EN 50178 ( Basic insulation )	
-20 °C ... 60 °C (Please observe module specifications)	
15g, according to IEC 60068-2-27	
2g, according to IEC 60068-2-6	
136 / 170 / 160 mm	
Power supply via power module	
19.2 V DC ... 30 V DC	
yes, decoupled from diodes	
Yes	
2x 2.5 A on PCB, slow-blow (replaceable)	
2 x red LED (error)	
2x green LEDs (PWR1 and PWR2)	
1 N/C contact (alarm = open)	

Description	
<b>Module carrier</b> for 16 MINI Analog channels, power and feed-through module	
- With connection for MACX MCR-S-MUX HART multiplexer	

Ordering data		
Type	Order No.	Pcs./Pkt.
TC-D37SUB-ADIO16-MP-P-UNI	2906639	1
TC-D37SUB-AIO16-MP-PS-UNI	2906640	1

MINI Analog Pro power terminal	
MINI Analog Pro fault signaling module	
HART multiplexer, 32-channel, including two 14-wire flat-ribbon cable	

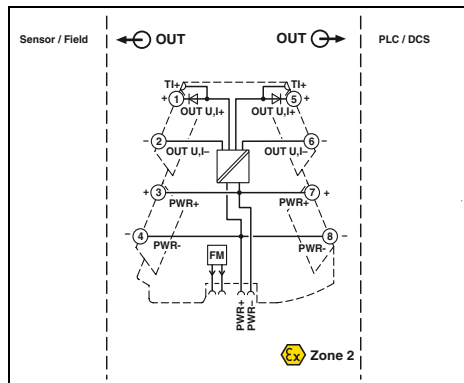
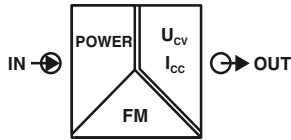
Accessories		
MINI MCR-2-PTB-PT	2902067	1
MINI MCR-2-FM-RC-PT	2904508	1
MACX MCR-S-MUX	2865599	1



TC-D37SUB-ADIO16-M-P-UNI and TC-D37SUB-AIO16-M-PS-UNI connection scheme

### Accessories

#### Constant voltage/ constant current source



Ex n



Output signals, configurable



Housing width 6.2 mm

- Constant voltage/constant current source for potentiometers, measuring bridges, encoders, etc.
- Plug-in connection system
- Highly precise
- Output signals can be configured via DIP switches
- Input signal corresponds to power supply
- Input signal and therefore energy supply and fault monitoring via the DIN rail connector
- For voltages up to 10 V and currents up to 20 mA
- Status LED

Input data	
Input signal	9.6 ... 30 V
Output data	
Output signal (can be configured using DIP switches)	U output 10 V DC 20 mA 8.75 V DC 17.5 mA 7.5 V DC 15 mA 6.25 V DC 12.5 mA 5 V DC 10 mA 3.75 V DC 7.5 mA 2.5 V DC 5 mA 1.25 V DC 2.5 mA
Short-circuit current	> 32 mA
Ripple	< 20 mV <sub>pp</sub> (at 600 Ω)
General data	
Supply voltage range	9.6 V DC ... 30 V DC
Power consumption	< 1.1 W (9.6 V DC)
Maximum transmission error	≤ 0.1 % (of final value)
Temperature coefficient	< 0.01 %/K
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1
Test voltage, input/output/supply	3 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-40 °C ... 70 °C
Housing material	PBT
Dimensions W/H/D	6.2 / 110.5 / 120.5 mm
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12
Screw connection solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12
EMC note	Class A product, see page 605
Conformance/Approvals	
Conformance	CE-compliant
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6

### Technical data

Technical data	
Input signal	9.6 ... 30 V
Output data	
Output signal (can be configured using DIP switches)	U output 10 V DC 20 mA 8.75 V DC 17.5 mA 7.5 V DC 15 mA 6.25 V DC 12.5 mA 5 V DC 10 mA 3.75 V DC 7.5 mA 2.5 V DC 5 mA 1.25 V DC 2.5 mA
Short-circuit current	> 32 mA
Ripple	< 20 mV <sub>pp</sub> (at 600 Ω)
General data	
Supply voltage range	9.6 V DC ... 30 V DC
Power consumption	< 1.1 W (9.6 V DC)
Maximum transmission error	≤ 0.1 % (of final value)
Temperature coefficient	< 0.01 %/K
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1
Test voltage, input/output/supply	3 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-40 °C ... 70 °C
Housing material	PBT
Dimensions W/H/D	6.2 / 110.5 / 120.5 mm
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12
Screw connection solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12
EMC note	Class A product, see page 605
Conformance/Approvals	
Conformance	CE-compliant
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6

### Ordering data

Description	Type	Order No.	Pcs./Pkt.	
<b>Constant voltage/constant current source</b>	Push-in connection	MINI MCR-2-CVCS-PT	2902065	1
	Screw connection	MINI MCR-2-CVCS	2902064	1

### Accessories

Description	Type	Order No.	Pcs./Pkt.	
<b>Setpoint potentiometer</b> , to set setpoints individually	Resistance value 4.7 kΩ	EMG 30-SP- 4K7LIN	2940252	10
	Resistance value 10 kΩ	EMG 30-SP-10K LIN	2942124	10

Accessories

Connector set

- FASTCON Pro connector set
- Consisting of four connectors, one each for every position on the module
- Suitable for all MINI Analog Pro modules
- Four-way coding prevents incorrect insertion into the device
- Screw or Push-in connection technology



with Push-in connection



with screw connection

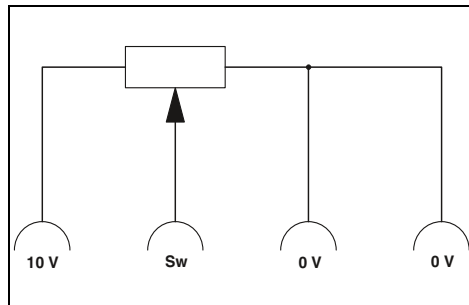
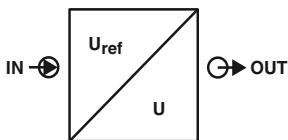
Technical data
Connection data solid/stranded/AWG
Description
<b>FASTCON Pro connector set</b> - with Push-in connection - with screw connection

Technical data		
0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 24 - 12		
Ordering data		
Type	Order No.	Pcs./ Pkt.
FASTCON PRO-SET-PT	2906228	1

Technical data		
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12		
Ordering data		
Type	Order No.	Pcs./ Pkt.
FASTCON PRO-SET	2906227	1

Accessories

Setpoint potentiometers



- For direct setpoint definition in combination with a constant voltage source

Input data
Resistance value
Linearity
Load capacity
General data
Ambient temperature (operation)
Mounting
Housing material
Dimensions W/H/D
Screw connection solid/stranded/AWG

Technical data	
EMG 30-SP- 4K7LIN	EMG 30-SP-10K LIN
4.7 kΩ ±20 %	10 kΩ ±20 %
5 % (of final value)	5 % (of final value)
0.5 W	0.5 W

Description
<b>Setpoint potentiometer</b> , to set setpoints individually
Resistance value 4.7 kΩ
Resistance value 10 kΩ

Ordering data		
Type	Order No.	Pcs./ Pkt.
EMG 30-SP- 4K7LIN	2940252	10
EMG 30-SP-10K LIN	2942124	10

### Accessories

#### ME 6,2 TBUS... DIN rail connector

- For bridging the supply voltage
- Reduced wiring effort
- Module replacement without interrupting the supply to the remaining modules (hot swappable)
- One DIN rail connector for two MINI Analog Pro modules
- Only distinguished by color coding



For bridging the supply voltage



For bridging the supply voltage

Description
<b>DIN rail connector (TBUS)</b> , for bridging the supply voltage, can be snapped onto 35 mm DIN rails according to EN 60715, with UL approval
Color: green Color: gray

Ordering data		
Type	Order No.	Pcs./ Pkt.
ME 6,2 TBUS-2 1,5/5-ST-3,81 GN	2869728	10

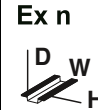
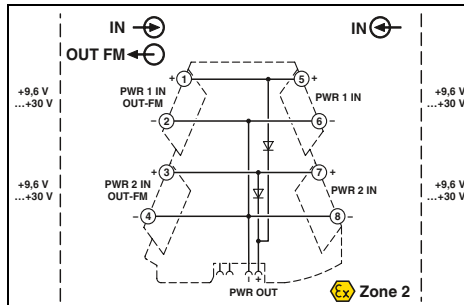
Ordering data		
Type	Order No.	Pcs./ Pkt.
ME 6,2 TBUS-2 1,5/5-ST-3,81 GY	2695439	10

### Accessories

#### Power terminals

- Power terminal for supplying the supply voltage to the DIN rail connector
- Plug-in connection system
- Increased output current of 3.2 A
- For up to 115 MINI Analog Pro modules
- Monitoring of supplies in combination with the fault monitoring module
- Flexible redundant supply from one or both module sides
- Status and error indicator LEDs

**Notes:**  
Pay attention to the supply instructions for the MINI and MACX modules.



Redundant supply for existing 24 V

Input data/output data
Input voltage range
Output voltage
Output current
General data
Ambient temperature (operation)
Housing material
EMC note
Conformance/Approvals
Conformance
ATEX
UL, USA/Canada
DNV GL

Technical data
9.9 V DC ... 30 V DC
9.6 V DC ... 29.7 V DC
≤ 3.2 A
-40 °C ... 70 °C
PBT
Class A product, see page 605
CE-compliant
Ex II 3 G Ex nA IIC T4 Gc X
UL 508 Listed
Class I, Div. 2, Groups A, B, C, D T6
Class I, Zone 2, Group IIC T6
C, EMC2

Description
<b>MINI Analog Pro power terminal</b>
Push-in connection
Screw connection

Ordering data		
Type	Order No.	Pcs./ Pkt.
MINI MCR-2-PTB-PT	2902067	1
MINI MCR-2-PTB	2902066	1

## Accessories

## ME 17,5 TBUS-... DIN rail connector

- For bridging the supply voltage when using a MINI POWER system power supply

## Notes:

If the system power supply is used, two ME 17,5 TBUS DIN rail connectors are required. This allows you to establish the connection to the ME 6,2 TBUS DIN rail connector of the MINI Analog system and provide an effective power supply.



For system power supply

Description	Ordering data		
	Type	Order No.	Pcs./Pkt.
<b>DIN rail connector</b> , for bridging the supply voltage, can be snapped onto 35 mm DIN rails according to EN 60715, with UL approval, two pieces are required per system power supply	ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10

## Accessories

## System power supply

- For supplying the supply voltage via the DIN rail connector where AC voltages are available
- Nominal input voltage range 100 ... 240 V AC
- 24 V DC output voltage
- For up to 60 MINI Analog modules
- For up to 1.5 A, secondary
- Status and error signaling via diagnostic LEDs



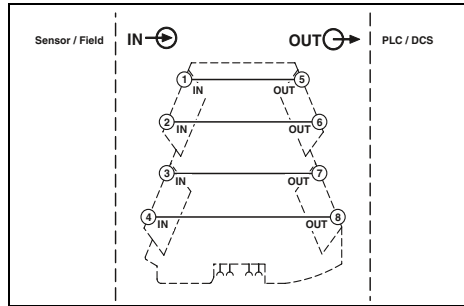
For applications with local voltages of over 100 V

Description	Ordering data		
	Type	Order No.	Pcs./Pkt.
<b>System power supply</b> , primary-switched, with Zone 2 approval. Further information can be found in Catalog 4, Surge protection and power supplies.	MINI-PS-100-240AC/24DC/1.5/EX	2866653	1
<b>System power supply</b> , primary-switched (not for Zone 2) You can find further information in Catalog 4, Surge protection and power supplies.	MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1

### Accessories

#### Feed-through terminal blocks

- Feed-through terminal block for 1:1 forwarding of signals that are already electrically isolated in the MINI Analog Pro group
- Plug-in connection system



For signals already electrically isolated

General data	
Degree of protection	IP20
Ambient temperature (operation)	-40 °C ... 70 °C
Mounting	any
Housing material	PBT
Dimensions W/H/D	6.2 / 110.5 / 120.5 mm
Screw connection solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12
Conformance/Approvals	
Conformance	CE-compliant
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6 C, EMC2
DNV GL	

#### Technical data

Degree of protection	IP20
Ambient temperature (operation)	-40 °C ... 70 °C
Mounting	any
Housing material	PBT
Dimensions W/H/D	6.2 / 110.5 / 120.5 mm
Screw connection solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12
Conformance/Approvals	
Conformance	CE-compliant
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6 C, EMC2

Description	
<b>MINI Analog Pro feed-through terminal block</b>	
	Screw connection

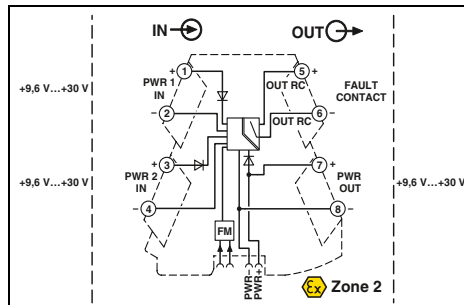
#### Ordering data

Type	Order No.	Pcs./Pkt.
MINI MCR-2-TB	2902068	1

### Accessories

#### Fault signaling modules

- Fault monitoring module for evaluating and reporting group errors from the fault monitoring system
- Monitoring of up to 115 connected MINI Analog Pro modules
- Plug-in connection system
- Monitoring of supply voltages of MINI MCR-2-PTB(-PT) power terminals
- Drawing off the supply is possible
- Fault signaling via an N/C contact
- Status and error indicator LEDs
- CE-compliant



For group error message and supply monitoring

Input data/output data	
Input signal	9.9 V DC ... 30 V DC
Output signal	9.6 V DC ... 29.7 V DC
Switching output	
Max. switching voltage	30 V DC
Maximum switching current	50 mA
General data	
Test voltage input/output	1.5 kV AC (50 Hz, 1 min.)
EMC note	Class A product, see page 605
Conformance/Approvals	
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6 C, EMC2
DNV GL	

#### Technical data

Input signal	9.9 V DC ... 30 V DC
Output signal	9.6 V DC ... 29.7 V DC
Switching output	
Max. switching voltage	30 V DC
Maximum switching current	50 mA
General data	
Test voltage input/output	1.5 kV AC (50 Hz, 1 min.)
EMC note	Class A product, see page 605
Conformance/Approvals	
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6 C, EMC2

Description	
<b>MINI Analog Pro fault signaling module</b>	
	Push-in connection
	Screw connection

#### Ordering data

Type	Order No.	Pcs./Pkt.
MINI MCR-2-FM-RC-PT	2904508	1
MINI MCR-2-FM-RC	2904504	1



Accessories

Programming adapters

IFS-USB-PROG-ADAPTER and NFC-USB-PROG-ADAPTER programming adapters for configuring Phoenix Contact INTERFACE modules with S-PORT or NFC interface.

The adapters are used with the FDT/DTM or the ANALOG-CONF software. For programming the MACX Analog, MINI Analog Pro, and MINI Analog.



General data		Technical data		
EMC note		Class A product, see page 605		
Description		Ordering data		
Programming adapter for configuring modules with S-PORT interface		Type	Order No.	Pcs./Pkt.
Programming adapter for configuring modules with NFC interface		IFS-USB-PROG-ADAPTER	2811271	1
Bluetooth programming adapter, with USB and S-PORT interface		NFC-USB-PROG-ADAPTER	2900013	1
		IFS-BT-PROG-ADAPTER	2905872	1

Accessories

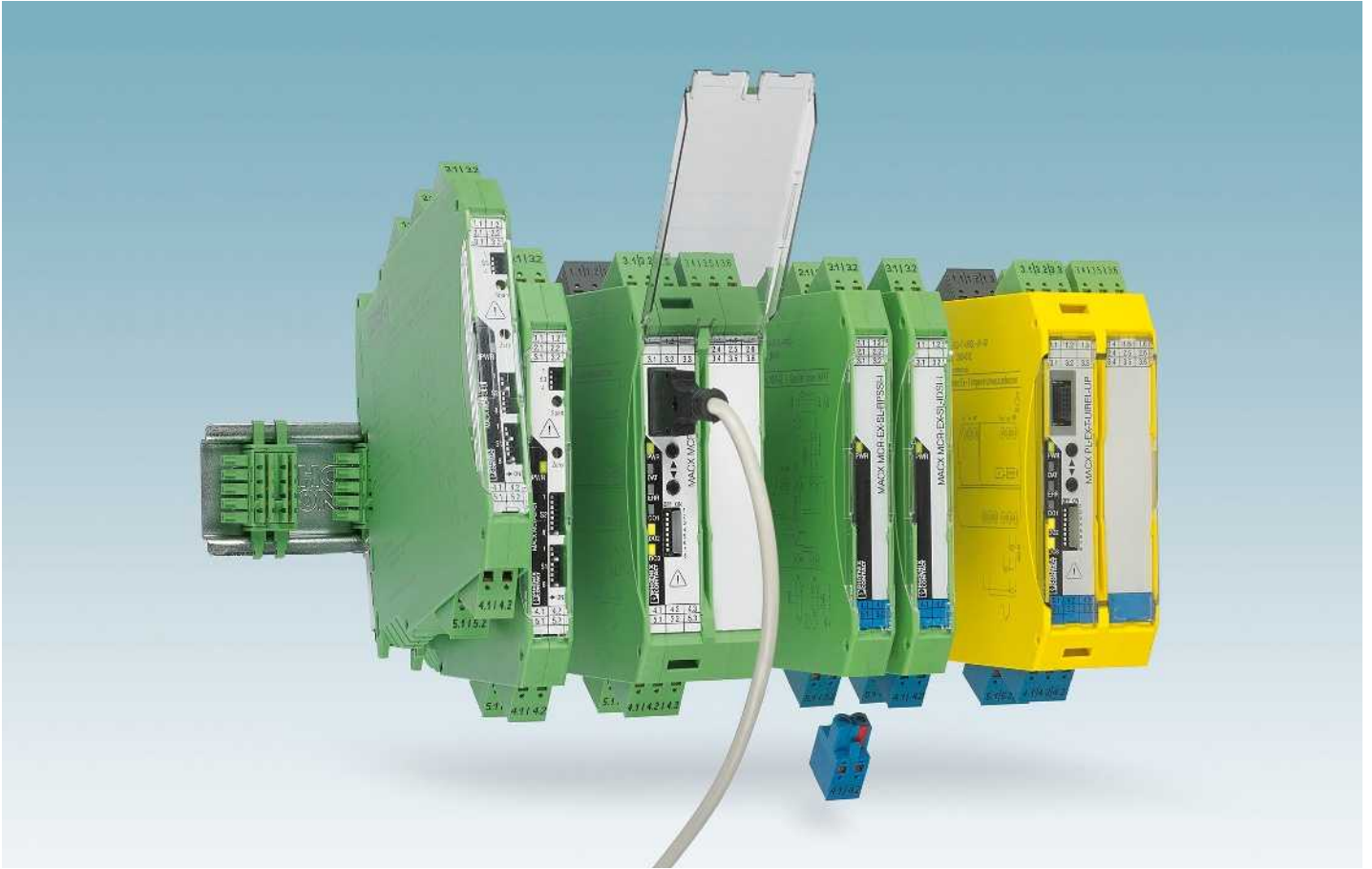
Marking label for transparent cover

- Snap-in labels and adhesive labels with large area for marking
- For snapping into or sticking onto MINI Analog Pro covers, without overlapping the status and error LEDs
- The sheets can be marked quickly and easily using the BLUEMARK CLED and the THERMOMARK CARD...
- They can also be custom printed according to customer requirements



Unmarked or marked according to customer specifications

Description		Ordering data			Ordering data		
UniCard, for marking the CLIPFIX 35-5 end bracket, 24-section, 8 individual labels per strip, lettering field size: 30 x 5 mm		Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Lettering field size: 30 x 5 mm	white	UCT-EM (30X5)	0801505	10			
10-section, lettering field size: 15 x 5 mm	white	UCT-EM (30X5) CUS	0801589	1			
10-section, lettering field size: 15 x 5 mm	white	UC-EMLP (15X5)	0819301	10			
	white	UC-EMLP (15X5) CUS	0824550	1			
Continuous labels, can be marked with thermal transfer printer, can be separated with a cutter, pitch as desired, strip length up to 1000 mm							
1 roll = 90 m continuous, height: 5.0 mm, 10 strips	white				SK 5,0 WH:REEL	0805221	1



**Machine building/process industry**  
 EN ISO 13849-1  
 EN 62061  
 IEC 61508  
 EN 60511



**PL**  
EN ISO 13849

**Signal conditioner with PL functional safety**  
 MACX Safety



**PL**  
EN ISO 13849

**Ex i signal conditioner with PL functional safety**  
 MACX Safety Ex

**Process industry**  
 IEC 61508  
 EN 60511



**SIL**  
IEC 61508

**Signal conditioner with SIL functional safety**  
 MACX Analog



**SIL**  
IEC 61508

**Ex i signal conditioner with SIL functional safety**  
 MACX Analog Ex

**No intrinsic safety**

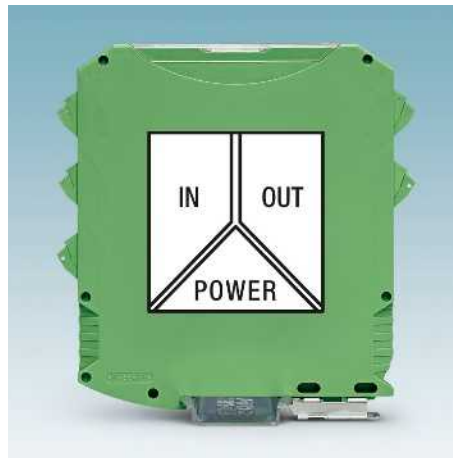
**Intrinsic safety**  
 ATEX/IECEX  
 EN 60079-11

## Signal conditioners with functional safety and explosion protection – the MACX ranges

**Reliable and safe**

Highest safety for your machines and systems.

Phoenix Contact meets the requirements of functional safety according to IEC 61508 in a standardized development process. We take measures for fault avoidance and fault control into consideration, from the development and production of a device up to device operation.

**Precise, interference-free signal transmission and long service life**

- Patented transmission concept with safe electrical isolation
- Low power consumption and self-heating

**Easy configuration and monitoring**

- Either via FDT/DTM or alternatively with user-friendly stand-alone software – with integrated monitoring function
- Or without software via DIP switches on the housing front or with the operator interface and display unit

**Easy installation, power bridging, and diagnostics**

- Flexible supply voltage bridging and the option of redundant, diode-decoupled supply and error indication.
- Plug-in, coded connection terminal blocks with test sockets, optionally with screw connection or with fast Push-in connection technology

**Fast and error-free signal connection**

- Compact Termination Carriers connect MACX Analog devices to the automation system – Plug and Play

**Ex i signal conditioner and PL d-certified signal conditioner**

- Single and two-channel signal isolators for intrinsically safe circuits up to Zone 0 and Zone 20
- Integrate analog signals into safety applications according to the Machinery Directive with ease

**Facts about explosion protection**

The chemical and petrochemical industries involve industrial processes which produce explosive atmospheres. They are caused, for example, by gases, fumes or vapors. Explosive atmospheres are also likely to occur in mills, silos, and sugar and fodder factories due to the dust present there.

Therefore, electrical devices in potentially explosive areas are subject to special directives.

**Devices and protective systems in potentially explosive areas**

European Parliament directive 94/9/EC of March 23, 1994 (ATEX manufacturer directive) is of particular importance within CENELEC (European Community and Western European EFTA states). It is designed to facilitate the harmonization of legal provisions in the member states of the European Union for devices and protective systems in terms of ensuring correct use in potentially explosive areas. Directive 94/9/EC must be applied to all explosion-protected devices and protective systems placed on the market in the European Union.

The scope of this directive also includes safety, monitoring, and control devices which are used outside of potentially explosive areas, but which are necessary for, or contribute towards, the safe operation of devices and protective systems with respect to explosion hazards.

The term **device** includes machines, equipment, stationary or mobile devices, control components, and system accessories. The directive also covers alarm and protection systems which are meant to be used, either individually or in combination, for the generation, transmission, storage, measurement, control, and conversion of energy as well as for processing materials and which have the potential to ignite and cause an explosion.

**Protective systems** are devices designed to stop an incipient explosion immediately and/or restrict the area affected by the explosion, and which are placed on the market separately as autonomous systems.



**Components** are defined as those parts that are necessary for ensuring the safe operation of devices and protective systems, but do not perform an autonomous function in themselves.

European directives are implemented in ordinances or laws at a national level.

**Systems in potentially explosive areas**

Directive 1999/92/EC (ATEX Operator Directive) was passed in Europe to regulate the operation of systems in potentially explosive areas.

Terminology associated with the Ex area	
<b>Explosive atmosphere</b>	A mixture of combustible gases, steam, vapors or dust and air in atmospheric conditions that allow the entire mixture to combust once ignited.
<b>Potentially explosive area</b>	An area where the atmosphere has the potential to explode due to local or operational conditions ("Ex area").
<b>Electrical equipment</b>	The entire set of components, electric circuits or parts of electric circuits that are usually located within a single housing.
<b>Intrinsically safe electrical equipment</b>	An electrical device in which all circuits are intrinsically safe. Note: These devices may be used directly in the Ex area.
<b>Associated equipment</b>	Electrical devices that contain both intrinsically safe and non-intrinsically-safe circuits and that are designed in such a way that the non-intrinsically-safe circuits cannot influence the intrinsically safe ones. Note: Associated electrical equipment must not be used directly in potentially explosive areas without additional protection defined by a further type of protection.

**Classification into groups**

The general stipulations of EN 60079-0 divide electrical devices for potentially explosive areas into three groups.

**Group I:**

Electrical devices for firedamp areas (mines) which are susceptible to pit gases (methane) and/or combustible dusts (coal dust).

**Group II:**

Electrical devices for operation in areas where explosive gas atmospheres are likely to occur, excluding mines susceptible to firedamp.

These include: devices for the chemical, petrochemical, and pharmaceutical industries as well as for wastewater treatment.

Electrical devices are further divided into subcategories according to the properties of the explosive atmosphere.

In the case of the intrinsic safety type of protection, classification is based on the minimum ignition energy of the gas or vapor.

Designation	Typical gas	Ignition energy/I intrinsic safety
II A	Propane	> 180
II B	Ethylene	60 ... 180
II C	Hydrogen	< 60

**Group III:**

Electrical devices for operation in areas where explosive dust atmospheres are likely to occur, excluding mines susceptible to firedamp.

These include: devices for areas associated with the food industry (mills, silos), for example.

Electrical devices are further divided into subcategories according to the properties of the explosive atmosphere.

Designation	Dusts
III A	Combustible flyings
III B	Non-conductive dust
III C	Conductive dust

## Classification into temperature classes

Simply dividing the various gases into explosion or gas groups according to their minimum ignition energy is not sufficient to describe the gases adequately with regard to their explosive properties.

A gas may explode either when the ignition energy is exceeded or where there is an excessively high temperature caused by a hot surface. This ignition temperature is, however, not usually linked to the ignition energy, i.e., a gas with a low ignition energy does not necessarily explode at a low temperature. Consequently, devices that are used directly in potentially explosive atmospheres are divided into temperature classes. Temperature classes define the maximum surface temperature even in the event of errors. Parallel to this, the gases are classified according to their different ignition temperatures.

Temperature class	Maximum permissible surface temperature of the equipment °C	Ignition temperatures of combustible substances °C
T 1	450	> 450
T 2	300	> 300 ≤ 450
T 3	200	> 200 ≤ 300
T 4	135	> 135 ≤ 200
T 5	100	> 100 ≤ 135
T 6	85	> 85 ≤ 100

The following table provides an overview of the ignition energies and ignition temperatures for certain gases:

Substance	T <sub>ign</sub>	Temperature class	E <sub>min</sub>	Group
Ethoxyethane	170	T 4	190	II B
Ethylene	425	T 2	82	II B
Ammonia	630	T 1	14000	II A
Butane	365	T 2	250	II A
Methane	595	T 1	280	I
Propane	470	T 1	250	II A
Carbon disulfide	95	T 6	9	II C
Hydrogen	560	T 1	16	II C

## Zone classification

Potentially explosive areas are divided into zones according to the probability of their occurrence. The EN 60079-10-1 standard defines the zones containing **explosive atmospheres** as follows:

### Zone 0:

Area in which an explosive atmosphere is present for continuous or long periods.

These conditions are usually present inside containers, pipelines, apparatus, and tanks.

### Zone 1:

Area in which an explosive atmosphere is to be expected only occasionally during normal operation.

This includes the immediate area surrounding Zone 0, as well as areas close to filling and emptying equipment.

### Zone 2:

Area in which an explosive atmosphere is not expected during normal operation; however, if it does occur, then it does so only rarely and for a short period.

Zone 2 includes areas that are used exclusively for storage, areas around pipe connections that can be disconnected, and generally the immediate area surrounding Zone 1.

Areas that are potentially explosive as a result of **combustible dusts** are divided into the following zones according to EN 60079-10-2 (formerly: EN 61241-10):

### Zone 20:

Area in which an explosive atmosphere is present for continuous, frequent or long periods in the form of an airborne cloud of combustible dust.

### Zone 21:

Area in which an explosive atmosphere in the form of an airborne cloud of combustible dust is to be expected only occasionally during normal operation.

### Zone 22:

Area in which an explosive atmosphere in the form of an airborne cloud of combustible dust is not expected during normal operation. However, if it does occur, then it does so only for a short period.

## Categories

The ATEX directive assigns devices for use in potentially explosive areas to categories. In IEC 60079-0, "Equipment Protection Level (EPL)" is the term used instead of "category".

In the same way that there are different zones, there are also different device categories. These consist of categories M1 and M2 for Group I and categories 1, 2, and 3 for Group II. The categories for **equipment group II** are described in more detail below:

### Category 1:

Devices constructed to guarantee a very high degree of safety.

Devices in this category must guarantee the required degree of safety even in the unlikely event of a device failure and therefore be provided with measures to protect against explosion, so that:

- In the event of one integrated protection measure failing, a second, independent protection measure is able to guarantee the necessary safety, or
- In the event of two independent errors, the necessary safety is guaranteed.

### Category 2:

Devices constructed to guarantee a very high degree of safety.

The explosion protection measures associated with this category guarantee the required degree of safety, even in the case of frequent device failures or common error states.

### Category 3:

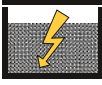



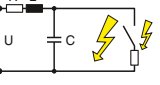
Devices constructed to guarantee a standard degree of safety.

Devices in this category guarantee an adequate degree of safety in normal operation.

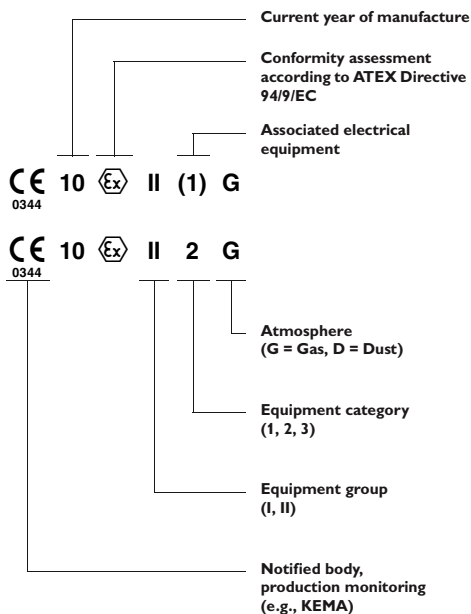
The table below shows which categories are assigned to which zones:

Category	For zone	Also possible
1	0 20	1 and 2 21 and 22
2	1 21	2 22
3	2 22	

### Types of protection

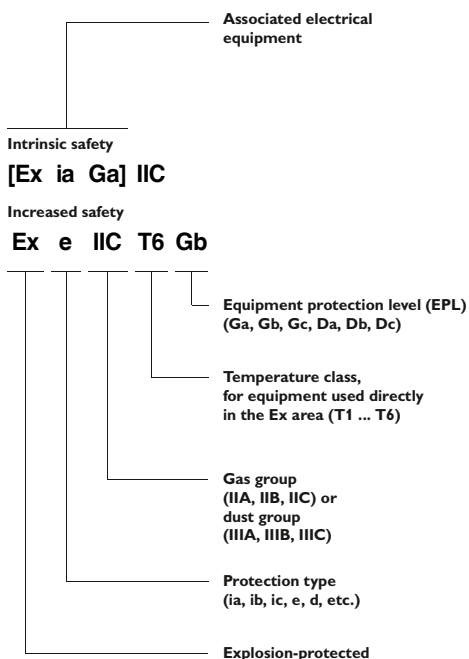
Protection principle	Type of protection	Area of application (selection)	Standard
 Isolation	Oil immersion	<b>o</b> Transformers, relays, startup controls, switching devices	EN 60079-6
	Sand filling	<b>q</b> Transformers, relays, capacitors	EN 60079-5
	Molded encapsulation	<b>m*</b> Coils of relays and motors, electronics, solenoid valves, connection systems	EN 60079-18
 Exclusion	Pressurized enclosure	<b>p</b> Control cabinets, motors, measuring and analysis devices, computers	EN 60079-2
 Special mechanical design	Flameproof enclosure	<b>d</b> Motors, switching devices, power electronics	EN 60079-1
 Clearance from electrically conductive parts	Increased safety	<b>e</b> Terminal blocks, housing, lights, motors	EN 60079-7
 Energy limitation	Intrinsic safety	<b>i*</b> Electronics, MCR	EN 60079-11
	Intrinsically safe systems	Electronic systems	EN 60079-25
	Intrinsically safe fieldbus systems	Fieldbus systems	EN 60079-27
Improved industrial quality nA: non-sparking nC: sparking equipment nR: restricted breathing housing nL: energy-limited nP: simplified pressurized enclosures	Protection type "n"	<b>n**</b> Motors, housing, lights, electronics	EN 60079-15
* ia, ma: application in Zone 0, 1, 2 / ib, mb: application in Zone 1, 2 / ic, mc: application in Zone 2 only    ** Application in Zone 2 only			

### Marking according to ATEX directive

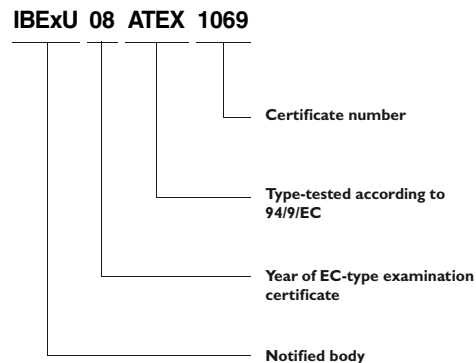


CE mark does not apply to components.

### Marking according to EN 60079-0



### EC-type examination certificate





### Safety-related function for the Ex area

The term SIL (safety integrity level) is becoming more and more significant in the field of process technology. It defines the requirements that a device or a system is expected to fulfill so that the failure probability can be specified. The aim is to achieve maximum possible operational reliability. If a device or system fails, a defined state is attained. Standard-based inspections are carried out to determine statistical probability.

### Application of SIL on the basis of IEC 61508 and IEC 61511

The SIL standard is used for a wide range of industries within the process industry, including the chemical industry, refineries, oil and gas production, paper manufacturing, and conventional power generation. In addition to functional safety requirements, systems in potentially explosive areas are also subject to Ex standards EN 60079-0 ff.

### IEC 61508: “Functional safety of electrical/electronic/programmable electronic safety-related systems”

This standard describes the requirements that the manufacturer has to bear in mind when producing devices or systems.

### IEC 61511: “Functional safety - Safety instrumented systems for the process industry sector”

The IEC 61511 standard describes the requirements for achieving systems with functional safety.

Compliance with the standard is determined by operators, owners, and planners on the basis of safety plans and national regulations. In addition, the standard also describes the requirements for using a device in an application on the basis of its proven effectiveness (proven in use).



### SIL marking on devices

The products in the MACX range from Phoenix Contact, which have been developed according to IEC 61508, are marked with the designation SIL 2 or SIL 3. This indicates clearly that the devices may be suitable for safety instrumented functions (SIF).

To determine whether they can actually be used, you need to calculate the sum of the probability failure values for all the devices in the signal circuit. The necessary values for this can be found in the safety manual of each SIL product.

### Overview of terms from SIL standards IEC 61508 and IEC 61511

<b>SIL</b>	<b>Safety Integrity Level</b> One of four discrete levels for the specification of requirements for the safety integrity of safety instrumented functions, which are assigned to the E/E/PE safety instrumented systems, where SIL 4 is the highest and SIL 1 the lowest level.	<b>PFH</b>	<b>Probability of dangerous Failure per Hour</b> Describes the probability of a dangerous failure occurring per hour.
<b>EUC</b>	<b>Equipment Under Control</b> Equipment, machines, devices or systems used in production, materials processing or transport.	<b>SFF</b>	<b>Safe Failure Fraction</b> Describes the proportion of harmless failures. This is the ratio of the rate of safe failures plus the rate of diagnosed or detected faults in relation to the total failure rate of the system.
<b>MTBF</b>	<b>Mean Time Between Failures</b> The expected mean time between failures.	<b>SIF</b>	<b>Safety Instrumented Function</b> Describes the safety instrumented functions of a system.
<b>PFD</b>	<b>Probability of Failure on Demand</b> The probability of a failure on demand. Describes the probability of a safety instrumented system failing to perform its function when required.	<b>SIS</b>	<b>Safety Instrumented System</b> An SIS (safety instrumented system) consists of one or more safety instrumented functions. An SIL requirement is applicable for each of these safety instrumented functions.
<b>PFDavg</b>	<b>Average Probability of Failure on Demand</b> The average probability of the function failing on demand.		
<b>E/E/PE</b>	<b>Electrical/Electronic/Programmable Electronic Systems</b> This term is used for all electrical devices or systems that can be used to execute a safety instrumented function. It includes simple electrical devices and all types of programmable logic controllers (PLCs).		



**SIL inspection**

The complete signal path must be taken into account during the SIL inspection. The example shows how the safety integrity level is calculated in a typical safety application using average failure probabilities of individual devices.

Table 2 of the IEC 61508-1 standard describes the relationship between the average failure probability and the attainable SIL. Here, the level required determines the overall budget for the sum of all PFD values.

A system with a single-channel structure with a low demand rate is used as an example; for SIL 2 the average PFD value is between  $10^{-3}$  and  $< 10^{-2}$ .

Safety integrity level SIL	Operating mode with a low demand rate (average probability of the specified function failing on demand)
4	$\geq 10^{-5}$ to $< 10^{-4}$
3	$\geq 10^{-4}$ to $< 10^{-3}$
2	$\geq 10^{-3}$ to $< 10^{-2}$
1	$\geq 10^{-2}$ to $< 10^{-1}$

Safety integrity level: failure limit values for a safety function which is operated in an operating mode with a low demand rate.

**Example:**

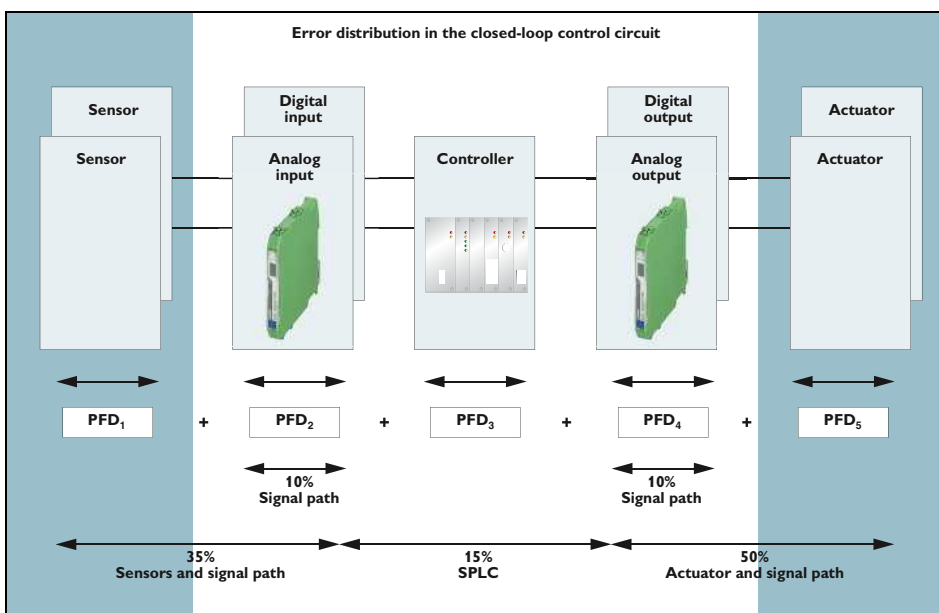
A sensor and actuator are assembled in the field and are exposed to chemical and physical loads (process medium, pressure, temperature, vibration, etc.). Accordingly, these components have a high risk of failure:

- The sensor accounts for 25% of the overall PFD
- The actuator accounts for 40% of the overall PFD

Neither the failsafe controller nor the interface modules come into contact with the process medium and both are usually located in a protected control cabinet:

- The failsafe controller accounts for 15% of the overall PFD
- The interface modules each account for 10% of the overall PFD

Typically, the values form the basis for a calculation.



**Functional safety performance level (PL) according to EN ISO 13849-1 and EN 62061**

**General information**

In modern industrial systems, the amount of complex technical equipment used is constantly increasing. The purpose of safety technology is to reduce the risk as far as possible but at least to a reasonable degree. At the same time, the availability of production equipment should not be restricted any more than is absolutely necessary.

The Machinery Directive defines the requirements machinery must meet before it can be placed on the market and operated in the European Economic Area. It also contains essential health and safety requirements for the planning and construction of machinery and safety components.

However, the number of systems subject to the directive that do not belong to classical machine building is increasing continually. These include, for example, wind turbine generators. However, biogas systems, distributed energy generation generally, and other process engineering systems also focus on the statutory requirements.

For this reason, analog signals are increasingly being handled according to the specifications of the Machinery Directive.

Every “machine” or system poses a risk. According to the requirements of the Machinery Directive, a risk assessment must be carried out for every machine. If the risk is greater than the level of risk that can be tolerated, risk reduction must be implemented.

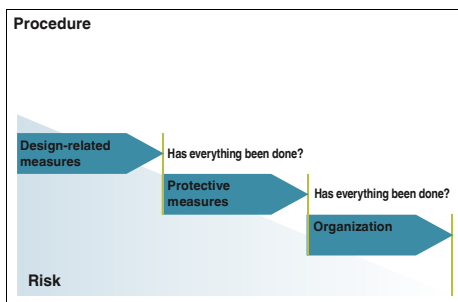


Figure 1: Risk reduction according to EN ISO 12100

**Functional safety**

In order to achieve the necessary “functional safety” of a system, it is essential for the safety-related parts of the safety equipment and control devices to operate correctly and, in the event of failure, for the system to remain in the safe state or enter a safe state. The requirements for achieving functional safety are based on the following objectives:

- Avoidance of systematic errors
- Control of systematic errors
- Control of random faults or failures

The EN ISO 13849 (and EN 62061) standard specifies the various safety levels in the form of the Performance Level “PL” (and the Safety Integrity Level “SIL”) depending on the extent of the risk and describes the characteristics of the safety functions.

**Practical procedure according to EN ISO 13849**

In practice, the following steps have proved to be effective:

1. Definition of the safety function  
The information is derived from the risk assessment.
2. Determination of the required Performance Level (PL)  
For each safety function, the required performance level is estimated using the adjacent risk graph (Fig. 3).
3. Technical implementation  
This step involves the technical pre-planning of the safety function, taking possible technologies and components into account.
4. Dividing the safety function into subsystems  
Implementation takes place in block diagrams. As a rule, a safety function consists of a sensor-logic actuator.

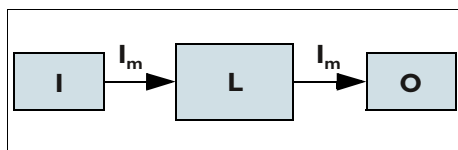


Figure 2: Safety technology block diagram (according to EN 13849-1)

5. Determination of the achieved PL for each subsystem  
A characteristic value when determining the performance level is the so-called PFHd value, the statistical “probability of a dangerous failure per hour”. The safety technology characteristics are given in the product data sheet, the FUNCTIONAL

SAFETY CHARACTERISTICS data sheet or the SISTEMA library (Fig. 4).

Further safety technology characteristic data consists of the category, the DC value, and the MTTFD value (Fig. 5).

6. Determination of the achieved PL  
The manufacturer of subsystems states the category and makes the specifications on the achieved PFHd value and the PL available.
7. Verification of the achieved PL  
Each individual subsystem and the entire safety chain must together meet the requirements of the necessary PL. This includes both the quantitative evaluation and the consideration of systematic aspects, such as proven components and safety principles.
8. Validation  
Finally, it is necessary to check whether the selected measures achieve the required risk reduction and therefore the protection objectives of the risk assessment. The result is included in the final risk assessment.

**Definitions:**

- PFH<sub>D</sub>: probability of a dangerous failure occurring per hour.
- DC: diagnostic coverage
- MTTF<sub>d</sub>: mean time to dangerous failure

**Category:**

- B10<sub>d</sub>: number of operating cycles after which 10% of the devices have failed
- CCF: Common cause failure

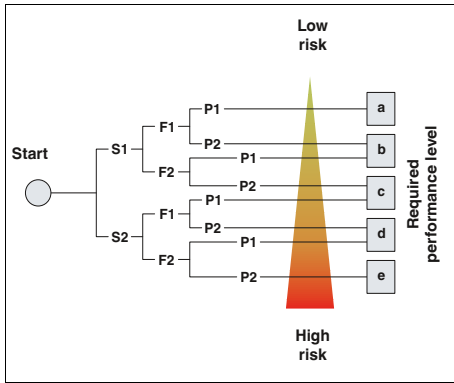


Figure 3: Risk graph

Meaning of individual parameters:

S: Severity of injury

– S1: Slight (reversible) injuries

– S2: Severe (irreversible) injuries

F: Frequency and duration of exposure to the hazard

– F1: Seldom to not very frequent

– F2: Frequent to continually or long

P: Possibility of avoiding or limiting damage

– P1: Possible under certain conditions

– P2: Hardly possible



Phoenix Contact offers a series of services surrounding the topic of functional safety.

It comprises initial planning and startup to the modernization of the safety lifecycle. There is also a training concept. Dates are published on the homepage.

In addition, all questions are answered via the free safety hotline.

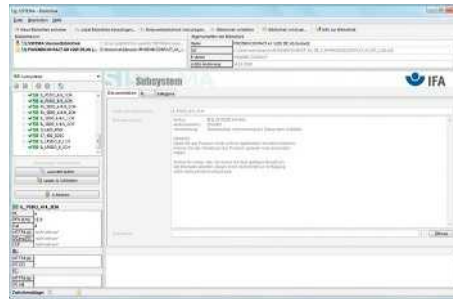


Figure 4: SISTEMA library

SISTEMA is a product library with which safety functions can be easily calculated. The products from MACX Safety and MACX Safety Ex are included in a SISTEMA library. It is available from the product download area on the Phoenix Contact homepage.

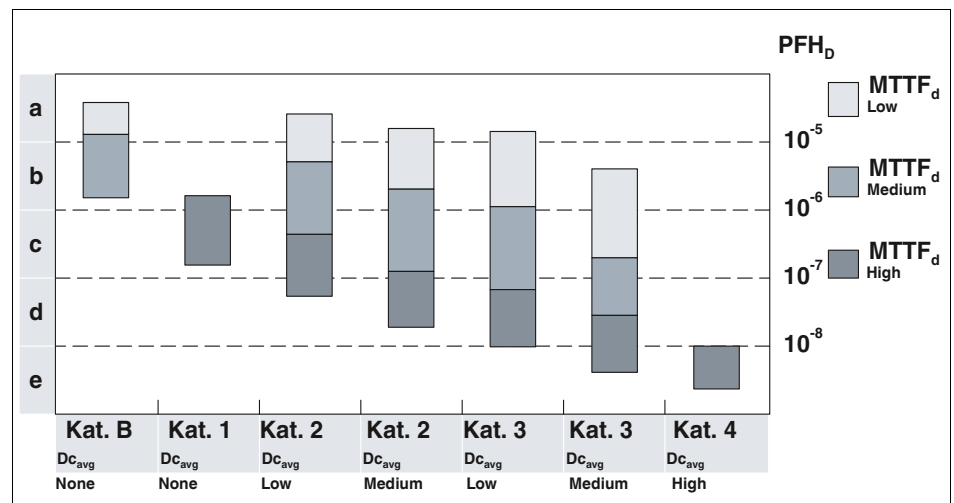
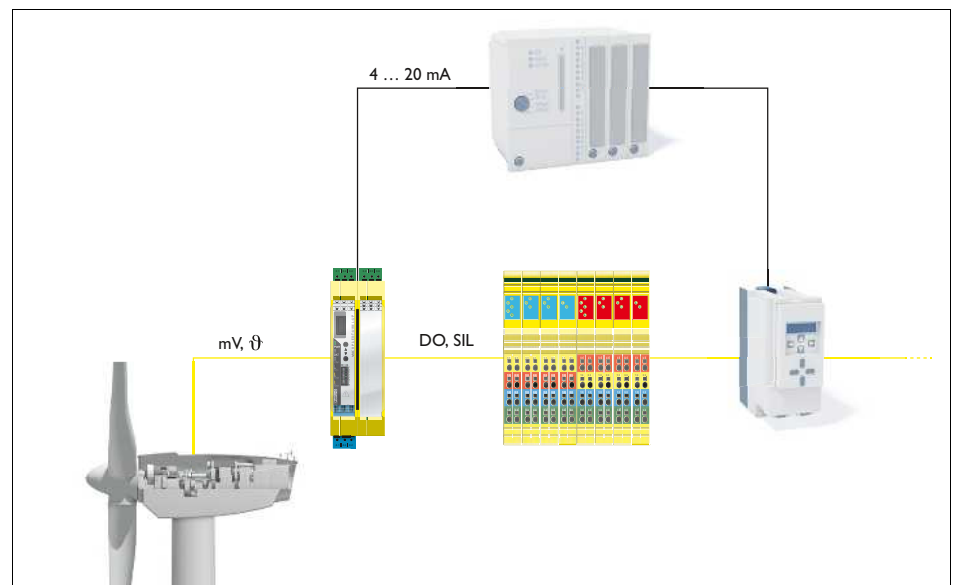
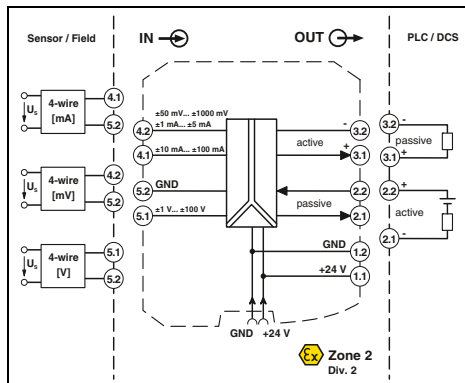
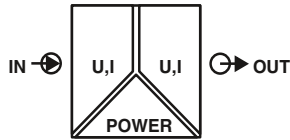


Figure 5: Relationship between PL, category, DC, and MTTFd (according to EN 13849-1)



Application example: Safety-related temperature monitoring in a wind turbine generator

Analog IN/Analog OUT  
3-way signal conditioner



Ex n



SIL IEC 61508



Universal, more than 1600 signal combinations

Functional Safety

Ex: Ex n

Housing width 12.5 mm

Technical data

<b>Input data</b>	Input signal (configurable using the DIP switch)
Maximum input signal	±50 mV... ±1000 mV
Input resistance	±1 mA... ±5 mA
<b>Output data</b>	Output signal (configurable using the DIP switch)
Load R <sub>B</sub>	±10 mA... ±100 mA
<b>General data</b>	Supply voltage range
Power dissipation	12 V DC ... 24 V DC (-20 % / +25 %)
Maximum transmission error	< 0.7 W (at 24 V DC / 20 mA)
Temperature coefficient	≤ 0.1 % (Compared to the final value)
ZERO / SPAN adjustment	0.0075 %/K
Limit frequency (3 dB)	± 4 % / ± 4 %
Step response (10-90%)	10 kHz (Can be switched to 30 Hz)
<b>Electrical isolation</b>	Input/output/power supply
Test voltage, input/output/supply	2.5 kV (50 Hz, 1 min., test voltage)
Degree of protection	300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
Ambient temperature (operation)	2.5 kV (50 Hz, 1 min.)
Mounting	IP20
Housing material	-20 °C ... 70 °C
Dimensions W/H/D	any
Screw connection solid/stranded/AWG	PA 66-FR
Push-in connection solid/stranded/AWG	12.5 / 99 / 114.5 mm
EMC note	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Conformance/Approvals	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Conformance	Class A product, see page 605
ATEX	CE-compliant
IECEX	Ex nA IIC T4 Gc
UL, USA/Canada	Ex nA IIC T4 Gc
	UL 61010 Listed
	Class I, Div. 2, Groups A, B, C, D T6
	Class I, Zone 2, Group IIC
	2
	SIL in accordance with IEC 61508

U input	I input
0 ... 10 V , please indicate if different setting when ordering	0 ... 1 mA , Configurable via DIP switches
± 100 V	± 100 mA
approx. 1 MΩ	approx. 10 Ω
(± 1 V DC ... ± 100 V DC)	(± 10 mA DC ... ± 100 mA DC)
<b>U output</b>	<b>I output</b>
0 ... 10 V , Configurable via DIP switches	0 ... 20 mA , please indicate if different setting when ordering
0 ... 20 mA , please indicate if different setting when ordering	≥ 1 kΩ (10 V)
	≤ 600 Ω (20 mA: active)
	passive: ≤ (UB-2 V) / I <sub>outmax</sub>

Universal signal conditioner for operating 4-conductor measuring transducers.

- Analog signal conditioner for isolating, filtering, amplifying, and converting standard analog signals
- Configurable input and output signals, including bipolar current and voltage signals
- 3-way electrical isolation
- Over 1600 signal conversions can be set via DIP switches on the front
- 10 kHz limit frequency for time-critical applications
- Output active or passive
- Plug-in screw or Push-in connection technology
- Power supply via DIN rail connector possible
- Status indicator for supply voltage
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

<b>Notes:</b>
To order a product with an order configuration, enter the required configuration by referring to the adjacent order key.
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174

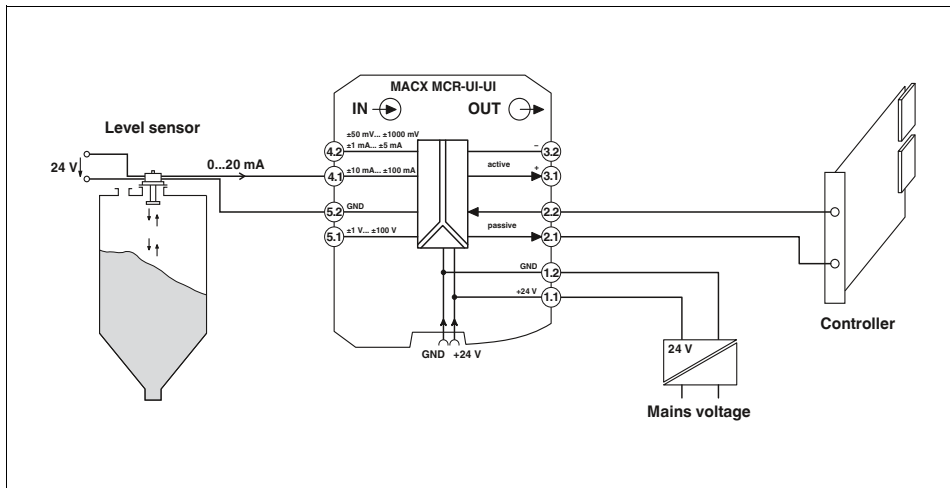
<b>Description</b>	<b>3-way signal conditioner</b> , for electrical isolation of analog signals
Order configuration	Screw connection
Order configuration	Push-in connection
Standard configuration	Screw connection
Standard configuration	Push-in connection

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs./Pkt.</b>
MACX MCR-UI-UI	2811284	1
MACX MCR-UI-UI-SP	2811572	1
MACX MCR-UI-UI-NC	2811446	1
MACX MCR-UI-UI-SP-NC	2811556	1

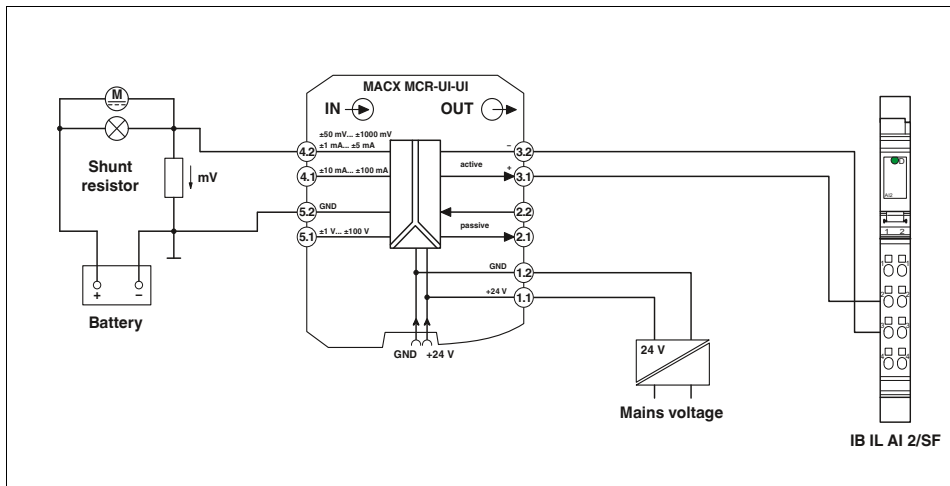
Order key for MACX MCR-UI-UI(-SP) (standard configuration entered as an example)

Order No.	Input	Output	Cut-off frequency	Factory calibration certificate (FCC)		
<b>2811284</b>	<b>IN03</b>	<b>OUT01</b>	<b>10K</b>	<b>NONE</b>		
2811284 ≙ MACX MCR-UI-UI	IN40 ≙ 0 ... 50 mV IN24 ≙ 0 ... 60 mV IN41 ≙ 0 ... 75 mV IN25 ≙ 0 ... 100 mV IN43 ≙ 0 ... 120 mV IN44 ≙ 0 ... 150 mV IN26 ≙ 0 ... 200 mV IN27 ≙ 0 ... 300 mV IN28 ≙ 0 ... 500 mV IN66 ≙ 0 ... 1000 mV IN29 ≙ 0 ... 1.0 V IN50 ≙ 0 ... 1.5 V IN30 ≙ 0 ... 2.0 V IN52 ≙ 0 ... 3.0 V IN05 ≙ 0 ... 5 V IN03 ≙ 0 ... 10 V IN67 ≙ 0 ... 15 V IN32 ≙ 0 ... 20 V IN39 ≙ 0 ... 30 V IN68 ≙ 0 ... 50 V IN69 ≙ 0 ... 100 V  IN06 ≙ 1 ... 5 V IN04 ≙ 2 ... 10 V	IN53 ≙ -50 ... +50 mV IN13 ≙ -60 ... +60 mV IN54 ≙ -75 ... +75 mV IN14 ≙ -100 ... +100 mV IN56 ≙ -120 ... +120 mV IN57 ≙ -150 ... +150 mV IN15 ≙ -200 ... +200 mV IN16 ≙ -300 ... +300 mV IN17 ≙ -500 ... +500 mV IN78 ≙ -1000 ... +1000 mV IN18 ≙ -1.0 ... +1.0 V IN63 ≙ -1.5 ... +1.5 V IN19 ≙ -2.0 ... +2.0 V IN65 ≙ -3.0 ... +3.0 V IN21 ≙ -5 ... +5 V IN22 ≙ -10 ... +10 V IN79 ≙ -15 ... +15 V IN23 ≙ -20 ... +20 V IN80 ≙ -30 ... +30 V IN81 ≙ -50 ... +50 V IN82 ≙ -100 ... +100 V  IN70 ≙ 0 ... 1.0 mA IN71 ≙ 0 ... 1.5 mA IN72 ≙ 0 ... 2.0 mA IN73 ≙ 0 ... 3.0 mA IN36 ≙ 0 ... 5 mA IN37 ≙ 0 ... 10 mA IN74 ≙ 0 ... 15 mA IN01 ≙ 0 ... 20 mA IN75 ≙ 0 ... 30 mA IN76 ≙ 0 ... 50 mA IN77 ≙ 0 ... 100 mA  IN83 ≙ -1.0 ... +1.0 mA IN84 ≙ -1.5 ... +1.5 mA IN85 ≙ -2.0 ... +2.0 mA IN86 ≙ -3.0 ... +3.0 mA IN33 ≙ -5 ... +5 mA IN34 ≙ -10 ... +10 mA IN87 ≙ -15 ... +15 mA IN35 ≙ -20 ... +20 mA IN88 ≙ -30 ... +30 mA IN89 ≙ -50 ... +50 mA IN90 ≙ -100 ... +100 mA  IN91 ≙ 1 ... 5 mA IN92 ≙ 2 ... 10 mA IN02 ≙ 4 ... 20 mA	OUT19 ≙ 0 ... 2.5 V OUT05 ≙ 0 ... 5 V OUT03 ≙ 0 ... 10 V  OUT20 ≙ -2.5 ... +2.5 V OUT13 ≙ -5 ... +5 V OUT14 ≙ -10 ... +10 V  OUT24 ≙ 0.5 ... +2.5 V OUT06 ≙ 1 ... 5 V OUT04 ≙ 2 ... 10 V  OUT27 ≙ 2.5 ... 0 V OUT11 ≙ 5 ... 0 V OUT09 ≙ 10 ... 0 V	OUT15 ≙ 0 ... 5 mA OUT16 ≙ 0 ... 10 mA OUT01 ≙ 0 ... 20 mA  OUT21 ≙ -5 ... +5 mA OUT22 ≙ -10 ... +10 mA OUT23 ≙ -20 ... +20 mA  OUT25 ≙ 1 ... 5 mA OUT26 ≙ 2 ... 10 mA OUT02 ≙ 4 ... 20 mA  OUT28 ≙ 5 ... 0 mA OUT29 ≙ 10 ... 0 mA OUT07 ≙ 20 ... 0 mA	30 ≙ 30 Hz 10K ≙ 10 kHz	NONE ≙ Without FCC YES ≙ With FCC (a fee is charged)  YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

Application example: Level measurement and active analog input card

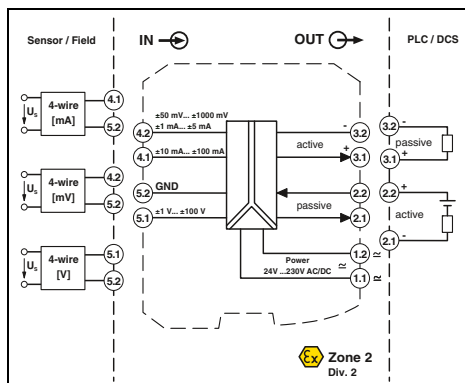
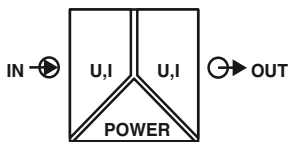


Application example: Shunt measurement and Inline terminal with passive analog input channels within an Inline station



(Information on automation solutions from Phoenix Contact can be found in Catalog 6 or at phoenixcontact.net/products)

Analog IN/Analog OUT  
3-way signal conditioner



Ex n



Universal, more than 1600 signal combinations,  
wide-range power supply

FAC DNV GL Functional Safety

Ex: Ex n

Housing width 12.5 mm



- Analog signal conditioner for isolating, filtering, amplifying, and converting standard analog signals
- Configurable input and output signals, including bipolar current and voltage signals
- 3-way electrical isolation
- Over 1600 signal conversions can be set via DIP switches on the front
- Output active or passive
- Plug-in screw or Push-in connection technology
- Wide-range power supply of 19.2 to 253 V AC/DC
- Status indicator for supply voltage
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

**Notes:**  
To order a product with an order configuration, enter the required configuration by referring to the adjacent order key.

<b>Input data</b>	Input signal (configurable using the DIP switch)
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 range
	Power dissipation
Maximum transmission error	
Temperature coefficient	
ZERO / SPAN adjustment	
Electrical isolation	Input/output/power supply
Degree of protection	
Ambient temperature (operation)	
Housing material	
Dimensions W/H/D	
Screw connection solid/stranded/AWG	
Push-in connection solid/stranded/AWG	
EMC note	
<b>Conformance/Approvals</b>	
Conformance	
ATEX	
SIL in accordance with IEC 61508	

Technical data	
<b>U input</b>	<b>I input</b>
0 ... 10 V , please indicate if different setting when ordering	0 ... 1 mA , Configurable via DIP switches
$\pm 100$ V	$\pm 100$ mA
approx. 1 M $\Omega$	approx. 10 $\Omega$
( $\pm 1$ V DC ... $\pm 100$ V DC)	( $\pm 10$ mA DC ... $\pm 100$ mA DC)
<b>U output</b>	<b>I output</b>
0 ... 10 V , Configurable via DIP switches	0 ... 20 mA , Configurable via DIP switches
15 V	35 mA
$\geq 1$ k $\Omega$ (10 V)	$\leq 600$ $\Omega$ (20 mA: active)
	passive: $\leq (U_B - 2$ V) / $I_{outmax}$
24 V ... 230 V AC/DC (-20 %/+10 % , 50/60 Hz)	
< 0.8 W (at 24 V DC / 20 mA)	
< 0.9 W (At 230 V AC / 20 mA)	
$\leq 0.1$ % (Compared to the final value)	
0.0075 %/K	
$\pm 4$ % / $\pm 4$ %	
2.5 kV (50 Hz, 1 min., test voltage)	
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))	
IP20	
-20 °C ... 70 °C	
PA 66-FR	
12.5 / 99 / 114.5 mm	
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
Class A product, see page 605	
CE-compliant	
Ex II 3 G Ex nA IIC T4 Gc	
2	

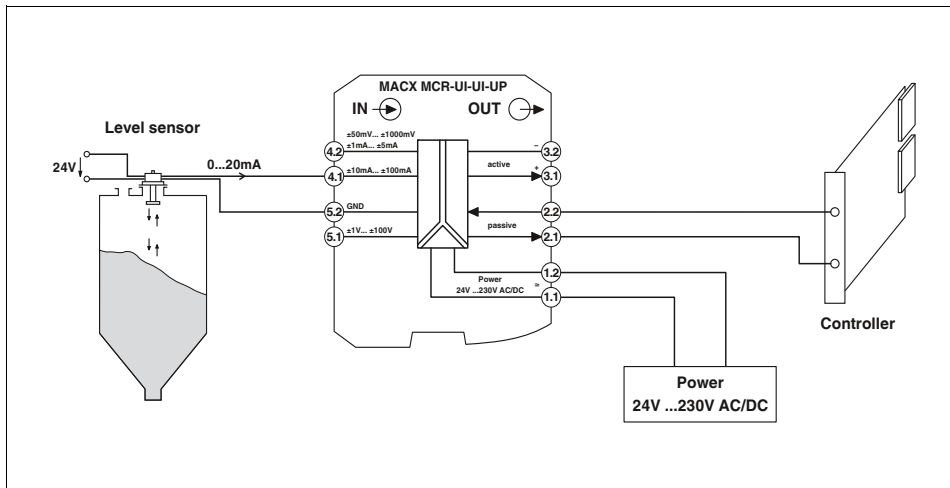
Description
<b>3-way signal conditioner</b> , for electrical isolation of analog signals with wide-range power supply
Order configuration Screw connection
Order configuration Push-in connection
Standard configuration Screw connection
Standard configuration Push-in connection

Ordering data		
Type	Order No.	Pcs./Pkt.
MACX MCR-UI-UI-UP	2811459	1
MACX MCR-UI-UI-UP-SP	2811585	1
MACX MCR-UI-UI-UP-NC	2811297	1
MACX MCR-UI-UI-UP-SP-NC	2811569	1

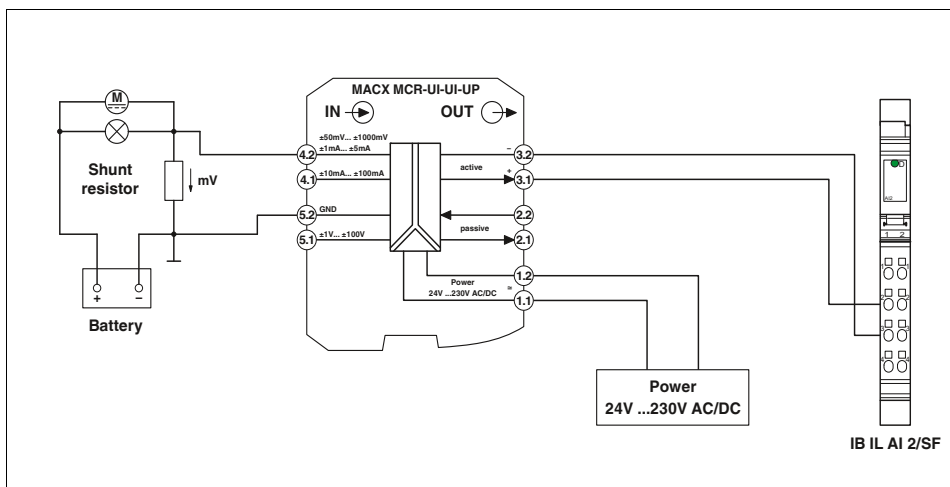
Order key for MACX MCR-UI-UI(-SP) (standard configuration entered as an example)

Order No.	Input	Output	Cut-off frequency	Factory calibration certificate (FCC)		
<b>2811459</b>	<b>IN03</b>	<b>OUT01</b>	<b>10K</b>	<b>NONE</b>		
2811459 ≙ MACX MCR-UI-UI-UP	IN40 ≙ 0 ... 50 mV IN24 ≙ 0 ... 60 mV IN41 ≙ 0 ... 75 mV IN25 ≙ 0 ... 100 mV IN43 ≙ 0 ... 120 mV IN44 ≙ 0 ... 150 mV IN26 ≙ 0 ... 200 mV IN27 ≙ 0 ... 300 mV IN28 ≙ 0 ... 500 mV IN66 ≙ 0 ... 1000 mV IN29 ≙ 0 ... 1.0 V IN50 ≙ 0 ... 1.5 V IN30 ≙ 0 ... 2.0 V IN52 ≙ 0 ... 3.0 V IN05 ≙ 0 ... 5 V IN03 ≙ 0 ... 10 V IN67 ≙ 0 ... 15 V IN32 ≙ 0 ... 20 V IN39 ≙ 0 ... 30 V IN68 ≙ 0 ... 50 V IN69 ≙ 0 ... 100 V  IN06 ≙ 1 ... 5 V IN04 ≙ 2 ... 10 V	IN53 ≙ -50 ... +50 mV IN13 ≙ -60 ... +60 mV IN54 ≙ -75 ... +75 mV IN14 ≙ -100 ... +100 mV IN56 ≙ -120 ... +120 mV IN57 ≙ -150 ... +150 mV IN15 ≙ -200 ... +200 mV IN16 ≙ -300 ... +300 mV IN17 ≙ -500 ... +500 mV IN78 ≙ -1000 ... +1000 mV IN18 ≙ -1.0 ... +1.0 V IN63 ≙ -1.5 ... +1.5 V IN19 ≙ -2.0 ... +2.0 V IN65 ≙ -3.0 ... +3.0 V IN21 ≙ -5 ... +5 V IN22 ≙ -10 ... +10 V IN79 ≙ -15 ... +15 V IN23 ≙ -20 ... +20 V IN80 ≙ -30 ... +30 V IN81 ≙ -50 ... +50 V IN82 ≙ -100 ... +100 V  IN70 ≙ 0 ... 1.0 mA IN71 ≙ 0 ... 1.5 mA IN72 ≙ 0 ... 2.0 mA IN73 ≙ 0 ... 3.0 mA IN36 ≙ 0 ... 5 mA IN37 ≙ 0 ... 10 mA IN74 ≙ 0 ... 15 mA IN01 ≙ 0 ... 20 mA IN75 ≙ 0 ... 30 mA IN76 ≙ 0 ... 50 mA IN77 ≙ 0 ... 100 mA  IN83 ≙ -1.0 ... +1.0 mA IN84 ≙ -1.5 ... +1.5 mA IN85 ≙ -2.0 ... +2.0 mA IN86 ≙ -3.0 ... +3.0 mA IN33 ≙ -5 ... +5 mA IN34 ≙ -10 ... +10 mA IN87 ≙ -15 ... +15 mA IN35 ≙ -20 ... +20 mA IN88 ≙ -30 ... +30 mA IN89 ≙ -50 ... +50 mA IN90 ≙ -100 ... +100 mA  IN91 ≙ 1 ... 5 mA IN92 ≙ 2 ... 10 mA IN02 ≙ 4 ... 20 mA	OUT19 ≙ 0 ... 2.5 V OUT05 ≙ 0 ... 5 V OUT03 ≙ 0 ... 10 V  OUT20 ≙ -2.5 ... +2.5 V OUT13 ≙ -5 ... +5 V OUT14 ≙ -10 ... +10 V  OUT24 ≙ 0.5 ... +2.5 V OUT06 ≙ 1 ... 5 V OUT04 ≙ 2 ... 10 V  OUT27 ≙ 2.5 ... 0 V OUT11 ≙ 5 ... 0 V OUT09 ≙ 10 ... 0 V	OUT15 ≙ 0 ... 5 mA OUT16 ≙ 0 ... 10 mA OUT01 ≙ 0 ... 20 mA  OUT21 ≙ -5 ... +5 mA OUT22 ≙ -10 ... +10 mA OUT23 ≙ -20 ... +20 mA  OUT25 ≙ 1 ... 5 mA OUT26 ≙ 2 ... 10 mA OUT02 ≙ 4 ... 20 mA  OUT28 ≙ 5 ... 0 mA OUT29 ≙ 10 ... 0 mA OUT07 ≙ 20 ... 0 mA	30 ≙ 30 Hz 10K ≙ 10 kHz	NONE ≙ Without FCC YES ≙ With FCC (a fee is charged)  YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

Application example: Level measurement and active analog input card

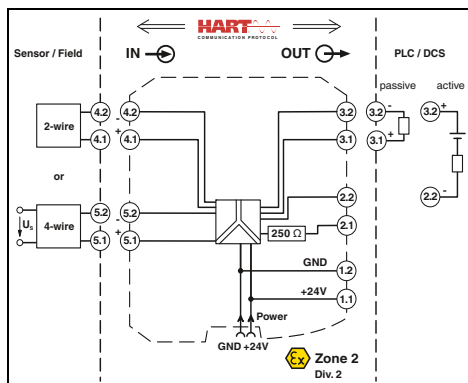
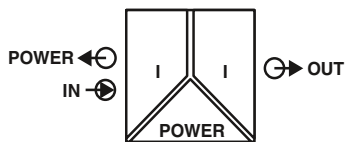


Application example: Shunt measurement and Inline terminal with analog input channels within an Inline station



(Information on automation solutions from Phoenix Contact can be found in Catalog 6 or at phoenixcontact.net/products)

Analog IN / Analog OUT  
repeater power supplies



Ex n



Repeater power supply and input signal conditioner

Functional Safety Ex

Ex: n

Housing width 12.5 mm

Technical data

Repeater power supply and input signal conditioner for the operation of 2-wire measuring transducers, 4-wire measuring transducers, and mA current sources

- 0/4 to 20 mA input (powered or not powered)
- 0/4 to 20 mA output (active or passive)
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- Terminal point with 250 Ω resistor to increase the HART impedance in the case of low-impedance systems
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

<b>Input data</b>	
Input signal	4 mA ... 20 mA
Transmitter supply voltage	> 21.5 V (20 mA)
Voltage drop	< 3.5 V (in input signal conditioner operation)
<b>Output data</b>	
Output signal	4 mA ... 20 mA (active) 4 mA ... 20 mA (14 ... 26 V ext. source voltage)
<b>Load</b>	
Output ripple	< 1000 Ω (20 mA) < 20 mV <sub>rms</sub>
<b>General data</b>	
Supply voltage range	19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Current consumption	< 76 mA (24 V DC / 20 mA / 1000 Ω) ; < 55 mA (24 V DC / 20 mA / 250 Ω)
Power dissipation	< 1.1 W (24 V DC / 20 mA) < 0.95 W (24 V DC / 20 mA / 250 Ω) < 1.2 W (24 V DC / 20 mA / 0 Ω)
Temperature coefficient	< 0.01 %/K
Step response (10-90%)	< 200 μs (for jump 4 mA ... 20 mA, load 600)
Transmission error, typical	< 0.05 % (of final value)
Maximum transmission error	< 0.1 % (of final value)
Under-/overload range	according to NE 43
Electrical isolation	
Input/output/power supply	300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20 °C ... 60 °C (Any mounting position)
Status indication	Green LED (supply voltage)
SMART communication	Yes
Signal bandwidth	as per HART specifications
Protocols supported	HART
Housing material	PA 66-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Push-in connection solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
EMC note	Class A product, see page 605
<b>Conformance/Approvals</b>	
Conformance	CE-compliant, additionally EN 61326
ATEX	Ex II 3 G Ex nA II T4 Gc X
UL, USA/Canada	UL 61010 Listed UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4

SIL in accordance with IEC 61508

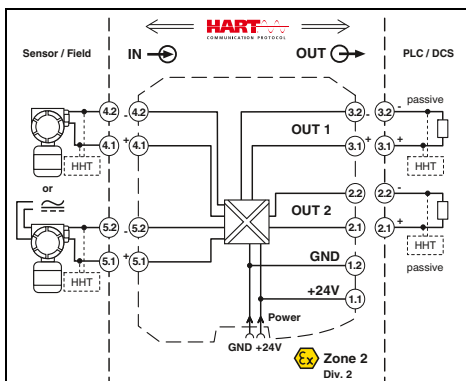
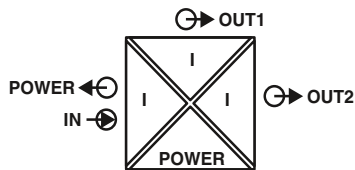
<b>Notes:</b>
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Test plugs for test sockets can be found on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

Ordering data

Description	Type	Order No.	Pcs./Pkt.	
Repeater power supply, with HART® protocol	Screw connection	MACX MCR-SL-RPSSI-I	2865955	1
	Push-in connection	MACX MCR-SL-RPSSI-I-SP	2924207	1



Analog IN / Analog OUT  
repeater power supplies



Repeater power supply and input signal conditioner, with two electrically isolated outputs

Functional Safety  
Ex: Ex n

Housing width 12.5 mm

Technical data

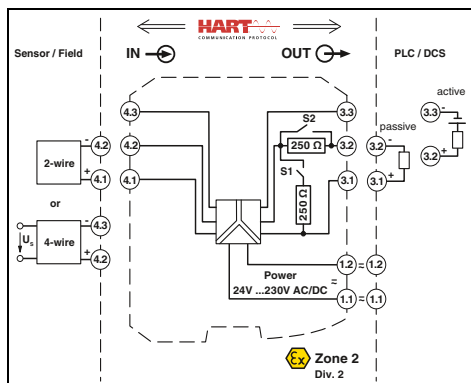
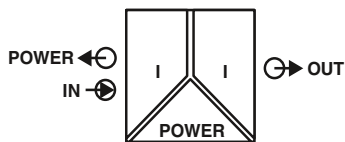
<b>Input data</b>		
Input signal		4 mA ... 20 mA / 0 mA ... 20 mA
Transmitter supply voltage		> 21.5 V (24 mA)
Voltage drop		< 3.9 V (in input signal conditioner operation)
<b>Output data</b>		
Output signal (Per output)		4 mA ... 20 mA (active) 0 mA ... 20 mA
Load		< 450 Ω (20 mA)
Output ripple		< 20 mV <sub>rms</sub>
<b>General data</b>		
Supply voltage range		19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Current consumption		< 75 mA (24 V DC / 20 mA)
Power dissipation		< 1.45 W (24 V DC / 20 mA)
Temperature coefficient		< 0.01 %/K
Step response (10-90%)		1.3 ms (for jump 4 mA ... 20 mA, typical)
Transmission error, typical		< 0.05 % (of final value)
Maximum transmission error		< 0.1 % (of final value)
Under-/overload range		according to NE 43
Electrical isolation	Input/output/power supply	300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
	Output 1/output 2	1.5 kV AC (50 Hz, 1 min., test voltage)
Ambient temperature range		-20 °C ... 60 °C (Any mounting position) -20 °C ... 70 °C (any mounting position, module distance > 5 mm, MTBF reduction factor 2.5, not assessed by UL)
Status indication		Green LED (PWR supply voltage)
SMART communication (Per output)		Yes
Protocols supported		HART
Housing material		PA 66-FR
Dimensions W/H/D		12.5 / 99 / 114.5 mm
Screw connection solid/stranded/AWG		0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Push-in connection solid/stranded/AWG		0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
EMC note		Class A product, see page 605
<b>Conformance/Approvals</b>		
Conformance		CE-compliant, additionally EN 61326-1
ATEX		Ex II 3 G Ex nA IIC T4 Gc X
SIL in accordance with IEC 61508		2

**Notes:**  
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174  
Test plugs for test sockets can be found on page 176  
Information on "Plug and play" connection using system cabling can be found from page 164

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Repeater power supply, with HART® protocol	Screw connection	MACX MCR-SL-RPSSI-2I 2924825	1
	Push-in connection	MACX MCR-SL-RPSSI-2I-SP 2924838	1

Analog IN / Analog OUT  
repeater power supplies



Ex n



IEC 61508



Repeater power supply and input signal conditioner, wide-range power supply

Functional Safety

Ex: Ex n

Housing width 17.5 mm

Technical data

Input data

Input signal  
Transmitter supply voltage  
Voltage drop

Output data

Output signal

Load

Output ripple

General data

Supply voltage range

Current consumption

Power dissipation  
Temperature coefficient  
Step response (10-90%)  
Transmission error, typical  
Maximum transmission error  
Under-/overload range  
Electrical isolation

Input/output/power supply

Ambient temperature range

Status indication

SMART communication

Signal bandwidth

Protocols supported

Housing material

Dimensions W/H/D

Screw connection solid/stranded/AWG

Push-in connection solid/stranded/AWG

EMC note

Conformance/Approvals

Conformance

ATEX

UL, USA/Canada

4 mA ... 20 mA  
> 16 V (20 mA)  
< 3.5 V (in input signal conditioner operation)

4 mA ... 20 mA (active)  
4 mA ... 20 mA (14 ... 26 V ext. source voltage)  
1 V ... 5 V (internal resistance, 250 Ω, 0.1%)  
Configurable via DIP switches  
< 600 Ω (20 mA)  
< 20 mV<sub>rms</sub>

19.2 V AC/DC ... 253 V AC/DC  
(24 V AC/DC ... 230 V AC/DC (-20 % ... +10 %, 50/60 Hz))  
< 80 mA (24 V DC / 20 mA)  
< 1.6 W (24 V DC / 20 mA)  
< 0.01 %/K  
< 600 μs (for 4 mA ... 20 mA step)  
< 0.05 % (of final value)  
< 0.1 % (of final value)  
according to NE 43

300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV (50 Hz, 1 min., test voltage)

-20 °C ... 60 °C (Any mounting position)

Green LED (supply voltage)

Yes

as per HART specifications

HART

PA 66-FR

17.5 / 99 / 114.5 mm

0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14

0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16

Class A product, see page 605

CE-compliant, additionally EN 61326-1

Ex II 3 G Ex nA IIC T4 Gc X

UL 508 Listed

UL 61010 Listed

Class I, Div. 2, Groups A, B, C, D T4

Class I, Zone 2, Group IIC T4

2

Repeater power supply and input signal conditioner for the operation of 2-wire measuring transducers, 4-wire measuring transducers, and mA current sources

- 0/4 to 20 mA input (powered or not powered)
- 0/4 to 20 mA output (active or passive), 0/1 to 5 V, can be selected via DIP switch
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- 250 Ω resistor that can be activated via DIP switches to increase the HART impedance in the case of low-impedance systems
- 3-way electrical isolation
- Wide-range power supply of 19.2 to 253 V AC/DC
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174

Test plugs for test sockets can be found on page 176

SIL in accordance with IEC 61508

Description

Repeater power supply, with HART® protocol

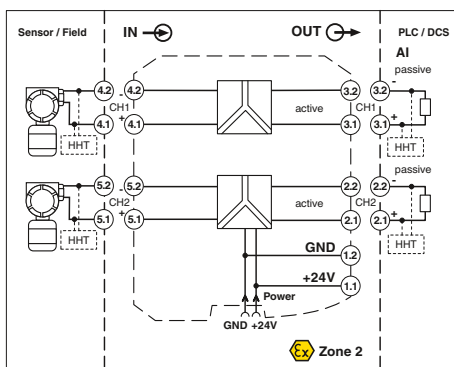
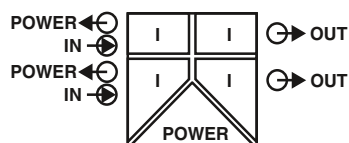
Screw connection

Push-in connection

Ordering data

Type	Order No.	Pcs./ Pkt.
MACX MCR-SL-RPSSI-I-UP	2865968	1
MACX MCR-SL-RPSSI-I-UP-SP	2924210	1

Analog IN / Analog OUT  
repeater power supplies



2-channel repeater power supply

Functional Safety  
Ex:   
Housing width 12.5 mm

Technical data

Input data		per channel	
Input signal	Transmitter supply voltage	Underload/overload signal range	per channel
Output data	Output signal	Load	Underload/overload signal range
General data		Supply voltage range	Current consumption
Ambient temperature range	Status indication	SMART communication	Signal bandwidth
Protocols supported	Housing material	Dimensions W/H/D	Screw connection solid/stranded/AWG
Push-in connection solid/stranded/AWG	EMC note	Conformance/Approvals	Conformance
ATEX	UL, USA/Canada	SIL in accordance with IEC 61508	

Repeater power supply for the operation of 2-wire measuring transducers.

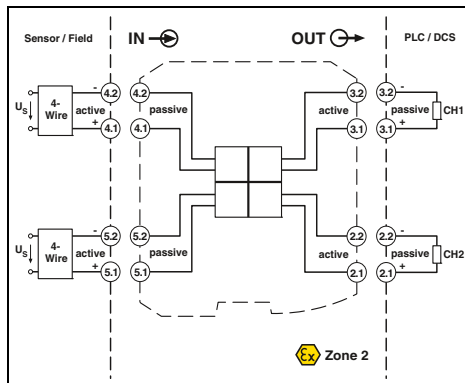
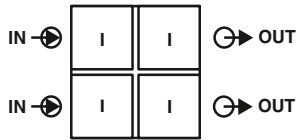
- 2-channel
- Input: 4 to 20 mA (powered)
- Output: 4 to 20 mA (active)
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- Safe 3-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 3 according to IEC 61508
- Installation in Zone 2 permitted

**Notes:**

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Test plugs for test sockets can be found on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

Ordering data		
Type	Order No.	Pcs./Pkt.
MACX MCR-SL-RPSS-2I-2I	2904089	1
MACX MCR-SL-RPSS-2I-2I-SP	2904090	1

Analog IN / Analog OUT  
passive isolators



Ex n



Ex: I, II, III

Housing width 12.5 mm



Passive isolator, single and two-channel

The single or two-channel input loop-powered 2-way isolator with increased isolation voltage and plug-in connection technology is used for the electrical isolation and filtering of analog signals.

The device allows operation on active sensor technology with a supply voltage of 6 to 30 V DC.

The device is powered via the current loop of the sensor. As a result, no additional power supply is required.

Input data

Max. voltage input signal  
Input signal  
Input voltage limitation  
Voltage dissipation  
Response current

Output data

Max. voltage output signal  
Output signal  
Residual ripple  
Transmission behavior  
Load

General data

Supply voltage range

Temperature coefficient  
Maximum transmission error  
Electrical isolation

Input/output/power supply

Ambient temperature range  
Humidity  
Degree of protection  
Inflammability class in acc. with UL 94  
Housing material  
Dimensions W/H/D  
Screw connection solid/stranded/AWG  
Push-in connection solid/stranded/AWG

Conformance/Approvals

Conformance  
ATEX  
UL, USA/Canada

SIL in accordance with IEC 61508

Technical data

< 30.5 V  
0 mA ... 20 mA / 4 mA ... 20 mA  
30.5 V  
2.9 V (I = 20 mA)  
approx. 50 µA

27.5 V  
0 mA ... 20 mA / 4 mA ... 20 mA  
< 10 mV<sub>rms</sub> (500 Ω load)  
1:1 to input signal  
≤ 1375 Ω (I = 20 mA)

no separate supply voltage necessary

≤ 0.002 %/K (of measured value / 100 Ω load)  
≤ 0.1 % (of final value)

300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV (50 Hz, 1 min., test voltage)

-40 °C ... 85 °C  
5 % ... 95 % (non-condensing)  
IP20  
V0  
PA 66  
12.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16

CE-compliant, additionally EN 61326-1  
Ex n IIC 3 G Ex nA IIC T4 Gc X  
UL 61010 Listed  
Class I, Div. 2, Groups A, B, C, D T4  
Class I, Zone 2, Group IIC T4  
3

Ordering data

Description

Passive isolator, single or two-channel

Push-in connection  
Screw connection  
Push-in connection  
Screw connection

Type

MACX MCR-SL-I-I-ILP-SP  
MACX MCR-SL-I-I-ILP  
MACX MCR-SL-2I-2I-ILP-SP  
MACX MCR-SL-2I-2I-ILP

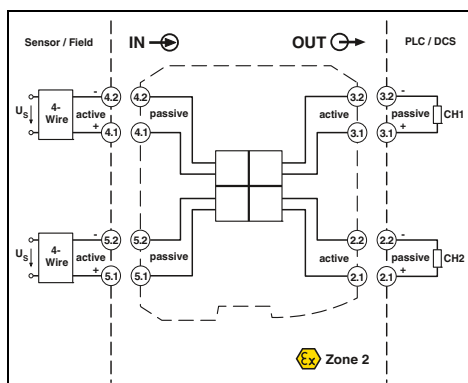
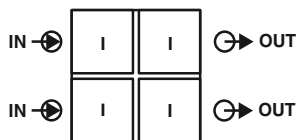
Order No.

2905279  
2905278  
2905281  
2905280

Pcs./Pkt.

1  
1  
1  
1

Analog IN / Analog OUT passive isolators



Passive isolator, single and two-channel  
5 kV test voltage



EX: us  
Housing width 12.5 mm

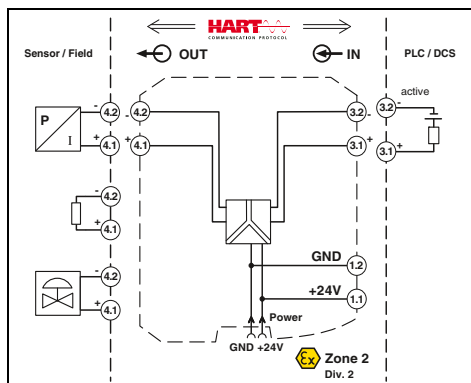
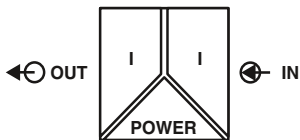
Technical data

<b>Input data</b>	Max. voltage input signal Input signal Input voltage limitation Voltage dissipation Response current	< 30.5 V 0 mA ... 20 mA / 4 mA ... 20 mA 30.5 V 2.9 V (I = 20 mA) approx. 50 µA
<b>Output data</b>	Max. voltage output signal Output signal Residual ripple Transmission behavior Load	27.5 V 0 mA ... 20 mA / 4 mA ... 20 mA < 10 mV <sub>rms</sub> (500 Ω load) 1:1 to input signal ≤ 1375 Ω (I = 20 mA)
<b>General data</b>	Supply voltage range	no separate supply voltage necessary
	Temperature coefficient Maximum transmission error Electrical isolation	≤ 0.002 %/K (of measured value / 100 Ω load) ≤ 0.1 % (of final value)
	Input/output/power supply	600 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 5 kV (50 Hz, 1 min., test voltage)
	Ambient temperature range Humidity Degree of protection Inflammability class in acc. with UL 94 Housing material Dimensions W/H/D Screw connection solid/stranded/AWG Push-in connection solid/stranded/AWG	-40 °C ... 85 °C 5 % ... 95 % (non-condensing) IP20 V0 PA 66 12.5 / 99 / 114.5 mm 0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
	<b>Conformance/Approvals</b>	CE-compliant, additionally EN 61326-1 Ex II 3 G Ex nA IIC T4 Gc X UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4 3
	SIL in accordance with IEC 61508	

Ordering data

Description	Type	Order No.	Pcs./Pkt.
<b>Passive isolator, single or two-channel</b>	Push-in connection	<b>MACX MCR-SL-I-I-HV-ILP-SP</b>	1
	Screw connection	<b>MACX MCR-SL-I-I-HV-ILP</b>	1
	Push-in connection	<b>MACX MCR-SL-2I-2I-HV-ILP-SP</b>	1
	Screw connection	<b>MACX MCR-SL-2I-2I-HV-ILP</b>	1

Analog OUT  
Output signal conditioner



Ex n



Ex n  
SIL IEC 61508

Ex n  
SIL IEC 61508

Housing width 12.5 mm

Output signal conditioner for controlling I/P transducers, control valves, and displays

- 0/4 to 20 mA input
- 0/4 to 20 mA output
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- Line fault detection (LF)
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Notes:
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Test plugs for test sockets can be found on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

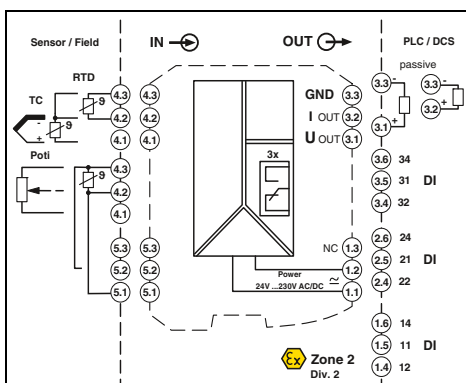
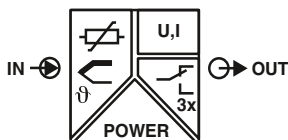
Input data
Input signal
Input voltage
Input impedance in the event of a cable break at the output
Output data
Output signal
Load
Output ripple
General data
Supply voltage range
Current consumption
Power dissipation
Temperature coefficient
Step response (10-90%)
Maximum transmission error
Electrical isolation
Input/output/power supply
Ambient temperature range
Humidity
SMART communication
Signal bandwidth
Protocols supported
Inflammability class in acc. with UL 94
Housing material
Dimensions W/H/D
Screw connection solid/stranded/AWG
Push-in connection solid/stranded/AWG
EMC note
Conformance/Approvals
Conformance
ATEX
UL, USA/Canada
SIL in accordance with IEC 61508

Technical data		
0 mA ... 20 mA / 4 mA ... 20 mA	5.4 V (at 20 mA)	> 100 kΩ (if there is a line fault)
0 mA ... 20 mA / 4 mA ... 20 mA	< 800 Ω (20 mA)	< 20 mV <sub>rms</sub>
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)	< 46 mW (24 V DC / 20 mA)	< 1.1 W (24 V DC / 20 mA)
< 0.01 %/K	< 140 μs (for 4 mA ... 20 mA step)	< 0.1 % (of final value)
1.5 kV (50 Hz, 1 min., test voltage)	300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II, degree of pollution 2))	-20 °C ... 60 °C (Any mounting position)
Yes	as per HART specifications	HART
Yes	as per HART specifications	V0
12.5 / 99 / 114.5 mm	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Class A product, see page 605	CE-compliant, additionally EN 61326-1	Ex n I 3 G Ex nA IIC T4 Gc X
	UL 508 Listed	UL 61010 Listed
	Class I, Div. 2, Groups A, B, C, D T4	Class I, Zone 2, Group IIC T4
	2	

Description
Output signal conditioner
Screw connection
Push-in connection

Ordering data		
Type	Order No.	Pcs./ Pkt.
MACX MCR-SL-IDSI-I	2865971	1
MACX MCR-SL-IDSI-I-SP	2924223	1

Temperature  
Temperature transducer



Universal, with three limit value relays,  
wide-range power supply

Functional Safety

Ex: Ex n

Housing width 35 mm

Technical data

Input data

Resistance thermometers  
Thermocouple sensors

Resistor  
Potentiometer  
Voltage

Output data

Output signal  
Maximum output signal  
Load  $R_B$   
Behavior in the event of a sensor error

Switching output

Contact type  
Contact material  
Max. switching voltage  
Maximum switching current

General data

Supply voltage range  
Power consumption  
Temperature coefficient  
Maximum transmission error  
Electrical isolation

Input/output/power supply

Input/output  
Input/power supply  
Input/switching output

Ambient temperature range  
Humidity  
Inflammability class in acc. with UL 94  
Housing material  
Dimensions W/H/D  
Screw connection solid/stranded/AWG  
Push-in connection solid/stranded/AWG  
EMC note

Conformance/Approvals

Conformance  
ATEX  
IECEX  
UL, USA/Canada

SIL in accordance with IEC 61508

Pt, Ni, Cu sensors: 2, 3, 4-wire  
B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG

0  $\Omega$  ... 50 k $\Omega$   
0  $\Omega$  ... 50 k $\Omega$   
-1000 mV ... 1000 mV

U output  
0 mA ... 20 mA  $\pm$ 10 V (in the case of SIL; further free configuration without SIL)

I output  
 $\pm$  11 V  
 $\geq$  10 k $\Omega$   
22 mA  
 $\leq$  600  $\Omega$  (at 20 mA)  
according to NE 43 or freely configurable

Relay output  
3 PDTs  
AgSnO<sub>2</sub>, hard gold-plated  
250 V AC (250 V DC)  
2 A (250 V AC) / 2 A (28 V DC)

24 V ... 230 V AC/DC (-20 %/+10 %, 50/60 Hz)  
< 2.4 W  
0.01 %/K  
0.1 % (e.g. for Pt 100, 300 K span, 4 ... 20 mA)

300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV (50 Hz, 1 min., test voltage)

375 V (Peak value in accordance with EN 60079-11)  
375 V (Peak value in accordance with EN 60079-11)  
375 V (Peak value in accordance with EN 60079-11)

-20 °C ... 65 °C  
typ. 5 % ... 95 % (non-condensing)  
V0  
PA 66-FR  
35 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

CE-compliant  
Ex II 3 G Ex nA nC ic IIC T4 Gc X  
Ex nA nC ic IIC T4 Gc X  
UL 508 Listed  
Class I, Div. 2, Groups A, B, C, D T6  
Class I, Zone 2, Group IIC T6  
2

Ordering data

Type	Order No.	Pcs./Pkt.
MACX MCR-T-UIREL-UP	2811378	1
MACX MCR-T-UIREL-UP-SP	2811828	1

Accessories

IFS-USB-PROG-ADAPTER	2811271	1
MACX MCR-CJC	2924993	1

Universal temperature transducer with  
freely configurable properties

- Input for resistance thermometers, thermocouples, resistance-type sensors, potentiometers, and mV sources
- Measure differential temperatures
- Freely programmable input and output
- Option of inverse output signal ranges
- Three limit value relays, can be used in combination as a safe limit value relay
- Configuration via software (FDT/DTM) or IFS-OP-UNIT operator interface and display unit
- Programming during operation and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in screw or Push-in connection technology
- Cold junction compensation with separate connector
- Wide-range power supply of 19.2 to 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Notes:

The configuration software can be downloaded from the Internet (phoenixcontact.net/products).

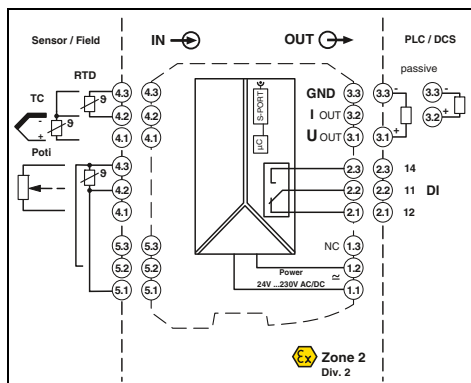
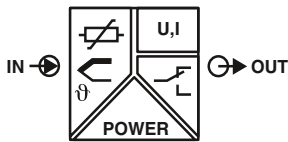
Information on the IFS-OP-UNIT operating and display unit and the associated IFS-OP-CRADLE DIN rail cradle can be found on page 171

For information on the programming adapter, refer to page 172

Description	
Temperature transducer	
Standard configuration	Screw connection
Standard configuration	Push-in connection

Programming adapter for configuring modules with S-PORT interface	
Cold junction compensation connector for thermocouples	

Temperature  
Temperature transducer



Universal, with switching output, wide-range power supply

Functional Safety  
Ex: Ex n  
Housing width 17.5 mm

Universal temperature transducer with freely configurable properties

- Input for resistance thermometers, thermocouples, resistance-type sensors, potentiometers, and mV sources
- Measure differential temperatures
- Freely programmable input and output
- Option of inverse output signal ranges
- Relay switching output
- Configuration via software (FDT/DTM) or IFS-OP-UNIT operator interface and display unit
- Programming during operation and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in screw or Push-in connection technology
- Cold junction compensation with separate connector
- Wide-range power supply of 19.2 to 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

<b>Notes:</b>
To order a product with an order configuration, enter the required configuration by referring to the adjacent order key.
The configuration software can be downloaded from the Internet ( <a href="http://phoenixcontact.net/products">phoenixcontact.net/products</a> ).
Information on the IFS-OP-UNIT operating and display unit and the associated IFS-OP-CRADLE DIN rail cradle can be found on page 171
For information on the programming adapter, refer to page 172

<b>Input data</b>	
Resistance thermometers Thermocouple sensors	
Resistor Potentiometer Voltage	
<b>Output data</b>	
Output signal	
Maximum output signal Load $R_B$ Behavior in the event of a sensor error	
<b>Switching output</b>	
Contact type Contact material Max. switching voltage Maximum switching current	
<b>General data</b>	
Supply voltage range Power consumption Temperature coefficient Transmission error, total Electrical isolation	
<b>Input/output/power supply</b>	
Input/output	375 V (Peak value in accordance with EN 60079-11)
Input/power supply	375 V (Peak value in accordance with EN 60079-11)
Input/switching output	375 V (Peak value in accordance with EN 60079-11)
Ambient temperature range Humidity Inflammability class in acc. with UL 94 Housing material Dimensions W/H/D Screw connection solid/stranded/AWG Push-in connection solid/stranded/AWG EMC note	
<b>Conformance/Approvals</b>	
Conformance ATEX IECEX SIL in accordance with IEC 61508	

**Technical data**

Pt, Ni, Cu sensors: 2, 3, 4-wire B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG	
0 Ω ... 50 kΩ 0 Ω ... 50 kΩ -1000 mV ... 1000 mV	
U output	I output
0 mA ... 20 mA ±10 V (in the case of SIL; further free configuration without SIL)	
± 11 V	22 mA
≥ 10 kΩ	≤ 600 Ω (20 mA)
according to NE 43 or freely configurable	
<b>Relay output</b>	
1 PDT AgSnO <sub>2</sub> , hard gold-plated 30 V AC (30 V DC) 0.5 A (30 V AC) / 1 A (30 V DC)	
24 V ... 230 V AC/DC (-20 %/+10 %, 50/60 Hz) < 1.5 W 0.01 %/K < 0.1 % (e.g., for Pt 100, 300 K span, 4 ... 20 mA)	
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)	
375 V (Peak value in accordance with EN 60079-11)	
375 V (Peak value in accordance with EN 60079-11)	
375 V (Peak value in accordance with EN 60079-11)	
-20 °C ... 65 °C typ. 5 % ... 95 % (non-condensing) V0 PA 66-FR 17.5 / 99 / 114.5 mm 0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16 Class A product, see page 605	
CE-compliant Ex II 3 G Ex nA nC ic IIC T4 Gc X Ex nA nC ic IIC T4 Gc X 2	

**Ordering data**

Type	Order No.	Pcs./Pkt.
MACX MCR-T-UI-UP	2811394	1
MACX MCR-T-UI-UP-SP	2811860	1
MACX MCR-T-UI-UP-C	2811873	1
MACX MCR-T-UI-UP-SP-C	2811970	1

**Accessories**

IFS-USB-PROG-ADAPTER	2811271	1
MACX MCR-CJC	2924993	1

<b>Description</b>	
<b>Temperature transducer</b>	
Standard configuration	Screw connection
Standard configuration	Push-in connection
Order configuration	Screw connection
Order configuration	Push-in connection
<b>Programming adapter for configuring modules with S-PORT interface</b>	
<b>Cold junction compensation connector for thermocouples</b>	



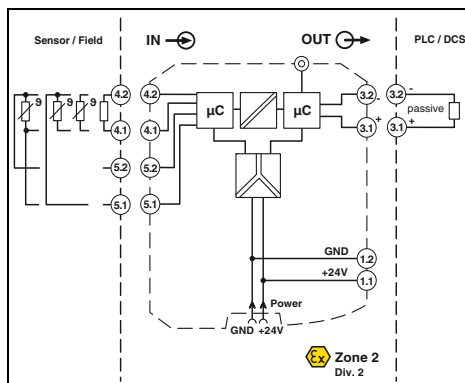
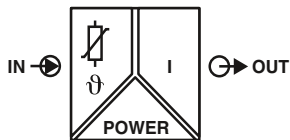
Signal conditioners with SIL functional safety – MACX Analog

Order key for MACX MCR-T-UI-UP(-SP)-C temperature transducers (standard configuration entered as an example)

Order No.	Safety Integrity Level (SIL)	Sensor type	Connection technology	Cold junction compensation	Measuring range:		Measuring unit	Output range	Factory calibration certificate = FCC
					Start	End			
<b>2811873</b>	<b>ON</b>	<b>PT100</b>	<b>4</b>	<b>0</b>	<b>-50</b>	<b>150</b>	<b>C</b>	<b>OUT02</b>	<b>NONE</b>
2811873 ≙ MACX MCR-T-UI-UP-C	ON ≙ Active NONE ≙ Not active	See below	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	0 ≙ Off, e.g., with RTD, R, potentiometer, mV 1 ≙ On, e.g., with TC	See below	See below	C ≙ °C F ≙ °F Ω ≙ Ω P ≙ % V ≙ mV	OUT15 ≙ 0 ... 5 mA OUT16 ≙ 0 ... 10 mA OUT01 ≙ 0 ... 20 mA OUT15 ≙ 0 ... 5 mA OUT25 ≙ 1 ... 5 mA OUT26 ≙ 2 ... 10 mA OUT02 ≙ 4 ... 20 mA OUT05 ≙ 0 ... 5 V OUT03 ≙ 0 ... 10 V OUT06 ≙ 1 ... 5 V OUT04 ≙ 2 ... 10 V OUT13 ≙ -5 ... +5 V OUT14 ≙ -10 ... +10 V Others can be freely configured in the software	NONE ≙ Without FCC Yes ≙ With FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)
2811970 ≙ MACX MCR-T-UI-UP-SP-C	ON only with output range = OUT02								
<b>Resistance thermometers (RTD)</b> Others can be selected or freely configured in the software.									
PT100 ≙ Pt 100 according to IEC 751					-200	850	°C	20 K	<b>Other setting options can be configured with the IFS-CONF software:</b> - Freely configurable user characteristic curve with 30 interpolation points - Output behavior in the event of a short circuit, sensor break or overrange/underrange can be freely configured or set according to NE43 (standard configuration: NE43 upscale) - Filter setting (standard configuration: 1) - Restart after failsafe (standard configuration: ON) - Switching behavior: switching output (limit values, times, etc.) (standard configuration: OFF)
PT200 ≙ Pt 200 according to IEC 751					-200	850	°C	20 K	
PT500 ≙ Pt 500 according to IEC 751					-200	850	°C	20 K	
PT1000 ≙ Pt 1000 according to IEC 751					-200	850	°C	20 K	
PT100S ≙ Pt 100 according to Sama RC21-4-1966					-200	850	°C	20 K	
PT1000S ≙ Pt 1000 according to Sama RC21-4-1966					-200	850	°C	20 K	
PT100G ≙ Pt 100 according to GOST 6651-2009 (α = 0.00385)					-200	850	°C	20 K	
PT1000G ≙ Pt 1000 according to GOST 6651-2009 (α = 0.00385)					-200	850	°C	20 K	
PT100J ≙ Pt 100 according to JIS C1604/1997					-200	850	°C	20 K	
PT1000J ≙ Pt 1000 according to JIS C1604/1997					-200	850	°C	20 K	
NI100 ≙ Ni 100 according to DIN 43760/DIN IEC 60751					-60	250	°C	20 K	
NI1000 ≙ Ni 1000 according to DIN 43760/DIN IEC 60751					-60	250	°C	20 K	
NI100S ≙ Ni 100 according to Sama RC21-4-1966					-60	180	°C	20 K	
NI1000S ≙ Ni 1000 according to Sama RC21-4-1966					-60	180	°C	20 K	
NI1000L ≙ Ni 1000 (Landis & Gyr)					-50	160	°C	20 K	
CU10 ≙ Cu 10 according to Sama RC21-4-1966					-70	500	°C	100 K	
CU50 ≙ Cu50 according to GOST 6651-2009 (α = 0.00428)					-50	200	°C	100 K	
CU100 ≙ Cu100 according to GOST 6651-2009 (α = 0.00428)					-50	200	°C	100 K	
CU53 ≙ Cu53 according to GOST 6651-2009 (α = 0.00426)					-50	180	°C	100 K	
KTY81 ≙ KTY81-110 (Philips)					-55	150	°C	20 K	
KTY84 ≙ KTY84-130 (Philips)					-40	300	°C	20 K	
<b>Thermocouples (TC)</b> Others can be selected in the software.									
B ≙ according to IEC 584-1 (Pt30Rh-Pt6Rh)					500	1820	°C	50 K	
E ≙ according to IEC 584-1 (NiCr-CuNi)					-230	1000	°C	50 K	
J ≙ according to IEC 584-1 (Fe-CuNi)					-210	1200	°C	50 K	
K ≙ according to IEC 584-1 (NiCr-Ni)					-250	1372	°C	50 K	
N ≙ according to IEC 584-1 (NiCrSi-NiSi)					-250	1300	°C	50 K	
R ≙ according to IEC 584-1 (Pt13Rh-Pt)					-50	1768	°C	50 K	
S ≙ according to IEC 584-1 (Pt10Rh-Pt)					-50	1768	°C	50 K	
T ≙ according to IEC 584-1 (Cu-CuNi)					-200	400	°C	50 K	
L ≙ according to DIN 43760 (Fe-CuNi)					-200	900	°C	50 K	
U ≙ according to DIN 43760 (Cu-CuNi)					-200	600	°C	50 K	
CA ≙ C ASTM JE988 (2002)					0	2315	°C	50 K	
DA ≙ D ASTM JE988 (2002)					0	2315	°C	50 K	
A1G ≙ A-1 GOST 8.585-2001					0	2500	°C	50 K	
A2G ≙ A-2 GOST 8.585-2001					0	1800	°C	50 K	
A3G ≙ A-3 GOST 8.585-2001					0	1800	°C	50 K	
MG ≙ M GOST 8.585-2001					-200	100	°C	50 K	
LG ≙ L GOST 8.585-2001					-200	800	°C	50 K	
<b>Remote resistance-type sensors (R) (2-, 3-, 4-conductor)</b> Others can be selected in the software.									
RES03 ≙ Resistance 0 ... 150 Ω					0	150	Ω	10% of the selected measuring range	
RES05 ≙ Resistance 0 ... 600 Ω					0	600	Ω		
RES06 ≙ Resistance 0 ... 1200 Ω					0	1200	Ω		
RES09 ≙ Resistance 0 ... 6250 Ω					0	6250	Ω		
RES10 ≙ Resistance 0 ... 12,500 Ω					0	12,500	Ω		
RES12 ≙ Resistance 0 ... 50,000 Ω					0	50,000	Ω		
<b>Potentiometers (3-conductor)</b> Others can be selected in the software.									
POT03 ≙ Potentiometer 0 ... 150 Ω					0	100	%	10% of the selected measuring range	
POT05 ≙ Potentiometer 0 ... 600 Ω					0	100	%		
POT06 ≙ Potentiometer 0 ... 1200 Ω					0	100	%		
POT09 ≙ Potentiometer 0 ... 6250 Ω					0	100	%		
POT10 ≙ Potentiometer 0 ... 12,500 Ω					0	100	%		
POT12 ≙ Potentiometer 0 ... 50,000 Ω					0	100	%		
<b>Voltage signals (mV)</b> Others can be selected in the software.									
V04 ≙ Voltage (mV)					-1000	+1000	mV	10% of nominal span	

Temperature conversion guide for °C to °F:  $T [°F] = \frac{9}{5} T [°C] + 32$

Temperature  
Temperature transducer



Ex n



For resistance thermometers and resistance-type sensors

DNV GL  
Ex:   
Housing width 12.5 mm

Programmable temperature transducer for operating resistance thermometers and resistance-type sensors. The measured values are converted into a linear 0 to 20 mA or 4 to 20 mA signal.

- Input for resistance thermometers and resistance-type sensors
- 0 to 20 mA or 4 to 20 mA output
- Configuration via software (FDT/DTM): Sensor type, connection method, measuring range, measuring unit, filter, alarm signal, and output range
- Programming during operation and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Status indicator for supply voltage, cable, sensor, and module errors
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Installation in Zone 2 permitted

Input data

Resistance thermometers  
Resistor  
Cable resistance  
Sensor input current  
Measuring range span

Output data

Output signal  
Load  
Behavior in the event of a sensor error  
Output ripple

General data

Supply voltage range  
Current consumption  
Power dissipation  
Temperature coefficient  
Step response (0–99%)

Transmission error, total  
ZERO / SPAN adjustment  
Electrical isolation

Input/output/power supply

Input/output  
Input/power supply

Ambient temperature range  
Humidity  
Inflammability class in acc. with UL 94  
Housing material  
Dimensions W/H/D  
Screw connection solid/stranded/AWG  
Push-in connection solid/stranded/AWG  
EMC note

Conformance/Approvals

Conformance  
ATEX  
UL, USA/Canada

Technical data

Pt, Ni, Cu sensors: 2, 3, 4-wire  
0 Ω ... 2000 Ω  
50 Ω per line  
200 µA ... 1 mA  
> 50 K

0 mA ... 20 mA / 4 mA ... 20 mA  
≤ 500 Ω  
As per NE 43 or can be freely defined  
< 50 µA<sub>PP</sub>

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)  
< 40 mA (24 V DC)  
< 1 W  
0.01 %/K  
typ. 700 ms  
≤ 1100 ms  
0.1 % x 1000 [K]/measuring span  
± 5 % / ± 5 %

2.5 kV (50 Hz, 1 min., test voltage)  
300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))

375 V (Peak value in accordance with EN 60079-11)  
375 V (Peak value in accordance with EN 60079-11)  
-20 °C ... 60 °C (Any mounting position)  
5 % ... 95 % (non-condensing)  
V0  
PA 66-FR  
12.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

CE-compliant, additionally EN 61326-1

II 3G Ex nA ic IIC T4 Gc X  
UL 508 Listed  
UL 61010 Listed  
Class I, Div. 2, Groups A, B, C, D T4  
Class I, Zone 2, Group IIC T4

Ordering data

Type	Order No.	Pcs./ Pkt.
MACX MCR-SL-RTD-I	2865065	1
MACX MCR-SL-RTD-I-SP	2924317	1
MACX MCR-SL-RTD-I-NC	2865078	1
MACX MCR-SL-RTD-I-SP-NC	2924320	1

Accessories

IFS-USB-PROG-ADAPTER	2811271	1
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Notes:

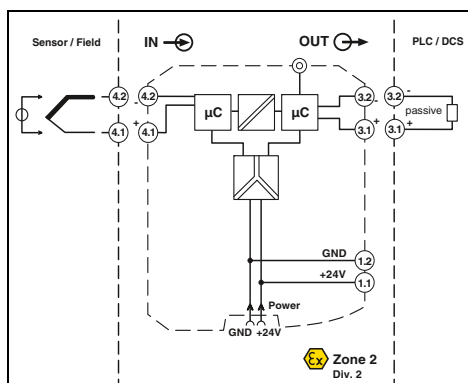
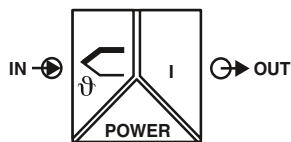
- To order a product with an order configuration, please enter the desired configuration by referring to the order key provided online (phoenixcontact.net/products).
- The configuration software can be downloaded from the Internet (phoenixcontact.net/products).
- Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
- For information on the programming adapter, refer to page 172
- Test plugs for test sockets can be found on page 176
- Information on "Plug and play" connection using system cabling can be found from page 164

Description

Temperature transducer	
Order configuration	Screw connection
Order configuration	Push-in connection
Standard configuration	Screw connection
Standard configuration	Push-in connection

Programming adapter for configuring modules with S-PORT interface

Temperature  
Temperature transducer



Ex n



For thermocouples and mV sources

DNV GL

Ex:

Housing width 12.5 mm

Programmable temperature transducer for operating thermocouples and mV sources. The measured values are converted into a linear 0 to 20 mA or 4 to 20 mA signal.

- Input for thermocouples and mV sources
- 0 to 20 mA or 4 to 20 mA output
- Configuration via software (FDT/DTM):  
Sensor type, connection method, measuring range, measuring unit, filter, alarm signal, and output range
- Programming during operation and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Status indicator for supply voltage, cable, sensor, and module errors
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Installation in Zone 2 permitted

Input data

Thermocouple sensors

Voltage  
Measuring range span

Output data

Output signal  
Load  
Behavior in the event of a sensor error  
Output ripple

General data

Supply voltage range  
Current consumption  
Power dissipation  
Temperature coefficient  
Step response (0–99%)

Transmission error, total  
Cold junction errors  
ZERO / SPAN adjustment  
Electrical isolation

Input/output/power supply

Ambient temperature range  
Humidity  
Inflammability class in acc. with UL 94  
Housing material  
Dimensions W/H/D  
Screw connection solid/stranded/AWG  
EMC note

Conformance/Approvals

Conformance  
ATEX  
UL, USA/Canada

Description

Temperature transducer

Order configuration      Screw connection  
Standard configuration      Screw connection

Programming adapter for configuring modules with S-PORT interface

Technical data

E, J, K, N as per IEC / EN 60584, L as per DIN 43760

-20 mV ... 70 mV  
Min. 50 K for thermocouples, 3 mV for mV sources

0 mA ... 20 mA / 4 mA ... 20 mA  
max. 500 Ω  
As per NE 43 or can be freely defined  
< 50 µA<sub>pp</sub>

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)  
< 40 mA (24 V DC)  
< 1 W  
0.01 %/K  
typ. 700 ms  
≤ 1100 ms  
0.1 % x 600 [K]/measuring span; 0.1 % > 600 [K]  
± 1 K  
± 5 % / ± 5 %

300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV (50 Hz, 1 min., test voltage)

Input/output      375 V (Peak value in accordance with EN 60079-11)  
Input/power supply      375 V (Peak value in accordance with EN 60079-11)  
-20 °C ... 60 °C (Any mounting position)  
5 % ... 95 % (non-condensing)  
V0  
PA 66-FR  
12.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
Class A product, see page 605

CE-compliant, additionally EN 61326-1  
 II 3G Ex nA ic IIC T4 Gc X  
UL 508 Listed  
UL 61010 Listed  
Class I, Div. 2, Groups A, B, C, D T4  
Class I, Zone 2, Group IIC T4

Ordering data

Type	Order No.	Pcs./Pkt.
MACX MCR-SL-TC-I	2924333	1
MACX MCR-SL-TC-I-NC	2924346	1

Accessories

IFS-USB-PROG-ADAPTER	2811271	1
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**Notes:**

To order a product with an order configuration, please enter the desired configuration by referring to the order key provided online (phoenixcontact.net/products).

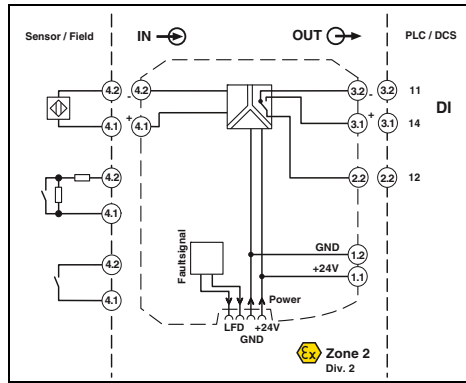
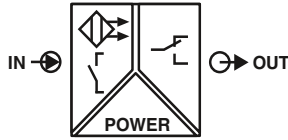
The configuration software can be downloaded from the Internet (phoenixcontact.net/products).

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174

For information on the programming adapter, refer to page 172

Information on "Plug and play" connection using system cabling can be found from page 164

Digital IN  
NAMUR signal conditioners



Ex n



Signal output: PDT relay

Ex n IEC 61508

Ex: Ex n

Housing width 12.5 mm

NAMUR signal conditioner for operating proximity sensors and mechanical contacts

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- Relay signal output (PDT)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Notes:
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Information about resistance circuits is given on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

Input data

Input signal

- No-load voltage
- Switching points
- Switching hysteresis
- Line fault detection

Switching output

- Contact type
- Contact material
- Max. switching voltage
- Maximum switching capacity
- Recommended minimum load
- Mechanical service life
- Switching behavior
- Maximum switching frequency

General data

- Supply voltage range
- Current consumption
- Power dissipation
- Electrical isolation

Input/output

Input/output/supply, DIN rail connector

Output/input, supply, DIN rail connector

Input/supply, DIN rail connector

- Ambient temperature range
- Humidity
- Inflammability class in acc. with UL 94
- Housing material
- Dimensions W/H/D
- Screw connection solid/stranded/AWG
- Push-in connection solid/stranded/AWG
- EMC note
- Conformance/Approvals
- Conformance
- ATEX
- UL, USA/Canada

SIL in accordance with IEC 61508

Technical data

NAMUR proximity sensors (EN 60947-5-6)

open circuit switch contacts

Switch contacts with resistance circuit

~ 8 V DC

> 2.1 mA (conductive) / < 1.2 mA (blocking)

< 0.2 mA

Break 0.05 mA < I<sub>IN</sub> < 0.35 mA

Short circuit 100 Ω < R<sub>Sensor</sub> < 360 Ω

Relay output

1 PDT

AgSnO<sub>2</sub>, hard gold-plated

250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)

500 VA

5 V / 10 mA

10<sup>7</sup> cycles

Can be inverted via slide switch

≤ 20 Hz (without load)

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)

21 mA (24 V DC)

< 650 mW

375 V (Peak value in accordance with EN 60079-11)

300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II);

degree of pollution 2, safe isolation as per EN 61010-1))

2.5 kV (50 Hz, 1 min., test voltage)

300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category III);

degree of pollution 2, safe isolation as per EN 61010-1))

2.5 kV (50 Hz, 1 min., test voltage)

375 V (Peak value in accordance with EN 60079-11)

-20 °C ... 60 °C (Any mounting position)

10 % ... 95 % (non-condensing)

V0

PA 66-FR

12.5 / 99 / 114.5 mm

0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14

0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16

Class A product, see page 605

CE-compliant, additionally EN 61326-1

Ex II 3 G Ex nA nC IIC T4 Gc X

UL 508 Listed

UL 61010 Listed

Class I, Div. 2, Groups A, B, C, D T4

Class I, Zone 2, Group IIC T4

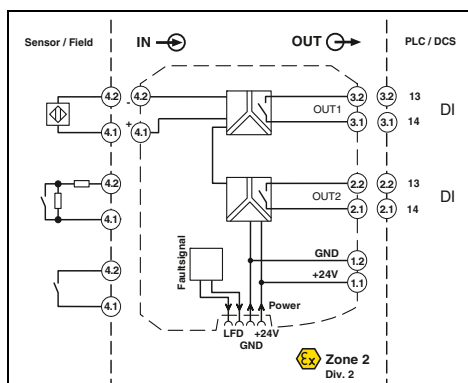
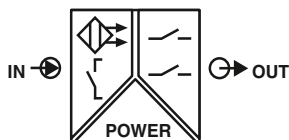
2

Ordering data

Description
NAMUR signal conditioner
Screw connection
Push-in connection

Type	Order No.	Pcs./ Pkt.
MACX MCR-SL-NAM-R	2865997	1
MACX MCR-SL-NAM-R-SP	2924252	1

Digital IN  
NAMUR signal conditioners



2 signal outputs: N/O contact relay

Ⓢ DNV GL Functional Safety

Ex: Ⓢ Ex

Housing width 12.5 mm

NAMUR signal conditioner for operating proximity sensors and mechanical contacts

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- 2 relay signal outputs (N/O contact), output 2 can also be used as an error signal output
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 4-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Input data

Input signal

- No-load voltage
- Switching points
- Switching hysteresis
- Line fault detection

Switching output

- Contact type
- Contact material
- Max. switching voltage
- Maximum switching capacity
- Recommended minimum load
- Mechanical service life
- Switching behavior
- Maximum switching frequency

General data

- Supply voltage range
- Current consumption
- Power dissipation
- Electrical isolation

Input/output

Output 1/output 2/input, power supply, DIN rail connector

- Ambient temperature range
- Humidity
- Inflammability class in acc. with UL 94
- Housing material
- Dimensions W/H/D
- Screw connection solid/stranded/AWG
- Push-in connection solid/stranded/AWG
- EMC note

Conformance/Approvals

- Conformance
- ATEX
- UL, USA/Canada

SIL in accordance with IEC 61508

Technical data

NAMUR proximity sensors (EN 60947-5-6)  
open circuit switch contacts  
Switch contacts with resistance circuit  
~ 8 V DC  
> 2.1 mA (conductive) / < 1.2 mA (blocking)  
< 0.2 mA  
Break 0.05 mA < IIN < 0.35 mA  
Short circuit 100 Ω < RSensor < 360 Ω  
Relay output  
2 N/O contacts  
AgSnO<sub>2</sub>, hard gold-plated  
250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)  
500 VA  
5 V / 10 mA  
10<sup>7</sup> cycles  
Can be inverted via slide switch  
≤ 20 Hz (without load)

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)  
30 mA (24 V DC)  
< 950 mW

375 V (Peak value in accordance with EN 60079-11)  
300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category III); degree of pollution 2, safe isolation as per EN 61010-1)

-20 °C ... 60 °C (Any mounting position)  
10 % ... 95 % (non-condensing)  
V0  
PA 66-FR  
12.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

CE-compliant, additionally EN 61326-1  
Ⓢ II 3 G Ex nA nC IIC T4 Gc X  
UL 508 Listed  
UL 61010 Listed  
Class I, Div. 2, Groups A, B, C, D T4  
Class I, Zone 2, Group IIC T4  
2

Ordering data

Description

NAMUR signal conditioner

- Screw connection
- Push-in connection

Type

MACX MCR-SL-NAM-2RO  
MACX MCR-SL-NAM-2RO-SP

Order No.

2865010  
2924265

Pcs./ Pkt.

1  
1

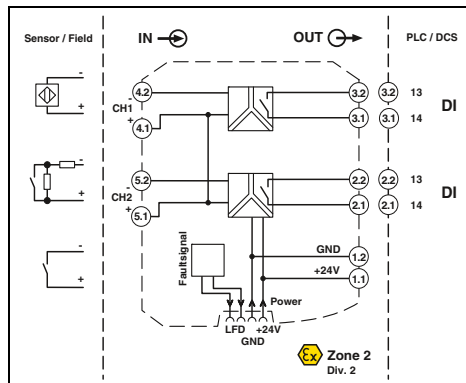
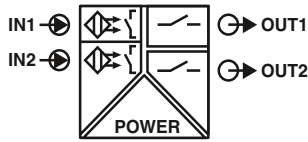
**Notes:**

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174

Information about resistance circuits is given on page 176

Information on "Plug and play" connection using system cabling can be found from page 164

Digital IN  
NAMUR signal conditioners



Ex n



SIL IEC 61508



2-channel, signal output: N/O contact relay

DNV GL Functional Safety

Ex: Ex

Housing width 12.5 mm

Technical data

NAMUR signal conditioner for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- Relay signal output (N/O contact)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Input data

Input signal

No-load voltage  
Switching points  
Switching hysteresis  
Line fault detection

Switching output

Contact type  
Contact material  
Max. switching voltage  
Maximum switching capacity  
Recommended minimum load  
Mechanical service life  
Switching behavior  
Maximum switching frequency

General data

Supply voltage range  
Current consumption  
Power dissipation  
Electrical isolation

Input/output  
Input/supply, DIN rail connector

Ambient temperature range  
Humidity  
Inflammability class in acc. with UL 94  
Housing material  
Dimensions W/H/D  
Screw connection solid/stranded/AWG  
Push-in connection solid/stranded/AWG  
EMC note

Conformance/Approvals

Conformance  
ATEX  
UL, USA/Canada

SIL in accordance with IEC 61508

NAMUR proximity sensors (EN 60947-5-6)

open circuit switch contacts  
Switch contacts with resistance circuit  
~ 8 V DC  
> 2.1 mA (conductive) / < 1.2 mA (blocking)  
< 0.2 mA  
Break 0.05 mA < IIN < 0.35 mA  
Short circuit 100 Ω < RSensor < 360 Ω

Relay output

1 N/O contact per channel  
AgSnO<sub>2</sub>, hard gold-plated  
250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)  
500 VA  
5 V / 10 mA  
10<sup>7</sup> cycles  
Can be inverted via slide switch  
≤ 20 Hz (without load)

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)  
35 mA (24 V DC)  
< 1 W

375 V (Peak value in accordance with EN 60079-11)  
375 V (Peak value in accordance with EN 60079-11)  
300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))

-20 °C ... 60 °C (Any mounting position)  
5 % ... 95 % (non-condensing)  
V0  
PA 66-FR  
12.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

CE-compliant, additionally EN 61326-1  
Ex II 3 G Ex nA nC IIC T4 Gc X  
UL 508 Listed  
UL 61010 Listed  
Class I, Div. 2, Groups A, B, C, D T4  
Class I, Zone 2, Group IIC T4  
2

Ordering data

Description

NAMUR signal conditioner

Screw connection  
Push-in connection

Type

MACX MCR-SL-2NAM-RO  
MACX MCR-SL-2NAM-RO-SP

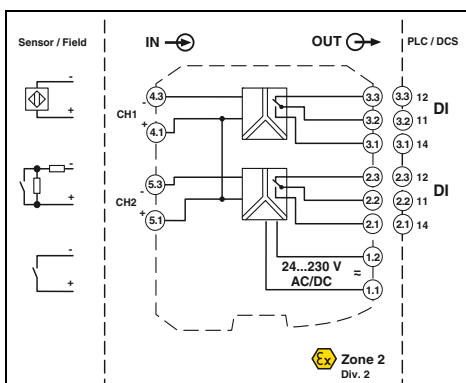
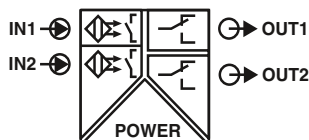
Order No.

2865049  
2924294

Pcs./ Pkt.

1  
1

Digital IN  
NAMUR signal conditioners



2-channel, signal output: PDT relay, wide-range power supply

Functional Safety

Ex: Ex n

Housing width 17.5 mm

NAMUR signal conditioner for operating proximity sensors and mechanical contacts

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- Relay signal output (PDT)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and de-excitation of the output relay
- Wide-range power supply of 19.2 to 253 V AC/DC
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Input data

Input signal

- No-load voltage
- Switching points
- Switching hysteresis
- Line fault detection

Switching output

- Contact type
- Contact material
- Max. switching voltage
- Maximum switching capacity
- Recommended minimum load
- Mechanical service life
- Switching behavior
- Maximum switching frequency

General data

Supply voltage range

- Current consumption
- Power dissipation
- Electrical isolation

Input/output  
Input/power supply

- Ambient temperature range
- Humidity
- Inflammability class in acc. with UL 94
- Housing material
- Dimensions W/H/D
- Screw connection solid/stranded/AWG
- Push-in connection solid/stranded/AWG
- EMC note

Conformance/Approvals

- Conformance
- ATEX
- UL, USA/Canada

SIL in accordance with IEC 61508

Technical data

NAMUR proximity sensors (EN 60947-5-6)  
open circuit switch contacts  
Switch contacts with resistance circuit  
~ 8 V DC  
> 2.1 mA (conductive) / < 1.2 mA (blocking)  
approx. 0.2 mA  
Break 0.05 mA < IIN < 0.35 mA  
Short circuit 100 Ω < RSensor < 360 Ω  
Relay output  
1 PDT per channel  
AgSnO<sub>2</sub>, hard gold-plated  
250 V AC (2 A, 60 Hz) / 120 V DC (0.2 A) / 30 V DC (2 A)  
500 VA  
5 V / 10 mA  
10<sup>7</sup> cycles  
can be inverted using DIP switch  
≤ 20 Hz (Load-dependent)

19.2 V AC/DC ... 253 V AC/DC  
(24 V AC/DC ... 230 V AC/DC (-20 % ... +10 %, 50/60 Hz))  
< 80 mA ; < 42 mA (24 V DC)  
≤ 1.3 W

375 V (Peak value in accordance with EN 60079-11)  
375 V (Peak value in accordance with EN 60079-11)  
300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV AC (50 Hz, 1 min., test voltage)

-20 °C ... 60 °C  
10 % ... 95 % (non-condensing)  
V0  
PA 66-FR  
17.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

CE-compliant, additionally EN 61326-1  
Ex II 3 G Ex nA nC IIC T4 Gc X  
UL 508 Listed  
UL 61010 Listed  
Class I, Div. 2, Groups A, B, C, D T4  
Class I, Zone 2, Group IIC T4  
2

Notes:

Information on resistance circuits and marking material can be found on page 176

Description

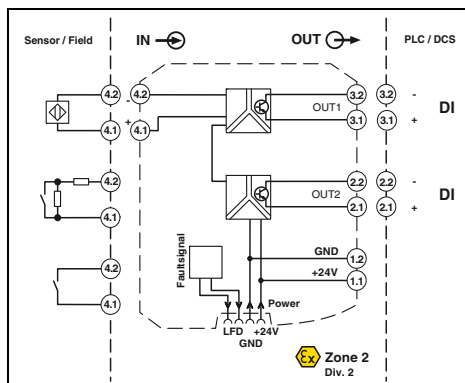
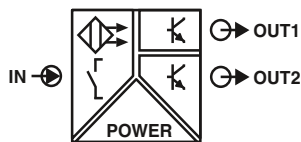
NAMUR signal conditioner

Screw connection  
Push-in connection

Ordering data

Type	Order No.	Pcs./Pkt.
MACX MCR-SL-2NAM-R-UP	2865052	1
MACX MCR-SL-2NAM-R-UP-SP	2924304	1

Digital IN  
NAMUR signal conditioners



Ex n



2 signal outputs: transistor (passive)

DNV GL Functional Safety

Ex: Ex n

Housing width 12.5 mm

NAMUR signal conditioner for operating proximity sensors and mechanical contacts

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- 2 signal outputs transistor (passive), up to 5 kHz
- Signal output 2 can also be used as a fault signaling output
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and blocking the transistor output
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 4-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Notes:
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Information about resistance circuits is given on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

Input data

Input signal

No-load voltage  
Switching points  
Line fault detection

Switching output

Max. switching voltage  
Maximum switching current  
Drop (ΔU)  
Switching behavior  
Maximum switching frequency

General data

Supply voltage range  
Current consumption  
Power dissipation  
Electrical isolation

Input/output

Input/output/supply, DIN rail connector

Input/supply, DIN rail connector

Output 1/output 2

Ambient temperature range  
Humidity  
Inflammability class in acc. with UL 94  
Housing material  
Dimensions W/H/D  
Screw connection solid/stranded/AWG  
Push-in connection solid/stranded/AWG  
EMC note

Conformance/Approvals

Conformance  
ATEX  
UL, USA/Canada

SIL in accordance with IEC 61508

Technical data

NAMUR proximity sensors (EN 60947-5-6)  
open circuit switch contacts  
Switch contacts with resistance circuit  
~ 8 V DC  
> 2.1 mA (conductive) / < 1.2 mA (blocking)  
Break 0.05 mA < I<sub>IN</sub> < 0.35 mA  
Short circuit 100 Ω < R<sub>Sensor</sub> < 360 Ω  
2 transistor outputs, passive

30 V DC  
50 mA (short-circuit-proof)  
< 1.4 V  
can be inverted using DIP switch  
≤ 5 kHz

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)  
< 28 mA (24 V DC)  
≤ 800 mW

375 V (Peak value in accordance with EN 60079-11)  
300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV (50 Hz, 1 min., test voltage)

375 V (Peak value in accordance with EN 60079-11)  
50 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, basic insulation as per EN 61010-1))  
1 kV (50 Hz, 1 min., test voltage)

-20 °C ... 60 °C (Any mounting position)  
10 % ... 95 % (non-condensing)  
V0  
PA 66-FR  
12.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

CE-compliant, additionally EN 61326-1  
Ex II 3 G Ex nA IIC T4 Gc X  
UL 508 Listed  
UL 61010 Listed  
Class I, Div. 2, Groups A, B, C, D T4  
Class I, Zone 2, Group IIC T4  
2

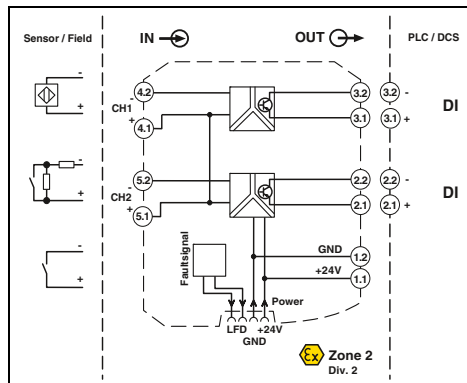
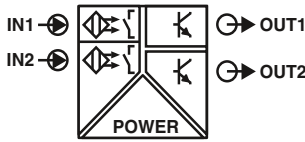
Ordering data

Description
NAMUR signal conditioner
Screw connection
Push-in connection

Type	Order No.	Pcs./ Pkt.
MACX MCR-SL-NAM-2T	2865023	1
MACX MCR-SL-NAM-2T-SP	2924278	1



Digital IN  
NAMUR signal conditioners



2-channel, signal output: transistor (passive)

Ⓢ DNV GL Functional Safety

Ex: Ⓢ Ex

Housing width 12.5 mm

Technical data

NAMUR proximity sensors (EN 60947-5-6)

open circuit switch contacts

Switch contacts with resistance circuit

~ 8 V DC

> 2.1 mA (conductive) / < 1.2 mA (blocking)

Break 0.05 mA < I<sub>IN</sub> < 0.35 mA

Short circuit 100 Ω < R<sub>Sensor</sub> < 360 Ω

1 transistor output, passive (per channel)

30 V DC

50 mA (short-circuit-proof)

< 1.4 V

can be inverted using DIP switch

≤ 5 kHz

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)

< 34 mA (24 V DC)

1000 mW

Input/output

Input/output/supply, DIN rail connector

375 V (Peak value in accordance with EN 60079-11)

300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II;

degree of pollution 2, safe isolation as per EN 61010-1))

2.5 kV (50 Hz, 1 min., test voltage)

Input/supply, DIN rail connector

Output 1/output 2

375 V (Peak value in accordance with EN 60079-11)

50 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II;

degree of pollution 2, basic insulation as per EN 61010-1))

1 kV (50 Hz, 1 min., test voltage)

-20 °C ... 60 °C (Any mounting position)

10 % ... 95 % (non-condensing)

V0

PA 66-FR

12.5 / 99 / 114.5 mm

0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14

0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16

Class A product, see page 605

Input data

Input signal

No-load voltage

Switching points

Line fault detection

Switching output

Max. switching voltage

Maximum switching current

Drop (ΔU)

Switching behavior

Maximum switching frequency

General data

Supply voltage range

Current consumption

Power dissipation

Electrical isolation

Ambient temperature range

Humidity

Inflammability class in acc. with UL 94

Housing material

Dimensions W/H/D

Screw connection solid/stranded/AWG

Push-in connection solid/stranded/AWG

EMC note

Conformance/Approvals

Conformance

ATEX

UL, USA/Canada

SIL in accordance with IEC 61508

NAMUR signal conditioner for operating proximity sensors and mechanical contacts

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- Signal output transistor (passive), up to 5 kHz
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and blocking the transistor output
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174

Information about resistance circuits is given on page 176

Information on "Plug and play" connection using system cabling can be found from page 164

Description

NAMUR signal conditioner

Screw connection

Push-in connection

Type

MACX MCR-SL-2NAM-T

MACX MCR-SL-2NAM-T-SP

Order No.

2865036

2924281

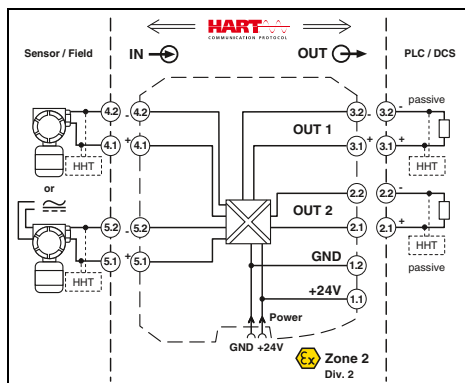
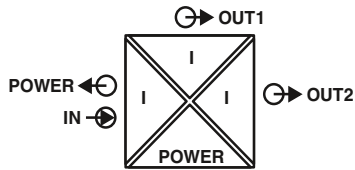
Pcs./Pkt.

1

1

Ordering data

Analog IN  
Repeater power supplies



Ex n



Repeater power supply and input signal conditioner, with two electrically isolated outputs

- 4 to 20 mA input, powered and not powered
- Two electrically isolated outputs, 4 to 20 mA (active)
- PL d according to EN ISO 13849-1
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 possible
- Plug-in screw and Push-in connection technology
- 4-way electrical isolation
- Bidirectional HART communication possible
- Power supply via DIN rail connector possible

**Notes:**

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Test plugs for test sockets can be found on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

<b>Input data</b>	
Input signal	
Transmitter supply voltage	
Voltage drop	
<b>Output data</b>	
Output signal (Per output)	
Load	
Output ripple	
<b>General data</b>	
Supply voltage range	
Current consumption	
Power dissipation	
Temperature coefficient	
Step response (10-90%)	
Transmission error, typical	
Maximum transmission error	
Under-/overload range	
Electrical isolation	
<b>Input/output/power supply</b>	
<b>Output 1/output 2</b>	
<b>Ambient temperature range</b>	
Status indication	
SMART communication (Per output)	
Protocols supported	
Housing material	
Dimensions W/H/D	
Screw connection solid/stranded/AWG	
Push-in connection solid/stranded/AWG	
EMC note	
<b>Conformance/Approvals</b>	
Conformance	
ATEX	
SIL in accordance with IEC 61508	
Performance level according to ISO 13849	



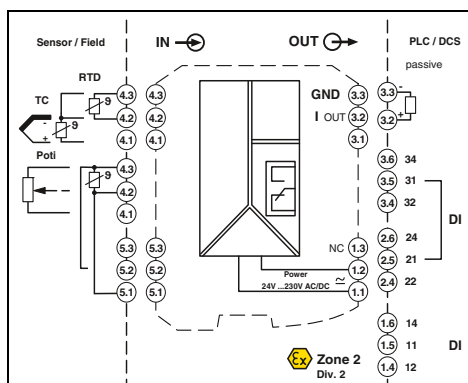
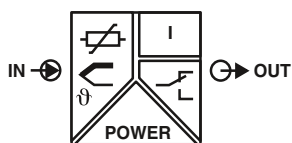
Housing width 12.5 mm

Technical data	
<b>Input data</b>	
4 mA ... 20 mA / 4 mA ... 20 mA	
> 21.5 V (20 mA)	
< 3.9 V (in input signal conditioner operation)	
<b>Output data</b>	
4 mA ... 20 mA (active)	
< 450 Ω (20 mA)	
< 20 mV <sub>rms</sub>	
<b>General data</b>	
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)	
< 75 mA (24 V DC / 20 mA)	
< 1.45 W (24 V DC / 20 mA)	
< 0.01 %/K	
1.3 ms (for jump 4 mA ... 20 mA, typical)	
< 0.05 % (of final value)	
< 0.1 % (of final value)	
according to NE 43	
<b>Input/output/power supply</b>	
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))	
2.5 kV (50 Hz, 1 min., test voltage)	
<b>Output 1/output 2</b>	
1.5 kV AC (50 Hz, 1 min., test voltage)	
-20 °C ... 60 °C (Any mounting position)	
Green LED (PWR supply voltage)	
Yes	
HART	
PA 66-FR	
12.5 / 99 / 114.5 mm	
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
Class A product, see page 605	
<b>Conformance/Approvals</b>	
CE-compliant, additionally EN 61326	
Ex II 3 G Ex nA IIC T4 Gc X	
2	
PLd	

Description
<b>Repeater power supply and input signal conditioner, signal duplicator, with performance level</b>
Screw connection
Push-in connection

Ordering data		
Type	Order No.	Pcs./ Pkt.
MACX PL-RPSSI-2I	2904961	1
MACX PL-RPSSI-2I-SP	2904962	1

Temperature  
Temperature transducer



Ex n



universal, with limit value relays,  
wide-range power supply



EX: Ex n

Housing width 35 mm

Technical data

Input data

Resistance thermometers  
Thermocouple sensors

Resistor  
Potentiometer  
Voltage

Output data

Output signal  
Maximum output signal  
Load  $R_B$   
Behavior in the event of a sensor error

Switching output

Contact type  
Contact material  
Max. switching voltage  
Maximum switching current

General data

Supply voltage range  
Power consumption  
Temperature coefficient  
Maximum transmission error  
Electrical isolation

Input/output/power supply

Input/output  
Input/power supply  
Input/switching output

Ambient temperature range  
Humidity  
Inflammability class in acc. with UL 94  
Housing material  
Dimensions W/H/D  
Screw connection solid/stranded/AWG  
Push-in connection solid/stranded/AWG  
EMC note

Conformance/Approvals

Conformance  
ATEX  
IECEX  
SIL in accordance with IEC 61508  
Performance level according to ISO 13849

Pt, Ni, Cu sensors: 2, 3, 4-wire  
B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG

0  $\Omega$  ... 50 k $\Omega$   
0  $\Omega$  ... 50 k $\Omega$   
-1000 mV ... 1000 mV

4 mA ... 20 mA  
22 mA

$\leq 600 \Omega$  (at 20 mA)  
according to NE 43 or freely configurable

Relay output

2 PDT  
AgSnO<sub>2</sub>, hard gold-plated  
250 V AC (250 V DC)  
2 A (250 V AC) / 2 A (28 V DC)

24 V ... 230 V AC/DC (-20 %/+10 %, 50/60 Hz)  
< 2.4 W  
0.01 %/K  
0.1 % (e.g. for Pt 100, 300 K span, 4 ... 20 mA)

300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II;  
degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV (50 Hz, 1 min., test voltage)

375 V (Peak value in accordance with EN 60079-11)  
375 V (Peak value in accordance with EN 60079-11)  
375 V (Peak value in accordance with EN 60079-11)  
-20 °C ... 65 °C

typ. 5 % ... 95 % (non-condensing)  
V0  
PA 66-FR  
35 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

CE-compliant  
Ex II 3 G Ex nA nC ic IIC T4 Gc X  
Ex nA nC ic IIC T4 Gc X  
2  
PLd

Ordering data

Type	Order No.	Pcs./Pkt.
MACX PL-T-UIREL-UP	2904901	1
MACX PL-T-UIREL-UP-SP	2904903	1

Accessories

IFS-USB-PROG-ADAPTER	2811271	1
MACX MCR-I20	2905680	1

- Input for resistance thermometers, thermocouples, resistance-type sensors, potentiometers, and mV sources
- A safety-related limit value relay, by bridging two relays
- Differential measurement possible with Pt 100
- An additional limit value relay for non-safety-related function
- PL d according to EN ISO 13849-1
- Up to SIL 2 according to IEC 61508
- Configuration via software (ANALOG-CONF or FDT/DTM)
- Cold junction compensation with separate connector
- Wide range power supply 19.2 to 253 V AC/DC
- Status indicators for supply voltage, cable, sensor, and module errors
- Installation in Zone 2 possible
- Plug-in screw and Push-in connection technology

Notes:

The configuration software can be downloaded from the Internet (phoenixcontact.net/products).

Information on the IFS-OP-UNIT operating and display unit and the associated IFS-OP-CRADLE DIN rail cradle can be found on page 171

For information on the programming adapter, refer to page 172

Description

Temperature transducer and threshold value switch with performance level

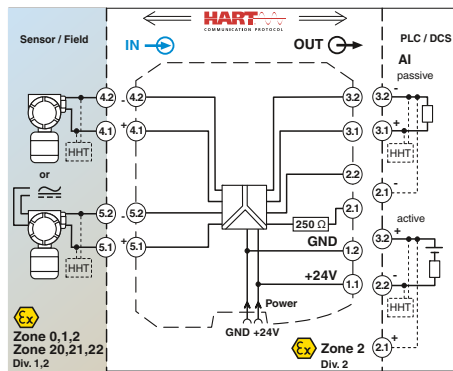
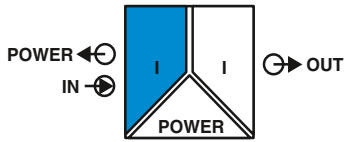
Screw connection  
Push-in connection

Programming adapter for configuring modules with S-PORT interface

Connector, for current signals between +20 mA and -20 mA

Analog IN

Repeater power supply, Ex i



Repeater power supply and input signal conditioner

Functional Safety  
 Ex: Ex EAC Ex  
 Housing width 12.5 mm

Repeater power supply and input signal conditioner for the operation of intrinsically safe (Ex i) 2-wire measuring transducers, 4-wire measuring transducers, and mA current sources installed in Ex areas.

- 0/4 to 20 mA input, [Ex ia] (powered or not powered)
- 0/4 to 20 mA output (active or passive)
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- Terminal point with 250 Ω resistor to increase the HART impedance in the case of low-impedance systems
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

<b>Notes:</b>
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Test plugs for test sockets can be found on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

<b>Input data</b>	Input signal Transmitter supply voltage Voltage drop
<b>Output data</b>	Output signal
<b>Load</b>	Output ripple
<b>General data</b>	Supply voltage range Current consumption
<b>Power dissipation</b>	Temperature coefficient Step response (10-90%)
<b>Transmission error, typical</b>	Maximum transmission error Under-/overload range Electrical isolation
<b>Ambient temperature range</b>	Humidity Status indication SMART communication Signal bandwidth Protocols supported Inflammability class in acc. with UL 94 Housing material Dimensions W/H/D Screw connection solid/stranded/AWG Push-in connection solid/stranded/AWG
<b>EMC note</b>	EMC note
<b>Safety data as per ATEX</b>	Maximum output voltage U <sub>o</sub> Maximum output current I <sub>o</sub> Maximum output power P <sub>o</sub> Maximum voltage U <sub>m</sub>
<b>Conformance/Approvals</b>	Conformance ATEX  IECEX UL, USA/Canada
<b>SIL in accordance with IEC 61508</b>	

**Technical data**

4 mA ... 20 mA > 16 V (20 mA) < 3.5 V (in input signal conditioner operation)
4 mA ... 20 mA (active) 4 mA ... 20 mA (14 ... 26 V ext. source voltage) < 1000 Ω (20 mA) < 20 mV <sub>rms</sub>
19.2 V DC ... 30 V DC (24 V DC -20%...+25%) < 76 mA (24 V DC / 20 mA / 1000 Ω) ; < 55 mA (24 V DC / 20 mA / 250 Ω) < 1.1 W (24 V DC / 20 mA / 1000 Ω) < 0.95 W (24 V DC / 20 mA / 250 Ω) < 1.2 W (24 V DC / 20 mA / 0 Ω) < 0.01 %/K < 200 μs (for jump 4 mA ... 20 mA, load 600)
< 0.05 % (of final value) < 0.1 % (of final value) according to NE 43

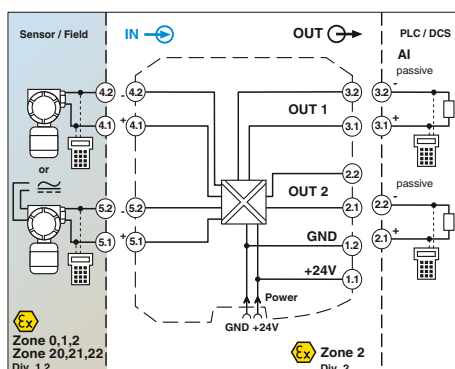
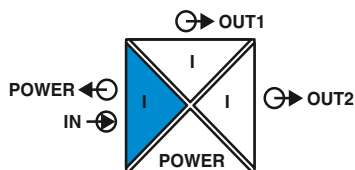
<b>Input/output/power supply</b>	300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
<b>Input/output</b>	375 V (Peak value in accordance with EN 60079-11)
<b>Input/power supply</b>	375 V (Peak value in accordance with EN 60079-11) -20 °C ... 60 °C (Any mounting position) 10 % ... 95 % (non-condensing) Green LED (supply voltage) Yes as per HART specifications HART V0 PA 66-FR 12.5 / 112.5 / 114.5 mm 0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16 Class A product, see page 605
<b>Safety data as per ATEX</b>	25.2 V 93 mA 587 mW 253 V AC (125 V DC)
<b>Conformance/Approvals</b>	CE-compliant, additionally EN 61326 Ex II (1) G [Ex ia Ga] IIC/IIB Ex II (1) D [Ex ia Da] IIIC Ex II 3 (1) G Ex nA [ia Ga] IIC/IIB T4 Gc Ex I (M1) [Ex ia Ma] I [Ex ia Ga] IIC/IIB , [Ex ia Da] IIIC , Ex nA [ia Ga] IIC/IIB T4 Gc UL 61010 Listed Class I Div 2; IS for Class I, II, III Div 1 2

**Ordering data**

Description	Type	Order No.	Pcs./Pkt.	
<b>Repeater power supply, smart, intrinsically safe input</b>	Screw connection	MACX MCR-EX-SL-RPSSI-I	2865340	1
	Push-in connection	MACX MCR-EX-SL-RPSSI-I-SP	2924016	1

Analog IN

Repeater power supply, Ex i



Repeater power supply and input signal conditioner, with two electrically isolated outputs

Functional Safety

Ex: EAC Ex Div. 2  
Housing width 12.5 mm

Technical data

<b>Input data</b>			4 mA ... 20 mA / 0 mA ... 20 mA
Input signal			> 16 V (20 mA)
Transmitter supply voltage			approx. 3.9 V (in input signal conditioner operation)
Voltage drop			
<b>Output data</b>			4 mA ... 20 mA (Output 1 and output 2 active)
Output signal (Per output)			
<b>Load</b>			< 450 Ω (20 mA)
Output ripple			< 20 mV <sub>rms</sub>
<b>General data</b>			19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Supply voltage range			< 75 mA (24 V DC / 20 mA)
Current consumption			< 1.45 W (24 V DC / 20 mA)
Power dissipation			< 0.01 %/K
Temperature coefficient			1.3 ms (for jump 4 mA ... 20 mA, typical)
Step response (10-90%)			< 0.05 % (of final value)
Transmission error, typical			< 0.1 % (of final value)
Maximum transmission error			according to NE 43
Under-/overload range			
Electrical isolation			
<b>Input/output/power supply</b>			300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
			2.5 kV (50 Hz, 1 min., test voltage)
<b>Input/output</b>			375 V (Peak value in accordance with EN 60079-11)
<b>Input/power supply</b>			375 V (Peak value in accordance with EN 60079-11)
<b>Output 1/output 2</b>			1.5 kV AC (50 Hz, 1 min., test voltage)
			-20 °C ... 60 °C (Any mounting position)
<b>Ambient temperature range</b>			Green LED (PWR supply voltage)
Status indication			Yes
SMART communication (Per output)			HART
Protocols supported			PA 66-FR
Housing material			12.5 / 99 / 114.5 mm
Dimensions W/H/D			0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Screw connection solid/stranded/AWG			0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Push-in connection solid/stranded/AWG			Class A product, see page 605
EMC note			
<b>Safety data as per ATEX</b>			25.2 V
Maximum output voltage U <sub>o</sub>			93 mA
Maximum output current I <sub>o</sub>			587 mW
Maximum output power P <sub>o</sub>			253 V AC (125 V DC)
Maximum voltage U <sub>m</sub>			
<b>Conformance/Approvals</b>			CE-compliant, additionally EN 61326
Conformance			Ex II (1) G [Ex ia Ga] IIC/IIB
ATEX			Ex II (1) D [Ex ia Da] IIIC
			Ex II 3 (1) G Ex nA [ia Ga] IIC/IIB T4 Gc
			[Ex ia Ga] IIC/IIB, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC/IIB T4 Gc
			Class I Div 2; IS for Class I, II, III Div 1
IECEX			2
UL, USA/Canada			
SIL in accordance with IEC 61508			

**Notes:**

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174

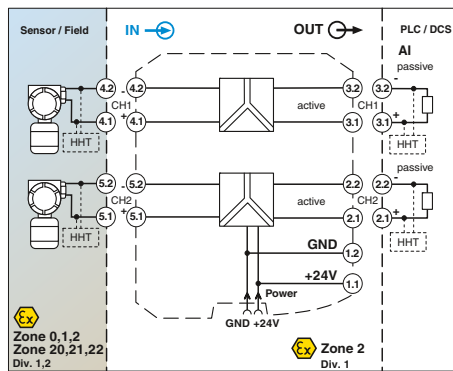
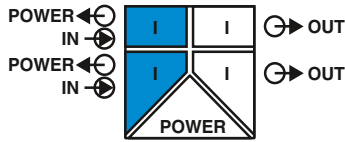
Test plugs for test sockets can be found on page 176

Information on "Plug and play" connection using system cabling can be found from page 164

Ordering data				
Description	Type	Order No.	Pcs./Pkt.	
<b>Repeater power supply, smart, intrinsically safe input</b>	Screw connection	<b>MACX MCR-EX-SL-RPSSI-2I</b>	2865366	1
	Push-in connection	<b>MACX MCR-EX-SL-RPSSI-2I-SP</b>	2924236	1
<b>With just one HART-transparent output</b>	Screw connection	<b>MACX MCR-EX-SL-RPSSI-2I-1S</b>	2908855	1
	Push-in connection	<b>MACX MCR-EX-SL-RPSSI-2I-1S-SP</b>	2908856	1

Analog IN

Repeater power supply, Ex i



2-channel repeater power supply

Functional Safety  
 Ex: Ex EAC Ex  
 Housing width 12.5 mm

Repeater power supply for the operation of intrinsically safe (Ex i) 2-wire measuring transducers installed in the Ex area.

- 2-channel
- 4 to 20 mA input, [Ex ia] (powered)
- 4 to 20 mA output (active)
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- Safe 3-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 3 according to IEC 61508
- Installation in Zone 2 permitted

<b>Notes:</b>
Information on the supply and error evaluation module, DIN rail connectors, system cabling, and marking material can be found from page 174
Test plugs for test sockets can be found on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

<b>Input data</b>	
Input signal	
Transmitter supply voltage	
Underload/overload signal range	
<b>Output data</b>	
Output signal	
Load	
Underload/overload signal range	
<b>General data</b>	
Supply voltage range	
Current consumption	
Power dissipation	
Temperature coefficient	
Step response (10-90%)	
Transmission error, typical	
Maximum transmission error	
Electrical isolation	
Input/output, power supply	
Input/output	
Input/power supply	
Output 1/output 2/ power supply	
Ambient temperature range	
Status indication	
SMART communication	
Signal bandwidth	
Protocols supported	
Housing material	
Dimensions W/H/D	
Screw connection solid/stranded/AWG	
Push-in connection solid/stranded/AWG	
EMC note	
<b>Safety data as per ATEX</b>	
Maximum output voltage U <sub>o</sub>	
Maximum output current I <sub>o</sub>	
Maximum output power P <sub>o</sub>	
Maximum voltage U <sub>m</sub>	
<b>Conformance/Approvals</b>	
Conformance	
ATEX	
IECEX	
UL, USA/Canada	
SIL in accordance with IEC 61508	

**Technical data**

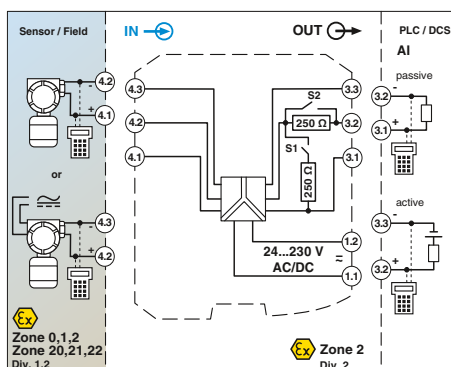
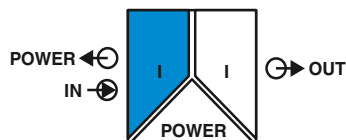
per channel	
4 mA ... 20 mA	
> 16 V (20 mA)	
0 mA ... 24 mA	
per channel	
4 mA ... 20 mA (active)	
≤ 450 Ω (20 mA)	
0 mA ... 24 mA	
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)	
< 100 mA (24 V / 20 mA)	
< 1.4 W (at 24 V DC / 20 mA)	
< 0.01 %/K	
< 1.3 ms (for 4 mA ... 20 mA step)	
< 0.05 % (of final value)	
< 0.1 % (of final value)	
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))	
2.5 kV (50 Hz, 1 min., test voltage)	
375 V (Peak value in accordance with EN 60079-11)	
375 V (Peak value in accordance with EN 60079-11)	
1.5 kV (50 Hz, 1 min., test voltage)	
-20 °C ... 60 °C (Any mounting position)	
Green LED (supply voltage)	
Yes	
as per HART specifications	
HART	
PA 66-FR	
12.5 / 99 / 114.5 mm	
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
Class A product, see page 605	
25.2 V	
93 mA	
587 mW	
253 V AC (125 V DC)	
CE-compliant, additionally EN 61326	
Ex II (1) G [Ex ia Ga] IIC/IIB	
Ex II (1) D [Ex ia Da] IIIC	
Ex II 3(1) G Ex nA [ia Ga] IIC T4 Gc	
[Ex ia Ga] IIC/IIB , [Ex ia Da] IIIC , Ex nA [ia Ga] IIC T4 Gc	
Class I Div 2; IS for Class I, II, III Div 1	
3	

**Ordering data**

Description	Type	Order No.	Pcs./ Pkt.
Repeater power supply, 2-channel, smart, intrinsically safe input			
Screw connection	MACX MCR-EX-SL-RPSS-2I-2I	2865382	1
Push-in connection	MACX MCR-EX-SL-RPSS-2I-2I-SP	2924676	1

Analog IN

Repeater power supply with wide range power supply, Ex i



Repeater power supply and input signal conditioner, wide-range power supply

Functional Safety  
 Ex: EAC Ex // Applied for: GL  
 Housing width 17.5 mm

Repeater power supply and input signal conditioner for the operation of intrinsically safe (Ex i) 2-wire measuring transducers, 4-wire measuring transducers, and mA current sources installed in Ex areas.

- 0/4 to 20 mA input, [Ex ia] (powered or not powered)
- 0/4 to 20 mA output (active or passive), 0/1 to 5 V, can be selected via DIP switch
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- 250 Ω resistor that can be activated via DIP switches to increase the HART impedance in the case of low-impedance systems
- 3-way electrical isolation
- Wide-range power supply of 19.2 to 253 V AC/DC
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

**Notes:**

Information on marking material can be found on page 177
Test plugs for test sockets can be found on page 176

<b>Input data</b>	
Input signal	4 mA ... 20 mA
Transmitter supply voltage	> 16 V (20 mA)
Voltage drop	< 3.5 V (in input signal conditioner operation)
<b>Output data</b>	
Output signal (configurable using the DIP switch)	4 mA ... 20 mA (active) 4 mA ... 20 mA (14 ... 26 V ext. source voltage) 1 V ... 5 V (internal resistance, 250 Ω, 0.1%) Configurable via DIP switches
Load	< 600 Ω (20 mA)
Output ripple	< 20 mV <sub>rms</sub>
<b>General data</b>	
Supply voltage range	24 V ... 230 V AC/DC (-20 %/+10 %, 50/60 Hz)
Current consumption	< 80 mA (24 V DC / 20 mA)
Power dissipation	< 1.6 W (24 V DC/ 20 mA)
Temperature coefficient	< 0.01 %/K
Step response (10-90%)	< 600 μs (for 4 mA ... 20 mA step)
Transmission error, typical	< 0.05 % (of final value)
Maximum transmission error	< 0.1 % (of final value)
Under-/overload range	according to NE 43
Electrical isolation	
	Input/output/power supply 300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
	Input/output 375 V (Peak value in accordance with EN 60079-11)
	Input/power supply 375 V (Peak value in accordance with EN 60079-11)
Ambient temperature range	-20 °C ... 60 °C (Any mounting position)
Humidity	10 % ... 95 % (non-condensing)
Status indication	Green LED (supply voltage)
SMART communication	Yes
Signal bandwidth	as per HART specifications
Protocols supported	HART
Inflammability class in acc. with UL 94	V0
Housing material	PA 66-FR
Dimensions W/H/D	17.5 / 99 / 114.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Push-in connection solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
EMC note	Class A product, see page 605
<b>Safety data as per ATEX</b>	
Maximum output voltage U <sub>o</sub>	25.2 V
Maximum output current I <sub>o</sub>	93 mA
Maximum output power P <sub>o</sub>	587 mW
Maximum voltage U <sub>m</sub>	253 V AC/DC (Supply terminals) 253 V AC (Output terminals) 125 V DC (Output terminals)
<b>Conformance/Approvals</b>	
Conformance	CE-compliant, additionally EN 61326
ATEX	Ex II (1) G [Ex ia Ga] IIC/IIB Ex II (1) D [Ex ia Da] IIIC Ex II 3(1) G Ex nA [ia Ga] IIC/IIB T4 Gc [Ex ia Ga] IIC/IIB, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC/IIB T4 Gc Class I Div 2; IS for Class I, II, III Div 1
IECEX	2
UL, USA/Canada	
SIL in accordance with IEC 61508	

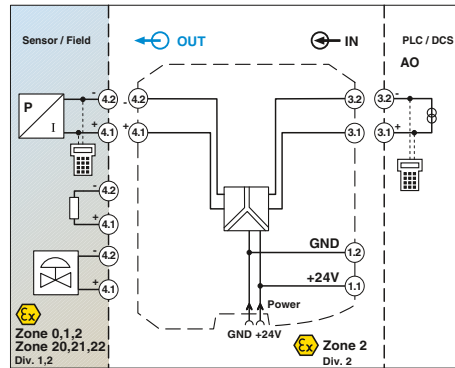
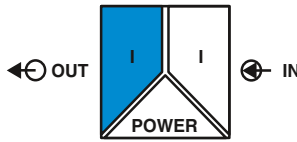
Technical data

<b>Technical data</b>	
Input signal	4 mA ... 20 mA
Transmitter supply voltage	> 16 V (20 mA)
Voltage drop	< 3.5 V (in input signal conditioner operation)
Output signal (configurable using the DIP switch)	4 mA ... 20 mA (active) 4 mA ... 20 mA (14 ... 26 V ext. source voltage) 1 V ... 5 V (internal resistance, 250 Ω, 0.1%) Configurable via DIP switches
Load	< 600 Ω (20 mA)
Output ripple	< 20 mV <sub>rms</sub>
Supply voltage range	24 V ... 230 V AC/DC (-20 %/+10 %, 50/60 Hz)
Current consumption	< 80 mA (24 V DC / 20 mA)
Power dissipation	< 1.6 W (24 V DC/ 20 mA)
Temperature coefficient	< 0.01 %/K
Step response (10-90%)	< 600 μs (for 4 mA ... 20 mA step)
Transmission error, typical	< 0.05 % (of final value)
Maximum transmission error	< 0.1 % (of final value)
Under-/overload range	according to NE 43
Electrical isolation	
	Input/output/power supply 300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
	Input/output 375 V (Peak value in accordance with EN 60079-11)
	Input/power supply 375 V (Peak value in accordance with EN 60079-11)
Ambient temperature range	-20 °C ... 60 °C (Any mounting position)
Humidity	10 % ... 95 % (non-condensing)
Status indication	Green LED (supply voltage)
SMART communication	Yes
Signal bandwidth	as per HART specifications
Protocols supported	HART
Inflammability class in acc. with UL 94	V0
Housing material	PA 66-FR
Dimensions W/H/D	17.5 / 99 / 114.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Push-in connection solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
EMC note	Class A product, see page 605
<b>Safety data as per ATEX</b>	
Maximum output voltage U <sub>o</sub>	25.2 V
Maximum output current I <sub>o</sub>	93 mA
Maximum output power P <sub>o</sub>	587 mW
Maximum voltage U <sub>m</sub>	253 V AC/DC (Supply terminals) 253 V AC (Output terminals) 125 V DC (Output terminals)
<b>Conformance/Approvals</b>	
Conformance	CE-compliant, additionally EN 61326
ATEX	Ex II (1) G [Ex ia Ga] IIC/IIB Ex II (1) D [Ex ia Da] IIIC Ex II 3(1) G Ex nA [ia Ga] IIC/IIB T4 Gc [Ex ia Ga] IIC/IIB, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC/IIB T4 Gc Class I Div 2; IS for Class I, II, III Div 1
IECEX	2
UL, USA/Canada	
SIL in accordance with IEC 61508	

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Repeater power supply, smart, intrinsically safe input			
	Screw connection	MACX MCR-EX-SL-RPSSI-I-UP	2865793 1
	Push-in connection	MACX MCR-EX-SL-RPSSI-I-UP-SP	2924029 1

**Analog OUT**  
Output signal conditioner, Ex i



UL DNV GL Functional Safety  
Ex: EAC Ex  
Housing width 12.5 mm

Output signal conditioner for controlling intrinsically safe (Ex i) I/P converters, control valves, and indicators installed in Ex areas.

- 0/4 to 20 mA input
- 0/4 to 20 mA output, [Ex ia] IIC
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- Line fault detection (LF)
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

<b>Notes:</b>
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Test plugs for test sockets can be found on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

<b>Input data</b>	
Input signal	
Input voltage	
Input impedance in the event of a cable break at the output	
<b>Output data</b>	
Output signal	
<b>Load</b>	
Output ripple	
<b>General data</b>	
Supply voltage range	
Current consumption	
Power dissipation	
Temperature coefficient	
Step response (10-90%)	
Maximum transmission error	
Electrical isolation	
<b>Ambient temperature range</b>	
Humidity	
Status indication	
SMART communication	
Signal bandwidth	
Protocols supported	
Inflammability class in acc. with UL 94	
Housing material	
Dimensions W/H/D	
Screw connection solid/stranded/AWG	
Push-in connection solid/stranded/AWG	
EMC note	
<b>Safety data as per ATEX</b>	
Maximum output voltage U <sub>o</sub>	
Maximum output current I <sub>o</sub>	
Maximum output power P <sub>o</sub>	
Maximum voltage U <sub>m</sub>	
<b>Conformance/Approvals</b>	
Conformance	
ATEX	
IECEX	
UL, USA/Canada	
SIL in accordance with IEC 61508	

Input/output/power supply

Output/input  
Output/supply

Technical data	
0 mA ... 20 mA / 4 mA ... 20 mA	
5.4 V (at 20 mA)	
> 100 kΩ (if there is a line fault)	
0 mA ... 20 mA (intrinsically safe) / 4 mA ... 20 mA (intrinsically safe)	
< 800 Ω (at 20 mA)	
< 20 mV <sub>rms</sub>	
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)	
< 46 mA (at 24 V DC / 20 mA)	
< 1.1 W (at 24 V DC / 20 mA)	
< 0.01 %/K	
< 140 μs (for 4 mA ... 20 mA step)	
< 0.1 % (of final value)	
1.5 kV (50 Hz, 1 min., test voltage)	
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II, degree of pollution 2))	
375 V (Peak value in accordance with EN 60079-11)	
375 V (Peak value in accordance with EN 60079-11)	
-20 °C ... 60 °C (Any mounting position)	
10 % ... 95 % (non-condensing)	
Green LED (supply voltage)	
Yes	
as per HART specifications	
HART	
V0	
PA 66-FR	
12.5 / 99 / 114.5 mm	
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
Class A product, see page 605	
27.7 V	
92 mA	
633 mW	
253 V AC (125 V DC)	
CE-compliant, additionally EN 61326	
Ex II (1) G [Ex ia Ga] IIC/IIB	
Ex II (1) D [Ex ia Da] IIIC	
Ex II 3(1) G Ex nA [ia Ga] IIC/IIB T4 Gc	
[Ex ia Ga] IIC/IIB, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC/IIB T4 Gc	
Class I Div 2; IS for Class I, II, III Div 1	
2	

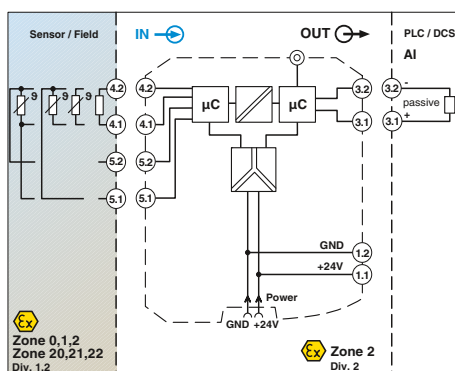
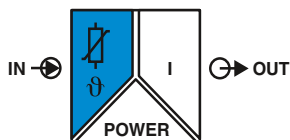
**Ordering data**

Description	Type	Order No.	Pcs./ Pkt.
<b>Output signal conditioner, smart, output intrinsically safe</b>			
Screw connection	<b>MACX MCR-EX-SL-IDSII</b>	<b>2865405</b>	1
Push-in connection	<b>MACX MCR-EX-SL-IDSII-SP</b>	<b>2924032</b>	1



Temperature

Temperature transducer, Ex i



For resistance thermometers and resistance-type sensors

Housing width 12.5 mm

Technical data

<b>Input data</b>		
Resistance thermometers		Sensors (2-, 3-, 4-wire)
Resistor		0 Ω ... 2000 Ω
Cable resistance		≤ 50 Ω per cable
Sensor input current		200 µA ... 1 mA
Measuring range span		min. 50 K
<b>Output data</b>		
Output signal		0 mA ... 20 mA / 4 mA ... 20 mA
Load		≤ 500 Ω
Behavior in the event of a sensor error		As per NE 43 or can be freely defined
Output ripple		< 50 µA <sub>pp</sub>
<b>General data</b>		
Supply voltage range		19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Current draw		≤ 40 mA (at 24 V DC)
Power dissipation		< 1 W
Temperature coefficient		0.01 %/K
Step response (0–99%)		typ. 700 ms ≤ 1100 ms
Transmission error, total		0.1 % x 1000 [K]/measuring span
ZERO / SPAN adjustment		± 5 % / ± 5 %
Electrical isolation		
	Input/output/power supply	300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
	Input/output	375 V (Peak value in accordance with EN 60079-11)
	Input/power supply	375 V (Peak value in accordance with EN 60079-11)
Ambient temperature range		-20 °C ... 60 °C (Any mounting position)
Humidity		5 % ... 95 % (non-condensing)
Status indication		Green LED (supply voltage, PWR) Red LED, flashing (line, sensor error, ERR) Red LED (module error, ERR)
Inflammability class in acc. with UL 94		V0
Dimensions W/H/D		12.5 / 99 / 114.5 mm
Screw connection solid/stranded/AWG		0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Push-in connection solid/stranded/AWG		0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
EMC note		Class A product, see page 605
<b>Safety data as per ATEX</b>		
Maximum output voltage U <sub>o</sub>		6 V
Maximum output current I <sub>o</sub>		6.3 mA
Maximum output power P <sub>o</sub>		9.4 mW
<b>Conformance/Approvals</b>		
Conformance		CE-compliant, additionally EN 61326
ATEX		 II (1) G [Ex ia Ga] IIC/IIB II (1) D [Ex ia Da] IIIC II 3(1) G Ex nA ic [ia Ga] IIC T4 Gc X [Ex ia Ga] IIC , [Ex ia Da] IIIC , Ex nA ic [ia Ga] IIC T4 Gc Class I Div 2; IS for Class I, II, III Div 1
IECEX		
UL, USA/Canada		

Programmable temperature transducer for intrinsically safe operation of resistance thermometers and resistance-type sensors installed in Ex areas. The measured values are converted into a linear 0 to 20 mA or 4 to 20 mA signal.

- Input for resistance thermometers and resistance-type sensors, [Ex ia]
- 0 to 20 mA or 4 to 20 mA output
- Configuration via software (FDT/DTM): Sensor type, connection method, measuring range, measuring unit, filter, alarm signal, and output range
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Status indicator for supply voltage, cable, sensor, and module errors
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Installation in Zone 2 permitted

<b>Notes:</b>
To order a product with an order configuration, please enter the desired configuration by referring to the order key provided online (phoenixcontact.net/products).
The configuration software can be downloaded from the Internet (phoenixcontact.net/products).
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
For information on the programming adapter, refer to page 172
Information on "Plug and play" connection using system cabling can be found from page 164

<b>Description</b>	
Temperature transducer for resistance thermometers, intrinsically safe input	
Order configuration	Screw connection
Order configuration	Push-in connection
Standard configuration	Screw connection
Standard configuration	Push-in connection

**Programming adapter** for configuring modules with S-PORT interface

Ordering data

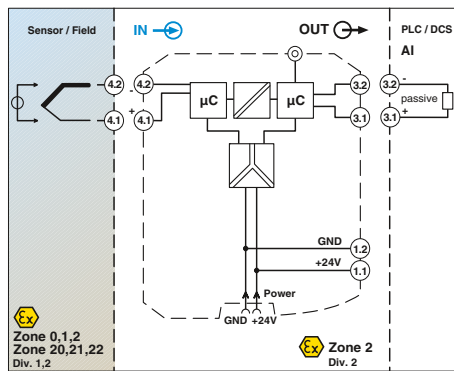
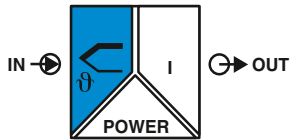
Type	Order No.	Pcs./Pkt.
MACX MCR-EX-SL-RTD-I	2865939	1
MACX MCR-EX-SL-RTD-I-SP	2924142	1
MACX MCR-EX-SL-RTD-I-NC	2865573	1
MACX MCR-EX-SL-RTD-I-SP-NC	2924168	1

Accessories

IFS-USB-PROG-ADAPTER	2811271	1
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Temperature

Temperature transducer, Ex i



For thermocouples and mV sources

Ex: 
  
 Housing width 12.5 mm

Programmable temperature transducer for intrinsically safe operation of thermocouples and mV sources installed in Ex areas. The measured values are converted into a linear 0 to 20 mA or 4 to 20 mA signal.

- Input for thermocouples and mV sources, [Ex ia]
- 0 to 20 mA or 4 to 20 mA output
- Configuration via software (FDT/DTM): Sensor type, connection method, measuring range, measuring unit, filter, alarm signal, and output range
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Status indicator for supply voltage, cable, sensor, and module errors
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Installation in Zone 2 permitted

Notes:
To order a product with an order configuration, please enter the desired configuration by referring to the order key provided online ( <a href="http://phoenixcontact.net/products">phoenixcontact.net/products</a> ).
The configuration software can be downloaded from the Internet ( <a href="http://phoenixcontact.net/products">phoenixcontact.net/products</a> ).
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
For information on the programming adapter, refer to page 172
Information on "Plug and play" connection using system cabling can be found from page 164

<b>Input data</b>	Thermocouple sensors
Voltage	
Measuring range span	
<b>Output data</b>	
Output signal	
Load	
Behavior in the event of a sensor error	
Output ripple	
<b>General data</b>	
Supply voltage range	
Current consumption	
Power dissipation	
Temperature coefficient	
Step response (0–99%)	
Transmission error, total	
Cold junction errors	
ZERO / SPAN adjustment	
Electrical isolation	
Ambient temperature range	
Humidity	
Status indication	
Inflammability class in acc. with UL 94	
Housing material	
Dimensions W/H/D	
Screw connection solid/stranded/AWG	
EMC note	
<b>Safety data as per ATEX</b>	
Maximum output voltage U <sub>o</sub>	
Maximum output current I <sub>o</sub>	
Maximum output power P <sub>o</sub>	
Maximum voltage U <sub>m</sub>	
<b>Conformance/Approvals</b>	
Conformance	
ATEX	
IECEX	
UL, USA/Canada	

Technical data	
E, J, K, N as per IEC / EN 60584, L as per DIN 43760	
-20 mV ... 70 mV	
Min. 50 K for thermocouples, 3 mV for mV sources	
0 mA ... 20 mA / 4 mA ... 20 mA	
≤ 500 Ω	
As per NE 43 or can be freely defined	
< 50 µA <sub>pp</sub>	
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)	
< 40 mA (24 V DC)	
< 1 W	
0.01 %/K	
typ. 700 ms	
≤ 1100 ms	
0.1 % x 600 [K]/measuring span; 0.1 % > 600 [K]	
± 1 K	
± 5 % / ± 5 %	
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))	
2.5 kV (50 Hz, 1 min., test voltage)	
375 V (Peak value in accordance with EN 60079-11)	
375 V (Peak value in accordance with EN 60079-11)	
-20 °C ... 60 °C (Any mounting position)	
5 % ... 95 % (non-condensing)	
Green LED (supply voltage, PWR)	
Red LED, flashing (line, sensor error, ERR)	
Red LED (module error, ERR)	
V0	
PA 66-FR	
12.5 / 99 / 114.5 mm	
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
Class A product, see page 605	
6 V	
4.7 mA	
7 mW	
253 V AC (125 V DC)	
CE-compliant, additionally EN 61326	
II (1) G [Ex ia Ga] IIC/IIB	
II (1) D [Ex ia Da] IIIC	
II 3(1) G Ex nA ic [ia Ga] IIC T4 Gc X	
[Ex ia Ga] IIC/IIB , [Ex ia Da] IIIC , Ex nA ic [ia Ga] IIC T4 Gc	
Class I Div 2; IS for Class I, II, III Div 1	

Description	Order configuration	Screw connection
<b>Temperature transducer for thermocouples</b> , intrinsically safe input		
Standard configuration		Screw connection

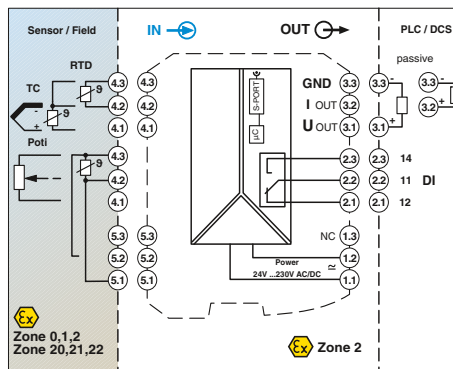
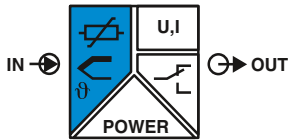
<b>Programming adapter</b> for configuring modules with S-PORT interface	
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Ordering data		
Type	Order No.	Pcs./Pkt.
MACX MCR-EX-SL-TC-I	2865942	1
MACX MCR-EX-SL-TC-I-NC	2865586	1

Accessories		
Type	Order No.	Pcs./Pkt.
IFS-USB-PROG-ADAPTER	2811271	1



Temperature  
Temperature transducer, Ex i



Universal, with switching output, wide-range power supply

Universal temperature transducer with freely configurable properties for intrinsically safe operation of resistance thermometers, thermocouples, resistance-type sensors, and potentiometers installed in Ex areas

- Input for resistance thermometers, thermocouples, resistance-type sensors, potentiometers, and mV sources, [Ex ia]
- Measure differential temperatures
- Freely programmable input and output
- Option of inverse output signal ranges
- Relay switching output
- Configuration via software (FDT/DTM) or IFS-OP-UNIT operator interface and display unit
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in screw or Push-in connection technology
- Cold junction compensation with separate connector
- Wide-range power supply of 19.2 to 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

<b>Notes:</b>
To order a product with an order configuration, enter the required configuration by referring to the adjacent order key.
The configuration software can be downloaded from the Internet ( <a href="http://phoenixcontact.net/products">phoenixcontact.net/products</a> ).
Information on the IFS-OP-UNIT operating and display unit and the associated IFS-OP-CRADLE DIN rail cradle can be found on page 171
For information on the programming adapter, refer to page 105

<b>Input data</b>	Resistance thermometers Thermocouple sensors
Resistor Potentiometer Voltage	
<b>Output data</b>	Output signal
Maximum output signal Load $R_B$ Behavior in the event of a sensor error	
<b>Switching output</b>	Contact type Contact material Max. switching voltage Maximum switching current
<b>General data</b>	Supply voltage range Power consumption Temperature coefficient Transmission error, total Electrical isolation
Ambient temperature range Humidity Inflammability class in acc. with UL 94 Housing material Dimensions W/H/D Screw connection solid/stranded/AWG Push-in connection solid/stranded/AWG EMC note	
<b>Safety data as per ATEX</b>	Maximum output voltage $U_o$ Maximum output current $I_o$ Maximum output power $P_o$
<b>Conformance/Approvals</b>	Conformance ATEX
IECEX SIL in accordance with IEC 61508	

Functional Safety  
Ex: EAC Ex  
Housing width 17.5 mm

<b>Technical data</b>	
Pt, Ni, Cu sensors: 2, 3, 4-wire B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG	
0 $\Omega$ ... 50 k $\Omega$ 0 $\Omega$ ... 50 k $\Omega$ -1000 mV ... 1000 mV	
U output 4 mA ... 20 mA (in the case of SIL; further free configuration without SIL)	I output
$\pm$ 11 V $\geq$ 10 k $\Omega$	22 mA $\leq$ 600 $\Omega$ (20 mA)
according to NE 43 or freely configurable	
<b>Switching output</b>	1 PDT AgSnO <sub>2</sub> , hard gold-plated 30 V AC (30 V DC) 0.5 A (30 V AC) / 1 A (30 V DC)
24 V ... 230 V AC/DC (-20 %/+10 %, 50/60 Hz) < 1.5 W 0.01 %/K < 0.1 % (e.g., for Pt 100, 300 K span, 4 ... 20 mA)	
Input/output/power supply Input/output Input/power supply Input/switching output Output/supply	2.5 kV (50 Hz, 1 min., test voltage) 375 V (Peak value in accordance with EN 60079-11) 375 V (Peak value in accordance with EN 60079-11) 375 V (Peak value in accordance with EN 60079-11) 300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
-20 °C ... 65 °C typ. 5 % ... 95 % (non-condensing) V0 PA 66-FR 17.5 / 99 / 114.5 mm 0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16 Class A product, see page 605	
6 V 7.4 mA 11 mW	
CE-compliant Ex II (1) G [Ex ia Ga] IIC Ex II (1) D [Ex ia Da] IIIC Ex II 3 G Ex nA nC ic IIC T4 Gc X [Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC ic IIC T4 Gc X 2	

<b>Description</b>	
<b>Temperature transducer, intrinsically safe input</b>	
Standard configuration	Screw connection
Standard configuration	Push-in connection
Order configuration	Screw connection
Order configuration	Push-in connection

**Programming adapter** for configuring modules with S-PORT interface

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs./Pkt.</b>
MACX MCR-EX-T-UI-UP	2865654	1
MACX MCR-EX-T-UI-UP-SP	2924689	1
MACX MCR-EX-T-UI-UP-C	2811763	1
MACX MCR-EX-T-UI-UP-SP-C	2924692	1
<b>Accessories</b>		
IFS-USB-PROG-ADAPTER	2811271	1

Ex i signal conditioners with SIL functional safety – MACX Analog Ex

Order key for MACX MCR-EX-T-UI-UP(-SP)-C temperature transducers (standard configuration entered as an example)

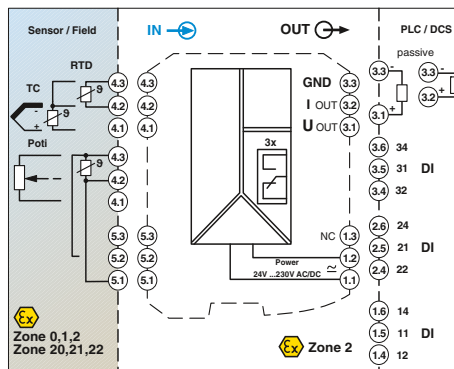
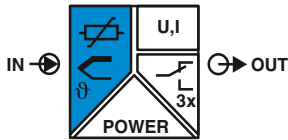
Order No.	Safety Integrity Level (SIL)	Sensor type	Connection technology	Cold junction compensation	Measuring range:		Measuring unit	Output range	Factory calibration certificate = FCC																																																																																																																																																																																
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<b>2811763</b>	<b>ON</b>	<b>PT100</b>	<b>4</b>	<b>0</b>	<b>-50</b>	<b>150</b>	<b>C</b>	<b>OUT02</b>	<b>NONE</b>																																																																																																																																																																																
2811763 ≙ MACX MCR-EX-T-UI-UP-C	ON ≙ Active NONE ≙ Not active	See below	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	0 ≙ Off, e.g., with RTD, R, potentiometer, mV 1 ≙ On, e.g., with TC	See below	See below	C ≙ °C F ≙ °F O ≙ Ω P ≙ % V ≙ mV	OUT15 ≙ 0 ... 5 mA OUT16 ≙ 0 ... 10 mA OUT01 ≙ 0 ... 20 mA OUT15 ≙ 0 ... 5 mA OUT25 ≙ 1 ... 5 mA OUT26 ≙ 2 ... 10 mA OUT02 ≙ 4 ... 20 mA OUT05 ≙ 0 ... 5 V OUT03 ≙ 0 ... 10 V OUT06 ≙ 1 ... 5 V OUT04 ≙ 2 ... 10 V OUT13 ≙ -5 ... +5 V OUT14 ≙ -10 ... +10 V Others can be freely configured in the software	NONE ≙ Without FCC YES ≙ With FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)																																																																																																																																																																																
<b>2924692</b>	ON only with output range = OUT02																																																																																																																																																																																								
<p><b>Resistance thermometers (RTD)</b> Others can be selected or freely configured in the software.</p> <table border="1"> <thead> <tr> <th>Order No.</th> <th>Sensor type</th> <th>Connection technology</th> <th>Cold junction compensation</th> <th>Measuring range: Start</th> <th>Measuring range: End</th> <th>Measuring unit</th> <th>Output range</th> </tr> </thead> <tbody> <tr><td>PT100</td><td>Pt 100</td><td>according to IEC 751</td><td></td><td>-200</td><td>850</td><td>°C</td><td>20 K</td></tr> <tr><td>PT200</td><td>Pt 200</td><td>according to IEC 751</td><td></td><td>-200</td><td>850</td><td>°C</td><td>20 K</td></tr> <tr><td>PT500</td><td>Pt 500</td><td>according to IEC 751</td><td></td><td>-200</td><td>850</td><td>°C</td><td>20 K</td></tr> <tr><td>PT1000</td><td>Pt 1000</td><td>according to IEC 751</td><td></td><td>-200</td><td>850</td><td>°C</td><td>20 K</td></tr> <tr><td>PT100S</td><td>Pt 100</td><td>according to Sama RC21-4-1966</td><td></td><td>-200</td><td>850</td><td>°C</td><td>20 K</td></tr> <tr><td>PT1000S</td><td>Pt 1000</td><td>according to Sama RC21-4-1966</td><td></td><td>-200</td><td>850</td><td>°C</td><td>20 K</td></tr> <tr><td>PT100G</td><td>Pt 100</td><td>according to GOST 6651-2009 (α = 0.00385)</td><td></td><td>-200</td><td>850</td><td>°C</td><td>20 K</td></tr> <tr><td>PT1000G</td><td>Pt 1000</td><td>according to GOST 6651-2009 (α = 0.00385)</td><td></td><td>-200</td><td>850</td><td>°C</td><td>20 K</td></tr> <tr><td>PT100J</td><td>Pt 100</td><td>according to JIS C1604/1997</td><td></td><td>-200</td><td>850</td><td>°C</td><td>20 K</td></tr> <tr><td>PT1000J</td><td>Pt 1000</td><td>according to JIS C1604/1997</td><td></td><td>-200</td><td>850</td><td>°C</td><td>20 K</td></tr> <tr><td>NI100</td><td>Ni 100</td><td>according to DIN 43760/DIN IEC 60751</td><td></td><td>-60</td><td>250</td><td>°C</td><td>20 K</td></tr> <tr><td>NI1000</td><td>Ni 1000</td><td>according to DIN 43760/DIN IEC 60751</td><td></td><td>-60</td><td>250</td><td>°C</td><td>20 K</td></tr> <tr><td>NI100S</td><td>Ni 100</td><td>according to Sama RC21-4-1966</td><td></td><td>-60</td><td>180</td><td>°C</td><td>20 K</td></tr> <tr><td>NI1000S</td><td>Ni 1000</td><td>according to Sama RC21-4-1966</td><td></td><td>-60</td><td>180</td><td>°C</td><td>20 K</td></tr> <tr><td>NI1000L</td><td>Ni 1000</td><td>(Landis &amp; Gyr)</td><td></td><td>-50</td><td>160</td><td>°C</td><td>20 K</td></tr> <tr><td>CU10</td><td>Cu 10</td><td>according to Sama RC21-4-1966</td><td></td><td>-70</td><td>500</td><td>°C</td><td>100 K</td></tr> <tr><td>CU50</td><td>Cu 50</td><td>according to GOST 6651-2009 (α = 0.00428)</td><td></td><td>-50</td><td>200</td><td>°C</td><td>100 K</td></tr> <tr><td>CU100</td><td>Cu 100</td><td>according to GOST 6651-20091 (α = 0.00428)</td><td></td><td>-50</td><td>200</td><td>°C</td><td>100 K</td></tr> <tr><td>CU53</td><td>Cu 53</td><td>according to GOST 6651-2009 (α = 0.00426)</td><td></td><td>-50</td><td>180</td><td>°C</td><td>100 K</td></tr> <tr><td>KTY81</td><td>KTY81-110</td><td>(Philips)</td><td></td><td>-55</td><td>150</td><td>°C</td><td>20 K</td></tr> <tr><td>KTY84</td><td>KTY84-130</td><td>(Philips)</td><td></td><td>-40</td><td>300</td><td>°C</td><td>20 K</td></tr> </tbody> </table>										Order No.	Sensor type	Connection technology	Cold junction compensation	Measuring range: Start	Measuring range: End	Measuring unit	Output range	PT100	Pt 100	according to IEC 751		-200	850	°C	20 K	PT200	Pt 200	according to IEC 751		-200	850	°C	20 K	PT500	Pt 500	according to IEC 751		-200	850	°C	20 K	PT1000	Pt 1000	according to IEC 751		-200	850	°C	20 K	PT100S	Pt 100	according to Sama RC21-4-1966		-200	850	°C	20 K	PT1000S	Pt 1000	according to Sama RC21-4-1966		-200	850	°C	20 K	PT100G	Pt 100	according to GOST 6651-2009 (α = 0.00385)		-200	850	°C	20 K	PT1000G	Pt 1000	according to GOST 6651-2009 (α = 0.00385)		-200	850	°C	20 K	PT100J	Pt 100	according to JIS C1604/1997		-200	850	°C	20 K	PT1000J	Pt 1000	according to JIS C1604/1997		-200	850	°C	20 K	NI100	Ni 100	according to DIN 43760/DIN IEC 60751		-60	250	°C	20 K	NI1000	Ni 1000	according to DIN 43760/DIN IEC 60751		-60	250	°C	20 K	NI100S	Ni 100	according to Sama RC21-4-1966		-60	180	°C	20 K	NI1000S	Ni 1000	according to Sama RC21-4-1966		-60	180	°C	20 K	NI1000L	Ni 1000	(Landis & Gyr)		-50	160	°C	20 K	CU10	Cu 10	according to Sama RC21-4-1966		-70	500	°C	100 K	CU50	Cu 50	according to GOST 6651-2009 (α = 0.00428)		-50	200	°C	100 K	CU100	Cu 100	according to GOST 6651-20091 (α = 0.00428)		-50	200	°C	100 K	CU53	Cu 53	according to GOST 6651-2009 (α = 0.00426)		-50	180	°C	100 K	KTY81	KTY81-110	(Philips)		-55	150	°C	20 K	KTY84	KTY84-130	(Philips)		-40	300	°C	20 K
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RES10	Resistance 0 ... 12,500 Ω			0	12,500	Ω																																																																																																																																																																																			
RES12	Resistance 0 ... 50,000 Ω			0	50,000	Ω																																																																																																																																																																																			
<p><b>Potentiometers (3-conductor)</b> Others can be selected in the software.</p> <table border="1"> <thead> <tr> <th>Order No.</th> <th>Sensor type</th> <th>Connection technology</th> <th>Cold junction compensation</th> <th>Measuring range: Start</th> <th>Measuring range: End</th> <th>Measuring unit</th> <th>Output range</th> </tr> </thead> <tbody> <tr><td>POT03</td><td>Potentiometer 0 ... 150 Ω</td><td></td><td></td><td>0</td><td>100</td><td>%</td><td rowspan="6">10% of the selected measuring range</td></tr> <tr><td>POT05</td><td>Potentiometer 0 ... 600 Ω</td><td></td><td></td><td>0</td><td>100</td><td>%</td></tr> <tr><td>POT06</td><td>Potentiometer 0 ... 1200 Ω</td><td></td><td></td><td>0</td><td>100</td><td>%</td></tr> <tr><td>POT09</td><td>Potentiometer 0 ... 6250 Ω</td><td></td><td></td><td>0</td><td>100</td><td>%</td></tr> <tr><td>POT10</td><td>Potentiometer 0 ... 12,500 Ω</td><td></td><td></td><td>0</td><td>100</td><td>%</td></tr> <tr><td>POT12</td><td>Potentiometer 0 ... 50,000 Ω</td><td></td><td></td><td>0</td><td>100</td><td>%</td></tr> </tbody> </table>										Order No.	Sensor type	Connection technology	Cold junction compensation	Measuring range: Start	Measuring range: End	Measuring unit	Output range	POT03	Potentiometer 0 ... 150 Ω			0	100	%	10% of the selected measuring range	POT05	Potentiometer 0 ... 600 Ω			0	100	%	POT06	Potentiometer 0 ... 1200 Ω			0	100	%	POT09	Potentiometer 0 ... 6250 Ω			0	100	%	POT10	Potentiometer 0 ... 12,500 Ω			0	100	%	POT12	Potentiometer 0 ... 50,000 Ω			0	100	%																																																																																																																													
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<p><b>Voltage signals (mV)</b> Others can be selected in the software.</p> <table border="1"> <thead> <tr> <th>Order No.</th> <th>Sensor type</th> <th>Connection technology</th> <th>Cold junction compensation</th> <th>Measuring range: Start</th> <th>Measuring range: End</th> <th>Measuring unit</th> <th>Output range</th> </tr> </thead> <tbody> <tr><td>V04</td><td>Voltage (mV)</td><td></td><td></td><td>-1000</td><td>+1000</td><td>mV</td><td>10% of nominal span</td></tr> </tbody> </table>										Order No.	Sensor type	Connection technology	Cold junction compensation	Measuring range: Start	Measuring range: End	Measuring unit	Output range	V04	Voltage (mV)			-1000	+1000	mV	10% of nominal span																																																																																																																																																																
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**Other setting options can be configured with the IFS-CONF software:**

- Freely configurable user characteristic curve with 30 interpolation points
- Output behavior in the event of a short circuit, sensor break or overrange/underrange can be freely configured or set according to NE43 (standard configuration: NE43 upscale)
- Filter setting (standard configuration: 1)
- Restart after failsafe (standard configuration: ON)
- Switching behavior: switching output (limit values, times, etc.) (standard configuration: OFF)

Temperature conversion guide for °C to °F:  $T [°F] = \frac{9}{5} T [°C] + 32$

Temperature  
Temperature transducer, Ex i



Universal, with three limit value relays,  
wide-range power supply

Functional Safety  
Ex: EAC Ex  
Housing width 35 mm

Universal temperature transducer with freely configurable properties for intrinsically safe operation of resistance thermometers, thermocouples, resistance-type sensors, and potentiometers installed in Ex areas

- Input for resistance thermometers, thermocouples, resistance-type sensors, potentiometers, and mV sources, [Ex ia]
- Measure differential temperatures
- Freely programmable input and output
- Option of inverse output signal ranges
- Three limit value relays, can be used in combination as a safe limit value relay
- Configuration via software (FDT/DTM) or IFS-OP-UNIT operator interface and display unit
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in screw or Push-in connection technology
- Cold junction compensation with separate connector
- Wide-range power supply of 19.2 to 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Input data

Resistance thermometers  
Thermocouple sensors

Resistor  
Potentiometer  
Voltage

Output data  
Output signal

Maximum output signal  
Load  $R_B$

Behavior in the event of a sensor error

Switching output  
Contact type

Contact material  
Max. switching voltage  
Maximum switching current

General data

Supply voltage range  
Power consumption  
Temperature coefficient  
Maximum transmission error  
Electrical isolation

Input/output/power supply  
Input/output  
Input/power supply  
Input/switching output  
Output/supply

Ambient temperature range  
Humidity  
Inflammability class in acc. with UL 94  
Housing material  
Dimensions W/H/D  
Screw connection solid/stranded/AWG  
Push-in connection solid/stranded/AWG  
EMC note

Safety data as per ATEX

Maximum output voltage  $U_o$   
Maximum output current  $I_o$   
Maximum output power  $P_o$

Conformance/Approvals

Conformance  
ATEX

IECEX  
SIL in accordance with IEC 61508

Technical data

Pt, Ni, Cu sensors: 2, 3, 4-wire  
B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG

0  $\Omega$  ... 50 k $\Omega$   
0  $\Omega$  ... 50 k $\Omega$   
-1000 mV ... 1000 mV

U output I output  
0 mA ... 20 mA  $\pm 10$  V (in the case of SIL; further free configuration without SIL)

$\pm 11$  V 22 mA  
 $\geq 10$  k $\Omega$   $\leq 600 \Omega$  (20 mA)  
according to NE 43 or freely configurable

Relay output

3 PDTs  
AgSnO<sub>2</sub>, hard gold-plated  
250 V AC (250 V DC)  
2 A (250 V AC) / 2 A (28 V DC)

24 V ... 230 V AC/DC (-20 %/+10 %, 50/60 Hz)  
< 2.4 W  
0.01 %/K  
0.1 % (e.g. for Pt 100, 300 K span, 4 ... 20 mA)

2.5 kV (50 Hz, 1 min., test voltage)  
375 V (Peak value in accordance with EN 60079-11)  
375 V (Peak value in accordance with EN 60079-11)  
375 V (Peak value in accordance with EN 60079-11)  
300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))

-20 °C ... 65 °C  
typ. 5 % ... 95 % (non-condensing)  
V0  
PA 66-FR  
35 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

6 V  
7.4 mA  
11 mW

CE-compliant  
Ex II (1) G [Ex ia Ga] IIC  
Ex II (1) D [Ex ia Da] IIIC  
Ex II 3 G Ex nA nC ic IIC T4 Gc X  
[Ex ia Ga] IIC , [Ex ia Da] IIIC , Ex nA nC ic IIC T4 Gc X 2

Ordering data

Type	Order No.	Pcs./Pkt.
MACX MCR-EX-T-UIREL-UP	2865751	1
MACX MCR-EX-T-UIREL-UP-SP	2924799	1

Accessories

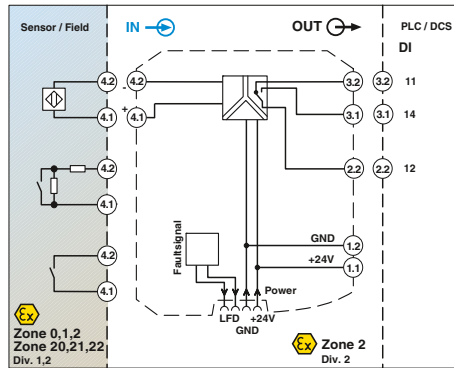
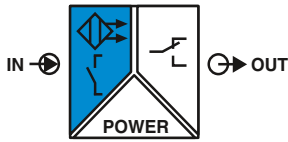
IFS-USB-PROG-ADAPTER	2811271	1
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**Notes:**  
The configuration software can be downloaded from the Internet (phoenixcontact.net/products).  
Information on the IFS-OP-UNIT operating and display unit and the associated IFS-OP-CRADLE DIN rail cradle can be found on page 171  
For information on the programming adapter, refer to page 172

Description	
Standard configuration	Screw connection
Standard configuration	Push-in connection

Programming adapter for configuring modules with S-PORT interface

Digital IN  
NAMUR signal conditioner, Ex i



Signal output: PDT relay

EAC Ex  
 DNV GL Functional Safety  
 Ex: Ex i  
 Housing width 12.5 mm

NAMUR signal conditioner for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- Relay signal output (PDT)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Notes:
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Information about resistance circuits is given on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

Input data
Input signal
No-load voltage
Switching points
Switching hysteresis
Line fault detection
Switching output
Contact type
Contact material
Max. switching voltage
Maximum switching capacity
Recommended minimum load
Mechanical service life
Switching behavior
Maximum switching frequency
General data
Supply voltage range
Current consumption
Power dissipation
Number of channels
Electrical isolation
Ambient temperature range
Humidity
Status indication
Inflammability class in acc. with UL 94
Housing material
Dimensions W/H/D
Screw connection solid/stranded/AWG
Push-in connection solid/stranded/AWG
EMC note
Safety data as per ATEX
Maximum output voltage U <sub>o</sub>
Maximum output current I <sub>o</sub>
Maximum output power P <sub>o</sub>
Maximum voltage U <sub>m</sub>
Conformance/Approvals
Conformance
ATEX
IECEx
UL, USA/Canada
SIL in accordance with IEC 61508

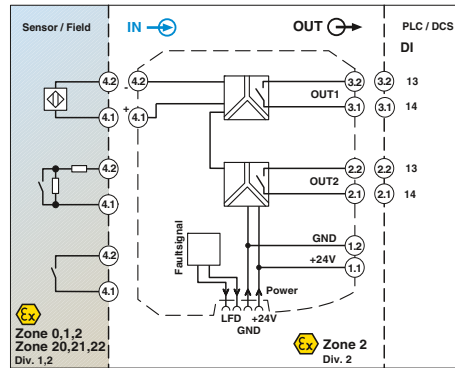
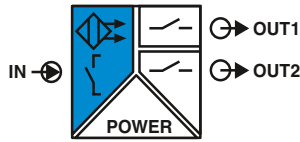
Technical data

NAMUR proximity sensors (EN 60947-5-6)
Floating switch contacts
Switch contacts with resistance circuit
~ 8 V DC
> 2.1 mA (conductive) / < 1.2 mA (blocking)
< 0.2 mA
Break 0.05 mA < I <sub>IN</sub> < 0.35 mA
Short circuit 100 Ω < R <sub>Sensor</sub> < 360 Ω
Relay output
1 PDT
AgSnO <sub>2</sub> , hard gold-plated
250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)
500 VA
5 V / 10 mA
10 <sup>7</sup> cycles
Can be inverted via slide switch
≤ 20 Hz (without load)
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
21 mA (24 V DC)
< 650 mW
1
375 V (Peak value in accordance with EN 60079-11)
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
2.5 kV (50 Hz, 1 min., test voltage)
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1))
2.5 kV (50 Hz, 1 min., test voltage)
-20 °C ... 60 °C (Any mounting position)
10 % ... 95 % (non-condensing)
Green LED (supply voltage)
Yellow LED (switching state)
Red LED (line fault)
V0
PA 66-FR
12.5 / 99 / 114.5 mm
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Class A product, see page 605
9.6 V
10 mA
25 mW
253 V AC (125 V DC)
CE-compliant, additionally EN 61326
II (1) G [Ex ia Ga] IIC
II (1) D [Ex ia Da] IIIC
II 3 G Ex nA nC IIC T4 Gc X
[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC IIC T4 Gc
Class I Div 2; IS for Class I, II, III Div 1
2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner, 1-channel, input intrinsically safe, output: PDT contact			
Screw connection	MACX MCR-EX-SL-NAM-R	2865434	1
Push-in connection	MACX MCR-EX-SL-NAM-R-SP	2924045	1

Digital IN  
NAMUR signal conditioner, Ex i



2 signal outputs: N/O contact relay

Ex: 
  
 Housing width 12.5 mm

NAMUR signal conditioner for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- 2 relay signal outputs (N/O contact), output 2 can also be used as an error signal output
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 4-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Notes:
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Information about resistance circuits is given on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

Input data
Input signal
No-load voltage
Switching points
Switching hysteresis
Line fault detection
Switching output
Contact type
Contact material
Max. switching voltage
Maximum switching capacity
Recommended minimum load
Mechanical service life
Switching behavior
Maximum switching frequency
General data
Supply voltage range
Current consumption
Power dissipation
Number of channels
Electrical isolation
Input/output Input/supply, DIN rail connector
Output 1/output 2/input, power supply, DIN rail connector
Output 1/output 2/input/power supply, DIN rail connector
Ambient temperature range
Humidity
Status indication
Inflammability class in acc. with UL 94
Dimensions W/H/D
Screw connection solid/stranded/AWG
Push-in connection solid/stranded/AWG
EMC note
Safety data as per ATEX
Maximum output voltage $U_o$
Maximum output current $I_o$
Maximum output power $P_o$
Maximum voltage $U_m$
Conformance/Approvals
Conformance
ATEX
IECEX
UL, USA/Canada
SIL in accordance with IEC 61508

Technical data

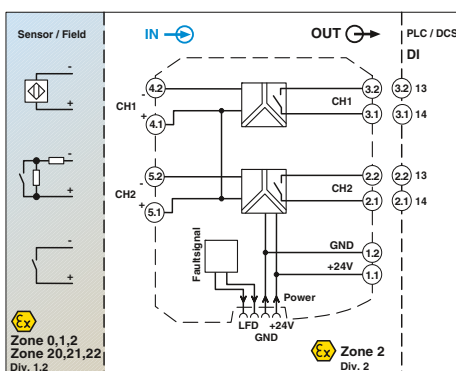
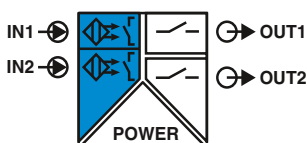
NAMUR proximity sensors (EN 60947-5-6)
Floating switch contacts
Switch contacts with resistance circuit
~ 8 V DC
> 2.1 mA (conductive) / < 1.2 mA (blocking)
< 0.2 mA
Break 0.05 mA < $I_{IN}$ < 0.35 mA
Short circuit 100 $\Omega$ < $R_{Sensor}$ < 360 $\Omega$
Relay output
2 N/O contacts
AgSnO <sub>2</sub> , hard gold-plated
250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)
500 VA
5 V / 10 mA
10 <sup>7</sup> cycles
Can be inverted via slide switch
≤ 20 Hz (without load)
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
30 mA (24 V DC)
< 950 mW
1
375 V (Peak value in accordance with EN 60079-11)
375 V (Peak value in accordance with EN 60079-11)
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1))
2.5 kV (50 Hz, 1 min., test voltage)
-20 °C ... 60 °C (Any mounting position)
10 % ... 95 % (non-condensing)
Green LED (supply voltage)
Yellow LED (switching state)
Red LED (line fault)
V0
12.5 / 99 / 114.5 mm
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Class A product, see page 605
9.6 V
10 mA
25 mW
253 V AC (125 V DC)
CE-compliant, additionally EN 61326
[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC IIC T4 Gc X
[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC IIC T4 Gc
Class I Div 2; IS for Class I, II, III Div 1
2

Ordering data

Description	Type	Order No.	Pcs./ Pkt.
NAMUR signal conditioner, 1-channel, input intrinsically safe, output: 2 N/O contacts			
Screw connection	MACX MCR-EX-SL-NAM-2RO	2865450	1
Push-in connection	MACX MCR-EX-SL-NAM-2RO-SP	2924061	1



Digital IN  
NAMUR signal conditioner, Ex i



2-channel, signal output: N/O contact relay

FRL DNV GL Functional Safety

Ex: EAC Ex

Housing width 12.5 mm

NAMUR signal conditioner for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- Relay signal output (N/O contact)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Input data	
Input signal	
No-load voltage	
Switching points	
Switching hysteresis	
Line fault detection	
Switching output	
Contact type	
Contact material	
Max. switching voltage	
Maximum switching capacity	
Recommended minimum load	
Mechanical service life	
Switching behavior	
Maximum switching frequency	
General data	
Supply voltage range	
Current consumption	
Power dissipation	
Number of channels	
Electrical isolation	
	Input/output
	Input/supply, DIN rail connector
	Output 1/output 2/input, power supply, DIN rail connector
	Output 1/output 2/input/power supply, DIN rail connector
Ambient temperature range	
Humidity	
Status indication	
Inflammability class in acc. with UL 94	
Dimensions W/H/D	
Screw connection solid/stranded/AWG	
Push-in connection solid/stranded/AWG	
EMC note	
Safety data as per ATEX	
Maximum output voltage U <sub>o</sub>	
Maximum output current I <sub>o</sub>	
Maximum output power P <sub>o</sub>	
Maximum voltage U <sub>m</sub>	
Conformance/Approvals	
Conformance	
ATEX	
IECEx	
UL, USA/Canada	
SIL in accordance with IEC 61508	

Technical data

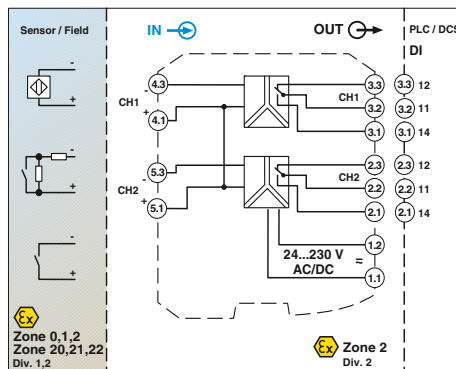
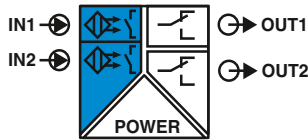
NAMUR proximity sensors (EN 60947-5-6)	
Floating switch contacts	
Switch contacts with resistance circuit	
~ 8 V DC	
> 2.1 mA (conductive) / < 1.2 mA (blocking)	
< 0.2 mA	
Break 0.05 mA < I <sub>IN</sub> < 0.35 mA	
Short circuit 100 Ω < R <sub>Sensor</sub> < 360 Ω	
Relay output	
1 N/O contact per channel	
AgSnO <sub>2</sub> , hard gold-plated	
250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)	
500 VA	
5 V / 10 mA	
10 <sup>7</sup> cycles	
Can be inverted via slide switch	
≤ 20 Hz (without load)	
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)	
35 mA (24 V DC)	
< 1 W	
2	
375 V (Peak value in accordance with EN 60079-11)	
375 V (Peak value in accordance with EN 60079-11)	
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))	
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1))	
2.5 kV (50 Hz, 1 min., test voltage)	
-20 °C ... 60 °C (Any mounting position)	
5% ... 95% (non-condensing)	
Green LED (supply voltage)	
Yellow LED (switching state)	
Red LED (line fault)	
V0	
12.5 / 99 / 114.5 mm	
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
Class A product, see page 605	
9.6 V	
10 mA	
25 mW	
253 V AC (125 V DC)	
Conformance/Approvals	
CE-compliant, additionally EN 61326	
Ex II (1) G [Ex ia Ga] IIC	
Ex II (1) D [Ex ia Da] IIIC	
Ex II 3 G Ex nA nC IIC T4 Gc X	
[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC IIC T4 Gc	
Class I Div 2; IS for Class I, II, III Div 1	
2	

Notes:
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found on page 174
Information about resistance circuits is given on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner, 2-channel, input intrinsically safe, output: N/O contact			
	Screw connection	MACX MCR-EX-SL-2NAM-RO	2865476
	Push-in connection	MACX MCR-EX-SL-2NAM-RO-SP	2924087

Digital IN  
NAMUR signal conditioner, Ex i



2-channel, signal output: PDT relay, wide-range power supply

Functional Safety  
Ex: EAC Ex  
Housing width 17.5 mm

NAMUR signal conditioner for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- Relay signal output (PDT)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and de-excitation of the output relay
- Wide-range power supply of 19.2 to 253 V AC/DC
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

**Notes:**  
Information on resistance circuits and marking material can be found on page 176

Input data  
Input signal

No-load voltage  
Switching points  
Switching hysteresis  
Line fault detection

Switching output

Contact type  
Contact material  
Max. switching voltage  
Maximum switching capacity  
Recommended minimum load  
Mechanical service life  
Switching behavior  
Maximum switching frequency

General data

Supply voltage range

Current consumption  
Power dissipation  
Electrical isolation

Input/output  
Input/power supply

Output 1/output 2/input, power supply

Ambient temperature range  
Humidity  
Inflammability class in acc. with UL 94  
Housing material  
Dimensions W/H/D  
Screw connection solid/stranded/AWG  
Push-in connection solid/stranded/AWG  
EMC note

Safety data as per ATEX

Maximum output voltage U<sub>o</sub>  
Maximum output current I<sub>o</sub>  
Maximum output power P<sub>o</sub>  
Maximum voltage U<sub>m</sub>

Conformance/Approvals

Conformance  
ATEX

IECEX  
UL, USA/Canada  
SIL in accordance with IEC 61508

Technical data

NAMUR proximity sensors (EN 60947-5-6)  
open circuit switch contacts  
Switch contacts with resistance circuit  
~ 8 V DC  
> 2.1 mA (conductive) / < 1.2 mA (blocking)  
approx. 0.2 mA  
Break 0.05 mA < I<sub>IN</sub> < 0.35 mA  
Short circuit 100 Ω < R<sub>Sensor</sub> < 360 Ω

Relay output

1 PDT per channel  
AgSnO<sub>2</sub>, hard gold-plated  
250 V AC (2 A, 60 Hz) / 120 V DC (0.2 A) / 30 V DC (2 A)  
500 VA  
5 V / 10 mA  
10<sup>7</sup> cycles  
can be inverted using DIP switch  
≤ 20 Hz (Load-dependent)

24 V ... 230 V AC/DC (-20 % ... +10 %, 50 Hz ... 60 Hz)

< 80 mA ; < 42 mA (24 V DC)  
≤ 1.3 W

375 V (Peak value in accordance with EN 60079-11)  
375 V (Peak value in accordance with EN 60079-11)  
300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV AC (50 Hz, 1 min., test voltage)

300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV (50 Hz, 1 min., test voltage)

-20 °C ... 60 °C  
10 % ... 95 % (non-condensing)

V0  
PA 66-FR  
17.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

9.56 V  
10.3 mA  
25 mW  
253 V AC/DC (Supply terminals)  
250 V AC (Output terminals)  
120 V DC (Output terminals)

CE-compliant, additionally EN 61326  
II (1) G [Ex ia Ga] IIC  
II (1) D [Ex ia Da] IIIC  
II 3(1) G Ex nA nC [ia Ga] IIC T4 Gc X  
[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC [ia Ga] IIC T4 Gc  
Class I Div 2; IS for Class I, II, III Div 1  
2

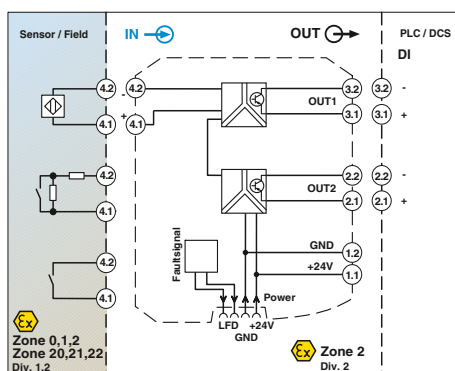
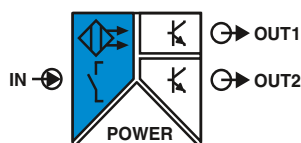
Ordering data

Type	Order No.	Pcs./Pkt.
MACX MCR-EX-SL-2NAM-R-UP	2865984	1
MACX MCR-EX-SL-2NAM-R-UP-SP	2924249	1

Description

NAMUR signal conditioner, 2-channel, input intrinsically safe, output: changeover contact  
Screw connection  
Push-in connection

Digital IN  
NAMUR signal conditioner, Ex i



2 signal outputs: transistor (passive)

UL DNV GL Functional Safety

Ex: EAC Ex  
Housing width 12.5 mm

Technical data

<b>Input data</b>	
Input signal	
No-load voltage	
Switching points	
Line fault detection	
<b>Switching output</b>	
Max. switching voltage	
Maximum switching current	
Drop ( $\Delta U$ )	
Switching behavior	
Maximum switching frequency	
<b>General data</b>	
Supply voltage range	
Current consumption	
Power dissipation	
Number of channels	
Electrical isolation	
Input/output	375 V (Peak value in accordance with EN 60079-11)
Input/output/supply, DIN rail connector	300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Input/supply, DIN rail connector	375 V (Peak value in accordance with EN 60079-11)
Output 1/output 2	50 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, basic insulation as per EN 61010-1)) 1 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20 °C ... 60 °C (Any mounting position)
Humidity	10 % ... 95 % (non-condensing)
Status indication	Green LED (supply voltage) Yellow LED (switching state) Red LED (line fault)
Inflammability class in acc. with UL 94	V0
Housing material	PA 66-FR
Dimensions W/H/D	12.5 / 99 / 114.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Push-in connection solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
EMC note	Class A product, see page 605
<b>Safety data as per ATEX</b>	
Maximum output voltage U <sub>o</sub>	
Maximum output current I <sub>o</sub>	
Maximum output power P <sub>o</sub>	
Maximum voltage U <sub>m</sub>	
Conformance/Approvals	
Conformance	
ATEX	
IECEX	
UL, USA/Canada	
SIL in accordance with IEC 61508	

<b>NAMUR proximity sensors (EN 60947-5-6)</b>	
Floating switch contacts	
Switch contacts with resistance circuit	
~ 8 V DC	
> 2.1 mA (conductive) / < 1.2 mA (blocking)	
Break 0.05 mA < I <sub>IN</sub> < 0.35 mA	
Short circuit 100 Ω < R <sub>Sensor</sub> < 360 Ω	
2 transistor outputs, passive	
30 V DC	
50 mA (short-circuit-proof)	
< 1.4 V	
can be inverted using DIP switch	
≤ 5 kHz	
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)	
< 28 mA (24 V DC)	
≤ 800 mW	
1	
375 V (Peak value in accordance with EN 60079-11)	
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)	
375 V (Peak value in accordance with EN 60079-11)	
50 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, basic insulation as per EN 61010-1)) 1 kV (50 Hz, 1 min., test voltage)	
-20 °C ... 60 °C (Any mounting position)	
10 % ... 95 % (non-condensing)	
Green LED (supply voltage) Yellow LED (switching state) Red LED (line fault)	
V0	
PA 66-FR	
12.5 / 99 / 114.5 mm	
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
Class A product, see page 605	
9.6 V	
10 mA	
25 mW	
253 V AC (125 V DC)	
CE-compliant, additionally EN 61326	
Ex II (1) G [Ex ia Ga] IIC	
Ex II (1) D [Ex ia Da] IIIC	
Ex II 3 G Ex nA IIC T4 Gc X	
[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA IIC T4 Gc	
Class I Div 2; IS for Class I, II, III Div 1	
2	

NAMUR signal conditioner for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

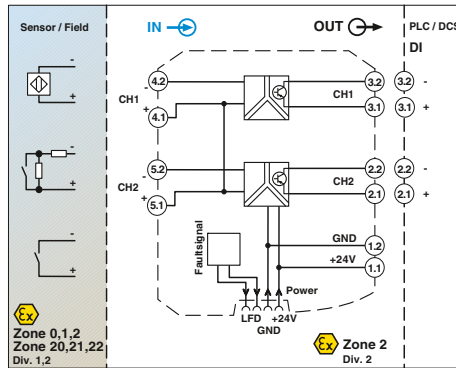
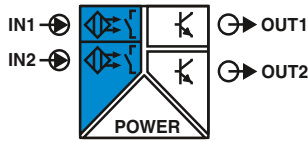
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- 2 signal outputs transistor (passive), up to 5 kHz
- Signal output 2 can also be used as a fault signaling output
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and blocking the transistor output
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 4-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

<b>Notes:</b>
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found on page 174
Information about resistance circuits is given on page 176
Information on "Plug and play" connection using system cabling can be found on page 164

<b>Description</b>
<b>NAMUR signal conditioner</b> , input intrinsically safe, output: transistor, passive
Screw connection
Push-in connection

Ordering data		
Type	Order No.	Pcs./ Pkt.
MACX MCR-EX-SL-NAM-2T	2865463	1
MACX MCR-EX-SL-NAM-2T-SP	2924074	1

Digital IN  
NAMUR signal conditioner, Ex i



2-channel, signal output transistor (passive)

Functional Safety  
Ex: Ex EAC Ex  
Housing width 12.5 mm

NAMUR signal conditioner for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- Signal output transistor (passive), up to 5 kHz
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and blocking the transistor output
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Notes:
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Information about resistance circuits is given on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

Input data
Input signal
No-load voltage
Switching points
Line fault detection
Switching output
Max. switching voltage
Maximum switching current
Drop ( $\Delta U$ )
Switching behavior
Maximum switching frequency
General data
Supply voltage range
Current consumption
Power dissipation
Number of channels
Electrical isolation
Input/output Input/output/supply, DIN rail connector
Input/supply, DIN rail connector Output 1/output 2
Ambient temperature range
Humidity
Status indication
Inflammability class in acc. with UL 94
Housing material
Dimensions W/H/D
Screw connection solid/stranded/AWG
Push-in connection solid/stranded/AWG
EMC note
Safety data as per ATEX
Maximum output voltage $U_o$
Maximum output current $I_o$
Maximum output power $P_o$
Maximum voltage $U_m$
Conformance/Approvals
Conformance
ATEX
IECEX
UL, USA/Canada
SIL in accordance with IEC 61508

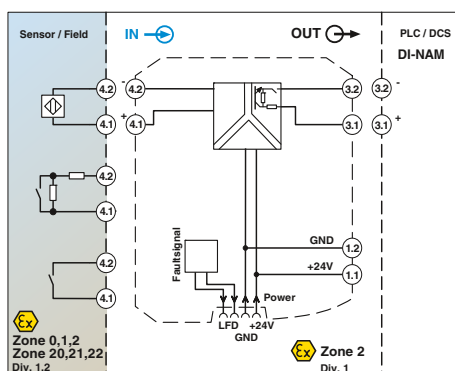
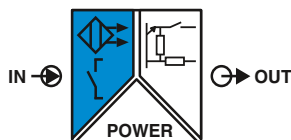
Technical data

NAMUR proximity sensors (EN 60947-5-6)
Floating switch contacts
Switch contacts with resistance circuit
~ 8 V DC
> 2.1 mA (conductive) / < 1.2 mA (blocking)
Break 0.05 mA < $I_{IN}$ < 0.35 mA
Short circuit 100 $\Omega$ < $R_{Sensor}$ < 360 $\Omega$
1 transistor output, passive (per channel)
30 V DC
50 mA (short-circuit-proof)
< 1.4 V
can be inverted using DIP switch
$\leq$ 5 kHz
General data
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
< 34 mA (24 V DC)
$\leq$ 1000 mW
2
Input/output
375 V (Peak value in accordance with EN 60079-11)
300 $V_{rms}$ (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
2.5 kV (50 Hz, 1 min., test voltage)
Input/supply, DIN rail connector
375 V (Peak value in accordance with EN 60079-11)
50 $V_{rms}$ (Rated insulation voltage (overvoltage category II; degree of pollution 2, basic insulation as per EN 61010-1))
1 kV (50 Hz, 1 min., test voltage)
-20 °C ... 60 °C (Any mounting position)
10 % ... 95 % (non-condensing)
Green LED (supply voltage)
Yellow LED (switching state)
Red LED (line fault)
V0
PA 66-FR
12.5 / 99 / 114.5 mm
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Class A product, see page 605
9.6 V
10 mA
25 mW
253 V AC (125 V DC)
CE-compliant, additionally EN 61326
Ex II (1) G [Ex ia Ga] IIC
Ex II (1) D [Ex ia Da] IIIC
Ex II 3 G Ex nA IIC T4 Gc X
[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA IIC T4 Gc
Class I Div 2; IS for Class I, II, III Div 1
2

Ordering data

Description	Type	Order No.	Pcs./ Pkt.
NAMUR signal conditioner, 2-channel, input intrinsically safe, output: transistor, passive			
Screw connection	MACX MCR-EX-SL-2NAM-T	2865489	1
Push-in connection	MACX MCR-EX-SL-2NAM-T-SP	2924090	1

Digital IN  
NAMUR signal conditioner, Ex i



With line fault transparency



Ex: EAC Ex  
Housing width 12.5 mm

NAMUR signal conditioners for the intrinsically safe operation of proximity sensors or mechanical contacts installed in the Ex area.

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- Signal output with resistive behavior (transistor)
- Signal output with line fault transparency: line fault indicated directly via output to PLC or PCS. The output responds in accordance with EN 60947-5-6.
- Up to 5 kHz
- Direction of operation can be selected
- Line fault detection can be activated and deactivated
- Power supply and error indication possible via the DIN rail connector
- LED indicators for supply voltage, status, and fault according to NAMUR NE 44
- Plug-in screw or Push-in connection technology
- Safe 3-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

<b>Input data</b>	
Input signal	
No-load voltage	
Switching points	
Line fault detection	
<b>Switching output</b>	
Switching voltage	
Switching frequency	
Impedance 0-signal	
Impedance 1-signal	
Impedance fault	
Switching behavior	
<b>General data</b>	
Supply voltage range	
Current draw	
Power dissipation	
Electrical isolation	
Input/output	
Input/output/supply, DIN rail connector	
Input/supply, DIN rail connector	
Ambient temperature range	
Humidity	
Status indication	
Inflammability class in acc. with UL 94	
Housing material	
Dimensions W/H/D	
Screw connection solid/stranded/AWG	
Push-in connection solid/stranded/AWG	
EMC note	
<b>Safety data as per ATEX</b>	
Maximum output voltage U <sub>o</sub>	
Maximum output current I <sub>o</sub>	
Maximum output power P <sub>o</sub>	
Maximum voltage U <sub>m</sub>	
<b>Conformance/Approvals</b>	
Conformance	
ATEX	
IECEX	
SIL in accordance with IEC 61508	

Technical data

NAMUR proximity sensors (EN 60947-5-6)
open circuit switch contacts
Switch contacts with resistance circuit
8 V DC ±10 %
> 2.1 mA (conductive) / < 1.2 mA (blocking)
Break 0.05 mA < I <sub>IN</sub> < 0.35 mA
Short circuit 100 Ω < R <sub>Sensor</sub> < 360 Ω
Resistive (transistor, passive)
8.2 V DC ±10 % (according to EN 60947-5-6)
≤ 5 kHz (Ohmic load)
11 kΩ ±5 %
1.4 kΩ ±5 %
> 100 kΩ
can be inverted using DIP switch
9.6 V DC ... 30 V DC (12 V DC ... 24 V DC (-20 % ... +25 %))
25 mA (24 V DC)
< 0.6 W
375 V (Peak value in accordance with EN 60079-11)
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
2.5 kV (50 Hz, 1 min., test voltage)
375 V (Peak value in accordance with EN 60079-11)
-20 °C ... 60 °C (Any mounting position)
10 % ... 95 % (non-condensing)
Green LED (supply voltage)
Yellow LED (switching state)
Red LED (line fault)
V0
PA 66-FR
12.5 / 99 / 114.5 mm
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Class A product, see page 605
9.6 V
10 mA
25 mW
253 V AC/DC
CE-compliant, additionally EN 61326
Ex II (1) G [Ex ia Ga] IIC
Ex II (1) D [Ex ia Da] IIC
Ex II 3G Ex nA IIC T4 Gc X
[Ex ia Ga] IIC , [Ex ia Da] IIC , Ex nA IIC T4 Gc
2

**Notes:**  
Information on the supply and error evaluation module, DIN rail connectors, system cabling, and marking material can be found from page 174  
Information about resistance circuits is given on page 176

Ordering data

Description	Type	Order No.	Pcs./Pkt.
<b>NAMUR signal conditioner</b> , intrinsically safe input, output with line fault transparency	Screw connection	<b>MACX MCR-EX-SL-NAM-NAM</b>	1
	Push-in connection	<b>MACX MCR-EX-SL-NAM-NAM-SP</b>	1
<b>Specifically for Yokogawa systems</b>	Screw connection	<b>MACX MCR-EX-SL-NAM-YO</b>	1
	Push-in connection	<b>MACX MCR-EX-SL-NAM-YO-SP</b>	1
<b>Specifically for Honeywell systems</b>	Screw connection	<b>MACX MCR-EX-SL-NAM-HO</b>	1
	Push-in connection	<b>MACX MCR-EX-SL-NAM-HO-SP</b>	1

Ex i signal conditioners with SIL functional safety – MACX Analog Ex

Solenoid drivers for controlling solenoid valves

In order to control intrinsically safe Ex i solenoid valves, you have to have an intrinsically safe control circuit. This is provided by the solenoid drivers that are available from Phoenix Contact.

The following must be taken into account when dimensioning your intrinsically safe control circuit:

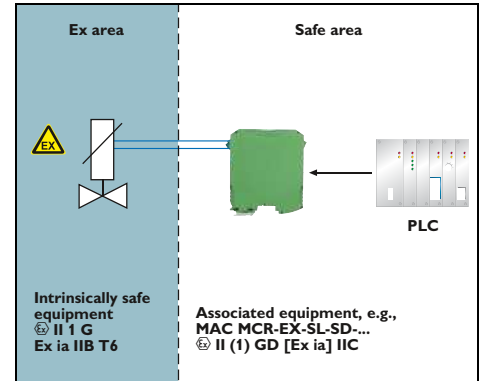
- Valve
- Cable with corresponding resistance
- Solenoid driver

As a result, it may be the case that not all valves are compatible with the solenoid drivers.

Below is an extract from a table showing possible combinations of valves and solenoid drivers.

A complete and updated list (along with details of the technical data for suitable valves, the maximum cable lengths, and the maximum cable resistances of the individual combinations) can be found on the Internet at: [phoenixcontact.net/products](http://phoenixcontact.net/products)

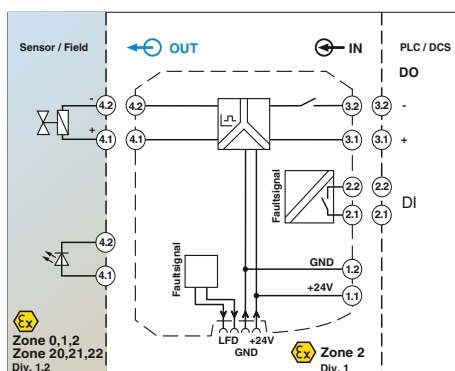
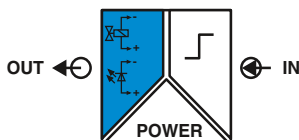
Example of a circuit



Valves overview

Manufacturer	Type designation	Ex certificate	Condition	MACX Analog Ex solenoid drivers			
				MACX MCR-EX-SL-SD-21-25-LP	MACX MCR-EX-SL-SD-21-40-LP	MACX MCR-EX-SL-SD-24-48-LP	MACX MCR-EX-SL-SD-21-60-LP
ASCO	Coil 195	LCIE 08 ATEX 6083			✓	✓	
	Coil 302 (12 V)	INERIS 03 ATEX 0249X				✓	✓
	Coil 302 (24 V)	INERIS 03 ATEX 0249X					✓
Bürkert	Coil AC 10, standard	PTB 01 ATEX 2101			✓	✓	
	Coil AC 10, high-resistance	PTB 01 ATEX 2101			✓	✓	
	Coil AC 21, standard	PTB 01 ATEX 2175	700 mW / 65°C		✓	✓	
	Coil AC 21, high-resistance	PTB 01 ATEX 2175	700 mW / 65°C		✓	✓	
	Coil AC 21, standard	PTB 01 ATEX 2175	900 mW / 45°C		✓	✓	
	Coil AC 21, high-resistance	PTB 01 ATEX 2175	900 mW / 45°C		✓	✓	
	Coil AC 21, standard	PTB 01 ATEX 2175	900 mW / 60°C		✓	✓	
	Coil AC 21, high-resistance	PTB 01 ATEX 2175	900 mW / 60°C		✓	✓	
	Coil G1 642735, standard		600 mW / 50°C		✓		
Coil G1 642735, high-resistance		600 mW / 50°C		✓			
FESTO	Coil MFH...IA-SA-EX GBXE022AIAD03	PTB 03 ATEX 2097				✓	✓
	Coil (J)MFH...BIA-SA-EX GBXE022AIAD03	PTB 03 ATEX 2097				✓	✓
	Coil 2050	PTB 07 ATEX 2019			✓	✓	✓
	Coil 2051	PTB 07 ATEX 2019			✓	✓	✓
	Coil 2052	PTB 07 ATEX 2019			✓	✓	✓
	Coil 2053	PTB 07 ATEX 2019			✓	✓	✓
	Coil 2085	PTB 06 ATEX 2001 U		✓		✓	
	Coil 2086	PTB 06 ATEX 2001 U		✓	✓	✓	✓
	Coil 3039	PTB 03 ATEX 2134				✓	✓
Hörbiger	Piezo P8 38x RF-Nx-SPN65	DMT 01 ATEX E026X	30 V type	✓	✓		
	Piezo P20 381RF-NG-CPN61	DMT 01 ATEX E025X	30 V type	✓	✓		
Parker	Coil VZ07 488650.01	LCIE 02 ATEX 6024X			✓	✓	
	Coil VZ33 494035.10	LCIE 02 ATEX 6024X			✓	✓	
	Coil VZ08 488660.01	LCIE 02 ATEX 6024X			✓	✓	
	Coil VZ09 488670.01	LCIE 02 ATEX 6024X			✓	✓	
	Coil VZ95 482160.01	LCIE 02 ATEX 6024X	EEx ia IIB T6		✓	✓	✓
	Coil VZ23 482870.01	LCIE 02 ATEX 6024X			✓	✓	
Samson	Coil 3701-11 (6 V)	PTB 02 ATEX 2178		✓	✓	✓	
	Coil 3701-12 (12 V)	PTB 02 ATEX 2178		✓	✓	✓	
	Coil 3701-13 (24 V)	PTB 02 ATEX 2178		✓	✓	✓	
	Coil 3963-11 (6 V)	PTB 01 ATEX 2085		✓	✓	✓	
	Coil 3963-12 (12 V)	PTB 01 ATEX 2085		✓	✓	✓	
	Coil 3963-13 (24 V)	PTB 01 ATEX 2085		✓	✓	✓	
	Coil 3964-11 (6 V)	PTB 02 ATEX 2047		✓	✓	✓	
	Coil 3964-12 (12 V)	PTB 02 ATEX 2047		✓	✓	✓	
	Coil 3964-13 (24 V)	PTB 02 ATEX 2047		✓	✓	✓	
	Coil 3965-11 (6 V)	PTB 05 ATEX 2044X		✓	✓	✓	
	Coil 3965-12 (12 V)	PTB 05 ATEX 2044X		✓	✓	✓	
	Coil 3965-13 (24 V)	PTB 05 ATEX 2044X		✓	✓	✓	
	Coil 3967-11 (6 V)	PTB 06 ATEX 2027		✓	✓	✓	
	Coil 3967-12 (12 V)	PTB 06 ATEX 2027		✓	✓	✓	
	Coil 3967-13 (24 V)	PTB 06 ATEX 2027		✓	✓	✓	
Seitz	Pilot valve PV 12F73 Ci oH	PTB 99 ATEX 2146		✓	✓	✓	
	Pilot valve PV 12F73 Xi oH	PTB 00 ATEX 2030		✓	✓	✓	
	Pilot valve PV 12F73 Xi oH-2	PTB 00 ATEX 2030		✓	✓	✓	
	Solenoid 11 G 52	PTB 01 ATEX 2020		✓	✓	✓	

Digital OUT  
Solenoid driver, Ex i



Current limitation 48 mA,  
with line fault detection

Functional Safety  
Ex: EAC Ex  
Housing width 12.5 mm

Solenoid driver for the intrinsically safe control of Ex i solenoid valves, alarm transmitters or indicators installed in the Ex area.

- Input: logic (low/high signal)
- Output: 48 mA current limitation at 9.5 V, [Ex ia]
- Line fault detection (can be activated and deactivated)
  - Directly via signal channel
  - Or via switching output
- Transparent for test pulses
- Power supply and error indication possible via the DIN rail connector
- LED indicators for supply voltage, status, and fault according to NAMUR NE 44
- Plug-in screw or Push-in connection technology
- Safe 3-way electrical isolation
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 permitted

Notes:

Information on the supply and error evaluation module, DIN rail connectors, system cabling, and marking material can be found from page 174

<b>Input data</b>	Switching level 0 signal ("L") Switching level 1 signal ("H") Current input signal Input impedance in the event of a line fault at the output
<b>Transparent for test pulses</b>	Yes
<b>Output data</b>	Output voltage Current limitation No-load voltage Internal resistance Immunity to short-circuiting Response time $t_A$ Line fault detection
<b>Error message output</b>	Switch contact Max. switching voltage Maximum switching current Short-circuit-proof
<b>General data</b>	Supply voltage range Current draw Power dissipation Electrical isolation
	Output/input, error message output
<b>Ambient temperature range</b>	-20 °C ... 60 °C (Any mounting position)
<b>Humidity</b>	10 % ... 95 % (non-condensing)
<b>Status indication</b>	Green LED (supply voltage) Yellow LED (switching state) Red LED (line fault)
<b>Degree of protection</b>	IP20
<b>Inflammability class in acc. with UL 94</b>	V0
<b>Housing material</b>	PA 66-FR
<b>Dimensions W/H/D</b>	12.5 / 112.5 / 114.5 mm
<b>Screw connection solid/stranded/AWG</b>	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
<b>Push-in connection solid/stranded/AWG</b>	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
<b>EMC note</b>	Class A product, see page 605
<b>Safety data as per ATEX</b>	25.3 V 94 mA 595 mW 253 V AC/DC
<b>Maximum output voltage <math>U_o</math></b>	
<b>Maximum output current <math>I_o</math></b>	
<b>Maximum output power <math>P_o</math></b>	
<b>Maximum voltage <math>U_m</math></b>	
<b>Conformance/Approvals</b>	CE-compliant, additionally EN 61326 [Ex ia Ga] IIC/IIB [Ex ia Da] IIIC [Ex ia Ga] IIC T4 Gc X [Ex ia Ga] IIC/IIB, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC T4 Gc 3
<b>Conformance</b>	
<b>ATEX</b>	
<b>IECEX</b>	
<b>SIL in accordance with IEC 61508</b>	

Technical data

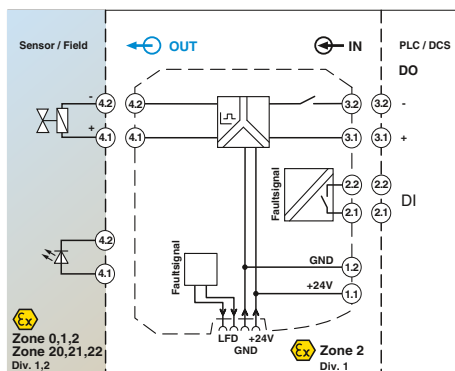
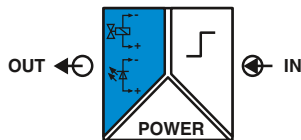
0 V DC ... 5 V DC (Open)
15 V DC ... 30 V DC
< 12 mA
3 M $\Omega$ (High resistance (Mega $\Omega$ ))
Yes
$\geq 9.36$ V DC (At 48 mA)
> 48 mA (With line fault detection)
> 22.5 V DC
$\geq 269 \Omega$ (Internal resistance $R_i$ )
yes
< 30 ms
< 50 $\Omega$ (short circuit on the line)
> 10 k $\Omega$ (line break)
N/C contact
30 V DC
50 mA
yes
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
< 90 mA (24 V DC)
< 1.8 W
375 V (Peak value in accordance with EN 60079-11)
300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
2.5 kV (50 Hz, 1 min., test voltage)
-20 °C ... 60 °C (Any mounting position)
10 % ... 95 % (non-condensing)
Green LED (supply voltage)
Yellow LED (switching state)
Red LED (line fault)
IP20
V0
PA 66-FR
12.5 / 112.5 / 114.5 mm
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Class A product, see page 605
25.3 V
94 mA
595 mW
253 V AC/DC
CE-compliant, additionally EN 61326
[Ex ia Ga] IIC/IIB
[Ex ia Da] IIIC
[Ex ia Ga] IIC T4 Gc X
[Ex ia Ga] IIC/IIB, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC T4 Gc 3

Ordering data

Description	Type	Order No.	Pcs./ Pkt.
<b>Solenoid driver</b> , logic input, intrinsically safe output, line fault detection	Screw connection	<b>MACX MCR-EX-SL-SD-23-48-LFD</b>	1
	Push-in connection	<b>MACX MCR-EX-SL-SD-23-48-LFD-SP</b>	1

Digital OUT  
Solenoid driver, Ex i

new



25.1 mA current limitation with line fault detection

Functional Safety  
Ex: Ex i  
Housing width 12.5 mm

Technical data

Solenoid driver for the intrinsically safe control of Ex i solenoid valves, alarm transmitters or indicators installed in the Ex area.

- Input: logic (low/high signal)
- Output: 25.1 mA current limitation at 4.64 V, [Ex ia]
- Line fault detection (can be activated and deactivated)
  - Directly via signal channel
  - Or via switching output
- Transparent for test pulses
- Power supply and error indication possible via the DIN rail connector
- LED indicators for supply voltage, status, and fault according to NAMUR NE 44
- Plug-in screw or Push-in connection technology
- Safe 3-way electrical isolation
- Up to SIL 3 according to IEC/EN 61508
- Installation in Zone 2 permitted

Input data

Switching level 0 signal ("L")  
Switching level 1 signal ("H")  
Current input signal  
Input impedance in the event of a line fault at the output

Transparent for test pulses

Output data

Output voltage  
Current limitation  
No-load voltage  
Internal resistance  
Immunity to short-circuiting  
Response time  $t_A$   
Line fault detection

Error message output

Switch contact  
Max. switching voltage  
Maximum switching current  
Short-circuit-proof

General data

Supply voltage range  
Current draw  
Power dissipation  
Electrical isolation

Output/input, error message output

Ambient temperature range

Humidity  
Status indication

Degree of protection

Inflammability class in acc. with UL 94  
Housing material  
Dimensions W/H/D  
Screw connection solid/stranded/AWG  
Push-in connection solid/stranded/AWG  
EMC note

Safety data as per ATEX

Maximum output voltage  $U_o$   
Maximum output current  $I_o$   
Maximum output power  $P_o$   
Maximum voltage  $U_m$

Conformance/Approvals

Conformance  
ATEX

IECEX

SIL in accordance with IEC 61508

0 V DC ... 5 V DC (Open)  
15 V DC ... 30 V DC  
< 12 mA  
3 M $\Omega$  (High resistance (Mega  $\Omega$ ))

Yes

$\geq 4.64$  V DC (at 25.1 mA)  
> 25.1 mA (With line fault detection)  
> 21.1 V DC  
 $\geq 641 \Omega$  (Internal resistance  $R_i$ )  
yes  
< 30 ms  
< 50  $\Omega$  (short circuit on the line)  
> 10 k $\Omega$  (line break)

N/C contact  
30 V DC  
50 mA  
yes

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)  
< 50 mA (24 V DC)  
< 0.8 W

375 V (Peak value in accordance with EN 60079-11)  
300 V<sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV (50 Hz, 1 min., test voltage)

-20 °C ... 60 °C (Any mounting position)  
10 % ... 95 % (non-condensing)  
Green LED (supply voltage)  
Yellow LED (switching state)  
Red LED (line fault)

IP20  
V0  
PA 66-FR  
12.5 / 112.5 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

23.98 V  
37.4 mA  
224 mW  
253 V AC/DC

CE-compliant, additionally EN 61326  
Ex II (1) G [Ex ia Ga] IIC/II B  
Ex II (1) D [Ex ia Da] IIIC  
Ex II 3(1) G Ex nA [ia Ga] IIC T4 Gc X  
[Ex ia Ga] IIC/II B , [Ex ia Da] IIIC , Ex nA [ia Ga] IIC T4 Gc  
3

Ordering data

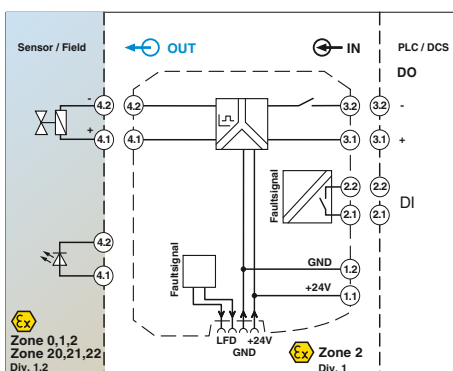
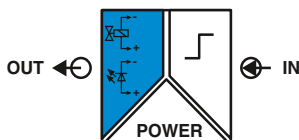
Description
Solenoid driver, logic input, intrinsically safe output, line fault detection
Screw connection
Push-in connection

Type	Order No.	Pcs./Pkt.
MACX MCR-EX-SL-SD-21-25-LFD	2905669	1
MACX MCR-EX-SL-SD-21-25-LFD-SP	2905674	1



new

Digital OUT  
Solenoid driver, Ex i



48 mA current limitation with line fault detection

Functional Safety  
Ex:   
Housing width 12.5 mm

Technical data

<b>Input data</b>	Switching level 0 signal ("L") Switching level 1 signal ("H") Current input signal Input impedance in the event of a line fault at the output	0 V DC ... 5 V DC (Open) 15 V DC ... 30 V DC < 12 mA 3 MΩ (High resistance (Mega Ω))
Transparent for test pulses		Yes
<b>Output data</b>	Output voltage Current limitation No-load voltage Internal resistance Immunity to short-circuiting Response time $t_A$ Line fault detection	≥ 9.7 V DC (At 48 mA) > 48 mA (With line fault detection) > 24.3 V DC ≥ 297 Ω (Internal resistance $R_i$ ) yes < 30 ms < 50 Ω (short circuit on the line) > 10 kΩ (line break)
<b>Error message output</b>	Switch contact Max. switching voltage Maximum switching current Short-circuit-proof	N/C contact 30 V DC 50 mA yes
<b>General data</b>	Supply voltage range Current draw Power dissipation Electrical isolation	19.2 V DC ... 30 V DC (24 V DC -20%...+25%) < 90 mA (24 V DC) < 1.62 W
Output/input, error message output		375 V (Peak value in accordance with EN 60079-11) 300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range		-20 °C ... 60 °C (Any mounting position)
Humidity		10 % ... 95 % (non-condensing)
Status indication		Green LED (supply voltage) Yellow LED (switching state) Red LED (line fault)
Degree of protection		IP20
Inflammability class in acc. with UL 94		V0
Housing material		PA 66-FR
Dimensions W/H/D		12.5 / 112.5 / 114.5 mm
Screw connection solid/stranded/AWG		0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Push-in connection solid/stranded/AWG		0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
EMC note		Class A product, see page 605
<b>Safety data as per ATEX</b>	Maximum output voltage $U_o$ Maximum output current $I_o$ Maximum output power $P_o$ Maximum voltage $U_m$	27.06 V 91.11 mA 616 mW 253 V AC/DC
<b>Conformance/Approvals</b>	Conformance ATEX	CE-compliant, additionally EN 61326 II (1) G [Ex ia Ga] IIC/IIB II (1) D [Ex ia Da] IIIC II 3(1) G Ex nA [ia Ga] IIC T4 Gc X [Ex ia Ga] IIC/IIB, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC T4 Gc 3
IECEX		
SIL in accordance with IEC 61508		

**Notes:**

A list of suitable valves and notes for calculating a valve circuit are available from the download center at [phoenixcontact.net/products](http://phoenixcontact.net/products).

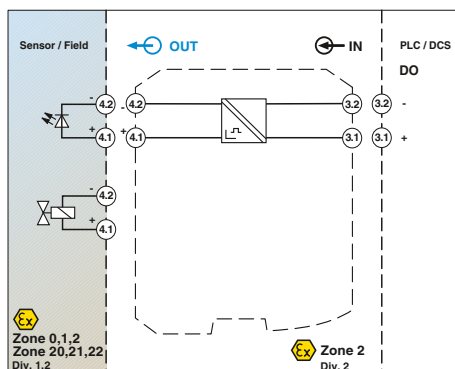
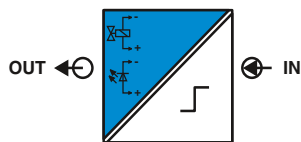
Information on marking material can be found on page 177

Information on "Plug and play" connection using system cabling can be found from page 164

Ordering data

Description	Type	Order No.	Pcs./Pkt.
<b>Solenoid driver</b> , logic input, intrinsically safe output, line fault detection			
Screw connection	<b>MACX MCR-EX-SL-SD-24-48-LFD</b>	<b>2906155</b>	1
Push-in connection	<b>MACX MCR-EX-SL-SD-24-48-LFD-SP</b>	<b>2906156</b>	1

Digital OUT  
Solenoid drivers, Ex i



Current limitation 25 mA

Functional Safety  
Ex: Ex EAC Ex Ex Ex Ex  
Housing width 12.5 mm

Solenoid drivers for controlling intrinsically safe solenoid valves, alarm transmitters, and indicators installed in Ex areas.

- 20 to 30 V DC input
- Output [Ex ia]
- Various output characteristic curves compatible with the commercial solenoid valves
- Loop-powered: the required power is supplied via the control signal on the input side.
- Mechanically compatible with DIN rail connector
- 2-way electrical isolation
- Up to SIL 3 according to EN 61508
- Installation in Zone 2 permitted

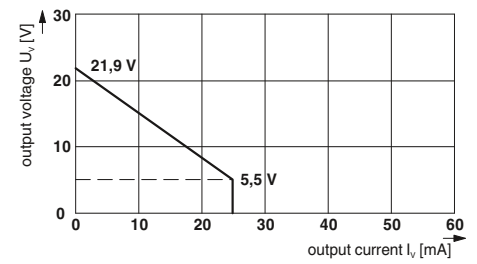
**Notes:**  
A list of suitable valves and notes for calculating a valve circuit are available from the download center at [phoenixcontact.net/products](http://phoenixcontact.net/products).  
Information on marking material can be found on page 177  
Information on "Plug and play" connection using system cabling can be found from page 164

<b>Input data</b>	
Input signal	
Input current	
<b>Output data</b>	
Output voltage	
Current limitation	
No-load voltage	
Internal resistance	
Immunity to short-circuiting	
Response time $t_A$	
<b>General data</b>	
Power dissipation	
Temperature coefficient	
Electrical isolation	
Ambient temperature range	
Status indication	
Degree of protection	
Inflammability class in acc. with UL 94	
Dimensions W/H/D	
Screw connection solid/stranded/AWG	
Push-in connection solid/stranded/AWG	
EMC note	
<b>Safety data as per ATEX</b>	
Maximum output voltage $U_o$	
Maximum output current $I_o$	
Maximum output power $P_o$	
Maximum voltage $U_m$	
<b>Conformance/Approvals</b>	
Conformance	
ATEX	
IECEX	
UL, USA/Canada	
SIL in accordance with IEC 61508	

<b>Technical data</b>		
	20 V DC ... 30 V DC (24 V DC -16.7 %...+25 %)	
	10 mA ... 70 mA (45 mA for $U_o = 24$ V DC)	
	5,5 V DC (At 25 mA)	
	25 mA	
	21.9 V DC	
	641 $\Omega$ (Internal resistance $R_i$ )	
	yes	
	20 ms	
	< 1 W	
	0.01 %/K	
Output/input	375 V (Peak value in accordance with EN 60079-11)	
	300 V $r_{ms}$ (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))	
	2.5 kV (50 Hz, 1 min., test voltage)	
	-20 °C ... 60 °C (Any mounting position)	
	Yellow LED (switching state / status, lights up when output circuit is active)	
	IP20	
	V0	
	12.5 / 99 / 114.5 mm	
	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
	Class A product, see page 605	
	25.1 V	
	39 mA	
	245 mW	
	253 V AC (125 V DC)	
	CE-compliant, additionally EN 61326	
	Ex II 3 G Ex nA IIC T4 Gc X	
	Ex II (1) G [Ex ia Ga] IIC/II B/IIA	
	Ex II (1) D [Ex ia Da] IIC	
	[Ex ia Ga] IIC/II B/IIA , [Ex ia Da] IIC , Ex nA IIC T4 Gc X	
	Class I Div 2; IS for Class I, II, III Div 1	
	3	

<b>Description</b>	
<b>Solenoid driver</b> , loop-powered, output intrinsically safe	
Screw connection	MACX MCR-EX-SL-SD-21-25-LP
Push-in connection	MACX MCR-EX-SL-SD-21-25-LP-SP

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs./Pkt.</b>
MACX MCR-EX-SL-SD-21-25-LP	2865492	1
MACX MCR-EX-SL-SD-21-25-LP-SP	2924113	1



Ex i signal conditioners with SIL functional safety – MACX Analog Ex



Current limitation 40 mA



Current limitation 48 mA



Current limitation 58 mA,  
[Ex ia] IIB

Functional Safety  
Ex: EAC Ex SIL IEC 61508 Ex

Functional Safety  
Ex: EAC Ex SIL IEC 61508 Ex

Functional Safety  
Ex: EAC Ex SIL IEC 61508 Ex

Technical data

Technical data

Technical data

20 V DC ... 30 V DC (24 V DC -16.7%...+25%)  
10 mA ... 95 mA (65 mA for  $U_o = 24$  V DC)

20 V DC ... 30 V DC (24 V DC -16.7%...+25%)  
10 mA ... 95 mA (75 mA for  $U_o = 24$  V DC)

20 V DC ... 30 V DC (24 V DC -16.7%...+25%)  
10 mA ... 105 mA (95 mA for  $U_o = 24$  V DC)

10 V DC (At 40 mA)  
40 mA  
21.9 V DC  
287  $\Omega$  (Internal resistance  $R_i$ )  
yes  
20 ms

10.5 V DC (At 48 mA)  
48 mA  
24 V DC  
276  $\Omega$  (Internal resistance  $R_i$ )  
yes  
30 ms

12.9 V DC (At 58 mA)  
58 mA  
21.9 V DC  
133  $\Omega$  (Internal resistance  $R_i$ )  
yes  
30 ms

< 1.2 W  
0.01 %/K

< 1.4 W  
0.01 %/K

< 1.4 W  
0.01 %/K

375 V (Peak value in accordance with EN 60079-11)  
300  $V_{rms}$  (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV (50 Hz, 1 min., test voltage)

375 V (Peak value in accordance with EN 60079-11)  
300  $V_{rms}$  (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV (50 Hz, 1 min., test voltage)

375 V (Peak value in accordance with EN 60079-11)  
300  $V_{rms}$  (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))  
2.5 kV (50 Hz, 1 min., test voltage)

-20 °C ... 60 °C (Any mounting position)  
Yellow LED (switching state / status, lights up when output circuit is active)  
IP20  
V0  
12.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

-20 °C ... 60 °C (Any mounting position)  
Yellow LED (switching state / status, lights up when output circuit is active)  
IP20  
V0  
12.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

-20 °C ... 60 °C (Any mounting position)  
Yellow LED (switching state / status, lights up when output circuit is active)  
IP20  
V0  
12.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
Class A product, see page 605

25.1 V  
87 mA  
550 mW  
253 V AC (125 V DC)

27.7 V  
101 mA  
697 mW  
253 V AC (125 V DC)

25.1 V  
188 mA  
1.18 W  
253 V AC (125 V DC)

CE-compliant, additionally EN 61326  
II 3 G Ex nA IIC T4 Gc X  
II (1) G [Ex ia Ga] IIC/IIB/IIA  
II (1) D [Ex ia Da] IIIC  
[Ex ia Ga] IIC/IIB/IIA  
Class I Div 2; IS for Class I, II, III Div 1  
3

CE-compliant, additionally EN 61326  
II 3 G Ex nA IIC T4 Gc X  
II (1) G [Ex ia Ga] IIC/IIB/IIA  
II (1) D [Ex ia Da] IIIC  
[Ex ia Ga] IIC/IIB/IIA  
Class I Div 2; IS for Class I, II, III Div 1  
3

CE-compliant, additionally EN 61326  
II 3 G Ex nA IIC T4 Gc X  
II (1) G [Ex ia Ga] IIC/IIB/IIA  
II (1) D [Ex ia Da] IIIC  
[Ex ia Ga] IIC/IIB/IIA  
Class I Div 2; IS for Class I, II, III Div 1  
3

Ordering data

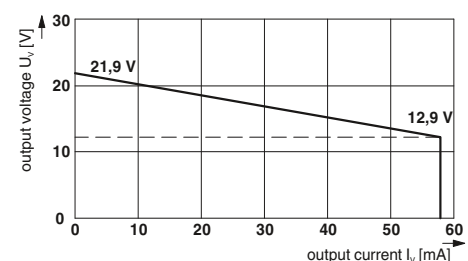
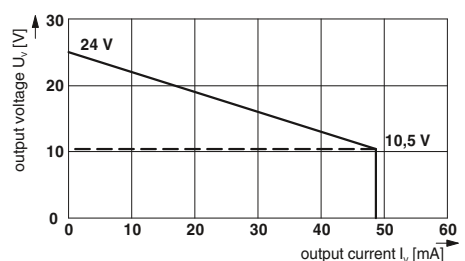
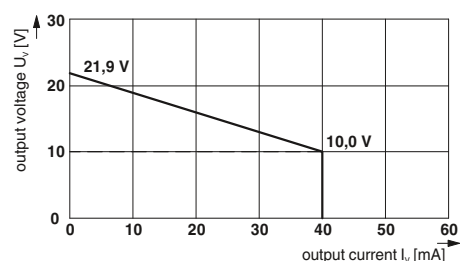
Ordering data

Ordering data

Type	Order No.	Pcs./Pkt.
MACX MCR-EX-SL-SD-21-40-LP	2865764	1
MACX MCR-EX-SL-SD-21-40-LP-SP	2924139	1

Type	Order No.	Pcs./Pkt.
MACX MCR-EX-SL-SD-24-48-LP	2865609	1
MACX MCR-EX-SL-SD-24-48-LP-SP	2924126	1

Type	Order No.	Pcs./Pkt.
MACX MCR-EX-SL-SD-21-60-LP	2865515	1
MACX MCR-EX-SL-SD-21-60-LP-SP	2924100	1



Termination Carrier for  
MACX Analog Ex signal conditioners



Select standard DIN rail device



Select module carrier

**TC... Termination Carriers** are compact solutions for quickly and smoothly connecting DIN rail devices from the MACX Analog Ex series to input and output cards of automation systems using system cabling.

The Termination Carriers combine the advantages of modular DIN rail devices with those offered by plug and play rapid cabling solutions to provide a consistent solution for system technology.

**Compact**

- Space savings of up to 30%, thanks to compact design

**Robust and reliable**

- Stable, vibration-resistant aluminum carrier device profile
- PCB is completely decoupled from modules
- PCB without active components
- Redundant supply and monitoring in separate DIN rail module

**Easy maintenance**

- Use of standard DIN rail devices
- Easy access to connection points
- Quick and safe module connection with plug-in and coded cable sets

**Flexible**

- Horizontal or vertical DIN rail mounting
- Profile section without pitch markings for I/O cards with specific number of channels
- Can be specifically adapted for I/O cards of various automation systems with different system plug types



Select controller-specific front adapter and system cable



Solutions are also available for MINI Analog, MACX Analog Ex, and Safety

### Termination Carrier for MACX Analog Ex signal conditioners

The **TC-D37SUB-ADIO16-EX-P-UNI** universal Termination Carrier is a compact solution which connects signal conditioners from the MACX Analog Ex series to analog or binary input/output cards of automation systems.

The **TC-D37SUB-AIO16-EX-PS-UNI** Termination Carrier design, when combined with the MACX MCR-S-MUX HART multiplexer, also enables communication between HART-capable field devices and a management system.

The **TC-D37SUB-ADIO16-2EX-P-UNI** universal Termination Carrier is a compact solution which connects two-channel signal conditioners from the MACX Analog Ex series to analog or binary input and output cards of automation systems.

- Connection of up to 16 single-channel (Ex i) signal conditioners
- Universal 1:1 signal routing to a 37-pos. D-SUB connector
- For system cables with D-SUB socket and open ends for universal connection
- Redundant supply and monitoring in separate DIN rail module

**Notes:**  
Contact us: specific Termination Carrier designs for I/O modules of various automation systems are available, planned or can be implemented according to your specification.



ERC  
Ex:   
Housing width 242 mm

General data	
Connection to the control system level	
Number of positions	
Maximum operating voltage	
Maximum permissible current	
Rated insulation voltage	
Degree of pollution	
Overvoltage category	
Rated surge voltage	
Air clearances and creepage distances	
Ambient temperature range	
Shock	
Vibration (operation)	
Dimensions W/H/D	
EMC note	
Power supply via power module	
Input voltage range	
Redundant supply	
Polarization and surge protection	
Fuse	
Status indication	
Switching output	
Maximum switching voltage	

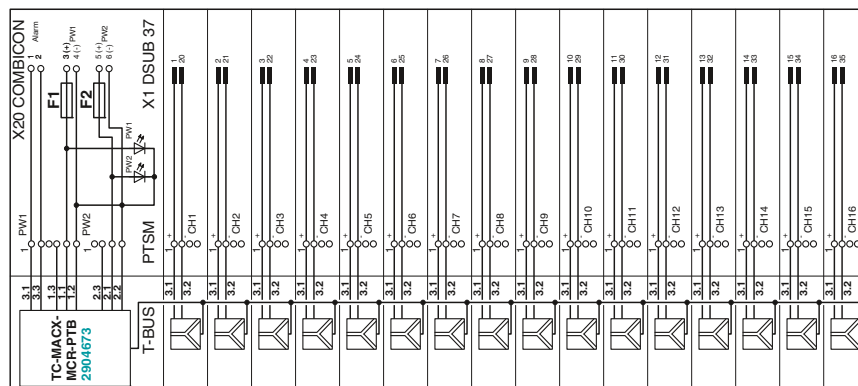
Technical data	
D-SUB pin strip	
37	
< 30 V DC (Per signal/channel)	
23 mA (Signal/channel)	
50 V	
2	
II	
0.5 kV	
DIN EN 50178 ( Basic insulation )	
-20 °C ... 60 °C (Please observe module specifications)	
15g, according to IEC 60068-2-27	
2g, according to IEC 60068-2-6	
242 / 170 / 160 mm	
Class A product, see page 605	
Power supply	
19.2 V DC ... 30 V DC	
yes, decoupled from diodes	
Yes	
2x 2.5 A on PCB, slow-blow (replaceable)	
Status	
1 x red LED (error)	
2x green LEDs (PWR1 and PWR2)	
1 N/C contact (alarm = open)	
50 V DC (0.3 A) / 30 V DC (2 A) / 33 V AC (2 A)	

Description	
<b>Universal Termination Carrier</b> for 16 single-channel MACX MCR-EX isolators	
- With connection for multiplexer	
<b>Universal Termination Carrier</b> for 16 two-channel MACX MCR-EX isolators	

Ordering data		
Type	Order No.	Pcs./ Pkt.
TC-D37SUB-ADIO16-EX-P-UNI	2924854	1
TC-D37SUB-AIO16-EX-PS-UNI	2902932	1
TC-2D37SUB-ADIO32-2EX-P-UNI	2904684	1

Power and fault signaling module	
HART multiplexer, 32-channel	

Accessories		
TC-MACX-MCR-PTB	2904673	1
MACX MCR-S-MUX	2865599	1



TC-D37SUB-ADIO16-EX-P-UNI and TC-D37SUB-AIO16-EX-PS-UNI connection scheme

**Multiplexer for HART signals**

Multiplexer for digital connection of HART-capable field devices (such as measuring transducers or control valves) to a PC or management system.

- Supports online configuration and diagnostics for the connected HART-capable field devices
- Constant documentation of process variables and states
- 32 HART channels per multiplexer
- Up to 128 HART multiplexers at one PC interface
- Communication via software tool (e.g. HART OPC Server) using RS-485 interface
- Electrical isolation between auxiliary energy, RS-485 bus, and the HART channels
- HART field devices are accessed at the same time that the measurement signal is transmitted without affecting measured value processing
- HART field devices connected via universal HART connection boards; direct connection if processing non-Ex signals, with separate Ex i signal isolator connected upstream if processing Ex signals
- Power supplied via HART connection board



<b>Field devices interface (HART)</b>	
Channels	16 or 32; adjustable using a switch
Connection method	Flat-ribbon cable, 14-pos. (inclusive)
Signal	HART FSK
HART specification	HART Field Communication Protocol Rev. 6.0 (downward compatible up to Rev 4.0); FSK Physical Layer Specification (Rev. 8.1)
Data transmission display	Two yellow "Tx" and "Rx" "HART" LEDs
Display error	Red "ERR" LED (flashes in case of an error in the HART bus)
<b>RS-485 interface</b>	
Connection method	D-SUB-9 socket
Signal	RS-485
Data flow control/protocols	Compatible with OPC HART server, PDM, PRM, and FDT/DTM
Number of HART multiplexers per bus segment	Max 31
Address setting	0...127; using a rotary switch at the front
Data rate	9600 / 19200 / 38400 / 57600 [bps]; via rotary switch at the front
Transmission length	≤ 1200 m
Display	Two yellow "Tx" and "Rx" "RS-485" LEDs
<b>General data</b>	
Supply voltage range	18 V ... 31.2 V
Nominal supply voltage	24 V DC
Current consumption	55 mA
Power consumption	1.35 W
Operating voltage display	Green "PWR" LED
Undervoltage monitoring	Yes (no faulty devices / output states)
Electrical isolation of HART signal/RS-485	350 V AC
Electrical isolation of HART signals between each other	100 V DC (Capacitive)
Electrical isolation of HART signal/supply	350 V AC
Electrical isolation of RS-485/supply	350 V AC
Error monitoring	Processor error: The "PWR" LED flashes; error in the HART communication: the "ERR" LED flashes
Ambient temperature range	-20 °C ... 60 °C
Humidity	≤ 95 % (non-condensing)
Dimensions W/H/D	35.2 / 99 / 114.5 mm
Conformance/Approvals	CE-compliant
Conformance	

ERC

Housing width 35.2 mm

**Technical data**

<b>Technical data</b>		
Channels	16 or 32; adjustable using a switch	
Connection method	Flat-ribbon cable, 14-pos. (inclusive)	
Signal	HART FSK	
HART specification	HART Field Communication Protocol Rev. 6.0 (downward compatible up to Rev 4.0); FSK Physical Layer Specification (Rev. 8.1)	
Data transmission display	Two yellow "Tx" and "Rx" "HART" LEDs	
Display error	Red "ERR" LED (flashes in case of an error in the HART bus)	
<b>RS-485 interface</b>		
Connection method	D-SUB-9 socket	
Signal	RS-485	
Data flow control/protocols	Compatible with OPC HART server, PDM, PRM, and FDT/DTM	
Number of HART multiplexers per bus segment	Max 31	
Address setting	0...127; using a rotary switch at the front	
Data rate	9600 / 19200 / 38400 / 57600 [bps]; via rotary switch at the front	
Transmission length	≤ 1200 m	
Display	Two yellow "Tx" and "Rx" "RS-485" LEDs	
<b>General data</b>		
Supply voltage range	18 V ... 31.2 V	
Nominal supply voltage	24 V DC	
Current consumption	55 mA	
Power consumption	1.35 W	
Operating voltage display	Green "PWR" LED	
Undervoltage monitoring	Yes (no faulty devices / output states)	
Electrical isolation of HART signal/RS-485	350 V AC	
Electrical isolation of HART signals between each other	100 V DC (Capacitive)	
Electrical isolation of HART signal/supply	350 V AC	
Electrical isolation of RS-485/supply	350 V AC	
Error monitoring	Processor error: The "PWR" LED flashes; error in the HART communication: the "ERR" LED flashes	
Ambient temperature range	-20 °C ... 60 °C	
Humidity	≤ 95 % (non-condensing)	
Dimensions W/H/D	35.2 / 99 / 114.5 mm	
Conformance/Approvals	CE-compliant	
Conformance		

**Ordering data**

Description	
<b>HART multiplexer</b> , 32-channel, including two 14-wire flat-ribbon cables	

Type	Order No.	Pcs./ Pkt.
MACX MCR-S-MUX	2865599	1

**Accessories**

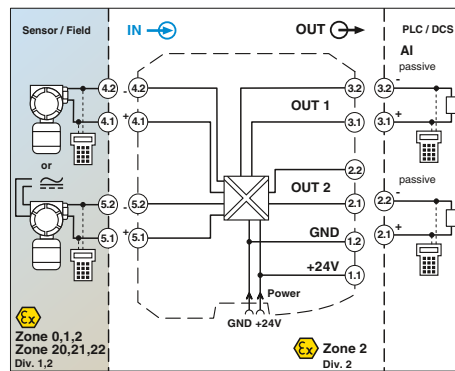
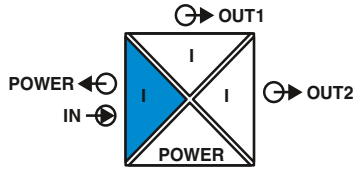
<b>Universal Termination Carrier</b> for 16 single-channel MACX MCR-EX isolators - With connection for multiplexer	
<b>Module carrier</b> for 16 MINI Analog channels, power and feed-through module - With connection for MACX MCR-S-MUX HART multiplexer	
<b>HART connection board</b>	
<b>Interface converter</b>	
<b>Repeater</b> , for electrical isolation and increased range	

TC-D37SUB-AIO16-EX-PS-UNI	2902932	1
TC-D37SUB-AIO16-M-PS-UNI	2902934	1
MACX MCR-S-MUX-TB	2308124	1
PSM-ME-RS232/RS485-P	2744416	1
PSM-ME-RS485/RS485-P	2744429	1



Analog IN

Repeater power supply, Ex i



Repeater power supply and input signal conditioner, with two electrically isolated outputs

Housing width 12.5 mm

Technical data

- 4 to 20 mA input, [Ex ia], powered and not powered
- Two electrically isolated outputs, 4 to 20 mA (active)
- PL d according to EN ISO 13849-1
- Up to SIL 2 according to IEC 61508
- Installation in Zone 2 possible
- Plug-in screw and Push-in connection technology
- 4-way electrical isolation
- Bidirectional HART communication possible
- Power supply via DIN rail connector possible

**Notes:**

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174

Test plugs for test sockets can be found on page 176

Information on "Plug and play" connection using system cabling can be found from page 164

<b>Input data</b>	
Input signal	4 mA ... 20 mA / 4 mA ... 20 mA
Transmitter supply voltage	> 16 V (20 mA)
Voltage drop	approx. 3.9 V
<b>Output data</b>	
Output signal (Per output)	4 mA ... 20 mA (active)
Load	< 450 Ω (20 mA)
Output ripple	< 20 mV <sub>rms</sub>
<b>General data</b>	
Supply voltage range	19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Current consumption	< 75 mA (24 V DC / 20 mA)
Power dissipation	< 1.45 W (24 V DC/ 20 mA)
Temperature coefficient	< 0.01 %/K
Step response (10-90%)	1.3 ms (for jump 4 mA ... 20 mA, typical)
Transmission error, typical	< 0.05 % (of final value)
Maximum transmission error	< 0.1 % (of final value)
Under-/overload range	according to NE 43
Electrical isolation	300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
	2.5 kV (50 Hz, 1 min., test voltage)
<b>Input/output/power supply</b>	
Input/output	375 V (Peak value in accordance with EN 60079-11)
Input/power supply	375 V (Peak value in accordance with EN 60079-11)
Output 1/output 2	1.5 kV AC (50 Hz, 1 min., test voltage)
	-20 °C ... 60 °C (Any mounting position)
	Green LED (PWR supply voltage)
	Yes
	HART
	PA 66-FR
	12.5 / 99 / 114.5 mm
	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
	Class A product, see page 605
<b>Safety data as per ATEX</b>	
Maximum output voltage U <sub>o</sub>	25.2 V
Maximum output current I <sub>o</sub>	93 mA
Maximum output power P <sub>o</sub>	587 mW
Maximum voltage U <sub>m</sub>	253 V AC (125 V DC)
<b>Conformance/Approvals</b>	
Conformance	CE-compliant, additionally EN 61326
ATEX	Ex II (1) G [Ex ia Ga] IIC/IIB Ex II (1) D [Ex ia Da] IIIC Ex II 3 (1) G Ex nA [ia Ga] IIC/IIB T4 Gc [Ex ia Ga] IIC/IIB , [Ex ia Da] IIIC , Ex nA [ia Ga] IIC/IIB T4 Gc
IECEX	2
SIL in accordance with IEC 61508	PLd
Performance level according to ISO 13849	

Ordering data

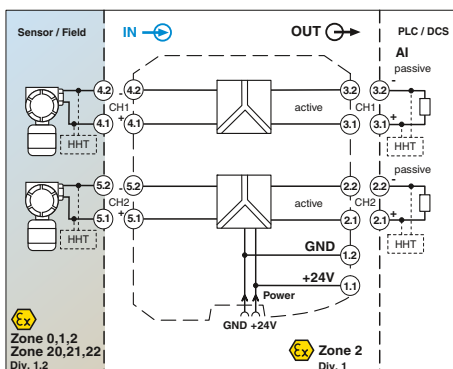
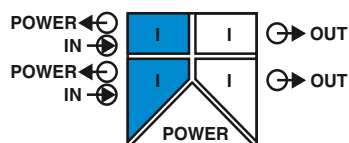
Description
<b>Repeater power supply and input signal conditioner, signal duplicator</b> , with performance level, intrinsically safe input
Screw connection
Push-in connection

Type	Order No.	Pcs./ Pkt.
MACX PL-EX-RPSSI-2I	2904959	1
MACX PL-EX-RPSSI-2I-SP	2904960	1



Analog IN

Repeater power supply, Ex i



2-channel repeater power supply

Functional Safety  
 Ex:   
 Housing width 12.5 mm

- 2-channel
- 4 to 20 mA input, [Ex ia], powered
- 4 to 20 mA output (active)
- PL d according to EN ISO 13849-1
- Up to SIL 3 according to IEC 61508
- Installation in Zone 2 possible
- Plug-in screw and Push-in connection technology
- 3-way electrical isolation, per channel
- Bidirectional HART communication possible
- Power supply via DIN rail connector possible

<b>Input data</b>	per channel
Input signal	4 mA ... 20 mA
Transmitter supply voltage	> 16 V (at 20 mA)
Underload/overload signal range	0 mA ... 24 mA
<b>Output data</b>	per channel
Output signal	4 mA ... 20 mA (active)
Load	≤ 450 Ω (20 mA)
Underload/overload signal range	0 mA ... 24 mA
<b>General data</b>	
Supply voltage range	19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Current consumption	< 100 mA (24 V / 20 mA)
Power dissipation	< 1.4 W (at 24 V DC / 20 mA)
Temperature coefficient	< 0.01 %/K
Step response (10-90%)	< 1.3 ms (for 4 mA ... 20 mA step)
Transmission error, typical	< 0.05 % (of final value)
Maximum transmission error	< 0.1 % (of final value)
Electrical isolation	
Input/output, power supply	300 V <sub>ins</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Input/output	375 V (Peak value in accordance with EN 60079-11)
Input/power supply	375 V (Peak value in accordance with EN 60079-11)
Output 1/output 2/ power supply	1.5 kV (50 Hz, 1 min., test voltage) -20 °C ... 60 °C (Any mounting position) Green LED (supply voltage) Yes as per HART specifications HART PA 66-FR 12.5 / 99 / 114.5 mm 0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16 Class A product, see page 605
Ambient temperature range	
Status indication	
SMART communication	
Signal bandwidth	
Protocols supported	
Housing material	
Dimensions W/H/D	
Screw connection solid/stranded/AWG	
Push-in connection solid/stranded/AWG	
EMC note	
<b>Safety data as per ATEX</b>	
Maximum output voltage U <sub>o</sub>	25.2 V
Maximum output current I <sub>o</sub>	93 mA
Maximum output power P <sub>o</sub>	587 mW
Maximum voltage U <sub>m</sub>	253 V AC (125 V DC)
<b>Conformance/Approvals</b>	
Conformance	CE-compliant, additionally EN 61326
ATEX	II (1) G [Ex ia Ga] IIC/IIB II (1) D [Ex ia Da] IIIC II 3(1) G Ex nA [ia Ga] IIC T4 Gc [Ex ia Ga] IIC/IIB, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC T4 Gc 3 PLd
IECEx	
SIL in accordance with IEC 61508	
Performance level according to ISO 13849	

<b>Notes:</b>
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 174
Test plugs for test sockets can be found on page 176
Information on "Plug and play" connection using system cabling can be found from page 164

<b>Description</b>
<b>Repeater power supply</b> , two-channel, with performance level, intrinsically safe input
Screw connection
Push-in connection

**Technical data**

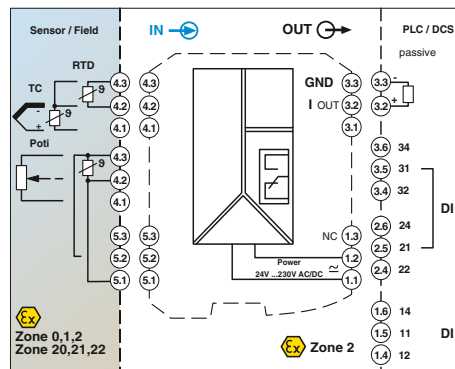
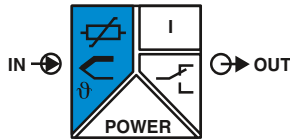
<b>Technical data</b>
per channel
4 mA ... 20 mA
> 16 V (at 20 mA)
0 mA ... 24 mA
per channel
4 mA ... 20 mA (active)
≤ 450 Ω (20 mA)
0 mA ... 24 mA
19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
< 100 mA (24 V / 20 mA)
< 1.4 W (at 24 V DC / 20 mA)
< 0.01 %/K
< 1.3 ms (for 4 mA ... 20 mA step)
< 0.05 % (of final value)
< 0.1 % (of final value)
300 V <sub>ins</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
375 V (Peak value in accordance with EN 60079-11)
375 V (Peak value in accordance with EN 60079-11)
1.5 kV (50 Hz, 1 min., test voltage)
-20 °C ... 60 °C (Any mounting position)
Green LED (supply voltage)
Yes
as per HART specifications
HART
PA 66-FR
12.5 / 99 / 114.5 mm
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Class A product, see page 605
25.2 V
93 mA
587 mW
253 V AC (125 V DC)
CE-compliant, additionally EN 61326
II (1) G [Ex ia Ga] IIC/IIB
II (1) D [Ex ia Da] IIIC
II 3(1) G Ex nA [ia Ga] IIC T4 Gc
[Ex ia Ga] IIC/IIB, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC T4 Gc
3
PLd

**Ordering data**

Type	Order No.	Pcs./ Pkt.
MACX PL-EX-RPSS-2I-2I	2904963	1
MACX PL-EX-RPSS-2I-2I-SP	2904964	1

Temperature

Temperature transducer, Ex i



universal, with limit value relays,  
wide-range power supply

Ex: Ex EAC Ex  
Housing width 35 mm

- Input for resistance thermometers, thermocouples, resistance-type sensors, potentiometers, mV sources, [Ex ia]
- Differential measurement possible with Pt 100
- A safety-related limit value relay, by bridging two relays
- An additional limit value relay for non-safety-related function
- PL d according to EN ISO 13849-1
- Up to SIL 2 according to IEC 61508
- Configuration via software (ANALOG-CONF or FDT/DTM)
- Cold junction compensation with separate connector
- Wide range power supply 19.2 to 253 V AC/DC
- Status indicators for supply voltage, cable, sensor, and module errors
- Installation in Zone 2 possible
- Plug-in screw and Push-in connection technology

<b>Notes:</b>
The configuration software can be downloaded from the Internet ( <a href="http://phoenixcontact.net/products">phoenixcontact.net/products</a> ).
Information on the IFS-OP-UNIT operating and display unit and the associated IFS-OP-CRADLE DIN rail cradle can be found on page 171
For information on the programming adapter, refer to page 172

<b>Input data</b>	Resistance thermometers Thermocouple sensors
Resistor	Potentiometer
Voltage	
<b>Output data</b>	Output signal Maximum output signal Load $R_B$ Behavior in the event of a sensor error
<b>Switching output</b>	Contact type Contact material Max. switching voltage Maximum switching current
<b>General data</b>	Supply voltage range Power consumption Temperature coefficient Maximum transmission error Electrical isolation
<b>Input/output/power supply</b>	Input/output Input/power supply Input/switching output Output/supply
<b>Ambient temperature range</b>	
<b>Humidity</b>	
<b>Inflammability class in acc. with UL 94</b>	
<b>Housing material</b>	
<b>Dimensions W/H/D</b>	
<b>Screw connection solid/stranded/AWG</b>	
<b>Push-in connection solid/stranded/AWG</b>	
<b>EMC note</b>	
<b>Safety data as per ATEX</b>	Maximum output voltage $U_o$ Maximum output current $I_o$ Maximum output power $P_o$
<b>Conformance/Approvals</b>	Conformance ATEX
<b>IECEX</b>	SIL in accordance with IEC 61508 Performance level according to ISO 13849

<b>Technical data</b>	
Pt, Ni, Cu sensors: 2, 3, 4-wire	B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG
0 $\Omega$ ... 50 k $\Omega$	0 $\Omega$ ... 50 k $\Omega$
-1000 mV ... 1000 mV	
4 mA ... 20 mA	22 mA
$\leq 600 \Omega$ (20 mA)	according to NE 43 or freely configurable
Relay output	2 PDT AgSnO <sub>2</sub> , hard gold-plated 250 V AC (250 V DC) 2 A (250 V AC) / 2 A (28 V DC)
24 V ... 230 V AC/DC (-20 %/+10 %, 50/60 Hz)	< 2.4 W
0.01 %/K	0.1 % (e.g. for Pt 100, 300 K span, 4 ... 20 mA)
2.5 kV (50 Hz, 1 min., test voltage)	375 V (Peak value in accordance with EN 60079-11)
Input/output	375 V (Peak value in accordance with EN 60079-11)
Input/power supply	375 V (Peak value in accordance with EN 60079-11)
Input/switching output	300 V <sub>rms</sub> (Rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
Output/supply	
-20 °C ... 65 °C	typ. 5 % ... 95 % (non-condensing)
V0	PA 66-FR
35 / 99 / 114.5 mm	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
	Class A product, see page 605
6 V	7.4 mA
11 mW	
CE-compliant	Ex II (1) G [Ex ia Ga] IIC Ex II (1) D [Ex ia Da] IIIC Ex II 3 G Ex nA nC ic IIC T4 Gc X [Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC ic IIC T4 Gc X
	2 PLd

<b>Description</b>	
<b>Temperature transducer with threshold value switch, with performance level, intrinsically safe input</b>	
	Screw connection Push-in connection
<b>Programming adapter for configuring modules with S-PORT interface</b>	

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs./ Pkt.</b>
MACX PL-EX-TUIREL-UP	2904910	1
MACX PL-EX-TUIREL-UP-SP	2904912	1
<b>Accessories</b>		
IFS-USB-PROG-ADAPTER	2811271	1

### Accessories, operating and display unit

- Local display of actual values
- Copy function
- Easy guided operation
- Easy configuration without PC software
- Operating and display unit can be snapped directly onto compatible devices with a housing width of 35 mm
- DIN rail mounting possible for thinner devices in conjunction with cradle unit
- Backlighting
- Installation in Zone 2 permitted



Can be snapped directly onto compatible 35 mm devices

General data	
Ambient temperature range	-20 °C ... 65 °C (-4 °F...149 °F)
Humidity	90 % (at 25 °C, non-condensing)
Housing material	PA 6.6
Dimensions W/H/D	35 / 99 / 20 mm
Connection method	PC side Measuring transducer side
EMC note	
Conformance/Approvals	
Conformance	CE-compliant
ATEX	Ex II 3G Ex nA ic IIC T4 Gc X
IECEX	Ex nA ic IIC T4 Gc

#### Technical data

-20 °C ... 65 °C (-4 °F...149 °F)  
90 % (at 25 °C, non-condensing)  
PA 6.6  
35 / 99 / 20 mm  
S-PORT (socket)  
S-PORT (connector)  
Class A product, see page 605

Description	
<b>Operating and display unit</b>	

#### Ordering data

Type	Order No.	Pcs./Pkt.
IFS-OP-UNIT	2811899	1

### Accessories, cradle unit

- For snapping onto the DIN rail
- For control cabinet mounting of the operating and display unit



Cradle for operating and display unit

General data	
Ambient temperature range	-20 °C ... 65 °C (-4 °F...149 °F)
Humidity	90 % (at 25 °C, non-condensing)
Housing material	PA 6.6
Dimensions W/H/D	35.2 / 29 / 99 mm
Connection method	IFS-OP-UNIT operator interface Measuring transducer side
EMC note	
Conformance/Approvals	
Conformance	CE-compliant
ATEX	Ex II 3G Ex nA ic IIC T4 Gc X
IECEX	Ex nA ic IIC T4 Gc

#### Technical data

-20 °C ... 65 °C (-4 °F...149 °F)  
90 % (at 25 °C, non-condensing)  
PA 6.6  
35.2 / 29 / 99 mm  
S-PORT (socket)  
S-PORT (connector)  
Class A product, see page 605

Description	
<b>Cradle unit</b> , for snapping the operating and display unit onto the DIN rail	

#### Ordering data

Type	Order No.	Pcs./Pkt.
IFS-OP-CRADLE	2811886	1

### Accessories

#### Programming adapter

The IFS-USB-PROG-ADAPTER programming adapter is used for configuring Phoenix Contact Interface modules with S-PORT interface.

The adapter is used with FDT/DTM software or ANALOG-CONF software. For programming the MACX Analog, MINI Analog Pro, and MINI Analog.



Description	Ordering data		
	Type	Order No.	Pcs./Pkt.
<b>Programming adapter</b> for configuring modules with S-PORT interface	<b>IFS-USB-PROG-ADAPTER</b>	<b>2811271</b>	1

### Accessories

#### Shield fast connection

- For connecting cable shielding to cable terminal points
- Can be connected to PLUGTRAB PT
- Easy assembly



Description	Ordering data		
	Type	Order No.	Pcs./Pkt.
<b>Shield fast connection</b> , for connection to PLUGTRAB PT			
For Ø 3-6 mm	<b>SSA 3-6</b>	<b>2839295</b>	10
For Ø 5-10 mm	<b>SSA 5-10</b>	<b>2839512</b>	10

Accessories

**ME 6,2 TBUS... DIN rail connector**

DIN rail connector (5-pos.) for bridging the supply voltage of 12.5 mm wide MACX analog modules

- Reduced wiring effort
- System can be extended or module replaced even while process is active
- Inter-extendable



Description	Ordering data		
	Type	Order No.	Pcs./Pkt.
<p><b>DIN rail connector (TBUS)</b>, for bridging the supply voltage, can be snapped onto 35 mm DIN rails according to EN 60715, with UL approval</p> <p>Color: green</p>	<b>ME 6,2 TBUS-2 1,5/5-ST-3,81 GN</b>	<b>2869728</b>	10

Accessories

**Dummy - MACX MCR-EX-DUMMY-ISOLATOR**

Dummy module with no function for connecting unused intrinsically safe signal cables, with plug-in connection terminal blocks.



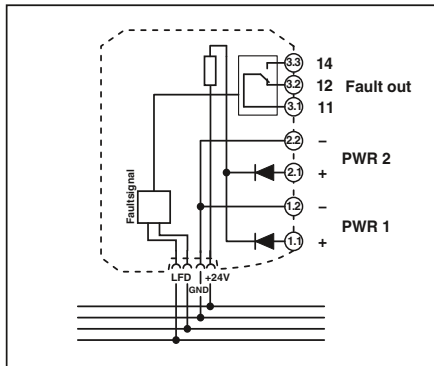
Description	Ordering data		
	Type	Order No.	Pcs./Pkt.
<p><b>Dummy module with no function</b> with screw connection with Push-in connection</p>	<b>MACX MCR-EX-DUMMY-ISOLATOR</b>	<b>2904970</b>	1
	<b>MACX MCR-EX-DUMMY-ISOLATOR-SP</b>	<b>2905846</b>	1

Accessories

**Power and fault signaling module**

Power and fault signaling module for feeding the 24 V supply voltage to the DIN rail connectors and signaling line faults and power supply failures.

- One-time or redundant supply, decoupled from diode, protected against polarization
- Supply current up to 3.75 A
- Relay output (PDT) and flashing LED for error messages
- Error message in the event of a power supply failure or fuse fault
- Bus cable fault message for MACX MCR-...(2)NAM... devices connected via DIN rail connectors
- Replaceable fuse
- Installation in Zone 2 permitted



Ex n



Housing width 17.5 mm

**Technical data**

<b>Input data</b>	
Input signal	
Redundant supply	
Polarization and surge protection	
<b>Output data</b>	
Maximum output signal	
Output voltage	
<b>Switching output</b>	
Contact type	
Contact material	
Max. switching voltage	
<b>General data</b>	
Ambient temperature range	
Humidity	
Fuse	
Status indication	
Inflammability class in acc. with UL 94	
Housing material	
Dimensions W/H/D	
Screw connection solid/stranded/AWG	
Push-in connection solid/stranded/AWG	
EMC note	
<b>Conformance/Approvals</b>	
Conformance	
ATEX	
IECEX	
UL, USA/Canada	

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
yes, decoupled from diodes
Yes
3.75 A
Input voltage - max 0.8 V at 3.75 A
Relay
1 PDT
Gold (Au)
50 V AC (50 V DC (0.3 A) / 50 V DC (2 A) / 33 V AC (2 A))
-20 °C ... 60 °C (Any mounting position)
5% ... 95% (non-condensing)
5 A (replaceable), slow-blow 250 V AC
1 x red LED (error)
2 x green LEDs (PWR1 and PWR2)
V0
Polyamide (PA 6.6)
17.5 / 99 / 114.5 mm
0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Class A product, see page 605
CE-compliant
Ex II 3 G Ex nA nC IIC T4 Gc X
Ex nA nC IIC T4 Gc X
UL 61010 Listed
Class I, Div. 2, Groups A, B, C, D T5
Class I, Zone 2, Group IIC

**Ordering data**

<b>Description</b>
<b>Power and fault signaling module</b> , including the relevant DIN rail connector ME 17,5 TBUS 1,5/5-ST-3,81 GN
Screw connection
Push-in connection

Type	Order No.	Pcs./Pkt.
MACX MCR-PTB	2865625	1
MACX MCR-PTB-SP	2924184	1

Accessories

**Power and fault signaling module**

Power and fault signaling module for supplying the 24 V supply voltage to the DIN rail connectors of the MACX Analog Ex Termination Carriers and signaling line faults and power supply failures.

- One-time or redundant supply, decoupled from diode, protected against polarization
- Feed-in current up to 2 A protected by Termination Carrier PCB
- Relay output (PDT) and flashing LED for error messages
- Error message in the event of a power supply failure or fuse fault
- Bus cable fault message for MACX MCR-...(2)NAM... devices connected via DIN rail connectors
- Installation in Zone 2 possible



Housing width 17.5 mm

Technical data	
Input data	
Input signal	19.2 V DC ... 30 V DC
Redundant supply	yes, decoupled from diodes
Polarization and surge protection	Yes
Output data	
Maximum output signal	2 A (Redundancy range)
Output voltage	Input voltage - 0.7 V
Switching output	Relay
Contact type	1 PDT
Contact material	Gold (Au)
Max. switching voltage	50 V AC/DC (33 V AC (2 A) / 50 V DC (0.3 A) / 30 V DC (2 A))
General data	
Ambient temperature range	-20 °C ... 60 °C (only on Termination Carrier)
Humidity	5 % ... 95 % (non-condensing)
Status indication	1 x red LED (error) 2 x green LEDs (PWR1 and PWR2) V0
Inflammability class in acc. with UL 94	Polyamide (PA 6.6)
Housing material	17.5 / 99 / 114.5 mm
Dimensions W/H/D	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Push-in connection solid/stranded/AWG	Class A product, see page 605
EMC note	
Conformance/Approvals	
Conformance	CE-compliant
ATEX	Ex II 3 G Ex nA nC IIC T4 Gc X
IECEX	Ex nA nC IIC T4 Gc X
UL, USA/Canada	UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC

Ordering data			
Description	Type	Order No.	Pcs./Pkt.
<b>Power and fault signaling module</b> without integrated fuse	Screw connection <b>TC-MACX-MCR-PTB</b>	<b>2904673</b>	1

### Accessories

#### Resistance circuit

Double-level terminal block with resistance circuit according to NAMUR for line fault detection in the case of mechanical contacts

#### Important:

- For intrinsically safe circuits, only in combination with D-UKK 3/5 cover



		Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.
<b>Double-level terminal block</b> , with pre-assembled resistors				
with screw connection	gray	<b>UKK 5-2R/NAMUR</b>	<a href="#">2941662</a>	50
<b>Cover</b> , width 2.5 mm	gray	<b>D-UKK 3/5</b>	<a href="#">2770024</a>	50
	blue	<b>D-UKK 3/5 BU</b>	<a href="#">2770105</a>	50

### Accessories

#### Test plug



		Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.
<b>Test plug</b> , consisting of:				
<b>Metal part</b> for 2.3 mm Ø socket hole and	silver	<b>MPS-MT</b>	<a href="#">0201744</a>	10
<b>Insulating sleeve</b> , for MPS metal part	red	<b>MPS-IH RD</b>	<a href="#">0201676</a>	10
	black	<b>MPS-IH BK</b>	<a href="#">0201731</a>	10
	gray	<b>MPS-IH GY</b>	<a href="#">0201728</a>	10
	green	<b>MPS-IH GN</b>	<a href="#">0201702</a>	10
	yellow	<b>MPS-IH YE</b>	<a href="#">0201692</a>	10
	blue	<b>MPS-IH BU</b>	<a href="#">0201689</a>	10
	white	<b>MPS-IH WH</b>	<a href="#">0201663</a>	10



## Accessories

**Marking material for device marking**

- For device marking inside the control cabinet and in the field
- Self-adhesive with high adhesive strength
- Large temperature range



		Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.
<b>UniCard</b> , with self-adhesive plastic labels				
10-part, lettering field size: 11 x 9 mm	white	<b>UC-EMLP (11X9)</b>	<b>0819291</b>	10
<b>UniCard</b> , with self-adhesive plastic labels, <b>marked according to customer specifications</b> For ordering details, see Catalog 3 or phoenixcontact.net/product.				
10-part, lettering field size: 11 x 9 mm	white	<b>UC-EMLP (11X9) CUS</b>	<b>0824547</b>	1



The Field Analog process indicators allow you to monitor and display analog and temperature signals as well as control them via digital and analog inputs and outputs.

**Further advantages:**

- 2-conductor sensors are powered by the integrated measuring transducer supply
- International use, thanks to UL and CSA approvals



### Universal use

Field Analog process indicators are available for field and control panel installation. The universal inputs allow you to record current, voltage, RTDs, and TCs.



### Everything at a glance

Current process values are easy to read on the five-digit backlit displays. The bar graph also provides you with a quick overview. You can recognize alarm statuses easily from a distance by their changing color.



### Easy installation and startup

Thanks to the standardized housing dimensions and plug-in connection terminal blocks, the indicators are easy to install. The devices are easy to configure via the keypad on the front or via FDT/DTM software.



### Intrinsic safety Zone 0, Zone 20

Also for intrinsically safe circuits in the Ex area: versions with ATEX, CSA, and FM approval.



### Distributed control cabinet installation

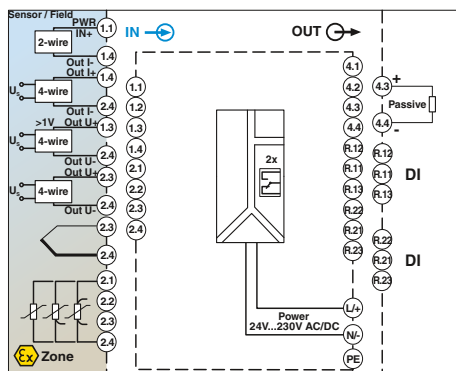
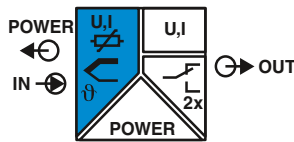
MCR temperature transducers for resistance thermometers, thermocouples, resistance-type sensors, and voltage sensors are also available for control cabinet installation.



### Head-mounted transducer

With head-mounted transducers you can record temperatures directly in the field and convert them into standard signals.

Multifunctional process indicator



Multifunctional process indicator for installation in the control cabinet

FAus DNV GL  
Housing width 96 mm

For installation in the control cabinet

- Multifunctional process indicator, in control panel component housing for monitoring and displaying analog measurement data
- Supply of 2-conductor sensors
- Safe 4-way isolation
- Configurable via software or hardware keypad on the front
- Universal inputs for connection of current, voltage, RTDs, and TCs
- Limit value monitoring with two relay outputs
- Process signal transmission via analog output
- Display changes color in the event of an error

**Notes:**  
The configuration software can be downloaded from the Internet ([phoenixcontact.net/products](http://phoenixcontact.net/products)).

<b>Input data</b>	Input signal
<b>Input data</b>	Sensor types that can be used Connection method Measuring rate Temperature measuring range
<b>Input resistance</b>	-
<b>Output data</b>	U output I output
<b>Output signal</b>	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 0 V ... 1 V -1 V ... 1 V -10 V ... 10 V -30 V ... 30 V -100 mV ... 100 mV
<b>Display</b>	7-segment LC display, with backlight, dot matrix for text/bar graph
<b>Number of the displayed positions</b>	5
<b>Switching output</b>	Transistor output, active Open collector output 1
<b>Number of outputs</b>	1
<b>Switching output</b>	Relay output 2 PDT 30 V DC (3 A) / 230 V AC (3 A) 3 A 10 mA
<b>General data</b>	Supply voltage range Degree of protection Ambient temperature (operation) Housing material Dimensions W/H/D Control panel cutout Screw connection solid/stranded/AWG
<b>Conformance/Approvals</b>	FA MCR-D-TUI-UI-2REL-UP CE-compliant ATEX UL, USA/Canada FM approval CSA GL

Technical data

<b>U input</b>	I input
0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 0 V ... 1 V 1 V ... 5 V -1 V ... 1 V -10 V ... 10 V -30 V ... 30 V -100 mV ... 100 mV	0 mA ... 20 mA +10 % 4 mA ... 20 mA +10 %
<b>RTD</b>	<b>TC</b>
Pt, Ni, Cu sensors 2, 3, 4-wire 200 ms -200 °C ... 1100 °C (Range depends on sensor type, adjustable)	J, K, T, N, B, S, R, U, L, C, D - 200 ms -200 °C ... 2495 °C (Range depends on sensor type, adjustable)
<b>Input resistance</b>	10 Ω
<b>U output</b>	<b>I output</b>
0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 0 V ... 1 V	0 mA ... 20 mA 4 mA ... 20 mA
<b>Display</b>	7-segment LC display, with backlight, dot matrix for text/bar graph
<b>Number of the displayed positions</b>	5
<b>Switching output</b>	Transistor output, active Open collector output 1
<b>Number of outputs</b>	1
<b>Switching output</b>	Relay output 2 PDT 30 V DC (3 A) / 230 V AC (3 A) 3 A 10 mA
<b>General data</b>	24 V DC ... 230 V DC IP65 from the front -20 °C ... 60 °C PC-GF10 96 / 48 / 151.8 mm 92 x 45 mm 0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
<b>Conformance/Approvals</b>	FA MCR-EX-D-TUI-UI-2REL-UP CE-compliant Ex II (1) G [Ex ia Ga] IIC UL 61010 Recognized AIS, NII/2/ABCDEF/G/T4 CSA GP GL EMC 1 C

<b>Description</b>	Multifunctional process indicator, in control panel component housing for monitoring and displaying analog measurement data
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Ordering data

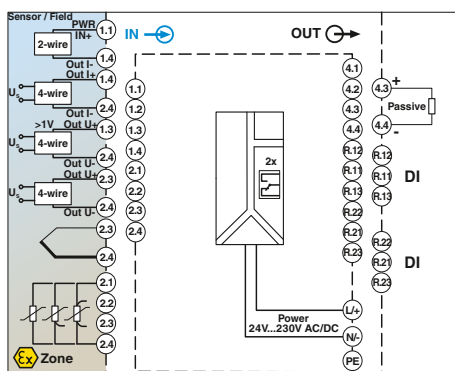
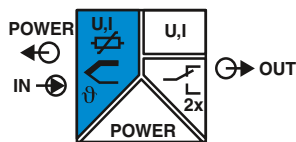
Type	Order No.	Pcs./ Pkt.
FA MCR-D-TUI-UI-2REL-UP	2907064	1
FA MCR-EX-D-TUI-UI-2REL-UP	2907216	1

Accessories

MCR-PAC-T-USB	2309000	1
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Multifunctional process indicator

new



Multifunctional process indicator in field housing



Housing width 199 mm

Field housing

- Multifunctional process indicator, in control panel component housing for monitoring and displaying analog measurement data
- Supply of 2-conductor sensors
- Safe 4-way isolation
- Configurable via software or hardware keypad on the front
- Universal inputs for connection of current, voltage, RTDs, and TCs
- Limit value monitoring with two relay outputs
- Process signal transmission via analog output
- Display changes color in the event of an error

Notes:

The configuration software can be downloaded from the Internet ([phoenixcontact.net/products](http://phoenixcontact.net/products)).

<b>Input data</b>	Input signal
<b>Input data</b>	Sensor types that can be used Connection method Measuring rate Temperature measuring range
<b>Input resistance</b>	-
<b>Output data</b>	Output signal
<b>Display</b>	Display
<b>Number of the displayed positions</b>	5
<b>Switching output</b>	Transistor output, active Open collector output 1
<b>Number of outputs</b>	2 PDT
<b>Switching output</b>	30 V DC (3 A) / 230 V AC (3 A)
<b>Contact type</b>	3 A
<b>Max. switching voltage</b>	10 mA
<b>Maximum switching current</b>	
<b>Minimum switching current</b>	
<b>General data</b>	24 V DC ... 230 V DC
<b>Supply voltage range</b>	IP67
<b>Degree of protection</b>	-40 °C ... 50 °C (The readability of the display is no longer guaranteed at temperatures below -30 °C (-22 °F).)
<b>Ambient temperature (operation)</b>	
<b>Housing material</b>	PBT GF30
<b>Dimensions W/H/D</b>	199 / 160 / 96 mm
<b>Screw connection solid/stranded/AWG</b>	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
<b>Conformance/Approvals</b>	FA MCR-FD-TUI-UI-2REL-UP      FA MCR-EX-FD-TUI-UI-2REL-UP
<b>Conformance</b>	CE-compliant      CE-compliant
<b>ATEX</b>	-      Ex II (1) G [Ex ia Ga] IIC
<b>UL, USA/Canada</b>	UL 61010 Recognized      UL 61010 Recognized
<b>FM approval</b>	-      AIS / I / 1 / ABCDEFG
<b>CSA</b>	CSA GP      Associated Apparatus

Technical data

<b>U input</b>	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 0 V ... 1 V 1 V ... 5 V -1 V ... 1 V -10 V ... 10 V -30 V ... 30 V -100 mV ... 100 mV	<b>I input</b>	0 mA ... 20 mA +10 % 4 mA ... 20 mA +10 %
<b>RTD</b>	Pt, Ni, Cu sensors	<b>TC</b>	J, K, T, N, B, S, R, U, L, C, D
<b>2, 3, 4-wire</b>	200 ms	<b>200 ms</b>	-
<b>-200 °C ... 1100 °C (Range depends on sensor type, adjustable)</b>		<b>-200 °C ... 2495 °C (Range depends on sensor type, adjustable)</b>	
<b>U output</b>	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 1 V ... 5 V	<b>I output</b>	0 mA ... 20 mA 4 mA ... 20 mA
<b>7-segment LC display, with backlight, dot matrix for text/bar graph</b>			
<b>5</b>			
<b>Transistor output, active</b>			
<b>Open collector output</b>			
<b>1</b>			
<b>Relay output</b>			
<b>2 PDT</b>			
<b>30 V DC (3 A) / 230 V AC (3 A)</b>			
<b>3 A</b>			
<b>10 mA</b>			
<b>24 V DC ... 230 V DC</b>			
<b>IP67</b>			
<b>-40 °C ... 50 °C (The readability of the display is no longer guaranteed at temperatures below -30 °C (-22 °F).)</b>			
<b>PBT GF30</b>			
<b>199 / 160 / 96 mm</b>			
<b>0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14</b>			
<b>FA MCR-FD-TUI-UI-2REL-UP</b>		<b>FA MCR-EX-FD-TUI-UI-2REL-UP</b>	
<b>CE-compliant</b>		<b>CE-compliant</b>	
<b>-</b>		<b>Ex II (1) G [Ex ia Ga] IIC</b>	
<b>UL 61010 Recognized</b>		<b>UL 61010 Recognized</b>	
<b>-</b>		<b>AIS / I / 1 / ABCDEFG</b>	
<b>CSA GP</b>		<b>Associated Apparatus</b>	

Ordering data

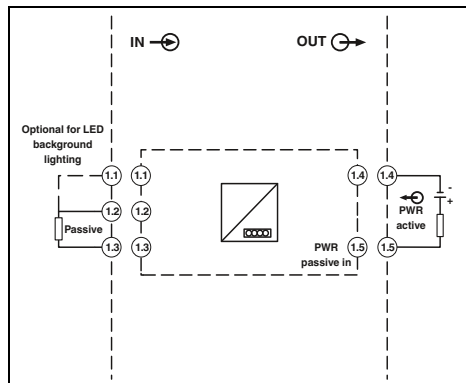
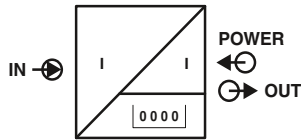
Type	Order No.	Pcs./ Pkt.
FA MCR-FD-TUI-UI-2REL-UP	2907780	1
FA MCR-EX-FD-TUI-UI-2REL-UP	2907781	1

Accessories

MCR-PAC-T-USB	2309000	1
FA MCR-FD-PM	2908739	1

<b>Description</b>	Multifunctional process indicator, in field housing for monitoring and displaying analog measurement data
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<b>Software adapter cable</b> , 2.4 m long, with USB connection, for programming
<b>Pipe or wall mounting set</b> , for use with multi-functional process indicator in field housing



Loop-powered process indicator with HART communication for installation in the control cabinet

**For installation in the control cabinet**

- Loop-powered
- Display of 4 to 20 mA or HART signals
- Low voltage drop
- 5-digit 7-segment display
- Display value can be scaled
- Low installation depth
- Configurable via front keypad
- SIL-impact-free according to EN61508

<b>Input data</b>
Input signal
Maximum input signal
Voltage drop
<b>Input impedance</b>
<b>Output data</b>
Display
<b>Number of the displayed positions</b>
<b>General data</b>
Supply voltage range
<b>Resolution A/D</b>
<b>Degree of protection</b>
<b>Ambient temperature (operation)</b>
<b>Housing material</b>
<b>Dimensions W/H/D</b>
<b>Control panel cutout</b>
<b>Screw connection solid/stranded/AWG</b>
<b>Conformance/Approvals</b>
<b>Conformance</b>

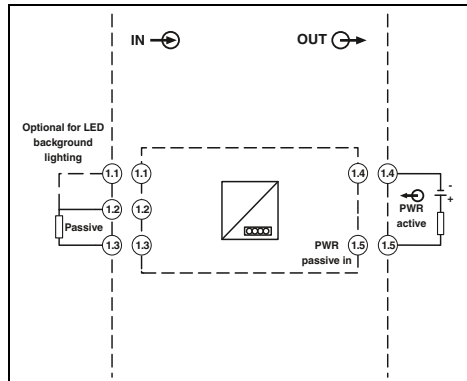
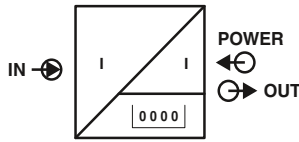
Housing width 96 mm

Technical data	
<b>I</b>	HART
4 mA ... 20 mA	up to 4x HART signals
200 mA	-
≤ 1 V	≤ 1.9 V
≤ 3.9 V (with display lighting)	≤ 4.8 V (with display lighting)
approx. 50 Ω	R <sub>x</sub> = 40 Ω / C <sub>x</sub> = 2.3 nF
<b>Output data</b>	7-segment LC display, with backlight, dot matrix for text/bar graph
<b>Display</b>	5
<b>Number of the displayed positions</b>	5
<b>General data</b>	loop-powered, no external supply necessary
<b>Supply voltage range</b>	
<b>Resolution A/D</b>	> 13 bit
<b>Degree of protection</b>	IP65 (Front) IP20 (On the rear)
<b>Ambient temperature (operation)</b>	-40 °C ... 60 °C
<b>Housing material</b>	Aluminum / polycarbonate
<b>Dimensions W/H/D</b>	96 / 48 / 41.5 mm
<b>Control panel cutout</b>	92 x 45 mm
<b>Screw connection solid/stranded/AWG</b>	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
<b>Conformance/Approvals</b>	
<b>Conformance</b>	CE-compliant

<b>Description</b>
<b>Output loop-powered process indicator</b> inside the control panel housing for representing current or HART signals

Ordering data		
Type	Order No.	Pcs./ Pkt.
FA MCR-DS-I-I-OLP	2908781	1

Loop-powered process indicator



Loop-powered process indicator with HART communication in field housing

Field housing

- Loop-powered
- Display of 4 to 20 mA or HART signals
- Low voltage drop
- 5-digit 7-segment display
- Display value can be scaled
- Low installation depth
- Configurable via front keypad
- SIL-impact-free according to EN61508

<b>Input data</b>	
Input signal	4 mA ... 20 mA
Maximum input signal	200 mA
Voltage drop	≤ 1 V
	≤ 3.9 V (with display lighting)
<b>Input impedance</b>	approx. 50 Ω
<b>Output data</b>	
Display	7-segment LC display, with backlight, dot matrix for text/bar graph
<b>Number of the displayed positions</b>	5
<b>General data</b>	
Supply voltage range	loop-powered, no external supply necessary
Resolution A/D	> 13 bit
Degree of protection	IP66/IP67
	NEMA 4X
Ambient temperature (operation)	-40 °C ... 60 °C
Housing material	Aluminum
Dimensions W/H/D	131 / 81.5 / 55.5 mm
Screw connection solid/stranded/AWG	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
<b>Conformance/Approvals</b>	
Conformance	CE-compliant

Housing width 131 mm

Technical data	
I	HART
4 mA ... 20 mA	up to 4x HART signals
200 mA	-
≤ 1 V	≤ 1.9 V
≤ 3.9 V (with display lighting)	≤ 4.8 V (with display lighting)
approx. 50 Ω	R <sub>x</sub> = 40 Ω / C <sub>x</sub> = 2.3 nF
7-segment LC display, with backlight, dot matrix for text/bar graph	
5	
loop-powered, no external supply necessary	
> 13 bit	
IP66/IP67	
NEMA 4X	
-40 °C ... 60 °C	
Aluminum	
131 / 81.5 / 55.5 mm	
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16	
CE-compliant	

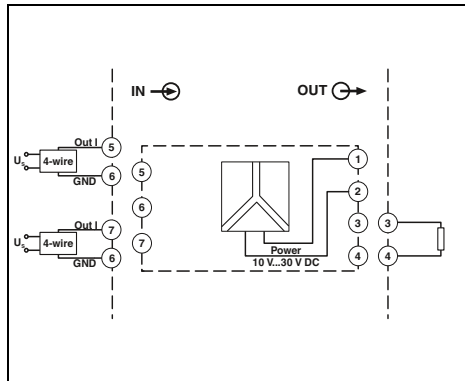
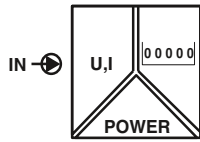
<b>Description</b>
<b>Output loop-powered process indicator</b> inside field housing for representing current or HART signals

Ordering data		
Type	Order No.	Pcs./Pkt.
FA MCR-FDS-I-I-OLP	2908782	1

<b>Pipe or wall mounting set</b> , for use with output loop-powered process indicator in field housing
--

Accessories		
FA MCR-FDS-PM	2908783	1

Displays  
Standard signals



for standard analog signals,  
configurable

- For 0 to 10 V and 0(4) to 20 mA standard analog signals
- Configurable
- 5 positions displayed
- 8 mm LED, 7-segment
- Electrical isolation
- Minimum/maximum value storage
- Latch/hold function for storing the display value
- Display 48 x 24 mm

<b>Input data</b>	
Input signal	
Maximum input signal	
Input resistance	
Resolution	
Measuring rate	
Input latch signal	
Switching level	1 signal ("H") 0 signal ("L")
<b>Output data</b>	
Display	
Number of the displayed positions	
Accuracy	
<b>General data</b>	
Supply voltage range	
Current consumption	
Mass storage	
Resolution A/D	
System hum suppression	
Test voltage input/power supply	
Degree of protection	
Ambient temperature (operation)	
Housing material	
Dimensions W/H/D	
Control panel cutout	
Screw connection solid/stranded/AWG	
<b>Conformance/Approvals</b>	
Conformance	
UL, USA/Canada	



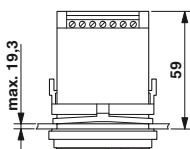
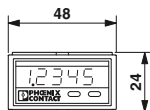
Housing width 48 mm

**Technical data**

<b>U input</b>	<b>I input</b>
0 ... 10 V	0 ... 20 mA / 4 ... 20 mA
30 V DC	50 mA
> 1 MΩ	approx. 100 Ω with 5 mA / approx. 70 Ω with 20 mA
1 mV	2 μA
0.5 to 2 measurements/second	
Display stop	
4 V DC ... 30 V DC	
0 V DC ... 2 V DC	
7-segment LED; 8 mm; red	
5	
< 0.1 % ±1 digit (At an ambient temperature of 20°C)	
10 V DC ... 30 V DC	
50 mA	
EEPROM 1 mil. memory cycles or 10 years	
14 bit	
Digital filtering 50/60 Hz	
500 V <sub>rms</sub> (50/60 Hz, 1 min.)	
IP65 from the front	
-10 °C ... 50 °C	
Macrolon 2405	
48 / 24 / 68 mm	
22(+0.6)x45(+0.8) mm	
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16	
CE-compliant	
UL 508 Recognized	

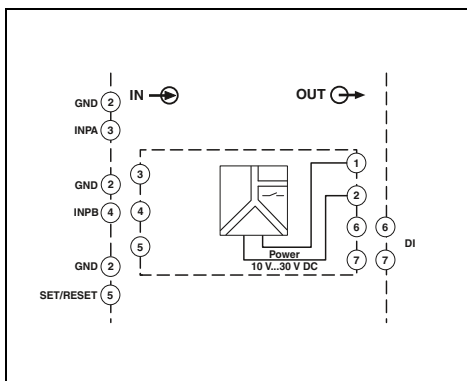
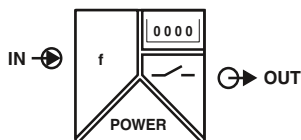
<b>Description</b>
<b>MCR process display</b> , for measuring and displaying standard signals
<b>MCR DIN rail adapter</b> for digital displays in a 24 x 48 mm housing

<b>Ordering data</b>		
Type	Order No.	Pcs./ Pkt.
MCR-SL-D-U-I	2864011	1
<b>Accessories</b>		
MCR-SL-D-RA	2810081	1





Displays  
Frequency



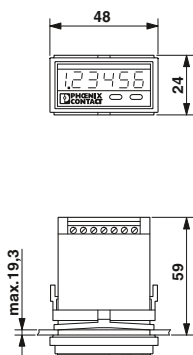
Programmable digital display for frequencies, pulses, and times

- For frequency signals up to max. 60 kHz
- Configurable
- 6 positions displayed
- LED 8 mm, 7 segment
- 48 x 24 mm display

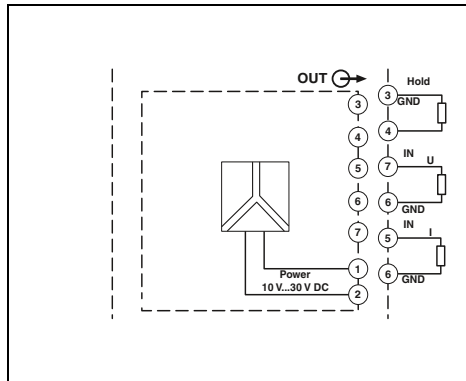
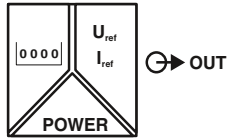
Input data	
Maximum input signal	60 kHz
Input resistance	10 kΩ
Switching level	1 signal ("H") 0 signal ("L")
4 V DC ... 30 V DC	
0 V DC ... 2 V DC	
Output data	
Display	7-segment LED; 8 mm; red
Number of the displayed positions	6
Switching output	
Max. switching voltage	30 V DC
Maximum switching current	10 mA
1 NPN optocoupler	
General data	
Supply voltage range	10 V DC ... 30 V DC
Current consumption	max. 40 mA
Mass storage	EEPROM 1 mil. memory cycles or 10 years
IP65 from the front	
Ambient temperature (operation)	-20 °C ... 65 °C
Housing material	Macrolon 2405
Dimensions W/H/D	48 / 24 / 68 mm
Control panel cutout	22(+0.6)x45(+0.8) mm
Screw connection solid/stranded/AWG	0.14 ... 1 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL 508 Recognized

Ordering data		
Type	Order No.	Pcs./Pkt.
MCR-SL-D-FIT	2864024	1
Accessories		
MCR-SL-D-RA	2810081	1

**MCR DIN rail adapter** for digital displays in a 24 x 48 mm housing



### Displays Setpoint adjuster



With manual and automatic ramp function

- Manual setpoint definition with incremental adjustment
- Manual setpoint definition via direct input
- Automatic setpoint definition with hold function and 20 interpolation points
- Flexible, adjustable signal ranges of 0 to 12 V or 0 to 24 mA
- Data backup in the event of power failure
- Display value parameterization
- Electrical isolation between output and supply

Input data	
Display	7-segment, 8 mm, red
Number of the displayed positions	4
Switching level	1 signal ("H") 0 signal ("L")
Output data	
Output signal	U output 0 ... 12 V
Length of step	10 mV
Load $R_B$	0 ... 24 mA 10 $\mu$ A $\geq 2$ k $\Omega$ $\leq 500 \Omega$ (Up to 20 mA) $\leq 400 \Omega$ (> 20 mA)
Ripple	$\leq 10$ mV <sub>pp</sub>
General data	
Supply voltage range	10 V DC ... 30 V DC
Power consumption	1 W (With 24 mA/12 V)
Maximum transmission error	< 0.2 % ((full-scale) at rated voltage)
Test voltage output/power supply	500 V AC (50 Hz, 1 min.)
Degree of protection	IP65 from the front
Ambient temperature (operation)	-20 °C ... 65 °C
Housing material	Macrolon 2405
Dimensions W/H/D	48 / 24 / 68 mm
Control panel cutout	45(+0.6)x22.2(+0.3) mm
Screw connection solid/stranded/AWG	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL 508 Recognized

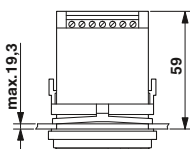
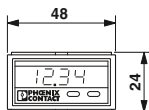


Housing width 48 mm

#### Technical data

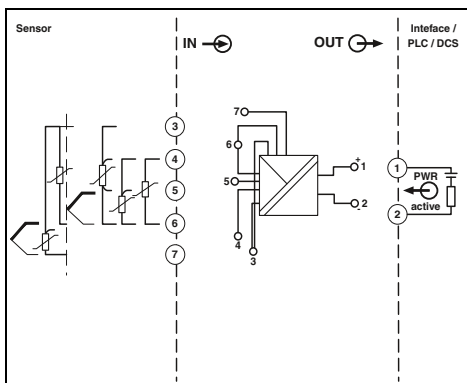
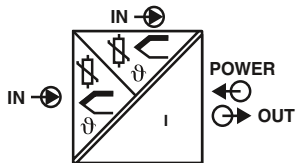
Ordering data	
Type	Order No.
MCR-SL-D-SPA-UI	2710314
	Pcs./Pkt.
	1
Accessories	
MCR-SL-D-RA	2810081
	1

Description	
<b>MCR digital setpoint adjuster</b> , for presetting current and voltage signals	
<b>MCR DIN rail adapter</b> for digital displays in a 24 x 48 mm housing	



new

Temperature  
Head-mounted temperature  
transducer



Block diagram for FA MCR-HT-TS-I-OLP-PT



Loop-powered  
head-mounted temperature transducer

- Output loop-powered head-mounted temperature transducer
- 2 universal inputs for RTD, TC, resistance-type sensors, and voltage sensors (mV)
- 4 to 20 mA output
- HART communication
- Freely configurable
- SIL 2/3
- For mounting in the connecting head, form B

<b>Input data</b>	Resistance thermometers Thermocouple sensors Resistor Input voltage range
<b>Output data</b>	Output signal Maximum output signal Load $R_B$ Switch-on delay
<b>General data</b>	Supply voltage range Current consumption Step response (0–99%) Electrical isolation
<b>Degree of protection</b>	Input/output
<b>Ambient temperature (operation)</b>	
<b>Screw connection solid/stranded/AWG</b>	
<b>Conformance/Approvals</b>	
Conformance	
ATEX	

<b>Technical data</b>	
Pt, Ni, Cu sensors: 2, 3, 4-wire : - A, B, C, D, E, J, K, L, N, R, S, T, U 10 $\Omega$ ... 2000 $\Omega$ (Minimum measuring span: 10 $\Omega$ ) -20 mV ... 100 mV	
4 ... 20 mA , HART / 20 ... 4 mA 22.5 mA ( $U_L$ - 11 V) / 0.023 A approx. 10 s (HART) approx. 28 s (Measured value)	
-12 V DC ... 42 V DC 23.5 mA 0.8 s (TC)	
2 kV AC IP33 (upon installation in field housing IP66/67, NEMA 4X)	
-40 °C ... 85 °C 0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16	
CE-compliant II 3G Ex nA IIC T6 Gc	

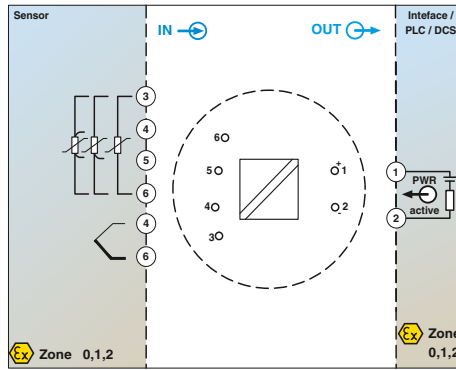
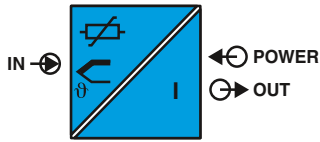
<b>Description</b>
<b>Output loop-powered head-mounted temperature transducer,</b> for RTD, TC, resistance-type sensors, and voltage sensors (mV)

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs./Pkt.</b>
FA MCR-HT-TS-I-OLP-PT	2908742	1

<b>Software adapter cable, 2.4 m long, with</b> USB connection, for programming
--

<b>Accessories</b>		
MCR-PAC-T-USB	2309000	1
FA MCR-HT-D	2908735	1

Temperature  
Head-mounted temperature  
transducer



Loop-powered,  
programmable



- 1-channel
- Loop-powered
- Input for resistance thermometers, thermocouples, and linear mV signals, Ex ia IIC
- 4 to 20 mA / 20 to 4 mA output
- Can be installed in Zone 0
- 2-way electrical isolation
- HART-compatible

**Notes:**  
The devices are supplied with the standard configuration: Pt100 sensor, 0 to 100°C measuring range, 3-conductor connection.  
To configure the MCR-FL-TS-LPI-EX HART-capable device, you need a HART modem.

**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

**Test voltage input/output**  
Switch-on delay  
Degree of protection  
Mounting position  
Connection  
Standards/regulations  
Housing material  
Inflammability class in acc. with UL 94  
Screw connection solid/stranded/AWG

**Safety data as per ATEX**  
Maximum voltage  $U_i$   
Maximum current  $I_i$   
Maximum power  $P_i$   
Maximum voltage  $U_o$   
Maximum current  $I_o$   
Maximum power  $P_o$   
Gas group  
- Maximum external inductance  $L_o$  [mH]  
- Maximum external capacitance  $C_o$  [ $\mu$ F]  
Maximum ambient temperature

**Conformance/Approvals**  
Conformance  
ATEX  
UL, USA/Canada  
Functional Safety (SIL)

**Description**  
**MCR temperature transducer, smart**, for resistance thermometers, thermocouples, resistance-type sensors, and voltage sensors

**Technical data**

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  $\Omega$  ... 400  $\Omega$  (min. measurement range 10  $\Omega$ )  
10  $\Omega$  ... 2000  $\Omega$  (min. measurement range 100  $\Omega$ )  
-10 mV ... 75 mV (min. measurement range 5 mV)  
Yes, programmable

4 mA ... 20 mA / 20 mA ... 4 mA  
 $\leq 23$  mA  
 $\leq 630 \Omega$  (At  $U_V = 24$  V;  $U_{supply} - 10$  V / 0.023 A)  
NE 43  
 $\leq 3.6$  mA or  $\geq 21$  mA (adjustable, not for thermocouples)

$\leq 3.6$  mA or  $\geq 21$  mA (adjustable)  
3.8 mA ... 20.5 mA (linear increase/decrease)

12 V DC ... 30 V DC  
 $< 3.5$  mA  
 $< 2$  s

Resistance thermometers  
Thermocouple sensors  
Resistance-type sensors  
Voltage sensor

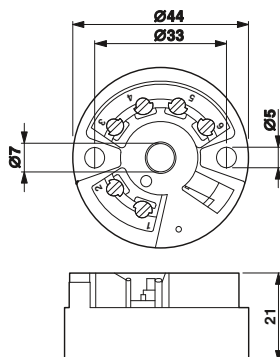
0.2 K (Pt 100, Ni 100), 0.5 K (Pt 500, Ni 500), 0.3 K (Pt 1000, Ni 1000)  
typ. 0.5 K (K, J, T, E, L, U), 1.0 K (N, C, D), 2.0 K (S, B, R)  
 $\pm 0.1 \Omega$  (10...400  $\Omega$ ),  $\pm 1.5 \Omega$  (10...2000  $\Omega$ )  
 $\pm 20 \mu$ V (-10...75 mV)  
2 kV AC (50 Hz, 1 min.)  
6 s  
IP00, IP66 (integrated in the connecting head)  
Connecting head in acc. with DIN 43729 form B  
Installation in connection head according to DIN 43729 form B  
NAMUR recommendation NE 21  
Polycarbonate, PC  
V0  
0.2 ... 1.75 mm<sup>2</sup> / 0.2 ... 1.75 mm<sup>2</sup> / 24 - 15

30 V  
100 mA  
750 mW  
5 V DC  
5.4 mA  
6.6 mW  
IIA IIB IIC  
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

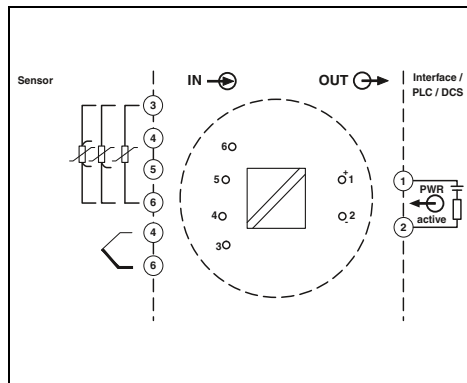
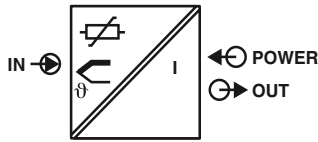
CE-compliant  
Ex II 1 G and II 2 G Ex ia IIC T6/T5/T4  
cULus  
SIL 2

**Ordering data**

Type	Order No.	Pcs./Pkt.
MCR-FL-HT-TS-I-EX	2864545	1



**Temperature**  
**Head-mounted temperature**  
**transducer**



**Loop-powered,**  
**programmable**



- Output loop-powered head-mounted temperature transducer
- Freely configurable
- Software available free of charge on the Internet
- For mounting in the connecting head, form B

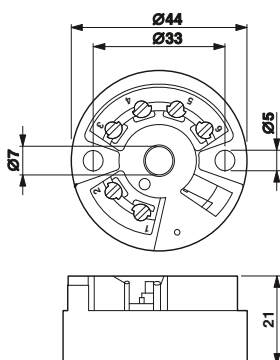
**Notes:**  
The devices are supplied with the standard configuration: Pt100 sensor, 0 to 100°C measuring range, 3-conductor connection.  
The configuration software can be downloaded from the Internet: [phoenixcontact.net/products](http://phoenixcontact.net/products).

<b>Input data</b>	
Resistance thermometers	
Thermocouple sensors	
Resistor	
Voltage	
<b>Output data</b>	
Output signal	
Load $R_B$	
Output signal with short-circuit	
Output signal with open circuit	
Measuring range overrange/underrange	
<b>General data</b>	
Supply voltage range	
Current consumption	
Transmission error	Resistance thermometers Thermocouple sensors Resistance-type sensors Voltage sensor
Step response (10-90%)	< 2 s
Switch-on 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
Mounting	any
Housing material	Polycarbonate, PC
Screw connection solid/stranded/AWG	0.2 ... 1.75 mm <sup>2</sup> / 0.2 ... 1.75 mm <sup>2</sup> / 24 - 15
<b>Conformance/Approvals</b>	
Conformance	CE-compliant
UL, USA/Canada	Class I, Div. 2, Groups A, B, C, D

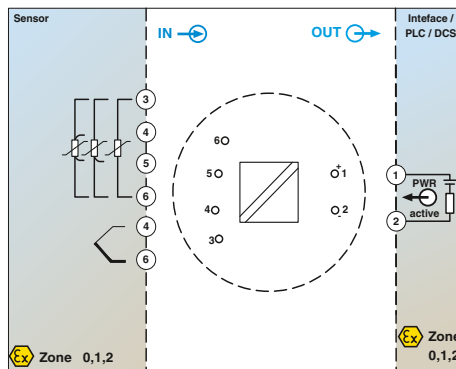
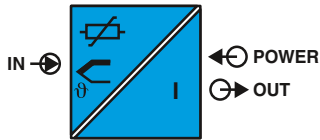
<b>Technical data</b>	
Pt, Ni (100, 500, 1000); minimum measurement range 10 K : 2, 3, 4-wire	
B, C, D, E, J, K, L, N, R, S, T, U; minimum measurement range 50 K/500 K	
Resistance-type sensor from 10 Ω to 400 Ω and from 10 Ω to 2000 Ω; minimum measurement range 10 Ω/100 Ω	
-10 mV ... 75 mV (min. measurement range 5 mV)	
4 ... 20 mA / 20 ... 4 mA	
Max $(V_{supply} - 8 V) / 0.025 A$ (current output)	
≤ 3.6 mA or ≥ 21 mA (adjustable, not for thermocouples)	
≤ 3.6 mA or ≥ 21 mA (adjustable)	
≤ 20.5 mA / ≥ 3.8 mA (linear increase/decrease)	
<b>General data</b>	
8 V DC ... 35 V DC	
< 3.5 mA	
0.2 K (Pt 100, Ni 100), 0.5 K (Pt 500, Ni 500), 0.3 K (Pt 1000, Ni 1000)	
typ. 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 s	
6 s	
2 kV (50 Hz, 1 min.)	
IP00, IP66 (integrated in the connecting head)	
-40 °C ... 85 °C	
any	
Polycarbonate, PC	
0.2 ... 1.75 mm <sup>2</sup> / 0.2 ... 1.75 mm <sup>2</sup> / 24 - 15	
<b>Conformance/Approvals</b>	
CE-compliant	
Class I, Div. 2, Groups A, B, C, D	

<b>Description</b>
<b>MCR temperature transducer</b> , for resistance thermometers, thermocouples, resistance-type sensors, and voltage sensors
<b>Software adapter cable</b> , 2.4 m long, with USB connection, for programming

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs./Pkt.</b>
MCR-FL-HT-T1	2864529	1
<b>Accessories</b>		
MCR-PAC-T-USB	2309000	1



Temperature  
Head-mounted temperature  
transducer



Loop-powered,  
programmable



- 1-channel
- Loop-powered
- Input for resistance thermometers, thermocouples, and linear mV signals, Ex ia IIC
- 4 to 20 mA / 20 to 4 mA output
- Can be installed in Zone 0
- 2-way electrical isolation
- Configuration using software

**Notes:**  
The devices are supplied with the standard configuration: Pt100 sensor, 0 to 100°C measuring range, 3-conductor connection.  
The configuration software can be downloaded from the Internet: phoenixcontact.net/products.

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

Degree of protection

Mounting position

Connection

Standards/regulations

Housing material

Inflammability class in acc. with UL 94

Screw connection solid/stranded/AWG

Safety data as per ATEX

Maximum voltage Ui

Maximum current Ii

Maximum power Pi

Maximum voltage Uo

Maximum current Io

Maximum power Po

Gas group

- Maximum external inductance Lo [mH]

- Maximum external capacitance Co [µF]

Maximum ambient temperature

Conformance/Approvals

Conformance

ATEX

UL, USA/Canada

Description

**MCR temperature transducer**, for resistance thermometers, thermocouples, resistance-type sensors, and voltage sensors

**Software adapter cable**, 2.4 m long, with USB connection, for programming

Technical data

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

≤ 720 Ω (For U<sub>v</sub> = 24 V; U<sub>supply</sub> = 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)

typ. 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

NAMUR recommendation NE 21

Polycarbonate, PC

V0

0.2 ... 1.75 mm<sup>2</sup> / 0.2 ... 1.75 mm<sup>2</sup> / 24 - 15

30 V

100 mA

750 mW

8.2 V DC

4.6 mA

9.35 mW

IIB IIC

8.5 4.5 [mH]

1.9 0.974 [µF]

Category 1: T4 = 60°C, T5 = 50°C, T6 = 40°C

Category 2: T4 = 85°C, T5 = 70°C, T6 = 55°C

CE-compliant

Ex II 1 G Ex ia IIC T6/T5/T4

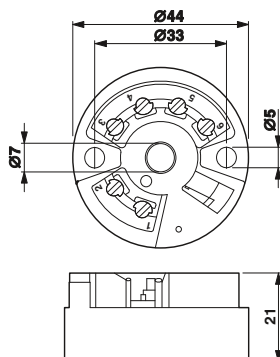
cULus

Ordering data

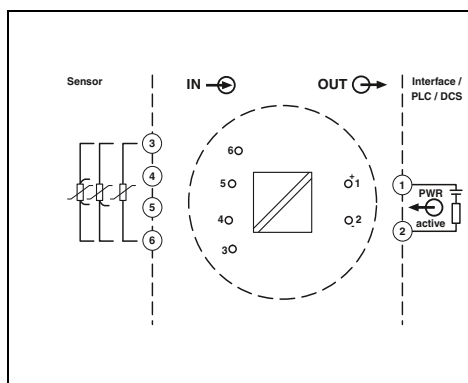
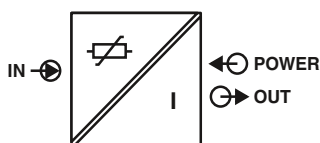
Type	Order No.	Pcs./Pkt.
MCR-FL-HT-T-I-EX	2864532	1

Accessories

MCR-PAC-T-USB	2309000	1
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**Temperature**  
**Head-mounted temperature**  
**transducer**



**Loop-powered,**  
**programmable**



- Output loop-powered head-mounted temperature transducer for Pt 100 sensors
- Freely configurable
- Software available free of charge on the Internet
- For mounting in the connecting head, form B

**Notes:**

The devices are supplied with the standard configuration: Pt100 sensor, 0 to 100°C measuring range, 3-conductor connection.

The configuration software can be downloaded from the Internet: [phoenixcontact.net/products](http://phoenixcontact.net/products).

**Input data**

Resistance thermometers

**Output data**

Output signal

Load  $R_B$

Output signal with short-circuit

Output signal with open circuit

Measuring range overrange/underrange

**General data**

Supply voltage range

Current consumption

Transmission error

Step response (10-90%)

Switch-on delay

Degree of protection

Ambient temperature (operation)

Mounting

Housing material

Conformance/Approvals

Conformance

UL, USA/Canada

Resistance thermometers

**Technical data**

Pt 100 ; minimum measurement range 10 K : 2, 3, 4-wire

4 ... 20 mA / 20 ... 4 mA

Max ( $V_{supply} - 10 V$ ) / 0.023 A (current output)

$\leq 3.6$  mA or  $\geq 21$  mA (adjustable)

$\leq 3.6$  mA or  $\geq 21$  mA (adjustable)

$\leq 20.5$  mA /  $\geq 3.8$  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

**Ordering data**

**Description**

**MCR head-mounted temperature transducer, loop-powered**

for Pt 100 resistance thermometer

**Type**

**Order No.**

**Pcs./Pkt.**

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

**2864516**

**1**

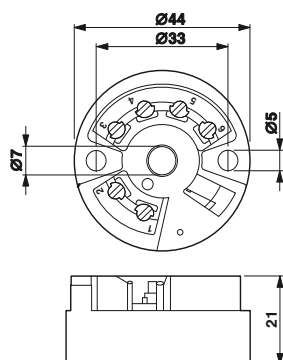
**Accessories**

**Software adapter cable, 2.4 m long, with USB connection, for programming**

**MCR-PAC-T-USB**

**2309000**

**1**



### Accessories for head-mounted transducers

- 2 cable entries
- Aluminum with polyester coating
- For use with head-mounted transducers
- Display window in cover

new



**Field housing for head-mounted transducers**

General data		Technical data		
Housing material		Aluminum		
Description		Ordering data		
<b>Field housing for head-mounted transducers, with display window and two cable entries</b>		Type	Order No.	Pcs./Pkt.
		FA MCR-HT-FH	2908736	1
Wall fastening for FA MCR-HT-FH field housing		Accessories		
Pipe fastening for FA MCR-HT-FH field housing		FA MCR-HT-FH-WM	2908737	1
		FA MCR-HT-FH-PM	2908738	1



### Accessories for head-mounted transducers

- For snapping onto the DIN rail
- For control cabinet installation of head-mounted transducers

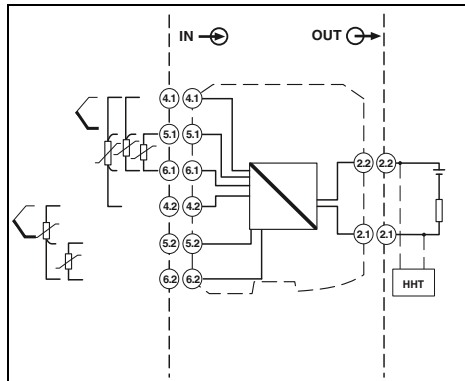
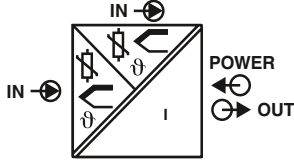


Adapter for DIN rail mounting of  
head-mounted transducers

Description	Ordering data		
	Type	Order No.	Pcs./Pkt.
Adapter for control cabinet installation of head-mounted transducers	MCR-DIN-RAIL-ADAPTER HT	2864671	1

Temperature  
Temperature transducer

new



SIL  
IEC 61508



Output loop-powered temperature transducer

- Loop-powered temperature transducer
- 2 universal inputs for RTD, TC, resistance-type sensors, and voltage sensors (mV)
- 4 to 20 mA output
- HART communication
- Freely configurable
- SIL 2/3
- For DIN rail mounting

Housing width 12.5 mm

Technical data

Input data

Input signal (can be configured using DIP switches)  
Input signal (can be configured using DIP switches)  
Temperature range

Linear resistance measuring range

Input voltage range

Output data

Output signal  
Maximum output signal  
Load  $R_B$

General data

Supply voltage range  
Current consumption  
Step response (0-99%)  
Electrical isolation of input/output  
Ambient temperature (operation)  
Dimensions W/H/D  
Push-in connection solid/stranded/AWG  
Screw connection solid/stranded/AWG

Conformance/Approvals

Conformance

Pt, Ni, Cu sensors: 2, 3, 4-wire : -  
A, B, C, D, E, J, K, L, N, R, S, T, U  
-250 °C ... 2500 °C (Range depending on the sensor type)

10 Ω ... 2000 Ω (Minimum measuring span: 10 Ω)

-20 mV ... 100 mV

4 ... 20 mA / 20 ... 4 mA  
22.5 mA  
( $U_L - 11 V$ ) / 0.023 A

12 V DC ... 42 V DC  
3.5 mA  
0.8 s (TC)  
2 kV AC  
-40 °C ... 85 °C  
12.5 / 99 / 114.5 mm  
0.2 ... 1.5 mm<sup>2</sup> / 0.2 ... 1.5 mm<sup>2</sup> / 24 - 16  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14

CE-compliant

Ordering data

Description

Output loop-powered temperature transducer, for  
RTD, TC, resistance-type sensors, and voltage sensors (mV)

Screw connection  
Push-in connection

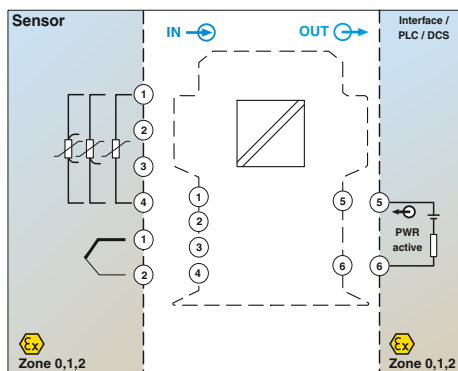
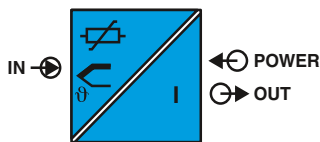
Type	Order No.	Pcs./Pkt.
MACX MCR-TS-I-OLP	2908662	1
MACX MCR-TS-I-OLP-SP	2908664	1

Accessories

Software adapter cable, 2.4 m long, with  
USB connection, for programming

MCR-PAC-T-USB	2309000	1
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Temperature  
Temperature transducer



Loop-powered, programmable

ERAC

Ex:   
Housing width 12.5 mm

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	12 V DC ... 30 V DC
Current consumption	< 3.5 mA
Step response (10-90%)	< 2 s
Transmission error	Resistance thermometers Thermocouple sensors Resistance-type sensors Voltage sensor

Test voltage input/output	2 kV AC (50 Hz, 1 min.)
Switch-on delay	4 s
Standards/regulations	NAMUR recommendation NE 21
Housing material	Polyamide PA non-reinforced
Inflammability class in acc. with UL 94	V0
Dimensions W/H/D	12.5 / 99 / 114.5 mm
Connection method	Screw connection
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Safety data as per ATEX	MCR-FL-TS-LP-I-EX      MCR-FL-T-LP-I-EX
Maximum voltage U <sub>i</sub>	30 V      30 V
Maximum current I <sub>i</sub>	100 mA      100 mA
Maximum power P <sub>i</sub>	750 mW      750 mW
Maximum voltage U <sub>o</sub>	5 V DC      4.4 V DC
Maximum current I <sub>o</sub>	5.9 mA      9.6 mA
Maximum power P <sub>o</sub>	7.2 mW      10.6 mW
Gas group	IIA    IIB    IIC      IIA    IIB    IIC
- Maximum external inductance L <sub>o</sub>	100    100    100      100    100    100
- Maximum external capacitance C <sub>o</sub>	10    10    2      12    12    2.4
Maximum ambient temperature	T <sub>4</sub> = 85 °C,      T <sub>4</sub> = 85 °C, T <sub>5</sub> = 70 °C,      T <sub>5</sub> = 65 °C, T <sub>6</sub> = 55 °C      T <sub>6</sub> = 50 °C

Conformance/Approvals	
Conformance	CE-compliant
ATEX	II 2(1) G Ex ia IIC T6
UL, USA/Canada	II 2(1) G Ex ia IIC T4...T6
Functional Safety (SIL)	cULus
	SIL 2

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  
≤ 23 mA  
≤ 520 Ω (At U<sub>v</sub> = 24 V; U<sub>supply</sub> - 12 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

- 1-channel
- Loop-powered
- Input for resistance thermometers, thermocouples, and linear mV signals, Ex ia IIC
- 4 to 20 mA / 20 to 4 mA output
- Can be installed in Zone 1
- 2-way electrical isolation
- HART-capable (MCR-FL-TS-LP-I-EX)
- Configuration using software

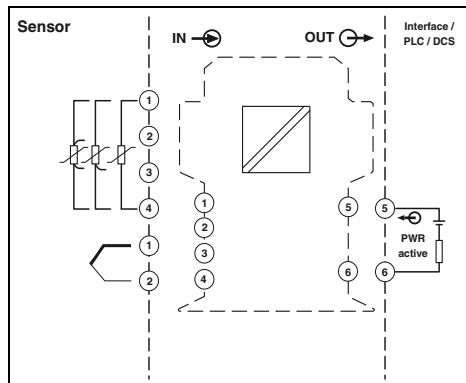
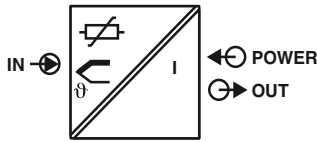
<b>Notes:</b>
The devices are supplied with the standard configuration: Pt100 sensor, 0 to 100°C measuring range, 3-conductor connection.
To configure the MCR-FL-TS-LPI-EX HART-capable device (2864587), you need a HART modem.
The configuration software can be downloaded from the Internet: phoenixcontact.net/products.

Description	<b>MCR temperature transducer</b> , for resistance thermometers, thermocouples, resistance-type sensors, and voltage sensors
	HART-compatible

Ordering data

Type	Order No.	Pcs./Pkt.
MCR-FL-TS-LP-I-EX	2864587	1
MCR-FL-T-LP-I-EX	2864574	1

Temperature  
Temperature transducer



Loop-powered,  
programmable



Housing width 12.5 mm

- Output loop-powered temperature transducer
- Freely configurable
- Software available free of charge on the Internet

**Notes:**  
The devices are supplied with the standard configuration: Pt100 sensor, 0 to 100°C measuring range, 3-conductor connection.  
The configuration software can be downloaded from the Internet: phoenixcontact.net/products.

<b>Input data</b>	
Resistance thermometers	
Thermocouple sensors	
Resistor	
<b>Voltage</b>	
<b>Output data</b>	
Output signal	
Load $R_B$	
Output signal with short-circuit	
Output signal with open circuit	
Measuring range overrange/underrange	
<b>General data</b>	
Supply voltage range	12 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 typ. 0.5 K (K, J, T, E, L, U), 1.0 K (N, C, D), 2.0 K (S, B, R) Resistance-type sensors $\pm 0.1 \Omega$ (10...400 $\Omega$ ), $\pm 1.5 \Omega$ (10...2000 $\Omega$ ) Voltage sensor $\pm 20 \mu V$ (-10...100 mV)
Step response (10-90%)	< 2 s
Switch-on delay	4 s
Test voltage input/output	2 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-40 °C ... 85 °C
Mounting	any
Housing material	Polyamide PA non-reinforced
Dimensions W/H/D	12.5 / 99 / 114.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
<b>Conformance/Approvals</b>	
Conformance	CE-compliant
UL, USA/Canada	Class I, Div. 2, Groups A, B, C, D

**Technical data**

Pt, Ni (100, 500, 1000); minimum measurement range 10 K : 2, 3, 4-wire
B, C, D, E, J, K, L, N, R, S, T, U; minimum measurement range 50 K/500 K
Resistance-type sensor from 10 $\Omega$ to 400 $\Omega$ and from 10 $\Omega$ to 2000 $\Omega$ ; minimum measurement range 10 $\Omega$ /100 $\Omega$
-10 mV ... 100 mV (min. measurement range 5 mV)
4 ... 20 mA / 20 ... 4 mA
Max ( $V_{supply} - 12 V$ ) / 0.023 A (current output)
$\leq 3.6$ mA or $\geq 21$ mA (adjustable, not for thermocouples)
$\leq 3.6$ mA or $\geq 21$ mA (adjustable)
$\leq 20.5$ mA / $\geq 3.8$ mA (linear increase/decrease)

<b>Description</b>
<b>MCR temperature transducer</b> , loop-powered for resistance thermometers, thermocouples, resistance-type sensors, and voltage sensors
<b>Software adapter cable</b> , 2.4 m long, with USB connection, for programming

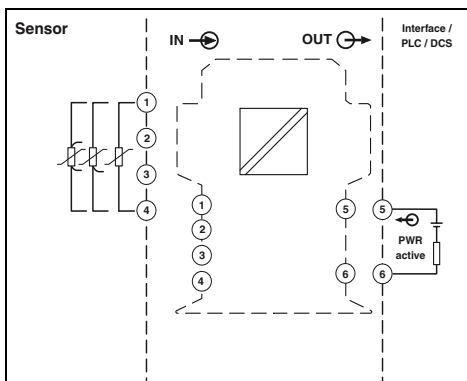
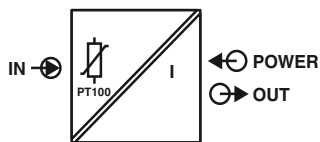
**Ordering data**

Type	Order No.	Pcs./Pkt.
<b>MCR-FL-T-LP-I</b>	<b>2864561</b>	1
<b>MCR-FL-T-LP-I-EX</b>	<b>2864574</b>	1

**Accessories**

<b>MCR-PAC-T-USB</b>	<b>2309000</b>	1
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Temperature  
Temperature transducer



Loop-powered,  
programmable

UL US ENEC

Ex:

Housing width 12.5 mm

Technical data

Pt 100 ; minimum measurement range 10 K : 2, 3, 4-wire

4 ... 20 mA / 20 ... 4 mA  
Max ( $V_{supply} - 12 V$ ) / 0.023 A (current output)

$\leq 3.6$  mA or  $\geq 21$  mA (adjustable)  
 $\leq 3.6$  mA or  $\geq 21$  mA (adjustable)  
 $\leq 20.5$  mA /  $\geq 3.8$  mA (linear increase/decrease)

12 V DC ... 35 V DC  
< 3.5 mA  
Resistance thermometers  
0.2 K  
< 2 s  
4 s  
2 kV (50 Hz, 1 min.)  
IP20  
-40 °C ... 85 °C  
any  
Polyamide PA non-reinforced  
12.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 24

CE-compliant  
Class I, Div. 2, Groups A, B, C, D

Ordering data

<b>Input data</b>	Resistance thermometers
<b>Output data</b>	Output signal Load $R_B$
	Output signal with short-circuit Output signal with open circuit Measuring range overrange/underrange
<b>General data</b>	Supply voltage range Current consumption Transmission error Step response (10-90%) Switch-on delay Test voltage input/output Degree of protection Ambient temperature (operation) Mounting Housing material Dimensions W/H/D Screw connection solid/stranded/AWG
<b>Conformance/Approvals</b>	
Conformance UL, USA/Canada	

Type	Order No.	Pcs./Pkt.
MCR-SL-PT100-LP-I	2864558	1

Description
MCR temperature transducer, loop-powered for Pt 100 resistance thermometer

- Two-wire transmitter for Pt 100 resistance thermometers
- Freely programmable via MCR/PI-CONF-WIN

Notes:

The devices are supplied with the standard configuration: Pt100 sensor, 0 to 100°C measuring range, 3-conductor connection.

You can implement your own measuring range settings, linearization, and characteristic curve adjustments. To do so, you need the MCR-PAC-T-USB programming adapter as well as the MCR/PI-CONF-WIN configuration software.



# Monitoring

## Energy and power measurement

EMpro energy meters measure, analyze, and communicate electrical system parameters.

Monitoring software ensures efficient energy and power measurement.

Stand-alone data loggers are the complete package for decentralized data acquisition.

PSK sensors acquire the operating pressure of gaseous media.

PSK meters record compressed air consumption.

## Current measurement

PACT current transformers convert currents up to 4000 A into secondary currents of 1 and 5 A.

MCR current transducers convert currents into standard analog signals.

## Monitoring and diagnostics

The SOLARCHECK modular monitoring system is used for string monitoring in photovoltaic systems.

EV Charge Control is the charging controller used to charge electric vehicles on the AC mains according to IEC 61851-1.

EMD monitoring relays detect and indicate deviations in important system parameters at an early stage.

ETD time relays are used for straightforward time control functions.

Diode modules, lamp testing modules, and EMG display modules allow industrial use of simple components such as diodes - with professional housing and connection technology.

## Product range overview

<b>Product overview</b>	<b>200</b>
<b>Energy and power measurement</b>	<b>202</b>
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EMpro function and communication modules	210
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# Monitoring

## Product overview

### Energy and power measurement



EMpro energy meters for front-panel installation Page 208



EMpro energy meters for DIN rail mounting Page 209



Function and communication modules for EMpro Page 210



DIN rail adapters for EMpro Page 213

### Current transformers



PACT busbar current transformers Page 222



PACT window-type current transformers Page 224



PACT winding current transformers Page 232



Mounting accessories, shock protection Page 233

### Voltage measurement



MCR voltage transducers for AC and DC voltages up to 660 V Page 250



Accessories  
Configuration software and USB adapter cable Page 251

### Solar system monitoring



SOLARCHECK  
Photovoltaic string monitoring Page 256

### Time relays



ETD-BL  
Ultra-narrow time relays Page 276



ETD  
Multifunctional time relays Page 278

### Function modules



EMG  
Diode modules, lamp testing modules, display modules Page 280

### Lightning monitoring system



Lightning monitoring system  
See Catalog 4





Software for usage data acquisition  
Page 214



Complete packages for data logging  
Page 215



Compressed air meters  
Page 216



Pressure sensor with IO-Link  
Page 218

### Current measurement



PACT RCP... current transformers for retrofitting  
Page 236



MCR current transducers for AC/DC and distorted currents  
Page 240



MCR current transducer for sinusoidal and distorted AC currents  
Passive, up to 5 A  
Page 246



MCR current protector for AC currents, sinusoidal up to 16 A  
Page 249

### Charging technology for E-Mobility



AC charging controllers for private and commercial applications  
See Catalog 2



Locking release module for mains failure  
See Catalog 2

### Monitoring relays



EMD-BL  
Compact monitoring relays  
Page 262

### HMI



HMI  
See Catalog 6

### Signal towers



Signal towers  
See Catalog 6



### Energy costs at a glance

Within industry, energy is viewed as a variable cost factor. As a result, lower energy costs are becoming increasingly important in terms of providing companies with a major competitive advantage in the areas of production, process, and industrial engineering.

Alongside energy consumption, the quality of the energy supplied, the reliability of supply, and effective system utilization also play an important role in ensuring profitability. This calls for continuous measurement and analysis of all sources of energy.

### Advantages of energy data acquisition

Continuously recorded energy flow provides the basis for a target-oriented energy management system.

Access comprehensive information regarding the characteristic electrical data of your machinery and benefit from the advantages of this:

- Reduce your energy costs by identifying potential energy savings.
- Optimize your system capacity: through intelligent switching of system parts, uniform network load, and reduced harmonics.
- Reduce peak loads using forward-looking trend calculation and load management.
- Safeguard your production processes and minimize downtimes by continuously monitoring important system parameters.

### Measurement – monitoring – communication

Efficient energy management – network-capable EMpro energy meters can be used to acquire and monitor the characteristic electrical data of your machines and systems.

They can be freely extended with communication modules and function modules, enabling your energy meters to keep pace with your growing requirements. Future-proof planning and investment is therefore ensured.



### The communication expert

The EMpro MA600 is capable of performing all measurement tasks associated with power supply applications up to 700 V AC.

- From simple current and power measurement to detection of harmonics including spectral analysis
- Flexible integration into Ethernet, PROFIBUS or RS-485 networks
- Remote access via web server
- Optional DIN rail adapter for DIN rail mounting
- Can be extended with communication modules and function modules



### The universal solution on the front panel

The EMpro MA400 performs standard measuring tasks up to 519 V AC.

- Optional DIN rail adapter for DIN rail mounting
- Communication module for integration into RS-485 networks (Modbus/RTU)
- Function module for pulse or alarm output



### The measuring device with RS-485 communication

The EMpro MA250 performs standard measuring tasks up to 519 V AC.

- DIN rail device
- With pulse or alarm output
- Integrated RS-485 communication (Modbus/RTU)

### The measuring device with pulse output

The EMpro MA200 is ideal for simple measuring tasks up to 519 V AC.

- DIN rail device
- With pulse or alarm output



### Controller solution for usage data acquisition

The EMlog software provides an efficient solution for recording energy data relating to heat, cold, air, and electricity when used in conjunction with the ILC 191 ME/AN modular Inline controller. This allows you to keep an eye on your resources and manage the consumption levels of your machines and systems.



### Sensors and meters

Use of resources at a glance - determine all relevant states using sensors and meters.

- Detailed procurement measurement, thanks to precise sensor and meter technology
- Intelligent sensor communication, thanks to IO-Link technology



### Inline power measurement terminal

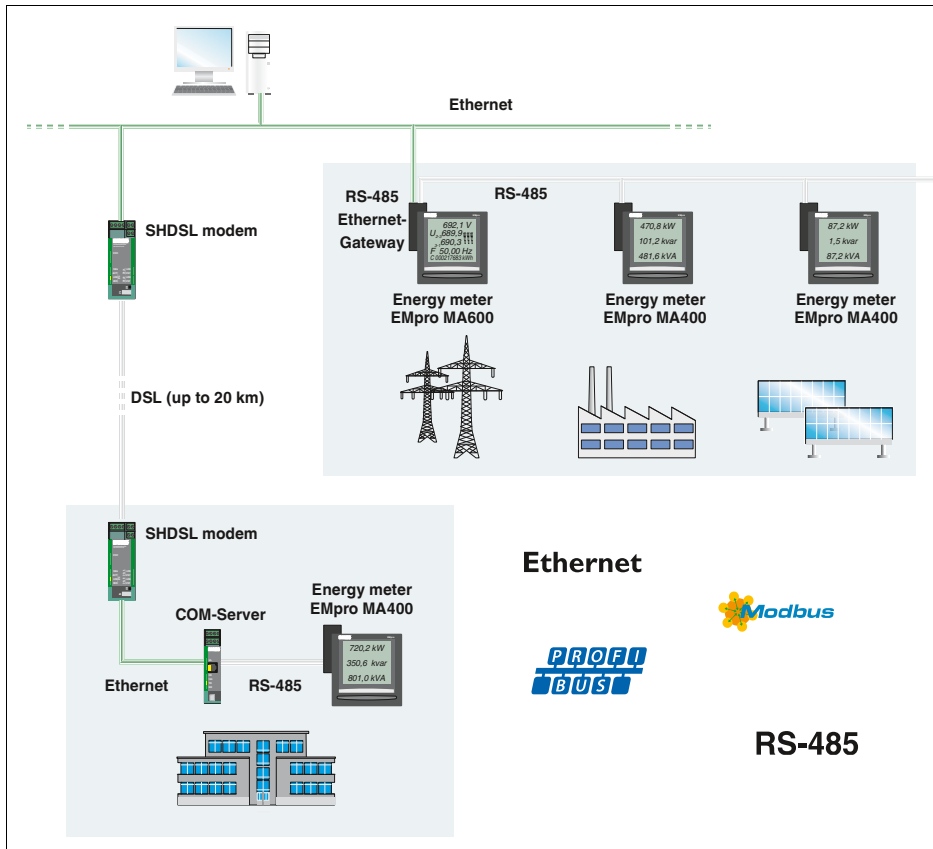
The Inline power measurement terminal enables analysis of AC networks.

- For measuring current, voltage, and power, as well as identifying distortion and harmonics
- The power measurement terminal can be found in Catalog 6, Control technology, I/O systems, and network structure.

# Monitoring

## Energy and power measurement

### Energy meters



### Measurement – monitoring – communication

In order to achieve efficient energy management, all energy data that has been determined is recorded and analyzed centrally in the control center.

For data transmission, integrate the EMpro measuring devices flexibly into your network structures.

The network components from Phoenix Contact offer interference-free and high-performance communication of energy data, even in harsh industrial environments:

- Copper-based and fiber optic data transmission
- Ethernet and modem communication
- Industrial wireless transmission



### Direct access to measured values

Analyze your system parameters quickly on site. At the touch of a button, you can access precisely those measured values that are of relevance.

You can also use the user-friendly web server function to request measured values directly from the control center.



### Planning reliability and investment security

Stay flexible. EMpro extension modules, function modules, and communication modules enable you to extend your EMpro measuring devices at any time:

- Digital inputs and outputs
- Pulse outputs
- Analog outputs
- Communication interfaces
- Measured data storage



### Remote access to multiple measuring devices - with just one IP address

The web server that has been integrated into the Ethernet communication modules allows you to conveniently configure key parameters online. It also allows remote access to key electrical characteristics such as current, voltage, power, energy, and harmonics.

## Selection guide

You can easily select the right device for your application by referring to the table below:



Product type	EMpro MA600	EMpro MA400	EMpro MA200/250
		2901366 EEM-MA600 2902352 EEM-MA600-24DC	2901364 EEM-MA400
<b>Voltages</b>			
Voltage measurement direct	Up to 700 V	Up to 519 V	Up to 519 V
Voltage transducers	Up to 500 kV		
Voltages U12, U23, U31, V1, V2, V3	•	•	•
Maximum mean value	•		
Mean value	•		
<b>Currents</b>			
Current measurement	Direct up to 6 A or current transformer	Current transformers	Current transformers
Currents I1, I2, I3	•	•	•
Neutral conductor current IN (calculation)	•	•	•
Maximum mean value	•	•	•
Mean value	•		
<b>Frequency</b>			
F	•	•	•
Maximum mean value	•		
Mean value	•		
<b>Power</b>			
Real power, reactive power, apparent power: $\Sigma P$ (+/-), $\Sigma Q$ (+/-), $\Sigma S$ (+/-)	•	•	•
P, Q, S per phase	•	•	•
Maximum mean value	•	•	•
Mean value	•		
Trend performances	•		
<b>Power factor</b>			
$\Sigma PF$	•	•	•
PF per phase	•	•	•
<b>Metering</b>			
Real energy (kWh)	kWh+/kWh-	kWh+	kWh+
Reactive energy (kvarh)	kvarh+/kvarh-	kvarh+	kvarh+
Apparent energy (kVAh)	kVAh		
Multi-tariff meter			2
Operating hours	•	•	•
<b>Accuracy class (EN62053-22)</b>	0.5 S	0.5 S	0.5 S
<b>Harmonics analysis</b>			
Distortion factor THD I/U/V	Up to 63rd	Up to 51st	Up to 51st
Spectral analysis	Up to 63rd		
<b>Functions</b>			
<b>Temperature recording</b>			•
<b>Digital input</b>			•
<b>Function modules (optional)</b>			
1 pulse or alarm output		2904314 EEM-IMP-MA400	Integrated
2 pulse outputs	2904313 EEM-IMP-MA600		
2 digital inputs, 2 digital outputs	2901371 EEM-2DIO-MA600		
2 analog outputs	2901475 EEM-2AO-MA600		
Memory	2901370 EEM-MEMO-MA600		
<b>Communication modules (optional)</b>			
RS-485 (Modbus/RTU)	2901367 EEM-RS485-MA600	2901365 EEM-RS485-MA400	Integrated (MA250 only)
D-SUB (PROFIBUS)	2901418 EEM-PB12-MA600		
Ethernet gateway (Modbus/TCP/RTU) with integrated web server	2901374 EEM-ETH-RS485-MA600		
Ethernet (Modbus/TCP) with integrated web server	2901373 EEM-ETH-MA600		

### Key

I1, I2, I3	Conductor currents
IN	Neutral conductor current
U12, U23, U31	Phase conductor voltages
V1, V2, V3	Phase/N conductor voltages

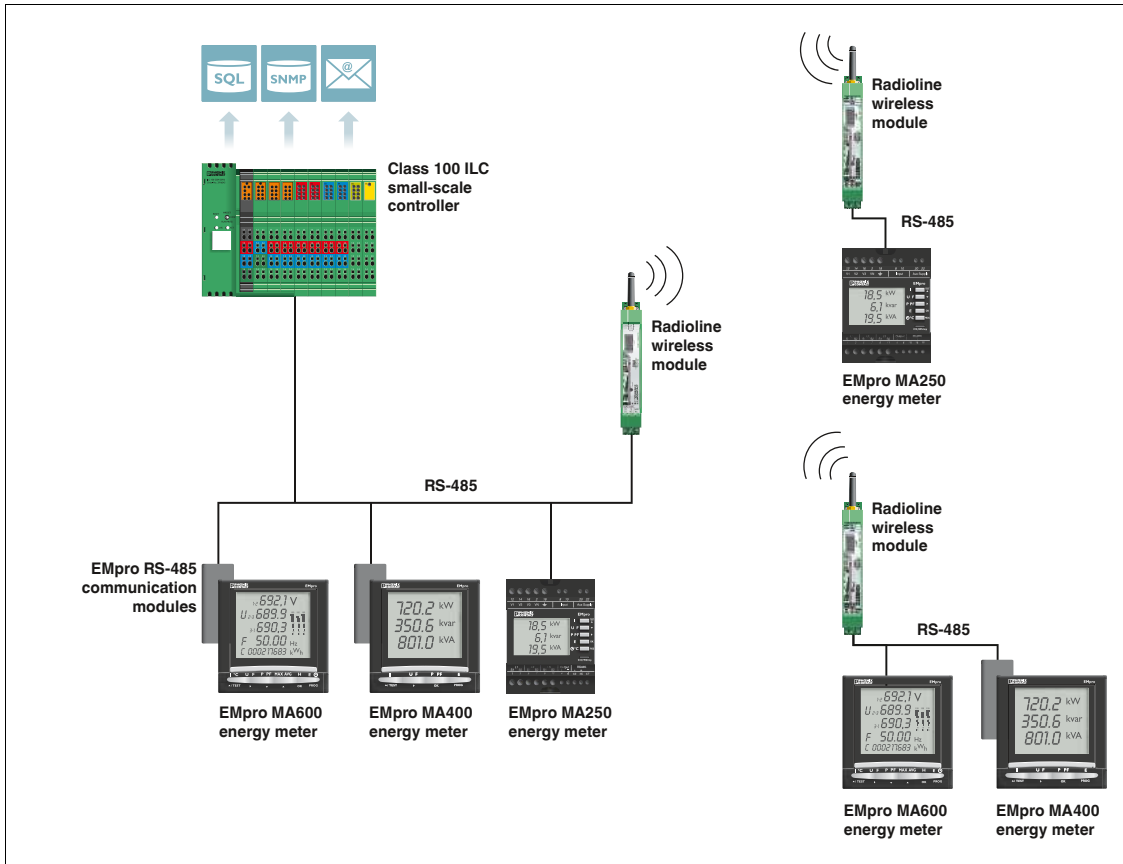
P	Real power
Q	Reactive power
S	Apparent power
PF	Power factor

THD	Total harmonic distortion
$\Sigma$	Total values

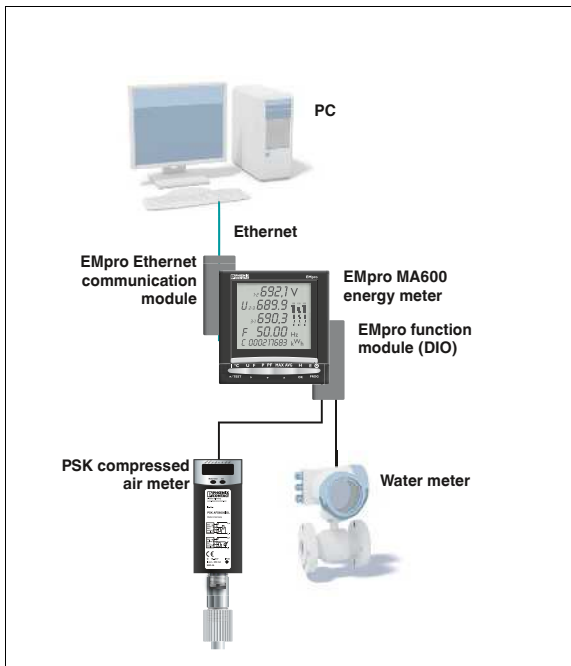
# Monitoring

## Energy and power measurement

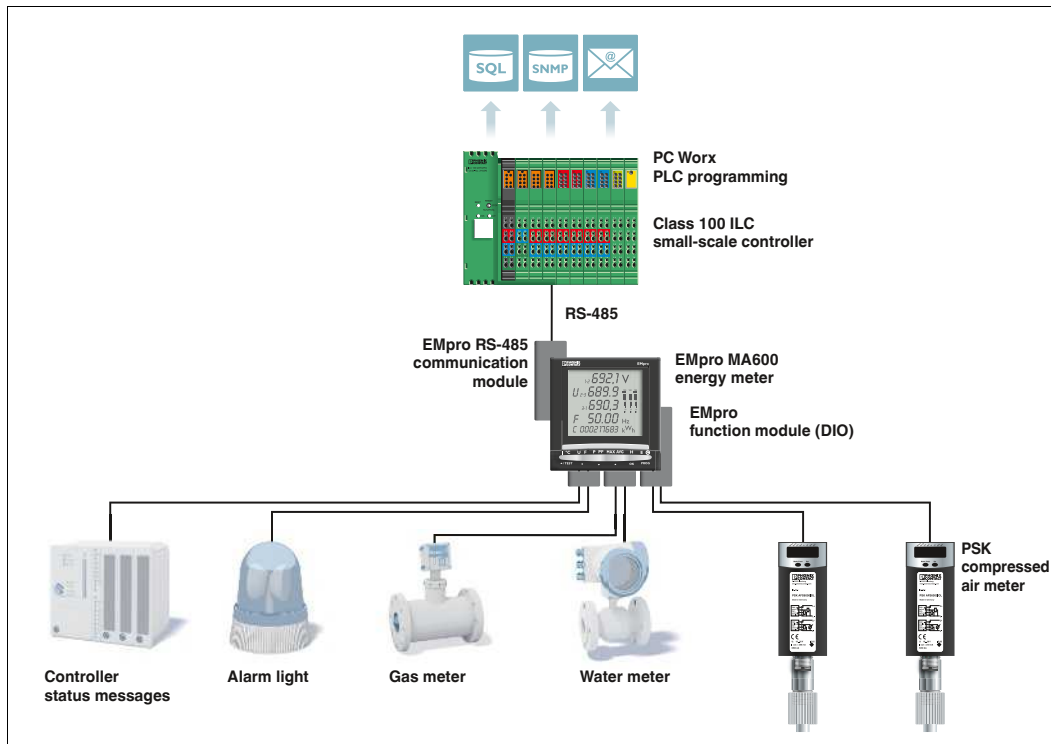
Transmit electrical characteristics wirelessly and easily



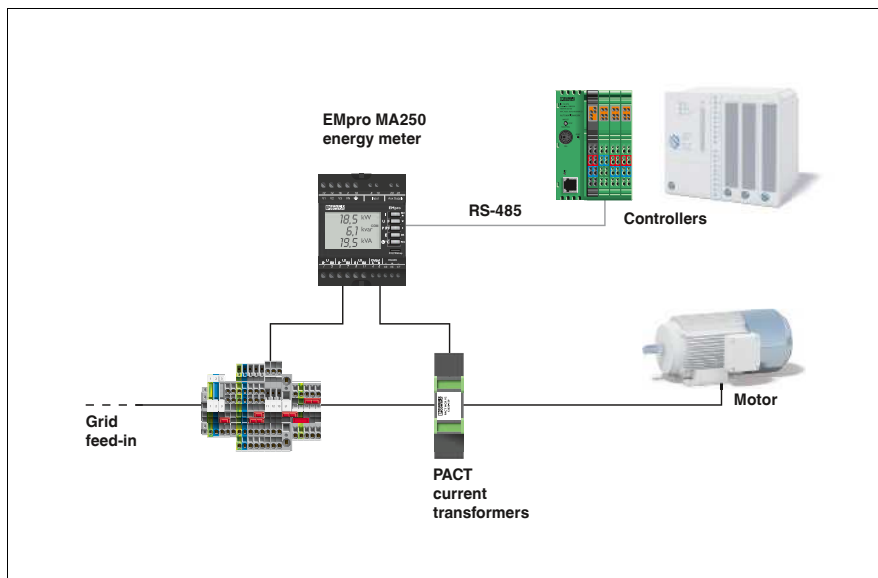
## Direct connection from the PC to the EMpro MA600



Connect up to six external meters to one EMpro MA600



Easy machine monitoring -  
communicate electrical characteristics via Modbus/RTU



# Monitoring

## Energy and power measurement

### Energy meters

EMpro energy meters are capable of acquiring, monitoring, and displaying all electrical system and machine parameters locally.

#### EEM-MA600

- Can be extended with function and communication modules
- Remote access via web server, integrated into Ethernet communication module
- Acquisition of individual harmonic components up to 63rd order
- Trend calculation for active and reactive power

#### EEM-MA400

- Can be extended with output module
- Can be extended with RS-485 communication module (JBUS/MODBUS)
- Acquisition of total harmonic content up to harmonic of 51st order

#### EEM-MA250

- Two-tariff measurement via digital input
- Pulse or alarm output
- RS-485 interface (JBUS/MODBUS)

#### EEM-MA200

- Two-tariff measurement via digital input
- Pulse or alarm output

#### EEM-MKT-DRA

- DIN rail adapter for the EEM-MA600 and EEM-MA400 front panel devices see page 213.

#### Notes:

The EEM-MA600-24DC energy meter (Order No. 2902352) is not CE-compliant.



Measuring voltage up to 700 V AC, can be extended with function and communication modules



<b>Input data</b>	Measuring principle Acquisition of harmonics Measured value Voltage measuring input V1, V2, V3 Input voltage range
<b>Accuracy</b>	Current measuring input I1, I2, I3 Input current range ( Via external transformers )  Overload capacity Operate threshold Accuracy
<b>Power measurement</b>	Measuring range
<b>Accuracy</b>	Active energy (IEC 62053-22) Reactive power (IEC 62053-23)
<b>Digital input</b>	Voltage input signal
<b>Switching output</b>	Output description Maximum switching voltage Current carrying capacity
<b>Serial port</b>	Output description Serial transmission speed
<b>Display</b>	Type Measuring rate
<b>General data</b>	Supply voltage range  Nominal power consumption  Degree of protection Ambient temperature (operation) Dimensions W/H/D Installation depth with extension module Connection cross section (solid / stranded / AWG)
<b>EMC note</b>	Voltage and other connections Current connection
<b>Conformance/Approvals</b>	Conformance

Technical data	
True r.m.s. value measurement up to 63rd harmonic AC sine (50/60 Hz)	
18 V AC ... 700 V AC (Phase/Phase) 11 V AC ... 404 V AC (Phase/neutral conductor) 500 kV AC (Primary, via external voltage transducers) Secondary: 60, 100, 110, 115, 120, 173, 190 V AC	
0.2 %	9999 A (primary) 1 A and 5 A, secondary 6 A (Permanent) 10 mA
0.2 %	0 MW ... 8000 MW / 0 Mvar ... 8000 Mvar / 0 MVA ... 8000 MVA
0.5 %	Class 0.5 S Class 2
	Via function module
	Via function module - -
	Via communication module -
	LCD display, backlighting 1 s
	110 V AC ... 400 V AC ±10 % 120 V DC ... 350 V DC (± 20 %) 10 VA 20 VA (with max. number of extension modules) IP52 (front), IP30 (back) -10 °C ... 55 °C (14 °F to 131 °F) 96 / 96 / 82 mm 80 mm
	0.5 ... 2.5 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 14 0.5 ... 6 mm <sup>2</sup> / 0.5 ... 6 mm <sup>2</sup> / 20 - 8 Class A product, see page 605
	CE-compliant

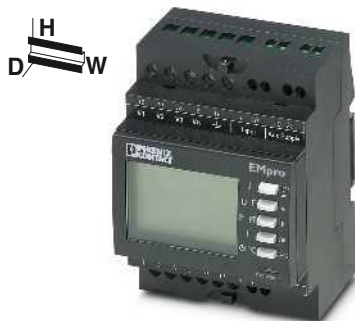
Description
<b>Energy meter</b> , for installation in front panel
<b>Energy meter</b> , for front-panel installation, 24 V DC
<b>Energy meter</b> , for mounting on a DIN rail

Ordering data		
Type	Order No.	Pcs./Pkt.
EEM-MA600	2901366	1
EEM-MA600-24DC	2902352	1





Measuring voltage up to 519 V AC, can be extended with RS-485 interface and output module



Measuring voltage up to 519 V AC, DIN rail installation, also with RS-485 interface



Technical data
True r.m.s. value measurement up to 51st harmonic AC sine (50/60 Hz)
50 V AC ... 500 V AC (Phase/Phase) 28 V AC ... 289 V AC (Phase/neutral conductor)
0.2 %
9999 A (primary) 5 A (secondary) 6 A (Permanent) 5 mA 0.2 %
0 MW ... 11 MW / 0 Mvar ... 11 Mvar / 0 MVA ... 11 MVA
0.5 % Class 0.5 S Class 2
-
Via function module -
Via communication module -
LCD display, backlighting 1 s
110 V AC ... 400 V AC ±10 % 120 V DC ... 350 V DC (±20 %) 5 VA 10 VA (with max. number of extension modules) IP52 (front), IP30 (back) -10 °C ... 55 °C (14 °F to 131 °F) 96 / 96 / 82 mm 80 mm
0.5 ... 2.5 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 14 0.5 ... 6 mm <sup>2</sup> / 0.5 ... 6 mm <sup>2</sup> / 20 - 8 Class A product, see page 605
CE-compliant

Technical data
True r.m.s. value measurement up to 51st harmonic AC sine (50/60 Hz)
50 V AC ... 519 V AC (Phase/Phase) 28 V AC ... 300 V AC (Phase/neutral conductor)
0.2 %
9999 A (primary) 5 A (secondary) 6 A (Permanent) 5 mA 0.2 %
0 kW ... 9999 kW / 0 kvar ... 9999 kvar / 0 kVA ... 9999 kVA
0.5 % Class 0.5 S Class 2
230 V AC ±10 % (Tariff switchover: e.g., day/nighttime tariff)
Transistor output, active 30 V DC 27 mA
EEM-MA250                      EEM-MA200 Modbus RTU/JBUS RS-485      None 2.4 ... 38.4 kbps
LCD display, backlighting 1 s
110 V AC ... 277 V AC -10 % ... +15 % 5 VA IP51 (front), IP20 (back) -10 °C ... 55 °C (14 °F to 131 °F) 72 / 90 / 64 mm
0.5 ... 2.5 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 14 0.5 ... 4 mm <sup>2</sup> / 0.5 ... 4 mm <sup>2</sup> / 20 - 10 Class A product, see page 605
CE-compliant

Ordering data		
Type	Order No.	Pcs./ Pkt.
EEM-MA400	2901364	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
EEM-MA250	2901363	1
EEM-MA200	2901362	1

# Monitoring

## Energy and power measurement

### Function modules

Plug-in function modules for the EEM-MA600 energy meter.

#### EEM-2DIO-MA600

- Two digital inputs and outputs
- Configurable threshold values

#### EEM-2AO-MA600

- Two analog outputs  
0 to 20 mA/4 to 20 mA, configurable



Two digital inputs, two digital outputs



Two analog outputs

Technical data	
Digital input	
Voltage input signal	10 V DC ... 30 V DC
Input pulse length	10 ms
Output	
Output description	Relay output
Maximum switching voltage	250 V AC/DC
General data	
Supply voltage	9 V (via EEM-MA600)
Degree of protection	IP20
Ambient temperature (operation)	-10 °C ... 55 °C (14 °F to 131 °F)
EMC note	Class A product, see page 605
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL 61010-1

Technical data		
Type	Order No.	Pcs./Pkt.
EEM-2DIO-MA600	2901371	1

Technical data	
-	
-	
Current output	
-	
General data	
Supply voltage	9 V (via EEM-MA600)
Degree of protection	IP20
Ambient temperature (operation)	-10 °C ... 55 °C (14 °F to 131 °F)
EMC note	Class A product, see page 605
Conformance/Approvals	
Conformance	CE-compliant
UL 61010-1	UL 61010-1

Ordering data		
Type	Order No.	Pcs./Pkt.
EEM-2AO-MA600	2901475	1

Ordering data	
Description	
Function module (for EEM-MA600)	

### Function module

Plug-in function module for the EEM-MA600 energy meter

#### EEM-MEMO-MA600

- Stores P (+/-) and Q (+/-) with an internal or external synchronization pulse of 5, 8, 10, 20, 30 or 60 minutes, e.g., synchronization pulse of 15 minutes over 45 days
- Stores the last ten alarms with time stamp (2DIO function module necessary)
- Stores the last smallest and largest instantaneous values for voltages, currents, frequency, actual power, reactive power, entire harmonic distortion
- Stores the mean values of the cable voltage, line to line voltage and frequency (maximum 60 days)
- Stores undervoltage, surge voltage, and phase failure
- Cannot be combined with PROFIBUS communication module



Memory module

Technical data	
Digital input	
Voltage input signal	10 V DC ... 30 V DC
General data	
Supply voltage	9 V (via EEM-MA600)
Memory size	512 kByte
Degree of protection	IP20
Ambient temperature (operation)	-10 °C ... 55 °C (14 °F to 131 °F)
EMC note	Class A product, see page 605
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL 61010-1

Technical data		
Type	Order No.	Pcs./Pkt.
EEM-MEMO-MA600	2901370	1

Ordering data	
Description	
Function module (for EEM-MA600)	
Memory module	

Ordering data		
Type	Order No.	Pcs./Pkt.
EEM-MEMO-MA600	2901370	1

## Communication modules

**EEM-PB 12-MA600**

- PROFIBUS DP, with transmission speeds of 12 Mbps

**EEM-RS485-MA...**

- JBUS / Modbus/RTU



Modbus/RTU (RS-485)



PROFIBUS

	Technical data			Technical data		
Serial port						
Output description	Modbus RTU/JBUS RS-485			PROFIBUS DP		
Serial transmission speed	2.4 ... 38.4 kbps			12 Mbps		
General data						
Supply voltage	9 V (Via EEM-MA600/EEM-MA400)			9 V (via EEM-MA600)		
Degree of protection	IP20			IP20		
Ambient temperature (operation)	-10 °C ... 55 °C (14 °F to 131 °F)			-10 °C ... 55 °C (14 °F to 131 °F)		
EMC note	Class A product, see page 605			Class A product, see page 605		
Conformance/Approvals						
Conformance	CE-compliant			CE-compliant		
UL, USA/Canada	UL 61010-1			UL 61010-1		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./ Pkt.	Type	Order No.	Pcs./ Pkt.
<b>Communication module</b> (for EEM-MA400) RS-485 (JBUS/Modbus/RTU)	<b>EEM-RS485-MA400</b>	<b>2901365</b>	1			
<b>Communication module</b> (for EEM-MA600) RS-485 (JBUS/Modbus/RTU)	<b>EEM-RS485-MA600</b>	<b>2901367</b>	1			
D-SUB (PROFIBUS DP)				<b>EEM-PB 12-MA600</b>	<b>2901418</b>	1

## Communication modules

**EEM-ETH-MA600**

- Ethernet
- Modbus/TCP
- Integrated web server

**EEM-ETH-RS485-MA600**

- Ethernet gateway to RS-485
- Modbus/TCP / Modbus/RTU
- Integrated web server



Ethernet with integrated web server



Ethernet gateway with integrated web server

	Technical data			Technical data		
Serial port						
Output description	Modbus/TCP Ethernet (RJ45)			Modbus/TCP Ethernet (RJ45)		
Serial transmission speed	10/100 Mbps			10/100 Mbps		
General data						
Supply voltage	9 V (via EEM-MA600)			9 V (via EEM-MA600)		
Degree of protection	IP20			IP20		
Ambient temperature (operation)	-10 °C ... 55 °C (14 °F to 131 °F)			-10 °C ... 55 °C (14 °F to 131 °F)		
EMC note	Class A product, see page 605			Class A product, see page 605		
Conformance/Approvals						
Conformance	CE-compliant			CE-compliant		
UL, USA/Canada	UL 61010-1			UL 61010-1		
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./ Pkt.	Type	Order No.	Pcs./ Pkt.
<b>Communication module</b> (for EEM-MA600) Ethernet	<b>EEM-ETH-MA600</b>	<b>2901373</b>	1			
Ethernet gateway				<b>EEM-ETH-RS485-MA600</b>	<b>2901374</b>	1

# Monitoring

## Energy and power measurement

### Function module

Plug-in function module for the EEM-MA400 energy meter.

#### EEM-IMP-MA400

- One configurable pulse output or one configurable threshold value



Pulse module

Output
Output description
Maximum switching voltage
General data
Supply voltage
Degree of protection
Ambient temperature (operation)
Conformance/Approvals
Conformance
UL, USA/Canada

Technical data		
Relay output		
100 V DC		
9 V (via EEM-MA400)		
IP20		
-10 °C ... 55 °C (14 °F to 131 °F)		
CE-compliant		
UL 61010-1		

Description
<b>Function module</b> (for EEM-MA400) with one pulse or alarm output

Ordering data		
Type	Order No.	Pcs./Pkt.
EEM-IMP-MA400	<a href="#">2904314</a>	1

### Function module

Plug-in function module for the EEM-MA600 energy meter

#### EEM-IMP-MA600

- Two configurable pulse outputs



Pulse module

Output
Output description
Maximum switching voltage
General data
Supply voltage
Degree of protection
Ambient temperature (operation)
Conformance/Approvals
Conformance
UL, USA/Canada

Technical data		
Relay output		
100 V DC		
9 V (via EEM-MA600)		
IP20		
-10 °C ... 55 °C (14 °F to 131 °F)		
CE-compliant		
UL 61010-1		

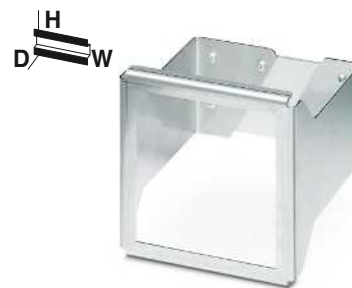
Description
<b>Function module</b> (for EEM-MA600) with two configurable pulse outputs

Ordering data		
Type	Order No.	Pcs./Pkt.
EEM-IMP-MA600	<a href="#">2904313</a>	1

## Accessories

**DIN rail adapter**

- For mounting the EEM-MA600 or EEM-MA400 energy meters on a 35 mm DIN rail according to EN 60715



For mounting on DIN rails

ERIC

**General data**

Vibration resistance  
DIN rail clip material  
Fixing sheet material  
Dimensions W/H/D

**Technical data**

57 Hz ... 150 Hz (2 g)  
Aluminum, natural anodized  
Stainless steel VA  
116 / 112 / 115 mm

**Ordering data****Description**

**DIN rail adapter** for EEM-MA600 and EEM-MA400

**Type**

EEM-MKT-DRA

**Order No.**

2902078

**Pcs./  
Pkt.**

1

# Monitoring

## Energy and power measurement

### Controller solution for usage data acquisition



The EMlog software from Phoenix Contact provides an efficient solution for recording energy data relating to heat, cold, air, and electricity when used in conjunction with the ILC 191 ME/AN modular Inline controller. This allows you to keep an eye on your resources and manage the consumption levels of your machines and systems.

#### Your advantages:

- Easy startup without programming knowledge
- Easy parameterization, thanks to web-based interface
- Direct parameterization of predefined sensors
- Existing configurations can be reused



Solution for usage data acquisition



Interfaces	
INTERBUS local bus (master)	
Ethernet	
Parameterization/operation/diagnostics	
INTERBUS master	
Number of devices with parameter channel	
Number of supported devices	
Amount of process data	
Digital inputs/outputs	
Number of inputs	8
Number of outputs	4
Analog inputs/outputs	
Number of inputs	2
Number of outputs	2
IEC-61131 runtime system	
Programming tool	PC WORX / PC WORX EXPRESS
Processor	Altera Nios II 64 MHz
Program memory	1 Mbyte
Mass storage	1 Mbyte
Retentive mass storage	48 kByte (NVRAM)
Number of data blocks	depends on mass storage
Number of timers, counters	depends on mass storage
Number of control tasks	8
Real-time clock	Yes
Power supply	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC
Typical current consumption	310 mA
General data	
Dimensions	W / H / D 164 mm / 136.8 mm / 71.5 mm
Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 55 °C
EMC note	Class A product, see page 605

#### Technical data

Inline data jumper	
2 x RJ45 socket	
1 x 6-pos. MINI DIN socket (PS/2)	
max. 24	
max. 128	
max. 4096 Bit (INTERBUS)	
max. 32768 Bit (internal Modbus /TCP client)	
8	
4	
2	
2	
PC WORX / PC WORX EXPRESS	
Altera Nios II 64 MHz	
1 Mbyte	
1 Mbyte	
48 kByte (NVRAM)	
depends on mass storage	
depends on mass storage	
8	
Yes	
24 V DC	
19.2 V DC ... 30 V DC	
310 mA	
W / H / D	164 mm / 136.8 mm / 71.5 mm
IP20	
-25 °C ... 55 °C	
Class A product, see page 605	

Description
<b>Compact controller</b> , complete with accessories (connector and marking field) - Analog inputs/outputs
<b>Program and configuration memory</b> , plug-in, 2 GB with license key and user program for reading from measuring devices
Programming cable
COM CAB MINI DIN

#### Ordering data

Type	Order No.	Pcs./ Pkt.
ILC 191 ME/AN	2700074	1
SD FLASH 2GB EMLOG	2403484	1

#### Accessories

COM CAB MINI DIN	2400127	1
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## Complete packages for data logging

The PSK RTU 50 is a multifunctional RTU (Remote Telemetry Unit), which combines the functions of a data logger, gateway, and alarm manager. The PSK RTU 50 offers various communication options, was developed with low power technology and allows independent operation, e.g., with batteries or solar cells.

### Your advantages:

- GSM/GPRS modem
- Ethernet interface
- IEC 60870-5-101
- IEC 60870-5-104
- Modbus/RTU



Multifunctional data logger

		Technical data	
Interfaces		RS-232	
Interfaces		RS-232/-485	
		Serial	
		Ethernet	
Digital inputs/outputs		4	
Number of inputs		2 (Relay output)	
Number of outputs			
Analog inputs		2	
Number of inputs			
IEC-61131 runtime system		832 kByte	
Program memory		1 Mbyte	
Retentive mass storage		Yes (battery-backed)	
Real-time clock			
Power supply		24 V DC	
Supply voltage		5 mA	
Typical current consumption			
General data		475 g	
Weight		210 mm	
Width		110 mm	
Height		45 mm	
Depth		IP20	
Degree of protection		-20 °C ... 65 °C	
Ambient temperature (operation)			
		Ordering data	
Description	Type	Order No.	Pcs./Pkt.
Multifunctional data logger	PSK RTU 50	2400018	1

#### Compressed air meters

Use meters from Phoenix Contact to monitor the use of compressed air, an expensive production resource. By using compressed air efficiently, you can decrease compressor usage and therefore reduce energy costs. The calorimetric measuring procedure records even the smallest consumption rates. You can therefore detect wear or leaks based on the amount of air consumed.

#### Use compressed air meters to acquire the following values:

- The current volumetric flow according to ISO 2533 and DIN 1343
- The total volume used
- The temperature of the compressed air in the monitored operating processes

#### The compressed air meters impress thanks to their:

- Detailed reference measurement with flow rate, total volume, and temperature display
- Intelligent sensor communication, thanks to IO-Link technology
- A measuring range from 0.06 to 700.0 Nm<sup>3</sup>/h
- Flexible use, thanks to IP65 protection: resistant to dust and splash water

 IO-Link



Compressed air meter up to 75 Nm<sup>3</sup>/h

Flow monitoring	
Measuring range	
Display area	
Repeatability	
Response time	
Measured value error	
Temperature monitoring	
Measuring range	
Display area	
Response time	
Resolution	
Accuracy	
Supply for module electronics	
Connection method	
No. of pos.	
Supply voltage range	
Current draw	
Digital outputs	
Pulse value	
Pulse length	
Delay time	
Analog outputs	
Type of protection	
Current output signal	
Load/output load current output	
General data	
Weight	
Width	
Height	
Depth	
Degree of protection	
Protection class	
Ambient temperature (operation)	
Ambient temperature (storage/transport)	
Vibration resistance in acc. with EN 60068-2-6/IEC 60068-2-6	

Technical data	
PSK AFS6050IOL	PSK AFS6000IOL
	0.20 Nm <sup>3</sup> /h ... 75 Nm <sup>3</sup> /h
	0.00 Nm <sup>3</sup> /h ... 90 Nm <sup>3</sup> /h
	±1.5% of the measured value
	< 0.1 s ((dAP = 0))
±15 % of the measured value	Depending on the air quality:
+1.5 % of the measuring range final value	±3% of the measured value
	+ 0.3% of the measuring range final value; ±6% of the measured value + 0.6% of the measuring range final value
	0 °C ... 60 °C
	-12 °C ... 72 °C
	30 s (Q > 0.1 Nm <sup>3</sup> /h)
	0.5 °C
	± 2.5 °C (Q > 0.1 Nm <sup>3</sup> /h)
	M12 connector
	4
	19 V DC ... 30 V DC
	< 100 mA
	0.0010 m <sup>3</sup> ... 1000000 m <sup>3</sup>
	min. 0.04 s
	0.5 s (Operational readiness)
	Short-circuit protection, polarity reversal protection
	4 mA ... 20 mA
	≤ 500 Ω
	581 g
	961 g
	45 mm
	300 mm
	79.5 mm
	76.8 mm
	IP65
	III
	0 °C ... 60 °C
	-20 °C ... 85 °C
	5g (55 ... 2000 Hz)

Description
<b>Compressed air meter:</b> G1/2 process connection, measuring range up to 75 Nm <sup>3</sup> /h
<b>Compressed air meter:</b> G1/2 process connection, measuring range up to 75 Nm <sup>3</sup> /h
<b>Compressed air meter:</b> R1/4 process connection, measuring range up to 15 Nm <sup>3</sup> /h
<b>Compressed air meter:</b> R1 process connection, measuring range up to 225 Nm <sup>3</sup> /h
<b>Compressed air meter:</b> R2 process connection, measuring range up to 700 Nm <sup>3</sup> /h

Ordering data		
Type	Order No.	Pcs./Pkt.
PSK AFS6050IOL	2700704	1
PSK AFS6000IOL	2700707	1



IO-Link



Compressed air meter up to 15 Nm³/h

IO-Link



Compressed air meter up to 225 Nm³/h

IO-Link



Compressed air meter up to 700 Nm³/h

Technical data

0.04 Nm³/h ... 15 Nm³/h  
 0.00 Nm³/h ... 18 Nm³/h  
 ±1.5% of the measured value  
 < 0.1 s ((dAP = 0))  
 Depending on the air quality: ±3% of the measured value + 0.3% of the measuring range final value; ±6% of the measured value + 0.6% of the measuring range final value

0 °C ... 60 °C  
 -12 °C ... 72 °C  
 30 s (Q > 0.1 Nm³/h)  
 0.5 °C  
 ± 2.5 °C (Q > 0.1 Nm³/h)

M12 connector  
 4  
 19 V DC ... 30 V DC  
 < 100 mA

0.0010 m³ ... 1000000 m³  
 min. 0.2 s  
 0.5 s (Operational readiness)

Short-circuit protection, polarity reversal protection  
 4 mA ... 20 mA  
 ≤ 500 Ω

887 g  
 45 mm  
 193.3 mm  
 74.5 mm  
 IP65  
 III  
 0 °C ... 60 °C  
 -20 °C ... 85 °C  
 5g (55 ... 2000 Hz)

Technical data

0.70 Nm³/h ... 225 Nm³/h  
 0.00 Nm³/h ... 270 Nm³/h  
 ±1.5% of the measured value  
 < 0.1 s ((dAP = 0))  
 Depending on the air quality: ±3% of the measured value + 0.3% of the measuring range final value; ±6% of the measured value + 0.6% of the measuring range final value

0 °C ... 60 °C  
 -12 °C ... 72 °C  
 30 s (Q > 0.1 Nm³/h)  
 0.5 °C  
 ± 2.5 °C (Q > 0.1 Nm³/h)

M12 connector  
 4  
 19 V DC ... 30 V DC  
 < 100 mA

0.0030 m³ ... 3000000 m³  
 min. 0.02 s  
 1 s (Operational readiness)

Short-circuit protection, polarity reversal protection  
 4 mA ... 20 mA  
 ≤ 500 Ω

2.053 kg  
 45 mm  
 475 mm  
 88.5 mm  
 IP65  
 III  
 0 °C ... 60 °C  
 -20 °C ... 85 °C  
 5g (55 ... 2000 Hz)

Technical data

2.30 Nm³/h ... 700 Nm³/h  
 0.00 Nm³/h ... 840 Nm³/h  
 ±1.5% of the measured value  
 < 0.1 s ((dAP = 0))  
 Depending on the air quality: ± 3% of the measured value + 0.3% of the measuring range final value; ± 6% of the measured value + 0.6% of the measuring range final value

0 °C ... 60 °C  
 -12 °C ... 72 °C  
 30 s (Q > 0.1 Nm³/h)  
 0.5 °C  
 ± 2.5 °C (Q > 0.1 Nm³/h)

M12 connector  
 4  
 19 V DC ... 30 V DC  
 < 100 mA

0.0100 m³ ... 4000000 m³  
 min. 0.043 s  
 0.5 s (Operational readiness)

Short-circuit protection, polarity reversal protection  
 4 mA ... 20 mA  
 ≤ 500 Ω

4.332 kg  
 133 mm  
 475 mm  
 -  
 IP65  
 III  
 0 °C ... 60 °C  
 -20 °C ... 85 °C  
 5g (55 ... 2000 Hz)

Ordering data

Type	Order No.	Pcs./Pkt.
PSK AFS5000IOL	2700705	1

Ordering data

Type	Order No.	Pcs./Pkt.
PSK AFS8000IOL	2700708	1

Ordering data

Type	Order No.	Pcs./Pkt.
PSK AFS2000IOL	2700709	1

### Pressure sensor

#### Pressure sensor with IO-Link

Pressure sensors from Phoenix Contact detect the operating pressure of gas media in a range from -1 to 10 bar. The overload-proof ceramic measuring cell is designed for in excess of 100 million cycles and enables a high switching point accuracy. The pressure switch offers the option of using the set switching points via two switching outputs or reading all process data via the IO-Link interface.

#### Your advantages:

- IO-Link communication
- Parameterization, diagnostics, and process value monitoring via IO-Link
- Programmable function
- 4-character alphanumeric display

 IO-Link



Pressure sensor up to 10 bar

Pressure monitoring	
Measuring range	-1 bar ... 10 bar (Minimum burst pressure 150 bar)
Pressure resistance	75 bar
Process connection	G1/4 I
Supply for module electronics	
Connection method	M12 connector
No. of pos.	4
Supply voltage range	18 V DC ... 36 V DC
Current draw	< 35 mA
Digital outputs	
Number of outputs	2 (OUT1 = switching output, OUT2 = switching output or diagnostic output)
Connection method	M12 connectors, assigned four times
Delay time	0.3 s (Operational readiness)
IO-Link	
Specification	V1.1
Transmission speed	38.4 kbaud
General data	
Weight	263 g
Width	34 mm
Height	91.5 mm
Depth	48 mm
Degree of protection	IP65
Protection class	III
Ambient temperature (operation)	-25 °C ... 80 °C
Ambient temperature (storage/transport)	-40 °C ... 100 °C
Vibration resistance in acc. with EN 60068-2-6/IEC 60068-2-6	20g (10 Hz ... 2000 Hz)

#### Technical data

Measuring range	-1 bar ... 10 bar (Minimum burst pressure 150 bar)	
Pressure resistance	75 bar	
Process connection	G1/4 I	
Supply for module electronics		
Connection method	M12 connector	
No. of pos.	4	
Supply voltage range	18 V DC ... 36 V DC	
Current draw	< 35 mA	
Digital outputs		
Number of outputs	2 (OUT1 = switching output, OUT2 = switching output or diagnostic output)	
Connection method	M12 connectors, assigned four times	
Delay time	0.3 s (Operational readiness)	
IO-Link		
Specification	V1.1	
Transmission speed	38.4 kbaud	
General data		
Weight	263 g	
Width	34 mm	
Height	91.5 mm	
Depth	48 mm	
Degree of protection	IP65	
Protection class	III	
Ambient temperature (operation)	-25 °C ... 80 °C	
Ambient temperature (storage/transport)	-40 °C ... 100 °C	
Vibration resistance in acc. with EN 60068-2-6/IEC 60068-2-6	20g (10 Hz ... 2000 Hz)	

Description
<b>Pressure sensor with indicator.</b> G1/4 I process connection, IO-Link communication

#### Ordering data

Type	Order No.	Pcs./ Pkt.
PSK APS7004IOL	2700710	1





### Extremely versatile

PACT current transformers offer a complete product range for converting alternating currents up to 4000 A into secondary currents of 1 A and 5 A. Depending on requirements, busbar, plug-in, and winding current transformers are available. PACT current transformers are available in different transformation ratios, accuracy classes, and rated powers - in 3000 versions, for your current measurement requirements.

### Also available for higher accuracy classes

For standard applications, such as in machine building or systems manufacturing, Phoenix Contact offers current transformers with accuracy classes 0.5 and 1 in a version that cannot be calibrated.

For higher accuracy or for billing purposes in energy supply, type-tested transformers that can be calibrated as well as calibrated transformers are available - with classes 0.2/0.2S/0.5 and 0.5S.



### Fast and secure installation

The current transformer quick-action mechanism offers the following advantages:

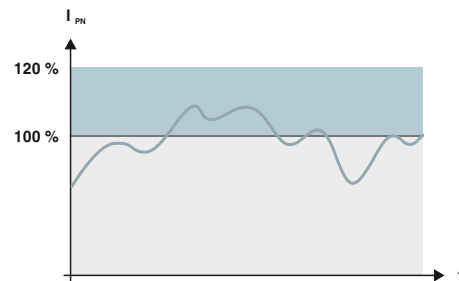
- Tool-free mounting
- Considerable reduction in installation time
- Easy handling and secure fastening by pressing with finger
- Current transformers align themselves – no need for subsequent alignment



### Variable and space-saving mounting

In addition to the vertical and horizontal mounting position, the optional accessories offer further installation options such as mounting on the DIN rail or on the control cabinet panel.

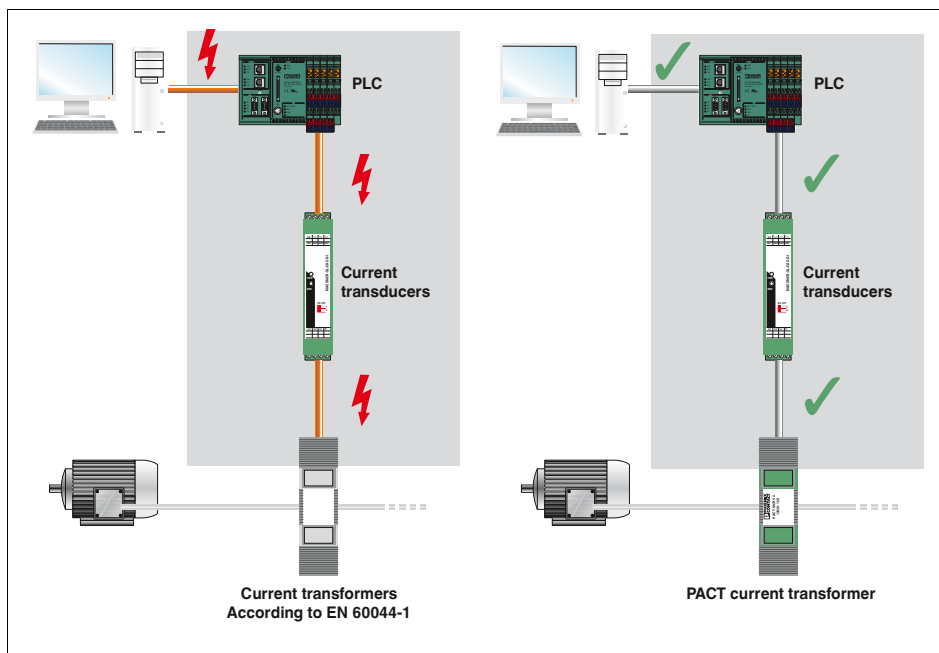
All PACT current transformers are just 30 mm wide. This saves space – for example with flat mounting when measuring branch outlets.



### Safely detecting current peaks

PACT current transformers can be used to safely detect current peaks greater than the rated nominal current strength – without resulting in any damage. The transformers are designed for a thermal nominal continuous current of 120% of the primary rated current strength.

Example: a PACT transformer with a specified rated power of 10 VA actually delivers 14.4 VA on a continual basis.



### Safe isolation

PACT current transformers are manufactured according to EN 50178. This is relevant for electronic equipment for use in power installations.

EN 50178 differs considerably from EN 60044, the usual standard for transformers, with regard to safety.

Your advantages:

- PACT current transformers offer safe isolation, thanks to greater air clearances and creepage distances.
- PACT current transformers ensure that there is no sparkover on the secondary side of the transformer and human life is protected inside and outside the control cabinet.
- Up to 1000 V (L-N) operating voltage possible
- Routine testing with 12 kV (1.2/50  $\mu$ s)
- Meets overvoltage category 3

# Monitoring

## Current measurement

### Current transformer selection guide

- Complete range consisting of winding, busbar, and window-type current transformers
- Popular types available from stock; alternatively, order key can be used for custom dimensioning
- Versions available to support official calibration



### Selection

- Select your transformer in accordance with the dimensions of the copper rail
- Specify the four electrical characteristics of the transformer:

- 1. The primary rated current strength  $I_{pn}$**  - the maximum amperage occurring in the path to be measured
- 2. The secondary rated current  $I_{sn}$**  - supplied to the downstream measuring devices
- 3. Class** - accuracy for adherence to the specified tolerances
- 4. Rated power  $S_n$  [VA]** - takes account of all the loads occurring in the measuring circuit

#### Input data

Thermal rated short-time current  
Rated surge current  
Rated frequency

Surge current limitation factor

#### General data

Rated insulation voltage  
Impulse withstand voltage  
Insulating material class  
Connection capacity of secondary terminals  
Ambient temperature (operation)  
Standards/regulations  
Housing material

#### Technical data

$I_{th} = 60 \cdot I_n$   
 $I_{dyn} = 2.5 \cdot I_{th}$   
50 Hz ... 60 Hz  
50 Hz  
FS 5

1 kV (Phase/neutral conductor)  
12 kV (1.2/50  $\mu$ s)  
E  
2 x (2.5 x 4) mm  
-25 °C ... 40 °C  
EN 50178 , EN 61869  
WELLAMID 6600-PA66-GV 20 HWV0CP

## Calculation guide

### Determination of the secondary side rated power $S_n$

All the occurring loads must be added:

- Calculate the power requirement of the copper wire (forward and return line)
- Take into account the power requirement of the connected devices (measuring devices)
- Add a reserve requirement

$$S_n \text{ total} = S_n \text{ copper wire} + S_n \text{ measuring device} + S_n \text{ reserve}$$

### Power requirement of copper wires with a different diameter

Conductor cross section in mm <sup>2</sup>	Rated power in VA/m (consider the forward and return line)	
	Secondary current $I_{sn}$ 5 A	Secondary current $I_{sn}$ 1 A
1.5	0.2917	0.0117
2.5	0.1750	0.0070
4	0.1094	0.0044
6	0.0729	0.0029

Example:

$S_n$  copper wire = cable length x 2 x rated power  
 $S_n$  copper wire = 10 m x 2 x 0.1750 VA/m = 3.50 VA

$S_n$  measuring device = 2 VA

$S_n$  reserve < 0.5 x ( $S_n$  copper wire +  $S_n$  measuring device)

$S_n$  reserve = 2 VA

$S_n$  total =  $S_n$  copper wire +  $S_n$  measuring device +  $S_n$  reserve  
 $S_n$  total = 3.5 VA + 2 VA + 2 VA = 7.5 VA

## Order key - example for PACT MCR-V2-3015-60

Preferred types that can be ordered directly are marked in green in the selection table.

Order No.	Primary current $I_{pn}$	Secondary current $I_{sn}$	Class	Rated power $S_n$
2277271	IP02000	IS05	C10	P750
	IP00600 $\hat{=}$ 60 A IP00750 $\hat{=}$ 75 A IP00800 $\hat{=}$ 80 A IP01000 $\hat{=}$ 100 A IP01250 $\hat{=}$ 125 A <b>IP02000 <math>\hat{=}</math> 200 A</b> IP02500 $\hat{=}$ 250 A	IS01 $\hat{=}$ 1 A <b>IS05 <math>\hat{=}</math> 5 A</b>	C02 $\hat{=}$ 0.2 C05 $\hat{=}$ 0.5 <b>C10 <math>\hat{=}</math> 1</b>	P125 $\hat{=}$ 1.25 VA P250 $\hat{=}$ 2.5 VA P375 $\hat{=}$ 3.75 VA P500 $\hat{=}$ 5.0 VA <b>P750 <math>\hat{=}</math> 7.5 VA</b> P1000 $\hat{=}$ 10 VA

Selection table (extract)

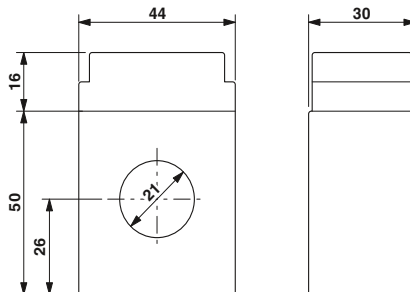
$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]								Rated power $S_n$ [VA]
		60	75	80	100	125	150	200	250	
1 A	0.5							2.5	2.5	
	1	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	7.5
5 A	0.5							2.5	2.5	
	1	1.25	1.25	1.25	2.5	2.5	2.5	2.5	2.5	10

Current transformers

**PACT MCR-V1-21-44**

- Primary rated current  $I_{pn}$ : 0...(50...500) A
- Circular conductor dimensions:  $\varnothing$  21 mm

**Notes:**  
 Our configurator, which is available at [phoenixcontact.net/products](http://phoenixcontact.net/products), makes ordering easy.  
 The relevant installation accessories can be found on page 233



Busbar curr. transf., official calibration as an option

ERIC

Ordering data

Description	Rated power $S_n$	Type	Order No.	Pcs./Pkt.
<b>Primary rated current <math>I_{pn}</math>:</b>				
- 50 A	1.25 VA	PACT MCR-V1-21-44- 50-5A-1	2277019	1
- 75 A	2.5 VA	PACT MCR-V1-21-44- 75-5A-1	2277611	1
- 100 A	2.5 VA	PACT MCR-V1-21-44-100-5A-1	2277022	1
- 125 A	3.75 VA	PACT MCR-V1-21-44-125-5A-1	2277763	1
- 150 A	5 VA	PACT MCR-V1-21-44-150-5A-1	2277035	1
- 200 A	5 VA	PACT MCR-V1-21-44-200-5A-1	2277776	1
- 250 A	5 VA	PACT MCR-V1-21-44-250-5A-1	2277048	1
- 300 A	10 VA	PACT MCR-V1-21-44-300-5A-1	2277789	1
- 400 A	5 VA	PACT MCR-V1-21-44-400-5A-1	2277051	1
- 500 A	10 VA	PACT MCR-V1-21-44-500-5A-1	2277792	1
<b>Current transformers</b> , to determine the desired current transformer type, refer to the order key below				
<b>Current transformers that support official calibration:</b> To specify the type of current transformer you require, please refer to the order key (see notes)				
		PACT MCR-V1-21-44	2277268	1
		PACT MCR-V1C-21-44	2277420	1

Add order key from the selection table (ordering example marked in orange)

Order No.	Primary current $I_{pn}$	Secondary current $I_{sn}$	Class	Rated power $S_n$
2277268	IP05000	IS01	C05	P1000

Selection table PACT MCR-V1-21-44 (Order No.: 2277268)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]												Rated power $S_n$ [VA]			
		50	60	75	80	100	125	150	200	250	300	400	500				
IS01 $\cong 1$ A	C05 $\cong 0.5$					1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	C10 $\cong 1$							3.75	5	5	5	5	5	5	5	5	5
IS05 $\cong 5$ A	C05 $\cong 0.5$					1.25	1.25	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	C10 $\cong 1$	1.25	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

# Monitoring

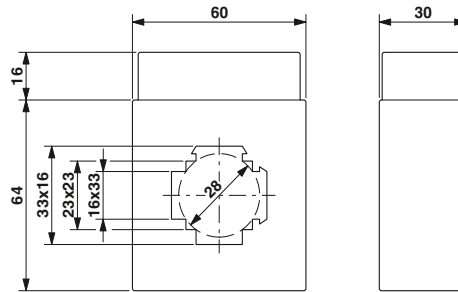
## Current measurement

### Current transformers

#### PACT MCR-V2-3015-60

- Primary rated current  $I_{pn}$ :  
0...(50...750) A
- Circular conductor dimensions:  $\varnothing$  28 mm
- Rail dimensions:  
30x15 mm, 20x20 mm

**Notes:**  
Our configurator, which is available at phoenixcontact.net/products, makes ordering easy.  
The relevant installation accessories can be found on page 233



Window-type curr. transformer, official calibration as an option

ERC

#### Ordering data

Description	Rated power $S_n$	Type	Order No.	Pcs./Pkt.
<b>Primary rated current <math>I_{pn}</math>:</b>				
- 60 A	1.25 VA	PACT MCR-V2-3015- 60- 60-5A-1	2277815	1
- 75 A	1.25 VA	PACT MCR-V2-3015- 60- 75-5A-1	2277828	1
- 75 A	1.5 VA	PACT MCR-V2- 3015- 60- 75-5A-1	2276502	1
- 80 A	1.25 VA	PACT MCR-V2-3015- 60- 80-5A-1	2277831	1
- 100 A	2.5 VA	PACT MCR-V2-3015- 60- 100-5A-1	2277064	1
- 125 A	3.75 VA	PACT MCR-V2-3015- 60- 125-5A-1	2277624	1
- 150 A	3.75 VA	PACT MCR-V2-3015- 60- 150-5A-1	2277844	1
- 150 A	5 VA	PACT MCR-V2- 3015- 60-150-5A-1	2277077	1
- 200 A	5 VA	PACT MCR-V2-3015- 60- 200-5A-1	2277637	1
- 200 A	7.5 VA	PACT MCR-V2-3015- 60- 200-5A-1	2277857	1
- 250 A	5 VA	PACT MCR-V2- 3015- 60-250-5A-1	2276544	1
- 250 A	7.5 VA	PACT MCR-V2-3015- 60- 250-5A-1	2277860	1
- 250 A	10 VA	PACT MCR-V2- 3015- 60-250-5A-1	2277080	1
- 300 A	7.5 VA	PACT MCR-V2-3015- 60- 300-5A-1	2277640	1
- 400 A	10 VA	PACT MCR-V2- 3015- 60-400-5A-1	2277093	1
- 500 A	10 VA	PACT MCR-V2-3015- 60- 500-5A-1	2277653	1
- 600 A	10 VA	PACT MCR-V2-3015- 60- 600-5A-1	2277103	1
- 750 A	10 VA	PACT MCR-V2-3015- 60- 750-5A-1	2277666	1
<b>Current transformers, to determine the desired current transformer type, refer to the order key below</b>				
<b>Current transformers that support official calibration:</b> To specify the type of current transformer you require, please refer to the order key (see notes)				
PACT MCR-V2- 3015- 60			2277271	1
PACT MCR-V2C- 3015- 60			2277433	1
<b>Accessories</b>				
<b>Quick-action mechanism</b>				
Fixing pin length 40 mm		PACT-FAST-MNT-W16-L40	2276638	1
Fixing pin length 65 mm		PACT-FAST-MNT-W16-L65	2276641	1

Add order key from the selection table (ordering example marked in orange)

Order No.	Primary current $I_{pn}$	Secondary current $I_{sn}$	Class	Rated power $S_n$
2277271	IP07500	IS01	C05	P1500

Selection table PACT MCR-V2-3015-60 (Order No.: 2277271)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]													Rated power $S_n$ [VA]				
		50	60	75	80	100	125	150	200	250	300	400	500	600		750			
IS01 $\cong$ 1 A	C05 $\cong$ 0.5					1.25	2.5	2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
										3.75	5	5	5	5	5	5	5	5	5
	C10 $\cong$ 1	1.25	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
IS05 $\cong$ 5 A	C05 $\cong$ 0.5																		
	C10 $\cong$ 1		1.25	1.25	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
			1.5	2		3.75	3.75	5	5	5	5	5	5	5	5	5	5	5	
						5	7.5	7.5	7.5	10	10	10	10	10	10	10	10	10	

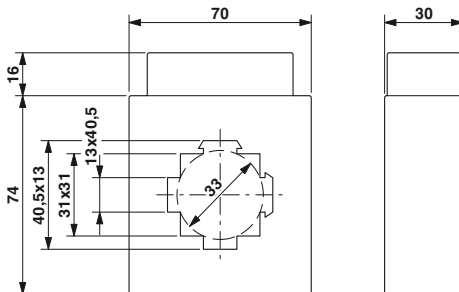


Current transformers

**PACT MCR-V2-4012-70**

- Primary rated current  $I_{pn}$ : 0...(75...1000) A
- Circular conductor dimensions:  $\varnothing$  33 mm
- Rail dimensions: 40x12 mm, 2x 30x10 mm

**Notes:**  
 Our configurator, which is available at phoenixcontact.net/products, makes ordering easy.  
 The relevant installation accessories can be found on page 233



Window-type curr. transformer, official calibration as an option

ERIC

Ordering data

Description	Rated power $S_n$	Type	Order No.	Pcs./Pkt.
<b>Primary rated current <math>I_{pn}</math>:</b>				
- 250 A	5 VA	PACT MCR-V2-4012- 70- 250-5A-1	2277116	1
- 300 A	7.5 VA	PACT MCR-V2-4012- 70- 300-5A-1	2277679	1
- 400 A	7.5 VA	PACT MCR-V2-4012- 70- 400-5A-1	2277129	1
- 500 A	10 VA	PACT MCR-V2-4012- 70- 500-5A-1	2277682	1
- 600 A	10 VA	PACT MCR-V2-4012- 70- 600-5A-1	2277132	1
- 750 A	10 VA	PACT MCR-V2-4012- 70- 750-5A-1	2277695	1
- 800 A	10 VA	PACT MCR-V2-4012- 70- 800-5A-1	2277145	1
- 1000 A	10 VA	PACT MCR-V2-4012- 70-1000-5A-1	2277158	1
<b>Current transformers, to determine the desired current transformer type, refer to the order key below</b>				
<b>Current transformers that support official calibration:</b> To specify the type of current transformer you require, please refer to the order key (see notes)				
PACT MCR-V2- 4012- 70			2277284	1
PACT MCR-V2C- 4012- 70			2277446	1
<b>Accessories</b>				
PACT-FAST-MNT-W13-L40			2276612	1
PACT-FAST-MNT-W13-L65			2276625	1

**Quick-action mechanism**  
 Fixing pin length 40 mm  
 Fixing pin length 65 mm

Add order key from the selection table (ordering example marked in orange)

Order No.	Primary current $I_{pn}$	Secondary current $I_{sn}$	Class	Rated power $S_n$
2277284	IP010000	IS05	C10	P250

Selection table PACT MCR-V2-4012-70 (Order No.: 2277284)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]												Rated power $S_n$ [VA]				
		75	80	100	125	150	200	250	300	400	500	600	750		800	1000		
IS01 ≅ 1 A	C05 ≅ 0.5				1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	15 15 15 15
							3.75	5	5	5	5	5	5	5	5	5		
	C10 ≅ 1		1.25	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
						3.75	5	5	5	5	5	5	5	5	5	5	5	
IS05 ≅ 5 A	C05 ≅ 0.5				1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	15 15 15 15
							3.75	5	5	5	5	5	5	5	5	5		
	C10 ≅ 1		1.25	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
						3.75	5	5	5	5	5	5	5	5	5	5	5	

# Monitoring

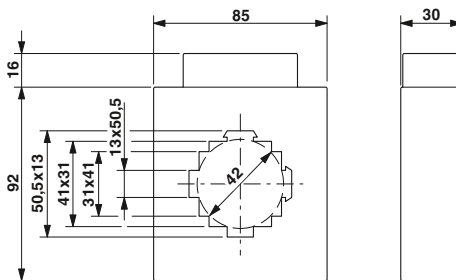
## Current measurement

### Current transformers

#### PACT MCR-V2-5012-85

- Primary rated current  $I_{pn}$ : 0...(100...1500) A
- Circular conductor dimensions:  $\varnothing$  42 mm
- Rail dimensions: 50x12 mm, 2x 40x10 mm

**Notes:**  
 Our configurator, which is available at phoenixcontact.net/products, makes ordering easy.  
 The relevant installation accessories can be found on page 233



Window-type curr. transformer, official calibration as an option

ERC

#### Ordering data

Description	Rated power $S_n$	Type	Order No.	Pcs./Pkt.
<b>Primary rated current <math>I_{pn}</math>:</b>				
- 150 A	3.75 VA	PACT MCR-V2-5012- 85- 150-5A-1	2276117	1
- 200 A	5 VA	PACT MCR-V2-5012- 85- 200-5A-1	2276120	1
- 250 A	7.5 VA	PACT MCR-V2-5012- 85- 250-5A-1	2276133	1
- 300 A	10 VA	PACT MCR-V2-5012- 85- 300-5A-1	2276146	1
- 400 A	10 VA	PACT MCR-V2-5012- 85- 400-5A-1	2277161	1
- 500 A	15 VA	PACT MCR-V2-5012- 85- 500-5A-1	2276159	1
- 600 A	10 VA	PACT MCR-V2-5012- 85- 600-5A-1	2277174	1
- 600 A	15 VA	PACT MCR-V2-5012- 85- 600-5A-1	2276162	1
- 750 A	10 VA	PACT MCR-V2-5012- 85- 750-5A-1	2276175	1
- 800 A	10 VA	PACT MCR-V2-5012- 85- 800-5A-1	2277187	1
- 1000 A	10 VA	PACT MCR-V2-5012- 85-1000-5A-1	2276463	1
- 1000 A	15 VA	PACT MCR-V2-5012- 85-1000-5A-1	2277190	1
- 1250 A	15 VA	PACT MCR-V2-5012- 85-1250-5A-1	2277200	1
- 1500 A	15 VA	PACT MCR-V2-5012- 85-1500-5A-1	2276188	1
<b>Current transformers</b> , to determine the desired current transformer type, refer to the order key below				
<b>Current transformers that support official calibration:</b> To specify the type of current transformer you require, please refer to the order key (see notes)				
		PACT MCR-V2- 5012- 85	2277297	1
		PACT MCR-V2C- 5012- 85	2277459	1
<b>Quick-action mechanism</b>				
Fixing pin length 40 mm			2276612	1
Fixing pin length 65 mm			2276625	1

#### Accessories

Add **order key** from the selection table (ordering example marked in orange)

Order No.	Primary current $I_{pn}$	Secondary current $I_{sn}$	Class	Rated power $S_n$
2277297	IP02500	IS01	C10	P750

Selection table PACT MCR-V2-5012-85 (Order No.: 2277297)

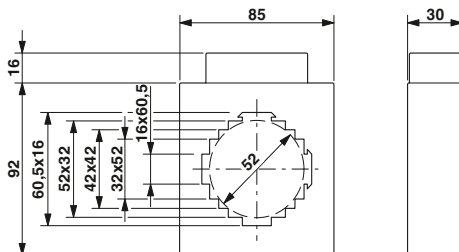
$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]													Rated power $S_n$ [VA]			
		100	125	150	200	250	300	400	500	600	750	800	1000	1250		1500		
IS01 ≅ 1 A	C05 ≅ 0.5			1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
					5	5	5	5	5	5	5	5	5	5	5	5	5	5
	C10 ≅ 1	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
IS05 ≅ 5 A	C05 ≅ 0.5			1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
					5	5	5	5	5	5	5	5	5	5	5	5	5	5
	C10 ≅ 1	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Current transformers

**PACT MCR-V2-6015-85**

- Primary rated current  $I_{pn}$ : 0...(200...1600) A
- Circular conductor dimensions:  $\varnothing$  52 mm
- Rail dimensions: 60x15 mm, 2x 50x10 mm, 40x40 mm

**Notes:**  
 Our configurator, which is available at phoenixcontact.net/products, makes ordering easy.  
 The relevant installation accessories can be found on page 233



Window-type curr. transformer, official calibration as an option

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Ordering data

Description	Rated power $S_n$	Type	Order No.	Pcs./Pkt.
<b>Primary rated current <math>I_{pn}</math>:</b>				
- 200 A	2.5 VA	PACT MCR-V2-6015- 85- 200-5A-1	2277873	1
- 250 A	2.5 VA	PACT MCR-V2-6015- 85- 250-5A-1	2277886	1
- 300 A	2.5 VA	PACT MCR-V2-6015- 85- 300-5A-1	2277899	1
- 400 A	2.5 VA	PACT MCR-V2-6015- 85- 400-5A-1	2277909	1
- 500 A	5 VA	PACT MCR-V2-6015- 85- 500-5A-1	2277912	1
- 600 A	10 VA	PACT MCR-V2-6015- 85- 600-5A-1	2277925	1
- 750 A	10 VA	PACT MCR-V2-6015- 85- 750-5A-1	2277938	1
- 800 A	10 VA	PACT MCR-V2-6015- 85- 800-5A-1	2277941	1
- 1000 A	15 VA	PACT MCR-V2-6015- 85-1000-5A-1	2277954	1
- 1250 A	15 VA	PACT MCR-V2-6015- 85-1250-5A-1	2277967	1
- 1600 A	15 VA	PACT MCR-V2-6015- 85-1600-5A-1	2277983	1
<b>Current transformers, to determine the desired current transformer type, refer to the order key below</b>				
<b>Current transformers that support official calibration:</b> To specify the type of current transformer you require, please refer to the order key (see notes)				
PACT MCR-V2- 6015- 85			2277336	1
PACT MCR-V2C- 6015- 85			2277462	1
<b>Accessories</b>				
PACT-FAST-MNT-W16-L40			2276638	1
PACT-FAST-MNT-W16-L65			2276641	1

Add order key from the selection table (ordering example marked in orange)

Order No.	Primary current $I_{pn}$	Secondary current $I_{sn}$	Class	Rated power $S_n$
2277336	IP05000	IS01	C10	P375

Selection table PACT MCR-V2-6015-85 (Order No.: 2277336)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]											Rated power $S_n$ [VA]	
		200	250	300	400	500	600	750	800	1000	1250	1500		1600
IS01 $\cong$ 1 A	C05 $\cong$ 0.5		1.25	1.25	1.25	2.5	2.5	2.5	2.5	2.5	5	5	5	5
	C10 $\cong$ 1	2.5	2.5	2.5	2.5	3.75	2.5	2.5	2.5	2.5	5	3.75	3.75	5
IS05 $\cong$ 5 A	C05 $\cong$ 0.5		1.25	1.25	1.25	2.5	2.5	2.5	2.5	2.5	5	5	10	10
	C10 $\cong$ 1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	10	10

# Monitoring

## Current measurement

### Current transformers

#### PACT MCR-V2-6315-95

- Primary rated current  $I_{pn}$ : 0...(200...2500) A
- Circular conductor dimensions:  $\varnothing$  53 mm
- Rail dimensions:  
63x15 mm  
2x 50x10 mm  
40x40 mm



Window-type curr. transformer, official calibration as an option

#### PACT MCR-V2-6040-96

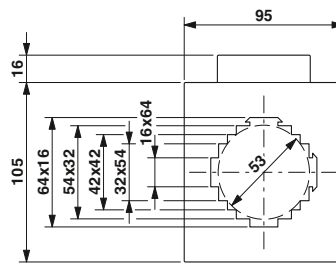
- Primary rated current  $I_{pn}$ : 0...(200...2000) A
- Circular conductor dimensions:  $\varnothing$  61 mm
- Rail dimensions:  
60x40 mm, 50x50 mm



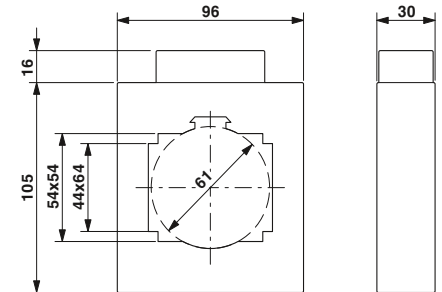
Window-type curr. transformer, official calibration as an option

**Notes:**  
Our configurator, which is available at [phoenixcontact.net/products](http://phoenixcontact.net/products), makes ordering easy.  
The relevant installation accessories can be found on page 233

ERC



ERC



#### Ordering data

Description	Rated power $S_n$
<b>Primary rated current <math>I_{pn}</math>:</b>	
- 600 A	10 VA
- 750 A	10 VA
- 800 A	10 VA
- 1000 A	10 VA
- 1250 A	10 VA
- 1250 A	15 VA
- 1500 A	10 VA
- 1600 A	10 VA
- 1600 A	15 VA
- 2000 A	15 VA
<b>Current transformers</b> , to determine the desired current transformer type, refer to the order key below	
<b>Current transformers that support official calibration:</b> To specify the type of current transformer you require, please refer to the order key (see notes)	

Type	Order No.	Pcs./ Pkt.
PACT MCR-V2-6315- 95- 800-5A-1	2277213	1
PACT MCR-V2-6315- 95-1000-5A-1	2277226	1
PACT MCR-V2-6315- 95-1250-5A-1	2277239	1
PACT MCR-V2-6315- 95-1500-5A-1	2277242	1
PACT MCR-V2-6315- 95-1600-5A-1	2277255	1
PACT MCR-V2- 6315- 95	2277307	1
PACT MCR-V2C- 6315- 95	2277475	1

#### Ordering data

Type	Order No.	Pcs./ Pkt.
PACT MCR-V2-6040- 96- 600-5A-1	2276191	1
PACT MCR-V2-6040- 96- 750-5A-1	2276201	1
PACT MCR-V2-6040- 96- 800-5A-1	2276214	1
PACT MCR-V2-6040- 96-1000-5A-1	2277705	1
PACT MCR-V2-6040- 96-1250-5A-1	2276227	1
PACT MCR-V2-6040- 96-1500-5A-1	2277718	1
PACT MCR-V2-6040- 96-1600-5A-1	2276230	1
PACT MCR-V2-6040- 96-2000-5A-1	2276243	1
PACT MCR-V2- 6040- 96	2277349	1
PACT MCR-V2C- 6040- 96	2277488	1

#### Accessories

Quick-action mechanism
Fixing pin length 40 mm
Fixing pin length 65 mm

Accessories	Order No.	Pcs./ Pkt.
PACT-FAST-MNT-W16-L40	2276638	1
PACT-FAST-MNT-W16-L65	2276641	1

#### Accessories

Accessories	Order No.	Pcs./ Pkt.
PACT-FAST-MNT-W16-L40	2276638	1
PACT-FAST-MNT-W16-L65	2276641	1

Add order key from the selection table (ordering example marked in orange)

Order No.	Primary current $I_{pn}$	Secondary current $I_{sn}$	Class	Rated power $S_n$
2277307	IP25000	IS05	C05	P500

Selection table PACT MCR-V2-6315-95 (Order No.: 2277307)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]													Rated power $S_n$ [VA]		
		200	250	300	400	500	600	750	800	1000	1250	1500	1600	2000		2500	
IS01 $\cong$ 1 A	C05 $\cong$ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	5	5	5	5
	C10 $\cong$ 1	3.75	5	5	5	5	5	10	10	10	10	10	10	10	15	15	
	C10 $\cong$ 1	7.5	10	10	10	15	15	15	15	15	15	15	15	20	20	20	
IS05 $\cong$ 5 A	C05 $\cong$ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	5	5	5	5
	C10 $\cong$ 1	3.75	5	5	5	5	5	10	10	10	10	10	10	10	15	15	
	C10 $\cong$ 1	7.5	10	10	10	15	15	15	15	15	15	15	15	20	20	20	

Selection table PACT MCR-V2-6040-96 (Order No.: 2277349)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]													Rated power $S_n$ [VA]		
		200	250	300	400	500	600	750	800	1000	1250	1500	1600	2000			
IS01 $\cong$ 1 A	C05 $\cong$ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	5	5	5	5
	C10 $\cong$ 1	3.75	5	5	5	5	5	10	10	10	10	10	10	10	15	15	
	C10 $\cong$ 1	7.5	10	10	10	15	15	15	15	15	15	15	15	20	20	20	
IS05 $\cong$ 5 A	C05 $\cong$ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	5	5	5	5
	C10 $\cong$ 1	3.75	3.75	5	5	5	5	10	10	10	10	10	10	10	15	15	
	C10 $\cong$ 1	7.5	7.5	10	10	10	10	15	15	15	15	15	15	20	20	20	

Current transformers

**PACT MCR-V2-8015-105**

- Primary rated current  $I_{pn}$ : 0...(400...2500) A
- Circular conductor dimensions:  $\varnothing$  61 mm
- Rail dimensions: 80x15 mm, 2x 60x10 mm, 3x 50x10 mm

**PACT MCR-V2-8020-105**

- Primary rated current  $I_{pn}$ : 0...(500...2000) A
- Circular conductor dimensions:  $\varnothing$  70 mm
- Rail dimensions: 2x 80x10 mm, 60x60 mm



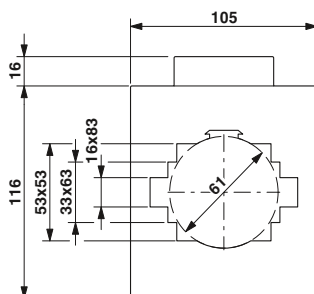
Window-type curr. transformer, official calibration as an option



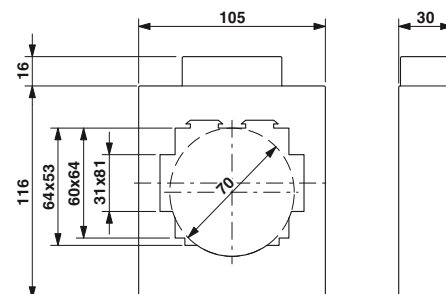
Window-type curr. transformer, official calibration as an option

**Notes:**  
 Our configurator, which is available at phoenixcontact.net/products, makes ordering easy.  
 The relevant installation accessories can be found on page 233

ERC



ERC



Ordering data

Ordering data

Description	Rated power $S_n$
<b>Primary rated current <math>I_{pn}</math>:</b>	
- 400 A	7.5 VA
- 500 A	10 VA
- 600 A	10 VA
- 750 A	10 VA
- 800 A	15 VA
- 1000 A	10 VA
- 1000 A	15 VA
- 1250 A	10 VA
- 1500 A	15 VA
- 1600 A	15 VA
- 2000 A	10 VA
- 2000 A	20 VA
- 2500 A	20 VA
<b>Current transformers</b> , to determine the desired current transformer type, refer to the order key below	
<b>Current transformers that support official calibration:</b> To specify the type of current transformer you require, please refer to the order key (see notes)	

Type	Order No.	Pcs./ Pkt.
PACT MCR-V2-8015-105- 400-5A-1	2276256	1
PACT MCR-V2-8015-105- 500-5A-1	2276269	1
PACT MCR-V2-8015-105- 600-5A-1	2276272	1
PACT MCR-V2-8015-105- 750-5A-1	2276285	1
PACT MCR-V2-8015-105- 800-5A-1	2276298	1
PACT MCR-V2-8015-105-1000-5A-1	2277721	1
PACT MCR-V2-8015-105-1000-5A-1	2276308	1
PACT MCR-V2-8015-105-1250-5A-1	2276311	1
PACT MCR-V2-8015-105-1500-5A-1	2277734	1
PACT MCR-V2-8015-105-1600-5A-1	2276324	1
PACT MCR-V2-8015-105-2000-5A-1	2276337	1
PACT MCR-V2-8015-105-2500-5A-1	2276340	1
PACT MCR-V2- 8015-105	2277352	1
PACT MCR-V2C- 8015-105	2277491	1

Type	Order No.	Pcs./ Pkt.
PACT MCR-V2-8020-105-1000-5A-1	2277747	1
PACT MCR-V2-8020-105-1500-5A-1	2277750	1
PACT MCR-V2-8020-105-2000-5A-1	2276382	1
PACT MCR-V2- 8020-105	2277365	1
PACT MCR-V2C- 8020-105	2277501	1

Add **order key** from the selection table (ordering example marked in orange)

Order No.	Primary current $I_{pn}$	Secondary current $I_{sn}$	Class	Rated power $S_n$
2277352	IP25000	IS05	C10	P3000

Selection table PACT MCR-V2-8015-105 (Order No.: 2277352)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]											Rated power $S_n$ [VA]		
		400	500	600	750	800	1000	1250	1500	1600	2000	2500			
IS01 $\approx 1$ A	C05 $\approx 0.5$	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	10	15	20
	C10 $\approx 1$	5	5	5	5	5	5	5	5	10	10	15	15	20	25
	C05 $\approx 0.5$	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	10
IS05 $\approx 5$ A	C05 $\approx 0.5$	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	C10 $\approx 1$	7.5	10	10	10	10	10	10	10	15	15	15	15	20	20
	C05 $\approx 0.5$	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5

Selection table PACT MCR-V2-8020-105 (Order No.: 2277365)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]									Rated power $S_n$ [VA]				
		500	600	750	800	1000	1250	1500	1600	2000					
IS01 $\approx 1$ A	C05 $\approx 0.5$	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	10	15	20
	C10 $\approx 1$	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	C05 $\approx 0.5$	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5
IS05 $\approx 5$ A	C05 $\approx 0.5$	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	C10 $\approx 1$	7.5	10	10	10	10	10	10	10	10	10	10	10	15	15
	C05 $\approx 0.5$	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5

# Monitoring

## Current measurement

### Current transformers

#### PACT MCR-V2-10020-129

- Primary rated current  $I_{pn}$ : 0...(400...4000) A
- Circular conductor dimensions:  $\varnothing$  85 mm
- Rail dimensions: 2x100x10 mm, 80x64 mm

#### PACT MCR-V2-10036-129

- Primary rated current  $I_{pn}$ : 0...(400...4000) A
- Rail dimensions: 3x 100x12 mm

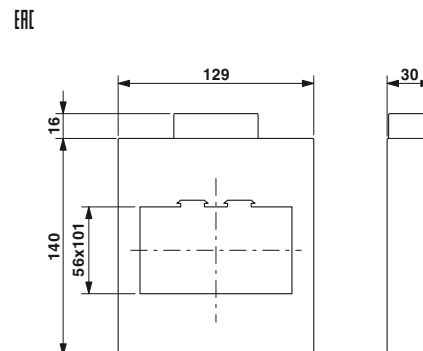
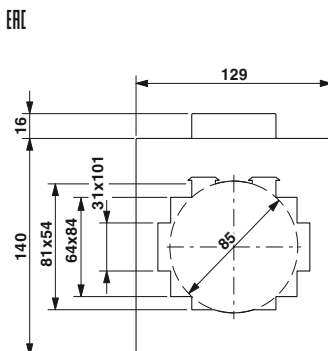


Window-type curr. transformer, official calibration as an option



Window-type curr. transformer, official calibration as an option

**Notes:**  
Our configurator, which is available at phoenixcontact.net/products, makes ordering easy.  
The relevant installation accessories can be found on page 233



Description	Rated power $S_n$
<b>Primary rated current <math>I_{pn}</math>:</b>	
- 2500 A	15 VA
- 3000 A	15 VA
<b>Current transformers</b> , to determine the desired current transformer type, refer to the order key below	
<b>Current transformers that support official calibration:</b> To specify the type of current transformer you require, please refer to the order key (see notes)	

Ordering data		
Type	Order No.	Pcs./ Pkt.
PACT MCR-V2-10020-129-2500-5A	2276395	1
PACT MCR-V2-10020-129	2277378	1
PACT MCR-V2C-10020-129	2277514	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
PACT MCR-V2-10036-129-3000-5A	2276405	1
PACT MCR-V2-10036-129	2277381	1
PACT MCR-V2C-10036-129	2277527	1

Add **order key** from the selection table (ordering example marked in orange)

<b>Order No.</b>	<b>Primary current <math>I_{pn}</math></b>	<b>Secondary current <math>I_{sn}</math></b>	<b>Class</b>	<b>Rated power <math>S_n</math></b>
2277378	IP40000	IS05	C05	P2500

Selection table PACT MCR-V2-10020-129 (Order No.: 2277378)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]													Rated power $S_n$ [VA]		
		400	500	600	750	800	1000	1250	1500	1600	2000	2500	3000	4000			
IS01 ≅ 1 A	C05 ≅ 0.5	2.5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	C10 ≅ 1	5	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10
IS05 ≅ 5 A	C05 ≅ 0.5	2.5	2.5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	C10 ≅ 1	5	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Selection table PACT MCR-V2-10036-129 (Order No.: 2277381)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]													Rated power $S_n$ [VA]		
		400	500	600	750	800	1000	1250	1500	1600	2000	2500	3000	4000			
IS01 ≅ 1 A	C05 ≅ 0.5	2.5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	C10 ≅ 1	5	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10
IS05 ≅ 5 A	C05 ≅ 0.5	2.5	2.5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	C10 ≅ 1	5	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Current transformers

**PACT MCR-V2-12020-159**

- Primary rated current  $I_{pn}$ : 0...(400...4000) A
- Circular conductor dimensions:  $\varnothing$  96 mm
- Rail dimensions: 2x 120x10 mm, 3x 100x10 mm, 80x80 mm

**PACT MCR-V2-12040-159**

- Primary rated current  $I_{pn}$ : 0...(400...4000) A
- Rail dimensions: 4x 120x10 mm

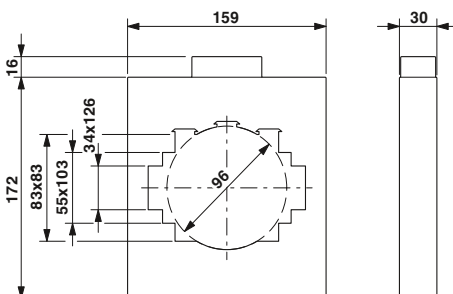


Window-type current transformer

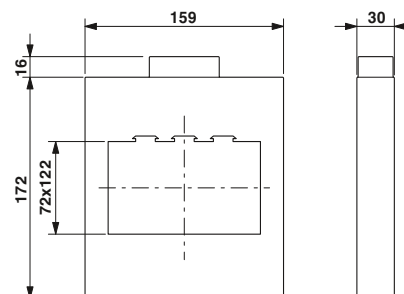


Window-type current transformer

ERC



ERC



**Notes:**  
Our configurator, which is available at phoenixcontact.net/products, makes ordering easy.  
The relevant installation accessories can be found on page 233

Ordering data

Type	Order No.	Pcs./Pkt.
PACT MCR-V2-12020-159	2277394	1

Ordering data

Type	Order No.	Pcs./Pkt.
PACT MCR-V2-12040-159-4000-5A	2276418	1
PACT MCR-V2-12040-159	2277404	1

Description	Rated power $S_n$
Primary rated current $I_{pn}$ : -4000 A	15 VA
Current transformers, to determine the desired current transformer type, refer to the order key below	

Add order key from the selection table (ordering example marked in orange)

Order No.	Primary current $I_{pn}$	Secondary current $I_{sn}$	Class	Rated power
2277404	IP08000	IS01	C05	P250

Selection table PACT MCR-V2-12020-159 (Order No.: 2277394)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]													Rated power $S_n$ [VA]	
		400	500	600	750	800	1000	1250	1500	1600	2000	2500	3000	4000		
IS01 ≅ 1 A	C05	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	5	10	15 VA
	≅ 0.5	5	5	5	5	5	5	10	10	10	10	10	10	15	15	
		10	10	10	10	10	10	15	15	15	15	15	15	15	30	
C10	2.5	5	5	2.5	2.5	5	5	5	5	5	5	5	10	10		
≅ 1	5	10	10	5	5	10	10	10	10	10	10	10	15	15		
	10	15	15	10	10	15	15	15	15	15	15	30	30	30		
	15	20	20	15	20	30	30	30	30	30	30	45	45	45		
IS05 ≅ 5 A	C05	2.5	2.5	2.5	2.5	2.5	5	5	10	5	5	5	10	10		
	≅ 0.5	5	5	5	5	5	10	10	15	10	10	10	15	15		
	10	10	10	10	10	15	15	30	15	15	15	30	30	30		
C10	2.5	5	5	5	5	5	10	5	5	5	10	10	10			
≅ 1	5	10	10	10	10	10	15	10	10	10	15	15	15			
	10	15	15	15	15	15	30	15	15	30	30	30	30			
	15	20	20	20	30	30	30	45	30	45	45	45	45			

Selection table PACT MCR-V2-12040-159 (Order No.: 2277404)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]													Rated power $S_n$ [VA]	
		400	500	600	750	800	1000	1250	1500	1600	2000	2500	3000	4000		
IS01 ≅ 1 A	C05	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	5	10	15 VA
	≅ 0.5	5	5	5	5	5	5	10	10	10	10	10	10	15	15	
								10	15	15	15	15	15	15	30	
C10	2.5	5	5	2.5	2.5	5	5	5	5	5	5	5	10	10		
≅ 1	5	10	10	5	5	10	10	10	10	10	10	10	15	15		
	10	15	15	10	10	15	15	15	15	15	15	30	30	30		
IS05 ≅ 5 A	C05	2.5	2.5	2.5	2.5	2.5	5	5	10	5	5	5	10	10		
	≅ 0.5	5	5	5	5	5	10	10	15	10	10	10	15	15		
	10	10	10	10	10	15	15	30	15	15	15	30	30	30		
C10	2.5	5	5	5	5	5	10	5	5	5	10	10	10			
≅ 1	5	10	10	10	10	10	15	10	10	10	15	15	15			
	10	15	15	15	15	15	30	15	15	15	30	30	30			
	10	15	15	15	15	15	30	15	15	30	30	30	30			

# Monitoring

## Current measurement

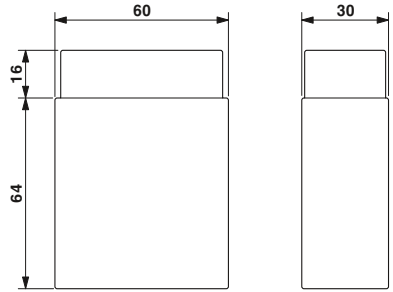
### Current transformers

#### PACT MCR-V3-60

– Primary rated current  $I_{pn}$ :  
0...(1...40) A

– Current-carrying copper lines connected directly to the screw terminal blocks on the primary side

**Notes:**  
Our configurator, which is available at [phoenixcontact.net/products](http://phoenixcontact.net/products), makes ordering easy.  
The relevant installation accessories can be found on page 233



Winding current transformer

ERC

Description
<b>Current transformers</b> , to determine the desired current transformer type, refer to the order key below

Ordering data		
Type	Order No.	Pcs./Pkt.
PACT MCR-V3-60	2277417	1

Add **order key** from the selection table (ordering example marked in orange)

Order No.	Primary current $I_{pn}$	Secondary current $I_{sn}$	Class	Rated power $S_n$
2277417	IP00025	IS01	C10	P250

Selection table PACT MCR-V3-60 (Order No.: 2277417)

$I_{sn}$	Cl.	Primary rated current strength $I_{pn}$ [A]													Rated power $S_n$ [VA]		
		1	2	2.5	4	5	6	7.5	10	12.5	15	20	25	30		40	
IS01 ≅ 1 A	C05 ≅ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	250
	C10 ≅ 1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
IS05 ≅ 5 A	C05 ≅ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	C10 ≅ 1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	



## Accessories

## Quick-action mechanism for PACT current transformers

- No tools necessary for mounting
- Extremely easy handling, thanks to secure fastening by pressing with finger
- Set consisting of two fixing pins and a holding latch

## Notes:

The 16 mm wide quick-action mechanism can also be used for larger current transformers if the length of the fixing pins is sufficient.



for: ...-V2-4012-70..., ...-V2-5012-85...



for: ...-V2-3015-60..., ...-V2-6015-85..., ...-V2-6315-95...

## General data

Ambient temperature (operation)

Width of the retaining bracket [mm]

-25 °C ... 120 °C

13

## Technical data

## Ordering data

## Description

## Quick-action mechanism

Fixing pin length 65 mm

Fixing pin length 40 mm

## Quick-action mechanism

Fixing pin length 65 mm

Fixing pin length 40 mm

## Type

PACT-FAST-MNT-W13-L65

PACT-FAST-MNT-W13-L40

## Order No.

2276625

2276612

## Pcs./Pkt.

1

1

## Technical data

-25 °C ... 120 °C

16

## Ordering data

## Type

PACT-FAST-MNT-W16-L65

PACT-FAST-MNT-W16-L40

## Order No.

2276641

2276638

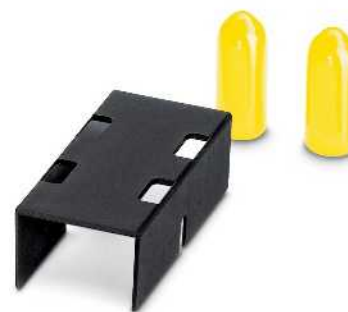
## Pcs./Pkt.

1

1

## Accessories

- Copper sleeves
- DIN rail adapter
- Secondary terminal cover
- Insulating caps

Copper sleeves  
DIN rail adapterSecondary terminal cover  
Insulating caps

## Ordering data

## Description

**Copper sleeves**, for establishing a conductive connection during the horizontal assembly of PACT analog current transformers. The size of the copper sleeve depends on the diameter of the inner hole of the current transformer.

- for PACT MCR-V1-21-44-...

Ø 21/8 mm

- for PACT MCR-V1-21-44-...

Ø 21/12 mm

- for PACT MCR-V2-3015-60-...

Ø 28/12 mm

- for PACT MCR-V2-5012-85-...

Ø 42/12 mm

## DIN rail adapter

**Secondary terminal cover**, for increasing the clearances and creepage distances

Length: 60 mm

Length: 75 mm

**Insulating caps**, for protection against unintended contact with mounting screws of the primary rail

## Type

PACT MCR-CB-21- 8

PACT MCR-CB-21-12

PACT MCR-CB-28-12

PACT MCR-CB-42-12

PACT MCR-RA

## Order No.

2277569

2277556

2277543

2277530

2277598

## Pcs./Pkt.

1

1

1

1

12

## Ordering data

## Type

PACT MCR-ETC-60

PACT MCR-ETC-75

PACT MCR-ICAP

## Order No.

2277572

2277585

2277608

## Pcs./Pkt.

9

9

18



### Fast installation in a confined space

PACT RCP current transformers for retrofitting can be conveniently mounted where there is not enough space for split core current transformers. System downtimes are reduced as system parts do not have to be removed for installation.

Your advantages:

- High system availability due to reduced downtimes: fast installation without removing system parts
- Safe installation and operation: no dangerous open circuit voltages
- No magnetic saturation
- High linearity, even at high currents
- Responds to fast current changes
- The coil is protected against electromagnetic interference
- The current can rise up to the short-circuit current without necessarily destroying the coil
- High nominal isolation voltage

### Professional holding device for busbars

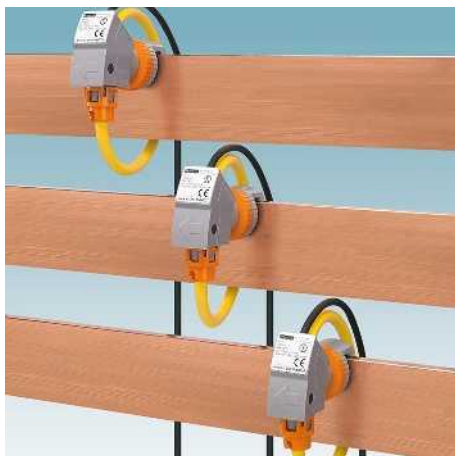
The PACT RCP-CLAMP holding device offers the following advantages:

- Suitable for industrial applications
- Steel bracket ensures permanent fixed seating at high busbar temperatures
- Designed for rails with a thickness of 10 to 15 mm
- Rogowski coil is snapped onto the fixing element
- Rogowski coil has a safe and defined place on the busbar
- Rogowski coil can be rotated in 15° increments for optimum alignment.
- PACT RCP avoids direct contact of the measuring coil with its own or adjacent busbar
- This allows installations on warm busbars to remain under control



### Easy and safe installation

Simply place the handy Rogowski coil quickly around busbars and circular conductors. The measuring transducer connected downstream supplies the same typical secondary currents as a standard current transformer.



### Fast installation in a confined space

PACT RCP current transformers save space and are handy as the size and weight of the Rogowski coil are not dependent on the amperage and unlike split core current transformers, remain the same.



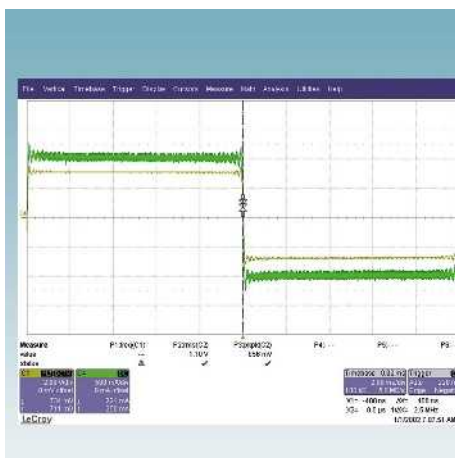
### One measuring system for all amperages

Acquire alternating currents up to 4000 A using a single coil type. Rogowski coils are available in three different lengths for optimum adjustment to the busbar and circular conductor dimensions.



### Eight current measuring ranges

The measuring transducer connected downstream supplies the same typical secondary currents as a standard current transformer. Choose between eight different current measuring ranges via DIP switches. For optimum measuring accuracy, compensate for the different coil lengths by simply using a potentiometer.



### Detect harmonics and transients

PACT RCP current transformers for retrofitting cover a large frequency range from 10 to 5000 Hz. You can therefore measure harmonics and transients with phase accuracy.



### Safe seating

The optional holding device ensures safe seating and optimal alignment of the coil even on very hot busbars. If the gap between the busbars is very small, simply turn the coil diagonally to avoid touching other rails.

# Monitoring

## Current measurement

### Current transformers for retrofitting

#### PACT RCP

- Practical handling due to the flexible measuring coil for opening
- Universal application possibilities thanks to 8 different current measuring ranges in one device: (0 ... 100/ ... / ... /4000 A)
- The large bandwidth from 10 to 5000 Hz enables harmonics and transients to be detected
- It is not possible for dangerous open circuit voltages to occur
- The bracket ensures optimum alignment of the measuring coil to the busbar
- Low space requirement in the control cabinet



Current transformer for subsequent installation in the field

Technical data	
Measuring coil input data	
Frequency range	40 Hz ... 20000 Hz
Position error	< 1 %
Measuring coil signal output	
Output signal (at 50 Hz)	100 mV (no load, at 1,000 A)
General data, measuring coil	
Length of signal cable	3000 mm
Rated insulation voltage	1000 V AC (rms CAT III) 600 V AC (rms CAT IV)
Test voltage	10.45 kV (DC / 1 min.)
Ambient temperature (operation)	-30 °C ... 80 °C (Measuring coil)
Ambient temperature (storage/transport)	-40 °C ... 80 °C (Measuring coil)
Measuring transducer input data	
Measuring ranges (current) via DIP switch	100 A , 250 A , 400 A , 630 A , 1000 A , 1500 A , 2000 A , 4000 A
Phase angle	< 1 °
Measuring transducer signal input	
Input signal (at 50 Hz)	100 mV (1000 A)
Measuring transducer signal output	
Current output signal	0 A AC ... 1 A
Miscellaneous data for measuring transducer	
Nominal supply voltage	24 V DC -20 % ... +25 %
Nominal supply voltage range	19.2 V DC ... 30 V DC
Transmission error, maximum	≤ 0.5 % (From the range end value)
Linearity error	< 0.5 % (From the range end value)
Frequency range	45 Hz ... 65 Hz
Degree of protection	IP20
Test voltage	1.5 kV AC (Supply/input and output: 50 Hz, 1 min)
Dimensions W/H/D	22.5 / 70.4 / 85 mm
Ambient temperature (operation)	-20 °C ... 70 °C (Measuring transducer)
Ambient temperature (storage/transport)	-25 °C ... 85 °C (Measuring transducer)
General data for the set	
Altitude	< 2000 m
Permissible humidity (operation)	5 % ... 95 % (non-condensing)
Approvals/conformities	
Standards/specifications	IEC 61010-1 IEC 61010-2-032

Description
<b>Current transformer for retrofitting</b> , set consisting of Rogowski coil and measuring transducer, output signal: 1 A AC (effective for sine)
Length of measuring coil 300 mm
Length of measuring coil 450 mm
Length of measuring coil 600 mm

Holding device for busbar
for busbar thicknesses of 5 to 10 mm
for busbar thicknesses of 10 to 15 mm

Ordering data		
Type	Order No.	Pcs./Pkt.
PACT RCP-4000A-1A-D95	2904921	1
PACT RCP-4000A-1A-D140	2904922	1
PACT RCP-4000A-1A-D190	2904923	1

Accessories		
	Order No.	Pcs./Pkt.
PACT RCP-CLAMP-5-10	2907888	1
PACT RCP-CLAMP	2904895	1

#### Recommendations for the use of coil lengths and busbar dimensions

Busbar	Diameter/ coil length	1 busbar per phase	2 busbars per phase	3 busbars per phase
[mm x mm]	[mm]			
30 x 10	95/300	X	X	
40 x 10	95/300	X	X	
40 x 10	140/450			X
50 x 10	95/300	X		
50 x 10	140/450		X	X
60 x 10	95/300	X		
60 x 10	140/450		X	X
60 x 10	140/450	X	X	X
100 x 10	140/450	X	X	
100 x 10	190/600			X
120 x 10	140/450	X		
120 x 10	190/600		X	X
160 x 10	190/600	X	X	X

## Current transformers for retrofitting

## PACT RCP

- Universal application possibilities thanks to 8 different current measuring ranges in one device: (0 ... 100/ ... / ... /4000 A)
- Detection of harmonics and transients in the frequency range from 16 to 1000 Hz
- Large number of different standard signals on output side
- Freely configurable 4-way signal conditioner with switching output
- FASTCON Pro plug-in connection system
- Overall width of just 6.2 mm
- Easy configuration e.g., via DIP switches, programmable software, via smartphone app or FDT/DTM



Current transformer for subsequent installation in the field

Technical data	
Measuring coil input data	
Frequency range	40 Hz ... 20000 Hz
Position error	< 1 %
Measuring coil signal output	
Output signal (at 50 Hz)	100 mV (no load, at 1,000 A)
General data, measuring coil	
Length of signal cable	3000 mm
Rated insulation voltage	1000 V AC (rms CAT III) 600 V AC (rms CAT IV)
Test voltage	10.45 kV (DC / 1 min.)
Ambient temperature (operation)	-30 °C ... 80 °C (Measuring coil)
Measuring transducer input data	
Measuring ranges (current) via DIP switch	100 A , 250 A , 400 A , 630 A , 1000 A , 1500 A , 2000 A , 4000 A
Measuring transducer signal input	
Input signal (at 50 Hz)	100 mV (1000 A)
Measuring transducer signal output	
Current output signal	0 mA ... 20 mA (via DIP switch) 4 mA ... 20 mA (via DIP switch) 0 mA ... 10 mA (via DIP switch) 2 mA ... 10 mA (via DIP switch) 0 mA ... 21 mA (Can be set via software)
Output signal	
Voltage	0 V ... 10 V (via DIP switch) 2 V ... 10 V (via DIP switch) 0 V ... 5 V (via DIP switch) 1 V ... 5 V (via DIP switch) 0 V ... 10.5 V (Can be set via software)
Miscellaneous data for measuring transducer	
Nominal supply voltage	24 V DC
Nominal supply voltage range	9.6 V DC ... 30 V DC
Transmission error, maximum	≤ 0.5 % (From the range end value)
Frequency range	16 Hz ... 1000 Hz
Degree of protection	IP20
Test voltage	3 kV (50 Hz, 1 min.)
Dimensions W/H/D	6.2 / 110.5 / 120.5 mm
Ambient temperature (operation)	-40 °C ... 70 °C (Measuring transducer)
General data for the set	
Altitude	> 4000 m
Permissible humidity (operation)	5 % ... 95 % (non-condensing)
Approvals/conformities	
Standards/specifications	IEC 61010-1 IEC 61010-2-032

Ordering data			
Description	Type	Order No.	Pcs./Pkt.
<b>Current transformer with screw connection for retrofitting</b> , set consisting of Rogowski coil and 4-way signal conditioner with switching output			
Length of measuring coil 300 mm			
Length of measuring coil 450 mm			
Length of measuring coil 600 mm			
<b>Current transformer with Push-in connection for retrofitting</b> , set consisting of Rogowski coil and 4-way signal conditioner with switching output			
Length of measuring coil 300 mm			
Length of measuring coil 450 mm			
Length of measuring coil 600 mm			
	<b>PACT RCP-4000A-UIRO-D95</b>	<b>2906231</b>	1
	<b>PACT RCP-4000A-UIRO-D140</b>	<b>2906232</b>	1
	<b>PACT RCP-4000A-UIRO-D190</b>	<b>2906233</b>	1
	<b>PACT RCP-4000A-UIRO-PT-D95</b>	<b>2906234</b>	1
	<b>PACT RCP-4000A-UIRO-PT-D140</b>	<b>2906235</b>	1
	<b>PACT RCP-4000A-UIRO-PT-D190</b>	<b>2906236</b>	1

Accessories			
Description	Type	Order No.	Pcs./Pkt.
<b>Holding device for busbar</b> for busbar thicknesses of 5 to 10 mm	<b>PACT RCP-CLAMP-5-10</b>	<b>2907888</b>	1
for busbar thicknesses of 10 to 15 mm	<b>PACT RCP-CLAMP</b>	<b>2904895</b>	1



### **With flexible power supply – current transducers up to 12 A AC**

Active current transducers convert sinusoidal alternating currents up to 12 A. The integrated wide-range power supply unit enables use in various different countries.

### **With hinged Rogowski sensor – current transducers up to 200 A AC**

The AC current transducers measure sinusoidal and non-sinusoidal alternating currents up to 200 A. The hinged Rogowski sensor ensures very easy installation, as cables that are to be measured do not have to be isolated. This enables mounting to be carried out without interruptions.

### **Limit value monitoring with the current protector**

At the current protector, a desired amperage is specified at which a PDT contact switches a load on or off.

### **Flexible signal conditioning – current transducers up to 55 A AC/DC**

Current transducers up to 55 A offer an infinitely adjustable measuring range. This range is mapped over the entire output signal range. This ensures extremely accurate resolution of measured values. Basic configuration can be performed quickly via the DIP switches. Additional useful device functions can be set via the software.

### **For high currents – current transducers up to 600 A AC/DC**

The universal current transducers are the ideal solution for measuring high currents with any waveform up to 600 A AC/DC. The product range offers various different devices in graded measuring ranges with current or voltage output.



### For sinusoidal alternating currents up to 12 A

- 3-way electrical isolation
- Wide-range version from 19.2 to 253 V AC/DC
- Voltage bridging with DIN rail connector
- Input and output can be configured via DIP switches
- Suitable for potentially explosive areas, thanks to ATEX approval for Ex Zone 2



### For sinusoidal and non-sinusoidal alternating currents up to 200 A

- Distorted alternating currents up to 6000 Hz can be also acquired, thanks to true r.m.s. value measurement (RMS)
- Uninterrupted installation and lossless current measurement thanks to hinged Rogowski sensor
- Measuring range selection with slide switch



### Limit value monitoring

- The current protector converts sinusoidal alternating currents to binary switching signals.
- Switching point can be freely selected in the measuring range from 0 to 16 A AC
  - Relay PDT output
  - Adjustable switch hysteresis
  - 3-way isolation
  - Settable operating current / quiescent current behavior



### With flexible measuring ranges for all waveforms up to 55 A

- Lossless true r.m.s. value measurement without shunt via Hall sensor (TRMS)
- Optimum mapping of the measuring range up to 55 A, thanks to software-programmable upper and lower limits
- Limit value alarm in the event of threshold value overrange or underrange up to 55 A
  - via relay or transistor output



### For high currents – current transducers up to 600 A AC/DC

- Lossless true r.m.s. value measurement without shunt via Hall sensor (TRMS)
- Compact dimensions also enable distributed use
- Variable mounting on DIN rail and mounting plate
- COMBICON plug-in connection terminal blocks
- 3-way isolation
- For a conductor diameter of up to 32 mm

# Monitoring

## Current measurement

### Current transducers for AC, DC, and distorted currents

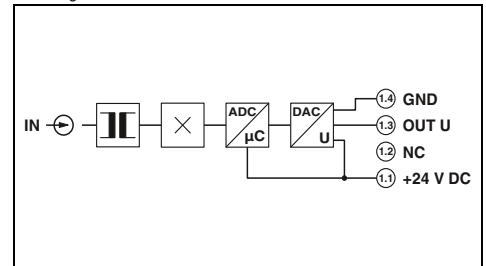
- The **MCR-SL-CUC-...** current transducers measure DC, AC, and distorted currents from 0 to 600 A.
- Universal current measurement, no shunt required
  - Compact dimensions also enable distributed use
  - Variable mounting on DIN rail and mounting plate
  - Simple connection method thanks to COMBICON plug-in connection terminal blocks
  - 3-way isolation



For DC, AC, and distorted currents of 0 ... 300 A, voltage output



Housing width 90 mm



#### Technical data

<b>Input data</b>	
Frequency range	20 Hz ... 6000 Hz (0 Hz)
Curve type	AC, DC or distorted currents
Connection method	Cable design: 32 mm diameter
<b>Output data</b>	
Output signal	0 ... 10 V
Maximum output signal	
Load $R_B$	$\geq 10 \text{ k}\Omega$
<b>General data</b>	
Supply voltage $U_B$	20 V DC ... 30 V DC
Maximum transmission error	$< \pm 1 \%$ (of final value)
Temperature coefficient	typ. 0.02 %/K (0 ... 60°C) 0.04 %/K (-40 ... 65 °C)
Step response (10-90%)	150 ms
Safe isolation	acc. to EN 61010
Rated insulation voltage	300 V AC
Surge voltage category/degree of pollution	III / 2
Degree of protection	IP20
Ambient temperature range	-40 °C ... 65 °C
Dimensions W/H/D	90 / 33.8 / 85 mm
Spring-cage connection (solid/stranded/AWG)	0.25 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
<b>Conformance/Approvals</b>	
Conformance	CE-compliant
UL, USA/Canada	UL/C-UL listed UL 508

#### Ordering data

Description	Overload capacity	Type	Order No.	Pcs./Pkt.
<b>Universal current transducer</b>				
Input current range: 0 ... 100 A	$6 \times I_{IN}$	<b>MCR-SL-CUC-100-U</b>	<b>2308108</b>	1
Input current range: 0 ... 200 A	$3 \times I_{IN}$	<b>MCR-SL-CUC-200-U</b>	<b>2308205</b>	1
Input current range: 0 ... 300 A	$3.33 \times I_{IN}$	<b>MCR-SL-CUC-300-U</b>	<b>2308302</b>	1
Input current range: 0 ... 400 A	$2.5 \times I_{IN}$			
<b>Universal current transducer without UL approval</b>				
Input current range: 0 ... 500 A	$3.6 \times I_{IN}$			
Input current range: 0 ... 600 A	$3 \times I_{IN}$			

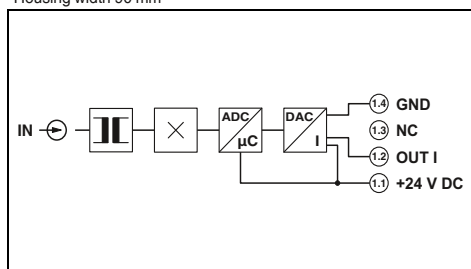




For DC, AC, and distorted currents of  
0 ... 600 A,  
current output



Housing width 90 mm



#### Technical data

20 Hz ... 6000 Hz (0 Hz)  
AC, DC or distorted currents  
Cable design: 32 mm diameter

4 ... 20 mA  
< 25 mA  
< 300 Ω

20 V DC ... 30 V DC  
<± 1 % (of final value)  
typ. 0.02 %/K (0 ... 60°C) 0.04 %/K (-40 ... 65 °C)

150 ms  
acc. to EN 61010  
300 V AC  
III / 2  
IP20  
-40 °C ... 65 °C  
90 / 33.8 / 85 mm  
0.25 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12

CE-compliant  
UL/C-UL listed UL 508

#### Ordering data

Type	Order No.	Pcs./ Pkt.
MCR-SL-CUC-100-I	2308027	1
MCR-SL-CUC-200-I	2308030	1
MCR-SL-CUC-300-I	2308043	1
MCR-SL-CUC-400-I	2308072	1
MCR-SL-CUC-500-I	2308085	1
MCR-SL-CUC-600-I	2308098	1

# Monitoring

## Current measurement

### Current transducers for AC, DC, and distorted currents

The **MCR-S...-UI(-SW)-DCI** current transducers measure direct, alternating, and distorted currents.

- Device can be set via DIP switches or MCR/PI-CONF-WIN configuration software
- True r.m.s. value measurement
- 3-way isolation
- With optional relay and transistor output

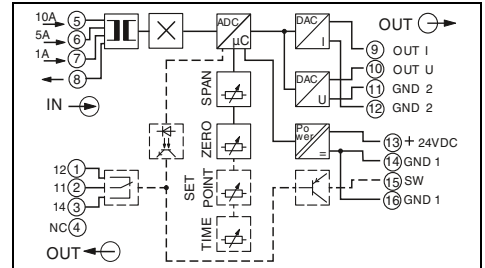
<b>Notes:</b>
To order a configurable product, please enter the desired configuration using the order key, see page 244
Further information about the configuration software can be found on page 251



For DC, AC, and distorted currents  
0 ... 11 A



Ex: Housing width 22.5 mm



### Technical data

<b>Input data</b>			
Input current		0 A ... 11 A (AC/DC)	
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	
<b>Output data</b>			
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
<b>Load R<sub>B</sub></b>			
<b>Switching output</b>			
Relay output	Contact material	1 PDT / AgSnO, hard gold-plated	
	Maximum switching current	50 mA (for gold layer, 30 V AC/ 36 V DC) 2 A (in case of a destroyed gold layer, 250 V AC)	
	Output voltage	19 V ... 29 V (supply voltage - 1 V)	
Transistor output pnp	Continuous load current	80 mA (Not short-circuit-proof)	
	Setting range of the threshold value	1 % ... 110 %	
	Response delay	0.1 s ... 20 s	
	Status indication	Yellow LED	
<b>General data</b>			
Supply voltage U <sub>B</sub>		20 V DC ... 30 V DC	
Current consumption		< 50 mA (without load)	
Maximum transmission error		< 0.5 % (of nominal range value under nominal conditions)	
Temperature coefficient		typ. < 0.025 %/K	
Step response (10-90%)		330 ms (with AC) 40 ms (with DC)	
Safe isolation		acc. to EN 50178, EN 61010	
Rated insulation voltage		300 V AC (to ground)	
Surge voltage category/degree of pollution		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	
Dimensions W/H/D		22.5 / 99 / 114.5 mm	
Screw connection solid/stranded/AWG		0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
EMC note		Class A product, see page 605	
<b>Conformance/Approvals</b>			
Conformance		CE-compliant	
UL, USA/Canada		Class I, Zone 2, AEx nA nC IIC T4, Ex nA nC IIC T4 Gc X	

### Ordering data

Description	Type	Order No.	Pcs./ Pkt.
<b>MCR current transducer</b> for measuring AC, DC, and distorted currents with relay and transistor switching output			
Configurable product	<b>MCR-S-1-5-UI-SW-DCI</b>	<b>2814650</b>	1
Standard product	<b>MCR-S-1-5-UI-SW-DCI-NC</b>	<b>2814731</b>	1
Configurable product, without switching output	<b>MCR-S-1-5-UI-DCI</b>	<b>2814634</b>	1
Standard product, without switching output	<b>MCR-S-1-5-UI-DCI-NC</b>	<b>2814715</b>	1

new



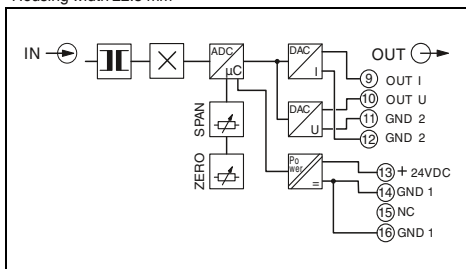
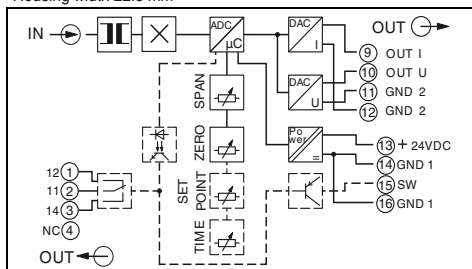
For DC, AC, and distorted currents  
0 ... 55 A



For DC, AC, and distorted currents  
0 to 100 A

CE  
UL  
Ex:   
Housing width 22.5 mm

Housing width 22.5 mm



Technical data

Technical data

0 A ... 55 A (AC/DC)  
1 % (of measuring range nominal value 50 A)  
15 Hz ... 400 Hz  
AC, DC or distorted currents  
Depending on through connected conductor  
Depending on through connected conductor  
Through connection, diameter 10.5 mm  
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

-100 A ... 100 A (AC/DC)  
1 % (of measuring range nominal value 100 A)  
15 Hz ... 400 Hz  
AC, DC or distorted currents  
Depending on through connected conductor  
Depending on through connected conductor  
Through connection, diameter 10.5 mm  
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

1 PDT / AgSnO, hard gold-plated  
50 mA (for gold layer, 30 V AC / 36 V DC)  
2 A (in case of a destroyed gold layer, 250 V AC)  
19 V ... 29 V (supply voltage - 1 V)  
80 mA (Not short-circuit-proof)  
1 % ... 110 %  
0.1 s ... 20 s  
Yellow LED

- / -  
-  
-  
-  
-  
-

20 V DC ... 30 V DC  
< 50 mA (without load)  
< 0.5 % (of nominal range value under nominal conditions)  
typ. < 0.025 %/K  
330 ms (with AC) 40 ms (with DC)  
acc. to EN 50178, EN 61010  
300 V AC (to ground)  
III / 2  
4 kV (50 Hz, 1 min.)  
4 kV (50 Hz, 1 min.)  
500 V (50 Hz, 1 min.)  
IP20  
22.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
Class A product, see page 605

20 V DC ... 30 V DC  
< 40 mA (without load)  
< 0.5 % (of nominal range value under nominal conditions)  
typ. < 0.025 %/K  
330 ms (AC) 40 ms (DC)  
acc. to EN 50178, EN 61010  
300 V AC (to ground)  
III / 2  
4 kV (50 Hz, 1 min.)  
4 kV (50 Hz, 1 min.)  
500 V (50 Hz, 1 min.)  
IP20  
22.5 / 99 / 114.5 mm  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14  
Class A product, see page 605

CE-compliant  
Class I, Zone 2, AEx nA nC IIC T4, Ex nA nC IIC T4 Gc X

CE-compliant  
Class I, Zone 2, AEx nA nC IIC T4, Ex nA nC IIC T4 Gc X

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
MCR-S-10-50-UI-SW-DCI	2814663	1
MCR-S-10-50-UI-SW-DCI-NC	2814744	1
MCR-S-10-50-UI-DCI	2814647	1
MCR-S-10-50-UI-DCI-NC	2814728	1

Type	Order No.	Pcs./ Pkt.
MCR-S-20-100-UI-DCI	2908798	1

# Monitoring

## Current measurement

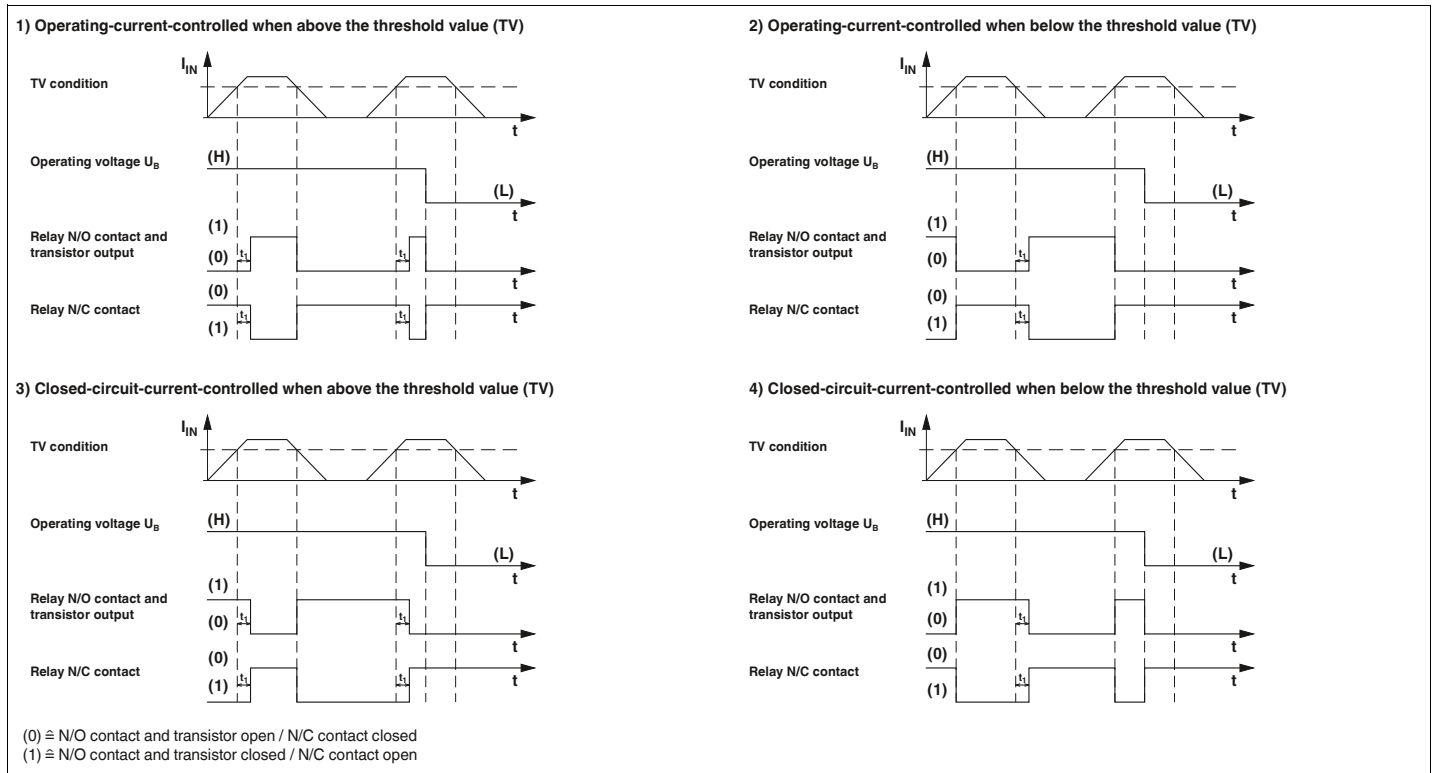
Order key for current transducers (standard configuration entered as an example)

Order No.	Measuring range:		Output	Threshold value	Suppression time	Switching behavior of relay and transistor	
	Start	End				A	O
<b>2814634</b>	<b>0.00</b>	<b>5.00</b>	<b>OUT01</b>				
<b>2814650</b>	<b>0.00</b>	<b>5.00</b>	<b>OUT01</b>	<b>50</b>	<b>3.0</b>	<b>A</b>	<b>O</b>
2814634 ≙ MCR-S-1-5-UI-DCI	Measuring range initial value between 0.00 ... 7.50 A	Measuring range final value between 0.2 ... 11 A	OUT01 ≙ 0 ... 20 mA OUT02 ≙ 4 ... 20 mA OUT03 ≙ 0 ... 10 V OUT04 ≙ 2 ... 10 V OUT05 ≙ 0 ... 5 V OUT06 ≙ 1 ... 5 V OUT07 ≙ 20 ... 0 mA OUT08 ≙ 20 ... 4 mA OUT09 ≙ 10 ... 0 V OUT10 ≙ 10 ... 2 V OUT11 ≙ 5 ... 0 V OUT12 ≙ 5 ... 1 V OUT13 ≙ -5 ... +5 V OUT14 ≙ -10 ... +10 V OUT17 ≙ +10 ... -10 V OUT18 ≙ +5 ... -5 V	Switching threshold between 1 ... 110%  50 ≙ 50% of the set measuring range final value (here 2.5 A)	between 0.1 ... 20 s  3.0 ≙ 3 s	A ≙ Operating- current- controlled  R ≙ Closed- circuit- current- controlled	O ≙ Overrange  U ≙ Underrange
2814650 ≙ MCR-S-1-5-UI-SW-DCI	0.00 ≙ 0.00 A	5.00 ≙ 5.00 A					

Order No.	Measuring range:		Output	Threshold value	Suppression time	Switching behavior of relay and transistor	
	Start	End				A	O
<b>2814647</b>	<b>0.0</b>	<b>50.0</b>	<b>OUT01</b>				
<b>2814663</b>	<b>0.0</b>	<b>50.0</b>	<b>OUT01</b>	<b>50</b>	<b>3.0</b>	<b>A</b>	<b>O</b>
2814647 ≙ MCR-S-10-50-UI-DCI	Measuring range initial value between 0.0 ... 37.5 A	Measuring range final value between 9.5 ... 55 A	OUT01 ≙ 0 ... 20 mA OUT02 ≙ 4 ... 20 mA OUT03 ≙ 0 ... 10 V OUT04 ≙ 2 ... 10 V OUT05 ≙ 0 ... 5 V OUT06 ≙ 1 ... 5 V OUT07 ≙ 20 ... 0 mA OUT08 ≙ 20 ... 4 mA OUT09 ≙ 10 ... 0 V OUT10 ≙ 10 ... 2 V OUT11 ≙ 5 ... 0 V OUT12 ≙ 5 ... 1 V OUT13 ≙ -5 ... +5 V OUT14 ≙ -10 ... +10 V OUT17 ≙ +10 ... -10 V OUT18 ≙ +5 ... -5 V	Switching threshold between 1 ... 110%  50 ≙ 50% of the set measuring range final value (here 25 A)	between 0.1 ... 20 s  3.0 ≙ 3 s	A ≙ Operating- current- controlled  R ≙ Closed- circuit- current- controlled	O ≙ Overrange  U ≙ Underrange
2814663 ≙ MCR-S-10-50-UI-SW-DCI	0.0 ≙ 0.0 A	50.0 ≙ 50.0 A					

Order No.	Measuring range:		Output
	Start	End	
<b>2908798</b>	<b>0.0</b>	<b>100.0</b>	<b>OUT01</b>
2908798 ≙ MCR-S-20-100-UI-DCI	Measuring range initial value between 0.0 ... 75 A  0.0 ≙ 0.0 A	Measuring range final value between 19 ... 110 A  100 ≙ 100 A	OUT01 ≙ 0 ... 20 mA OUT02 ≙ 4 ... 20 mA OUT03 ≙ 0 ... 10 V OUT04 ≙ 2 ... 10 V OUT05 ≙ 0 ... 5 V OUT06 ≙ 1 ... 5 V OUT07 ≙ 20 ... 0 mA OUT08 ≙ 20 ... 4 mA OUT09 ≙ 10 ... 0 V OUT10 ≙ 10 ... 2 V OUT11 ≙ 5 ... 0 V OUT12 ≙ 5 ... 1 V OUT13 ≙ -5 ... +5 V OUT14 ≙ -10 ... +10 V OUT17 ≙ +10 ... -10 V OUT18 ≙ +5 ... -5 V

Function chart: switching behavior of relay and transistor output:



# Monitoring

## Current measurement

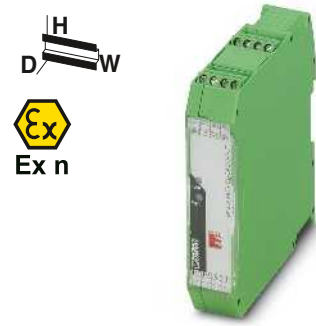
### AC current transducers, sinusoidal

The **MCR-SL-CAC-...** current transducers measure sinusoidal alternating currents from 0 to 1/5/12 A.

- Wide range version from 19.2 to 253 V AC/DC
- 3-way isolation
- Input and output can be configured via DIP switches

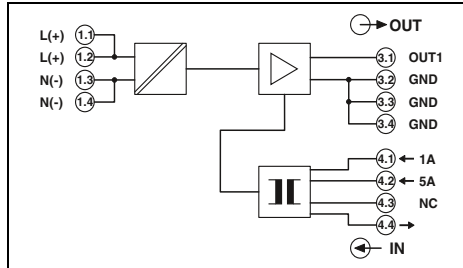


For sinusoidal alternating currents  
0 ... 1 A/0 ... 5 A



For sinusoidal alternating currents  
0 ... 5 A/0 ... 12 A

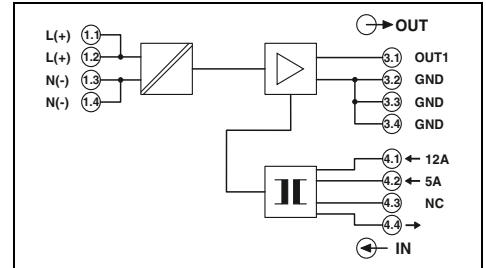
Ex n  
Housing width 22.5 mm



#### Technical data

Input data	0 A AC ... 1 A (configurable) / 0 A AC ... 5 A (configurable)	
Input current (configurable)		
Nominal frequency	50 Hz	
Frequency range	45 Hz ... 65 Hz	
Curve type	Sine	
Overload capacity	2 x I <sub>N</sub> (continuous)	
Surge strength	20 x I <sub>N</sub> (1 s)	
Connection method	Screw terminal block	
Output data		
Output signal (configurable)	0 ... 20 mA / 4 ... 20 mA	
Maximum output signal	25 mA	
Load R <sub>B</sub>	< 500 Ω (at 20 mA)	
Ripple	< 10 mV <sub>pp</sub> (for 500 Ω at 20 mA)	
General data		
Supply voltage U <sub>B</sub>	MACX MCR-SL-CAC-5-I 19.2 V DC ... 30 V DC	MACX MCR-SL-CAC-5-I-UP 19.2 V AC/DC ... 253 V AC/DC
Current consumption	< 32 mA (at U <sub>B</sub> =24 V DC, I <sub>OUT</sub> =20 mA)	< 30 mA (at U <sub>B</sub> =24 V DC, I <sub>OUT</sub> =20 mA)
Maximum transmission error	≤ 0.5 % (of nominal range value under nominal conditions)	≤ 0.5 % (of nominal range value under nominal conditions)

Ex n  
Housing width 22.5 mm



#### Technical data

Input data	0 A AC ... 5 A (configurable) / 0 A AC ... 12 A (configurable)	
Input current (configurable)		
Nominal frequency	50 Hz	
Frequency range	45 Hz ... 65 Hz	
Curve type	Sine	
Overload capacity	1 x I <sub>N</sub> (continuous)	
Surge strength	8 x I <sub>N</sub> (1 s)	
Connection method	Screw terminal block	
Output data		
Output signal (configurable)	0 ... 20 mA / 4 ... 20 mA	
Maximum output signal	25 mA	
Load R <sub>B</sub>	< 500 Ω (at 20 mA)	
Ripple	< 10 mV <sub>pp</sub> (for 500 Ω at 20 mA)	
General data		
Supply voltage U <sub>B</sub>	MACX MCR-SL-CAC-12-I-UP 19.2 V AC/DC ... 253 V AC/DC	
Current consumption	< 33 mA (at 24 V DC)	
Maximum transmission error	≤ 0.5 % (of nominal range value under nominal conditions)	≤ 0.5 % (of nominal range value under nominal conditions)

Temperature coefficient	< 0.02 %/K
Step response (10-90%)	max. 300 ms typ. 200 ms
Safe isolation	acc. to EN 61010
Rated insulation voltage	-
Overtoltage category Input/output	-
Degree of pollution	2
Test voltage input/output	4 kV (50 Hz, 1 min.)
Test voltage output/power supply	1.5 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature range	-20 °C ... 65 °C (-4 °F...149 °F)
Dimensions W/H/D	22.5 / 104 / 114.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Conformance/Approvals	
Conformance	CE-compliant
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Recognized

Temperature coefficient	< 0.02 %/K
Step response (10-90%)	max. 300 ms typ. 200 ms
Safe isolation	acc. to EN 61010
Rated insulation voltage	-
Overtoltage category Input/output	-
Degree of pollution	2
Test voltage input/output	4 kV (50 Hz, 1 min.)
Test voltage output/power supply	2 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature range	-20 °C ... 65 °C (-4 °F...149 °F)
Dimensions W/H/D	22.5 / 104 / 114.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Conformance/Approvals	
Conformance	CE-compliant
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Recognized

Temperature coefficient	< 0.02 %/K
Step response (10-90%)	< 300 ms
Safe isolation	acc. to EN 61010
Rated insulation voltage	300 V AC (to ground)
Overtoltage category Input/output	III
Degree of pollution	2
Test voltage input/output	4 kV (50 Hz, 1 min.)
Test voltage output/power supply	2 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature range	-20 °C ... 65 °C (-4 °F...149 °F)
Dimensions W/H/D	22.5 / 104 / 114.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Conformance/Approvals	
Conformance	CE-compliant
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	-

#### Ordering data

Description	Type	Order No.	Pcs./ Pkt.
<b>MCR current transducer</b> for sinusoidal alternating currents			
Supply voltage 19.2 ... 30 V DC	MACX MCR-SL-CAC-5-I	2810612	1
Supply voltage 19.2 ... 253 V AC/DC	MACX MCR-SL-CAC-5-I-UP	2810625	1

Description	Type	Order No.	Pcs./ Pkt.
<b>MCR current transducer</b> for sinusoidal alternating currents			
Supply voltage 19.2 ... 30 V DC	MACX MCR-SL-CAC-5-I	2810612	1
Supply voltage 19.2 ... 253 V AC/DC	MACX MCR-SL-CAC-5-I-UP	2810625	1

#### Ordering data

Description	Type	Order No.	Pcs./ Pkt.
<b>MCR current transducer</b> for sinusoidal alternating currents			
Supply voltage 19.2 ... 30 V DC	MACX MCR-SL-CAC-12-I-UP	2810638	1

#### Accessories

Description	Type	Order No.	Pcs./ Pkt.
<b>DIN rail connector</b> , for bridging the supply voltage (19.2...30 V DC), can be snapped on to 35 mm DIN rails according to EN 60715	ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50

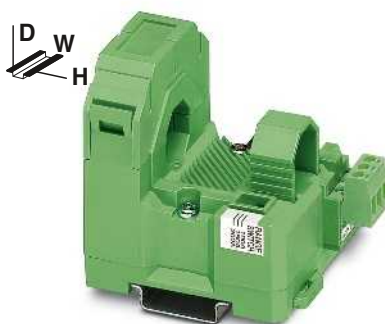
Description	Type	Order No.	Pcs./ Pkt.
<b>DIN rail connector</b> , for bridging the supply voltage (19.2...30 V DC), can be snapped on to 35 mm DIN rails according to EN 60715	ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50

Description	Type	Order No.	Pcs./ Pkt.
<b>DIN rail connector</b> , for bridging the supply voltage (19.2...30 V DC), can be snapped on to 35 mm DIN rails according to EN 60715	ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50

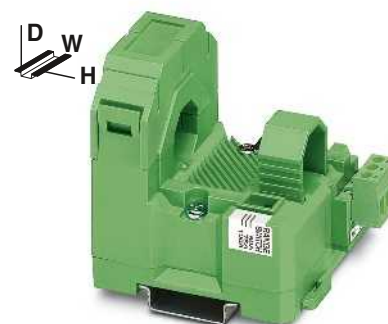
**AC current transducers, sinusoidal and distorted**

The **MCR-SL-S-...00-...** current transducers measure sinusoidal and non-sinusoidal alternating currents within the range from 0 to 200 A.

- 30 to 6000 Hz true r.m.s. value measurement
- Measuring range selection with slide switch
- Loop-powered
- Can be retrofitted with the open-up Rogowski coil

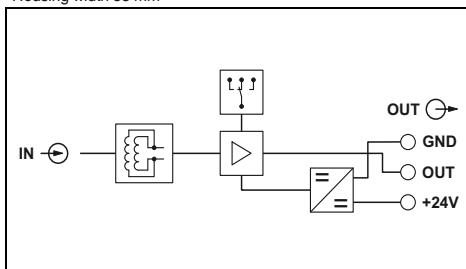


For sinusoidal and non-sinusoidal alternating currents, 0 ... 200 A, voltage output

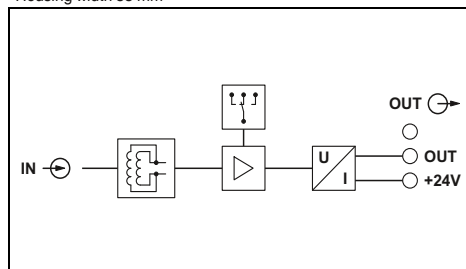


For sinusoidal and non-sinusoidal alternating currents, 0 ... 200 A, current output (loop-powered)

ERC  
Ex:   
Housing width 55 mm



ERC  
Ex:   
Housing width 55 mm



**Technical data**

Input data	...-S-100-U	...-S-200-U
Input current (configurable)	0 A ... 100 A (0...50/75/100 A)	0 A ... 200 A (0...100/150/200 A)
Operate threshold	1 % (of final value)	1 % (of final value)
Frequency range	30 Hz ... 6000 Hz	30 Hz ... 6000 Hz
Curve type	Sinusoidal and non-sinusoidal	Sinusoidal and non-sinusoidal
Overload capacity	Depending on laid conductor	Depending on laid conductor
Surge strength	Depending on through connected conductor	Depending on through connected conductor
Connection method	Clamp-on cable design, diameter 18.5 mm	Clamp-on cable design, diameter 18.5 mm
Output data		
Output signal	0 ... 5 V / 0 ... 10 V	0 ... 5 V / 0 ... 10 V
Maximum output signal	(0 V ... 10 V) 14 V, (0 V ... 5 V) 7 V	(0 V ... 10 V) 14 V, (0 V ... 5 V) 7 V
Load $R_B$	$\geq 10$ k $\Omega$	$\geq 10$ k $\Omega$
General data		
Supply voltage $U_B$	20 V DC ... 30 V DC	20 V DC ... 30 V DC
Current consumption	< 30 mA	< 30 mA
Maximum transmission error	< 1 % (of final value)	< 1 % (of final value)
Cable position error	< 0.63 %	< 0.63 %
Temperature coefficient	< 0.035 %/K	< 0.025 %/K
Step response (10-90%)	< 340 ms	< 340 ms
Safe isolation	As per IEC 61010-1 and IEC 61326	As per IEC 61010-1 and IEC 61326
Rated insulation voltage	300 V AC (to ground)	300 V AC (to ground)
Surge voltage category/degree of pollution	III / 2	III / 2
Test voltage input/output	5 kV (50 Hz, 1 min.)	5 kV (50 Hz, 1 min.)
Degree of protection	IP20	IP20
Ambient temperature range	-20 °C ... 60 °C	-20 °C ... 60 °C
Dimensions W/H/D	55 / 85 / 70.5 mm	55 / 85 / 70.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Conformance/Approvals		
Conformance	CE-compliant	CE-compliant
UL, USA/Canada	cULus	cULus

Input data	...-S-100-LP	...-S-200-LP
Input current (configurable)	0 A ... 100 A (0...50/75/100 A)	0 A ... 200 A (0...100/150/200 A)
Operate threshold	1 % (of final value)	1 % (of final value)
Frequency range	30 Hz ... 6000 Hz	30 Hz ... 6000 Hz
Curve type	Sinusoidal and non-sinusoidal	Sinusoidal and non-sinusoidal
Overload capacity	Depending on laid conductor	Depending on laid conductor
Surge strength	Depending on through connected conductor	Depending on through connected conductor
Connection method	Clamp-on cable design, diameter 18.5 mm	Clamp-on cable design, diameter 18.5 mm
Output data		
Output signal	4 ... 20 mA	4 ... 20 mA
Maximum output signal	< 25 mA	< 25 mA
Load $R_B$	( $U_B - 12$ V) x 350 / 12 A	( $U_B - 12$ V) x 350 / 12 A
General data		
Supply voltage $U_B$	20 V DC ... 30 V DC	20 V DC ... 30 V DC
Current consumption	< 30 mA	< 30 mA
Maximum transmission error	< 1 % (of final value)	< 1 % (of final value)
Cable position error	< 0.63 %	< 0.63 %
Temperature coefficient	< 0.025 %/K	< 0.025 %/K
Step response (10-90%)	< 340 ms	< 340 ms
Safe isolation	As per IEC 61010-1 and IEC 61326	As per IEC 61010-1 and IEC 61326
Rated insulation voltage	300 V AC (to ground)	300 V AC (to ground)
Surge voltage category/degree of pollution	III / 2	III / 2
Test voltage input/output	5 kV (50 Hz, 1 min.)	5 kV (50 Hz, 1 min.)
Degree of protection	IP20	IP20
Ambient temperature range	-20 °C ... 60 °C	-20 °C ... 60 °C
Dimensions W/H/D	55 / 85 / 70.5 mm	55 / 85 / 70.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Conformance/Approvals		
Conformance	CE-compliant	CE-compliant
UL, USA/Canada	cULus	cULus

**Ordering data**

Description
<b>MCR current transducer</b> for sinusoidal and non-sinusoidal alternating currents
Input current range: 0...50/75/100 A
Input current range: 0...100/150/200 A

Type	Order No.	Pcs./Pkt.
MCR-SL-S-100-U	2813457	1
MCR-SL-S-200-U	2813460	1

**Technical data**

Input data	...-S-100-LP	...-S-200-LP
Input current (configurable)	0 A ... 100 A (0...50/75/100 A)	0 A ... 200 A (0...100/150/200 A)
Operate threshold	1 % (of final value)	1 % (of final value)
Frequency range	30 Hz ... 6000 Hz	30 Hz ... 6000 Hz
Curve type	Sinusoidal and non-sinusoidal	Sinusoidal and non-sinusoidal
Overload capacity	Depending on laid conductor	Depending on laid conductor
Surge strength	Depending on through connected conductor	Depending on through connected conductor
Connection method	Clamp-on cable design, diameter 18.5 mm	Clamp-on cable design, diameter 18.5 mm
Output data		
Output signal	4 ... 20 mA	4 ... 20 mA
Maximum output signal	< 25 mA	< 25 mA
Load $R_B$	( $U_B - 12$ V) x 350 / 12 A	( $U_B - 12$ V) x 350 / 12 A
General data		
Supply voltage $U_B$	20 V DC ... 30 V DC	20 V DC ... 30 V DC
Current consumption	< 30 mA	< 30 mA
Maximum transmission error	< 1 % (of final value)	< 1 % (of final value)
Cable position error	< 0.63 %	< 0.63 %
Temperature coefficient	< 0.025 %/K	< 0.025 %/K
Step response (10-90%)	< 340 ms	< 340 ms
Safe isolation	As per IEC 61010-1 and IEC 61326	As per IEC 61010-1 and IEC 61326
Rated insulation voltage	300 V AC (to ground)	300 V AC (to ground)
Surge voltage category/degree of pollution	III / 2	III / 2
Test voltage input/output	5 kV (50 Hz, 1 min.)	5 kV (50 Hz, 1 min.)
Degree of protection	IP20	IP20
Ambient temperature range	-20 °C ... 60 °C	-20 °C ... 60 °C
Dimensions W/H/D	55 / 85 / 70.5 mm	55 / 85 / 70.5 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Conformance/Approvals		
Conformance	CE-compliant	CE-compliant
UL, USA/Canada	cULus	cULus

**Ordering data**

Type	Order No.	Pcs./Pkt.
MCR-SL-S-100-LP	2813486	1
MCR-SL-S-200-LP	2813499	1

# Monitoring

## Current measurement

### Passive AC current transducers, sinusoidal

The **MCR-SLP-1-5-UI-0** passive current transducer measures sinusoidal alternating currents within the range from 0 to 1 A/0 to 5 A.

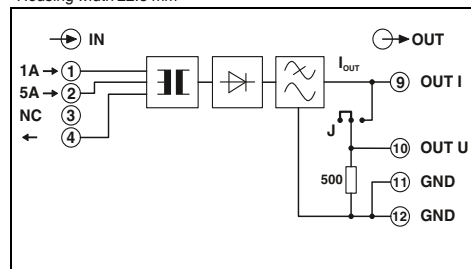
- Loop-powered
- Measuring ranges 1 and 5 A AC reconnectable



For sinusoidal alternating currents  
0 ... 1 A/0 ... 5 A



Housing width 22.5 mm



#### Technical data

Input data	1 A input	5 A input
Input current	0 A AC ... 1 A	0 A AC ... 5 A
Frequency range	45 Hz ... 60 Hz	45 Hz ... 60 Hz
Curve type	Sine	Sine
Overload capacity	2 x I <sub>N</sub> (5 min. at 60°C ambient temperature)	2 x I <sub>N</sub> (5 min. at 60°C ambient temperature)
Surge strength	50 A (1 s)	100 A (1 s)
Permissible output range	1.2 x I <sub>N</sub>	1.2 x I <sub>N</sub>
Connection method	Screw connection	Screw connection
Output data	U output	I output
Output signal	0 ... 10 V	0 ... 20 mA
Maximum output signal	20 V	30 mA
Load R <sub>B</sub>	> 100 kΩ	< 750 Ω < 250 Ω (when current and voltage outputs are used simultaneously)
Ripple	< 50 mV <sub>pp</sub>	< 50 mV <sub>pp</sub>
General data	< 0.5 % (of final value)	< 0.015 %/K
Maximum transmission error	< 200 ms	< 200 ms
Temperature coefficient	acc. to EN 50178, EN 61010	acc. to EN 50178, EN 61010
Step response (10-90%)	300 V AC (to ground)	300 V AC (to ground)
Safe isolation	III / 2	III / 2
Rated insulation voltage	IP20	IP20
Surge voltage category/degree of pollution	-25 °C ... 60 °C	-25 °C ... 60 °C
Degree of protection	22.5 / 99 / 114.5 mm	22.5 / 99 / 114.5 mm
Ambient temperature range	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14
Dimensions W/H/D	Class A product, see page 605	Class A product, see page 605
Screw connection solid/stranded/AWG	CE-compliant	CE-compliant
EMC note		
Conformance/Approvals		
Conformance		

#### Ordering data

Description	Type	Order No.	Pcs./Pkt.
<b>MCR passive current transducer</b> for sinusoidal alternating currents	<b>MCR-SLP-1-5-UI-0</b>	<b>2814359</b>	1



## AC current protector, sinusoidal

The **MCR-SL-S-16-SP-24** current protector converts sinusoidal 50 Hz/60 Hz alternating currents into binary switching signals.

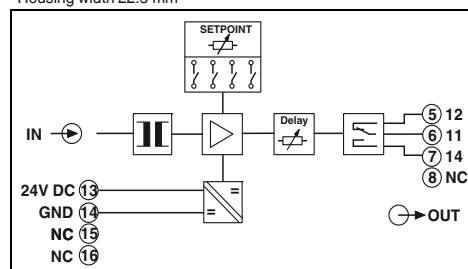
- Switching point can be freely selected in the measuring range of 0 to 16 A AC
- Relay PDT output
- Adjustable switch hysteresis
- 3-way isolation
- Adjustable operating current / quiescent current behavior



For sinusoidal alternating currents,  
0 ... 16 A AC



Housing width 22.5 mm



## Technical data

## Input data

Input current  
Frequency range  
Curve type  
Overload capacity  
Connection method

## Switching output

Contact type  
Contact material  
Max. switching current

## Switching hysteresis

## Response delay

Operating and closed circuit current behavior  
Relay status display

## General data

Supply voltage  $U_B$   
Current consumption  
Setting accuracy  
Temperature coefficient  
Step response (10-90%)  
Safe isolation  
Rated insulation voltage  
Surge voltage category/degree of pollution  
Test voltage input/output  
Test voltage input/power supply  
Degree of protection  
Ambient temperature range  
Dimensions W/H/D  
Screw connection solid/stranded/AWG  
EMC note

## Conformance/Approvals

## Conformance

0 A AC ... 16 A

45 Hz ... 65 Hz

Sine

$2 \times I_N$  (continuous)

Through connection, diameter 4.2 mm

## Relay output

1 PDT

AgSnO, hard gold-plated

50 mA (for gold layer, 30 V AC/ 36 V DC)

2 A (in case of a destroyed gold layer, 250 V AC)

Adjustable using a DIP switch (0.5 %, 5 %, 10 %, 15 %)

typ. 0.1 s ... 10 s (Adjustable using a potentiometer)

Adjustable using a DIP switch

Yellow LED (relay active)

20 V DC ... 30 V DC

< 30 mA

< 0.5 %

< 0.02 %/K

40 ms

acc. to EN 50178, EN 61010-1

300 V AC (to ground)

III / 2

4 kV (50 Hz, 1 min.)

4 kV (50 Hz, 1 min.)

IP20

-20 °C ... 65 °C

22.5 / 99 / 114.5 mm

0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14

Class A product, see page 605

## CE-compliant

## Ordering data

## Description

**MCR current protector** for sinusoidal alternating currents

## Type

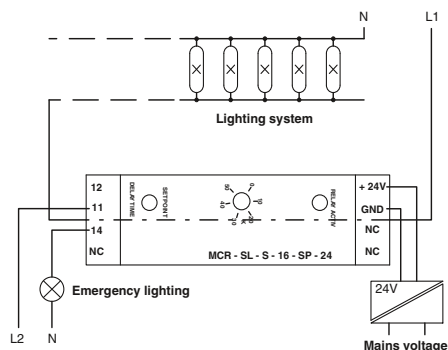
**MCR-SL-S- 16-SP- 24**

## Order No.

**2864464**

## Pcs./Pkt.

1



Lighting system with emergency lighting

# Monitoring

## Current measurement

### Voltage transducers

The MACX MCR-VDC voltage transducer measures DC voltages within the range of 0 to  $\pm 660$  V DC. The MACX MCR-VAC module measures sinusoidal AC voltages from 0 to 660 V AC.

- Bidirectional output signals
- 9 voltage measuring ranges
- Voltage measuring ranges can be freely adjusted
- ZERO/SPAN adjustment  $\pm 20\%$
- 3-way isolation



new

For DC voltages from 0 to  $\pm 660$  V DC

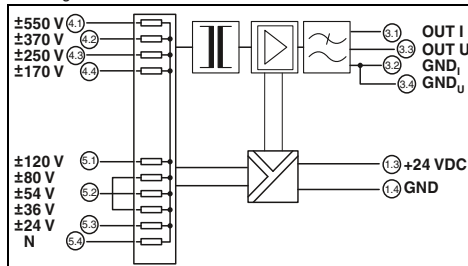


new

For sinusoidal AC voltages 0 ... 660 V AC



Housing width 22.5 mm

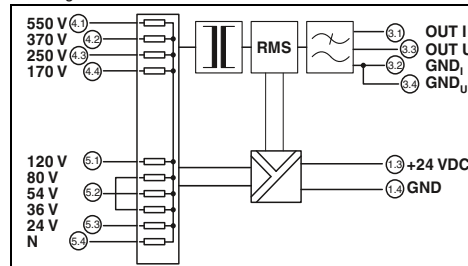


#### Technical data

Input data		
Input voltage range / resistor	<ul style="list-style-type: none"> <li>-550 V DC ... 550 V DC 5500 k<math>\Omega</math></li> <li>-370 V DC ... 370 V DC 3700 k<math>\Omega</math></li> <li>-250 V DC ... 250 V DC 2500 k<math>\Omega</math></li> <li>-170 V DC ... 170 V DC 1700 k<math>\Omega</math></li> <li>-120 V DC ... 120 V DC 1200 k<math>\Omega</math></li> <li>-80 V DC ... 80 V DC 800 k<math>\Omega</math></li> <li>-54 V DC ... 54 V DC 540 k<math>\Omega</math></li> <li>-36 V DC ... 36 V DC 540 k<math>\Omega</math></li> <li>-24 V DC ... 24 V DC 540 k<math>\Omega</math></li> </ul>	
ZERO / SPAN adjustment	$\pm 20\%$ / $\pm 20\%$	
Frequency range	-	
Maximum input voltage	$\pm 660$ V DC	
Output data		
Output signal	U output	I output
Maximum output signal	-10 ... 10 V	-20 ... 20 mA
Load $R_B$	$\leq 11$ V	$\leq 22$ mA
Ripple	$> 10$ k $\Omega$	$< 500$ $\Omega$
General data		
Supply voltage $U_B$	19.2 V DC ... 30 V DC	
Current consumption	$< 60$ mA	
Maximum transmission error	$< 1\%$ (of measuring range end value)	
Temperature coefficient	$< 0.015\%$ / K	
Step response (10-90%)	$< 16$ ms	
Safe isolation	according to IEC 61010-1	
Rated insulation voltage	300 V DC	
Surge voltage category/degree of pollution	- / 2	
Degree of protection	IP20	
Dimensions W/H/D	22.5 / 99 / 114.5 mm	
Connection data solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
EMC note	Class A product, see page 605	
Conformance/Approvals		
Conformance	CE-compliant	
UL, USA/Canada	UL 61010 Listed	



Housing width 22.5 mm



#### Technical data

Input data		
Input voltage range / resistor	<ul style="list-style-type: none"> <li>0 V ... 550 V AC 5500 k<math>\Omega</math></li> <li>0 V ... 370 V AC 3700 k<math>\Omega</math></li> <li>0 V ... 250 V AC 2500 k<math>\Omega</math></li> <li>0 V ... 170 V AC 1700 k<math>\Omega</math></li> <li>0 V ... 120 V AC 1200 k<math>\Omega</math></li> <li>0 V ... 80 V AC 800 k<math>\Omega</math></li> <li>0 V ... 54 V AC 800 k<math>\Omega</math></li> <li>0 V ... 36 V AC 800 k<math>\Omega</math></li> <li>0 V ... 24 V AC 240 k<math>\Omega</math></li> </ul>	
ZERO / SPAN adjustment	$\pm 20\%$ / $\pm 20\%$	
Frequency range	45 Hz ... 405 Hz	
Maximum input voltage	$\pm 660$ V AC	
Output data		
Output signal	U output	I output
Maximum output signal	0 ... 10 V / 2 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Load $R_B$	$\leq 11$ V	$\leq 22$ mA
Ripple	$> 10$ k $\Omega$	$< 500$ $\Omega$
General data		
Supply voltage $U_B$	19.2 V DC ... 30 V DC	
Current consumption	$< 45$ mA	
Maximum transmission error	$< 1\%$ (from a measuring range final value, 45 ... 65 Hz)	
Temperature coefficient	$< 0.015\%$ / K	
Step response (10-90%)	$< 180$ ms	
Safe isolation	acc. to EN 50178	
Rated insulation voltage	300 V DC	
Surge voltage category/degree of pollution	- / 2	
Degree of protection	IP20	
Dimensions W/H/D	22.5 / 99 / 114.5 mm	
Connection data solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 14	
EMC note	Class A product, see page 605	
Conformance/Approvals		
Conformance	CE-compliant	
UL, USA/Canada	UL 61010 Listed	

#### Ordering data

Description	Type	Order No.	Pcs./ Pkt.
<b>MCR voltage transducer</b> , for DC voltages from 0 ... $\pm 20$ V DC to 0 ... $\pm 660$ V DC			
- with screw connection	<b>MACX MCR-VDC</b>	<b>2906242</b>	1
- with Push-in connection	<b>MACX MCR-VDC-PT</b>	<b>2906243</b>	1
<b>MCR voltage transducer</b> , for sinusoidal AC voltages from 0 ... 20 V AC to 0 ... 660 V AC			
- with screw connection			
- with Push-in connection			

#### Ordering data

Description	Type	Order No.	Pcs./ Pkt.
<b>MCR voltage transducer</b> , for sinusoidal AC voltages from 0 ... 20 V AC to 0 ... 660 V AC			
- with screw connection	<b>MACX MCR-VAC</b>	<b>2906239</b>	1
- with Push-in connection	<b>MACX MCR-VAC-PT</b>	<b>2906244</b>	1

## Accessories

## Configuration software package

The **MCR/PI-CONF-WIN** configuration software package is used to configure and visualize all parameters for the programmable MCR measuring transducers.

- Straightforward menu interface
- Rapid programming

## Notes:

The software runs under the following operating systems: Windows NT™, 2000™, and XP™.



For MCR-S... current transducer

Description
<b>MCR configuration software</b> , for programming MCR-T..., MCR...-LP-..., MCR...-HT-..., MCR-S-..., MCR-F-..., and MCR-PSP-... modules, CD-ROM
<b>Labels</b> , for marking MCR-T and MCR-S modules, four sheets DIN A4 marking labels (112 pcs.)

Ordering data		
Type	Order No.	Pcs./Pkt.
MCR/PI-CONF-WIN	2814799	1
Accessories		
MCR-ET 38X35 WH	2814317	1

## USB adapter cable

## Software adapter cable

The following adapter cables are available for programming the MCR-S... current transducers:

- USB adapter cable
- Software adapter cable



For MCR-S... current transducer

Description
<b>USB adapter cable</b> , D-9-SUB to USB, with adapter D-9-SUB to D-25-SUB
<b>Software adapter cable</b> (stereo jack plug/25-pos. D-SUB), 1.2 m long, for programming MCR-T..., MCR-S-..., and MCR-F-... modules
<b>Adapter cable</b> , flexible, 9-pos. D-SUB socket to 25-pos. D-SUB pin

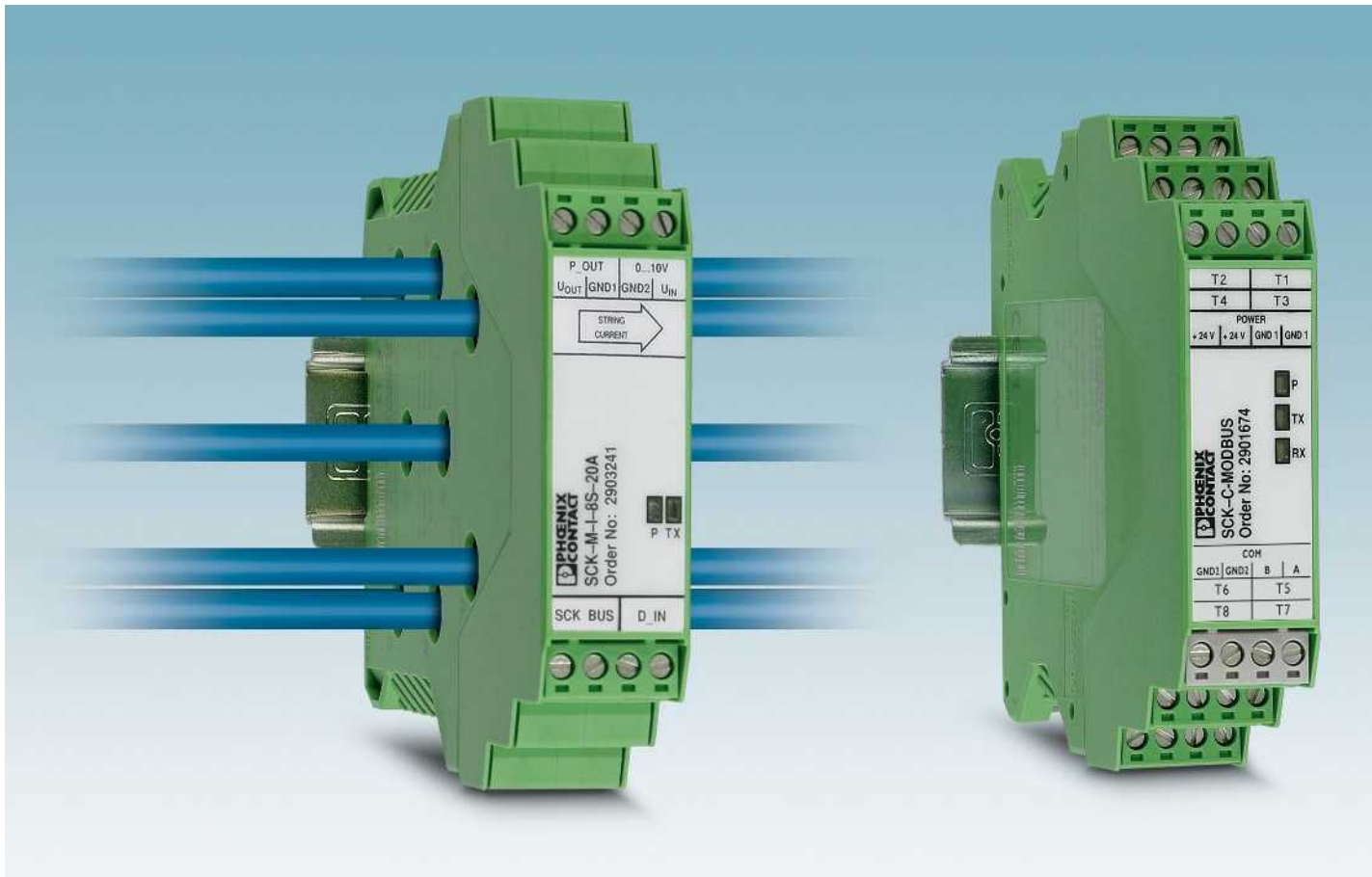
Ordering data		
Type	Order No.	Pcs./Pkt.
CM-KBL-RS232/USB	2881078	1
MCR-TTL-RS232-E	2814388	1
Accessories		
PSM-KAD 9 SUB 25/BS	2761295	1











### Utilize solar electricity efficiently

Detect errors – increase efficiency: photovoltaic systems should achieve maximum energy yield within the shortest possible time.

SOLARCHECK provides reliable information regarding the performance of your photovoltaic system. It can be used to detect faults, which may be caused by damaged panels, defective contacts or damage in the cabling. This allows you to implement countermeasures quickly, thereby increasing the efficiency of your system.

### Current topic: reliable monitoring

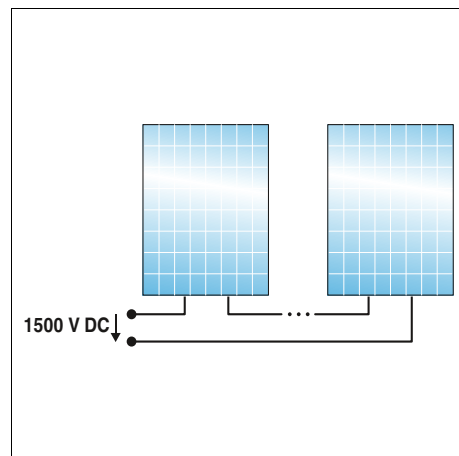
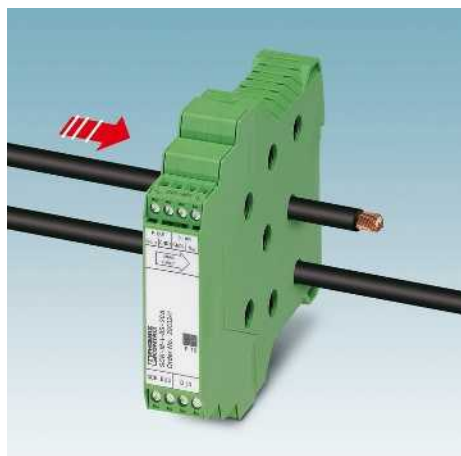
Whether a small roof-top system on a family home or a megawatt outdoor system: for reliable operation, the photovoltaic market requires monitoring systems where status information is continuously available and visualization is easy. Phoenix Contact offers a comprehensive portfolio of hardware and software products specifically designed for this purpose.

### Energy of the future

From installation to monitoring. In the “Components and systems for photovoltaics” brochure you will find further innovative solutions for your photovoltaic system, such as:

- Connection technology
- Surge protection
- Hardware and software solutions
- Generator connection boxes
- Tools and marking





**Contact-free current measurement**

Contact-free measurement using Hall sensors offers many advantages:

- Safe isolation is already ensured by the cable insulation.
- No contact resistance due to additional contact points.
- Reliable current transfer, as there is no direct intervention in the string circuit.

**Space-saving installation without an additional power supply**

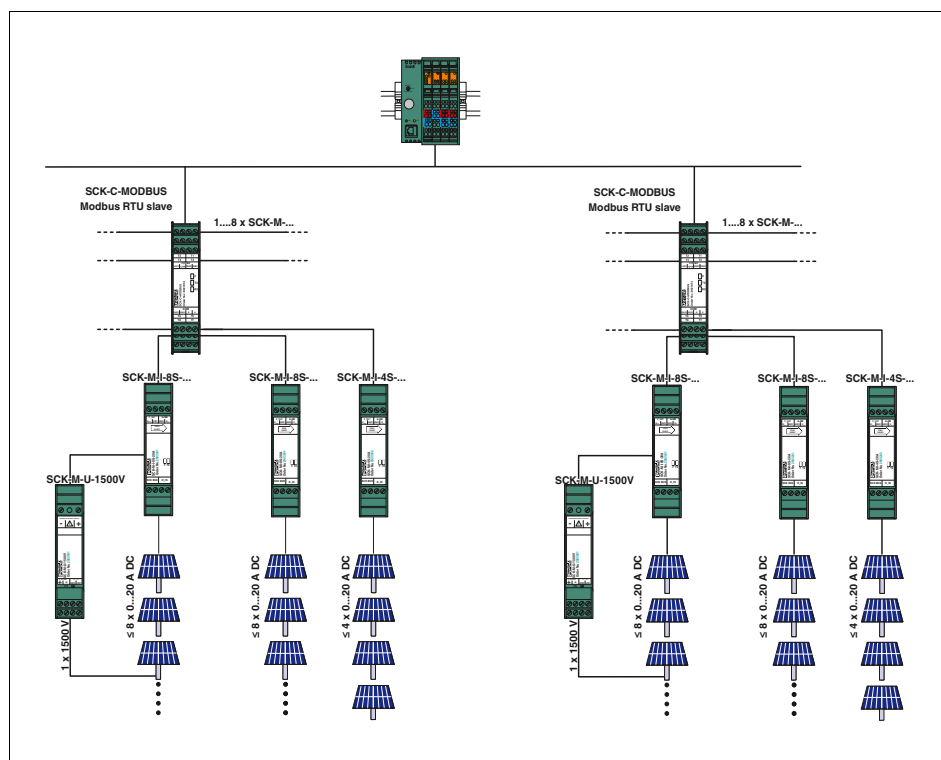
With a width of just 22.5 mm, the narrow measuring module bundles the cables in a confined space.

- The 2-conductor communication cable is also used to supply the measuring modules.
- This means that one communication module supplies up to eight measuring modules – without an additional power supply.

**Flexible expansion**

Optional extension of voltage measurement up to 1500 V DC

- Also suitable for grounded systems.
- Suitable for PV systems with extra high system voltages
- Flexible use, even outside the SOLARCHECK system



**Easy integration in monitoring systems**

The modular SOLARCHECK monitoring system consists of various measuring modules for current and voltage measurement and an associated communication module.

The communication module collects the measured values from the current measuring modules and forwards them to a higher-level controller. You can acquire up to eight or four string currents with one current measuring module each. A maximum of eight current measuring modules of any type can be connected to one communication module. The 2-conductor communication cable is also used to supply the measuring modules with power. This means that no additional power supply is required in the field.

The voltage measuring module is connected to and also supplied via the analog input provided on the 8-channel current measuring modules.

# Monitoring

## Monitoring and diagnostics

### Solar system monitoring

#### PV string monitoring

##### SOLARCHECK

The modular SOLARCHECK monitoring system consists of various devices for current and voltage measurement and an associated communication module.

##### Communication module:

- For connecting and collecting measured values from up to eight measuring modules
- Provision of data for transfer to higher-level controllers

##### Current measuring modules:

- 8-channel current measurement up to 20 A DC
- Detection of reverse currents up to -1 A
- 4-channel extension modules for 20 A DC
- Internal temperature monitoring
- Digital input for monitoring, e.g., the remote indication contacts of surge protection modules
- Supply via the communication module

##### Voltage measuring module

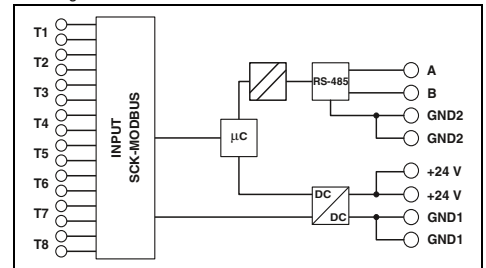
- Voltage measurement up to 1500 V DC in any grounded PV system
- Connection and supply is usually via the analog input (0 to 10 V) provided on the 8-channel SOLARCHECK current measuring module
- Voltage measurement is output as an analog signal 2 to 10 V
- As an option, can also be removed from the SOLARCHECK group and used separately



Communication module  
RS-485 (Modbus RTU)



Housing width 22.5 mm



#### Technical data

Supply	
Supply voltage	24 V DC -10 % ... +25 %
Own current consumption	22 mA (typical)
Measuring input	
Current measuring range	-
Transmission error, maximum	-
Temperature coefficient	-
Reverse current detection	-
Number of measuring channels	-
Voltage measuring range	-
Connection method	-
Digital input	
Controlled by external floating contact	-
Analog input	
Input voltage range	-
Analog output	
Output voltage range	-
SCK-C-MODBUS data interface	
Cable length (for 0.15 mm <sup>2</sup> )	-
Communication protocol	Proprietary
Serial port	RS-485
Serial transmission speed	9.6/14.4/19.2/38.4 kbps
Cable length	≤ 1200 m
Communication protocol	Modbus/RTU
General data	
Degree of protection	IP20
Ambient temperature range	-20 °C ... 70 °C
Dimensions W/H/D	22.5 / 102 / 106 mm
Screw connection solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
EMC note	Class A product, see page 605
Conformance/Approvals	
Conformance	CE-compliant
UL, USA	1741 Recognized
UL, USA/Canada	508 Listed

#### Ordering data

Description	Type	Order No.	Pcs./Pkt.
<b>Communication module</b>			
<b>Current measuring module, 8-channel</b>	<b>SCK-C-MODBUS</b>	<b>2901674</b>	<b>1</b>
<b>Current measuring module, 4-channel for extension</b>			
<b>Voltage measuring module</b>			



Current measuring module, 20 A DC, 8-channel

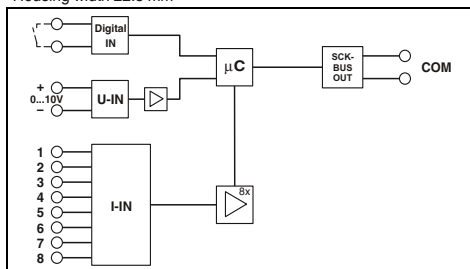


Extension module, 4-channel Current measurement 20 A DC



Voltage measuring module, 0...1500 V DC

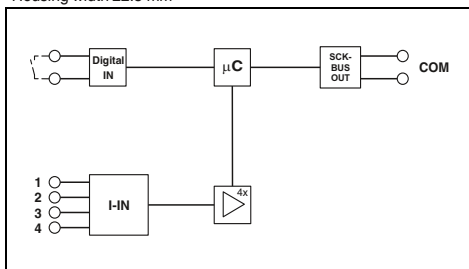
Housing width 22.5 mm



Technical data

Via SCK-C-MODBUS  
 43 mA (typical)  
 0 A DC ... 20 A (UL: 0 A DC...25 A DC)  
 ± 1 % (From the measuring range final value)  
 0.02 %/K (T<sub>K20</sub>)  
 -1 A DC ... 0 mA  
 8  
 Through connection, 9.5 mm diameter

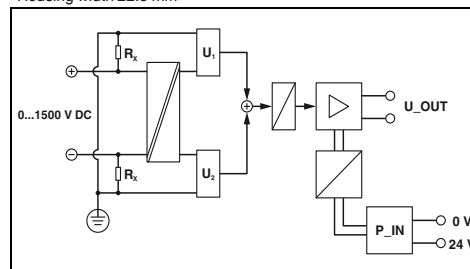
Housing width 22.5 mm



Technical data

Via SCK-C-MODBUS  
 43 mA (typical)  
 0 A DC ... 20 A (UL: 0 A DC...25 A DC)  
 ± 1 % (From the measuring range final value)  
 0.02 %/K (T<sub>K20</sub>)  
 -1 A DC ... 0 mA  
 4  
 Through connection, 9.5 mm diameter

Housing width 22.5 mm



Technical data

24 V DC -10 % ... +25 % (or via SSK-M-I-8S-20A)  
 8 mA (typical)  
 -  
 ± 1 % (after additional tuning (valid for 100 - 1500 V DC))  
 < 0.01 %/K  
 1  
 0 V DC ... 1500 V DC  
 Screw connection

Floating switch contacts

0 V ... 10 V

≤ 300 m (0.14 mm<sup>2</sup>)  
 Proprietary

IP20  
 -20 °C ... 70 °C  
 22.5 / 102 / 128.5 mm  
 0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
 Class A product, see page 605

CE-compliant  
 1741 Recognized  
 508 Listed

Ordering data

Type	Order No.	Pcs./ Pkt.
SCK-M-I-8S-20A	2903241	1

Floating switch contacts

-

≤ 300 m (0.14 mm<sup>2</sup>)  
 Proprietary

IP20  
 -20 °C ... 70 °C  
 22.5 / 102 / 128.5 mm  
 0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
 Class A product, see page 605

CE-compliant  
 1741 Recognized  
 508 Listed

Ordering data

Type	Order No.	Pcs./ Pkt.
SCK-M-I-4S-20A	2903242	1

-

-

2 V DC ... 10 V DC

IP20  
 -20 °C ... 70 °C  
 22.5 / 102 / 128.5 mm  
 0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
 Class A product, see page 605

CE-compliant  
 1741 Recognized  
 508 Listed

Ordering data

Type	Order No.	Pcs./ Pkt.
SCK-M-U-1500V	2903591	1



### For high system availability

EMD monitoring relays can be used to detect deviations in important system parameters at an early stage. These can be indicated or system parts can be shut down selectively. EMD monitoring relays ensure error-free and cost-effective operation of your system. They are an inexpensive solution for numerous monitoring functions.

- Surge voltage and undervoltage
- Overcurrent and undercurrent
- Phase failure, phase sequence, and phase asymmetry
- Power factor and real power
- Motor winding temperature
- Levels

For system monitoring, choose from two product ranges: compact or multifunctional monitoring relays.

### Perfect timing

ETD time relays ensure optimum time sequences.

The modules are the cost-effective alternative to a PLC: with easy configuration and fast wiring.

Choose from two product ranges for your ideal time control application:

- Ultra-narrow time relays each with one time range and one function
- Multifunctional time relays with selectable time ranges and functions

### Professionally packaged components

Function modules with professional housing and connection technology can be used to integrate electronic components in your system. They can be used to perform a variety of tasks:

- Diode modules provide protection against polarity reversal. In addition, they decouple messages in fault reporting systems.
- Lamp testing modules decouple signals in isolation in the field of fault reporting technology.
- Display modules simplify troubleshooting and provide help for monitoring processes.



### Compact monitoring relays

Ideal for simple monitoring tasks – from series production to building installation.

- Compact installation housing
- Quick and tool-free wiring with Push-in technology
- Parameters can be adjusted easily using rotary switches
- Clear diagnostics, thanks to color status LED



### Multifunctional monitoring relays

- Parameters can be adjusted easily using rotary switches
- Fast error detection, thanks to fine tuning and short response times
- Worldwide use, thanks to wide-range power supply unit or plug-in transformer
- Space saving, with two PDT outputs in 22.5 mm wide housing
- Electrically isolated measuring and supply circuits
- Clear diagnostics, thanks to color status LEDs



### Ultra-narrow time relays

The space-saving and inexpensive solution for simple time control applications.

- Each with one time range and one function
- Overall width of just 6.2 mm - saves up to 70% space compared to conventional time relays
- Precise time setting using the illuminated thumbwheel
- Fast wiring through the use of plug-in bridges



### Multifunctional time relays

For universal use thanks to wide range of functions.

- Just three versions for all conventional time control applications
- Two floating PDT outputs on an overall width of just 22.5 mm
- Supply voltage via wide-range power supply unit
- Optimum setting of times ranging from milliseconds to several days



### Function modules

Function modules transform components such as diodes into a shock-proof and dust-proof electronics module.

- Easy installation, thanks to electronics housing with IP20 protection that can be installed in a control cabinet
- Fast mounting on DIN rails, thanks to the foot catch
- User-friendly wiring, thanks to practical connection technology

# Monitoring

## Monitoring and diagnostics

### Monitoring relays

#### Single-phase current monitoring

- The **EMD-BL-C-10** monitors AC currents from 0 to 10 A.
- Adjustable response delay
  - 0 to 5 A or 0 to 10 A measuring range
  - Adjustable via rotary switch on the front

#### Single-phase voltage monitoring

- The **EMD-BL-V-230** monitors DC and AC voltages.
- 24 V AC/DC or 230 V AC
  - Separately adjustable response delay
  - Adjustable monitoring range
  - Adjustable via potentiometer on front

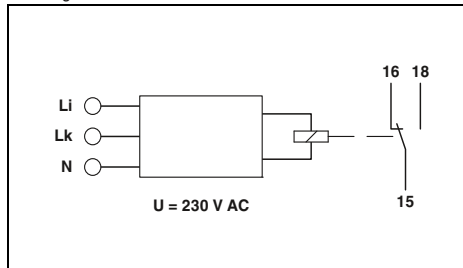


**Current monitoring, 1-phase**  
Overcurrent, undercurrent, window



**Voltage monitoring, 1-phase**  
Undervoltage, window

Housing width 17.5 mm



#### Technical data

Functions

Overcurrent, undercurrent, window

Input

Input ranges

Input ranges

0 A ... 5 A  
0 A ... 10 A  
Configurable via rotary switches  
3 mΩ  
5 % ... 95 % (From  $I_N$ )  
10 % ... 100 % (From  $I_N$ )  
0.1 s ... 10 s  
≤ 5 % (of the nominal value)  
± 5 % (of the nominal value)  
≤ 2 %

Input resistance

Minimum setting range

Maximum setting range

Setting range for response delay

Basic accuracy

Setting accuracy

Repeat accuracy

Relay output

Contact type

Switching capacity

Electrical service life

Mechanical service life

Output fuse

General data

Supply voltage

Nominal power consumption

1 floating PDT  
1250 VA (5 A/250 V AC)  
1 x 10<sup>6</sup> cycles  
15 x 10<sup>6</sup> cycles  
5 A (fast-blow)

Degree of protection

Ambient temperature (operation)

Dimensions W/H/D

Push-in connection solid/stranded/AWG

Screw connection solid/stranded/AWG

Conformance/Approvals

Conformance

UL, USA/Canada

IP40 (housing) / IP20 (connection terminal blocks)  
-25 °C ... 55 °C  
17.5 / 88 / 65.5 mm  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 26 - 14  
0.5 ... 2.5 mm<sup>2</sup> / 0.5 ... 2.5 mm<sup>2</sup> / 20 - 14

CE-compliant  
UL/C-UL listed UL 508

#### Ordering data

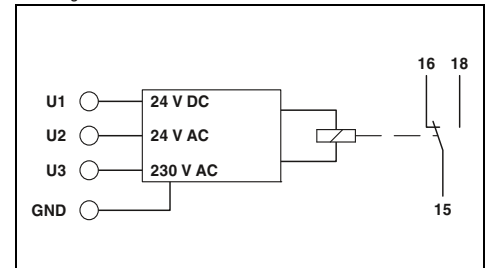
Description

**Compact monitoring relay** with Push-in connection

**Compact monitoring relay** with screw connection

Type	Order No.	Pcs./ Pkt.
EMD-BL-C-10-PT	2903522	1
EMD-BL-C-10	2903521	1

Housing width 17.5 mm



#### Technical data

Undervoltage, window

0 V DC ... 24 V DC (connection terminal blocks: U1 and GND)  
0 V AC ... 24 V AC (connection terminal blocks: U2 and GND)  
0 V AC ... 230 V AC (connection terminal blocks: U3 and GND)

75 % ... 115 % (From  $U_N$ )

80 % ... 120 % (From  $U_N$ )

0.1 s ... 10 s

≤ 5 % (of scale end value)

± 5 % (of scale end value)

≤ 2 %

1 floating PDT  
1250 VA (5 A/250 V AC)  
1 x 10<sup>6</sup> cycles  
15 x 10<sup>6</sup> cycles  
5 A (fast-blow)

-25 % ... +20 % (= measuring voltage)

10 VA (At 230 V AC (0.6 W))

1.3 VA (At 24 V AC (0.8 W))

0.6 W (at 24 V DC)

IP40 (housing) / IP20 (connection terminal blocks)

-25 °C ... 55 °C

17.5 / 88 / 65.5 mm

0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 26 - 14

0.5 ... 2.5 mm<sup>2</sup> / 0.5 ... 2.5 mm<sup>2</sup> / 20 - 14

CE-compliant  
UL/C-UL listed UL 508

#### Ordering data

Type	Order No.	Pcs./ Pkt.
EMD-BL-V-230-PT	2903524	1
EMD-BL-V-230	2903523	1

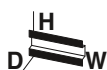
Monitoring relays

Three-phase voltage monitoring

- The **EMD-BL-3V-400** monitors three-phase AC voltages.
- 3~ 400 V AC/230 V AC ±30%
- Separately adjustable response delay
- Adjustable monitoring range
- Adjustable via potentiometer on front
- Supply from the measuring circuit

Phase monitoring

- The **EMD-BL-PH-400** monitors three-phase AC voltages.
- 3~ 208 to 480 V AC / 120 to 277 V AC
- Adjustable response delay
- Adjustable asymmetry: 5 to 25% / OFF
- Adjustable via potentiometer on front
- Supply from the measuring circuit

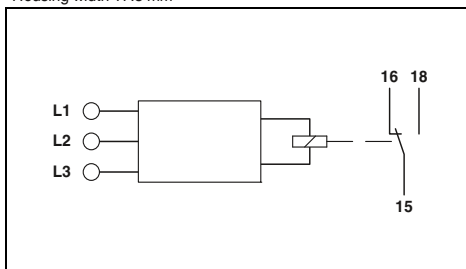


Voltage monitoring, 3-phase  
Window, phase sequence

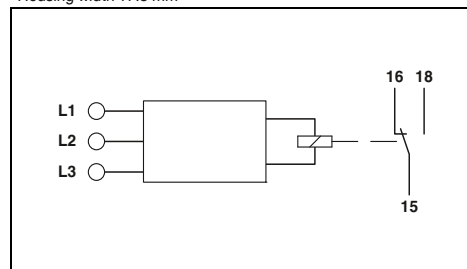


Phase monitoring  
Phase sequence, phase failure, asymmetry

ERIC  
Housing width 17.5 mm



ERIC  
Housing width 17.5 mm



Technical data

Technical data	
Window, phase sequence	
Monitoring range	280 V AC ... 519 V AC
Input ranges	3~ 400/230 V
Minimum setting range	70 % ... 120 % (From U <sub>N</sub> )
Maximum setting range	80 % ... 130 % (From U <sub>N</sub> )
Setting range for response delay	0.1 s ... 10 s
Asymmetry	-
Basic accuracy	≤ 5 % (of the nominal value)
Setting accuracy	± 5 % (of scale end value)
Repeat accuracy	± 2 %
Relay output	
Contact type	1 floating PDT
Switching capacity	1250 VA (5 A/250 V AC)
Electrical service life	1 x 10 <sup>5</sup> cycles
Mechanical service life	15 x 10 <sup>6</sup> cycles
Output fuse	5 A (fast-blow)
General data	
Supply voltage	±30 % (= measuring voltage)
Nominal power consumption	10 VA (1 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature (operation)	-25 °C ... 55 °C
Dimensions W/H/D	17.5 / 88 / 65.5 mm
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Screw connection solid/stranded/AWG	0.5 ... 2.5 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 14
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL/C-UL listed UL 508

Technical data

Technical data	
Phase sequence, phase failure, asymmetry	
Monitoring range	187 V AC ... 519 V AC
Input ranges	3~ 208 ... 480 V/120 ... 277 V
Minimum setting range	-
Maximum setting range	-
Setting range for response delay	0.1 s ... 10 s
Asymmetry	5 % ... 25% / OFF
Basic accuracy	≤ 5 % (of scale end value)
Setting accuracy	± 5 % (of scale end value)
Repeat accuracy	± 2 %
Relay output	
Contact type	1 floating PDT
Switching capacity	1250 VA (5 A/250 V AC)
Electrical service life	1 x 10 <sup>5</sup> cycles
Mechanical service life	15 x 10 <sup>6</sup> cycles
Output fuse	5 A (fast-blow)
General data	
Supply voltage	±10 % (= measuring voltage)
Nominal power consumption	10 VA ((1 W) at 400 V/50 Hz) 16 VA ((1.5 W) at 480 V/60 Hz)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature (operation)	-25 °C ... 55 °C
Dimensions W/H/D	17.5 / 88 / 65.5 mm
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Screw connection solid/stranded/AWG	0.5 ... 2.5 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 14
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL/C-UL listed UL 508

Ordering data

Ordering data		
Type	Order No.	Pcs./Pkt.
<b>EMD-BL-3V-400-PT</b>	<b>2903526</b>	1
<b>EMD-BL-3V-400</b>	<b>2903525</b>	1

Ordering data

Ordering data		
Type	Order No.	Pcs./Pkt.
<b>EMD-BL-PH-480-PT</b>	<b>2903528</b>	1
<b>EMD-BL-PH-480</b>	<b>2903527</b>	1

Functions	
Input	
Monitoring range	
Input ranges	
Minimum setting range	
Maximum setting range	
Setting range for response delay	
Asymmetry	
Basic accuracy	
Setting accuracy	
Repeat accuracy	
Relay output	
Contact type	
Switching capacity	
Electrical service life	
Mechanical service life	
Output fuse	
General data	
Supply voltage	
Nominal power consumption	
Degree of protection	
Ambient temperature (operation)	
Dimensions W/H/D	
Push-in connection solid/stranded/AWG	
Screw connection solid/stranded/AWG	
Conformance/Approvals	
Conformance	
UL, USA/Canada	

Description	
<b>Compact monitoring relay</b> with Push-in connection	
<b>Compact monitoring relay</b> with screw connection	

# Monitoring

## Monitoring and diagnostics

### Monitoring relays

#### Thermistor monitoring

The EMD-SL-PTC monitors the temperature of motor windings.

- Operate value  $\geq 3.6 \text{ k}\Omega$
- Release value  $\leq 1.6 \text{ k}\Omega$
- DIN 44081/DIN 44082-compliant
- Sensors can be connected in series

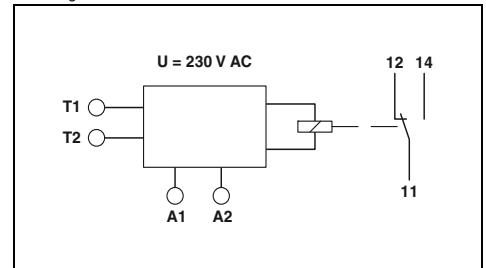


new

Temperature monitoring  
(motor windings)

ERC

Housing width 17.5 mm



#### Technical data

Functions	
<b>Input</b>	Winding temperature monitoring
Total cold resistance	$\leq 1.5 \text{ k}\Omega$
Response value	$\geq 3.6 \text{ k}\Omega$ (Relay drops out)
Release value	$\leq 1.6 \text{ k}\Omega$ (Relay picks up)
Basic accuracy	$\pm 10 \%$ (of scale end value)
<b>Relay output</b>	
Contact type	1 floating PDT
Switching capacity	1250 VA (5 A/250 V AC)
Electrical service life	$1 \times 10^5$ cycles
Mechanical service life	$15 \times 10^5$ cycles
Output fuse	5 A (fast-blow)
<b>General data</b>	
Supply voltage	230 V AC (-15 % ... +10 %)
Nominal power consumption	3.5 VA (0.5 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature (operation)	-25 °C ... 55 °C
Dimensions W/H/D	17.5 / 88 / 65.5 mm
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Screw connection solid/stranded/AWG	0.5 ... 2.5 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 14
<b>Conformance/Approvals</b>	
Conformance	CE-compliant

#### Ordering data

Description	Type	Order No.	Pcs./ Pkt.
<b>Compact monitoring relay</b>			
with Push-in connection	EMD-BL-PTC-PT	2906253	1
with screw connection	EMD-BL-PTC	2906252	1





# Monitoring

## Monitoring and diagnostics

### Monitoring relays

#### Single-phase current monitoring

**EMD-...C...** monitoring relays monitor DC and AC currents within the range of 0 to 10 A.

- Separately adjustable startup and release delays
- Variable supply voltage range
- Adjustable via potentiometer on front

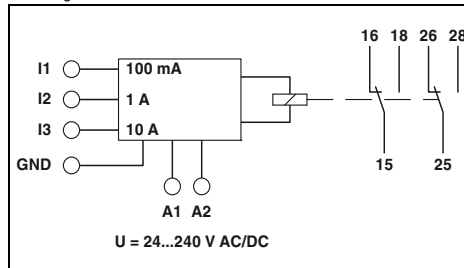


Overcurrent and undercurrent monitoring



Over or undercurrent monitoring

Housing width 22.5 mm



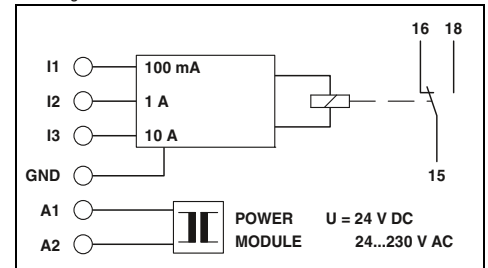
#### Technical data

Functions	Overcurrent, undercurrent, window, error memory
Input	0 mA ... 100 mA (Connection terminals: I1 and GND) 0 A ... 1 A (Connection terminals: I2 and GND) 0 A ... 10 A (Connection terminals: I3 and GND)
Input ranges	470 mΩ (at I <sub>N</sub> = 100 mA) ; 47 mΩ (at I <sub>N</sub> = 1 A) ; 5 mΩ (at I <sub>N</sub> = 10 A)
Input resistance	470 mΩ (at I <sub>N</sub> = 100 mA) ; 47 mΩ (at I <sub>N</sub> = 1 A) ; 5 mΩ (at I <sub>N</sub> = 10 A)
Minimum setting range	5 % ... 95 % (From I <sub>N</sub> )
Maximum setting range	10 % ... 100 % (From I <sub>N</sub> )
Setting range for response delay	0.1 s ... 10 s
Setting range for starting delay	0 s ... 10 s
Basic accuracy	± 5 % (of scale end value)
Setting accuracy	≤ 5 % (of scale end value)
Repeat accuracy	≤ 2 %
Relay output	2 floating PDT contacts
Contact type	750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing) 1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)
Switching capacity	750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing) 1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)
Electrical service life	2 x 10 <sup>5</sup> cycles at ohmic load, 1000 VA
Mechanical service life	Approx. 2x 10 <sup>7</sup> cycles
Output fuse	5 A (fast-blow)
General data	24 V AC ... 240 V AC -15 % ... +10 % 24 V DC ... 240 V DC -20 % ... +25 % 4.5 VA (1.5 W) IP40 (housing) / IP20 (connection terminal blocks) -25 °C ... 55 °C 22.5 / 90 / 113 mm 0.5 ... 2.5 mm <sup>2</sup> / 0.25 ... 2.5 mm <sup>2</sup> / 20 - 14 Class A product, see page 605
Supply voltage range	24 V AC ... 240 V AC -15 % ... +10 % 24 V DC ... 240 V DC -20 % ... +25 % 4.5 VA (1.5 W)
Nominal power consumption	4.5 VA (1.5 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature (operation)	-25 °C ... 55 °C
Dimensions W/H/D	22.5 / 90 / 113 mm
Screw connection solid/stranded/AWG	0.5 ... 2.5 mm <sup>2</sup> / 0.25 ... 2.5 mm <sup>2</sup> / 20 - 14
EMC note	Class A product, see page 605
Conformance/Approvals	CE-compliant UL/C-UL listed UL 508

#### Ordering data

Description	Type	Order No.	Pcs./ Pkt.
<b>Electronic monitoring relay</b>	<b>EMD-FL-C-10</b>	<b>2866022</b>	1
<b>Power module, plug-in, please order at the same time!</b>			
Supply voltage 20 ... 30 V DC			
Supply voltage 20.2 ... 26.4 V AC			
Supply voltage 88 ... 121 V AC			
Supply voltage 108 ... 132 V AC			
Supply voltage 195 ... 264 V AC			

Housing width 22.5 mm



#### Technical data

EMD-SL-C-OC-10	EMD-SL-C-UC-10
Overcurrent	Undercurrent
0 mA ... 100 mA (Connection terminals: I1 and GND) 0 A ... 1 A (Connection terminals: I2 and GND) 0 A ... 10 A (Connection terminals: I3 and GND)	0 mA ... 100 mA (Connection terminals: I1 and GND) 0 A ... 1 A (Connection terminals: I2 and GND) 0 A ... 10 A (Connection terminals: I3 and GND)
470 mΩ (at I <sub>N</sub> = 100 mA) ; 47 mΩ (at I <sub>N</sub> = 1 A) ; 5 mΩ (at I <sub>N</sub> = 10 A)	470 mΩ (at I <sub>N</sub> = 100 mA) ; 47 mΩ (at I <sub>N</sub> = 1 A) ; 5 mΩ (at I <sub>N</sub> = 10 A)
5 % ... 95 % (From I <sub>N</sub> )	5 % ... 95 % (From I <sub>N</sub> )
10 % ... 100 % (From I <sub>N</sub> )	10 % ... 100 % (From I <sub>N</sub> )
0.2 s ... 10 s	0.2 s ... 10 s
-	-
± 5 % (of scale end value)	± 5 % (of scale end value)
≤ 5 % (of scale end value)	≤ 5 % (of scale end value)
≤ 2 %	≤ 2 %
1 floating PDT	1 floating PDT
750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing) 1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)	750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing) 1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)
2 x 10 <sup>5</sup> cycles at ohmic load, 1000 VA	2 x 10 <sup>5</sup> cycles at ohmic load, 1000 VA
Approx. 2x 10 <sup>7</sup> cycles	Approx. 2x 10 <sup>7</sup> cycles
5 A (fast-blow)	5 A (fast-blow)
24 V AC ... 230 V AC (see Power modules) 24 V DC (see Power modules) 2 VA (1.5 W) IP40 (housing) / IP20 (connection terminal blocks) -25 °C ... 55 °C 22.5 / 90 / 113 mm 0.5 ... 2.5 mm <sup>2</sup> / 0.25 ... 2.5 mm <sup>2</sup> / 20 - 14	24 V AC ... 230 V AC (see Power modules) 24 V DC (see Power modules) 2 VA (1.5 W) IP40 (housing) / IP20 (connection terminal blocks) -25 °C ... 55 °C 22.5 / 90 / 113 mm 0.5 ... 2.5 mm <sup>2</sup> / 0.25 ... 2.5 mm <sup>2</sup> / 20 - 14
CE-compliant UL/C-UL listed UL 508	CE-compliant UL/C-UL listed UL 508

#### Ordering data

Description	Type	Order No.	Pcs./ Pkt.
<b>EMD-SL-C-OC-10</b>	<b>EMD-SL-C-OC-10</b>	<b>2866019</b>	1
<b>EMD-SL-C-UC-10</b>	<b>EMD-SL-C-UC-10</b>	<b>2867937</b>	1
<b>EMD-SL-PS- 24DC</b>	<b>EMD-SL-PS- 24DC</b>	<b>2885359</b>	1
<b>EMD-SL-PS- 24AC</b>	<b>EMD-SL-PS- 24AC</b>	<b>2866103</b>	1
<b>EMD-SL-PS-110AC</b>	<b>EMD-SL-PS-110AC</b>	<b>2866116</b>	1
<b>EMD-SL-PS-120AC</b>	<b>EMD-SL-PS-120AC</b>	<b>2885731</b>	1
<b>EMD-SL-PS-230AC</b>	<b>EMD-SL-PS-230AC</b>	<b>2866129</b>	1

Monitoring relays

Single-phase voltage monitoring

EMD-...V... monitoring relays monitor DC and AC voltages within the range 0 to 300 V.

- Separately adjustable startup and release delays
- Variable supply voltage range
- Adjustable via potentiometer on front

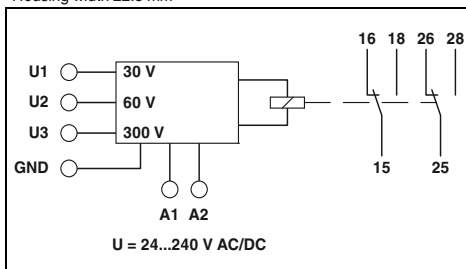


Undervoltage and overvoltage monitoring



Undervoltage monitoring

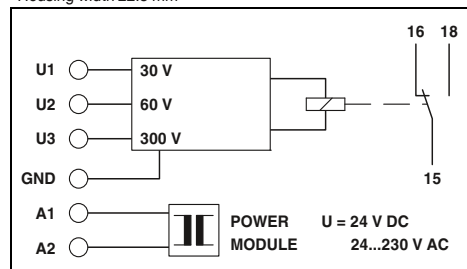
FRAC Housing width 22.5 mm



Technical data

Undervoltage, overvoltage, window, error memory

FRAC Housing width 22.5 mm



Technical data

Undervoltage

Functions	
Input	
Input ranges	
Input resistance	
Minimum setting range	
Maximum setting range	
Setting range for response delay	
Setting range for starting delay	
Basic accuracy	
Setting accuracy	
Repeat accuracy	
Relay output	
Contact type	
Switching capacity	
Electrical service life	
Mechanical service life	
Output fuse	
General data	
Supply voltage range	
Nominal power consumption	
Degree of protection	
Ambient temperature (operation)	
Dimensions W/H/D	
Screw connection solid/stranded/AWG	
EMC note	
Conformance/Approvals	
Conformance	
UL, USA/Canada	

Technical data	
Undervoltage, overvoltage, window, error memory	
Input ranges	0 V ... 30 V AC/DC (connection terminal blocks: U1 and GND) 0 V ... 60 V AC/DC (connection terminal blocks: U2 and GND) 0 V ... 300 V AC/DC (connection terminal blocks: U3 and GND)
Input resistance	47 kΩ (connection terminal blocks: U1 and GND) 100 kΩ (connection terminal blocks: U2 and GND) 470 kΩ (connection terminal blocks: U3 and GND)
Minimum setting range	5 % ... 95 % (From U <sub>N</sub> )
Maximum setting range	10 % ... 100 % (From U <sub>N</sub> )
Setting range for response delay	0.1 s ... 10 s
Setting range for starting delay	0 s ... 10 s
Basic accuracy	± 5 % (of scale end value)
Setting accuracy	≤ 5 % (of scale end value)
Repeat accuracy	≤ 2 %
Relay output	2 floating PDT contacts
Contact type	750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing) 1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)
Switching capacity	
Electrical service life	2 x 10 <sup>5</sup> cycles at ohmic load, 1000 VA
Mechanical service life	Approx. 2x 10 <sup>7</sup> cycles
Output fuse	5 A (fast-blow)
General data	
Supply voltage range	24 V AC ... 240 V AC -15 % ... +10 % 24 V DC ... 240 V DC -20 % ... +25 % 4.5 VA (1.5 W)
Nominal power consumption	IP40 (housing) / IP20 (connection terminal blocks)
Degree of protection	-25 °C ... 55 °C
Ambient temperature (operation)	22.5 / 90 / 113 mm
Dimensions W/H/D	0.5 ... 2.5 mm <sup>2</sup> / 0.25 ... 2.5 mm <sup>2</sup> / 20 - 14
Screw connection solid/stranded/AWG	Class A product, see page 605
EMC note	
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL/C-UL listed UL 508

Technical data	
Undervoltage	
Input ranges	0 V ... 30 V AC/DC (connection terminal blocks: U1 and GND) 0 V ... 60 V AC/DC (connection terminal blocks: U2 and GND) 0 V ... 300 V AC/DC (connection terminal blocks: U3 and GND)
Input resistance	47 kΩ (connection terminal blocks: U1 and GND) 100 kΩ (connection terminal blocks: U2 and GND) 470 kΩ (connection terminal blocks: U3 and GND)
Minimum setting range	5 % ... 95 % (From U <sub>N</sub> )
Maximum setting range	10 % ... 100 % (From U <sub>N</sub> )
Setting range for response delay	0.2 s ... 10 s
Setting range for starting delay	-
Basic accuracy	± 5 % (of scale end value)
Setting accuracy	≤ 5 % (of scale end value)
Repeat accuracy	≤ 2 %
Relay output	1 floating PDT
Contact type	750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing) 1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)
Switching capacity	
Electrical service life	2 x 10 <sup>5</sup> cycles at ohmic load, 1000 VA
Mechanical service life	Approx. 2x 10 <sup>7</sup> cycles
Output fuse	5 A (fast-blow)
General data	
Supply voltage range	24 V AC ... 230 V AC (see Power modules) 24 V DC (see Power modules) 2 VA (1.5 W)
Nominal power consumption	IP40 (housing) / IP20 (connection terminal blocks)
Degree of protection	-25 °C ... 55 °C
Ambient temperature (operation)	22.5 / 90 / 113 mm
Dimensions W/H/D	0.5 ... 2.5 mm <sup>2</sup> / 0.25 ... 2.5 mm <sup>2</sup> / 20 - 14
Screw connection solid/stranded/AWG	
EMC note	
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL/C-UL listed UL 508

Description	
Electronic monitoring relay	
Power module, plug-in, please order at the same time!	
Supply voltage 20 ... 30 V DC	
Supply voltage 20.2 ... 26.4 V AC	
Supply voltage 88 ... 121 V AC	
Supply voltage 108 ... 132 V AC	
Supply voltage 195 ... 264 V AC	

Ordering data		
Type	Order No.	Pcs./ Pkt.
EMD-FL-V-300	2866048	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
EMD-SL-V-UV-300	2866035	1
EMD-SL-PS- 24DC	2885359	1
EMD-SL-PS- 24AC	2866103	1
EMD-SL-PS-110AC	2866116	1
EMD-SL-PS-120AC	2885731	1
EMD-SL-PS-230AC	2866129	1

# Monitoring

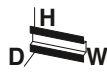
## Monitoring and diagnostics

### Monitoring relays

#### Three-phase voltage monitoring

**EMD-...-3V...** monitoring relays monitor three-phase AC voltages of 160 to 897 V AC (depending on the device concerned).

- Adjustable response delay
- Variable supply voltage range
- Adjustable via potentiometer on front
- Adjustable asymmetry



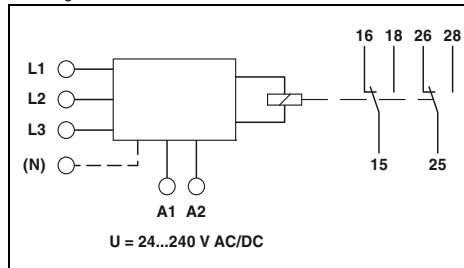
**Undervoltage and phase monitoring,  
400 V or 230 V**



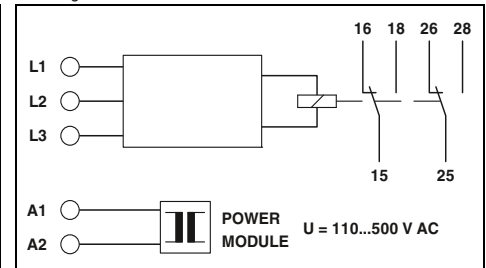
**Undervoltage and phase monitoring,  
500 V or 690 V**



Housing width 22.5 mm



Housing width 45 mm



#### Technical data

Functions	EMD-FL-3V-400	EMD-FL-3V-230
Input		
Monitoring range	280 V AC ... 520 V AC	161 V AC ... 299 V AC
Input ranges	3 N ~ 400/230 V	3 N ~ 230/132 V
Input resistance	1 MΩ	470 kΩ
Minimum setting range	-30 % ... 20 % (From U <sub>N</sub> )	
Maximum setting range	-20 % ... 30 % (From U <sub>N</sub> )	
Setting range for response delay	0.1 s ... 10 s	
Asymmetry	5 % ... 25% / OFF	5 % ... 25% / OFF
Basic accuracy	± 5 % (of scale end value)	
Setting accuracy	≤ 5 % (of scale end value)	
Repeat accuracy	≤ 2 %	
Relay output		
Contact type	2 floating PDT contacts	
Switching capacity	750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing) 1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)	
Electrical service life	2 x 10 <sup>5</sup> cycles at ohmic load, 1000 VA	
Mechanical service life	Approx. 2x 10 <sup>7</sup> cycles	
Output fuse	5 A (fast-blow)	
General data		
Supply voltage		
Supply voltage range	24 V AC ... 240 V AC -15 % ... +10 % 24 V DC ... 240 V DC -20 % ... +25 %	
Nominal power consumption	4.5 VA (1.5 W)	
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)	
Ambient temperature (operation)	-25 °C ... 55 °C	
Dimensions W/H/D	22.5 / 90 / 113 mm	
Screw connection solid/stranded/AWG	0.5 ... 2.5 mm <sup>2</sup> / 0.25 ... 2.5 mm <sup>2</sup> / 20 - 14	
EMC note	Class A product, see page 605	
Conformance/Approvals		
Conformance	CE-compliant	
UL, USA/Canada	UL/C-UL listed UL 508	

#### Technical data

Functions	EMD-FL-3V-690	EMD-FL-3V-500
Input		
Monitoring range	483 V AC ... 897 V AC	350 V AC ... 650 V AC
Input ranges	3 ~ 690 V	3 ~ 500 V
Input resistance	1 MΩ	1 MΩ
Minimum setting range	-30 % ... 20 % (From U <sub>N</sub> )	
Maximum setting range	-20 % ... 30 % (From U <sub>N</sub> )	
Setting range for response delay	0.1 s ... 10 s	
Asymmetry	5 % ... 25% / OFF	5 % ... 25% / OFF
Basic accuracy	± 5 % (of scale end value)	
Setting accuracy	≤ 5 % (of scale end value)	
Repeat accuracy	≤ 2 %	
Relay output		
Contact type	2 floating PDT contacts	
Switching capacity	750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing) 1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)	
Electrical service life	2 x 10 <sup>5</sup> cycles at ohmic load, 1000 VA	
Mechanical service life	Approx. 2x 10 <sup>7</sup> cycles	
Output fuse	5 A (fast-blow)	
General data		
Supply voltage		
Supply voltage range	110 V AC ... 500 V AC (see Power modules)	
Nominal power consumption	4.5 VA (1.5 W)	
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)	
Ambient temperature (operation)	-25 °C ... 55 °C	
Dimensions W/H/D	45 / 90 / 113 mm	
Screw connection solid/stranded/AWG	0.5 ... 2.5 mm <sup>2</sup> / 0.25 ... 2.5 mm <sup>2</sup> / 20 - 14	
EMC note		
Conformance/Approvals		
Conformance	CE-compliant	
UL, USA/Canada	UL/C-UL listed UL 508	

#### Ordering data

Description	Type	Order No.	Pcs./ Pkt.
<b>Electronic monitoring relay</b>			
	EMD-FL-3V-400	2866064	1
	EMD-FL-3V-230	2885773	1
<b>Power module, plug-in, please order at the same time!</b>			
Supply voltage 20 ... 30 V DC			
Supply voltage 20.2 ... 26.4 V AC			
Supply voltage 88 ... 121 V AC			
Supply voltage 108 ... 132 V AC			
Supply voltage 195 ... 264 V AC			
Supply voltage 323 ... 456 V AC			

#### Ordering data

Description	Type	Order No.	Pcs./ Pkt.
<b>Electronic monitoring relay</b>			
	EMD-FL-3V-690	2885249	1
	EMD-FL-3V-500	2867979	1
<b>Power module, plug-in, please order at the same time!</b>			
Supply voltage 20 ... 30 V DC			
Supply voltage 20.2 ... 26.4 V AC			
Supply voltage 88 ... 121 V AC			
Supply voltage 108 ... 132 V AC			
Supply voltage 195 ... 264 V AC			
Supply voltage 323 ... 456 V AC			



Undervoltage/overvoltage monitoring, 400 V with/without neutral conductor



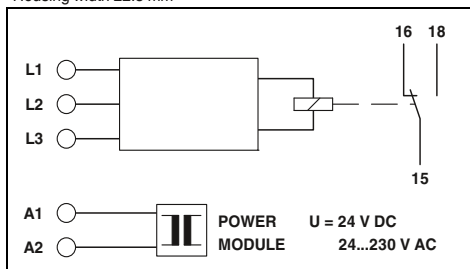
Phase monitoring, 400 V



Phase monitoring, 690 V



Housing width 22.5 mm



Technical data

EMD-SL-3V-400	EMD-SL-3V-400-N
Window, without neutral conductor connection	Window, with neutral conductor connection

280 V AC ... 520 V AC	280 V AC ... 520 V AC
3 ~ 400 V	3 N ~ 400/230 V
1 MΩ	1 MΩ
-30 % ... 20 % (From U <sub>N</sub> )	
-20 % ... 30 % (From U <sub>N</sub> )	
0.2 s ... 10 s	
± 5 % (of scale end value)	
≤ 5 % (of scale end value)	
≤ 2 %	

1 floating PDT  
750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing)  
1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)

2 x 10<sup>5</sup> cycles at ohmic load, 1000 VA  
Approx. 2x 10<sup>7</sup> cycles  
5 A (fast-blow)

24 V AC ... 230 V AC (see Power modules)  
24 V DC (see Power modules)  
2 VA (1.5 W)  
IP40 (housing) / IP20 (connection terminal blocks)  
-25 °C ... 55 °C  
22.5 / 90 / 113 mm  
0.5 ... 2.5 mm<sup>2</sup> / 0.25 ... 2.5 mm<sup>2</sup> / 20 - 14

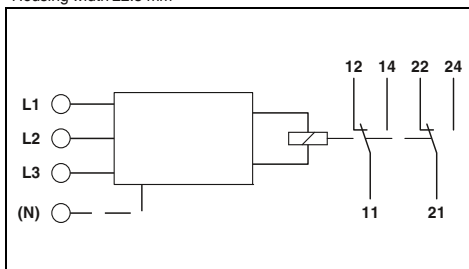
CE-compliant  
UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs./ Pkt.
EMD-SL-3V-400	2866051	1
EMD-SL-3V-400-N	2885278	1
EMD-SL-PS- 24DC	2885359	1
EMD-SL-PS- 24AC	2866103	1
EMD-SL-PS-110AC	2866116	1
EMD-SL-PS-120AC	2885731	1
EMD-SL-PS-230AC	2866129	1



Housing width 22.5 mm



Technical data

Phase sequence, phase failure, asymmetry

342 V AC ... 457 V AC
3 N ~ 400/230 V
15 kΩ
-
-
≤ 350 ms (fixed setting)
Fixed, approx. 30 %
-
-
-

2 floating PDT contacts  
750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing)  
1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)

2 x 10<sup>5</sup> cycles at ohmic load, 1000 VA  
Approx. 2x 10<sup>7</sup> cycles  
5 A (fast-blow)

From the measured voltage  
-  
9 VA  
IP40 (housing) / IP20 (connection terminal blocks)  
-25 °C ... 55 °C  
22.5 / 90 / 113 mm  
0.5 ... 2.5 mm<sup>2</sup> / 0.25 ... 2.5 mm<sup>2</sup> / 20 - 14

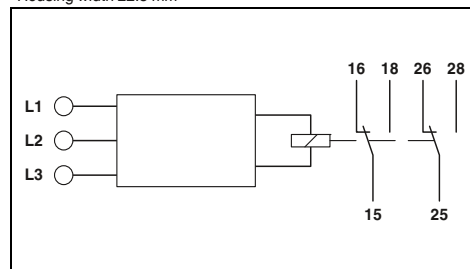
CE-compliant  
UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs./ Pkt.
EMD-SL-PH-400	2866077	1



Housing width 22.5 mm



Technical data

Undervoltage, phase sequence, phase failure

177 V AC ... 794 V AC
3~ 208 V ... 690 V
-
-
-
0.1 s ... 10 s
25 %
≤ 3 % (of scale end value)
≤ 5 % (of scale end value)
≤ 2 %

2 floating PDT contacts  
1250 VA (5 A/250 V AC at +55 °C)  
150 VA (5 A/30 V DC at +55 °C)

2 x 10<sup>5</sup> cycles  
20 x 10<sup>6</sup> cycles  
5 A (fast-blow)

±15 % (= measuring voltage)  
±15 % (= measuring voltage)  
2 VA (1.2 W)  
IP40 (housing) / IP20 (connection terminal blocks)  
-25 °C ... 70 °C (C300)  
22.5 / 90 / 113 mm  
0.5 ... 2.5 mm<sup>2</sup> / 0.5 ... 2.5 mm<sup>2</sup> / 20 - 14

CE-compliant  
UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs./ Pkt.
EMD-SL-PH-690	2905597	1

# Monitoring

## Monitoring and diagnostics

### Monitoring relays

#### Real power monitoring

The real power in single and three-phase networks is monitored with the **EMD-FL-RP-480** real power monitoring relay.

- Monitoring range up to 7.2 kW
- Separately adjustable startup and release delays
- Temperature monitoring of the motor winding
- Variable supply voltage range
- Detection of switched off loads

#### Load monitoring (cos φ)

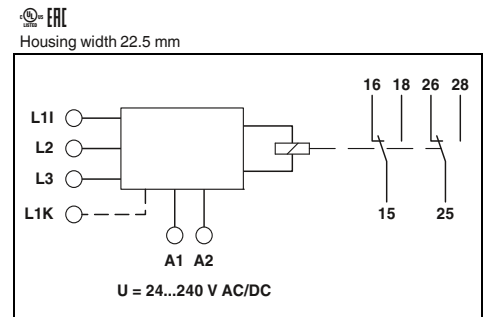
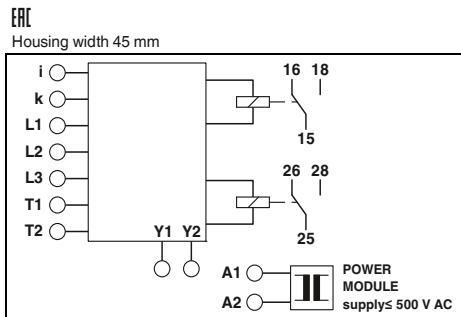
The **EMD-FL-PF-400** monitoring relay is a cos φ monitor for load monitoring in single or three-phase networks.



Real power monitoring



Load monitoring (cos φ)



#### Technical data

#### Technical data

#### Functions

Underload, overload, window, winding temperature monitoring

Underload, overload, window

#### Input

Description of the input  
Measured value  
Measuring ranges  $P_N$

Voltage input  
AC sine (10 Hz ... 400 Hz)  
Can be switched between 0.75 kW, 1.5 kW, 3 kW and 6 kW

-  
AC sine (10 ... 100 Hz)  
-

Nominal input voltage  $U_N$   
Input ranges

480 V (3 N ~ 480/277 V)  
0 V AC ... 480 V AC (1(N) ~, single-phase load)  
0 V AC ... 480 V AC (3(N) ~, 3-phase load)

3 N ~ 415/240 V  
40 V AC ... 415 V AC (1(N) ~, single-phase load)  
40 V AC ... 415 V AC (3(N) ~, 3-phase load)  
0.5 A ... 10 A (Connection terminal blocks: L1i and L1k)

Input ranges

0.15 A ... 6 A (Range: 0.75 kW and 1.5 kW)  
0.3 A ... 12 A (Range: 3 kW and 6 kW)

-

Minimum setting range  
Maximum setting range  
Switching threshold cos φ

5 % ... 110 % (of  $P_N$ )  
10 % ... 120 % (of  $P_N$ )

-  
0.1 ... 0.99  
0.2 ... 1

#### Relay output

Contact type  
Switching capacity

2 floating PDT contacts  
750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing)  
1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)

2 floating PDT contacts  
750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing)  
1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)

#### Electrical service life

2 x 10<sup>5</sup> cycles at ohmic load, 1000 VA

2 x 10<sup>5</sup> cycles at ohmic load, 1000 VA

#### Mechanical service life

Approx. 2x 10<sup>7</sup> cycles

Approx. 2x 10<sup>7</sup> cycles

#### Output fuse

5 A (fast-blow)

5 A (fast-blow)

#### General data

Supply voltage range

110 V AC ... 500 V AC (see Power modules)

24 V AC ... 240 V AC -15 % ... +10 %  
24 V DC ... 240 V DC (-20 % ... +25 %)

Nominal power consumption

3.5 VA (3 W)

4.5 VA (1.5 W)

Rated insulation voltage

300 V (According to EN 50178)

300 V (According to EN 50178)

Degree of protection

IP40 (housing) / IP20 (connection terminal blocks)

IP40 (housing) / IP20 (connection terminal blocks)

Ambient temperature (operation)

-25 °C ... 55 °C

-25 °C ... 55 °C

Dimensions W/H/D

45 / 90 / 113 mm

22.5 / 90 / 113 mm

Screw connection solid/stranded/AWG

0.5 ... 2.5 mm<sup>2</sup> / 0.25 ... 2.5 mm<sup>2</sup> / 20 - 14

0.5 ... 2.5 mm<sup>2</sup> / 0.25 ... 2.5 mm<sup>2</sup> / 20 - 14

EMC note

Class A product, see page 605

Class A product, see page 605

Conformance/Approvals

CE-compliant

CE-compliant

Conformance

UL applied for

UL/C-UL listed UL 508

UL, USA/Canada

#### Ordering data

#### Ordering data

#### Description

Electronic monitoring relay

Power module, plug-in, please order at the same time!

Supply voltage 88 ... 121 V AC  
Supply voltage 108 ... 132 V AC  
Supply voltage 195 ... 264 V AC  
Supply voltage 323 ... 456 V AC  
Supply voltage 425 ... 550 V AC

Type	Order No.	Pcs./Pkt.
EMD-FL-RP-480	2900177	1
EMD-SL-PS45-110AC	2885281	1
EMD-SL-PS45-120AC	2885744	1
EMD-SL-PS45-230AC	2885294	1
EMD-SL-PS45-400AC	2885304	1
EMD-SL-PS45-500AC	2885317	1

Type	Order No.	Pcs./Pkt.
EMD-FL-PF-400	2885809	1

Level monitoring

The **EMD-SL-LL-...** monitoring relay monitors the level of electrically conductive liquids with the help of conductive probes (not supplied as standard).  
 – Adjustable response delay  
 – Adjustable via potentiometer on front

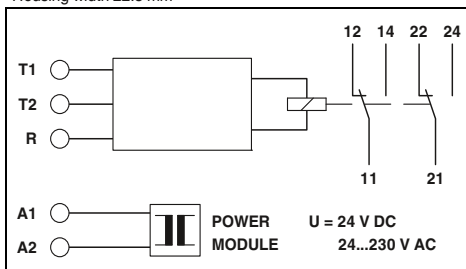


Temperature monitoring (motor windings)



Level monitoring

Housing width 22.5 mm



Technical data

Winding temperature monitoring

Input	
Total cold resistance	< 1.5 kΩ
Response value	≥ 3.6 kΩ (Relay drops out)
Release value	≤ 1.8 kΩ (Relay picks up)
Basic accuracy	± 10 % (of scale end value)
Repeat accuracy	≤ 2 %
Measuring input	-
Maximum probe voltage	-
Maximum probe current	-
Length of probe cable	-
Switching threshold	-
Relay output	
Contact type	2 floating PDT contacts
Switching capacity	750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing) 1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)
Electrical service life	2 x 10 <sup>5</sup> cycles at ohmic load, 1000 VA
Mechanical service life	Approx. 2x 10 <sup>7</sup> cycles
Output fuse	5 A (fast-blow)
General data	
Supply voltage	24 V AC ... 230 V AC (see Power modules)
Supply voltage range	24 V DC (see Power modules)
Nominal power consumption	2 VA (1.5 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature (operation)	-25 °C ... 55 °C
Dimensions W/H/D	22.5 / 90 / 113 mm
Screw connection solid/stranded/AWG	0.5 ... 2.5 mm <sup>2</sup> / 0.25 ... 2.5 mm <sup>2</sup> / 20 - 14
EMC note	Class A product, see page 605
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL/C-UL listed UL 508

Functions

Input  
 Total cold resistance  
 Response value  
 Release value  
 Basic accuracy  
 Repeat accuracy  
 Measuring input  
 Maximum probe voltage  
 Maximum probe current  
 Length of probe cable

Switching threshold  
 Relay output  
 Contact type  
 Switching capacity

Electrical service life

Mechanical service life  
 Output fuse

General data  
 Supply voltage  
 Supply voltage range

Nominal power consumption  
 Degree of protection  
 Ambient temperature (operation)  
 Dimensions W/H/D  
 Screw connection solid/stranded/AWG

EMC note  
 Conformance/Approvals  
 Conformance  
 UL, USA/Canada

Description

Electronic monitoring relay

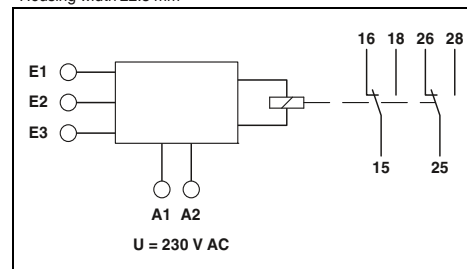
Power module, plug-in, please order at the same time!

Supply voltage 20 ... 30 V DC  
 Supply voltage 20.2 ... 26.4 V AC  
 Supply voltage 88 ... 121 V AC  
 Supply voltage 108 ... 132 V AC  
 Supply voltage 195 ... 264 V AC

Ordering data

Type	Order No.	Pcs./ Pkt.
EMD-SL-PTC	2866093	1
EMD-SL-PS- 24DC	2885359	1
EMD-SL-PS- 24AC	2866103	1
EMD-SL-PS-110AC	2866116	1
EMD-SL-PS-120AC	2885731	1
EMD-SL-PS-230AC	2866129	1

Housing width 22.5 mm



Technical data

Pumping up (minimum monitoring),  
 pumping down (maximum monitoring)

Input	
Conductive probe, type: SK1, SK2, SK3	
16 V AC	
7 mA	
< 1000 m (Line capacity 100 nF/km; set value < 50%)	
< 100 m (Line capacity 100 nF/km; set value 100%)	
0.25 kΩ ... 100 kΩ (4 mS ... 1 μS)	
Relay output	
Contact type	2 floating PDT contacts
Switching capacity	750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing) 1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)
Electrical service life	2 x 10 <sup>5</sup> cycles at ohmic load, 1000 VA
Mechanical service life	Approx. 2x 10 <sup>7</sup> cycles
Output fuse	5 A (fast-blow)
General data	
Supply voltage	EMD-SL-LL-230      EMD-SL-LL-110
Supply voltage range	230 V AC -15 % ... +15 % AC      110 V AC -10 % ... +15 % AC
Nominal power consumption	2 VA (1.5 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature (operation)	-25 °C ... 55 °C
Dimensions W/H/D	22.5 / 90 / 113 mm
Screw connection solid/stranded/AWG	0.5 ... 2.5 mm <sup>2</sup> / 0.25 ... 2.5 mm <sup>2</sup> / 20 - 14
EMC note	
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL/C-UL listed UL 508

-  
 -  
 -  
 -  
 -  
 Conductive probe, type: SK1, SK2, SK3  
 16 V AC  
 7 mA  
 < 1000 m (Line capacity 100 nF/km; set value < 50%)  
 < 100 m (Line capacity 100 nF/km; set value 100%)

0.25 kΩ ... 100 kΩ (4 mS ... 1 μS)  
 2 floating PDT contacts  
 750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing)  
 1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)

2 x 10<sup>5</sup> cycles at ohmic load, 1000 VA

Approx. 2x 10<sup>7</sup> cycles  
 5 A (fast-blow)

EMD-SL-LL-230      EMD-SL-LL-110  
 230 V AC -15 % ... +15 % AC      110 V AC -10 % ... +15 % AC

2 VA (1.5 W)  
 IP40 (housing) / IP20 (connection terminal blocks)  
 -25 °C ... 55 °C  
 22.5 / 90 / 113 mm  
 0.5 ... 2.5 mm<sup>2</sup> / 0.25 ... 2.5 mm<sup>2</sup> / 20 - 14

CE-compliant  
 UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs./ Pkt.
EMD-SL-LL-230	2885906	1
EMD-SL-LL-110	2901137	1

# Monitoring

## Monitoring and diagnostics

### Compact time relay

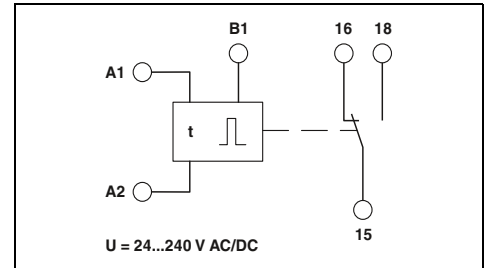
The multifunctional time relay offers universal use thanks to a variety of functions and various time settings. The rotary switches on the front of the housing allow easy parameterization. The compact design also allows flexible use.

Main features:

- Adjustable time
- Time range: 50 ms to 1 h
- Non-floating control input
- Delay functions
- Wiper functions
- Output: one floating changeover contact
- Clear diagnostics via status LED



Multifunctional time relay



#### Technical data

E: With switch-on delay  
 R: With release delay and control contact  
 Es: With switch-on delay and control contact  
 Ws: With single shot leading edge and control contact

#### Functions

Control contact	
Connection	Non-floating, terminals A1-B1
Control pulse length	≥ 50 ms (DC)
Relay output	
Contact type	1 floating PDT
Switching capacity	1250 VA (5 A/250 V AC)
Mechanical service life	15 x 10 <sup>6</sup> cycles
General data	
Supply voltage	24 V DC ... 240 V DC -20 % ... +25 %
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature range	-25 °C ... 55 °C
Dimensions W/H/D	17.5 / 88 / 65.5 mm
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Screw connection solid/stranded/AWG	0.5 ... 2.5 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 14
Conformance/Approvals	
Conformance	CE-compliant
UL, USA/Canada	UL 508 Listed

#### Ordering data

Description	
<b>Compact time relay, multifunctional, with screw connection</b>	
<b>Compact time relay, multifunctional, with Push-in connection</b>	

Type	Order No.	Pcs./Pkt.
ETD-BL-1T-230	2905813	1
ETD-BL-1T-230-PT	2905814	1



## Compact time relay

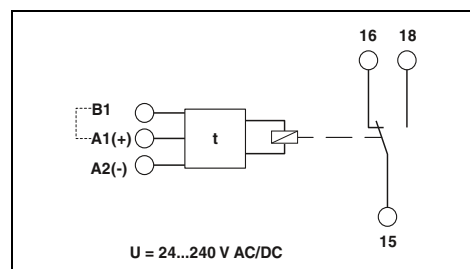
As an impulse encoder with adjustable times, the ETD-BL-2T-I-230 offers a range of flashing functions. The rotary switches on the front of the housing allow easy parameterization. The compact design also allows flexible use.

Main features:

- Two adjustable times
- Time ranges: 50 ms to 100 h
- Flashing function
- Wide-range power supply unit
- Output: two floating changeover contacts
- Clear diagnostics via status LED



**Impulse encoder,  
adjustable pulse and pause times**



### Technical data

Functions	
Time ranges	50 ms ... 100 h (7 time end ranges)
Setting range	
Control contact	Non-floating, terminals A1-B1
Connection	≥ 50 ms (DC)
Control pulse length	
Relay output	1 floating PDT
Contact type	750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing)
Switching capacity	1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)
Mechanical service life	Approx. 2x 10 <sup>7</sup> cycles
General data	
Supply voltage	24 V DC ... 240 V DC -10 % ... +15 %
Nominal power consumption	2.5 VA (1 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature range	-25 °C ... 55 °C
Dimensions W/H/D	17.5 / 88 / 65.5 mm
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Screw connection solid/stranded/AWG	0.5 ... 2.5 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 14
Conformance/Approvals	
Conformance	CE-compliant

lp: Switched-mode beginning with the pause  
li: Switched-mode beginning with the pulse

### Ordering data

Description	Type	Order No.	Pcs./Pkt.
<b>Compact time relay, impulse encoder</b>			
- with Push-in connection	ETD-BL-2T-I-230-PT	2907714	1
- with screw connection	ETD-BL-2T-I-230	2907713	1

# Monitoring

## Monitoring and diagnostics

### Plug-in timer module for RIF-1, RIF-2, RIF-3, and RIF-4

The multifunctional plug-in timer module transforms a relay module into a time relay. RIF-1 to RIF-4 bases can be equipped with this module. Using DIP switches, three time functions and four time ranges can be selected. Detailed time settings are made using a potentiometer. Relays can be operated with an input voltage of 12 or 24 V AC/DC.

The time functions:

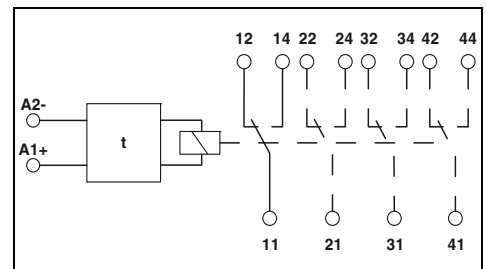
- With switch-on delay
- With passing make contact
- Pulse generator

Time ranges:

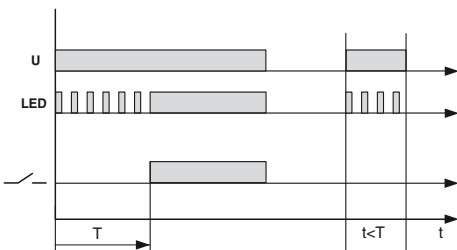
- 0.5 to 10 s
- 5 to 100 s
- 0.5 to 10 min
- 5 to 100 min



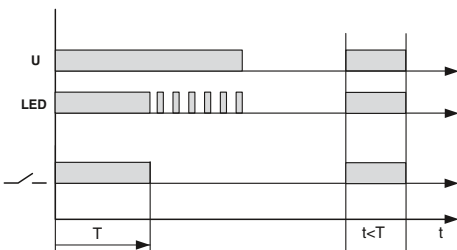
Timer module for RIF-1 to RIF-4 relay modules for 12 to 24 V AC/DC input voltage



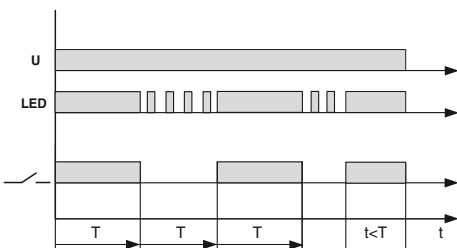
With switch-on delay



Passing make contact



Pulse generator



<b>Input data</b>
Nominal input voltage $U_N$
Nominal input voltage range with reference to $U_N$
Input circuit
<b>Output data</b>
Limiting continuous current
<b>General data</b>
Mounting position
Repeat accuracy
Ambient temperature (operation)
<b>Standards/specifications</b>
Rated insulation voltage
Rated surge voltage

<b>Technical data</b>
24 V DC (AC operation only permitted for RIF-1)
0.4 ... 1.2
Varistor, Yellow LED
$\leq 250$ mA (Relay coil current)
any
1 %
-25 °C ... 50 °C (RIF-1, AC coil, 2 PDTs at 6 A)
-25 °C ... 50 °C (RIF-1, DC coil, 2 PDTs at 5 A)
-25 °C ... 40 °C (RIF-2, DC coil, 2 PDTs at 8 A)
-25 °C ... 40 °C (RIF-2, DC coil, 4 PDTs at 5 A)
-25 °C ... 40 °C (RIF-3, DC coil, 3 PDTs at 6.75 A)
-25 °C ... 40 °C (RIF-3, DC coil, 2 PDTs at 8 A)
-25 °C ... 35 °C (RIF-4, DC coil, 3 PDTs at 8 A)
-25 °C ... 25 °C (RIF-4, DC coil, 3 N/O contacts at 8 A)
DIN EN 50178
50 V DC
0.4 kV

<b>Description</b>
<b>Timer module</b> , for mounting on RIF-1 to RIF-4, with LED status indicator for extending a relay module to create a time relay with an input voltage of 24 V AC/DC

<b>Ordering data</b>		
<b>Type</b>	<b>Order No.</b>	<b>Pcs./Pkt.</b>
RIF-T3-24UC	2902647	1



# Monitoring

## Monitoring and diagnostics

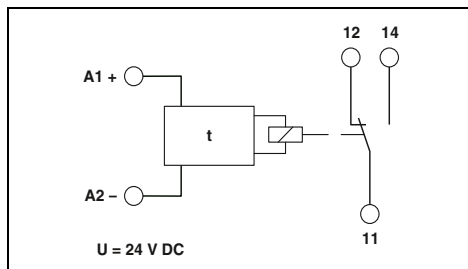
### Ultra-narrow time relays

The **ETD-BL-1T...** ultra-narrow time relays show their strengths in applications that involve set parameters for functionality and time range.

- Purposeful device selection: one function, one time range
- High level of setting accuracy thanks to labeled and illuminated thumb wheel
- Overall width of just 6.2 mm



Time relay with switch-on delay, voltage controlled



#### Technical data

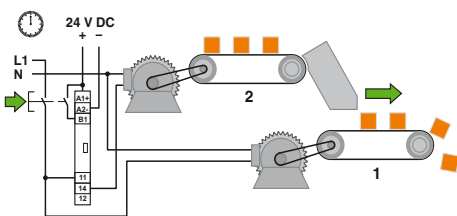
Functions	
Control contact	-
Connection	-
Control pulse length	min. 50 ms
Relay output	
Contact type	1 floating PDT
Switching capacity	1500 VA (6 A / 250 V AC)
Mechanical service life	Approx. 2x 10 <sup>7</sup> cycles
General data	
Supply voltage	24 V DC (19.2 V DC ... 30 V DC)
Typical nominal current	15 mA (Relay ON) 7 mA (Relay OFF)
Impulse withstand voltage	6 kV (According to EN 50178)
Degree of protection	IP20
Ambient temperature range	-20 °C ... 65 °C
Dimensions W/H/D	6.2 / 80 / 86 mm
Screw connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 30 - 12
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Conformance/Approvals	
Conformance	CE-compliant
ATEX	Ex II 3 G Ex nA nC IIC T4 Gc X
UL, USA/Canada	UL/C-UL listed UL 508

ON: With switch-on delay

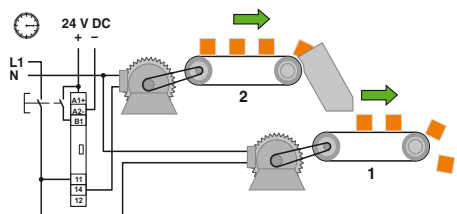
#### Ordering data

Description	
<b>Compact time relay, with screw connection</b>	
Time range 0.1...10 s	
Time range 3...300 s	
Time range 0.3...30 min	
Time range 3...300 min	
<b>Compact time relay, with Push-in connection</b>	
Time range 0.1...10 s	
Time range 3...300 s	
Time range 0.3...30 min	
Time range 3...300 min	

Type	Order No.	Pcs./Pkt.
ETD-BL-1T-ON- 10S	2917379	1
ETD-BL-1T-ON-300S	2917382	1
ETD-BL-1T-ON- 30MIN	2917395	1
ETD-BL-1T-ON-300MIN	2917405	1
ETD-BL-1T-ON- 10S-PT	2901476	1
ETD-BL-1T-ON-300S-PT	2901477	1
ETD-BL-1T-ON- 30MIN-PT	2901478	1
ETD-BL-1T-ON-300MIN-PT	2901479	1



Conveyor belt 1 starts immediately



Conveyor belt 2 starts with a time delay



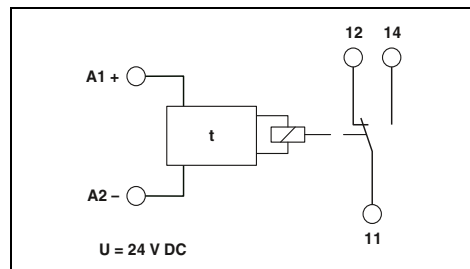
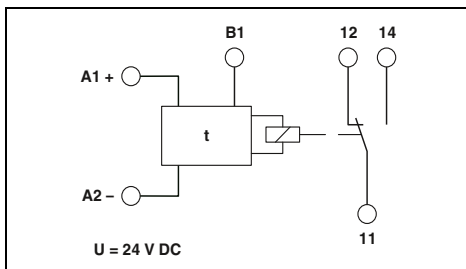
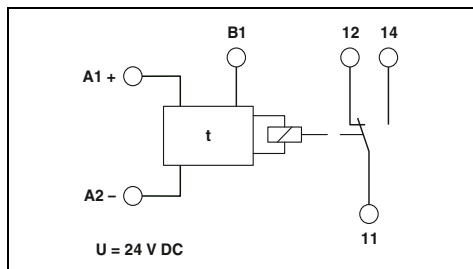
Time relay with switch-on delay, with control contact



Time relay with off delay, with control contact



Time relay with flashing indic. function, beginning with the pulse



Technical data

Technical data

Technical data

ON-CC: With switch-on delay with control contact

OFF-CC: Off delay with control contact

F: Flashing beginning with pulse

Non-floating, terminals A1-B1  
min. 50 ms

Non-floating, terminals A1-B1  
min. 50 ms

-  
min. 50 ms

1 floating PDT  
1500 VA (6 A / 250 V AC)  
Approx. 2x 10<sup>7</sup> cycles

1 floating PDT  
1500 VA (6 A / 250 V AC)  
Approx. 2x 10<sup>7</sup> cycles

1 floating PDT  
1500 VA (6 A / 250 V AC)  
Approx. 2x 10<sup>7</sup> cycles

24 V DC (19.2 V DC ... 30 V DC)  
15 mA (Relay ON)  
7 mA (Relay OFF)  
6 kV (According to EN 50178)  
IP20  
-20 °C ... 65 °C  
6.2 / 80 / 86 mm  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 30 - 12  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 26 - 14

24 V DC (19.2 V DC ... 30 V DC)  
15 mA (Relay ON)  
7 mA (Relay OFF)  
6 kV (According to EN 50178)  
IP20  
-20 °C ... 65 °C  
6.2 / 80 / 86 mm  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 30 - 12  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 26 - 14

24 V DC (19.2 V DC ... 30 V DC)  
15 mA (Relay ON)  
7 mA (Relay OFF)  
6 kV (According to EN 50178)  
IP20  
-20 °C ... 65 °C  
6.2 / 80 / 86 mm  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 30 - 12  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 26 - 14

CE-compliant  
Ex II 3 G Ex nA nC IIC T4 Gc X  
UL/C-UL listed UL 508

CE-compliant  
Ex II 3 G Ex nA nC IIC T4 Gc X  
UL/C-UL listed UL 508

CE-compliant  
Ex II 3 G Ex nA nC IIC T4 Gc X  
UL/C-UL listed UL 508

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
ETD-BL-1T-ON-CC- 10S	2917418	1
ETD-BL-1T-ON-CC-300S	2917421	1
ETD-BL-1T-ON-CC- 30MIN	2917434	1
ETD-BL-1T-ON-CC-300MIN	2917447	1
ETD-BL-1T-ON-CC- 10S-PT	2901480	1
ETD-BL-1T-ON-CC-300S-PT	2901481	1
ETD-BL-1T-ON-CC- 30MIN-PT	2901483	1
ETD-BL-1T-ON-CC-300MIN-PT	2901484	1

Type	Order No.	Pcs./ Pkt.
ETD-BL-1T-OFF-CC- 10S	2917450	1
ETD-BL-1T-OFF-CC-300S	2917463	1
ETD-BL-1T-OFF-CC- 30MIN	2917467	1
ETD-BL-1T-OFF-CC-300MIN	2917489	1
ETD-BL-1T-OFF-CC- 10S-PT	2901485	1
ETD-BL-1T-OFF-CC-300S-PT	2901486	1
ETD-BL-1T-OFF-CC- 30MIN-PT	2901487	1
ETD-BL-1T-OFF-CC-300MIN-PT	2901488	1

Type	Order No.	Pcs./ Pkt.
ETD-BL-1T-F- 10S	2917492	1
ETD-BL-1T-F-300S	2917502	1
ETD-BL-1T-F- 30MIN	2917515	1
ETD-BL-1T-F-300MIN	2917528	1
ETD-BL-1T-F- 10S-PT	2901489	1
ETD-BL-1T-F-300S-PT	2901490	1
ETD-BL-1T-F- 30MIN-PT	2901491	1
ETD-BL-1T-F-300MIN-PT	2901492	1

# Monitoring

## Monitoring and diagnostics

### Multifunctional time relays

The full range of conventional applications can be accommodated by the three versions of the **ETD** multifunctional time relay.

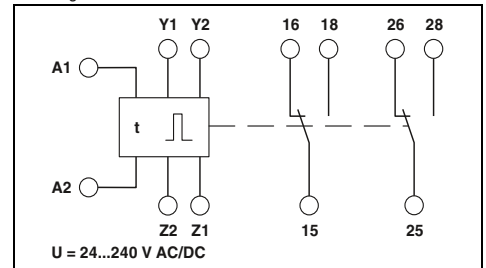
- Suitable for universal use thanks to varied functions and selectable time ranges
- Time ranges from a few milliseconds to several days
- Variable supply voltage range
- 2 floating PDT outputs



**Multifunctional time relay,  
two adjustable times**



Housing width 22.5 mm



#### Technical data

#### Functions

- Ip: Switched-mode beginning with the pause
- Ii: Switched-mode beginning with the pulse
- ER: With switch-on and release delay with control contact
- EWu: With switch-on delay and single shot leading edge, voltage controlled
- EWs: With switch-on delay and single shot leading edge with control contact
- WsWa: With single shot leading edge and single shot trailing edge with control contact
- Wt: Pulse sequence evaluation (retriggerable release delay)

#### Time ranges

- Setting range
- Control contact
- Connection

50 ms ... 10 h (10 time end ranges)

#### Load capacity

Floating, basic isolation between connection and input/output/bridge Y1-Y2  
Cannot carry load

- Cable length
- Control pulse length
- Relay output
- Contact type
- Switching capacity

< 10 m  
min. 50 ms (Only with Wt function: > 7 ms)

2 floating PDT contacts  
750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing)  
1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)

#### Mechanical service life

Approx.  $2 \times 10^7$  cycles

- General data
- Supply voltage

24 V DC ... 240 V DC -20 % ... +25 %  
24 V AC ... 240 V AC -15 % ... +10 %  
2.5 VA (1 W)  
IP40 (housing) / IP20 (connection terminal blocks)

- Nominal power consumption
- Degree of protection
- Ambient temperature range
- Housing material
- Dimensions W/H/D
- Screw connection solid/stranded/AWG
- EMC note

-25 °C ... 55 °C  
Polyamide PA, self-extinguishing  
22.5 / 90 / 113 mm  
0.5 ... 2.5 mm<sup>2</sup> / 0.5 ... 2.5 mm<sup>2</sup> / 20 - 14  
Class A product, see page 605

- Conformance/Approvals
- Conformance
- UL, USA/Canada

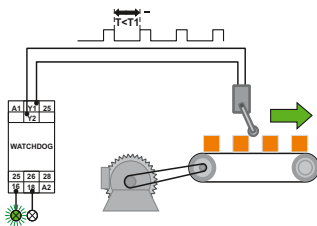
CE-compliant  
UL/C-UL listed UL 508

#### Ordering data

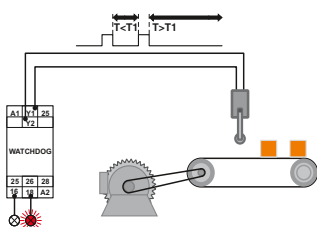
#### Description

**Electronic time relay with adjustable functions and times**

Type	Order No.	Pcs./Pkt.
ETD-FL-2T-DTI	2866187	1



**Function: Pulse sequence evaluation**



**Message for incorrect pulse**



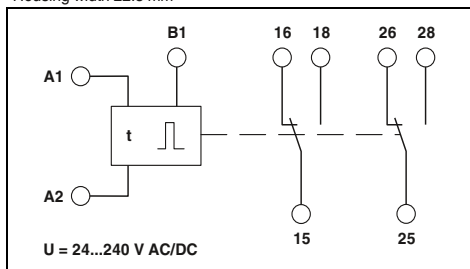
**Multifunctional time relay,  
one adjustable time**



**Impulse encoder,  
adjustable pulse and pause times**



Housing width 22.5 mm



**Technical data**

- E: With switch-on delay
- R: With release delay and control contact
- Es: With switch-on delay and control contact
- Wu: With single shot leading edge, voltage controlled
- Ws: With single shot leading edge and control contact
- Wa: With single shot trailing edge and control contact
- Bi: Flashing beginning with pulse
- Bp: Flashing beginning with pause

50 ms ... 100 h (7 time end ranges)

Non-floating, terminals A1-B1

Parallel switched minimum load current 1 VA (0.5 W), terminals A2-B1

< 10 m  
min. 70 ms

2 floating PDT contacts  
750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing)  
1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)

Approx. 2x 10<sup>7</sup> cycles

24 V DC ... 240 V DC -20 % ... +25 %  
24 V AC ... 240 V AC -15 % ... +10 %  
2.5 VA (1 W)  
IP40 (housing) / IP20 (connection terminal blocks)

-25 °C ... 55 °C  
Polyamide PA, self-extinguishing  
22.5 / 90 / 113 mm  
0.5 ... 2.5 mm<sup>2</sup> / 0.5 ... 2.5 mm<sup>2</sup> / 20 - 14  
Class A product, see page 605

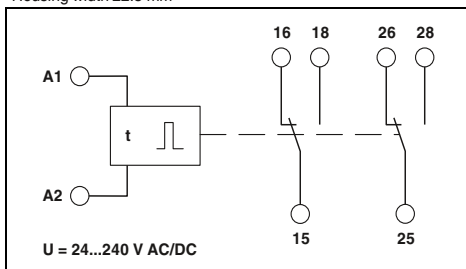
CE-compliant  
UL/C-UL listed UL 508

**Ordering data**

Type	Order No.	Pcs./ Pkt.
ETD-SL-1T-DTF	2866161	1



Housing width 22.5 mm



**Technical data**

- Ip: Switched-mode beginning with the pause
- Ii: Switched-mode beginning with the pulse

50 ms ... 100 h (7 time end ranges)

-

-

-  
-

2 floating PDT contacts  
750 VA (3 A/250 V AC, module aligned, ≤ 5 mm spacing)  
1250 VA (5 A/250 V AC, module not aligned, ≥ 5 mm spacing)

Approx. 2x 10<sup>7</sup> cycles

24 V DC ... 240 V DC -20 % ... +25 %  
24 V AC ... 240 V AC -15 % ... +10 %  
2.5 VA (1 W)  
IP40 (housing) / IP20 (connection terminal blocks)

-25 °C ... 55 °C  
Polyamide PA, self-extinguishing  
22.5 / 90 / 113 mm  
0.5 ... 2.5 mm<sup>2</sup> / 0.5 ... 2.5 mm<sup>2</sup> / 20 - 14  
Class A product, see page 605

CE-compliant  
UL/C-UL listed UL 508

**Ordering data**

Type	Order No.	Pcs./ Pkt.
ETD-SL-2T-I	2866174	1

### Diode module

Diode circuits perform various tasks in electrical control systems, particularly in electronic ones:

- Electrical decoupling of messages in fault signaling systems
- Spark-suppression diodes for limiting surge voltages of inductive loads, (solenoid valves, DC relays or similar)
- Can be supplied as “diode gates” combined with anode or cathode or as freely assignable diodes



with diode type 1 N 4007

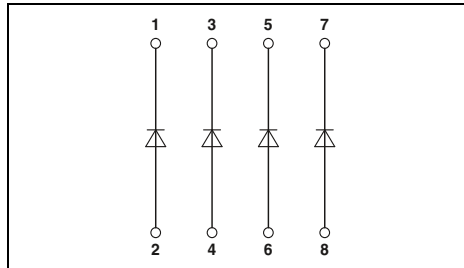


with diode type 1 N 5408

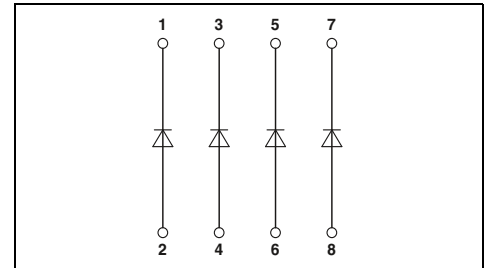
#### Notes:

Further circuit diagrams can be found in the data sheet at [phoenixcontact.net/products](http://phoenixcontact.net/products).

ERC



ERC



#### Technical data

Diodes	4E / 8E / 17E / 7P / 7M	14P / 14M / 32P / 32M
Max. operating voltage $U_{max}$	250 V AC	250 V AC
Peak reverse voltage per diode	1300 V	1300 V
Reverse current per diode	5 $\mu$ A	5 $\mu$ A
Conducting state voltage per diode	approx. 0.8 V	approx. 0.8 V
Conducting state current per diode		
	with single load	0.7 A
	with simultaneous loads	0.5 A

#### Technical data

4E-... / 4P-... / 4M-... / 8E-...	8P-... / 8M-...
250 V AC	250 V AC
1000 V	1000 V
10 $\mu$ A	10 $\mu$ A
approx. 0.8 V	approx. 0.8 V
1.5 A	1.5 A
1 A	0.3 A

#### General data

Ambient temperature range	-20 °C ... 50 °C
Rated insulation voltage	300 V (According to EN 50178)
Degree of pollution / Overvoltage category	III, basic insulation (as per EN 50178)
Degree of pollution / Overvoltage category	2 (according to EN 50178)
Mounting position	any
Mounting	In rows with zero spacing
Dimensions H / D	75 / 55 mm
Screw connection solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12

Ambient temperature range	-20 °C ... 50 °C
Degree of pollution / Overvoltage category	III, basic insulation (as per EN 50178)
Degree of pollution / Overvoltage category	2 (according to EN 50178)
Mounting position	any
Mounting	In rows with zero spacing
Dimensions H / D	75 / 55 mm
Screw connection solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12

#### Conformance/Approvals

Conformance

CE-compliant

CE-compliant

#### Ordering data

Description	Housing width	Type	Order No.	Pcs./ Pkt.
<b>Diode module</b> , can be individually wired	4 diodes	EMG 22-DIO 4E	2950048	10
	8 diodes	EMG 45-DIO 8E	2950103	5
	17 diodes	EMG 90-DIO 17E	2954895	5
<b>Diode module</b> , with P polarity (common cathode)	4 diodes	EMG 22-DIO 7P	2950064	10
	7 diodes			
	8 diodes			
	14 diodes			
	32 diodes			
<b>Diode module</b> , with M polarity (common anode)	4 diodes	EMG 22-DIO 7M	2950077	10
	7 diodes			
	8 diodes			
	14 diodes			
	32 diodes			

#### Ordering data

Type	Order No.	Pcs./ Pkt.
EMG 22-DIO 4E-1N5408	2952790	10
EMG 45-DIO 8E-1N5408	2949389	5
EMG 22-DIO 4P-1N5408	2952198	10
EMG 45-DIO 8P-1N5408	2954879	5
EMG 22-DIO 4M-1N5408	2952211	10
EMG 45-DIO 8M-1N5408	2954882	5

#### Accessories

Equipment marker	EMG-GKS 12	2947035	50
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#### Accessories

Equipment marker	EMG-GKS 12	2947035	50
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# Relay modules

The importance of the reliability of industrial automation equipment is growing with the increase in use of electronic modules.

Modern relays or solid-state relay interfaces perform a wide range of tasks. No matter what the field – production technology, electrical equipment for machines, control engineering for power distribution, building automation, or process engineering – the aim is to ensure signal exchange between process peripherals and the higher-level central control systems. And this exchange must be reliable, floating, and electrically unambiguous. Safe electrical interface modules that meet the requirements of modern system concepts must include the following features:

- Coupling of different signal levels
- Safe electrical isolation between input and output
- High resistance to interference

In practice, a relay interface is used in applications that require a flexible interface configuration with a large switching capacity range and the possibility of combining different types of contact. Further important features of relay interfaces are:

- Electrical isolation between open contacts
- Switching of independent switching current types
- High short-term overload resistance in the event of a short circuit or voltage peaks
- Practically impervious to electromagnetic fields
- Easy handling

Solid-state relay modules are used when an interface between the process peripherals and electronics is subject to the following requirements:

- Low control power
- High switching frequencies
- Wear-resistant and bounce-free switching
- Resistance to vibrations and shocks
- Long service life

## Product range overview

<b>Product overview</b>	<b>284</b>
<b>Basics of relay technology</b>	<b>286</b>
<b>Basics of solid-state relay technology</b>	<b>290</b>
<b>Sensor/actuator configuration aids and handling of interference signals</b>	<b>292</b>
<b>Industrial relay system - RIFLINE complete</b>	<b>294</b>
<b>Highly compact relay modules - PLC-INTERFACE</b>	<b>368</b>
<b>Programmable logic relay system - PLC logic</b>	<b>426</b>
<b>Relay modules in terminal block design - DEK series</b>	<b>436</b>
<b>Special relay and solid-state relay modules</b>	<b>442</b>
<b>Relay modules with force-guided contacts</b>	<b>456</b>
<b>Relay modules for potentially explosive areas (Zone 2)</b>	<b>458</b>

# Relay modules

## Product overview

### RIFLINE complete



RIF-0 for relays and solid-state relays  
Page 296



RIF-1 for relays and solid-state relays  
Page 302



RIF-2 for industrial relays  
Page 312



RIF-3 for octal relays  
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### PLC-INTERFACE



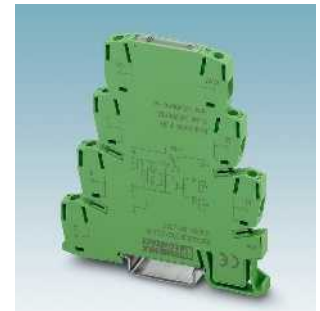
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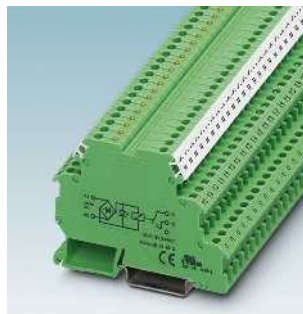


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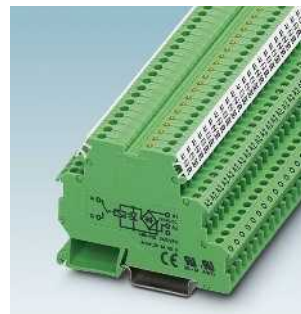
### DEK series



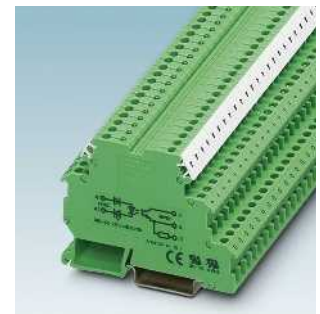
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Actuator series with miniature relays  
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Sensor series with miniature relays  
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### Relay modules with force-guided contacts



Relay modules with force-guided contacts  
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Relay modules for potentially explosive areas (Zone 2)  
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# Relay modules

## Basics of relay technology

### General information

Electromechanical relays are used as interface modules between the process I/O devices, on the one hand, and the open-loop/closed-loop control and signaling equipment, on the other, for level and power adjustment purposes.

Essentially, electromechanical relays can be divided into two main groups: monostable and bistable relays.

With monostable DC or AC relays, the contacts automatically return to the release state as soon as they are de-energized.

In the case of bistable relays, the contacts remain in their present switch position when the excitation current is switched off.

The documented relay data is based on test conditions and design criteria according to IEC 61810. Data may vary or be limited when mounting relays on DIN rail bases or on PCBs. Numerous parameters, such as:

- Operating time
- Load current
- Input voltage
- Dense mounting arrangement
- Heat dissipation into the environment and the layout for PCB applications ultimately determine the data for the overall arrangement.

The Phoenix Contact supply range features numerous ready-mounted relay combinations and base combinations, including some with additional input plug-in modules. These are tested under worst case conditions. The documented data then applies to the combinations.

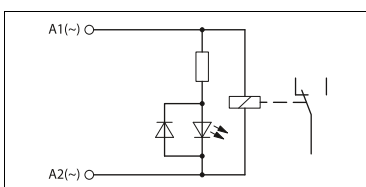
### Coil side

#### Input circuits and voltage types

There are various kinds of input circuit depending on the type of relay used and the nature of the control voltage.

If pure AC relays are used (AC input), the input circuit is generally nothing more than a visual switching status indicator.

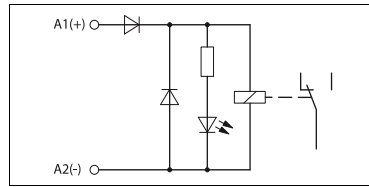
Unless otherwise specified, the frequency of the control voltage is 50/60 Hz.



Basic structure of a relay with AC input

In the case of a pure DC input, the most important addition to the circuit is a freewheeling diode. This limits the voltages induced on the coil on circuit interruption to a value of approximately 0.7 V, which does not pose a danger to any connected control electronics.

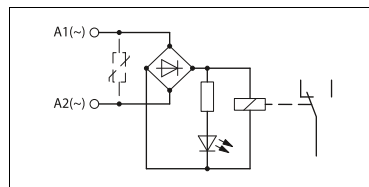
As the freewheeling diode can only perform its required function if the polarity of the voltage connection is correct, a polarity protection diode is also integrated into the input circuit.



Basic structure of a relay with DC input

To allow DC or AC voltage operation, a bridge rectifier is connected in the input circuit. The diodes are simultaneously responsible for performing rectification, freewheeling, and polarity reversal protection functions. The interrupting voltage of the coil is limited to approximately 1.4 V.

To protect the input circuit against overvoltages, a varistor is also connected (depending on the type) upstream of the bridge rectifier.

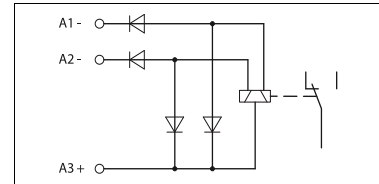


Basic structure of a relay with AC/DC input

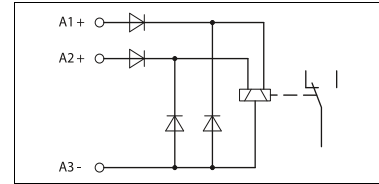
Bistable latching relays with a double winding are only ever operated with DC voltage.

With these types of relay, there are three coil connections on the coil side. In addition to the common connection, there are separate connections for “setting” and “resetting”; these are controlled by short pulses only. As a result, the relays hardly heat up at all. Simultaneous control of both control inputs is not permitted.

A distinction is made between negative switching (M) and positive switching (P) types, depending on the polarity of the freewheeling and polarity protection diodes.



Basic structure of a bistable relay, negative switching type



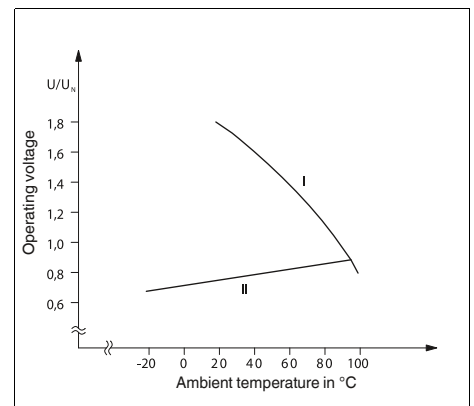
Basic structure of a bistable relay, positive switching type

### Operating voltage range

The ambient temperature prevailing at the location of use has a major impact on certain relay operating parameters.

As the ambient temperature increases, the coil winding heats up, causing the operate and release voltages to rise. At the same time, the maximum permissible coil voltage decreases, which means that the usable working range becomes restricted as a result.

The diagram below illustrates how the operating voltage behaves as a function of the ambient temperature.



Basic curve of a relay operating voltage

- I: Maximum permissible voltage with 100% operating time (OT) and compliance with the coil temperature limit
- II: Minimum response voltage

### Interference voltages and interference currents on the coil side

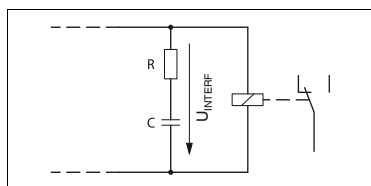
When inductive or capacitive interference voltages are coupled into the long supply lines of a relay, this can prevent the relay from operating safely.

If the coupled-in voltage exceeds the release voltage required by the IEC 61810-1 “relay standard”, in extreme cases the relay may fail to release. In the case of DC relays,

this release voltage is  $\geq 0.05 \times U_N$  and for purely AC relays, it is  $\geq 0.15 \times U_N$ .

The same disturbances can occur when a relay with a low input power is controlled by an electronics module with an AC voltage output featuring an RC circuit. The typical leakage current from RC elements of this kind (generally in the region of several mA) provides sufficient control power to prevent the downstream relay from releasing or even enough power to excite it.

The disturbance level of any interference voltages that are present can be reduced by connecting an RC element in parallel to the relay coil. This measure also subjects the interference voltage to a capacitive load, causing it to collapse.



External RC interference suppressor to prevent interference voltage coupling

The following values are recommended for the purpose of dimensioning the RC element:

- R = 100 to 220 Ω
- C = 220 to 470 nF

The SO46 series has been developed to provide even higher levels of immunity to interference. These products already contain an integrated RCZ filter. See, for example, PLC...SO46.

### Contact side, contact materials

Given the wide variety of potential applications in the different industrial sectors, the relays used must be matched to the various tasks that need to be performed by selecting the right kind of contact material.

The voltage, current, and power values play an important role when determining the suitability of contact materials. Other criteria include:

- Contact resistance
- Erosion resistance
- Material migration
- Welding tendency
- Chemical influences

In this way, the various contact materials (generally noble metal alloys) can be matched to the relevant areas of application.

The adjacent table provides details of some of the key materials.

Contact material	Typical properties	Typical applications	Guide values for the area of application*
Gold Au	Largely insensitive to industrial atmospheres, low and constant contact resistances in the range of small switching capacities with nickel (AuNi) or silver (AuAg) alloys.	Dry measuring and switching circuits, control inputs	$\mu\text{A} \dots 0.2 \text{ A}$ $\mu\text{V} \dots 30 \text{ V}$
Silver Ag	High electrical conductivity, sensitive to sulfur, therefore often gold-flashed (approximately, 0.2 $\mu\text{m}$ ) as protection; nickel (AgNi) or copper (AgCu) alloys increase the mechanical resistance and erosion resistance and reduce the welding tendency.	Universal, suitable for medium loads; nickel alloys (AgNi 0.15) for DC circuits with medium to large loads	$\geq 12 \text{ V}$ $\geq 10 \text{ mA}$
Silver, hard gold-plated Ag + Au	Properties similar to gold Au, when switching loads $> 30 \text{ V}/0.2 \text{ A}$ , the hard gold plating (5 - 10 $\mu\text{m}$ ) is destroyed and the values and properties of the Ag contact are applicable. However, a reduction in the service life is then to be expected.	Suitable for control inputs and other small loads.	$\geq 100 \text{ mV}$ $\geq 1 \text{ mA}$
Tungsten W	Highest melting point, very high erosion resistance, greater contact resistances, very low welding tendency, susceptible to corrosion, often used as lead contact.	Loads with very high inrush currents, e.g., glow lamps, fluorescent lamps.	$\geq 60 \text{ V}$ $\geq 1 \text{ A}$
Silver nickel AgNi	High erosion resistance, low welding tendency, higher contact resistances than with pure silver.	Universal, suitable for medium to high loads, DC circuits, and inductive loads.	$\geq 12 \text{ V}$ $\geq 10 \text{ mA}$
Silver nickel AgNi + Au	Properties similar to gold Au, when switching loads $> 30 \text{ V}/0.2 \text{ A}$ , the hard gold plating (5 - 10 $\mu\text{m}$ ) is destroyed and the values and properties of the AgNi contact are applicable. However, a reduction in the service life is then to be expected.	Suitable for control inputs and other small loads.	$\geq 100 \text{ mV}$ $\geq 1 \text{ mA}$
Silver tin oxide AgSnO	Low welding tendency, very high erosion resistance for high switching capacities, low material migration	Application depends heavily on the relay type, switching circuits with high make and break loads, e.g., glow lamps and fluorescent lamps, AC and DC circuits. Due to different alloys and production procedures, partly also suitable for smaller loads.	$\geq 12 \text{ V}$ $\geq 100 \text{ mA}$ ( $\geq 10 \text{ mA}$ )
Silver tin oxide, hard gold-plated AgSnO + Au	Properties similar to gold Au, when switching loads $> 30 \text{ V}/0.2 \text{ A}$ the hard gold plating (5 - 10 $\mu\text{m}$ ) is destroyed and the values and properties of the AgSnO contact are applicable. However, a reduction in the service life is then to be expected.	Suitable for control inputs and other small loads.	$\geq 100 \text{ mV}$ $\geq 1 \text{ mA}$

\* Values depend on the relay used and on further operating conditions.

### Contact protection circuit

Every electrical consumer constitutes a mixed load with ohmic, capacitive, and inductive components.

When these loads are switched, the switching contact is in turn subjected to a load, to either a lesser or greater extent. This load can be reduced by including a suitable contact protection circuit.

In view of the fact that consumers with a large inductive component are predominantly used in practice (e.g., contactors, solenoid valves, motors, etc.), these application scenarios are worth considering in more detail.

On interruption, voltage peaks with values of up to several thousand volts occur due to the energy stored in the coil.

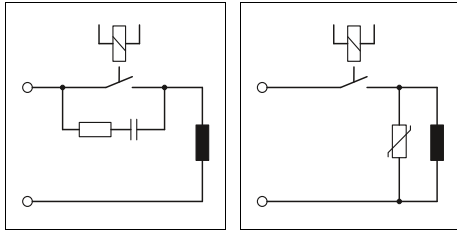
These high voltages cause an electric arc on the switching contact which can destroy the contact due to material vaporization and material migration. The electrical service life is reduced considerably as a result. In extreme cases, the relay may fail in the very first switching cycle with DC voltage and a static electric arc.

A protective circuit must be used to suppress the formation of an electric arc. With optimum dimensioning, almost the same number of switching cycles can be achieved as with an ohmic load.

## Basics of relay technology

In principle, there are a number of possible ways of achieving an effective circuit:

1. Wiring the contact
2. Wiring the consumer
3. Combination of both wiring methods



Wiring the contact

Wiring the inductive consumer

In principle, protective measures should intervene directly at the source of the interference.

Wiring a consumer should therefore be given priority over wiring the contact.

The following points are advantageous for the consumer circuit (image on right):

1. The circuit is only loaded with the induction voltage during interruption. By contrast, the sum of the operating voltage and the induction voltage is applied to the contact circuit.
2. When the contact is open, the load is electrically isolated from the operating voltage.
3. It is not possible for the load to be activated or to "stick" due to undesired operating currents, e.g., from RC elements.
4. Cut-off peaks of the load cannot be coupled into parallel control lines.

Nowadays, solenoid valves are usually connected using valve connectors that are also supplied with LEDs and components that limit the induction voltage. Valve connectors with an RC element, varistor or Zener diode often do not quench the arc and only serve to comply with legislation governing EMC. Only valve connectors with an integrated 1N4007 freewheeling diode quench the arc quickly and safely, thereby increasing the service life of the relay by a factor of 5 to 10. Valve connectors with LED, integrated 1N4007, and free cable end can be supplied on request as part of the SAC range.

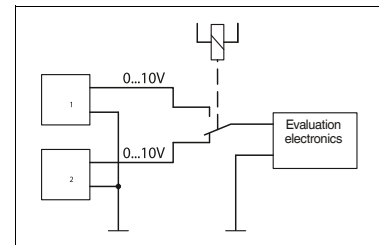
Load wiring	Additional dropout delay	Defined induction voltage limitation	Effective bipolar attenuation	Advantages and disadvantages
<b>Diode</b> 	Large	Yes ( $U_D$ )	No	<b>Advantages:</b> <ul style="list-style-type: none"> <li>• Good effect in terms of extending the service life of the contacts</li> <li>• Easy implementation</li> <li>• Inexpensive</li> <li>• Reliable</li> <li>• Dimensioning not critical</li> <li>• Low induction voltage</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>• Attenuation only via load resistor</li> <li>• Long dropout delay</li> </ul>
<b>Series connection diode/Zener diode</b> 	Medium to small	Yes ( $U_{ZD}$ )	No	<b>Advantages:</b> <ul style="list-style-type: none"> <li>• Dimensioning not critical</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>• Attenuation only above <math>U_{ZD}</math></li> <li>• Minimal effect in terms of extending the service life of the contacts</li> </ul>
<b>Suppressor diode</b> 	Medium to small	Yes ( $U_{ZD}$ )	Yes	<b>Advantages:</b> <ul style="list-style-type: none"> <li>• Inexpensive</li> <li>• Dimensioning not critical</li> <li>• Limitation of positive peaks</li> <li>• Suitable for AC voltage</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>• Attenuation only above <math>U_{ZD}</math></li> <li>• Minimal effect in terms of extending the service life of the contacts</li> </ul>
<b>Varistor</b> 	Medium to small	Yes ( $U_{VDR}$ )	Yes	<b>Advantages:</b> <ul style="list-style-type: none"> <li>• High energy absorption</li> <li>• Dimensioning not critical</li> <li>• Suitable for AC voltage</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>• Attenuation only above <math>U_{VDR}</math></li> <li>• Minimal effect in terms of extending the service life of the contacts</li> </ul>
<b>R/C combination</b> 	Medium to small	No	Yes	<b>Advantages:</b> <ul style="list-style-type: none"> <li>• HF attenuation due to energy storage</li> <li>• Suitable for AC voltage</li> <li>• Level-independent attenuation</li> </ul> <b>Disadvantages:</b> <ul style="list-style-type: none"> <li>• Precise dimensioning required</li> <li>• High inrush current surge</li> <li>• Minimal effect in terms of extending the service life of the contacts</li> </ul>

### Switching small loads

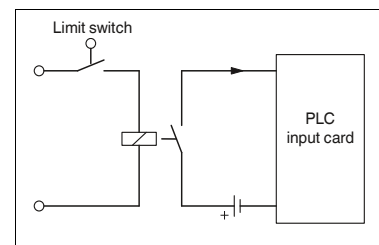
Small loads have to be processed mainly in applications where signals have to be forwarded to control inputs (e.g., of a PLC).

With these loads, no switching sparks (electric arcs) occur on the contacts in the small load range.

In addition to the constant cleaning effect due to contact friction, this switching spark assumes the function of penetrating non-conductive contamination layers that are formed on the contact surfaces of power contacts.



Application example: Measurement point changeover



Application example: PLC input signal



These contamination layers are usually oxidation or sulfidation products of the contact materials silver (Ag) or silver alloys such as silver nickel (AgNi) or silver tin oxide (AgSnO). As a result, the contact resistance may rise so considerably within a short time that reliable switching is no longer possible in the case of small loads.

Due to these properties, the power contact materials mentioned are not suitable for small load applications.

Gold (Au) has become accepted as the contact material of choice for these areas of application mainly on account of its low and constant contact resistances even with small loads and its insensitivity to sulfurous atmospheres.

For the smallest of loads and even greater contact reliability, double contact relays with gold contacts are used.

The slotted contact spring in this design provides two parallel contact points with even lower contact resistances and considerably higher contact reliability.

### Switching large loads

A few important points also need to be considered with regard to switching operations in the large load range that involve power contacts made of either silver (Ag) or silver tin oxide (AgSnO).

A basic distinction must be made between switching DC and AC loads.

### Switching large AC loads

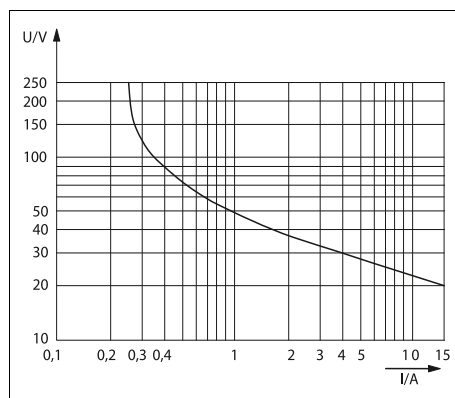
When switching large AC loads, the relay can be operated up to the corresponding maximum values for switching voltage, current, and power. The electric arc that occurs during interruption depends on the current, voltage, and phase relation. This cut-off arc usually disappears automatically the next time the load current passes through zero.

In applications with an inductive load, an effective protective circuit must be provided, otherwise the service life of the system will be reduced considerably.

### Switching large DC loads

Conventional switching relays can only switch off relatively small direct currents (which contrasts with their ability to switch off the maximum permissible AC current), since there is no zero crossing to extinguish the arc automatically. This maximum DC value is also dependent to a large extent on the switching voltage and is determined, among other things, by constructional features such as contact spacing and contact opening speed.

The corresponding current and voltage values are documented by relay manufacturers in electric arc or load limit curves.



Example of a load limit curve (dependent on the type)

A non-attenuated inductive DC load further reduces the values given for switchable currents. The energy stored in the inductance can cause an electric arc to occur, which forwards the current through the open contacts.

With an effective contact protection circuit, preferably type 1N4007 freewheeling diodes, the service life can be increased by a factor of 5 to 10 compared with unprotected or poorly protected inductive loads (see also “Contact protection circuit” section).

If higher DC loads than those documented are to be switched or if the electrical service life is to be increased, several contacts of a relay can be connected in series. See, for example, REL-IR... industrial relays.

Alternatively, solid-state relays with DC voltage output can also be used.

### Switching lamps and capacitive loads

Regardless of the type of voltage, all kinds of lamps and loads with a capacitive component impose extreme requirements on the switching contacts. The moment it is switched on, in other words precisely in the dynamic chattering phase of the relay, extremely powerful current peaks occur.

These are often in the region of several tens of amps, and not infrequently are known to exceed 100 A, which results in welding of the contact. This can be remedied by using specially optimized “lamp load relays” that can cope with these inrush peaks. See, for example, PLC...IC type.

### Switching capacity according to utilization categories AC15 and DC13 (IEC 60947)

In practice, both the maximum interrupting rating for AC loads and the DC interruption values taken from the load limit curves provide only a rough guide for the choice of relay. In reality, this is insufficient, since real loads in the vast majority of industrial applications have inductive or capacitive components and the wiring of the loads can be totally different. As already described, this sometimes leads to considerable variations in terms of service life.

The IEC 60947 contactor standard seeks to avoid these disadvantages by dividing the loads into various utilization categories (DC13, AC15, etc.). This standard is also partly applied to relays. However, users must be aware of the fact that these values are only applicable in practice to a limited extent as well, since all DC13 and AC15 test loads are highly inductive and are also operated without any protective circuit at all (see “Contact protection circuit” section). Moreover, the switching capacity test according to IEC 60947 only requires 6060 switching cycles to be performed by way of a minimum requirement.

A much more reliable way to determine the switching capacity and the anticipated service life is to refer to the specific application data. Using a comprehensive data bank, the service life can be accurately estimated for most applications and, if necessary, suggestions for improvement can be made. In the case of critical applications, the user is advised to gather service life information based on empirical data.

# Relay modules

## Basics of solid-state relay technology

### Control side

Solid-state relays for various voltage and power levels are available from Phoenix Contact for use as interface modules designed to match process I/O devices to control, signaling, and regulating devices. The solid-state relay element which is actually located in the module is limited to one defined voltage range by virtue of its design. The current consumption on the input side fluctuates depending on the circuit architecture and voltage level.

To accommodate all voltages required for industrial applications between 5 V and 230 V, an input circuit is provided. The inputs for DC voltage and AC voltage must always be differentiated.

### DC input

Adjustments are made in accordance with the various voltage levels by adding electronics which have been specially adapted to the desired voltage range. In the case of most modules, a polarity protection diode provides reliable protection against destruction in the event of a control voltage being connected incorrectly. Specially coordinated filters reliably suppress possible high-frequency noise emissions.

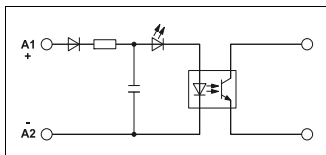


Figure 1: Block diagram for DC input

### AC input

The solid-state relay element requires a stable control voltage to ensure reliable operation. In the case of the AC input, this is achieved by connecting a rectifier and filter capacitor upstream. The rectification is followed, in principle, by the same circuit architecture as the DC input.

The switching frequency always lies below half the mains frequency. Due to the filter capacitor, a higher switching frequency

cannot be achieved. This results in continuous through-switching.

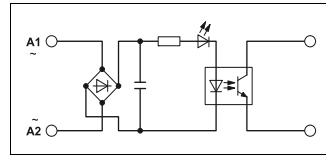


Figure 2: Block diagram for AC input

### Load side

Depending on the application and the type of load, the solid-state relay output must meet various requirements. The following are crucial:

- Power amplification
- Matching the switching voltage and the switching current (AC/DC)
- Short-circuit protection

For these different applications, the solid-state relay element must also be processed using additional electronics on the output side.

### DC output

In order to achieve the necessary output power, the solid-state relay element is supplemented by one or more semiconductor components.

The on-site user should nevertheless simply regard the connection terminal blocks of the output as conventional switch connections. Observing the specified polarity is the only essential requirement.

For practical reasons, the following criteria should be taken into account when selecting a suitable solid-state relay:

1. Operating voltage range (e.g., 12 ... 60 V DC)  
This determines the minimum or maximum voltage to be switched. The lower value must be observed in order to ensure reliable operation. In order to protect the output transistor, the upper value must not be exceeded.
2. Maximum continuous current (e.g., 1 A)  
This value indicates the maximum continuous current. If this value is exceeded continuously, the output semiconductor will be destroyed. The dependence of the output current on the ambient temperature of the solid-state relay should also be taken into consideration. A derating curve is therefore generally specified for solid-

state power relays. This shows the maximum load current as a function of the ambient temperature.

### 3. Output circuit

The 2-conductor output is similar to a mechanical contact. Only the polarity of the connections is specified and must be observed.

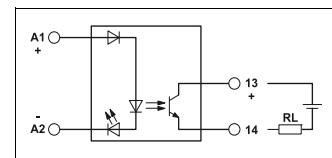


Figure 3: 2-conductor output

The 3-conductor output is non-isolated and requires both potentials from the voltage source on the output side to be connected if it is to operate reliably.

When switched off, a permanent reference to ground (negative potential) is established. In addition, this output circuit offers the advantage of an almost constant internal resistance.

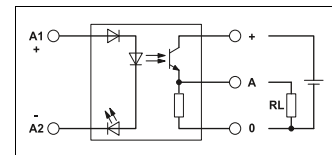


Figure 4: 3-conductor output

### AC output

In order to control the switching and control devices for AC voltage, a semiconductor for AC voltage (TRIAC or thyristor) is connected downstream of the solid-state relay element.

As with the DC output, it is particularly important to consider the maximum operating voltage range and the maximum continuous load current as a function of the ambient temperature.

Basics of solid-state relay technology

In addition, the maximum peak reverse voltage of the TRIAC (e.g., 600 V) is crucial with AC outputs. This must not be exceeded even in the case of voltage fluctuations or interference voltage peaks in order to prevent destruction. That is why the AC outputs of all solid-state relays from Phoenix Contact have an internal RC protective circuit to protect against interference voltage peaks.

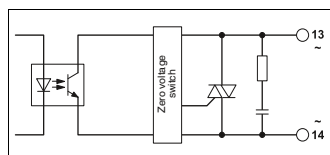


Figure 5: Basic circuit diagram of AC output

Protective circuits

The moment inductive loads (contactors, solenoid valves, motors) are switched off, surge voltages occur and these can reach very high amplitudes. Electronic components and switching elements are particularly susceptible to these. A protective circuit should therefore always be provided to prevent destruction.

A parallel connection to the load effectively reduces the switching surge voltage to a harmless level. Depending on the solid-state relay output and load type,

- a freewheeling diode/suppressor diode (DC only),
- a varistor (AC and DC)
- or an RC element (AC only)

can provide the necessary protection.

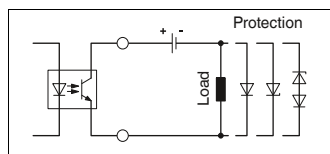


Figure 6: Protective circuit with DC voltage output

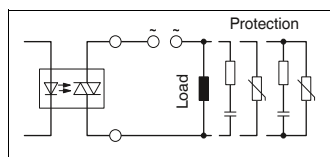


Figure 7: Protective circuit with AC voltage output

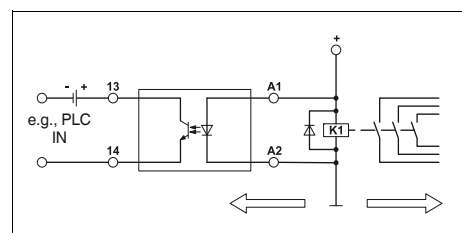
Application notes

Input solid-state relays acting in the direction from the I/O devices to the controller (signaling, controlling, monitoring)

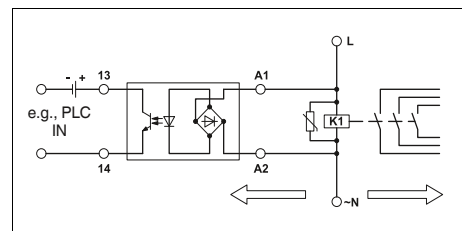
Plug-in version:  
- PLC-O...

Modular version:  
- DEK-OE...  
- EMG 10-OE...  
- SIM-EI...  
- OPT...

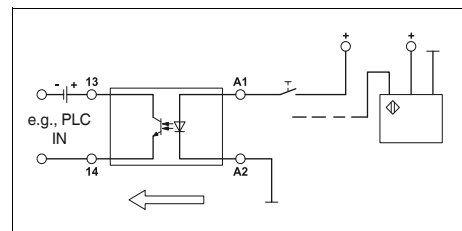
e.g., load protection monitoring (DC contactor)



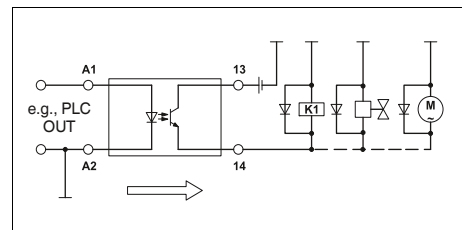
e.g., load protection monitoring (AC contactor)



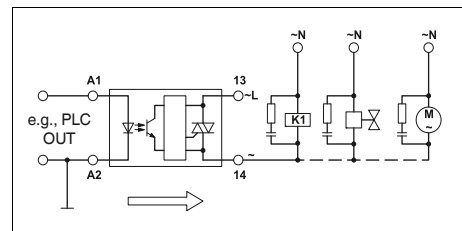
e.g., position indication with limit stop contact or initiator



e.g., switching the contactor, solenoid valve or motor (DC load)



e.g., switching the contactor, solenoid valve or motor (AC load)



Remarks:

- 1) Ground (negative) potential from the input and output of the solid-state relay must not be connected.
- 2) DC loads must be provided with an effective protective circuit (e.g., diode).
- 3) AC loads must be protected with a varistor or an RC element.

Output (power) solid-state relays acting in the direction from the controller to the I/O devices (switching, amplifying, controlling)

Plug-in version:  
- PLC-O...

Modular version:  
- DEK-OV...  
- EMG 10-OV  
- EMG 12-OV  
- EMG 17-OV  
- OV...  
- OPT...

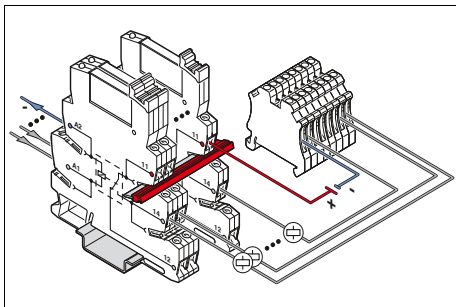
# Relay modules

## Sensor/actuator configuration aids and handling of interference signals

### Configuration aid for connecting sensors and actuators

Electromechanical relays or solid-state relays are used as the coupling element between the controller and the sensors or actuators in the field. This interface ensures appropriate signal conditioning with respect to current and voltage between the controller and field level.

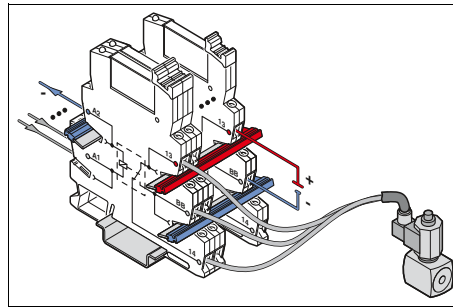
### Conventional connection of actuators



If actuators such as solenoid valves are connected to the controller via a universal relay with changeover contact, an additional terminal block strip must be used for the common load return line. The positive potential of the loads is applied to connection terminal block 11 (changeover contact) at the relay modules. This can be distributed over all relay modules using plug-in bridges. This means that direct connection of the potential to only one relay is necessary. The loads are connected to connection terminal block 14 (N/O contact). The negative potential required is supplied at a terminal block. This is then distributed to further terminal blocks by means of plug-in bridges. However, load return lines for the individual actuators are applied to every terminal block. This results in a common load return line potential for all actuators via the additional terminal block.

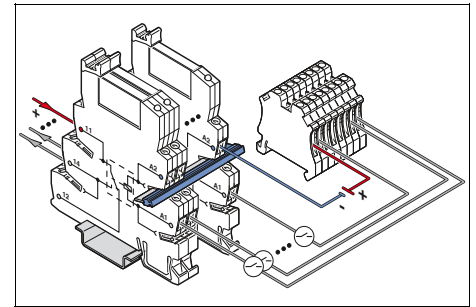
Because of increased space requirements and additional wiring to the terminal block, the use of additional terminal blocks for potential distribution is extremely time-consuming.

### Easy wiring of actuators



The PLC...ACT relay modules enable fast and easy connection of actuators. The positive potential of the loads is applied to connection terminal block 13. This can be distributed over all relay modules using plug-in bridges. This only makes direct connection to one module necessary. The actuators are connected to contact 14 (N/O contact). In the case of PLC...ACT relay modules, an N/C contact is not required. Instead, the BB connection serves as an option for connecting the load return line. Here the common negative potential is supplied and distributed by means of plug-in bridges. The terminal block for conventional wiring is not necessary due to the direct connection of the load return line potential to the relay module. This means that no additional space is required in the control cabinet and simpler wiring minimizes the risk of error.

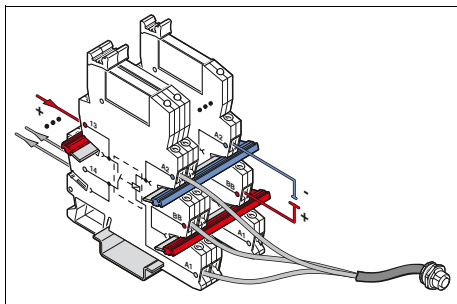
### Conventional connection of sensors



If sensors such as proximity switches are connected via a universal relay to a controller with a changeover contact, an additional terminal block strip must be used for the common sensor supply voltage. It is also important to note that either the wiring in the control cabinet must be implemented the other way round since control of the relay now takes place from the field level and not via the controller, or the relay module must be installed into the control cabinet rotated at 180°. The negative potential of the sensors is applied at connection terminal block A2 on the relay module. This can be distributed over all relay modules using plug-in bridges. This means that direct connection to only one relay is necessary. The sensors are connected to connection terminal block A1. The necessary positive potential is supplied to a terminal block and distributed to further terminal blocks by means of plug-in bridges. However, the supply for the individual sensors is applied to every terminal block. This results in a common supply signal for all sensors via the additional terminal blocks.

Because of increased space requirements and additional wiring to the terminal block, the use of additional terminal blocks for potential distribution is extremely time-consuming.

**Easy wiring of sensors**

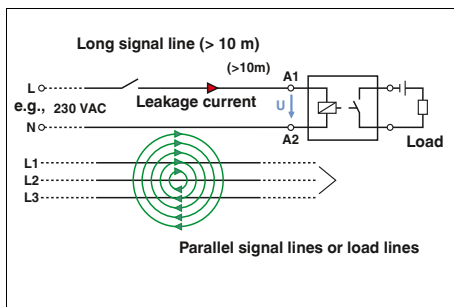


Sensors can be efficiently coupled with the controller with the PLC...SEN relay modules. The input and output side on the module are already interchanged so that the signal direction from the field to the controller can be ideally represented. Therefore, three connection terminal blocks (A1, A2, and BB) are located on the control side of the relay. The common negative potential of the sensors is connected to A2 and distributed to further relay modules by means of plug-in bridges. The sensors are connected directly to the A1 connections. Connection BB is used for the common supply potential of the sensors. The potential is distributed to all connected sensors by means of the plug-in bridges. However, only connections 13 and 14 for the N/O contact are located on the contact side. Signal feedback to the controller takes place via this. The terminal block for conventional wiring is not necessary due to direct connection of the sensor supply voltage to the relay module. This means that no additional space is required in the control cabinet and simpler wiring minimizes the risk of error.

**Configuration aid for handling interference signals**

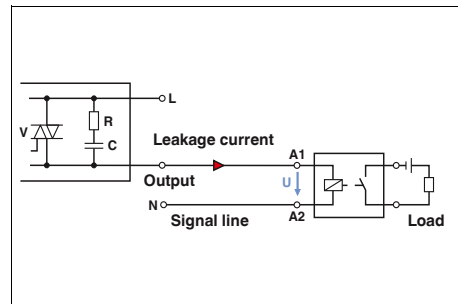
According to IEC 61810-1, the standard release voltage of a relay is 5% of the nominal voltage for DC coils and 15% for AC coils. That means that a relay with a nominal voltage of 230 V AC is only switched off when the control voltage is  $\leq 0.15 \times 230 \text{ V AC} = 34.5 \text{ V AC}$ . If interference signals occur on the control side of a relay that are greater than the release voltage, defined switch-off is no longer possible. In the worst case, the interference is large enough to energize the relay. The application is still switched on although no signal is issued by the controller. There can be various reasons for this.

**Coupling of interference signals from parallel lines**



If the control lines to the relay are very long, interference can occur from parallel-running cables. These influence the actual control line and couple the signals to it. This interference voltage can be measured on the control side, even if no signal is issued by the controller.

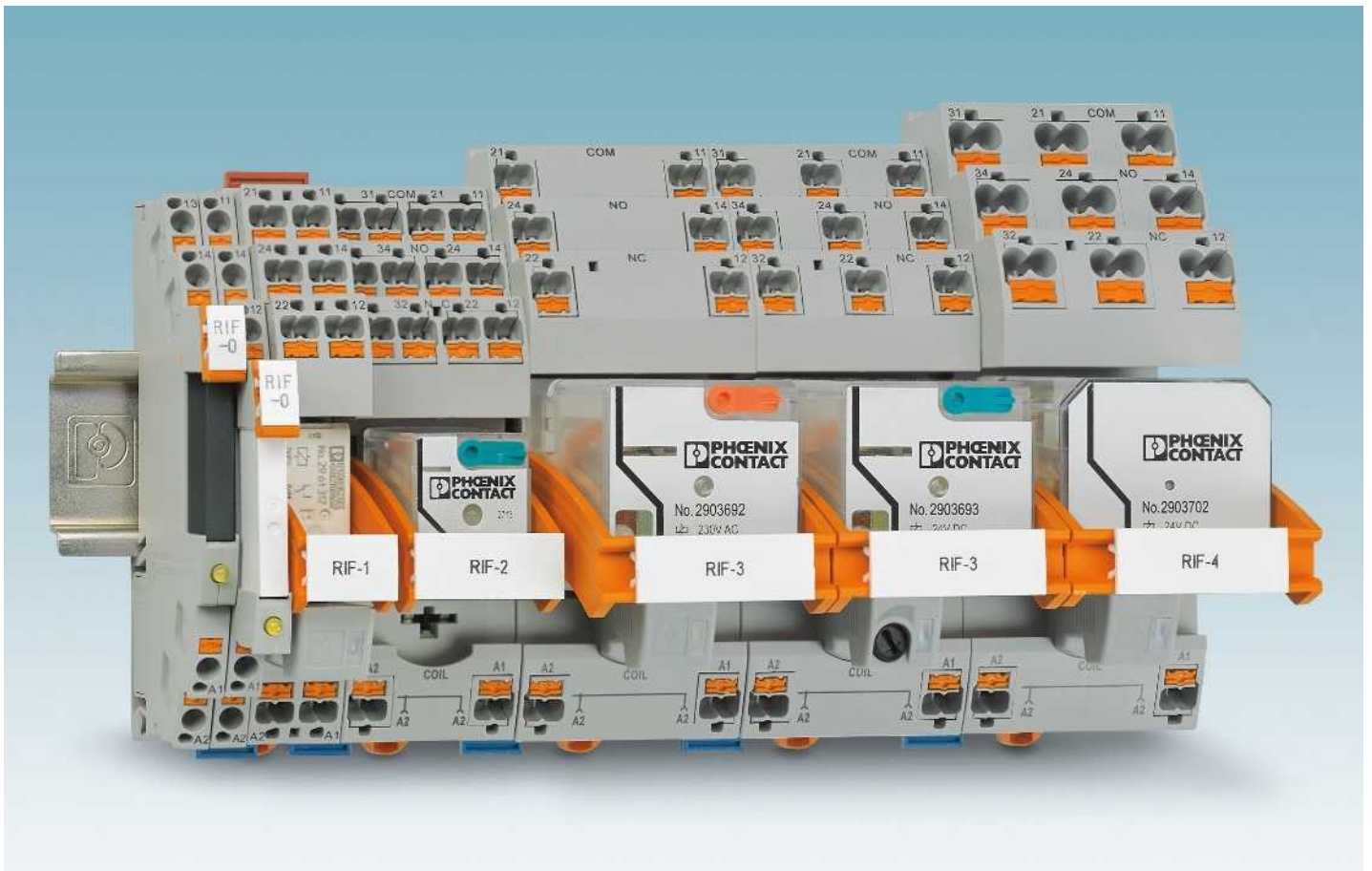
**Leakage current with AC voltage output card**



Leakage current on the signal line occurs if control of a relay takes place via an output card with AC voltage. This is caused by the RC wiring of the AC voltage output. Typically, the leakage current has a control power that is large enough not to switch off the relay reliably.

**Safe shutdown even with interference signals**

The PLC...SO46 series is equipped with RCZ wiring in the base. The release voltage of the relay is increased by this circuit of resistor, capacitor, and Zener diode so that the relay is resistant to interference voltages. In the case of a 230 V AC relay, the standard release voltage is 34.5 V AC. The PLC...230UC...SO46 modules have a release voltage of 80 V AC. This enables the relay to switch off reliably at interference voltages of  $\leq 80 \text{ V AC}$ . The PLC...SO46 bases are also available with further voltages. They can be fitted with both electromechanical relays or solid-state relays. Screw connection or Push-in connection is available as the connection technology.



RIFLINE complete is an inexpensive relay system with various accessories. It consists of DIN rail bases, electromechanical or solid-state relays, plug-in interference suppression modules, marking material, and bridging material. The range of accessories is rounded off with a timer module. This is used to transform a basic relay into a time relay with three different functions.

The RIFLINE complete relay range consists of seven different base versions from RIF-0 to RIF-4 – these range from one N/O contact up to four PDT contacts. The field of application of this product group ranges from coupling relay applications with switching currents of one milliamp to replacement for miniature contactors with currents up to 16 A.

The relay bases feature Push-in or screw connection technology. Push-in connection technology enables quick and tool-free conductor contacting. The RIF-1 to RIF-4 bases offer double the contact options on both the input and output side.

On the input side of all bases, the negative potential (A2) can be bridged – regardless of the base size. On the output side, the grouped contact (11) can be bridged within the RIF-0 base version. This connection can also be bridged within the RIF-1 base size.

To offer diverse marking options, the engagement lever can be fitted with a zack marker strip. In addition, marker carriers

can be mounted on the bases so that additional marking surfaces are available.

RIFLINE complete can be extended using many elements from the CLIPLINE complete accessories range. This includes marking material, bridges, and test adapters.

To make ordering and management easier, RIFLINE complete modules are provided in the most popular voltages as complete modules with relay and interference suppression module. For individual assembly, tailored to the requirements of the application, additional voltage levels are offered in the modular system.

**RIF-0**

The 6.2 mm narrow RIF-0 base series is suitable for a 1-PDT relay. Switching currents up to 6 A are implemented here. Two base versions are available: 1 N/O contact and 1 changeover contact. RIF-0 is therefore a good choice for all coupling applications.

**RIF-1**

The 16 mm narrow RIF-1 base series is suitable for a 2-PDT relay. Currents up to 13 A can be switched when using the FBS 2-8 plug-in bridge. This relay is ideal for power switching and signal duplication.

**RIF-2**

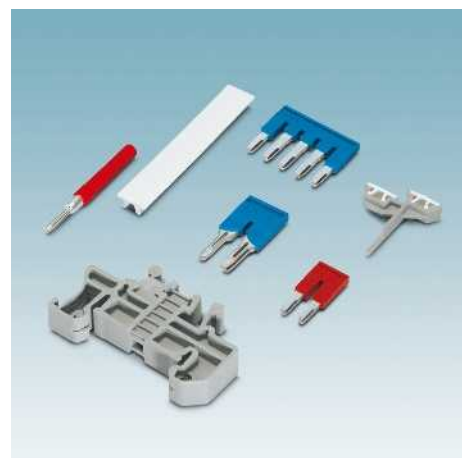
The 31 mm wide RIF-2 base series is designed for industrial relays with up to 4 contacts. Currents up to 12 A are no problem for these bases. This relay is ideal for applications that require power and signal multiplication.

**RIF-3**

The 40 mm wide RIF-3 base series is designed for octal relays with up to 3 contacts. Switching currents up to 10 A are implemented here. Two base versions are available: 2 changeover contacts and 3 changeover contacts. RIF-3 bases are ideal for all applications that require power and signal multiplication.

**RIF-4**

The 43 mm wide RIF-4 base series is designed for power relays with up to 3 contacts. Currents up to 16 A can be switched. RIF-4 bases are a good choice for applications that require power and signal multiplication, e.g., in miniature contactor applications.

**Accessories**

A wide range of accessories are available for the RIFLINE complete relay system that round off the range. These include bridges, professional marking material, function modules, test plugs, and end brackets.

# Relay modules

## Industrial relay system - RIFLINE complete

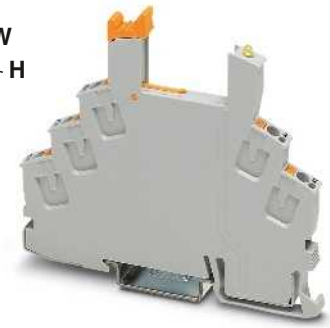
### Modular RIF-0 relay base

Relay base for assembly with miniature power relays or solid-state relays with a nominal voltage of 12 to 24 V DC.

The advantages:

- Integrated freewheeling diode for input circuit and interference suppression circuit
- LED for status display
- Safe isolation according to DIN EN 50178 between coil and contact
- Professional marking material
- Holders for test plugs
- Professional bridging of adjacent modules saves wiring time (A2 and 11/13)
- FBS 2-6 plug-in bridges for the input and output side

Notes:
Type of insulating housing: Polyamide PA, non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



**1-PDT relay base with Push-in connection technology**



Nominal voltage  $U_N$   
Nominal current at  $U_N$

General data
Ambient temperature (operation)
Connection data solid/stranded/AWG
Maximum tightening torque
Dimensions
Width
Depth
Height

### Technical data

250 V AC/DC (Contact side)  
max. 8 A (Depends on application/assembly)

-40 °C ... 85 °C (Depends on application/assembly)

0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16

6.2 mm  
78 mm  
93 mm

Description
<b>RIF-0 relay base</b> , PDT version, safe isolation I/O with Push-in connection
<b>RIF-0 relay base</b> , N/O contact version, safe isolation I/O with Push-in connection
<b>RIF-0 relay base</b> , PDT version, safe isolation I/O with screw connection
<b>RIF-0 relay base</b> , N/O contact version, safe isolation I/O with screw connection
<b>RIF-0 relay base</b> , negative switching, PDT version, safe isolation I/O with Push-in connection

### Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-BPT/21	2900958	10
RIF-0-BPT-M/ 21	2907468	10

Plug-in bridge	
2-pos. red, 24 A	
2-pos. red, 32 A	
2-pos. blue, 32 A	
2-pos. gray, 32 A	
3-pos. red, 24 A	
4-pos. red, 24 A	
5-pos. red, 24 A	
5-pos. red, 32 A	
10-pos. red, 32 A	
20-pos. red, 32 A	
50-pos. red, 32 A	
<b>End bracket</b> , for snapping onto NS 35, 9.5 mm wide, can be marked with ZB 6, ZB 8/27, KLM...	
<b>Test plug</b> , consisting of:	
<b>Metal part</b> for 2.3 mm Ø socket hole and	silver
<b>Insulating sleeve</b> , for MPS metal part	red white blue yellow green gray black

### Accessories

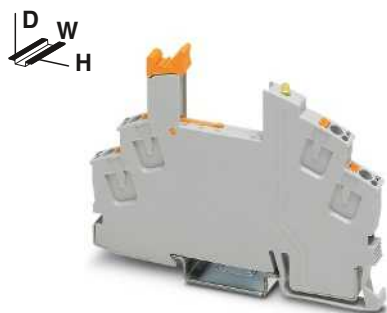
FBSR 2-6	3033715	50
FBS 2-6	3030336	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
FBSR 3-6	3001594	50
FBSR 4-6	3001595	50
FBSR 5-6	3001596	50
FBS 5-6	3030349	50
FBS 10-6	3030271	10
FBS 20-6	3030365	10
FBS 50-6	3032224	10
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10

**Zack marker strip, unprinted, 10-section:** each pack contains enough to mark 100 terminal blocks

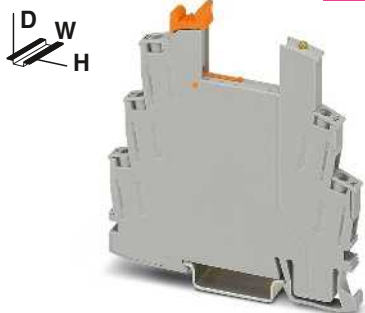
10-section

ZB 6:UNBEDRUCKT 1051003 10

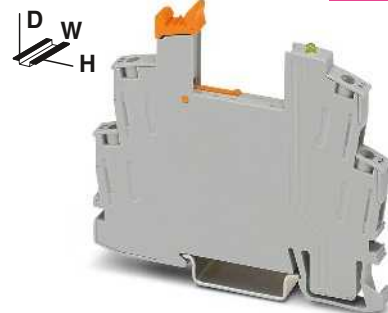




1-N/O relay base for miniature power relay



1-PDT relay base with screw connection technology



1-N/O relay base with screw connection technology



Technical data	
250 V AC/DC (Contact side) max. 8 A (Depends on application/assembly)	
-40 °C ... 85 °C (Depends on application/assembly)	
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16	
-	
6.2 mm	
66 mm	
93 mm	

Technical data	
250 V AC/DC (Contact side) max. 8 A (Depends on application/assembly)	
-40 °C ... 85 °C (Depends on application/assembly)	
0.5 ... 4 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 12	
0.5 Nm	
6.2 mm	
82 mm	
84 mm	

Technical data	
250 V AC/DC (Contact side) max. 8 A (Depends on application/assembly)	
-40 °C ... 85 °C (Depends on application/assembly)	
0.5 ... 4 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 12	
0.5 Nm	
6.2 mm	
68 mm	
84 mm	

Ordering data		
Type	Order No.	Pcs./ Pkt.
RIF-0-BPT/1	2901873	10

Ordering data		
Type	Order No.	Pcs./ Pkt.
RIF-0-BSC/21	2900957	10

Ordering data		
Type	Order No.	Pcs./ Pkt.
RIF-0-BSC/ 1	2901872	10

Accessories		
FBSR 2-6	3033715	50
FBS 2-6	3030336	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
FBSR 3-6	3001594	50
FBSR 4-6	3001595	50
FBSR 5-6	3001596	50
FBS 5-6	3030349	50
FBS 10-6	3030271	10
FBS 20-6	3030365	10
FBS 50-6	3032224	10
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 6:UNBEDRUCKT	1051003	10

Accessories		
FBSR 2-6	3033715	50
FBS 2-6	3030336	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
FBSR 3-6	3001594	50
FBSR 4-6	3001595	50
FBSR 5-6	3001596	50
FBS 5-6	3030349	50
FBS 10-6	3030271	10
FBS 20-6	3030365	10
FBS 50-6	3032224	10
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 6:UNBEDRUCKT	1051003	10

Accessories		
FBSR 2-6	3033715	50
FBS 2-6	3030336	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
FBSR 3-6	3001594	50
FBSR 4-6	3001595	50
FBSR 5-6	3001596	50
FBS 5-6	3030349	50
FBS 10-6	3030271	10
FBS 20-6	3030365	10
FBS 50-6	3032224	10
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 6:UNBEDRUCKT	1051003	10

### Plug-in miniature power relays

new

Plug-in 1-PDT relays suitable for RIF-0 and PLC-INTERFACE relay bases.

The advantages:

- Power contacts up to 6 A
- Multi-layer gold contact or power contact
- High degree of protection, RT III (wash-proof), or RT II for 1-PDT relay with manual operation
- Safe isolation according to DIN EN 50178 between coil and contact
- Can be soldered on PCB

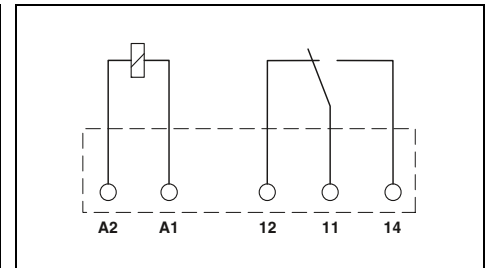
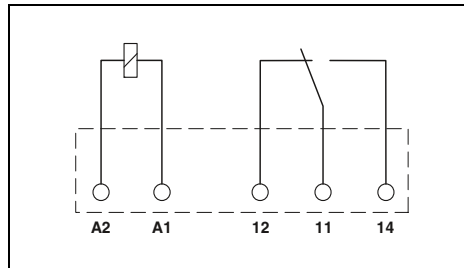


1-PDT relay, max. 6 A



1-PDT relay with manual operation, max. 6 A

**Notes:**  
 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.  
 For dimensional drawings and perforations for assembly, see page 398  
 When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



#### Technical data

Input data	①	②
Permissible range (with reference to $U_N$ )	see diagram	
Typical input current at $U_N$	14	7
Typical response time at $U_N$	5	5
Typical release time at $U_N$	2.5	2.5
Output data		
Contact type	1 PDT	1 PDT
Contact material	AgSnO	AgSnO, hard gold-plated
Max. switching voltage	250 V AC/DC	30 V AC / 36 V DC
Minimum switching voltage	5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current	6 A	50 mA
Maximum switch-on current	10 A (4 s)	50 mA
Minimum switching current	10 mA (at 12 V)	1 mA (at 24 V)
General data		
Test voltage (winding / contact)	4 kV AC (50 Hz, 1 min.)	
Ambient temperature (operation)	-40 °C ... 85 °C	
Nominal operating mode	100% operating factor	
Mechanical service life	2 x 10 <sup>7</sup> cycles	
Standards/regulations	IEC 60664, EN 50178, EN 61810-1	
Mounting position/mounting	any / In rows with zero spacing	
Dimensions	5 mm / 28 mm / 15 mm	

Input data	①	②
Permissible range (with reference to $U_N$ )	see diagram	
Typical input current at $U_N$	14	7
Typical response time at $U_N$	5	5
Typical release time at $U_N$	2.5	2.5
Output data		
Contact type	1 PDT	1 PDT
Contact material	AgSnO	AgSnO, hard gold-plated
Max. switching voltage	250 V AC/DC	30 V AC / 36 V DC
Minimum switching voltage	5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current	6 A	50 mA
Maximum switch-on current	10 A (4 s)	50 mA
Minimum switching current	10 mA (at 12 V)	1 mA (at 24 V)
General data		
Test voltage (winding / contact)	4 kV AC (50 Hz, 1 min.)	
Ambient temperature (operation)	-40 °C ... 85 °C	
Nominal operating mode	100% operating factor	
Mechanical service life	1 x 10 <sup>7</sup> cycles	
Standards/regulations	IEC 60664, EN 50178, EN 61810-1	
Mounting position/mounting	any / In rows with zero spacing	
Dimensions	5 mm / 28 mm / 16 mm	

#### Ordering data

Description	Input voltage $U_N$
<b>Plug-in miniature power relays, with power contacts</b>	① 12 V DC
	② 24 V DC
<b>Plug-in miniature power relays, with multi-layer gold contacts</b>	① 12 V DC
	② 24 V DC

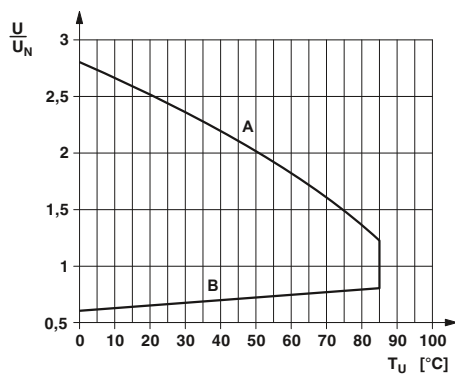
Type	Order No.	Pcs./ Pkt.
REL-MR- 12DC/21	2961150	10
REL-MR- 24DC/21	2961105	10
REL-MR- 12DC/21AU	2961163	10
REL-MR- 24DC/21AU	2961121	10

#### Ordering data

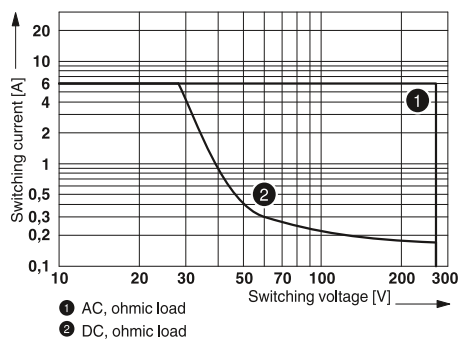
Type	Order No.	Pcs./ Pkt.
REL-MR- 12DC/21/MS	2909641	10
REL-MR- 24DC/21/MS	2909642	10
REL-MR- 12DC/21AU/MS	2909644	10
REL-MR- 24DC/21AU/MS	2909645	10

### REL-MR-.../21... (1-PDT)

Input voltage range

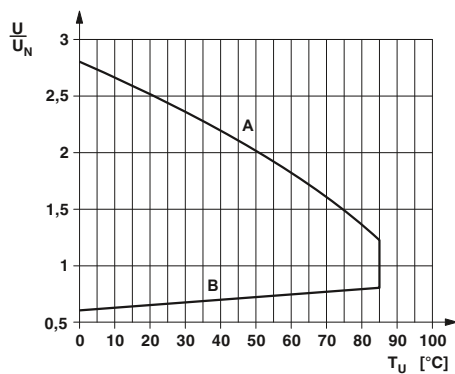


Interrupting rating

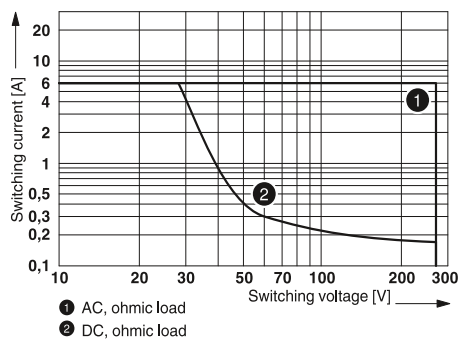


### REL-MR-.../21.../MS (1-PDT)

Input voltage range



Interrupting rating



# Relay modules

## Industrial relay system - RIFLINE complete

### Plug-in solid-state relays

Plug-in solid-state relays suitable for RIF-0 and PLC-INTERFACE relay bases.

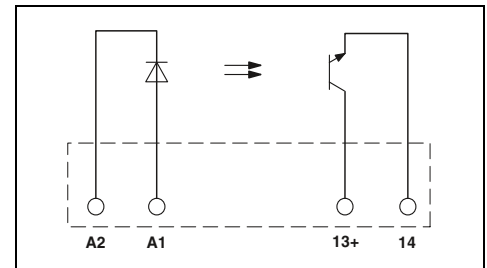
The advantages:

- Switching current of up to 3 A
- RT III-proof (wash-proof)
- Vibration and shock-resistant
- Wear-free and long-lasting
- Zero voltage switch at AC output
- Can be soldered on PCB

Notes:
For dimensional drawings and perforations for assembly, see page 399
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



Solid-state relay, DC output max. 3 A



Input data	
Permissible range (with reference to $U_N$ )	
Switching level	1 signal ("H") [V DC] $\geq$ 0 signal ("L") [V DC] $\leq$
Typical input current at $U_N$	[mA]
Typical switch-on time at $U_N$	[ $\mu$ s]
Typical switch-off time at $U_N$	[ $\mu$ s]
Transmission frequency $f_{limit}$	[Hz]
Output data	
Max. switching voltage	33 V DC
Minimum switching voltage	3 V DC
Limiting continuous current	3 A (see derating curve)
Minimum load current	-
Maximum switch-on current	15 A (10 ms)
Leakage current in off state	-
Phase angle (cos $\phi$ )	-
Output circuit	2-wire, floating
Max. load value	-
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	$\leq$ 150 mV
General data	
Rated surge voltage	Basic insulation
Test voltage input/output	2.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-25 °C ... 60 °C
Nominal operating mode	100% operating factor
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	any / In rows with zero spacing
Dimensions	W / H / D 5 mm / 28 mm / 15 mm

### Technical data

①	0.8 - 1.2
	16
	10
	7
	20
	300
	300
	33 V DC
	3 V DC
	3 A (see derating curve)
	-
	15 A (10 ms)
	-
	-
	2-wire, floating
	-
	Reverse polarity protection, surge protection
	$\leq$ 150 mV
	Basic insulation
	2.5 kV (50 Hz, 1 min.)
	-25 °C ... 60 °C
	100% operating factor
	IEC 60664, EN 50178
	2 / III
	any / In rows with zero spacing
	5 mm / 28 mm / 15 mm

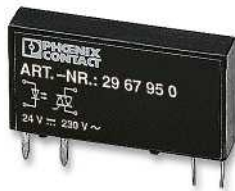
Description	Input voltage $U_N$
<b>Plug-in solid-state relays</b>	
Solid-state power relays	① 24 V DC
<b>Plug-in solid-state relays</b>	
Solid-state input relays	① 24 V DC

### Ordering data

Type	Order No.	Pcs./Pkt.
<b>OPT-24DC/ 24DC/ 2</b>	<b>2966595</b>	10

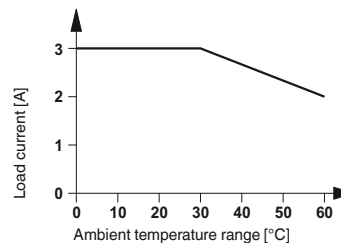


Solid-state relay,  
DC output max. 100 mA

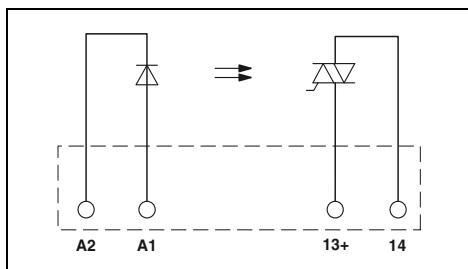
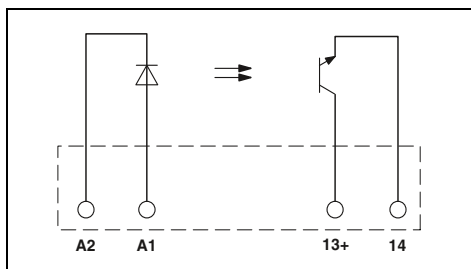
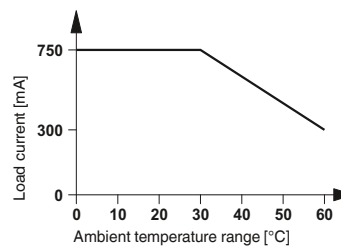


Solid-state relay,  
AC output max. 750 mA

Derating curve for OPT...DC/24DC/2 and PLC-OS.../24DC/2 solid-state relays



Derating curve for OPT...DC/230AC/1 and PLC-OS.../230AC/1 solid-state relays



Technical data

Technical data

①
0.8 -
1.2
16
10
7
20
300
300

①
0.8 -
1.2
10
5
3
6000
500
10

48 V DC
3 V DC
100 mA
-
-
-
-
2-wire, floating
-
Reverse polarity protection, surge protection
≤ 1 V

253 V AC
24 V AC
0.75 A (see derating curve)
10 mA
30 A (10 ms)
< 1 mA
0.5
2-conductor floating, zero voltage switch
4.5 A <sup>2</sup> s
RCV circuit
< 1 V

Basic insulation
2.5 kV (50 Hz, 1 min.)
-25 °C ... 60 °C
100% operating factor
IEC 60664 , EN 50178
2 / III
any / In rows with zero spacing
5 mm / 28 mm / 15 mm

Basic insulation
2.5 kV (50 Hz, 1 min.)
-25 °C ... 60 °C
100% operating factor
IEC 60664 , EN 50178
2 / III
any / In rows with zero spacing
5 mm / 28 mm / 15 mm

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
OPT-24DC/ 48DC/100	2966618	10

Type	Order No.	Pcs./ Pkt.
OPT-24DC/230AC/ 1	2967950	10

# Relay modules

## Industrial relay system - RIFLINE complete

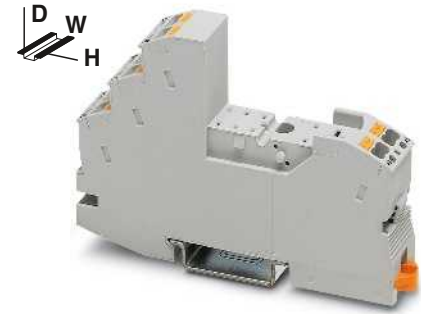
### Modular RIF-1 relay base

Relay base for assembly with 1 or 2-PDT relays or solid-state relays.

Range of accessories includes:

- Plug-in interference suppression module
- Plug-in timer module
- Relay retaining bracket with ejector function and holder for marking material
- Comprehensive range of marking material
- Test plug
- FBS 2-6 plug-in bridges for the input side (A2)
- FBS 2-8 plug-in bridges for the output side (11/21)

Notes:
Type of insulating housing: Polyamide PA, non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



2-PDT relay base with Push-in connection technology



Nominal voltage  $U_N$   
Nominal current at  $U_N$

#### General data

Ambient temperature (operation)

Connection data solid/stranded/AWG

Dimensions

Width

Depth with retaining bracket

Height

#### Technical data

250 V AC/DC

max. 13 A (Depends on application/assembly)

-40 °C ... 85 °C (Depends on application/assembly)

0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16

16 mm

75 mm

96 mm

#### Ordering data

Description

**RIF-1 relay base**, plug-in option for interference suppression module, safe isolation I/O with Push-in connection

**RIF-1 relay base**, plug-in option for interference suppression module, safe isolation I/O with screw connection

**Relay retaining bracket**, with ejector function and holder for marking material, suitable for RIF-1 relay base

- for 16 mm high miniature power and solid-state relays

- for 25 mm high miniature power relays

**Relay retaining bracket**, wire model, suitable for RIF-1 relay base

- for 16 mm high miniature power and solid-state relays

- for 25 mm high miniature power relays

Type

Order No.

Pcs./Pkt.

RIF-1-BPT/2X21

2900931

10

#### Accessories

#### Plug-in bridge

2-pos. red, 32 A

2-pos. red, 24 A

2-pos. red, 32 A

2-pos. blue, 32 A

2-pos. gray, 32 A

2-pos. red, 41 A

2-pos. blue, 41 A

2-pos. gray, 41 A

**End bracket**, for snapping onto NS 35, 9.5 mm wide, can be marked with ZB 6, ZB 8/27, KLM...

**Test plug**, consisting of:

**Metal part** for 2.3 mm Ø socket hole and

silver

**Insulating sleeve**, for MPS metal part

red

white

blue

yellow

green

gray

black

**Zack marker strip**, unprinted

10-section

5-section

**Double marker carrier for ZB 5**

FBS 2-6

3030336

50

FBSR 2-6

3033715

50

FBSR 2-8

3033808

10

FBS 2-6 BU

3036932

50

FBS 2-6 GY

3032237

50

FBS 2-8

3030284

10

FBS 2-8 BU

3032567

10

FBS 2-8 GY

3032541

10

7042

CLIPFIX 35

3022218

50

MPS-MT

0201744

10

MPS-IH RD

0201676

10

MPS-IH WH

0201663

10

MPS-IH BU

0201689

10

MPS-IH YE

0201692

10

MPS-IH GN

0201702

10

MPS-IH GY

0201728

10

MPS-IH BK

0201731

10

ZB 5 :UNBEDRUCKT

1050004

10

ZB 15:UNBEDRUCKT

0811972

10

STP 5-2

0800967

100



# Relay modules

## Industrial relay system - RIFLINE complete

### Plug-in miniature power relays

Plug-in miniature power relays with 1 or 2 changeover contacts, suitable for the RIF-1 and PLC-INTERFACE relay bases.

The advantages:

- Power contacts up to 16 A
- Multi-layer gold contact or power contact
- High degree of protection up to RT III depending on type (wash-proof)

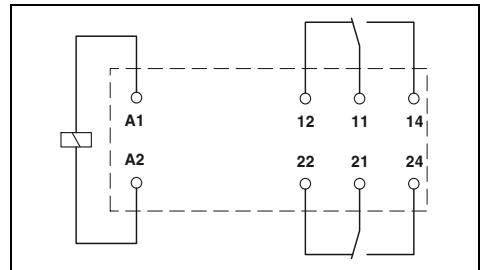
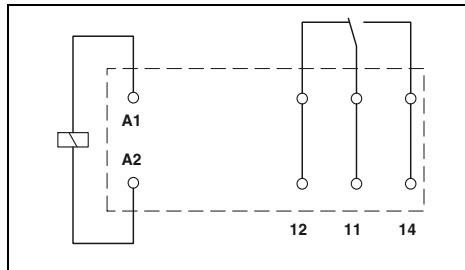


1-PDT relay,  
max. 16 A



2-PDT relay,  
max. 2 x 8 A

**Notes:**  
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.  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical response time at $U_N$ (depending on phase relation)	[ms]
Typical release time at $U_N$	[ms]
Typical release time at $U_N$ (depending on phase relation)	[ms]
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current AC	
Maximum switch-on current DC	
Minimum switching current	
General data	
Test voltage (winding / contact)	
Test voltage (contact/contact)	
Ambient temperature (operation), AC	
Ambient temperature (operation), DC	
Mechanical service life, AC	
Mechanical service life, DC	
Standards/regulations	

Technical data							
①	②	③	④	⑤	⑥	⑦	⑧
see diagram							
33	17	8.7	8.2	4.1	32	7	3
7	7	7	7	7	3 - 12	3 - 12	3 - 12
3	3	3	3	3	2 - 9	2 - 9	2 - 9
1 PDT		1 PDT		1 PDT		1 PDT	
AgNi		AgNi		AgNi, hard gold-plated		AgNi, hard gold-plated	
250 V AC/DC		30 V AC / 36 V DC		30 V AC / 36 V DC		30 V AC / 36 V DC	
12 V (at 10 mA)		100 mV (at 10 mA)		100 mV (at 10 mA)		100 mV (at 10 mA)	
16 A		50 mA		50 mA		50 mA	
25 A (20 ms)		50 mA		50 mA		50 mA	
50 A (20 ms)		50 mA		50 mA		50 mA	
10 mA (at 12 V)		1 mA (at 24 V)		1 mA (at 24 V)		1 mA (at 24 V)	
5 kV AC (50 Hz, 1 min.)		-		-		-	
-40 °C ... 85 °C		-40 °C ... 85 °C		-40 °C ... 85 °C		-40 °C ... 85 °C	
-40 °C ... 85 °C		-40 °C ... 85 °C		-40 °C ... 85 °C		-40 °C ... 85 °C	
1 x 10 <sup>7</sup> cycles		1 x 10 <sup>7</sup> cycles		1 x 10 <sup>7</sup> cycles		1 x 10 <sup>7</sup> cycles	
3 x 10 <sup>7</sup> cycles		3 x 10 <sup>7</sup> cycles		3 x 10 <sup>7</sup> cycles		3 x 10 <sup>7</sup> cycles	
IEC 60664, EN 50178, EN 61810-1		IEC 60664, EN 50178, EN 61810-1		IEC 60664, EN 50178, EN 61810-1		IEC 60664, EN 50178, EN 61810-1	

Technical data							
①	②	③	④	⑤	⑥	⑦	⑧
see diagram							
33	17	8.7	8.2	4.1	32	7	3
7	7	7	7	7	3 - 12	3 - 12	3 - 12
3	3	3	3	3	2 - 9	2 - 9	2 - 9
2 PDT		2 PDT		2 PDT		2 PDT	
AgNi		AgNi		AgNi, hard gold-plated		AgNi, hard gold-plated	
250 V AC/DC		30 V AC / 36 V DC		30 V AC / 36 V DC		30 V AC / 36 V DC	
5 V (at 10 mA)		100 mV (at 10 mA)		100 mV (at 10 mA)		100 mV (at 10 mA)	
8 A		50 mA		50 mA		50 mA	
12 A (20 ms)		50 mA		50 mA		50 mA	
25 A (20 ms)		50 mA		50 mA		50 mA	
10 mA (At 5 V)		1 mA (at 24 V)		1 mA (at 24 V)		1 mA (at 24 V)	
5 kV AC (50 Hz, 1 min.)		2.5 kV AC (50 Hz, 1 min.)		2.5 kV AC (50 Hz, 1 min.)		2.5 kV AC (50 Hz, 1 min.)	
-40 °C ... 85 °C		-40 °C ... 85 °C		-40 °C ... 85 °C		-40 °C ... 85 °C	
-40 °C ... 85 °C		-40 °C ... 85 °C		-40 °C ... 85 °C		-40 °C ... 85 °C	
1 x 10 <sup>7</sup> cycles		1 x 10 <sup>7</sup> cycles		1 x 10 <sup>7</sup> cycles		1 x 10 <sup>7</sup> cycles	
3 x 10 <sup>7</sup> cycles		3 x 10 <sup>7</sup> cycles		3 x 10 <sup>7</sup> cycles		3 x 10 <sup>7</sup> cycles	
IEC 60664, EN 50178, EN 61810-1		IEC 60664, EN 50178, EN 61810-1		IEC 60664, EN 50178, EN 61810-1		IEC 60664, EN 50178, EN 61810-1	

Ordering data	
Description	Input voltage $U_N$
<b>Plug-in miniature power relays, with power contacts</b>	
①	12 V DC
②	24 V DC
③	48 V DC
④	60 V DC
⑤	110 V DC
⑥	24 V AC
⑦	120 V AC
⑧	230 V AC
<b>Plug-in miniature power relays, with multi-layer gold contacts</b>	
①	12 V DC
②	24 V DC
③	48 V DC
④	60 V DC
⑤	110 V DC
⑥	24 V AC
⑦	120 V AC
⑧	230 V AC

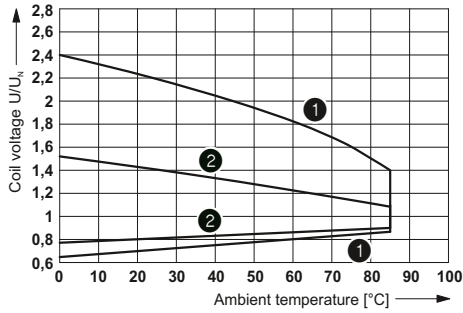
Ordering data		
Type	Order No.	Pcs./ Pkt.
REL-MR- 12DC/21HC	2961309	10
REL-MR- 24DC/21HC	2961312	10
REL-MR- 48DC/21HC	2834821	10
REL-MR- 60DC/21HC	2961325	10
REL-MR-110DC/21HC	2961338	10
REL-MR- 24AC/21HC	2961406	10
REL-MR-120AC/21HC	2961419	10
REL-MR-230AC/21HC	2961422	10
REL-MR- 12DC/21HC AU	2961532	10
REL-MR- 24DC/21HC AU	2961545	10
REL-MR-110DC/21HC AU	2961561	10
REL-MR- 24AC/21HC AU	2961503	10
REL-MR-120AC/21HC AU	2961516	10
REL-MR-230AC/21HC AU	2961529	10

Ordering data		
Type	Order No.	Pcs./ Pkt.
REL-MR- 12DC/21-21	2961257	10
REL-MR- 24DC/21-21	2961192	10
REL-MR- 48DC/21-21	2834834	10
REL-MR- 60DC/21-21	2961273	10
REL-MR-110DC/21-21	2961202	10
REL-MR- 24AC/21-21	2961435	10
REL-MR-120AC/21-21	2961448	10
REL-MR-230AC/21-21	2961451	10
REL-MR- 12DC/21-21AU	2961299	10
REL-MR- 24DC/21-21AU	2961215	10
REL-MR- 48DC/21-21AU	2834847	10
REL-MR- 60DC/21-21AU	2961286	10
REL-MR-110DC/21-21AU	2961228	10
REL-MR- 24AC/21-21AU	2961464	10
REL-MR-120AC/21-21AU	2961477	10
REL-MR-230AC/21-21AU	2961480	10



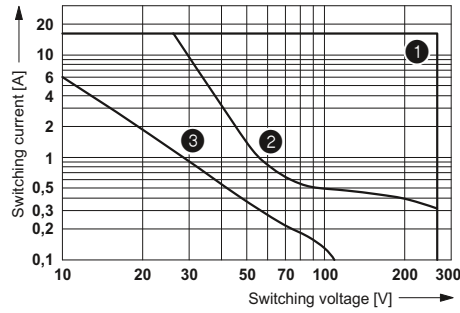
### REL-MR...21HC... (1-PDT)

Operating voltage range



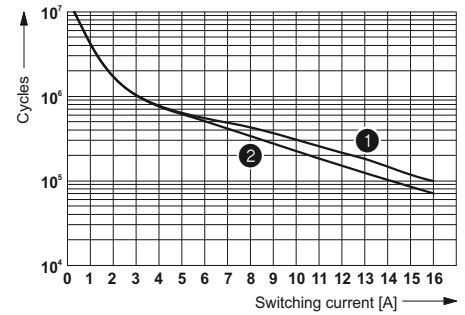
- 1 DC coils
- 2 AC coils

Interrupting rating



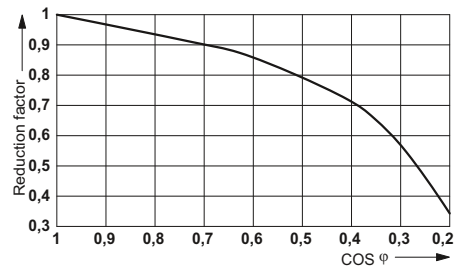
- 1 AC, ohmic load
- 2 DC, ohmic load
- 3 DC, L/R = 40 ms

Electrical service life



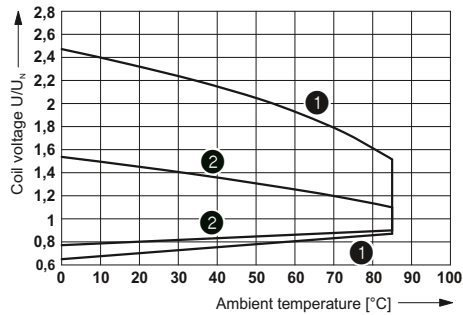
- 1 250 V AC, ohmic load (DC coils)
- 2 250 V AC, ohmic load (AC coils)

Service life reduction factor with various cos phi



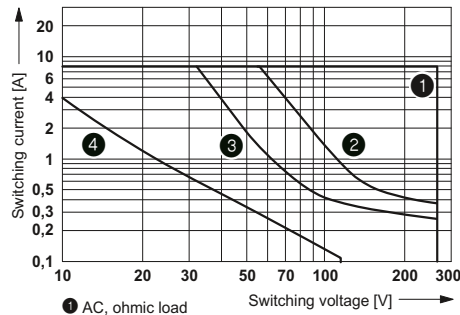
### REL-MR...21-21... (2-PDT)

Operating voltage range



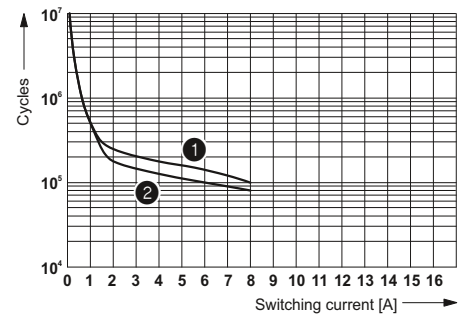
- 1 DC coils
- 2 AC coils

Interrupting rating



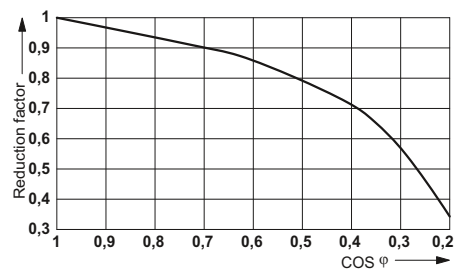
- 1 AC, ohmic load
- 2 DC, ohmic load, contacts in series
- 3 DC, ohmic load
- 4 DC, L/R = 40 ms

Electrical service life



- 1 250 V AC, ohmic load (DC coils)
- 2 250 V AC, ohmic load (AC coils)

Service life reduction factor with various cos phi



# Relay modules

## Industrial relay system - RIFLINE complete

### Plug-in miniature power relays

Plug-in miniature power relays with 1 or 2 changeover contacts, suitable for the RIF-1 relay base.

The advantages:

- Switching current of up to 16 A
- With lockable manual operation
- Mechanical switch position indicator
- Integrated status LED
- Multi-layer gold contact or power contact
- DC types with integrated freewheeling diode
- Can be soldered on PCB

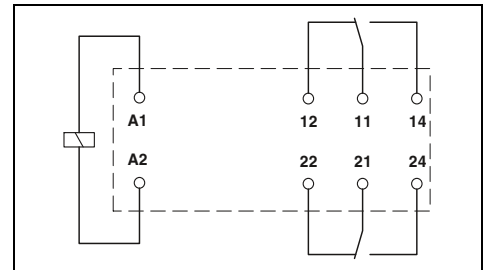
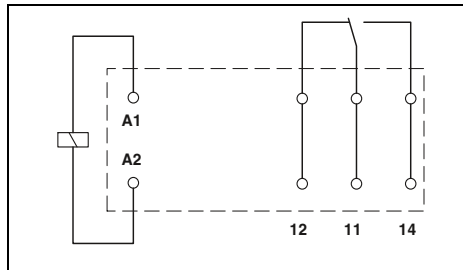


1-PDT relay with manual operation, 16 A, maximum



2-PDT relay with manual operation, 2 x 8 A, maximum

**Notes:**  
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.  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



Input data		
Permissible range (with reference to $U_N$ )		
Typical input current at $U_N$	[mA]	18 32 7 3.5
Typical response time at $U_N$	[ms]	9
Typical response time at $U_N$ (depending on phase relation)	[ms]	3 - 12 3 - 12
Typical release time at $U_N$	[ms]	6
Typical release time at $U_N$ (depending on phase relation)	[ms]	2 - 8 2 - 8 2 - 8
Output data		
Contact type		1 PDT 1 PDT
Contact material		AgNi AgNi, hard gold-plated
Max. switching voltage		250 V AC/DC 30 V AC / 36 V DC
Minimum switching voltage		12 V (at 10 mA) 12 V (At 1 mA)
Limiting continuous current		16 A 50 mA
Maximum switch-on current AC		32 A (20 ms) 50 mA
Maximum switch-on current DC		32 A (20 ms) 50 mA
Minimum switching current		10 mA (at 12 V) 1 mA (at 12 V)
General data		
Test voltage (winding / contact)		5 kV AC (50 Hz, 1 min.)
Test voltage (contact/contact)		-
Ambient temperature (operation), AC		-40 °C ... 70 °C
Ambient temperature (operation), DC		-40 °C ... 70 °C
Mechanical service life, AC		5 x 10 <sup>6</sup> cycles
Mechanical service life, DC		5 x 10 <sup>6</sup> cycles
Standards/regulations		EN 61810-1, VDE 0435-201, EN 50178

Technical data			
①	②	③	④
see diagram			
18	32	7	3.5
9		3 - 12	3 - 12
6		2 - 8	2 - 8
1 PDT		1 PDT	
AgNi		AgNi, hard gold-plated	
250 V AC/DC		30 V AC / 36 V DC	
12 V (at 10 mA)		12 V (At 1 mA)	
16 A		50 mA	
32 A (20 ms)		50 mA	
32 A (20 ms)		50 mA	
10 mA (at 12 V)		1 mA (at 12 V)	
5 kV AC (50 Hz, 1 min.)			
-			
-40 °C ... 70 °C			
-40 °C ... 70 °C			
5 x 10 <sup>6</sup> cycles			
5 x 10 <sup>6</sup> cycles			
EN 61810-1, VDE 0435-201, EN 50178			

Technical data			
①	②	③	④
see diagram			
18	32	7	3.5
9		3 - 12	3 - 12
6		2 - 8	2 - 8
2 PDT		2 PDT	
AgNi		AgNi, hard gold-plated	
250 V AC/DC		30 V AC / 36 V DC	
12 V (at 10 mA)		12 V (At 1 mA)	
8 A		50 mA	
16 A (20 ms)		50 mA	
16 A (20 ms)		50 mA	
10 mA (at 12 V)		1 mA (at 12 V)	
5 kV AC (50 Hz, 1 min.)			
5 kV AC (50 Hz, 1 min.)			
-40 °C ... 70 °C			
-40 °C ... 70 °C			
5 x 10 <sup>6</sup> cycles			
5 x 10 <sup>6</sup> cycles			
EN 61810-1, VDE 0435-201, EN 50178			

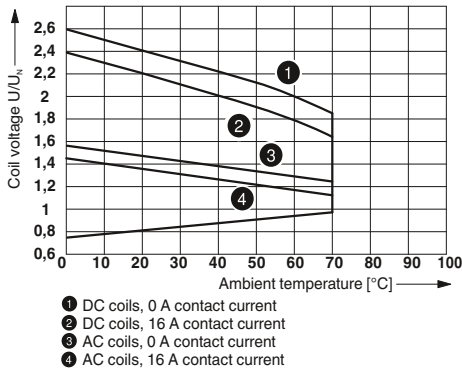
Description	Input voltage $U_N$
<b>Plug-in miniature power relays, with power contacts</b>	
- Status LED, freewheeling diode A1+, A2-	① 24 V DC
- Status LED	② 24 V AC
- Status LED	③ 120 V AC
- Status LED	④ 230 V AC
<b>Plug-in miniature power relays, with multi-layer gold contacts, with manual operation, mechanical switch position indicator</b>	
- Status LED, freewheeling diode A1+, A2-	① 24 V DC
- Status LED	⑤ 230 V AC

Ordering data		
Type	Order No.	Pcs./ Pkt.
REL-MR- 24DC/21HC/MS	2987888	10
REL-MR- 24AC/21HC/MS	2987891	10
REL-MR-120AC/21HC/MS	2987901	10
REL-MR-230AC/21HC/MS	2987914	10
REL-MR- 24DC/21HC AU/MS	2987927	10
REL-MR-230AC/21HC AU/MS	2987930	10

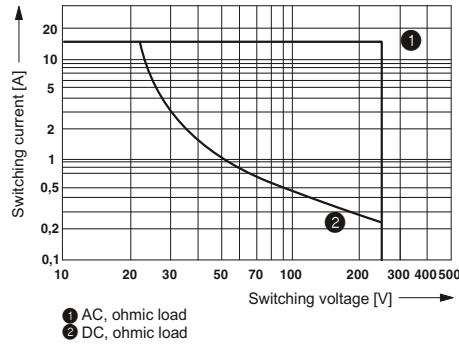
Ordering data		
Type	Order No.	Pcs./ Pkt.
REL-MR- 24DC/21-21/MS	2987943	10
REL-MR- 24AC/21-21/MS	2987956	10
REL-MR-120AC/21-21/MS	2987969	10
REL-MR-230AC/21-21/MS	2987972	10
REL-MR- 24DC/21-21AU/MS	2987985	10
REL-MR-230AC/21-21AU/MS	2987998	10

### REL-MR...21HC...MS (1-PDT)

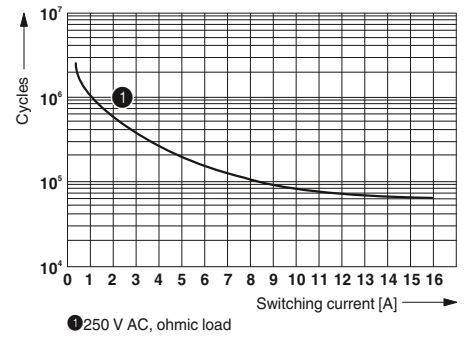
Operating voltage range



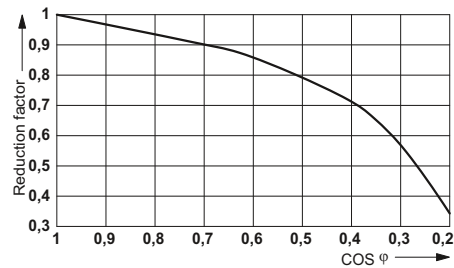
Interrupting rating



Electrical service life

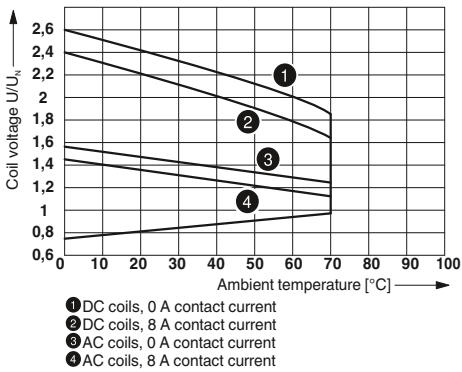


Service life reduction factor with various cos phi

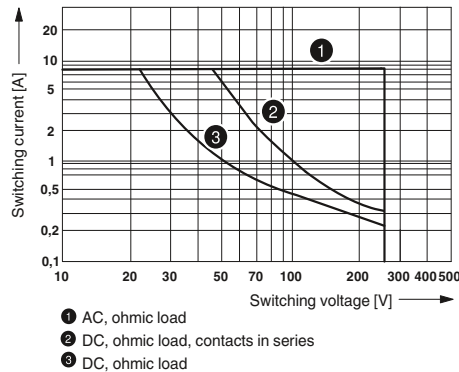


### REL-MR...21-21...MS (2-PDT)

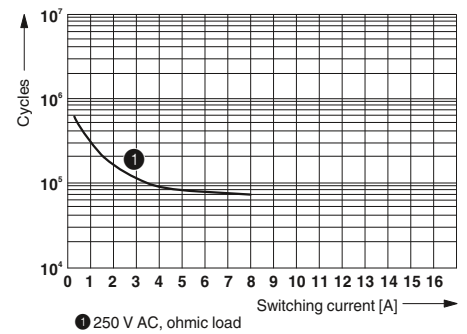
Operating voltage range



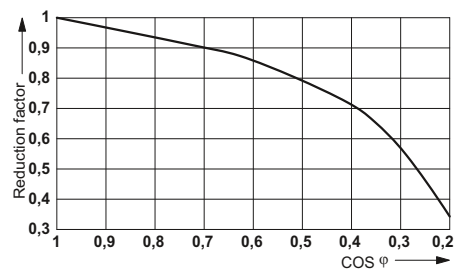
Interrupting rating



Electrical service life



Service life reduction factor with various cos phi



# Relay modules

## Industrial relay system - RIFLINE complete

### Bipolar, plug-in miniature power relays

new

new

Bipolar, plug-in miniature power relays with 1 or 2 changeover contacts, suitable for the RIF-1 relay base.

The advantages:

- Switching current of up to 16 A
- With detectable manual operation
- Mechanical switch position indicator
- Multi-layer power contact
- Can be soldered on PCB
- Special voltages (100 and 200 V AC)



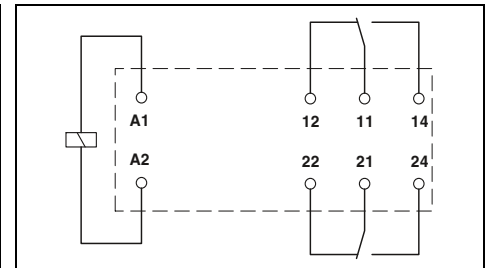
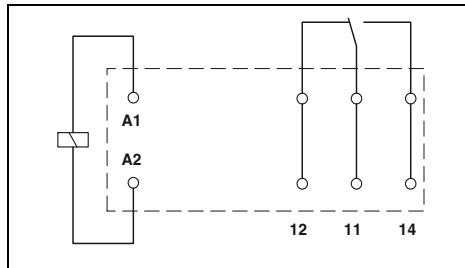
1-PDT relay (bipolar) with manual operation, max. 16 A



2-PDT relay (bipolar) with manual operation, max. 2 x 8 A

**Notes:**

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



**Technical data**

**Technical data**

Input data	①	②	③
Permissible range (with reference to $U_N$ )	see diagram		
Typical input current at $U_N$	17	8	4
Typical response time at $U_N$	9		
Typical response time at $U_N$ ( depending on phase relation )		3 - 12	3 - 12
Typical release time at $U_N$	6		
Typical release time at $U_N$ ( depending on phase relation )		2 - 8	2 - 8
Output data			
Contact type	1 PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Minimum switching voltage	12 V (at 10 mA)		
Limiting continuous current	16 A		
Maximum switch-on current AC	32 A (20 ms)		
Maximum switch-on current DC	32 A (20 ms)		
Minimum switching current	10 mA (at 12 V)		
General data			
Test voltage (winding / contact)	5 kV AC (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40 °C ... 70 °C		
Ambient temperature (operation), DC	-40 °C ... 70 °C		
Mechanical service life, AC	5 x 10 <sup>6</sup> cycles		
Mechanical service life, DC	5 x 10 <sup>6</sup> cycles		
Standards/regulations	IEC 61810 , IEC 60664		

Input data	①	②	③
Permissible range (with reference to $U_N$ )	see diagram		
Typical input current at $U_N$	17	8	4
Typical response time at $U_N$	9		
Typical response time at $U_N$ ( depending on phase relation )		3 - 12	3 - 12
Typical release time at $U_N$	6		
Typical release time at $U_N$ ( depending on phase relation )		2 - 8	2 - 8
Output data			
Contact type	2 PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Minimum switching voltage	12 V (at 10 mA)		
Limiting continuous current	8 A		
Maximum switch-on current AC	16 A (20 ms)		
Maximum switch-on current DC	16 A (20 ms)		
Minimum switching current	10 mA (at 12 V)		
General data			
Test voltage (winding / contact)	5 kV AC (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40 °C ... 70 °C		
Ambient temperature (operation), DC	-40 °C ... 70 °C		
Mechanical service life, AC	5 x 10 <sup>6</sup> cycles		
Mechanical service life, DC	5 x 10 <sup>6</sup> cycles		
Standards/regulations	IEC 61810 , IEC 60664		

**Ordering data**

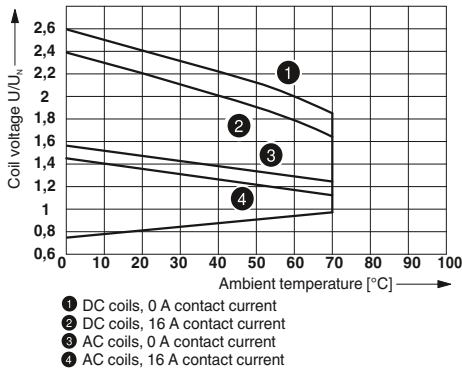
**Ordering data**

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Bipolar, plug-in miniature power relays, with power contacts</b>	① 24 V DC	REL-MR-BL-24DC/21HC/MS	2908180	10
	② 100 V AC	REL-MR-BL-100AC/21HC/MS	2908179	10
	③ 200 V AC	REL-MR-BL-200AC/21HC/MS	2908178	10

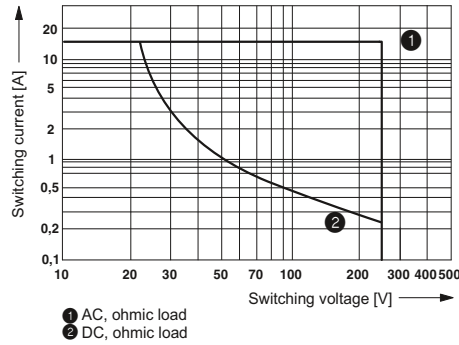
Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Bipolar, plug-in miniature power relays, with power contacts</b>	① 24 V DC	REL-MR-BL-24DC/21-21/MS	2908181	10
	② 100 V AC	REL-MR-BL-100AC/21-21/MS	2908183	10
	③ 200 V AC	REL-MR-BL-200AC/21-21/MS	2908182	10

### REL-MR-BL...21HC/MS (1-PDT)

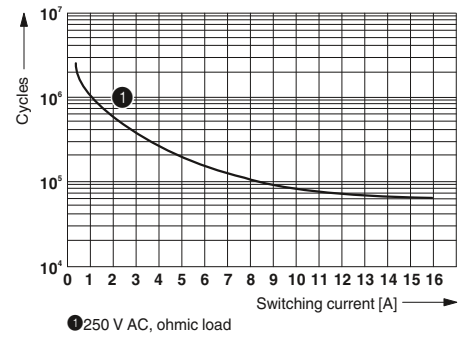
Operating voltage range



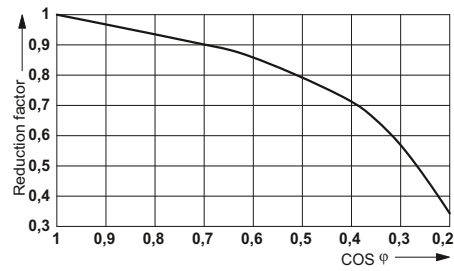
Interrupting rating



Electrical service life

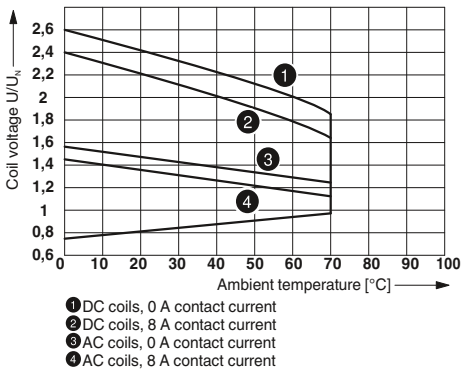


Service life reduction factor with various cos phi

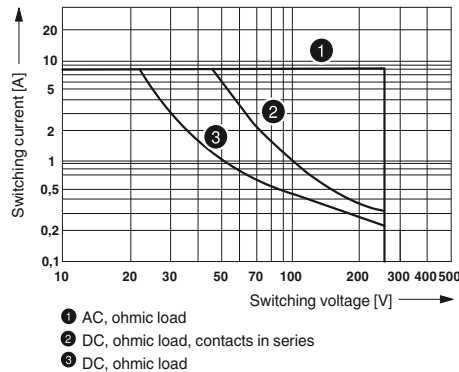


### REL-MR-BL...21-21/MS (2-PDT)

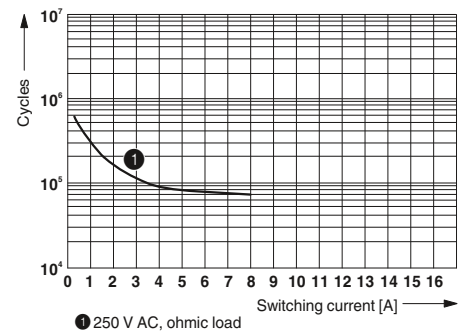
Operating voltage range



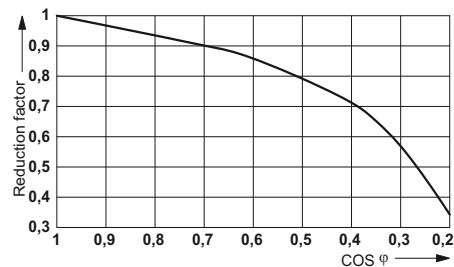
Interrupting rating



Electrical service life



Service life reduction factor with various cos phi



# Relay modules

## Industrial relay system - RIFLINE complete

### Plug-in solid-state relays

Plug-in solid-state relays are suitable for both relay bases RIF-1 and PLC-INTERFACE.

The advantages:

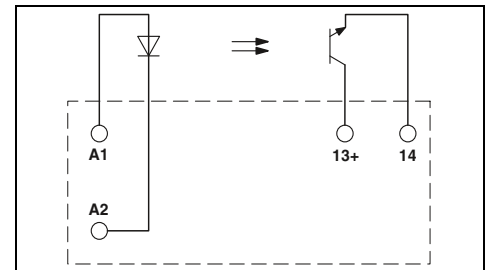
- Switching current of up to 5 A
- RT III-proof (wash-proof)
- Vibration and shock-resistant
- Wear-free and long-lasting
- Zero voltage switch at AC output
- Can be soldered on PCB

Notes:	
For dimensional drawings and perforations for assembly, see page 399	
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.	



Solid-state relay,  
DC output max. 5 A

PHOENIX CONTACT



Input data	
Permissible range (with reference to $U_N$ )	
Switching level	1 signal ("H") [V DC] $\geq$ 0 signal ("L") [V DC] $\leq$
Typical input current at $U_N$	[mA]
Typical switch-on time at $U_N$	[ $\mu$ s]
Typical switch-off time at $U_N$	[ $\mu$ s]
Transmission frequency $f_{limit}$	[Hz]
Output data	
Max. switching voltage	33 V DC
Minimum switching voltage	3 V DC
Limiting continuous current	5 A (see derating curve)
Minimum load current	-
Maximum switch-on current	15 A (10 ms)
Leakage current in off state	-
Output circuit	2-wire, floating
Max. load value	-
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	$\leq$ 200 mV
General data	
Rated surge voltage	Basic insulation
Test voltage input/output	2.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-25 °C ... 60 °C
Nominal operating mode	100% operating factor
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	any / In rows with zero spacing
Dimensions	W / H / D 12.7 mm / 29 mm / 15.7 mm

### Technical data

①	②	③
0.8 - 1.2	0.8 - 1.2	0.9 - 1.1
2.5	16	35
0.8	10	20
9	7	3
10	20	25
400	400	400
300	300	300

Max. switching voltage	33 V DC
Minimum switching voltage	3 V DC
Limiting continuous current	5 A (see derating curve)
Minimum load current	-
Maximum switch-on current	15 A (10 ms)
Leakage current in off state	-
Output circuit	2-wire, floating
Max. load value	-
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	$\leq$ 200 mV

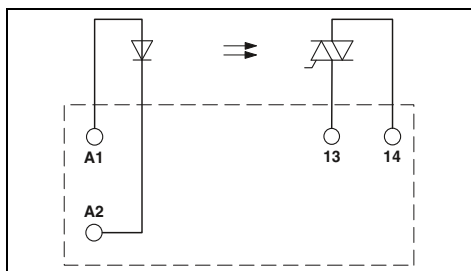
Rated surge voltage	Basic insulation
Test voltage input/output	2.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-25 °C ... 60 °C
Nominal operating mode	100% operating factor
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	any / In rows with zero spacing
Dimensions	W / H / D 12.7 mm / 29 mm / 15.7 mm

### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Plug-in solid-state relays</b>				
Solid-state power relays	① 5 V DC	OPT-5DC/ 24DC/ 5	2982113	10
Solid-state power relays	② 24 V DC	OPT-24DC/ 24DC/ 5	2982100	10
Solid-state power relays	③ 60 V DC	OPT-60DC/ 24DC/ 5	2982126	10



Solid-state relay,  
AC output max. 2 A



Technical data

①	②
0.8 -	0.8 -
1.2	1.2
3	18
1	8.4
15	7
10000	10000
10000	10000
10	10

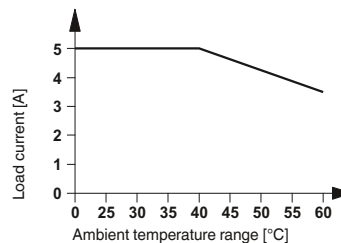
253 V AC  
 24 V AC  
 2 A (see derating curve)  
 25 mA  
 30 A (10 ms)  
 < 1 mA  
 2-conductor floating, zero voltage switch  
 4 A<sup>2</sup>s (tp = 10 ms, at 25 °C)  
 Surge protection  
 ≤ 1 V

Basic insulation  
 2.5 kV (50 Hz, 1 min.)  
 -25 °C ... 60 °C  
 100% operating factor  
 IEC 60664 , EN 50178  
 2 / III  
 any / See derating curve  
 12.7 mm / 29 mm / 15.7 mm

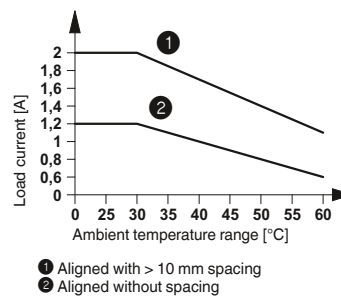
Ordering data

Type	Order No.	Pcs./ Pkt.
OPT-5DC/230AC/ 2	2982168	10
OPT-24DC/230AC/ 2	2982171	10

Derating curve for OPT...DC/24DC/5 solid-state relays



Derating curve for OPT...DC/230AC/2 solid-state relays



- ① Aligned with > 10 mm spacing
- ② Aligned without spacing

# Relay modules

## Industrial relay system - RIFLINE complete

### Modular RIF-2 relay base

Relay base for assembly with 2 or 4-PDT industrial relay.

Range of accessories includes:

- Plug-in interference suppression module
- Plug-in timer module
- Relay retaining bracket with ejector function and holder for marking material
- Comprehensive range of marking material
- Test plug
- FBS 2-6 plug-in bridges for the input side (A2)

Notes:
Type of insulating housing: Polyamide PA, non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



**4-PDT relay base with Push-in connection technology for industrial relays**



Nominal voltage  $U_N$   
Nominal current at  $U_N$

Technical data
250 V AC/DC max. 12 A (Depends on application/assembly)

General data
Ambient temperature (operation)
Connection data solid/stranded/AWG
Dimensions
Width
Depth with retaining bracket
Height

-40 °C ... 85 °C (Depends on application/assembly)
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
31 mm
75 mm
96 mm

Description
<b>RIF-2 relay base</b> , plug-in option for interference suppression module, safe isolation I/O with Push-in connection
<b>RIF-2 relay base</b> , plug-in option for interference suppression module, safe isolation I/O with screw connection
<b>Plastic relay retaining bracket</b> , with ejector function and holder for marking material, suitable for RIF-2 relay base
<b>Reinforced plastic relay retaining bracket</b> , with ejector function and holder for marking material, suitable for RIF-2 relay base
<b>Relay retaining bracket</b> , wire model, suitable for RIF-2 relay base

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-2-BPT/4X21	2900934	10

<b>Plug-in bridge</b> 2-pos. red, 32 A 2-pos. red, 24 A 2-pos. blue, 32 A 2-pos. gray, 32 A
<b>End bracket</b> , for snapping onto NS 35, 9.5 mm wide, can be marked with ZB 6, ZB 8/27, KLM...
<b>Test plug</b> , consisting of: <b>Metal part</b> for 2.3 mm Ø socket hole and silver
<b>Insulating sleeve</b> , for MPS metal part red white blue yellow green gray black
<b>Zack marker strip, unprinted</b> 10-section 5-section
<b>Double marker carrier for ZB 5</b>

Accessories		
Type	Order No.	Pcs./Pkt.
FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100





# Relay modules

## Industrial relay system - RIFLINE complete

### Plug-in industrial relays

Plug-in industrial relays with 2 or 4 changeover contacts, suitable for RIF-2 relay base.

The advantages:

- With detectable manual operation
- Mechanical switch position indicator
- Integrated status LED
- Multi-layer gold contact or power contact
- DC types with integrated freewheeling diode

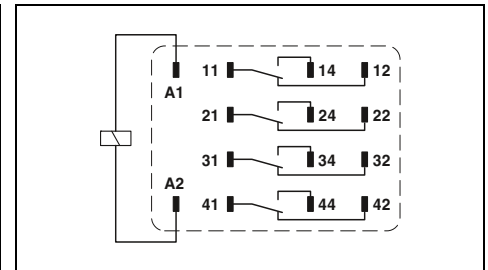
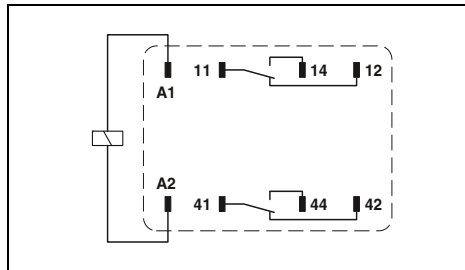


2-PDT industrial relay with manual operation, max. 2 x 12 A



4-PDT industrial relay with manual operation, max. 4 x 6 A

**Notes:**  
For other voltages, see phoenixcontact.net/products  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



Technical data	
Input data	
Permissible range (with reference to $U_N$ )	see diagram
Typical input current at $U_N$ [mA]	78 42 8 7.7 4 66 13 6.5
Typical response time at $U_N$ [ms]	13 13 13 13 13
Typical response time at $U_N$ (depending on phase relation) [ms]	5 - 15 5 - 15 5 - 15
Typical release time at $U_N$ [ms]	14 14 14 14 14
Typical release time at $U_N$ (depending on phase relation) [ms]	5 - 20 5 - 20 5 - 20
Output data	
Contact type	2 PDT
Contact material	AgNi
Max. switching voltage	250 V AC/DC
Minimum switching voltage	5 V (At 24 mA)
Limiting continuous current	12 A
Maximum switch-on current AC	30 A (20 ms, N/O contact)
Maximum switch-on current DC	30 A (20 ms, N/O contact)
Minimum switching current	5 mA (at 24 V)
General data	
Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Ambient temperature (operation), AC	-40 °C ... 55 °C
Ambient temperature (operation), DC	-40 °C ... 70 °C
Mechanical service life, AC	Approx. 2x 10 <sup>7</sup> cycles
Mechanical service life, DC	Approx. 2x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664 , IEC 61810

Technical data	
Input data	
Permissible range (with reference to $U_N$ )	see diagram
Typical input current at $U_N$ [mA]	78 42 8 7.7 4 66 13 6.5
Typical response time at $U_N$ [ms]	13 13 13 13 13
Typical response time at $U_N$ (depending on phase relation) [ms]	5 - 15 5 - 15 5 - 15
Typical release time at $U_N$ [ms]	14 14 14 14 14
Typical release time at $U_N$ (depending on phase relation) [ms]	5 - 20 5 - 20 5 - 20
Output data	
Contact type	4 PDT
Contact material	AgNi, hard gold-plated
Max. switching voltage	250 V AC/DC
Minimum switching voltage	5 V (At 24 mA)
Limiting continuous current	6 A
Maximum switch-on current AC	16 A (20 ms, N/O contact)
Maximum switch-on current DC	16 A (20 ms, N/O contact)
Minimum switching current	5 mA (at 24 V)
General data	
Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Ambient temperature (operation), AC	-40 °C ... 55 °C
Ambient temperature (operation), DC	-40 °C ... 70 °C
Mechanical service life, AC	Approx. 2x 10 <sup>7</sup> cycles
Mechanical service life, DC	Approx. 2x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664 , IEC 61810

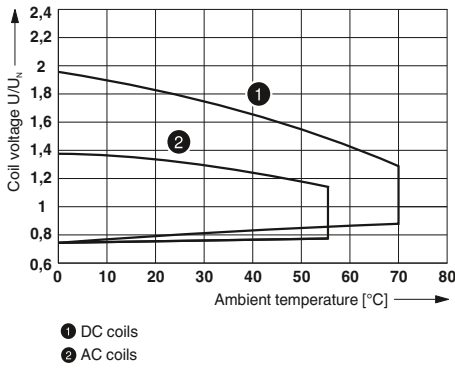
Ordering data	
Description	Input voltage $U_N$
<b>Plug-in industrial relays, with power contacts</b>	
With freewheeling diode	① 12 V DC
With freewheeling diode	② 24 V DC
With freewheeling diode	③ 110 V DC
With freewheeling diode	④ 125 V DC
With freewheeling diode	⑤ 220 V DC
	⑥ 24 V AC
	⑦ 120 V AC
	⑧ 230 V AC
<b>Plug-in industrial relays, with multi-layer gold contacts</b>	
With freewheeling diode	① 12 V DC
With freewheeling diode	② 24 V DC
With freewheeling diode	③ 110 V DC
With freewheeling diode	④ 125 V DC
With freewheeling diode	⑤ 220 V DC
	⑥ 24 V AC
	⑦ 120 V AC
	⑧ 230 V AC

Ordering data		
Type	Order No.	Pcs./Pkt.
REL-IR2/LDP- 12DC/2X21	2903659	10
REL-IR2/LDP- 24DC/2X21	2903660	10
REL-IR2/LDP-110DC/2X21	2903663	10
REL-IR2/LDP-125DC/2X21	2903664	10
REL-IR2/LDP-220DC/2X21	2903665	10
REL-IR2/L- 24AC/2X21	2903666	10
REL-IR2/L-120AC/2X21	2903667	10
REL-IR2/L-230AC/2X21	2903668	10

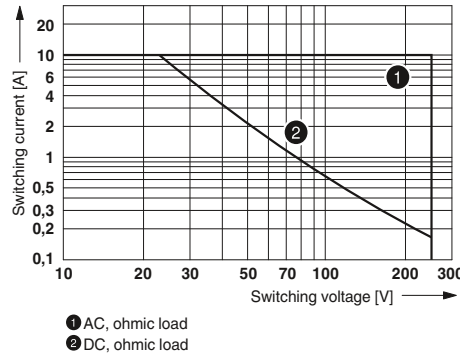
Ordering data		
Type	Order No.	Pcs./Pkt.
REL-IR4/LDP- 12DC/4X21	2903676	10
REL-IR4/LDP- 24DC/4X21	2903677	10
REL-IR4/LDP-110DC/4X21	2903680	10
REL-IR4/LDP-125DC/4X21	2903681	10
REL-IR4/LDP-220DC/4X21	2903682	10
REL-IR4/L- 24AC/4X21	2903686	10
REL-IR4/L-120AC/4X21	2903687	10
REL-IR4/L-230AC/4X21	2903688	10
REL-IR4/LDP- 12DC/4X21AU	2903669	10
REL-IR4/LDP- 24DC/4X21AU	2903670	10
REL-IR4/LDP-110DC/4X21AU	2903673	10
REL-IR4/LDP-125DC/4X21AU	2903674	10
REL-IR4/LDP-220DC/4X21AU	2903675	10
REL-IR4/L- 24AC/4X21AU	2903683	10
REL-IR4/L-120AC/4X21AU	2903684	10
REL-IR4/L-230AC/4X21AU	2903685	10

### REL-IR2... (2-PDT)

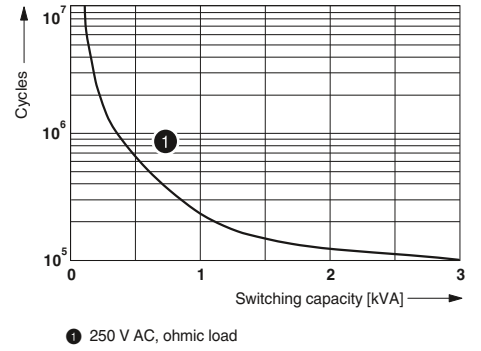
Operating voltage range



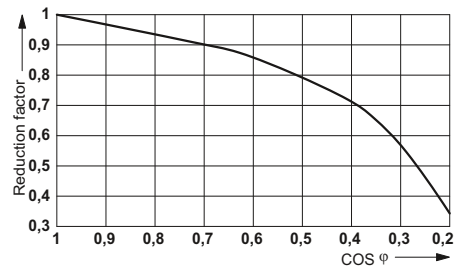
Interrupting rating



Electrical service life

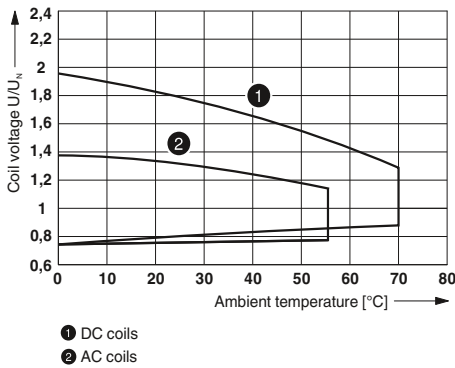


Service life reduction factor

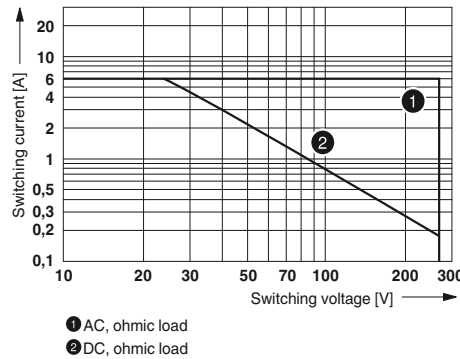


### REL-IR4... (4-PDT)

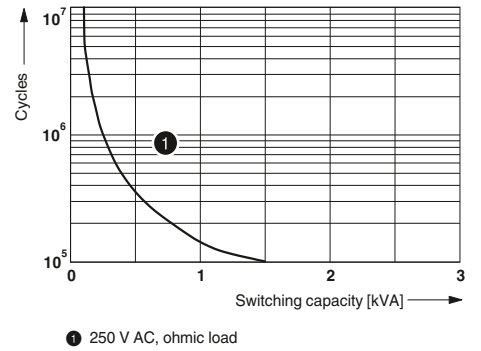
Operating voltage range



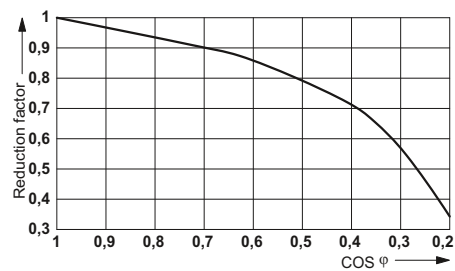
Interrupting rating



Electrical service life



Service life reduction factor



# Relay modules

## Industrial relay system - RIFLINE complete

### Bipolar, plug-in industrial relays

new

new

Bipolar, plug-in industrial relays with 2 or 4 changeover contacts, suitable for the RIF-2 relay base.

The advantages:

- Switching current of up to 12 A
- With detectable manual operation
- Mechanical switch position indicator
- Special voltages (100 and 200 V AC)

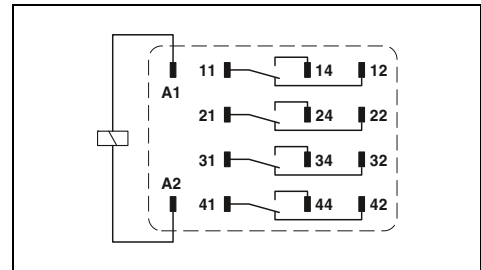
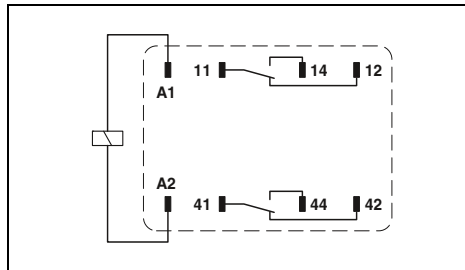
**Notes:**  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



2-PDT industrial relay (bipolar) with manual operation, max. 2 x 12 A



4-PDT industrial relay (bipolar) with manual operation, max. 4 x 6 A



#### Technical data

	①	②	③
<b>Input data</b>	see diagram		
Permissible range (with reference to $U_N$ )	38	14.8	7.1
Typical input current at $U_N$	[mA]		
Typical response time at $U_N$	[ms]	13	
Typical response time at $U_N$ ( depending on phase relation )	[ms]	5 - 15	5 - 15
Typical release time at $U_N$	[ms]	3	
Typical release time at $U_N$ ( depending on phase relation )	[ms]	5 - 20	5 - 20
<b>Output data</b>			
Contact type	2 PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Minimum switching voltage	5 V (At 24 mA)		
Limiting continuous current	12 A		
Maximum switch-on current AC	30 A (20 ms, N/O contact)		
Maximum switch-on current DC	30 A (20 ms, N/O contact)		
Minimum switching current	5 mA (at 24 V)		
<b>General data</b>			
Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40 °C ... 55 °C		
Ambient temperature (operation), DC	-40 °C ... 70 °C		
Mechanical service life, AC	Approx. 2x 10 <sup>7</sup> cycles		
Mechanical service life, DC	Approx. 2x 10 <sup>7</sup> cycles		
Standards/regulations	IEC 60664 , IEC 61810		

	①	②	③
<b>Input data</b>	see diagram		
Permissible range (with reference to $U_N$ )	38	14.8	7.1
Typical input current at $U_N$	[mA]		
Typical response time at $U_N$	[ms]	13	
Typical response time at $U_N$ ( depending on phase relation )	[ms]	5 - 15	5 - 15
Typical release time at $U_N$	[ms]	3	
Typical release time at $U_N$ ( depending on phase relation )	[ms]	5 - 20	5 - 20
<b>Output data</b>			
Contact type	4 PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Minimum switching voltage	5 V (At 24 mA)		
Limiting continuous current	6 A		
Maximum switch-on current AC	16 A (20 ms, N/O contact)		
Maximum switch-on current DC	16 A (20 ms, N/O contact)		
Minimum switching current	5 mA (at 24 V)		
<b>General data</b>			
Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40 °C ... 55 °C		
Ambient temperature (operation), DC	-40 °C ... 70 °C		
Mechanical service life, AC	1x 10 <sup>7</sup> cycles, approximately		
Mechanical service life, DC	1x 10 <sup>7</sup> cycles, approximately		
Standards/regulations	IEC 60664 , IEC 61810		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Bipolar, plug-in industrial relays, with power contacts</b>	① 24 V DC	REL-IR2/24DC/2X21	2907051	10
	② 100 V AC	REL-IR2/100AC/2X21	2907052	10
	③ 200 V AC	REL-IR2/200AC/2X21	2907053	10

Type	Order No.	Pcs./ Pkt.
REL-IR2/24DC/2X21	2907051	10
REL-IR2/100AC/2X21	2907052	10
REL-IR2/200AC/2X21	2907053	10

#### Technical data

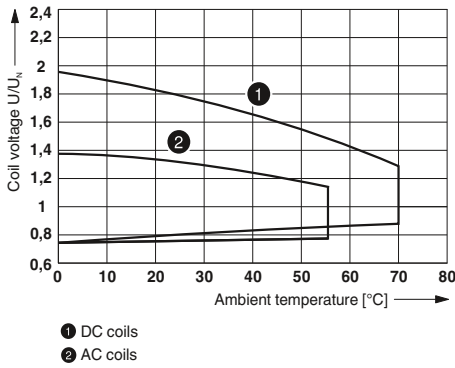
	①	②	③
<b>Input data</b>	see diagram		
Permissible range (with reference to $U_N$ )	38	14.8	7.1
Typical input current at $U_N$	[mA]		
Typical response time at $U_N$	[ms]	13	
Typical response time at $U_N$ ( depending on phase relation )	[ms]	5 - 15	5 - 15
Typical release time at $U_N$	[ms]	3	
Typical release time at $U_N$ ( depending on phase relation )	[ms]	5 - 20	5 - 20
<b>Output data</b>			
Contact type	4 PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Minimum switching voltage	5 V (At 24 mA)		
Limiting continuous current	6 A		
Maximum switch-on current AC	16 A (20 ms, N/O contact)		
Maximum switch-on current DC	16 A (20 ms, N/O contact)		
Minimum switching current	5 mA (at 24 V)		
<b>General data</b>			
Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40 °C ... 55 °C		
Ambient temperature (operation), DC	-40 °C ... 70 °C		
Mechanical service life, AC	1x 10 <sup>7</sup> cycles, approximately		
Mechanical service life, DC	1x 10 <sup>7</sup> cycles, approximately		
Standards/regulations	IEC 60664 , IEC 61810		

#### Ordering data

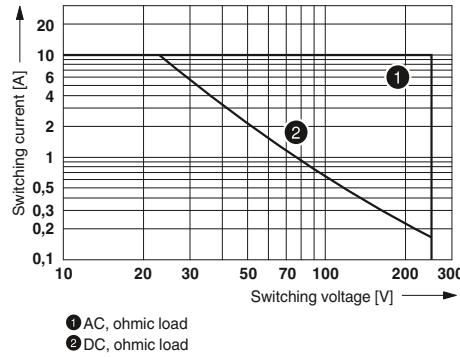
Type	Order No.	Pcs./ Pkt.
REL-IR4/24DC/4X21	2907054	10
REL-IR4/100AC/4X21	2907055	10
REL-IR4/200AC/4X21	2907056	10

## REL-IR2... (2-PDT)

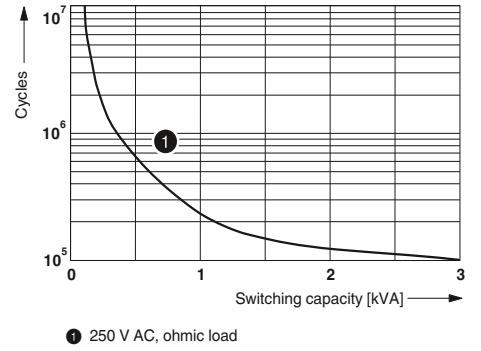
Operating voltage range



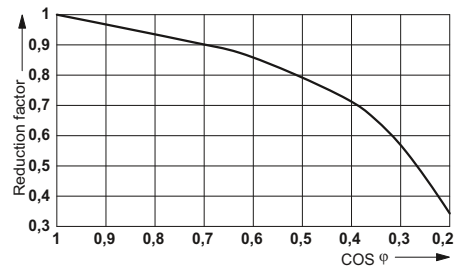
Interrupting rating



Electrical service life

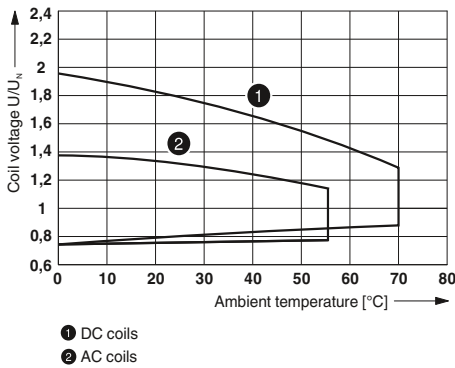


Service life reduction factor

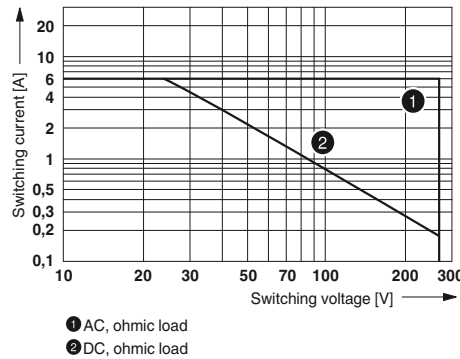


## REL-IR4... (4-PDT)

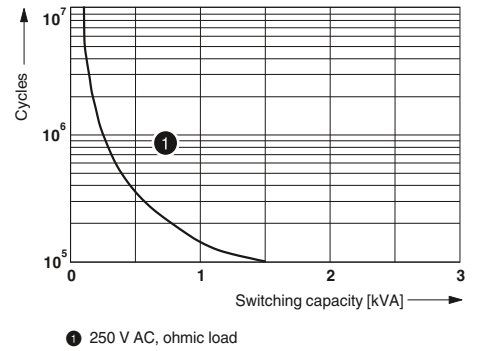
Operating voltage range



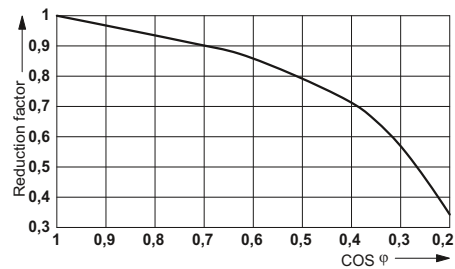
Interrupting rating



Electrical service life



Service life reduction factor



### Modular RIF-3 relay base

Relay base for assembly with 2 or 3-PDT relays.

Range of accessories includes:

- Plug-in interference suppression module
- Plug-in timer module
- Relay retaining bracket with ejector function and holder for marking material
- Comprehensive range of marking material
- Test plug
- FBS 2-6 plug-in bridges for the input side (A2)

Notes:
Type of insulating housing: Polyamide PA, non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



**2-PDT relay base with Push-in connection technology for octal relays**



Nominal voltage  $U_N$   
Nominal current at  $U_N$

General data
Ambient temperature (operation)
Connection data solid/stranded/AWG
Dimensions
Width
Depth with retaining bracket
Height

#### Technical data

250 V AC/DC  
max. 12 A (Depends on application/assembly)

-40 °C ... 85 °C (Depends on application/assembly)

0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16

40 mm  
90 mm  
103 mm

Description
<b>RIF-3 relay base</b> , 2-PDT version, plug-in option for interference suppression module, safe isolation I/O with Push-in connection
<b>RIF-3 relay base</b> , 3-PDT version, plug-in option for interference suppression module, safe isolation I/O with Push-in connection
<b>Plastic relay retaining bracket</b> , with holder for marking material, suitable for RIF-3 relay base
<b>Relay retaining bracket</b> , wire model, suitable for RIF-3 relay base

#### Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-3-BPT/2X21	2900937	10

<b>Plug-in bridge</b> 2-pos. red, 32 A 2-pos. red, 24 A 2-pos. blue, 32 A 2-pos. gray, 32 A	
<b>End bracket</b> , for snapping onto NS 35, 9.5 mm wide, can be marked with ZB 6, ZB 8/27, KLM...	
<b>Test plug</b> , consisting of: <b>Metal part</b> for 2.3 mm Ø socket hole and	silver
<b>Insulating sleeve</b> , for MPS metal part	red white blue yellow green gray black
<b>Zack marker strip</b> , unprinted 10-section 5-section	
<b>Double marker carrier for ZB 5</b>	

#### Accessories

FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100



# Relay modules

## Industrial relay system - RIFLINE complete

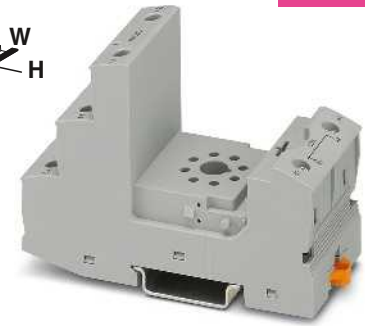
### Modular RIF-3 relay base

Relay base for assembly with 2 or 3-PDT octal relay.

Range of accessories includes:

- Plug-in interference suppression module
- Plug-in timer module
- Relay retaining bracket with ejector function and holder for marking material
- Comprehensive range of marking material
- Test plug
- FBS 2-6 plug-in bridges for the input side (A2)

Notes:
Type of insulating housing: Polyamide PA, non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



new

**2-PDT relay base with screw connection technology for octal relays**

Nominal voltage  $U_N$   
Nominal current at  $U_N$

250 V AC/DC  
max. 12.5 A (Depends on application/assembly)

**General data**  
Ambient temperature (operation)  
  
Connection data solid/stranded/AWG  
Dimensions  
Width  
Depth with retaining bracket  
Height

-40 °C ... 85 °C (Depends on application/assembly)  
  
0.14 ... 6 mm<sup>2</sup> / 0.14 ... 4 mm<sup>2</sup> / 26 - 10  
  
40 mm  
90 mm  
96 mm

Description
<b>RIF-3 relay base</b> , 2-PDT version, plug-in option for interference suppression module, safe isolation I/O with screw connection
<b>RIF-3 relay base</b> , 3-PDT version, plug-in option for interference suppression module, safe isolation I/O with screw connection
<b>Plastic relay retaining bracket</b> , with holder for marking material, suitable for RIF-3 relay base
<b>Relay retaining bracket</b> , wire model, suitable for RIF-3 relay base

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-3-BSC/2X21	2900935	10

<b>Plug-in bridge</b> 2-pos. red, 32 A 2-pos. red, 24 A 2-pos. blue, 32 A 2-pos. gray, 32 A	
<b>End bracket</b> , for snapping onto NS 35, 9.5 mm wide, can be marked with ZB 6, ZB 8/27, KLM...	
<b>Test plug</b> , consisting of: <b>Metal part</b> for 2.3 mm Ø socket hole and	silver
<b>Insulating sleeve</b> , for MPS metal part	red white blue yellow green gray black
<b>Zack marker strip</b> , unprinted 10-section 5-section	
<b>Double marker carrier for ZB 5</b>	

Accessories		
Type	Order No.	Pcs./Pkt.
FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100





# Relay modules

## Industrial relay system - RIFLINE complete

### Plug-in octal relays

Plug-in octal relays with 2 or 3 changeover contacts, suitable for RIF-3 relay base.

The advantages:

- With detectable manual operation
- Mechanical switch position indicator
- Integrated status LED
- DC types with integrated freewheeling diode

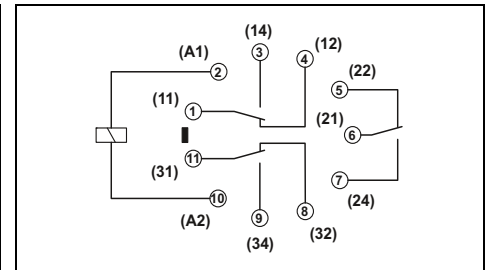
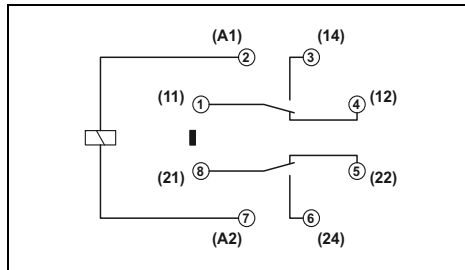
**Notes:**  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



**2-PDT octal relay with manual operation, max. 2 x 10 A**



**3-PDT octal relay with manual operation, max. 3 x 10 A**



Input data		①	④	⑤	⑥	⑦
Permissible range (with reference to $U_N$ )		see diagram				
Typical input current at $U_N$	[mA]	60	8	108	23	13
Typical response time at $U_N$	[ms]	18	18			
Typical response time at $U_N$ ( depending on phase relation )	[ms]			5 - 15	5 - 15	5 - 15
Typical release time at $U_N$	[ms]	20	7			
Typical release time at $U_N$ ( depending on phase relation )	[ms]			5 - 20	5 - 20	5 - 20
Output data						
Contact type		2 PDT				
Contact material		AgNi				
Max. switching voltage		250 V AC/DC				
Minimum switching voltage		10 V (At 24 mA)				
Limiting continuous current		10 A				
Maximum switch-on current AC		30 A (20 ms, N/O contact)				
Maximum switch-on current DC		30 A (20 ms, N/O contact)				
Minimum switching current		10 mA (at 24 V)				
General data						
Test voltage (winding / contact)		2.5 kV <sub>rms</sub> (50 Hz, 1 min.)				
Ambient temperature (operation), AC		-40 °C ... 55 °C				
Ambient temperature (operation), DC		-40 °C ... 70 °C				
Nominal operating mode		100% operating factor				
Mechanical service life, AC		Approx. 2x 10 <sup>7</sup> cycles				
Mechanical service life, DC		Approx. 2x 10 <sup>7</sup> cycles				
Standards/regulations		IEC 60664, IEC 61810				
Mounting position/mounting		any				
Dimensions	W / H / D	35 mm / 54.4 mm / 35 mm				

Technical data		①	②	③	④	⑤	⑥	⑦
see diagram								
		60			8	108	23	13
		18	18	18	18			
						5 - 15	5 - 15	5 - 15
		20	20	20	7			
						5 - 20	5 - 20	5 - 20
Technical data								
see diagram								
		60			8	108	23	13
		18	18	18	18			
						5 - 15	5 - 15	5 - 15
		20	20	20	7			
						5 - 20	5 - 20	5 - 20
Technical data								
see diagram								
		60			8	108	23	13
		18	18	18	18			
						5 - 15	5 - 15	5 - 15
		20	20	20	7			
						5 - 20	5 - 20	5 - 20

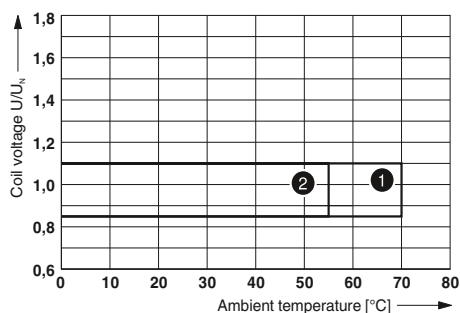
Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Plug-in octal relays, with power contacts</b>				
With freewheeling diode	① 24 V DC	REL-OR2/LDP- 24DC/2X21	2903689	10
	② 48 V DC			
	③ 110 V DC			
	④ 220 V DC	REL-OR2/LDP-220DC/2X21	2907026	10
	⑤ 24 V AC	REL-OR2/L- 24AC/2X21	2903690	10
	⑥ 120 V AC	REL-OR2/L-120AC/2X21	2903691	10
	⑦ 230 V AC	REL-OR2/L-230AC/2X21	2903692	10

Ordering data		Type	Order No.	Pcs./ Pkt.
		REL-OR2/LDP- 24DC/2X21	2903689	10
		REL-OR2/LDP-220DC/2X21	2907026	10
		REL-OR2/L- 24AC/2X21	2903690	10
		REL-OR2/L-120AC/2X21	2903691	10
		REL-OR2/L-230AC/2X21	2903692	10

Ordering data		Type	Order No.	Pcs./ Pkt.
		REL-OR3/LDP-24DC/3X21	2903693	10
		REL-OR3/LDP-48DC/3X21	2908897	10
		REL-OR3/LDP-110DC/3X21	2908898	10
		REL-OR3/LDP-220DC/3X21	2907027	10
		REL-OR3/L- 24AC/3X21	2903694	10
		REL-OR3/L-120AC/3X21	2903695	10
		REL-OR3/L-230AC/3X21	2903696	10

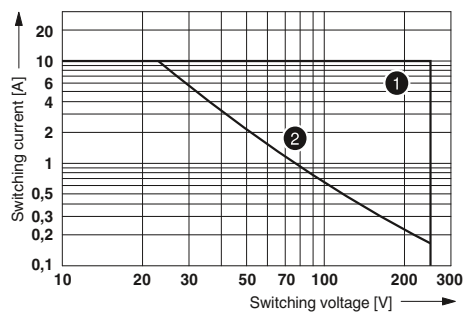
### REL-OR2... (2-PDT)

Operating voltage range



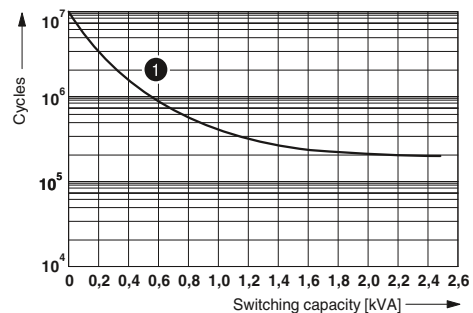
- 1 DC coils
- 2 AC coils

Interrupting rating



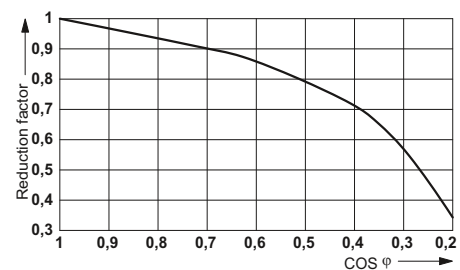
- 1 AC, ohmic load
- 2 DC, ohmic load

Electrical service life



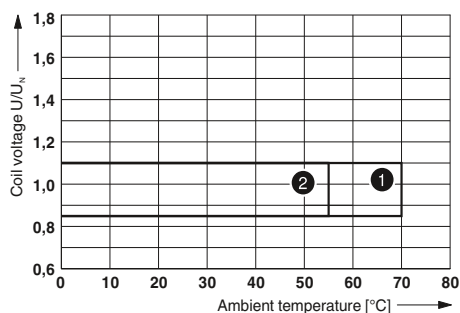
- 1 250 V AC, ohmic load

Service life reduction factor



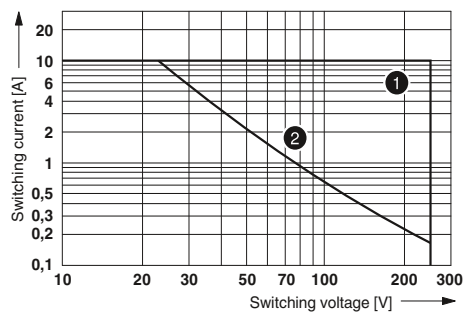
### REL-OR3... (3-PDT)

Operating voltage range



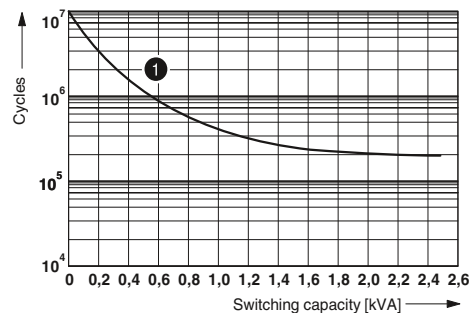
- 1 DC coils
- 2 AC coils

Interrupting rating



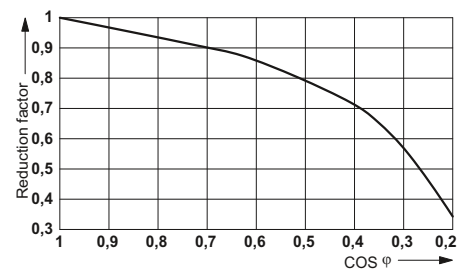
- 1 AC, ohmic load
- 2 DC, ohmic load

Electrical service life



- 1 250 V AC, ohmic load

Service life reduction factor



# Relay modules

## Industrial relay system - RIFLINE complete

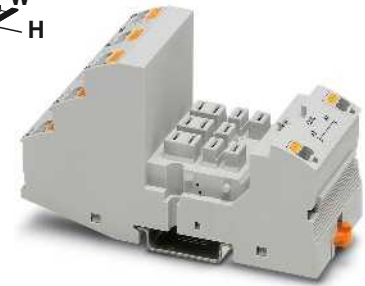
### Modular RIF-4 relay base

Relay base for assembly with 2 or 3-PDT relays or 3-N/O relays.

Range of accessories includes:

- Plug-in interference suppression module
- Plug-in timer module
- Relay retaining bracket with ejector function and holder for marking material
- Comprehensive range of marking material
- Test plug
- FBS 2-6 plug-in bridges for the input side (A2)

Notes:
Type of insulating housing: Polyamide PA, non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



**3-PDT relay base with Push-in connection technology for high-power relays**



Nominal voltage  $U_N$   
Nominal current at  $U_N$

440 V AC  
max. 16 A (Depends on application/assembly)

General data  
Ambient temperature (operation)

-40 °C ... 85 °C (Depends on application/assembly)

Connection data solid/stranded/AWG  
Input side  
Output side  
Dimensions  
Width  
Depth with retaining bracket  
Height

0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16  
0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 26 - 14  
43 mm  
90 mm  
111 mm

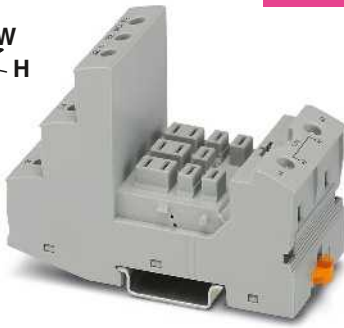
Description
<b>RIF-4 relay base</b> , plug-in option for interference suppression module, safe isolation I/O with Push-in connection
<b>RIF-4 relay base</b> , plug-in option for interference suppression module, safe isolation I/O with screw connection
<b>Relay retaining bracket</b> , with holder for marking material, suitable for RIF-4 relay base
<b>Relay retaining bracket</b> , wire model, suitable for RIF-4 relay base

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-4-BPT/3X21	2900961	10

<b>Plug-in bridge</b> 2-pos. red, 32 A 2-pos. red, 24 A 2-pos. blue, 32 A 2-pos. gray, 32 A <b>End bracket</b> , for snapping onto NS 35, 9.5 mm wide, can be marked with ZB 6, ZB 8/27, KLM...	
<b>Test plug</b> , consisting of: <b>Metal part</b> for 2.3 mm Ø socket hole and	silver
<b>Insulating sleeve</b> , for MPS metal part	red white blue yellow green gray black
<b>Zack marker strip</b> , unprinted 10-section 5-section	
<b>Double marker carrier for ZB 5</b>	

Accessories		
Type	Order No.	Pcs./Pkt.
FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100

new



3-PDT relay base with screw connection technology for high-power relays



Plastic relay retaining bracket for RIF-4 base



Metal wire relay retaining bracket for RIF-4 base



Technical data			Technical data			Technical data		
440 V AC max. 13 A (Depends on application/assembly)			-			-		
-40 °C ... 85 °C (Depends on application/assembly)			-			-		
0.14 ... 6 mm <sup>2</sup> / 0.14 ... 4 mm <sup>2</sup> / 26 - 10 0.14 ... 6 mm <sup>2</sup> / 0.14 ... 4 mm <sup>2</sup> / 26 - 10			-			-		
44 mm 91 mm 96 mm			-			-		
Ordering data			Ordering data			Ordering data		
Type	Order No.	Pcs./ Pkt.	Type	Order No.	Pcs./ Pkt.	Type	Order No.	Pcs./ Pkt.
RIF-4-BSC/3X21	2900960	10						
			RIF-RH-4	2900956	10			
						RIF-RHM-4	2905983	10
Accessories			Accessories			Accessories		

# Relay modules

## Industrial relay system - RIFLINE complete

### Plug-in high-power relays

Plug-in high-power relays with 2 or 3 changeover contacts for the RIF-4 relay base.

The advantages:

- Use in miniature contactor applications
- Switching current of up to 16 A
- Up to 440 V AC switching voltage

#### Notes:

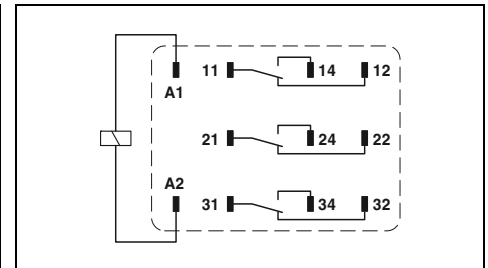
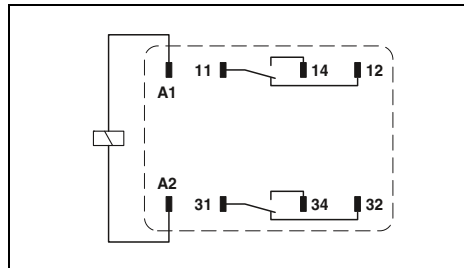
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



2-PDT high-power relay, max. 2 x 16 A



3-PDT high-power relay, max. 3 x 16 A



#### Technical data

Input data	①	②	③	④
Permissible range (with reference to $U_N$ )	see diagram			
Typical input current at $U_N$ [mA]	56	116	23	12
Typical response time at $U_N$ [ms]	20			
Typical response time at $U_N$ (depending on phase relation) [ms]		5 - 25	5 - 25	5 - 25
Typical release time at $U_N$ [ms]	15			
Typical release time at $U_N$ (depending on phase relation) [ms]		5 - 20	5 - 20	5 - 20
Output data				
Contact type	2 PDT			
Contact material	AgNi			
Max. switching voltage	440 V AC / 250 V DC			
Minimum switching voltage	10 V (At 24 mA)			
Limiting continuous current	16 A			
Maximum switch-on current AC	50 A (20 ms, N/O contact)			
Maximum switch-on current DC	50 A (20 ms, N/O contact)			
Minimum switching current	10 mA (at 24 V)			
Maximum interrupting rating, ohmic load	250 V AC	4000 VA		
	440 V AC	4000 VA		
Motor load according to UL 508		1/3 HP, 120 V AC (single-phase AC motor)		
		1/2 HP, 240 V AC (single-phase AC motor)		

#### Technical data

Input data	①	②	③	④	⑤
Permissible range (with reference to $U_N$ )	see diagram				
Typical input current at $U_N$ [mA]	56		116	23	12
Typical response time at $U_N$ [ms]	20	20			
Typical response time at $U_N$ (depending on phase relation) [ms]			5 - 25	5 - 25	5 - 25
Typical release time at $U_N$ [ms]	15	15			
Typical release time at $U_N$ (depending on phase relation) [ms]			5 - 20	5 - 20	5 - 20
Output data					
Contact type	3 PDT				
Contact material	AgNi				
Max. switching voltage	440 V AC / 250 V DC				
Minimum switching voltage	10 V (At 24 mA)				
Limiting continuous current	16 A				
Maximum switch-on current AC	50 A (20 ms, N/O contact)				
Maximum switch-on current DC	50 A (20 ms, N/O contact)				
Minimum switching current	10 mA (at 24 V)				
Maximum interrupting rating, ohmic load	4000 VA				
	4000 VA				
Motor load according to UL 508			1/3 HP, 120 V AC (single-phase AC motor)		
			1/2 HP, 240 V AC (single-phase AC motor)		
			1/2 HP, 240 V AC (three-phase induction motor)		

#### General data

Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Ambient temperature (operation), AC	-40 °C ... 55 °C
Ambient temperature (operation), DC	-40 °C ... 70 °C
Nominal operating mode	100% operating factor
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles
Mechanical service life, DC	Approx. 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, IEC 61810
Mounting position/mounting	any
Dimensions	W / H / D 38.6 mm / 45.5 mm / 36.1 mm

#### General data

Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Ambient temperature (operation), AC	-40 °C ... 55 °C
Ambient temperature (operation), DC	-40 °C ... 70 °C
Nominal operating mode	100% operating factor
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles
Mechanical service life, DC	Approx. 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, IEC 61810
Mounting position/mounting	any
Dimensions	38.6 mm / 45.5 mm / 36.1 mm

#### Ordering data

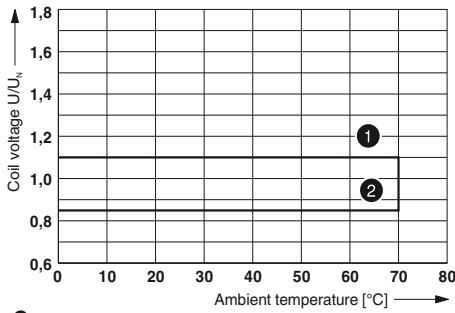
Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
Plug-in high-power relays, 2 changeover contacts with power contacts	① 24 V DC	REL-PR2- 24DC/2X21	2903698	1
	② 24 V AC	REL-PR2- 24AC/2X21	2903699	1
	③ 120 V AC	REL-PR2-120AC/2X21	2903700	1
	④ 230 V AC	REL-PR2-230AC/2X21	2903701	1
Plug-in high-power relays, 3 changeover contacts with power contacts	① 24 V DC			
	② 110 V DC			
	③ 24 V AC			
	④ 120 V AC			
	⑤ 230 V AC			

#### Ordering data

Type	Order No.	Pcs./ Pkt.
REL-PR3- 24DC/3X21	2903702	1
REL-PR3-110DC/3X21	2908893	1
REL-PR3- 24AC/3X21	2903703	1
REL-PR3-120AC/3X21	2903704	1
REL-PR3-230AC/3X21	2903705	1

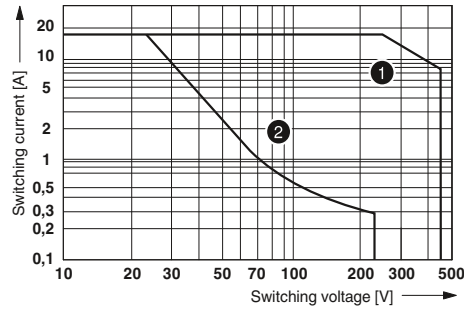
### REL-PR2... (2-PDT)

Operating voltage range



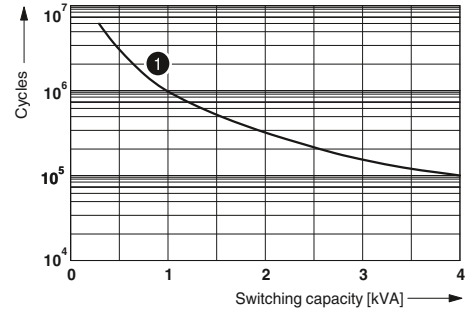
- 1 Maximum continuous voltage at limiting continuous current = 16 A
  - 2 Minimum operate voltage
- For pre-excitation with UN and limiting continuous current = 16 A

Interrupting rating



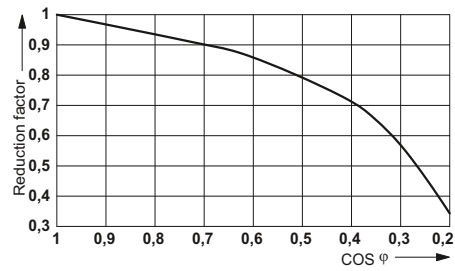
- 1 AC, ohmic load
- 2 DC, ohmic load

Electrical service life



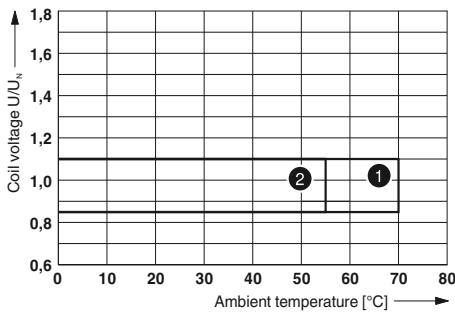
- 1 250 V AC, ohmic load

Service life reduction factor



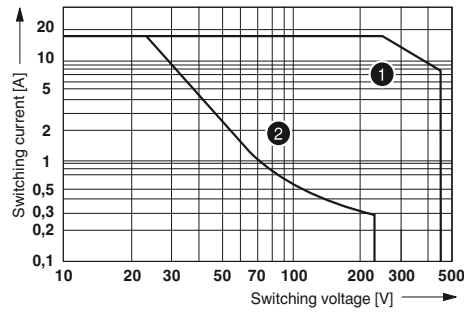
### REL-PR3... (3-PDT)

Operating voltage range



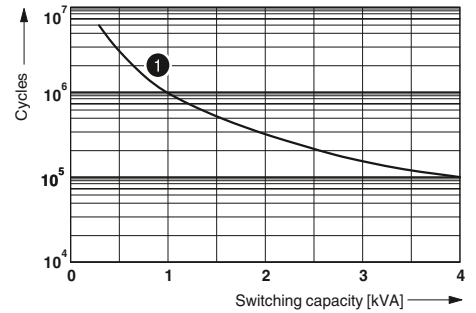
- 1 DC coils
- 2 AC coils

Interrupting rating



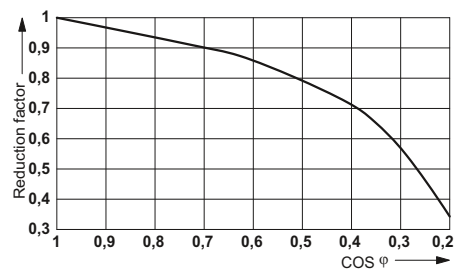
- 1 AC, ohmic load
- 2 DC, ohmic load

Electrical service life



- 1 250 V AC, ohmic load

Service life reduction factor



# Relay modules

## Industrial relay system - RIFLINE complete

### Plug-in high-power relays

Plug-in high-power relays with 3 N/O contacts suitable for the RIF-4 relay base.

The advantages:

- Use in miniature contactor applications
- Switching current of up to 16 A
- Up to 440 V AC switching voltage
- Full shutdown by means of  $\geq 3$  mm contact opening

**Notes:**  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.

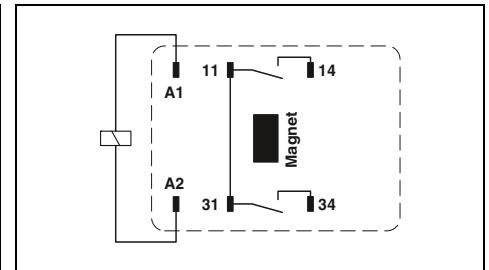
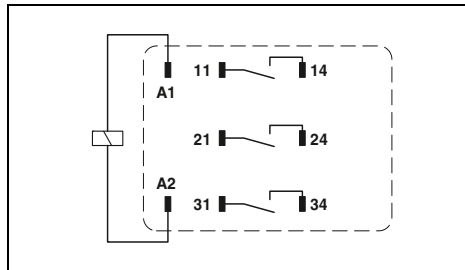
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3-N/O high-power relay, max. 3 x 16 A



1-N/O high-power relay with blowout magnet for switching high DC loads



#### Technical data

	①	②	③	④
Input data	see diagram			
Permissible range (with reference to $U_N$ )	70	116	23	12
Typical input current at $U_N$	[mA]			
Typical response time at $U_N$	[ms]			
Typical response time at $U_N$ (depending on phase relation)	[ms]	5 - 25	5 - 25	5 - 25
Typical release time at $U_N$	[ms]	15		
Typical release time at $U_N$ (depending on phase relation)	[ms]	5 - 20	5 - 20	5 - 20
Output data				
Contact type	3 N/O contacts			
Contact material	AgNi			
Max. switching voltage	440 V AC / 250 V DC			
Minimum switching voltage	10 V (At 24 mA)			
Limiting continuous current	16 A			
Maximum switch-on current AC	50 A (20 ms, N/O contact)			
Maximum switch-on current DC	50 A (20 ms, N/O contact)			
Minimum switching current	10 mA (at 24 V)			
Maximum interrupting rating, ohmic load	250 V AC	4000 VA		
	440 V AC	4000 VA		
Motor load according to UL 508		1/3 HP, 120 V AC (single-phase AC motor)		
		1/2 HP, 240 V AC (single-phase AC motor)		
		1/2 HP, 240 V AC (three-phase induction motor)		

	①	②	③	④
Input data	see diagram			
Permissible range (with reference to $U_N$ )	70	15	7.3	12
Typical input current at $U_N$	[mA]			
Typical response time at $U_N$	[ms]	20	20	
Typical response time at $U_N$ (depending on phase relation)	[ms]			5 - 25
Typical release time at $U_N$	[ms]	15	15	
Typical release time at $U_N$ (depending on phase relation)	[ms]			5 - 18
Output data				
Contact type	1 N/O contact			
Contact material	AgNi			
Max. switching voltage	440 V AC / 350 V DC			
Minimum switching voltage	5 V (At 24 mA)			
Limiting continuous current	16 A			
Maximum switch-on current AC	50 A (20 ms)			
Maximum switch-on current DC	50 A (20 ms)			
Minimum switching current	5 mA (at 24 V)			
Maximum interrupting rating, ohmic load	4000 VA			
Motor load according to UL 508				

General data	
Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Ambient temperature (operation), AC	-40 °C ... 55 °C
Ambient temperature (operation), DC	-40 °C ... 70 °C
Nominal operating mode	100% operating factor
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles
Mechanical service life, DC	Approx. 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, IEC 61810
Mounting position/mounting	any
Dimensions	W / H / D 38.6 mm / 45.5 mm / 36.1 mm

#### Technical data

	①	②	③	④
Input data	see diagram			
Permissible range (with reference to $U_N$ )	70	15	7.3	12
Typical input current at $U_N$	[mA]			
Typical response time at $U_N$	[ms]	20	20	
Typical response time at $U_N$ (depending on phase relation)	[ms]			5 - 25
Typical release time at $U_N$	[ms]	15	15	
Typical release time at $U_N$ (depending on phase relation)	[ms]			5 - 18
Output data				
Contact type	1 N/O contact			
Contact material	AgNi			
Max. switching voltage	440 V AC / 350 V DC			
Minimum switching voltage	5 V (At 24 mA)			
Limiting continuous current	16 A			
Maximum switch-on current AC	50 A (20 ms)			
Maximum switch-on current DC	50 A (20 ms)			
Minimum switching current	5 mA (at 24 V)			
Maximum interrupting rating, ohmic load	4000 VA			
Motor load according to UL 508				

General data	
Test voltage (winding / contact)	2.5 kV
Ambient temperature (operation), AC	-40 °C ... 70 °C
Ambient temperature (operation), DC	-40 °C ... 70 °C
Nominal operating mode	100% operating factor
Mechanical service life, AC	Approx. 2x 10 <sup>7</sup> cycles
Mechanical service life, DC	Approx. 2x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, IEC 61810
Mounting position/mounting	any
Dimensions	38.6 mm / 45.5 mm / 36.1 mm

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Plug-in high-power relays, 3 N/O contacts with power contacts</b>	① 24 V DC	REL-PR3-24DC/3X1	2903706	1
	② 24 V AC	REL-PR3-24AC/3X1	2903707	1
	③ 120 V AC	REL-PR3-120AC/3X1	2903708	1
	④ 230 V AC	REL-PR3-230AC/3X1	2903709	1
<b>Plug-in high-power relays, 1 N/O contact with blow magnet and power contacts</b>	① 24 V DC	REL-PR1-24DC/1/MB	2908040	1
	② 110 V DC	REL-PR1-110DC/1/MB	2908044	1
	③ 220 V DC	REL-PR1-220DC/1/MB	2908046	1
	④ 230 V AC	REL-PR1-230AC/1/MB	2908047	1

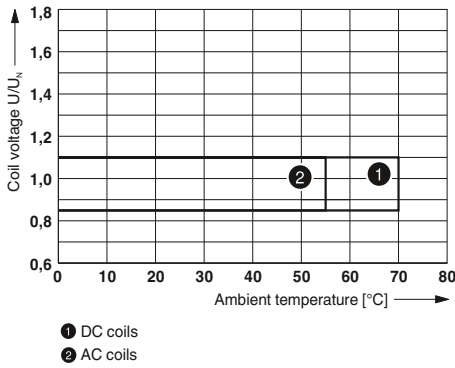
#### Ordering data

Type	Order No.	Pcs./ Pkt.
REL-PR1-24DC/1/MB	2908040	1
REL-PR1-110DC/1/MB	2908044	1
REL-PR1-220DC/1/MB	2908046	1
REL-PR1-230AC/1/MB	2908047	1

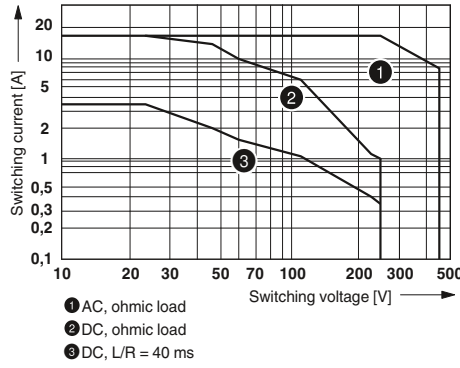


### REL-PR3... (3 N/O contacts)

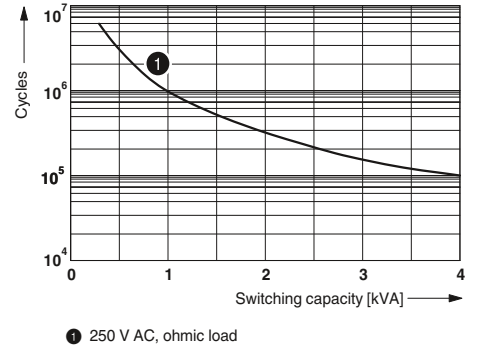
Operating voltage range



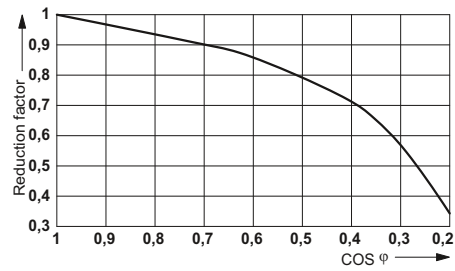
Interrupting rating



Electrical service life

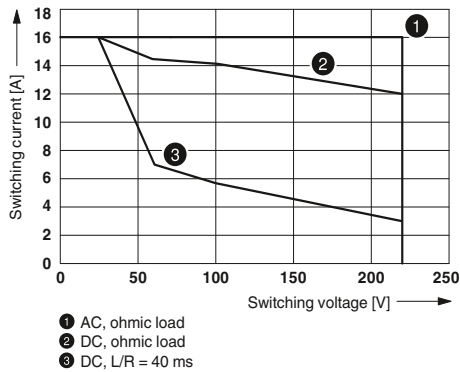


Service life reduction factor



### REL-PR1... (1 N/O contact with blow magnet)

Interrupting rating



## Industrial relay system - RIFLINE complete

### Plug-in interference suppression modules for RIF-1, RIF-2, RIF-3, and RIF-4

Plug-in interference suppression modules for optional assembly of RIF-1 to RIF-4 relay bases.

The advantages:

- Attenuation of reverse voltage induced in coil
- Mechanical coding to protect against incorrect connection



Interference suppression modules for RIF-1 to RIF-4



#### Ordering data

Description	Type	Order No.	Pcs./Pkt.
<b>Plug-in module, with LED status indicator and freewheeling diode</b> to effectively limit the coil induction voltage, polarity: <b>A1+</b> , <b>A2-</b> , input voltage: - 12-24 V DC $\pm 20\%$ - 48-60 V DC $\pm 20\%$ - 110 V DC $\pm 20\%$	<b>RIF-LDP-12-24 DC</b> <b>RIF-LDP-48-60 DC</b> <b>RIF-LDP-110 DC</b>	<b>2900939</b> <b>2900940</b> <b>2900941</b>	10 10 10
<b>Plug-in module, with LED status indicator and varistor</b> to limit the coil induction voltage and/or external interference peaks, input voltage: - 12-24 V AC/DC $\pm 20\%$ (30 V varistor) - 48-60 V AC/DC $\pm 20\%$ (75 V varistor) - 120-230 V AC/110 V DC $\pm 20\%$ (275 V varistor)	<b>RIF-LV-12-24 UC</b> <b>RIF-LV-48-60 UC</b> <b>RIF-LV-120-230 AC/110 DC</b>	<b>2900942</b> <b>2900943</b> <b>2900944</b>	10 10 10
<b>Plug-in module, with varistor</b> to limit the coil induction voltage and/or external interference peaks, input voltage: - 12-24 V AC/DC $\pm 20\%$ (30 V varistor) - 48-60 V AC/DC $\pm 20\%$ (75 V varistor) - 120-230 V AC/DC $\pm 20\%$ (275 V varistor)	<b>RIF-V-12-24 UC</b> <b>RIF-V-48-60 UC</b> <b>RIF-V-120-230 UC</b>	<b>2900945</b> <b>2900947</b> <b>2900948</b>	10 10 10
<b>Plug-in module, with RC element</b> to limit the coil induction voltage and/or external interference peaks, input voltage: - 12-24 V AC/DC $\pm 20\%$ (220 nF/100 $\Omega$ ) - 48-60 V AC/DC $\pm 20\%$ (220 nF/220 $\Omega$ ) - 120 - 230 V AC/DC $\pm 20\%$ (100 nF/470 $\Omega$ )	<b>RIF-RC-12-24 UC</b> <b>RIF-RC-48-60 UC</b> <b>RIF-RC-120-230 UC</b>	<b>2900949</b> <b>2900950</b> <b>2900951</b>	10 10 10
<b>Plug-in module, with bridge rectifier</b> for controlling electromechanical DC voltage relay, Input voltage: - 12 ... 230 V AC	<b>RIF-BR-12-230 AC</b>	<b>2907060</b>	10
<b>Plug-in module, with LED status indicator and freewheeling diode</b> to effectively limit the coil induction voltage, polarity: <b>A1-</b> , <b>A2+</b> , Input voltage: - 12-24 V DC $\pm 20\%$	<b>RIF-LDM-12-24 DC</b>	<b>2907057</b>	10
<b>Plug-in module, with LED status indicator and varistor</b> to limit the coil induction voltage and/or external interference peaks, polarity <b>A1-</b> , <b>A2+</b> , Input voltage: - 120-230 V AC/110 V DC $\pm 20\%$ (275 V varistor)	<b>RIF-LVM-100-200 AC/110 DC</b>	<b>2907058</b>	10

**Plug-in timer module for RIF-1, RIF-2, RIF-3, and RIF-4**

The multifunctional plug-in timer module transforms a relay module into a time relay. RIF-1 to RIF-4 bases can be equipped with this module. Using DIP switches, three time functions and four time ranges can be selected. Detailed time settings are made using a potentiometer. Relays can be operated with an input voltage of 12 or 24 V AC/DC.

The time functions:

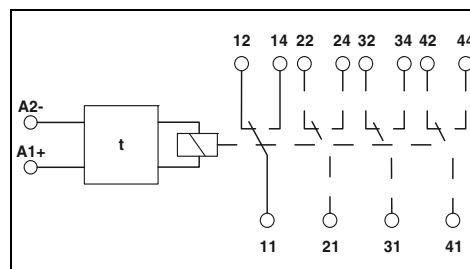
- With switch-on delay
- With passing make contact
- Pulse generator

Time ranges:

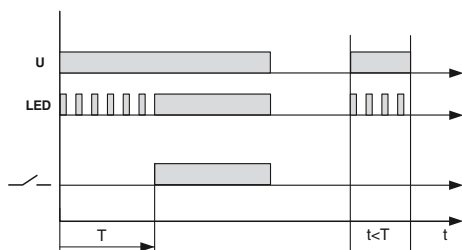
- 0.5 to 10 s
- 5 to 100 s
- 0.5 to 10 min
- 5 to 100 min



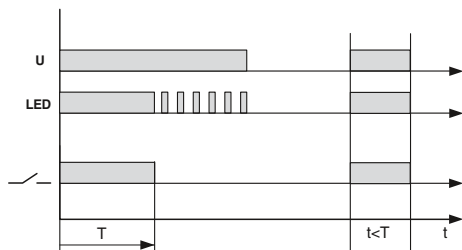
Timer module for RIF-1 to RIF-4 relay modules for 12 to 24 V AC/DC input voltage



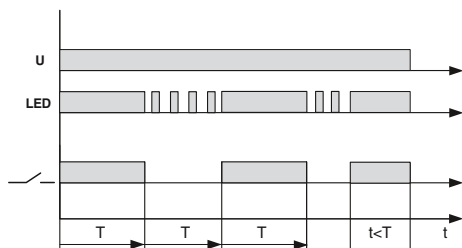
**With switch-on delay**



**Passing make contact**



**Pulse generator**



<b>Input data</b>
Nominal input voltage $U_N$
Nominal input voltage range with reference to $U_N$
Input circuit
<b>Output data</b>
Limiting continuous current
<b>General data</b>
Mounting position
Repeat accuracy
Ambient temperature (operation)
<b>Standards/specifications</b>
Rated insulation voltage
Rated surge voltage

<b>Technical data</b>
24 V DC (AC operation only permitted for RIF-1)
0.4 ... 1.2
Varistor, Yellow LED
$\leq 250$ mA (Relay coil current)
any
1 %
-25 °C ... 50 °C (RIF-1, AC coil, 2 PDTs at 6 A)
-25 °C ... 50 °C (RIF-1, DC coil, 2 PDTs at 5 A)
-25 °C ... 40 °C (RIF-2, DC coil, 2 PDTs at 8 A)
-25 °C ... 40 °C (RIF-2, DC coil, 4 PDTs at 5 A)
-25 °C ... 40 °C (RIF-3, DC coil, 3 PDTs at 6.75 A)
-25 °C ... 40 °C (RIF-3, DC coil, 2 PDTs at 8 A)
-25 °C ... 35 °C (RIF-4, DC coil, 3 PDTs at 8 A)
-25 °C ... 25 °C (RIF-4, DC coil, 3 N/O contacts at 8 A)
DIN EN 50178
50 V DC
0.4 kV

**Description**  
**Timer module**, for mounting on RIF-1 to RIF-4, with LED status indicator for extending a relay module to create a time relay with an input voltage of 24 V AC/DC

<b>Ordering data</b>		
Type	Order No.	Pcs./Pkt.
RIF-T3-24UC	2902647	1

# Relay modules

## Industrial relay system - RIFLINE complete

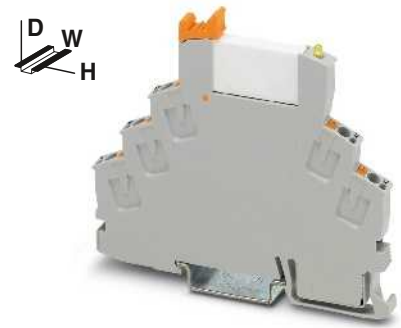
### Fully mounted RIF-0 relay modules

Fully mounted RIF-0 relay modules, consisting of:

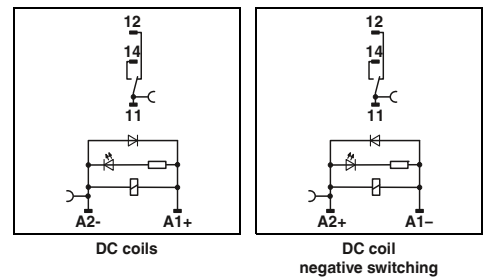
- Relay base with Push-in connection
- 1-N/O or 1-PDT relay
- Relay ejector lever on the housing

The advantages:

- Status LED integrated in the relay base
- Operational reliability thanks to sealed relay
- Safe isolation between coil and contact side
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input and output side, see page 366.



1-PDT relay module with Push-in connection

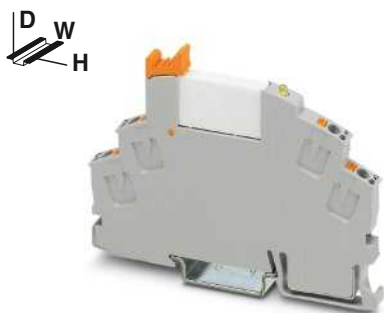


Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input protection:	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Minimum switching current	
General data	
Test voltage (winding / contact)	
Ambient temperature (operation)	
Nominal operating mode	
Mechanical service life	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

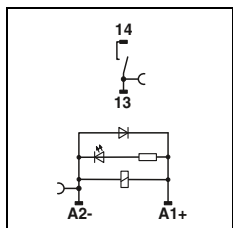
Technical data	
①	②
see diagram	
16	9
5	5
8	8
Yellow LED, Damping diode	
1 PDT	1 PDT
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
10 mA (at 12 V)	1 mA
4 kV <sub>rms</sub> (50 Hz, 1 min.)	
-40 °C ... 60 °C	
100% operating factor	
Approx. 2x 10 <sup>7</sup> cycles	
DIN EN 50178	
2 / III	
any / In rows with zero spacing	
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16	
6.2 mm / 93 mm / 78 mm	
Class A product, see page 605	

Description	Input voltage $U_N$
<b>Coupling relay modules</b> with power contact relay and Push-in connection	① 12 V DC
	② 24 V DC
<b>Coupling relay modules</b> with multi-layer gold contact relay, with Push-in connection	① 12 V DC
	② 24 V DC
<b>Coupling relay modules</b> with power contact relay and Push-in connection, negative switching	② 24 V DC

Ordering data		
Type	Order No.	Pcs./Pkt.
<b>RIF-0-RPT-12DC/21</b>	<b>2903371</b>	10
<b>RIF-0-RPT-24DC/21</b>	<b>2903370</b>	10
<b>RIF-0-RPT-12DC/21AU</b>	<b>2903369</b>	10
<b>RIF-0-RPT-24DC/21AU</b>	<b>2903368</b>	10
<b>RIF-0-RPT-M-24DC/21</b>	<b>2908327</b>	10



1-N/O relay module with Push-in connection



DC coils

Technical data

① ②  
see diagram  
16 9  
5 5  
8 8  
Yellow LED, Damping diode

1 N/O contact	1 N/O contact
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
10 mA (at 12 V)	1 mA (at 12 V)

4 kV<sub>rms</sub> (50 Hz, 1 min.)  
-40 °C ... 60 °C  
100% operating factor  
Approx. 2x 10<sup>7</sup> cycles  
DIN EN 50178  
2 / III

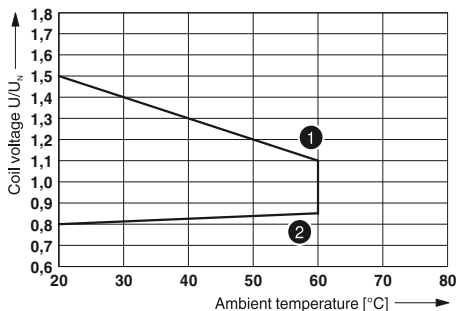
any / In rows with zero spacing  
0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16  
6.2 mm / 93 mm / 66 mm  
Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-0-RPT-12DC/ 1	2903362	10
RIF-0-RPT-24DC/ 1	2903361	10
RIF-0-RPT-12DC/ 1AU	2903360	10
RIF-0-RPT-24DC/ 1AU	2903359	10

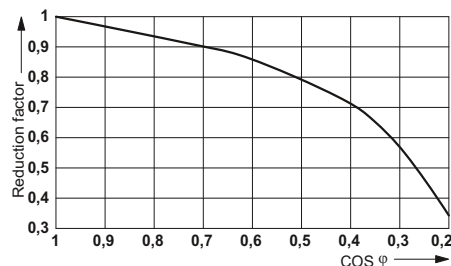
RIF-0-RPT.../21... (1-PDT)

Operating voltage range

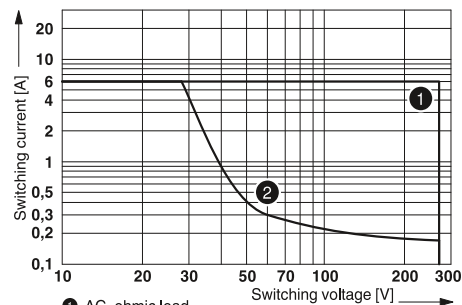


① Maximum continuous voltage at limiting continuous current = 6 A  
② Minimum operate voltage  
For pre-excitation with U<sub>n</sub> and limiting continuous current = 6 A

Service life reduction factor

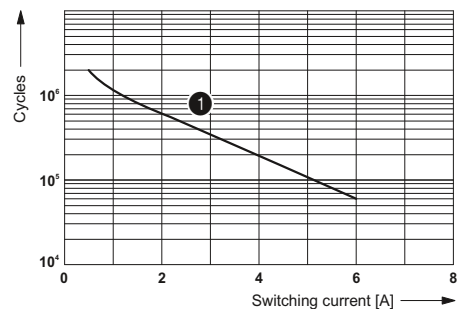


Interrupting rating



① AC, ohmic load  
② DC, ohmic load

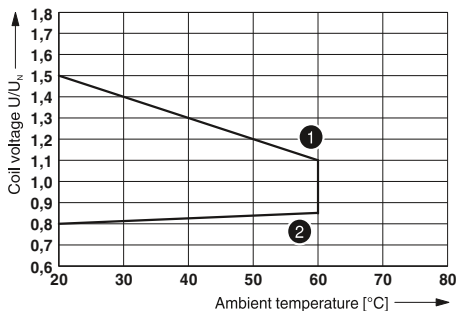
Electrical service life



① 250 V AC, ohmic load

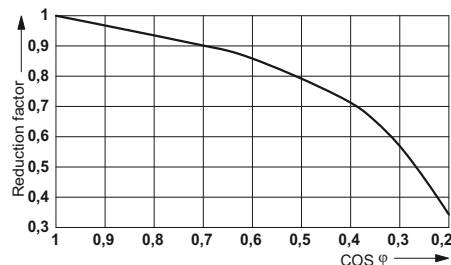
RIF-0-RPT.../1... (1-N/O)

Operating voltage range

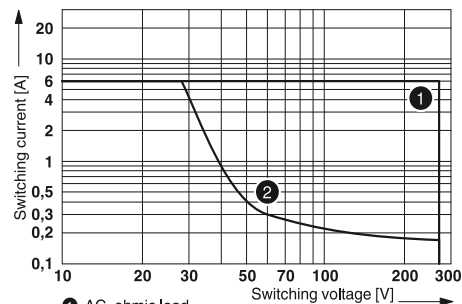


① Maximum continuous voltage at limiting continuous current = 6 A  
② Minimum operate voltage  
For pre-excitation with U<sub>n</sub> and limiting continuous current = 6 A

Service life reduction factor

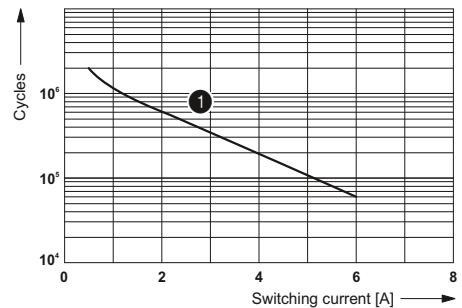


Interrupting rating



① AC, ohmic load  
② DC, ohmic load

Electrical service life



① 250 V AC, ohmic load

# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-0 relay modules

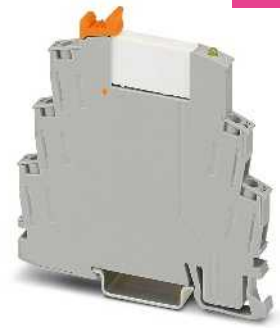
Fully mounted RIF-0 relay modules, consisting of:

- Relay base with screw connection
- 1-PDT or 1-N/O relay
- Relay ejector lever on the housing

The advantages:

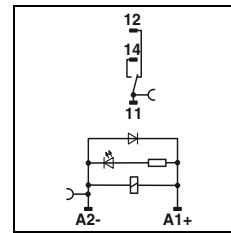
- Status LED integrated in the relay base
- Operational reliability thanks to sealed relay
- Safe isolation between coil and contact side
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input and output side, see page 366.

**Notes:**  
**General conditions:**  
 Direct alignment in the block, all devices 100% operating time, horizontal or vertical mounting.



new

1-PDT relay module with screw connection



DC coils

Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input protection:	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Minimum switching current	
General data	
Test voltage (winding / contact)	
Ambient temperature (operation)	
Nominal operating mode	
Mechanical service life	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Maximum tightening torque	
Dimensions	W / H / D

Technical data		
①	②	
see diagram		
16	9	
5	5	
8	8	
Yellow LED, Damping diode		
1 PDT	1 PDT	
AgSnO	AgSnO, hard gold-plated	
250 V AC/DC	30 V AC / 36 V DC	
5 V (at 100 mA)	100 mV (at 10 mA)	
6 A	50 mA	
10 mA (at 12 V)	1 mA (at 12 V)	
4 kV <sub>rms</sub> (50 Hz, 1 min.)		
-40 °C ... 60 °C		
100% operating factor		
Approx. 2x 10 <sup>7</sup> cycles		
DIN EN 50178		
2 / III		
any / In rows with zero spacing		
0.5 ... 4 mm <sup>2</sup> / 0.5 ... 2.5 mm <sup>2</sup> / 20 - 12		
0.5 Nm		
6.2 mm / 84 mm / 82 mm		

Description	Input voltage $U_N$
<b>Coupling relay modules</b> with power contact relay and screw connection	① 12 V DC
	② 24 V DC
<b>Coupling relay modules</b> with multi-layer gold contact relay, with screw connection	① 12 V DC
	② 24 V DC

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-0-RSC-12DC/21	2903375	10
RIF-0-RSC-24DC/21	2903374	10
RIF-0-RSC-12DC/21AU	2903373	10
RIF-0-RSC-24DC/21AU	2903372	10

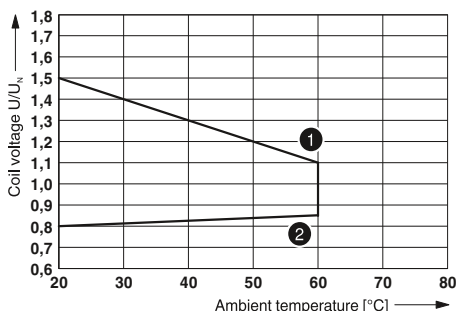
new

### RIF-0-RSC.../21... (1-PDT)



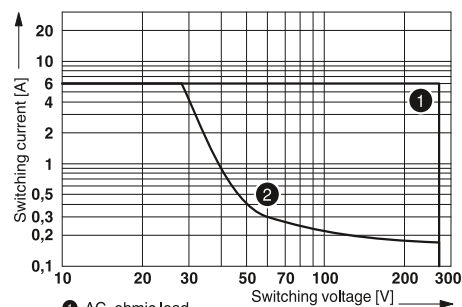
1-N/O relay module with screw connection

#### Operating voltage range



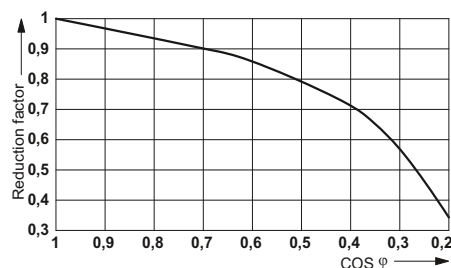
① Maximum continuous voltage at limiting continuous current = 6 A  
 ② Minimum operate voltage  
 For pre-excitation with  $U_n$  and limiting continuous current = 6 A

#### Interrupting rating

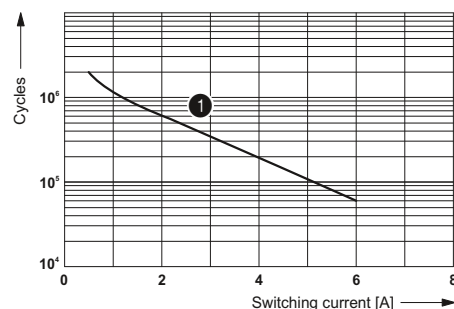


① AC, ohmic load  
 ② DC, ohmic load

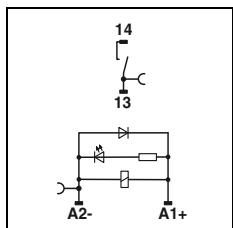
#### Service life reduction factor with various cos phi



#### Electrical service life



① 250 V AC, ohmic load



DC coils

#### Technical data

① ②  
 see diagram  
 16 9  
 5 5  
 8 8  
 Yellow LED, Damping diode

1 N/O contact	1 N/O contact
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
10 mA (at 12 V)	1 mA (at 12 V)

4 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -40 °C ... 60 °C  
 100% operating factor  
 Approx. 2x 10<sup>7</sup> cycles  
 DIN EN 50178  
 2 / III

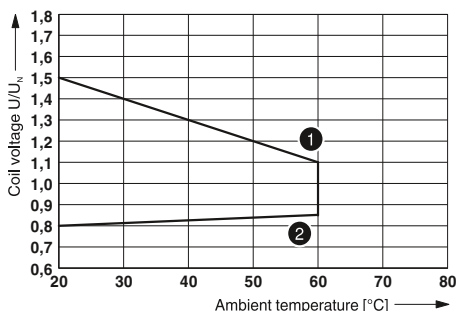
any / In rows with zero spacing  
 0.5 ... 4 mm<sup>2</sup> / 0.5 ... 2.5 mm<sup>2</sup> / 20 - 12  
 0.5 Nm  
 6.2 mm / 84 mm / 68 mm

#### Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-0-RSC-12DC/ 1	2903367	10
RIF-0-RSC-24DC/ 1	2903366	10
RIF-0-RSC-12DC/ 1AU	2903365	10
RIF-0-RSC-24DC/ 1AU	2903364	10

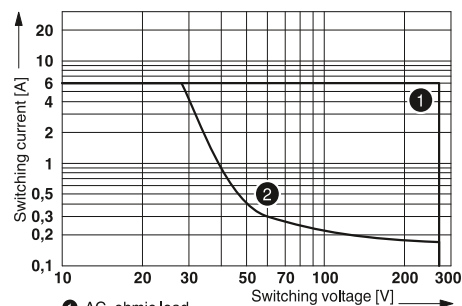
### RIF-0-RSC.../1... (1-N/O)

#### Operating voltage range



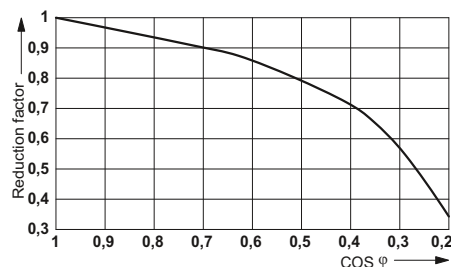
① Maximum continuous voltage at limiting continuous current = 6 A  
 ② Minimum operate voltage  
 For pre-excitation with  $U_n$  and limiting continuous current = 6 A

#### Interrupting rating

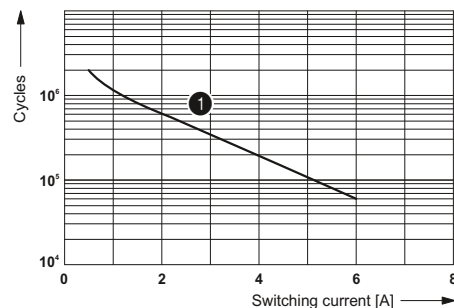


① AC, ohmic load  
 ② DC, ohmic load

#### Service life reduction factor



#### Electrical service life



① 250 V AC, ohmic load

# Relay modules

## Industrial relay system - RIFLINE complete

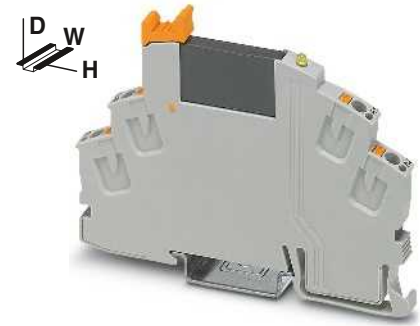
### Fully mounted RIF-0 relay modules

Fully mounted RIF-0 relay modules, consisting of:

- Relay base with Push-in connection
- Solid-state relays
- Relay ejector lever on the housing

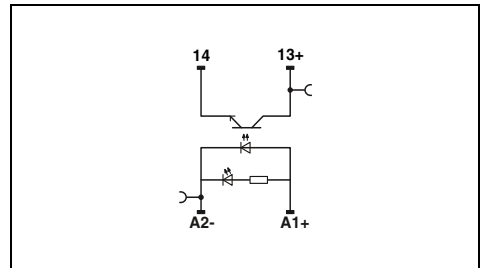
The advantages:

- Status LED integrated into the base
- RTIII sealed solid-state relay
- Zero voltage switch at AC output
- Professional bridging of adjacent modules saves wiring time



**Solid-state relay module with Push-in connection, DC output max. 3 A**

ERC



#### Technical data

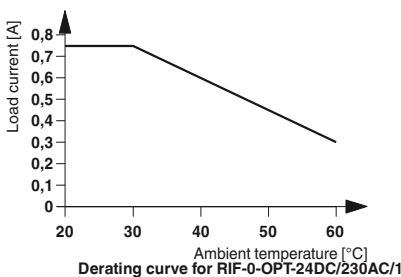
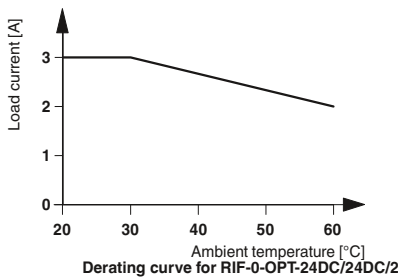
Input data	
Rated actuating voltage range with reference to $U_C$	
Rated actuating current $I_C$	[mA] 8.5
Switching level (with reference to $U_C$ )	1 signal ("H") > 0.8 0 signal ("L") < 0.4
Typical switch-on time at $U_N$	[ms] 0.02
Typical switch-off time at $U_N$	[ms] 0.3
Transmission frequency $f_{limit}$	[Hz] 300
Input circuit DC	Yellow LED, Freewheeling diode
Output data	
Max. switching voltage	33 V DC
Minimum switching voltage	3 V DC
Maximum switch-on current	15 A (10 ms)
Minimum/maximum switching current	- / 3 A (see derating curve)
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	< 200 mV
Leakage current in off state	-
Phase angle (cos $\phi$ )	-
Max. load value	-
General data	
Test voltage input/output	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
Ambient temperature (operation)	-25 °C ... 60 °C
Standards/regulations	DIN EN 50178
Degree of pollution/surge voltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1.5 mm <sup>2</sup> / 26 - 16
Dimensions	6.2 mm / 93 mm / 66 mm
EMC note	Class A product, see page 605

①	0.8 - 1.2
	8.5
	> 0.8
	< 0.4
	0.02
	0.3
	300
	Yellow LED, Freewheeling diode
	33 V DC
	3 V DC
	15 A (10 ms)
	- / 3 A (see derating curve)
	Reverse polarity protection, surge protection
	< 200 mV
	-
	-
	-
	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
	-25 °C ... 60 °C
	DIN EN 50178
	2 / III
	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1.5 mm <sup>2</sup> / 26 - 16
	6.2 mm / 93 mm / 66 mm
	Class A product, see page 605

#### Ordering data

Description	Rated actuating voltage $U_C$
<b>Coupling relay modules</b> with solid-state relay and Push-in connection	① 24 V DC

Type	Order No.	Pcs./ Pkt.
RIF-0-OPT-24DC/24DC/2	2905293	10





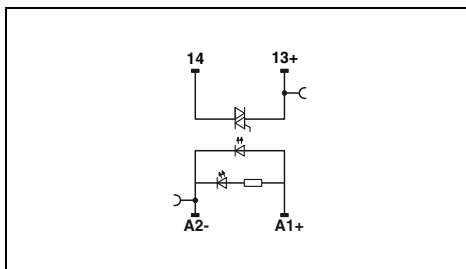
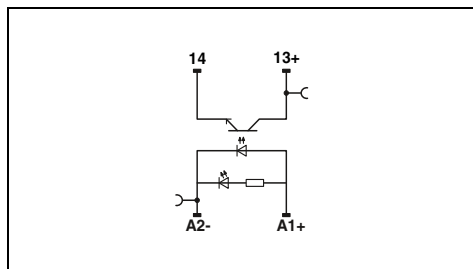


Solid-state relay module with Push-in connection, DC output max. 100 mA



Solid-state relay module with Push-in connection, AC output max. 750 mA

ERIC



Technical data

①
0.8 - 1.2
8.5
> 0.8
< 0.4
0.02
0.3
300
Yellow LED, Freewheeling diode
48 V DC
3 V DC
-
- / 100 mA
Reverse polarity protection, surge protection
< 1 V
-
-
-
2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
-25 °C ... 60 °C
DIN EN 50178
2 / III
0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1.5 mm <sup>2</sup> / 26 - 16
6.2 mm / 93 mm / 66 mm
Class A product, see page 605

Technical data

①
0.8 - 1.2
8
> 0.8
< 0.4
10
10
10
Yellow LED, Freewheeling diode
253 V AC
24 V AC
30 A (10 ms)
10 mA / 0.75 A (see derating curve)
RCV circuit
< 1 V
1 mA (in off state)
0.5
4.5 A <sup>2</sup> s (tp = 10 ms, at 25 °C)
2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
-25 °C ... 60 °C
DIN EN 50178
2 / III
0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1.5 mm <sup>2</sup> / 26 - 16
6.2 mm / 93 mm / 66 mm
Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-0-OPT-24DC/48DC/100	2905294	10

Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-0-OPT-24DC/230AC/1	2905295	10

# Relay modules

## Industrial relay system - RIFLINE complete

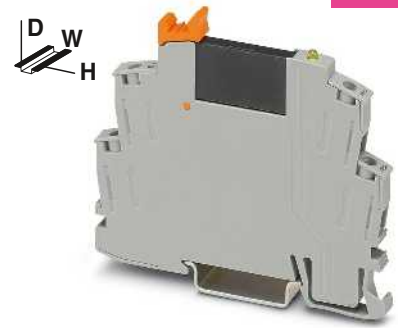
### Fully mounted RIF-0 relay modules

Fully mounted RIF-0 relay modules, consisting of:

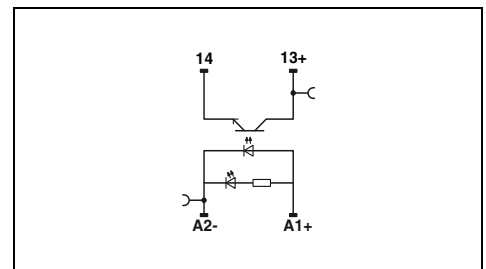
- Relay base with screw connection
- Solid-state relays
- Relay ejector lever on the housing

The advantages:

- Status LED integrated into the base
- RTIII sealed solid-state relay
- Zero voltage switch at AC output
- Professional bridging of adjacent modules saves wiring time



**Solid-state relay module with screw connection, DC output max. 3 A**



#### Technical data

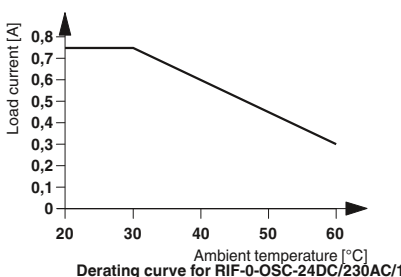
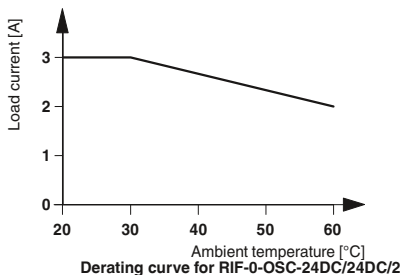
Input data	
Rated actuating voltage range with reference to $U_C$	
Rated actuating current $I_C$	[mA] 8.5
Switching level (with reference to $U_C$ )	1 signal ("H") > 0.8 0 signal ("L") < 0.4
Typical switch-on time at $U_N$	[ms] 0.02
Typical switch-off time at $U_N$	[ms] 0.3
Transmission frequency $f_{limit}$	[Hz] 300
Input circuit DC	Yellow LED, Freewheeling diode
Output data	
Max. switching voltage	33 V DC
Minimum switching voltage	3 V DC
Maximum switch-on current	15 A (10 ms)
Minimum/maximum switching current	- / 3 A (see derating curve)
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	< 200 mV
Leakage current in off state	-
Phase angle (cos $\phi$ )	-
Max. load value	-
General data	
Test voltage input/output	2.5 kV <sub>ms</sub> (50 Hz, 1 min.)
Ambient temperature (operation)	-25 °C ... 60 °C
Standards/regulations	DIN EN 50178
Degree of pollution/surge voltage category	2 / III
Connection data solid/stranded/AWG	0.5 - 4 mm <sup>2</sup> / 0.5 - 2.5 mm <sup>2</sup> / 20 - 12
Maximum tightening torque	0.5 Nm
Dimensions	6.2 mm / 84 mm / 68 mm

①	0.8 - 1.2
	8.5
	> 0.8
	< 0.4
	0.02
	0.3
	300
	Yellow LED, Freewheeling diode
	33 V DC
	3 V DC
	15 A (10 ms)
	- / 3 A (see derating curve)
	Reverse polarity protection, surge protection
	< 200 mV
	-
	-
	-
	2.5 kV <sub>ms</sub> (50 Hz, 1 min.)
	-25 °C ... 60 °C
	DIN EN 50178
	2 / III
	0.5 - 4 mm <sup>2</sup> / 0.5 - 2.5 mm <sup>2</sup> / 20 - 12
	0.5 Nm
	6.2 mm / 84 mm / 68 mm

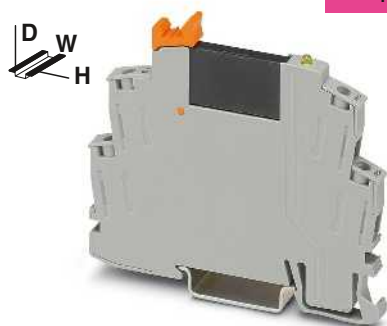
#### Ordering data

Description	Rated actuating voltage $U_C$
<b>Coupling relay modules</b> with solid-state relay and screw connection	24 V DC

Type	Order No.	Pcs./ Pkt.
RIF-0-OSC-24DC/24DC/2	2905657	10

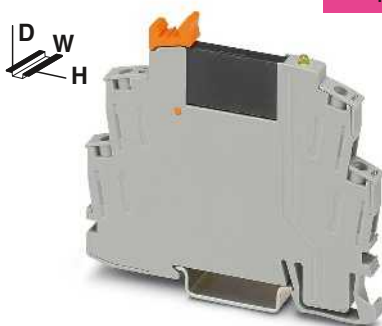


new

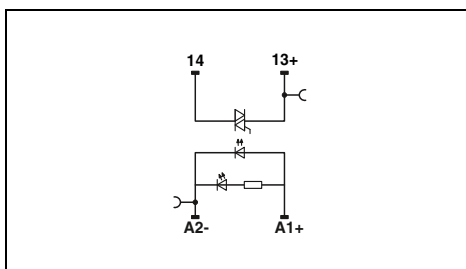
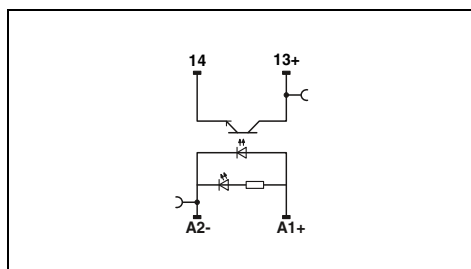


Solid-state relay module with screw connection, DC output max. 100 mA

new



Solid-state relay module with screw connection, AC output max. 750 mA



Technical data

①
0.8 - 1.2
8.5
> 0.8
< 0.4
0.02
0.3
300
Yellow LED , Freewheeling diode
48 V DC
3 V DC
-
- / 100 mA
Reverse polarity protection, surge protection
< 1 V
-
-
-
2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
-25 °C ... 60 °C
DIN EN 50178
2 / III
0.5 - 4 mm <sup>2</sup> / 0.5 - 2.5 mm <sup>2</sup> / 20 - 12
0.5 Nm
6.2 mm / 84 mm / 68 mm

Technical data

①
0.8 - 1.2
8
> 0.8
< 0.4
10
10
10
Yellow LED , Freewheeling diode
253 V AC
24 V AC
30 A (10 ms)
10 mA / 0.75 A (see derating curve)
RCV circuit
< 1 V
1 mA (in off state)
0.5
4.5 A <sup>2</sup> s (tp = 10 ms, at 25 °C)
2.5 kV <sub>rms</sub> (50 Hz, 1 min.)
-25 °C ... 60 °C
DIN EN 50178
2 / III
0.5 - 4 mm <sup>2</sup> / 0.5 - 2.5 mm <sup>2</sup> / 20 - 12
0.5 Nm
6.2 mm / 84 mm / 68 mm

Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-0-OSC-24DC/48DC/100	2905658	10

Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-0-OSC-24DC/230AC/1	2905656	10

# Relay modules

## Industrial relay system - RIFLINE complete

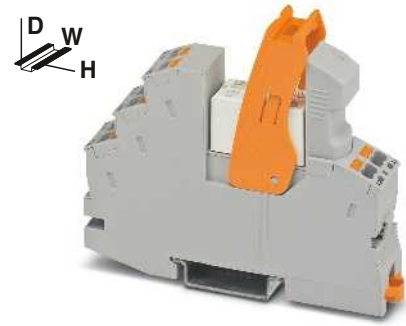
### Fully mounted RIF-1 relay modules

Fully mounted RIF-1 relay modules, consisting of:

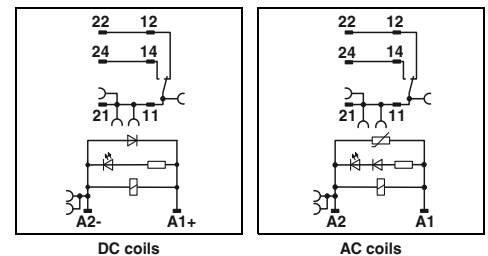
- Relay base with Push-in connection
- 1 or 2-PDT relays
- Relay retaining bracket
- Interference suppression module

The advantages:

- Logical contact arrangement thanks to 1/3-level relay base
- Operational reliability thanks to sealed relay
- Safe isolation between coil and contact side
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 366.
- For FBS 2-8 plug-in bridges for the output side (11/21), see page 366.



1-PDT relay module with Push-in connection



DC coils

AC coils

#### Technical data

Input data	①	②	③	④	⑤
Permissible range (with reference to $U_N$ )	see diagram				
Typical input current at $U_N$ [mA]	33	18	33	8	6
Typical response time at $U_N$ [ms]	8	8	3 - 12	3 - 12	3 - 12
Typical release time at $U_N$ [ms]	10	10	3 - 20	3 - 20	3 - 20
Input circuit AC	Yellow LED, Varistor				
Input circuit DC	Yellow LED, Damping diode				
Output data	1 PDT		1 PDT		
Contact type	AgNi		AgNi, hard gold-plated		
Contact material	250 V AC/DC		30 V AC / 36 V DC		
Max. switching voltage	12 V (at 10 mA)		100 mV (at 10 mA)		
Minimum switching voltage	11 A (see diagram)		50 mA		
Limiting continuous current	25 A (20 ms, N/O contact)		50 mA		
Maximum switch-on current AC	50 A (20 ms, N/O contact)		50 mA		
Maximum switch-on current DC	10 mA (at 12 V)		1 mA (at 24 V)		
Minimum switching current					
General data	4 kV <sub>rms</sub> (50 Hz, 1 min.)				
Test voltage (winding / contact)	-40 °C ... 50 °C				
Ambient temperature (operation), AC	-40 °C ... 70 °C				
Ambient temperature (operation), DC	100% operating factor				
Nominal operating mode	Approx. 10 <sup>7</sup> cycles				
Mechanical service life, AC	approx. 3x 10 <sup>7</sup> cycles				
Mechanical service life, DC	DIN EN 50178				
Standards/regulations	2 / III				
Degree of pollution/surge voltage category					
Mounting position/mounting	any / In rows with zero spacing				
Connection data solid/stranded/AWG	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16				
Dimensions	16 mm / 93 mm / 75 mm				
EMC note	Class A product, see page 605				

#### Ordering data

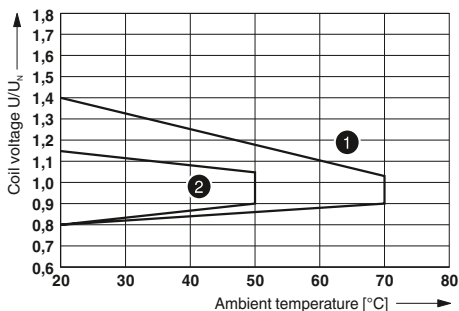
Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Coupling relay modules</b> with power contact relay and Push-in connection	① 12 V DC	RIF-1-RPT-LDP-12DC/1X21	2906224	10
	② 24 V DC	RIF-1-RPT-LDP-24DC/1X21	2903342	10
	③ 24 V AC	RIF-1-RPT-LV-24AC/1X21	2903341	10
	④ 120 V AC	RIF-1-RPT-LV-120AC/1X21	2903340	10
	⑤ 230 V AC	RIF-1-RPT-LV-230AC/1X21	2903339	10
<b>Coupling relay modules</b> with multi-layer gold contact relay, with Push-in connection	① 24 V DC	RIF-1-RPT-LDP-24DC/1X21AU	2903338	10
	② 24 V AC	RIF-1-RPT-LV-24AC/1X21AU	2903337	10
	③ 120 V AC	RIF-1-RPT-LV-120AC/1X21AU	2903336	10
	④ 230 V AC	RIF-1-RPT-LV-230AC/1X21AU	2903335	10



2-PDT relay module with Push-in connection

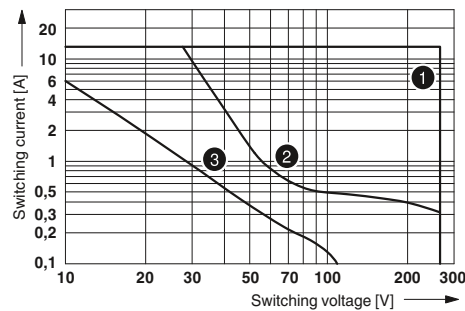
### RIF-1-RPT.../1X21... (1-PDT)

Operating voltage range



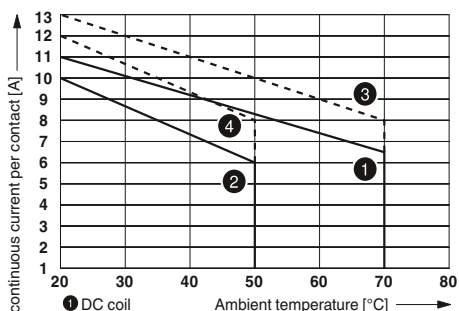
- 1 DC coils
- 2 AC coils

Interrupting rating



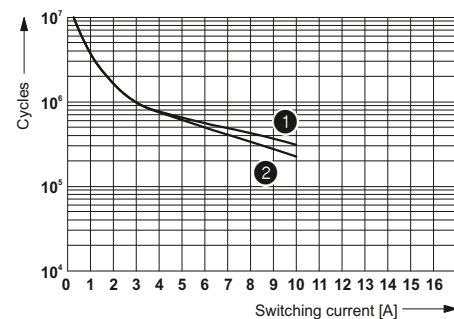
- 1 AC, ohmic load
- 2 DC, ohmic load
- 3 DC, L/R = 40 ms

Contact derating

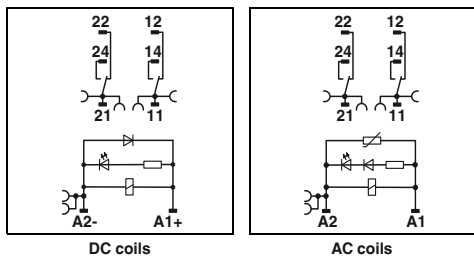


- 1 DC coil
- 2 AC coil
- 3 DC coil, jumper between 11 and 21
- 4 AC coil, jumper between 11 and 21

Electrical service life



- 1 250 V AC, ohmic load (DC coils)
- 2 250 V AC, ohmic load (AC coils)



#### Technical data

①	②	③	④	⑤
see diagram				
33	18	33	8	6
8	8	3-12	3-12	3-12
10	10	3-20	3-20	3-20
Yellow LED, Varistor				
Yellow LED, Damping diode				

2 PDT	2 PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 10 mA)	100 mV (at 10 mA)
8 A (see diagram)	50 mA
12 A (20 ms, N/O contact)	50 mA
25 A (20 ms, N/O contact)	50 mA
10 mA (At 5 V)	1 mA (at 24 V)

4 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -40 °C ... 50 °C  
 -40 °C ... 70 °C  
 100% operating factor  
 Approx. 10<sup>7</sup> cycles  
 approx. 3x 10<sup>7</sup> cycles  
 DIN EN 50178  
 2 / III

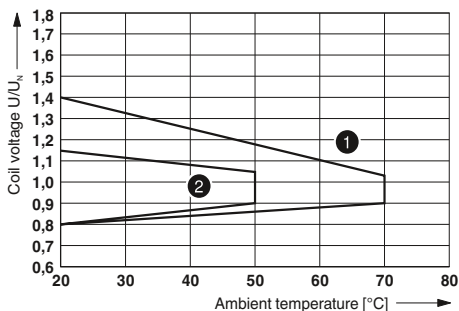
any / In rows with zero spacing  
 0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16  
 16 mm / 93 mm / 75 mm  
 Class A product, see page 605

#### Ordering data

Type	Order No.	Pcs./Pkt.
RIF-1-RPT-LDP-12DC/2X21	2906223	10
RIF-1-RPT-LDP-24DC/2X21	2903334	10
RIF-1-RPT-LV-24AC/2X21	2903333	10
RIF-1-RPT-LV-120AC/2X21	2903332	10
RIF-1-RPT-LV-230AC/2X21	2903331	10
RIF-1-RPT-LDP-24DC/2X21AU	2903330	10
RIF-1-RPT-LV-24AC/2X21AU	2903329	10
RIF-1-RPT-LV-120AC/2X21AU	2903328	10
RIF-1-RPT-LV-230AC/2X21AU	2903327	10

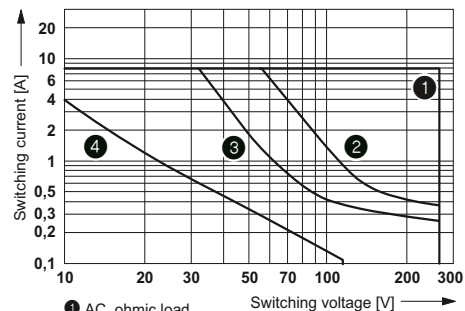
### RIF-1-RPT.../2X21... (2-PDT)

Operating voltage range



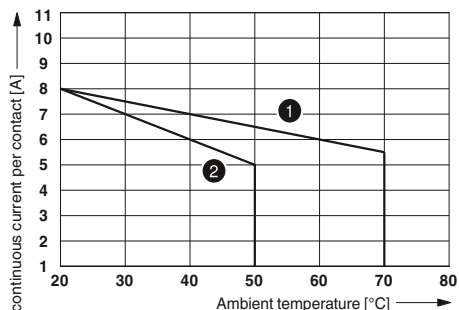
- 1 DC coils
- 2 AC coils

Interrupting rating



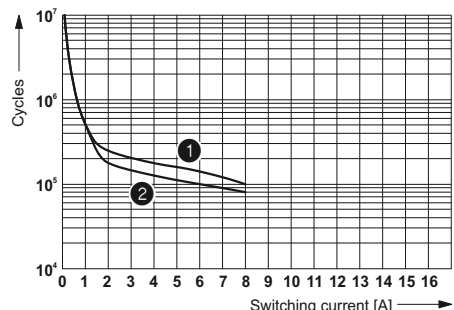
- 1 AC, ohmic load
- 2 DC, ohmic load, contacts in series
- 3 DC, ohmic load
- 4 DC, L/R = 40 ms

Contact derating



- 1 DC coil
- 2 AC coil

Electrical service life



- 1 250 V AC, ohmic load (DC coils)
- 2 250 V AC, ohmic load (AC coils)

# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-1 relay modules

Fully mounted RIF-1 relay modules, consisting of:

- Relay base with screw connection
- 1 or 2-PDT relays
- Relay retaining bracket
- Interference suppression module

The advantages:

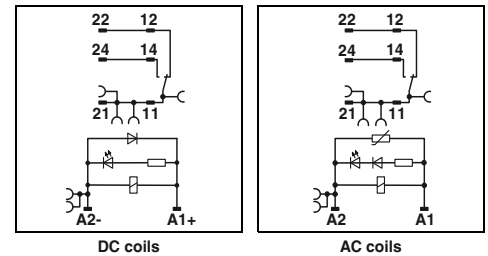
- Logical contact arrangement thanks to 1/3-level relay base
- Operational reliability thanks to sealed relay
- Safe isolation between coil and contact side
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 366.
- For FBS 2-8 plug-in bridges for the output side (11/21), see page 366.



new



1-PDT relay module with screw connection



DC coils

AC coils

#### Technical data

Input data	①	②	③	④	⑤
Permissible range (with reference to $U_N$ )	see diagram				
Typical input current at $U_N$ [mA]	33	18	33	8	6
Typical response time at $U_N$ [ms]	8	8	3 - 12	3 - 12	3 - 12
Typical release time at $U_N$ [ms]	10	10	3 - 20	3 - 20	3 - 20
Input circuit AC	Yellow LED, Varistor				
Input circuit DC	Yellow LED, Damping diode				
Output data	1 PDT		1 PDT		
Contact type	AgNi		AgNi, hard gold-plated		
Contact material	250 V AC/DC		30 V AC / 36 V DC		
Max. switching voltage	12 V (at 10 mA)		100 mV (at 10 mA)		
Minimum switching voltage	11 A (see diagram)		50 mA		
Limiting continuous current	25 A (20 ms, N/O contact)		25 A (20 ms, N/O contact)		
Maximum switch-on current AC	50 A (20 ms, N/O contact)		50 mA		
Maximum switch-on current DC	10 mA (at 12 V)		1 mA (at 24 V)		
Minimum switching current					
General data	4 kV <sub>rms</sub> (50 Hz, 1 min.)				
Test voltage (winding / contact)	-40 °C ... 50 °C				
Ambient temperature (operation), AC	-40 °C ... 70 °C				
Ambient temperature (operation), DC	100% operating factor				
Nominal operating mode	Approx. 10 <sup>7</sup> cycles				
Mechanical service life, AC	approx. 3x 10 <sup>7</sup> cycles				
Mechanical service life, DC	DIN EN 50178				
Standards/regulations	2 / III				
Degree of pollution/surge voltage category					
Mounting position/mounting	any / In rows with zero spacing				
Connection data solid/stranded/AWG	0.14 ... 6 mm <sup>2</sup> / 0.14 ... 4 mm <sup>2</sup> / 26 - 10				
Dimensions	16 mm / 89 mm / 75 mm				
EMC note	Class A product, see page 605				

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Coupling relay modules</b> with power contact relay and screw connection	① 12 V DC	RIF-1-RSC-LDP-12DC/1X21	2908500	10
	② 24 V DC	RIF-1-RSC-LDP-24DC/1X21	2903358	10
	③ 24 V AC	RIF-1-RSC-LV-24AC/1X21	2903357	10
	④ 120 V AC	RIF-1-RSC-LV-120AC/1X21	2903356	10
	⑤ 230 V AC	RIF-1-RSC-LV-230AC/1X21	2903355	10
<b>Coupling relay modules</b> with multi-layer gold contact relay, with screw connection	① 24 V DC	RIF-1-RSC-LDP-24DC/1X21AU	2903354	10
	② 24 V AC	RIF-1-RSC-LV-24AC/1X21AU	2903353	10
	③ 120 V AC	RIF-1-RSC-LV-120AC/1X21AU	2903352	10
	④ 230 V AC	RIF-1-RSC-LV-230AC/1X21AU	2903351	10

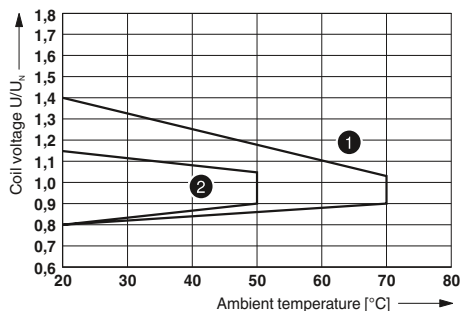
new

### RIF-1-RPT.../1X21... (1-PDT)



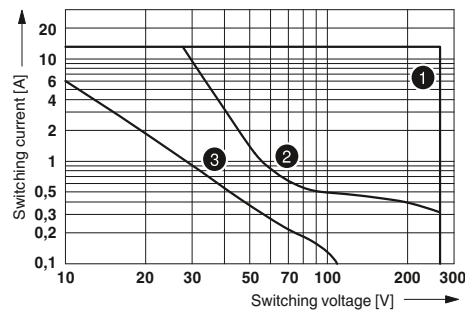
2-PDT relay module with screw connection

#### Operating voltage range



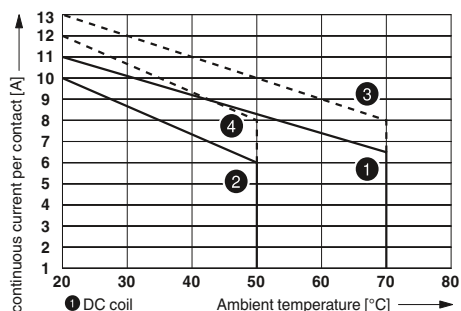
- 1 DC coils
- 2 AC coils

#### Interrupting rating



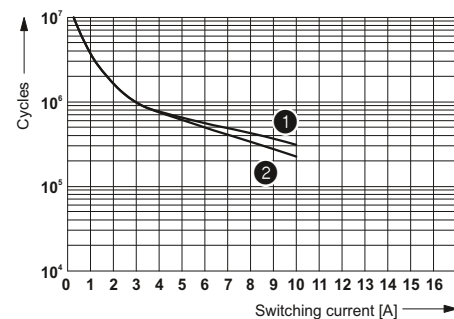
- 1 AC, ohmic load
- 2 DC, ohmic load
- 3 DC, L/R = 40 ms

#### Contact derating

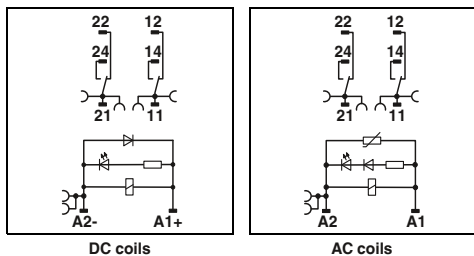


- 1 DC coil
- 2 AC coil
- 3 DC coil, jumper between 11 and 21
- 4 AC coil, jumper between 11 and 21

#### Electrical service life



- 1 250 V AC, ohmic load (DC coils)
- 2 250 V AC, ohmic load (AC coils)



DC coils

AC coils

#### Technical data

①	②	③	④	⑤
see diagram				
33	18	33	8	6
8	8	3-12	3-12	3-12
10	10	3-20	3-20	3-20
Yellow LED, Varistor				
Yellow LED, Damping diode				

2 PDT	2 PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 10 mA)	100 mV (at 10 mA)
8 A (see diagram)	50 mA
12 A (20 ms, N/O contact)	50 mA
25 A (20 ms, N/O contact)	50 mA
10 mA (At 5 V)	1 mA (at 24 V)

4 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -40 °C ... 50 °C  
 -40 °C ... 70 °C  
 100% operating factor  
 Approx. 10<sup>7</sup> cycles  
 approx. 3x 10<sup>7</sup> cycles  
 DIN EN 50178  
 2 / III

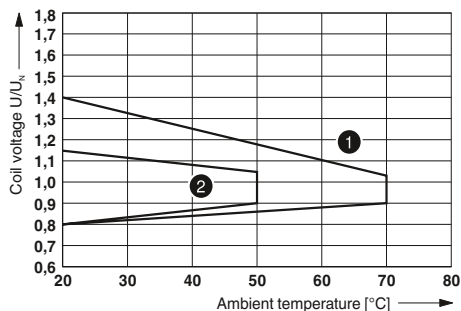
any / In rows with zero spacing  
 0.14 ... 6 mm<sup>2</sup> / 0.14 ... 4 mm<sup>2</sup> / 26 - 10  
 16 mm / 89 mm / 75 mm  
 Class A product, see page 605

#### Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-1-RSC-LDP-12DC/2X21	2908501	10
RIF-1-RSC-LDP-24DC/2X21	2903350	10
RIF-1-RSC-LV-24AC/2X21	2903349	10
RIF-1-RSC-LV-120AC/2X21	2903348	10
RIF-1-RSC-LV-230AC/2X21	2903347	10
RIF-1-RSC-LDP-24DC/2X21AU	2903346	10
RIF-1-RSC-LV-24AC/2X21AU	2903345	10
RIF-1-RSC-LV-120AC/2X21AU	2903344	10
RIF-1-RSC-LV-230AC/2X21AU	2903343	10

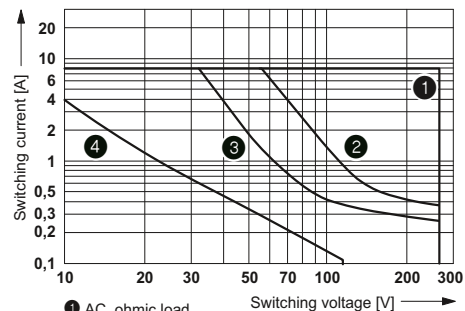
### RIF-1-RSC.../2X21... (2-PDT)

#### Operating voltage range



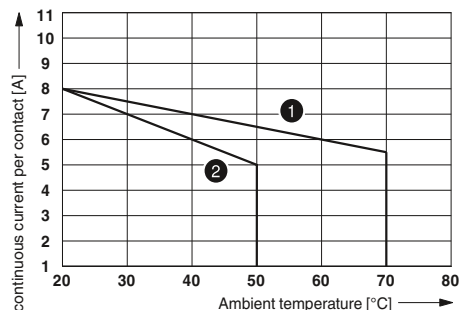
- 1 DC coils
- 2 AC coils

#### Interrupting rating



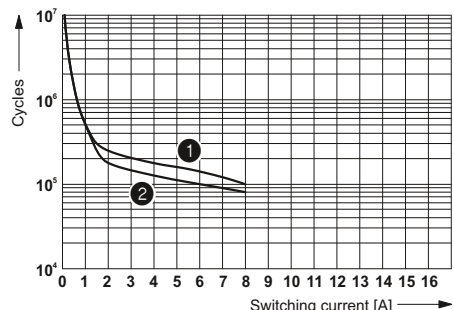
- 1 AC, ohmic load
- 2 DC, ohmic load, contacts in series
- 3 DC, ohmic load
- 4 DC, L/R = 40 ms

#### Contact derating



- 1 DC coil
- 2 AC coil

#### Electrical service life



- 1 250 V AC, ohmic load (DC coils)
- 2 250 V AC, ohmic load (AC coils)

# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-1 relay modules

Fully mounted RIF-1 relay modules, consisting of:

- Relay base with Push-in connection
- 1 or 2-PDT relays with detectable manual operation
- Relay retaining bracket
- Interference suppression module (AC types only)

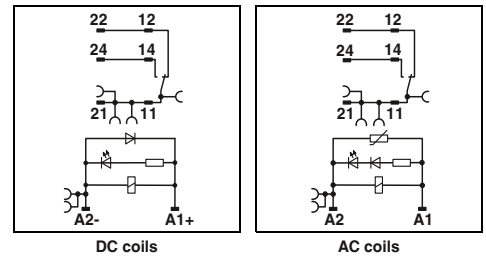
The advantages:

- Relay with lockable manual operation and status LED
- With DC types, freewheeling diode is integrated into relay
- Mechanical switch position indicator
- Professional bridging of adjacent modules saves wiring time



**1-PDT relay module with Push-in connection and manual operation**

ERC



<b>Input data</b>	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit AC	
Input circuit DC	
<b>Output data</b>	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current AC	
Maximum switch-on current DC	
Minimum switching current	
<b>General data</b>	
Test voltage (winding / contact)	
Ambient temperature (operation), AC	
Ambient temperature (operation), DC	
Nominal operating mode	
Mechanical service life	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

Technical data		
①	②	③
see diagram		
18	7	3.5
9	4 - 10	4 - 10
10	3 - 20	3 - 20
Yellow LED, Varistor		
Yellow LED, Damping diode		

1 PDT
AgNi
250 V AC/DC
12 V (at 10 mA)
see diagram
32 A (20 ms, N/O contact)
24 A (20 ms, N/O contact)
10 mA (at 12 V)

4 kV <sub>rms</sub> (50 Hz, 1 min.)
-40 °C ... 50 °C
-40 °C ... 60 °C
100% operating factor
Approx. 5 x 10 <sup>6</sup> cycles
DIN EN 50178
2 / III
any / In rows with zero spacing
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
16 mm / 93 mm / 75 mm
Class A product, see page 605

Ordering data		
Type	Order No.	Pcs./ Pkt.
<b>Coupling relay modules</b> with power contact relay with manual operation and Push-in connection		
① 24 V DC	<b>RIF-1-RPT-LDP-24DC/1X21MS</b>	2905289 10
② 120 V AC	<b>RIF-1-RPT-LV-120AC/1X21MS</b>	2909776 10
③ 230 V AC	<b>RIF-1-RPT-LV-230AC/1X21MS</b>	2905290 10

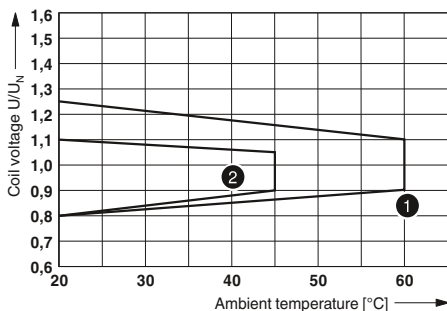




2-PDT relay module with Push-in connection and manual operation

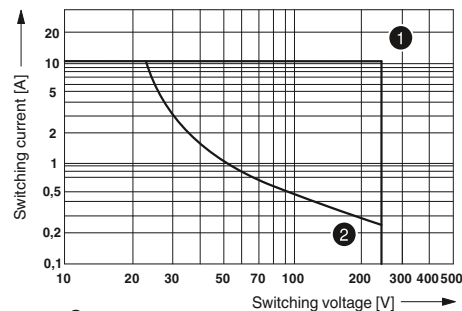
### RIF-1-RPT.../1X21... (1-PDT)

Operating voltage range



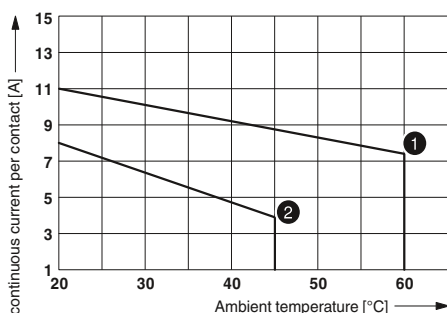
- 1 DC coils
- 2 AC coils

Interrupting rating



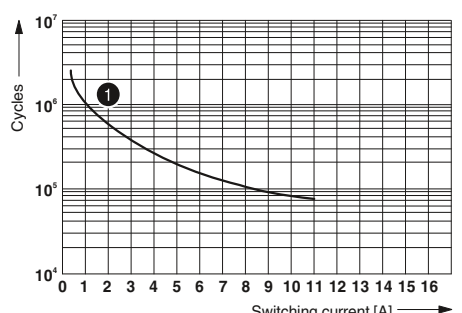
- 1 = AC, ohmic load
- 2 = DC, ohmic load

Contact derating



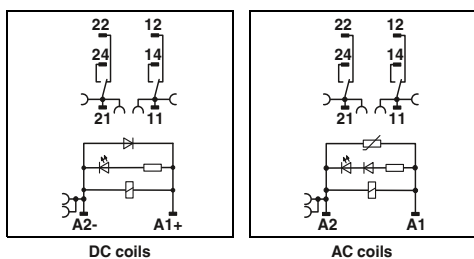
- 1 DC coil
- 2 AC coil

Electrical service life



- 1 = 250 V AC, ohmic load

ERIC



DC coils

AC coils

#### Technical data

- ① see diagram
- ② 18 7 3.5
- ③ 9 4 - 10 4 - 10
- 10 3 - 20 3 - 20
- Yellow LED, Varistor
- Yellow LED, Damping diode

- 2 PDT
- AgNi
- 250 V AC/DC
- 12 V (at 10 mA)
- see diagram
- 16 A (20 ms, N/O contact)
- 12 A (20 ms, N/O contact)
- 10 mA (at 12 V)

- 4 kV<sub>rms</sub> (50 Hz, 1 min.)
- 40 °C ... 45 °C
- 40 °C ... 60 °C
- 100% operating factor
- Approx. 5 × 10<sup>6</sup> cycles
- DIN EN 50178
- 2 / III

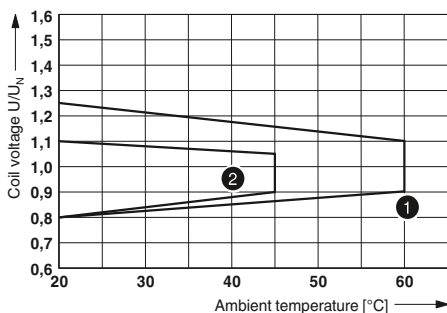
- any / In rows with zero spacing
- 0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16
- 16 mm / 93 mm / 75 mm
- Class A product, see page 605

#### Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-1-RPT-LDP-24DC/2X21MS	2905291	10
RIF-1-RPT-LV-120AC/2X21MS	2909775	10
RIF-1-RPT-LV-230AC/2X21MS	2905292	10

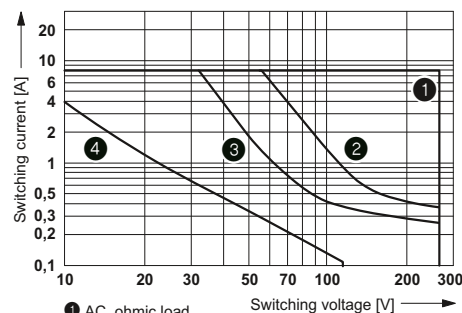
### RIF-1-RPT.../2X21... (2-PDT)

Operating voltage range



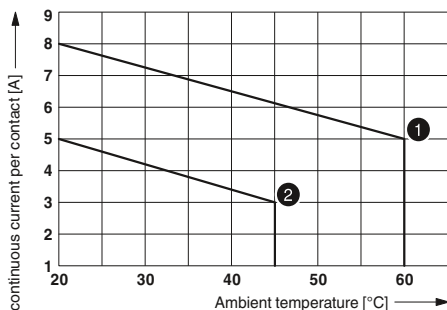
- 1 DC coils
- 2 AC coils

Interrupting rating



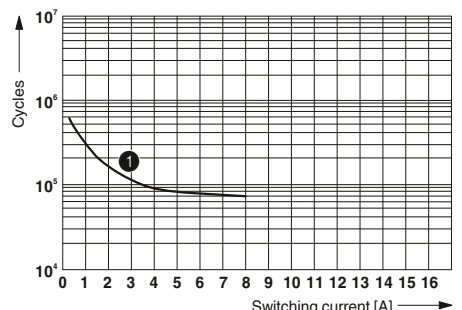
- 1 AC, ohmic load
- 2 DC, ohmic load, contacts in series
- 3 DC, ohmic load
- 4 DC, L/R = 40 ms

Contact derating



- 1 DC coil
- 2 AC coil

Electrical service life



- 1 250 V AC, ohmic load

# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-1 relay modules

Fully mounted RIF-1 relay modules, consisting of:

- Relay base with screw connection
- 1 or 2-PDT relays with detectable manual operation
- Relay retaining bracket
- Interference suppression module (AC types only)

The advantages:

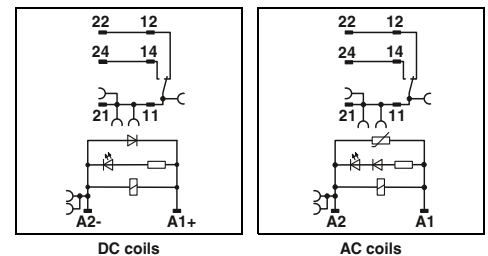
- Relay with lockable manual operation and status LED
- With DC types, freewheeling diode is integrated into relay
- Mechanical switch position indicator
- Professional bridging of adjacent modules saves wiring time



new



1-PDT relay module with screw connection and manual operation



DC coils

AC coils

#### Technical data

	①	②	③
<b>Input data</b>	see diagram		
Permissible range (with reference to $U_N$ )	18	7	4.5
Typical input current at $U_N$	[mA]	9	4 - 10
Typical response time at $U_N$	[ms]	10	3 - 20
Typical release time at $U_N$	[ms]		4 - 20
Input circuit AC	Yellow LED, Varistor		
Input circuit DC	Yellow LED, Damping diode		
<b>Output data</b>	1 PDT		
Contact type	AgNi		
Contact material	250 V AC/DC		
Max. switching voltage	12 V (at 10 mA)		
Minimum switching voltage	see diagram		
Limiting continuous current	32 A (20 ms, N/O contact)		
Maximum switch-on current AC	24 A (20 ms, N/O contact)		
Maximum switch-on current DC	10 mA (at 12 V)		
Minimum switching current			
<b>General data</b>	4 kV <sub>rms</sub> (50 Hz, 1 min.)		
Test voltage (winding / contact)	-40 °C ... 50 °C		
Ambient temperature (operation), AC	-40 °C ... 60 °C		
Ambient temperature (operation), DC	100% operating factor		
Nominal operating mode	Approx. 5 x 10 <sup>6</sup> cycles		
Mechanical service life	DIN EN 50178		
Standards/regulations	2 / III		
Degree of pollution/surge voltage category	any / In rows with zero spacing		
Mounting position/mounting	0.14 ... 6 mm <sup>2</sup> / 0.14 ... 4 mm <sup>2</sup> / 26 - 10		
Connection data solid/stranded/AWG	16 mm / 89 mm / 75 mm		
Dimensions	Class A product, see page 605		
EMC note			

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Coupling relay modules</b> with power contact relay with manual operation and screw connection				
	① 24 V DC	RIF-1-RSC-LDP-24DC/1X21MS	2905659	10
	② 120 V AC	RIF-1-RSC-LV-120AC/1X21MS	2909774	10
	③ 230 V AC	RIF-1-RSC-LV-230AC/1X21MS	2905661	10

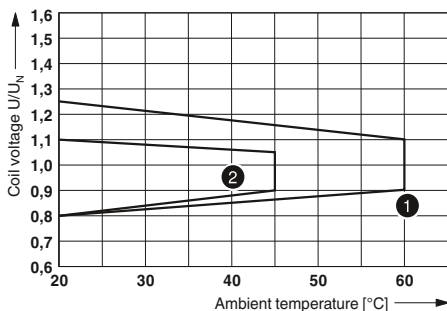
new



2-PDT relay module with screw connection and manual operation

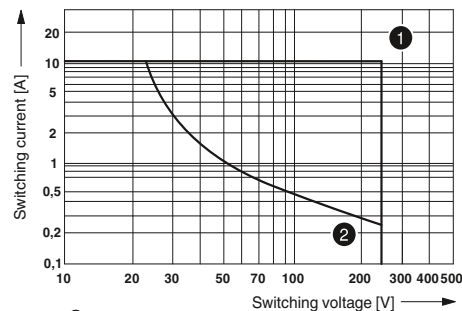
### RIF-1-RPT.../1X21... (1-PDT)

Operating voltage range

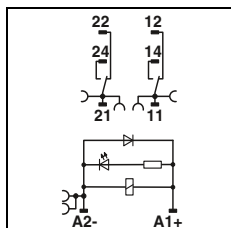


- 1 DC coils
- 2 AC coils

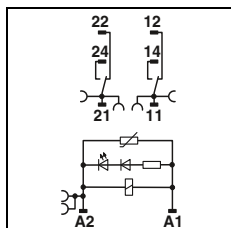
Interrupting rating



- 1 = AC, ohmic load
- 2 = DC, ohmic load

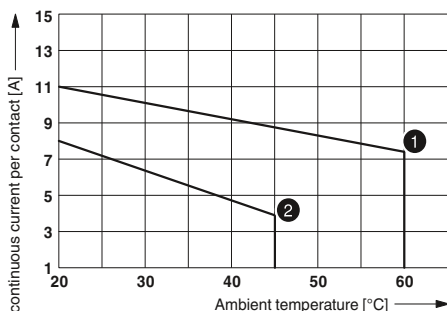


DC coils



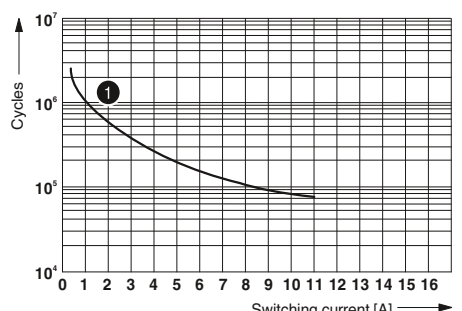
AC coils

Contact derating



- 1 DC coil
- 2 AC coil

Electrical service life



- 1 = 250 V AC, ohmic load

#### Technical data

- ① see diagram
- ② 18
- ③ 4.5
- 9
- 4 - 10
- 4 - 12
- 10
- 3 - 20
- 4 - 20
- Yellow LED, Varistor
- Yellow LED, Damping diode

- 2 PDT
- AgNi
- 250 V AC/DC
- 12 V (at 10 mA)
- see diagram
- 16 A (20 ms, N/O contact)
- 12 A (20 ms, N/O contact)
- 10 mA (at 12 V)

- 4 kV<sub>rms</sub> (50 Hz, 1 min.)
- 40 °C ... 45 °C
- 40 °C ... 60 °C
- 100% operating factor
- Approx. 5 × 10<sup>6</sup> cycles
- DIN EN 50178
- 2 / III

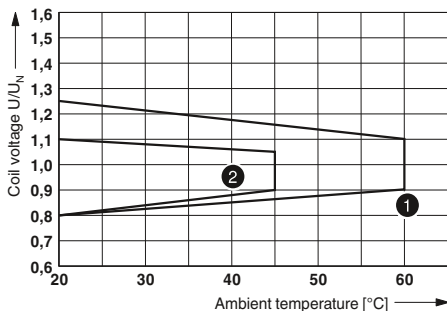
- any / In rows with zero spacing
- 0.14 ... 6 mm<sup>2</sup> / 0.14 ... 4 mm<sup>2</sup> / 26 - 10
- 16 mm / 89 mm / 75 mm
- Class A product, see page 605

#### Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-1-RSC-LDP-24DC/2X21MS	2905660	10
RIF-1-RSC-LV-120AC/2X21MS	2909773	10
RIF-1-RSC-LV-230AC/2X21MS	2905662	10

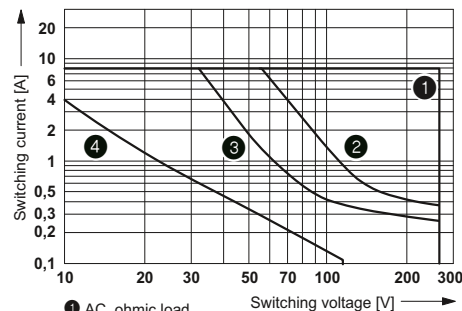
### RIF-1-RSC.../2X21... (2-PDT)

Operating voltage range



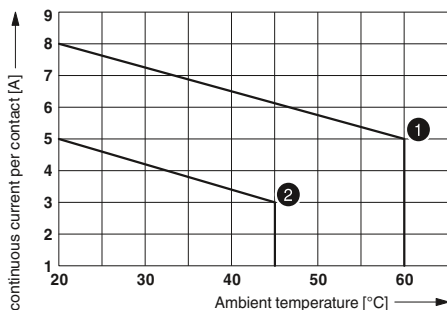
- 1 DC coils
- 2 AC coils

Interrupting rating



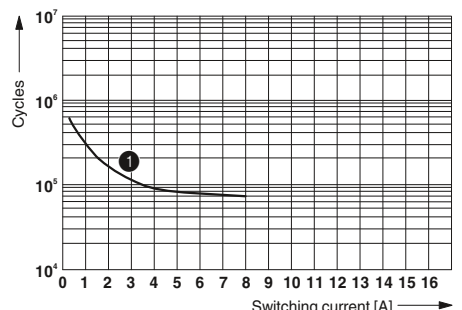
- 1 AC, ohmic load
- 2 DC, ohmic load, contacts in series
- 3 DC, ohmic load
- 4 DC, L/R = 40 ms

Contact derating



- 1 DC coil
- 2 AC coil

Electrical service life



- 1 250 V AC, ohmic load

# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-1 relay modules

Fully mounted RIF-1 relay modules, consisting of:

- Relay base with Push-in connection
- 1-N/O relay
- Relay retaining bracket

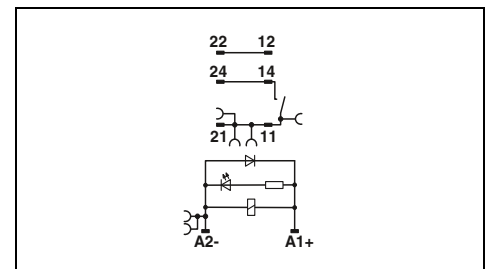
The advantages:

- Maximum inrush current up to 130 A
- Logical contact arrangement thanks to 1/3-level relay base
- Operational reliability thanks to sealed relay
- Safe isolation between coil and contact side
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 366.
- For FBS 2-8 plug-in bridges for the output side (11/21), see page 366.



new

**1-N/O relay module with Push-in and screw connection**



#### Technical data

<b>Input data</b>	①
Permissible range (with reference to $U_N$ )	see diagram
Typical input current at $U_N$	18 [mA]
Typical response time at $U_N$	8 [ms]
Typical release time at $U_N$	10 [ms]
Input circuit DC	Yellow LED, Polarity protection diode, Damping diode
<b>Output data</b>	
Contact type	1 N/O contact
Contact material	AgSnO
Max. switching voltage	250 V AC/DC
Minimum switching voltage	12 V AC/DC (at 100 mA)
Limiting continuous current	6 A
Maximum switch-on current DC	80 A (for 20 ms) / 130 A (peak, at capacitive load, 230 V AC, 24 $\mu$ F)
Minimum switching current	100 mA (at 12 V DC)
<b>General data</b>	
Test voltage (winding / contact)	4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation), DC	-40 °C ... 70 °C
Nominal operating mode	100% operating factor
Mechanical service life, DC	$3 \times 10^7$ cycles
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	any / In rows with zero spacing
Connection data solid/stranded/AWG	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
Dimensions	16 mm / 93 mm / 75 mm
EMC note	Class A product, see page 605

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Coupling relay modules</b> for high inrush currents				
with Push-in connection	① 24 V DC	RIF-1-RPT-LDP-24DC/1IC	2909884	10
with screw connection	② 24 V DC	RIF-1-RSC-LDP-24DC/1IC	2909885	10

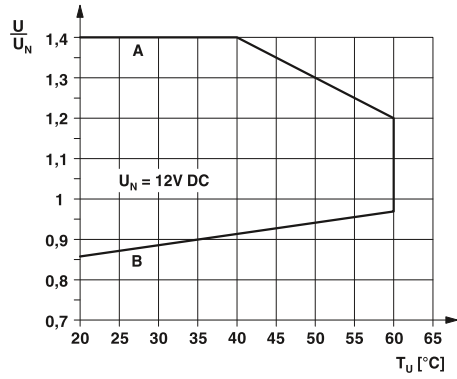
**Operating voltage range**

**Curve A**

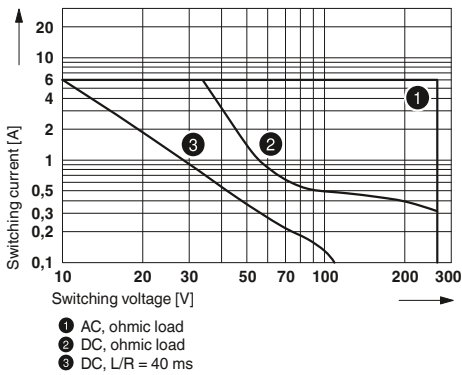
Maximum permissible continuous voltage  $U_{max}$  with limiting continuous current on the contact side (see relevant technical data).

**Curve B**

Minimum permitted pick-up voltage  $U_{op}$  after pre-excitation (see relevant technical data).

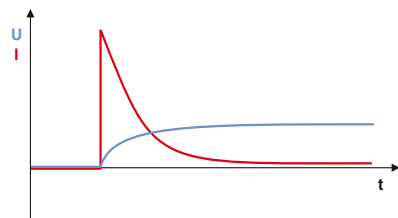


**Interrupting rating**



**Basic behavior of capacitive loads:**

- Very high input current
- Voltage increases with an e-function



# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-2 relay modules

Fully mounted RIF-2 relay modules, consisting of:

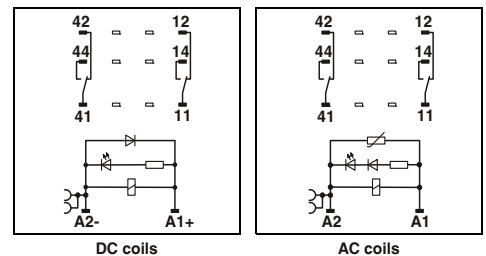
- Relay base with Push-in connection
- 2 or 4-PDT industrial relay
- Relay retaining bracket
- Varistor interference suppression module (AC types only)

The advantages:

- Relay with lockable manual operation and status LED
- With DC types, freewheeling diode is integrated into relay
- Mechanical switch position indicator
- Logical contact arrangement thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 366.



2-PDT industrial relay module with Push-in connection and manual operation



DC coils

AC coils

#### Technical data

	①	②	③	④
Input data	see diagram			
Permissible range (with reference to $U_N$ )	42	66	13	6.5
Typical input current at $U_N$	[mA]	13	5 - 15	5 - 15
Typical response time at $U_N$	[ms]	14	5 - 20	5 - 20
Typical release time at $U_N$	[ms]	Yellow LED, Varistor		
Input circuit AC	Yellow LED, Damping diode			
Input circuit DC				
Output data	2 PDT			
Contact type	AgNi			
Contact material	250 V AC/DC			
Max. switching voltage	5 V (At 24 mA)			
Minimum switching voltage	10 A (see diagram)			
Limiting continuous current	30 A (20 ms, N/O contact)			
Maximum switch-on current AC	30 A (20 ms, N/O contact)			
Maximum switch-on current DC	5 mA (at 24 V)			
Minimum switching current				
General data	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)			
Test voltage (winding / contact)	-40 °C ... 50 °C			
Ambient temperature (operation), AC	-40 °C ... 60 °C			
Ambient temperature (operation), DC	100% operating factor			
Nominal operating mode	Approx. 2x 10 <sup>7</sup> cycles			
Mechanical service life, AC	Approx. 2x 10 <sup>7</sup> cycles			
Mechanical service life, DC	DIN EN 50178			
Standards/regulations	2 / III			
Degree of pollution/surge voltage category				
Mounting position/mounting	any / In rows with zero spacing			
Connection data solid/stranded/AWG	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16			
Dimensions	31 mm / 96 mm / 75 mm			
W / H / D	Class A product, see page 605			
EMC note				

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules with power contact relay and Push-in connection	① 24 V DC	RIF-2-RPT-LDP-24DC/2X21	2903315	10
	② 24 V AC	RIF-2-RPT-LV-24AC/2X21	2903313	10
	③ 120 V AC	RIF-2-RPT-LV-120AC/2X21	2903311	10
	④ 230 V AC	RIF-2-RPT-LV-230AC/2X21	2903310	10

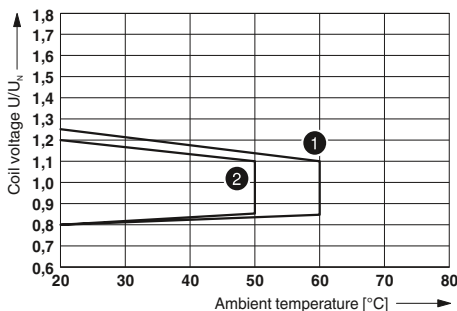


4-PDT industrial relay module with Push-in connection and manual operation



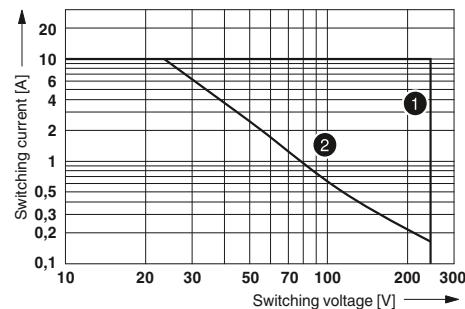
### RIF-2-RPT.../2X21 (2-PDT)

Operating voltage range



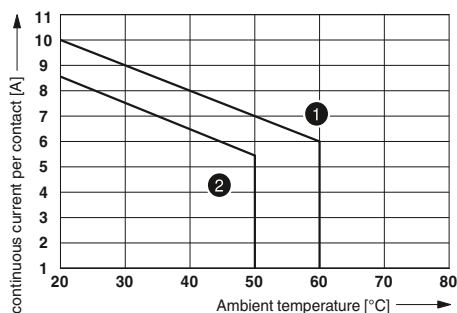
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



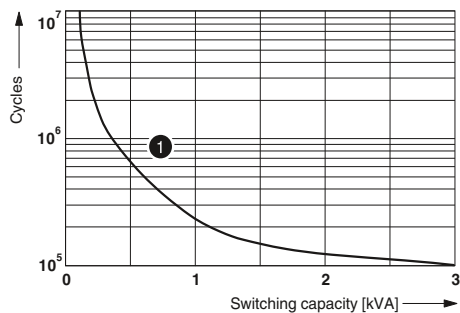
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating

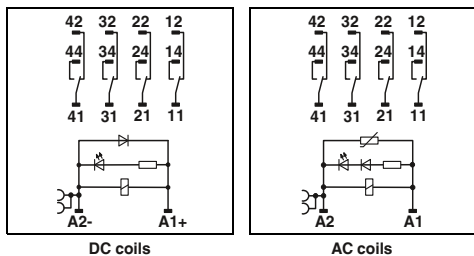


- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load



#### Technical data

①	②	③	④
see diagram			
42	66	13	6.5
13	5 - 15	5 - 15	5 - 15
14	5 - 20	5 - 20	5 - 20
Yellow LED, Varistor			
Yellow LED, Damping diode			

4 PDT  
 AgNi  
 250 V AC/DC  
 5 V (At 24 mA)  
 6 A (see diagram)  
 16 A (20 ms, N/O contact)  
 16 A (20 ms, N/O contact)  
 5 mA (at 24 V)

2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
 -40 °C ... 50 °C  
 -40 °C ... 60 °C  
 100% operating factor  
 Approx. 2x 10<sup>7</sup> cycles  
 Approx. 2x 10<sup>7</sup> cycles  
 DIN EN 50178  
 2 / II

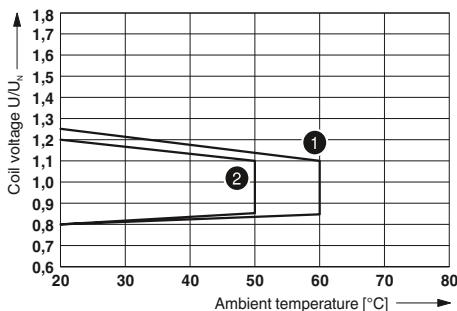
any / In rows with zero spacing  
 0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16  
 31 mm / 96 mm / 75 mm  
 Class A product, see page 605

#### Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-2-RPT-LDP-24DC/4X21	2903308	10
RIF-2-RPT-LV-24AC/4X21	2903306	10
RIF-2-RPT-LV-120AC/4X21	2903305	10
RIF-2-RPT-LV-230AC/4X21	2903304	10

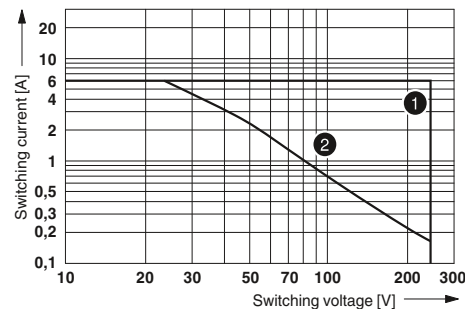
### RIF-2-RPT.../4X21 (4-PDT)

Operating voltage range



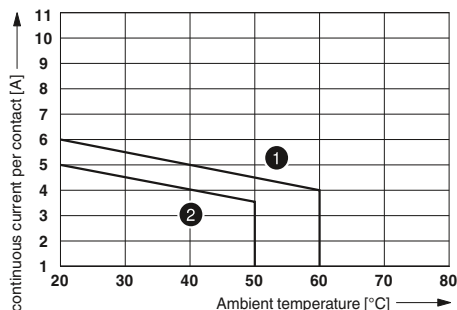
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



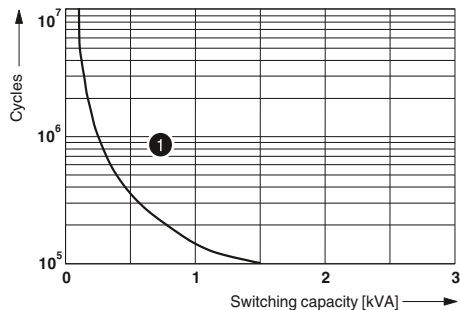
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating



- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load

# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-2 relay modules

Fully mounted RIF-2 relay modules, consisting of:

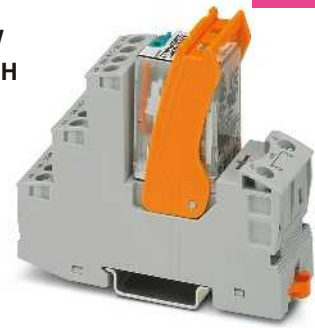
- Relay base with screw connection
- 2 or 4-PDT relay
- Relay retaining bracket
- Interference suppression module (AC types only)

The advantages:

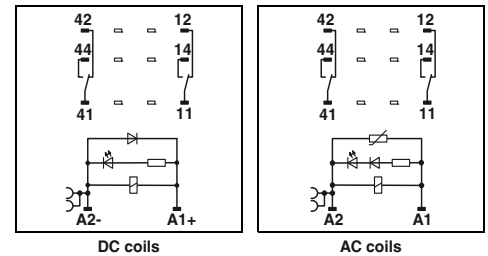
- Relay with lockable manual operation and status LED
- With DC types, freewheeling diode is integrated into relay
- Mechanical switch position indicator
- Logical contact arrangement thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 366.



new



2-PDT industrial relay module with screw connection and manual operation



DC coils

AC coils

#### Technical data

Input data	①	②	③	④	⑤
Permissible range (with reference to $U_N$ )	see diagram				
Typical input current at $U_N$ [mA]	42	7.5	66	13	6.5
Typical response time at $U_N$ [ms]	13	13	5 - 15	5 - 15	5 - 15
Typical release time at $U_N$ [ms]	14	14	5 - 20	5 - 20	5 - 20
Input circuit AC	Yellow LED, Varistor				
Input circuit DC	Yellow LED, Damping diode				
Output data					
Contact type	2 PDT				
Contact material	AgNi				
Max. switching voltage	250 V AC/DC				
Minimum switching voltage	5 V (At 24 mA)				
Limiting continuous current	10 A (see diagram)				
Maximum switch-on current AC	30 A (20 ms, N/O contact)				
Maximum switch-on current DC	30 A (20 ms, N/O contact)				
Minimum switching current	5 mA (at 24 V)				
General data					
Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)				
Ambient temperature (operation), AC	-40 °C ... 50 °C				
Ambient temperature (operation), DC	-40 °C ... 60 °C				
Nominal operating mode	100% operating factor				
Mechanical service life, AC	Approx. 2x 10 <sup>7</sup> cycles				
Mechanical service life, DC	Approx. 2x 10 <sup>7</sup> cycles				
Standards/regulations	DIN EN 50178				
Degree of pollution/surge voltage category	2 / III				
Mounting position/mounting	any / In rows with zero spacing				
Connection data solid/stranded/AWG	0.14 ... 6 mm <sup>2</sup> / 0.14 ... 4 mm <sup>2</sup> / 26 - 10				
Dimensions	W / H / D 27 mm / 89 mm / 75 mm				

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Pre-assembled coupling relay modules with power contact relay and screw connection</b>				
	① 24 V DC	RIF-2-RSC-LDP-24DC/2X21	2903326	10
	② 125 V DC	RIF-2-RSC-LDP-125DC/2X21	2903324	10
	③ 24 V AC	RIF-2-RSC-LV-24AC/2X21	2903323	10
	④ 120 V AC	RIF-2-RSC-LV-120AC/2X21	2903322	10
	⑤ 230 V AC	RIF-2-RSC-LV-230AC/2X21	2903321	10



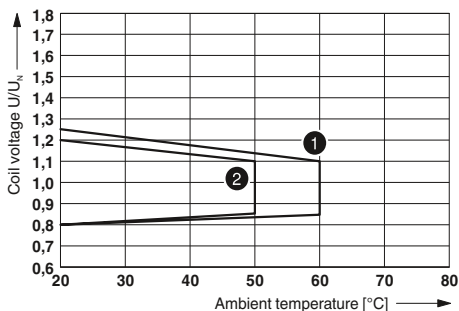
new



4-PDT industrial relay module with screw connection and manual operation

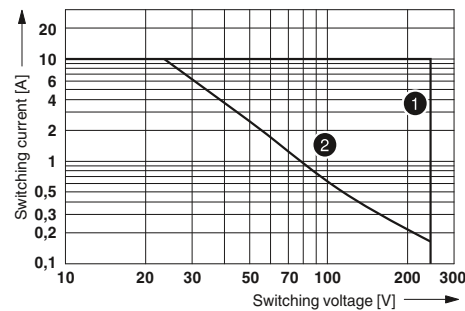
### RIF-2-RSC.../2X21 (2-PDT)

Operating voltage range

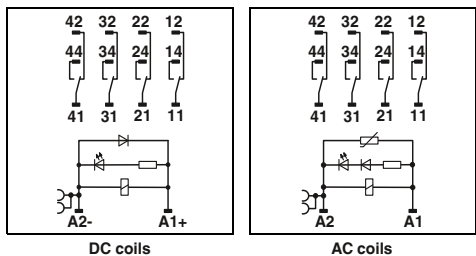


- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

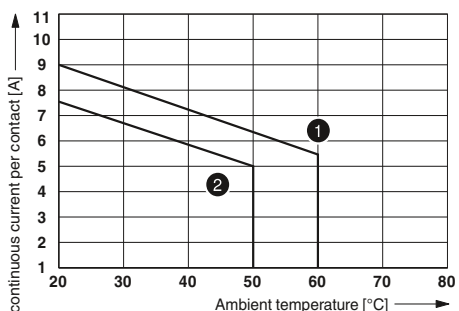
Interrupting rating



- ① AC, ohmic load
- ② DC, ohmic load

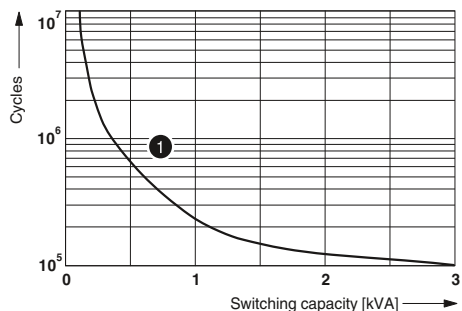


Contact derating



- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load

#### Technical data

①	②	③	④	⑤
see diagram				
42	7.5	66	13	6.5
13	13	5 - 15	5 - 15	5 - 15
14	14	5 - 20	5 - 20	5 - 20

Yellow LED, Varistor  
Yellow LED, Damping diode

4 PDT  
AgNi  
250 V AC/DC  
5 V (At 24 mA)  
6 A (see diagram)  
16 A (20 ms, N/O contact)  
16 A (20 ms, N/O contact)  
5 mA (at 24 V)

2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-40 °C ... 50 °C  
-40 °C ... 60 °C  
100% operating factor  
Approx. 2x 10<sup>7</sup> cycles  
Approx. 2x 10<sup>7</sup> cycles  
DIN EN 50178  
2 / II

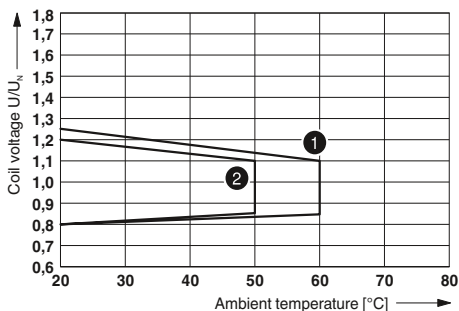
any / In rows with zero spacing  
0.14 ... 6 mm<sup>2</sup> / 0.14 ... 4 mm<sup>2</sup> / 26 - 10  
27 mm / 89 mm / 75 mm

#### Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-2-RSC-LDP-24DC/4X21	2903320	10
RIF-2-RSC-LDP-125DC/4X21	2903319	10
RIF-2-RSC-LV-24AC/4X21	2903318	10
RIF-2-RSC-LV-120AC/4X21	2903317	10
RIF-2-RSC-LV-230AC/4X21	2903316	10

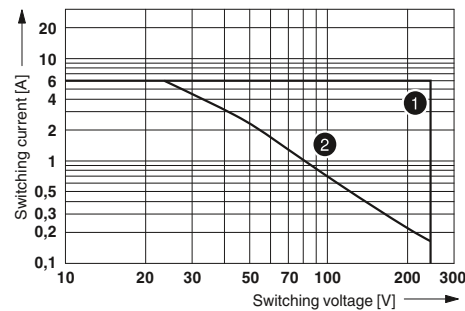
### RIF-2-RSC.../4X21 (4-PDT)

Operating voltage range



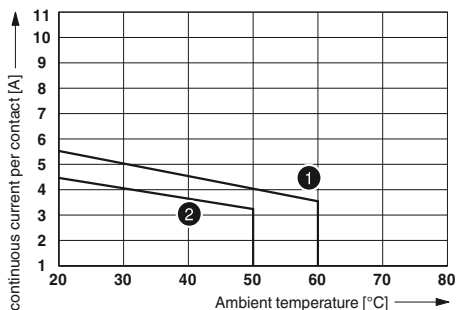
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



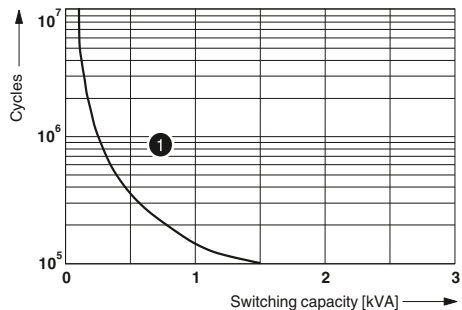
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating



- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load

# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-3 relay modules

Fully mounted RIF-3 relay modules, consisting of:

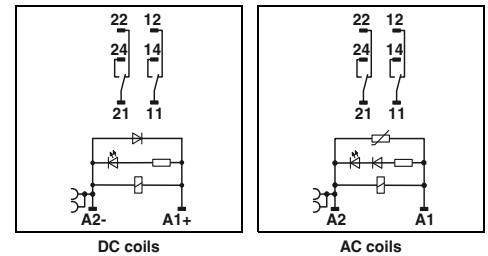
- Relay base with Push-in connection
- 2 or 3-PDT octal relay
- Relay retaining bracket
- Interference suppression module (AC types only)

The advantages:

- Relay with lockable manual operation and status LED
- With DC types, freewheeling diode is integrated into relay
- Mechanical switch position indicator
- Logical contact arrangement thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 366.



2-PDT octal relay module with Push-in connection and manual operation



Input data	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit AC	
Input circuit DC	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current AC	
Maximum switch-on current DC	
Minimum switching current	
General data	
Test voltage (winding / contact)	
Ambient temperature (operation), AC	
Ambient temperature (operation), DC	
Nominal operating mode	
Mechanical service life, AC	
Mechanical service life, DC	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

Technical data		
①	②	③
see diagram		
60	23	13
18	5 - 15	5 - 15
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, Damping diode		
2 PDT		
AgNi		
250 V AC/DC		
10 V (At 24 mA)		
10 A (see diagram)		
30 A (20 ms, N/O contact)		
30 A (20 ms, N/O contact)		
10 mA (at 24 V)		
2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
-40 °C ... 50 °C		
-40 °C ... 60 °C		
100% operating factor		
Approx. 2x 10 <sup>7</sup> cycles		
Approx. 2x 10 <sup>7</sup> cycles		
DIN EN 50178		
2 / III		
any / In rows with zero spacing		
0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16		
40 mm / 103 mm / 90 mm		
Class A product, see page 605		

Description	Input voltage $U_N$
Pre-assembled coupling relay modules with power contact relay and Push-in connection	① 24 V DC
	② 120 V AC
	③ 230 V AC

Ordering data		
Type	Order No.	Pcs./Pkt.
RIF-3-RPT-LDP-24DC/2X21	2903297	5
RIF-3-RPT-LV-120AC/2X21	2903296	5
RIF-3-RPT-LV-230AC/2X21	2903295	5

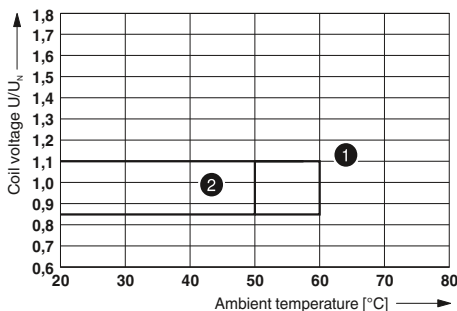


3-PDT octal relay module with Push-in connection and manual operation



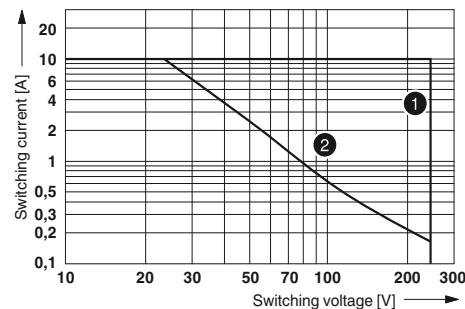
### RIF-3-RPT.../2X21 (2-PDT)

Operating voltage range



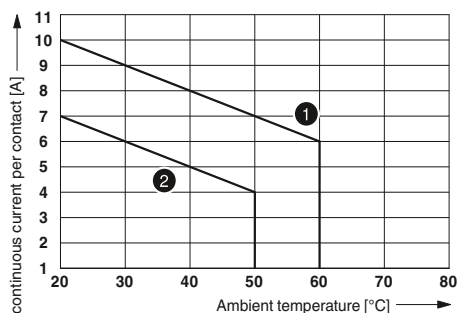
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



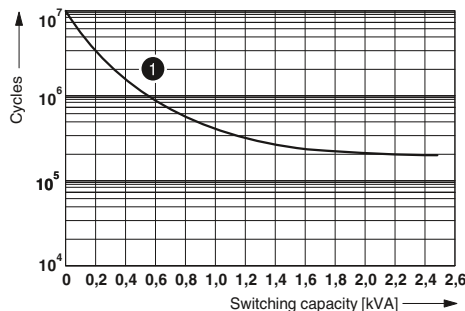
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating

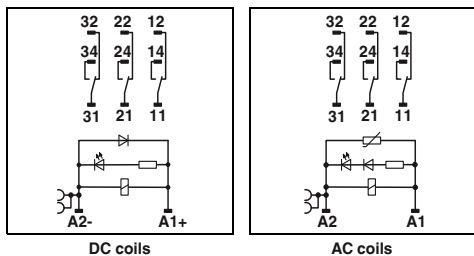


- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load



#### Technical data

- ① see diagram
- ② 60 23 13
- ③ 18 5 - 15 5 - 15
- 20 5 - 20 5 - 20
- Yellow LED, Varistor
- Yellow LED, Damping diode

- 3 PDT
- AgNi
- 250 V AC/DC
- 10 V (At 24 mA)
- 8.5 A (see diagram)
- 30 A (20 ms, N/O contact)
- 30 A (20 ms, N/O contact)
- 10 mA (at 24 V)

- 2.5 kV<sub>rms</sub> (50 Hz, 1 min.)
- 40 °C ... 50 °C
- 40 °C ... 60 °C
- 100% operating factor
- Approx. 2x 10<sup>7</sup> cycles
- Approx. 2x 10<sup>7</sup> cycles
- DIN EN 50178
- 2 / III

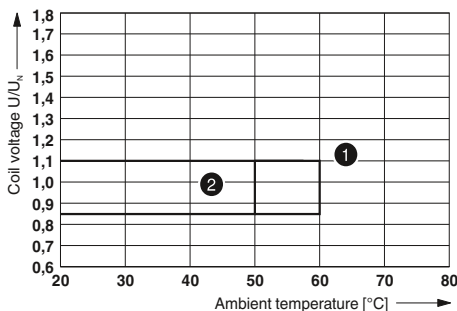
- any / In rows with zero spacing
- 0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16
- 40 mm / 103 mm / 90 mm
- Class A product, see page 605

#### Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-3-RPT-LDP-24DC/3X21	2903294	5
RIF-3-RPT-LV-120AC/3X21	2903293	5
RIF-3-RPT-LV-230AC/3X21	2903292	5

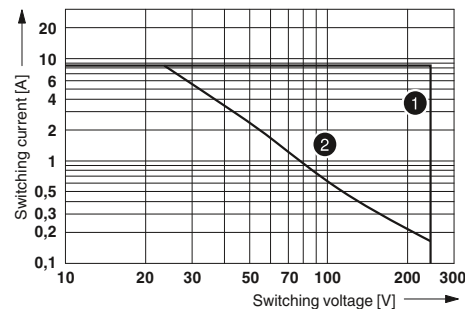
### RIF-3-RPT.../3X21 (3-PDT)

Operating voltage range



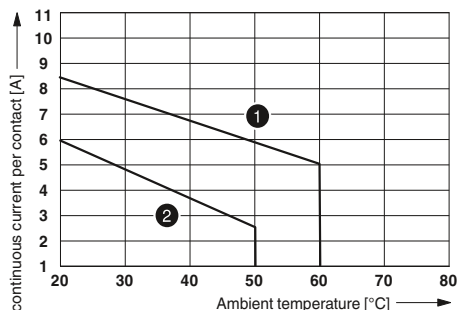
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



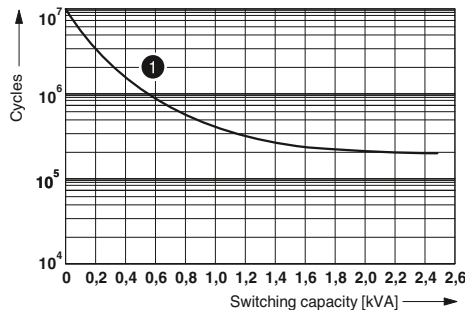
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating



- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load

# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-3 relay modules

Fully mounted RIF-3 relay modules, consisting of:

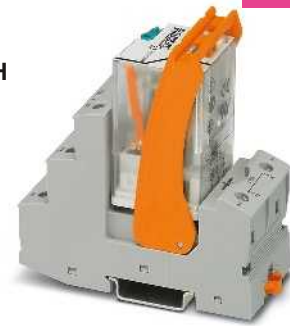
- Relay base with screw connection
- 2 or 3-PDT octal relay
- Relay retaining bracket
- Varistor interference suppression module (AC types only)

The advantages:

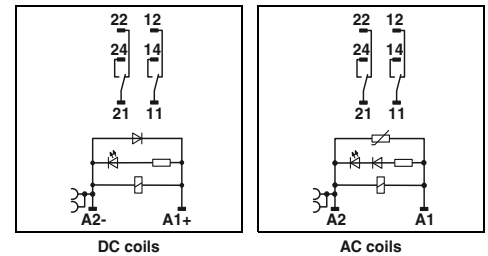
- Relay with lockable manual operation and status LED
- With DC types, freewheeling diode is integrated into relay
- Mechanical switch position indicator
- Logical contact arrangement thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 366.



new



2-PDT octal relay module with screw connection and manual operation



DC coils

AC coils

#### Technical data

Input data	①	②	③
Permissible range (with reference to $U_N$ )	see diagram		
Typical input current at $U_N$ [mA]	60	23	13
Typical response time at $U_N$ [ms]	18	5 - 15	5 - 15
Typical release time at $U_N$ [ms]	20	5 - 20	5 - 20
Input circuit AC	Yellow LED, Varistor		
Input circuit DC	Yellow LED, Damping diode		
Output data			
Contact type	2 PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Minimum switching voltage	10 V (At 24 mA)		
Limiting continuous current	10 A (see diagram)		
Maximum switch-on current AC	30 A (20 ms, N/O contact)		
Maximum switch-on current DC	30 A (20 ms, N/O contact)		
Minimum switching current	10 mA (at 24 V)		
General data			
Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40 °C ... 50 °C		
Ambient temperature (operation), DC	-40 °C ... 60 °C		
Nominal operating mode	100% operating factor		
Mechanical service life, AC	Approx. 2x 10 <sup>7</sup> cycles		
Mechanical service life, DC	Approx. 2x 10 <sup>7</sup> cycles		
Standards/regulations	DIN EN 50178		
Degree of pollution/surge voltage category	2 / III		
Mounting position/mounting	any / In rows with zero spacing		
Connection data solid/stranded/AWG	0.14 ... 6 mm <sup>2</sup> / 0.14 ... 4 mm <sup>2</sup> / 26 - 10		
Dimensions	W / H / D 40 mm / 96 mm / 90 mm		
EMC note	Class A product, see page 605		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules with power contact relay and screw connection	① 24 V DC	RIF-3-RSC-LDP-24DC/2X21	2903303	5
	② 120 V AC	RIF-3-RSC-LV-120AC/2X21	2903302	5
	③ 230 V AC	RIF-3-RSC-LV-230AC/2X21	2903301	5

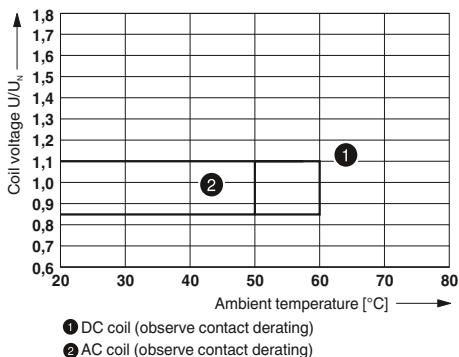
new



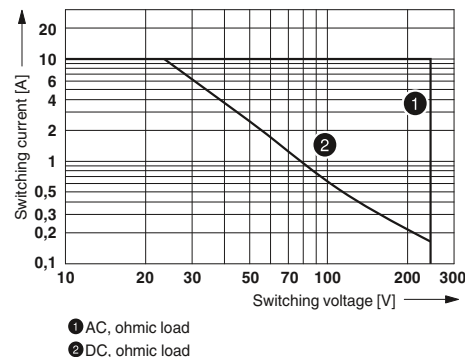
3-PDT octal relay module with screw connection and manual operation

### RIF-3-RSC.../2X21 (2-PDT)

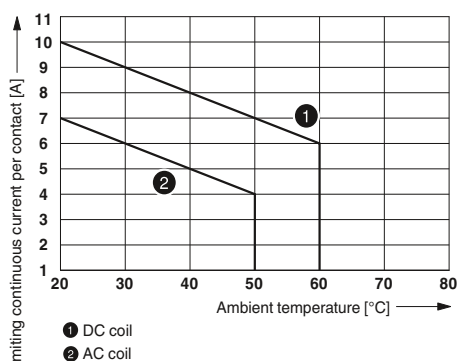
Operating voltage range



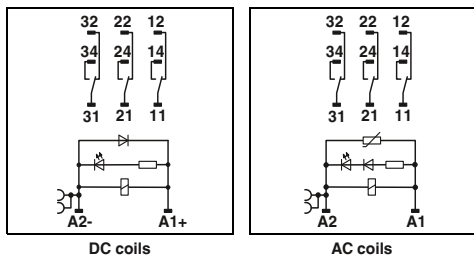
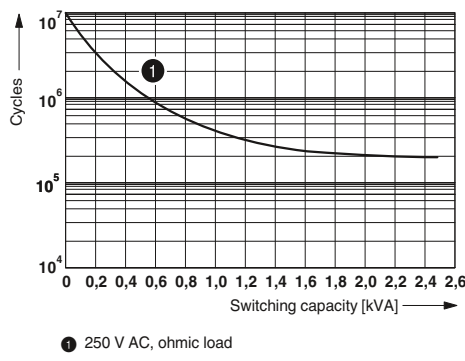
Interrupting rating



Contact derating



Electrical service life



#### Technical data

- ① see diagram
- ② 60 23 13
- ③ 18 5 - 15 5 - 15
- 20 5 - 20 5 - 20
- Yellow LED, Varistor
- Yellow LED, Damping diode

- 3 PDT
- AgNi
- 250 V AC/DC
- 10 V (At 24 mA)
- 8.5 A (see diagram)
- 30 A (20 ms, N/O contact)
- 30 A (20 ms, N/O contact)
- 10 mA (at 24 V)

- 2.5 kV<sub>rms</sub> (50 Hz, 1 min.)
- 40 °C ... 50 °C
- 40 °C ... 60 °C
- 100% operating factor
- Approx.  $2 \times 10^7$  cycles
- Approx.  $2 \times 10^7$  cycles
- DIN EN 50178
- 2 / III

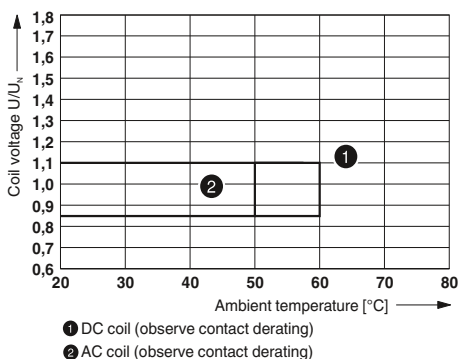
- any / In rows with zero spacing
- 0.14 ... 6 mm<sup>2</sup> / 0.14 ... 4 mm<sup>2</sup> / 26 - 10
- 40 mm / 96 mm / 90 mm
- Class A product, see page 605

#### Ordering data

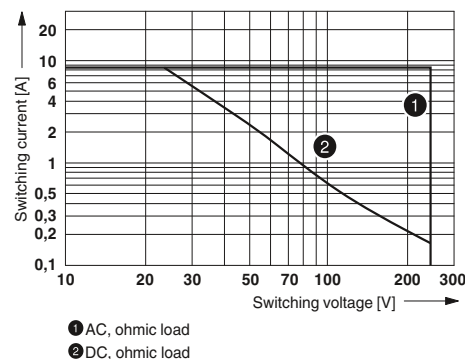
Type	Order No.	Pcs./ Pkt.
RIF-3-RSC-LDP-24DC/3X21	2903300	5
RIF-3-RSC-LV-120AC/3X21	2903299	5
RIF-3-RSC-LV-230AC/3X21	2903298	5

### RIF-3-RSC.../3X21 (3-PDT)

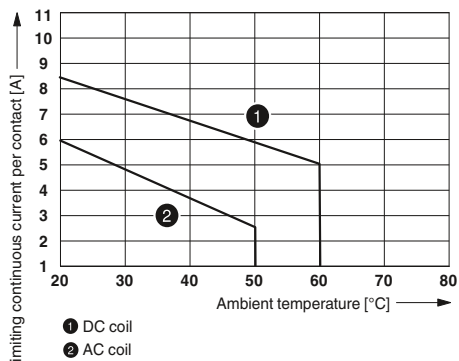
Operating voltage range



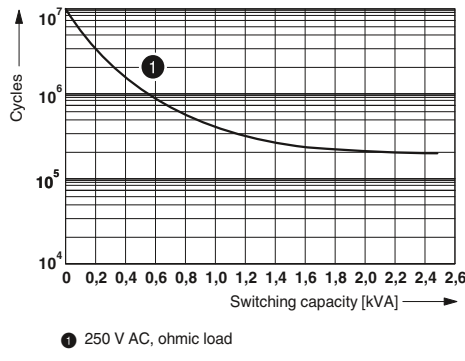
Interrupting rating



Contact derating



Electrical service life



# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-4 relay modules

Fully mounted RIF-4 relay modules, consisting of:

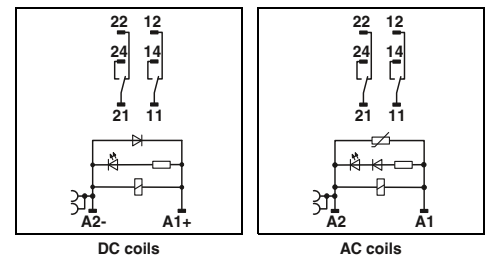
- Relay base with Push-in connection
- 2 or 3-PDT high-power relay
- Relay retaining bracket
- Varistor interference suppression module (AC types only)

The advantages:

- Logical contact arrangement thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 366.



2-PDT high-power relay module with Push-in connection



#### Technical data

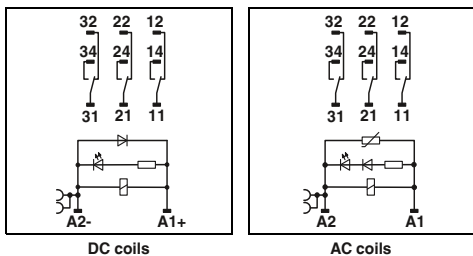
	①	②	③
<b>Input data</b>	see diagram		
Permissible range (with reference to $U_N$ )	56	24	14
Typical input current at $U_N$ [mA]	20	5 - 25	5 - 25
Typical response time at $U_N$ [ms]	20	5 - 20	5 - 20
Typical release time at $U_N$ [ms]	Yellow LED, Varistor		
Input circuit AC	Yellow LED, Damping diode		
Input circuit DC			
<b>Output data</b>	2 PDT		
Contact type	AgNi		
Contact material	440 V AC / 250 V DC		
Max. switching voltage	10 V (At 24 mA)		
Minimum switching voltage	11 A (see diagram)		
Limiting continuous current	50 A (20 ms, N/O contact)		
Maximum switch-on current AC	50 A (20 ms, N/O contact)		
Maximum switch-on current DC	10 mA (at 24 V)		
Minimum switching current	250 V AC	2500 VA	
Maximum interrupting rating, ohmic load	440 V AC	4000 VA	
Motor load according to UL 508		1/3 HP, 120 V AC (single-phase AC motor)	1/2 HP, 240 V AC (single-phase AC motor)
<b>General data</b>	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
Test voltage (winding / contact)	-40 °C ... 40 °C		
Ambient temperature (operation), AC	-40 °C ... 60 °C		
Ambient temperature (operation), DC	100% operating factor		
Nominal operating mode	Approx. 10 <sup>7</sup> cycles		
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles		
Mechanical service life, DC	DIN EN 50178		
Standards/regulations	2 / III		
Degree of pollution/surge voltage category	any / In rows with zero spacing		
Mounting position/mounting	Connection data solid/stranded/AWG		
Connection data solid/stranded/AWG	Input side		
Input side	Output side		
Output side	Dimensions		
Dimensions	W / H / D		
EMC note	Class A product, see page 605		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules with power contact relay and Push-in connection	① 24 V DC	RIF-4-RPT-LDP-24DC/2X21	2903281	5
	② 120 V AC	RIF-4-RPT-LV-120AC/2X21	2903280	5
	③ 230 V AC	RIF-4-RPT-LV-230AC/2X21	2903279	5



3-PDT high-power relay module with Push-in connection



Technical data

①	②	③
see diagram		
56	24	14
20	5 - 25	5 - 25
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, Damping diode		

- 3 PDT
- AgNi
- 440 V AC / 250 V DC
- 10 V (At 24 mA)
- 10 A (see diagram)
- 50 A (20 ms, N/O contact)
- 50 A (20 ms, N/O contact)
- 10 mA (at 24 V)
- 2500 VA
- 4000 VA
- 1/3 HP, 120 V AC (single-phase AC motor)
- 1/2 HP, 240 V AC (single-phase AC motor)
- 1/2 HP, 240 V AC (three-phase induction motor)

- 2.5 kV<sub>rms</sub> (50 Hz, 1 min.)
- 40 °C ... 40 °C
- 40 °C ... 60 °C
- 100% operating factor
- Approx. 10<sup>7</sup> cycles
- Approx. 10<sup>7</sup> cycles
- DIN EN 50178
- 2 / III

any / In rows with zero spacing

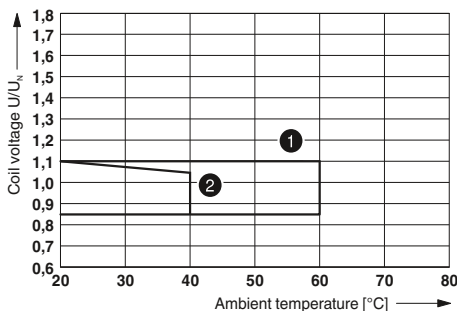
- 0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 26 - 16
- 0.14 ... 2.5 mm<sup>2</sup> / 0.14 ... 2.5 mm<sup>2</sup> / 26 - 14
- 43 mm / 111 mm / 90 mm
- Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-4-RPT-LDP-24DC/3X21	2903278	5
RIF-4-RPT-LV-120AC/3X21	2903277	5
RIF-4-RPT-LV-230AC/3X21	2903276	5

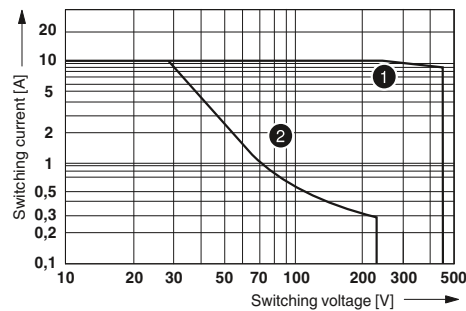
RIF-4-RPT.../2X21 (2-PDT)

Operating voltage range



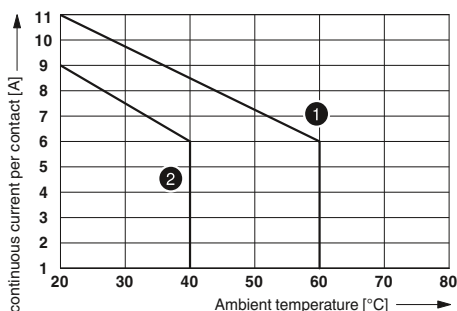
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



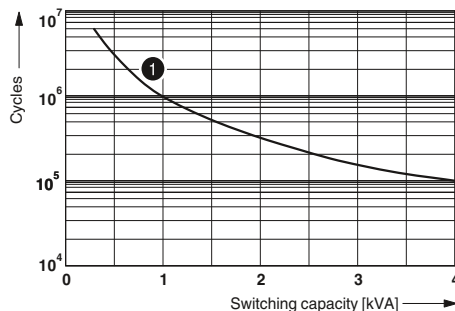
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating



- ① DC coil
- ② AC coil

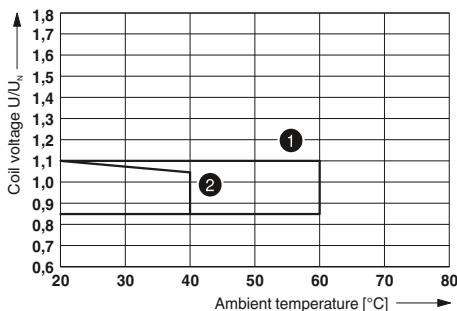
Electrical service life



- ① 250 V AC, ohmic load

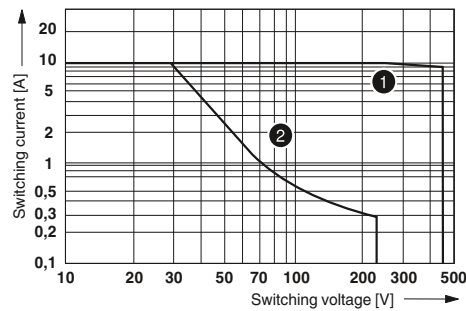
RIF-4-RPT.../3X21 (3-PDT)

Operating voltage range



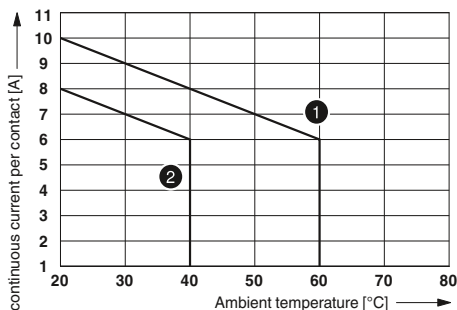
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



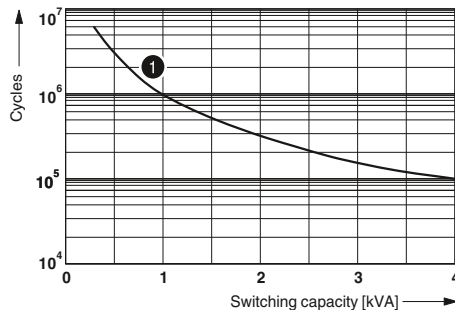
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating



- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load

# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-4 relay modules

Fully mounted RIF-4 relay modules, consisting of:

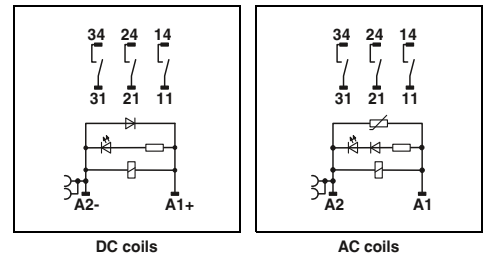
- Relay base with Push-in connection
- 3-N/O high-power relay
- Relay retaining bracket
- Varistor interference suppression module (AC types only)

The advantages:

- Logical contact arrangement thanks to 1/3-level relay base
- Full shutdown by means of  $\geq 3$  mm contact opening
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 366.



3-N/O high-power relay module with Push-in connection



DC coils

AC coils

#### Technical data

Input data	①	②	③
Permissible range (with reference to $U_N$ )	see diagram		
Typical input current at $U_N$	[mA]	70	24 14
Typical response time at $U_N$	[ms]	20	5 - 25 5 - 25
Typical release time at $U_N$	[ms]	20	5 - 20 5 - 20
Input circuit AC	Yellow LED, Varistor		
Input circuit DC	Yellow LED, Damping diode		
Output data			
Contact type	3 N/O contacts		
Contact material	AgNi		
Max. switching voltage	440 V AC / 250 V DC		
Minimum switching voltage	10 V (At 24 mA)		
Limiting continuous current	10 A (see diagram)		
Maximum switch-on current AC	50 A (20 ms, N/O contact)		
Maximum switch-on current DC	50 A (20 ms, N/O contact)		
Minimum switching current	10 mA (at 24 V)		
Maximum interrupting rating, ohmic load	250 V AC	2500 VA	
	440 V AC	4000 VA	
Motor load according to UL 508		1/3 HP, 120 V AC (single-phase AC motor) 1/2 HP, 240 V AC (single-phase AC motor) 1/2 HP, 240 V AC (three-phase induction motor)	
General data			
Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40 °C ... 40 °C		
Ambient temperature (operation), DC	-40 °C ... 60 °C		
Nominal operating mode	100% operating factor		
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles		
Mechanical service life, DC	Approx. 10 <sup>7</sup> cycles		
Standards/regulations	DIN EN 50178		
Degree of pollution/surge voltage category	2 / III		
Mounting position/mounting	any / In rows with zero spacing		
Connection data solid/stranded/AWG			
Input side	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16		
Output side	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14		
Dimensions	W / H / D	43 mm / 111 mm / 90 mm	
EMC note	Class A product, see page 605		

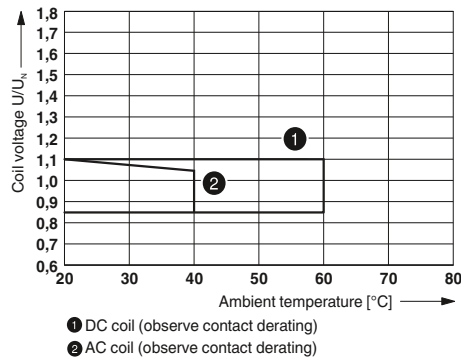
#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
Pre-assembled coupling relay modules with power contact relay and Push-in connection	① 24 V DC	RIF-4-RPT-LDP-24DC/3X1	2903275	5
	② 120 V AC	RIF-4-RPT-LV-120AC/3X1	2903274	5
	③ 230 V AC	RIF-4-RPT-LV-230AC/3X1	2903273	5

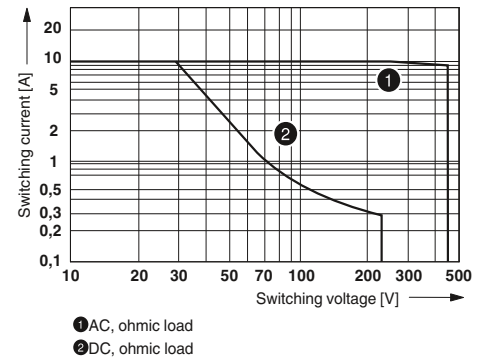


### RIF-4-RPT.../3X1 (3-N/O)

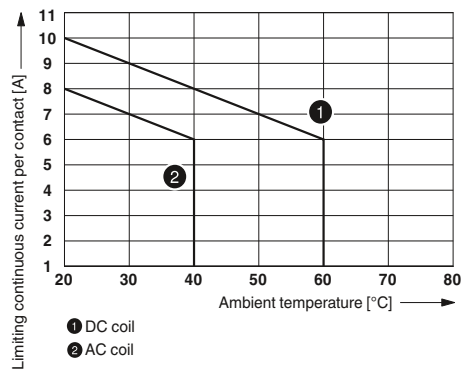
Operating voltage range



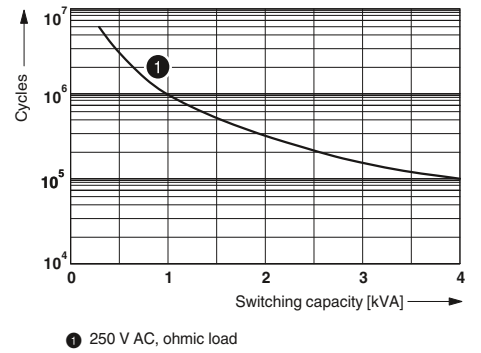
Interrupting rating



Contact derating



Electrical service life



# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-4 relay modules

Fully mounted RIF-4 relay modules, consisting of:

- Relay base with screw connection
- 3-PDT high-power relay
- Relay retaining bracket
- Varistor interference suppression module (AC types only)

The advantages:

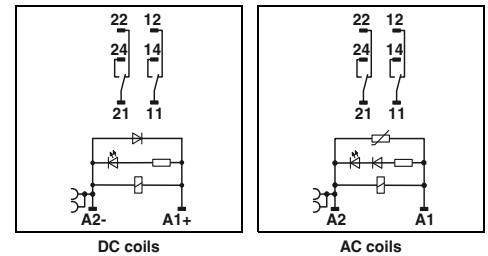
- Logical contact arrangement thanks to 1/3-level relay base
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 366.



new



2-PDT high-power relay module with screw connection



DC coils

AC coils

#### Technical data

	①	②	③
<b>Input data</b>	see diagram		
Permissible range (with reference to $U_N$ )			
Typical input current at $U_N$	[mA]	56	24 14
Typical response time at $U_N$	[ms]	20	5 - 25 5 - 25
Typical release time at $U_N$	[ms]	20	5 - 20 5 - 20
Input circuit AC	Yellow LED, Varistor		
Input circuit DC	Yellow LED, Damping diode		
<b>Output data</b>			
Contact type	2 PDT		
Contact material	AgNi		
Max. switching voltage	440 V AC / 250 V DC		
Minimum switching voltage	10 V (At 24 mA)		
Limiting continuous current	11 A (see diagram)		
Maximum switch-on current AC	50 A (20 ms, N/O contact)		
Maximum switch-on current DC	50 A (20 ms, N/O contact)		
Minimum switching current	10 mA (at 24 V)		
Maximum interrupting rating, ohmic load	250 V AC	2500 VA	
	440 V AC	4000 VA	
Motor load according to UL 508		1/3 HP, 120 V AC (single-phase AC motor)	1/2 HP, 240 V AC (single-phase AC motor)
<b>General data</b>			
Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40 °C ... 40 °C		
Ambient temperature (operation), DC	-40 °C ... 60 °C		
Nominal operating mode	100% operating factor		
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles		
Mechanical service life, DC	Approx. 10 <sup>7</sup> cycles		
Standards/regulations	DIN EN 50178		
Degree of pollution/surge voltage category	2 / III		
Mounting position/mounting	any / In rows with zero spacing		
Connection data solid/stranded/AWG			
Input side	0.14 ... 6 mm <sup>2</sup> / 0.14 ... 4 mm <sup>2</sup> / 26 - 10		
Output side	0.14 ... 6 mm <sup>2</sup> / 0.14 ... 4 mm <sup>2</sup> / 26 - 10		
Dimensions	W / H / D	44 mm / 96 mm / 91 mm	
EMC note	Class A product, see page 605		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Pre-assembled coupling relay modules with power contact relay and screw connection</b>	① 24 V DC	RIF-4-RSC-LDP-24DC/2X21	2903291	5
	② 120 V AC	RIF-4-RSC-LV-120AC/2X21	2903290	5
	③ 230 V AC	RIF-4-RSC-LV-230AC/2X21	2903289	5



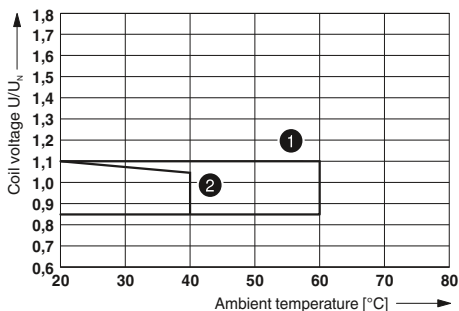
new



3-PDT high-power relay module with screw connection

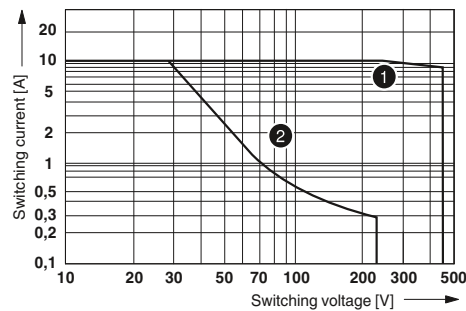
### RIF-4-RSC.../2X21 (2-PDT)

Operating voltage range



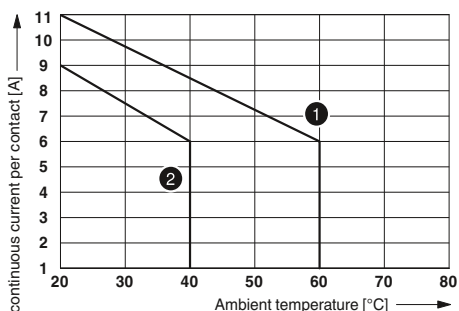
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



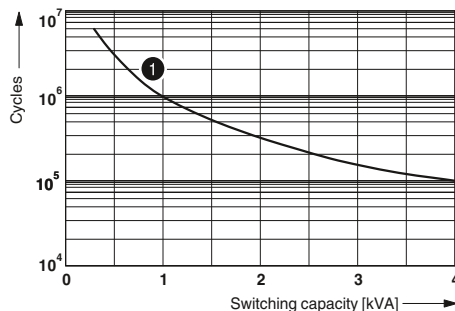
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating

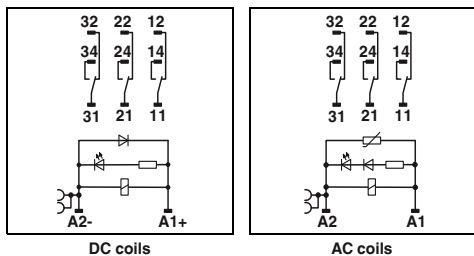


- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load



DC coils

AC coils

#### Technical data

- ① see diagram
- ② 56
- ③ 14
- 20 5 - 25 5 - 25
- 20 5 - 20 5 - 20
- Yellow LED, Varistor
- Yellow LED, Damping diode

- 3 PDT
- AgNi
- 440 V AC / 250 V DC
- 10 V (At 24 mA)
- 10 A (see diagram)
- 50 A (20 ms, N/O contact)
- 50 A (20 ms, N/O contact)
- 10 mA (at 24 V)

- 2500 VA
- 4000 VA
- 1/3 HP, 120 V AC (single-phase AC motor)
- 1/2 HP, 240 V AC (single-phase AC motor)
- 1/2 HP, 240 V AC (three-phase induction motor)

- 2.5 kV<sub>rms</sub> (50 Hz, 1 min.)
- 40 °C ... 40 °C
- 40 °C ... 60 °C
- 100% operating factor
- Approx. 10<sup>7</sup> cycles
- Approx. 10<sup>7</sup> cycles
- DIN EN 50178
- 2 / III

any / In rows with zero spacing

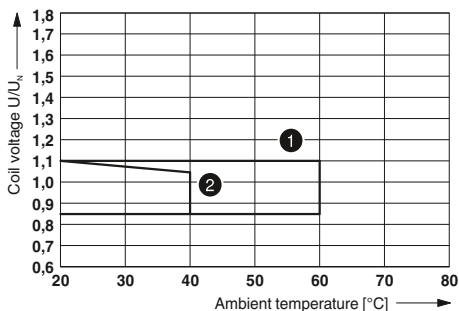
- 0.14 ... 6 mm<sup>2</sup> / 0.14 ... 4 mm<sup>2</sup> / 26 - 10
- 0.14 ... 6 mm<sup>2</sup> / 0.14 ... 4 mm<sup>2</sup> / 26 - 10
- 44 mm / 96 mm / 91 mm
- Class A product, see page 605

#### Ordering data

Type	Order No.	Pcs./ Pkt.
RIF-4-RSC-LDP-24DC/3X21	2903288	5
RIF-4-RSC-LV-120AC/3X21	2903287	5
RIF-4-RSC-LV-230AC/3X21	2903285	5

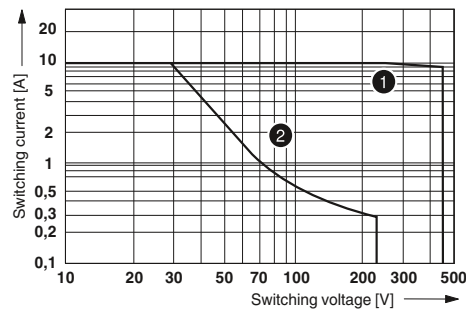
### RIF-4-RSC.../3X21 (3-PDT)

Operating voltage range



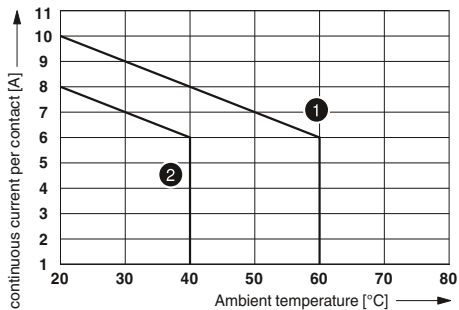
- ① DC coil (observe contact derating)
- ② AC coil (observe contact derating)

Interrupting rating



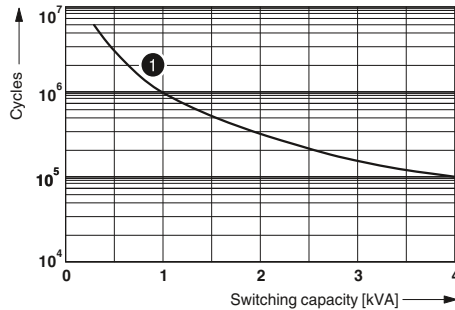
- ① AC, ohmic load
- ② DC, ohmic load

Contact derating



- ① DC coil
- ② AC coil

Electrical service life



- ① 250 V AC, ohmic load

# Relay modules

## Industrial relay system - RIFLINE complete

### Fully mounted RIF-4 relay modules

- Fully mounted RIF-4 relay modules, consisting of:
- Relay base with screw connection
  - 3-N/O high-power relay
  - Relay retaining bracket
  - Varistor interference suppression module (AC types only)

The advantages:

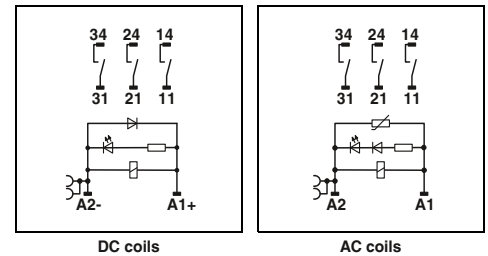
- Logical contact arrangement thanks to 1/3-level relay base
- Full shutdown by means of  $\geq 3$  mm contact opening
- Professional bridging of adjacent modules saves wiring time
- For FBS 2-6 plug-in bridges for the input side (A2), see page 366.



new



3-N/O high-power relay module with screw connection



DC coils

AC coils

#### Technical data

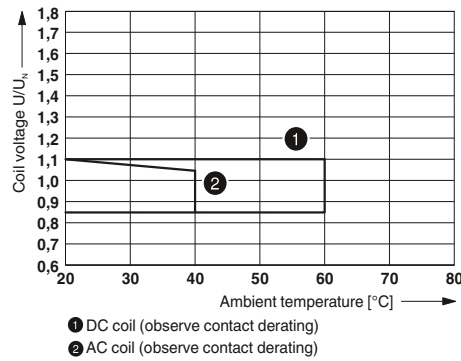
	①	②	③
<b>Input data</b>	see diagram		
Permissible range (with reference to $U_N$ )			
Typical input current at $U_N$	[mA]	70	24 14
Typical response time at $U_N$	[ms]	20	5 - 25 5 - 25
Typical release time at $U_N$	[ms]	20	5 - 20 5 - 20
Input circuit AC			Yellow LED, Varistor
Input circuit DC			Yellow LED, Damping diode
<b>Output data</b>			
Contact type	3 N/O contacts		
Contact material	AgNi		
Max. switching voltage	440 V AC / 250 V DC		
Minimum switching voltage	10 V (At 24 mA)		
Limiting continuous current	10 A (see diagram)		
Maximum switch-on current AC	50 A (20 ms, N/O contact)		
Maximum switch-on current DC	50 A (20 ms, N/O contact)		
Minimum switching current	10 mA (at 24 V)		
Maximum interrupting rating, ohmic load	250 V AC	2500 VA	
	440 V AC	4000 VA	
Motor load according to UL 508			1/3 HP, 120 V AC (single-phase AC motor) 1/2 HP, 240 V AC (single-phase AC motor) 1/2 HP, 240 V AC (three-phase induction motor)
<b>General data</b>			
Test voltage (winding / contact)	2.5 kV <sub>rms</sub> (50 Hz, 1 min.)		
Ambient temperature (operation), AC	-40 °C ... 40 °C		
Ambient temperature (operation), DC	-40 °C ... 60 °C		
Nominal operating mode	100% operating factor		
Mechanical service life, AC	Approx. 10 <sup>7</sup> cycles		
Mechanical service life, DC	Approx. 10 <sup>7</sup> cycles		
Standards/regulations	DIN EN 50178		
Degree of pollution/surge voltage category	2 / III		
Mounting position/mounting	any / In rows with zero spacing		
Connection data solid/stranded/AWG			
Input side	0.14 ... 6 mm <sup>2</sup> / 0.14 ... 4 mm <sup>2</sup> / 26 - 10		
Output side	0.14 ... 6 mm <sup>2</sup> / 0.14 ... 4 mm <sup>2</sup> / 26 - 10		
Dimensions	44 mm / 96 mm / 91 mm		
EMC note	Class A product, see page 605		

#### Ordering data

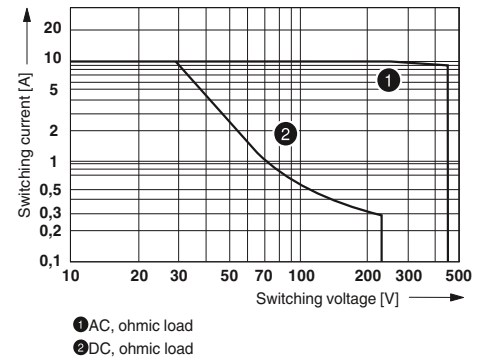
Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>Pre-assembled coupling relay modules with power contact relay and screw connection</b>	① 24 V DC	RIF-4-RSC-LDP-24DC/3X1	2903284	5
	② 120 V AC	RIF-4-RSC-LV-120AC/3X1	2903283	5
	③ 230 V AC	RIF-4-RSC-LV-230AC/3X1	2903282	5

### RIF-4-RSC.../3X1 (3-N/O)

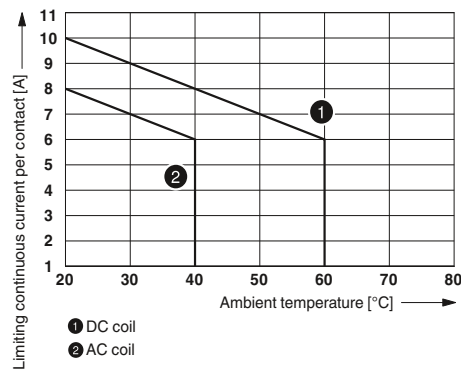
Operating voltage range



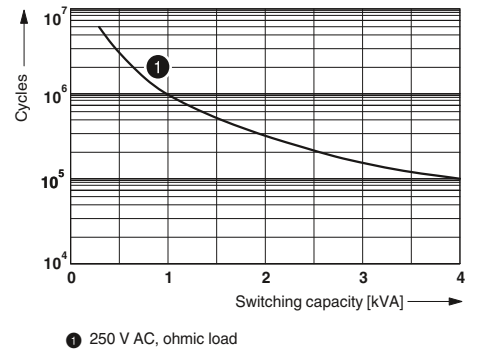
Interrupting rating



Contact derating



Electrical service life



# Relay modules

## Industrial relay system - RIFLINE complete

### RIFLINE complete accessories Plug-in bridges

The plug-in bridges can be used for simple potential distribution via all relay bases.

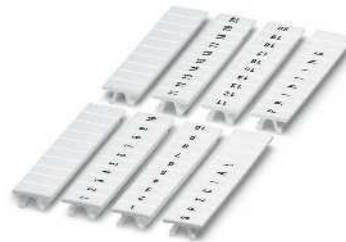
The end bracket is used for safe isolation between adjacent modules and to visually separate the various function groups.



Description	Color	Ordering data			Ordering data		
		Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
<b>Plug-in bridge</b>							
2-pos. red, 32 A		FBS 2-6	3030336	50			
2-pos. blue, 32 A		FBS 2-6 BU	3036932	50			
2-pos. gray, 32 A		FBS 2-6 GY	3032237	50			
5-pos. red, 32 A		FBS 5-6	3030349	50			
10-pos. red, 32 A		FBS 10-6	3030271	10			
20-pos. red, 32 A		FBS 20-6	3030365	10			
50-pos. red, 32 A		FBS 50-6	3032224	10			
2-pos. red, 41 A		FBS 2-8	3030284	10			
2-pos. blue, 41 A		FBS 2-8 BU	3032567	10			
2-pos. gray, 41 A		FBS 2-8 GY	3032541	10			
<b>End bracket</b> , for snapping onto NS 35, 9,5 mm wide, can be marked with ZB 6, ZB 8/27, KLM...		7042					
					CLIPFIX 35	3022218	50

### RIFLINE complete accessories Marking material

The ZB zack marker strip system offers numerous marking options that can be attached directly to the relay retaining brackets. In addition, further markings can be fixed to the relay base by means of double marker carriers.



5.2 mm, 6.2 mm, and 15.2 mm wide



Double marker carrier

Description	Color	Ordering data			Ordering data		
		Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
<b>Zack marker strip, unprinted</b>							
10-section	white	ZB 5 :UNBEDRUCKT	1050004	10			
10-section	white	ZB 6:UNBEDRUCKT	1051003	10			
5-section	white	ZB 15:UNBEDRUCKT	0811972	10			
<b>Double marker carrier for ZB 5</b>	gray				STP 5-2	0800967	100

**RIFLINE complete accessories**

**Test plugs**

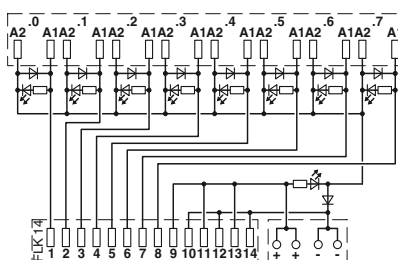
The two-piece test plug offers individual plug color combinations. It is inserted directly in the function shaft of the Push-in connection.



		Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.
<b>Test plug, consisting of:</b>				
<b>Metal part</b> for 2.3 mm Ø socket hole and	silver	MPS-MT	0201744	10
<b>Insulating sleeve</b> , for MPS metal part	red	MPS-IH RD	0201676	10
	white	MPS-IH WH	0201663	10
	blue	MPS-IH BU	0201689	10
	yellow	MPS-IH YE	0201692	10
	green	MPS-IH GN	0201702	10
	gray	MPS-IH GY	0201728	10
	black	MPS-IH BK	0201731	10

**Adapter for RIFLINE complete RF-1**

RIF-1-V8... is the VARIOFACE adapter which connects the RIF-1 relay module with the VARIOFACE system cabling. This allows easy connection of eight relay modules to a controller.



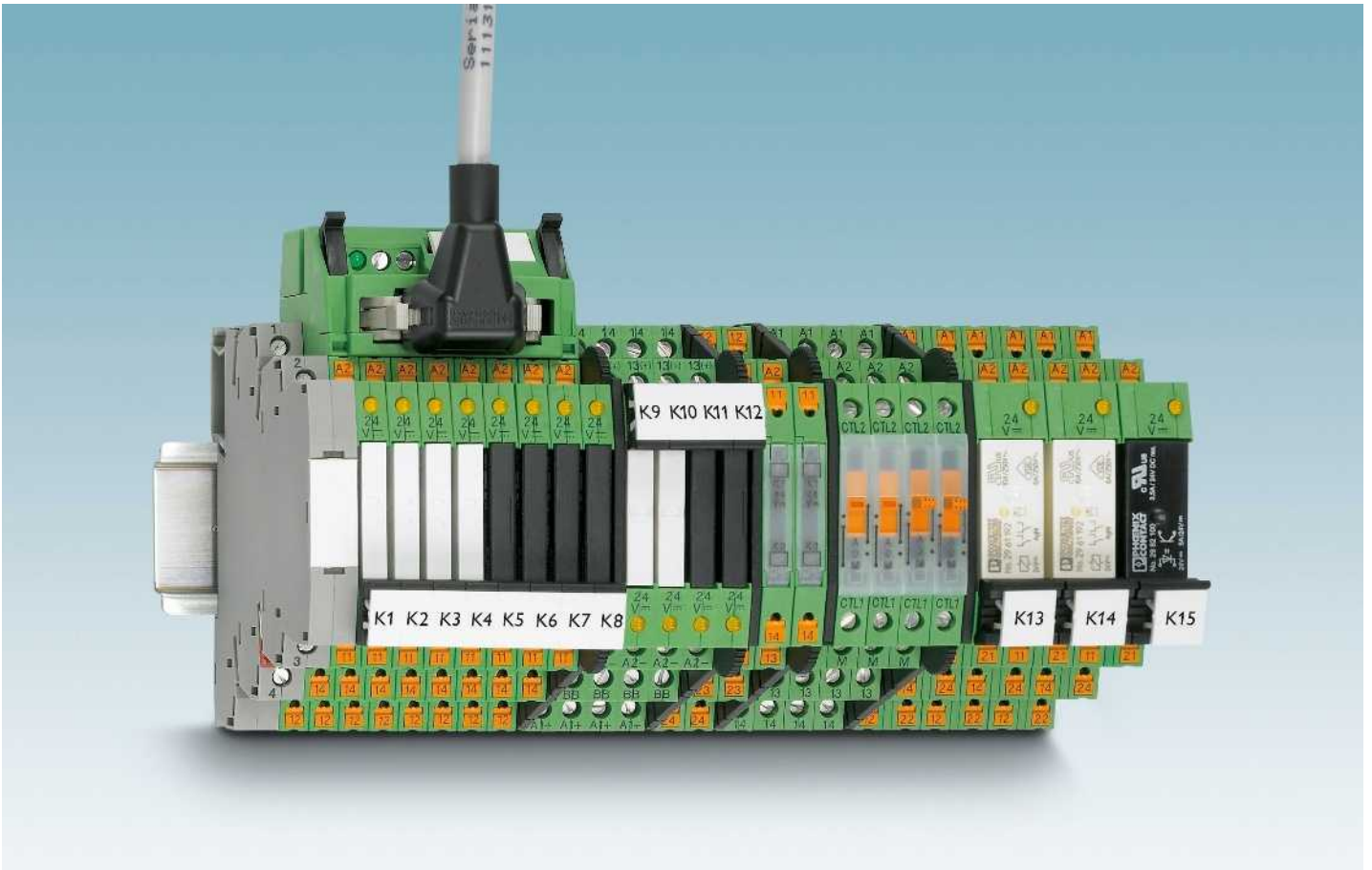
**VARIOFACE adapter for RIFLINE complete RIF-1**

		Technical data		
Maximum permissible operating voltage		30 V DC		
Maximum permissible current (per branch)		1 A (per signal path)		
Maximum total current (voltage supply)		3 A		
Rated surge voltage		0.6 kV (Functional insulation)		
Ambient temperature (operation)		-40 °C ... 60 °C		
Mounting position		any		
Standards/regulations		IEC 60664 , DIN EN 50178		
Connection method	Controller level	IDC/FLK pin strip		
	Supply	Push-in connection		
Connection data solid/stranded/AWG		0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16		
Dimensions	H / D	101 mm / 75 mm		

		Ordering data			
Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
<b>V8 adapter</b> , for eight RIF-1 relay modules, with IDC/FLK pin strip for PLC system cabling, <b>positive switching</b>					
	14	128 mm	RIF-1-V8/PT/FLK14/OUT	2905195	1

# Relay modules

## Highly compact relay modules - PLC-INTERFACE



The PLC-INTERFACE relay system is the interface between the controller and system I/O devices.

The universal design is compact and space-saving. While the narrow 6.2 mm module has one contact, the 14 mm version is available with two contacts. The modules can be equipped with either an electromechanical or a solid-state relay.

They are protected against environmental influences by RTIII (IP67). The relays also offer safe isolation according to DIN EN 50178 (VDE 0160).

PLC-INTERFACE is available in three connection technologies. Depending on the area of application, screw or Push-in connection can be selected.

In addition to the universal types, PLC-INTERFACE is also available in numerous special versions. These include:

- Sensor and actuator modules that can accommodate all connections directly on the interface
- Modules for high inrush or continuous currents
- Railway modules, which meet specific railway requirements
- Filter modules, which filter out interference on the input side

Plug-in bridges are available for all modules for simple potential distribution. In addition, solutions from system cabling applications offer easy connection to the plant control system. VARIOFACE adapters can be used to reduce wiring effort considerably. Installation is simplified significantly thanks to the integrated input and protective circuit.

Standard marking material for CLIPLINE complete terminal blocks can be used to mark PLC-INTERFACE.





### Universal modules

PLC-R... and PLC-O... relay and solid-state relay modules with PDT or N/O contact, designed for universal use. Available in an overall width of 6.2 mm with one contact or in 14 mm with two contacts.

Available with either screw or Push-in connection.



### Sensors/actuators

PLC...SEN and PLC...ACT offer space-saving sensor and actuator wiring without additional supply or output terminal blocks. The sensor or actuator connections are incorporated directly at the relay module.

Available with either screw or Push-in connection.



### High currents

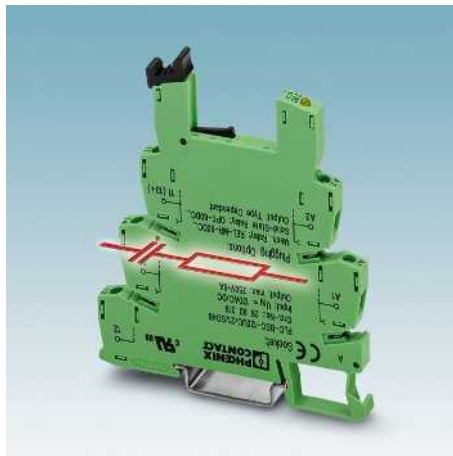
PLC...IC is particularly suitable for applications with high inrush currents, e.g. from lamp loads. The PLC...HC relay modules are designed for applications with high continuous currents.

Available with either screw or Push-in connection.



### Railway applications

PLC...RW relay or solid-state relay modules are suitable for railway requirements. These cover, for example, the extended temperature and input voltage range of railway applications.



### Interference signals on the input side

PLC-B...SO46 basic terminal blocks are used for filtering interference currents and interference voltages on the input side.

Available with either screw or Push-in connection.



### Accessories

The entire PLC-INTERFACE system can be extended by a range of accessories such as power terminals, adapters for system cabling or plug-in bridges for potential distribution.

# Relay modules

## Highly compact relay modules - PLC-INTERFACE


### Product overview


### Highly compact relay modules - special versions and accessories


		Page	Web code
 Actuator series	<b>PLC-R.../1/ACT</b> Assembled with a plug-in power contact relay	378	#0618
	<b>PLC-R.../11C/ACT</b> Assembled with a plug-in miniature relay for high inrush currents	386	
	<b>PLC-O.../24DC/2/ACT</b> Assembled with a plug-in solid-state power relay	380	
	<b>PLC-OSC.../230AC/1/ACT</b> Assembled with a plug-in solid-state power relay	381	
 Sensor series	<b>PLC-R.../1AU/SEN</b> Assembled with a plug-in relay for small switching capacities, with gold-plated multi-layer contact	384	#0617
	<b>PLC-O.../48DC/100/SEN</b> Assembled with a plug-in solid-state input relay	385	
 Filter series	<b>PLC-B...UC/21/SO46</b> For assembly with electromechanical or solid-state relays	388	#0689
	<b>PLC-B...UC/1/SEN/SO46</b> For assembly with electromechanical or solid-state relays	389	
	<b>PLC-BSC...UC/21-21/SO46</b> For assembly with relays	389	
	<b>PLC-BSC...UC/21/HC/SO46</b> For assembly with relays	389	
 Switch modules	<b>PLC-RS...-24UC/1/S...</b> Relay and switch integrated	404	#0898
	<b>PLC-S...-S/...</b> Switch integrated	405	
 Solid-state relays	<b>PLC-O.../24DC/...</b> Optocoupler modules for universal use	376	#0899
	<b>PLC-O.../230AC/...</b> Switching capacity up to 230 V AC and 2.4 A in 6.2 mm	408	
	<b>PLC-O.../300DC/...</b> DC voltage output up to 300 V DC	406	
 Ex relays	<b>PLC-R.../21/EX</b> 1 changeover contact with power contact	458	#0690
	<b>PLC-R.../21-21/EX</b> 2 changeover contacts with power contact	458	
	<b>PLC-R.../21/HC/EX</b> 1 changeover contact up to 10 A	459	
	<b>PLC-O...C1D2</b> DC voltage output	459	

Highly compact relay modules - PLC-INTERFACE

Hybrid solid-state relays	PLC-INTERFACE for railway applications	PLC-INTERFACE for high inrush currents	Reversing load relays
<p><b>PLC-H...24DC/230AC/10</b> Hybrid solid-state relay with AC voltage output, max. 10 A</p>	<p><b>PLC.../RW</b> Relay modules with extended input voltage and temperature range, specifically designed for use in railway applications</p>	<p><b>PLC...11C/ACT</b> Max. switch-on current of 130 A, suitable for capacitive loads, available with screw and Push-in connection technology</p>	<p><b>PLC-S...-ELR W 1/2-24DC</b> Electronic reversing load relay for motors up to 24 V DC/2 A</p>
<p>Page: 409 Web code: #0691</p>	<p>Page: 415 Web code: #0900</p>	<p>Page: 386 Web code: #0901</p>	<p>Page: 421 Web code: #0693</p>

Accessories			Web code: #0692 Page: 424
	<p><b>Continuous plug-in bridge</b> 500 mm long, insulated, can be cut to length, for potential distribution with PLC-INTERFACE</p>	<p><b>Plug-in bridge</b> 2-pos., 6 mm long, bridges potentials of neighboring PLC-INTERFACES</p>	<p><b>Plug-in bridge</b> 2-pos., 8 mm long, bridges potentials of neighboring PLC-INTERFACES with partition plate</p>
	<p><b>Plug-in bridge</b> 2-pos., for connecting adjacent connections on a 14 mm PLC-INTERFACE</p>	<p><b>Partition plate</b> 2 mm thick, required at the start and end of every PLC terminal strip</p>	<p><b>Passive feed-through bridge</b> Can be inserted instead of a relay or solid-state relay, bridges terminal points A1 and 14</p>

Logic modules			Web code: #0694 Page: 428
	<p><b>PLC-V8C.../SAM</b> <b>Stand-alone module</b> With 16 I/Os, cannot be extended, connection to PC via micro USB socket. Integrated real-time clock, accommodates external IFS-CONFSTICK memory module.</p>	<p><b>PLC-V8C.../BM</b> <b>Basic module</b> With 16 I/Os, can be extended up to a maximum of 48 I/Os. Connection to PC via micro USB socket. Integrated real-time clock. Accommodates external IFS-CONFSTICK memory module. Optional connection to IFS gateways.</p>	<p><b>PLC-V8C.../EM</b> <b>Extension module</b> With 16 I/Os, for extending the basic module. A maximum of two extension modules can be connected to each basic module.</p>

System cabling adapters for PLC-INTERFACE			Web code: #0897 Page: 425
	<p><b>PLC-V8/FLK14...</b> For 6.2 mm relay, with 14-pos. IDC/FLK pin strip, module width 49.6 mm</p>	<p><b>PLC-V8/D15S/...</b> For 6.2 mm relay, with 15-pos. D-SUB socket strip, module width 49.6 mm</p>	<p><b>PLC-V8L/FLK14/...</b> For 14 mm relay, with 14-pos. IDC/FLK pin strip, module width 112.3 mm</p>

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### Universal PLC series with PDT relay

PLC-R... is the relay series that can be used universally and consists of basic terminal blocks and plug-in relays with PDT contacts.

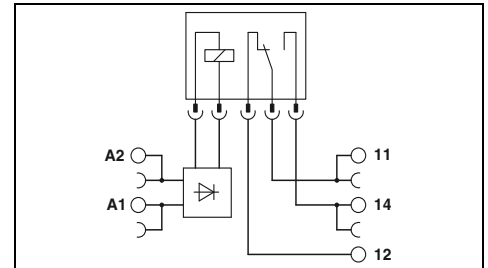
The advantages:

- Slim design
- Screw and Push-in connection technology
- Functional plug-in bridges
- Integrated input and interference suppression circuit
- High degree of protection, RT III (wash-proof), or RT II for 1-PDT relay with manual operation
- Safe isolation according to DIN EN 50178 between coil and contact
- Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate 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.
For diagrams of operating voltage ranges, see page 397
Note: for marking material (ZB 6), see "CLIPLINE industrial connection technology, marking material for terminals, conductors, and cables".
Inflammability class V0 (UL 94)
1) 120 and 230 V types up to 55 °C



1-PDT relay module, 6 A, maximum



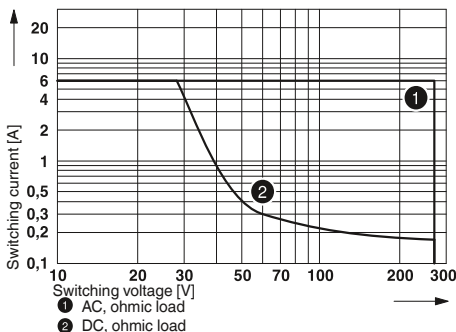
Input data	
Typical input current at $U_N$	[mA]
Response/release time at $U_N$	[ms]
Input circuit DC	
Input circuit AC/DC	
Output data	
Contact material	AgSnO
Max. switching voltage	250 V AC/DC
Minimum switching voltage	5 V (at 100 mA)
Limiting continuous current	6 A
Maximum switch-on current	10 A (4 s)
Minimum switching current	10 mA (at 12 V)
General data	
Test voltage input/output	4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-40 °C ... 60 °C <sup>1)</sup>
Mechanical service life	2 x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D
EMC note	Class A product, see page 605

Technical data						
①	②	③	④	⑤	⑥	⑦
15.3	9	11	9.2	4.8	3.5	3.2
5/8	5/8	6/15	5/8	5/8	6/15	7/15
Yellow LED, reverse polarity protection, freewheeling diode						
Yellow LED, bridge rectifier						

### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>PLC-INTERFACE, with screw connection</b>				
①	12 V DC	PLC-RSC- 12DC/21	2966906	10
②	24 V DC	PLC-RSC- 24DC/21	2966171	10
③	24 V AC/DC	PLC-RSC- 24UC/21	2966184	10
④	48 V DC	PLC-RSC- 48DC/21	2966113	10
⑤	60 V DC	PLC-RSC- 60DC/21	2966139	10
⑥	120 V AC / 110 V DC	PLC-RSC-120UC/21	2966197	10
⑦	230 V AC / 220 V DC	PLC-RSC-230UC/21	2966207	10
<b>PLC-INTERFACE, with Push-in connection</b>				
①	12 V DC	PLC-RPT- 12DC/21	2900316	10
②	24 V DC	PLC-RPT- 24DC/21	2900299	10
③	24 V AC/DC	PLC-RPT- 24UC/21	2900300	10
④	48 V DC	PLC-RPT- 48DC/21	2900301	10
⑤	60 V DC	PLC-RPT- 60DC/21	2900303	10
⑥	120 V AC / 110 V DC	PLC-RPT-120UC/21	2900304	10
⑦	230 V AC / 220 V DC	PLC-RPT-230UC/21	2900305	10

Electrical interrupting rating for PLC...21 with 1-PDT relay





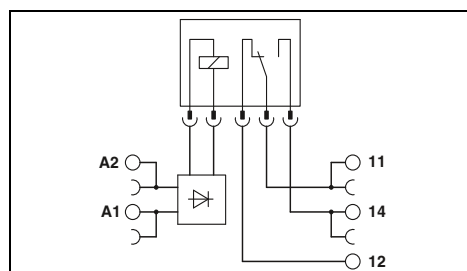
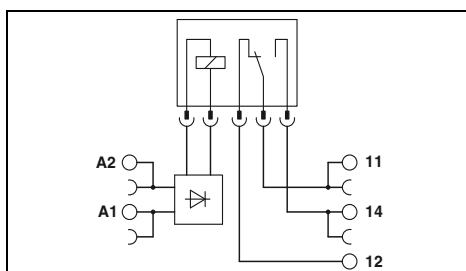
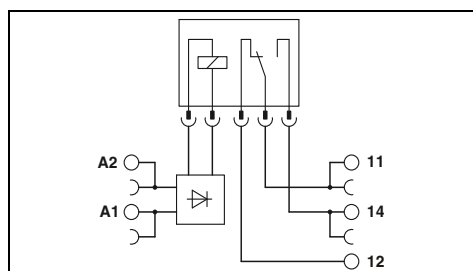
1-PDT relay module,  
50 mA, maximum



1-PDT relay module with  
manual operation, max. 6 A



1-PDT relay module with  
manual operation, max. 50 mA



Technical data						
①	②	③	④	⑤	⑥	⑦
15.3	9	11	9.2	4.8	3.5	3.2
5/8	5/8	6/15	5/8	5/8	6/15	7/15
Yellow LED, reverse polarity protection, freewheeling diode						
Yellow LED, bridge rectifier						
AgSnO, hard gold-plated						
30 V AC / 36 V DC						
100 mV (at 10 mA)						
50 mA						
50 mA						
1 mA (at 24 V)						
4 kV AC (50 Hz, 1 min.)						
-40 °C ... 60 °C <sup>1)</sup>						
2 x 10 <sup>7</sup> cycles						
IEC 60664, EN 50178						
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14						
6.2 mm / 80 mm / 94 mm						
Class A product, see page 605						

Technical data						
①	②	③	⑥	⑦		
15.3	9	11	3.5	3.2		
5/8	5/8	6/15	6/15	7/15		
Yellow LED						
Yellow LED, bridge rectifier						
AgSnO						
250 V AC/DC						
5 V (at 100 mA)						
6 A						
10 A (4 s)						
10 mA (at 12 V)						
4 kV AC (50 Hz, 1 min.)						
-40 °C ... 60 °C						
1 x 10 <sup>7</sup> cycles						
IEC 60664, EN 50178						
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14						
6.2 mm / 80 mm / 94 mm						
Class A product, see page 605						

Technical data						
①	②	③	⑥	⑦		
15.3	9	11	3.5	3.2		
5/8	5/8	6/15	6/15	7/15		
Yellow LED, reverse polarity protection, freewheeling diode						
Yellow LED, bridge rectifier						
AgSnO, hard gold-plated						
30 V AC / 36 V DC						
100 mV (at 10 mA)						
50 mA						
50 mA						
1 mA (at 24 V)						
4 kV AC (50 Hz, 1 min.)						
-40 °C ... 60 °C						
2 x 10 <sup>7</sup> cycles						
IEC 60664, EN 50178						
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14						
6.2 mm / 80 mm / 94 mm						
Class A product, see page 605						

Ordering data		
Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21AU	2966919	10
PLC-RSC- 24DC/21AU	2966265	10
PLC-RSC- 24UC/21AU	2966278	10
PLC-RSC- 48DC/21AU	2966126	10
PLC-RSC- 60DC/21AU	2966142	10
PLC-RSC-120UC/21AU	2966281	10
PLC-RSC-230UC/21AU	2966294	10
PLC-RPT- 12DC/21AU	2900317	10
PLC-RPT- 24DC/21AU	2900306	10
PLC-RPT- 24UC/21AU	2900307	10
PLC-RPT- 48DC/21AU	2900308	10
PLC-RPT- 60DC/21AU	2900309	10
PLC-RPT-120UC/21AU	2900310	10
PLC-RPT-230UC/21AU	2900311	10

Ordering data		
Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21/MS	2909648	10
PLC-RSC- 24DC/21/MS	2909649	10
PLC-RSC- 24UC/21/MS	2909650	10
PLC-RSC-120UC/21/MS	2909651	10
PLC-RSC-230UC/21/MS	2909653	10
PLC-RPT- 12DC/21/MS	2909666	10
PLC-RPT- 24DC/21/MS	2909667	10
PLC-RPT- 24UC/21/MS	2909668	10
PLC-RPT-120UC/21/MS	2909669	10
PLC-RPT-230UC/21/MS	2909670	10

Ordering data		
Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21AU/MS	2909654	10
PLC-RSC- 24DC/21AU/MS	2909655	10
PLC-RSC- 24UC/21AU/MS	2909656	10
PLC-RSC-120UC/21AU/MS	2909657	10
PLC-RSC-230UC/21AU/MS	2909660	10
PLC-RPT- 12DC/21AU/MS	2909671	10
PLC-RPT- 24DC/21AU/MS	2909672	10
PLC-RPT- 24UC/21AU/MS	2909673	10
PLC-RPT-120UC/21AU/MS	2909674	10
PLC-RPT-230UC/21AU/MS	2909676	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### Universal PLC series with PDT relay

PLC-R... is the relay series that can be used universally and consists of basic terminal blocks and plug-in relays with PDT contacts.

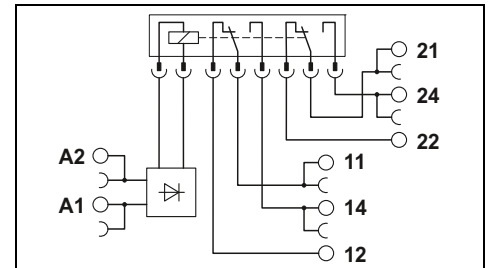
The advantages:

- Slim design
- Screw and Push-in connection technology
- Functional plug-in bridges
- Integrated input and interference suppression circuit
- RT III sealed relay
- Safe isolation according to DIN EN 50178 between coil and contact
- Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate 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....
For diagrams of operating voltage ranges, see page 397
Note: for marking material (ZB 6), see "CLIPLINE industrial connection technology, marking material for terminals, conductors, and cables".
Inflammability class V0 (UL 94)
1) 230 V types up to 55 °C
2) If the specified maximum values are exceeded for multi-layer contact relays, the gold layer will be destroyed. During further use, the maximum values of the power contact relays apply. This may then result in a shorter service life than a dedicated power contact.



2-PDT relay module,  
2 x 6 A, maximum



Input data	
Typical input current at $U_N$	[mA]
Response/release time at $U_N$	[ms]
Input circuit DC	
Input circuit AC/DC	
Output data	
Contact material	AgNi
Max. switching voltage	250 V AC/DC
Minimum switching voltage	5 V AC/DC (at 10 mA)
Limiting continuous current	6 A
Maximum switch-on current	15 A (300 ms)
Minimum switching current	10 mA (At 5 V)
General data	
Test voltage input/output	4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-40 °C ... 60 °C <sup>1)</sup>
Mechanical service life	3 x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D
EMC note	Class A product, see page 605

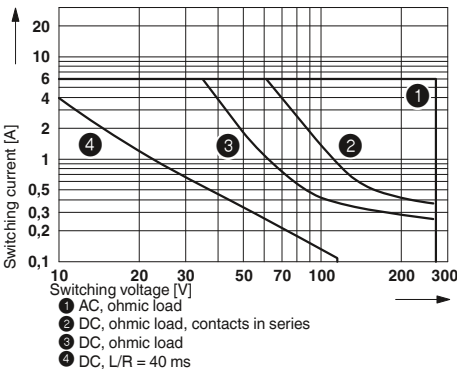
Technical data						
①	②	③	④	⑤	⑥	⑦
33	18	17.5	20	10	4.5	4.5
8 / 10	8 / 10	8 / 10	8 / 10	8 / 10	7 / 10	7 / 10
Yellow LED, reverse polarity protection, freewheeling diode						
Yellow LED, bridge rectifier						

Ordering data	
Type	Order No.
PLC-RSC- 12DC/21-21	2967235
PLC-RSC- 24DC/21-21	2967060
PLC-RSC- 24UC/21-21	2967073
PLC-RSC- 48DC/21-21	2967248
PLC-RSC- 60DC/21-21	2967293
PLC-RSC-120UC/21-21	2967086
PLC-RSC-230UC/21-21	2967099

Description	Input voltage $U_N$
<b>PLC-INTERFACE, with screw connection</b>	
①	12 V DC
②	24 V DC
③	24 V AC/DC
④	48 V DC
⑤	60 V DC
⑥	120 V AC / 110 V DC
⑦	230 V AC / 220 V DC
<b>PLC-INTERFACE, with Push-in connection</b>	
①	12 V DC
②	24 V DC
③	24 V AC/DC
④	48 V DC
⑤	60 V DC
⑥	120 V AC / 110 V DC
⑦	230 V AC / 220 V DC

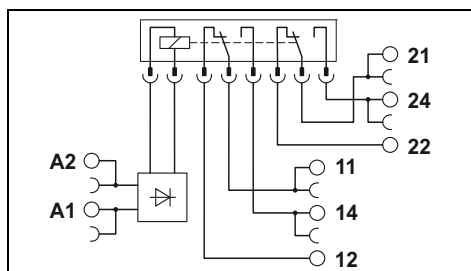
Type	Order No.	Pcs./ Pkt.
PLC-RPT- 12DC/21-21	2900329	10
PLC-RPT- 24DC/21-21	2900330	10
PLC-RPT- 24UC/21-21	2900332	10
PLC-RPT- 48DC/21-21	2900333	10
PLC-RPT- 60DC/21-21	2900334	10
PLC-RPT-120UC/21-21	2900335	10
PLC-RPT-230UC/21-21	2900336	10

Electrical interrupting rating for PLC...21-21 with 2-PDT relay





2-PDT relay module,  
2 x 50 mA, maximum



**Technical data**

①	②	③	④	⑤	⑥	⑦
33	18	17.5	20	10	4.5	4.5
8 / 10	8 / 10	8 / 10	8 / 10	8 / 10	7 / 10	7 / 10
Yellow LED, reverse polarity protection, freewheeling diode						
Yellow LED, bridge rectifier						

AgNi, hard gold-plated  
30 V AC / 36 V DC  
100 mV (at 10 mA)  
50 mA<sup>2</sup>  
50 mA<sup>2</sup>  
1 mA (at 24 V)

4 kV AC (50 Hz, 1 min.)  
-40 °C ... 60 °C<sup>1</sup>  
3 x 10<sup>7</sup> cycles  
IEC 60664 , EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
14 mm / 80 mm / 94 mm  
Class A product, see page 605

**Ordering data**

Type	Order No.	Pcs./ Pkt.
PLC-RSC- 12DC/21-21AU	2967277	10
PLC-RSC- 24DC/21-21AU	2967125	10
PLC-RSC- 24UC/21-21AU	2967112	10
PLC-RSC- 48DC/21-21AU	2967280	10
PLC-RSC- 60DC/21-21AU	2967303	10
PLC-RSC-120UC/21-21AU	2967138	10
PLC-RSC-230UC/21-21AU	2967141	10
PLC-RPT- 12DC/21-21AU	2900337	10
PLC-RPT- 24DC/21-21AU	2900338	10
PLC-RPT- 24UC/21-21AU	2900339	10
PLC-RPT- 48DC/21-21AU	2900340	10
PLC-RPT- 60DC/21-21AU	2900341	10
PLC-RPT-120UC/21-21AU	2900342	10
PLC-RPT-230UC/21-21AU	2900343	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### Universal PLC series with solid-state relays

PLC-O... is the solid-state relay series that can be used universally comprising basic terminal blocks and plug-in solid-state relays.

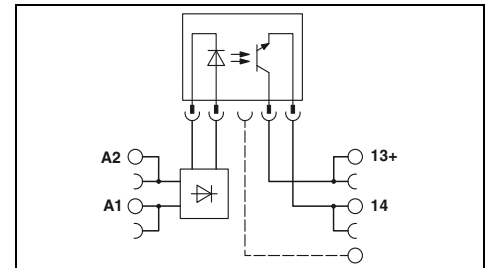
The advantages:

- Slim design
- Screw and Push-in connection technology
- Functional plug-in bridges
- Integrated input circuit
- RT-III sealed solid-state relays
- High switching capacity
- Zero voltage switch at AC output
- Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate 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....
For derating curves see page 399



Solid-state relay module, DC output max. 100 mA



Input data	
Permissible range (with reference to $U_N$ )	
Switching level (with reference to $U_N$ )	1 signal ("H") 0 signal ("L")
Typical input current at $U_N$	[mA]
Typical switch-on time at $U_N$	[ms]
Typical switch-off time at $U_N$	[ms]
Transmission frequency $f_{limit}$	[Hz]
Input circuit DC	
Input circuit AC/DC	
Output data	
Max. switching voltage	48 V DC
Minimum switching voltage	3 V DC
Maximum switch-on current	-
Minimum/maximum switching current	- / 100 mA
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	≤ 1 V
Leakage current in off state	-
Max. load value	-
General data	
Test voltage input/output	2.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-25 °C ... 60 °C
Standards/regulations	IEC 60664 , EN 50178
Degree of pollution/surge voltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D
EMC note	Class A product, see page 605

### Technical data

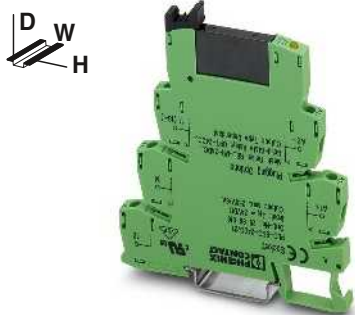
①	②	③	④	⑤	⑥
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.9 - 1.1	0.9 - 1.1
≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.9	≥ 0.8
≤ 0.4	≤ 0.3	≤ 0.4	≤ 0.4	≤ 0.3	≤ 0.3
8.5	9	5	3	3.5	3.5
0.02	0.03	0.04	1	3	3
0.3	0.3	2	3	4	5
300	300	100	50	10	10

Yellow LED, reverse polarity protection , freewheeling diode  
Yellow LED, bridge rectifier

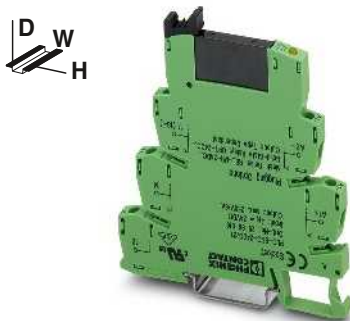
### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>PLC-INTERFACE, with screw connection</b>				
①	24 V DC	PLC-OSC- 24DC/ 48DC/100	2966728	10
②	48 V DC	PLC-OSC- 48DC/ 48DC/100	2966993	10
③	60 V DC	PLC-OSC- 60DC/ 48DC/100	2967455	10
④	125 V DC	PLC-OSC-125DC/ 48DC/100	2980047	10
⑤	120 V AC / 110 V DC	PLC-OSC-120UC/ 48DC/100	2966744	10
⑥	230 V AC / 220 V DC	PLC-OSC-230UC/ 48DC/100	2966757	10
<b>PLC-INTERFACE, with Push-in connection</b>				
①	24 V DC	PLC-OPT- 24DC/ 48DC/100	2900352	10
②	48 V DC	PLC-OPT- 48DC/ 48DC/100	2900353	10
③	60 V DC	PLC-OPT- 60DC/ 48DC/100	2900354	10
⑤	120 V AC / 110 V DC	PLC-OPT-120UC/ 48DC/100	2900355	10
⑥	230 V AC / 220 V DC	PLC-OPT-230UC/ 48DC/100	2900356	10

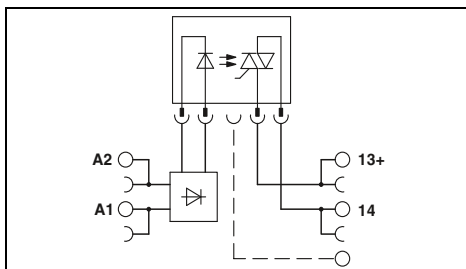
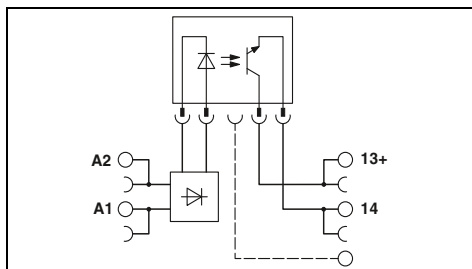




Solid-state relay module,  
DC output max. 3 A



Solid-state relay module,  
AC output max. 750 mA



Technical data

①	②	③	④	⑤	⑥
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.9 - 1.1	0.9 - 1.1
≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8
≤ 0.4	≤ 0.4	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.3
8.5	9	5	3	3.5	3.5
0.02	0.03	0.04	0.04	3.5	4
0.3	0.3	0.5	0.6	7	7
300	300	100	100	10	10

Yellow LED, reverse polarity protection, freewheeling diode  
Yellow LED, bridge rectifier

33 V DC  
3 V DC  
15 A (10 ms)  
- / 3 A (see derating curve)  
Reverse polarity protection, surge protection  
≤ 200 mV

-  
-  
2.5 kV (50 Hz, 1 min.)  
-25 °C ... 60 °C  
IEC 60664, EN 50178  
2 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 605

Technical data

①	②	③	④	⑤	⑥
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.9 - 1.1	0.8 - 1.1
≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8
≤ 0.25	≤ 0.25	≤ 0.3	≤ 0.3	≤ 0.25	≤ 0.25
8	9	6	3.5	4	3.5
10	10	10	10	10	10
10	10	10	10	10	10
10	10	10	10	3	3

253 V AC  
24 V AC  
30 A (10 ms)  
10 mA / 0.75 A (see derating curve)  
RCV circuit  
< 1 V

< 1 mA (in off state)  
4.5 A<sup>2</sup>s

2.5 kV (50 Hz, 1 min.)  
-25 °C ... 60 °C  
IEC 60664, EN 50178  
2 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-OSC- 24DC/ 24DC/ 2	2966634	10
PLC-OSC- 48DC/ 24DC/ 2	2967002	10
PLC-OSC- 60DC/ 24DC/ 2	2967468	10
PLC-OSC-125DC/ 24DC/ 2	2980050	10
PLC-OSC-120UC/ 24DC/ 2	2966650	10
PLC-OSC-230UC/ 24DC/ 2	2966663	10
PLC-OPT- 24DC/ 24DC/2	2900364	10
PLC-OPT- 48DC/ 24DC/2	2900365	10
PLC-OPT- 60DC/ 24DC/2	2900366	10
PLC-OPT-120UC/ 24DC/2	2900367	10
PLC-OPT-230UC/ 24DC/2	2900368	10

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-OSC- 24DC/230AC/ 1	2967840	10
PLC-OSC- 48DC/230AC/ 1	2967853	10
PLC-OSC- 60DC/230AC/ 1	2967866	10
PLC-OSC-125DC/230AC/ 1	2980063	10
PLC-OSC-120UC/230AC/ 1	2967879	10
PLC-OSC-230UC/230AC/ 1	2967882	10
PLC-OPT- 24DC/230AC/1	2900369	10
PLC-OPT- 48DC/230AC/1	2900370	10
PLC-OPT- 60DC/230AC/1	2900371	10
PLC-OPT-120UC/230AC/1	2900372	10
PLC-OPT-230UC/230AC/1	2900374	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC actuator series for output functions

The PLC actuator series couples controllers and actuators such as motors, contactors, and valves.

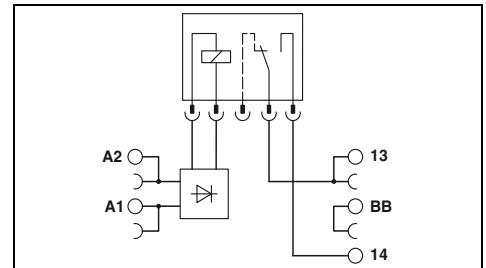
The advantages:

- Direct connection of actuator to relay module including load return line
- No need for additional terminal blocks
- Space savings of up to 80%
- Time savings of up to 60%
- Screw and Push-in connection technology
- Relay modules with safe isolation according to DIN EN 50178 between coil and contact
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter

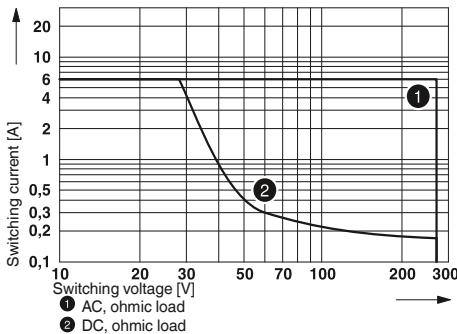
<b>Notes:</b>	
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.	
Marking systems and mounting material See Catalog 3	
The PLC-ATP partition plate must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....	
For diagrams of operating voltage ranges, see page 397	
For derating curves see page 399	



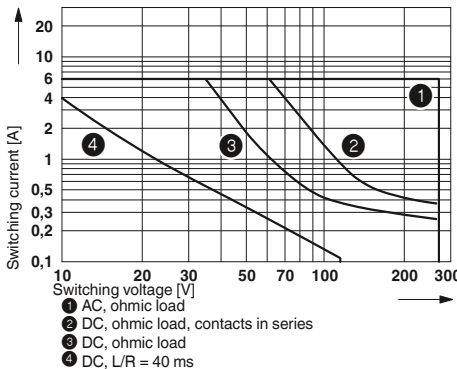
1-N/O relay module with additional floating terminal point



Electrical interrupting rating for PLC...24DC/1/ACT with 1-N/O relay



Electrical interrupting rating for PLC...24DC/1-1/ACT with 2-N/O relay



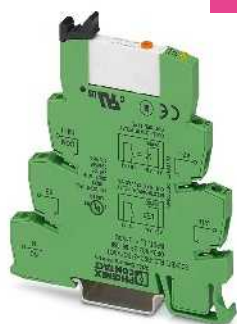
<b>Input data</b>	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time/switch-on time at $U_N$	[ms]
Typical release time/switch-off time at $U_N$	[ms]
Input circuit DC	
<b>Output data</b>	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current	
Minimum switching current	
<b>General data</b>	
Test voltage input/output	
Ambient temperature (operation)	
Mechanical service life	
Standards/regulations	
Degree of pollution/surge voltage category	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

<b>Technical data</b>	
①	See diagram
	9
	5
	8
	Yellow LED, reverse polarity protection, freewheeling diode
	AgSnO
	250 V AC/DC
	5 V (at 100 mA)
	6 A
	10 A (4 s)
	10 mA (at 12 V)
	4 kV AC (50 Hz, 1 min.)
	-40 °C ... 60 °C
	2 x 10 <sup>7</sup> cycles
	IEC 60664 , EN 50178
	3 / III
	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
	6.2 mm / 80 mm / 94 mm
	Class A product, see page 605

Description	Input voltage $U_N$
PLC-INTERFACE, with screw connection	
①	24 V DC
PLC-INTERFACE, with Push-in connection	
①	24 V DC

<b>Ordering data</b>		
Type	Order No.	Pcs./ Pkt.
PLC-RSC- 24DC/ 1/ACT	2966210	10
PLC-RPT- 24DC/ 1/ACT	2900312	10

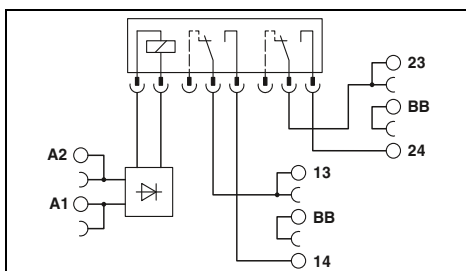
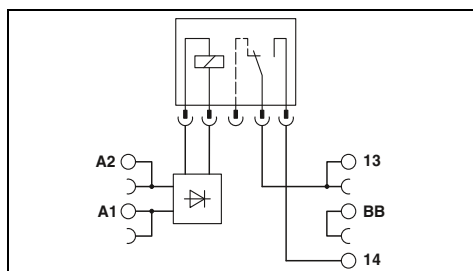
new



1-N/O relay module with manual operation and additional floating terminal point



2-N/O relay module with additional floating terminal points



Technical data

①  
See diagram  
9  
5  
8  
Yellow LED, reverse polarity protection, freewheeling diode

AgSnO  
250 V AC/DC  
5 V (at 100 mA)  
6 A  
10 A (4 s)  
10 mA (at 12 V)

4 kV AC (50 Hz, 1 min.)  
-40 °C ... 60 °C  
1 x 10<sup>7</sup> cycles  
IEC 60664 , EN 50178  
3 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-RSC- 24DC/ 1/MS/ACT	2909661	10
PLC-RPT- 24DC/ 1/MS/ACT	2909677	10

Technical data

①  
See diagram  
18  
8  
10  
Yellow LED, reverse polarity protection, freewheeling diode

AgNi  
250 V AC/DC  
5 V AC/DC  
6 A  
8 A  
10 mA

4 kV AC (50 Hz, 1 min.)  
-40 °C ... 60 °C  
3 x 10<sup>7</sup> cycles  
IEC 60664 , EN 50178  
3 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
14 mm / 80 mm / 94 mm  
Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-RSC- 24DC/ 1- 1/ACT	2967109	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC actuator series for output functions

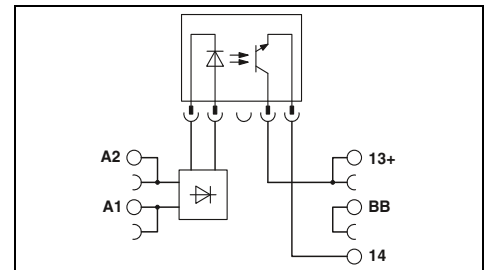
The PLC actuator series couples controllers and actuators such as motors, contactors, and valves.

The advantages:

- Direct connection of actuator to relay module including load return line
- No need for additional terminal blocks
- Space savings of up to 80%
- Time savings of up to 60%
- Screw and Push-in connection technology
- Relay modules with safe isolation according to DIN EN 50178 between coil and contact
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter



**Solid-state relay module with additional floating terminal point, DC output max. 3 A**

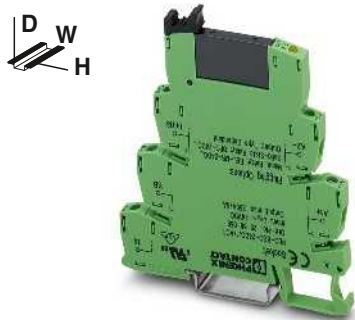


#### Technical data

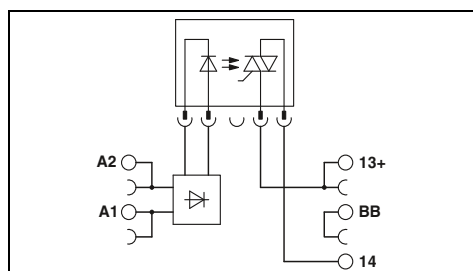
Input data		①	②
Permissible range (with reference to $U_N$ )		0.8 - 1.2	0.8 - 1.2
Switching level (with reference to $U_N$ )	1 signal ("H")	$\geq 0.8$	$\geq 0.8$
	0 signal ("L")	$\leq 0.25$	$\leq 0.4$
Typical input current at $U_N$	[mA]	9.5	8.5
Typical response time/switch-on time at $U_N$	[ms]	0.02	0.02
Typical release time/switch-off time at UN	[ms]	0.3	0.3
Transmission frequency $f_{limit}$	[Hz]	300	300
Input circuit DC		Yellow LED, reverse polarity protection, freewheeling diode	
Output data			
Max. switching voltage		33 V DC	
Minimum switching voltage		3 V DC	
Limiting continuous current		3 A (see derating curve)	
Maximum switch-on current		15 A (10 ms)	
Minimum switching current		-	
Output protection		Reverse polarity protection, surge protection	
Voltage drop at maximum limiting continuous current		$\leq 200$ mV	
Leakage current in off state		-	
Phase angle ( $\cos \phi$ )		-	
Max. load value		-	
General data			
Test voltage input/output		2.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)		-25 °C ... 60 °C	
Standards/regulations		IEC 60664 , EN 50178	
Degree of pollution/surge voltage category		2 / III	
Connection data solid/stranded/AWG		0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm	
EMC note		Class A product, see page 605	

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>PLC-INTERFACE, with screw connection</b>	①	PLC-OSC- 5DC/ 24DC/ 2/ACT	2980144	10
	②	PLC-OSC- 24DC/ 24DC/ 2/ACT	2966676	10
<b>PLC-INTERFACE, with Push-in connection</b>	①	PLC-OPT- 5DC/ 24DC/2/ACT	2900375	10
	②	PLC-OPT- 24DC/ 24DC/2/ACT	2900376	10



**Solid-state relay module with additional floating terminal point, AC output max. 750 mA**



**Technical data**

- ②
- 0.8 -
- 1.2
- ≥ 0.8
- ≤ 0.25
- 9
- 3
- 9
- 10

Yellow LED, reverse polarity protection, freewheeling diode

253 V AC  
 24 V AC  
 0.75 A (see derating curve)  
 30 A (10 ms)  
 10 mA  
 RCV circuit  
 < 1 V

< 1 mA (in off state)  
 0.5  
 4.5 A<sup>2</sup>s

2.5 kV (50 Hz, 1 min.)  
 -25 °C ... 60 °C  
 IEC 60664 , EN 50178  
 2 / III

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
 6.2 mm / 80 mm / 94 mm  
 Class A product, see page 605

**Ordering data**

Type	Order No.	Pcs./ Pkt.
PLC-OSC- 24DC/230AC/ 1/ACT	2967947	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC actuator series for output functions

PLC actuator series with solid-state power relays for coupling the controller and actuators, such as motors, contactors, valves, etc.



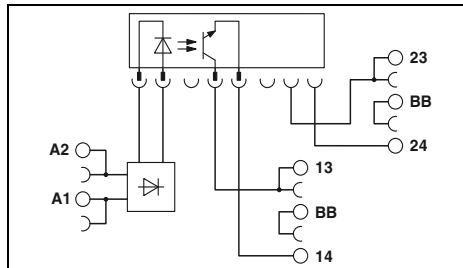
**Solid-state relay module with additional floating terminal point, DC output max. 5 A**



**Solid-state relay module with additional floating terminal point, AC output max. 2 A**

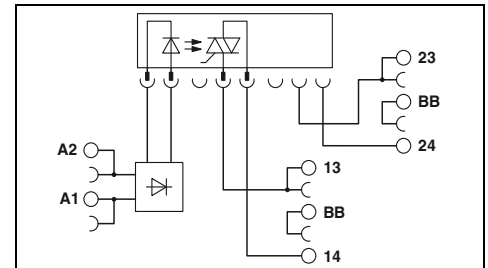


Notes:	
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.	
Marking systems and mounting material See Catalog 3	
The PLC-ATP partition plate must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....	
For derating curves see page 399	



#### Technical data

Input data	①
Permissible range (with reference to $U_N$ )	0.8 - 1.2
Switching level (with reference to $U_N$ )	1 signal ("H") $\geq 0.8$ 0 signal ("L") $\leq 0.4$
Typical input current at $U_N$	[mA] 9
Typical switch-on time at $U_N$	[ms] 0.02
Typical switch-off time at $U_N$	[ms] 0.4
Transmission frequency $f_{limit}$	[Hz] 300
Input circuit DC	Yellow LED, reverse polarity protection, freewheeling diode
Output data	
Maximum/minimum switching voltage	33 V DC / 3 V DC
Maximum switch-on current	15 A (10 ms)
Minimum/maximum switching current	- / 5 A (see derating curve)
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	$\leq 200$ mV
Leakage current in off state	-
Phase angle ( $\cos \phi$ )	-
Max. load value	-
General data	
Rated insulation voltage	-
Rated surge voltage	Basic insulation
Ambient temperature (operation)	-20 °C ... 60 °C
Standards/regulations	IEC 60664 , EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	see derating / In rows with zero spacing
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D 14 mm / 80 mm / 94 mm
EMC note	Class A product, see page 605



#### Technical data

Input data	①
Permissible range (with reference to $U_N$ )	0.8 - 1.2
Switching level (with reference to $U_N$ )	1 signal ("H") $\geq 0.8$ 0 signal ("L") $\leq 0.4$
Typical input current at $U_N$	[mA] 9
Typical switch-on time at $U_N$	[ms] 10
Typical switch-off time at $U_N$	[ms] 10
Transmission frequency $f_{limit}$	[Hz] 10
Input circuit AC	Yellow LED, reverse polarity protection, freewheeling diode
Output data	
Maximum/minimum switching voltage	253 V AC / 24 V AC
Maximum switch-on current	30 A (10 ms)
Minimum/maximum switching current	25 mA / 2 A (see derating curve)
Output protection	Surge protection
Voltage drop at maximum limiting continuous current	$\leq 1$ V
Leakage current in off state	typ. 1 mA
Phase angle ( $\cos \phi$ )	0.5
Max. load value	4 A <sup>2</sup> s (tp = 10 ms, at 25 °C)
General data	
Rated insulation voltage	-
Rated surge voltage	Basic insulation
Ambient temperature (operation)	-20 °C ... 60 °C
Standards/regulations	IEC 60664 , EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	see derating / In rows with zero spacing
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D 14 mm / 80 mm / 94 mm
EMC note	Class A product, see page 605

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
PLC-INTERFACE, with screw connection ①	24 V DC	PLC-OSC- 24DC/ 24DC/ 5/ACT	2982786	10

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
PLC-INTERFACE, with screw connection ①	24 V AC	PLC-OSC- 24DC/230AC/ 2/ACT	2982760	10

**PLC actuator series for output functions**

PLC actuator basic terminal blocks that can be fitted with a mechanical or solid-state relay. For coupling the controller and actuators, such as motors, contactors, valves, etc.

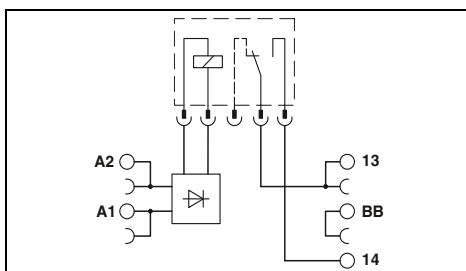
<b>Notes:</b>
Maximum interrupting rating diagrams, see page 400
For derating curves see page 399
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



**Basic terminal block with additional floating terminal point for assembly with relay**



**Basic terminal block with additional floating terminal point for assembly with solid-state relay**



**Technical data**

<b>Input data</b>	
Permissible range (with reference to $U_N$ )	0.8 ... 1.2
Typical input current at $U_N$ (50/60 Hz)	15.6 mA / 8.5 mA
Typical response time at $U_N$	5 ms
Typical release time at $U_N$	30 ms
Input circuit	Yellow LED , Bridge rectifier
<b>Output data with:</b>	REL-MR-24DC/21AU    REL-MR-24DC/21
Contact type	Single contact, 1 N/O contact    Single contact, 1 N/O contact
Contact material	AgSnO, hard gold-plated    AgSnO
Max. switching voltage	30 V AC / 36 V DC    250 V AC/DC
Minimum switching voltage	100 mV (at 10 mA)    5 V (at 100 mA)
Limiting continuous current	50 mA    6 A
Minimum switching current	1 mA (at 24 V)    10 mA (at 12 V)
Output protection	-    -
Voltage drop at limiting continuous current	-
Leakage current in off state	-
Max. load value $I^2 \times t$ (t = 10 ms)	-
<b>General data</b>	
Rated insulation voltage	250 V AC
Rated surge voltage/insulation	6 kV / Safe isolation, increased insulation
Ambient temperature (operation)	-20 °C ... 60 °C
Air clearances and creepage distances	EN 50178
Degree of pollution / Overvoltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D 6.2 mm / 80 mm / 94 mm

**Ordering data**

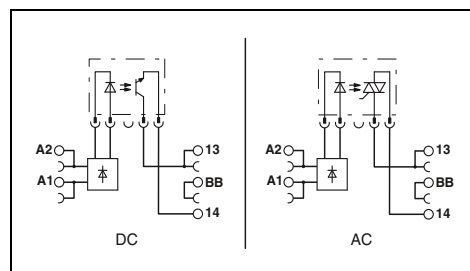
Description	Voltage $U_N$
PLC-INTERFACE, with screw connection	24 V AC/DC
PLC-INTERFACE, with Push-in connection	24 V AC/DC

Type	Order No.	Pcs./ Pkt.
PLC-BSC- 24UC/ 1/ACT	2982799	10
PLC-BPT- 24UC/ 1/ACT	2900450	10

**Accessories**

<b>Plug-in miniature power relays, with multi-layer gold contacts</b>	
REL-MR- 24DC/21AU	2961121    10
REL-MR- 24DC/21	2961105    10
<b>Plug-in solid-state relays</b>	
Solid-state input relays	
Solid-state power relays	
Solid-state power relays	

OPT-24DC/ 48DC/100	2966618	10
OPT-24DC/ 24DC/ 2	2966595	10
OPT-24DC/230AC/ 1	2967950	10



**Technical data**

<b>Input data</b>		
Permissible range (with reference to $U_N$ )	0.8 ... 1.2	
Typical input current at $U_N$ (50/60 Hz)	15 mA / 8.3 mA	
Typical response time at $U_N$	10 ms	
Typical release time at $U_N$	20 ms	
Input circuit	Yellow LED , Bridge rectifier	
<b>Output data with:</b>	OPT...48DC/...    OPT...24DC/...    OPT...230AC/...	
Contact type	-    -    -	
Contact material	-    -    -	
Max. switching voltage	48 V DC    33 V DC    253 V AC	
Minimum switching voltage	3 V DC    3 V DC    24 V AC	
Limiting continuous current	100 mA    3 A (see derating curve)    0.75 A (see derating curve)	
Minimum switching current	-    -    -	
Output protection	Reverse polarity protection, surge protection    Reverse polarity protection, surge protection    RCV circuit	
Voltage drop at limiting continuous current	≤ 1 V    ≤ 150 mV    ≤ 1 V	
Leakage current in off state	-    -    ≤ 1 mA	
Max. load value $I^2 \times t$ (t = 10 ms)	-    -    4.5 A <sup>2</sup> s (tp = 10 ms, at 25 °C)	
Rated insulation voltage	250 V AC	
Rated surge voltage/insulation	6 kV / Safe isolation, increased insulation	
Ambient temperature (operation)	-20 °C ... 60 °C	
Air clearances and creepage distances	EN 50178	
Degree of pollution / Overvoltage category	2 / III	
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	6.2 mm / 80 mm / 94 mm	

**Ordering data**

Type	Order No.	Pcs./ Pkt.
PLC-BSC- 24UC/ 1/ACT	2982799	10
PLC-BPT- 24UC/ 1/ACT	2900450	10

**Accessories**

OPT-24DC/ 48DC/100	2966618	10
OPT-24DC/ 24DC/ 2	2966595	10
OPT-24DC/230AC/ 1	2967950	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC sensor series for input functions

PLC sensor series for coupling controller and sensors, such as proximity switches, limit switches or auxiliary contacts

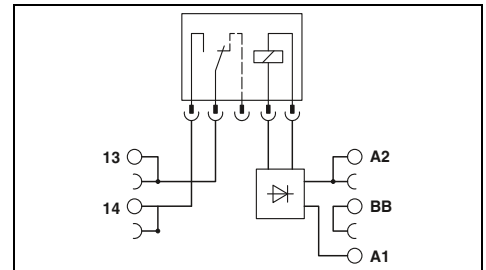
The advantages:

- Direct connection of sensor to relay module including sensor supply
- No need for additional terminal blocks
- Space savings of up to 80%
- Time savings of up to 60%
- Screw and Push-in connection technology
- Relay modules with safe isolation according to DIN EN 50178 between coil and contact
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate 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....
For diagrams of operating voltage ranges, see page 397
1) 120 and 230 V types up to 55 °C
2) If the specified maximum values are exceeded for multi-layer contact relays, the gold layer will be destroyed. During further use, the maximum values of the power contact relays apply. This may then result in a shorter service life than a dedicated power contact.



1-N/O relay module with additional floating terminal point



### Technical data

Input data	①	②	③	
Permissible range (with reference to $U_N$ )	See diagram			
Switching level (with reference to $U_N$ )	1 signal ("H") 0 signal ("L")			
Typical input current at $U_N$	[mA]	9	3.5	3.2
Typical response time/switch-on time at $U_N$	[ms]	5	6	7
Typical release time/switch-off time at $U_N$	[ms]	8	15	15
Transmission frequency $f_{limit}$	[Hz]			
Input circuit DC	Yellow LED, reverse polarity protection, freewheeling diode			
Input circuit AC/DC	Yellow LED, bridge rectifier			
Output data				
Contact material	AgSnO, hard gold-plated			
Max. switching voltage	30 V AC / 36 V DC			
Minimum switching voltage	100 mV (at 10 mA)			
Limiting continuous current	50 mA			
Maximum switch-on current	50 mA			
Minimum switching current	1 mA (at 24 V)			
Output protection	-			
Voltage drop at maximum limiting continuous current	-			
General data				
Test voltage input/output	4 kV AC (50 Hz, 1 min.)			
Ambient temperature (operation)	-40 °C ... 60 °C <sup>1)</sup>			
Mechanical service life	2 x 10 <sup>7</sup> cycles			
Standards/regulations	IEC 60664, EN 50178			
Degree of pollution/surge voltage category	3 / III			
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14			
Dimensions	W / H / D			
EMC note	Class A product, see page 605			

### Ordering data

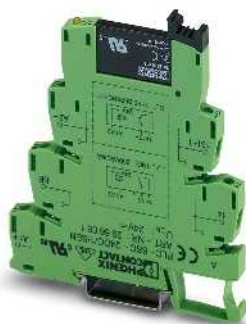
Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>PLC-INTERFACE, with screw connection</b>				
	① 24 V DC	PLC-RSC- 24DC/ 1AU/SEN	2966317	10
	② 120 V AC / 110 V DC	PLC-RSC-120UC/ 1AU/SEN	2966320	10
	③ 230 V AC / 220 V DC	PLC-RSC-230UC/ 1AU/SEN	2966333	10
<b>PLC-INTERFACE, with Push-in connection</b>				
	① 24 V DC	PLC-RPT- 24DC/ 1AU/SEN	2900313	10
	② 120 V AC / 110 V DC	PLC-RPT-120UC/ 1AU/SEN	2900314	10
	③ 230 V AC / 220 V DC	PLC-RPT-230UC/ 1AU/SEN	2900315	10



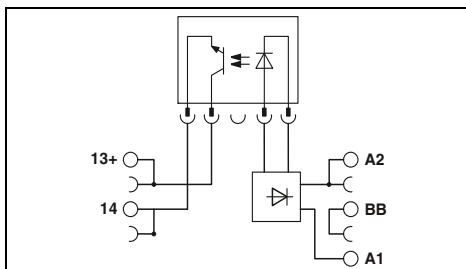
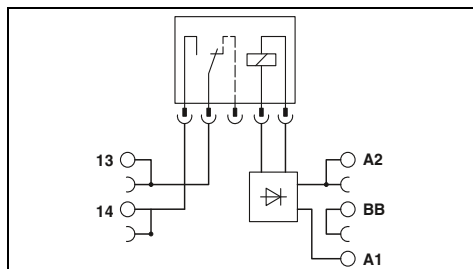
new



1-N/O relay module with manual operation and additional floating terminal point



Solid-state relay module with additional floating terminal point, DC output max. 100 mA



Technical data

①	②	③
See diagram		
9	3.5	3.2
5	6	7
8	15	15

Yellow LED, reverse polarity protection, freewheeling diode  
Yellow LED, bridge rectifier

AgSnO, hard gold-plated  
30 V AC / 36 V DC  
100 mV (at 10 mA)  
50 mA<sup>2</sup>  
50 mA<sup>2</sup>  
1 mA (at 24 V)  
-  
-

4 kV AC (50 Hz, 1 min.)  
-40 °C ... 60 °C)  
1 x 10<sup>7</sup> cycles  
IEC 60664, EN 50178  
3 / III  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 605

Technical data

①	②	③
0.8 - 1.2	0.8 - 1.1	0.8 - 1.1
≥ 0.8	≥ 0.8	≥ 0.8
≤ 0.4	≤ 0.3	≤ 0.3
8.5	3.5	3.5
0.02	6	3
0.3	10	5
300	10	10

Yellow LED, reverse polarity protection, freewheeling diode  
Yellow LED, bridge rectifier

-  
48 V DC  
3 V DC  
100 mA  
-  
-  
Reverse polarity protection, surge protection  
≤ 1 V

2.5 kV (50 Hz, 1 min.)  
-25 °C ... 60 °C  
-  
IEC 60664, EN 50178  
2 / III  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-RSC- 24DC/ 1AU/MS/SEN	2909663	10
PLC-RSC-120UC/ 1AU/MS/SEN	2909664	10
PLC-RSC-230UC/ 1AU/MS/SEN	2909665	10
PLC-RPT- 24DC/ 1AU/MS/SEN	2909678	10
PLC-RPT-120UC/ 1AU/MS/SEN	2909679	10
PLC-RPT-230UC/ 1AU/MS/SEN	2909680	10

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-OSC- 24DC/ 48DC/100/SEN	2966773	10
PLC-OSC-120UC/ 48DC/100/SEN	2966799	10
PLC-OSC-230UC/ 48DC/100/SEN	2966809	10
PLC-OPT- 24DC/ 48DC/100/SEN	2900358	10
PLC-OPT-120UC/ 48DC/100/SEN	2900359	10
PLC-OPT-230UC/ 48DC/100/SEN	2900361	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC-INTERFACE for high inrush currents

PLC relay modules for high inrush currents due, for example, to capacitive loads.

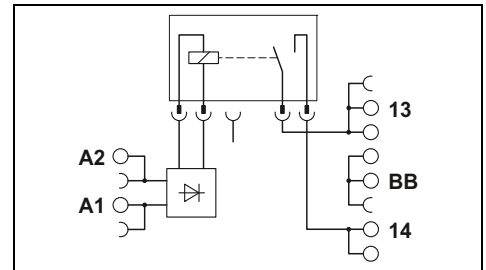
The advantages:

- Maximum switch-on current 130 A
- Direct connection of load return line thanks to actuator type
- Screw and Push-in connection technology
- Safe isolation according to DIN EN 50178 between coil and contact
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter

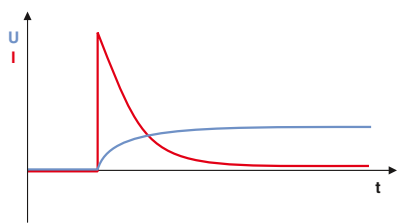
<b>Notes:</b>
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 397



**1-N/O relay module with additional floating terminal point, max. 130 A peak**



**Basic behavior of capacitive loads:**  
- Very high input current  
- Voltage increases with an e-function



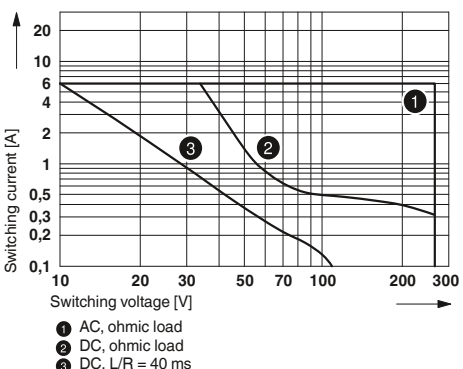
<b>Input data</b>	
Typical input current at $U_N$	[mA]
Response/release time at $U_N$	[ms]
Input circuit DC	
<b>Output data</b>	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Maximum switch-on current	
<b>General data</b>	
Test voltage input/output	
Ambient temperature (operation)	
Mechanical service life	
Standards/regulations	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

<b>Technical data</b>	
①	18
	8 / 10
Yellow LED, reverse polarity protection, freewheeling diode	
AgSnO	
250 V AC/DC	
12 V AC/DC (at 100 mA)	
80 A (for 20 ms) / 130 A (peak, at capacitive load, 230 V AC, 24 $\mu$ F)	
4 kV AC (50 Hz, 1 min.)	
-40 °C ... 60 °C	
3 x 10 <sup>7</sup> cycles	
IEC 60664 , EN 50178	
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
14 mm / 80 mm / 94 mm	
Class A product, see page 605	

Description	Input voltage $U_N$
PLC-INTERFACE, with screw connection	24 V DC
PLC-INTERFACE, with Push-in connection	24 V DC

<b>Ordering data</b>		
Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/ 11C/ACT	2967604	10
PLC-RPT- 24DC/ 11C/ACT	2900298	10

### Maximum interrupting rating



**PLC-INTERFACE for high continuous currents**

PLC relay modules for high continuous switching currents

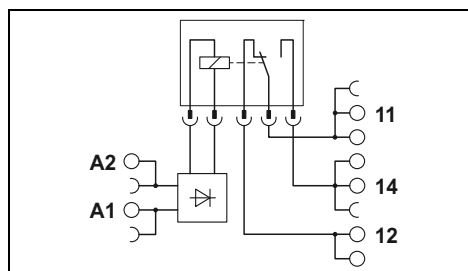
The advantages:

- Maximum continuous current 10 A
- Safe isolation according to DIN EN 50178 between coil and contact
- Screw and Push-in connection technology
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter
- Long electrical service life thanks to 16 A relay
- All common input voltages of 12 V DC to 230 V AC

<b>Notes:</b>
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate 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....
For diagrams of operating voltage ranges, see page 397
*) 230 V types up to 55 °C

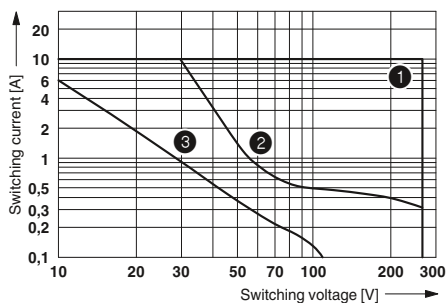


**1-PDT relay module, max. 10 A**



Input data	①	②	③	④	⑤	⑥	⑦
Typical input current at $U_N$ [mA]	33	18	17.5	20	10	4.5	4.5
Response/release time at $U_N$ [ms]	8 / 10	8 / 10	8 / 10	8 / 10	8 / 10	7 / 10	7 / 10
Input circuit DC	Yellow LED, reverse polarity protection, freewheeling diode						
Input circuit AC/DC	Yellow LED, bridge rectifier						
Output data							
Contact material	AgNi						
Max. switching voltage	250 V AC/DC						
Minimum switching voltage	12 V AC/DC						
Limiting continuous current	10 A						
Maximum switch-on current	30 A (300 ms)						
Minimum switching current	100 mA						
General data							
Test voltage input/output	4 kV AC (50 Hz, 1 min.)						
Ambient temperature (operation)	-40 °C ... 60 °C*)						
Mechanical service life	3 x 10 <sup>7</sup> cycles						
Standards/regulations	IEC 60664, EN 50178						
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14						
Dimensions	W / H / D			14 mm / 80 mm / 94 mm			
EMC note	Class A product, see page 605						

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
<b>PLC-INTERFACE, with screw connection</b>				
①	12 V DC	PLC-RSC- 12DC/21HC	2967617	10
②	24 V DC	PLC-RSC- 24DC/21HC	2967620	10
③	24 V AC/DC	PLC-RSC- 24UC/21HC	2967633	10
④	48 V DC	PLC-RSC- 48DC/21HC	2967646	10
⑤	60 V DC	PLC-RSC- 60DC/21HC	2967659	10
⑥	120 V AC / 110 V DC	PLC-RSC-120UC/21HC	2967662	10
⑦	230 V AC / 220 V DC	PLC-RSC-230UC/21HC	2967675	10
<b>PLC-INTERFACE, with Push-in connection</b>				
①	12 V DC	PLC-RPT- 12DC/21HC	2900290	10
②	24 V DC	PLC-RPT- 24DC/21HC	2900291	10
③	24 V AC/DC	PLC-RPT- 24UC/21HC	2900293	10
④	48 V DC	PLC-RPT- 48DC/21HC	2900294	10
⑤	60 V DC	PLC-RPT- 60DC/21HC	2900295	10
⑥	120 V AC / 110 V DC	PLC-RPT-120UC/21HC	2900296	10
⑦	230 V AC / 220 V DC	PLC-RPT-230UC/21HC	2900297	10



- ① AC, ohmic load
- ② DC, ohmic load
- ③ DC, L/R = 40 ms

**Max. interrupting rating**

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### Basic terminal blocks with interference current filter that can be fitted with relays

PLC basic terminal blocks with integrated filter to protect against interference voltages or currents due, for example, to long control lines.

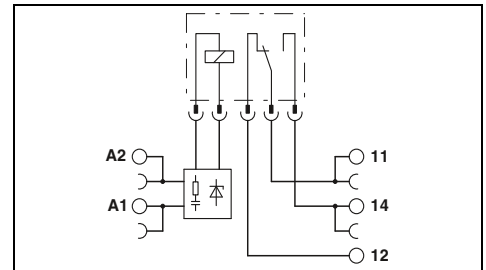
The advantages:

- Resistant to interference currents
  - High relay release voltage
- Typical applications:
- Applications with long control lines
  - Use of AC output boards, resulting in residual AC currents
  - Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate 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....
For diagrams of operating voltage ranges, see page 397
Maximum interrupting rating diagrams, see page 400
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.

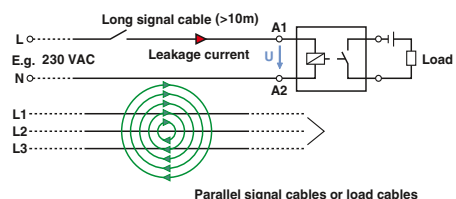
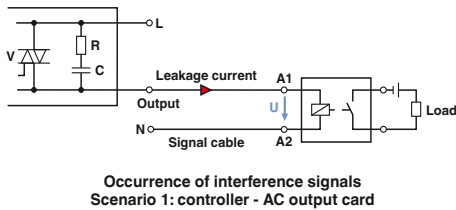


Basic terminal block with input filter



### Technical data

Input data	120 V AC	230 V AC
Nominal input voltage $U_N$	0.8 ... 1.4	0.78 ... 1.14
Permissible range (with reference to $U_N$ )	50 V AC	80 V AC
Typical release voltage (relay assembly)	7 mA / 8 mA	8.8 mA / 10 mA
Typical input current at $U_N$ (50/60 Hz)	7 ms	7 ms
Typical response time at $U_N$	20 ms	20 ms
Typical release time at $U_N$	Input circuit Yellow LED, Bridge rectifier, Filter	
Input circuit	REL-MR-60DC/21	REL-MR-60DC/21AU
Output data with:	Single contact, 1-PDT	Single contact, 1-PDT
Contact type	AgSnO	AgSnO, hard gold-plated
Contact material	250 V AC/DC	30 V AC / 36 V DC
Max. switching voltage	5 V (at 100 mA)	100 mV (at 10 mA)
Minimum switching voltage	6 A	50 mA
Limiting continuous current	on request	50 mA
Maximum switch-on current	10 mA (at 12 V)	1 mA (at 24 V)
Minimum switching current	General data	
General data	Test voltage input/output 4 kV (50 Hz, 1 min.)	
Test voltage input/output	Ambient temperature (operation) -20 °C ... 55 °C	
Ambient temperature (operation)	Mechanical service life 2 x 10 <sup>7</sup> cycles	
Mechanical service life	Standards/regulations IEC 60664, EN 50178	
Standards/regulations	Degree of pollution / Overvoltage category 3 / III	
Degree of pollution / Overvoltage category	Connection data solid/stranded/AWG 0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Connection data solid/stranded/AWG	Dimensions 6.2 mm / 80 mm / 94 mm	
Dimensions	EMC note Class A product, see page 605	
EMC note		

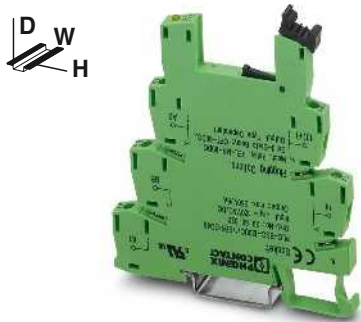


Description	Voltage $U_N$
PLC-INTERFACE basic terminal block, for plug-in miniature relays or solid-state relays	
with screw connection	120 V AC
with screw connection	230 V AC
with Push-in connection	120 V AC
with Push-in connection	230 V AC

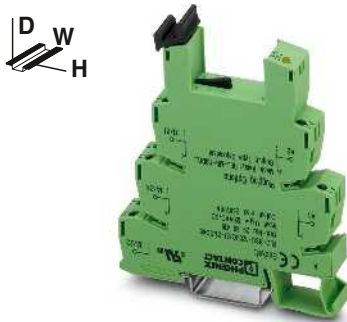
Plug-in miniature power relays, with multi-layer gold contacts		
REL-MR- 60DC/21AU	2961134	10
REL-MR- 60DC/21	2961118	10

Ordering data		
Type	Order No.	Pcs./ Pkt.
PLC-BSC-120UC/21/SO46	2980319	10
PLC-BSC-230UC/21/SO46	2980335	10
PLC-BPT-120UC/21/SO46	2900453	10
PLC-BPT-230UC/21/SO46	2900455	10

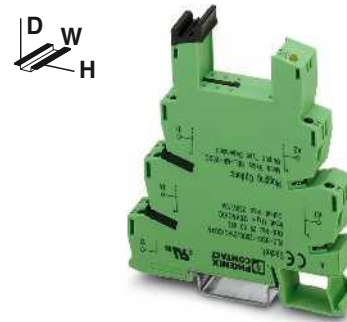
Accessories		
Type	Order No.	Pcs./ Pkt.
REL-MR- 60DC/21AU	2961134	10
REL-MR- 60DC/21	2961118	10



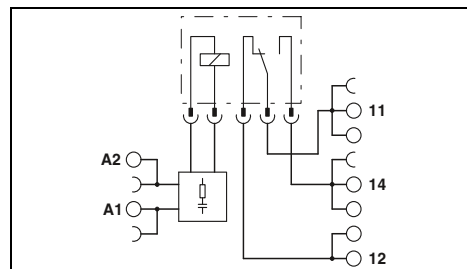
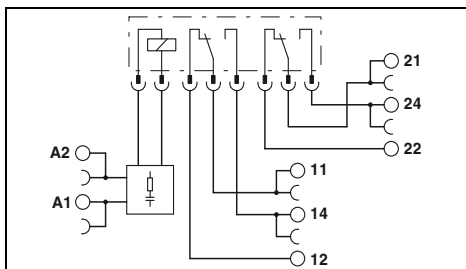
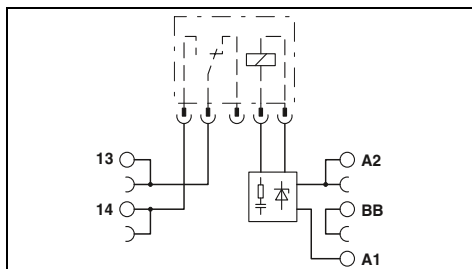
Basic terminal block with additional floating terminal point and input filter



2-PDT basic terminal block with input filter



1-PDT basic terminal block for high continuous currents with input filter



Technical data

120 V AC	230 V AC
0.8 ... 1.4	0.78 ... 1.14
50 V AC	80 V AC
7 mA / 8 mA	8.8 mA / 10 mA
7 ms	7 ms
20 ms	20 ms
Yellow LED, Bridge rectifier, Filter	
REL-MR-60DC/21	REL-MR-60DC/21AU
Single contact, 1 N/O contact	Single contact, 1 N/O contact
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
on request	50 mA
10 mA (at 12 V)	1 mA (at 24 V)

Technical data

120 V AC	230 V AC
0.78 ... 1.4	0.78 ... 1.14
16 V AC	70 V AC
6 mA / 7 mA	8.5 mA / 10 mA
7 ms	7 ms
10 ms	10 ms
Yellow LED, Bridge rectifier, Filter	
REL-MR-110DC/21-21	REL-MR-110DC/21-21AU
Single contact, 2-PDT	Single contact, 2-PDT
AgNi	AgNi, + 5 µm Au
250 V AC/DC	30 V AC / 36 V DC
5 V AC/DC	100 mV
6 A	50 mA
15 A (300 ms)	50 mA
10 mA	1 mA

Technical data

120 V AC	230 V AC
0.85 ... 1.4	0.78 ... 1.14
16 V AC	70 V AC
6 mA / 7 mA	8.5 mA / 10 mA
7 ms	7 ms
20 ms	20 ms
Yellow LED, Bridge rectifier, Filter	
REL-MR-110DC/21HC	
Single contact, 1-PDT	
AgNi	
250 V AC/DC	
12 V AC/DC	
10 A	
30 A (300 ms)	
100 mA	

4 kV (50 Hz, 1 min.)  
 -20 °C ... 55 °C  
 2 x 10<sup>7</sup> cycles  
 IEC 60664, EN 50178  
 3 / III  
 0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
 6.2 mm / 80 mm / 94 mm  
 Class A product, see page 605

4 kV (50 Hz, 1 min.)  
 -20 °C ... 55 °C  
 3 x 10<sup>7</sup> cycles  
 IEC 60664, EN 50178  
 3 / III  
 0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
 14 mm / 80 mm / 94 mm  
 Class A product, see page 605

4 kV (50 Hz, 1 min.)  
 -20 °C ... 55 °C  
 3 x 10<sup>7</sup> cycles  
 IEC 60664, EN 50178  
 3 / III  
 0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
 14 mm / 80 mm / 94 mm  
 Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-BSC-120UC/ 1/SEN/SO46	2980322	10
PLC-BSC-230UC/ 1/SEN/SO46	2980348	10
PLC-BPT-120UC/ 1/SEN/SO46	2900456	10
PLC-BPT-230UC/ 1/SEN/SO46	2900457	10

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-BSC-120UC/21-21/SO46	2980416	10
PLC-BSC-230UC/21-21/SO46	2980429	10

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-BSC-120UC/21HC/SO46	2980432	10
PLC-BSC-230UC/21HC/SO46	2980445	10

Accessories

REL-MR- 60DC/21AU	2961134	10
REL-MR- 60DC/21	2961118	10

Accessories

REL-MR-110DC/21-21AU	2961228	10
REL-MR-110DC/21-21	2961202	10

Accessories

REL-MR-110DC/21HC	2961338	10
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# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### Basic terminal blocks with interference current filter that can be fitted with solid-state relays

PLC basic terminal blocks with integrated filter to protect against interference voltages or currents due, for example, to long control lines.

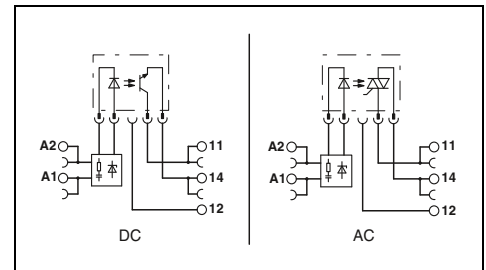
The advantages:

- Resistant to interference currents
  - High relay release voltage
- Typical applications:
- Applications with long control lines
  - Use of AC output boards, resulting in residual AC currents
  - Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate 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....
For diagrams of operating voltage ranges, see page 397
Maximum interrupting rating diagrams, see page 400
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



Basic terminal block with Input filter



Input data
Nominal input voltage $U_N$
Permissible range (with reference to $U_N$ )
Switching level (with optocoupler) 0 signal ("L")
Typical input current at $U_N$ (50/60 Hz)
Typical response time/switch-on time at $U_N$
Typical switch-off time at $U_N$
Input circuit
Output data with:
Max. switching voltage
Minimum switching voltage
Limiting continuous current
Maximum switch-on current
Output protection
Voltage drop at limiting continuous current
Leakage current in off state
Maximum phase shift (inductive consumer)
Max. load value $I^2 \times t$ (t = 10 ms)
General data
Test voltage input/output
Ambient temperature (operation)
Standards/regulations
Degree of pollution / Overvoltage category
Connection data solid/stranded/AWG
Dimensions
EMC note

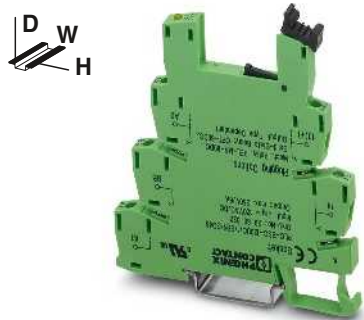
Technical data		
120 V AC	230 V AC	
0.85 ... 1.1	0.8 ... 1.1	
$\leq 0.4$	$\leq 0.4$	
7 mA / 8 mA	8.8 mA / 10 mA	
6 ms	6 ms	
10 ms	10 ms	
Yellow LED, Bridge rectifier, Filter		
OPT...48DC/...	OPT...24DC/...	OPT...230AC/...
48 V DC	30 V DC	253 V AC
3 V DC	3 V DC	24 V AC
100 mA	3 A	0.75 A
	15 A (10 ms)	30 A (10 ms)
Reverse polarity protection, surge protection	Reverse polarity protection, surge protection	RCV circuit
< 1 V	< 200 mV	< 1 V
-	-	< 1 mA
-	-	0.5
-	-	4.5 A <sup>2</sup> s
2.5 kV (50 Hz, 1 min.)		
-20 °C ... 55 °C		
IEC 60664, EN 50178		
2 / III		
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14		
6.2 mm / 80 mm / 94 mm		
Class A product, see page 605		

Description	Voltage $U_N$
<b>PLC-INTERFACE basic terminal block</b> , for plug-in miniature relays or solid-state relays	
with screw connection	120 V AC
with screw connection	230 V AC
with Push-in connection	120 V AC
with Push-in connection	230 V AC

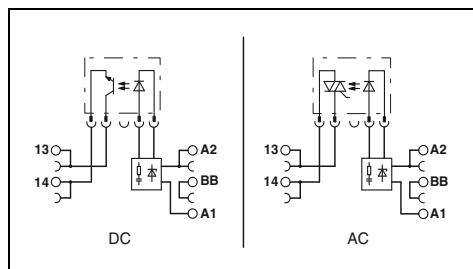
Ordering data			
Type	Order No.	Pcs./Pkt.	
PLC-BSC-120UC/21/SO46	2980319	10	
PLC-BSC-230UC/21/SO46	2980335	10	
PLC-BPT-120UC/21/SO46	2900453	10	
PLC-BPT-230UC/21/SO46	2900455	10	

Plug-in solid-state relays	
Solid-state input relays	
Solid-state power relays	
Solid-state power relays	

Accessories		
OPT-60DC/ 48DC/100	2966621	10
OPT-60DC/ 24DC/ 2	2966605	10
OPT-60DC/230AC/ 1	2967963	10



Basic terminal block with additional floating terminal point and Input filter



Technical data

120 V AC	230 V AC	
0.85 ... 1.1	0.8 ... 1.1	
≤ 0.4	≤ 0.4	
7 mA / 8 mA	8.8 mA / 10 mA	
6 ms	6 ms	
10 ms	10 ms	
Yellow LED, Bridge rectifier, Filter		
OPT...48DC/...	OPT...24DC/...	OPT...230AC/...
48 V DC	30 V DC	253 V AC
3 V DC	3 V DC	24 V AC
100 mA	3 A	0.75 A
	15 A (10 ms)	30 A (10 ms)
Reverse polarity protection, surge protection	Reverse polarity protection, surge protection	RCV circuit
< 1 V	< 200 mV	< 1 V
-	-	< 1 mA
-	-	0.5
-	-	4.5 A²s

2.5 kV (50 Hz, 1 min.)  
 -20 °C ... 55 °C  
 IEC 60664, EN 50178  
 2 / III

0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14  
 6.2 mm / 80 mm / 94 mm  
 Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-BSC-120UC/ 1/SEN/SO46	2980322	10
PLC-BSC-230UC/ 1/SEN/SO46	2980348	10
PLC-BPT-120UC/ 1/SEN/SO46	2900456	10
PLC-BPT-230UC/ 1/SEN/SO46	2900457	10

Accessories

OPT-60DC/ 48DC/100	2966621	10
OPT-60DC/ 24DC/ 2	2966605	10
OPT-60DC/230AC/ 1	2967963	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### Plug-in miniature power relays

new

Plug-in miniature power relays are suitable for PLC-INTERFACE and RIF-0 and RIF-1 relay base.

The advantages:

- Power contacts up to 16 A
- Multi-layer gold contact or power contact
- High degree of protection up to RT III depending on type (wash-proof)
- Safe isolation according to DIN EN 50178 between coil and contact

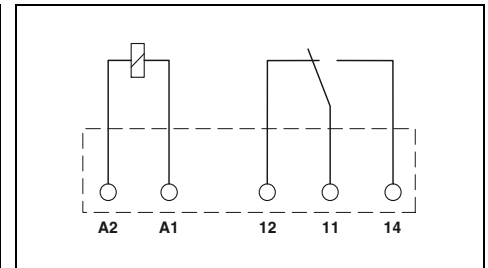
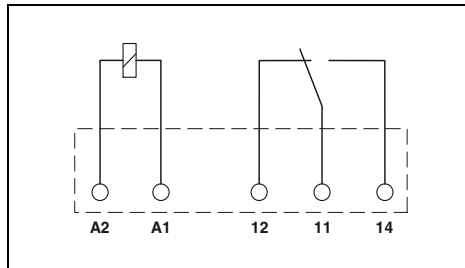


1-PDT relay,  
6 A, maximum



1-PDT relay with  
manual operation,  
max. 6 A

<b>Notes:</b>
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.
For dimensional drawings and perforations for assembly, see page 398
For diagrams of operating voltage ranges, see page 397
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



Input data		①	②	③	④	⑤
Permissible range (with reference to $U_N$ )		see diagram				
Typical input current at $U_N$	[mA]	38	14	9	7	3
Typical response time at $U_N$	[ms]	5	5	5	5	5
Typical release time at $U_N$	[ms]	2.5	2.5	2.5	2.5	2.5
Output data		1 PDT		1 PDT		
Contact type		AgSnO		AgSnO, hard gold-plated		
Contact material		250 V AC/DC		30 V AC / 36 V DC		
Max. switching voltage		5 V (at 100 mA)		100 mV (at 10 mA)		
Minimum switching voltage		6 A		50 mA		
Limiting continuous current		10 A (4 s)		on request		
Maximum switch-on current		10 mA (at 12 V)		1 mA (at 24 V)		
Minimum switching current		140 W		1.2 W		
Maximum interrupting rating, ohmic load		20 W		-		
	24 V DC	18 W		-		
	48 V DC	-		-		
	60 V DC	23 W		-		
	110 V DC	40 W		-		
	220 V DC	1500 VA		-		
	250 V AC	-		-		
General data		4 kV AC (50 Hz, 1 min.)		4 kV AC (50 Hz, 1 min.)		
Test voltage (winding / contact)		-40 °C ... 85 °C		-40 °C ... 85 °C		
Ambient temperature (operation)		100% operating factor		100% operating factor		
Nominal operating mode		2 x 10 <sup>7</sup> cycles		1 x 10 <sup>7</sup> cycles		
Mechanical service life		IEC 60664 , EN 50178 , EN 61810-1		IEC 60664 , EN 50178 , EN 61810-1		
Standards/regulations		any / In rows with zero spacing		any / In rows with zero spacing		
Mounting position/mounting		5 mm / 28 mm / 15 mm		5 mm / 28 mm / 16 mm		

Technical data		②	④	⑤
see diagram		see diagram		
		14	7	3
		5	5	5
		2.5	2.5	2.5
1 PDT		1 PDT		1 PDT
AgSnO		AgSnO, hard gold-plated		AgSnO, hard gold-plated
250 V AC/DC		30 V AC / 36 V DC		30 V AC / 36 V DC
5 V (at 100 mA)		100 mV (at 10 mA)		100 mV (at 10 mA)
6 A		50 mA		50 mA
10 A (4 s)		on request		50 mA
10 mA (at 12 V)		1 mA (at 24 V)		10 mA (at 12 V)
140 W		1.2 W		1.2 W
20 W		-		-
18 W		-		-
23 W		-		-
40 W		-		-
1500 VA		-		-

Ordering data		Type	Order No.	Pcs./ Pkt.	
Description	Input voltage $U_N$				
	<b>Plug-in miniature power relays, with power contacts</b>				
	①	4.5 V DC	REL-MR- 4,5DC/21	2961367	10
	②	12 V DC	REL-MR- 12DC/21	2961150	10
	③	18 V DC	REL-MR- 18DC/21	2961383	10
	④	24 V DC	REL-MR- 24DC/21	2961105	10
⑤	60 V DC	REL-MR- 60DC/21	2961118	10	
⑥	110 V DC				
<b>Plug-in miniature power relays, with multi-layer gold contacts</b>					
①	4.5 V DC	REL-MR 4,5DC/21AU	2961370	10	
②	12 V DC	REL-MR- 12DC/21AU	2961163	10	
③	18 V DC	REL-MR- 18DC/21AU	2961493	10	
④	24 V DC	REL-MR- 24DC/21AU	2961121	10	
⑤	60 V DC	REL-MR- 60DC/21AU	2961134	10	
⑥	110 V DC				

Ordering data		Type	Order No.	Pcs./ Pkt.	
Description	Input voltage $U_N$				
	<b>Plug-in miniature power relays, with power contacts</b>				
	②	12 V DC	REL-MR- 12DC/21/MS	2909641	10
	④	24 V DC	REL-MR- 24DC/21/MS	2909642	10
	⑤	60 V DC	REL-MR- 60DC/21/MS	2909643	10
	⑥	110 V DC			
<b>Plug-in miniature power relays, with multi-layer gold contacts</b>					
②	12 V DC	REL-MR- 12DC/21AU/MS	2909644	10	
④	24 V DC	REL-MR- 24DC/21AU/MS	2909645	10	
⑤	60 V DC	REL-MR- 60DC/21AU/MS	2909647	10	





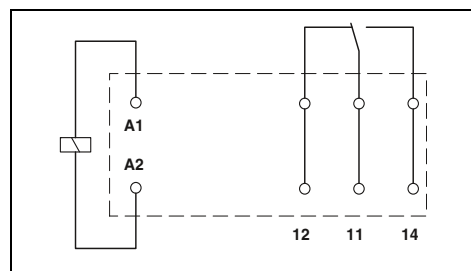
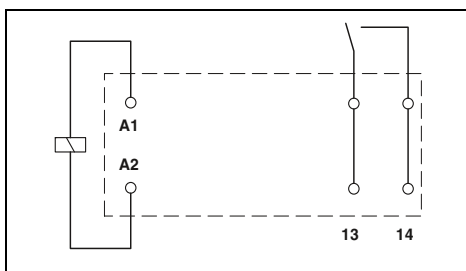
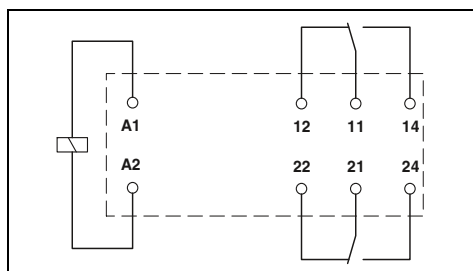
2-PDT relay,  
2 x 8 A, maximum



1-N/O relay for  
high inrush currents,  
max. 130 A peak



1-PDT relay for  
high continuous currents,  
max. 16 A



Technical data			
②	④	⑤	⑥
see diagram			
33	17	8.2	4.1
7	7	7	7
3	3	3	3
2 PDT		2 PDT	
AgNi		AgNi, hard gold-plated	
250 V AC/DC		30 V AC / 36 V DC	
5 V (at 10 mA)		100 mV (at 10 mA)	
8 A		50 mA	
25 A (20 ms)		50 mA	
10 mA (at 5 V)		1 mA (at 24 V)	
190 W		1.2 W	
85 W		-	
60 W		-	
44 W		-	
60 W		-	
2000 VA		-	
5 kV AC (50 Hz, 1 min.)			
-40 °C ... 85 °C			
100% operating factor			
3 x 10 <sup>7</sup> cycles			
IEC 60664 , EN 50178 , EN 61810-1			
any / Can be aligned without spacing (> 70 °C ≥ 2.5 mm)			
12.7 mm / 29 mm / 15.7 mm			

Technical data	
④	
see diagram	
17	
8	
3	
1 N/O contact	
AgSnO	
250 V AC/DC	
12 V (at 100 mA)	
16 A	
80 A (20 ms) /	
130 A (peak, at capacitive load, 230 V AC, 24 μF)	
100 mA (at 12 V DC)	
384 W	
58 W	
48 W	
50 W	
80 W	
4000 VA	
5 kV AC (50 Hz, 1 min.)	
-40 °C ... 85 °C	
100% operating factor	
3 x 10 <sup>7</sup> cycles	
IEC 60664 , EN 50178	
any / Can be aligned without spacing (> 70 °C ≥ 2.5 mm)	
12.7 mm / 29 mm / 15.7 mm	

Technical data			
②	④	⑤	⑥
see diagram			
33	17	8.2	4.1
7	7	7	7
3	3	3	3
1 PDT		1 PDT	
AgNi		AgNi	
250 V AC/DC		250 V AC/DC	
12 V (at 10 mA)		12 V (at 10 mA)	
16 A		16 A	
50 A (20 ms)		50 A (20 ms)	
10 mA (at 12 V)		10 mA (at 12 V)	
384 W		384 W	
58 W		58 W	
48 W		48 W	
50 W		50 W	
80 W		80 W	
4000 VA		4000 VA	
5 kV AC (50 Hz, 1 min.)			
-40 °C ... 85 °C			
100% operating factor			
3 x 10 <sup>7</sup> cycles			
IEC 60664 , EN 50178 , EN 61810-1			
any / Can be aligned without spacing (> 70 °C ≥ 2.5 mm)			
12.7 mm / 29 mm / 15.7 mm			

Ordering data		
Type	Order No.	Pcs./ Pkt.
REL-MR- 12DC/21-21	2961257	10
REL-MR- 24DC/21-21	2961192	10
REL-MR- 60DC/21-21	2961273	10
REL-MR-110DC/21-21	2961202	10
REL-MR- 12DC/21-21AU	2961299	10
REL-MR- 24DC/21-21AU	2961215	10
REL-MR- 60DC/21-21AU	2961286	10
REL-MR-110DC/21-21AU	2961228	10

Ordering data		
Type	Order No.	Pcs./ Pkt.
REL-MR- 24DC/11C	2961341	10

Ordering data		
Type	Order No.	Pcs./ Pkt.
REL-MR- 12DC/21HC	2961309	10
REL-MR- 24DC/21HC	2961312	10
REL-MR- 60DC/21HC	2961325	10
REL-MR-110DC/21HC	2961338	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### Plug-in solid-state relays

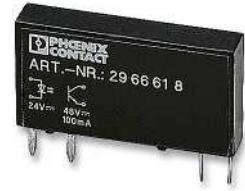
Plug-in solid-state relays are suitable for both PLC-INTERFACE and RIF-0 and RIF-1 relay base.

The advantages:

- Switching current of up to 5 A
- RT III-proof (wash-proof)
- Vibration and shock-resistant
- Wear-free and long-lasting
- Zero voltage switch at AC output
- Can be soldered on PCB

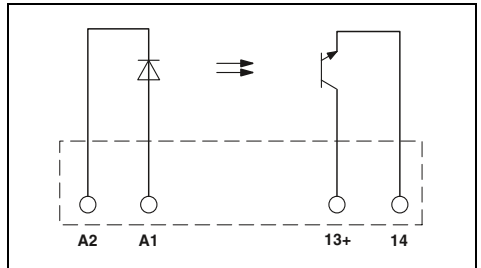
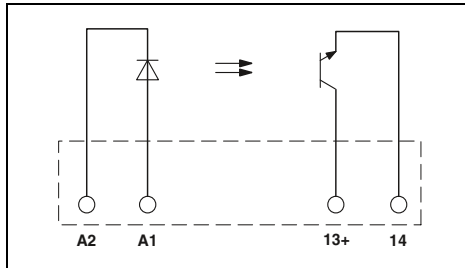


Solid-state relay,  
DC output max. 3 A



Solid-state relay,  
DC output max. 100 mA

**Notes:**  
For dimensional drawings and perforations for assembly, see page 399  
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Basics of relay technology" on page 286.



#### Technical data

Input data	①	②	③
Permissible range (with reference to $U_N$ )	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2
Switching level	2.5	16	35
1 signal ("H") [V DC] $\geq$	0.8	10	20
0 signal ("L") [V DC] $\leq$	9	7	3
Typical input current at $U_N$ [mA]	20	20	40
Typical switch-on time at $U_N$ [ $\mu$ s]	300	300	500
Typical switch-off time at $U_N$ [ $\mu$ s]	300	300	300
Transmission frequency $f_{limit}$ [Hz]			

Output data	①	②	③
Max. switching voltage	33 V DC		
Minimum switching voltage	3 V DC		
Limiting continuous current	3 A (see derating curve)		
Minimum load current	-		
Maximum switch-on current	15 A (10 ms)		
Leakage current in off state	-		
Phase angle (cos $\phi$ )	-		
Output circuit	2-wire, floating		
Max. load value	-		
Output protection	Reverse polarity protection, surge protection		
Voltage drop at maximum limiting continuous current	$\leq 150$ mV		

General data	①	②	③
Rated surge voltage	Basic insulation		
Test voltage input/output	2.5 kV (50 Hz, 1 min.)		
Ambient temperature (operation)	-25 °C ... 60 °C		
Nominal operating mode	100% operating factor		
Standards/regulations	IEC 60664 , EN 50178		
Degree of pollution/surge voltage category	2 / III		

Mounting position/mounting	①	②	③
Dimensions	any / In rows with zero spacing		
	5 mm / 28 mm / 15 mm		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Plug-in solid-state relays</b>				
Solid-state power relays	① 5 V DC	OPT-5DC/ 24DC/ 2	2967989	10
Solid-state power relays	② 24 V DC	OPT-24DC/ 24DC/ 2	2966595	10
Solid-state power relays	③ 60 V DC	OPT-60DC/ 24DC/ 2	2966605	10
<b>Plug-in solid-state relays</b>				
Solid-state input relays	① 5 V DC			
Solid-state input relays	② 24 V DC			
Solid-state input relays	③ 60 V DC			

#### Technical data

Input data	①	②	③
Permissible range (with reference to $U_N$ )	0.8 - 1.2	0.8 - 1.2	0.9 - 1.1
Switching level	2.5	16	52
1 signal ("H") [V DC] $\geq$	0.8	10	40
0 signal ("L") [V DC] $\leq$	4	7	3
Typical input current at $U_N$ [mA]	20	20	50
Typical switch-on time at $U_N$ [ $\mu$ s]	300	300	800
Typical switch-off time at $U_N$ [ $\mu$ s]	300	300	100
Transmission frequency $f_{limit}$ [Hz]			

Output data	①	②	③
Max. switching voltage	48 V DC		
Minimum switching voltage	3 V DC		
Limiting continuous current	100 mA		
Minimum load current	-		
Maximum switch-on current	-		
Leakage current in off state	-		
Phase angle (cos $\phi$ )	-		
Output circuit	2-wire, floating		
Max. load value	-		
Output protection	Reverse polarity protection, surge protection		
Voltage drop at maximum limiting continuous current	$\leq 1$ V		

General data	①	②	③
Rated surge voltage	Basic insulation		
Test voltage input/output	2.5 kV (50 Hz, 1 min.)		
Ambient temperature (operation)	-25 °C ... 60 °C		
Nominal operating mode	100% operating factor		
Standards/regulations	IEC 60664 , EN 50178		
Degree of pollution/surge voltage category	2 / III		

Mounting position/mounting	①	②	③
Dimensions	any / In rows with zero spacing		
	5 mm / 28 mm / 15 mm		

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Plug-in solid-state relays</b>				
Solid-state power relays	① 5 V DC	OPT-5DC/ 48DC/ 100	2967992	10
Solid-state power relays	② 24 V DC	OPT-24DC/ 48DC/ 100	2966618	10
Solid-state power relays	③ 60 V DC	OPT-60DC/ 48DC/ 100	2966621	10



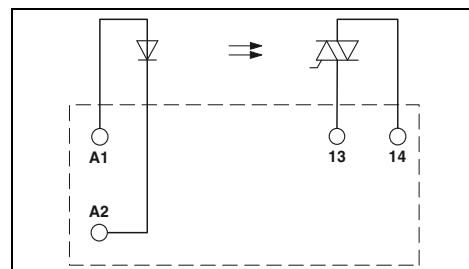
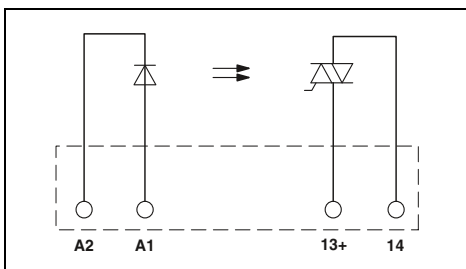
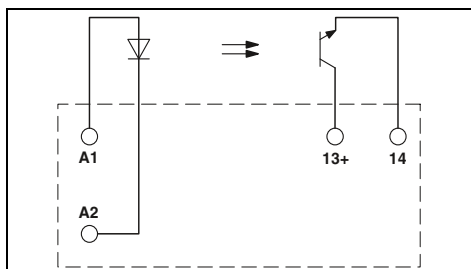
Solid-state relay,  
DC output max. 5 A



Solid-state relay,  
AC output max. 750 mA



Solid-state relay,  
AC output max. 2 A



Technical data

Technical data

Technical data

①	②	③
0.8 -	0.8 -	0.9 -
1.2	1.2	1.1
2.5	16	35
0.8	10	20
9	7	3
10	20	25
400	400	400
300	300	300

②	③
0.8 -	0.9 -
1.2	1.1
10	50
5	15
3	3
6000	9000
500	700
10	10

①	②	③
0.8 -	0.8 -	0.9 -
1.2	1.2	1.1
3	18	40
1	8.4	20
15	7	2.6
10000	10000	10000
10000	10000	10000
10	10	10

33 V DC  
3 V DC  
5 A (see derating curve)  
-  
15 A (10 ms)  
-  
-  
2-wire, floating  
-  
Reverse polarity protection, surge protection  
≤ 200 mV

253 V AC  
24 V AC  
0.75 A (see derating curve)  
10 mA  
30 A (10 ms)  
< 1 mA  
0.5  
2-conductor floating, zero voltage switch  
4.5 A<sup>2</sup>s  
RCV circuit  
< 1 V

253 V AC  
24 V AC  
2 A (see derating curve)  
25 mA  
30 A (10 ms)  
< 1 mA  
-  
2-conductor floating, zero voltage switch  
4 A<sup>2</sup>s (tp = 10 ms, at 25 °C)  
Surge protection  
≤ 1 V

Basic insulation  
2.5 kV (50 Hz, 1 min.)  
-25 °C ... 60 °C  
100% operating factor  
IEC 60664 , EN 50178  
2 / III

Basic insulation  
2.5 kV (50 Hz, 1 min.)  
-25 °C ... 60 °C  
100% operating factor  
IEC 60664 , EN 50178  
2 / III

Basic insulation  
2.5 kV (50 Hz, 1 min.)  
-25 °C ... 60 °C  
100% operating factor  
IEC 60664  
2 / III

any / In rows with zero spacing  
12.7 mm / 29 mm / 15.7 mm

any / In rows with zero spacing  
5 mm / 28 mm / 15 mm

any / See derating curve  
12.7 mm / 29 mm / 15.7 mm

Ordering data

Ordering data

Ordering data

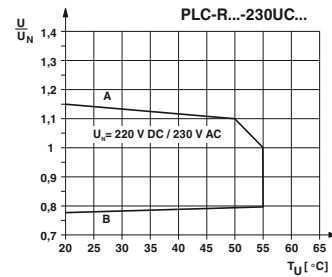
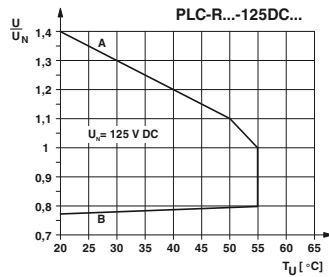
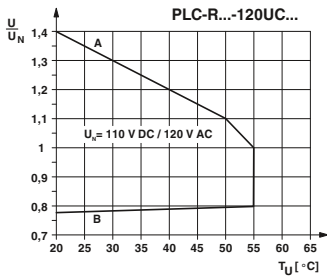
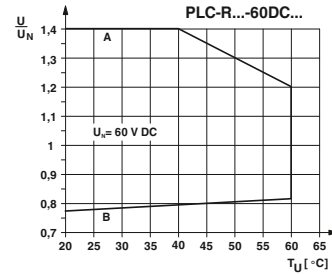
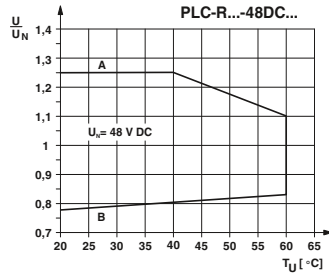
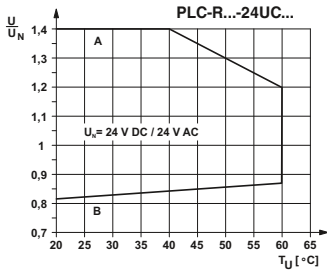
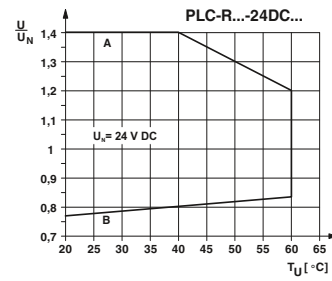
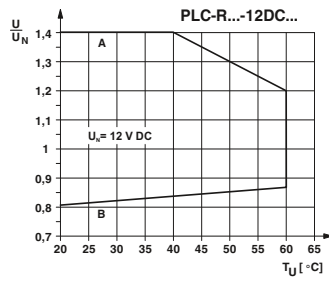
Type	Order No.	Pcs./ Pkt.
OPT-5DC/ 24DC/ 5	2982113	10
OPT-24DC/ 24DC/ 5	2982100	10
OPT-60DC/ 24DC/ 5	2982126	10

Type	Order No.	Pcs./ Pkt.
OPT-24DC/230AC/ 1	2967950	10
OPT-60DC/230AC/ 1	2967963	10

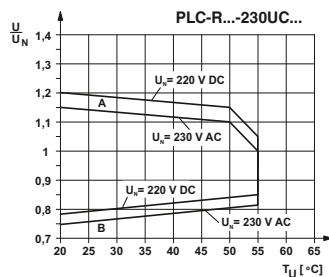
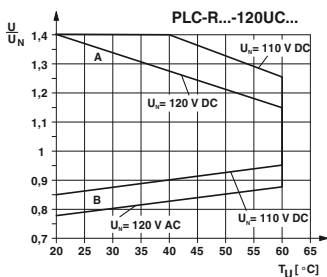
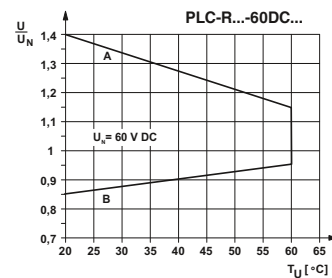
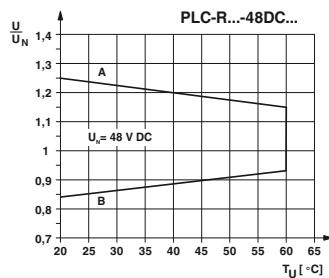
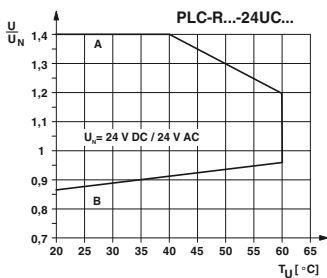
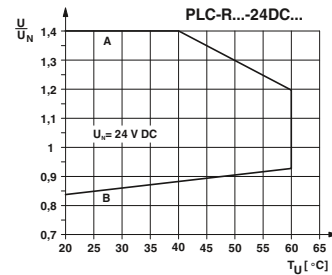
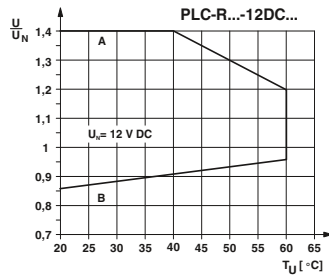
Type	Order No.	Pcs./ Pkt.
OPT-5DC/230AC/ 2	2982168	10
OPT-24DC/230AC/ 2	2982171	10
OPT-60DC/230AC/ 2	2982184	10



**Operating voltage ranges for PLC-INTERFACE, 6.2 mm versions, equipped with relay**



**Operating voltage ranges for PLC-INTERFACE, 14 mm versions, equipped with relay**



**General conditions:**  
Direct alignment in the block, all devices 100% operating time, horizontal or vertical mounting.

**Curve A**  
Maximum permissible continuous voltage  $U_{max}$  with limiting continuous current on the contact side (see relevant technical data).

**Curve B**  
Minimum permitted pick-up voltage  $U_{op}$  after pre-excitation<sup>1)</sup> (see relevant technical data).

<sup>1) Pre-excitation:</sup> relay has been operated in a thermally steady state at the ambient temperature  $T_A$  with nominal voltage  $U_N$  and limiting continuous current on the contact side (see relevant technical data) (warm coil). After being switched off for a short time, the relay must reliably pick up again at  $U_{op}$ . The  $U_{op}$  values for cold coils ( $T_{coil} = T_A = 20^\circ\text{C}$ ) indicated by other manufacturers yield better values, but are not practical.

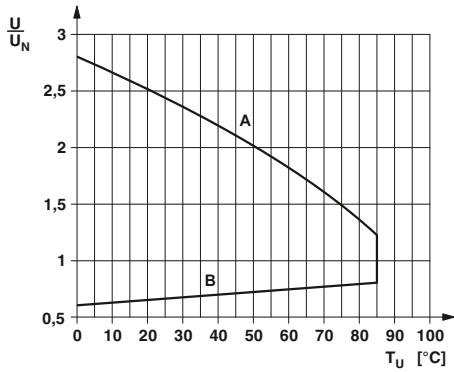
# Relay modules

## Tables, diagrams, dimensional drawings

### Plug-in 1 and 2-PDT relays

#### REL-MR...21

Permissible input voltage range for REL-MR...21



**General conditions:**

Direct alignment in the block, all devices 100% operating time, horizontal or vertical mounting.

**Curve A**

Maximum permissible continuous voltage  $U_{max}$  with limiting continuous current on the contact side (see relevant technical data).

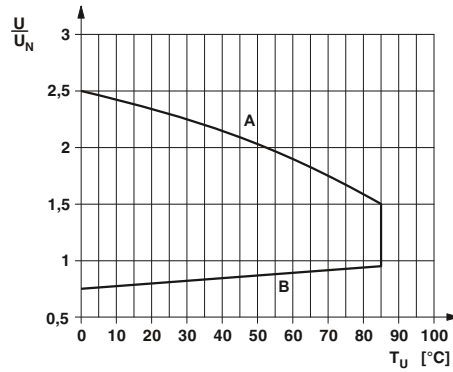
**Curve B**

Minimum permitted pick-up voltage  $U_{op}$  after pre-excitation<sup>1)</sup> (see relevant technical data).

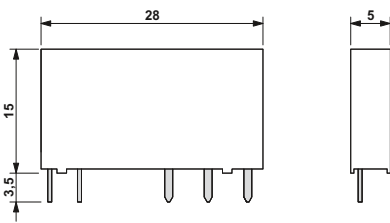
<sup>1) Pre-excitation:</sup> relay has been operated in a thermally steady state at the ambient temperature  $T_A$  with nominal voltage  $U_N$  and limiting continuous current on the contact side (see relevant technical data) (warm coil). After being switched off for a short time, the relay must reliably pick up again at  $U_{op}$ . The  $U_{op}$  values for cold coils ( $T_{coil} = T_A = 20^\circ\text{C}$ ) indicated by other manufacturers yield better values, but are not practical.

#### REL-MR...21-21

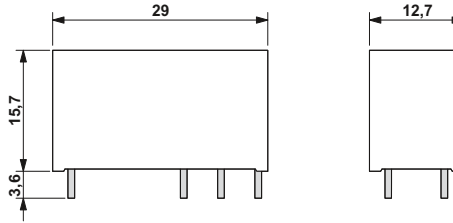
Permissible input voltage range for REL-MR...21-21, REL-MR-24DC/11C, REL-MR...21HC



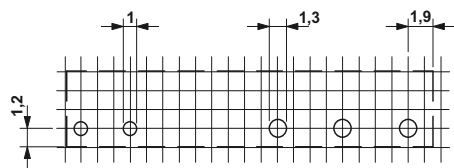
**5 mm overall width**



**12.7 mm overall width**

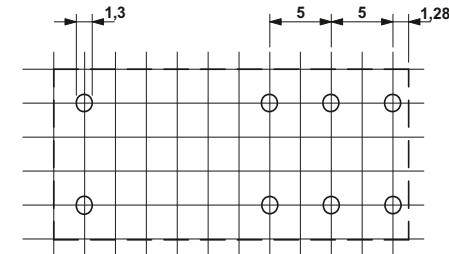


Perforations for assembly: view of the connections



Pitch division: 1.25 mm and 1.27 mm

Perforations for assembly: view of the connections

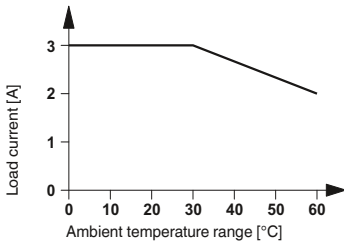


Pitch division: 2.5 mm

Plug-in solid-state relays

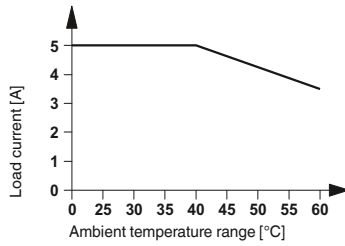
OPT...DC/24DC/2  
OPT...DC/230AC/1

Derating curve for OPT...DC/24DC/2 and PLC-OS.../24DC/2 solid-state relays

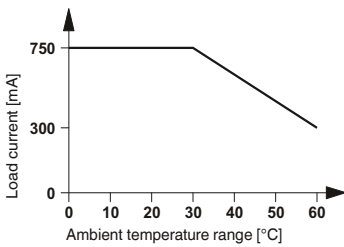


OPT...DC/24DC/5  
OPT...DC/230AC/2

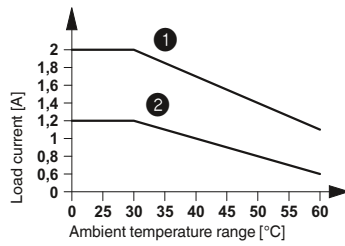
Derating curve for OPT...DC/24DC/5 and PLC-OS.../24DC/5/ACT solid-state relays



Derating curve for OPT...DC/230AC/1 and PLC-OS.../230AC/1 solid-state relays

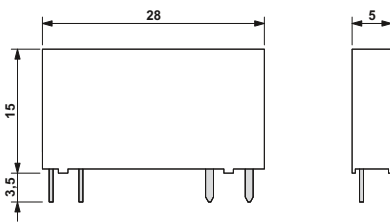


Derating curve for OPT...DC/230AC/2 and PLC-OS.../230AC/2/ACT solid-state relays

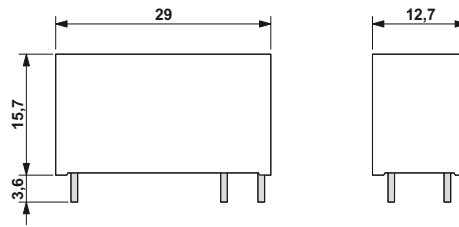


- ① Aligned with > 10 mm spacing
- ② Aligned without spacing

5 mm overall width



12.7 mm overall width

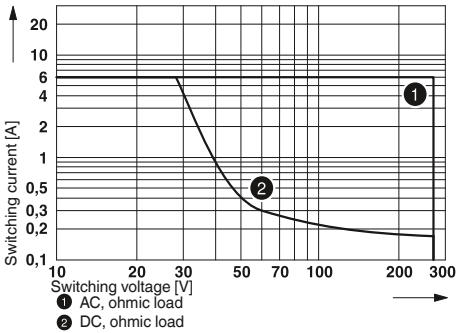


# Relay modules

## Tables, diagrams, dimensional drawings

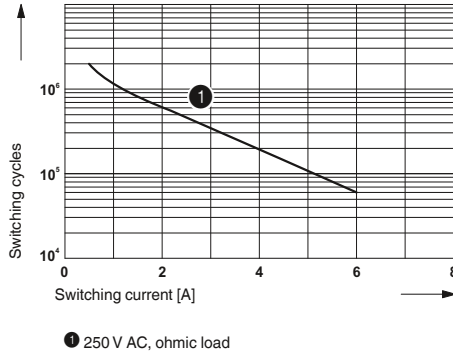
### Electrical interrupting rating for PLC-INTERFACE

Electrical interrupting rating for PLC...21 with 1-PDT relay

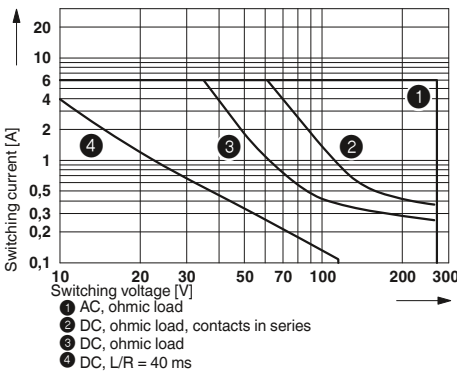


### PLC-INTERFACE for railway applications

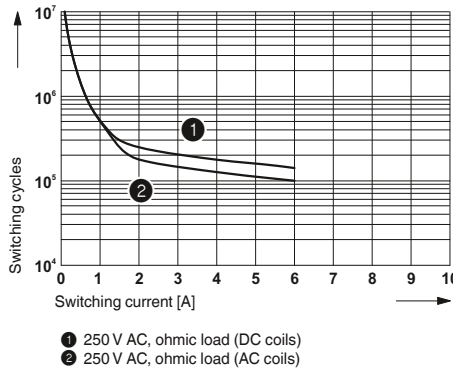
Electrical service life for PLC-RSP...UC/21RW



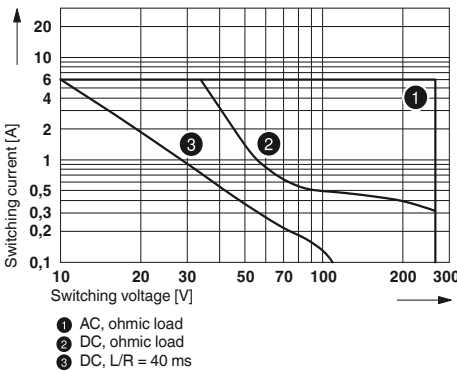
Electrical interrupting rating for PLC...21-21 with 2-PDT relay



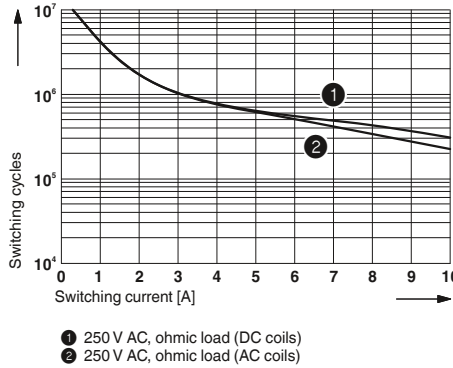
Electrical service life for PLC-RSP...UC/21-21/RW



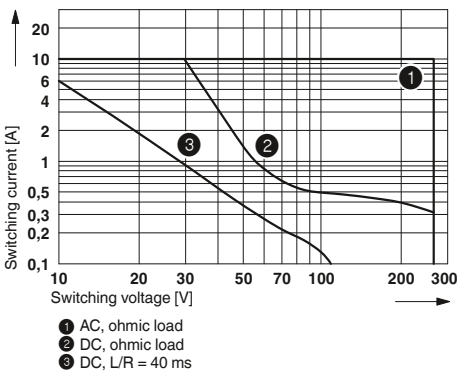
Electrical interrupting rating for PLC...1IC/ACT for high inrush currents



Electrical service life for PLC-RSP...UC/21HC/RW



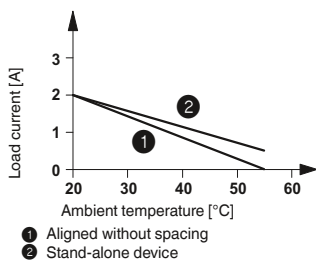
Electrical interrupting rating for PLC...21HC for high continuous currents





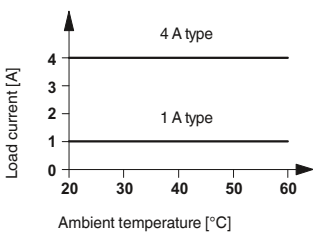
EMG-OV solid-state power relays

Derating curve for EMG 17-OV...48DC/2

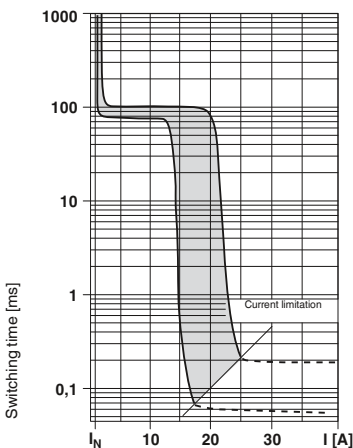


ST-OV 4-24DC/24DC...PRO power circuit breaker solid-state relays with signal logic

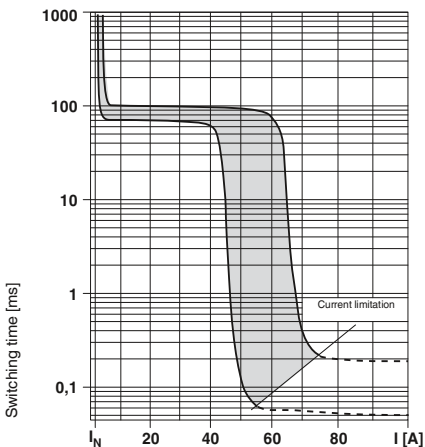
Derating curve for ST-OV 4-24DC/24DC...PRO



Time/current characteristic curve, 1 A version



Time/current characteristic curve, 4 A version



State diagram

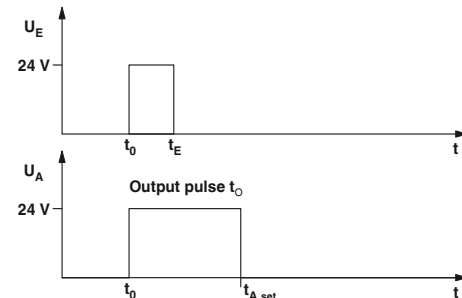
Operating state	Switching level Input	LED display yellow LED	LED display red LED	Signal contact/CONTROL
Not activated	L	L	L	
Normal operation	H	H	L	
Overload/short circuit	H	H	H	
Open circuit	L	L	H	

UEGM-OE/AV logic pulse expansion block

Time diagrams for UEGM-OE/AV-24DC/24DC/100

Scenario 1: Input pulse  $t_i < t_{O\ set}$

Operating voltage present



Scenario 2: input pulse  $t_i \geq t_{O\ set}$ ;  $t_i = t_o$

Operating voltage present

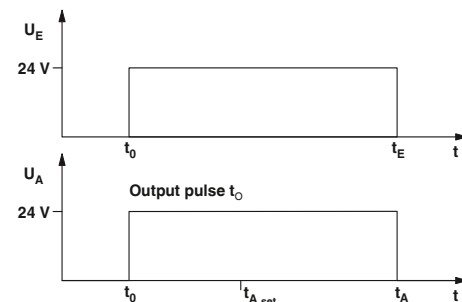


Table of adjustable output pulse lengths

	DIP switches <sup>1)</sup>							
	S1	S2	S3	S4	S5	S6	S7	S8
Length of output pulses [ms] (when switch is set to "ON")	10	-	-	-	-	-	-	-
	-	20	-	-	-	-	-	-
	-	-	50	-	-	-	-	-
	-	-	-	100	-	-	-	-
	-	-	-	-	200	-	-	-
	-	-	-	-	-	500	-	-
	-	-	-	-	-	-	1000	-
	-	-	-	-	-	-	-	1500

<sup>1)</sup> If no switch is actuated, the output voltage is not defined.

If the input pulse is longer than the set time, the output is switched off almost simultaneously with the input.

Intermediate values can be obtained by combining several DIP switches according to the following formula:

$$T_{tot} = \frac{1}{\frac{1}{t_1} + \frac{1}{t_2} + \dots + \frac{1}{t_n}}$$

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC-INTERFACE with two integrated relays

Relay module with two permanently soldered-in power relays

The advantages:

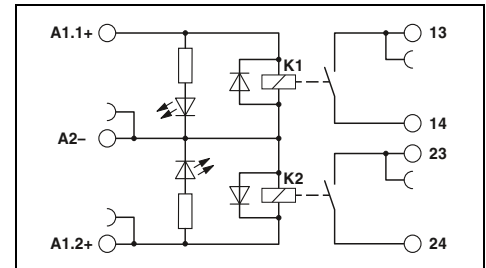
- 100% more channel density than the conventional 6.2 mm relay
- Two switching channels in a 6.2 mm housing
- Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3



Relay module with two integrated, independent relays up to 3.5 A for high channel density

ERC



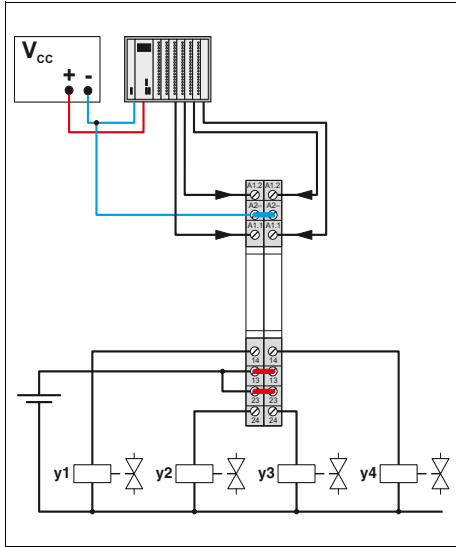
#### Technical data

Input data	①
Typical input current at $U_N$	7 [mA]
Response/release time at $U_N$	4 / 6 [ms]
Input circuit DC	Yellow LED, reverse polarity protection, freewheeling diode
Output data	
Contact material	AgNi
Max. switching voltage	250 V AC / 30 V DC
Minimum switching voltage	24 V AC/DC
Limiting continuous current	3.5 A
Minimum switching current	5 mA
General data	
Test voltage input/output	3 kV AC (50 Hz, 1 min.)
Test voltage output/output	3 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20 °C ... 60 °C
Mechanical service life	2 x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664 , EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 86 mm W / H / D
EMC note	Class A product, see page 605

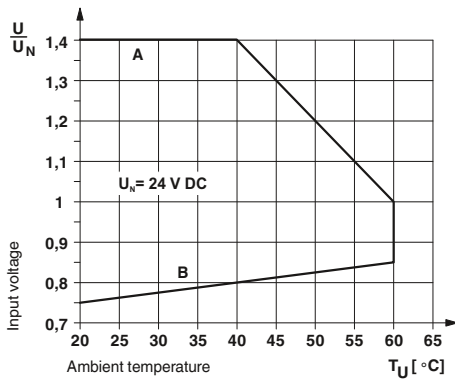
#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
PLC-INTERFACE, with screw connection				
①	24 V DC	PLC-2RSC-24DC/ 1	2987309	10
PLC-INTERFACE, with Push-in connection				
①	24 V DC	PLC-2RPT-24DC/1	2901639	10

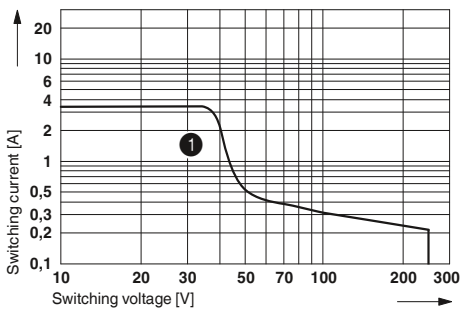
Application example for PLC-2RS...24DC/1



Operating voltage range



Interrupting rating



① DC, ohmic load

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC-INTERFACE with manual switch and relay

Relay module with manual switch and integrated power relay for manual, zero, and automatic functions

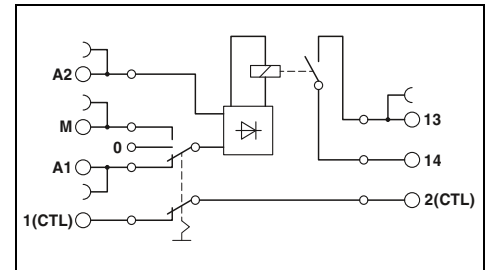
#### The advantages are:

- Maximum switching current 6 A
- Only 6.2 mm wide
- Floating confirmation contact
- Safe isolation according to DIN EN 50178 between coil and contact
- Screw and Push-in connection technology

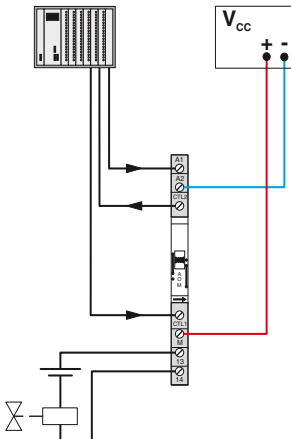
Notes:
Type of housing: Polyester PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
The PLC-ATP partition plate is to be used in the following cases: always at the start and end of a PLC terminal strip, for voltages greater than 250 V (L1, L2, L3) between the same terminal points of neighboring modules (potential bridging then takes place with FBST 8-PLC... or FBST 500...) and with safe isolation between neighboring modules.
<b>Module height:</b> PLC-...-S/H = 90 mm; PLC-...-S/L: = 86 mm
PLC...H - manual operation PLC...L - operation using screwdriver



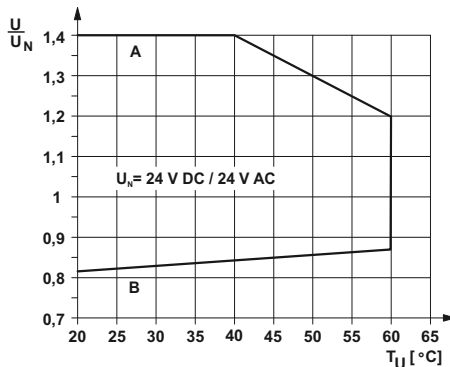
Relay module with manual switch and integrated relay



Application example for PLC-RS...24UC/1/S...



Permissible input voltage range for PLC-RS...24UC/1/S...



Curve A  
Maximum continuous voltage when limiting continuous current = 6 A

Curve B  
Minimum pick-up voltage for pre-excitation with U<sub>N</sub> and limiting continuous current = 6 A

Input data	
Typical input current at U <sub>N</sub>	[mA]
Response/release time at U <sub>N</sub>	[ms]
Input circuit AC/DC	
Output data	
Contact material	AgSnO
Max. switching voltage	250 V AC/DC
Minimum switching voltage	5 V (at 100 mA)
Limiting continuous current	6 A
Maximum switch-on current	on request
Minimum switching current	10 mA (at 12 V)
Feedback	
Operating mode "Automatic" floating	max. 30 V AC/DC / 50 mA min. 2 V AC/DC / 1 mA
General data	
Rated insulation voltage	250 V AC
Rated surge voltage	6 kV
Ambient temperature (operation)	-20 °C ... 60 °C
Standards/regulations	IEC 60664 , EN 50178
Degree of pollution/surge voltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D
EMC note	Class A product, see page 605

### Technical data

	①	②
Typical input current at U <sub>N</sub>	11	11
Response/release time at U <sub>N</sub>	6 / 15	6 / 15
Input circuit AC/DC	Yellow LED , Bridge rectifier	
Contact material	AgSnO	
Max. switching voltage	250 V AC/DC	
Minimum switching voltage	5 V (at 100 mA)	
Limiting continuous current	6 A	
Maximum switch-on current	on request	
Minimum switching current	10 mA (at 12 V)	
Operating mode "Automatic" floating	max. 30 V AC/DC / 50 mA min. 2 V AC/DC / 1 mA	
Rated insulation voltage	250 V AC	
Rated surge voltage	6 kV	
Ambient temperature (operation)	-20 °C ... 60 °C	
Standards/regulations	IEC 60664 , EN 50178	
Degree of pollution/surge voltage category	2 / III	
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	W / H / D	
EMC note	Class A product, see page 605	

Description	Input voltage U <sub>N</sub>
PLC-INTERFACE, with screw connection	① 24 V AC/DC
	② 24 V AC/DC
PLC-INTERFACE, with Push-in connection	① 24 V AC/DC
	② 24 V AC/DC

### Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-RSC- 24UC/ 1/S/H	2982236	10
PLC-RSC- 24UC/ 1/S/L	2834876	10
PLC-RPT- 24UC/ 1/S/H	2900328	10
PLC-RPT- 24UC/ 1/S/L	2900327	10

**PLC-INTERFACE with manual switch without relay**

Switching module without relay for manual, zero, and automatic functions

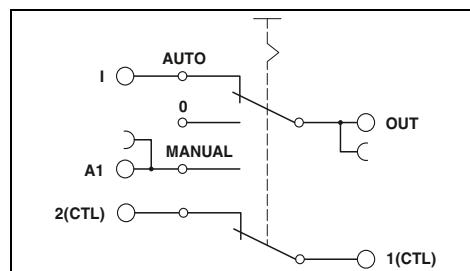
The advantages:

- Only 6.2 mm wide
- Floating confirmation contact
- Screw connection technology

<b>Notes:</b>
Type of housing: Polyester PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
The PLC-ATP partition plate is to be used in the following cases: always at the start and end of a PLC terminal strip, for voltages greater than 250 V (L1, L2, L3) between the same terminal points of neighboring modules (potential bridging then takes place with FBST 8-PLC... or FBST 500...) and with safe isolation between neighboring modules.
<b>Module height:</b> PLC-...-S/H = 90 mm; PLC-...-S/L = 86 mm
PLC...H - manual operation PLC...L - operation using screwdriver



Module with manual switch without relay



**Technical data**

Max. switching voltage  
Minimum switching voltage  
Maximum switch-on current  
Minimum switching current  
Switching cycles, max.

72 V DC  
2 V DC  
50 mA  
1 mA  
100 (At 72 V DC / 50 mA) /  
10000 (at 12 V DC / 100 mA)

**Feedback**  
Operating mode "Automatic" floating

≤ 72 V DC / 50 mA

**General data**

Rated insulation voltage  
Rated surge voltage  
Ambient temperature (operation)  
Standards/regulations  
Degree of pollution/surge voltage category  
Connection data solid/stranded/AWG  
Dimensions

85 V AC  
0.5 kV / basic insulation  
-20 °C ... 60 °C  
IEC 60664 , EN 50178  
2 / III  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 90 mm

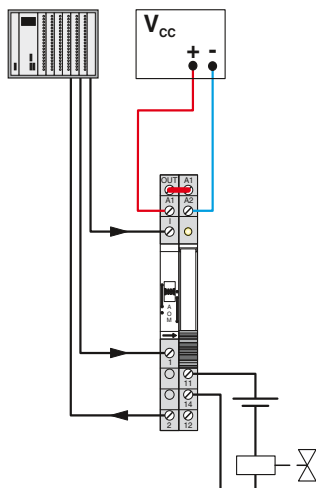
W / H / D

**Ordering data**

Description  
**PLC-INTERFACE, with screw connection**

Type	Order No.	Pcs./ Pkt.
PLC-SC-S/H	2980733	10
PLC-SC-S/L	2980775	10

Application example for PLC-S...S...



# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC-INTERFACE with an integrated solid-state relay

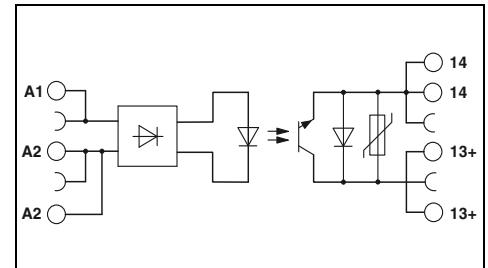
The slim 6.2 mm PLC housing with integrated electronics in various versions offers the following advantages:

- Option of bridging adjacent modules
- Status display
- Protection circuits in input and output
- Wear-resistant and bounce-free switching
- Integrated protection circuit
- DC outputs of up to 300 V DC/1 A or up to 24 V DC/10 A
- Electronic PDT output of up to 48 V DC/500 mA
- Screw and Push-in connection technology

Notes:
Type of housing: Polyester PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
The PLC-ATP partition plate is to be used in the following cases: always at the start and end of a PLC terminal strip, for voltages greater than 250 V (L1, L2, L3) between the same terminal points of neighboring modules (potential bridging then takes place with FBST 8-PLC... or FBST 500...) and with safe isolation between neighboring modules.
The housings of the following modules are open on one side: - PLC-O...-300DC/1 - PLC-O...-24DC/24DC/10/R



Solid-state relay module, DC output max. 300 V DC/1 A



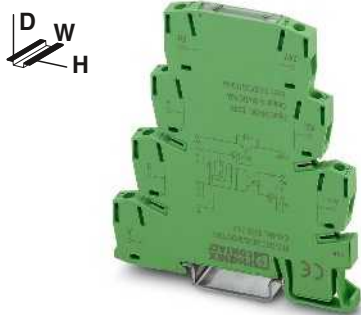
Input data	
Permissible range (with reference to $U_N$ )	
Switching level (with reference to $U_N$ )	1 signal ("H") 0 signal ("L")
Typical input current at $U_N$	[mA]
Transmission frequency $f_{limit}$	[Hz]
Alarm output	
Operating range	- / -
Output data	
Maximum/minimum switching voltage	300 V DC / 12 V DC
Limiting continuous current	1 A (see derating curve)
Voltage drop at maximum limiting continuous current	< 500 mV
General data	
Rated insulation voltage	300 V
Rated surge voltage	4 kV / basic insulation
Ambient temperature (operation)	-25 °C ... 60 °C
Standards/regulations	IEC 60664, EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D 6.2 mm / 80 mm / 86 mm
EMC note	Class A product, see page 605

Technical data							
①	②	③	④	⑤	⑥	⑦	⑧
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.8 - 1.1
≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8
≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4
15	6	8	5	5	3	5.6	8.4
50	50	50	50	50	50	10	10

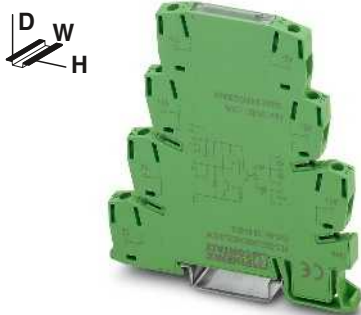
Description	Input voltage $U_N$
<b>PLC-INTERFACE, with screw connection</b>	
①	5 V DC
②	12 V DC
③	24 V DC
④	60 V DC
⑤	110 V DC
⑥	220 V DC
⑦	120 V AC
⑧	230 V AC
<b>PLC-INTERFACE, with Push-in connection</b>	
①	5 V DC
②	12 V DC
③	24 V DC
④	60 V DC
⑤	110 V DC
⑥	220 V DC
⑦	120 V AC
⑧	230 V AC

Ordering data			
Type	Order No.	Pcs./Pkt.	
PLC-OSC- 5DC/300DC/ 1	2980652	10	
PLC-OSC- 12DC/300DC/ 1	2980665	10	
PLC-OSC- 24DC/300DC/ 1	2980678	10	
PLC-OSC- 60DC/300DC/ 1	2980681	10	
PLC-OSC-110DC/300DC/ 1	2980694	10	
PLC-OSC-220DC/300DC/ 1	2980704	10	
PLC-OSC-120AC/300DC/ 1	2980717	10	
PLC-OSC-230AC/300DC/ 1	2980720	10	
PLC-OPT- 5DC/300DC/1	2900381	10	
PLC-OPT- 12DC/300DC/1	2900382	10	
PLC-OPT- 24DC/300DC/1	2900383	10	
PLC-OPT- 60DC/300DC/1	2900384	10	
PLC-OPT-110DC/300DC/1	2900385	10	
PLC-OPT-220DC/300DC/1	2900387	10	
PLC-OPT-120AC/300DC/1	2900388	10	
PLC-OPT-230AC/300DC/1	2900389	10	

Highly compact relay modules - PLC-INTERFACE

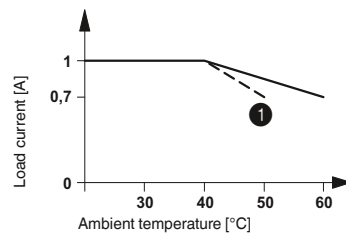


Solid-state relay module, short-circuit-proof DC output max. 10 A, with feedback



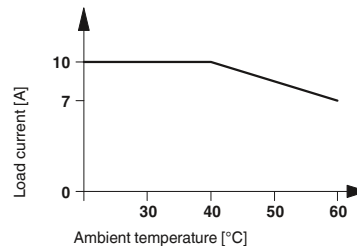
Solid-state relay module, DC output max. 500 mA, with electronic changeover contact

Derating curve for PLC...300DC/1

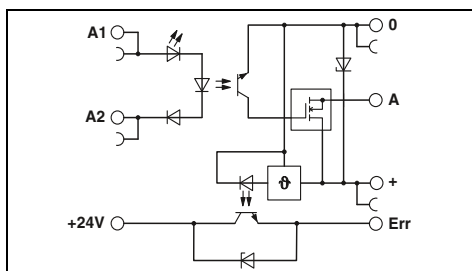
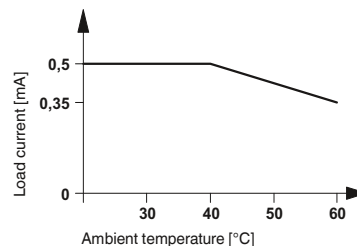


① For input voltages of 220 V DC and 230 V AC

Derating curve for PLC-...24DC/24DC/10/R



Derating curve for PLC-...24DC/48DC/500/W



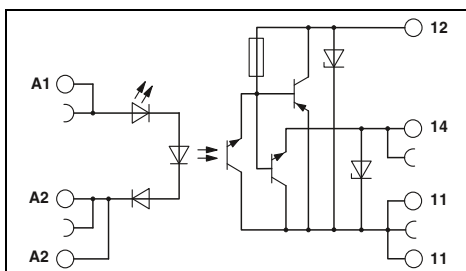
Technical data

- ③
- 0.8 -
- 1.2
- ≥ 0.8
- ≤ 0.4
- 3
- 100

3 V DC ... 33 V DC (High active) / 100 mA

33 V DC / 5 V DC  
10 A (see derating curve)  
≤ 50 mV

300 V  
4 kV / basic insulation  
-25 °C ... 60 °C  
IEC 60664 , EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 86 mm  
Class A product, see page 605



Technical data

- ③
- 0.8 -
- 1.2
- ≥ 0.8
- ≤ 0.4
- 3
- 1000

- / -

48 V DC / 3 V DC  
500 mA (see derating curve)  
< 1.2 V

300 V  
4 kV / basic insulation  
-25 °C ... 60 °C  
IEC 60664 , EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 86 mm  
Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-OSC- 24DC/ 24DC/ 10/R	2982702	10
PLC-OPT- 24DC/ 24DC/10/R	2900398	10

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-OSC- 24DC/ 48DC/500/W	2980636	10
PLC-OPT- 24DC/ 48DC/500/W	2900378	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

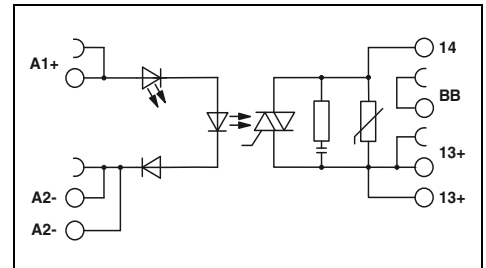
### PLC-INTERFACE with an integrated solid-state relay

- 6.2 mm narrow solid-state relay for switching AC loads
- Status display
- Protection circuits in input and output
- Wear-free
- Switching capacity up to 230 V AC/2.4 A
- Screw and Push-in connection technology



Solid-state relay module with additional floating terminal point, AC output max. 2.4 A

ERC

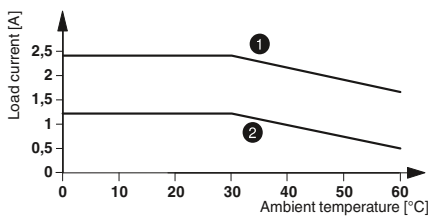


#### Technical data

Input data	①
Rated actuating voltage range with reference to $U_c$	0.8 - 1.2
Rated actuating current $I_c$	8 [mA]
Switching level (with reference to $U_c$ )	1 signal ("H") > 0.8 0 signal ("L") < 0.4
Typical switch-on time at $U_N$	10 [ms]
Typical switch-off time at $U_N$	10 [ms]
Transmission frequency $f_{limit}$	10 [Hz]
Input circuit DC	Yellow LED, reverse polarity protection, surge protection
Output data	
Max. switching voltage	253 V AC
Minimum switching voltage	24 V AC
Maximum switch-on current	250 A (20 ms)
Minimum/maximum switching current	10 mA / 2.4 A (see derating)
Output protection	RCV circuit
Voltage drop at maximum limiting continuous current	< 1 V
Leakage current in off state	< 1 mA
Max. load value	340 A <sup>2</sup> s (tp = 10 ms, at 25 °C)
General data	
Rated insulation voltage	260 V AC
Rated surge voltage	4 kV
Insulation	Basic insulation
Ambient temperature (operation)	-25 °C ... 60 °C
Standards/regulations	DIN EN 50178
Degree of pollution/surge voltage category	2 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 86 mm
EMC note	Class A product, see page 605

#### Ordering data

Description	Rated actuating voltage $U_c$	Type	Order No.	Pcs./ Pkt.
PLC-INTERFACE, with screw connection	① 24 V DC	PLC-OSC- 24DC/230AC/2.4/ACT	2904631	10
PLC-INTERFACE, with Push-in connection	① 24 V DC	PLC-OPT- 24DC/230AC/2.4/ACT	2904632	10



① = aligned with > 20 mm spacing  
② = aligned without spacing

Load current as a function of the ambient temperature  
Operating time: 100% operating factor



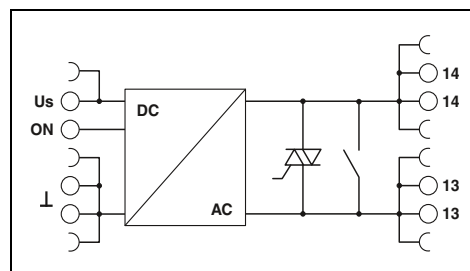
**PLC-INTERFACE with hybrid solid-state relay**

The solid-state relay, combined with a mechanical relay, offers the following advantages:

- Higher electrical service life
- Lower power dissipation
- Option of bridging adjacent modules
- Status display
- Protection circuits in input and output
- Switching capacity up to 230 V AC/10 A
- Screw and Push-in connection technology



**Hybrid solid-state relay, AC output max. 10 A and bypass relay**



**Technical data**

<b>Input data</b>		①
Rated control supply voltage $U_s$	[V DC]	24
Rated control supply voltage range with reference to $U_s$		0.8 - 1.2
Rated control supply current $I_s$		14 mA (Input low, output low) 19 mA (Input high, output high)
Rated actuation voltage $U_c$ ON	[V DC]	24
Rated actuating voltage range with reference to $U_c$		0.8 - 1.2
Rated actuating current $I_c$	[mA]	6.8
Input circuit DC		Yellow LED, reverse polarity protection, surge protection
<b>Output data</b>		
Max. switching voltage		253 V AC
Minimum switching voltage		24 V AC
Minimum/maximum switching current		100 mA / 10 A (see derating curve)
Output protection		RCV circuit
Leakage current in off state		< 1 mA
Max. load value		350 A <sup>2</sup> s (tp = 10 ms, at 25 °C)
<b>General data</b>		
Rated insulation voltage		260 V AC
Rated surge voltage		6 kV
Insulation		safe isolation
Ambient temperature (operation)		-25 °C ... 60 °C
Standards/regulations		DIN EN 50178
Degree of pollution/surge voltage category		2 / III
Connection data solid/stranded/AWG		0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D	14 mm / 80 mm / 94 mm
EMC note		Class A product, see page 605

**Ordering data**

Description	Rated actuating voltage $U_c$	Type	Order No.	Pcs./Pkt.
<b>PLC-INTERFACE, with screw connection</b>				
①	24 V DC	PLC-HSC-24DC/230AC/10	2905214	1
<b>PLC-INTERFACE, with Push-in connection</b>				
①	24 V DC	PLC-HPT-24DC/230AC/10	2905215	1

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC-INTERFACE

#### Solid-state relays up to 100 kHz

A solid-state relay for the safe acquisition of short pulses.

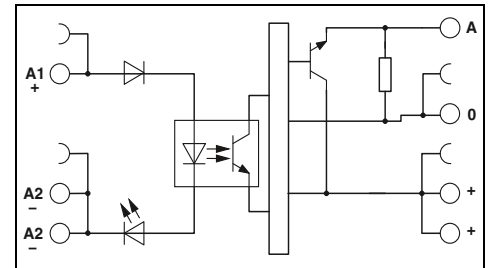
- Status display
- Bridging options
- Limit frequency of up to 100 kHz
- Push-pull stage on output side
- Features a capacitor on the input side for interference suppression

Notes:
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3



**Solid-state relay module,  
DC output,  
transmission frequency of 100 kHz**

ERC

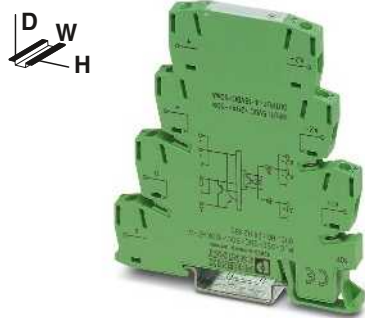


#### Technical data

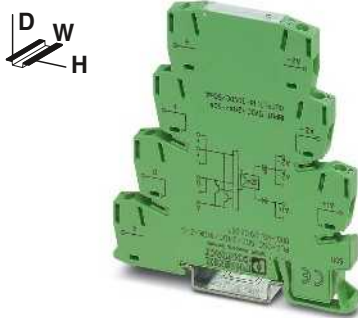
Input data		①	②
Permissible range (with reference to $U_N$ )		0.8 - 1.2	0.8 - 1.2
Switching level with reference to $U_N$	1 signal ("H")	> 0.8	> 0.8
	0 signal ("L")	< 0.4	< 0.4
Typical input current at $U_N$	[mA]	7	6
Typical switch-on time at $U_N$	[μs]	1.5	1.5
Typical switch-off time at $U_N$	[μs]	2	2
Transmission frequency $f_{limit}$	[kHz]	100	100
Input protection:		Yellow LED, reverse polarity protection, surge protection	
Output data			
Operating voltage range		4 V DC ... 30 V DC	
Limiting continuous current		50 mA	
Quiescent current		4.3 mA	
Residual voltage drop at "H"		< 0.5 V	
Output circuit		3-conductor, ground-referenced	
Output protection		Reverse polarity protection, surge protection	
General data			
Test voltage input/output		2.5 kV <sub>rms</sub> (50 Hz, 1 min.)	
Ambient temperature (operation)		-20 °C ... 60 °C	
Standards/regulations		DIN EN 50178	
Degree of pollution/surge voltage category		2 / II	
Connection data solid/stranded/AWG		0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm	
EMC note		Class A product, see page 605	

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
<b>Input solid-state relay</b> with screw connection	① 5 V DC	PLC-OSC- 5DC/ 24DC/100KHZ	2902963	1
	② 24 V DC	PLC-OSC- 24DC/ 24DC/100KHZ	2902964	1
<b>Input solid-state relay</b> with Push-in connection	① 5 V DC	PLC-OPT- 5DC/ 24DC/100KHZ	2902969	1
	② 24 V DC	PLC-OPT- 24DC/24DC/100KHZ	2902970	1



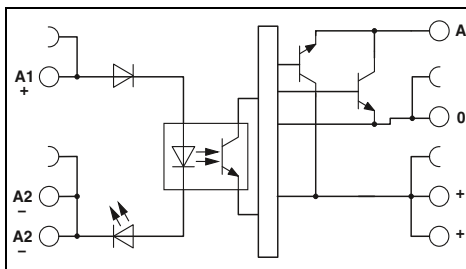
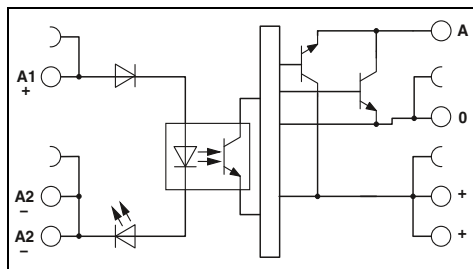
Solid-state relay module,  
DC push-pull output,  
transmission frequency of 100 kHz



Solid-state relay module,  
DC push-pull output,  
transmission frequency of 100 kHz

ERC

ERC



Technical data

Technical data

①	②
0.5 - 1.2	0.8 - 1.2
> 0.5	> 0.8
< 0.3	< 0.4
8	8
1	1
2	2
100	100

Yellow LED, reverse polarity protection, surge protection

①	②
0.5 - 1.2	0.8 - 1.2
> 0.5	> 0.8
< 0.3	< 0.4
8	8
1	1
2	2
100	100

Yellow LED, reverse polarity protection, surge protection

4 V DC ... 18 V DC  
50 mA  
8.5 mA  
< 1.2 V

3-conductor push-pull, ground referenced  
Reverse polarity protection, surge protection

14 V DC ... 30 V DC  
50 mA  
15 mA  
< 2.2 V

3-conductor push-pull, ground referenced  
Reverse polarity protection, surge protection

2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-20 °C ... 60 °C  
DIN EN 50178  
2 / II  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 86 mm  
Class A product, see page 605

2.5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-20 °C ... 60 °C  
DIN EN 50178  
2 / II  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 86 mm  
Class A product, see page 605

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-OSC- 5DC/ 5DC/100KHZ-G	2902965	1
PLC-OSC- 24DC/ 5DC/100KHZ-G	2902966	1
PLC-OPT- 5DC/ 5DC/100KHZ-G	2902971	1
PLC-OPT- 24DC/ 5DC/100KHZ-G	2902972	1

Type	Order No.	Pcs./ Pkt.
PLC-OSC- 5DC/ 24DC/100KHZ-G	2902967	1
PLC-OSC- 24DC/ 24DC/100KHZ-G	2902968	1
PLC-OPT- 5DC/24DC/100KHZ-G	2902973	1
PLC-OPT- 24DC/24DC/100KHZ-G	2902974	1

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC-INTERFACE for the TTL signal at input

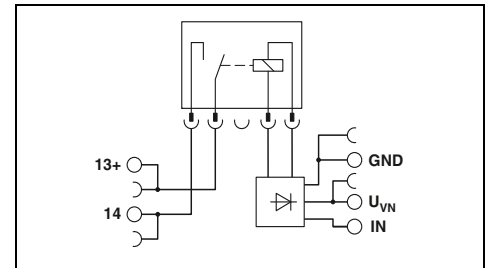
The PLC-BS...TTL/1 basic terminal block is controlled with a TTL (5 V) input signal. It is equipped with either a mechanical relay or a solid-state relay. The basic terminal block equipped with a robust miniature relay offers the following advantages:

- Overall width of just 6.2 mm
- Bridging options
- Status display
- RTIII degree of protection
- Safe isolation in accordance with EN 50178 (VDE 0160)
- 4 kV<sub>rms</sub> electrical isolation between coil and contact
- Screw and Push-in connection technology

Notes:
Type of housing: Polyester PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3



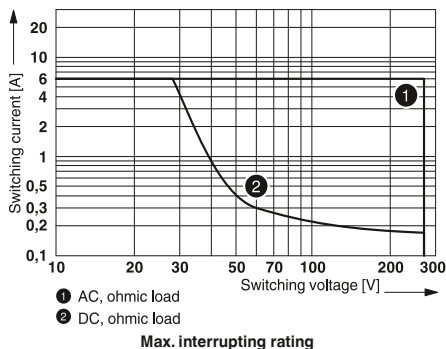
1-N/O basic terminal block for assembly with relay for TTL (5 V)



### Technical data

Input data	
Rated control supply voltage $U_{VN}$	5 V DC
Rated control supply voltage range with reference to $U_{VN}$	0.9 ... 1.2
Rated control supply current $I_{VN}$	41 mA
Rated actuating voltage $U_c$ (IN)	5 V DC (TTL)
Rated actuating voltage range with reference to $U_c$	0.9 ... 1.2
Rated actuating current $I_c$	2.5 mA
Typical response time at $U_c$	4.5 ms
Typical release time at $U_c$	3.5 ms
Input circuit	Yellow LED, reverse polarity protection, surge protection
Output data with:	
Contact type	REL-MR-4,5DC/21 AU      REL-MR-4,5DC/21 Single contact, 1 N/O contact      Single contact, 1 N/O contact
Contact material	AgSnO, hard gold-plated      AgSnO
Max. switching voltage	30 V AC / 36 V DC      250 V AC/DC
Minimum switching voltage	100 mV (at 10 mA)      5 V (at 100 mA)
Limiting continuous current	50 mA      6 A
Maximum switch-on current	50 mA      on request
Minimum switching current	1 mA (at 24 V)      10 mA (at 12 V)
General data	
Rated insulation voltage	250 V
Rated surge voltage/insulation	6 kV
Ambient temperature (operation)	-20 °C ... 60 °C
Mechanical service life	2 x 10 <sup>7</sup> cycles
Air clearances and creepage distances between the power circuits	IEC 60664, EN 50178
Degree of pollution / Overvoltage category	2 / III
Mounting position / Assembly	any / in rows with zero spacing
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 94 mm
EMC note	Class A product, see page 605

Ordering data		
Type	Order No.	Pcs./ Pkt.
PLC-BSC-TTL/1	2982689	10
PLC-BPT-TTL/1	2900458	10
Accessories		
REL-MR 4,5DC/21AU	2961370	10
REL-MR- 4,5DC/21	2961367	10



Description
PLC-INTERFACE with screw connection with Push-in connection
Plug-in miniature power relays, with multi-layer gold contacts

**PLC-INTERFACE for the TTL signal at input**

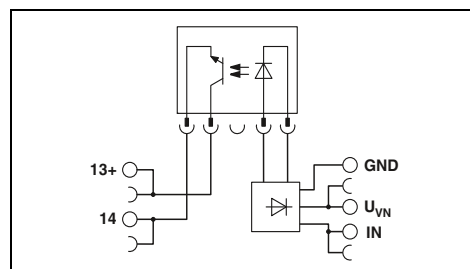
The PLC-BS...TTL/1 basic terminal block is controlled with a TTL (5 V) input signal. It is equipped with either a mechanical relay or a solid-state relay. The basic terminal block equipped with a solid-state relay offers the following advantages:

- Overall width of just 6.2 mm
- Bridging options
- Status display
- IP67-protected solid-state relay electronic unit
- Switching capacity of up to 24 V DC/3 A
- Alternative input or power solid-state relay
- Wear-free and bounce-free
- Integrated protective circuit
- 2.5 kV<sub>rms</sub> electrical isolation between input and output
- Screw and Push-in connection technology

Notes:
Type of housing: Polyester PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For derating curves see page 399



**Basic terminal block for assembly with solid-state relay for TTL (5 V)**



**Technical data**

<b>Input data</b>		5 V DC
Rated control supply voltage $U_{VN}$	Rated control supply voltage range with reference to $U_{VN}$	0.9 ... 1.2
Rated control supply current $I_{VN}$	Rated actuating voltage $U_c$ (IN)	11.5 mA
Rated actuating voltage $U_c$ (IN)	Switching level 1 signal ("H") (TTL signal)	5 V DC (TTL)
Switching level 1 signal ("H") (TTL signal)	Switching level 0 signal ("L") (TTL signal)	> 2 V DC
Switching level 0 signal ("L") (TTL signal)	Rated actuating current $I_c$	< 0.8 V DC
Rated actuating current $I_c$	Typical response time/switch-on time at $U_c$	2.5 mA
Typical response time/switch-on time at $U_c$	Typical switch-off time at $U_c$	35 $\mu$ s
Typical switch-off time at $U_c$	Input circuit	320 $\mu$ s
Input circuit		Yellow LED, reverse polarity protection, surge protection
<b>Output data with:</b>		
Max. switching voltage	OPT-5DC/48DC/100	OPT-5DC/24DC/2
Minimum switching voltage	48 V DC	33 V DC
Limiting continuous current	3 V DC	3 V DC
Output protection	100 mA	3 A
	Reverse polarity protection, Surge protection	Reverse polarity protection, Surge protection
	< 1 V	< 200 mV
Voltage drop at limiting continuous current		
<b>General data</b>		
Rated insulation voltage	Rated surge voltage/insulation	250 V
Rated surge voltage/insulation	Ambient temperature (operation)	6 kV/Basic isolation
Ambient temperature (operation)	Air clearances and creepage distances between the power circuits	-20 °C ... 60 °C
Air clearances and creepage distances between the power circuits	Degree of pollution / Overvoltage category	IEC 60664, EN 50178
Degree of pollution / Overvoltage category	Connection data solid/stranded/AWG	2 / III
Connection data solid/stranded/AWG	Dimensions	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	EMC note	6.2 mm / 80 mm / 94 mm
EMC note		Class A product, see page 605

**Ordering data**

Description	Type	Order No.	Pcs./ Pkt.
<b>PLC-INTERFACE</b>			
with screw connection	PLC-BSC-TTL/1	2982689	10
with Push-in connection	PLC-BPT-TTL/1	2900458	10

**Accessories**

<b>Plug-in solid-state relays</b>			
Solid-state input relays	OPT- 5DC/ 48DC/100	2967992	10
Solid-state power relays	OPT- 5DC/ 24DC/ 2	2967989	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC-INTERFACE for the TTL signal at output

The PLC-OS...24DC/TTL with a built-in solid-state relay can be used for fast and wear-free switching of TTL (5 V) signals.

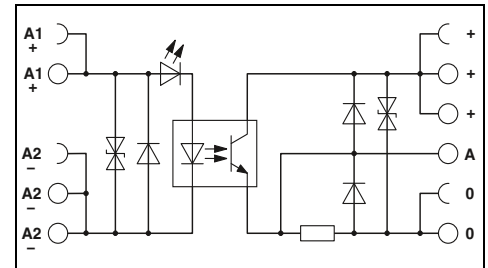
The module offers the following advantages:

- Switching capacity TTL (5 V), fan out = 1
- Overall width of just 6.2 mm
- Bridging options
- Status display
- Integrated protective circuit
- Screw and Push-in connection technology

Notes:
Type of housing: Polyester PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3



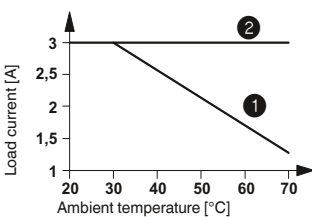
Input solid state relays with TTL (5 V) output



#### Technical data

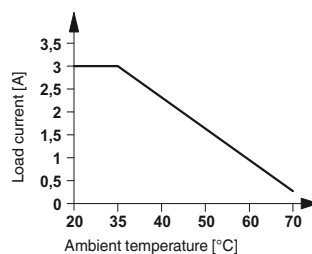
<b>Input data</b>		
Rated actuating voltage $U_C$	24 V DC	
Rated actuating voltage range with reference to $U_C$	0.8 ... 1.2	
Switching level 1 signal ("H")	> 0.8	
Switching level 0 signal ("L")	< 0.4	
Rated actuating current $I_C$	3.4 mA	
Typical switch-on time at $U_C$	35 $\mu$ s	
Typical switch-off time at $U_C$	35 $\mu$ s	
Transmission frequency $f_{limit}$	1 kHz	
Input circuit DC	Yellow LED, reverse polarity protection, surge protection	
<b>Output data with:</b>		
Rated control supply voltage $U_S$	5 V DC	
Rated control supply voltage range with reference to $U_S$	0.9 ... 1.2	
Limiting continuous current	A TTL load (Fan out = 1)/50 mA for switching mode	
Output protection	Reverse polarity protection, surge protection	
Voltage drop at maximum limiting continuous current	< 80 mV	
<b>General data</b>		
Rated insulation voltage	250 V DC	
Rated surge voltage/insulation	4 kV / basic insulation	
Ambient temperature (operation)	-25 °C ... 60 °C	
Air clearances and creepage distances between the power circuits	IEC 60664 , EN 50178	
Degree of pollution/surge voltage category	2 / III	
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	6.2 mm / 80 mm / 86 mm	
EMC note	Class A product, see page 605	
<b>Description</b>		
PLC-INTERFACE		
with screw connection	PLC-OSC- 24DC/TTL	
with Push-in connection	PLC-OPT- 24DC/TTL	
	Order No.	Pcs./ Pkt.
	2982728	10
	2900363	10

Derating curve for PLC-OSP...24DC/3RW



- 1 Aligned without spacing
- 2 Aligned with  $\geq 20$  mm spacing

Derating curve for PLC-OSP...110DC/3RW



**PLC-INTERFACE with solid-state relays for railway applications**

The PLC-OSP...RW interface modules are suitable for use according to DIN EN 50155 (VDE 0115 Part 200) "Railway applications - Electronic equipment used on rolling stock".

The advantages:

- Temperature range -25°C to +70°C
- Input voltage range 0.7-1.25 x U<sub>N</sub>
- Shock resistance in acc. with DIN 50155 (requirements in acc. with EN 61373).
- Spring cage and Push-in connection technology

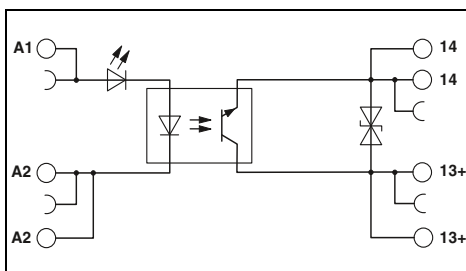


Solid-state relay module, DC output max. 3 A



Solid-state relay module, DC output max. 110 V DC/3 A

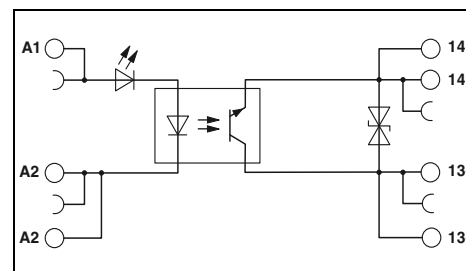
<b>Notes:</b>
Type of housing: Polyester PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For derating curves see page 414



**Technical data**

<b>Input data</b>		
Permissible range (with reference to U <sub>N</sub> )		
Switching level (with reference to U <sub>N</sub> )	1 signal ("H")	≥ 0.6
	0 signal ("L")	≤ 0.3
Typical input current at U <sub>N</sub>	[mA]	8.5
Typical switch-on time at U <sub>N</sub>	[ms]	0.04
Typical switch-off time at U <sub>N</sub>	[ms]	0.2
Transmission frequency f <sub>limit</sub>	[Hz]	300
Input circuit DC		Yellow LED, reverse polarity protection

①	②	③	④	⑤	⑥
0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25
≥ 0.6	≥ 0.6	≥ 0.6	≥ 0.6	≥ 0.6	≥ 0.6
≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.3
8.5	3	8.5	3	8.5	3
0.04	0.08	0.04	0.08	0.04	0.08
0.2	0.6	0.2	0.6	0.2	0.6
300	100	300	100	300	100
Yellow LED, reverse polarity protection					



**Technical data**

<b>Output data</b>	
Max. switching voltage	33 V DC
Minimum switching voltage	3 V DC
Limiting continuous current	3 A (see derating curve)
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	< 200 mV

①	②	③	④	⑤	⑥
0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25
≥ 0.6	≥ 0.6	≥ 0.6	≥ 0.6	≥ 0.6	≥ 0.6
≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.3
12	12	5.5	5.5	5.5	5.5
0.4	0.4	0.04	0.04	0.04	0.4
0.2	0.1	0.2	0.2	0.2	0.2
50	50	300	300	300	300
Yellow LED, reverse polarity protection, surge protection					

Max. switching voltage	140 V DC
Minimum switching voltage	12 V DC
Limiting continuous current	3 A (see derating curve)
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current	< 150 mV

<b>General data</b>	
Rated insulation voltage	250 V
Rated surge voltage	4 kV / basic insulation
Ambient temperature (operation)	-25 °C ... 70 °C
Standards/regulations	IEC 60664 , EN 50178
Degree of pollution/surge voltage category	2 / III

Rated insulation voltage	160 V DC
Rated surge voltage	4 kV / basic insulation
Ambient temperature (operation)	-25 °C ... 70 °C
Standards/regulations	IEC 60664 , EN 50178
Degree of pollution/surge voltage category	2 / III

Rated insulation voltage	160 V DC
Rated surge voltage	4 kV / basic insulation
Ambient temperature (operation)	-25 °C ... 70 °C
Standards/regulations	IEC 60664 , EN 50178
Degree of pollution/surge voltage category	2 / III

Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	W / H / D 6.2 mm / 80 mm / 86 mm
EMC note	Class A product, see page 605

Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 86 mm
EMC note	Class A product, see page 605

Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 86 mm
EMC note	Class A product, see page 605

**Ordering data**

Description	Input voltage U <sub>N</sub>
<b>PLC-INTERFACE, with spring-cage connection</b>	
①	24 V DC
②	36 V DC
③	48 V DC
④	72 V DC
⑤	96 V DC
⑥	110 V DC
<b>PLC-INTERFACE, with Push-in connection</b>	
①	24 V DC
②	36 V DC
③	48 V DC
④	72 V DC
⑤	96 V DC
⑥	110 V DC

Type	Order No.	Pcs./ Pkt.
PLC-OSP- 24DC/ 24DC/ 3RW	2980513	10
PLC-OSP-110DC/ 24DC/ 3RW	2980526	10
PLC-OPT- 24DC/ 24DC/3RW	2900379	10
PLC-OPT-110DC/ 24DC/3RW	2900380	10

**Ordering data**

Type	Order No.	Pcs./ Pkt.
PLC-OSP- 24DC/110DC/ 3RW	2982511	10
PLC-OSP- 36DC/110DC/ 3RW	2982524	10
PLC-OSP- 48DC/110DC/ 3RW	2982537	10
PLC-OSP- 72DC/110DC/ 3RW	2982540	10
PLC-OSP- 96DC/110DC/ 3RW	2982553	10
PLC-OSP-110DC/110DC/ 3RW	2982566	10
PLC-OPT- 24DC/110DC/3RW	2900391	10
PLC-OPT- 36DC/110DC/3RW	2900392	10
PLC-OPT- 48DC/110DC/3RW	2900393	10
PLC-OPT- 72DC/110DC/3RW	2900394	10
PLC-OPT- 96DC/110DC/3RW	2900395	10
PLC-OPT-110DC/110DC/3RW	2900396	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC-INTERFACE for railway applications

Relay modules with extended input voltage and temperature range, specifically for use in railway applications

The advantages:

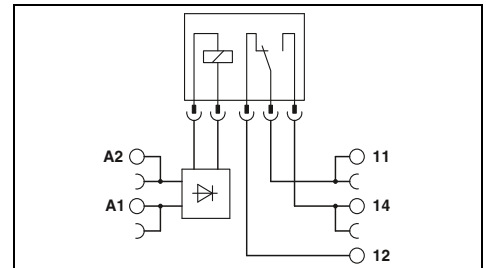
- Temperature range -25°C to +70°C
- Input voltage range 0.7 to 1.25 × U<sub>N</sub>
- Vibration and shock resistance according to EN 50155
- Safe isolation according to DIN EN 50178 between coil and contact
- Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate 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.

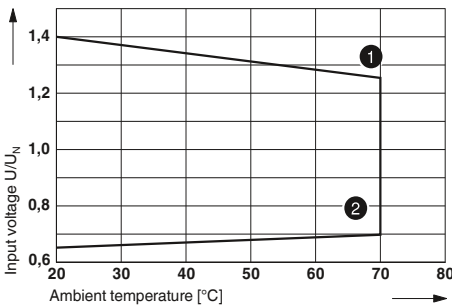


Basic terminal block for assembly with 1-PDT relay up to 6 A

RAI EAC DNV GL

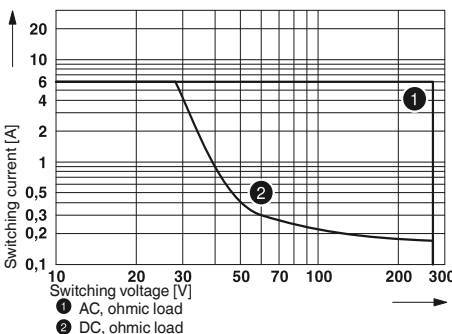


Permissible input voltage range for PLC-BSP-24DC/21RW (with REL-MR-18DC/21... relay)



- ① Maximum continuous voltage when limiting continuous current = 3 A
- ② Minimum pick-up voltage for pre-excitation with U<sub>N</sub> and limiting continuous current = 3 A

Electrical interrupting rating for PLC...21 with 1-PDT relay



- ① AC, ohmic load
- ② DC, ohmic load

Input data	
Nominal input voltage U <sub>N</sub>	24 V DC
Permissible range (with reference to U <sub>N</sub> )	See diagram
Typical input current at U <sub>N</sub>	12 mA
Typical response time at U <sub>N</sub>	5 ms
Typical release time at U <sub>N</sub>	8 ms
Input circuit	Yellow LED, reverse polarity protection, freewheeling diode
Output data with:	
Contact type	REL-MR-18DC/21 Single contact, 1-PDT / REL-MR-18DC/21AU Single contact, 1-PDT
Contact material	
Max. switching voltage	AgSnO / AgSnO, hard gold-plated
Minimum switching voltage	250 V AC/DC / 30 V AC / 36 V DC
Limiting continuous current	5 V (at 100 mA) / 100 mV (at 10 mA)
Maximum switch-on current	3 A / 50 mA
Minimum switching current	on request / 50 mA
	10 mA (at 12 V) / 1 mA (at 24 V)
General data	
Test voltage input/output	4 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-25 °C ... 70 °C
Mechanical service life	2 x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178
Degree of pollution / Overvoltage category	3 / III
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	6.2 mm / 80 mm / 94 mm
EMC note	Class A product, see page 605

### Technical data

Technical data	
Nominal input voltage U <sub>N</sub>	24 V DC
Permissible range (with reference to U <sub>N</sub> )	See diagram
Typical input current at U <sub>N</sub>	12 mA
Typical response time at U <sub>N</sub>	5 ms
Typical release time at U <sub>N</sub>	8 ms
Input circuit	Yellow LED, reverse polarity protection, freewheeling diode
Output data with:	REL-MR-18DC/21 Single contact, 1-PDT / REL-MR-18DC/21AU Single contact, 1-PDT
Contact type	REL-MR-18DC/21 Single contact, 1-PDT / REL-MR-18DC/21AU Single contact, 1-PDT
Contact material	AgSnO / AgSnO, hard gold-plated
Max. switching voltage	250 V AC/DC / 30 V AC / 36 V DC
Minimum switching voltage	5 V (at 100 mA) / 100 mV (at 10 mA)
Limiting continuous current	3 A / 50 mA
Maximum switch-on current	on request / 50 mA
Minimum switching current	10 mA (at 12 V) / 1 mA (at 24 V)

General data	
Test voltage input/output	4 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-25 °C ... 70 °C
Mechanical service life	2 x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664, EN 50178
Degree of pollution / Overvoltage category	3 / III

Connection data solid/stranded/AWG	
Dimensions	6.2 mm / 80 mm / 94 mm
EMC note	Class A product, see page 605

### Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-BPT- 24DC/21RW	2900261	10

### Accessories

Accessories	Order No.	Pcs./ Pkt.
REL-MR- 18DC/21	2961383	10
REL-MR- 18DC/21AU	2961493	10

Description	Voltage U <sub>N</sub>
PLC-INTERFACE basic terminal block, for plug-in miniature relay	
with Push-in connection	24 V DC

Plug-in miniature relays	
REL-MR- 18DC/21	2961383
REL-MR- 18DC/21AU	2961493



**PLC-INTERFACE for railway applications**

Relay module for input voltages with a nominal frequency of 16.7 Hz

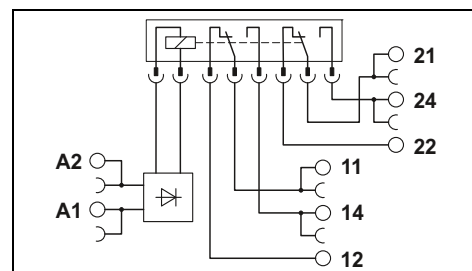
The advantages:

- Input nominal frequency 16.7 Hz
- Vibration and shock resistance according to EN 50155
- Safe isolation according to DIN EN 50178 between coil and contact
- Push-in connection technology

<b>Notes:</b>
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate 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 values in parentheses then apply for further operation. This can result in a shorter service life than with a pure power contact.



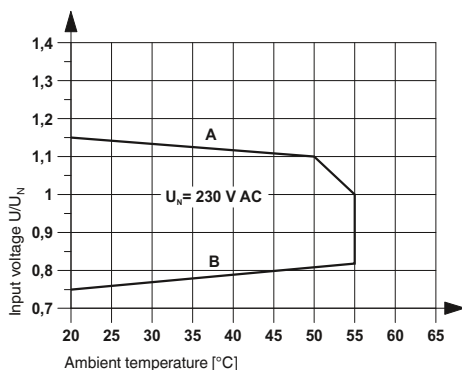
**2-PDT relay module for 16.7 Hz input frequency, max. 2 x 6 A**



**Technical data**

<b>Input data</b>	Nominal input voltage $U_N$	230 V AC
	Input nominal frequency	16.67 Hz
	Permissible range (with reference to $U_N$ )	see diagram
	Typical response time at $U_N$	20 ms
	Typical release time at $U_N$	60 ms
	Input circuit	Yellow LED, bridge rectifier
<b>Output data</b>	Contact type	2 PDT
	Contact material	AgNi, hard gold-plated
	Max. switching voltage	30 V AC / 36 V DC (250 V AC/DC)
	Minimum switching voltage	100 mV (5 V AC/DC)
	Limiting continuous current	50 mA (6 A)
	Maximum switch-on current	50 mA (8 A)
	Minimum switching current	1 mA (10 mA)
<b>General data</b>	Test voltage input/output	6 kV
	Ambient temperature (operation)	-25 °C ... 55 °C
	Mechanical service life	approx. $3 \times 10^7$ cycles
	Standards/regulations	IEC 60664, EN 50178
	Degree of pollution / Overvoltage category	2 / III
	Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
	Dimensions	14 mm / 80 mm / 94 mm
	EMC note	Class A product, see page 605

**Permissible input voltage range for PLC-RSP-230UC/21-21AU/RWF**



**Curve A**  
Maximum continuous voltage when limiting continuous current = 6 A

**Curve B**  
Minimum pick-up voltage for pre-excitation with  $U_N$  and limiting continuous current = 6 A

<b>Description</b>	<b>Voltage <math>U_N</math></b>	<b>Type</b>	<b>Order No.</b>	<b>Pcs./Pkt.</b>
<b>PLC-INTERFACE</b> with Push-in connection	230 V AC	PLC-RPT-230UC/21-21AU/RWF	2900345	10

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC-INTERFACE for railway applications

Relay modules with extended input voltage and temperature range, specifically designed for railway applications

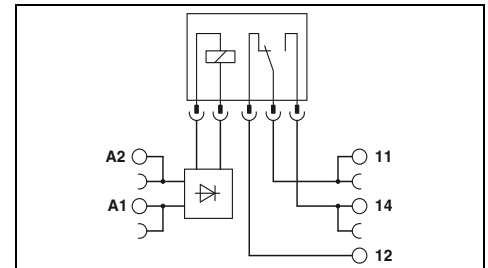
The advantages:

- Certified to EN 50155
- Optimum relay operation thanks to wide-range electronics
- Temperature range -40 to +70°C (short-term 85°C)
- Input voltage range 0.7 to 1.25 x U<sub>N</sub> (short-term 1.4 x U<sub>N</sub>)
- Vibration and shock resistance according to EN 50155
- Safe isolation according to DIN EN 50178 between coil and contact
- Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate 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.
Electrical service life diagrams, see page 400



1-PDT relay module, 6 A, maximum



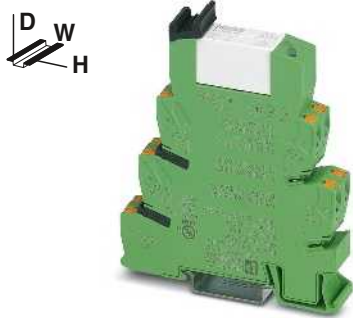
Input data	
Permissible range (with reference to U <sub>N</sub> )	
Typical input current at U <sub>N</sub>	[mA]
Typical response time at U <sub>N</sub>	[ms]
Typical release time at U <sub>N</sub>	[ms]
Input protection:	
Output data	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current	
Minimum switching current	
General data	
Test voltage (winding / contact)	
Ambient temperature (operation)	
Mechanical service life	
Standards/regulations	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

Technical data		
①	②	③
0.7 - 1.25	0.7 - 1.25	
9	3	2
4	4	4
4	4	4
Yellow LED, bridge rectifier, freewheeling diode		
1 PDT	1 PDT	
AgSnO	AgSnO, hard gold-plated	
250 V AC/DC	30 V AC / 36 V DC	
5 V (at 100 mA)	100 mV (at 10 mA)	
6 A	50 mA	
10 A (4 s)	50 mA	
10 mA (at 12 V)	1 mA (at 24 V)	
4 kV <sub>rms</sub> (50 Hz, 1 min.)		
-40 °C ... 70 °C (Temperature class TX)		
Approx. 2x 10 <sup>7</sup> cycles		
EN 50155 (VDE 0115 part 200), EN 50178, EN 61373, EN 50121		
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14		
6.2 mm / 80 mm / 94 mm		
Class A product, see page 605		

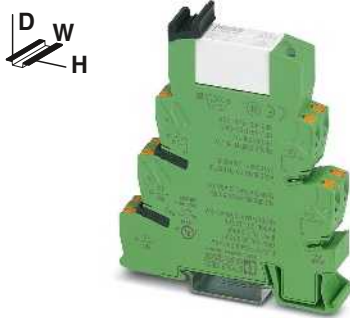
Description	Input voltage U <sub>N</sub>
<b>PLC-INTERFACE, with power contact</b>	
with Push-in connection	① 24 V DC
	② 72 V DC
	③ 110 V DC
<b>PLC-INTERFACE, with hard gold-plated contact</b>	
with Push-in connection	① 24 V DC
	② 72 V DC
	③ 110 V DC

Ordering data		
Type	Order No.	Pcs./Pkt.
PLC-RPT- 24UC/21/RW	2900318	10
PLC-RPT- 72UC/21/RW	2900319	10
PLC-RPT-110UC/21/RW	2900320	10
PLC-RPT- 24UC/21AU/RW	2900321	10
PLC-RPT- 72UC/21AU/RW	2900322	10
PLC-RPT-110UC/21AU/RW	2900323	10

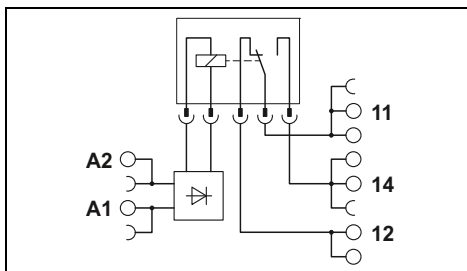
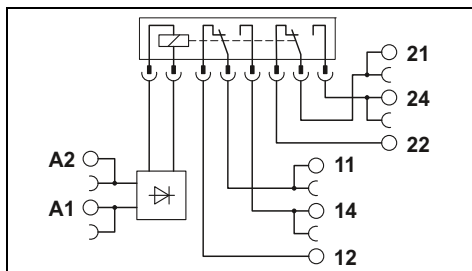
Highly compact relay modules - PLC-INTERFACE



2-PDT relay module,  
2 x 6 A, maximum



1-PDT relay module,  
max. 10 A



Technical data

①	②	③
0.7 - 1.25	0.7 - 1.25	0.7 - 1.25
20	6	4.5
5	5	5
11	11	11

Yellow LED, bridge rectifier, freewheeling diode

2 PDT	2 PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 10 mA)	100 mV (at 10 mA)
6 A	50 mA
15 A (300 ms)	50 mA
10 mA (At 5 V)	1 mA (at 24 V)

5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-40 °C ... 70 °C (Temperature class TX)  
approx. 3x 10<sup>7</sup> cycles  
EN 50155 (VDE 0115 part 200), EN 50178, EN 61373, EN 50121

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
14 mm / 80 mm / 94 mm  
Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-RPT- 24UC/21-21/RW	2900346	10
PLC-RPT- 72UC/21-21/RW	2900347	10
PLC-RPT-110UC/21-21/RW	2900348	10
PLC-RPT- 24UC/21-21AU/RW	2900349	10
PLC-RPT- 72UC/21-21AU/RW	2900350	10
PLC-RPT-110UC/21-21AU/RW	2900351	10

Technical data

①	②	③
0.7 - 1.25	0.7 - 1.25	0.7 - 1.25
20	6	4.5
5	5	5
11	11	11

Yellow LED, bridge rectifier, freewheeling diode

1 PDT
AgNi
250 V AC/DC
12 V (at 10 mA)
10 A (With inserted bridge 2967691)
30 A (300 ms)
10 mA (at 12 V)

5 kV<sub>rms</sub> (50 Hz, 1 min.)  
-40 °C ... 70 °C (Temperature class TX)  
approx. 3x 10<sup>7</sup> cycles  
EN 50155 (VDE 0115 part 200), EN 50178, EN 61373, EN 50121

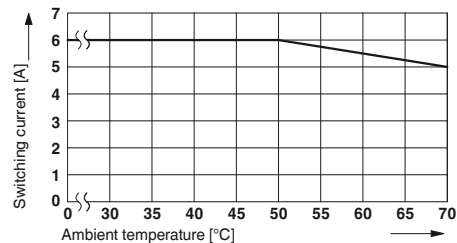
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
14 mm / 80 mm / 94 mm  
Class A product, see page 605

Ordering data

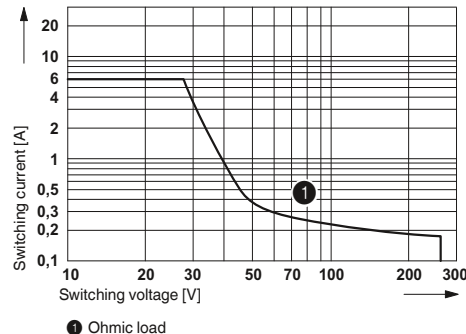
Type	Order No.	Pcs./ Pkt.
PLC-RPT- 24UC/21HC/RW	2900324	10
PLC-RPT- 72UC/21HC/RW	2900325	10
PLC-RPT-110UC/21HC/RW	2900326	10

Derating curve for

PLC-RSP...21/RW  
PLC-RSP...21AU/RW  
PLC-RSP...21-21/RW  
PLC-RSP...21-21AU/RW

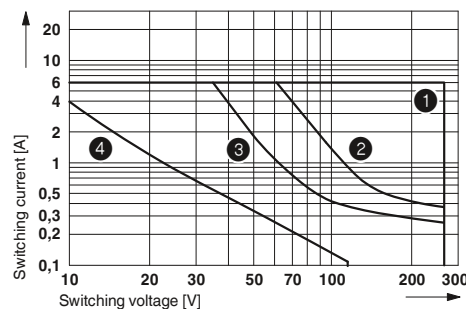


Interrupting rating for PLC-RSP...UC/21RW



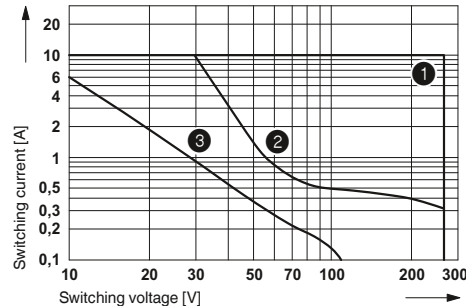
① Ohmic load

Interrupting rating for PLC-RSP...UC/21-21/RW



① AC, ohmic load  
② DC, ohmic load, contacts in series  
③ DC, ohmic load  
④ DC, L/R = 40 ms

Interrupting rating for PLC-RSP...UC/21HC/RW



① AC, ohmic load  
② DC, ohmic load  
③ DC, L/R = 40 ms

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC electronic sensor terminal block for NAMUR proximity sensors

The electronic sensor terminal block, PLC-...-EIK 1-SVN from Phoenix converts the changeable resistance of a NAMUR sensor unit into a digital signal that can be read by all PLCs.

In addition, the electronics monitors the sensor side for a short circuit or open circuit and indicates these errors via an integrated LED.

Due to a corresponding resistance circuit, the PLC-...-EIK 1-SVN can be used to monitor all mechanical switches (N/C contact or N/O contact) for short-circuits and/or wire break.

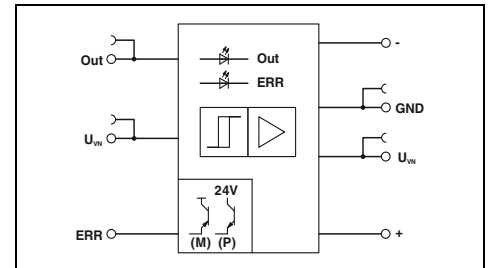
In addition to a high packing density, this switching amplifier features the following:

- Regulated power supply for the NAMUR proximity switch
- 24 V/50 mA digital output for directly connecting programmable logic controllers
- Connection option for PLC-V8 adapter
- Screw and Push-in connection technology

<b>Notes:</b>
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate is to be used in the following cases: always at the start and end of a PLC terminal strip, for voltages greater than 250 V (L1, L2, L3) between the same terminal points of neighboring modules (potential bridging then takes place with FBST 8-PLC... or FBST 500...) and with safe isolation between neighboring modules.



For inductive proximity sensors acc. to NAMUR, with light indicators for sensor signal and fault



#### Technical data

<b>Supply</b>	Input supply nominal voltage $U_{VN}$ Typical input current at $U_{VN}$ Transmission frequency $f_{limit}$ Input circuit
<b>Control circuit</b>	No-load voltage Switching points in accordance with EN 60947-5-6:
<b>Protective circuit</b>	Alarm output Operating voltage range (positive switching) Limiting continuous current Voltage drop at maximum limiting continuous current Output protection
<b>Signal output</b>	Limiting continuous current Voltage drop $U_R$ at maximum limiting continuous current
<b>Output protection</b>	General data Rated insulation voltage Rated surge voltage / insulation Ambient temperature (operation) Standards/regulations Degree of pollution / Overvoltage category
<b>Connection data solid/stranded/AWG</b>	Dimensions W / H / D
<b>EMC note</b>	

24 V DC  
approx. 14 mA  
approx. 350 Hz  
Green LED, reverse polarity protection, surge protection

8.2 V DC  $\pm 10\%$   
 $\geq 2.1$  mA (In conductive state)  
 $\leq 1.2$  mA (In blocking state)  
6.3 mA ... 10 mA (in the event of a short-circuit)  
0 mA ... 0.35 mA (In the event of a wire break)  
Surge protection

$U_{VN} - U_{Res}$   
50 mA  
 $\leq 1.5$  V ( $U_R$ )  
Red LED, surge protection

50 mA  
 $\leq 1.5$  V ( $U_R$ )

Surge protection

50 V DC  
0.4 kV/Basic isolation  
-25 °C ... 50 °C  
IEC 60664 , EN 50178  
2 / 1

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 12  
6.2 mm / 80 mm / 86 mm  
Class A product, see page 605

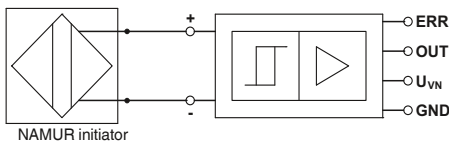
#### Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-SC-EIK 1-SVN 24P/P	2982663	10
PLC-PT-EIK 1-SVN 24P/P	2900397	10

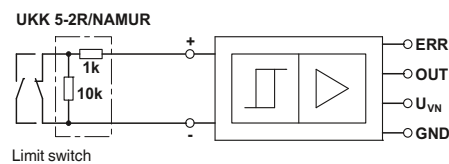
#### Accessories

UKK 5-2R/NAMUR	2941662	50
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#### Application 1



#### Application 2



Initiator state	Switching level		LED	
	OUT	ERR	Green	Red
Conductive	L	L	OFF	OFF
Blocking	H	L	ON	OFF
Short circuit	L	H	OFF	ON
Open circuit	L	H	OFF	ON

<b>Description</b>
<b>Switching amplifier electronic terminal block, positive switching</b>
with screw connection with Push-in connection

<b>Double-level terminal block, with pre-assembled resistors</b>
with screw connection

**PLC series**  
**Electronic reversing load relay for DC motors**

The PLC-S...-ELR W 1/2-24DC electronic reversing load relays are used to switch mechanically commutated DC motors up to 24 V/2 A.

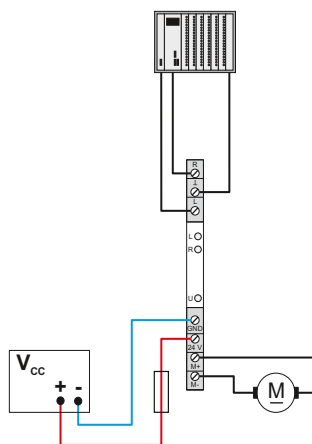
- Wear-free reversing
- Braking by controlling both inputs
- Short-circuit and surge and overload-proof output
- Integrated locking circuit and load wiring
- Screw or spring-cage connection technology

<b>Notes:</b>
Type of housing: Polyester PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate is to be used in the following cases: always at the start and end of a PLC terminal strip, for voltages greater than 250 V (L1, L2, L3) between the same terminal points of neighboring modules (potential bridging then takes place with FBST 8-PLC... or FBST 500...) and with safe isolation between neighboring modules.
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
PWM = Pulse Width Modulation



**DC reversing load relay with overload and short-circuit-proof output**

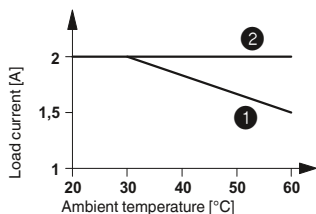
**Application example for PLC-S...ELR W 1/2-24DC**



**Status table**

Input		Output	
Right	Left	M +	M -
0	0	High resistance	High resistance
1	0	+ 24 V	GND
0	1	GND	+ 24 V
1	1	GND	GND

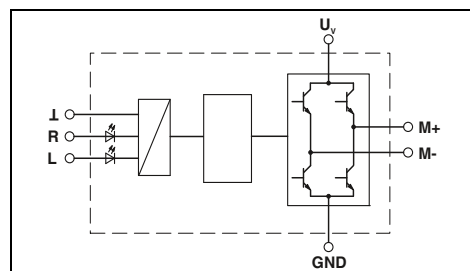
**Derating curve for PLC-S...ELR W 1/2-24DC**



- ① Aligned without spacing
- ② Aligned with > 20 mm spacing

<b>Input data</b>	Control voltage $U_{ST}$ right/left Control input current $I_{ST}$ right/left Input protection:
<b>PWM option</b>	Maximum clock frequency of the PWM at the control inputs
	Pulse width repetition rate of the PWM
<b>Output data</b>	Supply voltage range $U_V$ Quiescent current Output protection
<b>Motor switching output</b>	Continuous current $I_A$ max. Current limitation at short-circuits
<b>General data</b>	Rated insulation voltage Rated surge voltage / insulation Ambient temperature (operation) Standards/regulations Degree of pollution / Overvoltage category
<b>Mounting position</b>	Mounting Connection data solid/stranded/AWG Dimensions
<b>EMC note</b>	

<b>Description</b>	<b>Electronic reversing load relays</b> , for driving DC motors, with light indicator and protection circuit
	with screw connection with spring-cage connection



**Technical data**

24 V DC $\pm 20\%$ approx. 3 mA Yellow LED, reverse polarity protection, surge protection
1000 Hz
0 % ... 100 %
10 V DC ... 30 V DC 10 mA Green LED, reverse polarity protection, surge protection
2 A (see derating curve) 15 A (during braking)
50 V 0.5 kV / Basic insulation -25 °C ... 60 °C IEC 60664 , EN 50178 2 / II
Vertical (horizontal DIN rail) In rows with zero spacing 0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14 6.2 mm / 80 mm / 86 mm Class A product, see page 605

**Ordering data**

Type	Order No.	Pcs./ Pkt.
PLC-SC-ELR W1/ 2-24DC	2980539	1
PLC-SP-ELR W1/ 2-24DC	2980555	1

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC-INTERFACE

#### Pulse expansion module

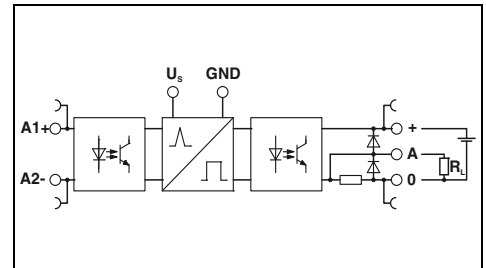
A solid-state relay for acquiring and extending short pulses.

- Pulse detection can be set from > 0.1 ms or > 2 ms
- Status display
- Delay times of 10 to 2550, can be set via DIP switches
- Bridging options
- Can be retriggered
- Screw and Push-in connection technology



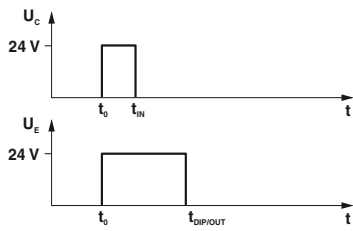
**Solid-state relay module for the extension of input pulses, DC output max. 100 mA**

ERC

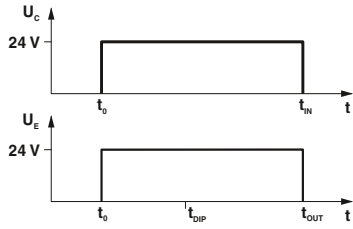


#### Technical data

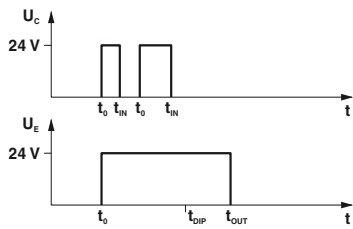
<b>Input data</b>			
Rated control supply voltage $U_s$	24 V DC		
Rated control supply voltage range with reference to $U_s$	0.8 ... 1.2		
Rated control supply current $I_s$			
- Input low, output low	13 mA		
- Input high, output high	19 mA		
Rated actuating voltage $U_c$	24 V DC		
Rated actuating current $I_c$	3 mA		
Switching threshold "0" signal in reference to $U_c$	< 0.4		
Switching threshold "1" signal in reference to $U_c$	> 0.8		
Status indication	Yellow LED		
Operating voltage display	Green LED		
Input circuit	Reverse polarity protection, surge protection		
<b>Output data</b>			
Output voltage range $U_E$	3 V DC ... 48 V DC		
Limiting continuous current	100 mA		
Voltage drop at maximum limiting continuous current	< 1 V DC		
Output circuit	3-conductor, ground-referenced		
Output protection	Reverse polarity protection, surge protection, free running		
<b>General data</b>			
Rated insulation voltage	50 V DC		
Rated surge voltage	0.5 kV		
Ambient temperature (operation)	-25 °C ... 60 °C		
Standards/regulations	DIN EN 50178		
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14		
Dimensions	6.2 mm / 80 mm / 86 mm		
EMC note	Class A product, see page 605		
	W / H / D		
<b>Ordering data</b>			
Description	Type	Order No.	Pcs./ Pkt.
PLC-INTERFACE, with screw connection	PLC-OSC-LPE-24DC/48DC/100	2903171	1
PLC-INTERFACE, with Push-in connection	PLC-OPT-LPE-24DC/48DC/100	2903173	1



Input pulse  $t_1 <$  set output pulse  $t_3$   
(no restart when triggered again)



Input pulse  $t_1 \geq$  set output pulse  $t_3$  then:  
input pulse  $t_1 =$  output pulse  $t_2$   
(no restart when triggered again)



Input pulse  $t_1 <$  set output pulse  $t_3$   
(restart when triggered again)

DIP							
S1	S2	S3	S4	S5	S6	S7	S8
10	-	-	-	-	-	-	-
-	20	-	-	-	-	-	-
-	-	40	-	-	-	-	-
-	-	-	80	-	-	-	-
-	-	-	-	160	-	-	-
-	-	-	-	-	320	-	-
-	-	-	-	-	-	640	-
-	-	-	-	-	-	-	1280

# Relay modules

## Highly compact relay modules - PLC-INTERFACE

### PLC accessories

The **PLC-ESK** power terminal is used to supply the bridge potentials, the **PLC-ATP** partition plate is used for the visual separation and safe isolation of adjacent PLC modules. The **PLC-BP (A1-14)** passive feed-through bridge is used instead of a relay and connects the A1 and 14 terminal points.



Power terminal and partition plate

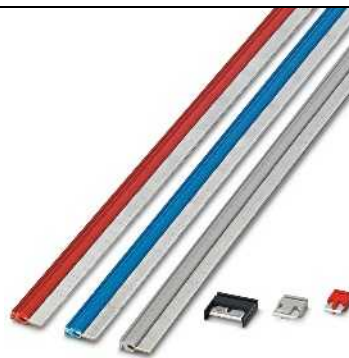


Feed-through bridge

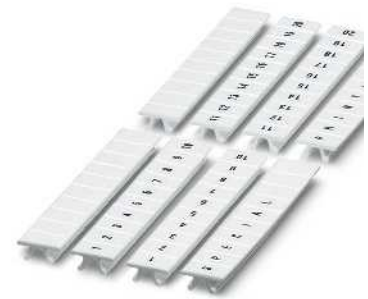
Ordering data			Ordering data				
Description	Color	Type	Order No.	Pcs./ Pkt.	Type	Order No.	Pcs./ Pkt.
<b>Power terminal</b> , for supply of up to four potentials, same shape as PLC standard series, max. 32 A/250 V AC		<b>PLC-ESK GY</b>	<a href="#">2966508</a>	5			
<b>Partition plate</b> , 2 mm thick, required at the start and end of a PLC terminal strip. It also serves in visual separation of groups, safe isolation of different voltages of neighboring PLC-INTERFACE devices according to DIN EN 50178/VDE0160, separation of neighboring bridges of different potentials, and separation of PLC-INTERFACE devices at voltages > 250 V	gray	<b>PLC-ATP BK</b>	<a href="#">2966841</a>	25			
<b>Screwdriver</b> Blade: 0.6 x 3.5 x 100 mm, length: 181 mm	black	<b>SZF 1-0,6X3,5</b>	<a href="#">1204517</a>	10			
<b>Passive feed-through bridge</b> , can be plugged in instead of relay or solid-state relay, bridges terminal points A1 and 14	black				<b>PLC-BP A1-14</b>	<a href="#">2980283</a>	10

### PLC accessories

The color-coded and insulated **FBST** plug-in bridges can reduce wiring time by up to 70% for PLC-INTERFACE. The 500 mm long **FBST 500-PLC** “continuous bridges” are particularly effective. The **FBST 6** 2-pos. single plug-in bridges are ideal for bridging a smaller number of PLC modules.



Plug-in bridge systems



Marking material

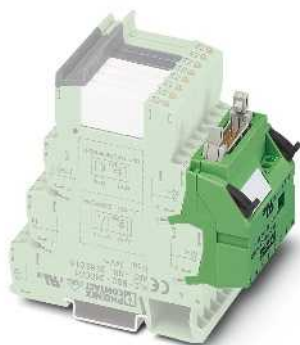
Ordering data			Ordering data				
Description	Color	Type	Order No.	Pcs./ Pkt.	Type	Order No.	Pcs./ Pkt.
<b>Cont. plug-in bridge</b> , 500 mm long, insulated, can be cut to length, for potential distribution Nominal current: 32 A	red	<b>FBST 500-PLC RD</b>	<a href="#">2966786</a>	20			
	blue	<b>FBST 500-PLC BU</b>	<a href="#">2966692</a>	20			
	gray	<b>FBST 500-PLC GY</b>	<a href="#">2966838</a>	20			
<b>Plug-in bridge</b> , 2-pos., 6 mm long, for potential distribution Nominal current: 6 A	red	<b>FBST 6-PLC RD</b>	<a href="#">2966236</a>	50			
	blue	<b>FBST 6-PLC BU</b>	<a href="#">2966812</a>	50			
	gray	<b>FBST 6-PLC GY</b>	<a href="#">2966825</a>	50			
<b>Plug-in bridge</b> , 2-pos., 8 mm long, for potential distribution with a partition plate Nominal current: 6 A	gray	<b>FBST 8-PLC GY</b>	<a href="#">2967688</a>	50			
<b>Plug-in bridge</b> , 2-pos., 14 mm long, insulated, for potential distribution Nominal current: 10 A	black	<b>FBST 14-PLC BK</b>	<a href="#">2967691</a>	50			
<b>Zack marker strip, printed horizontally</b> , 10-section, with consecutive numbers, e.g., 1-10, 11-20, etc. up to 91-100					<b>ZB 6,LGS:FORTL.ZAHLEN</b>	<a href="#">1051016</a>	10



Adapter for PLC-INTERFACE

**PLC-V8/...** are the VARIOFACE adapters which connect the narrow PLC-INTERFACE modules to the VARIOFACE system cabling:

**Notes:**  
Cross-ref. list for matching PLC-INTERFACE modules: page 548



VARIOFACE adapter for 6.2 mm PLC-INTERFACE



VARIOFACE adapter for 14 mm PLC-INTERFACE



Maximum permissible operating voltage  
Maximum permissible current (per branch)  
Maximum total current (voltage supply)

Ambient temperature (operation)  
Standards/regulations  
Connection method

Connection data solid/stranded/AWG  
Dimensions

Supply  
Controller level  
H / D

30 V DC  
1 A (per signal path)  
3 A

-40 °C ... 70 °C  
IEC 60664 , DIN EN 50178  
Screw connection  
IDC/FLK pin strip  
0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
100 mm / 94 mm

30 V DC  
1 A (per signal path)  
3 A

-40 °C ... 70 °C  
IEC 60664 , DIN EN 50178  
Screw connection  
IDC/FLK pin strip  
0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
100 mm / 94 mm

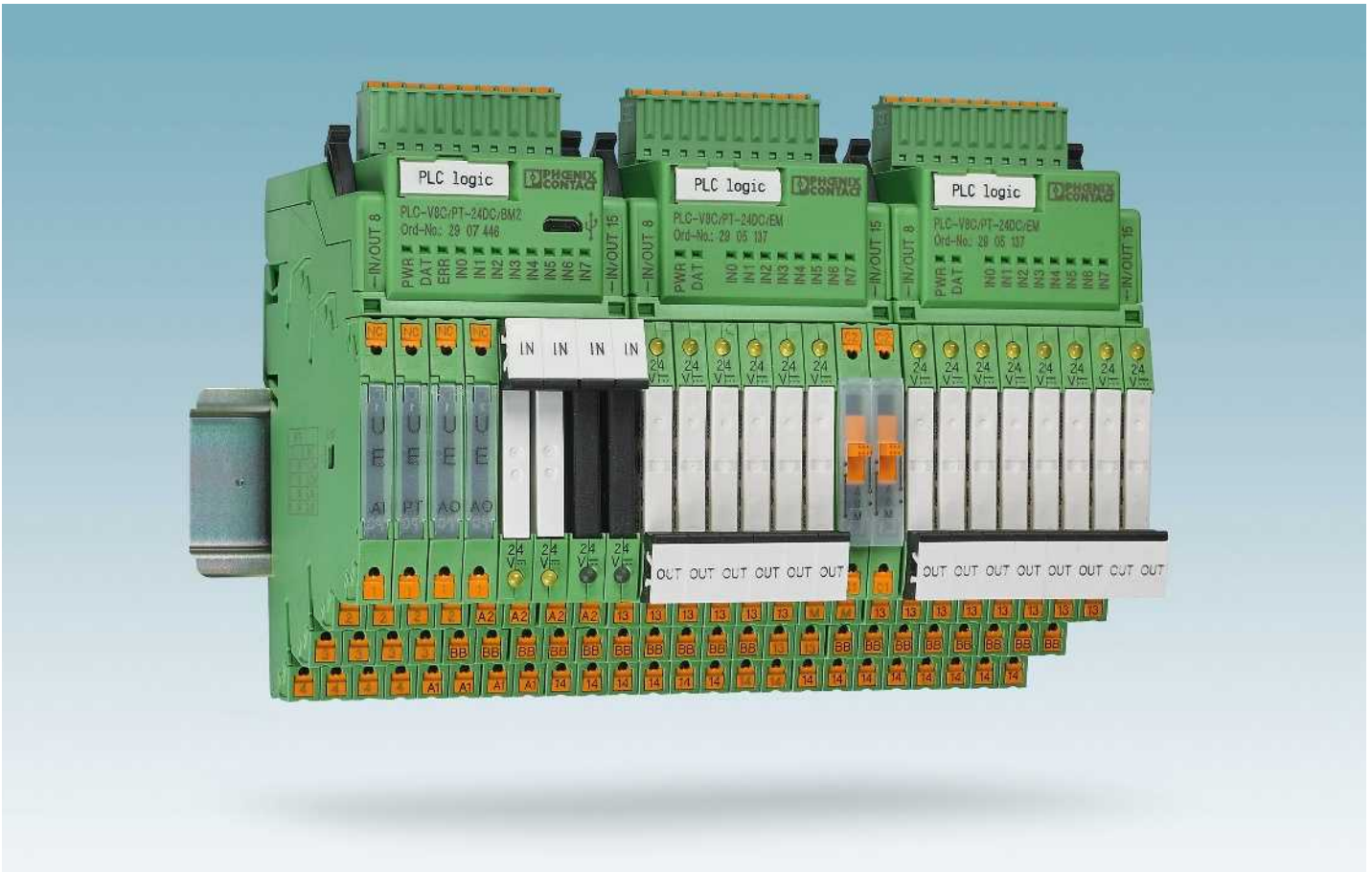
Ordering data

Ordering data

Description	No. of pos.	Module width W
<b>V8 adapter</b> , for 8 PLC-INTERFACE devices (6.2 mm), with IDC/FLK pin strip, for PLC system cabling, <b>positive switching</b>		
Output	14	49.6 mm
Input	14	49.6 mm
<b>V8 adapter</b> , for 8 PLC-INTERFACE devices (6.2 mm), with IDC/FLK pin strip, for PLC system cabling, <b>negative switching</b>		
Output	14	49.6 mm
Input	14	49.6 mm
<b>V8 output adapter</b> , for 8 PLC-INTERFACE devices (6.2 mm), with D-SUB connection		
Pin strip	15	49.6 mm
Socket strip	15	49.6 mm
<b>V8 input adapter</b> , for 8 PLC-INTERFACE devices (6.2 mm), with D-SUB connection		
Pin strip	15	49.6 mm
Socket strip	15	49.6 mm
<b>V8 adapter</b> , for 8 PLC-INTERFACE devices (14 mm), with IDC/FLK pin strip, for PLC system cabling, <b>positive switching</b>		
	14	112.3 mm
<b>V8 adapter</b> , for 8 PLC-INTERFACE devices (14 mm), with IDC/FLK pin strip, for PLC system cabling, <b>negative switching</b>		
	14	112.3 mm

Type	Order No.	Pcs./ Pkt.
PLC-V8/FLK14/OUT	2295554	1
PLC-V8/FLK14/IN	2296553	1
PLC-V8/FLK14/OUT/M	2304102	1
PLC-V8/FLK14/IN/M	2304115	1
PLC-V8/D15S/OUT	2296058	1
PLC-V8/D15B/OUT	2296061	1
PLC-V8/D15S/IN	2296074	1
PLC-V8/D15B/IN	2296087	1

Type	Order No.	Pcs./ Pkt.
PLC-V8L/FLK14/OUT	2299660	1
PLC-V8L/FLK14/OUT/M	2304306	1



### Extremely compact control

The PLC logic programmable logic relay system is the extremely compact way to carry out small automation tasks easily and flexibly. It consists of the PLC-V8C logic modules, the PLC-INTERFACE relay system, and the LOGIC+ software. The logic modules are simply plugged into a row of eight PLC-INTERFACE terminal blocks and combine the logic and interface level in one unit. Depending on the switching requirements, plug-in electromechanical and solid-state relays can be combined in order to flexibly switch and control the I/O signals.

PLC logic processes digital and analog input signals as well as logic functions and timer modules - and replaces conventional switching and control devices. Up to 16 I/O signals can be processed using the stand-alone logic modules - with an overall width of just 50 mm. If more I/O signals are required, a maximum of 48 I/O signals can be linked using the basic and extension modules.

### Switching and controlling with plug-in relays

- PLC logic brings together the standard combination of logic module and separate plug-in relay and eliminates the wiring effort and additional switching elements.
- Convenient connections with screw or Push-in connection technology, which also accommodate return conductors, remove the need for separate potential terminal blocks
- Each channel can be freely configured as an input or output and with relay or analog modules

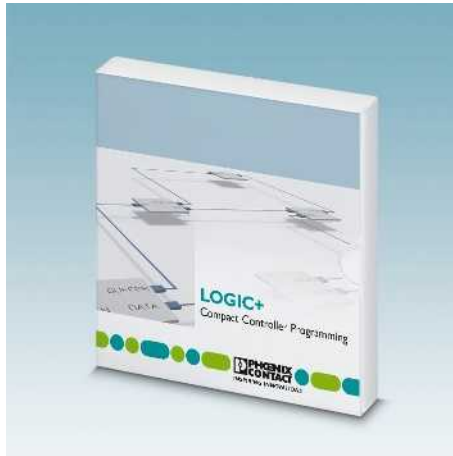
### Intuitive programming

Programming is quick and easy with the intuitive LOGIC+ programming software. Ladder (LD) and function block diagrams (FBD) can be created by selecting the relevant functions and their connection using drag & drop. The graphical representation of PLC logic in the hardware editor supports intuitive operation. The programs created can be simulated offline on the PC and tested online during operation. Basic functions, such as AND, OR, NOT, etc. are complemented by special functions, such as counters, seven-day timers, timer modules, and mathematical functions, to name a few.



**Logic module with plug-in relays**

PLC logic combines a logic module and plug-in relay and eliminates the wiring effort and additional switching elements. Each relay channel can be flexibly equipped with an electromechanical or a solid-state relay. PLC logic processes 16 I/O signals with just one logic module and boasts an extremely compact overall width of just 50 mm.



**Intuitive programming with LOGIC+**

- Function block diagram or ladder diagram
- Numerous integrated function blocks
- Specific function blocks are available to download
- Hardware view in the program
- Can be downloaded free of charge

**i** Your web code: #0139



**Standard programming cable**

PLC logic is connected to a PC via a standard micro USB cable. The drivers for PLC logic can be downloaded at [phoenixcontact.com](http://phoenixcontact.com).



**Easily connect extension modules**

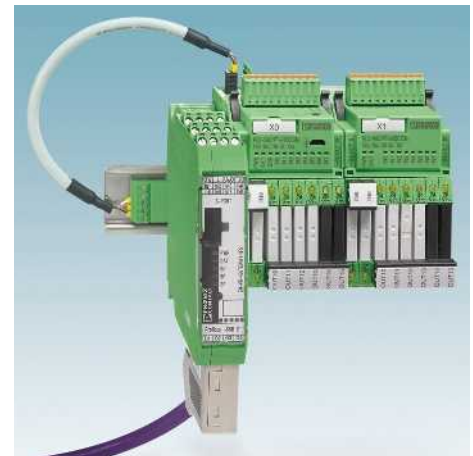
The basic module and the extension module are connected via integrated connectors - no tools required. A maximum of two extension modules can be connected to a basic module. This means that PLC logic can work with up to 48 I/Os.



**Control and monitor via Bluetooth adapter**

Together with the PLC logic app, the Bluetooth adapter is available for wireless access to process data between the logic module and the mobile terminal device, and can be used for operation and monitoring purposes.

The Bluetooth connection enables efficient monitoring of multiple logic modules, with just one visualization device.



**Integration into common bus systems**

PLC logic is integrated into various networks via optional adaptable fieldbus gateways. This enables bidirectional communication with a higher-level controller for remote control as well as diagnostics and visualization.

Gateways are available for transmitting data via PROFIBUS DP, RS-232, RS-485, Modbus/TCP, DeviceNet™, CANopen®, PROFINET, and EtherNet/IP™.

PLC-V8C are the plug-in logic modules which form the PLC logic relay system in conjunction with the narrow 6.2 mm PLC-INTERFACE terminal blocks. Eight freely selectable PLC-INTERFACE terminal blocks must be separately ordered for each logic module. You can find an overview of matching PLC-INTERFACE terminal blocks on page 434.

All logic modules feature these properties:

- 8 integrated digital inputs (of which two inputs are configurable as analog inputs), connection via connector with screw or Push-in connection technology
- A further 8 channels can be configured with matching PLC-INTERFACE terminal blocks as inputs or outputs
- Programming with LOGIC+ software

#### PLC-V8C.../SAM2

- Stand-alone logic module with 16 I/Os, not extendable
- Connection to PC via micro USB socket
- Integrated real-time clock (RTC)
- Accommodates external IFS-CONFSTICK memory module
- Relay and analog modules can be used

#### PLC-V8C.../BM2

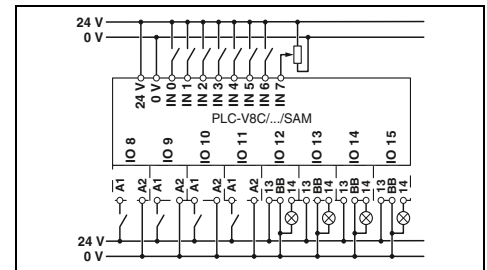
- Basic logic module with 16 I/Os, can be extended with a maximum of two extension modules (PLC-V8C.../EM) to 48 I/Os
- Connection to PC via micro USB socket
- Integrated real-time clock (RTC)
- Accommodates external IFS-CONFSTICK memory module
- Optional connection to IFS gateways
- Relay and analog modules can be used

#### PLC-V8C.../EM

- Extension logic module with 16 I/Os, for extending the basic module
- Relay modules can be used



Stand-alone module



#### Technical data

Supply	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 26.4 V DC
Maximum input current at $U_N$	160 mA
Input data (digital)	
Number of inputs	8 (2 configurable as analog)
Input voltage	24 V DC
Description of the input	EN 61131-2, type 3
Input current 0-signal	< 1 mA
Input current 1-signal	typ. 2.5 mA
Input data (analog)	
Number of inputs	2 (IN6 and IN7 are configurable as analog)
Input voltage range	0 V ... 10 V
Input resistance	> 3.5 k $\Omega$
Input data (PLC-INTERFACE)	
Number of inputs	$\leq 8$
Output data (for controlling PLC-INTERFACE)	
Number of outputs	$\leq 8$
Nominal voltage	24 V DC
Nominal current	9 mA
Real-time clock (basic module only)	
Buffer time (capacitor)	96 h (Capacitor)
Real-time clock accuracy	$\pm 2$ s/d
General data	
Ambient temperature (operation)	-20 °C ... 50 °C
Ambient temperature (storage/transport)	-20 °C ... 70 °C
Permissible humidity (operation)	95 %
Air clearances and creepage distances between the power circuits	DIN EN 50178
Rated insulation voltage	50 V
Rated surge voltage	0.8 kV
Insulation	Basic insulation
Mounting type	Can be plugged onto 8 x PLC-INTERFACE
Degree of protection	IP20
Screw connection solid/stranded/AWG	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1.5 mm <sup>2</sup> / 28 - 16
Push-in connection solid/stranded/AWG	0.14 - 1.5 mm <sup>2</sup> / 0.14 - 1.5 mm <sup>2</sup> / 26 - 16

#### Ordering data

Description	Type	Order No.	Pcs./Pkt.
PLC-V8C plug-in logic modules with screw connection with Push-in connection	PLC-V8C/SC-24DC/SAM2	2907445	1
	PLC-V8C/PT-24DC/SAM2	2907443	1

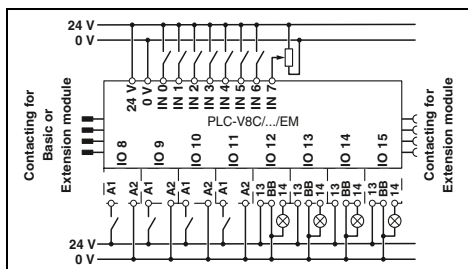
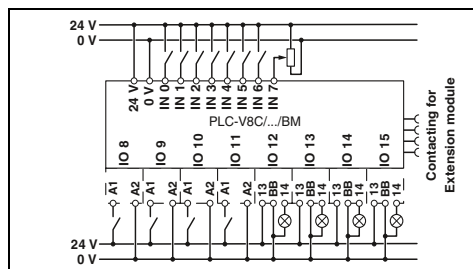
new



Basic module  
(can be extended)



Extension module



Technical data

Technical data

24 V DC  
19.2 V DC ... 26.4 V DC  
160 mA

24 V DC  
19.2 V DC ... 26.4 V DC  
65 mA

8 (2 configurable as analog)  
24 V DC  
EN 61131-2, type 3  
< 1 mA  
typ. 2.5 mA

8 (2 configurable as analog)  
24 V DC  
EN 61131-2, type 3  
< 1 mA  
typ. 2.5 mA

2 (IN6 and IN7 are configurable as analog)

2 (IN6 and IN7 are configurable as analog)

0 V ... 10 V  
> 3.5 kΩ

0 V ... 10 V  
> 3.5 kΩ

≤ 8

≤ 8

≤ 8  
24 V DC  
9 mA

≤ 8  
24 V DC  
9 mA

96 h (Capacitor)  
±2 s/d

-

-20 °C ... 50 °C  
-20 °C ... 70 °C  
95 %  
DIN EN 50178

-20 °C ... 45 °C  
-20 °C ... 70 °C  
95 %  
DIN EN 50178

50 V  
0.8 kV  
Basic insulation  
Can be plugged onto 8 x PLC-INTERFACE  
IP20  
0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1.5 mm<sup>2</sup> / 28 - 16  
0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1.5 mm<sup>2</sup> / 26 - 16

50 V  
0.8 kV  
Basic insulation  
Can be plugged onto 8 x PLC-INTERFACE  
IP20  
0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1.5 mm<sup>2</sup> / 28 - 16  
0.14 - 1.5 mm<sup>2</sup> / 0.14 - 1.5 mm<sup>2</sup> / 26 - 16

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
PLC-V8C/SC-24DC/BM2	2907447	1
PLC-V8C/PT-24DC/BM2	2907446	1

Type	Order No.	Pcs./ Pkt.
PLC-V8C/SC-24DC/EM	2903095	1
PLC-V8C/PT-24DC/EM	2905137	1

# Relay modules

## Programmable logic relay system - PLC logic

### Analog modules

Together with the PLC logic logic modules, the analog modules enable standard analog signals to be processed.

The analog modules are connected to PLC logic stand-alone modules or basic modules.

- Screw and Push-in connection technology
- Status indicator for supply voltage and diagnostics
- Standard configuration: 4 to 20 mA or Pt 100

### Analog input

- Available standard signals: 0 to 20 mA, 4 to 20 mA, 0 to 10 V or 2 to 10 V (configurable via DIP switch)

### Temperature transducer

- 2-conductor Pt 100 or Pt 1000 (configurable via DIP switch)
- Temperature measuring range: -50 to 200°C

### Analog output

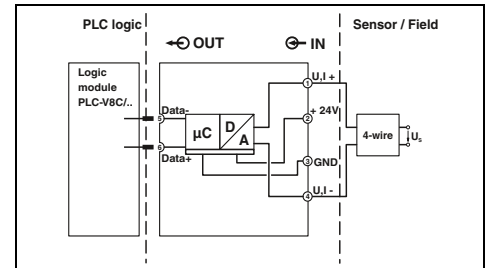
- Available standard signals: 0 to 20 mA, 4 to 20 mA, 0 to 10 V or 2 to 10 V (configurable via DIP switch)

**Notes:**  
The analog modules cannot be operated separately and must only be used in connection with the PLC logic logic modules.



new

Analog input



<b>Supply</b>		
Rated control supply voltage $U_S$	24 V DC	
Rated control supply voltage range with reference to $U_S$	0.8 ... 1.1	
Rated control supply current $I_S$	13 mA	
Operating voltage display	Green LED	
<b>Input signal</b>		
Input signal	Voltage input	
	Current input	
	0 V ... 10 V	0 mA ... 20 mA
	2 V ... 10 V	4 mA ... 20 mA
	> 120 kΩ	~ 40 Ω
<b>Output data</b>		
Output signal	-	
Maximum output signal	-	
Load $R_B$	-	
Ripple	-	
<b>General data</b>		
Ambient temperature (operation)	-20 °C ... 50 °C	
Ambient temperature (storage/transport)	-20 °C ... 70 °C	
Air clearances and creepage distances between the power circuits	DIN EN 50178	
Rated insulation voltage	50 V	
Rated surge voltage	0.5 kV	
Insulation	Basic insulation	
Mounting type	In rows with zero spacing	
Degree of protection	IP20	
Screw connection solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
Push-in connection solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	

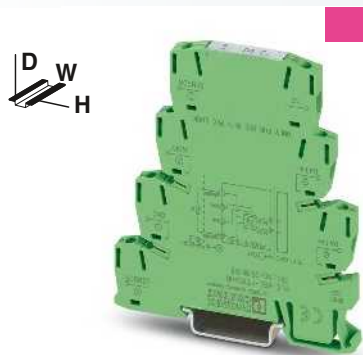
### Technical data

<b>Technical data</b>		
24 V DC		
0.8 ... 1.1		
13 mA		
Green LED		
Voltage input		Current input
0 V ... 10 V		0 mA ... 20 mA
2 V ... 10 V		4 mA ... 20 mA
> 120 kΩ		~ 40 Ω
-		
-		
-		
-		
<b>General data</b>		
-20 °C ... 50 °C		
-20 °C ... 70 °C		
DIN EN 50178		
50 V		
0.5 kV		
Basic insulation		
In rows with zero spacing		
IP20		
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14		
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14		

### Ordering data

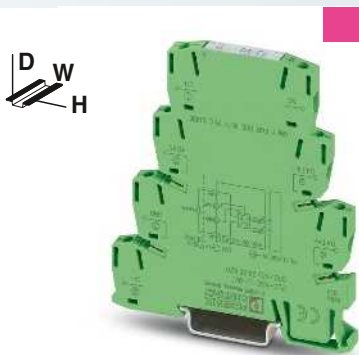
Description
<b>Analog input</b>
with screw connection
with Push-in connection
<b>Temperature transducer</b>
with screw connection
with Push-in connection
<b>Analog output</b>
with screw connection
with Push-in connection

Type	Order No.	Pcs./ Pkt.
PLC-ASC-UI-IN	2906916	1
PLC-APT-UI-IN	2906917	1



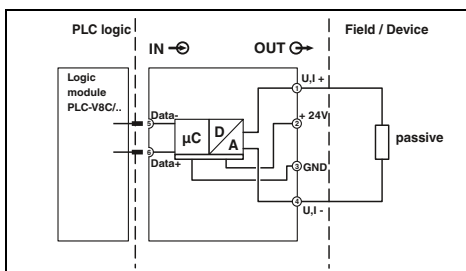
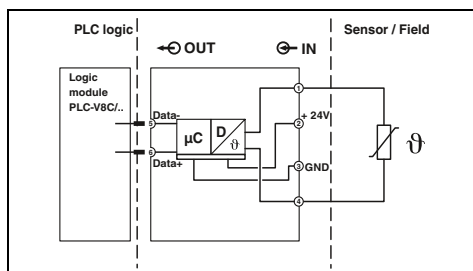
new

Temperature transducer



new

Analog output



**Technical data**

**Technical data**

24 V DC	0.8 ... 1.1
14 mA	Green LED
Temperature range	-50 °C ... 200 °C
-	-
-	-
-	-
-	-
-	-
-	-
-20 °C ... 50 °C	-20 °C ... 70 °C
DIN EN 50178	
50 V	0.5 kV
Basic insulation	
In rows with zero spacing	
IP20	
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	

24 V DC	0.8 ... 1.1
14 mA (U <sub>Out</sub> = 10 V)	Green LED
-	-
-	-
Voltage output	Current output
0 V ... 10 V	0 mA ... 20 mA
2 V ... 10 V	4 mA ... 20 mA
12.3 V	24.6 mA
10 kΩ	500 Ω (20 mA)
< 20 mV <sub>pp</sub>	-
-20 °C ... 50 °C	-20 °C ... 70 °C
DIN EN 50178	
50 V	0.5 kV
Basic insulation	
In rows with zero spacing	
IP20	
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	
0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14	

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./ Pkt.
PLC-ASC-PT100-IN	2906918	1
PLC-APT-PT100-IN	2906919	1

Type	Order No.	Pcs./ Pkt.
PLC-ASC-UI-OUT	2906920	1
PLC-APT-UI-OUT	2906921	1

# Relay modules

## Programmable logic relay system - PLC logic

### Accessories

#### Programming cable and memory module

- The programming cable (MICRO USB B to USB A) is used to connect PLC logic to a PC, length: 2 m
- PLC logic programs are saved by the memory module or can be easily copied to other devices



Cable for programming



Memory module

		Technical data			Technical data		
General data							
EMC note					Class A product, see page 605		
		Ordering data			Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Programming cable		CAB-USB A/MICRO USB B/2,0M	2701626	1			
Multi-functional memory module for the Interface system					IFS-CONFSTICK	2986122	1
- Flat design							

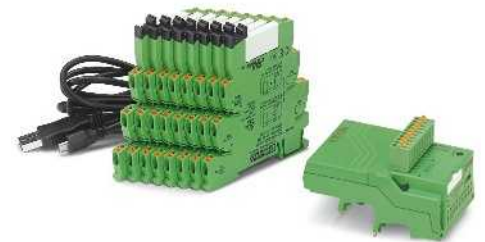
### Accessories

#### PLC logic starter kit

new

The PLC logic starter kit with 8 inputs and 8 outputs contains all the components needed to get started quickly and easily with PLC logic with Push-in connection technology.

- PLC-V8C-PT/24DC/SAM2 plug-in logic module
- PLC-RPT-24DC/1/ACT eight relay output terminal blocks
- Micro USB programming cable



Starter kit with stand-alone module

		Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.
PLC logic starter kit 3, consisting of: plug-in stand-alone logic module, eight relay output terminal blocks with Push-in connection (250 V AC/DC, max. 6 A), and micro USB programming cable		PLC-LOGIC-STARTERKIT3	2909916	1



Accessories

IFS gateways and Bluetooth adapter

- The gateways are connected to the PLC-V8C.../BM PLC logic basic module via the DIN rail connector and the connecting cable
  - The Bluetooth adapter is connected to the logic module via the memory connection
- Current values are monitored and controlled via the PLC logic app.
- INTERFACE system bus master terminal (IB IL IFS-MA-PAC, 2692720) for connecting PLC logic to an Inline controller, see Catalog 6, Automation



IFS gateways



Bluetooth adapter



General data  
EMC note

Technical data
Class A product, see page 605

Technical data

Description	Color
<b>IFS gateway</b> for PROFIBUS DP	green
RS-232	green
RS-485	green
Modbus/TCP	green
DeviceNet™	green
CANopen®	green
PROFINET	green
EtherNet/IP™	green
<b>Programming adapter</b> for configuring modules with S-PORT interface Cable length: 3 m	
<b>DIN rail connector</b>	green
<b>Connecting cable</b> for connecting PLC logic with the ME 22,5 TBUS DIN rail connector, cable length: 0.3 m	
<b>Bluetooth programming adapter</b> , with USB and S-PORT interface	

Ordering data		
Type	Order No.	Pcs./Pkt.
EM-PB-GATEWAY-IFS	2297620	1
EM-RS232-GATEWAY-IFS	2901526	1
EM-RS485-GATEWAY-IFS	2901527	1
EM-MODBUS-GATEWAY-IFS	2901528	1
EM-DNET-GATEWAY-IFS	2901529	1
EM-CAN-GATEWAY-IFS	2901504	1
EM-PNET-GATEWAY-IFS	2904472	1
EM-ETH-GATEWAY-IFS	2901988	1
IFS-USB-DATACABLE	2320500	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
PLC-V8C/CAB/TBUS/0,3M	2905263	1

Ordering data		
Type	Order No.	Pcs./Pkt.
IFS-BT-PROG-ADAPTER	2905872	1

# Relay modules

## Programmable logic relay system - PLC logic

### Selection table for PLC-INTERFACE

Relay output	Push-in connection		Screw connection	
	Type	Order No.	Type	Order No.
1 changeover contact, output data 6 A, 250 V AC/DC	PLC-RPT-24DC/21	2900299	PLC-RSC-24DC/21	2966171
1 changeover contact, output data 50 mA, 36 V DC, gold contact	PLC-RPT-24DC/21AU	2900306	PLC-RSC-24DC/21AU	2966265
1 N/O contact, output data 6 A, 250 V AC/DC, actuator type	PLC-RPT-24DC/1/ACT	2900312	PLC-RSC-24DC/1/ACT	2966210
1 N/O contact with switch, output data 6 A, 250 V AC/DC	PLC-RPT-24UC/1/S/H	2900328	PLC-RSC-24UC/1/S/H	2982236
<b>Solid-state relay output</b>				
Output data 100 mA, 3 V DC - 48 V DC	PLC-OPT-24DC/48DC/100	2900352	PLC-OSC-24DC/48DC/100	2966728
Output data 3 A, 3 V DC - 33 V DC	PLC-OPT-24DC/24DC/2	2900364	PLC-OSC-24DC/24DC/2	2966634
Output data 750 mA, 24 V AC - 253 V AC	PLC-OPT-24DC/230AC/1	2900369	PLC-OSC-24DC/230AC/1	2967840
Output data 3 A, 3 V DC - 33 V DC, actuator type	PLC-OPT-24DC/24DC/2/ACT	2900376	PLC-OSC-24DC/24DC/2/ACT	2966676
Output data 750 mA, 24 V AC - 253 V AC, actuator type			PLC-OSC-24DC/230AC/1/ACT	2967947
Output data 1 A, 12 V DC - 300 V DC	PLC-OPT-24DC/300DC/1	2900383	PLC-OSC-24DC/300DC/1	2980678
Output data 10 A, 3 V DC - 33 V DC	PLC-OPT-24DC/24 DC/10/R	2900398	PLC-OSC-24DC/24DC/10/R	2982702
Output data 500 mA, 3 V DC - 48 V DC, electronic changeover contact	PLC-OPT-24DC/48DC/500/W	2900378	PLC-OSC-24DC/48DC/500/W	2980636
Output data, TTL, 50 mA, 5 V DC	PLC-OPT-24DC/TTL	2900363	PLC-OSC-24DC/TTL	2982728
<b>Analog output</b>				
Output signal 0 V ... 10 V, 2 V ... 10 V, 0 mA ... 20 mA, 2 mA ... 20 mA	PLC-APT-UI-OUT	2906921	PLC-ASC-UI-OUT	2906920
<b>Relay input</b>				
Input voltage 24 V DC	PLC-RPT-24DC/1AU/SEN	2900313	PLC-RSC-24DC/1AU/SEN	2966317
Input voltage 120 V AC/DC	PLC-RPT-120UC/1AU/SEN	2900314	PLC-RSC-120UC/1AU/SEN	2966320
Input voltage 230 V AC/DC	PLC-RPT-230UC/1AU/SEN	2900315	PLC-RSC-230UC/1AU/SEN	2966333
Input voltage 5 V DC (basic terminal block without relay)			PLC-BSC-5DC/1/SEN	2980267
Relay for 5 V DC basic terminal block			REL-MR-4,5DC/21AU	2961370
<b>Solid-state relay input</b>				
Input voltage 24 V DC	PLC-OPT-24DC/V8C/SEN	2908172	PLC-OSC-24DC/V8C/SEN	2908173
Input voltage 120 V AC/DC	PLC-OPT-120UC/V8C/SEN	2908174	PLC-OSC-120UC/V8C/SEN	2908175
Input voltage 230 V AC/DC	PLC-OPT-230UC/V8C/SEN	2908176	PLC-OSC-230UC/V8C/SEN	2908177
<b>Analog input</b>				
Input signal 0 V ... 10 V, 2 V ... 10 V, 0 mA ... 20 mA, 2 mA ... 20 mA	PLC-APT-UI-IN	2906917	PLC-ASC-UI-IN	2906916
Input signal: Pt 100 or Pt 1000 sensor	PLC-APT-PT100-IN	2906919	PLC-ASC-PT100-IN	2906918
<b>Dummy or reserve</b>				
Basic terminal blocks output	PLC-BPT-24DC/21	2900445	PLC-BSC-24DC/21	2966016
Basic terminal blocks input	PLC-BPT-24DC/1/SEN	2900262	PLC-BSC-24DC/1/SEN	2966061

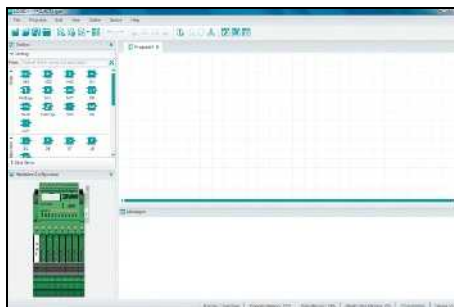
## LOGIC+ programming software



### Integrated web server

PLC logic basic settings are easily configured via the integrated web server. The LOGIC+ software does not need to be installed in order to do so.

- Time and date
- Password and access control
- Firmware update
- Status indicators for inputs and outputs
- General device information



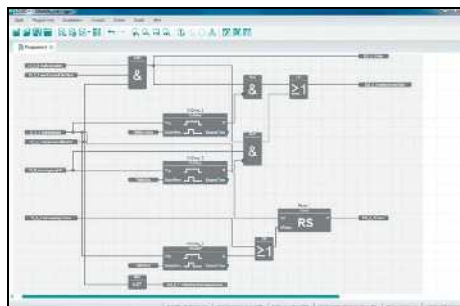
### Logic+ user interface

- Clear separation in program editor, toolbox, hardware view, and signaling window
- All elements can be easily placed using drag & drop
- Information and errors are highlighted in color in the program editor



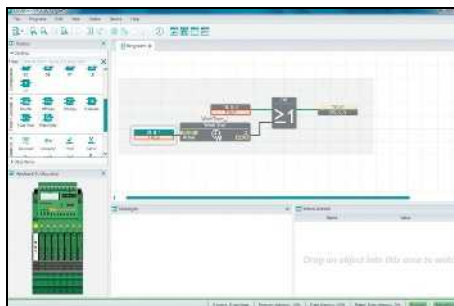
### Hardware configurator

- Each channel can be configured as an input or output and with relay or analog modules
- Clear assignment of the inputs and outputs thanks to the graphical representation of the hardware connections



### Function blocks

- Basic functions: AND, OR, NOT, XOR
- Mathematical functions: add, divide, multiply, subtract, generate absolute value
- Positive and negative edge detection
- RS and SR flip-flops
- Switch-on and switch-off delay, pulse encoder, pulse stretching, weekly clock timer
- Up and down counter
- Analog and digital comparators
- Special functions, for example, roller shutter control or pulse width modulation are available to download



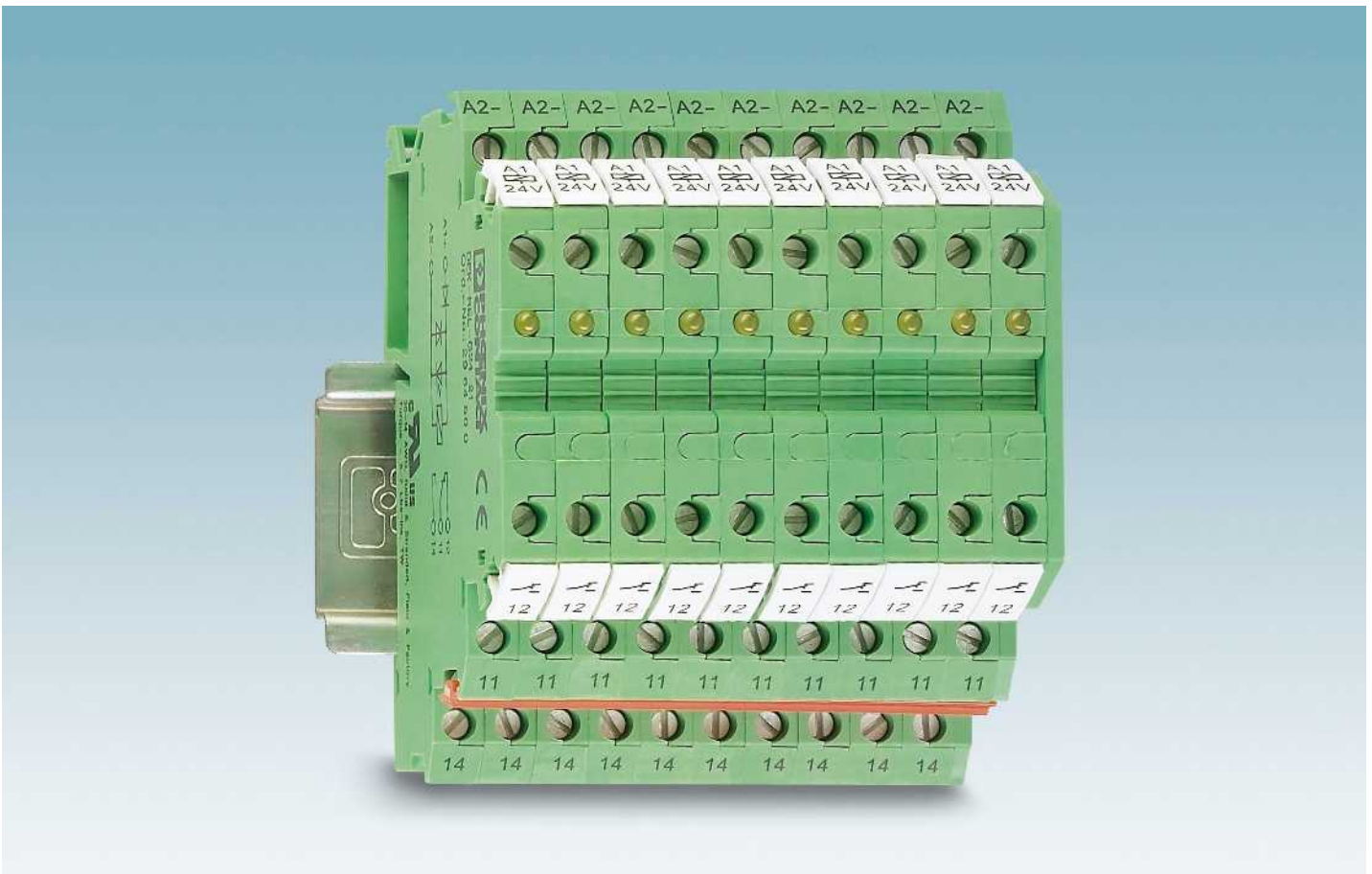
### Simulation and online values

- Offline simulation:
  - Simulation of the created program directly in LOGIC+
  - Virtualization of the values in the program editor, hardware view, and in the observation window
- Online values:
  - Representation of the program running on the hardware in LOGIC+ with online values
  - Overwriting values from LOGIC+



### PLC logic app

- Once the app is installed on your smartphone or tablet, it can be used to make parameter adjustments to the logic modules. The visualization view is created via the editor of the web server integrated in the logic modules. The app can be used for operation and monitoring, as it can access all program variables.
  - Inputs and outputs (digital, analog)
  - Flags
  - Numerical values
  - Time values



The Phoenix Contact DEK interface terminal blocks provide complete interface functions in terminal block housing that is just 6.2 mm wide. In conjunction with standard terminal block accessories, these high-capacity interfaces have not only the design but also the high level of user convenience of terminal blocks.

The main common feature of all Phoenix Contact interface terminal blocks is their width of just 6.2 mm. This saves 60% space in the control cabinet in comparison to conventional 15 mm wide coupling relays from modular systems.

The DEK range offers the best solution for all industrial voltages both for signal input and output.

High switching capacities are a matter of course for the DEK-REL... relay terminal block and the DEK-OV... solid-state relay terminal block.

The wear-free DEK-OV... power solid-state relay terminal block is used for applications that require a greater switching frequency in which electromechanical relays reach the end of their service life in a short time.

Integrated LEDs clearly indicate the switching status of the electronic terminal blocks and provide an excellent overview of the coupling level and the system.

EB-DIK color-coded insertion bridges for the supply and ground signals make it possible to design the circuit simply and effectively.

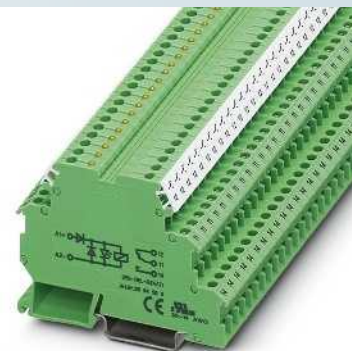
Integrated protective circuits such as freewheeling diodes, polarity reversal protection diodes, and surge protection elements protect the coupling modules and ensure optimum availability of the system.

**DEK-REL-... relay terminal block**

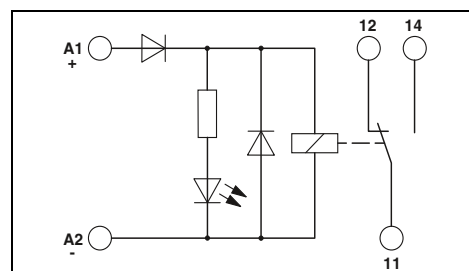
The Phoenix relay terminal block with PDT contact offers the following advantages:

- Width of only 6.2 mm
- High switching capacity of 250 V AC / 6 A
- Less storage, since PDT, N/O or N/C contacts can be wired
- Minimal wiring effort due to the use of EB-DIK insertion bridges
- IP67 protected relay housing
- Cadmium-free relay contacts
- 4 kV electrical isolation of input and output
- Safe isolation in acc. with DIN EN 50178 (VDE 0160)
- Light indicator for signaling the switching state

<b>Notes:</b>
Type of housing: Polyamide PA, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.
For additional EB...DIK... insertion bridges, refer to page 443



For medium to large power  
1 PDT (21)



**Technical data**

<b>Input data</b>	①
Permissible range (with reference to $U_N$ )	0.8 - 1.1
Typical input current at $U_N$ [mA]	9
Response/release time at $U_N$ [ms]	8 / 5
Input protection:	Yellow LED, reverse polarity protection, freewheeling diode
<b>Output data</b>	
Contact type	1 PDT
Contact material	AgSnO
Max. switching voltage	250 V AC/DC
Minimum switching voltage	12 V AC/DC
Limiting continuous current	6 A
Maximum switch-on current	6 A
Minimum switching current	10 mA
Maximum 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
<b>General data</b>	
Test voltage (winding / contact)	4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20 °C ... 50 °C
Mechanical service life	Approx. $10^7$ cycles
Standards/regulations	IEC 60664 , EN 50178
Connection data solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
Dimensions W / H / D	6.2 mm / 80 mm / 56 mm
EMC note	Class A product, see page 605

**Ordering data**

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
Relay terminal block with power relay	① 24 V DC	DEK-REL-G24/21	2964500	10

**Accessories**

Accessories	Order No.	Pcs./ Pkt.
D-DEK 1,5 GN	2716949	10
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1

# Relay modules

## Relay modules in terminal block design - DEK series

### DEK-REL-24/1/SEN input interface and DEK-REL-24/1/AKT output interface

In addition to the familiar advantages of the DEK-REL... electronic terminal blocks, such as:

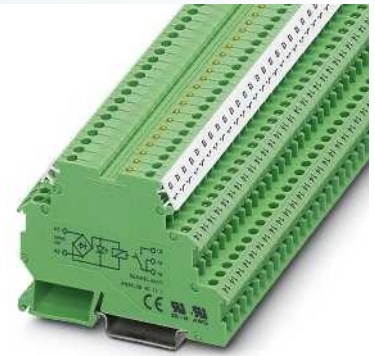
- 2-layer contact with hard gold-plating for universal applications from 1 mA to 5 A continuous current
- 2 kV<sub>rms</sub> electrical isolation of input and output
- Integrated input circuit  
With this terminal block, "ALL" connections for a sensor or actuator are provided in a width of just 6.2 mm.

This means that 16 outputs take up a total overall width of just 105.4 mm (including the power terminal).

Advantages:

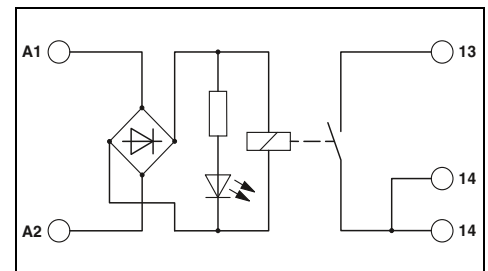
- Lower costs as the N terminal block is no longer required
- Wiring is reduced to a minimum
- Space savings of up to 73%

Notes:	
Type of housing:	Polyamide PA, non-reinforced, color: green.
Marking systems and mounting material	See Catalog 3
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.	
For additional EB...DIK... insertion bridges, refer to page 443	



for small to medium loads  
1 N/O contact (1)

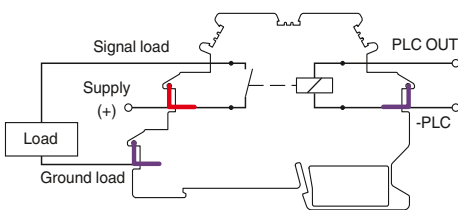
ERC



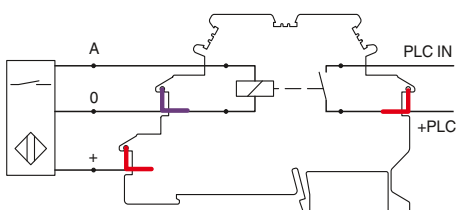
#### Technical data

Input data	
Permissible range (with reference to U <sub>N</sub> )	① 0.9 - 1.1 ② 0.8 - 1.1
Typical input current at U <sub>N</sub>	[mA] 23
Response/release time at U <sub>N</sub>	[ms] 8 / 15
Input protection:	Yellow LED, bridge rectifier
Output data	
Contact type	1 N/O contact (double contact)
Contact material	AgNi, hard gold-plated
Max. switching voltage	250 V AC / 125 V DC
Minimum switching voltage	0.1 V
Limiting continuous current	3 A (5 A up to 35°C at 24 V DC)
Maximum switch-on current	5 A
Minimum switching current	1 mA
Maximum interrupting rating, ohmic load	24 V DC 72 W 48 V DC 60 W 60 V DC 50 W 110 V DC 50 W 250 V AC 750 VA

General data	
Test voltage (winding / contact)	2 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20 °C ... 50 °C
Mechanical service life	Approx. 2x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664 , EN 50178
Connection data solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
Dimensions	W / H / D 6.2 mm / 80 mm / 56 mm
EMC note	Class A product, see page 605



Pin configuration, DEK-REL...AKT



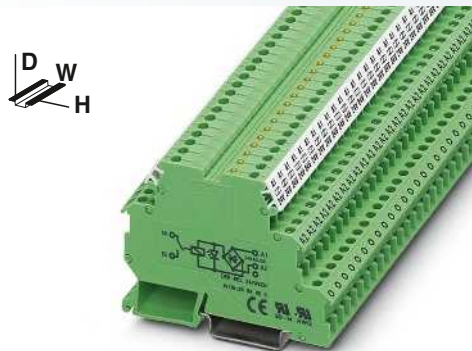
Pin configuration DEK-REL...SEN

Description	
Relay terminal block with miniature relay	Input voltage U <sub>N</sub> ① 5 V AC/DC ② 24 V AC/DC

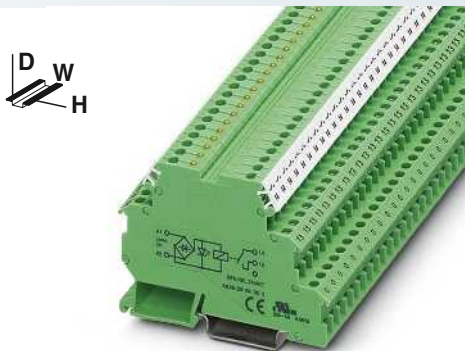
Ordering data		
Type	Order No.	Pcs./Pkt.
DEK-REL- 5/I/1	2941183	10
DEK-REL- 24/I/1	2940171	10

Accessories		
D-DEK 1,5 GN	2716949	10
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1

Relay modules in terminal block design - DEK series



for small to medium loads  
1 N/O contact (1)



for small to medium loads  
1 N/O contact (1)

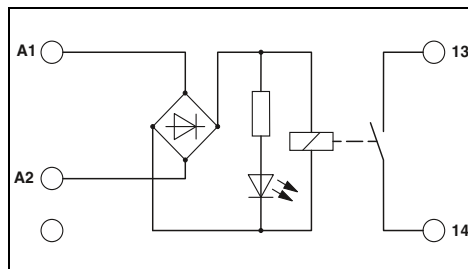
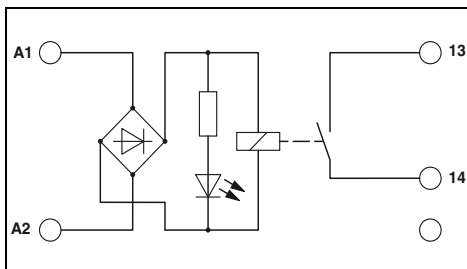
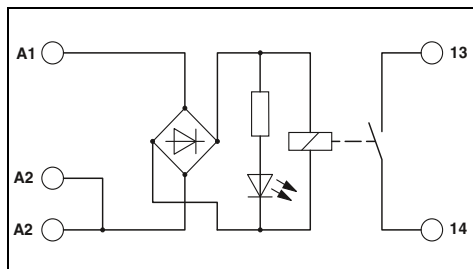


for small to medium loads  
1 N/O contact (1)

ERC

ERC

ERC



Technical data

Technical data

Technical data

① 0.9 - 1.1  
② 0.8 - 1.1  
23 6.5  
8 / 15 5 / 15  
Yellow LED, bridge rectifier

② 0.8 - 1.1  
6.5  
5 / 15  
Yellow LED, bridge rectifier

② 0.8 - 1.1  
6.5  
5 / 15  
Yellow LED, bridge rectifier

1 N/O contact (double contact)  
AgNi, hard gold-plated  
250 V AC / 125 V DC  
0.1 V  
3 A (5 A up to 35°C at 24 V DC)  
5 A  
1 mA

1 N/O contact  
AgNi, hard gold-plated  
250 V AC / 125 V DC  
0.1 V  
3 A (5 A up to 35°C at 24 V DC)  
5 A  
1 mA

1 N/O contact  
AgNi, hard gold-plated  
250 V AC / 125 V DC  
0.1 V  
3 A (5 A up to 35°C at 24 V DC)  
5 A  
1 mA

72 W  
60 W  
50 W  
50 W  
750 VA

72 W  
60 W  
50 W  
50 W  
750 VA

72 W  
60 W  
50 W  
50 W  
750 VA

2 kV AC (50 Hz, 1 min.)  
-20 °C ... 50 °C  
Approx. 2x 10<sup>7</sup> cycles  
IEC 60664 , EN 50178  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 605

2 kV AC (50 Hz, 1 min.)  
-20 °C ... 50 °C  
Approx. 2x 10<sup>7</sup> cycles  
IEC 60664 , EN 50178  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 605

2 kV AC (50 Hz, 1 min.)  
-20 °C ... 50 °C  
Approx. 2x 10<sup>7</sup> cycles  
IEC 60664 , EN 50178  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 605

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
DEK-REL- 5/O/1	2941170	10
DEK-REL- 24/O/1	2941154	10

Type	Order No.	Pcs./ Pkt.
DEK-REL- 24/1/AKT	2964063	10

Type	Order No.	Pcs./ Pkt.
DEK-REL- 24/1/SEN	2964050	10

Accessories

Accessories

Accessories

Accessories	Order No.	Pcs./ Pkt.
D-DEK 1,5 GN	2716949	10
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1

Accessories	Order No.	Pcs./ Pkt.
DIKD 1,5	2715979	50
D-DEK 1,5 GN	2716949	10
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1

Accessories	Order No.	Pcs./ Pkt.
DIKD 1,5	2715979	50
D-DEK 1,5 GN	2716949	10
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1

# Relay modules

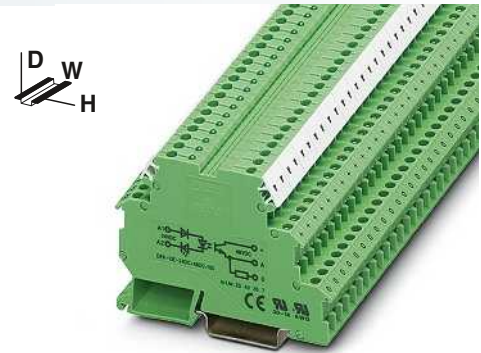
## Relay modules in terminal block design - DEK series

### DEK-OE... and DEK-OV... solid-state relay terminal blocks

Phoenix Contact DEK-OE and DEK-OV interface terminal blocks are only 6.2 mm wide but still provide a complete input or output interface with:

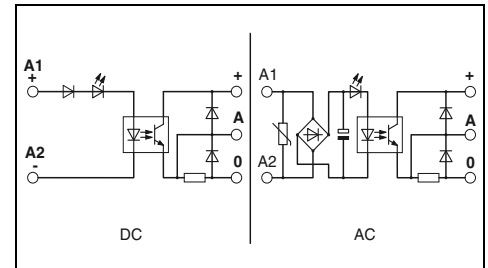
- Electrical isolation between input and output at up to 2.5 kV<sub>rms</sub>
- Integrated input circuit
- Status display
- EB-DIK insertion bridges
- Marking and mounting with terminal block convenience
- Wear-free switching up to 24 V DC/10 A and 240 V AC/800 mA
- Integrated output protection circuit
- Zero voltage switch at AC output
- Actuator version available

<b>Notes:</b>
Type of housing: Polyamide PA, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
For additional EB...DIK... insertion bridges, refer to page 443

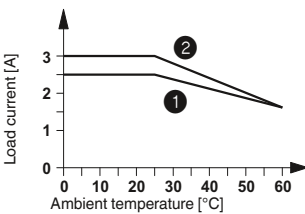


with DC voltage output  
max. = 100 mA

ERC

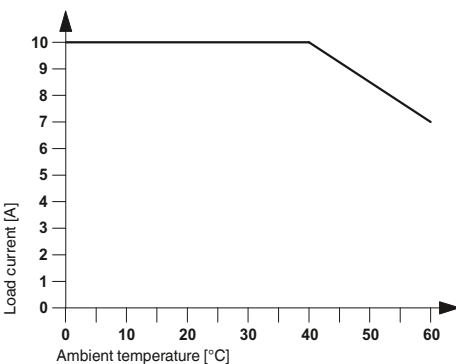


Derating curve for DEK-OV...24DC/3 and DEK-OV-24DC/24DC/3/AKT

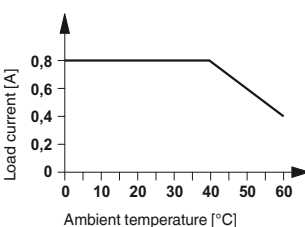


- 1 Horizontal mounting
- 2 Vertical mounting

Derating curve for DEK-OV-24DC/24DC/10



Derating curve for DEK-OV...240AC/800



<b>Input data</b>	
Permissible range (with reference to U <sub>N</sub> )	
Switching level with reference to U <sub>N</sub>	1 signal ("H") 0 signal ("L")
Typical input current at U <sub>N</sub>	[mA]
Transmission frequency f <sub>limit</sub>	[Hz]
Input circuit AC	
Input circuit DC	
<b>Output data</b>	
Operating voltage range	
Periodic peak reverse voltage	
Limiting continuous current	
Minimum load current	
Surge current	
Leakage current in off state	
Max. load value	
Output protection	
Voltage drop at maximum limiting continuous current	
<b>General data</b>	
Test voltage input/output	
Ambient temperature (operation)	
Standards/regulations	
Degree of pollution/surge voltage category	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

Technical data					
①	②	③	④	⑤	⑥
0.9 - 1.1	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.9 - 1.1	0.9 - 1.1
≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.9
≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4
6.5	11	7	4	3.2	2.5
300	300	300	300	3	3
Yellow LED, reverse polarity protection, surge protection					
Yellow LED, reverse polarity protection					
3 V DC ... 48 V DC					
-					
100 mA					
-					
-					
-					
Reverse polarity protection, freewheeling diode					
≤ 0.9 V					
2.5 kV (50 Hz, 1 min.)					
-20 °C ... 60 °C					
IEC 60664, EN 50178					
2 / III					
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14					
6.2 mm / 80 mm / 56 mm					
Class A product, see page 605					

Description	Input voltage U <sub>N</sub>
<b>Solid-state input relays</b>	
①	5 V DC
②	12 V DC
③	24 V DC
④	60 V DC
⑤	120 V AC
⑥	230 V AC
<b>Solid-state power relays</b>	
①	5 V DC
②	12 V DC
③	24 V DC
⑦	24 V DC
Actuator principle	

Ordering data		
Type	Order No.	Pcs./Pkt.
DEK-OE- 5DC/ 48DC/100	2940223	10
DEK-OE- 12DC/ 48DC/100	2964487	10
DEK-OE- 24DC/ 48DC/100	2940207	10
DEK-OE- 60DC/ 48DC/100	2941536	10
DEK-OE-120AC/ 48DC/100	2941659	10
DEK-OE-230AC/ 48DC/100	2940210	10

Insertion bridge, for middle and lower levels	No. of pos.	Color
	80	blue
	80	red
	80	white

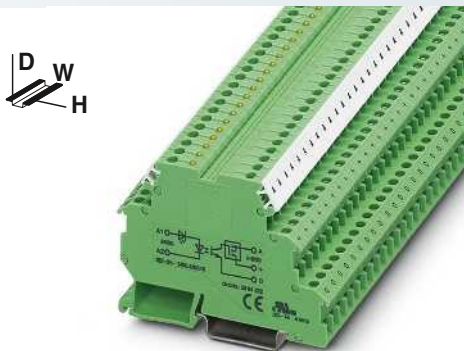
Accessories		
Part No.	Order No.	Pcs./Pkt.
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1



Relay modules in terminal block design - DEK series



with DC voltage output  
max. = 3 A



with DC voltage output  
max. = 10 A

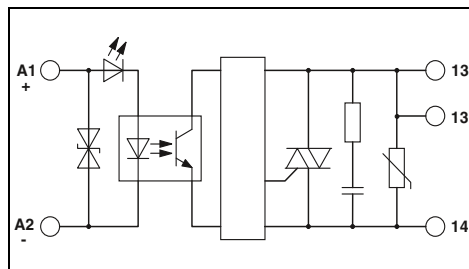
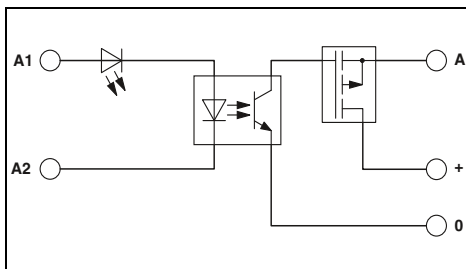
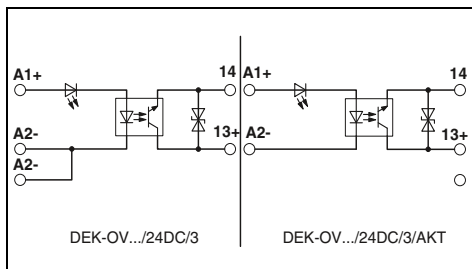


with AC voltage output  
max. = 800 mA

ERC

ERC

ERC



Technical data

Technical data

Technical data

①	②	③	⑦
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2
≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8
≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4
11	8.5	7	7
300	300	300	300

①	②	③
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2
≥ 0.8	≥ 0.8	≥ 0.8
≤ 0.4	≤ 0.4	≤ 0.4
5.1	4.7	3.5
100	100	100

①	②	③
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2
≥ 0.8	≥ 0.8	≥ 0.8
≤ 0.4	≤ 0.4	≤ 0.4
10.2	10.5	10.7
10	10	10

Yellow LED, reverse polarity protection

Yellow LED, reverse polarity protection, surge protection

Yellow LED, reverse polarity protection, surge protection

3 V DC ... 30 V DC

5 V DC ... 30 V DC

10 V AC ... 253 V AC (50/60 Hz)

3 A (see derating curve)

10 A (see derating curve)

0.8 A (see derating curve)

Reverse polarity protection, surge protection  
≤ 0.2 V

Reverse polarity protection, surge protection  
< 50 mV

RCV circuit  
≤ 1 V

2.5 kV (50 Hz, 1 min.)  
-20 °C ... 60 °C  
IEC 60664 , EN 50178  
2 / III  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 605

2.5 kV (50 Hz, 1 min.)  
-20 °C ... 60 °C  
IEC 60664 , EN 50178  
2 / III  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 605

2.5 kV (50 Hz, 1 min.)  
-20 °C ... 60 °C  
IEC 60664 , EN 50178  
2 / III  
0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
6.2 mm / 80 mm / 56 mm

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
DEK-OV- 5DC/ 24DC/ 3	2941361	10
DEK-OV- 12DC/ 24DC/ 3	2941387	10
DEK-OV- 24DC/ 24DC/ 3	2941374	10
DEK-OV- 24DC/ 24DC/ 3/AKT	2964296	10

Type	Order No.	Pcs./ Pkt.
DEK-OV- 5DC/ 24DC/ 10	2961752	10
DEK-OV- 12DC/ 24DC/ 10	2961749	10
DEK-OV- 24DC/ 24DC/ 10	2964322	10

Type	Order No.	Pcs./ Pkt.
DEK-OV- 5DC/240AC/800	2964623	10
DEK-OV- 12DC/240AC/800	2964636	10
DEK-OV- 24DC/240AC/800	2964649	10

Accessories

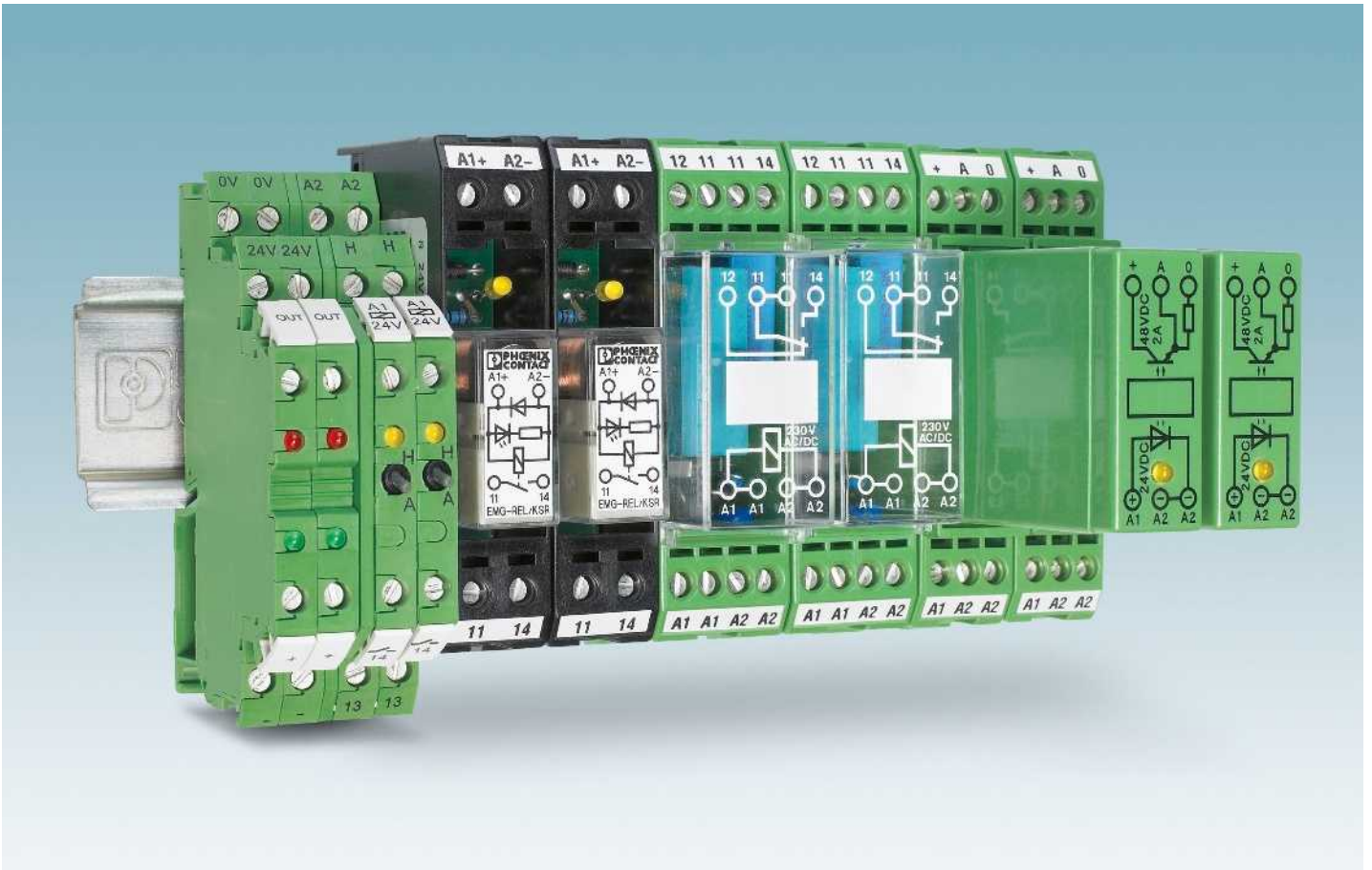
Accessories

Accessories

Type	Order No.	Pcs./ Pkt.
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1

Type	Order No.	Pcs./ Pkt.
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1

Type	Order No.	Pcs./ Pkt.
EB 80- DIK BU	26 A 2715940	1
EB 80- DIK RD	26 A 2715953	1
EB 80- DIK WH	26 A 2715788	1



### DEK-REL-24/1/S switch/relay terminal block

The “Manual”, “0”, and “Automatic” functions are performed in a relay terminal block that is just 6.2 mm wide.

### Interference-free relay and solid-state relay interfaces

Coupled interference voltages on the coil lines or leakage currents can cause malfunctions in conventional modules. These special interface modules, equipped with high switching thresholds and/or effective filters, ensure good functioning.

### ST-REL... and EMG 17-REL... relay interfaces for switching lamp loads

Lamp loads and capacitive loads produce extremely high inrush currents which weld conventional relay contacts. To prevent this, Phoenix Contact uses an arc-resistant contact optimized for these applications, which keeps these peaks under control.

### ST-OV 3-24DC/400/3 plug-in solid-state power relays

The output of this component, dimensioned with a peak reverse voltage of 800 V, allows, for example, 230 V motors to be driven in simple reversible mode.

### Power circuit breaker solid-state relay, with signal logic

These modules combine the features of a short-circuit-proof power solid-state relay and those of a thermomagnetic protection element.

### DEK-OE-...100KHZ 100 kHz input solid-state relay

Input solid-state relay for reliable transmission of high-frequency signals, such as those that occur with incremental encoders, for example.

### Electronic sensor terminal block for NAMUR proximity sensors

For converting the changeable resistance of a NAMUR sensor into a digital signal that can be read by a PLC.

### DEK-TR/INV inverter module

Module for converting NPN outputs to PNP outputs and PNP to NPN.

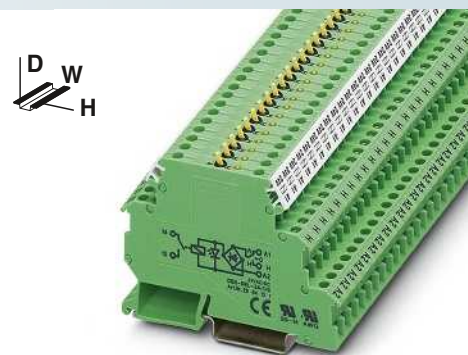
Relay module with manual switch

<b>Notes:</b>
Type of housing: Polyamide PA, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.

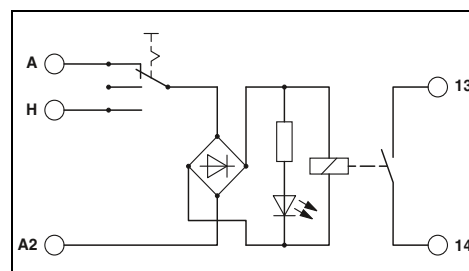
Relay module with manual switch and integrated power relay for manual, zero, and automatic functions

The advantages:

- Maximum switching current of 5 A
- Only 6.2 mm wide
- Increased contact stability thanks to double contact
- Safe isolation according to DIN EN 50178 between coil and contact



Relay module with manual switch and integrated relay



Technical data

<b>Input data</b>	①
Permissible range (with reference to $U_N$ )	0.8 - 1.1
Typical input current at $U_N$ [mA]	6.5
Response/release time at $U_N$ [ms]	5 / 15
Input protection:	Yellow LED, bridge rectifier
<b>Output data</b>	
Contact type	1 N/O contact
Contact material	AgNi, hard gold-plated
Max. switching voltage	250 V AC / 125 V DC
Minimum switching voltage	0.1 V
Limiting continuous current	3 A (5 A up to 35°C at 24 V DC)
Maximum switch-on current	5 A
Minimum switching current	1 mA
Maximum interrupting rating, ohmic load	
	24 V DC 72 W
	48 V DC 60 W
	60 V DC 50 W
	110 V DC 50 W
	250 V AC 750 VA
<b>General data</b>	
Test voltage (winding / contact)	2 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20 °C ... 50 °C
Mechanical service life	Approx. $2 \times 10^7$ cycles
Standards/regulations	IEC 60664 , EN 50178
Connection data solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 14
Dimensions	W / H / D 6.2 mm / 80 mm / 61 mm
EMC note	Class A product, see page 605

Ordering data

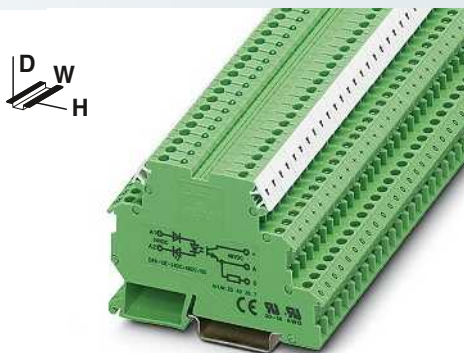
Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
Relay module with power relay	① 24 V AC/DC	DEK-REL- 24/1/S	2964131	10

Accessories

Cover	No. of pos.	Color	D-DEK 1,5 GN	Order No.	Pcs./Pkt.
Insertion bridge	2	red	EB 2- DIK RD	2716693	10
	3	red	EB 3- DIK RD	2716745	10
	4	red	EB 4- DIK RD	2716758	10
	5	red	EB 5- DIK RD	2716761	10
	10	red	EB 10- DIK RD	2716774	10
	2	blue	EB 2- DIK BU	2716648	10
	3	blue	EB 3- DIK BU	2716651	10
	4	blue	EB 4- DIK BU	2716664	10
	5	blue	EB 5- DIK BU	2716677	10
	10	blue	EB 10- DIK BU	2716680	10
	80	blue	EB 80- DIK BU	2715940	1
	80	red	EB 80- DIK RD	2715953	1



<b>Notes:</b>	
Type of housing:	
<b>ST-REL:</b> polyamide PA, non-reinforced, color: bottom part gray, hood green	
<b>EMG:</b> polyamide PA-F, fiber-reinforced, color: green	
<b>DEK:</b> polyamide PA, non-reinforced, color: green	
Marking systems and mounting material See Catalog 3	
For derating curve, refer to page 399	

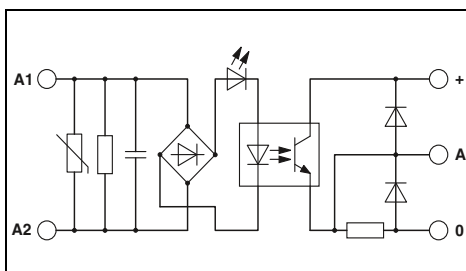


**Solid-state input relay**  
100 mA, maximum



**Solid-state power relay**  
Max. 2 A

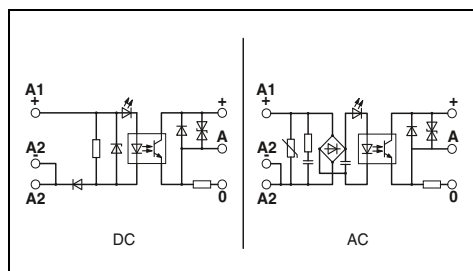
ERC



**Technical data**

Input data	②
Permissible range (with reference to $U_N$ )	0.9 - 1.1
Switching level	1 signal ("H") [V DC] $\geq$ 207 0 signal ("L") [V DC] $\leq$ 92
Typical input current at $U_N$	[mA] 2.5
Typical switch-on time at $U_N$	[ms] 4.4
Typical switch-off time at $U_N$	[ms] 14
Transmission frequency $f_{limit}$	[Hz] 5
Input circuit AC	Yellow LED, surge protection, RC element
Input circuit DC	
Output data	
Max. switching voltage	48 V DC
Minimum switching voltage	3 V DC
Limiting continuous current	100 mA
Maximum switch-on current	-
Output circuit	3-conductor, ground-referenced
Output protection	Reverse polarity protection, free running
Voltage drop at maximum limiting continuous current	$\leq 0.9$ V
General data	
Test voltage input/output	2.5 kV AC
Ambient temperature (operation)	0 °C ... 50 °C
Standards/regulations	IEC 60664, EN 50178
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	any / In rows with zero spacing
Connection data solid/stranded/AWG	0.2 - 2.5 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	W / H / D 6.2 mm / 80 mm / 56 mm
EMC note	

ERC



**Technical data**

①	0.8 - 1.2
①	16.8
①	16
①	8
①	0.02
①	0.2
①	300
	Reverse polarity protection
	48 V DC
	12 V DC
	2 A (see derating curve)
	5 A (t = 1 s)
	3-conductor, ground-referenced
	Reverse polarity protection, surge protection
	1.1 V
	3.5 kV AC
	-10 °C ... 55 °C
	IEC 60664, EN 50178
	2 / III
	- / Mounted in rows with zero spacing: Horizontal/not in rows: Any
	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
	17.5 mm / 75 mm / 102 mm
	Class A product, see page 605

**Ordering data**

Description	Input voltage $U_N$
<b>Solid-state power relays</b>	
	① 24 V DC
	② 230 V AC

Type	Order No.	Pcs./ Pkt.
DEK-OE-230AC/ 48DC/100/SO 46	2964678	10

**Accessories**

<b>Equipment marker</b>	
-------------------------	--

**Ordering data**

Type	Order No.	Pcs./ Pkt.
EMG 17-OV- 24DC/ 48DC/2	2942810	10

**Accessories**

EMG-GKS 12	2947035	50
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# Relay modules

## Special relays and solid-state relays

### Relay modules for high inrush currents

The Phoenix Contact relay modules of type SO 38 have been designed for switching electrical equipment with high inrush currents.

Areas of application include:

- Inductive loads (motors, power contactors etc.)
- Inductive/capacitive loads (fluorescent lamps, etc.)
- Ohmic loads (glow lamps, heaters)

The module is based on a relay with a special arc-resistant tungsten lead contact. This takes over the high inrush and interrupting current capacitively. The inductive main contact made of AgCdO takes over the continuous current up to 10 A reliably. With the EMG 17-REL...2E/SO38, this switching capacity is reached using a power relay with a set of silver tin oxide (AgSnO) contacts.

The module is available in two versions:

- Modular EMG housing that can be mounted on a DIN rail, with an overall width of 17.5 mm
- Convenient ST-REL plug-in housing from the Phoenix ST series for mounting on URELG or UDK-RELG basic terminal blocks

Other features include:

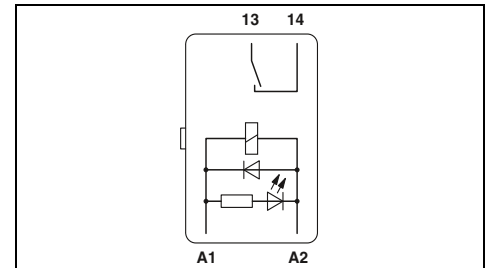
- Snap-on mounting on the common EN DIN rails
- Easy maintenance
- Clear marking of the terminal blocks using Phoenix Contact marking material

Notes:
Type of housing: Polycarbonate PC-F, fiber-reinforced, color: green or black.
Marking systems and mounting material See Catalog 3



medium to large powers  
1 N/O contact (1)

ERC



#### Technical data

Input data	
Permissible range (with reference to $U_N$ )	0.85 - 1.1
Typical input current at $U_N$	28 [mA]
Response/release time at $U_N$	13 / 15 [ms]
Input protection:	Yellow LED, freewheeling diode
Output data	
Contact type	1 N/O contact with lead contact
Contact material	AgCdO
Max. switching voltage	250 V AC
Limiting continuous current	10 A
Maximum switch-on current	80 A (20 ms)
Maximum interrupting rating, ohmic load	24 V DC - 48 V DC - 60 V DC - 110 V DC - 220 V DC - 250 V AC 2500 VA
General data	
Test voltage (winding / contact)	2.5 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20 °C ... 50 °C
Mechanical service life	Approx. 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664 , EN 50178
Mounting position/mounting	- / Horizontal with zero spacing, vertical with spacing
Connection data solid/stranded/AWG	-
Dimensions	W / H / D 20.8 mm / 42.5 mm / 112 mm
EMC note	

①	0.85 - 1.1
	28 [mA]
	13 / 15 [ms]
	Yellow LED, freewheeling diode

	1 N/O contact with lead contact
	AgCdO
	250 V AC
	10 A
	80 A (20 ms)
	24 V DC -
	48 V DC -
	60 V DC -
	110 V DC -
	220 V DC -
	250 V AC 2500 VA

	2.5 kV AC (50 Hz, 1 min.)
	-20 °C ... 50 °C
	Approx. 10 <sup>7</sup> cycles
	IEC 60664 , EN 50178
	- / Horizontal with zero spacing, vertical with spacing

#### Ordering data

Description	Input voltage $U_N$
Relay module with power contact relay + wolfram lead contact	① 24 V DC
Relay module with power contact relay, with two inputs for manual, automatic	① 24 V DC

Type	Order No.	Pcs./ Pkt.
ST-REL3-KG 24/ 1/SO38	2829564	10

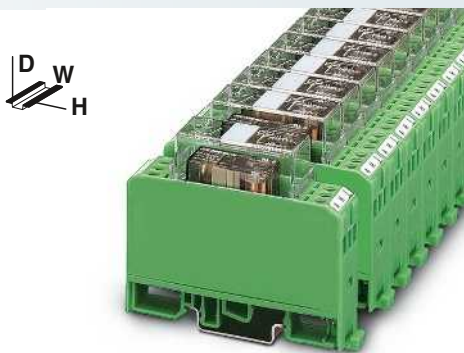
#### Accessories

Basic terminal block, complete with end cover	URELG 3	2820136	10
Equipment marker			

URELG 3	2820136	10
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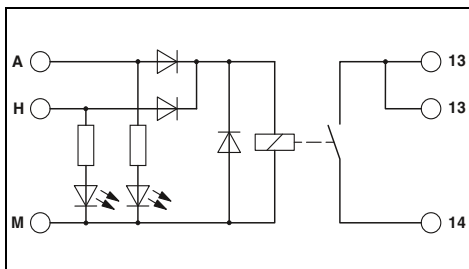
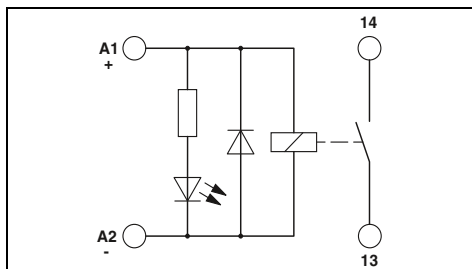
medium to large powers  
1 N/O contact (1)



medium to large powers  
1 N/O contact (1)

ERIC

ERIC



Technical data

Technical data

①  
0.85 -  
1.1  
28  
13 /  
15  
Yellow LED, freewheeling diode

①  
0.9 -  
1.1  
23  
9 / 10  
Automatic: Yellow LED, Manual: Red LED, freewheeling diode, reverse polarity protection

1 N/O contact with lead contact  
AgCdO  
250 V AC  
10 A  
80 A (20 ms)

Single contact, 1 N/O contact  
AgSnO  
250 V AC/DC  
10 A  
120 A (20 ms)

-  
-  
-  
-  
-  
2500 VA

240 W  
120 W  
85 W  
70 W  
90 W  
2500 VA

4 kV AC (50 Hz, 1 min.)  
-20 °C ... 50 °C  
Approx. 10<sup>7</sup> cycles  
IEC 60664 , EN 50178  
any

4 kV AC (50 Hz, 1 min.)  
-20 °C ... 50 °C  
3 x 10<sup>7</sup> cycles  
IEC 60664 , EN 50178  
any

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
17.5 mm / 75 mm / 62.5 mm  
Class A product, see page 605

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
17.5 mm / 75 mm / 62.5 mm  
Class A product, see page 605

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
EMG 17-REL/KSR-G 24/SO38 BK	2949994	10

Type	Order No.	Pcs./ Pkt.
EMG 17-REL/KSR-G 24/2E/SO38	2941646	10

Accessories

Accessories

EMG-GKS 12	2947035	50
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EMG-GKS 12	2947035	50
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# Relay modules

## Special relays and solid-state relays

### Plug-in solid-state power relays ST-OV 3

The plug-in version of the module provides all the advantages of the ST series, such as:

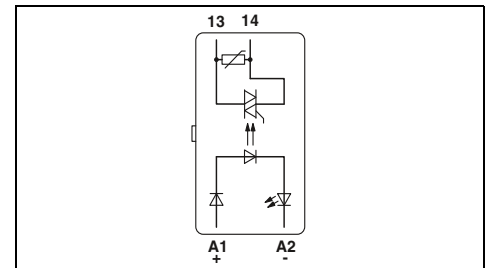
- Switching of up to 400 V AC/3 A
- Control of 230 V motors in straightforward reversing mode (e.g., synchronous motor in single-phase operation, see illustration)
- Plug-in design

Notes:	
Type of insulating housing: polyamide PA, non-reinforced, color: bottom part gray, hood green	
Ground (minus) potential from the input and output of the optocoupler should not be connected.	
AC loads must be protected with a varistor or an RC element.	



with AC voltage output  
max. = 3 A

ERC



#### Technical data

Input data		①
Switching level with reference to $U_N$	1 signal ("H")	$\geq 0.8$
	0 signal ("L")	$\leq 0.4$
Typical input current at $U_N$		[mA] 7
Transmission frequency $f_{limit}$		[Hz] 10
Input protection:		Yellow LED, reverse polarity protection, RC element
Output data		
Operating voltage		400 V AC
Operating voltage range		24 V AC ... 420 V AC
Periodic peak reverse voltage		800 V
Limiting continuous current		3 A (see derating curve)
Minimum load current		50 mA
Surge current		125 A ( $t = 10$ ms)
Residual voltage drop at "H"		$\leq 1.2$ V
Leakage current in off state		approx. 12 mA
Output protection		Surge protection, RC element
General data		
Test voltage input/output		2.5 kV AC
Ambient temperature (operation)		0 °C ... 60 °C
Standards/regulations		IEC 60664, EN 50178
Degree of pollution/surge voltage category		2 / III
Mounting position/mounting		Horizontal DIN rail / -
Dimensions	W / H / D	20.8 mm / 42.5 mm / 112 mm

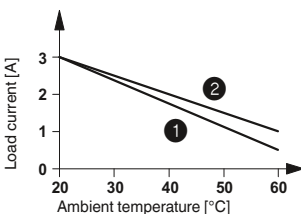
#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./Pkt.
Solid-state power relays	① 24 V DC	ST-OV3- 24DC/400AC/3	2905417	10

#### Accessories

Basic terminal block, complete with end cover	URELG 3	2820136	10
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Derating curve for ST-OV 3-24DC/400AC/3



- ① Aligned without spacing
- ② Aligned with  $\geq 20$  mm spacing



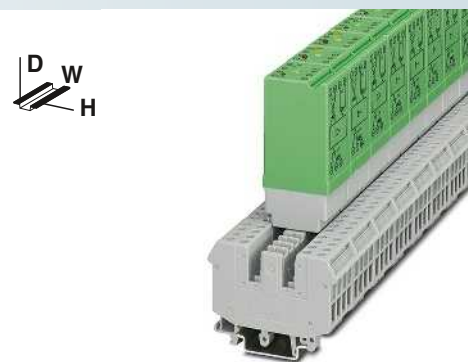
**Power circuit breaker solid-state relay with signal logic ST-OV 4-24DC/24DC/...-PRO**

The ST-OV 4-...PRO provides protection and monitoring functions that are otherwise only known from thermomagnetic protection elements.

The PROtect modules have the following features:

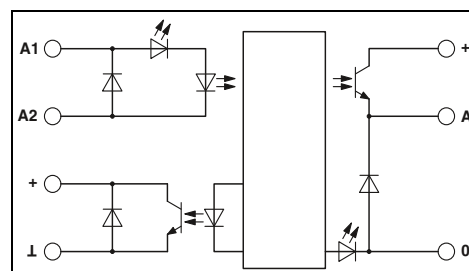
- Fast short-circuit shutdown and simultaneous current limitation
- Time-dependent overload shutdown for reliable protection against continuous overloads
- Brief inrush peaks are ignored
- After an overload or short circuit has been triggered, a defined reset of the control voltage must be carried out
- Reliable recognition and indication of an open circuit on the load side
- Feedback in the event of an error

Notes:	
Type of housing:	Polyamide PA, non-reinforced, color: bottom part gray, hood green
Marking systems and mounting material	See Catalog 3
For load current diagram, see page 401	
Derating curve, time/current characteristic curves, and state diagram, see page 401	



with short-circuit-proof DC voltage output max. = 1 A or 4 A

ERIC



**Technical data**

Input data	ST-OV4- 24DC/ 24DC/1-PRO	ST-OV4- 24DC/ 24DC/4-PRO
Operating voltage	24 V DC	24 V DC
Switching level	8.5 V DC	5 V DC
Typical input current at $U_N$	6.5 mA	6.5 mA
Transmission frequency $f_{limit}$	100 Hz	100 Hz
Reset duration after short circuit/overload cut-off	1 ms	1 ms
Input circuit	Yellow LED, polarity protection diode	
Output data signaling contact / CONTROL	5 V DC ... 36 V DC	
Operating voltage range	50 mA	
Limiting continuous current	$\leq 1.5 V$	
Residual voltage drop at "H"	Polarity protection diode	
Output protection	3-conductor, ground-referenced	
Output circuit	18 V DC ... 36 V DC	
Operating voltage range	1 A (see derating curve)	4 A (see derating curve)
Limiting continuous current	1 mA	200 mV
Minimum load current	300 mV	
Residual voltage drop at "H"	$< 100 \mu A$	
Open circuit alarm with load current	$\leq 100 ms$ (See the time-current characteristic curve)	
Overload disconnection (~ 1.4 x continuous current)	$< 200 \mu s$ (See the time-current characteristic curve)	
Short-circuit disconnection	approx. 25 A	approx. 70 A
Current limitation at short-circuits	300 $\mu s$ / 700 $\mu s$	
Switching time $t_{in} / t_{out}$	Red LED, Damping diode	
Output protection	3-conductor, ground-referenced	
Output circuit	2.5 kV AC	
General data	2.5 kV AC	
Test voltage input/output	Basic insulation	
Test voltage output/output	0 °C ... 60 °C	
Rated surge voltage	IEC 60664 / EN 50178	
Ambient temperature (operation)	0.2 - 4 mm <sup>2</sup> / 0.2 - 4 mm <sup>2</sup> / 24 - 12	
Standards/regulations	27 mm / 63.5 mm / 114 mm	
Screw connection solid/stranded/AWG		
Dimensions	W / H / D	

**Ordering data**

Description	Output current	Type	Order No.	Pcs./ Pkt.
<b>Power circuit breaker solid-state relay, with signal logic</b>	1 A	ST-OV4- 24DC/ 24DC/1-PRO	2905572	10
	4 A	ST-OV4- 24DC/ 24DC/4-PRO	2905585	10

**Accessories**

<b>Basic terminal block, complete with end cover</b>	UDK-RELG 4	2777056	10
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# Relay modules

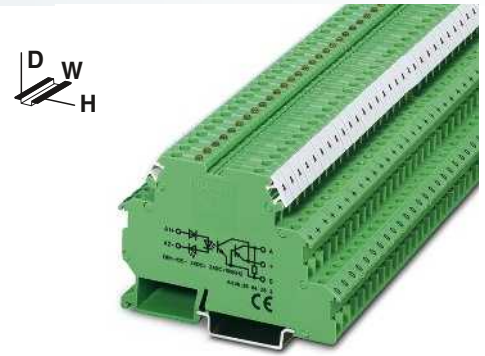
## Special relays and solid-state relays

### 100 kHz input solid-state relay DEK-OE

A solid-state relay for the reliable detection of short pulses

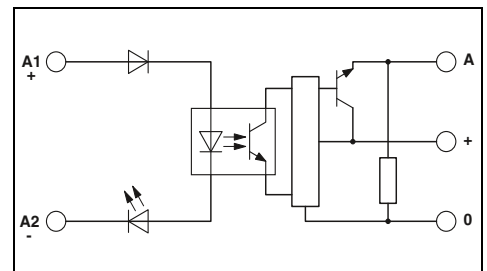
- Limit frequency of up to 100 kHz
- Push-pull stage on output side
- Includes signal inputs on PLC counter boards
- Features a capacitor on the input side for interference suppression

Notes:
Type of housing: Polyamide PA, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3



With DC voltage output  
Transmission frequency 100 kHz

ERC



#### Technical data

Input data		①	②
Permissible range (with reference to $U_N$ )		0.8 - 1.2	0.8 - 1.2
Switching level with reference to $U_N$	1 signal ("H")	$\geq 0.8$	$\geq 0.8$
	0 signal ("L")	$\leq 0.4$	$\leq 0.4$
Typical input current at $U_N$	[mA]	7	6
Typical switch-on time at $U_N$	[ $\mu$ s]	1.5	1.5
Typical switch-off time at $U_N$	[ $\mu$ s]	2	2
Transmission frequency $f_{limit}$	[kHz]	100	100
Input protection:		Yellow LED, reverse polarity protection, surge protection	
Output data			
Operating voltage range		4 V DC ... 30 V DC	
Limiting continuous current		50 mA	
Quiescent current		4.3 mA	
Residual voltage drop at "H"		$\leq 0.5$ V DC	
Output circuit		3-conductor, ground-referenced	
Output protection		Surge protection	
General data			
Test voltage input/output		2.5 kV AC	
Ambient temperature (operation)		-20 °C ... 60 °C	
Standards/regulations		IEC 60664 , EN 50178	
Degree of pollution/surge voltage category		2 / II	
Connection data solid/stranded/AWG		0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12	
Dimensions	W / H / D	6.2 mm / 80 mm / 56 mm	
EMC note		Class A product, see page 605	

#### Ordering data

Description	Input voltage $U_N$	Type	Order No.	Pcs./ Pkt.
Solid-state input relays	① 5 V DC	DEK-OE- 5DC/ 24DC/100KHZ	2964270	10
	② 24 V DC	DEK-OE- 24DC/ 24DC/100KHZ	2964283	10



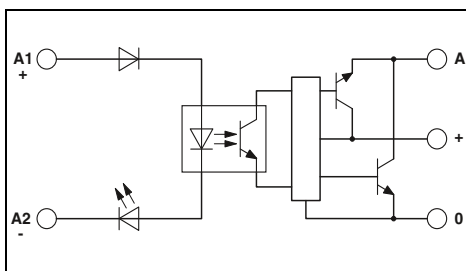
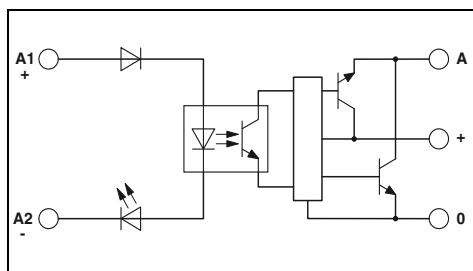
With DC voltage output push-pull  
Transmission frequency 100 kHz



With DC voltage output push-pull  
Transmission frequency 100 kHz

ERC

ERC



Technical data

Technical data

①	②
0.5 - 1.2	0.8 - 1.2
≥ 0.5	≥ 0.8
≤ 0.3	≤ 0.4
8	8
1	1
2	2
100	100

Yellow LED, reverse polarity protection, surge protection

①	②
0.5 - 1.2	0.8 - 1.2
≥ 0.5	≥ 0.8
≤ 0.3	≤ 0.4
8	8
1	1
2	2
100	100

Yellow LED, reverse polarity protection, surge protection

4 V DC ... 18 V DC  
50 mA  
8.5 mA  
≤ 1.2 V DC  
3-conductor push-pull, ground referenced  
Surge protection

14 V DC ... 30 V DC  
50 mA  
15 mA  
≤ 2.2 V DC  
3-conductor push-pull, ground referenced  
Surge protection

2.5 kV AC  
-20 °C ... 60 °C  
IEC 60664 , EN 50178  
2 / II

2.5 kV AC  
-20 °C ... 60 °C  
IEC 60664 , EN 50178  
2 / II

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 605

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
6.2 mm / 80 mm / 56 mm  
Class A product, see page 605

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
DEK-OE- 5DC/ 5DC/100KHZ-G	2964542	10
DEK-OE- 24DC/ 5DC/100KHZ-G	2964364	10

Type	Order No.	Pcs./ Pkt.
DEK-OE- 5DC/ 24DC/100KHZ-G	2964555	10
DEK-OE- 24DC/ 24DC/100KHZ-G	2964348	10

# Relay modules

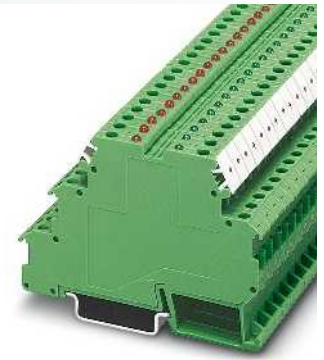
## Special relays and solid-state relays

### Electronic sensor terminal block for NAMUR proximity sensors

The EIK 1-SVN 24-P electronic sensor terminal block from Phoenix converts the changeable resistance of a NAMUR sensor unit into a digital signal that can be read by all PLCs.

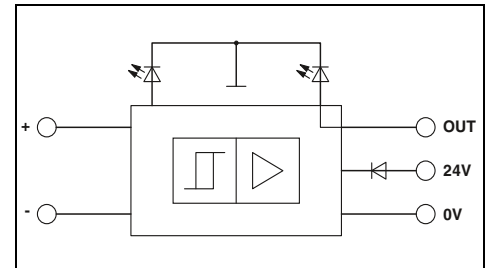
- Monitoring of initiator side for short circuits or strand breaks
- Suitable resistance circuit to enable monitoring of mechanical switches (see application 2)
- LED error display
- Status display (high signal) via green LED
- 24 V/50 mA digital output
- Bridging and marking with standard terminal accessories.

Notes:
Type of housing: Polyamide PA, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3



For inductive proximity sensors acc. to NAMUR

ERC



#### Technical data

<b>Supply</b>	Input supply nominal voltage $U_{VN}$
<b>Ripple</b>	Current consumption $I_{Imax}$ Input circuit
<b>Control circuit</b>	Non-load voltage Switching points in accordance with EN 60947-5-6:
<b>Switching hysteresis</b>	Internal resistance Output protection
<b>Signal output</b>	Maximum output current $I_{Amax}$ Residual voltage $U_R$ with $I_{Omax}$ Output voltage $U_O$
<b>Output protection</b>	36 V Zener diode as freewheeling diode
<b>General data</b>	Ambient temperature (operation) Transmission frequency (INPUT/OUTPUT) Input pulse length Input pause length Standards/regulations Degree of pollution / Overvoltage category
<b>Screw connection solid/stranded/AWG</b>	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
<b>Dimensions</b>	W / H / D 6.2 mm / 80 mm / 56 mm
<b>EMC note</b>	Class A product, see page 605

18.5 V DC ... 28.8 V DC ( $U_{VN}$ , see derating curve)

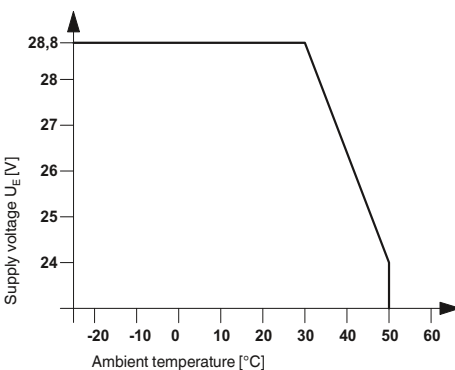
in acc. with DIN 19240  
70 mA (at 50 mA output current)  
Green LED, Polarity protection diode

8.2 V DC  $\pm 10\%$   
 $\geq 2.1$  mA (In conductive state)  
 $\leq 1.2$  mA (In blocking state)  
6.3 mA ... 10 mA (in the event of a short-circuit)  
0 mA ... 0.35 mA (In the event of a wire break)  
approx. 0.2 mA  
approx. 1 k $\Omega$   
visual short-circuit and wire break control with LED (red),  
12 V Zener diode

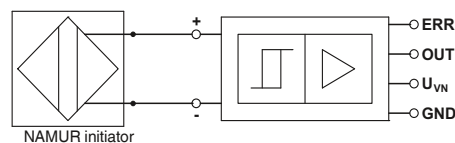
50 mA  
 $\leq 1.5$  V ( $U_R$ )  
 $\leq 100$  mV (In conductive state)  
 $U_{VN} - U_R$  in blocking state  
36 V Zener diode as freewheeling diode

-25 °C ... 50 °C  
1 kHz  
 $\geq 0.5$  ms  
 $\geq 0.5$  ms  
IEC 60664, EN 61000-6-2, EN 61000-6-4  
2 / III

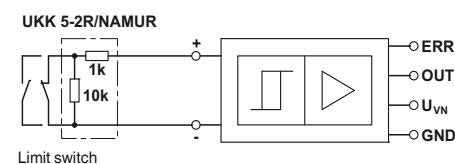
Derating curve for EIK 1-SVN 24 P



#### Application 1



#### Application 2



Description
<b>Switching amplifier electronic terminal block</b> , for inductive proximity sensors as per NAMUR, with light indicators for sensor signal and faults

<b>Terminal block</b> , with three through contacts, for mounting on NS 35...
<b>Double-level terminal block</b> , with pre-assembled resistors
<b>Insertion bridge</b>

#### Ordering data

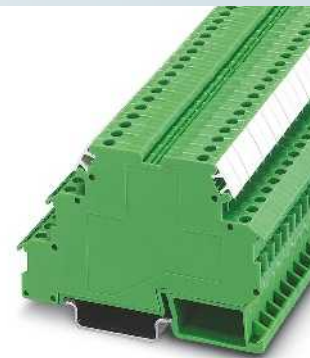
Type	Order No.	Pcs./ Pkt.
EIK1-SVN-24P	2940799	10

#### Accessories

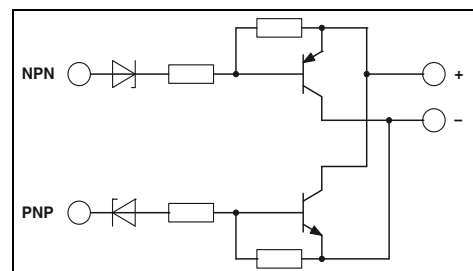
DIKD 1,5	2715979	50
UKK 5-2R/NAMUR	2941662	50
EB...-DIK...		
Ordering data at DEK-REL...		

**DEK-TR/INV inverter module**

<b>Notes:</b>
Type of housing: Polyamide PA, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3



The DEK-TR/INV inverter module inverts the signals of ground-switching NPN transistor outputs into positive switching PNP outputs, as well as signals from PNP into NPN signals. See application example.



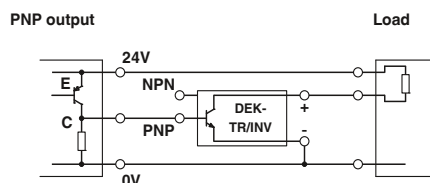
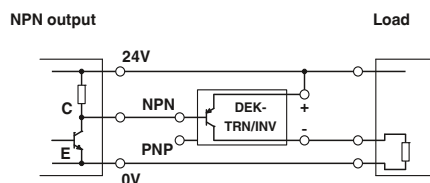
**Technical data**

Supply voltage	20 V DC ... 30 V DC ( $U_V$ )
Continuous current	200 mA
Residual voltage drop	< 1 V
Leakage current	< 1 mA
Maximum transmission frequency	15 kHz
NPN input/PNP output	
Switch-on threshold	< 5 V (at $U_V = 24$ V; < ( $U_V - 19$ V))
Switch-off threshold	> 15 V (at $U_V = 24$ V; > ( $U_V - 9$ V))
Minimum limit values	-2 V
Maximum limit values	26 V (at $U_V = 24$ V; $U_V + 2$ V)
Control circuit	
Switch-on threshold	> 19 V
Switch-off threshold	< 9 V
Minimum limit values	-2 V
Maximum limit values	26 V (at $U_V = 24$ V; $U_V + 2$ V)
General data	
Ambient temperature (operation)	-20 °C ... 50 °C
Standards/regulations	IEC 60664
	Basic insulation
	2 / II
Degree of pollution / Overvoltage category	
Screw connection solid/stranded/AWG	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	6.2 mm / 80 mm / 56 mm

**Ordering data**

Description	Type	Order No.	Pcs./ Pkt.
Inverter module	DEK-TR/INV	2964319	10

**Connection examples:**



# Relay modules

## Special relays and solid-state relays

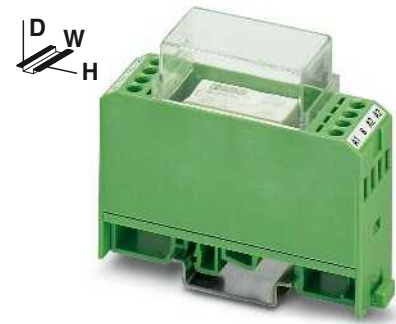
### Hybrid relay modules

With its integrated transistor level, the hybrid relay module is able to amplify weak input signals. This serves as the basis for reliable relay operation.

The advantages:

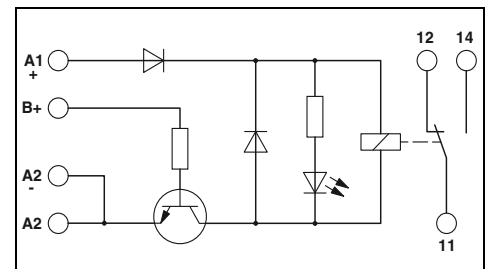
- Low control current (terminal B), type-dependent as of 0.5 mA
- Type-dependent positive or negative control current
- Integrated input and interference suppression circuit
- Safe isolation according to DIN EN 50178 between coil and contact

Notes:
Type of housing: Polycarbonate PC-F, fiber-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.



Positive switching hybrid relay

ERC



#### Technical data

Input data	①	②	③
Relay supply voltage $U_N \pm 10\%$	[V DC] 24	24	24
Minimum control voltage	[V DC] 2.7	5	15
Maximum control voltage	[V DC] 5.25	13.2	35
Minimum control current	[mA] 2.6	0.5	0.5
Maximum control current	[mA] 7.7	1	1
Typical input current at $U_N$	[mA] 21	21	21
Response/release time at $U_N$	[ms] 9 / 10	9 / 10	9 / 10
Input protection:	Yellow LED, reverse polarity protection, freewheeling diode		
Output data			
Contact type	Single contact, 1-PDT		
Contact material	AgNi		
Max. switching voltage	250 V AC/DC		
Limiting continuous current	5 A		
Maximum switch-on current	8 A		
Maximum interrupting rating, ohmic load	24 V DC	120 W	
	48 V DC	60 W	
	60 V DC	50 W	
	110 V DC	50 W	
	220 V DC	80 W	
	250 V AC	1250 VA	
General data			
Test voltage (winding / contact)	4 kV AC (50 Hz, 1 min.)		
Ambient temperature (operation)	-20 °C ... 50 °C		
Mechanical service life	Approx. $5 \times 10^7$ cycles		
Standards/regulations	IEC 60664, EN 50178		
Degree of pollution/surge voltage category	2 / III		
Connection data solid/stranded/AWG	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12		
Dimensions	W / H / D	22.5 mm / 75 mm / 62.5 mm	
EMC note	Class A product, see page 605		

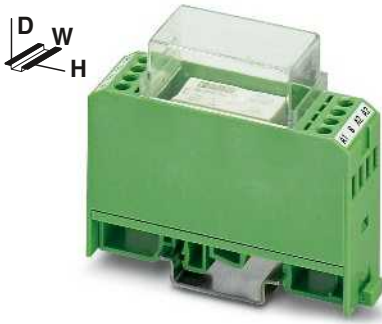
#### Ordering data

Description	Nominal control voltage
<b>Relay module with miniature power contact relay with integrated NPN transistor control, for low control currents</b>	① 5 V DC
	② 12 V DC
	③ 24 V DC
<b>Relay module with miniature power contact relay with integrated PNP transistor control, for low control currents</b>	① 5 V DC
	② 12 V DC
	③ 24 V DC

Type	Order No.	Pcs./ Pkt.
EMG 22-REL/KSR-G 24/TRN 5	2949787	10
EMG 22-REL/KSR-G 24/TRN12	2952363	10
EMG 22-REL/KSR-G 24/TRN35	2952350	10

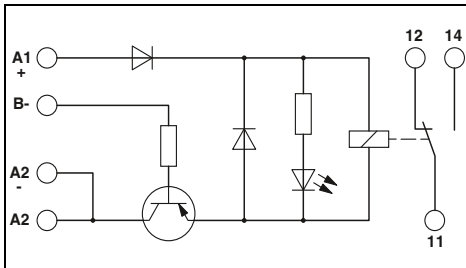
#### Accessories

Equipment marker	Order No.	Pcs.
EMG-GKS 12	2947035	50



Negative switching hybrid relay

ERC



Technical data

①	②	③
24	24	24
-2.4	-6.9	-17.5
-5.25	-13.2	-38.5
1.2	0.6	0.6
1.7	1	1.4
21	21	21
9 / 10	9 / 10	9 / 10

Yellow LED, reverse polarity protection, freewheeling diode

Single contact, 1-PDT

AgNi  
250 V AC/DC  
5 A  
8 A

120 W  
60 W  
50 W  
50 W  
80 W  
1250 VA

4 kV AC (50 Hz, 1 min.)  
-20 °C ... 50 °C  
Approx. 5x 10<sup>7</sup> cycles  
IEC 60664 , EN 50178  
2 / III

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
22.5 mm / 75 mm / 62.5 mm  
Class A product, see page 605

Ordering data

Type	Order No.	Pcs./ Pkt.
EMG 22-REL/KSR-G 24/TRP 5	2949790	10
EMG 22-REL/KSR-G 24/TRP12	2952156	10
EMG 22-REL/KSR-G 24/TRP35	2952169	10

Accessories

EMG-GKS 12	2947035	50
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# Relay modules

## Relays with force-guided contacts

### Fully assembled RIF-1 coupling relay module with force-guided contacts

Fully assembled RIF-1 coupling relay module with force-guided contacts, consisting of:

- Relay base with Push-in connection
- 2-PDT relay with force-guided contacts according to EN 50205
- Relay retaining bracket
- Interference suppression module

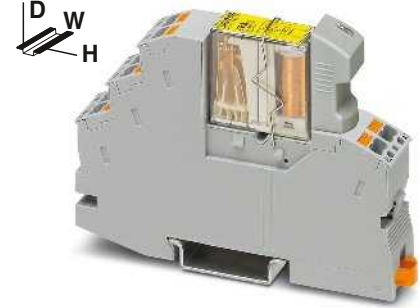
The advantages:

- Switching current of up to 2x 6 A
- Single-channel control
- Force-guided contacts according to EN 50205
- Professional bridging of adjacent modules saves wiring time
- Integrated status LED and freewheeling diode

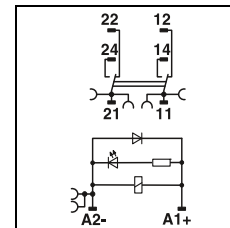
<b>Notes:</b>
Further voltage variants on request



new



**2-PDT relay module with force-guided contacts, max. 2 x 6 A**



<b>Input data</b>	
Permissible range (with reference to $U_N$ )	
Typical input current at $U_N$	[mA]
Typical response time at $U_N$	[ms]
Typical release time at $U_N$	[ms]
Input circuit DC	
<b>Output data</b>	
Contact type	
Contact material	
Max. switching voltage	
Minimum switching voltage	
Limiting continuous current	
Maximum switch-on current	
Minimum switching current	
<b>General data</b>	
Ambient temperature (operation)	
Nominal operating mode	
Mechanical service life	
Standards/regulations	
Degree of pollution/surge voltage category	
Mounting position/mounting	
Connection data solid/stranded/AWG	
Dimensions	W / H / D
EMC note	

<b>Technical data</b>	
①	see diagram
	30
	10
	10
	Yellow LED, damping diode
	2 PDT, force-guided
	AgNi
	250 V AC/DC
	15 V AC/DC
	6 A
	6 A
	10 mA
	-20 °C ... 50 °C
	100% operating factor
	Approx. 10 <sup>7</sup> cycles
	DIN EN 50178/VDE 0160 , EN 50205
	2 / III
	any / in rows with zero spacing
	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
	16 mm / 93 mm / 70 mm
	Class A product, see page 605

Description	Input voltage $U_N$
<b>Coupling relay module</b> with power contact relay and force-guided contacts, Push-in connection	
	① 24 V DC
<b>Force-guided coupling relay</b> with power contacts	
	① 24 V DC

<b>Ordering data</b>		
Type	Order No.	Pcs./Pkt.
RIF-1-RPT-LDP-24DC/2X21/FG	2908215	10



new

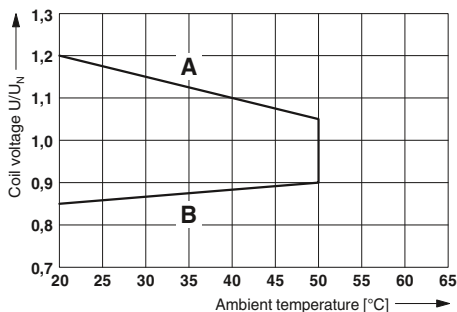
### RIF-1-RPT-LDP-24DC/2X21/FG



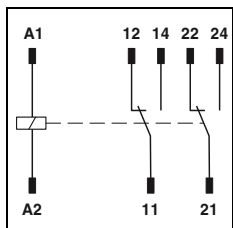
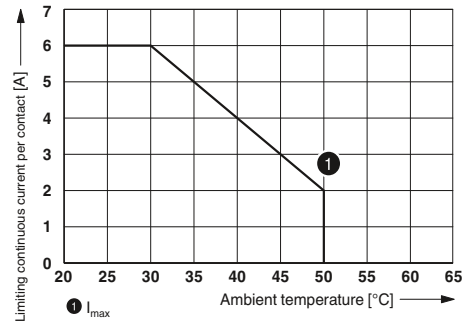
2-PDT relay with force-guided contacts, max. 2 x 6 A



Operating voltage range



Contact derating



#### Technical data

① see diagram  
29  
10  
4

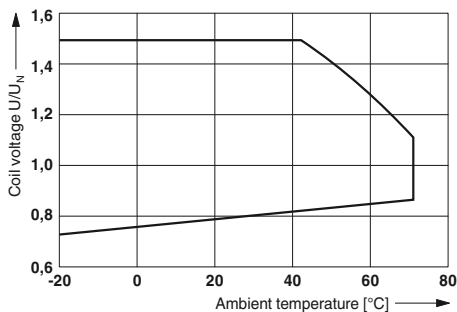
2 PDT  
AgNi  
250 V AC/DC  
15 V  
6 A  
6 A  
10 mA

-25 °C ... 70 °C  
100% operating factor  
Approx. 10<sup>7</sup> cycles  
DIN EN 50178, IEC 60664-1  
2 / III

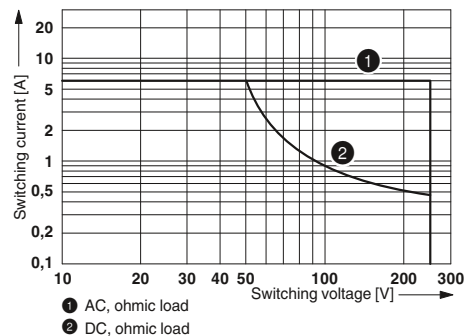
- ... - / - ... - / -  
12.6 mm / 29 mm / 25.5 mm

### REL-SR- 24DC/2X21/FG

Operating voltage range



Interrupting rating



#### Ordering data

Type	Order No.	Pcs./ Pkt.
REL-SR- 24DC/2X21/FG	2908777	20

# Relay modules

## Relay modules for potentially explosive areas (Zone 2)

### PLC-INTERFACE for hazardous areas

Relay modules with ATEX, IECEx, and Class 1, Division 2 approval for potentially explosive applications as well as solid-state relays with Class 1, Division 2 approval.

The advantages:

- Slim design
- Functional plug-in bridges
- Integrated input and interference suppression circuit
- RTIII-sealed relays
- Safe isolation according to DIN EN 50178 between coil and contact

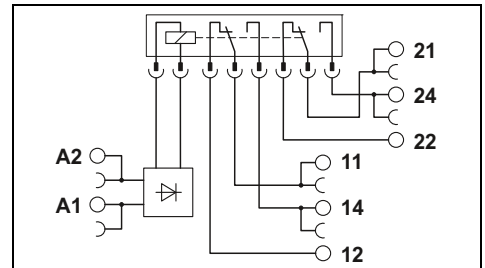
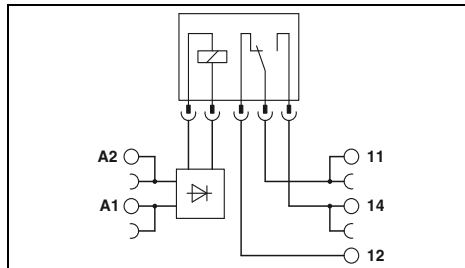
<b>Notes:</b>
Type of insulating housing: Polyamide PBT, non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
The PLC-ATP partition plate must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
<sup>1)</sup> Ambient temperature (operation): -40°C ... 55°C (ATEX / IECEx)



1-PDT relay module,  
6 A, maximum



2-PDT relay module,  
2 x 6 A, maximum



#### Technical data

Input data	①	②	③	④	
Permissible range (with reference to U <sub>N</sub> )	See diagram				
Switching level (with reference to U <sub>N</sub> )	1 signal ("H") 0 signal ("L")				
Typical input current at U <sub>N</sub>	[mA]	15.3	9	3.5	3.2
Typical response time/switch-on time at U <sub>N</sub>	[ms]	5	5	6	7
Typical release time/switch-off time at U <sub>N</sub>	[ms]	8	8	15	15
Transmission frequency f <sub>limit</sub>	[Hz]				
Input circuit DC	Yellow LED, reverse polarity protection, freewheeling diode				
Input circuit AC/DC	Yellow LED, bridge rectifier				
<b>Output data</b>					
Contact material	AgSnO				
Max. switching voltage	250 V AC/DC				
Minimum switching voltage	5 V (at 100 mA)				
Limiting continuous current	6 A				
Maximum switch-on current	10 A (4 s)				
Minimum switching current	10 mA (at 12 V)				
Output protection	-				
Voltage drop at maximum limiting continuous current	-				
<b>General data</b>					
Test voltage input/output	4 kV AC (50 Hz, 1 min.)				
Ambient temperature (operation)	-20 °C ... 60 °C (UL), -40 °C ... 60 °C (ATEX / IECEx)				
Mechanical service life	2 x 10 <sup>7</sup> cycles				
Standards/regulations	IEC 60664, EN 50178, EN 60079-0, -7, -15				
Degree of pollution/surge voltage category	3 / III				
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14				
Dimensions	W / H / D				
EMC note	6.2 mm / 80 mm / 94 mm				
<b>Conformance/Approvals</b>					
Conformance	CE-compliant				
ATEX	Ex II 3G Ex ec nC IIC T4 Gc (IBExU16ATEXB015 X)				
IECEX	Ex ec nC IIC T4 Gc (IECEX IBE 16.0029X)				
UL, USA	Class I, Zone 2, AEx nA nC IIC T6				
UL, USA/Canada	Class I, Div. 2, Groups A, B, C, D				
UL, Canada	Class I, Zone 2, Ex nA nC IIC Gc T6 X				

#### Technical data

Input data	①	②	③	④	
Permissible range (with reference to U <sub>N</sub> )	See diagram				
Switching level (with reference to U <sub>N</sub> )	1 signal ("H") 0 signal ("L")				
Typical input current at U <sub>N</sub>	[mA]	33	18	4.5	4.5
Typical response time/switch-on time at U <sub>N</sub>	[ms]	8	8	7	7
Typical release time/switch-off time at U <sub>N</sub>	[ms]	10	10	10	10
Transmission frequency f <sub>limit</sub>	[Hz]				
Input circuit DC	Yellow LED, reverse polarity protection, freewheeling diode				
Input circuit AC/DC	Yellow LED, bridge rectifier				
<b>Output data</b>					
Contact material	AgNi				
Max. switching voltage	250 V AC/DC				
Minimum switching voltage	5 V AC/DC (at 10 mA)				
Limiting continuous current	6 A				
Maximum switch-on current	15 A (300 ms)				
Minimum switching current	10 mA (At 5 V)				
Output protection	-				
Voltage drop at maximum limiting continuous current	-				
<b>General data</b>					
Test voltage input/output	4 kV AC (50 Hz, 1 min.)				
Ambient temperature (operation)	-20 °C ... 60 °C (UL), -40 °C ... 60 °C (ATEX / IECEx)				
Mechanical service life	3 x 10 <sup>7</sup> cycles				
Standards/regulations	IEC 60664, EN 50178, EN 60079-0, -7, -15				
Degree of pollution/surge voltage category	2 / III				
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14				
Dimensions	W / H / D				
EMC note	14 mm / 80 mm / 94 mm				
<b>Conformance/Approvals</b>					
Conformance	CE-compliant				
ATEX	Ex II 3G Ex ec nC IIC T4 Gc (IBExU16ATEXB015 X)				
IECEX	Ex ec nC IIC T4 Gc (IECEX IBE 16.0029X)				
UL, USA	Class I, Zone 2, AEx nA nC IIC T6				
UL, USA/Canada	Class I, Div. 2, Groups A, B, C, D				
UL, Canada	Class I, Zone 2, Ex nA nC IIC Gc T6 X				

#### Ordering data

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

Type	Order No.	Pcs./Pkt.
PLC-RSC-12DC/21/EX	2909522	10
PLC-RSC-24DC/21/EX	2909524	10
PLC-RSC-120UC/21/EX	2909525	10
PLC-RSC-230UC/21/EX <sup>1)</sup>	2909526	10
PLC-RPT-12DC/21/EX	2909527	10
PLC-RPT-24DC/21/EX	2909528	10
PLC-RPT-120UC/21/EX	2909529	10
PLC-RPT-230UC/21/EX <sup>1)</sup>	2909530	10

#### Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC-12DC/21-21/EX	2909517	10
PLC-RSC-24DC/21-21/EX	2909509	10
PLC-RSC-120UC/21-21/EX	2909511	10
PLC-RSC-230UC/21-21/EX <sup>1)</sup>	2909512	10
PLC-RPT-12DC/21-21/EX	2909513	10
PLC-RPT-24DC/21-21/EX	2909514	10
PLC-RPT-120UC/21-21/EX	2909515	10
PLC-RPT-230UC/21-21/EX <sup>1)</sup>	2909516	10

new



1-PDT relay module, max. 10 A



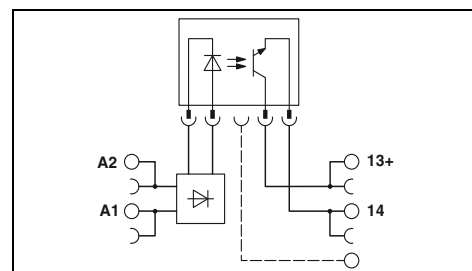
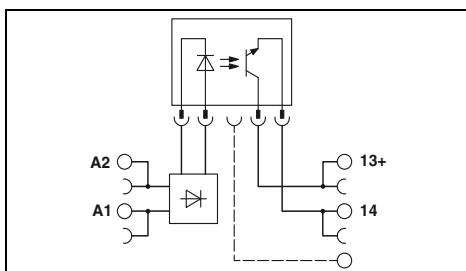
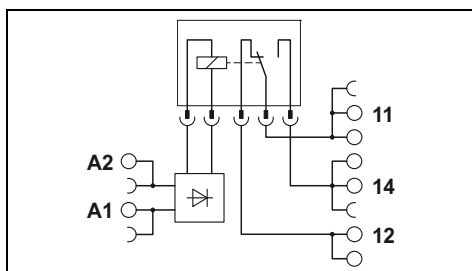
Solid-state relay module, DC output max. 3 A



Solid-state relay module, DC output max. 100 mA

Ex:

Ex:



Technical data

Technical data

Technical data

① ② ③ ④  
See diagram

②	③
0.8 - 1.2	0.9 - 1.1
≥ 0.8	≥ 0.8
≤ 0.4	≤ 0.3
8.5	3.5
0.02	3.5
0.3	7
300	10

②	③
0.8 - 1.2	0.9 - 1.1
≥ 0.8	≥ 0.9
≤ 0.4	≤ 0.3
8.5	3.5
0.02	3
0.3	4
300	10

Yellow LED, reverse polarity protection, freewheeling diode  
Yellow LED, bridge rectifier

Yellow LED, reverse polarity protection, freewheeling diode  
Yellow LED, bridge rectifier

Yellow LED, reverse polarity protection, freewheeling diode  
Yellow LED, bridge rectifier

AgNi  
250 V AC/DC  
12 V AC/DC  
10 A  
30 A (300 ms)  
100 mA  
-

-  
33 V DC  
3 V DC  
3 A  
15 A (10 ms)  
-  
Reverse polarity protection, surge protection  
≤ 200 mV

-  
48 V DC  
3 V DC  
100 mA  
-  
Reverse polarity protection, surge protection  
≤ 1 V

4 kV AC (50 Hz, 1 min.)  
-20 °C ... 60 °C (UL), -40 °C ... 60 °C (ATEX / IECEx)  
3 x 10<sup>7</sup> cycles  
IEC 60664, EN 50178, EN 60079-0, -7, -15  
2 / III  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
14 mm / 80 mm / 94 mm

2.5 kV (50 Hz, 1 min.)  
-20 °C ... 60 °C  
-  
IEC 60664, EN 50178  
2 / III  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 605

2.5 kV (50 Hz, 1 min.)  
-20 °C ... 60 °C  
-  
IEC 60664, EN 50178  
2 / III  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
6.2 mm / 80 mm / 94 mm  
Class A product, see page 605

CE-compliant  
Ex II 3G Ex ec nC IIC T4 Gc (IBExU16ATEXB015 X)  
Ex ec nC IIC T4 Gc (IECEx IBE 16.0029 X)  
Class I, Zone 2, AEx nA nC IIC T6  
Class I, Div. 2, Groups A, B, C, D  
Class I, Zone 2, Ex nA nC IIC Gc T6 X

CE-compliant  
-  
-  
Class I, Zone 2, AEx nA nC IIC T6  
Class I, Div. 2, Groups A, B, C, D  
Class I, Zone 2, Ex nA nC IIC Gc T6 X

CE-compliant  
-  
-  
Class I, Zone 2, AEx nA nC IIC T6  
Class I, Div. 2, Groups A, B, C, D  
Class I, Zone 2, Ex nA nC IIC Gc T6 X

Ordering data

Ordering data

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC-12DC/21HC/EX	2909518	10
PLC-RSC-24DC/21HC/EX	2909519	10
PLC-RSC-120UC/21HC/EX	2909520	10
PLC-RSC-230UC/21HC/EX <sup>1)</sup>	2909521	10
PLC-RPT-12DC/21HC/EX	2909531	10
PLC-RPT-24DC/21HC/EX	2909532	10
PLC-RPT-120UC/21HC/EX	2909533	10
PLC-RPT-230UC/21HC/EX <sup>1)</sup>	2909534	10

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

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



# System cabling for controllers

Wiring I/O modules with individual wires is an extremely time-consuming process. Wiring errors and tedious troubleshooting cannot be ruled out.

VARIOFACE system components reduce assembly costs by using plug-in components to carry out wiring quickly, clearly, and without errors.

In the case of **controller-specific system cabling**, front adapters, system cables, and modules are specially matched to each other. Individual solutions exist for the following controllers:

- **ABB**
- **Allen Bradley**
- **Emerson**
- **Honeywell**
- **GE Fanuc**
- **Phoenix Contact**
- **Mitsubishi Electric**
- **OMRON**
- **Schneider Electric**
- **Siemens**
- **Yokogawa**

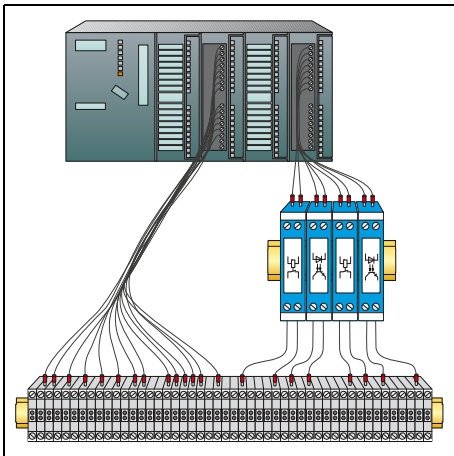
If automation components with high-pos. connectors such as D-SUB are in the control cabinet, **universal modules** and cables are suitable for signal connection. The 1:1 connection is characteristic for these universal all-purpose modules. The modules allow orderly connection of field signals to screw, spring-cage or Push-in technology.

**Universal cables** connect the control and signal level quickly and without errors.

A wide variety of **potential distributors** are available for splitting the control and operating voltage. The different potential levels and the connection terminal blocks support flexible use.

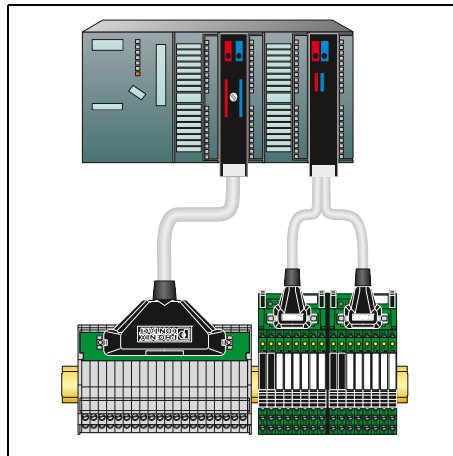
Individual application requirements can be implemented with customer-specific products (see page 468).

<b>Product range overview</b>	
Introduction	462
Product overview	464
<b>Customer-specific products</b>	468
<b>Controller-specific system cabling</b>	
For ABB S800 I/O	470
For Allen Bradley, ControlLogix, SLC 500, and PlantScape	472
For Emerson DeltaV	480
For GE Fanuc RX3i and Series 90-30	484
For Honeywell C300 Series CI/O and PlantScape	486
For Mitsubishi A1S and Q, Melsec L, Honeywell ML 200	488
For Omron CJ1, CS1, and C200H	490
For Phoenix Contact Axioline and Inline	491
For Schneider Electric Modicon	493
For Siemens SIMATIC® S7-300	496
For Siemens SIMATIC® S7-1500	510
For Siemens SIMATIC® S7-400	514
For Yokogawa CENTUM VP, ProSafe-RS	516
Termination Carriers for Yokogawa CENTUM VP and ProSafe-RS	524
Passive modules	526
Active modules	536
V8 adapters for PLC-INTERFACE	544
System and splitting cables	551
VIP I/O-Marshalling universal platform	552
<b>Retrofit and modernization components</b>	558
<b>Universal modules</b>	
With IDC/FLK connectors	566
With D-SUB connectors	570
With high-density D-SUB connectors	576
With RJ45 connectors	577
With ELCO connectors	578
<b>Universal cables</b>	
With IDC/FLK connectors	582
With D-SUB connectors	592
<b>Potential distributors</b>	598



### Wiring with single wires

- Time-consuming
- Confusing wiring
- Risk of mixing wires
- Time-consuming troubleshooting



### Wiring with the controller-specific system cabling:

- Fast, fault-free wiring
- Plug and Play solution
- Orderly structure
- Considerable time savings



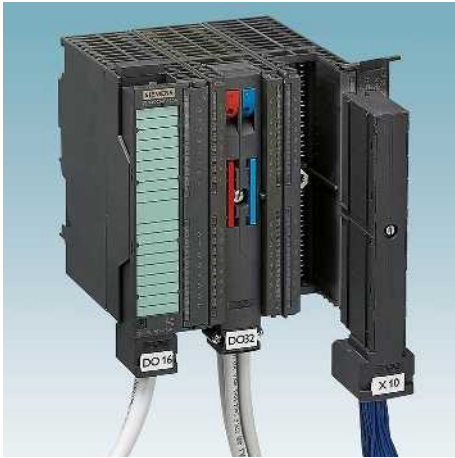
The matching components are selected with the help of the “system cabling for controllers” online configurator:

- Front adapter
- System cables
- Module

For the online configurator, use the web code:

**i** Your web code: **#0007**

Simply enter “#0007” into the search field on our website.



### Front adapter

- Tailored to controller-specific I/O modules
- Plug-in components
- Connection via system cables



### 8 and 32-channel modules

- Passive modules
- Relay modules
- Controller-specific layout
- Screw or Push-in connection technology



### PLC-V8 adapter

- Connection of 8 channels via the "PLC series"
- Feasible functions: relay, solid-state relay or feed-through
- Individual function selection per channel
- Screw or Push-in connection technology



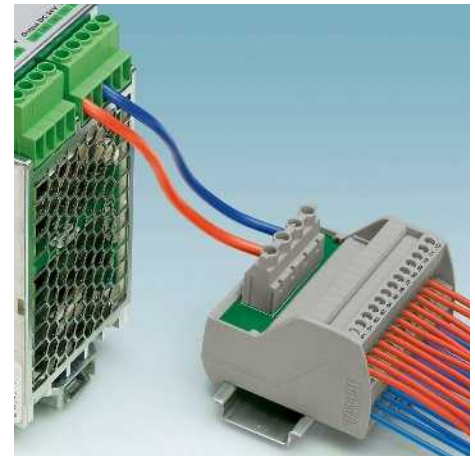
### Universal modules

- Connector: IDC/FLK, D-SUB, ELCO or DIN
- 1:1 connection
- Screw or Push-in connection technology
- Optional status indicator



### Universal cables

- With IDC/FLK connector
- With D-SUB connector
- Optionally with open end





### Potential distributors

- Up to 30 A/250 V
- Two, three or six potential levels
- Screw or Push-in connection technology

# System cabling for controllers

## Product overview

### Controller-specific system cabling

System component		Controller								
		ABB	Allen Bradley		Emerson	GE Fanuc		Honeywell		Mitsubishi
		S800 I/O	Control Logix	SLC 500	DeltaV	RX3i	90-30	C300 Series CI/O ML 200	PlantScape	MELSEC A, A1S, Q, L
Version		Page	Page	Page	Page	Page	Page	Page	Page	Page
Front adapter		not required	472	476	not required	484	485	486	472	not required
System cable	Standard	592	550	550	588	550	550	592	550	
	Controller-specific	471		478	480			489		488
Termination boards	Passive Standard	526	526	526	526	526	526	487	526	526
	Passive Controller-specific	470	474	477	481					
		536	536	536	536	536	536	536	536	536
	V8 adapter	544	544	544	544	544	544	544	544	544
	Relay/optocoupler	368	368	368	368	368	368	368	368	368
	MINI Analog Pro system adapter									
	MINI Analog Pro									






	OMRON CJ1	Phoenix Contact	Schneider		Siemens				Yokogawa	
	CS1, CQM1, C200H	Axioline Inline	TSX Quantum™	M340	S7 1500	S7 300	S7 400	Implementation S5 to S7	CENTUM VP	ProSafe RS
	Page	Page	Page	Page	Page	Page	Page	Page	Page	Page
	not required	492	493	494	510	500	514	560	not required	not required
		550	550	550	550	550	550			
	490			495		505			516	516
	526	526	526	526	526	526	526			
			474		510	508	508		520	522
	536	536	536	536	536	536	536			
	544	544	544	544	544	544	544		544	
	368	368	368	368	368	368	368		368	
						97			97	
						68			68	

# System cabling for controllers

## Product overview

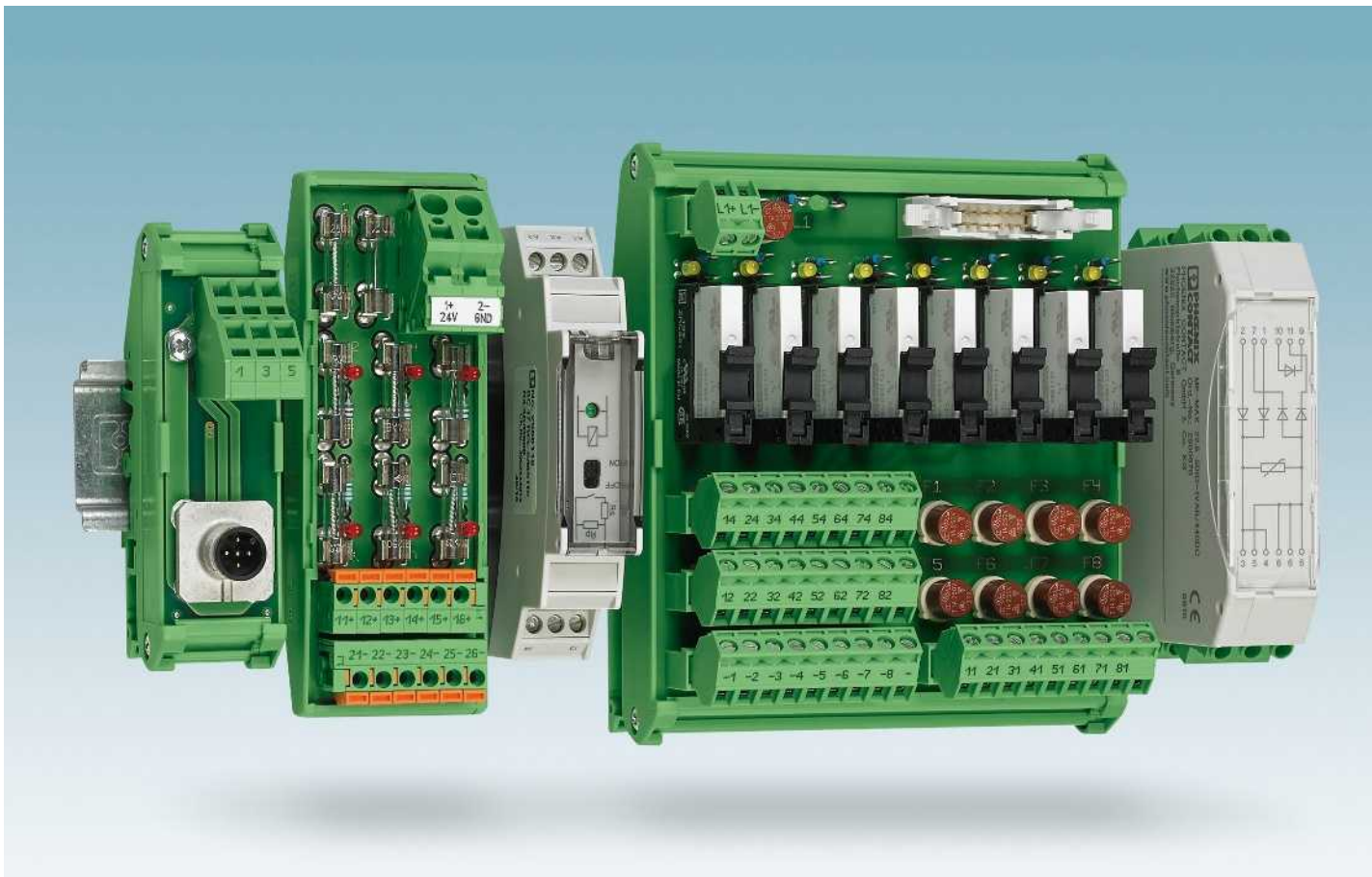
### Controller-specific system cabling

#### VIP I/O-Marshalling universal platform

System component		Version	Page
Base module			552
Plug-in module		Feed-through	554
		Analog	555
		Digital	555
		Relay	556
Cables			596

Universal modules and cables

Device series	Passive modules (connection technology)			
	IDC/FLK strip	D-SUB strip	ELCO strip	Potential distributors
VIP Line	 Page 566	 Page 570 576	 Page	 Page 598
Standard Line			580	
Slim Line		574		
Feed-through modules		575		
Cables	582	592		



### From the enquiry to the product

We develop your product from the idea to series production.

#### Concept phase

- Realization test according to your specifications
- Personal consultation
- Tendering including draft drawing

#### Realization phase

- Development according to product creation process
- Circuit diagram and PCB layout
- Component selection
- Creation of functional samples
- Creation of prototypes
- Tests in every phase of development
- EC conformance
- Preparation and implementation of approval procedures
- Environmental tests according to standards
- Documentation

#### Series phase

- Production according to IPC-A-610 Class 2
- 100% end test with automated test systems
- Lifecycle management

### Directives and standards

- Low-voltage directive
- EMC directive
- IEC 60664-1  
Insulation coordination for electrical equipment within low-voltage systems
- EN 50178  
Electronic equipment for use in power installations
- EN 61000-6  
Electromagnetic compatibility
- IPC A-600  
Acceptance criteria for PCBs
- IPC-A-610  
Acceptance criteria for electronic modules

### Components used

We use connection technology and housings from the comprehensive Phoenix Contact portfolio.

Here you find all common market technologies:

- Screw and spring-cage connection
- Push-in spring connection
- Knife disconnection
- Modular component housing
- Building installation housings
- Profile module carriers

Furthermore, we use components, connectors, cables as well as PCBs from qualified and certified suppliers.

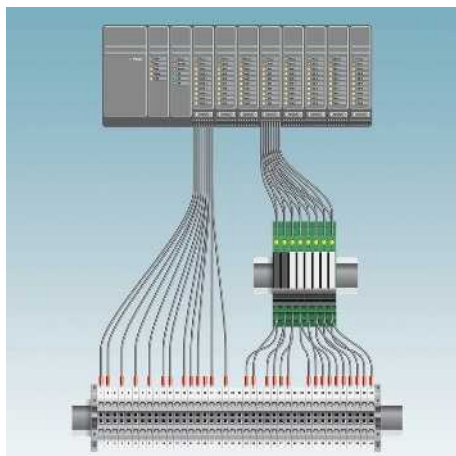
### Product range

We create versions from catalog production for you or new products according to your specifications from the following portfolio:

- Function modules such as diode gates
- Relay and optocoupler modules
- 1:1 installation modules (connector on terminal block)
- Potential distributors
- System cables with high-pos. connectors
- System adapters for controllers and control systems
- Transfer modules for use between controller and field level
- Output modules with electrical isolation
- Module carrier for system cabling of signal conditioners or safe coupling relays

### Your direct line to us

Do you have a specific question? Talk to us about it.



### Simplification of installation

- Objectives
  - Reduce assembly costs
  - Minimize installation time
  - Optimize space in the control cabinet
- Implementation
  - Analysis of the application
  - Draft of concept
- Result
  - Tailor-made solution from system components (standard and customer-specific)
  - Fault-free wiring

### Retrofitting systems

- Task
  - Extension
  - Retrofitting
- Objectives
  - System availability
  - Fulfillment of statutory specifications
- Solution
  - Use adaptation solutions and high-pos. system cables
- Result
  - Minimum downtimes

### Pre-assembled system cables

- With high-position connectors
  - D-SUB strips
  - IDC/FLK pin strips (2.54 mm)
- Pre-assembled at one or both ends
- Cables
  - Shielded, unshielded, halogen-free
  - 0.14 mm<sup>2</sup>/26 AWG and 0.25 mm<sup>2</sup>/24 AWG
- Quality
  - Continuity and dielectric test
- Other versions available on request.



### Installation modules

- 1:1 marshalling terminal to high-pos. connector (D-SUB, HE10, ELCO...)
- Passive transfer modules with system connection
- Potential distributors
- Fuse modules
- Diode modules
- Other modules on request

### Relay and optocoupler modules

- With electromechanical relays
- With solid-state relays
- Multi-channel
- With system connection
- N/O contact or PDT contact
- LED status display
- Freewheeling diode
- Reverse polarity protection
- Redundant power supply

### Termination Carrier module carrier

- The compact Termination Carrier connects
  - Signal conditioners
  - Signal conditioners for Ex i circuits
  - Signal conditioners for SIL applications
  - Safe coupling relays
- easily with the automation system via system cables.
- The advantages are clear:
  - Quick startup
  - Fault minimization

# System cabling for controllers

## Controller-specific system cabling

### ABB S800 I/O

#### Termination boards with knife disconnection

The ABB S800 I/O system can be used to install the process wiring via D-SUB connectors. The ABB TU 812 Compact MTU is available for this purpose.

The FLKM-D25SUB/B/KDS3-MT/... modules are connected to the I/O modules via assembled D-SUB cables (see page 592).

In addition to screw connection with knife disconnection for every channel and ABB S800-specific marking, the modules have the following features:

- Eight negative terminals with knife disconnection (TU810)
- Eight positive terminals with knife disconnection (TU810/P)
- For each channel, there is a positive and negative terminal with knife disconnection (TU830)

Passive termination boards can also be used for signal transmission (e.g., VIP-3/SC/D25SUB/F, 2315188), see page 571.

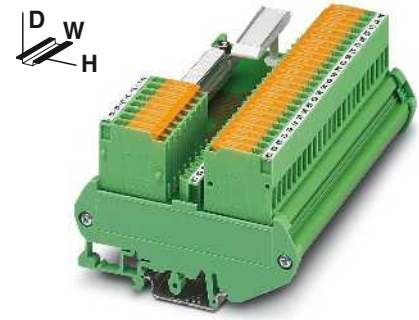
#### Web code for the online configurator

**i** Your web code: #0007

Connectable I/O modules	FLKM-D25SUB...		
	...TU810	...TU810/P	...TU830
<b>Digital input</b>	DI 814	DI 810 DI 811 DI 818 DI 830 DI 831 DI 840 DI 885	DI 810 DI 811 DI 814 DI 818 DI 830 DI 831 DI 840 DI 885
<b>Digital output</b>	DO 810 DO 818 DO 840	DO 814	DO 810 DO 814 DO 818 DO 840
<b>Analog input</b>	AI 810 AI 815 AI 820 AI 830 AI 835 AI 845	AI 810 AI 815	AI 810 AI 815 AI 820 AI 830 AI 835 AI 845
<b>Analog output</b>	AO 810 AO 815 AO 820 AO 845		AO 810 AO 815 AO 820 AO 845
<b>Miscellaneous</b>	DP 820		DP 820



**Explanation:**  
 IDC/FLK strip  
 Connection to I/O card  
 Screw terminal blocks for separate supply



Termination board with knife disconnect terminal blocks

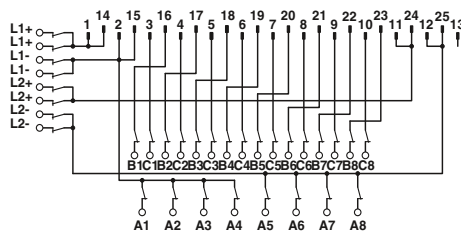
#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible current (per branch)	2 A
Maximum total current (voltage supply)	4 A (8 A L1-/L2-)
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	DIN EN 50178 , IEC 60664
Connection method	Screw connection with disconnect knife
Field level	D-SUB socket strip
Controller level	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Connection data solid/stranded/AWG	90 mm / 61 mm
Dimensions	H / D

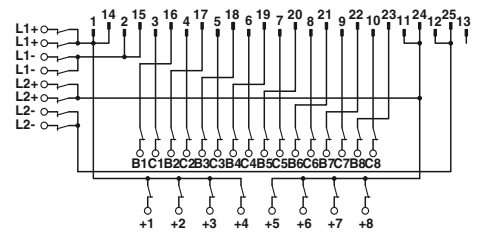
#### Ordering data

Type	Order No.	Pcs./Pkt.
FLKM-D25 SUB/B/KDS3-MT/TU810	2304513	1
FLKM-D25 SUB/B/KDS3-MT/TU810/P	2304539	1
FLKM-D25 SUB/B/KDS3-MT/TU830	2304526	1

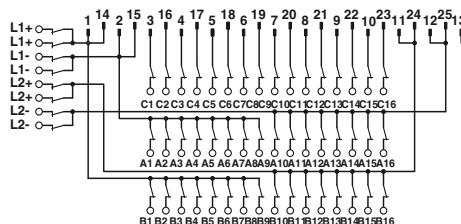
Description	No. of pos.	Module width W
<b>VARIOFACE module</b> , with knife disconnect terminal blocks in ABB-specific marking:		
- with 8 negative terminal blocks	25	126.5 mm
- with 8 positive terminal blocks	25	126.5 mm
- each with 16 positive and negative terminal blocks	25	247.5 mm



FLKM-D25 SUB/B/KDS3-MT/TU810 connection scheme



FLKM-D25 SUB/B/KDS3-MT/TU810/P connection scheme



FLKM-D25 SUB/B/KDS3-MT/TU830 connection scheme

**ABB S800 I/O**  
System cable

The ABB S800 I/O system can be used to install the process wiring via D-SUB connectors. The ABB TU 812 Compact MTU is available for this purpose.

The CABLE-D25SUB/B/2X14/.../TU812 system cables convert digital signals from a D-SUB socket strip to two IDC/FLK socket strips. Therefore, all 8-channel termination boards of the system cabling are connected to S800 I/O modules. Two termination boards are used per module.



System cable



**Technical data**

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	6.3 mm

**Ordering data**

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE system cable</b> , for S800 I/O, with a 25-pos. D-SUB socket strip and two 14-pos. IDC/FLK socket strips, in standard lengths	25	1 m	<b>CABLE-D25SUB/B/2X14/100/TU812</b>	<b>2304649</b>	1
	25	2 m	<b>CABLE-D25SUB/B/2X14/200/TU812</b>	<b>2304652</b>	1
	25	3 m	<b>CABLE-D25SUB/B/2X14/300/TU812</b>	<b>2304665</b>	1
	25	5 m	<b>CABLE-D25SUB/B/2X14/500/TU812</b>	<b>2304678</b>	1
<b>VARIOFACE system cable</b> , for S800 I/O, with a 25-pos. D-SUB socket strip and two 14-pos. IDC/FLK socket strips, in variable lengths	25		<b>CABLE-D25SUB/B/2X14/TU812/...</b>	<b>2304681</b>	1

**Color code and pin assignment**  
CABLE-D25SUB/B/2X14...TU812

D-SUB connector 25-pos.	FLK 14 1st connector	FLK 14 2nd connector	Wire color
1	9		Gray
2	10		White
3	1		Black
4	3		Red
5	5		Yellow
6	7		Blue
7		1	Black
8		3	Red
9		5	Yellow
10		7	Blue
11		9	Orange
12		10	White
13	NC	NC	-
14	11		White-black
15	12		White-brown
16	2		Brown
17	4		Orange
18	6		Green
19	8		Violet
20		2	Brown
21		4	Orange
22		6	Green
23		8	Violet
24		11	White-black
25		12	White-brown

**Ordering example** for system cable:

- Cable for ABB S800, 12.75 m long

Quantity	Order No.	Length [m] <sup>1)</sup>
1	2304681	12.75

<sup>1)</sup> min. 0.20 m

# System cabling for controllers

## Controller-specific system cabling

### Allen Bradley ControlLogix, Honeywell PlantScape Front adapter

#### I/O modules with 32 channels or of this type

The front adapters are pushed into the tall 1756-TBE covers (not supplied as standard, original accessories must be ordered directly from manufacturer) of the controller. A 50-pos. system cable can connect a maximum of 32 channels to the field level.

Tailor-made VARIOFACE termination boards round off this system concept.

#### Web code for the online configurator

 Your web code: **#0007**

Notes:
Front adapters can also be used without cover.
Controller-specific modules from page 474
Standard modules from page 526
For system cables, see page 550



**32-channel front adapter  
with 50-pos. FLK strip**



#### Technical data

Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA

< 50 V AC / 60 V DC  
125 V / -

Maximum permissible current

1 A (per path)  
8 A (per connection, supply via separate power supply)

Ambient temperature (operation)  
Ambient temperature (storage/transport)  
Connection data solid/stranded/AWG  
Standards/regulations

-20 °C ... 50 °C  
-20 °C ... 70 °C  
0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 28 - 16  
DIN EN 50178 / IEC 60664

#### Ordering data

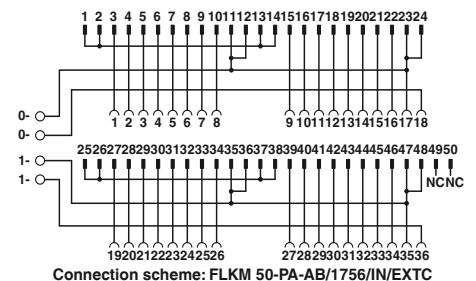
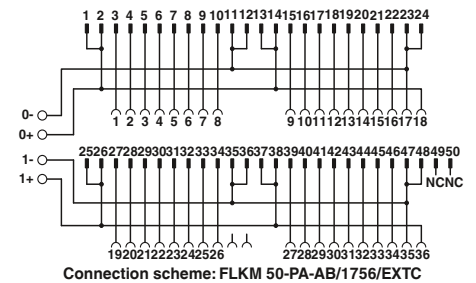
Description	No. of pos.
<b>VARIOFACE front adapters, for ControlLogix:</b>	
- A maximum of 1 x 32 channels can be connected	50
- IB 32 input board	50




Type	Order No.	Pcs./ Pkt.
<b>FLKM 50-PA-AB/1756/EXTC</b>	<b>2302735</b>	1
<b>FLKM 50-PA-AB/1756/IN/EXTC</b>	<b>2302748</b>	1

#### Front adapters for I/O modules of the Allen Bradley ControlLogix and Honeywell PlantScape automation devices

Card type	FLKM 50-PA-AB/1756/EXTC
<b>Digital input</b>	1756-IA 16 I* or TC-TDK 161* 1756-IB 16 D* or TC-TDX 161* 1756-IB 16 I* or TC-TDJ 161* 1756-IH 16 I*
<b>Digital output</b>	1756-OB 32 or TC-ODD 321
<b>Analog input</b>	1756-IF 8* 1756-IF 16 I* or TC-IAH 161* 1756-IF 8H* or TC-HAI 081*
<b>Counter</b>	1756-HSC*
<b>Servo</b>	1756-M02 AE*
Card type	FLKM 50-PA-AB/1756/IN/EXTC
<b>Digital input</b>	1756-IB 32 or TC-IDD 321

\* Only in conjunction with  
VIP-2/SC/FLK50/AB-1756, Order No.: 2922317  
VIP-2/PT/FLK50/AB-1756, Order No.: 2904286  
There must be no voltage supply at the front adapter. Risk of short circuit!



**Explanation:**  
 IDC/FLK strip  
 Connection to I/O card  
 Screw terminal blocks for separate supply



### Allen Bradley ControlLogix, Honeywell PlantScope Front adapter

#### I/O modules with 16 channels or of this type

The front adapters are pushed into the tall 1756-TBE covers (not supplied as standard, original accessories must be ordered directly from manufacturer) of the controller. Two 14-pos. system cables are used to connect up to 2 x 8 channels to the field level.

Tailor-made VARIOFACE termination boards round off this system concept.

#### Web code for the online configurator

 Your web code: **#0007**

Notes:
Front adapters can also be used without cover.
Controller-specific modules from page 474
Standard modules from page 526
For system cables, see page 550
1) No UL approval



16-channel front adapter  
with two 14-pos. FLK strips



#### Technical data

Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA

< 50 V AC / 60 V DC  
125 V / -

Maximum permissible current

1 A (per path)  
8 A (per connection, supply via separate power supply)

Ambient temperature (operation)  
Ambient temperature (storage/transport)  
Connection data solid/stranded/AWG  
Standards/regulations

-20 °C ... 50 °C  
-20 °C ... 70 °C  
0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 28 - 16  
DIN EN 50178 / IEC 60664

#### Ordering data

Description	No. of pos.
<b>VARIOFACE front adapters, for ControlLogix:</b>	
- Up to 2 x 8 channels can be connected	14
- IA 16, IB 16, IC 16, IN 16 input card	14
- IF6 I input card (only suitable for measuring current; no power terminals on adapter)	14

Type	Order No.	Pcs./Pkt.
FLKM 14-PA-AB/1756/EXTC	2302861	1
FLKM 14-PA-AB/1756/IN/EXTC	2302874	1
FLKM 14-PA-AB/1756/IF6/EXTC <sup>1)</sup>	2901037	1

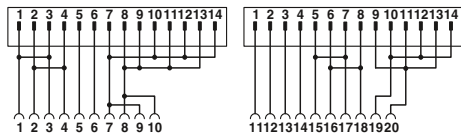
Front adapters for I/O modules of the  
Allen Bradley ControlLogix and Honeywell PlantScope  
automation devices

Card type	FLKM 14-PA-AB/1756/EXTC
Digital input	1756-IA 8 D** or TC-IDX 081**
Digital output	1756-OB 16 E
Analog input	1756-IF 6 CIS** 1756-IF 6 I** or TC-IAH 061** 1756-IR 6 I** or TC-IXR 061** 1756-IT 6 I** or TC-IXL 061**
Analog output	1756-OF 4 I** 1756-OF 6 CI** or TC-OAH 061** 1756-OF 6 VI** or TC-OAV 061** 1756-OF 8** or TC-OAV 081** 1756-OF 8 H**
Switch	1756-PLS**

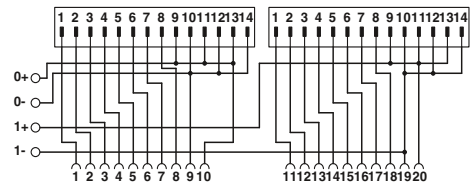
Card type	FLKM 14-PA-AB/1756/IN/EXTC
Digital input	1756-IN 16** 1756-IA 16 or TC-IDA 161** 1756-IB 16 1756-IC 16**

Card type	FLKM 14-PA-AB/1756/IF6/EXTC
Analog input	IF6I**

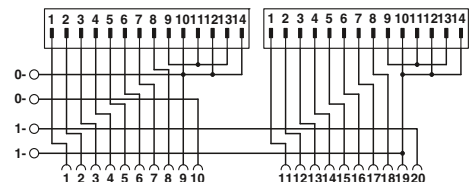
\*\* Only in conjunction with  
VIP-2/SC/2FLK14/AB-1756, Order No.: [2322333](#)  
VIP-2/PT/2FLK14/AB-1756, Order No.: [2904288](#)  
There must be no voltage supply at the front adapter. Risk of short circuit!



Connection scheme: FLKM 14-PA-AB/1756/IF6/EXTC





Connection scheme: FLKM 14-PA-AB/1756/EXTC



Connection scheme: FLKM 14-PA-AB/1756/IN/EXTC

#### Explanation:

-  IDC/FLK strip
-  Connection to I/O card
-  Screw terminal blocks for separate supply

# System cabling for controllers

## Controller-specific system cabling

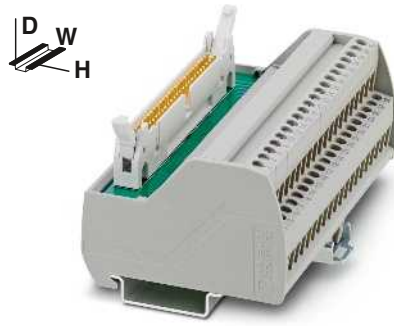
### VIP termination boards for Modicon TSX Quantum™ and Allen Bradley ControlLogix

These VIP - VARIOFACE Professional modules are used in combination with 50-pos. system cables and the relevant front adapters.

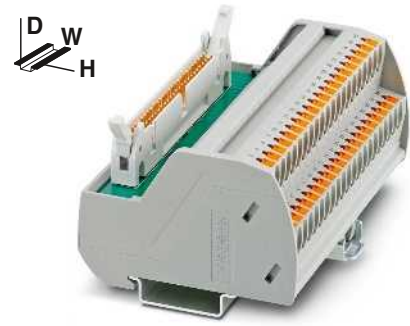
#### Features:

- Specific marking
- Specifically for Modicon TSX Quantum™ or ControlLogix

**Notes:**  
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



Passive termination boards for input/output, with specific marking and screw connection



Passive termination boards for input/output, with specific marking and Push-in connection



#### Technical data

Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Screw connection
	Field level
	Controller level
Connection data solid/stranded/AWG	IDC/FLK pin strip
Dimensions	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12 65.5 mm / 56 mm

Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Push-in connection
	Field level
	Controller level
Connection data solid/stranded/AWG	IDC/FLK pin strip
Dimensions	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14 72.1 mm / 56 mm

#### Ordering data

Description	No. of pos.	Module width W
<b>VARIOFACE termination board</b> , with Modicon® TSX Quantum™-specific marking from 1 to 40		
- with screw connection	50	106.1 mm
- with Push-in connection	50	107.9 mm
<b>VARIOFACE termination board</b> , with ControlLogix-specific marking from 1 to 36		
- with screw connection	50	95.9 mm
- with Push-in connection	50	97.7 mm

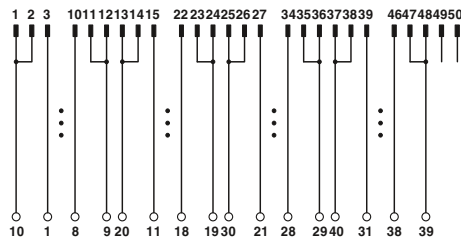
Type	Order No.	Pcs./ Pkt.
VIP-2/SC/FLK50/MODI-TSX/Q	2322304	1
VIP-2/SC/FLK50/AB-1756	2322317	1

#### Technical data

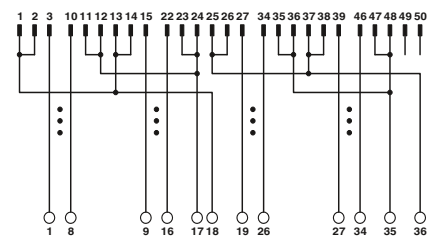
Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Push-in connection
	Field level
	Controller level
Connection data solid/stranded/AWG	IDC/FLK pin strip
Dimensions	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14 72.1 mm / 56 mm

#### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-2/PT/FLK50/MODI-TSX/Q	2904285	1
VIP-2/PT/FLK50/AB-1756	2904286	1



Connection scheme VIP-2/.../FLK50/MODI-TSX/Q



Connection scheme VIP-2/.../FLK50/AB-1756

### VIP termination boards for Allen Bradley ControlLogix

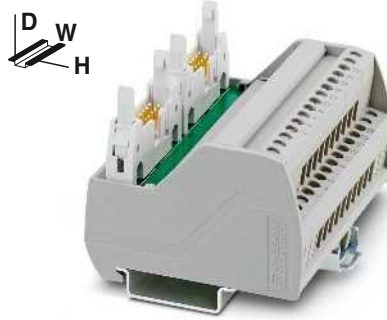
These VIP - VARIOFACE Professional modules are used in combination with two 14-pos. system cables and the relevant front adapters for Allen Bradley.

#### Features:

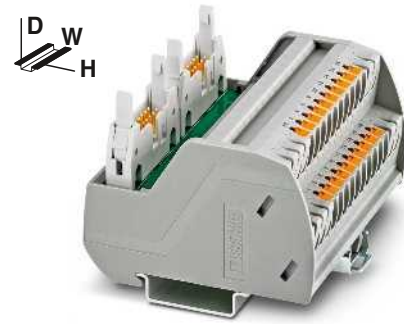
- Numerical marking (1-20)
- Specifically for ControlLogix

#### Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



Passive termination boards for Allen Bradley ControlLogix with screw connection



Passive termination boards for Allen Bradley ControlLogix with Push-in connection



#### Technical data

Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Field level Screw connection
Connection data solid/stranded/AWG	Controller level IDC/FLK pin strip
Dimensions	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12 65.5 mm / 56 mm

#### Technical data

Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Field level Push-in connection
Connection data solid/stranded/AWG	Controller level IDC/FLK pin strip
Dimensions	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14 72.1 mm / 56 mm

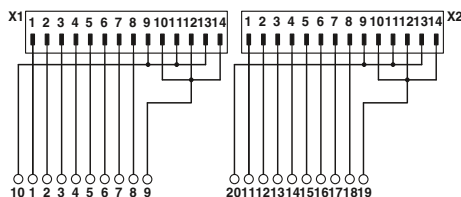
#### Ordering data

Description	No. of pos.	Module width W
<b>VARIOFACE termination board, with ControlLogix-specific marking from 1 to 20</b>		
- with screw connection	14	80.6 mm
- with Push-in connection	14	82.5 mm

Type	Order No.	Pcs./ Pkt.
VIP-2/SC/2FLK14/AB-1756	2322333	1

#### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-2/PT/2FLK14/AB-1756	2904288	1



Connection scheme VIP-2/.../2FLK14/AB-1756

# System cabling for controllers

## Controller-specific system cabling

### Allen Bradley SLC 500 Front adapter

The front adapters mean that pre-assembled system cables can be directly connected to I/O modules.

- The FLKM 14-PA-SLC500... adapters connect max. 2 x 8 channels via two 14-pos. system cables. Tailor-made VARIOFACE termination boards with a variety of functions and connection options round off this system concept.
- With the FLKM50-PA-SLC500 OUT/2A front adapters, the FLKM 50/16/SLC500 termination board, and 50-position system cables, the VARIOFACE system cabling can also be coupled to the OA16 and OW16 power output cards.

### Web code for the online configurator

**i** Your web code: **#0007**

Notes:
Standard modules from page 526
For system cables, see page 550



Front adapter for SLC 500 1746, 2 x 8 channels can be connected



#### Technical data

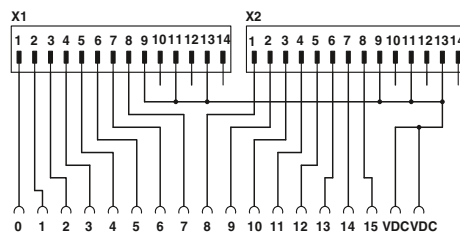
FLKM 14-PA...	FLKM 50-PA...
< 50 V AC / 60 V DC 125 V / -	< 50 V AC / 60 V DC 125 V / -
1 A (per path) 2 A (per Byte, for supply via connector)	2 A (per path) 7 A (per Byte, for supply via connector)
-20 °C ... 50 °C -20 °C ... 70 °C any	-20 °C ... 50 °C -20 °C ... 70 °C any
IEC 60664 / DIN EN 50178	IEC 60664 / DIN EN 50178

Maximum permissible operating voltage	Maximum permissible operating voltage UL / CSA
Maximum permissible current	Maximum permissible total current
Ambient temperature (operation)	Ambient temperature (storage/transport)
Mounting position	Standards/regulations

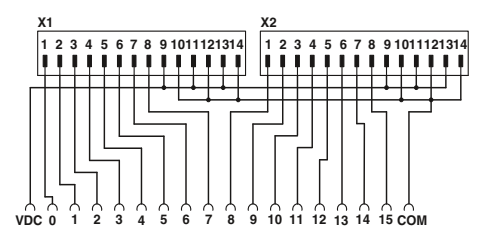
#### Ordering data

Description	No. of pos.
<b>VARIOFACE front adapter</b> , 2 x 8 channels can be connected for Allen Bradley SLC 500 for:	
- 1746 OB16, OV16, OG16 and IG16	14
- 1746 IA16, IB16, ITB16 and IN16	14
- 1746 IV16 and IVT16	14
<b>VARIOFACE front adapter</b> , 1 x 16 channels can be connected for Allen Bradley SLC 500 1746 OA16 and OW16	50

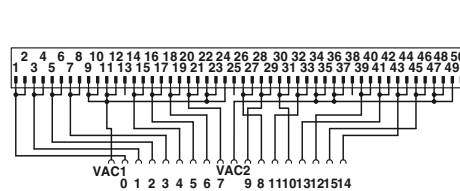
Type	Order No.	Pcs./Pkt.
FLKM 14-PA-SLC500/OUT	2293459	1
FLKM 14-PA-SLC500/IN	2293462	1
FLKM 14-PA-SLC500/IN/M	2293475	1
FLKM 50-PA-SLC500/OUT/2A	2293446	1



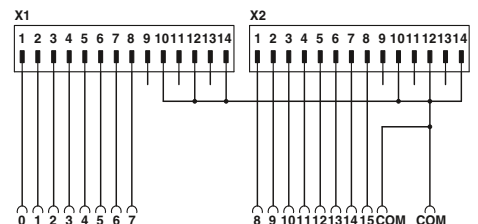
Connection scheme FLKM 14-PA-SLC500/IN/M



Connection scheme FLKM 14-PA-SLC500/OUT



Connection scheme FLKM 50-PA-SLC500/OUT/2A



Connection scheme FLKM 14-PA-SLC500/IN

#### Explanation:

- IDC/FLK strip
- Connection to I/O card
- Screw terminal blocks for separate supply



# System cabling for controllers

## Controller-specific system cabling

### Allen Bradley SLC 500 System cable for 32 channels

The 32-channel I/O cards of the SLC 500 are connected using 40-pos. connectors (already integrated into the I/O modules). Passive termination boards (-3/SC/FLK40, etc.) are connected to the I/O cards using the **FLK 40/EZ-DR/.../SLC** system cables.

32 channels are split into 4x8 channels using the **FLK 40/4X14/EZ-DR/...** system cables.

The following 8-channel system cabling modules can be coupled:

- OB32 and IB32  
passive and active modules plus V8 adapter
- OV32 and IV32  
passive modules without status indicator

### Web code for the online configurator

**i** Your web code: **#0007**

<b>Notes:</b>
Standard modules from page 526



**System cable for 32-channel I/O cards of the SLC 500 (OB32, OV32, IB32, IV32)**



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	10 mm

40-pos.

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Assembled round cable</b> , with two 40-pos. IDC/FLK socket strips in fixed lengths (50 cm increments) for connection to 32-channel I/O cards of the SLC 500					
	40	0.5 m	FLK 40/EZ-DR/ 50/SLC	2294610	1
	40	1 m	FLK 40/EZ-DR/ 100/SLC	2294623	1
	40	1.5 m	FLK 40/EZ-DR/ 150/SLC	2294636	1
	40	2 m	FLK 40/EZ-DR/ 200/SLC	2294649	1
	40	3 m	FLK 40/EZ-DR/ 300/SLC	2294652	1
<b>Assembled round cable</b> , for connection to Allen Bradley SLC500, OB32, and IB32, with a 40-pos. IDC/FLK socket strip and four 14-pos. IDC/FLK socket strips, for splitting max. 32 channels into 4 x 8 channels.					
for OB32	40	0.5 m			
	40	1 m			
	40	2 m			
	40	3 m			
for IB32	40	0.5 m			
	40	1 m			
	40	2 m			
	40	3 m			



**System cable for  
splitting max. 32 channels into 4 x 8 channels  
(OB32, IB32)**



#### Technical data

< 50 V AC / 60 V DC  
125 V / -

1 A

-20 °C ... 50 °C  
Insulation displacement, IEC 60352-4/DIN EN 60352-4

AWG 26 / 0.14 mm<sup>2</sup>  
7 / Cu tin-plated

7.8 mm

#### Ordering data

Type	Order No.	Pcs./ Pkt.
FLK 40/4X14/EZ-DR/ 50/OB32	<a href="#">2296786</a>	1
FLK 40/4X14/EZ-DR/ 100/OB32	<a href="#">2298483</a>	1
FLK 40/4X14/EZ-DR/ 200/OB32	<a href="#">2298522</a>	1
FLK 40/4X14/EZ-DR/ 300/OB32	<a href="#">2298535</a>	1
FLK 40/4X14/EZ-DR/ 50/IB32	<a href="#">2296812</a>	1
FLK 40/4X14/EZ-DR/ 100/IB32	<a href="#">2296825</a>	1
FLK 40/4X14/EZ-DR/ 200/IB32	<a href="#">2296838</a>	1
FLK 40/4X14/EZ-DR/ 300/IB32	<a href="#">2296841</a>	1

## Controller-specific system cabling

### Emerson DeltaV System cable

The DeltaV system can be used to install the process wiring via “mass termination blocks” (MTBs) using IDC/FLK connectors. In addition to the 10, 16, and 20-pos. system cables of system cabling (see page 550), the following system-specific cables are available:

- **FLK 16/14/DV-OUT/...**, for digital assemblies with 16-pos. MTB for connection with PLC-INTERFACE
- **FLK 16/14/DV-IN/...**, for digital modules with 16-pos. MTB for connection to PLC-INTERFACE
- **FLK 20/2FLK14/EZ-DR/...**, for digital assemblies with 40-pos. MTB for connection with PLC-INTERFACE
- **FLK 16/24/DV-AI/EZ-DR/...**, for analog assemblies with 24-pos. MTB
- **FLK 50/2FLK20/EZ-DR/.../DV** system cables are specifically designed for 32-channel I/O modules with 40-pin MTB for the purpose of connecting I/O modules with 32-channel VARIOFACE termination boards



System cable for DeltaV



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Outside diameter	
	16-pos. 6.8 mm
	20-pos. 7.6 mm
	24-pos. 6.5 mm
	20-pos. 10.3 mm

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>System cable</b> , for 16-pos. “mass termination blocks” with a 16-pos. and a 14-pos. IDC/FLK socket strip for connection with PLC-INTERFACE					
	16	0.3 m	FLK 16/14/DV-OUT/ 30	2304348	1
	16	0.5 m	FLK 16/14/DV-OUT/ 50	2304351	1
	16	1 m	FLK 16/14/DV-OUT/100	2300575	1
	16	2 m	FLK 16/14/DV-OUT/200	2300588	1
	16	3 m	FLK 16/14/DV-OUT/300	2304364	1
Variable cable length	16		FLK 16-14-DV-OUT/...	2304377	1
<b>System cable</b> , for 16-pos. “mass termination blocks” with a 16-pos. and a 14-pos. IDC/FLK socket strip for connection with PLC-INTERFACE					
	16	0.5 m	FLK 16/14/DV-IN/ 50	2304393	1
	16	1 m	FLK 16/14/DV-IN/100	2300559	1
	16	2 m	FLK 16/14/DV-IN/200	2300562	1
	16	3 m	FLK 16/14/DV-IN/300	2304403	1
	16	4 m	FLK 16/14/DV-IN/400	2305185	1
Variable cable length	16		FLK 16-14-DV-IN/...	2304416	1
<b>System cable</b> , for 40-pos. (2 x 20) “mass termination blocks” with a 20-pos. and two 14-pos. IDC/FLK socket strips for connection with PLC-INTERFACE (two cables should be used per 32-channel I/O card)					
	20	1 m	FLK 20/2FLK14/EZ-DR/100/KONFEK	2298470	1
	20	2 m	FLK 20/2FLK14/EZ-DR/200/KONFEK	2298438	1
	20	3 m	FLK 20/2FLK14/EZ-DR/300/KONFEK	2300818	1
Variable cable length	20		FLK 20/2FLK14/EZ-DR/...	2304487	1
<b>System cable</b> , for 24-pos. “mass termination blocks” with a 24-pos. and a 16-pos. IDC/FLK socket strip for connection with UM-DELTA/... modules					
	24	0.3 m	FLK 16/24/DV-AI/EZ-DR/ 30	2304319	1
	24	0.5 m	FLK 16/24/DV-AI/EZ-DR/ 50	2304296	1
	24	1 m	FLK 16/24/DV-AI/EZ-DR/100	2301134	1
	24	2 m	FLK 16/24/DV-AI/EZ-DR/200	2301545	1
	24	3 m	FLK 16/24/DV-AI/EZ-DR/300	2304322	1
Variable cable length	24		FLK 16-24-DV-AI-EZ-DR/...	2304335	1
<b>System cable</b> , for 40-pos. “mass termination blocks” with two 20-pos. and one 50-pos. IDC/FLK socket strip for connection with 32-channel termination boards					
	20	0.5 m	FLK 50/2FLK20/EZ-DR/ 50/DV	2304872	1
	20	1 m	FLK 50/2FLK20/EZ-DR/ 100/DV	2304898	1
	20	2 m	FLK 50/2FLK20/EZ-DR/ 200/DV	2304908	1
	20	3 m	FLK 50/2FLK20/EZ-DR/ 300/DV	2304911	1
	20	6 m	FLK 50/2FLK20/EZ-DR/ 600/DV	2304937	1
	20	8 m	FLK 50/2FLK20/EZ-DR/ 800/DV	2304940	1
	20	10 m	FLK 50/2FLK20/EZ-DR/1000/DV	2304953	1
Variable cable length	20		FLK 50-2FLK20-EZ-DR-DV/...	2304966	1





### Emerson DeltaV Termination board for eight channels

These system-specific termination boards for DeltaV modules are used in combination with the relevant system cables. They are connected to 8-channel modules via "mass termination blocks" with IDC/FLK connection.

#### FLKM 16/DV

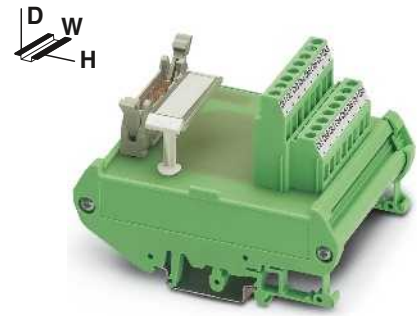
- Universal module
- 1:1 connection

#### FLKM 16/AI/DV

- 1:1 connection
- Separate equipotential terminals per channel

#### FLKM 16/AO/SI/DV

- 1:1 connection
- 5 x 20, 50 mA T, IEC 60127-2/3 fuse per channel



Termination board for 8 channels

Maximum permissible operating voltage  
Maximum permissible current (per branch)

Ambient temperature (operation)  
Mounting position  
Standards/regulations  
Connection method

Connection data solid/stranded/AWG  
Dimensions

Field level  
Controller level

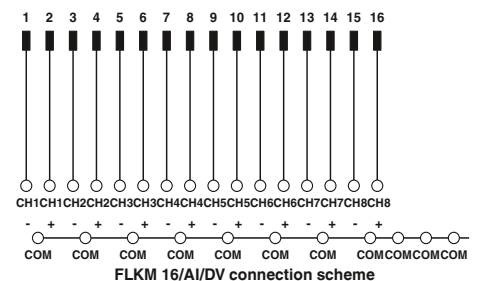
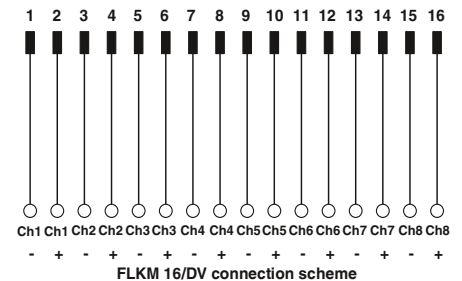
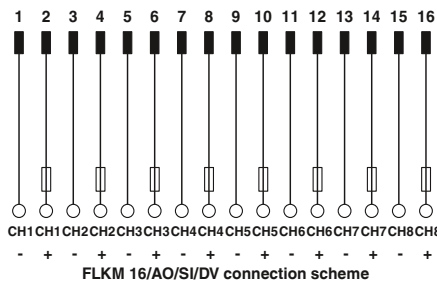
#### Technical data

FLKM 16/.../DV	FLKM 16/.../SI/.../DV
< 50 V AC / 60 V DC	< 50 V AC / 60 V DC
1 A (per signal path)	50 mA (In delivered state, with one 50 mA fuse, max. 1 A permitted)

-20 °C ... 50 °C	-20 °C ... 50 °C
any	any
DIN EN 50178 , IEC 60664	
Screw connection	Screw connection
IDC/FLK pin strip	IDC/FLK pin strip
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
90 mm / 68 mm	

#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
Termination board, with 1:1 connection			FLKM 16/DV	2304432	1
Termination board, with 1:1 connection and separate potential terminal blocks per channel	16	45 mm	FLKM 16/AI/DV	2304429	1
Termination board, with fuses per channel	16	57 mm	FLKM 16/AO/SI/DV	2304445	1
	16	90 mm			



# System cabling for controllers

## Controller-specific system cabling

### Emerson DeltaV

#### Termination board for 32 channels

These system-specific termination boards for DeltaV modules are used in combination with FLK 50/2FLK20/EZ-DR/.../DV system cables. They are connected to 32-channel modules via 40-pos. "mass termination blocks" with IDC/FLK connection.

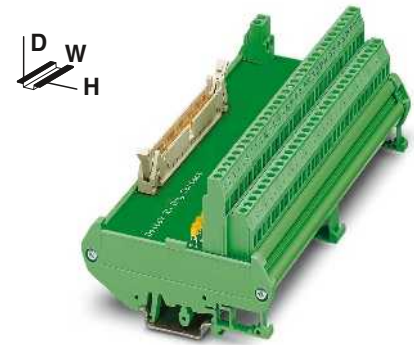
#### FLKM 50/32M/DV

- Can be used for 32-channel input and output cards
- Two-conductor connection with a separate negative terminal per channel

#### FLKM 50/32M/IN/LA/DV

- Can be used for 32-channel input modules
- LED status display per channel
- Two-conductor connection with a separate negative terminal per channel (Dry Contact)

Maximum permissible operating voltage	
Maximum permissible current (per branch)	
Ambient temperature (operation)	
Mounting position	
Standards/regulations	
Connection method	Field level
	Controller level
Connection data solid/stranded/AWG	
Dimensions	H / D



Termination board with 2-conductor connection technology for DeltaV

#### Technical data

FLKM 50/32M/DV	FLKM 50/32M/IN/LA/DV
< 50 V AC / 60 V DC	30 V DC
1 A	1 A
-20 °C ... 50 °C	-20 °C ... 50 °C
any	any
DIN EN 50178 , IEC 60664	
Screw connection	Screw connection
IDC/FLK pin strip	IDC/FLK pin strip
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
90 mm / 68 mm	

#### Ordering data

Description	No. of pos.	Module width W
<b>VARIOFACE termination boards, for 32-channel I/O modules:</b>		
- Input/Output	50	169 mm
- Input with LED per signal	50	169 mm

Type	Order No.	Pcs./ Pkt.
FLKM 50/32M/DV	2304869	1
FLKM 50/32M/IN/LA/DV	2304856	1

### Emerson DeltaV

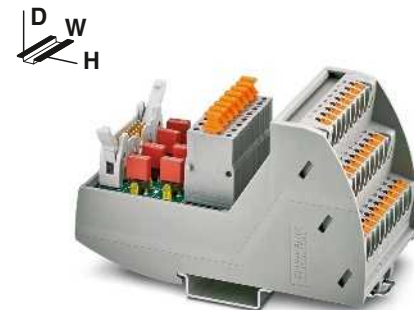
#### VIP termination board with fuses for 8 channels

System-specific termination board for use in combination with the respective system cables. The termination board is connected to 8-channel modules through 16-position "mass termination blocks" with flat ribbon cable connection.

Features:

- Fuse per channel
- Separate equipotential terminals per channel
- Knife disconnection for each channel
- Push-in connection

Maximum permissible operating voltage	
Maximum permissible operating voltage UL / CSA	
Maximum permissible current (per branch)	
Ambient temperature (operation)	
Mounting position	
Standards/regulations	
Connection method	Field level
	Controller level
Connection data solid/stranded/AWG	
Dimensions	H / D



Termination board with fuses for 16-pos. mass termination block

#### Technical data

24 V DC
24 V / 24 V
63 mA (in as supplied state, with one 63 mA fuse)
-20 °C ... 60 °C
any
DIN EN 50178
Push-in connection
IDC/FLK pin strip
0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
109.8 mm / 63 mm

#### Ordering data

Description	No. of pos.	Module width W
<b>Termination board for 16-pos. mass termination block</b>		
	16	57.1 mm

Type	Order No.	Pcs./ Pkt.
VIP-PT/FLK16/DS/FU/LED/AN/DV	2903599	1

### Emerson DeltaV Termination boards with fuses for 8 channels

These system-specific termination boards for DeltaV modules are used in combination with the relevant system cables. They are connected to 8-channel modules via 16-pos. or 24-pos. "mass termination blocks" with IDC/FLK connection.

#### UM-DELTA V/D/SI

- Fuse per channel
- Separate equipotential terminals per channel

#### UM-DELTA V/D/SI

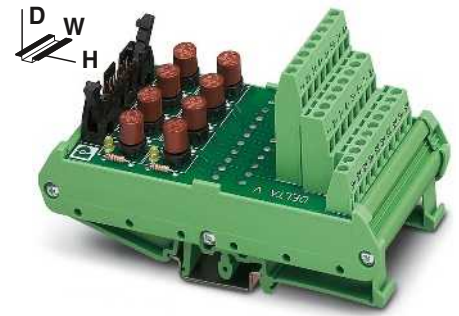
- Fuse per channel
- Separate equipotential terminals per channel
- Knife disconnection for each channel

#### UM-DELTA V/D/SI/BFI/TP

- Fuse and LED status indicator per channel
- Separate equipotential terminals per channel

#### UM-DELTA V/D/SI

- Fuse and LED status indicator per channel
- Separate equipotential terminals per channel
- Knife disconnection for each channel



Termination board with fuses for 16-pos. and 24-pos. mass termination blocks

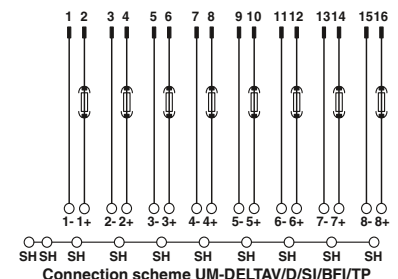
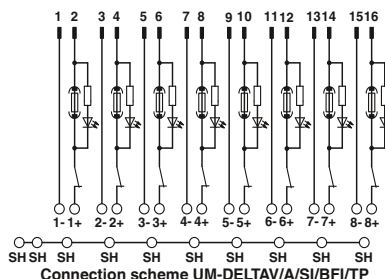
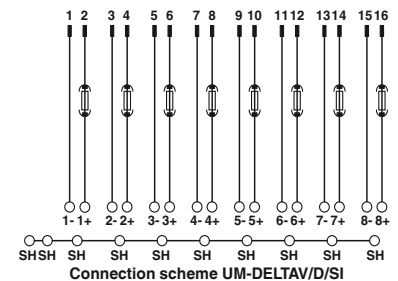
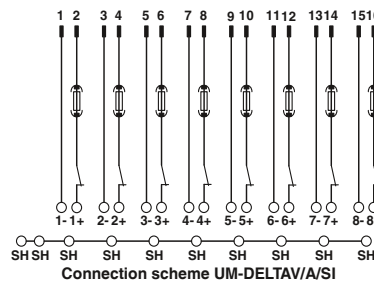


#### Technical data

Maximum permissible operating voltage	24 V DC
Maximum permissible operating voltage UL / CSA	24 V / -
Maximum permissible current (per branch)	50 mA (in as-supplied state, with one 50 mA fuse, max. 1 A permitted)
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Field level Controller level
Connection data solid/stranded/AWG	Screw connection IDC/FLK pin strip 0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	H / D 126 mm / 71 mm

#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>Termination boards for 16-pos. and 24-pos. mass termination blocks with:</b>					
- Fuses	16	61 mm	UM-DELTA V/D/SI	5603255	1
- Fuses and knife disconnect terminal blocks	16	61 mm	UM-DELTA V/D/SI/BFI/TP	5603257	1
- Fuses and fuse failure display	16	61 mm	UM-DELTA V/A/SI	5603256	1
- Fuses, fuse failure display, and knife disconnect terminal blocks	16	61 mm	UM-DELTA V/A/SI/BFI/TP	5603258	1



#### Explanation:

- IDC/FLK strip
- Connection to I/O card
- Screw terminal blocks for separate supply

## Controller-specific system cabling

### GE Fanuc RX3i Front adapters

The front adapters mean that pre-assembled system cables can be directly connected to I/O modules.

- Transfer of max. 32 channels over one 50-position system cable
- Can be plugged onto I/O modules
- Connection via suitable VARIOFACE termination boards

### Web code for the online configurator

**i** Your web code: **#0007**

Notes:
Standard modules from page 526
For system cables, see page 550



Front adapter for GE Fanuc RX3i

ERC

#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible current	1 A (per path) 8 A (per connection, supply via separate power supply)
Ambient temperature (operation)	-20 °C ... 50 °C
Ambient temperature (storage/transport)	-20 °C ... 70 °C
Mounting position	any
Standards/regulations	DIN EN 50178 / IEC 60664

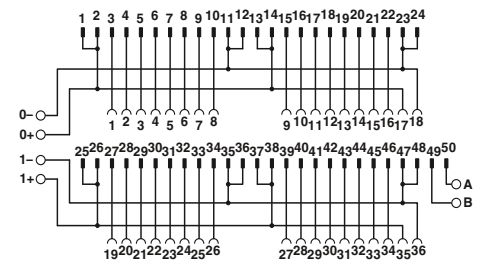
#### Ordering data

Description	No. of pos.	Type	Order No.	Pcs./Pkt.
<b>VARIOFACE front adapter, for PACSystems RX3i,</b>				
For digital output and analog modules	50	<b>FLKM 50-PA-GE/TKFC/RXI</b>	<b>2321473</b>	1
For digital input modules	50	<b>FLKM 50-PA-GE/TKFC/RXI/IN</b>	<b>2321486</b>	1

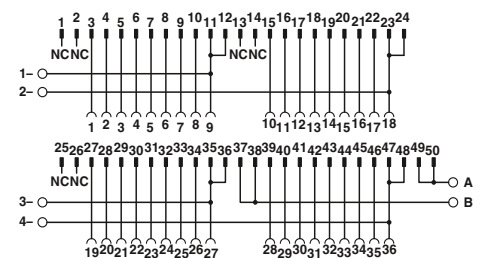
#### Front adapters for I/O modules of the RX3i series

Card type	<b>FLKM 50-PA-GE/TKFC/RXI</b>
Digital output	IC 694 MDL 754

Card type	<b>FLKM 50-PA-GE/TKFC/RXI/IN</b>
Digital input	IC 694 MDL 660



Connection scheme for FLKM 50-PA-GE/TKFC/RXI



Connection scheme for FLKM 50-PA-GE/TKFC/RXI/IN

#### Explanation:

- IDC/FLK strip
- Connection to I/O card
- Screw terminal blocks for separate supply

### GE Fanuc, Series 90-30

#### Front adapters

The front adapters mean that pre-assembled system cables can be directly connected to I/O modules.

Up to 2 x 8 channels are connected via two 14-pos. system cables.

Tailor-made VARIOFACE termination boards with a variety of functions and connection options round off this system concept.

#### Web code for the online configurator

**i** Your web code: **#0007**

#### Notes:

Standard modules from page 526

For system cables, see page 550



Front adapter for GE Fanuc Series 90-30



#### Technical data

Maximum permissible operating voltage  
Maximum permissible current

< 50 V AC / 60 V DC  
1 A (per path)  
4 A (per connection, supply via separate power supply)

Maximum permissible total current

3 A (per Byte, for supply via connector)

Ambient temperature (operation)  
Ambient temperature (storage/transport)  
Mounting position  
Standards/regulations

-20 °C ... 50 °C  
-20 °C ... 70 °C  
any  
IEC 60664 / DIN EN 50178

#### Ordering data

Description	No. of pos.
<b>VARIOFACE front adapter</b> , for Series 90-30, max. 2 x 8 channels can be connected, digital output	14
<b>VARIOFACE front adapter</b> , for Series 90-30, max. 2 x 8 channels can be connected, digital input	14

Type	Order No.	Pcs./Pkt.
<b>FLKM 14-PA/GE/DO</b>	<b>2290009</b>	2
<b>FLKM 14-PA/GE/DI</b>	<b>2290038</b>	5

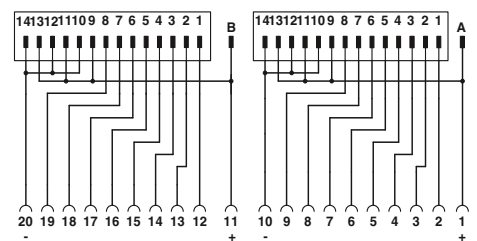
#### Front adapters for I/O modules of the Series 90-30

Card type	FLKM 14-PA/GE/DO
<b>Digital output</b>	IC 693 MDL 732 IC 693 MDL 733* IC 693 MDL 740 IC 693 MDL 741* IC 693 MDL 742
<b>Analog</b>	IC 693 ALG 220* IC 693 ALG 221* IC 693 ALG 222* IC 693 ALG 223* IC 693 ALG 390* IC 693 ALG 391* IC 693 ALG 392* IC 693 ALG 442*

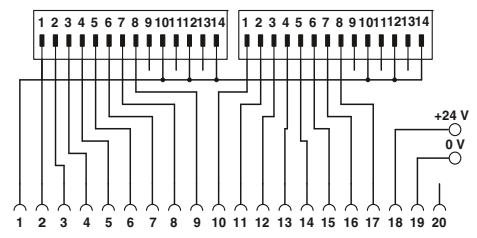
Card type	FLKM 14-PA/GE/DI
<b>Digital input</b>	IC 693 MDL 241 IC 693 MDL 634 IC 693 MDL 645 IC 693 MDL 646

\* Only in conjunction with VIP-2/SC/2FLK14(1-20)/S7, Order No.: 2315230 and UM 45-2FLK14/ZFKDS/S7, Order No.: 2965156. All wire bridges (DR) on the adapter must be disconnected. There must be no voltage supply at the front adapter (flowing via the slip-on connections).

**Explanation:**  
 IDC/FLK strip  
 Connection to I/O card  
 Screw terminal blocks for separate supply



Connection scheme FLKM 14-PA/GE/DO



Connection scheme FLKM 14-PA/GE/DI

# System cabling for controllers

## Controller-specific system cabling

### Honeywell C300, Series C I/O Front adapters

The front adapters mean that pre-assembled system cables can be directly connected to I/O modules.

#### FLKM-PA-D37/HW/DIO/C300

- Front adapter with D-SUB connector
- Connection of a maximum of 16 digital channels
- Specifically for digital I/O cards

#### FLKM-PA-D37/HW/AN/C300

- Front adapter with D-SUB connector
- Connection of analog modules

#### FLKM-PA-2D15/HW/.../C300

- Front adapter with two 15-pos. D-SUB connectors
- Connection of a maximum of 2 x 8 digital inputs/outputs per adapter
- Specifically for connecting PLC-V8/D15.../OUT or PLC-V8/D15.../IN

### Web code for the online configurator

**i** Your web code: #0007

Notes:
Matching system cable fitted with D-SUB socket strip at both ends, see page 593
1) No UL approval



Honeywell C300 front adapter



### Technical data

Maximum permissible operating voltage	60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	1 A (per path)
Ambient temperature (operation)	-20 °C ... 50 °C
Ambient temperature (storage/transport)	-20 °C ... 70 °C
Mounting position	any
Standards/regulations	IEC 60664 / DIN EN 50178

### Ordering data

Description	No. of pos.
<b>VARIOFACE front adapter</b> for C I/O series, with one D-SUB pin strip	
- For digital I/O modules	37
- For analog I/O modules	37
<b>VARIOFACE front adapter</b> for C I/O series, with two D-SUB pin strips	
- For digital output modules	15
- For digital input modules	15

Type	Order No.	Pcs./Pkt.
<b>FLKM-PA-D37/HW/DIO/C300</b>	<b>2901423</b>	1
<b>FLKM-PA-D37/HW/AN/C300</b>	<b>2900622</b>	1
<b>FLKM-PA-2D15/HW/DO/C300<sup>1)</sup></b>	<b>2900924</b>	1
<b>FLKM-PA-2D15/HW/DI/C300<sup>1)</sup></b>	<b>2901879</b>	1

#### Front adapters for I/O modules of the C300 and C I/O series

Card type	FLKM-PA-D37/HW/DIO/C300
Digital input	TDIL 11* TDIL 01*
Digital output	TDOB 11* TDOB 01*

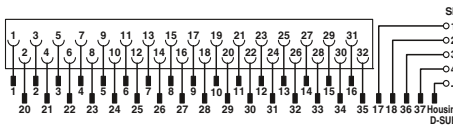
Card type	FLKM-PA-D37/HW/AN/C300
Analog input	TAIX 01** TAIX 11**
Analog output	TAOX 01** TAOX 11**

Card type	FLKM-PA-2D15/HW/DO/C300
Digital output	TDOB 01* TDOB 11*

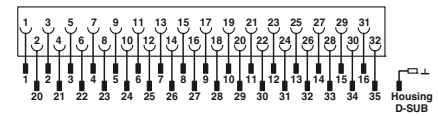
Card type	FLKM-PA-2D15/HW/DI/C300
Digital input	TDIL 01* TDIL 11*

\* Two front adapters are required for each module.

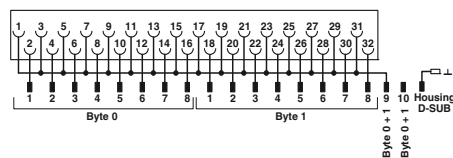
\*\* For three-conductor operation (channels 13 - 16) of input modules: only in conjunction with VIP-3/SC/D37SUB/M/HW/C300, Order No.: 2900675.



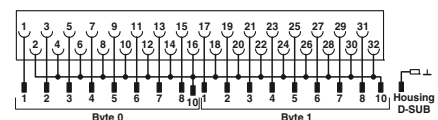
Connection scheme: FLKM-PA-D37/HW/AN/C300



Connection scheme: FLKM-PA-D37/HW/DIO/C300



FLKM-PA-2D15/HW/DI/C300 connection scheme



Connection scheme: FLKM-PA-2D15/HW/DO/C300

#### Explanation:

- Connectors
- Connection to I/O card
- Screw terminal blocks for separate supply

### Honeywell C300, Series C I/O termination boards

These VIP - VARIOFACE Professional modules are used in combination with 37-pos. D-SUB cables and the relevant front adapters. The three module versions are available with screw or Push-in connection technology.

#### VIP-2/.../D37SUB/M

- In conjunction with FLKM-PA-D37/HW/C300 or FLKM-PA-D37/HW/AN/C300 front adapter
- Universal module
- Field connection via double-level terminal blocks

#### VIP-2/.../D37SUB/M/SO

- In conjunction with FLKM-PA-D37/HW/C300 front adapter
- System-specific marking
- Field connection via double-level terminal blocks

### VIP-3/.../D37SUB/M/HW/C300

- In conjunction with FLKM-PA-D37/HW/AN/C300 front adapter
- System-specific marking
- For TAIX01, TAIX11 analog input modules
- Field connection via three-level terminal blocks

### Web code for the online configurator

**i** Your web code: #0007

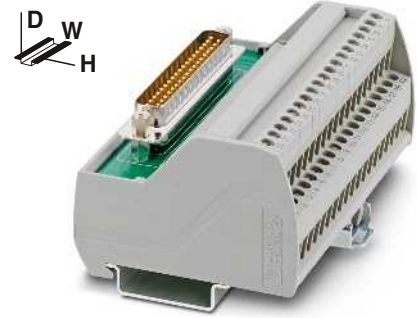
#### Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.

1) No UL approval

Maximum permissible operating voltage	
25 V AC / 60 V DC	
Maximum permissible operating voltage UL / CSA	
125 V / 105 V	
Maximum permissible current (per branch)	
2 A	
Ambient temperature (operation)	
-20 °C ... 50 °C	
Mounting position	
any	
Standards/regulations	
DIN EN 50178	
Connection method	Controller level
D-SUB pin strip	D-SUB pin strip
Screw connection solid/stranded/AWG	
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
Push-in connection solid/stranded/AWG	
0.14 ... 4 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	H / D
72.1 mm / 46.6 mm	75.8 mm / 63 mm

Description	No. of pos.	Module width W
<b>VARIOFACE termination board</b> , with D-SUB pin strip and universal marking,		
- with screw connection	37	101 mm
- with Push-in connection	37	102.8 mm
<b>VARIOFACE termination board</b> , with D-SUB pin strip and system-specific marking,		
- with screw connection	37	101 mm
- with Push-in connection	37	102.8 mm
<b>VARIOFACE termination board</b> , with D-SUB pin strip for analog input modules,		
- with screw connection	37	88 mm
- with Push-in connection	37	87.6 mm



37-pos. with screw or Push-in connection

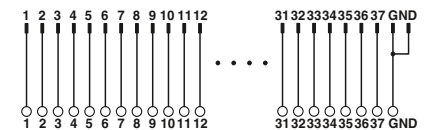
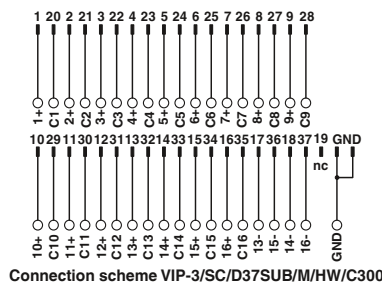


#### Technical data

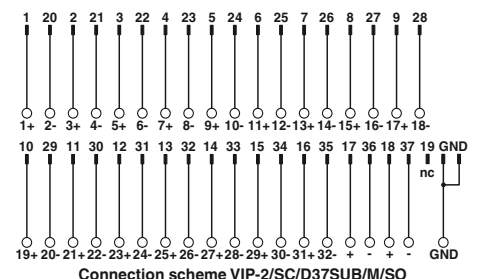
VIP-2/...	VIP-3/...C300
25 V AC / 60 V DC	25 V AC / 60 V DC
125 V / 105 V	125 V / 105 V
2 A	2 A
-20 °C ... 50 °C	-20 °C ... 50 °C
any	any
DIN EN 50178	
D-SUB pin strip	D-SUB pin strip
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
0.14 ... 4 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14	
72.1 mm / 46.6 mm	75.8 mm / 63 mm

#### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-2/SC/D37SUB/M	2900676	1
VIP-2/PT/D37SUB/M	2904277	1
VIP-2/SC/D37SUB/M/SO <sup>1)</sup>	2900786	1
VIP-2/PT/D37SUB/M/SO <sup>1)</sup>	2904278	1
VIP-3/SC/D37SUB/M/HW/C300	2900675	1
VIP-3/PT/D37SUB/M/HW/C300	2904276	1



Connection scheme VIP-2/SC/D37SUB/M



# System cabling for controllers

## Controller-specific system cabling

### Mitsubishi Electric MELSEC A, A1S and Q System cables

For 32/64-channel I/O cards with 37-pos. D-SUB connectors. System cables are available for connecting 1 x 32 channels or 4 x 8 channels.

#### Web code for the online configurator

**i** Your web code: #0007



**System cable,  
D-SUB socket strip to IDC/FLK socket strip,  
number of positions: 37 to 50**



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	10.5 mm

37-pos.

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Round cable for output module</b> MELSEC Q Y81 P, MELSEC A1S Y81, and MELSEC A AY82EP, in standard lengths	37	0.5 m	FLK 50/EZ-DR/D37SUB/ 50/Y81P-O	2302599	1
	37	1 m	FLK 50/EZ-DR/D37SUB/100/Y81P-O	2302609	1
	37	2 m	FLK 50/EZ-DR/D37SUB/200/Y81P-O	2302612	1
	37	3 m	FLK 50/EZ-DR/D37SUB/300/Y81P-O	2302638	1
	37		FLK 50-EZ-DR-D37SUB-Y81P-O/...	2302625	1
<b>Round cable for input module</b> MELSEC Q X81, MELSEC A1S X81, and MELSEC A AX82, in standard lengths	37	0.5 m	FLK 50/EZ-DR/D37SUB/ 50/X81-I	2302641	1
	37	1 m	FLK 50/EZ-DR/D37SUB/100/X81-I	2302654	1
	37	2 m	FLK 50/EZ-DR/D37SUB/200/X81-I	2302667	1
	37	3 m	FLK 50/EZ-DR/D37SUB/300/X81-I	2302670	1
	37		FLK 50-EZ-DR-D37SUB-X81-I/...	2302683	1



**Splitting cable,  
D-SUB socket strip to IDC/FLK socket strip,  
number of positions: 37 to 4 x 14**



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	6.3 mm

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Round cable, as above, but in variable lengths</b>	37		CABLE-D37-M2,5/4X14/ 50/Y81P-O	2302476	1
	37		CABLE-D37-M2,5/4X14/100/Y81P-O	2302489	1
	37		CABLE-D37-M2,5/4X14/200/Y81P-O	2302492	1
	37		CABLE-D37-M2,5/4X14/300/Y81P-O	2302502	1
	37		CABLE-D37-M2,5-4X14-Y81P-O/...	2302696	1
<b>Round cable, as above, but in variable lengths</b>	37		CABLE-D37-M2,5/4X14/ 50/X81-I	2302515	1
	37		CABLE-D37-M2,5/4X14/100/X81-I	2302528	1
	37		CABLE-D37-M2,5/4X14/200/X81-I	2302531	1
	37		CABLE-D37-M2,5/4X14/300/X81-I	2302544	1
	37		CABLE-D37-M2,5-4X14-X81-I/...	2302706	1

#### Ordering example for system cable:

– Cable for MELSEC Q Y81P, 12.75 m long

Quantity	Order No.	Length [m] <sup>1)</sup>
1	2302625	12.75

<sup>1)</sup> min. 0.20 m

#### Ordering example for splitting cable:

– Cable for MELSEC Q Y81P, 11.00 m long

Quantity	Order No.	Length [m] <sup>1)</sup>
1	2302696	11.00

<sup>1)</sup> min. 0.20 m



**Mitsubishi Electric  
MELSEC L/Q and Honeywell ML 200  
System cables**

These system cables are plugged onto the I/O cards that are connected using Fujitsu connectors.

**CABLE-FCN40/1X50/...**

– Signal transmission of 32 channels

**CABLE-FCN40/4X14/...**

– Splitting up 32 channels into  
4 x 8 channels

**Web code for the online configurator**

**i** Your web code: **#0007**



Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 50



Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 4 x 14



Technical data	
Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated



Technical data	
Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated

**Ordering data**

Type	Order No.	Pcs./ Pkt.
<b>Round cable</b> in variable lengths for <b>Mitsubishi MELSEC L</b> LX41C4, LX42C4 (common positive connection to B01, B02) LY41NT1P, LY42NT1P, LY41PT1P, LY42PT1P <b>Mitsubishi MELSEC Q</b> QX41, QX41-S1, QX42, QX42-S1 QX71 and QX72 (common positive connection to B01, B02) QY41P, QY42P, QY71, QH42P <b>Honeywell ML 200</b> 2MLQ-TR4A, 2MLQ-TR8A, 2MLQ-TR4B, 2MLQ-TR8B		
40 0.5 m CABLE-FCN40/1X50/ 0,5M/IM/MEL	2903468	1
40 1 m CABLE-FCN40/1X50/ 1,0M/IM/MEL	2903469	1
40 2 m CABLE-FCN40/1X50/ 2,0M/IM/MEL	2903470	1
40 3 m CABLE-FCN40/1X50/ 3,0M/IM/MEL	2903471	1
40 4 m CABLE-FCN40/1X50/ 4,0M/IM/MEL	2903472	1
40 6 m CABLE-FCN40/1X50/ 6,0M/IM/MEL	2903473	1
40 8 m CABLE-FCN40/1X50/ 8,0M/IM/MEL	2903474	1
40 10 m CABLE-FCN40/1X50/10,0M/IM/MEL	2903475	1
<b>Round cable</b> in variable lengths for <b>Mitsubishi MELSEC L</b> LX41C4 and LX42C4 (common negative connection to B01, B02) <b>Mitsubishi MELSEC Q</b> QX71 and QX72 (common negative connection to B01, B02) QX82, QX82-S1 <b>Honeywell ML 200</b> 2MLI-D24A, 2MLI-D28B, 2MLF-SOEA (common negative connection to B01, B02)		
40 0.5 m CABLE-FCN40/1X50/ 0,5M/IP/MEL	2903476	1
40 1 m CABLE-FCN40/1X50/ 1,0M/IP/MEL	2903477	1
40 2 m CABLE-FCN40/1X50/ 2,0M/IP/MEL	2903478	1
40 3 m CABLE-FCN40/1X50/ 3,0M/IP/MEL	2903479	1
40 4 m CABLE-FCN40/1X50/ 4,0M/IP/MEL	2903480	1
40 6 m CABLE-FCN40/1X50/ 6,0M/IP/MEL	2903481	1
40 8 m CABLE-FCN40/1X50/ 8,0M/IP/MEL	2903482	1
40 10 m CABLE-FCN40/1X50/10,0M/IP/MEL	2903483	1
<b>Round cable</b> in variable lengths for <b>Mitsubishi MELSEC L</b> LX41C4 and LX42C4 (common positive connection to B01, B02) LY41NT1P, LY42NT1P, LY41PT1P, LY42PT1P <b>Mitsubishi MELSEC Q</b> QX41, QX41-S1, QX42, QX42-S1 QY41P (24 V), QY42P (24 V), QH42P (24 V) <b>Honeywell ML 200</b> 2MLQ-TR4A, 2MLQ-TR8A, 2MLQ-TR4B, 2MLQ-TR8B		
40 0.5 m CABLE-FCN40/4X14/ 0,5M/IM/MEL	2903502	1
40 1 m CABLE-FCN40/4X14/ 1,0M/IM/MEL	2903503	1
40 2 m CABLE-FCN40/4X14/ 2,0M/IM/MEL	2903504	1
40 3 m CABLE-FCN40/4X14/ 3,0M/IM/MEL	2903505	1
40 4 m CABLE-FCN40/4X14/ 4,0M/IM/MEL	2903506	1
40 6 m CABLE-FCN40/4X14/ 6,0M/IM/MEL	2903507	1
40 8 m CABLE-FCN40/4X14/ 8,0M/IM/MEL	2903508	1
40 10 m CABLE-FCN40/4X14/10,0M/IM/MEL	2903509	1

**Ordering data**

Type	Order No.	Pcs./ Pkt.
<b>Round cable</b> in variable lengths for <b>Mitsubishi MELSEC L</b> LX41C4 and LX42C4 (common positive connection to B01, B02) LY41NT1P, LY42NT1P, LY41PT1P, LY42PT1P <b>Mitsubishi MELSEC Q</b> QX41, QX41-S1, QX42, QX42-S1 QY41P (24 V), QY42P (24 V), QH42P (24 V) <b>Honeywell ML 200</b> 2MLQ-TR4A, 2MLQ-TR8A, 2MLQ-TR4B, 2MLQ-TR8B		
40 0.5 m CABLE-FCN40/4X14/ 0,5M/IM/MEL	2903502	1
40 1 m CABLE-FCN40/4X14/ 1,0M/IM/MEL	2903503	1
40 2 m CABLE-FCN40/4X14/ 2,0M/IM/MEL	2903504	1
40 3 m CABLE-FCN40/4X14/ 3,0M/IM/MEL	2903505	1
40 4 m CABLE-FCN40/4X14/ 4,0M/IM/MEL	2903506	1
40 6 m CABLE-FCN40/4X14/ 6,0M/IM/MEL	2903507	1
40 8 m CABLE-FCN40/4X14/ 8,0M/IM/MEL	2903508	1
40 10 m CABLE-FCN40/4X14/10,0M/IM/MEL	2903509	1

# System cabling for controllers

## Controller-specific system cabling

### OMRON CJ1, CS1, CQM1 and C200H System cables

These system cables are plugged onto the I/O cards that are connected using Fujitsu connectors.

#### FLK 50/EZ-DR/...

– Signal transmission of 32 channels

#### CABLE-FCN40...

– Splitting up 32 channels into  
4 x 8 channels

#### CABLE-FCN24...

– Splitting up 16 channels into  
2 x 8 channels



Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 50



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated

#### Ordering data

Description	No. of pos.	Cable length
<b>Round cable</b> in variable lengths for CJ1: OD231, OD261 CS1, C200H: OD218, OD219 CQM1: OD213	40 40	1 m 2 m
<b>Round cable</b> , as above, but in variable lengths	40	
<b>Round cable</b> in variable lengths for CJ1: ID231, ID261 CS1 and C200H: ID111, ID216, ID217, CQM1: ID213; ID214; ID112	40 40	1 m 2 m
<b>Round cable</b> , as above, but in variable lengths	40	
<b>Round cable</b> in variable lengths for CS1, C200H: OD215, MD115 (only output), MD215 (only output)	24 24	1 m 2 m
<b>Round cable</b> , as above, but in variable lengths	24	
<b>Round cable</b> in variable lengths for CS1, C200H: ID215, MD115 (only input), MD215 (only input)	24 24	1 m 2 m
<b>Round cable</b> , as above, but in variable lengths	24	



Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 4 x 14 or 24 to 2 x 14



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated

#### Ordering data

Type	Order No.	Pcs./ Pkt.
FLK 50/EZ-DR/FCN40/100/OMR-OUT	<a href="#">2304144</a>	1
FLK 50/EZ-DR/FCN40/200/OMR-OUT	<a href="#">2304157</a>	1
FLK 50-EZ-DR-FCN40-OMR-OUT/...	<a href="#">2302829</a>	1
FLK 50/EZ-DR/FCN40/100/OMR-IN	<a href="#">2304160</a>	1
FLK 50/EZ-DR/FCN40/200/OMR-IN	<a href="#">2304173</a>	1
FLK 50-EZ-DR-FCN40-OMR-IN/...	<a href="#">2302803</a>	1
CABLE-FCN40/4X14/100/OMR-OUT	<a href="#">2304186</a>	1
CABLE-FCN40/4X14/200/OMR-OUT	<a href="#">2304199</a>	1
CABLE-FCN40-4X14-OMR-OUT/...	<a href="#">2302832</a>	1
CABLE-FCN40/4X14/100/OMR-IN	<a href="#">2304209</a>	1
CABLE-FCN40/4X14/200/OMR-IN	<a href="#">2304212</a>	1
CABLE-FCN40-4X14-OMR-IN/...	<a href="#">2302816</a>	1
CABLE-FCN24/2X14/100/OMR-OUT	<a href="#">2304225</a>	1
CABLE-FCN24/2X14/200/OMR-OUT	<a href="#">2304238</a>	1
CABLE-FCN24-2X14-OMR-OUT/...	<a href="#">2302858</a>	1
CABLE-FCN24/2X14/100/OMR-IN	<a href="#">2304241</a>	1
CABLE-FCN24/2X14/200/OMR-IN	<a href="#">2304254</a>	1
CABLE-FCN24-2X14-OMR-IN/...	<a href="#">2302845</a>	1

#### Ordering example for system cable:

– Cable for OMRON CJ1, ID231, 12.75 m long

Quantity	Order No.	Length [m] <sup>1)</sup>
1	<a href="#">2302803</a>	12.75

<sup>1)</sup> min. 0.20 m

### Phoenix Contact Axioline real-time I/O System cables

These cables have been specifically developed for connecting VARIOFACE termination boards to the Axioline real-time I/O system. The Push-in technology on the I/O system ensures rapid connection.

The cables have the following features:

- 1:1 connection
- 14-pos. connector, encapsulated
- 8 pre-assembled open ends, for connection to the Axioline real-time I/O system
- Transmission of groups of 8 channels
- Tailor-made VARIOFACE termination boards round off this system concept.

#### Notes:

The following modules cannot be coupled due to the larger outer contour of the encapsulated connectors:  
 UM 45-FLK14/ 8IM/ZFKDS/PLC, [2965211](#)  
 UM 45- 8RM/MR-G24/1/PLC, [2962900](#)



System cable for 8 channels



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	6.4 mm

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Round cable with an open end (8 individual wires)</b>					
	8	0.5 m	VIP-CAB-FLK14/AXIO/0,14/0,5M	<a href="#">2901604</a>	1
	8	1 m	VIP-CAB-FLK14/AXIO/0,14/1,0M	<a href="#">2901605</a>	1
	8	1.5 m	VIP-CAB-FLK14/AXIO/0,14/1,5M	<a href="#">2901606</a>	1
	8	2 m	VIP-CAB-FLK14/AXIO/0,14/2,0M	<a href="#">2901607</a>	1
	8	2.5 m	VIP-CAB-FLK14/AXIO/0,14/2,5M	<a href="#">2901608</a>	1
	8	3 m	VIP-CAB-FLK14/AXIO/0,14/3,0M	<a href="#">2901609</a>	1
	8	4 m	VIP-CAB-FLK14/AXIO/0,14/4,0M	<a href="#">2901610</a>	1
	8	6 m	VIP-CAB-FLK14/AXIO/0,14/6,0M	<a href="#">2901611</a>	1



# System cabling for controllers

## Controller-specific system cabling

### Phoenix Contact Inline Front adapters

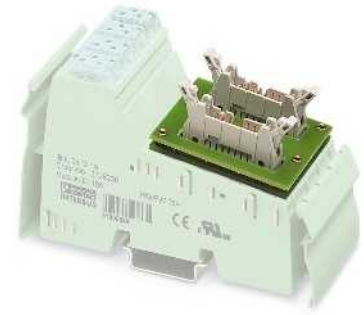
The front adapters are used to connect pre-assembled system cables directly to Inline. Front adapters are simply plugged into the relevant Inline modules. Three connection options are available:

- Transfer of 8 channels via a 14-pos. system cable
  - Transmission of 2 x 8 channels over two 14-position system cables
  - Transmission of 4 x 8 channels over four 14-position system cables
- Tailor-made VARIOFACE termination boards round off this system concept.

### Web code for the online configurator

**i** Your web code: **#0007**

Notes:
Standard modules from page 526
For system cables, see page 550



Front adapters for Inline



Maximum permissible operating voltage  
Maximum permissible current  
Ambient temperature (operation)  
Ambient temperature (storage/transport)  
Mounting position  
Standards/regulations

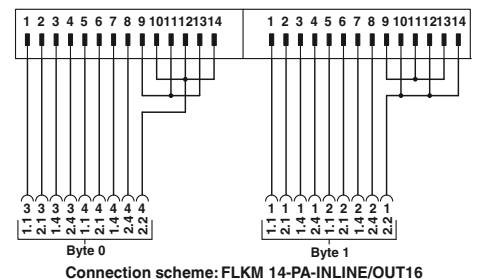
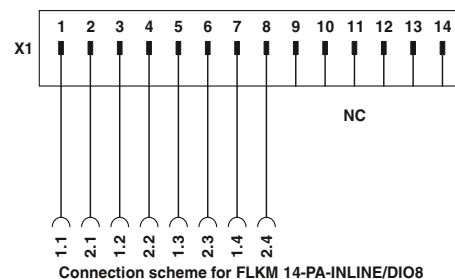
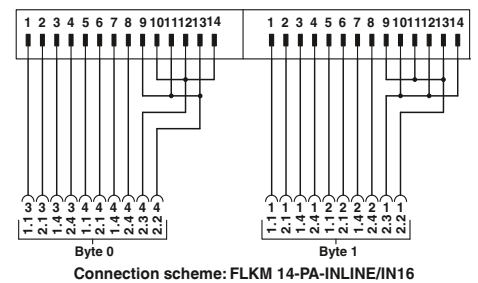
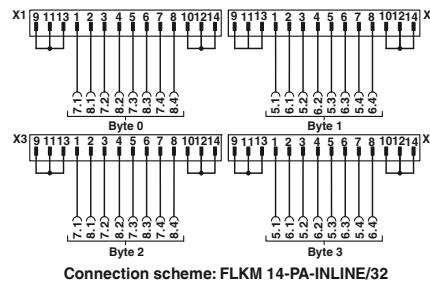
60 V DC  
1 A (per path)  
-20 °C ... 50 °C  
-20 °C ... 70 °C  
any  
IEC 60664 / DIN EN 50178

### Technical data

### Ordering data

Description	No. of pos.
<b>VARIOFACE front adapter, for 8-channel Inline modules</b>	
Input: IB IL 24 D I8/HD-PAC Output: IB IL 24 DO 8/HD-PAC	14
<b>VARIOFACE front adapter, for 16-channel Inline modules</b>	
Input: IB IL 24 DI 16-PAC Output: IB IL 24 DO 16-PAC	14
<b>VARIOFACE front adapter, for 32-channel Inline modules</b>	
Input: IB IL 24 DI 32/HD-PAC and IB IL 24 DI 32/HD-NPN-PAC Output: IB IL 24 DO 32/HD-PAC	14

Type	Order No.	Pcs./Pkt.
<b>FLKM 14-PA-INLINE/DIO8</b>	<b>2900889</b>	1
<b>FLKM 14-PA-INLINE/IN16</b>	<b>2302751</b>	1
<b>FLKM 14-PA-INLINE/OUT16</b>	<b>2302764</b>	1
<b>FLKM 14-PA-INLINE/32</b>	<b>2302777</b>	1



**Explanation:**  
 IDC/FLK strip  
 Connection to I/O card  
 Screw terminal blocks for separate supply

### Schneider Electric Modicon TSX Quantum™ Front adapters

The front adapters mean that pre-assembled system cables can be directly connected to I/O modules. Two connection options are available:

- Transfer of max. 32 channels over one 50-position system cable
- Transmission of 4 x 8 channels over four 14-position system cables

Tailor-made VARIOFACE termination boards with a variety of functions and connection options round off this system concept.

### Web code for the online configurator

 Your web code: **#0007**

Notes:
Controller-specific modules from page 474
Standard modules from page 526
For system cables, see page 550



Front adapter for Modicon® TSX Quantum™



### Technical data

Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA

Maximum permissible current

Ambient temperature (operation)  
Ambient temperature (storage/transport)  
Mounting position  
Standards/regulations

< 50 V AC / 60 V DC  
125 V / -

1 A (per path)  
4 A (per connection, supply via separate power supply)

-20 °C ... 50 °C  
-20 °C ... 70 °C  
any  
IEC 60664 / DIN EN 50178

### Ordering data

Description	No. of pos.
<b>VARIOFACE front adapter</b> , for Modicon® TSX Quantum™, 1 x 32 channels can be connected	50
<b>VARIOFACE front adapter</b> , for Modicon® TSX Quantum™, 4 x 8 channels can be connected	14

Type	Order No.	Pcs./ Pkt.
<b>FLKM 50-PA-MODI-TSX/Q</b>	<b>2294306</b>	1
<b>FLKM 50/ 4-FLK14/PA-MODI-TSX/Q</b>	<b>2294416</b>	1

### Front adapters for I/O modules of the Modicon TSX Quantum™ automation devices

Card type	FLKM 50-PA-MODI-TSX/Q
<b>Digital input</b>	DDI 353 DDI 841* DDI 853 DAI 340* DAI 353** DAI 440* DAI 453**
<b>Digital output</b>	DDO 353
<b>Digital input/output</b>	DDM 390*
<b>Analog input</b>	ACI 030* ACI 040* ATI 030* ARI 030* AVI 030*
<b>Analog output</b>	ACO 020* ACO 130* AVO 020*
<b>Analog input/output</b>	AMM 090*
<b>Counter</b>	ECH 105* EHC 202*

\* Only in conjunction with VIP-2/SC/FLK50/MODI-TSX/Q, Order No. 2322304.

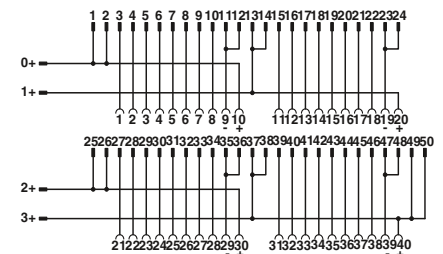
\*\* Only in conjunction with passive termination boards without LED.

Card type	FLKM 50/4-FLK14/PA-MODI-TSX/Q
<b>Digital input</b>	DDI 353 DDI 853 DAI 353** DAI 453**
<b>Digital output</b>	DDO 353

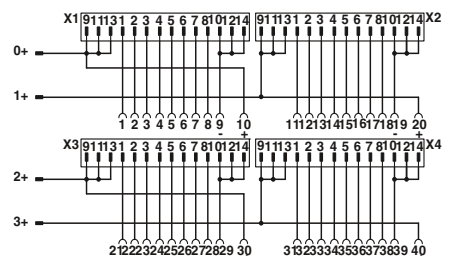
\*\* Only in conjunction with passive termination boards without LED.

### Explanation:

- IDC/FLK strip
- Connection to I/O card
- Screw terminal blocks for separate supply



Connection scheme FLKM 50-PA-MODI-TSX/Q



Connection scheme FLKM 50/ 4-FLK14/PA-MODI-TSX/Q

# System cabling for controllers

## Controller-specific system cabling

### Schneider Electric Modicon M340 Front adapter

Pre-assembled system cables are connected directly to the 16-channel I/O modules using the front adapter. The adapters connect 2 x 8 channels of the controller via two 14-pos. system cables. Tailor-made VARIOFACE termination boards with a variety of functions and connection options are available for connection to field level. They round off this system concept.

### Web code for the online configurator

**i** Your web code: #0007

Notes:
Standard modules from page 526
For system cables, see page 550



Schneider Electric Modicon M340 front adapter



### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	50 V / 50 V
Maximum permissible current	1 A (per path)
Maximum permissible total current	3 A (per system cable when supplying from the module side) 10 A (When supplying via the front adapter)
Ambient temperature (operation)	-20 °C ... 60 °C
Ambient temperature (storage/transport)	-20 °C ... 60 °C
Mounting position	any
Standards/regulations	IEC 60664 / DIN EN 50178

### Ordering data

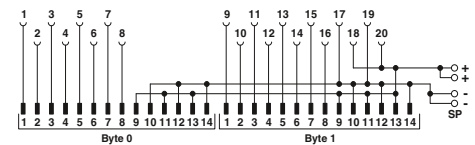
Description	No. of pos.	Type	Order No.	Pcs./Pkt.
<b>VARIOFACE front adapter</b> , for Modicon® M340 with two FLK pin strips	14	<b>FLKM 14-PA-MODI/M340</b>	<b>2903208</b>	1

### Front adapters for I/O modules of the Modicon C340 series

Card type	FLKM 14-PA-MODI/M340
Digital input	BMX DDI1602 BMX DDI1603 BMX DAI1602 BMX DAI1603
Digital output	BMX DDO1602 BMX DDO1612

### Assignment table

Contacts, front adapter/controller	Connector (Byte 0)	Connector (Byte 1)
1	1	
2	2	
3	3	
4	4	
5	5	
6	6	
7	7	
8	8	
9		1
10		2
11		3
12		4
13		5
14		6
15		7
16		8
17	10, 12, 14 (-)	10, 12, 14 (-)
18	9, 11, 13 (+)	9, 11, 13 (+)
19	10, 12, 14 (-)	10, 12, 14 (-)
20	9, 11, 13 (+)	9, 11, 13 (+)



Connection scheme FLKM 14-PA-MODI/M340

**Schneider Electric Modicon M340 System cable**

These system cables are plugged onto the I/O cards that are connected using Fujitsu connectors.

**CABLE-FCN40/1X50/...**

– Signal transmission of 32 channels

**CABLE-FCN40/4X14/...**

– Splitting up 32 channels into 4 x 8 channels

**Web code for the online configurator**

**i** Your web code: #0007



Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 50



Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 4 x 14



**Technical data**

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated



**Technical data**

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated

**Ordering data**

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Round cable</b> in variable lengths for BMX DDI 3202K, BMX DDI 6402K, BMX DD0 3202K, BMX DD0 6402K, BMX DDM 3202K					
	40	0.5 m	CABLE-FCN40/1X50/ 0,5M/M340	2321635	1
	40	1 m	CABLE-FCN40/1X50/ 1,0M/M340	2321648	1
	40	2 m	CABLE-FCN40/1X50/ 2,0M/M340	2321651	1
	40	3 m	CABLE-FCN40/1X50/ 3,0M/M340	2321664	1
	40	4 m	CABLE-FCN40/1X50/ 4,0M/M340	2321677	1
	40	6 m	CABLE-FCN40/1X50/ 6,0M/M340	2321680	1
	40	8 m	CABLE-FCN40/1X50/ 8,0M/M340	2321693	1
	40	10 m	CABLE-FCN40/1X50/10,0M/M340	2321703	1
	40	15 m	CABLE-FCN40/1X50/15,0M/M340	2903748	1

**Ordering data**

Type	Order No.	Pcs./ Pkt.
CABLE-FCN40/4X14/ 0,5M/M340	2321716	1
CABLE-FCN40/4X14/ 1,0M/M340	2321729	1
CABLE-FCN40/4X14/ 2,0M/M340	2321732	1
CABLE-FCN40/4X14/ 3,0M/M340	2321745	1
CABLE-FCN40/4X14/ 4,0M/M340	2321758	1
CABLE-FCN40/4X14/ 6,0M/M340	2321761	1
CABLE-FCN40/4X14/ 8,0M/M340	2321774	1
CABLE-FCN40/4X14/10,0M/M340	2321787	1
CABLE-FCN40/4X14/15,0M/M340	2903749	1

# System cabling for controllers

## Controller-specific system cabling

### VIP – power cabling

#### Universal front adapters for Siemens SIMATIC® S7-300

##### Two versions are available:

- Connection of 40-pos. modules via four cables, each with a 10-pos. COMBI connector
- Connection of 20-pos. modules via two cables, each with a 10-pos. COMBI connector

##### The front adapters have the following features:

- Can be screwed on/snapped in with the I/O module
- Suitable for all common S7-300 modules, up to max. 250 V AC/DC, 6 A
- Universal 1:1 connection
- Numerically marked connectors

##### Combination example:

A front adapter with attached 10-pos. COMBI connectors is combined with the following terminal blocks for field connection:

Overall width of 52 mm per connector:

– 3045017 UT 2,5/1P

– 3210033 PT 2,5/1P

– 3040012 ST 2,5/1P

– 3040766 ST 2,5-TWIN-MT/1P

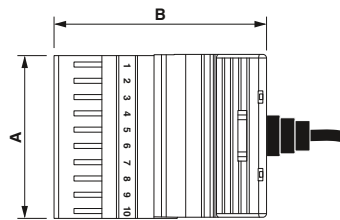
Reduced overall width of 35 mm per

connector:

– 3208582 PT 1,5/S/1P

– 3212439 PTTB 1,5/S/2P

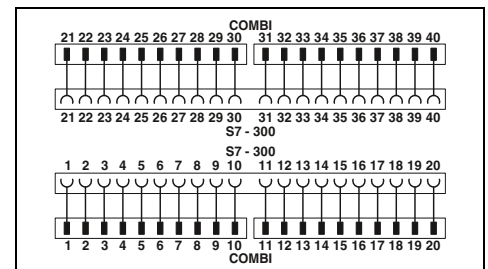
You can find further versions, accessories, and combination options in Catalog 1 “Terminal blocks” in the “Plug-in COMBI connection solutions” section or online at [phoenixcontact.net/products](http://phoenixcontact.net/products).



	A	B
...4X10COMBI...	52	70
...2X10COMBI...		
...4X10 PT...	35	62
...2X10 PT...		



Front adapter with punched-on connectors for 40 plug-in terminal blocks



#### Technical data

Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA

Maximum permissible current

Maximum permissible total current

Maximum conductor resistance  
Conductor cross section  
Conductor structure: stranded wires / material  
Outside diameter  
Ambient temperature range  
Standards/regulations  
Connection method

Controller level  
Field level

≤ 250 V AC/DC  
250 V / 250 V

6 A (per single wire at 40°C)  
4 A (per single wire at 60°C)  
20 A (per cable at 40°C)  
16 A (per cable at 60°C)

39 Ω/km  
AWG 21 / 0.5 mm<sup>2</sup>  
16 / Cu uninsulated  
9 mm

-20 °C ... 60 °C

DIN EN 50178 , IEC 60664

Plug connection

COMBICON connectors

#### Ordering data

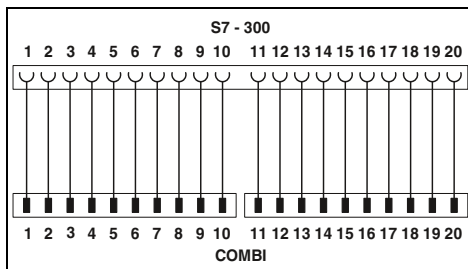
Description	Cable length
<b>VIP - power cabling front adapter</b> , for universal connection of the SIMATIC® S7-300, with an overall width of 52 mm per connector	
	0.5 m
	1 m
	1.5 m
	2 m
	2.5 m
	3 m
	4 m
	5 m
	6 m
	8 m
	10 m
<b>VIP - power cabling front adapter</b> , for universal connection of the SIMATIC® S7-300, with reduced overall width of 35 mm per connector	
	0.5 m
	1 m
	1.5 m
	2 m
	2.5 m
	3 m
	4 m
	5 m
	6 m
	8 m
	10 m

Type	Order No.	Pcs./ Pkt.
VIP-PA-PWR/4X10COMBI/ 0,5M/S7	2904702	1
VIP-PA-PWR/4X10COMBI/ 1,0M/S7	2904703	1
VIP-PA-PWR/4X10COMBI/ 1,5M/S7	2904704	1
VIP-PA-PWR/4X10COMBI/ 2,0M/S7	2904705	1
VIP-PA-PWR/4X10COMBI/ 2,5M/S7	2904706	1
VIP-PA-PWR/4X10COMBI/ 3,0M/S7	2904707	1
VIP-PA-PWR/4X10COMBI/ 4,0M/S7	2904708	1
VIP-PA-PWR/4X10COMBI/ 5,0M/S7	2904709	1
VIP-PA-PWR/4X10COMBI/ 6,0M/S7	2904710	1
VIP-PA-PWR/4X10COMBI/ 8,0M/S7	2904711	1
VIP-PA-PWR/4X10COMBI/10,0M/S7	2904712	1
VIP-PA-PWR/4X10 PT/ 0,5M/S7	2905516	1
VIP-PA-PWR/4X10 PT/ 1,0M/S7	2905517	1
VIP-PA-PWR/4X10 PT/ 1,5M/S7	2905518	1
VIP-PA-PWR/4X10 PT/ 2,0M/S7	2905519	1
VIP-PA-PWR/4X10 PT/ 2,5M/S7	2905520	1
VIP-PA-PWR/4X10 PT/ 3,0M/S7	2905521	1
VIP-PA-PWR/4X10 PT/ 4,0M/S7	2905522	1
VIP-PA-PWR/4X10 PT/ 5,0M/S7	2905523	1
VIP-PA-PWR/4X10 PT/ 6,0M/S7	2905524	1
VIP-PA-PWR/4X10 PT/ 8,0M/S7	2905525	1
VIP-PA-PWR/4X10 PT/10,0M/S7	2905526	1





Front adapter with punched-on connectors for 20 plug-in terminal blocks



#### Technical data

≤ 250 V AC/DC  
250 V / 250 V

6 A (per single wire at 40 °C)  
4 A (per single wire at 60 °C)  
20 A (per cable at 40 °C)  
16 A (per cable at 60 °C)  
39 Ω/km

AWG 21 / 0.5 mm<sup>2</sup>  
16 / Cu uninsulated  
9 mm

-20 °C ... 60 °C  
DIN EN 50178 , IEC 60664  
Plug connection  
COMBICON connectors

#### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-PA-PWR/2X10COMBI/ 0,5M/S7	2904713	1
VIP-PA-PWR/2X10COMBI/ 1,0M/S7	2904714	1
VIP-PA-PWR/2X10COMBI/ 1,5M/S7	2904715	1
VIP-PA-PWR/2X10COMBI/ 2,0M/S7	2904716	1
VIP-PA-PWR/2X10COMBI/ 2,5M/S7	2904717	1
VIP-PA-PWR/2X10COMBI/ 3,0M/S7	2904718	1
VIP-PA-PWR/2X10COMBI/ 4,0M/S7	2904719	1
VIP-PA-PWR/2X10COMBI/ 5,0M/S7	2904720	1
VIP-PA-PWR/2X10COMBI/ 6,0M/S7	2904721	1
VIP-PA-PWR/2X10COMBI/ 8,0M/S7	2904722	1
VIP-PA-PWR/2X10COMBI/10,0M/S7	2904723	1
VIP-PA-PWR/2X10 PT/ 0,5M/S7	2905528	1
VIP-PA-PWR/2X10 PT/ 1,0M/S7	2905529	1
VIP-PA-PWR/2X10 PT/ 1,5M/S7	2905531	1
VIP-PA-PWR/2X10 PT/ 2,0M/S7	2905532	1
VIP-PA-PWR/2X10 PT/ 2,5M/S7	2905533	1
VIP-PA-PWR/2X10 PT/ 3,0M/S7	2905534	1
VIP-PA-PWR/2X10 PT/ 4,0M/S7	2905535	1
VIP-PA-PWR/2X10 PT/ 5,0M/S7	2905536	1
VIP-PA-PWR/2X10 PT/ 6,0M/S7	2905537	1
VIP-PA-PWR/2X10 PT/ 8,0M/S7	2905538	1
VIP-PA-PWR/2X10 PT/10,0M/S7	2905539	1

# System cabling for controllers

## Controller-specific system cabling

### VIP – power cabling

#### Universal front adapters for Siemens SIMATIC® S7-300

##### Four versions are available:

- Connection of 40-pos. modules via 40 individual wires in rope structure (not assembled), PVC insulation
- Connection of 20-pos. modules via 20 individual wires in rope structure (not assembled), PVC insulation
- Connection of 40-pos. modules via 40 individual wires in rope structure (not assembled), insulation made from halogen-free material
- Connection of 20-pos. modules via 20 individual wires in rope structure (not assembled), insulation made from halogen-free material

The front adapters have the following features:

- Can be screwed on/snapped in with the I/O module
- Suitable for all common S7-300 modules, up to max. 250 V AC/DC, 6 A
- Universal 1:1 connection
- Numerically marked wires

Additional accessories, such as connection terminal blocks, can be found in Catalog 1 “Terminal blocks” or at [phoenixcontact.net/products](http://phoenixcontact.net/products).



Front adapter with 40 open cable ends, PVC insulation

ERC



#### Technical data

Maximum permissible operating voltage	≤ 250 V AC/DC
Maximum permissible current	6 A (per single wire at 40°C) 4 A (per single wire at 60°C) 750 mA (per single wire at 75 °C)
Maximum permissible total current	20 A (per cable at 40 °C) 16 A (per cable at 60°C)
Maximum conductor resistance	39 Ω/km
Conductor cross section	AWG 21 / 0.5 mm <sup>2</sup>
Conductor structure: stranded wires / material	16 / Cu uninsulated
Outside diameter	13 mm
Ambient temperature range	-20 °C ... 60 °C
Standards/regulations	DIN EN 50178 , IEC 60664
Connection method	Plug connection open cable end
	Controller level
	Field level

#### Ordering data

Description	Cable length	Type	Order No.	Pcs./Pkt.
<b>Front adapter</b> with 40 open cable ends for connecting 40-pos. modules	1 m	VIP-PA-PWR/40XOE/ 1,0M/S7	2904731	1
	2 m	VIP-PA-PWR/40XOE/ 2,0M/S7	2904732	1
	3 m	VIP-PA-PWR/40XOE/ 3,0M/S7	2904733	1
	4 m	VIP-PA-PWR/40XOE/ 4,0M/S7	2904734	1
	6 m	VIP-PA-PWR/40XOE/ 6,0M/S7	2904735	1
	8 m	VIP-PA-PWR/40XOE/ 8,0M/S7	2904736	1
	10 m	VIP-PA-PWR/40XOE/10,0M/S7	2904737	1
<b>Front adapter</b> with 20 open cable ends for connecting 20-pos. modules	1 m			
	2 m			
	3 m			
	4 m			
	6 m			
	8 m			
	10 m			



Front adapter with 20 open cable ends,  
PVC insulation

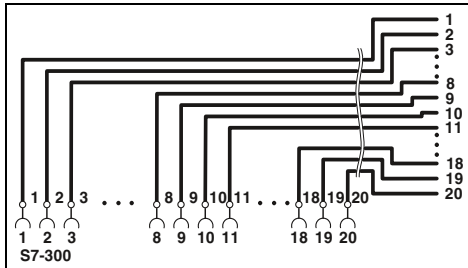


Front adapter with 40 open cable ends,  
halogen-free



Front adapter with 20 open cable ends,  
halogen-free

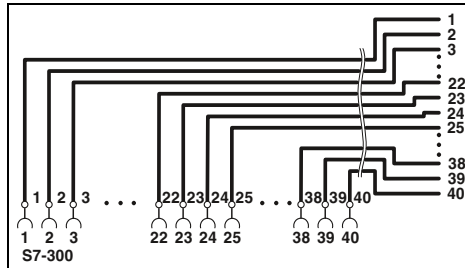
ERC



### Technical data

≤ 250 V AC/DC  
6 A (per single wire at 40°C)  
4 A (per single wire at 60°C)  
750 mA (per single wire at 75 °C)  
20 A (per cable at 40 °C)  
16 A (per cable at 60°C)  
39 Ω/km  
AWG 21 / 0.5 mm<sup>2</sup>  
16 / Cu uninsulated  
9 mm  
-20 °C ... 60 °C  
DIN EN 50178 , IEC 60664  
Plug connection  
open cable end

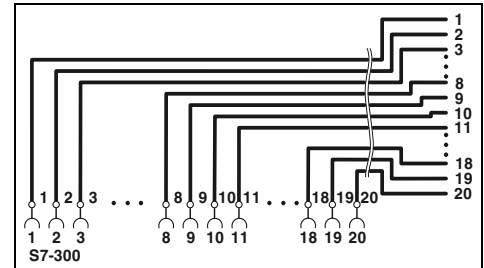
ERC



### Technical data

≤ 250 V AC/DC  
6 A (per single wire at 40°C)  
4 A (per single wire at 60°C)  
750 mA (per single wire at 75 °C)  
20 A (per cable at 40 °C)  
16 A (per cable at 60°C)  
39 Ω/km  
AWG 21 / 0.5 mm<sup>2</sup>  
16 / Cu uninsulated  
13 mm  
-20 °C ... 60 °C  
DIN EN 50178 , IEC 60664  
Plug connection  
open cable end

ERC



### Technical data

≤ 250 V AC/DC  
6 A (per single wire at 40°C)  
4 A (per single wire at 60°C)  
750 mA (per single wire at 75 °C)  
20 A (per cable at 40 °C)  
16 A (per cable at 60°C)  
39 Ω/km  
AWG 21 / 0.5 mm<sup>2</sup>  
16 / Cu uninsulated  
9 mm  
-20 °C ... 60 °C  
DIN EN 50178 , IEC 60664  
Plug connection  
open cable end

### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-PA-PWR/20XOE/ 1,0M/S7	2904724	1
VIP-PA-PWR/20XOE/ 2,0M/S7	2904725	1
VIP-PA-PWR/20XOE/ 3,0M/S7	2904726	1
VIP-PA-PWR/20XOE/ 4,0M/S7	2904727	1
VIP-PA-PWR/20XOE/ 6,0M/S7	2904728	1
VIP-PA-PWR/20XOE/ 8,0M/S7	2904729	1
VIP-PA-PWR/20XOE/10,0M/S7	2904730	1

### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-PA-PWR/40XOE/HF/ 1,0M/S7	2908909	1
VIP-PA-PWR/40XOE/HF/ 2,0M/S7	2908908	1
VIP-PA-PWR/40XOE/HF/ 3,0M/S7	2908907	1
VIP-PA-PWR/40XOE/HF/ 4,0M/S7	2908905	1
VIP-PA-PWR/40XOE/HF/ 6,0M/S7	2908904	1
VIP-PA-PWR/40XOE/HF/ 8,0M/S7	2908903	1
VIP-PA-PWR/40XOE/HF/10,0M/S7	2908902	1

### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-PA-PWR/20XOE/HF/ 1,0M/S7	2908916	1
VIP-PA-PWR/20XOE/HF/ 2,0M/S7	2908915	1
VIP-PA-PWR/20XOE/HF/ 3,0M/S7	2908914	1
VIP-PA-PWR/20XOE/HF/ 4,0M/S7	2908913	1
VIP-PA-PWR/20XOE/HF/ 6,0M/S7	2908912	1
VIP-PA-PWR/20XOE/HF/ 8,0M/S7	2908911	1
VIP-PA-PWR/20XOE/HF/10,0M/S7	2908910	1

# System cabling for controllers

## Controller-specific system cabling

### VIP – VARIOFACE Professional Front adapter for Siemens SIMATIC® S7-300

#### Three connection options are available:

- Transfer of max. 32 channels via two 50-pos. system cables (32-channel cards or this design)
- Transfer of 4 x 8 channels via two 14-pos. system cables (32-channel cards or this design)
- Transfer of 2 x 8 channels via two 14-pos. system cables (16-channel cards or this design)

#### The front adapters have the following features:

- Can be screwed with I/O module
- Voltage supply via terminal blocks with spring-cage double connection
- Encapsulated IDC/FLK socket strips for module side  
Special lengths are configured using separate order numbers.

#### Ordering example:

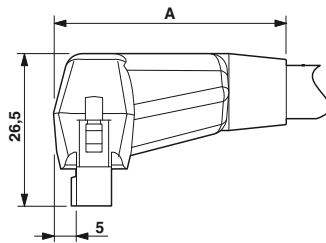
A front adapter with a connected 50-pos. system cable (32-channel cards), 12.75 m in length:

**1 pcs. 2900885/12,75**

#### Web code for the online configurator

**i Your web code: #0007**

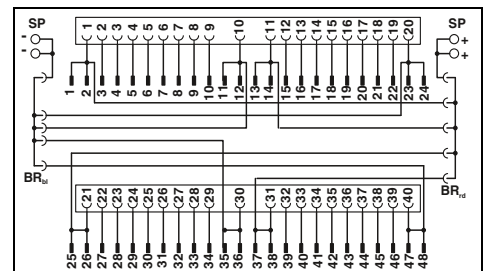
Notes:
The following modules cannot be coupled due to the larger outer contour of the molded connectors: UM 45-FLK14/ 8IM/ZFKDS/PLC, <a href="#">2965211</a> UM 45-FLK50/32IM/ZFKDS/PLC, <a href="#">2965224</a> UM 45- 8RM/MR-G24/1/PLC, <a href="#">2962900</a> UM 45-16RM/MR-G24/1/PLC, <a href="#">2962913</a>
Controller-specific modules from page 508
Standard modules from page 526



	A
...FLK14...	37
...FLK50...	42



Front adapter with system cable  
1 x 32 channels can be connected



#### Technical data

Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA

< 50 V AC / 60 V DC  
50 V / -

Maximum permissible current

1 A (per path)  
8 A (Separate power supply)

Maximum conductor resistance  
Conductor cross section  
Conductor structure: stranded wires / material  
Outside diameter

0.16 Ω/m  
AWG 26 / 0.14 mm<sup>2</sup>  
7 / Cu tin-plated  
10.3 mm

Ambient temperature range  
Standards/regulations  
Connection method

-20 °C ... 50 °C  
IEC 60664 , DIN EN 50178  
Plug connection

Connection data solid/stranded/AWG

Control side  
Field level

IDC/FLK socket strip  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14

#### Ordering data

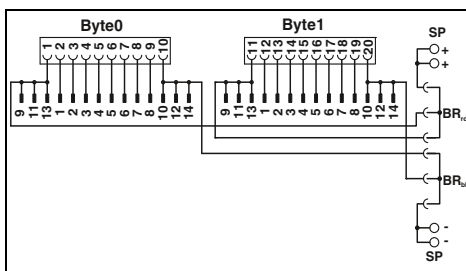
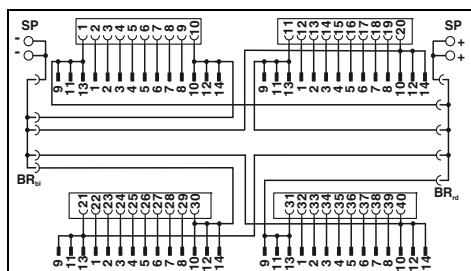
Description	Cable length	Type	Order No.	Pcs./ Pkt.
VIP VARIOFACE front adapter, with connected system cables for SIMATIC® S7-300	0.5 m	VIP-PA-FLK50/ 0,5M/S7	<a href="#">2322443</a>	1
	1 m	VIP-PA-FLK50/ 1,0M/S7	<a href="#">2322456</a>	1
	1.5 m	VIP-PA-FLK50/ 1,5M/S7	<a href="#">2322469</a>	1
	2 m	VIP-PA-FLK50/ 2,0M/S7	<a href="#">2321800</a>	1
	2.5 m	VIP-PA-FLK50/ 2,5M/S7	<a href="#">2322472</a>	1
	3 m	VIP-PA-FLK50/ 3,0M/S7	<a href="#">2322485</a>	1
	4 m	VIP-PA-FLK50/ 4,0M/S7	<a href="#">2322498</a>	1
	5 m	VIP-PA-FLK50/ 5,0M/S7	<a href="#">2322508</a>	1
	6 m	VIP-PA-FLK50/ 6,0M/S7	<a href="#">2322511</a>	1
	7 m	VIP-PA-FLK50/ 7,0M/S7	<a href="#">2322524</a>	1
	8 m	VIP-PA-FLK50/ 8,0M/S7	<a href="#">2322537</a>	1
	10 m	VIP-PA-FLK50/10,0M/S7	<a href="#">2322540</a>	1
VIP VARIOFACE front adapter, as above, in variable lengths		VIP-PA-FLK50-S7/...	<a href="#">2900885</a>	1



Front adapter with system cable  
4 x 8 channels can be connected



Front adapter with system cable  
2 x 8 channels can be connected



### Technical data

### Technical data

< 50 V AC / 60 V DC  
50 V / -

< 50 V AC / 60 V DC  
50 V / -

1 A (per path)  
8 A (Separate power supply)  
0.16 Ω/m  
AWG 26 / 0.14 mm<sup>2</sup>  
7 / Cu tin-plated  
6.4 mm  
-20 °C ... 50 °C  
IEC 60664 , DIN EN 50178  
Plug connection  
IDC/FLK socket strip  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14

1 A (per path)  
8 A (Separate power supply)  
0.16 Ω/m  
AWG 26 / 0.14 mm<sup>2</sup>  
7 / Cu tin-plated  
6.4 mm  
-20 °C ... 50 °C  
IEC 60664 , DIN EN 50178  
Plug connection  
IDC/FLK socket strip  
0.2 ... 2.5 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 14

### Ordering data

### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-PA-FLK50/4X14/ 0,5M/S7	2322553	1
VIP-PA-FLK50/4X14/ 1,0M/S7	2322566	1
VIP-PA-FLK50/4X14/ 1,5M/S7	2322579	1
VIP-PA-FLK50/4X14/ 2,0M/S7	2321910	1
VIP-PA-FLK50/4X14/ 2,5M/S7	2322582	1
VIP-PA-FLK50/4X14/ 3,0M/S7	2322595	1
VIP-PA-FLK50/4X14/ 4,0M/S7	2322605	1
VIP-PA-FLK50/4X14/ 5,0M/S7	2322618	1
VIP-PA-FLK50/4X14/ 6,0M/S7	2322621	1
VIP-PA-FLK50/4X14/ 7,0M/S7	2322634	1
VIP-PA-FLK50/4X14/ 8,0M/S7	2322647	1
VIP-PA-FLK50/4X14/10,0M/S7	2322650	1
VIP-PA-FLK50-4X14-S7/...	2900886	1

Type	Order No.	Pcs./ Pkt.
VIP-PA-FLK14/ 0,5M/S7	2322663	1
VIP-PA-FLK14/ 1,0M/S7	2322676	1
VIP-PA-FLK14/ 1,5M/S7	2322689	1
VIP-PA-FLK14/ 2,0M/S7	2321790	1
VIP-PA-FLK14/ 2,5M/S7	2322692	1
VIP-PA-FLK14/ 3,0M/S7	2322702	1
VIP-PA-FLK14/ 4,0M/S7	2322715	1
VIP-PA-FLK14/ 5,0M/S7	2322728	1
VIP-PA-FLK14/ 6,0M/S7	2322731	1
VIP-PA-FLK14/ 7,0M/S7	2322744	1
VIP-PA-FLK14/ 8,0M/S7	2322757	1
VIP-PA-FLK14/10,0M/S7	2322760	1
VIP-PA-FLK14-S7/...	2900887	1

### Front adapters for 32-channel cards of the SIMATIC® S7-300

Card type	VIP-PA-FLK50/...M/S7
Digital input	6ES7 321-1BL00-0AA0
Digital output	6ES7 322-1BL00-0AA0
Digital input/output	6ES7 323-1BL00-0AA0
Analog input	6ES7 331-7PF01-0AB0* 6ES7 331-7PF11-0AB0* 6ES7 331-7NF00-0AB0* 6ES7 331-7NF10-0AB0* 6ES7 331-1KF01-0AB0*
Analog output	6ES7 332-5HF00-0AB0*
CPU	313C, 313C, 314C, 313C-2PIP 313C-2DP, 314C-2DP
Other modules	6ES7 350-2AH01-0AE0* 6ES7 357-4AH01-0AE0*

Card type	VIP-PA-FLK50/4X14/...M/S7
Digital input	6ES7 321-1BL00-0AA0
Digital output	6ES7 322-1BL00-0AA0
Digital input/output	6ES7 323-1BL00-0AA0
CPU	313C, 314C, 313C-2PIP 313C-2DP, 314C-2DP

\* Only in conjunction with  
VIP-2/SC/FLK50 (1-40)/S7, Order No.: 2315243,  
VIP-2/PT/FLK50 (1-40)/S7, Order No.: 2903804,  
FLKM 50/KDS3-MT/PPA/S7-300, Order No.: 2304490.  
All bridges (BR) on the adapter must be removed.

### Front adapters for 16-channel cards of the SIMATIC® S7-300

Card type	VIP-PA-FLK14/...M/S7
Digital input	6ES7 321-1BH02-0AA0 6ES7 321-1BH10-0AA0 6ES7 321-1BH50-0AA0* 6ES7 321-7BH01-0AB0*
Digital output	6ES7 322-1BH01-0AA0 6ES7 322-1BH10-0AA0 6ES7 322-8BF00-0AB0*
Digital input/output	6ES7 323-1BH01-0AA0
Analog input	6ES7 331-7KF02-0AB0* 6ES7 331-7HF01-0AB0* 6ES7 331-7KB02-0AB0* 6ES7 331-7TF01-0AB0*
Analog output	6ES7 332-5HD01-0AB0* 6ES7 332-5HB01-0AB0* 6ES7 332-7ND02-0AB0*
Analog input/output	6ES7 334-0CE01-0AA0* 6ES7 334-0KE00-0AB0* 6ES7 335-7HG01-0AB0*
Other modules	6ES7 338-4BC01-0AB0* 6ES7 350-1AH03-0AE0* 6ES7 351-1AH01-0AE0* 6ES7 352-1AH02-0AE0* 6ES7 353-1AH01-0AE0* 6ES7 354-1AH01-0AE0* 6ES7 355-0VH10-0AE0* 6ES7 355-1VH10-0AE0*

\* Only in conjunction with  
VIP-2/SC/2FLK14 (1-20)/S7, Order No.: 2315230  
VIP-2/PT/2FLK14 (1-20)/S7, Order No.: 2903802  
FLKM-2FLK14/KDS 3-MT/PPA/S7, Order No.: 2295062  
All bridges (BR) on the adapter must be disconnected.

**Note:**  
The front adapters are non-isolated on delivery.  
Electrical isolation can be achieved by removing the bridges (in groups of 8).

**Explanation:**  
 IDC/FLK strip  
 Connection to I/O card  
 Connection to I/O card

SP: Separate power terminals  
BR<sub>sp</sub>: Blue plug-in bridge  
BR<sub>sp</sub>: Red plug-in bridge

# System cabling for controllers

## Controller-specific system cabling

### Siemens SIMATIC® S7-300

#### Front adapter

#### I/O modules with 32 channels or with this design

- Two connection options are available:
  - Transfer of max. 32 channels over one 50-position system cable
  - Transmission of 4 x 8 channels over four 14-position system cables

Tailor-made VARIOFACE termination boards with a variety of functions and connection options round off this system concept.

#### Web code for the online configurator

**i** Your web code: **#0007**

Notes:
Controller-specific modules from page 508
Standard modules from page 526
For system cables, see page 550



Front adapter for SIMATIC® S7-300, I/O cards with max. 32 channels



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	1 A (per path) 8 A (per connection, supply via separate power supply (2.8 x 0.8 mm))
Maximum permissible total current	2 A (per Byte, for supply via connector) 8 A (during supply via a separate bridged power supply)
Ambient temperature (operation)	-20 °C ... 50 °C
Ambient temperature (storage/transport)	-20 °C ... 70 °C
Standards/regulations	IEC 60664 / DIN EN 50178
Connection method	IDC/FLK pin strip

#### Front adapters for 32-channel cards of the SIMATIC® S7-300

Card type	FLKM 50-PA-S300
Digital input	6ES7 321-1BL00-0AA0
Digital output	6ES7 322-1BL00-0AA0
Digital input/output	6ES7 323-1BL00-0AA0
Analog input	6ES7 331-7PF01-0AB0* 6ES7 331-7PF11-0AB0* 6ES7 331-7NF00-0AB0* 6ES7 331-7NF10-0AB0* 6ES7 331-1KF01-0AB0*
Analog output	6ES7 332-5HF00-0AB0*
CPU	312C, 313C, 314C, 313C-2PiP 313C-2DP, 314C-2DP
Other modules	6ES7 350-2AH01-0AE0* 6ES7 357-4AH01-0AE0*

Card type	FLKM 50/4-FLK14/PA-S300
Digital input	6ES7 321-1BL00-0AA0
Digital output	6ES7 322-1BL00-0AA0
Digital input/output	6ES7 323-1BL00-0AA0
CPU	313C, 314C, 313C-2PiP 313C-2DP, 314C-2DP

\* Only in conjunction with VIP-2/SC/FLK50(1-40)/S7, Order No.: [2315243](#), VIP-2/PT/FLK50(1-40)/S7, Order No.: [2903804](#), FLKM 50/KDS3-MT/PPA/S7-300, Order No.: [2304490](#). All wire bridges (DR) on the adapter must be disconnected. There must be no voltage supply at the front adapter (flowing via the slip-on connections).

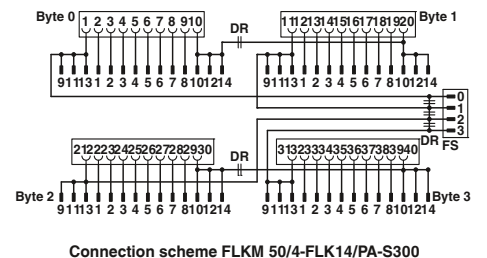
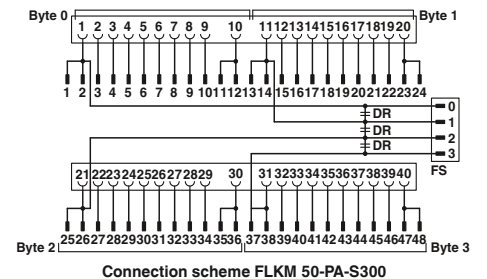
**Note:**  
The front adapters are non-isolated on delivery. Electrical isolation is achieved by removing the wire bridges (in groups of 8).

**Explanation:**  
 IDC/FLK strip  
 Connection to I/O card  
 Screw terminal blocks for separate supply

Description	No. of pos.
<b>VARIOFACE front adapters, for SIMATIC® S7-300</b>	
- 1 x 32 channels can be connected	50
- 4 x 8 channels can be connected	14

#### Ordering data

Type	Order No.	Pcs./ Pkt.
FLKM 50-PA-S300	<a href="#">2294445</a>	1
FLKM 50/4-FLK14/PA-S300	<a href="#">2296281</a>	1



### Siemens SIMATIC® S7-300

#### Front adapter

#### I/O modules with 16 channels or with this design

– Up to 2 x 8 channels are connected via two 14-position system cables.

Tailor-made VARIOFACE termination boards with a variety of functions and connection options round off this system concept.

#### Web code for the online configurator

 Your web code: **#0007**



Front adapter for SIMATIC® S7-300, I/O cards with max. 16 channels



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	1 A (per path) 8 A (per connection, supply via separate power supply (2.8 x 0.8 mm))
Maximum permissible total current	2 A (per Byte, for supply via connector) 8 A (during supply via a separate bridged power supply)
Ambient temperature (operation)	-20 °C ... 50 °C
Ambient temperature (storage/transport)	-20 °C ... 70 °C
Standards/regulations	IEC 60664 / DIN EN 50178
Connection method	IDC/FLK pin strip

#### Front adapters for 16-channel cards of the SIMATIC® S7-300

Card type	FLKM 14-PA-S300
Digital input	6ES7 321-1BH02-0AA0 6ES7 321-1BH10-0AA0 6ES7 321-1BH50-0AA0* 6ES7 321-7BH01-0AB0*
Digital output	6ES7 322-1BH01-0AA0 6ES7 322-1BH10-0AA0 6ES7 322-8BF00-0AB0*
Digital input/output	6ES7 323-1BH01-0AA0
Analog input	6ES7 331-7KF02-0AB0* 6ES7 331-7HF01-0AB0* 6ES7 331-7KB02-0AB0* 6ES7 331-7TF01-0AB0*
Analog output	6ES7 332-5HD01-0AB0* 6ES7 332-5HB01-0AB0* 6ES7 332-7ND02-0AB0*
Analog input/output	6ES7 334-0CE01-0AA0* 6ES7 334-0KE00-0AB0* 6ES7 335-7HG01-0AB0*
Other modules	6ES7 338-4BC01-0AB0* 6ES7 350-1AH03-0AE0* 6ES7 351-1AH01-0AE0* 6ES7 352-1AH02-0AE0* 6ES7 353-1AH01-0AE0* 6ES7 354-1AH01-0AE0* 6ES7 355-0VH10-0AE0* 6ES7 355-1VH10-0AE0*

Description	No. of pos.
<b>VARIOFACE front adapter, for SIMATIC® S7-300</b>	
- 2 x 8 channels can be connected	14

#### Ordering data



Type	Order No.	Pcs./Pkt.
FLKM 14-PA-S300	2299770	1

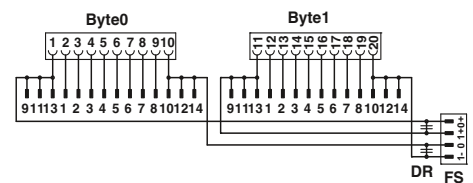
\* Only in conjunction with  
VIP-2/SC/2FLK14 (1-20)/S7, Order No.: [2315230](#)  
VIP-2/PT/2FLK14 (1-20)/S7, Order No.: [2903802](#)  
FLKM-2FLK14/KDS 3-MT/PPA/S7, Order No.: [2295062](#)  
All wire bridges (DR) on the adapter must be disconnected.  
There must be no voltage supply at the front adapter (flowing via the slip-on connections).

#### Note:

The front adapters are non-isolated on delivery.  
Electrical isolation is achieved by removing the wire bridges (in groups of 8).

#### Explanation:

-  IDC/FLK strip
-  Connection to I/O card
-  Screw terminal blocks for separate supply



Connection scheme FLKM 14-PA-S300

## Controller-specific system cabling

### Siemens SIMATIC® S7-300 Front adapter for failsafe modules

The front adapters are coupled using 50-pos. system cables. They convert the signals for passive modules.

Notes:
Controller-specific modules from page 508
For system cables, see page 550



Front adapter for SIMATIC® S7-300  
for failsafe I/O cards

#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible current	1 A (per path)
Maximum permissible total current	2 A
Ambient temperature (operation)	-20 °C ... 50 °C
Ambient temperature (storage/transport)	-20 °C ... 70 °C
Standards/regulations	IEC 60664 / DIN EN 50178
Connection method	IDC/FLK pin strip

#### Ordering data

Description	No. of pos.	Type	Order No.	Pcs./Pkt.
<b>VARIOFACE front adapter for failsafe I/O cards</b>				
6ES7 326-1BK02-0AB0 6ES7 326-1RF00-0AB0 6ES7 336-1HE00-0AB0	50	<b>FLKM 50-PA-S300/SO167</b>	<b>2307662</b>	1
<b>VARIOFACE front adapter for failsafe I/O cards</b>				
6ES7 326-2BF01-0AB0	50	<b>FLKM 50-PA/DO326/S7-300</b>	<b>2321952</b>	1

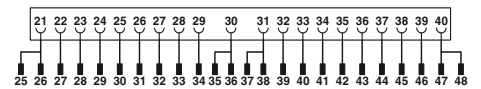
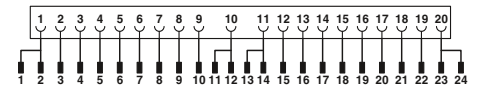
#### Front adapters for I/O modules of the SIMATIC® S7-300

Card type	FLKM 50-PA-S300/SO167
Digital input	6ES7 326-1BK02-0AB0* 6ES7 326-1RF00-0AB0**
Analog input	6ES7 336-1HE00-0AB0*
Card type	FLKM 50-PA/DO326/S7-300
Digital output	6ES7 326-2BF01-0AB0** 6ES7 326-2BF10-0AB0**

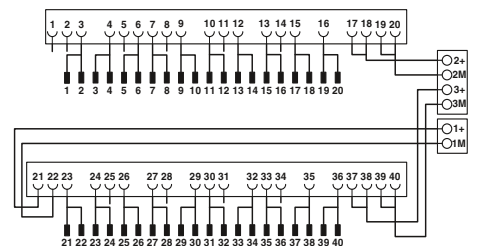
\* Only in conjunction with  
VIP-2/SC/FLK50 (1-40)/S7, Order No.: [2315243](#),  
VIP-2/PT/FLK50 (1-40)/S7, Order No.: [2903804](#),  
FLKM 50/KDS3-MT/PPA/S7-300, Order No.: [2304490](#).

\*\* Only in conjunction with  
FLKM 50/DO326/S7-300, Order No.: [2321965](#).

1) Not suitable for signals from the Ex area.



Connection scheme FLKM 50-PA-S300/SO167



Connection scheme FLKM 50-PA/DO326/S7-300

**Explanation:**  
 IDC/FLK strip  
 Connection to I/O card  
 Screw terminal blocks for separate supply



### Siemens SIMATIC® S7-300 System cables for 64-channel I/O cards

These system cables are plugged onto the 64-channel (2x32) I/O cards that are directly connected using connectors.

#### CABLE-FCN40/1X50/...

- Signal transmission of 1x32 channels
- System cable: 40-pos. connector to 50-pos. IDC/FLK socket strip

#### CABLE-FCN40/4X14/...

- Signal transmission of 4x8 channels
- Splitting cable: 40-pos. connector to four 14-pos. IDC/FLK socket strips



System cable



Splitting cable



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated

#### Ordering data

Description	No. of pos.	Cable length
<b>Round cable, for output module 6ES7 322-1BP00-0AA0 and 6ES7 322-1BP50-0AA0 (two cables per module)</b>	40	0.5 m
	40	1 m
	40	2 m
	40	3 m
	40	4 m
	40	6 m
	40	8 m
	40	10 m
<b>Round cable, for input module 6ES7 321-1BP00-0AA0 (two cables per module). Plus-reading operation (sinking mode) of the module</b>	40	0.5 m
	40	1 m
	40	2 m
	40	3 m
	40	4 m
	40	6 m
	40	8 m
	40	10 m

Type	Order No.	Pcs./ Pkt.
CABLE-FCN40/1X50/ 0,5M/S7-OUT	<a href="#">2321017</a>	1
CABLE-FCN40/1X50/ 1,0M/S7-OUT	<a href="#">2321020</a>	1
CABLE-FCN40/1X50/ 2,0M/S7-OUT	<a href="#">2321033</a>	1
CABLE-FCN40/1X50/ 3,0M/S7-OUT	<a href="#">2321046</a>	1
CABLE-FCN40/1X50/ 4,0M/S7-OUT	<a href="#">2321059</a>	1
CABLE-FCN40/1X50/ 6,0M/S7-OUT	<a href="#">2321062</a>	1
CABLE-FCN40/1X50/ 8,0M/S7-OUT	<a href="#">2321075</a>	1
CABLE-FCN40/1X50/10,0M/S7-OUT	<a href="#">2321088</a>	1
CABLE-FCN40/1X50/ 0,5M/S7-IN	<a href="#">2321091</a>	1
CABLE-FCN40/1X50/ 1,0M/S7-IN	<a href="#">2321101</a>	1
CABLE-FCN40/1X50/ 2,0M/S7-IN	<a href="#">2321114</a>	1
CABLE-FCN40/1X50/ 3,0M/S7-IN	<a href="#">2321127</a>	1
CABLE-FCN40/1X50/ 4,0M/S7-IN	<a href="#">2321130</a>	1
CABLE-FCN40/1X50/ 6,0M/S7-IN	<a href="#">2321143</a>	1
CABLE-FCN40/1X50/ 8,0M/S7-IN	<a href="#">2321156</a>	1
CABLE-FCN40/1X50/10,0M/S7-IN	<a href="#">2321169</a>	1

#### Ordering data

Type	Order No.	Pcs./ Pkt.
CABLE-FCN40/4X14/ 0,5M/S7-OUT	<a href="#">2321172</a>	1
CABLE-FCN40/4X14/ 1,0M/S7-OUT	<a href="#">2321185</a>	1
CABLE-FCN40/4X14/ 2,0M/S7-OUT	<a href="#">2321198</a>	1
CABLE-FCN40/4X14/ 3,0M/S7-OUT	<a href="#">2321208</a>	1
CABLE-FCN40/4X14/ 4,0M/S7-OUT	<a href="#">2321211</a>	1
CABLE-FCN40/4X14/ 6,0M/S7-OUT	<a href="#">2321224</a>	1
CABLE-FCN40/4X14/ 8,0M/S7-OUT	<a href="#">2321237</a>	1
CABLE-FCN40/4X14/10,0M/S7-OUT	<a href="#">2321240</a>	1
CABLE-FCN40/4X14/ 0,5M/S7-IN	<a href="#">2321253</a>	1
CABLE-FCN40/4X14/ 1,0M/S7-IN	<a href="#">2321266</a>	1
CABLE-FCN40/4X14/ 2,0M/S7-IN	<a href="#">2321279</a>	1
CABLE-FCN40/4X14/ 3,0M/S7-IN	<a href="#">2321282</a>	1
CABLE-FCN40/4X14/ 4,0M/S7-IN	<a href="#">2321295</a>	1
CABLE-FCN40/4X14/ 6,0M/S7-IN	<a href="#">2321305</a>	1
CABLE-FCN40/4X14/ 8,0M/S7-IN	<a href="#">2321318</a>	1
CABLE-FCN40/4X14/10,0M/S7-IN	<a href="#">2321321</a>	1

# System cabling for controllers

## Controller-specific system cabling

### Siemens SIMATIC® S7-300 Front adapter for MINI Analog Pro

This front adapter is only for connecting the MINI MCR-2-V8-FLK16 adapter and corresponding MINI Analog Pro isolators. With the aid of these components, converted standard analog signals are transmitted.

Notes:
For corresponding isolators, see from page 68
For system cables (FLK16/EZ-DR/...), see page 588



Front adapter for SIMATIC® S7-300,  
20-pos. analog I/O cards



#### Technical data

FLKM 16-PA-S300/MINI-MCR
< 50 V AC / 60 V DC
30 V / -
50 mA (per path)
500 mA (per connection, supply via separate power supply)
-20 °C ... 60 °C
-20 °C ... 70 °C
IEC 60664 / DIN EN 50178

#### Ordering data

Type	Order No.	Pcs./Pkt.
FLKM 16-PA-S300/MINI-MCR	2314749	1

#### Accessories

FLK 16/EZ-DR/ 300/KONFEK	2299330	1
MINI MCR-2-V8-FLK 16	2901993	1

Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA

Maximum permissible current

Ambient temperature (operation)  
Ambient temperature (storage/transport)  
Standards/regulations

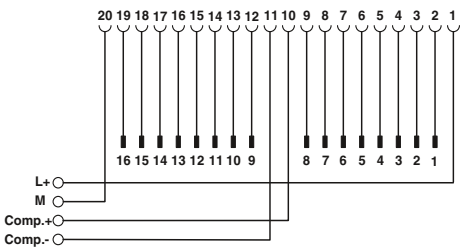
#### Front adapters for analog cards of the SIMATIC® S7-300

Card type	FLKM 16-PA-S300/MINI-MCR
Analog input	6ES7 331-7KF02-0AB0 6ES7 331-7KB02-0AB0 6ES7 331-7KB81-0AB0 6ES7 331-7TF00-0AB0
Analog output	6ES7 332-8TF01-0AB0

Description	No. of pos.
<b>VARIOFACE front adapter</b> , for SIMATIC® S7-300, only in connection with MCR-2-V8-FLK16	16

Assembled round cable, with two 16-pos. IDC/FLK socket strips

System cabling adapter for MINI Analog Pro modules



FLKM 16-PA-S300/MINI-MCR connection scheme

#### Explanation:

- IDC/FLK strip
- Connection to I/O card
- Screw terminal blocks for separate supply

**Siemens SIMATIC® S7-300**  
**Front adapter for**  
**MINI Analog Pro system cabling**

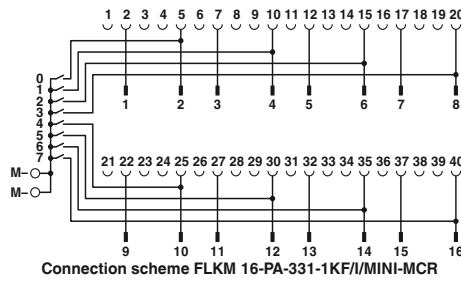
The **FLKM 16-PA-331-1KF//MINI-MCR** front adapter is used to implement system cabling in conjunction with the MINI Analog system adapter and a 16-pos. system cable.

Instead of the conventional front connector, screw terminal blocks are used to snap this component on to the analog module.

The DIP switches can be used to connect “M-” connections to each other and to the central ground of the system.

The front adapter supports **only current signals**.

The front adapter is suitable for the following analog input card:  
 – 6ES7 331-1KF02-0AB0



Connection scheme FLKM 16-PA-331-1KF//MINI-MCR



Front adapter for SIMATIC® S7-300,  
 6ES7 331-1KF02-0AB0 analog I/O card

**Technical data**

Maximum permissible operating voltage  
 Maximum permissible operating voltage UL / CSA

< 50 V AC / 60 V DC  
 30 V / -

Maximum permissible current  
 Ambient temperature (operation)  
 Ambient temperature (storage/transport)  
 Standards/regulations

50 mA (per path)  
 -20 °C ... 60 °C  
 -20 °C ... 70 °C  
 IEC 60664 / DIN EN 50178

**Ordering data**

Description	No. of pos.
<b>VARIOFACE front adapter</b> , for SIMATIC® S7-300, only in connection with MCR-2-V8-FLK16	16

Type	Order No.	Pcs./ Pkt.
<b>FLKM 16-PA- 331-1KF//MINI-MCR</b>	<b>2318237</b>	1

**Notes:**

For corresponding isolators, see from page 68
For system cables (FLK16/EZ-DR/...), see page 588

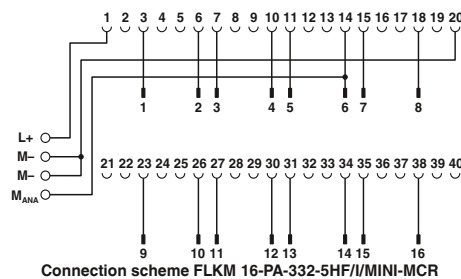
**Siemens SIMATIC® S7-300**  
**Front adapter for**  
**MINI Analog Pro system cabling**

The **FLKM 16-PA-332-5HF//MINI-MCR** front adapter is used to implement system cabling in conjunction with the MINI Analog system adapter and a 16-pos. system cable.

Instead of the conventional front connector, screw terminal blocks are used to snap this component on to the analog module.

The front adapter supports **only current signals**.

The front adapter is suitable for the following analog output cards:  
 – 6ES7 332-5HF00-0AB0



Connection scheme FLKM 16-PA-332-5HF//MINI-MCR



Front adapter for SIMATIC® S7-300,  
 6ES7 332-5HF00-0AB0 analog I/O card

**Technical data**

Maximum permissible operating voltage  
 Maximum permissible operating voltage UL / CSA

< 50 V AC / 60 V DC  
 30 V / -

Maximum permissible current  
 Ambient temperature (operation)  
 Ambient temperature (storage/transport)  
 Standards/regulations

50 mA (per path)  
 500 mA (per connection, supply via separate power supply)  
 -20 °C ... 60 °C  
 -20 °C ... 70 °C  
 IEC 60664 / DIN EN 50178

**Ordering data**

Description	No. of pos.
<b>VARIOFACE front adapter</b> , for SIMATIC® S7-300, only in connection with MCR-2-V8-FLK16	16

Type	Order No.	Pcs./ Pkt.
<b>FLKM 16-PA- 332-5HF//MINI-MCR</b>	<b>2318240</b>	1

**Notes:**

For corresponding isolators, see from page 68
For system cables (FLK16/EZ-DR/...), see page 588

# System cabling for controllers

## Controller-specific system cabling

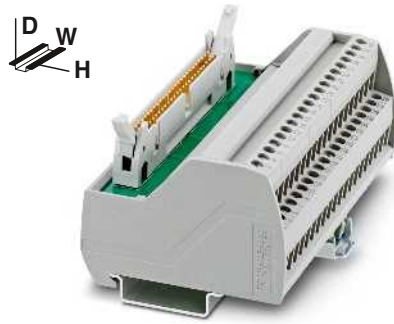
### VIP termination boards for Siemens SIMATIC® S7

These VIP - VARIOFACE Professional modules are used in combination with 50-pos. system cables and the relevant front adapters for S7.

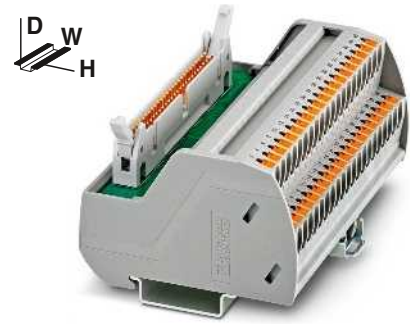
#### Features:

- Numerical marking
- Specifically for S7-300 or S7-400

<b>Notes:</b>
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.
1) No CSA approval



Passive termination boards for input/output, with SIMATIC®-specific marking and screw connection



Passive termination boards for input/output, with SIMATIC®-specific marking and Push-in connection



#### Technical data

Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Screw connection
	Field level
	Controller level
Connection data solid/stranded/AWG	IDC/FLK pin strip
Dimensions	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12 65.5 mm / 56 mm

#### Technical data

Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Push-in connection
Connection data solid/stranded/AWG	IDC/FLK pin strip
Dimensions	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14 72.1 mm / 56 mm

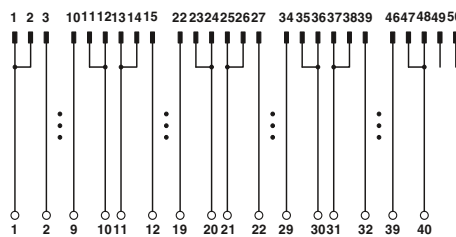
#### Ordering data

Description	No. of pos.	Module width W
<b>VARIOFACE termination board, with SIMATIC® S7-300-specific marking from 1 to 40</b>		
- with screw connection	50	106.1 mm
- with Push-in connection	50	107.9 mm
<b>VARIOFACE termination board, with SIMATIC® S7-400-specific marking from 3 to 48</b>		
- with screw connection	50	106.1 mm
- with Push-in connection	50	107.9 mm

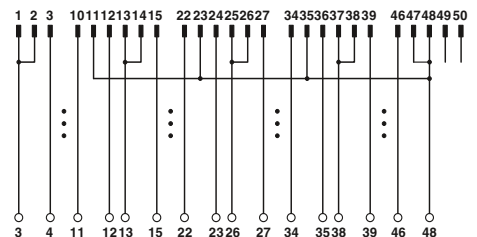
Type	Order No.	Pcs./ Pkt.
VIP-2/SC/FLK50 (1-40) /S7	2315243	1
VIP-2/SC/FLK50/S7/A-S400 <sup>1)</sup>	2322359	1

#### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-2/PT/FLK50 (1-40) /S7	2903804	1
VIP-2/PT/FLK50/S7/A-S400	2904289	1



Connection scheme VIP-2/.../FLK50 (1-40) /S7



Connection scheme VIP-2/.../FLK50/S7/A-S400

**VIP termination boards for Siemens SIMATIC® S7-300**

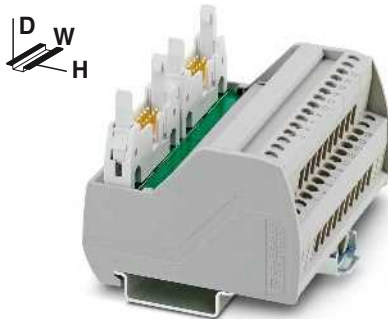
These VIP - VARIOFACE Professional modules are used in combination with two 14-pos. system cables and the relevant front adapters for S7-300.

**Features:**

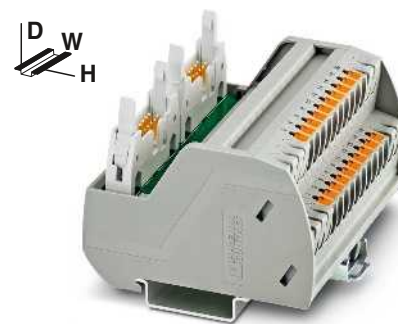
- Numerical marking (1-20)
- Specifically for S7-300

**Notes:**

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



**Passive termination boards for SIMATIC® S7-300 with screw connection**



**Passive termination boards for SIMATIC® S7-300 with Push-in connection**



**Technical data**

**Technical data**

Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Field level Screw connection Controller level IDC/FLK pin strip
Connection data solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	H / D 65.5 mm / 56 mm

Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Field level Push-in connection Controller level IDC/FLK pin strip
Connection data solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	H / D 72.1 mm / 56 mm

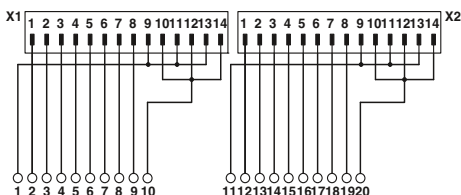
**Ordering data**

**Ordering data**

Description	No. of pos.	Module width W
<b>VARIOFACE termination board, with SIMATIC® S7-300-specific marking from 1 to 20</b>		
- with screw connection	14	80.6 mm
- with Push-in connection	14	82.5 mm

Type	Order No.	Pcs./ Pkt.
VIP-2/SC/2FLK14 (1-20) /S7	2315230	1

Type	Order No.	Pcs./ Pkt.
VIP-2/PT/2FLK14 (1-20) /S7	2903802	1



Connection diagram: VIP-2/.../2FLK14 (1-20) /S7

# System cabling for controllers

## Controller-specific system cabling

### Siemens SIMATIC® S7-1500 Front adapter

#### Digital I/O modules with 32 channels

- Two connection options are available:
  - Transfer of max. 32 channels over one 50-position system cable
  - Transmission of 4 x 8 channels via a 14-position system cable

#### Digital I/O modules with 16 channels

- Transmission of 2 x 8 channels over two 14-position system cables
- Tailor-made VARIOFACE termination boards with a variety of functions and connection options round off this system concept.

#### Web code for the online configurator

**i** Your web code: **#0007**

<b>Notes:</b>
Standard modules from page 526
For system cables, see page 550

new



Front adapter for SIMATIC® S7-1500 digital I/O cards

ERC

#### Technical data

Maximum permissible operating voltage	< 50 V DC
Maximum permissible current	1 A (per path)
Maximum permissible total current	2 A (per byte when supplying from the module side) 12 A (When supplying via the front adapter)
Ambient temperature (operation)	-25 °C ... 60 °C
Ambient temperature (storage/transport)	-40 °C ... 70 °C
Standards/regulations	IEC 61131-2
Connection method	IDC/FLK pin strip

#### Ordering data

Description	No. of pos.
<b>VARIOFACE front adapter</b> , for SIMATIC® S7-1500 digital 35 mm modules, 1 x 32 channels can be connected	
- with screw connection	50
- with Push-in connection	50
<b>VARIOFACE front adapter</b> , for SIMATIC® S7-1500 digital 35 mm modules, 4 x 8 or 2 x 8 channels can be connected	
- with screw connection	14
- with Push-in connection	14

Type	Order No.	Pcs./Pkt.
<b>FLKM 50-PA/SC/DIO/S7-1500</b>	<b>2907383</b>	1
<b>FLKM 50-PA/PT/DIO/S7-1500</b>	<b>2907384</b>	1
<b>FLKM 4X14-PA/SC/DIO/S7-1500</b>	<b>2907381</b>	1
<b>FLKM 4X14-PA/PT/DIO/S7-1500</b>	<b>2907382</b>	1

#### Front adapters for 32-channel digital cards of the SIMATIC® S7-1500

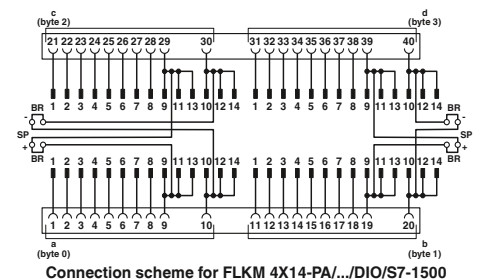
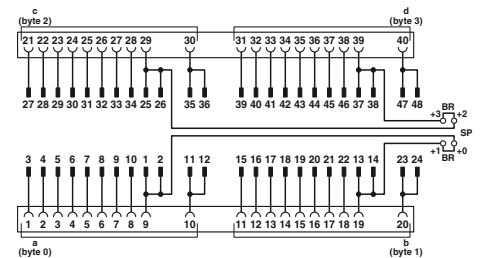
Card type	FLKM 50-PA/.../DIO/S7-1500 FLKM 4X14-PA/.../DIO/S7-1500
Digital input	6ES7 521-1BL00-0AB0
Digital output	6ES7 522-1BL00-0AB0 6ES7 522-1BL01-0AB0

#### Front adapters for 16-channel digital cards of the SIMATIC® S7-1500

Card type	FLKM 4X14-PA/.../DIO/S7-1500
Digital input	6ES7 521-1BH00-0AB0 6ES7 521-1BH50-0AAA
Digital output	6ES7 522-1BH00-0AB0 6ES7 522-1BH01-0AB0

**Note:**  
The front adapters are non-isolated on delivery.  
Electrical isolation is achieved by removing the wire bridges (in groups of 8).

**Explanation:**



new

Siemens SIMATIC® S7-1500

Front adapter

Analog I/O modules with 8 channels

- Two connection options are available:
  - Transmission of a maximum of 8 channels via a 50-pos. system cable
  - Transmission of 4 x 2 channels via a 14-pos. system cable

Analog I/O modules with 4 channels

- Transmission of 2 x 2 channels via two 14-pos. system cables

Web code for the online configurator

**i** Your web code: #0007

<b>Notes:</b>
Controller-specific modules from page 512
For system cables, see page 550



Front adapter for SIMATIC® S7-1500 analog I/O cards

ERC

Technical data

Maximum permissible operating voltage	< 50 V DC
Maximum permissible current	1 A (per path)
Ambient temperature (operation)	-25 °C ... 60 °C
Ambient temperature (storage/transport)	-40 °C ... 70 °C
Standards/regulations	IEC 61131-2
Connection method	IDC/FLK pin strip

Ordering data

Description	No. of pos.	Type	Order No.	Pcs./Pkt.
<b>VARIOFACE front adapter, for SIMATIC® S7-1500 analog 35 mm modules</b>				
- 8 channels can be connected	50	<b>FLKM 50-PA/AN/S7-1500</b>	<b>2907386</b>	1
- 4 x 2 or 2 x 2 channels can be connected	14	<b>FLKM 4X14-PA/AN/S7-1500</b>	<b>2907385</b>	1

Front adapters for 8-channel analog cards of the SIMATIC® S7-1500 (only one 50-pos. cable is connected)

Card type	FLKM 50-PA/AN/S7-1500
Analog input	6ES7 531-7KF00-0AB0* 6ES7 531-7NF00-0AB0* 6ES7 531-7NF10-0AB0* 6ES7 531-7PF00-0AB0*
Analog output	6ES7 532-5HF00-0AB0*

Front adapters for 8-channel analog cards of the SIMATIC® S7-1500 (four 14-pos. cables are connected)

Card type	FLKM 4X14-PA/AN/S7-1500
Analog input	6ES7 531-7KF00-0AB0** 6ES7 531-7NF00-0AB0** 6ES7 531-7NF10-0AB0** 6ES7 531-7PF00-0AB0**
Analog output	6ES7 532-5HF00-0AB0**

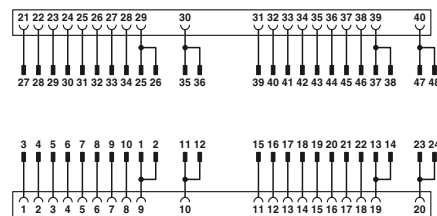
Front adapters for 4-channel analog cards of the SIMATIC® S7-1500 (only two 14-pos. cables are connected)

Card type	FLKM 4X14-PA/AN/S7-1500
Analog output	6ES7 532-5HD00-0AB0*** 6ES7 532-5ND00-0AB0***

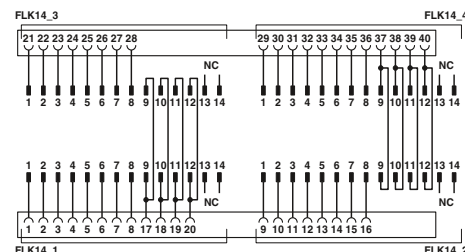
\* Only in conjunction with  
VIP-3/PT/FLK50/AN/S7-1500, Order No.: 2908496  
VIP-3/SC/FLK50/AN/S7-1500, Order No.: 2908495  
VIP-3/PT/FLK50/AN/2P/S7-1500, Order No.: 2908499  
VIP-3/SC/FLK50/AN/2P/S7-1500, Order No.: 2908497  
FLKM 50/KDS3-MT/PPA/S7-1500, Order No.: 2909893

\*\* Only in conjunction with  
VIP-3/PT/2FLK14/AN/2P/S7-1500A, Order No.: 2908465  
VIP-3/SC/2FLK14/AN/2P/S7-1500A, Order No.: 2908464  
VIP-3/PT/2FLK14/AN/2P/S7-1500B, Order No.: 2908846  
VIP-3/SC/2FLK14/AN/2P/S7-1500B, Order No.: 2908845  
FLKM-2FLK14/KDS3-MT/AN/S7-1500, Order No.: 2909894

\*\*\* Only in conjunction with  
VIP-3/PT/2FLK14/AN/2P/S7-1500A, Order No.: 2908465  
VIP-3/SC/2FLK14/AN/2P/S7-1500A, Order No.: 2908464  
FLKM-2FLK14/KDS3-MT/AN/S7-1500, Order No.: 2909894



Connection diagram FLKM 50-PA/AN/S7-1500



Connection diagram FLKM 4X14-PA/AN/S7-1500

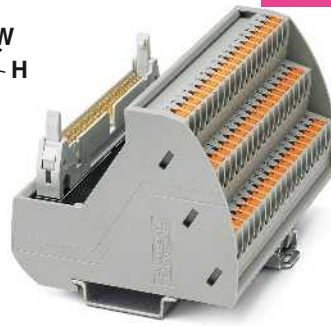
# System cabling for controllers

## Controller-specific system cabling

### VIP termination boards for analog I/O cards of Siemens SIMATIC® S7-1500

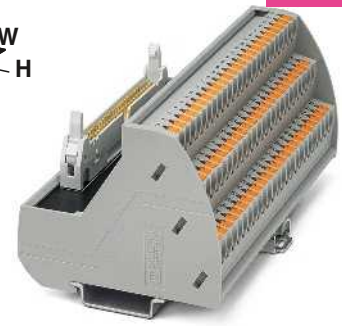
VARIOFACE termination board for Siemens S7-1500 systems with S7-1500-specific marking.

- One 50-pos. IDC/FLK pin strip
- Separate potentials L+ and M
- Printed channel marking



new

50-position IDC/FLK pin strip



new

50-position IDC/FLK pin strip with potentials P1 and P2



#### Technical data

	VIP-3/PT/FLK50/AN/S7-1500	VIP-3/SC/FLK50/AN/S7-1500
Maximum permissible operating voltage	60 V AC/DC	60 V AC/DC
Maximum permissible operating voltage UL / CSA	60 V / 60 V	60 V / 60 V
Maximum permissible current (per branch)	1 A	1 A
Maximum total current (voltage supply)	7 A	7 A
Ambient temperature (operation)	-20 °C ... 60 °C	-20 °C ... 60 °C
Mounting position	any	any
Standards/regulations	IEC 60664, DIN EN 50178	IEC 60664, DIN EN 50178
Connection method	Field level Push-in connection IDC/FLK pin strip	Controller level Screw connection IDC/FLK pin strip
Screw connection solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	H / D 75.8 mm / 63 mm	68.8 mm / 60.7 mm

#### Technical data

	VIP-3/PT/FLK50/AN/2P/S7-1500	VIP-3/SC/FLK50/AN/2P/S7-1500
Maximum permissible operating voltage	60 V AC/DC	60 V AC/DC
Maximum permissible operating voltage UL / CSA	60 V / 60 V	60 V / 60 V
Maximum permissible current (per branch)	1 A	1 A
Maximum total current (voltage supply)	7 A	7 A
Ambient temperature (operation)	-20 °C ... 60 °C	-20 °C ... 60 °C
Mounting position	any	any
Standards/regulations	IEC 60664, DIN EN 50178	IEC 60664, DIN EN 50178
Connection method	Field level Push-in connection IDC/FLK pin strip	Controller level Screw connection IDC/FLK pin strip
Screw connection solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Push-in connection solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	H / D 75.8 mm / 63 mm	68.8 mm / 60.7 mm

#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE termination board for Siemens S7-1500</b>					
- with Push-in connection	50	97.7 mm	VIP-3/PT/FLK50/AN/S7-1500	2908496	1
- with screw connection	50	97.7 mm	VIP-3/SC/FLK50/AN/S7-1500	2908495	1
<b>VARIOFACE termination board for Siemens S7-1500 marked 1 to 40, with potentials P1 and P2</b>					
- with Push-in connection	50	128.2 mm			
- with screw connection	50	128.2 mm			

#### Ordering data

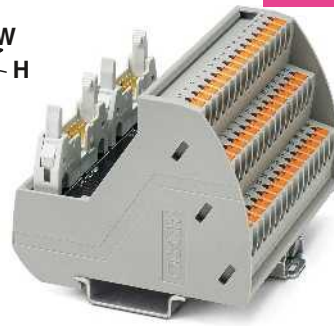
Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE termination board for Siemens S7-1500 marked 1 to 40, with potentials P1 and P2</b>					
- with Push-in connection	50	128.2 mm	VIP-3/PT/FLK50/AN/2P/S7-1500	2908499	1
- with screw connection	50	128.2 mm	VIP-3/SC/FLK50/AN/2P/S7-1500	2908497	1



**VIP termination boards for analog I/O cards of Siemens SIMATIC® S7-1500**

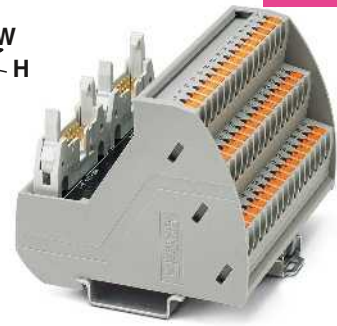
VARIOFACE termination board for Siemens S7-1500 systems with S7-1500-specific marking.

- Two 14-pos. IDC/FLK pin strips
- Separate potentials L+, M, P1, and P2
- Printed channel marking



new

Two 14-position IDC/FLK pin strip marked 1 to 20



new

Two 14-position IDC/FLK pin strip marked 21 to 40



**Technical data**

VIP-3/PT/2FLK14/AN/2P/S7-1500A	VIP-3/SC/2FLK14/AN/2P/S7-1500A
60 V AC/DC	60 V AC/DC
60 V / 60 V	60 V / 60 V
1 A	1 A
7 A	7 A
-20 °C ... 60 °C	-20 °C ... 60 °C
any	any
IEC 60664 , DIN EN 50178	
Field level Push-in connection	Controller level Screw connection
IDC/FLK pin strip	IDC/FLK pin strip
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14	
75.8 mm / 63 mm	68.8 mm / 60.7 mm

**Technical data**

VIP-3/PT/2FLK14/AN/2P/S7-1500A	VIP-3/SC/2FLK14/AN/2P/S7-1500A
60 V AC/DC	60 V AC/DC
60 V / 60 V	60 V / 60 V
1 A	1 A
7 A	7 A
-20 °C ... 60 °C	-20 °C ... 60 °C
any	any
IEC 60664 , DIN EN 50178	
Field level Push-in connection	Controller level Screw connection
IDC/FLK pin strip	IDC/FLK pin strip
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14	
75.8 mm / 63 mm	68.8 mm / 60.7 mm

**Ordering data**

Type	Order No.	Pcs./Pkt.
VIP-3/PT/2FLK14/AN/2P/S7-1500A	2908465	1
VIP-3/SC/2FLK14/AN/2P/S7-1500A	2908464	1

**Ordering data**

Type	Order No.	Pcs./Pkt.
VIP-3/PT/2FLK14/AN/2P/S7-1500B	2908846	1
VIP-3/SC/2FLK14/AN/2P/S7-1500B	2908845	1

Maximum permissible operating voltage	
Maximum permissible operating voltage UL / CSA	
Maximum permissible current (per branch)	
Maximum total current (voltage supply)	
Ambient temperature (operation)	
Mounting position	
Standards/regulations	
Connection method	
Screw connection solid/stranded/AWG	
Push-in connection solid/stranded/AWG	
Dimensions	H / D

Description	No. of pos.	Module width W
<b>VARIOFACE termination board</b> for Siemens S7-1500 marked 1 to 20		
- with Push-in connection	14	82.5 mm
- with screw connection	14	82.5 mm
<b>VARIOFACE termination board</b> for Siemens S7-1500 marked 21 to 40		
- with Push-in connection	14	82.5 mm
- with screw connection	14	82.5 mm

# System cabling for controllers

## Controller-specific system cabling

### Siemens SIMATIC® S7-400 Front adapter

The front adapters mean that pre-assembled system cables can be directly connected to I/O modules.

#### FLKM 50-PA-S400

– Transmission of max. 32 digital channels over one 50-position system cable.

#### Web code for the online configurator

 Your web code: #0007

Notes:
Controller-specific modules page 508
Standard modules from page 526
For system cables, see page 550



Front adapter for SIMATIC® S7-400



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	1 A (per path) 8 A (per connection, supply via separate power supply)
Maximum permissible total current	2 A (per Byte, for supply via connector) 8 A (during supply via a separate bridged power supply)
Ambient temperature (operation)	-20 °C ... 50 °C
Ambient temperature (storage/transport)	-20 °C ... 70 °C
Mounting position	any
Standards/regulations	IEC 60664 / DIN EN 50178

#### Front adapters for I/O modules of the SIMATIC® S7-400 Siemens automation devices

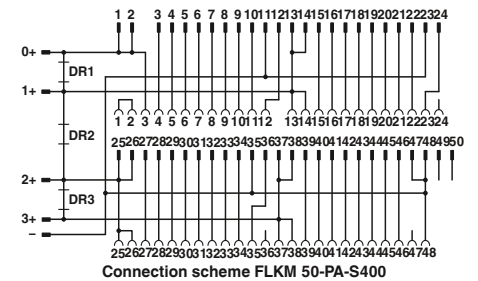
Card type	FLKM 50-PA-S400
Digital input	6ES7 421-1BL01-0AA0 6ES7 421-7BH01-0AB0* 6ES7 421-7DH00-0AB0*
Digital output	6ES7 422-1BL00-0AA0 6ES7 422-7BL00-0AB0

\* Only in conjunction with  
VIP-2/SC/FLK50/S7/A-S400, Order No.: [2322359](#)  
VIP-2/PT/FLK50/S7/A-S400, Order No.: [2904289](#)  
All DR wire bridges on the adapter must be disconnected.

Description	No. of pos.
<b>VARIOFACE front adapter</b> , for - SIMATIC® S7-400, 1 x 32 channels can be connected	50

#### Ordering data

Type	Order No.	Pcs./ Pkt.
FLKM 50-PA-S400	<a href="#">2294500</a>	2



#### Explanation:

-  IDC/FLK strip
-  Connection to I/O card
-  Screw terminal blocks for separate supply

### Siemens SIMATIC® S7-400

#### Front adapter

The front adapters mean that pre-assembled system cables can be directly connected to I/O modules.

#### FLKM 50/4-FLK14/PA-S400

– Transmission of max. 32 digital channels via one 14-position system cable.

Tailor-made VARIOFACE termination boards with a variety of functions and connection options round off this system concept.

#### FLKM 50-PA-S400 (3-48)

– Analog channels are connected via a 50-position system cable.

The 1:1 connection of the adapter means that corresponding 1:1 termination boards are connected here.

#### Web code for the online configurator

**i** Your web code: #0007

Notes:
Controller-specific modules from page 567
Standard modules from page 526
For system cables, see page 550



Front adapter for SIMATIC® S7-400

ERIC

#### Technical data

FLKM 50/ 4-FLK14/PA-S400	FLKM 50-PA-S400(3-48)
< 50 V AC / 60 V DC	< 50 V AC / 60 V DC
1 A (per path)	1 A (per path)
8 A (per connection, supply via separate power supply)	
2 A (per Byte, for supply via connector)	-
-20 °C ... 50 °C	-20 °C ... 50 °C
-20 °C ... 70 °C	-20 °C ... 70 °C
any	any
IEC 60664 / DIN EN 50178	IEC 60664 / DIN EN 50178

Maximum permissible operating voltage  
Maximum permissible current

Maximum permissible total current

Ambient temperature (operation)  
Ambient temperature (storage/transport)  
Mounting position  
Standards/regulations

#### Front adapters for I/O modules of the SIMATIC® S7-400 Siemens automation devices

Card type	FLKM 50/4-FLK14/PA-S400
Digital input	6ES7 421-1BL01-0AA0
Digital output	6ES7 422-1BL00-0AA0 6ES7 422-7BL00-0AB0

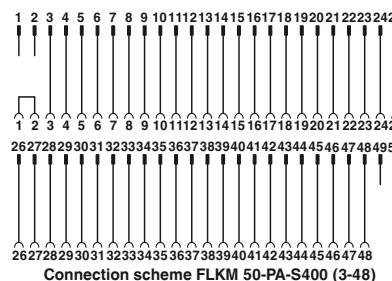
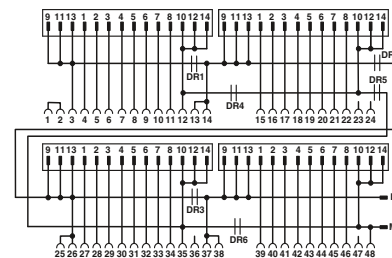
Card type	FLKM 50-PA-S400 (3-48)
Analog input	6ES7 431-0HH00-0AB0** 6ES7 431-1KF00-0AB0** 6ES7 431-1KF10-0AB0** 6ES7 431-1KF20-0AB0** 6ES7 431-7KF00-0AB0** 6ES7 431-7KF10-0AB0** 6ES7 431-7QH00-0AB0**
Analog output	6ES7 432-1HF00-0AB0**

\*\* Only in conjunction with  
VIP-3/SC/FLK50, Order No.: 2315081  
VIP-3/PT/FLK50, Order No.: 2903794  
FLKM 50/KDS 3-MT/PPA/AN/PLC, Order No.: 2291587

Description	No. of pos.
<b>VARIOFACE front adapter, for</b> - SIMATIC® S7-400, 4 x 8 channels can be connected	14
- SIMATIC® S7-400, only analog	50

#### Ordering data

Type	Order No.	Pcs./ Pkt.
FLKM 50/ 4-FLK14/PA-S400	2294429	2
FLKM 50-PA-S400(3-48)	2294908	2



#### Explanation:

- IDC/FLK strip
- Connection to I/O card
- Screw terminal blocks for separate supply

# System cabling for controllers

## Controller-specific system cabling

### Yokogawa CENTUM VP and ProSafe-RS Front adapter

These front adapters for digital (50-pos.) and analog (40-pos.) I/O modules are connected directly to the modules.

#### Features:

- Molded connector
- Can be screwed on
- Lateral cable outlet of the I/O module
- KS or AKB-compatible connectors on the module side



Shielded



Shielded and halogen-free



#### Technical data

Maximum permissible operating voltage	30 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	500 mA (per path at 70°C)
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 70 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	11 mm
	40-pos. 9.8 mm



#### Technical data

Maximum permissible operating voltage	30 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	500 mA (per path at 70°C)
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 70 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	11 mm
	9.8 mm

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Front adapter, for digital I/O modules</b>					
	50	1 m	FLK 50-PA/EZ-DR/KS/ 100/YUC	<a href="#">2900991</a>	1
	50	2 m	FLK 50-PA/EZ-DR/KS/ 200/YUC	<a href="#">2314299</a>	1
	50	3 m	FLK 50-PA/EZ-DR/KS/ 300/YUC	<a href="#">2314309</a>	1
	50	4 m	FLK 50-PA/EZ-DR/KS/ 400/YUC	<a href="#">2314312</a>	1
	50	5 m	FLK 50-PA/EZ-DR/KS/ 500/YUC	<a href="#">2321499</a>	1
	50	6 m	FLK 50-PA/EZ-DR/KS/ 600/YUC	<a href="#">2314927</a>	1
	50	7 m	FLK 50-PA/EZ-DR/KS/ 700/YUC	<a href="#">2321509</a>	1
	50	8 m	FLK 50-PA/EZ-DR/KS/ 800/YUC	<a href="#">2314930</a>	1
	50	9 m	FLK 50-PA/EZ-DR/KS/ 900/YUC	<a href="#">2321512</a>	1
	50	10 m	FLK 50-PA/EZ-DR/KS/1000/YUC	<a href="#">2314325</a>	1
	50	15 m	FLK 50-PA/EZ-DR/KS/1500/YUC	<a href="#">2314338</a>	1
	50	20 m	FLK 50-PA/EZ-DR/KS/2000/YUC	<a href="#">2314503</a>	1
	50	25 m	FLK 50-PA/EZ-DR/KS/2500/YUC	<a href="#">2314516</a>	1
	50	30 m	FLK 50-PA/EZ-DR/KS/3000/YUC	<a href="#">2314529</a>	1
<b>Front adapter, for analog I/O modules</b>					
	40	1 m	FLK 40-PA/EZ-DR/KS/ 100/YUC	<a href="#">2322786</a>	1
	40	2 m	FLK 40-PA/EZ-DR/KS/ 200/YUC	<a href="#">2314341</a>	1
	40	3 m	FLK 40-PA/EZ-DR/KS/ 300/YUC	<a href="#">2314354</a>	1
	40	4 m	FLK 40-PA/EZ-DR/KS/ 400/YUC	<a href="#">2314367</a>	1
	40	5 m	FLK 40-PA/EZ-DR/KS/ 500/YUC	<a href="#">2321570</a>	1
	40	6 m	FLK 40-PA/EZ-DR/KS/ 600/YUC	<a href="#">2314943</a>	1
	40	7 m	FLK 40-PA/EZ-DR/KS/ 700/YUC	<a href="#">2321583</a>	1
	40	8 m	FLK 40-PA/EZ-DR/KS/ 800/YUC	<a href="#">2314956</a>	1
	40	9 m	FLK 40-PA/EZ-DR/KS/ 900/YUC	<a href="#">2321415</a>	1
	40	10 m	FLK 40-PA/EZ-DR/KS/1000/YUC	<a href="#">2314370</a>	1
	40	15 m	FLK 40-PA/EZ-DR/KS/1500/YUC	<a href="#">2314383</a>	1
	40	20 m	FLK 40-PA/EZ-DR/KS/2000/YUC	<a href="#">2314532</a>	1
	40	25 m	FLK 40-PA/EZ-DR/KS/2500/YUC	<a href="#">2314545</a>	1
	40	30 m	FLK 40-PA/EZ-DR/KS/3000/YUC	<a href="#">2314558</a>	1

#### Ordering data

Type	Order No.	Pcs./ Pkt.
FLK 50-PA/EZ-DR/HF/KS/ 100/YUC	<a href="#">2904739</a>	1
FLK 50-PA/EZ-DR/HF/KS/ 200/YUC	<a href="#">2904740</a>	1
FLK 50-PA/EZ-DR/HF/KS/ 300/YUC	<a href="#">2904741</a>	1
FLK 50-PA/EZ-DR/HF/KS/ 400/YUC	<a href="#">2904742</a>	1
FLK 50-PA/EZ-DR/HF/KS/ 500/YUC	<a href="#">2904636</a>	1
FLK 50-PA/EZ-DR/HF/KS/ 600/YUC	<a href="#">2904743</a>	1
FLK 50-PA/EZ-DR/HF/KS/ 700/YUC	<a href="#">2904744</a>	1
FLK 50-PA/EZ-DR/HF/KS/ 800/YUC	<a href="#">2904745</a>	1
FLK 50-PA/EZ-DR/HF/KS/ 900/YUC	<a href="#">2904746</a>	1
FLK 50-PA/EZ-DR/HF/KS/1000/YUC	<a href="#">2904637</a>	1
FLK 50-PA/EZ-DR/HF/KS/1500/YUC	<a href="#">2904638</a>	1
FLK 50-PA/EZ-DR/HF/KS/2000/YUC	<a href="#">2904487</a>	1
FLK 50-PA/EZ-DR/HF/KS/2500/YUC	<a href="#">2904639</a>	1
FLK 50-PA/EZ-DR/HF/KS/3000/YUC	<a href="#">2904640</a>	1
<b>Front adapter, for analog I/O modules</b>		
FLK 40-PA/EZ-DR/HF/KS/ 100/YUC	<a href="#">2904747</a>	1
FLK 40-PA/EZ-DR/HF/KS/ 200/YUC	<a href="#">2904748</a>	1
FLK 40-PA/EZ-DR/HF/KS/ 300/YUC	<a href="#">2904749</a>	1
FLK 40-PA/EZ-DR/HF/KS/ 400/YUC	<a href="#">2904750</a>	1
FLK 40-PA/EZ-DR/HF/KS/ 500/YUC	<a href="#">2904645</a>	1
FLK 40-PA/EZ-DR/HF/KS/ 600/YUC	<a href="#">2904751</a>	1
FLK 40-PA/EZ-DR/HF/KS/ 700/YUC	<a href="#">2904752</a>	1
FLK 40-PA/EZ-DR/HF/KS/ 800/YUC	<a href="#">2904753</a>	1
FLK 40-PA/EZ-DR/HF/KS/ 900/YUC	<a href="#">2904754</a>	1
FLK 40-PA/EZ-DR/HF/KS/1000/YUC	<a href="#">2904646</a>	1
FLK 40-PA/EZ-DR/HF/KS/1500/YUC	<a href="#">2904647</a>	1
FLK 40-PA/EZ-DR/HF/KS/2000/YUC	<a href="#">2904488</a>	1
FLK 40-PA/EZ-DR/HF/KS/2500/YUC	<a href="#">2904648</a>	1
FLK 40-PA/EZ-DR/HF/KS/3000/YUC	<a href="#">2904649</a>	1

**Yokogawa CENTUM VP****Front adapter**

These front adapters for digital I/O modules are connected directly to the modules. Features:

- Lateral cable outlet of the I/O module
- Four 14-pos. connectors on the module side for connection of four 8-channel VARIOFACE modules of the system cabling

**Shielded**

Technical data	
Maximum permissible operating voltage	30 V DC
Maximum permissible current carrying capacity per path	500 mA (per path at 70°C)
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Outside diameter	11 mm

Ordering data					
Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Front adapter</b> for digital I/O modules for coupling four 8-channel VARIOFACE modules					
	50	2 m	CABLE-50/4FLK14/ 2,0M/YUC	2314655	1
	50	4 m	CABLE-50/4FLK14/ 4,0M/YUC	2314671	1
	50	6 m	CABLE-50/4FLK14/ 6,0M/YUC	2318978	1
	50	10 m	CABLE-50/4FLK14/10,0M/YUC	2314684	1
	50	15 m	CABLE-50/4FLK14/15,0M/YUC	2322773	1
	50	20 m	CABLE-50/4FLK14/20,0M/YUC	2314778	1

**Yokogawa CENTUM VP****Front adapter for MINI Analog system cabling**

This front adapter enables 16 MINI Analog modules to be connected to a Yokogawa controller. Together with two MINI MCR-2-V8-FLK 16 MINI Analog system adapters, the Yokogawa system cable is a simple, cost-effective “Plug and Play” solution.

The front adapter is connected directly to the Yokogawa module. Two 16-pos. IDC/FLK socket strips are attached for connecting the module to the MINI Analog system adapters.

Together with **4-conductor measuring transducers**, the front adapter is suitable for the following analog cards:

- AAI 141
- AAI 143

**Shielded**

Technical data	
Maximum permissible operating voltage	30 V DC
Maximum permissible current carrying capacity per path	500 mA (per path at 70°C)
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	11 mm

Ordering data					
Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Front adapter</b> , for analog I/O modules for coupling two 8-channel MINI analog system adapters					
	40	2 m	CABLE-40/2FLK16/ 2,0M/YUC	2321334	1
	40	4 m	CABLE-40/2FLK16/ 4,0M/YUC	2321347	1
	40	10 m	CABLE-40/2FLK16/10,0M/YUC	2321350	1
	40	15 m	CABLE-40/2FLK16/15,0M/YUC	2321376	1
	40	20 m	CABLE-40/2FLK16/20,0M/YUC	2321363	1

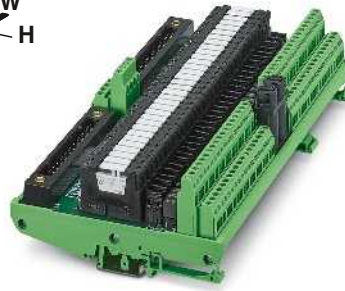
## Controller-specific system cabling

### Yokogawa CENTUM VP Termination boards

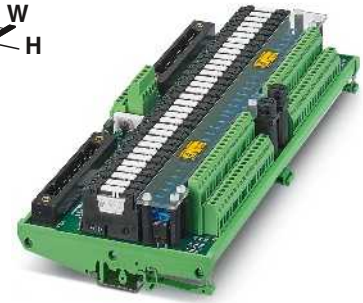
These modules are connected to the I/O module via the 50-pos. YUC system cable (on page 516).

The advantages:

- For digital modules
- Relay with integrated LED display per channel
- Flat-type plug-in fuse per channel
- Jumper option for field-side or module-side voltage supply
- Power supply via fuses with failure indicator



24 V DC relay output module



230 V AC relay output module

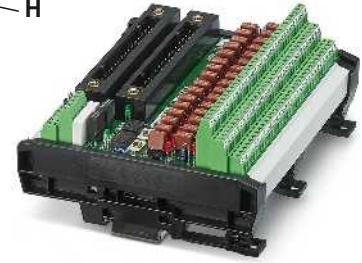
		Technical data			Technical data		
Coil side							
Operating voltage $U_N$		24 V DC		24 V DC			
Typical input current at $U_N$		7 mA		7 mA			
Typical response time at $U_N$		5 ms		5 ms			
Typical release time at $U_N$		6 ms		6 ms			
Input circuit		Freewheeling diode		Freewheeling diode			
Status indicator per channel		green LED		green LED			
Connection method		Screw connection		Screw connection			
Connection data solid/stranded/AWG		0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12		0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12			
Contact side							
Contact type		1 N/O contact		1 N/O contact			
Contact material		AgSnO		AgSnO			
Limiting continuous current		2 A (protected by fuse (2 AT))		2 A (protected by fuse (2 AT))			
Connection method		Yokogawa KS-compatible		Yokogawa KS-compatible			
No. of pos.		50		50			
General data							
Ambient temperature (operation)		-20 °C ... 50 °C		-20 °C ... 50 °C			
Nominal operating mode		100% operating factor		100% operating factor			
Mechanical service life		2 x 10 <sup>7</sup> cycles		2 x 10 <sup>7</sup> cycles			
Standards/regulations		DIN EN 50178 , IEC 60664-1		DIN EN 50178 , IEC 60664-1			
Mounting position		any		any			
Mounting		In rows with zero spacing		In rows with zero spacing			
Dimensions	H / D	128 mm / 55 mm		128 mm / 55 mm			
EMC note		Class A product, see page 605		Class A product, see page 605			
		Ordering data			Ordering data		
Description	Module width W	Type	Order No.	Pcs./ Pkt.	Type	Order No.	Pcs./ Pkt.
24 V DC relay module, for digital output modules ADV551, ADV561	218	UM-2KS50/32R/SI/J/DO24V/YCS	2908399	1			
230 V AC relay module, for digital output modules ADV551, ADV561	272				UM-2KS50/32R/SI/J/ADV551/YCS	2908400	1

## Yokogawa CENTUM VP Termination boards

This module is connected to the I/O module via the 50-pos. YUC system cable (on page 516).

The advantages:

- Potential supply terminal blocks per channel
- Reduced overall width, thanks to miniature terminal blocks
- Flat-type plug-in fuse with failure indicator per channel
- Redundant voltage supply with integrated voltage monitoring and signal contact
- Status indicator for the redundant voltage supply



24 V DC input module

### Technical data

Maximum permissible operating voltage	24 V DC
Maximum permissible current (per branch)	250 mA (protected by fuse (F 250mA))
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	DIN EN 50178
Connection method	Screw connection
	Field level
	Controller level
Connection data solid/stranded/AWG	Yokogawa KS-compatible
Dimensions	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1 mm <sup>2</sup> / 26 - 16
	H / D
	128 mm / 61 mm

### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
24 V DC input module, for digital input modules ADV151, ADV161		135 mm	UM-2KS50/32IM/SI/BFI/YCS	2908402	1

# System cabling for controllers

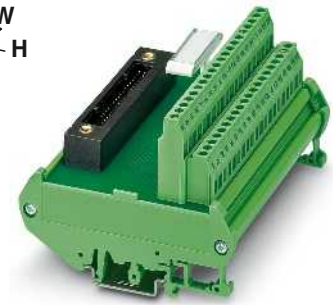
## Controller-specific system cabling

### Yokogawa CENTUM VP Termination boards

These modules are connected to the I/O module via the YUC system cable (on page 516).

#### FLKM-KS40/YCS:

- For analog modules
  - Universal termination board with 40 connecting terminal blocks
- Further system cabling solutions for Yokogawa at: [phoenixcontact.com](http://phoenixcontact.com)



Passive termination boards

#### Technical data

Maximum permissible operating voltage	< 25 V AC / 30 V DC
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	DIN EN 50178 , IEC 60664
Connection method	Screw connection
Field level	Yokogawa KS-compatible
Controller level	Yokogawa KS-compatible
Connection data solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	90 mm / 68 mm

#### Ordering data

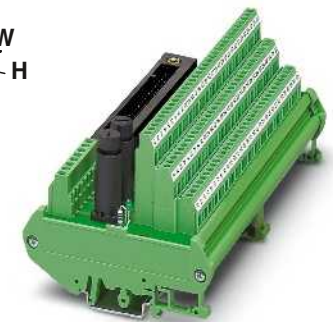
Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>Termination board</b> , for analog I/O modules	40	112 mm	<b>FLKM-KS40/YCS</b>	<b>2314642</b>	1

### Yokogawa CENTUM VP Termination boards

These modules are connected to the I/O module via the YUC system cable (on page 516).

#### FLKMS-KS50/32IM/YCS:

- For ADV151 and ADV551 digital modules
  - Three-conductor connection (signal, plus, minus)
  - Redundant voltage supply (fuse IEC 127-2, 5 x 20, 2 A)
- Further system cabling solutions for Yokogawa at: [phoenixcontact.com](http://phoenixcontact.com)



Passive termination boards

#### Technical data

Maximum permissible operating voltage	30 V DC
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	DIN EN 50178 , IEC 60664
Connection method	Screw connection
Field level	Yokogawa KS-compatible
Controller level	Yokogawa KS-compatible
Connection data solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	90 mm / 81 mm

#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>Termination board</b> , for ADV151 and ADV551 digital I/O modules	50	174 mm	<b>FLKMS-KS50/32IM/YCS</b>	<b>2314451</b>	1



## Yokogawa CENTUM VP Termination boards

These modules are connected to the analog I/O module via the 40-pos. YUC system cable (on page 516).

The modules are designed for redundant signal transmission (two connectors parallel). A separate connection to the HART multiplexer is possible.

### FLKM-KS40/AO16/YCS

– For AAI543 analog module

### FLKMS-KS40/SI/AI16/YCS

– For AAI141 and AAI143 analog modules (module operation in 4-conductor mode)

– Transfer of 16 channels with separate positive and negative connections

– 16 pluggable fuses (IEC 127-2, 5 x 20, 0.1 A) per positive supply and LED status indicator

– Redundant voltage supply (fuse IEC 127-2, 5 x 20, 2 A)

### FLKMS-KS40/AI/YCS

– For AAI141 and AAI143 analog modules (module operation in 4-conductor mode)

– Transfer of 16 channels with separate positive and negative connections

– Redundant voltage supply (fuse IEC 127-2, 5 x 20, 2 A)

Further system cabling solutions for Yokogawa at: [phoenixcontact.com](http://phoenixcontact.com)



Termination boards for analog I/O modules

Technical data	
Maximum permissible operating voltage	30 V DC
Maximum permissible current (per branch)	100 mA
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	DIN EN 50178 , IEC 60664
Connection method	Field level Controller level Screw connection
Connection data solid/stranded/AWG	Yokogawa KS-compatible 0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	H / D 126 mm / 68 mm

Description	No. of pos.	Module width W
<b>Termination board</b> , for AAI543 analog output modules	40	108 mm
<b>Termination board</b> , with fuses and LED, for AAI141 and AAI143 analog input modules	40	214 mm
<b>Termination board</b> , for AAI141 and AAI143 analog input modules, without fuses and LED	40	214 mm

Ordering data		
Type	Order No.	Pcs./Pkt.
FLKM-KS40/AO16/YCS	2314260	1
FLKMS-KS40/SI/AI16/YCS	2314273	1
FLKMS-KS40/AI/YCS	2314286	1

# System cabling for controllers

## Controller-specific system cabling

### Yokogawa ProSafe-RS Termination boards

These modules are connected to the I/O module via the 50-pos. YUC system cable (on page 516).

- For SDV144 digital module
- Redundant signal transmission (two parallel connectors)
- 16 channels

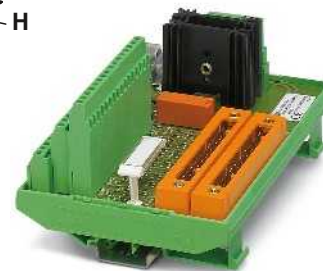
#### UM-2KS50/16DI/RS/MKDS

- Screw connection
- Redundant voltage supply with signaling relay and fuse (IEC 127-2, 5 x 20, 3,15 AT)
- LED status display per channel

#### UM-2KS50/DI16/RS/K-MT/SO241

- Screw connection with knife disconnection
- Redundant voltage supply with signaling relay and fuse (TR5, 2 AT)
- Plug-in fuses (TR5, 0,1 AT) and LED status indicator per channel

Maximum permissible operating voltage	24 V DC ±5 %
Maximum permissible current (per branch)	100 mA
Ambient temperature (operation)	-20 °C ... 70 °C
Mounting position	any
Standards/regulations	DIN EN 50178
Connection method	Screw connection
	Field level
	Controller level
Connection data solid/stranded/AWG	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 14
Dimensions	112 mm / 80 mm



Passive termination boards

#### Technical data

#### Ordering data

Description	No. of pos.	Module width W
<b>Termination board, for I/O card: SDV144</b>		
- with LED status indicator	50	162 mm
- with fuse and LED status indicator	50	181 mm

Type	Order No.	Pcs./ Pkt.
<b>UM-2KS50/16DI/RS/MKDS</b>	<b>2900173</b>	1
<b>UM-2KS50/DI16/RS/K-MT/SO241</b>	<b>2319618</b>	1

### Yokogawa ProSafe-RS Termination boards

These modules are connected to the I/O module via the 40-pos. YUC system cable (on page 516).

- Redundant signal transmission (two parallel connectors)

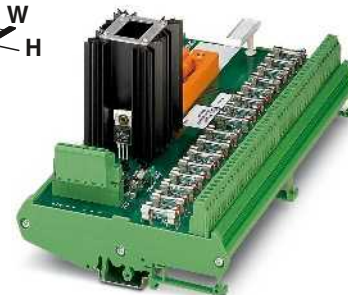
#### UM-2KS40/16AI/SI/RS/SO225

- For SAI143 analog module
- Screw connection
- Redundant voltage supply with signaling relay and fuse (IEC 127-2, 5 x 20, 10 AT)
- Plug-in fuses (IEC 127-2, 5 x 20, 1 AT) and LED status indicator per channel

#### UM-2KS40/16AIO/RS/SO225

- For SAI143, SAV144, SAI533 analog modules
- Screw connection
- 16 analog inputs or 8 analog outputs

Maximum permissible operating voltage	30 V DC
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 55 °C
Mounting position	any
Standards/regulations	DIN EN 50178
Connection method	Screw connection
	Field level
	Controller level
Connection data solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	126 mm / 96 mm



Passive termination boards

#### Technical data

#### Ordering data

Description	No. of pos.	Module width W
<b>Termination board, for I/O card: SAI143</b>		
	50	250 mm
<b>Termination board, for I/O card: SAI143, SAV144, and SAI533</b>		
	50	168 mm

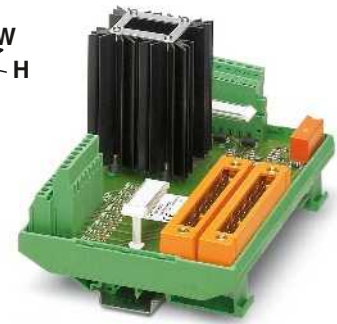
Type	Order No.	Pcs./ Pkt.
<b>UM-2KS40/16AI/SI/RS/SO225</b>	<b>2319841</b>	1
<b>UM-2KS40/16AIO/RS/SO225</b>	<b>2319838</b>	1

**Yokogawa ProSafe-RS Termination boards**

These modules are connected to the I/O module via the 50-pos. YUC system cable (on page 516).

**UM-2KS50/8DO/RS/MKDS**

- For SDV531 and SDV531L digital modules
- Redundant signal transmission (two parallel connectors)
- Screw terminal blocks
- Redundant voltage supply with signaling relay and fuse (IEC 127-2, 5 x 20, 3,15 AT)
- LED status display per channel



Passive termination boards

**Technical data**

Maximum permissible operating voltage	24 V DC ±5 %
Maximum permissible current (per branch)	100 mA
Ambient temperature (operation)	-20 °C ... 70 °C
Mounting position	any
Standards/regulations	DIN EN 50178
Connection method	Screw connection
	Field level
	Controller level
Connection data solid/stranded/AWG	Yokogawa KS-compatible
Dimensions	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 14
	112 mm / 80 mm

**Ordering data**

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
<b>Termination board</b> , for I/O card: SDV531 and SDV531L					
	50	162 mm	<b>UM-2KS50/ 8DO/RS/MKDS</b>	<b>2900174</b>	1

**Yokogawa ProSafe-RS Termination boards**

These modules are connected to the I/O module via the 50-pos. YUC system cable (on page 516).

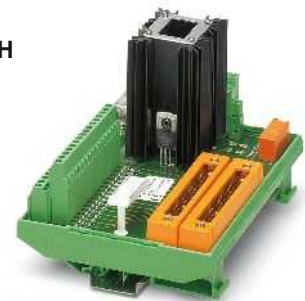
- Redundant signal transmission (two parallel connectors)
- Redundant voltage supply with signaling relay and fuse (IEC 127-2, 5 x 20, 6,3 AT)
- For SDV541 digital modules

**UM-2KS50/DO16/RS/K-MT/SO241**

- Screw connection with knife disconnection
- Plug-in fuses (TR5, 0,2 AT) and LED status indicator per channel

**UM-2KS50/16DO/RS/MKDS**

- Screw connection
- LED status display per channel



Passive termination boards

**Technical data**

Maximum permissible operating voltage	24 V DC ±5 %
Maximum permissible current (per branch)	100 mA
Ambient temperature (operation)	-20 °C ... 70 °C
Mounting position	any
Standards/regulations	DIN EN 50178
Connection method	Screw connection
	Field level
	Controller level
Connection data solid/stranded/AWG	Yokogawa KS-compatible
Dimensions	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 14
	112 mm / 80 mm

**Ordering data**

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
<b>Termination board</b> , for I/O card: SDV541					
- with LED status indicator	50	162 mm	<b>UM-2KS50/16DO/RS/MKDS</b>	<b>2900175</b>	1
- with fuse and LED status indicator	50	215 mm	<b>UM-2KS50/DO16/RS/K-MT/SO241</b>	<b>2319595</b>	1

# System cabling for controllers

## Controller-specific system cabling

### Termination Carriers for Yokogawa CENTUM VP and ProSafe-RS

The Termination Carriers are a compact solution for connecting signal conditioners and coupling relays to the Yokogawa CENTUM VP and ProSafe-RS systems.

- Mechanically decoupled PCB
- Redundant system connection
- Simple or redundant supply (diode decoupling, polarity reversal protection) and monitoring function. Implementation via separate DIN rail module or integrated switching on the PCB

### Termination Carriers for MINI Analog signal conditioners

#### TC-2KS40-AI16-M-PRH-CS

- For AAI141/AAI143 analog I/O modules

#### TC-2KS40-AO16-M-PRH-CS

- For AAI543 analog I/O module

### Termination Carriers for Ex i signal conditioners of the MACX Analog Ex series

#### TC-2KS50-DI32-2EX-PR-CS

- For ADV151/ADV161 digital I/O modules

#### TC-2KS50-DO32-EX-PR-CS

- For ADV551/ADV561 digital I/O modules

#### TC-2KS40-AO16-EX-PR-CS

- For AAI543 analog I/O module

#### TC-2KS40-AI16-EX-PR-CS

- For AAI141/AAI143 analog I/O modules

#### TC-2KS50-DO16-EX-PR-RS

- For SDV541 digital I/O module

#### TC-2KS50-DI16-EX-PR-RS

- For SDV144 digital I/O modules

#### TC-2KS40-AI16-EX-PR-RS

- For SAI143 analog I/O module

#### TC-2KS40-AO8-EX-PR-RS

- For SAI533 analog I/O module

### Termination Carriers for coupling relays from the PSR-ETP or PSR-FSP series

#### TC-2KS50-DO16-F&G-AR-RS

- For SDV541 digital I/O modules

#### TC-2KS50-DO16-ESD-AR-RS

- For SDV541 digital I/O modules



Termination Carrier for Centum VP system, can be used with signal conditioners of the MINI Analog series



Ex:

General data	
Connection to the control system level	Yokogawa KS-compatible
Maximum operating voltage	< 30 V DC (Per signal/channel)
Maximum permissible current	23 mA (Signal/channel)
Degree of pollution/surge voltage category	2 / II
Air clearances and creepage distances	DIN EN 50178 ( Basic insulation )
Ambient temperature range	-20 °C ... 60 °C (Please observe module specifications)
Shock	15g, according to IEC 60068-2-27
Vibration (operation)	2g, according to IEC 60068-2-6
Dimensions H / D	170 / 160 mm
EMC note	
Power supply via power module	
Input voltage range	19.2 V DC ... 30 V DC
Redundant supply	yes, decoupled from diodes
Polarization and surge protection	Yes
Fuse	2x 2.5 A on PCB, slow-blow (replaceable)
Status indication	2 x red LED (error) 2x green LEDs (PWR1 and PWR2) 1 N/C contact (alarm = open)
Switching output	

Technical data		
Yokogawa KS-compatible		
< 30 V DC (Per signal/channel)		
23 mA (Signal/channel)		
2 / II		
DIN EN 50178 ( Basic insulation )		
-20 °C ... 60 °C (Please observe module specifications)		
15g, according to IEC 60068-2-27		
2g, according to IEC 60068-2-6		
170 / 160 mm		
19.2 V DC ... 30 V DC		
yes, decoupled from diodes		
Yes		
2x 2.5 A on PCB, slow-blow (replaceable)		
2 x red LED (error)		
2x green LEDs (PWR1 and PWR2)		
1 N/C contact (alarm = open)		

Description	Module width W
<b>Termination Carrier</b> for 16 highly compact signal conditioners	
- For AAI141 and AAI143 analog I/O modules	148 mm
- For AAI543 analog I/O modules	148 mm
<b>Termination Carrier</b> for 16/32 Ex i signal conditioners (SIL 2)	
- For ADV151 and ADV161 digital I/O modules	242 mm
- For ADV551 and ADV561 digital I/O modules	448 mm
- For AAI543 analog I/O module	242 mm
- For AAI141 and AAI143 analog I/O modules	242 mm
<b>Termination Carrier</b> for 8/16 Ex i signal conditioners (SIL 2)	
- For SDV144 digital I/O modules	242 mm
- For SDV541 digital I/O modules	242 mm
- For SAI143 analog I/O module	242 mm
- For SAI533 analog I/O module	148 mm
<b>Termination Carrier</b> for 16 PSR-FSP/PSR-ETP relays	
- For SDV541 digital I/O modules (low-demand application)	304 mm
- For SDV541 digital I/O module (high-demand application)	304 mm

Ordering data		
Type	Order No.	Pcs./ Pkt.
TC-2KS40-AI16-M-PRH-CS	2905257	1
TC-2KS40-AO16-M-PRH-CS	2905905	1

<b>MINI Analog power terminal</b>		
<b>MINI Analog fault signaling module</b>		
<b>Power and fault signaling module</b>		
<b>Cable set</b> with 24 V module supply, suitable for PSR-ETP/Order No.: 2986711		
<b>Cable set</b> without use of confirmation contact, suitable for PSR-FSP/Order No.: 2981978		
<b>Cable set</b> with use of confirmation contact, suitable for PSR-FSP/Order No.: 2986960 and 2986575		
<b>Jumper plug</b> for occupying unused module slots, suitable for PSR-FSP/Order No.: 2986960 and 2986575		

Accessories		
MINI MCR-SL-PTB-FM	2902958	1
MINI MCR-SL-FM-RC-NC	2902961	1



Termination Carrier for Centum VP System, can be used with Ex i signal conditioners of the MACX Analog Ex series



Termination Carrier for ProSafe-RS system, can be used with Ex i signal conditioners of the MACX Analog Ex series



Termination Carrier for ProSafe-RS system, can be used with coupling relays from the PSR-ETP or PSR-FSP series

Technical data
Yokogawa KS-compatible
< 30 V DC (Per signal/channel)
1 A (Signal/channel)
2 / II
DIN EN 50178 ( Basic insulation )
-20 °C ... 60 °C (Please observe module specifications)
15g, according to IEC 60068-2-27
2g, according to IEC 60068-2-6
170 / 160 mm
19.2 V DC ... 30 V DC
yes, decoupled from diodes
Yes
2x 2.5 A on PCB, slow-blow (replaceable)
1 x red LED (error)
2x green LEDs (PWR1 and PWR2)
1 N/C contact (alarm = open)

Technical data
Yokogawa KS-compatible
< 30 V DC (Per signal/channel)
1 A (Signal/channel)
2 / II
DIN EN 50178 ( Basic insulation )
-20 °C ... 60 °C (Please observe module specifications)
15g, according to IEC 60068-2-27
2g, according to IEC 60068-2-6
170 / 160 mm
19.2 V DC ... 30 V DC
yes, decoupled from diodes
Yes
2x 2.5 A on PCB, slow-blow (replaceable)
1 x red LED (error)
2x green LEDs (PWR1 and PWR2)
1 N/C contact (alarm = open)

Technical data
Yokogawa KS-compatible
24 V DC (21.1 V ... 26.4 V)
1 A (Per signal/channel)
2 / II
DIN EN 50178 ( Basic insulation )
-20 °C ... 60 °C
15g, according to IEC 60068-2-27
2g, according to IEC 60068-2-6
170 / 160 mm
Class A product, see page 605
21.1 V DC ... 26.4 V DC
yes, decoupled from diodes
Yes
2.5 A on PCB, slow-blow (replaceable)
2 x red LED (error)
2x green LEDs (PWR1 and PWR2)
1 N/C contact (alarm = open)

Ordering data		
Type	Order No.	Pcs./ Pkt.
TC-2KS50-DI32-2EX-PR-CS	2904676	1
TC-2KS50-DO32-EX-PR-CS	2905199	1
TC-2KS40-AO16-EX-PR-CS	2905201	1
TC-2KS40-AI16-EX-PR-CS	2905677	1
TC-2KS50-DI16-EX-PR-RS	2905202	1
TC-2KS50-DO16-EX-PR-RS	2905678	1
TC-2KS40-AI16-EX-PR-RS	2905203	1
TC-2KS40-AO8-EX-PR-RS	2905204	1
TC-2KS50-DO16-F&G-AR-RS	2904112	1
TC-2KS50-DO16-ESD-AR-RS	2904113	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
TC-2KS50-DI32-2EX-PR-CS	2904676	1
TC-2KS50-DO32-EX-PR-CS	2905199	1
TC-2KS40-AO16-EX-PR-CS	2905201	1
TC-2KS40-AI16-EX-PR-CS	2905677	1
TC-2KS50-DI16-EX-PR-RS	2905202	1
TC-2KS50-DO16-EX-PR-RS	2905678	1
TC-2KS40-AI16-EX-PR-RS	2905203	1
TC-2KS40-AO8-EX-PR-RS	2905204	1
TC-2KS50-DO16-F&G-AR-RS	2904112	1
TC-2KS50-DO16-ESD-AR-RS	2904113	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
TC-2KS50-DI32-2EX-PR-CS	2904676	1
TC-2KS50-DO32-EX-PR-CS	2905199	1
TC-2KS40-AO16-EX-PR-CS	2905201	1
TC-2KS40-AI16-EX-PR-CS	2905677	1
TC-2KS50-DI16-EX-PR-RS	2905202	1
TC-2KS50-DO16-EX-PR-RS	2905678	1
TC-2KS40-AI16-EX-PR-RS	2905203	1
TC-2KS40-AO8-EX-PR-RS	2905204	1
TC-2KS50-DO16-F&G-AR-RS	2904112	1
TC-2KS50-DO16-ESD-AR-RS	2904113	1

Accessories		
Type	Order No.	Pcs./ Pkt.
TC-MACX-MCR-PTB	2904673	1

Accessories		
Type	Order No.	Pcs./ Pkt.
TC-MACX-MCR-PTB	2904673	1

Accessories		
Type	Order No.	Pcs./ Pkt.
TC-C-PSR3-SC-A100V+A20000	2903391	16
TC-C-PSR3-SC-A10000A20000	2903389	16
TC-C-PSR3-SC-A10000A23132	2903390	16
TC-C-PTSM-50-00000000J1J1	2903388	8

# System cabling for controllers

## Controller-specific system cabling

### VIP termination boards for 8 channels

These VIP - VARIOFACE Professional modules are used in combination with 14-pos. system cables and the relevant front adapters.

#### Features:

- Byte-wise marking
- For digital I/O modules
- With LED as an option

**Notes:**  
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



Passive termination boards for input/output with screw connection



Passive termination boards for input/output with Push-in connection



Technical data	
Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Maximum total current (voltage supply)	3 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Screw connection
	Field level
	Controller level
Connection data solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	H / D

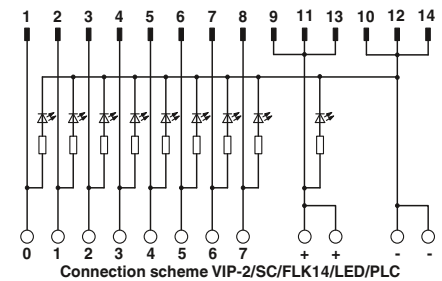
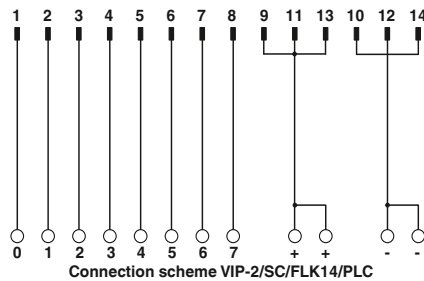
Technical data	
VIP-2/.../FLK14/PLC	VIP-2/.../FLK14/LED/PLC
60 V AC/DC	24 V DC
125 V / 125 V	24 V / 24 V
1 A	1 A
3 A	3 A
-20 °C ... 50 °C	-20 °C ... 50 °C
any	any
IEC 60664 , DIN EN 50178	IEC 60664 , DIN EN 50178
Screw connection	Screw connection
IDC/FLK pin strip	IDC/FLK pin strip
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
65.5 mm / 56 mm	72.1 mm / 56 mm

Technical data	
VIP-2/.../FLK14/PLC	VIP-2/.../FLK14/LED/PLC
60 V AC/DC	24 V DC
125 V / 125 V	24 V / 24 V
1 A	1 A
3 A	3 A
-20 °C ... 50 °C	-20 °C ... 50 °C
any	any
IEC 60664 , DIN EN 50178	IEC 60664 , DIN EN 50178
Push-in connection	Push-in connection
IDC/FLK pin strip	IDC/FLK pin strip
0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
72.1 mm / 56 mm	72.1 mm / 56 mm

Description	No. of pos.	Module width W
<b>VARIOFACE termination board</b> , for eight channels,		
- with screw connection	14	39.8 mm
- with Push-in connection	14	41.9 mm
<b>VARIOFACE termination board</b> , for eight channels with light indicator,		
- with screw connection	14	39.8 mm
- with Push-in connection	14	41.9 mm

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-2/SC/FLK14/PLC	2315214	1
VIP-2/SC/FLK14/LED/PLC	2322249	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-2/PT/FLK14/PLC	2903801	1
VIP-2/PT/FLK14/LED/PLC	2904279	1



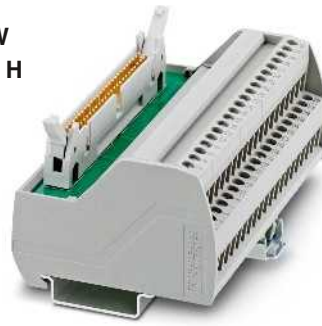
### VIP termination boards for 32 channels

These VIP - VARIOFACE Professional modules are used in combination with 50-pos. system cables and the relevant front adapters.

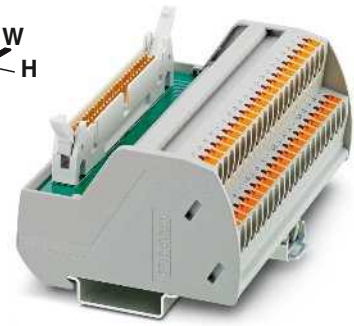
#### Features:

- Byte-wise marking
- For digital I/O modules
- With LED as an option

**Notes:**  
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



Passive termination boards for input/output with screw connection



Passive termination boards for input/output with Push-in connection



Technical data	
VIP-2/.../FLK50/PLC	VIP-2/.../FLK50/LED/PLC
60 V AC/DC	24 V DC
125 V / 125 V	24 V / 24 V
1 A	1 A
2 A (per byte)	2 A (per byte)
-20 °C ... 50 °C	-20 °C ... 50 °C
any	any
IEC 60664 , DIN EN 50178	
Screw connection	Screw connection
IDC/FLK pin strip	IDC/FLK pin strip
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
65.5 mm / 56 mm	

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-2/SC/FLK50/PLC	2315227	1
VIP-2/SC/FLK50/LED/PLC	2322252	1



Technical data	
VIP-2/.../FLK50/PLC	VIP-2/.../FLK50/LED/PLC
60 V AC/DC	24 V DC
125 V / 125 V	24 V / 24 V
1 A	1 A
2 A (per byte)	2 A (per byte)
-20 °C ... 50 °C	-20 °C ... 50 °C
any	any
IEC 60664 , DIN EN 50178	
Push-in connection	Push-in connection
IDC/FLK pin strip	IDC/FLK pin strip
0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14	
72.1 mm / 56 mm	

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-2/PT/FLK50/PLC	2903803	1
VIP-2/PT/FLK50/LED/PLC	2904280	1

Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA

Maximum permissible current (per branch)  
Maximum total current (voltage supply)

Ambient temperature (operation)  
Mounting position

Standards/regulations

Connection method

Field level

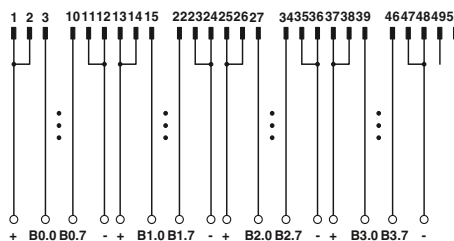
Controller level

Connection data solid/stranded/AWG

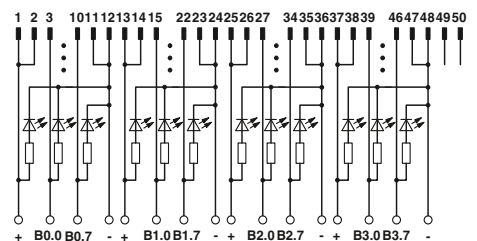
Dimensions

H / D

Description	No. of pos.	Module width W
<b>VARIOFACE termination board</b> , for 32 channels,		
- with screw connection	50	106.1 mm
- with Push-in connection	50	107.9 mm
<b>VARIOFACE termination board</b> , for 32 channels with light indicator,		
- with screw connection	50	106.1 mm
- with Push-in connection	50	107.9 mm



Connection scheme VIP-2/SC/FLK50/PLC



Connection scheme VIP-2/SC/FLK50/LED/PLC

# System cabling for controllers

## Controller-specific system cabling

### VIP termination boards in 2-conductor connection technology for 8 channels

These VIP - VARIOFACE Professional modules are used in combination with 14-pos. system cables and the relevant front adapters.

#### Features:

- Byte-wise marking
- For digital I/O modules
- Negative or positive connection per signal.

**Notes:**  
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



Passive termination boards with screw connection



Passive termination boards with Push-in connection



Technical data	
Maximum permissible operating voltage	60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current (per branch)	1 A
Maximum total current (voltage supply)	3 A (per byte)
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Screw connection
	Field level
	Controller level
Connection data solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	65.5 mm / 56 mm

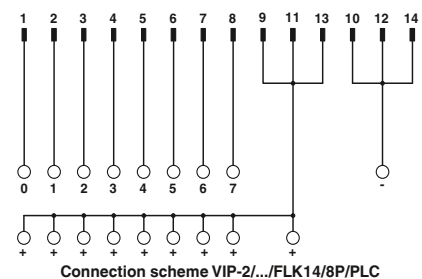
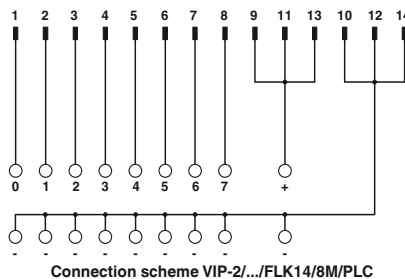
Technical data		
Maximum permissible operating voltage	60 V AC/DC	
Maximum permissible operating voltage UL / CSA	125 V / 125 V	
Maximum permissible current (per branch)	1 A	
Maximum total current (voltage supply)	3 A (per byte)	
Ambient temperature (operation)	-20 °C ... 50 °C	
Mounting position	any	
Standards/regulations	IEC 60664 , DIN EN 50178	
Connection method	Push-in connection	
	Field level	
	Controller level	
Connection data solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	72.1 mm / 56 mm	

Technical data		
Maximum permissible operating voltage	60 V AC/DC	
Maximum permissible operating voltage UL / CSA	125 V / 125 V	
Maximum permissible current (per branch)	1 A	
Maximum total current (voltage supply)	3 A (per byte)	
Ambient temperature (operation)	-20 °C ... 50 °C	
Mounting position	any	
Standards/regulations	IEC 60664 , DIN EN 50178	
Connection method	Push-in connection	
	Field level	
	Controller level	
Connection data solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14	
Dimensions	72.1 mm / 56 mm	

Ordering data		
Description	No. of pos.	Module width W
<b>VARIOFACE termination board</b> , for eight channels, each with an additional terminal block per signal for a common minus potential		
- with screw connection	14	50 mm
- with Push-in connection	14	52 mm
<b>VARIOFACE termination board</b> , for eight channels, each with an additional terminal block per signal for a common plus potential		
- with screw connection	14	50 mm
- with Push-in connection	14	52 mm

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-2/SC/FLK14/8M/PLC	2322281	1
VIP-2/SC/FLK14/8P/PLC	2322294	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-2/PT/FLK14/8M/PLC	2904283	1
VIP-2/PT/FLK14/8P/PLC	2904284	1





### Termination boards in 2-conductor connection technology for 32 channels

These VARIOFACE modules are used in combination with 50-pos. system cables and the relevant front adapters.

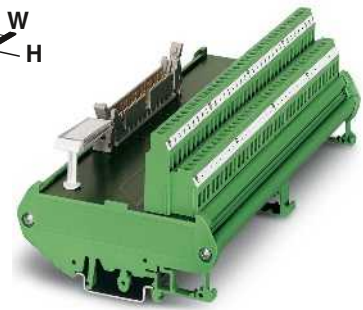
The following module types with 2-conductor connection technology are available:

#### FLKM 50/32M/PLC

- Byte-wise marking
- For digital I/O modules
- Negative connection per signal.

#### FLKM 50/32P/PLC

- Byte-wise marking
- For digital I/O modules
- Positive connection per signal.



Passive termination boards with screw connection

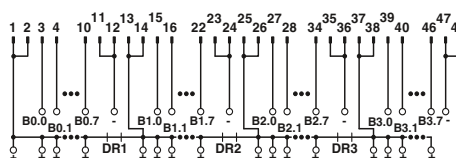


#### Technical data

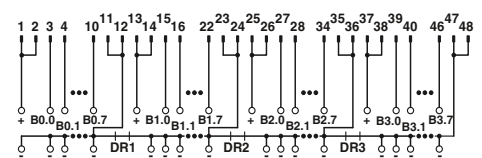
Maximum permissible operating voltage	60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current (per branch)	1 A
Maximum total current (voltage supply)	8 A (per byte)
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	DIN EN 50178 , IEC 60664
Connection method	Field level Controller level
Connection data solid/stranded/AWG	IDC/FLK pin strip 0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	H / D 90 mm / 68 mm

#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE termination board</b> , for 32 channels, each with an additional terminal block per signal for a common minus potential	50	192 mm	FLKM 50/32M/PLC	2289719	1
<b>VARIOFACE termination board</b> , for 32 channels, each with an additional terminal block per signal for a common plus potential	50	192 mm	FLKM 50/32P/PLC	2291121	1



Connection scheme: FLKM 50/32M/PLC



Connection scheme: FLKM 50/32P/PLC

# System cabling for controllers

## Controller-specific system cabling

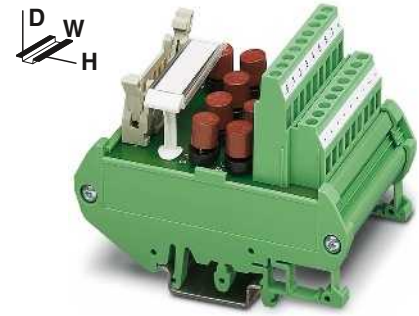
### Termination boards with fuses in 2-conductor connection technology

These VARIOFACE modules are used in combination with 14 or 50-pos. system cables and the relevant front adapters.

The following module types with fuses and 2-conductor connection technology are available:

#### FLKM 14/8M/SI/PLC (for 8 channels) FLKM 50/32M/SI/PLC (for 32 channels)

- Byte-wise marking
- Can be used for digital I/O modules
- Pluggable fuse (IEC 127-3, 1AF) per signal path (F1)
- Pluggable fuse (IEC 127-3, 2AF) per voltage supply (F2)
- Negative connection per signal.



Passive fuse modules for 8 or 32 channels

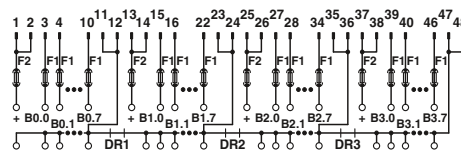


#### Technical data

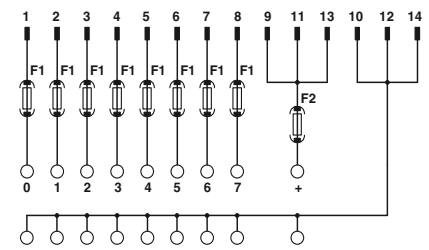
	FLKM 14/8M/SI/PLC	FLKM 50/32M/SI/PLC
Maximum permissible operating voltage	60 V DC	60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -	125 V / -
Maximum permissible current (per branch)	1 A	1 A
Maximum total current (voltage supply)	2 A	2 A (per byte)
Ambient temperature (operation)	-20 °C ... 50 °C	-20 °C ... 50 °C
Mounting position	any	any
Standards/regulations	DIN EN 50178 , IEC 60664	
Connection method	Field level Screw connection	Controller level Screw connection
Connection data solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	IDC/FLK pin strip
Dimensions	H / D	90 mm / 68 mm

#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
<b>VARIOFACE module</b> , for eight channels, each with an additional terminal block and fuse per signal, (common minus potential)	14	57 mm	FLKM 14/8M/SI/PLC	2294487	1
<b>VARIOFACE module</b> , for 32 channels, each with an additional terminal block and fuse per signal, (common minus potential)	50	192 mm	FLKM 50/32M/SI/PLC	2294490	1



Connection scheme: FLKM 50/32M/SI/PLC



Connection scheme: FLKM 14/8M/SI/PLC

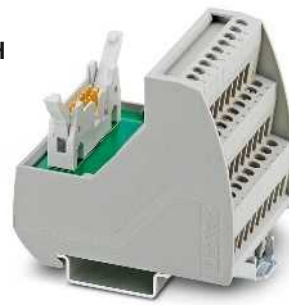
### VIP initiator modules for 8 channels

These VIP - VARIOFACE Professional modules are used in combination with 14-pos. system cables and the relevant front adapters.

#### Features:

- Byte-wise marking
- For digital I/O modules
- Positive and negative connection per signal
- With LED as an option

**Notes:**  
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



Initiator modules with screw connection



Initiator modules with Push-in connection



Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA

Maximum permissible current (per branch)  
Maximum total current (voltage supply)

Ambient temperature (operation)  
Mounting position

Standards/regulations

Connection method

Connection data solid/stranded/AWG

Dimensions

Field level  
Controller level

H / D

#### Technical data

VIP-3/SC/FLK14/8IM/PLC	VIP-3/SC/FLK14/8IM/LED/PLC
60 V DC	24 V DC
125 V / -	24 V / 24 V
1 A	1 A
3 A	3 A
-20 °C ... 50 °C	-20 °C ... 50 °C
any	any
IEC 60664 , DIN EN 50178	
Screw connection	Screw connection
IDC/FLK pin strip	IDC/FLK pin strip
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
69 mm / 62 mm	

#### Technical data

VIP-3/PT/FLK14/8IM/PLC	VIP-3/PT/FLK14/8IM/LED/PLC
60 V AC/DC	24 V DC
125 V / 125 V	24 V / 24 V
1 A	1 A
3 A	3 A
-20 °C ... 50 °C	-20 °C ... 50 °C
any	any
IEC 60664 , DIN EN 50178	
Push-in connection	Push-in connection
IDC/FLK pin strip	IDC/FLK pin strip
0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14	
75.8 mm / 63 mm	

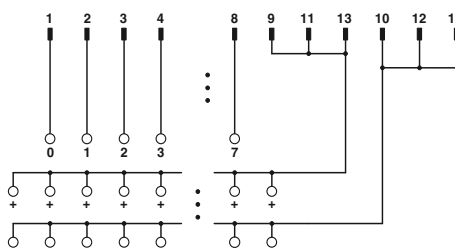
#### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-3/SC/FLK14/8IM/PLC	2322278	1
VIP-3/SC/FLK14/8IM/LED/PLC	2322265	1

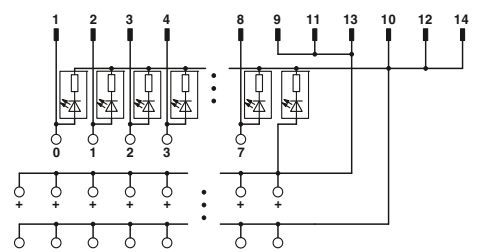
#### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-3/PT/FLK14/8IM/PLC	2904282	1
VIP-3/PT/FLK14/8IM/LED/PLC	2904281	1

Description	No. of pos.	Module width W
<b>VARIOFACE initiator module</b> , for connecting 8 PNP initiators, with an additional positive and negative terminal block each per signal		
- with screw connection	14	52.3 mm
- with Push-in connection	14	52 mm
<b>VARIOFACE initiator module with LED</b> , for connecting 8 PNP initiators, with an additional positive and negative terminal block each per signal		
- with screw connection	14	52.3 mm
- with Push-in connection	14	52 mm



Connection scheme VIP-3/.../FLK14/8IM/PLC



Connection scheme VIP-3/.../FLK14/8IM/LED/PLC

# System cabling for controllers

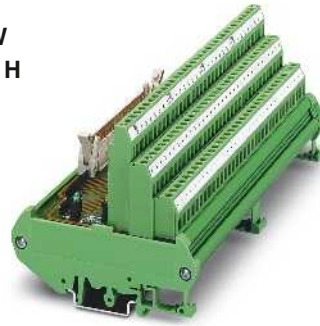
## Controller-specific system cabling

### Initiator modules for 32 channels

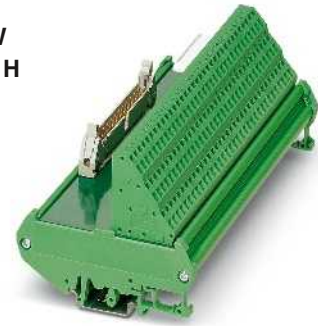
These VARIOFACE modules are used in combination with 50-pos. system cables and the relevant front adapters for digital I/O modules.

#### Features:

- Byte-wise marking
- Positive and negative connection per signal
- With LED as an option



Initiator modules for 32 channels, with screw connection

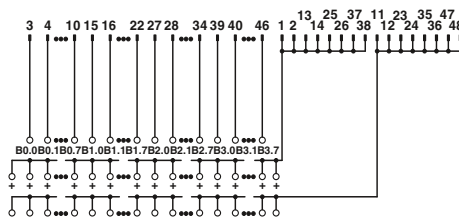


Initiator modules for 32 channels, with spring-cage connection

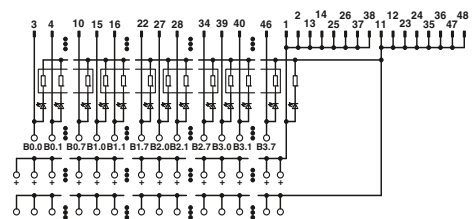


		Technical data		Technical data	
Maximum permissible operating voltage		... 50/32 IM	... 50/32 IM/LA	60 V DC	60 V DC
Maximum permissible operating voltage UL / CSA		60 V DC	30 V DC	- / -	- / -
		125 V / -	24 V / -		
Maximum permissible current (per branch)		1 A	1 A	1 A	1 A
Maximum total current (voltage supply)		2 A (per byte)	2 A (per byte)	2 A (per byte)	2 A (per byte)
Status indication		-	LED	-	-
Ambient temperature (operation)		-20 °C ... 50 °C	-20 °C ... 50 °C	-20 °C ... 50 °C	-20 °C ... 50 °C
Mounting position		any	any	any	any
Standards/regulations		DIN EN 50178 , IEC 60664	DIN EN 50178 , IEC 60664	DIN EN 50178 , IEC 60664	DIN EN 50178 , IEC 60664
Connection method	Field level	Screw connection	Screw connection	Spring-cage connection	Spring-cage connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip	IDC/FLK pin strip	IDC/FLK pin strip
Connection data solid/stranded/AWG		0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12	0.2 ... 2.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 12
Dimensions	H / D	90 mm / 81 mm	90 mm / 81 mm	90 mm / 73.5 mm	90 mm / 73.5 mm

			Ordering data			Ordering data		
Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.	Type	Order No.	Pcs./ Pkt.
VARIOFACE initiator module, for connection of 32 PNP initiators			FLKMS 50/32IM/PLC	2284523	1			
VARIOFACE initiator module, as above, but with light indicator	50	180 mm						
VARIOFACE initiator module, for connection of 32 PNP initiators	50	180 mm	FLKMS 50/32IM/LA/PLC	2284510	1			
VARIOFACE initiator module, for connection of 32 PNP initiators	50	180 mm				FLKMS 50/32IM/ZFKDS/PLC	2901389	1



Connection scheme: FLKMS 50/32IM/PLC, ...50/32IM/ZFKDS/PLC



FLKMS 50/32IM/LA/PLC connection scheme



# System cabling for controllers

## Controller-specific system cabling

### Termination boards with knife disconnect terminal blocks

These VARIOFACE modules with knife disconnection and test connection for each signal (2 or 2.3 mm Ø test plug) are used in combination with the respective front adapters.

#### FLKM14/KDS3-MT/PPA/PLC

(for 8 channels)

#### FLKM 50/KDS3-MT/PPA/PLC

(for 32 channels)

- Byte-wise marking
- Can be used for digital I/O modules

#### FLKM-2FLK14/KDS3-MT/PPA/S7

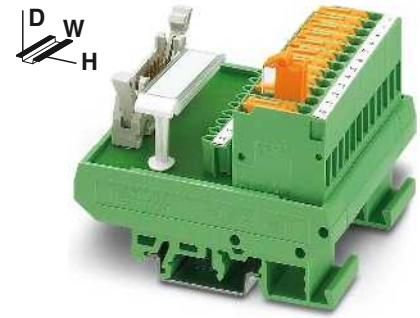
- Numerical marking (1-20)
- Specifically for S7-300 (in conjunction with the front adapter FLKM 14-PA-S300, Order No. [2299770](#))

#### FLKM 50/KDS3-MT/PPA/7-300

- Numerical marking (1-40)
- Specifically for S7-300 (in conjunction with the front adapter FLKM 50-PA-S300, Order No. [2294445](#))

#### FLKM 50/KDS3-MT/PPA/AN/PLC

- Numerical marking (1-50)
- Specifically for S7-400 (in conjunction with the front adapter FLKM 50-PA-S400 (3-48) Order No. [2294908](#))



Passive termination boards for 8 or 32 channels with knife disconnect terminal blocks



#### Technical data

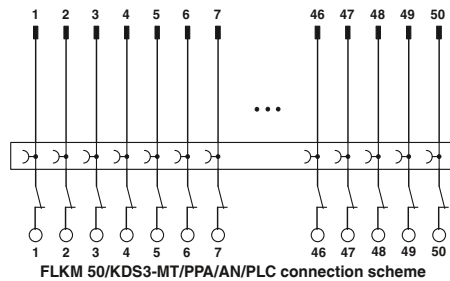
FLKM...14/KDS 3-MT...	FLKM 50/KDS 3-MT...
60 V DC	60 V DC
24 V / -	24 V / -
1 A	1 A
3 A	2 A (per byte)
-20 °C ... 50 °C	-20 °C ... 50 °C
any	any
DIN EN 50178 , IEC 60664	
Screw connection with disconnect knife	Screw connection with disconnect knife
IDC/FLK pin strip	IDC/FLK pin strip
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
77 mm / 61 mm	

#### Ordering data

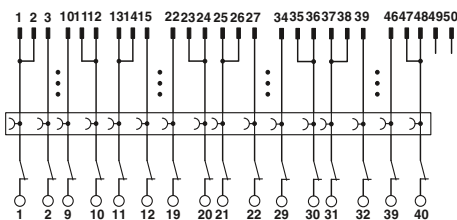
Type	Order No.	Pcs./Pkt.
FLKM 14/KDS3-MT/PPA/PLC	<a href="#">2290423</a>	1
FLKM 50/KDS3-MT/PPA/PLC	<a href="#">2290614</a>	1
FLKM-2FLK14/KDS3-MT/PPA/S7	<a href="#">2295062</a>	1
FLKM 50/KDS3-MT/PPA/S7-300	<a href="#">2304490</a>	1
FLKM 50/KDS3-MT/PPA/AN/PLC	<a href="#">2291587</a>	1

Maximum permissible operating voltage	
Maximum permissible operating voltage UL / CSA	
Maximum permissible current (per branch)	
Maximum total current (voltage supply)	
Ambient temperature (operation)	
Mounting position	
Standards/regulations	
Connection method	Field level
	Controller level
Connection data solid/stranded/AWG	
Dimensions	H / D

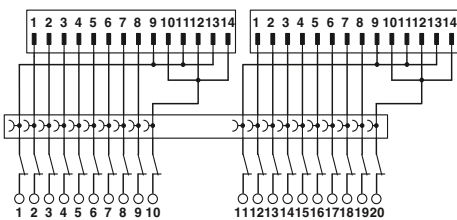
Description	No. of pos.	Module width W
VARIOFACE termination board, for eight channels, with knife disconnect terminal blocks and test sockets to the field and the system	14	67 mm
VARIOFACE termination board, for 32 channels, with knife disconnect terminal blocks and test sockets to the field and the system	50	214 mm
VARIOFACE termination board, for SIMATIC S7-300 with SIMATIC-specific marking (1-20), knife disconnect terminal blocks, and test sockets to the field and the system	14	113 mm
VARIOFACE termination board, as above, but with SIMATIC-specific marking (1-40)	50	214 mm
VARIOFACE termination board, as above, but for SIMATIC S7-400 with SIMATIC-specific marking (3-48)	50	259 mm



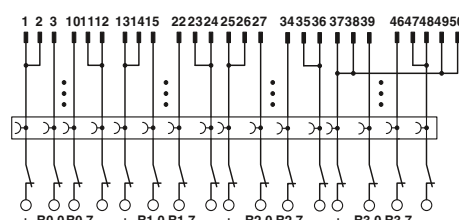
FLKM 50/KDS3-MT/PPA/AN/PLC connection scheme



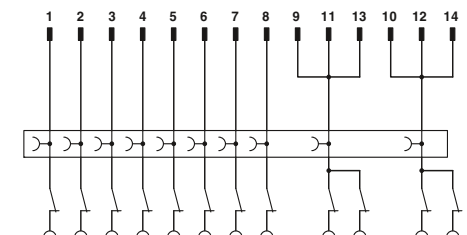
FLKM 50/KDS3-MT/PPA/S7-300 connection scheme



FLKM-2FLK14/KDS3-MT/PPA/S7 connection scheme



FLKM 50/KDS3-MT/PPA/PLC connection scheme



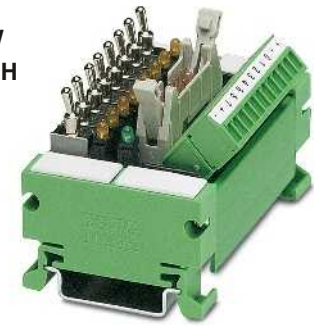
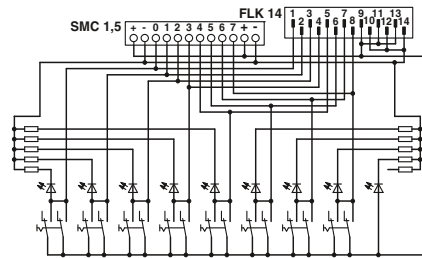
FLKM 14/KDS3-MT/PPA/PLC connection scheme

Simulation module with switches

These VARIOFACE modules enable simple simulation of the control and peripheral hardware for 8 signals.

The UM 45-DI/DO/S/LA/SIM8 switch module is equipped with a COMBICON screw connector for single-conductor wiring for signal transmission. Alternatively, connection to the PLC system cabling is possible via a 14-pos. IDC/FLK pin strip. Connection to the front adapters of the PLC system cabling is possible via 14-pos. system cables with IDC/FLK socket strip.

Each signal path is allocated an LED which signals the “high active” signal state. The supply voltage to the modules is signaled via a green LED.



Switch module

<b>Notes:</b>
Type of housing: Terminal blocks: polyamide PA, non-reinforced, color: green. Housing: PVC
Marking systems and mounting material See Catalog 3

Maximum permissible operating voltage  
Maximum permissible current (per branch)  
Maximum total current (voltage supply)

Ambient temperature (operation)  
Mounting position  
Standards/regulations  
Connection data solid/stranded/AWG  
Dimensions

30 V DC  
1 A  
8 A (+, - terminal block)

-20 °C ... 50 °C  
any  
DIN EN 50178 , IEC 60664  
0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 28 - 16  
45 mm / 51 mm

Description	No. of pos.	Module width W
<b>VARIOFACE switch module</b> , for simulation		75 mm

Technical data

Ordering data

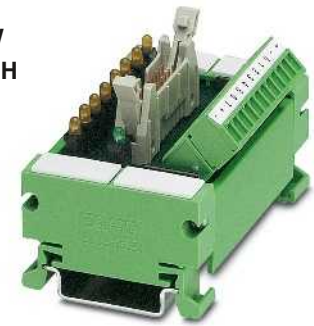
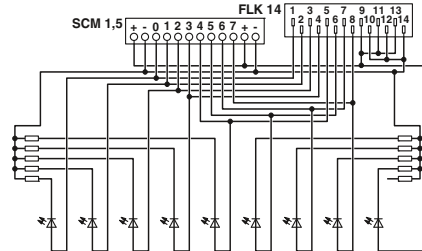
Type	Order No.	Pcs./Pkt.
<b>UM 45-DI/DO/S/LA/SIM8</b>	<a href="#">2968205</a>	1

Simulation module for indication

These VARIOFACE modules enable simple simulation of the control and peripheral hardware for 8 signals.

The UM 45-DO/LA/SIM8 indicator module is equipped with a COMBICON screw connector for single-conductor wiring for signal transmission. Alternatively, connection to the PLC system cabling is possible via a 14-pos. IDC/FLK pin strip. Connection to the front adapters of the PLC system cabling is possible via 14-pos. system cables with IDC/FLK socket strip.

Each signal path is allocated an LED which signals the “high active” signal state. The supply voltage to the modules is signaled via a green LED.



Indicator module

<b>Notes:</b>
Type of housing: Terminal blocks: polyamide PA, non-reinforced, color: green. Housing: PVC
Marking systems and mounting material See Catalog 3

Maximum permissible operating voltage  
Maximum permissible current (per branch)  
Maximum total current (voltage supply)

Ambient temperature (operation)  
Mounting position  
Standards/regulations  
Connection data solid/stranded/AWG  
Dimensions

30 V DC  
1 A  
8 A (+, - terminal block)

-20 °C ... 50 °C  
any  
DIN EN 50178 , IEC 60664  
0.14 ... 1.5 mm<sup>2</sup> / 0.14 ... 1.5 mm<sup>2</sup> / 28 - 16  
45 mm / 51 mm

Description	No. of pos.	Module width W
<b>VARIOFACE indicator module</b> , for simulation		75 mm

Technical data

Ordering data

Type	Order No.	Pcs./Pkt.
<b>UM 45-DO/LA/SIM8</b>	<a href="#">2968195</a>	1

# System cabling for controllers

## Controller-specific system cabling

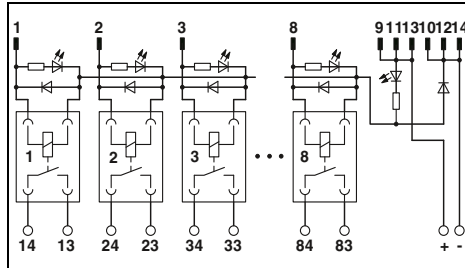
### Output modules with relays, one N/O contact

These VARIOFACE output modules are used in combination with the respective front adapters.

- Plug-in miniature relays, each with an N/O contact
- Universal applications from 1 mA to 3 A continuous current through 2-layer double contact with hard gold plating
- Overall width of just 55 mm (8 channels) or 202 mm (32 channels)
- LED status display for each signal path and supply voltage
- Freewheeling and reverse polarity protection diode for each signal path



**Output module with eight miniature relays, 1 N/O contact**



#### Technical data

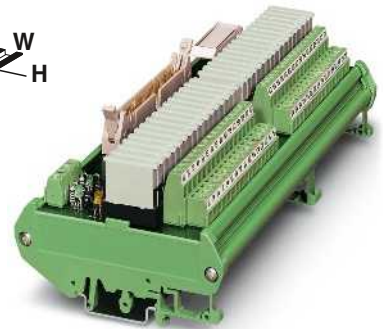
<b>Coil side</b>	
Operating voltage $U_N$	24 V DC
Typical input current at $U_N$	6.5 mA
Typical response time at $U_N$	5 ms
Typical release time at $U_N$	15 ms
Input circuit	Freewheeling diode, reverse polarity protection
Status indicator per channel	Yellow LED
Connection method	IDC/FLK pin strip
No. of pos.	14
<b>Contact side</b>	
Contact type	1 N/O contact (double contact)
Contact material	AgNi, 5 µm hard gold-plated
Max. switching voltage	250 V AC / 125 V DC
Minimum switching voltage	5 V
Maximum switch-on current	5 A
Limiting continuous current	3 A
Minimum switching current	1 mA
Maximum interrupting rating:	24 V DC 72 W 48 V DC 60 W 60 V DC 50 W 110 V DC 50 W 250 V AC 750 VA
Connection method	Screw connection
Connection data solid/stranded/AWG	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 14
<b>General data</b>	
Rated insulation voltage	260 V AC
Rated surge voltage	4 kV (basic insulation)
Degree of pollution / Overvoltage category	2 / III
Ambient temperature (operation)	-20 °C ... 50 °C
Nominal operating mode	100% operating factor
Mechanical service life	2 x 10 <sup>7</sup> cycles
Standards/regulations	DIN EN 50178 , IEC 60664
Mounting position	any
Mounting	In rows with zero spacing
Dimensions	90 mm / 58 mm
EMC note	Class A product, see page 605

#### Ordering data

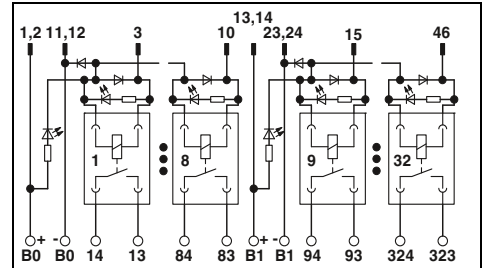
Description	Module width W
<b>VARIOFACE output module</b> , with 8 miniature relays, plugged in, for 24 V DC (including relays)	56
<b>VARIOFACE output module</b> , with 32 miniature relays, plugged in, for 24 V DC (including relays)	202

#### Accessories

<b>Plug-in miniature relays</b>	REL-MR-G 24/1	2961037	8
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**Output module with 32 miniature relays, 1 N/O contact**



#### Technical data

<b>Coil side</b>	
Operating voltage $U_N$	24 V DC
Typical input current at $U_N$	6.5 mA
Typical response time at $U_N$	5 ms
Typical release time at $U_N$	15 ms
Input circuit	Freewheeling diode, reverse polarity protection
Status indicator per channel	Yellow LED
Connection method	IDC/FLK pin strip
No. of pos.	50
<b>Contact side</b>	
Contact type	1 N/O contact (double contact)
Contact material	AgNi, 5 µm hard gold-plated
Max. switching voltage	250 V AC / 125 V DC
Minimum switching voltage	5 V
Maximum switch-on current	5 A
Limiting continuous current	3 A
Minimum switching current	1 mA
Maximum interrupting rating:	24 V DC 72 W 48 V DC 60 W 60 V DC 50 W 110 V DC 50 W 250 V AC 750 VA
Connection method	Screw connection
Connection data solid/stranded/AWG	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 16
<b>General data</b>	
Rated insulation voltage	260 V AC
Rated surge voltage	4 kV (basic insulation)
Degree of pollution / Overvoltage category	2 / III
Ambient temperature (operation)	-20 °C ... 50 °C
Nominal operating mode	100% operating factor
Mechanical service life	2 x 10 <sup>7</sup> cycles
Standards/regulations	DIN EN 50178 , IEC 60664
Mounting position	any
Mounting	In rows with zero spacing
Dimensions	90 mm / 58 mm
EMC note	Class A product, see page 605

#### Ordering data

Description	Module width W
<b>VARIOFACE output module</b> , with 32 miniature relays, plugged in, for 24 V DC (including relays)	202

#### Accessories

<b>Plug-in miniature relays</b>	REL-MR-G 24/1	2961037	8
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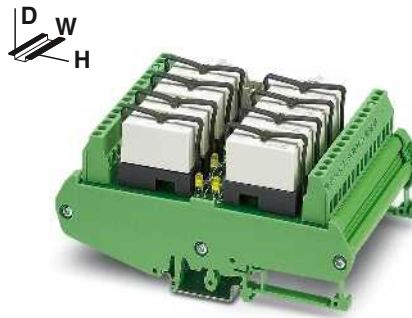


### Output modules with relay, 1 PDT

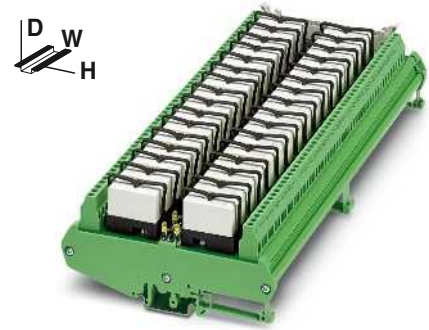
These VARIOFACE output modules are used in combination with the respective front adapters.

Like the front adapters, the modules are connected via 14-pos. or 50-pos. system cables. The following features characterize these relay modules:

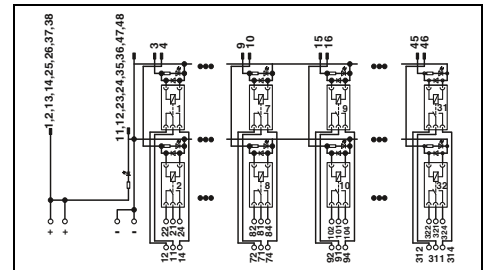
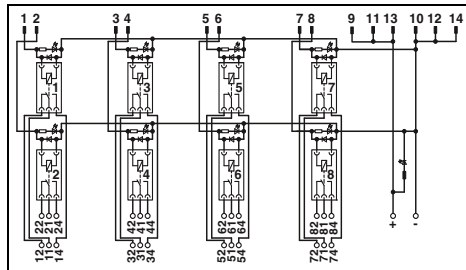
- Plug-in miniature relays, each with a PDT contact
- Overall width of just 80 mm (8 channels) or 271 mm (32 channels)
- LED status display for each signal path and supply voltage
- Freewheeling diode for each signal path



**Output module with eight miniature relays, 1 PDT**



**Output module with 32 miniature relays, 1 PDT**



#### Technical data

Coil side	
Operating voltage $U_N$	24 V DC
Typical input current at $U_N$	18 mA
Typical response time at $U_N$	8 ms
Typical release time at $U_N$	10 ms
Input circuit	Freewheeling diode
Status indicator per channel	Yellow LED
Connection method	IDC/FLK pin strip
No. of pos.	14
Contact side	
Contact type	Single contact, 1-PDT
Contact material	AgNi
Max. switching voltage	250 V AC/DC
Minimum switching voltage	12 V AC/DC
Limiting continuous current	5 A
Minimum switching current	10 mA
Maximum interrupting rating:	24 V DC 120 W 48 V DC 58 W 60 V DC 48 W 110 V DC 50 W 220 V DC 80 W 250 V AC 1250 VA
Connection method	Screw connection
Connection data solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
General data	
Rated insulation voltage	260 V AC
Rated surge voltage	4 kV (Basic insulation between output contact current paths) 6 kV (Safe isolation and reinforced insulation between input circuit and output contact paths)
Degree of pollution / Overvoltage category	2 / III
Ambient temperature (operation)	-20 °C ... 50 °C
Nominal operating mode	100% operating factor
Mechanical service life	3 x 10 <sup>7</sup> cycles
Standards/regulations	DIN EN 50178 , IEC 60664
Mounting position	any
Mounting	In rows with zero spacing
Dimensions	123 mm / 68 mm
EMC note	Class A product, see page 605

#### Ordering data

Description	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE output module, for 24 V DC (incl. relay)</b>				
- with 8 miniature relays	80	<b>UM- 8 RM/RT-G24/21/PLC</b>	<b>2968386</b>	1
- with 32 miniature relays	271			

#### Accessories

<b>Plug-in miniature power relays, with power contacts</b>	<b>REL-MR- 24DC/21HC</b>	<b>2961312</b>	10
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#### Technical data

Coil side	
Operating voltage $U_N$	24 V DC
Typical input current at $U_N$	18 mA
Typical response time at $U_N$	8 ms
Typical release time at $U_N$	10 ms
Input circuit	Freewheeling diode
Status indicator per channel	Yellow LED
Connection method	IDC/FLK pin strip
No. of pos.	50
Contact side	
Contact type	Single contact, 1-PDT
Contact material	AgNi
Max. switching voltage	250 V AC/DC
Minimum switching voltage	12 V AC/DC
Limiting continuous current	5 A
Minimum switching current	10 mA
Maximum interrupting rating:	120 W 58 W 48 W 50 W 80 W 1250 VA
Connection method	Screw connection
Connection data solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
General data	
Rated insulation voltage	260 V AC
Rated surge voltage	4 kV (Basic insulation between output contact current paths) 6 kV (Safe isolation and reinforced insulation between input circuit and output contact paths)
Degree of pollution / Overvoltage category	2 / III
Ambient temperature (operation)	-20 °C ... 50 °C
Nominal operating mode	100% operating factor
Mechanical service life	3 x 10 <sup>7</sup> cycles
Standards/regulations	DIN EN 50178 , IEC 60664
Mounting position	any
Mounting	In rows with zero spacing
Dimensions	123 mm / 68 mm
EMC note	Class A product, see page 605

#### Ordering data

Description	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE output module, for 24 V DC (incl. relay)</b>				
- with 8 miniature relays	80	<b>UM- 8 RM/RT-G24/21/PLC</b>	<b>2968386</b>	1
- with 32 miniature relays	271	<b>UM-32 RM/RT-G24/21/PLC</b>	<b>2968373</b>	1

#### Accessories

<b>Plug-in miniature power relays, with power contacts</b>	<b>REL-MR- 24DC/21HC</b>	<b>2961312</b>	10
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## Controller-specific system cabling

### Output modules with relay, 1 PDT

These VARIOFACE output modules are used in combination with the respective front adapters.

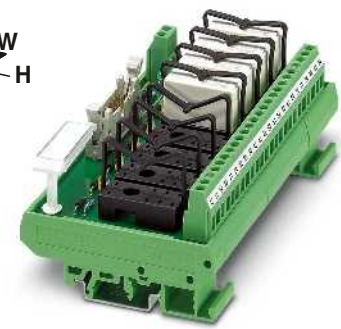
Like the front adapters, the modules are connected via 14-pos. or 50-pos. system cables. The following features characterize these relay modules:

- Plug-in miniature relays, each with a PDT contact
- LED status display for each signal path and supply voltage
- Freewheeling and reverse polarity protection diode for each signal path

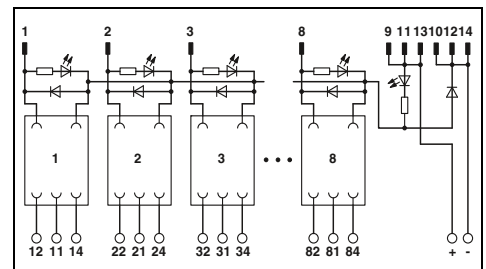
With the 32-channel version, the system cable is connected to the 16-channel UMK-16R.../KSR-G24/21/PLC base modules. The UMK-16R.../KSR-G24/21/E/PLC output extension modules with a further 16 channels are coupled to the base modules via a 20-position flat-ribbon cable (length: 10 cm).

#### Notes:

The connection cable between the base and the extension modules is delivered with the extension unit.



**Output module  
with eight miniature relays,  
1 PDT**



#### Technical data

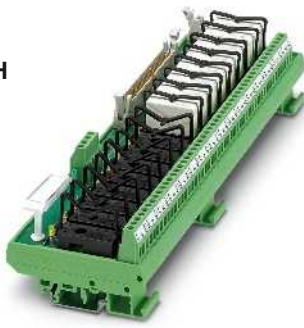
Coil side	
Operating voltage $U_N$	24 V DC
Input circuit	Freewheeling diode, reverse polarity protection
Operating voltage display	Green LED
Status indicator per channel	Yellow LED
Connection method	IDC/FLK pin strip
No. of pos.	14
Contact side	
Contact type	1 PDT
Max. switching voltage	250 V AC/DC
Limiting continuous current	5 A
Connection method	Screw connection
Connection data solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
General data	
Rated insulation voltage	260 V AC
Rated surge voltage	4 kV (Basic insulation between output contact current paths) 6 kV (Safe isolation and reinforced insulation between input circuit and output contact paths)
Degree of pollution / Overvoltage category	2 / III
Ambient temperature (operation)	-20 °C ... 50 °C
Standards/regulations	DIN EN 50178 , IEC 60664
Mounting position	any
Mounting	In rows with zero spacing
Dimensions	77 mm / 59 mm
EMC note	Class A product, see page 605

#### Ordering data

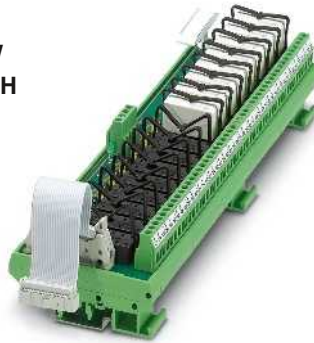
Description	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE output module</b> , for 24 V DC - with 8 plug-in bases including relay	135	<b>UMK- 8 RM/KSR-G 24/21/PLC</b>	<b>2979485</b>	1
- with 8 plug-in bases without relay	135	<b>UMK- 8 RELS/KSR-G24/21/PLC</b>	<b>2974914</b>	1
<b>VARIOFACE output basic module</b> , for 24 V DC - with 16 plug-in bases including relay	259			
- with 16 plug-in bases without relay	259			
<b>VARIOFACE output extension module</b> , for 24 V DC - with 16 plug-in bases including relay	259			
- with 16 plug-in bases without relay	259			

#### Accessories

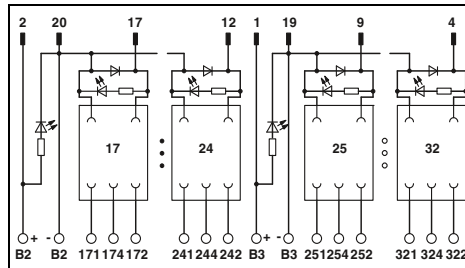
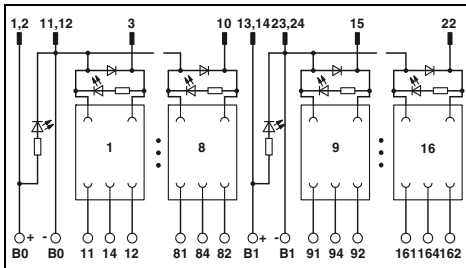
<b>Plug-in miniature power relays, with power contacts</b>	<b>REL-MR- 24DC/21HC</b>	<b>2961312</b>	10
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**Output base module  
with 16 miniature relays,  
1 PDT**



**Output extension module  
with 16 miniature relays,  
1 PDT**



**Technical data**

**Technical data**

24 V DC  
Freewheeling diode, reverse polarity protection  
Green LED  
Yellow LED  
IDC/FLK pin strip  
50

24 V DC  
Freewheeling diode, reverse polarity protection  
Green LED  
Yellow LED  
IDC/FLK pin strip  
20

1 PDT  
250 V AC/DC  
5 A  
Screw connection  
0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12

1 PDT  
250 V AC/DC  
5 A  
Screw connection  
0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12

260 V AC  
4 kV (Basic insulation between output contact current paths)  
6 kV (Safe isolation and reinforced insulation between input circuit and output contact paths)

260 V AC  
4 kV (Basic insulation between output contact current paths)  
6 kV (Safe isolation and reinforced insulation between input circuit and output contact paths)

2 / III  
-20 °C ... 50 °C  
DIN EN 50178 , IEC 60664  
any  
In rows with zero spacing  
77 mm / 59 mm  
Class A product, see page 605

2 / III  
-20 °C ... 50 °C  
DIN EN 50178 , IEC 60664  
any  
In rows with zero spacing  
77 mm / 59 mm  
Class A product, see page 605

**Ordering data**

**Ordering data**

Type	Order No.	Pcs./ Pkt.
UMK-16 RM/KSR-G 24/21/PLC	2979498	1
UMK-16 RELS/KSR-G24/21/PLC	2974901	1

Type	Order No.	Pcs./ Pkt.
UMK-16 RM/KSR-G 24/21/E/PLC	2979508	1
UMK-16 RELS/KSR-G24/21/E/PLC	2974891	1

**Accessories**

**Accessories**

REL-MR- 24DC/21HC	2961312	10
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REL-MR- 24DC/21HC	2961312	10
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## Controller-specific system cabling

### Output module for relays

#### - 2 PDTs

#### - 1 PDT with disconnect terminal blocks

These VARIOFACE output modules are used in combination with the respective front adapters.

8 channels are controlled via 14-pos. cables. All modules feature the following:

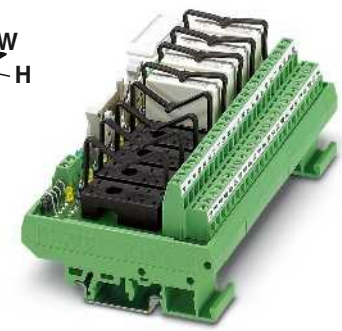
- Plug-in miniature relays
- LED status indicator and freewheeling diode per signal path
- Supply voltage indicator (LED)
- Polarity protection diode

With the 32-channel version (1 PDT with knife disconnect terminal blocks), the 50-pos. system cable is connected to the base module with 16 channels.

The output extension module with a further 16 channels is coupled to the base module via a 20-pos. flat-ribbon cable (length: 10 cm).

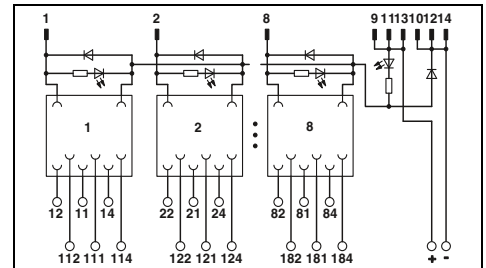
#### Notes:

The connection cable between the base and the extension modules is delivered with the extension unit.



Output module for 8 miniature relays, 2 PDTs

ERC



#### Technical data

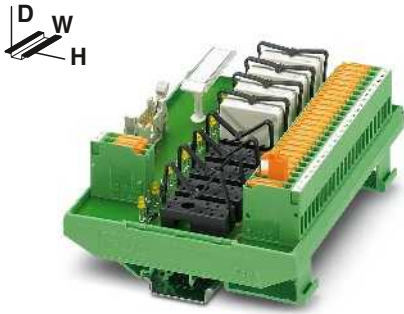
Coil side	
Operating voltage $U_N$	24 V DC
Input circuit	Freewheeling diode
Operating voltage display	Green LED
Status indicator per channel	Yellow LED
Connection method	IDC/FLK pin strip
No. of pos.	14
Contact side	
Contact type	2 PDT
Max. switching voltage	250 V AC/DC
Limiting continuous current	3 A
Connection method	Screw connection
Connection data solid/stranded/AWG	0.14 ... 1.5 mm <sup>2</sup> / 0.14 ... 1.5 mm <sup>2</sup> / 26 - 14
General data	
Rated insulation voltage	260 V AC
Rated surge voltage	4 kV (Basic insulation between output contact current paths) 6 kV (Safe isolation and reinforced insulation between input circuit and output contact paths)
Degree of pollution / Overvoltage category	2 / III
Ambient temperature (operation)	-20 °C ... 50 °C
Standards/regulations	DIN EN 50178 , IEC 60664
Mounting position	any
Mounting	In rows with zero spacing
Dimensions	77 mm / 59 mm
EMC note	Class A product, see page 605

#### Ordering data

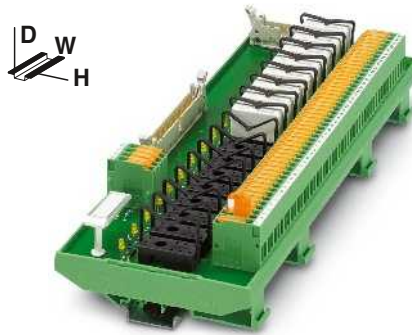
Description	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE output module</b> , for 24 V DC (2 PDTs)				
- with 8 plug-in bases without relay	135			
<b>VARIOFACE output module with knife disconnect terminal blocks</b> , for 24 V DC (1 PDT)				
- with 8 plug-in bases without relay	145	<b>UMK- 8 RELS/KSR-G24/21-21/PLC</b>	<b>2976187</b>	1
<b>VARIOFACE output module with knife disconnect terminal blocks</b> , for 24 V DC (1 PDT)				
- basic module with 16 plug-in bases without relay	285			
- extension module with 16 plug-in bases without relay	285			

#### Accessories

<b>Plug-in miniature power relays, with power contacts</b>	<b>REL-MR- 24DC/21-21</b>	<b>2961192</b>	10
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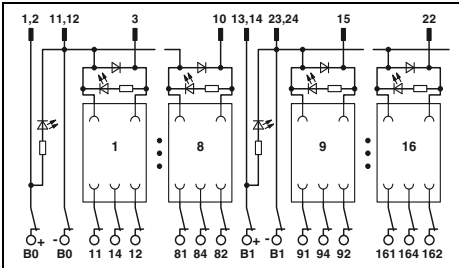
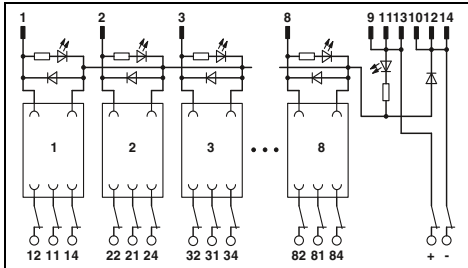
Output module for 8 miniature relays with knife disconnect terminal blocks, 1 PDT



Output module for 16 miniature relays with knife disconnect terminal blocks, 1 PDT

ERC

ERC



Technical data

Technical data

24 V DC  
 Freewheeling diode , Reverse polarity protection  
 Green LED  
 Yellow LED  
 IDC/FLK pin strip  
 14

24 V DC  
 Freewheeling diode  
 Green LED  
 Yellow LED  
 IDC/FLK pin strip  
 50

1 PDT  
 250 V AC/DC  
 5 A  
 Screw connection with disconnect knife  
 0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12

1 PDT  
 250 V AC/DC  
 5 A  
 Screw connection with disconnect knife  
 0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12

260 V AC  
 4 kV (Basic insulation between output contact current paths)  
 6 kV (Safe isolation and reinforced insulation between input circuit and output contact paths)

260 V AC  
 4 kV (Basic insulation between output contact current paths)  
 6 kV (Safe isolation and reinforced insulation between input circuit and output contact paths)

2 / III  
 -20 °C ... 50 °C  
 DIN EN 50178 , IEC 60664  
 any  
 In rows with zero spacing  
 111.5 mm / 59 mm  
 Class A product, see page 605

2 / III  
 -20 °C ... 50 °C  
 DIN EN 50178 , IEC 60664  
 any  
 In rows with zero spacing  
 111.5 mm / 59 mm  
 Class A product, see page 605

Ordering data

Ordering data

Type	Order No.	Pcs./ Pkt.
UM- 8 RELS/KSR-G24/21/MT/PLC	2962463	1

Type	Order No.	Pcs./ Pkt.
UM-16 RELS/KSR-G24/21/MT/PLC	2962382	1
UM-16 RELS/KSR-G24/21/E/MT/PLC	2962379	1

Accessories

Accessories

REL-MR- 24DC/21HC	2961312	10
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REL-MR- 24DC/21HC	2961312	10
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### VIP output module

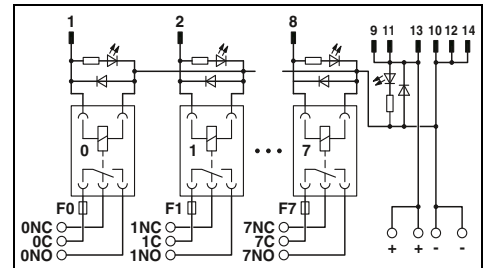
These VIP – VARIOFACE Professional output modules are used in combination with the respective front adapters. Like the front adapters, the modules are connected via 14-pos. system cables.

Features:

- Plug-in miniature relays, each with a PDT contact
- LED status display for each signal path and supply voltage
- Freewheeling diode for each signal path
- Push-in connection



Output module with 8 miniature relays, 1 PDT and fuse per output circuit



#### Technical data

<b>Coil side</b>		
Operating voltage $U_N$		24 V DC
Typical input current at $U_N$		9 mA
Typical response time at $U_N$		5 ms
Typical release time at $U_N$		8 ms
Input circuit		Freewheeling diode
Status indicator per channel		Yellow LED
Connection method		IDC/FLK pin strip
No. of pos.		14
<b>Contact side</b>		
Contact type		Single contact, 1-PDT
Contact material		AgSnO
Max. switching voltage		250 V AC/DC
Minimum switching voltage		12 V AC/DC
Limiting continuous current		5 A (observe derating)
Minimum switching current		10 mA
Maximum interrupting rating:		24 V DC 120 W
		48 V DC 20 W
		60 V DC 18 W
		110 V DC 23 W
		220 V DC 40 W
		250 V AC 1250 VA
Connection method		Push-in connection
Connection data solid/stranded/AWG		0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
<b>General data</b>		
Ambient temperature (operation)		-20 °C ... 60 °C
Nominal operating mode		100% operating factor
Mechanical service life		2 x 10 <sup>7</sup> cycles
Standards/regulations		DIN EN 50178
Mounting position		any
Mounting		In rows with zero spacing
Dimensions	H / D	109.8 mm / 63 mm
EMC note		Class A product, see page 605

#### Ordering data

Description	Module width W	Type	Order No.	Pcs./ Pkt.
VARIOFACE output module, with eight miniature relays, plugged in, for 24 V DC (incl. relays)	87.6	VIP-8RPT-24DC/21/DO/FU/PLC	2903601	1

### VIP input module

These VIP – VARIOFACE Professional input modules are used in combination with the respective front adapters. Like the front adapters, the modules are connected via 14-pos. system cables.

Features:

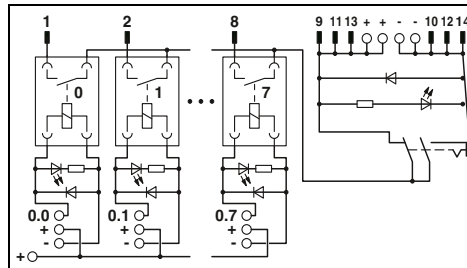
- Plug-in miniature relays, each with an N/O contact
- LED status display for each signal path and supply voltage
- Freewheeling diode for each signal path
- Push-in connection



Digital input module with 8 channels for 24 V DC

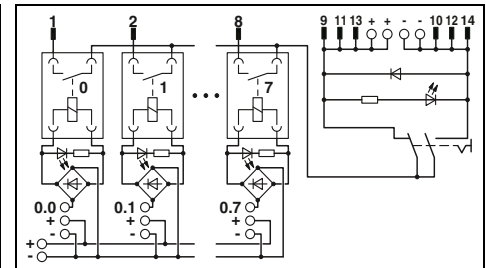


Digital input module with 8 channels for 120 V AC



#### Technical data

Coil side	
Operating voltage $U_N$	24 V DC $\pm 10\%$ (Supply, 2 A)
Typical input current at $U_N$	9 mA (per channel)
Typical response time at $U_N$	5 ms
Typical release time at $U_N$	8 ms
Input circuit	Freewheeling diode
Status indicator per channel	Yellow LED
Connection method	Push-in connection
Connection data solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Contact side	
Contact type	1 N/O contact
Contact material	AgSnO, hard gold-plated
Limiting continuous current	50 mA
Connection method	IDC/FLK pin strip
No. of pos.	14
General data	
Ambient temperature (operation)	-20 °C ... 60 °C
Nominal operating mode	100% operating factor
Mechanical service life	2 x 10 <sup>7</sup> cycles
Standards/regulations	DIN EN 50178
Mounting position	any
Mounting	In rows with zero spacing
Dimensions	109.8 mm / 63 mm
EMC note	Class A product, see page 605



#### Technical data

Coil side	
Operating voltage $U_N$	120 V AC $\pm 10\%$ (Supply, 2 A)
Typical input current at $U_N$	3.5 mA (per channel)
Typical response time at $U_N$	6 ms
Typical release time at $U_N$	15 ms
Input circuit	Freewheeling diode
Status indicator per channel	Yellow LED
Connection method	Push-in connection
Connection data solid/stranded/AWG	0.14 ... 2.5 mm <sup>2</sup> / 0.14 ... 2.5 mm <sup>2</sup> / 26 - 14
Contact side	
Contact type	1 N/O contact
Contact material	AgSnO, hard gold-plated
Limiting continuous current	50 mA
Connection method	IDC/FLK pin strip
No. of pos.	14
General data	
Ambient temperature (operation)	-20 °C ... 60 °C
Nominal operating mode	100% operating factor
Mechanical service life	2 x 10 <sup>7</sup> cycles
Standards/regulations	DIN EN 50178
Mounting position	any
Mounting	In rows with zero spacing
Dimensions	109.8 mm / 63 mm
EMC note	Class A product, see page 605

#### Ordering data

Description	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE termination board</b> , for eight channels,				
24 V DC (incl. relays)	92.7	VIP-8RPT-24DC/1AU/DI/PLC	2903600	1
120 V AC (incl. relays)	92.7			

#### Ordering data

Description	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE termination board</b> , for eight channels,				
120 V AC (incl. relays)	92.7	VIP-8RPT-120AC/1AU/DI/PLC	2904576	1

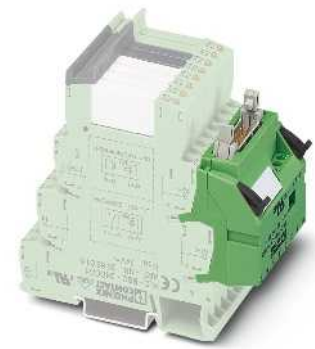
## Controller-specific system cabling

### Adapter for PLC-INTERFACE (6.2 mm)

**PLC-V8/...** are the VARIOFACE adapters connecting the eight slim 6.2 mm PLC-INTERFACE modules to the VARIOFACE system cabling:

- Can be plugged into the bridge shafts of eight aligned PLC-INTERFACE modules
- Freely definable configuration with relays, optocouplers, and passive feed-through terminal blocks
- With D-SUB connection as an option for universal connections

**Notes:**  
Cross-ref. list for matching PLC-INTERFACE modules: page 548



**VARIOFACE adapter for 6.2 mm PLC-INTERFACE**

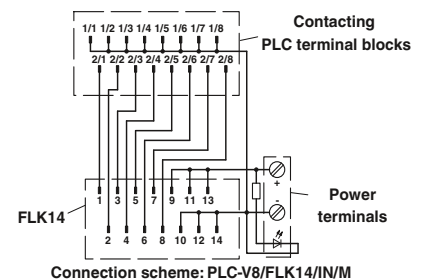
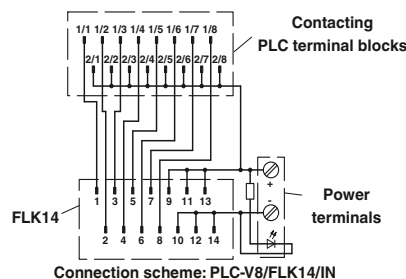
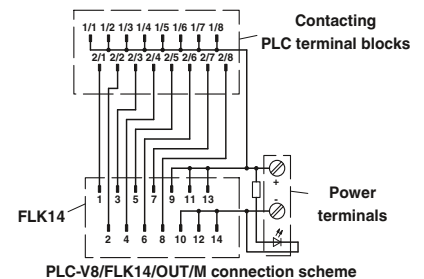
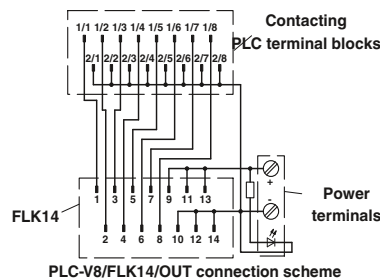


#### Technical data

Maximum permissible operating voltage	30 V DC
Maximum permissible operating voltage UL / CSA	24 V / -
Maximum permissible current (per branch)	1 A (per signal path)
Maximum total current (voltage supply)	3 A
Ambient temperature (operation)	-40 °C ... 70 °C
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Controller level Supply
Connection data solid/stranded/AWG	IDC/FLK pin strip Screw connection
Dimensions	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12 100 mm / 94 mm

#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>V8 adapter, for 8 PLC-INTERFACE devices (6.2 mm), with IDC/FLK pin strip, for PLC system cabling, positive switching</b>					
Output	14	49.6 mm	PLC-V8/FLK14/OUT	2295554	1
Input	14	49.6 mm	PLC-V8/FLK14/IN	2296553	1
<b>V8 adapter, for 8 PLC-INTERFACE devices (6.2 mm), with IDC/FLK pin strip, for PLC system cabling, negative switching</b>					
Output	14	49.6 mm	PLC-V8/FLK14/OUT/M	2304102	1
Input	14	49.6 mm	PLC-V8/FLK14/IN/M	2304115	1
<b>V8 output adapter, for 8 PLC-INTERFACE devices (6.2 mm), with D-SUB connection</b>					
Pin strip	15	49.6 mm	PLC-V8/D15S/OUT	2296058	1
Socket strip	15	49.6 mm	PLC-V8/D15B/OUT	2296061	1
<b>V8 input adapter, for 8 PLC-INTERFACE devices (6.2 mm), with D-SUB connection</b>					
Pin strip	15	49.6 mm	PLC-V8/D15S/IN	2296074	1
Socket strip	15	49.6 mm	PLC-V8/D15B/IN	2296087	1





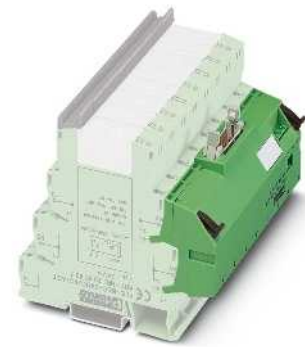
### Adapter for PLC-INTERFACE (14 mm)

PLC-V8L/... are the VARIOFACE adapters connecting the eight 14 mm PLC-INTERFACE modules (2 PDT, HC, and IC types) to the system cabling:

- Can be plugged into the bridge shafts of eight aligned PLC-INTERFACE modules
- Freely definable configuration with relays or optocouplers

**Notes:**

Cross-ref. list for matching PLC-INTERFACE modules: page 548



**VARIOFACE adapter for 14 mm PLC-INTERFACE**



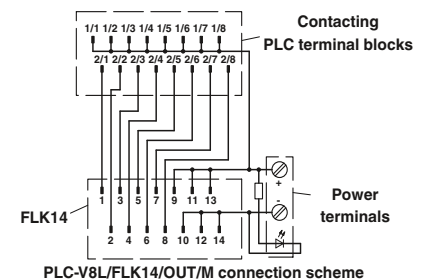
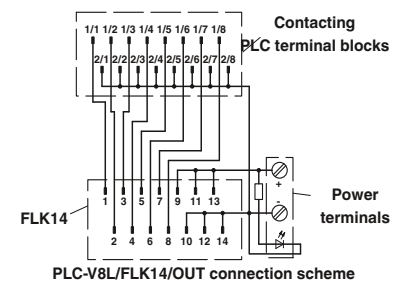
#### Technical data

Maximum permissible operating voltage	30 V DC
Maximum permissible operating voltage UL / CSA	24 V / -
Maximum permissible current (per branch)	1 A (per signal path)
Maximum total current (voltage supply)	3 A
Ambient temperature (operation)	-40 °C ... 70 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Controller level Supply
Connection data solid/stranded/AWG	IDC/FLK pin strip Screw connection
Dimensions	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12 100 mm / 94 mm

#### Ordering data

Description	No. of pos.	Module width W
<b>V8 adapter</b> , for 8 PLC-INTERFACE devices (14 mm), with IDC/FLK pin strip, for PLC system cabling, <b>positive switching</b>	14	112.3 mm
<b>V8 adapter</b> , for 8 PLC-INTERFACE devices (14 mm), with IDC/FLK pin strip, for PLC system cabling, <b>negative switching</b>	14	112.3 mm

Type	Order No.	Pcs./Pkt.
PLC-V8L/FLK14/OUT	2299660	1
PLC-V8L/FLK14/OUT/M	2304306	1



## Controller-specific system cabling

### Feed-through terminal blocks for PLC-INTERFACE

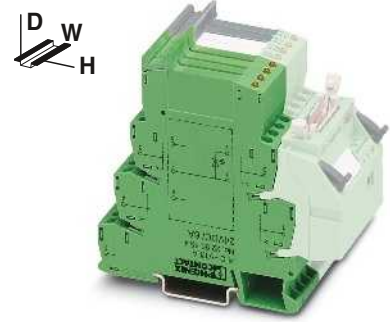
The VARIOFACE PLC-VT terminals are passive feed-through terminal blocks, with the same shape as the 6.2 mm slim relay and optocoupler interfaces of PLC-INTERFACE. It is thus possible to implement 8-channel interface modules for the system cabling, which can be adapted to a bit for the particular application. For individual requirements, the relay, optocoupler or the PLC-VT terminal blocks for passive signal transmission can be combined as needed.

### PLC-VT PLC-VT/LA

- Can be combined with PLC-INTERFACE universal series
- Signal path with additional potential level for free assignment (two-conductor connection)
- With LED as an option

### PLC-VT/ACT PLC-VT/ACT/LA

- Can be combined with PLC-INTERFACE actuator series
  - Signal path with two additional potential levels for free assignment (three-conductor connection)
  - With LED as an option
- The system connection is made via the PLC-V8 adapter.



**VARIOFACE feed-through terminal blocks for PLC-INTERFACE universal series**



#### Technical data

PLC-VT, PLC-VT/ACT	PLC-VT/LA, PLC-VT/ACT/LA
250 V AC/DC	30 V DC
220 V / -	20 V / -
6 A (per signal conductor)	6 A (per signal conductor)
-40 °C ... 70 °C	-40 °C ... 70 °C
any	any
DIN EN 50178 , IEC 60664	
0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12	
80 mm / 94 mm	

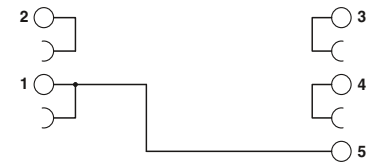
#### Ordering data

Description	No. of pos.	Module width W
<b>VARIOFACE feed-through terminal block</b> (two-conductor connection), for PLC-INTERFACE universal series		6.2 mm
<b>VARIOFACE feed-through terminal block</b> , as above, but with 24 V DC light indicator		6.2 mm
<b>VARIOFACE feed-through terminal block</b> (three-conductor connection), for PLC-INTERFACE actuator series		6.2 mm
<b>VARIOFACE feed-through terminal block</b> , as above, but with 24 V DC light indicator		6.2 mm

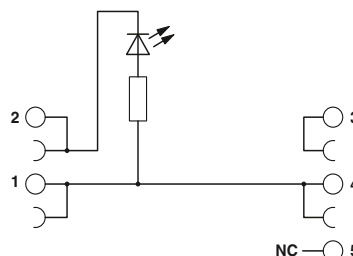
Type	Order No.	Pcs./ Pkt.
PLC-VT	<a href="#">2296870</a>	10
PLC-VT/LA	<a href="#">2296854</a>	10
PLC-VT/ACT	<a href="#">2295567</a>	10
PLC-VT/ACT/LA	<a href="#">2296867</a>	10



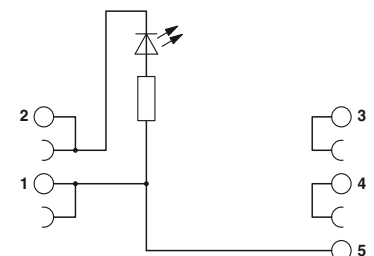
PLC-VT connection scheme



PLC-VT/ACT connection scheme



PLC-VT/LA connection scheme



PLC-VT/ACT/LA connection scheme

### Adapter for RIFLINE complete RF-1

RIF-1-V8/... VARIOFACE adapters connect the eight RIF-1 relay modules with the system cabling:

- Can be plugged into eight RIF-1 relay modules in series
- The adapter has one LED indicator and one freewheeling diode per relay

The following RIF-1 relay modules can be connected with the adapters:

#### With Push-in connection:

- RIF-1-RPT-LDP-24DC/1IC, Order No. **2909884\***
- RIF-1-BPT/2X21, Order No. **2900931**
- RIF-1-RPT-LDP-24DC/1X21, Order No. **2903342\***
- RIF-1-RPT-LDP-24DC/1X21 AU, Order No. **2903338\***
- RIF-1-RPT-LDP-24DC/2X21, Order No. **2903334\***
- RIF-1-RPT-LDP-24DC/2X21 AU, Order No. **2903330\***
- RIF-1-RPT-LDP-24DC/1X21MS, Order No. **2905289**
- RIF-1-RPT-LDP-24DC/2X21MS, Order No. **2905291**

#### With screw connection:

- RIF-1-RSC-LDP-24DC/1IC, Order No. **2909885\***
- RIF-1-BSC/2X21, Order No. **2900930**
- RIF-1-RSC-LDP-24DC/1X21, Order No. **2903358\***
- RIF-1-RSC-LDP-24DC/1X21 AU, Order No. AU **2903354\***
- RIF-1-RSC-LDP-24DC/2X21, Order No. **2903350\***
- RIF-1-RSC-LDP-24DC/2X21 AU, Order No. **2903346\***
- RIF-1-RSC-LDP-24DC/2X21 AU, Order No. **2903345\***
- RIF-1-RSC-LDP-24DC/2X21MS, Order No. **2905550**

\* If completely assembled RIF-1 relay modules are used, the indicator/interference suppression modules must be removed before installation.



**VARIOFACE adapter for RIFLINE complete RIF-1**

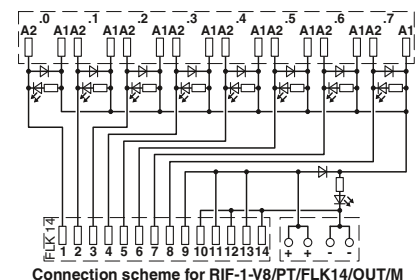
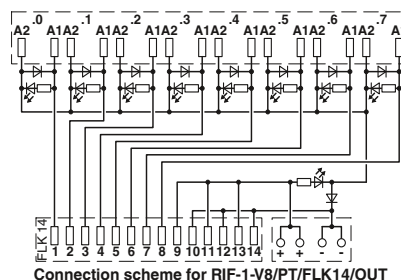


#### Technical data

Maximum permissible operating voltage	30 V DC
Maximum permissible operating voltage UL / CSA	24 V / -
Maximum permissible current (per branch)	1 A (per signal path)
Maximum total current (voltage supply)	3 A
Ambient temperature (operation)	-40 °C ... 60 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Controller level Supply IDC/FLK pin strip Push-in connection
Connection data solid/stranded/AWG	0.2 ... 1.5 mm <sup>2</sup> / 0.2 ... 1.5 mm <sup>2</sup> / 24 - 16
Dimensions	H / D 101 mm / 75 mm

#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
<b>V8 adapter</b> , for eight RIF-1 relay modules, with IDC/FLK pin strip for PLC system cabling, <b>positive switching</b>	14	128 mm	<b>RIF-1-V8/PT/FLK14/OUT</b>	<b>2905195</b>	1
<b>V8 adapter</b> , for eight RIF-1 relay modules, with IDC/FLK pin strip for PLC system cabling, <b>negative switching</b>	14	128 mm	<b>RIF-1-V8/PT/FLK14/OUT/M</b>	<b>2906992</b>	1



### Cross-reference list for PLC-V8 adapters with matching PLC-INTERFACE modules

Series	Function	Contact	Input	Output	Page
Universal	Relay	1 changeover contact	24 V DC	250 V AC/DC / 6 A	372
			24 V DC	250 V AC/DC / 10 A	387
			12 V DC	30 V AC/36 V DC / 50 mA	373
			24 V DC	30 V AC/36 V DC / 50 mA	373
			24 V AC/DC	30 V AC/36 V DC / 50 mA	373
			48 V DC	30 V AC/36 V DC / 50 mA	373
			60 V DC	30 V AC/36 V DC / 50 mA	373
			120 V AC/DC	30 V AC/36 V DC / 50 mA	373
			230 V AC/DC	30 V AC/36 V DC / 50 mA	373
			120 V AC	30 V AC/36 V DC / 50 mA <sup>1)</sup>	388
			230 V AC	30 V AC/36 V DC / 50 mA <sup>1)</sup>	388
			1 changeover contact with manual operation	24 V DC	250 V AC/DC / 6 A
	12 V DC	30 V AC/36 V DC / 50 mA		373	
	24 V DC	30 V AC/36 V DC / 50 mA		373	
	24 V AC/DC	30 V AC/36 V DC / 50 mA		373	
	120 V AC/DC	30 V AC/36 V DC / 50 mA		373	
	230 V AC/DC	30 V AC/36 V DC / 50 mA		373	
	2 changeover contacts	24 V DC	250 V AC/DC / 6 A	374	
		24 V DC	30 V AC/DC / 50 mA	375	
	Relay switch	1 N/O contact	24 V AC/DC	250 V AC/DC / 6 A	404
24 V AC/DC			250 V AC/DC / 6 A	404	
Optocoupler	1 N/O contact, electronic	24 V DC	24 V DC / 3 A	377	
		24 V DC	24 V DC / 10 A	407	
		24 V DC	250 V AC / 0.75 A	377	
		24 V DC	300 V DC / 1 A	406	
		24 V DC	48 V DC / 100 mA	376	
		48 V DC	48 V DC / 100 mA	376	
		60 V DC	48 V DC / 100 mA	376	
		120 V AC/DC	48 V DC / 100 mA	376	
		230 V AC/DC	48 V DC / 100 mA	376	
		NAMUR	24 V DC / 50 mA	420	
		120 V AC	48 V DC / 100 mA <sup>2)</sup>	388	
		230 V AC	48 V DC / 100 mA <sup>2)</sup>	388	
		1 changeover contact, electronic	24 V DC	48 V DC / 0.5 A	407
	Feed-through	-	250 V AC/DC	250 V AC/DC	546
24 V DC			24 V DC	546	
Actuator	Relay	1 N/O contact	24 V DC	250 V AC/DC / 6 A	378
			24 V DC	250 V AC/DC / 10 A (80 A, 20 ms)	386
		1 N/O contact with manual operation	24 V DC	250 V AC/DC / 6 A	379
			2 N/O contacts	24 V DC	250 V AC/DC / 6 A
	Optocoupler	1 N/O contact, electronic	24 V DC	24 V DC / 3 A	380
			24 V DC	24 V DC / 5 A	382
			24 V DC	250 V AC / 0.75 A	381
			24 V DC	250 V AC / 2 A	382
Feed-through	-	250 V AC/DC	250 V AC/DC	546	
		24 V DC	24 V DC	546	
Sensor <sup>4)</sup>	Relay	1 N/O contact	24 V DC	30 V AC/36 V DC / 50 mA	384
			120 V AC/DC	30 V AC/36 V DC / 50 mA	384
			230 V AC/DC	30 V AC/36 V DC / 50 mA	384
			120 V AC	30 V AC/36 V DC / 50 mA <sup>1)</sup>	389
			230 V AC	30 V AC/36 V DC / 50 mA <sup>1)</sup>	389
			24 V DC	30 V AC/36 V DC / 50 mA	385
	1 N/O contact with manual operation	120 V AC/DC	30 V AC/36 V DC / 50 mA	385	
		230 V AC/DC	30 V AC/36 V DC / 50 mA	385	
		24 V DC	48 V DC / 100 mA	385	
		120 V AC/DC	48 V DC / 100 mA	385	
Optocoupler	1 N/O contact, electronic	230 V AC/DC	48 V DC / 100 mA	385	
		120 V AC	48 V DC / 100 mA <sup>2)</sup>	389	
		230 V AC	48 V DC / 100 mA <sup>2)</sup>	389	
		24 V DC	48 V DC / 100 mA <sup>2)</sup>	389	

1) Plug-in miniature relay insert: REL-MR-60DC/21AU, [2961134](#)

2) Plug-in solid-state relay insert: OPT-60DC/48DC/100, [2966621](#)

3) PLC-...SO46 is supplied as a basic terminal block with filter, but without relay or solid-state relay.

4) Cannot be mixed with the universal series (within a byte)

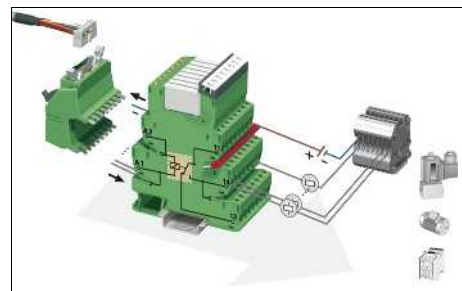


Push-in connection



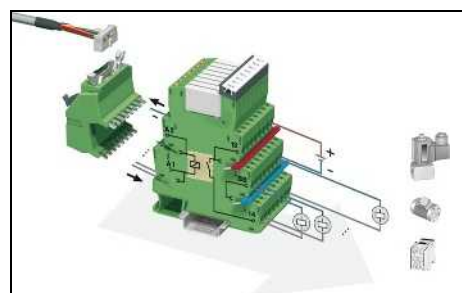
Screw connection

	Order No.		Order No.	PLC-V8...OUT(M)	PLC-V8...IN(M)	PLC-V8L...OUT
PLC-RPT-24DC/21	2900299	PLC-RSC-24DC/21	2966171	X		
PLC-RPT-24DC/21HC	2900291	PLC-RSC-24DC/21HC	2967620			X
PLC-RPT-12DC/21AU	2900317	PLC-RSC-12DC/21AU	2966919		X	
PLC-RPT-24DC/21AU	2900306	PLC-RSC-24DC/21AU	2966265	X	X	
PLC-RPT-24UC/21AU	2900307	PLC-RSC-24UC/21AU	2966278	X	X	
PLC-RPT-48DC/21AU	2900308	PLC-RSC-48DC/21AU	2966126		X	
PLC-RPT-60DC/21AU	2900309	PLC-RSC-60DC/21AU	2966142		X	
PLC-RPT-120UC/21AU	2900310	PLC-RSC-120UC/21AU	2966281		X	
PLC-RPT-230UC/21AU	2900311	PLC-RSC-230UC/21AU	2966294		X	
PLC-RPT-120UC/21/SO46	2900453 <sup>3)</sup>	PLC-BSC-120UC/21/SO46	2980319 <sup>3)</sup>		X	
PLC-RPT-230UC/21/SO46	2900455 <sup>3)</sup>	PLC-BSC-230UC/21/SO46	2980335 <sup>3)</sup>		X	
PLC-RPT-24DC/21/MS	2909667	PLC-RSC-24DC/21/MS	2909649	X		
PLC-RPT-12DC/21AU/MS	2909671	PLC-RSC-12DC/21AU/MS	2909654		X	
PLC-RPT-24DC/21AU/MS	2909672	PLC-RSC-24DC/21AU/MS	2909655	X	X	
PLC-RPT-24UC/21AU/MS	2909673	PLC-RSC-24UC/21AU/MS	2909656	X	X	
PLC-RPT-120UC/21AU/MS	2909674	PLC-RSC-120UC/21AU/MS	2909657		X	
PLC-RPT-230UC/21AU/MS	2909676	PLC-RSC-230UC/21AU/MS	2909660		X	
PLC-RPT-24DC/21-21	2900330	PLC-RSC-24DC/21-21	2967060			X
PLC-RPT-24DC/21-21AU	2900338	PLC-RSC-24DC/21-21AU	2967125			X
PLC-RPT-24UC/1/S/H	2900328	PLC-RSC-24UC/1/S/H	2982236	X		
PLC-RPT-24UC/1/S/L	2900327	PLC-RSC-24UC/1/S/L	2834876	X		
PLC-OPT-24DC/24DC/2	2900364	PLC-OSC-24DC/24DC/2	2966634	X		
PLC-OPT-24DC/24DC/10/R	2900398	PLC-OSC-24DC/24DC/10/R	2982702	X		
PLC-OPT-24DC/230AC/1	2900369	PLC-OSC-24DC/230AC/1	2967840	X		
PLC-OPT-24DC/300DC/1	2900383	PLC-OSC-24DC/300DC/1	2980678	X		
PLC-OPT-24DC/48DC/100	2900352	PLC-OSC-24DC/48DC/100	2966728	X	X	
PLC-OPT-48DC/48DC/100	2900353	PLC-OSC-48DC/48DC/100	2966993		X	
PLC-OPT-60DC/48DC/100	2900354	PLC-OSC-60DC/48DC/100	2967455		X	
PLC-OPT-120UC/48DC/100	2900355	PLC-OSC-120UC/48DC/100	2966744		X	
PLC-OPT-230UC/48DC/100	2900356	PLC-OSC-230UC/48DC/100	2966757		X	
PLC-PT-EIK 1-SVN 24P/P	2900397	PLC-SC-EIK 1-SVN 24P/P	2982663		X	
PLC-BPT-120UC/21/SO46	2900453 <sup>3)</sup>	PLC-BSC-120UC/21/SO46	2980319 <sup>3)</sup>		X	
PLC-BPT-230UC/21/SO46	2900455 <sup>3)</sup>	PLC-BSC-230UC/21/SO46	2980335 <sup>3)</sup>		X	
PLC-OPT-24DC/48DC/500/W	2900378	PLC-OSC-24DC/48DC/500/W	2980636	X		
-		PLC-VT	2296870	X	X	
-		PLC-VT/LA	2296854	X	X	
PLC-RPT-24DC/1/ACT	2900312	PLC-RSC-24DC/1/ACT	2966210	X		
PLC-RPT-24DC/11C/ACT	2900298	PLC-RSC-24DC/11C/ACT	2967604			X
PLC-RPT-24DC/1/MS/ACT	2909677	PLC-RSC-24DC/1/MS/ACT	2909661	X		
-		PLC-RSC-24DC/1-1/ACT	2967109			X
PLC-OPT-24DC/24DC/2/ACT	2900376	PLC-OSC-24DC/24DC/2/ACT	2966676	X		
-		PLC-OSC-24DC/24DC/5/ACT	2982786			X
-		PLC-OSC-24DC/230AC/1/ACT	2967947	X		
-		PLC-OSC-24DC/230AC/2/ACT	2982760			X
-		PLC-VT/AKT	2295567	X		
-		PLC-VT/AKT/LA	2296867	X		
PLC-RPT-24DC/1AU/SEN	2900313	PLC-RSC-24DC/1AU/SEN	2966317		X	
PLC-RPT-120UC/1AU/SEN	2900314	PLC-RSC-120UC/1AU/SEN	2966320		X	
PLC-RPT-230UC/1AU/SEN	2900315	PLC-RSC-230UC/1AU/SEN	2966333		X	
PLC-BPT-120UC/1/SEN/SO46	2900456 <sup>3)</sup>	PLC-BSC-120UC/1/SEN/SO46	2980322 <sup>3)</sup>		X	
PLC-BPT-230UC/1/SEN/SO46	2900457 <sup>3)</sup>	PLC-BSC-230UC/1/SEN/SO46	2980348 <sup>3)</sup>		X	
PLC-RPT-24DC/1AU/MS/SEN	2909678	PLC-RSC-24DC/1AU/MS/SEN	2909663			X
PLC-RPT-120UC/1AU/MS/SEN	2909679	PLC-RSC-120UC/1AU/MS/SEN	2909664			X
PLC-RPT-230UC/1AU/MS/SEN	2909680	PLC-RSC-230UC/1AU/MS/SEN	2909665			X
PLC-OPT-24DC/48DC/100/SEN	2900358	PLC-OSC-24DC/48DC/100/SEN	2966773		X	
PLC-OPT-120UC/48DC/100/SEN	2900359	PLC-OSC-120UC/48DC/100/SEN	2966799		X	
PLC-OPT-230UC/48DC/100/SEN	2900361	PLC-OSC-230UC/48DC/100/SEN	2966809		X	
PLC-BPT-120UC/1/SEN/SO46	2900456 <sup>3)</sup>	PLC-BSC-120UC/1/SEN/SO46	2980322 <sup>3)</sup>		X	
PLC-BPT-230UC/1/SEN/SO46	2900457 <sup>3)</sup>	PLC-BSC-230UC/1/SEN/SO46	2980348 <sup>3)</sup>		X	



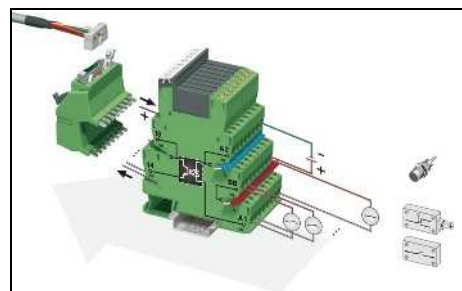
### PLC universal series

The universal series can be used as an input or output interface. Each product consists of a basic terminal block with a plug-in miniature relay (changeover contact) or a plug-in solid-state relay.



### PLC actuator series

When used as an interface between the PLC and actuators, such as motors, contactors or solenoid valves, only one N/O contact function is normally required. The PLC...ACT output interface is used here. All actuator connections, including the load return line, are connected directly. This eliminates the need for additional output terminal blocks.



### PLC sensor series

When used as an interface between the PLC and sensors, such as proximity switches, limit switches or auxiliary contacts, often only one N/O contact function is required. The PLC...SEN input interface is used here. All sensor connections, including the supply voltage for the sensors and switches, are connected directly. This eliminates the need for additional terminal blocks.

# System cabling for controllers

## Controller-specific system cabling

### System cable with IDC/FLK socket strips

- 1:1 connection
- 14 and 50-pos.
- Connectors as per IEC 60603-13
- Unshielded
- Shielded
- Halogen-free, see page 587
- Special lengths, see page 591



Unshielded



Shield connection at one end



Applied for: cUL / UL

#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Shield	-
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	14-pos. 6.4 mm 50-pos. 10.3 mm

#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Shield	Tinned copper-braided shield, approx. 85% covering
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	6.7 mm 11 mm

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Assembled round cable, with two 14-pos. IDC/FLK socket strips in fixed lengths for transfer of 8 channels</b>					
	14	0.3 m	FLK 14/EZ-DR/ 30/KONFEK	2295729	5
	14	0.5 m	FLK 14/EZ-DR/ 50/KONFEK	2288901	5
	14	1 m	FLK 14/EZ-DR/ 100/KONFEK	2288914	1
	14	1.5 m	FLK 14/EZ-DR/ 150/KONFEK	2288927	1
	14	2 m	FLK 14/EZ-DR/ 200/KONFEK	2288930	1
	14	2.5 m	FLK 14/EZ-DR/ 250/KONFEK	2288943	1
	14	3 m	FLK 14/EZ-DR/ 300/KONFEK	2288956	1
	14	3.5 m	FLK 14/EZ-DR/ 350/KONFEK	2288969	1
	14	4 m	FLK 14/EZ-DR/ 400/KONFEK	2288972	1
	14	4.5 m	FLK 14/EZ-DR/ 450/KONFEK	2290847	1
	14	5 m	FLK 14/EZ-DR/ 500/KONFEK	2290834	1
	14	5.5 m	FLK 14/EZ-DR/ 550/KONFEK	2290850	1
	14	6 m	FLK 14/EZ-DR/ 600/KONFEK	2290863	1
	14	8 m	FLK 14/EZ-DR/ 800/KONFEK	2299563	1
	14	10 m	FLK 14/EZ-DR/1000/KONFEK	2299576	1
<b>Assembled round cable, with two 50-pos. IDC/FLK socket strips in fixed lengths for transfer of 32 channels</b>					
	50	0.5 m	FLK 50/EZ-DR/ 50/KONFEK	2289065	5
	50	1 m	FLK 50/EZ-DR/ 100/KONFEK	2289078	1
	50	1.5 m	FLK 50/EZ-DR/ 150/KONFEK	2289081	1
	50	2 m	FLK 50/EZ-DR/ 200/KONFEK	2289094	1
	50	2.5 m	FLK 50/EZ-DR/ 250/KONFEK	2289104	1
	50	3 m	FLK 50/EZ-DR/ 300/KONFEK	2289117	1
	50	3.5 m	FLK 50/EZ-DR/ 350/KONFEK	2289120	1
	50	4 m	FLK 50/EZ-DR/ 400/KONFEK	2289133	1
	50	4.5 m	FLK 50/EZ-DR/ 450/KONFEK	2289573	1
	50	5 m	FLK 50/EZ-DR/ 500/KONFEK	2289586	1
	50	5.5 m	FLK 50/EZ-DR/ 550/KONFEK	2289599	1
	50	6 m	FLK 50/EZ-DR/ 600/KONFEK	2289609	1
	50	6.5 m	FLK 50/EZ-DR/ 650/KONFEK	2289612	1
	50	7 m	FLK 50/EZ-DR/ 700/KONFEK	2289625	1
	50	7.5 m	FLK 50/EZ-DR/ 750/KONFEK	2289638	1
	50	8 m	FLK 50/EZ-DR/ 800/KONFEK	2289641	1
	50	8.5 m	FLK 50/EZ-DR/ 850/KONFEK	2289654	1
	50	9 m	FLK 50/EZ-DR/ 900/KONFEK	2289667	1
	50	9.5 m	FLK 50/EZ-DR/ 950/KONFEK	2289670	1
	50	10 m	FLK 50/EZ-DR/1000/KONFEK	2289683	1

#### Ordering data

Type	Order No.	Pcs./ Pkt.
FLK 14/EZ-DR/ 50/KONFEK/S	2296977	1
FLK 14/EZ-DR/ 100/KONFEK/S	2296980	1
FLK 14/EZ-DR/ 150/KONFEK/S	2296993	1
FLK 14/EZ-DR/ 200/KONFEK/S	2297002	1
FLK 14/EZ-DR/ 300/KONFEK/S	2299013	1
FLK 14/EZ-DR/ 400/KONFEK/S	2299026	1
FLK 14/EZ-DR/ 600/KONFEK/S	2299039	1
FLK 14/EZ-DR/ 800/KONFEK/S	2299042	1
FLK 14/EZ-DR/1000/KONFEK/S	2299055	1
FLK 50/EZ-DR/ 50/KONFEK/S	2299097	1
FLK 50/EZ-DR/ 100/KONFEK/S	2299107	1
FLK 50/EZ-DR/ 150/KONFEK/S	2299110	1
FLK 50/EZ-DR/ 200/KONFEK/S	2299123	1
FLK 50/EZ-DR/ 300/KONFEK/S	2299136	1
FLK 50/EZ-DR/ 400/KONFEK/S	2299149	1
FLK 50/EZ-DR/ 600/KONFEK/S	2299152	1
FLK 50/EZ-DR/ 800/KONFEK/S	2299165	1
FLK 50/EZ-DR/1000/KONFEK/S	2299178	1

### Splitting cable with IDC/FLK socket strips

- Splitting 32 channels into 4 x 8 channels
- 50-pos. connector at one end
- 4 x 14-pos. connector at one end
- Connectors as per IEC 60603-13
- Unshielded
- Shielded
- Special lengths



**Splitting cable unshielded**  
50 positions to 4 x 14



**Splitting cable shielded**  
50 positions to 4 x 14



#### Technical data

Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA  
Maximum permissible current carrying capacity per path

< 50 V AC / 60 V DC  
125 V / -  
1 A

Maximum conductor resistance  
Ambient temperature (operation)  
Shield

0.16 Ω/m  
-20 °C ... 50 °C  
-

Assembly

Insulation displacement, IEC 60352-4/DIN EN 60352-4

Conductor cross section  
Conductor structure: stranded wires / material  
Number of plugs on the module side  
Outside diameter

AWG 26 / 0.14 mm<sup>2</sup>  
7 / Cu tin-plated  
4

50-pos. 6.3 mm

#### Ordering data

Description	No. of pos.	Cable length
<b>Assembled round cable</b> , with a 50-pos. IDC/FLK socket strip and four 14-pos. IDC/FLK socket strips, for splitting 32 channels into 4 x 8 channels.		
	50	0.5 m
	50	1 m
	50	1.5 m
	50	2 m
	50	2.5 m
	50	3 m
	50	4 m
	50	6 m
	50	8 m
	50	10 m
<b>Assembled round cable</b> , as above, but in variable lengths		
	50	
<b>Assembled round cable</b> , as above, but shielded and in variable lengths		
	50	

Type	Order No.	Pcs./ Pkt.
FLK 50/4X14/EZ-DR/ 50/KONFEK	2296689	1
FLK 50/4X14/EZ-DR/ 100/KONFEK	2296692	1
FLK 50/4X14/EZ-DR/ 150/KONFEK	2296702	1
FLK 50/4X14/EZ-DR/ 200/KONFEK	2296715	1
FLK 50/4X14/EZ-DR/ 250/KONFEK	2305402	1
FLK 50/4X14/EZ-DR/ 300/KONFEK	2296728	1
FLK 50/4X14/EZ-DR/ 400/KONFEK	2296731	1
FLK 50/4X14/EZ-DR/ 600/KONFEK	2296744	1
FLK 50/4X14/EZ-DR/ 800/KONFEK	2296757	1
FLK 50/4X14/EZ-DR/1000/KONFEK	2296773	1
FLK 50-4X14-EZ-DR ...	2302405	1



#### Technical data

< 50 V AC / 60 V DC  
125 V / -  
1 A

0.16 Ω/m  
-20 °C ... 50 °C  
Tinned copper-braided shield, approx. 85% covering

Insulation displacement, IEC 60352-4/DIN EN 60352-4

AWG 26 / 0.14 mm<sup>2</sup>  
7 / Cu tin-plated  
4

6.3 mm

#### Ordering data

Type	Order No.	Pcs./ Pkt.
FLK 50-4X14-EZ-DR-S ...	2302447	1

### Ordering example for system cable:

- Unshielded splitting cable 12.75 m long

Quantity	Order No.	Length [m] <sup>1)</sup>
1	2302405	12.75

<sup>1)</sup> min. 0.30 m

- Shielded splitting cable 11.00 m long

Quantity	Order No.	Length [m] <sup>1)</sup>
1	2302447	11.00

<sup>1)</sup> min. 0.30 m

# System cabling for controllers

## VIP I/O-Marshalling universal platform

### VIP I/O-Marshalling base, D-SUB

VIP base element for use with IOA... plugs.

- Up to 8 channels per base
- D-SUB 25 connection to controller
- 4 connections per channel
- Multiple shield options



new



8-channel base with screw connection

#### Technical data

Maximum permissible operating voltage	125 V
Maximum permissible current (per branch)	3 A (field signal)
Maximum total current (voltage supply)	15 A (per module)
Ambient temperature (operation)	-40 °C ... 70 °C
Mounting position	As desired on 35 mm DIN rail in acc. with EN 60715
Standards/regulations	IEC 60664 , DIN EN 50178
Connection method	Field level Screw connection Controller level D-SUB pin strip
Connection data solid/stranded/AWG	0.2 ... 4 mm <sup>2</sup> / 0.2 ... 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	H / D 102.7 mm / 72.2 mm

#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>Base element with D-SUB 25</b>					
- Marked 1 to 8	8	118.1 mm	VIP/S/D25M/BASE 1-8/L/C/EX	2906595	1



### VIP I/O-Marshalling base, removable plugs

- VIP base element for use with IOA... plugs.
- Up to 8 channels per base
- Base elements already marked for channels 1 to 32
- 4 connections per channel
- Multiple shield options
- Color-coded COMBICON connection to controller



8-channel base with screw connection

new



8-channel base with screw connection

new

Ex:

#### Technical data

Maximum permissible operating voltage  
Maximum permissible current (per branch)  
Maximum total current (voltage supply)

125 V  
3 A (field signal)  
15 A (per module)

Ambient temperature (operation)  
Mounting position

-40 °C ... 75 °C  
As desired on 35 mm DIN rail in acc. with EN 60715

Standards/regulations  
Connection method

Field level  
Controller level

IEC 60664 , DIN EN 50178  
Screw connection  
Plug-in screw connection  
0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
102.7 mm / 72.2 mm

Connection data solid/stranded/AWG  
Dimensions

H / D

#### Technical data

125 V  
3 A (field signal)  
15 A (per module)

-40 °C ... 75 °C  
As desired on 35 mm DIN rail in acc. with EN 60715

IEC 60664 , DIN EN 50178  
Screw connection  
Plug-in screw connection  
0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
102.7 mm / 72.2 mm

#### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP/S/MC/BASE 1-8/L/EX	2906596	1
VIP/S/MC/BASE 9-16/L/EX	2906630	1
VIP/S/MC/BASE 17-24/L/EX	2907024	1
VIP/S/MC/BASE 25-32/L/EX	2907025	1

#### Ordering data

Type	Order No.	Pcs./ Pkt.
VIP/S/MC/BASE 1-8/L/C/EX	2907186	1
VIP/S/MC/BASE 9-16/L/C/EX	2907187	1
VIP/S/MC/BASE 17-24/L/C/EX	2907209	1
VIP/S/MC/BASE 25-32/L/C/EX	2907210	1

#### Accessories

VIP/S/BASE 3L DIVIDER	2907715	1
VIP/U/RAIL 3L DIVIDER	2908555	1

#### Accessories

VIP/S/BASE 3L DIVIDER	2907715	1
VIP/U/RAIL 3L DIVIDER	2908555	1

Description	No. of pos.	Module width W
<b>Base element with MCC</b>		
- Marked 1 to 8	8	118.1 mm
- Marked 9 to 16	8	118.1 mm
- Marked 17 to 24	8	118.1 mm
- Marked 25 to 32	8	118.1 mm
<b>Base element with MCC, conformally coated</b>		
- Marked 1 to 8	8	118.1 mm
- Marked 9 to 16	8	118.1 mm
- Marked 17 to 24	8	118.1 mm
- Marked 25 to 32	8	118.1 mm

<b>Partition plate</b>		
- Base mount		
- Rail mount		

### Input/output accessory, feed-through

IOA plug for VIP base element

- Feed-through plug for single channel
- Two-stage plug release

new



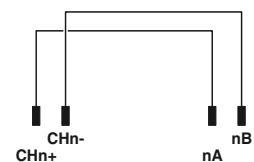
**Feed-through plug**

#### Technical data

Maximum permissible operating voltage	24 V DC
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-40 °C ... 75 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Dimensions	H / D 64.2 mm / 72.9 mm

#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>Feed-through plug</b>	1	10,3 mm	<b>IOA FEED-THRU/EX</b>	<b>2906598</b>	1



**Input/output accessory,  
analog and digital**

- IOA plug for VIP base element
- Analog and digital input/output plugs for single channel
- 500 mA fuse with blown fuse indication
- Disconnect with test points
- Two-stage plug release



new

Analog protection plug with fuse



new

Digital protection plug with fuse

**Technical data**

Maximum permissible operating voltage  
Maximum permissible current (per branch)  
Ambient temperature (operation)  
Mounting position  
Standards/regulations  
Dimensions

24 V DC  
500 mA (fuse limited)  
-40 °C ... 75 °C  
any  
IEC 60664 , DIN EN 50178  
64.2 mm / 72.9 mm

**Ordering data**

Description	No. of pos.	Module width W
<b>Analog protection plug</b> - 500 mA fuse	1	10.3 mm
<b>Digital protection plug</b> - 1 A fuse	1	10.3 mm

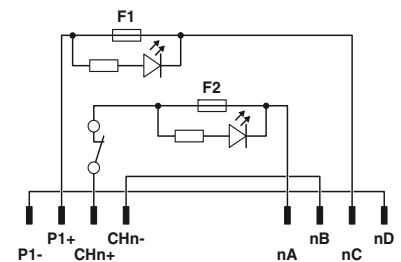
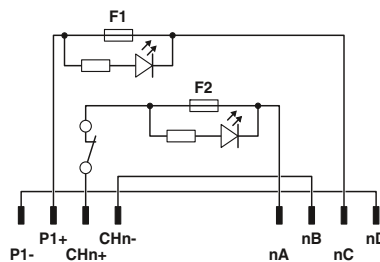
Type	Order No.	Pcs./ Pkt.
<b>IOA AI/AO/BFI/DS/0.5A/EX</b>	<b>2906599</b>	1

**Technical data**

24 V DC  
1 A (fuse limited)  
-40 °C ... 75 °C  
any  
IEC 60664 , DIN EN 50178  
64.2 mm / 72.9 mm

**Ordering data**

Type	Order No.	Pcs./ Pkt.
<b>IOA DI/DO/BFI/DS/1.0A/EX</b>	<b>2906600</b>	1



### Input/output accessory, relay

- IOA plug for VIP base element
- Relay input and output plugs for single channel
- Fused with blown fuse indication
- Selectable N/O and N/C output contacts
- Two-stage plug release



new

Relay input plug



new

Relay output plug

Input data	
Permissible range (with reference to $U_N$ )	0.9 - 1.1
Typical input current at $U_N$ [mA]	7
Typical response time at $U_N$ [ms]	5
Typical release time at $U_N$ [ms]	8
Input protection:	Yellow LED, polarity protection diode, damping diode
Output data	
Contact type	1 N/O contact
Contact material	AgSnO, hard gold-plated
Max. switching voltage	24 V DC
Minimum switching voltage	100 mV (at 10 mA)
Limiting continuous current	50 mA
Minimum switching current	1 mA (at 24 V)
General data	
Ambient temperature (operation)	-40 °C ... 70 °C
Nominal operating mode	100% operating factor
Mechanical service life	2 x 10 <sup>7</sup> cycles
Standards/regulations	IEC 60664 , DIN EN 50178
Dimensions	10.3 mm / 64.2 mm / 72.9 mm

Technical data		
	①	②
Permissible range (with reference to $U_N$ )	0.9 - 1.1	0.9 - 1.1
Typical input current at $U_N$ [mA]	7	3
Typical response time at $U_N$ [ms]	5	3
Typical release time at $U_N$ [ms]	8	4
Input protection:	Yellow LED, polarity protection diode, damping diode	
Contact type	1 N/O contact	1 N/O contact
Contact material	AgSnO, hard gold-plated	AgSnO, hard gold-plated
Max. switching voltage	24 V DC	36 V DC
Minimum switching voltage	100 mV (at 10 mA)	-
Limiting continuous current	50 mA	50 mA
Minimum switching current	1 mA (at 24 V)	1 mA (at 24 V)
Ambient temperature (operation)	-40 °C ... 70 °C	
Nominal operating mode	100% operating factor	
Mechanical service life	2 x 10 <sup>7</sup> cycles	
Standards/regulations	IEC 60664 , DIN EN 50178	
Dimensions	10.3 mm / 64.2 mm / 72.9 mm	

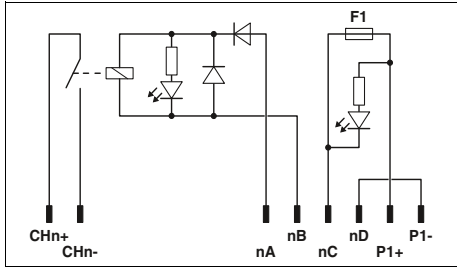
Technical data		
	①	②
Permissible range (with reference to $U_N$ )	0.9 - 1.1	0.9 - 1.1
Typical input current at $U_N$ [mA]	13.5	13.5
Typical response time at $U_N$ [ms]	5	5
Typical release time at $U_N$ [ms]	8	8
Input protection:	Yellow LED, polarity protection diode, damping diode	
Contact type	1 PDT	1 PDT
Contact material	AgSnO	AgSnO
Max. switching voltage	36 V DC	120 V AC / 125 V DC
Minimum switching voltage	5 V (at 100 mA)	-
Limiting continuous current	3 A (fuse limited)	3 A (fuse limited)
Minimum switching current	10 mA (at 12 V)	10 mA (at 12 V)
Ambient temperature (operation)	-40 °C ... 70 °C	
Nominal operating mode	100% operating factor	
Mechanical service life	2 x 10 <sup>7</sup> cycles	
Standards/regulations	IEC 60664 , DIN EN 50178	
Dimensions	10.3 mm / 64.2 mm / 72.9 mm	

Description	Input voltage $U_N$
<b>Digital relay input plug</b>	① 24 V DC
	② 120 V AC/DC
<b>Digital relay output plug</b>	① 24 V DC
	② 24 V DC

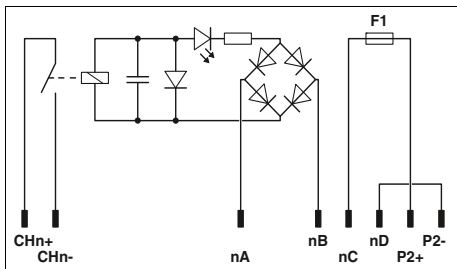
Ordering data		
Type	Order No.	Pcs./ Pkt.
IOA REL 24V DI/BFI/1.0A/EX	2910155	10
IOA REL 120V DI/1.0A/EX	2910157	10

Ordering data		
Type	Order No.	Pcs./ Pkt.
IOA REL 24V DO/BFI/3.0A/EX	2910153	10
IOA REL 120V DO/BFI/3.0A/EX	2910154	10

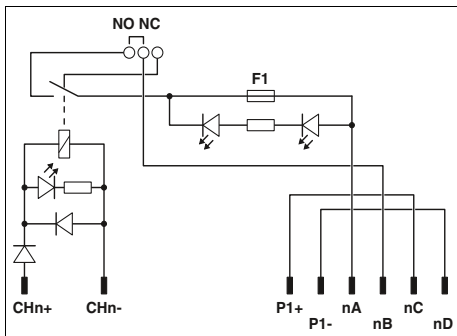
IOA REL 24V DI/BFI/1.0A/EX connection scheme



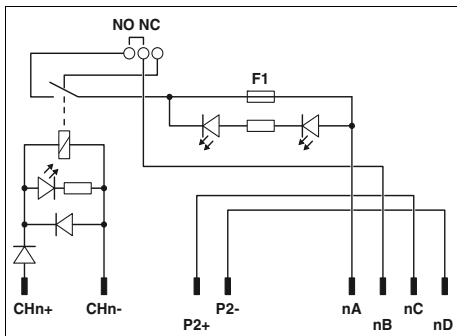
IOA REL 120V DI/1.0A/EX connection scheme



IOA REL 24V DO/BFI/3.0A/EX connection scheme



IOA REL 120V DO/BFI/3.0A/EX connection scheme





### Intermediate adapter for SIMATIC® S5 to SIMATIC® S7-400

The S5 connector is plugged directly into the I/O card using the intermediate adapter. A new S7-400 is installed in place of the S5. The existing field wiring is retained.



### Conversion adapter from SIMATIC® S5 to SIMATIC® S7-300

Using the adapters, the signals of the S5 front adapter are converted to a 50-pos. strip. The signals are routed to the S7-300 I/O module via a system cable and front adapter.



### Startup adapter for test purposes

The universal startup adapters extend all signals of the existing S5 wiring. The open cable end can be connected to different controllers such as S7-400 or S7-300.

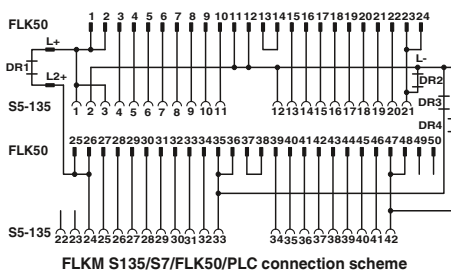
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**Siemens SIMATIC® S7-300 adapter for conversion from S5-135/155 to S7-300**

S5-S7 adapters connect the S5-135 front adapters wired with individual wires to the I/O modules of the S7.

With the aid of the FLKM S135/S7/FLK50 converter module, the signals of the S5-135 front adapter can be converted to a 50-pos. strip. A FLK 50/EZ-DR/.../KONFEK 50-pos. system cable and a front adapter for S7-300 (FLKM 50-PA-S300) connect the signals to the I/O module.



Maximum permissible operating voltage  
 Maximum permissible current  
 Ambient temperature (operation)  
 Ambient temperature (storage/transport)  
 Mounting position  
 Standards/regulations

60 V DC  
 1 A (per path)  
 -20 °C ... 50 °C  
 -20 °C ... 70 °C  
 any  
 IEC 60664 / DIN EN 50178

**Notes:**  
 Due to the geometry, it is not possible to couple any molded FLK connectors (e.g., VIP-PA...S7).

Description
<b>Digital IN or OUT 24 V DC from S5-135 to S7-300</b>
<b>IN</b> 6ES5 420-4UA14 to 6ES7 321-1BL00-0AA0 6ES5 430-4UA14 to 6ES7 321-1BL00-0AA0
<b>OUT</b> 6ES5 441-4UA14 to 6ES7 322-1BL00-0AA0 6ES5 451-4UA14 to 6ES7 322-1BL00-0AA0

**Converter for SIMATIC® S5-135 to 50-pos. FLK strip**

**Technical data**

60 V DC  
 1 A (per path)  
 -20 °C ... 50 °C  
 -20 °C ... 70 °C  
 any  
 IEC 60664 / DIN EN 50178

**Ordering data**

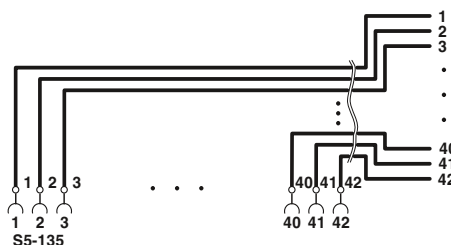
Type	Order No.	Pcs./Pkt.
FLKM S135/S7/FLK50/PLC	2314736	1



**Startup adapter for extending the existing S5-135/155 field wiring**

All signals of the existing S5-135 wiring 3 or 5 are extended with the help of the universal startup adapters. The open cable end can be connected to various controllers such as S7-400 or S7-300. Thus, the existing field wiring of S5-135 can communicate with the new controller for test purposes. Since the new control unit is temporarily arranged before the control cabinet, the original status of the system can be restored if required.

The S5-135 is replaced once the system operates without errors with the new controller.



Maximum permissible operating voltage  
 Maximum permissible current  
 Ambient temperature (operation)  
 Ambient temperature (storage/transport)  
 Mounting position  
 Standards/regulations

250 V AC/DC  
 6 A (per path)  
 -20 °C ... 50 °C  
 -20 °C ... 80 °C  
 any  
 IEC 60664 / DIN EN 50178

Description
<b>Connection of all S5-135 connections (1 to 42) at the open cable end</b>
<b>Connection of all S5-135 connections (1 to 42) without cable</b>

**Technical data**

250 V AC/DC  
 6 A (per path)  
 -20 °C ... 50 °C  
 -20 °C ... 80 °C  
 any  
 IEC 60664 / DIN EN 50178

**Ordering data**

Type	Order No.	Pcs./Pkt.
FLKM S135/42X0,75/3,0M/OE	2315007	1
FLKM S135/42X0,75/5,0M/OE	2318017	1
FLKM S135/42XMKDSN	2901603	1



**Startup adapter for S5-135/155 field wiring**

### Siemens SIMATIC® S7-400 adapter for conversion from S5-135/155 to S7-400

The FLKM S135/... adapters directly connect an S5 connector wired with single wires to the S7-400 basic card.

The S5 connector is plugged directly into an S7-400 I/O card with the aid of the FLKM S135/... intermediate adapter.

A new S7-400 is installed in place of the S5. The existing field wiring is retained.

#### Note:

The LEDs of the S7-400 module are hidden.



Adapter for digital input modules

		Technical data		
		...SO120, ...S400, ...SO122	...SO121	
Maximum permissible operating voltage		60 V DC	60 V DC	
Maximum permissible current		4 A (per path) 4 A (per connection, supply via separate power supply)	2 A (per path) 2 A (during supply via separate power supply)	
Ambient temperature (operation)		-20 °C ... 50 °C	-20 °C ... 50 °C	
Connection method	Field level	SIEMENS S5-135 U pin strip	SIEMENS S5-135 U pin strip	
Standards/regulations		IEC 60664 / DIN EN 50178	IEC 60664 / DIN EN 50178	
		Ordering data		
Description	Module width W	Type	Order No.	Pcs./Pkt.
<b>Digital IN 24 V DC</b>				
6ES5 420-4UA14 on 6ES7 421-1BL01-0AA0		FLKM S135/S400/SO120	2301723	1
6ES5 430-4UA14 on 6ES7 421-1BL01-0AA0		FLKM S135/S400/SO121	2301736	1
6ES5 431-4UA12 to 6ES7 421-7DH00-0AB0		FLKM S135-431-4UA/S400	2314846	1
6ES5 432-4UA12 on 6ES7 421-1BL01-0AA0		FLKM S135/S400/SO122	2301749	1
<b>Digital OUT 24 V DC</b>				
6ES5 441-4UA12 to 6ES7 422-1BL00-0AA0				
6ES5 451-4UA14 to 6ES7 422-1BL00-0AA0				
<b>Digital OUT 24 V DC / 2 A</b>				
6ES5 453-4UA12 to 6ES7 422-1HH00-0AA0				
6ES5 454-4UA14 to 6ES7 422-1BH11-0AA0				
<b>Analog IN</b>				
<b>Pt 100</b>				
6ES5 465-4UA13 to 6ES7 431-7KF10-0AB0				
<b>Current and voltage measurement</b>				
6ES5 465-4UA13 to 6ES7 431-0HH00-0AB0				
6ES5 465-4UA13 to 6ES7 431-7QH00-0AB0				
<b>Current measurement</b>				
6ES5 460-4UA13 to 6ES7 431-1KF00-0AB0				
<b>Voltage measurement</b>				
6ES5 460-4UA13 to 6ES7 431-1KF00-0AB0				
<b>Analog OUT</b>				
<b>Current output</b>				
6ES5 470-4UA13 to 6ES7 432-1HF00-0AB0				
6ES5 470-4UC13 to 6ES7 432-1HF00-0AB0				
<b>Voltage output</b>				
6ES5 470-4UA13 to 6ES7 432-1HF00-0AB0				
6ES5 470-4UB13 to 6ES7 432-1HF00-0AB0				
6ES5 470-4UC13 to 6ES7 432-1HF00-0AB0				





Adapter for digital output modules



Adapter for analog input modules



Adapter for analog output modules

### Technical data

60 V DC  
4 A (per path)  
4 A (per connection, supply via separate power supply)

-20 °C ... 50 °C  
SIEMENS S5-135 U pin strip

IEC 60664 / DIN EN 50178

### Technical data

...T/S400	...UI/S400, ...I/S400, ...U/S400
60 V DC	60 V DC
2 A (per path)	4 A (per path)
2 A (per connection, supply via separate power supply)	4 A (per connection, supply via separate power supply)

-20 °C ... 50 °C	-20 °C ... 50 °C
SIEMENS S5-135 U pin strip	SIEMENS S5-135 U pin strip

IEC 60664 / DIN EN 50178	IEC 60664 / DIN EN 50178
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### Technical data

60 V DC  
4 A (per path)  
4 A (per connection, supply via separate power supply)

-20 °C ... 50 °C  
SIEMENS S5-135 U pin strip

IEC 60664 / DIN EN 50178

### Ordering data

Type	Order No.	Pcs./ Pkt.
FLKM S135/S400/SO125	2301778	1
FLKM S135/S400/SO126	2301781	1
FLKM S135/S400/SO127	2301794	1
FLKM S135-454-4UA/S400	2314859	1

### Ordering data

Type	Order No.	Pcs./ Pkt.
FLKM S135-465-4UA/T/S400	2314875	1
FLKM S135-465-4UA/UI/S400	2314888	1
FLKM S135-460-4UA/I/S400	2314613	1
FLKM S135-460-4UA/U/S400	2314862	1

### Ordering data

Type	Order No.	Pcs./ Pkt.
FLKM S135-470-4UC/I/S400	2314626	1
FLKM S135-470-4UC/U/S400	2314891	1

# System cabling for controllers

## Retrofit and modernization components

### Siemens SIMATIC® S7-400 adapter for conversion from S5-115 to S7-400

The FLKM S115/... adapters directly connect an S5 connector wired with single wires to the S7-400 basic card.

The S5 connector is plugged directly into an S7-400 I/O card with the aid of the FLKM S115/... intermediate adapter.

A new S7-400 is installed in place of the S5. The existing field wiring is retained.

#### Note:

Due to the geometry, it is only possible to use every other slot. The LEDs of the S7-400 module are hidden by the S5-115 adapter.



Adapter for SIMATIC® S5-115/S7-400

Maximum permissible operating voltage  
Maximum permissible current

Ambient temperature (operation)  
Ambient temperature (storage/transport)  
Mounting position  
Standards/regulations

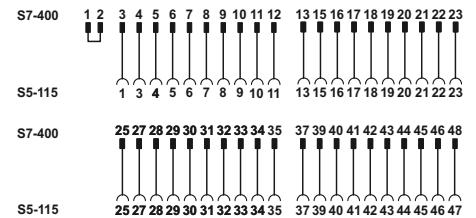
60 V DC  
4 A (per path)  
4 A (per connection, supply via separate power supply)

-20 °C ... 50 °C  
-20 °C ... 70 °C  
any  
IEC 60664 / DIN EN 50178

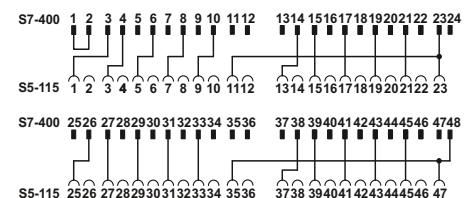
#### Technical data

Description
<b>Digital IN or OUT 24 V DC from S5-115 to S7-400</b>
<b>IN</b> 6ES5 420-7LA11 to 6ES7 421-1BL01-0AA0 6ES5 430-7LA11 to 6ES7 421-1BL01-0AA0
<b>OUT</b> 6ES5 441-7LA11 to 6ES7 422-1BL00-0AA0 6ES5 451-7LA11 to 6ES7 422-1BL00-0AA0
<b>Digital OUT 24 V DC from S5-115 to S7-400</b>
6ES5 454-7LA12 to 6ES7 422-1BH11-0AA0

Ordering data		
Type	Order No.	Pcs./Pkt.
FLKM S115/S400/SO155	2307248	1
FLKM S115-454-7LA/S400	2314901	1



Connection scheme: FLKM S115/S400/SO155

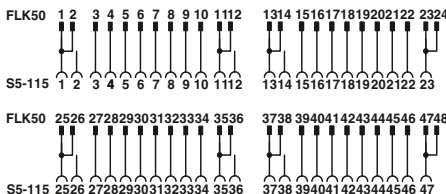


FLKM S115-454-7LA/S400 connection scheme

**Siemens SIMATIC® S7-300 adapter for conversion from S5-115 to S7-300**

S5-S7 adapters connect the S5-115 front adapters wired with individual wires to the I/O modules of S7-300.

With the aid of the FLKM S115/S7/FLK50/SO137 converter module, the signals of the S5-115 front adapter can be converted to a 50-pos. strip. A FLK 50/EZ-DR/.../KONFEK 50-pos. system cable and a front adapter for S7-300 (FLKM 50-PA-S300) connect the signals to the I/O module.



Connection scheme: FLKM S115/S7/FLK50/PLC/SO137



Converter for SIMATIC® S5-115 to 50-pos. FLK strip

**Notes:**  
Due to the geometry, it is not possible to couple any molded FLK connectors (e.g., VIP-PA...S7).

Maximum permissible operating voltage  
Maximum permissible current  
Maximum permissible total current  
Ambient temperature (operation)  
Ambient temperature (storage/transport)  
Standards/regulations

60 V DC  
1 A (per path)  
2 A (per byte)  
-20 °C ... 50 °C  
-20 °C ... 70 °C  
IEC 60664 / DIN EN 50178

Technical data

Ordering data

Description
<b>Digital IN or OUT 24 V DC from S5-115 through converters, system cables and front adapters to S7-300</b>
<b>IN</b> 6ES5 420-7LA11 on 6ES7 321-1BL00-0AA0 6ES5 430-7LA11 on 6ES7 321-1BL00-0AA0
<b>OUT</b> 6ES5 441-7LA11 on 6ES7 322-1BL00-0AA0 6ES5 451-7LA11 on 6ES7 322-1BL00-0AA0

Type	Order No.	Pcs./ Pkt.
FLKM S115/S7/FLK50/PLC/SO137	2306294	1

**Startup adapters for extending the existing S5-115 field wiring**

All signals of the existing S5-115 wiring 3 or 5 are extended with the help of the universal startup adapters. The open cable end can be connected to various controllers such as S7-400 or S7-300. Thus, the existing field wiring of S5-115 can communicate with the new controller for test purposes. Since the new control unit is temporarily arranged before the control cabinet, the original status of the system can be restored if required.

The S5-115 is replaced once the system operates without errors with the new controller.



Startup adapter for S5-115 field wiring

Maximum permissible operating voltage  
Maximum permissible current  
Ambient temperature (operation)  
Ambient temperature (storage/transport)  
Mounting position  
Standards/regulations

250 V AC/DC  
6 A (per path)  
-20 °C ... 50 °C  
-20 °C ... 80 °C  
any  
DIN EN 50178 / IEC 60664

Technical data

Ordering data

Description
<b>Connection of all S5-115 connections (1 to 23, 25 to 47) at the open cable end</b>

Type	Order No.	Pcs./ Pkt.
FLKM S115/47X0,75/3,0M/OE	2314985	1
FLKM S115/47X0,75/5,0M/OE	2314998	1

### Siemens SIMATIC® S7-300 adapter for conversion from S5-95U to S7-300

S5-S7 adapters connect the S5-95U front adapters wired with individual wires to the I/O modules of the S7-300.

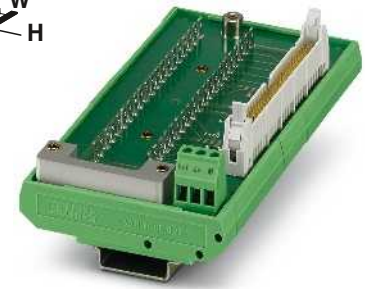
With the aid of the UM-S95U/S/FLK50/PLC converter module, the signals can be converted to a 50-pos. strip. A FLK 50/EZ-DR/.../KONFEK 50-pos. cable and the front adapter for SIMATIC® S7-300 (FLKM 50-PA-S300) establish a connection to the I/O module.

#### Notes:

Due to the geometry, it is not possible to couple any molded FLK connectors (e.g., VIP-PA...S7).



new



Converter for SIMATIC® S5-95U to 50-pos. IDC/FLK pin strip

#### Technical data

Maximum permissible operating voltage	30 V DC
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	DIN EN 50178
Connection method	Field level Slip-on connection
Dimensions	Controller level IDC/FLK pin strip 77 mm / 49 mm H / D

#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>Digital 16 IN/16 OUT, 24 V DC from S5-95U/100U to S7-300</b> S5-100U: 6ES5 482-8MA13 to 6ES7 323-1BL00-AA0 S5-95U: 6ES5 095-8MA03 to 6ES7 323-1BL00-AA0		135 mm	UM-S95U/S7/FLK50/PLC	2907030	1





## Universal modules

### VIP – VARIOFACE Professional modules with IDC/FLK pin strip

- 1:1 connection
  - 10 to 64-pos.
  - Screw connection
  - Metal foot
  - As per IEC 60603-13
  - With status indicator as an option
- Low and high engagement latches are supplied with all modules.

**Notes:**  
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



10 to 20 positions  
with screw connection

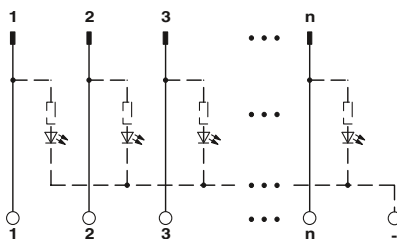


#### Technical data

Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664, DIN EN 50178
Connection data solid/stranded/AWG	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	H / D 65.5 mm / 56 mm

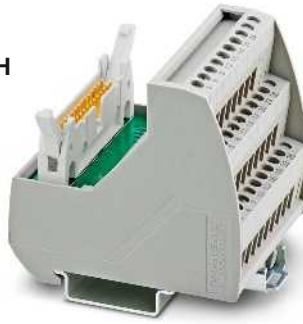
#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE module, with pin strip</b>	10	34.70	VIP-2/SC/FLK10	2315010	1
	14	39.80	VIP-2/SC/FLK14	2315023	1
	16	45.00	VIP-2/SC/FLK16	2315036	1
	20	55.10	VIP-2/SC/FLK20	2315049	1
<b>VARIOFACE module, with pin strip and light indicator</b>	10	34.70			
	14	44.90			
	16	50.00			
	20	60.20			
<b>VARIOFACE module, with pin strip</b>	26	57.10			
	34	67.30			
	40	77.40			
	50	92.70			
	60	108.00			
	64	118.00			
<b>VARIOFACE module, with pin strip and light indicator</b>	26	57.40			
	34	67.60			
	40	77.80			
	50	93.10			
	60	113.50			
	64	118.60			





10 to 20 positions  
with screw connection and light indicator



26 to 64 positions  
with screw connection



26 to 64 positions  
with screw connection and light indicator



Technical data
24 V DC 24 V / 24 V
1 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12 65.5 mm / 56 mm

Technical data
60 V AC/DC 125 V / 125 V
1 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12 69 mm / 62 mm

Technical data
24 V DC 24 V / 24 V
1 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12 69 mm / 62 mm

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-2/SC/FLK10/LED	2322045	1
VIP-2/SC/FLK14/LED	2322058	1
VIP-2/SC/FLK16/LED	2322061	1
VIP-2/SC/FLK20/LED	2322074	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-3/SC/FLK26	2315052	1
VIP-3/SC/FLK34	2315065	1
VIP-3/SC/FLK40	2315078	1
VIP-3/SC/FLK50	2315081	1
VIP-3/SC/FLK60	2315094	1
VIP-3/SC/FLK64	2315104	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-3/SC/FLK26/LED	2322087	1
VIP-3/SC/FLK34/LED	2322090	1
VIP-3/SC/FLK40/LED	2322100	1
VIP-3/SC/FLK50/LED	2322113	1
VIP-3/SC/FLK60/LED	2322126	1
VIP-3/SC/FLK64/LED	2322139	1

## Universal modules

### VIP – VARIOFACE Professional modules with IDC/FLK pin strip

- 1:1 connection
  - 10 to 64-pos.
  - Push-in connection
  - Metal foot
  - As per IEC 60603-13
  - With status indicator as an option
- Low and high engagement latches are supplied with all modules.

**Notes:**  
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



10 to 20 positions  
with Push-in connection

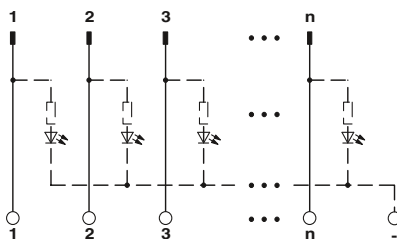


#### Technical data

Maximum permissible operating voltage	60 V AC/DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664, DIN EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	H / D 72.1 mm / 56 mm

#### Ordering data

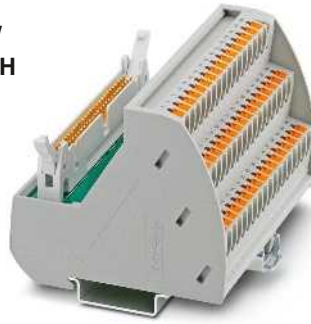
Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
VARIOFACE module, with pin strip	10	36.80	VIP-2/PT/FLK10	2903787	1
	14	41.90	VIP-2/PT/FLK14	2903788	1
	16	46.90	VIP-2/PT/FLK16	2903789	1
	20	57.10	VIP-2/PT/FLK20	2903790	1
VARIOFACE module, with pin strip and light indicator	10	36.80			
	14	41.90			
	16	46.90			
	20	57.10			
VARIOFACE module, with pin strip	26	57.10			
	34	67.30			
	40	77.40			
	50	92.70			
	60	107.90			
	64	118.10			
VARIOFACE module, with pin strip and light indicator	26	57.10			
	34	67.30			
	40	77.40			
	50	92.70			
	60	107.90			
	64	118.10			



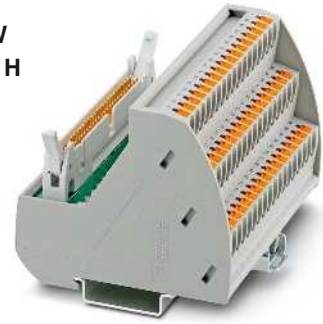




10 to 20 positions  
with Push-in connection and light indicator



26 to 64 positions  
with Push-in connection



26 to 64 positions  
with Push-in connection and light indicator



Technical data
24 V DC 24 V / 24 V
1 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14 72.1 mm / 56 mm

Technical data
60 V AC/DC 125 V / 125 V
1 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14 75.8 mm / 63 mm

Technical data
24 V DC 24 V / 24 V
1 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14 75.8 mm / 63 mm

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-2/PT/FLK10/LED	2904248	1
VIP-2/PT/FLK14/LED	2904249	1
VIP-2/PT/FLK16/LED	2904250	1
VIP-2/PT/FLK20/LED	2904251	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-3/PT/FLK26	2903791	1
VIP-3/PT/FLK34	2903792	1
VIP-3/PT/FLK40	2903793	1
VIP-3/PT/FLK50	2903794	1
VIP-3/PT/FLK60	2903795	1
VIP-3/PT/FLK64	2903796	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-3/PT/FLK26/LED	2904252	1
VIP-3/PT/FLK34/LED	2904253	1
VIP-3/PT/FLK40/LED	2904254	1
VIP-3/PT/FLK50/LED	2904255	1
VIP-3/PT/FLK60/LED	2904256	1
VIP-3/PT/FLK64/LED	2904257	1

## Universal modules

### VIP – VARIOFACE Professional Modules with D-SUB connectors

- 1:1 connection
  - 9 to 50-pos.
  - Screw connection
  - Metal foot
  - As per IEC 60807-2
  - With status indicator as an option
- The D-SUB-4-40 UNC threads are led on to a connecting terminal block directly.

**Notes:**  
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



9 to 15 positions with screw connection



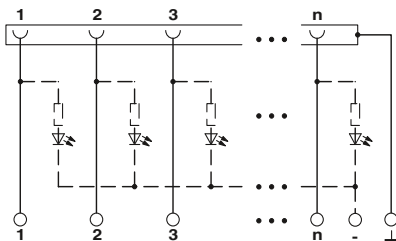
Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA  
  
Maximum permissible current (per branch)  
Ambient temperature (operation)  
Mounting position  
Standards/regulations  
Connection data solid/stranded/AWG  
Dimensions

25 V AC / 60 V DC  
125 V / 105 V  
  
2 A  
-20 °C ... 50 °C  
any  
IEC 60664, DIN EN 50178  
0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
65.5 mm / 45.1 mm

#### Ordering data

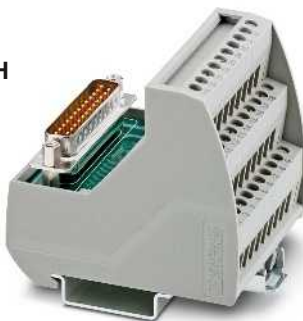
Description	No. of pos.	Module width W
<b>VARIOFACE module</b> , with D-Subminiature pin strip	9	34.70
	15	45.00
<b>VARIOFACE module</b> , with D-Subminiature pin strip and light indicator	9	34.70
	15	50.00
<b>VARIOFACE module</b> , with D-Subminiature socket strip	9	34.70
	15	45.00
<b>VARIOFACE module</b> , with D-Subminiature socket strip and light indicator	9	34.70
	15	50.00
<b>VARIOFACE module</b> , with D-Subminiature pin strip	25	57.40
	37	72.70
	50	98.20
<b>VARIOFACE module</b> , with D-Subminiature pin strip and light indicator	25	57.40
	37	72.70
	50	98.20
<b>VARIOFACE module</b> , with D-Subminiature socket strip	25	57.40
	37	72.70
	50	98.20
<b>VARIOFACE module</b> , with D-Subminiature socket strip and light indicator	25	57.40
	37	72.70
	50	98.20

Type	Order No.	Pcs./ Pkt.
<b>VIP-2/SC/D 9SUB/M</b> <b>VIP-2/SC/D15SUB/M</b>	2315117	1
	2315120	1
<b>VIP-2/SC/D 9SUB/F</b> <b>VIP-2/SC/D15SUB/F</b>	2315162	1
	2315175	1





9 to 15 positions  
with screw connection and light indicator



25 to 50 positions  
with screw connection



25 to 50 positions  
with screw connection and light indicator



Technical data
24 V DC 24 V / 24 V
2.5 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12 65.5 mm / 45.1 mm

Technical data
25 V AC / 60 V DC 125 V / 105 V
2 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12 69 mm / 62 mm

Technical data
24 V DC 24 V / 24 V
2.5 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12 69 mm / 62 mm

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-2/SC/D 9SUB/M/LED	2322142	1
VIP-2/SC/D15SUB/M/LED	2322155	1
VIP-2/SC/D 9SUB/F/LED	2322197	1
VIP-2/SC/D15SUB/F/LED	2322207	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-3/SC/D25SUB/M	2315133	1
VIP-3/SC/D37SUB/M	2315146	1
VIP-3/SC/D50SUB/M	2315159	1
VIP-3/SC/D25SUB/F	2315188	1
VIP-3/SC/D37SUB/F	2315191	1
VIP-3/SC/D50SUB/F	2315201	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-3/SC/D25SUB/M/LED	2322168	1
VIP-3/SC/D37SUB/M/LED	2322171	1
VIP-3/SC/D50SUB/M/LED	2322184	1
VIP-3/SC/D25SUB/F/LED	2322210	1
VIP-3/SC/D37SUB/F/LED	2322223	1
VIP-3/SC/D50SUB/F/LED	2322236	1

## Universal modules

### VIP – VARIOFACE Professional Modules with D-SUB connectors

- 1:1 connection
  - 9 to 50-pos.
  - Push-in connection
  - Metal foot
  - As per IEC 60807-2
  - With status indicator as an option
- The D-SUB-4-40 UNC threads are led on to a connecting terminal block directly.

**Notes:**  
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



9 to 15 positions  
with Push-in connection

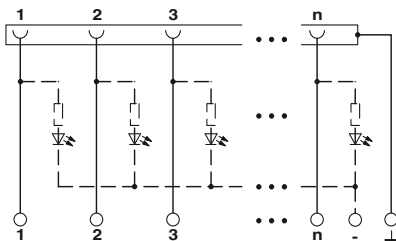


#### Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 105 V
Maximum permissible current (per branch)	2 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	IEC 60664, DIN EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	72.1 mm / 46.6 mm

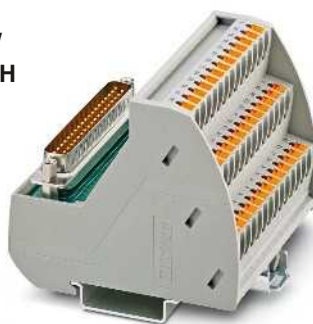
#### Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE module</b> , with D-Subminiature pin strip	9	36.80	<b>VIP-2/PT/D 9SUB/M</b>	<b>2903777</b>	1
	15	46.90			
<b>VARIOFACE module</b> , with D-Subminiature pin strip and light indicator	9	36.80			
	15	52.00			
<b>VARIOFACE module</b> , with D-Subminiature socket strip	9	36.80	<b>VIP-2/PT/D 9SUB/F</b>	<b>2903778</b>	1
	15	46.90			
<b>VARIOFACE module</b> , with D-Subminiature socket strip and light indicator	9	36.80			
	15	52.00			
<b>VARIOFACE module</b> , with D-Subminiature pin strip	25	57.10			
	37	72.30			
	50	97.70			
<b>VARIOFACE module</b> , with D-Subminiature pin strip and light indicator	25	57.10			
	37	72.30			
	50	97.70			
<b>VARIOFACE module</b> , with D-Subminiature socket strip	25	57.10			
	37	72.30			
	50	97.70			
<b>VARIOFACE module</b> , with D-Subminiature socket strip and light indicator	25	57.10			
	37	72.30			
	50	97.70			

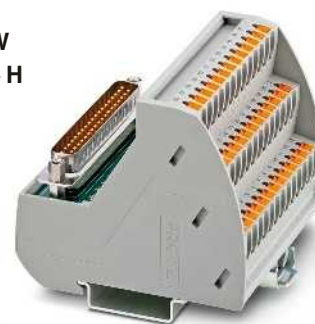




9 to 15 positions  
with Push-in connection and light indicator



25 to 50 positions  
with Push-in connection



25 to 50 positions  
with Push-in connection and light indicator



Technical data
24 V DC 24 V / 24 V
2 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14 72.1 mm / 46.6 mm

Technical data
25 V AC / 60 V DC 125 V / 105 V
2 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14 75.8 mm / 63 mm

Technical data
24 V DC 24 V / 24 V
2 A -20 °C ... 50 °C any IEC 60664 , DIN EN 50178 0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14 75.8 mm / 63 mm

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-2/PT/D 9SUB/M/LED VIP-2/PT/D15SUB/M/LED	2904258 2904259	1 1
VIP-2/PT/D 9SUB/F/LED VIP-2/PT/D15SUB/F/LED	2904263 2904264	1 1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-3/PT/D25SUB/M VIP-3/PT/D37SUB/M VIP-3/PT/D50SUB/M	2903781 2903783 2903785	1 1 1
VIP-3/PT/D25SUB/F VIP-3/PT/D37SUB/F VIP-3/PT/D50SUB/F	2903782 2903784 2903786	1 1 1

Ordering data		
Type	Order No.	Pcs./ Pkt.
VIP-3/PT/D25SUB/M/LED VIP-3/PT/D37SUB/M/LED VIP-3/PT/D50SUB/M/LED	2904260 2904261 2904262	1 1 1
VIP-3/PT/D25SUB/F/LED VIP-3/PT/D37SUB/F/LED VIP-3/PT/D50SUB/F/LED	2904265 2904266 2904267	1 1 1

# System cabling for controllers

## Universal modules

### SLIM-LINE modules for D-SUB connectors

These VARIOFACE modules connect D-SUB strips with front connection terminal blocks in accordance with IEC 60807-2/DIN 41652.

To make the ground connection, the metallic plug shell (4-40 UNC thread) makes contact with a connecting terminal block.



9 to 25 positions  
with screw connection



37 to 50 positions  
with screw connection

Maximum permissible operating voltage  
Maximum permissible current (per branch)  
Ambient temperature (operation)  
Mounting position  
Standards/regulations  
Screw connection solid/stranded/AWG  
Dimensions

D / W

ERC

#### Technical data

25 V AC / 60 V DC  
2.5 A  
-10 °C ... 50 °C  
any  
DIN EN 50178 , IEC 60664  
0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
45 mm / 25 mm

#### Ordering data

Description	No. of pos.	Module height H
<b>VARIOFACE-SLIM-LINE module, with D-Subminiature pin strip</b>		
	9	117.00
	15	147.00
	25	217.00
<b>VARIOFACE-SLIM-LINE module, with D-Subminiature socket strip</b>		
	9	117.00
	15	147.00
	25	217.00
<b>VARIOFACE-SLIM-LINE module, with D-Subminiature pin strip</b>		
	37	157.00
	50	187.00
<b>VARIOFACE-SLIM-LINE module, with D-Subminiature socket strip</b>		
	37	157.00
	50	187.00

ERC

#### Technical data

25 V AC / 60 V DC  
2.5 A  
-10 °C ... 50 °C  
any  
DIN EN 50178 , IEC 60664  
0.2 ... 4 mm<sup>2</sup> / 0.2 ... 2.5 mm<sup>2</sup> / 24 - 12  
45 mm / 45 mm

#### Ordering data

Type	Order No.	Pcs./ Pkt.
UM 25-D 9SUB/S/Front/Q	2959573	1
UM 25-D15SUB/S/Front/Q	2959599	1
UM 25-D25SUB/S/Front/Q	2959612	1
UM 25-D 9SUB/B/Front/Q	2959560	1
UM 25-D15SUB/B/Front/Q	2959586	1
UM 25-D25SUB/B/Front/Q	2959609	1

Type	Order No.	Pcs./ Pkt.
UM 45-D37SUB/S/Front/Q	2959638	1
UM 45-D50SUB/S/Front/Q	2959654	1
UM 45-D37SUB/B/Front/Q	2959625	1
UM 45-D50SUB/B/Front/Q	2959641	1

**Feed-through modules for D-SUB connectors with screw connection**

- 1:1 connection
- 9 to 50-pos.
- Screw connection
- As per IEC 60807-2
- D-SUB 4-40 UNC thread
- 9 to 37-pos.: separate ground tap
- 50-pos.: no ground tap



With D-SUB pin strip



With D-SUB socket strip

Maximum permissible operating voltage  
 Maximum permissible operating voltage UL / CSA  
 Maximum permissible current (per branch)  
 Ambient temperature (operation)  
 Mounting position  
 Standards/regulations  
 Connection data solid/stranded/AWG

25 V AC / 60 V DC  
 125 V / -  
 2.5 A  
 -20 °C ... 50 °C  
 any  
 IEC 60664 , DIN EN 50178  
 0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12

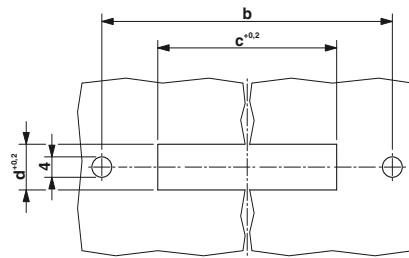
25 V AC / 60 V DC  
 125 V / -  
 2.5 A  
 -20 °C ... 50 °C  
 any  
 IEC 60664 , DIN EN 50178  
 0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12

Description	No. of pos.	Module width W
<b>VARIOFACE feed-through module, with D-subminiature connector</b>		
	9	39.00
	15	39.00
	25	39.00
	37	39.00
	50	39.00

Ordering data		
Type	Order No.	Pcs./ Pkt.
DFLK-D 9 SUB/S	2283870	5
DFLK-D15 SUB/S	2280297	5
DFLK-D25 SUB/S	2280310	5
DFLK-D37 SUB/S	2280336	5
DFLK-D50 SUB/S	2291286	5

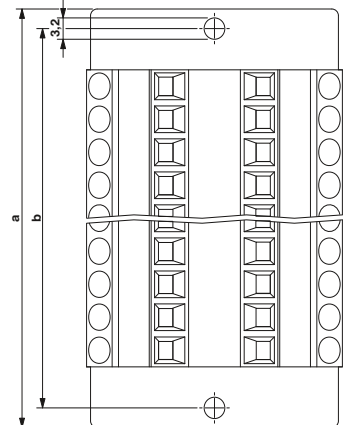
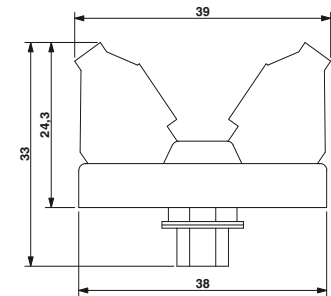
Ordering data		
Type	Order No.	Pcs./ Pkt.
DFLK-D 9 SUB/B	2287135	5
DFLK-D15 SUB/B	2280307	5
DFLK-D25 SUB/B	2280323	5
DFLK-D37 SUB/B	2280349	5
DFLK-D50 SUB/B	2287669	5

Dimensioning of the housing cutout



Type	a	b	c	d
DFLK-D 9 SUB/S	58.4	52.5	40.2 + 0.2	13 + 0.2
DFLK-D 15 SUB/S	58.4	52.5	40.2 + 0.2	13 + 0.2
DFLK-D 25 SUB/S	83.4	77.5	54.2 + 0.2	13 + 0.2
DFLK-D 37 SUB/S	128.4	122.5	70.6 + 0.2	13 + 0.2
DFLK-D 50 SUB/S	143.4	137.5	67.8 + 0.2	15.8 + 0.2
DFLK-D 9 SUB/B	58.4	52.5	40.2 + 0.2	13 + 0.2
DFLK-D 15 SUB/B	58.4	52.5	40.2 + 0.2	13 + 0.2
DFLK-D 25 SUB/B	83.4	77.5	54.2 + 0.2	13 + 0.2
DFLK-D 37 SUB/B	128.4	122.5	70.6 + 0.2	13 + 0.2
DFLK-D 50 SUB/B	143.4	137.5	67.8 + 0.2	15.8 + 0.2

Dimensional drawing DFLK-D...SUB



# System cabling for controllers

## Universal modules

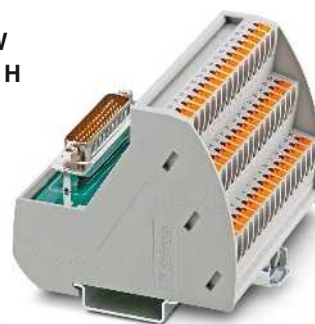
### VIP – VARIOFACE Professional Modules for high-density D-SUB connectors

- 1:1 connection
- 15 to 62-pos.
- Screw and Push-in connection
- Metal foot

The D-SUB-4-40 UNC threads are led directly to a connection terminal block.



15 to 62-pos.  
with screw connection



15 to 62-pos.  
with Push-in connection

<b>Notes:</b>
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.
1) Module with double-level terminal blocks



Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA

Maximum permissible current (per branch)  
Ambient temperature (operation)  
Mounting position  
Standards/regulations

Connection data solid/stranded/AWG  
Dimensions H / D

25 V AC / 60 V DC  
125 V / -  
1 A  
-20 °C ... 50 °C  
any  
EN 50178  
0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
69 mm / 62 mm

25 V AC / 60 V DC  
125 V / 105 V  
1 A  
-20 °C ... 50 °C  
any  
EN 50178  
0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14  
75.8 mm / 63 mm

#### Technical data

#### Technical data

#### Ordering data

#### Ordering data

Description	No. of pos.	Module width W
<b>VARIOFACE module, with D-Subminiature pin strip</b>		
with screw connection	26	52.30
with screw connection	44	82.90
with screw connection	62	113.50
with Push-in connection	26	52.00
with Push-in connection	44	82.50
with Push-in connection	62	113.00
<b>VARIOFACE module, with D-Subminiature socket strip</b>		
with screw connection 1)	15	44.90
with screw connection	26	52.30
with screw connection	44	82.90
with screw connection	62	113.50
with Push-in connection 1)	15	46.90
with Push-in connection	26	52.00
with Push-in connection	44	82.50
with Push-in connection	62	113.00

Type	Order No.	Pcs./ Pkt.
VIP-3/SC/HD26SUB/M	2322375	1
VIP-3/SC/HD44SUB/M	2322388	1
VIP-3/SC/HD62SUB/M	2322391	1
VIP-2/SC/HD15SUB/F	2322401	1
VIP-3/SC/HD26SUB/F	2322414	1
VIP-3/SC/HD44SUB/F	2322427	1
VIP-3/SC/HD62SUB/F	2322430	1

Type	Order No.	Pcs./ Pkt.
VIP-3/PT/HD26SUB/M	2904269	1
VIP-3/PT/HD44SUB/M	2904270	1
VIP-3/PT/HD62SUB/M	2904271	1
VIP-2/PT/HD15SUB/F	2904272	1
VIP-3/PT/HD26SUB/F	2904273	1
VIP-3/PT/HD44SUB/F	2904274	1
VIP-3/PT/HD62SUB/F	2904275	1



Modules with RJ45 connector

- 1:1 connection
- RJ45 connector, 8-pos.
- Screw or Push-in connection (direct plug-in technology)
- Connector housing led to separate connection terminal blocks

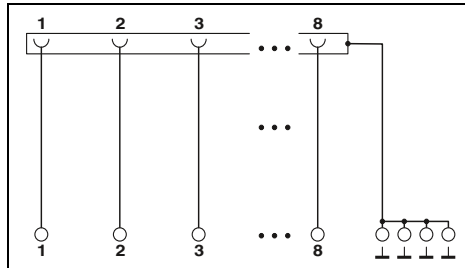
**Notes:**  
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 3.



8-pos.  
with screw connection



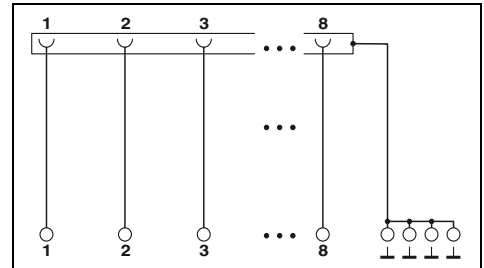
8-pos.  
with Push-in connection



Technical data

Maximum permissible operating voltage	48 V AC/DC
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	DIN EN 50178
Connection data solid/stranded/AWG	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	69 mm / 62 mm

H / D



Technical data

Maximum permissible operating voltage	48 V AC/DC
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20 °C ... 50 °C
Mounting position	any
Standards/regulations	EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 mm <sup>2</sup> / 0.14 - 2.5 mm <sup>2</sup> / 26 - 14
Dimensions	75.8 mm / 63 mm

Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-3/SC/RJ45	2900701	1

Ordering data

Type	Order No.	Pcs./ Pkt.
VIP-3/PT/RJ45	2904290	1

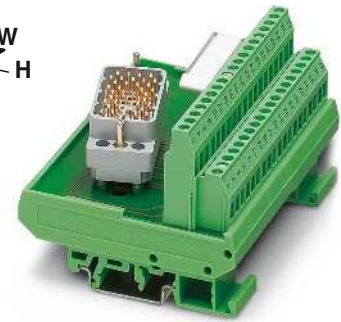
Description	No. of pos.	Module width W
<b>VARIOFACE module, with RJ45 connector</b>		
with screw connection	8	26.90
with Push-in connection	8	26.60

### Modules for ELCO connectors

These modules can be used to connect ELCO connectors of the 8016 series to screw connection terminal blocks.

Thanks to the slanted placement of the ELCO connector, the cables which are fed out of the side of the cable housing are led away without affecting the neighboring modules.

**Notes:**  
Dimensional drawings and pin assignments, see page 600



38-pos.

ERC

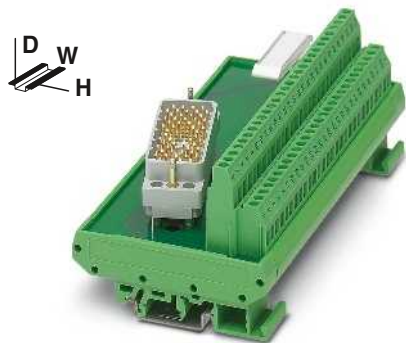
#### Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible current (per branch)	2 A
Total current	76 A
Ambient temperature (operation)	-20 °C ... 40 °C
Mounting position	any
Standards/regulations	IEC 60664 , DIN EN 50178
Connection data solid/stranded/AWG	0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
Dimensions	77 mm / 58.5 mm

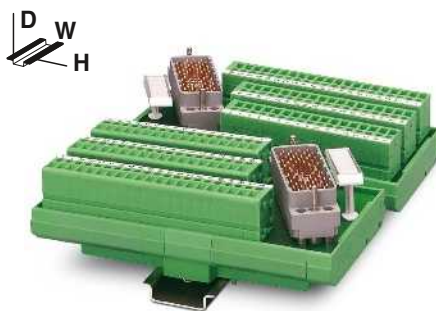
H / D

#### Ordering data

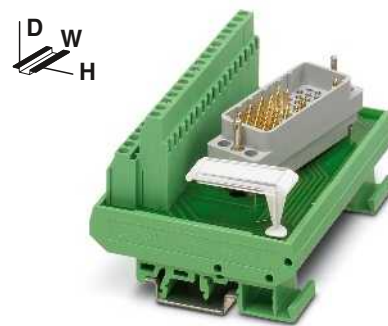
Description	No. of pos.	Module width W	Type	Order No.	Pcs./ Pkt.
<b>VARIOFACE module, with:</b>					
- Pin strip 8016 right	38	101.50	<b>UMK- EC38/38-XOR</b>	<a href="#">2976297</a>	1
- Pin strip 8016 left	38	101.50	<b>UMK- EC38/38-XOL</b>	<a href="#">2976284</a>	1
<b>VARIOFACE module, with:</b>					
- Pin strip 8016 right	56	157.50			
- Pin strip 8016 left	56	157.50			
<b>VARIOFACE module, with:</b>					
- Pin strip 8016 right	56	77.00			
- Pin strip 8016 left	56	77.00			
<b>VARIOFACE module, with:</b>					
- Pin strip 8016 right above	32	101.30			
- Pin strip 8016 right below	32	101.30			
- Pin strip 8016 left above	32	101.30			
- Pin strip 8016 left below	32	101.30			



56-pos.



56-pos.,  
with front connection terminal blocks



32-pos.

ERC

ERC

ERC

Technical data
125 V AC/DC
1.5 A
28 A (56 branches with 0.5 A each)
-20 °C ... 50 °C
any
IEC 60664 , DIN EN 50178
0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
77 mm / 58.5 mm

Technical data
25 V AC / 60 V DC
1.5 A
28 A (56 branches with 0.5 A each)
-20 °C ... 50 °C
any
IEC 60664 , DIN EN 50178
0.2 - 2.5 mm <sup>2</sup> / 0.2 - 1.5 mm <sup>2</sup> / 26 - 16
146.3 mm / 47.5 mm

Technical data
25 V AC / 60 V DC
2 A
32 A (32 branches with 1 A each)
-20 °C ... 40 °C
any
IEC 60664 , DIN EN 50178
0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
77 mm / 58.5 mm

Ordering data		
Type	Order No.	Pcs./ Pkt.
UMK- EC56/56-XOR	2975900	1
UMK- EC56/56-XOL	2975890	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
UMK- EC56/FRONT 2,5V/R	2976161	1
UMK- EC56/FRONT 2,5V/L	2976158	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
UMK- EC56/32-XOR	2975858	1
UMK- EC56/32-XUR	2975777	1
UMK- EC56/32-XOL	2975764	1
UMK- EC56/32-XUL	2975780	1

# System cabling for controllers

## Universal modules

### Modules for ELCO connectors for use in Ex i circuits

The VARIOFACE modules connect ELCO connectors from the 8016 series to screw connection terminal blocks. The modules for ELCO connectors are regarded as simple electrical equipment according to EN 60079-14 for use in intrinsically safe circuits. They meet the requirements of intrinsic safety protection according to EN 60079-11 (EN 50020) and are also used for various intrinsically safe circuits, taking the pin assignment into account.

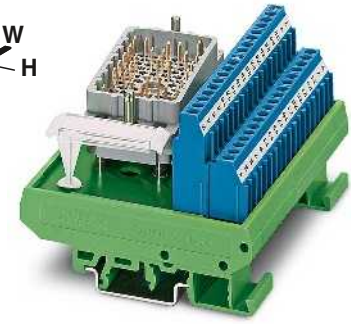
The voltage of an intrinsically safe circuit may not exceed 30 V. The voltage difference between two intrinsically safe circuits can be up to 60 V.

For clear identification of intrinsically safe circuits, the modules are assembled with blue screw connection terminal blocks.

Thanks to the slanted placement of the ELCO connector, the cables which are fed out of the side of the cable housing are led away without affecting the neighboring modules.

For the separation of intrinsically safe and non-intrinsically safe circuits, a distance of at least 50 mm should be maintained between the connection points using partition plates or spaces.

Notes:
Dimensional drawings and pin assignments, see page 601
Facts about explosion protection, see page 108



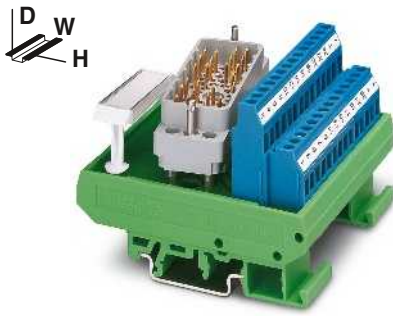
32-pos.

Maximum permissible operating voltage	
Maximum permissible current (per branch)	
Ambient temperature (operation)	
Mounting position	
Standards/regulations	
Connection data solid/stranded/AWG	
Dimensions	H / D

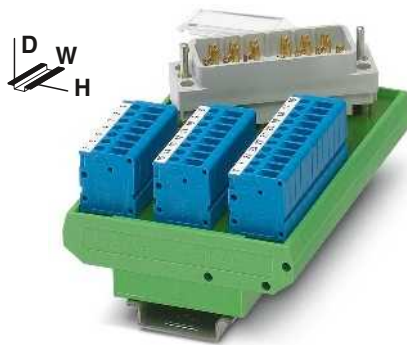
Technical data
max. 30 V DC (Max. voltage between two intrinsically safe circuits: 60 V DC)
500 mA
-20 °C ... 50 °C
any
DIN EN 60079-11
0.2 - 4 mm <sup>2</sup> / 0.2 - 2.5 mm <sup>2</sup> / 24 - 12
77 mm / 58.5 mm

Description	No. of pos.	Module width W
<b>VARIOFACE module, with:</b>		
- Pin strip 8016 right above	32	101.30
- Pin strip 8016 right below	32	101.30
- Pin strip 8016 left above	32	101.30
- Pin strip 8016 left below	32	101.30
<b>VARIOFACE module, with:</b>		
- Pin strip 8016 right	25	78.80
- Pin strip 8016 left	25	78.80
<b>VARIOFACE module, with:</b>		
- Pin strip 8016 right	25	77.00
- Pin strip 8016 left	25	77.00

Ordering data		
Type	Order No.	Pcs./Pkt.
<b>UMK- EC90/32/EX-XOR</b>	<b>2900109</b>	1
<b>UMK- EC90/32/EX-XUR</b>	<b>2969068</b>	1
<b>UMK- EC90/32/EX-XOL</b>	<b>2900110</b>	1
<b>UMK- EC90/32/EX-XUL</b>	<b>2969071</b>	1



25-pos.



25-pos.,  
with front connection terminal blocks

ERIC

**Technical data**

max. 30 V DC  
(Max. voltage between two intrinsically safe circuits: 60 V DC)  
500 mA  
-20 °C ... 50 °C  
any  
DIN EN 60079-11  
0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12  
77 mm / 58.5 mm

**Technical data**

max. 30 V DC  
(Max. voltage between two intrinsically safe circuits: 60 V DC)  
500 mA  
-20 °C ... 50 °C  
any  
DIN EN 60079-11  
0.2 - 2.5 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 14  
112.5 mm / 52.5 mm

**Ordering data**

Type	Order No.	Pcs./ Pkt.
UMK- EC56/25/EX -R	2900112	1
UMK- EC56/25/EX -L	2900113	1

**Ordering data**

Type	Order No.	Pcs./ Pkt.
UMK- EC56/25/EX -FRONT 2,5V/R	2900114	1
UMK- EC56/25/EX -FRONT 2,5V/L	2900115	1

# System cabling for controllers

## Universal cables

### VIP – VARIOFACE Professional System cable with IDC/FLK socket strip

- 1:1 connection
- IDC/FLK connector according to IEC 60603-13
- In the desired lengths
- Individual serial number

#### Note:

Module designs with UM 45 profile and three-level terminal blocks cannot be connected to the VIP-CAB-FLK... system cable due to the larger outer contour of the connectors.

The VIP-CAB-FLK... system cables are not suitable for front adapters.



Unshielded



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Outside diameter	10-pos. 6.1 mm 14-pos. 6.4 mm 40-pos. 9.9 mm

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Round cable, with 2 molded IDC/FLK socket strips</b>					
	10	1 m	VIP-CAB-FLK10/0,14/1,0M	2318318	1
	10	2 m	VIP-CAB-FLK10/0,14/2,0M	2318334	1
	10	3 m	VIP-CAB-FLK10/0,14/3,0M	2318347	1
<b>Round cable, as above, in variable lengths (minimum ordering quantity five pieces)</b>	10		VIP-CAB-FLK10-0,14/...	2318376	1
<b>Round cable, with 2 molded IDC/FLK socket strips</b>					
	14	1 m	VIP-CAB-FLK14/0,14/1,0M	2318392	1
	14	2 m	VIP-CAB-FLK14/0,14/2,0M	2318415	1
	14	3 m	VIP-CAB-FLK14/0,14/3,0M	2318428	1
<b>Round cable, as above, in variable lengths (minimum ordering quantity five pieces)</b>	14		VIP-CAB-FLK14-0,14/...	2318457	1
<b>Round cable, with 2 molded IDC/FLK socket strips</b>					
	40	1 m	VIP-CAB-FLK40/0,14/1,0M	2318790	1
	40	2 m	VIP-CAB-FLK40/0,14/2,0M	2318813	1
	40	3 m	VIP-CAB-FLK40/0,14/3,0M	2318826	1
<b>Round cable, as above, in variable lengths (minimum ordering quantity five pieces)</b>	40		VIP-CAB-FLK40-0,14/...	2318855	1

#### Ordering example for system cable:

– 10-pos. cable, 7.6 m long

Quantity	Order No.	Length [m]
1	2318376	7.6
		min. 0.5 m
		max. 100.0 m
		Increment 0.1 m



# System cabling for controllers

## Universal cables

### System cable with IDC/FLK socket strip and an open end

- 1:1 connection
- 10, 14, and 16-pos.
- IDC/FLK connector according to IEC 60603-13
- Open end at the other end

The individual wires at the open end are marked (1, 2, 3, 4, ...) and fitted with a ferrule.



Encapsulated connectors, unshielded



Unshielded



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	10-pos. 6.1 mm 14-pos. 6.4 mm 16-pos. 6.5 mm



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	6.1 mm 6.4 mm 6.5 mm

#### Ordering data

Description	No. of pos.	Cable length
<b>Round cable with an open end</b>		
	10	0.5 m
	10	1 m
	10	1.5 m
	10	2 m
	10	2.5 m
	10	3 m
	10	4 m
	10	6 m
	10	8 m
	10	10 m
<b>Round cable, as above, but in variable lengths</b>	10	
<b>Round cable with an open end</b>		
	14	0.5 m
	14	1 m
	14	1.5 m
	14	2 m
	14	2.5 m
	14	3 m
	14	4 m
	14	6 m
	14	8 m
	14	10 m
<b>Round cable, as above, but in variable lengths</b>	14	
<b>Round cable with an open end</b>		
	16	0.5 m
	16	1 m
	16	1.5 m
	16	2 m
	16	2.5 m
	16	3 m
	16	4 m
	16	6 m
	16	8 m
	16	10 m
<b>Round cable, as above, but in variable lengths</b>	16	

Type	Order No.	Pcs./ Pkt.
VIP-CAB-FLK14/FR/OE/0,14/0,5M	2900122	1
VIP-CAB-FLK14/FR/OE/0,14/1,0M	2900123	1
VIP-CAB-FLK14/FR/OE/0,14/1,5M	2900125	1
VIP-CAB-FLK14/FR/OE/0,14/2,0M	2900126	1
VIP-CAB-FLK14/FR/OE/0,14/3,0M	2900127	1
VIP-CAB-FLK16/FR/OE/0,14/0,5M	2900130	1
VIP-CAB-FLK16/FR/OE/0,14/1,0M	2900131	1
VIP-CAB-FLK16/FR/OE/0,14/1,5M	2900132	1
VIP-CAB-FLK16/FR/OE/0,14/2,0M	2900133	1
VIP-CAB-FLK16/FR/OE/0,14/3,0M	2900134	1

#### Ordering data

Type	Order No.	Pcs./ Pkt.
CABLE-FLK10/OE/0,14/ 0,5M	2904073	1
CABLE-FLK10/OE/0,14/ 1,0M	2904074	1
CABLE-FLK10/OE/0,14/ 1,5M	2904075	1
CABLE-FLK10/OE/0,14/ 2,0M	2904076	1
CABLE-FLK10/OE/0,14/ 2,5M	2904077	1
CABLE-FLK10/OE/0,14/ 3,0M	2904078	1
CABLE-FLK10/OE/0,14/ 4,0M	2904079	1
CABLE-FLK10/OE/0,14/ 6,0M	2904080	1
CABLE-FLK10/OE/0,14/ 8,0M	2904081	1
CABLE-FLK10/OE/0,14/10,0M	2904082	1
CABLE-FLK10-OE/0,14/...	2904331	1
CABLE-FLK14/OE/0,14/ 50	2305761	1
CABLE-FLK14/OE/0,14/ 100	2305253	1
CABLE-FLK14/OE/0,14/ 150	2305266	1
CABLE-FLK14/OE/0,14/ 200	2305279	1
CABLE-FLK14/OE/0,14/ 250	2305282	1
CABLE-FLK14/OE/0,14/ 300	2305295	1
CABLE-FLK14/OE/0,14/ 400	2305774	1
CABLE-FLK14/OE/0,14/ 600	2305787	1
CABLE-FLK14/OE/0,14/ 800	2305790	1
CABLE-FLK14/OE/0,14/1000	2305800	1
CABLE-FLK14/OE/0,14/...	2305732	1
CABLE-FLK16/OE/0,14/ 0,5M	2318127	1
CABLE-FLK16/OE/0,14/ 1,0M	2318130	1
CABLE-FLK16/OE/0,14/ 1,5M	2318143	1
CABLE-FLK16/OE/0,14/ 2,0M	2318156	1
CABLE-FLK16/OE/0,14/ 2,5M	2318169	1
CABLE-FLK16/OE/0,14/ 3,0M	2318172	1
CABLE-FLK16/OE/0,14/ 4,0M	2318185	1
CABLE-FLK16/OE/0,14/ 6,0M	2318198	1
CABLE-FLK16/OE/0,14/ 8,0M	2318208	1
CABLE-FLK16/OE/0,14/10,0M	2318211	1
CABLE-FLK16/OE/0,14/...	2318224	1



**System cable with IDC/FLK socket strip and an open end**

- 1:1 connection
  - 20- and 50-pos.
  - IDC/FLK connector according to IEC 60603-13
  - Open end at the other end
- The individual wires at the open end are marked (1, 2, 3, 4, ...) and fitted with a ferrule.



Encapsulated connectors, unshielded



Unshielded



**Technical data**

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	20-pos. 7.6 mm 50-pos. 10.3 mm



**Technical data**

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	7.6 mm 10.3 mm

**Ordering data**

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Round cable with an open end</b>	20	0.5 m	VIP-CAB-FLK20/FR/OE/0,14/1,0M	2900139	1
	20	1 m			
	20	1.5 m			
	20	2 m	VIP-CAB-FLK20/FR/OE/0,14/2,0M	2900142	1
	20	2.5 m			
	20	3 m			
	20	4 m	VIP-CAB-FLK20/FR/OE/0,14/3,0M	2900143	1
	20	6 m			
	20	8 m			
	20	10 m			
20	10 m				
<b>Round cable, as above, but in variable lengths</b>	20				
<b>Round cable with an open end</b>	50	0.5 m			
	50	1 m			
	50	1.5 m			
	50	2 m			
	50	2.5 m			
	50	3 m			
	50	4 m			
	50	6 m			
	50	8 m			
	50	10 m			
<b>Round cable, as above, but in variable lengths</b>	50				

**Ordering data**

Type	Order No.	Pcs./ Pkt.
CABLE-FLK20/OE/0,14/ 50	2305826	1
CABLE-FLK20/OE/0,14/ 100	2305305	1
CABLE-FLK20/OE/0,14/ 150	2305318	1
CABLE-FLK20/OE/0,14/ 200	2305321	1
CABLE-FLK20/OE/0,14/ 250	2305334	1
CABLE-FLK20/OE/0,14/ 300	2305347	1
CABLE-FLK20/OE/0,14/ 400	2305839	1
CABLE-FLK20/OE/0,14/ 600	2305842	1
CABLE-FLK20/OE/0,14/ 800	2305855	1
CABLE-FLK20/OE/0,14/1000	2305868	1
CABLE-FLK20/OE/0,14/...	2305745	1
CABLE-FLK50/OE/0,14/ 50	2305871	1
CABLE-FLK50/OE/0,14/ 100	2305350	1
CABLE-FLK50/OE/0,14/ 150	2305363	1
CABLE-FLK50/OE/0,14/ 200	2305376	1
CABLE-FLK50/OE/0,14/ 250	2305389	1
CABLE-FLK50/OE/0,14/ 300	2305392	1
CABLE-FLK50/OE/0,14/ 400	2305884	1
CABLE-FLK50/OE/0,14/ 600	2305897	1
CABLE-FLK50/OE/0,14/ 800	2305907	1
CABLE-FLK50/OE/0,14/1000	2305910	1
CABLE-FLK50/OE/0,14/...	2305758	1

## Universal cables

### System cable with IDC/FLK socket strips

#### Standard lengths

Round cable sets are used to connect the PLC front adapters to the corresponding VARIOFACE termination boards.

The following versions are available with 14 and 50 positions:

- Unshielded
- Shielded
- Halogen-free

The cables are assembled at both ends with IDC/FLK socket strips according to IEC 60603-13/DIN 41651 (1:1 connection).

In the case of shielded cables, a cable end with a ferrule is additionally provided as a shield connection (length: approx. 0.5 m; cable H05V-K 1 mm<sup>2</sup>, black).

Special lengths are defined using an order key, refer to page 590.



Unshielded



#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Shield	-
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	14-pos. 6.4 mm 50-pos. 10.3 mm

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Assembled round cable<sup>1)</sup></b> , with two 14-pos. IDC/FLK socket strips in fixed lengths, for transfer of 8 channels, for example					
	14	0.3 m	FLK 14/EZ-DR/ 30/KONFEK	2295729	5
	14	0.5 m	FLK 14/EZ-DR/ 50/KONFEK	2288901	5
	14	1 m	FLK 14/EZ-DR/ 100/KONFEK	2288914	1
	14	1.5 m	FLK 14/EZ-DR/ 150/KONFEK	2288927	1
	14	2 m	FLK 14/EZ-DR/ 200/KONFEK	2288930	1
	14	2.5 m	FLK 14/EZ-DR/ 250/KONFEK	2288943	1
	14	3 m	FLK 14/EZ-DR/ 300/KONFEK	2288956	1
	14	3.5 m	FLK 14/EZ-DR/ 350/KONFEK	2288969	1
	14	4 m	FLK 14/EZ-DR/ 400/KONFEK	2288972	1
	14	4.5 m	FLK 14/EZ-DR/ 450/KONFEK	2290847	1
	14	5 m	FLK 14/EZ-DR/ 500/KONFEK	2290834	1
	14	5.5 m	FLK 14/EZ-DR/ 550/KONFEK	2290850	1
	14	6 m	FLK 14/EZ-DR/ 600/KONFEK	2290863	1
	14	7 m			
	14	8 m	FLK 14/EZ-DR/ 800/KONFEK	2299563	1
	14	10 m	FLK 14/EZ-DR/1000/KONFEK	2299576	1
<b>Assembled round cable<sup>2)</sup></b> , with two 50-pos. IDC/FLK socket strips in fixed lengths, for transfer of 32 channels, for example					
	50	0.5 m	FLK 50/EZ-DR/ 50/KONFEK	2289065	5
	50	1 m	FLK 50/EZ-DR/ 100/KONFEK	2289078	1
	50	1.5 m	FLK 50/EZ-DR/ 150/KONFEK	2289081	1
	50	2 m	FLK 50/EZ-DR/ 200/KONFEK	2289094	1
	50	2.5 m	FLK 50/EZ-DR/ 250/KONFEK	2289104	1
	50	3 m	FLK 50/EZ-DR/ 300/KONFEK	2289117	1
	50	3.5 m	FLK 50/EZ-DR/ 350/KONFEK	2289120	1
	50	4 m	FLK 50/EZ-DR/ 400/KONFEK	2289133	1
	50	4.5 m	FLK 50/EZ-DR/ 450/KONFEK	2289573	1
	50	5 m	FLK 50/EZ-DR/ 500/KONFEK	2289586	1
	50	5.5 m	FLK 50/EZ-DR/ 550/KONFEK	2289599	1
	50	6 m	FLK 50/EZ-DR/ 600/KONFEK	2289609	1
	50	6.5 m	FLK 50/EZ-DR/ 650/KONFEK	2289612	1
	50	7 m	FLK 50/EZ-DR/ 700/KONFEK	2289625	1
	50	7.5 m	FLK 50/EZ-DR/ 750/KONFEK	2289638	1
	50	8 m	FLK 50/EZ-DR/ 800/KONFEK	2289641	1
	50	8.5 m	FLK 50/EZ-DR/ 850/KONFEK	2289654	1
	50	9 m	FLK 50/EZ-DR/ 900/KONFEK	2289667	1
	50	9.5 m	FLK 50/EZ-DR/ 950/KONFEK	2289670	1
	50	10 m	FLK 50/EZ-DR/1000/KONFEK	2289683	1



Shield connection at one end



Halogen-free (only the cable)

ERC  
Applied for: cUL / UL

ERC

Technical data	
< 50 V AC / 60 V DC 125 V / -	
1 A	
0.16 Ω/m -20 °C ... 50 °C Tinned copper-braided shield, approx. 85% covering	
Insulation displacement, IEC 60352-4/DIN EN 60352-4	
AWG 26 / 0.14 mm <sup>2</sup> 7 / Cu tin-plated	
6.7 mm 11 mm	

Technical data	
< 50 V AC / 60 V DC 125 V / 125 V	
1 A	
0.16 Ω/m -20 °C ... 50 °C -	
Insulation displacement, IEC 60352-4/DIN EN 60352-4	
AWG 26 / 0.14 mm <sup>2</sup> 7 / Cu tin-plated	
6.4 mm 10.3 mm	

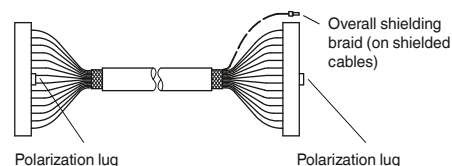
Ordering data		
Type	Order No.	Pcs./ Pkt.
FLK 14/EZ-DR/ 50/KONFEK/S	2296977	1
FLK 14/EZ-DR/ 100/KONFEK/S	2296980	1
FLK 14/EZ-DR/ 150/KONFEK/S	2296993	1
FLK 14/EZ-DR/ 200/KONFEK/S	2297002	1
FLK 14/EZ-DR/ 300/KONFEK/S	2299013	1
FLK 14/EZ-DR/ 400/KONFEK/S	2299026	1
FLK 14/EZ-DR/ 600/KONFEK/S	2299039	1
FLK 14/EZ-DR/ 800/KONFEK/S	2299042	1
FLK 14/EZ-DR/1000/KONFEK/S	2299055	1
FLK 50/EZ-DR/ 50/KONFEK/S	2299097	1
FLK 50/EZ-DR/ 100/KONFEK/S	2299107	1
FLK 50/EZ-DR/ 150/KONFEK/S	2299110	1
FLK 50/EZ-DR/ 200/KONFEK/S	2299123	1
FLK 50/EZ-DR/ 300/KONFEK/S	2299136	1
FLK 50/EZ-DR/ 400/KONFEK/S	2299149	1
FLK 50/EZ-DR/ 600/KONFEK/S	2299152	1
FLK 50/EZ-DR/ 800/KONFEK/S	2299165	1
FLK 50/EZ-DR/1000/KONFEK/S	2299178	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
FLK 14/EZ-DR/HF/ 50/KONFEK	2305952	1
FLK 14/EZ-DR/HF/ 100/KONFEK	2305965	1
FLK 14/EZ-DR/HF/ 150/KONFEK	2305978	1
FLK 14/EZ-DR/HF/ 200/KONFEK	2305981	1
FLK 14/EZ-DR/HF/ 250/KONFEK	2305994	1
FLK 14/EZ-DR/HF/ 300/KONFEK	2304759	1
FLK 14/EZ-DR/HF/ 400/KONFEK	2304762	1
FLK 14/EZ-DR/HF/ 500/KONFEK	2304717	1
FLK 14/EZ-DR/HF/ 600/KONFEK	2306003	1
FLK 14/EZ-DR/HF/ 700/KONFEK	2314011	1
FLK 14/EZ-DR/HF/ 800/KONFEK	2314024	1
FLK 14/EZ-DR/HF/1000/KONFEK	2314037	1
CABLE-FLK50/0,14/HF/ 0,5M	2314134	1
CABLE-FLK50/0,14/HF/ 1,0M	2314147	1
CABLE-FLK50/0,14/HF/ 1,5M	2314150	1
CABLE-FLK50/0,14/HF/ 2,0M	2314163	1
CABLE-FLK50/0,14/HF/ 2,5M	2314176	1
CABLE-FLK50/0,14/HF/ 3,0M	2314189	1
CABLE-FLK50/0,14/HF/ 4,0M	2314192	1
CABLE-FLK50/0,14/HF/ 5,0M	2314202	1
CABLE-FLK50/0,14/HF/ 6,0M	2314215	1
CABLE-FLK50/0,14/HF/ 7,0M	2314228	1
CABLE-FLK50/0,14/HF/ 8,0M	2314231	1
CABLE-FLK50/0,14/HF/10,0M	2314244	1

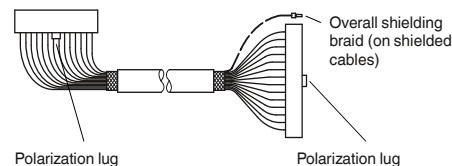
### Color code of system cables

Wire No.	Pin	Wire color
	1	Black
	2	Brown
	3	Red
	4	Orange
	5	Yellow
	6	Green
	7	Blue
	8	Violet
	9	Gray
10-pos.	10	White
	11	White-black
	12	White-brown
	13	White-red
14-pos.	14	White-orange
	15	White-yellow
16-pos.	16	White-green
	17	White-blue
	18	White-violet
20-pos.	19	White-gray
	20	Brown-black
	21	Brown-red
	22	Brown-orange
	23	Brown-yellow
	24	Brown-green
	25	Brown-blue
26-pos.	26	Brown-violet
	27	Brown-gray
	28	Brown-white
	29	Green-black
	30	Green-brown
	31	Green-red
	32	Green-orange
	33	Green-blue
34-pos.	34	Green-violet
	35	Green-gray
	36	Green-white
	37	Yellow-black
	38	Yellow-brown
	39	Yellow-red
40-pos.	40	Yellow-orange
	41	Yellow-blue
	42	Yellow-violet
	43	Yellow-gray
	44	Yellow-white
	45	Gray-black
	46	Gray-brown
	47	Gray-red
	48	Gray-orange
	49	Gray-yellow
50-pos.	50	Gray-green

1) IDC/FLK socket strip assembled straight at both ends.



2) IDC/FLK socket strip assembled straight at one end and angled at the other.



# System cabling for controllers

## Universal cables

### System cable with IDC/FLK socket strips

#### Standard lengths

Pre-assembled round cables to couple the VARIOFACE termination boards.

The cables are assembled at both ends with IDC/FLK socket strips according to IEC 60603-13/DIN 41651 (1:1 connection).

Special lengths are defined using an order key, refer to page 590.



Unshielded



Applied for: cUL / UL

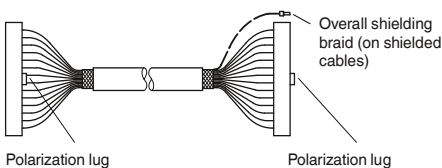
#### Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	10-pos. 6 mm 16-pos. 6.5 mm 20-pos. 7.6 mm

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Round cable<sup>1)</sup>, with two IDC/FLK socket strips</b>					
	10	0.5 m	FLK 10/EZ-DR/ 50/KONFEK	2299204	1
	10	1 m	FLK 10/EZ-DR/ 100/KONFEK	2299217	1
	10	1.5 m	FLK 10/EZ-DR/ 150/KONFEK	2299220	1
	10	2 m	FLK 10/EZ-DR/ 200/KONFEK	2299233	1
	10	3 m	FLK 10/EZ-DR/ 300/KONFEK	2299246	1
	10	4 m	FLK 10/EZ-DR/ 400/KONFEK	2299259	1
	10	6 m	FLK 10/EZ-DR/ 600/KONFEK	2299262	1
	10	8 m	FLK 10/EZ-DR/ 800/KONFEK	2299275	1
	10	10 m	FLK 10/EZ-DR/1000/KONFEK	2299288	1
<b>Round cable<sup>1)</sup>, with two IDC/FLK socket strips</b>					
	16	0.5 m	FLK 16/EZ-DR/ 50/KONFEK	2299291	1
	16	1 m	FLK 16/EZ-DR/ 100/KONFEK	2299301	1
	16	1.5 m	FLK 16/EZ-DR/ 150/KONFEK	2299314	1
	16	2 m	FLK 16/EZ-DR/ 200/KONFEK	2299327	1
	16	3 m	FLK 16/EZ-DR/ 300/KONFEK	2299330	1
	16	4 m	FLK 16/EZ-DR/ 400/KONFEK	2299343	1
	16	6 m	FLK 16/EZ-DR/ 600/KONFEK	2299356	1
	16	8 m	FLK 16/EZ-DR/ 800/KONFEK	2299369	1
	16	10 m	FLK 16/EZ-DR/1000/KONFEK	2299372	1
<b>Round cable<sup>1)</sup>, with two IDC/FLK socket strips</b>					
	20	0.5 m	FLK 20/EZ-DR/ 50KONFEK	2296391	1
	20	1 m	FLK 20/EZ-DR/ 100KONFEK	2296401	1
	20	1.5 m	FLK 20/EZ-DR/ 150KONFEK	2296472	1
	20	2 m	FLK 20/EZ-DR/ 200KONFEK	2296485	1
	20	3 m	FLK 20/EZ-DR/ 300KONFEK	2296498	1
	20	4 m	FLK 20/EZ-DR/ 400KONFEK	2296508	1
	20	6 m	FLK 20/EZ-DR/ 600KONFEK	2296511	1
	20	8 m	FLK 20/EZ-DR/ 800KONFEK	2296524	1
	20	10 m	FLK 20/EZ-DR/1000KONFEK	2296537	1

<sup>1)</sup> IDC/FLK socket strip assembled straight at both ends.



**System cable with IDC/FLK socket strips**

**Standard lengths**

Pre-assembled round cables to couple the VARIOFACE termination boards.

The cables are assembled at both ends with IDC/FLK socket strips according to IEC 60603-13/DIN 41651 (1:1 connection).

Special lengths are defined using an order key, refer to page 590.



Unshielded



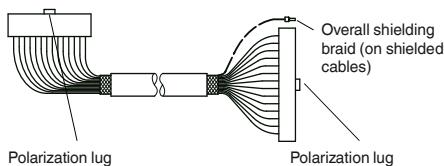
**Technical data**

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	
	26-pos. 7.8 mm
	34-pos. 8.7 mm
	40-pos. 9.9 mm

**Ordering data**

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Round cable<sup>1)</sup>, with two IDC/FLK socket strips</b>					
	26	0.5 m	FLK 26/EZ-DR/ 50/KONFEK	2299385	1
	26	1 m	FLK 26/EZ-DR/ 100/KONFEK	2299398	1
	26	1.5 m	FLK 26/EZ-DR/ 150/KONFEK	2299408	1
	26	2 m	FLK 26/EZ-DR/ 200/KONFEK	2299411	1
	26	3 m	FLK 26/EZ-DR/ 300/KONFEK	2299424	1
	26	4 m	FLK 26/EZ-DR/ 400/KONFEK	2299437	1
	26	6 m	FLK 26/EZ-DR/ 600/KONFEK	2299440	1
	26	8 m	FLK 26/EZ-DR/ 800/KONFEK	2299453	1
	26	10 m	FLK 26/EZ-DR/1000/KONFEK	2299466	1
<b>Round cable<sup>1)</sup>, with two IDC/FLK socket strips</b>					
	34	0.5 m	FLK 34/EZ-DR/ 50/KONFEK	2299479	1
	34	1 m	FLK 34/EZ-DR/ 100/KONFEK	2299482	1
	34	1.5 m	FLK 34/EZ-DR/ 150/KONFEK	2299495	1
	34	2 m	FLK 34/EZ-DR/ 200/KONFEK	2299505	1
	34	3 m	FLK 34/EZ-DR/ 300/KONFEK	2299518	1
	34	4 m	FLK 34/EZ-DR/ 400/KONFEK	2299521	1
	34	6 m	FLK 34/EZ-DR/ 600/KONFEK	2299534	1
	34	8 m	FLK 34/EZ-DR/ 800/KONFEK	2299547	1
	34	10 m	FLK 34/EZ-DR/1000/KONFEK	2299550	1
<b>Round cable<sup>2)</sup>, with two IDC/FLK socket strips</b>					
	40	0.5 m	FLK 40/EZ-DR/ 50/KONFEK	2288985	5
	40	1 m	FLK 40/EZ-DR/ 100/KONFEK	2288998	1
	40	1.5 m	FLK 40/EZ-DR/ 150/KONFEK	2289007	1
	40	2 m	FLK 40/EZ-DR/ 200/KONFEK	2289010	1
	40	2.5 m	FLK 40/EZ-DR/ 250/KONFEK	2289023	1
	40	3 m	FLK 40/EZ-DR/ 300/KONFEK	2289036	1
	40	3.5 m	FLK 40/EZ-DR/ 350/KONFEK	2289049	1
	40	4 m	FLK 40/EZ-DR/ 400/KONFEK	2289052	1
	40	6 m	FLK 40/EZ-DR/ 600/KONFEK	2299589	1
	40	8 m	FLK 40/EZ-DR/ 800/KONFEK	2299592	1
	40	10 m	FLK 40/EZ-DR/1000/KONFEK	2299602	1

<sup>2)</sup> IDC/FLK socket strip assembled straight at one end and angled at the other.



# System cabling for controllers

## Universal cables

### System cables with IDC/FLK socket strip

#### Special lengths

Pre-assembled round cables for connecting, e.g., PLC front adapters to the corresponding VARIOFACE termination boards. The cables are assembled with IDC/FLK socket strips on both ends according to IEC 60603-13/DIN 41651. For shielded cables, a cable end with ferrule is also available as an overall shielding braid (length: approx. 0.5 m; cable: H05V-K 1 mm<sup>2</sup>, black).

The order key for special lengths is described using three features.

The order of the features is as follows:

- Cable type
- Assembly
- Length in meters

There are two order keys, one for unshielded round cables, FLK EZ-DR/.../.../..., and one for shielded round cables, FLK EZ-DR-S/.../.../... To ensure clear specification when ordering, the features are described in detail below:

#### Cable type

- This specifies the number of individual cables of the specific cable.

#### Assembly

- None, the cable is not assembled at either end,
- 10-pos. IDC/FLK socket strip at both ends, the cable is assembled at both ends with 10-pos. IDC/FLK socket strips (1:1 connection),
- 14-pos. IDC/FLK socket strip at both ends, the cable is assembled at both ends with 14-pos. IDC/FLK socket strips

(1:1 connection), etc. to

- 50-pos. IDC/FLK socket strip at both ends, the cable is assembled at both ends with 50-pos. IDC/FLK socket strips (1:1 connection),
- 14-pos. IDC/FLK socket strip at one end, 16-pos. IDC/FLK socket strip at the other end, the cable is assembled with a 14-pos. IDC/FLK socket strip at one end and a 16-pos. IDC/FLK socket strip at the other end (for SIMATIC® S7, no 1:1 connection).

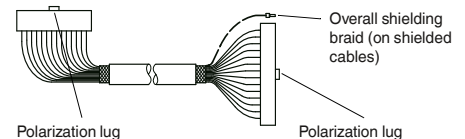
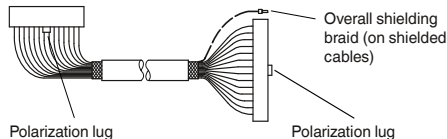
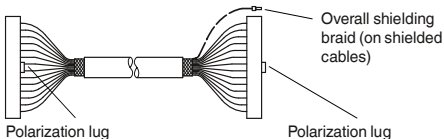
#### Features of permissible configurations:

Cable type	Unshielded round cables FLK EZ-DR/.../.../...							Shielded round cables FLK EZ-DR-S/.../.../...				
	10-pos.	14-pos.	16-pos.	20-pos.	26-pos.	34-pos.	40-pos.	50-pos.	14-pos.	16-pos.	40-pos.	50-pos.
No assembly	10U/C00/...	14U/C00/...	16U/C00/...	20U/C00/...	26U/C00/...	34U/C00/...	40U/C00/...	50U/C00/...	14S/C00/...	16S/C00/...	40S/C00/...	50S/C00/...
10-pos. IDC/FLK at both ends	10U/C55/... <sup>1)</sup>											
14-pos. IDC/FLK at both ends		14U/C23/... <sup>1)</sup>							14S/C23/... <sup>1)</sup>			
16-pos. IDC/FLK at both ends			16U/C58/... <sup>1)</sup>							16S/C58/... <sup>1)</sup>		
20-pos. IDC/FLK at both ends				20U/C61/... <sup>1)</sup>								
26-pos. IDC/FLK at both ends					26U/C63/... <sup>1)</sup>							
34-pos. IDC/FLK at both ends						34U/C65/... <sup>1)</sup>						
40-pos. IDC/FLK at both ends							40U/C30/... <sup>2)</sup>				40S/C30/... <sup>2)</sup>	
50-pos. IDC/FLK at both ends								50U/C38/... <sup>2)</sup>				50S/C38/... <sup>2)</sup>
14-pos. IDC/FLK at one end, 16-pos. IDC/FLK at the other end		14U/C52/... <sup>1)</sup>							14S/C52/... <sup>1)</sup>			

1) IDC/FLK socket strip assembled straight at both ends.

2) IDC/FLK socket strip assembled straight at one end and angled at the other.

3) IDC/FLK socket strip assembled straight at one end and angled at the other.



#### Ordering example for unshielded round cable:

– unshielded 50-pos. round cable, assembled with two 50-pos. IDC/FLK socket strips, 11.5 m long

Quantity	Order No.	Cable type	Assembly	Length [m] <sup>4)</sup>
1	2295059	50U 10U ≙ 10-pos. unshielded 14U ≙ 14-pos. unshielded 16U ≙ 16-pos. unshielded 20U ≙ 20-pos. unshielded 26U ≙ 26-pos. unshielded 34U ≙ 34-pos. unshielded 40U ≙ 40-pos. unshielded 50U ≙ 50-pos. unshielded	C38 C00 ≙ No assembly C55 ≙ 10-pos. IDC/FLK socket strip at both ends C23 ≙ 14-pos. IDC/FLK socket strip at both ends C52 ≙ 14-pos. IDC/FLK socket strip at one end, 16-pos. IDC/FLK socket strip at the other end (for S7) C58 ≙ 16-pos. IDC/FLK socket strip at both ends C61 ≙ 20-pos. IDC/FLK socket strip at both ends C63 ≙ 26-pos. IDC/FLK socket strip at both ends C65 ≙ 34-pos. IDC/FLK socket strip at both ends C30 ≙ 40-pos. IDC/FLK socket strip at both ends C38 ≙ 50-pos. IDC/FLK socket strip at both ends	11.50 <sup>4)</sup> min. 0.20 m

#### Ordering example for shielded round cable:

– shielded 14-pos. round cable, assembled with two 14-pos. IDC/FLK socket strips, 12.75 m long

Quantity	Order No.	Cable type	Assembly	Length [m] <sup>4)</sup>
1	2295046	14S 14S ≙ 14-pos. shielded 16S ≙ 16-pos. shielded 40S ≙ 40-pos. shielded 50S ≙ 50-pos. shielded	C23 C00 ≙ No assembly C23 ≙ 14-pos. IDC/FLK socket strip at both ends C52 ≙ 14-pos. IDC/FLK socket strip at one end, 16-pos. IDC/FLK socket strip at the other end (for S7) C58 ≙ 16-pos. IDC/FLK socket strip at both ends C30 ≙ 40-pos. IDC/FLK socket strip at both ends C38 ≙ 50-pos. IDC/FLK socket strip at both ends	12.75 <sup>4)</sup> min. 0.20 m



Unshielded



Shielded



Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Shield	-
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated

Ordering data

Description	No. of pos.	Cable length
Unshielded round cable, as above, but in variable lengths of type "FLK EZ-DR/14U/C52/..."		
	10	

Type	Order No.	Pcs./ Pkt.
FLK EZ-DR.../.../...	2295059	1



Technical data

Maximum permissible operating voltage	< 50 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Shield	Tinned copper-braided shield, approx. 85% covering
Conductor cross section	AWG 26 / 0.14 mm <sup>2</sup>
Conductor structure: stranded wires / material	7 / Cu tin-plated

Ordering data

Type	Order No.	Pcs./ Pkt.
FLK EZ-DR-S.../.../...	2295046	1

# System cabling for controllers

## Universal cables

### System cable with D-SUB socket and pin strips

#### Standard lengths

Shielded round cable sets to connect the control level with the corresponding VARIOFACE termination boards.

Assembly with D-SUB strips as per IEC 60807-2/DIN 41652, (1:1 connection).

– D-SUB socket strip at one end and

D-SUB pin strip at the other

– D-SUB socket strips at both ends

– DSUB pin strips at both ends

– Cable exit: straight

– Screw connection: 2 UNC 4-40 screws

Special lengths and assembly versions are defined using an order key, refer to page 594.



Socket strip at one end and pin strip at the other



#### Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	2 A
Maximum conductor resistance	0.09 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Shield	Tinned copper-braided shield, approx. 85% covering
Insertion/withdrawal cycles	> 200
Conductor cross section	AWG 24 / 0.25 mm <sup>2</sup>
Outside diameter	
	9-pos. 7.5 mm
	15-pos. 9 mm
	25-pos. 10.5 mm
	37-pos. 12.5 mm
	50-pos. 13.5 mm

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Shielded round cable</b> , assembled with two D-SUB strips, various numbers of positions and lengths					
	9	0.5 m	CABLE-D 9SUB/B/S/ 50/KONFEK/S	2299987	1
	9	1 m	CABLE-D 9SUB/B/S/100/KONFEK/S	2299990	1
	9	1.5 m	CABLE-D 9SUB/B/S/150/KONFEK/S	2300009	1
	9	2 m	CABLE-D 9SUB/B/S/200/KONFEK/S	2302010	1
	9	3 m	CABLE-D 9SUB/B/S/300/KONFEK/S	2302023	1
	9	4 m	CABLE-D 9SUB/B/S/400/KONFEK/S	2302036	1
	9	6 m	CABLE-D 9SUB/B/S/600/KONFEK/S	2302049	1
	15	0.5 m	CABLE-D15SUB/B/S/ 50/KONFEK/S	2302052	1
	15	1 m	CABLE-D15SUB/B/S/100/KONFEK/S	2302065	1
	15	1.5 m	CABLE-D15SUB/B/S/150/KONFEK/S	2302078	1
	15	2 m	CABLE-D15SUB/B/S/200/KONFEK/S	2302081	1
	15	3 m	CABLE-D15SUB/B/S/300/KONFEK/S	2302094	1
	15	4 m	CABLE-D15SUB/B/S/400/KONFEK/S	2302104	1
	15	6 m	CABLE-D15SUB/B/S/600/KONFEK/S	2302117	1
	25	0.5 m	CABLE-D25SUB/B/S/ 50/KONFEK/S	2302120	1
	25	1 m	CABLE-D25SUB/B/S/100/KONFEK/S	2302133	1
	25	1.5 m	CABLE-D25SUB/B/S/150/KONFEK/S	2302146	1
	25	2 m	CABLE-D25SUB/B/S/200/KONFEK/S	2302159	1
	25	3 m	CABLE-D25SUB/B/S/300/KONFEK/S	2302162	1
	25	4 m	CABLE-D25SUB/B/S/400/KONFEK/S	2302175	1
	25	6 m	CABLE-D25SUB/B/S/600/KONFEK/S	2302188	1
	37	0.5 m	CABLE-D37SUB/B/S/ 50/KONFEK/S	2302191	1
	37	1 m	CABLE-D37SUB/B/S/100/KONFEK/S	2302201	1
	37	2 m	CABLE-D37SUB/B/S/200/KONFEK/S	2302227	1
	37	3 m	CABLE-D37SUB/B/S/300/KONFEK/S	2302230	1
	37	4 m	CABLE-D37SUB/B/S/400/KONFEK/S	2302243	1
	37	6 m	CABLE-D37SUB/B/S/600/KONFEK/S	2302256	1
	37	8 m			
	37	10 m			
	37	15 m			
	37	20 m			
	50	0.5 m	CABLE-D50SUB/B/S/ 50/KONFEK/S	2302269	1
	50	1 m	CABLE-D50SUB/B/S/100/KONFEK/S	2302272	1
	50	1.5 m	CABLE-D50SUB/B/S/150/KONFEK/S	2302285	1
	50	2 m	CABLE-D50SUB/B/S/200/KONFEK/S	2302298	1
	50	3 m	CABLE-D50SUB/B/S/300/KONFEK/S	2302308	1
	50	4 m	CABLE-D50SUB/B/S/400/KONFEK/S	2302311	1
	50	6 m	CABLE-D50SUB/B/S/600/KONFEK/S	2302324	1





Socket strip at both ends



Pin strip at both ends



Socket strip at both ends  
Halogen-free



Technical data
25 V AC / 60 V DC 125 V / 125 V 2 A 0.09 Ω/m -20 °C ... 50 °C Tinned copper-braided shield, approx. 85% covering
> 200 AWG 24 / 0.25 mm <sup>2</sup>
7.5 mm 9 mm 10.5 mm 12 mm 13.5 mm

Technical data
25 V AC / 60 V DC 125 V / 125 V 2 A 0.09 Ω/m -20 °C ... 50 °C Tinned copper-braided shield, approx. 85% covering
> 200 AWG 24 / 0.25 mm <sup>2</sup>
7.5 mm 9 mm 10.5 mm 12 mm 13.5 mm

Technical data
25 V AC / 60 V DC - / - 2 A (50 °C) , 1 A (70 °C) 0.09 Ω/m -20 °C ... 70 °C Tinned copper braided shield
- AWG 24 / 0.25 mm <sup>2</sup>
- - - 12.5 mm -

Ordering data		
Type	Order No.	Pcs./ Pkt.
CABLE-D 9SUB/B/B/100/KONFEK/S	2305415	1
CABLE-D 9SUB/B/B/200/KONFEK/S	2305428	1
CABLE-D 9SUB/B/B/300/KONFEK/S	2305431	1
CABLE-D15SUB/B/B/100/KONFEK/S	2305444	1
CABLE-D15SUB/B/B/200/KONFEK/S	2305457	1
CABLE-D15SUB/B/B/300/KONFEK/S	2305460	1
CABLE-D25SUB/B/B/100/KONFEK/S	2305473	1
CABLE-D25SUB/B/B/200/KONFEK/S	2305486	1
CABLE-D25SUB/B/B/300/KONFEK/S	2305499	1
CABLE-D37SUB/B/B/ 100/KONFEK/S	2305509	1
CABLE-D37SUB/B/B/ 200/KONFEK/S	2305512	1
CABLE-D37SUB/B/B/ 300/KONFEK/S	2305525	1
CABLE-D37SUB/B/B/ 400/KONFEK/S	2900759	1
CABLE-D37SUB/B/B/ 600/KONFEK/S	2900760	1
CABLE-D37SUB/B/B/ 800/KONFEK/S	2900761	1
CABLE-D37SUB/B/B/1000/KONFEK/S	2900762	1
CABLE-D37SUB/B/B/1500/KONFEK/S	2900763	1
CABLE-D37SUB/B/B/2000/KONFEK/S	2900764	1
CABLE-D50SUB/B/B/100/KONFEK/S	2305541	1
CABLE-D50SUB/B/B/200/KONFEK/S	2305554	1
CABLE-D50SUB/B/B/300/KONFEK/S	2305567	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
CABLE-D 9SUB/S/S/100/KONFEK/S	2305570	1
CABLE-D 9SUB/S/S/200/KONFEK/S	2305583	1
CABLE-D 9SUB/S/S/300/KONFEK/S	2305596	1
CABLE-D15SUB/S/S/100/KONFEK/S	2305606	1
CABLE-D15SUB/S/S/200/KONFEK/S	2305619	1
CABLE-D15SUB/S/S/300/KONFEK/S	2305622	1
CABLE-D25SUB/S/S/100/KONFEK/S	2305635	1
CABLE-D25SUB/S/S/200/KONFEK/S	2305648	1
CABLE-D25SUB/S/S/300/KONFEK/S	2305651	1
CABLE-D37SUB/S/S/100/KONFEK/S	2305664	1
CABLE-D37SUB/S/S/200/KONFEK/S	2305677	1
CABLE-D37SUB/S/S/300/KONFEK/S	2305680	1
CABLE-D50SUB/S/S/100/KONFEK/S	2305693	1
CABLE-D50SUB/S/S/200/KONFEK/S	2305703	1
CABLE-D50SUB/S/S/300/KONFEK/S	2305716	1

Ordering data		
Type	Order No.	Pcs./ Pkt.
CABLE-D37SUB/B/B/HF/S/ 1,0M	2908516	1
CABLE-D37SUB/B/B/HF/S/ 2,0M	2908517	1
CABLE-D37SUB/B/B/HF/S/ 3,0M	2908518	1
CABLE-D37SUB/B/B/HF/S/ 4,0M	2908519	1
CABLE-D37SUB/B/B/HF/S/ 6,0M	2908520	1
CABLE-D37SUB/B/B/HF/S/ 8,0M	2908521	1
CABLE-D37SUB/B/B/HF/S/10,0M	2908522	1
CABLE-D37SUB/B/B/HF/S/15,0M	2908523	1
CABLE-D37SUB/B/B/HF/S/20,0M	2908525	1

# System cabling for controllers

## Universal cables

### System cables with D-SUB socket and pin strips

#### Special lengths

Pre-assembled, shielded **round cables** for connecting VARIOFACE termination boards. The cables are assembled with D-SUB strips according to IEC 60807-2/DIN 41652.

The order key is described using three features.

The order of the features is as follows:

- Cable type
- Assembly
- Length in meters

There are three assembly versions for the shielded round cable:

- CABLE D-SUB-S/.../.../...  
D-SUB socket strip at one end and D-SUB pin strip at the other end,
- CABLE D-SUB-B-B-S/.../.../...  
D-SUB socket strips at both ends,
- CABLE D-SUB-S-S/.../.../...

D-SUB pin strips at both ends  
To ensure clear specification when ordering, the features are described in detail below:

#### Cable type

- This specifies the number of individual cables of the specific cable.

#### Assembly

- (Example for CABLE D-SUB-S/.../.../...)
- None, the cable is not assembled at either end,
- 9-pos. D-SUB socket strip at one end, 9-pos. D-SUB pin strip at the other end, the cable connects (1:1) a 9-pos. D-SUB socket and pin strip,
- 15-pos. D-SUB socket strip at one end, 15-pos. D-SUB pin strip at the other end, the cable connects (1:1) a 15-pos. D-SUB socket and pin strip, etc. to

- 50-pos. D-SUB socket strip at one end, 50-pos. D-SUB pin strip at the other end, the cable connects (1:1) a 50-pos. D-SUB socket and pin strip.

#### Ordering example for round cable assembled with pin strip at one end and socket strip at the other end

- shielded 25-pos. round cable, assembled with a 25-pos. D-SUB socket strip and a 25-pos. D-SUB pin strip, 11.5 mm long

Quantity	Order No.	Cable type	Assembly	Length [m] <sup>1)</sup>
1	2302340	25S 09S ≙ 9-pos. shielded 15S ≙ 15-pos. shielded 25S ≙ 25-pos. shielded 37S ≙ 37-pos. shielded 50S ≙ 50-pos. shielded	C36 C00 ≙ No assembly C01 ≙ 9-pos. D-SUB socket strip at one end 9-pos. D-SUB pin strip at the other end C28 ≙ 15-pos. D-SUB socket strip at one end 15-pos. D-SUB pin strip at the other end C36 ≙ 25-pos. D-SUB socket strip at one end 25-pos. D-SUB pin strip at the other end C43 ≙ 37-pos. D-SUB socket strip at one end 37-pos. D-SUB pin strip at the other end C49 ≙ 50-pos. D-SUB socket strip at one end 50-pos. D-SUB pin strip at the other end	11.50 <sup>1)</sup> min. 0.20 m

#### Ordering example for round cable assembled with socket strip at both ends

- shielded 37-pos. round cable, assembled with two D-SUB 37 socket strips, 12.75 m long

Quantity	Order No.	Cable type	Assembly	Length [m] <sup>1)</sup>
1	2302421	37S 09S ≙ 9-pos. shielded 15S ≙ 15-pos. shielded 25S ≙ 25-pos. shielded 37S ≙ 37-pos. shielded 50S ≙ 50-pos. shielded	C44 C00 ≙ No assembly C22 ≙ 9-pos. D-SUB socket strip at both ends C29 ≙ 15-pos. D-SUB socket strip at both ends C37 ≙ 25-pos. D-SUB socket strip at both ends C44 ≙ 37-pos. D-SUB socket strip at both ends C50 ≙ 50-pos. D-SUB socket strip at both ends	12.75 <sup>1)</sup> min. 0.20 m

#### Ordering example for round cable assembled with pin strip at both ends

- shielded 15-pos. round cable, assembled with two D-SUB 15 pin strips, 8.5 m long

Quantity	Order No.	Cable type	Assembly	Length [m] <sup>1)</sup>
1	2302434	15S 09S ≙ 9-pos. shielded 15S ≙ 15-pos. shielded 25S ≙ 25-pos. shielded 37S ≙ 37-pos. shielded 50S ≙ 50-pos. shielded	C71 C00 ≙ No assembly C70 ≙ 9-pos. D-SUB pin strip at both ends C71 ≙ 15-pos. D-SUB pin strip at both ends C72 ≙ 25-pos. D-SUB pin strip at both ends C73 ≙ 37-pos. D-SUB pin strip at both ends C74 ≙ 50-pos. D-SUB pin strip at both ends	8.50 <sup>1)</sup> min. 0.20 m



Shielded



### Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	2 A
Maximum conductor resistance	0.09 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Shield	Tinned copper-braided shield, approx. 85% covering
Insertion/withdrawal cycles	> 200
Conductor cross section	AWG 24 / 0.25 mm <sup>2</sup>

### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Assembled round cable, in variable lengths, pin strip at one end and socket strip at the other end</b>	9		CABLE D-SUB-S/.../.../...	2302340	1
<b>Assembled round cable, in variable lengths, socket strip at both ends</b>	9		CABLE D-SUB-B-B-S/.../.../...	2302421	1
<b>Assembled round cable, in variable lengths, pin strip at both ends</b>	9		CABLE D-SUB-S-S-S/.../.../...	2302434	1

# System cabling for controllers

## Universal cables

### System cable with D-SUB socket strip or pin strip and an open end

- 1:1 connection
- D-SUB socket strip or pin strip at one end
- Connector according to IEC 60807-2/DIN 41652
- Gland: 2 UNC 4-40 screws
- Open end at the other end
- Individual wire marking: 1, 2, 3, 4, etc.
- Individual wires fitted with ferrules
- Shield connection: H05V-K 1 mm<sup>2</sup> cable, black, 0.5 m in length



Socket strip at one end and open end at the other end



Pin strip at one end and open end at the other end



#### Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	2 A
Maximum conductor resistance	0.09 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Shield	Tinned copper-braided shield, approx. 85% covering
Insertion/withdrawal cycles	> 200
Conductor cross section	AWG 24 / 0.25 mm <sup>2</sup>
Outside diameter	9-pos. 7.5 mm 15-pos. 9 mm 25-pos. 10.5 mm

#### Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	2 A
Maximum conductor resistance	0.09 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Shield	Tinned copper-braided shield, approx. 85% covering
Insertion/withdrawal cycles	> 200
Conductor cross section	AWG 24 / 0.25 mm <sup>2</sup>
Outside diameter	7.5 mm 9 mm 10.5 mm

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Round cable with an open end</b>					
	9	0.5 m	CABLE-D- 9SUB/F/OE/0,25/S/0,5M	2926014	1
	9	1 m	CABLE-D- 9SUB/F/OE/0,25/S/1,0M	2926027	1
	9	1.5 m	CABLE-D- 9SUB/F/OE/0,25/S/1,5M	2926030	1
	9	2 m	CABLE-D- 9SUB/F/OE/0,25/S/2,0M	2926043	1
	9	3 m	CABLE-D- 9SUB/F/OE/0,25/S/3,0M	2926056	1
	9	4 m	CABLE-D- 9SUB/F/OE/0,25/S/4,0M	2926069	1
	9	6 m	CABLE-D- 9SUB/F/OE/0,25/S/6,0M	2926072	1
<b>Round cable, as above, but in variable lengths</b>					
	9		CABLE-D- 9SUB-F-OE-0,25-S/...	2900903	1
<b>Round cable with an open end</b>					
	15	0.5 m	CABLE-D-15SUB/F/OE/0,25/S/0,5M	2926085	1
	15	1 m	CABLE-D-15SUB/F/OE/0,25/S/1,0M	2926098	1
	15	1.5 m	CABLE-D-15SUB/F/OE/0,25/S/1,5M	2926108	1
	15	2 m	CABLE-D-15SUB/F/OE/0,25/S/2,0M	2926111	1
	15	3 m	CABLE-D-15SUB/F/OE/0,25/S/3,0M	2926124	1
	15	4 m	CABLE-D-15SUB/F/OE/0,25/S/4,0M	2926137	1
	15	6 m	CABLE-D-15SUB/F/OE/0,25/S/6,0M	2926140	1
<b>Round cable, as above, but in variable lengths</b>					
	15		CABLE-D-15SUB-F-OE-0,25-S/...	2900905	1
<b>Round cable with an open end</b>					
	25	0.5 m	CABLE-D-25SUB/F/OE/0,25/S/0,5M	2926153	1
	25	1 m	CABLE-D-25SUB/F/OE/0,25/S/1,0M	2926166	1
	25	1.5 m	CABLE-D-25SUB/F/OE/0,25/S/1,5M	2926179	1
	25	2 m	CABLE-D-25SUB/F/OE/0,25/S/2,0M	2926182	1
	25	3 m	CABLE-D-25SUB/F/OE/0,25/S/3,0M	2926195	1
	25	4 m	CABLE-D-25SUB/F/OE/0,25/S/4,0M	2926205	1
	25	6 m	CABLE-D-25SUB/F/OE/0,25/S/6,0M	2926218	1
<b>Round cable, as above, but in variable lengths</b>					
	25		CABLE-D-25SUB-F-OE-0,25-S/...	2900906	1

#### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
<b>Round cable with an open end</b>					
	9	0.5 m	CABLE-D- 9SUB/M/OE/0,25/S/0,5M	2926360	1
	9	1 m	CABLE-D- 9SUB/M/OE/0,25/S/1,0M	2926373	1
	9	1.5 m	CABLE-D- 9SUB/M/OE/0,25/S/1,5M	2926386	1
	9	2 m	CABLE-D- 9SUB/M/OE/0,25/S/2,0M	2926399	1
	9	3 m	CABLE-D- 9SUB/M/OE/0,25/S/3,0M	2926409	1
	9	4 m	CABLE-D- 9SUB/M/OE/0,25/S/4,0M	2926412	1
	9	6 m	CABLE-D- 9SUB/M/OE/0,25/S/6,0M	2926425	1
<b>Round cable, as above, but in variable lengths</b>					
	9		CABLE-D- 9SUB-M-OE-0,25-S/...	2900909	1
<b>Round cable with an open end</b>					
	15	0.5 m	CABLE-D-15SUB/M/OE/0,25/S/0,5M	2926438	1
	15	1 m	CABLE-D-15SUB/M/OE/0,25/S/1,0M	2926441	1
	15	1.5 m	CABLE-D-15SUB/M/OE/0,25/S/1,5M	2926454	1
	15	2 m	CABLE-D-15SUB/M/OE/0,25/S/2,0M	2926467	1
	15	3 m	CABLE-D-15SUB/M/OE/0,25/S/3,0M	2926470	1
	15	4 m	CABLE-D-15SUB/M/OE/0,25/S/4,0M	2926483	1
	15	6 m	CABLE-D-15SUB/M/OE/0,25/S/6,0M	2926496	1
<b>Round cable, as above, but in variable lengths</b>					
	15		CABLE-D-15SUB-M-OE-0,25-S/...	2900910	1
<b>Round cable with an open end</b>					
	25	0.5 m	CABLE-D-25SUB/M/OE/0,25/S/0,5M	2926506	1
	25	1 m	CABLE-D-25SUB/M/OE/0,25/S/1,0M	2926519	1
	25	1.5 m	CABLE-D-25SUB/M/OE/0,25/S/1,5M	2926522	1
	25	2 m	CABLE-D-25SUB/M/OE/0,25/S/2,0M	2926535	1
	25	3 m	CABLE-D-25SUB/M/OE/0,25/S/3,0M	2926548	1
	25	4 m	CABLE-D-25SUB/M/OE/0,25/S/4,0M	2926551	1
	25	6 m	CABLE-D-25SUB/M/OE/0,25/S/6,0M	2926564	1
<b>Round cable, as above, but in variable lengths</b>					
	25		CABLE-D-25SUB-M-OE-0,25-S/...	2900911	1

Special lengths of D-SUB cable with open ends are configured using separate order numbers.

### Ordering example:

One system cable assembled with a 37-pos. D-SUB socket strip and an open end, 12.75 m in length:

**1 pcs. 2900907/12,75**



Socket strip at one end and open end at the other end



Pin strip at one end and open end at the other end



### Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	2 A
Maximum conductor resistance	0.09 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Shield	Tinned copper-braided shield, approx. 85% covering
Insertion/withdrawal cycles	> 200
Conductor cross section	AWG 24 / 0.25 mm <sup>2</sup>
Outside diameter	37-pos. 12 mm 50-pos. 13.5 mm



### Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	2 A
Maximum conductor resistance	0.09 Ω/m
Ambient temperature (operation)	-20 °C ... 50 °C
Shield	Tinned copper-braided shield, approx. 85% covering
Insertion/withdrawal cycles	> 200
Conductor cross section	AWG 24 / 0.25 mm <sup>2</sup>
Outside diameter	12 mm 13.5 mm

### Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./ Pkt.
Round cable with an open end	37	0.5 m	CABLE-D-37SUB/F/OE/0,25/S/0,5M	2926221	1
	37	1 m	CABLE-D-37SUB/F/OE/0,25/S/1,0M	2926234	1
	37	1.5 m	CABLE-D-37SUB/F/OE/0,25/S/1,5M	2926247	1
	37	2 m	CABLE-D-37SUB/F/OE/0,25/S/2,0M	2926250	1
	37	3 m	CABLE-D-37SUB/F/OE/0,25/S/3,0M	2926263	1
	37	4 m	CABLE-D-37SUB/F/OE/0,25/S/4,0M	2926276	1
	37	6 m	CABLE-D-37SUB/F/OE/0,25/S/6,0M	2926289	1
Round cable, as above, but in variable lengths	37		CABLE-D-37SUB-F-OE-0,25-S/...	2900907	1
Round cable with an open end	50	0.5 m	CABLE-D-50SUB/F/OE/0,25/S/0,5M	2926292	1
	50	1 m	CABLE-D-50SUB/F/OE/0,25/S/1,0M	2926302	1
	50	1.5 m	CABLE-D-50SUB/F/OE/0,25/S/1,5M	2926315	1
	50	2 m	CABLE-D-50SUB/F/OE/0,25/S/2,0M	2926328	1
	50	3 m	CABLE-D-50SUB/F/OE/0,25/S/3,0M	2926331	1
	50	4 m	CABLE-D-50SUB/F/OE/0,25/S/4,0M	2926344	1
	50	6 m	CABLE-D-50SUB/F/OE/0,25/S/6,0M	2926357	1
Round cable, as above, but in variable lengths	50		CABLE-D-50SUB-F-OE-0,25-S/...	2900908	1

### Ordering data

Type	Order No.	Pcs./ Pkt.
CABLE-D-37SUB/M/OE/0,25/S/0,5M	2926577	1
CABLE-D-37SUB/M/OE/0,25/S/1,0M	2926580	1
CABLE-D-37SUB/M/OE/0,25/S/1,5M	2926593	1
CABLE-D-37SUB/M/OE/0,25/S/2,0M	2926603	1
CABLE-D-37SUB/M/OE/0,25/S/3,0M	2926616	1
CABLE-D-37SUB/M/OE/0,25/S/4,0M	2926629	1
CABLE-D-37SUB/M/OE/0,25/S/6,0M	2926632	1
CABLE-D-37SUB-M-OE-0,25-S/...	2900912	1
CABLE-D-50SUB/M/OE/0,25/S/0,5M	2926645	1
CABLE-D-50SUB/M/OE/0,25/S/1,0M	2926658	1
CABLE-D-50SUB/M/OE/0,25/S/1,5M	2926661	1
CABLE-D-50SUB/M/OE/0,25/S/2,0M	2926674	1
CABLE-D-50SUB/M/OE/0,25/S/3,0M	2926687	1
CABLE-D-50SUB/M/OE/0,25/S/4,0M	2926690	1
CABLE-D-50SUB/M/OE/0,25/S/6,0M	2926700	1
CABLE-D-50SUB-M-OE-0,25-S/...	2900913	1

# System cabling for controllers

## Potential distributors

### Modules as compact potential distributors

The VIP-2/.../PDM... modules offer the following features:

- Two potential levels
- Separate supply
- Screw or Push-in connection
- Consecutive marking
- With fuse as an option

The UMK-PVB and UMK-PVB 6 modules have three or six potential levels.

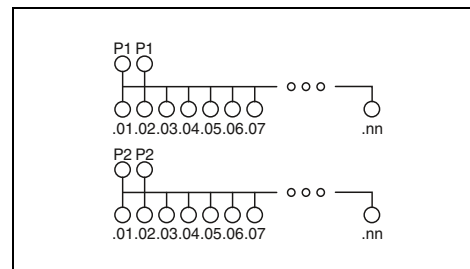
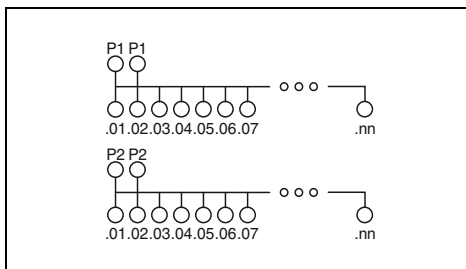
<b>Notes:</b>
Marking systems and mounting material See Catalog 3
1) No UL approval



With screw connection and 2 potential levels



With Push-in connection and 2 potential levels



#### Technical data

Maximum permissible operating voltage  
Maximum permissible operating voltage UL / CSA

250 V AC/DC  
250 V / 250 V

Maximum permissible current (per branch)  
Total current  
Ambient temperature (operation)  
Mounting position  
Standards/regulations  
Supply connection data solid/stranded/AWG

15 A  
30 A (per potential)  
-20 °C ... 50 °C  
any  
IEC 60664 , DIN EN 50178  
0.2 - 6 mm<sup>2</sup> / 0.2 - 4 mm<sup>2</sup> / 24 - 10

Distribution connection data solid/stranded/AWG

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12

Dimensions

H / D

65.5 mm / 50 mm

#### Technical data

250 V AC/DC  
250 V / 250 V

15 A  
30 A (per potential)  
-20 °C ... 50 °C  
any  
IEC 60664 , DIN EN 50178  
0.25 - 6 mm<sup>2</sup> / 0.25 - 4 mm<sup>2</sup> / 24 - 10

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14

75.8 mm / 63 mm

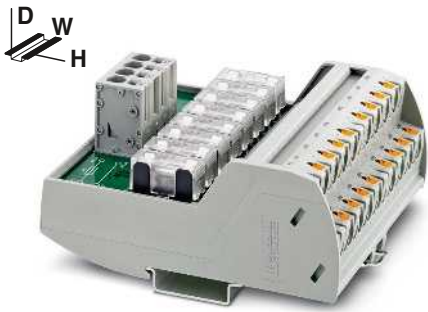
#### Ordering data

Description	No. of pos.	Module width W
<b>VARIOFACE module</b> , with two busbars (P1, P2) for potential distribution, per potential:		
2 power terminals/8 distributor terminal blocks		50.00
2 power terminals/12 distributor terminal blocks		70.40
2 power terminals/16 distributor terminal blocks		90.80
2 power terminals/24 distributor terminal blocks		131.50
<b>VARIOFACE module</b> , with two busbars (P1, P2) for potential distribution, per potential:		
2 power terminals/8 distributor terminal blocks		41.90
2 power terminals/12 distributor terminal blocks		57.10
2 power terminals/16 distributor terminal blocks		67.30
2 power terminals/24 distributor terminal blocks		97.70
<b>VARIOFACE module</b> with 2 busbars for potential distribution		
- 2 power terminals/8 distributor blocks		97.70
<b>VARIOFACE module</b> , with three busbars (+, -, PE) for potential distribution, per potential:		
(+) 2 power terminals/48 distributor terminal blocks		168.80
(-) 2 power terminals/24 distributor terminal blocks		
(PE) 2 power terminals/72 distributor terminal blocks		
<b>VARIOFACE module</b> , with six busbars (P1 to P6) for potential distribution, per potential:		
2 power terminals/12 distributor terminal blocks		123.80

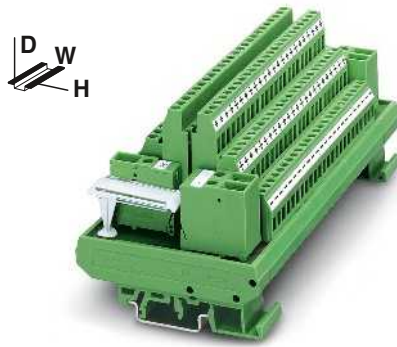
Type	Order No.	Pcs./ Pkt.
VIP-2/SC/PDM-2/16	2315256	1
VIP-2/SC/PDM-2/24	2315269	1
VIP-2/SC/PDM-2/32	2315272	1
VIP-2/SC/PDM-2/48 <sup>1)</sup>	2903717	1

#### Ordering data

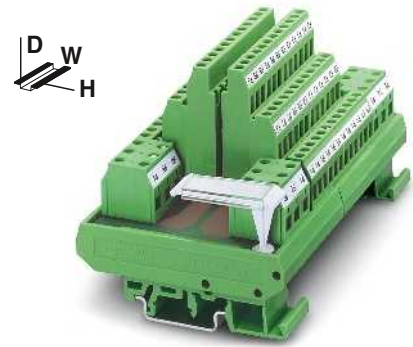
Type	Order No.	Pcs./ Pkt.
VIP-3/PT/PDM-2/16	2903797	1
VIP-3/PT/PDM-2/24	2903798	1
VIP-3/PT/PDM-2/32	2903799	1
VIP-3/PT/PDM-2/48	2903800	1



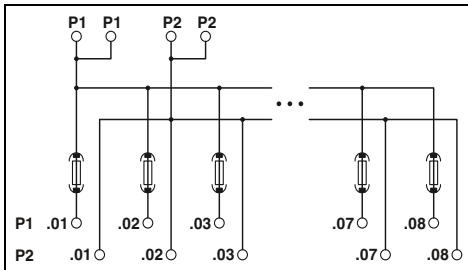
With Push-in connection and 2 potential levels and eight 6.3 A fuses



With screw connection and 3 potential levels



With screw connection and 6 potential levels



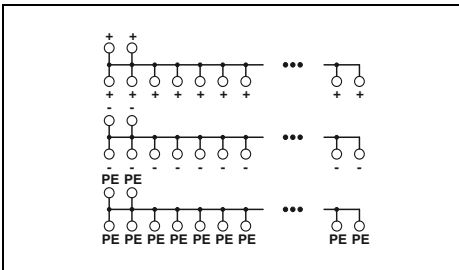
### Technical data

250 V AC/DC  
250 V / 250 V

6.3 A (fuse limited)  
30 A (per potential)  
-20 °C ... 60 °C  
any  
IEC 60664 , DIN EN 50178  
0.2 - 10 mm<sup>2</sup> / 0.2 - 6 mm<sup>2</sup> / 24 - 8

0.14 - 2.5 mm<sup>2</sup> / 0.14 - 2.5 mm<sup>2</sup> / 26 - 14

109.8 mm / 51 mm



### Technical data

250 V AC/DC  
- / -

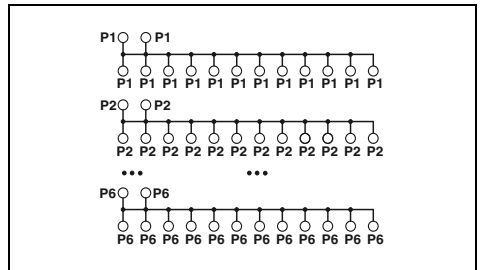
16 A  
16 A (per potential)  
-20 °C ... 50 °C  
any  
IEC 60664 , DIN EN 50178  
0.5 - 6 mm<sup>2</sup> / 0.5 - 4 mm<sup>2</sup> / 20 - 10

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12

77 mm / 72 mm

### Ordering data

Type	Order No.	Pcs./ Pkt.
UMK- PVB	2971302	1



### Technical data

250 V AC/DC  
- / -

16 A  
16 A (per potential)  
-20 °C ... 50 °C  
any  
IEC 60664 , DIN EN 50178  
0.2 - 6 mm<sup>2</sup> / 0.2 - 4 mm<sup>2</sup> / 24 - 10

0.2 - 4 mm<sup>2</sup> / 0.2 - 2.5 mm<sup>2</sup> / 24 - 12

77 mm / 72 mm

### Ordering data

Type	Order No.	Pcs./ Pkt.
UMK- PVB 6	2972136	1

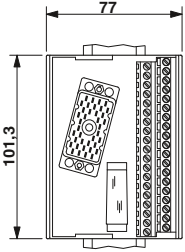
Type	Order No.	Pcs./ Pkt.
VIP-2/PT/PDM-2/16/FU 6.3A	2903603	1

# System cabling for controllers

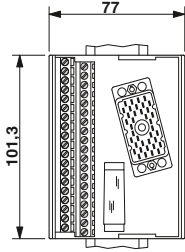
## Tables, dimensional drawings

### Modules for ELCO connectors

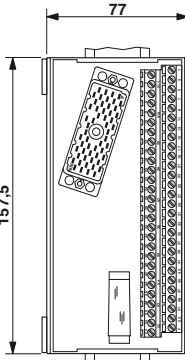
Dimensional drawing for UMK-EC38/38-XOL



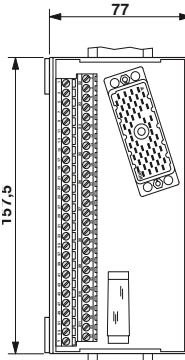
Dimensional drawing for UMK-EC38/38-XOR



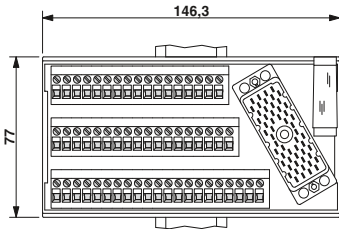
Dimensional drawing for UMK-EC56/56-XOL



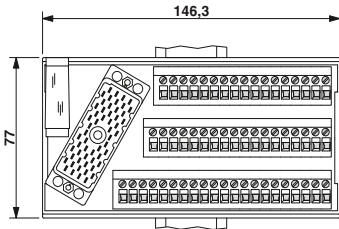
Dimensional drawing for UMK-EC56/56-XOR



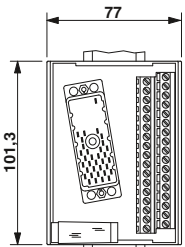
Dimensional drawing for UMK-EC56/FRONT 2,5V/R



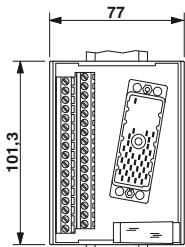
Dimensional drawing for UMK-EC56/FRONT 2,5V/L



Dimensional drawing for UMK-EC56/32-XOL



Dimensional drawing for UMK-EC56/32-XOR



Pin assignment UMK-EC38/38...

Terminal block	Pin strip
1	A
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L
11	M
12	N
13	P
14	R
15	S
16	T
17	U
18	V
19	W
20	X
21	Y
22	Z
23	AA
24	BB
25	DD
26	EE
27	FF
28	HH
29	JJ
30	KK
31	LL
32	MM
33	NN
34	PP
35	RR
36	SS
37	TT
CC	CC

Pin assignment UMK-EC56/56...

Terminal block	Pin strip
Z	Z
1	A
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L
11	M
12	N
13	P
14	R
15	S
16	T
17	U
18	V
19	W
20	X
21	a
22	b
23	c
24	d
25	e
26	f
27	h
28	j
29	k
30	l
31	m
32	n
33	p
34	r
35	s
36	t
37	u
38	v
39	w
40	x
41	y
42	z
43	AA
44	BB
45	CC
46	DD
47	EE
48	FF
49	HH
50	JJ
51	KK
52	LL
53	MM
54	NN
Y	Y (shield)

Pin assignment UMK-EC56/FRONT 2,5V/...

Terminal block	ELCO connector
X	N.C.
1	A
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L
11	M
12	N
13	P
14	R
15	S
16	T
17	U
18	V
19	W
20	X
21	a
22	b
23	c
24	d
25	e
26	f
27	h
28	j
29	k
30	l
31	m
32	n
33	p
34	r
35	s
36	t
37	u
38	v
39	w
40	x
41	y
42	z
43	AA
44	BB
45	CC
46	DD
47	EE
48	FF
49	HH
50	JJ
51	KK
52	LL
53	MM
54	NN
Y	Y (shield)

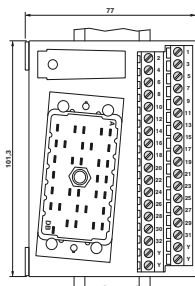
Pin assignment UMK-EC56/32-...

Terminal block	ELCO connector
1	A
2	B
3	C
4	D
5	E
6	F
7	H
8	J
9	K
10	L
11	M
12	N
13	P
14	R
15	S
16	T
17	U
18	V
19	W
20	X
21	Z
22	a
23	b
24	c
25	d
26	e
27	f
28	h
29	j
30	k
31	l
32	m
Y	NN + Y

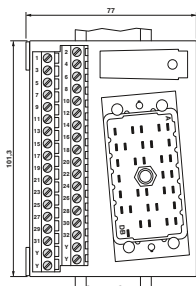


Modules for ELCO connectors with Ex i protection

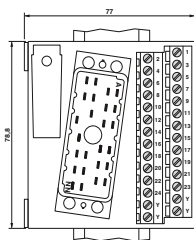
Dimensional drawing for UMK-EC90/32/EX-XUL



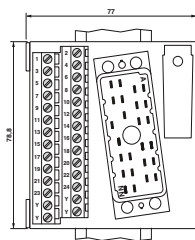
Dimensional drawing for UMK-EC90/32/EX-XUR



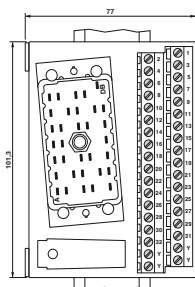
Dimensional drawing for UMK-EC56/25/EX-L



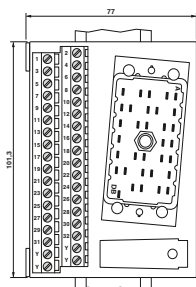
Dimensional drawing for UMK-EC56/25/EX-R



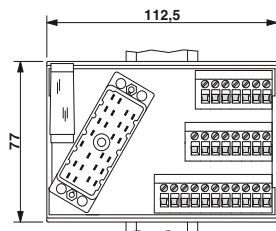
Dimensional drawing for UMK-EC90/32/EX-XOL



Dimensional drawing for UMK-EC90/32/EX-XOR



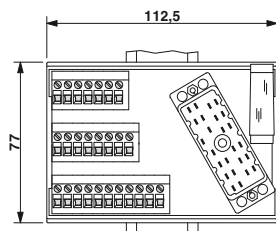
Dimensional drawing for UMK-EC 56/25/EX/FRONT 2,5 V/L



Pin assignment UMK-EC90/32/EX...

Terminal block	Pin strip	Channel
1	H	1
2	J	1
3	L	2
4	M	2
5	P	3
6	X	3
7	Z	4
8	AA	4
9	AC	5
10	AD	5
11	AM	6
12	AN	6
13	AR	7
14	AS	7
15	AU	8
16	BC	8
17	AZ	9
18	BA	9
19	BJ	10
20	BK	10
21	BM	11
22	BN	11
23	BR	12
24	BY	12
25	CA	13
26	CB	13
27	CD	14
28	CE	14
29	CN	15
30	CP	15
31	CS	16
32	CT	16
Y	DB	

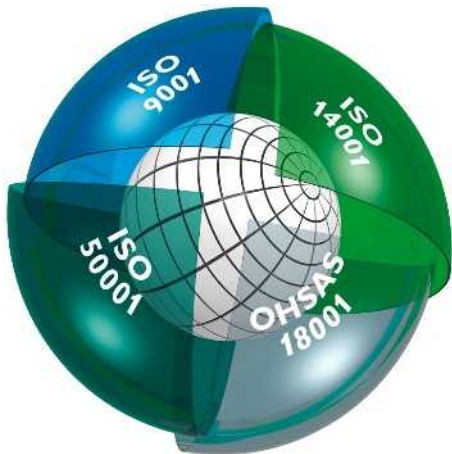
Dimensional drawing for UMK-EC 56/25/EX/FRONT 2,5 V/R



Pin assignment UMK-EC 56/25/EX/...

Terminal block	Pin strip	Channel
1	C	1
2	D	1
3	E	2
4	F	2
5	N	3
6	P	3
7	R	4
8	S	4
9	a	5
10	b	5
11	d	6
12	j	6
13	k	7
14	l	7
15	s	8
16	t	8
17	u	9
18	v	9
19	BB	10
20	CC	10
21	DD	11
22	EE	11
23	MM	12
24	NN	12
Y	Y	

## Quality in quantity



### Integrated management system

The objective of the Phoenix Contact integrated management system is to integrate all requirements pertaining to products, processes, and the organization.

Statutory and regulatory requirements, as well as those of international standards and our customers, are met and, in some cases, even exceeded in all phases of the product lifecycle.

The Phoenix Contact management system is monitored by internationally recognized independent bodies each year to ensure that quality, environmental protection, energy efficiency, and occupational safety have been integrated in conformance with the relevant requirements. Certification in accordance with international standards ISO 9001, ISO 14001, ISO 50001, and BS OHSAS 18001 is the result of our corporate philosophy of meeting the needs of our customers, staff, and environment as best as possible. They serve as the basis for innovative products with the familiar high Phoenix quality standard, actively practiced environmental protection through efficient production and products that conserve resources, and responsibility in the field of occupational health and safety. It goes without saying that we integrate all further requirements of standards, international approvals or special customer requirements into our company processes.

The result of this system is a building block for the success of the Phoenix Contact Group as well as its products and services.

### CE marking

CE marking was introduced as an important instrument for the free movement of goods within the European single market. By applying the mark to a product, the manufacturer confirms its compliance with all EU directives applicable to this product. The EU directives describe

the product characteristics with regard to device safety and the avoidance of risks. These are legally binding regulations of the European Union (EU), which means that the fulfillment of these requirements is a **legal prerequisite for the marketing of these products within the EU.**

Where applicable, our products currently fall within the scope of the following directives:

- 2014/35/EU  
Electrical equipment designed for use within certain voltage limits (Low Voltage Directive)
- 2014/30/EU  
Electromagnetic compatibility (EMC Directive)
- 2014/32/EU  
Measuring instruments
- 2006/42/EC  
Safety of machinery (Machinery Directive)
- 2014/34/EU  
Equipment and protective systems intended for use in potentially explosive atmospheres (ATEX Directive)
- 1999/5/EC  
Radio Equipment and Telecommunications Terminal Equipment Directive (R&TTE)
- 2014/53/EU  
Radio equipment (RED)
- 2011/65/EU  
RoHS Directive

The standards used as the basis for the aforementioned directives have been at the heart of our development standard for some time as a way of ensuring compliance with European directives. The numbers of the directives indicate their version at the time of publication. In the event of changes to directives and/or standards, our products will undergo conformity assessment again in good time and a new declaration of conformity will be issued promptly. The current declarations for each product can also be found in our download area.

Among the aforementioned European directives, the EMC Directive plays a particularly important role. It uses a legally binding directive as the basis for defining electromagnetic compatibility as a fundamental device property. European legislation therefore places great emphasis on the electromagnetic compatibility of devices and systems as a basic prerequisite for the error-free operation of machines and systems. As an international leader in the field of surge protection, Phoenix Contact has extensive expertise in EMC. This expertise and the experience gained over many years in the development and application of industrial interface and

communication technology have resulted in an extremely high standard of quality for our products when it comes to electromagnetic compatibility. Our sister company, Phoenix Testlab, was founded in order to share this expertise with other companies. Phoenix Testlab GmbH is an independent, accredited service company, which carries out EMC testing in compliance with the European standards. At Phoenix Testlab, devices are also tested with regard to their electrical safety, mechanical influences, and their behavior in relation to environmental influences. Phoenix Testlab is also a notified body according to EMC Directive 2014/30/EU, R&TTE Directive 1999/5/EC for radio equipment and telecommunications terminal equipment, and Radio Equipment Directive (RED) 2014/53/EU. As a certification body (TCB, FCB, and RCB), Phoenix Testlab is also able to approve these products for the markets in the USA, Canada, and Japan.

### Standards and regulations

All relevant standards and regulations are used as the basis for the development and maintenance of our products.

International standards are subject to continuous changes as a result of harmonization and new developments. In line with this process, the current version of all standards that are relevant to our products is documented in the product area on our website at

**[phoenixcontact.net/products](http://phoenixcontact.net/products)**.

### Online product information service on the world wide web

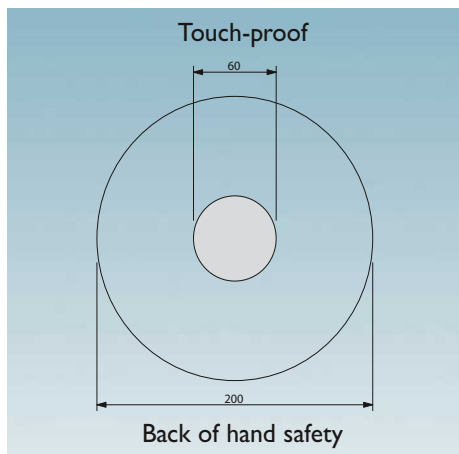
Phoenix Contact is continuously extending its product range.

Within the scope of our product monitoring obligation, all products are subject to an improvement process.

The Internet is an ideal platform to quickly communicate new product developments and improvements to the market.

You can quickly access the relevant Phoenix Contact website for your region via [phoenixcontact.com](http://phoenixcontact.com). There you will always find an up-to-date overview of products, solutions, and services from Phoenix Contact. This includes technical documents such as data sheets and user manuals, current driver and demo software, and a direct link to the relevant contact person.

## Touch proofness



Example: pressure actuation



Finger safety



Back of hand safety

The accident prevention regulations BGV A 2 issued by the German employer's liability insurance association for precision mechanics and electrical engineering apply to the operators of electrical systems and are aimed at the prevention of electrical accidents by means of special safety requirements.

These regulations contain specifications regarding the safety distances for work, operation, and occasional handling in the proximity of "live parts" in low-voltage systems up to 1000 V ~ or 1500 V –.

- Work with live parts is only permitted once they have been de-energized.

Operational activities are only permitted in the vicinity of live parts if these parts are de-energized or are protected against direct contact (§ 6). The following safety measures apply when working in the vicinity of live parts:

- Provision of the de-energized state for the duration of the work
- Ensure shock protection is in place in the form of covers or barriers during the work
- Assurance that proximity limits will not be violated (§ 7)

The term "occasional handling" has been introduced for the operation of elements such as pushbuttons, rocker arms or rotary buttons in the proximity of live parts.

In VDE 0105-1, this is covered by "operation with partial protection against direct contact".

Detailed specifications for "occasional handling" can be found in DIN VDE 0106-100. This specifies to what degree live parts in the proximity of operating elements are to be protected against contact. The basis for this is the definition of a "protection area for occasional handling"; this is the area into which the user must reach in order to handle the machine.

The most important thing is that an area formed by an even envelope curve 30 mm in radius must surround the live parts. This area must be **touch-proof**, i.e., the live parts of the electrical device must not be within reach of the VDE test finger according to IEC 60529/DIN VDE 0470-1 (test finger).

Back of hand safety is specified for the "rest of the area" up to 100 mm around the operating element. **Back of hand safety** means that when a force of 50 N is applied to a ball with a diameter of 50 mm, this does not come into contact with the live parts of the equipment. No special measures for ensuring contact safety are stipulated outside this area.

Note: Systems and equipment that are operated with SELV up to 25 V ~ or 60 V – are considered to be protected against "direct contact".

According to § 5, Subsection 4 of the BGV A 2 regulations, there is no need to test the condition of the system prior to initial startup if the company has confirmation from the manufacturer or installer that the electrical systems and equipment conform to BGV A 2. The confirmation required relates to systems and equipment that have been installed and are ready for operation and can only be issued by the installer or installation company. The manufacturer of the electrical equipment can only issue a confirmation that products have been produced in accordance with the relevant electrotechnical DIN VDE regulations stipulated in BGV A 2. The installer must bear this in mind when selecting the equipment to be used.

In the field of connection technology, Phoenix Contact offers a wide range of products which are touch-proof or can be protected against contact by means of

covers. Depending on the conditions, all of this must be taken into account when selecting the individual types of terminal blocks and accessories.

## Quality features of insulating housings

### Thermoplastics

The majority of our insulating housing is made from thermoplastic materials. Roughly speaking, these can be divided into amorphous and semi-crystalline substances. Thermoplastics are processed using the efficient and environmentally-friendly injection molding process. They have good recycling properties and can be re-used. We use many materials that are modified in different ways to meet the demanding requirements that electrical and electronic modules, devices, and systems have to meet with regard to their mechanical, thermal, and electrical properties.

### Behavior of plastics under the influence of temperature (operating temperatures, mechanical influences)

All plastics undergo a process referred to as thermal aging when they are subjected to heat over long periods. This process causes changes in the mechanical and electrical properties of the material. External influences, e.g., radiation, additional mechanical, chemical or electrical stresses, amplify this effect. Special tests on samples can yield characteristic data which provides a good means of drawing comparisons between different plastics. However, applying these characteristics to an evaluation of molded plastic parts is only possible to a limited extent, and can only give the designer a rough guide when it comes to selecting a plastic material. This catalog uses the following assessment criteria: the **RTI value** according to UL746B/ANSI 746 B (elec. based on electric strength) and the **Ti value** according to IEC 60216-1 (based on a 50% reduction in tensile strength after 20,000 hours).

IEC 60947-7-1/EN 60947-7-1 specifies a permissible temperature increase of 45 K for terminal blocks under nominal load. Phoenix Contact terminal blocks fulfill this requirement.

The properties of plastics are not only affected by the influence of heat as described above; they also undergo changes as a result of cold influences. When subjected to cold as well as low levels of humidity, plastics become increasingly brittle with the result that they are no longer capable of withstanding the same mechanical loads. As the table on the right shows, the plastics concerned can be used down to a temperature of -40°C, but only without a mechanical load. As far as the products presented in the catalog are concerned, it is the ambient temperature specified in each case that is to be regarded as definitive for operation. Regardless of the plastics used,

this may be subject to further restrictions (e.g., limited to -20°C) as a result of the components used or other restrictive parameters.

At very low temperatures, this means that any form of mechanical load on the plastic components must be avoided (e.g., mounting of products on/removal of products from the DIN rail, actuation of terminal points, locking/ejection of relays from bases, prizing out of jumpers, bending of cables and lines, etc.), as there is always an associated risk of damage. Unless otherwise indicated, it is recommended that you carry out the specified mounting/operational tasks in a temperature range from -10°C to +40°C.

### Inflammability characteristics of plastics (UL 94)

The inflammability tests for plastics have been defined by the Underwriters Laboratory (USA) in regulation UL 94. This applies to all areas of application, particularly in electrical engineering. A horizontal or vertical test is carried out at the test laboratory to determine the inflammability of the plastic material with a naked flame. In order of increasing flame-retardant behavior, the evaluation classes are HB, V2, V1, V0, and 5V. Test results are recorded on "yellow cards" and are published annually in the **Recognized Component Directory**.

### Thermoplastics: non-reinforced polyamide, PA

We use the modern, semi-crystalline polyamide insulation material, which has now become an essential component in electrical engineering and electronics. It has long occupied a leading position and is authorized for use by the relevant approval authorities such as the CSA, NEMKO, KEMA, PTB, SEV, UL, VDE, etc.

Polyamide has excellent electrical, mechanical, chemical, and other properties even at high operating temperatures. Brief peak temperatures of up to approximately 200°C are permitted as a result of heat aging stabilization. Depending on the type (PA 4.6, 6.6, 6.10, etc.), its melting point is in the region of 215°C to 295°C.

Polyamide absorbs moisture from its surroundings, on average 2.8%. This is not the embedded water of crystallization, however, but rather chemically bound H<sub>2</sub>O groups in the molecular structure. This makes the plastic flexible and resistant to breakage, even at temperatures as low as -40°C. PA belongs to flammability rating V2 to V0 according to UL 94.

### Thermoplastics: polyester, PBT

We use the semi-crystalline thermoplastic polyester in non-reinforced and fiberglass-reinforced variants for special applications which require increased dimensional and form stability.

Apart from the high operating temperature, the material is characterized by excellent mechanical strength and hardness. Polyester does not absorb moisture from its surroundings. Therefore, PBT is particularly suitable for strips, for example, that are soldered onto PCBs and are subsequently required to pass a burn-in test where they are subjected to the influence of heat. PBT belongs to flammability rating V2 to V0 according to UL 94.

### Thermoplastics: polycarbonate, PC

Polycarbonate combines many advantages such as rigidity, impact strength, transparency, dimensional stability, good insulation properties, and resistance to heat.

The amorphous material only absorbs moisture to a very limited degree, and is used for items such as large, rigid electronic component housings.

In its transparent form, polycarbonate is particularly suitable for use as a material for cover profiles or marking materials.

PC has good resistance properties against mineral acids, saturated aliphatic hydrocarbons, gasoline, greases, and oils.

This material is not very resistant to solvents, benzene, alkalis, acetone, and ammonia. Strain cracks may result from contact with certain chemicals.

PC belongs to flammability rating V2 to V0 according to UL 94.

### Thermoplastics: polycarbonate fiber-reinforced, PC-F

Compared to non-reinforced materials, fiber-reinforced polycarbonates feature greater rigidity, impact strength, and operating temperature. In other respects, their properties are largely identical to those of non-reinforced polycarbonate.

### Thermoplastics: ABS

We use the thermoplastic molding compound ABS for products which must have good impact and notched impact properties in addition to high mechanical stability and rigidity. The products are resistant to chemicals and stress cracking due to their special surface quality and hardness.

The characteristic thermal properties provide good dimensional stability at both low and high temperatures. Products made from ABS can be coated with metallic

surfaces, e.g., nickel.

The flammability rating of the molding compound used is HB to V0 according to UL 94.

Properties	Unit/level	Polyamide PA	Polyester PBT	Polycarbonate PC	Polycarbonate PC-F	ABS
Operating temperature RTI */**	°C	≤ 105	≤ 105	≤ 125	≤ 120	≤ 80
Minimum temperature (without mechanical load)	°C	-40	-40	-40	-40	-40
Electric strength IEC 60243-1/DIN VDE 0303-21	kV/cm	600	400	> 300		850
Resistance to creepage IEC 60112/DIN VDE 0303-1	CTI...M	550	225	175		200
	CTI...	600	225	175	175	600
Tropical and termite resistance		Good	Good	Good		
Specific contact resistance IEC 60093/VDE 0303 Part 30; IEC 60167/VDE 0303 Part 31	Ω cm	10 <sup>12</sup>	10 <sup>16</sup>	> 10 <sup>16</sup>	> 10 <sup>14</sup>	10 <sup>14</sup>
Surface resistance IEC 60093/VDE 0303 Part 30; IEC 60167/VDE 0303 Part 31	Ω	10 <sup>10</sup>	10 <sup>13</sup>	> 10 <sup>14</sup>		10 <sup>13</sup>
Flammability rating according to UL 94		V2-V0	V0	V2-V0	V0	HB-V0

\* According to UL 746 B/ANSI 746 B (elec.)

\*\* Minimum value

### Dimensions

#### Dimensions: Width/Height/Depth



The dimensions “Width/Height/Depth” are defined as follows for all

DIN-rail-mountable products:

- **Width:** measurement taken along the DIN rail
- **Height:** measurement taken across the DIN rail
- **Depth:** measurement taken starting from the mounting plate and including the DIN rail NS 35/7.5 (EN 60715)

The width, height, and depth never change, even if the products shown in this catalog happen to be photographed from two different perspectives (horizontal or vertical).

To make things easier for you, one of the two symbols shown above has been included next to each product photo:

### EMC: Class A product:

In accordance with statutory regulations, our products are indicated with this footnote if they are intended for use in industrial environments. This means that the permitted limit values for residential applications may be exceeded in the event of conducted and emitted disturbance variables. In such cases, the operator may have to take additional safety measures in order to ensure electromagnetic compatibility in residential applications.

### Note:

Subject to changes that serve the purpose of technical progress.

## Connection cross section

The rated cross section of terminal blocks must be specified by the manufacturer according to IEC 60947-7-1. The rated cross section is the maximum conductor cross section that can be connected in single, multi or fine-strand versions subject to specific thermal, mechanical, and electrical requirements.

The manufacturer must also specify the **rated connection capacity**, i.e., the area of connectable conductors as well as the number of conductors which can be connected simultaneously and the necessary preparation of the conductor ends. The conductors can be **solid (single or multi-**

**strand)** or flexible (**fine-strand**).

These values can be found in the product-specific technical data.

The rated connection capacity of Phoenix Contact terminal blocks usually exceeds standard requirements, which specify that it must only be possible to connect one conductor with one of the two next smallest cross sections, excluding the rated cross section (standardized for the cross section range from 0.2 to 35 mm<sup>2</sup>).

In addition, conductors with a rated cross section can usually be wired with ferrules with plastic sleeve.

Phoenix Contact terminal blocks are

designed to allow copper conductors to be connected to them untreated. "Special treatment" or the use of ferrules – both permitted according to IEC 60947-7-1 – are not required. If ferrules are nevertheless used to protect stranded conductors against splicing, the connection capacity of the stranded conductor is generally reduced by one level.

## Structure and dimensions of connecting cables

Cross section [mm <sup>2</sup> ]	Single-stranded		Multi-stranded		Fine-stranded		Gauge no. AWG	American Wire Gauge [AWG]					
	Diameter max. dimension	Number of wires	Diameter max. dimension	Number of wires (minimum number)	Diameter max. dimension	Number of wires (guide value)		Solid wires			Stranded wires		
								[Ø mm]	[circ. mils]	[mm <sup>2</sup> ]	[Ø mm]	[circ. mils]	[mm <sup>2</sup> ]
0.2	0.5	1	–	–	–	–	24	0.51	404	0.21	–	–	–
0.5	0.9	1	1.1	7	1.1	16	20	0.81	1022	0.52	0.97	1111	0.56
0.75	1.0	1	1.2	7	1.3	24	18	1.02	1620	0.82	1.16	1600	0.82
1	1.2	1	1.4	7	1.5	32	(17)	1.15	2050	1.04	–	–	–
–	–	–	–	–	–	–	16	1.29	2580	1.31	1.50	2580	1.32
1.5	1.5	1	1.7	7	1.8	30	(15)	1.45	3260	1.65	–	–	–
–	–	–	–	–	–	–	14	1.63	4110	2.08	1.85	4100	2.09
2.5	1.9	1	2.2	7	2.3	50	(13)	1.83	5180	2.63	–	–	–
–	–	–	–	–	–	–	12	2.05	6530	3.31	2.41	6500	3.32
4	2.4	1	2.7	7	2.9	56	(11)	2.30	8230	4.17	–	–	–
–	–	–	–	–	–	–	10	2.59	10380	5.26	2.95	10530	5.37
6	2.9	1	3.3	7	3.9	84	(9)	2.91	13100	6.63	–	–	–
–	–	–	–	–	–	–	8	3.26	16510	8.37	3.73	16625	8.48

## Tightening torque of terminal block screws

IEC 60947-1/EN 60947-1, modified, Table 4 specifies tightening torques for screw connections based on the screw size for electrical and mechanical type tests.

### Extract from IEC 60947-1/EN 60947-1, Table 4

The torque according to IEC and the recommended torque for Phoenix Contact terminal blocks are specified

Thread	Head screw with slot	
	Torque	Recommended tightening torque
	[Nm]	[Nm]
M2.5 (M2.6)	0.4	0.4 - 0.5
M3	0.5	0.5 - 0.6
M3.5	0.8	0.8 - 1.0
M4	1.2	1.2 - 1.5

















































## Current carrying capacity

Standard IEC 60947-7-1/EN 60947-7-1/DIN VDE 0611-1 specifies the test currents for the individual conductor cross sections listed in the adjacent table. The corresponding currents are listed with the connection data for the individual terminal blocks. The type tests of terminal blocks are based on this data.

### Test currents according to IEC 60947-7-1/EN 60947-7-1, Table 5

Rated cross section	[mm <sup>2</sup> ]	0.2	0.5	0.75	1.0	1.5	2.5	4	6	10	16
Test current	[A]	4	6	9	13.5	17.5	24	32	41	57	76

## Certification bodies and safety marks

Certification bodies and approvals	Country code	Explosion protection	Country code	Marine classification societies	Country code
 IECCE CB Scheme (in combination with certifying body)	International	 International Electrotechnical Commission	International	 DNV GL - MARITIME	DE
 CENELEC Certification Agreement (CCA inspection report) (in combination with certifying body)	EU	 ATEX Directive	EU	 Bureau Veritas	FR
 Canadian Standards Association (CSA)	CA	 DEKRA Certification B.V.	NL	 Germanischer Lloyd AG	DE
 Canadian Standards Association (CSA) - CSA approval for the USA -	US	 Physikalisch-Technische Bundesanstalt	DE	 Lloyd's Register of Shipping	GB
 Canadian Standards Association (CSA) Combined logo - CSA approval for Canada and the USA -	CA US	 KIWA Nederland B.V.	NL	 Nippon Kaiji Kyokai	JP
 Underwriters Laboratories Inc. (UL)	US	 VTT Expert Services Oy	FI	 Det Norske Veritas	NO
 Underwriters Laboratories Inc. (UL) - UL approval for Canada -	CA	 IBExU Institut für Sicherheitstechnik GmbH	DE	 Polski Rejestr Statków	PL
 Underwriters Laboratories Inc. (UL) Combined logo - UL approval for the USA and Canada -	US CA	 TÜV Rheinland do Brasil	BR	 Russian Maritime Register of Shipping	RU
 INSIEME PER LA QUALITA' E LA SICUREZZA	IT	 Technischer Überwachungsverein Nord	DE	 Korean Register of Shipping	KR
 Eurasian Conformity	BY KZ RU	 DEKRA EXAM GmbH	DE	 American Bureau of Shipping	US
 DEKRA Certification B.V.	NL	 Canadian Standards Association (CSA)	CA		
 Österreichischer Verband für Elektrotechnik	AT	 Canadian Standards Association (CSA) - CSA approval for the USA -	US		
 electrosuisse SEV Verband für Elektro-, Energie- und Informationstechnik	CH	 Canadian Standards Association (CSA) Combined logo - CSA approval for Canada and the USA -	CA US		
 Verband Deutscher Elektrotechniker e.V. (VDE) - Approval of drawings - Reports with production monitoring	DE	 Underwriters Laboratories Inc. (UL)	US		
 Berufsgenossenschaft (BG) GS Tested safety	DE	 Underwriters Laboratories Inc. (UL) - UL approval for Canada -	CA		
 Intertek ETL Listed - Approval for the USA -	US	 Underwriters Laboratories Inc. (UL) Combined logo - UL approval for the USA and Canada -	US CA		
 Intertek ETL Listed - Approval for Canada -	CA	 FM Approvals	US		
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 Korea Communications Commission	KR				

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FLK 14/EZ-DR/ 400000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 500000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 600000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 800000000/KONFEK/S	2299714	550
FLK 14/EZ-DR/ 1000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 1500000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 2000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 3000000000/KONFEK/S	2299714	550
FLK 14/EZ-DR/ 4000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 5000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 6000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 8000000000/KONFEK/S	2299714	550
FLK 14/EZ-DR/ 10000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 15000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 20000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 30000000000/KONFEK/S	2299714	550
FLK 14/EZ-DR/ 40000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 50000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 60000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 80000000000/KONFEK/S	2299714	550
FLK 14/EZ-DR/ 100000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 150000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 200000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 300000000000/KONFEK/S	2299714	550
FLK 14/EZ-DR/ 400000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 500000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 600000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 800000000000/KONFEK/S	2299714	550
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FLK 14/EZ-DR/ 4000000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 5000000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 6000000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 8000000000000/KONFEK/S	2299714	550
FLK 14/EZ-DR/ 10000000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 15000000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 20000000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 30000000000000/KONFEK/S	2299714	550
FLK 14/EZ-DR/ 40000000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 50000000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 60000000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 80000000000000/KONFEK/S	2299714	550
FLK 14/EZ-DR/ 100000000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 150000000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 200000000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 300000000000000/KONFEK/S	2299714	550
FLK 14/EZ-DR/ 400000000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 500000000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 600000000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 800000000000000/KONFEK/S	2299714	550
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FLK 14/EZ-DR/ 4000000000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 5000000000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 6000000000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 8000000000000000/KONFEK/S	2299714	550
FLK 14/EZ-DR/ 10000000000000000/KONFEK/S	2299698	550	FLK 14/EZ-DR/ 15000000000000000/KONFEK/S	2288927	550	FLK 14/EZ-DR/ 20000000000000000/KONFEK/S	2299697	550	FLK 14/EZ-DR/ 30000000000000000/KONFEK/S	2299714	550
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FLK 50/EZ-DR/ 600/KONFEK	2289609	550	FLKM S115/S7/FLK50/PLC/SO137	2306294	563	MACX MCR-SL-NAM-R-SP	2924089	123	MACX MCR-SL-NAM-R-SP	2924089	123
FLK 50/EZ-DR/ 600/KONFEK/S	2289152	550	FLKM S115/431-4UA/S400	2314846	560	MACX MCR-SL-RPSS-2I-2I	2904090	123	MACX MCR-SL-RPSS-2I-2I	2904090	123
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FLK 50/EZ-DR/1000/KONFEK/S	2289683	550	FLKM S115/47X0,75/5,0M/OE	2314998	563	MACX MCR-SL-RTD-I-SP-NC	2924320	130	MACX MCR-SL-RTD-I-SP-NC	2924320	130
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MCR-FL-HT-FI-EX	2864532	190	MINI MCR-2-TC-UI-PT-C	2905248	82	PACT MCR-CB-21-12	2277556	233	PACT MCR-V2-6015-85-750-5A-1	2277938	227
MCR-FL-HT-FS-I-EX	2864545	188	MINI MCR-2-U-I0	2902022	74	PACT MCR-CB-28-12	2277543	233	PACT MCR-V2-6015-85-800-5A-1	2277941	227
MCR-FL-T-LP-I	2864561	196	MINI MCR-2-U-I0-PT	2902023	74	PACT MCR-CB-42-12	2277530	233	PACT MCR-V2-6015-85-1000-5A-1	2277954	227
MCR-FL-T-LP-I-EX	2864574	195	MINI MCR-2-U-I4	2902029	74	PACT MCR-ETC-60	2277572	233	PACT MCR-V2-6015-85-1250-5A-1	2277967	227
MCR-FL-TS-LP-I-EX	2864587	195	MINI MCR-2-U-I4-PT	2902030	74	PACT MCR-ETC-75	2277585	233	PACT MCR-V2-6015-85-1600-5A-1	2277983	227
MCR-PAC-T-USB	2309000	180	MINI MCR-2-U-U	2902042	74	PACT MCR-ICAP	2277608	233	PACT MCR-V2-6040-96-600-5A-1	2276191	228
MCR-S-1-5-UI-DCI	2814634	242	MINI MCR-2-U-U-PT	2902043	74	PACT MCR-RA	2277598	233	PACT MCR-V2-6040-96-750-5A-1	2276201	228
MCR-S-1-5-UI-DCI-NC	2814715	242	MINI MCR-2-UI-FRO	2902031	86	PACT MCR-V1-21-44	2277268	223	PACT MCR-V2-6040-96-800-5A-1	2276214	228
MCR-S-1-5-UI-SW-DCI	2814650	242	MINI MCR-2-UI-FRO-C	2902021	86	PACT MCR-V1-21-44-50-5A-1	2277019	223	PACT MCR-V2-6040-96-1000-5A-1	2277705	228
MCR-S-1-5-UI-SW-DCI-NC	2814731	242	MINI MCR-2-UI-FRO-PT	2902032	86	PACT MCR-V1-21-44-75-5A-1	2277611	223	PACT MCR-V2-6040-96-1250-5A-1	2276227	228
MCR-S-10-50-UI-DCI	2814647	243	MINI MCR-2-UI-FRO-PT-C	2902022	86	PACT MCR-V1-21-44-100-5A-1	2277022	223	PACT MCR-V2-6040-96-1500-5A-1	2277718	228
MCR-S-10-50-UI-SW-DCI	2814663	243	MINI MCR-2-UH-OLP	2902061	79	PACT MCR-V1-21-44-125-5A-1	2277763	223	PACT MCR-V2-6040-96-1600-5A-1	2276230	228
MCR-S-20-100-UI-DCI	2808798	243	MINI MCR-2-UH-OLP-C	2902060	79	PACT MCR-V1-21-44-150-5A-1	2277035	223	PACT MCR-V2-6040-96-2000-5A-1	2276243	228
MCR-S10-50-UI-DCI-NC	2814728	243	MINI MCR-2-UH-OLP-PT	2902063	79	PACT MCR-V1-21-44-200-5A-1	2277776	223	PACT MCR-V2-6315-95-800-5A-1	2277213	228
MCR-S10-50-UI-SW-DCI-NC	2814744	243	MINI MCR-2-UH-OLP-PT-C	2902062	79	PACT MCR-V1-21-44-250-5A-1	2277048	223	PACT MCR-V2-6315-95-1000-5A-1	2277226	228
MCR-SL-CUC-100-I	2308027	241	MINI MCR-2-UI-REL	2902033	91	PACT MCR-V1-21-44-300-5A-1	2277789	223	PACT MCR-V2-6315-95-1250-5A-1	2277239	228
MCR-SL-CUC-100-U	2308108	240	MINI MCR-2-UI-REL-PT	2902035	91	PACT MCR-V1-21-44-400-5A-1	2277051	223	PACT MCR-V2-6315-95-1500-5A-1	2277242	228
MCR-SL-CUC-200-I	2308030	241	MINI MCR-2-UI-UI	2902037	72	PACT MCR-V1-21-44-500-5A-1	2277792	223	PACT MCR-V2-6315-95-1600-5A-1	2277255	228
MCR-SL-CUC-200-U	2308205	240	MINI MCR-2-UI-UI-C	2902036	72	PACT MCR-V1C-21-44	2277420	223	PACT MCR-V2-8015-105-400-5A-1	2276256	229
MCR-SL-CUC-300-I	2308043	241	MINI MCR-2-UI-UI-PT	2902040	72	PACT MCR-V2-3015-60	2277271	224	PACT MCR-V2-8015-105-500-5A-1	2276269	229
MCR-SL-CUC-300-U	2308302	240	MINI MCR-2-UI-UI-PT-C	2902039	72	PACT MCR-V2-3015-60-75-5A-1	2276502	224	PACT MCR-V2-8015-105-600-5A-1	2276272	229
MCR-SL-CUC-400-I	2308072	241	MINI MCR-2-UNI-UI-2UI	2905026	76	PACT MCR-V2-3015-60-150-5A-1	2277077	224	PACT MCR-V2-8015-105-750-5A-1	2276285	229
MCR-SL-CUC-500-I	2308085	241	MINI MCR-2-UNI-UI-2UI-C	2905025	76	PACT MCR-V2-3015-60-250-5A-1	2276544	224	PACT MCR-V2-8015-105-800-5A-1	2276298	229
MCR-SL-CUC-600-I	2308098	241	MINI MCR-2-UNI-UI-2UI-PT	2905028	76	PACT MCR-V2-3015-60-250-5A-1	2277080	224	PACT MCR-V2-8015-105-1000-5A-1	2277721	229
MCR-SL-D-FIT	2864024	185	MINI MCR-2-UNI-UI-2UI-PT-C	2905027	76	PACT MCR-V2-3015-60-400-5A-1	2277093	224	PACT MCR-V2-8015-105-1000-5A-1	2276308	229
MCR-SL-D-RA	2810081	184	MINI MCR-2-UNI-UI-UIRO	2902026	70	PACT MCR-V2-4012-70	2277284	225	PACT MCR-V2-8015-105-1250-5A-1	2276311	229
MCR-SL-D-SPA-UI	2710314	186	MINI MCR-2-UNI-UI-UIRO-C	2902024	70	PACT MCR-V2-5012-85	2277297	226	PACT MCR-V2-8015-105-1500-5A-1	2277734	229
MCR-SL-D-U-I	2864011	184	MINI MCR-2-UNI-UI-UIRO-PT	2902028	70	PACT MCR-V2-6015-85	2277336	227	PACT MCR-V2-8015-105-1600-5A-1	2276324	229
MCR-SL-HTPT 100-I	2864516	191	MINI MCR-2-UNI-UI-UIRO-PT-C	2902027	70	PACT MCR-V2-6040-96	2277349	228	PACT MCR-V2-8015-105-2000-5A-1	2276337	229
MCR-SL-PT100-LP-I	2864558	197	MINI MCR-2-V8-FLK 16	2901993	97	PACT MCR-V2-6315-95	2277307	228	PACT MCR-V2-8015-105-2500-5A-1	2276340	229
MCR-SL-S-16-SP-24	2864464	249	MINI MCR-2-V8-MOD-RTU	2905634	96	PACT MCR-V2-8015-105	2277352	229	PACT MCR-V2-8020-105-1000-5A-1	2277447	229
MCR-SL-S-100-I-LP	2813486	247	MINI MCR-2-V8-MOD-TCP	2905635	96	PACT MCR-V2-8020-105	2277355	229	PACT MCR-V2-8020-105-1500-5A-1	2277750	229
MCR-SL-S-100-U	2813457	247	MINI MCR-2-V8-PB-DP	2905636	96	PACT MCR-V2-10020-129	2277378	230	PACT MCR-V2-8020-105-2000-5A-1	2276382	229
MCR-SL-S-200-I-LP	2813499	247	MINI MCR-SL-FM-RC-NC	2902961	524	PACT MCR-V2-10020-129-2500-5A	2276395	230	PACT MCR-V2C-3015-60	2277433	224
MCR-SL-S-200-U	2813460	247	MINI MCR-SL-PTB-FM	2902958	524	PACT MCR-V2-10036-129	2277381	230	PACT MCR-V2C-4012-70	2277446	225
MCR-SLP-1-5-UI-0	2814359	248	MINI-PS-100-240AC/24DC/1.5/EX	2866653	103	PACT MCR-V2-10036-129-3000-5A	2276405	230	PACT MCR-V2C-5012-85	2277459	226
MCR-TTL-RS232-E	2814388	251	MINI-SYS-PS-100-240AC/24DC/1.5	2866983	103	PACT MCR-V2-12020-159	2277394	231	PACT MCR-V2C-6015-85	2277462	227
MCR/PI-CONF-WIN	2814799	251	MM-CONF-SET	2297992	14	PACT MCR-V2-12040-159	2277404	231	PACT MCR-V2C-6040-96	2277488	228
ME 17,5 TBUS 1,5/5-ST-3,81 GN	2709561	103	MPS-IH BK	0201731	176	PACT MCR-V2-12040-159-4000-5A	2276418	231	PACT MCR-V2C-6315-95	2277475	228
ME 22,5 TBUS 1,5/5-ST-3,81 GN	2707437	433	MPS-IH BU	0201689	176	PACT MCR-V2-3015-60-60-5A-1	2277815	224	PACT MCR-V2C-8015-105	2277491	229
ME 6,2 TBUS-2 1,5/5-ST-3,81 GN	2869728	102	MPS-IH GN	0201702	176	PACT MCR-V2-3015-60-75-5A-1	2277828	224	PACT MCR-V2C-8020-105	2277501	229
ME 6,2 TBUS-2 1,5/5-ST-3,81 GY	2869539	102	MPS-IH GY	0201728	176	PACT MCR-V2-3015-60-80-5A-1	2277831	224	PACT MCR-V2C-10020-129	2277514	230
MINI MCR-2-2I-2H-LP	2901996	78	MPS-IH RD	0201676	176	PACT MCR-V2-3015-60-100-5A-1	2277064	224	PACT MCR-V2C-10036-129	2277527	230
MINI MCR-2-2I-2H-LP-PT	2901997	78	MPS-IH WH	0201663	176	PACT MCR-V2-3015-60-125-5A-1	2277624	224	PACT MCR-V3-60	2277417	232
MINI MCR-2-CVCS	2902064	100	MPS-IH YE	0201692	176	PACT MCR-V2-3015-60-150-5A-1	2277844	224	PACT RCP-4000A-1A-D140	2904922	236
MINI MCR-2-CVCS-PT	2902065	100	MPS-MT	0201744	176	PACT MCR-V2-3015-60-200-5A-1	2277637	224	PACT RCP-4000A-1A-D190	2904923	236
MINI MCR-2-F-UI	2902056	84				PACT MCR-V2-3015-60-200-5A-1	2277857	224	PACT RCP-4000A-1A-D95	2904921	236
MINI MCR-2-F-UI-PT	2902058	84				PACT MCR-V2-3015-60-250-5A-1	2277860	224	PACT RCP-4000A-UIRO-D140	2906232	237
MINI MCR-2-FM-RC	2904504	104				PACT MCR-V2-3015-60-300-5A-1	2277640	224	PACT RCP-4000A-UIRO-D190	2906233	237
MINI MCR-2-FM-RC-PT	2904508	104	<b>N</b>			PACT MCR-V2-3015-60-500-5A-1	2277653	224	PACT RCP-4000A-UIRO-D95	2906231	237
MINI MCR-2-I-I	2901998	74	NFC-USB-PROG-ADAPTER	2900013	105	PACT MCR-V2-3015-60-600-5A-1	2277103	224	PACT RCP-4000A-UIRO-PT-D140	2906235	237
MINI MCR-2-I-I-HLP	2901994	78				PACT MCR-V2-3015-60-750-5A-1	2277666	224	PACT RCP-4000A-UIRO-PT-D190	2906236	237
MINI MCR-2-I-I-HLP-PT	2901995	78				PACT MCR-V2-4012-70-250-5A-1	2277116	225	PACT RCP-4000A-UIRO-PT-D95	2906234	237
MINI MCR-2-I-I-PT	2901999	74				PACT MCR-V2-4012-70-300-5A-1	2277679	225	PACT RCP-CLAMP	2904895	236
MINI MCR-2-I0-U	2902000	74				PACT MCR-V2-4012-70-400-5A-1	2277129	225	PACT RCP-CLAMP-5-10	2907888	236
MINI MCR-2-I0-U-PT	2902001	74				PACT MCR-V2-4012-70-500-5A-1	2277682	225	PACT-FAST-MNT-W13-L40	2276612	233
MINI MCR-2-I4-U	2902002	74	<b>O</b>			PACT MCR-V2-4012-70-600-5A-1	2277132	225	PACT-FAST-MNT-W13-L65	2276625	233
MINI MCR-2-I4-U-PT	2902003	74	OPT-5DC/24DC/ 2	2967989	394	PACT MCR-V2-4012-70-750-5A-1	2277695	225	PACT-FAST-MNT-W16-L40	2276638	233
MINI MCR-2-NAM-2RO	2902004	90	OPT-5DC/24DC/ 5	2982113	310	PACT MCR-V2-4012-70-800-5A-1	2277145	225	PACT-FAST-MNT-W16-L65	2276641	233
MINI MCR-2-NAM-2RO-PT	2902005	90	OPT-5DC/48DC/100	2967992	394	PACT MCR-V2-4					

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PLC-BSC-24UC/ 1/ACT	2982799	383	PLC-OSC-24DC/230AC/ 1/ACT	2967947	381	PLC-RPT-60DC/21-21AU	2900341	375	PLC-RSC-60DC/21-21AU	2967303	375
PLC-BSC-120UC/ 1/SEN/SO46	2980322	389	PLC-OSC-24DC/230AC/ 2/ACT	2982760	382	PLC-RPT-60DC/21AU	2900309	373	PLC-RSC-60DC/21AU	2966142	373
PLC-BSC-120UC/21-21/SO46	2980416	389	PLC-OSC-24DC/230AC/2.4/ACT	2904631	408	PLC-RPT-60DC/21HC	2900295	387	PLC-RSC-60DC/21HC	2967659	387
PLC-BSC-120UC/21/SO46	2980319	388	PLC-OSC-24DC/300DC/ 1	2980678	406	PLC-RPT-72UC/21-21/RW	2900347	419	PLC-RSC-120UC/ 1AU/MS/SEN	2909664	385
PLC-BSC-120UC/21HC/SO46	2980432	389	PLC-OSC-24DC/TTL	2982728	414	PLC-RPT-72UC/21-21AU/RW	2900350	419	PLC-RSC-120UC/ 1AU/SEN	2966320	384
PLC-BSC-230UC/ 1/SEN/SO46	2980348	389	PLC-OSC-48DC/ 24DC/ 2	2967002	377	PLC-RPT-72UC/21/RW	2900319	418	PLC-RSC-120UC/21	2966197	372
PLC-BSC-230UC/21-21/SO46	2980429	389	PLC-OSC-48DC/ 48DC/100	2966993	376	PLC-RPT-72UC/21AU/RW	2900322	418	PLC-RSC-120UC/21-21	2967086	374
PLC-BSC-230UC/21/SO46	2980335	388	PLC-OSC-48DC/230AC/ 1	2967853	377	PLC-RPT-72UC/21HC/RW	2900325	419	PLC-RSC-120UC/21-21/EX	2909511	458
PLC-BSC-230UC/21HC/SO46	2980445	389	PLC-OSC-60DC/ 24DC/ 2	2967468	377	PLC-RPT-110UC/21-21/RW	2900348	419	PLC-RSC-120UC/21-21AU	2967138	375
PLC-BSC-TTL/1	2982689	412	PLC-OSC-60DC/ 48DC/100	2967455	376	PLC-RPT-110UC/21-21AU/RW	2900351	419	PLC-RSC-120UC/21/EX	2909525	458
PLC-ESK GY	2966508	424	PLC-OSC-60DC/230AC/ 1	2967866	377	PLC-RPT-110UC/21/RW	2900320	418	PLC-RSC-120UC/21/MS	2909651	373
PLC-HPT-24DC/230AC/10	2905215	409	PLC-OSC-60DC/300DC/ 1	2980681	406	PLC-RPT-110UC/21AU/RW	2900323	418	PLC-RSC-120UC/21AU	2966281	373
PLC-HSC-24DC/230AC/10	2905214	409	PLC-OSC-110DC/300DC/ 1	2980694	406	PLC-RPT-110UC/21HC/RW	2900326	419	PLC-RSC-120UC/21AU/MS	2909657	373
PLC-LOGIC-STARTERKIT3	2909916	432	PLC-OSC-120AC/300DC/ 1	2980717	406	PLC-RPT-120UC/ 1AU/MS/SEN	2909679	385	PLC-RSC-120UC/21HC	2967662	387
PLC-OPT-5DC/ 24DC/100KHZ	2902969	410	PLC-OSC-120UC/ 24DC/ 2	2966650	377	PLC-RPT-120UC/ 1AU/SEN	2900314	384	PLC-RSC-120UC/21HC/EX	2909520	459
PLC-OPT-5DC/ 24DC/2/ACT	2900375	380	PLC-OSC-120UC/ 24DC/ 2/C1D2	5603262	459	PLC-RPT-120UC/21	2900304	372	PLC-RSC-12DC/21-21/EX	2909517	458
PLC-OPT-5DC/ 5DC/100KHZ-G	29002971	411	PLC-OSC-120UC/ 48DC/ 100	2966744	376	PLC-RPT-120UC/21-21	2900335	374	PLC-RSC-12DC/21/EX	2909522	458
PLC-OPT-5DC/24DC/100KHZ-G	2902973	411	PLC-OSC-120UC/ 48DC/100/C1D2	5603263	459	PLC-RPT-120UC/21-21/EX	2909515	458	PLC-RSC-12DC/21HC/EX	2909518	459
PLC-OPT-5DC/300DC/1	2900381	406	PLC-OSC-120UC/ 48DC/100/SEN	2966799	385	PLC-RPT-120UC/21-21AU	2900342	375	PLC-RSC-230UC/ 1AU/MS/SEN	2909665	385
PLC-OPT-12DC/300DC/1	2900382	406	PLC-OSC-120UC/230AC/ 1	2967879	377	PLC-RPT-120UC/21/EX	2909529	458	PLC-RSC-230UC/ 1AU/SEN	2966333	384
PLC-OPT-24DC/ 24DC/10/R	2900398	417	PLC-OSC-125DC/ 24DC/ 2	2980650	377	PLC-RPT-120UC/21/MS	2909669	373	PLC-RSC-230UC/21	2966207	372
PLC-OPT-24DC/ 24DC/2	2900364	377	PLC-OSC-125DC/ 48DC/100	2980047	376	PLC-RPT-120UC/21AU	2900310	373	PLC-RSC-230UC/21-21	2967099	374
PLC-OPT-24DC/ 24DC/2/ACT	2900376	380	PLC-OSC-125DC/230AC/ 1	2980063	377	PLC-RPT-120UC/21AU/MS	2909674	373	PLC-RSC-230UC/21-21/EX	2909512	458
PLC-OPT-24DC/ 24DC/3/RW	2900379	415	PLC-OSC-220DC/300DC/ 1	2980704	406	PLC-RPT-120UC/21HC	2900296	387	PLC-RSC-230UC/21-21AU	2967141	375
PLC-OPT-24DC/ 48DC/100	2900352	376	PLC-OSC-230AC/300DC/ 1	2980720	406	PLC-RPT-120UC/21HC/EX	2909533	459	PLC-RSC-230UC/21/EX	2909526	458
PLC-OPT-24DC/ 48DC/100/SEN	2900358	385	PLC-OSC-230UC/ 24DC/ 2	2966663	377	PLC-RPT-12DC/21-21/EX	2909513	458	PLC-RSC-230UC/21/MS	2909653	373
PLC-OPT-24DC/ 48DC/500W	2900378	407	PLC-OSC-230UC/ 48DC/100	2966757	376	PLC-RPT-12DC/21/EX	2909527	458	PLC-RSC-230UC/21AU	2966294	373
PLC-OPT-24DC/ 5DC/100KHZ-G	2902972	411	PLC-OSC-230UC/ 48DC/100/SEN	2966809	385	PLC-RPT-12DC/21HC/EX	2909531	459	PLC-RSC-230UC/21AU/MS	2909660	373
PLC-OPT-24DC/110DC/3/RW	2900391	415	PLC-OSC-230UC/230AC/ 1	2967882	377	PLC-RPT-230UC/ 1AU/MS/SEN	2909680	385	PLC-RSC-230UC/21HC	2967675	387
PLC-OPT-24DC/230AC/1	2900369	377	PLC-OSC-LPE-24DC/48DC/100	2903171	422	PLC-RPT-230UC/ 1AU/SEN	2900315	384	PLC-RSC-230UC/21HC/EX	2909521	459
PLC-OPT-24DC/230AC/2.4/ACT	2904632	408	PLC-OSP-24DC/ 24DC/ 3/RW	2980513	415	PLC-RPT-230UC/21AU/MS	2900305	372	PLC-RSC-24DC/21/EX	2909524	458
PLC-OPT-24DC/24DC/100KHZ	2902970	410	PLC-OSP-24DC/110DC/ 3/RW	2982511	415	PLC-RPT-230UC/21-21	2900336	374	PLC-RSC-24DC/21HC/EX	2909519	459
PLC-OPT-24DC/24DC/100KHZ-G	2902974	411	PLC-OSP-36DC/110DC/ 3/RW	2982524	415	PLC-RPT-230UC/21-21/EX	2909516	458	PLC-SC-EIK 1-SVN 24P/P	2982663	420
PLC-OPT-24DC/300DC/1	2900363	406	PLC-OSP-48DC/110DC/ 3/RW	2982537	415	PLC-RPT-230UC/21-21AU	2900343	375	PLC-SC-ELR W1/ 2-24DC	2980539	421
PLC-OPT-24DC/TTL	2900363	414	PLC-OSP-72DC/110DC/ 3/RW	2982540	415	PLC-RPT-230UC/21-21AU/RWF	2900345	417	PLC-SC-SH	2980733	405
PLC-OPT-36DC/110DC/3/RW	2900392	415	PLC-OSP-96DC/110DC/ 3/RW	2982553	415	PLC-RPT-230UC/21/EX	2909530	458	PLC-SC-SL	2980775	405
PLC-OPT-48DC/ 24DC/2	2900365	377	PLC-OSP-110DC/ 24DC/ 3/RW	2980526	415	PLC-RPT-230UC/21/MS	2909670	373	PLC-SP-ELR W1/ 2-24DC	2980555	421
PLC-OPT-48DC/ 48DC/100	2900353	376	PLC-OSP-110DC/110DC/ 3/RW	2982566	415	PLC-RPT-230UC/21AU	2900311	373	PLC-V8/D15B/IN	2926087	425
PLC-OPT-48DC/110DC/3/RW	2900393	415	PLC-PT-EIK 1-SVN 24P/P	2900397	420	PLC-RPT-230UC/21AU/MS	2909676	373	PLC-V8/D15B/OUT	2966061	425
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