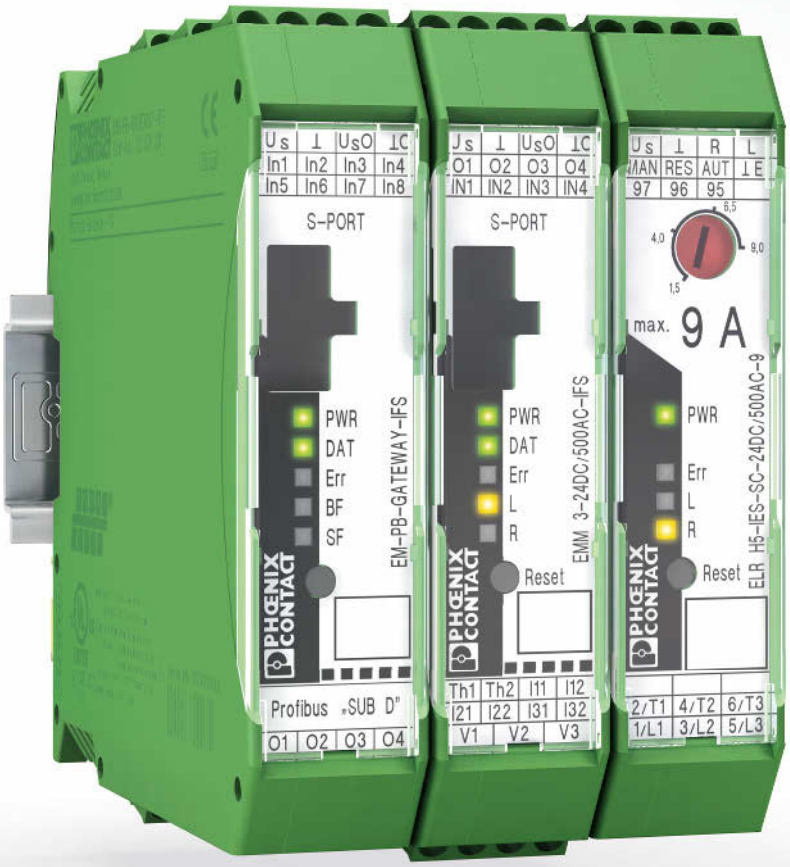
7

Interface Technology and Switching Devices

2013 / 2014



PHOENIX CONTACT
INSPIRING INNOVATIONS

PCB connection technology and electronics housing
- PCB terminal blocks and plug-in connectors
- Electronics housing

Connection technology for field devices
- Plug-in connectors
- Cables and connectors

Modular terminal blocks
- Modular terminal blocks

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

Marking systems, tools, and mounting material
- Marking and labeling
- Tools
- Installation and mounting material

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

Interface technology and switching devices

Control technology, I/O systems and automation infrastructure
- Ethernet networks • Functional safety • HMIs and industrial PCs • I/O systems
- Industrial lighting and signaling • Industrial communication technology
- Fieldbus components and systems • Wireless data communication
- Process infrastructure • Software • Controllers

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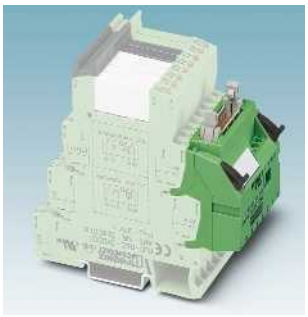

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max. 9 A
PWR
Err
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Reset
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PHOENIX CONTACT

Electronic switchgear and motor control

Switching devices for starting, reversing, and protecting electric motors are some of the most frequently used components in automation technology. These are often 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 4 functions in a single device. Integration in popular fieldbus systems is implemented using 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 via gateways and evaluated by a controller.

Product range overview

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Stainless steel base, IP67 protection
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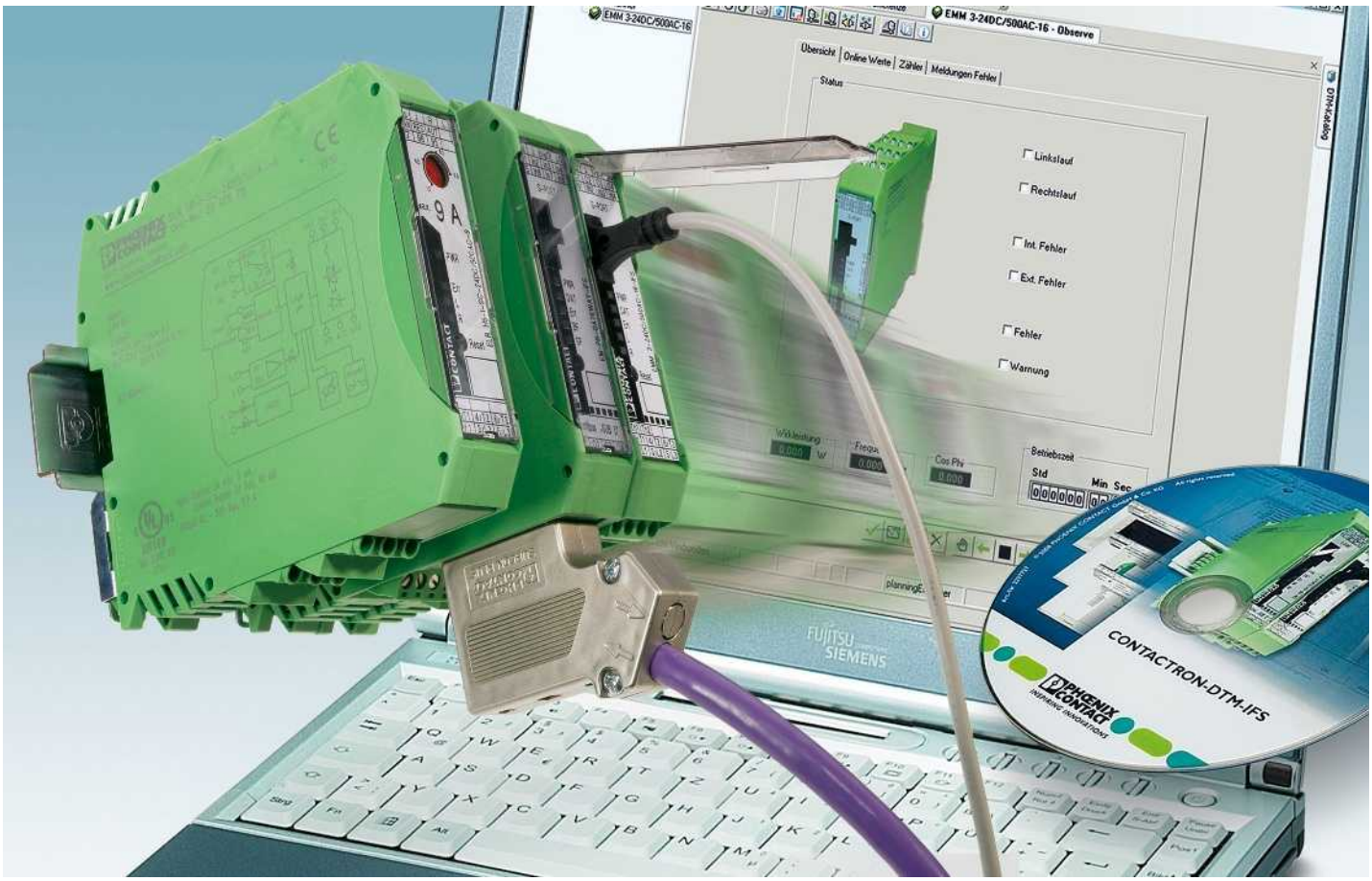


Electronic motor management (EMM)

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

ELR-MM modules combine fast, wear-free electronic reversing load relays with modern measurement and evaluation electronics. 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 relating to the two directions of rotation. Parameterization relies on the real power consumed (calculated from three currents, voltages, and the phase angle), thereby offering a much more precise basis than if only the current is taken into consideration, as it is independent of voltage fluctuations and drive load. If a switching threshold is exceeded or not reached, the ELR-MM or EMM initiates an emergency shutdown of the motor immediately (or after an adjustable "delay time"). In addition, a message can be sent via an output.

This state can only be deactivated via a defined reset. If the effective 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.

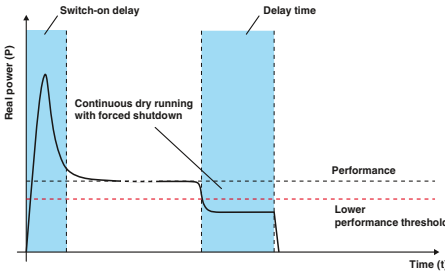
Permanent status monitoring with high scanning rates and the fast semiconductor switch enable complete system protection, including motor protection.

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.

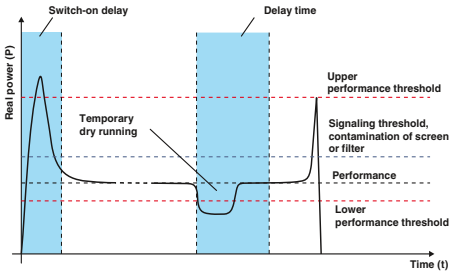
Protection against dry running, blocking, and cavitation, warning thresholds to indicate filter contamination.

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.

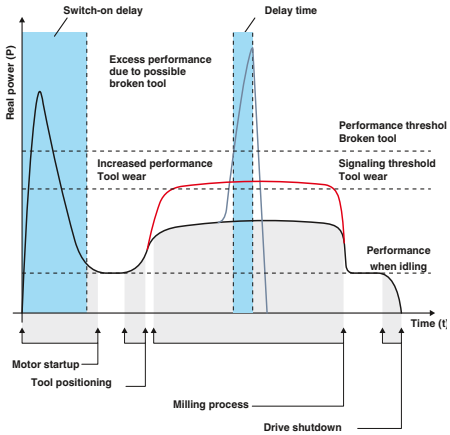


In the case of motor-driven pumps, the lower performance threshold provides reliable protection against hazardous dry running.



Forced shutdown of the drive can be delayed by the "delay time".

This prevents forced shutdown in the event of air bubbles.



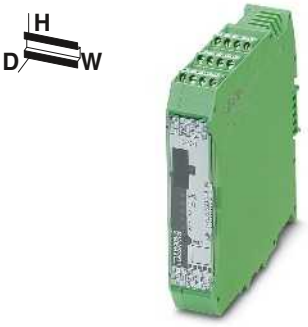
Tooling machines are monitored and protected in a similar way when drilling, milling or grinding. If the feed value on a milling machine is set too high, a tool may break in the "worst-case" scenario. The power threshold - parameterized accordingly - can be used to resolve this issue.

Additionally, a message threshold signals tool wear in advance.

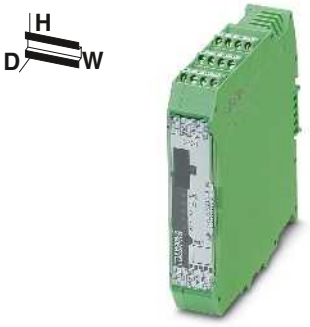
Electronic motor management

The EMM motor management module (with/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 INTERFACE system and PROFIBUS-GATEWAY-IFS via TBUS



Allows the use of external current transformers



With integrated current transformers

Notes:

1) EMC: Class A product, see page 571

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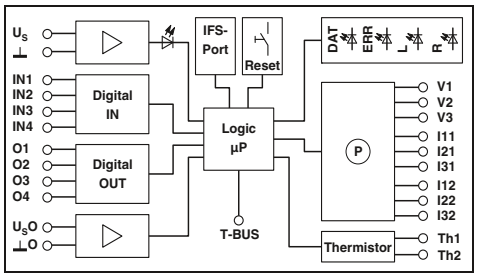

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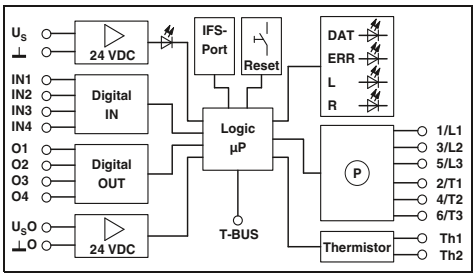


Technical data

Input data				
Rated control supply voltage U_S	24 V DC	230 V AC	24 V DC	230 V AC
Rated control supply voltage range with reference to U_S	0.8 ... 1.25	0.4 ... 1.1	0.8 ... 1.25	0.4 ... 1.1
Rated control supply current I_S at U_S	25 mA	10 mA	25 mA	10 mA
Input data of digital inputs	EMM 3- 24DC/500AC-IFS[1])	EMM 3-230AC/500AC-IFS[1])	EMM 3- 24DC/500AC-16-IFS[1])	EMM 3-230AC/500AC-16-IFS[1])
Number of inputs	4 (IN1 - IN4)	4 (IN1 - IN4)	4 (IN1 - IN4)	4 (IN1 - IN4)
Rated actuating voltage U_C	24 V DC	230 V AC	24 V DC	230 V AC
Rated actuating current I_C	3.3 mA	3.5 mA	3.3 mA	3.5 mA
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	max. 16 A	max. 16 A
Output power of the converter	> 1.25 VA	> 1.25 VA	-	-
Internal resistance EMM	0.02 Ω	0.02 Ω	-	-
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) / 500 mA	24 V DC (semiconductor output) / 500 mA	230 V AC (relay output/500 mA) / 500 mA
General data				
Rated insulation voltage	500 V		500 V	
Rated surge voltage	6 kV/safe isolation	6 kV/safe isolation	6 kV/safe isolation	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C		-25°C ... 70°C	
Standards/regulations	EN 60947 / EN 60947-4-2		EN 60947 / EN 60947-4-2	
EMC regulations	EN 61000-6-2 / EN 61000-6-3 / EN 61000-6-4		EN 61000-6-2 / EN 61000-6-3 / EN 61000-6-4	
Degree of protection according to IEC 60529/ EN 60529	IP20		IP20	
Mounting position	Vertical (horizontal DIN rail)		Vertical (horizontal DIN rail)	
Screw connection solid / stranded / AWG	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 12		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 12	
Dimensions W / H / D	22.5 mm / 99 mm / 114.5 mm		22.5 mm / 99 mm / 114.5 mm	

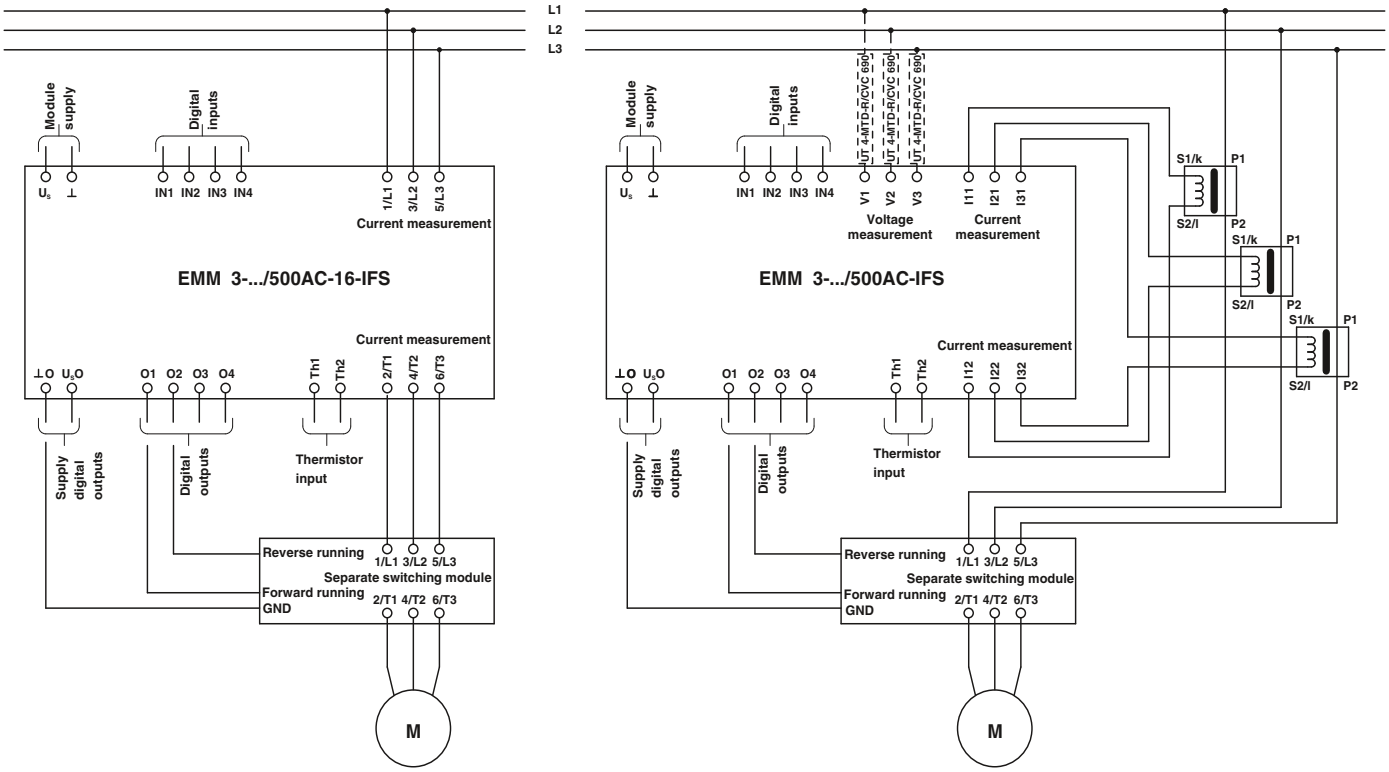
Ordering data

Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Electronic motor management						
	EMM 3- 24DC/500AC-IFS[1])	**2297497**	1	**EMM 3- 24DC/500AC-16-IFS[1])**	**2297523**	1
	EMM 3-230AC/500AC-IFS[1])	**2297507**	1	**EMM 3-230AC/500AC-16-IFS[1])**	**2297536**	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER[1])**	**2811271**	1	**IFS-USB-PROG-ADAPTER[1])**	**2811271**	1
DIN rail connector	**ME 22,5 TBUS 1,5/ 5-ST-3,81 GN**	**2707437**	50	**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 modular terminal blocks and cover	**UT 4-MTD-R/CVC 690/SET**	**2901667**	1			
Multi-functional memory block for the INTERFACE system						
- Flat design	**IFS-CONFSTICK[1])**	**2986122**	1	**IFS-CONFSTICK[1])**	**2986122**	1
- Tall design	**IFS-CONFSTICK-L**	**2901103**	1	**IFS-CONFSTICK-L**	**2901103**	1
Mini COMBICON connectors						
- Socket contact	**MC 1,5/ 5-ST-3,81**	**1803604**	50	**MC 1,5/ 5-ST-3,81**	**1803604**	50
- Pin contact	**IMC 1,5/ 5-ST-3,81**	**1857919**	50	**IMC 1,5/ 5-ST-3,81**	**1857919**	50

Electronic motor management



The electronic motor management modules offer all the advantages of modern effective power monitoring. Every 6.6 ms, the effective power of a drive system or of any other 3-phase consumer is calculated from three currents, voltages and the phase angle. Currents of up to 16 A can be directly acquired and currents >16 A are supplied via external converters. Digital outputs can be used to control separate mechanical or electronic switching elements that adopt the actual switching of the load. In this configuration, the EMM reliably protects connected loads – irrespective of their power consumption – against overload and underload, and provides permanent 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 effective 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
– PROFIBUS connection via TBUS
– Pre-configured motor exits such as reversing starters, star delta starters, etc.

The EMM modules can be used to record complete "curves that can be used for system documentation.

The operating modes forward and reversing running, reverse and limit switch operation (with integrated restart inhibit) switch actuating and regulating drives, pumps etc. and also check 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 consumer (refer to connection diagram). For suitable current transformers, see catalog INTERFACE.

DIN rail connector TBUS

The **TBUS** (Order No. 2707437) can be used to supply several EMMs with 24 V DC or to couple up to 31 EMMs (for example) to the PROFIBUS-GATEWAY-IFS.

Switching element

Depending on the particular requirement of the application, either an electro-mechanical contactor or reversing contactor combination, or a semiconductor contactor or a solid-state reversing contactor is to be used for the actual task of switching the load. These switching elements are controlled via the digital outputs of the EMM modules.

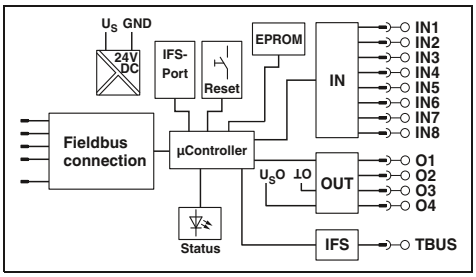
IFS gateways for electronic motor management modules

EM...GATEWAY-IFS for connecting EMM...IFS modules to popular bus systems: PROFIBUS DP, Modbus, Modbus TCP, DeviceNet™, and CANopen®.

– Communication via T-BUS with up to 31 EMM…IFS modules
– Equipped with freely parameterizable digital inputs and outputs
– Digital switching outputs for direct control of EMM…IFS (forward/reverse running)

Notes:

1) EMC: Class A product, see page 571



Technical data

Input data		
Operating voltage U_B		24 V DC -20 % ... +25 %
Nominal input current at U_{IN}		85 mA
Input circuit		Polarity protection, surge protection
Digital inputs		
Input voltage		24 V DC ±20%
Nominal input current at U_{IN}		3 mA
Input circuit		Polarity protection, surge protection
Digital outputs		
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
IFS interface		
Connection method		TBUS
General data		
Test voltage data interface/power supply		1.5 kV
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 / -
Connection data solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	W / H / D	22.5 mm / 99 mm / 114.5 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
IFS gateways for electronic motor management modules			
PROFIBUS DP	**EM-PB-GATEWAY-IFS**[1])	**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

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**[1])	**2811271**	1
DIN rail connector	**ME 22,5 TBUS 1,5/ 5-ST-3,81 GN**	**2707437**	50
Mini COMBICON connectors			
- Socket contact	**MC 1,5/ 5-ST-3,81**	**1803604**	50
- Pin contact	**IMC 1,5/ 5-ST-3,81**	**1857919**	50

Device Type Manager (DTM) for motor management modules EMM...IFS

- CONTACTRON-DTM-IFS, programming adapter, and user manual on CD available as configuration package
- Also available as USB programming adapter even individually
- CONTACTRON-DTM-IFS also available free of charge as a separate download from www.phoenixcontact.com

Notes:

1) EMC: Class A product, see page 571

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Configuration package for the EMM...IFS, comprising CONTACTRON-DTM-IFS, USB programming adapter, and user manual on CD	**MM-CONF-SET**	**2297992**	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER[1])**	**2811271**	1

Hybrid motor starters for controlling 3-phase asynchronous motors combine up to four functions in one device as required. These include forward running, reverse running with optional reversing function including load wiring. The locking circuit for the reversing function is also integrated and certified as a single electronic reversing starter according to UL 508a and the new UL 60947-1. Furthermore, the devices protect the motor by means of an integrated motor protection relay with automatic and remote reset function. The implemented safety function according to Performance Level e (PL e) of EN ISO 13849-1 provides the emergency stop requirement. A PDT confirmation contact provides information regarding the availability of the device, and the motor state. This means that in the event of motor control without an error message the integrated current measurement and symmetry scanning ensures that the motor is turning. Even with these numerous functions, the hybrid motor starter is just 22.5 mm wide.

Short-circuit-proof hybrid motor starters with integrated protective devices, for mounting on 35 mm DIN rails and 60 mm busbar systems and connection to popular bus systems via SmartWire-DT™ complete the product portfolio.

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

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

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

The uniform design of the control side enables the combination of short-circuit-proof hybrid motor starters with SmartWire-DT™ adapters for integration in a bus system.

"4 in 1" hybrid motor starter with reversing function, motor protection, and emergency stop

These 3-phase "4 in 1" hybrid motor starters combine four functions in one device: right contactor, left contactor, motor protection relay, and emergency stop up to category 3.

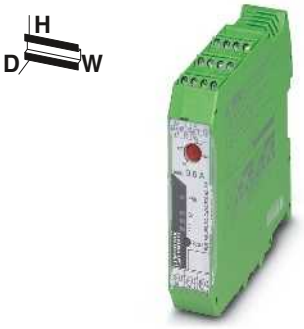
Offer the following advantages:

– 22.5 mm wide
– They save wiring
– Bi-metal function can be set up to 9 A
– Long service life
– Space-saving
– 3-phase loop bridging

Safety level according to:

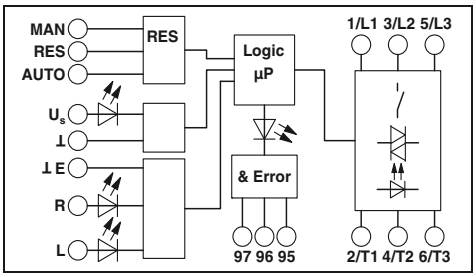
– IEC 61508-1: SIL3
– ISO 13849: PL e

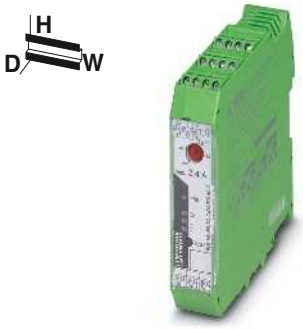
Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5



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

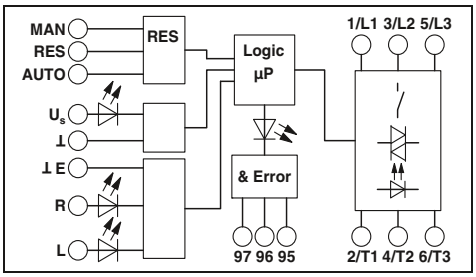
Ex:





For reversing 3~ AC motors up to 550 V AC/3 x 2 A

Ex:



Technical data

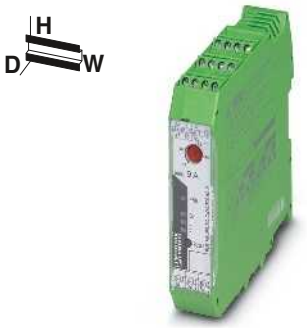
Input data				
Rated control supply voltage U_S	24 V DC	230 V AC (50/60 Hz)	24 V DC	230 V AC (50/60 Hz)
Rated control supply voltage range with reference to U_S	0.8 ... 1.25	0.4 ... 1.1	0.8 ... 1.25	0.4 ... 1.1
Rated control supply current I_S at U_S	40 mA	4 mA	40 mA	4 mA
Rated actuating voltage U_C R/L	24 V DC	230 V AC	24 V DC	230 V AC
Rated actuating voltage range with reference to U_C	0.8 ... 1.25	0.4 ... 1.1	0.8 ... 1.25	0.4 ... 1.1
Rated actuating current I_C at U_C	5 mA	7 mA	5 mA	7 mA
Input circuit	Protection against polarity reversal, Surge protection	Surge protection	Protection against polarity reversal, Surge protection	Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED		Green LED / Yellow LED / Red LED	
Output data load side				
Output voltage range	42 V AC ... 550 V AC	42 V AC ... 550 V AC	42 V AC ... 550 V AC	42 V AC ... 550 V AC
Load current	max. 600 mA (see derating curve)	max. 600 mA (see derating curve)	max. 2.4 A (see derating curve)	max. 2.4 A (see derating curve)
Surge current	100 A (t = 10 ms)	100 A (t = 10 ms)	100 A (t = 10 ms)	100 A (t = 10 ms)
Min. load current	75 mA	75 mA	180 mA	180 mA
Residual voltage	< 0.2 V	< 0.2 V	< 0.3 V	< 0.3 V
Output protection	Surge protection		Surge protection	
General data				
Rated insulation voltage	500 V		500 V	
Rated surge voltage	6 kV/safe isolation	6 kV/safe isolation	6 kV/safe isolation	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C		-25°C ... 70°C	
Electrical service life	3 x 10^7 cycles		3 x 10^7 cycles	
Standards/regulations	DIN EN 50178 / EN 60947		DIN EN 50178 / EN 60947	
Mounting position	Vertical (horizontal DIN rail)		Vertical (horizontal DIN rail)	
Mounting	Can be aligned with spacing = 20 mm		Can be aligned with spacing = 20 mm	
Connection data solid / stranded / AWG	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
Dimensions W / H / D	22.5 mm / 99 mm / 114.5 mm		22.5 mm / 99 mm / 114.5 mm	
Safety data				
EC-type examination certificate according to ATEX	Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145	Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145	Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145	Ex II (2) G, Ex II (2) D PTB 07 ATEX 3145

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
"4 in 1" hybrid motor starter, incl. right contactor, left contactor, motor protection relay, and emergency stop			
Screw connection	**ELR H5-IES-SC- 24DC/500AC-0,6**	**2900582**	1
Push-in connection	**ELR H5-IES-PT-24DC/500AC-0,6**	**2903902**	1
Screw connection	**ELR H5-IES-SC-230AC/500AC-0,6**	**2900692**	1
"4 in 1" hybrid motor starter, incl. right contactor, left contactor, motor protection relay, and emergency stop, terminals L1, L2, L3 and T1, T2, T3 rotated			
	ELR W3- 24DC/500AC- 2I	**2297031**	1
	ELR W3-230AC/500AC- 2I	**2297044**	1

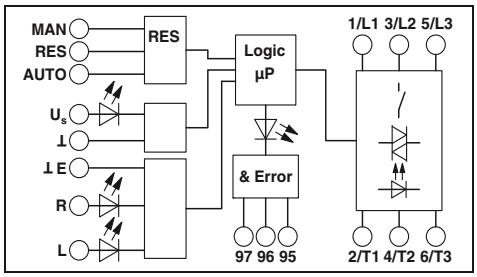
Ordering data

Type	Order No.	Pcs. / Pkt.
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



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

Ex:



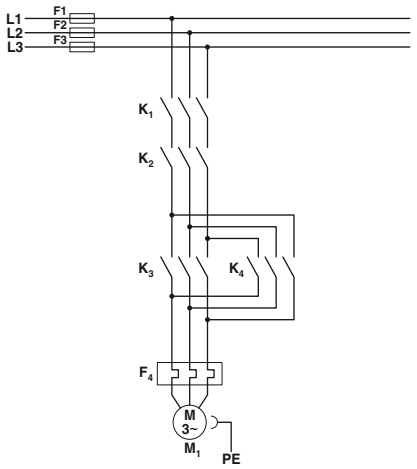
Technical data

24 V DC	230 V AC (50/60 Hz)
0.8 ... 1.25	0.4 ... 1.1
40 mA	4 mA
24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
5 mA	7 mA
Protection against polarity reversal, Surge protection	Surge protection
Green LED / Yellow LED / Red LED	
42 V AC ... 550 V AC	42 V AC ... 550 V AC
max. 9 A (see derating curve)	max. 9 A (see derating curve)
100 A (t = 10 ms)	100 A (t = 10 ms)
1.5 A	1.5 A
< 0.5 V	< 0.5 V
Surge protection	
500 V	
6 kV/safe isolation	6 kV/safe isolation
-25°C ... 70°C	
3 x 10^7 cycles	
DIN EN 50178 / EN 60947	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
22.5 mm / 99 mm / 114.5 mm	
II (2) G, II (2) D	II (2) G, II (2) D
PTB 07 ATEX 3145	PTB 07 ATEX 3145

Ordering data

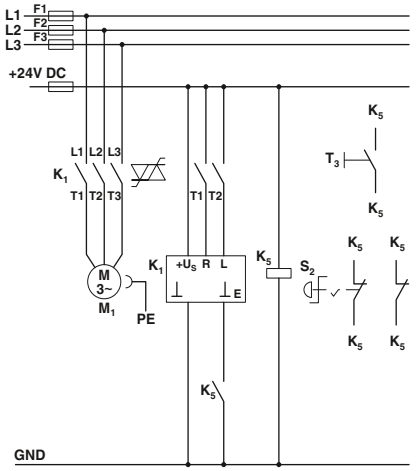
Type	Order No.	Pcs. / Pkt.
ELR H5-IES-SC- 24DC/500AC-9	**2900421**	1
ELR H5-IES-PT-24DC/500AC-9	**2903906**	1
ELR H5-IES-SC-230AC/500AC-9	**2900422**	1
ELR W3- 24DC/500AC- 9I	**2297057**	1
ELR W3-230AC/500AC- 9I	**2297060**	1

Conventional structure
Main current path reversing contactor according to category 3



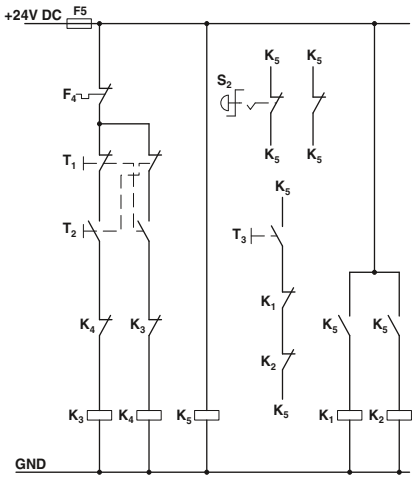
K1 + K2 = Emergency stop contactor
K3 = Left contactor
K4 = Right contactor
F4 = Motor protection relay

Structure with CONTACTRON
Main and control current path for "4 in 1" hybrid motor starter with reversing function according to category 3

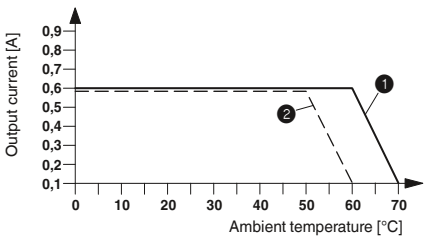


K1 = "4 in 1" hybrid motor starter with reversing function
K5 = PSR SCP-24DC.../Safety relay
T1 = Left, T2 = Right, T3 = Reset
S2 = Emergency stop

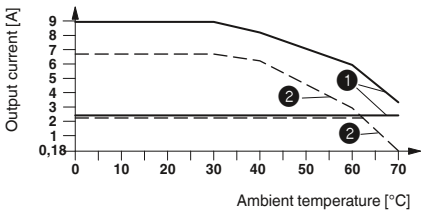
Conventional structure
Control current path reversing contactor according to category 3



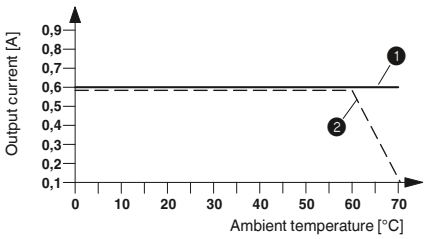
K1 + K2 = Emergency stop contactor
K3 = Left contactor
K4 = Right contactor
K5 = PSR SCP-24DC.../Safety relay
T1 = Left, T2 = Right, T3 = Reset
S2 = Emergency stop
F4 = Motor protection relay



Derating curve ELR H5-IES-SC-230AC/500AC-0,6 100% operating time

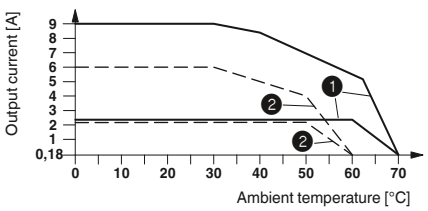


Derating curve ELR H5-IES-SC-24DC/500AC-2 and ELR H5-IES-SC-24DC/500AC-9 100% operating time



Derating curve ELR H5-IES-SC-24DC/500AC-0,6 100% operating time

❶ Aligned with > 20 mm spacing
❷ Aligned without spacing



Derating curve ELR H5-IES-SC-230AC/500AC-2 and ELR H5-IES-SC-230AC/500AC-9 100% operating time

"3 in 1" hybrid motor starter with motor protection and emergency stop

These 3-phase "3 in 1" hybrid motor starters combine three functions in one device: right contactor, motor protection relay, and emergency stop up to category 3.

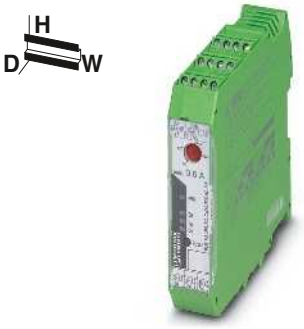
Offer the following advantages:

– 22.5 mm wide
– They save wiring
– Bi-metal function can be set up to 9 A
– Long service life
– Space-saving
– 3-phase loop bridging

Safety level according to:

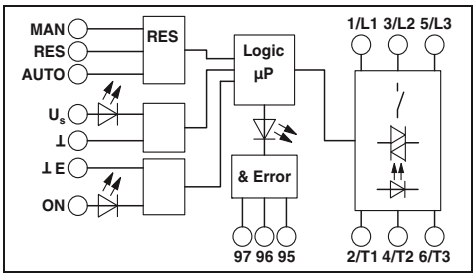
– IEC 61508-1: SIL3
– ISO 13849: PL e

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5



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

Ex:

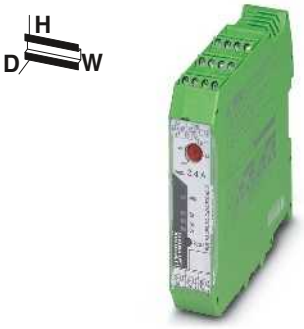


Technical data

Input data			
Rated control supply voltage U_S	24 V DC	230 V AC (50/60 Hz)	
Rated control supply voltage range with reference to U_S	0.8 ... 1.25	0.4 ... 1.1	
Rated control supply current I_S at U_S	40 mA	4 mA	
Rated actuation voltage U_C ON	24 V DC	230 V AC	
Rated actuating voltage range with reference to U_C	0.8 ... 1.25	0.4 ... 1.1	
Rated actuating current I_C at U_C	5 mA	7 mA	
Input circuit	Protection against polarity reversal, Surge protection	Surge protection	
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED		
Output data load side			
Output voltage range	42 V AC ... 550 V AC	42 V AC ... 550 V AC	
Load current	max. 600 mA (see derating curve)	max. 600 mA (see derating curve)	
Surge current	100 A (t = 10 ms)	100 A (t = 10 ms)	
Min. load current	75 mA	75 mA	
Residual voltage	< 0.2 V	< 0.2 V	
Output protection	Surge protection		
General data			
Rated insulation voltage	500 V		
Rated surge voltage	6 kV/safe isolation	6 kV/safe isolation	
Ambient temperature (operation)	-25°C ... 70°C		
Electrical service life	3 x 10^7 cycles		
Standards/regulations	DIN EN 50178 / EN 60947		
Mounting position	Vertical (horizontal DIN rail)		
Mounting	Can be aligned with spacing = 20 mm		
Connection data solid / stranded / AWG	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14		
Dimensions W / H / D	22.5 mm / 99 mm / 114.5 mm		
Safety data			
EC-type examination certificate according to ATEX	II (2) G, II (2) D PTB 07 ATEX 3145	II (2) G, II (2) D PTB 07 ATEX 3145	

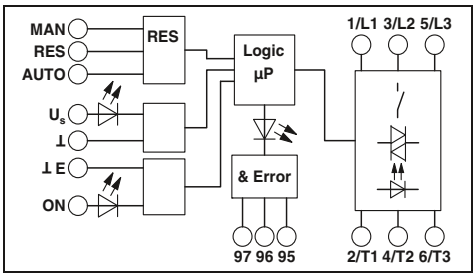
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
"3 in 1" hybrid motor starter, incl. right contactor, motor protection relay, and emergency stop			
Screw connection	**ELR H3-IES-SC- 24DC/500AC-0,6**	**2900566**	1
Push-in connection	**ELR H3-IES-PT-24DC/500AC-0,6**	**2903914**	1
Screw connection	**ELR H3-IES-SC-230AC/500AC-0,6**	**2900689**	1



For starting 3~ AC motors up to 550 V AC/3 x 2 A

Ex:



Technical data

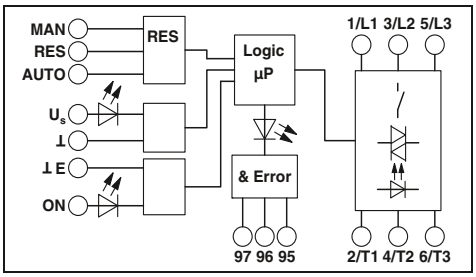
Input data			
Rated control supply voltage U_S	24 V DC	230 V AC (50/60 Hz)	
Rated control supply voltage range with reference to U_S	0.8 ... 1.25	0.4 ... 1.1	
Rated control supply current I_S at U_S	40 mA	4 mA	
Rated actuation voltage U_C ON	24 V DC	230 V AC	
Rated actuating voltage range with reference to U_C	0.8 ... 1.25	0.4 ... 1.1	
Rated actuating current I_C at U_C	5 mA	7 mA	
Input circuit	Protection against polarity reversal, Surge protection	Surge protection	
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED		
Output data load side			
Output voltage range	42 V AC ... 550 V AC	42 V AC ... 550 V AC	
Load current	max. 2.4 A (see derating curve)	max. 2.4 A (see derating curve)	
Surge current	100 A (t = 10 ms)	100 A (t = 10 ms)	
Min. load current	180 mA	180 mA	
Residual voltage	< 0.3 V	< 0.3 V	
Output protection	Surge protection		
General data			
Rated insulation voltage	500 V		
Rated surge voltage	6 kV/safe isolation	6 kV/safe isolation	
Ambient temperature (operation)	-25°C ... 70°C		
Electrical service life	3 x 10^7 cycles		
Standards/regulations	DIN EN 50178 / EN 60947		
Mounting position	Vertical (horizontal DIN rail)		
Mounting	Can be aligned with spacing = 20 mm		
Connection data solid / stranded / AWG	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14		
Dimensions W / H / D	22.5 mm / 99 mm / 114.5 mm		
Safety data			
EC-type examination certificate according to ATEX	II (2) G, II (2) D PTB 07 ATEX 3145	II (2) G, II (2) D PTB 07 ATEX 3145	

Ordering data

Type	Order No.	Pcs. / Pkt.
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

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

Ex:



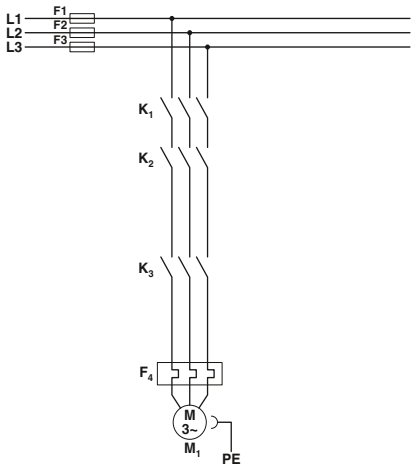
Technical data

24 V DC	230 V AC (50/60 Hz)
0.8 ... 1.25	0.4 ... 1.1
40 mA	4 mA
24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
5 mA	7 mA
Protection against polarity reversal, Surge protection	Surge protection
Green LED / Yellow LED / Red LED	
42 V AC ... 550 V AC	42 V AC ... 550 V AC
max. 9 A (see derating curve)	max. 9 A (see derating curve)
100 A (t = 10 ms)	100 A (t = 10 ms)
1.5 A	1.5 A
< 0.5 V	< 0.5 V
Surge protection	
500 V	
6 kV/safe isolation	6 kV/safe isolation
-25°C ... 70°C	
3 x 10^7 cycles	
DIN EN 50178 / EN 60947	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
22.5 mm / 99 mm / 114.5 mm	
II (2) G, II (2) D	II (2) G, II (2) D
PTB 07 ATEX 3145	PTB 07 ATEX 3145

Ordering data

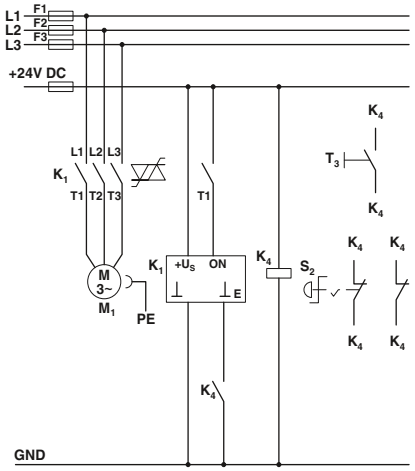
Type	Order No.	Pcs. / Pkt.
ELR H3-IES-SC- 24DC/500AC-9	**2900569**	1
ELR H3-IES-PT-24DC/500AC-9	**2903918**	1
ELR H3-IES-SC-230AC/500AC-9	**2900570**	1

Conventional structure
Main current path contactor according to category 3



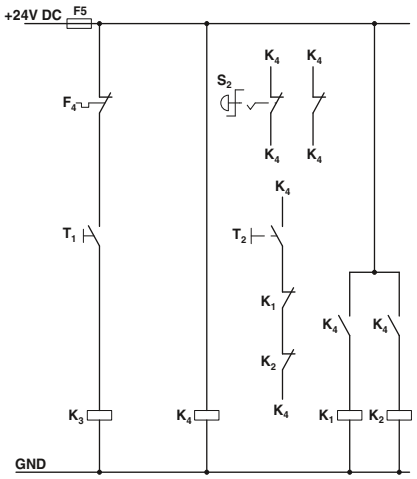
K1 + K2 = Emergency stop contactor
K3 = Right contactor
F4 = Motor protection relay

Structure with CONTACTRON
Main and control current path for "3 in 1" hybrid motor starter according to category 3

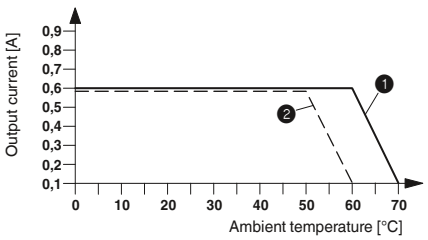


K1 = "3 in 1" hybrid motor starter
K4 = PSR SCP-24DC.../Safety relay
T1 = Right, T3 = Reset
S2 = Emergency stop

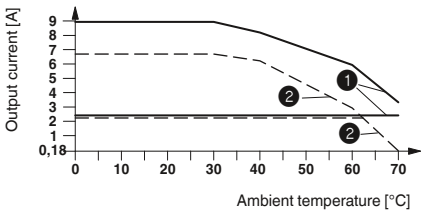
Conventional structure
Control current path contactor according to category 3



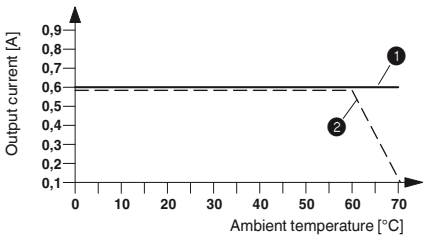
K1 + K2 = Emergency stop contactor
K3 = Right contactor
K4 = PSR SCP-24DC.../Safety relay
T1 = Right, T3 = Reset
S2 = Emergency stop
F4 = Motor protection relay



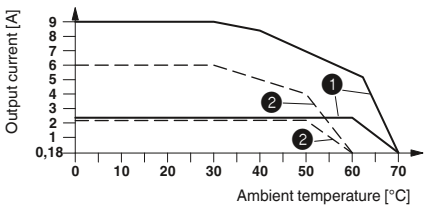
Derating curve ELR H3-IES-SC-230AC/500AC-0,6
100% operating time



Derating curve ELR H3-IES-SC-24DC/500AC-2 and ELR H3-IES-SC-24DC/500AC-9
100% operating time



Derating curve ELR H3-IES-SC-24DC/500AC-0,6
100% operating time



Derating curve ELR H3-IES-SC-230AC/500AC-2 and ELR H3-IES-SC-230AC/500AC-9
100% operating time

❶ Aligned with > 20 mm spacing
❷ Aligned without spacing

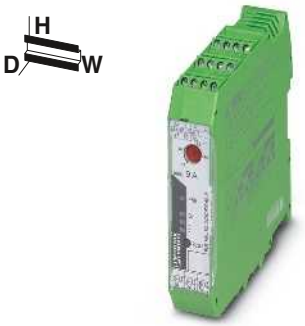
"3 in 1" hybrid motor starter with reversing function and motor protection

These 3-phase "3 in 1" hybrid motor starters combine three functions in one device: right contactor, left contactor, and motor protection relay.

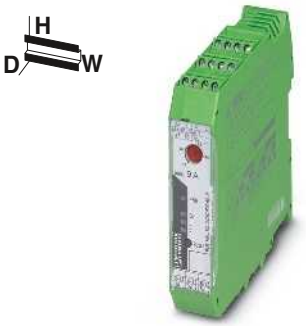
Offer the following advantages:

– 22.5 mm wide
– They save wiring
– Bi-metal function can be set up to 9 A
– Long service life
– Space-saving
– 3-phase loop bridging

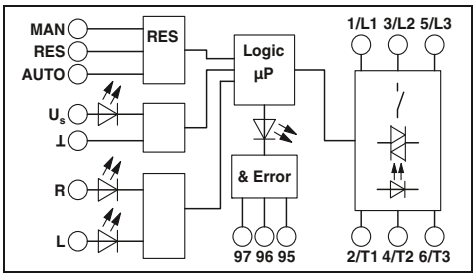
Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5

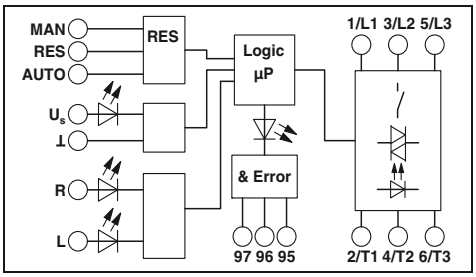


For starting 3~ AC motors up to 550 V AC/3 x 0.6 A



For starting 3~ AC motors up to 550 V AC/3 x 2 A





Technical data

Input data				
Rated control supply voltage U_S	24 V DC	230 V AC (50/60 Hz)	24 V DC	230 V AC (50/60 Hz)
Rated control supply voltage range with reference to U_S	0.8 ... 1.25	0.4 ... 1.1	0.8 ... 1.25	0.4 ... 1.1
Rated control supply current I_S at U_S	40 mA	4 mA	40 mA	4 mA
Rated actuation voltage U_C ON	24 V DC	230 V AC	24 V DC	230 V AC
Rated actuating voltage range with reference to U_C	0.8 ... 1.25	0.4 ... 1.1	0.8 ... 1.25	0.4 ... 1.1
Rated actuating current I_C at U_C	5 mA	7 mA	5 mA	7 mA
Input circuit	Protection against polarity reversal, Surge protection	Surge protection	Protection against polarity reversal, Surge protection	Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED		Green LED / Yellow LED / Red LED	
Output data load side				
Output voltage range	42 V AC ... 550 V AC	42 V AC ... 550 V AC	42 V AC ... 550 V AC	42 V AC ... 550 V AC
Load current	max. 600 mA (see derating curve)	max. 600 mA (see derating curve)	max. 2.4 A (see derating curve)	max. 2.4 A (see derating curve)
Surge current	100 A (t = 10 ms)	100 A (t = 10 ms)	100 A (t = 10 ms)	100 A (t = 10 ms)
Min. load current	75 mA	75 mA	180 mA	180 mA
Residual voltage	< 0.2 V	< 0.2 V	< 0.3 V	< 0.3 V
Output protection	Surge protection		Surge protection	
General data				
Rated insulation voltage	500 V		500 V	
Rated surge voltage	6 kV/safe isolation	6 kV/safe isolation	6 kV/safe isolation	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C		-25°C ... 70°C	
Electrical service life	3 x 10^7 cycles		3 x 10^7 cycles	
Standards/regulations	DIN EN 50178 / EN 60947		DIN EN 50178 / EN 60947	
Mounting position	Vertical (horizontal DIN rail)		Vertical (horizontal DIN rail)	
Mounting	Can be aligned with spacing = 20 mm		Can be aligned with spacing = 20 mm	
Screw connection solid / stranded / AWG	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
Dimensions W / H / D	22.5 mm / 99 mm / 114.5 mm		22.5 mm / 99 mm / 114.5 mm	

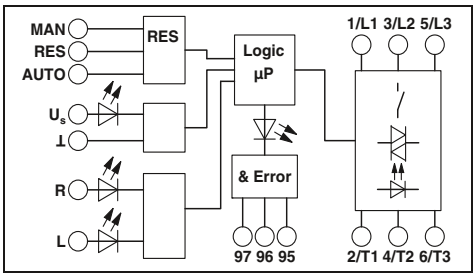
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
"3 in 1" hybrid motor starter, incl. right contactor, left contactor, and motor protection relay			
	ELR H5-I-SC- 24DC/500AC-0,6	**2900573**	1
	ELR H5-I-SC-230AC/500AC-0,6	**2900691**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
ELR H5-I-SC- 24DC/500AC-2	**2900574**	1
ELR H5-I-SC-230AC/500AC-2	**2900575**	1

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



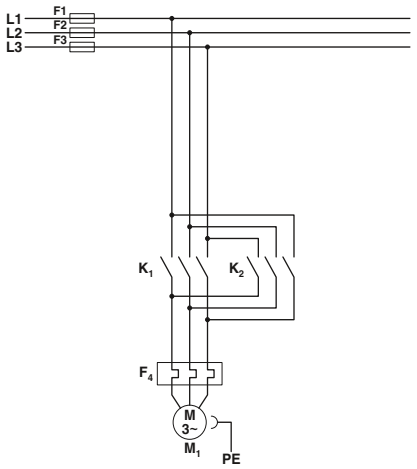
Technical data

24 V DC	230 V AC (50/60 Hz)
0.8 ... 1.25	0.4 ... 1.1
40 mA	4 mA
24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
5 mA	7 mA
Protection against polarity reversal, Surge protection	Surge protection
Green LED / Yellow LED / Red LED	
42 V AC ... 550 V AC	42 V AC ... 550 V AC
max. 9 A (see derating curve)	max. 9 A (see derating curve)
100 A (t = 10 ms)	100 A (t = 10 ms)
1.5 A	1.5 A
< 0.5 V	< 0.5 V
Surge protection	
500 V	
6 kV/safe isolation	6 kV/safe isolation
-25°C ... 70°C	
3 x 10^7 cycles	
DIN EN 50178 / EN 60947	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
22.5 mm / 99 mm / 114.5 mm	

Ordering data

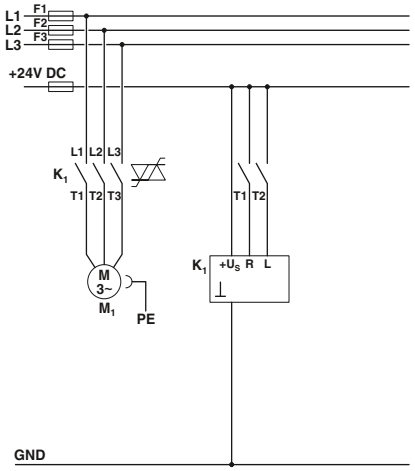
Type	Order No.	Pcs. / Pkt.
ELR H5-I-SC- 24DC/500AC-9	**2900576**	1
ELR H5-I-SC-230AC/500AC-9	**2900578**	1

Conventional structure
Main current path contactor according to category 3



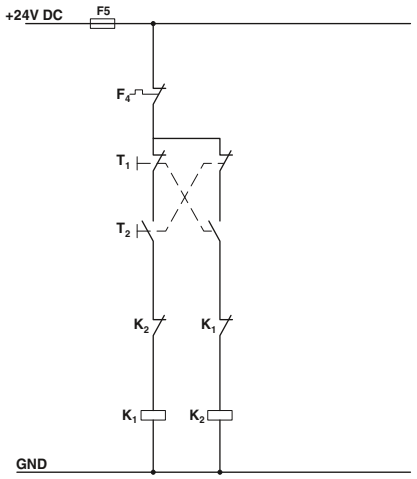
K1 = Left contactor
K2 = Right contactor
F4 = Motor protection relay

Structure with CONTACTRON
Main and control current path for "3 in 1" hybrid motor starter according to category 3

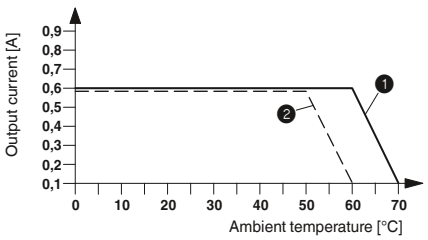


K1 = "3 in 1" hybrid motor starter
T1 = Right, T2 = Left, T3 = Reset

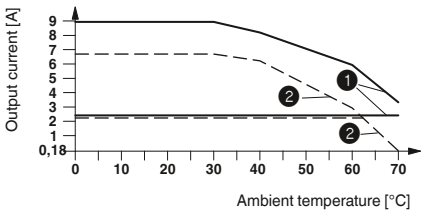
Conventional structure
Control current path contactor according to category 3



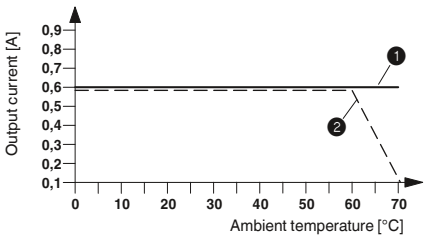
K1 = Left contactor
K2 = Right contactor
T1 = Right, T2 = Left, T3 = Reset
F4 = Motor protection relay



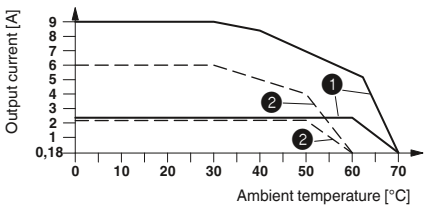
Derating curve ELR H5-I-SC-230AC/500AC-0,6
100% operating time



Derating curve ELR H5-I-SC-24DC/500AC-2 and
ELR H5-I-SC-24DC/500AC-99
100% operating time



Derating curve ELR H5-I-SC-24DC/500AC-0,6
100% operating time



Derating curve ELR H5-I-SC-230AC/500AC-2 and
ELR H5-I-SC-230AC/500AC-9
100% operating time

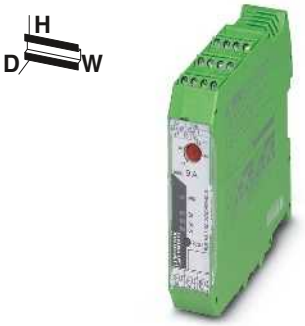
❶ Aligned with > 20 mm spacing
❷ Aligned without spacing

"2 in 1" hybrid motor starter with motor protection

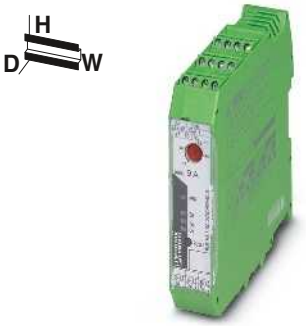
These 3-phase "2 in 1" hybrid motor starters combine two functions in one device: right contactor and motor protection.

The devices offer the following advantages:

– 22.5 mm wide
– They save wiring
– Bi-metal function can be set up to 9 A
– Low-wear switching
– Long service life
– Space-saving
– 3-phase loop bridging

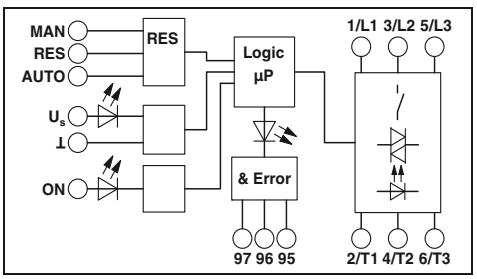


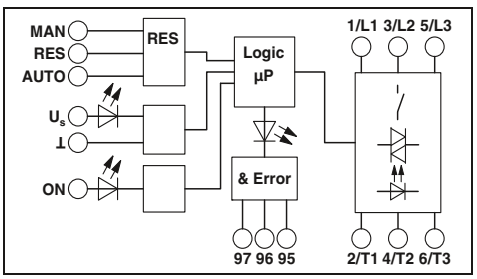
For starting 3~ AC motors up to 550 V AC/3 x 0.6 A



For starting 3~ AC motors up to 550 V AC/3 x 2 A

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5





Technical data

Input data				
Rated control supply voltage U_S	24 V DC	230 V AC (50/60 Hz)	24 V DC	230 V AC (50/60 Hz)
Rated control supply voltage range with reference to U_S	0.8 ... 1.25	0.4 ... 1.1	0.8 ... 1.25	0.4 ... 1.1
Rated control supply current I_S at U_S	40 mA	4 mA	40 mA	4 mA
Rated actuation voltage U_C ON	24 V DC	230 V AC	24 V DC	230 V AC
Rated actuating voltage range with reference to U_C	0.8 ... 1.25	0.4 ... 1.1	0.8 ... 1.25	0.4 ... 1.1
Rated actuating current I_C at U_C	5 mA	7 mA	5 mA	7 mA
Input circuit	Protection against polarity reversal, Surge protection	Surge protection	Protection against polarity reversal, Surge protection	Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED		Green LED / Yellow LED / Red LED	
Output data load side				
Output voltage range	42 V AC ... 550 V AC	42 V AC ... 550 V AC	42 V AC ... 550 V AC	42 V AC ... 550 V AC
Load current	max. 600 mA (see derating curve)	max. 600 mA (see derating curve)	max. 2.4 A (see derating curve)	max. 2.4 A (see derating curve)
Surge current	100 A (t = 10 ms)	100 A (t = 10 ms)	100 A (t = 10 ms)	100 A (t = 10 ms)
Min. load current	75 mA	75 mA	180 mA	180 mA
Residual voltage	< 0.2 V	< 0.2 V	< 0.3 V	< 0.3 V
Output protection	Surge protection		Surge protection	
General data				
Rated insulation voltage	500 V		500 V	
Rated surge voltage	6 kV/safe isolation	6 kV/safe isolation	6 kV/safe isolation	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C		-25°C ... 70°C	
Electrical service life	3 x 10^7 cycles		3 x 10^7 cycles	
Standards/regulations	DIN EN 50178 / EN 60947		DIN EN 50178 / EN 60947	
Mounting position	Vertical (horizontal DIN rail)		Vertical (horizontal DIN rail)	
Mounting	Can be aligned with spacing = 20 mm		Can be aligned with spacing = 20 mm	
Screw connection solid / stranded / AWG	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
Dimensions W / H / D	22.5 mm / 99 mm / 114.5 mm		22.5 mm / 99 mm / 114.5 mm	

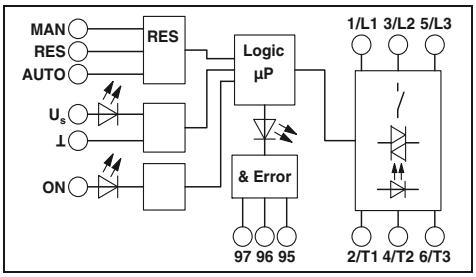
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
"2 in 1" hybrid motor starter, incl. right contactor and motor protection relay			
	ELR H3-I-SC- 24DC/500AC-0,6	**2900542**	1
	ELR H3-I-SC-230AC/500AC-0,6	**2900685**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
ELR H3-I-SC- 24DC/500AC-2	**2900543**	1
ELR H3-I-SC-230AC/500AC-2	**2900544**	1

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



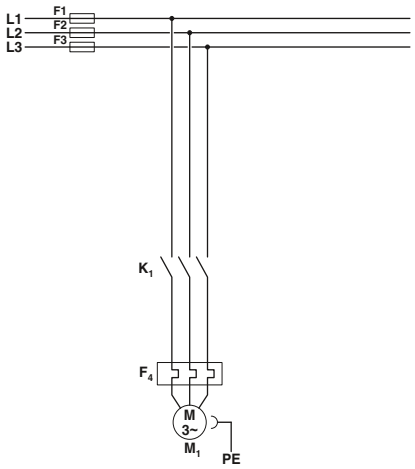
Technical data

24 V DC	230 V AC (50/60 Hz)
0.8 ... 1.25	0.4 ... 1.1
40 mA	4 mA
24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
5 mA	7 mA
Protection against polarity reversal, Surge protection	Surge protection
Green LED / Yellow LED / Red LED	
42 V AC ... 550 V AC	42 V AC ... 550 V AC
max. 9 A (see derating curve)	max. 9 A (see derating curve)
100 A (t = 10 ms)	100 A (t = 10 ms)
1.5 A	1.5 A
< 0.5 V	< 0.5 V
Surge protection	
500 V	
6 kV/safe isolation	6 kV/safe isolation
-25°C ... 70°C	
3 x 10^7 cycles	
DIN EN 50178 / EN 60947	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
22.5 mm / 99 mm / 114.5 mm	

Ordering data

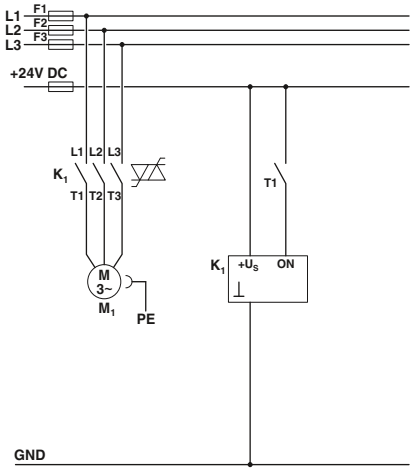
Type	Order No.	Pcs. / Pkt.
ELR H3-I-SC- 24DC/500AC-9	**2900545**	1
ELR H3-I-SC-230AC/500AC-9	**2900546**	1

Conventional structure
Main current path reversing contactor according to category 3



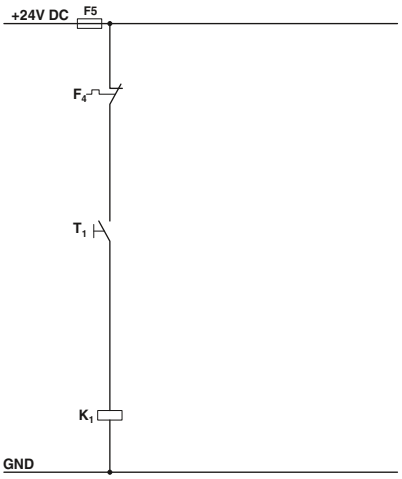
K1 = Right contactor
F4 = Motor protection relay

Structure with CONTACTRON
Main and control current path for "2 in 1" hybrid motor starter according to category 3

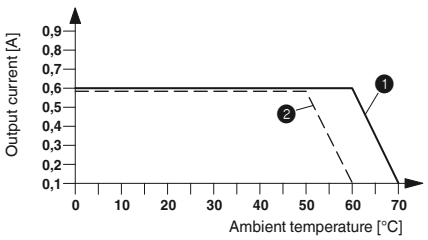


K1 = "2 in 1" hybrid motor starter
T1 = Right, T3 = Reset

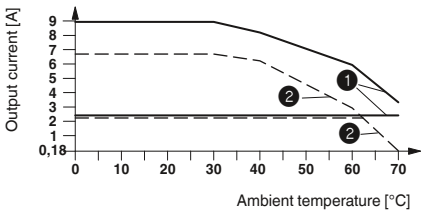
Conventional structure
Control current path contactor according to category 3



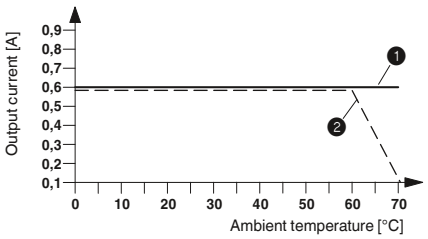
K1 = Right contactor
T1 = Right, T3 = Reset
F4 = Motor protection relay



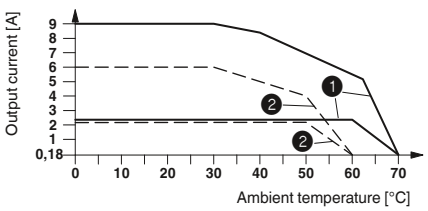
Derating curve ELR H3-I-SC-230AC/500AC-0,6
100% operating time



Derating curve ELR H3-I-SC-24DC/500AC-2 and
ELR H3-I-SC-24DC/500AC-9
100% operating time



Derating curve ELR H3-I-SC-24DC/500AC-0,6
100% operating time



Derating curve ELR H3-I-SC-230AC/500AC-2 and
ELR H3-I-SC-230AC/500AC-9
100% operating time

❶ Aligned with > 20 mm spacing
❷ Aligned without spacing

"2 in 1" hybrid motor starter with reversing function

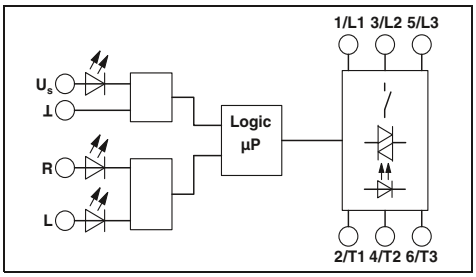
3-phase hybrid motor starter for reversing three-phase induction motors

The devices offer the following advantages:

– 22.5 mm wide
– They save wiring
– Up to 9 A
– Low-wear switching
– Long service life
– Space-saving
– 3-phase loop bridging

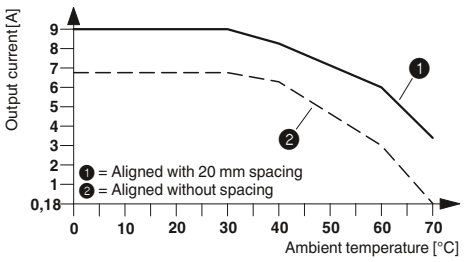
Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5

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

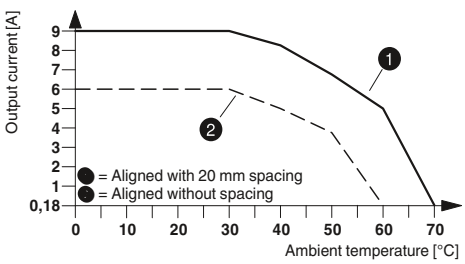


Technical data

Input data			
Rated control supply voltage U_S		24 V DC	230 V AC (50/60 Hz)
Rated control supply voltage range with reference to U_S		0.8 ... 1.25	0.4 ... 1.1
Rated control supply current I_S at U_S		40 mA	4 mA
Rated actuating voltage U_C R/L		24 V DC	230 V AC
Rated actuating voltage range with reference to U_C		0.8 ... 1.25	0.4 ... 1.1
Rated actuating current I_C at U_C		5 mA	7 mA
Input circuit		Protection against polarity reversal, Surge protection	Surge protection
Operating voltage / status / error indicator		Green LED / Yellow LED / Red LED	
Output data load side			
Output voltage range		42 V AC ... 550 V AC	42 V AC ... 550 V AC
Load current		max. 9 A (see derating curve)	max. 9 A (see derating curve)
Surge current		100 A (t = 10 ms)	100 A (t = 10 ms)
Minimum load current		0 A	0 A
Residual voltage		< 0.5 V	< 0.5 V
Output protection		Surge protection	
General data			
Rated insulation voltage		500 V	
Rated surge voltage		6 kV/safe isolation	6 kV/safe isolation
Ambient temperature (operation)		-25°C ... 70°C	
Electrical service life		3 x 10^7 cycles	
Standards/regulations		DIN EN 50178 / EN 60947	
Mounting position		Vertical (horizontal DIN rail)	
Mounting		Can be aligned with spacing = 20 mm	
Screw connection solid / stranded / AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
Dimensions	W / H / D	22.5 mm / 99 mm / 114.5 mm	



Derating curve for ELR H3-SC-24DC/500AC-9 100% operating time



Derating curve for ELR H3-SC-230AC/500AC-9 100% operating time

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
"2 in 1" hybrid motor starter, incl. right contactor and left contactor	**ELR H5-SC- 24DC/500AC-9**	**2900538**	1
	ELR H5-SC-230AC/500AC-9	**2900539**	1

"1 in 1" hybrid motor starter

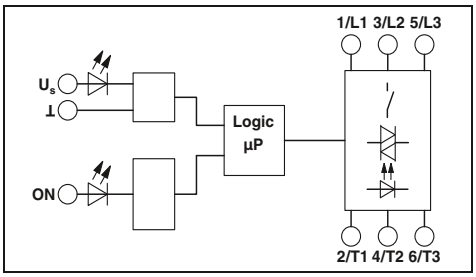
3-phase hybrid motor starter for starting three-phase induction motors

The devices offer the following advantages:

– 22.5 mm wide
– Low-wear switching
– Up to 9 A
– Long service life
– Space-saving
– 3-phase loop bridging

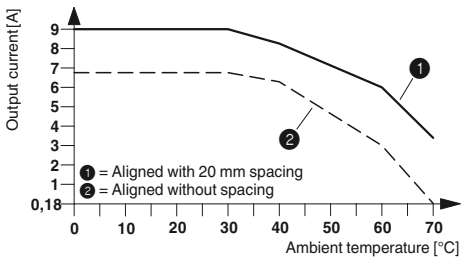
Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5

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

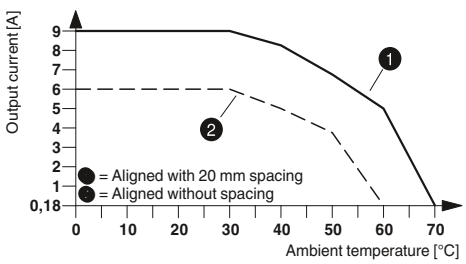


Technical data

Input data		
Rated control supply voltage U_S	24 V DC	230 V AC (50/60 Hz)
Rated control supply voltage range with reference to U_S	0.8 ... 1.25	0.4 ... 1.1
Rated control supply current I_S at U_S	40 mA	4 mA
Rated actuation voltage U_C ON	24 V DC	230 V AC
Rated actuating voltage range with reference to U_C	0.8 ... 1.25	0.4 ... 1.1
Rated actuating current I_C at U_C	5 mA	7 mA
Input circuit	Protection against polarity reversal, Surge protection	Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED	
Output data load side		
Output voltage range	42 V AC ... 550 V AC	42 V AC ... 550 V AC
Load current	max. 9 A (see derating curve)	max. 9 A (see derating curve)
Surge current	100 A (t = 10 ms)	100 A (t = 10 ms)
Minimum load current	0 A	0 A
Residual voltage	< 0.5 V	< 0.5 V
Output protection	Surge protection	
General data		
Rated insulation voltage	500 V	
Rated surge voltage	6 kV/safe isolation	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C	
Electrical service life	3 x 10^7 cycles	
Standards/regulations	DIN EN 50178 / EN 60947	
Mounting	Can be aligned with spacing = 20 mm	
Screw connection solid / stranded / AWG	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
Dimensions W / H / D	22.5 mm / 99 mm / 114.5 mm	



Derating curve for ELR H5-SC-24DC/500AC-9 100% operating time



Derating curve for ELR H5-SC-230AC/500AC-9 100% operating time

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
"1 in 1" hybrid motor starter, incl. right contactor			
	ELR H3-SC- 24DC/500AC-9	**2900530**	1
	ELR H3-SC-230AC/500AC-9	**2900531**	1

CONTACTRON hybrid motor starters with short-circuit protection

These short-circuit-proof 3-phase “4 in 1” hybrid motor starters for mounting on 30 mm DIN rails or 60 mm busbars combine four functions in one device: right contactor, left contactor, motor protection relay, and emergency stop up to category 3.

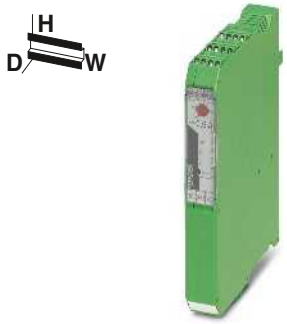
Offer the following advantages:

– 22.5 mm wide
– Bi-metal function can be set up to 9 A
– Long service life
– Space-saving
– They save wiring
– 3-phase loop bridging
– Plug-in motor output terminal block
– Coordination type 2 according to IEC/EN 60947-4-2

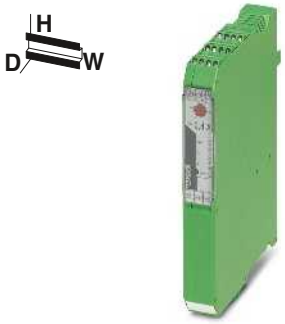
Input data	
Rated control supply voltage U_S	
Rated control supply voltage range with reference to U_S	
Rated control supply current I_S at U_S	
Rated actuating voltage U_C R/L	
Rated actuating voltage range with reference to U_C	
Rated actuating current I_C at U_C	
Input circuit	
Operating voltage / status / error indicator	
Output data load side	
Output voltage range	
Load current	
Minimum load current	
Residual voltage	
Output protection	
General data	
Rated insulation voltage	
Rated surge voltage	
Ambient temperature (operation)	
Electrical service life	
Standards/regulations	
Mounting position	
Mounting	
Screw connection solid / stranded / AWG	
Dimensions	W / H / D

Description
Short-circuit-proof hybrid motor starters
Hybrid motor starters
DIN rail adapter
Power rail adapter, 160 mm
Power rail adapter, 200 mm
Set consisting of short-circuit-proof hybrid motor starter and DIN rail adapter

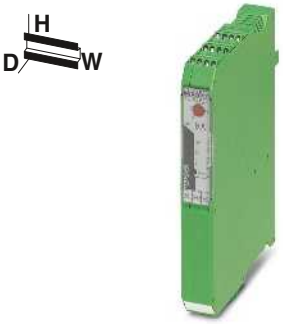
Fuse
Coordination type 2 to 10 kA/500 V
Coordination type 2 to 5 kA/400 V
Coordination type 1 to 30 kA/500 V



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

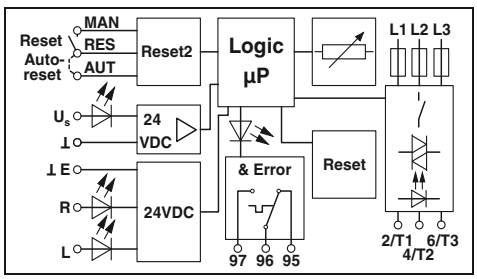


For reversing 3~ AC motors
up to 550 V AC/3 x 2.4 A



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

Ex:



Technical data

24 V DC	
0.8 ... 1.25	
40 mA	
24 V DC	
0.8 ... 1.25	
5 mA	
Protection against polarity reversal, Surge protection	
Green LED / Yellow LED / Red LED	
42 V AC ... 550 V AC	
max. 600 mA	
75 mA	
< 0.3 V	
Surge protection, short-circuit protection	
500 V	
6 kV/safe isolation	
-25°C ... 70°C	
3 x 10^7 cycles	
DIN EN 50178 / EN 60947	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
22.5 mm / 160 mm / 114.5 mm	

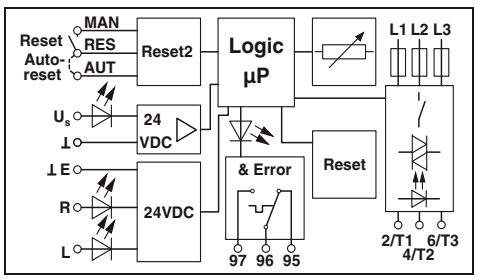
Ordering data

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

Accessories

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

Ex:



Technical data

24 V DC	
0.8 ... 1.25	
40 mA	
24 V DC	
0.8 ... 1.25	
5 mA	
Protection against polarity reversal, Surge protection	
Green LED / Yellow LED / Red LED	
42 V AC ... 550 V AC	
max. 2.4 A	
180 mA	
< 0.4 V	
Surge protection, short-circuit protection	
500 V	
6 kV/safe isolation	
-25°C ... 70°C	
3 x 10^7 cycles	
DIN EN 50178 / EN 60947	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
22.5 mm / 160 mm / 114.5 mm	

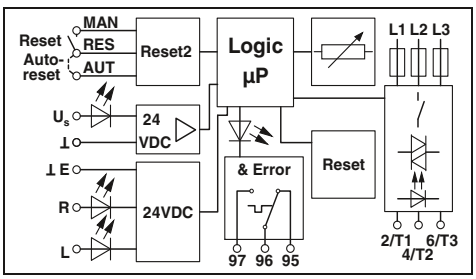
Ordering data

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

Accessories

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

Ex:



Technical data

24 V DC	
0.8 ... 1.25	
40 mA	
24 V DC	
0.8 ... 1.25	
5 mA	
Protection against polarity reversal, Surge protection	
Green LED / Yellow LED / Red LED	
42 V AC ... 550 V AC	
max. 9 A	
1.5 A	
< 0.6 V	
Surge protection, short-circuit protection	
500 V	
6 kV/safe isolation	
-25°C ... 70°C	
3 x 10^7 cycles	
DIN EN 50178 / EN 60947	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
22.5 mm / 160 mm / 114.5 mm	

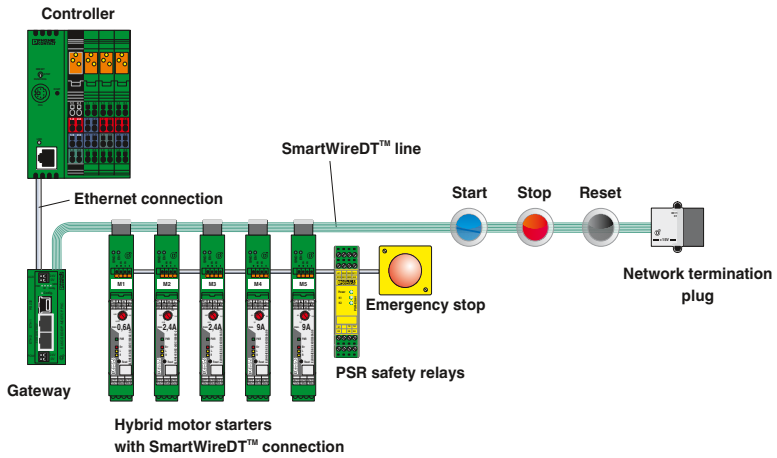
Ordering data

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

Accessories

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

CONTACTRON hybrid motor starters with SmartWire-DT™ support



Switch and reverse motors safely and reliably with CONTACTRON compact hybrid motor starters. The CONTACTRON "4 in 1" combines all the functions of a conventional reversing contactor circuit in a single device – for motors up to 4 kW, with a design width of just 22.5 mm.

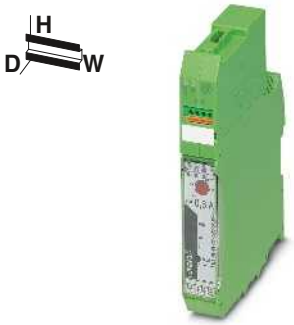
The SmartWire-DT™ communication system makes the complex cabling of the control and signal levels easier and clearer. You can also combine the hybrid motor starters with standard fieldbus systems.

The hybrid motor starters, as well as the command and signaling devices, are directly connected to the controller with SmartWire-DT™ via a gateway. Safe shutdown is implemented with a PSR safety relay. Thanks to SmartWire-DT™, the amount of wiring is significantly reduced. You benefit from clearly arranged and compact control cabinets.

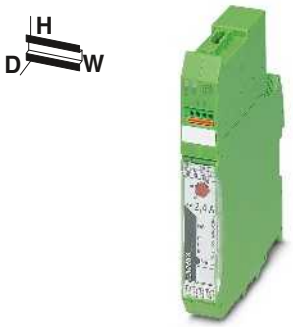
Notes:
Switching device technical data
You can download the **SmartWire-DT™ Assist** software for easy creation of SmartWire-DT™ networks free of charge at www.phoenixcontact.com
SmartWire-DT™ is a registered trademark of Eaton Corporation.

Input data	
Rated control supply voltage U_S	
Rated control supply voltage range with reference to U_S	
Rated control supply current I_S at U_S	
Rated actuating voltage U_C R/L	
Rated actuating voltage range with reference to U_C	
Rated actuating current I_C at U_C	
Input circuit	
Operating voltage / status / error indicator	
Output data load side	
Output voltage range	
Load current	
Surge current	
Minimum load current	
Residual voltage	
Output protection	
General data	
Rated insulation voltage	
Rated surge voltage	
Ambient temperature (operation)	
Electrical service life	
Standards/regulations	
Mounting position	
Mounting	
Screw connection solid / stranded / AWG	
Dimensions (including adapter)	W / H / D
Safety data	
EC-type examination certificate according to ATEX	

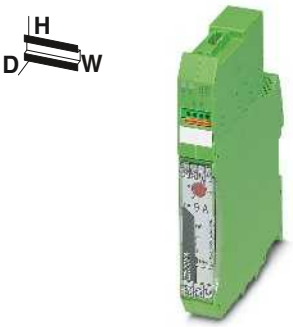
Description
Reversing starter + emergency stop + motor protection + SmartWire-DT™ adapter as a set



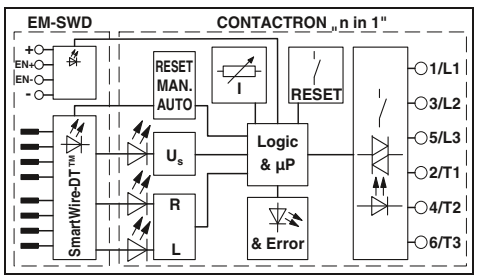
Reversing starter + emergency stop + motor protection + SmartWire-DT™ adapter, as a set 550 V AC/3 x 0.6 A

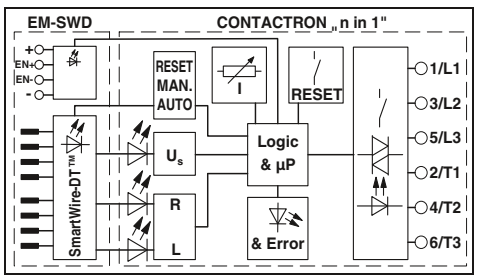


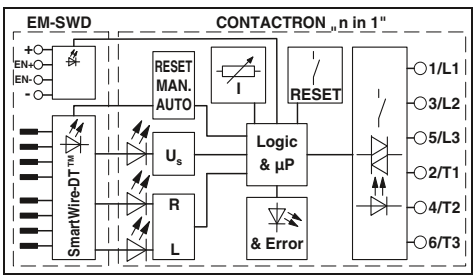
Reversing starter + emergency stop + motor protection + SmartWire-DT™ adapter, as a set 550 V AC/3 x 2.4 A



Reversing starter + emergency stop + motor protection + SmartWire-DT™ adapter, as a set 550 V AC/3 x 9 A







Technical data

Supply voltage	24 V DC
Supply voltage range	0.8 ... 1.25
Power consumption	40 mA
Power supply	24 V DC
Power supply range	0.8 ... 1.25
Control input	5 mA
Protective circuit	Protection against polarity reversal, Surge protection
Status indicator	Green LED / Yellow LED / Red LED
Load voltage	42 V AC ... 550 V AC
Load current	max. 600 mA (see derating curve)
Inrush current	100 A (t = 10 ms)
Residual current	75 mA
Voltage drop	< 0.2 V
Protective circuit	Surge protection
Rated insulation voltage	500 V
Safe isolation	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C
Service life	3 x 10^7 cycles
Conformance	DIN EN 50178 / EN 60947
Mounting position	Vertical (horizontal DIN rail)
Mounting	Can be aligned with spacing = 20 mm
Connection data	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	22.5 mm / 165 mm / 114.5 mm
Approvals	Ⓔx II (2) G, Ⓔx II (2) D
	PTB 07 ATEX 3145

Ordering data

Type	Order No.	Pcs. / Pkt.
ELR H5-IES-SC-SWD/500AC-0,6	2903116	1

Technical data

Supply voltage	24 V DC
Supply voltage range	0.8 ... 1.25
Power consumption	40 mA
Power supply	24 V DC
Power supply range	0.8 ... 1.25
Control input	5 mA
Protective circuit	Protection against polarity reversal, Surge protection
Status indicator	Green LED / Yellow LED / Red LED
Load voltage	42 V AC ... 550 V AC
Load current	max. 2.4 A (see derating curve)
Inrush current	100 A (t = 10 ms)
Residual current	180 mA
Voltage drop	< 0.3 V
Protective circuit	Surge protection
Rated insulation voltage	500 V
Safe isolation	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C
Service life	3 x 10^7 cycles
Conformance	DIN EN 50178 / EN 60947
Mounting position	Vertical (horizontal DIN rail)
Mounting	Can be aligned with spacing = 20 mm
Connection data	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	22.5 mm / 165 mm / 114.5 mm
Approvals	Ⓔx II (2) G, Ⓔx II (2) D
	PTB 07 ATEX 3145

Ordering data

Type	Order No.	Pcs. / Pkt.
ELR H5-IES-SC-SWD/500AC-2	2903117	1

Technical data

Supply voltage	24 V DC
Supply voltage range	0.8 ... 1.25
Power consumption	40 mA
Power supply	24 V DC
Power supply range	0.8 ... 1.25
Control input	5 mA
Protective circuit	Protection against polarity reversal, Surge protection
Status indicator	Green LED / Yellow LED / Red LED
Load voltage	42 V AC ... 550 V AC
Load current	max. 9 A (see derating curve)
Inrush current	100 A (t = 10 ms)
Residual current	1.5 A
Voltage drop	< 0.5 V
Protective circuit	Surge protection
Rated insulation voltage	500 V
Safe isolation	6 kV/safe isolation
Ambient temperature (operation)	-25°C ... 70°C
Service life	3 x 10^7 cycles
Conformance	DIN EN 50178 / EN 60947
Mounting position	Vertical (horizontal DIN rail)
Mounting	Can be aligned with spacing = 20 mm
Connection data	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	22.5 mm / 165 mm / 114.5 mm
Approvals	Ⓔx II (2) G, Ⓔx II (2) D
	PTB 07 ATEX 3145

Ordering data

Type	Order No.	Pcs. / Pkt.
ELR H5-IES-SC-SWD/500AC-9	2903118	1

SmartWire-DT™ accessories

With the "EM SWD-ADAPTER" SmartWire-DT™ adapter for the CONTACTRON 24 V DC "n in 1" devices, the device concerned can be seamlessly integrated into the fieldbus environment using SmartWire-DT™. Corresponding gateways are available for the following bus systems:
– PROFIBUS-DP
– CANopen
– Modbus TCP/Ethernet IP

SmartWire DT adapter

Technical data

Input data		
Supply voltage U_{AUX}		-
Rated current I_{AUX}		-
Supply voltage U_{POW}		-
Rated current I_{POW}		-
Input data		
Description		Enable input
Input voltage		24 V DC
Input current		5 mA
Output data		
Description		-
Output supply		-
Output current		-
SmartWire-DT interface		
Connection method		Pin strip, 8-pos.
Data rate		125 kBd / 250 kBd
Current consumption I_{AUX}		120 mA
Current consumption I_{POW}		25 mA
General data		
Ambient temperature (operation)		-25°C ... 55°C
Standards/regulations		IEC 60947-1 / EN 60947-1
Degree of protection according to IEC 60529/ EN 60529		IP20
Mounting position		Any
Mounting		On CONTACTRON hybrid motor starter
Connection data solid / stranded / AWG		0.14 - 1 mm² / 0.14 - 1 mm² / 26 - 18
Dimensions	W / H / D	22.5 mm / 165 mm / 114.5 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
SmartWire-DT™ adapter			
	EM SWD-ADAPTER	**2902776**	1
Gateways			
CANopen®			
PROFIBUS			
Ethernet			
I/O modules			
Digital, 4 inputs, 4 outputs			
Digital, 4 inputs			
Digital, 8 outputs			
Analog, 2 inputs, 2 outputs			
Power feed module for supplying further SmartWire-DT™ devices			

Gateways

Input/output 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	
EN 50178	
IP20	
Any	
-	
0.2 - 1.5 mm² / 0.2 - 1.5 mm² / 24 - 16	
35 mm / 90 mm / 127 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

Technical data

-	-
-	-
-	-
-	-
-	-
Digital inputs	Analog inputs
24 V DC	-
Typ. 4 mA	-
-	-
Digital outputs	Analog outputs
24 V DC -15% ... +20%	-
Typ. 500 mA	-
-	-
Pin strip, 8-pos.	Pin strip, 8-pos.
125 kBd / 250 kBd	125 kBd / 250 kBd
-	-
-	-
-	
EN 50178	
IP20	
Any	
-	
0.2 - 1.5 mm² / 0.2 - 1.5 mm² / 24 - 16	
35 mm / 90 mm / 101 mm	

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

Technical data

24 V DC -15% ... +20%	
3 A	
24 V DC -15% ... +20%	
700 mA	
-	
-	
-	
-	
-	
-	
Pin strip, 8-pos.	
125 kBd / 250 kBd	
-	
-	
-	
EN 50178	
IP20	
Any	
-	
0.2 - 1.5 mm² / 0.2 - 1.5 mm² / 24 - 16	
35 mm / 90 mm / 124 mm	

Ordering data

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

SmartWire-DT™ accessories

Plug tools

Flat-ribbon cable, 8-pos.

Description	Color	Ordering data: Type	Order No.	Pcs. / Pkt.	Ordering data: 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

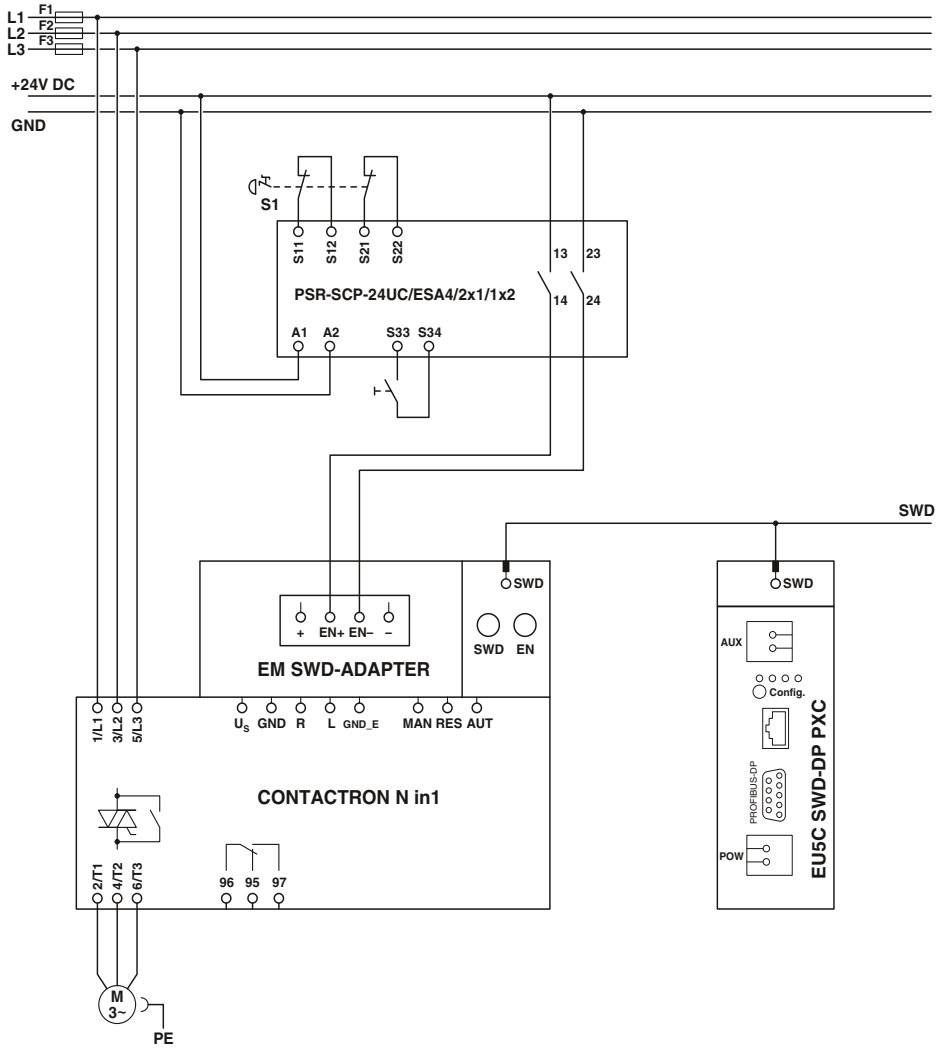
SmartWire-DT™ accessories

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

Plug and coupler

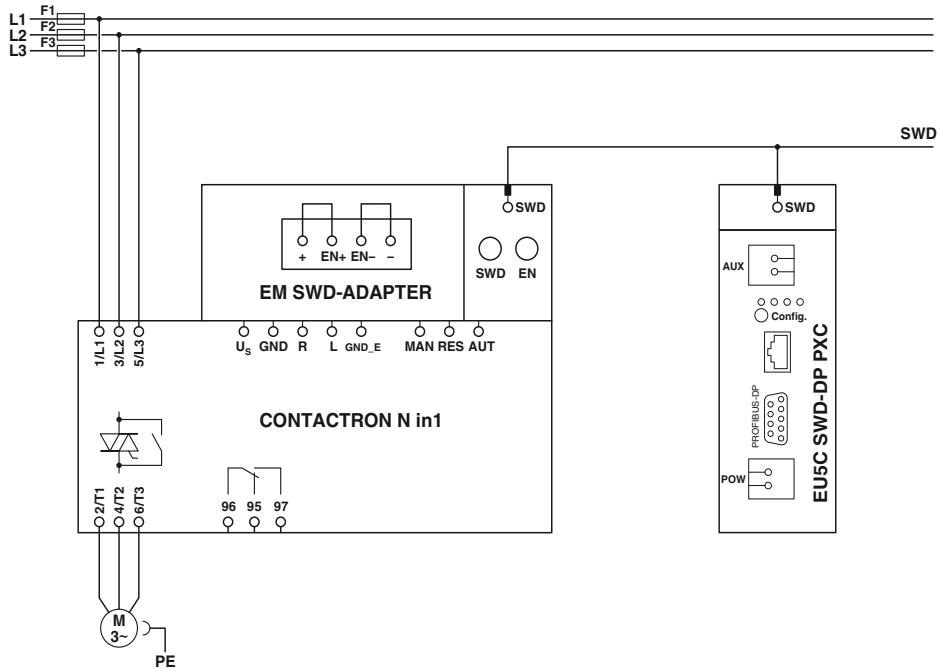
Programming adapter

Description	Color	Ordering data: Type	Order No.	Pcs. / Pkt.	Ordering data: Type	Order No.	Pcs. / Pkt.
Plug and coupling							
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			
Programming adapter							
					EU4A-RJ45-USB-CAB1 PXC	**2903465**	1

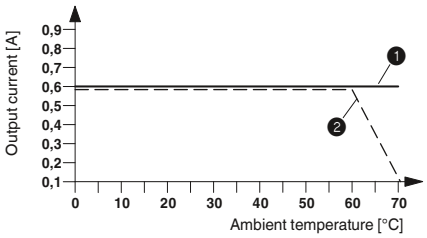


Emergency stop wiring example (two-channel)

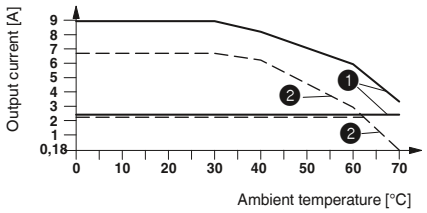
Intended use The SmartWire-DT™ adapter is approved exclusively for use in conjunction with the following CONTACTRON hybrid motor starters. If other switching devices are used, correct operation, in particular of the safety function, cannot be ensured.	
Motor protection and safe shutdown	
2900582	ELR 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



Wiring example without emergency stop



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



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

❶ Aligned with > 20 mm spacing
❷ Aligned without spacing

CONTACTRON bridge

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:

– Saves considerable 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

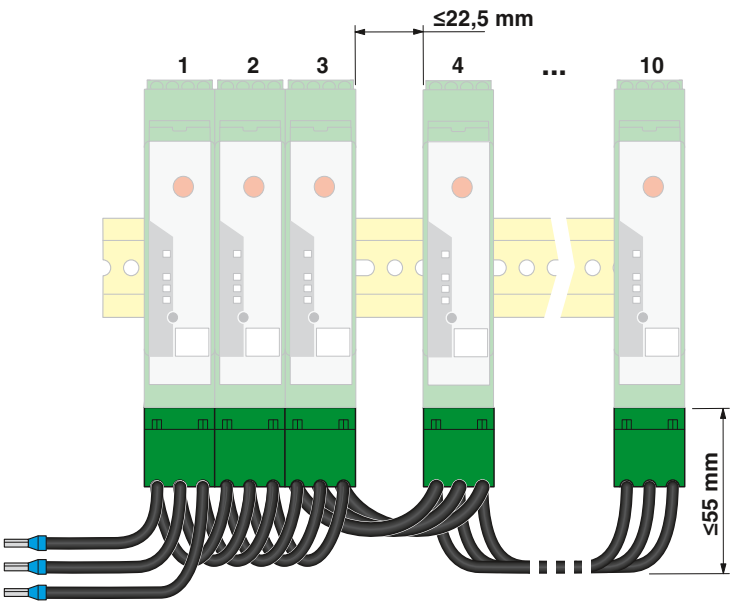
0.3 m connecting cable with ferrules

Technical data

General data	
Nominal voltage U_N	575 V AC
Nominal current at U_N	25 A
Cross section	2.5 mm²

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
3-phase loop bridge			
2-way	**BRIDGE- 2**	**2900746**	1
3-way	**BRIDGE- 3**	**2900747**	1
4-way	**BRIDGE- 4**	**2900748**	1
5-way	**BRIDGE- 5**	**2900749**	1
6-way	**BRIDGE- 6**	**2900750**	1
7-way	**BRIDGE- 7**	**2900751**	1
8-way	**BRIDGE- 8**	**2900752**	1
9-way	**BRIDGE- 9**	**2900753**	1
10-way	**BRIDGE-10**	**2900754**	1



N

3 m connecting cable
without ferrules

Technical data

575 V AC
25 A
2.5 mm²

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

Three-phase solid-state reversing contactors

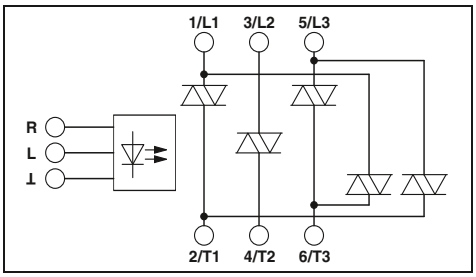
The three-phase solid-state reversing contactor with an integrated locking circuit and load wiring are intended for applications such as control valves, slides, separating filters, ship steering gears, etc. The scope of performance ranges from 575 V AC/3 x 2 A to 575 V AC/3 x 37 A.

Advantages of three-phase solid-state reversing contactors:

– 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

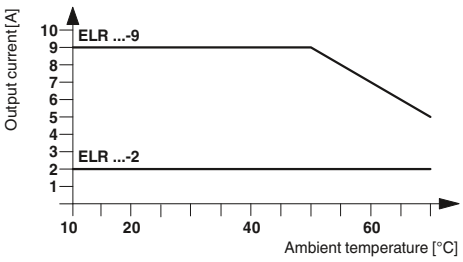
Notes:
Type of insulation housing: **ELR W 3...2, ELR W 3...9** Polyamide PA non-reinforced, color: green **ELR W 3...16, ELR W 3...37** Polyester PBT non-reinforced, color: green
Marking systems and mounting material See Catalog 5

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

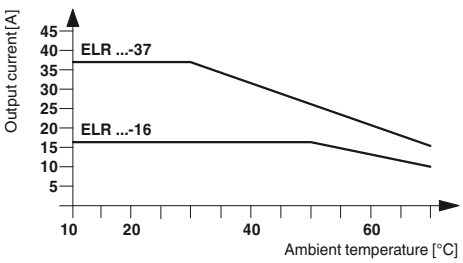


Technical data

Input data		
Rated actuating voltage U_C R/L	24 V DC	230 V AC
Rated actuating voltage range with reference to U_C	0.8 ... 1.25	0.4 ... 1.1
Rated actuating current I_C at U_C	12.7 mA	11.2 mA
Input circuit	Protection against polarity reversal, Surge protection	Surge protection
Operating voltage / status / error indicator	- / Yellow LED / Red LED	
Output data load side		
Output voltage range	48 V AC ... 575 V AC	48 V AC ... 575 V AC
Periodic peak reverse voltage	1200 V	1200 V
Load current	max. 2 A (see derating curve)	max. 2 A (see derating curve)
Surge current	200 A (t = 10 ms)	200 A (t = 10 ms)
Minimum load current	100 mA	100 mA
Residual voltage	< 1.5 V	< 1.5 V
Leakage current	6 mA	6 mA
Maximum load value I^2 x t (t = 10 ms)	250 A^2s	250 A^2s
Output protection	RCV circuit	
General data		
Rated insulation voltage	500 V	
Rated surge voltage	6 kV/basic isolation	6 kV/basic isolation
Reversing frequency	max. 10 Hz	max. 2 Hz
Switching frequency	max. 5 Hz	max. 1 Hz
Ambient temperature (operation)	-25°C ... 70°C	
Standards/regulations	DIN EN 50178 / EN 60947	
Power station requirements	DWR 1300 / ZXX01/DD/7080.8d	
Degree of protection according to 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	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 12	
- Load side	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 12	
Dimensions W / H / D	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

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
3-phase solid-state reversing contactor			
	ELR W3- 24DC/500AC- 2	**2297293**	1
	ELR W3-230AC/500AC- 2	**2297303**	1

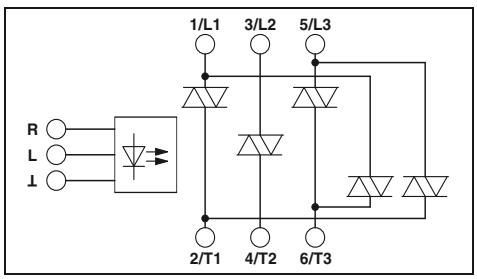
Accessories

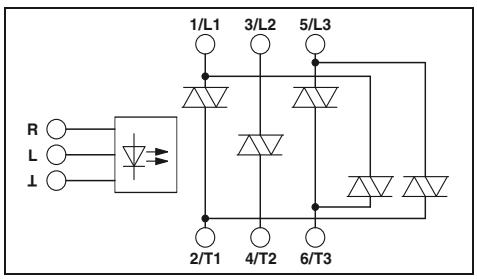
Thermal fuse	**THERMAL FUSE TF104**	**2900796**	1

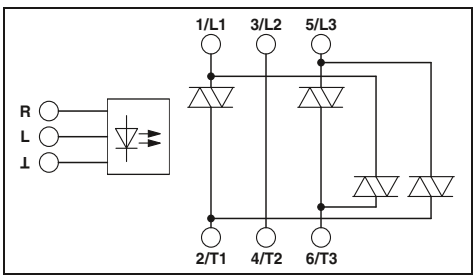
For reversing 3~ AC motors up to 575 V AC/3 x 9 A

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







Technical data

24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
12.7 mA	11.2 mA
Protection against polarity reversal, Surge protection	Surge protection
- / Yellow LED / Red LED	
48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
max. 9 A	max. 9 A
(see derating curve)	(see derating curve)
300 A (t = 10 ms)	300 A (t = 10 ms)
100 mA	100 mA
< 1.5 V	< 1.5 V
6 mA	6 mA
580 A²s	580 A²s
RCV circuit	
500 V	
6 kV/basic isolation	6 kV/basic isolation
max. 10 Hz	max. 2 Hz
max. 5 Hz	max. 1 Hz
-25°C ... 70°C	
DIN EN 50178 / EN 60947	
DWR 1300 / ZXX01/DD/7080.8d	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 12	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 12	
67.5 mm / 99 mm / 114.5 mm	

Ordering data

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

Accessories

THERMAL FUSE TF104	**2900796**	1

Technical data

24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
12.7 mA	11.2 mA
Protection against polarity reversal, Surge protection	Surge protection
- / Yellow LED / Red LED	
48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
max. 16 A	max. 16 A
(see derating curve)	(see derating curve)
300 A (t = 10 ms)	300 A (t = 10 ms)
100 mA	100 mA
< 1.5 V	< 1.5 V
6 mA	6 mA
580 A²s	580 A²s
RCV circuit	
500 V	
6 kV/basic isolation	6 kV/basic isolation
max. 10 Hz	max. 2 Hz
max. 5 Hz	max. 1 Hz
-25°C ... 70°C	
DIN EN 50178 / EN 60947	
DWR 1300 / ZXX01/DD/7080.8d	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 40 mm	
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12	
0.5 - 16 mm² / 0.5 - 16 mm² / 20 - 6	
147.5 mm / 99 mm / 114.5 mm	

Ordering data

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

Accessories

THERMAL FUSE TF104	**2900796**	1

Technical data

24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
12.7 mA	11.2 mA
Protection against polarity reversal, Surge protection	Surge protection
- / Yellow LED / Red LED	
48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
max. 37 A	max. 37 A
(see derating curve)	(see derating curve)
1300 A (t = 10 ms)	1300 A (t = 10 ms)
200 mA	200 mA
< 1.5 V	< 1.5 V
6 mA	6 mA
9000 A²s	9000 A²s
RCV circuit	
500 V	
6 kV/basic isolation	6 kV/basic isolation
max. 10 Hz	max. 2 Hz
max. 5 Hz	max. 1 Hz
-25°C ... 70°C	
DIN EN 50178 / EN 60947	
DWR 1300 / ZXX01/DD/7080.8d	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 40 mm	
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12	
0.5 - 16 mm² / 0.5 - 16 mm² / 20 - 6	
147.5 mm / 99 mm / 114.5 mm	

Ordering data

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

Accessories

THERMAL FUSE TF104	**2900796**	1

Three-phase semiconductor contactor

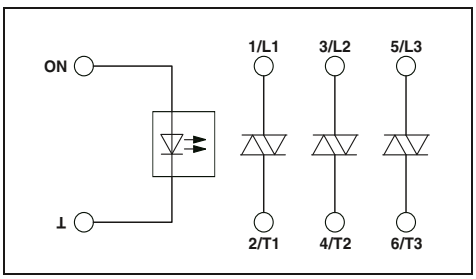
Motors of mixers, machine tools, conveying systems, pumps, and fans up to 575 V AC/3 x 37 A (equivalent to 1 kW to 18.5 kW) can be controlled using the CONTACTRON three-phase semiconductor contactors.

Advantages of three-phase semiconductor contactors:

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

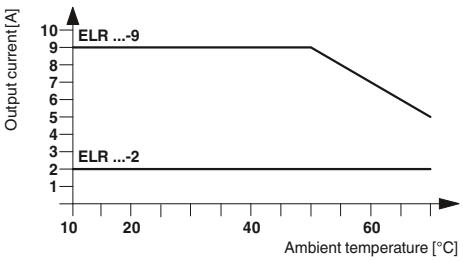
Notes:
Type of insulation housing: **ELR 3...2, ELR 3...9** Polyamide PA non-reinforced, color: green **ELR 3...16, ELR 3...37** Polyester PBT non-reinforced, color: green
Marking systems and mounting material See Catalog 5

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

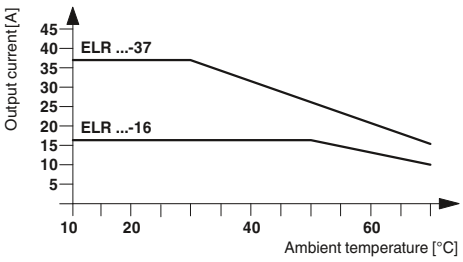


Technical data

Input data			
Rated actuation voltage U_C ON		24 V DC	230 V AC
Rated actuating voltage range with reference to U_C		0.8 ... 1.25	0.4 ... 1.1
Rated actuating current I_C at U_C		8.3 mA	12.5 mA
Input circuit		Protection against polarity reversal, Surge protection	Surge protection
Operating voltage / status / error indicator		- / Yellow LED / Red LED	
Output data load side			
Output voltage range		48 V AC ... 575 V AC	48 V AC ... 575 V AC
Periodic peak reverse voltage		1200 V	1200 V
Load current		max. 2 A (see derating curve)	max. 2 A (see derating curve)
Surge current		200 A (t = 10 ms)	200 A (t = 10 ms)
Minimum load current		100 mA	100 mA
Residual voltage		< 1.5 V	< 1.5 V
Leakage current		6 mA	6 mA
Maximum load value I^2 x t (t = 10 ms)		250 A^2s	250 A^2s
Output protection		RCV circuit	
General data			
Rated insulation voltage		500 V	
Rated surge voltage		6 kV/basic isolation	6 kV/basic isolation
Switching frequency		max. 10 Hz	max. 1 Hz
Ambient temperature (operation)		-25°C ... 70°C	
Standards/regulations		DIN EN 50178 / EN 60947	
Power station requirements		DWR 1300 / ZXX01/DD/7080.8d	
Degree of protection according to 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		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 12	
- Load side		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 12	
Dimensions	W / H / D	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

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Three-phase semiconductor contactor			
	ELR 3- 24DC/500AC- 2	**2297196**	1
	ELR 3-230AC/500AC- 2	**2297206**	1

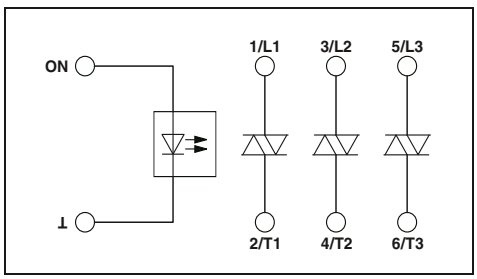
Accessories

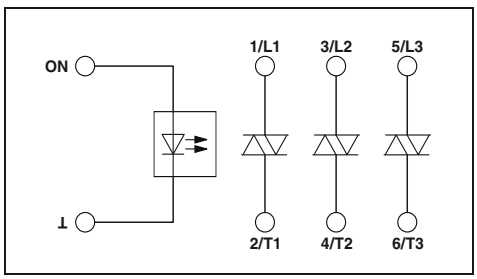
Thermal fuse		
THERMAL FUSE TF104	**2900796**	1

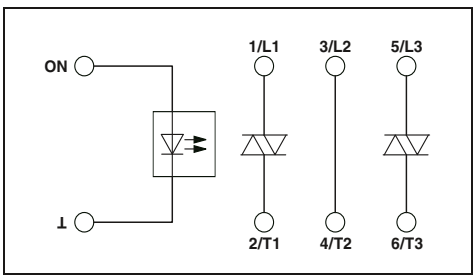
For switching 3~ AC motors up to 575 V AC/3 x 9 A

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







Technical data

24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
8.3 mA	12.5 mA
Protection against polarity reversal, Surge protection	Surge protection
- / Yellow LED / Red LED	
48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
max. 9 A (see derating curve)	max. 9 A (see derating curve)
300 A (t = 10 ms)	300 A (t = 10 ms)
100 mA	100 mA
< 1.5 V	< 1.5 V
6 mA	6 mA
580 A²s	580 A²s
RCV circuit	
500 V	
6 kV/basic isolation	6 kV/basic isolation
max. 10 Hz	max. 1 Hz
-25°C ... 70°C	
DIN EN 50178 / EN 60947	
DWR 1300 / ZXX01/DD/7080.8d	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 12	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 12	
67.5 mm / 99 mm / 114.5 mm	

Ordering data

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

Accessories

THERMAL FUSE TF104	**2900796**	1

Technical data

24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
8.3 mA	12.5 mA
Protection against polarity reversal, Surge protection	Surge protection
- / Yellow LED / Red LED	
48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
max. 16 A (see derating curve)	max. 16 A (see derating curve)
300 A (t = 10 ms)	300 A (t = 10 ms)
100 mA	100 mA
< 1.5 V	< 1.5 V
6 mA	6 mA
580 A²s	580 A²s
RCV circuit	
500 V	
6 kV/basic isolation	6 kV/basic isolation
max. 10 Hz	max. 1 Hz
-25°C ... 70°C	
DIN EN 50178 / EN 60947	
DWR 1300 / ZXX01/DD/7080.8d	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 40 mm	
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12	
0.5 - 16 mm² / 0.5 - 16 mm² / 20 - 6	
147.5 mm / 99 mm / 114.5 mm	

Ordering data

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

Accessories

THERMAL FUSE TF104	**2900796**	1

Technical data

24 V DC	230 V AC
0.8 ... 1.25	0.4 ... 1.1
8.3 mA	12.5 mA
Protection against polarity reversal, Surge protection	Surge protection
- / Yellow LED / Red LED	
48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
max. 37 A (see derating curve)	max. 37 A (see derating curve)
1300 A (t = 10 ms)	1300 A (t = 10 ms)
200 mA	200 mA
< 1.5 V	< 1.5 V
6 mA	6 mA
9000 A²s	9000 A²s
RCV circuit	
500 V	
6 kV/basic isolation	6 kV/basic isolation
max. 10 Hz	max. 1 Hz
-25°C ... 70°C	
DIN EN 50178 / EN 60947	
DWR 1300 / ZXX01/DD/7080.8d	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 40 mm	
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12	
0.5 - 16 mm² / 0.5 - 16 mm² / 20 - 6	
147.5 mm / 99 mm / 114.5 mm	

Ordering data

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

Accessories

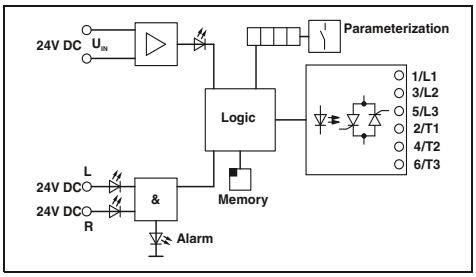
THERMAL FUSE TF104	**2900796**	1

Electronic reversing load relay, with integrated soft switch

The ELR W 3/9-400 S soft switch can be used to increase the service life of a 3-phase induction motor.

- Parameterization is performed directly on the device via display and keyboard
- Friction time
- Torque, start
- Start time
- Stop time
- Torque, stop
- Braking time
- Braking torque
- Drive can be controlled locally via keyboard

Notes:
Type of housing: Polycarbonate PC, color: green.
Marking systems and mounting material See Catalog 5
1) EMC: Class A product, see page 571

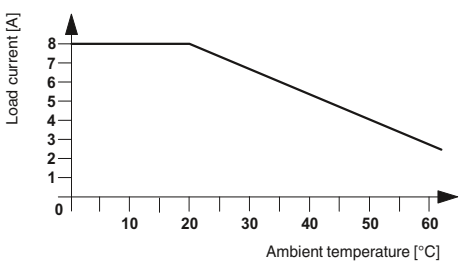


Technical data

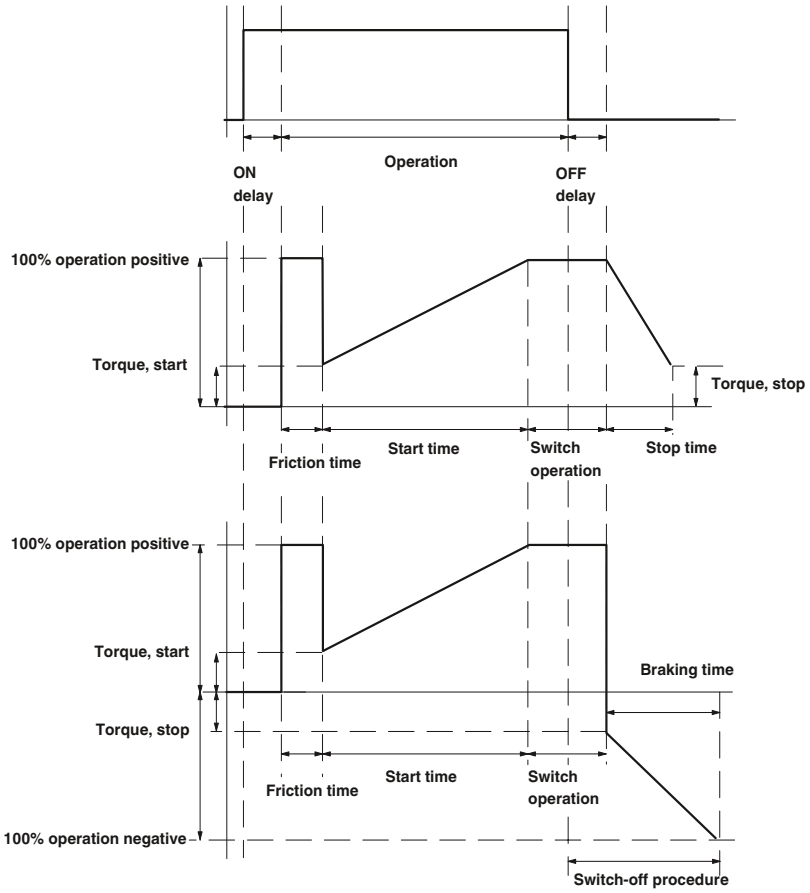
Input data		
Supply nominal voltage U_{VN}		24 V DC
Supply voltage range with reference to U_{VN}		0.8 ... 1.2
Quiescent current		85 mA
Control voltage U_{ST} right/left		24 V DC
Control voltage range in reference to U_{ST}		0.8 ... 1.2
Typ. input current at U_N		5 mA
Input circuit		Protection against polarity reversal, Surge protection
Operating voltage / status / error indicator		Green LED / Yellow LED / Red LED
Output data load side		
Maximum switching voltage		440 V AC (L1/T1) 440 V AC (L2/T2) 440 V AC (L3/T3)
Output voltage range		110 V AC ... 433 V AC
Periodic peak reverse voltage		1000 V
Load current		< 8 A (IL1, at 20°C Tu, see derating) < 8 A (IL2, at 20°C Tu, see derating) < 8 A (IL3, at 20°C Tu, see derating)
Surge current		230 A (tp = 10 ms, at 25°C)
Minimum load current		150 mA
Residual voltage		Typ. 1.5 V (For IL)
Leakage current		5 mA (IL1, in switched-off state)
Output protection		RC element, surge protection
General data		
Test voltage input/output		2.5 kV
Ambient temperature (operation)		-20°C ... 60°C
Standards/regulations		DIN EN 50178 / Safe isolation
Power station requirements		DWR 1300 / ZXX01/DD/7080.8d
EMC regulations		EN 61000-6-2 / EN 61000-6-4
Degree of protection according to 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 mm² / 0.2 - 4 mm² / 24 - 10
Dimensions	W / H / D	62 mm / 94 mm / 122 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Electronic reversing load relay, with an integrated soft switch			
	ELR W3/ 9-400 S[1])	**2963569**	1



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



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

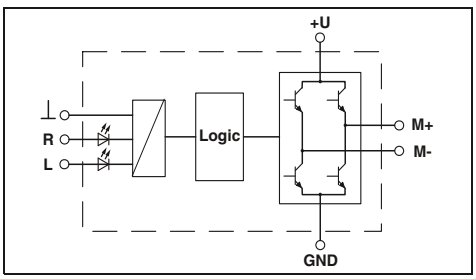
Electronic reversing load relay for DC motors

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.

If a 24 V DC signal is applied to the "left" input, the ELR-DC is interconnected so that the output supplies the motor with voltage. If the "right" input is triggered, the polarity of the voltage is inverted on the output. By triggering 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 expense is reduced to a minimum.

Notes:
Type of housing: Polycarbonate PC, color: green.
Marking systems and mounting material See Catalog 5
PWM = Pulse Width Modulation
1) EMC: Class A product, see page 571



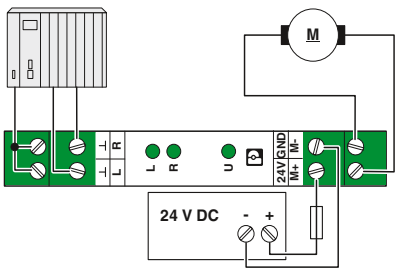
Technical data

Input data		
Control voltage U_{ST} right/left	24 V DC	24 V DC
Control voltage range in reference to U_{ST}	0.8 ... 1.2	0.8 ... 1.2
Typ. input current at U_N	3 mA	3 mA
Input circuit	Protection against polarity reversal, Surge protection	
Operating voltage / status / error indicator	Green LED / LED yellow, forward running (R), LED yellow, reverse running (L) / -	
PWM option		
Maximum clock frequency of the PWM at the control inputs	1000 Hz	1000 Hz
Pulse width repetition rate of the PWM	0% ... 100%	0% ... 100%
Output data load side		
Output voltage range	10 V DC ... 30 V DC	10 V DC ... 30 V DC
Load current	2 A (Mounted in rows with zero spacing)	6 A (see derating curve)
Quiescent current	Approx. 7 mA (When switched off)	Approx. 7 mA (When switched off)
Current limitation at short-circuits	15 A	20 A
Output protection	Protection against polarity reversal, Surge protection	
Operating voltage / status / error indicator	Green LED / - / -	
General data		
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 / Basic insulation	
Degree of protection according to IEC 60529/ EN 60529	IP20	
Mounting position	Vertical (horizontal DIN rail)	
Screw connection solid / stranded / AWG	0.2 - 6 mm² / 0.2 - 4 mm² / 24 - 10	
Dimensions W / H / D	12.5 mm / 99 mm / 114.5 mm	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
3-phase solid-state reversing contactor, for controlling DC motors	**ELR W1/ 2-24DC[1])**	**2963598**	1
	ELR W1/ 6-24DC[1])	**2982090**	1

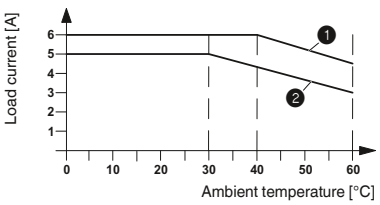
Application example



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% OT



❶ Single device
❷ Aligned without spacing

Single-phase solid-state contactors

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

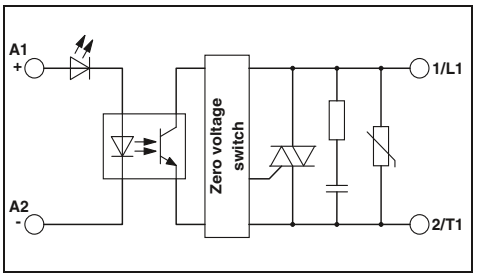
The sturdy power semi-conductors switch in zero voltage crossing and thus produce no additional high-frequency interferences. The modules are insensitive to shock loads and vibrations – even use in aggressive, polluted environments is unproblematic.

They offer the following advantages:
- High switching frequency
- Wear-free and output-free
- Input voltage versions 24 V DC and 230 V AC

Common 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 5

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

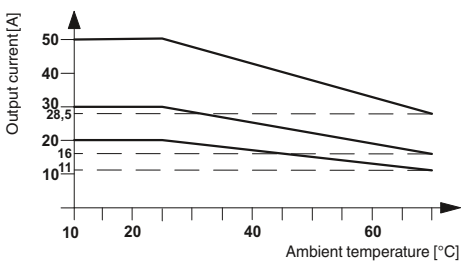


Technical data

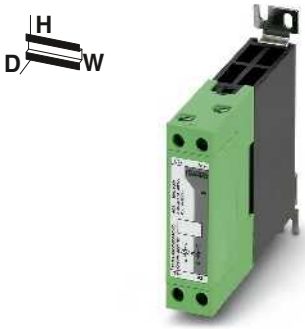
Input data			
Input voltage range		4 V DC ... 32 V DC	24 V AC ... 275 V AC
Typ. input current at U_N		Approx. 12 mA	Approx. 17 mA
Switching level	1 signal (“H”)	≥ 4 V DC	≥ 22 V AC
	0 signal (“L”)	≤ 1 V DC	≤ 6 V AC
Transmission frequency f_{limit}		25 Hz	6 Hz
Operating voltage / status / error indicator		Green LED / - / -	
Output data load side			
Output voltage range		42 V AC ... 660 V AC (45/65 Hz)	42 V AC ... 660 V AC (45/65 Hz)
Periodic peak reverse voltage		1200 V	1200 V
Load current		20 A (see derating curve)	20 A (see derating curve)
Surge current		250 A (t = 10 ms)	250 A (t = 10 ms)
Minimum load current		350 mA	350 mA
Residual voltage		< 1.6 V	< 1.6 V
Leakage current		< 3 mA (In off state)	< 3 mA (In off state)
Phase angle (cos ϕ)		0.5	0.5
Maximum load value $I^2 x t$ (t = 10 ms)		525 A^2s	525 A^2s
Output protection		RCV circuit	
General data			
Test voltage input/output		4 kV_{rms}	
Ambient temperature (operation)		-30°C ... 70°C	
Standards/regulations		EN 61000-4-2 / EN 61000-4-3 / EN 61000-4-4 / EN 61000-4-5 / EN 61000-4-6 / EN 55011 / Basic insulation	
Mounting position		Vertical (horizontal DIN rail)	
Mounting		Can be aligned with ≥ 22.5 mm spacing	
Screw connection solid / stranded / AWG			
- Control side		0.5 - 2.5 mm^2 / 0.5 - 2.5 mm^2 / 20 - 14	
- Load side		0.5 - 4 mm^2 / 0.5 - 4 mm^2 / 20 - 12	
Dimensions	W / H / D	22.5 mm / 103 mm / 103 mm	

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

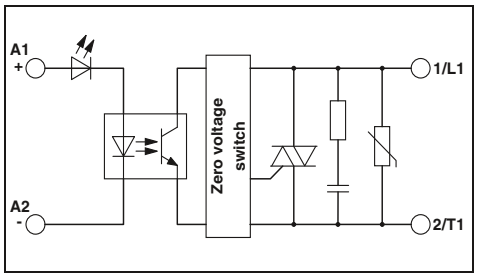


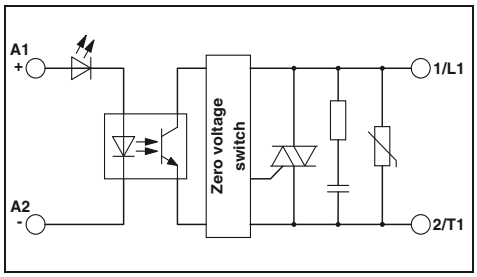
Load current as a function of the ambient temperature
Operating time: 100% operating factor



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

4 V DC ... 32 V DC	24 V AC ... 275 V AC
Approx. 12 mA	Approx. 17 mA
≥ 4 V DC	≥ 22 V AC
≤ 1 V DC	≤ 6 V AC
25 Hz	6 Hz
Green LED / - / -	
42 V AC ... 660 V AC (45/65 Hz)	42 V AC ... 660 V AC (45/65 Hz)
1200 V	1200 V
30 A (see derating curve)	30 A (see derating curve)
400 A (t = 10 ms)	400 A (t = 10 ms)
150 mA	150 mA
< 1.6 V	< 1.6 V
< 3 mA (In off state)	< 3 mA (In off state)
0.5	0.5
1800 A^2s	1800 A^2s
RCV circuit	
4 kV_{rms}	
-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 / Basic insulation	
Vertical (horizontal DIN rail)	
Can be aligned with ≥ 22.5 mm spacing	
0.5 - 2.5 mm^2 / 0.5 - 2.5 mm^2 / 20 - 14	
0.5 - 4 mm^2 / 0.5 - 4 mm^2 / 20 - 12	
22.5 mm / 103 mm / 103 mm	

Ordering data

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

Technical data

4 V DC ... 32 V DC	24 V AC ... 275 V AC
Approx. 12 mA	Approx. 17 mA
≥ 4 V DC	≥ 22 V AC
≤ 1 V DC	≤ 6 V AC
25 Hz	6 Hz
Green LED / - / -	
42 V AC ... 660 V AC (45/65 Hz)	42 V AC ... 660 V AC (45/65 Hz)
1200 V	1200 V
50 A (see derating curve)	50 A (see derating curve)
1900 A (t = 10 ms)	1900 A (t = 10 ms)
150 mA	150 mA
< 1.6 V	< 1.6 V
< 3 mA (In off state)	< 3 mA (In off state)
0.5	0.5
18,000 A^2s	18,000 A^2s
RCV circuit	
4 kV_{rms}	
-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 / Basic insulation	
Vertical (horizontal DIN rail)	
Can be aligned with ≥ 22.5 mm spacing	
0.5 - 4 mm^2 / 0.5 - 4 mm^2 / 20 - 12	
4 - 25 mm^2 / 4 - 25 mm^2 / 12 - 3	
45 mm / 103 mm / 103 mm	

Ordering data

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

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: 0.06 kW to 3.0 kW
– Simple 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
– One- and two-motor reversing starters

Notes:

1) EMC: Class A product, see page 571

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

PROFIBUS

Technical data

	ELR 5011 IP PN	ELR 5011-2 IP PN
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_{INI} = 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 plug-in connector	
Connection method	2, 3, 4-conductor	
Digital outputs		
Number of outputs	4	
Connection method	M12 plug-in connector	
Connection method	2-conductor	
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 according to IEC 60529	
Ambient temperature (operation)	-25°C ... 50°C (no condensation)	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
PROFINET motor starter			
- 1-channel reversing starter, 1.1 kW	**ELR 5011 IP PN**	**2700745**	1
- 2-channel reversing starter, 1.1 kW	**ELR 5011-2 IP PN**	**2701007**	1
PROFINET motor starter			
- 1-channel reversing starter, 3.0 kW			
- 2-channel reversing starter, 3.0 kW			
Lower part of the housing, stainless steel			
- Standard version	**IBS IP 400 MBH -F[1])**	**2732868**	1
Pg screw connection, plastic (IP67), for INTERBUS and PROFINET motor starters and variable frequency drives.	**IBS PG SET**	**2836599**	1

Accessories

RJ45 connector, shielded, with bend protection sleeve, x 2			
- gray for straight cables	**FL PLUG RJ45 GR/2**	**2744856**	1
- green for crossed cables	**FL PLUG RJ45 GN/2**	**2744571**	1
Bus system cable	**VS-937/...**	**1402611**	1
Crimping pliers, for assembling the RJ45 connectors	**FL CRIMPTOOL**	**2744869**	1

N

Electronic motor starters,
1 x 3.0 kW and 2 x 3.0 kW

High-grade steel lower part,
IP67 degree of protection

Technical data

ELR 5030 IP PN	ELR 5030-2 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_{INI} = U_{S1} minus 1 V	
500 mA	
Short-circuit/overload protection	
10	
M12 plug-in connector	
2, 3, 4-conductor	
4	
M12 plug-in connector	
2-conductor	
max. 500 mA (per channel)	
POWER-COMBICON	
360 V AC ... 550 V AC (line voltage 50/60 Hz)	
2.4 A ... 6 A	
50 Hz ... 60 Hz (mains frequency)	
3 kW (at U_{mains} = 400 V AC)	
2.4 A ... 6 A	
Based on class 10 A of IEC 60947	
2115 g	2425 g
IP67 according to IEC 60529	
-25°C ... 50°C (no condensation)	

Technical data

IBS IP 400 MBH -F[1])	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
-	
1130 g	-
IP67 according to IEC 60529	-
-	

Ordering data

Type	Order No.	Pcs. / Pkt.
ELR 5030 IP PN	**2701006**	1
ELR 5030-2 IP PN	**2701008**	1
IBS IP 400 MBH -F[1])	**2732868**	1
IBS PG SET	**2836599**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
IBS IP 400 MBH -F[1])	**2732868**	1
IBS PG SET	**2836599**	1

Accessories

FL PLUG RJ45 GR/2	**2744856**	1
FL PLUG RJ45 GN/2	**2744571**	1
VS-937/...	**1402611**	1
FL CRIMPTOOL	**2744869**	1

Accessories

FL PLUG RJ45 GR/2	**2744856**	1
FL PLUG RJ45 GN/2	**2744571**	1
VS-937/...	**1402611**	1
FL CRIMPTOOL	**2744869**	1

Inline frequency inverters

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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.

0.75 kW

Additional features:

- Maximum motor power 0.75 kW, 1.5 kW, 2.2 kW, and 4.0 kW
- 3 x 400 V mains input (±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

Notes:

1) EMC: Class A product, see page 571

Technical data

Interface	
Name	Fieldline local bus
Connection method	9-pos. D-SUB plug/socket
Power supply for module electronics	
Supply voltage	24 V DC ±15%
Supply voltage range	20.4 V DC ... 27.6 V DC ±15%
Digital inputs	
Number of inputs	5
Connection method	COMBICON
Connection method	Spring-cage connection
Digital outputs	
Number of outputs	1
Connection method	COMBICON
Connection method	Spring-cage connection
Motor starter, output	
Connection method	PCB terminal block
Nominal current range	2.6 A (Short-term peak current, 1.5 times the nominal current for 30 s; permissible continuous current, 1.2 times the nominal current range)
Frequency range	0 Hz ... 400 Hz
Nominal motor power	0.75 kW
Tripping class	5.6 A OC tripping current
General data	
Weight	1400 g
Degree of protection	IP20
Width	86.8 mm
Height	184 mm
Depth	132.9 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Inline frequency inverters for the control cabinet			
	VFD 5007 IL IB	**2701054**	1

Accessories

Inline Modular branch terminal for coupling one Fieldline Modular M8 local bus at the end of an Inline station	**IB IL 24 FLM-PAC[1])**	**2736903**	1
Remote bus cable, highly stranded, 3 x 2 x 0.25 mm²	**IBS RBC/F-T/**	**2740151**	1

Frequency inverter for a max. motor power of up to 1.5 kW

Technical data	
Fieldline local bus	
9-pos. D-SUB plug/socket	
24 V DC ±15%	
20.4 V DC ... 27.6 V DC ±15%	
5	
COMBICON	
Spring-cage connection	
1	
COMBICON	
Spring-cage connection	
PCB terminal block	
4.1 A (Short-term peak current, 1.5 times the nominal current for 30 s; permissible continuous current, 1.2 times the nominal current range)	
0 Hz ... 400 Hz	
1.5 kW	
8.8 A OC tripping current	
1400 g	
IP20	
86.8 mm	
184 mm	
132.9 mm	

Ordering data		
Type	**Order No.**	Pcs. / Pkt.
VFD 5015 IL IB	**2701055**	1
Accessories		
IB IL 24 FLM-PAC[1])	**2736903**	1
IBS RBC/F-T/	**2740151**	1

Frequency inverter for a max. motor power of up to 2.2 kW

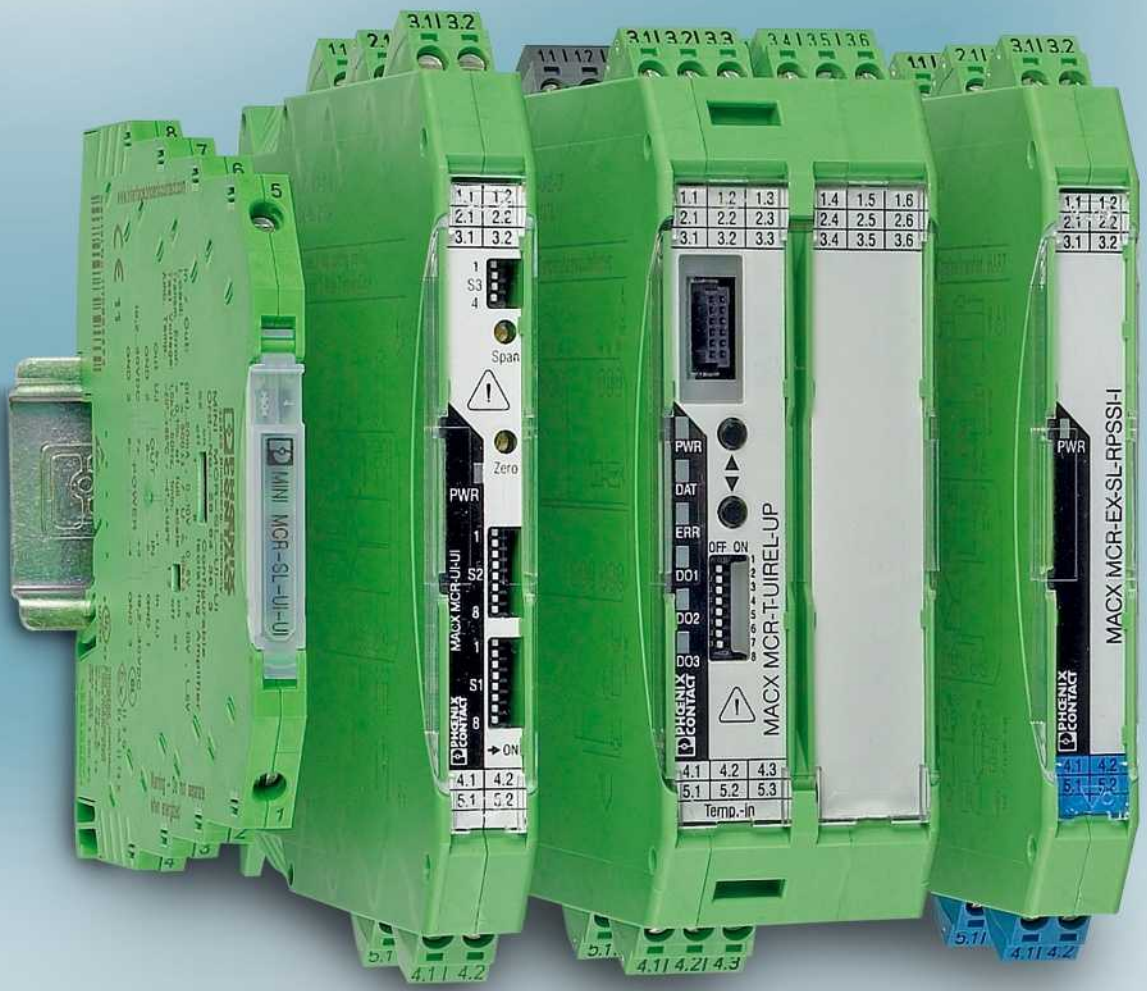
Technical data	
Fieldline local bus	
9-pos. D-SUB plug/socket	
24 V DC ±15%	
20.4 V DC ... 27.6 V DC ±15%	
5	
COMBICON	
Spring-cage connection	
1	
COMBICON	
Spring-cage connection	
PCB terminal block	
5.8 A (Short-term peak current, 1.5 times the nominal current for 30 s; permissible continuous current, 1.2 times the nominal current range)	
0 Hz ... 400 Hz	
2.2 kW	
12.5 A OC tripping current	
2006 g	
IP20	
114 mm	
184 mm	
153 mm	

Ordering data		
Type	**Order No.**	Pcs. / Pkt.
VFD 5022 IL IB	**2701057**	1
Accessories		
IB IL 24 FLM-PAC[1])	**2736903**	1
IBS RBC/F-T/	**2740151**	1

Frequency inverter for a max. motor power of up to 4.0 kW

Technical data	
Fieldline local bus	
9-pos. D-SUB plug/socket	
24 V DC ±15%	
20.4 V DC ... 27.6 V DC ±15%	
5	
COMBICON	
Spring-cage connection	
1	
COMBICON	
Spring-cage connection	
PCB terminal block	
9.1 A (Short-term peak current, 1.5 times the nominal current for 30 s; permissible continuous current, 1.2 times the nominal current range)	
0 Hz ... 400 Hz	
4 kW	
21 A OC tripping current	
2006 g	
IP20	
114 mm	
184 mm	
153 mm	

Ordering data		
Type	**Order No.**	Pcs. / Pkt.
VFD 5040 IL IB	**2701058**	1
Accessories		
IB IL 24 FLM-PAC[1])	**2736903**	1
IBS RBC/F-T/	**2740151**	1


MINI MCR-SL-UI-UI
MACX MCR-UI-UI
Span
Zero
PWR
S3
S2
S1
ON
MACX MCR-T-UIREL-UP
DAT
ERR
DO1
DO2
DO3
OFF ON
Temp.-In
MACX MCR-EX-SL-RPSSI-I

Measurement and control technology

The modular analog converters for measurement and control technology prevent analog signals from being distorted by disturbance variables. With accurate conversion, isolation, filtering or amplification of analog signals, they secure and increase transmission quality and therefore the quality of closed-loop control circuits.

We offer the following product ranges:

Highly compact isolating amplifiers – MINI Analog

For significant space savings and efficiency
– Design width of just 6.2 mm
– System cabling and multiplexer solutions
– 3-way electrical isolation

Isolating amplifiers with SIL functional safety – MACX Analog

For maximum signal safety
– Consistent SIL certification
– Safe 3-way electrical isolation

Isolating amplifiers, special types, and digital displays – MCR Analog

For special applications in signal processing
– Electrical isolation
– Record and convert temperatures directly in the field

Ex i isolating amplifiers 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
– Design width of just 12.5 mm for all single- and two-channel devices
– Safe 3-way electrical isolation

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compact monitoring relays
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Test disconnect terminal blocks

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EMD
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Controllers

Controllers

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Surge protection for measurement and control technology

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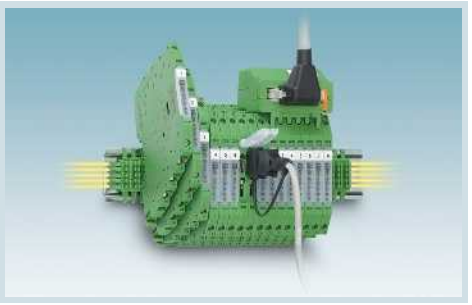

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Input

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 an isolating amplifier 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 requirements of the module. The greater the auxiliary power requirements of the passive isolator, the smaller the operational output load is allowed to be. Low auxiliary power requirements are regarded as an indicator of device quality.

Common mode rejection

In the case of isolating amplifiers, 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 in the same direction, 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

If the devices operate without fault conditions, an overload at the input cannot cause greater values than this maximum to occur 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 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 an isolating amplifier. Current outputs can usually drive a maximum of 500 Ω, voltage outputs can be loaded with a minimum of up to 10 kΩ

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_{PP} or mV_{rms}.

Open circuit response

With some measuring transducers, the input signal is permanently monitored for possible open circuits in the signal cable. 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 transmitted 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 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 ... 30 V DC. For other supply voltages, please refer to the technical data.

Current consumption

The value specified here describes the auxiliary power requirements 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 end point. 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 an isolating amplifier or measuring transducer changes. In most cases this is specified as a percentage. An alternative definition is ppm/K (parts per million/Kelvin). Example:
250 ppm/K = 0.025%/K.

Limit frequency

Isolating amplifiers 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 limit frequency. At the same time, a low limit 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 ... 90%). The step response is inversely proportional to the limit frequency. This means that the response time decreases as the limit frequency increases.

Test voltage

The test voltage indicates the dielectric 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 is able to move to another potential level 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 faultless operation and operation under fault conditions. Nominal supply voltages of 30 V AC/60 V DC are deemed valid for faultless operation.

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 during this process.

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

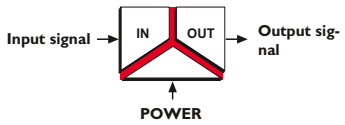
When carrying out further processing of non-independent items of equipment (components), the applicable regulations pertaining to installation must be observed.

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 (LVD)	2006/95/EC	-
Ex Directive (ATEX)	94/9/EC	-
Product standards		
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 controllers - Part 2: Equipment requirements and tests	EN 61131-2:2007	IEC 61131-2:2007
EMC		
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
ATEX		
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
Environmental tests		
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

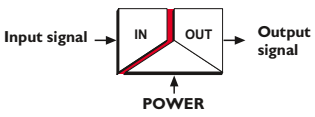


In the case of modules with this isolation method, all components that are connected to the input, output or power supply are protected against interference from each other. All three directions (input, output, and power supply) are electrically isolated from one another accordingly.

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

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

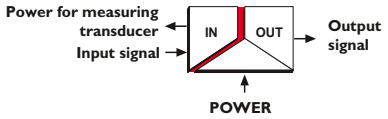
Input isolation



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 that 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



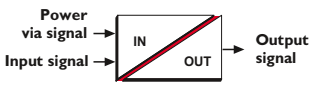
Repeater power supplies use the signal input side not only for measured value acquisition, but also to provide the necessary power to the passive measurement sensors connected on the input side.

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

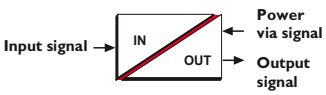
Passive isolation, supplied on the input side



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 actuators.

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)

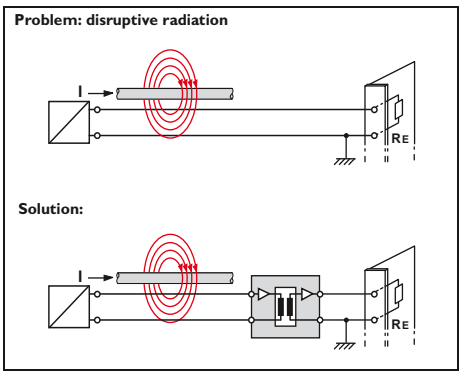


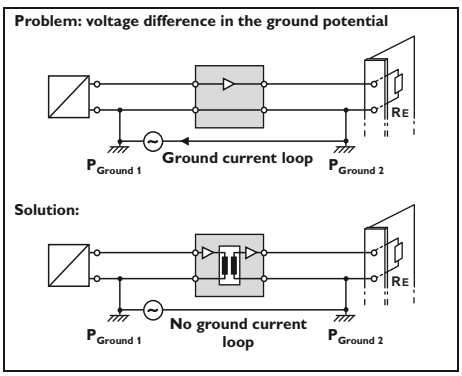
The modules draw the power needed for signal transmission and electrical isolation from the active output circuit, ideally from a PLC input board that supplies power.

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

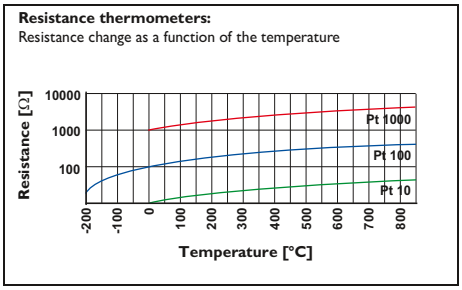
When this isolation method is used, it is important to make sure that the active signal source connected on the output side (e.g., an active PLC input board) is able to supply the passive isolator with power, as well as operate its load.

Applications





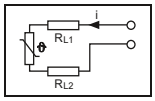
Resistance thermometers



Resistance thermometers (e.g., Pt 100, Ni 1000) change their resistance value depending on the temperature. The MCR 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 µA).

Two-conductor connection technology

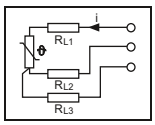


The resistance thermometer is connected to the MCR measuring transducer using a two-core cable. Please note that the supply cable resistances are added to the measured resistance and consequently distort the result.

A distance of 10 m should not be exceeded.

Example: a 50 m long copper cable with a cross section of 0.5 mm² has a specific resistance of 3.4 Ω A Pt 100 sensor has a resistance change of 0.384 Ω per 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.

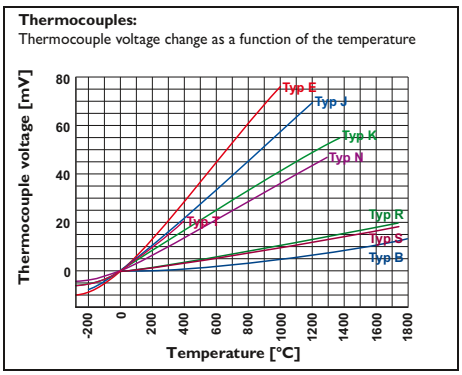
Since this is more or less the case in the majority of applications, three-conductor technology is the most commonly encountered today. Line compensation is not necessary.

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.

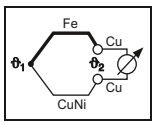
Thermocouples



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 (ϑ_1) and the cold junction (ϑ_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 so current flows.

A thermocouple therefore 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 block, thermal voltages with opposite polarity 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.

A role is also played by the temperature at the terminal point. 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 the latter 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 ... 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-I

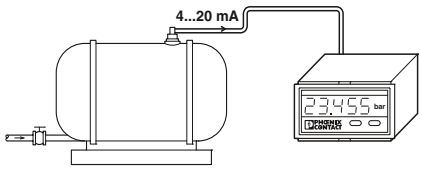
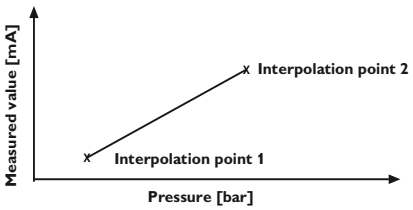


Table:	Analog signal	Display value
Interpolation point 1	4 mA	15 bar
Interpolation point 2	20 mA	30 bar

Characteristic curve:



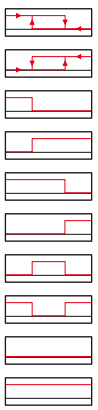
Switching behavior of relay or transistor outputs:

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



Relay picks up when the value is below SPL, hysteresis active

Relay picks up when SPH is exceeded, hysteresis active

Relay picks up when the value is below SPL

Relay picks up when SPL is exceeded

Relay picks up when the value is below SPH

Relay picks up when SPH is exceeded

Relay picks up when value is between SPL and SPH

Relay picks up when value is outside SPL and SPH

Relay is permanently dropped

Relay is permanently picked up

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 and MACX Analog ranges are designed to provide protection type "n" for this purpose and must be installed in zone 2 in suitable and approved housing (EN 60079-15 and EN 60079-0) with IP54 protection minimum.

Example:

A sensor/actuator with protection type "n" can be connected to an isolator from the 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/actuators is not exceeded.

If the sensors/actuators are mounted in explosion-proof housing or if they have their own explosion-proof housing, they can also be installed in zone 1.

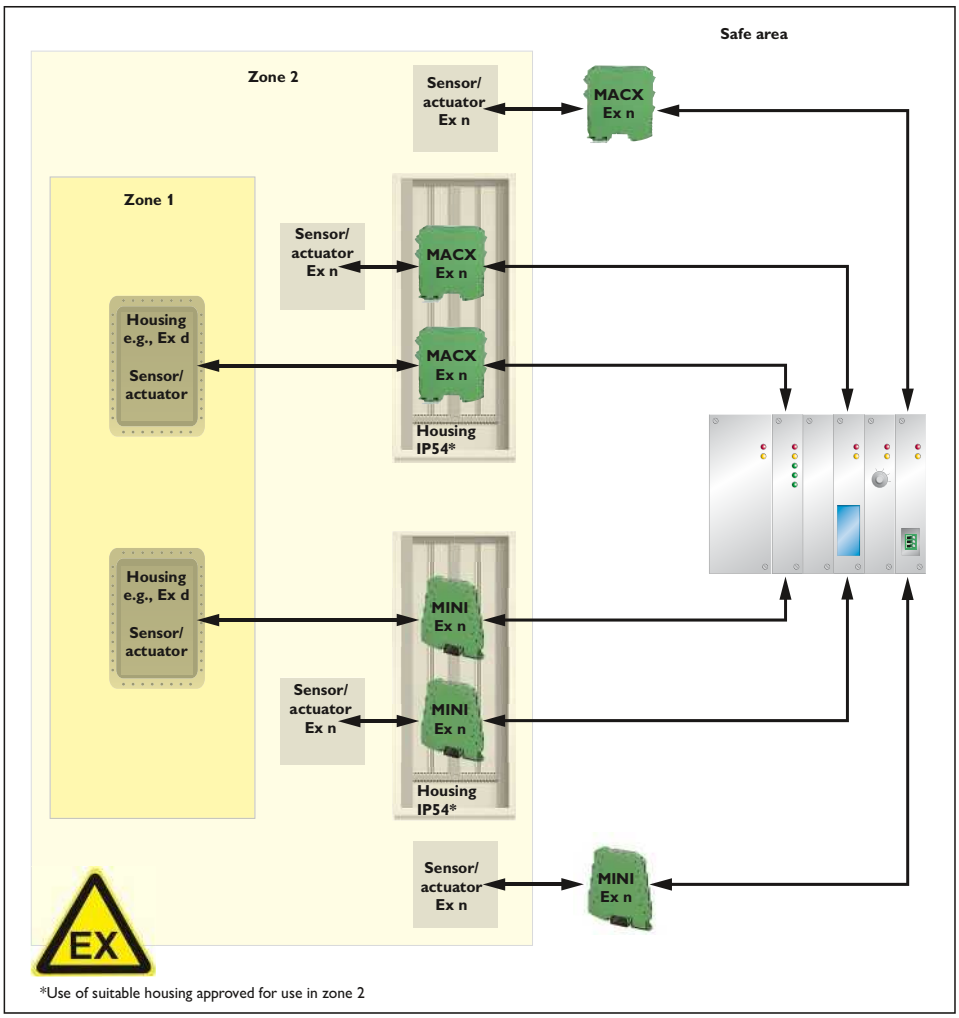
Installation requirements

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, the relevant contents of EN 61241-14 were incorporated in EN 60079-14.

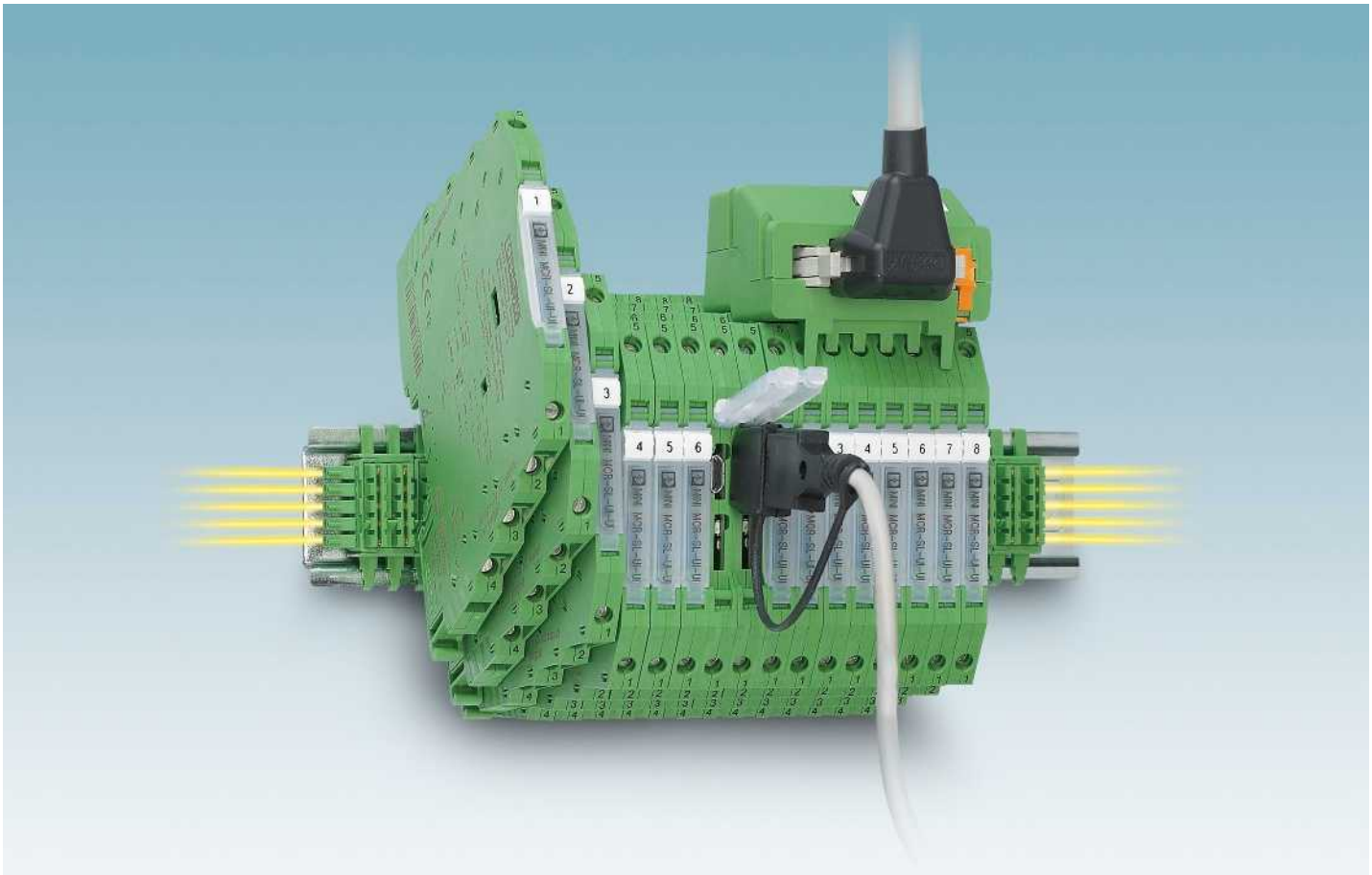
EN 61241-14 must still be observed when installing electrical equipment in areas containing combustible dust. Other important factors when it comes to running systems in potentially explosive areas are inspection, maintenance, and repairs. Stipulations regarding these matters can be found in EN 60079-17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

Installation of electrical devices for signal transmission



*Use of suitable housing approved for use in zone 2

Highly compact isolating amplifiers - MINI Analog



Highly compact and efficient

MINI Analog isolating amplifiers isolate, convert, filter, and amplify your analog signals – with a design width of just 6.2 mm.

The isolating amplifiers from the MINI Analog range offer the full spectrum of analog signal conditioning. They are therefore extremely efficient with regard to saving costs, space, and energy.

The comprehensive approval package means that they can be used in a variety of areas.

Choose the right MINI Analog isolating amplifier for your application:

Analog IN/OUT
- Universal and standard 3-way isolating amplifiers
- 3-way repeater power supplies
- 4-way signal duplicators
- 2-way passive isolators
- Output loop-powered isolators

Temperature
- Universal measuring transducers for resistance thermometers and thermocouples
- Active measuring transducers for Pt 100 and thermocouples
- Output loop-powered Pt 100 measuring transducers

Frequency
- Frequency transducer up to 80 kHz
- Analog frequency transducers

Potentiometer/resistor
- Potentiometer measuring transducers with automatic potentiometer detection

Limit values
- Threshold value switches with PDT relay

Digital IN
- NAMUR isolating amplifiers with relay output

Accessories
- Supply components
- Fault monitoring module
- System cabling
- Marking material
- Surge protection

Fault monitoring

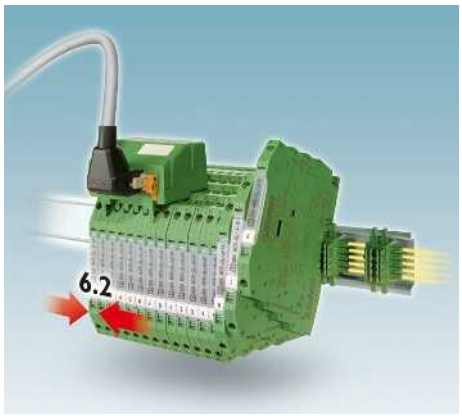
Fault monitoring is a modular solution for convenient error evaluation in multi-channel applications.

Depending on the module type, the following errors can be indicated by means of a group error message:
- Overrange
- Underrange
- Open circuit
- Short circuit
- Module error

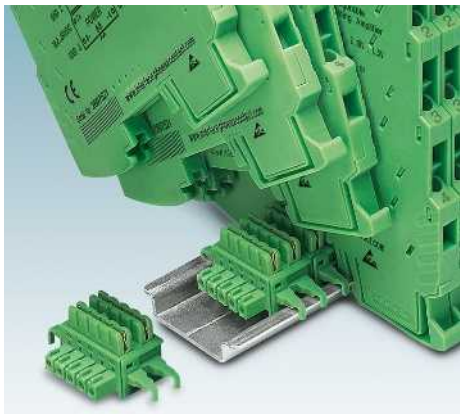
It is also possible to detect and indicate the failure of a supply voltage at the power terminal block.

The modularity is characterized by the ability to freely adjust error evaluation, both on the device side and in the evaluation module.

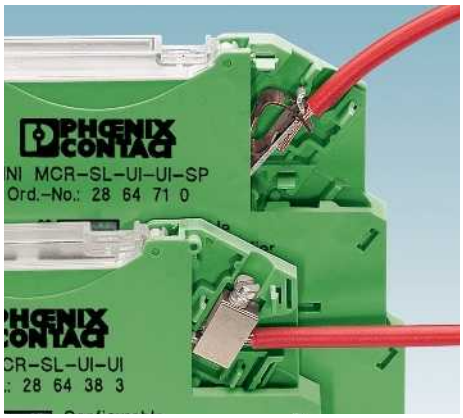
Fault monitoring is compatible with and can be used for the following isolating amplifier ranges:
- MINI Analog
- MACX Analog



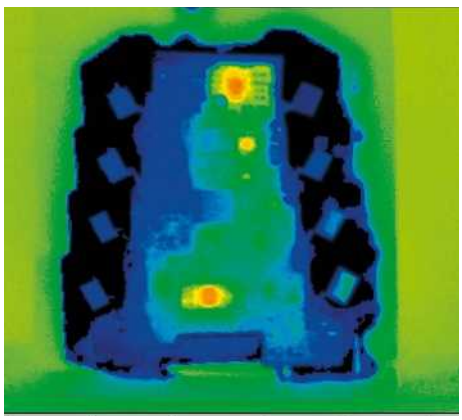
Space savings of up to 65%
– Compared to other isolating amplifiers on the market with design widths up to 17.5 mm.



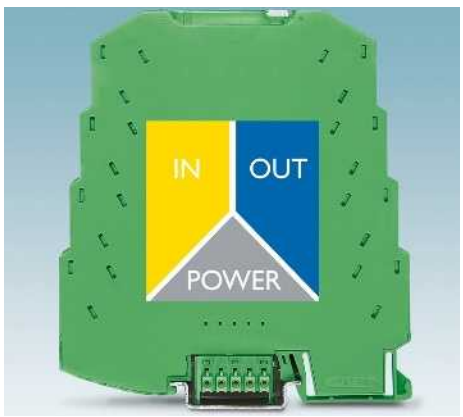
Fault monitoring and power bridging
– The DIN rail connector simplifies supply and enables group error monitoring.



Clearly arranged wiring
– Eight connections, with a choice of screw or spring-cage terminal blocks.



Low power consumption
– The resulting minimal self-heating results in a long service life and a high degree of operational reliability.



High operational reliability
– 3-way electrical isolation increases the operational reliability against system disturbances.

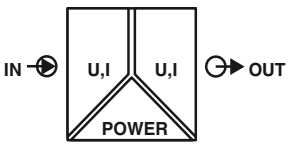
Easy configuration
– Can be configured easily via DIP switches or software, for extended functionality and monitoring.

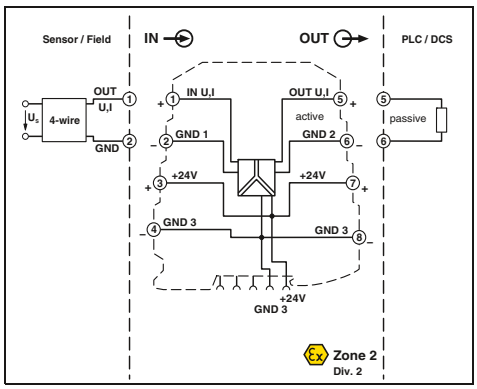
Reduction in analog inputs on controllers
– The MINI Analog multiplexer reduces up to eight analog signals to a single 4 … 20 mA signal.

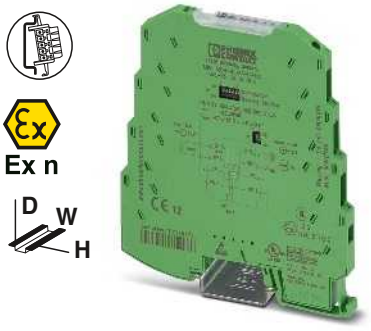
Time-saving system cabling
– Plug and play – for eight channels on the isolating amplifier and controller side.

Fast and error-free signal connection
– Compact termination carriers connect MINI Analog devices to the automation system – plug and play and hot-swappable.

Analog IN / Analog OUT
3-way isolating amplifier







Configurable, up to 36 signal combinations

Ex:
Housing width 6.2 mm

- Highly compact isolating amplifier for electrical isolation, conversion, amplification, and filtering of standard analog signals
- Up to 36 signal combinations can be configured using DIP switches
- 3-way isolation
- Low power consumption
- Power supply possible through the foot element (T-Connector)
- Standard configuration: 0 ... 10 V input, 0 ... 20 mA output

Notes:

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

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

Technical data

Input data	U input	I input
Input signal	0 ... 5 V / 1 ... 5 V 0 ... 10 V / 2 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Input resistance	Approx. 100 kΩ	Approx. 50 Ω
Output data	U output	I output
Output signal	0 ... 5 V / 1 ... 5 V 0 ... 10 V / 2 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	Approx. 12.5 V	28 mA
No-load voltage		Approx. 12.5 V
Short-circuit current	Approx. 22 mA	
Load R_B	≥ 10 kΩ	< 500 Ω (at 20 mA)
Ripple	< 20 mV_{PP} (at 10 kΩ)	< 20 mV_{PP} (at 500 Ω)
General data	U output	I output
Supply voltage U_B	19.2 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	< 9 mA (Voltage output, at 24 V DC incl. load)	< 19 mA (Current output, at 24 V DC incl. load)
Power consumption	< 200 mW (Voltage output)	< 450 mW (Current output)
Maximum transmission error	≤ 0.1% (of final value)	
Temperature coefficient	< 0.01%/K, typ. < 0.002%/K	
Limit frequency (3 dB)	Approx. 100 Hz	
Step response (10 - 90%)	Approx. 3.2 ms	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature (operation)	-20°C ... 65°C	
Mounting	Any	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5	
GL	GL EMC 2 D	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MCR 3-way isolating amplifier, for electrical isolation of analog signals,				
Order configuration	Screw connection	**MINI MCR-SL-UI-UI**[1])	**2864383**	1
Order configuration	Spring-cage conn.	**MINI MCR-SL-UI-UI-SP**[1])	**2864710**	1
Standard configuration	Screw connection	**MINI MCR-SL-UI-UI-NC**[1])	**2864150**	1
Standard configuration	Spring-cage conn.	**MINI MCR-SL-UI-UI-SP-NC**[1])	**2864163**	1

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

Order No.	Input	Output	Factory calibration certificate
2864383	IN03	OUT01	NONE

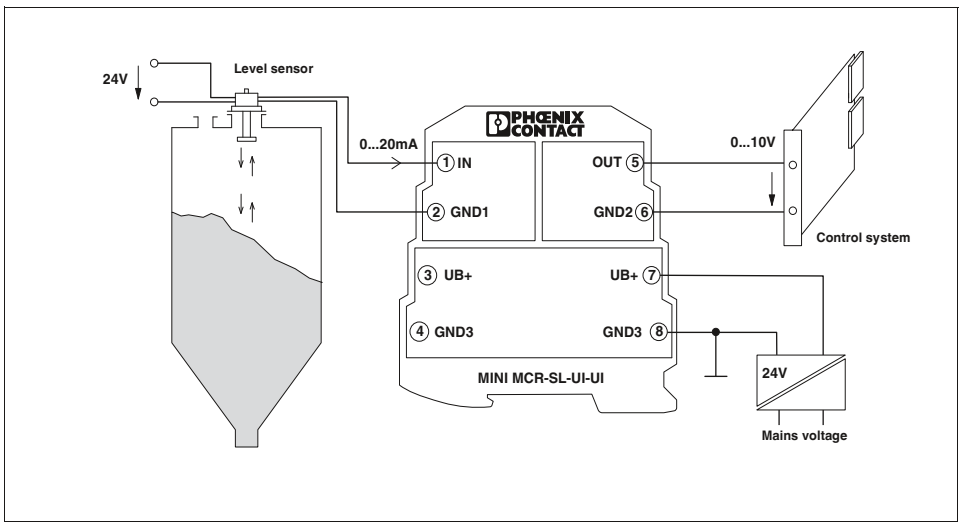
2864383 ≙ ...-UI-UI
2864710 ≙ ...-UI-UI-SP

Input	Output	Factory calibration certificate
IN01 ≙ 0...20 mA	OUT01 ≙ 0...20 mA	NONE ≙ Without factory
IN02 ≙ 4...20 mA	OUT02 ≙ 4...20 mA	YES ≙ With factory calibration certificate (fee)
IN03 ≙ 0...10 V	OUT03 ≙ 0...10 V	
IN04 ≙ 2...10 V	OUT04 ≙ 2...10 V	YESPLUS ≙ Factory calibration certificate with 5 measuring points (fee)
IN05 ≙ 0...5 V	OUT05 ≙ 0...5 V	
IN06 ≙ 1...5 V	OUT06 ≙ 1...5 V	

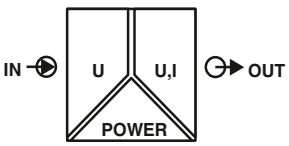
Combination table for input and output signals

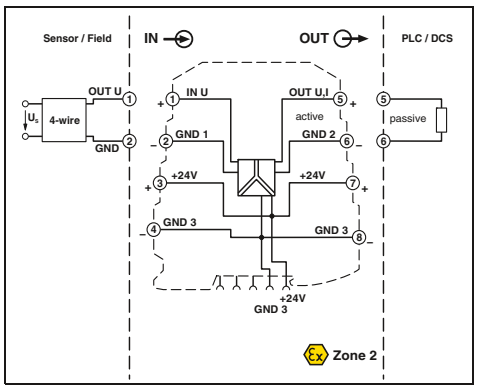
		DIP switch SW 2						DIP switch SW 1	
Input	**Output**	**DIP 1**	**DIP 2**	**DIP 3**	**DIP 4**	**DIP 5**	**DIP 6**	**DIP 1**	**DIP 2**
0 - 10 V	0 - 20 mA	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	4 - 20 mA	OFF	OFF	OFF	OFF	OFF	**ON**	OFF	OFF
	0 - 10 V	**ON**	OFF	**ON**	OFF	OFF	OFF	OFF	OFF
	2 - 10 V	**ON**	OFF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

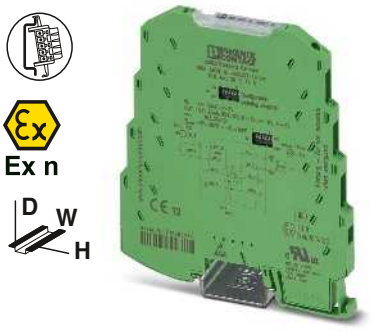
Application example: Level measurement



Analog IN / Analog OUT
3-way isolating amplifier







Configurable, for shunt measurements

Ex:
Housing width 6.2 mm

- Highly compact isolating amplifier for electrical isolation, conversion, amplification, and filtering of mV signals to create standard analog signals
- Ideal for converting signals in the case of shunt measurements
- Up to 280 signal combinations can be configured using DIP switches
- 3-way isolation
- Low power consumption
- Power supply possible through the foot element (T-Connector)
- Standard configuration: 0 ... 50 mV input, 0 ... 20 mA output

Notes:

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

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

Technical data

Input data		
Input signal (can be configured using DIP switches)	0 ... 50 mV	
Maximum input signal	Approx. 30 V DC	
Input resistance	Approx. 10 kΩ	
Output data	U output	I output
Output signal (configurable using the DIP switch)	0 ... 5 V / 1 ... 5 V 0 ... 10 V / 2 ... 10 V -5 ... 5 V / -10 ... 10 V (The bi-polar output can be used only for bi-polar input signals.)	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	12.5 V	28 mA
Load R_B	≥ 10 kΩ	< 500 Ω (at 20 mA)
Ripple	< 20 mV_{PP} (at 10 kΩ)	< 20 mV_{PP} (at 500 Ω)
General data		
Supply voltage U_B	19.2 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Power consumption	< 450 mW (Current output)	
Maximum transmission error	≤ 0.2%	
Temperature coefficient	< 0.01%/K, typ. < 0.002%/K	
Limit frequency (3 dB)	(100 Hz / 30 Hz switchable)	
Step response (10 - 90%)	3.5 ms (At 100 Hz)	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature (operation)	-20°C ... 65°C	
Mounting	Any	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5 applied for	
GL	GL EMC 2 D	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MCR 3-way isolating amplifier, for realization of mV voltages in standard signals,				
Order configuration	Screw connection	**MINI MCR-SL-SHUNT-UI**	**2810858**	1
Order configuration	Spring-cage conn.	**MINI MCR-SL-SHUNT-UI-SP**	**2810874**	1
Standard configuration	Screw connection	**MINI MCR-SL-SHUNT-UI-NC[1])**	**2810780**	1
Standard configuration	Spring-cage conn.	**MINI MCR-SL-SHUNT-UI-SP-NC[1])**	**2810793**	1

Order key MINI MCR-SL-SHUNT-UI-... (standard configuration entered as an example)

Order No.	Input	Output	Limit frequency	Factory calibration certificate FCC
2810858	IN40	OUT01	100	NONE

2810858 ≙ ...-SHUNT-UI				
IN40 ≙ 0...50 mV	IN28 ≙ 0...500 mV	IN53 ≙ -50...+50 mV	IN17 ≙ -500...+500 mV	OUT01 ≙ 0...20 mA
IN24 ≙ 0...60 mV	IN46 ≙ 0...600 mV	IN13 ≙ -60...+60 mV	IN59 ≙ -600...+600 mV	OUT02 ≙ 4...20 mA
IN41 ≙ 0...75 mV	IN47 ≙ 0...750 mV	IN54 ≙ -75...+75 mV	IN60 ≙ -750...+750 mV	OUT03 ≙ 0...10 V
IN42 ≙ 0...80 mV	IN48 ≙ 0...800 mV	IN55 ≙ -80...+80 mV	IN61 ≙ -800...+800 mV	OUT04 ≙ 2...10 V
IN25 ≙ 0...100 mV	IN29 ≙ 0...1.0 V	IN14 ≙ -100...+100 mV	IN18 ≙ -1.0...+1.0 V	OUT05 ≙ 0...5 V
2810874 ≙ ...-SHUNT-UI-SP				
IN43 ≙ 0...120 mV	IN49 ≙ 0...1.2 V	IN56 ≙ -120...+120 mV	IN62 ≙ -1.2...+1.2 V	OUT06 ≙ 1...5 V
IN44 ≙ 0...150 mV	IN50 ≙ 0...1.5 V	IN57 ≙ -150...+150 mV	IN63 ≙ -1.5...+1.5 V	
IN26 ≙ 0...200 mV	IN30 ≙ 0...2.0 V	IN15 ≙ -200...+200 mV	IN19 ≙ -2.0...+2.0 V	OUT13 ≙ -5...+5 V
IN45 ≙ 0...240 mV	IN51 ≙ 0...2.4 V	IN58 ≙ -240...+240 mV	IN64 ≙ -2.4...+2.4 V	OUT14 ≙ -10...+10 V
IN27 ≙ 0...300 mV	IN52 ≙ 0...3.0 V	IN16 ≙ -300...+300 mV	IN65 ≙ -3.0...+3.0 V	

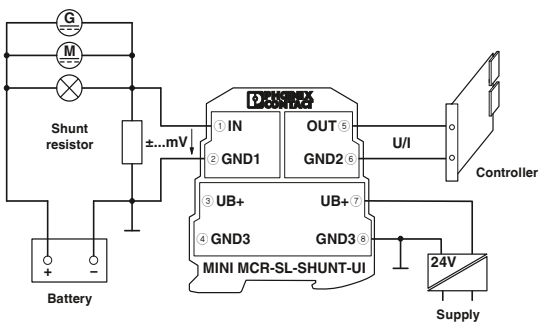
Limit frequency	Factory calibration certificate FCC
30 ≙ 30 Hz	NONE ≙ without FCC
100 ≙ 100 Hz	YES ≙ with FCC (a fee is charged)
	YESPLUS ≙ Factory calibration certificate with 5 measuring points (a fee is charged)

Note:
A bipolar output (-5...+5 V, -10...+10 V) can only be used for a bipolar input signal.

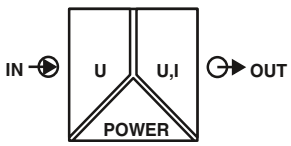
Combination table for input and output signals

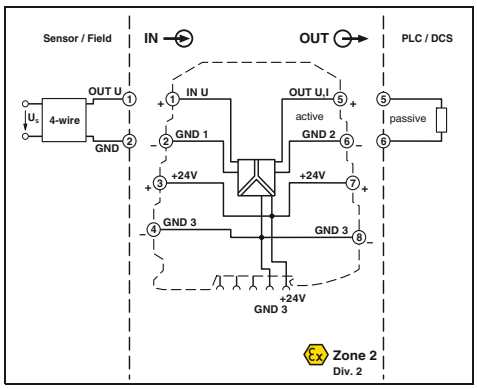
	Voltage output						Current output	
Input	-10...+10 V	0...10 V	2...10 V	-5...+5 V	0...5 V	1...5 V	0...20 mA	4...20 mA
0...50 mV		x	x		x	x	x	x
0...60 mV		x	x		x	x	x	x
0...75 mV		x	x		x	x	x	x
0...80 mV		x	x		x	x	x	x
0...100 mV		x	x		x	x	x	x
0...120 mV		x	x		x	x	x	x
0...150 mV		x	x		x	x	x	x
0...200 mV		x	x		x	x	x	x
0...240 mV		x	x		x	x	x	x
0...300 mV		x	x		x	x	x	x
0...500 mV		x	x		x	x	x	x
0...600 mV		x	x		x	x	x	x
0...750 mV		x	x		x	x	x	x
0...800 mV		x	x		x	x	x	x
0...1 V		x	x		x	x	x	x
0...1.2 V		x	x		x	x	x	x
0...1.5 V		x	x		x	x	x	x
0...2 V		x	x		x	x	x	x
0...2.4 V		x	x		x	x	x	x
0...3 V		x	x		x	x	x	x
-50...50 mV	x	x	x	x	x	x	x	x
-60...60 mV	x	x	x	x	x	x	x	x
-75...75 mV	x	x	x	x	x	x	x	x
-80...80 mV	x	x	x	x	x	x	x	x
-100...100 mV	x	x	x	x	x	x	x	x
-120...120 mV	x	x	x	x	x	x	x	x
-150...150 mV	x	x	x	x	x	x	x	x
-200...200 mV	x	x	x	x	x	x	x	x
-240...240 mV	x	x	x	x	x	x	x	x
-300...300 mV	x	x	x	x	x	x	x	x
-500...500 mV	x	x	x	x	x	x	x	x
-600...600 mV	x	x	x	x	x	x	x	x
-750...750 mV	x	x	x	x	x	x	x	x
-800...800 mV	x	x	x	x	x	x	x	x
-1...1 V	x	x	x	x	x	x	x	x
-1.2...1.2 V	x	x	x	x	x	x	x	x
-1.5...1.5 V	x	x	x	x	x	x	x	x
-2...2 V	x	x	x	x	x	x	x	x
-2.4...2.4 V	x	x	x	x	x	x	x	x
-3...3 V	x	x	x	x	x	x	x	x

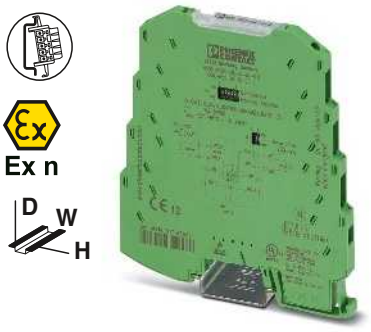
Application example: Monitoring of loading and unloading currents



Analog IN / Analog OUT
3-way isolating amplifier







Ex n

D W H

Configurable,
for 0 ... 24 V / 0 ... 30 V input signals

Ex:

Housing width 6.2 mm

- Highly compact isolating amplifier for electrical isolation, conversion, amplification, and filtering of 24 V or 30 V DC signals to create standard analog signals
- Up to 12 signal combinations can be configured using DIP switches
- 3-way isolation
- Low power consumption
- Power supply possible through the foot element (T-Connector)
- Standard configuration: 0 ... 30 V input, 0 ... 20 mA output

Notes:

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

Information about power bridging, system cabling, and marking components can be found starting at page 88

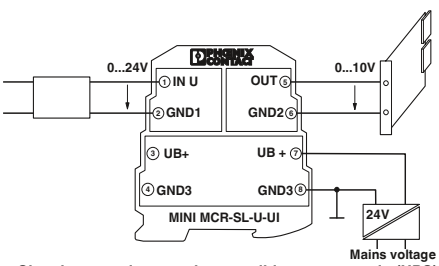
1) EMC: Class A product, see page 571

Technical data

Input data		
Input signal	0 ... 24 V / 0 ... 30 V	
Input resistance	Approx. 125 kΩ (0 ... 24 V)	
Output data	U output	I output
Output signal (configurable using the DIP switch)	0 ... 5 V / 1 ... 5 V 0 ... 10 V / 2 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	≤ 12.5 V	28 mA
No-load voltage		≤ 12.5 V
Short-circuit current	≤ 22 mA	
Load R_B	> 10 kΩ	< 500 Ω (at 20 mA)
Ripple	< 20 mV_{PP} (at 10 kΩ)	< 20 mV_{PP} (at 500 Ω)
General data		
Supply voltage U_B	19.2 V DC ... 30 V DC	
Power consumption	< 450 mW	
Maximum transmission error	< 0.1% (of final value)	
Temperature coefficient	< 0.01%/K, typ. < 0.002%/K	
Limit frequency (3 dB)	Approx. 100 Hz	
Step response (10 - 90%)	Approx. 3.5 ms	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 65°C	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5	
GL	GL EMC 2 D	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MCR 3-way isolating amplifier, for electrical isolation of analog signals,				
Order configuration	Screw connection	**MINI MCR-SL-U-UI[1])**	**2864053**	1
Order configuration	Spring-cage conn.	**MINI MCR-SL-U-UI-SP[1])**	**2811213**	1
Standard configuration	Screw connection	**MINI MCR-SL-U-UI-NC[1])**	**2865007**	1
Standard configuration	Spring-cage conn.	**MINI MCR-SL-U-UI-SP-NC[1])**	**2810078**	1

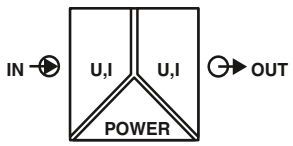


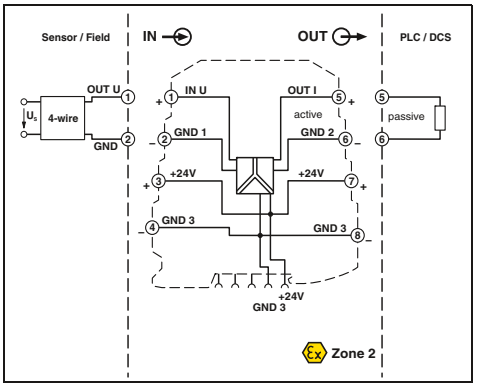
Signal conversion to uninterruptible power supply (UPS)

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

Order No.	/	Input	/	Output
2864053	/	**IN39**	/	**OUT01**
2864053 ≙ ...-U-UI		IN38 ≙ 0...24 V IN39 ≙ 0...30 V		OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA OUT03 ≙ 0...10 V OUT04 ≙ 2...10 V OUT05 ≙ 0...5 V OUT06 ≙ 1...5 V
2811213 ≙ ...-U-UI-SP				

Analog IN / Analog OUT
3-way isolating amplifier





Ex n

With fixed signal combinations

Ex:

- Highly compact isolating amplifier for electrical isolation, conversion, amplification, and filtering of standard analog signals
- Fixed signal combinations
- Entry-level alternative to configurable isolating amplifiers
- 3-way isolation
- Low power consumption
- Power supply possible through the foot element (T-Connector)

Notes:

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

Technical data

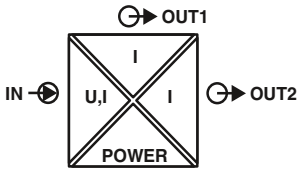
Input data		
Input resistance	U input	I input
	Approx. 100 kΩ	Approx. 50 Ω
Output data	U output	I output
Maximum output signal	12.5 V	28 mA
No-load voltage		Approx. 12.5 V
Short-circuit current	Approx. 2 mA	
Load R_B	≥ 10 kΩ	≤ 500 Ω
Ripple	< 20 mV_{PP} (at 10 kΩ)	< 20 mV_{PP} (at 500 Ω)
General data		
Supply voltage U_B	19.2 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	< 20 mA	
Maximum transmission error	≤ 0.1% (of final value)	
Temperature coefficient	< 0.01%/K, typ. < 0.002%/K	
Limit frequency (3 dB)	Approx. 100 Hz	
Step response (10 - 90%)	Approx. 3.5 ms	
Degree of protection	IP20	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 65°C	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	Ⓔx II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5 applied for	
GL	GL EMC 2 D	

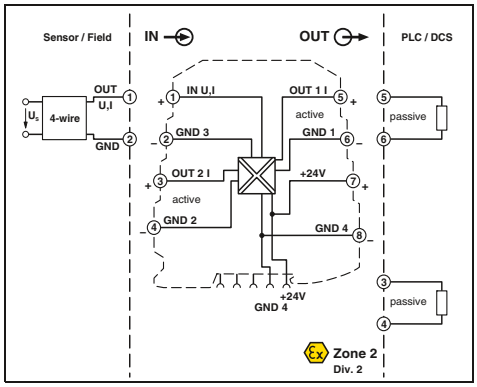
Ordering data

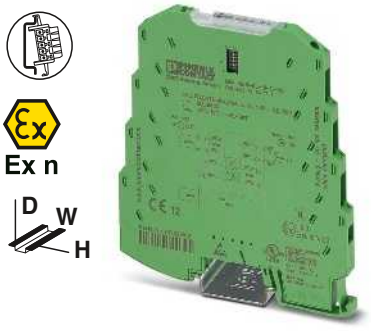
Description	Input signal	Output signal	Type	Order No.	Pcs. / Pkt.
MCR 3-way isolating amplifier, for electrical isolation of analog signals,					
Screw connection	0 ... 10 V	0 ... 20 mA	**MINI MCR-SL-U-I-0[1])**	**2813512**	1
Spring-cage conn.	0 ... 10 V	0 ... 20 mA	**MINI MCR-SL-U-I-0-SP[1])**	**2813570**	1
Screw connection	0 ... 10 V	4 ... 20 mA	**MINI MCR-SL-U-I-4[1])**	**2813525**	1
Spring-cage conn.	0 ... 10 V	4 ... 20 mA	**MINI MCR-SL-U-I-4-SP[1])**	**2813583**	1
Screw connection	0 ... 20 mA	0 ... 10 V	**MINI MCR-SL-I-U-0[1])**	**2813541**	1
Spring-cage conn.	0 ... 20 mA	0 ... 10 V	**MINI MCR-SL-I-U-0-SP[1])**	**2813554**	1
Screw connection	4 ... 20 mA	0 ... 10 V	**MINI MCR-SL-I-U-4[1])**	**2813538**	1
Spring-cage conn.	4 ... 20 mA	0 ... 10 V	**MINI MCR-SL-I-U-4-SP[1])**	**2813567**	1
Screw connection	0 ... 20 mA 4 ... 20 mA	0 ... 20 mA 4 ... 20 mA	**MINI MCR-SL-I-I[1])**	**2864406**	1
Spring-cage conn.	0 ... 20 mA 4 ... 20 mA	0 ... 20 mA 4 ... 20 mA	**MINI MCR-SL-I-I-SP[1])**	**2864723**	1
Screw connection	0 ... 10 V -10 ... 10 V	0 ... 10 V -10 ... 10 V	**MINI MCR-SL-U-U[1])**	**2864684**	1
Spring-cage conn.	0 ... 10 V -10 ... 10 V	0 ... 10 V -10 ... 10 V	**MINI MCR-SL-U-U-SP[1])**	**2864697**	1

Highly compact isolating amplifiers - MINI Analog

Analog IN/Analog OUT signal duplicators







Configurable, with two current output signals

Ex:
Housing width 6.2 mm

- Highly compact isolating amplifier for electrical isolation, conversion, amplification, filtering, and duplication of standard analog signals
- Duplication of a standard analog signal on two current outputs
- Up to 8 signal combinations can be configured using DIP switches
- 4-way isolation
- Power supply possible through the foot element (T-Connector)
- Standard configuration: Input: 0 ... 10 V, output 1: 0 ... 20 mA, output 2: 0 ... 20 mA

Notes:

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

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

Technical data

Input data	U input	I input
Input signal	0 ... 10 V / 1 ... 5 V	0 ... 20 mA / 4 ... 20 mA
Maximum input signal	30 V	50 mA
Input resistance	Approx. 100 kΩ	Approx. 50 Ω
Output data		
Output signal (configurable using the DIP switch)	2x ; 0 ... 20 mA / 4 ... 20 mA	
Maximum output signal	22 mA	
No-load voltage	9 V	
Load R_B	≤ 250 Ω (at 20 mA)	
Ripple	< 20 mV_{PP} (at 250 Ω)	
General data		
Supply voltage U_B	19.2 V DC ... 30 V DC	
Current consumption	< 30 mA (at 24 V DC incl. load)	
Power consumption	< 600 mW	
Maximum transmission error	≤ 0.2% (of final value), typ. < 0.1%	
Temperature coefficient	< 0.01%/K, typ. < 0.004%/K	
Limit frequency (3 dB)	Approx. 35 Hz	
Step response (0 - 99%)	Approx. 10 ms	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 60°C	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5	
GL	GL EMC 2 D	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MCR signal duplicator, for duplication and electrical isolation of analog signals				
Order configuration	Screw connection	**MINI MCR-SL-UI-2I[1])**	**2864794**	1
Order configuration	Spring-cage conn.	**MINI MCR-SL-UI-2I-SP[1])**	**2864804**	1
Standard configuration	Screw connection	**MINI MCR-SL-UI-2I-NC[1])**	**2864176**	1
Standard configuration	Spring-cage conn.	**MINI MCR-SL-UI-2I-SP-NC[1])**	**2864189**	1

Order key for MINI MCR-SL-UI-2I (standard configuration entered as an example)

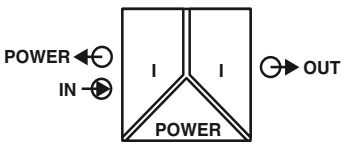
Order No.	Input	Output combination [1])	Behavior of the analog outputs	Factory calibration certificate (FCC)
2864794 /	**IN03** /	**A** /	**0** /	**NONE**
2864794 ≙ ...-UI-2I 2864804 ≙ ...-UI-2I-SP	IN01 ≙ 0...20 mA IN02 ≙ 4...20 mA IN03 ≙ 0...10 V IN06 ≙ 1...5 V	A B C	0 ≙ Analog behavior 1 ≙ Limitation	NONE ≙ without FCC YES ≙ with FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

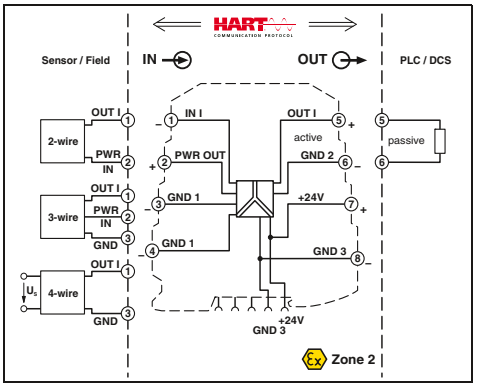
Explanation for output combination:

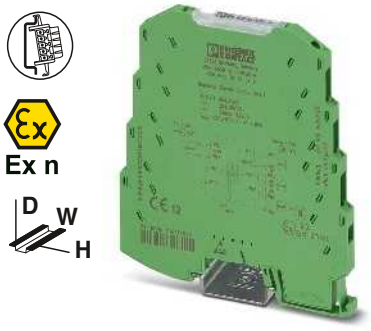
	Output 1	Output 2
A	0...20 mA	0...20 mA
B	0...20 mA	4...20 mA
C	4...20 mA	4...20 mA

[1]) For explanations, see adjacent text on the right; for further details, see data sheet: www.phoenixcontact.net/products

Analog IN / Analog OUT repeater power supplies







Ex n

D W H

Optionally available with HART transmission

- Highly compact repeater power supplies for electrical isolation, amplification, and filtering of standard analog signals
- Supply of 2-conductor and passive 3-conductor sensors
- Can also be used as an isolator without supply
- 3-way isolation
- Alternatively bidirectional HART transmission
- Power supply possible through the foot element (T-Connector)

Notes:

Information about power bridging, system cabling, and marking components can be found starting at page 73

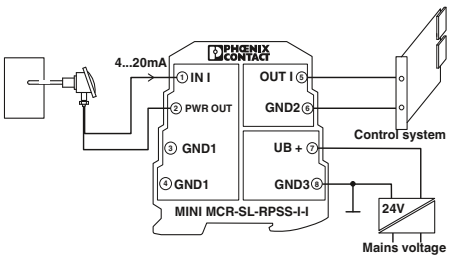
1) EMC: Class A product, see page 571

Ex:

Housing width 6.2 mm

Technical data

Input data	MINI MCR-SL-RPSS-I-I[1])	MINI MCR-SL-RPS-I-I[1])
Input signal	0 ... 20 mA, isolator operation / 4 ... 20 mA	0 ... 20 mA, isolator operation / 4 ... 20 mA
Input resistance	Approx. 50 Ω	Approx. 50 Ω
Transmitter supply voltage	16.5 V	14.7 V DC ... 25.5 V DC (U_B - max. 4.5 V for load 0 mA ... 20 mA)
Output data		
Output signal	0 ... 20 mA / 4 ... 20 mA	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	21 mA	28 mA
No-load voltage	Approx. 12.5 V	Approx. 12.5 V
Load R_B	≤ 500 Ω (at I = 20 mA)	≤ 500 Ω (at I = 20 mA)
Ripple	< 20 mV_{rms} (at 500 Ω)	< 20 mV_{rms} (at 500 Ω)
General data		
Supply voltage U_B	20.4 V DC ... 30 V DC	19.2 V DC ... 30 V DC
Nominal supply voltage	24 V DC	24 V DC
Current consumption		
Power consumption	< 900 mW (at 24 V DC and in repeater power supply operation)	< 900 mW (at 24 V DC and in repeater power supply operation)
Maximum transmission error	≤ 0.2% (of final value), typ. ≤ 0.1% (of final value)	≤ 0.2% (of final value), typ. ≤ 0.1% (of final value)
Temperature coefficient	< 0.005%/K, typ. < 0.002%/K	< 0.01%/K, typ. < 0.002%/K
Limit frequency (3 dB)	175 Hz (typ.)	Approx. 100 Hz
Communication	HART specification in both operating modes (RPSS isolator / RPSS repeater power supply)	-
Step response (10 - 90%)	< 2 ms (typ.)	Approx. 3.5 ms
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	1.5 kV (50 Hz, 1 min.)
Degree of protection	IP20	IP20
Ambient temperature (operation)	-20°C ... 60°C	-20°C ... 60°C
Mounting	Any	Any
Housing material	PBT	PBT
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	6.2 / 93.1 / 102.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X	II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada	UL 508 Recognized applied for Class I, Div. 2, Groups A, B, C, D T5 applied for	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5
GL	GL EMC 2 D	GL EMC 2 D

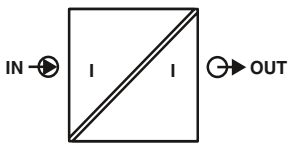


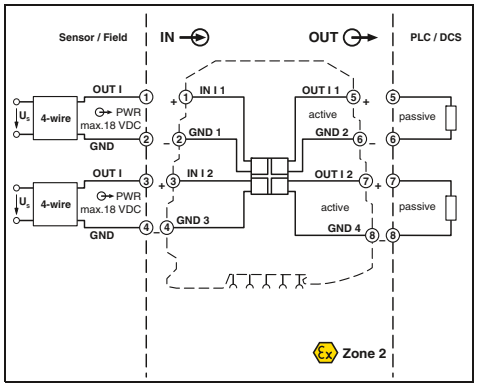
Repeater power supply operation with a passive sensor

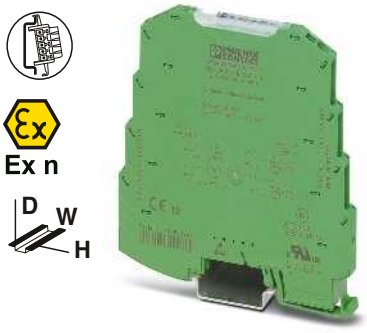
Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MCR repeater power supplies				
with HART® protocol	Screw connection	**MINI MCR-SL-RPSS-I-I[1])**	**2864079**	1
with HART® protocol	Spring-cage conn.	**MINI MCR-SL-RPSS-I-I-SP[1])**	**2810230**	1
	Screw connection	**MINI MCR-SL-RPS-I-I[1])**	**2864422**	1
	Spring-cage conn.	**MINI MCR-SL-RPS-I-I-SP[1])**	**2864752**	1

Analog IN / Analog OUT passive isolators







Either 1- or 2-channel

Ex:
Housing width 6.2 mm

- Highly compact 2-conductor passive isolators for electrical isolation and filtering of standard analog signals
- Input loop-supplied
- Does not require any additional auxiliary voltage
- 2 channels in conj. with a design width of just 6.2 mm
- Voltage drop on isolating amplifier of just 1.7 V

Notes:

When using passive isolators, make sure that the current sourcing voltage of the measuring transducer U_B is sufficient to drive the maximum current of 20 mA via the passive isolator with a voltage drop U_V = 1.7 V and load R_B.
This means:
$U_B \geq U_E = 1.7\ V + 20\ mA \times R_B$

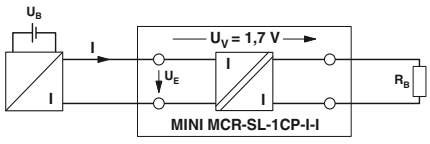
Information on components for power bridging, system cabling, and marking can be found in the INTERFACE catalog or at www.phoenixcontact.net/products

Technical data

Input data	
Input signal	0 ... 20 mA / 4 ... 20 mA
Voltage drop	1.7 V (at I = 20 mA)
Response current	Approx. 190 µA
Maximum input current / overload	40 mA
Maximum input voltage	18 V
Output data	
Output signal	0 ... 20 mA / 4 ... 20 mA
Load R_B	< 600 Ω (at I = 20 mA output signal)
Ripple	< 10 mV_{rms} (at 600 Ω)
General data	
Maximum transmission error	≤ 0.1% (of final value)
Additional error per 100 Ω load	0.03% (of measured value / 100 Ω load)
Temperature coefficient	≤ 0.002%/K (of measured value / 100 Ω load)
Limit frequency (3 dB)	75 Hz
Step response (10 - 90%)	5 ms (At 600 Ω load)
Electrical isolation	Basic insulation according to EN 61010
Test voltage input/output	1.5 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-20°C ... 65°C
Mounting	Any
Housing material	PBT
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12
Conformance / approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA II T6 X
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D
GL	GL EMC 2 D

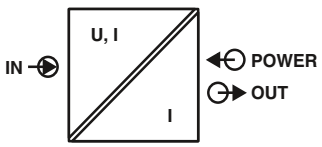
Ordering data

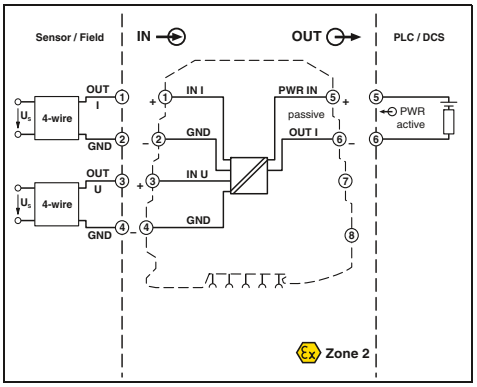
Description		Type	Order No.	Pcs. / Pkt.
MCR passive isolator, for electrical isolation of current signals without auxiliary power				
two-channel	Screw connection	**MINI MCR-SL-2CP-I-I**	**2864655**	1
two-channel	Spring-cage conn.	**MINI MCR-SL-2CP-I-I-SP**	**2864781**	1
single-channel	Screw connection	**MINI MCR-SL-1CP-I-I**	**2864419**	1
single-channel	Spring-cage conn.	**MINI MCR-SL-1CP-I-I-SP**	**2864749**	1



N

Analog IN/Analog OUT loop-powered isolator





Ex n

Configurable, up to 74 signal combinations, loop-powered

Applied for:
cUL / UL
Housing width 6.2 mm

- Highly compact isolating amplifier for electrical isolation, conversion, and filtering of standard analog signals
- Supplied by an output loop
- Does not require any additional auxiliary voltage
- Up to 74 signal combinations can be configured using DIP switches
- Voltage input from mV voltages right up to 30 volts
- Current input from 2 mA right up to 40 mA
- 2-way isolation
- Standard configuration: Input 2...10 V, output 4...20 mA

Notes:

Other input signals that have not been listed can be provided on request.

Information on components for power bridging, system cabling, and marking can be found in the INTERFACE catalog or at www.phoenixcontact.net/products

1) EMC: Class A product, see page 571

Technical data

	U input	I input
Input data		
Input signal (configurable using the DIP switch)	2 ... 10 V, additional areas can be configured, see table	
Maximum input signal	< 40 V	< 50 mA (Dielectric strength up to 30 V)
Input resistance	Approx. 100 kΩ (At ≤ 1 V, otherwise approximately 1 MΩ)	≤ 50 Ω
Output data		
Output signal	4 ... 20 mA	
Maximum output signal	35 mA	
Load R_B	$((U_B - 8\ V) / 22\ mA)$	
Ripple	< 20 mV_{PP} (at 500 Ω)	
General data		
Supply voltage U_B	8 V DC ... 30 V DC	
Current consumption	< 3.5 mA (without signal current)	
Power consumption	28 mW (without signal)	
Maximum transmission error	< 0.1% (of final value)	
Temperature coefficient	0.01%/K, typ. 0.005%/K	
ZERO / SPAN adjustment	±2% / ±2%	
Limit frequency (3 dB)	Approx. 30 Hz	
Step response (10 - 90%)	Approx. 16 ms	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage input/output	1.5 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature (operation)	-25°C ... 70°C	
Mounting	Any	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	Ex II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5	

Ordering data

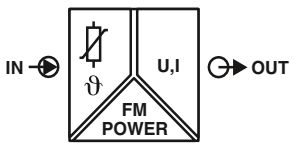
Description	Type	Order No.	Pcs. / Pkt.
MCR loop-powered isolator			
Screw connection	**MINI MCR-SL-UI-I-LP-NC[1])**	**2902829**	1
Spring-cage conn.	**MINI MCR-SL-UI-I-LP-SP-NC[1])**	**2902830**	1

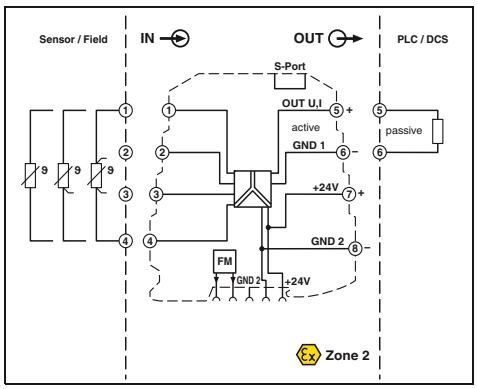
Possible input signal ranges (configurable via DIP switch)

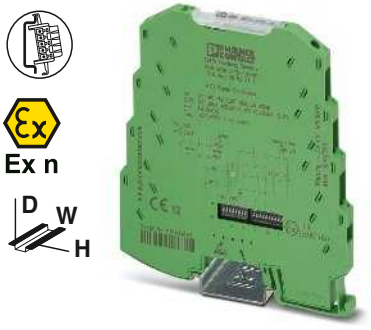
0...40 mA		0...30 V	0...10 V	2...10 V	0...1000 mV	±30 V	±10 V	±1000 mV
0...30 mA		0...25 V	0...7.5 V		0...750 mV	±25 V	±7.5 V	±750 mV
0...20 mA	4...20 mA	0...20 V	0...5 V	1...5 V	0...500 mV	±20 V	±5 V	±500 mV
0...12 mA		0...15 V	0...3 V		0...300 mV	±15 V	±3 V	±300 mV
0...10 mA	2...10 mA	0...12.5 V	0...2.5 V		0...250 mV	±12.5 V	±2.5 V	±250 mV
0...8 mA		0...12 V	0...2 V		0...200 mV	±12 V	±2 V	±200 mV
0...7.5 mA			0...1.5 V		0...150 mV		±1.5 V	±150 mV
0...6 mA			0...1.25 V		0...125 mV		±1.25 V	±125 mV
0...5 mA	1...5 mA		0...1.2 V		0...120 mV		±1.2 V	±120 mV
0...4 mA					0...100 mV			±100 mV
0...3 mA					0...75 mV			±75 mV
0...2.5 mA					0...60 mV			±60 mV
0...2 mA					0...50 mV			±50 mV

N

Temperature
Temperature transducers
for resistance thermometers







Universal measuring transducer for resistance thermometers

Housing width 6.2 mm

Universal temperature transducer for electrical isolation, conversion, amplification, and filtering of resistance thermometers and remote resistance-type sensors

- High level of accuracy over the entire measuring range
- For 2-, 3- or 4-conductor sensors according to IEC 751, JIS, GOST
- Configurable via DIP switches and software
- Software available free of charge on the Internet
- Power supply possible through the foot element (T-Connector)
- Supports fault monitoring
- Standard configuration: Pt 100 sensor IEC 751; 3-conductor; -50 ... 150°C; 4 ... 20 mA output; error evaluation according to NE43 (downscale); fault monitoring contact responds on any error

Notes:

The configuration software can be downloaded from the Internet: www.phoenixcontact.net/products

For information on the programming adapter, refer to page 119

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

Technical data

Input data		
Input signal (can be configured using DIP switches)	Pt, Ni, Cu sensors : 2, 3, 4-conductor	
Temperature range	-200°C ... 850°C (Range depending on the sensor type)	
Measuring range span	min. 50 K	
Linear resistance measuring range	0 Ω ... 4000 Ω (Minimum measuring span: 10% of the selected measuring range)	
Output data	U output	I output
Output signal	0 ... 5 V / 1 ... 5 V	0 ... 20 mA / 4 ... 20 mA
	0 ... 10 V / 10 ... 0 V	20 ... 0 mA / 20 ... 4 mA
Maximum output signal	Approx. 12.3 V	24.6 mA
Load R_B	10 kΩ	500 Ω (at 20 mA)
Ripple	< 20 mV_{PP}	< 20 mV_{PP} (at 500 Ω)
General data		
Supply voltage U_B	9.6 V DC ... 30 V DC	
Current consumption	< 27 mA (at 24 V DC)	
Power consumption	≤ 700 mW (at I_{OUT} = 20 mA, 9.6 V DC, load 500 Ω)	
Transmission error	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)	
Temperature coefficient	0.01%/K	
Step response (0 - 99%)	Typ. 200 ms (2-conductor) Typ. 500 ms (3-conductor) Typ. 500 ms (4-conductor)	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 65°C	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	Ⓔx II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized applied for Class I, Div. 2, Groups A, B, C, D T5 applied for	
GL	GL applied for	

Ordering data

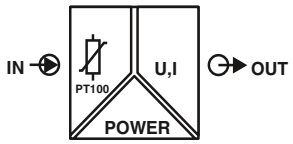
Description		Type	Order No.	Pcs. / Pkt.
Temperature transducers for resistance thermometers				
Standard configuration	Screw connection	**MINI MCR-RTD-UI-NC**[1])	**2902849**	1
Standard configuration	Spring-cage conn.	**MINI MCR-RTD-UI-SP-NC**[1])	**2902850**	1

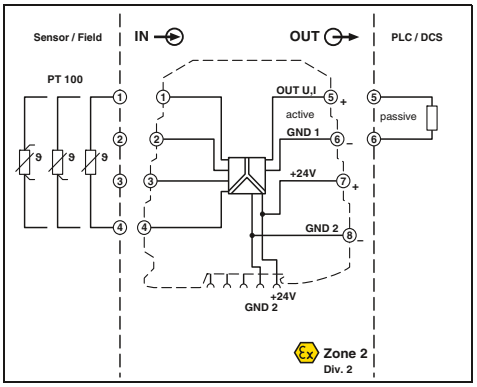
Accessories

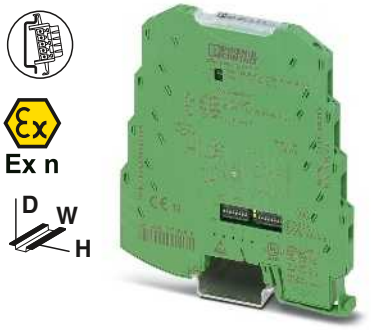
Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**[1])	**2811271**	1

Sensor type	Standard	Measuring range	Smallest measuring range span
Pt100	IEC 751 = GOST 6651-2009 (α = 0.00385)	-200°C ... +850°C	50 K
Pt200	IEC 751 = GOST 6651-2009 (α = 0.00385)	-200°C ... +850°C	50 K
Pt500	IEC 751 = GOST 6651-2009 (α = 0.00385)	-200°C ... +850°C	50 K
Pt1000	IEC 751 = GOST 6651-2009 (α = 0.00385)	-200°C ... +850°C	50 K
Pt100	GOST 6651-2009 (α = 0.00391)	-200°C ... +850°C	50 K
Pt1000	GOST 6651-2009 (α = 0.00391)	-200°C ... +850°C	50 K
Pt100	JIS C1604-1997	-200°C ... +850°C	50 K
Pt1000	JIS C1604-1997	-200°C ... +850°C	50 K
Ni100	DIN 43760	-60°C ... +250°C	50 K
Ni1000	DIN 43760	-60°C ... +250°C	50 K
Cu50	GOST 6651-2009 (α = 1.428)	-180°C ... +200°C	50 K
Cu100	GOST 6651-2009 (α = 1.428)	-180°C ... +200°C	50 K
Cu53	GOST 6651-2009 (α = 1.426)	-50°C ... +180°C	50 K
Customer-specific characteristic curves			

Temperature
Temperature transducer for Pt 100







Ex n

D W H

Configurable, for a temperature measuring range of -50°C ... +200°C

Ex:

Housing width 6.2 mm

- Highly compact temperature transducer for electrical isolation, conversion, amplification, and filtering of Pt 100 signals to create standard signals
- Optimized temperature measuring range of -50°C to +200°C for increased accuracy
- For 2-, 3- or 4-conductor Pt 100 sensors according to IEC 60751
- Input and output signals can be configured via DIP switches
- 3-way isolation
- Error signaling via diagnostic LED and analog signal
- Power supply possible through the foot element (T-Connector)

Notes:

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

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

Technical data

Input data		
Input signal (can be configured using DIP switches)	Pt 100 (IEC 60751/EN 60751) : 2, 3, 4-conductor	
Temperature range	-50°C ... 200°C (configurable)	
Measuring range span	min. 50 K	
Output data	U output	I output
Output signal	0 ... 5 V / 1 ... 5 V	0 ... 20 mA / 4 ... 20 mA
	0 ... 10 V / 10 ... 0 V	20 ... 0 mA / 20 ... 4 mA
Maximum output signal	Approx. 12.5 V	23 mA
Load R_B	> 10 kΩ	< 500 Ω (at 20 mA)
Ripple	< 20 mV_{PP} (at 10 kΩ)	< 20 mV_{PP} (at 500 Ω)
General data		
Supply voltage U_B	19.2 V DC ... 30 V DC	
Current consumption	< 21 mA (at 24 V DC)	
Power consumption	< 500 mW	
Transmission error for the full/set measurement range	≤ 0.25% ; ((50 K / Δ Temp) + 0.05)%	
Temperature coefficient	< 0.02%/K	
Step response (0 - 99%)	< 200 ms	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 65°C	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5	
GL	GL EMC 2 D	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducer, for Pt 100 temperature sensors				
Order configuration	Screw connection	**MINI MCR-SL-PT100-UI-200**	**2864309**	1
Order configuration	Spring-cage conn.	**MINI MCR-SL-PT100-UI-200-SP**[1])	**2864192**	1
Unconfigured	Screw connection	**MINI MCR-SL-PT100-UI-200-NC**[1])	**2864370**	1
Unconfigured	Spring-cage conn.	**MINI MCR-SL-PT100-UI-200-SP-NC**[1])	**2864202**	1

Order key for MINI MCR-SL-PT100-UI-200 (standard configuration entered as an example)

Order No.	Connection technology	Measuring range [°C] Start	Measuring range [°C] End	Output	Failure information [1])	Factory calibration certificate (FCC)
2864309	**3**	**0**	**100**	**OUT01**	**A**	**NONE**
2864309 ≙ ...-PT100-UI-200	2 ≙ 2-conductor	0	**Range** (increment)	OUT01 ≙ 0...20 mA	A	NONE ≙ without FCC
		-5		OUT02 ≙ 4...20 mA	B	YES ≙ with FCC (a fee is charged)
	3 ≙ 3-conductor	-10		OUT03 ≙ 0...10 V	C	
		-15	0...200 (5 K)	OUT05 ≙ 0...5 V	D	
2864192 ≙ ...-PT100-UI-200-SP	4 ≙ 4-conductor	-20		OUT06 ≙ 1...5 V		YESPLUS ≙ FCC with 5 measuring points (a fee is charged)
		-30		OUT07 ≙ 20...0 mA		
		-40		OUT08 ≙ 20...4 mA		
		-50		OUT09 ≙ 10...0 V		

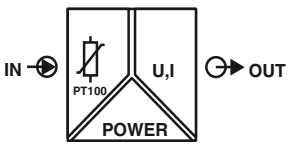
[1]) For explanations, see adjacent text on the right; for further details, see data sheet: www.phoenixcontact.net/products

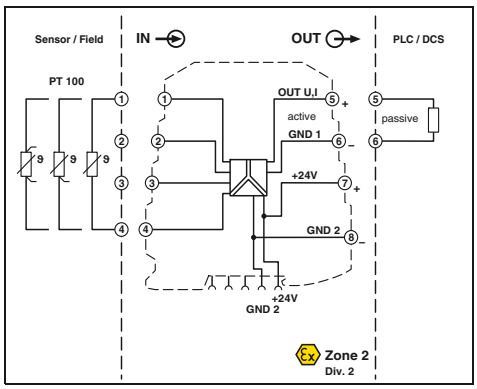
Failure information (depends on the output signal range):

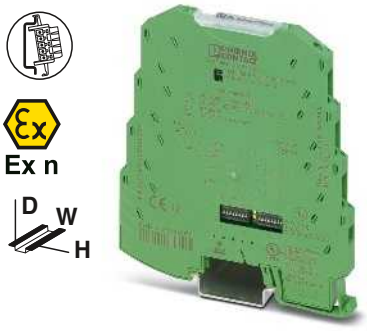
	Overrange			Open circuit		
	0...20 mA	4...20 mA	0...10 V	0...20 mA	4...20 mA	0...10 V
A	20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
B	20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
C	20 mA	20 mA	10 V	21 mA	21 mA	10.5 V
D	20 mA	20 mA	10 V	0 mA	4 mA	0 V

	Underrange			Short circuit		
	0...20 mA	4...20 mA	0...10 V	0...20 mA	4...20 mA	0...10 V
A	0 mA	4 mA	0 V	0 mA	4 mA	0 V
B	0 mA	3.5 mA	0 V	0 mA	3 mA	0 V
C	0 mA	4 mA	0 V	21 mA	21 mA	10.5 V
D	0 mA	4 mA	0 V	0 mA	4 mA	0 V

Temperature
Temperature transducer for Pt 100







Ex n

D W H

Configurable, for a temperature measuring range of -150°C ... +850°C

Ex:

Housing width 6.2 mm

- Highly compact temperature transducer for electrical isolation, conversion, amplification, and filtering of Pt 100 signals to create standard signals
- Temperature measuring range of -150°C to +850°C
- For 2-, 3- or 4-conductor Pt 100 sensors according to IEC 60751
- Input and output signals can be configured via DIP switches
- 3-way isolation
- Error signaling via diagnostic LED and analog signal
- Power supply possible through the foot element (T-Connector)

Notes:

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

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

Technical data

Input data		
Input signal (can be configured using DIP switches)	Pt 100 (IEC 60751/EN 60751) : 2, 3, 4-conductor	
Temperature range	-150°C ... 850°C (configurable)	
Measuring range span	min. 50 K	
Output data	U output	I output
Output signal (configurable using the DIP switch)	0 ... 5 V / 1 ... 5 V	0 ... 20 mA / 4 ... 20 mA
	0 ... 10 V / 10 ... 0 V	20 ... 0 mA / 20 ... 4 mA
Maximum output signal	Approx. 12.5 V	23 mA
Load R_B	≥ 10 kΩ	< 500 Ω (at 20 mA)
Ripple	< 20 mV_{PP} (at 10 kΩ)	< 20 mV_{PP} (at 500 Ω)
General data		
Supply voltage U_B	19.2 V DC ... 30 V DC	
Current consumption	< 21 mA (at 24 V DC)	
Power consumption	< 500 mW	
Transmission error for the full/set measurement range	≤ 0.2% ; ((100 K / set measurement range [K]) + 0.1%)	
Temperature coefficient	< 0.02%/K	
Step response (0 - 99%)	< 160 ms	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 65°C	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5	
GL	GL EMC 2 D	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducer, for Pt 100 temperature sensors				
Order configuration	Screw connection	**MINI MCR-SL-PT100-UI**[1]	**2864435**	1
Order configuration	Spring-cage conn.	**MINI MCR-SL-PT100-UI-SP**	**2864736**	1
Unconfigured	Screw connection	**MINI MCR-SL-PT100-UI-NC**[1]	**2864273**	1
Unconfigured	Spring-cage conn.	**MINI MCR-SL-PT100-UI-SP-NC**[1]	**2864286**	1

Order key for MINI MCR-SL-PT100-UI (standard configuration entered as an example)

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

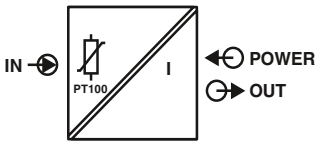
[1] For explanations, see adjacent text on the right; for further details, see data sheet: www.phoenixcontact.net/products

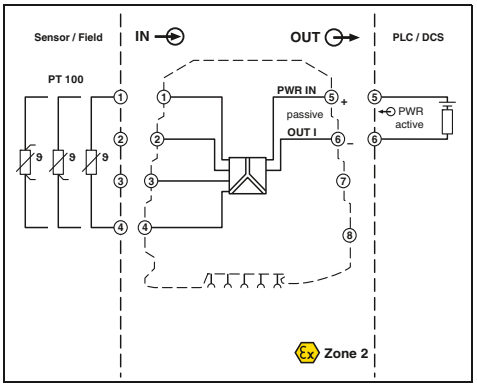
Failure information (depends on the output signal range):

	Overrange			Open circuit		
	0...20 mA	4...20 mA	0...10 V	0...20 mA	4...20 mA	0...10 V
A	20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
B	20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
C	20 mA	20 mA	10 V	21 mA	21 mA	10.5 V
D	20 mA	20 mA	10 V	0 mA	4 mA	0 V

	Underrange			Short circuit		
	0...20 mA	4...20 mA	0...10 V	0...20 mA	4...20 mA	0...10 V
A	0 mA	4 mA	0 V	0 mA	4 mA	0 V
B	0 mA	3.5 mA	0 V	0 mA	3 mA	0 V
C	0 mA	4 mA	0 V	21 mA	21 mA	10.5 V
D	0 mA	4 mA	0 V	0 mA	4 mA	0 V

Temperature
Temperature transducer for Pt 100





Ex n

Configurable, for a temperature measuring range of -150°C ... +300°C, loop-powered

Ex:
Housing width 6.2 mm

- Highly compact loop-powered temperature transducer for electrical isolation, conversion, amplification, and filtering of Pt 100 signals to create standard signals
- Supplied by an output loop
- Does not require any additional auxiliary voltage
- Temperature measuring range of -150°C to +300°C
- 2-, 3- or 4-conductor Pt 100 sensors
- Input signals can be configured via DIP switches
- 2-way isolation
- Error signaling via diagnostic LED and analog signal

Notes:

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

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

Technical data

Input data	
Input signal (can be configured using DIP switches)	Pt 100 (IEC 60751/EN 60751) : 2, 3, 4-conductor
Temperature range	-150°C ... 300°C (configurable)
Measuring range span	min. 50 K
Output data	
Output signal	4 ... 20 mA / 20 ... 4 mA
Maximum output signal	23 mA
Load R_B	($(U_{supply}$ - 12 V) / 22 mA)
Ripple	< 20 mV_{PP} (at 500 Ω)
General data	
Supply voltage U_B	12 V DC ... 30 V DC
Current consumption	< 3.5 mA (without signal current)
Power consumption	< 42 mW (without signal current)
Transmission error for the full/set measurement range	≤ 0.25% ; ((90 K / set measuring range [K]) + 0.05%)
Temperature coefficient	< 0.02%/K
Step response (0 - 99%)	< 200 ms
Electrical isolation	Basic insulation according to EN 61010
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-20°C ... 65°C
Mounting	Any
Housing material	PBT
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12
Conformance / approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5 applied for

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducer, for Pt 100 temperature sensors, loop-powered				
Order configuration	Screw connection	**MINI MCR-SL-PT100-LP**	**2810298**	1
Order configuration	Spring-cage conn.	**MINI MCR-SL-PT100-LP-SP**	**2810382**	1
Unconfigured	Screw connection	**MINI MCR-SL-PT100-LP-NC[1])**	**2810308**	1
Unconfigured	Spring-cage conn.	**MINI MCR-SL-PT100-LP-NC-SP[1])**	**2810395**	1

Order key for MINI MCR-SL-PT100-LP (standard configuration entered as an example)

Order No.	Connection technology	Measuring range [°C] Start	Measuring range [°C] End	Output	Failure information [1])	Factory calibration certificate (FCC)
2810298	**3**	**0**	**100**	**OUT02**	**1**	**NONE**
	2 ≙ 2-conductor	0	**Range**			NONE ≙ without FCC
2810298 ≙		-10	(increment)	OUT02 ≙ 4...20 mA	1	YES ≙ with FCC (a fee is charged)
...-PT100-LP	3 ≙ 3-conductor	-20		OUT08 ≙ 20...4 mA	2	
		-30	0...300 (5 K)		3	
2810382 ≙	4 ≙ 4-conductor	-40			4	YESPLUS ≙ FCC with 5 measuring points (a fee is charged)
...-PT100-LP-SP		-50				
		-100				
		-150				

[1]) For explanations, see adjacent text on the right; for further details, see data sheet: www.phoenixcontact.net/products

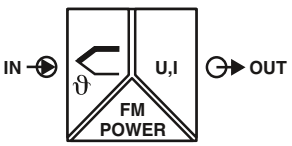
Failure information

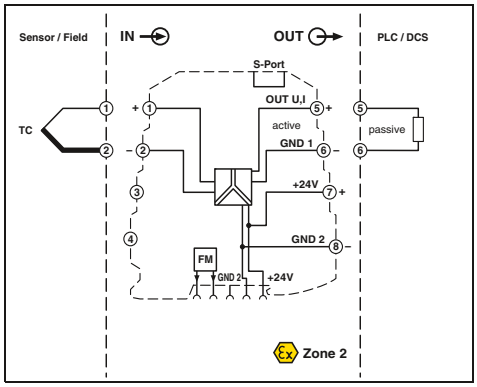
	Overrange	Open circuit
1	-	Start of range
2	21.5 mA	21.5 mA
3	3.5 mA	3.5 mA
4	21.5 mA	21.5 mA

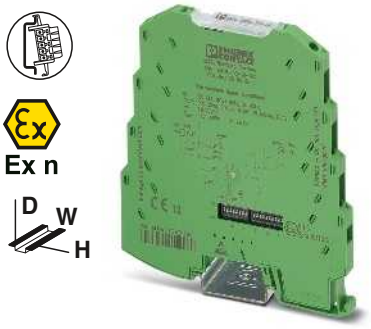
	Underrange	Short circuit
1	-	Start of range
2	21.5 mA	21.5 mA
3	3.5 mA	3.5 mA
4	3.5 mA	3.5 mA

Temperature
Temperature transducers for thermocouples

N







Universal measuring transducer for thermocouples

Housing width 6.2 mm

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
- Configurable via DIP switches and software
- Software available free of charge on the Internet
- Power supply possible through the foot element (T-Connector)
- Supports fault monitoring
- Standard configuration: TC sensor type J IEC 584 TC; cold junction compensation "ON"; -200 ... 1200°C; 4 ... 20 mA output; error evaluation according to NE43 (downscale); fault monitoring contact responds on any error.

Notes:
For information on the programming adapter, refer to page 119
The configuration software can be downloaded from the Internet: www.phoenixcontact.net/products
Information about power bridging, system cabling, and marking components can be found starting at page 88
1) EMC: Class A product, see page 571

Technical data

Input data		
Input signal (can be configured using DIP switches)	B, E, J, K, N, R, S, T, L, U, A-1, A-2, A-3, M, L	
Temperature range	-250°C ... 2500°C (Range depending on the sensor type)	
Measuring range span	min. 50 K	
Output data	U output	I output
Output signal (configurable using the DIP switch)	0 ... 5 V / 1 ... 5 V 0 ... 10 V / 10 ... 0 V	0 ... 20 mA / 4 ... 20 mA 20 ... 0 mA / 20 ... 4 mA
Maximum output signal	Approx. 12.3 V	24.6 mA
No-load voltage		
Short-circuit current		
Load R_B	≥ 10 kΩ	< 500 Ω (at 20 mA)
Ripple	< 20 mV_{PP}	< 20 mV_{PP} (at 500 Ω)
General data		
Supply voltage U_B	9.6 V DC ... 30 V DC	
Current consumption	< 27 mA (at 24 V DC)	
Power consumption	≤ 700 mW (at I_{OUT} = 20 mA, 9.6 V DC, load 500 Ω)	
Transmission error	0.1% * 600 K / set measuring range; 0.1% > 600 K (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)	
Cold junction errors	< 3 K (typ. < 2 K)	
Temperature coefficient	≤ 0.01%/K	
Step response (0 - 99%)	Typ. 400 ms	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 65°C	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized applied for Class I, Div. 2, Groups A, B, C, D T5 applied for	
GL	GL applied for	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Universal temperature transducer for thermocouples			
Standard configuration, Screw connection	**MINI MCR-TC-UI-NC**[1])	**2902851**	1

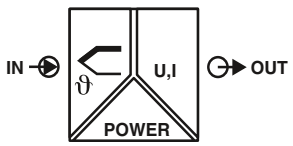
Accessories

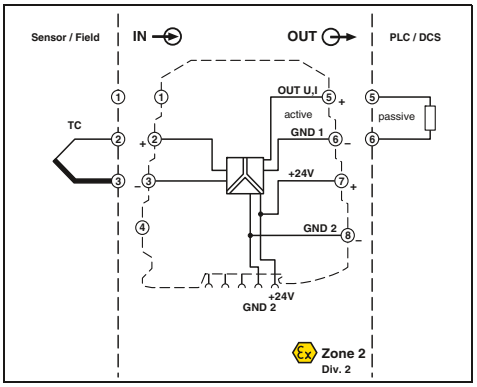
Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**[1])	**2811271**	1

Sensor type	Standard	Measuring range
B	IEC 584-1	+500°C ... +1820°C
E	IEC 584-1	-230°C ... +1000°C
J	IEC 584-1	-210°C ... +1200°C
K	IEC 584-1	-250°C ... +1372°C
N	IEC 584-1	-200°C ... +1300°C
R	IEC 584-1	-50°C ... +1768°C
S	IEC 584-1	-50°C ... +1768°C
T	IEC 584-1	-200°C ... +400°C

Sensor type	Standard	Measuring range
L	DIN 43710	-200°C ... +900°C
U	DIN 43710	-200°C ... +600°C
A-1	GOST 8.585	0°C ... +2500°C
A-2	GOST 8.585	0°C ... +1800°C
A-3	GOST 8.585	0°C ... +1800°C
M	GOST 8.585	-200°C ... +100°C
L	GOST 8.585	-200°C ... +800°C
Customer-specific characteristic curves		

Temperature
Temperature transducer for J- and K-type thermocouples





Configurable, for a temperature measuring range of -150°C ... +1350°C

Ex:

Housing width 6.2 mm

- Highly compact temperature transducer for electrical isolation, conversion, amplification, and filtering of thermocouple signals to create standard signals
- Temperature measuring range of -150°C to +1350°C
- For J and K thermocouples according to IEC 584-1
- Internal cold junction compensation
- Input and output signals can be configured via DIP switches
- 3-way isolation
- Error signaling via diagnostic LED and analog signal
- Power supply possible through the foot element (T-Connector)

Notes:

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

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

Technical data

Input data		
Input signal (can be configured using DIP switches)	Thermocouples type J, K (IEC 584-1)	
Temperature range	Typ J : -150°C ... 1200°C (configurable) Typ K : -150°C ... 1350°C	
Measuring range span	min. 50 K	
Output data	U output	I output
Output signal (configurable using the DIP switch)	0 ... 5 V / 1 ... 5 V 0 ... 10 V / 10 ... 0 V	0 ... 20 mA / 4 ... 20 mA 20 ... 0 mA / 20 ... 4 mA
Maximum output signal	Approx. 12.5 V	23 mA
No-load voltage		Approx. 12.5 V
Short-circuit current		Approx. 10 mA
Load R_B	≥ 10 kΩ	< 500 Ω (at 20 mA)
Ripple	< 20 mV_{PP} (at 10 kΩ)	< 20 mV_{PP} (at 500 Ω)
General data		
Supply voltage U_B	19.2 V DC ... 30 V DC	
Current consumption	< 25 mA (at 24 V DC)	
Power consumption	< 500 mW	
Transmission error for the full/set measurement range	≤ 0.2% ; ((150 K / set measurement range [K]) + 0.1%)	
Cold junction errors	< 3 K (typ. < 2 K)	
Temperature coefficient	< 0.02%/K	
Step response (0 - 99%)	< 30 ms	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 65°C	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5	
GL	GL EMC 2 D	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducer, for thermocouples				
Order configuration	Screw connection	**MINI MCR-SL-TC-UI**[1]	**2864448**	1
Unconfigured	Screw connection	**MINI MCR-SL-TC-UI-NC**[1]	**2864299**	1

Order key for MINI MCR-SL-TC-UI (standard configuration entered as an example)

Order No.	Sensor type	Measuring range [°C] Start	Measuring range [°C] End	Output	Failure information [1]	Factory calibration certificate (FCC)
2864448	**J**	**0**	**1000**	**OUT01**	**A**	**NONE**
	J ≙ Type J	0	**Range**	OUT01 ≙ 0...20 mA	A	NONE ≙ without FCC
		-10	(increment)	OUT02 ≙ 4...20 mA	B	YES ≙ with FCC (a fee is charged)
	K ≙ Type K	-20		OUT03 ≙ 0...10 V	C	
		-30		OUT05 ≙ 0...5 V	D	
		-40	0 ... 300 (10 K)	OUT06 ≙ 1...5 V		YESPLUS ≙ FCC with 5 measuring points (a fee is charged)
		-50	320 ... 700 (20 K)	OUT07 ≙ 20...0 mA		
		-100	750...1350 (50 K)	OUT08 ≙ 20...4 mA		
		-150		OUT09 ≙ 10...0 V		

[1]) For explanations, see adjacent text on the right; for further details, see data sheet: www.phoenixcontact.net/products

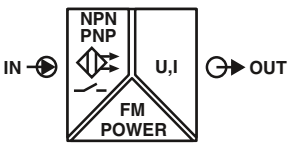
Failure information (depends on the output signal range):

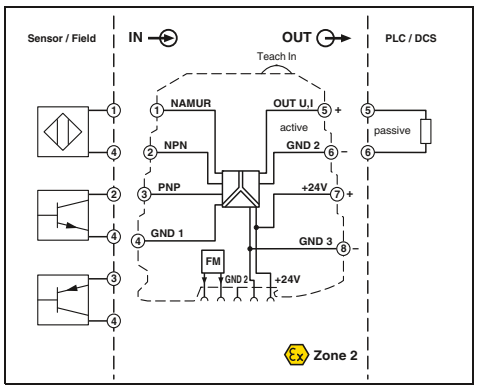
	Overrange			Open circuit		
	0...20 mA	4...20 mA	0...10 V	0...20 mA	4...20 mA	0...10 V
A	20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
B	20.5 mA	20.5 mA	10.25 V	21 mA	21 mA	10.5 V
C	20 mA	20 mA	10 V	21 mA	21 mA	10.5 V
D	20 mA	20 mA	10 V	0 mA	4 mA	0 V

	Underrange		
	0...20 mA	4...20 mA	0...10 V
A	0 mA	4 mA	0 V
B	0 mA	3.5 mA	0 V
C	0 mA	4 mA	0 V
D	0 mA	4 mA	0 V

Frequency
Frequency transducers
For up to 80 kHz

N





Ex n

D W H

Frequency transducer for up to 80 kHz

Housing width 6.2 mm

Configurable 3-way isolated frequency transducer.

- 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
- The device is configured via DIP switches
- Frequency range is freely adjustable via a press/slide button ("teach-in wheel")
- Supports fault monitoring
- Standard configuration: NAMUR sensor; mean-value generation "OFF"; 0.002 Hz ... 20 kHz frequency range; 4 ... 20 mA output; error evaluation NE43 (downscale); fault monitoring contact responds on any error

Notes:

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

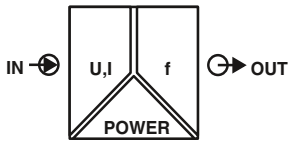
Technical data

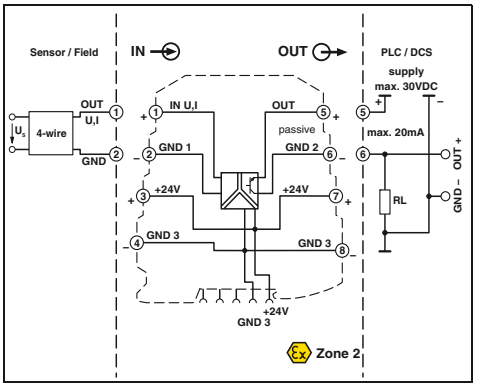
Input data		
Input sources	NPN/PNP transistor outputs NAMUR initiators Floating relay contact (dry contact)	
Frequency measuring range	0.002 Hz ... 20 kHz (DIP switch) 0.002 Hz ... 80 kHz (Teach-in wheel)	
Maximum input signal	30 V (incl. DC voltage)	
Output data	U output	I output
Output signal	0 ... 5 V / 1 ... 5 V 0 ... 10 V / 10 ... 0 V	0 ... 20 mA / 4 ... 20 mA 20 ... 0 mA / 20 ... 4 mA
Maximum output signal	Approx. 12.3 V	24.6 mA
Load R_B	≥ 10 kΩ	500 Ω (at 20 mA)
Ripple	< 20 mV_{PP}	< 20 mV_{PP} (at 500 Ω)
General data		
Supply voltage U_B	9.6 V DC ... 30 V DC	
Power consumption	< 800 mW (at I_{OUT} = 20 mA, 9.6 V DC, load 500 Ω)	
Transmission error of the full measuring span	0.1%	
Temperature coefficient	0.01%/K	
Step response (0 - 99%)	< 35 ms (At f > 500 Hz)	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature (operation)	-20°C ... 65°C	
Mounting	Any	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized applied for Class I, Div. 2, Groups A, B, C, D T5 applied for	
GL	GL applied for	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MCR frequency transducers				
Standard configuration	Screw connection	**MINI MCR-SL-F-UI-NC[1])**	**2902832**	1
Standard configuration	Spring-cage conn.	**MINI MCR-SL-F-UI-SP-NC[1])**	**2902833**	1

Frequency
Analog-frequency transducer





Ex n

Configurable, frequency and PWM output

Ex:

Housing width 6.2 mm

- Highly compact analog-to-frequency transducer for electrical isolation, amplification, conversion, and filtering of standard signals to create frequencies or PWM signals
- Configurable interference filter
- Input and output signals can be configured via DIP switches
- 3-way isolation
- Error signaling via diagnostic LED and analog signal
- Power supply possible through the foot element (T-Connector)
- PWM output of 5 ... 95%

Notes:

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

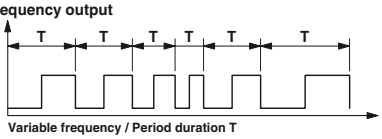
Technical data

Input data		
Input signal (configurable using the DIP switch)	U input	I input
	0 ... 5 V / 1 ... 5 V	0 ... 20 mA / 4 ... 20 mA
	0 ... 10 V / 2 ... 10 V	0 ... 10 mA / 2 ... 10 mA -
Maximum input signal	30 V DC	100 mA
Input resistance	Approx. 110 kΩ	Approx. 50 Ω
Output data	Frequency output	PWM output
Output signal (can be configured using DIP switches)	0 Hz ... 10 kHz / 0 Hz ... 5 kHz	7.8 kHz (10 bit) / 3.9 kHz (10 bit)
	0 Hz ... 2.5 kHz / 0 Hz ... 1 kHz	1.9 kHz (12 bit) / 977 Hz (12 bit)
	0 Hz ... 500 Hz / 0 Hz ... 250 Hz	488 Hz (14 bit) / 244 Hz (14 bit)
	0 Hz ... 100 Hz / 0 Hz ... 50 Hz	122 Hz (16 bit) / 61 Hz (16 bit)
Minimum load	4 mA ≤ (U_L / R_L) ≤ 20 mA	12 mA ≤ (U_L / R_L) ≤ 20 mA
Maximum load current	20 mA	
Maximum switching voltage	30 V	
Overrange/underrange	Can be set (via DIP switch)	
Protective circuit	Short-circuit protection, polarity reversal protection	
General data		
Supply voltage U_B	19.2 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	< 10 mA (at 24 V DC)	
Power consumption	< 200 mW	
Maximum transmission error	≤ 0.1% (> 7 kHz ≤ 0.2%)	
Temperature coefficient	< 0.02%/K	
Step response (0 - 99%)	< 15 ms (+ (1/f) smallest filter)	
	< 1 s (+ (1/f) largest filter)	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature (operation)	-20°C ... 65°C	
Mounting	Any	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5 applied for	
GL	GL EMC 2 D	

Ordering data

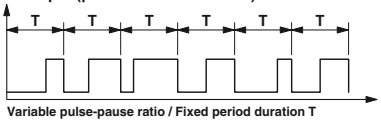
Description	Type	Order No.	Pcs. / Pkt.
MCR frequency transducer			
Screw connection	**MINI MCR-SL-UI-F[1])**	**2864082**	1
Spring-cage conn.	**MINI MCR-SL-UI-F-SP[1])**	**2810243**	1

Frequency output



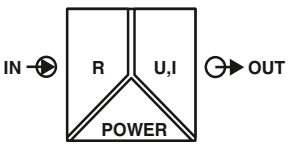
Variable frequency / Period duration T

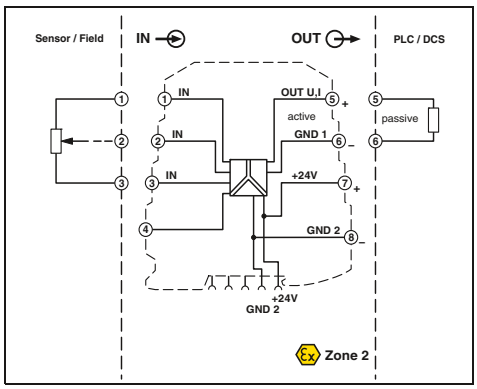
PWM output (pulse width modulation)

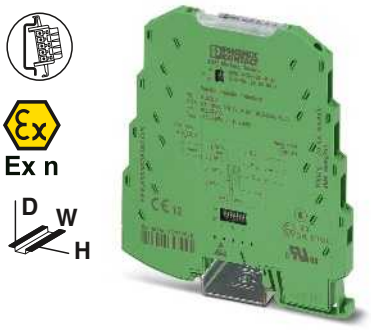


Variable pulse-pause ratio / Fixed period duration T

Potentiometer
Potiposition transducer







Ex n

D W H

Configurable, automatic potentiometer detection

Ex:

Housing width 6.2 mm

- Highly compact potiposition transducer for electrical isolation, conversion, amplification, and filtering of potentiometer signals to create standard signals
- Automatic potentiometer detection without manual adjustment
- For potentiometers from 100 Ω to 100 kΩ
- Configurable measuring range and output signals
- A potentiometer sub-range can be linearized via the "teach-in" switch on the device
- Input and output signals can be configured via DIP switches
- 3-way isolation
- Error signaling via diagnostic LED and analog signal
- Power supply possible through the foot element (T-Connector)

Notes:

Information about power bridging, system cabling, and marking components can be found starting at page 88

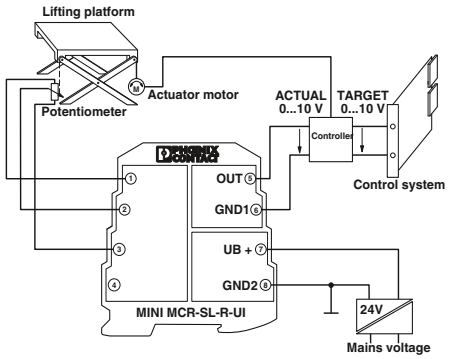
1) EMC: Class A product, see page 571

Technical data

Input data		
Potentiometer	100 Ω ... 100 kΩ	
Reference voltage source	< 3.6 V	
Output data	U output	I output
Output signal	0 ... 5 V / 1 ... 5 V 0 ... 10 V / 10 ... 0 V	0 ... 20 mA / 4 ... 20 mA 20 ... 0 mA / 20 ... 4 mA
Maximum output signal	12.5 V	23 mA
No-load voltage		Approx. 12.5 V
Short-circuit current	Approx. 10 mA	
Load R_B	> 10 kΩ	< 500 Ω (20 mA)
Ripple	< 20 mV_{PP} (at 10 kΩ)	< 20 mV_{PP} (at 500 Ω)
Behavior in the event of a sensor error	0% ... 105% (configurable)	
General data		
Supply voltage U_B	19.2 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	< 25 mA (at 24 V DC)	
Power consumption	< 500 mW	
Maximum transmission error	< 0.2%	
Temperature coefficient	< 0.02%/K	
Step response (0 - 99%)	< 30 ms	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature (operation)	-20°C ... 65°C	
Mounting	Any	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5 applied for	
GL	GL EMC 2 D	

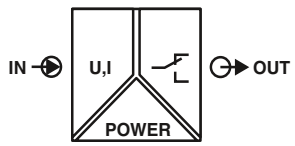
Ordering data

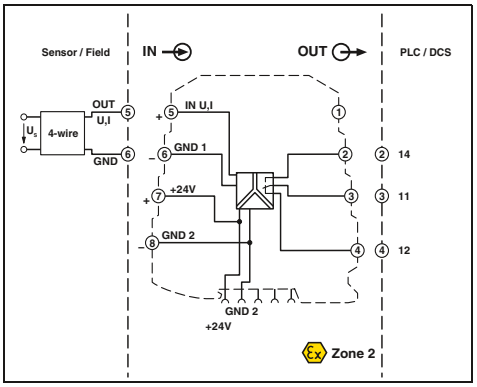
Description	Type	Order No.	Pcs. / Pkt.
MCR potiposition transducer			
Screw connection	**MINI MCR-SL-R-UI**[1]	**2864095**	1
Spring-cage conn.	**MINI MCR-SL-R-UI-SP**[1]	**2810256**	1

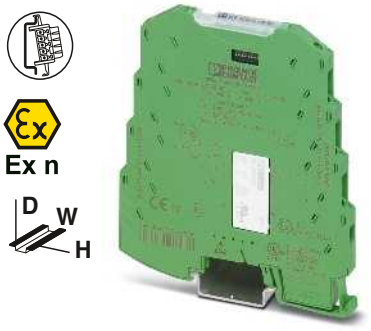


Height adjustment of a lifting platform with setpoint and actual value control

Limit values
Threshold value switch







Ex n

D W H

Configurable, with relay PDT output

Ex:

Housing width 6.2 mm

- Highly compact threshold value switch for switching analog limit values
- Input signal, hysteresis, and delay time can be configured via DIP switches
- Limit value can be freely adjusted via potentiometer on front
- 3-way isolation
- PDT relay at output
- Operating current/quiescent current switchover
- Status and error signaling via two diagnostic LEDs
- Power supply possible through the foot element (T-Connector)

Notes:

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

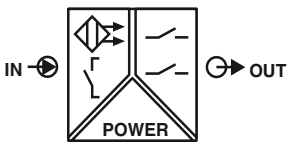
Technical data

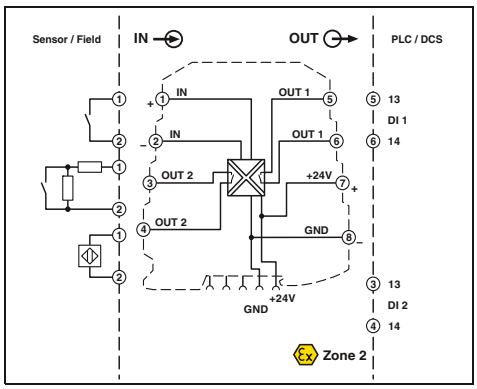
Input data	U input	I input
Input signal (configurable using the DIP switch)	0 ... 10 V	0 ... 20 mA
Maximum input signal	30 V	100 mA
Input resistance	> 100 kΩ	50 Ω
Specification of the switching point	With 25-speed potentiometer	
Switching output		
Relay output	1 PDT	
Contact material	$AgSnO_2$, hard gold-plated	
Max. switching voltage	250 V AC	
Limiting continuous current	2 A	
Hysteresis (configurable using the DIP switch)	(0.1%; 1%; 2.5%; 5%)	
Operating and closed circuit current behavior	Switchable using DIP switch	
Setting range of the response delay (configurable using the DIP switch)	0 s ... 10 s (0 s; 1 s; 2 s; 3 s; 4 s; 6 s; 8 s; 10 s)	
General data		
Supply voltage U_B	19.2 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	< 14 mA (at 24 V DC)	
Power consumption	< 330 mW (at 24 V DC)	
Linearity error	< 0.05% (of final value)	
Temperature coefficient	< 0.02%/K	
Step response (0 - 99%)	< 35 ms	
Electrical isolation	Basic insulation according to EN 61010	
Test voltage input/power supply	1.5 kV AC (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature (operation)	-20°C ... 65°C	
Mounting	Any	
Housing material	PBT	
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 26 - 12	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA nC IIC T4 Gc X	
UL, USA / Canada	UL 508 Recognized	
UL, USA	Class I, Zone 2, AEx nC IIC T6	
UL, Canada	Class I, Zone 2, Ex nC IIC T6	
GL	GL EMC 2 D	

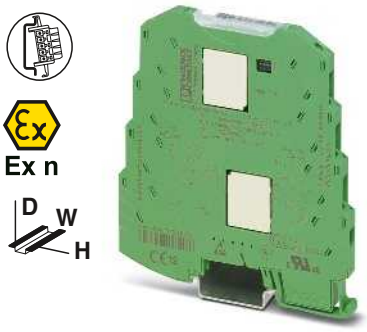
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR threshold value switch			
Screw connection	**MINI MCR-SL-UI-REL**[1])	**2864480**	1
Spring-cage conn.	**MINI MCR-SL-UI-REL-SP**[1])	**2864493**	1

Digital IN
NAMUR isolation amplifiers







Configurable, for NAMUR sensors and floating contacts

Ex:
Housing width 6.2 mm

- Highly compact isolation amplifier 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
- Input and output signals can be configured via DIP switches
- N/O contacts at output
- Second output can be used as a doubler or error signaling output
- 3-way isolation
- Switchover between operating current and quiescent current (inverted switching behavior)
- Error signaling via diagnostic LED and analog signal
- Power supply possible through the foot element (T-Connector)

Notes:

Information about power bridging, system cabling, and marking components can be found starting at page 88

1) EMC: Class A product, see page 571

Technical data

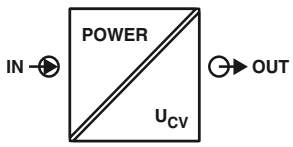
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Open circuit switch contacts Switch contacts with resistance circuit
Control circuit	
No-load voltage	8.2 V DC ±10%
Switching points (according to IEC 60947-5-6)	< 1.2 mA (blocking) > 2.1 mA (conductive)
Line error detection	> 6 mA (in the event of a short-circuit) < 0.35 mA (With wire break)
Switching output	
Relay output	2 N/O contacts
Contact material	Hard gold plated AgNi
Maximum switching voltage	250 V AC
Maximum switching current	2 A
Minimum contact current	1 mA (for 5 V DC)
Switching frequency	0.5 Hz (240 V AC / 30 V DC / 2 A) 10 Hz (without load)
General data	
Supply voltage U_B	19.2 V DC ... 30 V DC
Nominal supply voltage	24 V DC
Current consumption	< 25 mA
Power consumption	< 600 mW
Electrical isolation	Basic insulation according to EN 61010
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-20°C ... 65°C
Mounting	Any
Housing material	PBT
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 26 - 12
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 12
Conformance / approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA nC IIC T4 Gc X
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5 applied for
GL	GL EMC 2 D

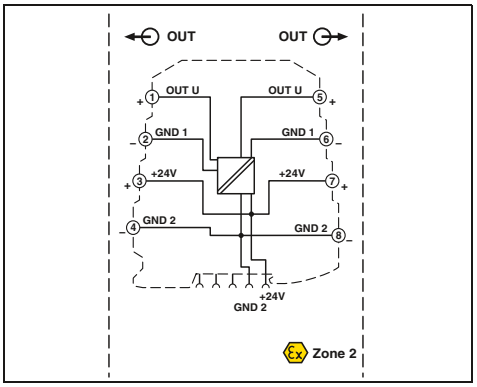
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR NAMUR switching amplifier			
Screw connection	**MINI MCR-SL-NAM-2RNO[1])**	**2864105**	1
Spring-cage conn.	**MINI MCR-SL-NAM-2RNO-SP[1])**	**2810269**	1

N

Accessories
Constant voltage source





Ex n

Configurable,
output signals 2.5 V / 5 V / 7.5 V / 10 V

Ex:
Applied for: cUL / UL
Housing width 6.2 mm

- Constant voltage source for potentiometers, measuring bridges, encoders
- Highly precise
- Input signal corresponds to power supply
- Input signal and, in turn, the power supply can be provided via the foot element (T-Connector)
- Standard configuration: Output 10 V DC

Notes:

Information on components for power bridging, system cabling, and marking can be found in the INTERFACE catalog or at www.phoenixcontact.net/products

1) EMC: Class A product, see page 571

Technical data

Input data	
Input signal	9.6 ... 30 V
Output data	
Output signal (can be configured using DIP switches)	10 V DC 7.5 V DC 5 V DC 2.5 V DC
Short-circuit current	Approx. 32 mA
Ripple	< 20 mV_{PP}
General data	
Supply voltage U_B	9.6 V DC ... 30 V DC
Power consumption	< 600 mW (at 24 V IN)
Maximum transmission error	≤ 0.1% (of final value)
Temperature coefficient	< 0.01%/K, typ. < 0.002%/K
Electrical isolation	Basic insulation according to EN 61010
Test voltage input/output	1.5 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature (operation)	-20°C ... 65°C
Housing material	PBT
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 26 - 12
Spring-cage connection (solid/stranded/AWG)	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 12
Conformance / approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5

Ordering data

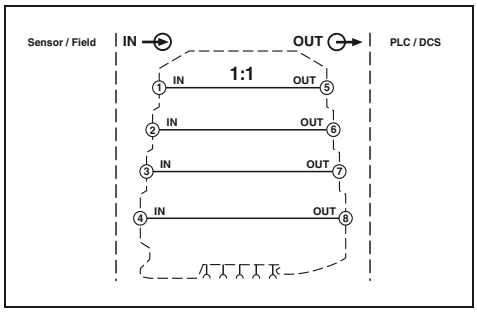
Description		Type	Order No.	Pcs. / Pkt.
MCR constant voltage source				
With screw connection	Screw connection	**MINI MCR-SL-CVS-24-5-10-NC[1])**	**2902822**	1
With spring-cage connection	Spring-cage conn.	**MINI MCR-SL-CVS-24-5-10-SP-NC[1])**	**2902823**	1

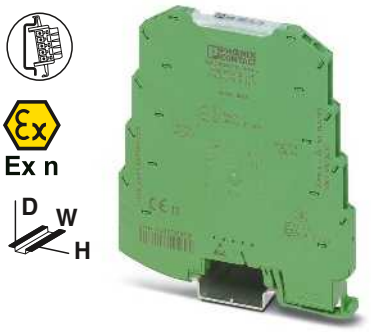
Accessories

Setpoint potentiometer, 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
Feed-through terminal blocks

– Feed-through terminal block for 1:1 forwarding of signals in the MINI Analog group
– For plugging gaps in system cabling with the V8 system adapter, e.g., when there are fewer than eight signals
– Used in conjunction with the MINI Analog multiplexer
– For direct mounting in the case of applications without signal conversion and without electrical isolation





1:1 connection

Technical data

General data	
Degree of protection	IP20
Ambient temperature (operation)	-20°C ... 65°C
Mounting	Any
Housing material	PBT
Dimensions W / H / D	6.2 / 93.1 / 102.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 12
Conformance / approvals	
ATEX	II 3 G Ex nA IIC T4 Gc X
GL	GL EMC 2 D

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MINI Analog feed-through terminal block Screw connection	**MINI MCR-SL-TB**	**2811420**	1

Accessories
Marking material

– Flexible labeling system with pivoting transparent cover and matching insert strips
– Transparent cover that can be snapped onto the module instead of the standard cover
– Insert strips on pre-punched paper sheets
– Marking option for standard cover in the form of ZBF 6 zack marker strip marking labels

Transparent cover with insert strips

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Fold-up transparent cover, for labeling MINI Analog modules with insert strips	**MINI MCR DKL**	**2308111**	10

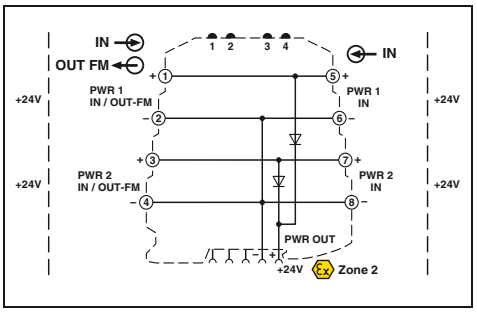
Accessories

Insert strips, stamped, for transparent cover	**MINI MCR-DKL-LABEL**	**2810272**	10
Zack marker strip, flat **UniCard sheets,** for marker groove	**ZBF 6 (see Catalog 5)** **UC-TMF 6 (see Catalog 5)**		

Accessories
Power terminals

N

- For up to 80 MINI Analog modules
- The MINI MCR-SL-PTB-FM(-SP) power terminal block is used to supply the supply voltage to the DIN rail connector
- Monitoring of supplies in combination with the fault monitoring module
- Flexible redundant supply from one or both module sides
- Extended supply voltage range from 0 ... 30 V DC



Ex n

D W H

Power terminal block, can be monitored

Notes:

1) EMC: Class A product, see page 571

Technical data

Input data	
Input voltage range	0 V DC ... 30 V DC
Output data	
Output voltage	(Input voltage - 0.8 V)
Output current	≤ 2 A
General data	
Ambient temperature (operation)	-20°C ... 65°C
Conformance / approvals	
Conformance	CE-compliant
ATEX	Ⓔx II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada	UL 508 Recognized applied for Class I, Div. 2, Groups A, B, C, D T5 applied for
GL	GL applied for

Ordering data

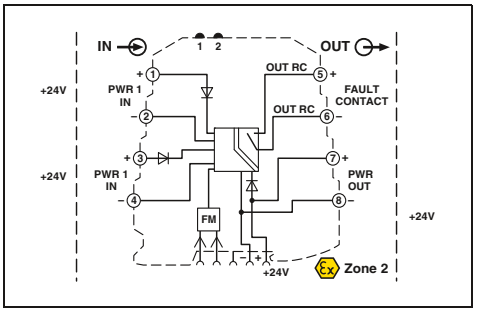
Description	Type	Order No.	Pcs. / Pkt.
MINI Analog power terminal blocks			
	MINI MCR-SL-PTB-FM[1])	**2902958**	1
	MINI MCR-SL-PTB-FM-SP[1])	**2902959**	1

Accessories
Error message modules

N

Fault monitoring module for evaluating and reporting group errors from the fault monitoring system.

- Monitoring of supply voltages of MINI MCR-SL-PTB-FM(-SP) power terminal blocks
- Drawing off the supply is possible
- The error is reported via an N/C contact
- Standard configuration: group error detection “ON”; redundancy monitoring “ON”; relay “active”



Ex n

D W H

Group error message and Supply monitoring

Notes:

1) EMC: Class A product, see page 571

Technical data

Input data/output data	
Input signal	9.6 V DC ... 30 V DC
Output signal	9.6 V DC ... 30 V DC
Output signal maximum current	2 A
Switching output	
Maximum switching voltage	30 V DC
Maximum switching current	50 mA
Test voltage input/output	1.5 kV AC (50 Hz, 1 min.)
Conformance / approvals	
Conformance	CE-compliant
ATEX	Ⓔx II 3 G Ex nA nC IIC T4 Gc X
UL, USA / Canada	UL 508 Recognized applied for Class I, Div. 2, Groups A, B, C, D T5 applied for
GL	GL applied for

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MINI Analog error message modules				
Standard configuration	Screw connection	**MINI MCR-SL-FM-RC-NC[1])**	**2902961**	1
Standard configuration	Spring-cage conn.	**MINI MCR-SL-FM-RC-SP-NC[1])**	**2902962**	1

Accessories
ME 6,2 TBUS... T-Connector

– For bridging the supply voltage
– Reduces wiring costs
– Module can be replaced without interrupting the supply to the remaining modules (hot swap)
– One T-Connector for two MINI Analog modules
– Current carrying capacity of 2 A to MINI Analog modules

For bridging the supply voltage

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
DIN rail connector (TBUS), for bridging the supply voltage, can be snapped onto 35 mm DIN rails as per EN 60715, with UL approval	**ME 6,2 TBUS-2 1,5/5-ST-3,81 GN**	**2869728**	10

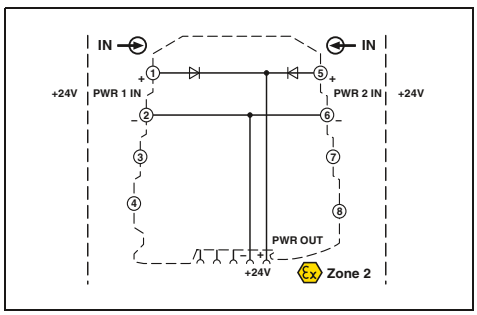
Accessories
Power terminals

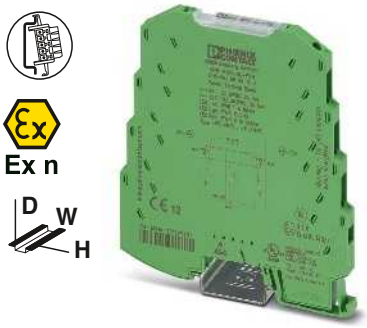
– For supplying the supply voltage via the foot element (T-Connector) where DC voltages of up to 30 V are already available
– Option of redundant supply decoupled from diode
– For up to 80 MINI analog modules
– For up to 2 A
– Status and error signaling via diagnostic LEDs

Notes:

Recommended fuse for power terminal block:
Fuse according to IEC 60127-2/V
Nominal current: 2.5 A
Characteristics: Slow-blow
(e.g., Wickmann 5 x 20 mm/No. 195 - glass fuse)

1) EMC: Class A product, see page 571





Redundant supply for existing 24 V

Technical data

Input data	
Input voltage range	20 V DC ... 30 V DC
Output data	
Output voltage	(Input voltage - 0.8 V)
Output current	≤ 2 A
General data	
Ambient temperature (operation)	-20°C ... 65°C
Housing material	PBT
Conformance / approvals	
Conformance	CE-compliant
ATEX	Ⓔx II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5
GL	GL EMC 2 D

Ordering data

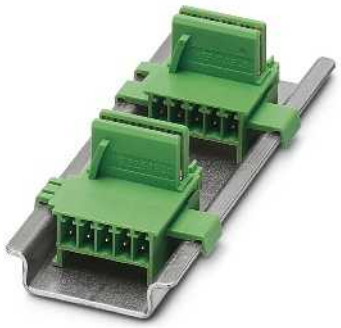
Description	Type	Order No.	Pcs. / Pkt.
MCR power terminal block			
	MINI MCR-SL-PTB[1])	**2864134**	1
	MINI MCR-SL-PTB-SP[1])	**2864147**	1

Accessories
ME 17,5 TBUS-...T-Connector

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

Notes:

If the system power supply is used, you need two ME 17,5 TBUS T-Connectors to establish the connection with the ME 6,2 TBUS T-Connectors of the MINI Analog system and provide an effective power supply.



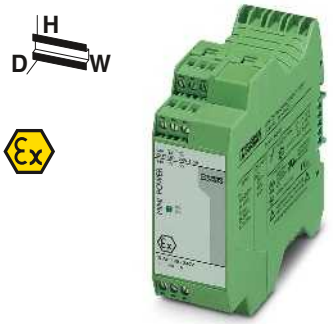
For system power supply

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
DIN rail connector, for bridging the supply voltage, can be snapped onto 35 mm DIN rails as per 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 foot element (T-Connector) where AC voltages are available
– 100 ... 240 V AC nominal input voltage range
– 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

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
System power supply unit, primary-switched with zone 2 approval. More information is given in the INTERFACE Power Supply catalog part.	**MINI-PS-100-240AC/24DC/1.5/EX**	**2866653**	1
System power supply unit, primary-switched (not for zone 2). More information is given in the INTERFACE Power Supply catalog part.	**MINI-SYS-PS-100-240AC/24DC/1.5**	**2866983**	1

Accessories
System cabling

A high number of channels enables analog signal transmission across 6 mm in a confined space for many applications. In this kind of context, in particular, it is really important to have access to wiring solutions that avoid errors and are time-efficient, thereby cutting costs.

The MINI Analog system cabling solution allows you to wire up to eight channels quickly, easily, and without errors.

System cabling can take various forms.

System cabling with a front adapter

This includes:

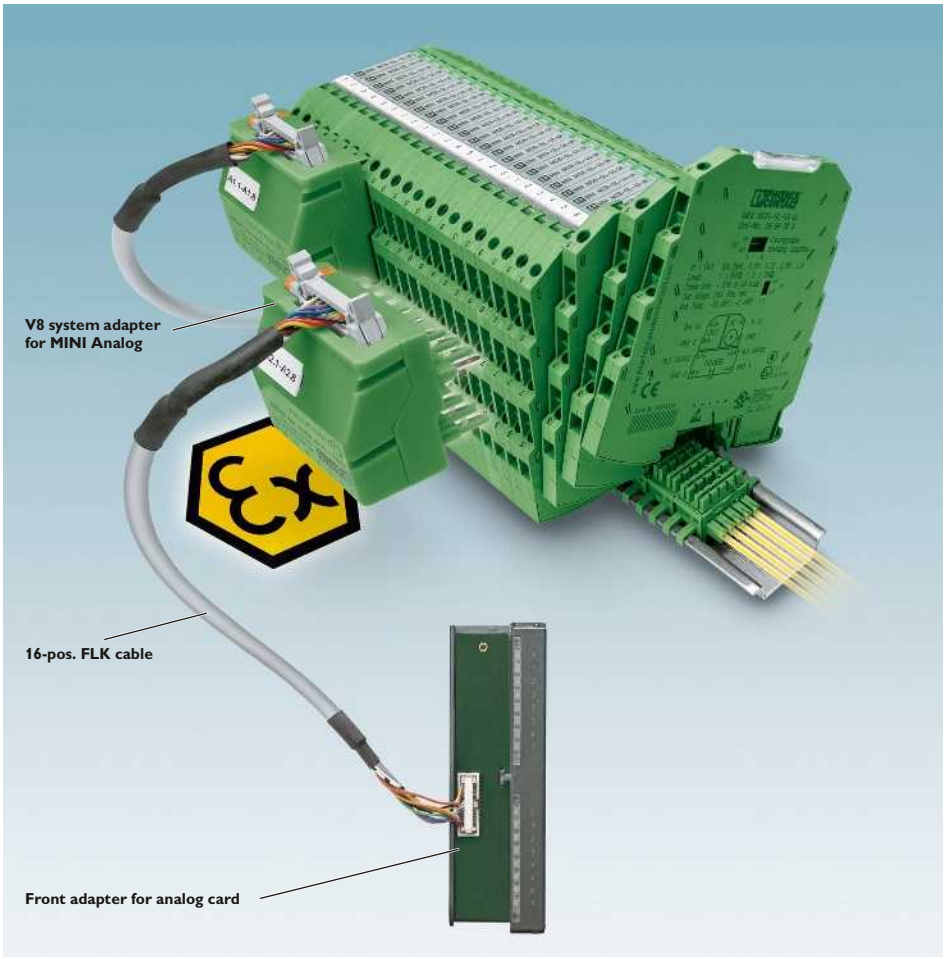
– A 16-pos. FLK cable
– The V8 system adapter for MINI Analog modules
– A front adapter that needs to be specifically selected based on the analog card of the controller

With this solution, all you need to do is connect the components together. There is virtually no wiring effort involved. What's more, it completely rules out wiring errors, as the pre-assembled components ensure correct assignment by virtue of their design.

System cabling without a front adapter

The version that does not require the use of a front adapter is the ideal addition.

This solution involves using a 16-pos. FLK cable with open ends on one side. The open ends are fitted with ferrules and are numbered. This allows you to create a system cabling connection to virtually any module without having to fit a front adapter. The other advantage is that you can implement system cabling on the module side quickly, easily, and without errors.

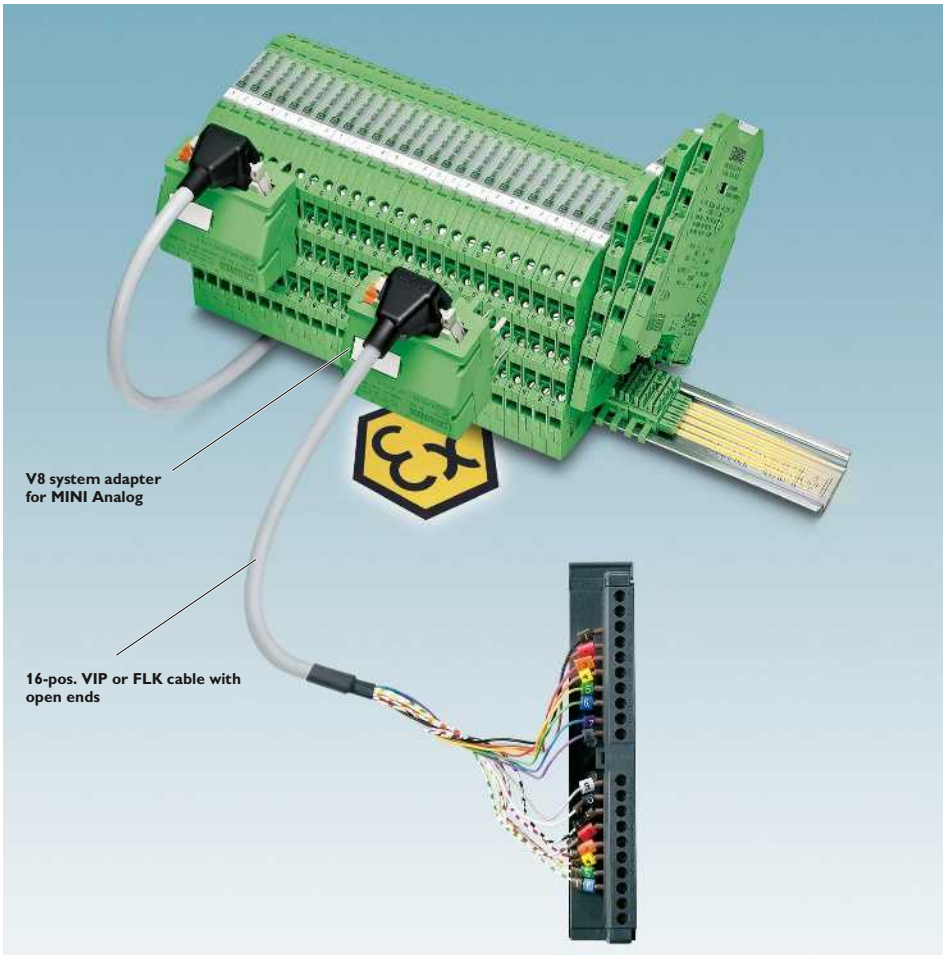


System cabling with a front adapter

The tables below are designed to serve as a configuration aid. Details of other solutions are available on the Internet or on request.

Configuration aid for MINI Analog system cabling

Controller	Analog card	Front adapter	FLK cable	V8 system adapter for MINI Analog
Siemens SIMATIC S7-300 / ET 200 M	6ES7-331-7KF02-0AB0 6ES7-331-7KB02-0AB0 6ES7-331-7KB81-0AB0 6ES7-331-7TF00-0AB0 6ES7-332-8TF01-0AB0	**FLKM 16-PA-S300/MINI-MCR** (in the catalog on page 454)	**FLK 16/EZ-DR/.../KONFEK** (non-molded plugs, in the catalog on page 506)	**MINI MCR-SL-V8-FLK 16-A** (in the catalog on page 94)
	6ES7-331-1KF01-0AB0 (for current signals)	**FLKM 16-PA-331-1KF/I/MINI-MCR** (in the catalog on page 455)		
	6ES7-331-5HF00-0AB0 (for current signals)	**FLKM 16-PA-332-5HF/I/MINI-MCR** (in the catalog on page 455)		
Yokogawa Centum CS 3000 R3	AAI 141 AAI 143	Not required	**CABLE-40/2/FLK16/.../YUC** (non-molded plugs, in the catalog on page 467)	**2 x MINI MCR-SL-V8-FLK 16-A** (in the catalog on page 94)
Miscellaneous controllers / actuators / sensors	All cards	Not required	**CABLE-FLK16/OE/0,14/...M** (non-molded plugs, in the catalog on page 502) or alternatively **VIP-CAB-FLK16/FR/OE/0,14/...M** (molded plugs, in the catalog on page 502)	**MINI MCR-SL-V8-FLK 16-A** (in the catalog on page 94)



System cabling without a front adapter

Innovative concept

Thanks to its innovative design concept, the MINI MCR-SL-V8-FLK 16 A MINI Analog system adapter can be used on both the input and output side. Consequently, there is nothing at all to prevent you from using the same components for system cabling on both output and input modules.

Complete flexibility

The proven FLK cable series offers complete flexibility in terms of selection and is the ideal solution for system cabling with a front adapter. The flat and flexible plug connections mean that the products can be easily installed in any analog module.

Increased protection

The new VIP cables with molded FLK plugs offer enhanced protection in harsh industrial environments. If you opt for system cabling without a front adapter, you can enjoy all the advantages of the new VIP cables on the system adapter side.

Addition

If the application demands a form of system cabling with fewer than eight channels, the MINI MCR-SL-TB feed-through terminal block (page 88) represents the perfect addition.

Plug-in connection

Innovative concept

Complete flexibility

Increased protection

Addition

Accessories
MINI Analog system adapter

– Time-saving wiring solution thanks to unique plug-in concept
– System cabling on PLC side
– Plug and play
– For up to eight channels
– Reduces wiring costs and errors

Ex n

System adapter

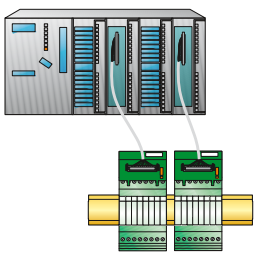
Ex:
Housing width 50.4 mm

Technical data

General data	
Contact resistance	< 10 mΩ
Current carrying capacity	≤ 1 A
Test voltage	500 V (50 Hz, 1 min. from channel to channel)
Vibration resistance	≤ 0.7 g
Surge voltage category / Pollution degree	III / 2
Ambient temperature (operation)	-20°C ... 60°C
Housing material	PBT
Dimensions W / H / D	50.4 / 46.2 / 45.5 mm
Connection to the signal level	Flat-ribbon cable plug connector according to IEC 60603-13
Insertion/withdrawal cycles (System adapter / FLK 16)	10 / ≥ 200
Conformance / approvals	
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada	UL 508 Recognized Class I, Div. 2, Groups A, B, C, D T5 applied for
GL	GL EMC 2 D

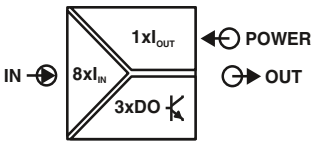
Ordering data

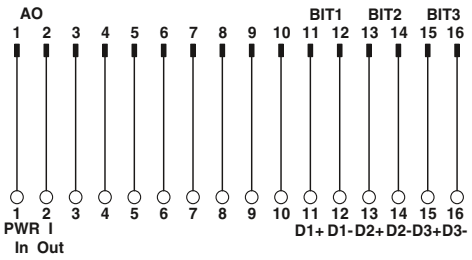
Description	Type	Order No.	Pcs. / Pkt.
System adapter, for MINI analog modules with screw connection	**MINI MCR-SL-V8-FLK 16-A**	**2811268**	1



MINI Analog system cabling

Accessories
MINI Analog multiplexer





FLK pin strip assignment

Ex:
Housing width 50.4 mm

- Generates an analog output from up to eight analog input signals – parallel analog signals are transmitted serially via a cable
- The desired number of channels is selected via DIP switches (8, 6, 4 or 2 channels)
- The channel currently switched is indicated as a bit pattern via three digital outputs
- Two clock cycles for execution can be selected via DIP switches (one- or two-second clock)
- Supplied by an output loop
- For 4 ... 20 mA current signals
- Can be easily snapped onto MINI Analog modules with screw connection method
- Huge reduction in analog inputs at controllers
- System cabling on the output side using pre-assembled FLK cables with open ends.

Notes:

For six, four or two channels you will also need the corresponding number of feed-through terminal blocks (i.e., two, four or six).

1) EMC: Class A product, see page 571

Technical data

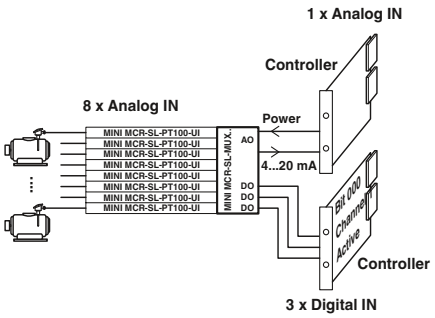
Input data	
Description	2, 4, 6, or 8-channel (can be switched over)
Can be configured/parameterized	Via DIP switches
Input signal	4 ... 20 mA
Maximum input signal	< 30 mA
Switching cycles	2 or 1 sec. (can be selected)
Output data	
Output signal	4 ... 20 mA
Maximum output signal	< 30 mA
Load R_B	$((U_{supply} - 7\ V) / I_{max})$
Status indication Active input	1, 2, 3-bit digital output (can be selected)
Switching output	3 x PNP optocouplers
Maximum switching voltage	30 V DC
General data	
Supply voltage U_B	7 V DC ... 30 V DC (Loop-powered)
Current consumption	< 3.5 mA (without signal current)
Power consumption	< 24 mW (without signal current)
Maximum transmission error	0.3% (0.1%, typical)
Temperature coefficient	< 0.01%/K
Ambient temperature (operation)	-20°C ... 65°C
Housing material	PBT
Dimensions W / H / D	50.4 / 45.5 / 46.2 mm
Connection to control level	Flat-ribbon cable plug connector according to IEC 60603-13
Insertion/withdrawal cycles (System adapter / FLK 16)	10 / ≥ 200
Conformance / approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada	UL 508 Recognized applied for Class I, Div. 2, Groups A, B, C, D T5 applied for

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Multiplexer for MINI Analog modules with screw connection	**MINI MCR-SL-MUX-V8-FLK 16**[1]	**2811815**	1

Accessories

MINI Analog feed-through terminal block	**MINI MCR-SL-TB**	**2811420**	1
For round cable with one open end, see "System cabling for controllers" section	**VIP-CAB-FLK16/FR/OE/0,14/...**		
For round cable with one open end, see "System cabling for controllers" section	**CABLE-FLK16/OE/0,14/...**		



Monitoring of eight motor temperatures with just one analog control input

Termination carrier for MINI Analog isolating amplifier

Select standard DIN rail device

Select module carrier

TC... termination carriers are compact solutions for conveniently and smoothly connecting standard DIN rail isolating amplifiers from the MINI Analog series to input/output cards of automation systems using system cables.

The most compact isolating amplifiers 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 isolating amplifiers
– 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 controller-specific front adapter and system cable

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

Termination carrier for MINI Analog isolating amplifier

The **TC-D37SUB-ADIO16-M-P-UNI** universal termination carrier is a compact solution which connects isolating amplifiers from the MINI Analog series to input/output cards of automation systems.

The **TC-D37SUB-AIO16-M-PS-UNI** termination carrier version also enables the coupling and decoupling of HART signals.

– Connection of up to 16 channels
– Can be universally connected, thanks to 37-pos. D-SUB cable with open ends. This enables flexible connection to automation systems
– Redundant power supply, decoupled from diode via separate MINI MCR-PTB power module and MINI MCR-SL-TB feed-through terminal block

Notes:

Contact us: together, we can develop optimum solutions for your automation system with the termination carrier for MINI Analog.

1) EMC: Class A product, see page 571

Housing width 136 mm

Technical data

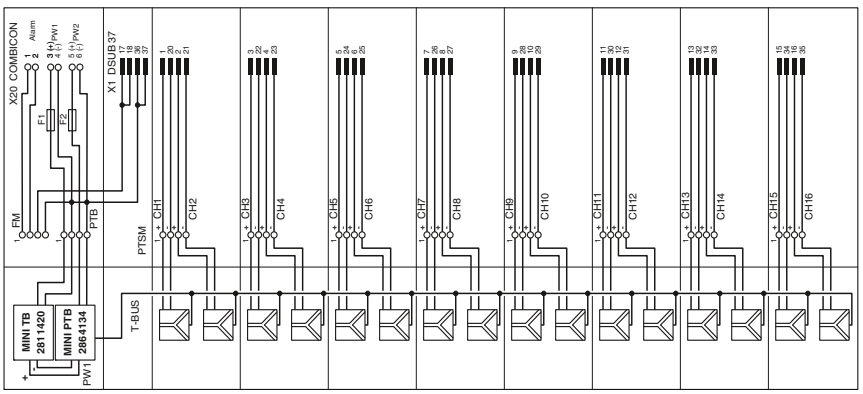
General data	
Connection to the control system level	D-SUB pin strip
Number of positions	37
Maximum operating voltage	< 50 V DC (Per signal/channel)
Maximum permissible current	1 A (Signal/channel)
Rated insulation voltage	50 V
Surge voltage category	II
Pollution degree	2
Rated surge voltage	0.5 kV
Air and creepage distances	DIN EN 50178 (Basic insulation)
Degree of protection	IP20
Ambient temperature range	-40°C ... 80°C (Please observe module specifications)
Shock	15g, according to IEC 60068-2-27
Vibration (operation)	2g, according to IEC 60068-2-6
Inflammability class according to UL 94	V0
Dimensions W / H / D	136 / 170 / 160 mm
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	2.5 A Slow-blow
Status indication	2 x red LED (error) 1 x green LED (PWR)

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Module carrier for 16 MINI Analog channels, power and feed-through module			
	TC-D37SUB-ADIO16-M-P-UNI	**2902933**	1
- With connection for MACX MCR-S-MUX HART multiplexer	**TC-D37SUB-AIO16-M-PS-UNI**[1])	**2902934**	1

Accessories

MINI Analog power terminal blocks	**MINI MCR-SL-PTB-FM**[1])	**2902958**	1
MINI Analog error message modules	**MINI MCR-SL-FM-RC-NC**[1])	**2902961**	1
HART multiplexer, 32-chanel, including two 14-wire flat-ribbon cables	**MACX MCR-S-MUX**	**2865599**	1



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

Accessories

Surge protection

LINETRAB LIT

The ideal addition to MINI Analog - the innovative surge protection solution in 6.2 mm housing.

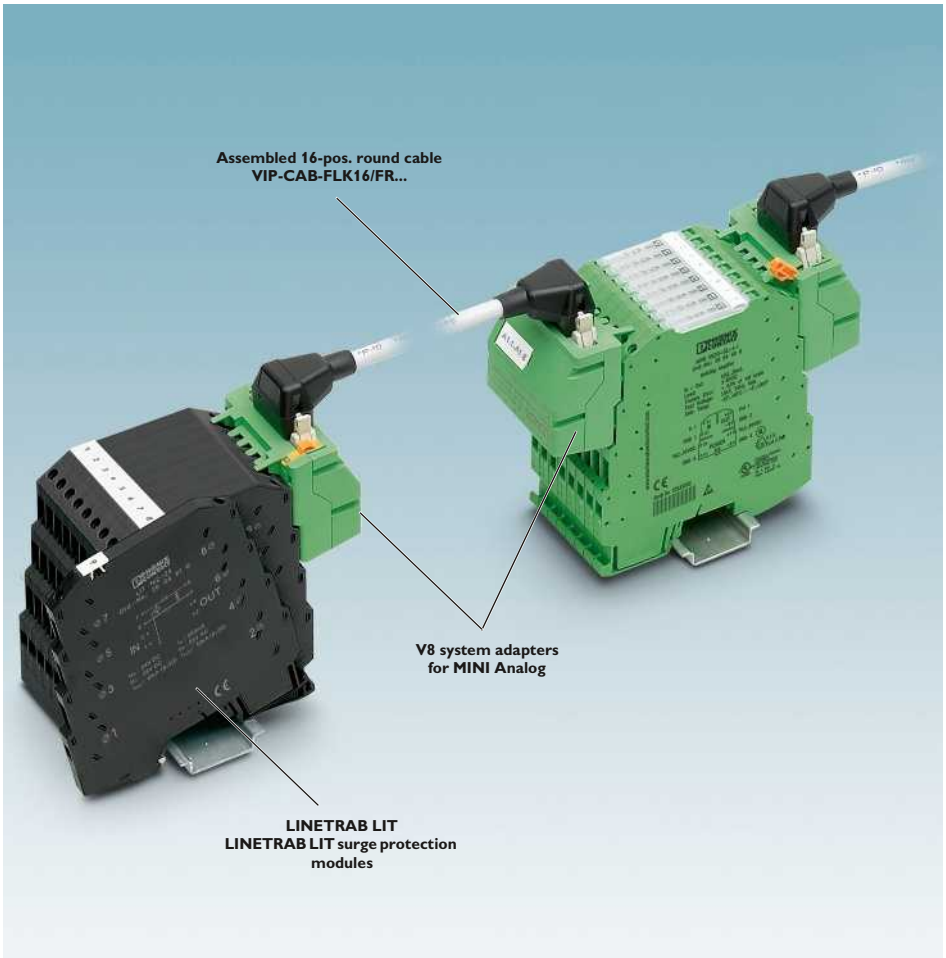
Because the LINETRAB LIT and MINI Analog housing is the same shape, you can benefit from the numerous advantages of system cabling. The advantage of combining MINI Analog and LINETRAB LIT products is that it enables you to set up a space-saving, protected, and optimally coordinated signal chain from the sensor right up to the controller.

The tables below are designed to serve as configuration aids for combining MINI Analog and LINETRAB products.

On the left, you will find a list of the components and combination options for setting up system cabling between MINI Analog and LINETRAB.

For details of system cabling solutions that can be used between MINI Analog and the controller side, please refer to page 92.

For more detailed information on LINETRAB LIT surge protection modules, please see the TRABTECH catalog.



Reliable and systematic measurements - LINETRAB LIT and MINI Analog

Configuration aid for LINETRAB LIT - MINI Analog

Cabling via MINI Analog system adapter (8 modules)

LINETRAB LIT (surge protection)		MINI Analog	
Type	Order No.	**Type**	Order No.
LIT 1X2-24	2804610	**MINI MCR-SL-UI-UI**	2864383
		MINI MCR-SL-UI-UI-NC	2864150
		MINI MCR-SL-U-UI-NC	2865007
		MINI MCR-SL-U-I-0	2813512
		MINI MCR-SL-U-I-4	2813525
		MINI MCR-SL-I-U-0	2813541
		MINI MCR-SL-I-U-4	2813538
		MINI MCR-SL-I-I	2864406
		MINI MCR-SL-U-U	2864684
		MINI MCR-SL-UI-2I	2864794
		MINI MCR-SL-UI-2I-NC	2864176
		MINI MCR-SL-RPS-I-I	2864422
		MINI MCR-SL-RPSS-I-I	2864079
		MINI MCR-SL-1CP-I-I	2864419
		MINI MCR-SL-UI-F	2864082
		MINI MCR-SL-NAM-2RNO	2864105
		MINI MCR-SL-UI-REL	2864480
		MINI MCR-SL-SHUNT-UI	2810858
		MINI MCR-SL-SHUNT-UI-NC	2810780

Components required for system cabling

Available 16-pos. VIP... round cables			V8 system adapter for MINI Analog
Type	Length	Order No.	**Type**
VIP-CAB-FLK16/FR/FR/0,14/0,5M	0.5 m	2900154	**2 x MINI MCR-SL-V8-FLK 16-A** (in the catalog on page 94)
VIP-CAB-FLK16/FR/FR/0,14/1,0M	1.0 m	2900155	
VIP-CAB-FLK16/FR/FR/0,14/2,0M	2.0 m	2900156	

VIP... round cables are available in special lengths on request.

VIP system cable

The new VIP cables provide a way of setting up secure and robust connections, even in harsh industrial environments.

Innovative concept

The MINI Analog system adapter does not just support system cabling on the input and output sides. It also allows cabling to be installed with LINETRAB surge protection modules quickly, easily, and without errors.

Increased protection

In addition to all the advantages associated with electrical isolation, filtering, amplification, and the conversion of standard analog signals using MINI Analog, there is now also the option of effective surge protection.

Surge protection

Surge protection is a reliable means of actively preventing and protecting against system damage and downtimes. LINETRAB is able to limit transient surge voltages safely and without affecting the signal - all in a compact device with a design width of just 6.2 mm.

VIP system cable

Innovative concept

Increased protection

Surge protection

Configuration aid for LINETRAB LIT - MINI Analog

Manual cabling

LINETRAB LIT (surge protection)		MINI Analog	
Type	Order No.	**Type**	Order No.
LIT 1X2-24	2804610	**MINI MCR-SL-UI-UI**	2864383
		MINI MCR-SL-UI-UI-NC	2864150
		MINI MCR-SL-UI-UI-SP	2864710
		MINI MCR-SL-UI-UI-SP-NC	2864163
		MINI MCR-SL-SHUNT-UI-SP	2810874
		MINI MCR-SL-SHUNT-UI-SP-NC	2810793
		MINI MCR-SL-U-UI-SP	2811213
		MINI MCR-SL-U-UI-SP-NC	2810078
		MINI MCR-SL-U-I-0-SP	2813570
		MINI MCR-SL-U-I-4-SP	2813583
		MINI MCR-SL-I-U-0-SP	2813554
		MINI MCR-SL-I-U-4-SP	2813567
		MINI MCR-SL-I-I-SP	2864723
		MINI MCR-SL-U-U-SP	2864697
		MINI MCR-SL-UI-2I-SP	2864804
		MINI MCR-SL-UI-2I-SP-NC	2864189
		MINI MCR-SL-RPS-I-I-SP	2864752
		MINI MCR-SL-RPSS-I-I-SP	2810230
		MINI MCR-SL-1CP-I-I-SP	2864749
LIT 2X2-24	2804623	**MINI MCR-SL-2CP-I-I**	2864655
		MINI MCR-SL-2CP-I-I-SP	2864781
LIT 2-12 (for 2-conductor connection technology)	2804665	**MINI MCR-SL-PT100-UI-200**	2864309
		MINI MCR-SL-PT100-UI-200-NC	2864370
		MINI MCR-SL-PT100-UI-200-SP	2864192
		MINI MCR-SL-PT100-UI-200-SP-NC	2864202
		MINI MCR-SL-PT100-UI	2864435
LIT 4-12 (for 3- and 4-conductor connection technology)	2804678	**MINI MCR-SL-PT100-UI-NC**	2864273
		MINI MCR-SL-PT100-UI-SP	2864736
		MINI MCR-SL-PT100-UI-SP-NC	2864286
		MINI MCR-SL-PT100-UI-LP	2810298
		MINI MCR-SL-PT100-UI-LP-NC	2810308
		MINI MCR-SL-PT100-UI-LP-SP	2810382
		MINI MCR-SL-PT100-UI-LP-SP-NC	2810395
LIT 1X2-24	2804610	**MINI MCR-SL-UI-F-SP**	2810243
		MINI MCR-SL-NAM-2RNO-SP	2810269
		MINI MCR-SL-UI-REL-SP	2864493
LIT 4-24	2804678	**MINI MCR-SL-R-UI**	2864095
		MINI MCR-SL-R-UI-SP	2810256

Reliable and safe

MACX Analog - safe and high-performance signal isolating amplifiers. This product range enables you to safely isolate, condition, filter, and amplify all the signals of your system.

In all phases of the product life cycle, the MACX Analog range has been consistently developed and produced according to standards for functional safety. Save planning and operating costs – by combining high signal flexibility with safe isolation and SIL evaluation.

The universal nature of the product range provides you with a solution for all applications using analog signal transmission. You are free to choose between either multifunctional high-end devices or reasonably-priced standard modules with exactly the right functions.

Choose the right MACX Analog isolating amplifier for your application:

Analog IN/OUT

– Configurable 3-way isolating amplifiers
– Repeater power supplies with HART signal transmission for supplying 2-conductor transmitters
– Output isolating amplifiers with HART signal transmission

Temperature

– Universal temperature transducers for resistance thermometers, resistance-type sensors, potentiometers, thermocouples, and mV sources – also with safe limit value relays as an option
– Configurable temperature transducer for resistance thermometers and resistance-type sensors
– Configurable temperature transducer for thermocouples and mV sources

Digital IN

– Isolation amplifiers with input for NAMUR proximity sensor or switch
– Single-channel with PDT or passive transistor output
– Single-channel with double N/O contact output
– Two-channel with one N/O contact output per channel
– Two-channel with one PDT or passive transistor output per channel

Functional safety – from the initial idea to the finished product

Phoenix Contact meets the requirements of functional safety according to IEC 61508 in a standardized development process. Here, all fault avoidance and fault control measures are taken into consideration, from the very development and production of a device right up to device operation. These measures are audited within the scope of a full assessment by an independent test center.

Phoenix Contact therefore makes a significant contribution to high system safety and availability.

DIN rail connector-compatible

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

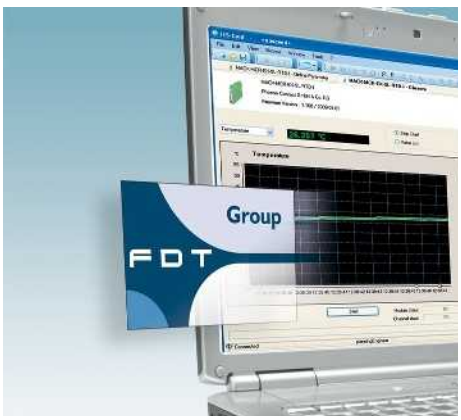
Wide-range power supply

The modules featuring a wide-range power supply (...-UP) can be used in all power supply networks the world over without the need for additional power supply units.

Safe and reliable functions
– Consistent SIL certification. This ensures the highest level of reliability and safety for your systems.

Precise transmission and high operational reliability
– Thanks to patented transmission concept

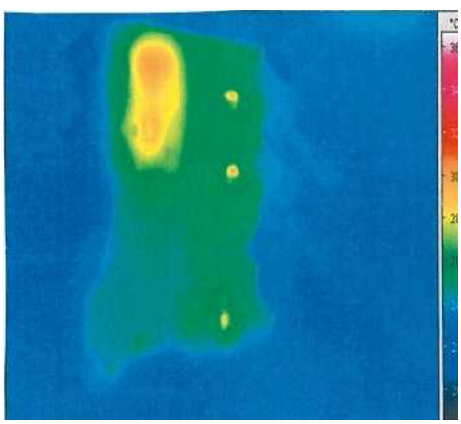
Easy configuration
– Without software via DIP switches on the device front or with the operator interface and display unit.



Easy configuration and monitoring
– Either via FDT/DTM or user-friendly stand-alone software – with integrated monitoring function.

Flexible power bridging
– The DIN rail connector simplifies wiring, system expansion or module replacement during operation.

Easy-maintenance connection technology
– Plug-in connection terminal blocks with screw connection or fast push-in technology – coded, with integrated sockets.

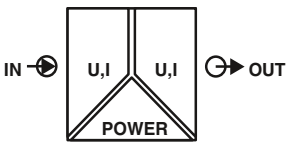


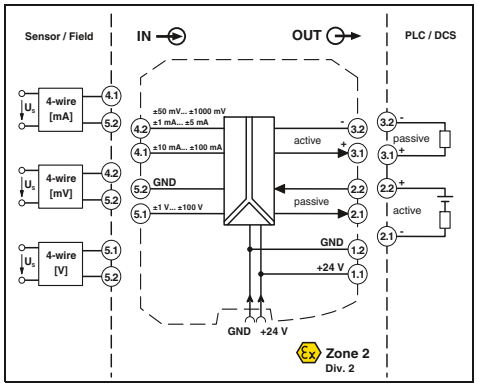
Precise transmission, long service life
– Patented circuit concepts ensure precise signal transmission and minimal self-heating.

Even for the Ex area
– Maximum explosion protection for all Ex zones with the MACX Analog Ex range.

Fast and error-free signal connection
– Compact termination carriers connect MACX Analog devices to the automation system – plug and play.

Analog IN / Analog OUT
3-way isolating amplifier





Universal,
more than 1600 signal combinations

Functional safety
Ex: // Applied for: cUL / UL
Housing width 12.5 mm

Universal isolating amplifier for operating 4-conductor measuring transducers

- Analog isolating amplifier 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 capable screw or spring-cage connection method
- Power supply via DIN rail connector possible
- Status indicator for supply voltage
- Up to SIL 2 according to EN 61508
- Installation in zone 2 permissible

Notes:

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 126

1) EMC: Class A product, see page 571

Technical data

Input data		
Input signal (configurable using the DIP switch)	U input	I input
	0 ... 10 V, please indicate if different setting when ordering	
Maximum input signal	±100 V	±100 mA
Input resistance	Approx. 1 MΩ (±1 V DC ... ±100 V DC)	Approx. 10 Ω (±10 mA DC ... ±100 mA DC)
Output data		
Output signal (configurable using the DIP switch)	U output	I output
	0 ... 20 mA, please indicate if different setting when ordering	
Load R_B	≥ 1 kΩ (10 V)	≤ 600 Ω (20 mA; active) (passive: ≤ (UB-2 V) / I_{outmax})
General data		
Supply voltage U_B	12 V DC ... 24 V DC (-20% / +25%)	
Power dissipation	< 0.7 W (at 24 V DC / 20 mA)	
Maximum transmission error	≤ 0.1% (Compared to the final value)	
Temperature coefficient	0.0075%/K	
ZERO / SPAN adjustment	±4% / ±4%	
Limit frequency (3 dB)	10 kHz (Can be switched to 30 Hz)	
Step response (10 - 90%)	35 µs (at 10 kHz) 11 ms (at 30 Hz)	
Electrical isolation		
Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)	
Degree of protection	IP20	
Ambient temperature (operation)	-20°C ... 70°C	
Mounting	Any	
Housing material	PA 66-FR	
Dimensions W / H / D	12.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc	
IECEx	Ex nA IIC T4 Gc	
UL, USA / Canada	UL applied for	
Functional safety (SIL)	SIL 2	
GL	-	

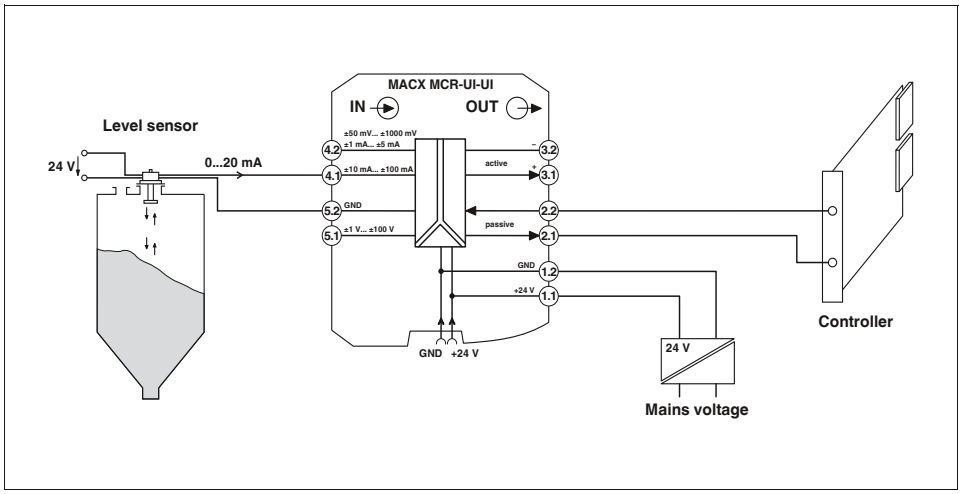
Ordering data

Description		Type	Order No.	Pcs. / Pkt.
3-way isolating amplifier, for electrical isolation of analog signals				
Order configuration	Screw connection	**MACX MCR-UI-UI[1])**	**2811284**	1
Order configuration	Spring-cage connection	**MACX MCR-UI-UI-SP[1])**	**2811572**	1
Standard configuration	Screw connection	**MACX MCR-UI-UI-NC[1])**	**2811446**	1
Standard configuration	Spring-cage connection	**MACX MCR-UI-UI-SP-NC[1])**	**2811556**	1

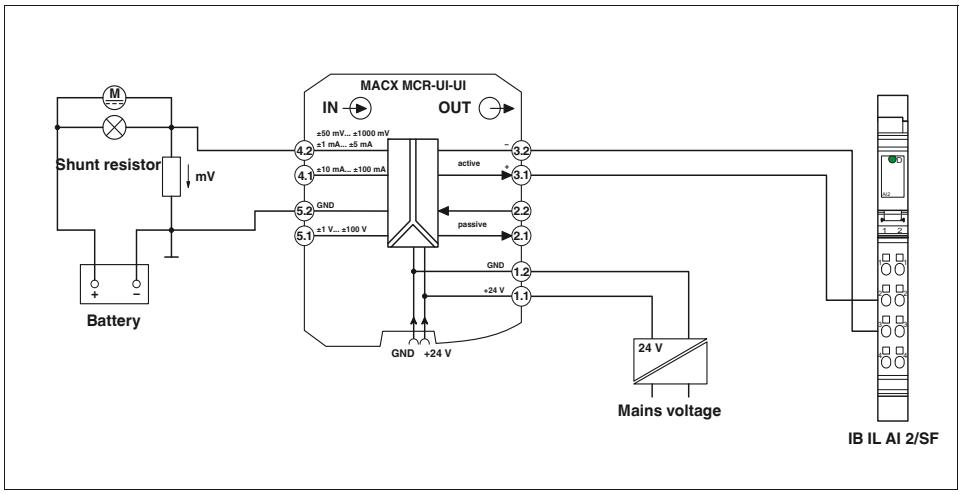
Order key for MACX MCR-UI-UI-... (standard configuration entered as an example)

Order No.	Input			Output		Limit frequency	Factory calibration certificate (FCC)
2811284 /	**IN03**			**OUT01**		**10K** /	**NONE**
2811284 ≙ ...-UI-UI	IN40 ≙ 0...50 mV IN24 ≙ 0...60 mV IN41 ≙ 0...75 mV IN25 ≙ 0...100 mV IN43 ≙ 0...120 mV	IN53 ≙ -50...+50 mV IN13 ≙ -60...+60 mV IN54 ≙ -75...+75 mV IN14 ≙ -100...+100 mV IN56 ≙ -120...+120 mV	IN70 ≙ 0...1.0 mA IN71 ≙ 0...1.5 mA IN72 ≙ 0...2.0 mA IN73 ≙ 0...3.0 mA IN36 ≙ 0...5 mA	OUT19 ≙ 0...2.5 V OUT05 ≙ 0...5 V OUT03 ≙ 0...10 V OUT20 ≙ -2.5...+2.5 V	OUT15 ≙ 0...5 mA OUT16 ≙ 0...10 mA OUT01 ≙ 0...20 mA OUT21 ≙ -5...+5 mA	30 ≙ 30 Hz 10K ≙ 10 kHz	NONE ≙ without FCC YES ≙ with FCC (a fee is charged)
2811572 ≙ ...-UI-UI-SP	IN44 ≙ 0...150 mV IN26 ≙ 0...200 mV IN27 ≙ 0...300 mV IN28 ≙ 0...500 mV IN66 ≙ 0...1000 mV	IN57 ≙ -150...+150 mV IN15 ≙ -200...+200 mV IN16 ≙ -300...+300 mV IN17 ≙ -500...+500 mV IN78 ≙ -1000...+1000 mV	IN37 ≙ 0...10 mA IN74 ≙ 0...15 mA IN01 ≙ 0...20 mA IN75 ≙ 0...30 mA IN76 ≙ 0...50 mA	OUT13 ≙ -5...+5 V OUT14 ≙ -10...+10 V OUT24 ≙ 0.5...+2.5 V OUT06 ≙ 1...5 V	OUT22 ≙ -10...+10 mA OUT23 ≙ -20...+20 mA OUT25 ≙ 1...5 mA OUT26 ≙ 2...10 mA		YESPLUS ≙ FCC with 5 measuring points (a fee is charged)
	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	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	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	OUT27 ≙ 2.5...0 V OUT11 ≙ 5...0 V OUT09 ≙ 10...0 V	OUT28 ≙ 5...0 mA OUT29 ≙ 10...0 mA OUT07 ≙ 20...0 mA		
	IN06 ≙ 1...5 V IN04 ≙ 2...10 V		IN91 ≙ 1...5 mA IN92 ≙ 2...10 mA IN02 ≙ 4...20 mA				

Application example: level measurement and active analog input card

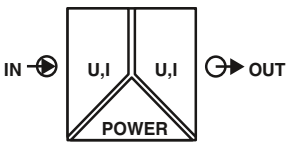


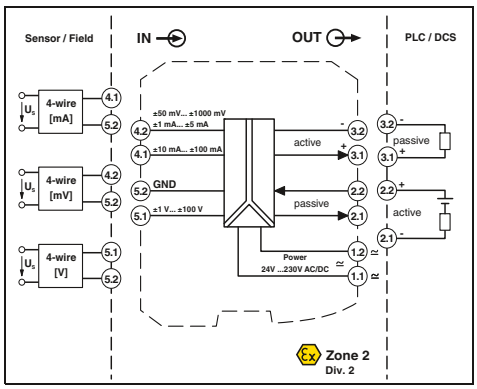
Application example: shunt measurement and Inline terminal with passive analog input channels within an Inline station



(Information on automation solutions from Phoenix Contact can be found in Catalog 8 or at www.phoenixcontact.net/products)

Analog IN / Analog OUT
3-way isolating amplifier





Universal, more than 1600 signal combinations, wide-range power supply

Functional safety
Ex:
Housing width 12.5 mm

- Analog isolating amplifier 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 capable screw or spring-cage connection method
- Wide-range power supply: 19.2 ... 253 V AC/DC
- Status indicator for supply voltage
- Up to SIL 2 according to EN 61508
- Installation in zone 2 permissible

Notes:

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

1) EMC: Class A product, see page 571

Technical data

Input data	U input	I input
Input signal (configurable using the DIP switch)	0 ... 10 V, please indicate if different setting when ordering	
Maximum input signal	±100 V	±100 mA
Input resistance	Approx. 1 MΩ (±1 V DC ... ±100 V DC)	Approx. 10 Ω (±10 mA DC ... ±100 mA DC)
Output data	U output	I output
Output signal (configurable using the DIP switch)	0 ... 20 mA, configurable via DIP switches	
Maximum output signal	15 V	35 mA
Load R_B	≥ 1 kΩ (10 V)	≤ 600 Ω (20 mA; active) (passive: ≤ (UB-2 V) / I_{outmax})
General data		
Supply voltage U_B	24 V ... 230 V AC/DC (-20%/+10%, 50/60 Hz)	
Power dissipation	< 0.8 W (at 24 V DC / 20 mA) < 0.9 W (At 230 V AC / 20 mA)	
Maximum transmission error	≤ 0.1% (Compared to the final value)	
Temperature coefficient	0.0075%/K	
ZERO / SPAN adjustment	±4% / ±4%	
Electrical isolation		
Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)	
Degree of protection	IP20	
Ambient temperature (operation)	-20°C ... 70°C	
Housing material	PA 66-FR	
Dimensions W / H / D	12.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc	
IECEx	Ex nA IIC T4 Gc	
UL, USA / Canada	-	
Functional safety (SIL)	SIL 2	
GL	-	

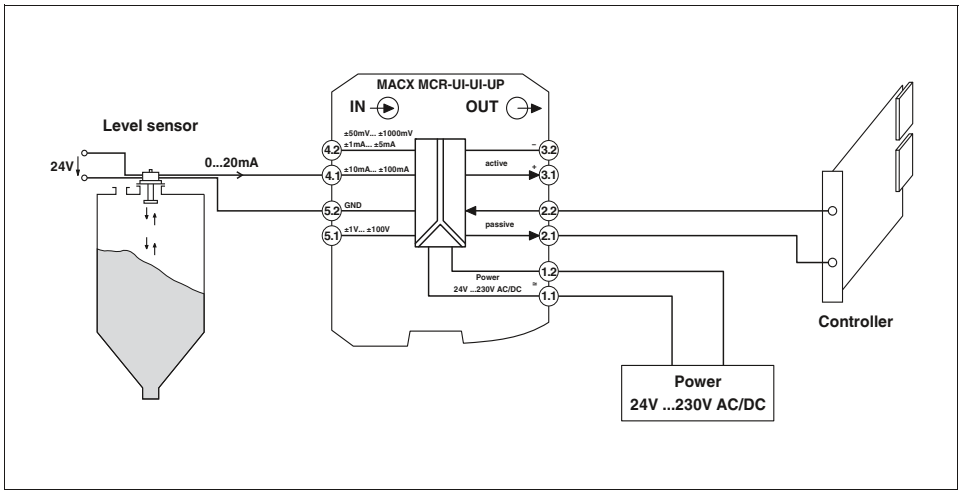
Ordering data

Description		Type	Order No.	Pcs. / Pkt.
3-way isolating amplifier, for electrical isolation of analog signals with long-range power supply				
Order configuration	Screw connection	**MACX MCR-UI-UI-UP[1])**	**2811459**	1
Order configuration	Spring-cage connection	**MACX MCR-UI-UI-UP-SP[1])**	**2811585**	1
Standard configuration	Screw connection	**MACX MCR-UI-UI-UP-NC[1])**	**2811297**	1
Standard configuration	Spring-cage connection	**MACX MCR-UI-UI-UP-SP-NC[1])**	**2811569**	1

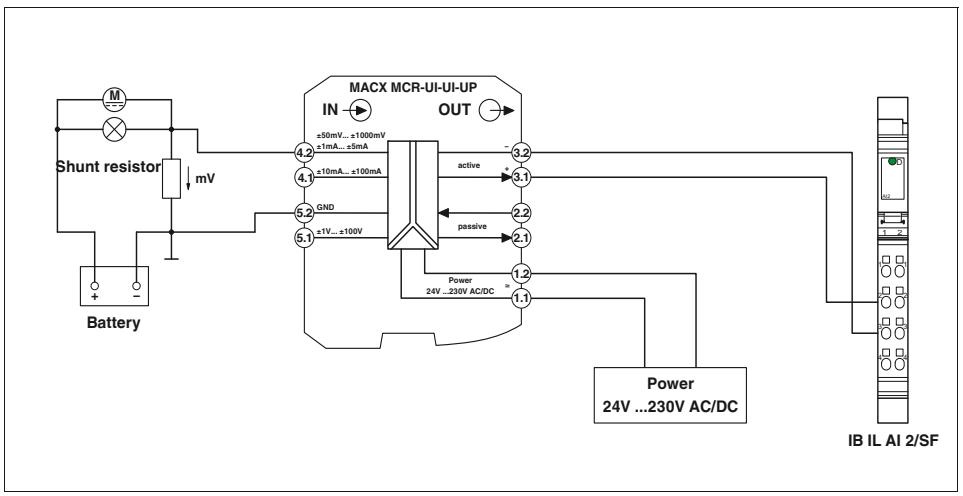
Order key for MACX MCR-UI-UI-... (standard configuration entered as an example)

Order No.	Input			Output		Limit frequency	Factory calibration certificate (FCC)
2811459	IN03			OUT01		10K	NONE
2811459 ≙ ...-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

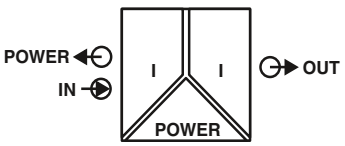


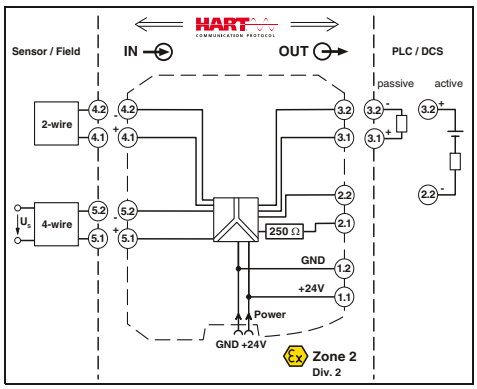
Application example: shunt measurement and Inline terminal with analog input channels within an Inline station



(Information on automation solutions from Phoenix Contact can be found in Catalog 8 or at www.phoenixcontact.net/products)

Analog IN / Analog OUT repeater power supplies





Ex n

Repeater power supply and input isolating amplifier

Functional safety
Ex:
Housing width 12.5 mm

Repeater power supply and input isolating amplifier for the operation of 2-conductor measuring transducers, 4-conductor measuring transducers, and mA current sources

- Input 0/4...20 mA (feeding or non-feeding)
- 0/4...20 mA output (active or passive)
- Bidirectional transmission of digital HART communication signals
- Plug-in capable screw or spring-cage connection method, 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 EN 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 126

Test plugs for test sockets can be found on page 191

Information on “Plug and play” connection using system cabling can be found from page 128

1) EMC: Class A product, see page 571

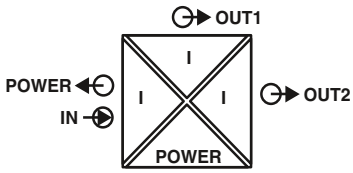
Technical data

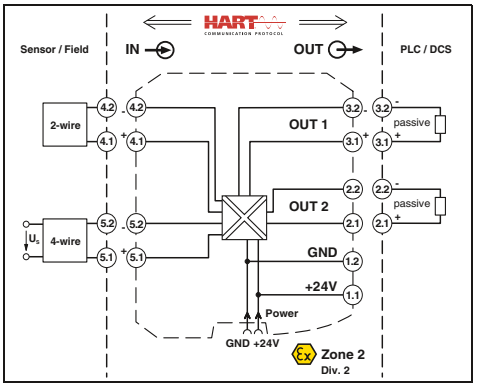
Input data		
Input signal		0 mA ... 20 mA / 4 mA ... 20 mA
Transmitter supply voltage		> 16 V (at 20 mA)
Voltage drop		< 3.5 V (in input isolating amplifier operation)
Output data		
Output signal		0 mA ... 20 mA (active) 4 mA ... 20 mA (active) 0 mA ... 20 mA (14 ... 26 V ext. source voltage) 4 mA ... 20 mA (14 ... 26 V ext. source voltage)
Load		< 600 Ω
Output ripple		< 20 mV_{rms}
General data		
Supply voltage range		19.2 V DC ... 30 V DC
Current consumption		< 60 mA (at 24 V DC)
Power dissipation		< 1.1 W (at 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		as per NE 43
Electrical isolation		
	Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
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 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada		UL applied for
Functional safety (SIL)		SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Repeater power supply, with HART® protocol			
Screw connection	**MACX MCR-SL-RPSSI-I[1])**	**2865955**	1
Spring-cage conn.	**MACX MCR-SL-RPSSI-I-SP[1])**	**2924207**	1

Analog IN / Analog OUT repeater power supplies





Ex n

SIL IEC 61508

Repeater power supply and input isolating amplifier, with two electrically isolated outputs

Functional safety
Ex:
Housing width 12.5 mm

Repeater power supply and input isolating amplifier for the operation of 2-conductor measuring transducers, 4-conductor measuring transducers, and mA current sources

- Input 0/4...20 mA (feeding or non-feeding)
- Two electrically isolated 0/4 ... 20 mA (active) outputs
- Bidirectional transmission of digital HART communication signals (both outputs)
- Plug-in capable screw or spring-cage connection method, with integrated sockets for HART communicators
- 4-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 2 according to EN 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 126

Test plugs for test sockets can be found on page 191

Information on "Plug and play" connection using system cabling can be found from page 128

1) EMC: Class A product, see page 571

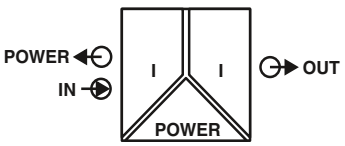
Technical data

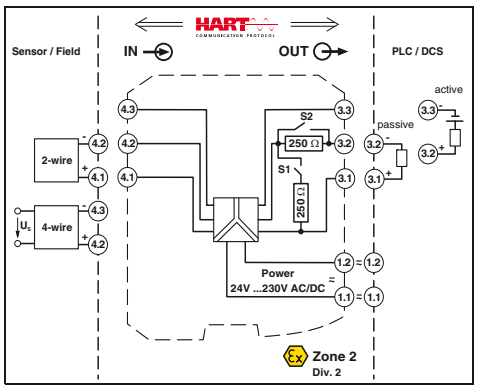
Input data		
Input signal		4 mA ... 20 mA / 0 mA ... 20 mA
Transmitter supply voltage		> 21.5 V (at 20 mA)
Voltage drop		< 3.9 V (in input isolating amplifier operation)
Output data		
Output signal (Per output)		0 mA ... 20 mA (active) 4 mA ... 20 mA (active)
Load		< 450 Ω (at 20 mA)
Output ripple		< 20 mV_{rms}
General data		
Supply voltage range		19.2 V DC ... 30 V DC (24 V DC (-20% ... +25%))
Current consumption		< 75 mA (at 24 V DC)
Power dissipation		< 1.45 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)
Under-/overload range		as per NE 43
Electrical isolation		
	Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
	Output 1/output 2	1.5 kV AC (50 Hz, 1 min., test voltage)
Ambient temperature range		-20°C ... 60°C (Any mounting position)
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^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		II 3 G Ex nA IIC T4 Gc X
Functional safety (SIL)		SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Repeater power supply, with HART® protocol			
Screw connection	**MACX MCR-SL-RPSSI-2I[1])**	**2924825**	1
Spring-cage conn.	**MACX MCR-SL-RPSSI-2I-SP[1])**	**2924838**	1

Analog IN / Analog OUT repeater power supplies





Ex n

Repeater power supply and input isolating amplifier, wide-range power supply

Functional safety
Ex: Ex
Housing width 17.5 mm

Repeater power supply and input isolating amplifier for the operation of 2-conductor measuring transducers, 4-conductor measuring transducers, and mA current sources

- Input 0/4...20 mA (feeding or non-feeding)
- Output 0/4...20 mA (active or passive), 0/1...5 V, can be switched via the DIP switch
- Bidirectional transmission of digital HART communication signals
- Plug-in capable screw or spring-cage connection method, 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: 19.2 ... 253 V AC/DC
- Up to SIL 2 according to EN 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 126

Test plugs for test sockets can be found on page 191

1) EMC: Class A product, see page 571

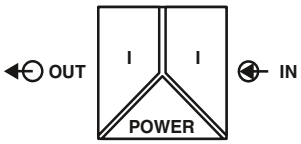
Technical data

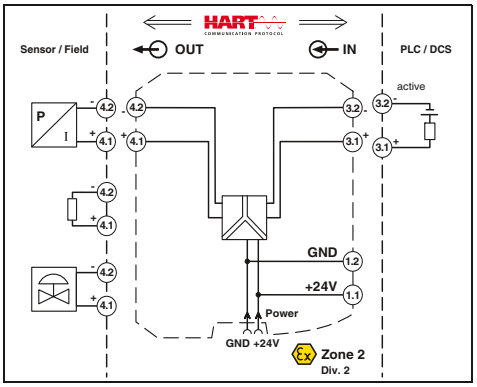
Input data		
Input signal		0 mA ... 20 mA / 4 mA ... 20 mA
Transmitter supply voltage		> 16 V (at 20 mA)
Voltage drop		< 3.5 V (in input isolating amplifier operation)
Output data		
Output signal		0 mA ... 20 mA (active) 4 mA ... 20 mA (active) 0 mA ... 20 mA (14 ... 26 V ext. source voltage) 4 mA ... 20 mA (14 ... 26 V ext. source voltage) 0 V ... 5 V (internal resistance, 250 Ω, 0.1%) 1 V ... 5 V (internal resistance, 250 Ω, 0.1%)
Load		< 600 Ω (I output)
Output ripple		< 20 mV_{rms}
General data		
Supply voltage range		24 V ... 230 V AC/DC (-20%/+10%, 50/60 Hz)
Current consumption		< 75 mA (at 24 V DC)
Power dissipation		< 1.8 W
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		as per NE 43
Electrical isolation		
	Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
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		17.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		Ex II 3 G Ex nA IIC T4 Gc X
UL, USA / Canada		UL applied for
Functional safety (SIL)		SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Repeater power supply, with HART® protocol			
Screw connection	**MACX MCR-SL-RPSSI-I-UP**[1]	**2865968**	1
Spring-cage conn.	**MACX MCR-SL-RPSSI-I-UP-SP**[1]	**2924210**	1

Analog OUT
output isolating amplifier





Ex n

SIL
IEC 61508

Functional safety
Ex:
Housing width 12.5 mm

Output isolating amplifier for controlling I/P transducers, control valves, and displays

- 0/4 ... 20 mA input
- 0/4 ... 20 mA output
- Bidirectional transmission of digital HART communication signals
- Plug-in capable screw or spring-cage connection method, 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 EN 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 126
Test plugs for test sockets can be found on page 191
Information on “Plug and play” connection using system cabling can be found from page 128
1) EMC: Class A product, see page 571

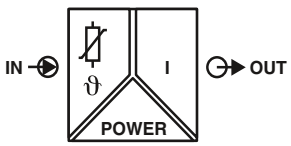
Technical data

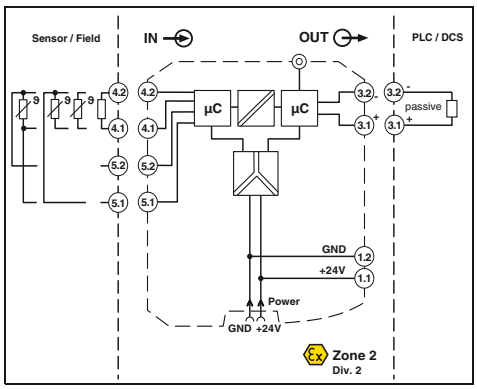
Input data		
Input signal		0 mA ... 20 mA / 4 mA ... 20 mA
Input voltage		5.4 V (at 20 mA)
Input impedance in the event of a cable break at the output		> 100 kΩ (If there is a line fault)
Output data		
Output signal		0 mA ... 20 mA / 4 mA ... 20 mA
Load		< 800 Ω (at 20 mA)
Output ripple		< 20 mV_{rms}
General data		
Supply voltage range		19.2 V DC ... 30 V DC
Current consumption		< 46 mA (at 24 V DC / 20 mA)
Power dissipation		< 1.1 W (at 24 V DC / 20 mA)
Temperature coefficient		< 0.01%/K
Step response (10 - 90%)		< 140 µs
Maximum transmission error		< 0.1% (of final value)
Electrical isolation		
	Input/output/power supply	1.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Ambient temperature range		-20°C ... 60°C (Any mounting position)
Humidity		10% ... 95% (no condensation)
SMART communication		Yes
Signal bandwidth		as per HART specifications
Protocols supported		HART
Housing material		PA 66-FR
Inflammability class according to UL 94		V0
Dimensions W / H / D		12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		II 3 G Ex nA IIC T4 Gc X
Functional safety (SIL)		SIL 2 according to EN 61508

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
Output isolating amplifier				
	Screw connection	**MACX MCR-SL-IDSI-I[1])**	**2865971**	1
	Spring-cage conn.	**MACX MCR-SL-IDSI-I-SP[1])**	**2924223**	1

Temperature
Temperature transducer





Ex n

SIL IEC 61508

For resistance thermometers and resistance-type sensors

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 ... 20 mA or 4 ... 20 mA signal.

- Input for resistance thermometers and resistance-type sensors
- 0 ... 20 mA or 4 ... 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
- Up to SIL 2 according to EN 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.

The configuration software can be downloaded from the Internet (www.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 126

For information on the programming adapter, refer to page 119

Test plugs for test sockets can be found on page 191

Information on “Plug and play” connection using system cabling can be found from page 128

1) EMC: Class A product, see page 571

Technical data

Input data		
Resistance thermometers		Pt, Ni, Cu sensors: 2, 3, 4-conductor
Resistor		0 Ω ... 2000 Ω
Cable resistance		50 Ω per line
Sensor input current		(200 µA ... 1 mA)
Measuring range span		min. 50 K
Output data		
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_{PP}
General data		
Supply voltage range		19.2 V DC ... 30 V DC
Current consumption		< 40 mA (24 V DC)
Power dissipation		< 1 W
Temperature coefficient		0.01%/K
Step response (0 - 99%)		Typ. 800 ms (With SIL) max. 1200 ms (With SIL) Typ. 700 ms (Without SIL) max. 1100 ms (Without SIL)
Transmission error, total		0.05% x 100 [K] / measuring range span [K] + 0.05%
ZERO / SPAN adjustment		±5% / ±5%
Electrical isolation		
	Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Ambient temperature range		-20°C ... 60°C (Any mounting position)
Humidity		5% ... 95% (no condensation)
Housing material		PA 66-FR
Inflammability class according to UL 94		V0
Dimensions W / H / D		12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		II 3 G Ex nA ic IIC T4 Gc X
Functional safety (SIL)		SIL 2 according to EN 61508

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
Temperature transducer				
Order configuration	Screw connection	**MACX MCR-SL-RTD-I[1])**	**2865065**	1
Order configuration	Spring-cage conn.	**MACX MCR-SL-RTD-I-SP[1])**	**2924317**	1
Standard configuration	Screw connection	**MACX MCR-SL-RTD-I-NC[1])**	**2865078**	1
Standard configuration	Spring-cage conn.	**MACX MCR-SL-RTD-I-SP-NC[1])**	**2924320**	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER[1])**	**2811271**	1

Order key and temperature ranges for MACX-MCR-SL-RTD-I(-SP) temperature transducer

Order key for MACX-MCR-SL-RTD-I(-SP) temperature transducer (standard configuration entered as an example)

Order No.	Sensor type	Safety integrity level (SIL)	Connection technology	Measuring range: Start	Measuring range: End	Measuring unit	Output range	Filter: Oversampling	Filter: Moving average value
2865065	PT100	ON	3	0	100	C	OUT02	10	1
2865065 ≙ MACX MCR-SL-RTD-I 2924317 ≙ MACX MCR-SL-RTD-I-SP	see below	ON ≙ active NONE ≙ not active ON only with output range = OUT02	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	see below	see below	C ≙ °C F ≙ °F O ≙ Ω	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA	1 ≙ 1 value 3 ≙ 3 values 5 ≙ 5 values 7 ≙ 7 values 10 ≙ 10 values 20 ≙ 20 values	1 ≙ 1 value 2 ≙ 2 values 3 ≙ 3 values 4 ≙ 4 values

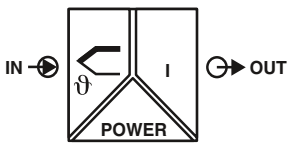
		Smallest measuring range span
RES01	≙ Resistor	25 Ω
PT50	≙ Pt 50 acc. to IEC 751	50 K
PT100	≙ Pt 100 acc. to IEC 751	50 K
PT200	≙ Pt 200 acc. to IEC 751	50 K
PT500	≙ Pt 500 acc. to IEC 751	50 K
PT100S	≙ Pt 100 acc. to Sama RC21-4-1966	50 K
PT500S	≙ Pt 500 acc. to Sama RC21-4-1966	50 K
NI100DIN	≙ Ni 100 acc. to DIN 43760	50 K
NI500DIN	≙ Ni 500 acc. to DIN 43760	50 K
CU50	≙ Cu 50 acc. to GOST 6651-2009 (α = 0.00428)	50 K
CU53	≙ Cu 53 acc. to GOST 6651-2009 (α = 0.00426)	50 K

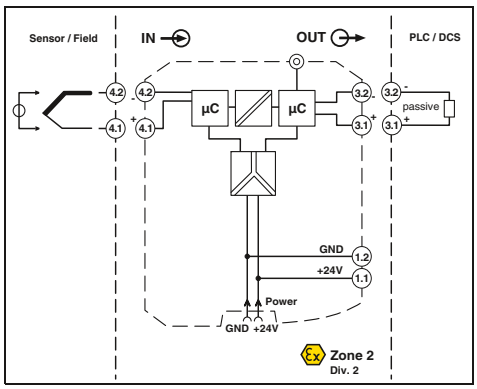
...	Alarm signal: Short circuit/overrange	Alarm signal: Sensor break/underrange	Factory calibration certificate = FCC
	I035	I215	NONE
	I000 ≙ 0 mA I035 ≙ 3.5 mA I215 ≙ 21.5 mA I035 only with output range = OUT02 Alarm signals can also be configured individually using software.	I000 ≙ 0 mA I035 ≙ 3.5 mA I215 ≙ 21.5 mA	NONE ≙ without FCC YES ≙ with FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

Temperature conversion guide for °C to °F:

$$T\,[°F] = \frac{9}{5}\,T\,[°C] + 32$$

Temperature
Temperature transducer





Ex n

SIL
IEC 61508

For thermocouples and mV sources

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 ... 20 or 4 ... 20 mA signal.

- Input for thermocouples and mV sources
- 0 ... 20 mA or 4 ... 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
- Up to SIL 2 according to EN 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.

The configuration software can be downloaded from the Internet (www.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 126

For information on the programming adapter, refer to page 119

Information on “Plug and play” connection using system cabling can be found from page 128

1) EMC: Class A product, see page 571

Technical data

Input data		
Thermocouple sensors		E, J, K, N as per IEC / EN 60584, L as per DIN 43760
Voltage		-20 mV ... 70 mV
Measuring range span		(Min. 50 K for thermocouples, 3 mV for mV sources)
Output data		
Output signal		0 mA ... 20 mA / 4 mA ... 20 mA
Load		max. 500 Ω
Behavior in the event of a sensor error		As per NE 43 or can be freely defined
Output ripple		< 50 μA_{PP}
General data		
Supply voltage range		19.2 V DC ... 30 V DC
Current consumption		< 40 mA (24 V DC)
Power dissipation		< 1 W
Temperature coefficient		0.01%/K
Step response (0 - 99%)		Typ. 800 ms (With SIL) max. 1200 ms (With SIL) Typ. 700 ms (Without SIL) max. 1100 ms (Without SIL)
Transmission error, total		0.05% x 200 [K]/Measuring range span [K] + 0.05%
Cold junction errors		±1 K
ZERO / SPAN adjustment		±5% / ±5%
Electrical isolation		
	Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Ambient temperature range		-20°C ... 60°C (Any mounting position)
Humidity		5% ... 95% (no condensation)
Housing material		PA 66-FR
Inflammability class according to UL 94		V0
Dimensions W / H / D		12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		II 3 G Ex nA ic IIC T4 Gc X
Functional safety (SIL)		SIL 2 according to EN 61508

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
Temperature transducer				
Order configuration	Screw connection	**MACX MCR-SL-TC-I[1])**	**2924333**	1
Standard configuration	Screw connection	**MACX MCR-SL-TC-I-NC[1])**	**2924346**	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER[1])**	**2811271**	1

Order key and temperature ranges for MACX-MCR-SL-TC-I temperature transducer

Order key for MACX-MCR-SL-TC-I temperature transducer (standard configuration entered as an example)

Order No.	Sensor type	Safety integrity level (SIL)	Cold junction compensation	Measuring range: Start	Measuring range: End	Measuring unit	Output range	Filter: Oversampling	Filter: Moving average value
2924333	J	ON	1	0	1000	C	OUT02	10	1
MACX MCR-SL-TC-I	see below	ON ≙ active NONE ≙ not active ON only with output range = OUT02	1 ≙ switched on 0 ≙ switched off (e.g., for mV voltage measurement)	see below	see below	C ≙ °C F ≙ °F V ≙ mV	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA	1 ≙ 1 value 3 ≙ 3 values 5 ≙ 5 values 7 ≙ 7 values 10 ≙ 10 values 20 ≙ 20 values	1 ≙ 1 value 2 ≙ 2 values 3 ≙ 3 values 4 ≙ 4 values

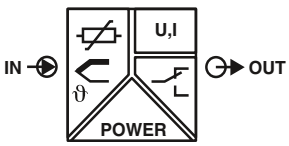
Sensor type			Measuring range: Start	Measuring range: End	Measuring unit	Smallest measuring range span
V03	≙	Voltage (mV)	-20	+70	mV	3 mV
E	≙	acc. to IEC 584-1 (NiCr-CuNi)	-250	1000	°C	50 K
J	≙	acc. to IEC 584-1 (Fe-CuNi)	-210	1200	°C	50 K
K	≙	acc. to IEC 584-1 (NiCr-Ni)	-250	1372	°C	50 K
N	≙	acc. to IEC 584-1 (NiCrSi-NiSi)	-250	1300	°C	50 K
L	≙	acc. to DIN 43760 (Fe-CuNi)	-200	900	°C	50 K

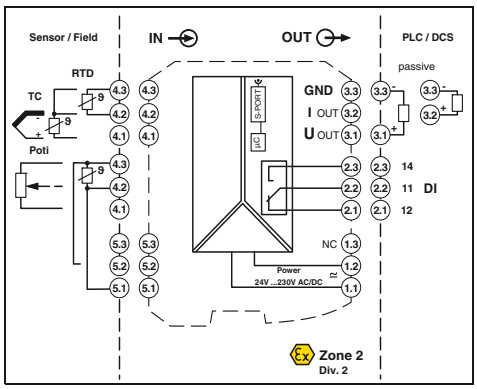
...	Alarm signal: Overrange	Alarm signal: Sensor break/underrange	Factory calibration certificate = FCC
...	I035	I215	NONE
	I000 ≙ 0 mA I035 ≙ 3.5 mA I215 ≙ 21.5 mA I035 only with output range = OUT02 Alarm signals can also be configured individually using software.	I000 ≙ 0 mA I035 ≙ 3.5 mA I215 ≙ 21.5 mA	NONE ≙ without FCC YES ≙ with FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

Temperature conversion guide for °C to °F:

$$T\,[°F] = \frac{9}{5}\,T\,[°C] + 32$$

Temperature
Temperature transducer





Universal, with switching output, wide-range power supply

Functional safety
Ex:
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 operating and display unit
- Programming during operation and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in capable screw or spring-cage connection method
- Cold junction compensation with separate connector
- Wide-range power supply: 19.2 ... 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 according to EN 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.

The configuration software can be downloaded from the Internet (www.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 118

For information on the programming adapter, refer to page 119

1) EMC: Class A product, see page 571

Technical data

Input data		
Resistance thermometers		Pt, Ni, Cu sensors: 2, 3, 4-conductor
Thermocouple sensors		B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG
Resistor		0 Ω ... 50 kΩ
Potentiometer		0 Ω ... 50 kΩ
Voltage		-1000 mV ... 1000 mV
Output data	U output	I output
Output signal	4 mA ... 20 mA (in the case of SIL; further free configuration without SIL)	
Maximum output signal	±11 V	22 mA
Load R_B	≥ 10 kΩ	≤ 600 Ω (20 mA)
Behavior in the event of a sensor error	According to NE 43 or freely configurable	
Switching output	**Relay output**	
Contact type	1 PDT	
Contact material	$AgSnO_2$, hard gold-plated	
Maximum switching voltage	30 V AC (30 V DC)	
Maximum switching current	0.5 A (30 V AC) / 1 A (30 V DC)	
General data		
Supply voltage range	24 V ... 230 V AC/DC (-20%/+10%, 50/60 Hz)	
Power consumption	< 1.5 W	
Temperature coefficient	0.01%/K	
Transmission error, total	< 0.1% (e.g., for Pt 100, 300 K span, 4 ... 20 mA)	
Electrical isolation		
Input/output/power supply	2.5 kV 1 (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)	
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	-20°C ... 65°C	
Humidity	Typ. 5% ... 95% (no condensation)	
Housing material	PA 66-FR	
Inflammability class according to UL 94	V0	
Dimensions W / H / D	17.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA nC ic IIC T4 Gc X	
IECEx	Ex nA nC ic IIC T4 Gc X	
Functional safety (SIL)	SIL 2, PL d	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
Temperature transducer				
Standard configuration	Screw connection	**MACX MCR-T-UI-UP**[1]	**2811394**	1
Standard configuration	Spring-cage conn.	**MACX MCR-T-UI-UP-SP**[1]	**2811860**	1
Order configuration	Screw connection	**MACX MCR-T-UI-UP-C**[1]	**2811873**	1
Order configuration	Spring-cage conn.	**MACX MCR-T-UI-UP-SP-C**[1]	**2811970**	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**[1]	**2811271**	1

Order key for MACX-MCR-T-UI-UP(-SP)-C temperature transducer (standard configuration entered as an example)

Order No.	Safety integrity level (SIL)	Sensor type	Connection technology	Cold junction compensation	Measuring range: Start	Measuring range: End	Measuring unit	Output range	Factory calibration certificate = FCC
2811873	ON	PT100	4	0	-50	150	C	OUT02	NONE

2811873 ≙ MACX MCR-T-UI-UP-C

2811970 ≙ MACX MCR-T-UI-UP-SP-C

ON: ON ≙ active; NONE ≙ not active; ON only with output range = OUT02

PT100: see below

4: 2 ≙ 2-conductor; 3 ≙ 3-conductor; 4 ≙ 4-conductor

0: 0 ≙ off, e.g., with RTD, R, potentiometer, mV; 1 ≙ on, e.g., with TC

-50: see below

150: see below

C: C ≙ °C; F ≙ °F; O ≙ Ω; P ≙ %; V ≙ mV

OUT02: 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: NONE ≙ without FCC; YES ≙ with FCC (a fee is charged); YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

			Start	End	Unit	Smallest measuring range span
Resistance thermometers (RTD) Others can be selected or freely configured in the software.	PT100	Pt 100 acc. to IEC 751	-200	850	°C	20 K
	PT200	Pt 200 acc. to IEC 751	-200	850	°C	20 K
	PT500	Pt 500 acc. to IEC 751	-200	850	°C	20 K
	PT1000	Pt 1000 acc. to IEC 751	-200	850	°C	20 K
	PT100S	Pt 100 acc. to Sama RC21-4-1966	-200	850	°C	20 K
	PT1000S	Pt 1000 acc. to Sama RC21-4-1966	-200	850	°C	20 K
	PT100G	Pt 100 acc. to GOST 6651-2009 (α = 0.00385)	-200	850	°C	20 K
	PT1000G	Pt 1000 acc. to GOST 6651-2009 (α = 0.00385)	-200	850	°C	20 K
	PT100J	Pt 100 acc. to JIS C1604/1997	-200	850	°C	20 K
	PT1000J	Pt 1000 acc. to JIS C1604/1997	-200	850	°C	20 K
	NI100	Ni 100 acc. to DIN 43760/DIN IEC 60751	-60	250	°C	20 K
	NI1000	Ni 1000 acc. to DIN 43760/DIN IEC 60751	-60	250	°C	20 K
	NI100S	Ni 100 acc. to Sama RC21-4-1966	-60	180	°C	20 K
	NI1000S	Ni 1000 acc. to Sama RC21-4-1966	-60	180	°C	20 K
	NI1000L	Ni 1000 (Landis & Gyr)	-50	160	°C	20 K
	CU10	Cu 10 acc. to Sama RC21-4-1966	-70	500	°C	100 K
	CU50	Cu50 acc. to GOST 6651-2009 (α = 0.00428)	-50	200	°C	100 K
	CU100	Cu100 acc. to GOST 6651-2009 (α = 0.00428)	-50	200	°C	100 K
	CU53	Cu53 acc. 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
Thermocouples (TC) Others can be selected in the software.	B	acc. to IEC 584-1 (Pt30Rh-Pt6Rh)	500	1820	°C	50 K
	E	acc. to IEC 584-1 (NiCr-CuNi)	-230	1000	°C	50 K
	J	acc. to IEC 584-1 (Fe-CuNi)	-210	1200	°C	50 K
	K	acc. to IEC 584-1 (NiCr-Ni)	-250	1372	°C	50 K
	N	acc. to IEC 584-1 (NiCrSi-NiSi)	-250	1300	°C	50 K
	R	acc. to IEC 584-1 (Pt13Rh-Pt)	-50	1768	°C	50 K
	S	acc. to IEC 584-1 (Pt10Rh-Pt)	-50	1768	°C	50 K
	T	acc. to IEC 584-1 (Cu-CuNi)	-200	400	°C	50 K
	L	acc. to DIN 43760 (Fe-CuNi)	-200	900	°C	50 K
	U	acc. 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
Remote resistance-type sensors (R) (2, 3, 4-conductor) Others can be selected in the software.	RES03	0...150 Ω resistor	0	150	Ω	10% of the selected measuring range
	RES05	0...600 Ω resistor	0	600	Ω	
	RES06	0...1200 Ω resistor	0	1200	Ω	
	RES09	0...6250 Ω resistor	0	6250	Ω	
	RES10	0...12500 Ω resistor	0	12500	Ω	
	RES12	0...50000 Ω resistor	0	50000	Ω	
Potentiometers (3-conductor) Others can be selected in the software.	POT03	0...150 Ω potentiometer	0	100	%	10% of the selected measuring range
	POT05	0...600 Ω potentiometer	0	100	%	
	POT06	0...1200 Ω potentiometer	0	100	%	
	POT09	0...6250 Ω potentiometer	0	100	%	
	POT10	0...12500 Ω potentiometer	0	100	%	
	POT12	0...50000 Ω potentiometer	0	100	%	
Voltage signals (mV) Others can be selected in the software.	V04	Voltage (mV)	-1000	+1000	mV	10% of nominal span

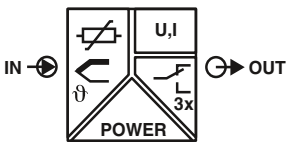
Other setting options can be configured with the IFS-CONF software:

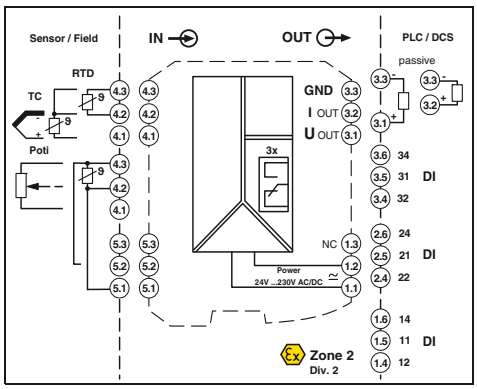
- Freely configurable user characteristic curve with 30 interpolation points
- Output behavior in the event of a short circuit, sensor break or overrange/underrange can be freely configured or set according to NE43 (standard configuration: NE43 upscale)
- Filter setting (standard configuration: 1)
- 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





Universal, with three limit value relays, wide-range power supply

Functional safety
Ex:
Housing width 35 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
- Three limit value relays, can be used in combination as a safe limit value relay
- Configuration via software (FDT-DTM) or IFS-OP-UNIT operating and display unit
- Programming during operation and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in capable screw or spring-cage connection method
- Cold junction compensation with separate connector
- Wide-range power supply: 19.2 ... 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 according to EN 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.

The configuration software can be downloaded from the Internet (www.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 118

For information on the programming adapter, refer to page 119

1) EMC: Class A product, see page 571

Technical data

Input data		
Resistance thermometers		Pt, Ni, Cu sensors: 2, 3, 4-conductor
Thermocouple sensors		B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG
Resistor		0 Ω ... 50 kΩ
Potentiometer		0 Ω ... 50 kΩ
Voltage		-1000 mV ... 1000 mV
Output data	U output	I output
Output signal	4 mA ... 20 mA (in the case of SIL; further free configuration without SIL)	
Maximum output signal	±11 V	22 mA
Load R_B	≥ 10 kΩ	≤ 600 Ω (20 mA)
Behavior in the event of a sensor error	According to NE 43 or freely configurable	
Switching output	**Relay output**	
Contact type	3 PDTs	
Contact material	$AgSnO_2$, hard gold-plated	
Maximum switching voltage	250 V AC (250 V DC)	
Maximum switching current	2 A (250 V AC) / 2 A (28 V DC)	
General data		
Supply voltage range	24 V ... 230 V AC/DC (-20%/+10%, 50/60 Hz)	
Power consumption	< 2.4 W	
Temperature coefficient	0.01%/K	
Transmission error, total	< 0.1% (e.g., for Pt 100, 300 K span, 4 ... 20 mA)	
Electrical isolation		
Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)	
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	-20°C ... 65°C	
Humidity	Typ. 5% ... 95% (no condensation)	
Housing material	PA 66-FR	
Inflammability class according to UL 94	V0	
Dimensions W / H / D	35 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA nC ic IIC T4 Gc X	
IECEx	Ex nA nC ic IIC T4 Gc X	
Functional safety (SIL)	SIL 2, PL d	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
Temperature transducer				
Standard configuration	Screw connection	**MACX MCR-T-UIREL-UP[1])**	**2811378**	1
Standard configuration	Spring-cage conn.	**MACX MCR-T-UIREL-UP-SP[1])**	**2811828**	1
Order configuration	Screw connection	**MACX MCR-T-UIREL-UP-C[1])**	**2811514**	1
Order configuration	Spring-cage conn.	**MACX MCR-T-UIREL-UP-SP-C[1])**	**2811831**	1

Accessories

Description	Type	Order No.	Pcs. / Pkt.
Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER[1])**	**2811271**	1

Order key for MACX-MCR-T-UIREL-UP(-SP)-C temperature transducer (standard configuration entered as an example)

Order No.	Safety integrity level (SIL)	Sensor type	Connection technology	Cold junction compensation	Measuring range: Start	Measuring range: End	Measuring unit	Output range	Factory calibration certificate = FCC
2811514	ON	PT100	4	0	-50	150	C	OUT02	NONE
2811514 ≙ MACX MCR-T-UIREL-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)
2811831 ≙ MACX MCR-T-UIREL-UP-SP-C	ON only with output range = OUT02								

					Smallest measuring range span
Resistance thermometers (RTD) Others can be selected or freely configured in the software.	PT100	≙ Pt 100 acc. to IEC 751	-200	850	°C	20 K
	PT200	≙ Pt 200 acc. to IEC 751	-200	850	°C	20 K
	PT500	≙ Pt 500 acc. to IEC 751	-200	850	°C	20 K
	PT1000	≙ Pt 1000 acc. to IEC 751	-200	850	°C	20 K
	PT100S	≙ Pt 100 acc. to Sama RC21-4-1966	-200	850	°C	20 K
	PT1000S	≙ Pt 1000 acc. to Sama RC21-4-1966	-200	850	°C	20 K
	PT100G	≙ Pt 100 acc. to GOST 6651-2009 (α = 0.00385)	-200	850	°C	20 K
	PT1000G	≙ Pt 1000 acc. to GOST 6651-2009 (α = 0.00385)	-200	850	°C	20 K
	PT100J	≙ Pt 100 acc. to JIS C1604/1997	-200	850	°C	20 K
	PT1000J	≙ Pt 1000 acc. to JIS C1604/1997	-200	850	°C	20 K
	NI100	≙ Ni 100 acc. to DIN 43760/DIN IEC 60751	-60	250	°C	20 K
	NI1000	≙ Ni 1000 acc. to DIN 43760/DIN IEC 60751	-60	250	°C	20 K
	NI100S	≙ Ni 100 acc. to Sama RC21-4-1966	-60	180	°C	20 K
	NI1000S	≙ Ni 1000 acc. to Sama RC21-4-1966	-60	180	°C	20 K
	NI1000L	≙ Ni 1000 (Landis & Gyr)	-50	160	°C	20 K
	CU10	≙ Cu 10 acc. to Sama RC21-4-1966	-70	500	°C	100 K
	CU50	≙ Cu 50 acc. to GOST 6651-2009 (α = 1.428)	-50	200	°C	100 K
	CU100	≙ Cu 100 acc. to GOST 6651-2009 (α = 1.428)	-50	200	°C	100 K
	CU53	≙ Cu 53 acc. to GOST 6651-2009 (α = 1.426)	-50	180	°C	100 K
	KTY81	≙ KTY81-110 (Philips)	-55	150	°C	20 K
	KTY84	≙ KTY84-130 (Philips)	-40	300	°C	20 K
Thermocouples (TC) Others can be selected in the software.	B	≙ acc. to IEC 584-1 (Pt30Rh-Pt6Rh)	500	1820	°C	50 K
	E	≙ acc. to IEC 584-1 (NiCr-CuNi)	-230	1000	°C	50 K
	J	≙ acc. to IEC 584-1 (Fe-CuNi)	-210	1200	°C	50 K
	K	≙ acc. to IEC 584-1 (NiCr-Ni)	-250	1372	°C	50 K
	N	≙ acc. to IEC 584-1 (NiCrSi-NiSi)	-250	1300	°C	50 K
	R	≙ acc. to IEC 584-1 (Pt13Rh-Pt)	-50	1768	°C	50 K
	S	≙ acc. to IEC 584-1 (Pt10Rh-Pt)	-50	1768	°C	50 K
	T	≙ acc. to IEC 584-1 (Cu-CuNi)	-200	400	°C	50 K
	L	≙ acc. to DIN 43760 (Fe-CuNi)	-200	900	°C	50 K
	U	≙ acc. 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
Remote resistance-type sensors (R) (2, 3, 4-conductor) Others can be selected in the software.	RES03	≙ 0...150 Ω resistor	0	150	Ω	10% of the selected measuring range
	RES05	≙ 0...600 Ω resistor	0	600	Ω	
	RES06	≙ 0...1200 Ω resistor	0	1200	Ω	
	RES09	≙ 0...6250 Ω resistor	0	6250	Ω	
	RES10	≙ 0...12500 Ω resistor	0	12500	Ω	
	RES12	≙ 0...50000 Ω resistor	0	50000	Ω	
Potentiometers (3-conductor) Others can be selected in the software.	POT03	≙ 0...150 Ω potentiometer	0	100	%	10% of the selected measuring range
	POT05	≙ 0...600 Ω potentiometer	0	100	%	
	POT06	≙ 0...1200 Ω potentiometer	0	100	%	
	POT09	≙ 0...6250 Ω potentiometer	0	100	%	
	POT10	≙ 0...12500 Ω potentiometer	0	100	%	
	POT12	≙ 0...50000 Ω potentiometer	0	100	%	
Voltage signals (mV) Others can be selected in the software.	V04	≙ Voltage (mV)	-1000	+1000	mV	10% of nominal span

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:

$$T\,[°F] = \frac{9}{5}\,T\,[°C] + 32$$

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 permissible

Notes:
1) EMC: Class A product, see page 571

Ex n

Can be snapped directly onto compatible 35 mm devices

Technical data

General data		
Ambient temperature range		-20°C ... 65°C (-4°F ... 149°F)
Humidity		90% (at 25°C, no condensation)
Housing material		PA 6.6
Dimensions W / H / D		35 / 99 / 20 mm
Connection method	PC side	S port (socket)
	Measuring transducer side	S port (plug)
Conformance / approvals		
Conformance		CE-compliant
ATEX		Ⓔx II 3G Ex nA ic IIC T4 Gc X
IECEx		Ex nA ic IIC T4 Gc X

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Operating and display unit			
	IFS-OP-UNIT[1])	**2811899**	1

Accessories
Cradle unit

– For snapping onto the DIN rail
– For control cabinet mounting of the operating and display unit

Notes:
1) EMC: Class A product, see page 571

Ex n

Cradle for operating and display unit

Technical data

General data		
Ambient temperature range		-20°C ... 65°C (-4°F ... 149°F)
Humidity		90% (at 25°C, no condensation)
Housing material		PA 6.6
Dimensions W / H / D		35.2 / 29 / 99 mm
Connection method	IFS-OP-UNIT operator interface	S port (socket)
	Measuring transducer side	S port (plug)
Conformance / approvals		
Conformance		CE-compliant
ATEX		Ⓔx II 3G Ex nA ic IIC T4 Gc X
IECEx		Ex nA ic IIC T4 Gc X

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Cradle unit, for snapping the operating and display unit onto the DIN rail			
	IFS-OP-CRADLE[1])	**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 MACX Analog and MINI Analog.

Notes:

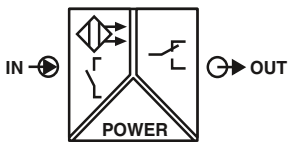
1) EMC: Class A product, see page 571

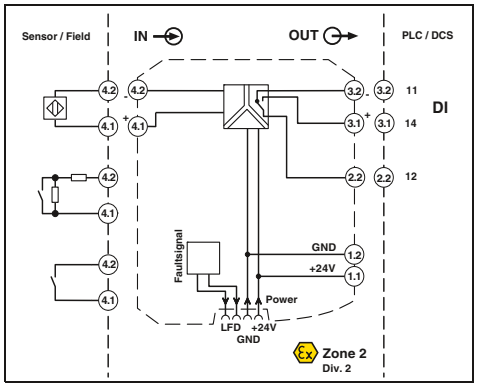
Applied for:
cUL / UL

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER[1])**	**2811271**	1

Digital IN
NAMUR isolation amplifiers





Ex n

SIL IEC 61508

Signal output: PDT relay

GL Functional safety
Ex:
Housing width 12.5 mm

NAMUR isolation amplifier 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/deactivated, error message signaled by red flashing LED with de-excitation of 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 EN 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 126

Information about resistance circuits is given on page 183

Information on “Plug and play” connection using system cabling can be found from page 128

1) EMC: Class A product, see page 571

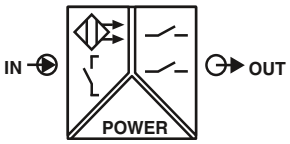
Technical data

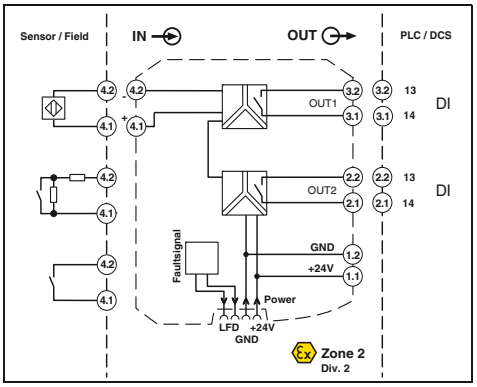
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	8 V DC ±10%
Switching points	> 2.1 mA (conductive) / < 1.2 mA (blocking)
Switching hysteresis	< 0.2 mA
Line error detection	Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output	**Relay output**
Contact type	1 PDT
Contact material	$AgSnO_2$, hard gold-plated
Maximum switching voltage	250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)
Maximum switching capacity	500 VA
Recommended minimum load	5 V / 10 mA
Mechanical service life	10^7 cycles
Switching behavior	Can be inverted via slide switch
Maximum switching frequency	20 Hz (without load)
General data	
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption	21 mA (24 V DC)
Power dissipation	< 650 mW
Electrical isolation	
Input/output/supply, T-Connector	300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	10% ... 95% (no condensation)
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	II 3 G Ex nA nC IIC T4 Gc X
Functional safety (SIL)	SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolation amplifier			
Screw connection	**MACX MCR-SL-NAM-R[1])**	**2865997**	1
Spring-cage conn.	**MACX MCR-SL-NAM-R-SP[1])**	**2924252**	1

Digital IN
NAMUR isolation amplifiers





2 signal outputs: N/O contact relay

Functional safety
Ex:
Housing width 12.5 mm

NAMUR isolation amplifier for operating proximity sensors and mechanical contacts

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- Two relay signal outputs (N/O contact); output 2 can be used as an error message output
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD), can be activated/deactivated, error message signaled by red flashing LED with de-excitation of 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 EN 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 126

Information about resistance circuits is given on page 183

Information on “Plug and play” connection using system cabling can be found from page 128

1) EMC: Class A product, see page 571

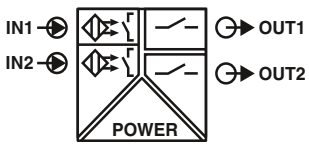
Technical data

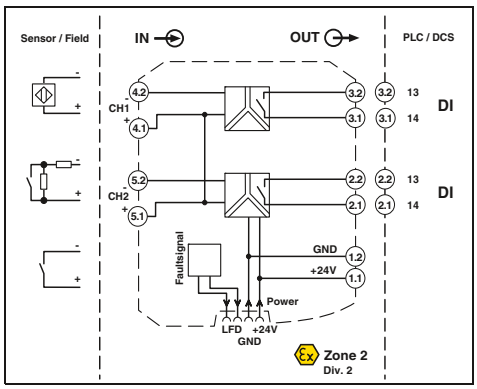
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	8 V DC ±10%
Switching points	> 2.1 mA (conductive) / < 1.2 mA (blocking)
Switching hysteresis	< 0.2 mA
Line error detection	Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output	**Relay output**
Contact type	2 N/O contacts
Contact material	$AgSnO_2$, hard gold-plated
Maximum switching voltage	250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)
Maximum switching capacity	500 VA
Recommended minimum load	5 V / 10 mA
Mechanical service life	10^7 cycles
Switching behavior	Can be inverted via slide switch
Maximum switching frequency	20 Hz (without load)
General data	
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption	30 mA (24 V DC)
Power dissipation	< 950 mW
Electrical isolation	
Input/supply, T connector	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Output 1/output 2/input, power supply, T connector	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category III; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	10% ... 95% (no condensation)
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	II 3 G Ex nA nC IIC T4 Gc X
Functional safety (SIL)	SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolation amplifier			
Screw connection	**MACX MCR-SL-NAM-2RO[1])**	**2865010**	1
Spring-cage conn.	**MACX MCR-SL-NAM-2RO-SP[1])**	**2924265**	1

Digital IN
NAMUR isolation amplifiers





Ex n

SIL IEC 61508

2-channel, signal output: N/O contact relay

GL Functional safety
Ex: Ex
Housing width 12.5 mm

NAMUR isolating amplifier 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/deactivated, error message signaled by red flashing LED with de-excitation of 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 EN 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 126

Information about resistance circuits is given on page 183

Information on “Plug and play” connection using system cabling can be found from page 128

1) EMC: Class A product, see page 571

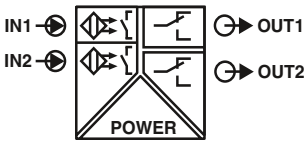
Technical data

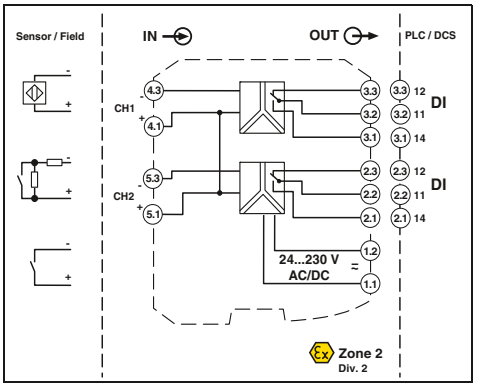
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	8 V DC ±10%
Switching points	> 2.1 mA (conductive) / < 1.2 mA (blocking)
Switching hysteresis	< 0.2 mA
Line error detection	Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output	**Relay output**
Contact type	2 N/O contacts
Contact material	$AgSnO_2$, hard gold-plated
Maximum switching voltage	250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)
Maximum switching capacity	500 VA
Recommended minimum load	5 V / 10 mA
Mechanical service life	10^7 cycles
Switching behavior	Can be inverted via slide switch
Maximum switching frequency	20 Hz (without load)
General data	
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption	35 mA (24 V DC)
Power dissipation	< 1 W
Electrical isolation	
Input/supply, T connector	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Output 1/output 2/input, power supply, T connector	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category III; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	5% ... 95% (no condensation)
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	Ex II 3 G Ex nA nC IIC T4 Gc X
Functional safety (SIL)	SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolation amplifier			
Screw connection	**MACX MCR-SL-2NAM-RO[1])**	**2865049**	1
Spring-cage conn.	**MACX MCR-SL-2NAM-RO-SP[1])**	**2924294**	1

Digital IN
NAMUR isolation amplifiers





Ex n

SIL
IEC 61508

2-channel, signal output: PDT relay, wide-range power supply

Functional safety
Ex:
Housing width 17.5 mm

NAMUR isolation amplifier 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/deactivated, error message signaled by red flashing LED with de-excitation of output relay
- Wide-range power supply: 19.2 ... 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 EN 61508
- Installation in zone 2 permitted

Notes:

Information on resistance circuits and marking material can be found on page 183

1) EMC: Class A product, see page 571

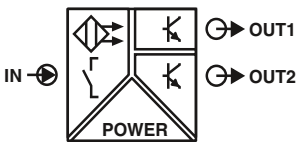
Technical data

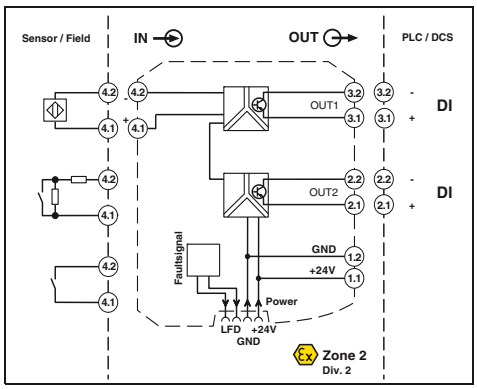
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) open circuit switch contacts Switch contacts with resistance circuit
No-load voltage	8 V DC ±10%
Switching points	> 2.1 mA (conductive) / < 1.2 mA (blocking)
Switching hysteresis	Approx. 0.2 mA
Line error detection	Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output	Relay output
Contact type	2 PDT
Contact material	$AgSnO_2$, hard gold-plated
Maximum switching voltage	250 V AC (2 A, 60 Hz) / 120 V DC (0.2 A) / 30 V DC (2 A)
Maximum switching capacity	500 VA
Recommended minimum load	5 V / 10 mA
Mechanical service life	10^7 cycles
Switching behavior	can be inverted using DIP switch
Maximum switching frequency	20 Hz (Load-dependent)
General data	
Supply voltage range	24 V ... 230 V AC/DC (-20% ... +10%, 50 ... 60 Hz)
Current consumption	< 80 mA ; < 42 mA (24 V DC)
Power dissipation	max. 1.3 W
Electrical isolation	
Input/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Output 1/output 2/input, power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category III; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Ambient temperature range	-20°C ... 60°C
Humidity	10% ... 95% (no condensation)
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	17.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	II 3 G Ex nA nC IIC T4 Gc X
Functional safety (SIL)	SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolation amplifier			
Screw connection	**MACX MCR-SL-2NAM-R-UP[1])**	**2865052**	1
Spring-cage conn.	**MACX MCR-SL-2NAM-R-UP-SP[1])**	**2924304**	1

Digital IN
NAMUR isolation amplifiers





Ex n

SIL IEC 61508

2 signal outputs: transistor (passive)

GL Functional safety
Ex:
Housing width 12.5 mm

NAMUR isolation amplifier 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/deactivated, error message signaled by red flashing LED with inhibiting of 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 EN 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 126

Information about resistance circuits is given on page 183

Information on “Plug and play” connection using system cabling can be found from page 128

1) EMC: Class A product, see page 571

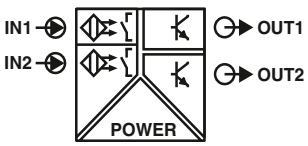
Technical data

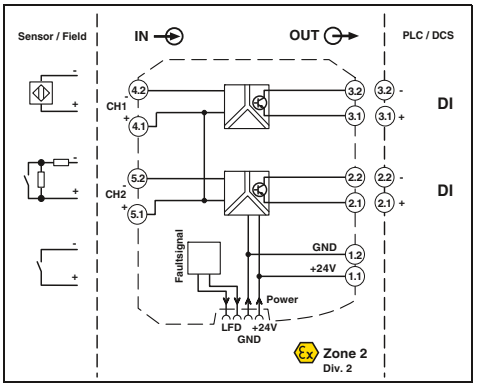
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	8 V DC ±10%
Switching points	> 2.1 mA (conductive) / < 1.2 mA (blocking)
Line error detection	Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output	2 transistor outputs, passive
Maximum switching voltage	30 V DC (per output)
Maximum switching current	50 mA (short-circuit resistant)
Drop (ΔU)	< 1.4 V
Switching behavior	can be inverted using DIP switch
Maximum switching frequency	5 kHz
General data	
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption	< 28 mA (24 V DC)
Power dissipation	800 mW
Electrical isolation	
Input/output/supply, T-Connector	300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
Output 1/output 2	1 kV (50 Hz, 1 min., test voltage) 50 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	10% ... 95% (no condensation)
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	II 3 G Ex nA IIC T4 Gc X
Functional safety (SIL)	SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolation amplifier			
Screw connection	**MACX MCR-SL-NAM-2T[1])**	**2865023**	1
Spring-cage conn.	**MACX MCR-SL-NAM-2T-SP[1])**	**2924278**	1

Digital IN
NAMUR isolation amplifiers





Ex n

SIL IEC 61508

2-channel, signal output transistor (passive)

Functional safety
Ex:
Housing width 12.5 mm

NAMUR isolation amplifier 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/deactivated, error message signaled by red flashing LED with inhibiting of 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 EN 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 126
Information about resistance circuits is given on page 183
Information on “Plug and play” connection using system cabling can be found from page 128
1) EMC: Class A product, see page 571

Technical data

Input data		
Input signal		NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage		8 V DC ±10%
Switching points		> 2.1 mA (conductive) / < 1.2 mA (blocking)
Line error detection		Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output		Transistor output, passive
Maximum switching voltage		30 V DC (per output)
Maximum switching current		50 mA (short-circuit resistant)
Drop (ΔU)		< 1.4 V
Switching behavior		can be inverted using DIP switch
Maximum switching frequency		5 kHz
General data		
Supply voltage range		19.2 V DC ... 30 V DC
Current consumption		< 34 mA (24 V DC)
Power dissipation		1000 mW
Electrical isolation		
	Input/output/supply, T-Connector	300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
	Output 1/output 2	1 kV (50 Hz, 1 min., test voltage) 50 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Ambient temperature range		-20°C ... 60°C (Any mounting position)
Humidity		10% ... 95% (no condensation)
Housing material		PA 66-FR
Inflammability class according to UL 94		V0
Dimensions W / H / D		12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		II 3 G Ex nA IIC T4 Gc X
Functional safety (SIL)		SIL 2 according to EN 61508

Ordering data

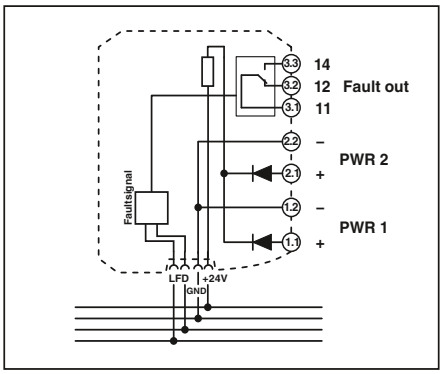
Description		Type	Order No.	Pcs. / Pkt.
NAMUR isolation amplifier				
	Screw connection	**MACX MCR-SL-2NAM-T[1])**	**2865036**	1
	Spring-cage conn.	**MACX MCR-SL-2NAM-T-SP[1])**	**2924281**	1

Accessories

Power and error message module

Power and error message 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 permissible



Ex n

H
D W

Ex: // Applied for: cUL / UL
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	3.75 A
Output voltage	(Input voltage - max 0.8 V at 3.75 A)
Switching output	Relay
Contact type	1 PDT
Contact material	Gold (Au)
Maximum switching voltage	50 V AC (2 A)
General data	
Current consumption	
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	5% ... 95% (no condensation)
Fuse	5 A (replaceable), slow-blow 250 V AC
Status indication	1 x red LED (error) 2 x green LEDs (PWR1 and PWR2)
Housing material	Polyamide (PA 6.6)
Inflammability class according to UL 94	V0
Dimensions W / H / D	17.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Conformance / approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA nC IIC T4 Gc X
IECEx	Ex nA nC IIC T4 Gc X
UL, USA / Canada	UL 61010

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Supply and error message module, including the relevant DIN rail connector ME 17,5 TBUS 1,5/5-ST-3,81 GN			
Screw connection	**MACX MCR-PTB**	**2865625**	1
Spring-cage conn.	**MACX MCR-PTB-SP**	**2924184**	1

Accessories

ME 6,2 TBUS... T-Connector

DIN rail connector (5-pos.) for bridging the supply voltage of 12.5 mm wide MACX analog modules

– Reduces wiring costs
– System can be extended or module replaced even while process is active
– Inter-extendable

Description	Ordering data		
	Type	Order No.	Pcs. / Pkt.
DIN rail connector (TBUS), for bridging the supply voltage, can be snapped onto 35 mm DIN rails as per EN 60715, with UL approval			
	ME 6,2 TBUS-2 1,5/5-ST-3,81 GN	**2869728**	10

Accessories

Marking material for device marking

– For device marking inside the control cabinet and in the field
– Self-adhesive with high adhesive strengths
– Large temperature range

Description	Color	Ordering data		
		Type	Order No.	Pcs. / Pkt.
UniCard, with self-adhesive plastic labels				
10-part, lettering field size: 11 x 9 mm	white	**UC-EMLP (11X9)**	**0819291**	10
UniCard, with self-adhesive plastic labels, **marked according to customer specifications** For ordering details, see Catalog 5 or www.phoenixcontact.net/products				
10-part, lettering field size: 11 x 9 mm	white	**UC-EMLP (11X9) CUS**	**0824547**	1

Termination carrier for MACX Analog Ex isolating amplifiers

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/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
– Saves up to 30% of space due 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 isolating amplifiers

The **TC-D37SUB-ADIO16-EX-P-UNI** universal termination carrier is a compact solution which connects isolating amplifiers from the MACX Analog 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.

– Connection of up to 16 single-channel (Ex i-)isolating amplifiers
– Universal 1:1 signal routing to a 37-pos. D-SUB plug-in 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 specifications.

1) EMC: Class A product, see page 571

Housing width 244 mm

Technical data

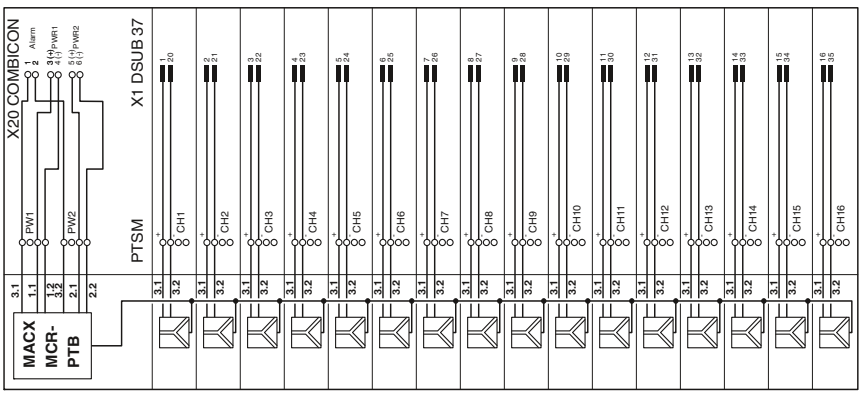
General data	
Connection to the control system level	D-SUB pin strip
Number of positions	37
Maximum operating voltage	< 50 V DC (Per signal/channel)
Maximum permissible current	1 A (Signal/channel)
Rated insulation voltage	50 V
Surge voltage category	II
Pollution degree	2
Rated surge voltage	0.5 kV
Air and creepage distances	DIN EN 50178 (Basic insulation)
Degree of protection	IP20
Ambient temperature range	-40°C ... 80°C (Please observe module specifications)
Shock	15g, according to IEC 60068-2-27
Vibration (operation)	2g, according to IEC 60068-2-6
Inflammability class according to UL 94	V0
Dimensions W / H / D	244 / 170 / 160 mm
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	5 A Slow-blow (can be exchanged)
Status indication	1 x red LED (error) 2 x green LEDs (PWR1 and PWR2)
Switching output	1 PDT
Contact material	Au
Maximum switching voltage	50 V DC (0.3 A) / 30 V DC (2 A) / 33 V AC (2 A)

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Universal termination carrier for 16 MACX MCR-EX isolators			
	TC-D37SUB-ADIO16-EX-P-UNI	**2924854**	1
- With connection for MACX MCR-S-MUX HART multiplexer	**TC-D37SUB-AIO16-EX-PS-UNI**[1)]	**2902932**	1

Accessories

Supply and error message module	**MACX MCR-PTB**	**2865625**	1
	MACX MCR-PTB-SP	**2924184**	1
HART multiplexer, 32-channel	**MACX MCR-S-MUX**	**2865599**	1



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

Also for special applications

MCR Analog isolating amplifiers and digital displays – for special applications using signal processing.

Isolating amplifiers in the MCR Analog range can be used to record temperatures directly in the field, for example, or to convert digital signals into analog signals. You can monitor your process values using digital displays.

Choose the right MACX Analog isolating amplifier for your application:

Analog IN/Analog OUT
- Configurable signal multipliers to double standard analog signals
- Configurable loop-powered isolators and standard passive isolators for temperature
- Programmable temperature transducers
- Configurable temperature transducers for Pt 100
- Temperature relay for Pt 100
- Programmable loop-powered temperature transducers.

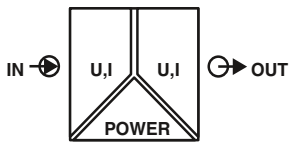
Frequency
- Programmable frequency transducers for frequencies of up to 120 kHz

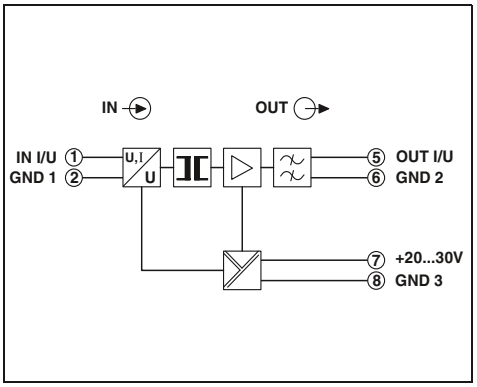
Limit value switches
- Limit value switches for standard analog signals

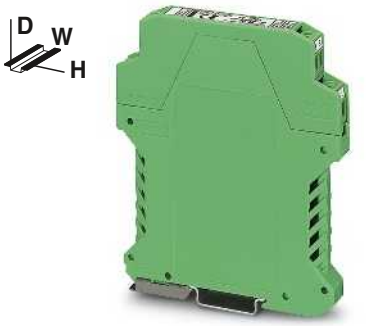
Digital displays
- Programmable digital displays for standard signals
- Setpoint adjuster

Your advantages:
- High operational reliability in the event of disturbances, thanks to electrical isolation
- User-friendly wiring, thanks to plug-in connection terminal blocks
- Easy configuration via software, DIP switches or display keypad
- Digital displays can be programmed without software: via the keypad on the front
- The digital displays are easy to read, thanks to the large five-digit display

Analog IN / Analog OUT
3-way isolating amplifier







With fixed signal combinations

- Processing standard signals
- Fixed setting of input and output signals
- 3-way isolation

Notes:

1) EMC: Class A product, see page 571

Housing width 12.5 mm

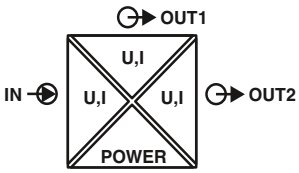
Technical data

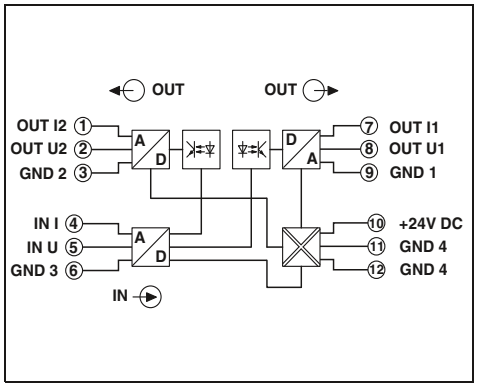
Input data	U input	I input
Input signal	0 ... 10 V / -10 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Maximum input signal	30 V	50 mA
Input resistance	100 kΩ	50 Ω
Output data	U output	I output
Output signal	0 ... 10 V / -10 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	15 V	30 mA
Load R_B	≥ 10 kΩ	≤ 500 Ω
Linear transmission range (in reference to the output range end value)	0% ... 105% -110% ... 110% (Bipolar signals)	-5% ... 105%
General data		
Supply voltage U_B	20 V DC ... 30 V DC	
Current consumption	< 15 mA (without load)	
Maximum transmission error	≤ 0.3% (of final value), typ. < 0.2% (of final value)	
Temperature coefficient	< 0.015%/K	
Limit frequency (3 dB)	30 Hz	
Step response (10 - 90%)	11 ms	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-25°C ... 60°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 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance / approvals		
Conformance	CE-compliant	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
MCR 3-way isolating amplifier, for electrical isolation of analog signals,				
Input signal	Output signal			
0 ... 10 V	4 ... 20 mA	**MCR-C-U-I- 4-DC[1])**	**2814537**	5
4 ... 20 mA	0 ... 10 V	**MCR-C-I-U- 4-DC[1])**	**2814511**	5
0 ... 10 V, -10 ... 10 V	0 ... 10 V, -10 ... 10 V	**MCR-C-U-U-DC[1])**	**2814469**	5
0 ... 20 mA, 4 ... 20 mA	0 ... 20 mA, 4 ... 20 mA	**MCR-C-I-I-00-DC[1])**	**2814508**	5

Analog IN/Analog OUT signal multiplier





With freely configurable input and two outputs

Ex:

Housing width 17.5 mm

- 4-way isolation
- Calibrated reversible input and output signals

Notes:

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

1) EMC: Class A product, see page 571

Technical data

	U input	I input
Input data		
Input signal	0 V ... 12 V (freely selectable in 0.1 V steps)	0 mA ... 24 mA (freely selectable in 0.1 mA steps)
Measuring range span	min. 4 V	min. 8 mA
Maximum input signal	30 V	50 mA
Input resistance	200 kΩ	50 Ω
Output data	U output	I output
Output signal (configurable using the DIP switch)	refer to the order key	refer to the order key
Maximum output signal	15 V	35 mA
Load R_B	≥ 10 kΩ	≤ 600 Ω
General data		
Supply voltage U_B	20 V DC ... 30 V DC	
Current consumption	< 25 mA	
Maximum transmission error	≤ 0.15% (of final value), typ. 0.05% (of final value)	
Temperature coefficient	< 0.015%/K, typ. 0.0075%/K	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature (operation)	-25°C ... 55°C	
Housing material	Polyamide PA non-reinforced	
Dimensions W / H / D	17.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D or non-hazardous locations	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR signal multiplier, for multiplication and electrical isolation of analog signals,			
Order configuration	**MCR-FL-C-UI-2UI-DCI**[1])	**2814854**	1
Standard configuration	**MCR-FL-C-UI-2UI-DCI-NC**[1])	**2814867**	1

Order key for MCR-FL-C-UI-2UI-DCI (standard configuration entered as an example)

Order No.	Input signal	Input signal (standard and special signals) Initial value	Final value	Output signal (standard signals) Output 1	Output 2	Factory calibration certificate (FCC)
2814854	I	0.0	20.0	OUT01	OUT01	NONE
	I ≙ Current U ≙ Voltage	0.0 ≙ 0.0 mA I : freely selectable between 0.0 ... 24.0 mA U : freely selectable between 0.0 ... 12.0 V	20.0 ≙ 20.0 mA I : freely selectable between 0.0 ... 24.0 mA U : freely selectable between 0.0 ... 12.0 V	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA OUT03 ≙ 0...10 V OUT04 ≙ 2...10 V OUT05 ≙ 0...5 V OUT06 ≙ 1...5 V OUT16 ≙ 0...10 mA	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA OUT03 ≙ 0...10 V OUT04 ≙ 2...10 V OUT05 ≙ 0...5 V OUT06 ≙ 1...5 V OUT16 ≙ 0...10 mA	NONE ≙ without FCC YES ≙ with FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

8.0 mA/4.0 V min. measuring range span
0.1 mA/0.1 V increment

Ordering examples:

2814854	I	5.3	13.3	OUT01	OUT01	NONE
	I ≙ Current	I ≙ 5.3 mA	I ≙ 13.3 mA	OUT01 ≙ 0...20 mA	OUT01 ≙ 0...20 mA	NONE ≙ without FCC

8.0 mA measuring range span, i.e., order is possible.

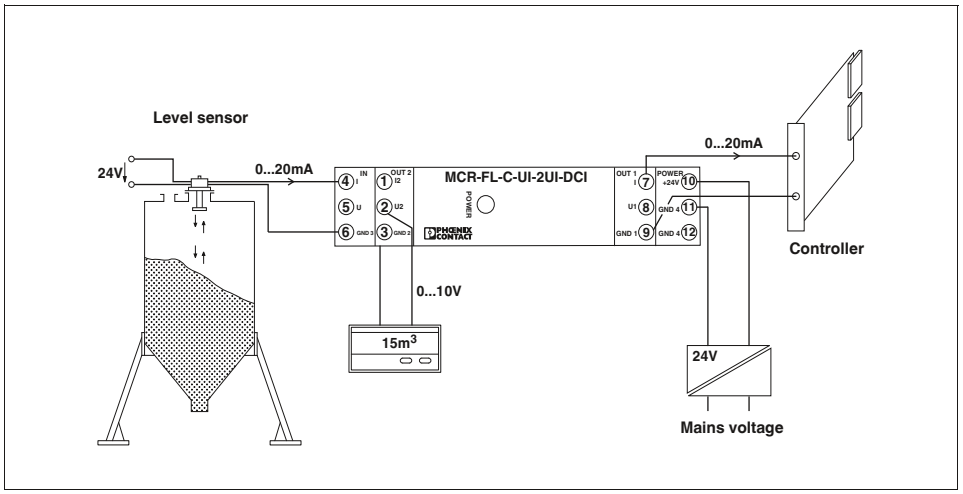
2814854	U	7.8	11.8	OUT01	OUT03	NONE
	U ≙ Voltage	U ≙ 7.8 V	U ≙ 11.8 V	OUT01 ≙ 0...20 mA	OUT03 ≙ 0...10 V	NONE ≙ without FCC

4.0 V measuring range span, i.e., order is possible.

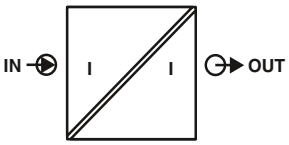
Combination table for input and output signals that can be set via DIP switches

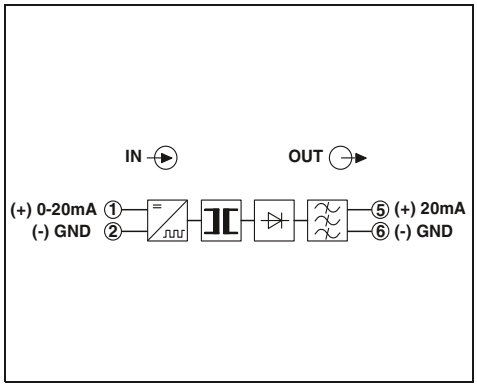
	Output 1							Output 2						
Input	0...20 mA	4...20 mA	0...10 mA	0...10 V	0...5 V	1...5 V	2...10 V	0...20 mA	4...20 mA	0...10 mA	0...10 V	0...5 V	1...5 V	2...10 V
0...20 mA	x	x	x	x	x	x	x	x	x	x	x	x	x	x
4...20 mA	x	x	x	x	x	x	x	x	x	x	x	x	x	x
0...10 mA	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2...10 mA	x	x	x	x	x	x	x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

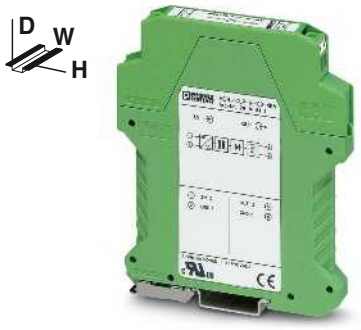
Application example: level measurement with subsequent signal multiplication



Analog IN / Analog OUT passive isolators







1-channel, with safe isolation

Housing width 12.5 mm

- Electrical isolation without additional auxiliary power supply
- Current signals 0(4)...20 mA
- Safe isolation

Notes:

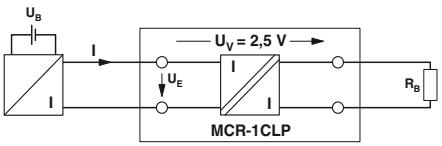
When using passive isolators, make sure that the current sourcing voltage of the measuring transducer U_B is sufficient to drive the maximum current of 20 mA via the passive isolator with the voltage drop U_V = 2.5 V and the load R_B.
This means:
$U_B \geq U_E = 2.5\ V + 20\ mA \times R_B$

Technical data

Input data	
Input signal	0 ... 20 mA / 4 ... 20 mA
Voltage drop	2.5 V (at I = 20 mA)
Response current	< 50 µA
Maximum input current	50 mA (100 mA overload)
Maximum input voltage	30 V (30 V overload)
Input voltage limitation	33 V 5% (with Zener diode)
Output data	
Output signal	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	< 50 mA
Load R_B	≤ 1375 Ω (at I = 20 mA output signal)
Ripple	< 5 mV (rms)
General data	
Maximum transmission error	≤ 0.1% (of final value)
Additional error per 100 Ω load	0.02% (of measured value / 100 Ω load)
Temperature coefficient	≤ 0.002%/K (of measured value / 100 Ω load)
Test voltage input/output	4 kV (50 Hz, 1 min.)
Protection against electric shock	Increased insulation according to DIN EN 61 010 part 1 and safe isolation according to VDE 0100 part 410 along the lines of VDE 0106 part 101 up to 300 V AC/DC for surge voltage category II and pollution degree 2 between all isolated distances.
Ambient temperature (operation)	-10°C ... 70°C
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 mm² / 0.2 ... 2.5 mm² / 24 - 14
Conformance / approvals	
Conformance	CE-compliant

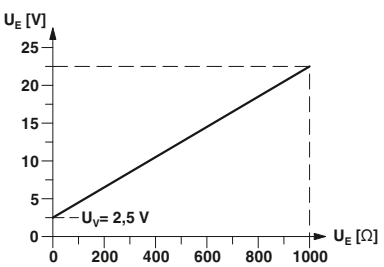
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR passive isolator, for electrical isolation of current signals without auxiliary power	**MCR-SL-1CLP-I-I-00-4KV**	**2814841**	1

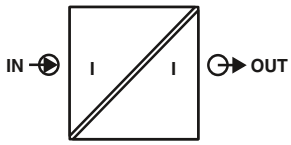


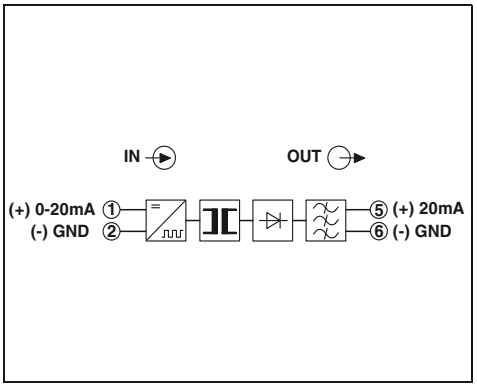
Input voltage in relation to load for I_A = 20 mA

The diagram shows input voltage U_I in relation to load R_B taking into account voltage failure U_V.
If the load is known, the minimum voltage the sensor must supply in order to drive the maximum current of 20 mA via the passive isolator and the load can be read on the Y-axis.



Analog IN / Analog OUT passive isolators





1-, 2- or 4-channel options

- Electrical isolation without additional auxiliary power supply
- Current signals 0(4)...20 mA
- Alternatively 1-, 2- or 4-channel version

Notes:

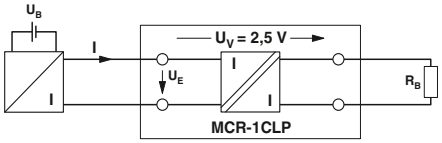
When using passive isolators, make sure that the current sourcing voltage of the measuring transducer U_B is sufficient to drive the maximum current of 20 mA via the passive isolator with the voltage drop U_V = 2.5 V and the load R_B.
This means:
$U_B \geq U_E$ = 2.5 V + 20 mA x R_B

Technical data

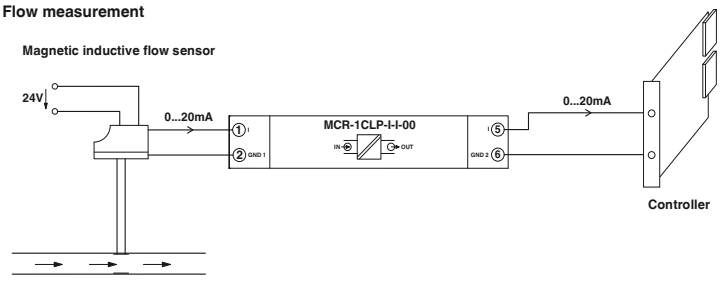
Input data	
Input signal	0 ... 20 mA / 4 ... 20 mA
Voltage drop	2.5 V (at I = 20 mA)
Response current	< 50 µA
Maximum input current	50 mA (100 mA overload)
Maximum input voltage	30 V (30 V overload)
Input voltage limitation	33 V (with Zener diode)
Output data	
Output signal	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	< 50 mA
Load R_B	≤ 1375 Ω (at I = 20 mA output signal)
Ripple	< 5 mV (rms)
General data	
Additional error per 100 Ω load	0.02% (of measured value)
Temperature coefficient	≤ 0.002%/K (of measured value / 100 Ω load)
Test voltage input/output	510 V (50 Hz, 1 min.)
Ambient temperature (operation)	-10°C ... 70°C
Housing material	Polyamide PA non-reinforced
Dimensions H / D	99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Conformance / approvals	
Conformance	CE-compliant

Ordering data

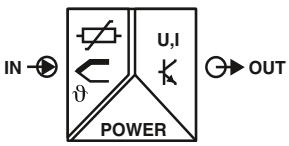
Description		Type	Order No.	Pcs. / Pkt.
MCR passive isolator, for electrical isolation of current signals without auxiliary power				
1-channel	12.5 mm wide	**MCR-1CLP-I-I-00**	**2814016**	1
2-channel	12.5 mm wide	**MCR-2CLP-I-I-00**	**2814029**	1
4-channel	22.5 mm wide	**MCR-4CLP-I-I-00**	**2814045**	1

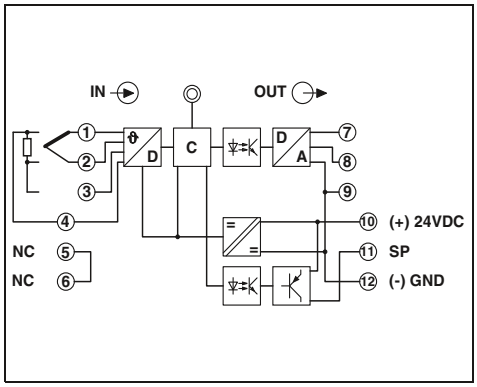


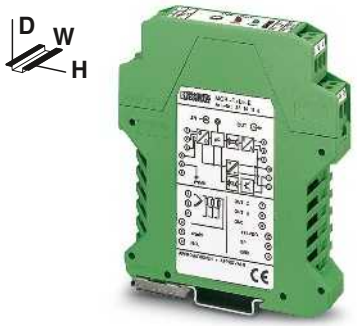
Flow measurement



Temperature
Temperature transducer







For resistance thermometers, thermocouples, resistance-type sensors, and mV sources

Ex:

Housing width 17.5 mm

- For resistance thermometers and thermocouples
- Measure differential temperatures
- With transistor switching output
- Freely programmable via MCR/PI-CONF-WIN
- Option of inverse output signal ranges

Notes:

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

Further information about the configuration software can be found on page 149

1) EMC: Class A product, see page 571

Technical data

Input data		
Resistance thermometers	Pt, Ni, Cu sensors : 2, 3, 4-conductor	
Thermocouple sensors	U, T, L, J, E, K, N, S, R, B, C, W, HK	
Resistor	0 Ω ... 8000 Ω (freely adjustable, min. measuring range 100 Ω)	
Voltage	-20 mV ... 2400 mV (freely adjustable, minimum measuring range span of 10 mV)	
Temperature range	(Depending on sensor type used)	
Sensor input current	250 µA (resistance thermometer)	
Output data	**U output**	**I output**
Output signal	0 ... 5 V / 0 ... 10 V	0 ... 20 mA / 4 ... 20 mA
	-5 ... 5 V / -10 ... 10 V	-
Maximum output signal	±12 V	24 mA
D/A resolution	±12 bit	±12 bit
Load R_B	≥ 10 kΩ	≤ 500 Ω
Ripple	< 20 mV_{PP}	
Output signal with open circuit	-12 V ... 12 V	0 A ... 24 mA
Measuring range overrange/underrange	-12 V ... 12 V	0 A ... 24 mA
Switching output	Transistor output, pnp	
	Can carry a load of 100 mA, switches supply voltage (not protected against short-circuit); locked in case of order-specific configuration, otherwise freely programmable through MCR/PI-CONF-WIN	
General data		
Supply voltage U_B	18 V DC ... 30 V DC	
Current consumption	≤ 60 mA, typ. 40 mA	
Maximum transmission error	≤ 0.1% (of maximum range, ±6 mV or ±12 µA at output)	
Cold junction errors	≤ 3 K, typ. 1.5 K	
Temperature coefficient	≤ 0.01%/K, typ. 0.005%/K	
Test voltage input/output	1 kV (50 Hz, 1 min.)	
Test voltage input/power supply	1 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 65°C	
Mounting	Any	
Housing material	Polyamide PA non-reinforced	
Dimensions W / H / D	17.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D or non-hazardous locations	
GL	Germanischer Lloyd	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducers, for resistance thermometers and thermocouple sensors, with electrical isolation of input/output and input/supply voltage			
Order configuration	**MCR-T-UI-E[1])**	**2814113**	1
Standard configuration	**MCR-T-UI-E-NC[1])**	**2814126**	1
Order configuration, without electrical isolation	**MCR-T-UI[1])**	**2814090**	1
Standard configuration, without electrical isolation	**MCR-T-UI-NC[1])**	**2814100**	1

Order key for MCR-T-UI(-E)... (standard configuration entered as an example)

Order No.	Sensor type	Input characteristic curve	Connection technology	Measuring range: Start	Measuring range: End	Measuring unit	Output	Output characteristic curve	Factory calibration certificate (FCC)
2814113	PT100	D	3	-200.0	+850.0	C	OUT02	N	NONE
2814113 ≙ MCR-T-UI-E 2814090 ≙ MCR-T-UI	See tables under "Sensor type"	D ≙ DIN S ≙ SAMA (see table) 0 ≙ for Ni1000 (Landis & Gyr), Cu10, Cu50, Cu53, KTY81-110, thermocouple, resistor, potentiometer, voltage	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor 0 ≙ for thermocouple, resistor, potentiometer, voltage	for 0 mA (e.g., -200.0°C)	for 20 mA (e.g., +850.0°C)	C ≙ °C F ≙ °F V ≙ mV O ≙ W P ≙ %	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA OUT03 ≙ 0...10 V OUT05 ≙ 0...5 V OUT13 ≙ -5...+5 V OUT14 ≙ -10...+10 V	N ≙ Normal I ≙ Inverse	NONE ≙ without FCC YES ≙ with FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

Resistance thermometers

Sensor type [1]	Standard (input characteristic curve)	Measuring range	Smallest measuring range span
PT...	DIN/SAMA	-200°C ... 850°C	0.4 K
NI...	DIN/SAMA	-60°C ... 180°C	0.4 K
Ni1000	Landis & Gyr	-50°C ... 160°C	0.4 K
CU10	SAMA	-70°C ... 500°C	0.4 K
CU50	–	-50°C ... 200°C	0.4 K
CU53	–	-50°C ... 180°C	0.4 K
KTY81	Philips	-55°C ... 150°C	0.4 K
KTY84	–	-40°C ... 300°C	0.4 K

Temperature ranges according to IEC 60751/EN 60751 and DIN 43760 SAMA RC 21-4-1966 with 2, 3 or 4-conductor circuit.

[1]) Note: Pt sensors in increments of 10, 20, ...100 and 100, 200, ...1000, 2000.
KTY81 ≙ KTY81-110.

Other types or characteristic curves available on request.

Thermocouples

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

[2]) Thermocouples according to IEC 60584/EN 60584.

Other types or characteristic curves available on request.

Resistors, potentiometers, mV voltages

Sensor type	Input	Measuring range	Smallest measuring range span
RES	Resistor	0 Ω ... 8000 Ω (2-conductor)	2 Ω
POT	Potentiometer (max. 8 kΩ)	0 ... 100% (3-conductor)	0.2%
V01	Voltage	-20 mV ...+2400 mV	2 mV

Temperature conversion guide for °C to °F:

$$T\,[°F] = \frac{9}{5}\,T\,[°C] + 32$$

Ordering examples with different input versions:

Resistance thermometer

2814113	PT100	D	3	-200.0	+850.0	C	OUT02	N	NONE

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

Thermocouple

2814113	J	0	0	-346	+2192	F	OUT02	I	NONE

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

Voltage

2814113	V01	0	0	-10	1200	V	OUT03	I	NONE

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

Resistor

(2-conductor connection)

2814113	RES	0	0	0	7500	O	OUT05	N	NONE

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

Potentiometer

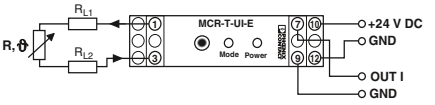
(3-conductor connection)

2814113	POT	0	0	10	90	P	OUT02	N	NONE

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

Application examples:

Resistance thermometer: 2-conductor connection technology

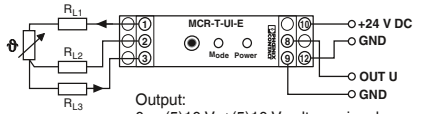


Output: 0(4) ... 20 mA current signal

Application:
- For short distances (< 10 m)

Please note:
- Cable resistances R_{L1} and R_{L2} are incorporated in the measurement result directly and falsify the result accordingly (example for Pt 100: 0.385 Ω ≙ 1 K). Compensation of ±5% is possible.

Resistance thermometer: 3-conductor connection technology

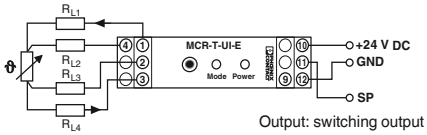


Output:
0 ... (5)10 V, ±(5)10 V voltage signal

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

Please note:
- To compensate the cable resistance, all cable resistances must have exactly the same values ($R_{L1} = R_{L2} = R_{L3}$)

Resistance thermometer: 4-conductor connection technology

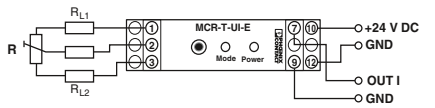


Output: switching output

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

Please note:
- The cable resistance ($R_{L2} + R_{L4}$) must not exceed a value of 50 Ω.

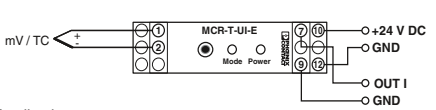
Potentiometer



Application:
- For short distances and gradual changes.

Please note:
- Cable resistances R_{L1} and R_{L2} are incorporated in the measurement result directly and falsify the result accordingly. Compensation of ±5% is possible.

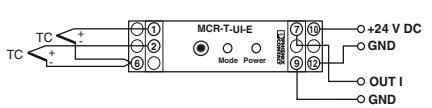
Thermocouple: absolute temperature measurement



Application:
- Connecting a thermocouple or an mV signal.

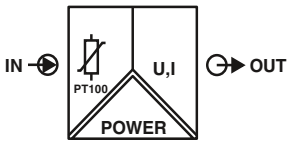
Note:
- Activate cold junction compensation for the device in the case of thermocouple measurements.

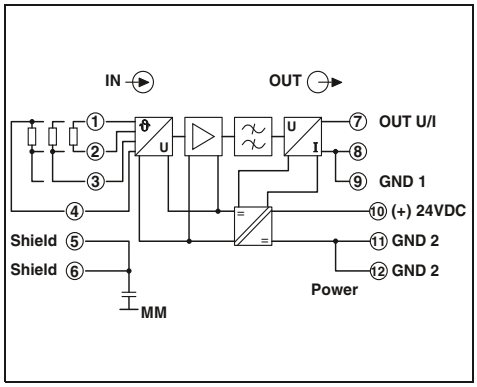
Thermocouple: differential temperature measurement

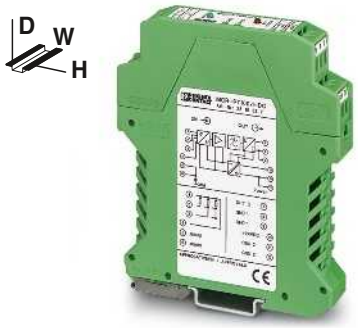


Application:
- Differential temperature measurement with thermocouples.
- Deactivate cold junction compensation for the device.

Temperature
Temperature transducer







For Pt 100, either voltage or current output

- Temperature range adjustable via DIP switch
- ZERO/SPAN adjustment
- Open circuit detection
- Alternatively with galvanically isolated supply voltage

Notes:

When ordering, you must use the order key to specify the desired configuration.

1) EMC: Class A product, see page 571

Housing width 17.5 mm

Technical data

Input data				
Resistance thermometers	Pt 100 (IEC 60751/EN 60751) : 2, 3, 4-conductor			
Temperature range	0°C ... 300°C (0 ... 100/150/200/300) / -50°C ... 250°C (-50 ... 50/100/150/250)			
Sensor input current	Approx. 1 mA			
Output data	U output		I output	
Output signal	0 ... 10 V		0 ... 20 mA / 4 ... 20 mA	
Maximum output signal	15 V		30 mA	
Load R_B	≥ 10 kΩ		≤ 500 Ω	
Output signal with open circuit	> 11 V		> 22 mA	
General data	...-U-DC	...-I-DC	...-U	...-I
Supply voltage U_B	20 ... 30 V DC	20 ... 30 V DC	20 ... 30 V DC	20 ... 30 V DC
Current consumption	35 mA	60 mA	20 mA	45 mA
Maximum transmission error	≤ 0.4% (of final value)			
Temperature coefficient	≤ 0.02%/K			
ZERO / SPAN adjustment	±5% / ±5%			
Step response (10 - 90%)	11 ms			
Test voltage power supply/signal	750 V AC (50 Hz, 1 min.)			
Ambient temperature (operation)	-20°C ... 65°C			
Housing material	Polyamide PA non-reinforced			
Dimensions W / H / D	17.5 / 99 / 114.5 mm			
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14			
Conformance / approvals				
Conformance	CE-compliant			
UL, USA / Canada	UL 508 Recognized			

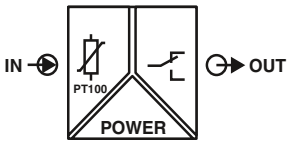
Ordering data

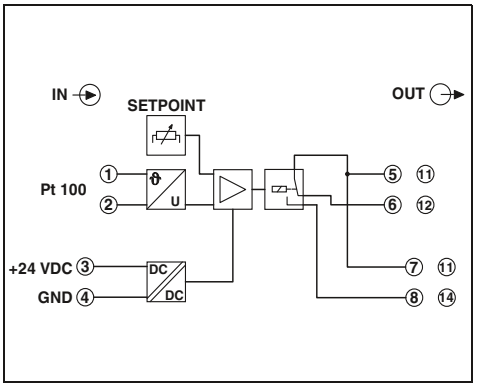
Description	Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducer, for Pt 100 temperature sensors with 2, 3, 4-conductor technology with electrically isolated supply voltage			
Output: 0..0.10 V	**MCR-PT100-U-DC[1])**	**2810311**	1
Output: 0...(4)20 mA	**MCR-PT100-I-DC[1])**	**2810337**	1
Output: 0...10 V, without electrical isolation	**MCR-PT100-U[1])**	**2810340**	1
Output: 0...(4)20 mA, without electrical isolation	**MCR-PT100-I[1])**	**2810353**	1

Order key MCR-PT100-...(-DC) (standard configuration entered as example)

Order No.	/	Connection method	/	Temperature range	/	Output	/	Factory calibration certificate
2810337	/	**3**	/	**TR05**	/	**OUT02**	/	**NONE**
2810311 ≙ MCR-PT100-U-DC 2810337 ≙ MCR-PT100-I-DC 2810340 ≙ MCR-PT100-U 2810353 ≙ MCR-PT100-I		2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor		TR01 ≙ -50...+50°C TR02 ≙ -50...+100°C TR03 ≙ -50...+150°C TR04 ≙ -50...+250°C TR05 ≙ 0...100°C TR06 ≙ 0...150°C TR07 ≙ 0...200°C TR08 ≙ 0...300°C		OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA With the devices: 2810311 MCR-PT100-U-DC 2810340 MCR-PT100-U The output signal is 0...10 V. No details are necessary.		NONE ≙ Without certificate YES ≙ With factory calibration certificate (fee) YESPLUS ≙ Factory calibration certificate with 5 measuring points (fee)

Temperature
Temperature relay





For Pt 100

- Switching point in the temperature range from -100°C ... +700°C freely selectable
- Changeover relay output
- Galvanically isolated
- Adjustable switch hysteresis

Notes:

1) EMC: Class A product, see page 571

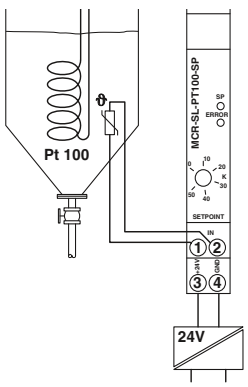
Housing width 12.5 mm

Technical data

Input data	
Resistance thermometers	Pt 100 (IEC 60751/EN 60751) : 2-conductor
Temperature range	-100°C ... 700°C
Sensor input current	Approx. 1 mA
Switching output	**Relay output**
Contact type	1 PDT
Contact material	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)
Operate delay time	Approx. 6 ms
Off delay time	Approx. 200 ms
Switching hysteresis	Adjustable using DIP switches (0.5 K, 2 K, 3 K, 5 K)
Error/status indicator	Red LED (short-circuit/wire break) / Yellow LED (relay active)
General data	
Supply voltage U_B	20 V DC ... 30 V DC
Current consumption	< 30 mA
Linearity error	< 0.1%
Setting accuracy	< 1%, typ. < 0.5%
Temperature coefficient	< 0.01%/K, typ. 0.005%/K
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 65°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 mm² / 0.2 ... 2.5 mm² / 24 - 14
Conformance / approvals	
Conformance	CE-compliant
UL, USA / Canada	UL 508 Recognized

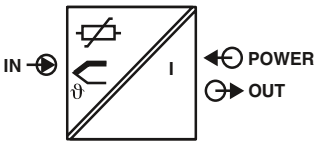
Ordering data

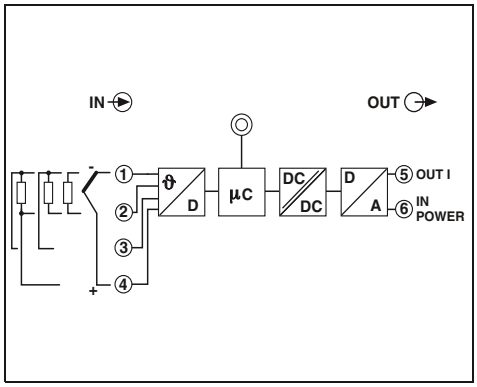
Description	Type	Order No.	Pcs. / Pkt.
MCR temperature relay, for Pt 100 in 2-conductor system			
	MCR-SL-PT100-SP[1])	**2814948**	1



Application example - Temperature control of a heated medium
1 = mains voltage

Temperature
Temperature transducer





Loop-powered, programmable

Ex:

Housing width 12.5 mm

- Two-wire transmitter for resistance thermometers, thermocouples, resistance-type, and voltage sensors
- Freely programmable via MCR/PI-CONF-WIN

Notes:

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

You can implement your own measuring range settings, linearization, and characteristic curve adjustments. For this purpose, you need the MCR-PAC-T-USB programming adapter and the MCR/PI-CONF-WIN configuration software, see page 149

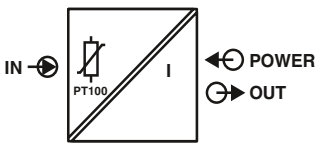
Technical data

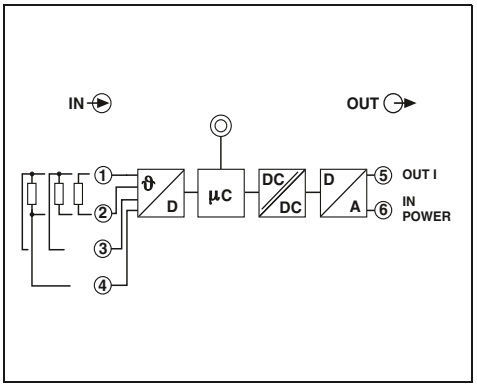
Input data		
Resistance thermometers		Pt, Ni (100, 500, 1000); minimum measurement range 10 K : 2, 3, 4-conductor
Thermocouple sensors		B, C, D, E, J, K, L, N, R, S, T, U; minimum measurement range 50 K/500 K
Resistor		(Resistance-type sensor from 10 Ω to 400 Ω and from 10 Ω to 2000 Ω; minimum measurement range 10 Ω/100 Ω)
Voltage		-10 mV ... 100 mV (min. measurement range 5 mV)
Output data		
Output signal		4 ... 20 mA / 20 ... 4 mA
Load R_B		(Max (V_{supply} -12 V) / 0.023 A (current output))
Output signal with short-circuit		≤ 3.6 mA or ≥ 21 mA (adjustable, not for thermocouples)
Output signal with open circuit		≤ 3.6 mA or ≥ 21 mA (adjustable)
Measuring range overrange/underrange		≤ 20.5 mA / ≥ 3.8 mA (linear increase/decrease)
General data		
Supply voltage U_B		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	Type 0.5 K (K, J, T, E, L, U), 1.0 K (N, C, D), 2.0 K (S, B, R)
	Resistance-type sensors	±0.1 Ω (10...400 Ω), ±1.5 Ω (10...2000 Ω)
	Voltage sensor	±20 µV (-10...100 mV)
Step response (10 - 90%)		< 2 s
Pickup delay		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 mm² / 0.2 ... 2.5 mm² / 24 - 14
Conformance / approvals		
Conformance		CE-compliant
UL, USA / Canada		Class I, Div. 2, Groups A, B, C, D

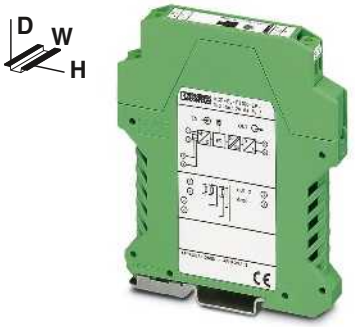
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducer, loop-powered for resistance thermometers, thermocouples, resistance-type, and voltage sensors	**MCR-FL-T-LP-I**	**2864561**	1

Temperature
Temperature transducer







Loop-powered, programmable

Ex:

Housing width 12.5 mm

- Two-wire transmitter for Pt 100 resistance thermometers
- Freely programmable via MCR/PI-CONF-WIN

Notes:

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

You can implement your own measuring range settings, linearization, and characteristic curve adjustments. For this purpose, you need the MCR-PAC-T-USB programming adapter and the MCR/PI-CONF-WIN configuration software, see page 149

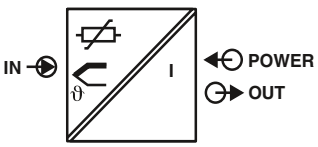
Technical data

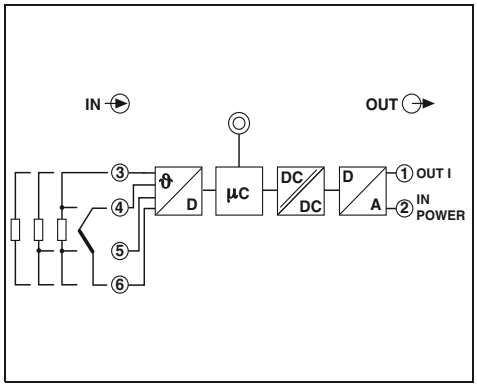
Input data		
Resistance thermometers		Pt 100 ; minimum measurement range 10 K : 2, 3, 4-conductor
Output data		
Output signal		4 ... 20 mA / 20 ... 4 mA
Load R_B		(Max (V_{supply} -12 V) / 0.023 A (current output))
Output signal with short-circuit		≤ 3.6 mA or ≥ 21 mA (adjustable)
Output signal with open circuit		≤ 3.6 mA or ≥ 21 mA (adjustable)
Measuring range overrange/underrange		≤ 20.5 mA / ≥ 3.8 mA (linear increase/decrease)
General data		
Supply voltage U_B		12 V DC ... 35 V DC
Current consumption		< 3.5 mA
Transmission error	Resistance thermometers	0.2 K
Step response (10 - 90%)		< 2 s
Pickup 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 mm² / 0.2 ... 2.5 mm² / 24 - 24
Conformance / approvals		
Conformance		CE-compliant
UL, USA / Canada		Class I, Div. 2, Groups A, B, C, D

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducer, loop-powered			
for Pt 100 resistance thermometer	**MCR-SL-PT100-LP-I**	**2864558**	1

Temperature
Temperature head transmitter





Loop-powered, programmable

Ex:

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

Notes:

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

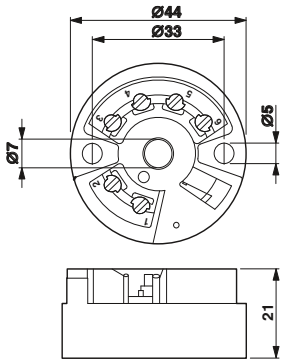
You can implement your own measuring range settings, linearization, and characteristic curve adjustments. For this purpose, you need the MCR-PAC-T-USB programming adapter and the MCR/PI-CONF-WIN configuration software, see page 149

Technical data

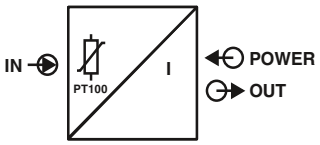
Input data		
Resistance thermometers		Pt, Ni (100, 500, 1000); minimum measurement range 10 K : 2, 3, 4-conductor
Thermocouple sensors		B, C, D, E, J, K, L, N, R, S, T, U; minimum measurement range 50 K/500 K
Resistor		(Resistance-type sensor from 10 Ω to 400 Ω and from 10 Ω to 2000 Ω; minimum measurement range 10 Ω/100 Ω)
Voltage		-10 mV ... 75 mV (min. measurement range 5 mV)
Output data		
Output signal		4 ... 20 mA / 20 ... 4 mA
Load R_B		(Max (V_{supply} - 8 V) / 0.025 A (current output))
Output signal with short-circuit		≤ 3.6 mA or ≥ 21 mA (adjustable, not for thermocouples)
Output signal with open circuit		≤ 3.6 mA or ≥ 21 mA (adjustable)
Measuring range overrange/underrange		≤ 20.5 mA / ≥ 3.8 mA (linear increase/decrease)
General data		
Supply voltage U_B		8 V DC ... 35 V DC
Current consumption		< 3.5 mA
Transmission error	Resistance thermometers	0.2 K (Pt 100, Ni 100), 0.5 K (Pt 500, Ni 500), 0.3 K (Pt 1000, Ni 1000)
	Thermocouple sensors	Type 0.5 K (K, J, T, E, L, U), 1.0 K (N, C, D), 2.0 K (S, B, R)
	Resistance-type sensors	±0.1 Ω (10...400 Ω), ±1.5 Ω (10...2000 Ω)
	Voltage sensor	±20 µV (-10...100 mV)
Step response (10 - 90%)		< 2 s
Pickup delay		6 s
Test voltage input/output		2 kV (50 Hz, 1 min.)
Degree of protection		IP00, IP66 (integrated in the connecting head)
Ambient temperature (operation)		-40°C ... 85°C
Mounting		Any
Housing material		Polycarbonate, PC
Screw connection solid / stranded / AWG		0.2 ... 1.75 mm² / 0.2 ... 1.75 mm² / 24 - 15
Conformance / approvals		
Conformance		CE-compliant
UL, USA / Canada		Class I, Div. 2, Groups A, B, C, D

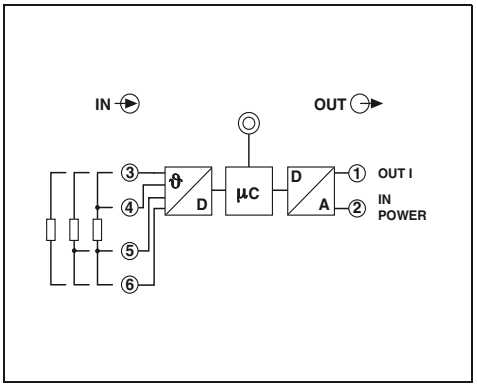
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducer, loop-powered for resistance thermometers, thermocouples, resistance-type, and voltage sensors	**MCR-FL-HT-T-I**	**2864529**	1



Temperature
Temperature head transmitter





Loop-powered, programmable

Ex:

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

Notes:

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

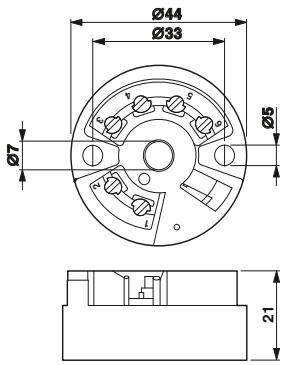
You can implement your own measuring range settings, linearization, and characteristic curve adjustments. For this purpose, you need the MCR-PAC-T-USB programming adapter and the MCR/PI-CONF-WIN configuration software, see page 149

Technical data

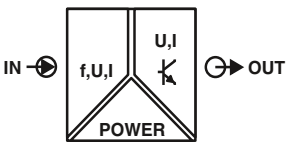
Input data		
Resistance thermometers		Pt 100 ; minimum measurement range 10 K : 2, 3, 4-conductor
Output data		
Output signal		4 ... 20 mA / 20 ... 4 mA
Load R_B		(Max (V_{supply} - 10 V) / 0.023 A (current output))
Output signal with short-circuit		≤ 3.6 mA or ≥ 21 mA (adjustable)
Output signal with open circuit		≤ 3.6 mA or ≥ 21 mA (adjustable)
Measuring range overrange/underrange		≤ 20.5 mA / ≥ 3.8 mA (linear increase/decrease)
General data		
Supply voltage U_B		10 V DC ... 35 V DC
Current consumption		< 3.5 mA
Transmission error	Resistance thermometers	0.2 K
Step response (10 - 90%)		< 2 s
Pickup delay		4 s
Degree of protection		IP00, IP54 (integrated in the connecting head)
Ambient temperature (operation)		-40°C ... 85°C
Mounting		Any
Housing material		Polycarbonate, PC
Conformance / approvals		
Conformance		CE-compliant
UL, USA / Canada		Class I, Div. 2, Groups A, B, C, D

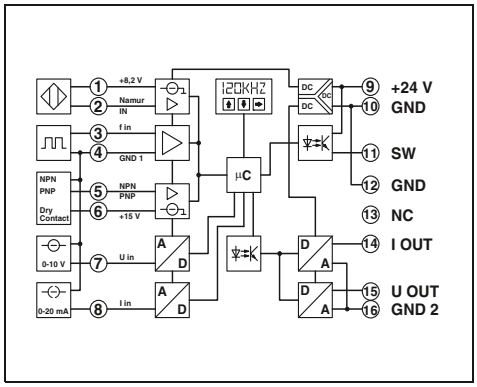
Ordering data

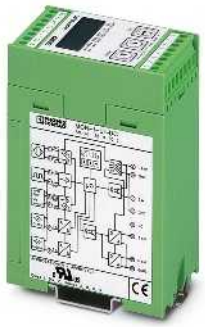
Description	Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducer, loop-powered			
for Pt 100 resistance thermometer	**MCR-SL-HT-PT 100-I**	**2864516**	1



Frequency
Frequency transducer







Programmable,
for frequencies of up to 120 kHz

Ex:

Housing width 45 mm

- Frequencies up to 120 kHz
- For NAMUR sensors, floating contacts, frequency generators, and NPN/PNP transistor outputs
- Analog and switching output
- 3-way isolation
- Programmable using membrane keypad or software
- Display of input or output signal

Notes:

Further information about the configuration software can be found on page 149

1) EMC: Class A product, see page 571

Technical data

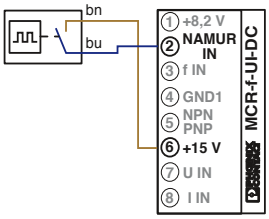
Input data	**Frequency input**	
Frequency range	0.1 Hz ... 120 kHz	
Input sources	NPN/PNP transistor outputs NAMUR initiators Floating relay contact (dry contact) Frequency generator	
Transducer supply	Approx. 15 V DC / max. 25 mA (constant)	
Signal level	2 V_{PP} (In case of rectangle 0.1 Hz ... 120 kHz) 2 V_{PP} (In case of sine 8 Hz ... 120 kHz) 13 V_{PP} (In case of sine 1 Hz ... 120 kHz)	
Maximum input signal	30 V (incl. DC voltage)	
Signal form	Any	
Pulse length	≥ 1 µs	
Resolution	> 12 bit	
Signal conversion time	≤ 32 ms	
Input data	**Isolating amplifier function**	
Input signal	0 V ... 10 V (freely adjustable)	0 mA ... 20 mA (freely adjustable)
Maximum input signal	12 V	24 mA
Input resistance	95 kΩ	200 Ω
Resolution	14 bit (full-scale)	14 bit (full-scale)
Output data	**U output**	**I output**
Output signal	0 ... 5 V / 0 ... 10 V	0 ... 20 mA
Maximum output signal	12.5 V	25 mA
Load R_B	≥ 500 Ω	≤ 500 Ω
Ripple	< 20 mV_{PP}	
Switching output	**Transistor output, pnp**	
	Switches supply voltage to terminal block SW, can carry a load of 100 mA, not protected against short-circuit	
General data		
Supply voltage U_B	20 V DC ... 30 V DC	
Current consumption	< 60 mA (without load, without switching output)	
Maximum transmission error	≤ 0.15% (of measured value), typ. 0.1%	
Temperature coefficient	0.015%/K, typ. 0.01%/K	
ZERO / SPAN adjustment	±25% / ±25%	
Step response (10 - 90%)	< 25 ms	
Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 65°C (for specified data)	
Status indication	LC display	
Operating elements	Membrane keypad with 3 keys and LCD display	
Housing material	ASA-PC (V0)	
Dimensions W / H / D	45 / 75 / 110 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	Class I, Div. 2, Groups A, B, C, D or non-hazardous locations	
GL	Germanischer Lloyd	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR frequency measuring transducer, for conversion of frequencies into analog signals 0(4)...20 mA, 0...(5)10 V and their inverse signals	**MCR-F-UI-DC[1])**	**2814605**	1

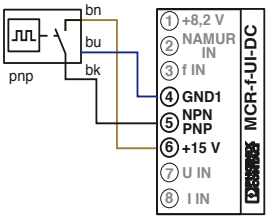
Connection examples for common frequency transmitters

2-wire DC (mechanical contact)

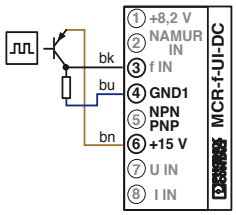


Terminal block ① also possible instead of terminal block ⑥.

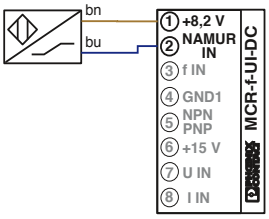
3-wire DC
• With PNP transistor output



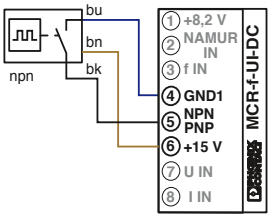
3-wire DC
• PNP transistor with pull-down resistance



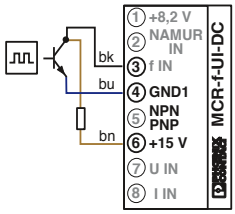
2-wire DC NAMUR sensor



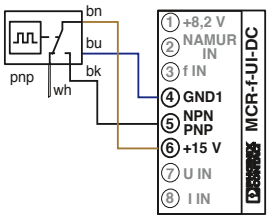
• With NPN transistor output



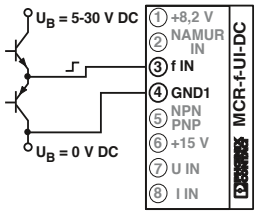
• NPN transistor with pull-up resistance



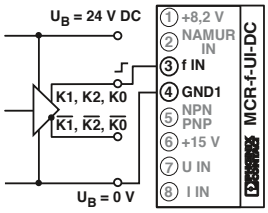
4-wire DC
• With PNP transistor output



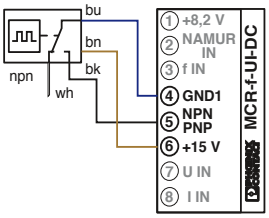
Incremental rotary transducer with push-pull:
• Supply of the external signaling encoder



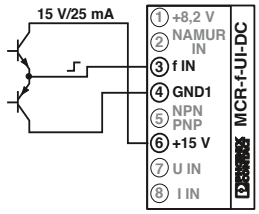
Incremental rotary transducer with HTL logic:
• Supply of the external signaling encoder



• With NPN transistor output

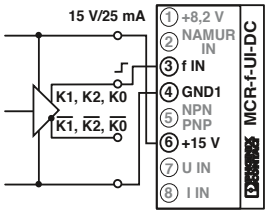


• Supply of the signaling encoder from the module



The external supply can be picked off by terminal blocks ⑨ +24VDC and ⑩ GND as well.
Any 3-way isolation then no longer applies.

• Supply of the signaling encoder from the module



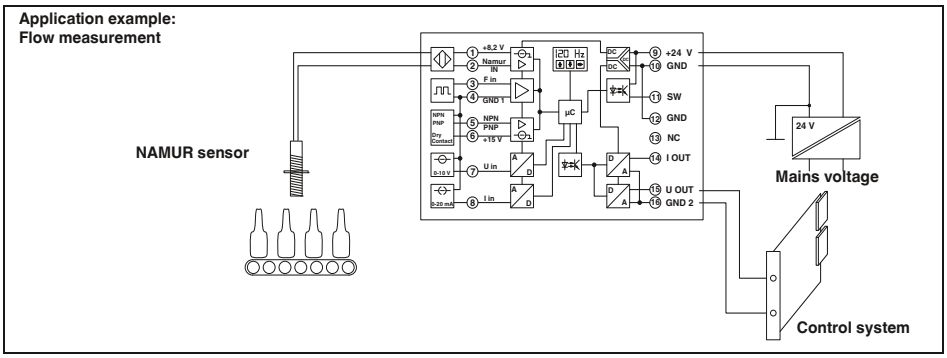
Application examples:

The **MCR-F-UI-DC** frequency transducer converts the pulse signal into an analog standard signal that provides information about the numbers of bottles in filling systems recorded in a defined time unit.

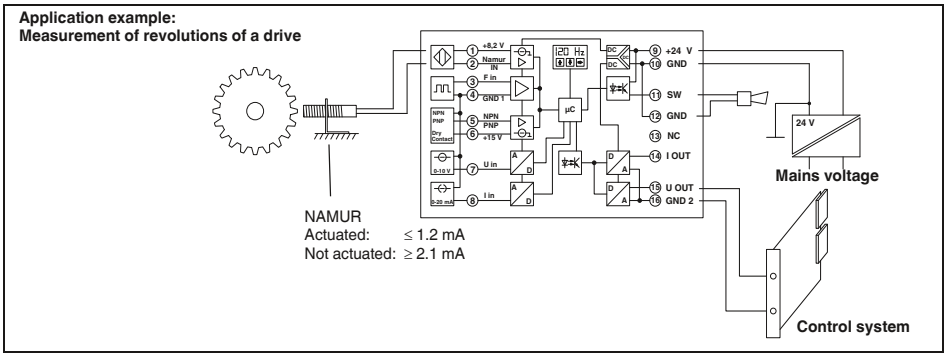
For speed measurements, it is possible to enter the measuring range in revolutions per minute (rpm) and to display the current measured value on the device.

The frequency measuring transducer has an automatic measuring range selection function (autorange) to ensure the best possible resolution. This permits response times to be reduced to a minimum and the measured value is optimally adapted to the input value.

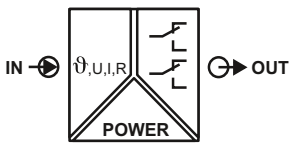
Application example:
Flow measurement

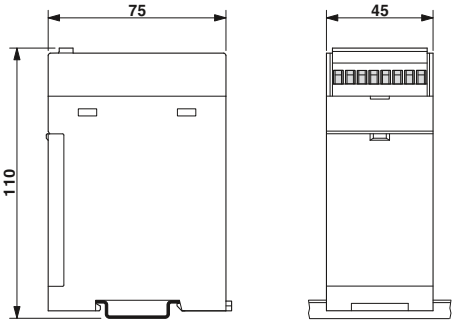


Application example:
Measurement of revolutions of a drive



Programmable limit value switch



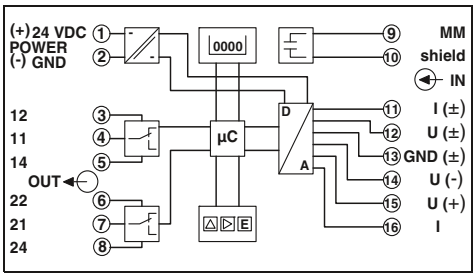


MCR-PSP-DC

- For thermocouple sensors, resistance thermometers, and linear resistors
- For current or voltage signals
- Four independently adjustable switching thresholds
- With or without electrical isolation of input signals
- Programming via membrane keypad or **MCR-PICONF-WIN** software
- Continuous measured value display

Further information about the configuration software can be found on page 149

1) EMC: Class A product, see page 571

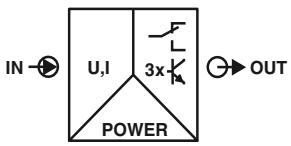


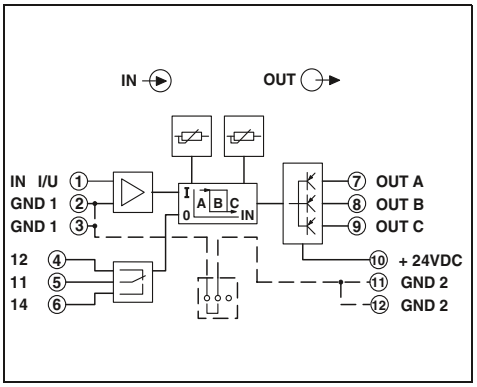
Technical data

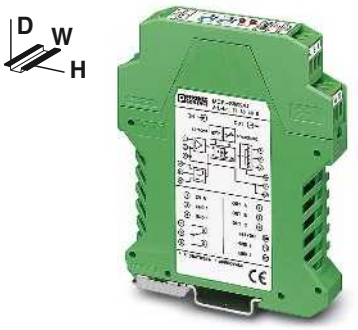
Input data		
Input sources		Resistance thermometer 2, 3 or 4-conductor system (according to DIN 43760/DIN IEC 751 or SAMA RC 21-4-1966), e.g., PT sensors, Ni sensors, etc. Thermocouple sensors (according to DIN IEC 584-1/DIN 43710): B, E, J, K, L, N, R, S, T, U Resistance: 0 kΩ ... 8 kΩ (only 2-conductor connection) Current: - 30 mA...+30 mA Voltage: - 30 V...+30 V
Measuring rate		2 Hz
Input resistance	Current / voltage	50 Ω / 200 kΩ
Discontinuous control resolution		0.1°C / 0.01 V / 0.01 mA / 0.1 Ω
Switching output		
Contact type		2 x PDT contact, / 2 switching points each, pick-up/drop-out (can be switched)
Contact material		AgNi 0,15 + HTV (hard gold-plated)
Maximum switching voltage		250 V AC
Maximum switching current		2 A AC
Mechanical service life		2 x 10^7 cycles
Response delay		0 s ... 2 s (adjustable)
Status indication		LED display
General data		
Supply voltage U_B		20 V DC ... 30 V DC
Current consumption		< 60 mA
Maximum transmission error		0.1% (of final value)
Temperature coefficient		≤ 0.01%/K
Test voltage input/power supply		1 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 65°C
Status indication		5-position 7-segment display and LEDs
Mounting		Any
Housing material		ABS
Conformance / approvals		
Conformance		CE-compliant
UL, USA / Canada		cULus

Description	Type	Order No.	Pcs. / Pkt.
MCR threshold value switch, with two relay contacts			
With electrically isolated input	**MCR-PSP-DC**[1])	**2811925**	1
	MCR-PSP[1])	**2811912**	1

Limit values, threshold value switch







For either standard voltage or standard current signals

- 0 ... 10 V or 0 ... 20 mA input
- Relay/transistor output
- Limit indicator
- Adjustable hysteresis
- Monitoring of three signal statuses

Notes:

1) EMC: Class A product, see page 571

Housing width 17.5 mm

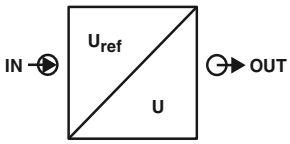
Technical data

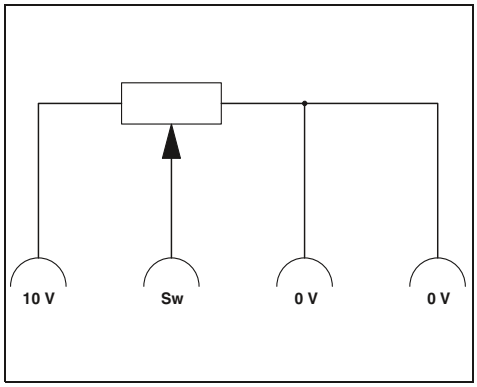
Input data	MCR-SWS-U[1])	MCR-SWS-I[1])
Input signal	0 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Maximum input signal	11 V	22 mA
Input resistance	≥ 100 kΩ	≤ 120 Ω
Limit value setting	Setting potentiometer, scaled 270° potentiometer	
Setting range of the limit value	0 V ... 10 V	0 A ... 20 mA
Setting range for the hysteresis	0.1 V ... 10 V (setting accuracy: ±30 mV)	0.2 mA ... 20 mA (setting accuracy: ±60 µA)
Internal hysteresis	±30 mV (around the lower/upper switching point)	±60 µA (around the lower/upper switching point)
Switching output	**Transistor output, pnp**	
Number of outputs	3	
Output voltage	20 V DC ... 30 V DC	
Continuous load current	100 mA	
Switching output	**Relay output**	
Contact type	1 PDT	
Contact material	AgNi 0,15 + HTV (hard gold-plated)	
Maximum switching voltage	250 V AC (30 V DC)	
Maximum switching current	2 A	
Mechanical service life	10^7 cycles	
Error/status indicator		
General data		
Supply voltage U_B	20 V DC ... 30 V DC	
Current consumption	Typ. 60 mA	
Temperature coefficient	≤ 0.02%/K	
Step response (10 - 90%)	< 25 ms	
Ambient temperature (operation)	-20°C ... 65°C	
Mounting	Any	
Housing material	Polyamide PA non-reinforced	
Dimensions W / H / D	17.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	UL 508 Recognized	

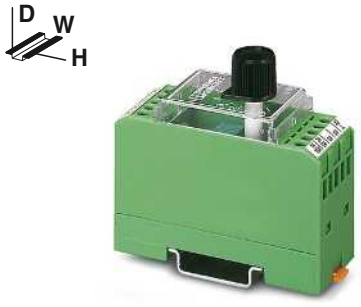
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR threshold value switch, with adjustable hysteresis and relay/transistor output			
Input: 0..0.10 V	**MCR-SWS-U[1])**	**2766465**	1
Input: 0(4) - 20 mA	**MCR-SWS-I[1])**	**2766478**	1

Setpoint value potentiometer







Housing width 30 mm

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

Notes:

1) EMC: Class A product, see page 571

Technical data

Input data	EMG 30-SP- 4K7LIN	EMG 30-SP-10K LIN
Resistance value	4.7 kΩ ±20%	10 kΩ ±20%
Linearity	5% (of final value)	5% (of final value)
Load capacity	1 W	0.5 W
General data		
Ambient temperature (operation)	0°C ... 40°C	
Mounting	Any	
Housing material	Polycarbonate fiber reinforced PC-F	
Dimensions W / H / D	30 / 75 / 68 mm	
Screw connection solid / stranded / AWG	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 14	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Setpoint potentiometer, 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

MCR constant voltage source			
With screw connection	**MINI MCR-SL-CVS-24-5-10-NC[1])**	**2902822**	1
With spring-cage connection	**MINI MCR-SL-CVS-24-5-10-SP-NC[1])**	**2902823**	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™.

Description	Type	Order No.	Pcs. / Pkt.
Ordering data			
MCR configuration software, for programming MCR-T-...-, MCR-...-LP-...-, MCR-...-HT-...-, MCR-S-...-, MCR-F-..., and MCR-PSP-... modules, CD-ROM	**MCR/PI-CONF-WIN**	**2814799**	1
Accessories			
Labels, for labeling MCR-T and MCR-S modules, four sheets DIN A4 marking labels (112 pieces.)	**MCR-ET 38X35 WH**	**2814317**	1

USB adapter cable
Software adapter cable

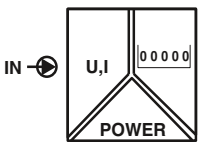
The following adapter cables are available for programming:
– USB adapter cable
– Interface converter

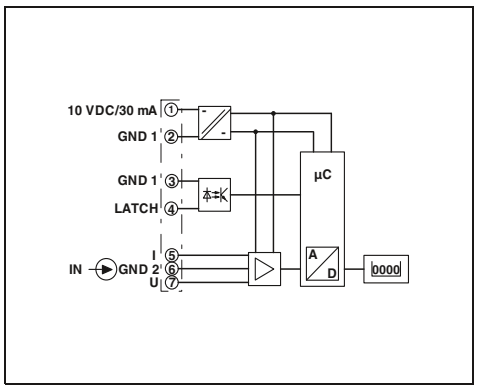
The following modules are supported:
– MCR-T-UI(-E)...
– MCR-F-UI-DC
– MCR-PSP...
– MCR-FL-T-LP-I
– MCR-SL-PT100-LP-I
– MCR-FL-HT-T-I
– MCR-SL-HT-PT100-I

Data cable

Description	Type	Order No.	Pcs. / Pkt.
Ordering data			
USB adapter cable, D-9-SUB to USB, with adapter D-9-SUB to D-25-SUB	**CM-KBL-RS232/USB**	**2881078**	1
Software adapter cable (stereo jack plug/25-pos. D-SUB), 1.2 m long, for programming MCR-T-..., MCR-S-..., and MCR-F-... modules	**MCR-TTL-RS232-E**	**2814388**	1
Software adapter cable (6-pos./D-SUB 25-pos.), 1.5 m length, for programming MCR-PSP modules	**MCR-TTL-RS232**	**2814391**	1
Software adapter cable, 2.4 m length, with USB connection, for programming MCR-...-LP-... and MCR-...-HT-... modules	**MCR-PAC-T-USB**	**2309000**	1
Accessories			
Adapter cable, stranded, 9-pos. D-SUB socket on 25-pos. D-SUB pin	**PSM-KAD 9 SUB 25/BS**	**2761295**	1

Analog IN
standard signals





For standard analog signals, programmable

- For 0 ... 10 V and 0(4) ... 20 mA standard analog signals
- Programmable
- 5 positions displayed
- 8 mm LED, 7-segment
- Galvanically isolated
- Min./max. value saving
- Freely programmable decimal point display
- Latch/hold function for storing the display value
- Display 48 x 24 mm

Housing width 48 mm

Technical data

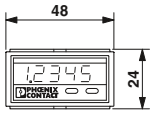
Input data		U input	I input
Input signal		0 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Maximum input signal		30 V DC	50 mA
Input resistance		> 1 MΩ	(approx. 100 Ω with 5 mA / approx. 70 Ω with 20 mA)
Resolution		1 mV	2 µA
Measuring rate		0.5 to 2 measurements/second	
Input latch signal		Display stop	
Switching level	1 signal (“H”)	4 V DC ... 30 V DC	
	0 signal (“L”)	0 V DC ... 2 V DC	
Output data			
Display		7-segment LED; 8 mm; red	
Number of the displayed positions		5	
Accuracy		< 0.1% ±1 digit (At an ambient temperature of 20°C)	
General data			
Supply voltage U_B		10 V DC ... 30 V DC	
Current consumption		50 mA	
Data memory		EEPROM 1 mil. memory cycles or 10 years	
Resolution A/D		14 bit	
System hum suppression		Digital filtering 50/60 Hz	
Test voltage input/power supply		500 V_{rms} (50/60 Hz, 1 min.)	
Degree of protection		IP65 from the front	
Ambient temperature (operation)		-10°C ... 50°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 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16	
Conformance / approvals			
Conformance		CE-compliant	
UL, USA / Canada		UL 508 Recognized	

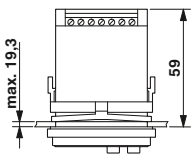
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR digital display, for measurement and display of standard signals	**MCR-SL-D-U-I**	**2864011**	1

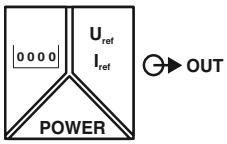
Accessories

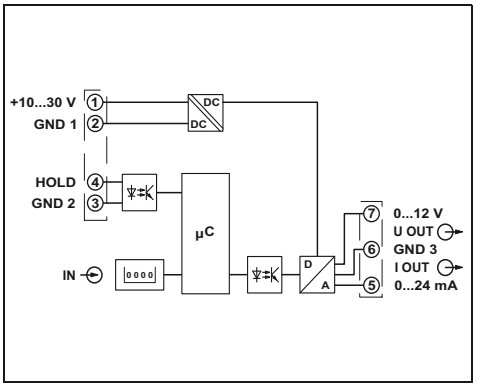
MCR DIN rail adapter for digital displays in a 24 x 48 mm housing	**MCR-SL-D-RA**	**2810081**	1





Analog OUT setpoint adjuster





With manual and automatic ramp function

- Manual setpoint definition with step width setting
- Manual setpoint definition via direct input
- Automatic setpoint definition with hold function and 20 support points
- Highly adjustable 0 ... 12 V or 0 ... 24 mA signal ranges
- Data backup in case of a power failure
- Display value parameterization
- Electrical isolation between output and supply

Housing width 48 mm

Technical data

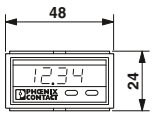
Input data		
Display	7-segment, 8 mm, red	
Number of the displayed positions	4	
Switching level	1 signal ("H")	4 V DC ... 30 V DC
	0 signal ("L")	0 V DC ... 2 V DC
Output data	U output	I output
Output signal	0 ... 12 V	0 ... 24 mA
Length of step	10 mV	10 µA
Load R_B	≥ 2 kΩ	≤ 500 Ω (Up to 20 mA) ≤ 400 Ω (> 20 mA)
Ripple	≤ 10 mV_{PP}	
General data		
Supply voltage U_B	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^2 / 0.14 ... 1.5 mm^2 / 26 - 16	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	UL 508 Recognized	

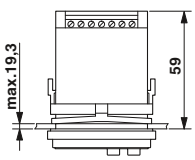
Ordering data

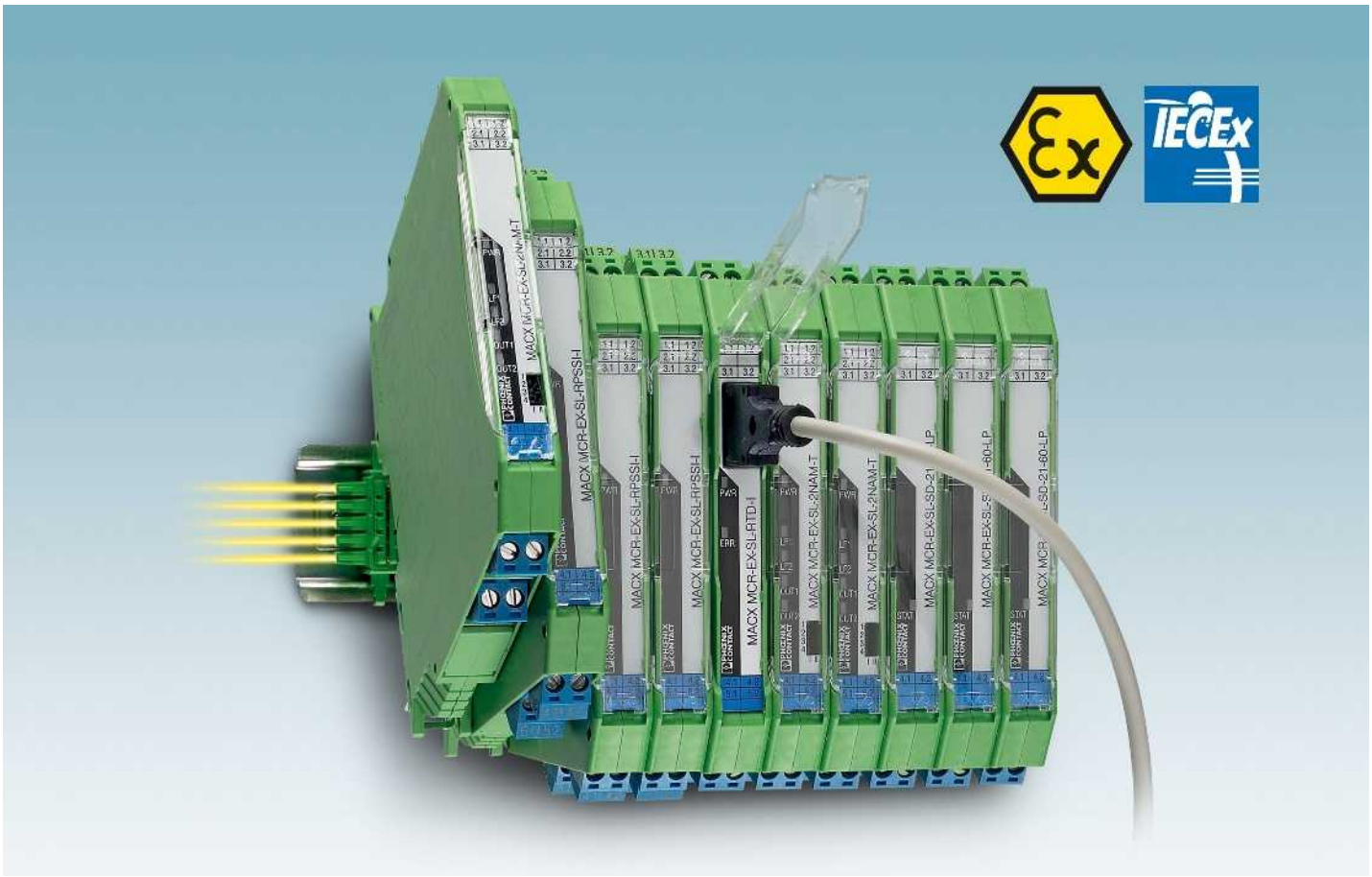
Description	Type	Order No.	Pcs. / Pkt.
MCR digital setpoint encoder, for presetting current and voltage signals	**MCR-SL-D-SPA-UI**	**2710314**	1

Accessories

MCR DIN rail adapter for digital displays in a 24 x 48 mm housing	**MCR-SL-D-RA**	**2810081**	1







Highly compact – leading technology

MACX Analog Ex – single- and two-channel signal isolating amplifiers for intrinsically safe circuits in the Ex area.

MACX Analog Ex isolating amplifiers ensure maximum system safety and explosion protection within a minimum amount of space. With a design width of just 12.5 mm, this comprehensive range for analog signal conditioning is approved according to ATEX and IECEx and consistently SIL-certified.

Maximum explosion protection for all Ex zones and gas groups

Many process technology systems have areas where potentially explosive atmospheres may occur. As such, measuring and control circuits are usually designed with intrinsic safety protection type Ex i.

MACX Analog Ex i isolating amplifiers and measuring transducers isolate intrinsically safe circuits from non-intrinsically safe circuits and safely limit the energy supplied to the Ex area. Furthermore, they handle extensive signal conditioning tasks.

All MACX Analog Ex isolating amplifiers are approved in accordance with the applicable ATEX and IECEx standards:

– [Ex ia] – for intrinsically safe circuits up to Ex zone 0 and Ex zone 20
– Ex n – for installing devices in Ex zone 2
– In addition, relevant national approvals such as UL and GOST are available.

Choose the right MACX Analog Ex isolating amplifier for your application:

Analog IN

Measuring transducer repeater power supply and input isolating amplifier for the intrinsically safe operation of 2-wire transmitters, 4-conductor measuring transducers, and current sources.

Analog OUT

Output isolating amplifiers for the intrinsically safe operation of control valves, I/P converters, and displays.

Temperature

Configurable temperature transducers for the intrinsically safe operation of resistance thermometers, remote resistance-type sensors, thermocouples, and mV sources – with safe limit value relays as an option.

Digital IN

NAMUR isolating amplifiers for the intrinsically safe operation of proximity sensors and switches.

Digital OUT

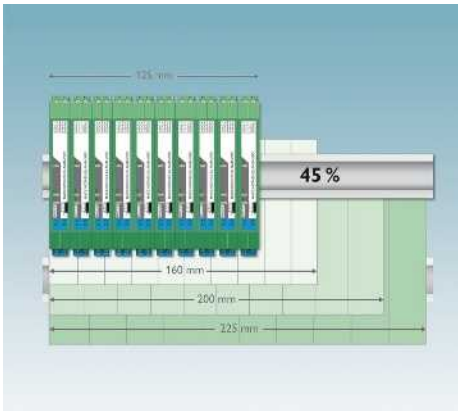
Solenoid drivers for the intrinsically safe operation of solenoid valves and alarm transmitters.

DIN rail connector-compatible

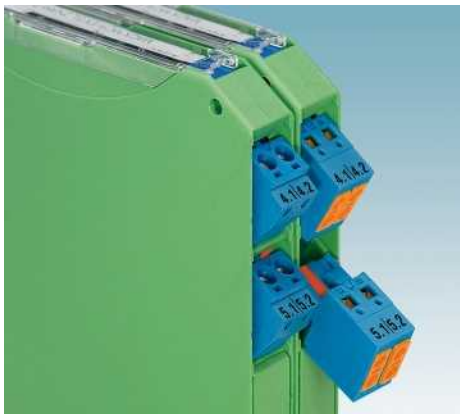
The DIN rail connector enables the modular bridging of the 24 V supply voltage.

Wide-range power supply

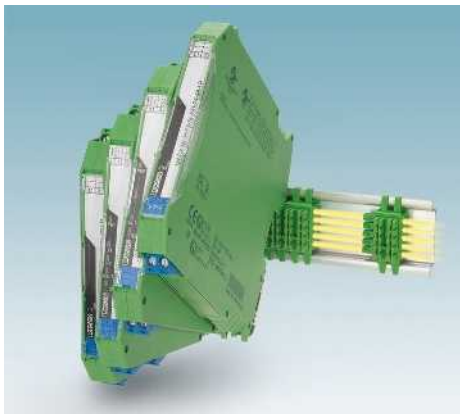
The modules featuring a wide-range power supply (...-UP) can be used in all power supply networks the world over without the need for additional power supply units.



Significant space savings
– Housing width of just 12.5 mm for all single- and two-channel 24 V devices. Saves up to 45% of space, when compared to design widths up to 22.5 mm.



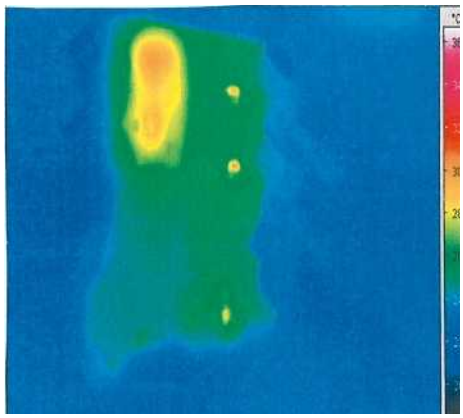
Easy-maintenance connection method:
– Plug-in connection terminal blocks with screw connection or fast push-in technology – coded, with integrated sockets.



Flexible power bridging and diagnostics
– Supply voltage bridging and the option of redundant, diode-decoupled supply and error indication.

Easy configuration and monitoring
– Either via FDT/DTM or user-friendly stand-alone software – with integrated monitoring function.

Easy configuration
– Without software via DIP switches on the device front or with the operator interface and display unit.



Precise transmission, long service life
– Patented circuit concepts ensure precise transmission and minimal self-heating.

High operational reliability
– High operational reliability, thanks to safe 3-way electrical isolation.

Safe and reliable functions
– Consistent SIL certification. This ensures the highest level of reliability and safety for your systems.

Fast and error-free signal connection
– Compact termination carriers connect MACX Analog Ex devices to the automation system – plug and play.

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
Explosive atmosphere A mixture of combustible gases, steam, vapors or dust and air in atmospheric conditions that allow the entire mixture to combust once ignited.
Potentially explosive area An area where the atmosphere has the potential to explode due to local or operational conditions ("Ex area").
Electrical equipment The entire set of components, electric circuits or parts of electric circuits that are usually located within a single housing.
Intrinsically safe electrical equipment An electrical device in which all circuits are intrinsically safe. Note: these devices may be used directly in the Ex area.
Associated equipment 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 protection type.

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.

This also includes devices for the chemical, petrochemical, and pharmaceutical industries as well as for waste water treatment.

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

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

Designation	Typical gas	Ignition energy/µJ 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.

This includes 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 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_{ign}	Temperature class	E_{min}	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.
– 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:

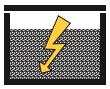
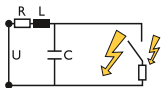
Devices constructed to guarantee a standard degree of safety.

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

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

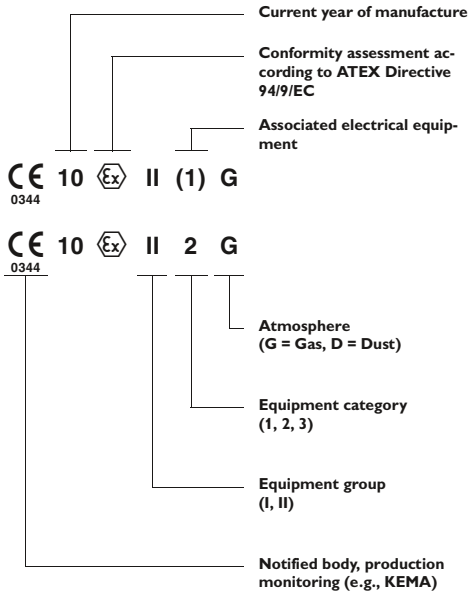
Category	For Zone	Also possible
1	0 20	1 and 2 21 and 22
2	1 21	2 22
3	2 22	

Protection types

Protection principle	Protection type		Area of application (selection)	Standard
 Isolation	Oil immersion	o	Transformers, relays, startup controls, switching devices	EN 60079-6
	Sand filling	q	Transformers, relays, capacitors	EN 60079-5
	Molded encapsulation	m*	Coils of relays and motors, electronics, solenoid valves, connection systems	EN 60079-18
Exclusion	Pressurized enclosure	p	Control cabinets, motors, measuring and analysis devices, computers	EN 60079-2
Special mechanical design	Flameproof enclosure	d	Motors, switching devices, power electronics	EN 60079-1
Clearance from electrically conductive parts	Increased safety	e	Terminal blocks, housing, lights, motors	EN 60079-7
 Energy limitation	Intrinsic safety		Electronics, measurement and control	EN 60079-11
	Intrinsically safe systems	i*	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"	n**	Motors, housing, lights, electronics	EN 60079-15

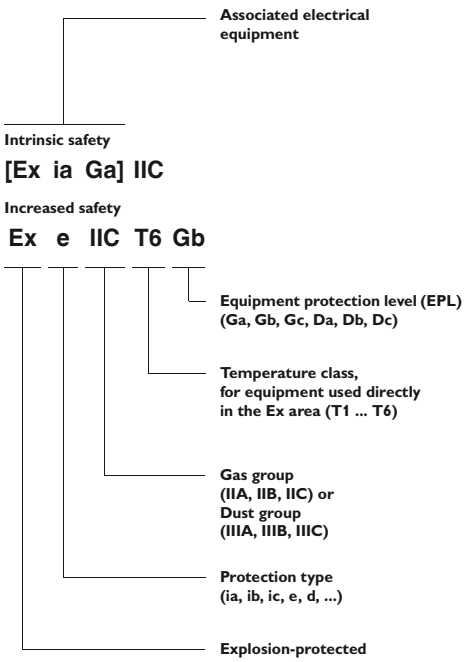
* **ia, ma:** application in zone 0, 1, 2 / **ib, mb:** application in zone 1, 2 / **ic, mc:** application in zone 2 only ** Application in zone 2 only

Marking according to ATEX Directive

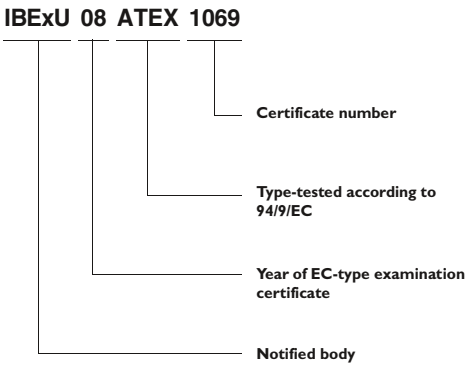


CE mark does not apply to components.

Designation according to EN 60079-0



EC-type examination certificate



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:

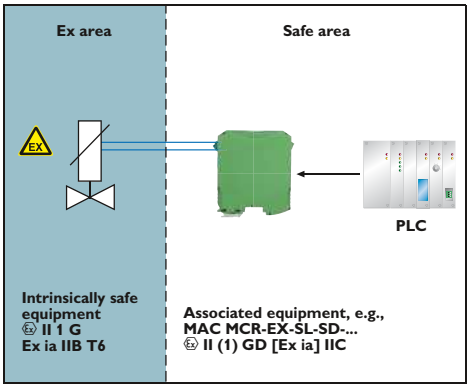
– Valve
– Cable with corresponding resistance
– Solenoid driver

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 of suitable valves, the maximum cable lengths, and the maximum cable resistances of the individual combinations) can be found on the Internet at:
www.phoenixcontact.net/products

Example circuit



Valves overview

					INTERFACE Ex solenoid driver			
Manufacturer	Type designation		Ex certificate	Condition	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		✓		
	Coil	G1 642735, standard	PTB 01 ATEX 2173	800 mW / 40°C		✓	✓	
	Coil	G1 642735, high-resistance	PTB 01 ATEX 2173	800 mW / 40°C		✓	✓	
	Coil	G1 642735, standard	PTB 01 ATEX 2173	1000 mW / 40°C		✓	✓	
	Coil	G1 642735, high-resistance	PTB 01 ATEX 2173	1000 mW / 40°C		✓	✓	
FESTO	Coil	MFH-...IA-SA-EX GBXE022AIAD03	PTB 03 ATEX 2097				✓	✓
	Coil	(J)MFH-...BIA-SA-EX GBXE022AIAD03	PTB 03 ATEX 2097				✓	✓
Norgren Herion	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				✓	
	Coil	2003	PTB 04 ATEX 2010				✓	
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				✓	

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 EN 61508 and EN 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.

EN 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.

EN 61511: "Functional safety - Safety instrumented systems for the process industry sector"

Standard EN 61511 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 in accordance with EN 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 values required for this can be found in the safety manual accompanying any SIL product.

Overview of terms from SIL standards EN 61508 and EN 61511

SIL – **Safety integrity level**
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.

EUC – **Equipment under control**
Equipment, machines, devices or systems used in production, materials processing or transport.

MTBF – **Mean Time Between Failures**
The expected mean time between failures.

PFD – **Probability of failure on demand**
The probability of a failure on demand.
Describes the probability of a safety instrumented system failing to perform its function when required.

PFDavg – **Average probability of failure on demand**
The average probability of the function failing on demand.

E/E/PES – **Electrical/electronic/programmable electronic systems**
This term is used for all electrical devices or systems which can be used to execute a safety instrumented function. It includes simple electrical devices and all types of programmable logic controllers (PLCs).

PFH – **Probability of dangerous failure per hour**
Describes the probability of a dangerous failure occurring per hour.

SFF – **Safe failure fraction**
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.

SIF – **Safety instrumented function**
Describes the safety instrumented functions of a system.

SIS – **Safety instrumented system**
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.

SIL inspection

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

Table 2 of standard EN 61508-1 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	≥ 10^{-5} to < 10^{-4}
3	≥ 10^{-4} to < 10^{-3}
2	≥ 10^{-3} to < 10^{-2}
1	≥ 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.

The INTERFACE Analog and INTERFACE Ex product ranges include products that meet the requirements for explosion protection as well as functional safety.

Example:

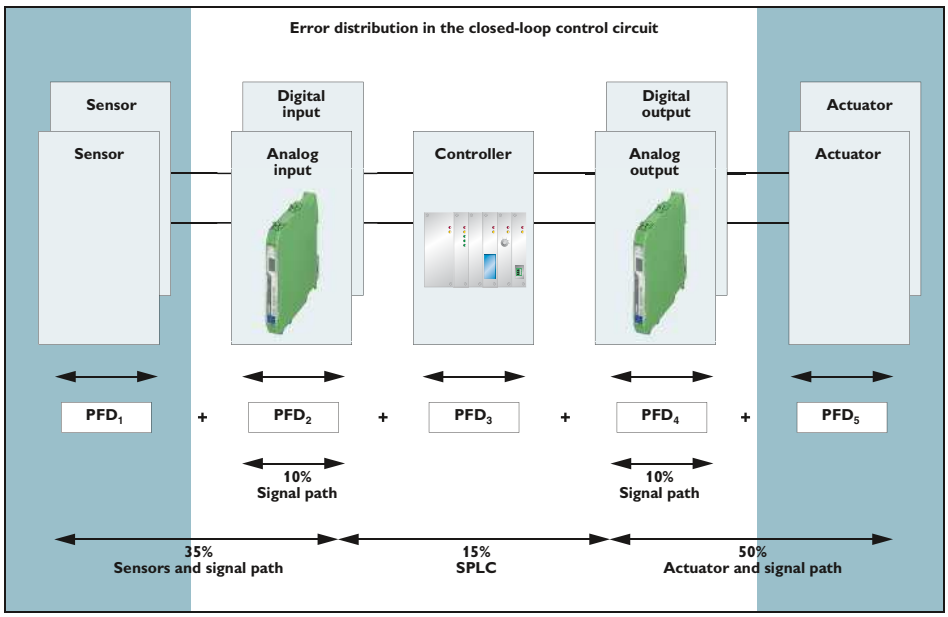
A sensor and actuator are assembled in the field and are exposed to chemical and physical loads (process medium, pressure, temperature, vibration, etc.). Accordingly, these components have a high risk of failure:

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

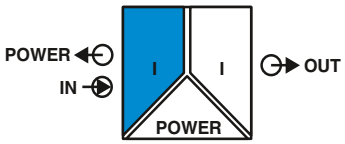
Neither the failsafe controller nor the interface modules come into contact with the process medium and both are usually located in a protected control cabinet:

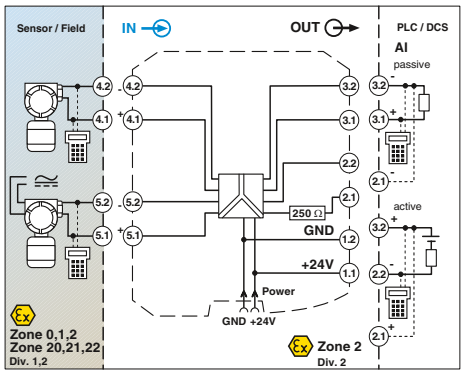
– The failsafe controller accounts for 15% of the overall PFD
– Each of the interface modules accounts for 10% of the overall PFD

Typically, the values form the basis for a calculation.



Analog IN
Repeater power supply, Ex i





Repeater power supply and input isolating amplifier

Functional safety
Ex: // Applied for: GL
Housing width 12.5 mm

Repeater power supply and input isolating amplifier for the operation of intrinsically safe (Ex-i) 2-conductor measuring transducers, 4-conductor measuring transducers, and mA current sources installed in Ex areas.

- 0/4 ... 20 mA input, [Ex ia] (powered or not powered)
- 0/4...20 mA output (active or passive)
- Bidirectional transmission of digital HART communication signals
- Plug-in capable screw or spring-cage connection method, 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 EN 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 182

Test plugs for test sockets can be found on page 191

Information on “Plug and play” connection using system cabling can be found from page 184

1) EMC: Class A product, see page 571

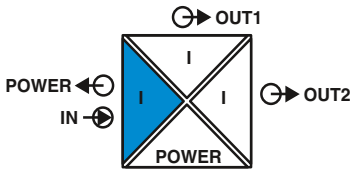
Technical data

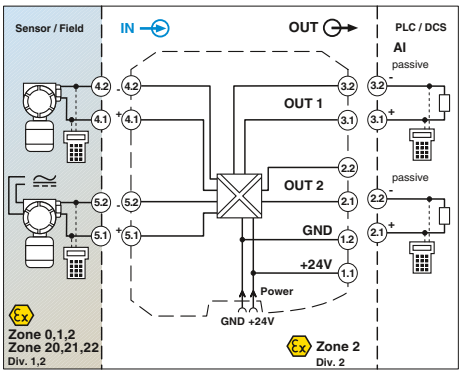
Input data		
Input signal		0 mA ... 20 mA / 4 mA ... 20 mA
Transmitter supply voltage		> 16 V (at 20 mA)
Voltage drop		< 3.5 V (in input isolating amplifier operation)
Output data		
Output signal		0 mA ... 20 mA (active) 4 mA ... 20 mA (active) 0 mA ... 20 mA (14 ... 26 V ext. source voltage) 4 mA ... 20 mA (14 ... 26 V ext. source voltage)
Load		< 600 Ω
Output ripple		< 20 mV_{rms}
General data		
Supply voltage range		19.2 V DC ... 30 V DC
Current consumption		< 60 mA (at 24 V DC)
Power dissipation		< 1.1 W (at 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		as per NE 43
Electrical isolation		
	Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
	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% (no condensation)
Status indication		Green LED (supply voltage)
SMART communication		Yes
Signal bandwidth		as per HART specifications
Protocols supported		HART
Housing material		PA 66-FR
Inflammability class according to UL 94		V0
Dimensions W / H / D		12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX		
Maximum voltage U_o		25.2 V
Maximum current I_o		93 mA
Maximum power P_o		587 mW
Maximum voltage U_m		253 V AC (125 V DC)
Conformance / approvals		
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/IIB T4 Gc
IECEx		[Ex ia Ga] IIC/IIB; [Ex ia Da] IIIC; Ex nA [ia Ga] IIC/IIB T4 Gc
UL, USA / Canada		Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)		SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Repeater power supply, smart, intrinsically safe input			
Screw connection	**MACX MCR-EX-SL-RPSSI-I[1])**	**2865340**	1
Spring-cage conn.	**MACX MCR-EX-SL-RPSSI-I-SP[1])**	**2924016**	1

Analog IN
Repeater power supply, Ex i





Repeater power supply and input isolating amplifier, with two electrically isolated outputs

Functional safety
Ex:
Housing width 12.5 mm

Repeater power supply and input isolating amplifier for the operation of intrinsically safe (Ex-i) 2-conductor measuring transducers, 4-conductor measuring transducers, and mA current sources installed in Ex areas.

- 0/4 ... 20 mA input, [Ex ia] (powered or not powered)
- Two electrically isolated 0/4 ... 20 mA (active) outputs
- Bidirectional transmission of digital HART communication signals (both outputs)
- Plug-in capable screw or spring-cage connection method, with integrated sockets for HART communicators
- 4-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 2 according to EN 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 182
Test plugs for test sockets can be found on page 191
Information on “Plug and play” connection using system cabling can be found from page 184
1) EMC: Class A product, see page 571

Technical data

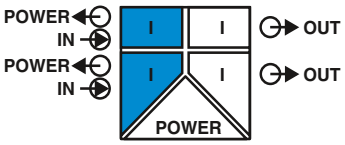
Input data		
Input signal		4 mA ... 20 mA / 0 mA ... 20 mA
Transmitter supply voltage		> 16 V (at 20 mA)
Voltage drop		< 3.9 V (in input isolating amplifier operation)
Output data		
Output signal (Per output)		4 mA ... 20 mA (active)
Load		< 450 Ω (at 20 mA)
Output ripple		< 20 mV_{rms}
General data		
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 4 mA ... 20 mA step)
Transmission error, typical		< 0.05% (of final value)
Maximum transmission error		< 0.1% (of final value)
Under-/overload range		as per NE 43
Electrical isolation		
	Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
	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)
Ambient temperature range		-20°C ... 60°C (Any mounting position)
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^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX		
Maximum voltage U_o		25.2 V
Maximum current I_o		93 mA
Maximum power P_o		587 mW
Maximum voltage U_m		253 V AC (125 V DC)
Conformance / approvals		
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/IIB T4 Gc
IECEx		[Ex ia Ga] IIC/IIB; [Ex ia Da] IIIC; Ex nA [ia Ga] IIC/IIB T4 Gc
Functional safety (SIL)		SIL 2 according to EN 61508

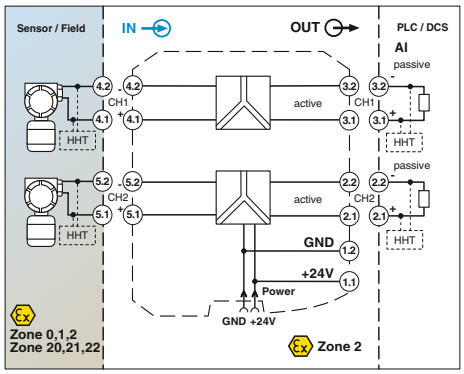
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Repeater power supply, smart, intrinsically safe input			
Screw connection	**MACX MCR-EX-SL-RPSSI-2I[1])**	**2865366**	1
Spring-cage conn.	**MACX MCR-EX-SL-RPSSI-2I-SP[1])**	**2924236**	1

Analog IN
Repeater power supply, Ex i

N





2-channel repeater power supply

Repeater power supply for the operation of intrinsically safe (Ex i) 2-conductor measuring transducers installed in the Ex area.

- 2-channel
- 4 ... 20 mA input, [Ex ia] (powered)
- 4 ... 20 mA output (active)
- Bidirectional transmission of digital HART communication signals
- Plug-in capable screw or spring-cage connection method, with integrated sockets for HART communicators
- Safe 3-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 2 according to EN 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 182

Test plugs for test sockets can be found on page 191

Information on "Plug and play" connection using system cabling can be found from page 184

Housing width 12.5 mm

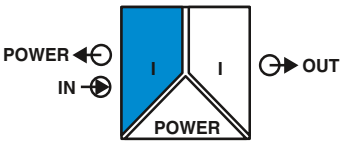
Technical data

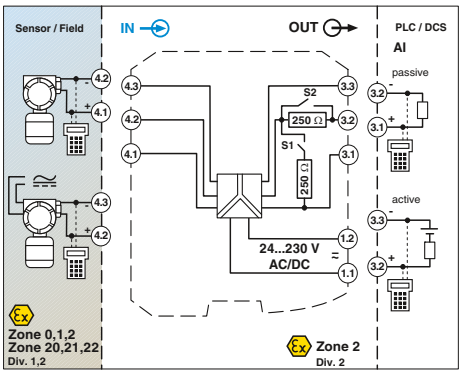
Input data		Per channel
Input signal		4 mA ... 20 mA
Transmitter supply voltage		> 16 V (at 20 mA)
Underload/overload signal range		0 mA ... 24 mA
Output data		Per channel
Output signal		4 mA ... 20 mA (active)
Load		450 Ω (at 20 mA)
Underload/overload signal range		0 mA ... 24 mA
General data		
Supply 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	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
	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 (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 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX		
Maximum voltage U_o		25.2 V
Maximum current I_o		93 mA
Maximum power P_o		587 mW
Maximum voltage U_m		253 V AC (125 V DC)
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		Ex II (1) G [Ex ia Ga] IIC Ex II (1) D [Ex ia Da] IIIC Ex II 3(1) G Ex nA [ia Ga] IIC T4 Gc
IECEx		[Ex ia Ga] IIC/IIB; [Ex ia Da] IIIC; Ex nA IIC T4 Gc
Functional safety (SIL)		SIL 2, PL d

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
Spring-cage conn.	**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 isolating amplifier, wide-range power supply

Functional safety
Ex: // Applied for: GL
Housing width 17.5 mm

Repeater power supply and input isolating amplifier for the operation of intrinsically safe (Ex-i) 2-conductor measuring transducers, 4-conductor measuring transducers, and mA current sources installed in Ex areas.

- 0/4 ... 20 mA input, [Ex ia] (powered or not powered)
- Output 0/4...20 mA (active or passive), 0/1...5 V, can be switched via the DIP switch
- Bidirectional transmission of digital HART communication signals
- Plug-in capable screw or spring-cage connection method, 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: 19.2 ... 253 V AC/DC
- Up to SIL 2 according to EN 61508
- Installation in zone 2 permitted

Notes:
Information on marking material can be found on page 127
Test plugs for test sockets can be found on page 191
1) EMC: Class A product, see page 571

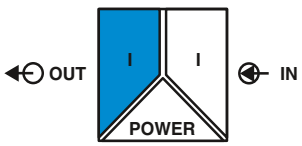
Technical data

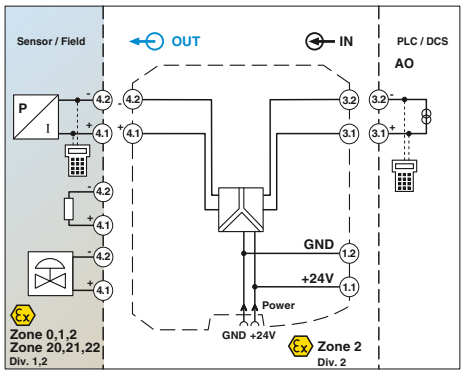
Input data		
Input signal		0 mA ... 20 mA / 4 mA ... 20 mA
Transmitter supply voltage		> 16 V (at 20 mA)
Voltage drop		< 3.5 V (in input isolating amplifier operation)
Output data		
Output signal (configurable using the DIP switch)		0 mA ... 20 mA (active) 4 mA ... 20 mA (active) 0 mA ... 20 mA (14 ... 26 V ext. source voltage) 4 mA ... 20 mA (14 ... 26 V ext. source voltage) 0 V ... 5 V (internal resistance, 250 Ω, 0.1%) 1 V ... 5 V (internal resistance, 250 Ω, 0.1%)
Load		< 600 Ω (I output)
Output ripple		< 20 mV_{rms}
General data		
Supply voltage range		24 V ... 230 V AC/DC (-20%/+10%, 50/60 Hz)
Current consumption		< 80 mA (at 24 V DC)
Power dissipation		< 1.6 W
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		as per NE 43
Electrical isolation		
	Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
	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% (no condensation)
Status indication		Green LED (supply voltage)
SMART communication		Yes
Signal bandwidth		as per HART specifications
Protocols supported		HART
Housing material		PA 66-FR
Inflammability class according to UL 94		V0
Dimensions W / H / D		17.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX		
Maximum voltage U_o		25.2 V
Maximum current I_o		93 mA
Maximum power P_o		587 mW
Maximum voltage U_m		253 V AC (125 V DC)
Conformance / approvals		
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/IIB T4 Gc
IECEx		[Ex ia Ga] IIC/IIB; [Ex ia Da] IIIC; Ex nA [ia Ga] IIC/IIB T4 Gc
UL, USA / Canada		Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)		SIL 2 according to EN 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**[1])	**2865793**	1
Spring-cage conn.	**MACX MCR-EX-SL-RPSSI-I-UP-SP**[1])	**2924029**	1

Analog OUT
Output isolating amplifier, Ex-i





Functional safety
Ex:
Housing width 12.5 mm

Output isolating amplifier for controlling intrinsically safe (Ex-i) I/P converters, control valves, and indicators installed in Ex areas.

- 0/4...20 mA input
- 0/4...20 mA output, [Ex ia] IIC
- Bidirectional transmission of digital HART communication signals
- Plug-in capable screw or spring-cage connection method, 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 EN 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 182

Test plugs for test sockets can be found on page 191

Information on “Plug and play” connection using system cabling can be found from page 184

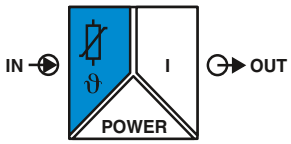
Technical data

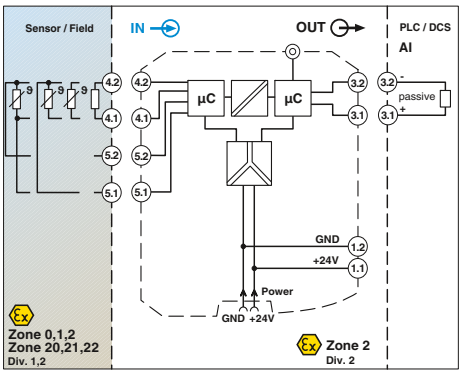
Input data		
Input signal		0 mA ... 20 mA / 4 mA ... 20 mA
Input voltage		5.4 V (at 20 mA)
Input impedance in the event of a cable break at the output		> 100 kΩ (If there is a line fault)
Output data		
Output signal		0 mA ... 20 mA / 4 mA ... 20 mA
Load		< 800 Ω (at 20 mA)
Output ripple		< 20 mV_{rms}
General data		
Supply voltage range		19.2 V DC ... 30 V DC
Current consumption		< 46 mA (at 24 V DC / 20 mA)
Power dissipation		< 1.1 W (at 24 V DC / 20 mA)
Temperature coefficient		< 0.01%/K
Step response (10 - 90%)		< 140 µs
Maximum transmission error		< 0.1% (of final value)
Electrical isolation		
	Input/output/power supply	1.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
	Output/input	375 V (Peak value in accordance with EN 60079-11)
	Output/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% (no condensation)
Status indication		Green LED (supply voltage)
SMART communication		Yes
Signal bandwidth		as per HART specifications
Protocols supported		HART
Housing material		PA 66-FR
Inflammability class according to UL 94		V0
Dimensions W / H / D		12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX		
Maximum voltage U_o		27.7 V
Maximum current I_o		92 mA
Maximum power P_o		633 mW
Maximum voltage U_m		253 V AC (125 V DC)
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC II 3(1) G Ex nA [ia Ga] IIC T4 Gc
IECEx		[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA [ia Ga] IIC T4 Gc
UL, USA / Canada		Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)		SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Output isolating amplifier, smart, output intrinsically safe			
Screw connection	**MACX MCR-EX-SL-IDSI-I**	**2865405**	1
Spring-cage conn.	**MACX MCR-EX-SL-IDSI-I-SP**	**2924032**	1

Temperature transducer, Ex i





SIL
IEC 61508

For resistance thermometers and resistance-type sensors

Ex:

Housing width 12.5 mm

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 ... 20 mA or 4 ... 20 mA signal.

- Input for resistance thermometers and resistance-type sensors, [Ex ia]
- 0 ... 20 mA or 4 ... 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
- Up to SIL 2 according to EN 61508
- 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, see page 167
The configuration software can be downloaded from the Internet (www.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 182
For information on the programming adapter, refer to page 119
Information on “Plug and play” connection using system cabling can be found from page 184
1) EMC: Class A product, see page 571

Technical data

Input data		
Resistance thermometers		Pt, Ni, Cu sensors: 2, 3, 4-conductor
Resistor		0 Ω ... 2000 Ω
Cable resistance		50 Ω per line
Sensor input current		(200 µA ... 1 mA)
Measuring range span		min. 50 K
Output data		
Output signal		0 mA ... 20 mA / 4 mA ... 20 mA
Load		max. 500 Ω
Behavior in the event of a sensor error		As per NE 43 or can be freely defined
Output ripple		< 50 μA_{PP}
General data		
Supply voltage range		19.2 V DC ... 30 V DC (24 V DC (-20% ... +25%))
Current consumption		< 40 mA (24 V DC)
Power dissipation		< 1 W
Temperature coefficient		0.01%/K
Step response (0 - 99%)		Typ. 800 ms (With SIL) max. 1200 ms (With SIL) Typ. 700 ms (Without SIL) max. 1100 ms (Without SIL)
Transmission error, total		0.05% x 100 [K] / measuring range span [K] + 0.05%
ZERO / SPAN adjustment		±5% / ±5%
Electrical isolation		
	Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
	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% (no condensation)
Status indication		Green LED (supply voltage, PWR) Red LED, flashing (line, sensor error, ERR) Red LED (module error, ERR)
Housing material		PA 66-FR
Inflammability class according to UL 94		V0
Dimensions W / H / D		12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX		
Maximum voltage U_o		6 V
Maximum current I_o		6.3 mA
Maximum power P_o		9.4 mW
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		Ex II (1) G [Ex ia Ga] IIC Ex II (1) D [Ex ia Da] IIIC Ex II 3(1) G Ex nA ic [ia Ga] IIC T4 Gc X
IECEx		[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA ic [ia Ga] IIC T4 Gc
UL, USA / Canada		Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)		SIL 2 TÜV Rheinland 968/EZ374.00/09

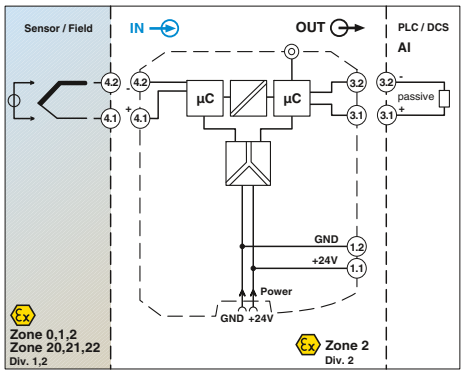
Ordering data

Description		Type	Order No.	Pcs. / Pkt.
Temperature measuring transducers for resistance thermometers, intrinsically safe input				
Order configuration	Screw connection	**MACX MCR-EX-SL-RTD-I[1])**	**2865939**	1
Order configuration	Spring-cage conn.	**MACX MCR-EX-SL-RTD-I-SP[1])**	**2924142**	1
Standard configuration	Screw connection	**MACX MCR-EX-SL-RTD-I-NC[1])**	**2865573**	1
Standard configuration	Spring-cage conn.	**MACX MCR-EX-SL-RTD-I-SP-NC[1])**	**2924168**	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER[1])**	**2811271**	1

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 ... 20 mA or 4 ... 20 mA signal.

- Input for thermocouples and mV sources, [Ex ia]
- 0 ... 20 mA or 4 ... 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
- Up to SIL 2 according to EN 61508
- 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, see page 167

The configuration software can be downloaded from the Internet (www.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 182

For information on the programming adapter, refer to page 119

Information on “Plug and play” connection using system cabling can be found from page 184

1) EMC: Class A product, see page 571

Technical data

Input data		
Thermocouple sensors		E, J, K, N as per IEC / EN 60584, L as per DIN 43760
Voltage		-20 mV ... 70 mV
Measuring range span		(Min. 50 K for thermocouples, 3 mV for mV sources)
Output data		
Output signal		0 mA ... 20 mA / 4 mA ... 20 mA
Load		max. 500 Ω
Behavior in the event of a sensor error		As per NE 43 or can be freely defined
Output ripple		< 50 μA_{PP}
General data		
Supply voltage range		19.2 V DC ... 30 V DC
Current consumption		< 40 mA (24 V DC)
Power dissipation		< 1 W
Temperature coefficient		0.01%/K
Step response (0 - 99%)		Typ. 800 ms (With SIL) max. 1200 ms (With SIL) Typ. 700 ms (Without SIL) max. 1100 ms (Without SIL)
Transmission error, total		0.05% x 200 [K]/Measuring range span [K] + 0.05%
Cold junction errors		±1 K
ZERO / SPAN adjustment		±5% / ±5%
Electrical isolation		
	Input/output/power supply	2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
	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% (no condensation)
Status indication		Green LED (supply voltage, PWR) Red LED, flashing (line, sensor error, ERR) Red LED (module error, ERR)
Housing material		PA 66-FR
Inflammability class according to UL 94		V0
Dimensions W / H / D		12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Safety data as per ATEX		
Maximum voltage U_o		6 V
Maximum current I_o		4.7 mA
Maximum power P_o		7 mW
Maximum voltage U_m		253 V AC (125 V DC)
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC II 3(1) G Ex nA ic [ia Ga] IIC T4 Gc X
IECEx		[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA ic [ia Ga] IIC T4 Gc
UL, USA / Canada		Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)		SIL 2 TÜV Rheinland 968/EZ374.00/09

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
Temperature measuring transducers for thermocouples, intrinsically safe input				
Order configuration	Screw connection	**MACX MCR-EX-SL-TC-I[1])**	**2865942**	1
Standard configuration	Screw connection	**MACX MCR-EX-SL-TC-I-NC[1])**	**2865586**	1

Accessories

Description	Type	Order No.	Pcs. / Pkt.
Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER[1])**	**2811271**	1

Order key and temperature ranges for MACX-MCR-EX-SL-RTD-I(-SP) temperature transducer

Order key for MACX-MCR-EX-SL-RTD-I(-SP) temperature transducer (standard configuration entered as an example)

Order No.	Sensor type	Safety integrity level (SIL)	Connection technology	Measuring range: Start	Measuring range: End	Measuring unit	Output range	Filter Oversampling	Filter Moving average value
2865939	PT100	ON	3	0	100	C	OUT02	10	1
2865939 ≙ MACX MCR-EX-SL-RTD-I 2924142 ≙ MACX MCR-EX-SL-RTD-I-SP	see below	ON ≙ active NONE ≙ not active ON only with output range = OUT02	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	see below	see below	C ≙ °C F ≙ °F O ≙ Ω	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA	1 ≙ 1 value 3 ≙ 3 values 5 ≙ 5 values 7 ≙ 7 values 10 ≙ 10 values 20 ≙ 20 values	1 ≙ 1 value 2 ≙ 2 values 3 ≙ 3 values 4 ≙ 4 values

		Smallest measuring range span
RES01	≙ Resistor	0	2000	Ω	25 Ω
PT50	≙ Pt 50 acc. to IEC 751	-200	850	°C	50 K
PT100	≙ Pt 100 acc. to IEC 751	-200	850	°C	50 K
PT200	≙ Pt 200 acc. to IEC 751	-200	850	°C	50 K
PT500	≙ Pt 500 acc. to IEC 751	-200	850	°C	50 K
PT100S	≙ Pt 100 acc. to Sama RC21-4-1966	-200	600	°C	50 K
PT500S	≙ Pt 500 acc. to Sama RC21-4-1966	-200	600	°C	50 K
NI100DIN	≙ Ni 100 acc. to DIN 43760	-60	250	°C	50 K
NI500DIN	≙ Ni 500 acc. to DIN 43760	-60	250	°C	50 K
CU50	≙ CU50 acc. to GOST 6651 (α = 1.428)	-50	200	°C	50 K
CU53	≙ CU53 acc. to GOST 6651 (α = 1.426)	-50	180	°C	50 K

...	Alarm signal Short circuit/ overrange	Alarm signal Sensor break/ underrange	Factory calibration certificate = FCC
	I035	I215	NONE
	I000 ≙ 0 mA I035 ≙ 3.5 mA I215 ≙ 21.5 mA I035 only with output range = OUT02 Alarm signals can also be configured individually using software.	I000 ≙ 0 mA I035 ≙ 3.5 mA I215 ≙ 21.5 mA	NONE ≙ without FCC YES ≙ with FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

Temperature conversion guide for °C to °F:

$$T\,[°F] = \frac{9}{5}\,T\,[°C] + 32$$

Order key and temperature ranges for MACX-MCR-EX-SL-TC-I temperature transducer

Order key for MACX-MCR-EX-SL-TC-I temperature transducer (standard configuration entered as an example)

Order No.	Sensor type	Safety integrity level (SIL)	Cold junction compensation	Measuring range: Start	Measuring range: End	Measuring unit	Output range	Filter Oversampling	Filter Moving average value
2924942	J	ON	1	0	1000	C	OUT02	10	1
MACX MCR-EX-SL-TC-I	see below	ON ≙ active NONE ≙ not active ON only with output range = OUT02	1 ≙ switched on 0 ≙ switched off (e.g., for mV voltage measurement)	see below	see below	C ≙ °C F ≙ °F V ≙ mV	OUT01 ≙ 0...20 mA OUT02 ≙ 4...20 mA	1 ≙ 1 value 3 ≙ 3 values 5 ≙ 5 values 7 ≙ 7 values 10 ≙ 10 values 20 ≙ 20 values	1 ≙ 1 value 2 ≙ 2 values 3 ≙ 3 values 4 ≙ 4 values

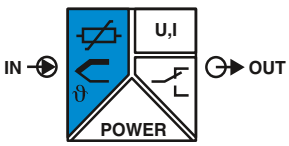
		Smallest measuring range span
V03	≙ Voltage (mV)	-20	+70	mV	3 mV
E	≙ acc. to IEC 584-1 (NiCr-CuNi)	-250	1000	°C	50 K
J	≙ acc. to IEC 584-1 (Fe-CuNi)	-210	1200	°C	50 K
K	≙ acc. to IEC 584-1 (NiCr-Ni)	-250	1372	°C	50 K
N	≙ acc. to IEC 584-1 (NiCrSi-NiSi)	-250	1300	°C	50 K
L	≙ acc. to DIN 43760 (Fe-CuNi)	-200	900	°C	50 K

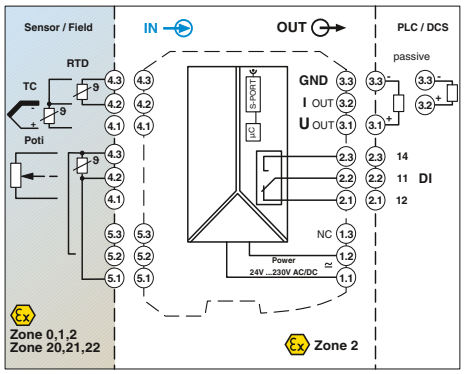
...	Alarm signal Overrange	Alarm signal Sensor break/ underrange	Factory calibration certificate = FCC
	I035	I215	NONE
	I000 ≙ 0 mA I035 ≙ 3.5 mA I215 ≙ 21.5 mA I035 only with output range = OUT02 Alarm signals can also be configured individually using software.	I000 ≙ 0 mA I035 ≙ 3.5 mA I215 ≙ 21.5 mA	NONE ≙ without FCC YES ≙ with FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

Temperature conversion guide for °C to °F:

$$T\,[°F] = \frac{9}{5}\,T\,[°C] + 32$$

Temperature transducer, Ex i





Universal, with switching output, wide-range power supply

Functional safety
Ex:
Housing width 17.5 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
- Relay switching output
- Configuration via software (FDT-DTM) or IFS-OP-UNIT operating and display unit
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in capable screw or spring-cage connection method
- Cold junction compensation with separate connector
- Wide-range power supply: 19.2 ... 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 according to EN 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.

The configuration software can be downloaded from the Internet (www.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 118

For information on the programming adapter, refer to page 119

1) EMC: Class A product, see page 571

Technical data

Input data		
Resistance thermometers		Pt, Ni, Cu sensors: 2, 3, 4-conductor
Thermocouple sensors		B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG
Resistor		0 Ω ... 50 kΩ
Potentiometer		0 Ω ... 50 kΩ
Voltage		-1000 mV ... 1000 mV
Output data	U output	I output
Output signal		4 mA ... 20 mA (in the case of SIL; further free configuration without SIL)
Maximum output signal	±11 V	22 mA
Load R_B	≥ 10 kΩ	≤ 600 Ω (20 mA)
Behavior in the event of a sensor error	According to NE 43 or freely configurable	
Switching output	Switching output	
Contact type	1 PDT	
Contact material	$AgSnO_2$, hard gold-plated	
Maximum switching voltage	30 V AC (30 V DC)	
Maximum switching current	0.5 A (30 V AC) / 1 A (30 V DC)	
General data		
Supply voltage range	24 V ... 230 V AC/DC (-20%/+10%, 50/60 Hz)	
Power consumption	< 1.5 W	
Temperature coefficient	0.01%/K	
Transmission error, total	< 0.1% (e.g., for Pt 100, 300 K span, 4 ... 20 mA)	
Electrical isolation		
Input/output/power supply	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)	
Input/switching output	375 V (Peak value in accordance with EN 60079-11)	
Output/power supply	300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)	
Ambient temperature range	-20°C ... 65°C	
Humidity	Typ. 5% ... 95% (no condensation)	
Housing material	PA 66-FR	
Inflammability class according to UL 94	V0	
Dimensions W / H / D	17.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16	
Safety data as per ATEX		
Maximum voltage U_o	6 V	
Maximum current I_o	7.4 mA	
Maximum power P_o	11 mW	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC II 3 G Ex nA nC ic IIC T4 Gc X	
IECEx	[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA nC ic IIC T4 Gc	
Functional safety (SIL)	SIL 2, PL d	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
Temperature transducer, intrinsically safe input				
Standard configuration	Screw connection	**MACX MCR-EX-T-UI-UP[1])**	**2865654**	1
Standard configuration	Spring-cage conn.	**MACX MCR-EX-T-UI-UP-SP[1])**	**2924689**	1
Order configuration	Screw connection	**MACX MCR-EX-T-UI-UP-C[1])**	**2811763**	1
Order configuration	Spring-cage conn.	**MACX MCR-EX-T-UI-UP-SP-C[1])**	**2924692**	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER[1])**	**2811271**	1

Order key for MACX-MCR-EX-T-UI-UP(-SP)-C temperature transducer (standard configuration entered as an example)

Order No.	Safety integrity level (SIL)	Sensor type	Connection technology	Cold junction compensation	Measuring range: Start	Measuring range: End	Measuring unit	Output range	Factory calibration certificate = FCC
2811763	ON	PT100	4	0	-50	150	C	OUT02	NONE
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)
2924692 ≙ MACX MCR-EX-T-UI-UP-SP-C	ON only with output range = OUT02								

					Smallest measuring range span
Resistance thermometers (RTD) Others can be selected or freely configured in the software.	PT100	≙ Pt 100 acc. to IEC 751	-200	850	°C	20 K
	PT200	≙ Pt 200 acc. to IEC 751	-200	850	°C	20 K
	PT500	≙ Pt 500 acc. to IEC 751	-200	850	°C	20 K
	PT1000	≙ Pt 1000 acc. to IEC 751	-200	850	°C	20 K
	PT100S	≙ Pt 100 acc. to Sama RC21-4-1966	-200	850	°C	20 K
	PT1000S	≙ Pt 1000 acc. to Sama RC21-4-1966	-200	850	°C	20 K
	PT100G	≙ Pt 100 acc. to GOST 6651-2009 (α = 0.00385)	-200	850	°C	20 K
	PT1000G	≙ Pt 1000 acc. to GOST 6651-2009 (α = 0.00385)	-200	850	°C	20 K
	PT100J	≙ Pt 100 acc. to JIS C1604/1997	-200	850	°C	20 K
	PT1000J	≙ Pt 1000 acc. to JIS C1604/1997	-200	850	°C	20 K
	NI100	≙ Ni 100 acc. to DIN 43760/DIN IEC 60751	-60	250	°C	20 K
	NI1000	≙ Ni 1000 acc. to DIN 43760/DIN IEC 60751	-60	250	°C	20 K
	NI100S	≙ Ni 100 acc. to Sama RC21-4-1966	-60	180	°C	20 K
	NI1000S	≙ Ni 1000 acc. to Sama RC21-4-1966	-60	180	°C	20 K
	NI1000L	≙ Ni 1000 (Landis & Gyr)	-50	160	°C	20 K
	CU10	≙ Cu 10 acc. to Sama RC21-4-1966	-70	500	°C	100 K
	CU50	≙ Cu 50 acc. to GOST 6651-2009 (α = 0.00428)	-50	200	°C	100 K
	CU100	≙ Cu 100 acc. to GOST 6651-20091 (α = 0.00428)	-50	200	°C	100 K
	CU53	≙ Cu 53 acc. 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
Thermocouples (TC) Others can be selected in the software.	B	≙ acc. to IEC 584-1 (Pt30Rh-Pt6Rh)	500	1820	°C	50 K
	E	≙ acc. to IEC 584-1 (NiCr-CuNi)	-230	1000	°C	50 K
	J	≙ acc. to IEC 584-1 (Fe-CuNi)	-210	1200	°C	50 K
	K	≙ acc. to IEC 584-1 (NiCr-Ni)	-250	1372	°C	50 K
	N	≙ acc. to IEC 584-1 (NiCrSi-NiSi)	-250	1300	°C	50 K
	R	≙ acc. to IEC 584-1 (Pt13Rh-Pt)	-50	1768	°C	50 K
	S	≙ acc. to IEC 584-1 (Pt10Rh-Pt)	-50	1768	°C	50 K
	T	≙ acc. to IEC 584-1 (Cu-CuNi)	-200	400	°C	50 K
	L	≙ acc. to DIN 43760 (Fe-CuNi)	-200	900	°C	50 K
	U	≙ acc. 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
Remote resistance-type sensors (R) (2, 3, 4-conductor) Others can be selected in the software.	RES03	≙ 0...150 Ω resistor	0	150	Ω	10% of the selected measuring range
	RES05	≙ 0...600 Ω resistor	0	600	Ω	
	RES06	≙ 0...1200 Ω resistor	0	1200	Ω	
	RES09	≙ 0...6250 Ω resistor	0	6250	Ω	
	RES10	≙ 0...12500 Ω resistor	0	12500	Ω	
	RES12	≙ 0...50000 Ω resistor	0	50000	Ω	
Potentiometers (3-conductor) Others can be selected in the software.	POT03	≙ 0...150 Ω potentiometer	0	100	%	10% of the selected measuring range
	POT05	≙ 0...600 Ω potentiometer	0	100	%	
	POT06	≙ 0...1200 Ω potentiometer	0	100	%	
	POT09	≙ 0...6250 Ω potentiometer	0	100	%	
	POT10	≙ 0...12500 Ω potentiometer	0	100	%	
	POT12	≙ 0...50000 Ω potentiometer	0	100	%	
Voltage signals (mV) Others can be selected in the software.	V04	≙ Voltage (mV)	-1000	+1000	mV	10% of nominal span

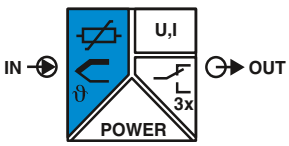
Other setting options can be configured with the IFS-CONF software:

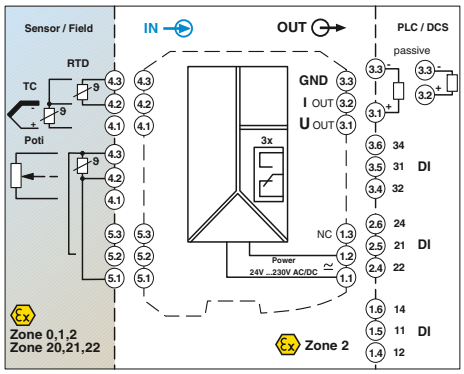
- Freely configurable user characteristic curve with 30 interpolation points
- Output behavior in the event of a short circuit, sensor break or overrange/underrange can be freely configured or set according to NE43 (standard configuration: NE43 upscale)
- Filter setting (standard configuration: 1)
- 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 transducer, Ex i





Universal, with three limit value relays, wide-range power supply

Functional safety
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 operating and display unit
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in capable screw or spring-cage connection method
- Cold junction compensation with separate connector
- Wide-range power supply: 19.2 ... 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 according to EN 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.

The configuration software can be downloaded from the Internet (www.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 118

For information on the programming adapter, refer to page 119

1) EMC: Class A product, see page 571

Technical data

Input data		
Resistance thermometers		Pt, Ni, Cu sensors: 2, 3, 4-conductor
Thermocouple sensors		B, E, J, K, N, R, S, T, L, U, CA, DA, A1G, A2G, A3G, MG, LG
Resistor		0 Ω ... 50 kΩ
Potentiometer		0 Ω ... 50 kΩ
Voltage		-1000 mV ... 1000 mV
Output data	U output	I output
Output signal		4 mA ... 20 mA (in the case of SIL; further free configuration without SIL)
Maximum output signal	±11 V	22 mA
Load R_B	≥ 10 kΩ	≤ 600 Ω (20 mA)
Behavior in the event of a sensor error	According to NE 43 or freely configurable	
Switching output	Relay output	
Contact type	3 PDTs	
Contact material	$AgSnO_2$, hard gold-plated	
Maximum switching voltage	250 V AC (250 V DC)	
Maximum switching current	2 A (250 V AC) / 2 A (28 V DC)	
General data		
Supply voltage range	24 V ... 230 V AC/DC (-20%/+10%, 50/60 Hz)	
Power consumption	< 2.4 W	
Temperature coefficient	0.01%/K	
Transmission error, total	< 0.1% (e.g., for Pt 100, 300 K span, 4 ... 20 mA)	
Electrical isolation		
Input/output/power supply	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)	
Input/switching output	375 V (Peak value in accordance with EN 60079-11)	
Output/power supply	300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)	
Ambient temperature range	-20°C ... 65°C	
Humidity	Typ. 5% ... 95% (no condensation)	
Housing material	PA 66-FR	
Inflammability class according to UL 94	V0	
Dimensions W / H / D	35 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16	
Safety data as per ATEX		
Maximum voltage U_o	6 V	
Maximum current I_o	7.4 mA	
Maximum power P_o	11 mW	
Conformance / approvals		
Conformance	CE-compliant	
ATEX	II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC II 3 G Ex nA nC ic IIC T4 Gc X	
IECEx	[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA nC ic IIC T4 Gc	
Functional safety (SIL)	SIL 2, PL d	

Ordering data

Description		Type	Order No.	Pcs. / Pkt.
Temperature transducer, intrinsically safe input				
Standard configuration	Screw connection	**MACX MCR-EX-T-UIREL-UP**[1]	**2865751**	1
Standard configuration	Spring-cage conn.	**MACX MCR-EX-T-UIREL-UP-SP**[1]	**2924799**	1
Order configuration	Screw connection	**MACX MCR-EX-T-UIREL-UP-C**[1]	**2865722**	1
Order configuration	Spring-cage conn.	**MACX MCR-EX-T-UIREL-UP-SP-C**[1]	**2924809**	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**[1]	**2811271**	1

Order key for MACX-MCR-EX-T-UIREL-UP(-SP)-C temperature transducer (standard configuration entered as an example)

Order No.	Safety integrity level (SIL)	Sensor type	Connection technology	Cold junction compensation	Measuring range: Start	Measuring range: End	Measuring unit	Output range	Factory calibration certificate = FCC
2865722	**ON**	**PT100**	**4**	**0**	**-50**	**150**	**C**	**OUT02**	**NONE**
2865722 ≙ MACX MCR-EX-T-UIREL-UP-C 2924809 ≙ MACX MCR-EX-T-UIREL-UP-SP-C	ON ≙ active NONE ≙ not active ON only with output range = OUT02	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)

						Smallest measuring range span
Resistance thermometers (RTD) Others can be selected or freely configured in the software.	PT100 ≙ Pt 100 acc. to IEC 751	-200	850	°C		20 K
	PT200 ≙ Pt 200 acc. to IEC 751	-200	850	°C		20 K
	PT500 ≙ Pt 500 acc. to IEC 751	-200	850	°C		20 K
	PT1000 ≙ Pt 1000 acc. to IEC 751	-200	850	°C		20 K
	PT100S ≙ Pt 100 acc. to Sama RC21-4-1966	-200	850	°C		20 K
	PT1000S ≙ Pt 1000 acc. to Sama RC21-4-1966	-200	850	°C		20 K
	PT100G ≙ Pt 100 acc. to GOST 6651-2009 (α = 0.00385)	-200	850	°C		20 K
	PT1000G ≙ Pt 1000 acc. to GOST 6651-2009 (α = 0.00385)	-200	850	°C		20 K
	PT100J ≙ Pt 100 acc. to JIS C1604/1997	-200	850	°C		20 K
	PT1000J ≙ Pt 1000 acc. to JIS C1604/1997	-200	850	°C		20 K
	NI100 ≙ Ni 100 acc. to DIN 43760/DIN IEC 60751	-60	250	°C		20 K
	NI1000 ≙ Ni 1000 acc. to DIN 43760/DIN IEC 60751	-60	250	°C		20 K
	NI100S ≙ Ni 100 acc. to Sama RC21-4-1966	-60	180	°C		20 K
	NI1000S ≙ Ni 1000 acc. to Sama RC21-4-1966	-60	180	°C		20 K
	NI1000L ≙ Ni 1000 (Landis & Gyr)	-50	160	°C		20 K
	CU10 ≙ Cu 10 acc. to Sama RC21-4-1966	-70	500	°C		100 K
	CU50 ≙ Cu 50 acc. to GOST 6651-2009 (α = 0.00428)	-50	200	°C		100 K
	CU100 ≙ Cu 100 acc. to GOST 6651-2009 (α = 0.00428)	-50	200	°C		100 K
	CU53 ≙ Cu 53 acc. 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
Thermocouples (TC) Others can be selected in the software.	B ≙ acc. to IEC 584-1 (Pt30Rh-Pt6Rh)	500	1820	°C		50 K
	E ≙ acc. to IEC 584-1 (NiCr-CuNi)	-230	1000	°C		50 K
	J ≙ acc. to IEC 584-1 (Fe-CuNi)	-210	1200	°C		50 K
	K ≙ acc. to IEC 584-1 (NiCr-Ni)	-250	1372	°C		50 K
	N ≙ acc. to IEC 584-1 (NiCrSi-NiSi)	-250	1300	°C		50 K
	R ≙ acc. to IEC 584-1 (Pt13Rh-Pt)	-50	1768	°C		50 K
	S ≙ acc. to IEC 584-1 (Pt10Rh-Pt)	-50	1768	°C		50 K
	T ≙ acc. to IEC 584 (Cu-CuNi)	-200	400	°C		50 K
	L ≙ acc. to DIN 43760 (Fe-CuNi)	-200	900	°C		50 K
	U ≙ acc. 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
Remote resistance-type sensors (R) (2, 3, 4-conductor) Others can be selected in the software.	RES03 ≙ 0...150 Ω resistor	0	150	Ω		10% of the selected measuring range
	RES05 ≙ 0...600 Ω resistor	0	600	Ω		
	RES06 ≙ 0...1200 Ω resistor	0	1200	Ω		
	RES09 ≙ 0...6250 Ω resistor	0	6250	Ω		
	RES10 ≙ 0...12500 Ω resistor	0	12500	Ω		
	RES12 ≙ 0...50000 Ω resistor	0	50000	Ω		
Potentiometers (3-conductor) Others can be selected in the software.	POT03 ≙ 0...150 Ω potentiometer	0	100	%		10% of the selected measuring range
	POT05 ≙ 0...600 Ω potentiometer	0	100	%		
	POT06 ≙ 0...1200 Ω potentiometer	0	100	%		
	POT09 ≙ 0...6250 Ω potentiometer	0	100	%		
	POT10 ≙ 0...12500 Ω potentiometer	0	100	%		
	POT12 ≙ 0...50000 Ω potentiometer	0	100	%		
Voltage signals (mV) Others can be selected in the software.	V04 ≙ Voltage (mV)	-1000	+1000	mV		10% of nominal span

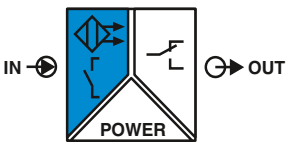
Other setting options can be configured with the IFS-CONF software:

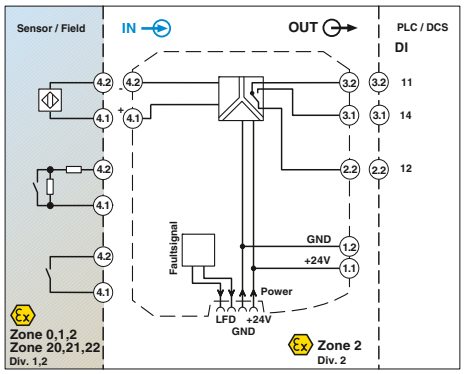
- Freely configurable user characteristic curve with 30 interpolation points
- Output behavior in the event of a short circuit, sensor break or overrange/underrange can be freely configured or set according to NE43 (standard configuration: NE43 upscale)
- Filter setting (standard configuration: 1)
- Restart after failsafe (standard configuration: ON)
- Switching behavior: switching output ? (limit values, times, etc.) (standard configuration: OFF)

Temperature conversion guide for °C to °F:

$$T\,[°F] = \frac{9}{5}\,T\,[°C] + 32$$

Digital IN
NAMUR isolating amplifier, Ex i





Signal output: PDT relay

Functional safety
Ex:
Housing width 12.5 mm

NAMUR isolating amplifier 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/deactivated, error message signaled by red flashing LED with de-excitation of 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 EN 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 182

Information about resistance circuits is given on page 183

Information on “Plug and play” connection using system cabling can be found from page 184

1) EMC: Class A product, see page 571

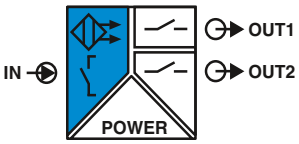
Technical data

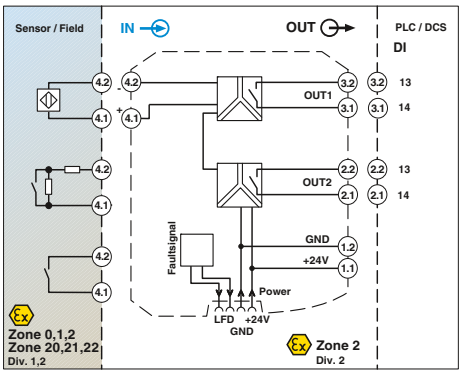
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	8 V DC ±10%
Switching points	> 2.1 mA (conductive) / < 1.2 mA (blocking)
Switching hysteresis	< 0.2 mA
Line error detection	Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output	Relay output
Contact type	1 PDT
Contact material	$AgSnO_2$, hard gold-plated
Maximum switching voltage	250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)
Maximum switching capacity	500 VA
Recommended minimum load	5 V / 10 mA
Mechanical service life	10^7 cycles
Switching behavior	Can be inverted via slide switch
Maximum switching frequency	20 Hz (without load)
General data	
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption	21 mA (24 V DC)
Power dissipation	< 650 mW
Number of channels	1
Electrical isolation	
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/output/supply, T-Connector	300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, basic insulation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	10% ... 95% (no condensation)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum voltage U_o	9.6 V
Maximum current I_o	10 mA
Maximum power P_o	25 mW
Maximum voltage U_m	253 V AC (125 V DC)
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC II 3 G Ex nA nC IIC T4 Gc X
IECEx	[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA nC IIC T4 Gc
UL, USA / Canada	Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)	SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolating amplifier, 1-channel, input intrinsically safe, output: PDT contact			
Screw connection	**MACX MCR-EX-SL-NAM-R**[1])	**2865434**	1
Spring-cage conn.	**MACX MCR-EX-SL-NAM-R-SP**[1])	**2924045**	1

Digital IN
NAMUR isolating amplifier, Ex i





2 signal outputs: N/O contact relay

Functional safety
Ex:
Housing width 12.5 mm

NAMUR isolating amplifier 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]
- Two relay signal outputs (N/O contact); output 2 can be used as an error message output
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD), can be activated/deactivated, error message signaled by red flashing LED with de-excitation of 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 EN 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 182

Information about resistance circuits is given on page 183

Information on “Plug and play” connection using system cabling can be found from page 184

1) EMC: Class A product, see page 571

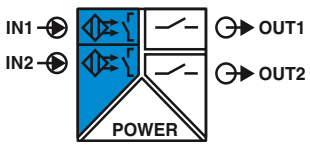
Technical data

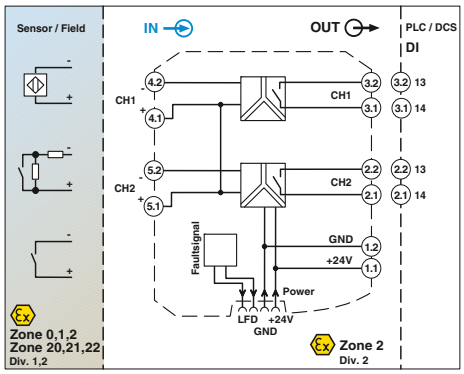
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	8 V DC ±10%
Switching points	> 2.1 mA (conductive) / < 1.2 mA (blocking)
Switching hysteresis	< 0.2 mA
Line error detection	Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output	**Relay output**
Contact type	2 N/O contacts
Contact material	$AgSnO_2$, hard gold-plated
Maximum switching voltage	250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)
Maximum switching capacity	500 VA
Recommended minimum load	5 V / 10 mA
Mechanical service life	10^7 cycles
Switching behavior	Can be inverted via slide switch
Maximum switching frequency	20 Hz (without load)
General data	
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption	30 mA (24 V DC)
Power dissipation	< 950 mW
Number of channels	1
Electrical isolation	
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/supply, T connector	300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, basic insulation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
Output 1/output 2/input, power supply, T connector	300 V_{rms} (Rated insulation voltage, surge voltage category III; pollution degree 2, safe isolation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	10% ... 95% (no condensation)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum voltage U_o	9.6 V
Maximum current I_o	10 mA
Maximum power P_o	25 mW
Maximum voltage U_m	253 V AC (125 V DC)
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC II 3 G Ex nA nC IIC T4 Gc X
IECEx	[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA nC IIC T4 Gc
UL, USA / Canada	Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)	SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolating amplifier, 1-channel, input intrinsically safe, output: 2 N/O contacts			
Screw connection	**MACX MCR-EX-SL-NAM-2RO**[1])	**2865450**	1
Spring-cage conn.	**MACX MCR-EX-SL-NAM-2RO-SP**[1])	**2924061**	1

Digital IN
NAMUR isolating amplifier, Ex i





2-channel, signal output: N/O contact relay

Functional safety
Ex:
Housing width 12.5 mm

NAMUR isolating amplifier 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/deactivated, error message signaled by red flashing LED with de-excitation of 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 EN 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 182

Information about resistance circuits is given on page 183

Information on “Plug and play” connection using system cabling can be found from page 184

1) EMC: Class A product, see page 571

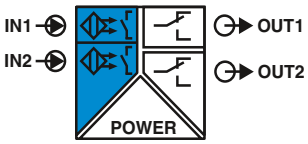
Technical data

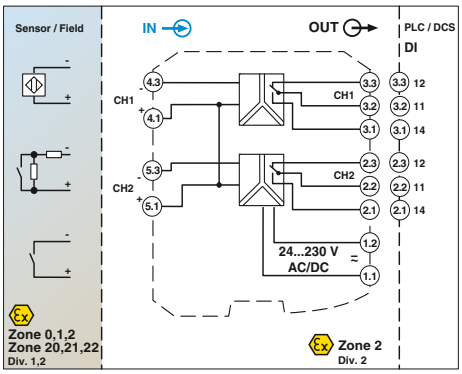
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	8 V DC ±10%
Switching points	> 2.1 mA (conductive) / < 1.2 mA (blocking)
Switching hysteresis	< 0.2 mA
Line error detection	Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output	Relay output
Contact type	2 N/O contacts
Contact material	$AgSnO_2$, hard gold-plated
Maximum switching voltage	250 V AC (2 A) / 120 V DC (0.2 A) / 30 V DC (2 A)
Maximum switching capacity	500 VA
Recommended minimum load	5 V / 10 mA
Mechanical service life	10^7 cycles
Switching behavior	Can be inverted via slide switch
Maximum switching frequency	20 Hz (without load)
General data	
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption	35 mA (24 V DC)
Power dissipation	< 1 W
Number of channels	2
Electrical isolation	
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/supply, T connector	300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, basic insulation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
Output 1/output 2/input, power supply, T connector	300 V_{rms} (Rated insulation voltage, surge voltage category III; pollution degree 2, safe isolation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	5% ... 95% (no condensation)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum voltage U_o	9.6 V
Maximum current I_o	10.3 mA
Maximum power P_o	25 mW
Maximum voltage U_m	253 V AC (125 V DC)
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC II 3 G Ex nA nC IIC T4 Gc X
IECEx	[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA nC IIC T4 Gc
UL, USA / Canada	Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)	SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolating amplifier, 2-channel, input intrinsically safe, output: N/O contact			
Screw connection	**MACX MCR-EX-SL-2NAM-RO**[1])	**2865476**	1
Spring-cage conn.	**MACX MCR-EX-SL-2NAM-RO-SP**[1])	**2924087**	1

Digital IN
NAMUR isolating amplifier, Ex i





2-channel, signal output: PDT relay, wide-range power supply

Functional safety
Ex: // Applied for: cUL / UL
Housing width 17.5 mm

NAMUR isolating amplifier 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/deactivated, error message signaled by red flashing LED with de-excitation of output relay
- Wide-range power supply: 19.2 ... 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 EN 61508
- Installation in zone 2 permitted

Notes:

Information on resistance circuits and marking material can be found on page 183

1) EMC: Class A product, see page 571

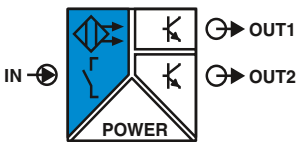
Technical data

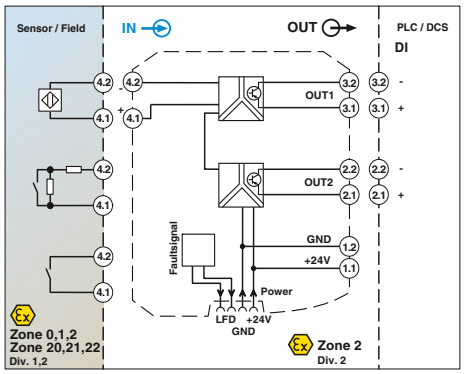
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) open circuit switch contacts Switch contacts with resistance circuit
No-load voltage	8 V DC ±10%
Switching points	> 2.1 mA (conductive) / < 1.2 mA (blocking)
Switching hysteresis	Approx. 0.2 mA
Line error detection	Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output	**Relay output**
Contact type	2 PDT
Contact material	$AgSnO_2$, hard gold-plated
Maximum switching voltage	250 V AC (2 A, 60 Hz) / 120 V DC (0.2 A) / 30 V DC (2 A)
Maximum switching capacity	500 VA
Recommended minimum load	5 V / 10 mA
Mechanical service life	10^7 cycles
Switching behavior	can be inverted using DIP switch
Max. switching frequency	20 Hz (Load-dependent)
General data	
Supply voltage range	24 V ... 230 V AC/DC (-20% ... +10%, 50 ... 60 Hz)
Current consumption	< 80 mA ; < 42 mA (24 V DC)
Power dissipation	max. 1.3 W
Electrical isolation	
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) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178) 2.5 kV AC (50 Hz, 1 min., test voltage)
Output 1/output 2/input, power supply	300 V_{rms} (Rated insulation voltage, surge voltage category III; pollution degree 2, safe isolation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C
Humidity	10% ... 95% (no condensation)
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	17.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum voltage U_o	9.6 V
Maximum current I_o	10.3 mA
Maximum power P_o	25 mW
Maximum voltage U_m	253 V AC/DC (Supply terminals) 250 V AC (Output terminals) 120 V DC (Output terminals)
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	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
IECEx	[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA nC [ia Ga] IIC T4 Gc
Functional safety (SIL)	SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolating amplifier, 2-channel, input intrinsically safe, output: Changeover contact			
Screw connection	**MACX MCR-EX-SL-2NAM-R-UP**[1]	**2865984**	1
Spring-cage conn.	**MACX MCR-EX-SL-2NAM-R-UP-SP**[1]	**2924249**	1

Digital IN
NAMUR isolating amplifier, Ex i





2 signal outputs: transistor (passive)

Functional safety
Ex:
Housing width 12.5 mm

NAMUR isolating amplifier 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/deactivated, error message signaled by red flashing LED with inhibiting of 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 EN 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 182

Information about resistance circuits is given on page 183

Information on “Plug and play” connection using system cabling can be found from page 184

1) EMC: Class A product, see page 571

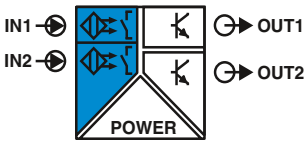
Technical data

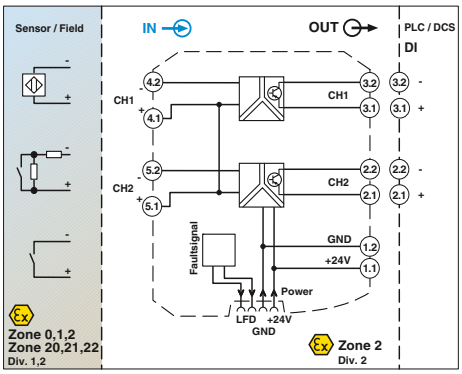
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	8 V DC ±10%
Switching points	> 2.1 mA (conductive) / < 1.2 mA (blocking)
Line error detection	Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output	2 transistor outputs, passive
Maximum switching voltage	30 V DC (per output)
Maximum switching current	50 mA (short-circuit resistant)
Drop (ΔU)	< 1.4 V
Switching behavior	can be inverted using DIP switch
Maximum switching frequency	5 kHz
General data	
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption	< 28 mA (24 V DC)
Power dissipation	800 mW
Number of channels	1
Electrical isolation	
Input/output	375 V (Peak value in accordance with EN 60079-11)
Input/supply, T-Connector	375 V (Peak value in accordance with EN 60079-11)
Input/output/supply, T-Connector	300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
Output 1/output 2	50 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178) 1 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	10% ... 95% (no condensation)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum voltage U_o	9.6 V
Maximum current I_o	10 mA
Maximum power P_o	25 mW
Maximum voltage U_m	253 V AC (125 V DC)
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC II 3 G Ex nA IIC T4 Gc X
IECEx	[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA IIC T4 Gc
UL, USA / Canada	Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)	SIL 2 according to EN 61508

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolating amplifier, input intrinsically safe, output: Transistor, passive			
Screw connection	**MACX MCR-EX-SL-NAM-2T**[1]	**2865463**	1
Spring-cage conn.	**MACX MCR-EX-SL-NAM-2T-SP**[1]	**2924074**	1

Digital IN
NAMUR isolating amplifier, Ex i





2-channel, signal output transistor (passive)

Functional safety
Ex:
Housing width 12.5 mm

NAMUR isolating amplifier 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/deactivated, error message signaled by red flashing LED with inhibiting of 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 EN 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 182

Information about resistance circuits is given on page 183

Information on “Plug and play” connection using system cabling can be found from page 184

1) EMC: Class A product, see page 571

Technical data

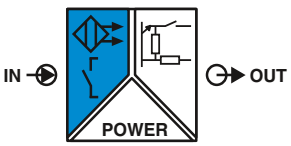
Input data		
Input signal		NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage		8 V DC ±10%
Switching points		> 2.1 mA (conductive) / < 1.2 mA (blocking)
Line error detection		Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output		Transistor output, passive
Maximum switching voltage		30 V DC (per output)
Maximum switching current		50 mA (short-circuit resistant)
Drop (ΔU)		< 1.4 V
Switching behavior		can be inverted using DIP switch
Maximum switching frequency		5 kHz
General data		
Supply voltage range		19.2 V DC ... 30 V DC
Current consumption		< 34 mA (24 V DC)
Power dissipation		1000 mW
Number of channels		2
Electrical isolation		
	Input/output	375 V (Peak value in accordance with EN 60079-11)
	Input/supply, T-Connector	375 V (Peak value in accordance with EN 60079-11)
	Input/output/supply, T-Connector	300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
	Output 1/output 2	50 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178) 1 kV (50 Hz, 1 min., test voltage)
Ambient temperature range		-20°C ... 60°C (Any mounting position)
Humidity		10% ... 95% (no condensation)
Status indication		Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Housing material		PA 66-FR
Inflammability class according to UL 94		V0
Dimensions W / H / D		12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX		
Maximum voltage U_o		9.6 V
Maximum current I_o		10.3 mA
Maximum power P_o		25 mW
Maximum voltage U_m		253 V AC (125 V DC)
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		II (1) G [Ex ia Ga] IIC II (1) D [Ex ia Da] IIIC II 3 G Ex nA IIC T4 Gc X
IECEx		[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA IIC T4 Gc
UL, USA / Canada		Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)		SIL 2 according to EN 61508

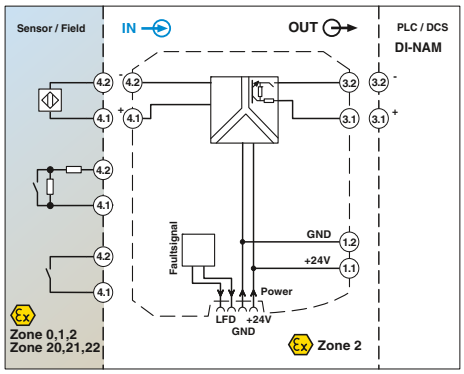
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolating amplifier, 2-channel, input intrinsically safe, output: Transistor, passive			
Screw connection	**MACX MCR-EX-SL-2NAM-T**[1])	**2865489**	1
Spring-cage conn.	**MACX MCR-EX-SL-2NAM-T-SP**[1])	**2924090**	1

Digital IN
NAMUR isolating amplifier, Ex i

N





With line fault transparency

Housing width 12.5 mm

NAMUR isolation amplifiers 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 error message 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/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 spring-cage connection technology
- Safe 3-way electrical isolation
- Up to SIL 2 according to EN 61508
- Installation in zone 2 permissible

Notes:

Information on the supply and error evaluation module, DIN rail connectors, system cabling, and marking material can be found from page 182

Information about resistance circuits is given on page 183

Technical data

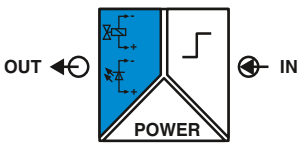
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	8 V DC ±10%
Switching points	> 2.1 mA (conductive) / < 1.2 mA (blocking)
Line error detection	Break 0.05 mA < I_{IN} < 0.35 mA Short-circuit 100 Ω < R_{Sensor} < 360 Ω
Switching output	Resistive (transistor, passive)
Switching voltage	Typ. 8.2 V DC ±10% (according to EN 60947-5-6)
Switching frequency	≤ 5 kHz (Ohmic load)
Impedance 0-signal	11 kΩ ±5%
Impedance 1-signal	1.4 kΩ ±5%
Impedance fault	> 100 kΩ
Switching behavior	can be inverted using DIP switch
General data	
Supply voltage range	12 V DC ... 24 V DC -20 % ... +25 %
Current draw	25 mA (24 V DC)
Power dissipation	< 0.6 W
Electrical isolation	
Input/output	375 V (Peak value in accordance with EN 60079-11)
Input/supply, T-Connector	375 V (Peak value in accordance with EN 60079-11)
Input/output/supply, T-Connector	300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	10% ... 95% (no condensation)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum voltage U_o	9.6 V
Maximum current I_o	10 mA
Maximum power P_o	25 mW
Maximum voltage U_m	253 V AC (125 V DC)
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	Ex II (1) G [Ex ia Ga] IIC Ex II (1) D [Ex ia Da] IIIC Ex II 3G Ex nA IIC T4 Gc X
IECEx	Yes
Functional safety (SIL)	SIL 2

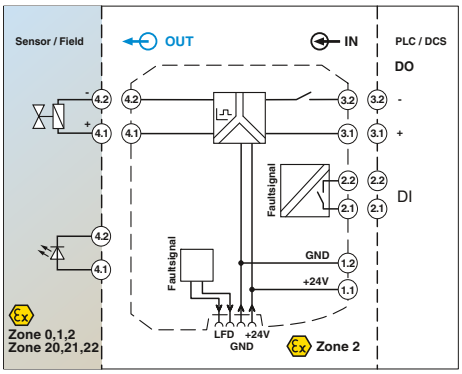
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
NAMUR isolation amplifier, intrinsically safe input, output with line fault transparency			
Screw connection	**MACX MCR-EX-SL-NAM-NAM**	**2866006**	1
Spring-cage conn.	**MACX MCR-EX-SL-NAM-NAM-SP**	**2924883**	1

Digital OUT
Solenoid driver, Ex i

N





Current limitation 48 mA, with line fault detection

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/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 spring-cage connection technology
- Safe 3-way electrical isolation
- Up to SIL 2 according to EN 61508
- Installation in zone 2 permissible

Notes:

Information on the supply and error evaluation module, DIN rail connectors, system cabling, and marking material can be found from page 182

Housing width 12.5 mm

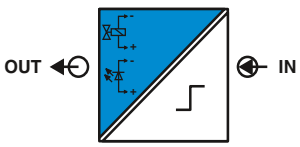
Technical data

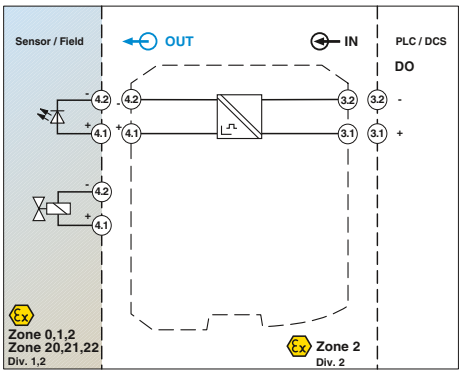
Input data	
Switching level 0 signal ("L")	0 V DC ... 5 V DC (Open)
Switching level 1 signal ("H")	15 V DC ... 30 V DC
Input current	< 12 mA
Input impedance in the event of a line fault at the output	3 MΩ (High resistance (Mega Ω))
Transparent for test pulses	Yes
Output data	
Output voltage	≥ 9.5 V DC (At 48 mA)
Current limitation	> 48 mA (With cable error detection)
No-load voltage	> 23 V DC
Internal resistance	≥ 269 Ω (Internal resistance R_i)
Immunity to short-circuiting	Yes
Response time t_A	< 30 ms
Line error detection	< 50 Ω (short circuit on the line) > 10 kΩ (line break)
Error message output	
Switch contact	N/C contact
Maximum switching voltage	30 V DC
Maximum switching current	50 mA
Short-circuit-proof	Yes
General data	
Supply voltage range	19.2 V DC ... 30 V DC (24 V DC (-20% ... +25%))
Current draw	< 90 mA
Power dissipation	< 1.5 W
Electrical isolation	
Input/output, supply, error message output	375 V (Peak value in accordance with EN 60079-11) 2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	10% ... 95% (no condensation)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Degree of protection	IP20
Housing material	PA 66-FR
Inflammability class according to UL 94	V0
Dimensions W / H / D	12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum voltage U_o	25.3 V
Maximum current I_o	94 mA
Maximum power P_o	595 mW
Maximum voltage U_m	253 V
Conformance / approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	Ex II (1) G [Ex ia Ga] IIC Ex II (1) D [Ex ia Da] IIIC Ex II 3(1) G Ex nA [ia Ga] IIC T4 Gc X
IECEx	Yes
Functional safety (SIL)	SIL 3 (applied for)

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Solenoid driver, logic input, intrinsically safe output, line fault detection			
Screw connection	**MACX MCR-EX-SL-SD-23-48-LFD**	**2924867**	1
Spring-cage conn.	**MACX MCR-EX-SL-SD-23-48-LFD-SP**	**2924870**	1

Digital OUT
Solenoid driver, Ex i





Current limitation 25 mA

Functional safety
Ex:
Housing width 12.5 mm

Solenoid drivers for controlling intrinsically safe solenoid valves, alarm transmitters, and indicators installed in Ex areas.

- 20 ... 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
- Galvanic 2-way isolation
- Up to SIL 3 as per 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 www.phoenixcontact.net/products

Information on marking material can be found on page 127

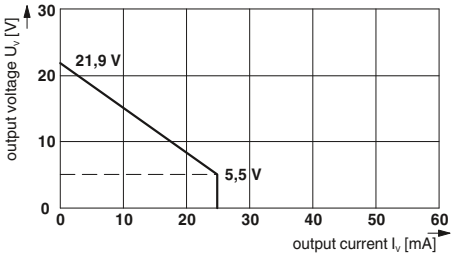
Information on “Plug and play” connection using system cabling can be found from page 184

Technical data

Input data		
Input signal		20 V DC ... 30 V DC
Input current		10 mA DC ... 70 mA DC (45 mA for U_e = 24 V DC)
Output data		
Output voltage		5.5 V DC (At 25 mA)
Current limitation		25 mA
No-load voltage		21.9 V DC
Internal resistance		641 Ω (Internal resistance R_i)
Immunity to short-circuiting		Yes
Response time t_A		20 ms
General data		
Power dissipation		< 1 W
Temperature coefficient		0.01%/K
Electrical isolation		
	Output/input	375 V (Peak value in accordance with EN 60079-11) 2.5 kV (50 Hz, 1 min., test voltage) 300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
Ambient temperature range		-20°C ... 60°C (Any mounting position)
Humidity		10% ... 95% (no condensation)
Status indication		Yellow LED (switching state / status, lights up when output circuit is active)
Degree of protection		IP20
Housing material		PA 66-FR
Inflammability class according to UL 94		V0
Dimensions W / H / D		12.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX		
Maximum voltage U_o		25.1 V
Maximum current I_o		39 mA
Maximum power P_o		245 mW
Maximum voltage U_m		253 V AC (125 V DC)
Conformance / approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		II (1) G [Ex ia Ga] IIC/IIB/IIA II (1) D [Ex ia Da] IIIC II 3 G Ex nA IIC T4 Gc X
IECEx		[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA IIC T4 Gc X
UL, USA / Canada		Class I Div 2; IS for Class I, II, III Div 1
Functional safety (SIL)		SIL 3

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Solenoid driver, loop-powered, output intrinsically safe			
Screw connection	**MACX MCR-EX-SL-SD-21-25-LP**	**2865492**	1
Spring-cage conn.	**MACX MCR-EX-SL-SD-21-25-LP-SP**	**2924113**	1



Current limitation 40 mA

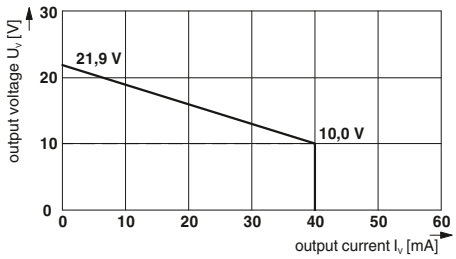
Functional safety
Ex:
Housing width 12.5 mm

Technical data

20 V DC ... 30 V DC
10 mA ... 95 mA (65 mA for U_e = 24 V DC)
10 V DC (At 40 mA)
40 mA
21.9 V DC
287 Ω (Internal resistance R_i)
Yes
20 ms
< 1.2 W
0.01%/K
375 V (Peak value in accordance with EN 60079-11)
2.5 kV (50 Hz, 1 min., test voltage)
300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
-20°C ... 60°C (Any mounting position)
10% ... 95% (no condensation)
Yellow LED (switching state / status, lights up when output circuit is active)
IP20
PA 66-FR
V0
12.5 / 99 / 114.5 mm
0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
25.1 V
87 mA
550 mW
253 V AC (125 V DC)
CE-compliant, additionally EN 61326
II (1) G [Ex ia Ga] IIC/IIB/IIA
II (1) D [Ex ia Da] IIIC
II 3 G Ex nA IIC T4 Gc X
[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA IIC T4 Gc X
Class I Div 2; IS for Class I, II, III Div 1
SIL 3

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



Current limitation 48 mA

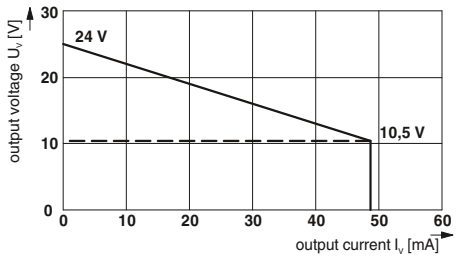
Functional safety
Ex:
Housing width 12.5 mm

Technical data

20 V DC ... 30 V DC
10 mA ... 95 mA (75 mA for U_e = 24 V DC)
10.5 V DC (At 48 mA)
48 mA
24 V DC
276 Ω (Internal resistance R_i)
Yes
30 ms
< 1.4 W
0.01%/K
375 V (Peak value in accordance with EN 60079-11)
2.5 kV (50 Hz, 1 min., test voltage)
300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
-20°C ... 60°C (Any mounting position)
10% ... 95% (no condensation)
Yellow LED (switching state / status, lights up when output circuit is active)
IP20
PA 66-FR
V0
12.5 / 99 / 114.5 mm
0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
27.7 V
101 mA
697 mW
253 V AC (125 V DC)
CE-compliant, additionally EN 61326
II (1) G [Ex ia Ga] IIC/IIB/IIA
II (1) D [Ex ia Da] IIIC
II 3 G Ex nA IIC T4 Gc X
[Ex ia Ga] IIC; [Ex ia Da] IIIC; Ex nA IIC T4 Gc X
Class I Div 2; IS for Class I, II, III Div 1
SIL 3

Ordering data

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



Current limitation 58 mA, [Ex ia] IIB

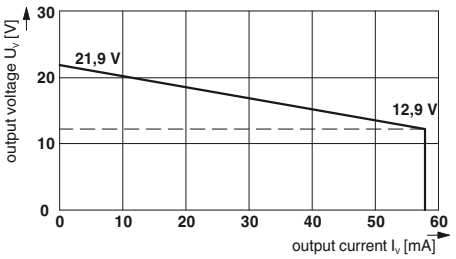
Functional safety
Ex:
Housing width 12.5 mm

Technical data

20 V DC ... 30 V DC
10 mA ... 105 mA (95 mA for U_e = 24 V DC)
12.9 V DC (At 58 mA)
58 mA
21.9 V DC
133 Ω (Internal resistance R_i)
Yes
30 ms
< 1.4 W
0.01%/K
375 V (Peak value in accordance with EN 60079-11)
2.5 kV (50 Hz, 1 min., test voltage)
300 V_{rms} (Rated insulation voltage, surge voltage category II; pollution degree 2, safe isolation as per EN 61010, EN 50178)
-20°C ... 60°C (Any mounting position)
10% ... 95% (no condensation)
Yellow LED (switching state / status, lights up when output circuit is active)
IP20
PA 66-FR
V0
12.5 / 99 / 114.5 mm
0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
25.1 V
188 mA
1.18 W
253 V AC (125 V DC)
CE-compliant, additionally EN 61326
II (1) G [Ex ia Ga] IIB/IIA
II (1) D [Ex ia Da] IIIC
II 3 G Ex nA IIC T4 Gc X
[Ex ia Ga] IIB; [Ex ia Da] IIIC; Ex nA IIC T4 Gc X
Class I Div 2; IS for Class I, II, III Div 1
SIL 3

Ordering data

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



Accessories

Power and error message module

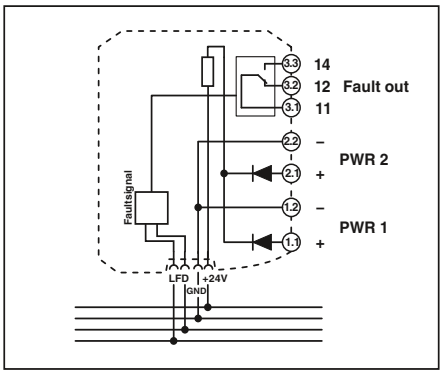
Power and error message module for feeding the 24 V supply voltage to the DIN rail connectors and signaling line faults and power supply failures.

– 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 permissible

ME 6,2 TBUS... T-Connector

DIN rail connector (5-pos.) for bridging the supply voltage of 12.5 mm wide MACX analog Ex modules.

– Reduces wiring costs
– System can be extended or module replaced even while process is active
– Inter-extendable



Power and error message module

Ex: // Applied for: cUL / UL
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	3.75 A
Output voltage	(Input voltage - max. 0.8 V at 3.75 A)
Switching output	Relay
Contact type	1 PDT
Contact material	Gold (Au)
Maximum switching voltage	50 V AC (2 A)
General data	
Current consumption	
Ambient temperature range	-20°C ... 60°C (Any mounting position)
Humidity	5% ... 95% (no condensation)
Fuse	5 A (replaceable), slow-blow 250 V AC
Status indication	1 x red LED (error) 2 x green LEDs (PWR1 and PWR2)
Housing material	Polyamide (PA 6.6)
Inflammability class according to UL 94	V0
Dimensions W / H / D	17.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Spring-cage connection (solid/stranded/AWG)	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Conformance / approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA nC IIC T4 Gc X
IECEx	Ex nA nC IIC T4 Gc X
UL, USA / Canada	UL 61010

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Supply and error message module, including the relevant DIN rail connector ME 17,5 TBUS 1,5/5-ST-3,81 GN			
Screw connection	**MACX MCR-PTB**	**2865625**	1
Spring-cage conn.	**MACX MCR-PTB-SP**	**2924184**	1

Accessories

DIN rail connector (TBUS), for bridging the supply voltage, can be snapped onto 35 mm DIN rails as per EN 60715, with UL approval	**ME 6,2 TBUS-2 1,5/5-ST-3,81 GN**	**2869728**	10

Accessories

Marking material for device marking

– For device marking inside the control cabinet and in the field
– Self-adhesive with high adhesive strengths
– Large temperature range

Description	Color	Ordering data: Type	Order No.	Pcs. / Pkt.
UniCard, with self-adhesive plastic labels				
10-part, lettering field size: 11 x 9 mm	white	**UC-EMLP (11X9)**	**0819291**	10
UniCard, with self-adhesive plastic labels, **marked according to customer specifications** For ordering details, see Catalog 5 or www.phoenixcontact.net/products				
10-part, lettering field size: 11 x 9 mm	white	**UC-EMLP (11X9) CUS**	**0824547**	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

Description	Color	Ordering data: Type	Order No.	Pcs. / Pkt.
Double-level terminal block, with preassembled resistors				
With screw connection		**UKK 5-2R/NAMUR**	**2941662**	50
Cover, width 2.5 mm				
	gray	**D-UKK 3/5**	**2770024**	50
	blue	**D-UKK 3/5 BU**	**2770105**	50

Termination carrier for MACX Analog Ex-isolating amplifiers

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/output cards of automation systems using system cables.

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

– Saves up to 30% of space due 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-isolating amplifiers

The **TC-D37SUB-ADIO16-EX-P-UNI** universal termination carrier is a compact solution which connects isolating amplifiers 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.

– Connection of up to 16 single-channel (Ex i-)isolating amplifiers
– Universal 1:1 signal routing to a 37-pos. D-SUB plug-in 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 specifications.

1) EMC: Class A product, see page 571

Housing width 244 mm

Technical data

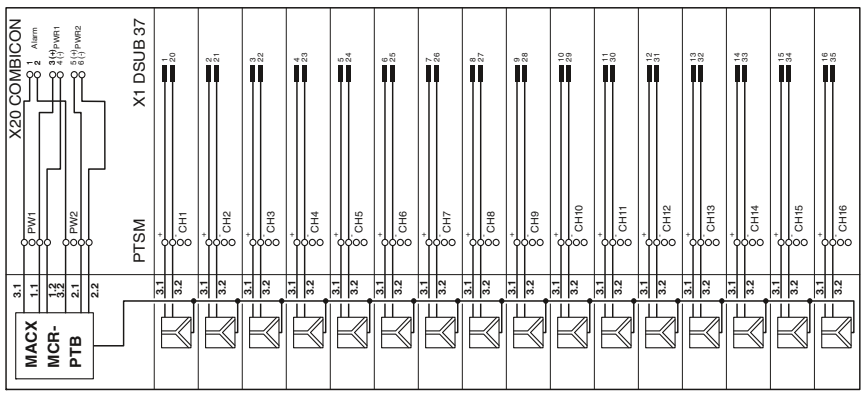
General data	
Connection to the control system level	D-SUB pin strip
Number of positions	37
Maximum operating voltage	< 50 V DC (Per signal/channel)
Maximum permissible current	1 A (Signal/channel)
Rated insulation voltage	50 V
Surge voltage category	II
Pollution degree	2
Rated surge voltage	0.5 kV
Air and creepage distances	DIN EN 50178 (Basic insulation)
Degree of protection	IP20
Ambient temperature range	-40°C ... 80°C (Please observe module specifications)
Shock	15g, according to IEC 60068-2-27
Vibration (operation)	2g, according to IEC 60068-2-6
Inflammability class according to UL 94	V0
Dimensions W / H / D	244 / 170 / 160 mm
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	5 A Slow-blow (can be exchanged)
Status indication	1 x red LED (error) 2 x green LEDs (PWR1 and PWR2)
Switching output	1 PDT
Contact material	Au
Maximum switching voltage	50 V DC (0.3 A) / 30 V DC (2 A) / 33 V AC (2 A)

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Universal termination carrier for 16 MACX MCR-EX isolators			
- With connection for MACX MCR-S-MUX HART multiplexer	**TC-D37SUB-ADIO16-EX-P-UNI**	**2924854**	1
	TC-D37SUB-AIO16-EX-PS-UNI[1)]	**2902932**	1

Accessories

Supply and error message module	**MACX MCR-PTB**	**2865625**	1
	MACX MCR-PTB-SP	**2924184**	1
HART multiplexer, 32-channel	**MACX MCR-S-MUX**	**2865599**	1



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

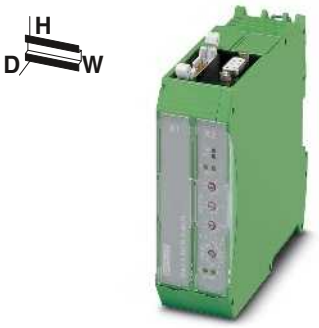
Multiplexers for HART signals

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

Notes:

1) EMC: Class A product, see page 571



Housing width 35.2 mm

Technical data

Field devices interface (HART)	
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)
RS-485 interface	
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
General data	
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)
Galvanic isolation of HART signal/RS-485	350 V AC
Galvanic isolation of HART signals between each other	100 V DC (Capacitive)
Galvanic isolation of HART signal/supply	350 V AC
Galvanic 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% (no condensation)
Dimensions W / H / D	35.2 / 99 / 114.5 mm
Conformance / approvals	
Conformance	CE-compliant

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
HART multiplexer, 32-channel including two 14-wire flat-ribbon cables	**MACX MCR-S-MUX**	**2865599**	1

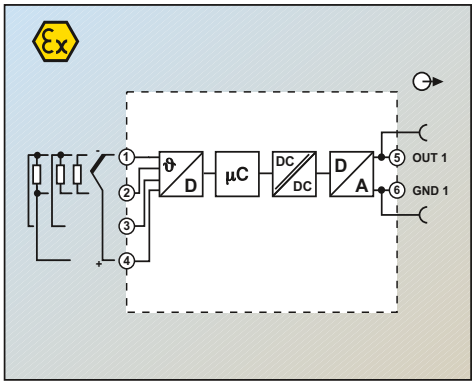
Accessories

Universal termination carrier for 16 MACX MCR-EX isolators - With connection for MACX MCR-S-MUX HART multiplexer	**TC-D37SUB-AIO16-EX-PS-UNI[1])**	**2902932**	1
Universal termination carrier for 16 MINI MCR isolators - With connection for MACX MCR-S-MUX HART multiplexer	**TC-D37SUB-AIO16-M-PS-UNI[1])**	**2902934**	1
HART connection board	**MACX MCR-S-MUX-TB**	**2308124**	1
Interface converter, for conversion from RS-232 (V.24) to RS-485, with electrical isolation, rail-mountable, changeover of data direction self-controlling or through RTS/CTS	**PSM-ME-RS232/RS485-P[1])**	**2744416**	1
Repeater, for electrical isolation and increased range	**PSM-ME-RS485/RS485-P[1])**	**2744429**	1

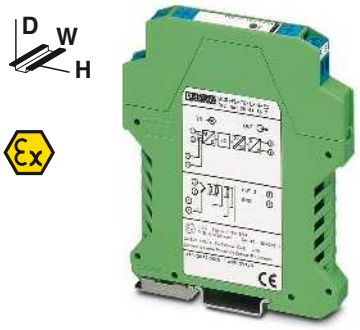
Programmable loop-powered temperature measuring transducer, Ex i

- 1-channel
- Loop-powered
- Input for resistance thermometers, thermocouples, and linear mV signals, Ex ia IIC
- Output 4...20 mA/20...4 mA
- Can be installed in zone 1
- Galvanic 2-way isolation
- HART-capable (MCR-FL-TS-LP-I-EX)
- Configuration using software

Notes:
The devices are supplied with the standard configuration: Pt 100 sensor, measuring range 0 ... 100°C, 3-cond. connection.
To configure the MCR-FL-TS-LPI-EX HART-capable device (2864587), you need a HART modem.
To configure the MCR-FL-T-LP-EX device (2864574), you need the MCR-PAC-T-USB programming adapter and the MCR/PI-CONF-WIN software, see page 190



Block diagram MCR-FL-TS-LP-I-EX



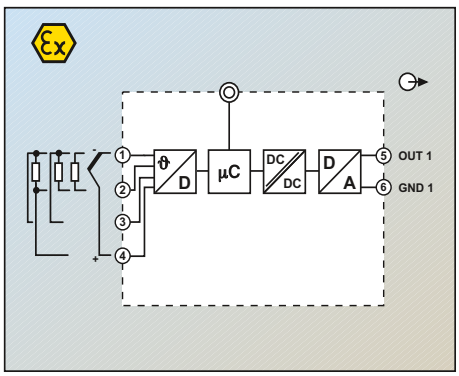
Loop-powered, programmable

Ex:

Housing width 12.5 mm

Technical data

Measuring input			
Resistance thermometers			Pt, Ni (100, 500, 1000); min. measurement range 10 K
Thermocouple sensors			B, C, D, E, J, K, L, N, R, S, T, U; min. measurement range 50 K/500 K
Resistor			10 Ω ... 400 Ω (min. measurement range 10 Ω) 10 Ω ... 2000 Ω (min. measurement range 100 Ω)
Voltage			-10 mV ... 100 mV (min. measurement range 5 mV)
Configuration			Yes, programmable
Measuring output			
Output signal range			4 mA ... 20 mA / 20 mA ... 4 mA
Maximum output signal			≤ 23 mA
Load			≤ 520 Ω (At U_V = 24 V; U_{supply} - 12 V / 0.023 A)
Line monitoring			NE 43
Short-circuit current			≤ 3.6 mA or ≥ 21 mA (adjustable, not for thermocouples)
Output current with open circuit			≤ 3.6 mA or ≥ 21 mA (adjustable)
Output current, measuring range overrange/underrange			3.8 mA ... 20.5 mA
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		0.2 K (Pt 100, Ni 100), 0.5 K (Pt 500, Ni 500), 0.3 K (Pt 1000, Ni 1000)
	Thermocouple sensors		Type 0.5 K (K, J, T, E, L, U), 1.0 K (N, C, D), 2.0 K (S, B, R)
	Resistance-type sensors		±0.1 Ω (10...400 Ω), ±1.5 Ω (10...2000 Ω)
	Voltage sensor		±20 µV (-10...100 mV)
Test voltage input/output			2 kV AC (50 Hz, 1 min.)
Switch on delay time			4 s
Standards/regulations			NAMUR recommendation NE 21
Housing material			Polyamide PA non-reinforced
Inflammability class according to UL 94			V0
Dimensions W / H / D			12.5 / 99 / 114.5 mm
Connection method			Plug-in screw connection
Screw connection solid / stranded / AWG			0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Safety data as per ATEX		MCR-FL-TS-LP-I-EX	MCR-FL-T-LP-I-EX
Maximum voltage U_i		30 V	30 V
Maximum current I_i		100 mA	100 mA
Maximum power P_i		750 mW	750 mW
Maximum voltage U_o		5 V DC	4.4 V DC
Maximum current I_o		5.9 mA	9.6 mA
Maximum power P_o		7.2 mW	10.6 mW
Gas group		II A II B II C	II A II B II C
- max. external inductivity Lo	[mH]	100 100 100	100 100 100
- max. external capacity Co	[µF]	10 10 2	12 12 2.4
Maximum ambient temperature		T4 = 85°C, T5 = 70°C, T6 = 55°C	T4 = 85°C, T5 = 65°C, T6 = 50°C
Conformance / approvals			
Conformance		CE-compliant	CE-compliant
ATEX		II 2(1) G Ex ia IIC T6	II 2(1) G Ex ia IIC T4...T6
UL, USA / Canada		cULus	cULus
Functional safety (SIL)		SIL 2 according to EN 61508	-



Block diagram MCR-FL-T-LP-I-EX

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR temperature transducer, for resistance thermometers, thermocouples, resistance-type sensors, and voltage sensors			
HART-compatible	**MCR-FL-TS-LP-I-EX**	**2864587**	1
	MCR-FL-T-LP-I-EX	**2864574**	1

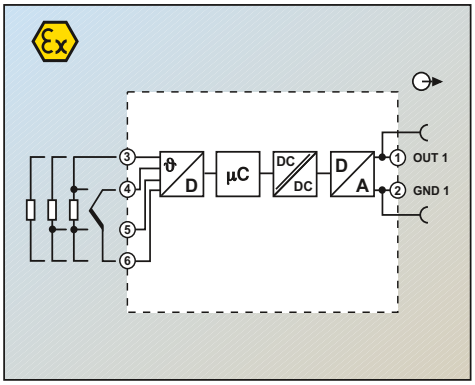
Programmable loop-powered temperature measuring transducers with connection heads, Ex i

- 1-channel
- Loop-powered
- Input for resistance thermometers, thermocouples, and linear mV signals, Ex ia IIC
- Output 4...20 mA/20...4 mA
- Can be installed in zone 0
- Galvanic 2-way isolation
- HART-compatible

Notes:

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

To configure the MCR-FL-TS-LPI-EX HART-capable device, you need a HART modem.



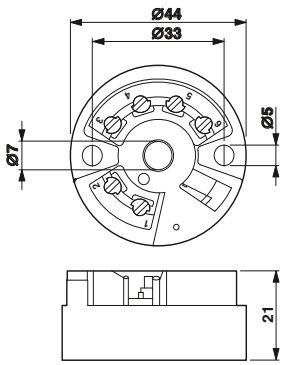
Block diagram MCR-FL-HT-TS-I-EX

Loop-powered, programmable

Ex:

Technical data

Measuring input		
Resistance thermometers		Pt, Ni (100, 500, 1000); min. measurement range 10 K
Thermocouple sensors		B, C, D, E, J, K, L, N, R, S, T, U; min. measurement range 50 K/500 K
Resistor		10 Ω ... 400 Ω (min. measurement range 10 Ω) 10 Ω ... 2000 Ω (min. measurement range 100 Ω)
Voltage		-10 mV ... 75 mV (min. measurement range 5 mV)
Configuration		Yes, programmable
Measuring output		
Output signal range		4 mA ... 20 mA / 20 mA ... 4 mA
Maximum output signal		≤ 23 mA
Load		≤ 630 Ω (At UV = 24 V; U_{supply} - 10 V / 0.023 A)
Line monitoring		NE 43
Short-circuit current		≤ 3.6 mA or ≥ 21 mA (adjustable, not for thermocouples)
Output current with open circuit		≤ 3.6 mA or ≥ 21 mA (adjustable)
Output current, measuring range overrange/underrange		3.8 mA ... 20.5 mA (linear increase/decrease)
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	0.2 K (Pt 100, Ni 100), 0.5 K (Pt 500, Ni 500), 0.3 K (Pt 1000, Ni 1000)
	Thermocouple sensors	Type 0.5 K (K, J, T, E, L, U), 1.0 K (N, C, D), 2.0 K (S, B, R)
	Resistance-type sensors	±0.1 Ω (10...400 Ω), ±1.5 Ω (10...2000 Ω)
	Voltage sensor	±20 µV (-10...75 mV)
Test voltage input/output		2 kV AC (50 Hz, 1 min.)
Switch on delay time		6 s
Degree of protection		IP00, IP66 (integrated in the connecting head)
Mounting position		Connecting head according to DIN 43729 form B
Connection		Installation in connection head according to DIN 43729 form B
Standards/regulations		NAMUR recommendation NE 21
Housing material		Polycarbonate, PC
Inflammability class according to UL 94		V0
Screw connection solid / stranded / AWG		0.2 ... 1.75 mm² / 0.2 ... 1.75 mm² / 24 - 15
Safety data as per ATEX		
Maximum voltage U_i		30 V
Maximum current I_i		100 mA
Maximum power P_i		750 mW
Maximum voltage U_o		5 V DC
Maximum current I_o		5.4 mA
Maximum power P_o		6.6 mW
Gas group		II A / II B / II C
- max. external inductivity Lo	[mH]	100 / 100 / 100
- max. external capacity Co	[µF]	9.9 / 9.9 / 2
Maximum ambient temperature		Category 1: T4 = 60°C, T5 = 50°C, T6 = 40°C Category 2: T4 = 85°C, T5 = 70°C, T6 = 55°C
Conformance / approvals		
Conformance		CE-compliant
ATEX		II 1 G and II 2 G Ex ia IIC T6/T5/T4
UL, USA / Canada		cULus
Functional safety (SIL)		SIL 2 according to EN 61508



Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducer, smart, for resistance thermometers, thermocouples, resistance-type sensors, and voltage sensors	**MCR-FL-HT-TS-I-EX**	**2864545**	1

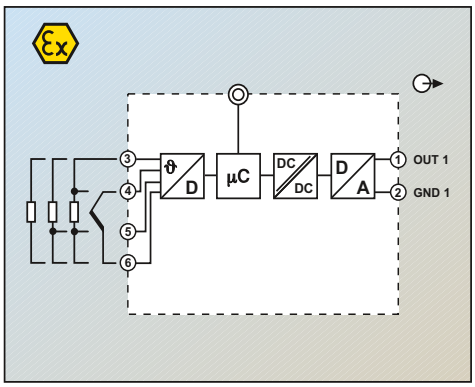
Programmable loop-powered temperature measuring transducers with connection heads, Ex i

- 1-channel
- Loop-powered
- Input for resistance thermometers, thermocouples, and linear mV signals, Ex ia IIC
- Output 4...20 mA/20...4 mA
- Can be installed in zone 0
- Galvanic 2-way isolation
- Configuration using software

Notes:

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

You can implement your own measuring range settings, linearization, and characteristic curve adjustments. For this purpose, you need the MCR-PAC-T-USB programming adapter and the MCR/PI-CONF-WIN configuration software, see page 190



Block diagram MCR-FL-HT-T-I-EX

Loop-powered, programmable

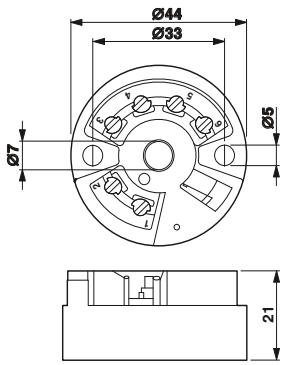
Ex:

Technical data

Measuring input		
Resistance thermometers		Pt, Ni (100, 500, 1000); min. measurement range 10 K
Thermocouple sensors		B, C, D, E, J, K, L, N, R, S, T, U; min. measurement range 50 K/500 K
Resistor		10 Ω ... 400 Ω (min. measurement range 10 Ω) 10 Ω ... 2000 Ω (min. measurement range 100 Ω)
Voltage		-10 mV ... 100 mV (min. measurement range 5 mV)
Configuration		Yes, programmable
Measuring output		
Output signal range		4 mA ... 20 mA / 20 mA ... 4 mA
Maximum output signal		≤ 25 mA
Load		≤ 720 Ω (For U_V = 24 V; U_{supply} - 8 V / 0.025 A)
Line monitoring		NE 43
Short-circuit current		≤ 3.6 mA or ≥ 21 mA (adjustable, not for thermocouples)
Output current with open circuit		≤ 3.6 mA or ≥ 21 mA (adjustable)
Output current, measuring range overrange/underrange		3.8 mA ... 20.5 mA (linear increase/decrease)
General data		
Supply voltage range		8 V DC ... 30 V DC
Current consumption		< 3.5 mA
Step response (10 - 90%)		< 2 s
Transmission error	Resistance thermometers	0.2 K (Pt 100, Ni 100), 0.5 K (Pt 500, Ni 500), 0.3 K (Pt 1000, Ni 1000)
	Thermocouple sensors	Type 0.5 K (K, J, T, E, L, U), 1.0 K (N, C, D), 2.0 K (S, B, R)
	Resistance-type sensors	±0.1 Ω (10...400 Ω), ±1.5 Ω (10...2000 Ω)
	Voltage sensor	±20 µV (-10...100 mV)
Test voltage input/output		2 kV AC (50 Hz, 1 min.)
Switch on delay time		6 s
Degree of protection		IP00, IP66 (integrated in the connecting head)
Mounting position		Connecting head according to DIN 43729 form B
Connection		Installation in connection head according to DIN 43729 form B
Standards/regulations		NAMUR recommendation NE 21
Housing material		Polycarbonate, PC
Inflammability class according to UL 94		V0
Screw connection solid / stranded / AWG		0.2 ... 1.75 mm² / 0.2 ... 1.75 mm² / 24 - 15
Safety data as per ATEX		
Maximum voltage U_i		30 V
Maximum current I_i		100 mA
Maximum power P_i		750 mW
Maximum voltage U_o		8.2 V DC
Maximum current I_o		4.6 mA
Maximum power P_o		9.35 mW
Gas group		II B II C
- max. external inductivity Lo	[mH]	8.5 4.5
- max. external capacity Co	[µF]	1.9 0.974
Maximum ambient temperature		Category 1: T4 = 60°C, T5 = 50°C, T6 = 40°C Category 2: T4 = 85°C, T5 = 70°C, T6 = 55°C
Conformance / approvals		
Conformance		CE-compliant
ATEX		II 1 G Ex ia IIC T6/T5/T4
UL, USA / Canada		cULus

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR temperature measuring transducer, for resistance thermometers, thermocouples, resistance-type sensors, and voltage sensors	**MCR-FL-HT-T-I-EX**	**2864532**	1



Accessories

Configuration software package

The **MCR/PI-CONF-WIN configuration software package** is used to configure and visualize all parameters for the programmable loop-powered temperature transducers.

– For temperature transducers MCR-FL-T(S)-LP-I-EX and MCR-FL-HT-T(S)-I-EX
– Galvanically isolated
– Configuration possible during operation
– Straightforward menu interface
– Rapid programming

The computer and the measuring transducer communicate with one another via a software adapter cable and a serial interface.

Notes:

The software runs under the following operating systems: Windows NT™, 2000™, and XP™.

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR configuration software, for programming MCR-T-...-, MCR-...-LP-...-, MCR-...-HT-...-, MCR-S-...-, MCR-F-..., and MCR-PSP-... modules, CD-ROM	**MCR/PI-CONF-WIN**	**2814799**	1

Accessories

USB adapter cable
Software adapter cable

For connecting the programmable MCR-/PI modules to the USB interface of a computer, the USB adapter cable **CM-KBL-RS232/USB** can be used together with the relevant adapter cables. Programming with the MCR/PI-CONF-WIN software is possible under the operating systems Windows 98™, Windows 2000™ and Windows XP™.

The following modules are supported:

– MCR-FL-T-LP-I-EX
– MCR-FL-HT-T-I-EX

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
USB adapter cable, D-9-SUB to USB, with adapter D-9-SUB to D-25-SUB	**CM-KBL-RS232/USB**	**2881078**	1
Software adapter cable, 2.4 m length, with USB connection, for programming MCR-...-LP-... and MCR-...-HT-... modules	**MCR-PAC-T-USB**	**2309000**	1

Accessories

Adapter cable, stranded, 9-pos. D-SUB socket on 25-pos. D-SUB pin	**PSM-KAD 9 SUB 25/BS**	**2761295**	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.
Shield fast connection			
For Ø 3-6 mm	**SSA 3-6**	**2839295**	10
For Ø 5-10 mm	**SSA 5-10**	**2839512**	10

Accessories

Test plug

Description	Color	Ordering data		
		Type	Order No.	Pcs. / Pkt.
Test plug, consisting of:				
Metal part for 2.3 mm Ø socket hole and		**MPS-MT**	**0201744**	10
Insulating sleeve, 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

PHOENIX CONTACT
EMpro
690.3 V
689.6
688.9
50.00 Hz
0002 17683 kWh
I °C U F P PF MAX AVG H E
/ TEST
OK
PROG
Webserver

Monitoring

Energy and power measuring technology
EMpro energy meters measure, analyze, and communicate important electrical system parameters.
PSK DL data logger kits monitor and log operating states.
PSK meters record compressed air consumption.

Current transformers
PACT current transformers convert currents up to 4000 A into secondary currents of 1 and 5 A.

Current and voltage measuring technology
MCR current and voltage transducers convert currents and voltages into standard analog signals.

Solar and PV system monitoring
The SOLARCHECK modular monitoring system is used for string monitoring in photovoltaic systems.

Residual current monitoring
RCM devices provide residual current monitoring in grounded power supply systems. They detect residual currents at an early stage before they result in forced shutdown.

Components for E-Mobility
EV Charge Control is the charging controller used to charge electric vehicles on the AC mains according to IEC 61851-1.

Electronic monitoring relays
EMD monitoring relays detect and indicate deviations in important system parameters at an early stage.

Electronic timer relays
ETD timer relays are used for straightforward time control functions.

Special function modules
EMG special function modules enable simple components such as diodes to be used in an industrial context. These products feature professional housing and connection technology.

Product range overview

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ETD electronic timer relays	**258**
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Energy and power measuring technology

EMpro energy meters for front-panel installation Page 200

EMpro energy meters for DIN rail mounting Page 201

Special function and communication modules Page 202

DIN rail adapters Page 205

Current and voltage measuring technology

PACT winding current transformers Page 222

Mounting accessories, shock protection Page 223

MCR current transducers for AC/DC and distorted currents up to 600 A Page 229

MCR current transducers for AC/DC and distorted currents up to 55 A, programmable Page 230

Solar and PV system monitoring

Accessories
Configuration software and USB adapter cable Page 149

SOLARCHECK PV string monitoring
Communication module Page 240

SOLARCHECK PV string monitoring
Current measuring modules Page 241

SOLARCHECK PV string monitoring
Voltage measuring modules Page 241

Monitoring relays

EMD-BL
Compact monitoring relays Page 250

EMD
Multifunctional monitoring relays Page 252

Timer relays

ETD-BL
Ultra-narrow timer relays Page 258

ETD
Multifunctional timer relays Page 260

Complete packages for data logging
Page 206

Compressed air meters
Page 208

Current transformers

PACT bus-bar current transformers
Page 212
Can be calibrated Page 224

PACT plug-in current transformers
Page 214
Can be calibrated Page 224

MCR current transducers for AC currents, sinusoidal up to 12 A Page 232
Passive, up to 5 A Page 234

MCR current transducers for AC currents, sinusoidal and distorted, up to 200 A
Page 233

MCR current protectors for AC currents, sinusoidal up to 16 A Page 235

MCR voltage transducers
for DC voltages up to 660 V Page 236
For AC voltages up to 444 V Page 236

Residual current monitoring

RCM type B+ for DC residual currents and pulsating DC and AC residual currents
Page 244

RCM type A for pulsating DC and AC residual currents Page 245

Components for E-Mobility

EV Charge Control
Charging controller Page 247

EV Charge Lock Release
Mains failure plug release Page 247

Special function modules

EMG
Diode modules, lamp testing modules, display modules Page 262

Lightning current measuring system

Lightning current measuring system
See Catalog 6

HMIs

HMIs
See Catalog 8

Signal towers

Signal towers
See Catalog 8

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 special 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 straightforward current and power measurement and detection of harmonics to spectral analysis and trend calculation.

– Flexible network connection
– Can be extended with plug-in communication modules and special function modules
– Remote access via web server

The universal solution on the front panel

The EMpro MA400 is capable of all standard measurement tasks in the main distribution up to 500 V AC.

– Plug-in RS-485 extension module for integration in JBUS and MODBUS systems

The compact starter for use in the sub-distribution

The EMpro MA200 energy meter is ideal for simple measurement tasks where on-site analysis of the measured values is sufficient.

The highly communicative device for use on DIN rails

The EMpro MA250 performs simple measuring tasks in small control cabinets directly on the machine.

– With built-in RS-485 interface for integration in JBUS and MODBUS systems

Data logger kits

PSK DL data logger kits monitor the operating state of your plant and inform you of any change in state by SMS.

The complete package is available in two versions:

– PSK DL BASIC with all basic functions
– PSK DL FLEX allows programming directly in SQL and supports modular expansion. Sends e-mails via GPRS or DSL.

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

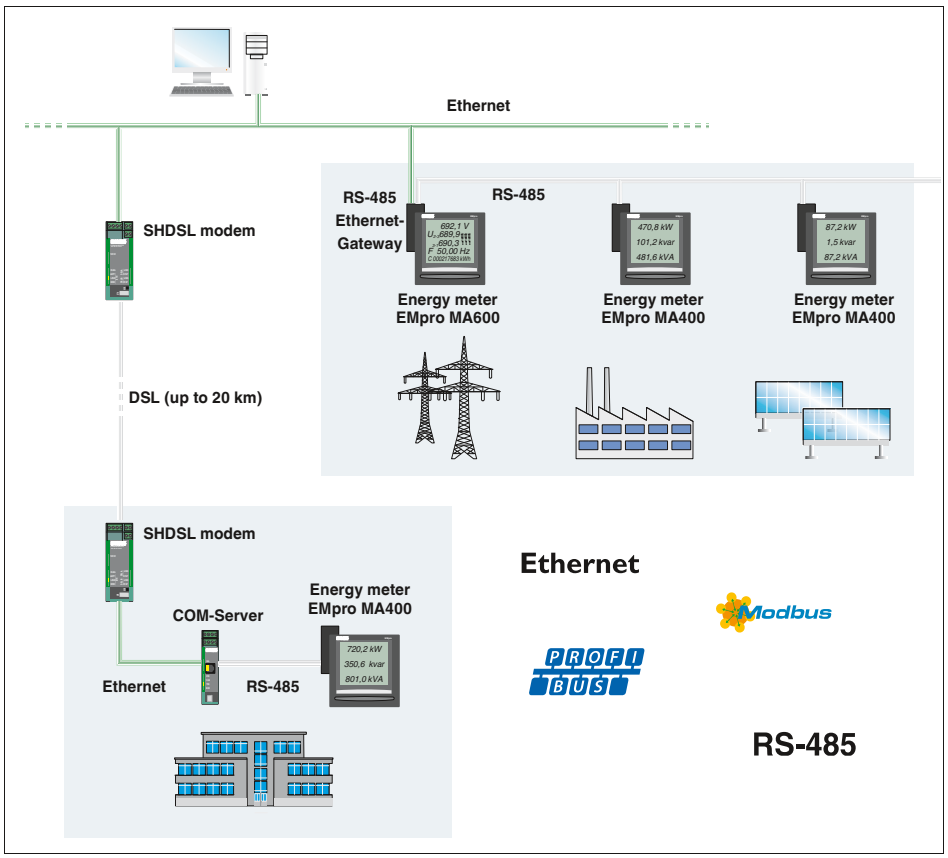
Inline power measurement terminal

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 8, control technology, I/O systems, and network structure.

Energy meters



Measurement – monitoring – communication

In order to achieve efficient energy management, all energy data that has been determined is acquired 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

EMpro extension modules, special function modules, and communication modules enable you to remain flexible and extend your EMpro measuring devices at any time:

– Digital inputs and outputs
– Pulse outputs
– Analog outputs
– Communication interfaces
– Measured data memory
– Temperature measurement

Remote access to multiple meters - 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.

You can easily select the right device for your application by referring to the table below:

Product type	The compact starter EEM-MA200	The highly communicative device for use on DIN rails EEM-MA250 with RS-485	The universal solution on the front panel EEM-MA400	The communication expert EEM-MA600 EEM-MA600-24DC
Mounting				
DIN rail	•	•		
Front panel			•	•
Measurement				
Currents				
I1, I2, I3, Σ3	•	•		•
I1, I2, I3, IN (calculation)			•	•
Maximum values	•	•	•	•
Average values			•	•
Supports current measurement without an external transformer				•
Voltages				
U12, U23, U31, V1, V2, V3	•	•	•	•
Maximum values				•
Average values				•
Voltage measurement via voltage transducer				•
Voltage measurement, direct, up to 500 V	•	•	•	•
Voltage measurement, direct, up to 700 V				•
Frequency	•	•	•	•
Power				
ΣP, ΣQ, ΣS (±)	•	•	•	•
P, Q, S per phase (±)			•	•
Maximum values P, Q, S	•	•	•	•
Average values P, Q, S			•	•
Trend power				•
Power factor				
ΣPF	•	•	•	•
PF per phase			•	•
THD (Total Harmonic Distortion)				
I1, I2, I3, U12, U23, U31, V1, V2, V3	**Up to 51st harmonic**	**Up to 51st harmonic**	**Up to 51st harmonic**	**Up to 63rd harmonic**
Temperature				
Temperature measurement (internal)	•	•		
Metering				
Active and reactive energy (kWh+, kvarh+)	•	•	•	•
Active and reactive energy (kWh±, kvarh±)				•
Two-tariff meter	•	•		
Operating hours	•	•	•	•
Analysis				
Harmonics analysis				**Up to 63rd harmonic**
Outputs				
One configurable pulse output (kWh+, kvarh+) or alarm (threshold value)	•	•		
Inputs				
One configurable input for tariff switch-over	•	•		
Special function modules (optional)				
Memory				•
Two digital I/Os				•
One pulse output or one threshold value			•	
Two pulse outputs				•
Two analog outputs				•
Temperature measurement				•
Communication modules (optional)				
JBUS/Modbus RTU (RS-485)			•	•
PROFIBUS DP				•
PROFIBUS (D-SUB)				•
Ethernet				•
RS-485/Ethernet gateway				•

Key

I1, I2, I3	Conductor currents	P	Real power
IN	Neutral conductor current	Q	Reactive power
U12, U23, U31	Phase conductor voltages	S	Apparent power
V1, V2, V3	Conductor voltages to N	PF	Power factor
		THD	Total harmonic distortion

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 special 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 a pulse 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 pulse input
– Pulse output
– RS-485 interface (JBUS/MODBUS)

EEM-MA200
– Two-tariff measurement via pulse input
– Pulse output

Notes:

1) EMC: Class A product, see page 571

Measuring voltage of up to 700 V AC, extendable

Housing width 96 mm

Technical data

Input data	
Measuring principle	True r.m.s. value measurement
Acquisition of harmonics	up to 63rd harmonic
Measured value	AC sine (50/60 Hz)
Voltage measuring input V1, V2, V3	
Input voltage range	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)
Accuracy	0.2%
Current measuring input I1, I2, I3	
Input current range (Via external transformers)	9999 A (primary) (1 A and 5 A, secondary)
Overload capacity	6 A (Permanent)
Operate threshold	10 mA
Accuracy	0.2%
Power measurement	
Measuring range	0 MW ... 8000 MW / 0 Mvar ... 8000 Mvar / 0 MVA ... 8000 MVA
Accuracy	0.5%
Active energy (IEC 62053-22)	Class 0.5S
Reactive power (IEC 62053-23)	Class 2
Digital input	
Voltage input signal	(Via extension module)
Switching output	
Output description	Via extension module
Maximum switching voltage	-
Current carrying capacity	-
Serial port	
Output description	Via extension module
Serial transmission speed	-
Display	
Type	LCD display, backlighting
Measuring rate	approximately
General data	
Supply voltage	
Nominal power consumption	10 VA 20 VA (With maximum number of extension modules)
Degree of protection	IP52 (front), IP30 (back)
Ambient temperature range	-10°C ... 55°C (14°F to 131°F)
Dimensions W / H / D	96 / 96 / 82 mm
Dimensions W / H / D With extension module	96 / 96 / 80 mm
Connection cross section (solid / stranded / AWG)	
Voltage and other connections	0.5 ... 2.5 mm² / 0.5 ... 2.5 mm² / 20 - 14
Current connection	0.5 ... 6 mm² / 0.5 ... 6 mm² / 20 - 8
Conformance / approvals	
Conformance	CE-compliant
UL, USA / Canada	UL 61010-1

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Energy meter, for installation in front panel	**EEM-MA600[1])**	**2901366**	1
Energy meter, for front-panel installation, 24 V DC			
Energy meter, for mounting on a DIN rail			

N

Measuring voltage of up to 700 V AC, supply voltage 24 V DC

Housing width 96 mm

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 0.5S Class 2
(Via extension module)
Via extension module - -
Via extension module -
LCD display, backlighting approximately
10 VA 20 VA (With maximum number of extension modules) IP52 (front), IP30 (back) -10°C ... 55°C (14°F to 131°F) 96 / 96 / 82 mm 96 / 96 / 80 mm
0.5 ... 2.5 mm² / 0.5 ... 2.5 mm² / 20 - 14 0.5 ... 6 mm² / 0.5 ... 6 mm² / 20 - 8
CE-compliant -

Ordering data

Type	Order No.	Pcs. / Pkt.
EEM-MA600-24DC	**2902352**	1

Measuring voltage of up to 500 V AC, can be extended with RS-485 interface

Housing width 96 mm

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 0.5S Class 2
-
- - -
Via extension module -
LCD display, backlighting approximately
5 VA 10 VA (With maximum number of extension modules) IP52 (front), IP30 (back) -10°C ... 55°C (14°F to 131°F) 96 / 96 / 82 mm 96 / 96 / 80 mm
0.5 ... 2.5 mm² / 0.5 ... 2.5 mm² / 20 - 14 0.5 ... 6 mm² / 0.5 ... 6 mm² / 20 - 8
CE-compliant UL 61010-1

Ordering data

Type	Order No.	Pcs. / Pkt.
EEM-MA400[1])	**2901364**	1

Measuring voltage of up to 500 V AC, with DIN rail mounting, also with RS-485 interface

Housing width 72 mm

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 0.5S Class 2	
230 V AC ±10% (Tariff switchover: e.g., day/nighttime tariff)	
Transistor output, active 30 V DC 27 mA	
EEM-MA250[1])	EEM-MA200[1])
Modbus RTU/JBUS RS-485	None
2,4 ... 38.4 kbps	
LCD display, backlighting approximately	
5 VA IP51 (front), IP20 (back) -10°C ... 55°C (14°F to 131°F) 72 / 90 / 64 mm	
0.5 ... 2.5 mm² / 0.5 ... 2.5 mm² / 20 - 14 0.5 ... 4 mm² / 0.5 ... 4 mm² / 20 - 10	
CE-compliant UL 61010-1	

Ordering data

Type	Order No.	Pcs. / Pkt.
EEM-MA250[1])	**2901363**	1
EEM-MA200[1])	**2901362**	1

Extension modules

Plug-in special function module for the EEM-MA600 energy meter

EEM-2DIO-MA600

– Two digital inputs and outputs
– Configurable threshold values

EEM-2AO-MA600

– Two 0 ... 20 mA/4 ... 20 mA analog outputs, configurable

Notes:

1) EMC: Class A product, see page 571

Two digital inputs and 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 range	-10°C ... 55°C (14°F to 131°F)
Conformance / approvals	
Conformance	CE-compliant
UL, USA / Canada	UL 61010-1

Technical data	
Digital input	
Voltage input signal	-
Input pulse length	-
Output	
Output description	Current output
Maximum switching voltage	-
General data	
Supply voltage	9 V (via EEM-MA600)
Degree of protection	IP20
Ambient temperature range	-10°C ... 55°C (14°F to 131°F)
Conformance / approvals	
Conformance	CE-compliant
UL, USA / Canada	UL 61010-1

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Special function module (for EEM-MA600) With two digital I/Os	**EEM-2DIO-MA600[1])**	**2901371**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
EEM-2AO-MA600[1])	**2901475**	1

Extension modules

Plug-in special function module for the EEM-MA600 energy meter

EEM-MEMO-MA600

– Stores the last ten alarms together with the time and date
– Stores the real and reactive power, e.g., for 45 days with a 15-minute synchronization pulse

Notes:

1) EMC: Class A product, see page 571

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 range	-10°C ... 55°C (14°F to 131°F)
Conformance / approvals	
Conformance	CE-compliant
UL, USA / Canada	UL 61010-1

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Memory module (for EEM-MA600)	**EEM-MEMO-MA600[1])**	**2901370**	1

Extension modules

Communication modules

EEM-RS485-MA...
– JBUS/Modbus RTU (RS-485)

EEM-PB...-MA600
– PROFIBUS DP, with transmission speeds of 1.5 or 12 Mbps

Notes:
1) EMC: Class A product, see page 571

RS-485

PROFIBUS

Technical data		
Serial port		
Output description	Modbus RTU/JBUS RS-485	
Serial transmission speed	2.4 ... 38.4 kbps	
General data		
Supply voltage	9 V (via EEM-MA400)	
Degree of protection	IP20	
Ambient temperature range	-10°C ... 55°C (14°F to 131°F)	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	UL 61010-1	

Technical data		
	EEM-PB-MA600[1])	EEM-PB12-MA600[1])
Output description	PROFIBUS DP RS-485	PROFIBUS DP RS-485
Serial transmission speed	9.6 kbps ... 1.5 Mbps	9.6 kbps ... 12 Mbps
General data		
Supply voltage	9 V (via EEM-MA600)	
Degree of protection	IP20	
Ambient temperature range	-10°C ... 55°C (14°F to 131°F)	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	UL 61010-1	

Ordering data			
Description	Type	Order No.	Pcs. / Pkt.
Communication module (for EEM-MA400) JBUS/Modbus RTU (RS-485)	**EEM-RS485-MA400[1])**	**2901365**	1
Communication module (for EEM-MA600) JBUS/Modbus RTU (RS-485)	**EEM-RS485-MA600[1])**	**2901367**	1
PROFIBUS DP (1.5 Mbps)	**EEM-PB-MA600[1])**	**2901368**	1
PROFIBUS DP (12 Mbps)	**EEM-PB12-MA600[1])**	**2901418**	1

Communication modules

EEM-ETH-MA600
– Ethernet
– Integrated web server

EEM-ETH-RS485-MA600
– Ethernet/RS-485 gateway
– MODBUS RTU master for up to 246 slaves
– Integrated web server

Notes:
1) EMC: Class A product, see page 571

Ethernet
(MODBUS TCP)

Ethernet/RS-485 gateway
(MODBUS TCP/MODBUS RTU)

Technical data		
Serial port		
Output description	Modbus TCP Ethernet (RJ45)	
Serial transmission speed	10/100 Mbps	
General data		
Supply voltage	9 V (via EEM-MA600)	
Degree of protection	IP20	
Ambient temperature range	-10°C ... 55°C (14°F to 131°F)	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	UL 61010-1	

Technical data		
Serial port		
Output description	Modbus TCP Ethernet (RJ45)	
Serial transmission speed	10/100 Mbps	
General data		
Supply voltage	9 V (via EEM-MA600)	
Degree of protection	IP20	
Ambient temperature range	-10°C ... 55°C (14°F to 131°F)	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	UL 61010-1	

Ordering data			
Description	Type	Order No.	Pcs. / Pkt.
Communication module (for EEM-MA600) Ethernet RS-485/Ethernet gateway	**EEM-ETH-MA600[1])**	**2901373**	1
	EEM-ETH-RS485-MA600[1])	**2901374**	1

Extension module

Plug-in special function module for the EEM-MA600 energy meter

EEM-TEMP-MA600

– Temperature recording for up to three PT 100 temperature sensors
– Temperature measuring range −20°C...+150°C
– Internal temperature recording of the ambient temperature −10°C...+55°C

Notes:

1) EMC: Class A product, see page 571

Temperature module

Technical data

Input data	
Description of the input	Pt 100 input: 2, 3, 4-conductor
Temperature range	-20°C ... 150°C (Connected sensors) -10°C ... 55°C (in the immediate vicinity)
Transmission error	0.5 K/m (2-conductor) 0.25 K/m (3-conductor) 0 K/m (4-conductor)
Basic accuracy	±1 K
General data	
Supply voltage	9 V (via EEM-MA600)
Degree of protection	IP20
Ambient temperature range	-10°C ... 55°C (14°F to 131°F)
Conformance / approvals	
Conformance	CE-compliant

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Special function module (for EEM-MA600)			
	EEM-TEMP-MA600[1])	**2901949**	1

Extension modules

N

Plug-in special function modules for the EEM-MA400 and EEM-MA600 energy meters.

EEM-IMP-MA400

– One configurable pulse output
– One configurable threshold value

EEM-IMP-MA600

– Two configurable pulse outputs

Pulse module

Pulse module

Technical data

Digital input		
Voltage input signal	-	-
Input pulse length	-	-
Output		
Output description	Relay output	Relay output
Maximum switching voltage	100 V DC	100 V DC
General data		
Supply voltage	9 V (via EEM-MA400)	9 V (via EEM-MA600)
Degree of protection	IP20	IP20
Ambient temperature range	-10°C ... 55°C (14°F to 131°F)	-10°C ... 55°C (14°F to 131°F)
Conformance / approvals		
Conformance	CE-compliant	CE-compliant

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Special function module (for EEM-MA600)			
With two digital I/Os	**EEM-IMP-MA400**	**2904314**	1
With two analog outputs	**EEM-IMP-MA600**	**2904313**	1

Measuring instrument bracket

– 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

Technical data

General data	
Vibration resistance	57 Hz ... 150 Hz (2 g)
Weight	265 g
DIN rail clip material	Aluminum, natural anodized
Fixing sheet material	Stainless steel VA
Dimensions W / H / D	116 / 112 / 115 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
DIN rail adapter for EEM-MA600 and EEM-MA400 energy meters	**EEM-MKT-DRA**	**2902078**	1

BASIC data logger kit

Optimize your use of energy and resources. Data loggers from Phoenix Contact can be used to monitor and log the supply of water, compressed air, and electricity to your system. This enables efficient cost control. No additional software or operator panels are needed to parameterize data loggers – simply use a web browser on your PC.

The BASIC data logger kit features:

- Low installation and energy costs, thanks to parameterization via web interface without programming knowledge
- Comprehensive solution – complete package available under one order number
- Flexible communication, thanks to the integrated GSM/GPRS modem and Ethernet interface
- Maximum system availability, thanks to limit value monitoring
- Standardized data routing, thanks to SQL interface
- Process information sent to the user via e-mail or SMS
- Set digital outputs on the data logger via SMS
- Integrated FTP and web server

Technical data

See www.phoenixcontact.net/products

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Parameterizable **data logger kit** with Ethernet interface and GSM modem, including power supply unit with 8 digital outputs and 16 digital inputs, plus accessories and patch cable	**PSK DL BASIC**	**2700726**	1

Complete packages for data logging

FLEX data logger kit

The PSK DL FLEX data logger kit is the extended version of the PSK DL BASIC basic package. A maximum of three digital input terminals and four analog input terminals from the Inline I/O system can also be connected to the FLEX kit. The mounted terminals are automatically detected and started up. The PSK DL FLEX can be used to send digital and analog status information via SMS or e-mail or via mobile phone networks or Ethernet. In addition, the PSK DL FLEX can write the information directly to an SQL database that is provided.

In addition to all the properties of the BASIC version, the FLEX extended solution kit also offers the following:

– Direct SQL connection via SQL interface
– Process information via e-mail and SMS
– Flexible extension with additional I/O modules

Notes:

1) EMC: Class A product, see page 571

Technical data

See www.phoenixcontact.net/products

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Extendable parameterizable **data logger kit** with Ethernet interface and GSM/GPRS modem, including power supply unit with 8 digital outputs, 24 digital inputs, and 8 analog inputs, plus accessories and patch cable	**PSK DL FLEX**	**2700727**	1

Accessories

Inline digital input terminal, complete with accessories (connector and labeling field)			
- 2 inputs	**IB IL 24 DI 2-PAC[1])**	**2861221**	1
- 4 inputs	**IB IL 24 DI 4-PAC[1])**	**2861234**	1
- 8 inputs	**IB IL 24 DI 8-PAC[1])**	**2861247**	1
- 16 inputs	**IB IL 24 DI 16-PAC[1])**	**2861250**	1
- S0 counter	**IB IL DI 8/S0-PAC[1])**	**2897020**	1
Inline analog input terminal, complete with accessories (connector and labeling field)			
- 2 inputs	**IB IL AI 2/SF-PAC[1])**	**2861302**	1
- 8 inputs	**IB IL AI 8/SF-PAC[1])**	**2861412**	1
- 8 inputs, initiator with supply outputs	**IB IL AI 8/IS-PAC[1])**	**2861661**	1

Sensors and meters
Compressed air meters

N

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
- Measuring range from 0.06 Nm3/h to 700.0 Nm3/h
- Flexible use, thanks to IP65 protection: resistant to dust and splash water

IO-Link

Compressed air counter up to 75 Nm³/h

Technical data

	PSK AFS6050IOL	PSK AFS6000IOL
Flow monitoring		
Measuring range	0 Nm³/h ... 75 Nm³/h	
Display area	0 Nm³/h ... 90 Nm³/h	
Repeatability	(±1.5% of the measured value)	
Response time	< 0.1 s ((dAP = 0))	
Measured value error	±15% of the measured value +1.5% of the measuring range final value	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
Temperature monitoring		
Measuring range	0°C ... 60°C	
Display area	-12°C ... 72°C	
Response time	30 s (Q > 0.1 Nm³/h)	
Resolution	0.5°C	
Accuracy	±2.5°C (Q > 0.1 Nm³/h)	
Supply for module electronics		
Connection method	M12 plug-in connector	
No. of pos.	4	
Supply voltage range	19 V DC ... 30 V DC	
Current draw	< 100 mA	
Digital outputs		
Pulse value	0.0010 m³ ... 1000000 m³	
Pulse length	min. 0.04 s	
Delay time	0.5 s (Operational readiness)	
Analog outputs		
Type of protection	Short-circuit protection, polarity reversal protection	
Current output signal	4 mA ... 20 mA	
Load/output load current output	≤ 500 Ω	
General data		
Weight	581 g	961 g
Width	45 mm	
Height	111 mm	300 mm
Depth	79.5 mm	76.8 mm
Degree of protection	IP65	
Protection class	III	
Ambient temperature (operation)	0°C ... 60°C	
Ambient temperature (storage/transport)	-20°C ... 85°C	
Vibration resistance according to IEC 60068-2-6	5 g (55 ... 2000 Hz)	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Compressed air meter: G1/2 process connection, measuring range up to 75 Nm³/h	**PSK AFS6050IOL**	**2700704**	1
Compressed air meter: G1/2 process connection, measuring range up to 75 Nm³/h	**PSK AFS6000IOL**	**2700707**	1
Compressed air meter: R1/4 process connection, measuring range up to 15 Nm³/h			
Compressed air meter: R1 process connection, measuring range up to 225 Nm³/h			
Compressed air meter: R2 process connection, measuring range up to 700 Nm³/h			

N

IO-Link

Compressed air counter up to 15 Nm³/h

Technical data

0 Nm³/h ... 15 Nm³/h 0 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 plug-in 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 5 g (55 ... 2000 Hz)

Ordering data

Type	Order No.	Pcs. / Pkt.
PSK AFS5000IOL	2700705	1

N

IO-Link

Compressed air counter up to 225 Nm³/h

Technical data

0 Nm³/h ... 225 Nm³/h 0 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 plug-in 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 5 g (55 ... 2000 Hz)

Ordering data

Type	Order No.	Pcs. / Pkt.
PSK AFS8000IOL	2700708	1

N

IO-Link

Compressed air counter up to 700 Nm³/h

Technical data

2 Nm³/h ... 700 Nm³/h 0 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 plug-in 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 5 g (55 ... 2000 Hz)

Ordering data

Type	Order No.	Pcs. / Pkt.
PSK AFS2000IOL	2700709	1

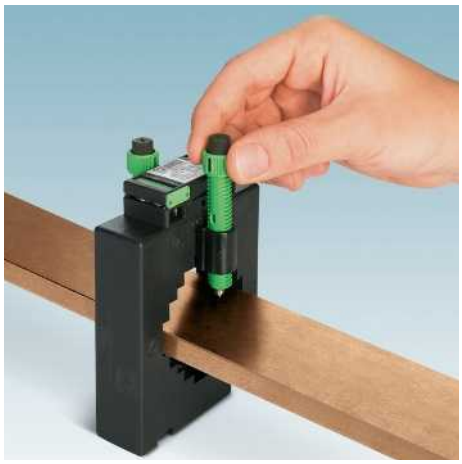
Extremely versatile

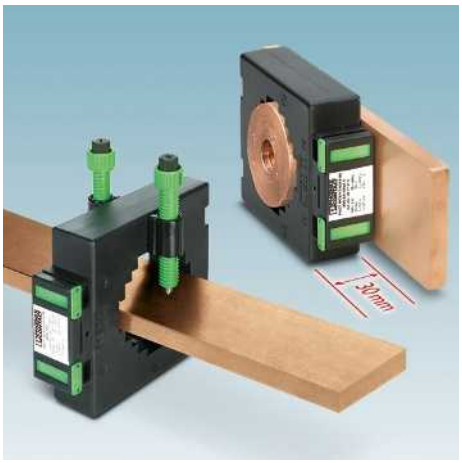
PACT current transformers offer a complete product range for converting alternating currents up to 4000 A into secondary currents of 1 A and 5 A. Depending on requirements, bus-bar, plug-in, and winding current transformers are available. PACT current transformers are available in different transformation ratios, accuracy classes, and rated powers - in 3000 versions, for your current measurement requirements.

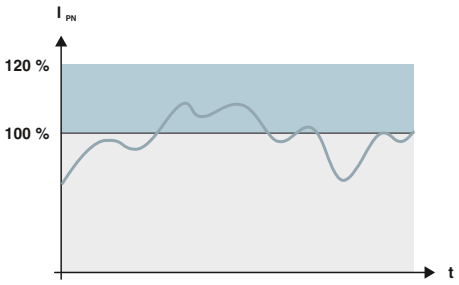
Also available for higher accuracy classes

For standard applications, such as in machine building or system 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

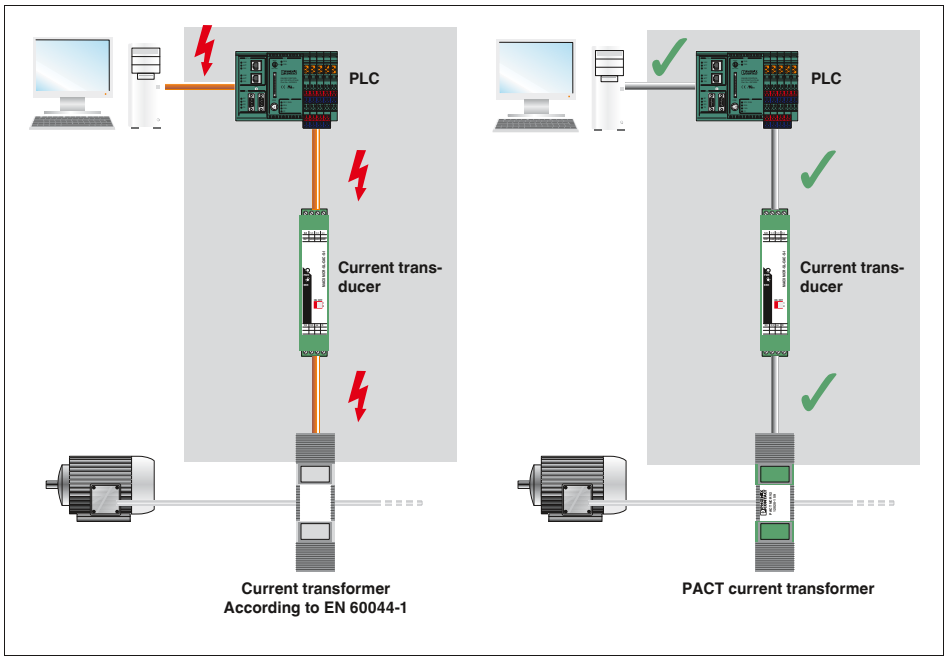
In addition to the vertical and horizontal mounting position, the optional accessories offer further installation options such as mounting on the DIN rail or on the control cabinet panel.

All PACT current transformers are just 30 mm wide. This saves space – for example flat mounting when measuring branch outlets.

Safe detection of 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 continuous thermal nominal current that is 120% of the primary rated current strength.

Example: a PACT transformer with a specified rated power of 10 VA does indeed deliver 14.4 VA on a continual basis.



Safe isolation

PACT current transformers are manufactured in accordance with 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 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 µs)
– Surge voltage category 3 is met

Selection guide

– Complete range consisting of winding, bus-bar, and plug-in 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 converter in accordance with the dimensions of the copper rail
– Specify the four electrical characteristics of the converter:
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

Technical data

Input data	
Thermal rated short-time current	$I_{th} = 60 * I_n$
Rated surge current	$I_{dyn} = 2.5 * I_{th}$
Rated frequency	50 Hz ... 60 Hz
Surge current limitation factor	FS 5
General data	
Rated insulation voltage	1 kV
Test voltage	3 kV (50 Hz, 1 min.)
Impulse withstand voltage	12 kV (1.2 / 50 µs)
Insulating material class	E
Connection capacity of secondary terminals	2 x (2.5 x 4) mm
Ambient temperature (operation)	-25°C ... 40°C
Standards/regulations	IEC 60044-1, EN 50178
Housing material	Polyamide PA fiberglass reinforced

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 cable (forward and return line)
– Take into account the power requirement of the connected devices (measuring devices)
– Add a reserve requirement

S_n total = S_n copper cable + S_n measuring device + S_n reserve

Power requirement of copper cables with a different diameter

Conductor cross section in mm²	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 cable = cable length x 2 x rated power
S_n copper cable = 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 cable + S_n measuring device)
S_n reserve = 2 VA

S_n total = S_n copper cable + 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 ≙ 60 A	IS01 ≙ 1 A	C02 ≙ **0.2**	P125 ≙ 1.25 VA
	IP00750 ≙ 75 A	IS05 ≙ 5 A	C05 ≙ **0.5**	P250 ≙ 2.5 VA
	IP00800 ≙ 80 A		C10 ≙ **1**	P375 ≙ 3.75 VA
	IP01000 ≙ 100 A			P500 ≙ 5.0 VA
	IP01250 ≙ 125 A			P750 ≙ 7.5 VA
	IP02000 ≙ 200 A			P1000 ≙ 10 VA
	IP02500 ≙ 250 A			

1. 2. 3. 4.

Selection table (extract)

I_{sn}	Cl.	Primary rated current strength I_{pn} [A] 60	75	80	100	125	150	200	250
1A	0.5				1.25	2.5	2.5	2.5	2.5
								3.75	5
	1	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5
						3.75	5	5	5
									7.5
5A	0.5							2.5	2.5
								3.75	5
	1	1.25	1.25	1.25	2.5	2.5	2.5	2.5	2.5
			1.5	2		3.75	3.75	5	5
							5	7.5	
									10

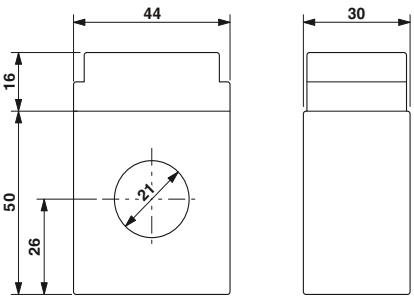
Rated power S_n [VA]

Current transformers

PACT MCR-V1-21-44

– Primary rated current I_{pn}: 0...(50...500) A
– Round conductor dimensions: Ø 21 mm

Notes:
Our configurator, which is available at www.phoenixcontact.net/products, makes ordering easy.
Current transformers that support official calibration: To specify the type of current transformer you require, please use the order key on page 224
The relevant installation accessories can be found on page 223



Bus-bar curr. transf., official calibration as an option

Ordering data

Description	Rated power S_n	Type	Order No.	Pcs. / Pkt.
Preferred versions available from stock (marked in green in the selection table) Primary rated current I_{pn}:				
- 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
Current transformers, pay attention to the following order key for determining the desired current transformer type		**PACT MCR-V1-21-44**	**2277268**	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 amperage I_{pn} [A]												Rated power S_n [VA]
		50	60	75	80	100	125	150	200	250	300	400	500	
IS01 ≙ 1 A	C05 ≙ 0.5					1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
								3.75	5	5	5	5	5	
										7.5		7.5	10	
	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	
							3.75	5	5	5	5	5	5	
										7.5		7.5	10	
IS05 ≙ 5 A	C05 ≙ 0.5					1.25	1.25	1.25	2.5	2.5	2.5	2.5	2.5	
						1.5	2.0	2.5	3.75	5	5	5	5	
										7.5	10	7.5	7.5	
	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	
			1.5				3.75	5	5	5	5	5	5	
									7.5	7.5	10	7.5	10	

Current transformers

PACT MCR-V2-3015-60

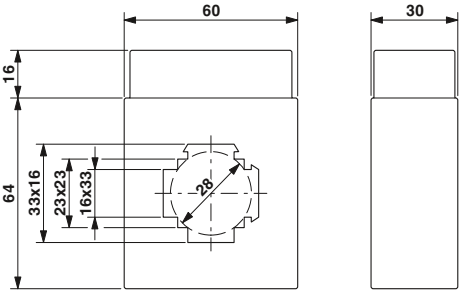
– Primary rated current I_{pn}: 0...(50...750) A
– Round conductor dimensions: Ø 28 mm
– Rail dimensions: 30x15 mm; 20x20 mm

Notes:

Our configurator, which is available at www.phoenixcontact.net/products, makes ordering easy.

Current transformers that support official calibration: To specify the type of current transformer you require, please use the order key on page 224

The relevant installation accessories can be found on page 223



Plug-in curr. transformer, official calibration as an option

Ordering data

Description	Rated power S_n	Type	Order No.	Pcs. / Pkt.
Preferred versions available from stock (marked in green in the selection table) Primary rated current I_{pn}:				
- 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
Current transformers, pay attention to the following order key for determining the desired current transformer type		**PACT MCR-V2- 3015- 60**	**2277271**	1

Accessories

Quick-action mechanism; width of the holding latch 16 mm Fixing pin length 40 mm	**PACT-FAST-MNT-W16-L40**	**2276638**	1
Quick-action mechanism; width of the holding latch 16 mm 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)

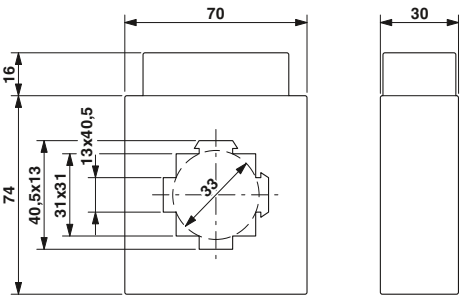
I_{sn}	Cl.	Primary rated current amperage I_{pn} [A] 50	60	75	80	100	125	150	200	250	300	400	500	600	750	Rated power S_n [VA]
IS01 ≙ 1 A	C05 ≙ 0.5					1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
									3.75	5	5	5	5	5	5	
											7.5	10	10	10	10	
														15	15	
	C10 ≙ 1	1.25	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	
							3.75	5	5	5	5	5	5	5	10	
										7.5	10	10	10	10	15	
														15	20	
IS05 ≙ 5 A	C05 ≙ 0.5								2.5	2.5	2.5	2.5	2.5	2.5	2.5	
									3.75	5	5	5	5	5	5	
											7.5	10	10	10	10	
	C10 ≙ 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	
				1.5	2		3.75	3.75	5	5	5	5	5	5	5	
								5	7.5	7.5	7.5	10	10	10	10	
										10	10	15			15	

Current transformers

PACT MCR-V2-4012-70

– Primary rated current I_{pn}: 0...(75...1000) A
– Round conductor dimensions: Ø 33 mm
– Rail dimensions: 40x12 mm; 2x 30x10 mm

Notes:
Our configurator, which is available at www.phoenixcontact.net/products, makes ordering easy.
Current transformers that support official calibration: To specify the type of current transformer you require, please use the order key on page 224
The relevant installation accessories can be found on page 223



Plug-in curr. transformer, official calibration as an option

Ordering data

Description	Rated power S_n	Type	Order No.	Pcs. / Pkt.
Preferred versions available from stock (marked in green in the selection table) Primary rated current I_{pn}:				
- 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
Current transformers, pay attention to the following order key for determining the desired current transformer type		**PACT MCR-V2- 4012- 70**	**2277284**	1

Accessories

Quick-action mechanism; width of the holding latch 13 mm Fixing pin length 40 mm	**PACT-FAST-MNT-W13-L40**	**2276612**	1
Quick-action mechanism; width of the holding latch 13 mm Fixing pin length 65 mm	**PACT-FAST-MNT-W13-L65**	**2276625**	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
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	
							3.75	5	5	5	5	5	5	5	5	
										7.5	10	10	10	10	10	
														15		
	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	
					3.75	5	5	5	5	5	5	5	5	5	5	
								7.5	10	10	10	10	10	10	10	
													15	15		
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	
							3.75	5	5	5	5	5	5	5	5	
										7.5	10	10	10	10	10	
														15		
	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	
					3.75	5	5	5	5	5	5	5	5	5	5	
								7.5	7.5	7.5	10	10	10	10	10	
													15	15		

Current transformers

PACT MCR-V2-5012-85

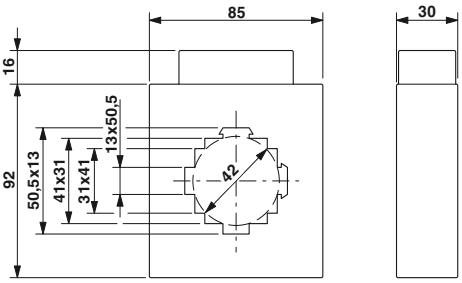
– Primary rated current I_{pn}:
  0...(100...1500) A
– Round conductor dimensions: Ø 42 mm
– Rail dimensions:
  50x12 mm; 2x 40x10 mm

Notes:

Our configurator, which is available at www.phoenixcontact.net/products, makes ordering easy.

Current transformers that support official calibration: To specify the type of current transformer you require, please use the order key on page 224

The relevant installation accessories can be found on page 223



Plug-in curr. transformer, official calibration as an option

Ordering data

Description	Rated power S_n	Type	Order No.	Pcs. / Pkt.
Preferred versions available from stock (marked in green in the selection table) Primary rated current I_{pn}:				
- 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
Current transformers, pay attention to the following order key for determining the desired current transformer type		**PACT MCR-V2- 5012- 85**	**2277297**	1

Accessories

Quick-action mechanism; width of the holding latch 13 mm Fixing pin length 40 mm	**PACT-FAST-MNT-W13-L40**	**2276612**	1
Quick-action mechanism; width of the holding latch 13 mm Fixing pin length 65 mm	**PACT-FAST-MNT-W13-L65**	**2276625**	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
2277297	/	IP02500	/	IS01	/	C10	/	P750

Selection table PACT MCR-V2-5012-85 (Order No.: 2277297)

I_{sn}	Cl.	Primary rated current amperage 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	
					5	5	5	5	5	5	5	5	5	5	5	
							7.5	10	10	10	10	10	10	10	10	
								15	15	15			15	15	15	
	C10 ≙ 1	1.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	
				3.75	5	5	5	5	5	5	5	5	10	10	10	
					7.5	**7.5**	10	10	10	10	10	10	15	15	15	
						10		15	20	20		15	20	20	30	
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	
					5	5	5	5	5	5	5	5	5	5	5	
							7.5	10	10	20	10	10	10	10	10	
								15	15	15			15	15	15	
	C10 ≙ 1	1.25	2.5	2.5	2.5	2.5	2.5	2.5	5	5	2.5	2.5	5	5	5	
				3.75	5	5	5	5	10	10	5	5	10	10	10	
					7.5	7.5	10	10	15	15	10	10	15	15	15	
						10		15	20	20		15	20	20	20	

Current transformers

PACT MCR-V2-6015-85

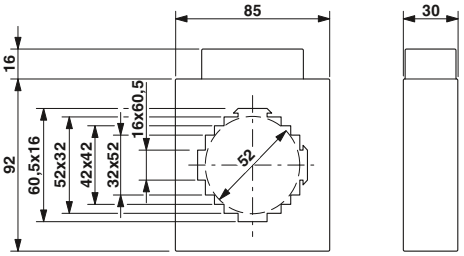
– Primary rated current I_{pn}:
  0...(200...1600) A
– Round conductor dimensions: Ø 52 mm
– Rail dimensions:
  60x15 mm; 2x 50x10 mm; 40x40 mm

Notes:

Our configurator, which is available at www.phoenixcontact.net/products, makes ordering easy.

Current transformers that support official calibration: To specify the type of current transformer you require, please use the order key on page 224

The relevant installation accessories can be found on page 223



Plug-in curr. transformer, official calibration as an option

Ordering data

Description	Rated power S_n	Type	Order No.	Pcs. / Pkt.
Preferred versions available from stock (marked in green in the selection table) Primary rated current I_{pn}:				
- 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
- 1500 A	15 VA	**PACT MCR-V2-6015- 85-1500-5A-1**	**2277970**	1
- 1600 A	15 VA	**PACT MCR-V2-6015- 85-1600-5A-1**	**2277983**	1
Current transformers, pay attention to the following order key for determining the desired current transformer type		**PACT MCR-V2- 6015- 85**	**2277336**	1

Accessories

Quick-action mechanism; width of the holding latch 16 mm Fixing pin length 40 mm	**PACT-FAST-MNT-W16-L40**	**2276638**	1
Quick-action mechanism; width of the holding latch 16 mm 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
2277336	/	IP05000	/	IS01	/	C10	/	P375

Selection table PACT MCR-V2-6015-85 (Order No.: 2277336)

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A]												
		200	250	300	400	500	600	750	800	1000	1250	1500	1600	
IS01 ≙ 1 A	C05 ≙ 0.5		1.25	1.25	1.25	2.5	2.5	2.5	2.5	2.5	2.5			Rated power S_n [VA]
								5			5			
	C10 ≙ 1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5			
						3.75		5	3.75	3.75	5			
IS05 ≙ 5 A	C05 ≙ 0.5		1.25	1.25	1.25	2.5	2.5	2.5	2.5	2.5	5	5	5	
					2.5	5	5	5	5	5	10	10	10	
							10	10	10	10	15	15	15	
									15	15	20	20		
	C10 ≙ 1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	
						5	5	5	5	10	10	10	10	
							10	10	10	15	15	15	15	
									15		20	30		

Current transformers

PACT MCR-V2-6315-95

– Primary rated current I_{pn}:
  0...(200...2500) A
– Round conductor dimensions: Ø 53 mm
– Rail dimensions:
  63x15 mm
  2x 50x10 mm
  40x40 mm

Plug-in curr. transformer, official calibration as an option

PACT MCR-V2-6040-96

– Primary rated current I_{pn}:
  0...(200...2000) A
– Round conductor dimensions: Ø 61 mm
– Rail dimensions:
  60x40 mm; 50x50 mm

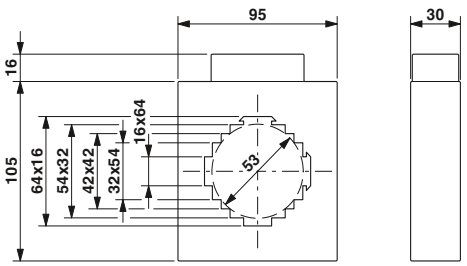
Plug-in curr. transformer, official calibration as an option

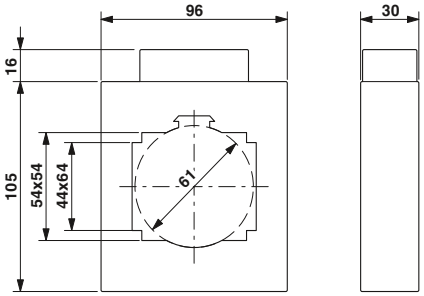
Notes:

Our configurator, which is available at www.phoenixcontact.net/products, makes ordering easy.

Current transformers that support official calibration: To specify the type of current transformer you require, please use the order key on page 225

The relevant installation accessories can be found on page 223





Description	Rated power S_n	Ordering data: Type	Order No.	Pcs. / Pkt.	Ordering data: Type	Order No.	Pcs. / Pkt.
Preferred versions available from stock (marked in green in the selection table) Primary rated current I_{pn}:							
- 600 A	10 VA				PACT MCR-V2-6040- 96- 600-5A-1	2276191	1
- 750 A	10 VA				PACT MCR-V2-6040- 96- 750-5A-1	2276201	1
- 800 A	10 VA	PACT MCR-V2-6315- 95- 800-5A-1	2277213	1	PACT MCR-V2-6040- 96- 800-5A-1	2276214	1
- 1000 A	10 VA	PACT MCR-V2-6315- 95-1000-5A-1	2277226	1	PACT MCR-V2-6040- 96-1000-5A-1	2277705	1
- 1250 A	10 VA	PACT MCR-V2-6315- 95-1250-5A-1	2277239	1			
- 1250 A	15 VA				PACT MCR-V2-6040- 96-1250-5A-1	2276227	1
- 1500 A	10 VA	PACT MCR-V2-6315- 95-1500-5A-1	2277242	1	PACT MCR-V2-6040- 96-1500-5A-1	2277718	1
- 1600 A	10 VA	PACT MCR-V2-6315- 95-1600-5A-1	2277255	1			
- 1600 A	15 VA				PACT MCR-V2-6040- 96-1600-5A-1	2276230	1
- 2000 A	15 VA				PACT MCR-V2-6040- 96-2000-5A-1	2276243	1
Current transformers, pay attention to the following order key for determining the desired current transformer type		PACT MCR-V2- 6315- 95	2277307	1	PACT MCR-V2- 6040- 96	2277349	1
Accessories							
Quick-action mechanism; width of the holding latch 16 mm Fixing pin length 40 mm		PACT-FAST-MNT-W16-L40	2276638	1	PACT-FAST-MNT-W16-L40	2276638	1
Quick-action mechanism; width of the holding latch 16 mm Fixing pin length 65 mm		PACT-FAST-MNT-W16-L65	2276641	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 amperage I_{pn} [A] 200	250	300	400	500	600	750	800	1000	1250	1500	1600	2000	2500	Rated power S_n [VA]
IS01 ≙ 1 A	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	5		
				5	5	5	10	10	10	10	10	10	10	10		
					7.5	10	10	15	15			15	15	15		
														20		
	C10 ≙ 1	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	10		
		3.75	5	5	5	5	5	10	10	10	10	10	10	15		
				7.5	10	10	10	15	15			15	15	20		
							15		20							
IS05 ≙ 5 A	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	5	5	
			3.75	5	5	5	5	10	10	10	10	10	10	10	10	
				7.5	10	10	10	15	15	15	15	15	15	15	15	
						15	15	20	20	30	20	30	30	30	30	
	C10 ≙ 1	2.5	2.5	2.5	2.5	5	5	5	5	10	5	5	10	10	10	
		3.75	5	5	5	10	10	10	10	15	10	10	15	15	15	
				10	10	15	15	15	15	30	15	15	30	30	30	
					15	20	20	30	30		30	30				

Selection table PACT MCR-V2-6040-96 (Order No.: 2277349)

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A] 200	250	300	400	500	600	750	800	1000	1250	1500	1600	2000	Rated power S_n [VA]
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			
					5	5	5	5	5	5	5				
						7.5		7.5	7.5	10	10				
	C10 ≙ 1	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			
					7.5	7.5		7.5	7.5	10	10				
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	5	
					5	5	5	5	5	5	5	5	5	10	
						7.5	7.5	10	10	7.5	10	10	10	15	
													15		
	C10 ≙ 1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	2.5	5	5	
		3.75	3.75	5	5	5	5	5	5	5	10	5	10	10	
					7.5	7.5	10	10	10	10	15	10	15	15	
									15						

Current transformers

PACT MCR-V2-8015-105

– Primary rated current I_{pn}: 0...(400...2500) A
– Round conductor dimensions: Ø 61 mm
– Rail dimensions: 80x15 mm; 2x 60x10 mm; 3x 50x10 mm

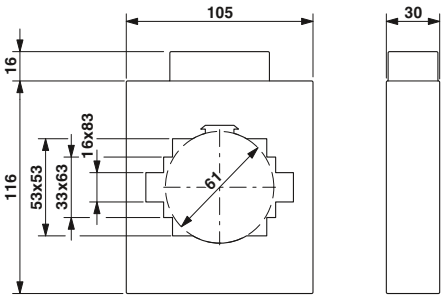
PACT MCR-V2-8020-105

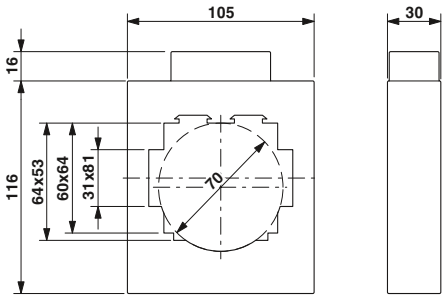
– Primary rated current I_{pn}: 0...(500...2000) A
– Round conductor dimensions: Ø 70 mm
– Rail dimensions: 2x 80x10 mm; 60x60 mm

Plug-in curr. transformer, official calibration as an option

Plug-in curr. transformer, official calibration as an option

Notes:
Our configurator, which is available at www.phoenixcontact.net/products, makes ordering easy.
Current transformers that support official calibration: To specify the type of current transformer you require, please use the order key on page 225
The relevant installation accessories can be found on page 223





Description	Rated power S_n	Ordering data: Type	Order No.	Pcs. / Pkt.	Ordering data: Type	Order No.	Pcs. / Pkt.
Preferred versions available from stock (marked in green in the selection table) Primary rated current I_{pn}:							
- 400 A	7.5 VA	**PACT MCR-V2-8015-105- 400-5A-1**	**2276256**	1			
- 500 A	10 VA	**PACT MCR-V2-8015-105- 500-5A-1**	**2276269**	1			
- 600 A	10 VA	**PACT MCR-V2-8015-105- 600-5A-1**	**2276272**	1			
- 750 A	10 VA	**PACT MCR-V2-8015-105- 750-5A-1**	**2276285**	1			
- 800 A	15 VA	**PACT MCR-V2-8015-105- 800-5A-1**	**2276298**	1			
- 1000 A	10 VA	**PACT MCR-V2-8015-105-1000-5A-1**	**2277721**	1	**PACT MCR-V2-8020-105-1000-5A-1**	**2277747**	1
- 1000 A	15 VA	**PACT MCR-V2-8015-105-1000-5A-1**	**2276308**	1			
- 1250 A	10 VA	**PACT MCR-V2-8015-105-1250-5A-1**	**2276311**	1			
- 1500 A	15 VA	**PACT MCR-V2-8015-105-1500-5A-1**	**2277734**	1	**PACT MCR-V2-8020-105-1500-5A-1**	**2277750**	1
- 1600 A	15 VA	**PACT MCR-V2-8015-105-1600-5A-1**	**2276324**	1			
- 2000 A	10 VA				**PACT MCR-V2-8020-105-2000-5A-1**	**2276382**	1
- 2000 A	20 VA	**PACT MCR-V2-8015-105-2000-5A-1**	**2276337**	1			
- 2500 A	20 VA	**PACT MCR-V2-8015-105-2500-5A-1**	**2276340**	1			
Current transformers, pay attention to the following order key for determining the desired current transformer type		**PACT MCR-V2- 8015-105**	**2277352**	1	**PACT MCR-V2- 8020-105**	**2277365**	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 amperage I_{pn} [A] 400	500	600	750	800	1000	1250	1500	1600	2000	2500	Rated power S_n [VA]
IS01 ≙ 1 A	C05 ≙ 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	5	5	5	5	10		
				10		10	7.5	10	10	10	15		
									15	15	20		
	C10 ≙ 1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	10		
		5	5	5	5	5	5	5	10	10	15		
		7.5	10	10	10	10	10	10	15	15	20		
							15	15	20	20	25		
IS05 ≙ 5 A	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	5	2.5	2.5	2.5	2.5	5	
		5	5	5	5	5	10	5	5	5	5	10	
				10	10	10	15	10	10	10	10	15	
					15	15	20			15	15	20	
	C10 ≙ 1	2.5	2.5	2.5	2.5	5	5	2.5	2.5	5	5	10	
		5	5	5	5	10	10	5	5	10	10	15	
		7.5	10	10	10	15	15	10	10	15	15	20	
					15		20		15		20	30	

Selection table PACT MCR-V2-8020-105 (Order No.: 2277365)

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A] 500	600	750	800	1000	1250	1500	1600	2000	Rated power S_n [VA]
IS01 ≙ 1 A	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		
			5	5	5	5		5	5		
						10					
	C10 ≙ 1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5		
		5	5	5	5	5	5	5	5		
			7.5	7.5	7.5	10					
						15					
IS05 ≙ 5 A	C05 ≙ 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	5	5	5	5	
			7.5	7.5	7.5	10	10	10	10	10	
									15		
	C10 ≙ 1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	
		5	5	5	5	5	5	5	10	10	
			7.5	7.5	10	10	10	10	15		
								15			

Current transformers

PACT MCR-V2-10020-129

– Primary rated current I_{pn}:
  0...(400...4000) A
– Round conductor dimensions: Ø 85 mm
– Rail dimensions:
  2x 100x10 mm; 80x64 mm

PACT MCR-V2-10036-129

– Primary rated current I_{pn}:
  0...(400...4000) A
– Rail dimensions:
  3x 100x12 mm

Plug-in curr. transformer, official calibration as an option

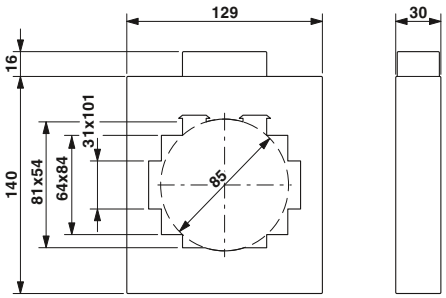
Plug-in curr. transformer, official calibration as an option

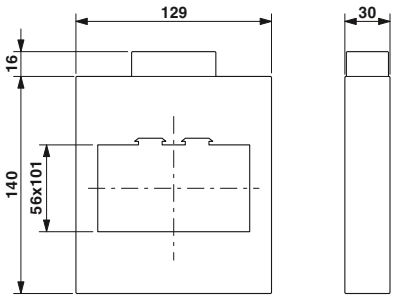
Notes:

Our configurator, which is available at www.phoenixcontact.net/products, makes ordering easy.

Current transformers that support official calibration: To specify the type of current transformer you require, please use the order key on page 225

The relevant installation accessories can be found on page 223





Description	Rated power S_n	Ordering data: Type	Order No.	Pcs. / Pkt.	Ordering data: Type	Order No.	Pcs. / Pkt.
Preferred versions available from stock (marked in green in the selection table) Primary rated current I_{pn}:							
- 2500 A	15 VA	PACT MCR-V2-10020-129-2500-5A	2276395	1			
- 3000 A	15 VA				PACT MCR-V2-10036-129-3000-5A	2276405	1
Current transformers, pay attention to the following order key for determining the desired current transformer type							
		PACT MCR-V2-10020-129	2277378	1	PACT MCR-V2-10036-129	2277381	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
2277378	/	IP40000	/	IS05	/	C05	/	P2500

Selection table PACT MCR-V2-10020-129 (Order No.: 2277378)

I_{sn}	Cl.	Primary rated current amperage 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	10	10	10	10	10	10	10	10	10	10		
								15	15	15	15	15	15		
												20	20		
	C10 ≙ 1	2.5	2.5	5	5	5	5	5	5	5	5	5	5		
		5	5	10	10	10	10	10	10	10	10	10	10		
								15	15	15	15	15	15		
												25	30		
IS05 ≙ 5 A	C05 ≙ 0.5		2.5	2.5	5	5	5	5	5	5	5	5	5	5	
			5	5	10	10	10	10	10	10	10	10	10	10	
								15	15	15	15	15	15	15	
											20	20	25	25	
	C10 ≙ 1	2.5	2.5	5	5	5	5	5	5	5	5	5	5	5	
		5	5	10	10	10	10	10	10	10	10	10	10	10	
							15	15	15	15	15	15	15	15	
										20	25	30	30	30	

Selection table PACT MCR-V2-10036-129 (Order No.: 2277381)

I_{sn}	Cl.	Primary rated current amperage 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	10	10	10	10	10	10	10	10	10	10		
								15	15	15	15	15	15		
												20	20		
	C10 ≙ 1	2.5	2.5	5	5	5	5	5	5	5	5	5	5		
		5	5	10	10	10	10	10	10	10	10	10	10		
								15	15	15	15	15	15		
												25	30		
IS05 ≙ 5 A	C05 ≙ 0.5		2.5	2.5	5	5	5	5	5	5	5	5	5	5	
			5	5	10	10	10	10	10	10	10	10	10	10	
								15	15	15	15	15	15	15	
											20	20	25	25	
	C10 ≙ 1	2.5	2.5	5	5	5	5	5	5	5	5	5	5	5	
		5	5	10	10	10	10	10	10	10	10	10	10	10	
							15	15	15	15	15	15	15	15	
											20	25	30	30	

Current transformers

PACT MCR-V2-12020-159

– Primary rated current I_{pn}: 0...(400...4000) A
– Round conductor dimensions: Ø 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

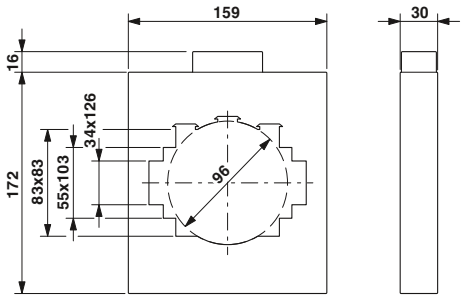
Plug-in current transformer

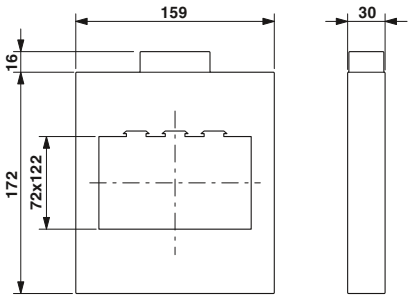
Plug-in current transformer

Notes:

Our configurator, which is available at www.phoenixcontact.net/products, makes ordering easy.

The relevant installation accessories can be found on page 223





Description	Rated power S_n
Preferred versions available from stock (marked in green in the selection table) Primary rated current I_{pn}: - 4000 A	15 VA
Current transformers, pay attention to the following order key for determining the desired current transformer type	

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

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 amperage I_{pn} [A]													Rated power S_n [VA]
		400	500	600	750	800	1000	1250	1500	1600	2000	2500	3000	4000	
IS01 ≙ 1A	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	10	
		5	5	5	5	5	5	10	10	10	10	10	10	15	
		10	10	10	10	10	10	15	15	15	15	15	15	30	
							15	20	30	30	30	30	30	45	
	C10 ≙ 1	2.5	5	5	2.5	2.5	5	5	5	5	5	5	10	10	
		5	10	10	5	5	10	10	10	10	10	10	15	15	
		10	15	15	10	10	15	15	15	15	15	15	30	30	
		15	20	20		15	20	30	30	30	30	30	45	45	
IS05 ≙ 5 A	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	5	5	10	5	5	5	10	10	
		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	
					15	15	30	30	45	30	30	30	45	45	
	C10 ≙ 1	2.5	5	5	5	5	5	5	10	5	5	10	10	10	
		5	10	10	10	10	10	10	15	10	10	15	15	15	
		10	15	15	15	15	15	15	30	15	15	30	30	30	
		15	20	20	20	30	30	30	45	30	30	45	45	45	

Selection table PACT MCR-V2-12040-159 (Order No.: 2277404)

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A]													Rated power S_n [VA]
		400	500	600	750	800	1000	1250	1500	1600	2000	2500	3000	4000	
IS01 ≙ 1A	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	10	
		5	5	5	5	5	5	10	10	10	10	10	10	15	
							10	15	15	15	15	15	15	30	
	C10 ≙ 1	2.5	5	5	2.5	2.5	5	5	5	5	5	5	10	10	
		5	10	10	5	5	10	10	10	10	10	10	15	15	
		10	15	15		10	15	15	15	15	15	15	30	30	
IS05 ≙ 5 A	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	5	5	10	5	5	5	10	10	
		5	5	5	5	5	10	10	15	10	10	10	15	15	
					10	10	15	15	30	15	15	15	30	30	
	C10 ≙ 1	2.5	5	5	5	5	5	5	10	5	5	10	10	10	
		5	10	10	10	10	10	10	15	10	10	15	15	15	
		10	15	15	15	15	15	15	30	15	15	30	30	30	

Current transformers

PACT MCR-V3-60

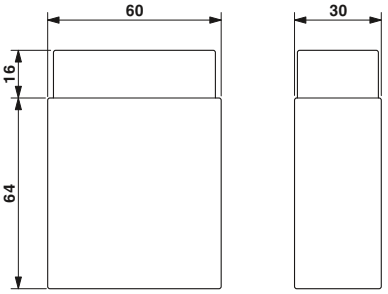
– Primary rated current I_{pn}: 0...(1...40) A

– Current-carrying copper lines connected directly to the screw terminal blocks on the primary side

Notes:

Our configurator, which is available at www.phoenixcontact.net/products, makes ordering easy.

The relevant installation accessories can be found on page 223



Winding current transformer

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Current transformers, pay attention to the following order key for determining the desired current transformer type			
	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	
		5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	C10 ≙ 1	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	
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	
		5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	C10 ≙ 1	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	

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...

	Technical data	Technical data
General data		
Material	PA 6	PA 6
Ambient temperature (operation)	-25°C ... 120°C	-25°C ... 120°C

	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Quick-action mechanism; width of the holding latch 13 mm						
Fixing pin length 65 mm	**PACT-FAST-MNT-W13-L65**	**2276625**	1			
Fixing pin length 40 mm	**PACT-FAST-MNT-W13-L40**	**2276612**	1			
Quick-action mechanism; width of the holding latch 16 mm						
Fixing pin length 65 mm				**PACT-FAST-MNT-W16-L65**	**2276641**	1
Fixing pin length 40 mm				**PACT-FAST-MNT-W16-L40**	**2276638**	1

Accessories

– Copper sleeves
– DIN rail adapter
– Secondary terminal cover
– Insulating caps

Copper sleeves
DIN rail adapter

Secondary terminal cover
Insulating caps

	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
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	**PACT MCR-CB-21- 8**	**2277569**	1			
- for PACT MCR-V1-21-44-... Ø 21/12 mm	**PACT MCR-CB-21-12**	**2277556**	1			
- for PACT MCR-V2-3015-60-... Ø 28/12 mm	**PACT MCR-CB-28-12**	**2277543**	1			
- for PACT MCR-V2-5012-85-... Ø 42/12 mm	**PACT MCR-CB-42-12**	**2277530**	1			
DIN rail adapter	**PACT MCR-RA**	**2277598**	12			
Secondary terminal cover, for increasing the clearances and creepage distances						
Length: 60 mm				**PACT MCR-ETC-60**	**2277572**	9
Length: 75 mm				**PACT MCR-ETC-75**	**2277585**	9
Insulating caps, for protection against unintended contact with mounting screws of the primary rail				**PACT MCR-ICAP**	**2277608**	18

Calibratable current transformers - order key and selection tables

Add **order key** from the relevant selection table (ordering examples are marked in orange)

Order No.	Primary current I_{pn}	Secondary current I_{sn}	Class	Rated power S_n	Calibration	Calibration certificate
	IP01500 ≙ 150 A IP02000 ≙ 200 A IP02500 ≙ 250 A IP03000 ≙ 300 A IP04000 ≙ 400 A IP05000 ≙ 500 A IP06000 ≙ 600 A IP07500 ≙ 750 A IP08000 ≙ 800 A IP10000 ≙ 1000 A IP12000 ≙ 1200 A IP12500 ≙ 1250 A IP15000 ≙ 1500 A IP16000 ≙ 1600 A IP20000 ≙ 2000 A IP25000 ≙ 2500 A	IS05 ≙ 5 A	C02S ≙ 0.2S C02 ≙ 0.2 C05S ≙ 0.5S C05 ≙ 0.5	P250 ≙ 2.5 VA P500 ≙ 5.0 VA P1000 ≙ 10 VA P1500 ≙ 15 VA P2000 ≙ 20 VA P3000 ≙ 30 VA	NONE ≙ not calibrated YES ≙ calibrated	NONE ≙ no calibration certificate YES ≙ calibration certificate (a fee is charged) YESPLUS ≙ Calibration certificate with catalog of errors (5 measuring points) (a fee is charged)

PACT MCR-V1C-21-44 (Order No.: 2277420)

You will find information about the product on page 213.

Add **order key** from the selection table

2277420	IP03000	IS05	C02	P250	NONE	NONE

Selection table

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A] 150	200	250	300	400	500	Rated power Sn [VA]
IS05 ≙ 5 A	C02S ≙ 0.2S					2.5	2.5	
							5	
	C02 ≙ 0.2				**2.5**	2.5	2.5	
					5	5	5	
	C05S ≙ 0.5S		2.5	2.5	2.5	2.5	2.5	
				5	5	5	5	
					10		10	
	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	
			5	5	5	5	5	
					10		10	

PACT MCR-V2C-3015-60 (Order No.: 2277433)

You will find information about the product on page 214.

Add **order key** from the selection table

2277433	IP02000	IS05	C05	P250	NONE	NONE

Selection table

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A] 200	250	300	400	500	600	750	Rated power Sn [VA]
IS05 ≙ 5 A	C02S ≙ 0.2S						2.5	2.5	
							5	5	
							10	10	
	C02 ≙ 0.2				2.5	2.5	2.5	2.5	
						5	5	5	
							10	10	
	C05S ≙ 0.5S		2.5	2.5	2.5	2.5	2.5	2.5	
				5	5	5	5	5	
					10	10	10	10	
								15	
	C05 ≙ 0.5	**2.5**	2.5	2.5	2.5	2.5	2.5	2.5	
			5	5	5	5	5	5	
					10	10	10	10	
								15	

PACT MCR-V2C-4012-70 (Order No.: 2277446)

You will find information about the product on page 215.

Add **order key** from the selection table

2277446	IP06000	IS05	C02	P1000	NONE	NONE

Selection table

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A] 200	250	300	400	500	600	750	800	1000	Rated power Sn [VA]
IS05 ≙ 5 A	C02S ≙ 0.2S						2.5	2.5	2.5	5	
							5	5	5	10	
								10	10		
	C02 ≙ 0.2				2.5	2.5	2.5	5	2.5	5	
					5	5	5	10	5	10	
						10	**10**		10		
	C05S ≙ 0.5S		2.5	2.5	2.5	2.5	5	5	2.5	5	
				5	5	5	10	10	5	10	
					10	10			10		
	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	5	5	2.5	5	
			5	5	5	5	10	10	5	10	
					10	10			10		

PACT MCR-V2C-5012-85 (Order No.: 2277459)

You will find information about the product on page 216.

Add **order key** from the selection table

2277459	IP10000	IS05	C05	P1500	NONE	NONE

Selection table

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A] 200	250	300	400	500	600	750	800	1000	1200	Rated power Sn [VA]
IS05 ≙ 5 A	C02S ≙ 0.2S						2.5	2.5	2.5	5	5	
							5	5	5	10	10	
								10	10	15	15	
										20	30	
	C02 ≙ 0.2				2.5	2.5	2.5	2.5	2.5	5	5	
					5	5	5	5	5	10	10	
							10	10	10	15	15	
										30	30	
	C05S ≙ 0.5S	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	
				5	5	5	10	10	10	10	10	
					10	10				15	15	
										30	30	
	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	
			5	5	5	5	10	10	10	10	10	
					10	10				**15**	15	
										30	30	

PACT MCR-V2C-6015-85 (Order No.: 2277462)

You will find information about the product on page 217.

Add **order key** from the selection table

2277462	IP02500	IS05	C05	P250	NONE	NONE

Selection table

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A] 250	300	400	500	600	750	800	1000	1200	Rated power Sn [VA]
IS05 ≙ 5 A	C02S ≙ 0.2S						2.5	2.5	2.5	2.5	
							5	5	5	5	
									10	10	
	C02 ≙ 0.2					2.5	2.5	2.5	2.5	2.5	
							5	5	5	5	
									10	10	
										15	
	C05S ≙ 0.5S			2.5	2.5	2.5	2.5	2.5	2.5	2.5	
					5	5	5	5	5	5	
							10	10	10	10	
									15	15	
	C05 ≙ 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	5	
							10	10	10	10	
									15	15	

Calibratable current transformers - order key and selection tables

Add **order key** from the relevant selection table (ordering examples are marked in orange)

Order No.	/	Primary current I_{pn}	/	Secondary current I_{sn}	/	Class	/	Rated power S_n	/	Calibration	/	Calibration certificate
	/	IP01500 ≙ 150 A IP02000 ≙ 200 A IP02500 ≙ 250 A IP03000 ≙ 300 A IP04000 ≙ 400 A IP05000 ≙ 500 A IP06000 ≙ 600 A IP07500 ≙ 750 A IP08000 ≙ 800 A IP10000 ≙ 1000 A IP12000 ≙ 1200 A IP12500 ≙ 1250 A IP15000 ≙ 1500 A IP16000 ≙ 1600 A IP20000 ≙ 2000 A IP25000 ≙ 2500 A	/	IS05 ≙ 5 A	/	C02S ≙ 0.2S C02 ≙ 0.2 C05S ≙ 0.5S C05 ≙ 0.5	/	P250 ≙ 2.5 VA P500 ≙ 5.0 VA P1000 ≙ 10 VA P1500 ≙ 15 VA P2000 ≙ 20 VA P3000 ≙ 30 VA	/	NONE ≙ not calibrated YES ≙ calibrated	/	NONE ≙ no calibration certificate YES ≙ calibration certificate (a fee is charged) YESPLUS ≙ Calibration certificate with catalog of errors (5 measuring points) (a fee is charged)

PACT MCR-V2C-6315-95 (Order No.: 2277475)

You will find information about the product on page 218.

Add **order key** from the selection table

2277475	/	IP15000	/	IS05	/	C05	/	P3000	/	NONE	/	NONE

Selection table

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A]												Rated power Sn [VA]
		200	250	300	400	500	600	750	800	1000	1200	1250	1500	
IS05 ≙ 5 A	C02S ≙ 0.2S									2.5	5	5	5	
										5	10	10	10	
										10	15	15	15	
											20	20	20	
	C02 ≙ 0.2				2.5	2.5	2.5	2.5	2.5	5	5	5	5	
					5	5	5	5	5	10	10	10	10	
							10	10	10	15	15	15	15	
								15	15	20	20	20	30	
	C05S ≙ 0.5S			2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	
					5	5	5	5	10	10	10	10	10	
						10	10	10	15	15	15	15	15	
								15	20	20	20	30	30	
	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	
			5	5	5	5	5	10	10	10	10	10	10	
					10	10	10	15	15	15	15	15	15	
					15	15	15	20	30	30	20	30	**30**	

PACT MCR-V2C-6040-96 (Order No.: 2277488)

You will find information about the product on page 218.

Add **order key** from the selection table

2277488	/	IP12000	/	IS05	/	C02	/	P1000	/	NONE	/	NONE

Selection table

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A]								Rated power Sn [VA]
		500	600	750	800	1000	1200	1250	1500	
IS05 ≙ 5 A	C02S ≙ 0.2S						2.5	2.5	2.5	
							5	5	5	
								10		
								15		
	C02 ≙ 0.2			2.5	2.5	2.5	2.5	2.5	2.5	
				5	5	5	5	5	5	
							10	10		
								15		
	C05S ≙ 0.5S	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
			5	5	5	5	5	5	5	
					10	10	10	10	10	
							15	15		
	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		5	5	5	5	5	5	5	5	
				10	10	10	10	10	10	
							15	15		

PACT MCR-V2C-8015-105 (Order No.: 2277491)

You will find information about the product on page 219.

Add **order key** from the selection table

2277491	/	IP05000	/	IS05	/	C05	/	P500	/	NONE	/	NONE

Selection table

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A]									Rated power Sn [VA]
		400	500	600	750	800	1000	1200	1250	1500	
IS05 ≙ 5 A	C02S ≙ 0.2S									2.5	
										5	
	C02 ≙ 0.2			2.5	2.5	2.5	2.5	2.5	2.5	2.5	
				5	5	5	5	5	5	5	
					10	10	10	10	10	10	
							15			15	
	C05S ≙ 0.5S	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
				5	5	5	10	5	5	5	
					10	10	15	10	10	10	
						15	20			15	
	C05 ≙ 0.5	2.5	2.5	2.5	2.5	2.5	5	2.5	2.5	2.5	
		5	**5**	5	5	5	10	5	5	5	
				10	10	10	15	10	10	10	
					15	15	20			15	

PACT MCR-V2C-8020-105 (Order No.: 2277501)

You will find information about the product on page 219.

Add **order key** from the selection table

2277501	/	IP15000	/	IS05	/	C05S	/	P1000	/	NONE	/	NONE

Selection table

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A]									Rated power Sn [VA]
		400	500	600	750	800	1000	1200	1250	1500	
IS05 ≙ 5 A	C02S ≙ 0.2S								2.5	2.5	
									5	5	
	C02 ≙ 0.2			2.5	2.5	2.5	2.5	2.5	2.5	2.5	
				5	5	5	5	5	5	5	
								10	10	10	
	C05S ≙ 0.5S		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
				5	5	5	5	5	5	5	
						10	10	10	10	**10**	
	C05 ≙ 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	5	5	5	5	
						10	10	10	10	10	

PACT MCR-V2C-10020-129 (Order No.: 2277514)

You will find information about the product on page 220.

Add **order key** from the selection table

2277514	/	IP08000	/	IS05	/	C05	/	P1500	/	NONE	/	NONE

Selection table

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A]											Rated power Sn [VA]
		500	600	750	800	1000	1200	1250	1500	1600	2000	2500	
IS05 ≙ 5 A	C02S ≙ 0.2S								2.5	2.5	2.5	2.5	
									5	5	5	5	
												10	
	C02 ≙ 0.2					2.5	2.5	2.5	2.5	2.5	2.5	2.5	
						5	5	5	5	5	5	5	
						10	10	10	10	10	10	10	
								15	15	15	15	15	
	C05S ≙ 0.5S	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	
					10	10	10	10	10	10	10	10	
						15	15	15	15	15	15	15	
	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	
		5	5	5	5	5	5	5	5	5	5	5	
				10	10	10	10	10	10	10	10	10	
					15	15	15	15	15	15	15	15	

PACT MCR-V2C-10036-129 (Order No.: 2277527)

You will find information about the product on page 220.

Add **order key** from the selection table

2277527	/	IP16000	/	IS05	/	C05	/	P500	/	NONE	/	NONE

Selection table

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A]											Rated power Sn [VA]
		500	600	750	800	1000	1200	1250	1500	1600	2000	2500	
IS05 ≙ 5 A	C02S ≙ 0.2S												
	C02 ≙ 0.2					2.5	2.5	2.5	2.5	2.5	2.5	2.5	
						5	5	5	5	5	5	5	
						10	10	10	10	10	10	10	
									15	15	15	15	
	C05S ≙ 0.5S												
	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	
		5	5	5	5	5	5	5	5	**5**	5	5	
				10	10	10	10	10	10	10	10	10	
								15	15	15	15	15	

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.

Voltage transducers, AC and DC

Voltage transducers convert AC and DC voltages into standard analog signals.

For sinusoidal alternating currents up to 12 A
– 3-way electrical isolation
– Wide-range version from 19.2 ... 253 V AC/DC
– Voltage bridging with DIN rail connector
– Input/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 of 0 ... 16 A AC
– Changeover relay 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

Voltage transducers, AC and DC
– For DC voltages from 0 ... ±660 V DC and AC voltages from 0 ... 444 V AC
– Bidirectional output signals
– Adjustable voltage ranges
– ZERO/SPAN adjustment ±20%
– 3-way isolation

Current acquisition

If purely ohmic loads (incandescent lamps, heaters, etc.) are operated on a conventional 230 V network, no distortions are produced on the power grid.

As non-linear loads increase as a result of phase angle-controlled regulation modules, pure sinusoidal waves gradually take on a trapezoidal waveform.

The majority of current and voltage transducers are calibrated for sinusoidal alternating currents, which means that they can only indicate the r.m.s. value of an alternating current by mean-value generation.

True r.m.s. measuring transducers do not rely on specific form factors and accept all waveforms.

r.m.s. value acquisition according to the transformer principle (RMS)

According to Faraday's law of induction, a magnetic flux which changes over time produces an induced voltage at the terminals of a coil. A circuit arrangement consisting of two electrically isolated but magnetically coupled circuits is known as a transformer. This is one of the simplest and most commonly used methods of current transfer.

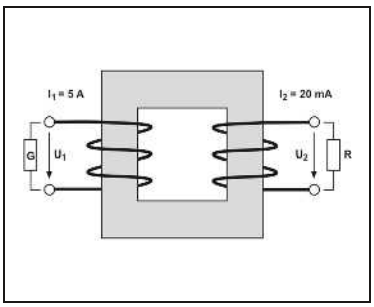
True r.m.s. value acquisition according to the Rogowski principle (TRMS)

The Rogowski measuring principle is used to measure sinusoidal and non-sinusoidal alternating currents. A non-ferrous induction coil (air-core coil), known as the Rogowski coil, measures the magnetic voltage along a closed circumference around a live conductor.

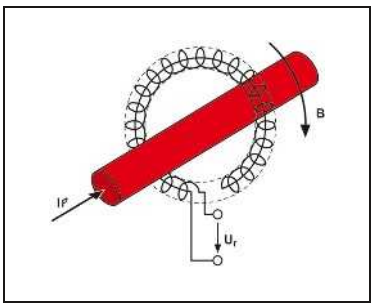
The output signal of the Rogowski coil is then conditioned so as to obtain an exact replica of the primary current.

True r.m.s. value acquisition with a Hall sensor (TRMS)

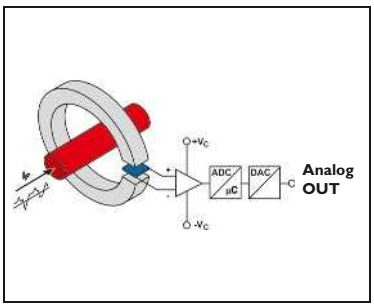
The magnetic flux generated by the primary current I_P is condensed in the magnetic circuit and measured in the air gap using a Hall sensor. The output signal of the Hall sensor is then conditioned so as to obtain an exact replica of the primary current.



r.m.s. value acquisition according to the transformer principle (RMS)



True r.m.s. value acquisition according to the Rogowski principle (TRMS)



True r.m.s. value acquisition with a Hall sensor (TRMS)

Mean-value generation

r.m.s. value (root mean square value)

The r.m.s. value of an alternating current corresponds to the steady-state value that results from the instantaneous values of this current. This steady-state value generates the same thermal work in an ohmic resistor as a direct current of identical magnitude.

The term "true r.m.s. value" simply means that distorted, direct, and pulsating currents can be acquired. Here, the measuring transducer is compatible with any waveform.

For a sinusoidal AC current this means:

$$I_{rm} = \frac{I_S}{\sqrt{2}} \qquad U_r = \frac{U_S}{\sqrt{2}}$$

Arithmetic average value

The arithmetic average value is used to measure direct currents or filter a DC component out from a pulsating current. Applying the arithmetic average value to a symmetrical alternating current would result in a measured value of "0".

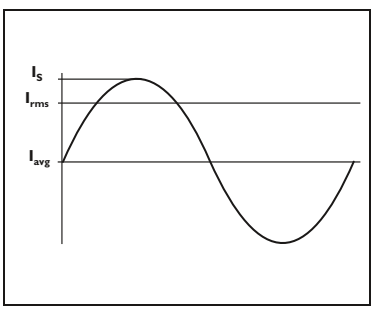
The arithmetic average value enables direct currents to be made available at the output in the form of standard analog signals. The polarity can be evaluated by means of a bipolar output signal.

For a 230 V/50 Hz power grid, this results in the following with regard to the voltage levels:

U_{rms} = 230 V

U_S = 325 V

U_{avg} = 0 V



Arithmetic average value

AC/DC current transducers and distorted currents

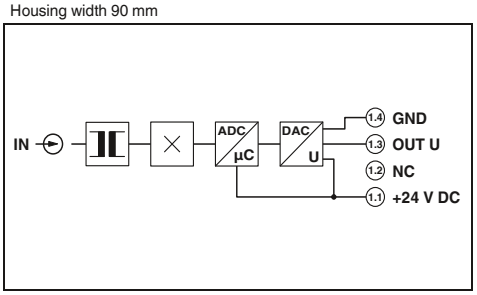
The **MCR-SL-CUC-...** current transducers measure DC, AC, and distorted currents of 0 ... 600 A.

- 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

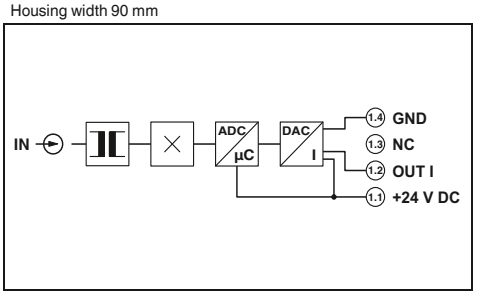
For DC, AC, and distorted currents of 0 ... 300 A, voltage output

For DC, AC, and distorted currents of 0 ... 600 A, current output

Housing width 90 mm



Housing width 90 mm



Technical data

Input data	
Frequency range	20 Hz ... 6000 Hz (0 Hz)
Curve type	AC, DC or distorted currents
Connection method	Cable design: 32 mm diameter
Output data	
Output signal	0 ... 10 V
Maximum output signal	
Load R_B	≥ 10 kΩ
General data	
Supply voltage U_B	20 V DC ... 30 V DC
Maximum transmission error	<±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 / pollution degree	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 mm² / 0.2 ... 2.5 mm² / 24 - 12
Conformance / approvals	
Conformance	CE-compliant
UL, USA / Canada	UL/C-UL listed UL 508

Technical data

Input data	
Frequency range	20 Hz ... 6000 Hz (0 Hz)
Curve type	AC, DC or distorted currents
Connection method	Cable design: 32 mm diameter
Output data	
Output signal	4 ... 20 mA
Maximum output signal	< 25 mA
Load R_B	< 300 Ω
General data	
Supply voltage U_B	20 V DC ... 30 V DC
Maximum transmission error	<±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 / pollution degree	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 mm² / 0.2 ... 2.5 mm² / 24 - 12
Conformance / approvals	
Conformance	CE-compliant
UL, USA / Canada	UL/C-UL listed UL 508

Ordering data

Description	Overload capacity	Type	Order No.	Pcs. / Pkt.
Universal current transducer				
Input current range: 0 ... 100 A	6 x I_{IN}	**MCR-SL-CUC-100-U**	**2308108**	1
Input current range: 0 ... 200 A	3 x I_{IN}	**MCR-SL-CUC-200-U**	**2308205**	1
Input current range: 0 ... 300 A	3.33 x I_{IN}	**MCR-SL-CUC-300-U**	**2308302**	1
Input current range: 0 ... 400 A	2.5 x I_{IN}			
Universal current transducer without UL approval				
Input current range: 0 ... 500 A	3.6 x I_{IN}			
Input current range: 0 ... 600 A	3 x I_{IN}			

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

AC/DC current transducers 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

Notes:

To order a configurable product, enter the required configuration by referring to the adjacent order key.

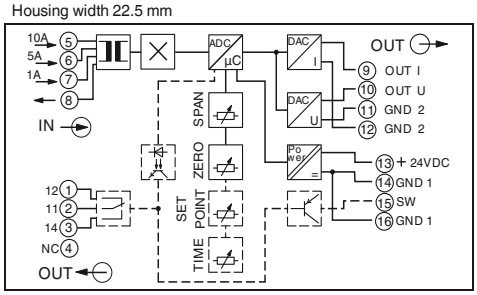
Further information about the configuration software can be found on page 237

1) EMC: Class A product, see page 571

For DC, AC, and distorted currents
0 ... 11 A

Ex:

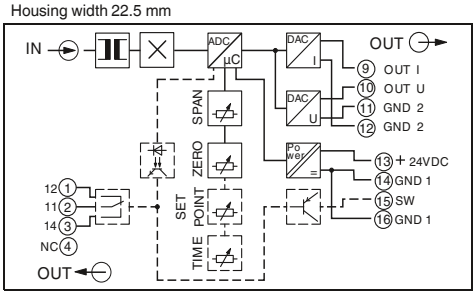
Housing width 22.5 mm



For DC, AC, and distorted currents
0 ... 55 A

Ex:

Housing width 22.5 mm



Technical data

Input data			
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_N (continuous)	
Surge strength		20 x I_N (1 s)	
Connection method		Screw connection	
Output data		U output	I output
Output signal (normal and inverse)		0 ... 5 V / 1 ... 5 V / 0 ... 10 V 2 ... 10 V / -5 ... 5 V / -10 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Load R_B		> 10 kΩ	< 500 Ω
Switching output			
Relay output	Contact material	1 PDT / AgSnO, hard gold-plated	
	Max. 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)	
Transistor output pnp	Output voltage	19 V ... 29 V (supply voltage - 1 V)	
	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	
General data			
Supply voltage U_B		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		as per EN 50178, EN 61010	
Rated insulation voltage		300 V AC (to ground)	
Surge voltage category / pollution degree		III / 2	
Test voltage input/output		4 kV (50 Hz, 1 min.)	
Test voltage input/power supply		4 kV (50 Hz, 1 min.)	
Test voltage output/power supply		500 V (50 Hz, 1 min.)	
Degree of protection		IP20	
Ambient temperature range		-20°C ... 60°C	
Dimensions W / H / D		22.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance / approvals			
Conformance		CE-compliant	
UL, USA / Canada		Class I, Zone 2, AEx nC IIC T6, Ex nC IIC T6	

Technical data

Input data			
Input current		0 A ... 55 A (AC/DC)	
Operate threshold		0.8% (of measuring range nominal value 50 A)	
Frequency range		15 Hz ... 400 Hz	
Curve type		AC, DC or distorted currents	
Overload capacity		Depending on through connected conductor	
Surge strength		Depending on through connected conductor	
Connection method		Through connection, diameter 10.5 mm	
Output data		U output	I output
Output signal (normal and inverse)		0 ... 5 V / 1 ... 5 V / 0 ... 10 V 2 ... 10 V / -5 ... 5 V / -10 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Load R_B		> 10 kΩ	< 500 Ω
Switching output			
Relay output	Contact material	1 PDT / AgSnO, hard gold-plated	
	Max. 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)	
Transistor output pnp	Output voltage	19 V ... 29 V (supply voltage - 1 V)	
	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	
General data			
Supply voltage U_B		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		as per EN 50178, EN 61010	
Rated insulation voltage		300 V AC (to ground)	
Surge voltage category / pollution degree		III / 2	
Test voltage input/output		4 kV (50 Hz, 1 min.)	
Test voltage input/power supply		4 kV (50 Hz, 1 min.)	
Test voltage output/power supply		500 V (50 Hz, 1 min.)	
Degree of protection		IP20	
Ambient temperature range		-20°C ... 60°C	
Dimensions W / H / D		22.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance / approvals			
Conformance		CE-compliant	
UL, USA / Canada		Class I, Zone 2, AEx nC IIC T6, Ex nC IIC T6	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR current measuring transducer for measuring AC, DC, and distorted currents with relay and transistor switching output			
Configurable product	**MCR-S-1-5-UI-SW-DCI[1])**	**2814650**	1
Standard product	**MCR-S-1-5-UI-SW-DCI-NC[1])**	**2814731**	1
Configurable product, without switching output	**MCR-S-1-5-UI-DCI[1])**	**2814634**	1
Standard product, without switching output	**MCR-S-1-5-UI-DCI-NC[1])**	**2814715**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
MCR-S-10-50-UI-SW-DCI[1])	**2814663**	1
MCR-S10-50-UI-SW-DCI-NC[1])	**2814744**	1
MCR-S-10-50-UI-DCI[1])	**2814647**	1
MCR-S10-50-UI-DCI-NC[1])	**2814728**	1

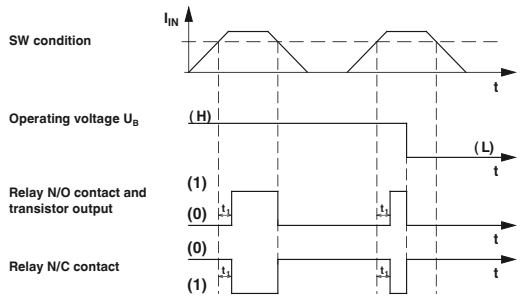
Order key for the current transducers (standard configuration entered as example)

Order No.	Measuring range: Start	Measuring range: End	Output	Threshold value	Suppression time	Operating behavior of relay and transistor	
2814634	0.00	5.00	OUT01				
2814650	**0.00**	**5.00**	**OUT01**	**50**	**3.0**	**A**	**O**
2814634 ≙ MCR-S-1-5-UI-DCI 2814650 ≙ MCR-S-1-5-UI-SW-DCI	Measuring range starting value is between 0.00…7.50 A 0.00 ≙ 0.00 A	Measuring range final value between 0.2...11 A 5.00 ≙ 5.00 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...2V 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 set upper measuring range 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

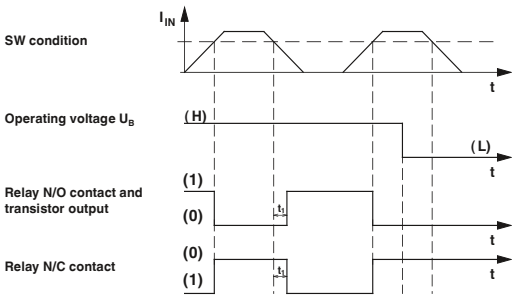
Order No.	Measuring range: Start	Measuring range: End	Output	Threshold value	Suppression time	Operating behavior and transistor	
2814647	0.0	50.0	OUT01				
2814663	**0.0**	**50.0**	**OUT01**	**50**	**3.0**	**A**	**O**
2814647 ≙ MCR-S-10-50-UI-DCI 2814663 ≙ MCR-S-10-50-UI-SW-DCI	Measuring range start value is between 0.00…37.5 A 0.0 ≙ 0.0 A	Measuring range final value between 9.5...55 A 50.0 ≙ 50.0 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...2V 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 set upper measuring range 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

Function diagrams: Switching behavior of relay and transistor output:

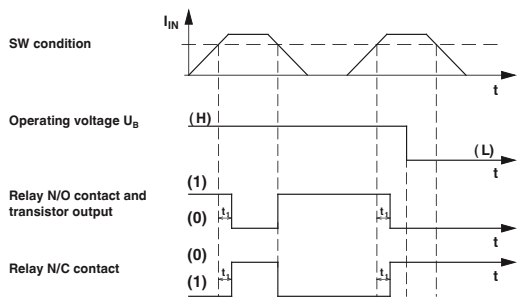
1) Operating current-controlled when threshold value is exceeded



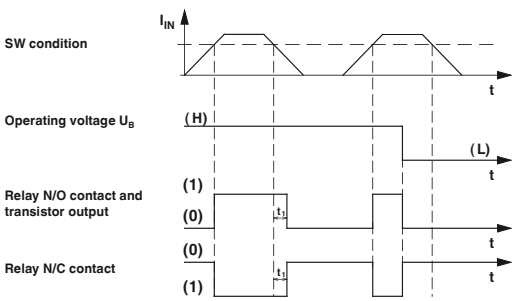
2) Operating current-controlled when below the threshold value



3) Quiescent current-controlled when threshold value is exceeded



4) Quiescent current-controlled when below the threshold value



(0) ≙ N/O contact and transistor open / N/C contact closed
(1) ≙ N/O contact and transistor closed / N/C contact open

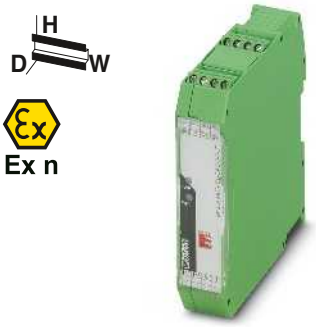
AC current transducers, sinusoidal

The **MCR-SL-CAC-...** current transducers measure sinusoidal alternating currents within the range 0 ... 1/5/12 A.

– Wide-range version from 19.2 ... 253 V AC/DC
– 3-way isolation
– Input/output can be configured using the DIP switch

Notes:

1) EMC: Class A product, see page 571

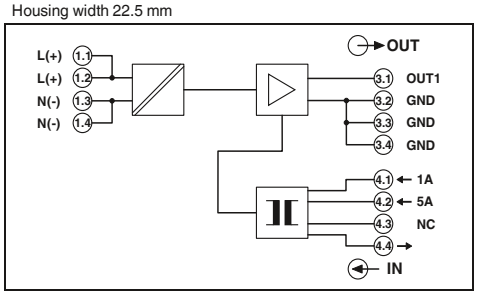


For sinusoidal alternating currents 0 ... 1 A/0 ... 5 A

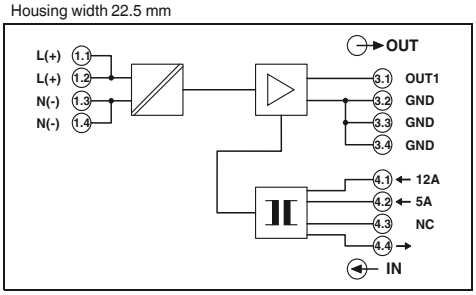
For sinusoidal alternating currents 0 ... 5 A/0 ... 12 A

Ex:

Housing width 22.5 mm



Housing width 22.5 mm



Technical data

Input data		
Input current (configurable)	0 A AC ... 1 A AC (configurable) / 0 A AC ... 5 A AC (configurable)	0 A AC ... 5 A AC (configurable) / 0 A AC ... 12 A AC (configurable)
Nominal frequency	50 Hz	50 Hz
Frequency range	45 Hz ... 65 Hz	45 Hz ... 65 Hz
Curve type	Sine	Sine
Overload capacity	2 x I_N (continuous)	1 x I_N (continuous)
Surge strength	20 x I_N (1 s)	8 x I_N (1 s)
Connection method	Screw terminal block	Screw terminal block
Output data		
Output signal (configurable)	0 ... 20 mA / 4 ... 20 mA	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	25 mA	25 mA
Load R_B	< 500 Ω (at 20 mA)	< 500 Ω (at 20 mA)
Ripple	< 10 mV_{PP} (for 500 Ω at 20 mA)	< 10 mV_{PP} (for 500 Ω at 20 mA)
General data	MACX MCR-SL-CAC- 5-I[1])	MACX MCR-SL-CAC-12-I-UP[1])
Supply voltage U_B	19.2 V DC ... 30 V DC / 19.2 V AC/DC ... 253 V AC/DC	19.2 V AC/DC ... 253 V AC/DC
Current consumption	< 32 mA (at U_B=24 V DC, I_{OUT}=20 mA) / < 30 mA (at U_B=24 V DC, I_{OUT}=20 mA)	< 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)	≤ 0.5% (of nominal range value under nominal conditions)
Temperature coefficient	< 0.02%/K / < 0.02%/K	< 0.02%/K
Step response (10 - 90%)	max. 300 ms Typ. 200 ms / max. 300 ms Typ. 200 ms	< 300 ms
Safe isolation	acc. to EN 61010 / acc. to EN 61010	acc. to EN 61010
Rated insulation voltage	- / -	300 V AC (to ground)
Surge voltage category Input/output	- / -	III
Pollution degree	2 / 2	2
Test voltage input/output	4 kV (50 Hz, 1 min.) / 4 kV (50 Hz, 1 min.)	4 kV (50 Hz, 1 min.)
Test voltage output/power supply	1.5 kV (50 Hz, 1 min.) / 2 kV (50 Hz, 1 min.)	2 kV (50 Hz, 1 min.)
Degree of protection	IP20 / IP20	IP20
Ambient temperature range	-20°C ... 65°C (-4°F ... 149°F) / -20°C ... 65°C (-4°F ... 149°F)	-20°C ... 65°C (-4°F ... 149°F)
Dimensions W / H / D	22.5 / 104 / 114.5 mm / 22.5 / 104 / 114.5 mm	22.5 / 104 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14 / 0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Conformance / approvals		
Conformance	CE-compliant	CE-compliant
ATEX	Ex II 3 G Ex nA II T4 X	Ex II 3 G Ex nA II T4 X
UL, USA / Canada	UL 508 Recognized	-

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR current measuring transducers for sinusoidal alternating currents			
Supply voltage 19.2 ... 30 V DC	**MACX MCR-SL-CAC- 5-I[1])**	**2810612**	1
Supply voltage 19.2 ... 253 V AC/DC	**MACX MCR-SL-CAC- 5-I-UP[1])**	**2810625**	1

Accessories

DIN rail connector, for bridging the supply voltage (19.2...30 V DC), can be snapped on to 35 mm DIN rails as per EN 60715	**ME 22,5 TBUS 1,5/ 5-ST-3,81 GN**	**2707437**	50

Ordering data

Type	Order No.	Pcs. / Pkt.
MACX MCR-SL-CAC-12-I-UP[1])	**2810638**	1

Accessories

AC current transducers, sinusoidal and distorted

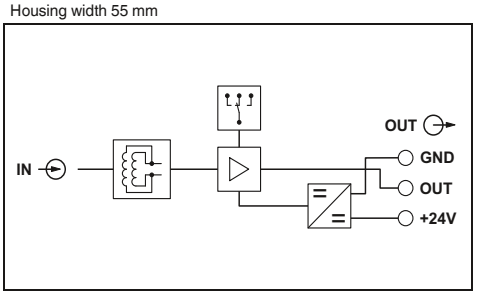
The **MCR-SL-S-...00-...** current transducers measure sinusoidal and non-sinusoidal alternating currents within the range 0 ... 200 A.

- True/r.m.s. value measurement from 30...6000 Hz
- Measuring range selection with slide switch
- Loop-powered
- Can be retrofitted with the open-up Rogowski coil

For sinusoidal and non-sinusoidal alternating currents, 0 ... 200 A, voltage output

Ex:

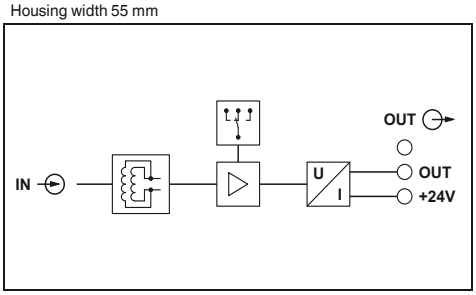
Housing width 55 mm



For sinusoidal and non-sinusoidal alternating currents, 0 ... 200 A, current output (loop-powered)

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)	
Frequency range	30 Hz ... 6000 Hz	
Curve type	Sinusoidal and non-sinusoidal	
Overload capacity	Depending on laid conductor	
Surge strength	Depending on through connected conductor	
Connection method	Clamp-on cable design, diameter 18.5 mm	
Output data		
Output signal	0 ... 5 V / 0 ... 10 V	
Maximum output signal	((0 V ... 10 V) 14 V, (0 V ... 5 V) 7 V)	
Load R_B	≥ 10 kΩ	
General data		
Supply voltage U_B	20 V DC ... 30 V DC	
Current consumption	< 30 mA	
Maximum transmission error	< 1% (of final value)	
Cable position error	< 0.63%	
Temperature coefficient	< 0.035%/K	
Step response (10 - 90%)	< 340 ms	
Safe isolation	As per IEC 61010-1 and IEC 61326	
Rated insulation voltage	300 V AC (to ground)	
Surge voltage category / pollution degree	III / 2	
Test voltage input/output	5 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature range	-20°C ... 60°C	
Dimensions W / H / D	55 / 85 / 70.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	cULus	

Technical data

Input data	...-S-100-I-LP	...-S-200-I-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)	
Frequency range	30 Hz ... 6000 Hz	
Curve type	Sinusoidal and non-sinusoidal	
Overload capacity	Depending on laid conductor	
Surge strength	Depending on through connected conductor	
Connection method	Clamp-on cable design, diameter 18.5 mm	
Output data		
Output signal	4 ... 20 mA	
Maximum output signal	< 25 mA	
Load R_B	((U_B - 12 V) x 350 / 12 A)	
General data		
Supply voltage U_B	20 V DC ... 30 V DC	
Current consumption		
Maximum transmission error	< 1% (of final value)	
Cable position error	< 0.63%	
Temperature coefficient	< 0.025%/K	
Step response (10 - 90%)	< 340 ms	
Safe isolation	As per IEC 61010-1 and IEC 61326	
Rated insulation voltage	300 V AC (to ground)	
Surge voltage category / pollution degree	III / 2	
Test voltage input/output	5 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature range	-20°C ... 60°C	
Dimensions W / H / D	55 / 85 / 70.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	cULus	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR current measuring transducers for sinusoidal and non-sinusoidal alternating currents			
Input current range: 0...50/75/100 A	**MCR-SL-S-100-U**	**2813457**	1
Input current range: 0..0.100/150/200 A	**MCR-SL-S-200-U**	**2813460**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
MCR-SL-S-100-I-LP	**2813486**	1
MCR-SL-S-200-I-LP	**2813499**	1

Passive AC current transducers, sinusoidal

The **MCR-SLP-1-5-UI-0** passive current transducer measures sinusoidal alternating currents within the range 0 ... 1 A/0 ... 5 A.

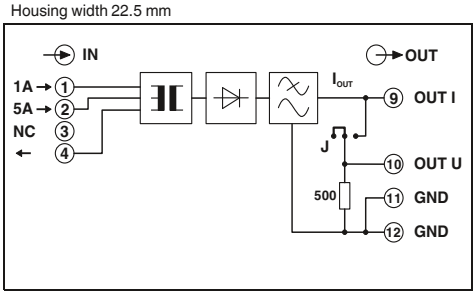
– Loop-powered
– Measuring ranges 1 A and 5 A AC, reconnectable

Notes:

1) EMC: Class A product, see page 571

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 ... 5 A AC	0 A AC ... 0.005 A AC
Frequency range	45 Hz ... 60 Hz	45 Hz ... 60 Hz
Curve type	Sine	Sine
Overload capacity	2 x I_N (5 min. at 60°C ambient temperature)	-
Surge strength	50 A (1 s)	100 A (1 s)
Permissible output range	1.2 x I_N	1.2 x I_N
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_B	> 100 kΩ	< 750 Ω < 250 Ω (when current and voltage outputs are used simultaneously)
Ripple	< 50 mV_{PP}	< 50 mV_{PP}
General data		
Maximum transmission error	< 0.5% (of final value)	
Temperature coefficient	< 0.015%/K	
Step response (10 - 90%)	< 200 ms	
Safe isolation	as per EN 50178, EN 61010	
Rated insulation voltage	300 V AC (to ground)	
Surge voltage category / pollution degree	III / 2	
Test voltage input/output	4 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature range	-25°C ... 60°C	
Dimensions W / H / D	22.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14	
Conformance / approvals		
Conformance	CE-compliant	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR passive current measuring transducers for sinusoidal alternating currents	**MCR-SLP-1-5-UI-0**[1]	**2814359**	1

AC current protectors, sinusoidal

The **MCR-SL-S-16-SP-24** current protector converts sinusoidal 50 Hz/60 Hz alternating currents into binary switching signals.

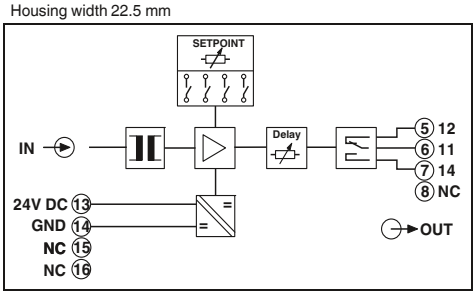
– Switching point can be freely selected in the measuring range of 0...16 A AC
– Changeover relay output
– Adjustable switch hysteresis
– 3-way isolation
– Settable operating current/quiescent current behavior

Notes:

1) EMC: Class A product, see page 571

For sinusoidal alternating currents, 0 ... 16 A AC

Housing width 22.5 mm

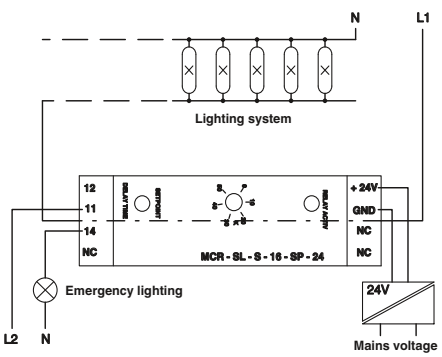


Technical data

Input data	
Input current	0 A AC ... 16 A AC
Frequency range	45 Hz ... 65 Hz
Curve type	Sine
Overload capacity	2 x I_{N} (continuous)
Connection method	Through connection, diameter 4.2 mm
Switching output	**Relay output**
Contact type	1 PDT
Contact material	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)
Switching hysteresis	Adjustable using a DIP switch (0.5%, 5%, 10%, 15%)
Response delay	Typ. 0.1 s ... 10 s (Adjustable using a potentiometer)
Operating and closed circuit current behavior	Adjustable using a DIP switch
Relay status display	Yellow LED (relay active)
General data	
Supply voltage U_B	20 V DC ... 30 V DC
Current consumption	< 30 mA
Setting accuracy	< 0.5%
Temperature coefficient	< 0.02%/K
Step response (10 - 90%)	40 ms
Safe isolation	as per EN 50178, EN 61010-1
Rated insulation voltage	300 V AC (to ground)
Surge voltage category / pollution degree	III / 2
Test voltage input/output	4 kV (50 Hz, 1 min.)
Test voltage input/power supply	4 kV (50 Hz, 1 min.)
Degree of protection	IP20
Ambient temperature range	-20°C ... 65°C
Dimensions W / H / D	22.5 / 99 / 114.5 mm
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Conformance / approvals	
Conformance	CE-compliant

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR current protector for sinusoidal alternating currents	**MCR-SL-S- 16-SP- 24**[1)]	**2864464**	1



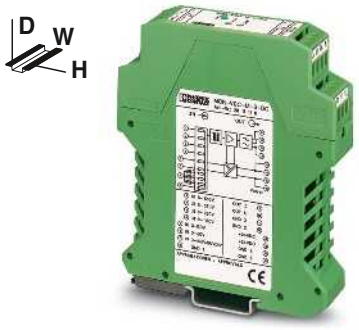
Lighting system with emergency lighting

Voltage transducers

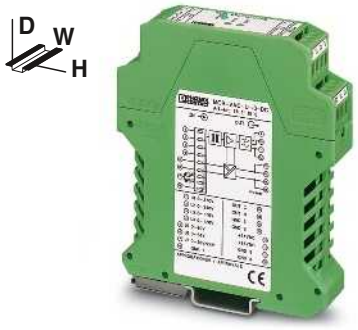
The **MCR-VDC-UI-B-DC** voltage transducer measures DC voltages within the range 0 ... ±660 V DC.

The **MCR-VAC-UI-O-DC** voltage transducer measures sinusoidal AC voltages from 0 ... 444 V AC.

– Bidirectional output signals
– Adjustable voltage ranges
– ZERO/SPAN adjustment ±20%
– 3-way isolation



For DC voltages
0 ... ±660 V DC

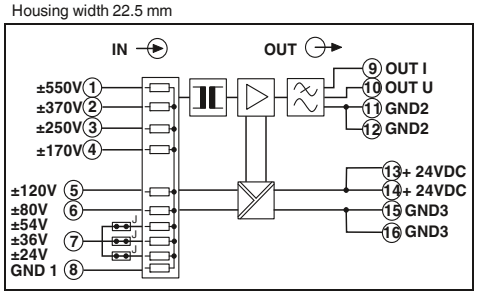


For sinusoidal AC voltages
0...444 V AC

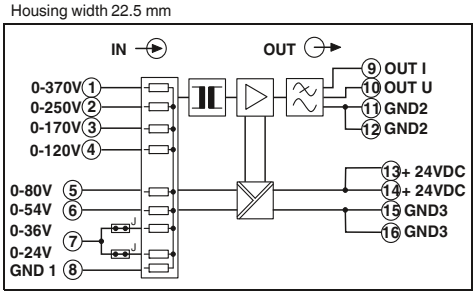
Notes:

1) EMC: Class A product, see page 571

Housing width 22.5 mm



Housing width 22.5 mm



Technical data

Input data		
Input voltage range / resistor	-550 V DC ... 550 V DC	550 kΩ
	-370 V DC ... 370 V DC	370 kΩ
	-250 V DC ... 250 V DC	250 kΩ
	-170 V DC ... 170 V DC	170 kΩ
	-120 V DC ... 120 V DC	120 kΩ
	-80 V DC ... 80 V DC	80 kΩ
	-54 V DC ... 54 V DC	54 kΩ
	-36 V DC ... 36 V DC	36 kΩ
	-24 V DC ... 24 V DC	24 kΩ
ZERO / SPAN adjustment	±20% / ±20%	
Frequency range	-	
Output data	U output	I output
Output signal	-10 ... 10 V	-20 ... 20 mA
Maximum output signal	±15 V	±30 mA
Load R_B	> 10 kΩ	< 500 Ω
Ripple	< 50 mV_{PP}	< 50 mV_{PP}
General data		
Supply voltage U_B	18.5 V DC ... 30.2 V DC	
Current consumption	< 50 mA	
Maximum transmission error	< 1% (of final value)	
Temperature coefficient	< 0.015%/K	
Limit frequency (3 dB)	40 Hz	
Step response (10 - 90%)	12 ms	
Safe isolation	acc. to EN 50178	
Rated insulation voltage	-	
Surge voltage category / pollution degree	II / 2	
Test voltage input/output	1.5 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature range	-25°C ... 50°C	
Dimensions W / H / D	22.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14	
Conformance / approvals		
Conformance	CE-compliant	

Technical data

Input data		
Input voltage range / resistor	0 V ... 370 V AC	370 kΩ
	0 V ... 250 V AC	250 kΩ
	0 V ... 170 V AC	170 kΩ
	0 V ... 120 V AC	120 kΩ
	0 V ... 80 V AC	80 kΩ
	0 V ... 54 V AC	54 kΩ
	0 V ... 36 V AC	36 kΩ
	0 V ... 24 V AC	24 kΩ
ZERO / SPAN adjustment	±20% / ±20%	
Frequency range	45 Hz ... 400 Hz	
Output data	U output	I output
Output signal	0 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	15 V	30 mA
Load R_B	> 10 kΩ	< 500 Ω
Ripple	< 50 mV_{PP}	< 50 mV_{PP}
General data		
Supply voltage U_B	18.5 V DC ... 30.2 V DC	
Current consumption	< 45 mA	
Maximum transmission error	< 1.5% (of final value)	
Temperature coefficient	-	
Limit frequency (3 dB)	-	
Step response (10 - 90%)	250 ms	
Safe isolation	acc. to EN 50178	
Rated insulation voltage	300 V DC	
Surge voltage category / pollution degree	III / 2	
Test voltage input/output	3.3 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature range	-25°C ... 60°C	
Dimensions W / H / D	22.5 / 99 / 114.5 mm	
Screw connection solid / stranded / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14	
Conformance / approvals		
Conformance	CE-compliant	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR voltage measuring transducer, for DC voltages from 0...±20 V DC to 0...±660 V DC	**MCR-VDC-UI-B-DC[1])**	**2811116**	1
MCR voltage transducer, for sinusoidal AC voltages from 0...20 V AC to 0...440 V AC	**MCR-VAC-UI-O-DC[1])**	**2811103**	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

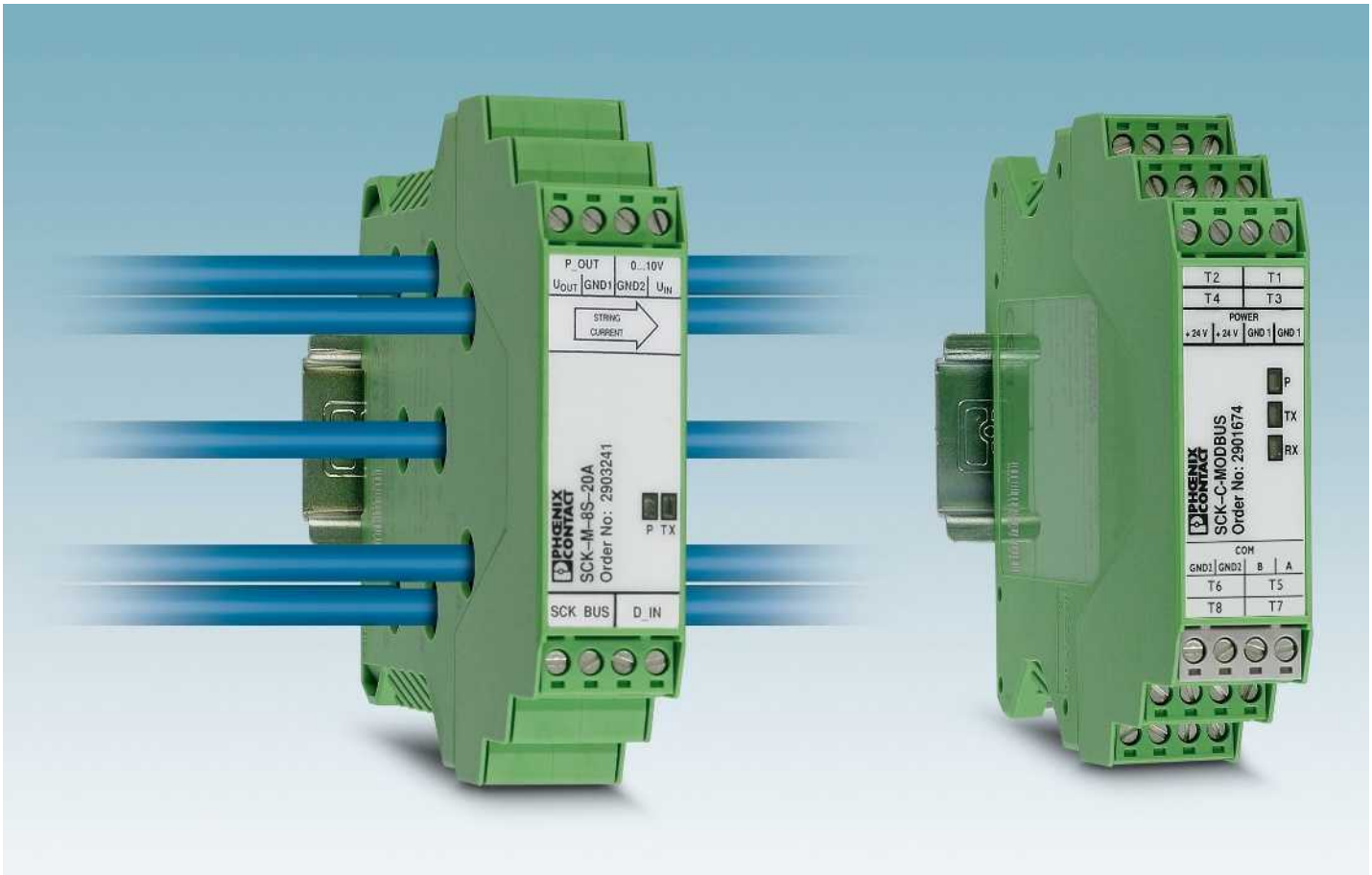
Description	Type	Order No.	Pcs. / Pkt.
	Ordering data		
MCR configuration software, for programming MCR-T-...-, MCR-...-LP-...-, MCR-...-HT-...-, MCR-S-...-, MCR-F-..., and MCR-PSP-... modules, CD-ROM	**MCR/PI-CONF-WIN**	**2814799**	1
	Accessories		
Labels, for labeling MCR-T and MCR-S modules, four sheets DIN A4 marking labels (112 pieces)	**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	Type	Order No.	Pcs. / Pkt.
	Ordering data		
USB adapter cable, D-9-SUB to USB, with adapter D-9-SUB to D-25-SUB	**CM-KBL-RS232/USB**	**2881078**	1
Software adapter cable (stereo jack plug/25-pos. D-SUB), 1.2 m long, for programming MCR-T-..., MCR-S-..., and MCR-F-... modules	**MCR-TTL-RS232-E**	**2814388**	1
	Accessories		
Adapter cable, stranded, 9-pos. D-SUB socket on 25-pos. D-SUB pin	**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.

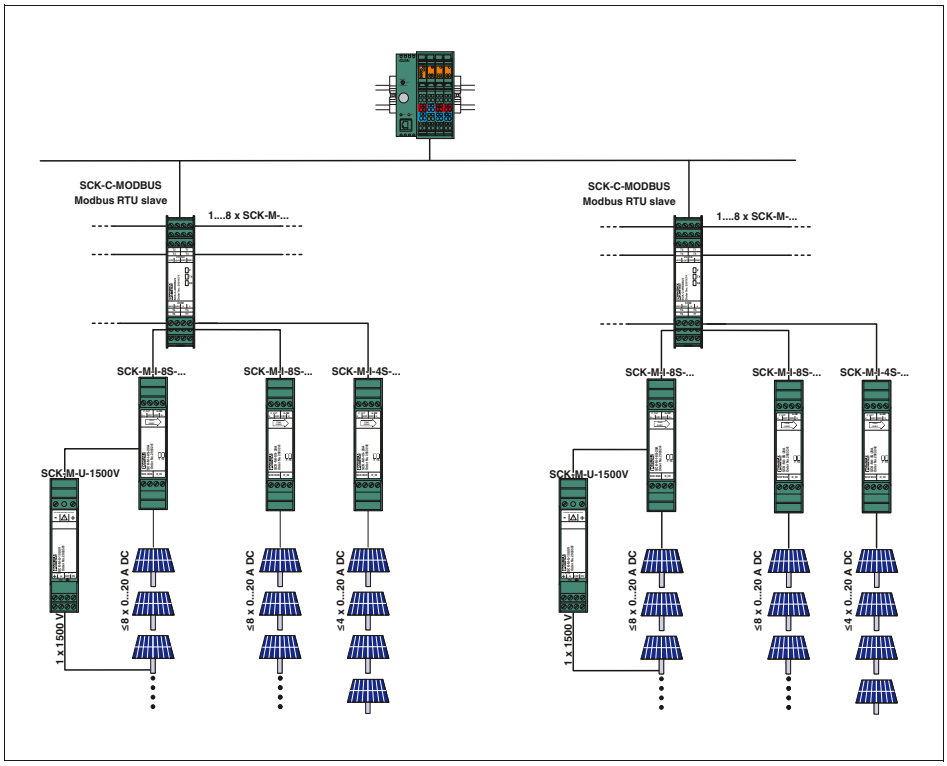
Current topic: reliable monitoring

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

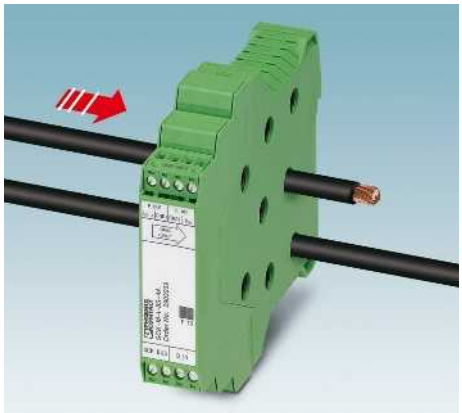


Easy integration in monitoring systems

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 unit is required in the field.

The voltage measuring module is usually connected to and also supplied via the analog input provided on the 8-channel current measuring modules.



Contact-free current measurement

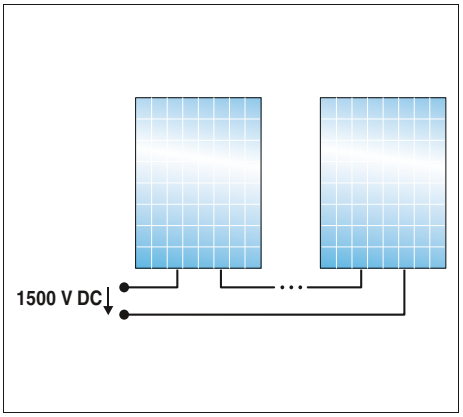
Contact-free measurement using Hall sensors offers many advantages:

– Safe isolation is already ensured by the cable insulation.
– No contact resistance due to additional contact points.
– The current is forwarded safely as the line circuit is not directly accessed.

Space-saving installation without an additional power supply unit

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 unit.



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.

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 provided (0 ... 10 V) on the 8-channel Solarcheck current measuring module
– Output of the voltage measured value as a 2 ... 10 V analog signal
– As an option, can also be removed from the Solarcheck group and used separately

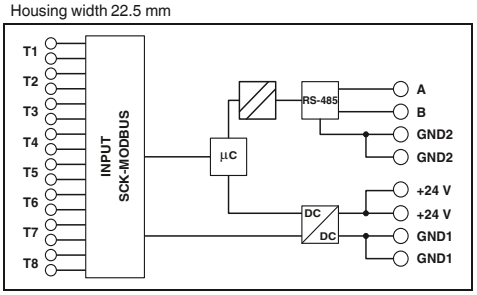
Notes:

1) EMC: Class A product, see page 571

N

Communication module RS-485 (Modbus RTU)

Housing width 22.5 mm



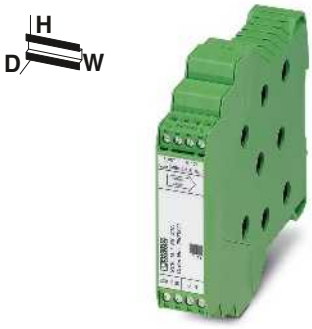
Technical data

Supply	
Supply voltage	24 V DC -10% ... +25%
Own current consumption	12 mA
Measuring input	
Current measuring range	-
Maximum transmission error	-
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 mm²)	-
Communication protocol	-
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	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16
Conformance / approvals	
Conformance	CE-compliant

Ordering data

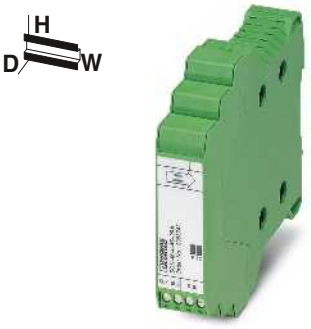
Description	Type	Order No.	Pcs. / Pkt.
Communication module	**SCK-C-MODBUS**[1])	**2901674**	1
Current measuring module, 8-channel			
Current measuring module, 4-channel for extension			
Voltage measuring module			

N



Current measuring module, 20 A DC, 8-channel

N

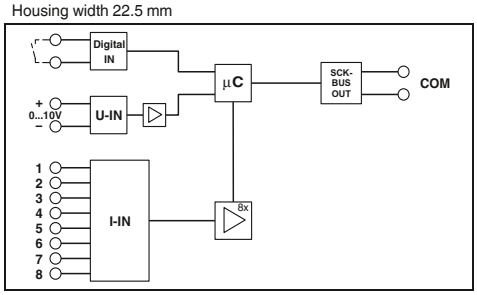


Extension module, 4-channel Current measurement 20 A DC

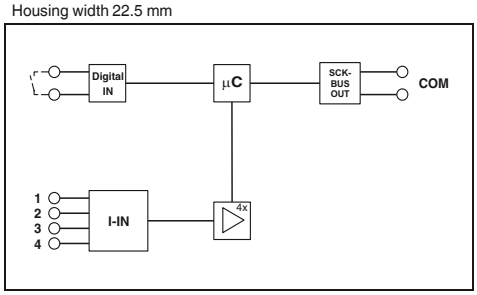
N

Voltage measuring module, 0...1500 V DC

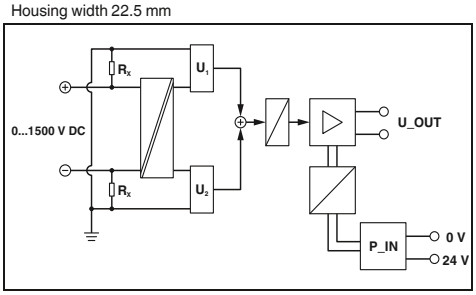
Housing width 22.5 mm



Housing width 22.5 mm



Housing width 22.5 mm



Technical data

-	
45 mA	
0 A ... 20 A	
±1% (From the measuring range final value)	
0.02%/K (From T > 25°C)	
-1 A ... 0 A	
8	
-	
Through connection, 9.5 mm diameter	
Floating switch contacts	
0 V ... 10 V	
-	
max. 300 m	
Proprietary	
-	
-	
-	
IP20	
-20°C ... 70°C	
22.5 / 102 / 128.5 mm	
0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16	
CE-compliant	

Ordering data

Type	Order No.	Pcs. / Pkt.
SCK-M-I-8S-20A	**2903241**	1

Technical data

-	
45 mA	
0 A ... 20 A	
±1% (From the measuring range final value)	
0.02%/K (From T > 25°C)	
-1 A ... 0 A	
4	
-	
Through connection, 9.5 mm diameter	
-	
-	
-	
max. 300 m	
Proprietary	
-	
-	
-	
IP20	
-20°C ... 70°C	
22.5 / 102 / 128.5 mm	
0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16	
CE-compliant	

Ordering data

Type	Order No.	Pcs. / Pkt.
SCK-M-I-4S-20A	**2903242**	1

Technical data

24 V DC -10% ... +25% (or via SCK-M-I-8S-...)	
35 mA	
-	
1% (After additional adjustment)	
< 0.03%/K	
-	
1	
0 V DC ... 1500 V DC	
Screw connection	
-	
-	
2 V ... 10 V	
max. 0.5 m	
-	
-	
-	
-	
IP20	
-20°C ... 70°C	
22.5 / 102 / 128.5 mm	
0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16	
CE-compliant	

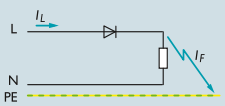
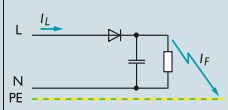
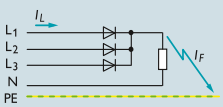
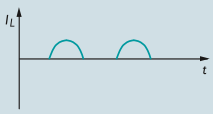
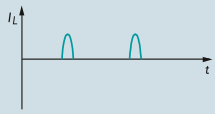
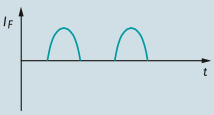
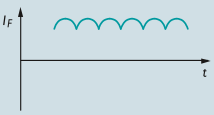
Ordering data

Type	Order No.	Pcs. / Pkt.
SCK-M-U-1500V	**2903591**	1

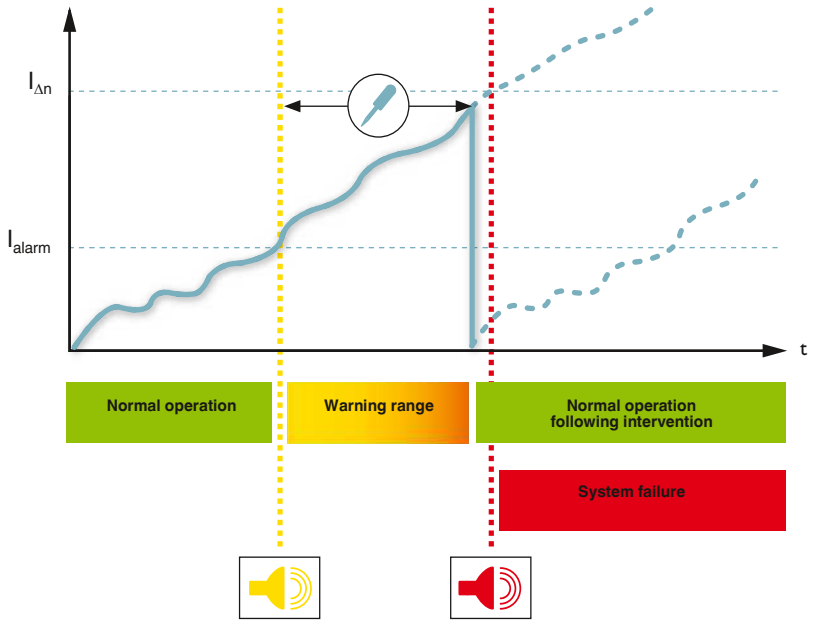
Detect errors before they actually occur

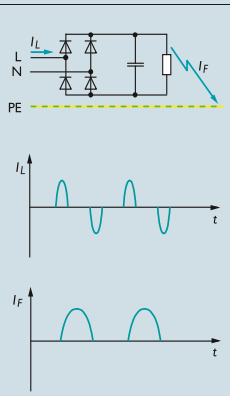
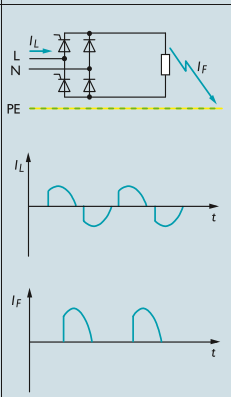
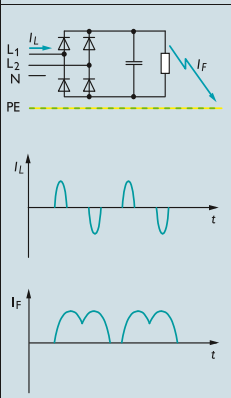
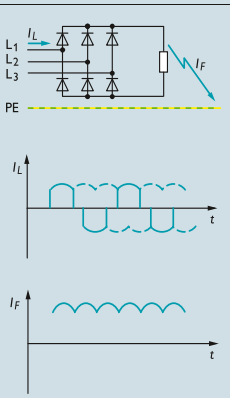
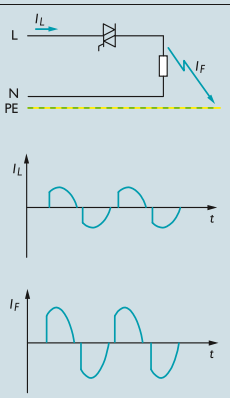
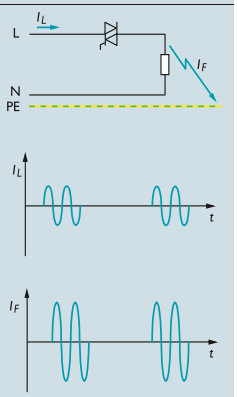
RCM devices provide residual current monitoring in grounded power supply systems. They detect residual currents at an early stage, such as those that occur as a result of insulation errors. They can therefore be used to prevent forced system shutdown. Plans can be made to remove errors outside of operating hours. RCM devices also act as a form of fire prevention.

Increasing use is being made of equipment such as frequency inverters. In the event of an error, residual currents with a frequency of up to 50 kHz can be generated. Type B+ RCM devices from Phoenix Contact are already able to detect residual currents with frequencies up to 100 kHz. This far exceeds present-day requirements of 20 kHz for type B+ devices.

	Single-phase	Single-phase with smoothing	Three-phase star circuit
Circuit			
Correct load current			
Residual current to ground potential			
Solution	**Type A**	–	–
	Type B	**Type B**	**Type B**

Residual currents can increase continually due to gradual processes. This can be attributed to humidity or conductive dirt on live parts, for example. Residual current circuit breakers trip at different rated residual currents $I_{\Delta n}$, depending on their type. Additionally installed residual current monitoring devices prevent sudden system downtimes thanks to early warnings. The continuous supply of information about gradually increasing residual currents allows timely intervention. Unplanned system failures can be avoided.



	Full bridge circuit	Semi-controlled full bridge circuit	Full bridge circuit between phase conductors	Three-phase full bridge circuit	Phase-controlled modulator	Burst control
						
	Type A	**Type A**	**–**	**–**	**Type A**	**Type A**
	Type B	**Type B**	**Type B**	**Type B**	**Type B**	**Type B**

Residual current monitoring - RCM

- Adjustable residual response current of 30 mA to 3 A
- Adjustable pre-alarm threshold and delay time
- Actual differential current can be read via LED display
- Remote signaling for main and pre-alarm

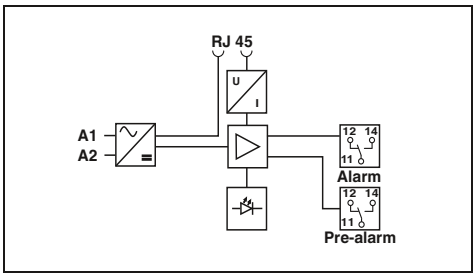
Notes:

Cables for type B+ converter connection (RJ45, 4-pair, 1:1 line) can be found in the accessories section by entering the order number (RCM/converter) at: www.phoenixcontact.net/products

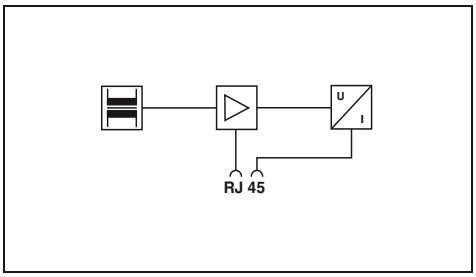
RCM type B+ for smooth and pulsating DC and AC residual currents up to 100 kHz

Converter for RCM type B+

Total width 71.6 mm



Total width 65.5 mm



Technical data

Electrical data	
Nominal voltage range	85 V AC ... 264 V AC
Nominal frequency f_N	50 Hz (60 Hz)
Rated current I_n	-
Max. required back-up fuse	16 A (B)
RCM data	
Rated response differential current I_{dyn}	3 A
Differential current acquisition characteristic	Type B+ (DC up to 100 kHz)
Response differential current $I_{\Delta n}$	30, 100, 300, 1000, 3000 mA (adjustable)
Discrimination threshold main alarm	80% ... 100% (of the set response differential current $I_{\Delta n}$)
Discrimination threshold pre-alarm	10% ... 90% (of the main alarm threshold, adjustable)
Response time for 2 x $I_{\Delta n}$	0.1 s ... 1 s (adjustable)
Thermal permanent differential current I_{cth}	-
Thermal rated short-time differential current I_{th}	-
Rated surge voltage resistance U_{imp}	4 kV
General data	
Connection data solid / stranded / AWG	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Maximum permissible outside diameter of cables	-
Housing material	polycarbonate
Ambient temperature (operation)	-25°C ... 65°C
Degree of protection	IP20
Test standards	DIN EN 62020 / DIN EN 60664 / DIN VDE 0664-110
Test standards	-
Pollution degree	2
Surge voltage category	III
Mounting	
Mounting type	DIN rail: 35 mm
Remote indication contact	PDT contact
Connection data solid / stranded / AWG	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / -
Max. operating voltage	230 V AC
Max. operating current	5 A (cos phi > 0.9)

Technical data

	...SCT-35	...SCT-70	...SCT-105
Nominal voltage range	-	-	-
Nominal frequency f_N	-	-	-
Rated current I_n	125 A	200 A	300 A
Max. required back-up fuse	-	-	-
Rated response differential current I_{dyn}	3 A	3 A	3 A
Differential current acquisition characteristic	Type B+ (DC up to 100 kHz)	Type B+ (DC up to 100 kHz)	Type B+ (DC up to 100 kHz)
Response differential current $I_{\Delta n}$	0.03 A ... 3 A	0.03 A ... 3 A	0.1 A ... 3 A
Discrimination threshold main alarm	-	-	-
Discrimination threshold pre-alarm	-	-	-
Response time for 2 x $I_{\Delta n}$	-	-	-
Thermal permanent differential current I_{cth}	150 A (50 Hz/20 kHz)	150 A (50 Hz/20 kHz)	150 A (50 Hz/20 kHz)
Thermal rated short-time differential current I_{th}	3 kA for 1 s (50 Hz/20 kHz)	3 kA for 1 s (50 Hz/20 kHz)	3 kA for 1 s (50 Hz/20 kHz)
Rated surge voltage resistance U_{imp}	8 kV	8 kV	8 kV
Connection data solid / stranded / AWG	-		
Maximum permissible outside diameter of cables	23.00 mm	46.00 mm	70.00 mm
Housing material	polycarbonate		
Ambient temperature (operation)	-20°C ... 65°C		
Degree of protection	IP20		
Test standards	DIN EN 62020 / VDE 0663 / DIN EN 60044-1 / VDE 0414 / DIN V VDE V 0664-110		
Test standards			
Pollution degree	2	2	2
Surge voltage category	IV	IV	IV
Mounting type	Screw mounting	Screw mounting	Screw mounting
Remote indication contact	-		
Connection data solid / stranded / AWG	-		
Max. operating voltage	-		
Max. operating current	-		

Ordering data

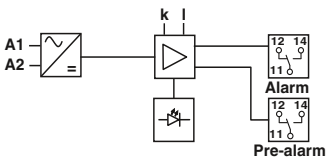
Description	Type	Order No.	Pcs. / Pkt.
Evaluation unit			
	RCM-B/50/85-264V	**2806210**	1
Current transformer			
20 mm Ø			
30 mm Ø			
35 mm Ø	**RCM-B-SCT- 35**	**2806223**	1
70 mm Ø	**RCM-B-SCT- 70**	**2806236**	1
105 mm Ø	**RCM-B-SCT-105**	**2806249**	1
140 mm Ø			
210 mm Ø			

RCM type A for pulsating DC and AC residual currents with 50/60 Hz

Converter for RCM type A

Converter for RCM type A

Total width 71.6 mm



Total width 32 mm

Total width 33 mm

Technical data

85 V AC ... 264 V AC	
50 Hz (60 Hz)	
-	
16 A (B)	
3 A	
Type A	
(50 / 60 Hz)	
30, 100, 300, 1000, 3000 mA (adjustable)	
80% ... 100% (of the set response differential current $I_{\Delta n}$)	
10% ... 90% (of the main alarm threshold, adjustable)	
0.1 s ... 1 s (adjustable)	
-	
-	
4 kV	
0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
-	
polycarbonate	
-25°C ... 65°C	
IP20	
DIN EN 62020 / DIN EN 60664	
-	
2	
III	
DIN rail: 35 mm	
PDT contact	
0.2 ... 4 mm² / 0.2 ... 2.5 mm² / -	
230 V AC	
5 A (cos phi > 0.9)	

Technical data

	...SCT-20	...SCT-30	...SCT-35	...SCT-70
85 V AC ... 264 V AC	-	-	-	-
50 Hz (60 Hz)	-	-	-	-
-	50 A	100 A	125 A	200 A
16 A (B)	-	-	-	-
3 A	3 A	3 A	3 A	3 A
Type A	Type A	Type A	Type A	Type A
(50 / 60 Hz)	(50 / 60 Hz)	(50 / 60 Hz)	(50 / 60 Hz)	(50 / 60 Hz)
30, 100, 300, 1000, 3000 mA (adjustable)	0.03 A ... 3 A	0.03 A ... 3 A	0.03 A ... 3 A	0.03 A ... 3 A
80% ... 100% (of the set response differential current $I_{\Delta n}$)	-	-	-	-
10% ... 90% (of the main alarm threshold, adjustable)	-	-	-	-
0.1 s ... 1 s (adjustable)	-	-	-	-
-	1.5 x I_n	1.5 x I_n	1.5 x I_n	1.5 x I_n
-	10 x I_n (for 1 s)	10 x I_n (for 1 s)	10 x I_n (for 1 s)	10 x I_n (for 1 s)
4 kV	8 kV	8 kV	8 kV	8 kV
0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12			
-	13.00 mm	20.00 mm	23.00 mm	46.00 mm
polycarbonate	polycarbonate			
-25°C ... 65°C	-20°C ... 65°C			
IP20	IP20 (terminal blocks)			
DIN EN 62020 / DIN EN 60664	DIN EN 62020 / VDE 0663 / DIN EN 60044-1 / VDE 0414			
-				
2	2	2	2	2
III	IV	IV	IV	IV
DIN rail: 35 mm	DIN rail: 35 mm	DIN rail: 35 mm	Screw mounting	Screw mounting
PDT contact	-			
0.2 ... 4 mm² / 0.2 ... 2.5 mm² / -	-			
230 V AC	-			
5 A (cos phi > 0.9)	-			

Technical data

	...SCT-105	...SCT-140	...SCT-210
85 V AC ... 264 V AC	-	-	-
50 Hz (60 Hz)	-	-	-
-	250 A	350 A	400 A
16 A (B)	-	-	-
3 A	3 A	3 A	3 A
Type A	Type A	Type A	Type A
(50 / 60 Hz)	(50 / 60 Hz)	(50 / 60 Hz)	(50 / 60 Hz)
30, 100, 300, 1000, 3000 mA (adjustable)	0.03 A ... 3 A	0.03 A ... 3 A	0.03 A ... 3 A
80% ... 100% (of the set response differential current $I_{\Delta n}$)	-	-	-
10% ... 90% (of the main alarm threshold, adjustable)	-	-	-
0.1 s ... 1 s (adjustable)	-	-	-
-	1.5 x I_n	1.5 x I_n	1.5 x I_n
-	10 x I_n (for 1 s)	10 x I_n (for 1 s)	10 x I_n (for 1 s)
4 kV	8 kV	8 kV	8 kV
0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12			
-	70.00 mm	93.00 mm	140.00 mm
polycarbonate			
-25°C ... 65°C	-20°C ... 65°C		
IP20	IP20 (terminal blocks)		
DIN EN 62020 / DIN EN 60664	DIN EN 62020 / VDE 0663 / DIN EN 60044-1 / VDE 0414		
-			
2	2	2	2
III	IV	IV	IV
DIN rail: 35 mm	Screw mounting	Screw mounting	Screw mounting
PDT contact	-		
0.2 ... 4 mm² / 0.2 ... 2.5 mm² / -	-		
230 V AC	-		
5 A (cos phi > 0.9)	-		

Ordering data

Type	Order No.	Pcs. / Pkt.
RCM-A/50/85-264V	**2806016**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
RCM-A-SCT- 20	**2806045**	1
RCM-A-SCT- 30	**2806058**	1
RCM-A-SCT- 35	**2806061**	1
RCM-A-SCT- 70	**2806074**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
RCM-A-SCT-105	**2806087**	1
RCM-A-SCT-140	**2806090**	1
RCM-A-SCT-210	**2806100**	1

EV Charge Control charging controller

EV Charge Control is the charging controller used to charge electric vehicles on the AC mains according to IEC 61851-1. The control and monitoring functions that are defined here for charging mode 3 serve as the basis for the equipment.

- Control Pilot evaluation and control
- Monitoring of the PE protective ground connection
- Evaluation of the proximity
- Control of the charge contactor and locking actuators

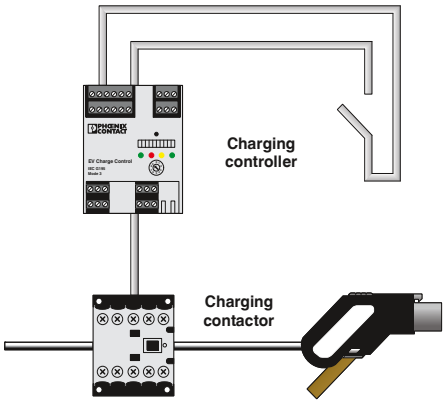
Plug-in charging systems

For information on plug-in charging systems, see Catalog 2, connection technology for field devices.

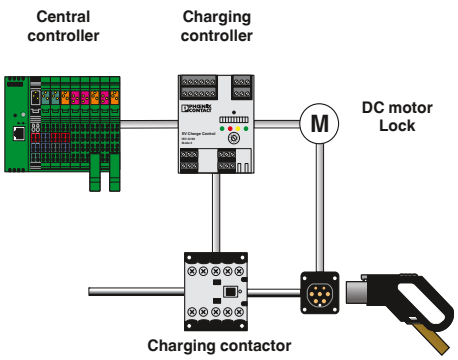
Additional functions:

All necessary control functions are integrated in a single device. No additional controller is required.

- Easy configuration directly at the device or via the integrated web server
- Adjustable charging current limitation of 6 ... 80 A
- Parameterizable automatic rejection of charging cables with low current carrying capacity
- Automatic or manual locking as well as selection of DC motor or magnetic locking actuators
- Optional locking confirmation and external enabling as a switching requirement
- Integration into your charging infrastructure via Ethernet interface (Modbus/TCP)
- Charging process enabling, status requests, and dynamic load management via remote access
- 4 digital inputs and 4 digital outputs
- Two digital outputs configurable via web server
- 4 relay outputs



Simple charging point with permanently connected cable



EV Charge Control charging controller in conjunction with a central controller

EV Charge Control charging controller

EV Charge Control

– Charging controller for charging electric vehicles on AC mains according to IEC 61851-1.

EV Charge Lock Release

– Optional extension module for plug release in the event of mains failure.

Notes:

For information on plug-in charging systems, see Catalog 2, connection technology for field devices.

Charging controller

Mains power failure plug enable

	Housing width 71.6 mm	Housing width 35.6 mm
	Technical data	**Technical data**
Input		
Description of the input	Digital input	Signal input
Nominal input voltage U_N	24 V	12 V
Input current	8 mA (24 V)	Approx. 5 mA (at 12 V)
Input ranges	-3 V ... 5 V (Off) 15 V ... 30 V (On)	-3 V ... 3 V (Off) -30 V ... -10 V (Locking ON) 10 V ... 30 V (Unlocking ON)
Switching output		
Output description	Relay output $C_{1.2}$ and $V_{1.2}$	Relay output
Maximum switching voltage	250 V AC	Approx. 11.5 V (Operating/capacitor voltage minus the diode voltage of ~ 0.5 V)
Maximum switching current	6 A	4 A
Switching output		
Output description	Relay output $R_{1.3}$ and $R_{2.4}$	-
Maximum switching voltage	30 V AC/DC	-
Maximum switching current	6 A	-
Switching output		
Output description	Digital output	-
Maximum output voltage	30 V	-
Maximum output current	0.6 A	-
Ethernet interface		
Connection method	RJ45 socket	-
Transmission speed	10/100 Mbps	-
Transmission length	100 m (with shielded, twisted-pair data cable)	-
General data		
Supply voltage		12 V DC ±5%
Supply voltage range	110 V AC ... 240 V AC (nominal voltage range) 95 V AC ... 264 V AC	-
Maximum current consumption	40 mA	-
Own current consumption	-	4 A (4 mA in idle state)
Frequency range	45 Hz ... 65 Hz	-
Degree of protection	IP20	IP20
Ambient temperature range	-25°C ... 60°C	-25°C ... 60°C
Dimensions W / H / D	71.6 / 61 / 90 mm	35.6 / 61 / 90 mm
Screw connection solid / stranded / AWG	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Conformance / approvals		
Conformance	CE-compliant	CE-compliant

	Ordering data			Ordering data		
Description	**Type**	**Order No.**	Pcs. / Pkt.	**Type**	**Order No.**	Pcs. / Pkt.
EV Charge Control charging controller	**EM-CP-PP-ETH**	**2902802**	1			
Mains failure plug release EV Charge Lock Release				**EM-EV-CLR-12V**	**2903246**	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 timer 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 timer relays each with one time range and one function
– Multifunctional timer relays with selectable time ranges and functions

Professionally packaged components

Special 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 timer relays

The space-saving and inexpensive solution for simple time control applications.

– Each with one time range and one function
– Design width of just 6.2 mm - saves up to 70% space compared to conventional timer relays
– Precise time setting using the illuminated thumbwheel
– Fast wiring through the use of plug-in bridges

Multifunctional timer relays

For universal use thanks to wide range of functions.

– Just three versions for all conventional time control applications.
– Two floating PDT outputs on a design width of just 22.5 mm
– Supply voltage via wide-range power supply unit
– Optimum setting of times ranging from milliseconds to several days

Special function modules

Special 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

Single-phase current and voltage monitoring

Single-phase current monitoring

The **EMD-BL-C-10** monitors AC currents from 0 ... 10 A.

– Adjustable response delay
– 0 ... 5 A or 0 ... 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 the front

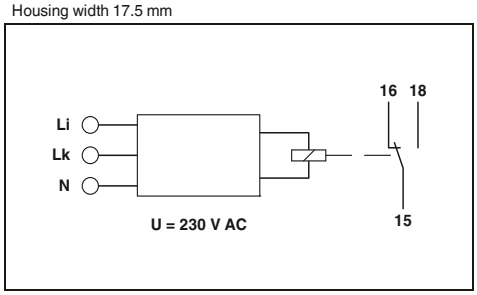
N

Current monitoring, 1-phase
Overcurrent, undercurrent, window

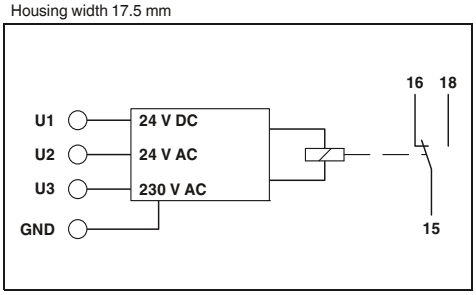
N

Voltage monitoring, 1-phase
Undervoltage, window

Housing width 17.5 mm



Housing width 17.5 mm



	Technical data	Technical data
Functions		
	Overcurrent, undercurrent, window	Undervoltage, window
Input		
Input ranges		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)
Input ranges	0 A ... 5 A AC 0 A ... 10 A AC (Configurable via rotary switches)	-
Input resistance	3 mΩ	-
Min. setting range	5% ... 95% (From I_N)	75% ... 115% (From U_N)
Max. setting range	10% ... 100% (From I_N)	80% ... 120% (From U_N)
Setting range for response delay	0.1 s ... 10 s	0.1 s ... 10 s
Basic accuracy	≤ 5% (of the nominal value)	≤ 5% (of scale end value)
Setting accuracy	±5% (of the nominal value)	±5% (of scale end value)
Repeat accuracy	≤ 2%	≤ 2%
Relay output		
Contact type	1 floating PDT	1 floating PDT
Switching capacity	1250 VA (5 A/250 V AC)	1250 VA (5 A/250 V AC)
Electrical service life	1 x 10^5 cycles	1 x 10^5 cycles
Mechanical service life	15 x 10^6 cycles	15 x 10^6 cycles
Output fuse	5 A (fast-blow)	5 A (fast-blow)
General data		
Supply voltage	230 V AC ±15%	-25% ... +20% (= measuring voltage)
Nominal power consumption	5 VA (0.8 W)	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)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature range	-25°C ... 55°C	-25°C ... 55°C
Dimensions W / H / D	17.5 / 88 / 65.5 mm	17.5 / 88 / 65.5 mm
Connection data solid / stranded / AWG	0.5 ... 2.5 mm^2 / 0.5 ... 2.5 mm^2 / 20 - 14	0.5 ... 2.5 mm^2 / 0.5 ... 2.5 mm^2 / 20 - 14
Conformance / approvals		
Conformance	CE-compliant	CE-compliant

	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Compact monitoring relays with push-in connection						
	EMD-BL-C-10-PT	**2903522**	1	**EMD-BL-V-230-PT**	**2903524**	1
Compact monitoring relays with screw connection						
	EMD-BL-C-10	**2903521**	1	**EMD-BL-V-230**	**2903523**	1

Three-phase voltage monitoring, phase monitoring

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 the front
– Supply from the measuring circuit

Phase monitoring

The **EMD-BL-PH-400** monitors three-phase AC voltages.

– 3~ 208 ... 480 V AC/120 ... 277 V AC
– Adjustable response delay
– Adjustable asymmetry: 5 ... 25%/OFF
– Adjustable via potentiometer on the front
– Supply from the measuring circuit

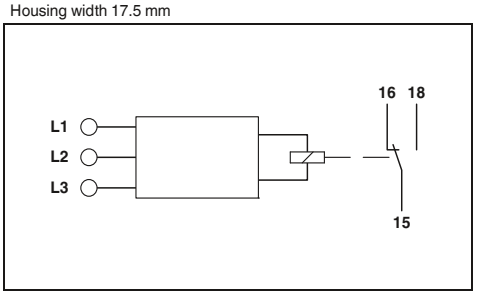
N

Voltage monitoring, 3-phase
Window, phase sequence

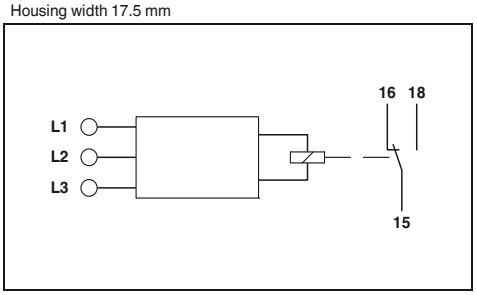
N

Phase monitoring
Phase sequence, phase failure, asymmetry

Housing width 17.5 mm



Housing width 17.5 mm



	Technical data	Technical data
Functions		
	Window, phase sequence	Phase sequence, phase failure, asymmetry
Input		
Monitoring range	280 V AC ... 519 V AC	187 V AC ... 519 V AC
Input ranges	3~ 400/230 V	3~ 208 ... 480 V/120 ... 277 V
Input resistance	-	-
Min. setting range	70% ... 120% (From U_N)	-
Max. setting range	80% ... 130% (From U_N)	-
Setting range for response delay	0.1 s ... 10 s	0.1 s ... 10 s
Asymmetry	-	5 % ... 25% / OFF
Basic accuracy	≤ 5% (of the nominal value)	≤ 5% (of scale end value)
Setting accuracy	±5% (of scale end value)	±5% (of scale end value)
Repeat accuracy	≤ 2%	≤ 2%
Relay output		
Contact type	1 floating PDT	1 floating PDT
Switching capacity	1250 VA (5 A/250 V AC)	1250 VA (5 A/250 V AC)
Electrical service life	1 x 10^5 cycles	1 x 10^5 cycles
Mechanical service life	15 x 10^6 cycles	15 x 10^6 cycles
Output fuse	5 A (fast-blow)	5 A (fast-blow)
General data		
Supply voltage	±30% (= measuring voltage)	±10% (= measuring voltage)
Nominal power consumption	10 VA (1 W)	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)	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature range	-25°C ... 55°C	-25°C ... 55°C
Dimensions W / H / D	17.5 / 88 / 65.5 mm	17.5 / 88 / 65.5 mm
Connection data solid / stranded / AWG	0.5 ... 2.5 mm^2 / 0.5 ... 2.5 mm^2 / 20 - 14	0.5 ... 2.5 mm^2 / 0.5 ... 2.5 mm^2 / 20 - 14
Conformance / approvals		
Conformance	CE-compliant	CE-compliant

	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Compact monitoring relays with push-in connection						
	EMD-BL-3V-400-PT	**2903526**	1	**EMD-BL-PH-480-PT**	**2903528**	1
Compact monitoring relays with screw connection						
	EMD-BL-3V-400	**2903525**	1	**EMD-BL-PH-480**	**2903527**	1

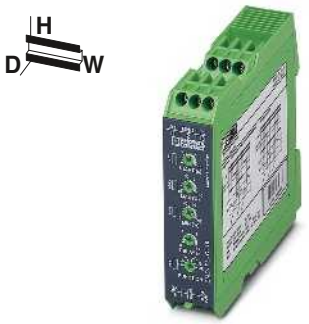
Single-phase current monitoring

EMD-...C... monitoring relays monitor DC and AC currents within the range 0 ... 10 A.

– Separately adjustable startup and release delays
– Variable supply voltage range
– Adjustable via potentiometer on front

Notes:

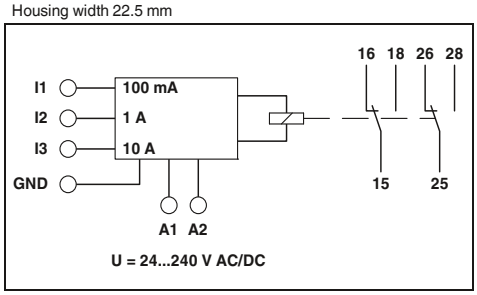
1) EMC: Class A product, see page 571



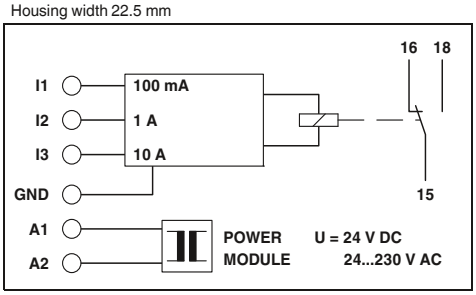
Overcurrent and undercurrent monitoring

Overcurrent or undercurrent monitoring

Housing width 22.5 mm



Housing width 22.5 mm



Technical data

Functions	
	Overcurrent, undercurrent, window, error memory
Input	
Input ranges	0 mA ... 100 mA AC/DC (Connection terminals: I1 and GND) 0 A ... 1 A AC/DC (Connection terminals: I2 and GND) 0 A ... 10 A AC/DC (Connection terminals: I3 and GND)
Input resistance	470 mΩ (at I_N = 100 mA) ; 47 mΩ (at I_N = 1 A) ; 5 mΩ (at I_N = 10 A)
Min. setting range	5% ... 95% (From I_N)
Max. setting range	10% ... 100% (From I_N)
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	
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 10^5 cycles at ohmic load, 1000 VA
Mechanical service life	Approx. 2 x 10^7 cycles
Output fuse	5 A (fast-blow)
General data	
Supply voltage	
Nominal power consumption	4.5 VA (1.5 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature range	-25°C ... 55°C
Dimensions W / H / D	22.5 / 90 / 113 mm
Screw connection solid / stranded / AWG	0.5 ... 2.5 mm² / 0.25 ... 2.5 mm² / 20 - 14
Conformance / approvals	
Conformance	CE-compliant
UL, USA / Canada	UL/C-UL listed UL 508

Technical data

EMD-SL-C-OC-10	EMD-SL-C-UC-10
Overcurrent	Undercurrent
0 mA ... 100 mA AC/DC (Connection terminals: I1 and GND) 0 A ... 1 A AC/DC (Connection terminals: I2 and GND) 0 A ... 10 A AC/DC (Connection terminals: I3 and GND)	
470 mΩ (at I_N = 100 mA) ; 47 mΩ (at I_N = 1 A) ; 5 mΩ (at I_N = 10 A)	
5% ... 95% (From I_N)	
10% ... 100% (From I_N)	
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 10^5 cycles at ohmic load, 1000 VA	
Approx. 2 x 10^7 cycles	
5 A (fast-blow)	
2 VA (1.5 W)	
IP40 (housing) / IP20 (connection terminal blocks)	
-25°C ... 55°C	
22.5 / 90 / 113 mm	
0.5 ... 2.5 mm² / 0.25 ... 2.5 mm² / 20 - 14	
CE-compliant	
UL/C-UL listed UL 508	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Electronic monitoring relay			
	EMD-FL-C-10[1])	**2866022**	1
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-C-OC-10	**2866019**	1
EMD-SL-C-UC-10	**2867937**	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

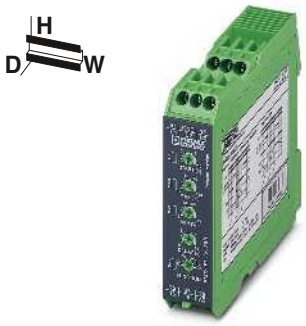
Single-phase voltage monitoring

EMD-...V... monitoring relays monitor DC and AC voltages within the range 0 ... 300 V.

– Separately adjustable startup and release delays
– Variable supply voltage range
– Adjustable via potentiometer on front

Notes:

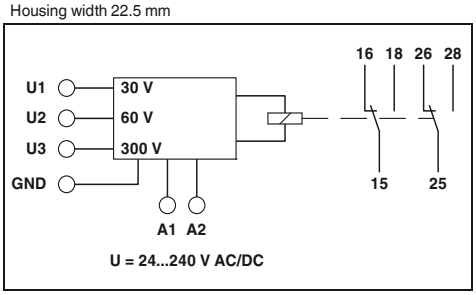
1) EMC: Class A product, see page 571



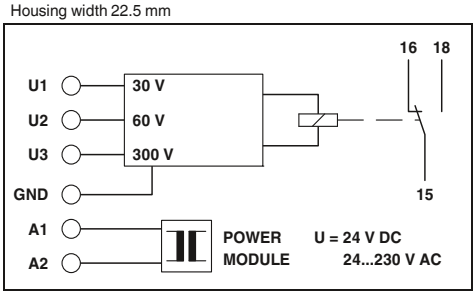
Undervoltage and overvoltage monitoring

Undervoltage monitoring

Housing width 22.5 mm



Housing width 22.5 mm



	Technical data	Technical data
Functions		
	Undervoltage, overvoltage, window, error memory	Undervoltage
Input		
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)	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)	47 kΩ (connection terminal blocks: U1 and GND) 100 kΩ (connection terminal blocks: U2 and GND) 470 kΩ (connection terminal blocks: U3 and GND)
Min. setting range	5% ... 95% (From U_N)	5% ... 95% (From U_N)
Max. setting range	10% ... 100% (From U_N)	10% ... 100% (From U_N)
Setting range for response delay	0.1 s ... 10 s	0.2 s ... 10 s
Setting range for starting delay	0 s ... 10 s	-
Basic accuracy	±5% (of scale end value)	±5% (of scale end value)
Setting accuracy	≤ 5% (of scale end value)	≤ 5% (of scale end value)
Repeat accuracy	≤ 2%	≤ 2%
Relay output		
Contact type	2 floating PDT contacts	1 floating PDT
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)	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 10^5 cycles at ohmic load, 1000 VA	2 x 10^5 cycles at ohmic load, 1000 VA
Mechanical service life	Approx. 2 x 10^7 cycles	Approx. 2 x 10^7 cycles
Output fuse	5 A (fast-blow)	5 A (fast-blow)
General data		
Supply voltage		
Nominal power consumption	4.5 VA (1.5 W)	2 VA (1.5 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature range	-25°C ... 55°C	-25°C ... 55°C
Dimensions W / H / D	22.5 / 90 / 113 mm	22.5 / 90 / 113 mm
Screw connection solid / stranded / AWG	0.5 ... 2.5 mm^2 / 0.25 ... 2.5 mm^2 / 20 - 14	0.5 ... 2.5 mm^2 / 0.25 ... 2.5 mm^2 / 20 - 14
Conformance / approvals		
Conformance	CE-compliant	CE-compliant
UL, USA / Canada	UL/C-UL listed UL 508	UL/C-UL listed UL 508

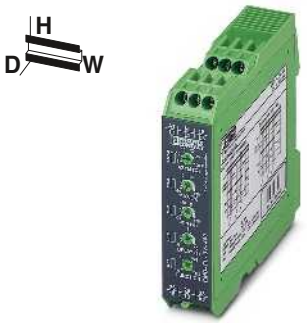
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Electronic monitoring relay						
	EMD-FL-V-300[1])	**2866048**	1	**EMD-SL-V-UV-300**	**2866035**	1
Power module, plug-in, please order at the same time!						
Supply voltage 20 ... 30 V DC				**EMD-SL-PS- 24DC**	**2885359**	1
Supply voltage 20.2 ... 26.4 V AC				**EMD-SL-PS- 24AC**	**2866103**	1
Supply voltage 88 ... 121 V AC				**EMD-SL-PS-110AC**	**2866116**	1
Supply voltage 108 ... 132 V AC				**EMD-SL-PS-120AC**	**2885731**	1
Supply voltage 195 ... 264 V AC				**EMD-SL-PS-230AC**	**2866129**	1

Three-phase voltage monitoring

EMD-...-3V... monitoring relays monitor three-phase AC voltages of 160 ... 897 V AC (depending on the device concerned).
– Adjustable response delay
– Variable supply voltage range
– Adjustable via potentiometer on front
– Adjustable asymmetry

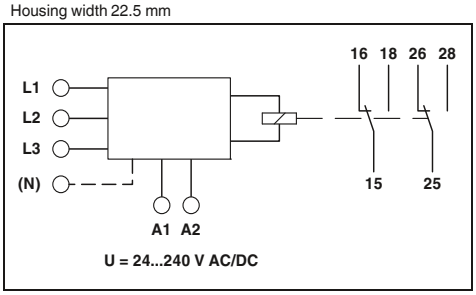
Notes:

1) EMC: Class A product, see page 571



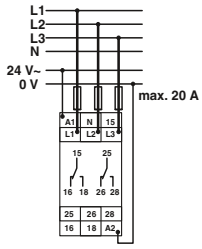
Undervoltage and phase monitoring, 400 V or 230 V

Housing width 22.5 mm



Technical data

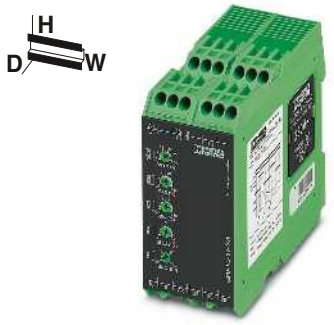
Functions	EMD-FL-3V-400[1])	EMD-FL-3V-230[1])
	Undervoltage, window, asymmetry, phase sequence, phase failure	Undervoltage, window, asymmetry, phase sequence, phase failure
Input		
Monitoring range	280 V AC ... 520 V AC	161 V AC ... 299 V AC
Input ranges	3 N ~ 400/230 V	3 N ~ 230/132 V
Input resistance	1 MΩ	470 kΩ
Min. setting range	-30% ... 20% (From U_N)	
Max. setting range	-20% ... 30% (From U_N)	
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 10^5 cycles at ohmic load, 1000 VA	
Mechanical service life	Approx. 2 x 10^7 cycles	
Output fuse	5 A (fast-blow)	
General data		
Supply voltage		
Nominal power consumption	4.5 VA (1.5 W)	
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)	
Ambient temperature range	-25°C ... 55°C	
Dimensions W / H / D	22.5 / 90 / 113 mm	
Screw connection solid / stranded / AWG	0.5 ... 2.5 mm^2 / 0.25 ... 2.5 mm^2 / 20 - 14	
Conformance / approvals		
Conformance	CE-compliant	
UL, USA / Canada	UL/C-UL listed UL 508	



Connection example

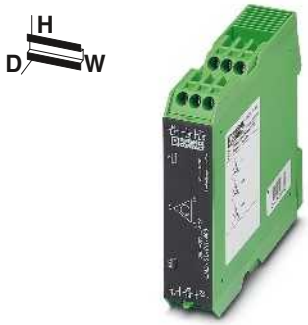
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Electronic monitoring relay			
	EMD-FL-3V-400[1])	**2866064**	1
	EMD-FL-3V-230[1])	**2885773**	1
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			
Supply voltage 323 ... 456 V AC			



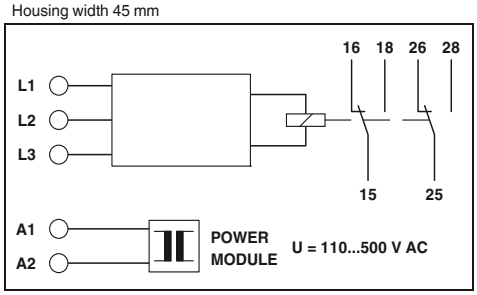
Undervoltage and phase monitoring, 500 V or 690 V

Undervoltage/overvoltage monitoring, 400 V with/without neutral conductor

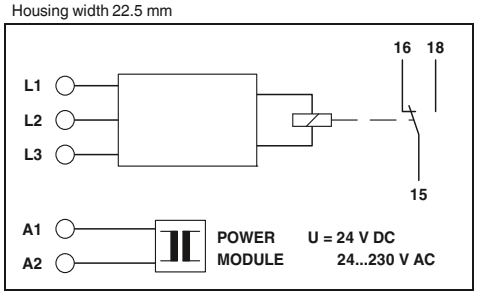


Phase monitoring, 400 V

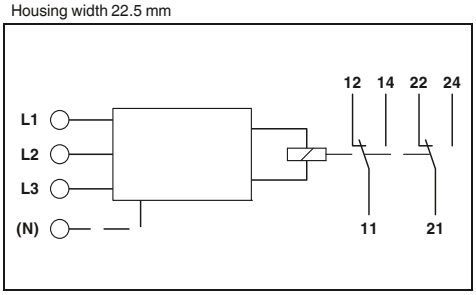
Housing width 45 mm



Housing width 22.5 mm



Housing width 22.5 mm



Technical data

	EMD-FL-3V-690	EMD-FL-3V-500
	Undervoltage, window, asymmetry, phase sequence, phase failure	Undervoltage, window, asymmetry, phase sequence, phase failure
	483 V AC ... 897 V AC	350 V AC ... 650 V AC
	3 ~ 690 V	3 ~ 500 V
	1 MΩ	1 MΩ
	-30% ... 20% (From U_N)	
	-20% ... 30% (From U_N)	
	0.1 s ... 10 s	
	5 % ... 25% / OFF	5 % ... 25% / OFF
	±5% (of scale end value)	
	≤ 5% (of scale end value)	
	≤ 2%	
	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 10^5 cycles at ohmic load, 1000 VA	
	Approx. 2 x 10^7 cycles	
	5 A (fast-blow)	
	4.5 VA (1.5 W)	
	IP40 (housing) / IP20 (connection terminal blocks)	
	-25°C ... 55°C	
	45 / 90 / 113 mm	
	0.5 ... 2.5 mm² / 0.25 ... 2.5 mm² / 20 - 14	
	CE-compliant	
	UL/C-UL listed UL 508	

Ordering data

Type	Order No.	Pcs. / Pkt.
EMD-FL-3V-690	**2885249**	1
EMD-FL-3V-500	**2867979**	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

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_N)	
	-20% ... 30% (From U_N)	
	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 10^5 cycles at ohmic load, 1000 VA	
	Approx. 2 x 10^7 cycles	
	5 A (fast-blow)	
	2 VA (1.5 W)	
	IP40 (housing) / IP20 (connection terminal blocks)	
	-25°C ... 55°C	
	22.5 / 90 / 113 mm	
	0.5 ... 2.5 mm² / 0.25 ... 2.5 mm² / 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

Technical data

	Phase sequence, phase failure, asymmetry
	342 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 10^5 cycles at ohmic load, 1000 VA
	Approx. 2 x 10^7 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 mm² / 0.25 ... 2.5 mm² / 20 - 14
	CE-compliant
	UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs. / Pkt.
EMD-SL-PH-400	**2866077**	1

Effective power monitoring, load monitoring (cos ϕ)

Effective power monitoring

The effective power in single- and 3-phase networks can be monitored with the **EMD-FL-RP-480** effective power monitoring relay.

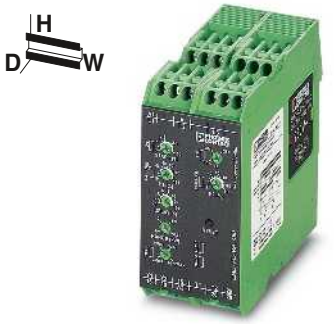
– Monitoring range up to 7.2 kW
– Separately adjustable startup and release delays
– Temperature monitoring of the motor winding
– Variable supply voltage range
– Detection of switched off loads

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.

Notes:

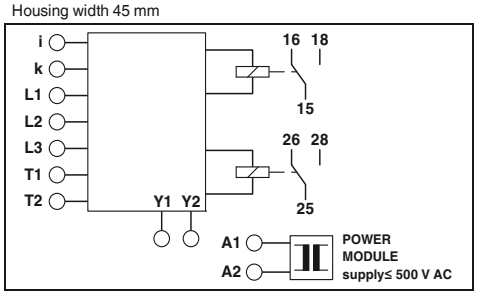
1) EMC: Class A product, see page 571



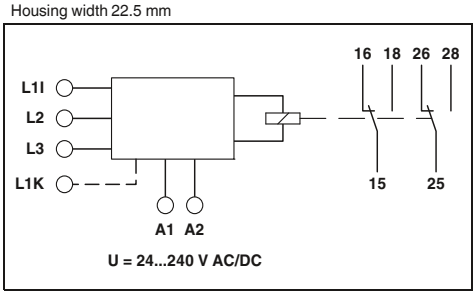
Effective power monitoring

Load monitoring (cos ϕ)

Housing width 45 mm



Housing width 22.5 mm



		Technical data	Technical data
Functions			
		Underload, overload, window, winding temperature monitoring	Underload, overload, Window
Input			
Description of the input		Voltage input	-
Measured value		AC sine (10 Hz ... 400 Hz)	AC sine (10 ... 100 Hz)
Measuring ranges P_N		Can be switched between 0.75 kW, 1.5 kW, 3 kW and 6 kW	-
Nominal input voltage U_N		480 V (3 N ~ 480/277 V)	(3 N ~ 415/240 V)
Input ranges		0 V AC ... 480 V AC (1(N) ~, single-phase load) 0 V AC ... 480 V AC (3(N) ~, 3-phase load)	40 V AC ... 415 V AC (1(N) ~, single-phase load) 40 V AC ... 415 V AC (3(N) ~, 3-phase load)
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)	0.5 A ... 10 A (Connection terminal blocks: L1i and L1k)
Min. setting range		5% ... 110% (of P_N)	-
Max. setting range		10% ... 120% (of P_N)	-
Switching threshold cos ϕ	Min.	-	0.1 ... 0.99
	Max.	-	0.2 ... 1
Relay output			
Contact type		2 floating PDT contacts	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)	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 10^5 cycles at ohmic load, 1000 VA	2 x 10^5 cycles at ohmic load, 1000 VA
Mechanical service life		Approx. 2 x 10^7 cycles	Approx. 2 x 10^7 cycles
Output fuse		5 A (fast-blow)	5 A (fast-blow)
General data			
Supply voltage			
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 range		-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 mm² / 0.25 ... 2.5 mm² / 20 - 14	0.5 ... 2.5 mm² / 0.25 ... 2.5 mm² / 20 - 14
Conformance / approvals			
Conformance		CE-compliant	CE-compliant
UL, USA / Canada		UL applied for	UL/C-UL listed UL 508

	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Electronic monitoring relay						
	EMD-FL-RP-480	**2900177**	1	**EMD-FL-PF-400[1])**	**2885809**	1
Power module, plug-in, please order at the same time!						
Supply voltage 88 ... 121 V AC	**EMD-SL-PS45-110AC**	**2885281**	1			
Supply voltage 108 ... 132 V AC	**EMD-SL-PS45-120AC**	**2885744**	1			
Supply voltage 195 ... 264 V AC	**EMD-SL-PS45-230AC**	**2885294**	1			
Supply voltage 323 ... 456 V AC	**EMD-SL-PS45-400AC**	**2885304**	1			
Supply voltage 425 ... 550 V AC	**EMD-SL-PS45-500AC**	**2885317**	1			

Temperature monitoring, filling level monitoring

Temperature monitoring (motor winding)

The monitoring relay **EMD-SL-PTC** monitors the motor winding temperatures by means of PTC (PTC thermistor resistance) as per DIN 44081.

– Test function with integrated test/reset button
– Variable supply voltage range
– Short-circuit and open-circuit monitoring

Filling level monitoring

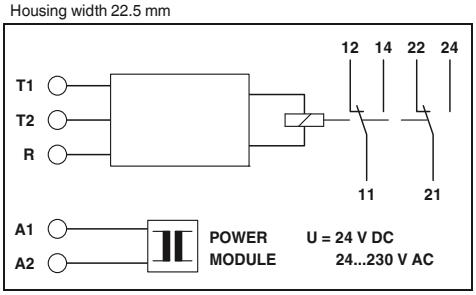
The **EMD-SL-LL-...** monitoring relay monitors the level of electrically conductive liquids with the help of conductive probes (not supplied as standard).

– Adjustable response delay
– Adjustable via potentiometer on front

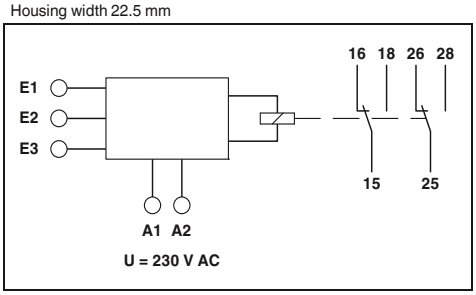
Temperature monitoring (motor windings)

Filling level monitoring

Housing width 22.5 mm



Housing width 22.5 mm



	Technical data	Technical data
Functions		
	Winding temperature monitoring	Pumping up (minimum monitoring), pumping down (maximum 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	-	Conductive probe, type: SK1, SK2, SK3
Max. probe voltage	-	16 V AC
Max. probe current	-	7 mA
Length of probe cable	-	< 1000 m Set value < 50% (Capacity 100 nF/km) < 100 m Set value 100% (Capacity 100 nF/km)
Switching threshold	-	0.25 kΩ ... 100 kΩ (4 mS ... 1 µS)
Relay output		
Contact type	2 floating PDT contacts	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)	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 10^5 cycles at ohmic load, 1000 VA	2 x 10^5 cycles at ohmic load, 1000 VA
Mechanical service life	Approx. 2 x 10^7 cycles	Approx. 2 x 10^7 cycles
Output fuse	5 A (fast-blow)	5 A (fast-blow)
General data		EMD-SL-LL-230 / EMD-SL-LL-110
Supply voltage		230 V AC -15% ... +15% AC / 110 V AC -10% ... +15% AC
Nominal power consumption	2 VA (1.5 W)	2 VA (1.5 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature range	-25°C ... 55°C	-25°C ... 55°C
Dimensions W / H / D	22.5 / 90 / 113 mm	22.5 / 90 / 113 mm
Screw connection solid / stranded / AWG	0.5 ... 2.5 mm^2 / 0.25 ... 2.5 mm^2 / 20 - 14	0.5 ... 2.5 mm^2 / 0.25 ... 2.5 mm^2 / 20 - 14
Conformance / approvals		
Conformance	CE-compliant	CE-compliant
UL, USA / Canada	UL/C-UL listed UL 508	UL/C-UL listed UL 508

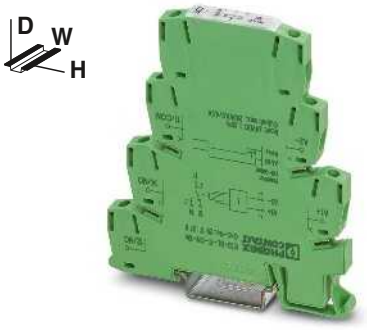
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Electronic monitoring relay						
	EMD-SL-PTC	**2866093**	1	**EMD-SL-LL-230**	**2885906**	1
				EMD-SL-LL-110	**2901137**	1
Power module, plug-in, please order at the same time!						
Supply voltage 20 ... 30 V DC	**EMD-SL-PS- 24DC**	**2885359**	1			
Supply voltage 20.2 ... 26.4 V AC	**EMD-SL-PS- 24AC**	**2866103**	1			
Supply voltage 88 ... 121 V AC	**EMD-SL-PS-110AC**	**2866116**	1			
Supply voltage 108 ... 132 V AC	**EMD-SL-PS-120AC**	**2885731**	1			
Supply voltage 195 ... 264 V AC	**EMD-SL-PS-230AC**	**2866129**	1			

Ultra-narrow timer relays

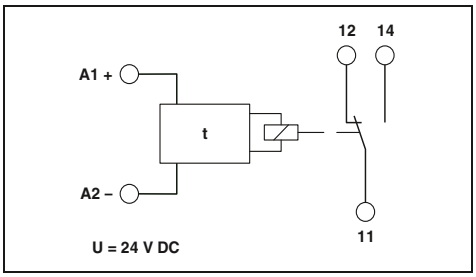
N

The **ETD-BL-1T-...** ultra-narrow timer 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 thumbwheel
– 6.2 mm slim design width

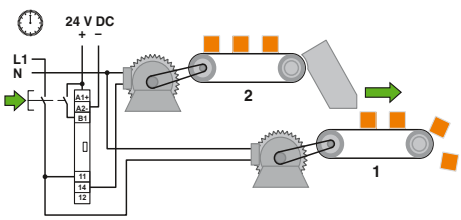


Timer relay with switch-on delay, voltage controlled

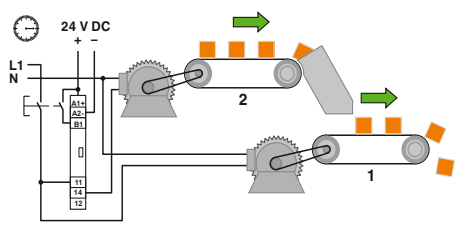


Technical data

Functions	
	ON: With switch-on delay
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. 2 x 10^7 cycles
General data	
Supply voltage	24 V DC (19,2 V DC ...30 V DC)
Nominal current typ.	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
Housing material	Polyamide PA, self-extinguishing
Dimensions W / H / D	6.2 / 80 / 86 mm
Screw connection solid / stranded / AWG	0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14
Spring-cage connection (solid/stranded/AWG)	0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14
Conformance / approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA nC IIC T4 Gc X



Conveyor belt 1 starts immediately

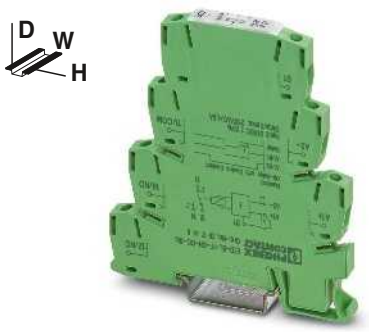


Conveyor belt 2 starts with a time delay

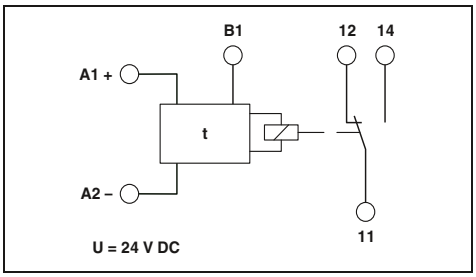
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Compact timer relay, with screw connection			
Time range 0.1...10 s	**ETD-BL-1T-ON- 10S**	**2917379**	1
Time range 3...300 s	**ETD-BL-1T-ON-300S**	**2917382**	1
Time range 0.3...30 min	**ETD-BL-1T-ON- 30MIN**	**2917395**	1
Time range 3...300 min	**ETD-BL-1T-ON-300MIN**	**2917405**	1
Compact timer relay, with push-in technology			
Time range 0.1...10 s	**ETD-BL-1T-ON- 10S-PT**	**2901476**	1
Time range 3...300 s	**ETD-BL-1T-ON-300S-PT**	**2901477**	1
Time range 0.3...30 min	**ETD-BL-1T-ON- 30MIN-PT**	**2901478**	1
Time range 3...300 min	**ETD-BL-1T-ON-300MIN-PT**	**2901479**	1

N



Timer relay with switch-on delay, with control contact



Technical data

ON-CC: With switch-on delay with control contact

Non-floating, terminals A1-B1
min. 50 ms

1 floating PDT
1500 VA (6 A / 250 V AC)
Approx. 2 x 10^7 cycles

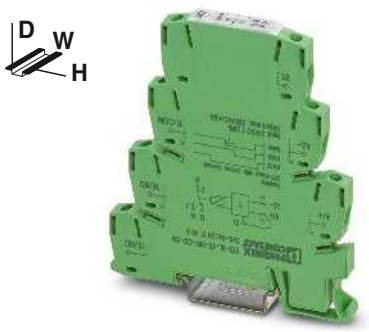
24 V DC (19.2 V DC ...30 V DC)
15 mA (Relay ON)
7 mA (Relay OFF)
6 kV (According to EN 50178)
IP20
-20°C ... 65°C
Polyamide PA, self-extinguishing
6.2 / 80 / 86 mm
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14

CE-compliant
II 3 G Ex nA nC IIC T4 Gc X

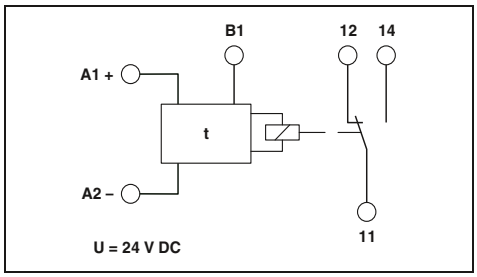
Ordering data

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

N



Timer relay with off delay, with control contact



Technical data

OFF-CC: Off delay with control contact

Non-floating, terminals A1-B1
min. 50 ms

1 floating PDT
1500 VA (6 A / 250 V AC)
Approx. 2 x 10^7 cycles

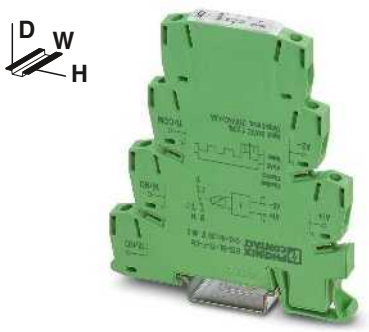
24 V DC (19,2 V DC ...30 V DC)
15 mA (Relay ON)
7 mA (Relay OFF)
6 kV (According to EN 50178)
IP20
-20°C ... 65°C
Polyamide PA, self-extinguishing
6.2 / 80 / 86 mm
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14

CE-compliant
II 3 G Ex nA nC IIC T4 Gc X

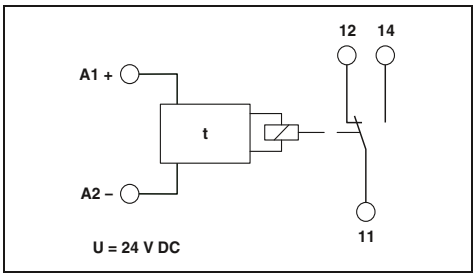
Ordering data

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

N



Timer relay with flashing indic. function, beginning with the pulse



Technical data

F: Flashing beginning with pulse

-
min. 50 ms

1 floating PDT
1500 VA (6 A / 250 V AC)
Approx. 2 x 10^7 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
Polyamide PA, self-extinguishing
6.2 / 80 / 86 mm
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14

CE-compliant
II 3 G Ex nA nC IIC T4 Gc X

Ordering data

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

Multifunctional timer relays

The full range of conventional applications can be accommodated by the three versions of the **ETD** multifunctional timer relay.

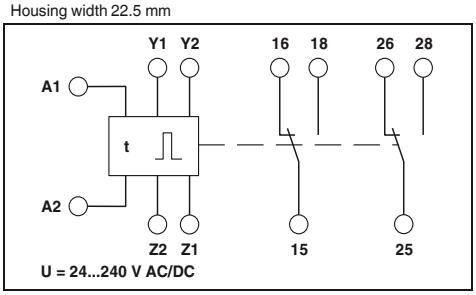
– Suitable for universal use thanks to varied functions and selectable time ranges
– Time ranges from a few milliseconds to several days
– Variable supply voltage range
– 2 floating PDT outputs

Notes:

1) EMC: Class A product, see page 571

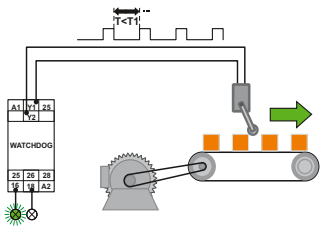
Multifunctional timer relay, two adjustable times

Housing width 22.5 mm

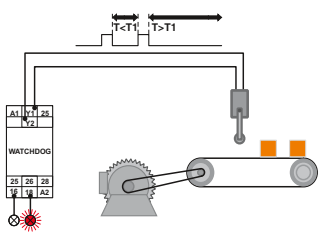


Technical data

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	50 ms ... 10 h (10 time end ranges)
Control contact	
Connection	Floating, basic isolation between connection and input/output/bridge Y1-Y2
Load capacity	Cannot carry load
Cable length	max. 10 m
Control pulse length	min. 50 ms (Only with Wt function: > 7 ms)
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)
Mechanical service life	Approx. 2 x 10^7 cycles
General data	
Supply voltage	24 V DC ... 240 V DC -20 % ... +25 % 24 V AC ... 240 V AC -15 % ... +10 %
Nominal power consumption	2.5 VA (1 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature range	-25°C ... 55°C
Housing material	Polyamide PA, self-extinguishing
Dimensions W / H / D	22.5 / 90 / 113 mm
Screw connection solid / stranded / AWG	0.5 ... 2.5 mm² / 0.5 ... 2.5 mm² / 20 - 14
Conformance / approvals	
Conformance	CE-compliant
UL, USA / Canada	UL/C-UL listed UL 508



Function: Pulse sequence evaluation



Message for incorrect pulse

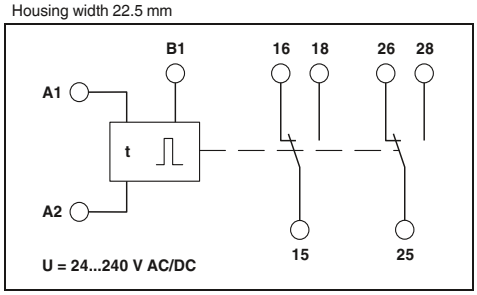
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Electronic timer relay with adjustable functions and times	**ETD-FL-2T-DTI**[1])	**2866187**	1

Multifunctional timer 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

max. 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. 2 x 10^7 cycles

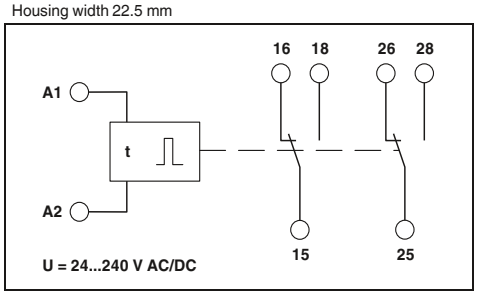
24 V DC ... 240 V DC -20 % ... +25 %
24 V AC ... 240 V AC -15 % ... +10 %
2.5 VA (1 W)
IP40 (housing) / IP20 (connection terminal blocks)
-25°C ... 55°C
Polyamide PA, self-extinguishing
22.5 / 90 / 113 mm
0.5 ... 2.5 mm^2 / 0.5 ... 2.5 mm^2 / 20 - 14

CE-compliant
UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs. / Pkt.
ETD-SL-1T-DTF[1])	**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. 2 x 10^7 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^2 / 0.5 ... 2.5 mm^2 / 20 - 14

CE-compliant
UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs. / Pkt.
ETD-SL-2T-I[1])	**2866174**	1

Diode modules

Diode circuits perform various tasks in electrical control systems, particularly in electronic ones:

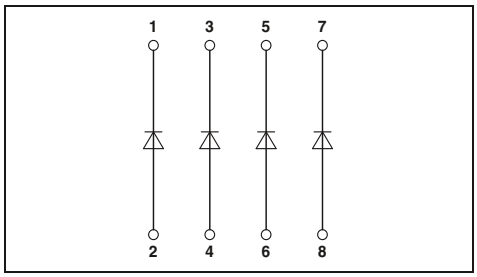
- Electrical decoupling of messages in fault signaling systems
- Spark-suppression diodes for limiting surge voltages of inductive loads, (solenoid valves, DC relays or similar)
- Can be supplied as “diode gates” combined with anode or cathode or as freely assignable diodes

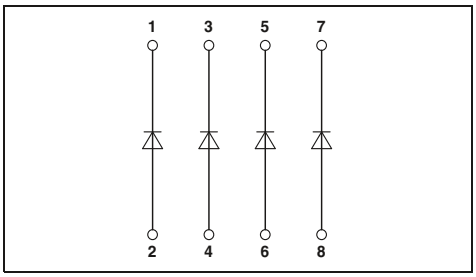
Notes:

Further circuit diagrams can be found in the data sheet at www.phoenixcontact.net/products

with diode type 1 N 4007

with diode type 1 N 5408





Technical data

Diodes	4E / 8E / 17E / 7P / 7M	14P / 14M / 32P / 32M	4E-... / 4P-... / 4M-... / 8E-...	8P-... / 8M-...
Max. operating voltage U_{max}	250 V AC	250 V AC	250 V AC	250 V AC
Peak reverse voltage per diode	1300 V	1300 V	1000 V	1000 V
Reverse current per diode	5 µA	5 µA	10 µA	10 µA
Conducting state voltage per diode	Approx. 0.8 V	Approx. 0.8 V	Approx. 0.8 V	Approx. 0.8 V
Conducting state current per diode				
with single load	0.7 A	0.7 A	1.5 A	1.5 A
with simultaneous loads	0.5 A	0.2 A	1 A	0.3 A
General data				
Ambient temperature range	-20°C ... 50°C		-20°C ... 50°C	
Rated insulation voltage	300 V (According to EN 50178)			
Pollution degree / Surge voltage category	III, basic insulation (as per EN 50178)		III, basic insulation (as per EN 50178)	
Pollution degree / Surge voltage category	2 (according to EN 50178)		2 (according to EN 50178)	
Mounting position	Any		Any	
Mounting	In rows with zero spacing		In rows with zero spacing	
Dimensions H / D	75 / 55 mm		75 / 55 mm	
Screw connection solid / stranded / AWG	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Conformance / approvals				
Conformance	CE-compliant		CE-compliant	

Ordering data

Description	Housing width	Type	Order No.	Pcs. / Pkt.
Diode module, can be individually wired				
4 diodes	22.5 mm	**EMG 22-DIO 4E**	**2950048**	10
8 diodes	45 mm	**EMG 45-DIO 8E**	**2950103**	5
17 diodes	90 mm	**EMG 90-DIO 17E**	**2954895**	5
Diode module, with P-polarity (common cathode)				
4 diodes	22.5 mm			
7 diodes	22.5 mm	**EMG 22-DIO 7P**	**2950064**	10
8 diodes	45 mm			
14 diodes	45 mm	**EMG 45-DIO14P**	**2950116**	5
32 diodes	90 mm	**EMG 90-DIO 32P**	**2954918**	5
Diode module, with M polarity (common anode)				
4 diodes	22.5 mm			
7 diodes	22.5 mm	**EMG 22-DIO 7M**	**2950077**	10
8 diodes	45 mm			
14 diodes	45 mm	**EMG 45-DIO14M**	**2950129**	5
32 diodes	90 mm	**EMG 90-DIO 32M**	**2954934**	5

Accessories

Equipment marker	**EMG-GKS 12**	**2947035**	50

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

EMG-GKS 12	**2947035**	50

Lamp testing modules, display modules

Lamp testing modules

Lamp testing modules for checking lamps that are installed and ready for operation:

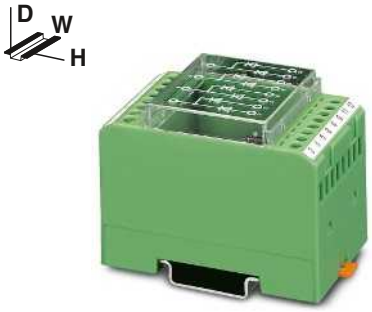
– Individual checking of separate lamps (EMG...-E/LP)
– Centrally controlled checking of lamps (EMG...-M/LP)

Display modules

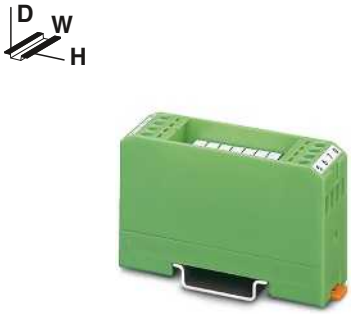
– Light indicator modules facilitate the monitoring of processes on electronic control systems during troubleshooting

Notes:

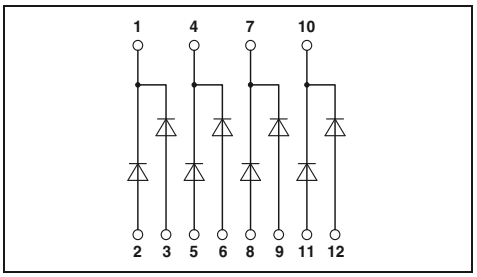
Further circuit diagrams can be found in the data sheet at www.phoenixcontact.net/products

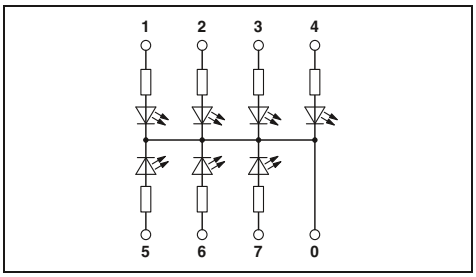


Lamp testing module, groups of 2 diodes with common cathode



Light indicator module, with common return line





Technical data

Diodes	8E/16E	14M/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 µA	≤ 5 µA
Conducting state voltage per diode	Approx. 0.8 V	Approx. 0.8 V
Conducting state current per diode		
with single load	0.7 A	0.7 A
with simultaneous loads	0.4 A	0.2 A
Input		
Current required per light indicator		
General data		
Ambient temperature range	-20°C ... 50°C	
Rated insulation voltage	300 V (According to EN 50178)	
Pollution degree / Surge voltage category	III, basic insulation (as per EN 50178)	
Pollution degree / Surge voltage 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 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Conformance / approvals		
Conformance	CE-compliant	

Technical data

LA 7S	LED 7S/LED 14S	
Approx. 1 mA	Approx. 3 mA	
-20°C ... 45°C		
III, basic insulation (as per EN 50178)		
2 (according to EN 50178)		
Any		
In rows with zero spacing		
75 / 47.5 mm		
0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12		
CE-compliant		

Ordering data

Description	Housing width	Type	Order No.	Pcs. / Pkt.
Lamp testing module, for individual wiring				
4-pair	45 mm	**EMG 45-DIO 8E/LP**	**2954798**	5
8-pair	90 mm	**EMG 90-DIO 16E/LP**	**2954808**	5
Lamp testing module, with common control				
7-pair	45 mm	**EMG 45-DIO14M/LP**	**2950132**	5
16-pair	90 mm	**EMG 90-DIO 32M/LP**	**2954785**	5
Light indicator module, 110 ... 230 V AC input voltage				
7 glow lamps	22.5 mm			
Light indicator module, 24 V DC input voltage				
7 LEDs	22.5 mm			
14 LEDs	45 mm			

Ordering data

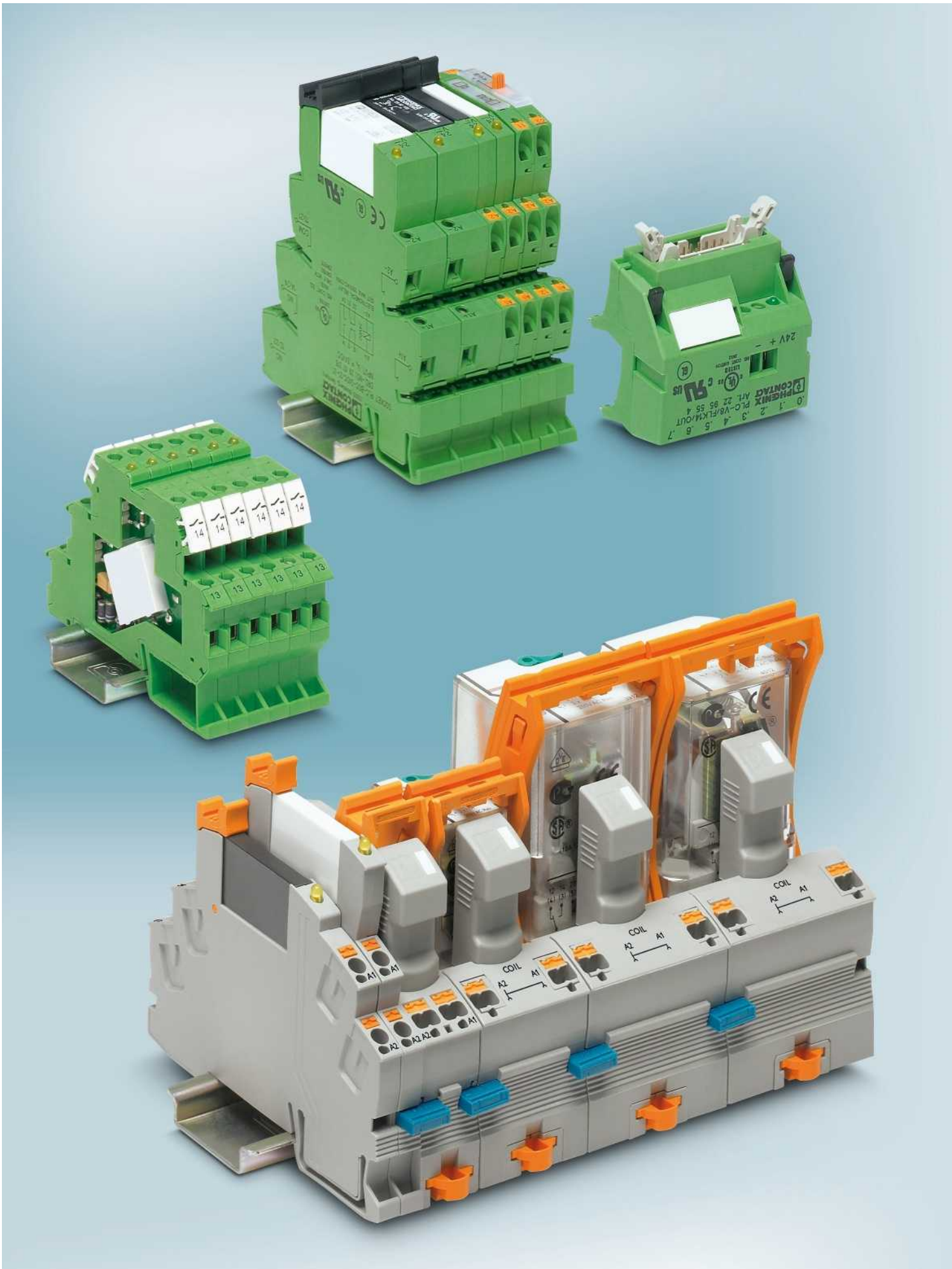
Type	Order No.	Pcs. / Pkt.
EMG 22-LA 7S/230	**2949677**	10
EMG 22-LED 7S/24	**2952305**	10
EMG 45-LED 14S/24	**2952334**	5

Accessories

Equipment marker	**EMG-GKS 12**	**2947035**	50

Accessories

EMG-GKS 12	**2947035**	50


24V + –
COIL
A2
A1

Relay modules

The importance of the reliability of industrial automation equipment is growing with the increase in use of electronic modules.

Modern relay or solid-state relay interfaces perform a wide range of tasks. Whether in production engineering, for the electrical equipment of machines or in control engineering for energy distribution, building automation and materials processing – the main aim is to guarantee the exchange of signals between the process peripherals and the superior, central control systems. This exchange must provide reliable operation, be 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 interference insensitivity.

In practice, a relay interface comes into use with 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-free switching with no contact bounce
– Resistance to vibration and impacts
– Long service life.

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RIFLINE complete

RIF-0 for miniature and solid-state relays
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RIF-1 for miniature and solid-state relays
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RIF-2 for industrial relays
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RIF-3 for octal relays
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PLC series

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Safety devices
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Monitoring relays

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PR series

PR1 for miniature or solid-state relays
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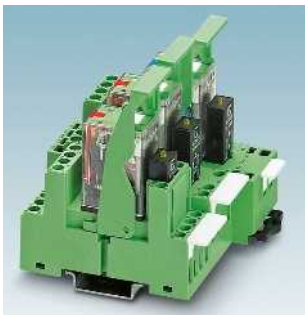

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Special relay and solid-state relay modules

Relay terminal blocks with switch
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Interference-free relays and solid-state relays
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Solid-state power relays with 400 V AC/400 V AC/3 A output
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General

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.

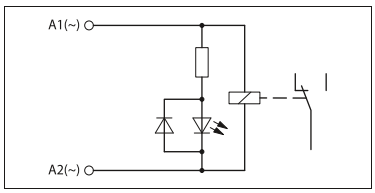
Coil side

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.

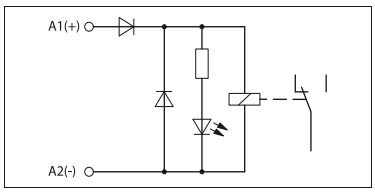
Unless otherwise specified, the frequency of the control voltage is 50/60 Hz.



Basic construction 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.

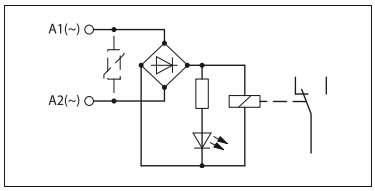
As the freewheeling diode can only perform its required function if the polarity of the voltage connection is correct, a reverse polarity protection diode is also integrated into the input circuit.



Basic construction 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.

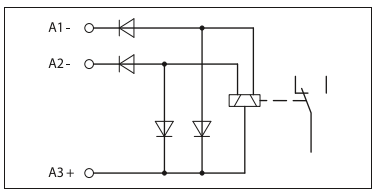


Basic construction of a relay with AC/DC input

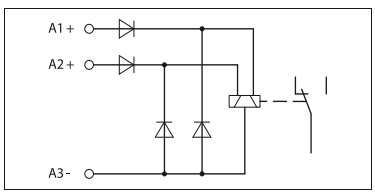
Bistable remanence relays with a double winding are only ever operated with DC voltage.

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 reverse polarity protection diodes.



Block diagram of a bistable relay, negative switching type



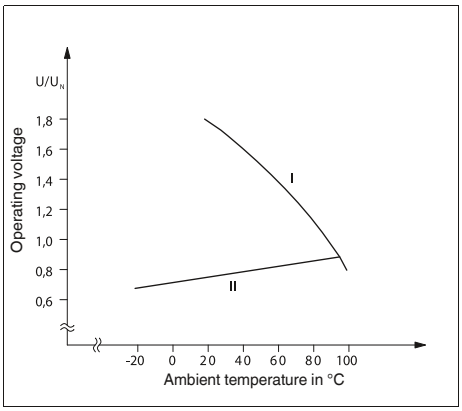
Block diagram of bistable relay, positive switching type

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 assuming compliance with the coil temperature limit
II: Minimum operate voltage

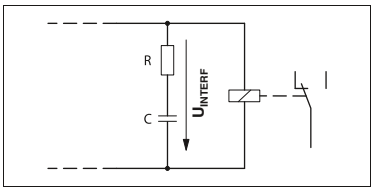
Interference voltages and interference currents on the coil side

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 parallel to the relay coil. This measure also subjects the interference voltage to a capacitive load, causing it to collapse.



External RC interference suppression filter to prevent interference voltage coupling

The following values are recommended for the purpose of dimensioning the RC element:

– R = 100 ... 220 Ω
– C = 220 ... 470 nF

The SO46 series have 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	Typ. properties	Typ. 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	µA ... 0.2 A µV ... 30 V
Silver Ag	High electrical conductivity; sensitive to sulfur, therefore often gold-flashed (approximately 0.2 µm) 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.	≥ 12 V ≥ 10 mA
Silver, hard gold-plated Ag+Au	Properties similar to gold Au. When switching loads > 30 V/0.2 A, the hard gold plating (5 - 10 µm) 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.	≥ 100 mV ≥ 1 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.	≥ 60 V ≥ 1 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.	≥ 12 V ≥ 10 mA
Silver nickel AgNi+Au	Properties similar to gold Au. When switching loads > 30 V/0.2 A, the hard gold plating (5 - 10 µm) 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.	≥ 100 mV ≥ 1 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.	≥ 12 V ≥ 100 mA (≥ 10 mA)
Silver tin oxide, hard gold-plated AgSnO+Au	Properties similar to gold Au. When switching loads > 30 V/0.2 A, the hard gold plating (5 - 10 µm) 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.	≥ 100 mV ≥ 1 mA

*** Values depend on the relay used and on further operating conditions.**

Contact protection circuit

Every electrical load 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 loads 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.

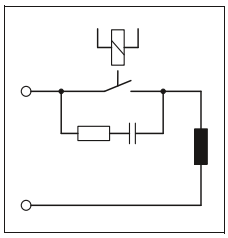
On interruption, voltage peaks with values of up to several thousand volts occur due to the energy stored in the coil.

These high voltages cause an 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 cycle with DC voltage and a static arc.

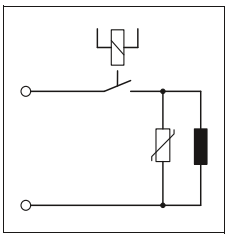
A protective circuit must be used to suppress the formation of an arc. With optimum dimensioning, almost the same number of cycles can be achieved as with an ohmic load.

In principle, there are a number of possible ways of achieving an effective circuit:

1. Contact wiring
2. Load wiring
3. Combination of both wiring methods



Contact wiring



Inductive load wiring

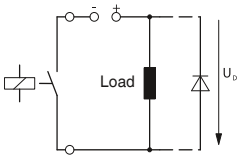
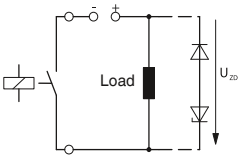
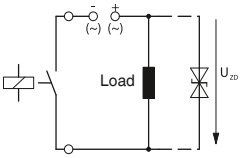
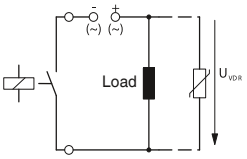
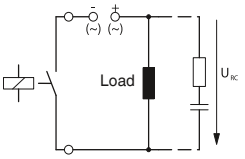
In principle, protective measures should intervene directly at the source of the interference.

Wiring a load should therefore be given priority over wiring the contact.

The following points are advantageous for the load 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 plugs that are also supplied with LEDs and components that limit the induction voltage. Valve plugs 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 plugs 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 plugs with LED, integrated 1N4007, and free cable end can be supplied on request as part of the SAC range.

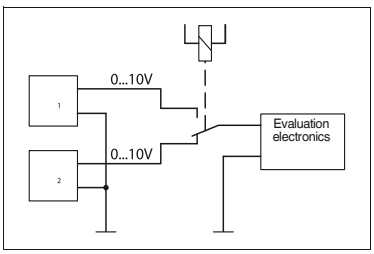
Load wiring	Additional dropout delay	Defined induction voltage limitation	Effective bipolar attenuation	Advantages/disadvantages
Diode 	Large	Yes (U_D)	No	**Advantages:** • Good effect in terms of extending the service life of the contacts • Easy implementation • Inexpensive • Reliable • Dimensioning not critical • Low induction voltage **Disadvantages:** • Attenuation only via load resistor • Long dropout delay
Diode/Zener diode series connection 	Medium to small	Yes (U_{ZD})	No	**Advantages:** • Dimensioning not critical **Disadvantages:** • Attenuation only above U_{ZD} • Minimal effect in terms of extending the service life of the contacts
Suppressor diode 	Medium to small	Yes (U_{ZD})	Yes	**Advantages:** • Inexpensive • Dimensioning not critical • Limitation of positive peaks • Suitable for AC voltages **Disadvantages:** • Attenuation only above U_{ZD} • Minimal effect in terms of extending the service life of the contacts
Varistor 	Medium to small	Yes (U_{VDR})	Yes	**Advantages:** • High energy absorption • Dimensioning not critical • Suitable for AC voltages **Disadvantages:** • Attenuation only above U_{VDR} • Minimal effect in terms of extending the service life of the contacts
R/C combination 	Medium to small	No	Yes	**Advantages:** • HF attenuation due to energy storage • Suitable for AC voltages • Level-independent damping **Disadvantages:** • Precise dimensioning required • High inrush current surge • Minimal effect in terms of extending the service life of the contacts

Switching small loads

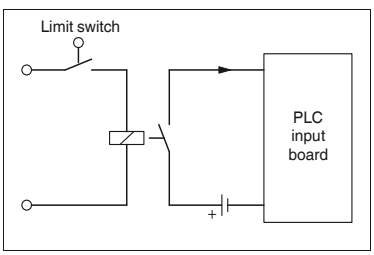
Small loads must be processed mainly in applications where signals must be forwarded to control inputs (e.g., of a PLC).

With these loads, no switching sparks (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 high-performance 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 arc that occurs during interruption depends on the current, voltage, and phase angle. This cut-off arc usually disappears automatically the next time the load current passes through zero.

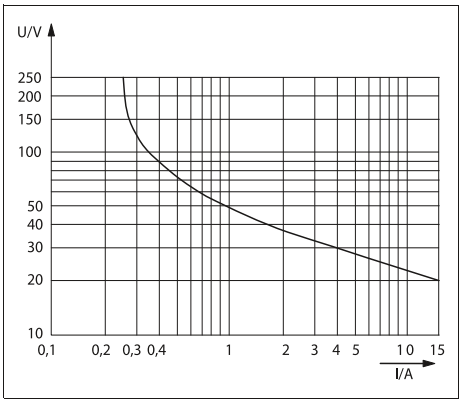
In applications with an inductive load, an effective protective circuit must be provided, otherwise the service life of the system will be reduced considerably.

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 arc or load limit curves.

A non-attenuated inductive DC load further reduces the values given for switchable currents. The energy stored in the inductance can cause an arc to occur, which forwards the current through the open contacts.



Example of a load limit curve (dependent on the type)

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 circuits" 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 in accordance with 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 in accordance with IEC 60947 only requires 6060 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.

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 industrial voltages 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.

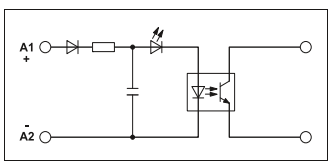


Figure 1: block diagram for DC input

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. Rectifying 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 would result in continuous through-switching.

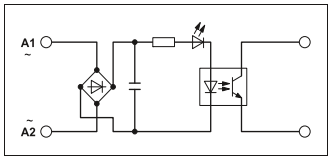


Figure 2: block diagram for AC input

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.

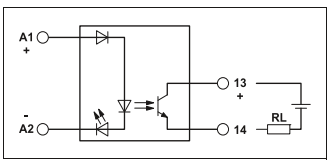


Figure 3: 2-conductor output

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.

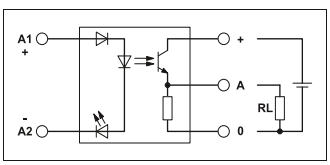


Figure 4: 3-conductor output

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.

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.

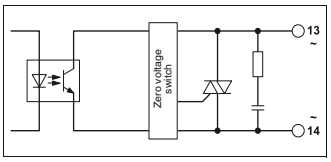


Figure 5: basic circuit diagram of AC output

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 type of load:

– A freewheeling diode/suppressor diode (DC only)
– A varistor (AC and DC)
– Or an RC element (AC only)

can provide the necessary protection.

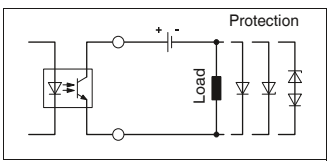


Figure 6: protective circuit with DC voltage output

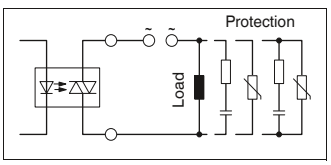


Figure 7: protective circuit with AC voltage output

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...

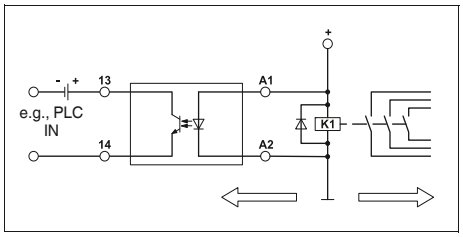
Modular version:
– DEK-OE...
– EMG 10-OE...
– SIM-EI...
– OPT...

Output (power) solid-state relays acting in the direction from the controller to the I/O devices (switching, amplifying, controlling)

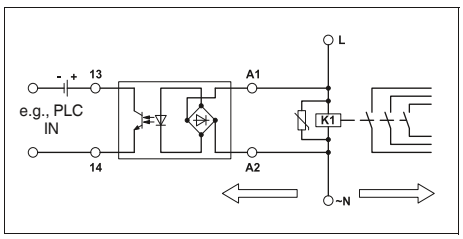
Plug-in version:
– PLC-O...

Modular version:
– DEK-OV...
– EMG 10-OV
– EMG 12-OV
– EMG 17-OV
– OV...
– OPT...

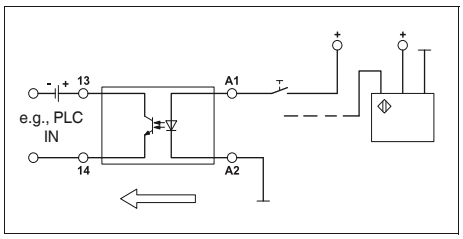
Example: load contactor monitoring (DC contactor)



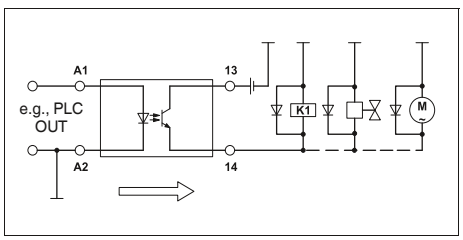
Example: load contactor monitoring (AC contactor)



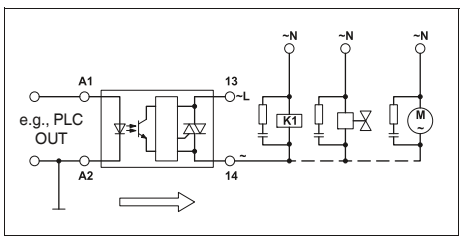
Example: position indication with limit stop contact or initiator



Example: switching the contactor, solenoid valve or motor (DC load)

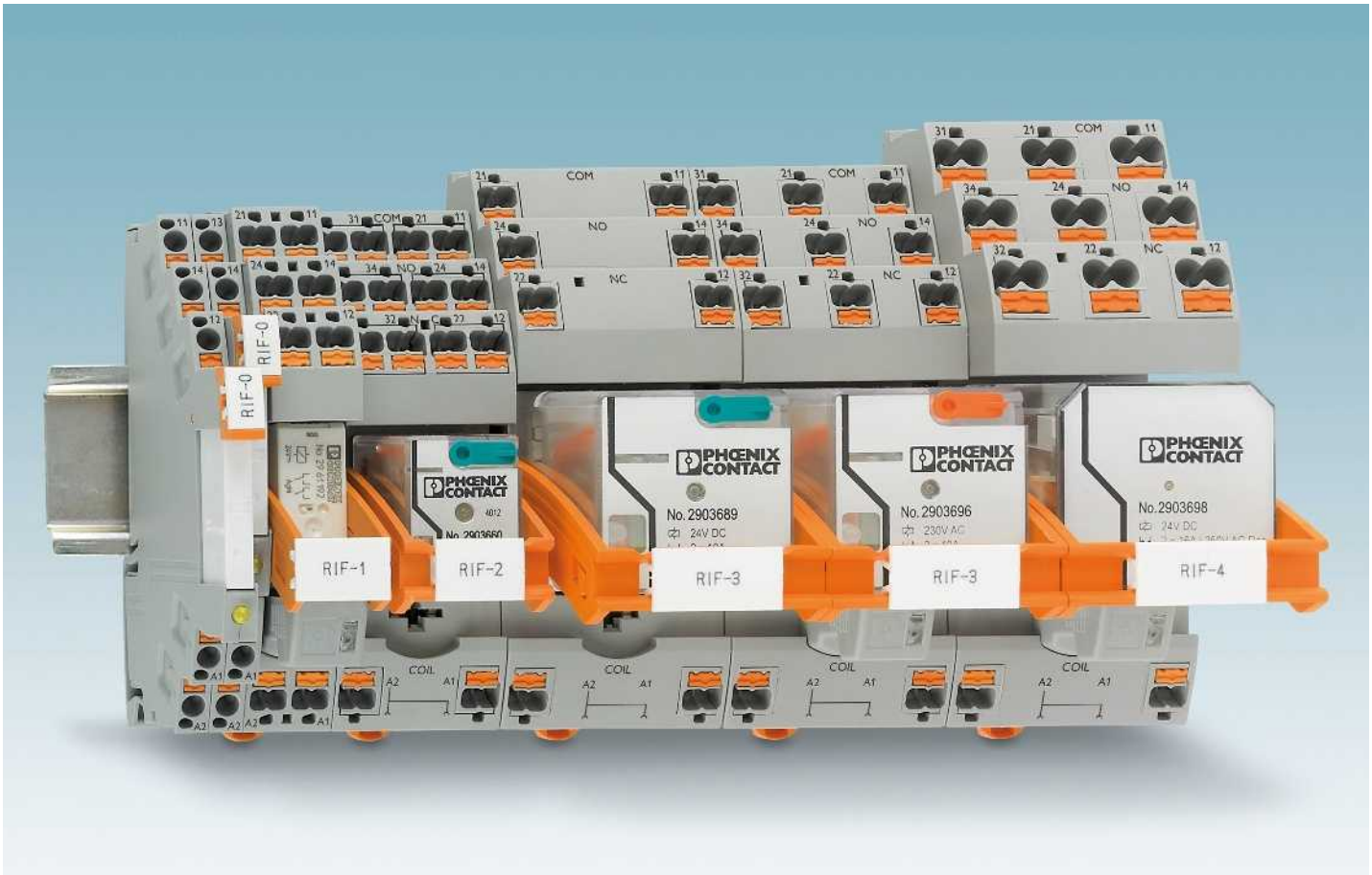


Example: switching the contactor, solenoid valve or motor (AC load)



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.



RIFLINE complete is an inexpensive relay system with various accessories. It consists of DIN rail bases, electromechanical or solid-state relays, plug-in input/interference suppression modules, marking material, and bridging material. The range of accessories is rounded off with a timer module. This can be used to transform a basic relay into a timer 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 connection technology, which 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 easy, RIFLINE complete modules are provided in the most popular voltages as complete modules with relay and input/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 narrow 6.2 mm RIF-0 base series is designed for miniature relays with one contact. Switching currents up to 6 A are implemented here. Two base versions are available: 1 N/O contact and 1 PDT contact. RIF-0 is therefore a good choice for all coupling applications.

RIF-1

The narrow 16 mm RIF-1 base series is designed for miniature relays with 2 contacts. Currents up to 13 A can be switched when using the FBS 2-8 plug-in bridge. This is the ideal relay for applications that require coupling, power switching, and signal duplication.

RIF-2

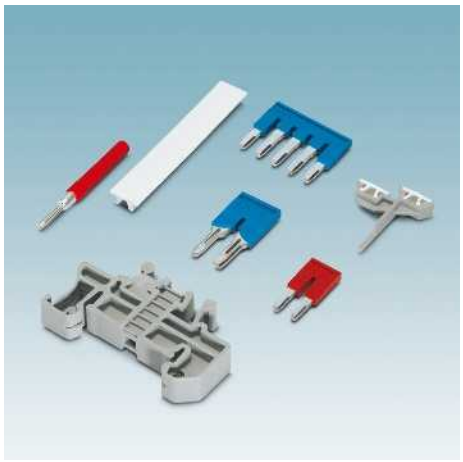
The 31 mm wide RIF-2 base series is designed for industrial relays with up to 4 contacts. Currents up to 12 A are no problem for these bases. This relay is ideal for applications that require power and signal multiplication.

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 can be implemented here. Two base versions are available: 2 PDT contacts and 3 PDT 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, special function modules, test plugs, and end brackets.

Modular RIF-0 relay base

Relay base that can be fitted 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 5.

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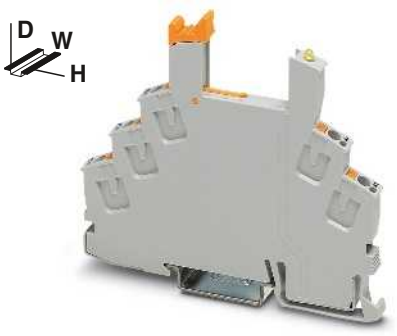


1 PDT relay base for miniature power relay

Technical data

Nominal voltage U_N	230 V AC (Contact side)
Nominal current at U_N	max. 8 A (Depends on application/assembly)
General data	
Ambient temperature (operation)	-40°C ... 85°C (Depends on application/assembly)
Connection data solid / stranded / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16
Dimensions	
Width	6.2 mm
Depth	78 mm
Height	93 mm

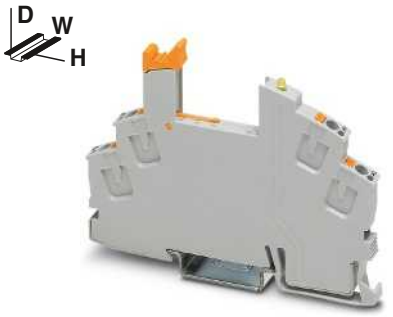
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
RIF-0 relay base, PDT version, safe isolation I/O With push-in connection	**RIF-0-BPT/21**	**2900958**	10
RIF-0 relay base, N/O contact version, safe isolation I/O With push-in connection			

Accessories

Plug-in bridge			
2-pos. red	**FBS 2-6**	**3030336**	50
2-pos. blue	**FBS 2-6 BU**	**3036932**	50
2-pos. gray	**FBS 2-6 GY**	**3032237**	50
5-pos. red	**FBS 5-6**	**3030349**	50
10-pos. red	**FBS 10-6**	**3030271**	10
20-pos. red	**FBS 20-6**	**3030365**	10
50-pos. red	**FBS 50-6**	**3032224**	10
End clamp, to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...	**CLIPFIX 35**	**3022218**	50
Test plug, consisting of: **Metal part** for 2.3 mm Ø socket hole and	**MPS-MT**	**0201744**	10
Insulating sleeve, 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
Zack marker strip, 10-section, unprinted: pack contains enough to label 100 terminal blocks 10-section	**ZB 6:UNBEDRUCKT**	**1051003**	10

N



1 N/O contact relay base for miniature power relay

Technical data

230 V AC max. 8 A (Depends on application/assembly)	
-40°C ... 85°C (Depends on application/assembly)	
0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16	
6.2 mm 66 mm 93 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
RIF-0-BPT/1	**2901873**	10

Accessories

FBS 2-6	**3030336**	50
FBS 2-6 BU	**3036932**	50
FBS 2-6 GY	**3032237**	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

Plug-in miniature power relays suitable for RIF-0 and PLC-INTERFACE relay bases.

The advantages:

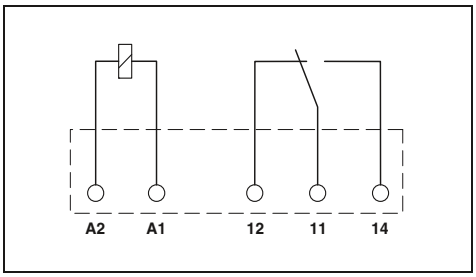
– Power contacts up to 6 A
– Multi-layer gold contact or power contact
– High degree of protection RT III (comparable with IP67)
– Safe isolation according to DIN EN 50178 between coil and contact
– Can be soldered in on PCB

1 PDT

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 344



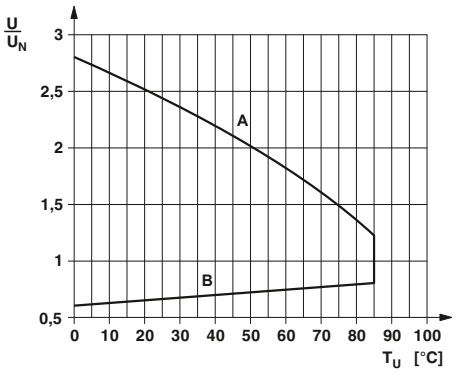
Technical data

		①	②
Input data			
Permissible range (with reference to U_N)		refer to the diagram	
Typ. input current at U_N	[mA]	14	7
Typ. response time at U_N	[ms]	5	5
Typ. release time at U_N	[ms]	2.5	2.5
Output data			
Contact type		Single contact, 1-PDT	Single contact, 1-PDT
Contact material		AgSnO	AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Min. switching voltage		5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current		6 A	50 mA
Max. inrush current		(on request)	50 mA
Min. 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 10^7 cycles	
Standards/regulations		IEC 60664, EN 50178, IEC 62103	
Mounting position/mounting		Any / In rows with zero spacing	
Dimensions	W / H / D	5 mm / 28 mm / 15 mm	

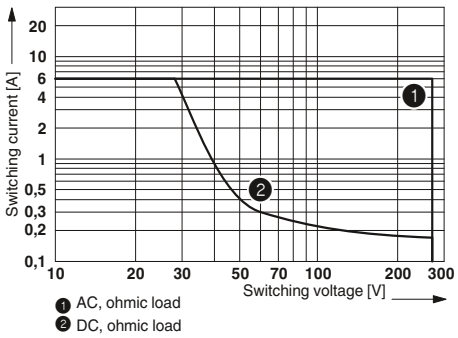
Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in miniature power relays					
with power contact	①	12 V DC	**REL-MR- 12DC/21**	**2961150**	10
with power contact	②	24 V DC	**REL-MR- 24DC/21**	**2961105**	10
Plug-in miniature power relays					
with gold contact	①	12 V DC	**REL-MR- 12DC/21AU**	**2961163**	10
with gold contact	②	24 V DC	**REL-MR- 24DC/21AU**	**2961121**	10

REL-MR-.../21... (1 PDT)



Interrupting rating



1 AC, ohmic load
2 DC, ohmic load

Plug-in solid-state relays

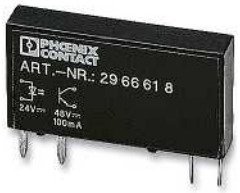
Plug-in solid-state relays suitable for RIF-0 and PLC-INTERFACE relay bases.

The advantages:

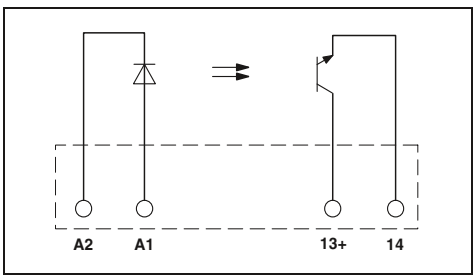
– Switching capacity of up to 24 V DC/3 A
– RT III wash tight (comparable to IP67)
– Vibration- and shock-resistant
– Wear-free and long-lasting
– Zero voltage switch at AC output
– Can be soldered in on PCB

Notes:

For dimensional drawings and perforations for assembly, see page 345



Max. DC voltage output of 3 A

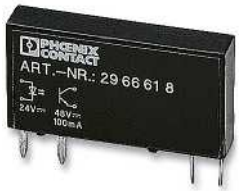


Technical data

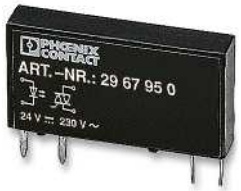
Input data		①
Permissible range (with reference to U_N)		0.8 - 1.2
Switching level	1 signal (“H”) [V DC] ≥	16
	0 signal (“L”) [V DC] ≤	10
Typ. input current at U_N	[mA]	7
Typ. switch-on time at U_N	[µs]	20
Typ. switch-off time at U_N	[µs]	300
Transmission frequency f_{limit}	[Hz]	300
Output data		
Max. switching voltage		33 V DC
Min. switching voltage		3 V DC
Limiting continuous current		3 A (see derating curve)
Min. load current		-
Max. inrush current		15 A (10 ms)
Leakage current in off state		-
Phase angle (cos ϕ)		-
Output circuit		2-conductor, floating
Max. load value		-
Output protection		Protection against polarity reversal, surge protection
Voltage drop at max. limiting continuous current		≤ 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, IEC 62103
Pollution degree/surge voltage category		2 / III
Mounting position/mounting		Any / In rows with zero spacing
Dimensions	W / H / D	5 mm / 28 mm / 15 mm

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in solid-state relays					
Solid-state power relays	①	24 V DC	**OPT-24DC/ 24DC/ 2**	**2966595**	10
Plug-in solid-state relays					
Solid-state input relays	①	24 V DC			

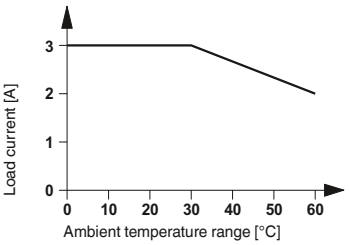


Max. DC voltage output of 100 mA

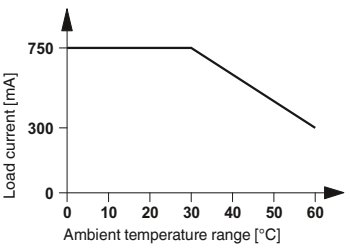


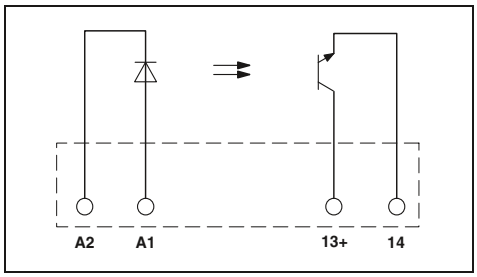
Max. AC voltage output of 750 mA

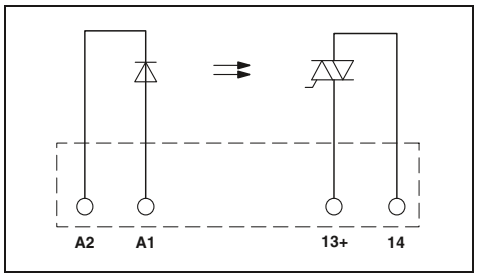
Derating curve for OPT...DC/24DC/2 and PLC-OS.../24DC/2 solid-state relays



Derating curve for OPT...DC/230AC/1 and PLC-OS.../230AC/1 solid-state relays







Technical data

①	
0.8 -	0.8 -
1.2	1.2
16	10
10	5
7	3
20	6000
300	500
300	10
48 V DC	253 V AC
3 V DC	24 V AC
100 mA	0.75 A (see derating curve)
-	10 mA
-	30 A (10 ms)
-	< 1 mA
-	0.5
2-conductor, floating	2-conductor floating, zero voltage switch
-	4.5 A^2s
Protection against polarity reversal, surge protection	RCV circuit
≤ 1 V	< 1 V
Basic insulation	Basic insulation
2.5 kV (50 Hz, 1 min.)	2.5 kV (50 Hz, 1 min.)
-25°C ... 60°C	-25°C ... 60°C
100% operating factor	100% operating factor
IEC 60664, EN 50178, IEC 62103	IEC 60664, EN 50178, IEC 62103
2 / III	2 / III
Any / In rows with zero spacing	Any / In rows with zero spacing
5 mm / 28 mm / 15 mm	5 mm / 28 mm / 15 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
OPT-24DC/ 48DC/100	**2966618**	10

Ordering data

Type	Order No.	Pcs. / Pkt.
OPT-24DC/230AC/ 1	**2967950**	10

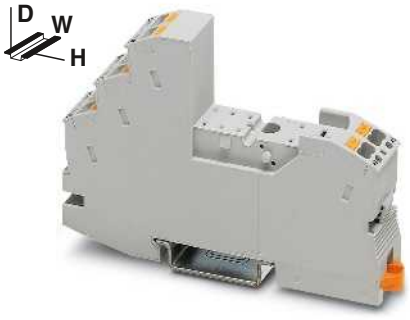
Modular RIF-1 relay base

Relay base that can be fitted with 1 or 2 PDT relays or solid-state relays.
Range of accessories includes:

- Plug-in input and 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)

N

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 5.



2 PDT relay base for miniature power relay

Technical data

Nominal voltage U_N	230 V AC
Nominal current at U_N	max. 13 A (Depends on application/assembly)
General data	
Ambient temperature (operation)	-40°C ... 85°C (Depends on application/assembly)
Connection data solid / stranded / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16
Dimensions	
Width	16 mm
Depth with retaining bracket	75 mm
Height	93 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
RIF-1 relay base, plug-in option for input/interference suppression module, safe isolation I/O with push-in connection	**RIF-1-BPT/2X21**	**2900931**	10
Relay retaining bracket, with ejector function and holder for marking material, suitable for RIF-1 relay base			

Accessories

Plug-in bridge				
2-pos. red		**FBS 2-6**	**3030336**	50
2-pos. blue		**FBS 2-6 BU**	**3036932**	50
2-pos. gray		**FBS 2-6 GY**	**3032237**	50
2-pos. red		**FBS 2-8**	**3030284**	10
2-pos. blue		**FBS 2-8 BU**	**3032567**	10
2-pos. gray		**FBS 2-8 GY**	**3032541**	10
End clamp, to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...		**CLIPFIX 35**	**3022218**	50
Test plug, consisting of:				
Metal part for 2.3 mm Ø socket hole and		**MPS-MT**	**0201744**	10
Insulating sleeve, 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
Zack marker strip, unprinted				
10-section		**ZB 5 :UNBEDRUCKT**	**1050004**	10
5-section		**ZB 15:UNBEDRUCKT**	**0811972**	10
Double marker carrier for ZB 5		**STP 5-2**	**0800967**	100

N

Relay retaining bracket

Technical data

-
-

-

-

-
-
-

Ordering data

Type	Order No.	Pcs. / Pkt.
RIF-RH-1	2900953	10

Accessories

Plug-in miniature power relays

Plug-in miniature power relays with 1 or 2 PDT contacts, suitable for RIF-1, PR1, and PLC-INTERFACE relay bases.

The advantages:

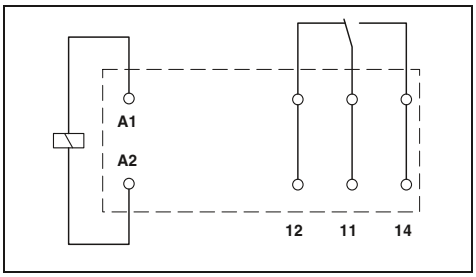
– Power contacts up to 16 A
– Multi-layer gold contact or power contact
– High degree of protection up to RT III (comparable with IP67) depending on type

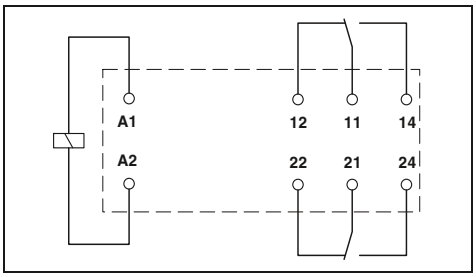
Notes:

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.

1 PDT relay

2 PDT relay





Technical data

Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		refer to the diagram							
Typ. input current at U_N	[mA]	33	17	8.7	8.2	4.1	32	7	3
Typ. response time at U_N	[ms]	7	7	7	7	7			
Typ. response time at U_N (depending on phase relation)	[ms]						3 - 12	3 - 12	3 - 12
Typ. release time at U_N	[ms]	3	3	3	3	3			
Typ. release time at U_N (depending on phase relation)	[ms]						2 - 9	2 - 9	2 - 9
Output data									
Contact type		Single contact, 1-PDT		Single contact, 1-PDT					
Contact material		AgNi		AgNi, hard gold-plated					
Max. switching voltage		250 V AC/DC		30 V AC / 36 V DC					
Min. switching voltage		12 V (at 10 mA)		100 mV (at 10 mA)					
Limiting continuous current		16 A		50 mA					
Max. inrush current, AC		25 A (20 ms)		50 mA					
Max. inrush current, DC		50 A (20 ms)		50 mA					
Min. switching current		10 mA (at 12 V)		1 mA (at 24 V)					
General data									
Test voltage (winding / contact)		5 kV AC (50 Hz, 1 min.)							
Test voltage (contact/contact)		-							
Ambient temperature (operation), AC		-40°C ... 85°C							
Ambient temperature (operation), DC		-40°C ... 85°C							
Mechanical service life, AC		1 x 10^7 cycles							
Mechanical service life, DC		3 x 10^7 cycles							
Standards/regulations		IEC 60664, EN 50178, IEC 62103							

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in miniature power relays					
with power contact	①	12 V DC	**REL-MR- 12DC/21HC**	**2961309**	10
with power contact	②	24 V DC	**REL-MR- 24DC/21HC**	**2961312**	10
with power contact	③	48 V DC	**REL-MR- 48DC/21HC**	**2834821**	10
with power contact	④	60 V DC	**REL-MR- 60DC/21HC**	**2961325**	10
with power contact	⑤	110 V DC	**REL-MR-110DC/21HC**	**2961338**	10
with power contact	⑥	24 V AC	**REL-MR- 24AC/21HC**	**2961406**	10
with power contact	⑦	120 V AC	**REL-MR-120AC/21HC**	**2961419**	10
with power contact	⑧	230 V AC	**REL-MR-230AC/21HC**	**2961422**	10
Plug-in miniature power relays					
with gold contact	①	12 V DC	**REL-MR- 12DC/21HC AU**	**2961532**	10
with gold contact	②	24 V DC	**REL-MR- 24DC/21HC AU**	**2961545**	10
with gold contact	③	48 V DC			
with gold contact	④	60 V DC			
with gold contact	⑤	110 V DC	**REL-MR-110DC/21HC AU**	**2961561**	10
with gold contact	⑥	24 V AC	**REL-MR- 24AC/21HC AU**	**2961503**	10
with gold contact	⑦	120 V AC	**REL-MR-120AC/21HC AU**	**2961516**	10
with gold contact	⑧	230 V AC	**REL-MR-230AC/21HC AU**	**2961529**	10

Technical data

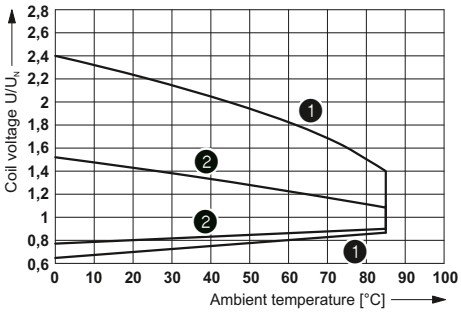
Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		refer to the diagram							
Typ. input current at U_N	[mA]	33	17	8.7	8.2	4.1	32	7	3
Typ. response time at U_N	[ms]	7	7	7	7	7			
Typ. response time at U_N (depending on phase relation)	[ms]						3 - 12	3 - 12	3 - 12
Typ. release time at U_N	[ms]	3	3	3	3	3			
Typ. release time at U_N (depending on phase relation)	[ms]						2 - 9	2 - 9	2 - 9
Output data									
Contact type		Single contact, 2-PDT		Single contact, 2-PDT					
Contact material		AgNi		AgNi, hard gold-plated					
Max. switching voltage		250 V AC/DC		30 V AC / 36 V DC					
Min. switching voltage		5 V (at 10 mA)		100 mV (at 10 mA)					
Limiting continuous current		8 A		50 mA					
Max. inrush current, AC		12 A (20 ms)		50 mA					
Max. inrush current, DC		25 A (20 ms)		50 mA					
Min. switching current		10 mA (At 5 V)		1 mA (at 24 V)					
General data									
Test voltage (winding / contact)		5 kV AC (50 Hz, 1 min.)							
Test voltage (contact/contact)		2.5 kV AC (50 Hz, 1 min.)							
Ambient temperature (operation), AC		-40°C ... 85°C							
Ambient temperature (operation), DC		-40°C ... 85°C							
Mechanical service life, AC		1 x 10^7 cycles							
Mechanical service life, DC		3 x 10^7 cycles							
Standards/regulations		IEC 60664, EN 50178, IEC 62103							

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

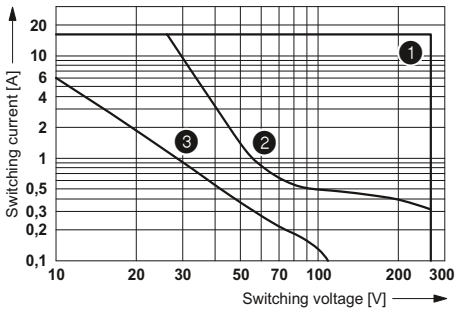
REL-MR...21HC... (1 PDT)

Operating voltage range



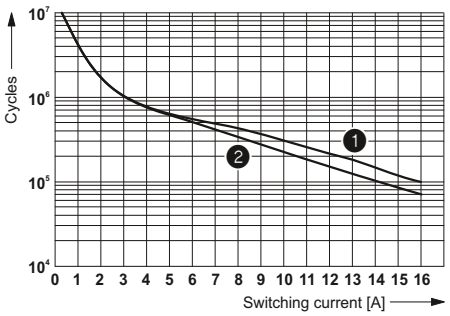
❶ DC coils
❷ AC coils

Interrupting rating



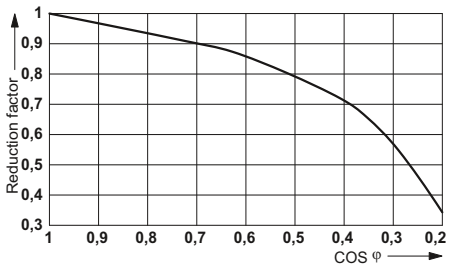
❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Electrical service life



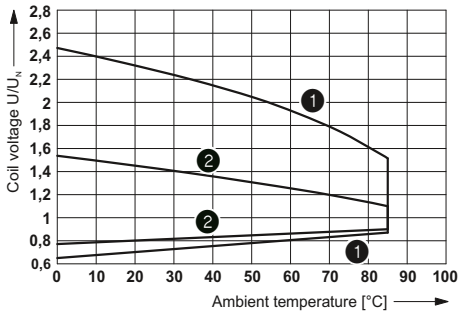
❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

Service life reduction factor with various cos phi



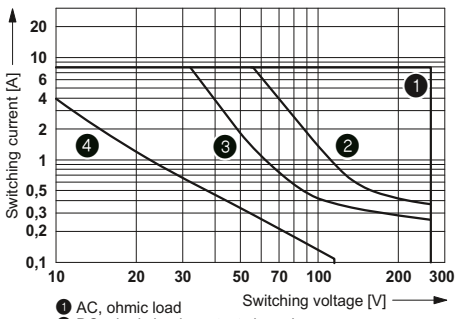
REL-MR...21-21... (2 PDTs)

Operating voltage range



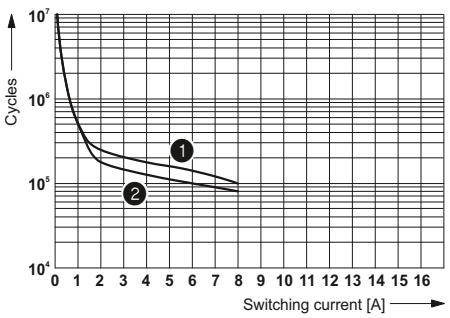
❶ DC coils
❷ AC coils

Interrupting rating



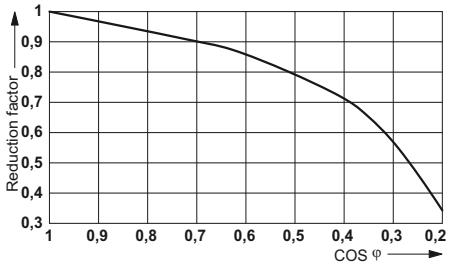
❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

Electrical service life



❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

Service life reduction factor with various cos phi



Plug-in miniature power relays

Plug-in miniature power relays with 1 or 2 PDT contacts, suitable for RIF-1 and PR1 relay bases.

The advantages:

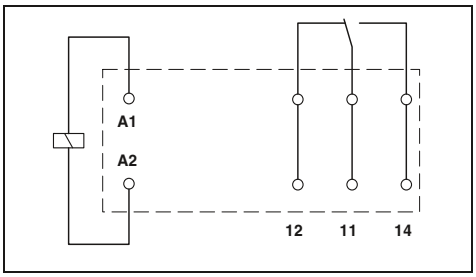
– Switching current of up to 16 A
– With lockable manual operation
– Mechanical switch position indicator
– Integrated status LED
– Multi-layer gold contact or power contact
– DC types with integrated freewheeling diode
– Can be soldered in on PCB

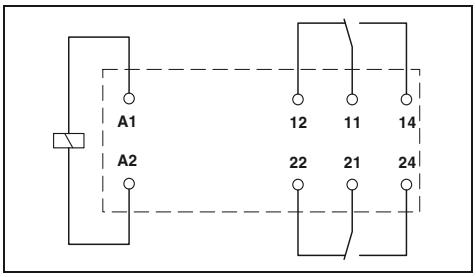
1 PDT relay

2 PDT relay

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.





Technical data

Input data		①	②	③	④
Permissible range (with reference to U_N)		refer to the diagram			
Typ. input current at U_N	[mA]	18	32	7	3.5
Typ. response time at U_N	[ms]	9			
Typ. response time at U_N (depending on phase relation)	[ms]		3 - 12	3 - 12	
Typ. release time at U_N	[ms]	6			
Typ. release time at U_N (depending on phase relation)	[ms]		2 - 8	2 - 8	2 - 8

Output data		
Contact type	Single contact, 1-PDT	Single contact, 1-PDT
Contact material	AgNi	AgNi, hard gold-plated
Max. switching voltage	250 V AC/DC	30 V AC / 36 V DC
Min. switching voltage	12 V (at 10 mA)	12 V (At 1 mA)
Limiting continuous current	16 A	50 mA
Max. inrush current, AC	32 A (20 ms)	50 mA
Max. inrush current, DC	32 A (20 ms)	50 mA
Min. 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°C
Mechanical service life, AC	5 x 10^6 cycles
Mechanical service life, DC	5 x 10^6 cycles
Standards/regulations	DIN EN 61810-1, VDE 0435-201, EN 50178, IEC 62103

Technical data

Input data	①	②	③	④
Permissible range (with reference to U_N)	refer to the diagram			
Typ. input current at U_N [mA]	18	32	7	3.5
Typ. response time at U_N [ms]	9			
Typ. response time at U_N (depending on phase relation) [ms]		3 - 12	3 - 12	3 - 12
Typ. release time at U_N [ms]	6			
Typ. release time at U_N (depending on phase relation) [ms]		2 - 8	2 - 8	2 - 8

Output data		
Contact type	Single contact, 2-PDT	Single contact, 2-PDT
Contact material	AgNi	AgNi, hard gold-plated
Max. switching voltage	250 V AC/DC	30 V AC / 36 V DC
Min. switching voltage	12 V (at 10 mA)	12 V (At 1 mA)
Limiting continuous current	8 A	50 mA
Max. inrush current, AC	16 A (20 ms)	50 mA
Max. inrush current, DC	16 A (20 ms)	50 mA
Min. 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)	2.5 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 10^6 cycles
Mechanical service life, DC	5 x 10^6 cycles
Standards/regulations	DIN EN 61810-1, VDE 0435-201, EN 50178, IEC 62103

Ordering data

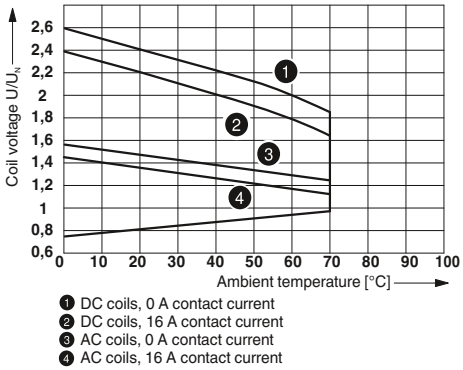
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in miniature power relays, with power contacts					
- Status LED, freewheeling diode A1+, A2-	①	24 V DC	**REL-MR- 24DC/21HC/MS**	**2987888**	10
- Status LED	②	24 V AC	**REL-MR- 24AC/21HC/MS**	**2987891**	10
- Status LED	③	120 V AC	**REL-MR-120AC/21HC/MS**	**2987901**	10
- Status LED	④	230 V AC	**REL-MR-230AC/21HC/MS**	**2987914**	10
Plug-in miniature power relays with manual test function, with hard gold-plated multi-layer contacts, mechanical switch position indicator					
- Status LED, freewheeling diode A1+, A2-	①	24 V DC	**REL-MR- 24DC/21HC AU/MS**	**2987927**	10
- Status LED	④	230 V AC	**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

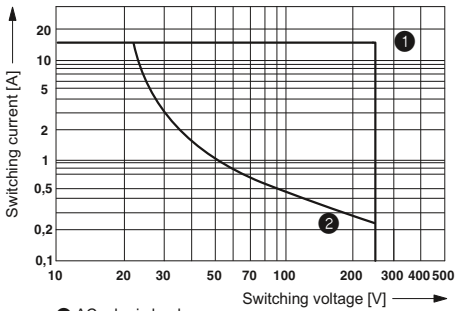
REL-MR...21HC...MS (1 PDT)

Operating voltage range



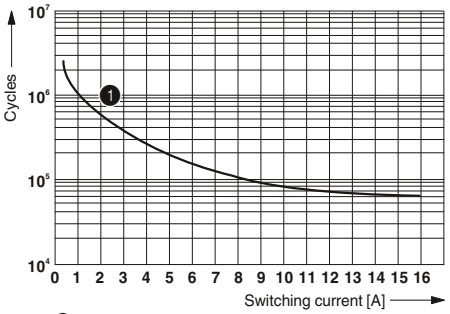
1 DC coils, 0 A contact current
2 DC coils, 16 A contact current
3 AC coils, 0 A contact current
4 AC coils, 16 A contact current

Interrupting rating



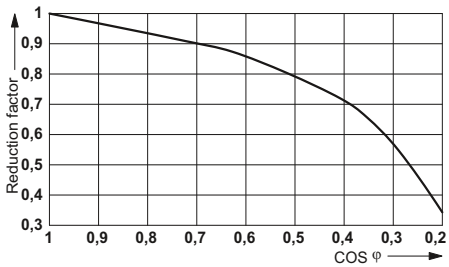
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



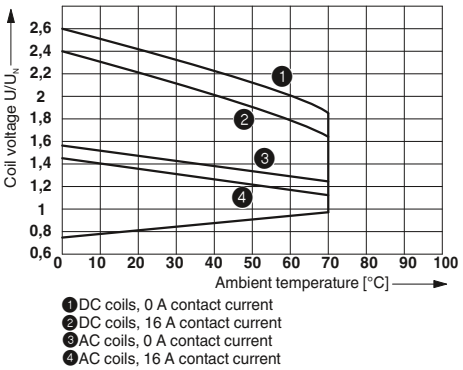
1 250 V AC, ohmic load

Service life reduction factor with various cos phi



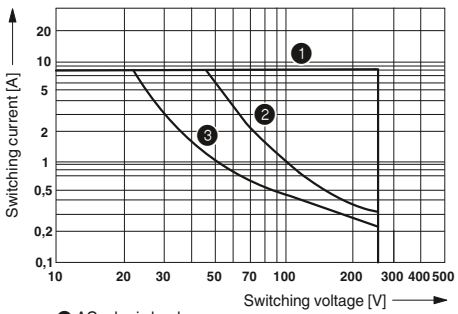
REL-MR...21-21...MS (2 PDTs)

Operating voltage range



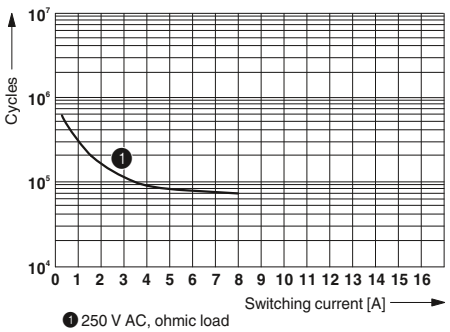
1 DC coils, 0 A contact current
2 DC coils, 16 A contact current
3 AC coils, 0 A contact current
4 AC coils, 16 A contact current

Interrupting rating



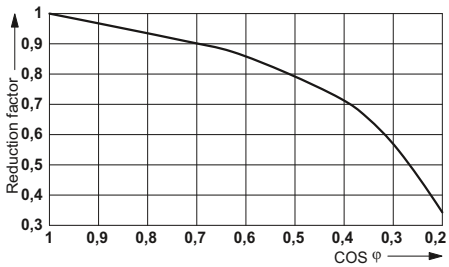
1 AC, ohmic load
2 DC, ohmic load, contacts in series
3 DC, ohmic load

Electrical service life



1 250 V AC, ohmic load

Service life reduction factor with various cos phi



Plug-in solid-state relays

Plug-in solid-state relays suitable for RIF-1, PR1, and PLC-INTERFACE relay bases.

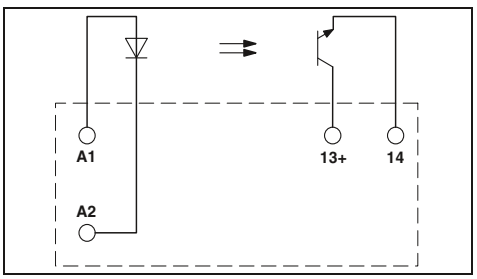
The advantages:

– Switching capacity of up to 24 V DC/5 A
– RT III wash tight (comparable to IP67)
– Vibration- and shock-resistant
– Wear-free and long-lasting
– Zero voltage switch at AC output
– Can be soldered in on PCB

Notes:

For dimensional drawings and perforations for assembly, see page 345

Max. DC voltage output of 5 A



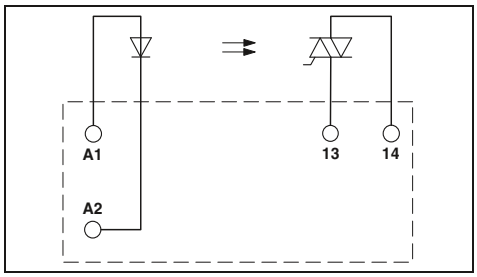
Technical data

		①	②	③
Input data				
Permissible range (with reference to U_N)		0.8 - 1.2	0.8 - 1.2	0.9 - 1.1
Switching level	1 signal (“H”) [V DC] ≥	2.5	16	35
	0 signal (“L”) [V DC] ≤	0.8	10	20
Typ. input current at U_N	[mA]	9	7	3
Typ. switch-on time at U_N	[µs]	10	20	25
Typ. switch-off time at U_N	[µs]	400	400	400
Transmission frequency f_{limit}	[Hz]	300	300	300
Output data				
Max. switching voltage		33 V DC		
Min. switching voltage		3 V DC		
Limiting continuous current		5 A (see derating curve)		
Min. load current		-		
Max. inrush current		15 A (10 ms)		
Leakage current in off state		-		
Phase angle (cos ϕ)		-		
Output circuit		2-conductor, floating		
Max. load value		-		
Output protection		Protection against polarity reversal, surge protection		
Voltage drop at max. limiting continuous current		≤ 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, IEC 62103		
Pollution degree/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		

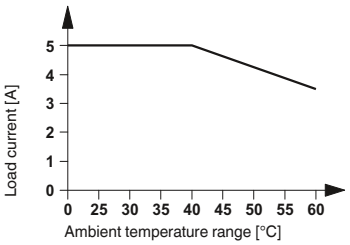
Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in solid-state relays					
	①	5 V DC	**OPT- 5DC/ 24DC/ 5**	**2982113**	10
	②	24 V DC	**OPT-24DC/ 24DC/ 5**	**2982100**	10
	③	60 V DC	**OPT-60DC/ 24DC/ 5**	**2982126**	10

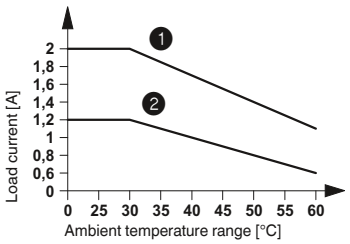
Max. AC voltage output of 2 mA



Derating curve for OPT...DC/24DC/5 solid-state relays



Derating curve for OPT...DC/230AC/2 solid-state relays



❶ Aligned with > 10 mm spacing
❷ Aligned without spacing

Technical data

①	②	③
0.8 - 1.2	0.8 - 1.2	0.9 - 1.1
3	18	40
1	8.4	20
15	7	2.6
10000	10000	10000
10000	10000	10000
10	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^2s (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, IEC 62103
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
OPT-60DC/230AC/ 2	**2982184**	10

Modular RIF-2 relay base

N

Relay base that can be fitted with 2 or 4 PDT relays.
Range of accessories includes:

- Plug-in input and 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 5.

4 PDT relay base for industrial relay

Technical data

Nominal voltage U_N	250 V AC
Nominal current at U_N	max. 12 A (Depends on application/assembly)
General data	
Ambient temperature (operation)	-40°C ... 85°C (Depends on application/assembly)
Connection data solid / stranded / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16
Dimensions	
Width	31 mm
Depth with retaining bracket	75 mm
Height	93 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
RIF-2 relay base, plug-in option for input/interference suppression module, safe isolation I/O with push-in connection	**RIF-2-BPT/4X21**	**2900934**	10
Relay retaining bracket, with ejector function and holder for marking material, suitable for RIF-2 relay base			

Accessories

Plug-in bridge				
2-pos. red		**FBS 2-6**	**3030336**	50
2-pos. blue		**FBS 2-6 BU**	**3036932**	50
2-pos. gray		**FBS 2-6 GY**	**3032237**	50
End clamp, to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...		**CLIPFIX 35**	**3022218**	50
Test plug, consisting of:				
Metal part for 2.3 mm Ø socket hole and		**MPS-MT**	**0201744**	10
Insulating sleeve, 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
Zack marker strip, unprinted				
10-section		**ZB 5 :UNBEDRUCKT**	**1050004**	10
5-section		**ZB 15:UNBEDRUCKT**	**0811972**	10
Double marker carrier for ZB 5		**STP 5-2**	**0800967**	100

N

Relay retaining bracket

Technical data

-
-

-

-

-
-
-

Ordering data

Type	Order No.	Pcs. / Pkt.
RIF-RH-2	2900954	10

Accessories

Plug-in industrial relays

N

N

Plug-in industrial relays with 2 or 4 PDT contacts, suitable for RIF-2 and PR2 relay bases.

The advantages:

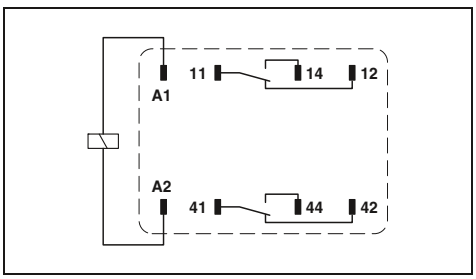
– Detectable manual operation
– Mechanical switch position indicator
– Integrated status LED
– Multi-layer gold contact or power contact
– DC types with integrated freewheeling diode

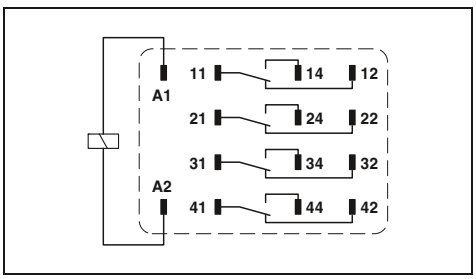
2 PDT relay

4 PDT relay

Notes:

For other voltages, see www.phoenixcontact.net/products





Technical data

Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		refer to the diagram							
Typ. input current at U_N	[mA]	78	41	22	18	8	70	13	6.5
Typ. response time at U_N	[ms]	13	13	13	13	13			
Typ. response time at U_N (depending on phase relation)	[ms]						5 - 15	5 - 15	5 - 15
Typ. release time at U_N	[ms]	14	14	14	14	14			
Typ. release time at U_N (depending on phase relation)	[ms]						5 - 20	5 - 20	5 - 20
Output data									
Contact type		Single contact, 2-PDT							
Contact material		AgNi							
Max. switching voltage		250 V AC/DC							
Min. switching voltage		5 V (At 24 mA)							
Limiting continuous current		12 A							
Max. inrush current, AC		30 A (20 ms, N/O contact)							
Max. inrush current, DC		30 A (20 ms, N/O contact)							
Min. switching current		5 mA (at 24 V)							
General data									
Test voltage (winding / contact)		2.5 kV_{rms} (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. 2 x 10^7 cycles							
Mechanical service life, DC		Approx. 2 x 10^7 cycles							
Standards/regulations		IEC 60664							

Technical data

Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		refer to the diagram							
Typ. input current at U_N	[mA]	78	41	22	18	8	70	13	6.5
Typ. response time at U_N	[ms]	13	13	13	13	13			
Typ. response time at U_N (depending on phase relation)	[ms]						5 - 15	5 - 15	5 - 15
Typ. release time at U_N	[ms]	14	14	14	14	14			
Typ. release time at U_N (depending on phase relation)	[ms]						5 - 20	5 - 20	5 - 20
Output data									
Contact type		Single contact, 4-PDT							
Contact material		AgNi							
Max. switching voltage		250 V AC/DC							
Min. switching voltage		5 V (At 24 mA)							
Limiting continuous current		6 A							
Max. inrush current, AC		16 A (20 ms, N/O contact)							
Max. inrush current, DC		16 A (20 ms, N/O contact)							
Min. switching current		5 mA (at 24 V)							
General data									
Test voltage (winding / contact)		2.5 kV_{rms} (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. 2 x 10^7 cycles							
Mechanical service life, DC		Approx. 2 x 10^7 cycles							
Standards/regulations		IEC 60664							

Ordering data

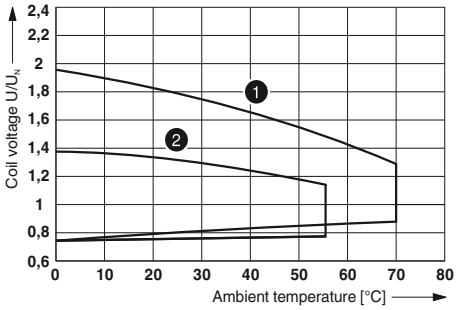
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in industrial relays, with power contacts					
With freewheeling diode	①	12 V DC	**REL-IR2/LDP- 12DC/2X21**	**2903659**	10
With freewheeling diode	②	24 V DC	**REL-IR2/LDP- 24DC/2X21**	**2903660**	10
With freewheeling diode	③	48 V DC	**REL-IR2/LDP- 48DC/2X21**	**2903661**	10
With freewheeling diode	④	60 V DC	**REL-IR2/LDP- 60DC/2X21**	**2903662**	10
With freewheeling diode	⑤	110 V DC	**REL-IR2/LDP-110DC/2X21**	**2903663**	10
	⑥	24 V AC	**REL-IR2/L- 24AC/2X21**	**2903666**	10
	⑦	120 V AC	**REL-IR2/L-120AC/2X21**	**2903667**	10
	⑧	230 V AC	**REL-IR2/L-230AC/2X21**	**2903668**	10
Plug-in industrial relays, with multi-layer gold contacts					
With freewheeling diode	①	12 V DC			
With freewheeling diode	②	24 V DC			
With freewheeling diode	③	48 V DC			
With freewheeling diode	④	60 V DC			
With freewheeling diode	⑤	110 V DC			
	⑥	24 V AC			
	⑦	120 V AC			
	⑧	230 V AC			

Ordering data

Type	Order No.	Pcs. / Pkt.
REL-IR4/LDP- 12DC/4X21	**2903676**	10
REL-IR4/LDP- 24DC/4X21	**2903677**	10
REL-IR4/LDP- 48DC/4X21	**2903678**	10
REL-IR4/LDP- 60DC/4X21	**2903679**	10
REL-IR4/LDP-110DC/4X21	**2903680**	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- 48DC/4X21AU	**2903671**	10
REL-IR4/LDP- 60DC/4X21AU	**2903672**	10
REL-IR4/LDP-110DC/4X21AU	**2903673**	10
REL-IR4/L- 24AC/4X21AU	**2903683**	10
REL-IR4/L-120AC/4X21AU	**2903684**	10
REL-IR4/L-230AC/4X21AU	**2903685**	10

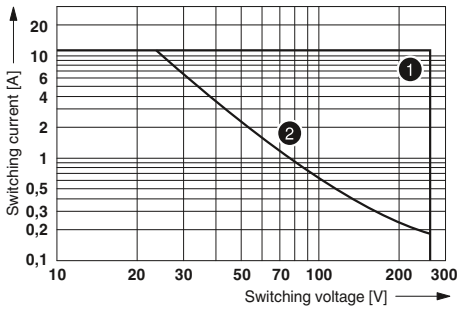
REL-IR2... (2 PDTs)

Operating voltage range



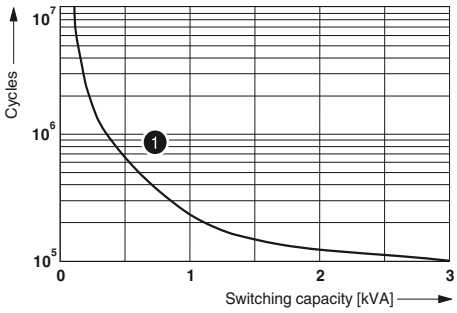
1 DC coils
2 AC coils

Interrupting rating



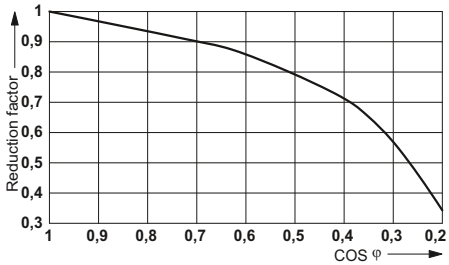
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



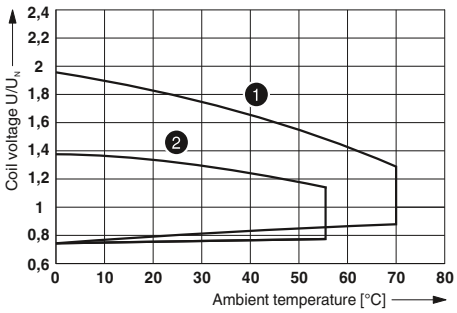
1 250 V AC, ohmic load

Service life reduction factor



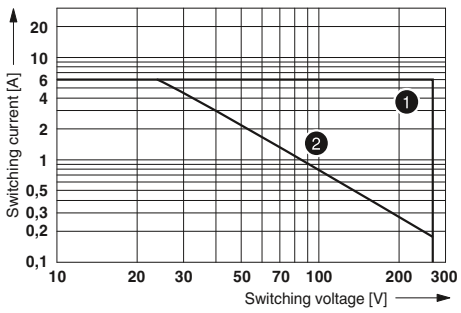
REL-IR4... (4 PDTs)

Operating voltage range



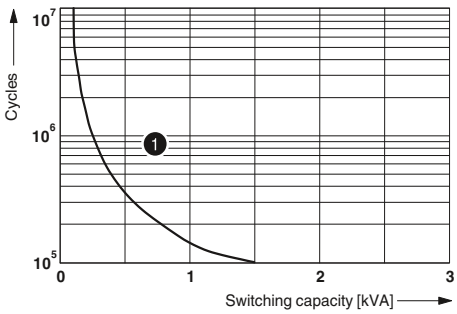
1 DC coils
2 AC coils

Interrupting rating



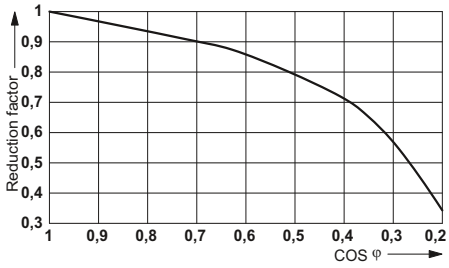
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



1 250 V AC, ohmic load

Service life reduction factor



Modular RIF-3 relay base

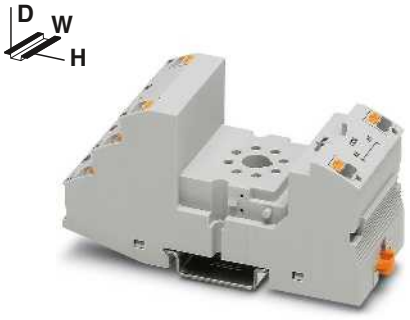
Relay base that can be fitted with 2 or 3 PDT relays.
Range of accessories includes:
- Plug-in input and interference suppression module
- Plug-in timer module
- Relay retaining bracket with ejector function and holder for marking material
- Comprehensive range of marking material
- Test plug
- FBS 2-6 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 5.

N



2 PDT relay base for octal relay

Technical data

Nominal voltage U_N	250 V AC
Nominal current at U_N	max. 12 A (Depends on application/assembly)
General data	
Ambient temperature (operation)	-40°C ... 85°C (Depends on application/assembly)
Connection data solid / stranded / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16
Dimensions	
Width	40 mm
Depth with retaining bracket	90 mm
Height	100 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
RIF-3 relay base, 2 PDT version, plug-in option for input/interference suppression module, safe isolation I/O with push-in connection	**RIF-3-BPT/2X21**	**2900937**	10
RIF-3 relay base, 3 PDT version, plug-in option for input/interference suppression module, safe isolation I/O with push-in connection			
Relay retaining bracket, with holder for marking material, suitable for RIF-3 relay base			

Accessories

Plug-in bridge			
2-pos. red	**FBS 2-6**	**3030336**	50
2-pos. blue	**FBS 2-6 BU**	**3036932**	50
2-pos. gray	**FBS 2-6 GY**	**3032237**	50
End clamp, to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...	**CLIPFIX 35**	**3022218**	50
Test plug, consisting of:			
Metal part for 2.3 mm Ø socket hole and	**MPS-MT**	**0201744**	10
Insulating sleeve, 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
Zack marker strip, unprinted			
10-section	**ZB 5 :UNBEDRUCKT**	**1050004**	10
5-section	**ZB 15:UNBEDRUCKT**	**0811972**	10
Double marker carrier for ZB 5	**STP 5-2**	**0800967**	100

N

3 PDT relay base for octal relay

N

Relay retaining bracket

Technical data	
250 V AC	-
max. 12 A (Depends on application/assembly)	-
-40°C ... 85°C (Depends on application/assembly)	-
0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16	-
40 mm	-
90 mm	-
100 mm	-

Ordering data					
Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
RIF-3-BPT/3X21	2900938	10			
			RIF-RH-3	2900955	10

Accessories			Accessories		
FBS 2-6	3030336	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			

Plug-in octal relays

Plug-in octal relays with 2 or 3 PDT contacts, suitable for RIF-3 and PR3 relay bases.

The advantages:

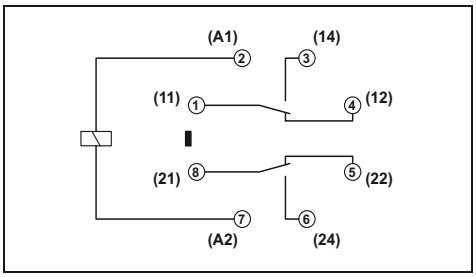
– Detectable manual operation
– Mechanical switch position indicator
– Integrated status LED
– DC types with integrated freewheeling diode

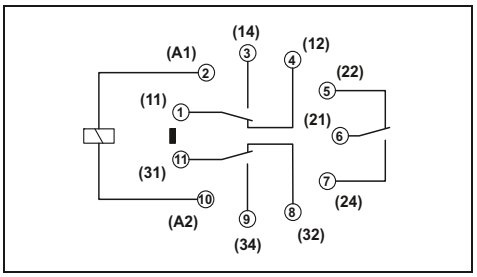
N

2 PDT relay

N

3 PDT relay





Technical data

Input data		①	②	③	④
Permissible range (with reference to U_N)		refer to the diagram			
Typ. input current at U_N	[mA]	60	108	23	13
Typ. response time at U_N	[ms]	18			
Typ. response time at U_N (depending on phase relation)	[ms]		5 - 15	5 - 15	5 - 15
Typ. release time at U_N	[ms]				
Typ. release time at U_N (depending on phase relation)	[ms]		5 - 20	5 - 20	5 - 20
Output data					
Contact type		Single contact, 2-PDT			
Contact material		AgNi			
Max. switching voltage		250 V AC/DC			
Min. switching voltage		10 V (At 24 mA)			
Limiting continuous current		10 A			
Max. inrush current, AC		30 A (20 ms, N/O contact)			
Max. inrush current, DC		30 A (20 ms, N/O contact)			
Min. switching current		10 mA (at 24 V)			
General data					
Test voltage (winding / contact)		2.5 kV_{rms} (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. 2 x 10^7 cycles			
Mechanical service life, DC		Approx. 2 x 10^7 cycles			
Standards/regulations		IEC 60664			
Mounting position/mounting		Any			
Dimensions	W / H / D	35 mm / 54.4 mm / 35 mm			

Technical data

Input data		①	②	③	④
Permissible range (with reference to U_N)		refer to the diagram			
Typ. input current at U_N	[mA]	60	108	23	13
Typ. response time at U_N	[ms]	18			
Typ. response time at U_N (depending on phase relation)	[ms]		5 - 15	5 - 15	5 - 15
Typ. release time at U_N	[ms]				
Typ. release time at U_N (depending on phase relation)	[ms]		5 - 20	5 - 20	5 - 20
Output data					
Contact type		Single contact, three PDTs			
Contact material		AgNi			
Max. switching voltage		250 V AC/DC			
Min. switching voltage		10 V (At 24 mA)			
Limiting continuous current		10 A			
Max. inrush current, AC		30 A (20 ms, N/O contact)			
Max. inrush current, DC		30 A (20 ms, N/O contact)			
Min. switching current		10 mA (at 24 V)			
General data					
Test voltage (winding / contact)		2.5 kV_{rms} (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. 2 x 10^7 cycles			
Mechanical service life, DC		Approx. 2 x 10^7 cycles			
Standards/regulations		IEC 60664			
Mounting position/mounting		Any			
Dimensions	W / H / D	35 mm / 54.4 mm / 35 mm			

Ordering data

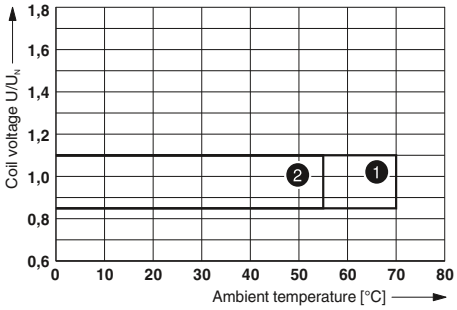
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in octal relays, with power contacts					
With freewheeling diode	①	24 V DC	**REL-OR2/LDP- 24DC/2X21**	**2903689**	10
	②	24 V AC	**REL-OR2/L- 24AC/2X21**	**2903690**	10
	③	120 V AC	**REL-OR2/L-120AC/2X21**	**2903691**	10
	④	230 V AC	**REL-OR2/L-230AC/2X21**	**2903692**	10

Ordering data

Type	Order No.	Pcs. / Pkt.
REL-OR3/LDP-24DC/3X21	**2903693**	10
REL-OR3/L- 24AC/3X21	**2903694**	10
REL-OR3/L-120AC/3X21	**2903695**	10
REL-OR3/L-230AC/3X21	**2903696**	10

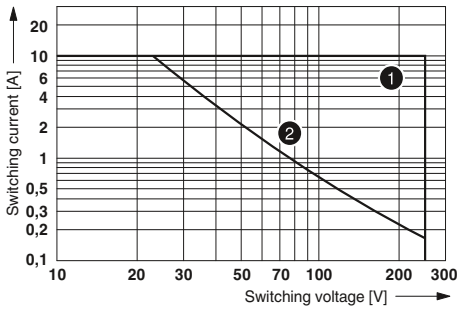
REL-OR2... (2 PDTs)

Operating voltage range



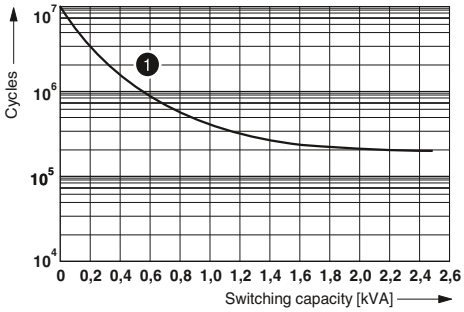
1 DC coils
2 AC coils

Interrupting rating



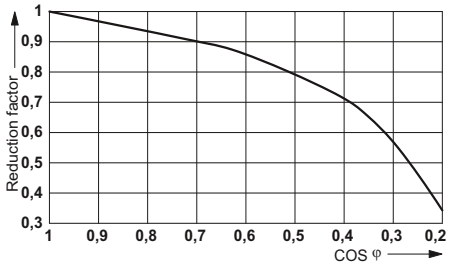
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



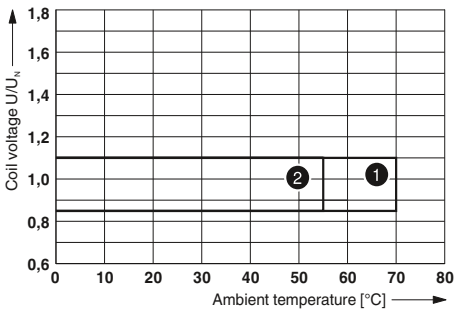
1 250 V AC, ohmic load

Service life reduction factor



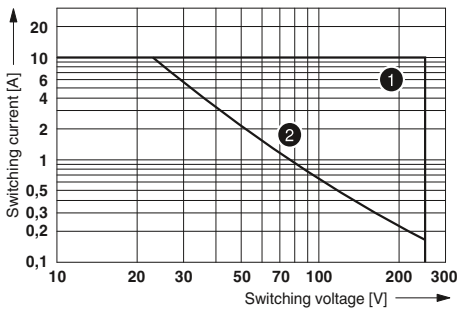
REL-OR3... (3 PDTs)

Operating voltage range



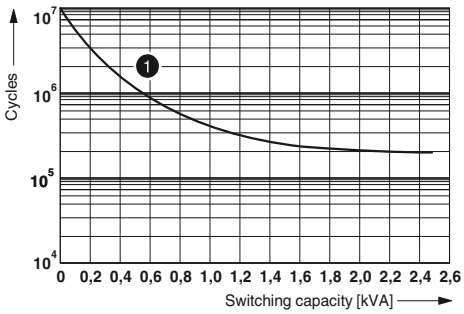
1 DC coils
2 AC coils

Interrupting rating



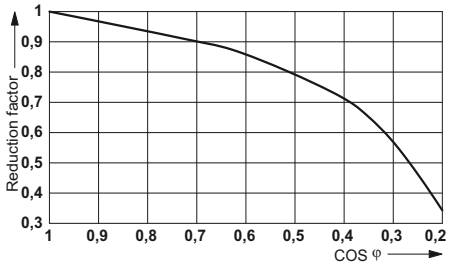
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



1 250 V AC, ohmic load

Service life reduction factor



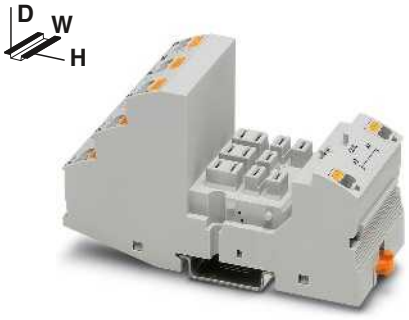
Modular RIF-4 relay base

Relay base that can be fitted with 2 or 3 PDT relays or 3 N/O relays.
Range of accessories includes:

- Plug-in input and 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 5.

N



3 PDT relay base for high-power relay

Technical data

Nominal voltage U_N	400 V AC
Nominal current at U_N	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	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16
Output side	0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14
Dimensions	
Width	43 mm
Depth with retaining bracket	90 mm
Height	107 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
RIF-4 relay base, plug-in option for input/interference suppression module, safe isolation I/O with push-in connection	**RIF-4-BPT/3X21**	**2900961**	10
Relay retaining bracket, with holder for marking material, suitable for RIF-4 relay base			

Accessories

Plug-in bridge				
2-pos. red		**FBS 2-6**	**3030336**	50
2-pos. blue		**FBS 2-6 BU**	**3036932**	50
2-pos. gray		**FBS 2-6 GY**	**3032237**	50
End clamp, to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...		**CLIPFIX 35**	**3022218**	50
Test plug, consisting of:				
Metal part for 2.3 mm Ø socket hole and		**MPS-MT**	**0201744**	10
Insulating sleeve, 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
Zack marker strip, unprinted				
10-section		**ZB 5 :UNBEDRUCKT**	**1050004**	10
5-section		**ZB 15:UNBEDRUCKT**	**0811972**	10
Double marker carrier for ZB 5		**STP 5-2**	**0800967**	100

N

Relay retaining bracket

Technical data

-
-

-

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-
-
-

Ordering data

Type	Order No.	Pcs. / Pkt.
RIF-RH-4	2900956	10

Accessories

Plug-in high-power relays

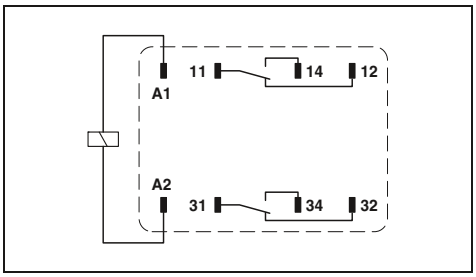
Plug-in high-power relays with 2 or 3 PDT contacts for the RIF-4 relay base.

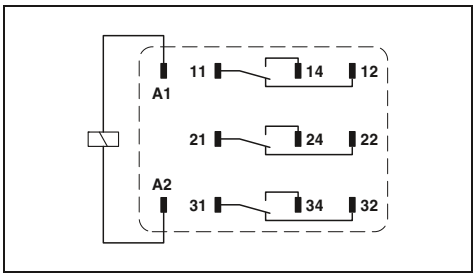
The advantages:

– Use in miniature contactor applications
– Switching current of up to 16 A
– Up to 440 V AC switching voltage

2 PDT relay

3 PDT relay





Technical data

Input data		①	②	③	④
Permissible range (with reference to U_N)		refer to the diagram			
Typ. input current at U_N	[mA]	56	116	23	12
Typ. response time at U_N	[ms]	20			
Typ. response time at U_N (depending on phase relation)	[ms]		5 - 25	5 - 25	5 - 25
Typ. release time at U_N	[ms]	15			
Typ. release time at U_N (depending on phase relation)	[ms]		5 - 20	5 - 20	5 - 20
Output data					
Contact type		Single contact, 2-PDT			
Contact material		AgNi			
Max. switching voltage		440 V AC / 250 V DC			
Min. switching voltage		10 V (At 24 mA)			
Limiting continuous current		16 A			
Max. inrush current, AC		50 A (20 ms, N/O contact)			
Max. inrush current, DC		50 A (20 ms, N/O contact)			
Min. switching current		10 mA (at 24 V)			
Max. 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)			
General data					
Test voltage (winding / contact)		2.5 kV_{rms} (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. 10^7 cycles			
Mechanical service life, DC		Approx. 10^7 cycles			
Standards/regulations		IEC 60664			
Mounting position/mounting		Any			
Dimensions	W / H / D	38.6 mm / 45.5 mm / 36.1 mm			

Technical data

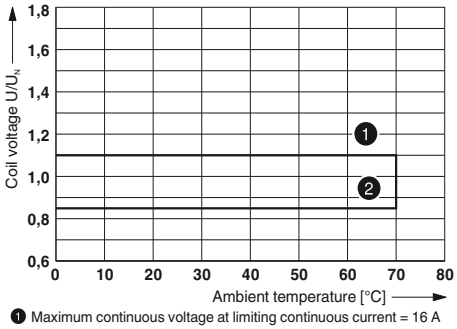
Input data		①	②	③	④
Permissible range (with reference to U_N)		refer to the diagram			
Typ. input current at U_N	[mA]	56	116	23	12
Typ. response time at U_N	[ms]	20			
Typ. response time at U_N (depending on phase relation)	[ms]		5 - 25	5 - 25	5 - 25
Typ. release time at U_N	[ms]	15			
Typ. release time at U_N (depending on phase relation)	[ms]		5 - 20	5 - 20	5 - 20
Output data					
Contact type		Single contact, three PDTs			
Contact material		AgNi			
Max. switching voltage		440 V AC / 250 V DC			
Min. switching voltage		10 V (At 24 mA)			
Limiting continuous current		16 A			
Max. inrush current, AC		50 A (20 ms, N/O contact)			
Max. inrush current, DC		50 A (20 ms, N/O contact)			
Min. switching current		10 mA (at 24 V)			
Max. 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)			
General data					
Test voltage (winding / contact)		2.5 kV_{rms} (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. 10^7 cycles			
Mechanical service life, DC		Approx. 10^7 cycles			
Standards/regulations		IEC 60664			
Mounting position/mounting		Any			
Dimensions	W / H / D	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 PDTs 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 PDTs with power contacts				
①	24 V DC	**REL-PR3- 24DC/3X21**	**2903702**	1
②	24 V AC	**REL-PR3- 24AC/3X21**	**2903703**	1
③	120 V AC	**REL-PR3-120AC/3X21**	**2903704**	1
④	230 V AC	**REL-PR3-230AC/3X21**	**2903705**	1

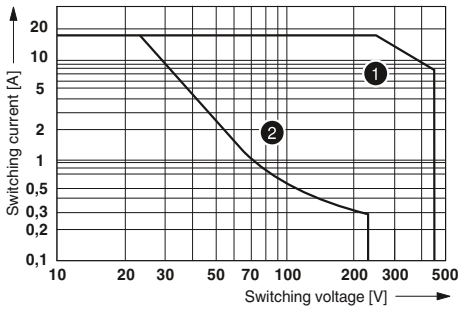
REL-PR2... (2 PDTs)

Operating voltage range



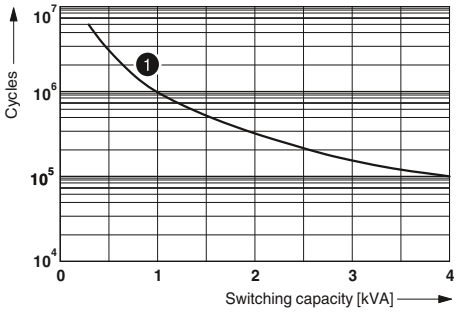
1 Maximum continuous voltage at limiting continuous current = 16 A
2 Minimum operate voltage
For pre-excitation with UN and limiting continuous current = 16 A

Interrupting rating



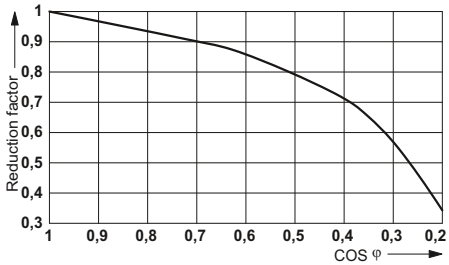
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



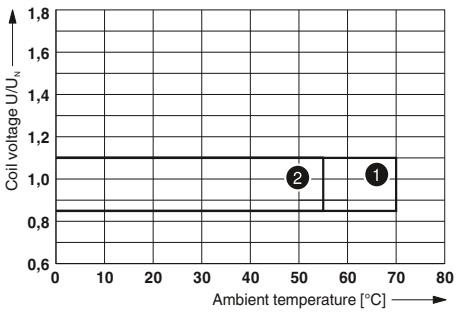
1 250 V AC, ohmic load

Service life reduction factor



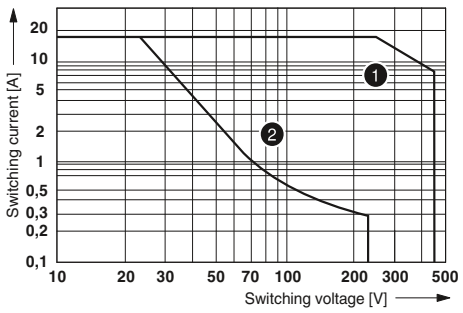
REL-PR3... (3 PDTs)

Operating voltage range



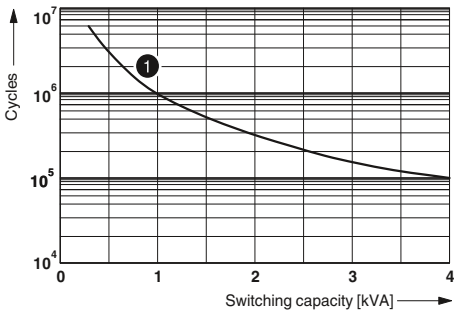
1 DC coils
2 AC coils

Interrupting rating



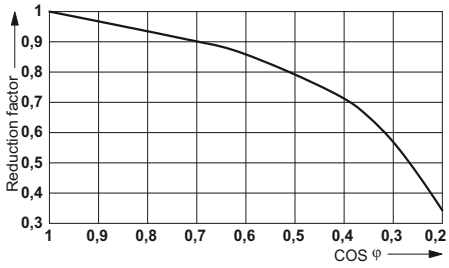
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



1 250 V AC, ohmic load

Service life reduction factor



Plug-in high-power relays

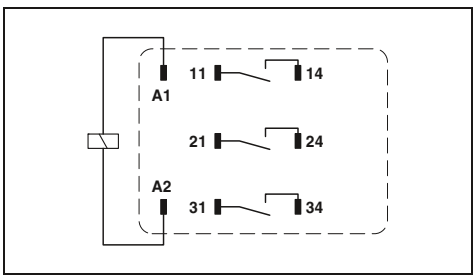
N

Plug-in high-power relays with 3 N/O contacts suitable for the RIF-4 relay base.

The advantages:0

– Use in miniature contactor applications
– Switching current of up to 16 A
– Up to 440 V AC switching voltage
– Full shutdown by means of ≥ 3 mm contact opening

3 N/O relay



Technical data

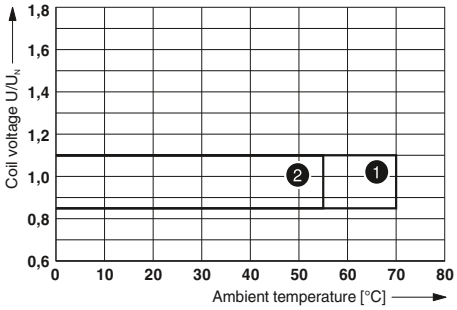
Input data		①	②	③	④
Permissible range (with reference to U_N)		refer to the diagram			
Typ. input current at U_N	[mA]	70	116	23	12
Typ. response time at U_N	[ms]	20			
Typ. response time at U_N (depending on phase relation)	[ms]		5 - 25	5 - 25	5 - 25
Typ. release time at U_N	[ms]	15			
Typ. release time at U_N (depending on phase relation)	[ms]		5 - 20	5 - 20	5 - 20
Output data					
Contact type		Single contact, 3 N/O contacts			
Contact material		AgNi			
Max. switching voltage		440 V AC / 250 V DC			
Min. switching voltage		10 V (At 24 mA)			
Limiting continuous current		16 A			
Max. inrush current, AC		50 A (20 ms, N/O contact)			
Max. inrush current, DC		50 A (20 ms, N/O contact)			
Min. switching current		10 mA (at 24 V)			
Max. 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)			
General data					
Test voltage (winding / contact)		2.5 kV_{rms} (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. 10^7 cycles			
Mechanical service life, DC		Approx. 10^7 cycles			
Standards/regulations		IEC 60664			
Mounting position/mounting		Any			
Dimensions	W / H / D	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, 3 N/O contacts with power contacts					
	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

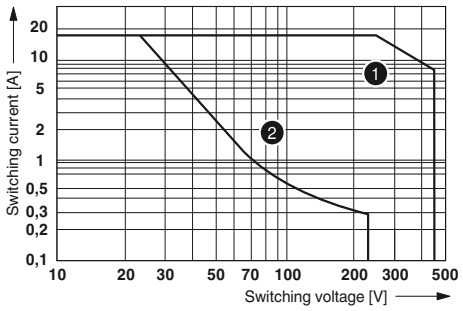
REL-PR2... (3 N/O contacts)

Operating voltage range



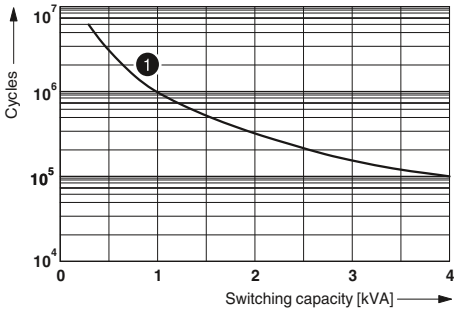
1 DC coils
2 AC coils

Interrupting rating



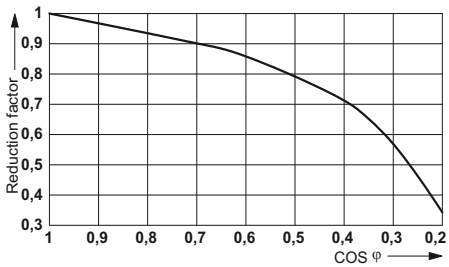
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



1 250 V AC, ohmic load

Service life reduction factor



N

Input modules/interference suppression modules for RIF-1, RIF-2, RIF-3, and RIF-4

Plug-in input modules/interference suppression modules for optional fitting of RIF-1 to RIF-4 relay bases.

The advantages:

– Attenuation of reverse voltage induced in coil
– Mechanical coding to protect against incorrect connection

Input/interference suppression module

Description	Type	Order No.	Pcs. / Pkt.
		Ordering data	
Plug-in module, with LED status indicator and freewheeling diode to effectively limit the coil induction voltage, polarity: **A1+, A2-**, input voltage:			
- 12-24 V DC ±20%	**RIF-LDP-12-24 DC**	**2900939**	10
- 48-60 V DC ±20%	**RIF-LDP-48-60 DC**	**2900940**	10
- 110 V DC ±20%	**RIF-LDP-110 DC**	**2900941**	10
Plug-in module, with LED status indicator and varistor to limit the coil induction voltage and/or external interference peaks, input voltage:			
- 12-24 V AC/DC ±20% (30-V-varistor)	**RIF-LV-12-24 UC**	**2900942**	10
- 48-60 V AC/DC ±20% (75-V-varistor)	**RIF-LV-48-60 UC**	**2900943**	10
- 120-230 V AC/110 V DC ±20% (275-V-varistor)	**RIF-LV-120-230 AC/110 DC**	**2900944**	10
Plug-in module, with varistor to limit the coil induction voltage and/or external interference peaks, input voltage:			
- 12-24 V AC/DC ±20% (30-V-varistor)	**RIF-V-12-24 UC**	**2900945**	10
- 48-60 V AC/DC ±20% (75-V-varistor)	**RIF-V-48-60 UC**	**2900947**	10
- 120-230 V AC/110 V DC ±20% (275-V-varistor)	**RIF-V-120-230 UC**	**2900948**	10
Plug-in module, with RC element to limit the coil induction voltage and/or external interference peaks, input voltage:			
- 12-24 V AC/DC ±20% (220 nF/100 Ω)	**RIF-RC-12-24 UC**	**2900949**	10
- 48-60 V AC/DC ±20% (220 nF/220 Ω)	**RIF-RC-48-60 UC**	**2900950**	10
- 120 - 230 V AC/110 DC ±20% (100 nF/470 Ω)	**RIF-RC-120-230 UC**	**2900951**	10

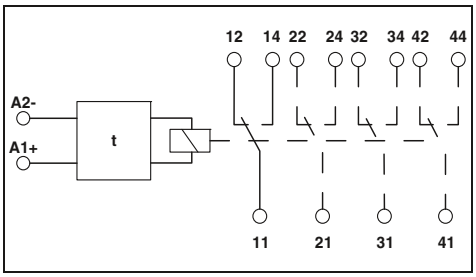
Plug-in timer module for RIF-1, RIF-2, RIF-3, and RIF-4

The multifunctional plug-in timer module transforms the relay module into a timer relay. The RIF-1 to RIF-4 bases can be fitted with this module. Using DIP switches, you can choose from three time ranges and select four time functions. Fine adjustments to the time are made using a potentiometer. Relays can be operated with an input voltage of 24 V AC/DC.

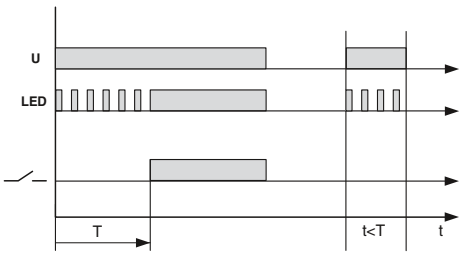
Functions:
– Switch-on delay
– Single shot leading edge
– Flasher/pulse generator

Time ranges:
– 0.5 s - 10 s
– 5 s - 100 s
– 0.5 min - 10 min
– 5 min - 100 min

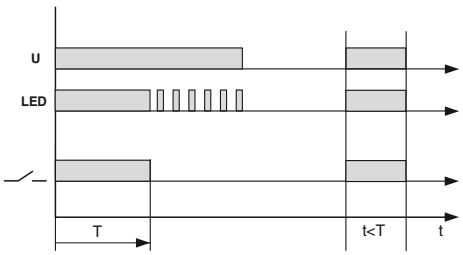
Time module



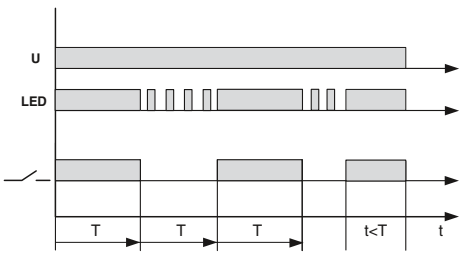
With switch-on delay



With passing make contact



Flasher/pulse generator



Technical data

Input data	
Nominal input voltage U_N	24 V DC (AC operation only permitted for RIF-1)
Nominal input voltage range with reference to U_N	0.4 ... 1.2
Input circuit	Varistor, Yellow LED
Output data	
Limiting continuous current	≤ 250 mA (Relay coil current)
General data	
Mounting position	Any
Repeat accuracy	1%
Ambient temperature (operation)	-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)
Standards/specifications	DIN EN 50178
Rated insulation voltage	50 V DC
Rated surge voltage	0.4 kV

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Timer module, for mounting on RIF-1 to RIF-4, with LED status indicator for extending a relay module to create a timer relay with an input voltage of 24 V AC/DC	**RIF-T3-24UC**	**2902647**	1

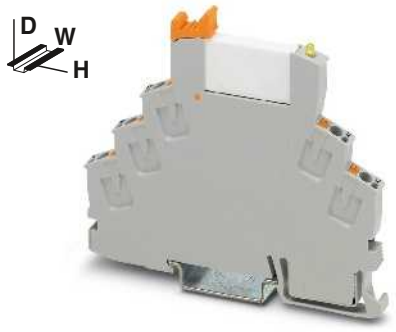
Fully mounted RIF-0 relay modules

N

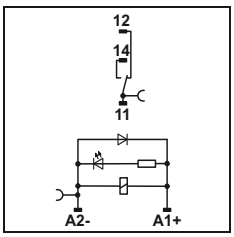
Fully mounted RIF-0 relay modules, consisting of:
– Relay base
– 1 N/O contact or 1 PDT relay
– Relay ejector lever on the housing

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 318.



RIF-0 relay module with 1 PDT relay



DC coils

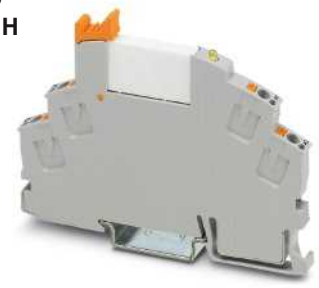
Technical data

Input data		①	②
Permissible range (with reference to U_N)		refer to the diagram	
Typ. input current at U_N	[mA]	16	9
Typ. response time at U_N	[ms]	5	5
Typ. release time at U_N	[ms]	8	8
Input protection:		Yellow LED, Damping diode	
Output data			
Contact type		Single contact, 1-PDT	Single contact, 1-PDT
Contact material		AgSnO	AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Min. switching voltage		5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current		6 A	50 mA
Min. switching current		10 mA (at 12 V)	1 mA
General data			
Test voltage (winding / contact)		4 kV_{rms} (50 Hz, 1 min.)	
Ambient temperature (operation)		-40°C ... 60°C	
Nominal operating mode		100% operating factor	
Mechanical service life		Approx. 2 x 10^7 cycles	
Standards/regulations		DIN EN 50178, IEC 62103	
Pollution degree/surge voltage category		2 / III	
Mounting position/mounting		Any / In rows with zero spacing	
Connection data solid / stranded / AWG		0.14 - 1.5 mm^2 / 0.14 - 1.5 mm^2 / 26 - 16	
Dimensions	W / H / D	6.2 mm / 78 mm / 93 mm	

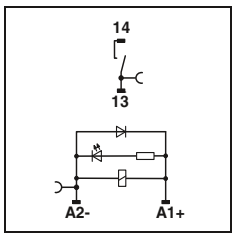
Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Coupling relay modules with power contact relay					
	①	12 V DC	**RIF-0-RPT-12DC/21**	**2903371**	10
	②	24 V DC	**RIF-0-RPT-24DC/21**	**2903370**	10
Coupling relay modules with power contact relay and gold contacts					
	①	12 V DC	**RIF-0-RPT-12DC/21AU**	**2903369**	10
	②	24 V DC	**RIF-0-RPT-24DC/21AU**	**2903368**	10

N



RIF-0 relay module with 1 N/O relay



DC coils

Technical data

	①	②
refer to the diagram		
16	9	
5	5	
8	8	
Yellow LED, Damping diode		

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
10 mA (at 12 V)	1 mA (at 12 V)

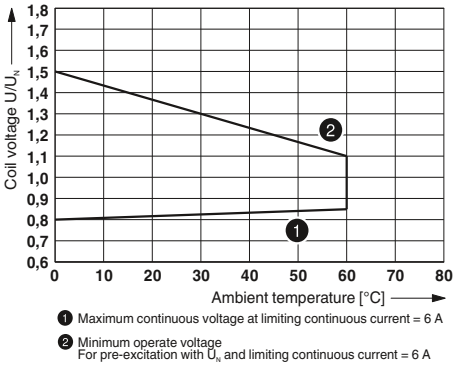
4 kV_{rms} (50 Hz, 1 min.)
-40°C ... 60°C
100% operating factor
Approx. 2 x 10^7 cycles
DIN EN 50178, IEC 62103
2 / III
Any / In rows with zero spacing
0.14 - 1.5 mm^2 / 0.14 - 1.5 mm^2 / 26 - 16
6.2 mm / 78 mm / 93 mm

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)

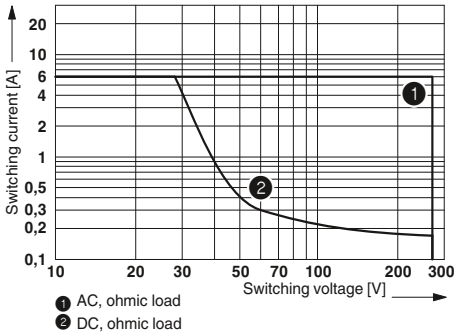
Operating voltage range



❶ Maximum continuous voltage at limiting continuous current = 6 A

❷ Minimum operate voltage
For pre-excitation with U_N and limiting continuous current = 6 A

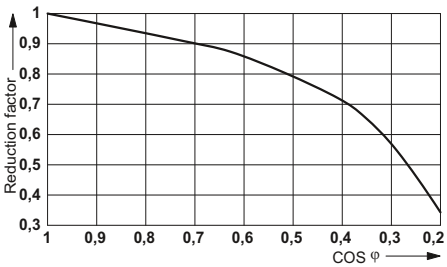
Interrupting rating



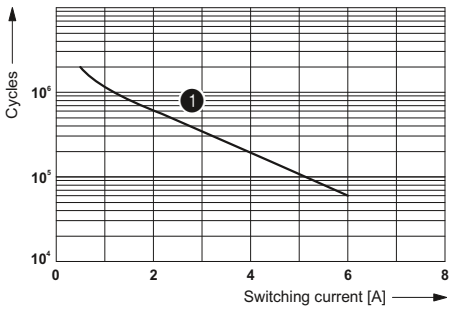
❶ AC, ohmic load

❷ DC, ohmic load

Service life reduction factor



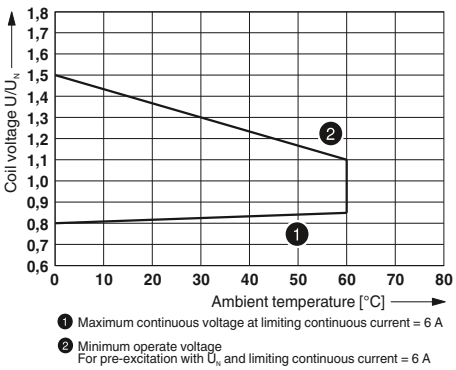
Electrical service life



❶ 250 V AC, ohmic load

RIF-0-RPT.../1... (1 N/O contact)

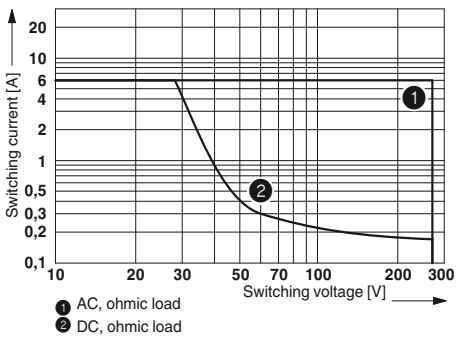
Operating voltage range



❶ Maximum continuous voltage at limiting continuous current = 6 A

❷ Minimum operate voltage
For pre-excitation with U_N and limiting continuous current = 6 A

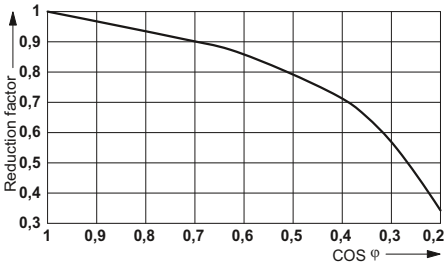
Interrupting rating



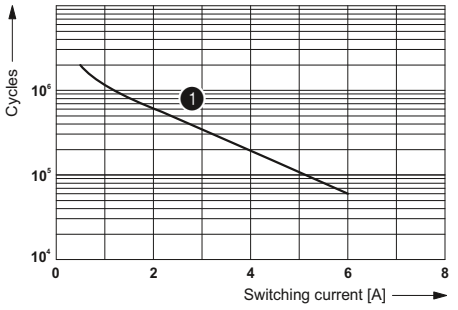
❶ AC, ohmic load

❷ DC, ohmic load

Service life reduction factor



Electrical service life



❶ 250 V AC, ohmic load

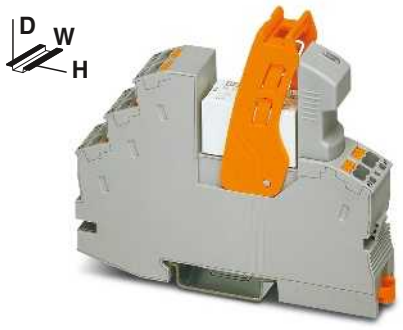
Fully mounted RIF-1 relay modules

N

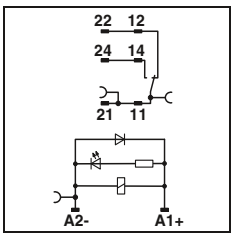
Fully mounted RIF-1 relay modules, consisting of:
– 1 or 2 PDT relays
– Relay retaining bracket
– Input module/interference suppr. module

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

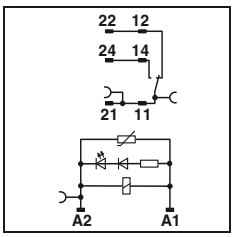
– For FBS 2-6 plug-in bridges for the input side (A2), see page 318.
– For FBS 2-8 plug-in bridges for the output side (11/21), see page 318.



RIF-1 relay module with 1 PDT relay



DC coils



AC coils

Technical data

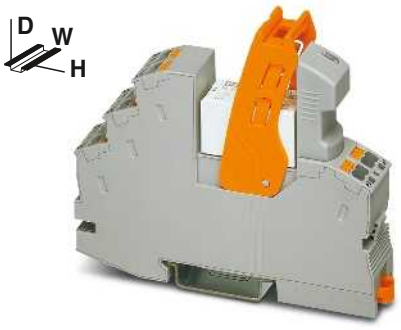
Input data		①	②	③	④
Permissible range (with reference to U_N)		refer to the diagram			
Typ. input current at U_N	[mA]	18	33	8	6
Typ. response time at U_N	[ms]	8	3 - 12	3 - 12	3 - 12
Typ. release time at U_N	[ms]	10	3 - 20	3 - 20	3 - 20
Input circuit AC		Yellow LED, Varistor			
Input circuit DC		Yellow LED, Damping diode, Polarity protection diode			
Output data					
Contact type		Single contact, 1-PDT		Single contact, 1-PDT	
Contact material		AgNi		AgNi, hard gold-plated	
Max. switching voltage		250 V AC/DC		30 V AC / 36 V DC	
Min. switching voltage		12 V (at 10 mA)		100 mV (at 10 mA)	
Limiting continuous current		(refer to the diagram)		50 mA	
Max. inrush current, AC		25 A (20 ms, N/O contact)		50 mA	
Max. inrush current, DC		50 A (20 ms, N/O contact)		50 mA	
Min. switching current		10 mA (at 12 V)		1 mA (at 24 V)	
General data					
Test voltage (winding / contact)		4 kV_{rms} (50 Hz, 1 min.)			
Ambient temperature (operation), AC		-40°C ... 70°C			
Ambient temperature (operation), DC		-40°C ... 50°C			
Nominal operating mode		100% operating factor			
Mechanical service life, AC		Approx. 10^7 cycles			
Mechanical service life, DC		Approx. 3 x 10^7 cycles			
Standards/regulations		DIN EN 50178, IEC 62103			
Pollution degree/surge voltage category		2 / III			
Mounting position/mounting		Any / In rows with zero spacing			
Connection data solid / stranded / AWG		0.14 - 1.5 mm^2 / 0.14 - 1.5 mm^2 / 26 - 16			
Dimensions	W / H / D	16 mm / 75 mm / 93 mm			

Ordering data

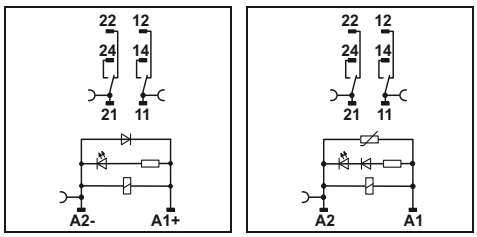
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Coupling relay modules with power contact relay					
	①	24 V DC	**RIF-1-RPT-LDP-24DC/1X21**	**2903342**	10
	②	24 V AC	**RIF-1-RPT-LV-24AC/1X21**	**2903341**	10
	③	120 V AC	**RIF-1-RPT-LV-120AC/1X21**	**2903340**	10
	④	230 V AC	**RIF-1-RPT-LV-230AC/1X21**	**2903339**	10
Coupling relay modules with power contact relay and gold contacts					
	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

N

RIF-1-RPT.../1X21... (1 PDT)



RIF-1 relay module with 2 PDT relay



DC coils AC coils

Technical data

①	②	③	④
refer to the diagram			
18	33	8	6
8	3 - 12	3 - 12	3 - 12
10	3 - 20	3 - 20	3 - 20
Yellow LED, Varistor			
Yellow LED, Damping diode, Polarity protection diode			

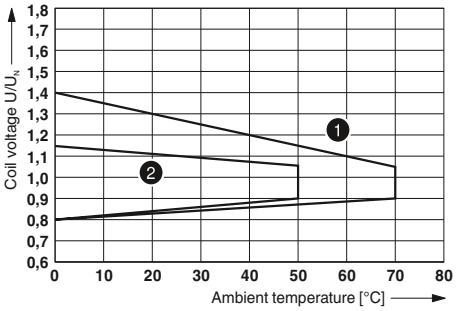
Single contact, 2-PDT	Single contact, 2-PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 10 mA)	100 mV (at 10 mA)
8 A (refer to the diagram)	50 mA
12 A (20 ms, N/O contact)	50 mA
25 A (20 ms, N/O contact)	50 mA
10 mA (At 5 V)	1 mA (at 24 V)

4 kV_{rms} (50 Hz, 1 min.)
-40°C ... 70°C
-40°C ... 50°C
100% operating factor
Approx. 10^7 cycles
Approx. 3 x 10^7 cycles
DIN EN 50178, IEC 62103
2 / III
Any / In rows with zero spacing
0.14 - 1.5 mm^2 / 0.14 - 1.5 mm^2 / 26 - 16
16 mm / 75 mm / 93 mm

Ordering data

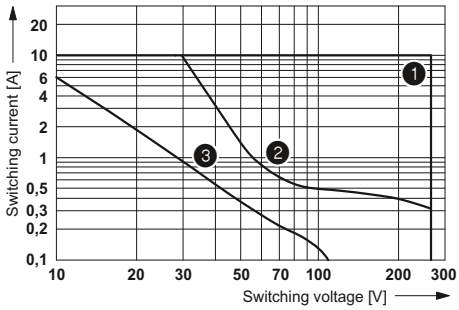
Type	Order No.	Pcs. / Pkt.
RIF-1-RPT-LDP-24DC/2X21	**2903334**	10
RIF-1-RPT-LV-24AC/2X21	**2903333**	10
RIF-1-RPT-LV-120AC/2X21	**2903332**	10
RIF-1-RPT-LV-230AC/2X21	**2903331**	10
RIF-1-RPT-LDP-24DC/2X21AU	**2903330**	10
RIF-1-RPT-LV-24AC/2X21AU	**2903329**	10
RIF-1-RPT-LV-120AC/2X21AU	**2903328**	10
RIF-1-RPT-LV-230AC/2X21AU	**2903327**	10

Operating voltage range



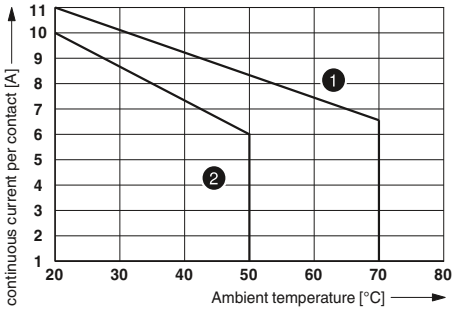
❶ DC coils
❷ AC coils

Interrupting rating



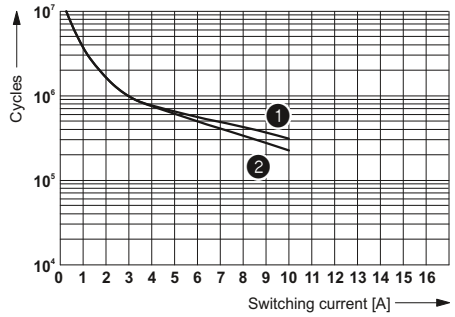
❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Contact derating



❶ DC coil
❷ AC coil

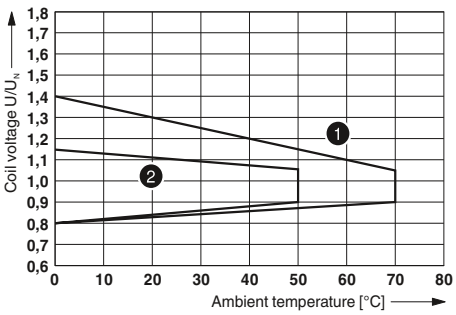
Electrical service life



❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

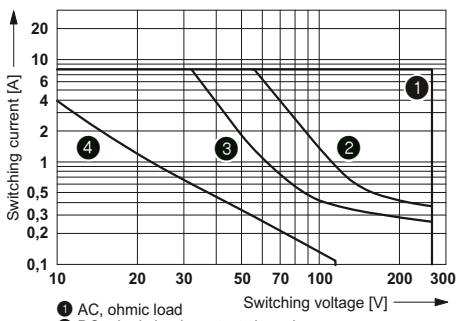
RIF-1-RPT.../2X21... (2 PDTs)

Operating voltage range



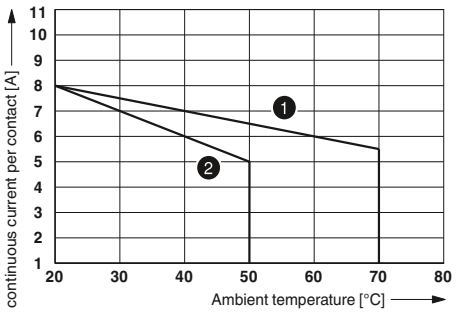
❶ DC coils
❷ AC coils

Interrupting rating



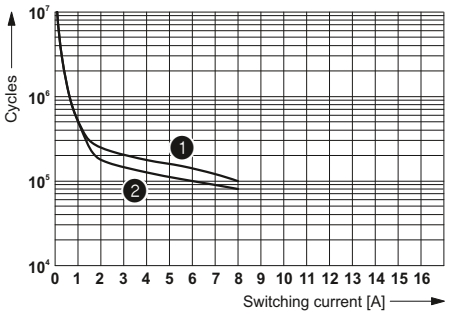
❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

Contact derating



❶ DC coil
❷ AC coil

Electrical service life



❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

Fully mounted RIF-2 relay modules

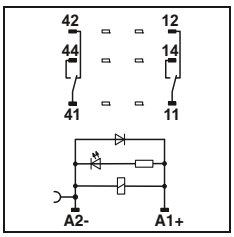
N

Fully mounted RIF-2 relay modules, consisting of:
– 1 or 2 PDT relays
– Relay retaining bracket
– Input module/interference suppr. module (AC types only)

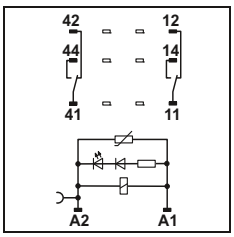
The advantages:
– Relay with lockable manual operation and status LED
– With DC types, freewheeling diode is integrated into relay
– Mechanical switch position indicator
– Logical contact arrangement thanks to 1/3-level relay base
– Professional bridging of adjacent modules saves wiring time

– For FBS 2-6 plug-in bridges for the input side (A2), see page 318.

RIF-2 relay module with 2 PDT relay



DC coils



AC coils

Technical data

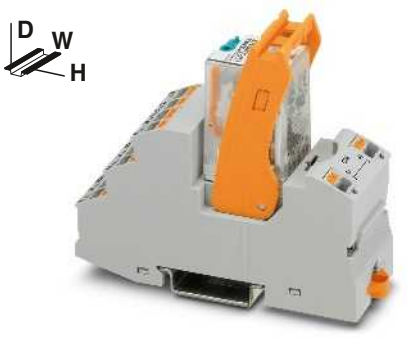
Input data		①	②	③	④
Permissible range (with reference to U_N)		refer to the diagram			
Typ. input current at U_N	[mA]	41	70	13	6.5
Typ. response time at U_N	[ms]	13	5 - 15	5 - 15	5 - 15
Typ. release time at U_N	[ms]	14	5 - 20	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor			
Input circuit DC		Yellow LED, Damping diode			
Output data					
Contact type		Single contact, 2-PDT			
Contact material		AgNi			
Max. switching voltage		250 V AC/DC			
Min. switching voltage		5 V (At 24 mA)			
Limiting continuous current		(refer to the diagram)			
Max. inrush current, AC		30 A (20 ms, N/O contact)			
Max. inrush current, DC		30 A (20 ms, N/O contact)			
Min. switching current		5 mA (at 24 V)			
General data					
Test voltage (winding / contact)		2.5 kV_{rms} (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. 2 x 10^7 cycles			
Mechanical service life, DC		Approx. 2 x 10^7 cycles			
Standards/regulations		DIN EN 50178, IEC 62103			
Pollution degree/surge voltage category		2 / III			
Mounting position/mounting		Any / In rows with zero spacing			
Connection data solid / stranded / AWG		0.14 - 1.5 mm^2 / 0.14 - 1.5 mm^2 / 26 - 16			
Dimensions	W / H / D	31 mm / 75 mm / 93 mm			

Ordering data

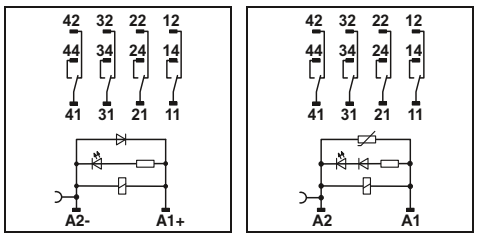
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Pre-assembled coupling relay modules with miniature power contact relay					
	①	24 V DC	**RIF-2-RPT-LDP-24DC/2X21**	**2903315**	10
	②	24 V AC	**RIF-2-RPT-LV-24AC/2X21**	**2903313**	10
	③	120 V AC	**RIF-2-RPT-LV-120AC/2X21**	**2903311**	10
	④	230 V AC	**RIF-2-RPT-LV-230AC/2X21**	**2903310**	10

N

RIF-2-RPT.../2X21 (2 PDTs)



RIF-2 relay module with 4 PDT relay



DC coils AC coils

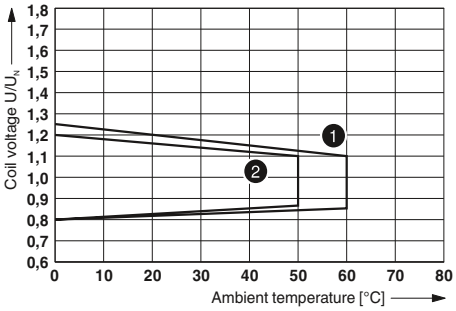
Technical data

①	②	③	④
refer to the diagram			
41	70	13	6.5
13	5 - 15	5 - 15	5 - 15
14	5 - 20	5 - 20	5 - 20
Yellow LED, Varistor			
Yellow LED, Damping diode			
Single contact, 4-PDT			
AgNi			
250 V AC/DC			
5 V (At 24 mA)			
(refer to the diagram)			
16 A (20 ms, N/O contact)			
16 A (20 ms, N/O contact)			
5 mA (at 24 V)			
2.5 kV_{rms} (50 Hz, 1 min.)			
-40°C ... 50°C			
-40°C ... 60°C			
100% operating factor			
Approx. 2 x 10^7 cycles			
Approx. 2 x 10^7 cycles			
DIN EN 50178, IEC 62103			
2 / II			
Any / In rows with zero spacing			
0.14 - 1.5 mm^2 / 0.14 - 1.5 mm^2 / 26 - 16			
31 mm / 75 mm / 93 mm			

Ordering data

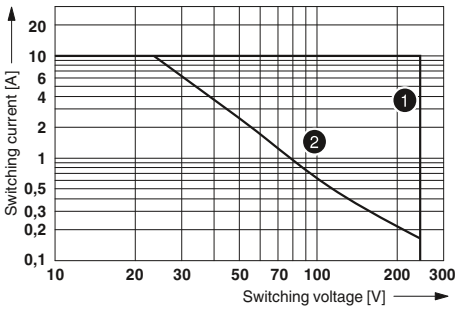
Type	Order No.	Pcs. / Pkt.
RIF-2-RPT-LDP-24DC/4X21	**2903308**	10
RIF-2-RPT-LV-24AC/4X21	**2903306**	10
RIF-2-RPT-LV-120AC/4X21	**2903305**	10
RIF-2-RPT-LV-230AC/4X21	**2903304**	10

Operating voltage range



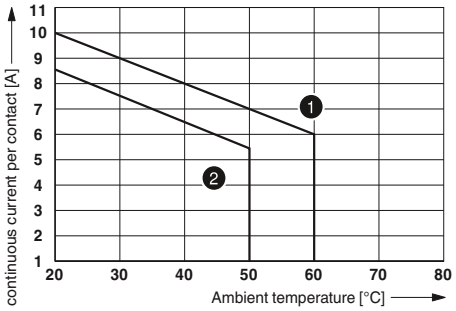
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



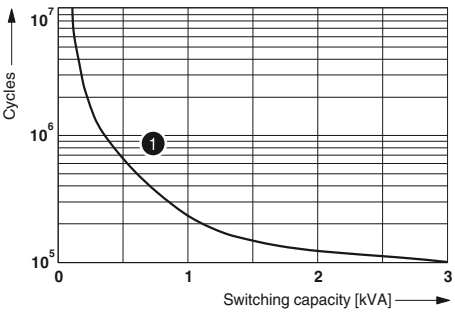
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

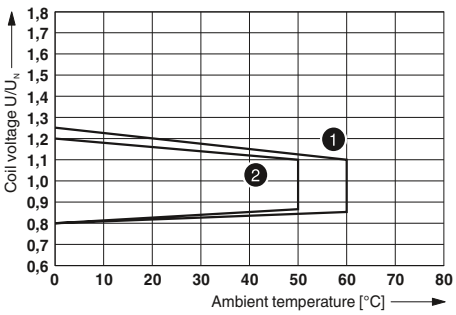
Electrical service life



❶ 250 V AC, ohmic load

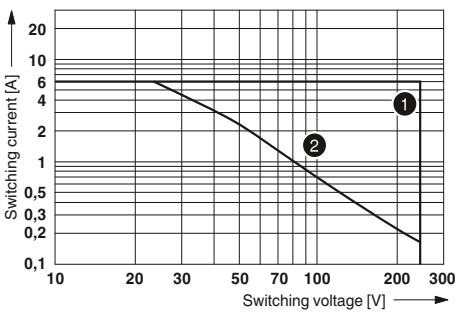
RIF-2-RPT.../4X21 (4 PDTs)

Operating voltage range



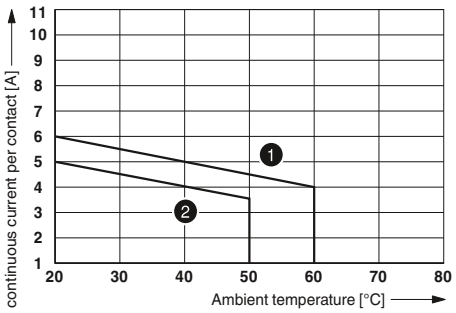
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



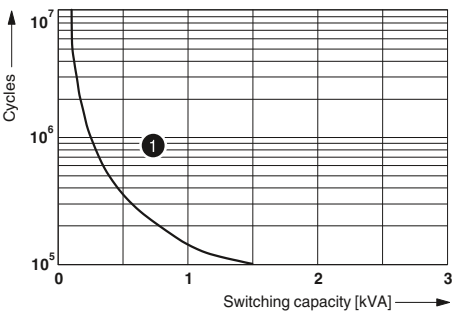
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

Electrical service life



❶ 250 V AC, ohmic load

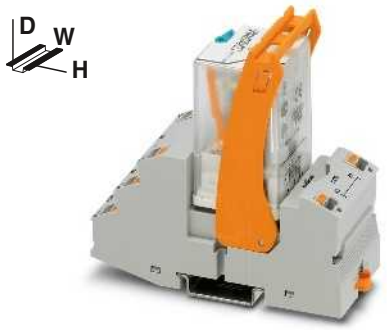
Fully mounted RIF-3 relay modules

N

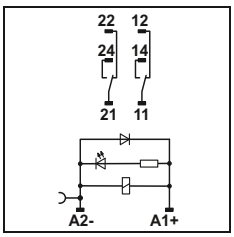
Fully mounted RIF-3 relay modules, consisting of:
– Relay base
– 2 or 3 PDT relays
– Relay retaining bracket
– Input module/interference suppr. module (AC types only)

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

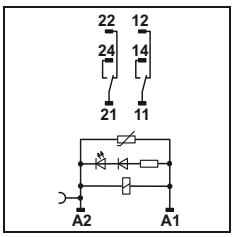
– For FBS 2-6 plug-in bridges for the input side (A2), see page 318.



RIF-3 relay module with 2 PDT relay



DC coils



AC coils

Technical data

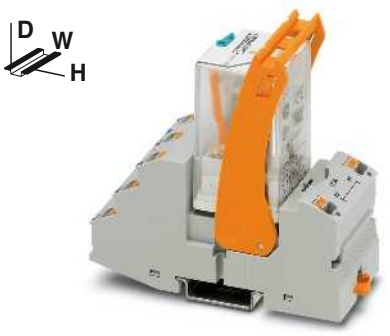
Input data		①	②	③
Permissible range (with reference to U_N)		refer to the diagram		
Typ. input current at U_N	[mA]	60	23	13
Typ. response time at U_N	[ms]	18	5 - 15	5 - 15
Typ. release time at U_N	[ms]	20	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor		
Input circuit DC		Yellow LED, Damping diode		
Output data				
Contact type		Single contact, 2-PDT		
Contact material		AgNi		
Max. switching voltage		250 V AC/DC		
Min. switching voltage		10 V (At 24 mA)		
Limiting continuous current		(refer to the diagram)		
Max. inrush current, AC		30 A (20 ms, N/O contact)		
Max. inrush current, DC		30 A (20 ms, N/O contact)		
Min. switching current		10 mA (at 24 V)		
General data				
Test voltage (winding / contact)		2.5 kV_{rms} (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. 2 x 10^7 cycles		
Mechanical service life, DC		Approx. 2 x 10^7 cycles		
Standards/regulations		DIN EN 50178, IEC 62103		
Pollution degree/surge voltage category		2 / III		
Mounting position/mounting		Any / In rows with zero spacing		
Connection data solid / stranded / AWG		0.14 - 1.5 mm^2 / 0.14 - 1.5 mm^2 / 26 - 16		
Dimensions	W / H / D	40 mm / 90 mm / 100 mm		

Ordering data

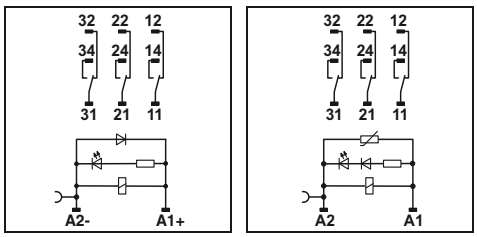
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Pre-assembled coupling relay modules with miniature power contact relay					
	①	24 V DC	**RIF-3-RPT-LDP-24DC/2X21**	**2903297**	5
	②	120 V AC	**RIF-3-RPT-LV-120AC/2X21**	**2903296**	5
	③	230 V AC	**RIF-3-RPT-LV-230AC/2X21**	**2903295**	5

N

RIF-3-RPT.../2X21 (2 PDTs)



RIF-3 relay module with 3 PDT relay



DC coils AC coils

Technical data

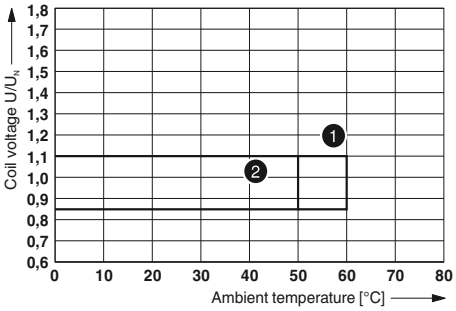
①	②	③
refer to the diagram		
60	23	13
18	5 - 15	5 - 15
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, Damping diode		

Single contact, three PDTs	
AgNi	
250 V AC/DC	
10 V (At 24 mA)	
(refer to the diagram)	
30 A (20 ms, N/O contact)	
30 A (20 ms, N/O contact)	
10 mA (at 24 V)	
2.5 kV_{rms} (50 Hz, 1 min.)	
-40°C ... 50°C	
-40°C ... 60°C	
100% operating factor	
Approx. 2 x 10^7 cycles	
Approx. 2 x 10^7 cycles	
DIN EN 50178, IEC 62103	
2 / III	
Any / In rows with zero spacing	
0.14 - 1.5 mm^2 / 0.14 - 1.5 mm^2 / 26 - 16	
40 mm / 90 mm / 100 mm	

Ordering data

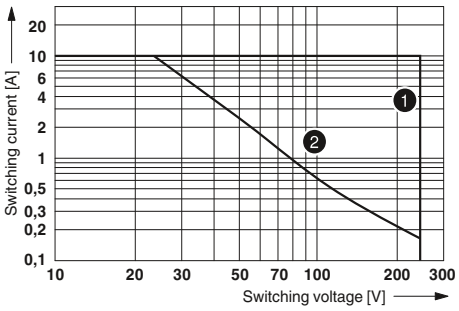
Type	Order No.	Pcs. / Pkt.
RIF-3-RPT-LDP-24DC/3X21	**2903294**	5
RIF-3-RPT-LV-120AC/3X21	**2903293**	5
RIF-3-RPT-LV-230AC/3X21	**2903292**	5

Operating voltage range



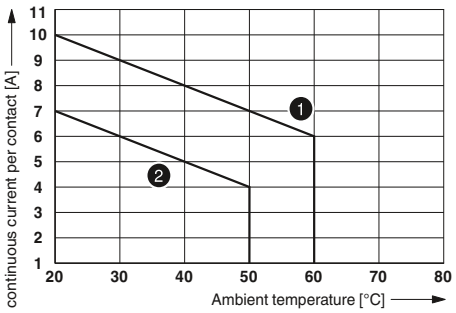
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



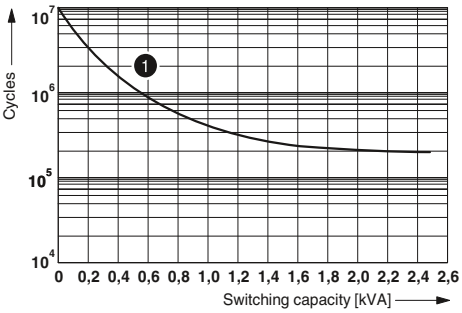
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

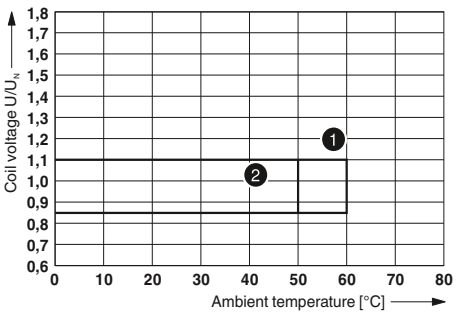
Electrical service life



❶ 250 V AC, ohmic load

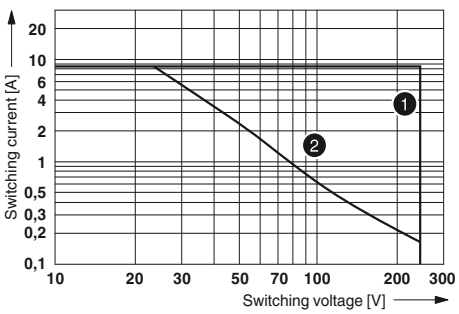
RIF-3-RPT.../3X21 (3 PDTs)

Operating voltage range



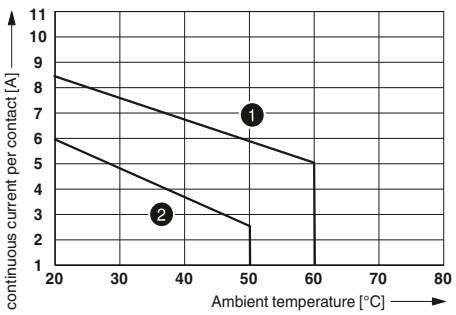
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



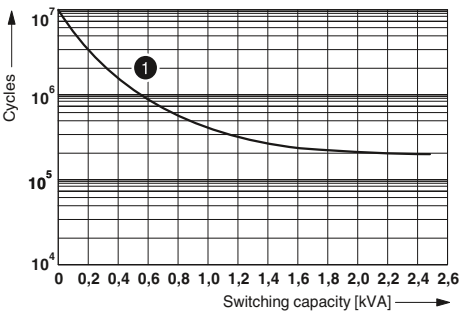
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

Electrical service life



❶ 250 V AC, ohmic load

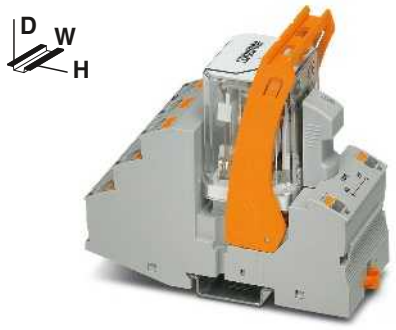
Fully mounted RIF-4 relay modules

N

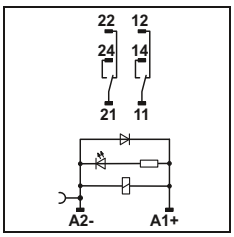
Fully mounted RIF-4 relay modules, consisting of:
– Relay base
– 2 or 3 PDT relays
– Relay retaining bracket
– Input module/interference suppr. module

The advantages:
– Logical contact arrangement thanks to 1/3-level relay base
– Professional bridging of adjacent modules saves wiring time

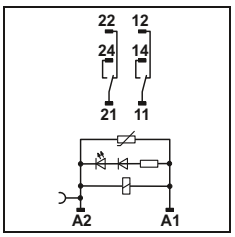
– For FBS 2-6 plug-in bridges for the input side (A2), see page 318.



RIF-4 relay module with 2 PDT relay



DC coils



AC coils

Technical data

Input data		①	②	③
Permissible range (with reference to U_N)		refer to the diagram		
Typ. input current at U_N	[mA]	56	24	14
Typ. response time at U_N	[ms]	20	5 - 25	5 - 25
Typ. release time at U_N	[ms]	20	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor		
Input circuit DC		Yellow LED, Damping diode, Polarity protection diode		
Output data				
Contact type		Single contact, 2-PDT		
Contact material		AgNi		
Max. switching voltage		440 V AC / 250 V DC		
Min. switching voltage		10 V (At 24 mA)		
Limiting continuous current		(refer to the diagram)		
Max. inrush current, AC		50 A (20 ms, N/O contact)		
Max. inrush current, DC		50 A (20 ms, N/O contact)		
Min. switching current		10 mA (at 24 V)		
Max. 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)		
General data				
Test voltage (winding / contact)		2.5 kV_{rms} (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. 10^7 cycles		
Mechanical service life, DC		Approx. 10^7 cycles		
Standards/regulations		DIN EN 50178, IEC 62103		
Pollution degree/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^2 / 0.14 ... 1.5 mm^2 / 26 - 16		
Output side		0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14		
Dimensions	W / H / D	43 mm / 90 mm / 107 mm		

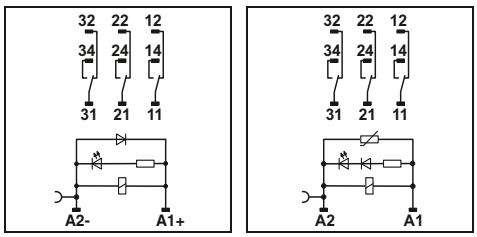
Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Pre-assembled coupling relay modules with miniature power contact relay					
	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

N

D W H

RIF-4 relay module with 3 PDT relay



Technical data

①	②	③
refer to the diagram		
56	24	14
20	5 - 25	5 - 25
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, Damping diode, Polarity protection diode		

Single contact, three PDTs
AgNi
440 V AC / 250 V DC
10 V (At 24 mA)
(refer to the 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_{rms} (50 Hz, 1 min.)
-40°C ... 40°C
-40°C ... 60°C
100% operating factor
Approx. 10^7 cycles
Approx. 10^7 cycles
DIN EN 50178, IEC 62103
2 / III
Any / In rows with zero spacing

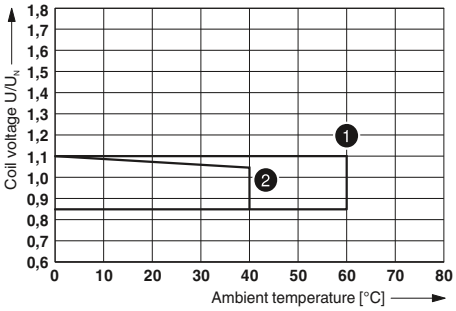
0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14
43 mm / 90 mm / 107 mm

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

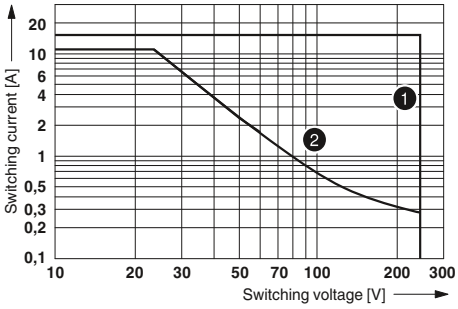
RIF-4-RPT.../2X21 (2 PDTs)

Operating voltage range



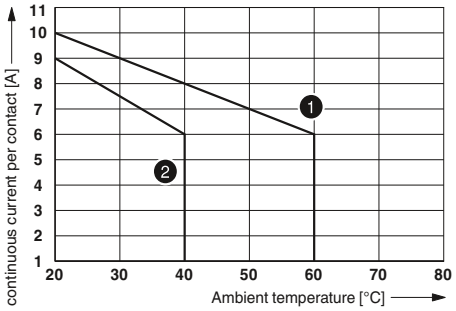
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



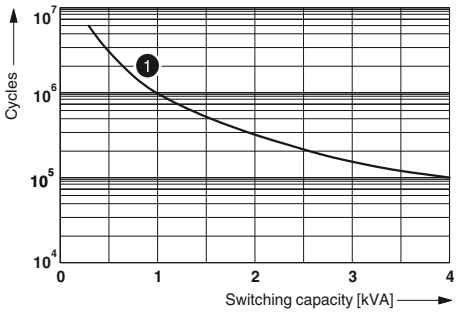
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

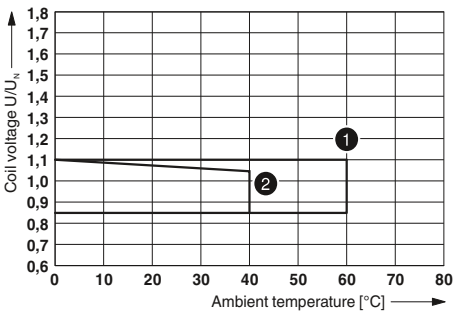
Electrical service life



❶ 250 V AC, ohmic load

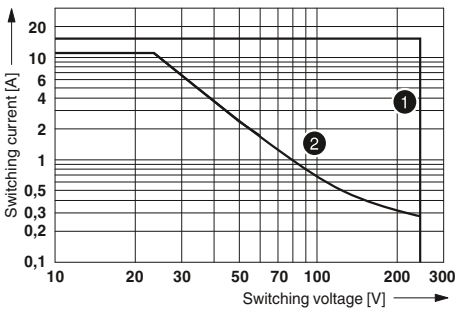
RIF-4-RPT.../3X21 (3 PDTs)

Operating voltage range



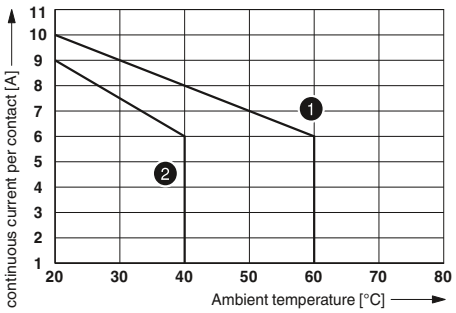
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



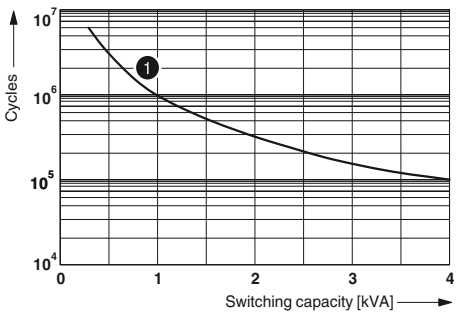
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

Electrical service life



❶ 250 V AC, ohmic load

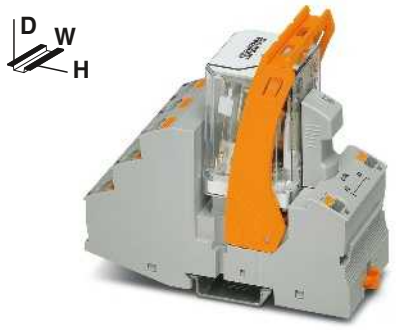
Fully mounted RIF-4 relay modules

N

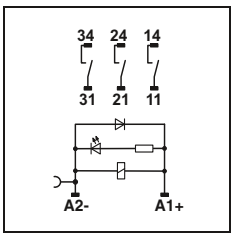
Fully mounted RIF-4 relay modules, consisting of:
– Relay base
– 3 N/O relays
– Relay retaining bracket
– Input module/interference suppr. module

The advantages:
– Logical contact arrangement thanks to 1/3-level relay base
– Full shutdown by means of ≥ 3 mm contact opening
– Professional bridging of adjacent modules saves wiring time

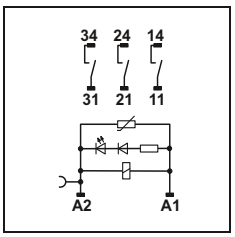
– For FBS 2-6 plug-in bridges for the input side (A2), see page 318.



RIF-4 relay module with 3 N/O relay



DC coils



AC coils

Technical data

Input data		① ② ③
Permissible range (with reference to U_N)		refer to the diagram
Typ. input current at U_N	[mA]	70 24 14
Typ. response time at U_N	[ms]	20 5 - 25 5 - 25
Typ. release time at U_N	[ms]	20 5 - 20 5 - 20
Input circuit AC		Yellow LED, Varistor
Input circuit DC		Yellow LED, Damping diode, Polarity protection diode
Output data		
Contact type		Single contact, 3 N/O contacts
Contact material		AgNi
Max. switching voltage		440 V AC / 250 V DC
Min. switching voltage		10 V (At 24 mA)
Limiting continuous current		(refer to the diagram)
Max. inrush current, AC		50 A (20 ms, N/O contact)
Max. inrush current, DC		50 A (20 ms, N/O contact)
Min. switching current		10 mA (at 24 V)
Max. 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_{rms} (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. 10^7 cycles
Mechanical service life, DC		Approx. 10^7 cycles
Standards/regulations		DIN EN 50178, IEC 62103
Pollution degree/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^2 / 0.14 ... 1.5 mm^2 / 26 - 16
Output side		0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14
Dimensions	W / H / D	43 mm / 90 mm / 107 mm

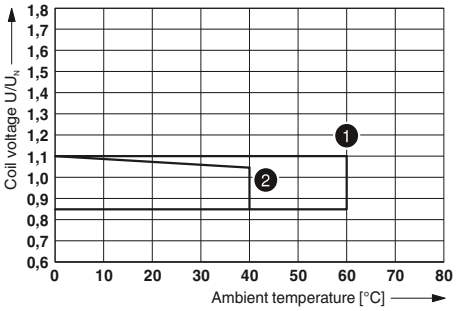
Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Pre-assembled coupling relay modules with miniature power contact relay					
	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

N

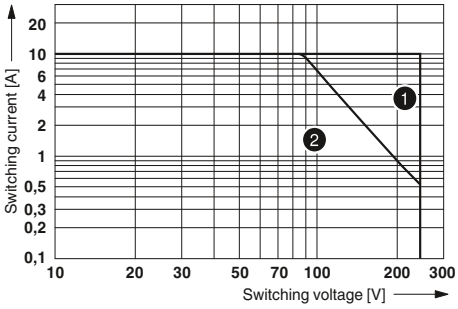
RIF-4-RPT.../3X1 (3 N/O contacts)

Operating voltage range



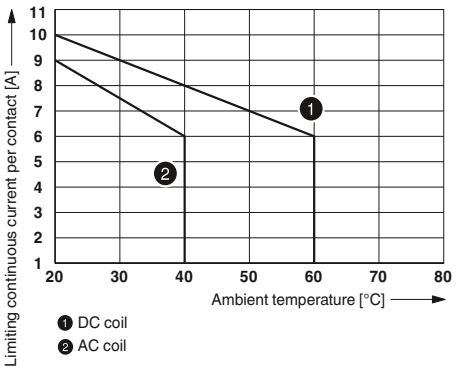
1 DC coil (observe contact derating)
2 AC coil (observe contact derating)

Interrupting rating



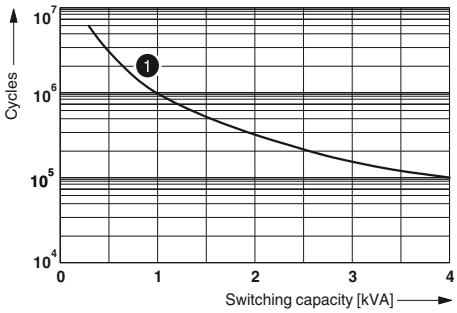
1 AC, ohmic load
2 DC, ohmic load

Contact derating



1 DC coil
2 AC coil

Electrical service life



1 250 V AC, ohmic load

RIFLINE complete accessories
Plug-in bridges

The plug-in bridges can be used for simple potential distribution via all relay bases.

The end clamp is used for safe isolation between adjacent modules and to visually separate the various function groups.

Description	Color	Ordering data: Type		Order No.	Pcs. / Pkt.	Ordering data: Type	Order No.	Pcs. / Pkt.
Plug-in bridge								
2-pos. red		**FBS 2-6**		**3030336**	50			
2-pos. blue		**FBS 2-6 BU**		**3036932**	50			
2-pos. gray		**FBS 2-6 GY**		**3032237**	50			
5-pos. red		**FBS 5-6**		**3030349**	50			
10-pos. red		**FBS 10-6**		**3030271**	10			
20-pos. red		**FBS 20-6**		**3030365**	10			
50-pos. red		**FBS 50-6**		**3032224**	10			
2-pos. red		**FBS 2-8**		**3030284**	10			
2-pos. blue		**FBS 2-8 BU**		**3032567**	10			
2-pos. gray		**FBS 2-8 GY**	**7042**	**3032541**	10			
End clamp, to snap on NS 35, 9.5 mm wide, can be labeled with ZB 6, ZB 8/27, KLM...						**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

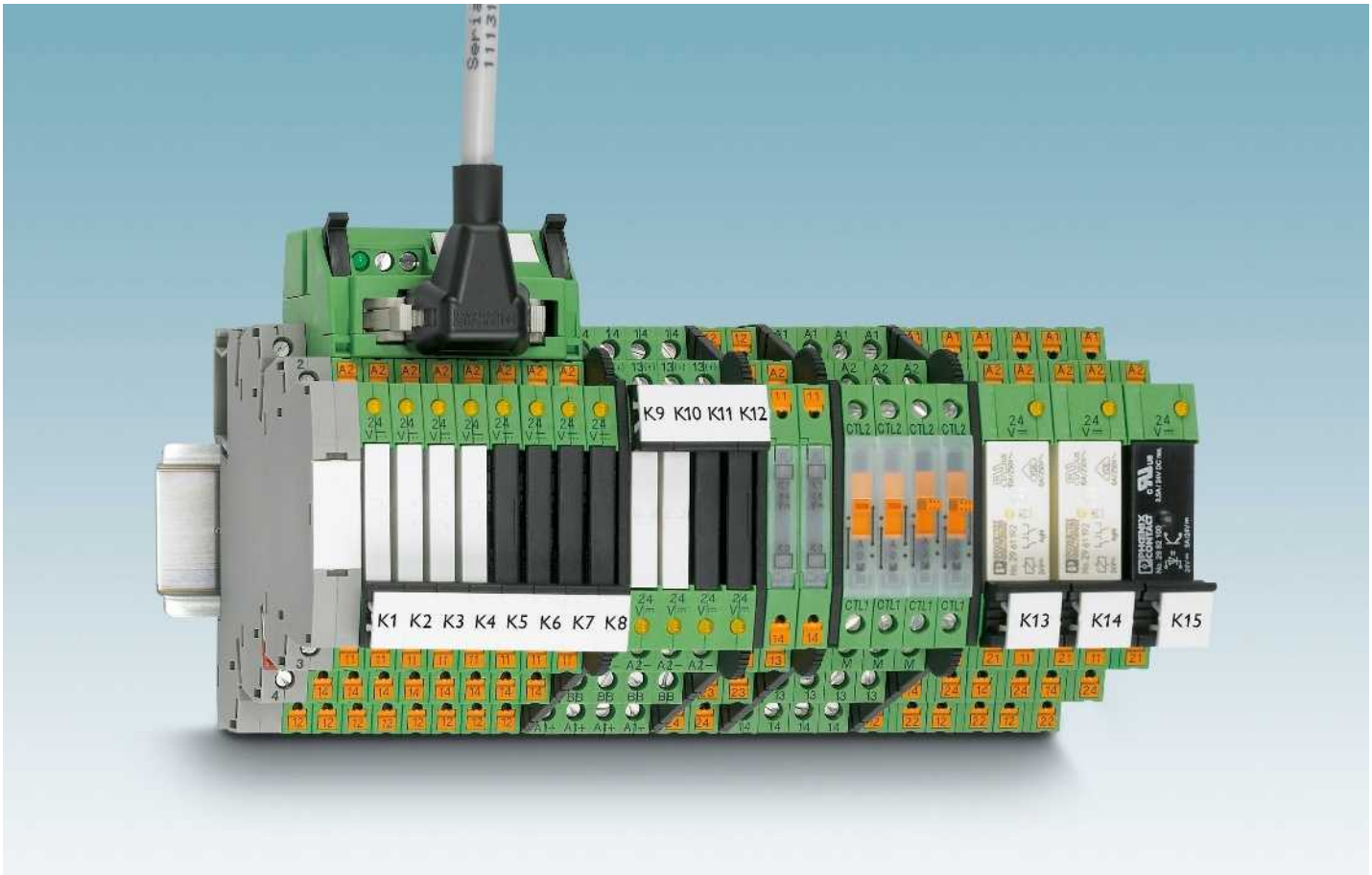
Double marker carrier

Description	Color	Ordering data: Type	Order No.	Pcs. / Pkt.	Ordering data: Type	Order No.	Pcs. / Pkt.
Zack marker strip, unprinted							
10-section	white	**ZB 5 :UNBEDRUCKT**	**1050004**	10			
10-section	white	**ZB 6:UNBEDRUCKT**	**1051003**	10			
5-section	white	**ZB 15:UNBEDRUCKT**	**0811972**	10			
Double marker carrier for ZB 5	gray				**STP 5-2**	**0800967**	100

RIFLINE complete accessories
Test plugs

The two-piece test plug offers individual plug color combinations. The test plug is inserted directly in the function shaft of the push-in connection.

Description	Color	Ordering data		
		Type	**Order No.**	Pcs. / Pkt.
Test plug, consisting of:				
Metal part for 2.3 mm Ø socket hole and		**MPS-MT**	**0201744**	10
Insulating sleeve, 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



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 with three connection technologies. Depending on the area of application, screw, spring-cage 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 from CLIPLINE complete modular terminal blocks can be used to mark PLC-INTERFACE.

Adapters for the system cabling

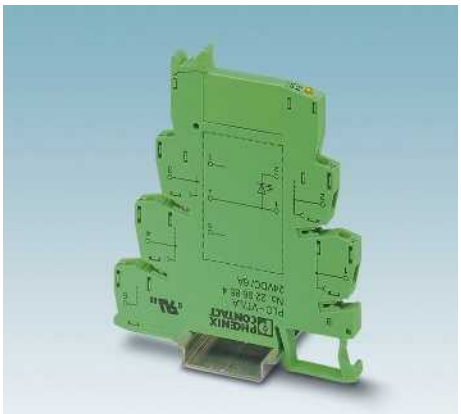
The PLC-V8... adapter is used to connect 8 PLC-INTERFACE modules to the PLC system cabling for input and output functions. For more details, see page 369

6.2 mm design width

PLC-R...21 and PLC-O... relay and solid-state relay modules with PDT or N/O contact, designed for universal use. Available with screw, spring-cage or push-in connection.

14 mm design width

PLC-R...21-21 includes plug-in relays with two PDT contacts for switching capacities of up to 250 V AC/6 A. Available with screw, spring-cage, and push-in connection.



Feed-through terminal block

PLC-VT... is the feed-through terminal block for PLC-INTERFACE and the system cabling for passive signal transfer. For more details, see page 486

Sensors/actuators

PLC...SEN and PLC...ACT do not require additional supply/output terminal blocks. All connections are connected directly.

High currents

PLC...IC is ideal for high inrush currents, e.g., from lamp loads. PLC...HC are the modules to use for applications with high continuous load currents.

Railway applications

PLC...RW relay or solid-state relay modules are suitable for railway requirements. They are only available with spring-cage and push-in connection.

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.

Accessories

The entire PLC-INTERFACE system can be extended with a wide range of accessories, such as power terminal blocks or plug-in bridges. For more details, see page 368

Universal PLC series with PDT relay

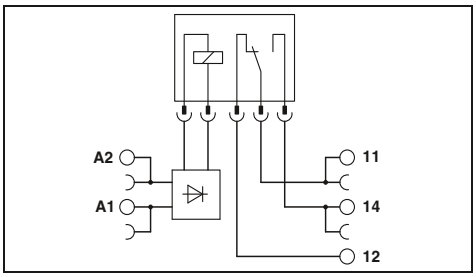
PLC-R... is the relay series that can be used universally and consists of basic terminal blocks and plug-in relays with PDT contacts.

The advantages:

– Slim design
– Screw, spring-cage, and push-in 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 housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.
For diagrams of operating voltage ranges, see page 343
Note: for marking material (ZB 6), see "CLIPLINE industrial connection technology, marking material for terminals, conductors, and cables".
1) 120 and 230 V types up to 55°C
2) 230 V types up to 55°C
3) EMC: Class A product, see page 571

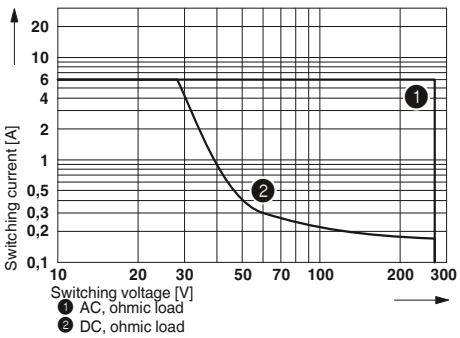
1 PDT with power contact



Technical data

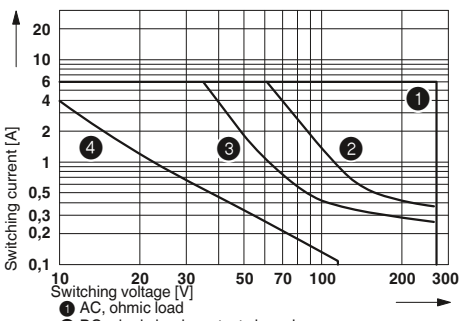
		①	②	③	④	⑤	⑥	⑦
Input data								
Typ. input current at U_N	[mA]	15.3	9	11	9.2	4.8	3.5	3.2
Response/release time at U_N	[ms]	5 / 8	5 / 8	6 / 15	5 / 8	5 / 8	6 / 15	7 / 15
Input circuit DC		Yellow LED, Protection against polarity reversal, freewheeling diode						
Input circuit AC/DC		Yellow LED, Bridge rectifier						
Output data								
Contact material		AgSnO						
Max. switching voltage		250 V AC/DC						
Min. switching voltage		5 V (at 100 mA)						
Limiting continuous current		6 A						
Max. inrush current		(on request)						
Min. 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[1])						
Mechanical service life		2 x 10^7 cycles						
Standards/regulations		IEC 60664, EN 50178, IEC 62103						
Connection data solid / stranded / AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14						
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm						

Electrical interrupting rating for PLC...21 with 1-PDT relay



1 AC, ohmic load
2 DC, ohmic load

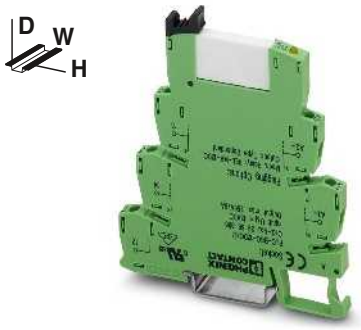
Electrical interrupting rating for PLC...21-21 with 2-PDT relay



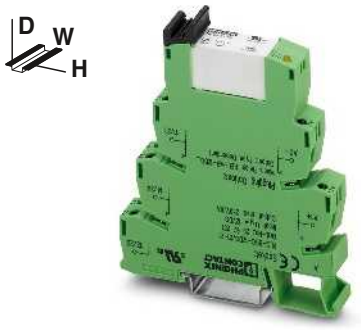
1 AC, ohmic load
2 DC, ohmic load, contacts in series
3 DC, ohmic load
4 DC, L/R = 40 ms

Ordering data

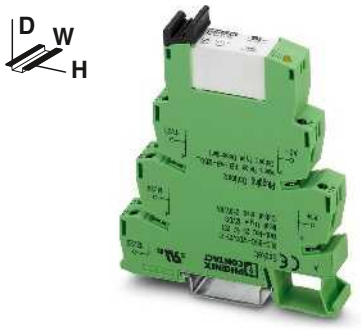
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection**					
	①	12 V DC	**PLC-RSC- 12DC/21[3])**	**2966906**	10
	②	24 V DC	**PLC-RSC- 24DC/21[3])**	**2966171**	10
	③	24 V AC/DC	**PLC-RSC- 24UC/21[3])**	**2966184**	10
	④	48 V DC	**PLC-RSC- 48DC/21[3])**	**2966113**	10
	⑤	60 V DC	**PLC-RSC- 60DC/21[3])**	**2966139**	10
	⑥	120 V AC (110 V DC)	**PLC-RSC-120UC/21[3])**	**2966197**	10
	⑦	230 V AC (220 V DC)	**PLC-RSC-230UC/21[3])**	**2966207**	10
PLC INTERFACE, with **spring-cage connection**					
	①	12 V DC	**PLC-RSP- 12DC/21[3])**	**2967439**	10
	②	24 V DC	**PLC-RSP- 24DC/21[3])**	**2966472**	10
	③	24 V AC/DC	**PLC-RSP- 24UC/21[3])**	**2966485**	10
	④	48 V DC	**PLC-RSP- 48DC/21[3])**	**2966498**	10
	⑤	60 V DC	**PLC-RSP- 60DC/21[3])**	**2966511**	10
	⑥	120 V AC (110 V DC)	**PLC-RSP-120UC/21[3])**	**2966524**	10
	⑦	230 V AC (220 V DC)	**PLC-RSP-230UC/21[3])**	**2966537**	10
PLC-INTERFACE, with **push-in connection**					
	①	12 V DC	**PLC-RPT- 12DC/21[3])**	**2900316**	10
	②	24 V DC	**PLC-RPT- 24DC/21[3])**	**2900299**	10
	③	24 V AC/DC	**PLC-RPT- 24UC/21[3])**	**2900300**	10
	④	48 V DC	**PLC-RPT- 48DC/21[3])**	**2900301**	10
	⑤	60 V DC	**PLC-RPT- 60DC/21[3])**	**2900303**	10
	⑥	120 V AC (110 V DC)	**PLC-RPT-120UC/21[3])**	**2900304**	10
	⑦	230 V AC (220 V DC)	**PLC-RPT-230UC/21[3])**	**2900305**	10



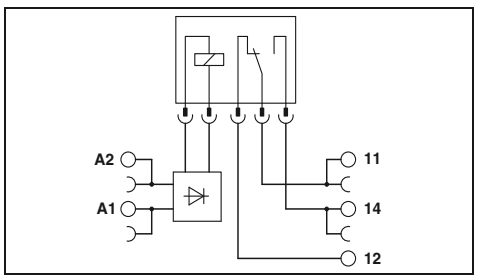
1 PDT with multi-layer gold contact

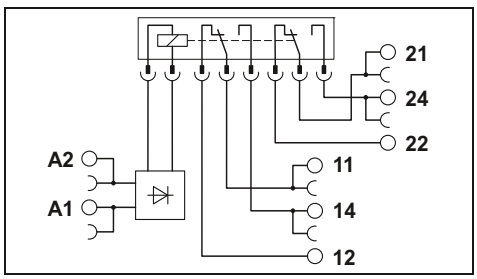


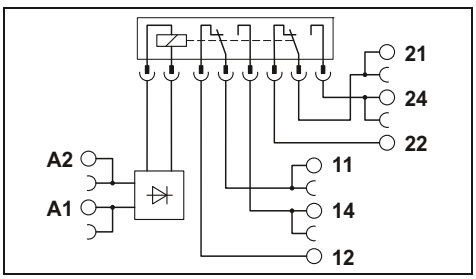
2 PDT with power contact



2 PDT with multi-layer gold contact







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, Protection against polarity reversal, 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[1])
2 x 10^7 cycles
IEC 60664, EN 50178, IEC 62103
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
6.2 mm / 80 mm / 94 mm

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, Protection against polarity reversal, freewheeling diode
Yellow LED, Bridge rectifier

AgNi
250 V AC/DC
5 V AC/DC (at 10 mA)
6 A
15 A (300 ms)
10 mA (At 5 V)

4 kV AC (50 Hz, 1 min.)
-40°C ... 60°C[2])
3 x 10^7 cycles
IEC 60664, EN 50178, IEC 62103
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
14 mm / 80 mm / 94 mm

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, Protection against polarity reversal, freewheeling diode
Yellow LED, Bridge rectifier

AgNi, 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])
3 x 10^7 cycles
IEC 60664, EN 50178, IEC 62103
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
14 mm / 80 mm / 94 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-RSC- 12DC/21AU[3])	**2966919**	10
PLC-RSC- 24DC/21AU[3])	**2966265**	10
PLC-RSC- 24UC/21AU[3])	**2966278**	10
PLC-RSC- 48DC/21AU[3])	**2966126**	10
PLC-RSC- 60DC/21AU[3])	**2966142**	10
PLC-RSC-120UC/21AU[3])	**2966281**	10
PLC-RSC-230UC/21AU[3])	**2966294**	10
PLC-RSP- 12DC/21AU[3])	**2967442**	10
PLC-RSP- 24DC/21AU[3])	**2966540**	10
PLC-RSP- 24UC/21AU[3])	**2966553**	10
PLC-RSP- 48DC/21AU[3])	**2966566**	10
PLC-RSP- 60DC/21AU[3])	**2966579**	10
PLC-RSP-120UC/21AU[3])	**2966582**	10
PLC-RSP-230UC/21AU[3])	**2966647**	10
PLC-RPT- 12DC/21AU[3])	**2900317**	10
PLC-RPT- 24DC/21AU[3])	**2900306**	10
PLC-RPT- 24UC/21AU[3])	**2900307**	10
PLC-RPT- 48DC/21AU[3])	**2900308**	10
PLC-RPT- 60DC/21AU[3])	**2900309**	10
PLC-RPT-120UC/21AU[3])	**2900310**	10
PLC-RPT-230UC/21AU[3])	**2900311**	10

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-RSC- 12DC/21-21[3])	**2967235**	10
PLC-RSC- 24DC/21-21[3])	**2967060**	10
PLC-RSC- 24UC/21-21[3])	**2967073**	10
PLC-RSC- 48DC/21-21[3])	**2967248**	10
PLC-RSC- 60DC/21-21[3])	**2967293**	10
PLC-RSC-120UC/21-21[3])	**2967086**	10
PLC-RSC-230UC/21-21[3])	**2967099**	10
PLC-RSP- 12DC/21-21[3])	**2912497**	10
PLC-RSP- 24DC/21-21[3])	**2912507**	10
PLC-RSP- 24UC/21-21[3])	**2912510**	10
PLC-RSP- 48DC/21-21[3])	**2912523**	10
PLC-RSP- 60DC/21-21[3])	**2912536**	10
PLC-RSP-120UC/21-21[3])	**2912549**	10
PLC-RSP-230UC/21-21[3])	**2912552**	10
PLC-RPT- 12DC/21-21[3])	**2900329**	10
PLC-RPT- 24DC/21-21[3])	**2900330**	10
PLC-RPT- 24UC/21-21[3])	**2900332**	10
PLC-RPT- 48DC/21-21[3])	**2900333**	10
PLC-RPT- 60DC/21-21[3])	**2900334**	10
PLC-RPT-120UC/21-21[3])	**2900335**	10
PLC-RPT-230UC/21-21[3])	**2900336**	10

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-RSC- 12DC/21-21AU[3])	**2967277**	10
PLC-RSC- 24DC/21-21AU[3])	**2967125**	10
PLC-RSC- 24UC/21-21AU[3])	**2967112**	10
PLC-RSC- 48DC/21-21AU[3])	**2967280**	10
PLC-RSC- 60DC/21-21AU[3])	**2967303**	10
PLC-RSC-120UC/21-21AU[3])	**2967138**	10
PLC-RSC-230UC/21-21AU[3])	**2967141**	10
PLC-RSP- 12DC/21-21AU[3])	**2912565**	10
PLC-RSP- 24DC/21-21AU[3])	**2912578**	10
PLC-RSP- 24UC/21-21AU[3])	**2912581**	10
PLC-RSP- 48DC/21-21AU[3])	**2912594**	10
PLC-RSP- 60DC/21-21AU[3])	**2912604**	10
PLC-RSP-120UC/21-21AU[3])	**2912617**	10
PLC-RSP-230UC/21-21AU[3])	**2912620**	10
PLC-RPT- 12DC/21-21AU[3])	**2900337**	10
PLC-RPT- 24DC/21-21AU[3])	**2900338**	10
PLC-RPT- 24UC/21-21AU[3])	**2900339**	10
PLC-RPT- 48DC/21-21AU[3])	**2900340**	10
PLC-RPT- 60DC/21-21AU[3])	**2900341**	10
PLC-RPT-120UC/21-21AU[3])	**2900342**	10
PLC-RPT-230UC/21-21AU[3])	**2900343**	10

Universal PLC series with solid-state relays

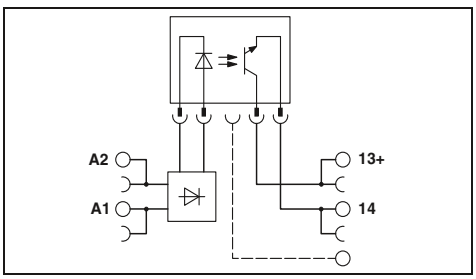
PLC-O... is the solid-state relay series that can be used universally consisting of basic terminal blocks and plug-in solid-state relays.

The advantages:

- Slim design
- Screw, spring-cage, and push-in 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 housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For derating curves see page 345
1) EMC: Class A product, see page 571

Max. DC voltage output of 100 mA



Technical data

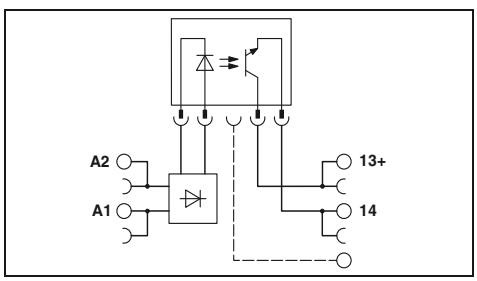
		①	②	③	④	⑤	⑥
Input data							
Permissible range (with reference to U_N)		0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.9 - 1.1	0.9 - 1.1
Switching level (with reference to U_N)	1 signal (“H”)	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.9	≥ 0.8
	0 signal (“L”)	≤ 0.4	≤ 0.3	≤ 0.4	≤ 0.4	≤ 0.3	≤ 0.3
Typ. input current at U_N	[mA]	8.5	9	5	3	3.5	3.5
Typ. switch-on time at U_N	[ms]	0.02	0.03	0.04	1	3	3
Typ. switch-off time at U_N	[ms]	0.3	0.3	2	3	4	5
Transmission frequency f_{limit}	[Hz]	300	300	100	50	10	10
Input circuit DC		Yellow LED, Protection against polarity reversal, freewheeling diode					
Input circuit AC/DC		Yellow LED, Bridge rectifier					
Output data							
Max. switching voltage		48 V DC					
Min. switching voltage		3 V DC					
Max. inrush current		-					
Min./max. switching current		- / 100 mA					
Output protection		Protection against polarity reversal, Surge protection					
Voltage drop at max. limiting continuous current		≤ 1 V					
Leakage current in off state		-					
Phase angle (cos ϕ)		-					
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, IEC 62103					
Pollution degree/surge voltage category		2 / III					
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14					
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm					

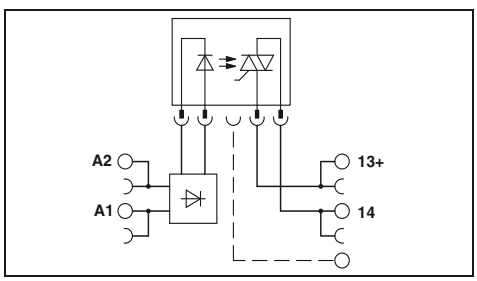
Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection**					
	①	24 V DC	**PLC-OSC- 24DC/ 48DC/100[1])**	**2966728**	10
	②	48 V DC	**PLC-OSC- 48DC/ 48DC/100[1])**	**2966993**	10
	③	60 V DC	**PLC-OSC- 60DC/ 48DC/100[1])**	**2967455**	10
	④	125 V DC	**PLC-OSC-125DC/ 48DC/100[1])**	**2980047**	10
	⑤	120 V AC (110 V DC)	**PLC-OSC-120UC/ 48DC/100[1])**	**2966744**	10
	⑥	230 V AC (220 V DC)	**PLC-OSC-230UC/ 48DC/100[1])**	**2966757**	10
PLC INTERFACE, with **spring-cage connection**					
	①	24 V DC	**PLC-OSP- 24DC/ 48DC/100[1])**	**2967549**	10
	②	48 V DC	**PLC-OSP- 48DC/ 48DC/100[1])**	**2967743**	10
	③	60 V DC	**PLC-OSP- 60DC/ 48DC/100[1])**	**2967756**	10
	④	120 V AC (110 V DC)	**PLC-OSP-120UC/ 48DC/100[1])**	**2967552**	10
	⑤	230 V AC (220 V DC)	**PLC-OSP-230UC/ 48DC/100[1])**	**2967565**	10
PLC-INTERFACE, with **push-in connection**					
	①	24 V DC	**PLC-OPT- 24DC/ 48DC/100[1])**	**2900352**	10
	②	48 V DC	**PLC-OPT- 48DC/ 48DC/100[1])**	**2900353**	10
	③	60 V DC	**PLC-OPT- 60DC/ 48DC/100[1])**	**2900354**	10
	④	120 V AC (110 V DC)	**PLC-OPT-120UC/ 48DC/100[1])**	**2900355**	10
	⑤	230 V AC (220 V DC)	**PLC-OPT-230UC/ 48DC/100[1])**	**2900356**	10

Max. DC voltage output of 3 A

Max. AC voltage output of 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, Protection against polarity reversal, freewheeling diode					
Yellow LED, Bridge rectifier					

33 V DC	
3 V DC	
15 A (10 ms)	
- / 3 A (see derating curve)	
Protection against polarity reversal, Surge protection	
≤ 200 mV	
-	
-	
-	
2.5 kV (50 Hz, 1 min.)	
-25°C ... 60°C	
IEC 60664, EN 50178, IEC 62103	
2 / III	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
6.2 mm / 80 mm / 94 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-OSC- 24DC/ 24DC/ 2[1])	**2966634**	10
PLC-OSC- 48DC/ 24DC/ 2[1])	**2967002**	10
PLC-OSC- 60DC/ 24DC/ 2[1])	**2967468**	10
PLC-OSC-125DC/ 24DC/ 2[1])	**2980050**	10
PLC-OSC-120UC/ 24DC/ 2[1])	**2966650**	10
PLC-OSC-230UC/ 24DC/ 2[1])	**2966663**	10
PLC-OSP- 24DC/ 24DC/ 2[1])	**2967471**	10
PLC-OSP- 48DC/ 24DC/ 2[1])	**2967727**	10
PLC-OSP- 60DC/ 24DC/ 2[1])	**2967730**	10
PLC-OSP-120UC/ 24DC/ 2[1])	**2967484**	10
PLC-OSP-230UC/ 24DC/ 2[1])	**2967497**	10
PLC-OPT- 24DC/ 24DC/2[1])	**2900364**	10
PLC-OPT- 48DC/ 24DC/2[1])	**2900365**	10
PLC-OPT- 60DC/ 24DC/2[1])	**2900366**	10
PLC-OPT-120UC/ 24DC/2[1])	**2900367**	10
PLC-OPT-230UC/ 24DC/2[1])	**2900368**	10

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
Yellow LED, Protection against polarity reversal, freewheeling diode					
Yellow LED, Bridge rectifier					

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 A²s	
2.5 kV (50 Hz, 1 min.)	
-25°C ... 60°C	
IEC 60664, EN 50178, IEC 62103	
2 / III	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
6.2 mm / 80 mm / 94 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-OSC- 24DC/230AC/ 1[1])	**2967840**	10
PLC-OSC- 48DC/230AC/ 1[1])	**2967853**	10
PLC-OSC- 60DC/230AC/ 1[1])	**2967866**	10
PLC-OSC-125DC/230AC/ 1[1])	**2980063**	10
PLC-OSC-120UC/230AC/ 1[1])	**2967879**	10
PLC-OSC-230UC/230AC/ 1[1])	**2967882**	10
PLC-OSP- 24DC/230AC/ 1[1])	**2967895**	10
PLC-OSP- 48DC/230AC/ 1[1])	**2967905**	10
PLC-OSP- 60DC/230AC/ 1[1])	**2967918**	10
PLC-OSP-120UC/230AC/ 1[1])	**2967921**	10
PLC-OSP-230UC/230AC/ 1[1])	**2967934**	10
PLC-OPT- 24DC/230AC/1[1])	**2900369**	10
PLC-OPT- 48DC/230AC/1[1])	**2900370**	10
PLC-OPT- 60DC/230AC/1[1])	**2900371**	10
PLC-OPT-120UC/230AC/1[1])	**2900372**	10
PLC-OPT-230UC/230AC/1[1])	**2900374**	10

PLC actuator series for output functions

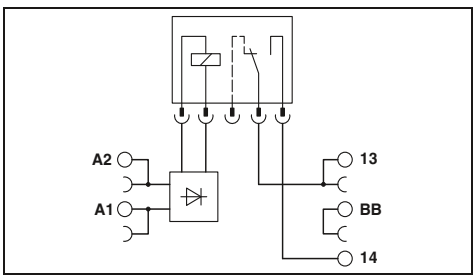
PLC actuator series for coupling controller and actuators, such as motors, contactors, valves, etc.

The advantages:

– Actuator connected directly to relay module
– No need for additional modular terminal blocks
– Space savings of up to 80%
– Time savings of up to 60%
– Screw, spring-cage, and push-in 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 housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 343
For derating curves see page 345
1) EMC: Class A product, see page 571

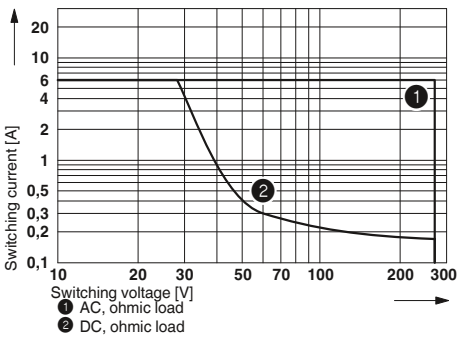
1 N/O contact with power contact



Technical data

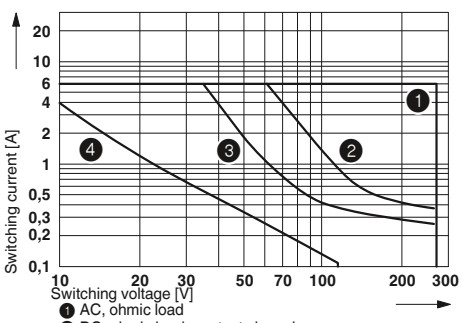
		②
Input data		
Permissible range (with reference to U_N)		See diagram
Switching level (with reference to U_N)	1 signal (“H”)	
	0 signal (“L”)	
Typ. input current at U_N	[mA]	9
Typ. response time/switch-on time at U_N	[ms]	5
Typ. release time/switch-off time at U_n	[ms]	8
Transmission frequency f_{limit}	[Hz]	
Input circuit DC		Yellow LED, Protection against polarity reversal, freewheeling diode
Output data		
Contact material		AgSnO
Max. switching voltage		250 V AC/DC
Min. switching voltage		5 V (at 100 mA)
Limiting continuous current		6 A
Max. inrush current		(on request)
Min. switching current		10 mA (at 12 V)
Output protection		-
Voltage drop at max. limiting continuous current		-
Leakage current in off state		-
Phase angle (cos ϕ)		-
Max. load value		-
General data		
Test voltage input/output		4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)		-40°C ... 60°C
Mechanical service life		2 x 10^7 cycles
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Pollution degree/surge voltage category		3 / III
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm

Electrical interrupting rating for PLC...24DC/1/ACT with 1-N/O relay



❶ AC, ohmic load
❷ DC, ohmic load

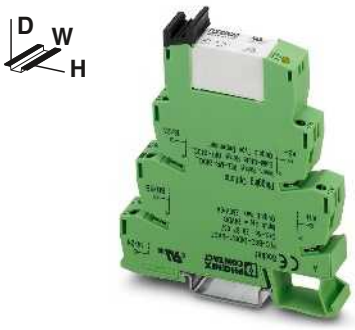
Electrical interrupting rating for PLC...24DC/1-1/ACT with 2-N/O relay



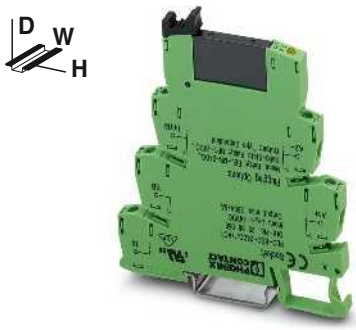
❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

Ordering data

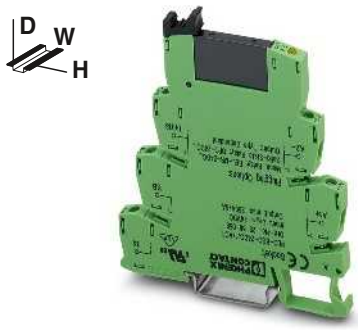
Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection**				
①	5 V DC			
②	24 V DC	**PLC-RSC- 24DC/ 1/ACT**[1])	**2966210**	10
PLC INTERFACE, with **spring-cage connection**				
①	5 V DC			
②	24 V DC	**PLC-RSP- 24DC/ 1/ACT**[1])	**2967345**	10
PLC-INTERFACE, with **push-in connection**				
①	5 V DC			
②	24 V DC	**PLC-RPT- 24DC/ 1/ACT**[1])	**2900312**	10



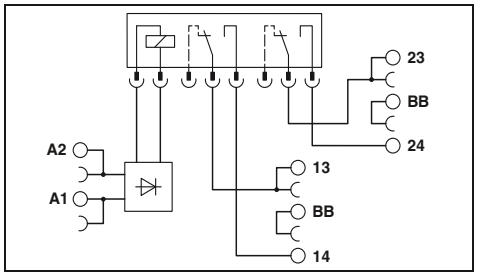
2 N/O contacts with power contact

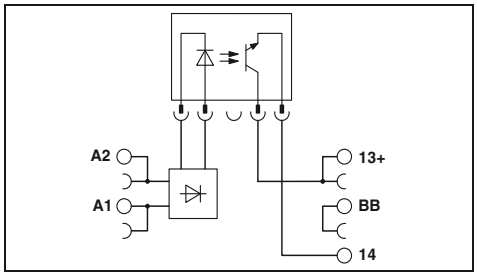


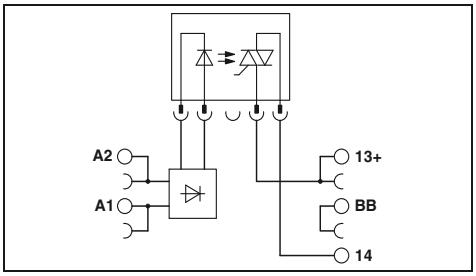
Max. DC voltage output of 3 A



Max. AC voltage output of 750 mA







Technical data

	②
	See diagram
	18
	8
	10
	Yellow LED, Protection against polarity reversal, 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 10^7 cycles
	IEC 60664, EN 50178, IEC 62103
	3 / III
	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
	14 mm / 80 mm / 94 mm

Technical data

	①	②
	0.8 - 1.2	0.8 - 1.2
	≥ 0.8	≥ 0.8
	≤ 0.25	≤ 0.4
	9.5	8.5
	0.02	0.02
	0.3	0.3
	300	300
	Yellow LED, Protection against polarity reversal, freewheeling diode	
	-	
	33 V DC	
	3 V DC	
	3 A (see derating curve)	
	15 A (10 ms)	
	-	
	Protection against polarity reversal, Surge protection	
	≤ 200 mV	
	-	
	-	
	-	
	2.5 kV (50 Hz, 1 min.)	
	-25°C ... 60°C	
	-	
	IEC 60664, EN 50178, IEC 62103	
	2 / III	
	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
	6.2 mm / 80 mm / 94 mm	

Technical data

	②
	0.8 - 1.2
	≥ 0.8
	≤ 0.25
	9
	3
	9
	10
	Yellow LED, Protection against polarity reversal, 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 A²s
	2.5 kV (50 Hz, 1 min.)
	-25°C ... 60°C
	-
	IEC 60664, EN 50178, IEC 62103
	2 / III
	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
	6.2 mm / 80 mm / 94 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-RSC- 24DC/ 1- 1/ACT[1])	**2967109**	10

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-OSC- 5DC/ 24DC/ 2/ACT[1])	**2980144**	10
PLC-OSC- 24DC/ 24DC/ 2/ACT[1])	**2966676**	10
PLC-OSP- 5DC/ 24DC/ 2/ACT[1])	**2980157**	10
PLC-OSP- 24DC/ 24DC/ 2/ACT[1])	**2967507**	10
PLC-OPT- 5DC/ 24DC/2/ACT[1])	**2900375**	10
PLC-OPT- 24DC/ 24DC/2/ACT[1])	**2900376**	10

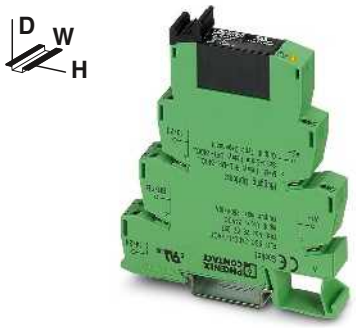
Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-OSC- 24DC/230AC/ 1/ACT[1])	**2967947**	10

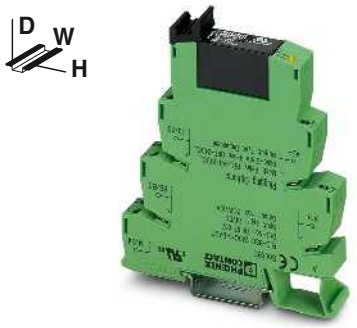
PLC actuator series for output functions

PLC actuator series with solid-state power relays for coupling the controller and actuators, such as motors, contactors, valves, etc.

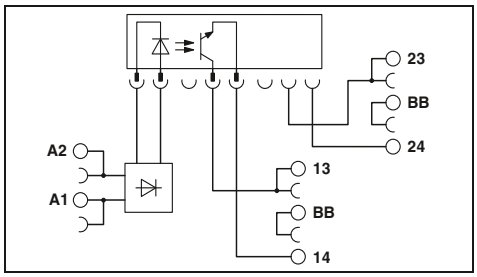
Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For derating curves see page 345

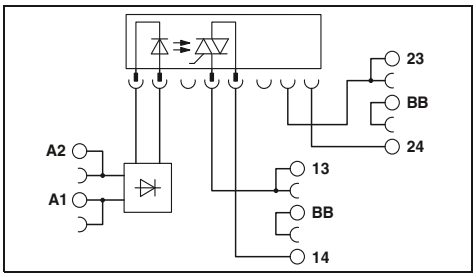


Max. DC voltage output of 5 A



Max. AC voltage output of 2 mA





Technical data

		①
Input data		
Permissible range (with reference to U_N)		0.8 - 1.2
Switching level (with reference to U_N)	1 signal (“H”) 0 signal (“L”)	≥ 0.8 ≤ 0.4
Typ. input current at U_N	[mA]	9
Typ. switch-on time at U_N	[ms]	0.02
Typ. switch-off time at U_N	[ms]	0.4
Transmission frequency f_{limit}	[Hz]	300
Input circuit DC		Yellow LED, Protection against polarity reversal, freewheeling diode
Output data		
Max. / min. switching voltage		33 V DC / 3 V DC
Max. inrush current		15 A (10 ms)
Min./max. switching current		- / 5 A (see derating curve)
Output protection		Protection against polarity reversal, Surge protection
Voltage drop at max. limiting continuous current		≤ 200 mV
Leakage current in off state		-
Phase angle (cos ϕ)		-
Max. load value		-
General data		
Rated insulation voltage		100 V DC
Rated surge voltage		1.5 kV, basic insulation
Ambient temperature (operation)		-20°C ... 60°C
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Pollution degree/surge voltage category		2 / III
Mounting position/mounting		Refer to Derating / In rows with zero spacing
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	W / H / D	14 mm / 80 mm / 94 mm

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

Technical data

		①
Input data		
Permissible range (with reference to U_N)		0.8 - 1.2
Switching level (with reference to U_N)	1 signal (“H”) 0 signal (“L”)	≥ 0.8 ≤ 0.4
Typ. input current at U_N	[mA]	9
Typ. switch-on time at U_N	[ms]	10
Typ. switch-off time at U_N	[ms]	10
Transmission frequency f_{limit}	[Hz]	10
Input circuit DC		Yellow LED, Protection against polarity reversal, freewheeling diode
Output data		
Max. / min. switching voltage		253 V AC / 24 V AC
Max. inrush current		30 A (10 ms)
Min./max. switching current		25 mA / 2 A (see derating curve)
Output protection		Surge protection
Voltage drop at max. limiting continuous current		≤ 1 V
Leakage current in off state		Typ. 1 mA
Phase angle (cos ϕ)		0.5
Max. load value		4 A²s (tp = 10 ms, at 25°C)
General data		
Rated insulation voltage		250 V AC
Rated surge voltage		4 kV / basic insulation
Ambient temperature (operation)		-20°C ... 60°C
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Pollution degree/surge voltage category		2 / III
Mounting position/mounting		Refer to Derating / In rows with zero spacing
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	W / H / D	14 mm / 80 mm / 94 mm

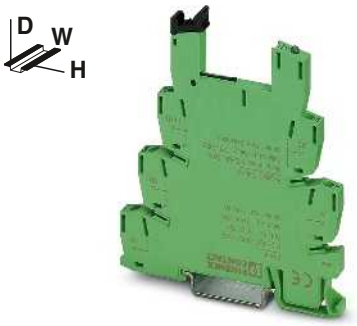
Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-OSC- 24DC/230AC/ 2/ACT	**2982760**	10

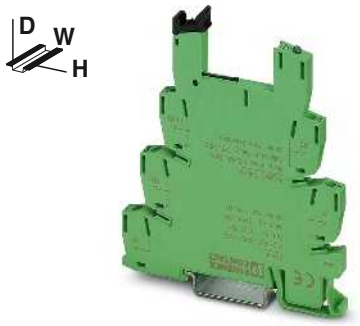
PLC actuator series for output functions

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.

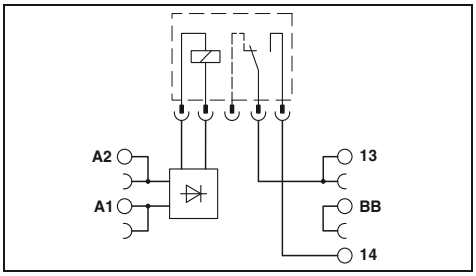
Notes:
Maximum interrupting rating diagrams, see page 346
For derating curves see page 345
1) EMC: Class A product, see page 571

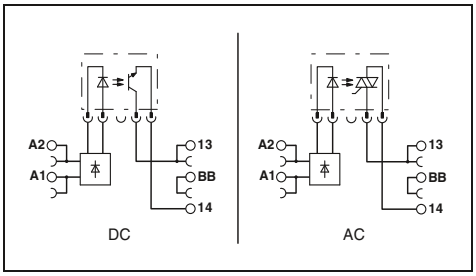


Basic terminal block that can be fitted with mech. relay



Basic terminal block that can be fitted with solid-state relay





Technical data

Input data			
Permissible range (with reference to U_N)	0.8 ... 1.2		
Typ. input current with U_N (50 /60 Hz)	15.6 mA / 8.5 mA		
Typ. response time at U_N	5 ms		
Typ. release time at U_N	30 ms		
Input circuit	LED yellow, Bridge rectifier		
Output data with:	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	
Min. switching voltage	100 mV (at 10 mA)	5 V (at 100 mA)	
Limiting continuous current	50 mA	6 A	
Min. 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)	-	-	
General data			
Rated insulation voltage	250 V AC		
Rated surge voltage / insulation	6 kV / Safe isolation, increased insulation		
Ambient temperature (operation)	-20°C ... 60°C		
Air and creepage distances	EN 50178, IEC 62103		
Pollution degree / Surge voltage category	2 / III		
Connection data solid / stranded / AWG	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14		
Dimensions W / H / D	6.2 mm / 80 mm / 94 mm		

Technical data

Input data			
Permissible range (with reference to U_N)	0.8 ... 1.2		
Typ. input current with U_N (50 /60 Hz)	15 mA / 8.3 mA		
Typ. response time at U_N	10 ms		
Typ. release time at U_N	20 ms		
Input circuit	Yellow LED, Bridge rectifier		
Output data with:	OPT...48DC/...	OPT...24DC/...	OPT...230AC/...
Contact type	-	-	-
Contact material	-	-	-
Max. switching voltage	48 V DC	33 V DC	253 V AC
Min. 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)
Min. switching current			-
Output protection	Protection against polarity reversal, Surge protection	Protection against polarity reversal, 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 A²s (tp = 10 ms, at 25°C)
General data			
Rated insulation voltage	250 V AC		
Rated surge voltage / insulation	6 kV / Safe isolation, increased insulation		
Ambient temperature (operation)	-20°C ... 60°C		
Air and creepage distances	EN 50178, IEC 62103		
Pollution degree / Surge voltage category	2 / III		
Connection data solid / stranded / AWG	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14		
Dimensions W / H / D	6.2 mm / 80 mm / 94 mm		

Ordering data

Description	Voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection**	24 V AC/DC	**PLC-BSC- 24UC/ 1/ACT**	**2982799**	10
PLC INTERFACE, with **spring-cage connection**	24 V AC/DC	**PLC-BSP- 24UC/ 1/ACT**	**2982809**	10
PLC-INTERFACE, with **push-in connection**	24 V AC/DC	**PLC-BPT- 24UC/ 1/ACT**[1])	**2900450**	10

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-BSC- 24UC/ 1/ACT	**2982799**	10
PLC-BSP- 24UC/ 1/ACT	**2982809**	10
PLC-BPT- 24UC/ 1/ACT[1])	**2900450**	10

Accessories

Plug-in miniature relays			
with gold contact	**REL-MR- 24DC/21AU**	**2961121**	10
with power contact	**REL-MR- 24DC/21**	**2961105**	10
Plug-in solid-state relays			
Solid-state input relays			
Solid-state power relays			
Solid-state power relays			

Accessories

OPT-24DC/ 48DC/100	**2966618**	10
OPT-24DC/ 24DC/ 2	**2966595**	10
OPT-24DC/230AC/ 1	**2967950**	10

PLC sensor series for input functions

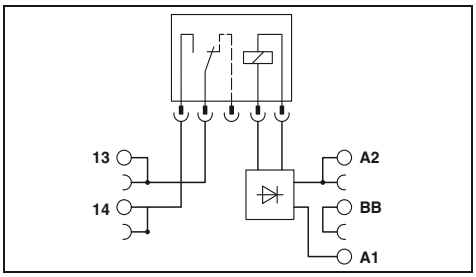
PLC sensor series for coupling controller and sensors, such as proximity switches, limit switches or auxiliary contacts

The advantages:

– Direct connection of sensor to relay module
– No need for additional modular terminal blocks
– Space savings of up to 80%
– Time savings of up to 60%
– Screw, spring-cage, and push-in 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 housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.
For diagrams of operating voltage ranges, see page 343
1) 120 and 230 V types up to 55°C
2) EMC: Class A product, see page 571

Relay module
1 N/O contact

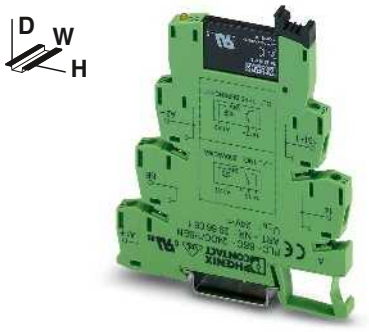


Technical data

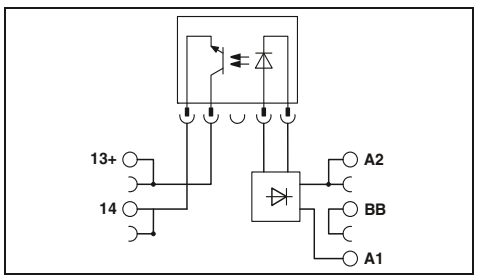
		①	②	③
Input data				
Permissible range (with reference to U_N)		See diagram		
Switching level (with reference to U_N)	1 signal (“H”) 0 signal (“L”)			
Typ. input current at U_N	[mA]	9	3.5	3.2
Typ. response time/switch-on time at U_N	[ms]	5	6	7
Typ. release time/switch-off time at U_n	[ms]	8	15	15
Transmission frequency f_{limit}	[Hz]			
Input circuit DC		Yellow LED, Protection against polarity reversal, 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		
Min. switching voltage		100 mV (at 10 mA)		
Limiting continuous current		50 mA		
Max. inrush current		50 mA		
Min. switching current		1 mA (at 24 V)		
Output protection		-		
Voltage drop at max. limiting continuous current		-		
General data				
Test voltage input/output		4 kV AC (50 Hz, 1 min.)		
Ambient temperature (operation)		-40°C ... 60°C[1])		
Mechanical service life		2 x 10^7 cycles		
Standards/regulations		IEC 60664, EN 50178, IEC 62103		
Pollution degree/surge voltage category		3 / III		
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14		
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection**					
	①	24 V DC	**PLC-RSC- 24DC/ 1AU/SEN[2])**	**2966317**	10
	②	120 V AC (110 V DC)	**PLC-RSC-120UC/ 1AU/SEN[2])**	**2966320**	10
	③	230 V AC (220 V DC)	**PLC-RSC-230UC/ 1AU/SEN[2])**	**2966333**	10
PLC INTERFACE, with **spring-cage connection**					
	①	24 V DC	**PLC-RSP- 24DC/ 1AU/SEN[2])**	**2967374**	10
	②	120 V AC (110 V DC)	**PLC-RSP-120UC/ 1AU/SEN[2])**	**2967390**	10
	③	230 V AC (220 V DC)	**PLC-RSP-230UC/ 1AU/SEN[2])**	**2967413**	10
PLC-INTERFACE, with **push-in connection**					
	①	24 V DC	**PLC-RPT- 24DC/ 1AU/SEN[2])**	**2900313**	10
	②	120 V AC (110 V DC)	**PLC-RPT-120UC/ 1AU/SEN[2])**	**2900314**	10
	③	230 V AC (220 V DC)	**PLC-RPT-230UC/ 1AU/SEN[2])**	**2900315**	10



Max. DC voltage output of 100 mA



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, Protection against polarity reversal, freewheeling diode		
Yellow LED, Bridge rectifier		
-		
48 V DC		
3 V DC		
100 mA		
-		
-		
Protection against polarity reversal, Surge protection		
≤ 1 V		
2.5 kV (50 Hz, 1 min.)		
-25°C ... 60°C		
-		
IEC 60664, EN 50178, IEC 62103		
2 / III		
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14		
6.2 mm / 80 mm / 94 mm		

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-OSC- 24DC/ 48DC/100/SEN²)	**2966773**	10
PLC-OSC-120UC/ 48DC/100/SEN²)	**2966799**	10
PLC-OSC-230UC/ 48DC/100/SEN²)	**2966809**	10
PLC-OSP- 24DC/ 48DC/100/SEN²)	**2967578**	10
PLC-OSP-120UC/ 48DC/100/SEN²)	**2967581**	10
PLC-OSP-230UC/ 48DC/100/SEN²)	**2967594**	10
PLC-OPT- 24DC/ 48DC/100/SEN²)	**2900358**	10
PLC-OPT-120UC/ 48DC/100/SEN²)	**2900359**	10
PLC-OPT-230UC/ 48DC/100/SEN²)	**2900361**	10

PLC-INTERFACE for high inrush currents

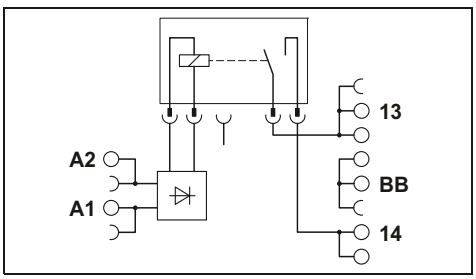
PLC relay modules for high inrush currents due, for example, to capacitive loads

The advantages:

– Max. inrush current of 130 A
– Direct connection of load return line thanks to actuator type
– Screw, spring-cage, and push-in technology
– 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 housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 343
1) EMC: Class A product, see page 571

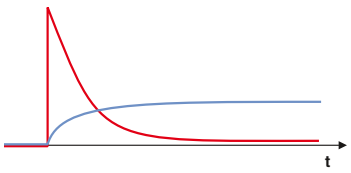
1 N/O contact of up to 130 A peak



Technical data

Input data		①
Typ. input current at U_N	[mA]	18
Response/release time at U_N	[ms]	8 / 10
Input circuit DC		Yellow LED, Protection against polarity reversal, freewheeling diode
Output data		
Contact material		AgSnO
Max. switching voltage		250 V AC/DC
Min. switching voltage		12 V AC/DC (at 100 mA)
Max. inrush current		80 A (for 20 ms) / 130 A (peak, at capacitive load, 230 V AC, 24 µF)
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 10^7 cycles
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Connection data solid / stranded / AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
Dimensions	W / H / D	14 mm / 80 mm / 94 mm

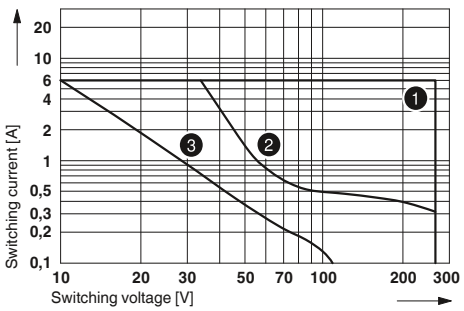
Basic behavior of capacitive loads:
- Very high input current
- Voltage increases with an e-function



Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection** ①	24 V DC	**PLC-RSC- 24DC/ 1IC/ACT**[1])	**2967604**	10
PLC INTERFACE, with **spring-cage connection** ①	24 V DC	**PLC-RSP- 24DC/ 1IC/ACT**[1])	**2912413**	10
PLC-INTERFACE, with **push-in connection** ①	24 V DC	**PLC-RPT- 24DC/ 1IC/ACT**[1])	**2900298**	10

Max. interrupting rating



1 AC, ohmic load
2 DC, ohmic load
3 DC, L/R = 40 ms

PLC-INTERFACE for high continuous currents

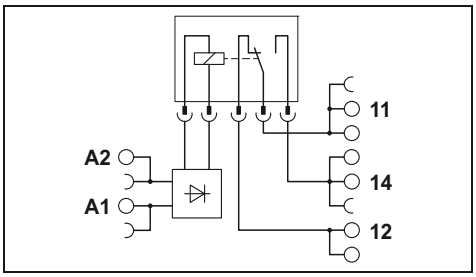
PLC relay modules for high continuous switching currents

The advantages:

– Max. continuous current of 10 A
– Safe isolation according to DIN EN 50178 between coil and contact
– Screw, spring-cage, and push-in 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

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 343
1) 230 V types up to 55°C
2) EMC: Class A product, see page 571

1 PDT up to 10 A

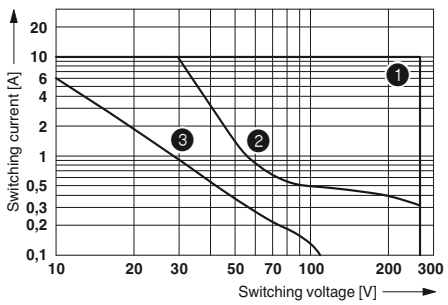


Technical data

		①	②	③	④	⑤	⑥	⑦
Input data								
Typ. 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, Protection against polarity reversal, freewheeling diode						
Input circuit AC/DC		Yellow LED, Bridge rectifier						
Output data								
Contact material		AgNi						
Max. switching voltage		250 V AC/DC						
Min. switching voltage		12 V AC/DC						
Limiting continuous current		10 A						
Max. inrush current		30 A (300 ms)						
Min. switching current		100 mA						
General data								
Test voltage input/output		4 kV AC (50 Hz, 1 min.)						
Ambient temperature (operation)		-40°C ... 60°C[1])						
Mechanical service life		3 x 10^7 cycles						
Standards/regulations		IEC 60664, EN 50178, IEC 62103						
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14						
Dimensions	W / H / D	14 mm / 80 mm / 94 mm						

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection**					
	①	12 V DC	**PLC-RSC- 12DC/21HC²)**	**2967617**	10
	②	24 V DC	**PLC-RSC- 24DC/21HC²)**	**2967620**	10
	③	24 V AC/DC	**PLC-RSC- 24UC/21HC²)**	**2967633**	10
	④	48 V DC	**PLC-RSC- 48DC/21HC²)**	**2967646**	10
	⑤	60 V DC	**PLC-RSC- 60DC/21HC²)**	**2967659**	10
	⑥	120 V AC (110 V DC)	**PLC-RSC-120UC/21HC²)**	**2967662**	10
	⑦	230 V AC (220 V DC)	**PLC-RSC-230UC/21HC²)**	**2967675**	10
PLC INTERFACE, with **spring-cage connection**					
	①	12 V DC	**PLC-RSP- 12DC/21HC²)**	**2912264**	10
	②	24 V DC	**PLC-RSP- 24DC/21HC²)**	**2912277**	10
	③	24 V AC/DC	**PLC-RSP- 24UC/21HC²)**	**2912280**	10
	④	48 V DC	**PLC-RSP- 48DC/21HC²)**	**2912293**	10
	⑤	60 V DC	**PLC-RSP- 60DC/21HC²)**	**2912303**	10
	⑥	120 V AC (110 V DC)	**PLC-RSP-120UC/21HC²)**	**2912316**	10
	⑦	230 V AC (220 V DC)	**PLC-RSP-230UC/21HC²)**	**2912329**	10
PLC-INTERFACE, with **push-in connection**					
	①	12 V DC	**PLC-RPT- 12DC/21HC²)**	**2900290**	10
	②	24 V DC	**PLC-RPT- 24DC/21HC²)**	**2900291**	10
	③	24 V AC/DC	**PLC-RPT- 24UC/21HC²)**	**2900293**	10
	④	48 V DC	**PLC-RPT- 48DC/21HC²)**	**2900294**	10
	⑤	60 V DC	**PLC-RPT- 60DC/21HC²)**	**2900295**	10
	⑥	120 V AC (110 V DC)	**PLC-RPT-120UC/21HC²)**	**2900296**	10
	⑦	230 V AC (220 V DC)	**PLC-RPT-230UC/21HC²)**	**2900297**	10



❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Max. interrupting rating

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:

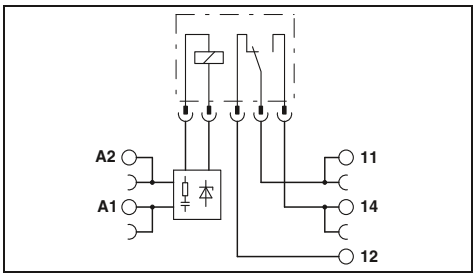
– Resistant to interference currents
– High relay release voltage

Typical applications:

– Applications with long control lines
– Use of AC output boards, resulting in residual AC currents
– Screw, spring-cage, and push-in technology

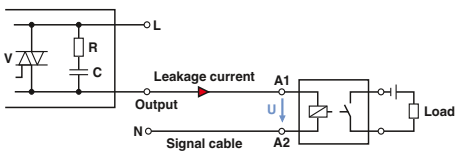
Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 343
Maximum interrupting rating diagrams, see page 346
1) EMC: Class A product, see page 571

Universal design

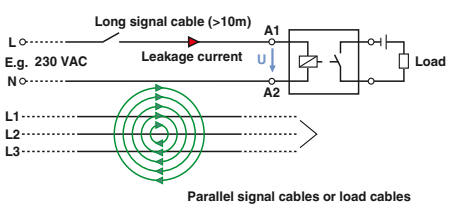


Technical data

Input data			
Nominal input voltage U_N		120 V AC	230 V AC
Permissible range (with reference to U_N)		0.8 ... 1.4	0.78 ... 1.14
Typ. release voltage (with relay)		50 V AC	80 V AC
Typ. input current with U_N (50 /60 Hz)		7 mA / 8 mA	8.8 mA / 10 mA
Typ. response time at U_N		7 ms	7 ms
Typ. release time at U_N		20 ms	20 ms
Input circuit		Yellow LED, Bridge rectifier, Filter	
Output data with:		REL-MR-60DC/21	REL-MR-60DC/21AU
Contact type		Single contact, 1-PDT	Single contact, 1-PDT
Contact material		AgSnO	AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Min. switching voltage		5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current		6 A	50 mA
Max. inrush current		(on request)	50 mA
Min. 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)		-20°C ... 55°C	
Mechanical service life		2 x 10^7 cycles	
Standards/regulations		IEC 60664, EN 50178, IEC 62103	
Pollution degree / Surge voltage category		3 / III	
Connection data solid / stranded / AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm	



Occurrence of interference signals
Scenario 1: controller - AC output card



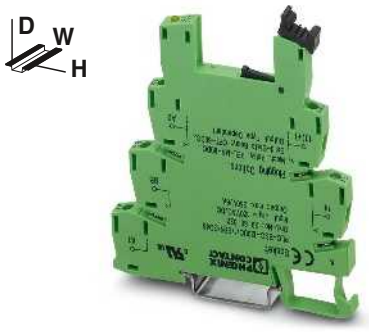
Occurrence of interference signals
Scenario 2: long signal cables

Ordering data

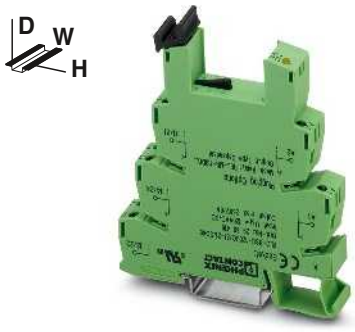
Description	Voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC-INTERFACE basic terminal block, for plug-in miniature relays or solid-state relays				
With screw connection	120 V AC	**PLC-BSC-120UC/21/SO46[1])**	**2980319**	10
With screw connection	230 V AC	**PLC-BSC-230UC/21/SO46[1])**	**2980335**	10
With spring-cage connection	120 V AC	**PLC-BSP-120UC/21/SO46[1])**	**2980351**	10
With spring-cage connection	230 V AC	**PLC-BSP-230UC/21/SO46[1])**	**2980377**	10
With push-in connection	120 V AC	**PLC-BPT-120UC/21/SO46[1])**	**2900453**	10
With push-in connection	230 V AC	**PLC-BPT-230UC/21/SO46[1])**	**2900455**	10

Accessories

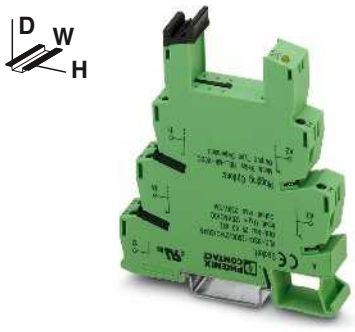
Plug-in miniature relays			
with gold contact	**REL-MR- 60DC/21AU**	**2961134**	10
with power contact	**REL-MR- 60DC/21**	**2961118**	10



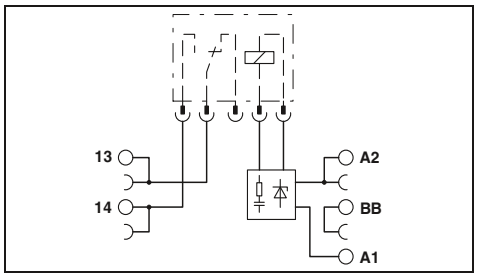
Sensor design

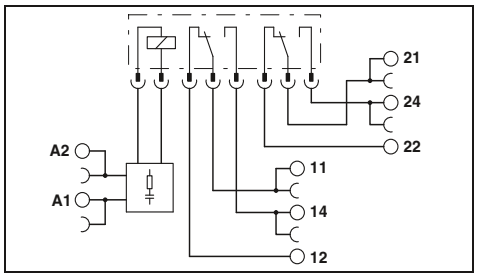


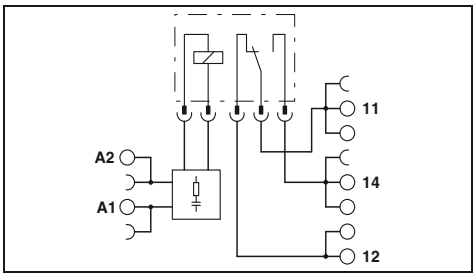
2 PDT universal design



1 PDT for high continuous currents







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)
4 kV (50 Hz, 1 min.)	
-20°C ... 55°C	
2 x 10^7 cycles	
IEC 60664, EN 50178, IEC 62103	
3 / III	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
6.2 mm / 80 mm / 94 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-BSC-120UC/ 1/SEN/SO46[1])	**2980322**	10
PLC-BSC-230UC/ 1/SEN/SO46[1])	**2980348**	10
PLC-BSP-120UC/ 1/SEN/SO46[1])	**2980364**	10
PLC-BSP-230UC/ 1/SEN/SO46[1])	**2980380**	10
PLC-BPT-120UC/ 1/SEN/SO46[1])	**2900456**	10
PLC-BPT-230UC/ 1/SEN/SO46[1])	**2900457**	10

Accessories

REL-MR- 60DC/21AU	**2961134**	10
REL-MR- 60DC/21	**2961118**	10

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
4 kV (50 Hz, 1 min.)	
-20°C ... 55°C	
3 x 10^7 cycles	
IEC 60664, EN 50178, IEC 62103	
3 / III	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
14 mm / 80 mm / 94 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-BSC-120UC/21-21/SO46[1])	**2980416**	10
PLC-BSC-230UC/21-21/SO46[1])	**2980429**	10

Accessories

REL-MR-110DC/21-21AU	**2961228**	10
REL-MR-110DC/21-21	**2961202**	10

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	
3 x 10^7 cycles	
IEC 60664, EN 50178, IEC 62103	
3 / III	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
14 mm / 80 mm / 94 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-BSC-120UC/21HC/SO46[1])	**2980432**	10
PLC-BSC-230UC/21HC/SO46[1])	**2980445**	10

Accessories

REL-MR-110DC/21HC	**2961338**	10

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:

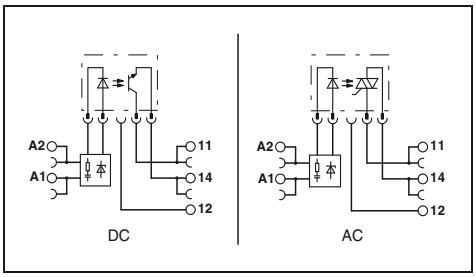
– Resistant to interference currents
– High relay release voltage

Typical applications:

– Applications with long control lines
– Use of AC output boards, resulting in residual AC currents
– Screw, spring-cage, and push-in technology

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For derating curves see page 345
1) EMC: Class A product, see page 571

Universal design



Technical data

Input data			
Nominal input voltage U_N		120 V AC	230 V AC
Permissible range (with reference to U_N)		0.85 ... 1.1	0.8 ... 1.1
Switching level (with optocoupler) 0 signal (“L”)		≤ 0.4	≤ 0.4
Typ. input current with U_N (50 /60 Hz)		7 mA / 8 mA	8.8 mA / 10 mA
Typ. response time/switch-on time at U_N		6 ms	6 ms
Typ. switch-off time at U_N		10 ms	10 ms
Input circuit		Yellow LED, Bridge rectifier, Filter	
Output data with:		OPT...48DC/...	OPT...24DC/...	OPT...230AC/...
Max. switching voltage		48 V DC	30 V DC	253 V AC
Min. switching voltage		3 V DC	3 V DC	24 V AC
Limiting continuous current		100 mA	3 A	0.75 A
Max. inrush current			15 A (10 ms)	30 A (10 ms)
Output protection		Protection against polarity reversal, Surge protection	Protection against polarity reversal, Surge protection	RCV circuit
Voltage drop at limiting continuous current		< 1 V DC	< 200 mV	< 1 V AC
Leakage current in off state		-	-	< 1 mA
Max. phase shift (inductive consumer)		-	-	0.5
Max. load value I^2 x t (t = 10 ms)		-	-	4.5 A^2s
General data			
Test voltage input/output		2.5 kV (50 Hz, 1 min.)	
Ambient temperature (operation)		-20°C ... 55°C	
Standards/regulations		IEC 60664, EN 50178, IEC 62103	
Pollution degree / Surge voltage category		2 / III	
Connection data solid / stranded / AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm	

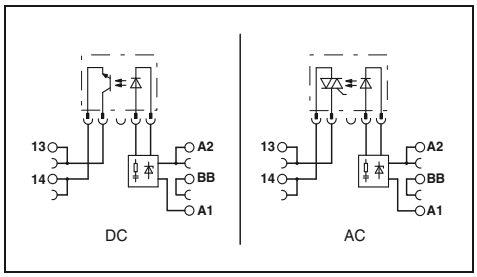
Ordering data

Description	Voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC-INTERFACE basic terminal block, for plug-in miniature relays or solid-state relays				
With screw connection	120 V AC	**PLC-BSC-120UC/21/SO46[1])**	**2980319**	10
With screw connection	230 V AC	**PLC-BSC-230UC/21/SO46[1])**	**2980335**	10
With spring-cage connection	120 V AC	**PLC-BSP-120UC/21/SO46[1])**	**2980351**	10
With spring-cage connection	230 V AC	**PLC-BSP-230UC/21/SO46[1])**	**2980377**	10
With push-in connection	120 V AC	**PLC-BPT-120UC/21/SO46[1])**	**2900453**	10
With push-in connection	230 V AC	**PLC-BPT-230UC/21/SO46[1])**	**2900455**	10

Accessories

Plug-in solid-state relays			
Solid-state input relays	**OPT-60DC/ 48DC/100**	**2966621**	10
Solid-state power relays	**OPT-60DC/ 24DC/ 2**	**2966605**	10
Solid-state power relays	**OPT-60DC/230AC/ 1**	**2967963**	10

Sensor design



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)
Protection against polarity reversal, Surge protection	Protection against polarity reversal, 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, IEC 62103
2 / III
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
6.2 mm / 80 mm / 94 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-BSC-120UC/ 1/SEN/SO46[1])	**2980322**	10
PLC-BSC-230UC/ 1/SEN/SO46[1])	**2980348**	10
PLC-BSP-120UC/ 1/SEN/SO46[1])	**2980364**	10
PLC-BSP-230UC/ 1/SEN/SO46[1])	**2980380**	10
PLC-BPT-120UC/ 1/SEN/SO46[1])	**2900456**	10
PLC-BPT-230UC/ 1/SEN/SO46[1])	**2900457**	10

Accessories

OPT-60DC/ 48DC/100	**2966621**	10
OPT-60DC/ 24DC/ 2	**2966605**	10
OPT-60DC/230AC/ 1	**2967963**	10

Plug-in miniature power relays

Plug-in miniature power relays suitable for PLC-INTERFACE and RIF-0, RIF-1, and PR1 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 (comparable with IP67) depending on type
– Safe isolation according to DIN EN 50178 between coil and contact

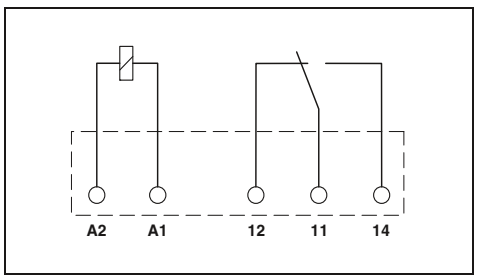
Notes:

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 344

For diagrams of operating voltage ranges, see page 343

1 PDT



Technical data

		①	②	③	④	⑤
Input data						
Permissible range (with reference to U_N)		refer to the diagram				
Typ. input current at U_N	[mA]	38	14	9	7	3
Typ. response time at U_N	[ms]	5	5	5	5	5
Typ. release time at U_N	[ms]	2.5	2.5	2.5	2.5	2.5
Output data						
Contact type		Single contact, 1-PDT				Single contact, 1-PDT
Contact material		AgSnO				AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC				30 V AC / 36 V DC
Min. switching voltage		5 V (at 100 mA)				100 mV (at 10 mA)
Limiting continuous current		6 A				50 mA
Max. inrush current		(on request)				(on request)
Min. switching current		10 mA (at 12 V)				1 mA (at 24 V)
Max. interrupting rating, ohmic load						
	24 V DC	140 W				1.2 W
	48 V DC	20 W				-
	60 V DC	18 W				-
	110 V DC	23 W				-
	220 V DC	40 W				-
	250 V AC	1500 VA				-
General data						
Test voltage (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 10^7 cycles				
Standards/regulations		IEC 60664, EN 50178, IEC 62103				
Mounting position/mounting		Any / In rows with zero spacing				
Dimensions	W / H / D	5 mm / 28 mm / 15 mm				

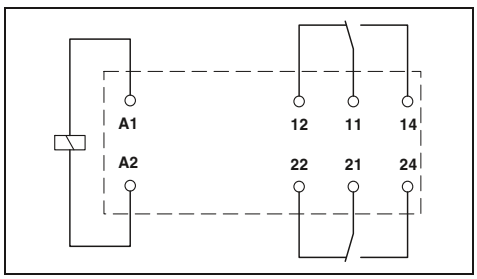
Ordering data

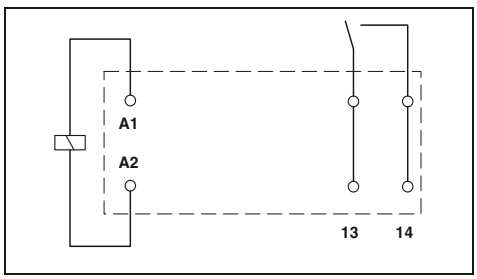
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in miniature power relays					
with power contact	①	4.5 V DC	**REL-MR- 4,5DC/21**	**2961367**	10
with power contact	②	12 V DC	**REL-MR- 12DC/21**	**2961150**	10
with power contact	③	18 V DC	**REL-MR- 18DC/21**	**2961383**	10
with power contact	④	24 V DC	**REL-MR- 24DC/21**	**2961105**	10
with power contact	⑤	60 V DC	**REL-MR- 60DC/21**	**2961118**	10
with power contact	⑥	110 V DC			
Plug-in miniature power relays					
with gold contact	①	4.5 V DC	**REL-MR 4,5DC/21AU**	**2961370**	10
with gold contact	②	12 V DC	**REL-MR- 12DC/21AU**	**2961163**	10
with gold contact	③	18 V DC	**REL-MR- 18DC/21AU**	**2961493**	10
with gold contact	④	24 V DC	**REL-MR- 24DC/21AU**	**2961121**	10
with gold contact	⑤	60 V DC	**REL-MR- 60DC/21AU**	**2961134**	10
with gold contact	⑥	110 V DC			

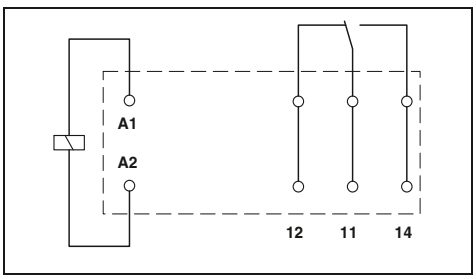
2 PDT

1 N/O contact, for high inrush currents

1 PDT for high continuous currents







Technical data

②	④	⑤	⑥
refer to the diagram			
33	17	8.2	4.1
7	7	7	7
3	3	3	3
Single contact, 2-PDT	Single contact, 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 10^7 cycles			
IEC 60664, EN 50178, IEC 62103			
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

Technical data

④	
refer to the diagram	
17	
8	
3	
Single contact, 1 N/O contact	
AgSnO	
250 V AC/DC	
12 V (at 100 mA)	
16 A	
80 A (20 ms)	
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 10^7 cycles	
IEC 60664, EN 50178, IEC 62103	
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- 24DC/1IC	**2961341**	10

Technical data

②	④	⑤	⑥
refer to the diagram			
33	17	8.2	4.1
7	7	7	7
3	3	3	3
Single contact, 1-PDT			
AgNi			
250 V AC/DC			
12 V (at 10 mA)			
16 A			
30 A (300 ms)			
100 mA			
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 10^7 cycles			
IEC 60664, EN 50178, IEC 62103			
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/21HC	**2961309**	10
REL-MR- 24DC/21HC	**2961312**	10
REL-MR- 60DC/21HC	**2961325**	10
REL-MR-110DC/21HC	**2961338**	10

Plug-in solid-state relays

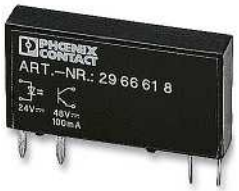
Plug-in solid-state relays suitable for PLC-INTERFACE and RIF-0, RIF-1, and PR1 relay bases.

The advantages:

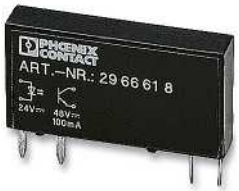
– Switching capacity of up to 24 V DC/5 A
– RT III wash tight (comparable to IP67)
– Vibration- and shock-resistant
– Wear-free and long-lasting
– Zero voltage switch at AC output
– Can be soldered in on PCB

Notes:

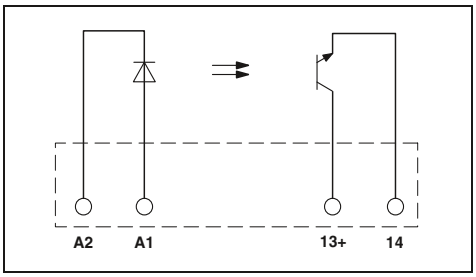
For dimensional drawings and perforations for assembly, see page 345

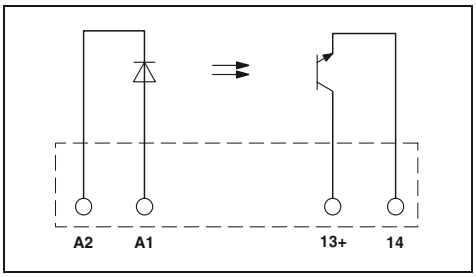


Max. DC voltage output of 3 A



Max. DC voltage output of 100 mA





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	1 signal (“H”) [V DC] ≥	2.5	16	35
	0 signal (“L”) [V DC] ≤	0.8	10	20
Typ. input current at U_N	[mA]	9	7	3
Typ. switch-on time at U_N	[µs]	20	20	40
Typ. switch-off time at U_N	[µs]	300	300	500
Transmission frequency f_{limit}	[Hz]	300	300	300
Output data				
Max. switching voltage		33 V DC		
Min. switching voltage		3 V DC		
Limiting continuous current		3 A (see derating curve)		
Min. load current		-		
Max. inrush current		15 A (10 ms)		
Leakage current in off state		-		
Phase angle (cos ϕ)		-		
Output circuit		2-conductor, floating		
Max. load value		-		
Output protection		Protection against polarity reversal, Surge protection		
Voltage drop at max. limiting continuous current		≤ 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, IEC 62103		
Pollution degree/surge voltage category		2 / III		
Mounting position/mounting		Any / In rows with zero spacing		
Dimensions	W / H / D	5 mm / 28 mm / 15 mm		

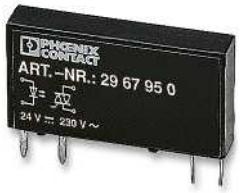
Technical data

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	1 signal (“H”) [V DC] ≥	2.5	16	52
	0 signal (“L”) [V DC] ≤	0.8	10	40
Typ. input current at U_N	[mA]	4	7	3
Typ. switch-on time at U_N	[µs]	20	20	50
Typ. switch-off time at U_N	[µs]	300	300	800
Transmission frequency f_{limit}	[Hz]	300	300	100
Output data				
Max. switching voltage		48 V DC		
Min. switching voltage		3 V DC		
Limiting continuous current		100 mA		
Min. load current		-		
Max. inrush current		-		
Leakage current in off state		-		
Phase angle (cos ϕ)		-		
Output circuit		2-conductor, floating		
Max. load value		-		
Output protection		Protection against polarity reversal, Surge protection		
Voltage drop at max. limiting continuous current		≤ 1 V		
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, IEC 62103		
Pollution degree/surge voltage category		2 / III		
Mounting position/mounting		Any / In rows with zero spacing		
Dimensions	W / H / D	5 mm / 28 mm / 15 mm		

Ordering data

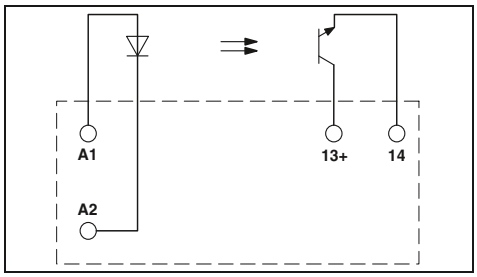
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in solid-state relays					
Solid-state power relays	①	5 V DC	**OPT- 5DC/ 24DC/ 2**	**2967989**	10
Solid-state power relays	②	24 V DC	**OPT-24DC/ 24DC/ 2**	**2966595**	10
Solid-state power relays	③	60 V DC	**OPT-60DC/ 24DC/ 2**	**2966605**	10
Plug-in solid-state relays					
Solid-state input relays	①	5 V DC	**OPT- 5DC/ 48DC/100**	**2967992**	10
Solid-state input relays	②	24 V DC	**OPT-24DC/ 48DC/100**	**2966618**	10
Solid-state input relays	③	60 V DC	**OPT-60DC/ 48DC/100**	**2966621**	10

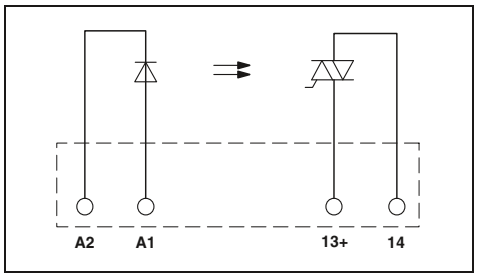
Max. DC voltage output of 5 A

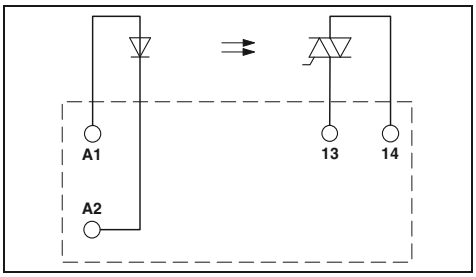


Max. AC voltage output of 750 mA

Max. AC voltage output of 2 mA







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
33 V DC		
3 V DC		
5 A (see derating curve)		
-		
15 A (10 ms)		
-		
-		
2-conductor, floating		
-		
Protection against polarity reversal, Surge protection		
≤ 200 mV		
Basic insulation		
2.5 kV (50 Hz, 1 min.)		
-25°C ... 60°C		
100% operating factor		
IEC 60664, EN 50178, IEC 62103		
2 / III		
Any / In rows with zero spacing		
12.7 mm / 29 mm / 15.7 mm		

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

Technical data

②	③
0.8 -	0.9 -
1.2	1.1
10	50
5	15
3	3
6000	9000
500	700
10	10
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 A²s	
RCV circuit	
< 1 V	
Basic insulation	
2.5 kV (50 Hz, 1 min.)	
-25°C ... 60°C	
100% operating factor	
IEC 60664, EN 50178, IEC 62103	
2 / III	
Any / In rows with zero spacing	
5 mm / 28 mm / 15 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
OPT-24DC/230AC/ 1	**2967950**	10
OPT-60DC/230AC/ 1	**2967963**	10

Technical data

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
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 A²s (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		
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
OPT-60DC/230AC/ 2	**2982184**	10

Relay options for PLC basic terminal blocks

Relay and solid-state relay options		Push-in connection												Spring-cage connection												Screw connection											
				1 PDT basic terminal block												1 PDT basic terminal block												1 PDT basic terminal block											
		PLC-BPT-5DC/21	2900443	PLC-BPT-12DC/21	2900444	PLC-BPT-24DC/21	2900445	PLC-BPT-24UC/21	2900446	PLC-BPT-48DC/21	2900447	PLC-BPT-60DC/21	2900279	PLC-BPT-120DC/21	2900280	PLC-BPT-230DC/21	2900281	PLC-BSP-5DC/21	2980238	PLC-BSP-12DC/21	2967426	PLC-BSP-24DC/21	2967219	PLC-BSP-24UC/21	2967222	PLC-BSP-48DC/21	2967329	PLC-BSP-60DC/21	2967332	PLC-BSP-120DC/21	2967167	PLC-BSC-5DC/21	2980225	PLC-BSC-12DC/21	2966896	PLC-BSC-24DC/21	2966016	PLC-BSC-24UC/21	2966029
REL-MR-4,5DC/21	2961367	X																																			
REL-MR-4,5DC/21AU	2961370	X																																			
REL-MR-12DC/21	2961150			X																																	
REL-MR-12DC/21AU	2961163			X																																	
REL-MR-24DC/21	2961105				X	X	X																														
REL-MR-24DC/21AU	2961121				X	X	X																														
REL-MR-60DC/21	2961118							X	X	X	X																										
REL-MR-60DC/21AU	2961134							X	X	X	X																										
REL-MR-24DC/1IC	2961341																																				
REL-MR-18DC/21	2961383																																				
REL-MR-18DC/21AU	2961493																																				
REL-MR-12DC/21-21	2961257																																				
REL-MR-12DC/21-21AU	2961299																																				
REL-MR-24DC/21-21	2961192																																				
REL-MR-24DC/21-21AU	2961215																																				
REL-MR-60DC/21-21	2961273																																				
REL-MR-60DC/21-21AU	2961286																																				
REL-MR-110DC/21-21	2961202																																				
REL-MR-110DC/21-21AU	2961228																																				
REL-MR-12DC/21HC	2961309																																				
REL-MR-24DC/21HC	2961312																																				
REL-MR-60DC/21HC	2961325																																				
REL-MR-110DC/21HC	2961338																																				
OPT-24DC/230AC/1	2967950					X				X																											
OPT-60DC/230AC/1	2967963											X	X	X																							
OPT-5DC/24DC/2	2967989	X																																			
OPT-24DC/24DC/2	2966595					X				X																											
OPT-60DC/24DC/2	2966605											X	X	X																							
OPT-5DC/48DC/100	2967992	X																																			
OPT-24DC/48DC/100	2966618					X				X																											
OPT-60DC/48DC/100	2966621											X	X	X																							
OPT-24DC/24DC/5	2982100																																				
OPT-60DC/24DC/5	2982126																																				
OPT-24DC/230AC/2	2982171																																				
OPT-60DC/230AC/2	2982184																																				

Relay and solid-state relay options		Push-in connection												Spring-cage connection												Screw connection											
				2 PDT basic terminal block												2 PDT basic terminal block												2 PDT basic terminal block											
		PLC-BPT-12DC/21-21	2900282	PLC-BPT-24DC/21-21	2900283	PLC-BPT-24UC/21-21	2900284	PLC-BPT-48DC/21-21	2900285	PLC-BPT-60DC/21-21	2900286	PLC-BPT-120DC/21-21	2900287	PLC-BPT-230DC/21-21	2900288			PLC-BSP-12DC/21-21	2912426	PLC-BSP-24DC/21-21	2912439	PLC-BSP-24UC/21-21	2912442	PLC-BSP-48DC/21-21	2912455	PLC-BSP-60DC/21-21	2912468	PLC-BSP-120DC/21-21	2912471	PLC-BSP-230DC/21-21	2912484	PLC-BSC-12DC/21-21	2967251	PLC-BSC-24DC/21-21	2967015	PLC-BSC-24UC/21-21	2967028
REL-MR-4,5DC/21	2961367																																				
REL-MR-4,5DC/21AU	2961370																																				
REL-MR-12DC/21	2961150																																				
REL-MR-12DC/21AU	2961163																																				
REL-MR-24DC/21	2961105																																				
REL-MR-24DC/21AU	2961121																																				
REL-MR-60DC/21	2961118																																				
REL-MR-60DC/21AU	2961134																																				
REL-MR-24DC/1IC	2961341																																				
REL-MR-18DC/21	2961383																																				
REL-MR-18DC/21AU	2961493																																				
REL-MR-12DC/21-21	2961257	X																																			
REL-MR-12DC/21-21AU	2961299	X																																			
REL-MR-24DC/21-21	2961192			X		X		X																													
REL-MR-24DC/21-21AU	2961215			X		X		X																													
REL-MR-60DC/21-21	2961273									X																											
REL-MR-60DC/21-21AU	2961286									X																											
REL-MR-110DC/21-21	2961202											X		X																							
REL-MR-110DC/21-21AU	2961228											X		X																							
REL-MR-12DC/21HC	2961309																	X																			
REL-MR-24DC/21HC	2961312																		X		X		X														
REL-MR-60DC/21HC	2961325																							X													
REL-MR-110DC/21HC	2961338																								X	X											
OPT-24DC/230AC/1	2967950																																				
OPT-60DC/230AC/1	2967963																																				
OPT-5DC/24DC/2	2967989																																				
OPT-24DC/24DC/2	2966595																																				
OPT-60DC/24DC/2	2966605																																				
OPT-5DC/48DC/100	2967992																																				
OPT-24DC/48DC/100	2966618																																				
OPT-60DC/48DC/100	2966621																																				
OPT-24DC/24DC/5	2982100			X																X																	
OPT-60DC/24DC/5	2982126									X																											
OPT-24DC/230AC/2	2982171			X																X																	
OPT-60DC/230AC/2	2982184									X																											

Relay and solid-state relay options		Push-in connection												Spring-cage connection												Screw connection											
				HC basic terminal block												HC basic terminal block												HC basic terminal block											
		PLC-BPT-12DC/21HC	2900253	PLC-BPT-24DC/21HC	2900254	PLC-BPT-24UC/21HC	2900255	PLC-BPT-48DC/21HC	2900256	PLC-BPT-60DC/21HC	2900257	PLC-BPT-120DC/21HC	2900258	PLC-BPT-230DC/21HC	2900259			PLC-BSP-12DC/21HC	2912332	PLC-BSP-24DC/21HC	2912345	PLC-BSP-24UC/21HC	2912358	PLC-BSP-48DC/21HC	2912361	PLC-BSP-60DC/21HC	2912374	PLC-BSP-120DC/21HC	2912387	PLC-BSP-230DC/21HC	2912390	PLC-BSC-12DC/21HC	2967769	PLC-BSC-24DC/21HC	2967772	PLC-BSC-24UC/21HC	2967785
REL-MR-4,5DC/21	2961367																																				
REL-MR-4,5DC/21AU	2961370																																				
REL-MR-12DC/21	2961150																																				
REL-MR-12DC/21AU	2961163																																				
REL-MR-24DC/21	2961105																																				
REL-MR-24DC/21AU	2961121																																				
REL-MR-60DC/21	2961118																																				
REL-MR-60DC/21AU	2961134																																				
REL-MR-24DC/1IC	2961341																																				
REL-MR-18DC/21	2961383																																				
REL-MR-18DC/21AU	2961493																																				
REL-MR-12DC/21-21	2961257																																				
REL-MR-12DC/21-21AU	2961299																																				
REL-MR-24DC/21-21	2961192																																				
REL-MR-24DC/21-21AU	2961215																																				
REL-MR-60DC/21-21	2961273																																				
REL-MR-60DC/21-21AU	2961286																																				
REL-MR-110DC/21-21	2961202																																				
REL-MR-110DC/21-21AU	2961228																																				
REL-MR-12DC/21HC	2961309	X																X																			
REL-MR-24DC/21HC	2961312			X		X		X											X		X		X														
REL-MR-60DC/21HC	2961325																							X													
REL-MR-110DC/21HC	2961338																								X	X											
OPT-24DC/230AC/1	2967950																																				
OPT-60DC/230AC/1	2967963																																				
OPT-5DC/24DC/2	2967989																																				
OPT-24DC/24DC/2	2966595																																				
OPT-60DC/24DC/2	2966605																																				
OPT-5DC/48DC/100	2967992																																				
OPT-24DC/48DC/100	2966618																																				
OPT-60DC/48DC/100	2966621																																				
OPT-24DC/24DC/5	2982100																																				
OPT-60DC/24DC/5	2982126																																				
OPT-24DC/230AC/2	2982171																																				
OPT-60DC/230AC/2	2982184																																				

Relay and solid-state relay options		Push-in connection												Spring-cage connection												Screw connection											
				Sensor basic terminal block												Sensor basic terminal block												Sensor basic terminal block											
		PLC-BPT-24DC/1/SEN	2900262	PLC-BPT-120UC/1/SEN	2900451	PLC-BPT-230UC/1/SEN	2900452											PLC-BSP-24DC/1/SEN	2967206	PLC-BSP-120UC/1/SEN	2967154	PLC-BSP-230UC/1/SEN	2967170											PLC-BSC-5DC/1/SEN	2980267	PLC-BSC-24DC/1/SEN	2966061	PLC-BSC-120UC/1/SEN	2966074	PLC-BSC-230UC/1/SEN	2966087
REL-MR-4,5DC/21	2961367																													X							
REL-MR-4,5DC/21AU	2961370																													X							
REL-MR-12DC/21	2961150																																				
REL-MR-12DC/21AU	2961163																																				
REL-MR-24DC/21	2961105																															X					
REL-MR-24DC/21AU	2961121																															X					
REL-MR-60DC/21	2961118																																				
REL-MR-60DC/21AU	2961134																																				
REL-MR-24DC/1IC	2961341																																				
REL-MR-18DC/21	2961383																																				
REL-MR-18DC/21AU	2961493																																				
REL-MR-12DC/21-21	2961257																																				
REL-MR-12DC/21-21AU	2961299																																				
REL-MR-24DC/21-21	2961192																																				
REL-MR-24DC/21-21AU	2961215																																				
REL-MR-60DC/21-21	2961273																																				
REL-MR-60DC/21-21AU	2961286																																				
REL-MR-110DC/21-21	2961202																																				
REL-MR-110DC/21-21AU	2961228																																				
REL-MR-12DC/21HC	2961309																																				
REL-MR-24DC/21HC	2961312																																				
REL-MR-60DC/21HC	2961325																																				
REL-MR-110DC/21HC	2961338																																				
OPT-24DC/230AC/1	2967950																																				
OPT-60DC/230AC/1	2967963																																				
OPT-5DC/24DC/2	2967989																																				
OPT-24DC/24DC/2	2966595																																				
OPT-60DC/24DC/2	2966605																																				
OPT-5DC/48DC/100	2967992																																				
OPT-24DC/48DC/100	2966618																																				
OPT-60DC/48DC/100	2966621																																				
OPT-24DC/24DC/5	2982100																																				
OPT-60DC/24DC/5	2982126																																				
OPT-24DC/230AC/2	2982171																																				
OPT-60DC/230AC/2	2982184																																				

Relay and solid-state relay options		Push-in connection												Spring-cage connection												Screw connection											
				Actuator basic terminal block												Actuator basic terminal block												Actuator basic terminal block											
		PLC-BPT-5DC/1/ACT	2900448	PLC-BPT-24DC/1/ACT	2900449	PLC-BPT-24UC/1/ACT	2900450	PLC-BPT-24DC/21RW	2900261											PLC-BSP-5DC/1/ACT	2980254	PLC-BSP-24DC/1/ACT	2967196	PLC-BSP-24UC/1/ACT	2982809	PLC-BSP-24DC/21RW	2961396											PLC-BSC-5DC/1/ACT	2980241	PLC-BSC-24DC/1/ACT	2966058	PLC-BSC-24UC/1/ACT	2982799
REL-MR-4,5DC/21	2961367																													X							
REL-MR-4,5DC/21AU	2961370																													X							
REL-MR-12DC/21	2961150																															X					
REL-MR-12DC/21AU	2961163																																				
REL-MR-24DC/21	2961105																																	X			
REL-MR-24DC/21AU	2961121																															X		X			
REL-MR-60DC/21	2961118																																				
REL-MR-60DC/21AU	2961134																																				
REL-MR-24DC/1IC	2961341																																				
REL-MR-18DC/21	2961383																																				
REL-MR-18DC/21AU	2961493																																				
REL-MR-12DC/21-21	2961257																																				
REL-MR-12DC/21-21AU	2961299																																				
REL-MR-24DC/21-21	2961192																																				
REL-MR-24DC/21-21AU	2961215																																				
REL-MR-60DC/21-21	2961273																																				
REL-MR-60DC/21-21AU	2961286																																				
REL-MR-110DC/21-21	2961202																																				
REL-MR-110DC/21-21AU	2961228																																				
REL-MR-12DC/21HC	2961309																																				
REL-MR-24DC/21HC	2961312																																				
REL-MR-60DC/21HC	2961325																																				
REL-MR-110DC/21HC	2961338																																				
OPT-24DC/230AC/1	2967950																																				
OPT-60DC/230AC/1	2967963																																				
OPT-5DC/24DC/2	2967989																																				
OPT-24DC/24DC/2	2966595																																				
OPT-60DC/24DC/2	2966605																																				
OPT-5DC/48DC/100	2967992																																				
OPT-24DC/48DC/100	2966618																																				
OPT-60DC/48DC/100	2966621																																				
OPT-24DC/24DC/5	2982100																																				
OPT-60DC/24DC/5	2982126																																				
OPT-24DC/230AC/2	2982171																																				
OPT-60DC/230AC/2	2982184																																				

Relay and solid-state relay options		Push-in connection												Spring-cage connection												Screw connection											
		PLC-BPT-24DC/1IC/ACT	2900260											PLC-BSP-24DC/1IC/ACT	2912400											PLC-BSC-24DC/1IC/ACT	2967837										
REL-MR-4,5DC/21	2961367																																				
REL-MR-4,5DC/21AU	2961370																																				
REL-MR-12DC/21	2961150																																				
REL-MR-12DC/21AU	2961163																																				
REL-MR-24DC/21	2961105																																				
REL-MR-24DC/21AU	2961121																																				
REL-MR-60DC/21	2961118																																				
REL-MR-60DC/21AU	2961134																																				
REL-MR-24DC/1IC	2961341																																				
REL-MR-18DC/21	2961383																																				
REL-MR-18DC/21AU	2961493																																				
REL-MR-12DC/21-21	2961257																																				
REL-MR-12DC/21-21AU	2961299																																				
REL-MR-24DC/21-21	2961192																																				
REL-MR-24DC/21-21AU	2961215																																				
REL-MR-60DC/21-21	2961273																																				
REL-MR-60DC/21-21AU	2961286																																				
REL-MR-110DC/21-21	2961202																																				
REL-MR-110DC/21-21AU	2961228																																				
REL-MR-12DC/21HC	2961309																																				
REL-MR-24DC/21HC	2961312																																				
REL-MR-60DC/21HC	2961325																																				
REL-MR-110DC/21HC	2961338																																				
OPT-24DC/230AC/1	2967950																																				
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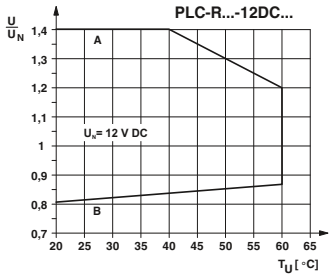
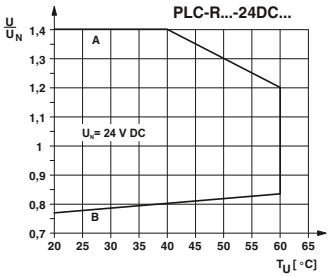
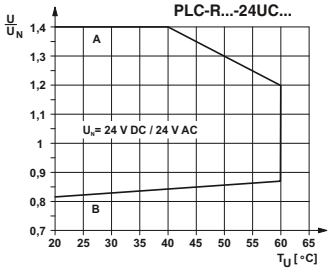
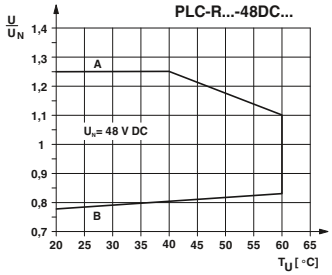
OPT-5DC/24DC/2	2967989																																				
OPT-24DC/24DC/2	2966595																																				
OPT-60DC/24DC/2	2966605																																				
OPT-5DC/48DC/100	2967992																																				
OPT-24DC/48DC/100	2966618																																				
OPT-60DC/48DC/100	2966621																																				
OPT-24DC/24DC/5	2982100																																				
OPT-60DC/24DC/5	2982126																																				
OPT-24DC/230AC/2	2982171																																				
OPT-60DC/230AC/2	2982184																																				

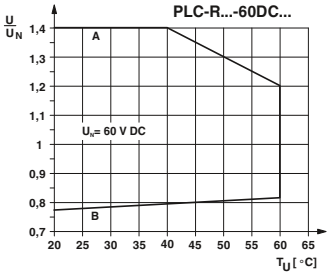
Operating voltage ranges for PLC-INTERFACE, 6.2 mm versions, equipped with relay

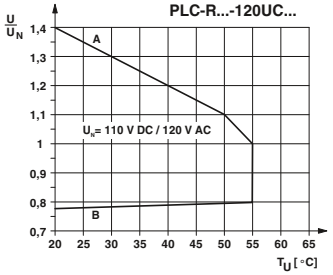


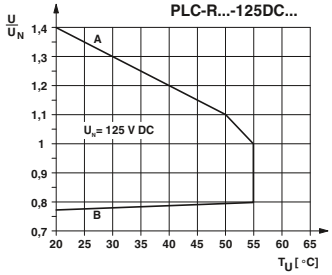


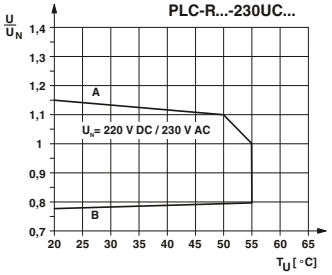




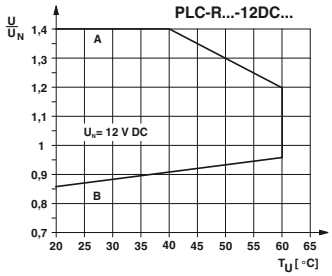


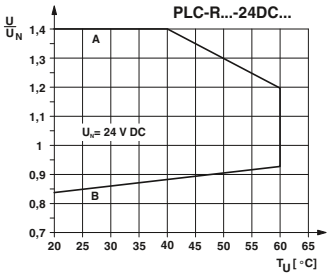


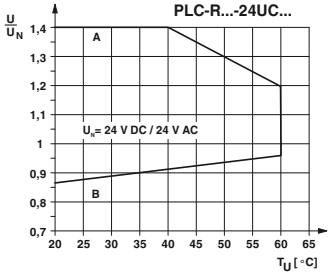


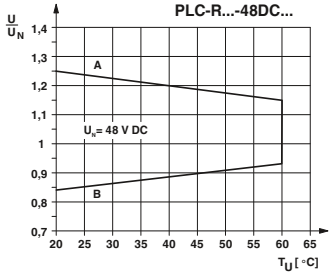


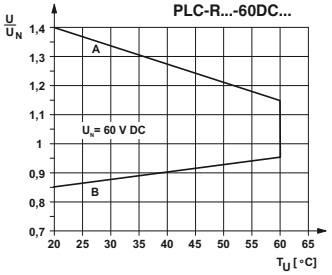
Operating voltage ranges for PLC-INTERFACE, 14 mm versions, equipped with relay

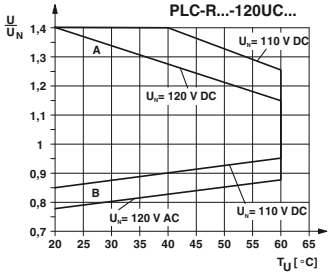


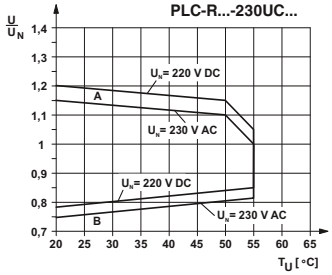












General conditions:
Direct alignment in the block, all devices 100% operating time, horizontal or vertical mounting.

Curve A
Maximum permissible continuous voltage U_{max} with limiting continuous current on the contact side (see relevant technical data).

Curve B
Minimum permissible operate voltage U_{op} after pre-excitation[1]) (see relevant technical data).

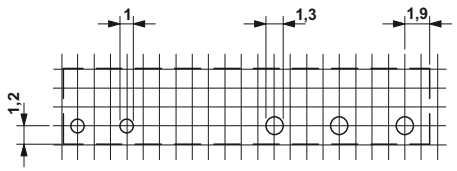
[1]) **Pre-excitation**: relay has been operated in a thermally steady state at the ambient temperature T_A with nominal voltage U_N and limiting continuous current on the contact side (see relevant technical data) (warm coil). After being switched off for a short time, the relay must reliably pick up again at U_{op}. The U_{op} values for cold coils ($T_{coil} = T_A = 20°C$) indicated by other manufacturers yield better values, but are not practical.

Plug-in miniature power relays

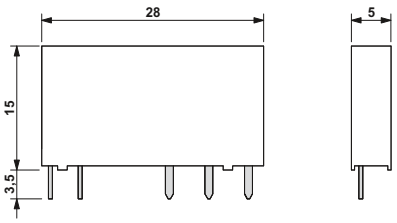
REL-MR...21

5 mm design width

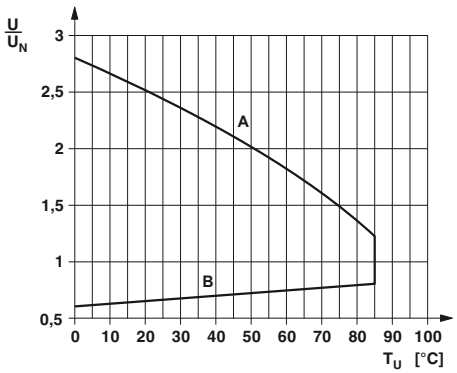
Perforations for assembly: view of the connections



Pitch division: 1.25 mm and 1.27 mm



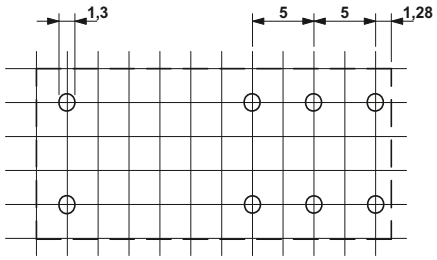
Permissible input voltage range for REL-MR...21



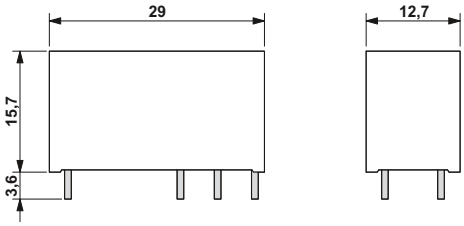
REL-MR...21-21

12.7 mm design width

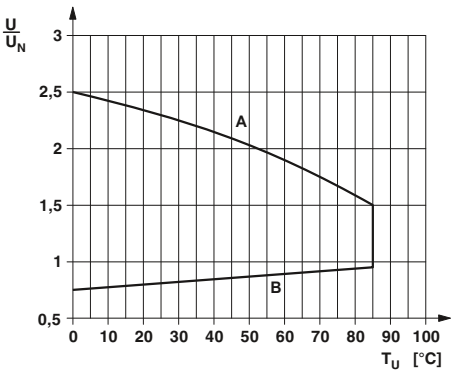
Perforations for assembly: view of the connections



Pitch division: 2.5 mm



Permissible input voltage range for REL-MR...21-21, REL-MR-24DC/1IC, REL-MR...21HC



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 permissible operate voltage U_{op} after pre-excitation[1]) (see relevant technical data).

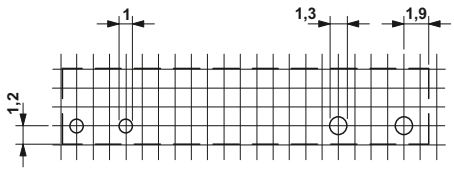
[1]) **Pre-excitation**: relay has been operated in a thermally steady state at the ambient temperature T_A with nominal voltage U_N and limiting continuous current on the contact side (see relevant technical data) (warm coil). After being switched off for a short time, the relay must reliably pick up again at U_{op}. The U_{op} values for cold coils ($T_{coil} = T_A = 20°C$) indicated by other manufacturers yield better values, but are not practical.

Plug-in solid-state relays

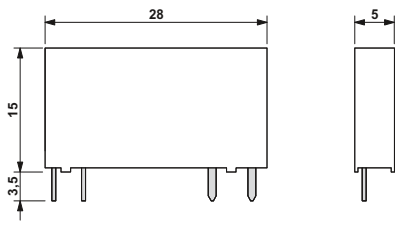
OPT...DC/24DC/2
OPT...DC/230AC/1

5 mm design width

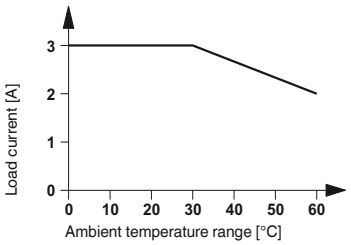
Perforations for assembly: view of the connections



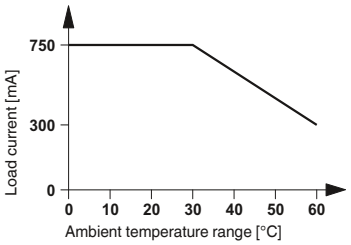
Pitch division: 1.25 mm and 1.27 mm



Derating curve for OPT...DC/24DC/2 and PLC-OS.../24DC/2 solid-state relays



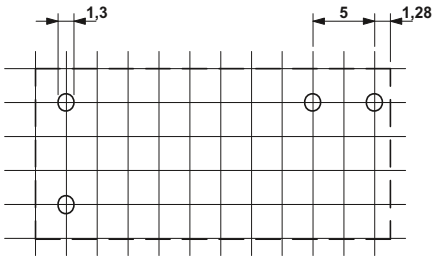
Derating curve for OPT...DC/230AC/1 and PLC-OS.../230AC/1 solid-state relays



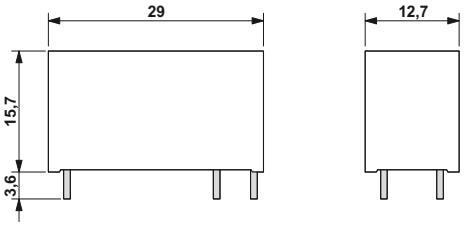
OPT...DC/24DC/5
OPT...DC/230AC/2

12.7 mm design width

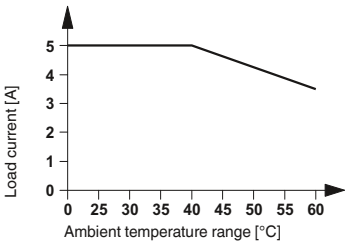
Perforations for assembly: view of the connections



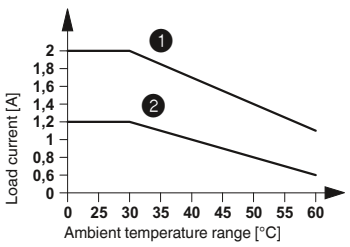
Pitch division: 2.5 mm



Derating curve for OPT...DC/24DC/5 and PLC-OS.../24DC/5/ACT solid-state relays



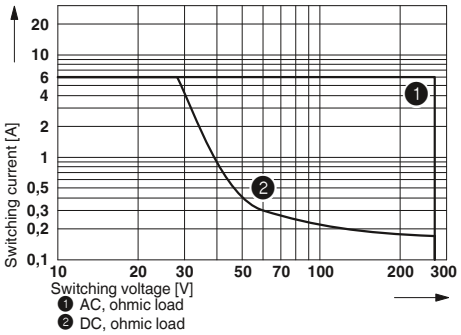
Derating curve for OPT...DC/230AC/2 and PLC-OS.../230AC/2/ACT solid-state relays



❶ Aligned with > 10 mm spacing
❷ Aligned without spacing

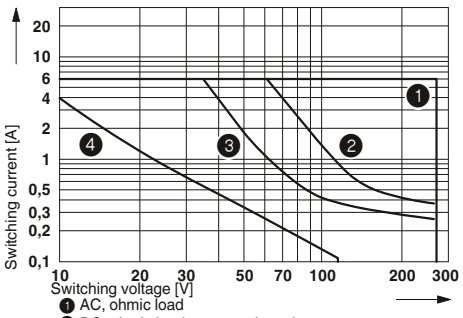
Electrical interrupting rating for PLC-INTERFACE

Electrical interrupting rating for PLC...21 with 1 PDT relays



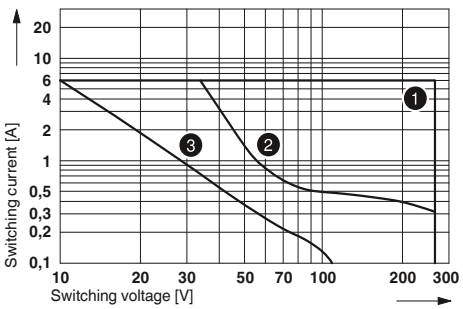
1 AC, ohmic load
2 DC, ohmic load

Electrical interrupting rating for PLC...21-21 with 2 PDT relays



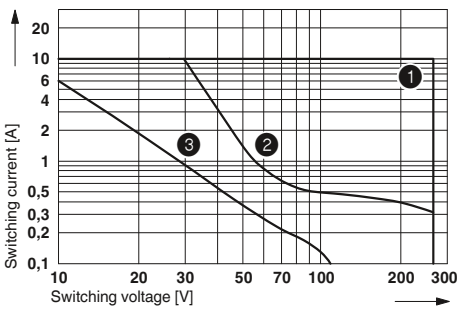
1 AC, ohmic load
2 DC, ohmic load, contacts in series
3 DC, ohmic load
4 DC, L/R = 40 ms

Electrical interrupting rating for PLC...1IC/ACT for high inrush currents



1 AC, ohmic load
2 DC, ohmic load
3 DC, L/R = 40 ms

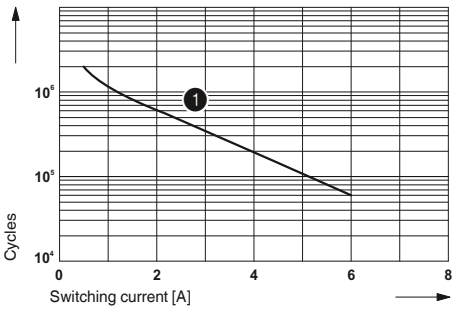
Electrical interrupting rating for PLC...21HC for high continuous currents



1 AC, ohmic load
2 DC, ohmic load
3 DC, L/R = 40 ms

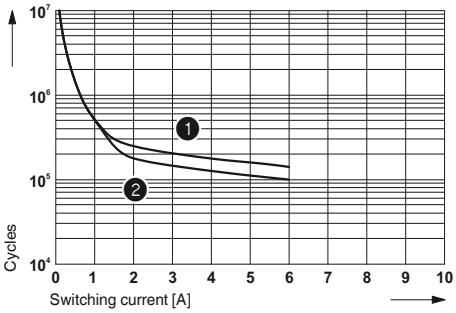
PLC-INTERFACE for railway applications

Electrical service life for PLC-RSP...UC/21RW



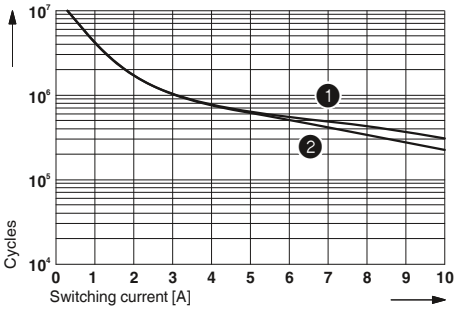
1 250 V AC, ohmic load

Electrical service life for PLC-RSP...UC/21-21/RW



1 250 V AC, ohmic load (DC coils)
2 250 V AC, ohmic load (AC coils)

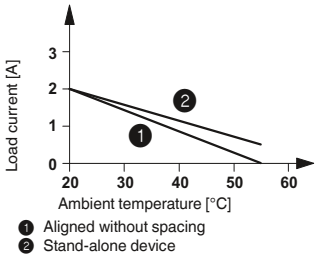
Electrical service life for PLC-RSP...UC/21HC/RW



1 250 V AC, ohmic load (DC coils)
2 250 V AC, ohmic load (AC coils)

EMG-OV solid-state power relays

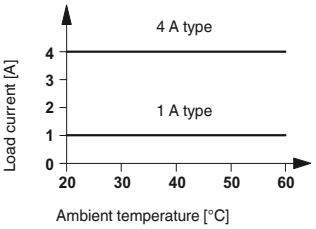
Derating curve for EMG 17-OV...48DC/2



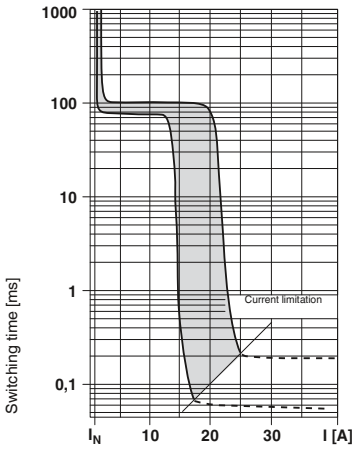
1 Aligned without spacing
2 Stand-alone device

ST-OV 4-24DC/24DC...PRO power circuit breaker solid-state relays with signal logic

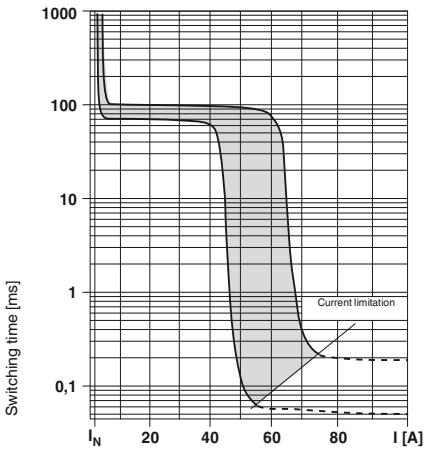
Derating curve for ST-OV 4-24DC/24DC...PRO



Time-current characteristic, 1 A version



Time-current characteristic, 4 A version



State diagram

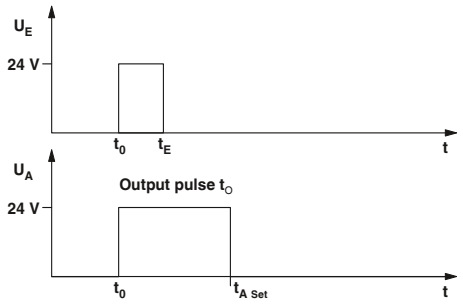
Operating state	Switching level Input	Light indicator, yellow LED	Light indicator, red LED	Alarm contact/ CONTROL
Not activated	L	L	L	
Normal operation	H	H	L	
Overload/short circuit	H	H	H	
Open circuit	L	L	H	

UEGM-OE/AV logic pulse expansion module

Time diagrams for UEGM-OE/AV-24DC/24DC/100

Scenario 1: input pulse t_I < output pulse $t_{O\ set}$

Operating voltage present



Scenario 2: input pulse $t_I \geq$ output pulse $t_{O\ set}$: $t_I = t_O$

Operating voltage present

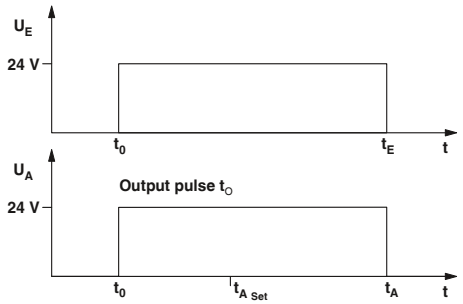


Table of adjustable output pulse lengths

	DIP switches[1])							
	S1	S2	S3	S4	S5	S6	S7	S8
Length of output pulses [ms] (when in "on" switch position)	10	–	–	–	–	–	–	–
	–	20	–	–	–	–	–	–
	–	–	50	–	–	–	–	–
	–	–	–	100	–	–	–	–
	–	–	–	–	200	–	–	–
	–	–	–	–	–	500	–	–
	–	–	–	–	–	–	1000	–
	–	–	–	–	–	–	–	1500

[1]) 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:

$$T_{tot} = \frac{1}{\frac{1}{t_1} + \frac{1}{t_2} + \ldots + \frac{1}{t_n}}$$

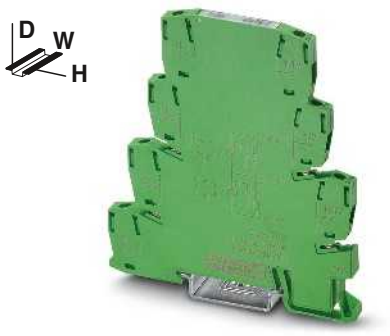
PLC-INTERFACE with two integrated relays

Relay module with two permanently soldered-in power relays

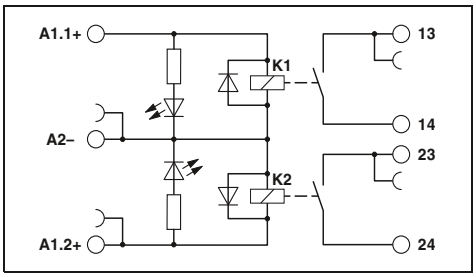
The advantages:

– 100% more channel density than the conventional 6.2 mm relay
– Two switching channels in a 6.2 mm housing
– Integrated input circuit/protective circuit
– Safe isolation according to DIN EN 50178 between coil and contacts and between contacts
– Screw, spring-cage, and push-in technology

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
1) EMC: Class A product, see page 571



Two integrated relays



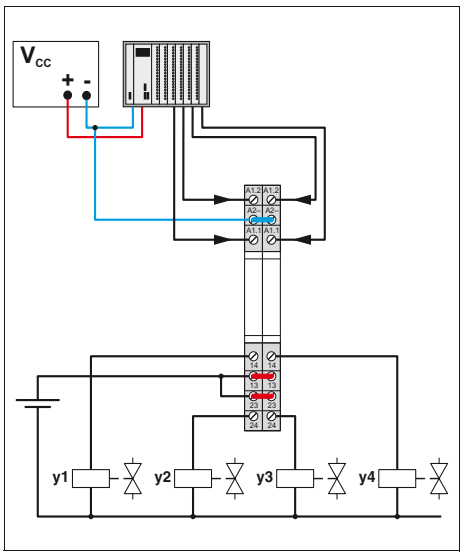
Technical data

Input data		①
Typ. input current at U_N	[mA]	7
Response/release time at U_N	[ms]	4 / 6
Input circuit DC		Yellow LED, Protection against polarity reversal, freewheeling diode
Output data		
Contact material		AgNi
Max. switching voltage		250 V AC/DC
Min. switching voltage		24 V AC/DC
Limiting continuous current		3.5 A
Min. 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 10^7 cycles
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Connection data solid / stranded / AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm

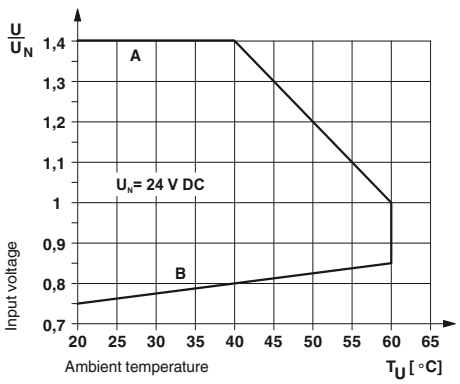
Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection** ①	24 V DC	**PLC-2RSC-24DC/ 1**[1]**)**	**2987309**	10
PLC INTERFACE, with **spring-cage connection** ①	24 V DC	**PLC-2RSP-24DC/ 1**[1]**)**	**2987312**	10
PLC-INTERFACE, with **push-in connection** ①	24 V DC	**PLC-2RPT-24DC/1**[1]**)**	**2901639**	10

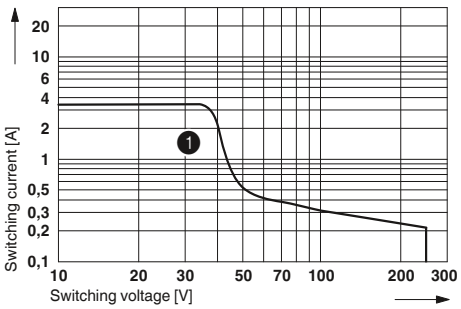
Application example for PLC-2RS...24DC/1



Operating voltage range



Interrupting rating



❶ DC, ohmic load

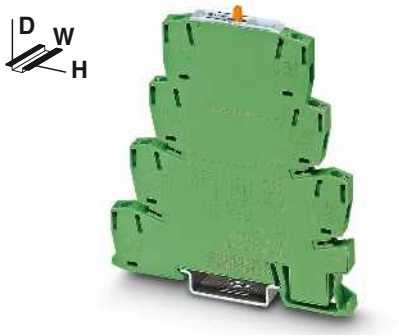
PLC-INTERFACE with manual switch and relay

Relay module with manual switch and integrated power relay for manual, zero, and automatic functions

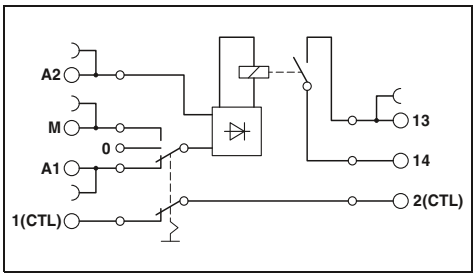
The advantages are:

– Max. switching current of 6 A
– Only 6.2 mm wide
– Floating confirmation contact
– Safe isolation according to DIN EN 50178 between coil and contact
– Screw, spring-cage, and push-in technology

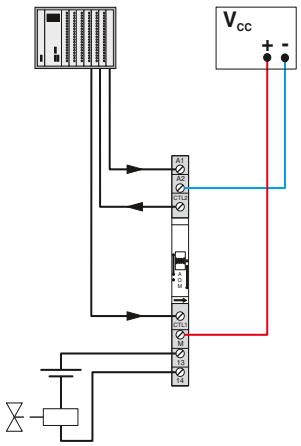
Notes:
Type of housing: Polyester PBT non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
Separating plate PLC-ATP is to be used in the following cases: always 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.
Module height: PLC-...-S/H = 90 mm; PLC-...-S/L: = 86 mm
PLC...**H** - manual operation PLC...**L** - operation using screwdriver
1) EMC: Class A product, see page 571



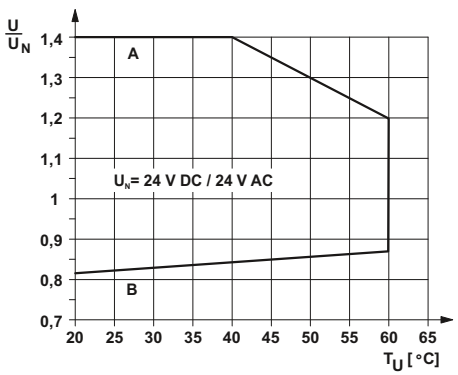
Relay module with manual switch and integrated relay



Application example PLC-RS...24UC/1/S...



Permissible input voltage range for PLC-RS...24UC/1/S...



Curve A
maximum continuous voltage at limiting continuous current = 6 A

Curve B
minimum operating voltage for pre-excitation with U_N and limiting continuous current = 6 A

Technical data

Input data		①	②
Typ. input current at U_N	[mA]	11	11
Response/release time at U_N	[ms]	6 / 15	6 / 15
Input circuit AC/DC		Yellow LED, Bridge rectifier	
Output data			
Contact material		AgSnO	
Max. switching voltage		250 V AC/DC	
Min. switching voltage		5 V (at 100 mA)	
Limiting continuous current		6 A	
Max. inrush current		(on request)	
Min. 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, IEC 62103	
Pollution degree/surge voltage category		2 / III	
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 90 mm	

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection**					
	①	24 V AC/DC	**PLC-RSC- 24UC/ 1/S/H**	**2982236**	10
	②	24 V AC/DC	**PLC-RSC- 24UC/ 1/S/L**[1])	**2834876**	10
PLC INTERFACE, with **spring-cage connection**					
	①	24 V AC/DC	**PLC-RSP- 24UC/ 1/S/H**	**2982249**	10
	②	24 V AC/DC	**PLC-RSP- 24UC/ 1/S/L**[1])	**2834889**	10
PLC-INTERFACE, with **push-in connection**					
	①	24 V AC/DC	**PLC-RPT- 24UC/ 1/S/H**[1])	**2900328**	10
	②	24 V AC/DC	**PLC-RPT- 24UC/ 1/S/L**[1])	**2900327**	10

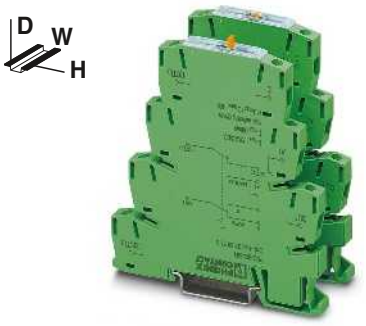
PLC-INTERFACE with manual switch without relay

Switching module without relay for manual, zero, and automatic functions

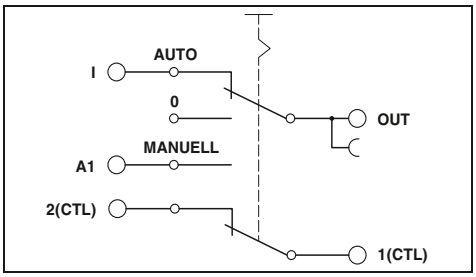
The advantages:

– Only 6.2 mm wide
– Floating confirmation contact
– Screw and spring-cage connection technology

Notes:
Type of housing: Polyester PBT non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
Separating plate PLC-ATP 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.
Module height: 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



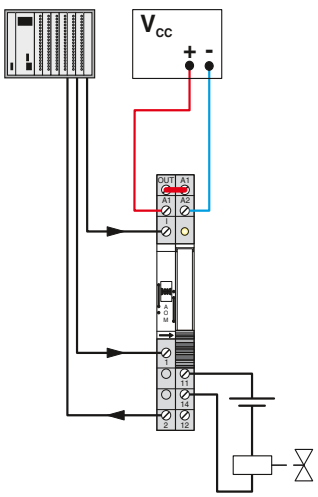
Technical data

Max. switching voltage		72 V DC
Min. switching voltage		2 V DC
Max. inrush current		50 mA
Min. switching current		1 mA
Cycles, max.		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		85 V AC
Rated surge voltage		0.5 kV / basic insulation
Ambient temperature (operation)		-20°C ... 60°C
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Pollution degree/surge voltage category		2 / III
Dimensions	W / H / D	6.2 mm / 80 mm / 90 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection**			
	PLC-SC-S/H	**2980733**	10
	PLC-SC-S/L	**2980775**	10
PLC INTERFACE, with **spring-cage connection**			
	PLC-SP-S/H	**2980746**	10
	PLC-SP-S/L	**2980788**	10

Application example PLC-S...S...

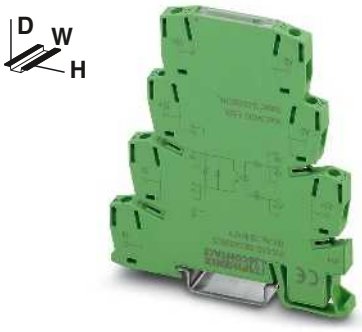


PLC-INTERFACE with an integrated solid-state relay

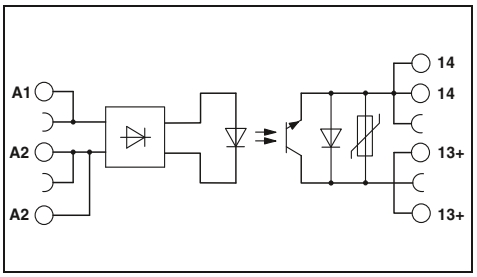
The slim 6.2 mm PLC housing with integrated electronics in various versions offers the following advantages:

– 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, spring-cage, and push-in technology

Notes:
Type of housing: Polyester PBT non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
Separating plate PLC-ATP 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-OS...-...-300DC/1 - PLC-OS...-24DC/24DC/10/R
1) EMC: Class A product, see page 571



Power solid-state relay with DC voltage output, max. 1 A

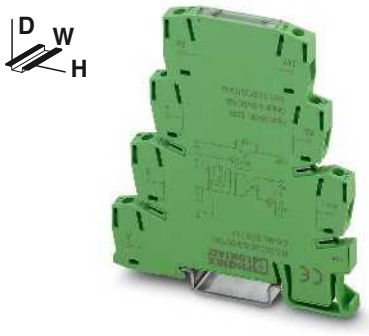


Technical data

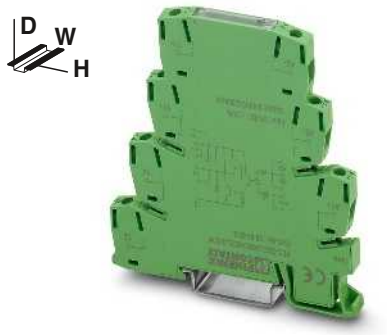
		①	②	③	④	⑤	⑥	⑦	⑧
Input data									
Permissible range (with reference to U_N)		0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.8 - 1.1
Switching level (with reference to U_N)	1 signal (“H”)	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8
	0 signal (“L”)	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4
Typ. input current at U_N	[mA]	15	6	8	5	5	3	5.6	8.4
Transmission frequency f_{limit}	[Hz]	50	50	50	50	50	50	10	10
Alarm output									
Operating range		- / -							
Output data									
Max. / min. switching voltage		300 V DC / 12 V DC							
Limiting continuous current		1 A (see derating curve)							
Voltage drop at max. 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, IEC 62103							
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14							
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm							

Ordering data

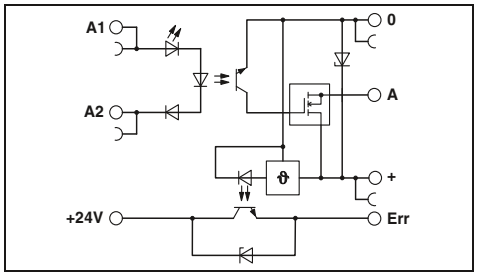
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection**					
	①	5 V DC	**PLC-OSC- 5DC/300DC/ 1[1])**	**2980652**	10
	②	12 V DC	**PLC-OSC- 12DC/300DC/ 1[1])**	**2980665**	10
	③	24 V DC	**PLC-OSC- 24DC/300DC/ 1[1])**	**2980678**	10
48 V DC ... 60 V DC	④	60 V DC	**PLC-OSC- 60DC/300DC/ 1[1])**	**2980681**	10
	⑤	110 V DC	**PLC-OSC-110DC/300DC/ 1[1])**	**2980694**	10
	⑥	220 V DC	**PLC-OSC-220DC/300DC/ 1[1])**	**2980704**	10
	⑦	120 V AC	**PLC-OSC-120AC/300DC/ 1[1])**	**2980717**	10
	⑧	230 V AC	**PLC-OSC-230AC/300DC/ 1[1])**	**2980720**	10
PLC INTERFACE, with **spring-cage connection**					
	①	5 V DC	**PLC-OSP- 5DC/300DC/ 1[1])**	**2980814**	10
	②	12 V DC	**PLC-OSP- 12DC/300DC/ 1[1])**	**2980827**	10
	③	24 V DC	**PLC-OSP- 24DC/300DC/ 1[1])**	**2980830**	10
48 V DC ... 60 V DC	④	60 V DC	**PLC-OSP- 60DC/300DC/ 1[1])**	**2980843**	10
	⑤	110 V DC	**PLC-OSP-110DC/300DC/ 1[1])**	**2980856**	10
	⑥	220 V DC	**PLC-OSP-220DC/300DC/ 1[1])**	**2980869**	10
	⑦	120 V AC	**PLC-OSP-120AC/300DC/ 1[1])**	**2980872**	10
	⑧	230 V AC	**PLC-OSP-230AC/300DC/ 1[1])**	**2980885**	10
PLC-INTERFACE, with **push-in connection**					
	①	5 V DC	**PLC-OPT- 5DC/300DC/1[1])**	**2900381**	10
	②	12 V DC	**PLC-OPT- 12DC/300DC/1[1])**	**2900382**	10
	③	24 V DC	**PLC-OPT- 24DC/300DC/1[1])**	**2900383**	10
48 V DC ... 60 V DC	④	60 V DC	**PLC-OPT- 60DC/300DC/1[1])**	**2900384**	10
	⑤	110 V DC	**PLC-OPT-110DC/300DC/1[1])**	**2900385**	10
	⑥	220 V DC	**PLC-OPT-220DC/300DC/1[1])**	**2900387**	10
	⑦	120 V AC	**PLC-OPT-120AC/300DC/1[1])**	**2900388**	10
	⑧	230 V AC	**PLC-OPT-230AC/300DC/1[1])**	**2900389**	10

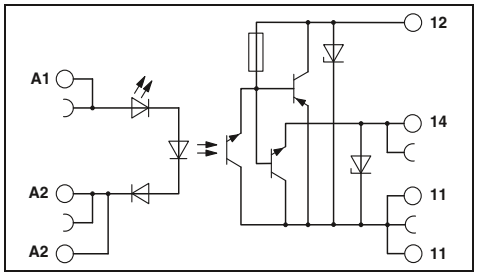


Power solid-state relay with short-circuit-proof DC voltage output, max. 10 A, with feedback



Input solid-state relay with DC voltage output, max. 500 mA, with electronic PDT





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	48 V DC / 3 V DC
10 A (see derating curve)	500 mA (see derating curve)
≤ 50 mV	< 1.2 V
300 V	300 V
4 kV / basic insulation	4 kV / basic insulation
-25°C ... 60°C	-25°C ... 60°C
IEC 60664, EN 50178, IEC 62103	IEC 60664, EN 50178, IEC 62103
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
6.2 mm / 80 mm / 86 mm	6.2 mm / 80 mm / 86 mm

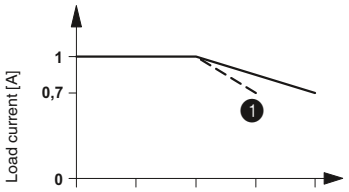
Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-OSC- 24DC/ 24DC/ 10/R[1])	**2982702**	10
PLC-OSP- 24DC/ 24DC/ 10/R[1])	**2982715**	10
PLC-OPT- 24DC/ 24DC/10/R[1])	**2900398**	10

Ordering data

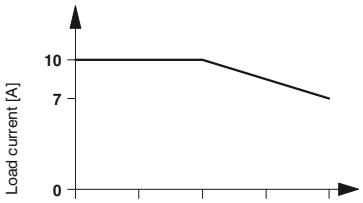
Type	Order No.	Pcs. / Pkt.
PLC-OSC- 24DC/ 48DC/500/W[1])	**2980636**	10
PLC-OSP- 24DC/ 48DC/500/W[1])	**2980649**	10
PLC-OPT- 24DC/ 48DC/500/W[1])	**2900378**	10

Derating curve for PLC...300DC/1

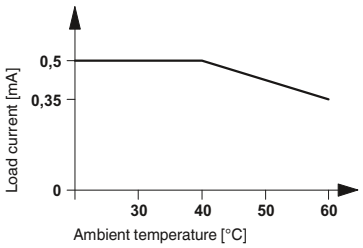


1 For input voltages 220 V DC and 230 V AC

Derating curve for PLC-...24DC/24DC/10/R



Derating curve for PLC...24DC/48DC/500/W



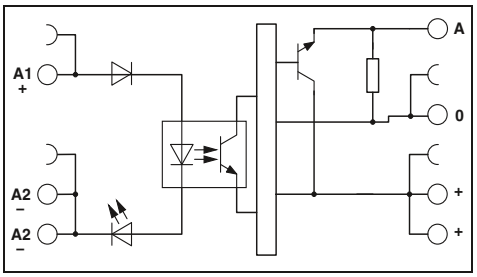
PLC-INTERFACE
Solid-state relays up to 100 kHz

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 housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
1) EMC: Class A product, see page 571

N

with DC voltage output
Transmission frequency 100 kHz



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
Typ. input current at U_N	[mA]	7	6
Typ. switch-on time at U_N	[µs]	1.5	1.5
Typ. switch-off time at U_N	[µs]	2	2
Transmission frequency f_{limit}	[kHz]	100	100
Input protection:		LED yellow, Protection against polarity reversal, 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	Protection against polarity reversal, Surge protection

General data	
Test voltage input/output	2.5 kV_{rms} (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 60°C
Standards/regulations	DIN EN 50178
Pollution degree/surge voltage category	2 / II
Connection data solid / stranded / AWG	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
Dimensions W / H / D	6.2 mm / 80 mm / 86 mm

Ordering data

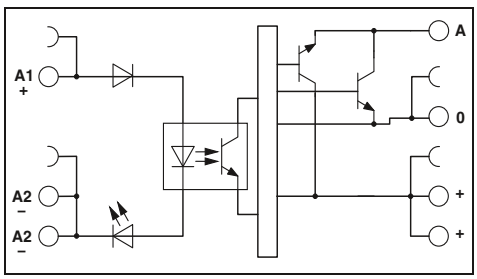
Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Input solid-state relay with push-in connection				
①	5 V DC	**PLC-OSC- 5DC/24DC/100KHZ[1])**	**2902963**	1
②	24 V DC	**PLC-OSC- 24DC/24DC/100KHZ[1])**	**2902964**	1
Input solid-state relay with screw connection				
①	5 V DC	**PLC-OPT- 5DC/ 24DC/100KHZ[1])**	**2902969**	1
②	24 V DC	**PLC-OPT- 24DC/24DC/100KHZ[1])**	**2902970**	1

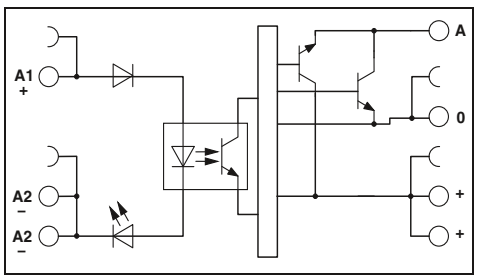
N

with DC voltage output push-pull
Transmission frequency 100 kHz

N

with DC voltage output push-pull
Transmission frequency 100 kHz





Technical data

①	②
0.5 -	0.8 -
1.2	1.2
> 0.5	> 0.8
< 0.3	< 0.4
8	8
1	1
2	2
100	100
LED yellow, Protection against polarity reversal, Surge protection	

4 V DC ... 18 V DC	14 V DC ... 30 V DC
50 mA	50 mA
8.5 mA	15 mA
< 1.2 V	< 2.2 V
3-conductor push-pull, ground referenced	3-conductor push-pull, ground referenced
Protection against polarity reversal, Surge protection	Protection against polarity reversal, Surge protection
2.5 kV_{rms} (50 Hz, 1 min.)	2.5 kV_{rms} (50 Hz, 1 min.)
-20°C ... 60°C	-20°C ... 60°C
DIN EN 50178	DIN EN 50178
2 / II	2 / II
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
6.2 mm / 80 mm / 86 mm	6.2 mm / 80 mm / 86 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-OSC- 5DC/ 5DC/100KHZ-G[1])	**2902965**	1
PLC-OSC- 24DC/ 5DC/100KHZ-G[1])	**2902966**	1
PLC-OPT- 5DC/ 5DC/100KHZ-G[1])	**2902971**	1
PLC-OPT- 24DC/ 5DC/100KHZ-G[1])	**2902972**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-OSC- 5DC/ 24DC/100KHZ-G[1])	**2902967**	1
PLC-OSC- 24DC/ 24DC/100KHZ-G[1])	**2902968**	1
PLC-OPT- 5DC/24DC/100KHZ-G[1])	**2902973**	1
PLC-OPT- 24DC/24DC/100KHZ-G[1])	**2902974**	1

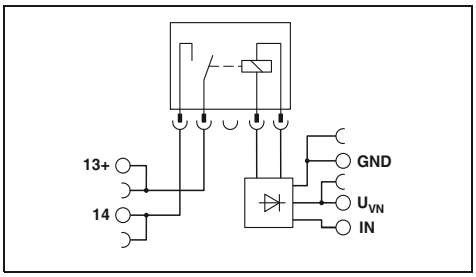
PLC-INTERFACE for the TTL signal at the input

The PLC-BS…TTL/1 basic terminal block is controlled using a TTL (5 V) input signal and can be equipped with a mechanical relay or a solid-state relay as an option. The basic terminal block equipped with a robust miniature relay offers the following advantages:

– 6.2 mm slim design width
– Bridging options
– Status display
– Screw and spring-cage connection
– RTIII degree of protection
– Safe isolation in accordance with EN 50178 (VDE 0160)
– 4 kV_{rms} electrical isolation between coil and contact.
– Screw, spring-cage, and push-in technology

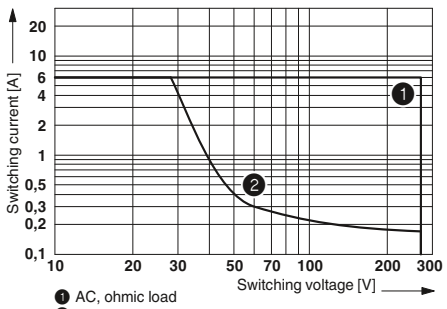
Notes:
Type of housing: Polyester PBT non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
1) EMC: Class A product, see page 571

Basic terminal block, for fitting 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	
Typ. response time at U_c		4.5 ms	
Typ. release time for U_c		3.5 ms	
Input circuit		Yellow LED, Protection against polarity reversal, Surge protection	
Output data with:		REL-MR-4,5DC/21 AU	REL-MR-4,5DC/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
Min. switching voltage		100 mV (at 10 mA)	5 V (at 100 mA)
Limiting continuous current		50 mA	6 A
Max. inrush current		50 mA	(on request)
Min. 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 10^7 cycles	
Air and creepage distances between the power circuits		IEC 60664, EN 50178, IEC 62103	
Pollution degree / Surge voltage category		2 / III	
Mounting position / Assembly		Any / In rows with zero spacing	
Connection data solid / stranded / AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm	



❶ AC, ohmic load
❷ DC, ohmic load

Max. interrupting rating

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
PLC-INTERFACE			
With screw connection	**PLC-BSC-TTL/1[1])**	**2982689**	10
With spring-cage connection	**PLC-BSP-TTL/1[1])**	**2982692**	10
With push-in connection	**PLC-BPT-TTL/1[1])**	**2900458**	10

Accessories

Plug-in miniature power relays			
with gold contact	**REL-MR 4,5DC/21AU**	**2961370**	10
with power contact	**REL-MR- 4,5DC/21**	**2961367**	10

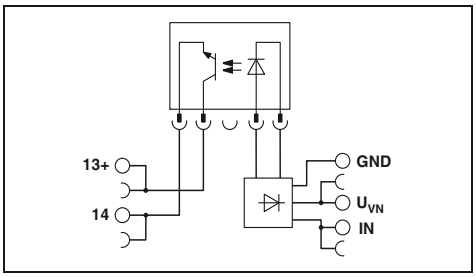
PLC-INTERFACE for the TTL signal at the input

The PLC-BS…TTL/1 basic terminal block is controlled using a TTL (5 V) input signal and can be equipped with a mechanical relay or a solid-state relay as an option. The basic terminal block equipped with a solid-state relay offers the following advantages:

– 6.2 mm slim design width
– Bridging options
– Status display
– Screw and spring-cage connection
– 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 output-free
– Integrated protection circuit
– Insensitive to vibrations and shocks
– 2.5 kV_{rms} electrical isolation between input and output
– Screw, spring-cage, and push-in technology

Notes:
Type of housing: Polyester PBT non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
For derating curves see page 345
1) EMC: Class A product, see page 571

Basic terminal block for fitting with solid-state 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}		11.5 mA	
Rated actuating voltage U_c (IN)		5 V DC (TTL)	
Switching level 1 signal (“H”) (TTL signal)		> 2 V DC	
Switching level 0 signal (“L”) (TTL signal)		< 0.8 V DC	
Rated actuating current I_C		2.5 mA	
Typ. response time/switch-on time at U_c		35 µs	
Typ. switch-off time at U_C		320 µs	
Input circuit		Yellow LED, Protection against polarity reversal, Surge protection	
Output data with:		OPT-5DC/48DC/100	OPT-5DC/24DC/2
Max. switching voltage		48 V DC	33 V DC
Min. switching voltage		3 V DC	3 V DC
Limiting continuous current		100 mA	3 A
Output protection		Protection against polarity reversal, Surge protection	Protection against polarity reversal, Surge protection
Voltage drop at limiting continuous current		< 1 V	< 200 mV
General data			
Rated insulation voltage		250 V	
Rated surge voltage / insulation		6 kV/basic isolation	
Ambient temperature (operation)		-20°C ... 60°C	
Air and creepage distances between the power circuits		IEC 60664, EN 50178, IEC 62103	
Pollution degree / Surge voltage category		2 / III	
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm	

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
PLC-INTERFACE			
With screw connection	**PLC-BSC-TTL/1[1])**	**2982689**	10
With spring-cage connection	**PLC-BSP-TTL/1[1])**	**2982692**	10
With push-in connection	**PLC-BPT-TTL/1[1])**	**2900458**	10

Accessories

Plug-in solid-state relays			
Solid-state input relays	**OPT- 5DC/ 48DC/100**	**2967992**	10
Solid-state power relays	**OPT- 5DC/ 24DC/ 2**	**2967989**	10

PLC-INTERFACE for the TTL signal at the output

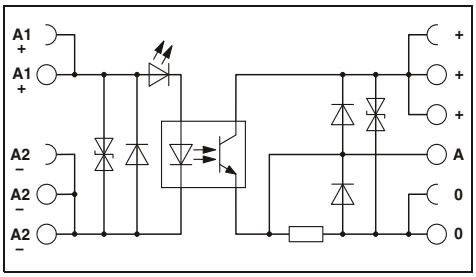
The PLC-OS…24DC/TTL with a built-in solid-state relay can be used for fast and wear-free switching of TTL (5 V) signals.

The module offers the following advantages:

– Switching capacity TTL (5 V), fan out = 1
– 6.2 mm slim design width
– Bridging options
– Status display
– Screw and spring-cage connection
– Integrated protection circuit
– Insensitive to vibrations and shocks
– Screw, spring-cage, and push-in technology

Notes:
Type of housing: Polyester PBT non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
1) EMC: Class A product, see page 571

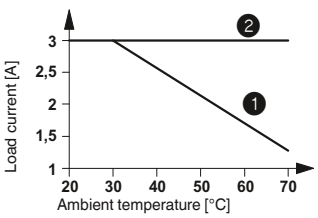
Input solid state relay with TTL (5 V) output



Technical data

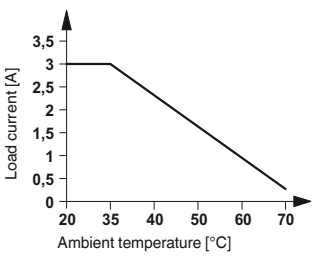
Input data		
Rated actuating voltage U_C		24 V DC
Rated actuating voltage range with reference to U_C		0.8 ... 1.2
Switching level 1 signal (“H”)		> 0.8
Switching level 0 signal (“L”)		< 0.4
Rated actuating current I_C		3.4 mA
Typ. switch-on time for U_C		35 µs
Typ. switch-off time at U_C		35 µs
Transmission frequency f_{limit}		1 kHz
Input circuit DC		Yellow LED, Protection against polarity reversal, Surge protection
Output data with:		
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		Protection against polarity reversal, Surge protection
Voltage drop at max. limiting continuous current		< 80 mV
General data		
Rated insulation voltage		250 V DC
Rated surge voltage / insulation		4 kV / basic insulation
Ambient temperature (operation)		-25°C ... 60°C
Air and creepage distances between the power circuits		IEC 60664, EN 50178, IEC 62103
Pollution degree/surge voltage category		2 / III
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm

Derating curve for PLC-OSP...24DC/3RW



❶ Aligned without spacing
❷ Aligned with ≥ 20 mm spacing

Derating curve for PLC-OSP...110DC/3RW



Ordering data

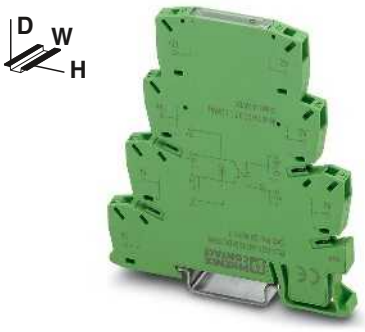
Description	Type	Order No.	Pcs. / Pkt.
PLC-INTERFACE			
With screw connection	**PLC-OSC- 24DC/TTL[1])**	**2982728**	10
With spring-cage connection	**PLC-OSP- 24DC/TTL[1])**	**2982731**	10
With push-in connection	**PLC-OPT- 24DC/TTL[1])**	**2900363**	10

PLC-INTERFACE with solid-state relays for railway applications

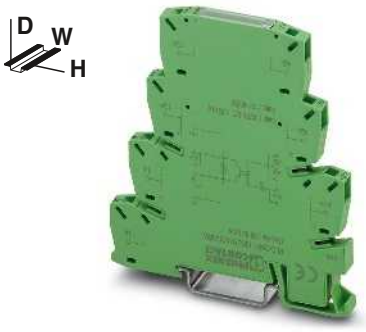
The PLC-OSP...RW interface modules are intended for use as per DIN EN 50155 (VDE 0115 part 200) "Railway applications, Part 200: Electronic devices in rail vehicles".

The advantages:

– Temperature range -25°C to +70°C
– Input voltage range 0.7 - 1.25 x U_N
– Shock resistance according to DIN 50155 (requirements according to EN 61373).
– Screw, spring-cage, and push-in technology

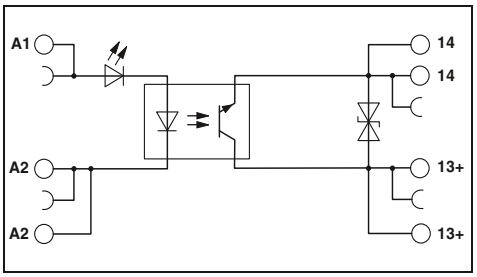


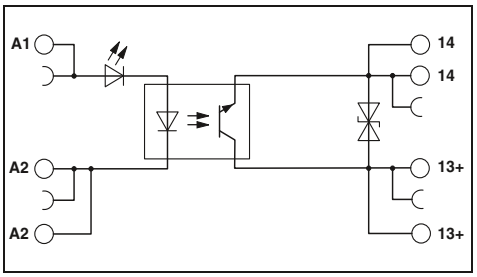
Power solid-state relay with DC voltage output, max. 3 A



Power solid-state relay with DC voltage output, max. 3 A

Notes:
Type of housing: Polyester PBT non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
For derating curves see page 358
1) EMC: Class A product, see page 571





Technical data

Input data		①	⑥
Permissible range (with reference to U_N)		0.7 - 1.25	0.7 - 1.25
Switching level (with reference to U_N)	1 signal ("H")	≥ 0.6	≥ 0.6
	0 signal ("L")	≤ 0.3	≤ 0.3
Typ. input current at U_N	[mA]	8.5	3
Typ. switch-on time at U_N	[ms]	0.04	0.08
Typ. switch-off time at U_N	[ms]	0.2	0.6
Transmission frequency f_{limit}	[Hz]	300	100
Input circuit DC		Yellow LED, Protection against polarity reversal	
Output data			
Max. switching voltage		33 V DC	
Min. switching voltage		3 V DC	
Limiting continuous current		3 A (see derating curve)	
Output protection		Protection against polarity reversal, Surge protection	
Voltage drop at max. limiting continuous current		< 200 mV	
General data			
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, IEC 62103	
Pollution degree/surge voltage category		2 / III	
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm	

Technical data

Input data		①	②	③	④	⑤	⑥
Permissible range (with reference to U_N)		0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25	0.7 - 1.25
Switching level (with reference to U_N)	1 signal ("H")	> 0.6	> 0.6	> 0.6	> 0.6	> 0.6	> 0.6
	0 signal ("L")	< 0.4	< 0.4	< 0.3	< 0.3	< 0.3	< 0.3
Typ. input current at U_N	[mA]	12	12	5.5	5.5	5.5	5.5
Typ. switch-on time at U_N	[ms]	0.4	0.4	0.04	0.04	0.04	0.4
Typ. switch-off time at U_N	[ms]	0.2	0.1	0.2	0.2	0.2	0.2
Transmission frequency f_{limit}	[Hz]	50	50	300	300	300	300
Input circuit DC		Yellow LED, Protection against polarity reversal, Surge protection					
Output data							
Max. switching voltage		140 V DC					
Min. switching voltage		12 V DC					
Limiting continuous current		3 A (see derating curve)					
Output protection		Protection against polarity reversal, Surge protection					
Voltage drop at max. limiting continuous current		< 150 mV					
General data							
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, IEC 62103					
Pollution degree/surge voltage category		2 / III					
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14					
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm					

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **spring-cage connection**				
①	24 V DC	**PLC-OSP- 24DC/ 24DC/ 3RW**	**2980513**	10
②	36 V DC			
③	48 V DC			
④	72 V DC			
⑤	96 V DC			
⑥	110 V DC	**PLC-OSP-110DC/ 24DC/ 3RW**	**2980526**	10
PLC-INTERFACE, with **push-in connection**				
①	24 V DC	**PLC-OPT- 24DC/ 24DC/3RW[1])**	**2900379**	10
②	36 V DC			
③	48 V DC			
④	72 V DC			
⑤	96 V DC			
⑥	110 V DC	**PLC-OPT-110DC/ 24DC/3RW[1])**	**2900380**	10

Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-OSP- 24DC/110DC/ 3RW[1])	**2982511**	10
PLC-OSP- 36DC/110DC/ 3RW[1])	**2982524**	10
PLC-OSP- 48DC/110DC/ 3RW[1])	**2982537**	10
PLC-OSP- 72DC/110DC/ 3RW[1])	**2982540**	10
PLC-OSP- 96DC/110DC/ 3RW[1])	**2982553**	10
PLC-OSP-110DC/110DC/ 3RW[1])	**2982566**	10
PLC-OPT- 24DC/110DC/3RW[1])	**2900391**	10
PLC-OPT- 36DC/110DC/3RW[1])	**2900392**	10
PLC-OPT- 48DC/110DC/3RW[1])	**2900393**	10
PLC-OPT- 72DC/110DC/3RW[1])	**2900394**	10
PLC-OPT- 96DC/110DC/3RW[1])	**2900395**	10
PLC-OPT-110DC/110DC/3RW[1])	**2900396**	10

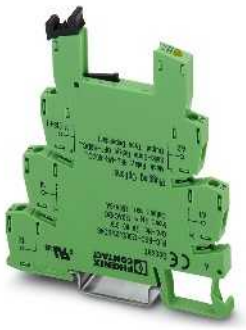
PLC-INTERFACE for railway applications

Relay modules with extended input voltage and temperature range, specifically for use in railway applications

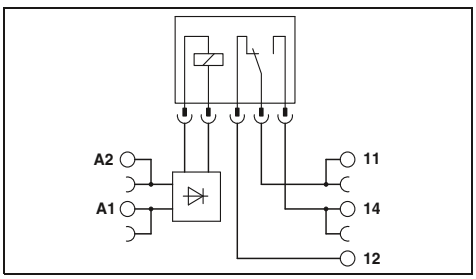
The advantages:

– Temperature range -25°C to +70°C
– Input voltage range 0.7 to 1.25 x UN
– Vibration and shock resistance to EN 50155
– Safe isolation according to DIN EN 50178 between coil and contact
– Spring cage and push-in connection method

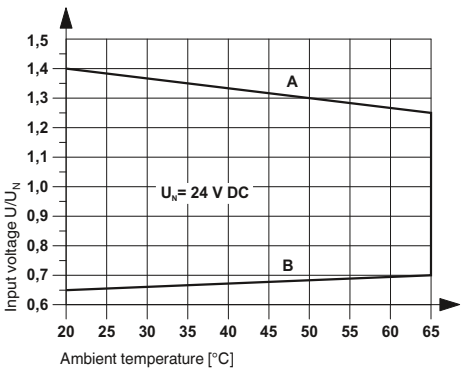
Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.
1) EMC: Class A product, see page 571



Basic terminal block that can be fitted with 1 PDT relay



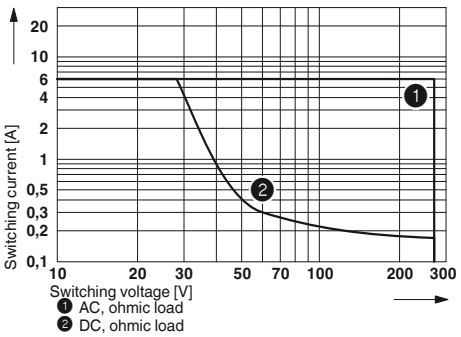
Permissible input voltage range for PLC-BSP-24DC/21RW (with REL-MR-18DC/21... relay)



Curve A
Maximum continuous voltage at limiting continuous current = 3 A

Curve B
Minimum operate voltage for pre-excitation with U_N and limiting continuous current = 3 A

Electrical interrupting rating for PLC...21 with 1 PDT relay



Technical data

Input data			
Nominal input voltage U_N		24 V DC	
Permissible range (with reference to U_N)		See diagram	
Typ. input current at U_N		12 mA	
Typ. response time at U_N		5 ms	
Typ. release time at U_N		8 ms	
Input circuit		Yellow LED, Protection against polarity reversal, freewheeling diode	
Output data with:		REL-MR-18DC/21	REL-MR-18DC/21AU
Contact type		Single contact, 1-PDT	Single contact, 1-PDT
Contact material		AgSnO	AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Min. switching voltage		5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current		3 A	50 mA
Max. inrush current		(on request)	50 mA
Min. 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 10^7 cycles	
Standards/regulations		IEC 60664, EN 50178, IEC 62103	
Pollution degree / Surge voltage category		3 / III	
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm	

Ordering data

Description	Voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC-INTERFACE basic terminal block, for plug-in miniature relay				
With spring-cage connection	24 V DC	**PLC-BSP- 24DC/21RW**[1])	**2961396**	10
With push-in connection	24 V DC	**PLC-BPT- 24DC/21RW**[1])	**2900261**	10

Accessories

Plug-in miniature relays			
with power contact	**REL-MR- 18DC/21**	**2961383**	10
with gold contact	**REL-MR- 18DC/21AU**	**2961493**	10

PLC-INTERFACE for railway applications

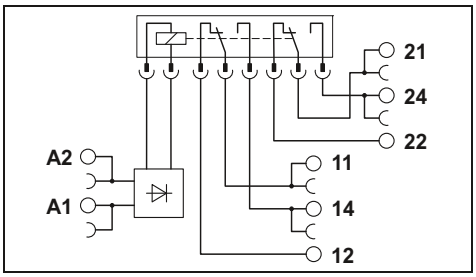
Relay module for input voltages with a nominal frequency of 16.7 Hz

The advantages:

– Input nominal frequency 16.7 Hz
– Vibration and shock resistance to EN 50155
– Safe isolation according to DIN EN 50178 between coil and contact
– Spring cage and push-in connection method

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The values in parentheses then apply for further operation. This can result in a shorter service life than with a pure power contact.
1) EMC: Class A product, see page 571

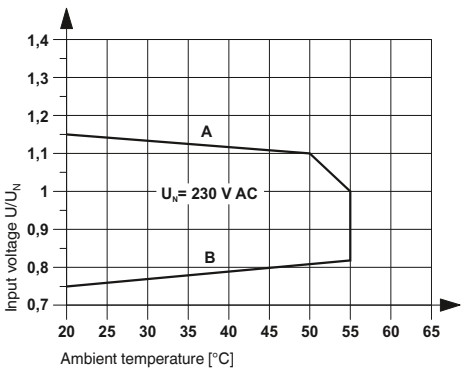
For 16.7 Hz input frequency with 2 PDTs



Technical data

Input data		
Nominal input voltage U_N	230 V AC	
Input nominal frequency	16.67 Hz	
Permissible range (with reference to U_N)	(refer to the diagram)	
Typ. input current at U_N	4.8 mA (with AC)	
Typ. response time at U_N	20 ms	
Typ. release time at U_N	60 ms	
Input circuit	Yellow LED, Bridge rectifier	
Output data		
Contact type	Single contact, 2-PDT	
Contact material	AgNi, hard gold-plated	
Max. switching voltage	30 V AC / 36 V DC	(250 V AC/DC)
Min. switching voltage	100 mV	(5 V AC/DC)
Limiting continuous current	50 mA	(6 A)
Max. inrush current	50 mA	(8 A)
Min. switching current	1 mA	(10 mA)
General data		
Test voltage input/output	6 kV	
Ambient temperature (operation)	-25°C ... 60°C	
Mechanical service life	Approx. 3 x 10^7 cycles	
Standards/regulations	IEC 60664, EN 50178, IEC 62103	
Pollution degree / Surge voltage category	2 / III	
Connection data solid / stranded / AWG	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
Dimensions W / H / D	14 mm / 80 mm / 94 mm	

Permissible input voltage range for PLC-RSP-230UC/21-21AU/RWF



Curve A
maximum continuous voltage at limiting continuous current = 6 A

Curve B
minimum operating voltage for pre-excitation with U_N and limiting continuous current = 6 A

Ordering data

Description	Voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC-INTERFACE				
With spring-cage connection	230 V AC	**PLC-RSP-230UC/21-21AU/RWF[1])**	**2968001**	10
With push-in connection	230 V AC	**PLC-RPT-230UC/21-21AU/RWF[1])**	**2900345**	10

PLC-INTERFACE for railway applications

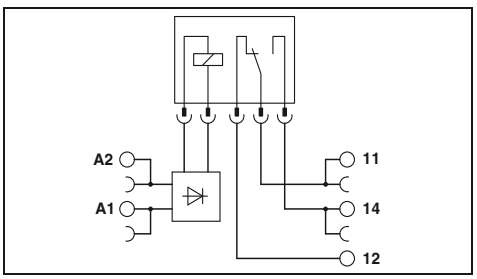
Relay modules with extended input voltage and temperature range, specifically designed for railway applications

The advantages:

– Certified to EN 50155
– Optimum relay operation thanks to wide-range electronics
– Temperature range from -40°C to +70°C (short-term 85°C)
– Input voltage range 0.7 to 1.25 x U_N (short-term 1.4 x U_N)
– Vibration and shock resistance to EN 50155
– Safe isolation according to DIN EN 50178 between coil and contact
– Spring cage and push-in connection method

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.
Electrical service life diagrams, see page 346
1) EMC: Class A product, see page 571

1 PDT



Technical data

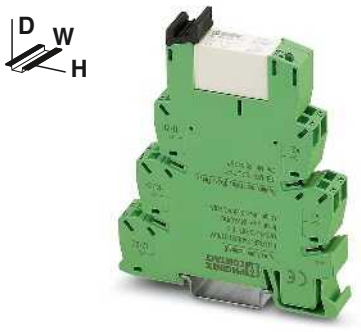
Input data		①	②	③
Permissible range (with reference to U_N)		0.7 - 1.25	0.7 - 1.25	0.7 - 1.25
Typ. input current at U_N	[mA]	9	3	2
Typ. response time at U_N	[ms]	4	4	4
Typ. release time at U_N	[ms]	4	4	4
Input protection:		Yellow LED, Bridge rectifier, freewheeling diode		

Output data		
Contact type	Single contact, 1-PDT	Single contact, 1-PDT
Contact material	AgSnO	AgSnO, hard gold-plated
Max. switching voltage	250 V AC/DC	30 V AC / 36 V DC
Min. switching voltage	5 V (at 100 mA)	100 mV
Limiting continuous current	6 A	50 mA
Max. inrush current	(on request)	50 mA
Min. switching current	10 mA (at 12 V)	1 mA

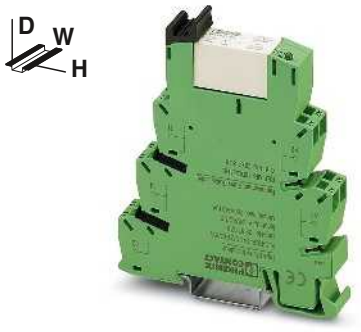
General data	
Test voltage (winding / contact)	4 kV_{rms} (50 Hz, 1 min.)
Ambient temperature (operation)	-40°C ... 70°C (Temperature class TX)
Mechanical service life	Approx. 2 x 10^7 cycles
Standards/regulations	EN 50155 (VDE 0115 part 200), EN 50178, IEC 62103, EN 61373, EN 50121
Connection data solid / stranded / AWG	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
Dimensions W / H / D	6.2 mm / 80 mm / 94 mm

Ordering data

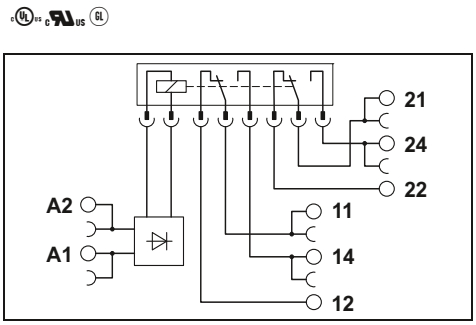
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
PLC-INTERFACE, with **power contact**					
With spring-cage connection	①	24 V DC	**PLC-RSP- 24UC/21/RW[1])**	**2987011**	10
	②	72 V DC	**PLC-RSP- 72UC/21/RW[1])**	**2987037**	10
	③	110 V DC	**PLC-RSP-110UC/21/RW[1])**	**2987053**	10
With push-in connection	①	24 V DC	**PLC-RPT- 24UC/21/RW[1])**	**2900318**	10
	②	72 V DC	**PLC-RPT- 72UC/21/RW[1])**	**2900319**	10
	③	110 V DC	**PLC-RPT-110UC/21/RW[1])**	**2900320**	10
PLC-INTERFACE, with **hard gold-plated contact**					
With spring-cage connection	①	24 V DC	**PLC-RSP- 24UC/21AU/RW[1])**	**2987024**	10
	②	72 V DC	**PLC-RSP- 72UC/21AU/RW[1])**	**2987040**	10
	③	110 V DC	**PLC-RSP-110UC/21AU/RW[1])**	**2987066**	10
With push-in connection	①	24 V DC	**PLC-RPT- 24UC/21AU/RW[1])**	**2900321**	10
	②	72 V DC	**PLC-RPT- 72UC/21AU/RW[1])**	**2900322**	10
	③	110 V DC	**PLC-RPT-110UC/21AU/RW[1])**	**2900323**	10

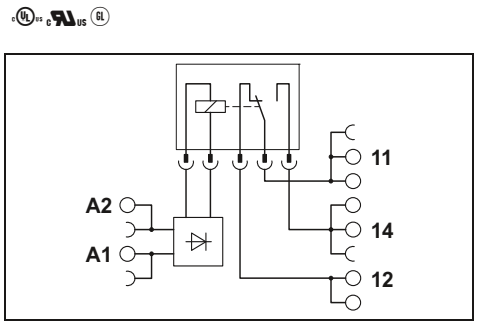


2 PDT



1 PDT up to 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

Single contact, 2-PDT	Single contact, 2-PDT	Single contact, 1-PDT
AgNi	AgNi, hard gold-plated	AgNi
250 V AC/DC	30 V AC / 36 V DC	250 V AC/DC
5 V (at 100 mA)	100 mV	12 V AC/DC
2x 6 A	50 mA	10 A (With inserted bridge 2967691)
15 A (300 ms)	50 mA	30 A (300 ms)
10 mA (at 12 V)	1 mA	10 mA

5 kV_{rms} (50 Hz, 1 min.)
-40°C ... 70°C (Temperature class TX)
Approx. 3 x 10^7 cycles
EN 50155 (VDE 0115 part 200), EN 50178, IEC 62103, EN 61373, EN 50121
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
14 mm / 80 mm / 94 mm

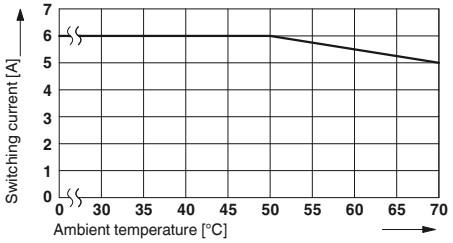
Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-RSP- 24UC/21-21/RW[1])	**2987105**	10
PLC-RSP- 72UC/21-21/RW[1])	**2987121**	10
PLC-RSP-110UC/21-21/RW[1])	**2987147**	10
PLC-RPT- 24UC/21-21/RW[1])	**2900346**	10
PLC-RPT- 72UC/21-21/RW[1])	**2900347**	10
PLC-RPT-110UC/21-21/RW[1])	**2900348**	10
PLC-RSP- 24UC/21-21AU/RW[1])	**2987118**	10
PLC-RSP- 72UC/21-21AU/RW[1])	**2987134**	10
PLC-RSP-110UC/21-21AU/RW[1])	**2987150**	10
PLC-RPT- 24UC/21-21AU/RW[1])	**2900349**	10
PLC-RPT- 72UC/21-21AU/RW[1])	**2900350**	10
PLC-RPT-110UC/21-21AU/RW[1])	**2900351**	10

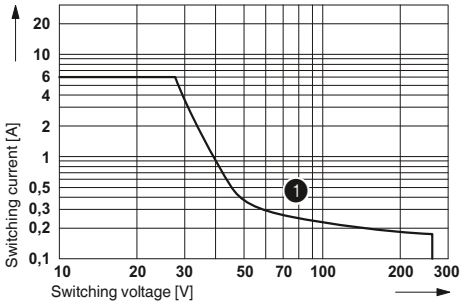
Ordering data

Type	Order No.	Pcs. / Pkt.
PLC-RSP- 24UC/21HC/RW[1])	**2987079**	10
PLC-RSP- 72UC/21HC/RW[1])	**2987082**	10
PLC-RSP-110UC/21HC/RW[1])	**2987095**	10
PLC-RPT- 24UC/21HC/RW[1])	**2900324**	10
PLC-RPT- 72UC/21HC/RW[1])	**2900325**	10
PLC-RPT-110UC/21HC/RW[1])	**2900326**	10

Derating curve for **PLC-RSP...21/RW**
PLC-RSP...21AU/RW
PLC-RSP...21-21/RW
PLC-RSP...21-21AU/RW

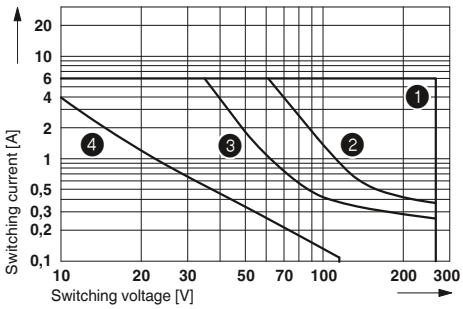


Interrupting rating for PLC-RSP...UC/21RW



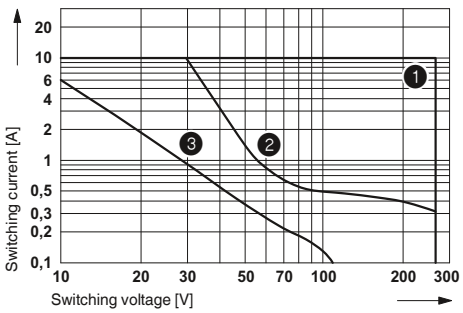
❶ Ohmic load

Interrupting rating for PLC-RSP...UC/21-21/RW



❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

Interrupting rating for PLC-RSP...UC/21HC/RW



❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

PLC electronic sensor terminal block for NAMUR proximity sensors

The PLC-...EIK 1-SVN electronic sensor terminal block from Phoenix Contact converts the changeable resistance of a NAMUR sensor unit into a digital signal that can be read by all PLCs.

In addition, the electronics unit monitors the sensor side for short-circuits or wire breaks and reports this error via an integrated LED.

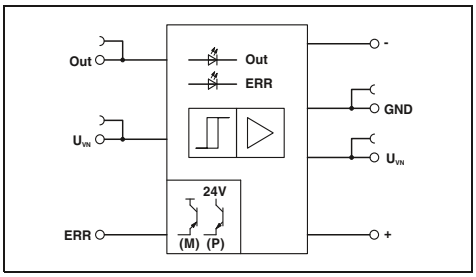
Due to a corresponding resistance circuit, the PLC-...-EIK 1-SVN can be used to monitor all mechanical switches (N/C contact or N/O contact) for short-circuits and/or wire break.

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 controls
– Connection option for PLC-V8 adapter
– Screw, spring-cage, and push-in technology

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP 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.
1) EMC: Class A product, see page 571

For inductive proximity sensors according to NAMUR, with light indicators for sensor signal and faults



Technical data

Supply		
Input supply nominal voltage U_{VN}		24 V DC ±20%
Typ. input current at U_{VN}		Approx. 14 mA
Transmission frequency f_{limit}		Approx. 350 Hz
Input circuit		Green LED, Protection against polarity reversal, Surge protection
Control circuit		
No-load voltage		8.2 V DC ±10%
Switching points in accordance with EN 60947-5-6:		≥ 2.1 mA (In conductive state) ≤ 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)
Protective circuit		Surge protection
Alarm output		
Operating voltage range (positive switching)		(U_{VN} - U_{Res})
Limiting continuous current		50 mA
Voltage drop at max. limiting continuous current		≤ 1.5 V (U_R)
Output protection		Red LED, Surge protection
Signal output		
Limiting continuous current		50 mA
Voltage drop U_R at max. limiting continuous current		≤ 1.5 V (U_R)
Output protection		Surge protection
General data		
Rated insulation voltage		50 V DC
Rated surge voltage / insulation		0.4 kV / Basic isolation
Ambient temperature (operation)		-25°C ... 50°C
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Pollution degree / Surge voltage category		2 / I
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 12
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm

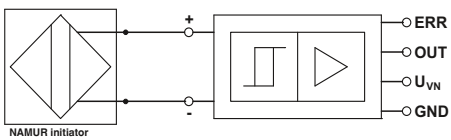
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Switching amplifier electronic terminal block, positive switching			
With screw connection	**PLC-SC-EIK 1-SVN 24P/P[1])**	**2982663**	10
With spring-cage connection	**PLC-SP-EIK 1-SVN 24P/P[1])**	**2982676**	10
With push-in connection	**PLC-PT-EIK 1-SVN 24P/P[1])**	**2900397**	10

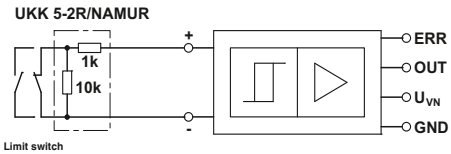
Accessories

Description	Type	Order No.	Pcs. / Pkt.
Double-level terminal block, with preassembled resistors			
With screw connection	**UKK 5-2R/NAMUR**	**2941662**	50

Application 1



Application 2



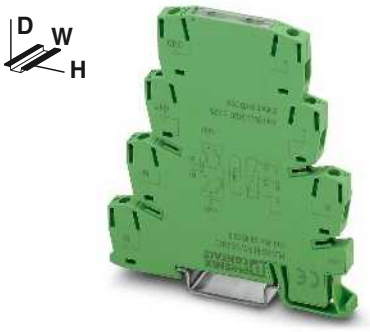
Initiator state	Switching level		LED	
	OUT	ERR	Green	Red
conductive	L	L	OFF	OFF
blocking	H	L	ON	OFF
short circuit	L	H	OFF	ON
open circuit	L	H	OFF	ON

PLC series
Electronic reversing load relay for DC motors

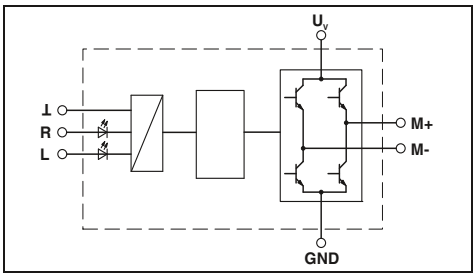
The PLC-S...-ELR W 1/2-24DC electronic reversing load relays are used to switch mechanically commutated DC motors up to 24 V/2 A.

– Wear-free reversing
– Braking by controlling both inputs
– Short-circuit and surge- and overload-proof output
– Integrated locking circuit and load wiring
– Screw, spring-cage, and push-in technology

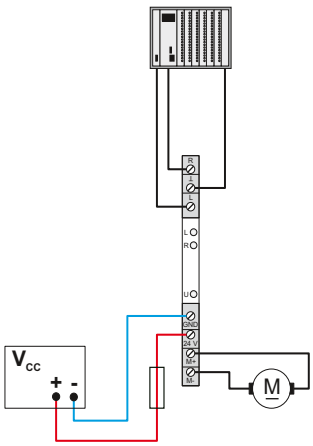
Notes:
Type of housing: Polyester PBT non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
Separating plate PLC-ATP is to be used in the following cases: always at the start and end of a PLC terminal strip, for voltages greater than 250 V (L1, L2, L3) between the same terminal 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
1) EMC: Class A product, see page 571



With overload and short-circuit-proof output



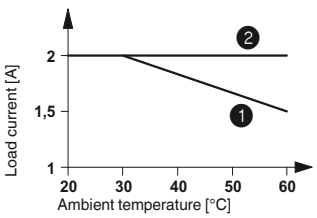
Application example for PLC-S...ELR W 1/2-24DC



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



❶ Aligned without spacing
❷ Aligned with > 20 mm spacing

Technical data

Input data		
Control voltage U_{ST} right/left		24 V DC ±20%
Control input current I_{ST} right/left		Approx. 3 mA
Input protection:		Yellow LED, Protection against polarity reversal, Surge protection
PWM option		
Max. clock frequency of the PWM at the control inputs		1000 Hz
Pulse width repetition rate of the PWM		0% ... 100%
Output data		
Supply voltage range U_V		10 V DC ... 30 V DC
Quiescent current		10 mA
Output protection		Green LED, Protection against polarity reversal, Surge protection
Motor switching output		
Continuous current I_A max.		2 A (see derating curve)
Current limitation at short-circuits		15 A (during braking)
General data		
Rated insulation voltage		50 V DC
Rated surge voltage / insulation		0.5 kV / basic insulation
Ambient temperature (operation)		-25°C ... 60°C
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Pollution degree / Surge voltage category		2 / II
Mounting position		Vertical (horizontal DIN rail)
Mounting		In rows with zero spacing
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Electronic reversing load relays, for driving DC motors, with light indicator and protection circuit			
With screw connection	**PLC-SC-ELR W1/ 2-24DC[1])**	**2980539**	1
With spring-cage connection	**PLC-SP-ELR W1/ 2-24DC[1])**	**2980555**	1

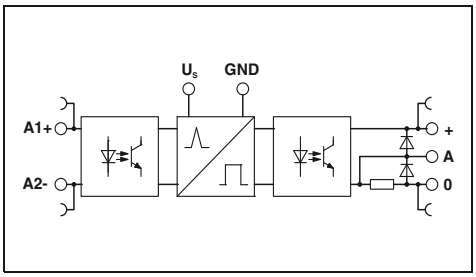
PLC-INTERFACE
Pulse expansion module

N

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

With DC voltage output
Max. 100 mA

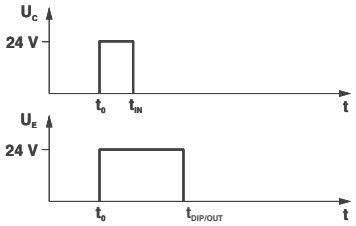


Technical data

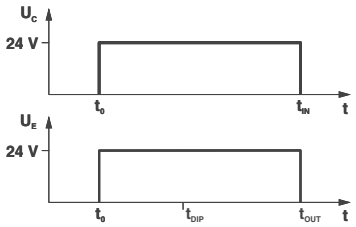
Input data		
Rated control supply voltage U_S		24 V DC
Rated control supply voltage range with reference to U_S		0.8 ... 1.2
Rated control supply current I_S		
Input low, output low		13 mA
Input high, output high		19 mA
Rated actuating voltage U_C		24 V DC
Rated actuating current I_C		3 mA
Switching 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		Protection against polarity reversal, Surge protection
Output data		
Output voltage range U_E		3 V DC ... 48 V DC
Limiting continuous current		100 mA
Voltage drop at max. limiting continuous current		< 1 V DC
Output circuit		3-conductor, ground-referenced
Output protection		Protection against polarity reversal, Surge protection, Free running
General data		
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 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm

Ordering data

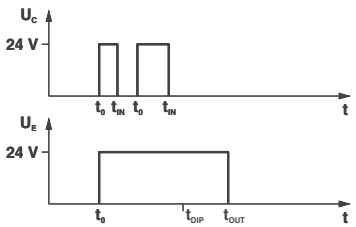
Description	Type	Order No.	Pcs. / Pkt.
PLC INTERFACE, with **screw connection**	**PLC-OSC-LPE-24DC/48DC/100**	**2903171**	1
PLC-INTERFACE, with **push-in connection**	**PLC-OPT-LPE-24DC/48DC/100**	**2903173**	1



**Input pulse t1 < set output pulse t3
(no restart when triggered again)**



**Input pulse t1 ≥ set output pulse t3, then input pulse t1 = output pulse t2
(no restart when triggered again)**

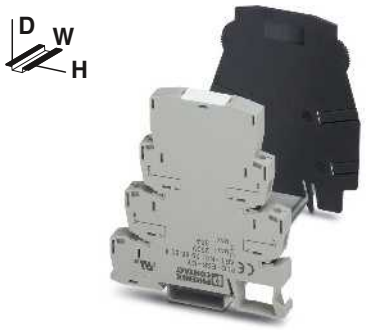


**Input pulse t1 < set output pulse t3
(restart when triggered again)**

DIP							
S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**
10	-	-	-	-	-	-	-
-	20	-	-	-	-	-	-
-	-	40	-	-	-	-	-
-	-	-	80	-	-	-	-
-	-	-	-	160	-	-	-
-	-	-	-	-	320	-	-
-	-	-	-	-	-	640	-
-	-	-	-	-	-	-	1280

PLC accessories

The **PLC-ESK** power terminal helps with supplying the bridge potentials; the **PLC-ATP** partition plate helps with optical and safe disconnection of the 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.

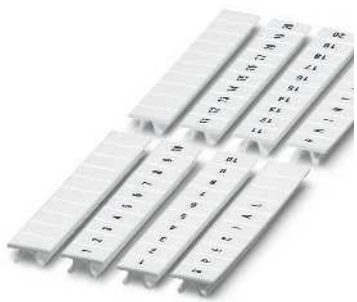


Description	Color	Type	Order No.	Pcs. / Pkt.
Power terminal block, for supply of up to four potentials, with the same shape as PLC standard series, max. 32 A/250 V AC	gray	**PLC-ESK GY**	**2966508**	5
Separating plate, thickness 2 mm, required at the start and end of a PLC terminal strip. It is also used for visual separation of groups, safe isolation of different voltages of neighboring PLC interfaces as per DIN EN 50178/VDE0160, separation of neighboring bridges of different potentials, and separation of PLC interfaces at voltages > 250 V	black	**PLC-ATP BK**	**2966841**	25
Screwdriver Blade: 0.6 x 3.5 x 100 mm, length: 181 mm		**SZF 1-0,6X3,5**	**1204517**	10
Passive feed-through bridge, can be plugged in instead of relay or solid-state relay, bridges terminal points A1 and 14	black			

Type	Order No.	Pcs. / Pkt.
PLC-BP A1-14	**2980283**	10

PLC accessories

The colored isolated FBST plug-in bridges are not required for the PLC interface up to 70%. The 500 mm long **FBST 500-PLC** "endless bridges" are especially effective. The 2-pos. **FBST 6** single plug-in bridges are especially suited for bridging a smaller number of PLC modules.



Description	Color	Type	Order No.	Pcs. / Pkt.
Cont. plug-in bridge, 500 mm long, isolated, can be cut to length, for potential distribution				
Nominal current: 32 A	red	**FBST 500-PLC RD**	**2966786**	20
	blue	**FBST 500-PLC BU**	**2966692**	20
	gray	**FBST 500-PLC GY**	**2966838**	20
Plug-in bridge, 2-pos., 6 mm long, for potential distribution				
Nominal current: 6 A	red	**FBST 6-PLC RD**	**2966236**	50
	blue	**FBST 6-PLC BU**	**2966812**	50
	gray	**FBST 6-PLC GY**	**2966825**	50
Plug-in bridge, 2-pos., 8 mm long, for potential distribution with a partition plate				
Nominal current: 6 A	gray	**FBST 8-PLC GY**	**2967688**	50
Plug-in bridge, 2-pos., 14 mm long, insulated, for potential distribution				
Nominal current: 10 A	black	**FBST 14-PLC BK**	**2967691**	50
Zack marker strip, printed horizontally, 10-section, with consecutive numbers, e.g., 1-10, 11-20, etc. up to 91-100				

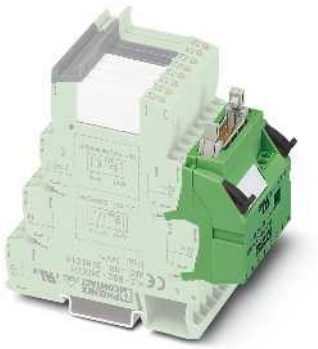
Type	Order No.	Pcs. / Pkt.
ZB 6,LGS:FORTL.ZAHLEN	**1051016**	10

Adapter for PLC-INTERFACE

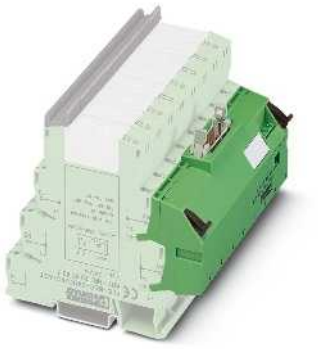
PLC-V8/... are VARIOFACE adapters which connect the 6.2 mm wide PLC RELAY modules to the VARIOFACE system cabling

Notes:

For cross-reference list with matching PLC-INTERFACE modules, see page 488



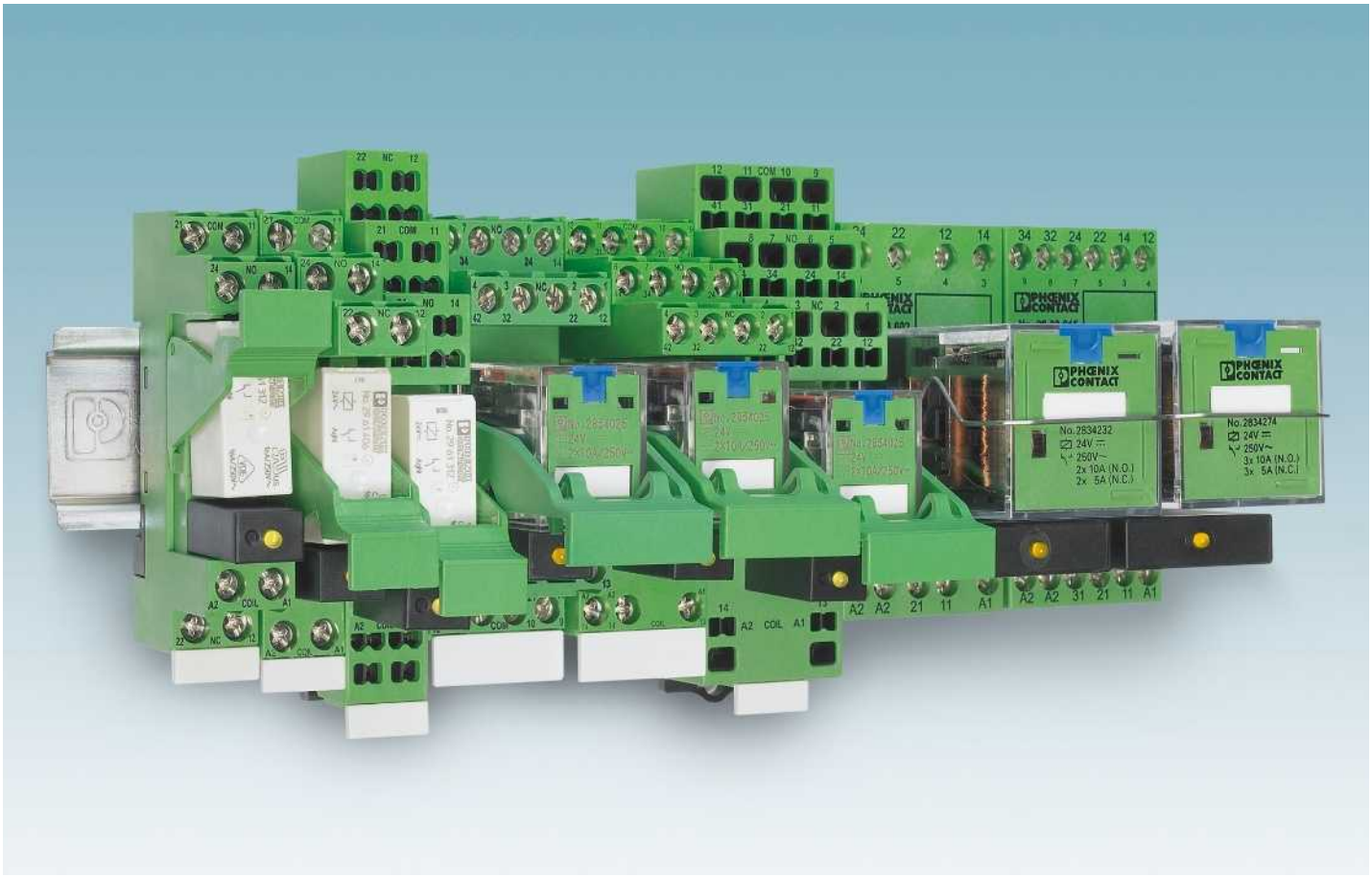
VARIOFACE adapter for 6.2 mm PLC-INTERFACE



VARIOFACE adapter for 14 mm PLC-INTERFACE

		Technical data	Technical data
Max. perm. operating voltage		24 V DC ±25%	24 V DC ±25%
Max. perm. current (per branch)		1 A (per signal path)	1 A (per signal path)
Max total current (voltage supply)		3 A	3 A
Test voltage		500 V AC (50 Hz, 1 min.)	500 V (50 Hz, 1 min.)
Ambient temperature (operation)		-40°C ... 70°C	-40°C ... 70°C
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	IEC 60664, DIN EN 50178, IEC 62103
Connection method	Power supply	Screw connection	Screw connection
	Signal level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	100 mm / 94 mm	100 mm / 94 mm

Description	No. of pos.	Module width W	Ordering data: Type	Order No.	Pcs. / Pkt.	Ordering data: Type	Order No.	Pcs. / Pkt.
V8 adapter, for 8 PLC interfaces (6.2 mm), with F LK connection, for PLC system cabling, **positive switching**								
OUTPUT	14	49.6 mm	**PLC-V8/FLK14/OUT**	**2295554**	1			
INPUT	14	49.6 mm	**PLC-V8/FLK14/IN**	**2296553**	1			
V8 adapter, for 8 PLC interfaces (6.2 mm), with FLK connection, for PLC system cabling, **negative switching**								
OUTPUT	14	49.6 mm	**PLC-V8/FLK14/OUT/M**	**2304102**	1			
INPUT	14	49.6 mm	**PLC-V8/FLK14/IN/M**	**2304115**	1			
V8 output adapter, for 8 PLC interfaces (6.2 mm), with 15-pos. D-SUB connection								
Pin strip	15	49.6 mm	**PLC-V8/D15S/OUT**	**2296058**	1			
Socket strip	15	49.6 mm	**PLC-V8/D15B/OUT**	**2296061**	1			
V8 input adapter, for 8 PLC interfaces (6.2 mm), with 15-pos. D-SUB connection								
Pin strip	15	49.6 mm	**PLC-V8/D15S/IN**	**2296074**	1			
Socket strip	15	49.6 mm	**PLC-V8/D15B/IN**	**2296087**	1			
V8 adapter, for 8 PLC interfaces (14 mm), with FLK connection, for PLC system cabling, **positive switching**								
	14	112.3 mm				**PLC-V8L/FLK14/OUT**	**2299660**	1
V8 adapter, for 8 PLC interfaces (14 mm), with FLK connection, for PLC system cabling, **negative switching**								
	14	112.3 mm				**PLC-V8L/FLK14/OUT/M**	**2304306**	1

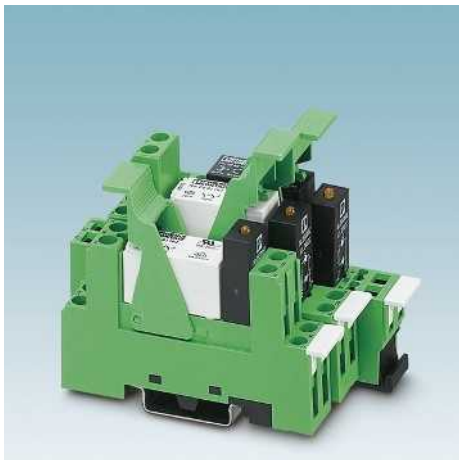


The PR series is a low-priced relay modular system, consisting of DIN rail bases, relays, plug-in input/interference suppression modules, engagement levers, and the matching marking labels and universal bridging materials for all bases. The modules are largely compatible with the usual standards on the market, have the major international approvals and are therefore accepted worldwide.

Besides the familiar relay bases with the screw connection method, relay bases with the spring-cage connection method for miniature power relays with one or two PDT contacts and for industrial relays with two or four PDT contacts are available in the PR series. The connections in these bases are configured with double spring cages for free, simple bridging of all potentials.

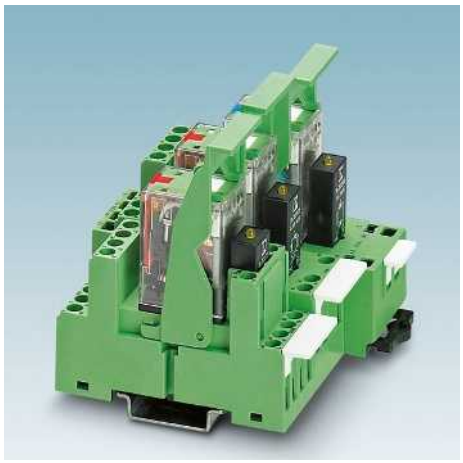
The PR series also boasts its own particular features:

– Relay retaining bracket: The EL... plastic relay retaining bracket, with which the relays can be held and, if necessary, ejected, have an exposed, smooth, large equipment marking area for standard self-adhesive labels that can be printed easily and inexpensively using standard printers. When fitted, the engagement lever is securely connected to the base, which means that the labeling cannot be lost.
– Industrial relays: All REL-IR... industrial relays have as standard an LED status display and all DC types also have an integrated freewheeling diode. In most cases, this eliminates the plug-in input modules that are otherwise also used.
– Plug-in input modules with RC element: most standard input/interference suppression modules with an RC element used for compensation of interference coupling on long lines or in the event of leakage currents from electronic AC outputs have only low capacitance values. This greatly limits the filter effect. In contrast, the RC-120-230UC and RC3-120-230UC plug-in module series for mains voltage applications have a filter function that is improved up to a factor of 10. Unlike with the discharge resistors that are normally used for such applications, using RC plug-in modules gives rise to no additional heating!



PR1 series

The narrow 16 mm PR1 base series for relays with one or two contacts is available with a screw or spring-cage connection method. Both the traditional 2/2-level bases and two modern "logical" 1/3-level versions with fully opposite coil and contact connections are available.



PR2 series

The PR2 base series accommodates plug-in industrial relays with two or four PDT contacts. Like the PR1 series, the bases are available with screw and spring-cage connection methods, as well as in the traditional 2/2-level and modern "logical" 1/3-level versions.

PR3 series

The robust octal relays with two or three PDT contacts that are widely used in some areas fit on the PR3 base with touch-protected screw connections. All the base connections have a wide connection cross section and are arranged on one level with good accessibility.

The active components of the PR1 modular system include various miniature power relays (optionally available with manual test function) and electronic solid-state relays. Matching relay retaining brackets with integrated marking area prevent them from being shaken loose. Depending on requirements, input/interference suppression modules with various functions can also be plugged in. Marking labels and loop bridges in various colors that are suitable for universal use with all PR bases complete the range of accessories.

The PR2 modular system is specifically designed for plug-in industrial relays. Industrial relays from Phoenix Contact feature the following as standard: a manual test button, switch position indicator, status LED, and freewheeling diode (DC coils only). Interference suppression modules with a varistor or RC element can also be plugged in as an option. Relay retaining brackets with integrated marking areas prevent the relays from being shaken loose. Marking labels and loop bridges in various colors that are suitable for universal use with all PR bases complete the range of accessories.

The PR3 modular system is specifically designed for the robust octal relays. The relays have a switch position indicator and a manual test button and there is a wire bracket to prevent them from being shaken loose. Input/interference suppression modules with various functions can also be plugged in as an option. The base can be marked with an 8 x 20 mm standard adhesive label. Loop bridges in various colors for universal use round off the range of accessories.

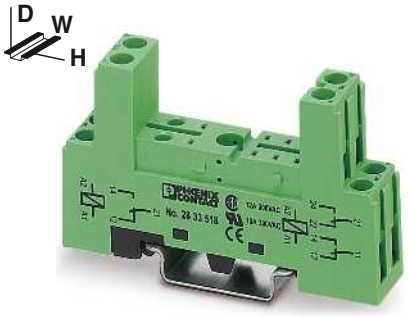
Modular PR1 relay base

Range of relay bases that can be fitted with 1 PDT or 2 PDT relay or solid-state relay

Range of accessories includes:

– Plug-in input modules/interference suppression modules
– Relay retaining bracket with labeling field and ejection function
– Marking labels
– Loop bridges

Notes:
Type of housing: Polyamide fiber reinforced PA-F, color: green.
Marking systems and mounting material See Catalog 5



2/2-level design with screw connection

Technical data

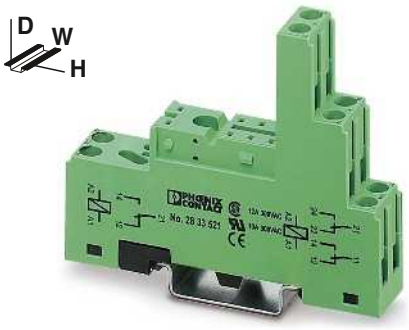
Nominal voltage U_N	300 V AC/DC
Nominal current at U_N	12 A
General data	
Ambient temperature (operation)	-25°C ... 85°C
Connection data solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 26 - 14
Dimensions	
Width	16 mm
Depth with retaining bracket	63 mm (EL1-P16) 71 mm (EL1-P25)
Height	75 mm

Ordering data

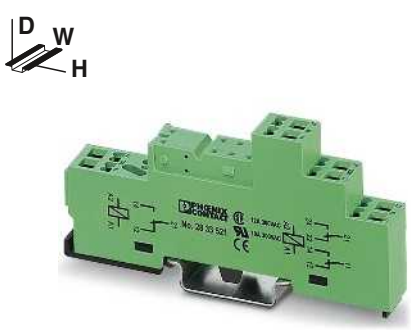
Description	Type	Order No.	Pcs. / Pkt.
Relay base PR1, 2/2-level design, plug-in option for input/interference suppression module, safe isolation I/O, including ten MP1 marking labels per pack			
With screw connection	**PR1-BSC2/2X21**	**2833518**	10
Relay base PR1, 1/3-level design, plug-in option for input/interference suppression module, safe isolation I/O, including ten MP1 marking labels per pack			
With screw connection			
Relay base PR1, 1/3-level design, plug-in option for input/interference suppression module, safe isolation I/O, including ten MP1 marking labels per pack			
With spring-cage connection			
Relay retaining bracket, with ejector function and integrated equipment marking area (7.5 x 15 mm), suitable for relay socket PR1			
for 16 mm tall miniature power relay and solid-state relay	**EL1-P16**	**2833547**	10
for 25 mm tall miniature switching relay and solid-state relay	**EL1-P25**	**2833550**	10

Accessories

Equipment marking label, labeling surface 6 x 15 mm			
	MP 1	**2833631**	10
Device marking label, for thermal transfer printer, labeling surface 6 x 15 mm			
2500 labels per roll	**EML (15X6) R YE**	**0819288**	1
Loop bridge, 50-pos., divisible, max. bridging distance 60 mm, 0.5 mm²			
blue	**DB 50- 90 BU**	**2821180**	1
black	**DB 50- 90 BK**	**2820916**	1
gray	**DB 50- 90 GY**	**2820929**	1



1/3-level design with screw connection



1/3-level design with spring-cage connection

Relay retaining bracket

cULus

Technical data	
300 V AC/DC	
12 A	
-25°C ... 85°C	
0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 26 - 14	
16 mm	
71 mm (EL1-P16)	
79 mm (EL1-P25)	
78.5 mm	

Ordering data		
Type	**Order No.**	Pcs. / Pkt.
PR1-BSC3/2X21	**2833521**	10
EL1-P16	**2833547**	10
EL1-P25	**2833550**	10

Accessories		
MP 1	**2833631**	10
EML (15X6) R YE	**0819288**	1
DB 50- 90 BU	**2821180**	1
DB 50- 90 BK	**2820916**	1
DB 50- 90 GY	**2820929**	1

cULus

Technical data	
300 V AC/DC	
10 A	
-25°C ... 85°C	
0.5 ... 1.5 mm² / 0.5 ... 1.5 mm² / 26 - 16	
16 mm	
72 mm (EL1-P16)	
80 mm (EL1-P25)	
97 mm	

Ordering data		
Type	**Order No.**	Pcs. / Pkt.
PR1-BSP3/2X21	**2833534**	10
EL1-P16	**2833547**	10
EL1-P25	**2833550**	10

Accessories		
MP 1	**2833631**	10
EML (15X6) R YE	**0819288**	1
DB 50- 90 BU	**2821180**	1
DB 50- 90 BK	**2820916**	1
DB 50- 90 GY	**2820929**	1

Technical data	
-	
-	
-	
-	
-	
-	
-	

Ordering data		
Type	**Order No.**	Pcs. / Pkt.
EL1-P16	**2833547**	10
EL1-P25	**2833550**	10

Accessories		

Plug-in miniature power relays

Plug-in miniature power relays with 1 or 2 PDT contacts, suitable for RIF-1, PR1, and PLC-INTERFACE relay bases.

The advantages:

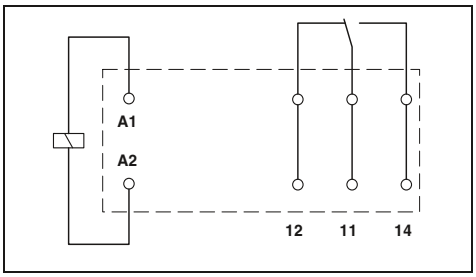
– Power contacts up to 16 A
– Multi-layer gold contact or power contact
– High degree of protection up to RT III (comparable with IP67) depending on type

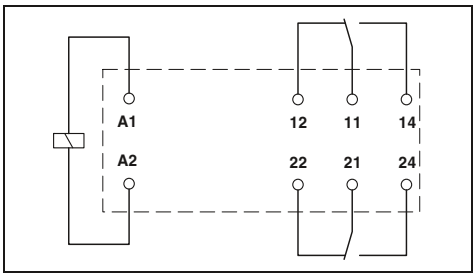
Notes:

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.

1 PDT relay

2 PDT relay





Technical data

Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		refer to the diagram							
Typ. input current at U_N	[mA]	33	17	8.7	8.2	4.1	32	7	3
Typ. response time at U_N	[ms]	7	7	7	7	7			
Typ. response time at U_N (depending on phase relation)	[ms]						3 - 12	3 - 12	3 - 12
Typ. release time at U_N	[ms]	3	3	3	3	3			
Typ. release time at U_N (depending on phase relation)	[ms]						2 - 9	2 - 9	2 - 9

Output data			
Contact type		Single contact, 1-PDT	Single contact, 1-PDT
Contact material		AgNi	AgNi, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Min. switching voltage		12 V (at 10 mA)	100 mV (at 10 mA)
Limiting continuous current		16 A	50 mA
Max. inrush current		25 A (20 ms)	50 mA
Min. switching current		10 mA (at 12 V)	1 mA (at 24 V)
Max. interrupting rating, ohmic load			
	250 V AC	4000 VA	-

General data	
Test voltage (winding / contact)	5 kV AC (50 Hz, 1 min.)
Test voltage (contact/contact)	-
Ambient temperature (operation)	-40°C ... 85°C
Mechanical service life	1 x 10^7 cycles
Electrical service life	See diagram
Standards/regulations	IEC 60664, EN 50178, IEC 62103

Technical data

Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		refer to the diagram							
Typ. input current at U_N	[mA]	33	17	8.7	8.2	4.1	32	7	3
Typ. response time at U_N	[ms]	7	7	7	7	7			
Typ. response time at U_N (depending on phase relation)	[ms]						3 - 12	3 - 12	3 - 12
Typ. release time at U_N	[ms]	3	3	3	3	3			
Typ. release time at U_N (depending on phase relation)	[ms]						2 - 9	2 - 9	2 - 9

Output data		
Contact type	Single contact, 2-PDT	Single contact, 2-PDT
Contact material	AgNi	AgNi, hard gold-plated
Max. switching voltage	250 V AC/DC	30 V AC / 36 V DC
Min. switching voltage	5 V (at 10 mA)	100 mV (at 10 mA)
Limiting continuous current	8 A	50 mA
Max. inrush current	12 A (20 ms)	50 mA
Min. switching current	10 mA (At 5 V)	1 mA (at 24 V)
Max. interrupting rating, ohmic load		
250 V AC	2000 VA	-

General data	
Test voltage (winding / contact)	5 kV AC (50 Hz, 1 min.)
Test voltage (contact/contact)	2.5 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-40°C ... 85°C
Mechanical service life	1 x 10^7 cycles
Electrical service life	See diagram
Standards/regulations	IEC 60664, EN 50178, IEC 62103

Ordering data

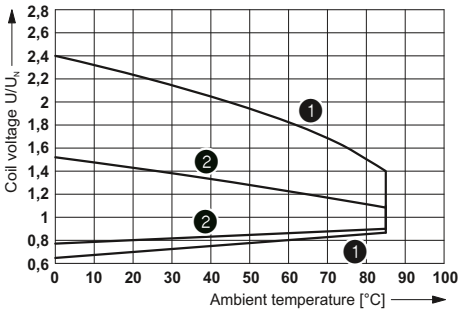
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in miniature power relays					
with power contact	①	12 V DC	**REL-MR- 12DC/21HC**	**2961309**	10
with power contact	②	24 V DC	**REL-MR- 24DC/21HC**	**2961312**	10
with power contact	③	48 V DC	**REL-MR- 48DC/21HC**	**2834821**	10
with power contact	④	60 V DC	**REL-MR- 60DC/21HC**	**2961325**	10
with power contact	⑤	110 V DC	**REL-MR-110DC/21HC**	**2961338**	10
with power contact	⑥	24 V AC	**REL-MR- 24AC/21HC**	**2961406**	10
with power contact	⑦	120 V AC	**REL-MR-120AC/21HC**	**2961419**	10
with power contact	⑧	230 V AC	**REL-MR-230AC/21HC**	**2961422**	10
Plug-in miniature power relays					
with gold contact	①	12 V DC	**REL-MR- 12DC/21HC AU**	**2961532**	10
with gold contact	②	24 V DC	**REL-MR- 24DC/21HC AU**	**2961545**	10
with gold contact	③	48 V DC			
with gold contact	④	60 V DC			
with gold contact	⑤	110 V DC	**REL-MR-110DC/21HC AU**	**2961561**	10
with gold contact	⑥	24 V AC	**REL-MR- 24AC/21HC AU**	**2961503**	10
with gold contact	⑦	120 V AC	**REL-MR-120AC/21HC AU**	**2961516**	10
with gold contact	⑧	230 V AC	**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

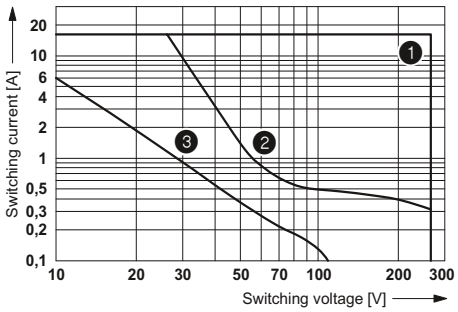
REL-MR...21HC... (1 PDT)

Operating voltage range



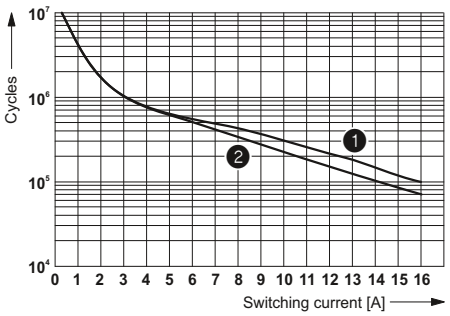
❶ DC coils
❷ AC coils

Interrupting rating



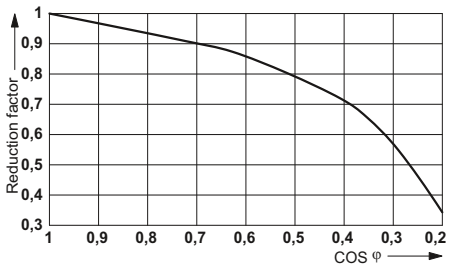
❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Electrical service life



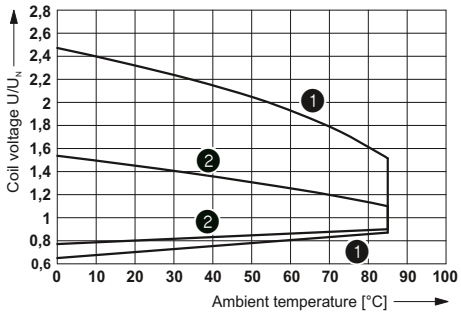
❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

Service life reduction factor with various cos phi



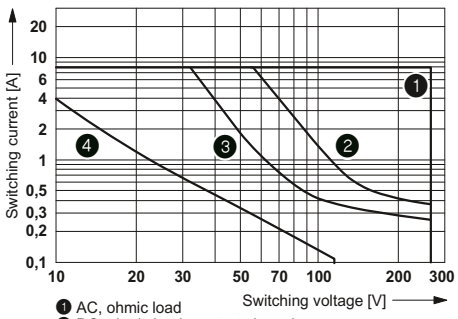
REL-MR...21-21... (2 PDTs)

Operating voltage range



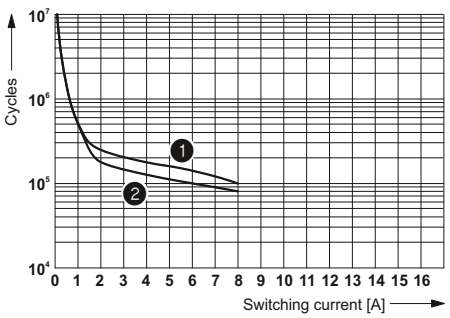
❶ DC coils
❷ AC coils

Interrupting rating



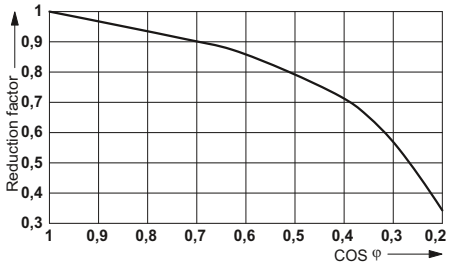
❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

Electrical service life



❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

Service life reduction factor with various cos phi



Plug-in miniature power relays

Plug-in miniature power relays with 1 or 2 PDT contacts, suitable for RIF-1 and PR1 relay bases.

The advantages:

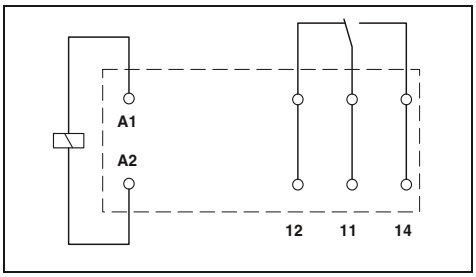
– Switching current of up to 16 A
– With lockable manual operation
– Mechanical switch position indicator
– Integrated status LED
– Multi-layer gold contact or power contact
– DC types with integrated freewheeling diode
– Can be soldered in on PCB

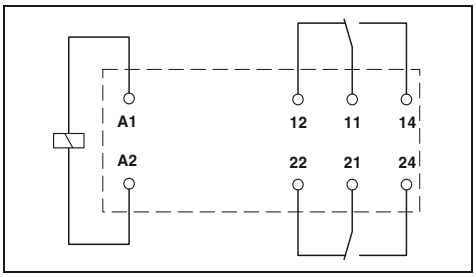
1 PDT relay

2 PDT relay

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.





Technical data

Input data		①	②	③	④
Permissible range (with reference to U_N)		refer to the diagram			
Typ. input current at U_N	[mA]	18	32	7	3.5
Typ. response time at U_N	[ms]	9			
Typ. response time at U_N (depending on phase relation)	[ms]		3 - 12	3 - 12	
Typ. release time at U_N	[ms]	6			
Typ. release time at U_N (depending on phase relation)	[ms]		2 - 8	2 - 8	2 - 8

Output data			
Contact type		Single contact, 1-PDT	Single contact, 1-PDT
Contact material		AgNi	AgNi, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Min. switching voltage		12 V (at 10 mA)	12 V (At 1 mA)
Limiting continuous current		16 A	50 mA
Max. inrush current		32 A (20 ms)	50 mA
Min. switching current		10 mA (at 12 V)	1 mA (at 12 V)
Max. interrupting rating, ohmic load			
	250 V AC	4000 VA	-

General data	
Test voltage (winding / contact)	5 kV AC (50 Hz, 1 min.)
Test voltage (contact/contact)	-
Ambient temperature (operation)	-40°C ... 70°C
Mechanical service life	5 x 10^6 cycles
Electrical service life	See diagram
Standards/regulations	DIN EN 61810-1, VDE 0435-201, EN 50178, IEC 62103

Technical data

Input data		①	②	③	④
Permissible range (with reference to U_N)		refer to the diagram			
Typ. input current at U_N	[mA]	18	32	7	3.5
Typ. response time at U_N	[ms]	9			
Typ. response time at U_N (depending on phase relation)	[ms]		3 - 12	3 - 12	3 - 12
Typ. release time at U_N	[ms]	6			
Typ. release time at U_N (depending on phase relation)	[ms]		2 - 8	2 - 8	2 - 8

Output data			
Contact type		Single contact, 2-PDT	Single contact, 2-PDT
Contact material		AgNi	AgNi, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Min. switching voltage		12 V (at 10 mA)	12 V (At 1 mA)
Limiting continuous current		8 A	50 mA
Max. inrush current		16 A (20 ms)	50 mA
Min. switching current		10 mA (at 12 V)	1 mA (at 12 V)
Max. interrupting rating, ohmic load			
	250 V AC	2000 VA	-

General data	
Test voltage (winding / contact)	5 kV AC (50 Hz, 1 min.)
Test voltage (contact/contact)	2.5 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-40°C ... 70°C
Mechanical service life	5 x 10^6 cycles
Electrical service life	See diagram
Standards/regulations	DIN EN 61810-1, VDE 0435-201, EN 50178, IEC 62103

Ordering data

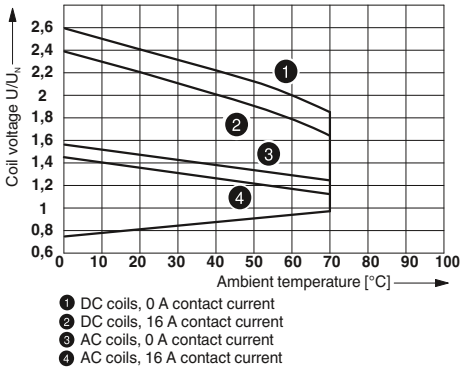
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in miniature power relays, with power contacts					
- Status LED, freewheeling diode A1+, A2-	①	24 V DC	**REL-MR- 24DC/21HC/MS**	**2987888**	10
- Status LED	②	24 V AC	**REL-MR- 24AC/21HC/MS**	**2987891**	10
- Status LED	③	120 V AC	**REL-MR-120AC/21HC/MS**	**2987901**	10
- Status LED	④	230 V AC	**REL-MR-230AC/21HC/MS**	**2987914**	10
Plug-in miniature power relays with manual test function, with hard gold-plated multi-layer contacts, mechanical switch position indicator					
- Status LED, freewheeling diode A1+, A2-	①	24 V DC	**REL-MR- 24DC/21HC AU/MS**	**2987927**	10
- Status LED	④	230 V AC	**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

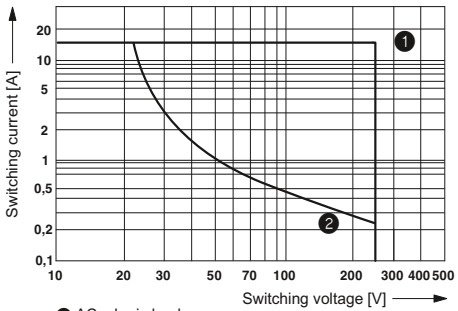
REL-MR...21HC...MS (1 PDT)

Operating voltage range



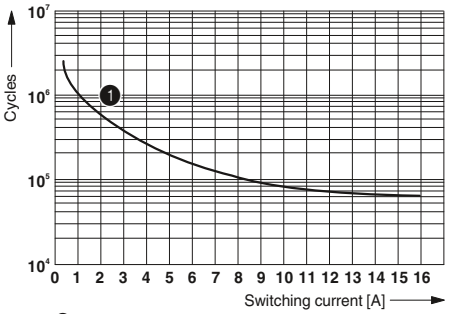
1 DC coils, 0 A contact current
2 DC coils, 16 A contact current
3 AC coils, 0 A contact current
4 AC coils, 16 A contact current

Interrupting rating



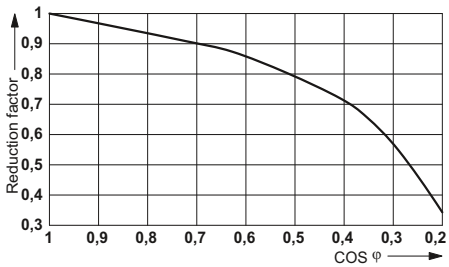
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



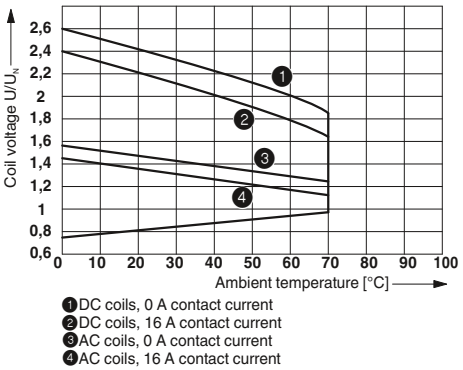
1 250 V AC, ohmic load

Service life reduction factor with various cos phi



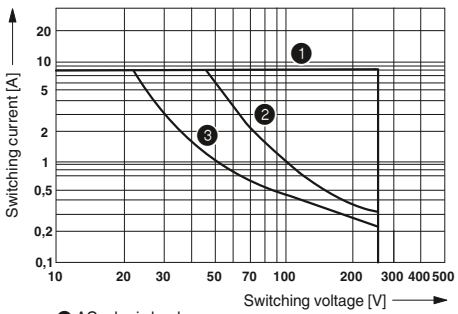
REL-MR...21-21...MS (2 PDTs)

Operating voltage range



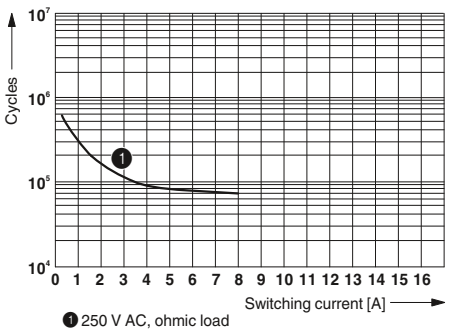
1 DC coils, 0 A contact current
2 DC coils, 16 A contact current
3 AC coils, 0 A contact current
4 AC coils, 16 A contact current

Interrupting rating



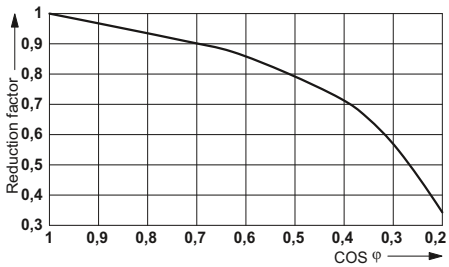
1 AC, ohmic load
2 DC, ohmic load, contacts in series
3 DC, ohmic load

Electrical service life



1 250 V AC, ohmic load

Service life reduction factor with various cos phi



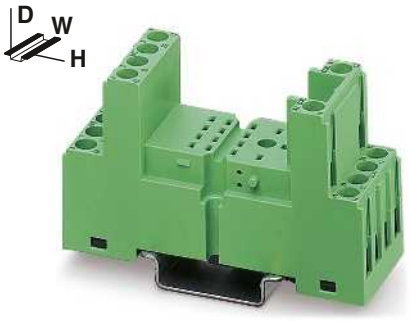
Modular PR2 relay base

Range of relay bases that can be fitted with 2 PDT or 4 PDT relays

Range of accessories includes:

– Plug-in input modules/interference suppression modules
– Relay retaining bracket with labeling field and ejection function
– Marking labels
– Loop bridges

Notes:
Type of housing: Polyamide fiber reinforced PA-F, color: green.
Marking systems and mounting material See Catalog 5



2/2-level design with screw connection

Technical data

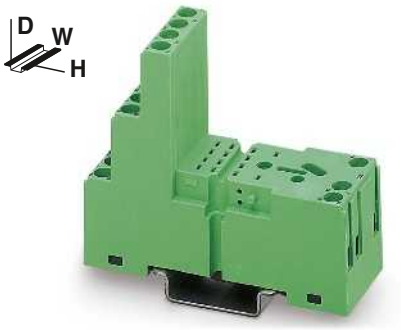
Nominal voltage U_N	300 V AC/DC
Nominal current at U_N	12 A
General data	
Ambient temperature (operation)	-25°C ... 85°C
Connection data solid / stranded / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 26 - 16
Dimensions	
Width	27 mm
Depth with retaining bracket	84 mm (EL2-P35)
Height	75 mm

Ordering data

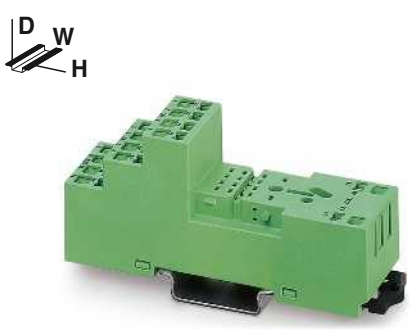
Description	Type	Order No.	Pcs. / Pkt.
Relay base PR2-B, for industrial relay, REL-IR with two or four PDTs, 2/2-level design, connection option for input/interference suppression module, including ten MP2 marking labels per packaging			
With screw connection	**PR2-BSC2/4X21**	**2833563**	10
Relay base PR2-B, for industrial relay, REL-IR with two or four PDTs, 1/3-level design, connection option for input/interference suppression module, including ten MP2 marking labels per packaging			
With screw connection			
Relay base PR2-B, for industrial relay, REL-IR with two or four PDTs, 1/3-level design, connection option for input/interference suppression module, including ten MP1 marking labels per packaging			
With spring-cage connection			
Relay retaining bracket, with eject function and integrated device marking area (8 x 25 mm), to suit relay base PR2, for 35 mm high industrial relay			
	EL2-P35	**2833592**	10

Accessories

Equipment marking label, labeling surface 6 x 15 mm			
Equipment marking label, labeling surface 9 x 25 mm			
	MP 2	**2833644**	10
Device marking label, for thermal transfer printer, labeling surface 6 x 15 mm			
2500 labels per roll	**EML (15X6) R YE**	**0819288**	1
Loop bridge, 50-pos., divisible, max. bridging distance 60 mm, 0.5 mm²			
blue	**DB 50- 90 BU**	**2821180**	1
black	**DB 50- 90 BK**	**2820916**	1
gray	**DB 50- 90 GY**	**2820929**	1



1/3-level design with screw connection



1/3-level design with spring-cage connection

Relay retaining bracket

Technical data

300 V AC/DC	
12 A	
-25°C ... 85°C	
0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 26 - 16	
27 mm	
86 mm (EL2-P35)	
78.5 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
PR2-BSC3/4X21	2833576	10
EL2-P35	2833592	10

Accessories

MP 2	2833644	10
EML (15X6) R YE	0819288	1
DB 50- 90 BU	2821180	1
DB 50- 90 BK	2820916	1
DB 50- 90 GY	2820929	1

Technical data

300 V AC/DC	
10 A	
-25°C ... 85°C	
0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16	
31 mm	
84 mm (EL2-P35)	
95 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
PR2-BSP3/4X21	2833589	10
EL2-P35	2833592	10

Accessories

MP 1	2833631	10
EML (15X6) R YE	0819288	1
DB 50- 90 BU	2821180	1
DB 50- 90 BK	2820916	1
DB 50- 90 GY	2820929	1

Technical data

-	
-	
-	
-	
-	
-	
-	

Ordering data

Type	Order No.	Pcs. / Pkt.
EL2-P35	2833592	10

Accessories

Plug-in industrial relays suitable for PR2 relay base

Plug-in industrial relays with 2 or 4 PDT contacts, suitable for PR2 and RIF-2 relay bases.

The advantages:

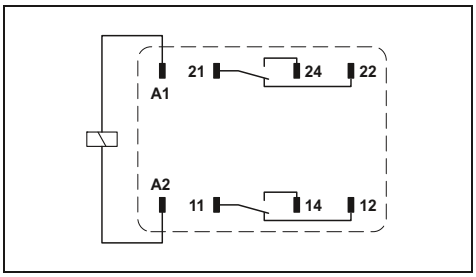
– Lockable manual operation
– Mechanical switch position indicator
– Integrated status LED
– Multi-layer gold contact or power contact
– DC types with integrated freewheeling diode

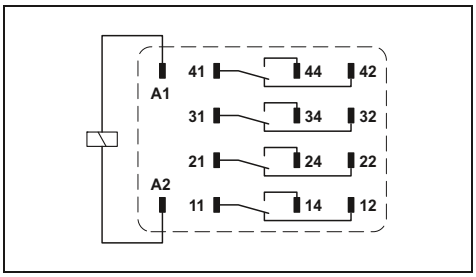
Notes:

For 48 V DC and 60 V DC types, see www.phoenixcontact.net/products

2 PDT relay with power contacts

4 PDT relay with multi-layer gold contact





Technical data

Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		refer to the diagram							
Typ. input current at U_N	[mA]	75	38	10	7.2	3.6	54	11	5
Typ. response time at U_N	[ms]	13	13	13	13	13			
Typ. response time at U_N (AC, depending on phase relation)	[ms]						4 - 10	4 - 10	4 - 10
Typ. release time at U_N	[ms]	5	5	5	5	5			
Typ. release time at U_N (AC, depending on phase relation)	[ms]						3 - 12	3 - 12	3 - 12
Output data									
Contact type		Single contact, 2-PDT							
Contact material		Ag							
Max. switching voltage		250 V AC/DC							
Min. switching voltage		5 V							
Limiting continuous current		10 A							
Min. switching current		1 mA							
Max. interrupting rating, ohmic load									
	250 V AC	2500 VA							
General data									
Test voltage (winding / contact)		2 kV AC (50 Hz, 1 min.)							
Test voltage (contact/contact)		2 kV AC (50 Hz, 1 min.)							
Ambient temperature (operation)		-55°C ... 70°C							
Nominal operating mode		100% operating factor							
Mechanical service life		5 x 10^7 cycles							
Electrical service life		See diagram							
Standards/regulations		DIN EN 61810-1, VDE 0435-201, EN 50178, IEC 62103							
Mounting position/mounting		Any / On relay base PR2							

Technical data

Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		refer to the diagram							
Typ. input current at U_N	[mA]	75	38	10	7.2	3.6	54	11	5
Typ. response time at U_N	[ms]	13	13	13	13	13			
Typ. response time at U_N (AC, depending on phase relation)	[ms]						4 - 10	4 - 10	4 - 10
Typ. release time at U_N	[ms]	5	5	5	5	5			
Typ. release time at U_N (AC, depending on phase relation)	[ms]						3 - 12	3 - 12	3 - 12
Output data									
Contact type		Single contact, 4-PDT							
Contact material		AgNi, hard gold-plated							
Max. switching voltage		250 V AC/DC							
Min. switching voltage		1 V							
Limiting continuous current		5 A							
Min. switching current		1 mA							
Max. interrupting rating, ohmic load									
	250 V AC	1250 VA							
General data									
Test voltage (winding / contact)		2 kV AC (50 Hz, 1 min.)							
Test voltage (contact/contact)		2 kV AC (50 Hz, 1 min.)							
Ambient temperature (operation)		-55°C ... 70°C							
Nominal operating mode		100% operating factor							
Mechanical service life		5 x 10^7 cycles							
Electrical service life		See diagram							
Standards/regulations		DIN EN 61810-1, VDE 0435-201, EN 50178, IEC 62103							
Mounting position/mounting		Any / On relay base PR2							

Ordering data

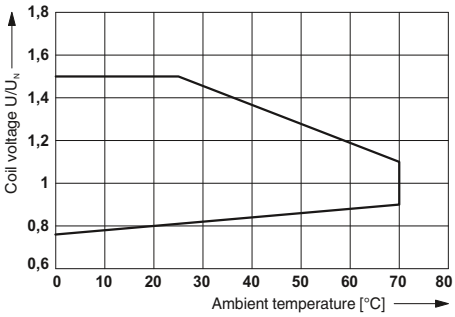
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in industrial relay with a test button, status LED, mechanical switch position indicator					
with freewheeling diode, **A1 +, A2 -**	①	12 V DC	**REL-IR/LDP- 12DC/2X21**	**2834012**	10
with freewheeling diode, **A1 +, A2 -**	②	24 V DC	**REL-IR/LDP- 24DC/2X21**	**2834025**	10
with freewheeling diode, **A1 +, A2 -**	③	110 V DC	**REL-IR/LDP-110DC/2X21**	**2834041**	10
with freewheeling diode, **A1 +, A2 -**	④	125 V DC	**REL-IR/LDP-125DC/2X21**	**2834960**	10
with freewheeling diode, **A1 +, A2 -**	⑤	220 V DC	**REL-IR/LDP-220DC/2X21**	**2834957**	10
	⑥	24 V AC	**REL-IR/L- 24AC/2X21**	**2834054**	10
	⑦	120 V AC	**REL-IR/L-120AC/2X21**	**2834067**	10
	⑧	230 V AC	**REL-IR/L-230AC/2X21**	**2834070**	10
Plug-in industrial relay with a test button, status LED, mechanical switch position indicator (Japanese standard)					
with freewheeling diode, **A1 -, A2 +**	①	12 V DC	**REL-IR/LDM- 12DC/2X21**	**2834151**	10
with freewheeling diode, **A1 -, A2 +**	②	24 V DC	**REL-IR/LDM- 24DC/2X21**	**2834164**	10
with freewheeling diode, **A1 -, A2 +**	③	48 V DC	**REL-IR/LDM- 48DC/2X21**	**2834177**	10
with freewheeling diode, **A1 -, A2 +**	④	110 V DC	**REL-IR/LDM-110DC/2X21**	**2834180**	10

Ordering data

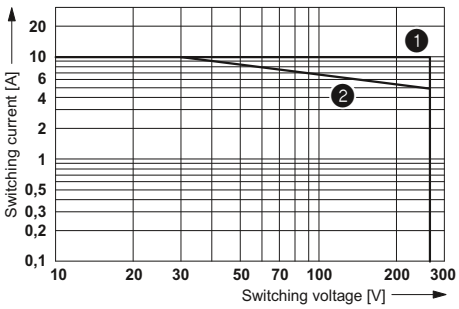
Type	Order No.	Pcs. / Pkt.
REL-IR/LDP- 12DC/4X21AU	**2834083**	10
REL-IR/LDP- 24DC/4X21AU	**2834096**	10
REL-IR/LDP-110DC/4X21AU	**2834119**	10
REL-IR/LDP-125DC/4X21AU	**2834313**	10
REL-IR/LDP-220DC/4X21AU	**2834973**	10
REL-IR/L- 24AC/4X21AU	**2834122**	10
REL-IR/L-120AC/4X21AU	**2834135**	10
REL-IR/L-230AC/4X21AU	**2834148**	10
REL-IR/LDM- 12DC/4X21AU	**2834193**	10
REL-IR/LDM- 24DC/4X21AU	**2834203**	10
REL-IR/LDM- 48DC/4X21AU	**2834216**	10
REL-IR/LDM-110DC/4X21AU	**2834229**	10

REL-IR...2x21 (2 PDTs)

Operating voltage range

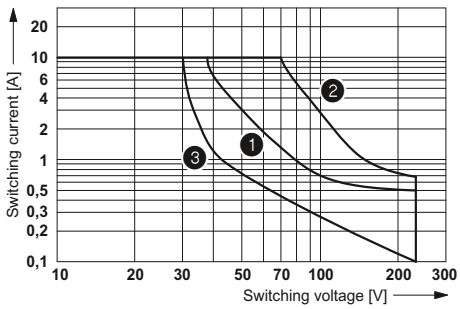


AC interrupting rating



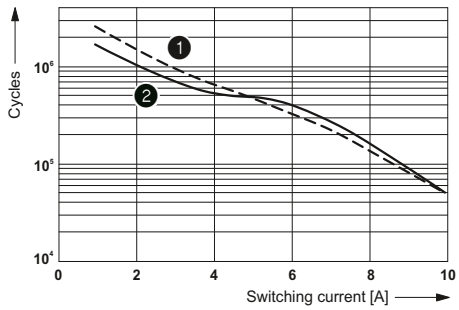
❶ Ohmic load
❷ cos φ = 0.4

DC interrupting rating



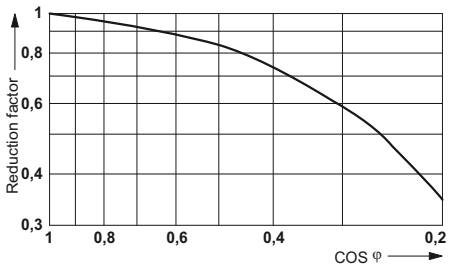
❶ Ohmic load
❷ ohmic load, contacts in series
❸ L/R < 7 ms

Electrical service life



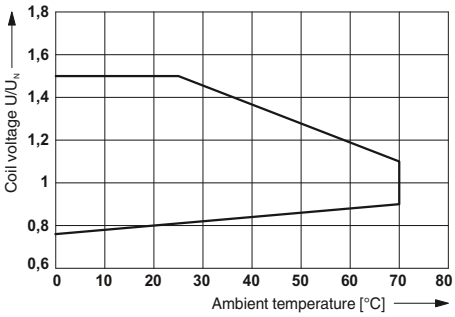
❶ 250 V AC, ohmic load
❷ 30 V DC, ohmic load

Service life reduction factor

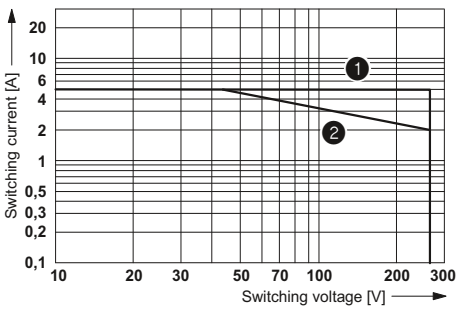


REL-IR...4x21AU (4 PDTs)

Operating voltage range

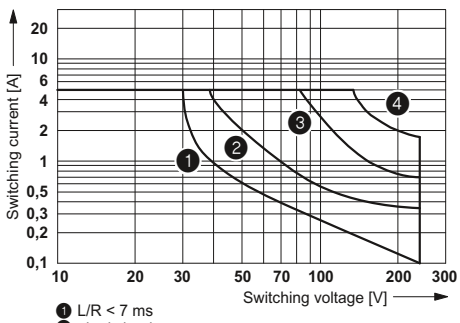


AC interrupting rating



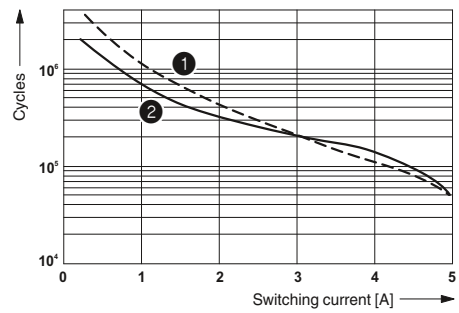
❶ Ohmic load
❷ cos φ = 0.4

DC interrupting rating



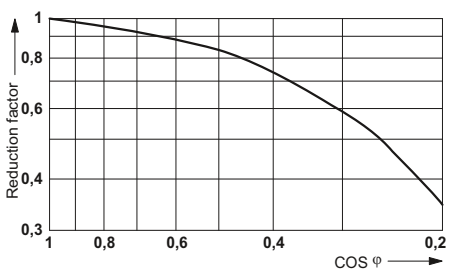
❶ L/R < 7 ms
❷ ohmic load
❸ ohmic load, 2 contacts in series
❹ ohmic load, 4 contacts in series

Electrical service life



❶ 250 V AC, ohmic load
❷ 30 V DC, ohmic load

Service life reduction factor



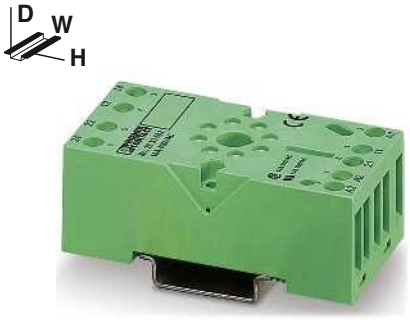
Modular PR3 relay base

Range of relay bases that can be fitted with 2 PDT or 3 PDT relays

Range of accessories includes:

– Plug-in input modules/interference suppression modules
– Relay retaining bracket
– Loop bridges

Notes:
Type of housing: Polyamide fiber reinforced PA-F, color: green.
Marking systems and mounting material See Catalog 5



Relay base for 2 PDT octal relay

Technical data

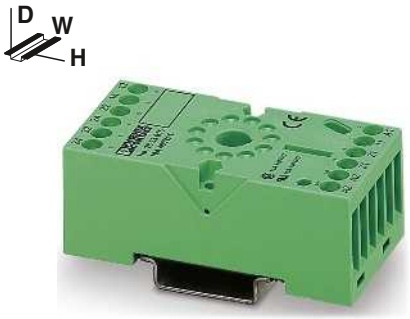
Nominal voltage U_N	400 V AC/DC
Nominal current at U_N	10 A
General data	
Ambient temperature (operation)	-40°C ... 85°C
Connection data solid / stranded / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 26 - 14
Dimensions	
Width	38 mm
Depth with retaining bracket	84 mm (EL3-M52)
Height	75 mm

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Relay base PR3, for octal relay REL-OR with two PDTs, plug-in option for input/interference suppression modules			
With screw connection	**PR3-BSC1/2X21**	**2833602**	10
Relay base PR3, for octal relay REL-OR with three PDTs, plug-in option for input/interference suppression modules			
With screw connection			
Relay retaining bracket, wiring to suit relay base PR3, for 52 mm high octal relay			
	EL3-M52	**2833628**	10

Accessories

Loop bridge, 50-pos., divisible, max. bridging distance 60 mm, 0.5 mm²			
blue	**DB 50- 90 BU**	**2821180**	1
black	**DB 50- 90 BK**	**2820916**	1
gray	**DB 50- 90 GY**	**2820929**	1



Relay base for
3 PDT octal relay

Relay retaining bracket

Technical data	Technical data
400 V AC/DC	-
10 A	-
-40°C ... 85°C	-
0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 26 - 14	-
38 mm	-
84 mm (EL3-M52)	-
75 mm	-

Ordering data			Ordering data		
Type	**Order No.**	Pcs. / Pkt.	**Type**	**Order No.**	Pcs. / Pkt.
PR3-BSC1/3X21	**2833615**	10			
EL3-M52	**2833628**	10	**EL3-M52**	**2833628**	10

Accessories			Accessories		
DB 50- 90 BU	**2821180**	1			
DB 50- 90 BK	**2820916**	1			
DB 50- 90 GY	**2820929**	1			

Plug-in octal relays suitable for PR3 relay base

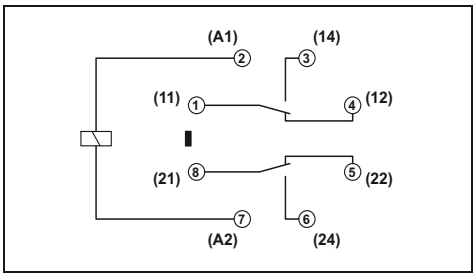
Plug-in octal relays with 2 or 3 PDT contacts, suitable for PR3 and RIF-3 relay bases.

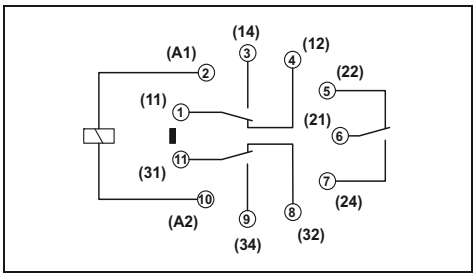
The advantages:

– Lockable manual operation
– Mechanical switch position indicator
– Extremely robust design

2 PDT relay with power contacts

3 PDT relay with power contacts





Technical data

Input data		①	②	③	④
Typ. input current at U_N	[mA]	56	110	22	10
Typ. response time at U_N	[ms]	12			
Typ. response time at U_N (AC, depending on phase relation)	[ms]		5 - 20	5 - 20	5 - 20
Typ. release time at U_N	[ms]	6			
Typ. release time at U_N (AC, depending on phase relation)	[ms]		5 - 20	5 - 20	5 - 20
Output data					
Contact type		Single contact, 2-PDT			
Contact material		AgSnIn			
Max. switching voltage		250 V AC/DC			
Min. switching voltage		1 V			
Limiting continuous current		10 A (N/O contact)			
Min. switching current		10 mA			
Max. interrupting rating, ohmic load					
	250 V AC	2500 VA			
General data					
Test voltage (winding / contact)		2.5 kV AC (50 Hz, 1 min.)			
Test voltage (contact/contact)		2.5 kV AC (50 Hz, 1 min.)			
Ambient temperature (operation)		-40°C ... 60°C			
Nominal operating mode		100% operating factor			
Mechanical service life		10 x 10^6 cycles			
Electrical service life		See diagram			
Standards/regulations		IEC 60664			
Mounting position/mounting		Any / On relay base PR3			

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in octal relay with power contacts, with a test button and mechanical switch position indicator				
①	24 V DC	**REL-OR- 24DC/2X21**	**2834232**	10
②	24 V AC	**REL-OR- 24AC/2X21**	**2834245**	10
③	120 V AC	**REL-OR-120AC/2X21**	**2834258**	10
④	230 V AC	**REL-OR-230AC/2X21**	**2834261**	10

Technical data

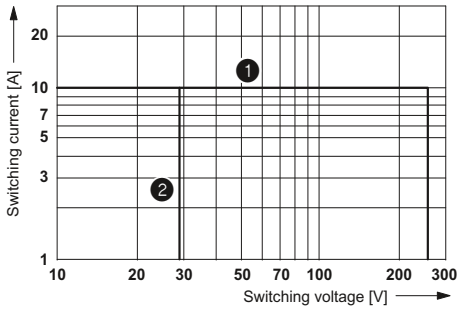
Input data		①	②	③	④
Typ. input current at U_N	[mA]	56	110	22	10
Typ. response time at U_N	[ms]	12			
Typ. response time at U_N (AC, depending on phase relation)	[ms]		5 - 20	5 - 20	5 - 20
Typ. release time at U_N	[ms]	6			
Typ. release time at U_N (AC, depending on phase relation)	[ms]		5 - 20	5 - 20	5 - 20
Output data					
Contact type		Single contact, three PDTs			
Contact material		AgSnIn			
Max. switching voltage		250 V AC/DC			
Min. switching voltage		1 V			
Limiting continuous current		10 A (N/O contact)			
Min. switching current		10 mA			
Max. interrupting rating, ohmic load					
	250 V AC	2500 VA			
General data					
Test voltage (winding / contact)		2.5 kV AC (50 Hz, 1 min.)			
Test voltage (contact/contact)		2.5 kV AC (50 Hz, 1 min.)			
Ambient temperature (operation)		-40°C ... 60°C			
Nominal operating mode		100% operating factor			
Mechanical service life		10 x 10^6 cycles			
Electrical service life		See diagram			
Standards/regulations		IEC 60664			
Mounting position/mounting		Any / On relay base PR3			

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in octal relay with power contacts, with a test button and mechanical switch position indicator				
①	24 V DC	**REL-OR- 24DC/3X21**	**2834274**	10
②	24 V AC	**REL-OR- 24AC/3X21**	**2834287**	10
③	120 V AC	**REL-OR-120AC/3X21**	**2834290**	10
④	230 V AC	**REL-OR-230AC/3X21**	**2834300**	10

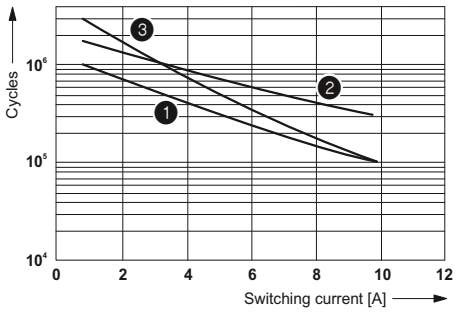
REL-OR...2x21 (2 PDTs)

Interrupting rating



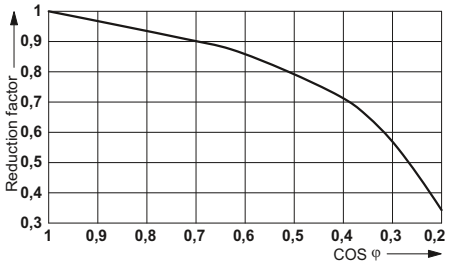
❶ AC, ohmic load
❷ DC, ohmic load

Electrical service life



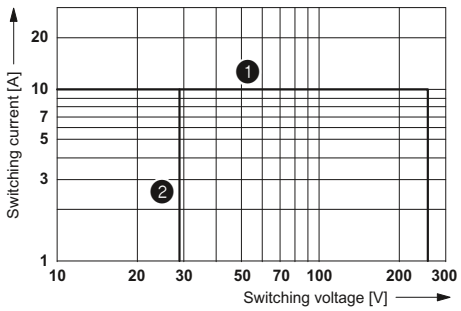
❶ 250V AC, ohmic load
❷ 120VDC, ohmic load
❸ 28V DC, ohmic load

Service life reduction factor with various cos phi



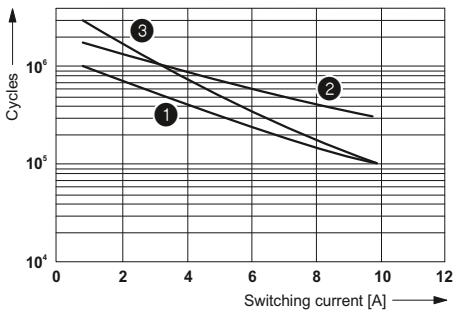
REL-OR...3x21 (3 PDTs)

Interrupting rating



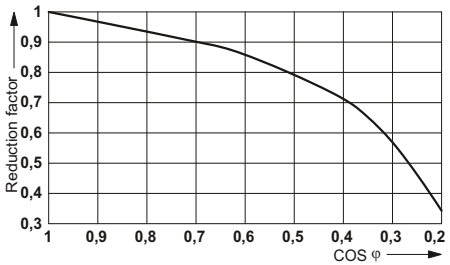
❶ AC, ohmic load
❷ DC, ohmic load

Electrical service life



❶ 250V AC, ohmic load
❷ 120VDC, ohmic load
❸ 28V DC, ohmic load

Service life reduction factor with various cos phi



Plug-in octal relays for high DC loads

Plug-in octal relays with two N/O contacts connected in series suitable for PR3 and RIF-3 relay bases.

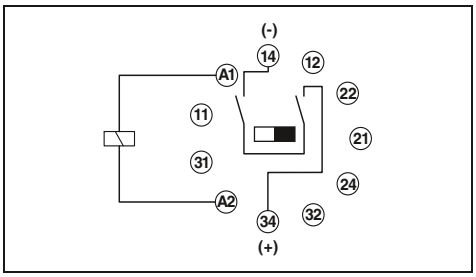
The relays are specially designed for switching high DC loads.

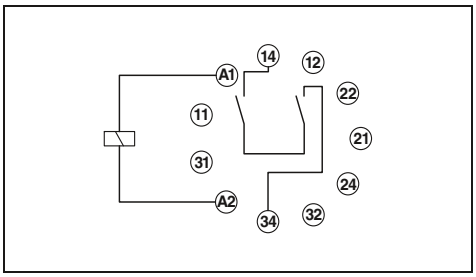
Further advantages:

– Full shutdown by means of 2 x 1.7 mm contact opening
– With lockable manual operation
– Integrated status LED
– Integrated freewheeling diode with DC types

1 N/O contact, with blow magnet

1 N/O contact





Technical data

Input data		①	②	③	④	⑤	⑥
Permissible range (with reference to U_N)		refer to the diagram					
Typ. input current at U_N	[mA]	55	13	7	100	22	11
Typ. response time at U_N	[ms]	20	20	20			
Typ. response time at U_N (depending on phase relation)	[ms]				5 - 20	5 - 20	5 - 20
Typ. release time at U_N	[ms]	30	30	30			
Typ. release time at U_N (depending on phase relation)	[ms]				5 - 20	5 - 20	5 - 20
Output data							
Contact type		Single contact, 1 N/O contact (series connection, 2 N/O contacts) with blowout magnet					
Contact material		AgNi					
Max. switching voltage		250 V AC / 220 V DC					
Min. switching voltage		10 V (at 10 mA)					
Limiting continuous current		10 A					
Min. switching current		10 mA (at 10 V)					
Max. interrupting rating, ohmic load							
	250 V AC	2500 VA					
General data							
Test voltage (winding / contact)		2.5 kV_{rms} (50 Hz, 1 min.)					
Ambient temperature (operation)		-40°C ... 60°C					
Nominal operating mode		100% operating factor					
Mechanical service life		Approx. 10^7 cycles					
Standards/regulations		IEC 61810, EN 60947					
Mounting position/mounting		Any / On relay base PR3					

Technical data

Input data		①	②	③	④	⑤	⑥
Permissible range (with reference to U_N)		refer to the diagram					
Typ. input current at U_N	[mA]	55	13	7	100	22	11
Typ. response time at U_N	[ms]	20	20	20			
Typ. response time at U_N (depending on phase relation)	[ms]				5 - 20	5 - 20	5 - 20
Typ. release time at U_N	[ms]	30	30	30			
Typ. release time at U_N (depending on phase relation)	[ms]				5 - 20	5 - 20	5 - 20
Output data							
Contact type		Single contact, 1 N/O contact (series connection, 2 N/O contacts)					
Contact material		AgNi					
Max. switching voltage		250 V AC / 220 V DC					
Min. switching voltage		10 V (at 10 mA)					
Limiting continuous current		10 A					
Min. switching current		10 mA (at 10 V)					
Max. interrupting rating, ohmic load							
	250 V AC	2500 VA					
General data							
Test voltage (winding / contact)		2.5 kV_{rms} (50 Hz, 1 min.)					
Ambient temperature (operation)		-40°C ... 60°C					
Nominal operating mode		100% operating factor					
Mechanical service life		Approx. 10^7 cycles					
Standards/regulations		IEC 61810, EN 60947					
Mounting position/mounting		Any / On relay base PR3					

Ordering data

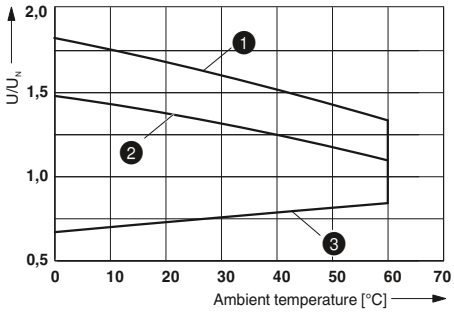
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in octal relay for high DC loads					
	①	24 V DC	**REL-OR/LDP- 24DC/1/MB**	**2901901**	10
	②	110 V DC	**REL-OR/LDP-110DC/1/MB**	**2901902**	10
	③	220 V DC	**REL-OR/LDP-220DC/1/MB**	**2901904**	10
	④	24 V AC	**REL-OR/L- 24AC/1/MB**	**2901905**	10
	⑤	120 V AC	**REL-OR/L-120AC/1/MB**	**2901906**	10
	⑥	230 V AC	**REL-OR/L-230AC/1/MB**	**2901907**	10

Ordering data

Type	Order No.	Pcs. / Pkt.
REL-OR/LDP- 24DC/1	**2901908**	10
REL-OR/LDP-110DC/1	**2901909**	10
REL-OR/LDP-220DC/1	**2901910**	10
REL-OR/L- 24AC/1	**2901911**	10
REL-OR/L-120AC/1	**2901912**	10
REL-OR/L-230AC/1	**2901913**	10

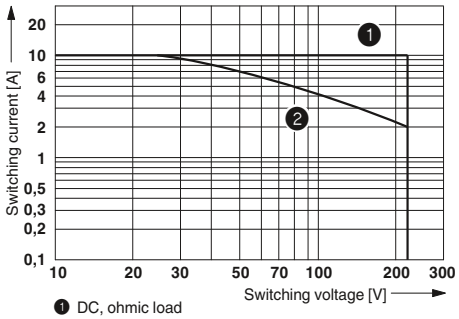
REL-OR.../1/MB (1 N/O contact with blow magnet)

Operating voltage range of the relay



❶ Maximum operating voltage without load current (0 A)
❷ Maximum operating voltage at limiting continuous current (10 A)
❸ Minimum pick-up voltage without pre-excitation

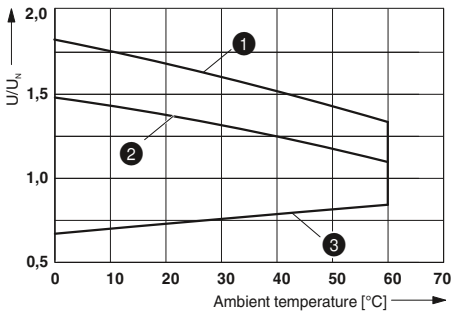
DC interrupting rating



❶ DC, ohmic load
❷ L/R = 40 ms

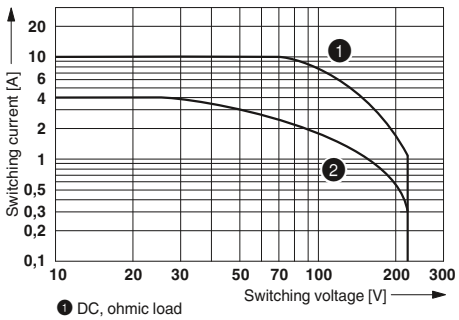
REL-OR.../1 (1 N/O contact)

Operating voltage range of the relay



❶ Maximum operating voltage without load current (0 A)
❷ Maximum operating voltage at limiting continuous current (10 A)
❸ Minimum pick-up voltage without pre-excitation

DC interrupting rating



❶ DC, ohmic load
❷ L/R = 40 ms

Input modules/interference suppression modules for PR1, PR2, and PR3

Plug-in input modules/interference suppression modules for optional fitting of PR... relay base

The advantages:

– Attenuation of reverse voltage induced in coil
– Mechanical coding to protect against incorrect connection

Input/interference suppression module to match PR1 and PR2

Input/interference suppression module to match PR3

Description	Ordering data			Ordering data		
	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Plug-in module, for mounting on PR..., with LED status indicator and freewheeling diode to limit the coil induction voltage effectively, polarity: **A1 +, A2 –,** Input voltage:						
- 12-24 V DC ±20%	**LDP- 12- 24DC**	**2833657**	10	**LDP3- 12- 24DC**	**2833770**	10
- 48-60 V DC ±20%	**LDP- 48- 60DC**	**2833660**	10	**LDP3- 48- 60DC**	**2833783**	10
- 110 V DC ±20%	**LDP-110DC**	**2833673**	10	**LDP3-110DC**	**2833796**	10
Plug-in module, for mounting on PR..., with LED status indicator and freewheeling diode to limit the coil induction voltage effectively, polarity: **A1 –, A2 +** (Japanese standard), Input voltage:						
- 12-24 V DC ±20%	**LDM- 12- 24DC**	**2833686**	10	**LDM3- 12- 24DC**	**2833806**	10
- 48-60 V DC ±20%	**LDM- 48- 60DC**	**2833699**	10	**LDM3- 48- 60DC**	**2833819**	10
- 110 V DC ±20%	**LDM-110DC**	**2833709**	10	**LDM3-110DC**	**2833822**	10
Plug-in module, for mounting on PR..., with LED status indicator and varistor to limit the coil induction voltage and/or external interference peaks, Input voltage:						
- 12-24 V AC/DC ±20% (30-V-varistor)	**LV- 12- 24UC**	**2833712**	10	**LV3- 12- 24UC**	**2833835**	10
- 48-60 V AC/DC ±20% (75-V-varistor)	**LV- 48- 60UC**	**2833725**	10	**LV3- 48- 60UC**	**2833848**	10
- 120-230 V AC/110 V DC ±20% (275-V-varistor)	**LV-120-230AC/110DC**	**2833738**	10	**LV3-120-230AC/110DC**	**2833851**	10
Plug-in module, for mounting on PR..., with varistor to limit the coil induction voltage and/or external interference peaks, Input voltage:						
- 12-24 V AC/DC ±20% (30-V-varistor)	**V- 12- 24UC**	**2833864**	10	**V3- 12- 24UC**	**2833929**	10
- 48-60 V AC/DC ±20% (75-V-varistor)	**V- 48- 60UC**	**2833877**	10	**V3- 48- 60UC**	**2833932**	10
- 120-230 V AC/DC ±20% (275-V-varistor)	**V-120-230UC**	**2833880**	10	**V3-120-230UC**	**2833945**	10
Plug-in module, for mounting on PR..., with RD-element to attenuate the coil induction voltage and/or external interference peaks, Input voltage:						
- 12-24 V AC/DC ±20% (220 nF/100 Ω)	**RC- 12- 24UC**	**2833741**	10	**RC3- 12- 24UC**	**2833893**	10
- 48-60 V AC/DC ±20% (220 nF/220 Ω)	**RC- 12- 24UC**	**2833754**	10	**RC3- 48- 60UC**	**2833903**	10
- 120-230 V AC/DC ±20% (100 nF/470 Ω)	**RC-120-230UC**	**2833767**	10	**RC3-120-230UC**	**2833916**	10

Terminal assignment PR1 base / Solid-state relay								
	Terminal blocks, PR1 base							
	A1	A2	11	12	14	21	22	24
Solid-state relays								
SIM-EI...48DC/100	A2 (-)	A1 (+)			A	+		
SIM-EI...TTL/100	A2 (-)	A1 (+)			A	+	0	
SIM-EI...48DC/100RC	A2 (-)	A1 (+)			A	+		
SIM-EI-OV-24DC/24DC/3	A2 (-)	A1 (+)			A	+		
OPT-...24DC/5	A1 (+)	A2 (-)	13		14			
OPT-...230AC/2	A1 (+)	A2 (-)	13		14			

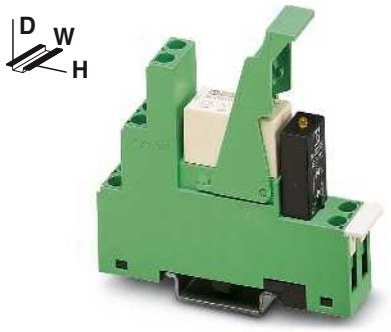
The relay bases of the PR1 series can also be equipped with wear-free solid-state relays (OPT… or SIM-EI...) as an alternative to the electromechanical relay.
LDP... and LV... plug-in modules cannot be used in conjunction with SIM-EI... solid-state relays

Fully mounted PR1 relay modules with screw connection

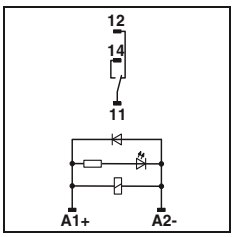
Fully mounted PR1 relay modules, consisting of:
– Relay base
– 1/2 PDT relay
– Relay retaining bracket
– Input module/interference suppr. module
– Marking labels

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

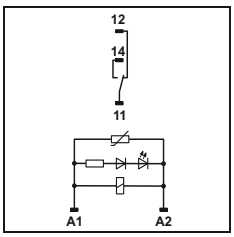
Notes:
Type of housing: Polyamide fiber reinforced PA-F, color: green.
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.
Other input voltages on request.
1) EMC: Class A product, see page 571



PR1 relay module with 1 PDT relay



DC coils



AC coils

Technical data

Input data		24 V DC	24 V AC	120 V AC	230 V AC
Permissible range (with reference to U_N)		See diagram			
Typ. input current with U_N (for AC: 50/60 Hz)	[mA]	19	34 / 26	9 / 7	6 / 5.5
Typ. response time at U_N	[ms]	8	3 ... 12	3 ... 12	3 ... 12
Typ. release time at U_N	[ms]	10	1.5 ... 14	1.5 ... 16	2 ... 22
Input protection:	24 V DC	Damping diode, Yellow LED			
	24, 120, 230 V AC	Varistor, Yellow LED			

Output data	PR...	PR...AU
Contact type	Single contact, 1-PDT	Single contact, 1-PDT
Contact material	AgNi	AgNi, hard gold-plated
Maximum switching voltage	250 V AC/DC	30 V AC / 36 V DC
Minimum switching voltage	12 V (at 10 mA)	100 mV (at 10 mA)
Limiting continuous current	12 A	50 mA
Maximum inrush current	30 A (300 ms)	50 mA
Min. switching current	100 mA	1 mA (at 24 V)
Interrupting rating (ohmic load) max.	3000 VA (for 250 V AC)	-
	For more data, see diagram	

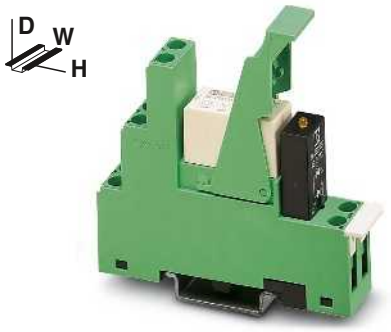
General data		
Test voltage	Winding to contact	4 kV (50 Hz, 1 min.)
	Contact/contact	-
Ambient temperature (operation)		-25°C ... 60°C
Nominal operating mode		100% operating factor
Mechanical service life		3 x 10^7 cycles
Service life, electrical		See diagram
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Pollution degree/surge voltage category		3 / III
Mounting position / Mounting		Any / In rows with zero spacing
Connection data solid / stranded / AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
Dimensions	W / H / D	16 mm / 78.5 mm / 71 mm

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Pre-assembled coupling relay modules with miniature power contact relay				
	24 V DC	**PR1-RSC3-LDP-24DC/21[1])**	**2834326**	5
	24 V AC	**PR1-RSC3-LV- 24AC/21[1])**	**2834339**	5
	120 V AC	**PR1-RSC3-LV-120AC/21[1])**	**2834342**	5
	230 V AC	**PR1-RSC3-LV-230AC/21[1])**	**2834355**	5
Pre-assembled coupling relay modules with multi-layer contact relay				
	24 V DC	**PR1-RSC3-LDP-24DC/21AU[1])**	**2834368**	5
	24 V AC	**PR1-RSC3-LV- 24AC/21AU[1])**	**2834371**	5
	120 V AC	**PR1-RSC3-LV-120AC/21AU[1])**	**2834384**	5
	230 V AC	**PR1-RSC3-LV-230AC/21AU[1])**	**2834397**	5

Accessories

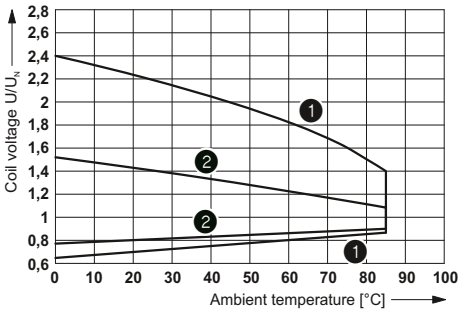
Device marking label, for thermal transfer printer, labeling surface 6 x 15 mm	**EML (15X6) R YE**	**0819288**	1



PR1 relay module with
2 PDT contact relay

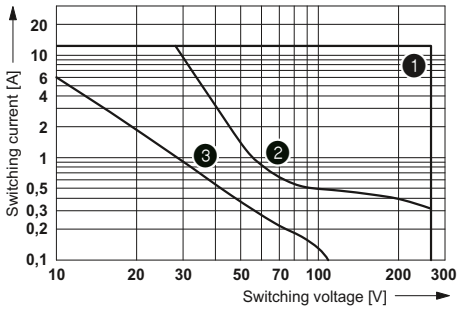
PR1-RSC3.../21 (1 PDT)

Operating voltage range of the relay



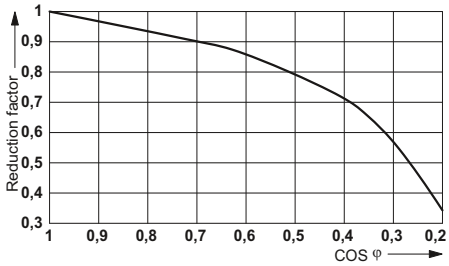
1 DC coils
2 AC coils

Interrupting rating

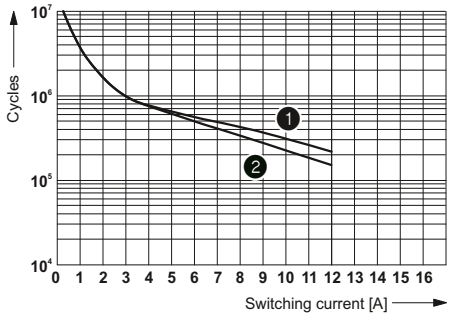


1 AC, ohmic load
2 DC, ohmic load
3 DC, L/R = 40 ms

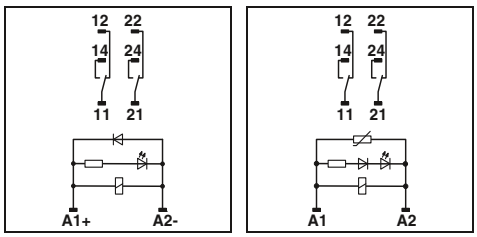
Service life reduction factor



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

24 V DC	24 V AC	120 V AC	230 V AC
See diagram			
19	34 / 26	9 / 7	6 / 5.5
8	3 ... 12	3 ... 12	3 ... 12
10	1.5 ... 14	1.5 ... 16	2 ... 22
Damping diode, Yellow LED			
Varistor, Yellow LED			
PR...		PR...AU	
Single contact, 2-PDT		Single contact, 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	
15 A (300 ms)		50 mA	
10 mA (At 5 V)		1 mA (at 24 V)	
2000 VA (for 250 V AC)		-	
For more data, see diagram			
4 kV (50 Hz, 1 min.)			
2.5 kV (50 Hz, 1 min.)			
-25°C ... 60°C			
100% operating factor			
3 x 10^7 cycles			
See diagram			
IEC 60664, EN 50178, IEC 62103			
3 / III			
Any / In rows with zero spacing			
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14			
16 mm / 78.5 mm / 71 mm			

Ordering data

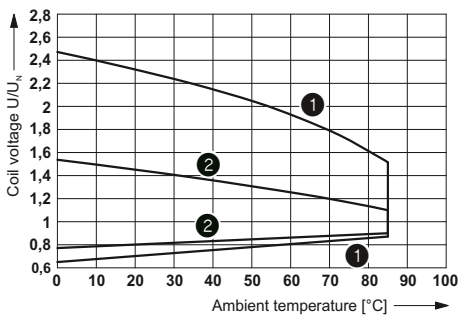
Type	Order No.	Pcs. / Pkt.
PR1-RSC3-LDP-24DC/2X21[1])	**2834481**	5
PR1-RSC3-LV- 24AC/2X21[1])	**2834494**	5
PR1-RSC3-LV-120AC/2X21[1])	**2834504**	5
PR1-RSC3-LV-230AC/2X21[1])	**2834517**	5
PR1-RSC3-LDP-24DC/2X21AU[1])	**2834520**	5
PR1-RSC3-LV- 24AC/2X21AU[1])	**2834533**	5
PR1-RSC3-LV-120AC/2X21AU[1])	**2834546**	5
PR1-RSC3-LV-230AC/2X21AU[1])	**2834559**	5

Accessories

EML (15X6) R YE	**0819288**	1

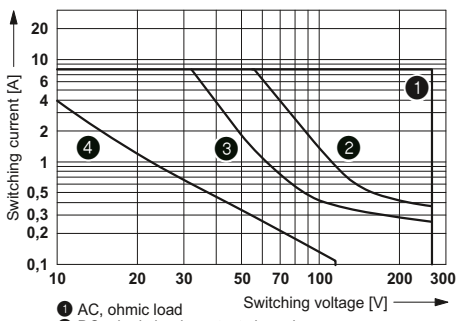
PR1-RSC3.../2x21 (2 PDT)

Operating voltage range of the relay



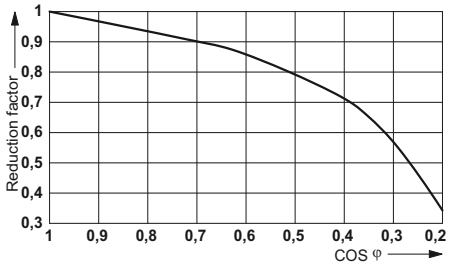
1 DC coils
2 AC coils

Interrupting rating

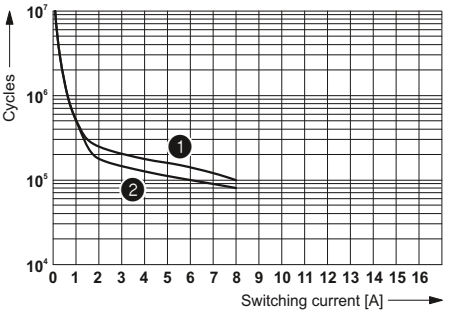


1 AC, ohmic load
2 DC, ohmic load, contacts in series
3 DC, ohmic load
4 DC, L/R = 40 ms

Service life reduction factor with various cos phi



Electrical service life



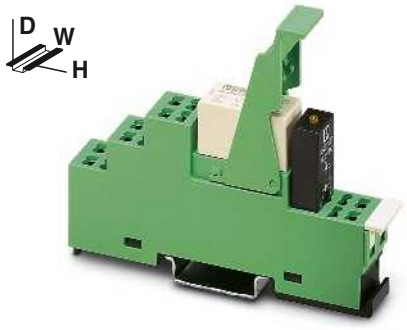
1 250 V AC, ohmic load (DC coils)
2 250 V AC, ohmic load (AC coils)

Fully mounted PR1 relay modules with spring-cage connection

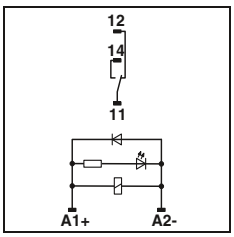
Fully mounted PR1 relay modules, consisting of:
– Relay base
– 1/2 PDT relay
– Relay retaining bracket
– Input module/interference suppr. module
– Marking labels

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

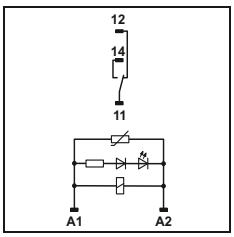
Notes:
Type of housing: Polyamide fiber reinforced PA-F, color: green.
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.
There is a double spring-cage for each terminal point.
Other input voltages on request.
1) EMC: Class A product, see page 571



PR1 relay module with 1 PDT relay



DC coils



AC coils

Technical data

Input data		24 V DC	24 V AC	120 V AC	230 V AC
Permissible range (with reference to U_N)		See diagram			
Typ. input current with U_N (for AC: 50/60 Hz)	[mA]	19	34 / 26	9 / 7	6 / 5.5
Typ. response time at U_N	[ms]	8	3 ... 12	3 ... 12	3 ... 12
Typ. release time at U_N	[ms]	10	1.5 ... 14	1.5 ... 16	2 ... 22
Input protection:	24 V DC	Damping diode, Yellow LED			
	24, 120, 230 V AC	Varistor, Yellow LED			

Output data	PR...	PR...AU
Contact type	Single contact, 1-PDT	Single contact, 1-PDT
Contact material	AgNi	AgNi, hard gold-plated
Maximum switching voltage	250 V AC/DC	30 V AC / 36 V DC
Minimum switching voltage	12 V (at 10 mA)	100 mV (at 10 mA)
Limiting continuous current	10 A	50 mA
Maximum inrush current	30 A (300 ms)	50 mA
Min. switching current	100 mA	1 mA (at 24 V)
Interrupting rating (ohmic load) max.	2500 VA	-
	For more data, see diagram	

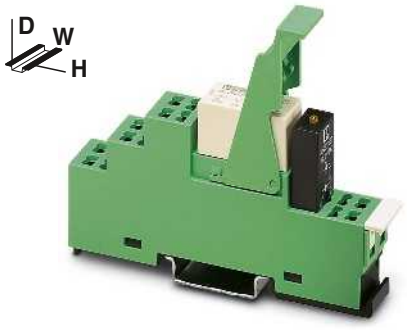
General data		
Test voltage	Winding to contact	4 kV (50 Hz, 1 min.)
	Contact/contact	-
Ambient temperature (operation)		-25°C ... 60°C
Nominal operating mode		100% operating factor
Mechanical service life		3 x 10^7 cycles
Service life, electrical		See diagram
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Pollution degree/surge voltage category		3 / III
Mounting position / Mounting		Any / In rows with zero spacing
Connection data solid / stranded / AWG		0.2 - 1.5 mm^2 / 0.2 - 1.5 mm^2 / 24 - 16
Dimensions	W / H / D	16 mm / 97 mm / 72 mm

Ordering data

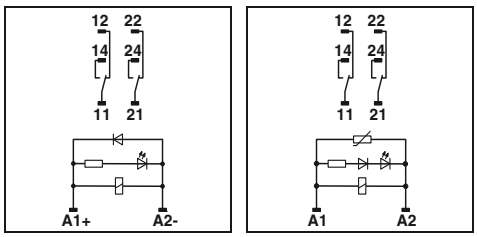
Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Pre-assembled coupling relay modules with miniature power contact relay				
	24 V DC	**PR1-RSP3-LDP-24DC/21[1])**	**2834407**	5
	24 V AC	**PR1-RSP3-LV- 24AC/21[1])**	**2834410**	5
	120 V AC	**PR1-RSP3-LV-120AC/21[1])**	**2834423**	5
	230 V AC	**PR1-RSP3-LV-230AC/21[1])**	**2834436**	5
Pre-assembled coupling relay modules with multi-layer contact relay				
	24 V DC	**PR1-RSP3-LDP-24DC/21AU[1])**	**2834449**	5
	24 V AC	**PR1-RSP3-LV- 24AC/21AU[1])**	**2834452**	5
	120 V AC	**PR1-RSP3-LV-120AC/21AU[1])**	**2834465**	5
	230 V AC	**PR1-RSP3-LV-230AC/21AU[1])**	**2834478**	5

Accessories

Device marking label, for thermal transfer printer, labeling surface 6 x 15 mm	**EML (15X6) R YE**	**0819288**	1



PR1 relay module with 2 PDT contact relay



DC coils **AC coils**

Technical data

24 V DC	24 V AC	120 V AC	230 V AC
See diagram			
19	34 / 26	9 / 7	6 / 5.5
8	3 ... 12	3 ... 12	3 ... 12
10	1.5 ... 14	1.5 ... 16	2 ... 22
Damping diode, Yellow LED			
Varistor, Yellow LED			
PR...		PR...AU	
Single contact, 2-PDT		Single contact, 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	
15 A (300 ms)		50 mA	
10 mA (At 5 V)		1 mA (at 24 V)	
2000 VA		-	
For more data, see diagram			
4 kV (50 Hz, 1 min.)			
2.5 kV (50 Hz, 1 min.)			
-25°C ... 60°C			
100% operating factor			
3 x 10^7 cycles			
See diagram			
IEC 60664, EN 50178, IEC 62103			
3 / III			
Any / In rows with zero spacing			
0.2 - 1.5 mm^2 / 0.2 - 1.5 mm^2 / 24 - 16			
16 mm / 97 mm / 72 mm			

Ordering data

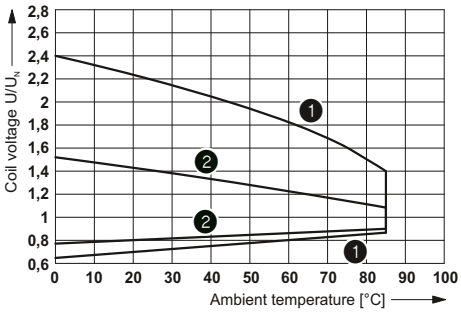
Type	Order No.	Pcs. / Pkt.
PR1-RSP3-LDP-24DC/2X21[1])	**2834562**	5
PR1-RSP3-LV- 24AC/2X21[1])	**2834575**	5
PR1-RSP3-LV-120AC/2X21[1])	**2834588**	5
PR1-RSP3-LV-230AC/2X21[1])	**2834591**	5
PR1-RSP3-LDP-24DC/2X21AU[1])	**2834601**	5
PR1-RSP3-LV- 24AC/2X21AU[1])	**2834614**	5
PR1-RSP3-LV-120AC/2X21AU[1])	**2834627**	5
PR1-RSP3-LV-230AC/2X21AU[1])	**2834630**	5

Accessories

EML (15X6) R YE	**0819288**	1

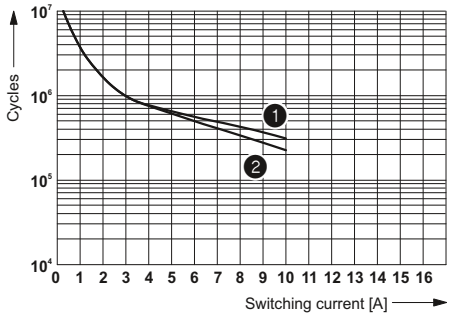
PR1-RSP3.../21 (1 PDT)

Operating voltage range of the relay



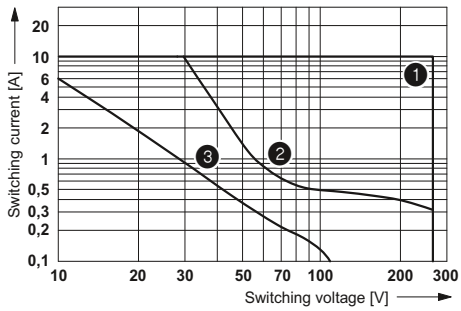
❶ DC coils
❷ AC coils

Electrical service life



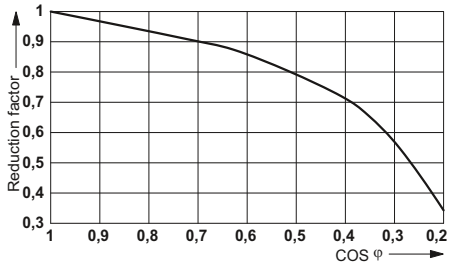
❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

Interrupting rating



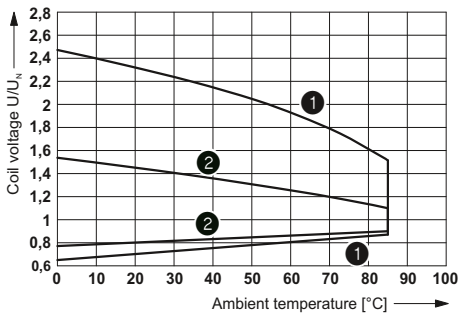
❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Service life reduction factor with various cos phi



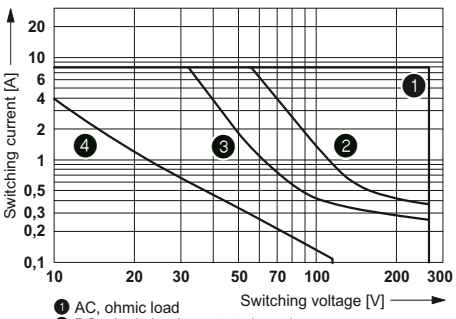
PR1-RSP3.../2x21 (2 PDT)

Operating voltage range of the relay



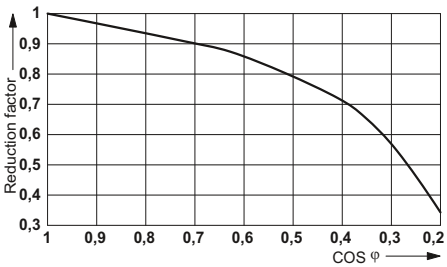
❶ DC coils
❷ AC coils

Interrupting rating

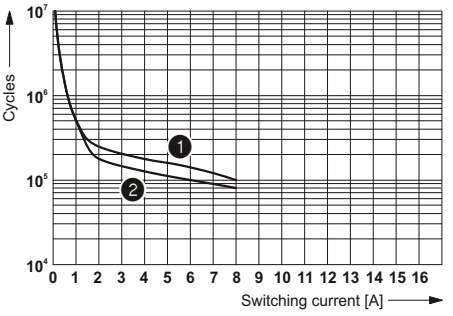


❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

Service life reduction factor with various cos phi



Electrical service life



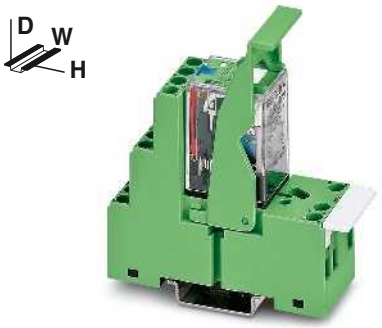
❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

Fully mounted PR2 relay modules

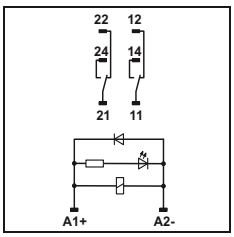
Fully mounted PR2 relay modules, consisting of:
- Relay base
- 2/4 PDT relay
- Relay retaining bracket
- Input module/interference suppr. module (AC types only)
- Marking labels

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
- Screw or spring-cage connection
- 4 PDT types with multi-layer gold contacts

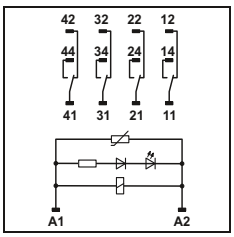
Notes:
Type of housing: Polyamide fiber reinforced PA-F, color: green.
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.
Other input voltages on request.
The DC types do not have a plug-in module because the status LED and the freewheeling diode are integrated directly into the relay.
1) EMC: Class A product, see page 571



PR2 relay module with screw connection



DC coils



AC coils

Technical data

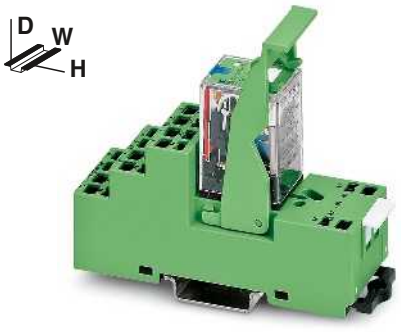
Input data		24 V DC	24 V AC	120 V AC	230 V AC
Permissible range (with reference to U_N)		See diagram			
Typ. input current with U_N (for AC: 50/60 Hz)	[mA]	38	54 / 46	11 / 9	5 / 4
Typ. response time at U_N	[ms]	13	4 ... 10	4 ... 10	4 ... 10
Typ. release time at U_N	[ms]	5	3 ... 12	3 ... 12	3 ... 12
Input protection:	24 V DC	Damping diode, Green LED			
	24, 120, 230 V AC	Varistor, LED red			
Output data		PR...		PR...AU	
Contact type		Single contact, 2-PDT		Single contact, 4-PDT	
Contact material		Ag		AgNi, hard gold-plated	
Maximum switching voltage		250 V AC / 125 V DC		250 V AC / 125 V DC	
Minimum switching voltage		5 V		1 V	
Limiting continuous current		10 A		5 A	
Maximum inrush current		20 A (15 ms)		12 A (15 ms)	
Min. switching current		1 mA		1 mA	
Interrupting rating (ohmic load) max.		2500 VA		1250 VA	
		For more data, see diagram			
General data					
Test voltage	Winding to contact	2 kV (50 Hz, 1 min.)			
	Contact/contact	2 kV (50 Hz, 1 min.)			
Ambient temperature (operation)		-25°C ... 60°C			
Nominal operating mode		100% operating factor			
Mechanical service life		5 x 10^7 cycles			
Service life, electrical		See diagram			
Standards/regulations		IEC 60664, EN 50178, IEC 62103			
Pollution degree/surge voltage category		3 / II			
Mounting position / Mounting		Any / In rows with zero spacing			
Connection data solid / stranded / AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14			
Dimensions	W / H / D	27 mm / 78.5 mm / 86 mm			

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Pre-assembled coupling relay modules with 2-PDT contact relay				
	24 V DC	**PR2-RSC3-LDP-24DC/2X21[1])**	**2834643**	5
	24 V AC	**PR2-RSC3-LV- 24AC/2X21[1])**	**2834656**	5
	120 V AC	**PR2-RSC3-LV-120AC/2X21[1])**	**2834669**	5
	230 V AC	**PR2-RSC3-LV-230AC/2X21[1])**	**2834672**	5
Pre-assembled coupling relay modules with 4-PDT contact relay and additional hard gold-plating				
	24 V DC	**PR2-RSC3-LDP-24DC/4X21AU[1])**	**2834724**	5
	24 V AC	**PR2-RSC3-LV- 24AC/4X21AU[1])**	**2834737**	5
	120 V AC	**PR2-RSC3-LV-120AC/4X21AU[1])**	**2834740**	5
	230 V AC	**PR2-RSC3-LV-230AC/4X21AU[1])**	**2834753**	5

Accessories

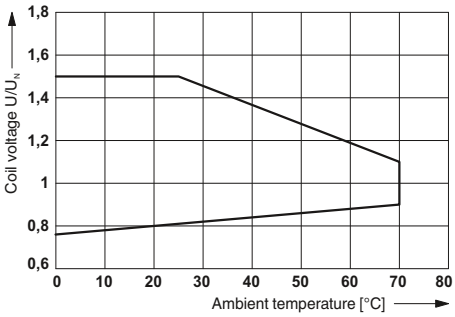
Device marking label, for thermal transfer printer, labeling surface 6 x 15 mm	**EML (15X6) R YE**	**0819288**	1



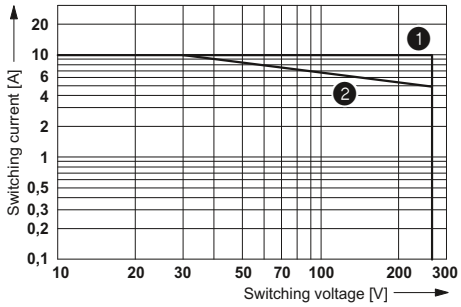
PR2 relay module with spring-cage connection

PR2-RS.../2x21 (2 PDT)

Operating voltage range of relay $T_u=T_{coil}$

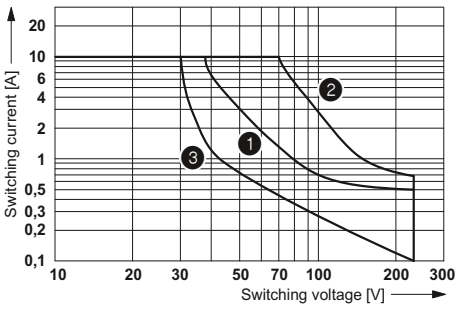


AC interrupting rating



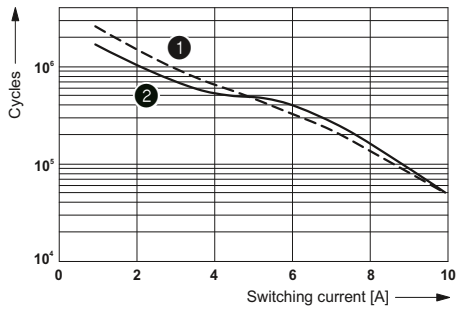
1 Ohmic load
2 cos φ = 0.4

DC interrupting rating

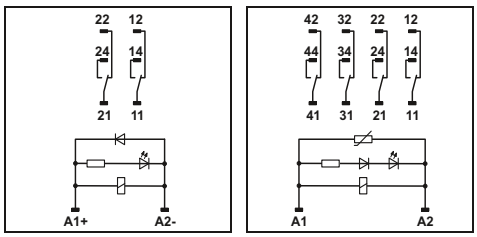


1 Ohmic load
2 ohmic load, contacts in series
3 L/R < 7 ms

Electrical service life



1 250 V AC, ohmic load
2 30 V DC, ohmic load



DC coils AC coils

Technical data

24 V DC	24 V AC	120 V AC	230 V AC
See diagram			
38	54 / 46	11 / 9	5 / 4
13	4 ... 10	4 ... 10	4 ... 10
5	3 ... 12	3 ... 12	3 ... 12
Damping diode, Green LED			
Varistor, LED red			
PR...		PR...AU	
Single contact, 2-PDT		Single contact, 4-PDT	
Ag		AgNi, hard gold-plated	
250 V AC / 125 V DC		250 V AC / 125 V DC	
5 V		1 V	
10 A		5 A	
20 A (15 ms)		12 A (15 ms)	
1 mA		1 mA	
2500 VA		1250 VA	
For more data, see diagram			
2 kV (50 Hz, 1 min.)			
2 kV (50 Hz, 1 min.)			
-25°C ... 60°C			
100% operating factor			
5 x 10^7 cycles			
See diagram			
IEC 60664, EN 50178, IEC 62103			
3 / II			
Any / In rows with zero spacing			
0.2 - 1.5 mm^2 / 0.2 - 1.5 mm^2 / 24 - 16			
31 mm / 95 mm / 84 mm			

Ordering data

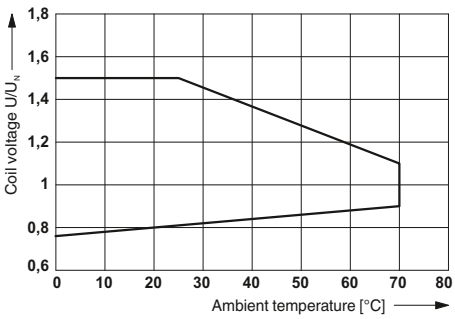
Type	Order No.	Pcs. / Pkt.
PR2-RSP3-LDP-24DC/2X21[1])	**2834685**	5
PR2-RSP3-LV- 24AC/2X21[1])	**2834698**	5
PR2-RSP3-LV-120AC/2X21[1])	**2834708**	5
PR2-RSP3-LV-230AC/2X21[1])	**2834711**	5
PR2-RSP3-LDP-24DC/4X21AU[1])	**2834766**	5
PR2-RSP3-LV- 24AC/4X21AU[1])	**2834779**	5
PR2-RSP3-LV-120AC/4X21AU[1])	**2834782**	5
PR2-RSP3-LV-230AC/4X21AU[1])	**2834795**	5

Accessories

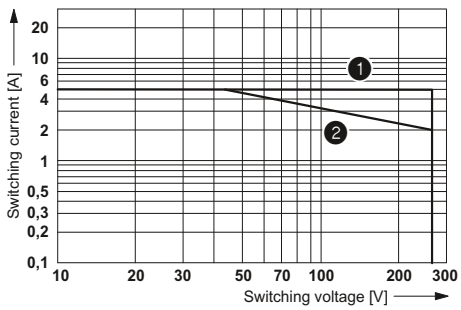
EML (15X6) R YE	**0819288**	1

PR2-RS.../4x21 (4 PDT)

Operating voltage range of relay $T_u=T_{coil}$

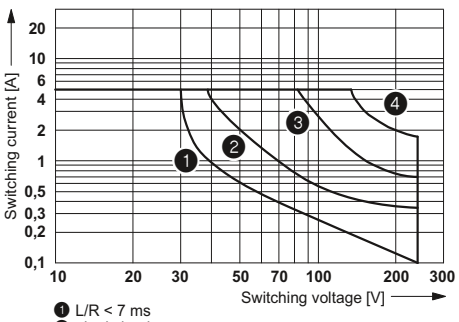


AC interrupting rating



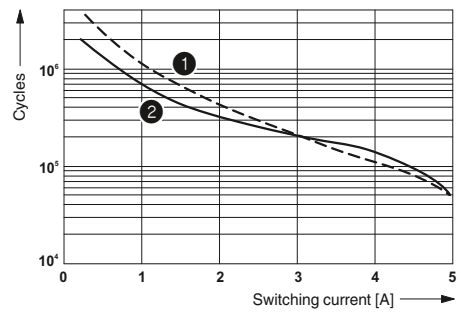
1 Ohmic load
2 cos φ = 0.4

DC interrupting rating

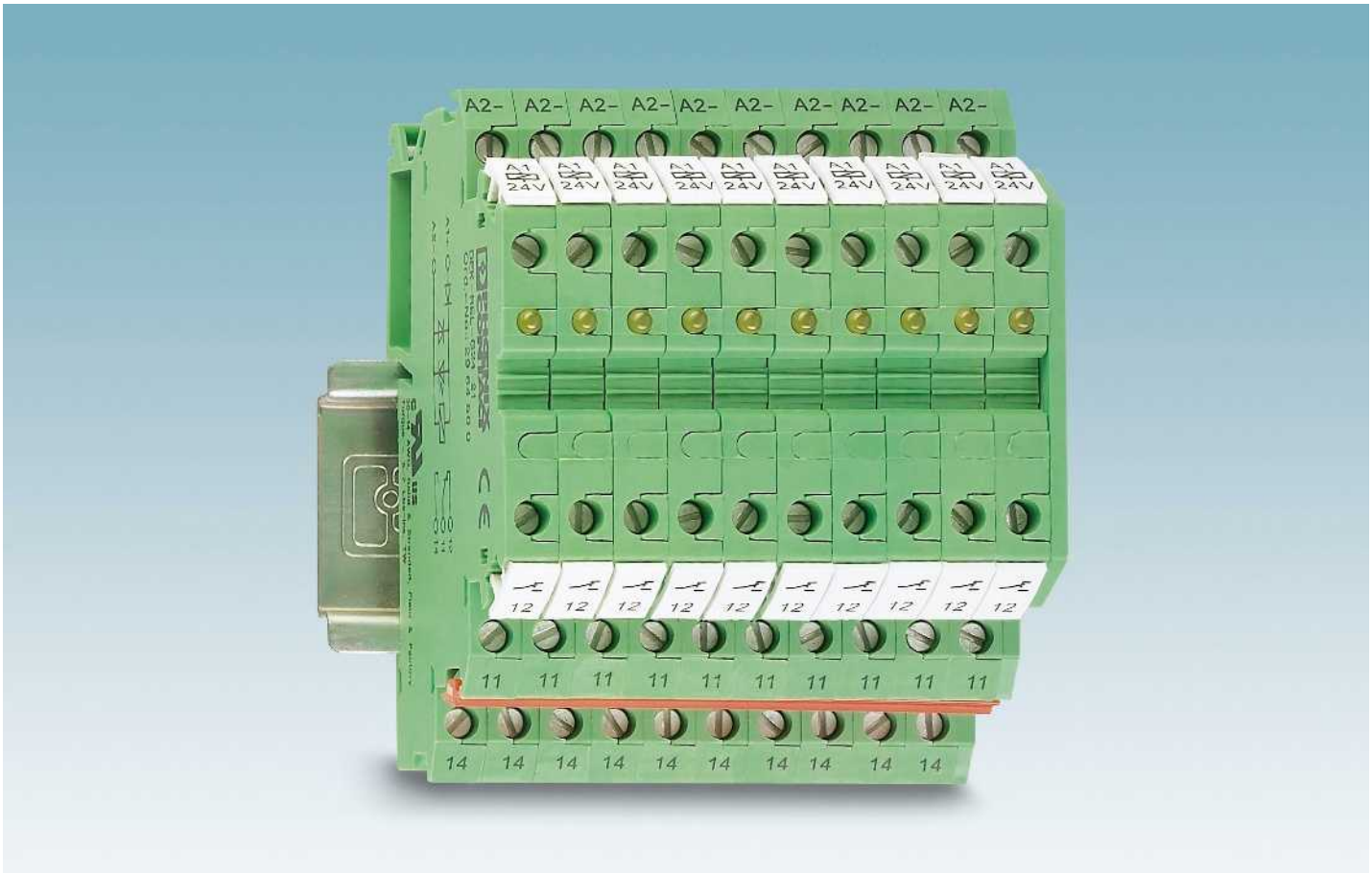


1 L/R < 7 ms
2 ohmic load
3 ohmic load, 2 contacts in series
4 ohmic load, 4 contacts in series

Electrical service life



1 250 V AC, ohmic load
2 30 V DC, ohmic load



The Phoenix Contact DEK interface terminal blocks provide complete interface functions in modular 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 modular 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.

Colored EB-DIK insertion bridges for the supply and ground signals make it possible to design the circuit simply and effectively.

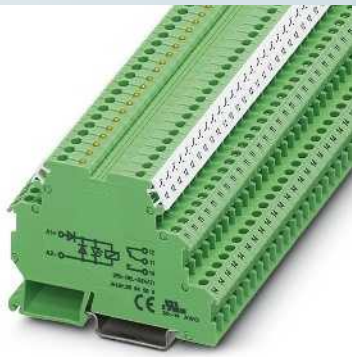
Integrated protective circuits such as freewheeling diodes, polarity reversal protection diodes, and surge protection elements protect the coupling modules and ensure optimum availability of the system.

DEK-REL-... relay terminal block

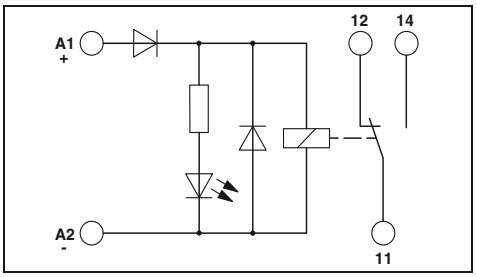
The Phoenix Contact relay terminal block with PDT contact offers the following advantages:

– 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
– Little wiring expense 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 according to DIN EN 50178 (VDE 0160)
– Light indicator for signaling the switching status.

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.
For further EB...DIK... insertion bridges, refer to page 403
1) EMC: Class A product, see page 571



For medium to large power
1 PDT (21)



Technical data

Input data		①
Permissible range (with reference to U_N)		0.8 - 1.1
Typ. input current at U_N	[mA]	9
Response/release time at U_N	[ms]	8 / 5
Input protection:		Yellow LED, Protection against polarity reversal, freewheeling diode
Output data		
Contact type		Single contact, 1-PDT
Contact material		AgSnO
Max. switching voltage		250 V AC/DC
Min. switching voltage		12 V AC/DC
Limiting continuous current		6 A
Max. inrush current		6 A
Min. switching current		10 mA
Max. interrupting rating, ohmic load		
	24 V DC	140 W
	48 V DC	20 W
	60 V DC	18 W
	110 V DC	23 W
	220 V DC	40 W
	250 V AC	1500 VA
General data		
Test voltage (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, IEC 62103
Connection data solid / stranded / AWG		0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14
Dimensions	W / H / D	6.2 mm / 80 mm / 56 mm

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[1])**		**2964500**	10

Accessories

Cover						
			D-DEK 1,5 GN		**2716949**	10
Insertion bridge, for middle and lower levels	No. of pos.	Color				
	80	blue	**EB 80- DIK BU**	26 A	**2715940**	1
	80	red	**EB 80- DIK RD**	26 A	**2715953**	1
	80	white	**EB 80- DIK WH**	26 A	**2715788**	1

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_{rms} electrical isolation of input and output
– Integrated input circuit

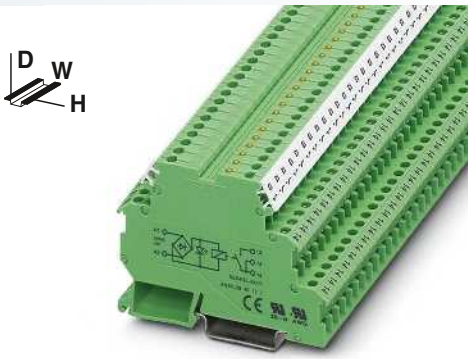
With this terminal block, "ALL" connections for a sensor or actuator are provided over a width of just 6.2 mm!

This means that 16 outputs take up a total constructional width of just 105.4 mm (including the power terminal block).

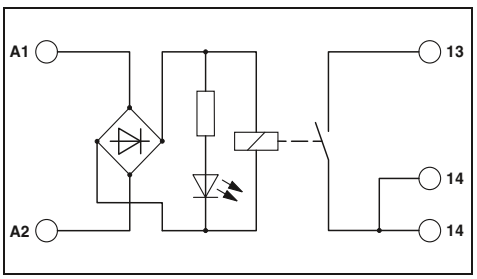
Advantages:

– Lower costs as the N terminal block is no longer required
– Wiring is reduced to a minimum
– Up to 73% more space

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.
For further EB...DIK... insertion bridges, refer to page 403
1) EMC: Class A product, see page 571

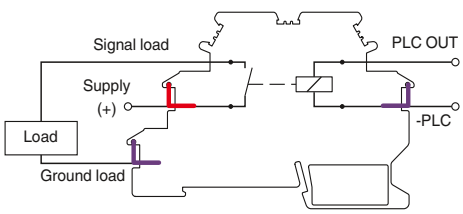


for small to medium loads
1 N/O contact (1)

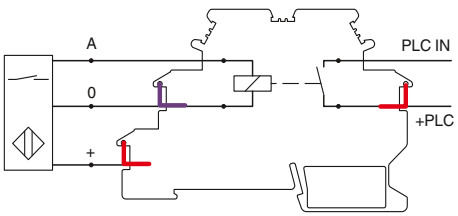


Technical data

		①	②
Input data			
Permissible range (with reference to U_N)		0.9 - 1.1	0.8 - 1.1
Typ. input current at U_N	[mA]	23	6.5
Response/release time at U_N	[ms]	8 / 15	5 / 15
Input protection:		Yellow LED, Bridge rectifier	
Output data			
Contact type		Double contact, 1 N/O contact	
Contact material		AgNi, hard gold-plated	
Max. switching voltage		250 V AC / 125 V DC	
Min. switching voltage		0.1 V	
Limiting continuous current		3 A (5 A up to 35°C at 24 V DC)	
Max. inrush current		5 A	
Min. switching current		1 mA	
Max. 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. 2 x 10^7 cycles	
Standards/regulations		IEC 60664, EN 50178, IEC 62103	
Connection data solid / stranded / AWG		0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 56 mm	



Pin configuration, DEK-REL-...AKT



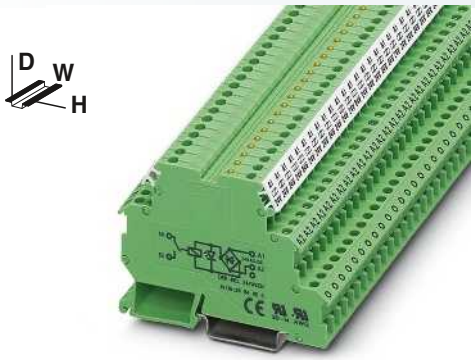
Pin configuration, DEK-REL-...SEN

Ordering data

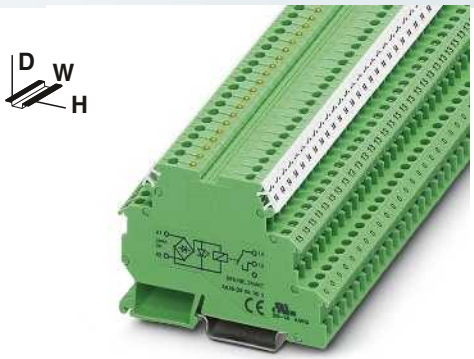
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Relay terminal block with miniature relay					
	①	5 V AC/DC	**DEK-REL- 5/I/1[1])**	**2941183**	10
	②	24 V AC/DC	**DEK-REL- 24/I/1[1])**	**2940171**	10

Accessories

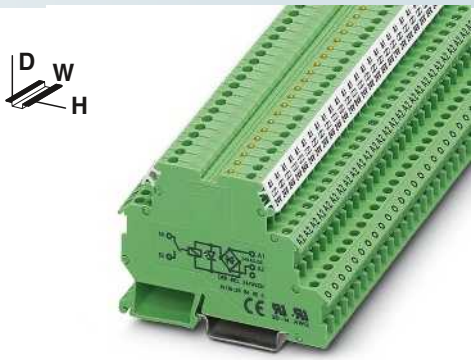
Terminal block, with three through contacts, for mounting on NS 35... For busbar feeding					
Cover			**D-DEK 1,5 GN**	**2716949**	10
Insertion bridge, for middle and lower levels	No. of pos.	Color			
	80	blue	**EB 80- DIK BU**	**2715940**	1
	80	red	**EB 80- DIK RD**	**2715953**	1
	80	white	**EB 80- DIK WH**	**2715788**	1



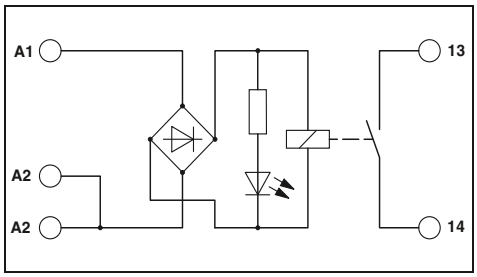
for small to medium loads
1 N/O contact (1)

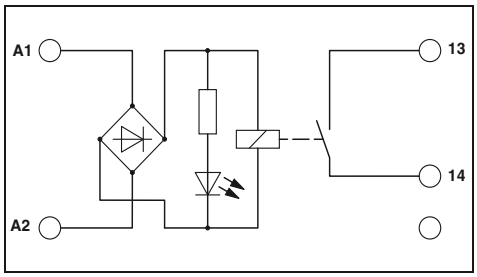


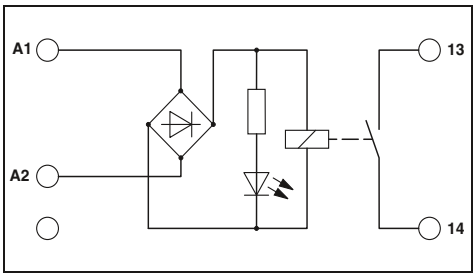
for small to medium loads
1 N/O contact (1)



for small to medium loads
1 N/O contact (1)







Technical data

①	②
0.9 -	0.8 -
1.1	1.1
23	6.5
8 / 15	5 / 15
Yellow LED, Bridge rectifier	
Double contact, 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	
2 kV AC (50 Hz, 1 min.)	
-20°C ... 50°C	
Approx. 2 x 10^7 cycles	
IEC 60664, EN 50178, IEC 62103	
0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14	
6.2 mm / 80 mm / 56 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
DEK-REL- 5/O/1[1])	**2941170**	10
DEK-REL- 24/O/1[1])	**2941154**	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

Technical data

①
0.8 -
1.1
6.5
5 / 15
Yellow LED, Bridge rectifier
Double contact, 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
2 kV AC (50 Hz, 1 min.)
-20°C ... 50°C
Approx. 2 x 10^7 cycles
IEC 60664, EN 50178, IEC 62103
0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14
6.2 mm / 80 mm / 56 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
DEK-REL- 24/1/AKT[1])	**2964063**	10

Accessories

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

Technical data

①
0.8 -
1.1
6.5
5 / 15
Yellow LED, Bridge rectifier
Double contact, 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
2 kV AC (50 Hz, 1 min.)
-20°C ... 50°C
Approx. 2 x 10^7 cycles
IEC 60664, EN 50178, IEC 62103
0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14
6.2 mm / 80 mm / 56 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
DEK-REL- 24/1/SEN[1])	**2964050**	10

Accessories

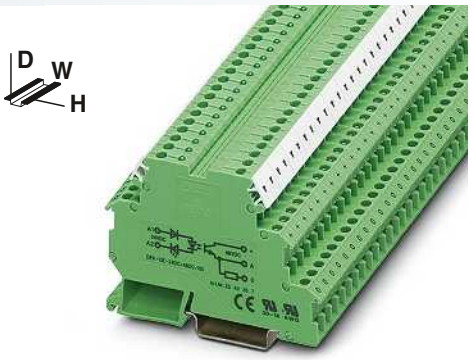
DIKD 1,5		**2715979**	50
D-DEK 1,5 GN		**2716949**	10
EB 80- DIK BU	26 A	**2715940**	1
EB 80- DIK RD	26 A	**2715953**	1
EB 80- DIK WH	26 A	**2715788**	1

DEK-OE... and DEK-OV... solid-state relay terminal blocks

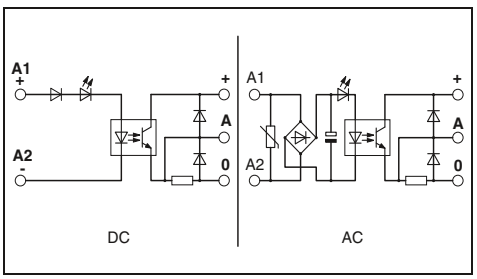
Phoenix Contact DEK-OE and DEK-OV interface terminal blocks are only 6.2 mm wide but still provide a complete input or output interface with:

– Electrical isolation between input and output at up to 2.5 kV_{rms}
– Integrated input circuit
– Status display
– EB-DIK insertion bridges
– Labeling and mounting with modular 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.

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
For further EB...DIK... insertion bridges, refer to page 403
1) EMC: Class A product, see page 571



with DC voltage output max. = 100 mA



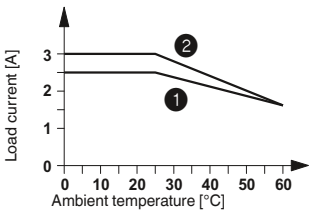
Technical data

Input data		①	②	③	④	⑤	⑥
Permissible range (with reference to U_N)		0.9 - 1.1	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.9 - 1.1	0.9 - 1.1
Switching level with reference to U_N	1 signal (“H”)	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.9
	0 signal (“L”)	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4
Typ. input current at U_N	[mA]	6.5	11	7	4	3.2	2.5
Transmission frequency f_{limit}	[Hz]	300	300	300	300	3	3
Input circuit AC		Yellow LED, Protection against polarity reversal, Surge protection					
Input circuit DC		Yellow LED, Protection against polarity reversal					

Output data	
Operating voltage range	3 V DC ... 48 V DC
Periodic peak reverse voltage	-
Limiting continuous current	100 mA
Min. load current	-
Surge current	-
Leakage current in off state	-
Max. load value	-
Output protection	Protection against polarity reversal, freewheeling diode
Voltage drop at max. limiting continuous current	≤ 0.9 V

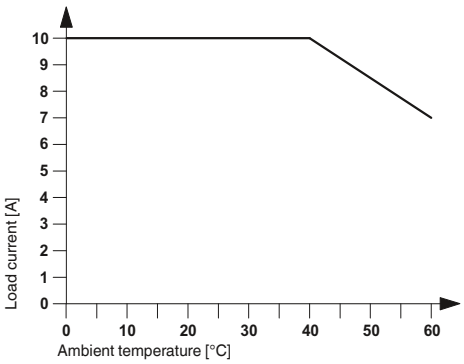
General data		
Test voltage input/output		2.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 60°C
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Pollution degree/surge voltage category		2 / III
Connection data solid / stranded / AWG		0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
Dimensions	W / H / D	6.2 mm / 80 mm / 56 mm

Derating curve for DEK-OV...24DC/3 and DEK-OV-24DC/24DC/3/AKT

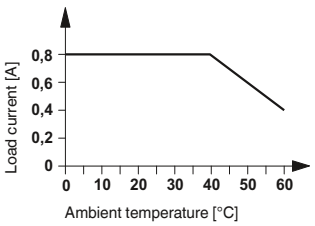


❶ Horizontal mounting
❷ Vertical mounting

Derating curve for DEK-OV-24DC/24DC/10



Derating curve for DEK-OV...240AC/800

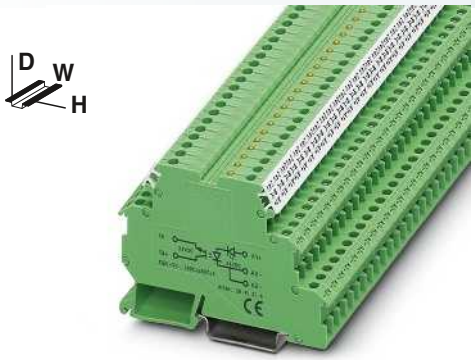


Ordering data

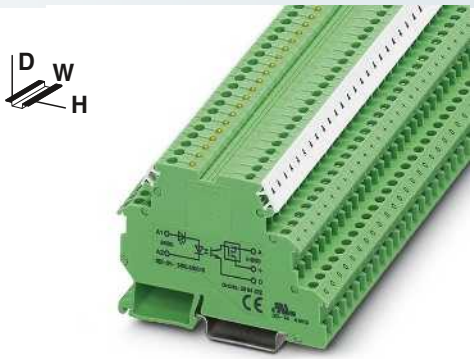
Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Solid-state input relays					
	①	5 V DC	**DEK-OE- 5DC/ 48DC/100[1])**	**2940223**	10
	②	12 V DC	**DEK-OE- 12DC/ 48DC/100[1])**	**2964487**	10
	③	24 V DC	**DEK-OE- 24DC/ 48DC/100[1])**	**2940207**	10
	④	60 V DC	**DEK-OE- 60DC/ 48DC/100[1])**	**2941536**	10
	⑤	120 V AC	**DEK-OE-120AC/ 48DC/100**	**2941659**	10
	⑥	230 V AC	**DEK-OE-230AC/ 48DC/100**	**2940210**	10
Solid-state power relays					
	①	5 V DC			
	②	12 V DC			
	③	24 V DC			
Actuator principle	⑦	24 V DC			

Accessories

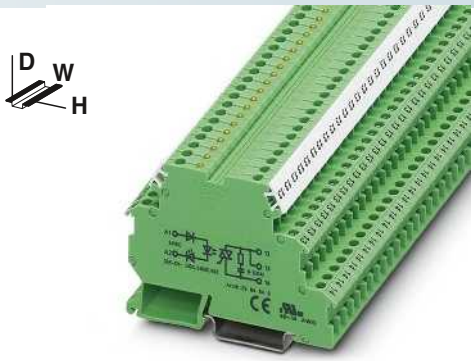
Insertion bridge, for middle and lower levels	No. of pos.	Color				
	80	blue	**EB 80- DIK BU**	26 A	**2715940**	1
	80	red	**EB 80- DIK RD**	26 A	**2715953**	1
	80	white	**EB 80- DIK WH**	26 A	**2715788**	1



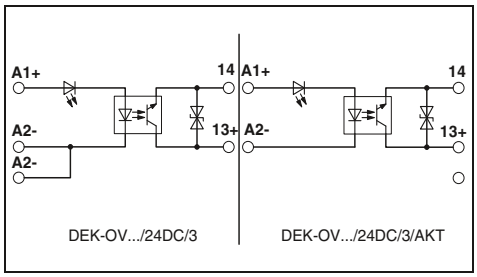
with DC voltage output
max. = 3 A

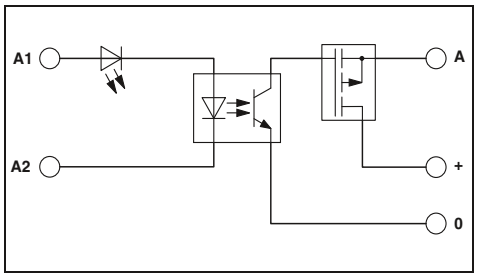


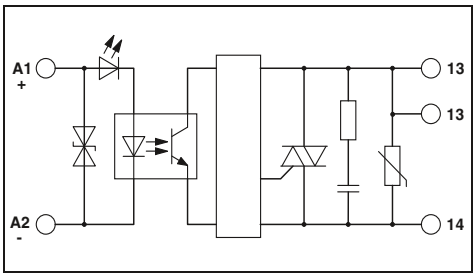
with DC voltage output
max. = 10 A



with AC voltage output
max. = 800 mA







Technical data

①	②	③	⑦
0.8 -	0.8 -	0.8 -	0.8 -
1.2	1.2	1.2	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

Yellow LED, Protection against polarity reversal

	3 V DC ... 30 V DC
	-
	3 A (see derating curve)
	-
	-
	-
	-
	Protection against polarity reversal, Surge protection
	≤ 0.2 V
	2.5 kV (50 Hz, 1 min.)
	-20°C ... 60°C
	IEC 60664, EN 50178, IEC 62103
	2 / III
	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
	6.2 mm / 80 mm / 56 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
DEK-OV- 5DC/ 24DC/ 3[1])	**2941361**	10
DEK-OV- 12DC/ 24DC/ 3[1])	**2941387**	10
DEK-OV- 24DC/ 24DC/ 3[1])	**2941374**	10
DEK-OV- 24DC/ 24DC/ 3/AKT	**2964296**	10

Accessories

EB 80- DIK BU	26 A	**2715940**	1
EB 80- DIK RD	26 A	**2715953**	1
EB 80- DIK WH	26 A	**2715788**	1

Technical data

①	②	③
0.8 -	0.8 -	0.8 -
1.2	1.2	1.2
≥ 0.8	≥ 0.8	≥ 0.8
≤ 0.4	≤ 0.4	≤ 0.4
5.1	4.7	3.5
100	100	100

Yellow LED, Protection against polarity reversal, Surge protection

	5 V DC ... 30 V DC
	-
	10 A (see derating curve)
	-
	100 A (t = 20 ms)
	-
	-
	Protection against polarity reversal, Surge protection
	< 50 mV
	2.5 kV (50 Hz, 1 min.)
	-20°C ... 60°C
	IEC 60664, EN 50178, IEC 62103
	2 / III
	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
	6.2 mm / 80 mm / 56 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
DEK-OV- 5DC/ 24DC/ 10[1])	**2961752**	10
DEK-OV- 12DC/ 24DC/ 10[1])	**2961749**	10
DEK-OV- 24DC/ 24DC/ 10[1])	**2964322**	10

Accessories

EB 80- DIK BU	26 A	**2715940**	1
EB 80- DIK RD	26 A	**2715953**	1
EB 80- DIK WH	26 A	**2715788**	1

Technical data

①	②	③
0.8 -	0.8 -	0.8 -
1.2	1.2	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, Protection against polarity reversal, Surge protection

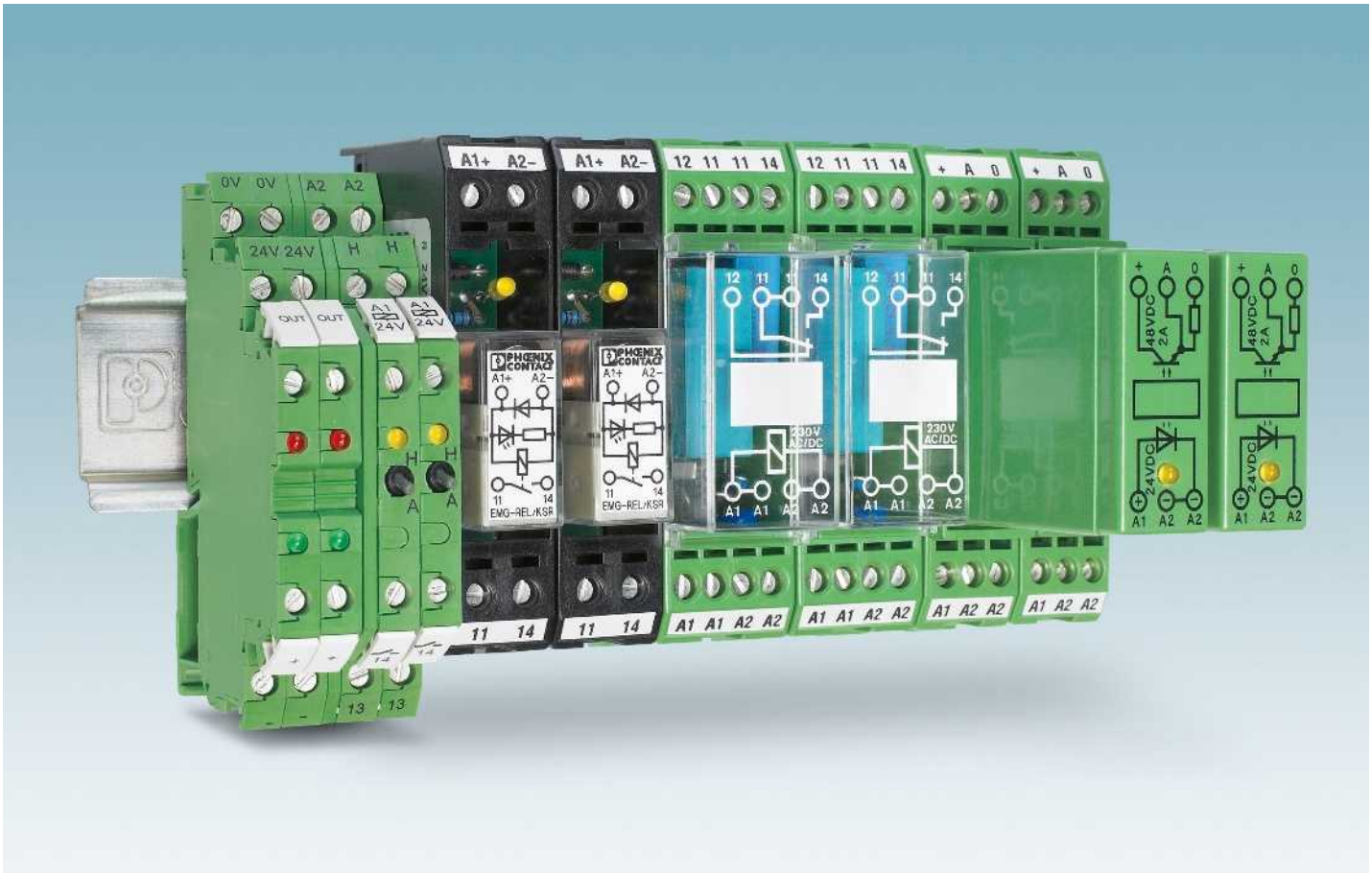
	10 V AC ... 253 V AC (50/60 Hz)
	600 V
	0.8 A (see derating curve)
	10 mA
	30 A (t = 10 ms)
	1.2 mA
	4.5 A²s
	RCV circuit
	≤ 1 V
	2.5 kV (50 Hz, 1 min.)
	-20°C ... 60°C
	IEC 60664, EN 50178, IEC 62103
	2 / III
	0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
	6.2 mm / 80 mm / 56 mm

Ordering data

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

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 functions "Manual", "0", "Automatic" are provided in a 6.2 mm narrow relay terminal block.

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 consumers 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 relay

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 of the type that occur with, for example, incremental encoders.

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.

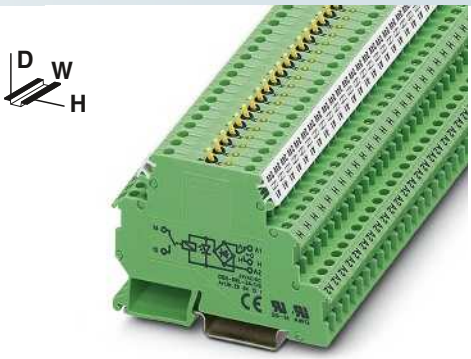
Relay module with manual switch

Relay module with manual switch and integrated power relay for manual, zero, and automatic functions

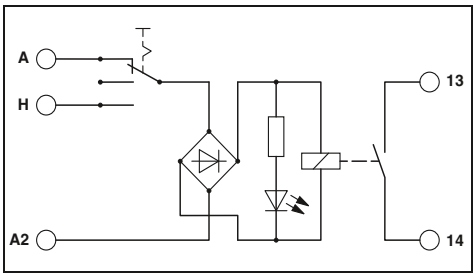
The advantages:

– Max. 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

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
1) EMC: Class A product, see page 571



Relay module with manual switch and integrated relay



Technical data

Input data		①
Permissible range (with reference to U_N)		0.8 - 1.1
Typ. input current at U_N	[mA]	6.5
Response/release time at U_N	[ms]	5 / 15
Input protection:		Yellow LED, Bridge rectifier
Output data		
Contact type		Double contact, 1 N/O contact
Contact material		AgNi, hard gold-plated
Max. switching voltage		250 V AC / 125 V DC
Min. switching voltage		0.1 V
Limiting continuous current		3 A (5 A up to 35°C at 24 V DC)
Max. inrush current		5 A
Min. switching current		1 mA
Max. 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. 2 x 10^7 cycles
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Connection data solid / stranded / AWG		0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14
Dimensions	W / H / D	6.2 mm / 80 mm / 61 mm

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**[1]	**2964131**	10

Accessories

Cover			**D-DEK 1,5 GN**	**2716949**	10
Insertion bridge	No. of pos.	Color			
	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
	80	white	**EB 80- DIK WH**	**2715788**	1

Relay modules with interference current filter

Relay and solid-state relay modules 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:

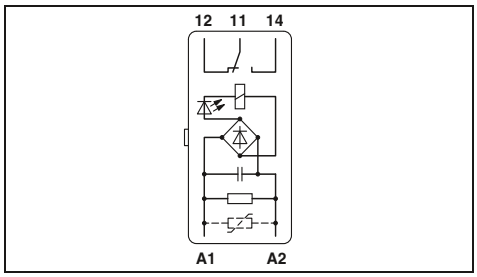
– Applications with long control lines
– Use of AC output boards, resulting in residual AC currents

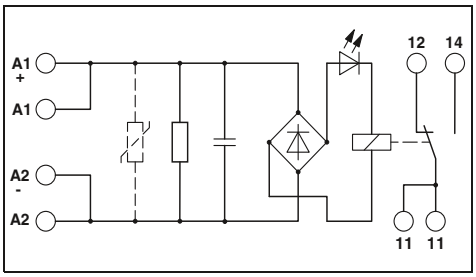
Notes:

Load current diagrams, see page 347

1 PDT, plug-in relay

1 PDT, soldered-in relay





Technical data

Input data		①	②	③
Permissible range (with reference to U_N)		0.9 - 1.1	0.85 - 1.1	0.9 - 1.1
Typ. input current at U_N	[mA]	26	19	18
Response/release time at U_N	[ms]	8 / 10	8 / 11	10 / 8
Input protection:		Yellow LED, Bridge rectifier, Surge protection		

Output data			
Contact type		Single contact, 1-PDT	Double contact, 1 PDT
Contact material		AgNi	Au
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Limiting continuous current		6 A	0.5 A
Max. inrush current		8 A	0.2 A
Max. interrupting rating, ohmic load			
	24 V DC	140 W	5 W
	48 V DC	60 W	-
	60 V DC	45 W	-
	110 V DC	35 W	-
	220 V DC	55 W	-
	250 V AC	1500 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. 2 x 10^7 cycles
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Connection data solid / stranded / AWG		- / - / -
Dimensions	W / H / D	20.8 mm / 42.5 mm / 112 mm

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Relay module with power contact relay				
①	24 V AC	**ST-REL3-KG 24/21/SO46**	**2826091**	10
②	120 V AC	**ST-REL3-KG120/21/SO46**	**2833026**	10
③	230 V AC	**ST-REL3-KG230/21/SO46**	**2832027**	10
Relay module with multi-layer contact relay				
①	24 V AC	**ST-REL3-KG 24/21/AU/SO46**	**2826981**	10
②	120 V AC	**ST-REL3-KG120/21/AU/SO46**	**2829797**	10
③	230 V AC	**ST-REL3-KG230/21/AU/SO46**	**2826266**	10

Accessories

Basic terminal block, complete with end cover	**URELG 3**	**2820136**	10
Equipment marker			

Technical data

Input data	③
Permissible range (with reference to U_N)	0.9 - 1.1
Typ. input current at U_N	18
Response/release time at U_N	10 / 8
Input protection:	Yellow LED, Bridge rectifier, Surge protection

Output data		
Contact type	Single contact, 1-PDT	Double contact, 1 PDT
Contact material	AgNi	AgPd60, hard gold-plated
Max. switching voltage	250 V AC/DC	30 V AC / 36 V DC
Limiting continuous current	6 A	0.5 A
Max. inrush current	8 A	0.2 A
Max. interrupting rating, ohmic load		
24 V DC	95 W	5 W
48 V DC	50 W	-
60 V DC	45 W	-
110 V DC	35 W	-
220 V DC	55 W	-
250 V AC	1500 VA	-

General data	
Test voltage (winding / contact)	2.5 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 40°C
Mechanical service life	Approx. 2 x 10^7 cycles
Standards/regulations	IEC 60664, EN 50178, IEC 62103
Connection data solid / stranded / AWG	0.2 - 4 mm^2 / 0.2 - 2.5 mm^2 / 24 - 12
Dimensions	22.5 mm / 75 mm / 62.5 mm

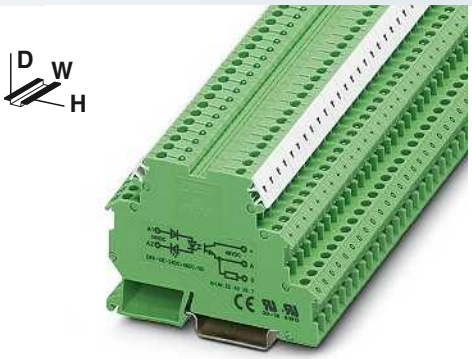
Ordering data

Type	Order No.	Pcs. / Pkt.
EMG 22-REL/KSR-230/21/ SO46	**2940760**	10
EMG 22-REL/KSR-230/21/AU/SO46	**2940061**	10

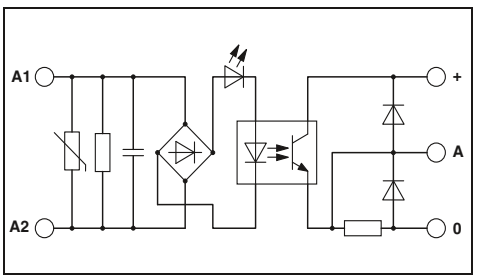
Accessories

EMG-GKS 12	**2947035**	50

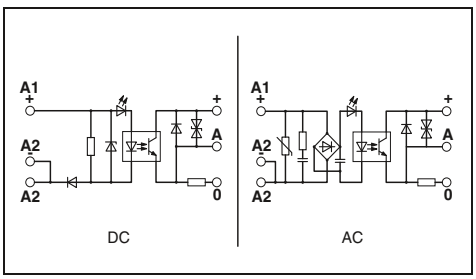
Notes:
Type of housing: **ST-REL:** Polyamide non-reinforced PA, color: bottom part gray, hood green **EMG:** Polyamide fiber reinforced PA-F, color: green. **DEK:** Polyamide non-reinforced PA, color: green.
Marking systems and mounting material See Catalog 5
For derating curve, refer to page 345
1) EMC: Class A product, see page 571



Solid-state input relay
100 mA, maximum



Solid-state power relay
Max. 2 A



Technical data

		②
Input data		
Permissible range (with reference to U_N)		0.9 - 1.1
Switching level	1 signal ("H") [V DC] ≥	207
	0 signal ("L") [V DC] ≤	92
Typ. input current at U_N	[mA]	2.5
Typ. switch-on time at U_N	[ms]	4.4
Typ. 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
Min. switching voltage		3 V DC
Limiting continuous current		100 mA
Max. inrush current		-
Output circuit		3-conductor, ground-referenced
Output protection		Protection against polarity reversal, Free running
Voltage drop at max. limiting continuous current		≤ 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, IEC 62103
Pollution degree/surge voltage category		2 / III
Mounting position/mounting		Any / In rows with zero spacing
Connection data solid / stranded / AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions	W / H / D	6.2 mm / 80 mm / 56 mm

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Solid-state power relays				
①	24 V DC			
②	230 V AC	**DEK-OE-230AC/ 48DC/100/SO 46**	**2964678**	10

Accessories

Equipment marker		

Technical data

		①
Input data		
Permissible range (with reference to U_N)		0.8 - 1.2
Switching level	1 signal ("H") [V DC] ≥	16.8
	0 signal ("L") [V DC] ≤	16
Typ. input current at U_N	[mA]	8
Typ. switch-on time at U_N	[ms]	0.02
Typ. switch-off time at U_N	[ms]	0.2
Transmission frequency f_{limit}	[Hz]	300
Input circuit AC		
Input circuit DC		Protection against polarity reversal
Output data		
Max. switching voltage		48 V DC
Min. switching voltage		12 V DC
Limiting continuous current		2 A (see derating curve)
Max. inrush current		5 A (t = 1 s)
Output circuit		3-conductor, ground-referenced
Output protection		Protection against polarity reversal, Surge protection
Voltage drop at max. limiting continuous current		1.1 V
General data		
Test voltage input/output		3.5 kV AC
Ambient temperature (operation)		-10°C ... 55°C
Standards/regulations		IEC 60664, EN 50178, IEC 62103
Pollution degree/surge voltage category		2 / III
Mounting position/mounting		- / Mounted in rows with zero spacing: Horizontal/not in rows: Any
Connection data solid / stranded / AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions	W / H / D	17.5 mm / 75 mm / 102 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
EMG 17-OV- 24DC/ 48DC/2[1])	**2942810**	10

Accessories

EMG-GKS 12	**2947035**	50

Relay modules for high inrush currents

The Phoenix Contact relay modules of the type SO 38 have been designed for switching electrical equipment with high inrush currents.

Areas of application are:

– 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 model, 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:

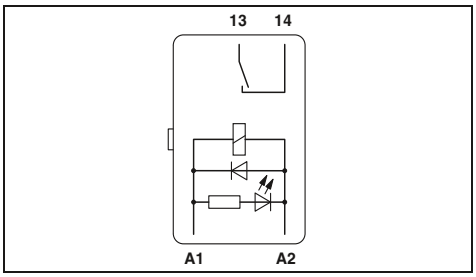
– Modular EMG rail-mountable housing with a design width of 17.5 mm
– Convenient ST-REL plug-in housing from the Phoenix ST series for mounting on the URELG or UDK-RELG basic terminal blocks.

Further features are:

– Snap-on mounting on the common EN rails
– Easy maintenance
– Clear labeling of the terminal blocks using Phoenix Contact marking material.

Notes:
Type of housing: Polycarbonate fiber reinforced PC-F, color: green or black.
Marking systems and mounting material See Catalog 5

medium to large loads
1 N/O contact (1)



Technical data

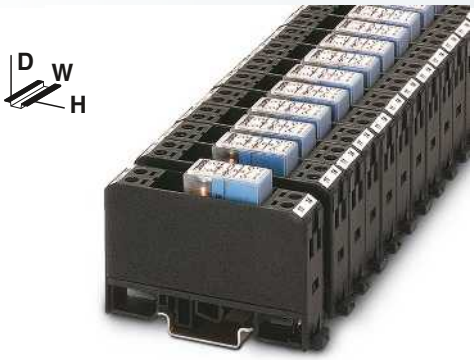
Input data		①
Permissible range (with reference to U_N)		0.85 - 1.1
Typ. input current at U_N	[mA]	28
Response/release time at U_N	[ms]	13 / 15
Input protection:		Yellow LED, freewheeling diode
Output data		
Contact type		1 N/O contact with lead contact
Contact material		AgCdO
Max. switching voltage		250 V AC
Limiting continuous current		10 A
Max. inrush current		80 A (20 ms)
Max. 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. 10^7 cycles
Standards/regulations		IEC 60664, EN 50178, IEC 62103
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

Ordering data

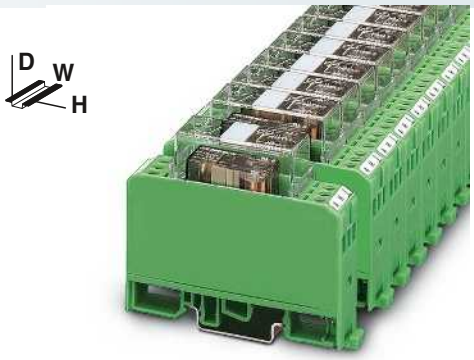
Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Relay module with power contact relay + wolfram lead contact				
①	24 V DC	**ST-REL3-KG 24/ 1/SO38**	**2829564**	10
Relay module with power contact relay, with two inputs for manual, automatic				
①	24 V DC			

Accessories

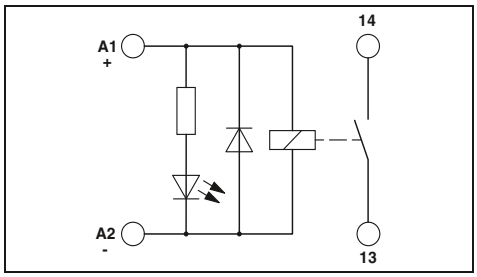
Basic terminal block, complete with end cover	**URELG 3**	**2820136**	10
Equipment marker			

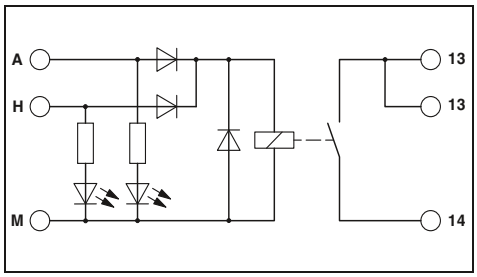


medium to large loads
1 N/O contact (1)



medium to large loads
1 N/O contact (1)





Technical data

①	
0.85 -	0.9 -
1.1	1.1
28	23
13 / 15	9 / 10
Yellow LED, freewheeling diode	Automatic: Yellow LED, Manual: Red LED, freewheeling diode, Protection against polarity reversal
1 N/O contact with lead contact	Single contact, 1 N/O contact
AgCdO	AgSnO
250 V AC	250 V AC/DC
10 A	10 A
80 A (20 ms)	120 A (20 ms)
-	240 W
-	120 W
-	85 W
-	70 W
-	90 W
2500 VA	2500 VA
4 kV AC (50 Hz, 1 min.)	4 kV AC (50 Hz, 1 min.)
-20°C ... 50°C	-20°C ... 50°C
Approx. 10^7 cycles	3 x 10^7 cycles
IEC 60664, EN 50178, IEC 62103	IEC 60664, EN 50178, IEC 62103
Any	Any
0.2 - 4 mm^2 / 0.2 - 2.5 mm^2 / 24 - 12	0.2 - 4 mm^2 / 0.2 - 2.5 mm^2 / 24 - 12
17.5 mm / 75 mm / 62.5 mm	17.5 mm / 75 mm / 62.5 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
EMG 17-REL/KSR-G 24/SO38 BK	**2949994**	10

Accessories

EMG-GKS 12	**2947035**	50

Ordering data

Type	Order No.	Pcs. / Pkt.
EMG 17-REL/KSR-G 24/2E/SO38	**2941646**	10

Accessories

EMG-GKS 12	**2947035**	50

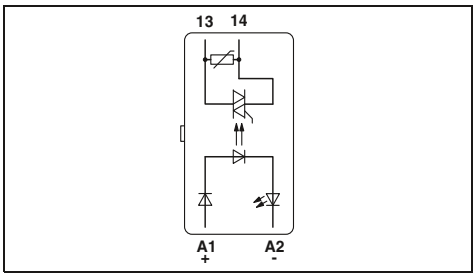
ST-OV 3 plug-in solid-state power relays

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

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



Technical data

Input data		①
Switching level with reference to U_N	1 signal (“H”)	≥ 0.8
	0 signal (“L”)	≤ 0.4
Typ. input current at U_N	[mA]	7
Transmission frequency f_{limit}	[Hz]	10
Input protection:		Yellow LED, Protection against polarity reversal, 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)
Min. load current		50 mA
Surge current		125 A (t = 10 ms)
Residual voltage drop at “H”		≤ 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, IEC 62103
Pollution degree/surge voltage category		2 / III
Mounting position/mounting		Horizontal DIN rail / -
Dimensions	W / H / D	20.8 mm / 42.5 mm / 112 mm

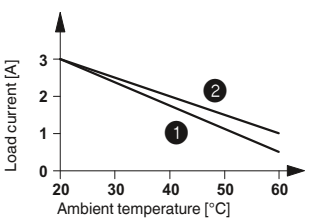
Ordering data

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

Derating curve for ST-OV 3-24DC/400AC/3



❶ Aligned without spacing
❷ Aligned with ≥ 20 mm spacing

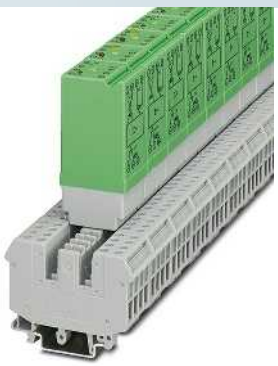
ST-OV 4-24DC/24DC/...-PRO power protection circuit solid-state relay with signal logic

The ST-OV 4-...PRO provides protection and monitoring functions that are otherwise only known from thermomagnetic protection elements.

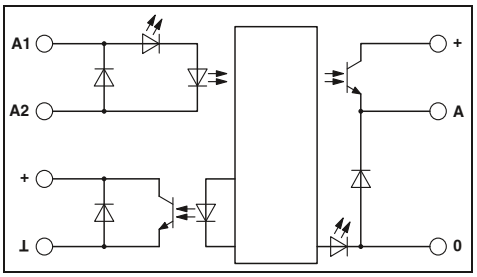
The PROtect modules have the following features:

– Fast disconnection with short-circuits 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 a line break 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 5
For load current diagram, see page 347
Derating curve, time/current characteristic curves, and state diagram, see page 347



with short-circuit-proof DC voltage output max. = 1 A or 4 A



Technical data

Input data		ST-OV4- 24DC/ 24DC/1-PRO	ST-OV4- 24DC/ 24DC/4-PRO
Operating voltage		24 V DC ±50%	
Switching level	1 signal (“H”)	8.5 V DC	
	0 signal (“L”)	5 V DC	
Typ. input current at U_N		6.5 mA	
Transmission frequency f_{limit}		100 Hz	
Reset period after short-circuit / overload shut down		1 ms	
Input circuit		Yellow LED, Polarity protection diode	
Output data signaling contact / CONTROL			
Operating voltage range		5 V DC ... 36 V DC	
Limiting continuous current		50 mA	
Residual voltage drop at “H”		≤ 1.5 V	
Output protection		Polarity protection diode	
Output circuit		3-conductor, ground-referenced	
Output data load contact			
Operating voltage range		18 V DC ... 36 V DC	
Limiting continuous current		1 A (see derating curve)	4 A (see derating curve)
Min. load current		1 mA	
Residual voltage drop at “H”		300 mV	200 mV
Open circuit alarm with load current		< 100 µA	
Overload disconnection (~ 1.4 x continuous current)		≤ 100 ms (See the time-current characteristic curve)	
Short-circuit disconnection		< 200 µs (See the time-current characteristic curve)	
Current limitation at short-circuits		Approx. 25 A	Approx. 70 A
Switching time t_{in} /t_{out}		300 µs / 700 µs	
Output protection		Red LED, Damping diode	
Output circuit		3-conductor, ground-referenced	
General data			
Test voltage input/output		2.5 kV AC	
Test voltage output/output		2.5 kV AC	
Rated surge voltage		Basic insulation	
Ambient temperature (operation)		0°C ... 60°C	
Standards/regulations		IEC 60664 / EN 50178 / IEC 62103	
Screw connection solid / stranded / AWG		0.2 - 4 mm² / 0.2 - 4 mm² / 24 - 12	
Dimensions	W / H / D	27 mm / 63.5 mm / 114 mm	

Ordering data

Description	Output current	Type	Order No.	Pcs. / Pkt.
Power circuit breaker solid-state relay, with signal logic				
	1 A	**ST-OV4- 24DC/ 24DC/1-PRO**	**2905572**	10
	4 A	**ST-OV4- 24DC/ 24DC/4-PRO**	**2905585**	10

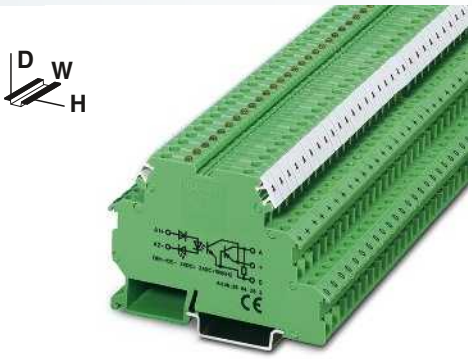
Accessories

Basic terminal block, complete with end cover	**UDK-RELG 4**	**2777056**	10

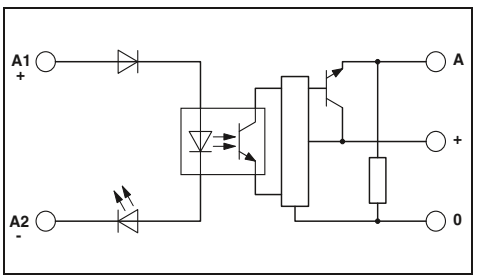
DEK-OE 100 kHz input solid-state relay

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 5
1) EMC: Class A product, see page 571



with DC voltage output
Transmission frequency 100 kHz

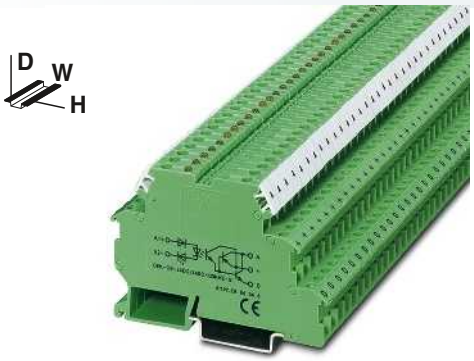


Technical data

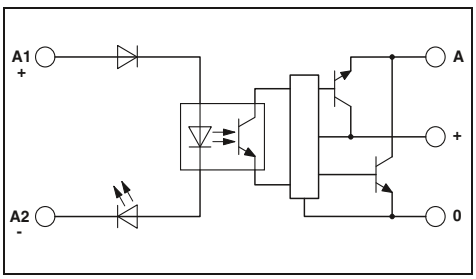
Input data		①	②
Permissible range (with reference to U_N)		0.8 - 1.2	0.8 - 1.2
Switching level with reference to U_N	1 signal (“H”)	≥ 0.8	≥ 0.8
	0 signal (“L”)	≤ 0.4	≤ 0.4
Typ. input current at U_N	[mA]	7	6
Typ. switch-on time at U_N	[µs]	1.5	1.5
Typ. switch-off time at U_N	[µs]	2	2
Transmission frequency f_{limit}	[kHz]	100	100
Input protection:		Yellow LED, Protection against polarity reversal, 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 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, IEC 62103	
Pollution degree/surge voltage category		2 / II	
Connection data solid / stranded / AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12	
Dimensions	W / H / D	6.2 mm / 80 mm / 56 mm	

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[1])**	**2964270**	10
	②	24 V DC	**DEK-OE- 24DC/ 24DC/100KHZ[1])**	**2964283**	10



with DC voltage output push-pull
Transmission frequency 100 kHz



Technical data

①	②
0.5 -	0.8 -
1.2	1.2
≥ 0.5	≥ 0.8
≤ 0.3	≤ 0.4
8	8
1	1
2	2
100	100

Yellow LED, Protection against polarity reversal, Surge protection

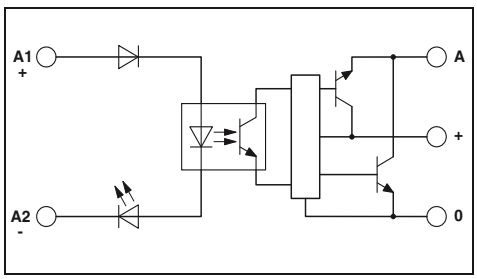
4 V DC ... 18 V DC
50 mA
8.5 mA
≤ 1.2 V DC
3-conductor push-pull, ground referenced
Surge protection

2.5 kV AC
-20°C ... 60°C
IEC 60664, EN 50178, IEC 62103
2 / II
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
6.2 mm / 80 mm / 56 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
DEK-OE- 5DC/ 5DC/100KHZ-G[1])	**2964542**	10
DEK-OE- 24DC/ 5DC/100KHZ-G[1])	**2964364**	10

with DC voltage output push-pull
Transmission frequency 100 kHz



Technical data

①	②
0.5 -	0.8 -
1.2	1.2
≥ 0.5	≥ 0.8
≤ 0.3	≤ 0.4
8	8
1	1
2	2
100	100

Yellow LED, Protection against polarity reversal, 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, IEC 62103
2 / II
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
6.2 mm / 80 mm / 56 mm

Ordering data

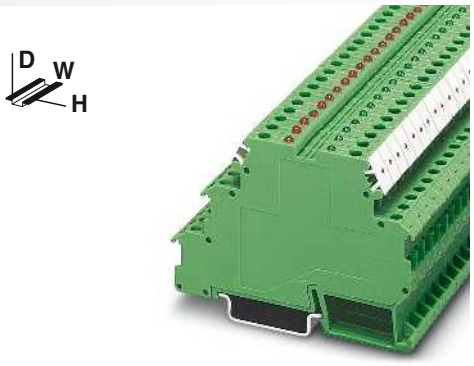
Type	Order No.	Pcs. / Pkt.
DEK-OE- 5DC/ 24DC/100KHZ-G[1])	**2964555**	10
DEK-OE- 24DC/ 24DC/100KHZ-G[1])	**2964348**	10

Electronic sensor terminal block for NAMUR proximity sensors

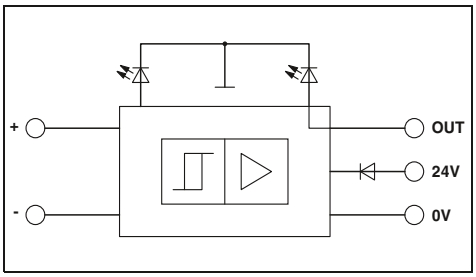
The EIK 1-SVN 24-P electronic sensor terminal block from Phoenix Contact converts the changeable resistance of a NAMUR sensor unit into a digital signal that can be read by all PLCs.

– 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 5
1) EMC: Class A product, see page 571



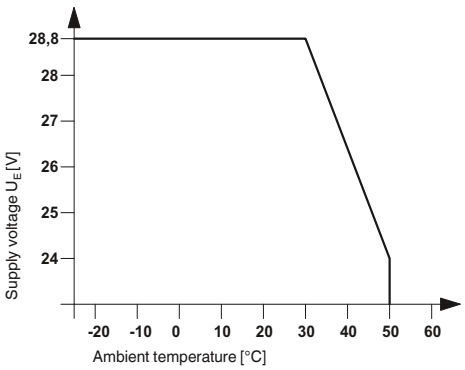
For inductive proximity sensors according to NAMUR



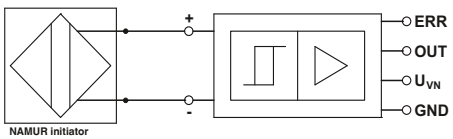
Technical data

Supply	
Input supply nominal voltage U_{VN}	18.5 V DC ... 28.8 V DC (U_{VN}, see derating curve)
Ripple	according to DIN 19240
Current consumption I_{Imax}	70 mA (at 50 mA output current)
Input circuit	Green LED, Polarity protection diode
Control circuit	
Non-load voltage	8.2 V DC ±10%
Switching points in accordance with EN 60947-5-6:	≥ 2.1 mA (In conductive state) ≤ 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)
Switching hysteresis	Approx. 0.2 mA
Internal resistance	Approx. 1 kΩ
Output protection	visual short-circuit and wire break control with LED (red), 12 V Zener diode
Signal output	
Max. output current I_{Omax}	50 mA
Residual voltage U_R with I_{Omax}	≤ 1.5 V (U_R)
Output voltage U_O	≤ 100 mV (In conductive state) (U_{VN} - U_R;in blocking state)
Output protection	36 V Zener diode as freewheeling diode
General data	
Ambient temperature (operation)	-25°C ... 50°C
Transmission frequency (INPUT/OUTPUT)	1 kHz
Input pulse length	≥ 0.5 ms
Input pause length	≥ 0.5 ms
Standards/regulations	IEC 60664, EN 61000-6-2, EN 61000-6-4
Pollution degree / Surge voltage category	2 / III
Screw connection solid / stranded / AWG	0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions W / H / D	6.2 mm / 80 mm / 56 mm

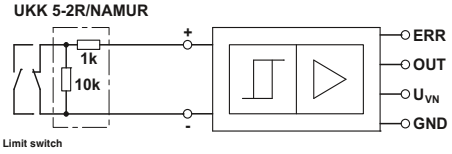
Derating curve for EIK 1-SVN 24 P



Application 1



Application 2



Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Switching amplifier electronic terminal block, for inductive proximity initiators as per NAMUR, with light indicators for sensor signal and faults	**EIK1-SVN-24P[1])**	**2940799**	10

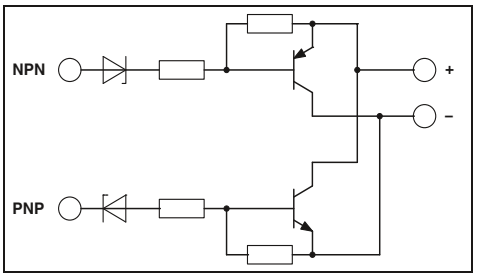
Accessories

Terminal block, with three through contacts, for mounting on NS 35...	**DIKD 1,5**	**2715979**	50
Double-level terminal block, with pre-assembled resistors	**UKK 5-2R/NAMUR**	**2941662**	50
Insertion bridge	**EB...-DIK...** **Ordering data at DEK-REL...**		

DEK-TR/INV inverter module

The Phoenix Contact DEK-TR/INV inverter module inverts the signals of ground switching NPN transistor outputs into positive switching PNP outputs, and vice versa (see application example).

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5



Technical data

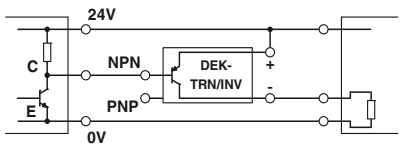
Supply voltage		20 V DC ... 30 V DC (U_V)
Continuous current		200 mA
Residual voltage drop		< 1 V
Leakage current		< 1 mA
Max. transmission frequency		15 kHz
NPN input/PNP output		
Switch-on threshold		< 5 V (at U_V = 24 V; < (U_V - 19 V))
Switch-off threshold		> 15 V (at U_V = 24 V; > (U_V - 9 V))
Min. limit values		-2 V
Max. 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
Min. limit values		-2 V
Max. 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
Pollution degree / Surge voltage category		2 / II
Screw connection solid / stranded / AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions	W / H / D	6.2 mm / 80 mm / 56 mm

Ordering data

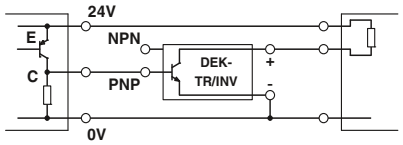
Description	Type	Order No.	Pcs. / Pkt.
Inverter module	**DEK-TR/INV**	**2964319**	10

Connection examples:

NPN output **Load**



PNP output **Load**



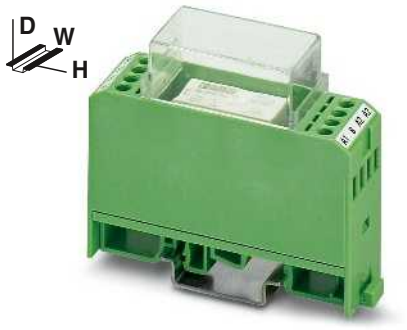
Hybrid relay modules

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.

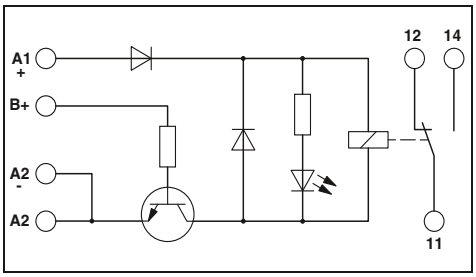
The advantages:

– 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 fiber reinforced PC-F, color: green.
Marking systems and mounting material See Catalog 5
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.
1) EMC: Class A product, see page 571



Positive switching hybrid relay



Technical data

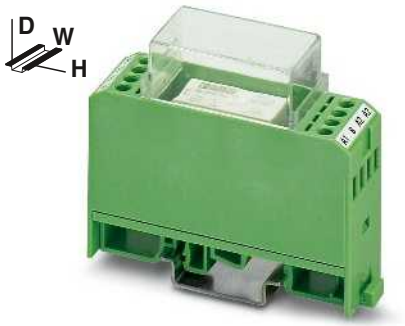
Input data		①	②	③
Relay supply voltage U_N ±10%	[V DC]	24	24	24
Min. control voltage	[V DC]	2.7	5	15
Max. control voltage	[V DC]	5.25	13.2	35
Min. control current	[mA]	2.6	0.5	0.5
Max. control current	[mA]	7.7	1	1
Typ. input current at U_N	[mA]	21	21	21
Response/release time at U_N	[ms]	9 / 10	9 / 10	9 / 10
Input protection:		Yellow LED, Protection against polarity reversal, 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		
Max. inrush current		8 A		
Max. 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 x 10^7 cycles		
Standards/regulations		IEC 60664, EN 50178, IEC 62103		
Pollution degree/surge voltage category		2 / III		
Connection data solid / stranded / AWG		0.2 - 4 mm^2 / 0.2 - 2.5 mm^2 / 24 - 12		
Dimensions	W / H / D	22.5 mm / 75 mm / 62.5 mm		

Ordering data

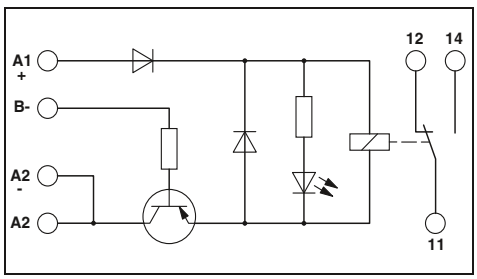
Description	Nominal control voltage	Type	Order No.	Pcs. / Pkt.
Relay module with miniature power contact relay with integrated NPN transistor control, for low control currents				
	① 5 V DC	**EMG 22-REL/KSR-G 24/TRN 5[1])**	**2949787**	10
	② 12 V DC	**EMG 22-REL/KSR-G 24/TRN12[1])**	**2952363**	10
	③ 24 V DC	**EMG 22-REL/KSR-G 24/TRN35[1])**	**2952350**	10
Relay module with miniature power contact relay with integrated PNP transistor control, for low control currents				
	① 5 V DC			
	② 12 V DC			
	③ 24 V DC			

Accessories

Equipment marker	**EMG-GKS 12**	**2947035**	50



Negative switching hybrid relay



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, Protection against polarity reversal, 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. 5 x 10^7 cycles
IEC 60664, EN 50178, IEC 62103
2 / III
0.2 - 4 mm^2 / 0.2 - 2.5 mm^2 / 24 - 12
22.5 mm / 75 mm / 62.5 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
EMG 22-REL/KSR-G 24/TRP 5[1])	**2949790**	10
EMG 22-REL/KSR-G 24/TRP12[1])	**2952156**	10
EMG 22-REL/KSR-G 24/TRP35[1])	**2952169**	10

Accessories

EMG-GKS 12	**2947035**	50

DO32
VARIOFACE
Professional

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.

Interface cabling reduces assembly costs by using plug-in components to carry out wiring quickly, clearly, and without errors.

The new interface modules in the VIP - VARIOFACE Professional series, which feature a modern housing design, offer the following advantages:

– Space-saving
– Vibration resistant up to 5g thanks to metal feet
– Reliable connection technology, either with screw or push-in connections
– Wide range of marking options

VIP modules are available for both product segments:

VARIOFACE system cabling is a cabling concept that has been specially developed to allow connection to the I/O modules of a wide range of automation devices.

The VIP series is rounded off by new front adapters with encapsulated system cables for the SIMATIC S7 300.

VARIOFACE wiring interfaces are suitable for universal use. Various VIP - VARIOFACE Professional modules with a 1:1 connection from a high-position plug-in connector to a different connection technology are available. The encapsulated system cables provide an effective and efficient means of establishing a connection to a control device with protection against polarity reversal.

A variety of potential distributors are available for splitting the control and operating voltage.

Product range overview

Introduction to VARIOFACE system cabling 418

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With DIN strips 540
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With RJ45 plug-in connectors 546
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VIP potential distributors 548

Active interface modules
For relay couplers/optocouplers 550
For solid-state relays 553
Accessories (relays, optocouplers) 554

A large part of the costs incurred in automation systems today results from the cabling for the actuators and signaling units. On top of this, machines and systems are becoming more and more complex, which means that the cabling costs for the input and output stations are also steadily on the increase. In addition to cabling material costs, the costs associated with planning, assembly, startup, and documentation must also be considered.

VARIOFACE system cabling is a system concept that reduces manufacturing costs through fast, error-free, and uniform wiring of the input and output signals of a PLC.

The system design comprises three components:

– VARIOFACE front adapters
– VARIOFACE system cables
– VARIOFACE termination board

VARIOFACE system cabling is available for controllers from:

– ABB
– Allen-Bradley
– Emerson
– Honeywell
– GE Fanuc
– Mitsubishi Electric
– OMRON
– Schneider Electric
– Siemens
– Yokogawa
– Phoenix Contact

VIP - VARIOFACE Professional

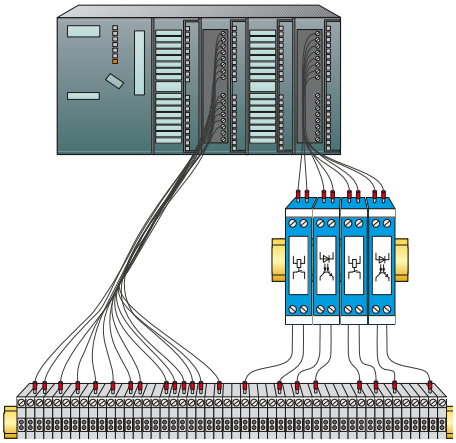
The new front adapters with encapsulated system cables for the S7 300 and new compact termination boards make the system cabling even more robust. VARIOFACE Professional means:

New front adapters

– Optimized housing concept
– Power supplied via PCB terminal blocks
– Plug-in bridges for electrical isolation
– Directly connected system cables with encapsulated plugs

New termination boards

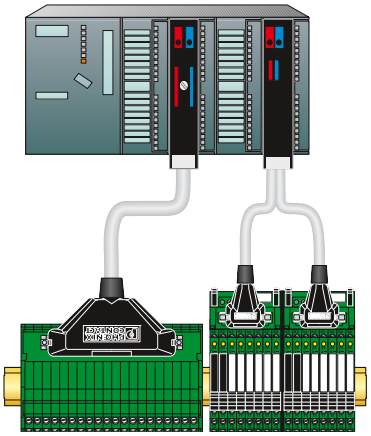
– Space saving
– Vibration resistant up to 5g
– Optional marking
– New housing design



The conventional wiring of input and output cards of programmable logic controls requires a lot of time.

Signals are transferred from the control system to modular terminal blocks or coupling modules such as relays or optocouplers by means of single conductor wiring.

This requires a complex wiring process. At the same time, errors in wiring are always possible with this connection method. Wiring errors are often only noticed when the system is put into operation and they then cause additional costs.



Wiring with the system cabling considerably reduces the assembly time and guarantees protection against polarity reversal.

Front adapters with an integrated pin strip (IEC 60603-13) are plugged onto the PLC I/O cards. They replace connection technologies such as those involving a screw or crimp connection.

The controller boards are simply snapped onto the DIN rail instead of modular terminal blocks or coupling modules. On the control side they also have a multi-position pin strip.

The controller boards are connected to the front adapters using multi-position and pre-assembled system cables.

Actuators and sensors from the field level are connected to the termination boards by means of screw or spring-cage connections or knife disconnect terminal blocks. The termination boards are marked on the field side according to the application, so that the signals can be clearly assigned.

The configuration cross-reference list (a quick reference guide to the VARIOFACE system components) is extremely useful when selecting the required components. What's more, matching components can be configured using the INTERFACE search assistant.
See www.phoenixcontact.net/products.

Rationalize your application with the aid of VARIOFACE system cabling:

- **Easy planning with configuration cross-reference list or online selector**
- **Cost reductions thanks to time-saving wiring**
- **Fault minimization through protection against polarity reversal**
- **Easy maintenance thanks to modular system components**

Product overview of VARIOFACE system cabling

System component		Version	Controller								
			ABB	Allen-Bradley			Emerson	GE FANUC		Honeywell	
			S800 I/O	Control Logix	PLC 5	SLC 500	DeltaV	RX3i	90-30	C300 CI/O, ML 200 series	PlantScape
			Page	Page	Page	Page	Page	Page	Page	Page	Page
Front adapters			Not required	424	426	428	Not required	436	437	438	424
System cables		Standard	512	504	504	504	506	504	504	512	504
		Controller-specific	423			430	432			441	
Termination boards		Passive Standard	470	470	470	470	470	470	470	439	470
		Passive Controller-specific	422	473		429	433				
		Active Standard	490	490	490	490	490	490	490	490	490
		V8 adapter/ feed-through terminal block	484	484	484	484	484	484	484	484	484
		Relay/ optocoupler	320	320	320	320	320	320	320	320	320
		MINI Analog system adapter									
		MINI Analog									

	Mitsubishi	OMRON CJ1	Phoenix Contact	Schneider		Siemens				Yokogawa
	MELSEC A, A1S, Q, L	CS1, CQM1, C200H	Axioline Inline	TSX Qantum	M340	S7 300	S7 1500	S7 400	S5 to S7 conversion	Centum CS3000
	Page	Page	Page	Page	Page	Page	Page	Page	Page	Page
	Not required	Not required	444	445	446	448	Not required	458	459	Not required
			504	504	504	504		504		
	440	442			447	453	456			466
	470	470	470	470	470	470	470	470		
				473		472		472		468
	490	490	490	490	490	490	490	490		
	484	484	484	484	484	484	484	484		484
	320	320	320	320	320	320	320	320		320
						94				94
						92				92

ABB S800 I/O
Termination boards with knife disconnection

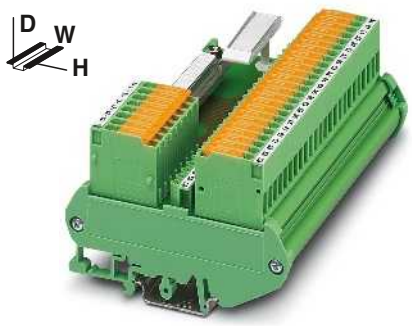
The ABB S800 I/O system offers the possibility of realizing the process wiring with D-SUB plug-in connectors. ABB TU 812 Compact MTU are available for this purpose.

The FLKM-D25SUB/B/KDS3-MT/... modules are connected to the I/O modules using assembled D-SUB cables (refer to "System cables" chapter).

In addition to screw connection with knife disconnection for every channel and ABB S800-specific labeling, 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 interface modules can also be used for signal transmission (e.g., VIP-3/SC/D25SUB/F, 2315188), see page 533.



Interface module with knife disconnect terminal blocks

Connectable I/O modules

Card type	FLKM-D25SUB...
Digital input	DI 810 DI 811 DI 814 DI 830 DI 831 DI 885
Digital output	DO 810 DO 814
Analog input	AI 810 AI 820 AI 830 AI 835
Analog output	AO 810 AO 820

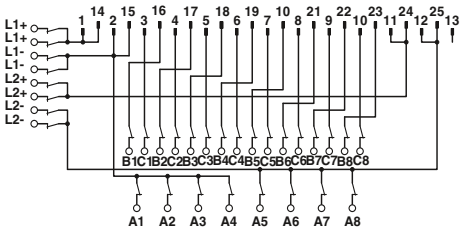
Technical data

Max. perm. operating voltage		50 V AC/DC
Max. perm. current (per branch)		2 A
Max total current (voltage supply)		4 A (8 A L1-/L2-)
Rated surge voltage		1.4 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		DIN EN 50178, IEC 62103
Connection method	Field level	Screw connection with disconnect knife
	Control system level	D-SUB socket strip
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	90 mm / 61 mm

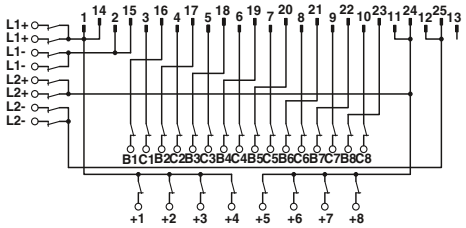
Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, with knife disconnect terminal blocks for:					
- S800 I/O output modules	25	126.5 mm	**FLKM-D25 SUB/B/KDS3-MT/TU810**	**2304513**	1
- S800 I/O input modules	25	126.5 mm	**FLKM-D25 SUB/B/KDS3-MT/TU810/P**	**2304539**	1
- S800 I/O universal module	25	247.5 mm	**FLKM-D25 SUB/B/KDS3-MT/TU830**	**2304526**	1

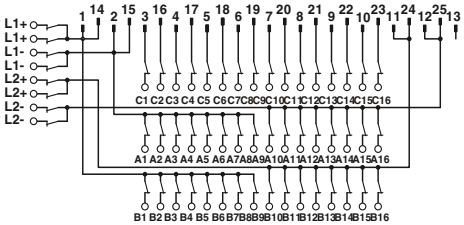
Explanation:
Flat-ribbon cable strip
Connection to I/O card
Screw terminal blocks for separate supply



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 offers the possibility of realizing the process wiring with D-SUB plug-in connectors. ABB TU 812 Compact MTU are available for this purpose.

The CABLE-D25SUB/B/2X14/.../TU812 system cables convert from a D-SUB socket strip to two flat-ribbon cable plugs. Therefore, all 8-channel controller boards of the system cabling can be connected to S800 I/O modules. Two controller boards are used per module.

System cable

Technical data

Max. perm. operating voltage		< 50 V AC / 60 V DC
Max. perm. 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 - / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter		
	25 -position	6.3 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
VARIOFACE system cable, for S800 I/O, with a 25-pos. D-SUB socket strip and two 14-pos. flat-ribbon cable plugs, in standard lengths					
	25	1 m	**CABLE-D25SUB/B/2X14/100/TU812**	**2304649**	1
	25	2 m	**CABLE-D25SUB/B/2X14/200/TU812**	**2304652**	1
	25	3 m	**CABLE-D25SUB/B/2X14/300/TU812**	**2304665**	1
	25	5 m	**CABLE-D25SUB/B/2X14/500/TU812**	**2304678**	1
VARIOFACE system cable for S800 I/O, with a 25-pos. D-SUB socket strip and two 14-pos. flat-ribbon cable plugs, in variable lengths					
	25		**CABLE-D25SUB/B/2X14/TU812/...**	**2304681**	1

Color code and pin assignment CABLE-D25SUB/B/2X14...TU812

D-SUB connector 25-pos.	FLK 14 1. Connector	FLK 14 2. Connector	Conductor 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][1])
1	2304681	/ 12.75

[1]) min. 0.20 m

Allen-Bradley ControlLogix, Honeywell PlantScape Front adapter

I/O modules with 32 channels or with this design

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.

Perfectly-fitting VARIOFACE termination boards round off this system concept.

Notes:

Front adapters can also be used without cover.

Suitable system cabling components can be configured in the INTERFACE search wizard. See **www.phoenixcontact.net/products**

32-channel front adapter with 50-pos. FLK strip

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. 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
Connection data solid / stranded / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 28 - 16
Standards/regulations	IEC 60664 / IEC 60664 / IEC 60664

Ordering data

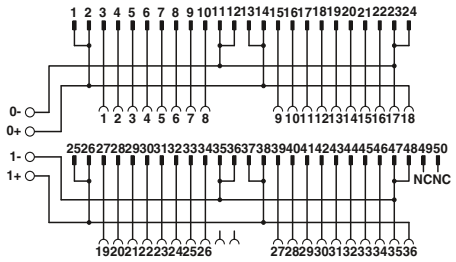
Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapters, for ControlLogix:				
- A maximum of 1 x 32 channels can be connected	50	**FLKM 50-PA-AB/1756/EXTC**	**2302735**	1
- IB 32 input board	50	**FLKM 50-PA-AB/1756/IN/EXTC**	**2302748**	1

Front adapters for I/O modules of Allen-Bradley ControlLogix and Honeywell PlantScape automation devices

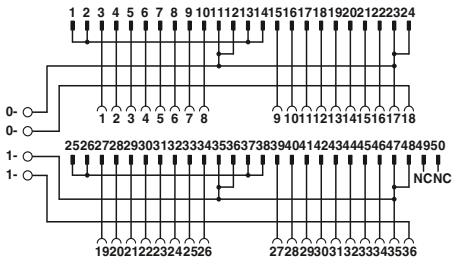
Card type	FLKM 50-PA-AB/1756/EXTC
Digital input	1756-IA 16 I* or TC-TDK 161* 1756-IB 16 D* or TC-TDX 161* 1756-IB 16 I* or TC-TDJ 161* 1756-IH 16 I*
Digital output	1756-OB 32 or TC-ODD 321
Analog input	1756-IF 8* 1756-IF 16 I* or TC-IAH 161* 1756-IF 8H* or TC-HAI 081*
Counter	1756-HSC*
Servo	1756-M02 AE*

Card type	FLKM 50-PA-AB/1756/IN/EXTC
Digital input	1756-IB 32 or TC-IDD 321

* Only in conjunction with VIP-2/SC/FLK50/AB-1756, Order No. 2322317. There must be no voltage supply at the front adapter. Risk of short circuit!



Connection scheme: FLKM 50-PA-AB/1756/EXTC



Connection scheme: FLKM 50-PA-AB/1756/IN/EXTC

Explanation:

- Flat-ribbon cable strip
- Connection to I/O card
- Screw terminal blocks for separate supply

Allen-Bradley ControlLogix, Honeywell PlantScape Front adapter

I/O modules with 16 channels or with this design

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.

Perfectly-fitting VARIOFACE termination boards round off this system concept.

Notes:

Front adapters can also be used without cover.

Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**

16-channel front adapter with two 14-pos. FLK strips

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. 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
Connection data solid / stranded / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 28 - 16
Standards/regulations	IEC 60664 / IEC 60664 / IEC 60664

Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapters, for ControlLogix:				
– Up to 2 x 8 channels can be connected – IA 16, IB 16, IC 16, IN 16 input card	14 14	**FLKM 14-PA-AB/1756/EXTC** **FLKM 14-PA-AB/1756/IN/EXTC**	**2302861** **2302874**	1 1
- IF6 I input card (only suitable for measuring current; no power terminals on adapter)	14	**FLKM 14-PA-AB/1756/IF6I/EXTC**	**2901037**	1

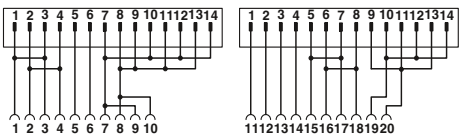
Front adapter for I/O modules of Allen Bradley ControlLogix and Honeywell PlantScape automation devices

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**

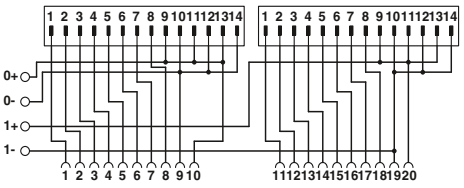
Card type	FLKM 14-PA-AB/1756/IN/EXTC
Digital input	1756-IN 16** 1756-IA 16 or TC-IDA 161** 1756-IB 16 1756-IC 16**

Card type	FLKM 14-PA-AB/1756/IF6I/EXTC
Analog input	IF6I**

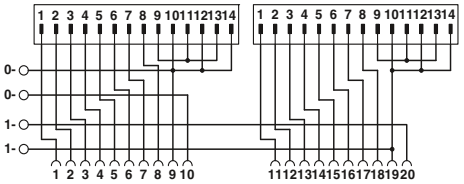
** Only in conjunction with VIP-2/SC/2FLK14/AB-1756, Order No.: 2322333. There must be no voltage supply at the front adapter. Risk of short circuit!!



Connection scheme: FLKM 14-PA-AB/1756/IF6I/EXTC



Connection scheme: FLKM 14-PA-AB/1756/EXTC



Connection scheme: FLKM 14-PA-AB/1756/IN/EXTC

Explanation:
- Flat-ribbon cable strip
- Connection to I/O card
- Screw terminal blocks for separate supply

Allen-Bradley, PLC 5 series 1771 Front adapter

The front adapters mean that pre-assembled system cables can be directly connected to I/O modules.

Up to 32 channels are connected via 50-pos. system cables.

Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.

Notes:

Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**

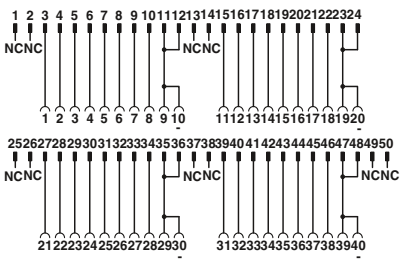
Front adapter for Allen-Bradley PLC 5, 1771

Technical data

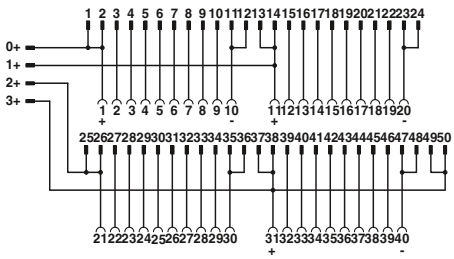
Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. permissible current	1 A (per path)
Max. perm. total current	2 A (Per Byte, for supply via connector)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Standards/regulations	IEC 60664 / IEC 60664 / IEC 60664

Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapters, for Allen-Bradley PLC 5, 1771				
- IBN 32 channels input	50	**FLKM 50-PA-AB/IBN**	**2289816**	2
- OBN 32 channels output	50	**FLKM 50-PA-AB/OBN**	**2289829**	2



Connection scheme FLKM 50-PA-AB/IBN



Connection scheme FLKM 50-PA-AB/OBN

Explanation:

Flat-ribbon cable strip
Connection to I/O card
Screw terminal blocks for separate supply

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. Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.
– With the FLKM50-PA-SLC500 OUT/2A front adapters, the FLKM 50/16/SLC500 termination board and 50-pos. system cables, the VARIOFACE system cabling can also be coupled to the OA16 and OW16 power output cards.

Notes:

Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**

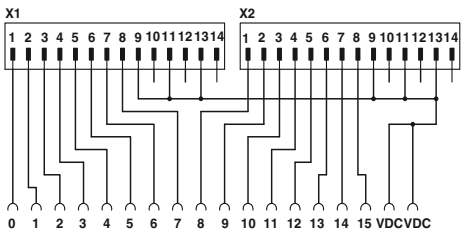
Front adapter for SLC 500 1746, 2 x 8 channels can be connected

Technical data

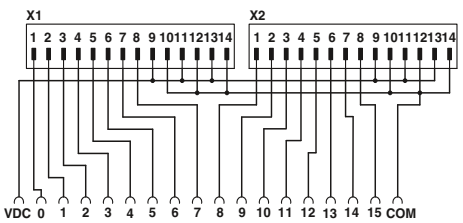
	FLKM 14-PA...	FLKM 50-PA...
Max. perm. operating voltage	< 50 V AC / 60 V DC	< 50 V AC / 60 V DC
Max. permissible current	1 A (per path)	2 A (per path)
Max. perm. total current	2 A (Per Byte, for supply via connector)	7 A (Per Byte, for supply via connector)
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C	-20°C ... 70°C
Mounting position	Any	Any
Standards/regulations	IEC 60664 / IEC 60664 / IEC 60664	IEC 60664 / IEC 60664 / IEC 60664

Ordering data

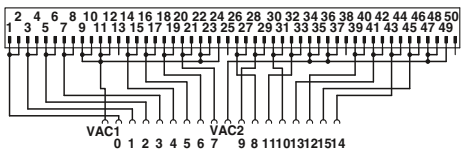
Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter, 2 x 8 channels can be connected for Allen-Bradley SLC 500 for:				
- 1746 OB16, OV16, OG16 and IG16	14	**FLKM 14-PA-SLC500/OUT**	**2293459**	1
- 1746 IA16, IB16, ITB16 and IN16	14	**FLKM 14-PA-SLC500/IN**	**2293462**	1
- 1746 IV16 and IVT16	14	**FLKM 14-PA-SLC500/IN/M**	**2293475**	1
VARIOFACE front adapter, 1 x 16 channels can be connected for Allen-Bradley SLC 500 1746 OA16 and OW16	50	**FLKM 50-PA-SLC500/OUT/2A**	**2293446**	1



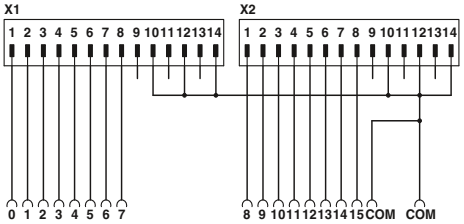
Connection scheme FLKM 14-PA-SLC500/IN/M



Connection scheme FLKM 14-PA-SLC500/OUT



Connection scheme FLKM 50-PA-SLC500/OUT/2A



Connection scheme FLKM 14-PA-SLC500/IN

Explanation:

Flat-ribbon cable strip
Connection to I/O card
Screw terminal blocks for separate supply

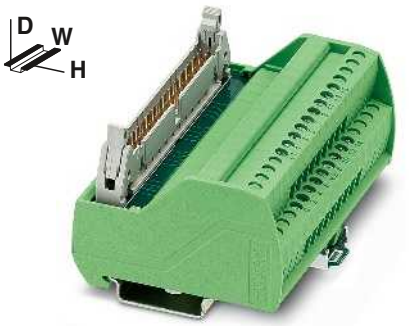
N

VIP termination board for Allen-Bradley SLC 500, 2 A output cards

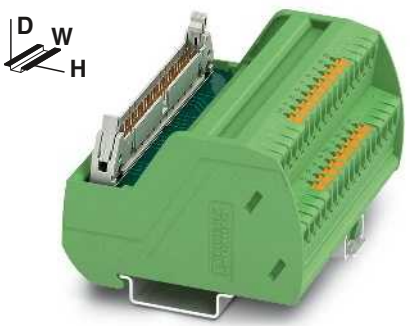
The VIP-2/.../FLK50/16/SLC500 VARIOFACE Professional (VIP) module has been designed specifically for OA16 and OW16 output modules. When used in conjunction with the FLKM 50-PA-SLC500/OUT/2A front adapter, currents up to 2 A per channel can be transferred with the system cabling.

Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No, 0811862) and mounting material, see Catalog 5.



VARIOFACE termination board for 16 channels with screw connection



VARIOFACE termination board for 16 channels with push-in connection

Technical data

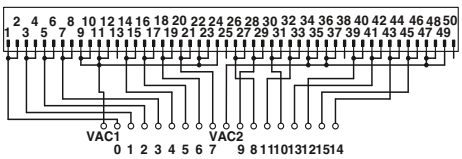
Max. perm. operating voltage		120 V AC/DC
Max. perm. current (per branch)		1 A
Max total current (voltage supply)		2 A (per channel)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	65.5 mm / 56 mm

Technical data

Max. perm. operating voltage		120 V AC/DC
Max. perm. current (per branch)		1 A
Max total current (voltage supply)		2 A (per channel)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		EN 50178,
Connection method	Field level	Push-in connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 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 controller board, for transfer of max. 16 channels, only in connection with FLKM 50-PA-SLC500 OUT/2A					
- with screw connection	50	90.8 mm	**VIP-2/SC/FLK50/16/SLC500**	**2322320**	1
- with push-in connection	50	92.7 mm	**VIP-2/PT/FLK50/16/SLC500**	**2904287**	1



Connection scheme VIP-2/.../FLK50/16/SLC500

Allen-Bradley SLC 500
System cable for 32 channels

The 32-channel I/O cards of the SLC 500 are connected using 40-pos. plug-in connectors (already integrated into the I/O modules). Passive interface modules (-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

Notes:

Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**

System cable for 32-channel I/O cards of the SLC 500 (OB32, OV32, IB32, IV32)

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. perm. 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 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	10 mm
40 -position	

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
Assembled round cables, with two 40-pos. socket strips in fixed lengths (50 cm steps) for connection with 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
Round cable sets, for connection to Allen-Bradley SLC500, OB32 and IB32, with one 40-pos. socket strip and four 14-pos. 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
1 A
-20°C ... 50°C
Insulation displacement, IEC 60352-4/DIN EN 60352-4

AWG 26 / 0.14 mm²
7 / Cu tin-plated

7.8 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
FLK 40/4X14/EZ-DR/ 50/OB32	**2296786**	1
FLK 40/4X14/EZ-DR/ 100/OB32	**2298483**	1
FLK 40/4X14/EZ-DR/ 200/OB32	**2298522**	1
FLK 40/4X14/EZ-DR/ 300/OB32	**2298535**	1
FLK 40/4X14/EZ-DR/ 50/IB32	**2296812**	1
FLK 40/4X14/EZ-DR/ 100/IB32	**2296825**	1
FLK 40/4X14/EZ-DR/ 200/IB32	**2296838**	1
FLK 40/4X14/EZ-DR/ 300/IB32	**2296841**	1

Emerson DeltaV System cable

The DeltaV system allows you to install the process wiring through "Mass termination blocks" (MTB) using flat-ribbon cable connectors. Besides the 10-, 16-, and 20-pos. system cables of system cabling (refer to the System cables chapter), the following system-specific lines are also available:

- **FLK 16/14/DV-OUT/...**, for digital assemblies with 16-pos. MTB for connection to PLC-INTERFACE
- **FLK 16/14/DV-IN/...**, for digital assemblies with 16-pos. MTB for connection to PLC-INTERFACE
- **FLK 20/2FLK14/EZ-DR/...**, for digital assemblies with 40-pos. MTB for connection to 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 to 32-channel VARIOFACE interface modules

System cable for DeltaV

Technical data

Max. perm. operating voltage		< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path		1 A
Max. conductor resistance		0.16 Ω/m
Ambient temperature (operation)		-20°C ... 50°C
Conductor cross section		AWG 26 / 0.14 mm²
Outside diameter		
	16 -position	6.8 mm
	20 -position	7.6 mm
	24 -position	6.5 mm
	20 -position	10.3 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
System cable, for 16-pos. "mass termination blocks" with a 16-pos. and a 14-pos. flat-ribbon cable plug 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
System cable, for 16-pos. "mass termination blocks" with a 16-pos. and a 14-pos. flat-ribbon cable plug 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
System cable, for 40-pos. (2 x 20) "mass termination blocks" with a 20-pos. and two 14-pos. flat-ribbon cable plugs 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
System cable, for 24-pos. "mass termination blocks" with a 24-pos. and a 16-pos. flat-ribbon cable plug for connection with UM-DELTAV/... 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
System cable, for 40-pos. "mass termination blocks" with two 20-pos. and one 50-pos. flat-ribbon cable plugs for connecting with 32-channel interface modules					
	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
Controller board for eight channels

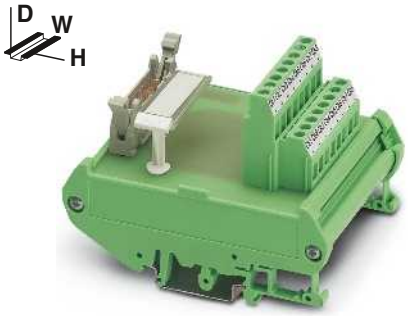
These system-specific interface modules for DeltaV assemblies are used in combination with the respective system cables. The controller board is connected to 8-channel modules through "mass termination blocks" with flat-ribbon cable connection.

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
– Fuse 5 x 20, 50 mA T, IEC60127-2/3 per channel

FLKM 16/DI/SI/LA/DV
– 1:1 connection
– Fuse 5 x 20, 50 mA T, IEC60127-2/3 per channel
– LED status indicator per signal path



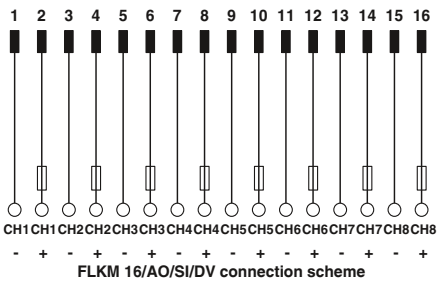
Interface module for 8 channels

Technical data

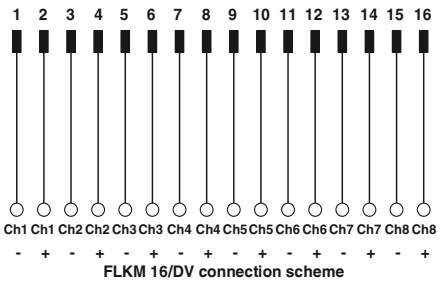
		FLKM 16/.../DV	FLKM 16/.../SI/.../DV
Max. perm. operating voltage		< 50 V AC	< 50 V AC
Max. perm. current (per branch)		1 A (per signal path)	50 mA (In delivered state, with one 50 mA fuse, max. 1 A permitted)
Rated surge voltage		0.8 kV	0.8 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Screw connection	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Dimensions	H / D	90 mm / 68 mm	

Ordering data

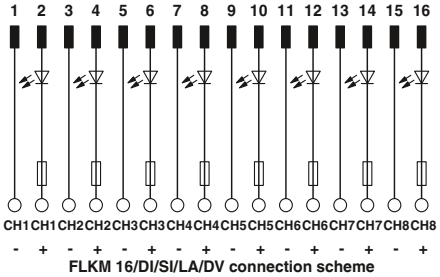
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
Interface module, with 1:1 connection	16	45 mm	**FLKM 16/DV**	**2304432**	1
Interface module, with 1:1 connection and separate potential terminal blocks per channel	16	57 mm	**FLKM 16/AI/DV**	**2304429**	1
Interface module, with fuses per channel	16	90 mm	**FLKM 16/AO/SI/DV**	**2304445**	1
Interface module, with LED and fuses per channel	16	90 mm	**FLKM 16/DI/SI/LA/DV**	**2304458**	1



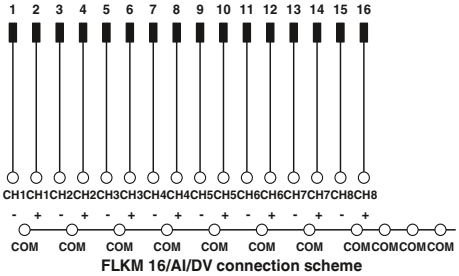
FLKM 16/AO/SI/DV connection scheme



FLKM 16/DV connection scheme



FLKM 16/DI/SI/LA/DV connection scheme



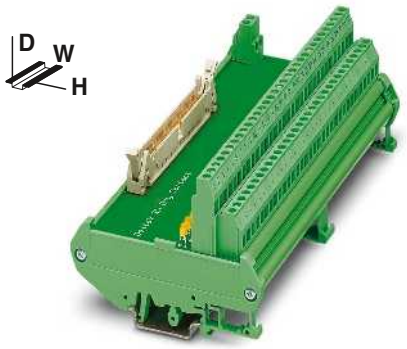
FLKM 16/AI/DV connection scheme

Emerson DeltaV
Controller board for 32 channels

These system-specific interface modules for DeltaV assemblies are used in combination with the FLK 50/2FLK20/EZ-DR/.../DV system cables. The controller board is connected to 32-channel modules through 40-pos. "mass termination blocks" with flat-ribbon cable 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)



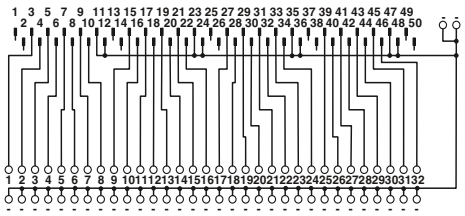
Interface module with two-conductor connection method for DeltaV

Technical data

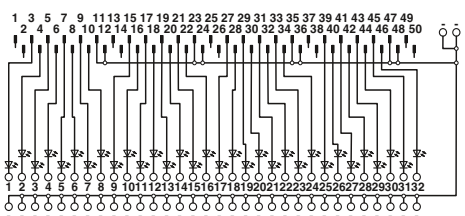
		FLKM 50/32M/DV	FLKM 50/32M/IN/LA/DV
Max. perm. operating voltage		< 50 V AC	30 V DC
Max. perm. current (per branch)		1 A	1 A
Rated surge voltage		0.8 kV	0.8 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Screw connection	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Dimensions	H / D	90 mm / 68 mm	

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE interface modules, for 32-channel I/O modules:					
- Input/Output	50	169 mm	**FLKM 50/32M/DV**	**2304869**	1
- Input with LED per signal	50	169 mm	**FLKM 50/32M/IN/LA/DV**	**2304856**	1



FLKM 50/32M/DV connection scheme



FLKM 50/32M/IN/LA/DV connection scheme

Emerson DeltaV Controller boards with fuses for 8 channels

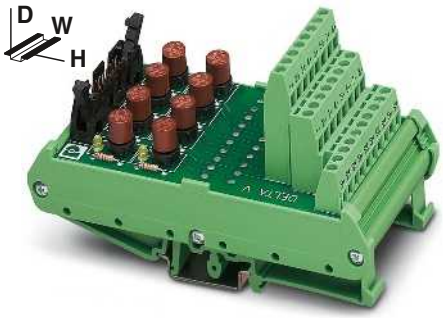
These system-specific interface modules for DeltaV assemblies are used in combination with the respective system cables. The controller board is connected to 8-channel modules through 16-pos. or 24-pos. “mass termination blocks” with flat-ribbon cable connection.

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



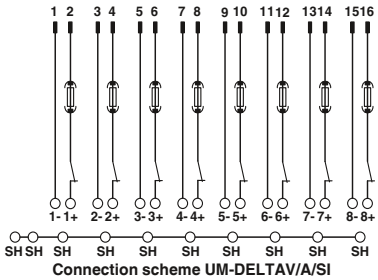
Interface module with fuses for 16-pos. and 24-pos. “mass termination blocks”

Technical data

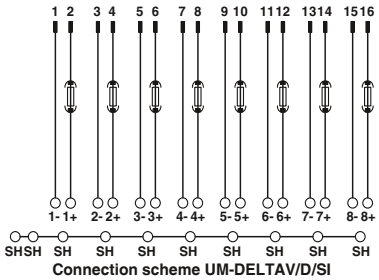
Max. perm. operating voltage		24 V DC
Max. perm. current (per branch)		50 mA (in as-supplied state, with one 50 mAF fuse, max. 1 A permitted)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	126 mm / 71 mm

Ordering data

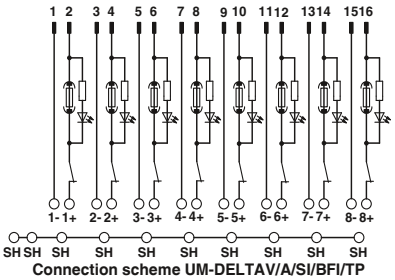
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
Interface modules for 16-pos. and 24-pos. “mass termination blocks” with:					
- Fuses	16	61 mm	**UM-DELTA V/D/SI**	**5603255**	1
– Fuses and knife disconnect terminal blocks	16	61 mm	**UM-DELTA V/D/SI/BFI/TP**	**5603257**	1
– Fuses and 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



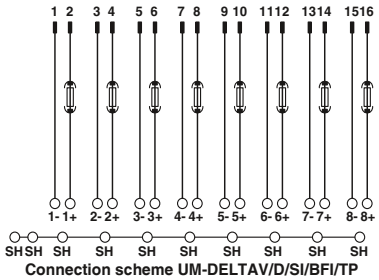
Connection scheme UM-DELTAV/A/SI



Connection scheme UM-DELTAV/D/SI



Connection scheme UM-DELTAV/A/SI/BFI/TP



Connection scheme UM-DELTAV/D/SI/BFI/TP

Explanation:
Flat-ribbon cable strip
Connection to I/O card
Screw terminal blocks for separate supply

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-pos. system cable
– Can be plugged onto I/O modules
– Connection via suitable VARIOFACE termination boards

Notes:

Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**

Front adapter for GE Fanuc RX3i

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. 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 / DIN EN 50178 / DIN EN 50178

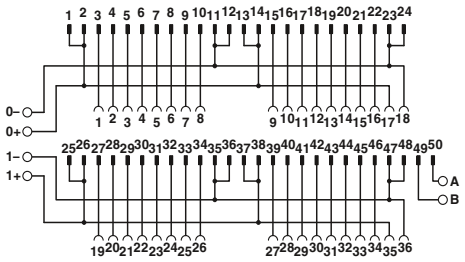
Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter, for PACSystems RX3i,				
For digital output and analog modules	50	**FLKM 50-PA-GE/TKFC/RXI**	**2321473**	1
For digital input modules	50	**FLKM 50-PA-GE/TKFC/RXI/IN**	**2321486**	1

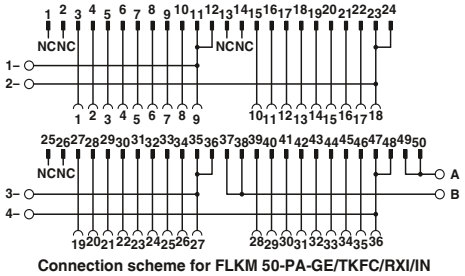
Front adapter for I/O modules of RX3i series

Card type	FLKM 50-PA/GE/TKFC/RXI
Digital output	IC 694 MDL 754
Analog	IC 695 ALG 608* IC 695 ALG 616* IC 695 ALG 626* IC 695 ALG 629* IC 695 ALG 704* IC 695 ALG 708* IC 695 ALG 728*

Card type	FLKM 50-PA/GE/TKFC/RXI/IN
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

* Only in connection with VIP-3/SC/FLK50, Order No. 2315081. No voltage may be supplied through the slip-on connections on the front adapter.

Explanation:

Flat-ribbon cable strip
Connection to I/O card
Screw terminal blocks for separate supply

GE-FANUC, series 90-30 Front adapter

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.

Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.

Notes:

Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**

Front adapter for GE-FANUC series 90-30

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. permissible current	1 A (per path) 4 A (per connection, supply via separate power supply)
Max. perm. total current	3 A (Per Byte, for supply via connector)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Mounting position	Any
Standards/regulations	IEC 60664 / IEC 60664 / IEC 60664

Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter, for 90-30 series, max. 2 x 8 channels can be connected, digital output	14	**FLKM 14-PA/GE/DO**	**2290009**	2
VARIOFACE front adapter, for 90-30 series, max. 2 x 8 channels can be connected, digital input	14	**FLKM 14-PA/GE/DI**	**2290038**	5

Front adapter for 90-30 series I/O modules

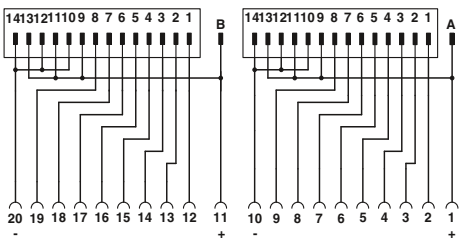
Card type	FLKM 14-PA/GE/DO
Digital output	IC 693 MDL 732 IC 693 MDL 733* IC 693 MDL 740 IC 693 MDL 741* IC 693 MDL 742
Analog	IC 693 ALG 220* IC 693 ALG 221* IC 693 ALG 222* IC 693 ALG 223* IC 693 ALG 390* IC 693 ALG 391* IC 693 ALG 392* IC 693 ALG 442*

Card type	FLKM 14-PA/GE/DI
Digital input	IC 693 MDL 241 IC 693 MDL 634 IC 693 MDL 645 IC 693 MDL 646

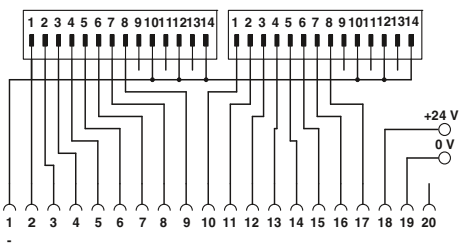
* Only in conjunction with VIP-2/SC/2FLK14(1-20)/S7, Order No.: 2315230 and UM 45-2FLK14/ZFKDS/S7, Order No.: 2965156. All wire bridges (DR) on the adapter must be disconnected. There must be no voltage supply at the front adapter (flowing via the slip-on connections)!

Explanation:

Flat-ribbon cable 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

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 plug-in 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 plug-in connector
– Connection of analog modules

FLKM-PA-2D15/HW/.../C300
– Front adapter with two 15-pos. D-SUB plug-in 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

Notes:

For matching system cable fitted with D-SUB socket strip at both ends, see page 513

Honeywell C300 front adapter

Technical data

Max. perm. operating voltage	24 V DC
Max. 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	DIN EN 50178 / DIN EN 50178

Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter for C I/O series, with one D-SUB pin strip				
- For digital I/O modules	37	**FLKM-PA-D37/HW/DIO/C300**	**2901423**	1
- For analog I/O modules	37	**FLKM-PA-D37/HW/AN/C300**	**2900622**	1
VARIOFACE front adapter for C I/O series, with two D-SUB pin strips				
- For digital output modules	15	**FLKM-PA-2D15/HW/DO/C300**	**2900924**	1
- For digital input modules	15	**FLKM-PA-2D15/HW/DI/C300**	**2901879**	1

Front adapters for I/O modules of the C300 series, C I/O series

Card type	FLKM-PA-D37/HW/DIO/C300
Digital input	TDIL 11* TDIL 01*
Digital output	TDOB 11* TDOB 01*

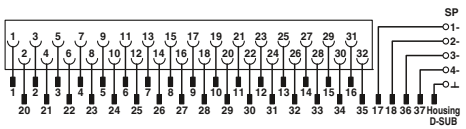
Card type	FLKM-PA-D37/HW/AN/C300
Analog input	TAIX 01** TAIX 11**
Analog output	TAOX 01** TAOX 11**

Card type	FLKM-PA-2D15/HW/DO/C300
Digital output	TDOB 01* TDOB 11*

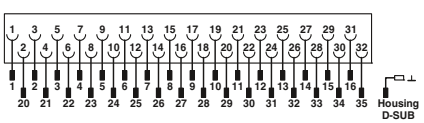
Card type	FLKM-PA-2D15/HW/DI/C300
Digital input	TDIL 01* TDIL 11*

* Two front adapters are required for each module.

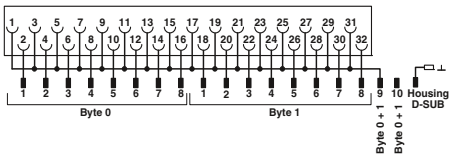
** For three-conductor operation (channels 13 - 16) of input modules: only in conjunction with VIP-3/SC/D37SUB/M/HW/C300, Order No. 2900675.



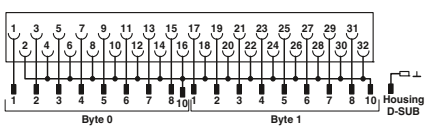
Connection scheme: FLKM-PA-D37/HW/AN/C300



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:
- Plug-in connector
- Connection to I/O card
- Screw terminal blocks for separate supply

N

Honeywell C300, Series C I/O interface modules

These VARIOFACE 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

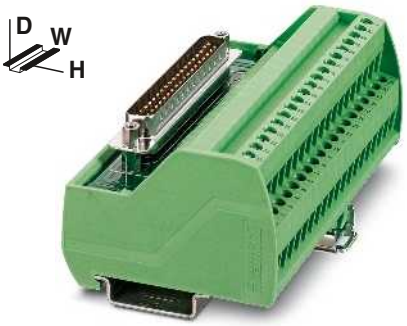
– In conjunction with FLKM-PA-D37/HW/C300 front adapter
– System-specific labeling
– Field connection via double-level terminal blocks

VIP-3/.../D37SUB/M/HW/C300

– In conjunction with FLKM-PA- D37/HW/AN/C300 front adapter
– System-specific labeling
– For TAIX01, TAIX11 analog input modules
– Field connection via three-level terminal blocks

Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No., 0811862) and mounting material, see Catalog 5.



37-pos. with screw or push-in connection

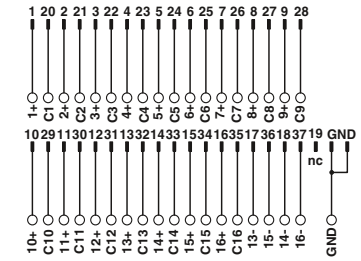
c UL us

Technical data

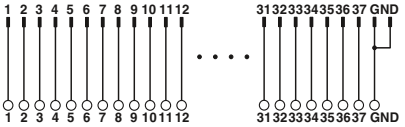
	VIP-2/...	VIP-3/...C300
Max. perm. operating voltage	125 V AC/DC	125 V AC/DC
Max. perm. current (per branch)	2 A	2 A
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C
Mounting position	Any	Any
Standards/regulations	DIN EN 50178,	
Connection method	D-SUB connection	D-SUB pin strip
Dimensions	H / D	72.1 mm / 46.6 mm
Screw connection solid / stranded / AWG	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Push-in connection solid/stranded/AWG	0.14 ... 4 mm² / 0.14 ... 2.5 mm² / 26 - 14	

Ordering data

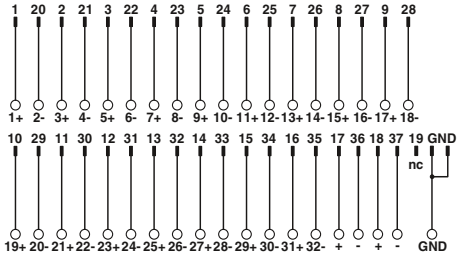
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE interface module, with D-SUB pin strip and universal labeling,					
- with screw connection	37	101 mm	**VIP-2/SC/D37SUB/M**	**2900676**	1
- with push-in connection	37	102.8 mm	**VIP-2/PT/D37SUB/M**	**2904277**	1
VARIOFACE interface module, with D-SUB pin strip and system-specific labeling,					
- with screw connection	37	101 mm	**VIP-2/SC/D37SUB/M/SO**	**2900786**	1
- with push-in connection	37	102.8 mm	**VIP-2/PT/D37SUB/M/SO**	**2904278**	1
VARIOFACE interface module, with D-SUB pin strip for analog input modules,					
- with screw connection	37	88 mm	**VIP-3/SC/D37SUB/M/HW/C300**	**2900675**	1
- with push-in connection	37	87.6 mm	**VIP-3/PT/D37SUB/M/HW/C300**	**2904276**	1



Connection scheme VIP-3/SC/D37SUB/M/HW/C300



Connection scheme VIP-2/SC/D37SUB/M



Connection scheme VIP-2/SC/D37SUB/M/SO

Mitsubishi Electric MELSEC A, A1S, and Q System cable

For 32-/64-channel I/O boards with 37-pos. D-SUB plug-in connectors. System cables are available for connecting 1 x 32 channels or 4 x 8 channels.

Notes:

Suitable system cabling components can be configured in the INTERFACE search wizard. See **www.phoenixcontact.net/products**

System cable, D-SUB socket strip to FLK, number of positions: 37 on 50

Splitting cable, D-SUB socket strip to FLK, number of positions: 37 on 4 x 14

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path	1 A	1 A
Max. conductor resistance	0.16 Ω/m	0.16 Ω/m
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C
Conductor cross section	AWG 26 / 0.14 mm²	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated	7 / Cu tin-plated
Outside diameter		
37-pos.	10.5 mm	6.3 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Round cable for output module 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	**CABLE-D37-M2,5/4X14/ 50/Y81P-O**	**2302476**	1
	37	1 m	**FLK 50/EZ-DR/D37SUB/100/Y81P-O**	**2302609**	1	**CABLE-D37-M2,5/4X14/100/Y81P-O**	**2302489**	1
	37	2 m	**FLK 50/EZ-DR/D37SUB/200/Y81P-O**	**2302612**	1	**CABLE-D37-M2,5/4X14/200/Y81P-O**	**2302492**	1
	37	3 m	**FLK 50/EZ-DR/D37SUB/300/Y81P-O**	**2302638**	1	**CABLE-D37-M2,5/4X14/300/Y81P-O**	**2302502**	1
Round cable, same as before, however in variable lengths								
	37		**FLK 50-EZ-DR-D37SUB-Y81P-O/...**	**2302625**	1	**CABLE-D37-M2,5-4X14-Y81P-O/...**	**2302696**	1
Round cable for input module 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	**CABLE-D37-M2,5/4X14/ 50/X81-I**	**2302515**	1
	37	1 m	**FLK 50/EZ-DR/D37SUB/100/X81-I**	**2302654**	1	**CABLE-D37-M2,5/4X14/100/X81-I**	**2302528**	1
	37	2 m	**FLK 50/EZ-DR/D37SUB/200/X81-I**	**2302667**	1	**CABLE-D37-M2,5/4X14/200/X81-I**	**2302531**	1
	37	3 m	**FLK 50/EZ-DR/D37SUB/300/X81-I**	**2302670**	1	**CABLE-D37-M2,5/4X14/300/X81-I**	**2302544**	1
Round cable, same as before, however in variable lengths								
	37		**FLK 50-EZ-DR-D37SUB-X81-I/...**	**2302683**	1	**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][1])
1	2302625	/ 12.75

[1]) min. 0.20 m

Ordering example for splitting cable:

– Cable for MELSEC Q Y81P, 11.00 m long

Quantity	Order No.	Length [m][1])
1	2302696	/ 11.00

[1]) 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 plug-in connectors.

CABLE-FCN40/1X50/...
– Signal transmission of 32 channels

CABLE-FCN40/4X14/...
– Splitting up 32 channels into 4 x 8 channels

Notes:
Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**

Fujitsu FCN plug-in connector to flat-ribbon cable, number of positions: 40 on 50

Fujitsu plug-in connector to flat-ribbon cable, number of positions: 40 on 4 x 14

	Technical data	Technical data
Max. perm. operating voltage	< 50 V AC / 60 V DC	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path	1 A	1 A
Max. conductor resistance	0.16 Ω/m	0.16 Ω/m
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C
Conductor cross section	AWG 26 / 0.14 mm²	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated	7 / Cu tin-plated

			Ordering data			Ordering data		
Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Round cable in variable lengths for **Mitsubishi Melsec L** LX41C4, LX42C4 (common positive connection to B01, B02) LY41NT1P, LY42NT1P, LY41PT1P, LY42PT1P **Mitsubishi Melsec Q** QX41, QX41-S1, QX42, QX42-S1 QX71 and QX72 (common positive connection to B01, B02) QY41P, QY42P, QY71, QH42P **Honeywell ML 200** 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			
Round cable in variable lengths for **Mitsubishi Melsec L** LX41C4 and LX42C4 (common negative connection to B01, B02) **Mitsubishi Melsec Q** QX71 and QX72 (common negative connection to B01, B02) QX82, QX82-S1 **Honeywell ML 200** 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			
Round cable in variable lengths for **Mitsubishi Melsec L** LX41C4 and LX42C4 (common positive connection to B01, B02) LY41NT1P, LY42NT1P, LY41PT1P, LY42PT1P **Mitsubishi Melsec Q** QX41, QX41-S1, QX42, QX42-S1 QY41P (24 V), QY42P (24 V), QH42P (24 V) **Honeywell ML 200** 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

OMRON CJ1, CS1, CQM1, and C200H System cable

These system cables are plugged onto the I/O cards that are connected using Fujitsu plug-in 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 plug-in connector to flat-ribbon cable, number of positions: 40 on 50

Fujitsu FCN plug-in connector to flat-ribbon cable, number of positions: 40 on 4 x 14 or 24 on 2 x 14

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path	1 A
Max. conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20°C ... 50°C
Conductor cross section	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path	1 A
Max. conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20°C ... 50°C
Conductor cross section	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
Round cable in variable lengths for CJ1: OD231, OD261 CS1, C200H: OD218, OD219 CQM1: OD213					
	40	1 m	**FLK 50/EZ-DR/FCN40/100/OMR-OUT**	**2304144**	1
	40	2 m	**FLK 50/EZ-DR/FCN40/200/OMR-OUT**	**2304157**	1
Round cable, same as before, however in variable lengths					
	40		**FLK 50-EZ-DR-FCN40-OMR-OUT/...**	**2302829**	1
Round cable in variable lengths for CJ1: ID231, ID261 CS1 and C200H: ID111, ID216, ID217, CQM1: ID213; ID214;ID112					
	40	1 m	**FLK 50/EZ-DR/FCN40/100/OMR-IN**	**2304160**	1
	40	2 m	**FLK 50/EZ-DR/FCN40/200/OMR-IN**	**2304173**	1
Round cable, same as before, however in variable lengths					
	40		**FLK 50-EZ-DR-FCN40-OMR-IN/...**	**2302803**	1
Round cable in variable lengths for CS1, C200H: OD215, MD115 (only output), MD215 (only output)					
	24	1 m			
	24	2 m			
Round cable, same as before, however in variable lengths					
	24				
Round cable in variable lengths for CS1, C200H: ID215, MD115 (only input), MD215 (only input)					
	24	1 m			
	24	2 m			
Round cable, same as before, however in variable lengths					
	24				

Ordering data

Type	Order No.	Pcs. / Pkt.
CABLE-FCN40/4X14/100/OMR-OUT	**2304186**	1
CABLE-FCN40/4X14/200/OMR-OUT	**2304199**	1
CABLE-FCN40-4X14-OMR-OUT/...	**2302832**	1
CABLE-FCN40/4X14/100/OMR-IN	**2304209**	1
CABLE-FCN40/4X14/200/OMR-IN	**2304212**	1
CABLE-FCN40-4X14-OMR-IN/...	**2302816**	1
CABLE-FCN24/2X14/100/OMR-OUT	**2304225**	1
CABLE-FCN24/2X14/200/OMR-OUT	**2304238**	1
CABLE-FCN24-2X14-OMR-OUT/...	**2302858**	1
CABLE-FCN24/2X14/100/OMR-IN	**2304241**	1
CABLE-FCN24/2X14/200/OMR-IN	**2304254**	1
CABLE-FCN24-2X14-OMR-IN/...	**2302845**	1

Ordering example for system cable:
– Cable for OMRON CJ1, ID231, 12.75 m long

Quantity	Order No.	Length [m][1])
1	2302803	/ 12.75

[1]) 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 realtime I/O system. The push-in technology on the I/O system ensures rapid connection.

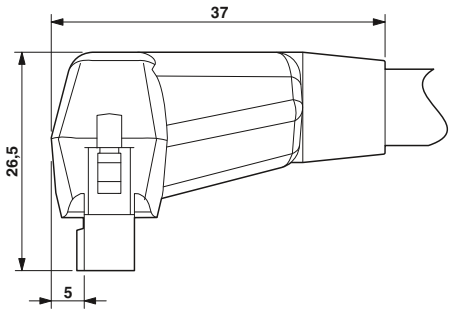
The cables have the following features:

– 1:1 connection
– 14-pos. plug-in connector, molded
– 8 pre-assembled open ends, for connection to the Axioline realtime I/O system
– Transmission of groups of 8 channels
– Labeling field on plug

Perfectly-fitting VARIOFACE termination boards round off this system concept.

Notes:

The following modules cannot be coupled due to the larger outer contour of the molded connectors:
UM 45-FLK14/ 8IM/ZFKDS/PLC, 2965211
UM 45- 8RM/MR-G24/1/PLC, 2962900



System cable for 8 channels

Technical data

Max. perm. operating voltage		< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path		1 A
Max. 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 - / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter		6.4 mm
	14 -position	

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
Round cable with an open end (8 individual wires)					
	14	0.5 m	**VIP-CAB-FLK14/AXIO/0,14/0,5M**	**2901604**	1
	14	1 m	**VIP-CAB-FLK14/AXIO/0,14/1,0M**	**2901605**	1
	14	1.5 m	**VIP-CAB-FLK14/AXIO/0,14/1,5M**	**2901606**	1
	14	2 m	**VIP-CAB-FLK14/AXIO/0,14/2,0M**	**2901607**	1
	14	2.5 m	**VIP-CAB-FLK14/AXIO/0,14/2,5M**	**2901608**	1
	14	3 m	**VIP-CAB-FLK14/AXIO/0,14/3,0M**	**2901609**	1
	14	4 m	**VIP-CAB-FLK14/AXIO/0,14/4,0M**	**2901610**	1
	14	6 m	**VIP-CAB-FLK14/AXIO/0,14/6,0M**	**2901611**	1

Phoenix Contact Inline Front adapters

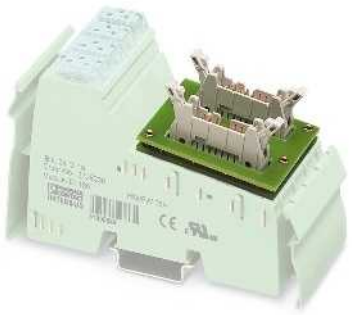
The front adapters are used to connect pre-assembled system cables directly to Inline. Front adapters are simply plugged into the relevant Inline modules. Three connection options are available:

– Transfer of 8 channels via a 14-pos. system cable
– Transmission of 2 x 8 channels over two 14-pos. system cables
– Transmission of 4 x 8 channels over four 14-pos. system cables

Perfectly-fitting VARIOFACE termination boards round off this system concept.

Notes:

Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**



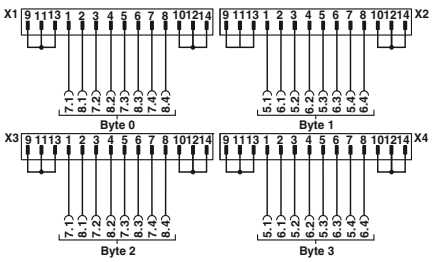
Front adapters for Inline

Technical data

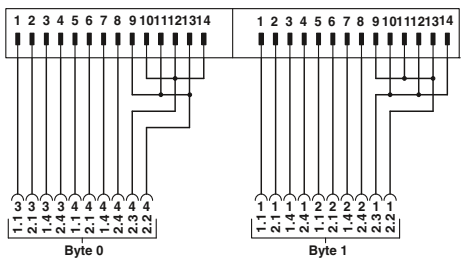
Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. permissible current	1 A (per path)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Mounting position	Any
Standards/regulations	IEC 60664 / IEC 60664 / IEC 60664

Ordering data

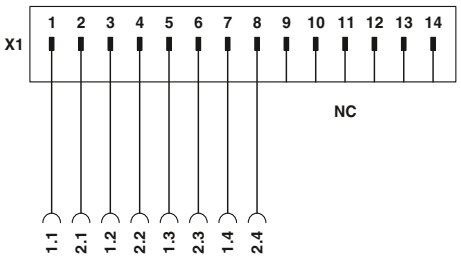
Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter, for 8-channel Inline modules				
Input: IB IL 24 D I8/HD-PAC Output: IB IL 24 DO 8/HD-PAC		**FLKM 14-PA-INLINE/DIO8**	**2900889**	1
VARIOFACE front adapter, for 16-channel Inline modules				
Input: IB IL 24 DI 16		**FLKM 14-PA-INLINE/IN16**	**2302751**	1
Output: IB IL 24 DO 16		**FLKM 14-PA-INLINE/OUT16**	**2302764**	1
VARIOFACE front adapter, for 32-channel Inline modules				
Input: IB IL 24 DI 32/HD and Output: IB IL 24 DO 32/HD		**FLKM 14-PA-INLINE/32**	**2302777**	1



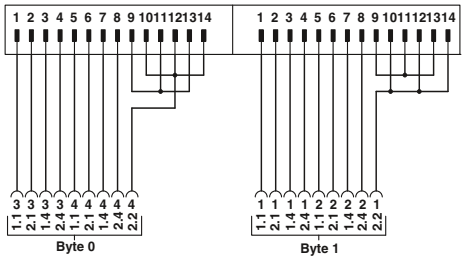
Connection scheme: FLKM 14-PA-INLINE/32



Connection scheme: FLKM 14-PA-INLINE/IN16



Connection scheme for FLKM 14-PA-INLINE/DIO8



Connection scheme: FLKM 14-PA-INLINE/OUT16

Explanation:

Flat-ribbon cable strip
Connection to I/O card
Screw terminal blocks for separate supply

Schneider Electric MODICON® TSX Quantum Front adapter

The front adapters mean that pre-assembled system cables can be directly connected to I/O modules. There are two connection possibilities available:

– Transfer of max. 32 channels over one 50-pos. system cable
– Transmission of 4 x 8 channels over four 14-pos. system cables

Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.

Notes:

Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**

Front adapter for MODICON TSX Quantum

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. permissible current	1 A (per path) 4 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 / DIN EN 50178 / DIN EN 50178

Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter, for MODICON® TSX Quantum, 1 x 32 channels can be connected	50	**FLKM 50-PA-MODI-TSX/Q**	**2294306**	1
VARIOFACE front adapter, for MODICON® TSX Quantum, 4 x 8 channels can be connected	14	**FLKM 50/ 4-FLK14/PA-MODI-TSX/Q**	**2294416**	1

Front adapter for I/O modules of MODICON® TSX Quantum automation devices

Card type	FLKM 50-PA-MODI-TSX/Q
Digital input	DDI 353 DDI 841* DDI 853 DAI 340* DAI 353** DAI 440* DAI 453**
Digital output	DDO 353
Digital input/output	DDM 390*
Analog input	ACI 030* ACI 040* ATI 030* ARI 030* AVI 030*
Analog output	ACO 020* ACO 130* AVO 020*
Analog input/output	AMM 090*
Counter	ECH 105* EHC 202*

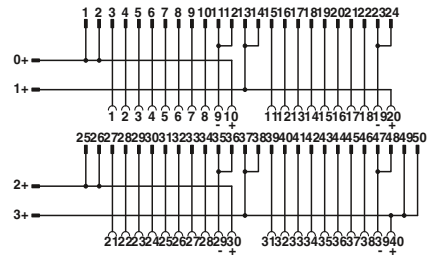
* Only in conjunction with VIP-2/SC/FLK50/MODI-TSX/Q, Order No. 2322304.
** Only in conjunction with passive termination boards without LED.

Card type	FLKM 50/4-FLK14/PA-MODI-TSX/Q
Digital input	DDI 353 DDI 853 DAI 353** DAI 453**
Digital output	DDO 353

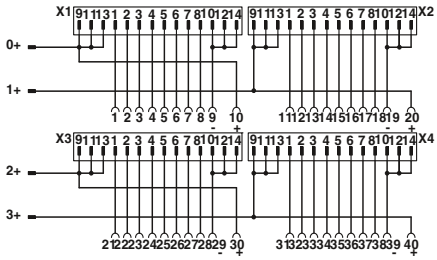
** Only in conjunction with passive termination boards without LED.

Explanation:

Flat-ribbon cable 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

Schneider Electric MODICON® M340 Front adapter

N

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 and round off this system concept.

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. permissible current	1 A (per path)
Max. perm. 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	DIN EN 50178

Ordering data

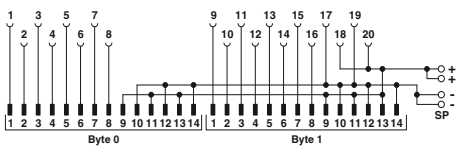
Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter, for MODICON® M340 with two FLK pin strips	14	**FLKM 14-PA-MODI/M340**	**2903208**	1

Front adapter for MODICON C340 series I/O modules

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 of front adapter/ controller	Plug-in connector (byte 0)	Plug-in 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 plug-in connectors.

CABLE-FCN40/1X50/…
– Signal transmission of 32 channels

CABLE-FCN40/4X14/…
– Splitting up 32 channels into 4 x 8 channels

Notes:

Suitable system cabling components can be configured in the INTERFACE search wizard. See **www.phoenixcontact.net/products**

Fujitsu FCN plug-in connector to flat-ribbon cable, number of positions: 40 on 50

Fujitsu FCN plug-in connector to flat-ribbon cable, number of positions: 40 on 4 x 14

	Technical data	Technical data
Max. perm. operating voltage	< 50 V AC / 60 V DC	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path	1 A	1 A
Max. conductor resistance	0.16 Ω/m	0.16 Ω/m
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C
Conductor cross section	AWG 26 / 0.14 mm²	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated	7 / Cu tin-plated

			Ordering data			Ordering data		
Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Round cable 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	**CABLE-FCN40/4X14/ 0,5M/M340**	**2321716**	1
	40	1 m	**CABLE-FCN40/1X50/ 1,0M/M340**	**2321648**	1	**CABLE-FCN40/4X14/ 1,0M/M340**	**2321729**	1
	40	2 m	**CABLE-FCN40/1X50/ 2,0M/M340**	**2321651**	1	**CABLE-FCN40/4X14/ 2,0M/M340**	**2321732**	1
	40	3 m	**CABLE-FCN40/1X50/ 3,0M/M340**	**2321664**	1	**CABLE-FCN40/4X14/ 3,0M/M340**	**2321745**	1
	40	4 m	**CABLE-FCN40/1X50/ 4,0M/M340**	**2321677**	1	**CABLE-FCN40/4X14/ 4,0M/M340**	**2321758**	1
	40	6 m	**CABLE-FCN40/1X50/ 6,0M/M340**	**2321680**	1	**CABLE-FCN40/4X14/ 6,0M/M340**	**2321761**	1
	40	8 m	**CABLE-FCN40/1X50/ 8,0M/M340**	**2321693**	1	**CABLE-FCN40/4X14/ 8,0M/M340**	**2321774**	1
	40	10 m	**CABLE-FCN40/1X50/10,0M/M340**	**2321703**	1	**CABLE-FCN40/4X14/10,0M/M340**	**2321787**	1
	40	15 m	**CABLE-FCN40/1X50/15,0M/M340**	**2903748**	1	**CABLE-FCN40/4X14/15,0M/M340**	**2903749**	1

VIP – VARIOFACE Professional front adapters for 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 socket strips for module side

Special lengths can be configured using separate order numbers.

Ordering example:

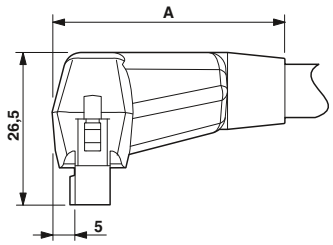
A front adapter with a connected 50-pos. system cable (32-channel cards), 12.75 m in length:

1 pcs. 2900885/12,75

Notes:

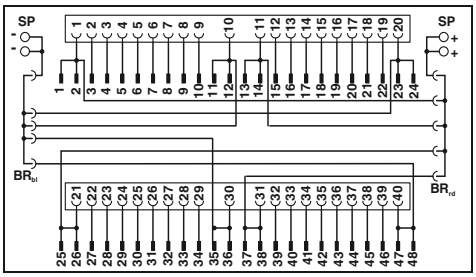
The following modules cannot be coupled due to the larger outer contour of the molded connectors:
UM 45-FLK14/ 8IM/ZFKDS/PLC, 2965211
UM 45-FLK50/32IM/ZFKDS/PLC, 2965224
UM 45- 8RM/MR-G24/1/PLC, 2962900
UM 45-16RM/MR-G24/1/PLC, 2962913

Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**



	A
...FLK14...	37
...FLK50...	42

Front adapter with system cable 1 x 32 channels can be connected



Technical data

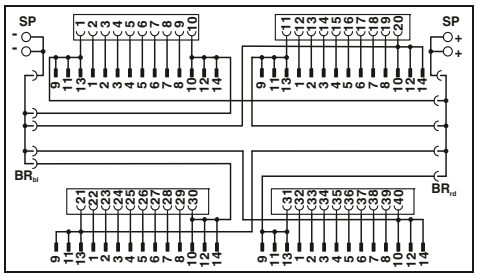
Max. perm. operating voltage		< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path		1 A (per path)
Max. perm. current (separate power supply)		8 A
Rated surge voltage		0.8 kV
Max. conductor resistance		0.16 Ω/m
Conductor cross section		AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter		10.3 mm
Ambient temperature range		-20°C ... 50°C
Standards/regulations		IEC 60664, IEC 62103, DIN EN 50178
Connection method	Front adapter	Can be plugged onto 40-pos. I/O modules / separate power supply through terminal blocks with spring-cage double connection
	System cable	Flat-ribbon cable plug-in connector according to IEC 60603-13
Connection data solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14

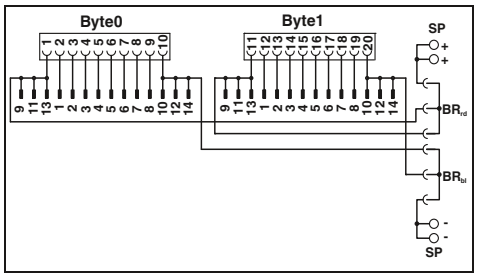
Ordering data

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**	**2322443**	1
	1 m	**VIP-PA-FLK50/ 1,0M/S7**	**2322456**	1
	1.5 m	**VIP-PA-FLK50/ 1,5M/S7**	**2322469**	1
	2 m	**VIP-PA-FLK50/ 2,0M/S7**	**2321800**	1
	2.5 m	**VIP-PA-FLK50/ 2,5M/S7**	**2322472**	1
	3 m	**VIP-PA-FLK50/ 3,0M/S7**	**2322485**	1
	4 m	**VIP-PA-FLK50/ 4,0M/S7**	**2322498**	1
	5 m	**VIP-PA-FLK50/ 5,0M/S7**	**2322508**	1
	6 m	**VIP-PA-FLK50/ 6,0M/S7**	**2322511**	1
	7 m	**VIP-PA-FLK50/ 7,0M/S7**	**2322524**	1
	8 m	**VIP-PA-FLK50/ 8,0M/S7**	**2322537**	1
	10 m	**VIP-PA-FLK50/10,0M/S7**	**2322540**	1
VIP VARIOFACE front adapter, as above, in variable lengths		**VIP-PA-FLK50-S7/...**	**2900885**	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

	< 50 V AC / 60 V DC
	1 A (per path)
	8 A
	0.8 kV
	0.16 Ω/m
	AWG 26 / 0.14 mm²
	7 / Cu tin-plated
	6.4 mm
	-20°C ... 50°C
	IEC 60664, IEC 62103, DIN EN 50178
	Can be plugged onto 40-pos. I/O modules / separate power supply through terminal blocks with spring-cage double connection
	Flat-ribbon cable plug-in connector according to IEC 60603-13
	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14

Technical data

	< 50 V AC / 60 V DC
	1 A (per path)
	8 A
	0.8 kV
	0.16 Ω/m
	AWG 26 / 0.14 mm²
	7 / Cu tin-plated
	6.4 mm
	-20°C ... 50°C
	IEC 60664, IEC 62103, DIN EN 50178
	Can be plugged onto 20-pos. I/O modules / separate power supply through terminal blocks with spring-cage double connection
	Flat-ribbon cable plug-in connector according to IEC 60603-13
	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14

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

Ordering data

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 adapter for 32-channel cards of 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	312C, 313C, 314C, 313C-2PtP 313C-2DP, 314C-2DP, 314C-2PtP
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-2PtP 313C-2DP, 314C-2DP, 314C-2PtP

* Only in conjunction with
VIP-2/SC/FLK50 (1-40)/S7, Order No.: 2315243,
UM 45-FLK50/ZFKDS/S7-300, Order No.: 2968111,
FLKM 50/KDS3-MT/PPA/S7-300, Order No.: 2304490.
All bridges (BR) at the adapter must be removed!

Front adapter for 16-channel cards of 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
IP-2/SC/2FLK14 (1-20)S7, Order No.: 2315230
UM 45-2FLK14/ZFKDS/S7, Order No.: 2965156
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.
Removal of the bridges can achieve electrical isolation (in groups of 8).

Explanation:
Flat-ribbon cable strip
Connection to I/O card

SP: Separate power terminals
BRbl: Blue plug-in bridge
BRrd: Red plug-in bridge

Siemens SIMATIC® S7-300 Front adapter

I/O modules with 32 channels or with this design

There are two connection possibilities available:

– Transfer of max. 32 channels over one 50-pos. system cable
– Transmission of 4 x 8 channels over four 14-pos. system cables

Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.

Notes:

Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**

Front adapter for SIMATIC® S7-300, I/O cards with max. 32 channels

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. permissible current	1 A (per path) 8 A (per connection, supply via separate power supply (2.8 x 0.8 mm))
Max. perm. 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 / IEC 60664 / IEC 60664
Connection method	IDC/FLK pin strip (2.54 mm)

Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapters, for SIMATIC® S7-300				
- 1 x 32 channels can be connected	50	**FLKM 50-PA-S300**	**2294445**	1
- 4 x 8 channels can be connected	14	**FLKM 50/4-FLK14/PA-S300**	**2296281**	1

Front adapter for 32-channel cards of SIMATIC® S7-300

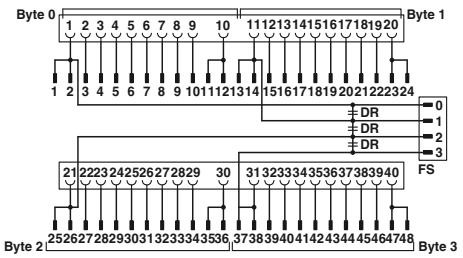
Card type	FLKM 50-PA-S300
Digital input	6ES7 321-1BL00-0AA0
Digital output	6ES7 322-1BL00-0AA0
Digital input/output	6ES7 323-1BL00-0AA0
Analog input	6ES7 331-7PF01-0AB0* 6ES7 331-7PF11-0AB0* 6ES7 331-7NF00-0AB0* 6ES7 331-7NF10-0AB0* 6ES7 331-1KF01-0AB0*
Analog output	6ES7 332-5HF00-0AB0*
CPU	312C, 313C, 314C, 313C-2PtP 313C-2DP, 314C-2DP, 314C-2PtP
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-2PtP 313C-2DP, 314C-2DP, 314C-2Pt

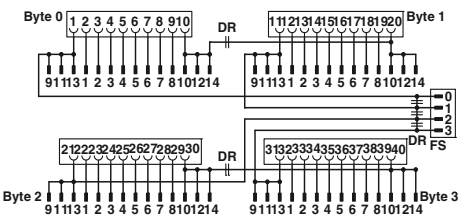
* Only in conjunction with
VIP-2/SC/FLK50 (1-40)/S7, Order No.:2315243,
UM 45-FLK50/ZFKDS/S7-300, Order No.: 2968111,
FLKM 50/KDS3-MT/PPA/S7-300, Order No.: 2304490.
All wire bridges (DR) on the adapter must be disconnected!
There must be no voltage supply at the front adapter (flowing via the slip-on connections)!

Note:
The front adapters are non-isolated on delivery.
Removal of the bridges can achieve electrical isolation (in groups of 8).

Explanation:
Flat-ribbon cable strip
Connection to I/O card
Screw terminal blocks for separate supply



Connection scheme FLKM 50-PA-S300



Connection scheme FLKM 50/4-FLK14/PA-S300

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-pos. system cables.

Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.

Notes:

Suitable system cabling components can be configured in the INTERFACE search wizard.
See **www.phoenixcontact.net/products**

Front adapter for SIMATIC® S7-300, I/O cards with max. 16 channels

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. permissible current	1 A (per path) 8 A (per connection, supply via separate power supply (2.8 x 0.8 mm))
Max. perm. 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 / IEC 60664 / IEC 60664
Connection method	IDC/FLK pin strip (2.54 mm)

Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapters, for SIMATIC® S7-300				
- 2 x 8 channels can be connected	14	**FLKM 14-PA-S300**	**2299770**	1

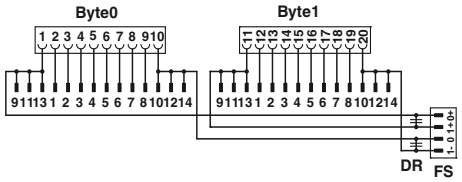
Front adapter for 16-channel cards of SIMATIC® S7-300

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*

* Only in conjunction with
VIP-2/SC/2FLK14 (1-20)/S7, Order No.: 2315230
UM 45-2FLK14/ZFKDS/S7, Order No.: 2965156
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.
Removal of the bridges can achieve electrical isolation (in groups of 8).

Explanation:
Flat-ribbon cable strip
Connection to I/O card
Screw terminal blocks for separate supply



Connection scheme FLKM 14-PA-S300

Siemens SIMATIC® S7-300
Front adapter for failsafe modules

The front adapters are coupled using 50-pos. system cables and convert the signals for passive modules.

Siemens SIMATIC S7-300 front adapter for failsafe I/O cards

Technical data

Max. perm. operating voltage	30 V DC
Max. permissible current	1 A (per path)
Max. perm. total current	2 A
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Standards/regulations	EN 50178
Connection method	Flat-ribbon cable plug-in connector according to IEC 60603-13

Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter for failsafe I/O cards 6ES7 326-1BK02-0AB0 6ES7 326-1RF00-0AB0 6ES7 336-1HE00-0AB0	50	**FLKM 50-PA-S300/SO167**	**2307662**	1
VARIOFACE front adapter for failsafe I/O cards 6ES7 326-2BF01-0AB0	50	**FLKM 50-PA/DO326/S7-300**	**2321952**	1

Front adapter for I/O modules of SIMATIC® S7-300

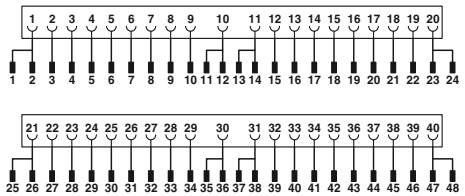
Card type	FLKM 50-PA-S300/SO167
Digital input	6ES7 326-1BK02-0AB0* 6ES7 326-1RF00-0AB0*[1])
Analog input	6ES7 336-1HE00-0AB0*

Card type	FLKM 50-PA/DO326/S7-S300
Digital output	6ES7 326-2BF01-0AB0** 6ES7 326-2BF10-0AB0**

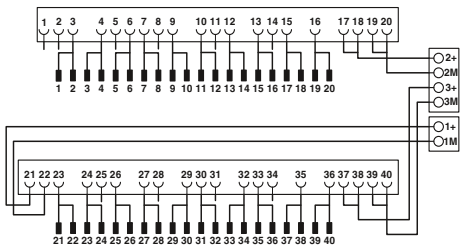
* Only in conjunction with
VIP-2/SC/FLK50 (1-40)/S7, Order No. 2315243,
UM 45-FLK50/ZFKDS/S7-300, Order No. 2968111,
FLKM 50/KDS3-MT/PPA/S7-300, Order No. 2304490.

** 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:
Flat-ribbon cable 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 plug-in connectors.

CABLE-FCN40/1X50/…
– Signal transmission of 1 x 32 channels
– System cable: 40-pos. plug-in connector on 50-pos. flat-ribbon cable strip

CABLE-FCN40/4X14/…
– Signal transmission of 4 x 8 channels
– Splitting cable: 40-pos. plug-in connector on four 14-pos. flat-ribbon cable strips

System cable

Splitting cable

	Technical data	Technical data
Max. perm. operating voltage	< 50 V AC / 60 V DC	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path	1 A	1 A
Max. conductor resistance	0.16 Ω/m	0.16 Ω/m
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C
Conductor cross section	AWG 26 / 0.14 mm²	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated	7 / Cu tin-plated

			Ordering data			Ordering data		
Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Round cable, for output module 6ES7 322-1BP00-0AA0 and 6ES7 322-1BP50-0AA0 (two cables per module)								
	40	0.5 m	**CABLE-FCN40/1X50/ 0,5M/S7-OUT**	**2321017**	1	**CABLE-FCN40/4X14/ 0,5M/S7-OUT**	**2321172**	1
	40	1 m	**CABLE-FCN40/1X50/ 1,0M/S7-OUT**	**2321020**	1	**CABLE-FCN40/4X14/ 1,0M/S7-OUT**	**2321185**	1
	40	2 m	**CABLE-FCN40/1X50/ 2,0M/S7-OUT**	**2321033**	1	**CABLE-FCN40/4X14/ 2,0M/S7-OUT**	**2321198**	1
	40	3 m	**CABLE-FCN40/1X50/ 3,0M/S7-OUT**	**2321046**	1	**CABLE-FCN40/4X14/ 3,0M/S7-OUT**	**2321208**	1
	40	4 m	**CABLE-FCN40/1X50/ 4,0M/S7-OUT**	**2321059**	1	**CABLE-FCN40/4X14/ 4,0M/S7-OUT**	**2321211**	1
	40	6 m	**CABLE-FCN40/1X50/ 6,0M/S7-OUT**	**2321062**	1	**CABLE-FCN40/4X14/ 6,0M/S7-OUT**	**2321224**	1
	40	8 m	**CABLE-FCN40/1X50/ 8,0M/S7-OUT**	**2321075**	1	**CABLE-FCN40/4X14/ 8,0M/S7-OUT**	**2321237**	1
	40	10 m	**CABLE-FCN40/1X50/10,0M/S7-OUT**	**2321088**	1	**CABLE-FCN40/4X14/10,0M/S7-OUT**	**2321240**	1
Round cable, for input module 6ES7 321-1BP00-0AA0 (two cables per module). Plus-reading operation (sinking mode) of the module								
	40	0.5 m	**CABLE-FCN40/1X50/ 0,5M/S7-IN**	**2321091**	1	**CABLE-FCN40/4X14/ 0,5M/S7-IN**	**2321253**	1
	40	1 m	**CABLE-FCN40/1X50/ 1,0M/S7-IN**	**2321101**	1	**CABLE-FCN40/4X14/ 1,0M/S7-IN**	**2321266**	1
	40	2 m	**CABLE-FCN40/1X50/ 2,0M/S7-IN**	**2321114**	1	**CABLE-FCN40/4X14/ 2,0M/S7-IN**	**2321279**	1
	40	3 m	**CABLE-FCN40/1X50/ 3,0M/S7-IN**	**2321127**	1	**CABLE-FCN40/4X14/ 3,0M/S7-IN**	**2321282**	1
	40	4 m	**CABLE-FCN40/1X50/ 4,0M/S7-IN**	**2321130**	1	**CABLE-FCN40/4X14/ 4,0M/S7-IN**	**2321295**	1
	40	6 m	**CABLE-FCN40/1X50/ 6,0M/S7-IN**	**2321143**	1	**CABLE-FCN40/4X14/ 6,0M/S7-IN**	**2321305**	1
	40	8 m	**CABLE-FCN40/1X50/ 8,0M/S7-IN**	**2321156**	1	**CABLE-FCN40/4X14/ 8,0M/S7-IN**	**2321318**	1
	40	10 m	**CABLE-FCN40/1X50/10,0M/S7-IN**	**2321169**	1	**CABLE-FCN40/4X14/10,0M/S7-IN**	**2321321**	1

Siemens SIMATIC® S7-300 Front adapter for MINI MCR

This front adapter is used exclusively for coupling the MINI MCR-SL-V8-FLK 16 A adapter. Changed analog standard signals can be transmitted with the help of these components.

Suitable isolators can be seen from page 66.

For suitable 16-pos. system cable (FLK 16/EZ-DR/...), refer to page 506.

Front adapter for SIMATIC® S7-300, 20-pos. analog I/O boards

Front adapter for analog cards of 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

Technical data

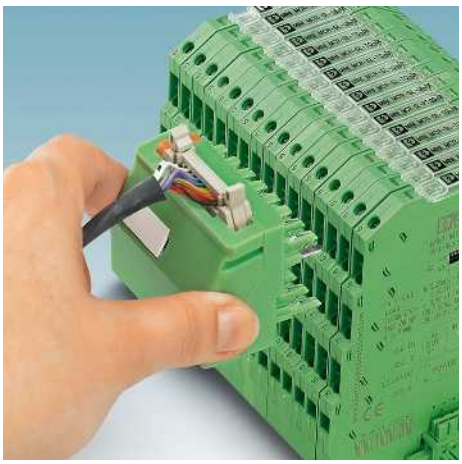
		FLKM 16-PA-S300/MINI-MCR
Max. perm. operating voltage		30 V AC/DC
Max. permissible current		50 mA (per path) 500 mA (per connection, supply via separate power supply)
Ambient temperature (operation)		-20°C ... 60°C
Ambient temperature (storage/transport)		-20°C ... 70°C
Standards/regulations		DIN EN 50178 / DIN EN 50178
Certification data		
Nominal voltage/current	CUL	- / -
Nominal voltage/current	UL	- / -

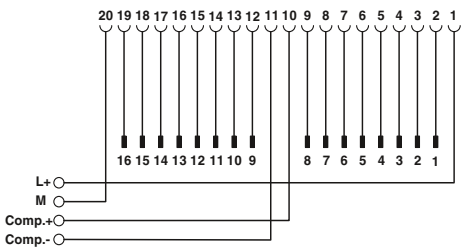
Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter, for SIMATIC® S7-300, only in connection with MINI MCR-SL-V8-FLK 16-A	16	**FLKM 16-PA-S300/MINI-MCR**	**2314749**	1

Accessories

Assembled round cable, with two 16-pos. socket strips	**FLK 16/EZ-DR/ 300/KONFEK**	**2299330**	1
System adapter, for MINI analog modules with screw connection	**MINI MCR-SL-V8-FLK 16-A**	**2811268**	1





FLKM 16-PA-S300/MINI-MCR connection scheme

Explanation:
- Flat-ribbon cable strip
- Connection to I/O card
- Screw terminal blocks for separate supply

Siemens SIMATIC® S7-300 Front adapter for MINI analog system cabling

The FLKM 16-PA-331-1KF/I/MINI-MCR front adapter is used for implementing system cabling in conjunction with the MINI Analog system adapter and a 16-pos. system cable FLK 16/EZ-DR/.../KONFEK; refer to page 506.

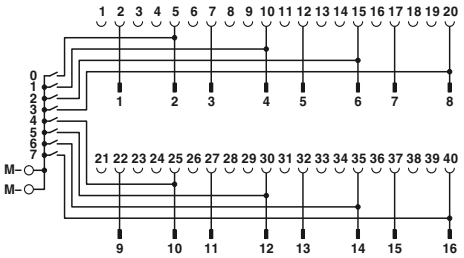
Instead of the conventional front plug, screw terminal blocks are used to snap this component onto the analog module.

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/I/MINI-MCR

Front adapter for SIMATIC® S7-300, 6ES7 331-1KF02-0AB0 analog I/O board

Technical data

Max. perm. operating voltage	30 V AC/DC
Max. permissible current	50 mA (per path)
Rated surge voltage / insulation	0.5 kV / basic insulation
Ambient temperature (operation)	-20°C ... 60°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Standards/regulations	DIN EN 50178 / DIN EN 50178

Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter, for SIMATIC® S7-300, only in connection with MINI MCR-SL-V8-FLK 16-A	16	**FLKM 16-PA- 331-1KF/I/MINI-MCR**	**2318237**	1

Siemens SIMATIC® S7-300 Front adapter for MINI analog system cabling

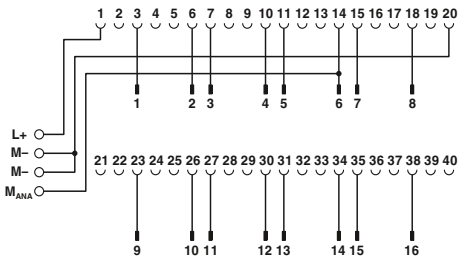
The FLKM 16-PA-332-5HF/I/MINI-MCR front adapter is used for implementing system cabling in conjunction with the MINI Analog system adapter and a 16-pos. system cable FLK 16/EZ-DR/.../KONFEK; refer to page 506.

Instead of the conventional front plug, 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/I/MINI-MCR

Front adapter for SIMATIC® S7-300, 6ES7 332-5HF00-0AB0 analog I/O board

Technical data

Max. perm. operating voltage	30 V AC/DC
Max. permissible current	50 mA (per path) 500 mA (per connection, supply via separate power supply)
Rated surge voltage / insulation	0.5 kV / basic insulation
Ambient temperature (operation)	-20°C ... 60°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Standards/regulations	DIN EN 50178 / DIN EN 50178

Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter, for SIMATIC® S7-300, only in connection with MINI MCR-SL-V8-FLK 16-A	16	**FLKM 16-PA- 332-5HF/I/MINI-MCR**	**2318240**	1

Siemens SIMATIC® S7-1500 System cables for front plugs from the "TOP connect" series

These system cables are connected directly to Siemens "SIMATIC TOP connect" front plugs. A VARIOFACE front adapter is not required. The cables can be used to connect existing 8-channel Phoenix Contact termination boards.

– For passive signal transmission, e.g., VIP-2/SC/FLK14/PLC; Order No. 2315214, see page 470.
– For relay or solid-state relay connection via V8 adapters, e.g., PLC-V8/FLK14/OUT; Order No. 2295554, see page 369.

The system cables are available in the following versions:

– Unshielded
– Shielded
– Halogen-free
– Encapsulated plug-in connector

Details regarding assignment to Siemens modules are provided with the system cable order numbers at www.phoenixcontact.net/products.

N

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path	1 A
Max. conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20°C ... 50°C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Number of positions, control side	16
Number of positions, module side	14
Conductor cross section	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	6.4 mm

Ordering data

Description	Cable length	Type	Order No.	Pcs. / Pkt.
Unshielded round cables, with one 16-pos. and one 14-pos. socket strip in fixed lengths for transmitting 8 channels				
	0.5 m	**FLK 14/16/EZ-DR/ 50/S7**	**2293815**	5
	1 m	**FLK 14/16/EZ-DR/ 100/S7**	**2293828**	1
	1.5 m	**FLK 14/16/EZ-DR/ 150/S7**	**2293831**	1
	2 m	**FLK 14/16/EZ-DR/ 200/S7**	**2293844**	1
	2.5 m	**FLK 14/16/EZ-DR/ 250/S7**	**2293857**	1
	3 m	**FLK 14/16/EZ-DR/ 300/S7**	**2293860**	1
	4 m	**FLK 14/16/EZ-DR/ 400/S7**	**2293886**	1
	5 m	**FLK 14/16/EZ-DR/ 500/S7**	**2293899**	1
	6 m	**FLK 14/16/EZ-DR/ 600/S7**	**2293909**	1
	7 m	**FLK 14/16/EZ-DR/ 700/S7**	**2293912**	1
	8 m	**FLK 14/16/EZ-DR/ 800/S7**	**2293925**	1
	9 m	**FLK 14/16/EZ-DR/ 900/S7**	**2293938**	1
	10 m	**FLK 14/16/EZ-DR/1000/S7**	**2293941**	1
Unshielded round cables, as above, but in variable lengths of type **"FLK EZ-DR/14U/C52/..."**		**FLK EZ-DR.../.../...**	**2295059**	1
Shielded round cables, with one 16-pos. and one 14-pos. socket strip, for transmitting 8 channels in variable lengths of type **"FLK EZ-DR-S/14S/C52/..."**		**FLK EZ-DR-S.../.../...**	**2295046**	1
Unshielded halogen-free round cables, with one 16-pos. and one 14-pos. socket strip, for transmitting 8 channels in variable lengths				

N

Halogen-free (only the cable)

N

One encapsulated plug-in connector (on module side, 14-pos.)

Technical data

< 50 V AC / 60 V DC
1 A
0.16 Ω/m
-20°C ... 50°C
Insulation displacement, IEC 60352-4/DIN EN 60352-4

16
14
AWG 26 / 0.14 mm²
7 / Cu tin-plated
6.4 mm

Technical data

< 50 V AC / 60 V DC
1 A
0.16 Ω/m
-20°C ... 50°C
Insulation displacement, IEC 60352-4/DIN EN 60352-4

16
14
AWG 26 / 0.14 mm²
7 / Cu tin-plated
6.4 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
FLK 14/16/EZ-DR/HF/ 50/S7	**2296919**	1
FLK 14/16/EZ-DR/HF/ 100/S7	**2296922**	1
FLK 14/16/EZ-DR/HF/ 150/S7	**2296935**	1
FLK 14/16/EZ-DR/HF/ 200/S7	**2296948**	1
FLK 14/16/EZ-DR/HF/ 250/S7	**2296951**	1
FLK 14/16/EZ-DR/HF/ 300/S7	**2296964**	1
FLK 14/16/EZ-DR/HF/ 400/S7	**2904525**	1
FLK 14/16/EZ-DR/HF/ 500/S7	**2304704**	1
FLK 14/16/EZ-DR/HF/ 600/S7	**2904526**	1
FLK 14/16/EZ-DR/HF/ 800/S7	**2904527**	1
FLK 14/16/EZ-DR/HF/1000/S7	**2904528**	1
FLK 14-16-EZ-DR-HF-S7/...	**2295693**	1

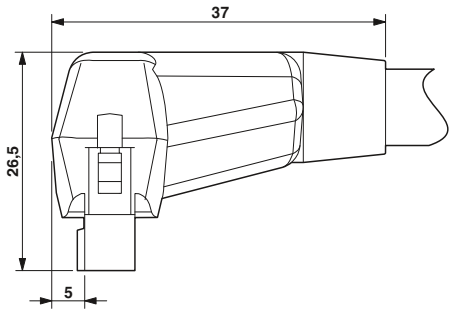
Ordering data

Type	Order No.	Pcs. / Pkt.
VIP-CAB-FLK14/16/0,5M/S7	**2904514**	1
VIP-CAB-FLK14/16/1,0M/S7	**2904515**	1
VIP-CAB-FLK14/16/1,5M/S7	**2904516**	1
VIP-CAB-FLK14/16/2,0M/S7	**2904517**	1
VIP-CAB-FLK14/16/2,5M/S7	**2904518**	1
VIP-CAB-FLK14/16/3,0M/S7	**2904519**	1
VIP-CAB-FLK14/16/4,0M/S7	**2904520**	1
VIP-CAB-FLK14/16/5,0M/S7	**2904521**	1
VIP-CAB-FLK14/16/6,0M/S7	**2904522**	1
VIP-CAB-FLK14/16/8,0M/S7	**2904523**	1
VIP-CAB-FLK14/16/10,0M/S7	**2904524**	1

Pin assignment and color code:
- FLK 14/16/EZ-DR/.../S7
- FLK 14/16/EZ-DR/HF/.../S7
- VIP-CAB-FLK14/16/.../S7

14-pos. socket strip PIN	16-pos. socket strip PIN	Wire color
1	16	Black
2	14	Brown
3	12	Red
4	10	Orange
5	8	Yellow
6	6	Green
7	4	Blue
8	2	Violet
9	9	Gray
10	1	White
11	11	White-black
12	3	White-brown
13	13	White-red
14	5	White-orange
Not used	7	-
Not used	15	-

Encapsulated 14-pos. plug-in connector:



Note:
The following modules cannot be coupled due to the larger outer contour of the molded 14-pos. plug-in connector:
UM 45-FLK14/ 8IM/ZFKDS/PLC, 2965211
UM 45- 8RM/MR-G24/1/PLC, 2962900

Ordering example for unshielded round cable:
Unshielded round cable, assembled with one 14-pos. and one 16-pos. socket strip, 12.70 m long
Type: FLK EZ-DR /14U/C52/...

Quantity	Order No.	Length [m] [1]
1	2295059/14U/C52	/ 12.70

[1]) Min. 0.20 m

14U ≙ 14-pos. unshielded cable
C52 ≙ S7-1500 assembly with 14-pos. socket strip at one end and 16-pos. socket strip at the other

Ordering example for shielded round cable:
Unshielded round cable, assembled with one 14-pos. and one 16-pos. socket strip, 13.20 m long
Type: FLK EZ-DR-S /14S/C52/...

Quantity	Order No.	Length [m] [1]
1	2295046/14S/C52	/ 13.20

[1]) Min. 0.20 m

14S ≙ 14-pos. shielded cable
C52 ≙ S7-1500 assembly with 14-pos. socket strip at one end and 16-pos. socket strip at the other

Ordering example for halogen-free round cable:
Halogen-free round cable, assembled with one 14-pos. and one 16-pos. socket strip, 15.50 m long
Type: FLK 14-16-EZ-DR-HF-S7/...

Quantity	Order No.	Length [m] [1]
1	2295693	/ 15.50

[1]) Min. 0.20 m

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-pos. system cable.

FLKM 50/4-FLK14/PA-S400

– Transmission of max. 32 digital channels via one 14-pos. system cable.

Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.

FLKM 50-PA-S400 (3-48)

– Analog channels are connected via a 50-pos. system cable.

The 1:1 connection of the adapter means that corresponding 1:1 interface modules are connected here

Front adapter for SIMATIC® S7-400

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. permissible current	1 A (per path) 8 A (per connection, supply via separate power supply)
Max. perm. 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 / IEC 60664 / IEC 60664

Ordering data

Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
VARIOFACE front adapter, for				
- SIMATIC® S7-400, 1 x 32 channels can be connected	50	**FLKM 50-PA-S400**	**2294500**	2
- SIMATIC® S7-400, 4 x 8 channels can be connected	14	**FLKM 50/ 4-FLK14/PA-S400**	**2294429**	2
- SIMATIC® S7-400, only analog	50	**FLKM 50-PA-S400(3-48)**	**2294908**	2

Front adapter for I/O modules of the Siemens automation equipment SIMATIC® S7-400

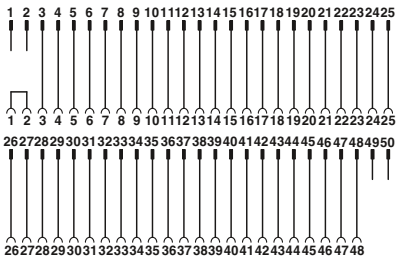
Card type	FLKM 50-PA-S400
Digital input	6ES7 421-1BL01-0AA0 6ES7 421-7BH01-0AB0* 6ES7 421-7DH00-0AB0*
Digital output	6ES7 422-1BL00-0AA0 6ES7 422-7BL00-0AB0

Card type	FLKM 50/4-FLK14/PA-S400
Digital input	6ES7 421-1BL01-0AA0
Digital output	6ES7 422-1BL00-0AA0 6ES7 422-7BL00-0AB0

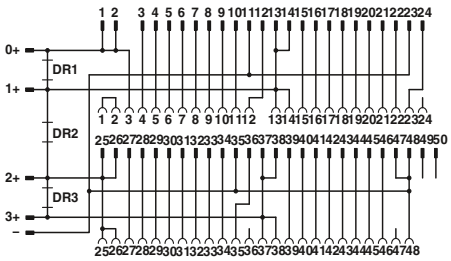
Card type	FLKM 50-PA-S400 (3-48)
Analog input	6ES7 431-0HH00-0AB0** 6ES7 431-1KF00-0AB0** 6ES7 431-1KF10-0AB0** 6ES7 431-1KF20-0AB0** 6ES7 431-7KF00-0AB0** 6ES7 431-7KF10-0AB0** 6ES7 431-7QH00-0AB0**
Analog output	6ES7 432-1HF00-0AB0**

* Only in connection with
VIP-2/SC/FLK50/S7/A-S400, Order No.: 2322359
All wire bridges (DR) on the adapter must be disconnected.

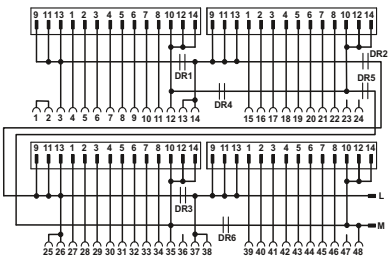
** Only in connection with
VIP-3/SC/FLK50, Order No.: 2315081
UM 45-FLK 50/ZFKDS, Order No.: 2293585
UM 45-FLKS 50/ZFKDS, Order No.: 2968470
FLKM 50/KDS 3-MT/PPA/AN/PLC, Order No.: 2291587



Connection scheme FLKM 50-PA-S400 (3-48)



Connection scheme FLKM 50-PA-S400



Connection scheme: FLKM 50/4-FLK14/PA-S400

Explanation:
Flat-ribbon cable strip
Connection to I/O card
Screw terminal blocks for separate supply

Siemens SIMATIC® S7-400 Adapter for conversion from S5-135/155 to S7-400

The FLKM S135/... adapters connect a SIMATIC® S5 connector wired with individual conductors directly to the SIMATIC® S7-400 basic card.

The SIMATIC® S5 connector is plugged directly onto an S7-400-I/O card with the help of an FFLKM S135/... intermediate adapter.

A new SIMATIC® S7-400 is installed in place of the SIMATIC® S5. The existing field wiring remains intact.

Attention:

The LEDs of the S7-400 module are hidden.

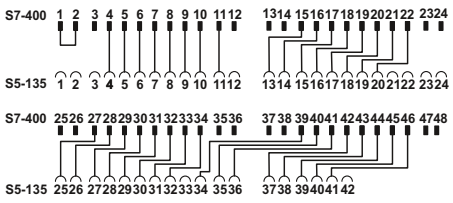
Adapter for Siemens SIMATIC® S5-135/S7-400

Technical data

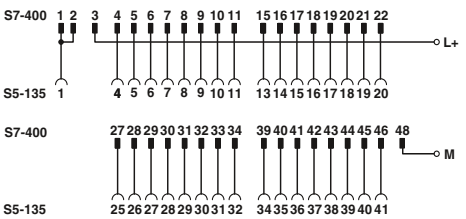
	①	②	③	④
Max. perm. operating voltage	24 V AC/DC	60 V DC	24 V DC	24 V AC/DC
Max. permissible current	4 A (per path)	2 A (per path)	4 A (per path)	4 A (per path)
Test voltage (contact/contact)	500 V (50 Hz, 1 min.)	1.25 kV (50 Hz, 1 min.)	1.25 kV (50 Hz, 1 min.)	1.25 kV (50 Hz, 1 min.)
Ambient temperature (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	-			

Ordering data

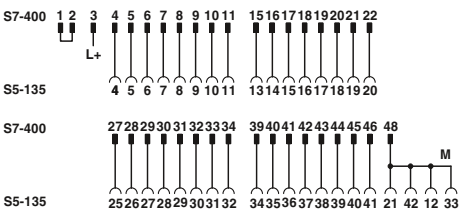
Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
Digital IN 24 V from S5-135/155 to S7-400				
6ES5 420-4UA14 on 6ES7 421-1BL01-0AA0	①	**FLKM S135/S400/SO120**	**2301723**	1
6ES5 430-4UA14 on 6ES7 421-1BL01-0AA0	②	**FLKM S135/S400/SO121**	**2301736**	1
6ES5 431-4UA12 to 6ES7 421-7DH00-0AB0	③	**FLKM S135-431-4UA/S400**	**2314846**	1
6ES5 432-4UA12 on 6ES7 421-1BL01-0AA0	④	**FLKM S135/S400/SO122**	**2301749**	1



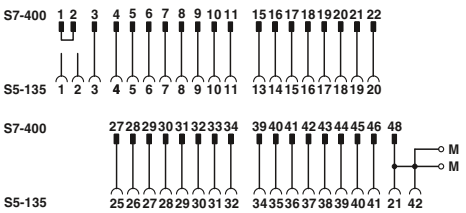
FLKM S135-431-UA/S400 connection scheme



Connection scheme: FLKM S135/S400/SO120



Connection scheme: FLKM S135/S400/SO122



Connection scheme: FLKM S135/S400/SO121

Siemens SIMATIC® S7-400 Adapter for conversion from S5-135/155 to S7-400

The FLKM S135/... adapters connect a SIMATIC® S5 connector wired with individual conductors directly to the SIMATIC® S7-400 basic card.

The SIMATIC® S5 connector is plugged directly onto an S7-400-I/O card to the help of an FFLKM S135/... intermediate adapter.

A new SIMATIC® S7-400 is installed in place of the SIMATIC® S5. The existing field wiring remains intact.

Attention:

The LEDs of the S7-400 module are hidden.

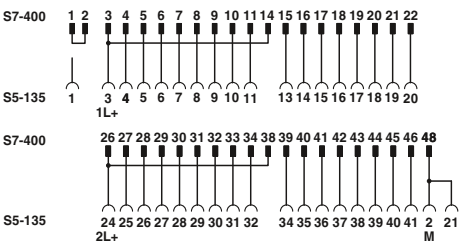
Front adapter for SIMATIC S5-135/S7-400

Technical data

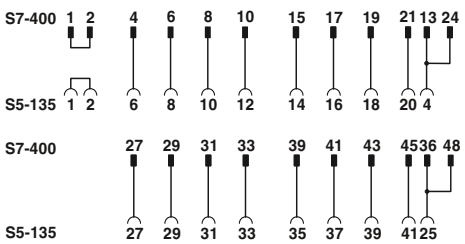
	①	②	③	④
Max. perm. operating voltage	230 V AC/DC	24 V AC/DC	24 V DC	24 V DC
Max. permissible current	4 A (per path)	4 A (per path)	4 A (per path)	4 A (per path)
Test voltage (contact/contact)	1.5 kV (50 Hz, 1 min.)	500 V (50 Hz, 1 min.)	1.25 kV (50 Hz, 1 min.)	500 V (50 Hz, 1 min.)
Ambient temperature (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	-			

Ordering data

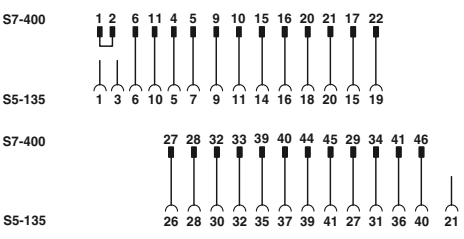
Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
Digital IN 120/230 V UC from S5-135/155 to S7-400				
6ES5 436-4UA12 to 6ES7 421-1FH20-0AA0	①	**FLKM S135/S400/SO123**	**2301752**	1
Digital OUT 24 V from S5-135/155 to S7-400				
6ES5 441-4UA12 to 6ES7 422-1BL00-0AA0	②	**FLKM S135/S400/SO125**	**2301778**	1
6ES5 451-4UA14 to 6ES7 422-1BL00-0AA0	③	**FLKM S135/S400/SO126**	**2301781**	1
Digital OUT 24 V DC / 2 A from S5-135/155 to S7-400				
6ES5 453-4UA12 to 6ES7 422-1HH00-0AA0	④	**FLKM S135/S400/SO127**	**2301794**	1



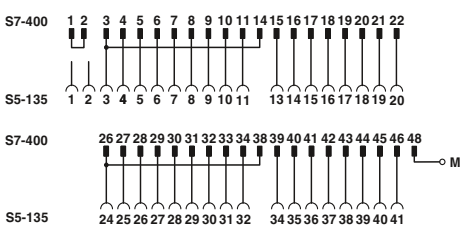
Connection scheme: FLKM S135/S400/SO126



Connection scheme: FLKM S135/S400/SO123



Connection scheme: FLKM S135/S400/SO127



Connection scheme: FLKM S135/S400/SO125

Siemens SIMATIC® S7-400 Adapter for conversion from S5-135/155 to S7-400

The FLKM S135/... adapters connect a SIMATIC® S5 connector wired with individual conductors directly to the SIMATIC® S7-400 basic card.

The SIMATIC® S5 connector is plugged directly onto an S7-400-I/O card to the help of an FFLKM S135/... intermediate adapter.

A new SIMATIC® S7-400 is installed in place of the SIMATIC® S5. The existing field wiring remains intact.

Attention:

The LEDs of the S7-400 module are hidden.

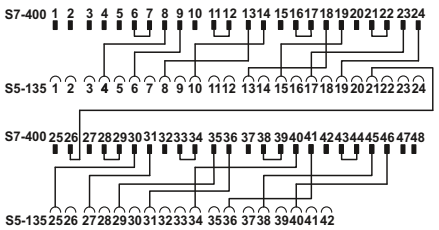
Adapter for Siemens SIMATIC® S5-135/S7-400

Technical data

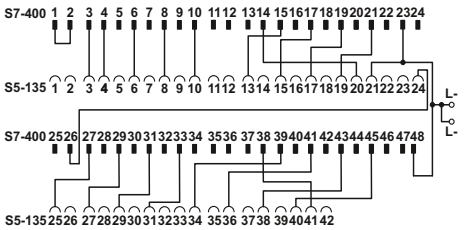
	①	②	③	④
Max. perm. operating voltage	24 V DC	230 V AC	24 V DC	24 V DC
Max. permissible current	4 A (per path)	4 A (per path)	4 A (per path)	4 A (per path)
Test voltage (contact/contact)	1.25 kV (50 Hz, 1 min.)	1.5 kV (50 Hz, 1 min.)	500 V (50 Hz, 1 min.)	500 V (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C	-20°C ... 50°C	-20°C ... 50°C
Mounting position	Vertical	Vertical	Vertical	Vertical
Standards/regulations	-			

Ordering data

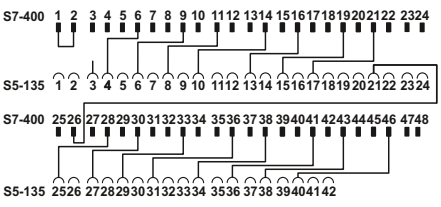
Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
Digital OUT 24 V DC / 2 A from S5-135/155 to S7-400				
6ES5 454-4UA14 to 6ES7 422-1BH11-0AA0	①	**FLKM S135-454-4UA/S400**	**2314859**	1
Digital OUT 230 V UC / 2 A from S5-135/155 to S7-400				
6ES5 456-4UA12 to 6ES7 422-1FH00-0AA0	②	**FLKM S135/S400/SO124**	**2301765**	1
Analog IN (only current measurement) from S5-135/155 to S7-400				
6ES5 460-4UA13 to 6ES7 431-1KF00-0AB0	③	**FLKM S135-460-4UA/I/S400**	**2314613**	1
Analog IN (only voltage measurement) from S5-135/155 to S7-400				
6ES5 460-4UA13 to 6ES7 431-1KF00-0AB0	④	**FLKM S135-460-4UA/U/S400**	**2314862**	1



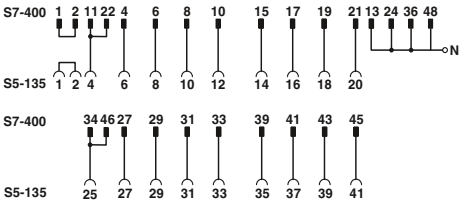
FLKM S135-460-4UA/I/S400 connection scheme



FLKM S135-454-4UA/S400 connection scheme



Connection scheme: FLKM S135-460-4UA/U/S400



Connection scheme: FLKM S135/S400/SO124

Siemens SIMATIC® S7-400 Adapter for conversion from S5-135/155 to S7-400

The FLKM S135/... adapters connect a SIMATIC® S5 connector wired with individual conductors directly to the SIMATIC® S7-400 basic card.

The SIMATIC® S5 connector is plugged directly onto an S7-400-I/O card to the help of an FFLKM S135/... intermediate adapter.

A new SIMATIC® S7-400 is installed in place of the SIMATIC® S5. The existing field wiring remains intact.

Attention:

The LEDs of the S7-400 module are hidden.

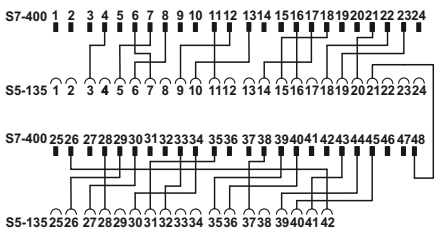
Adapter for Siemens SIMATIC® S5-135/S7-400

Technical data

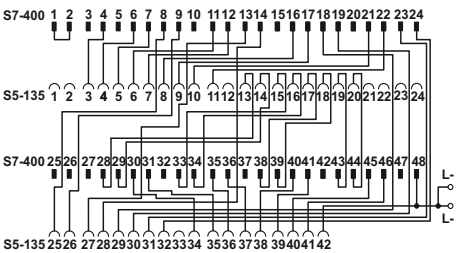
	①	②	③	④
Max. perm. operating voltage	24 V DC	24 V DC	24 V DC	24 V DC
Max. permissible current	2 A (per path)	4 A (per path)	4 A (per path)	4 A (per path)
Test voltage (contact/contact)	500 V (50 Hz, 1 min.)	500 V (50 Hz, 1 min.)	500 V (50 Hz, 1 min.)	500 V (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C	-20°C ... 50°C	-20°C ... 50°C
Mounting position	Any	Any	Any	Any
Standards/regulations	-			

Ordering data

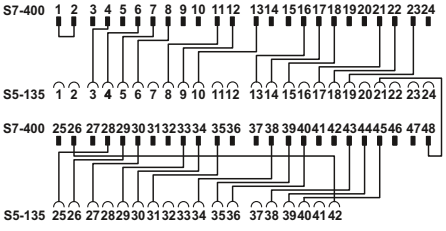
Description	No. of pos.	Type	Order No.	Pcs. / Pkt.
Analog IN (only Pt 100) from S5-135/155 to S7-400				
6ES5 465-4UA13 to 6ES7 431-7KF10-0AB0	①	**FLKM S135-465-4UA/T/S400**	**2314875**	1
Analog IN (only current and voltage measurement) from S5-135/155 to S7-400 6ES5 465-4UA13 to 6ES7 431-0HH00-0AB0 6ES5 465-4UA13 to 6ES7 431-7QH00-0AB0	②	**FLKM S135-465-4UA/UI/S400**	**2314888**	1
Analog OUT (only current output) from S5-135/155 to S7-400				
6ES5 470-4UA13 to 6ES7 432-1HF00-0AB0 6ES5 470-4UC13 to 6ES7 432-1HF00-0AB0	③	**FLKM S135-470-4UC/I/S400**	**2314626**	1
Analog OUT (only voltage output) from S5-135/155 to S7-400				
6ES5 470-4UA13 to 6ES7 432-1HF00-0AB0 6ES5 470-4UB13 to 6ES7 432-1HF00-0AB0 6ES5 470-4UC13 to 6ES7 432-1HF00-0AB0	④	**FLKM S135-470-4UC/U/S400**	**2314891**	1



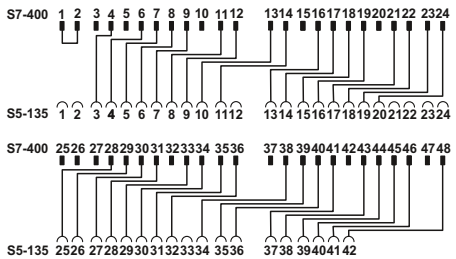
Connection scheme FLKM S135-470-4UC/I/S400



FLKM S135-465-4UA/T/S400 connection scheme



Connection scheme FLKM S135-470-4UC/U/S400



FLKM S135-465-4UA/UI/S400 connection scheme

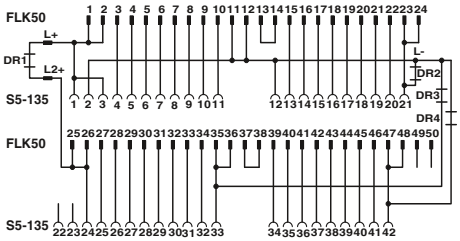
Siemens SIMATIC® S7-300 Adapter for conversion from S5-135/155 to S7-300

S5-S7 adapters connect the S5-135 front adapters wired with individual wires to the I/O modules of the S7.

With the help 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 50-pos. system cable FLK 50/EZ-DR/.../KONFEK and a front adapter for the SIMATIC® S7 (FLKM 50-PA-S300) now connect the signals with the I/O module.

Notes:

Due to the geometry, it is not possible to couple any molded FLK connectors (e.g., VIP-PA...S7).



FLKM S135/S7/FLK50/PLC connection scheme

Converter for Siemens SIMATIC® S5-135 to 50-pos. FLK strip.

Technical data

Max. perm. operating voltage	50 V AC/DC
Max. 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	DIN EN 50178 / DIN EN 50178

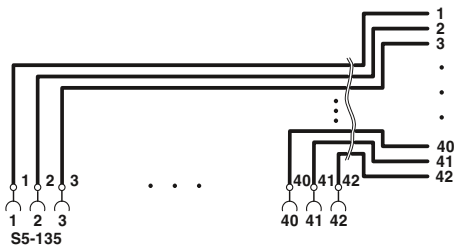
Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Digital IN or OUT 24 V DC from S5-135 to S7-300 **IN** 6ES5 420-4UA14 to 6ES7 321-1BL00-0AA0 6ES5 430-4UA14 to 6ES7 321-1BL00-0AA0 **OUT** 6ES5 441-4UA14 to 6ES7 322-1BL00-0AA0 6ES5 451-4UA14 to 6ES7 322-1BL00-0AA0	**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 commissioning adapters. The open cable end can be connected to various controllers such as S7-400 or S7-300. This means that 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.

If the system functions with the new controller without problems, the S5-135 can now be replaced.



Technical data

Max. perm. operating voltage	250 V AC/DC
Max. permissible current	6 A (per path)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 80°C
Mounting position	Any
Standards/regulations	EN 60664-1

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Connection of all S5-135 connections (1 to 42) at the open cable end	**FLKM S135/42X0,75/3,0M/OE**	**2315007**	1
	FLKM S135/42X0,75/5,0M/OE	**2318017**	1

Siemens SIMATIC® S7-400 Adapter for conversion from S5-115 to S7-400

The FLKM S115/... adapters connect a SIMATIC® S5 connector wired with individual conductors directly to the SIMATIC® S7-400 basic card.

The SIMATIC® S5 connector is plugged directly onto an S7-400-I/O card to the help of an FFLKM S115/... intermediate adapter.

A new SIMATIC® S7-400 is installed in place of the SIMATIC® S5. The existing field wiring remains intact.

Attention:

Due to the geometry, it is only possible to use every second slot. The LEDs of the S7-400 module are hidden by the S5-115 adapter.

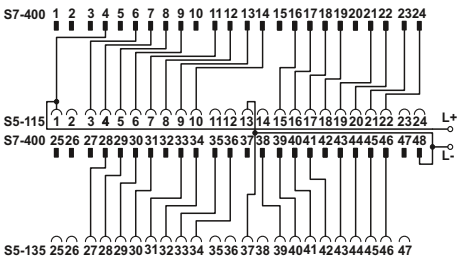
Adapter for Siemens SIMATIC® S5-115/S7-400

Technical data

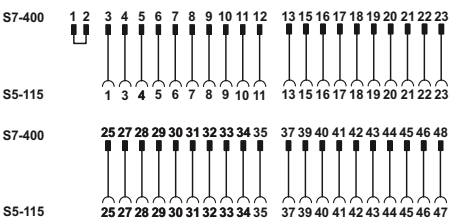
Max. perm. operating voltage	24 V AC/DC
Max. permissible current	4 A (per path) 4 A (per connection, supply via separate power supply)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Mounting position	Vertical
Standards/regulations	DIN EN 50178 / DIN EN 50178

Ordering data

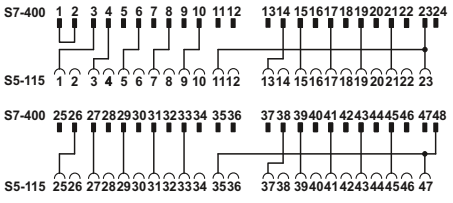
Description	Type	Order No.	Pcs. / Pkt.
Digital IN or OUT 24 V DC from S5-115 to S7-400			
IN 6ES5 420-7LA11 to 6ES7 421-1BL01-0AA0 6ES5 430-7LA11 to 6ES7 421-1BL01-0AA0 **OUT** 6ES5 441-7LA11 to 6ES7 422-1BL00-0AA0 6ES5 451-7LA11 to 6ES7 422-1BL00-0AA0	**FLKM S115/S400/SO155**	**2307248**	1
Digital OUT 24 V DC from S5-115 to S7-400			
6ES5 454-7LA12 to 6ES7 422-1BH11-0AA0	**FLKM S115-454-7LA/S400**	**2314901**	1
Analog IN (only current and voltage measurement) from S5-115 to S7-400 6ES5 465-7LA13 to 6ES7 431-0HH00-0AB0 6ES5 465-7LA13 to 6ES7 431-7QH00-0AB0	**FLKM S115-465-7LA/UI/S400**	**2314914**	1



FLKM S115-465-7LA/UI/S400 connection scheme



Connection scheme: FLKM S115/S400/SO155



FLKM S115-454-7LA/S400 connection scheme

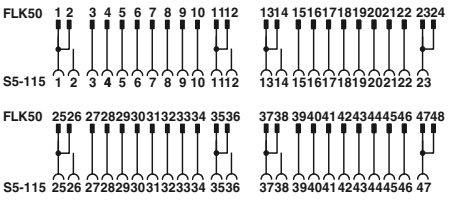
Siemens SIMATIC® S7-300 Adapter for conversion from S5-115 to S7-300

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 50-pos. system cable FLK 50/EZ-DR/.../KONFEK and a front adapter for the SIMATIC® S7 (FLKM 50-PA-S300) now connect the signals with the I/O module.

Notes:

Due to the geometry, it is not possible to couple any molded FLK connectors (e.g., VIP-PA...S7).



Connection scheme: FLKM S115/S7/FLK50/PLC/SO137

Converter for Siemens SIMATIC® S5-115 to 50-pos. FLK strip.

Technical data

Max. perm. operating voltage	24 V AC/DC
Max. permissible current	1 A (per path)
Max. perm. total current	2 A (per byte)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Standards/regulations	DIN EN 50178 / DIN EN 50178

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Digital IN or OUT 24 V DC from S5-115 through converters, system cables, and front adapters to S7-300			
IN 6ES5 420-7LA11 on 6ES7 321-1BL00-0AA0 6ES5 430-7LA11 on 6ES7 321-1BL00-0AA0 **OUT** 6ES5 441-7LA11 on 6ES7 322-1BL00-0AA0 6ES5 451-7LA11 on 6ES7 322-1BL00-0AA0	**FLKM S115/S7/FLK50/PLC/SO137**	**2306294**	1

Commissioning 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 commissioning adapters. The open cable end can be connected to various controllers such as S7-400 or S7-300. This means that 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.

If the system functions with the new controller without problems, the S5-115 can now be replaced.

Technical data

Max. perm. operating voltage	250 V AC/DC
Max. permissible current	6 A (per path)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 80°C
Mounting position	Any
Standards/regulations	EN 60664-1

Ordering data

Description	Type	Order No.	Pcs. / Pkt.
Connection of all S5-115 connections (1 to 23, 25 to 47) at the open cable end			
	FLKM S115/47X0,75/3,0M/OE	**2314985**	1
	FLKM S115/47X0,75/5,0M/OE	**2314998**	1

YOKOGAWA Centum CS3000 R3 System cable

These shielded system cables for digital (50-pos.) and analog (40-pos.) I/O modules are connected directly to the modules. An intermediate adapter is not required. Features:

– Molded plug-in connector
– Can be screwed
– Lateral cable outlet of the I/O module
– KS/AKB-compatible plug-in connectors on the module side

Technical data

Max. perm. operating voltage		30 V DC
Max. perm. current carrying capacity per path		500 mA
Max. conductor resistance		0.16 Ω/m
Ambient temperature (operation)		-20°C ... 50°C
Conductor cross section		AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter		
	50 -position	11 mm
	40 -position	11 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
50-pos. YUC cables, for digital I/O modules					
	50	2 m	**FLK 50-PA/EZ-DR/KS/ 200/YUC**	**2314299**	1
	50	3 m	**FLK 50-PA/EZ-DR/KS/ 300/YUC**	**2314309**	1
	50	4 m	**FLK 50-PA/EZ-DR/KS/ 400/YUC**	**2314312**	1
	50	5 m	**FLK 50-PA/EZ-DR/KS/ 500/YUC**	**2321499**	1
	50	6 m	**FLK 50-PA/EZ-DR/KS/ 600/YUC**	**2314927**	1
	50	7 m	**FLK 50-PA/EZ-DR/KS/ 700/YUC**	**2321509**	1
	50	8 m	**FLK 50-PA/EZ-DR/KS/ 800/YUC**	**2314930**	1
	50	9 m	**FLK 50-PA/EZ-DR/KS/ 900/YUC**	**2321512**	1
	50	10 m	**FLK 50-PA/EZ-DR/KS/1000/YUC**	**2314325**	1
	50	11 m	**FLK 50-PA/EZ-DR/KS/1100/YUC**	**2321389**	1
	50	12 m	**FLK 50-PA/EZ-DR/KS/1200/YUC**	**2321525**	1
	50	13 m	**FLK 50-PA/EZ-DR/KS/1300/YUC**	**2321392**	1
	50	14 m	**FLK 50-PA/EZ-DR/KS/1400/YUC**	**2321402**	1
	50	15 m	**FLK 50-PA/EZ-DR/KS/1500/YUC**	**2314338**	1
	50	16 m	**FLK 50-PA/EZ-DR/KS/1600/YUC**	**2321538**	1
	50	17 m	**FLK 50-PA/EZ-DR/KS/1700/YUC**	**2321541**	1
	50	18 m	**FLK 50-PA/EZ-DR/KS/1800/YUC**	**2321554**	1
	50	19 m	**FLK 50-PA/EZ-DR/KS/1900/YUC**	**2321567**	1
	50	20 m	**FLK 50-PA/EZ-DR/KS/2000/YUC**	**2314503**	1
	50	25 m	**FLK 50-PA/EZ-DR/KS/2500/YUC**	**2314516**	1
	50	30 m	**FLK 50-PA/EZ-DR/KS/3000/YUC**	**2314529**	1
40-pos. YUC cables, for analog I/O modules					
	40	1 m	**FLK 40-PA/EZ-DR/KS/ 100/YUC**	**2322786**	1
	40	2 m	**FLK 40-PA/EZ-DR/KS/ 200/YUC**	**2314341**	1
	40	3 m	**FLK 40-PA/EZ-DR/KS/ 300/YUC**	**2314354**	1
	40	4 m	**FLK 40-PA/EZ-DR/KS/ 400/YUC**	**2314367**	1
	40	5 m	**FLK 40-PA/EZ-DR/KS/ 500/YUC**	**2321570**	1
	40	6 m	**FLK 40-PA/EZ-DR/KS/ 600/YUC**	**2314943**	1
	40	7 m	**FLK 40-PA/EZ-DR/KS/ 700/YUC**	**2321583**	1
	40	8 m	**FLK 40-PA/EZ-DR/KS/ 800/YUC**	**2314956**	1
	40	9 m	**FLK 40-PA/EZ-DR/KS/ 900/YUC**	**2321415**	1
	40	10 m	**FLK 40-PA/EZ-DR/KS/1000/YUC**	**2314370**	1
	40	11 m	**FLK 40-PA/EZ-DR/KS/1100/YUC**	**2321428**	1
	40	12 m	**FLK 40-PA/EZ-DR/KS/1200/YUC**	**2321431**	1
	40	13 m	**FLK 40-PA/EZ-DR/KS/1300/YUC**	**2321444**	1
	40	14 m	**FLK 40-PA/EZ-DR/KS/1400/YUC**	**2321457**	1
	40	15 m	**FLK 40-PA/EZ-DR/KS/1500/YUC**	**2314383**	1
	40	16 m	**FLK 40-PA/EZ-DR/KS/1600/YUC**	**2321596**	1
	40	17 m	**FLK 40-PA/EZ-DR/KS/1700/YUC**	**2321606**	1
	40	18 m	**FLK 40-PA/EZ-DR/KS/1800/YUC**	**2321619**	1
	40	19 m	**FLK 40-PA/EZ-DR/KS/1900/YUC**	**2321622**	1
	40	20 m	**FLK 40-PA/EZ-DR/KS/2000/YUC**	**2314532**	1
	40	25 m	**FLK 40-PA/EZ-DR/KS/2500/YUC**	**2314545**	1
	40	30 m	**FLK 40-PA/EZ-DR/KS/3000/YUC**	**2314558**	1

YOKOGAWA Centum CS3000 R3 System cable

These system cables for digital I/O modules are connected directly to the modules. An intermediate adapter is not required.
Features:

– Lateral cable outlet of the I/O module
– Four 14-pos. plug-in connectors on the module side for connection of four 8-channel VARIOFACE modules of the system cabling

Technical data

Max. perm. operating voltage		30 V DC
Max. perm. current carrying capacity per path		500 mA
Max. conductor resistance		0.16 Ω/m
Ambient temperature (operation)		-20°C ... 50°C
Conductor cross section		AWG 26 / 0.14 mm²
Outside diameter		
	50 -position	11 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
System cable 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 CS3000 R3 System cable for MINI analog system cabling

The Yokogawa **CABLE-40/2FLK16/.../YUC** system cable makes it possible to connect 16 MINI analog modules to a Yokogawa control system. In conjunction with two MINI analog MINI MCR-SL-V8-FLK-16-A system adapters, the Yokogawa system cable provides a simple and economical "Plug and Play" solution.

The system cable is plugged directly into the Yokogawa module. Two 16-pos. flat-ribbon cable plug-in connectors are provided for connecting the module to the MINI analog system adapters.

The system cable in conjunction with **4-conductor measuring transducers** is suitable for the following analog cards:

– AAI 141
– AAI 143

Technical data

Max. perm. operating voltage		30 V DC
Max. perm. current carrying capacity per path		500 mA
Max. conductor resistance		0.16 Ω/m
Ambient temperature (operation)		-20°C ... 50°C
Conductor cross section		AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter		
	40 -position	11 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
System cable, 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

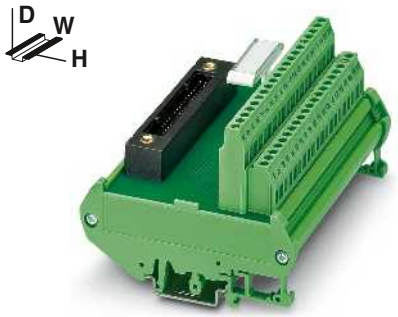
YOKOGAWA Centum CS3000 R3 Controller boards

These modules are connected to the I/O modules through the YUC system cable.

FLKM-KS40/YCS:

– For analog modules
– Universal interface module with 40 connection terminal blocks

For more cabling solutions for Yokogawa: www.phoenixcontact.com



Passive interface modules

Technical data

Max. perm. operating voltage		24 V AC/DC ±10%
Max. perm. current (per branch)		1 A
Test voltage (contact/contact)		500 V (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		DIN EN 50178,
Connection method	Field level	Screw connection
	Control system level	Yokogawa KS-compatible
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	90 mm / 68 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
Controller board, for analog I/O modules					
	40	112 mm	**FLKM-KS40/YCS**	**2314642**	1

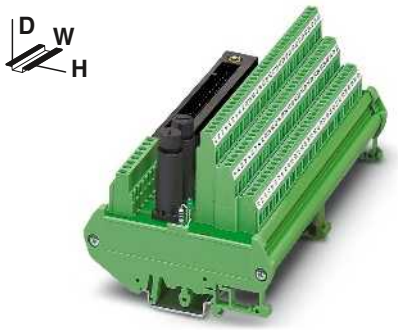
YOKOGAWA Centum CS3000 R3 Controller boards

These modules are connected to the I/O modules through the YUC system cable.

FLKMS-KS50/32IM/YCS:

– For digital modules ADV 151 and ADV 551
– Three-conductor connection (signal, plus, minus)
– Redundant voltage supply (fuse IEC 127-2, 5 x 20, 2 A)

For more cabling solutions for Yokogawa: www.phoenixcontact.com



Passive interface modules

Technical data

Max. perm. operating voltage		24 V AC/DC ±10%
Max. perm. current (per branch)		1 A
Test voltage (contact/contact)		500 V (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		DIN EN 50178,
Connection method	Field level	Screw connection
	Control system level	Yokogawa KS-compatible
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	90 mm / 81 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
Controller board, for digital I/O modules ADV 151 and ADV 551					
	50	174 mm	**FLKMS-KS50/32IM/YCS**	**2314451**	1

YOKOGAWA Centum CS3000 R3 Controller boards

These modules are connected to the analog I/O modules through the 40-pos. YUC system cable.

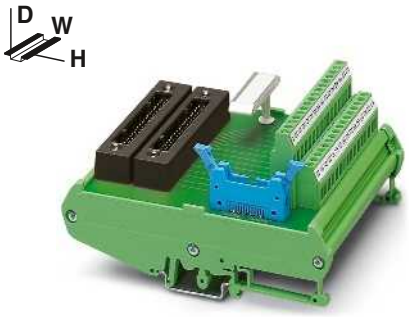
The modules are designed for redundant signal transmission (two plug-in connectors in parallel). A separate connection to the HART multiplexer is possible.

FLKM-KS40/AO16/YCS
– For analog module AAI 543

FLKMS-KS40/SI/AI16/YCS
– For analog modules AAI 141 and AAI 143 (operation of modules in the 4-conductor mode)
– Transfer of 16 channels with separate positive and negative connections
– 16 plug-in 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 analog modules AAI 141 and AAI 143 (operation of modules in the 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)

For more cabling solutions for Yokogawa: www.phoenixcontact.com



Interface modules for analog I/O modules

Technical data

Max. perm. operating voltage		24 V DC ±10%
Max. perm. current (per branch)		100 mA
Test voltage (contact/contact)		500 V (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		DIN EN 50178,
Connection method	Field level	Screw connection
	Control system level	Yokogawa KS-compatible
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	126 mm / 68 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
Controller board, for analog output modules AAI 543	40	108 mm	**FLKM-KS40/AO16/YCS**	**2314260**	1
Controller board, with fuses and LED, for analog input modules AAI 141 and AAI 143	40	214 mm	**FLKMS-KS40/SI/AI16/YCS**	**2314273**	1
Controller board, for analog input modules AAI 141 and AAI 143, without fuses and LED	40	214 mm	**FLKMS-KS40/AI/YCS**	**2314286**	1

VIP termination boards for 8 channels

N

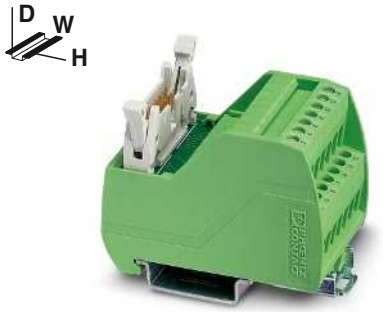
These VIP - VARIOFACE Professional modules are used in combination with 14-pos. system cables and the relevant front adapters.

Features:

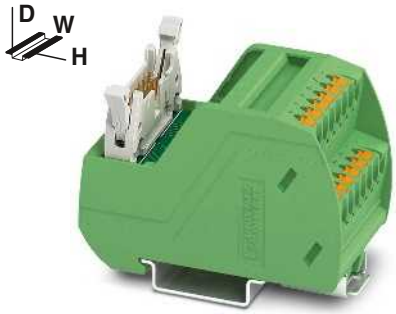
– Byte-wise labeling
– For digital I/O modules
– Optionally with LED.

Notes:

For marking systems (e.g., “ZB 22:UNBEDRUCKT”; Order No. 0811862) and mounting material, see Catalog 5.



Passive interface modules for input/output with screw connection



Passive interface modules for input/output with push-in connection

Technical data

		VIP-2/.../FLK14/PLC	VIP-2/.../FLK14/LED/PLC
Max. perm. operating voltage		60 V AC/DC	24 V DC
Max. perm. current (per branch)		1 A	1 A
Max total current (voltage supply)		3 A	3 A
Rated surge voltage		0.6 kV	0.6 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Screw connection	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Dimensions	H / D	65.5 mm / 56 mm	

Technical data

		VIP-2/.../FLK14/PLC	VIP-2/.../FLK14/LED/PLC
Max. perm. operating voltage		60 V AC/DC	24 V DC
Max. perm. current (per branch)		1 A	1 A
Max total current (voltage supply)		3 A	3 A
Rated surge voltage		0.6 kV	0.6 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Push-in connection	Push-in connection
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14	
Dimensions	H / D	72.1 mm / 56 mm	

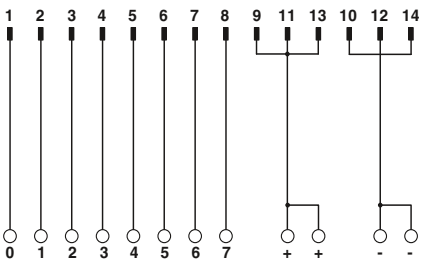
Description	No. of pos.	Module width W
VARIOFACE interface module, for eight channels,		
- with screw connection	14	39.8 mm
- with push-in connection	14	41.9 mm
VARIOFACE interface module, for eight channels with light indicator,		
- with screw connection	14	39.8 mm
- with push-in connection	14	41.9 mm

Ordering data

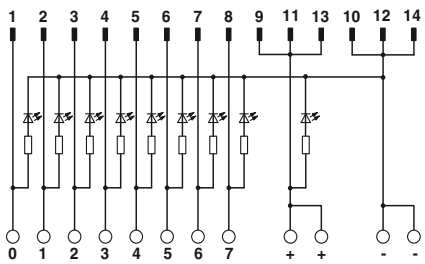
Type	Order No.	Pcs. / Pkt.
VIP-2/SC/FLK14/PLC	**2315214**	1
VIP-2/SC/FLK14/LED/PLC	**2322249**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
VIP-2/PT/FLK14/PLC	**2903801**	1
VIP-2/PT/FLK14/LED/PLC	**2904279**	1



VIP-2/SC/FLK14/PLC connection scheme



Connection scheme VIP-2/SC/FLK14/LED/PLC

N

VIP termination boards for 32 channels

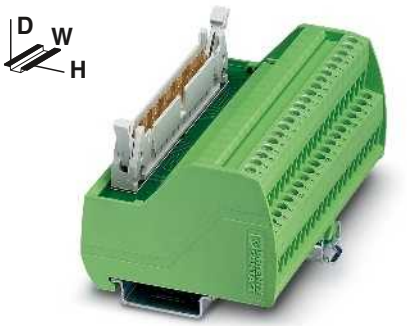
These VIP - VARIOFACE Professional modules are used in combination with 50-pos. system cables and the relevant front adapters.

Features:

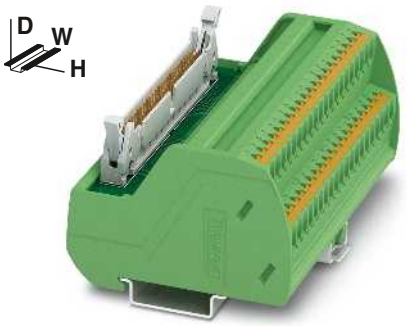
– Byte-wise labeling
– For digital I/O modules
– Optionally with LED.

Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No, 0811862) and mounting material, see Catalog 5.



Passive interface modules for input/output with screw connection



Passive interface modules for input/output with push-in connection

Technical data

		VIP-2/.../FLK50/PLC	VIP-2/.../FLK50/LED/PLC
Max. perm. operating voltage		60 V AC/DC	24 V DC
Max. perm. current (per branch)		1 A	1 A
Max total current (voltage supply)		2 A (per byte)	2 A (per byte)
Rated surge voltage		0.6 kV	0.6 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Screw connection	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Dimensions	H / D	65.5 mm / 56 mm	

Technical data

		VIP-2/.../FLK50/PLC	VIP-2/.../FLK50/LED/PLC
Max. perm. operating voltage		60 V AC/DC	24 V DC
Max. perm. current (per branch)		1 A	1 A
Max total current (voltage supply)		2 A (per byte)	2 A (per byte)
Rated surge voltage		0.6 kV	0.6 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Push-in connection	Push-in connection
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14	
Dimensions	H / D	72.1 mm / 56 mm	

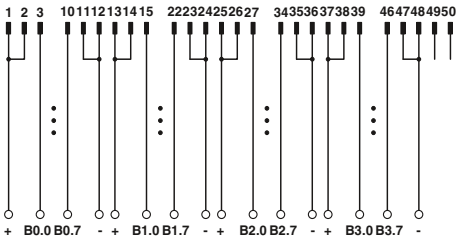
Description	No. of pos.	Module width W
VARIOFACE interface module, for 32 channels,		
- with screw connection	50	106.1 mm
- with push-in connection	50	107.9 mm
VARIOFACE interface module, for 32 channels with light indicator,		
- with screw connection	50	106.1 mm
- with push-in connection	50	107.9 mm

Ordering data

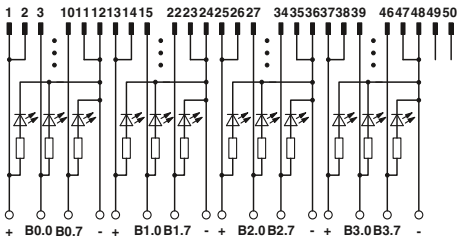
Type	Order No.	Pcs. / Pkt.
VIP-2/SC/FLK50/PLC	**2315227**	1
VIP-2/SC/FLK50/LED/PLC	**2322252**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
VIP-2/PT/FLK50/PLC	**2903803**	1
VIP-2/PT/FLK50/LED/PLC	**2904280**	1



VIP-2/SC/FLK50/PLC connection scheme



Connection scheme VIP-2/SC/FLK50/LED/PLC

VIP termination boards for SIMATIC® S7

These VIP - VARIOFACE Professional modules are used in combination with 50-pos. system cables and the relevant front adapters for SIMATIC® S7.

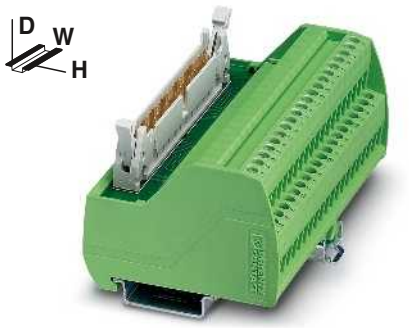
Features:

– Numerical marking
– Specifically for S7-300 or S7-400

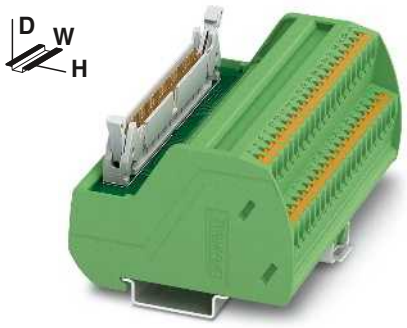
Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 5.

N



Passive interface modules for input/output, with SIMATIC®-specific marking and screw connection



Passive interface modules for input/output, with SIMATIC®-specific marking and push-in connection

Technical data

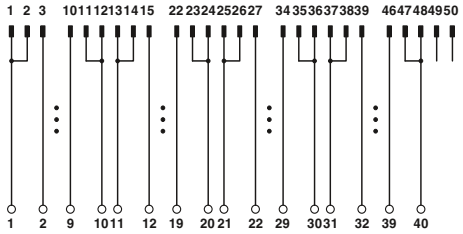
Max. perm. operating voltage		60 V AC/DC
Max. perm. current (per branch)		1 A
Rated surge voltage		0.6 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	65.5 mm / 56 mm

Technical data

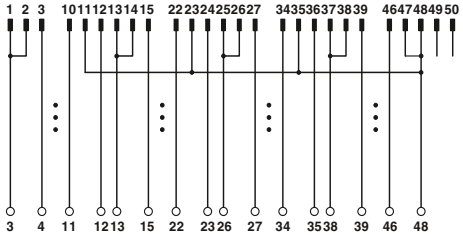
Max. perm. operating voltage		60 V AC/DC
Max. perm. current (per branch)		1 A
Rated surge voltage		0.6 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Push-in connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 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 interface module, with SIMATIC® S7-300-specific marking from 1 to 40					
- with screw connection	50	106.1 mm	**VIP-2/SC/FLK50 (1-40) /S7**	**2315243**	1
- with push-in connection	50	107.9 mm	**VIP-2/PT/FLK50 (1-40) /S7**	**2903804**	1
VARIOFACE interface module, with SIMATIC® S7-400-specific marking from 3 to 48					
- with screw connection	50	106.1 mm	**VIP-2/SC/FLK50/S7/A-S400**	**2322359**	1
- with push-in connection	50	107.9 mm	**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

N

VIP termination boards for MODICON® TSX Quantum and Allen-Bradley ControlLogix

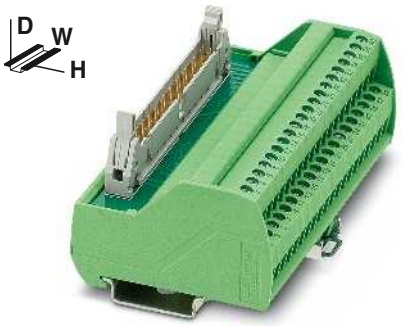
These VIP - VARIOFACE Professional modules are used in combination with 50-pos. system cables and the relevant front adapters.

Features:

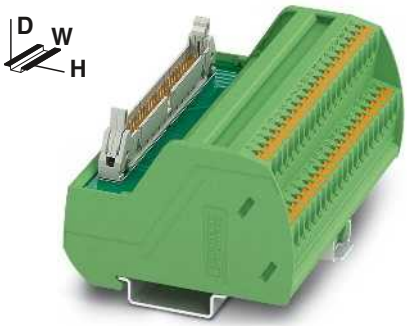
– Specific marking
– Specifically for MODICON TSX Quantum or ControlLogix

Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 5.



Passive interface modules for input/output, with specific marking and screw connection



Passive interface modules for input/output, with specific marking and push-in connection

Technical data

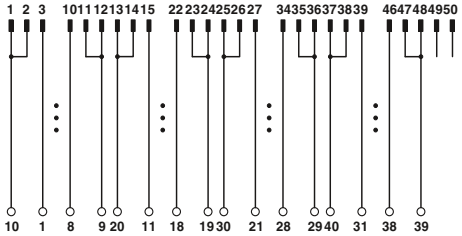
Max. perm. operating voltage		60 V AC/DC
Max. perm. current (per branch)		1 A
Rated surge voltage		0.6 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	65.5 mm / 56 mm

Technical data

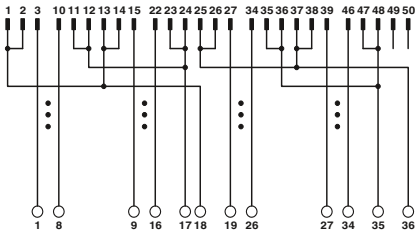
Max. perm. operating voltage		60 V AC/DC
Max. perm. current (per branch)		1 A
Rated surge voltage		0.6 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Push-in connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 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 interface module, with MODICON® TSX Quantum-specific marking from 1 to 40					
- with screw connection	50	106.1 mm	**VIP-2/SC/FLK50/MODI-TSX/Q**	**2322304**	1
- with push-in connection	50	107.9 mm	**VIP-2/PT/FLK50/MODI-TSX/Q**	**2904285**	1
VARIOFACE interface module, with ControlLogix-specific marking from 1 to 36					
- with screw connection	50	95.9 mm	**VIP-2/SC/FLK50/AB-1756**	**2322317**	1
- with push-in connection	50	97.7 mm	**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 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 Siemens SIMATIC® S7-300.

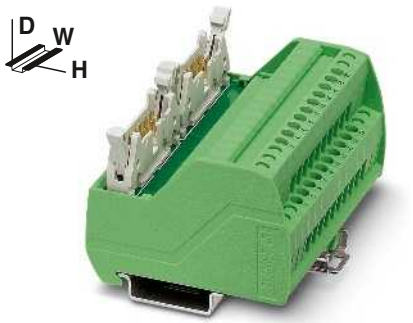
Features:

– Numerical labeling (1-20)
– Specifically for S7 300.

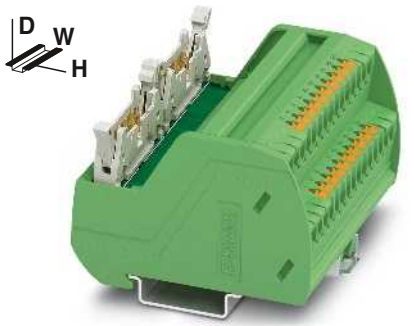
Notes:

For marking systems (e.g., “ZB 22:UNBEDRUCKT”; Order No, 0811862) and mounting material, see Catalog 5.

N



Passive interface modules for SIMATIC® S7-300 with screw connection



Passive interface modules for SIMATIC® S7-300 with push-in connection

Technical data

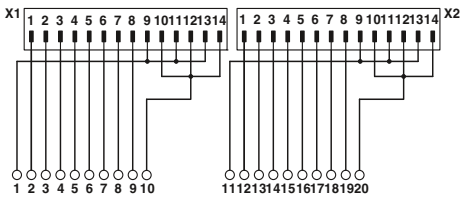
Max. perm. operating voltage		60 V AC/DC
Max. perm. current (per branch)		1 A
Rated surge voltage		0.6 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	65.5 mm / 56 mm

Technical data

Max. perm. operating voltage		60 V AC/DC
Max. perm. current (per branch)		1 A
Rated surge voltage		0.6 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Push-in connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 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 interface module, with SIMATIC® S7-300-specific marking from 1 to 20					
- with screw connection	14	80.6 mm	**VIP-2/SC/2FLK14 (1-20) /S7**	**2315230**	1
- with push-in connection	14	82.5 mm	**VIP-2/PT/2FLK14 (1-20) /S7**	**2903802**	1



Connection scheme: VIP-2/.../2FLK14 (1-20) /S7

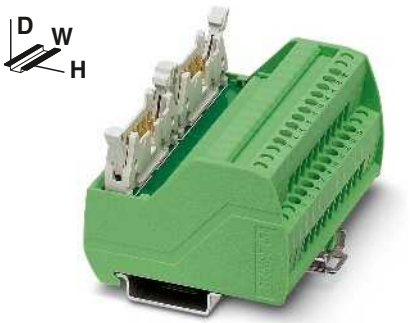
N

VIP termination boards for Allen-Bradley

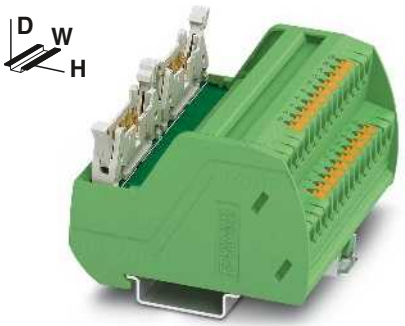
These VIP - VARIOFACE Professional modules are used in combination with two 14-pos. system cables and the relevant front adapters for Allen-Bradley.

Features:
– Numerical labeling (1-20)
– Specifically for ControlLogix.

Notes:
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No, 0811862) and mounting material, see Catalog 5.



Passive interface modules for Allen-Bradley ControlLogix with screw connection



Passive interface modules for Allen-Bradley ControlLogix with push-in connection

Technical data

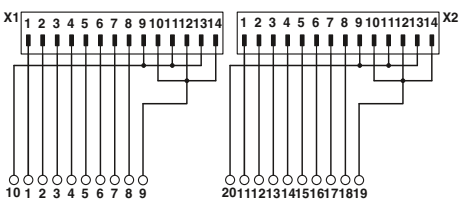
Max. perm. operating voltage		60 V AC/DC
Max. perm. current (per branch)		1 A
Rated surge voltage		0.6 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	65.5 mm / 56 mm

Technical data

Max. perm. operating voltage		60 V AC/DC
Max. perm. current (per branch)		1 A
Rated surge voltage		0.6 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Push-in connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	72.1 mm / 56 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE interface module, with ControlLogix-specific marking from 1 to 20					
- with screw connection	14	80.6 mm	**VIP-2/SC/2FLK14/AB-1756**	**2322333**	1
- with push-in connection	14	82.5 mm	**VIP-2/PT/2FLK14/AB-1756**	**2904288**	1



Connection scheme VIP-2/.../2FLK14/AB-1756

N

VIP termination boards with 2-conductor connection technology for 8 channels

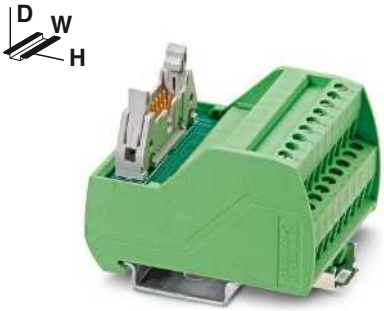
These VIP VARIOFACE modules are used in combination with 14-pos. system cables and the relevant front adapters.

Features:

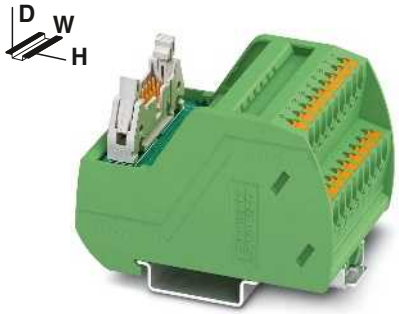
– Byte-wise labeling
– For digital I/O modules
– Negative or positive connection per signal.

Notes:

For marking systems (e.g., “ZB 22:UNBEDRUCKT”; Order No. 0811862) and mounting material, see Catalog 5.



Passive interface modules with screw connection



Passive interface modules with push-in connection

Technical data

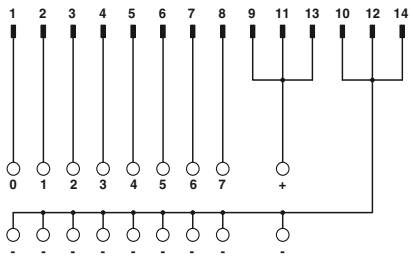
Max. perm. operating voltage		60 V DC
Max. perm. current (per branch)		1 A
Max total current (voltage supply)		3 A (per byte)
Rated surge voltage		0.6 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	65.5 mm / 56 mm

Technical data

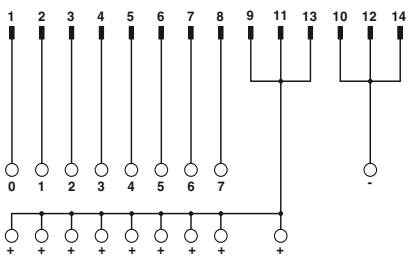
Max. perm. operating voltage		60 V DC
Max. perm. current (per branch)		1 A
Max total current (voltage supply)		3 A (per byte)
Rated surge voltage		0.6 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Push-in connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 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 interface module, for eight channels, each with an additional terminal block per signal for a common minus potential					
- with screw connection	14	50 mm	**VIP-2/SC/FLK14/8M/PLC**	**2322281**	1
- with push-in connection	14	52 mm	**VIP-2/PT/FLK14/8M/PLC**	**2904283**	1
VARIOFACE interface module, for eight channels, each with an additional terminal block per signal for a common plus potential					
- with screw connection	14	50 mm	**VIP-2/SC/FLK14/8P/PLC**	**2322294**	1
- with push-in connection	14	52 mm	**VIP-2/PT/FLK14/8P/PLC**	**2904284**	1



Connection scheme VIP-2/.../FLK14/8M/PLC



Connection scheme VIP-2/.../FLK14/8P/PLC

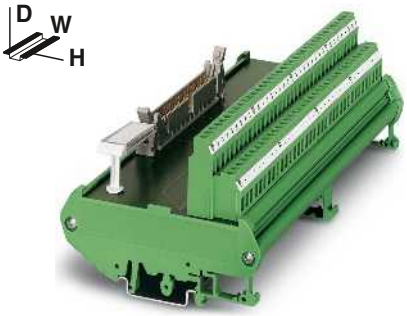
Termination boards with 2-conductor connection technology for 32 channels

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 labeling
– For digital I/O modules
– Negative connection for each signal.

FLKM 50/32P/PLC
– Byte-wise labeling
– For digital I/O modules
– Positive connection per signal.



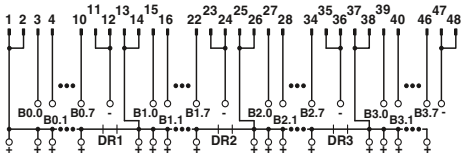
Passive interface modules with screw connection

Technical data

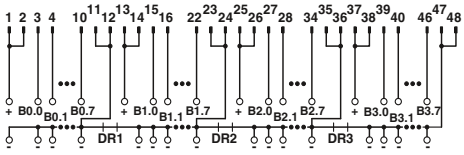
Max. perm. operating voltage		60 V DC
Max. perm. current (per branch)		1 A
Max total current (voltage supply)		8 A (per byte)
Rated surge voltage		0.8 kV
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Field level	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	90 mm / 68 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE interface module, 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
VARIOFACE interface module, 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 50/32P/PLC



Connection scheme: FLKM 50/32M/PLC

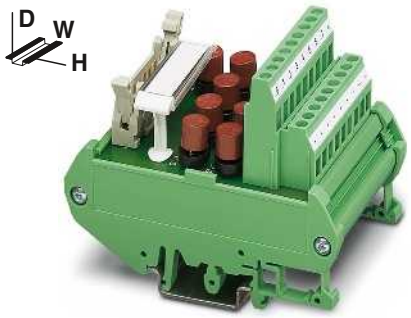
Termination boards with fuses with 2-conductor connection method

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 labeling
– Can be used for digital I/O modules
– Plug-in fuse (IEC 127-3, 1AF) per signal path (F1)
– Plug-in fuse (IEC 127-3, 2AF) per voltage supply (F2)
– Negative connection for each signal.



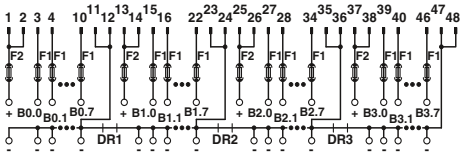
Passive fuse modules for 8 or 32 channels

Technical data

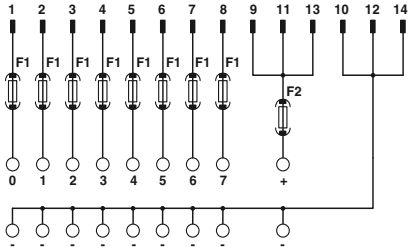
		FLKM 14/8M/SI/PLC	FLKM 50/32M/SI/PLC
Max. perm. operating voltage		60 V DC	60 V DC
Max. perm. current (per branch)		1 A	1 A
Max total current (voltage supply)		2 A	2 A (per byte)
Rated surge voltage		0.8 kV	0.8 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Screw connection	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Dimensions	H / D	90 mm / 68 mm	

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, 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
VARIOFACE module, 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

N

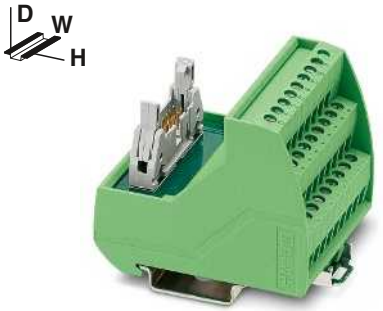
These VIP - VARIOFACE Professional modules are used in combination with 14-pos. system cables and the relevant front adapters.

Features:

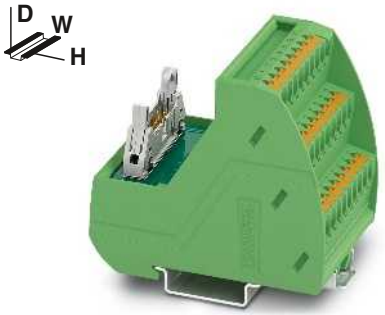
– Byte-wise labeling
– For digital I/O modules
– Positive and negative connection per signal
– Optionally with LED.

Notes:

For marking systems (e.g., “ZB 22:UNBEDRUCKT”; Order No. 0811862) and mounting material, see Catalog 5.



Initiator modules with screw connection



Initiator modules with push-in connection

Technical data

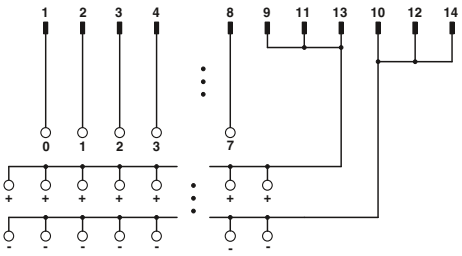
		VIP-3/SC/FLK14/8IM/PLC	VIP-3/SC/FLK14/8IM/LED/PLC
Max. perm. operating voltage		60 V DC	24 V DC
Max. perm. current (per branch)		1 A	1 A
Max total current (voltage supply)		3 A	3 A
Rated surge voltage		0.6 kV	0.6 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Screw connection	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Dimensions	H / D	69 mm / 62 mm	

Technical data

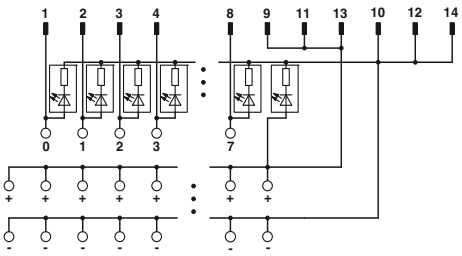
		VIP-3/PT/FLK14/8IM/PLC	VIP-3/PT/FLK14/8IM/LED/PLC
Max. perm. operating voltage		60 V DC	24 V DC
Max. perm. current (per branch)		1 A	1 A
Max total current (voltage supply)		3 A	3 A
Rated surge voltage		0.6 kV	0.6 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Push-in connection	Push-in connection
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14	
Dimensions	H / D	75.8 mm / 63 mm	

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE initiator module, for connecting 8 PNP initiators, with an additional positive and negative terminal block each per signal					
- with screw connection	14	52.3 mm	**VIP-3/SC/FLK14/8IM/PLC**	**2322278**	1
- with push-in connection	14	52 mm	**VIP-3/PT/FLK14/8IM/PLC**	**2904282**	1
VARIOFACE initiator module with LED, for connecting 8 PNP initiators, with an additional positive and negative terminal block each per signal					
- with screw connection	14	52.3 mm	**VIP-3/SC/FLK14/8IM/LED/PLC**	**2322265**	1
- with push-in connection	14	52 mm	**VIP-3/PT/FLK14/8IM/LED/PLC**	**2904281**	1



Connection scheme VIP-3/.../FLK14/8IM/PLC



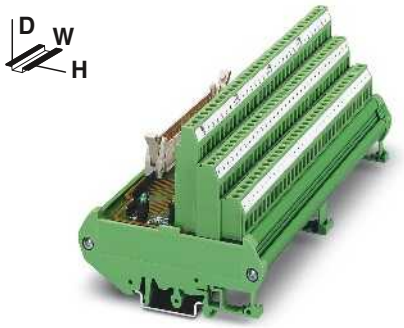
Connection scheme VIP-3/.../FLK14/8IM/LED/PLC

Initiator modules for 32 channels

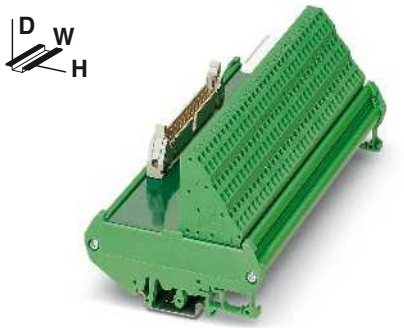
These VARIOFACE modules are used in combination with 50-pos. system cables and the relevant front adapters for digital I/O modules.

Features:

– Byte-wise labeling
– Positive and negative connection per signal
– Optionally with LED



Initiator modules for 32 channels, with screw connection



Initiator modules for 32 channels, with spring-cage connection

Technical data

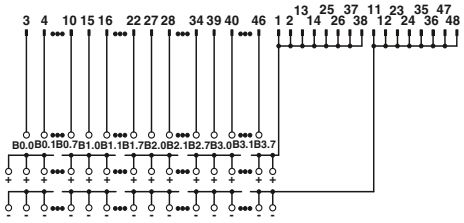
		... 50/32 IM	... 50/32 IM/LA
Max. perm. operating voltage		60 V DC	20 V DC (up to 30 V DC)
Max. perm. current (per branch)		1 A	1 A
Max total current (voltage supply)		2 A (per byte)	2 A (per byte)
Status indication		No	LED
Rated surge voltage		0.8 kV	0.8 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Screw connection	Screw connection
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Dimensions	H / D	90 mm / 81 mm	

Technical data

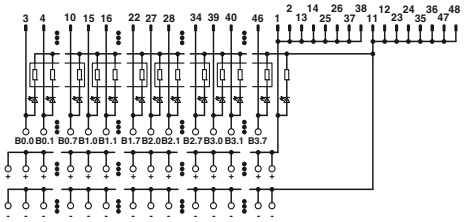
	60 V DC
	1 A
	2 A (per byte)
	-
	0.6 kV
	-20°C ... 50°C
	Any
	DIN EN 50178,
	Spring-cage connection
	IDC/FLK pin strip (2.54 mm)
	0.2 ... 2.5 mm² / 0.2 ... 1.5 mm² / 24 - 12
	90 mm / 73.5 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE initiator module, for connection of 32 PNP initiators	50	180 mm	**FLKMS 50/32IM/PLC**	**2284523**	1
VARIOFACE initiator module, same as before, however with light indicator	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

COMPACT-LINE initiator modules with spring-cage connection

These VARIOFACE modules are used in combination with 14- and 50-pos. system cables and the relevant front adapters.

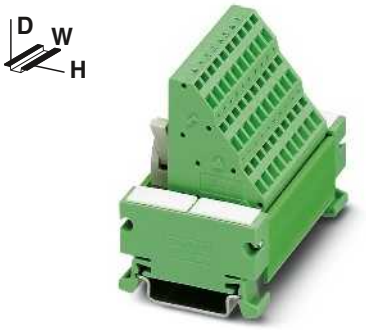
The following COMPACT-LINE initiator modules are available:

UM 45-FLK14/8IM/.../PLC (for 8 channels)
UM 45-FLK 50/32IM/.../PLC (for 32 channels)

– Byte-wise labeling
– Can be used for digital I/O modules
– Positive and negative connection for every signal

Notes:

Due to the geometry, it is not possible to couple any molded FLK connectors (e.g., VIP-PA...S7).



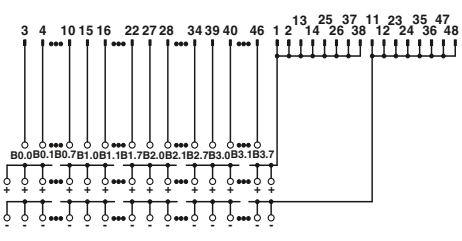
Sensor modules for 8 or 32 channels With spring-cage connection

Technical data

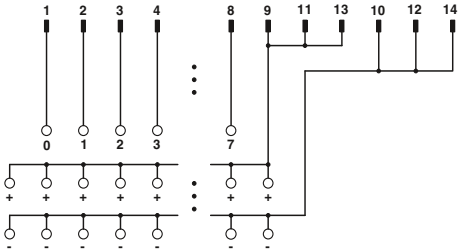
		UM 45-FLK 14/.../PLC	UM 45-FLK 50/.../PLC
Max. perm. operating voltage		60 V DC	60 V DC
Max. perm. current (per branch)		1 A	1 A
Max total current (voltage supply)		3 A	2 A (per byte)
Rated surge voltage		0.8 kV	0.8 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Spring-cage connection	Spring-cage connection
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 2.5 mm² / 0.2 ... 1.5 mm² / 24 - 14	
Dimensions	H / D	45 mm / 61 mm	

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE-COMPACT-LINE initiator module, for connection of eight PNP initiators	14	75 mm	**UM 45-FLK14/ 8IM/ZFKDS/PLC**	**2965211**	1
VARIOFACE-COMPACT-LINE initiator module, for connection of 32 PNP initiators	50	197 mm	**UM 45-FLK50/32IM/ZFKDS/PLC**	**2965224**	1



UM 45-FLK50/32IM/ZFKDS/PLC connection scheme



UM 45-FLK14/8IM/ZFKDS/PLC connection scheme

Controller boards with knife disconnect terminal blocks

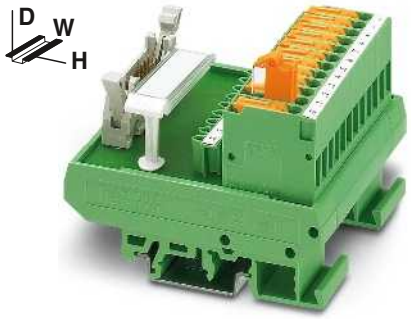
These VARIOFACE modules with knife disconnection and test connection for each signal (2 or 2.3 mm Ø test plug) are used in combination with the respective front adapters.

FLKM14/KDS3-MT/PPA/PLC (for 8 channels)
FLKM 50/KDS3-MT/PPA/PLC (for 32 channels)
– Byte-wise labeling
– Can be used for digital I/O modules

FLKM-2FLK14/KDS3-MT/PPA/S7
– Numerical labeling (1-20)
– Specially for S7-300 (in conjunction with the front adapter FLKM 14-PA-S300, Order No.: 2299770)

FLKM 50/KDS3-MT/PPA/7-300
– Numerical labeling (1-40)
– Specially for S7-300 (in conjunction with the front adapter FLKM 50-PA-S300, Order No.: 2294445).

FLKM 50/KDS3-MT/PPA/AN/PLC
– Numerical labeling (1-50)
– Specially for S7-400 (in conjunction with the front adapter FLKM 50-PA-S400 (3-48) Order No.: 2294908).



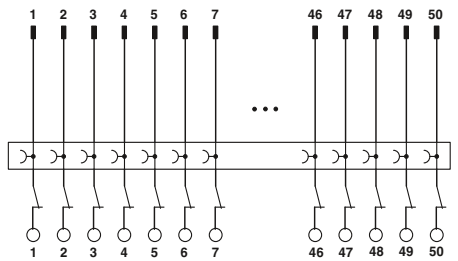
Passive interface modules for 8 or 32 channels with knife disconnect terminal blocks

Technical data

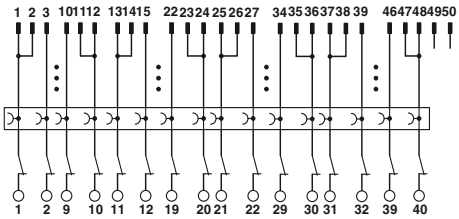
		FLKM...14/KDS 3-MT...	FLKM 50/KDS 3-MT...
Max. perm. operating voltage		60 V DC	60 V DC
Max. perm. current (per branch)		1 A	1 A
Max total current (voltage supply)		3 A	2 A (per byte)
Rated surge voltage		0.8 kV	0.8 kV
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	
Connection method	Field level	Screw connection with disconnect knife	Screw connection with disconnect knife
	Control system level	IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Dimensions	H / D	77 mm / 61 mm	

Ordering data

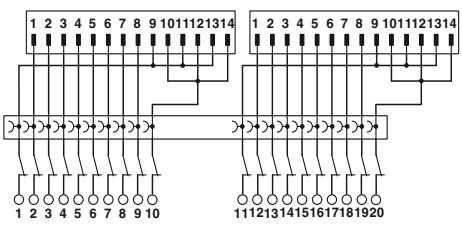
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE interface module, for eight channels, with knife disconnect terminal blocks and test sockets to the field and the system	14	67 mm	**FLKM 14/KDS3-MT/PPA/PLC**	**2290423**	1
VARIOFACE interface module, for 32 channels, with knife disconnect terminal blocks and test sockets to the field and the system	50	214 mm	**FLKM 50/KDS3-MT/PPA/PLC**	**2290614**	1
VARIOFACE interface module, for SIMATIC S7-300 with SIMATIC-specific labeling (1-20), knife disconnect terminal blocks, and test sockets to the field and the system	14	113 mm	**FLKM-2FLK14/KDS3-MT/PPA/S7**	**2295062**	1
VARIOFACE interface module, same as before, however, with SIMATIC-specific labeling (1-40)	50	214 mm	**FLKM 50/KDS3-MT/PPA/S7-300**	**2304490**	1
VARIOFACE interface module, same as before, however, for SIMATIC S7-400 with SIMATIC-specific labeling (3-48)	50	259 mm	**FLKM 50/KDS3-MT/PPA/AN/PLC**	**2291587**	1



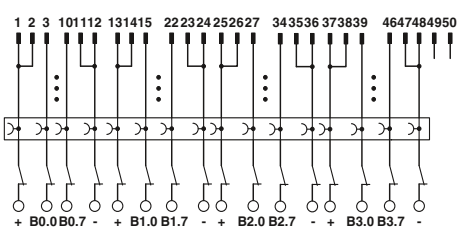
FLKM 50/KDS3-MT/PPA/AN/PLC connection scheme



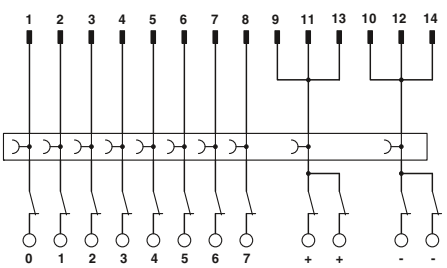
FLKM 50/KDS3-MT/PPA/S7-300 connection scheme



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.

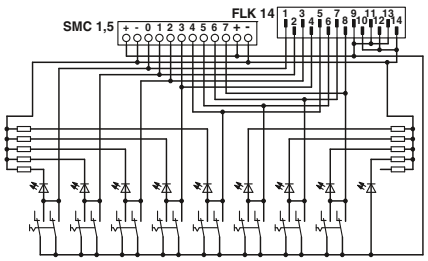
The UM 45-DI/DO/S/LA/SIM8 switch module is assembled for signal transmission with COMBICON screw connector for single-conductor wiring. Alternatively, connection to the PLC system cabling is established through a 14-pos. flat-ribbon cable pin strip. Connection to the front adapters of the PLC system cabling is established through 14-pos. system cables with socket strips.

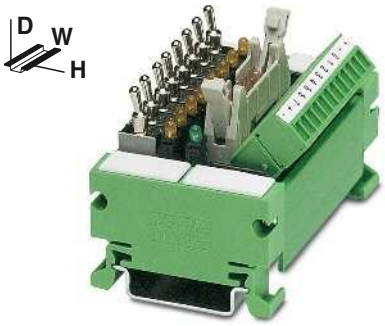
Each signal path is allocated an LED which signals the "high active" signal state. The supply voltage to the modules is signaled via a green LED.

Notes:

Type of housing:
Terminal blocks: Polyamide PA non-reinforced, color: green.
Housing: PVC

Marking systems and mounting material
See Catalog 5





Switch module

Technical data

Max. perm. operating voltage	24 V DC
Max. perm. current (per branch)	1 A
Max total current (voltage supply)	8 A (+, - terminal block)
Rated surge voltage	0.8 kV
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Connection data solid / stranded / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 28 - 16
Dimensions H / D	45 mm / 51 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE switch module, for simulation		75 mm	**UM 45-DI/DO/S/LA/SIM8**	**2968205**	1

Simulation module for display

These VARIOFACE modules enable simple simulation of the control and peripheral hardware for 8 signals.

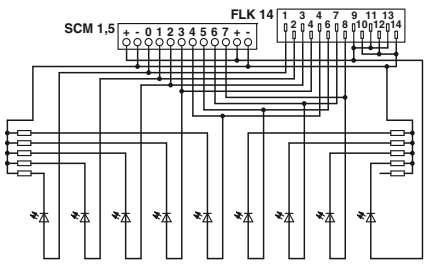
The UM 45-DO/LA/SIM8 display module is assembled for signal transmission with COMBICON screw connector for single-conductor wiring. Alternatively, connection to the PLC system cabling is established through a 14-pos. flat-ribbon cable pin strip. Connection to the front adapters of the PLC system cabling is established through 14-pos. system cables with socket strips.

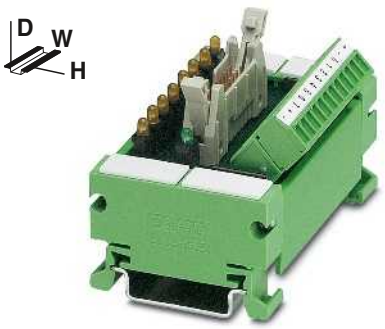
Each signal path is allocated an LED which signals the "high active" signal state. The supply voltage to the modules is signaled via a green LED.

Notes:

Type of housing:
Terminal blocks: Polyamide PA non-reinforced, color: green.
Housing: PVC

Marking systems and mounting material
See Catalog 5





Indicator module

Technical data

Max. perm. operating voltage	24 V DC
Max. perm. current (per branch)	1 A
Max total current (voltage supply)	8 A (+, - terminal block)
Rated surge voltage	0.8 kV
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Connection data solid / stranded / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 28 - 16
Dimensions H / D	45 mm / 51 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE display module, for simulation		75 mm	**UM 45-DO/LA/SIM8**	**2968195**	1

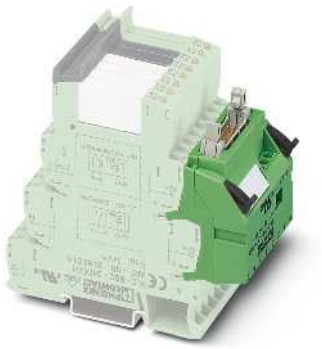
Adapter for PLC-INTERFACE (6.2 mm)

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:

For cross-reference list with matching PLC-INTERFACE modules, see page 488



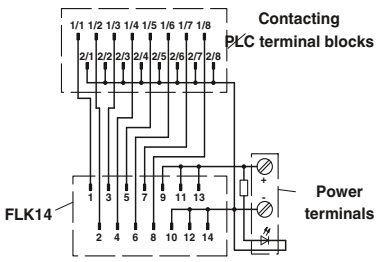
VARIOFACE adapter for 6.2 mm PLC-INTERFACE

Technical data

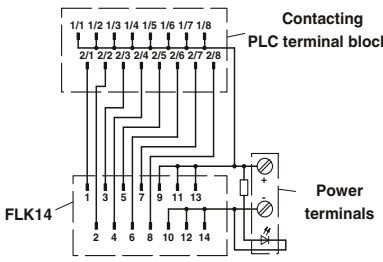
Max. perm. operating voltage		24 V DC ±25%
Max. perm. current (per branch)		1 A (per signal path)
Max total current (voltage supply)		3 A
Rated surge voltage		0.8 kV
Ambient temperature (operation)		-40°C ... 70°C
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Power supply	Screw connection
	Signal level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	100 mm / 94 mm

Ordering data

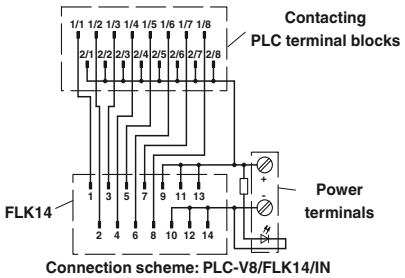
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
V8 adapter, for 8 PLC interfaces (6.2 mm), with FLK connection, for PLC system cabling, **positive switching**					
OUTPUT	14	49.6 mm	**PLC-V8/FLK14/OUT**	**2295554**	1
INPUT	14	49.6 mm	**PLC-V8/FLK14/IN**	**2296553**	1
V8 adapter, for 8 PLC interfaces (6.2 mm), with FLK connection, for PLC system cabling, **negative switching**					
OUTPUT	14	49.6 mm	**PLC-V8/FLK14/OUT/M**	**2304102**	1
INPUT	14	49.6 mm	**PLC-V8/FLK14/IN/M**	**2304115**	1
V8 output adapter, for 8 PLC interfaces (6.2 mm), with 15-pos. D-SUB connection					
Pin strip	15	49.6 mm	**PLC-V8/D15S/OUT**	**2296058**	1
Socket strip	15	49.6 mm	**PLC-V8/D15B/OUT**	**2296061**	1
V8 input adapter, for 8 PLC interfaces (6.2 mm), with 15-pos. D-SUB connection					
Pin strip	15	49.6 mm	**PLC-V8/D15S/IN**	**2296074**	1
Socket strip	15	49.6 mm	**PLC-V8/D15B/IN**	**2296087**	1



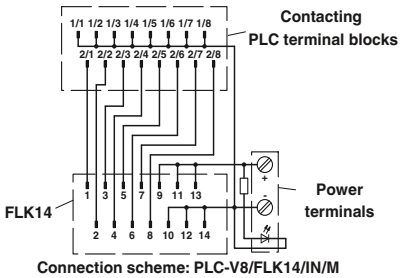
PLC-V8/FLK14/OUT connection scheme



PLC-V8/FLK14/OUT/M connection scheme



Connection scheme: PLC-V8/FLK14/IN



Connection scheme: PLC-V8/FLK14/IN/M

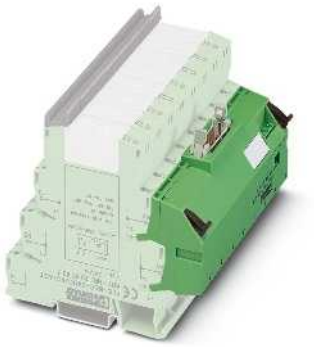
Adapter for PLC-INTERFACE (14 mm)

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 selectable assembly with relays or optocouplers

Notes:

For cross-reference list with matching PLC-INTERFACE modules, see page 488



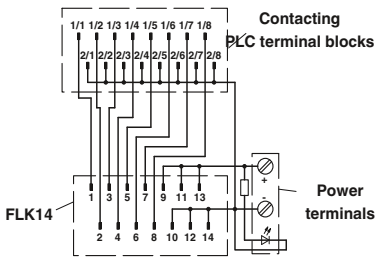
VARIOFACE adapter for 14 mm PLC-INTERFACE

Technical data

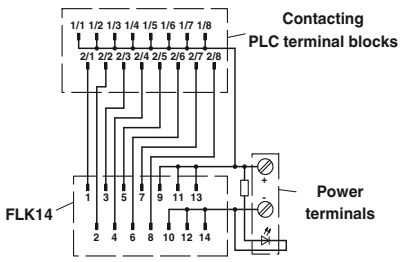
Max. perm. operating voltage		24 V DC ±25%
Max. perm. current (per branch)		1 A (per signal path)
Max total current (voltage supply)		3 A
Rated surge voltage		0.8 kV
Ambient temperature (operation)		-40°C ... 70°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Connection method	Power supply	Screw connection
	Signal level	IDC/FLK pin strip (2.54 mm)
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	100 mm / 94 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
V8 adapter, for 8 PLC interfaces (14 mm), with FLK connection, for PLC system cabling, **positive switching**	14	112.3 mm	**PLC-V8L/FLK14/OUT**	**2299660**	1
V8 adapter, for 8 PLC interfaces (14 mm), with FLK connection, for PLC system cabling, **negative switching**	14	112.3 mm	**PLC-V8L/FLK14/OUT/M**	**2304306**	1



PLC-V8L/FLK14/OUT connection scheme



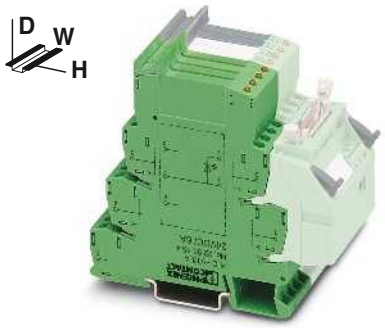
PLC-V8L/FLK14/OUT/M connection scheme

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 PLC-INTERFACE optocoupler interfaces. This makes it possible to implement 8-channel interface blocks 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)
– Optionally with LED



VARIOFACE feed-through terminal blocks for PLC-INTERFACE universal series

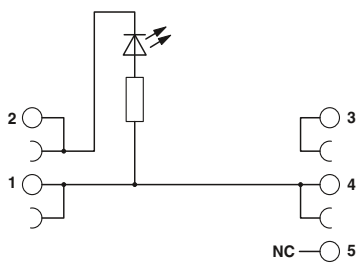
Technical data

	PLC-VT	PLC-VT/LA
Max. perm. operating voltage	max. 250 V AC/DC	24 V DC
Max. perm. current (per branch)	6 A (per signal conductor)	6 A (per signal conductor)
Ambient temperature (operation)	-40°C ... 70°C	-40°C ... 70°C
Mounting position	Any	Any
Standards/regulations	DIN EN 50178, IEC 62103	
Connection data solid / stranded / AWG	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Dimensions H / D	80 mm / 94 mm	

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE feed-through terminal block (two-conductor connection), for PLC-INTERFACE universal series		6.2 mm	**PLC-VT**	**2296870**	10
VARIOFACE feed-through terminal block, same as before, however, with 24 V DC light indicator		6.2 mm	**PLC-VT/LA**	**2296854**	10

PLC-VT connection scheme



PLC-VT/LA connection scheme

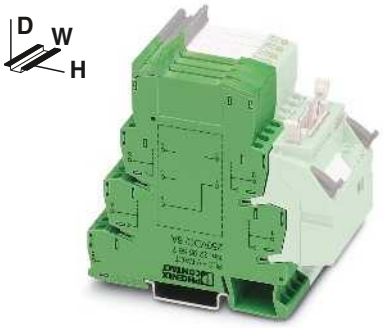
Feed-through terminal blocks for PLC-INTERFACE

The VARIOFACE PLC-VT terminals are passive feed-through terminal blocks, with the same shape as the 6.2 mm slim relay and PLC-INTERFACE optocoupler interfaces. This makes it possible to implement 8-channel interface blocks 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/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)
– Optionally with LED

The system connection is made via the PLC-V8 adapter.



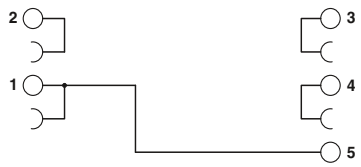
VARIOFACE feed-through terminal blocks for PLC-INTERFACE actuator series

Technical data

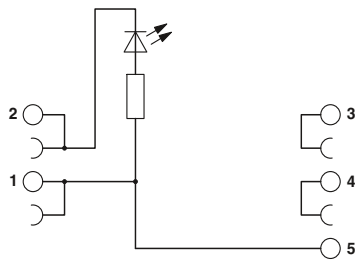
	PLC-VT/AKT	PLC-VT/AKT/LA
Max. perm. operating voltage	max. 250 V AC/DC	24 V DC
Max. perm. current (per branch)	6 A (per signal conductor)	6 A (per signal conductor)
Ambient temperature (operation)	-40°C ... 70°C	-40°C ... 70°C
Mounting position	Any	Any
Standards/regulations	DIN EN 50178, IEC 62103	
Connection data solid / stranded / AWG	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Dimensions H / D	80 mm / 94 mm	

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE feed-through terminal block (three-conductor connection), for PLC-INTERFACE actuator series		6.2 mm	**PLC-VT/ACT**	**2295567**	10
VARIOFACE feed-through terminal block, same as before, however, with 24 V DC light indicator		6.2 mm	**PLC-VT/ACT/LA**	**2296867**	10



PLC-VT/ACT connection scheme



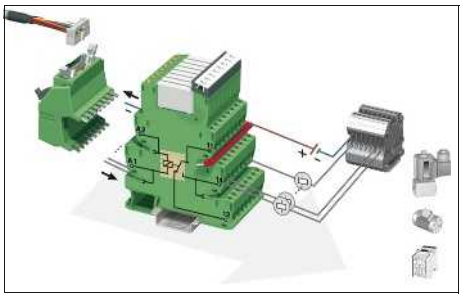
PLC-VT/ACT/LA connection scheme

Cross-reference list for PLC-V8 adapters with matching PLC-INTERFACE modules

Series	Function	Contact	Input	Output	Page	Spring-cage connection	Order No.:
Universal	Relay	1 PDT	24 V DC	250 V AC/DC / 6 A	322	PLC-RSP-24DC/21	2966472
			24 V DC	250 V AC/DC / 10 A	333	PLC-RSP-24DC/21HC	2912277
			12 V DC	30 V AC/36 V DC / 50 mA	323	PLC-RSP-12DC/21AU	2967442
			24 V DC	30 V AC/36 V DC / 50 mA	323	PLC-RSP-24DC/21AU	2966540
			24 V AC/DC	30 V AC/36 V DC / 50 mA	323	PLC-RSP-24UC/21AU	2966553
			48 V DC	30 V AC/36 V DC / 50 mA	323	PLC-RSP-48DC/21AU	2966566
			60 V DC	30 V AC/36 V DC / 50 mA	323	PLC-RSP-60DC/21AU	2966579
			120 V AC/DC	30 V AC/36 V DC / 50 mA	323	PLC-RSP-120UC/21AU	2966582
			230 V AC/DC	30 V AC/36 V DC / 50 mA	323	PLC-RSP-230UC/21AU	2966647
			120 V AC	30 V AC/36 V DC / 50 mA[1]	334	PLC-BSP-120UC/21/SO46	2980351[3]
			230 V AC	30 V AC/36 V DC / 50 mA[1]	334	PLC-BSP-230UC/21/SO46	2980377[3]
		2 PDTs	24 V DC	250 V AC/DC / 6 A	323	PLC-RSP-24DC/21-21	2912507
			24 V DC	30 V AC/DC / 50 mA	323	PLC-RSP-24DC/21-21AU	2912578
	Relay switch	1 N/O contact	24 V AC/DC	250 V AC/DC / 6 A	350	PLC-RSP-24UC/1/S/H	2982249
			24 V AC/DC	250 V AC/DC / 6 A	350	PLC-RSP-24UC/1/S/L	2834889
	Optocoupler	1 N/O contact, electronic	24 V DC	24 V DC / 3 A	325	PLC-OSP-24DC/24DC/2	2967471
			24 V DC	24 V DC / 10 A	353	PLC-OSP-24DC/24DC/10/R	2982715
			24 V DC	250 V AC / 0.75 A	325	PLC-OSP-24DC/230AC/1	2967895
			24 V DC	300 V DC / 1 A	352	PLC-OSP-24DC/300DC/1	2980830
			24 V DC	48 V DC / 100 mA	324	PLC-OSP-24DC/48DC/100	2967549
			48 V DC	48 V DC / 100 mA	324	PLC-OSP-48DC/48DC/100	2967743
			60 V DC	48 V DC / 100 mA	324	PLC-OSP-60DC/48DC/100	2967756
			120 V AC/DC	48 V DC / 100 mA	324	PLC-OSP-120UC/48DC/100	2967552
			230 V AC/DC	48 V DC / 100 mA	324	PLC-OSP-230UC/48DC/100	2967565
			NAMUR	24 V DC / 50 mA	364	PLC-SP-EIK 1-SVN 24P/P	2982676
			120 V AC	48 V DC / 100 mA[2]	334	PLC-BSP-120UC/21/SO46	2980351[3]
			230 V AC	48 V DC / 100 mA[2]	334	PLC-BSP-230UC/21/SO46	2980377[3]
		1 PDT, electronic	24 V DC	48 V DC / 0.5 A	353	PLC-OSP-24DC/48DC/500/W	2980649
	Feed-through	–	250 V AC/DC	250 V AC/DC	486	–	
			24 V DC	24 V DC	486	–	
Actuator	Relay	1 N/O contact	24 V DC	250 V AC/DC / 6 A	326	PLC-RSP-24DC/1/ACT	2967345
			24 V DC	250 V AC/DC / 10 A (80 A; 20 ms)	332	PLC-RSP-24DC/1IC/ACT	2912413
		2 N/O contacts	24 V DC	250 V AC/DC / 6 A	327	–	
	Optocoupler	1 N/O contact, electronic	24 V DC	24 V DC / 3 A	327	PLC-OSP-24DC/24DC/2/ACT	2967507
			24 V DC	24 V DC / 5 A	328	–	
			24 V DC	250 V AC / 0.75 A	327	–	
			24 V DC	250 V AC / 2 A	328	–	
	Feed-through	–	250 V AC/DC	250 V AC/DC	487	–	
			24 V DC	24 V DC	487	–	
Sensor[4]	Relay	1 N/O contact	24 V DC	30 V AC/36 V DC / 50 mA	330	PLC-RSP-24DC/1AU/SEN	2967374
			120 V AC/DC	30 V AC/36 V DC / 50 mA	330	PLC-RSP-120UC/1AU/SEN	2967390
			230 V AC/DC	30 V AC/36 V DC / 50 mA	330	PLC-RSP-230UC/1AU/SEN	2967413
			120 V AC	30 V AC/36 V DC / 50 mA[1]	335	PLC-BSP-120UC/1/SEN/SO46	2980364[3]
			230 V AC	30 V AC/36 V DC / 50 mA[1]	335	PLC-BSP-230UC/1/SEN/SO46	2980380[3]
	Optocoupler	1 N/O contact, electronic	24 V DC	48 V DC / 100 mA	331	PLC-OSP-24DC/48DC/100/SEN	2967578
			120 V AC/DC	48 V DC / 100 mA	331	PLC-OSP-120UC/48DC/100/SEN	2967581
			230 V AC/DC	48 V DC / 100 mA	331	PLC-OSP-230UC/48DC/100/SEN	2967594
			120 V AC	48 V DC / 100 mA[2]	335	PLC-BSP-120UC/1/SEN/SO46	2980364[3]
			230 V AC	48 V DC / 100 mA[2]	335	PLC-BSP-230UC/1/SEN/SO46	2980380[3]

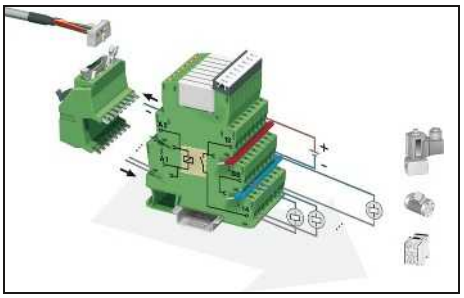
[1] Plug-in miniature relay insert: REL-MR-60DC/21AU, 2961134
[2] Plug-in solid-state relay insert: OPT-60DC/48DC/100, 2966621
[3] PLC-...SO46 is supplied as a basic terminal block with filter, but without relay or solid-state relay.
[4] Cannot be combined with the universal series (within a byte)

Push-in connection	Order No.:	Screw connection	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[3])	PLC-BSC-120UC/21/SO46	2980319[3])		X	
PLC-RPT-230UC/21/SO46	2900455[3])	PLC-BSC-230UC/21/SO46	2980335[3])		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[3])	PLC-BSC-120UC/21/SO46	2980319[3])		X	
PLC-BPT-230UC/21/SO46	2900455[3])	PLC-BSC-230UC/21/SO46	2980335[3])		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/1IC/ACT	2900298	PLC-RSC-24DC/1IC/ACT	2967604			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[3])	PLC-BSC-120UC/1/SEN/SO46	2980322[3])		X	
PLC-BPT-230UC/1/SEN/SO46	2900457[3])	PLC-BSC-230UC/1/SEN/SO46	2980348[3])		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[3])	PLC-BSC-120UC/1/SEN/SO46	2980322[3])		X	
PLC-BPT-230UC/1/SEN/SO46	2900457[3])	PLC-BSC-230UC/1/SEN/SO46	2980348[3])		X	



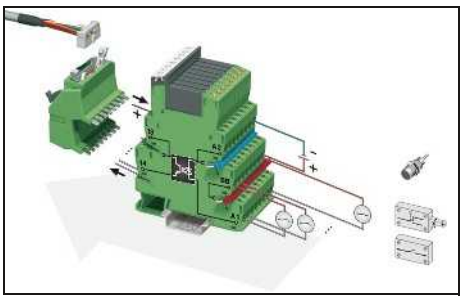
PLC universal series

The universal series of products can be used as either input or output interfaces. Each product consists of a basic terminal block with a plug-in miniature relay (PDT 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. In such cases, the PLC...ACT output interface is used. 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, only one N/O contact function is normally required. In such cases, the PLC…SEN input interface is used. All sensor connections, including the supply voltage for the sensors/switches, are connected directly. This eliminates the need for additional modular terminal blocks.

COMPACT-LINE output modules with relays, one N/O contact

These VARIOFACE Compact Line 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 an N/O contact
– Universal applications from 1 mA to 3 A continuous current through 2-layer double contact with hard gold plating
– Low construction height of only 45 mm
– LED status display for each signal path and supply voltage
– Freewheeling and reverse polarity protection diode for each signal path.

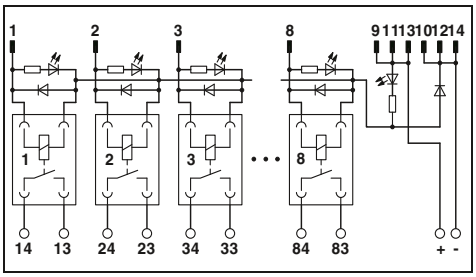
With the 32-channel version, the system cable is connected to the UM 45-16RM/MR-G24/1/PLC 16-channel base module.
The UM 45-16RM/MR-G24/1/E/PLC output extension module with a further 16 channels is coupled to the base module via a 20-pos. flat-ribbon cable (length: 10 cm).

Notes:

The connection cable between the base and the extension modules is delivered with the extension unit.

Due to the geometry, it is not possible to couple any molded FLK connectors (e.g., VIP-PA...S7).

Output module with eight miniature relays, 1 N/O contact



Technical data

Coil side		
Operating voltage U_N		24 V DC
Typ. input current at U_N		6.5 mA
Typ. response time at U_N		5 ms
Typ. release time at U_N		15 ms
Input circuit		Freewheeling diode, Protection against polarity reversal
Status display/channel		Yellow LED
Connection method		IDC/FLK pin strip (2.54 mm)
No. of pos.		14
Contact side		
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
Min. switching voltage		5 V
Max. inrush current		5 A
Limiting continuous current		3 A
Min. switching current		1 mA
Max. 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 mm² / 0.14 ... 1.5 mm² / 26 - 14
General data		
Test voltage		2 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 50°C
Nominal operating mode		100% operating factor
Mechanical service life		2 x 10^7 cycles
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Mounting position		Any
Mounting		In rows with zero spacing
Dimensions	H / D	45 mm / 50 mm

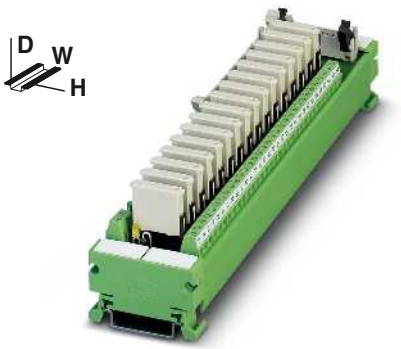
Ordering data

Description	Module width W
VARIOFACE COMPACT LINE output module, for 24 V DC (including relays)	
- With 8 miniature relays	103
- With 16 miniature relays	215
VARIOFACE COMPACT LINE output extension module, for 24 V DC (including relays)	
- With 16 miniature relays	200

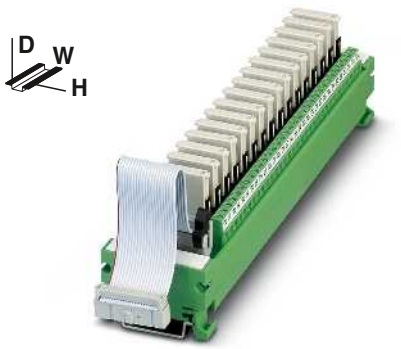
Type	Order No.	Pcs. / Pkt.
UM 45- 8RM/MR-G24/1/PLC	**2962900**	1

Accessories

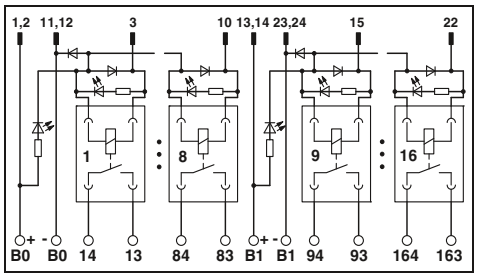
Plug-in miniature relays		
REL-MR-G 24/1	**2961037**	8

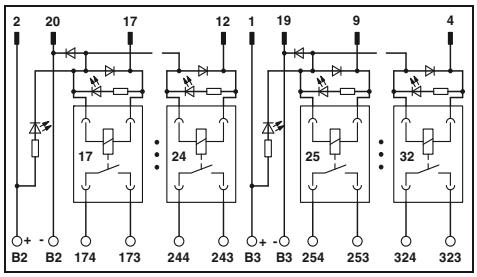


Output base module with 16 miniature relays, 1 N/O contact



Output extension module with 16 miniature relays, one N/O contact





Technical data

24 V DC	
6.5 mA	
5 ms	
15 ms	
Freewheeling diode, Protection against polarity reversal	
Yellow LED	
IDC/FLK pin strip (2.54 mm)	
50	
1 N/O contact (double contact)	
AgNi, 5 µm hard gold-plated	
250 V AC / 125 V DC	
5 V	
5 A	
3 A	
1 mA	
72 W	
60 W	
50 W	
50 W	
750 VA	
Screw connection	
0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 14	
2 kV (50 Hz, 1 min.)	
-20°C ... 50°C	
100% operating factor	
2 x 10^7 cycles	
IEC 60664, DIN EN 50178, IEC 62103	
Any	
In rows with zero spacing	
45 mm / 50 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
UM 45-16RM/MR-G24/1/PLC	**2962913**	1

Accessories

REL-MR-G 24/1	**2961037**	8

Technical data

24 V DC	
6.5 mA	
5 ms	
15 ms	
Freewheeling diode, Protection against polarity reversal	
Yellow LED	
IDC/FLK pin strip (2.54 mm)	
20	
1 N/O contact (double contact)	
AgNi, 5 µm hard gold-plated	
250 V AC / 125 V DC	
5 V	
5 A	
3 A	
1 mA	
72 W	
60 W	
50 W	
50 W	
750 VA	
Screw connection	
0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 14	
2 kV (50 Hz, 1 min.)	
-20°C ... 50°C	
100% operating factor	
2 x 10^7 cycles	
IEC 60664, DIN EN 50178, IEC 62103	
Any	
In rows with zero spacing	
45 mm / 50 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
UM 45-16RM/MR-G24/1/E/PLC	**2962926**	1

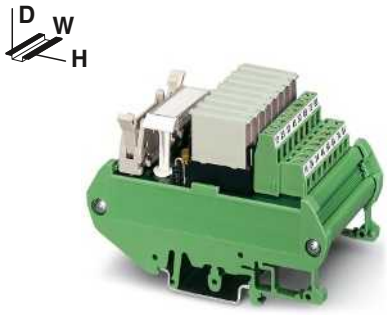
Accessories

REL-MR-G 24/1	**2961037**	8

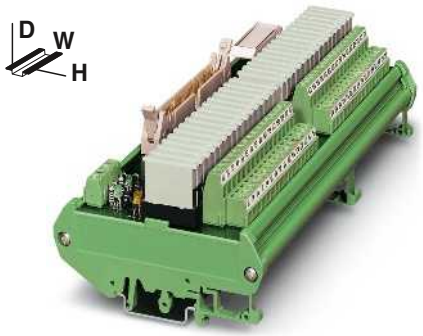
Output modules with relays, one N/O contact

These VARIOFACE output modules are used in combination with the respective front adapters.

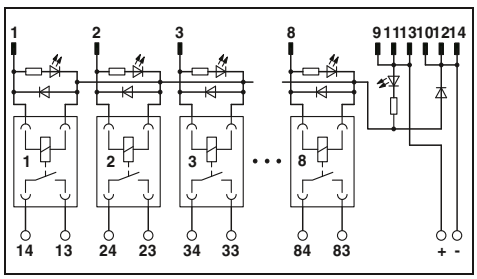
- Plug-in miniature relays, each with an N/O contact
- Universal applications from 1 mA to 3 A continuous current through 2-layer double contact with hard gold plating
- Slim construction widths of only 55 mm (8 channels) or 202 mm (32 channels)
- LED status display for each signal path and supply voltage
- Freewheeling and reverse polarity protection diode for each signal path.

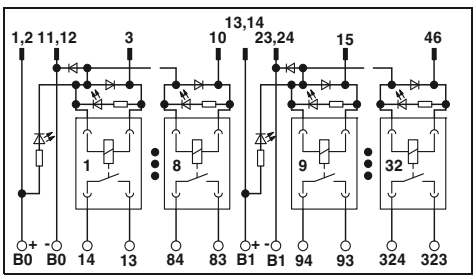


Output module with eight miniature relays, 1 N/O contact



Output modules with 32 miniature relays, 1 N/O contact





		Technical data	Technical data
Coil side			
Operating voltage U_N		24 V DC	24 V DC
Typ. input current at U_N		6.5 mA	6.5 mA
Typ. response time at U_N		5 ms	5 ms
Typ. release time at U_N		15 ms	15 ms
Input circuit		Freewheeling diode, Protection against polarity reversal	Freewheeling diode, Protection against polarity reversal
Status display/channel		Yellow LED	Yellow LED
Connection method		IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
No. of pos.		14	50
Contact side			
Contact type		1 N/O contact (double contact)	1 N/O contact (double contact)
Contact material		AgNi, 5 µm hard gold-plated	AgNi, 5 µm hard gold-plated
Max. switching voltage		250 V AC / 125 V DC	250 V AC / 125 V DC
Min. switching voltage		5 V	5 V
Max. inrush current		5 A	5 A
Limiting continuous current		3 A	3 A
Min. switching current		1 mA	1 mA
Max. interrupting rating:	24 V DC	72 W	72 W
	48 V DC	60 W	60 W
	60 V DC	50 W	50 W
	110 V DC	50 W	50 W
	250 V AC	750 VA	750 VA
Connection method		Screw connection	Screw connection
Connection data solid / stranded / AWG		0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 14	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16
General data			
Test voltage		3 kV AC	3 kV AC
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 10^7 cycles	2 x 10^7 cycles
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	IEC 60664, DIN EN 50178, IEC 62103
Mounting position		Any	Any
Mounting		In rows with zero spacing	In rows with zero spacing
Dimensions	H / D	90 mm / 58 mm	90 mm / 58 mm

Description	Module width W	Ordering data: Type	Order No.	Pcs. / Pkt.
VARIOFACE output module, with 8 miniature relays, plugged in, for 24 V DC (including relays)	56	**UMK- 8 RM/MR-G24/ 1/PLC**	**2979469**	1
VARIOFACE output module, with 32 miniature relays, plugged in, for 24 V DC (including relays)	202	**UMK-32 RM/MR-G24/1/PLC**	**2979472**	1

Accessories			
Plug-in miniature relays	**REL-MR-G 24/1**	**2961037**	8

Output modules with relay, 1 PDT

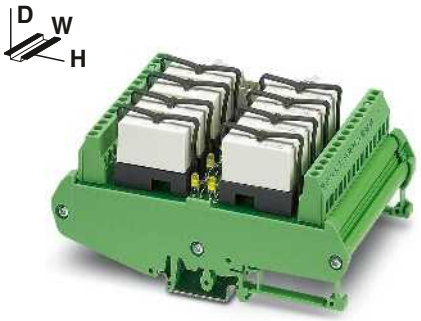
These VARIOFACE output modules are used in combination with the respective front adapters.

Like the front adapters, the modules are connected via 14-pos. or 50-pos. system cables. The following features characterize these relay modules:

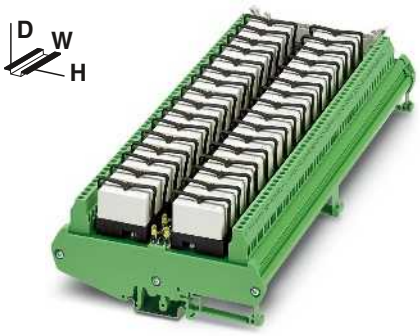
– Plug-in miniature relays, each with a PDT contact
– Slim construction widths of only 80 mm (8 channels) or 271 mm (32 channels)
– LED status display for each signal path and supply voltage
– Freewheeling diode for each signal path

Notes:

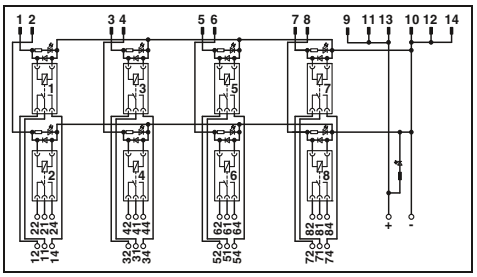
1) EMC: Class A product, see page 571

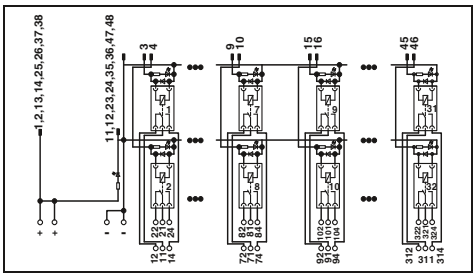


Output module with eight miniature relays, 1 PDT



Output module with 32 miniature relays, 1 PDT





Technical data

Coil side			
Operating voltage U_N		24 V DC	24 V DC
Typ. input current at U_N		18 mA	18 mA
Typ. response time at U_N		8 ms	8 ms
Typ. release time at U_N		10 ms	10 ms
Input circuit		Freewheeling diode	Freewheeling diode
Status display/channel		Yellow LED	Yellow LED
Connection method		IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
No. of pos.		14	50
Contact side			
Contact type		Single contact, 1-PDT	Single contact, 1-PDT
Contact material		AgNi	AgNi
Max. switching voltage		250 V AC/DC	250 V AC/DC
Min. switching voltage		12 V AC/DC	12 V AC/DC
Limiting continuous current		5 A	5 A
Min. switching current		100 mA	100 mA
Max. interrupting rating:	24 V DC	120 W	120 W
	48 V DC	58 W	58 W
	60 V DC	48 W	48 W
	110 V DC	50 W	50 W
	220 V DC	80 W	80 W
	250 V AC	1250 VA	1250 VA
Connection method		Screw connection	Screw connection
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
General data			
Test voltage		2.5 kV (50 Hz, 1 min.)	2.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Nominal operating mode		100% operating factor	100% operating factor
Mechanical service life		3 x 10^7 cycles	3 x 10^7 cycles
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103	IEC 60664, DIN EN 50178, IEC 62103
Mounting position		Any	Any
Mounting		In rows with zero spacing	In rows with zero spacing
Dimensions	H / D	123 mm / 68 mm	123 mm / 68 mm

Ordering data

Description	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE output module, with 8 miniature relays, plugged in, for 24 V DC (including relays)	80	**UM- 8 RM/RT-G24/21/PLC**	**2968386**	1
VARIOFACE output module, with 32 miniature relays, plugged in, for 24 V DC (including relays)	271	**UM-32 RM/RT-G24/21/PLC**[1]	**2968373**	1

Accessories

Plug-in miniature relays	**REL-MR- 24DC/21HC**	**2961312**	10

Output modules with relay, 1 PDT

These VARIOFACE output modules are used in combination with the respective front adapters.

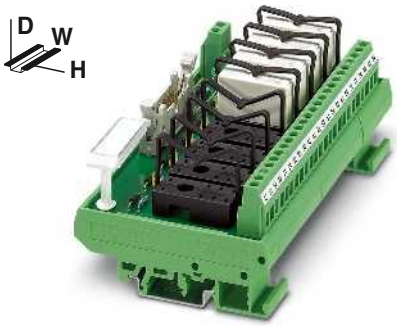
Like the front adapters, the modules are connected via 14-pos. or 50-pos. system cables. The following features characterize these relay modules:

– 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.

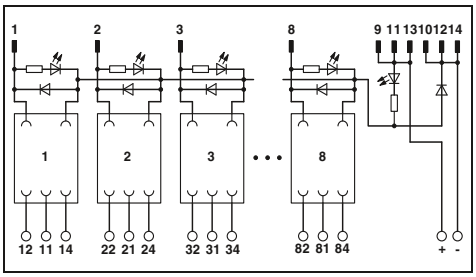
With the 32-channel version, the system cable is connected to the 16-channel UMK-16R.../KSR-G24/21/PLC base module. The UMK-16R.../KSR-G24/21/E/PLC output extension module with a further 16 channels is coupled to the base module via a 20-pos. flat-ribbon cable (length: 10 cm).

Notes:

The connection cable between the base and the extension modules is delivered with the extension unit.



Output module with eight miniature relays, 1 PDT



Technical data

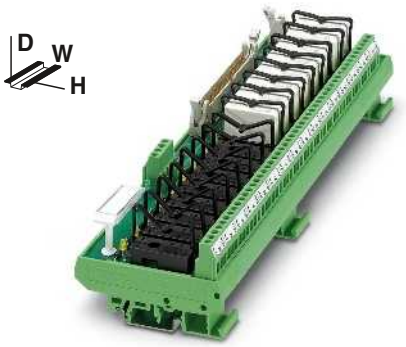
Coil side	
Operating voltage U_N	24 V DC ±10%
Input circuit	Freewheeling diode, Protection against polarity reversal
Operating voltage display	Green LED
Status display/channel	Yellow LED
Connection method	IDC/FLK pin strip (2.54 mm)
No. of pos.	14
Contact side	
Contact type	1 PDT
Max. switching voltage	250 V AC/DC
Limiting continuous current	5 A
Connection method	Screw connection
Connection data solid / stranded / AWG	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
General data	
Test voltage	2.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 50°C
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Mounting position	Any
Mounting	In rows with zero spacing
Dimensions H / D	77 mm / 59 mm

Ordering data

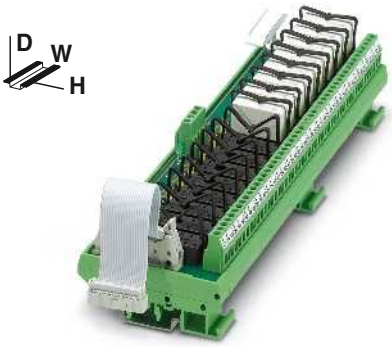
Description	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE output module, with 8 miniature relays, plugged in, for 24 V DC (including relays)	135	**UMK- 8 RM/KSR-G 24/21/PLC**	**2979485**	1
VARIOFACE output module, with plug-in bases for eight miniature relays, for 24 V DC (without relays)	135	**UMK- 8 RELS/KSR-G24/21/PLC**	**2974914**	1
VARIOFACE output module, with 16 miniature relays, plugged in, for 24 V DC (base module, including relays)	259			
VARIOFACE output module, with plug-in bases for 16 miniature relays, for 24 V DC (base module, without relays)	259			
VARIOFACE output extension module, with 16 miniature relays, plugged in, for 24 V DC (including relays)	259			
VARIOFACE output extension module, with plug-in bases for 16 miniature relays, for 24 V DC (without relays)	259			

Accessories

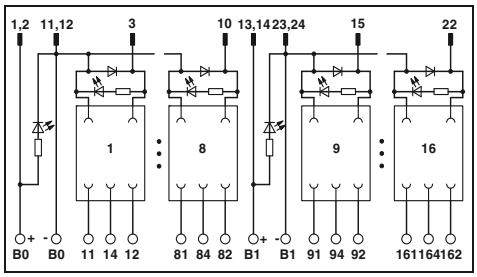
Plug-in miniature relays	**REL-MR- 24DC/21HC**	**2961312**	10

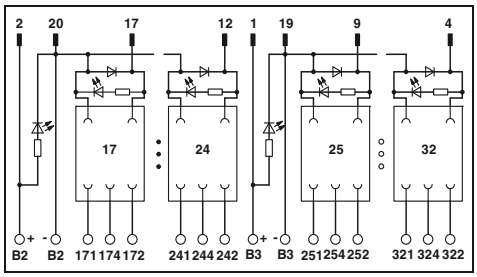


Output base module with 16 miniature relays, 1 PDT



Output extension module with 16 miniature relays, 1 PDT





Technical data

24 V DC ±10%	24 V DC ±10%
Freewheeling diode, Protection against polarity reversal	Freewheeling diode, Protection against polarity reversal
Green LED	Green LED
Yellow LED	Yellow LED
IDC/FLK pin strip (2.54 mm)	IDC/FLK pin strip (2.54 mm)
50	20
1 PDT	1 PDT
250 V AC/DC	250 V AC/DC
5 A	5 A
Screw connection	Screw connection
0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
2.5 kV (50 Hz, 1 min.)	2.5 kV (50 Hz, 1 min.)
-20°C ... 50°C	-20°C ... 50°C
IEC 60664, DIN EN 50178, IEC 62103	IEC 60664, DIN EN 50178, IEC 62103
Any	Any
In rows with zero spacing	In rows with zero spacing
77 mm / 59 mm	77 mm / 59 mm

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

Accessories

REL-MR- 24DC/21HC	**2961312**	10

Ordering data

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

REL-MR- 24DC/21HC	**2961312**	10

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:

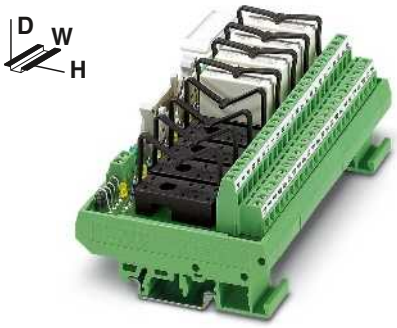
– Plug-in miniature relays
– LED status indicator and freewheeling diode per signal path
– Supply voltage indicator (LED)
– Polarity protection diode

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.

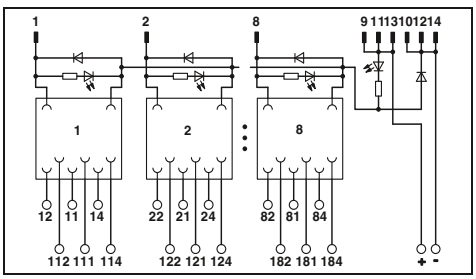
The output extension module with a further 16 channels is coupled to the base module via a 20-pos. flat-ribbon cable (length: 10 cm).

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



Technical data

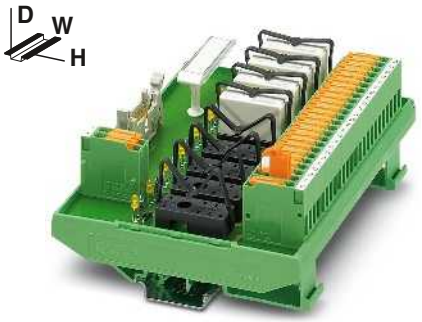
Coil side	
Operating voltage U_N	24 V DC
Input circuit	Freewheeling diode
Operating voltage display	Green LED
Status display/channel	Yellow LED
Connection method	IDC/FLK pin strip (2.54 mm)
No. of pos.	14
Contact side	
Contact type	2 PDT
Max. switching voltage	250 V AC/DC
Limiting continuous current	3 A
Connection method	Screw connection
Connection data solid / stranded / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 14
General data	
Test voltage	2.5 kV AC
Ambient temperature (operation)	-20°C ... 50°C
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Mounting position	Any
Mounting	In rows with zero spacing
Dimensions H / D	77 mm / 59 mm

Ordering data

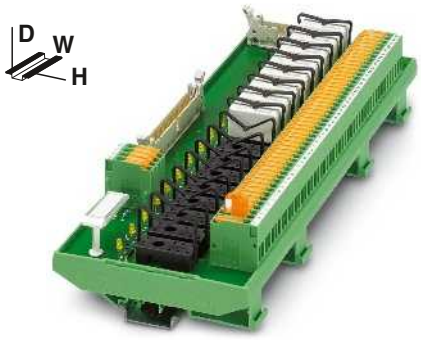
Description	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE output module, with plug-in bases for eight miniature relays, for 24 V DC, each with two PDTs (without relays)	135	**UMK- 8 RELS/KSR-G24/21-21/PLC**	**2976187**	1
VARIOFACE output module, with plug-in bases for 8 miniature relays, for 24 V DC and knife disconnect terminal blocks, each with 1 PDT (without relays)	145			
VARIOFACE output module, with plug-in bases for 16 miniature relays, for 24 V DC and knife disconnect terminal blocks, each with 1 PDT (without relays)	285			
VARIOFACE output extension module, with plug-in bases for 16 miniature relays, for 24 V DC and knife disconnect terminal blocks, each with 1 PDT (without relays)	285			

Accessories

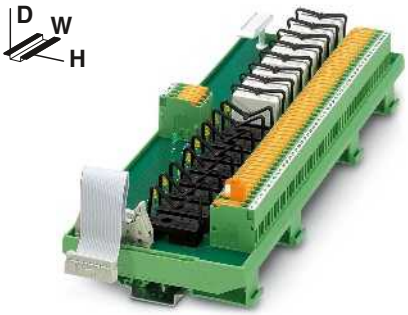
Plug-in miniature relays	**REL-MR- 24DC/21-21**	**2961192**	10



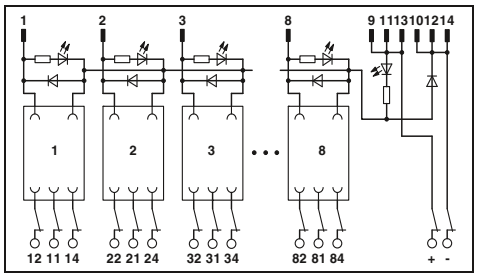
Output module for 8 miniature relays with knife/disconnect terminal blocks, 1 PDT

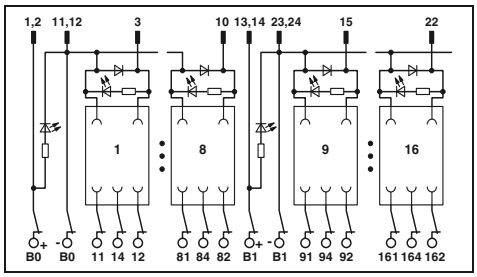


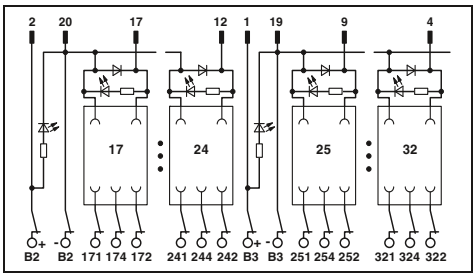
Output module for 16 miniature relays with knife/disconnect terminal blocks, 1 PDT



Output extension module for 16 miniature relays with knife/disconnect terminal blocks, 1 PDT







Technical data

24 V DC	
Freewheeling diode, Protection against polarity reversal	
Green LED	
Yellow LED	
IDC/FLK pin strip (2.54 mm)	
14	
1 PDT	
250 V AC/DC	
5 A	
Screw connection with disconnect knife	
0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
2.5 kV (50 Hz, 1 min.)	
-20°C ... 50°C	
IEC 60664, DIN EN 50178, IEC 62103	
Any	
In rows with zero spacing	
111.5 mm / 59 mm	

Technical data

24 V DC	
Freewheeling diode	
Green LED	
Yellow LED	
IDC/FLK pin strip (2.54 mm)	
50	
1 PDT	
250 V AC/DC	
5 A	
Screw connection with disconnect knife	
0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
2.5 kV (50 Hz, 1 min.)	
-20°C ... 50°C	
IEC 60664, DIN EN 50178, IEC 62103	
Any	
In rows with zero spacing	
111.5 mm / 59 mm	

Technical data

24 V DC	
Freewheeling diode	
Green LED	
Yellow LED	
IDC/FLK pin strip (2.54 mm)	
20	
1 PDT	
250 V AC/DC	
5 A	
Screw connection with disconnect knife	
0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
2.5 kV (50 Hz, 1 min.)	
-20°C ... 50°C	
IEC 60664, DIN EN 50178, IEC 62103	
Any	
In rows with zero spacing	
111.5 mm / 59 mm	

Ordering data

Type	Order No.	Pcs. / Pkt.
UM- 8 RELS/KSR-G24/21/MT/PLC	**2962463**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
UM-16 RELS/KSR-G24/21/MT/PLC	**2962382**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
UM-16 RELS/KSR-G24/21/E/MT/PLC	**2962379**	1

Accessories

REL-MR- 24DC/21-21	**2961192**	10

Accessories

REL-MR- 24DC/21-21	**2961192**	10

Accessories

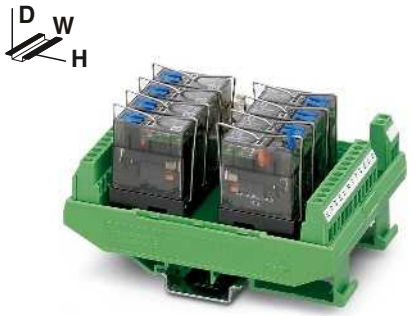
REL-MR- 24DC/21-21	**2961192**	10

Output modules with relays, 1 PDT with detectable manual operation

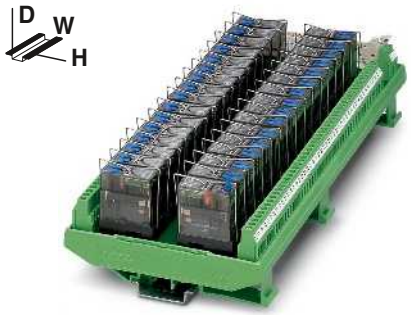
These VARIOFACE output modules are used in combination with the respective front adapters.

The modules are connected via a 14- or 50-pos. system cable. These relay modules offer the following features:

– Plug-in miniature relays each with a PDT contact and detectable manual operation
– Slim design width of just 92 mm (8 channels) or 285 mm (32 channels)
– LED status indicator and freewheeling diode per signal path (integrated in relay)
– Supply voltage indicator (LED)



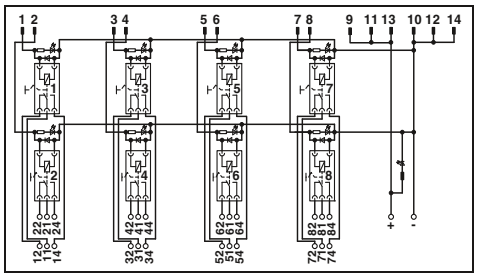
Output module with 8 miniature relays, 1 PDT with detectable manual operation

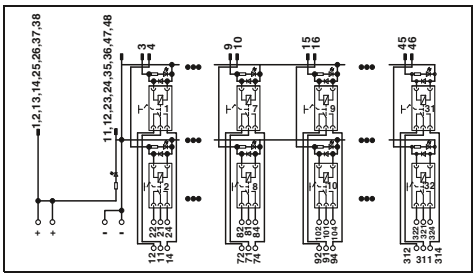


Output module with 32 miniature relays, 1 PDT with detectable manual operation

Notes:

1) EMC: Class A product, see page 571





Technical data

Coil side			
Operating voltage U_N		24 V DC	24 V DC
Typ. input current at U_N		18 mA	18 mA
Typ. response time at U_N		9 ms	9 ms
Typ. release time at U_N		6 ms	6 ms
Input circuit		Freewheeling diode (integrated in relay)	Freewheeling diode (integrated in relay)
Status display/channel		Yellow LED (integrated in relay)	Yellow LED (integrated in relay)
Connection method		Flat-ribbon cable plug-in connector according to IEC 60603-13	Flat-ribbon cable plug-in connector according to IEC 60603-13
No. of pos.		14	50
Contact side			
Contact type		Single contact, 1-PDT	Single contact, 1-PDT
Contact material		AgNi	AgNi
Max. switching voltage		250 V AC/DC	250 V AC/DC
Min. switching voltage		12 V AC/DC	12 V AC/DC
Limiting continuous current		5 A	5 A
Min. switching current		100 mA	100 mA
Max. interrupting rating:	24 V DC	120 W	120 W
	48 V DC	62 W	62 W
	60 V DC	42 W	42 W
	110 V DC	55 W	55 W
	220 V DC	66 W	66 W
	250 V AC	1250 VA	1250 VA
Connection method		Screw connection	Screw connection
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
General data			
Rated insulation voltage		260 V AC	260 V AC
Rated surge voltage		4 kV	4 kV
Pollution degree / Surge voltage category		2 / III	2 / III
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Nominal operating mode		100% operating factor	100% operating factor
Mechanical service life		5 x 10^6 cycles	5 x 10^6 cycles
Standards/regulations		DIN EN 50178	DIN EN 50178
Mounting position		Any	Any
Mounting		In rows with zero spacing	In rows with zero spacing
Dimensions	H / D	111 mm / 64 mm	111 mm / 64 mm

Ordering data

Description	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE output module, with 8 miniature relays, plugged in, for 24 V DC (including relays)	92	**UM- 8RM/KSR-G24/21/MS/PLC[1])**	**2900890**	1
VARIOFACE output module, with 32 miniature relays, plugged in, for 24 V DC (including relays)	285	**UM-32RM/KSR-G24/21/MS/PLC[1])**	**2900891**	1

Accessories

Plug-in miniature power relays, with power contacts	**REL-MR- 24DC/21HC/MS**	**2987888**	10

Technical data

Ordering data

Accessories

Plug-in miniature power relays, with power contacts	**REL-MR- 24DC/21HC/MS**	**2987888**	10

Output modules with relays, 1 PDT with or without manual operation and fuses

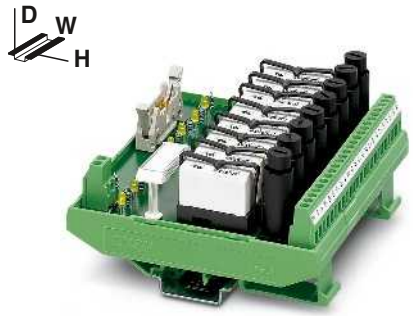
These VARIOFACE output modules are used in combination with the respective front adapters.

The modules are connected via a 14-pos. system cable. These relay modules offer the following features:

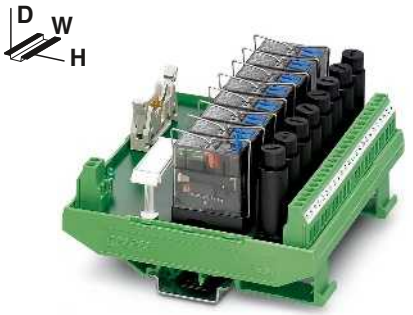
– Plug-in miniature relays each with a PDT contact with or without manual operation
– Fuse per output circuit as short-circuit protection
– Slim design width of just 127 mm
– LED status indicator and freewheeling diode per signal path
– Supply voltage indicator (LED)
– Polarity protection diode

Notes:

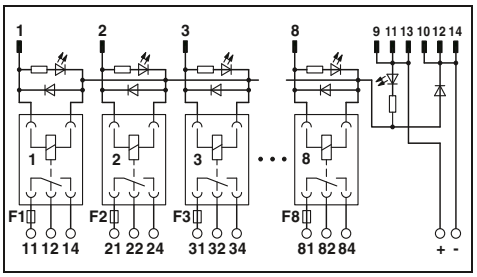
1) EMC: Class A product, see page 571

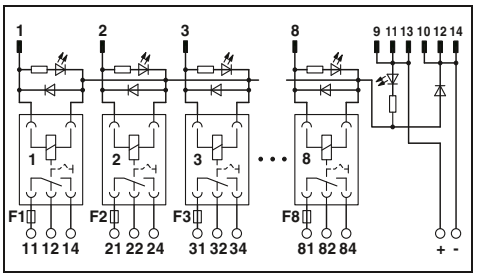


Output module with 8 miniature relays, 1 PDT and fuse per output circuit



Output module with 8 miniature relays, 1 PDT with detectable manual operation and fuse per output circuit





Technical data

Coil side		
Operating voltage U_N		24 V DC
Typ. input current at U_N		17 mA
Typ. response time at U_N		8 ms
Typ. release time at U_N		10 ms
Input circuit		Freewheeling diode
Status display/channel		Yellow LED
Connection method		Flat-ribbon cable plug-in connector according to IEC 60603-13
No. of pos.		14
Contact side		
Contact type		Single contact, 1-PDT
Contact material		AgNi
Max. switching voltage		250 V AC/DC
Min. switching voltage		12 V AC/DC
Output fuse		4 A 5x20 fuse (slow-blow)
Limiting continuous current		3.9 A (observe derating)
Min. switching current		100 mA
Max. interrupting rating:	24 V DC	93 W
	48 V DC	58 W
	60 V DC	48 W
	110 V DC	50 W
	220 V DC	80 W
	250 V AC	975 VA
Connection method		Screw connection
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
General data		
Rated insulation voltage		260 V AC
Rated surge voltage		4 kV
Pollution degree / Surge voltage category		2 / III
Ambient temperature (operation)		-20°C ... 50°C
Nominal operating mode		100% operating factor
Mechanical service life		3 x 10^7 cycles
Standards/regulations		DIN EN 50178
Mounting position		Any
Mounting		In rows with zero spacing
Dimensions	H / D	111 mm / 60 mm

Ordering data

Description	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE output module, with 8 miniature relays, plugged in, for 24 V DC (including relays)	127	**UM- 8RM/KSR-G24/21/SI/PLC[1])**	**2900892**	1

Accessories

Plug-in miniature relays	**REL-MR- 24DC/21HC**	**2961312**	10

Technical data

Coil side		
Operating voltage U_N		24 V DC
Typ. input current at U_N		18 mA
Typ. response time at U_N		9 ms
Typ. release time at U_N		6 ms
Input circuit		Freewheeling diode (integrated in relay)
Status display/channel		Yellow LED (integrated in relay)
Connection method		Flat-ribbon cable plug-in connector according to IEC 60603-13
No. of pos.		14
Contact side		
Contact type		Single contact, 1-PDT
Contact material		AgNi
Max. switching voltage		250 V AC/DC
Min. switching voltage		12 V AC/DC
Output fuse		4 A 5x20 fuse (slow-blow)
Limiting continuous current		3.9 A (observe derating)
Min. switching current		100 mA
Max. interrupting rating:	24 V DC	93 W
	48 V DC	62 W
	60 V DC	42 W
	110 V DC	55 W
	220 V DC	66 W
	250 V AC	975 VA
Connection method		Screw connection
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
General data		
Rated insulation voltage		260 V AC
Rated surge voltage		4 kV
Pollution degree / Surge voltage category		2 / III
Ambient temperature (operation)		-20°C ... 50°C
Nominal operating mode		100% operating factor
Mechanical service life		5 x 10^6 cycles
Standards/regulations		DIN EN 50178
Mounting position		Any
Mounting		In rows with zero spacing
Dimensions	H / D	111 mm / 64 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
UM- 8RM/KSR-G24/21/MS/SI/PLC[1])	**2900893**	1

Accessories

REL-MR- 24DC/21HC/MS	**2987888**	10

VIP – VARIOFACE Professional system cables with flat-ribbon connectors

– 1:1 connection
– 10- to 20-pos.
– Plug-in connectors as per IEC 60603-13
– In the desired lengths
– Individual serial number

Note:

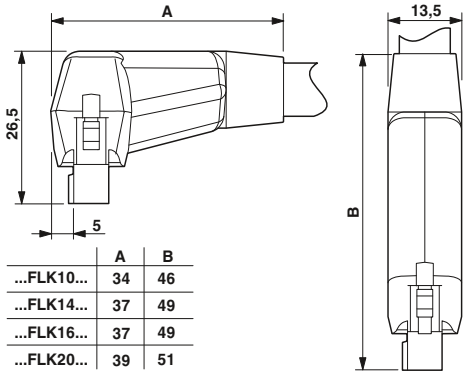
Due to the enlarged outer contour of the molded plug-in connectors, module types with UM45 profile and three-level terminal blocks cannot be connected with the VIP-CAB-FLK... system cable.

The following module types (10- to 50-pos.) can be connected.

For example, for 20 positions:

– VIP-2/SC/FLK 20
– VIP-2/SC/FLK20/LED
– FLKM 20/ZFKDS
– UM45-FLK 20/ZFKDS (double-level connection)

The VIP-CAB-FLK... system cables are not suitable for front adapters (see the dimensional drawing).



	A	B
...FLK10...	34	46
...FLK14...	37	49
...FLK16...	37	49
...FLK20...	39	51

not shielded

Technical data

Max. perm. operating voltage		< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path		1 A
Max. 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 mm²
Outside diameter		
	10 -position	6.1 mm
	14 -position	6.4 mm
	16 -position	6.8 mm
	20 -position	7.6 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
Round cable, with two molded socket strips					
	10	0.5 m	VIP-CAB-FLK10/0,14/0,5M	2318305	1
	10	1 m	VIP-CAB-FLK10/0,14/1,0M	2318318	1
	10	1.5 m	VIP-CAB-FLK10/0,14/1,5M	2318321	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
	10	4 m	VIP-CAB-FLK10/0,14/4,0M	2318350	1
	10	6 m	VIP-CAB-FLK10/0,14/6,0M	2318363	1
Round cable, same as before, in variable lengths (minimum ordering quantity five pieces)	10		VIP-CAB-FLK10-0,14/...	2318376	1
Round cable, with two molded socket strips					
	14	0.5 m	VIP-CAB-FLK14/0,14/0,5M	2318389	1
	14	1 m	VIP-CAB-FLK14/0,14/1,0M	2318392	1
	14	1.5 m	VIP-CAB-FLK14/0,14/1,5M	2318402	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
	14	4 m	VIP-CAB-FLK14/0,14/4,0M	2318431	1
	14	6 m	VIP-CAB-FLK14/0,14/6,0M	2318444	1
Round cable, same as before, in variable lengths (minimum ordering quantity five pieces)	14		VIP-CAB-FLK14-0,14/...	2318457	1
Round cable, with two molded socket strips					
	16	0.5 m	VIP-CAB-FLK16/0,14/0,5M	2318460	1
	16	1 m	VIP-CAB-FLK16/0,14/1,0M	2318473	1
	16	1.5 m	VIP-CAB-FLK16/0,14/1,5M	2318486	1
	16	2 m	VIP-CAB-FLK16/0,14/2,0M	2318499	1
	16	3 m	VIP-CAB-FLK16/0,14/3,0M	2318509	1
	16	4 m	VIP-CAB-FLK16/0,14/4,0M	2318512	1
	16	6 m	VIP-CAB-FLK16/0,14/6,0M	2318525	1
Round cable, same as before, in variable lengths (minimum ordering quantity five pieces)	16		VIP-CAB-FLK16-0,14/...	2318538	1
Round cable, with two molded socket strips					
	20	0.5 m	VIP-CAB-FLK20/0,14/0,5M	2318541	1
	20	1 m	VIP-CAB-FLK20/0,14/1,0M	2318554	1
	20	1.5 m	VIP-CAB-FLK20/0,14/1,5M	2318567	1
	20	2 m	VIP-CAB-FLK20/0,14/2,0M	2318570	1
	20	3 m	VIP-CAB-FLK20/0,14/3,0M	2318583	1
	20	4 m	VIP-CAB-FLK20/0,14/4,0M	2318596	1
	20	6 m	VIP-CAB-FLK20/0,14/6,0M	2318606	1
Round cable, same as before, in variable lengths (minimum ordering quantity five pieces)	20		VIP-CAB-FLK20-0,14/...	2318619	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
Step width	0.1 m

VIP – VARIOFACE Professional system cables with flat-ribbon plug-in connectors

– 1:1 connection
– 26- to 50-pos.
– Plug-in connectors as per IEC 60603-13
– In the desired lengths
– Individual serial number

Note:

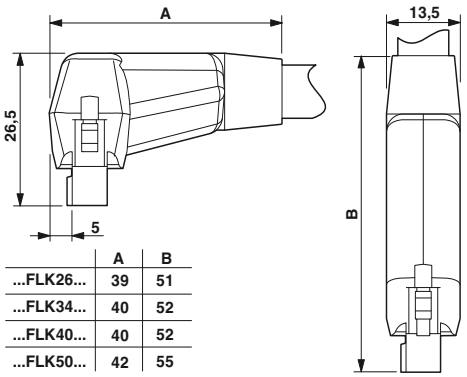
Due to the enlarged outer contour of the molded connectors, module types with UM45 profile and three-level terminal blocks cannot be connected with the VIP-CAB-FLK... system cable.

The following module types (10- to 50-pos.) can be connected.

For example, for 20 positions:

– VIP-2/SC/FLK 20
– VIP-2/SC/FLK20/LED
– FLKM 20/ZFKDS
– UM45-FLK 20/ZFKDS (double-level connection)

The VIP-CAB-FLK... system cables are not suitable for front adapters (see the dimensional drawing).



	A	B
...FLK26...	39	51
...FLK34...	40	52
...FLK40...	40	52
...FLK50...	42	55

not shielded

Technical data

Max. perm. operating voltage		< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path		1 A
Max. 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 mm²
Outside diameter		
	26 -position	8.3 mm
	34 -position	8.7 mm
	40 -position	9.9 mm
	50 -position	10.3 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
Round cable, with two molded socket strips					
	26	0.5 m	VIP-CAB-FLK26/0,14/0,5M	2318622	1
	26	1 m	VIP-CAB-FLK26/0,14/1,0M	2318635	1
	26	1.5 m	VIP-CAB-FLK26/0,14/1,5M	2318648	1
	26	2 m	VIP-CAB-FLK26/0,14/2,0M	2318651	1
	26	3 m	VIP-CAB-FLK26/0,14/3,0M	2318664	1
	26	4 m	VIP-CAB-FLK26/0,14/4,0M	2318677	1
	26	6 m	VIP-CAB-FLK26/0,14/6,0M	2318680	1
Round cable, same as before, in variable lengths (minimum ordering quantity five pieces)	26		VIP-CAB-FLK26-0,14/...	2318693	1
Round cable, with two molded socket strips					
	34	0.5 m	VIP-CAB-FLK34/0,14/0,5M	2318703	1
	34	1 m	VIP-CAB-FLK34/0,14/1,0M	2318716	1
	34	1.5 m	VIP-CAB-FLK34/0,14/1,5M	2318729	1
	34	2 m	VIP-CAB-FLK34/0,14/2,0M	2318732	1
	34	3 m	VIP-CAB-FLK34/0,14/3,0M	2318745	1
	34	4 m	VIP-CAB-FLK34/0,14/4,0M	2318758	1
	34	6 m	VIP-CAB-FLK34/0,14/6,0M	2318761	1
Round cable, same as before, in variable lengths (minimum ordering quantity five pieces)	34		VIP-CAB-FLK34-0,14/...	2318774	1
Round cable, with two molded socket strips					
	40	0.5 m	VIP-CAB-FLK40/0,14/0,5M	2318787	1
	40	1 m	VIP-CAB-FLK40/0,14/1,0M	2318790	1
	40	1.5 m	VIP-CAB-FLK40/0,14/1,5M	2318800	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
	40	4 m	VIP-CAB-FLK40/0,14/4,0M	2318839	1
	40	6 m	VIP-CAB-FLK40/0,14/6,0M	2318842	1
Round cable, same as before, in variable lengths (minimum ordering quantity five pieces)	40		VIP-CAB-FLK40-0,14/...	2318855	1
Round cable, with two molded socket strips					
	50	0.5 m	VIP-CAB-FLK50/0,14/0,5M	2318868	1
	50	1 m	VIP-CAB-FLK50/0,14/1,0M	2318871	1
	50	1.5 m	VIP-CAB-FLK50/0,14/1,5M	2318884	1
	50	2 m	VIP-CAB-FLK50/0,14/2,0M	2318897	1
	50	3 m	VIP-CAB-FLK50/0,14/3,0M	2318907	1
	50	4 m	VIP-CAB-FLK50/0,14/4,0M	2318910	1
	50	6 m	VIP-CAB-FLK50/0,14/6,0M	2318923	1
Round cable, same as before, in variable lengths (minimum ordering quantity five pieces)	50		VIP-CAB-FLK50-0,14/...	2318936	1

Ordering example for system cable:
– 26-pos. cable, 12.6 m long

Quantity	Order No.		Length [m]
1	2318693	/	12.6

Min.	0.5 m
Max.	100.0 m
Step width	0.1 m

System cable with a flat-ribbon cable plug-in connector and an open end

– 1:1 connection
– 10-, 14-, and 16-pos.
– Plug-in connectors as per IEC 60603-13
– Open end at the other end

The individual wires at the open end are labeled (1, 2, 3, 4, ...) and equipped with a ferrule.

Notes:

In the case of molded connectors, please observe the dimensional drawing and note, see page 500

Molded plug-in connectors, not shielded

not shielded

		Technical data	Technical data
Max. perm. operating voltage		< 50 V AC / 60 V DC	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path		1 A	1 A
Max. conductor resistance		0.16 Ω/m	0.16 Ω/m
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Assembly		Insulation displacement, IEC 60352-4/DIN EN 60352-4	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section		AWG 26 / 0.14 mm²	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated	7 / Cu tin-plated
Outside diameter			
	10 -position	6.1 mm	6.1 mm
	14 -position	6.4 mm	6.4 mm
	16 -position	6.5 mm	6.5 mm

			Ordering data			Ordering data		
Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Round cable with an open end								
	10	0.5 m				CABLE-FLK10/OE/0,14/ 0,5M	2904073	1
	10	1 m				CABLE-FLK10/OE/0,14/ 1,0M	2904074	1
	10	1.5 m				CABLE-FLK10/OE/0,14/ 1,5M	2904075	1
	10	2 m				CABLE-FLK10/OE/0,14/ 2,0M	2904076	1
	10	2.5 m				CABLE-FLK10/OE/0,14/ 2,5M	2904077	1
	10	3 m				CABLE-FLK10/OE/0,14/ 3,0M	2904078	1
	10	4 m				CABLE-FLK10/OE/0,14/ 4,0M	2904079	1
	10	6 m				CABLE-FLK10/OE/0,14/ 6,0M	2904080	1
	10	8 m				CABLE-FLK10/OE/0,14/ 8,0M	2904081	1
	10	10 m				CABLE-FLK10/OE/0,14/10,0M	2904082	1
Round cable, same as before, however in variable lengths								
	10					CABLE-FLK10-OE-0,14/...	2904331	1
Round cable with an open end								
	14	0.5 m	VIP-CAB-FLK14/FR/OE/0,14/0,5M	2900122	1	CABLE-FLK14/OE/0,14/ 50	2305761	1
	14	1 m	VIP-CAB-FLK14/FR/OE/0,14/1,0M	2900123	1	CABLE-FLK14/OE/0,14/ 100	2305253	1
	14	1.5 m	VIP-CAB-FLK14/FR/OE/0,14/1,5M	2900125	1	CABLE-FLK14/OE/0,14/ 150	2305266	1
	14	2 m	VIP-CAB-FLK14/FR/OE/0,14/2,0M	2900126	1	CABLE-FLK14/OE/0,14/ 200	2305279	1
	14	2.5 m				CABLE-FLK14/OE/0,14/ 250	2305282	1
	14	3 m	VIP-CAB-FLK14/FR/OE/0,14/3,0M	2900127	1	CABLE-FLK14/OE/0,14/ 300	2305295	1
	14	4 m	VIP-CAB-FLK14/FR/OE/0,14/4,0M	2900128	1	CABLE-FLK14/OE/0,14/ 400	2305774	1
	14	6 m	VIP-CAB-FLK14/FR/OE/0,14/6,0M	2900129	1	CABLE-FLK14/OE/0,14/ 600	2305787	1
	14	8 m				CABLE-FLK14/OE/0,14/ 800	2305790	1
	14	10 m				CABLE-FLK14/OE/0,14/1000	2305800	1
Round cable, same as before, however in variable lengths								
	14					CABLE-FLK14/OE/0,14/...	2305732	1
Round cable with an open end								
	16	0.5 m	VIP-CAB-FLK16/FR/OE/0,14/0,5M	2900130	1	CABLE-FLK16/OE/0,14/ 0,5M	2318127	1
	16	1 m	VIP-CAB-FLK16/FR/OE/0,14/1,0M	2900131	1	CABLE-FLK16/OE/0,14/ 1,0M	2318130	1
	16	1.5 m	VIP-CAB-FLK16/FR/OE/0,14/1,5M	2900132	1	CABLE-FLK16/OE/0,14/ 1,5M	2318143	1
	16	2 m	VIP-CAB-FLK16/FR/OE/0,14/2,0M	2900133	1	CABLE-FLK16/OE/0,14/ 2,0M	2318156	1
	16	2.5 m				CABLE-FLK16/OE/0,14/ 2,5M	2318169	1
	16	3 m	VIP-CAB-FLK16/FR/OE/0,14/3,0M	2900134	1	CABLE-FLK16/OE/0,14/ 3,0M	2318172	1
	16	4 m	VIP-CAB-FLK16/FR/OE/0,14/4,0M	2900135	1	CABLE-FLK16/OE/0,14/ 4,0M	2318185	1
	16	6 m	VIP-CAB-FLK16/FR/OE/0,14/6,0M	2900136	1	CABLE-FLK16/OE/0,14/ 6,0M	2318198	1
	16	8 m				CABLE-FLK16/OE/0,14/ 8,0M	2318208	1
	16	10 m				CABLE-FLK16/OE/0,14/10,0M	2318211	1
Round cable, same as before, however in variable lengths								
	16					CABLE-FLK16/OE/0,14/...	2318224	1

System cable with a flat-ribbon cable plug-in connector and an open end

– 1:1 connection
– 20- and 50-pos.
– Plug-in connectors as per IEC 60603-13
– Open end at the other end

The individual wires at the open end are labeled (1, 2, 3, 4, ...) and equipped with a ferrule.

Notes:

In the case of molded connectors, please observe the dimensional drawing and note, see page 500

Molded plug-in connectors, not shielded

not shielded

		Technical data	Technical data
Max. perm. operating voltage		< 50 V AC / 60 V DC	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path		1 A	1 A
Max. conductor resistance		0.16 Ω/m	0.16 Ω/m
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Assembly		Insulation displacement, IEC 60352-4/DIN EN 60352-4	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section		AWG 26 / 0.14 mm²	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated	7 / Cu tin-plated
Outside diameter			
	20 -position	7.6 mm	7.6 mm
	50 -position	10.3 mm	10.3 mm

			Ordering data			Ordering data		
Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Round cable with an open end								
	20	0.5 m	VIP-CAB-FLK20/FR/OE/0,14/0,5M	2900138	1	CABLE-FLK20/OE/0,14/ 50	2305826	1
	20	1 m	VIP-CAB-FLK20/FR/OE/0,14/1,0M	2900139	1	CABLE-FLK20/OE/0,14/ 100	2305305	1
	20	1.5 m	VIP-CAB-FLK20/FR/OE/0,14/1,5M	2900141	1	CABLE-FLK20/OE/0,14/ 150	2305318	1
	20	2 m	VIP-CAB-FLK20/FR/OE/0,14/2,0M	2900142	1	CABLE-FLK20/OE/0,14/ 200	2305321	1
	20	2.5 m				CABLE-FLK20/OE/0,14/ 250	2305334	1
	20	3 m	VIP-CAB-FLK20/FR/OE/0,14/3,0M	2900143	1	CABLE-FLK20/OE/0,14/ 300	2305347	1
	20	4 m	VIP-CAB-FLK20/FR/OE/0,14/4,0M	2900144	1	CABLE-FLK20/OE/0,14/ 400	2305839	1
	20	6 m	VIP-CAB-FLK20/FR/OE/0,14/6,0M	2900145	1	CABLE-FLK20/OE/0,14/ 600	2305842	1
	20	8 m				CABLE-FLK20/OE/0,14/ 800	2305855	1
	20	10 m				CABLE-FLK20/OE/0,14/1000	2305868	1
Round cable, same as before, however in variable lengths								
	20					CABLE-FLK20/OE/0,14/...	2305745	1
Round cable with an open end								
	50	0.5 m	VIP-CAB-FLK50/FR/OE/0,14/0,5M	2900146	1	CABLE-FLK50/OE/0,14/ 50	2305871	1
	50	1 m	VIP-CAB-FLK50/FR/OE/0,14/1,0M	2900147	1	CABLE-FLK50/OE/0,14/ 100	2305350	1
	50	1.5 m	VIP-CAB-FLK50/FR/OE/0,14/1,5M	2900148	1	CABLE-FLK50/OE/0,14/ 150	2305363	1
	50	2 m	VIP-CAB-FLK50/FR/OE/0,14/2,0M	2900149	1	CABLE-FLK50/OE/0,14/ 200	2305376	1
	50	2.5 m				CABLE-FLK50/OE/0,14/ 250	2305389	1
	50	3 m	VIP-CAB-FLK50/FR/OE/0,14/3,0M	2900150	1	CABLE-FLK50/OE/0,14/ 300	2305392	1
	50	4 m	VIP-CAB-FLK50/FR/OE/0,14/4,0M	2900151	1	CABLE-FLK50/OE/0,14/ 400	2305884	1
	50	6 m	VIP-CAB-FLK50/FR/OE/0,14/6,0M	2900152	1	CABLE-FLK50/OE/0,14/ 600	2305897	1
	50	8 m				CABLE-FLK50/OE/0,14/ 800	2305907	1
	50	10 m				CABLE-FLK50/OE/0,14/1000	2305910	1
Round cable, same as before, however in variable lengths								
	50					CABLE-FLK50/OE/0,14/...	2305758	1

System cable with flat-ribbon cable plug-in connector

Standard lengths

Round cable sets are used to connect the PLC front adapters to the corresponding VARIOFACE controller boards.

The following versions are available with 14 and 50 positions:

– Not shielded
– Shielded
– Halogen-free

Plug-in connector strips are fitted on both sides of the cables in accordance with IEC 60603-13/DIN 41651 (1:1 connection).

In 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 mm², black).

Special lengths are defined using an order key, refer to page 510.

not shielded

Technical data

Max. perm. operating voltage		< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path		1 A
Max. 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 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter		
	14 -position	6.4 mm
	50 -position	10.3 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
Assembled round cables[1]), with two 14-pos. socket strips in fixed lengths, for transfer of eight channels among other things					
	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
Assembled round cables[2]), with two 50-pos. socket strips in fixed lengths, for transfer of 32 channels among other things					
	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

Shielded

Halogen-free
(only the cable)

Applied for: cUL / UL

Technical data

	< 50 V AC / 60 V DC
	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 mm²
	7 / Cu tin-plated
	6.7 mm
	11 mm

Technical data

	< 50 V AC / 60 V DC
	1 A
	0.16 Ω/m
	-20°C ... 50°C
	-
	Insulation displacement, IEC 60352-4/DIN EN 60352-4
	AWG 26 / 0.14 mm²
	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

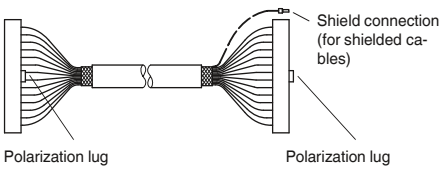
Ordering data

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

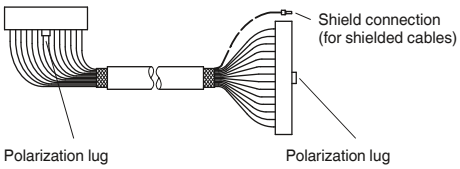
Color code of system cables

No. of wires	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
	19	White-gray
20-pos.	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]) Socket strips assembled straight at both ends.



[2]) Socket strips assembled straight at one end and angled at the other.



System cable with flat-ribbon cable plug-in connector

Standard lengths

Pre-assembled round cables to couple the VARIOFACE interface modules.

Plug-in connector strips are fitted on both sides of the cables in accordance with IEC 60603-13/DIN 41651 (1:1 connection).

Special lengths are defined using an order key, refer to page 510.

Notes:
Outside diameter of the cable
10-pos.: 6 mm 16-pos.: 6.5 mm 20-pos.: 7.6 mm 26-pos.: 7.8 mm 34-pos.: 10 mm

not shielded

Applied for: cUL / UL

Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path	1 A
Max. 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 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
Round cable[1]), with two socket strips					
	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
Round cable[1]), with two socket strips					
	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
Round cable[1]), with two socket strips					
	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
Round cable[1]), with two socket strips					
	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
Round cable[1]), with two socket strips					
	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

System cable with flat-ribbon cable plug-in connector

Standard lengths

Round cable sets are used to connect the PLC front adapters to the corresponding VARIOFACE controller boards.

Plug-in connector strips are fitted on both sides of the cables in accordance with IEC 60603-13/DIN 41651 (1:1 connection).

Special lengths are defined using an order key, refer to page 510.

not shielded

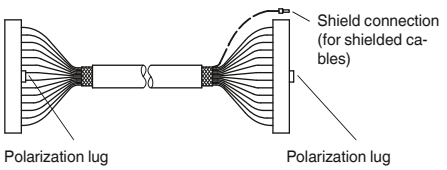
Technical data

Max. perm. operating voltage	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path	1 A
Max. 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 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	
40 -position	9.9 mm

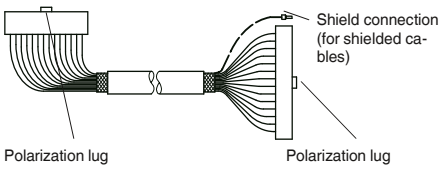
Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
Round cable[2]), with two socket strips					
	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

[1]) Socket strips assembled straight at both ends.



[2]) Socket strips assembled straight at one end and angled at the other.



System cable with flat-ribbon cable plug-in connector

The FLK 50... types are plugged onto the VARIOFACE front adapters for 32 channels and make it possible to split the channels into 4 x 8 channels. All 8-channel VARIOFACE modules and the PLC-V8 adapters for PLC-INTERFACE can therefore be connected.

In 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 mm², black).

Splitting cable unshielded
50 positions on 4 x 14

Splitting cable shielded
50 positions on 4 x 14

	Technical data	Technical data
Max. perm. operating voltage	< 50 V AC / 60 V DC	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path	1 A	1 A
Max. conductor resistance	0.16 Ω/m	0.16 Ω/m
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C
Shield	-	Tinned copper-braided shield, approx. 85% covering
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm²	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated	7 / Cu tin-plated
Number of connectors on the module side	4	4
Outside diameter		
50 -position	6.3 mm	6.3 mm

Description	No. of pos.	Cable length	Ordering data: Type	Order No.	Pcs. / Pkt.	Ordering data: Type	Order No.	Pcs. / Pkt.
Round cable sets, for connection to the VARIOFACE system cabling, with a 50-pos. socket strip and four 14-pos. socket strips, for splitting max. 32 channels into 4 x 8 channels.								
	50	0.5 m	**FLK 50/4X14/EZ-DR/ 50/KONFEK**	**2296689**	1			
	50	1 m	**FLK 50/4X14/EZ-DR/ 100/KONFEK**	**2296692**	1			
	50	1.5 m	**FLK 50/4X14/EZ-DR/ 150/KONFEK**	**2296702**	1			
	50	2 m	**FLK 50/4X14/EZ-DR/ 200/KONFEK**	**2296715**	1			
	50	2.5 m	**FLK 50/4X14/EZ-DR/ 250/KONFEK**	**2305402**	1			
	50	3 m	**FLK 50/4X14/EZ-DR/ 300/KONFEK**	**2296728**	1			
	50	4 m	**FLK 50/4X14/EZ-DR/ 400/KONFEK**	**2296731**	1			
	50	6 m	**FLK 50/4X14/EZ-DR/ 600/KONFEK**	**2296744**	1			
	50	8 m	**FLK 50/4X14/EZ-DR/ 800/KONFEK**	**2296757**	1			
	50	10 m	**FLK 50/4X14/EZ-DR/1000/KONFEK**	**2296773**	1			
Assembled round cables, same as before, however in variable lengths								
	50		**FLK 50-4X14-EZ-DR ...**	**2302405**	1			
Assembled round cables, same as before, however shielded and in variable lengths								
	50					**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][1])
1	2302405	/ 12.75

[1]) min. 0.30 m

– Shielded splitting cable 11.00 m long

Quantity	Order No.	Length [m][1])
1	2302447	/ 11.00

[1]) min. 0.30 m

System cable with flat-ribbon cable plug-in connector

Special lengths

Pre-assembled **round cables** for connecting, e.g., PLC front adapters to the corresponding VARIOFACE termination boards. The cables are assembled with plug-in connector strips at both ends according to IEC 60603-13/DIN 41651. For shielded cables, a cable end with ferrule is available additionally as a shielded connection (length: approx. 0.5 m; cable: H05V-K 1 mm², 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 within the specific cable.

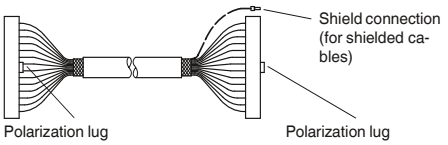
Assembly

– None,
the cable is not assembled at either end;
– 10-pos. socket strip at both ends, the cable is assembled with 10-pos. plug-in connectors at both ends
(1:1 connection);
– 14-pos. socket strip at both ends, the cable is assembled with 14-pos. plug-in connectors at both ends
(1:1 connection); and so on up to
– 50-pos. socket strip at both ends, the cable is assembled with 50-pos. plug-in connectors at both ends
(1:1 connection);
– 14-pos. socket strip at one end,
16-pos. socket strip at one end,
the cable is assembled with a 14-pos. plug-in connector at one end and a 16-pos. plug-in connector at the other end
(for SIMATIC S7; no 1:1 connection).

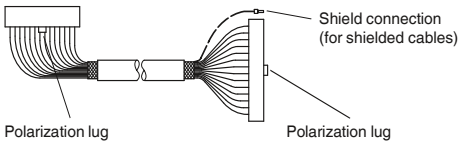
Features of permissible assemblies:

Cable type / Assembly	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. socket strip at both ends	**10U/C55/...**[1]											
14-pos. socket strip at both ends		**14U/C23/...**[1]							**14S/C23/...**[1]			
16-pos. socket strip at both ends			**16U/C58/...**[1]							**16S/C58/...**[1]		
20-pos. socket strip at both ends				**20U/C61/...**[1]								
26-pos. socket strip at both ends					**26U/C63/...**[1]							
34-pos. socket strip at both ends						**34U/C65/...**[1]						
40-pos. socket strip at both ends							**40U/C30/...**[3]				**40S/C30/...**[3]	
50-pos. socket strip at both ends								**50U/C38/...**[2]				**50S/C38/...**[2]
14-pos. socket strip at one end; 16-pos. socket strip at one end		**14U/C52/...**[1]							**14S/C52/...**[1]			

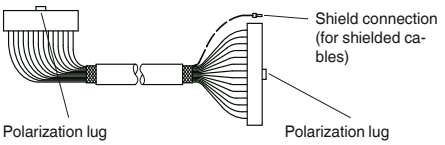
[1] Socket strips assembled straight at both ends.



[2] Socket strips assembled straight at one end and angled at the other.



[3] Socket strips 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. socket strips, 11.5 m long

Quantity	Order No.	Cable type	Assembly	Length [m][4]
1	2295059	50U	C38	11.50

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

C00 ≙ No assembly
C55 ≙ 10-pos. socket strip at both ends
C23 ≙ 14-pos. socket strip at both ends
C52 ≙ 14-pos. socket strip at one end, 16-pos. socket strip at the other (for S7)
C58 ≙ 16-pos. socket strip at both ends
C61 ≙ 20-pos. socket strip at both ends
C63 ≙ 26-pos. socket strip at both ends
C65 ≙ 34-pos. socket strip at both ends
C30 ≙ 40-pos. socket strip at both ends
C38 ≙ 50-pos. socket strip at both ends

[4] Min. 0.20 m

Ordering example for **shielded** round cable:

– Shielded 14-pos. round cable, assembled with two 14-pos. socket strips, 12.75 m long

Quantity	Order No.	Cable type	Assembly	Length [m][4]
1	2295046	14S	C23	12.75

14S ≙ 14-pos. shielded
16S ≙ 16-pos. shielded
40S ≙ 40-pos. shielded
50S ≙ 50-pos. shielded

C00 ≙ No assembly
C23 ≙ 14-pos. socket strip at both ends
C52 ≙ 14-pos. socket strip at one end, 16-pos. socket strip at the other (for S7)
C58 ≙ 16-pos. socket strip at both ends
C30 ≙ 40-pos. socket strip at both ends
C38 ≙ 50-pos. socket strip at both ends

[4] Min. 0.20 m

not shielded

shielded

	Technical data	Technical data
Max. perm. operating voltage	< 50 V AC / 60 V DC	< 50 V AC / 60 V DC
Max. perm. current carrying capacity per path	1 A	1 A
Max. conductor resistance	0.16 Ω/m	0.16 Ω/m
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C
Shield	-	Tinned copper-braided shield, approx. 85% covering
Conductor cross section	AWG 26 / 0.14 mm²	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated	7 / Cu tin-plated

			Ordering data			Ordering data		
Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Unshielded round cables, as above, but in variable lengths of type **"FLK EZ-DR/14U/C52/..."**								
			FLK EZ-DR.../.../...	**2295059**	1	**FLK EZ-DR-S.../.../...**	**2295046**	1

System cable with D-SUB socket and pin strip

Standard lengths

Shielded round cable sets to connect the control level with the corresponding VARIOFACE interface modules.

Assembly with D-SUB strips as per IEC 60807-2/DIN 41652, (1:1 connection).

– D-SUB socket strip on one side and D-SUB pin strip on the other
– D-SUB sockets on both sides
– D-SUB pin strips on both sides
– Cable exit: straight
– Screw connection: 2 UNC 4-40 screws.

Special lengths and assembly versions are defined using an order key, refer to page 514.

Socket at one end and pin strip at the other

Technical data

Max. perm. operating voltage		125 V AC/DC
Max. perm. current carrying capacity per path		2 A
Max. 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 mm²
Outside diameter		
	9 -position	7.5 mm
	15 -position	9 mm
	25 -position	10.5 mm
	37 -position	12.5 mm
	50 -position	13.5 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
Shielded round cable, fitted 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	1.5 m	**CABLE-D37SUB/B/S/150/KONFEK/S**	**2302214**	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

Technical data

125 V AC/DC
2 A
0.09 Ω/m
-20°C ... 50°C
Tinned copper-braided shield, approx. 85% covering

> 200
AWG 24 / 0.25 mm²

7.5 mm
9 mm
10.5 mm
12 mm
13.5 mm

Technical data

125 V AC/DC
2 A
0.09 Ω/m
-20°C ... 50°C
Tinned copper-braided shield, approx. 85% covering

> 200
AWG 24 / 0.25 mm²

7.5 mm
9 mm
10.5 mm
12 mm
13.5 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

Color code of the system cables CABLE-D...SUB/...

No. of wires	PIN	Wire color
	1	white
	2	brown
	3	green
	4	yellow
	5	gray
	6	pink
	7	blue
	8	red
9-pos.	9	black
	10	violet
	11	gray-pink
	12	red-blue
	13	white-green
	14	brown-green
15-pos.	15	white-yellow
	16	yellow-brown
	17	white-gray
	18	gray-brown
	19	white-pink
	20	pink-brown
	21	white-blue
	22	brown-blue
	23	white-red
	24	brown-red
25-pos.	25	white-black
	26	brown-black
	27	gray-green
	28	yellow-gray
	29	pink-green
	30	yellow-pink
	31	green-blue
	32	yellow-blue
	33	green-red
	34	yellow-red
	35	green-black
	36	yellow-black
37-pos.	37	gray-blue
	38	pink-blue
	39	gray-red
	40	pink-red
	41	gray-black
	42	pink-black
	43	blue-black
	44	red-black
	45	white-brown-black
	46	yellow-green-black
	47	gray-pink-black
	48	blue-red-black
	49	white-green-black
50-pos.	50	green-brown-black

System cable with D-SUB sockets and pin strip

Special lengths

Pre-assembled shielded **round cables** for connecting VARIOFACE termination boards. The cables are assembled with D-SUB strips in accordance with IEC 60807-2/DIN 41652.

The order key is defined by three features.

The features in the appropriate sequence are:

– Cable type
– Assembly
– Length in meters

There are three assembly variants of the shielded round cable:

– CABLE D-SUB-S/.../.../...
  D-SUB socket strip on one end and D-SUB pin strip on the other
– CABLE D-SUB-B-B-S/.../.../... D-SUB socket strip at both ends
– CABLE D-SUB-S-S-S/.../.../... D-SUB pin strip at both ends

The features necessary for clear identification of an order are described below:

Cable type

– The number of individual cables within the cable is defined here.

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 one 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 one end
  the cable connects (1:1) a 15-pos. D-SUB socket and pin strip; or up to
– 50-pos. D-SUB socket strip at one end
  50-pos. D-SUB pin strip at one end
  the cable connects (1:1) a 50-pos. D-SUB socket and pin strip.

Sample order for round cable set assembled with pin strip on one side and socket strip on one side

– unshielded 25-pos. round cable set, assembled with one 25-pos. D-SUB socket strip and one 25-pos. D-SUB pin strip, 11.5 mm long

Quantity	Order No.	Cable type	Assembly	Length [m][1)]
1	2302340	25S	C36	11.50

Cable type
09S ≙ 9-pos. shielded
15S ≙ 15-pos. shielded
25S ≙ 25-pos. shielded
37S ≙ 37-pos. shielded
50S ≙ 50-pos. shielded

Assembly
C00 ≙ no assembly
C01 ≙ 9-pos. D-SUB socket strip at one end
9-pos. D-SUB pin strip at one end
C28 ≙ 15-pos. D-SUB socket strip at one end
15-pos. D-SUB pin strip at one end
C36 ≙ 25-pos. D-SUB socket strip at one end
25-pos. D-SUB pin strip at one end
C43 ≙ 37-pos. D-SUB socket strip at one end
37-pos. D-SUB pin strip at one end
C49 ≙ 50-pos. D-SUB socket strip at one end
50-pos. D-SUB pin strip at one end

[1)] min. 0.20 m

Sample order for round cable set assembled with socket strip at both ends

– Shielded 37-pos. round cable, assembled with two 37-pos. D-SUB socket strips, 12.75 m long

Quantity	Order No.	Cable type	Assembly	Length [m][1)]
1	2302421	37S	C44	12.75

Cable type
09S ≙ 9-pos. shielded
15S ≙ 15-pos. shielded
25S ≙ 25-pos. shielded
37S ≙ 37-pos. shielded
50S ≙ 50-pos. shielded

Assembly
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

[1)] min. 0.20 m

Sample order for round cable set assembled with pin strip at both ends

– Shielded 15-pos. round cable, assembled with two 15-pos. D-SUB pin strips, 8.5 m long

Quantity	Order No.	Cable type	Assembly	Length [m][1)]
1	2302434	15S	C71	8.50

Cable type
09S ≙ 9-pos. shielded
15S ≙ 15-pos. shielded
25S ≙ 25-pos. shielded
37S ≙ 37-pos. shielded
50S ≙ 50-pos. shielded

Assembly
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

[1)] min. 0.20 m

Shielded

Technical data

Max. perm. operating voltage	125 V AC/DC
Max. perm. current carrying capacity per path	2 A
Max. 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 mm²

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
Assembled round cables, in variable lengths, **pin strip on one side** and **socket strip on one side**			**CABLE D-SUB-S/.../.../...**	**2302340**	1
Assembled round cables, in variable lengths, **socket strip on both sides**			**CABLE D-SUB-B-B-S/.../.../...**	**2302421**	1
Assembled round cables, in variable lengths, **pin strip on both sides**			**CABLE D-SUB-S-S-S/.../.../...**	**2302434**	1

System cable with D-SUB socket or pin strip and one open end

– 1:1 connection
– D-SUB socket 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 mm² 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	Technical data
Max. perm. operating voltage	125 V AC/DC	125 V AC/DC
Max. perm. current carrying capacity per path	2 A	2 A
Max. conductor resistance	0.09 Ω/m	0.09 Ω/m
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C
Shield	Tinned copper-braided shield, approx. 85% covering	Tinned copper-braided shield, approx. 85% covering
Insertion/withdrawal cycles	> 200	> 200
Conductor cross section	AWG 24 / 0.25 mm²	AWG 24 / 0.25 mm²
Outside diameter		
9 -position	7.5 mm	7.5 mm
15 -position	9 mm	9 mm
25 -position	10.5 mm	10.5 mm

Description	No. of pos.	Cable length	Ordering data: Type	Order No.	Pcs. / Pkt.	Ordering data: Type	Order No.	Pcs. / Pkt.
Round cable with an open end								
	9	0.5 m	CABLE-D- 9SUB/F/OE/0,25/S/0,5M	2926014	1	CABLE-D- 9SUB/M/OE/0,25/S/0,5M	2926360	1
	9	1 m	CABLE-D- 9SUB/F/OE/0,25/S/1,0M	2926027	1	CABLE-D- 9SUB/M/OE/0,25/S/1,0M	2926373	1
	9	1.5 m	CABLE-D- 9SUB/F/OE/0,25/S/1,5M	2926030	1	CABLE-D- 9SUB/M/OE/0,25/S/1,5M	2926386	1
	9	2 m	CABLE-D- 9SUB/F/OE/0,25/S/2,0M	2926043	1	CABLE-D- 9SUB/M/OE/0,25/S/2,0M	2926399	1
	9	3 m	CABLE-D- 9SUB/F/OE/0,25/S/3,0M	2926056	1	CABLE-D- 9SUB/M/OE/0,25/S/3,0M	2926409	1
	9	4 m	CABLE-D- 9SUB/F/OE/0,25/S/4,0M	2926069	1	CABLE-D- 9SUB/M/OE/0,25/S/4,0M	2926412	1
	9	6 m	CABLE-D- 9SUB/F/OE/0,25/S/6,0M	2926072	1	CABLE-D- 9SUB/M/OE/0,25/S/6,0M	2926425	1
Round cable, same as before, however in variable lengths								
	9		CABLE-D- 9SUB-F-OE-0,25-S/...	2900903	1	CABLE-D- 9SUB-M-OE-0,25-S/...	2900909	1
Round cable with an open end								
	15	0.5 m	CABLE-D-15SUB/F/OE/0,25/S/0,5M	2926085	1	CABLE-D-15SUB/M/OE/0,25/S/0,5M	2926438	1
	15	1 m	CABLE-D-15SUB/F/OE/0,25/S/1,0M	2926098	1	CABLE-D-15SUB/M/OE/0,25/S/1,0M	2926441	1
	15	1.5 m	CABLE-D-15SUB/F/OE/0,25/S/1,5M	2926108	1	CABLE-D-15SUB/M/OE/0,25/S/1,5M	2926454	1
	15	2 m	CABLE-D-15SUB/F/OE/0,25/S/2,0M	2926111	1	CABLE-D-15SUB/M/OE/0,25/S/2,0M	2926467	1
	15	3 m	CABLE-D-15SUB/F/OE/0,25/S/3,0M	2926124	1	CABLE-D-15SUB/M/OE/0,25/S/3,0M	2926470	1
	15	4 m	CABLE-D-15SUB/F/OE/0,25/S/4,0M	2926137	1	CABLE-D-15SUB/M/OE/0,25/S/4,0M	2926483	1
	15	6 m	CABLE-D-15SUB/F/OE/0,25/S/6,0M	2926140	1	CABLE-D-15SUB/M/OE/0,25/S/6,0M	2926496	1
Round cable, same as before, however in variable lengths								
	15		CABLE-D-15SUB-F-OE-0,25-S/...	2900905	1	CABLE-D-15SUB-M-OE-0,25-S/...	2900910	1
Round cable with an open end								
	25	0.5 m	CABLE-D-25SUB/F/OE/0,25/S/0,5M	2926153	1	CABLE-D-25SUB/M/OE/0,25/S/0,5M	2926506	1
	25	1 m	CABLE-D-25SUB/F/OE/0,25/S/1,0M	2926166	1	CABLE-D-25SUB/M/OE/0,25/S/1,0M	2926519	1
	25	1.5 m	CABLE-D-25SUB/F/OE/0,25/S/1,5M	2926179	1	CABLE-D-25SUB/M/OE/0,25/S/1,5M	2926522	1
	25	2 m	CABLE-D-25SUB/F/OE/0,25/S/2,0M	2926182	1	CABLE-D-25SUB/M/OE/0,25/S/2,0M	2926535	1
	25	3 m	CABLE-D-25SUB/F/OE/0,25/S/3,0M	2926195	1	CABLE-D-25SUB/M/OE/0,25/S/3,0M	2926548	1
	25	4 m	CABLE-D-25SUB/F/OE/0,25/S/4,0M	2926205	1	CABLE-D-25SUB/M/OE/0,25/S/4,0M	2926551	1
	25	6 m	CABLE-D-25SUB/F/OE/0,25/S/6,0M	2926218	1	CABLE-D-25SUB/M/OE/0,25/S/6,0M	2926564	1
Round cable, same as before, however in variable lengths								
	25		CABLE-D-25SUB-F-OE-0,25-S/...	2900906	1	CABLE-D-25SUB-M-OE-0,25-S/...	2900911	1

Special lengths of D-SUB cable with open ends can be configured using separate order numbers.

Ordering example:

One system cable assembled with a 37-pos. D-SUB socket strip and one 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	Technical data
Max. perm. operating voltage		125 V AC/DC	125 V AC/DC
Max. perm. current carrying capacity per path		2 A	2 A
Max. conductor resistance		0.09 Ω/m	0.09 Ω/m
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Shield		Tinned copper-braided shield, approx. 85% covering	Tinned copper-braided shield, approx. 85% covering
Insertion/withdrawal cycles		> 200	> 200
Conductor cross section		AWG 24 / 0.25 mm²	AWG 24 / 0.25 mm²
Outside diameter			
	37 -position	12 mm	12 mm
	50 -position	13.5 mm	13.5 mm

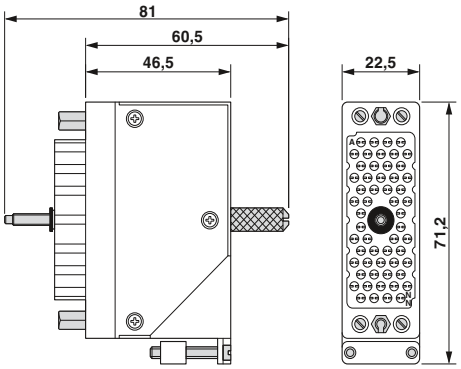
			Ordering data			Ordering data		
Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.	Type	Order No.	Pcs. / Pkt.
Round cable with an open end								
	37	0.5 m	CABLE-D-37SUB/F/OE/0,25/S/0,5M	2926221	1	CABLE-D-37SUB/M/OE/0,25/S/0,5M	2926577	1
	37	1 m	CABLE-D-37SUB/F/OE/0,25/S/1,0M	2926234	1	CABLE-D-37SUB/M/OE/0,25/S/1,0M	2926580	1
	37	1.5 m	CABLE-D-37SUB/F/OE/0,25/S/1,5M	2926247	1	CABLE-D-37SUB/M/OE/0,25/S/1,5M	2926593	1
	37	2 m	CABLE-D-37SUB/F/OE/0,25/S/2,0M	2926250	1	CABLE-D-37SUB/M/OE/0,25/S/2,0M	2926603	1
	37	3 m	CABLE-D-37SUB/F/OE/0,25/S/3,0M	2926263	1	CABLE-D-37SUB/M/OE/0,25/S/3,0M	2926616	1
	37	4 m	CABLE-D-37SUB/F/OE/0,25/S/4,0M	2926276	1	CABLE-D-37SUB/M/OE/0,25/S/4,0M	2926629	1
	37	6 m	CABLE-D-37SUB/F/OE/0,25/S/6,0M	2926289	1	CABLE-D-37SUB/M/OE/0,25/S/6,0M	2926632	1
Round cable, same as before, however in variable lengths								
	37		CABLE-D-37SUB-F-OE-0,25-S/...	2900907	1	CABLE-D-37SUB-M-OE-0,25-S/...	2900912	1
Round cable with an open end								
	50	0.5 m	CABLE-D-50SUB/F/OE/0,25/S/0,5M	2926292	1	CABLE-D-50SUB/M/OE/0,25/S/0,5M	2926645	1
	50	1 m	CABLE-D-50SUB/F/OE/0,25/S/1,0M	2926302	1	CABLE-D-50SUB/M/OE/0,25/S/1,0M	2926658	1
	50	1.5 m	CABLE-D-50SUB/F/OE/0,25/S/1,5M	2926315	1	CABLE-D-50SUB/M/OE/0,25/S/1,5M	2926661	1
	50	2 m	CABLE-D-50SUB/F/OE/0,25/S/2,0M	2926328	1	CABLE-D-50SUB/M/OE/0,25/S/2,0M	2926674	1
	50	3 m	CABLE-D-50SUB/F/OE/0,25/S/3,0M	2926331	1	CABLE-D-50SUB/M/OE/0,25/S/3,0M	2926687	1
	50	4 m	CABLE-D-50SUB/F/OE/0,25/S/4,0M	2926344	1	CABLE-D-50SUB/M/OE/0,25/S/4,0M	2926690	1
	50	6 m	CABLE-D-50SUB/F/OE/0,25/S/6,0M	2926357	1	CABLE-D-50SUB/M/OE/0,25/S/6,0M	2926700	1
Round cable, same as before, however in variable lengths								
	50		CABLE-D-50SUB-F-OE-0,25-S/...	2900908	1	CABLE-D-50SUB-M-OE-0,25-S/...	2900913	1

N

System cable with a 56-pos. ELCO/EDAC plug-in connector and an open end

Assembled system cable for connecting 56-pos. EDAC plug-in connectors from the 516 series or ELCO plug-in connectors from the 8016 series.

– Single-sided 516 series EDAC socket plug-in connectors
– Metal housing with lateral cable outlet
– Coding sockets in location 1 by default
– Open end at the other end
– Single wire marking:
  1, 2, 3, ... 53, 54, Y, Z (see pin assignment)
– Shield connection on both sides:
  H05V-K 1 mm² cable, black, length: 0.5 m



56-pos. system cable

Notes:

The system cables are designed specifically for the UMK-EC56/56-XOR (2975900) and UMK-EC56/56-XOL (2975890) modules.

When using the UMK-EC56/FRONT 2,5V/R (2976161) or UMK-EC56/FRONT 2,5V/L (2976158) modules, the coding sockets must be adapted accordingly.

Observe the module and system cable layouts.

Technical data

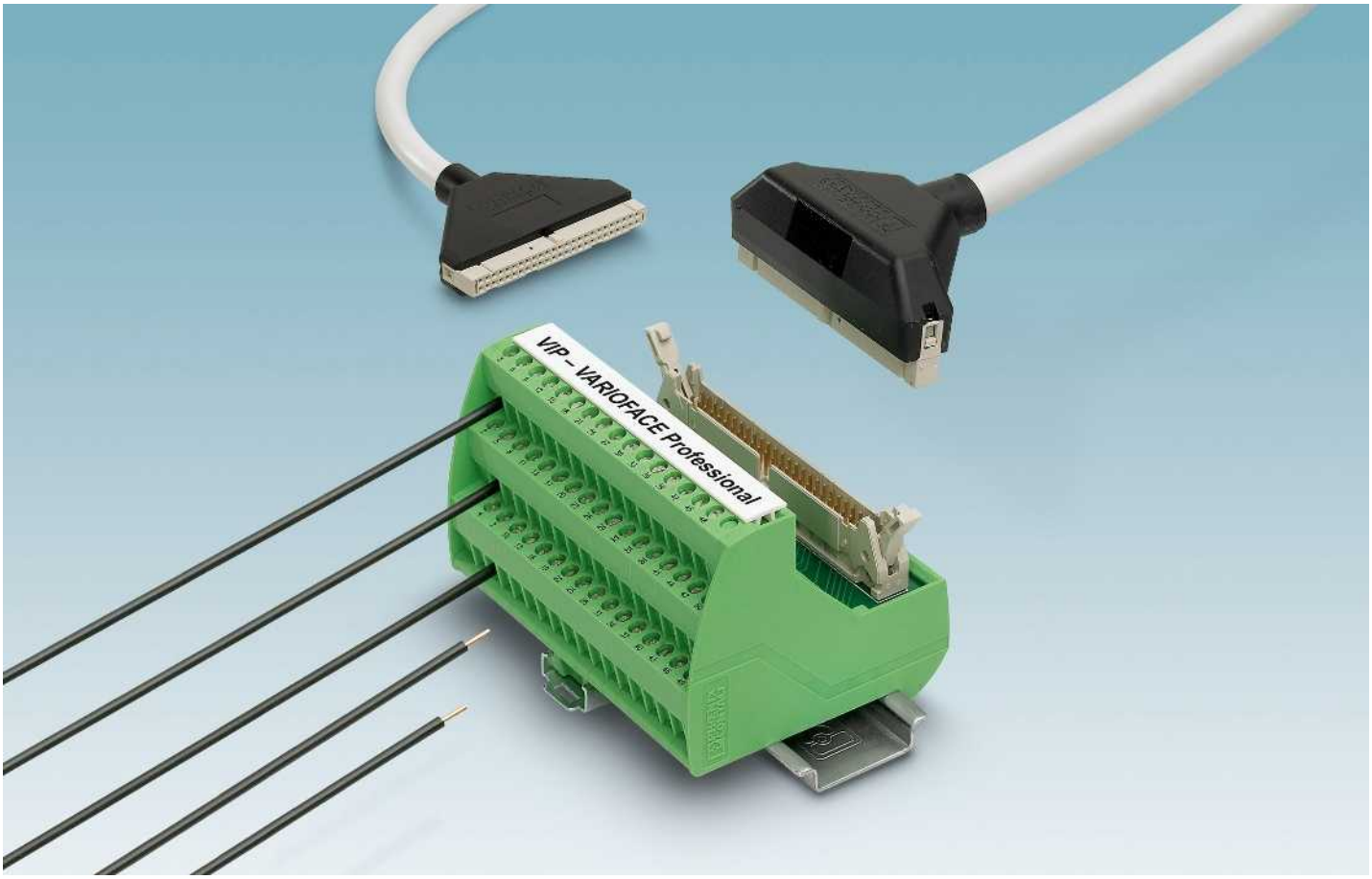
Max. perm. operating voltage	25 V AC / 60 V DC
Max. perm. current carrying capacity per path	1.5 A
Max. conductor resistance	0.056 Ω/m
Ambient temperature (operation)	-20°C ... 60°C
Shield	Tinned copper-braided shield, approx. 85% covering
Conductor cross section	AWG 22 / 0.34 mm²
Conductor structure: stranded wires / material	19 / Cu uninsulated

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs. / Pkt.
Shielded round cable, single-sided with assembled EDAC socket plug-in connector and an open end					
	56	1 m	**CABLE-EC56/F/OE/0,34/S/ 1,0M**	**2903395**	1
	56	2 m	**CABLE-EC56/F/OE/0,34/S/ 2,0M**	**2903396**	1
	56	4 m	**CABLE-EC56/F/OE/0,34/S/ 4,0M**	**2903397**	1
	56	6 m	**CABLE-EC56/F/OE/0,34/S/ 6,0M**	**2903398**	1
	56	8 m	**CABLE-EC56/F/OE/0,34/S/ 8,0M**	**2903399**	1
	56	10 m	**CABLE-EC56/F/OE/0,34/S/10,0M**	**2903400**	1
	56	15 m	**CABLE-EC56/F/OE/0,34/S/15,0M**	**2903401**	1
	56	20 m	**CABLE-EC56/F/OE/0,34/S/20,0M**	**2903402**	1
Shielded round cable, as above, but in variable lengths			**CABLE-EC56-F-OE-0,34-S/...**	**2904025**	1

Pin assignment

Single wire marking	EDAC socket plug-in connector	Single wire marking	EDAC socket plug-in connector
Z	Z	31	m
1	A	32	n
2	B	33	p
3	C	34	r
4	D	35	s
5	E	36	t
6	F	37	u
7	H	38	v
8	J	39	w
9	K	40	x
10	L	41	y
11	M	42	z
12	N	43	AA
13	P	44	BB
14	R	45	CC
15	S	46	DD
16	T	47	EE
17	U	48	FF
18	V	49	HH
19	W	50	JJ
20	X	51	KK
21	a	52	LL
22	b	53	MM
23	c	54	NN
24	d	Y	Y
25	e		
26	f		
27	h		
28	j		
29	k		
30	l		



VIP – VARIOFACE Professional – secure and reliable connections in even the tightest of spaces

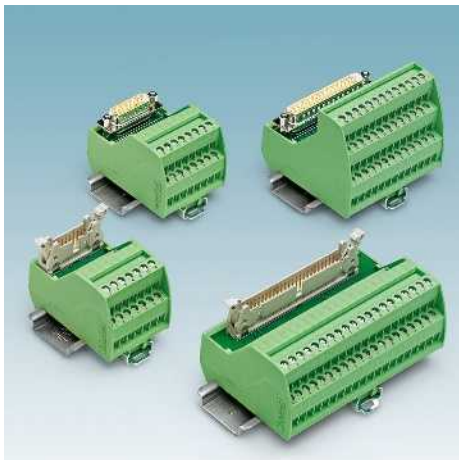
Space is extremely valuable in the control cabinet. That is why the I/O of automation devices feature high-position plug-in connectors. To enable the individual wires of the sensor/actuator level to be connected to the automation interface in accordance with industry requirements, Phoenix Contact is now able to offer new interface modules and new system cables inside a professional and compact housing design. Thanks to the encapsulated system cables, the control and process levels can be connected safely and reliably in harsh industrial environments.

To allow all components to be supplied with power, potential distributors are available with the same housing design.

VARIOFACE Professional means:

New modules:
– Space-saving
– Vibration resistant thanks to metal foot
– Optional marking
– New housing design

New FLK system cables:
– Encapsulated FLK plug-in connectors
– Professional strain relief
– Robust design



VIP - VARIOFACE Professional interface modules

Interface modules with various connection technologies and designs are available for the widely-used FLK, D-SUB, and high-density D-SUB plug-in connectors. Modules with a status indicator can be selected for operation monitoring purposes.

Interface module with ELCO or DIN plug-in connector

Modules with ELCO plug-in connectors exist for robust environments or where there are increased safety requirements.

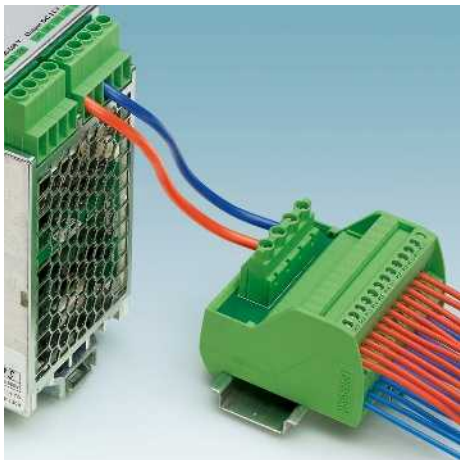
Interface modules are also available for DIN strip types C, D, E, and F.

Relay/solid-state relay modules

The active modules are configured as a 4-channel, 8-channel, and 16-channel interface. Multi-channel modules exist for relay and signal/power optocouplers. These allow functions such as signal conditioning, electrical isolation, and power gain to be achieved.

System cables with encapsulated FLK or D-SUB plug-in connectors

Assembled FLK and D-SUB cables guarantee a reliable connection between the automation device and the module. 1 A (FLK cable) and 2 A (D-SUB cable) currents can be transmitted on each signal path thanks to the large conductor cross sections.



VIP - VARIOFACE Professional potential distributors

Designed for up to 250 V/30 V, the potential distributors can be used universally – for both operating voltage and control voltage distribution. Screw connections or spring-cage connection can be selected as required for the application.

Product overview for VIP - VARIOFACE Professional

Device series	Passive modules (connection technology)				
	Flat-ribbon cable strip	D-SUB strip	DIN strip	ELCO strip	Potential distributor
	Page	Page	Page	Page	Page
VIP Line	524	532 539			548
Standard Line			540	544	
Slim Line	528	536			
Feed-through modules	530	537			
Cables	500	512			

	COMBICON	Active modules (function)	
Device series		Relays/ solid-state relays	Solid-state relays
	Page	Page	Page
Standard Line		550	553
Accessories	547	554	558
	547		

VIP – VARIOFACE Professional Modules with flat-ribbon cable plug-in connectors

– 1:1 connection
– 10- to 64-pos.
– Screw connection
– Metal foot
– As per IEC 60603-13
– Optional with status indicator

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 5.

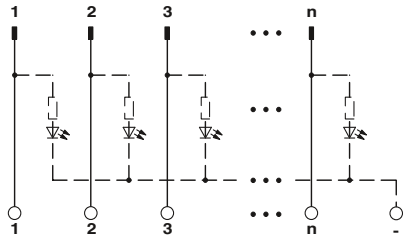
10 to 20 positions with screw connection

Technical data

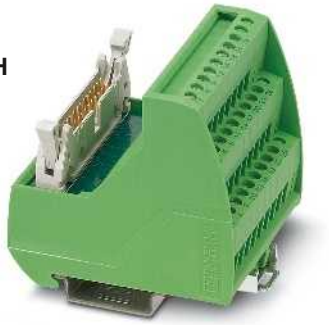
Operating voltage	60 V AC/DC
Max. perm. current (per branch)	1 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Connection data solid / stranded / AWG	0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions H / D	65.5 mm / 56 mm

Ordering data

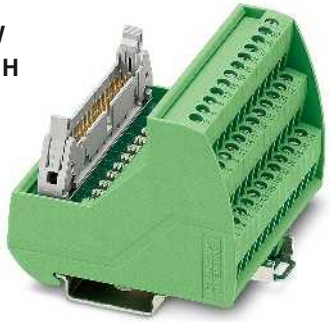
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, with pin strip					
	10	34.70	**VIP-2/SC/FLK10**	**2315010**	1
	14	39.80	**VIP-2/SC/FLK14**	**2315023**	1
	16	45.00	**VIP-2/SC/FLK16**	**2315036**	1
	20	55.10	**VIP-2/SC/FLK20**	**2315049**	1
VARIOFACE module, with pin strip and light indicator					
	10	34.70			
	14	44.90			
	16	50.00			
	20	60.20			
VARIOFACE module, with pin strip					
	26	57.10			
	34	67.30			
	40	77.40			
	50	92.70			
	60	108.00			
	64	118.00			
VARIOFACE module, with pin strip and light indicator					
	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
1 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
65.5 mm / 56 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

Technical data

60 V AC/DC
1 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
69 mm / 62 mm

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

Technical data

24 V DC
1 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
69 mm / 62 mm

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

VIP – VARIOFACE Professional Modules with flat-ribbon cable plug-in connectors

– 1:1 connection
– 10- to 64-pos.
– Push-in connection
– Metal foot
– As per IEC 60603-13
– Optional with status indicator

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 5.

N

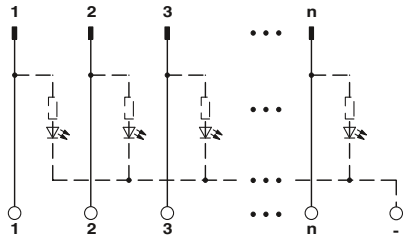
10 to 20 positions with push-in connection

Technical data

Operating voltage	60 V AC/DC
Max. perm. current (per branch)	1 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Connection data solid / stranded / AWG	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions H / D	72.1 mm / 56 mm

Ordering data

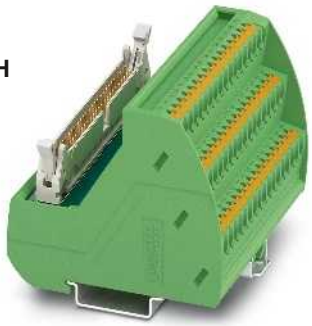
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, with pin strip					
	10	36.80	**VIP-2/PT/FLK10**	**2903787**	1
	14	41.90	**VIP-2/PT/FLK14**	**2903788**	1
	16	46.90	**VIP-2/PT/FLK16**	**2903789**	1
	20	57.10	**VIP-2/PT/FLK20**	**2903790**	1
VARIOFACE module, with pin 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			



N

10 to 20 positions
with push-in connection and light indicator

N



26 to 64 positions
with push-in connection

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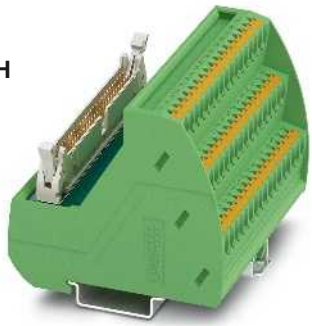


26 to 64 positions
with push-in connection and light indicator

Technical data

24 V DC
1 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
72.1 mm / 56 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

Technical data

60 V AC/DC
1 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
75.8 mm / 63 mm

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

Technical data

24 V DC
1 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
75.8 mm / 63 mm

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

SLIM-LINE modules for flat-ribbon cable plug-in connectors

VARIOFACE SLIM-LINE modules connect flat-ribbon cable plug-in connectors in accordance with IEC 60603-13/DIN 41651 to front connection terminal blocks.

The modules are provided with low and high engagement latches to protect the flat-ribbon cable plug-in connector against being accidentally released.

20 and 26-pos. with screw connection

34 to 50 positions with screw connection

Technical data

Operating voltage		< 50 V AC / 60 V DC
Max. perm. current (per branch)		0.8 A (data valid for 100% coincidence factor)
Ambient temperature (operation)		-10°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Screw connection solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	D / W	45 mm / 25 mm

Technical data

Operating voltage		< 50 V AC / 60 V DC
Max. perm. current (per branch)		1 A (data valid for 100% coincidence factor)
Ambient temperature (operation)		-10°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Screw connection solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	D / W	45 mm / 45 mm

Ordering data

Description	No. of pos.	Module height H	Type	Order No.	Pcs. / Pkt.
VARIOFACE-SLIM-LINE module, with pin strip					
	20	177.00	**UM 25-FLK20/FRONT/Q**	**2959515**	1
	26	217.00	**UM-25 FLK26/FRONT/Q**	**2959528**	1
VARIOFACE-SLIM-LINE module, with pin strip					
	34	147.00	**UM 45-FLK34/FRONT/Q**	**2959531**	1
	40	167.00	**UM 45-FLK40/FRONT/Q**	**2959544**	1
	50	197.00	**UM 45-FLK50/FRONT/Q**	**2959557**	1

Panel feed-through modules for flat-ribbon cable plug-in connectors

VARIOFACE DFLK... panel feed-through modules connect the flat-ribbon cable plug-in connectors in accordance with IEC 60603-13/DIN 41651 to the screw connection terminal blocks.

These modules are suitable for mounting on a side panel with an appropriate housing cutout (see dimensioning table).

The modules are provided with low and high engagement latches to protect the flat-ribbon cable plug-in connector against being accidentally released.

16 to 50 positions with screw connection

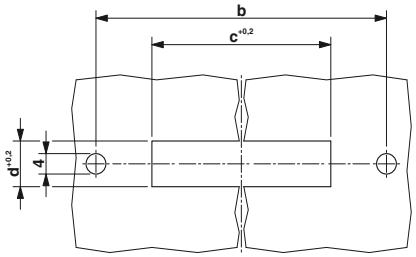
Technical data

Operating voltage	< 50 V AC / 60 V DC
Max. perm. 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 mm² / 0.2 - 2.5 mm² / 24 - 12

Ordering data

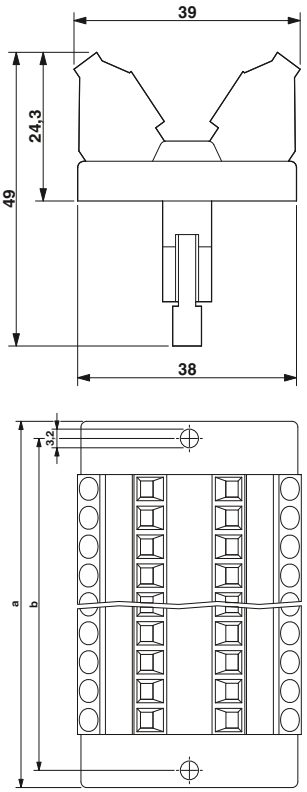
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE feed-through module, with pin strip					
	16	39.00	**DFLK 16**	**2280239**	5
	20	39.00	**DFLK 20**	**2280242**	5
	26	39.00	**DFLK 26**	**2280255**	5
	34	39.00	**DFLK 34**	**2280268**	5
	40	39.00	**DFLK 40**	**2280271**	5
	50	39.00	**DFLK 50**	**2280284**	5

Dimensioning of the housing cutout



Type	a	b	c	d
DFLK 16	58.4	52.5	40.1 + 0.2	9 + 0.2
DFLK 20	68.4	62.5	45.2 + 0.2	9 + 0.2
DFLK 26	83.4	77.5	52.8 + 0.2	9 + 0.2
DFLK 34	103.4	97.5	63.0 + 0.2	9 + 0.2
DFLK 40	128.4	122.5	70.6 + 0.2	9 + 0.2
DFLK 50	143.4	137.5	83.3 + 0.2	9 + 0.2

Dimensional drawing DFLK:



Feed-through modules for IDC/FLK plug-in connectors (pitch 2.54 mm) with spring-cage connection

– 1:1 connection
– 10- to 50-pos.
– Plug-in push-in spring-cage connection
– Plug-in connectors as per IEC 60603-13
– Short and long latches are supplied with the module
– Select housing cutout for side panel mounting according to dimensions table

With pin strip and push-in spring-cage connection

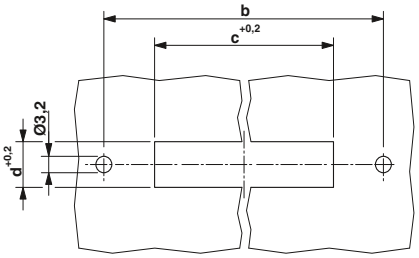
Technical data

Operating voltage	< 50 V AC / 60 V DC
Max. perm. 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 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 12

Ordering data

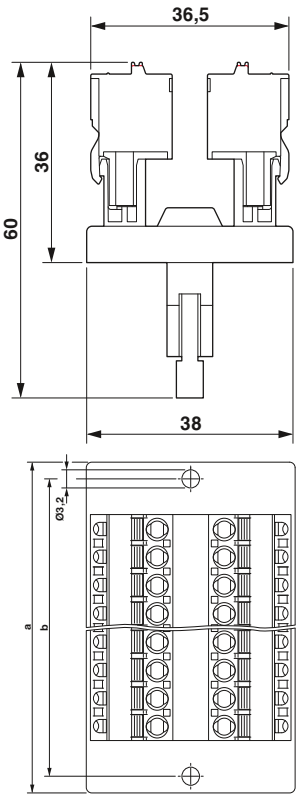
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE feed-through module, with pin strip					
	10	36.50	**DFLK 10/FKCT**	**2903034**	1
	14	36.50	**DFLK 14/FKCT**	**2903035**	1
	16	36.50	**DFLK 16/FKCT**	**2903036**	1
	20	36.50	**DFLK 20/FKCT**	**2903038**	1
	26	36.50	**DFLK 26/FKCT**	**2903039**	1
	34	36.50	**DFLK 34/FKCT**	**2903041**	1
	40	36.50	**DFLK 40/FKCT**	**2903042**	1
	50	36.50	**DFLK 50/FKCT**	**2903043**	1

Dimensioning of the housing cutout



Type	a	b	c	d
DFLK 10/FKCT	58.4	52.5	40.1 + 0.2	9 + 0.2
DFLK 14/FKCT	58.4	52.5	40.1 + 0.2	9 + 0.2
DFLK 16/FKCT	58.4	52.5	40.1 + 0.2	9 + 0.2
DFLK 20/FKCT	68.4	62.5	45.2 + 0.2	9 + 0.2
DFLK 26/FKCT	83.4	77.5	52.8 + 0.2	9 + 0.2
DFLK 34/FKCT	103.4	97.5	63.0 + 0.2	9 + 0.2
DFLK 40/FKCT	128.4	122.5	70.6 + 0.2	9 + 0.2
DFLK 50/FKCT	143.4	137.5	83.3 + 0.2	9 + 0.2

Dimensional drawing DFLK...FKCT



VIP – VARIOFACE Professional Modules with D-SUB plug-in connectors

– 1:1 connection
– 9- to 50-pos.
– Screw connection
– Metal foot
– As per IEC 60807-2
– Optional with status indicator

The D-SUB-4-40 UNC threads are guided directly onto a connection terminal block.

Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT";
Order No. 0811862) and mounting material, see Catalog 5.

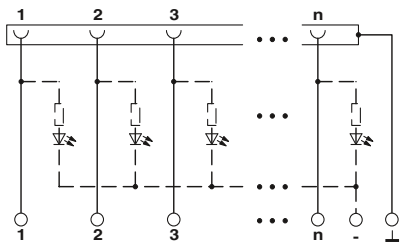
9 to 15 positions with screw connection

Technical data

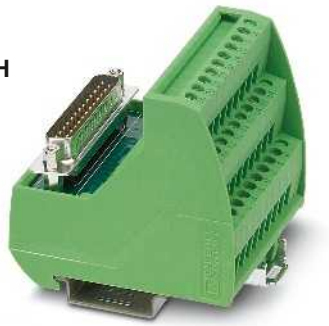
Operating voltage	125 V AC/DC
Max. perm. current (per branch)	2 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Connection data solid / stranded / AWG	0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions H / D	65.5 mm / 45.1 mm

Ordering data

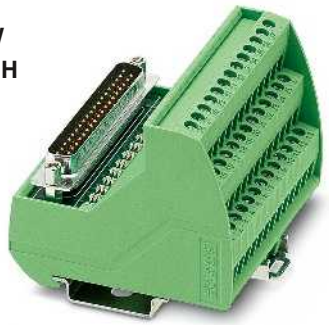
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, with D-SUB miniature pin strip					
	9	34.70	**VIP-2/SC/D 9SUB/M**	**2315117**	1
	15	45.00	**VIP-2/SC/D15SUB/M**	**2315120**	1
VARIOFACE module, with D-SUB miniature pin strip and light indicator					
	9	34.70			
	15	50.00			
VARIOFACE module, with D-SUB miniature socket strip					
	9	34.70	**VIP-2/SC/D 9SUB/F**	**2315162**	1
	15	45.00	**VIP-2/SC/D15SUB/F**	**2315175**	1
VARIOFACE module, with D-SUB miniature socket strip and light indicator					
	9	34.70			
	15	50.00			
VARIOFACE module, with D-SUB miniature pin strip					
	25	57.40			
	37	72.70			
	50	98.20			
VARIOFACE module, with D-SUB miniature pin strip and light indicator					
	25	57.40			
	37	72.70			
	50	98.20			
VARIOFACE module, with D-SUB miniature socket strip					
	25	57.40			
	37	72.70			
	50	98.20			
VARIOFACE module, with D-SUB miniature socket strip and light indicator					
	25	57.40			
	37	72.70			
	50	98.20			



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
2.5 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
65.5 mm / 45.1 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

Technical data

125 V AC/DC
2 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
69 mm / 62 mm

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

Technical data

24 V DC
2.5 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
69 mm / 62 mm

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

N

VIP – VARIOFACE Professional Modules with D-SUB plug-in connectors

– 1:1 connection
– 9- to 50-pos.
– Push-in connection
– Metal foot
– As per IEC 60807-2
– Optional with status indicator

The D-SUB-4-40 UNC threads are guided directly onto a connection terminal block.

Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT";
Order No. 0811862) and mounting material, see Catalog 5.

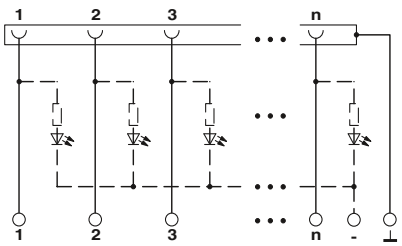
9 to 15 positions with push-in connection

Technical data

Operating voltage	125 V AC/DC
Max. perm. current (per branch)	2 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Connection data solid / stranded / AWG	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions H / D	72.1 mm / 46.6 mm

Ordering data

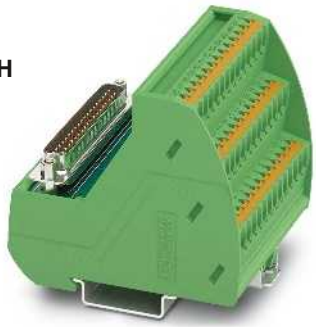
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, with D-SUB miniature pin strip					
	9	36.80	**VIP-2/PT/D 9SUB/M**	**2903777**	1
	15	46.90	**VIP-2/PT/D15SUB/M**	**2903779**	1
VARIOFACE module, with D-SUB miniature pin strip and light indicator					
	9	36.80			
	15	52.00			
VARIOFACE module, with D-SUB miniature socket strip					
	9	36.80	**VIP-2/PT/D 9SUB/F**	**2903778**	1
	15	46.90	**VIP-2/PT/D15SUB/F**	**2903780**	1
VARIOFACE module, with D-SUB miniature socket strip and light indicator					
	9	36.80			
	15	52.00			
VARIOFACE module, with D-SUB miniature pin strip					
	25	57.10			
	37	72.30			
	50	97.70			
VARIOFACE module, with D-SUB miniature pin strip and light indicator					
	25	57.10			
	37	72.30			
	50	97.70			
VARIOFACE module, with D-SUB miniature socket strip					
	25	57.10			
	37	72.30			
	50	97.70			
VARIOFACE module, with D-SUB miniature socket strip and light indicator					
	25	57.10			
	37	72.30			
	50	97.70			



N

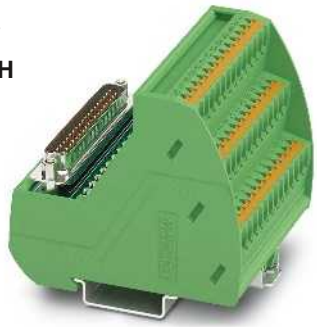
9 to 15 positions
with push-in connection and light indicator

N



25 to 50 positions
with push-in connection

N



25 to 50 positions
with push-in connection and light indicator

Technical data

24 V DC
2 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
72.1 mm / 46.6 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
VIP-2/PT/D 9SUB/M/LED	2904258	1
VIP-2/PT/D15SUB/M/LED	2904259	1
VIP-2/PT/D 9SUB/F/LED	2904263	1
VIP-2/PT/D15SUB/F/LED	2904264	1

Technical data

125 V AC/DC
2 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
75.8 mm / 63 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
VIP-3/PT/D25SUB/M	2903781	1
VIP-3/PT/D37SUB/M	2903783	1
VIP-3/PT/D50SUB/M	2903785	1
VIP-3/PT/D25SUB/F	2903782	1
VIP-3/PT/D37SUB/F	2903784	1
VIP-3/PT/D50SUB/F	2903786	1

Technical data

24 V DC
2 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
75.8 mm / 63 mm

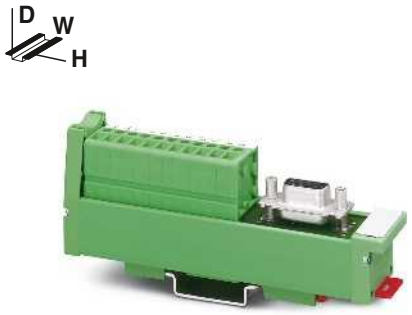
Ordering data

Type	Order No.	Pcs. / Pkt.
VIP-3/PT/D25SUB/M/LED	2904260	1
VIP-3/PT/D37SUB/M/LED	2904261	1
VIP-3/PT/D50SUB/M/LED	2904262	1
VIP-3/PT/D25SUB/F/LED	2904265	1
VIP-3/PT/D37SUB/F/LED	2904266	1
VIP-3/PT/D50SUB/F/LED	2904267	1

SLIM-LINE modules for D-subminiature plug-in 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 connection terminal block.



9 to 25 positions
With screw connection

37 to 50 positions
With screw connection

Technical data

Operating voltage	125 V AC/DC
Max. perm. current (per branch)	2.5 A
Ambient temperature (operation)	-10°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, IEC 60664 A, DIN VDE 0110, DIN VDE 0160 (in parts)
Dimensions D / W	45 mm / 25 mm

Technical data

Operating voltage	125 V AC/DC
Max. perm. current (per branch)	2.5 A
Ambient temperature (operation)	-10°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Dimensions	45 mm / 45 mm

Ordering data

Description	No. of pos.	Module height H	Type	Order No.	Pcs. / Pkt.
VARIOFACE-SLIM-LINE module, with D-SUB miniature pin strip					
	9	117.00	**UM 25-D 9SUB/S/FRONT/Q**	**2959573**	1
	15	147.00	**UM 25-D15SUB/S/FRONT/Q**	**2959599**	1
	25	217.00	**UM 25-D25SUB/S/FRONT/Q**	**2959612**	1
VARIOFACE-SLIM-LINE module, with D-SUB miniature socket strip					
	9	117.00	**UM 25-D 9SUB/B/FRONT/Q**	**2959560**	1
	15	147.00	**UM 25-D15SUB/B/FRONT/Q**	**2959586**	1
	25	217.00	**UM 25-D25SUB/B/FRONT/Q**	**2959609**	1
VARIOFACE-SLIM-LINE module, with D-SUB miniature pin strip					
	37	157.00	**UM 45-D37SUB/S/FRONT/Q**	**2959638**	1
	50	187.00	**UM 45-D50SUB/S/FRONT/Q**	**2959654**	1
VARIOFACE-SLIM-LINE module, with D-SUB miniature socket strip					
	37	157.00	**UM 45-D37SUB/B/FRONT/Q**	**2959625**	1
	50	187.00	**UM 45-D50SUB/B/FRONT/Q**	**2959641**	1

Feed-through modules for D-SUB miniature plug-in 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-subminiature pin strip

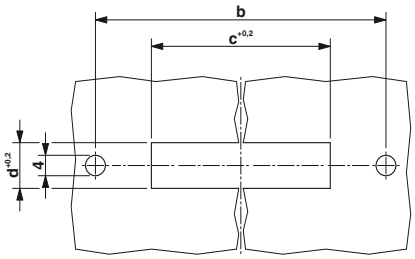
With D-subminiature socket strip

Technical data	
Operating voltage	125 V AC/DC
Max. perm. current (per branch)	2.5 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	DIN EN 50178
Connection data solid / stranded / AWG	0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12

Technical data	
Operating voltage	125 V AC/DC
Max. perm. current (per branch)	2.5 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	DIN EN 50178
Connection data solid / stranded / AWG	0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12

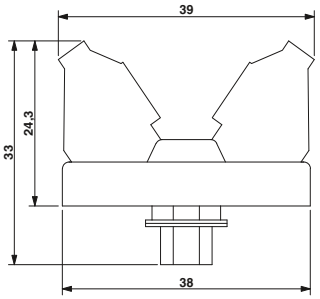
Description	No. of pos.	Module width W	Ordering data: Type	Order No.	Pcs. / Pkt.	Ordering data: Type	Order No.	Pcs. / Pkt.
VARIOFACE feed-through module, with D-subminiature plug-in connector								
	9	39.00	**DFLK-D 9 SUB/S**	**2283870**	5	**DFLK-D 9 SUB/B**	**2287135**	5
	15	39.00	**DFLK-D15 SUB/S**	**2280297**	5	**DFLK-D15 SUB/B**	**2280307**	5
	25	39.00	**DFLK-D25 SUB/S**	**2280310**	5	**DFLK-D25 SUB/B**	**2280323**	5
	37	39.00	**DFLK-D37 SUB/S**	**2280336**	5	**DFLK-D37 SUB/B**	**2280349**	5
	50	39.00	**DFLK-D50 SUB/S**	**2291286**	5	**DFLK-D50 SUB/B**	**2287669**	5

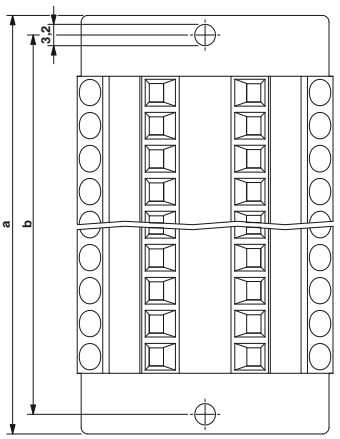
Dimensioning of the housing cutout



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:





Feed-through modules for D-SUB miniature plug-in connectors with push-in connection

- 1:1 connection
- 9- to 50-pos.
- Plug-in push-in spring-cage connection
- Plug-in connector according to IEC 60807-2
- D-SUB 4-40 UNC thread
- 9- to 37-pos. with separate ground tap
- 50-pos.: No ground tap
- Select housing cutout for side panel mounting according to dimensions table

With D-SUB pin strip and push-in connection

With D-SUB socket strip and push-in connection

Technical data

Operating voltage	125 V AC/DC
Max. perm. current (per branch)	2.5 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	DIN EN 50178
Connection data solid / stranded / AWG	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 12

Technical data

Operating voltage	125 V AC/DC
Max. perm. current (per branch)	2.5 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	DIN EN 50178
Connection data solid / stranded / AWG	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 12

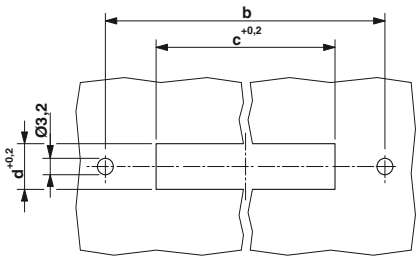
Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE feed-through module, with D-subminiature plug-in connector					
	9	36.50	**DFLK-D 9 SUB/M/FKCT**	**2903052**	1
	15	36.50	**DFLK-D15 SUB/M/FKCT**	**2903054**	1
	25	36.50	**DFLK-D25 SUB/M/FKCT**	**2903055**	1
	37	36.50	**DFLK-D37 SUB/M/FKCT**	**2903056**	1
	50	36.50	**DFLK-D50 SUB/M/FKCT**	**2903058**	1

Ordering data

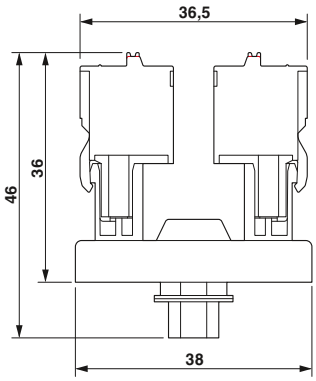
Type	Order No.	Pcs. / Pkt.
DFLK-D 9 SUB/F/FKCT	**2903063**	1
DFLK-D15 SUB/F/FKCT	**2903065**	1
DFLK-D25 SUB/F/FKCT	**2903067**	1
DFLK-D37 SUB/F/FKCT	**2903069**	1
DFLK-D50 SUB/F/FKCT	**2903070**	1

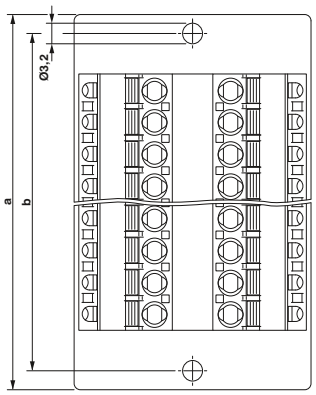
Dimensioning of the housing cutout



Type	a	b	c	d
DFLK-D 9 SUB/M/FKCT	58.4	52.5	40.2 + 0.2	13 + 0.2
DFLK-D15 SUB/M/FKCT	58.4	52.5	40.2 + 0.2	13 + 0.2
DFLK-D25 SUB/M/FKCT	83.4	77.5	54.2 + 0.2	13 + 0.2
DFLK-D37 SUB/M/FKCT	128.4	122.5	70.6 + 0.2	13 + 0.2
DFLK-D50 SUB/M/FKCT	143.4	137.5	67.8 + 0.2	15.8 + 0.2
DFLK-D 9 SUB/F/FKCT	58.4	52.5	40.2 + 0.2	13 + 0.2
DFLK-D15 SUB/F/FKCT	58.4	52.5	40.2 + 0.2	13 + 0.2
DFLK-D25 SUB/F/FKCT	83.4	77.5	54.2 + 0.2	13 + 0.2
DFLK-D37 SUB/F/FKCT	128.4	122.5	70.6 + 0.2	13 + 0.2
DFLK-D50 SUB/F/FKCT	143.4	137.5	67.8 + 0.2	15.8 + 0.2

Dimensional drawing DFLK-D...SUB...FKCT





VIP – VARIOFACE Professional modules for high density D-SUB miniature plug-in connectors

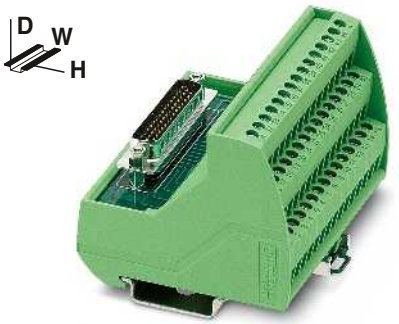
– 1:1 connection
– 15- to 62-pos.
– Screw and push-in connection
– Metal foot

The D-SUB-4-40 UNC threads are guided directly onto a connection terminal block.

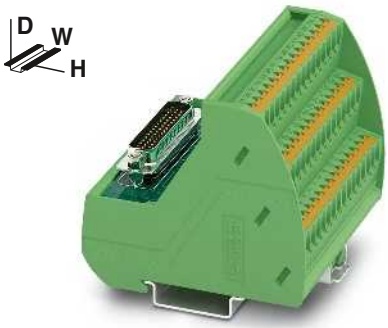
Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 5.

[1]) Module with double-level terminal blocks



15 to 62 positions with screw connection



15 to 62 positions with push-in connection

Technical data

Operating voltage		125 V AC/DC
Max. perm. current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Connection data solid / stranded / AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions	H / D	69 mm / 62 mm

Technical data

Operating voltage		125 V AC/DC
Max. perm. current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Connection data solid / stranded / AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	H / D	75.8 mm / 63 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, with D-SUB miniature pin strip					
With screw connection [1])	15	44.90	**VIP-2/SC/HD15SUB/M**	**2322326**	1
With screw connection	26	52.30	**VIP-3/SC/HD26SUB/M**	**2322375**	1
With screw connection	44	82.90	**VIP-3/SC/HD44SUB/M**	**2322388**	1
With screw connection	62	113.50	**VIP-3/SC/HD62SUB/M**	**2322391**	1
With push-in connection [1])	15	46.90	**VIP-2/PT/HD15SUB/M**	**2904268**	1
With push-in connection	26	52.00	**VIP-3/PT/HD26SUB/M**	**2904269**	1
With push-in connection	44	82.50	**VIP-3/PT/HD44SUB/M**	**2904270**	1
With push-in connection	62	113.00	**VIP-3/PT/HD62SUB/M**	**2904271**	1
VARIOFACE module, with D-SUB miniature socket strip					
With screw connection [1])	15	44.90	**VIP-2/SC/HD15SUB/F**	**2322401**	1
With screw connection	26	52.30	**VIP-3/SC/HD26SUB/F**	**2322414**	1
With screw connection	44	82.90	**VIP-3/SC/HD44SUB/F**	**2322427**	1
With screw connection	62	113.50	**VIP-3/SC/HD62SUB/F**	**2322430**	1
With push-in connection [1])	15	46.90	**VIP-2/PT/HD15SUB/F**	**2904272**	1
With push-in connection	26	52.00	**VIP-3/PT/HD26SUB/F**	**2904273**	1
With push-in connection	44	82.50	**VIP-3/PT/HD44SUB/F**	**2904274**	1
With push-in connection	62	113.00	**VIP-3/PT/HD62SUB/F**	**2904275**	1

Modules for plug-in connectors IEC 60603/DIN 41612

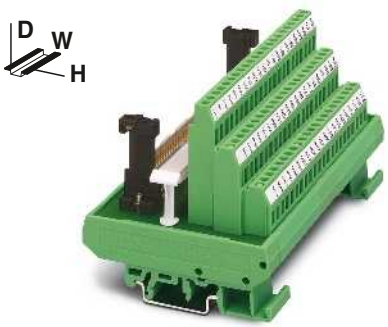
These VARIOFACE interface modules connect high-position plug-in connectors according to IEC 60603/DIN 41612 to screw connection terminal blocks.

The following VARIOFACE modules are available:

– **UMK** modules with double-level connection terminal blocks
– **UMKS** modules with three-level connection terminal blocks.

Notes:

For suitable cable housings, see the table on page 562



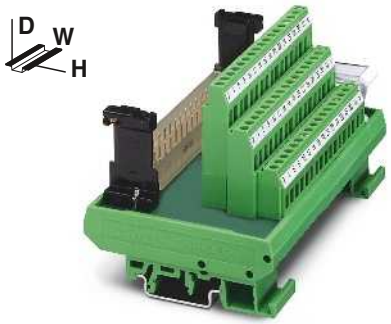
Design C,
64-position, a, c assembled

Technical data

Operating voltage	125 V AC/DC
Max. perm. current (per branch)	1 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Connection data solid / stranded / AWG	0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions H / D	77 mm / 72 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, C 64-pos., screw-on cable housing, with:					
- Pin strip	64	135.00	**UMKS- C64M-VS**	**2970565**	1
VARIOFACE module, E 48-pos., screw-on cable housing, with:					
- Pin strip	48	123.80			
VARIOFACE module, F 48-pos., screw-on cable housing, with:					
- Pin strip	48	112.50			
VARIOFACE module, F 48-pos., snap-on cable housing, with:					
- Pin strip	48	112.50			
VARIOFACE module, D 32-pos., screw-on cable housing, with:					
- Pin strip	32	135.00			



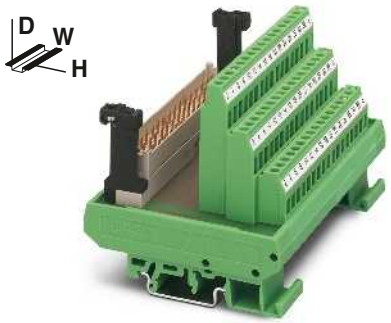
Design E,
48-position, a, c, e assembled

Technical data

125 V AC/DC
4 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
77 mm / 72 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
UMKS- E48M-VS	2970154	1



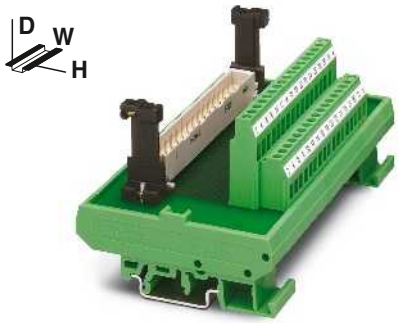
Design F,
48-position, z, b, d assembled

Technical data

250 V AC
4 A
-20°C ... 45°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
77 mm / 72 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
UMKS- F48M-VS	2970714	1
UMKS- F48M-VR	2970167	1



Design D,
32-position, a, c assembled

Technical data

250 V AC/DC
2 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
77 mm / 62.5 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
UMK- D32M-VS	2970060	1

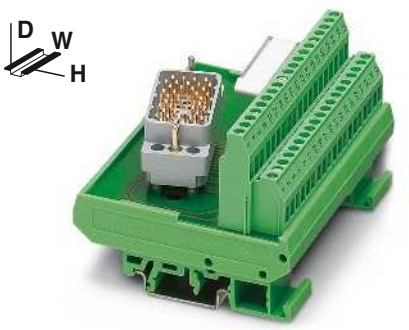
Modules for ELCO plug-in connectors

These modules can be used to connect ELCO plug-in connectors of the 8016 series to screw connection terminal blocks.

The diagonal position of the ELCO plug-in connector means that the wires leading out of the cable housing at the side can be led away without restricting neighboring modules.

Notes:

Dimensional drawings and pin assignments, see page 562



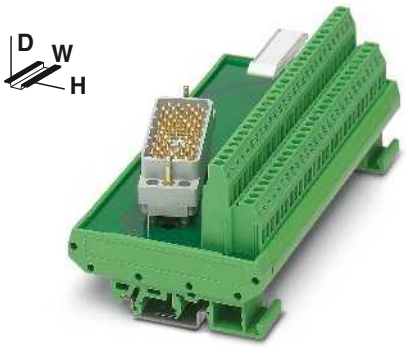
38-pos.

Technical data

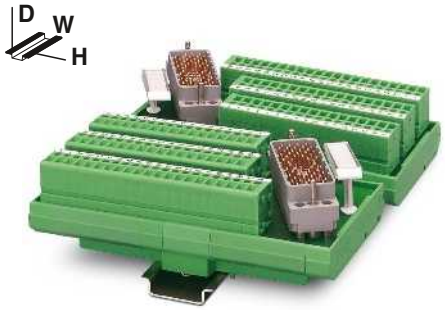
Operating voltage	25 V AC / 60 V DC
Max. perm. current (per branch)	1.5 A
Total current	19 A (38 branches with 0.5 A each)
Ambient temperature (operation)	-20°C ... 40°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Connection data solid / stranded / AWG	0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions H / D	77 mm / 58.5 mm

Ordering data

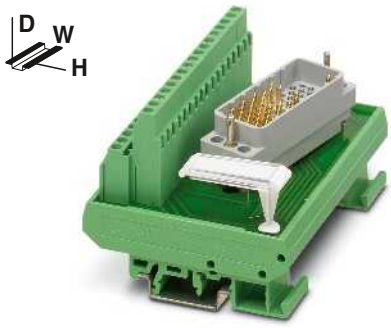
Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, with:					
- Pin strip 8016 right	38	101.50	**UMK- EC38/38-XOR**	**2976297**	1
- Pin strip 8016 left	38	101.50	**UMK- EC38/38-XOL**	**2976284**	1
VARIOFACE module, with:					
- Pin strip 8016 right	56	157.50			
- Pin strip 8016 left	56	157.50			
VARIOFACE module, with:					
- Pin strip 8016 right	56	77.00			
- Pin strip 8016 left	56	77.00			
VARIOFACE module, with:					
- 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.

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, IEC 62103
0.2 - 4 mm² / 0.2 - 2.5 mm² / 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

Technical data

< 25 V AC / 30 V DC
1.5 A
28 A (56 branches with 0.5 A each)
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.2 - 2.5 mm² / 0.2 - 1.5 mm² / 26 - 16
146.3 mm / 47.5 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
UMK- EC56/FRONT 2,5V/R	**2976161**	1
UMK- EC56/FRONT 2,5V/L	**2976158**	1

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, IEC 62103
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
77 mm / 58.5 mm

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

Modules for ELCO plug-in connectors for use in Ex i circuits

The VARIOFACE modules connect ELCO plug-in connectors of the 8016 series to screw connection terminal blocks. The modules for ELCO connectors can be used as simple electrical equipment for applications in intrinsically safe circuits as per EN 60079-14. They fulfill the requirements of intrinsic safety as per EN 60079-11 (EN 50020) and can be used for various intrinsically safe circuits taking into account the pin configuration.

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.

The modules are equipped with blue screw connection methods are clear labeling for intrinsically safe circuits.

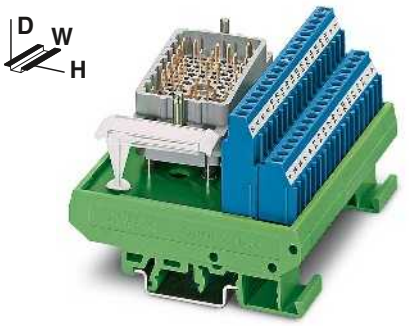
The arrangement of angled ELCO plug-in connectors makes it possible to lead the lines led out from the cable housing away from the adjacent modules without any negative effects.

For the disconnection of intrinsically safe and non-intrinsically safe circuits, a distance of at least 50 mm should be kept between the connection points using partition plates or spaces.

Notes:

Dimensional drawings and pin assignments, see page 563

Facts about explosion protection, see page 154



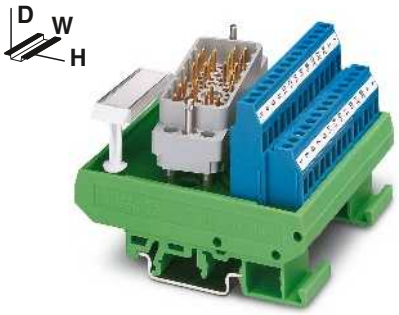
32-pos.

Technical data

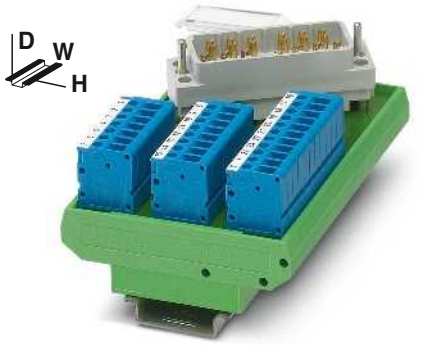
Operating voltage	max. 30 V DC (Max. voltage between two intrinsically safe circuits: 60 V DC)
Max. perm. current (per branch)	500 mA
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	DIN EN 60079-11
Connection data solid / stranded / AWG	0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions H / D	77 mm / 58.5 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, with:					
- Pin strip 8016 right above	32	101.30	**UMK- EC90/32/EX-XOR**	**2900109**	1
- Pin strip 8016 right below	32	101.30	**UMK- EC90/32/EX-XUR**	**2969068**	1
- Pin strip 8016 left above	32	101.30	**UMK- EC90/32/EX-XOL**	**2900110**	1
- Pin strip 8016 left above	32	101.30	**UMK- EC90/32/EX-XUL**	**2969071**	1
VARIOFACE module, with:					
- Pin strip 8016 right	25	78.80			
- Pin strip 8016 left	25	78.80			
VARIOFACE module, with:					
- Pin strip 8016 right	25	77.00			
- Pin strip 8016 left	25	77.00			



25-pos.



25-pos.,
with front connection terminal blocks

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 mm² / 0.2 - 2.5 mm² / 24 - 12
77 mm / 58.5 mm

Ordering data		
Type	**Order No.**	Pcs. / Pkt.
UMK- EC56/25/EX -R	**2900112**	1
UMK- EC56/25/EX -L	**2900113**	1

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 mm² / 0.2 - 2.5 mm² / 24 - 14
112.5 mm / 52.5 mm

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

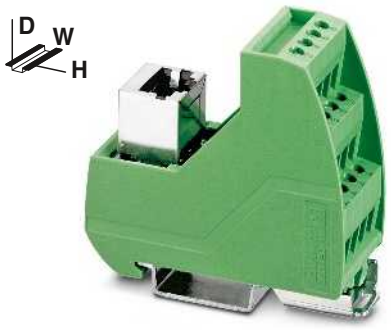
Modules with RJ45 plug-in connector

N

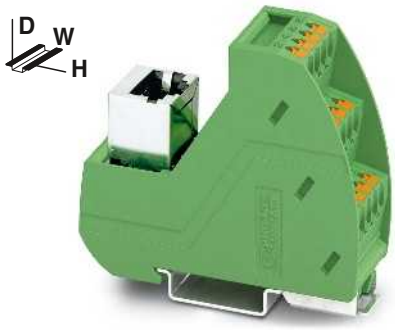
- 1:1 connection
- 8-positions, RJ45 connector
- Screw or push-in connection (direct plug-in technology)
- Connector housing led to separate connection terminal blocks

Notes:

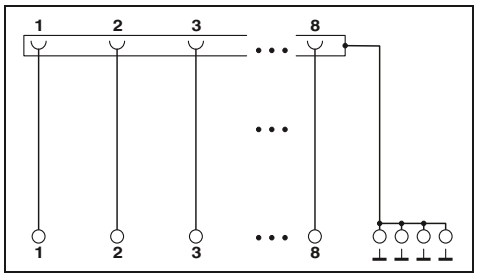
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No. 0811862) and mounting material, see Catalog 5.

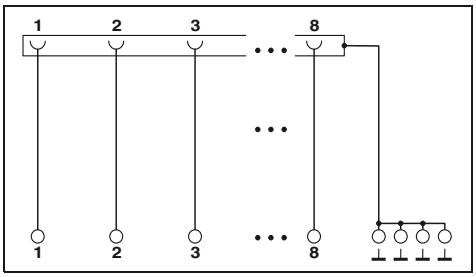


**8-pos.
with screw connection**



**8-pos.
with push-in connection**





Description	No. of pos.	Module width W
VARIOFACE module, with RJ45 plug-in connector		
With screw connection	8	26.90
With push-in connection	8	26.60

Technical data

Operating voltage	48 V AC/DC
Max. perm. 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 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions H / D	69 mm / 62 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
VIP-3/SC/RJ45	**2900701**	1

Technical data

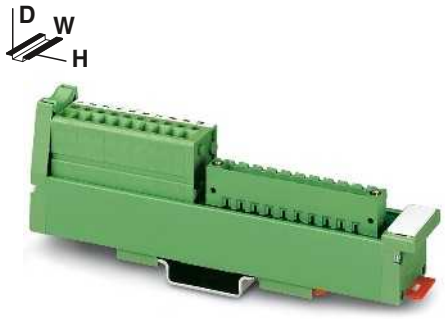
Operating voltage	48 V AC/DC
Max. perm. current (per branch)	1 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	EN 50178
Connection data solid / stranded / AWG	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions H / D	75.8 mm / 63 mm

Ordering data

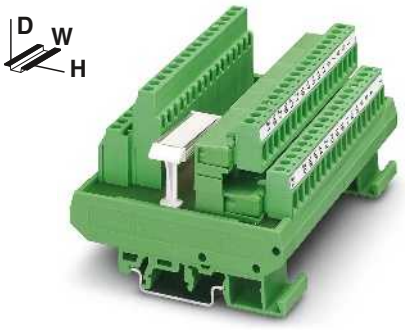
Type	Order No.	Pcs. / Pkt.
VIP-3/PT/RJ45	**2904290**	1

Modules with COMBICON connection

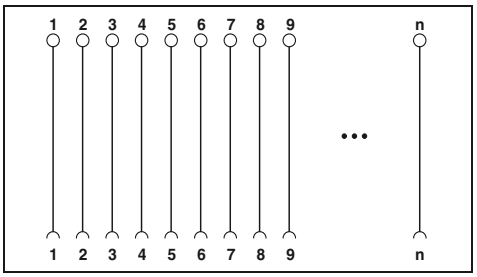
- The slim 10- and 18-pos. VARIOFACE SLIM-LINE modules connect the front connection terminal blocks to a COMBICON header. The corresponding COMBICON plugs (5.0 mm pitch) can be found in the COMBICON catalog PCB Connection Technique.
- The 32-pos. UMK-32 MDSTB/MKKDS 3/R module connects screw connection terminal blocks with coded COMBICON plug-in screw connectors.

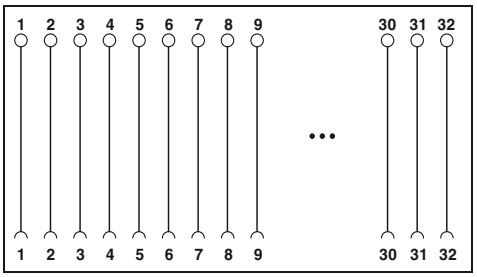


10- and 18-pos.
With screw connection



32-pos.
With screw connection





Technical data

Operating voltage	250 V AC/DC
Max. perm. current (per branch)	2.5 A
Ambient temperature (operation)	-10°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Dimensions D / W	45 mm / 25 mm

Technical data

Operating voltage	250 V AC/DC
Max. perm. current (per branch)	3 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178, IEC 62103
Dimensions D / W	58.5 mm / 112.5 mm

Ordering data

Description	No. of pos.	Module height H	Type	Order No.	Pcs. / Pkt.
VARIOFACE-SLIM-LINE module, with a COMBICON header (without a COMBICON plug-in connector)					
	10	137.00	**UM 25-10 MSTB/FRONT/Q**	**2959803**	1
	18	217.00	**UM 25-18 MSTB/FRONT/Q**	**2959502**	1
VARIOFACE module, with COMBICON plug-in connector, coded					
	32	77.00	**UMK-32 MDSTB/MKKDS3/R**	**2970196**	1

Modules as compact potential distributors

The VIP-2/.../PDM... modules offer the following features:

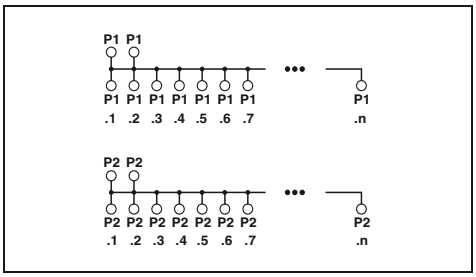
– Two potential levels
– Separate supply
– Screw or push-in connection
– Consecutive labeling

The UMK-PVB and UMK-PVB 6 modules have three or six potential levels.

Notes:

Marking systems and mounting material
See Catalog 5

With screw connection and 2 potential levels



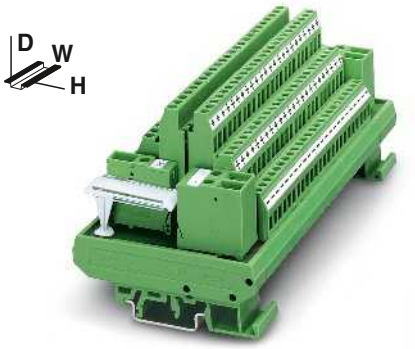
Technical data

Operating voltage		250 V AC/DC
Max. perm. current (per branch)		15 A
Total current		30 A (Per potential)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178, IEC 62103
Supply connection data solid / stranded / AWG		0.2 - 6 mm² / 0.2 - 4 mm² / 24 - 10
Distribution connection data solid / stranded / AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions	H / D	65.5 mm / 50 mm

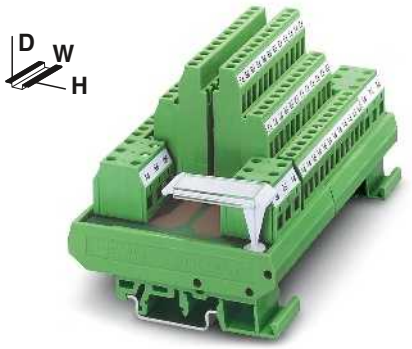
Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, with two busbars (P1, P2) for potential distribution, per potential:					
2 power terminal blocks/ 8 distributor terminal blocks		50.00	**VIP-2/SC/PDM-2/16**	**2315256**	1
2 power terminal blocks/ 12 distributor terminal blocks		70.40	**VIP-2/SC/PDM-2/24**	**2315269**	1
2 power terminal blocks/ 16 distributor terminal blocks		90.80	**VIP-2/SC/PDM-2/32**	**2315272**	1
2 power terminal blocks/ 24 distributor terminal blocks		131.50	**VIP-2/SC/PDM-2/48**	**2903717**	1
VARIOFACE module, with three busbars (+, -, PE) for potential distribution, per potential: (+) two power terminal blocks/48 distributor terminal blocks (-) two power terminal blocks/24 distributor terminal blocks (PE) 2 power/72 distributor terminal blocks		168.80			
VARIOFACE module, with six busbars (P1 to P6) for potential distribution, per potential:					
2 power terminal blocks/ 12 distributor terminal blocks		123.80			
VARIOFACE module, with two busbars (P1, P2) for potential distribution, per potential:					
2 power terminal blocks/ 8 distributor terminal blocks		41.90			
2 power terminal blocks/ 12 distributor terminal blocks		57.10			
2 power terminal blocks/ 16 distributor terminal blocks		67.30			
2 power terminal blocks/ 24 distributor terminal blocks		97.70			

N

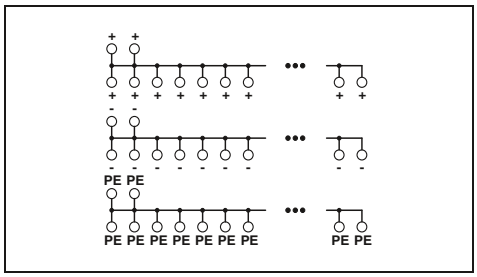


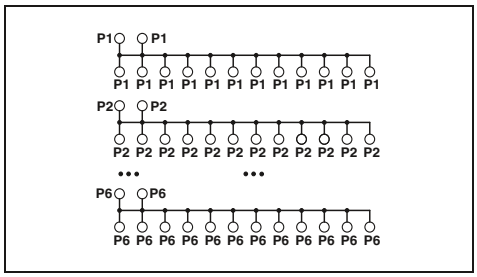
With screw connection and 3 potential levels

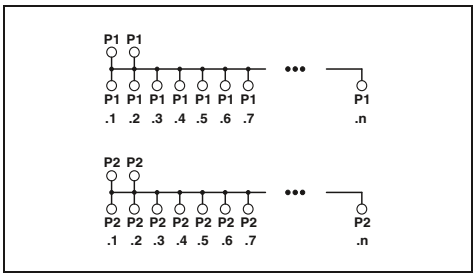


With screw connection and 6 potential levels

With push-in three-level connection and 2 potential levels







Technical data

250 V AC/DC
16 A
16 A (Per potential)
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.5 - 6 mm² / 0.5 - 4 mm² / 20 - 10

0.2 - 4 mm² / 0.2 - 2.5 mm² / 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, IEC 62103
0.2 - 6 mm² / 0.2 - 4 mm² / 24 - 10

0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12

77 mm / 72 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
UMK- PVB 6	2972136	1

Technical data

250 V AC/DC
15 A
30 A (Per potential)
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178, IEC 62103
0.25 - 6 mm² / 0.25 - 4 mm² / 24 - 10

0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14

75.8 mm / 63 mm

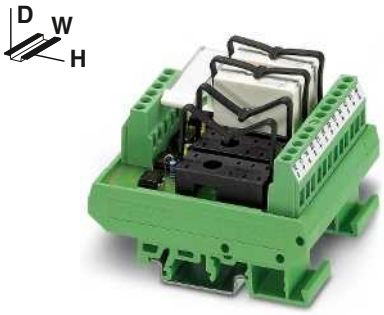
Ordering data

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

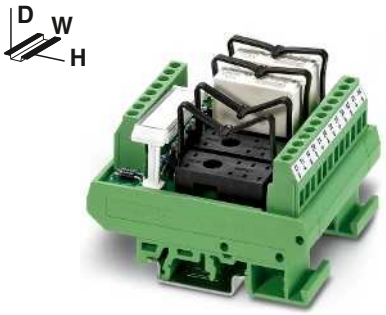
VARIOFACE modules for plug-in miniature relays and/or miniature solid-state relays

The UMK-... RM 4-, 8-, and 16-way relay or solid-state relay interfaces provide 4, 8 or 16 slots for standard electromechanical relays (REL-MR..., not REL-MR...MS) or optoelectronic relays (SIM-EI...). The connections between the I/O module and the electronics, as well as the process cabling, are implemented via screw connection terminal blocks.

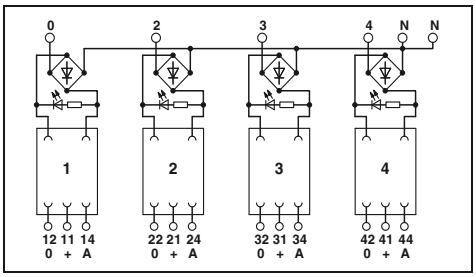
Notes:
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.
Other input voltages on request.
1) not with 230 V AC.
2) with 230 V AC glow lamp.
3) with 100 V DC and 230 V AC glow lamp.

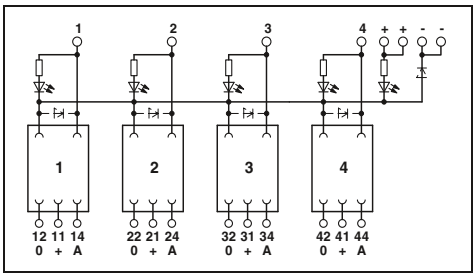


4-channel with bridge rectifier



4-channel for relays with a PDT contact





Technical data

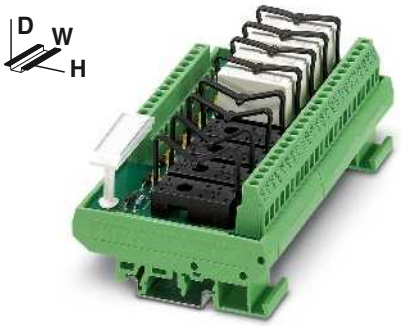
Coil side			
Tolerance of the input voltage		±10%	±10%
Input circuit		Bridge rectifier	Freewheeling diode, Protection against polarity reversal
Operating voltage display		-	Yellow LED[1])
Status display/channel		Yellow LED	Yellow LED[2])
Connection method		Screw connection	Screw connection
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 24
Contact side			
Contact type		1 PDT	1 PDT
Max. switching voltage		250 V AC/DC	250 V AC/DC
Limiting continuous current		6 A	5 A
Connection method		Screw connection	Screw connection
Connection data solid / stranded / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
General data			
Test voltage		2.5 kV (50 Hz, 1 min.)	2.5 kV (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Standards/regulations		DIN VDE 0110	DIN VDE 0110
Mounting position		Any	Any
Dimensions	W / H / D	67.5 mm / 77 mm / 59 mm	67.5 mm / 77 mm / 59 mm

Ordering data

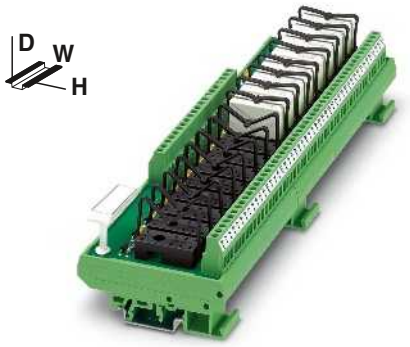
Description	Input voltage	Type	Order No.	Pcs. / Pkt.
VARIOFACE module, for four plug-in miniature relays or miniature solid-state relays, with light indicator (without relays)				
	24 V AC/DC	**UMK- 4 RM 24**	**2971344**	1
VARIOFACE module, for plug-in miniature relays or miniature solid-state relays, with light indicator (without relay)				
	5 V DC			
	12 V DC			
	24 V DC			
	48 V DC			
	110 V DC			
	230 V AC			

Ordering data

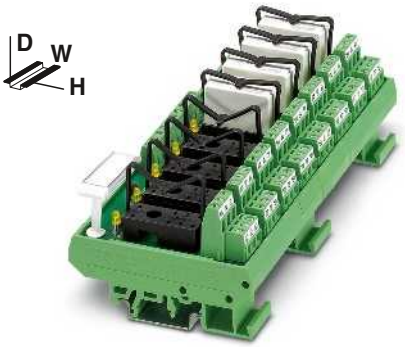
Type	Order No.	Pcs. / Pkt.
UMK- 4 RM 5DC	**2972819**	1
UMK- 4 RM 12DC	**2972822**	1
UMK- 4 RM 24DC	**2972835**	1
UMK- 4 RM 60DC	**2972851**	1
UMK- 4 RM110DC	**2972864**	1
UMK- 4 RM230AC	**2972880**	1



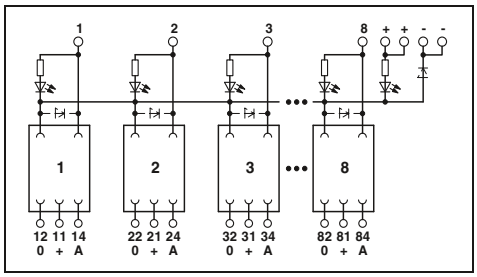
8-channel for relays with a PDT contact

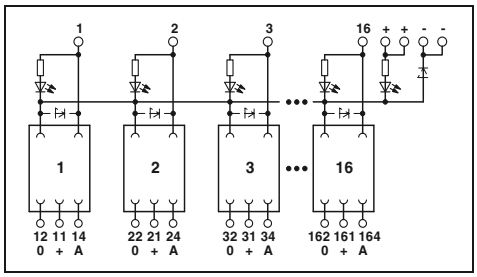


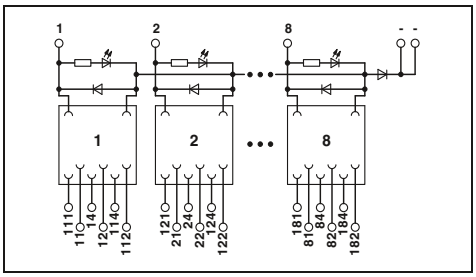
16-channel for relays with a PDT contact



8-channel for relays with two PDT contacts







Technical data

	±10%
	Freewheeling diode, Protection against polarity reversal
	Yellow LED[3])
	Yellow LED[3])
	Screw connection
	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 24
	1 PDT
	250 V AC
	5 A
	Screw connection
	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
	2.5 kV (50 Hz, 1 min.)
	-20°C ... 50°C
	DIN VDE 0110
	Any
	135 mm / 77 mm / 59 mm

Technical data

	±10%
	Freewheeling diode, Protection against polarity reversal
	Yellow LED[2])
	Yellow LED[2])
	Screw connection
	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 24
	1 PDT
	250 V AC
	5 A
	Screw connection
	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
	2.5 kV (50 Hz, 1 min.)
	-20°C ... 50°C
	DIN VDE 0110
	Any
	259 mm / 77 mm / 59 mm

Technical data

	±10%
	Freewheeling diode, Protection against polarity reversal
	-
	Yellow LED
	Screw connection
	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 26
	2 PDT
	250 V AC
	5 A
	Screw connection
	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 14
	2.5 kV (50 Hz, 1 min.)
	-20°C ... 50°C
	DIN VDE 0110
	Any
	168.8 mm / 77 mm / 59 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
UMK- 8 RM 5DC/MKDS	**2972893**	1
UMK- 8 RM 12DC/MKDS	**2972903**	1
UMK- 8 RM24DC/MKDS	**2972916**	1
UMK- 8 RM 60DC/MKDS	**2972932**	1
UMK- 8 RM110DC/MKDS	**2972945**	1
UMK- 8 RM230AC/MKDS	**2972961**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
UMK-16 RM 5DC/MKDS	**2972974**	1
UMK-16 RM 12DC/MKDS	**2972987**	1
UMK-16 RM 24DC/MKDS	**2972990**	1
UMK-16 RM 60DC/MKDS	**2973038**	1
UMK-16 RM110DC/MKDS	**2973041**	1
UMK-16 RM230AC/MKDS	**2973067**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
UMK- 8 RELS/KSR-24/21/21	**2975722**	1

VARIOFACE modules as interface for plug-in solid-state relays or digital I/O modules

The 1-, 4-, 8- or 16-time INTERFACE modules are the wiring interface and the coupling level in one unit. The connection to the interface module is established using screw connection technology.

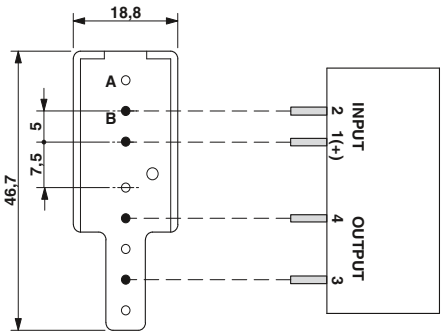
Properties of the single interface:

– Status display
– Protection against polarity reversal in input
– Surge protection in input
– Assembly option with solid-state relay for loads up to 350 V DC/1 A or 480 V AC/5 A

Properties of the 4-, 8-, and 16-time interfaces:

– Status display
– Integrated fuse for line protection
– Assembly option with solid-state relay or I/O modules

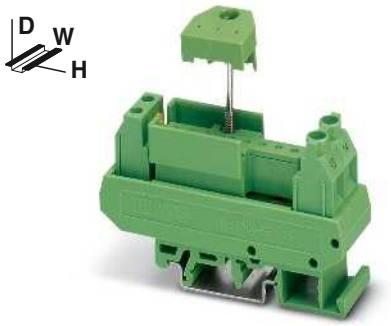
Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 5
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.
Solid-state relays, see page 558



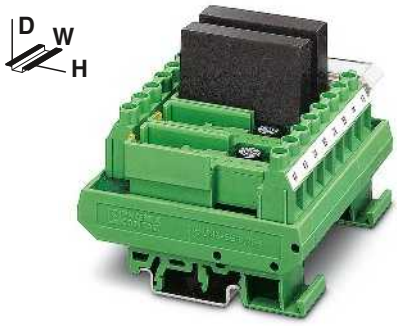
A = without metal
B = with metal

Input data	
Input voltage range	
Input circuit	
Status display/channel	
Connection method	
Connection data solid / stranded / AWG	
Output data	
Connection method	
Connection data solid / stranded / AWG	
General data	
Ambient temperature (operation)	
Standards/regulations	
Mounting position	
Mounting	
Dimensions	H / D

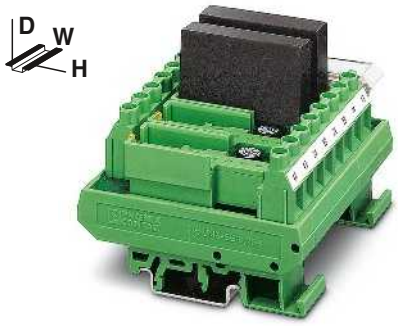
Description	Module width W
Interface module, with plug-in base for one solid-state relay, with locking clip	22.5
Interface module, with plug-in base for four solid-state relays, with locking clip Microfuse: 250 V, 4 A	90
Interface module, with plug-in base for eight digital I/O modules. Microfuse: 250 V, 4 A	180
Interface module, with plug-in base for eight solid-state relays, with locking clip Microfuse: 250 V, 4 A	180
Interface module, with plug-in base for 16 digital I/O modules. Microfuse: 250 V, 4 A	326.5
Interface module, with plug-in base for 16 solid-state relays, with locking clip Microfuse: 250 V, 4 A	326.5



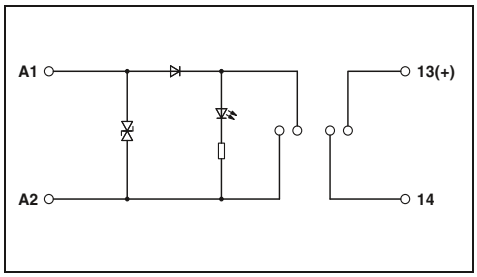
With light indicator

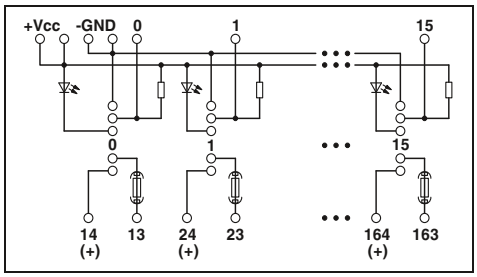


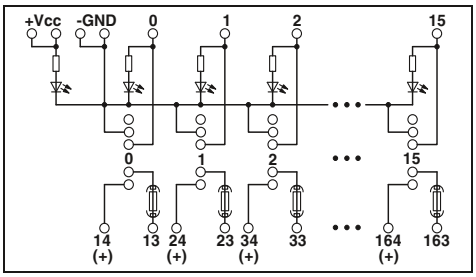
With light indicator and fuse, control logic negative switching



With light indicator and fuse, control logic positive switching







Technical data

	4 V ... 32 V
	Protection against polarity reversal, Surge protection
	Yellow LED
	Screw connection
	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
	Screw connection
	0.2 ... 6 mm² / 0.2 ... 4 mm² / 24 - 10
	-20°C ... 60°C
	DIN EN 50178
	Any
	In rows with zero spacing
	77 mm / 72 mm

Technical data

	4 V ... 32 V
	Yellow LED
	Screw connection
	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 24
	Screw connection
	0.2 ... 6 mm² / 0.2 ... 4 mm² / 24 - 10
	-20°C ... 55°C
	DIN VDE 0110b, Gr. C for 250 V DC, DIN VDE 0160 (in relevant parts)
	Any
	In rows with zero spacing
	77 mm / 72 mm

Technical data

	4 V ... 32 V
	Yellow LED
	Screw connection
	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 24
	Screw connection
	0.2 ... 6 mm² / 0.2 ... 4 mm² / 24 - 10
	-20°C ... 55°C
	DIN VDE 0110b, Gr. C for 250 V DC, DIN VDE 0160 (in relevant parts)
	Any
	In rows with zero spacing
	77 mm / 72 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
UMK- 1 OM-R/AMS	**2983002**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
UMK- 4 OM-R/MF	**2970882**	1
UMK- 8 OM/MF/MKDS	**2972712**	1
UMK- 8 OM-R/MF/MKDS	**2972738**	1
UMK-16 OM/MF/MKDS	**2972754**	1
UMK-16 OM-R/MF/MKDS	**2972770**	1

Ordering data

Type	Order No.	Pcs. / Pkt.
UMK- 4 OM-R/MF/P	**2972673**	1
UMK- 8 OM-R/MF/MKDS/P	**2972699**	1
UMK-16 OM-R/MF/MKDS/P	**2972796**	1

REL-MR miniature relay

The robust relays are used as interface relays throughout process and production engineering.

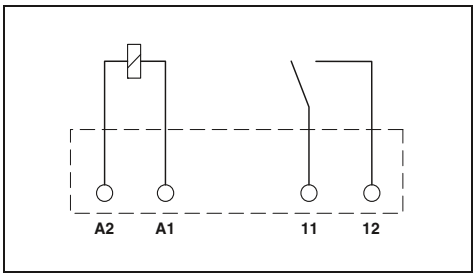
The main features of these relays are their compact design, reliable electrical isolation, and compliance with the most important standards, as well as the number of variants.

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 diagrams of operating voltage ranges, see page 344

1 N/O contact



Technical data

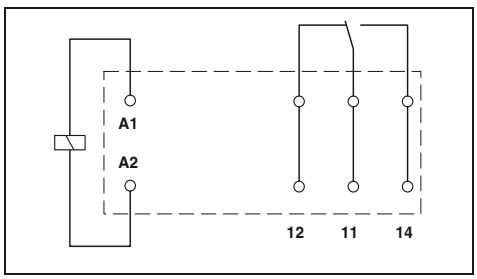
Input data		②
Permissible range (with reference to U_N)		-
Permissible range (with reference to U_N)		0.8 - 1.1
Typ. input current at U_N	[mA]	5
Typ. response time at U_N	[ms]	5
Typ. response time at U_N (depending on phase relation)	[ms]	
Typ. release time at U_N	[ms]	2
Typ. release time at U_N (depending on phase relation)	[ms]	
Output data		
Contact type		Double contact, 1 N/O contact
Contact material		AgNi, hard gold-plated
Max. switching voltage		250 V AC / 125 V DC
Min. switching voltage		5 V DC
Limiting continuous current		3 A
Max. inrush current		5 A
Max. interrupting rating, ohmic load	250 V AC	-
General data		
Test voltage (winding / contact)		2 kV AC (50 Hz, 1 min.)
Test voltage (contact/contact)		-
Ambient temperature (operation)		-40°C ... 85°C
Nominal operating mode		100% operating factor
Mechanical service life		Approx. 2 x 10^7 cycles
Standards/regulations		DIN VDE 0110, IEC 255/DIN VDE 0435 (in relevant parts)
Mounting position/mounting		Any
Dimensions	W / H / D	5 mm / 23 mm / 17 mm

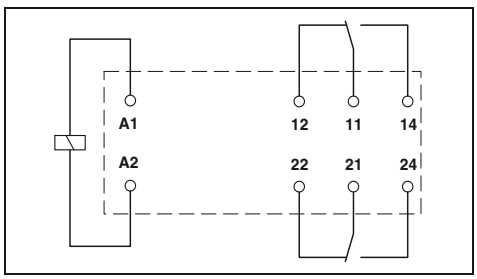
Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Plug-in miniature power relays					
with power contact	①	12 V DC			
with power contact	②	24 V DC	**REL-MR-G 24/1**	**2961037**	8
with power contact	③	48 V DC			
with power contact	④	60 V DC			
with power contact	⑤	110 V DC			
with power contact	⑥	230 V AC			
Plug-in miniature power relays					
with gold contact	①	12 V DC			
with gold contact	②	24 V DC			
with gold contact	③	48 V DC			
with gold contact	④	60 V DC			
with gold contact	⑤	110 V DC			
with gold contact	⑥	230 V AC			

1 PDT for high continuous currents

2 PDT





Technical data

①	②	③	④	⑤	⑥
refer to the diagram					
33	17	8.7	8.2	4.1	3
7	7	7	7	7	
					3 - 12
3	3	3	3	3	
					2 - 9

Single contact, 1-PDT	Single contact, 1-PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
12 V (at 10 mA)	100 mV (at 10 mA)
16 A	50 mA
30 A (300 ms)	50 mA
4000 VA	-

5 kV AC (50 Hz, 1 min.)
-
-40°C ... 85°C
100% operating factor
3 x 10^7 cycles
IEC 60664, EN 50178, IEC 62103
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/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-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-230AC/21HC AU	**2961529**	10

Technical data

①	②	③	④	⑤	⑥
refer to the diagram					
33	17	8.7	8.2	4.1	3
7	7	7	7	7	
					3 - 12
3	3	3	3	3	
					2 - 9

Single contact, 2-PDT	Single contact, 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
2000 VA	-

5 kV AC (50 Hz, 1 min.)
2.5 kV AC (50 Hz, 1 min.)
-40°C ... 85°C
100% operating factor
3 x 10^7 cycles
IEC 60664, EN 50178, IEC 62103
Any / Can be aligned without spacing (> 70°C ≥ 2.5 mm)
12.7 mm / 29 mm / 15.7 mm

Ordering data

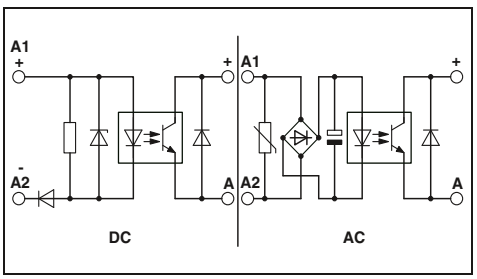
Type	Order No.	Pcs. / Pkt.
REL-MR- 12DC/21-21	**2961257**	10
REL-MR- 24DC/21-21	**2961192**	10
REL-MR- 48DC/21-21	**2834834**	10
REL-MR- 60DC/21-21	**2961273**	10
REL-MR-110DC/21-21	**2961202**	10
REL-MR-230AC/21-21	**2961451**	10
REL-MR- 12DC/21-21AU	**2961299**	10
REL-MR- 24DC/21-21AU	**2961215**	10
REL-MR- 48DC/21-21AU	**2834847**	10
REL-MR- 60DC/21-21AU	**2961286**	10
REL-MR-110DC/21-21AU	**2961228**	10
REL-MR-230AC/21-21AU	**2961480**	10

SIM-EI miniature solid-state relay

The SIM-EI miniature solid-state relays have connections compatible with commercially available miniature switching relays and are of the same shape.

The modules are used for floating conditioning of process signals as an alternative to electromechanical relays. Substituting mechanical relays for solid-state ones opens new possibilities for solving interface problems in a user-friendly way. The compatibility of the pins with the mechanical relay permits use of solid-state relays without any changes in the layout. The output of the solid-state relay is "high active" and designed as a 2- or 3-conductor output.

with DC voltage output max. = 100 mA



Technical data

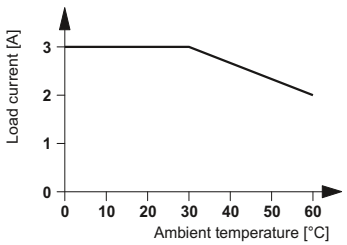
		①	②	③	④	⑤	⑥	⑦	⑧
Input data									
Permissible range (with reference to U_N)		0.9 - 1.1	0.9 - 1.1	0.9 - 1.1	0.9 - 1.1	0.9 - 1.1	0.9 - 1.1	0.9 - 1.1	0.9 - 1.1
Switching level with reference to U_N	1 signal ("H")	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8
	0 signal ("L")	≤ 0.35	≤ 0.4	≤ 0.4	≤ 0.25	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4
Typ. input current at U_N	[mA]	5.4	5.7	5.1	6.8	2.4	2.6	2.1	2.1
Transmission frequency f_{limit}	[Hz]	600	600	600	600	300	300	3	3
Input circuit AC		Protection against polarity reversal, Surge protection							
Input circuit DC		Protection against polarity reversal							
Output data									
Operating voltage range		8 V DC ... 48 V DC							
Limiting continuous current		100 mA							
Residual voltage drop at "H"		1 V							
Max. inrush current		-							
Output circuit		2-conductor, floating							
Output protection		Protection against polarity reversal							
General data									
Test voltage input/output		2.5 kV (50 Hz, 1 min.)							
Ambient temperature (operation)		-20°C ... 50°C							
Standards/regulations		DIN VDE 0110							
Mounting position/mounting		Any / Can be aligned with 2 mm spacing							
Dimensions	W / H / D	13 mm / 29 mm / 25 mm							

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Solid-state relay, with protective circuit in the input and output circuit					
48 V DC ... 60 V DC	①	5 V DC	**SIM-EI- 5DC/48DC/100**	**2271057**	10
	②	12 V DC	**SIM-EI- 12DC/48DC/100**	**2271060**	10
	③	24 V DC	**SIM-EI- 24DC/48DC/100**	**2271073**	10
	④	60 V DC	**SIM-EI- 60DC/48DC/100**	**2271086**	10
	⑤	110 V DC	**SIM-EI-110DC/48DC/100**	**2271099**	10
	⑥	220 V DC	**SIM-EI-220DC/48DC/100**	**2271109**	10
	⑦	120 V AC	**SIM-EI-120AC/48DC/100**	**2271112**	10
	⑧	230 V AC	**SIM-EI-230AC/48DC/100**	**2271125**	10

Accessories

Plug-in base, for plug-in miniature relays or miniature solid-state relays, for soldering onto the printed circuit board.	**SIM-ERSN**	**2271484**	100
Retaining bracket, for miniature solid-state relay			
- Plastic	**SIM-ERSN-HB-KSR**	**2271468**	10
- Metal	**SIM-ERSN-HB-KSR/MET**	**2271497**	10
Retaining bracket, for miniature relay			
- Plastic	**SIM-ERSN-HB-MR**	**2271471**	10
- Metal	**SIM-ERSN-HB-MR/MET**	**2271510**	10

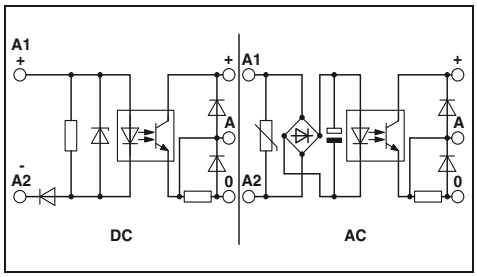


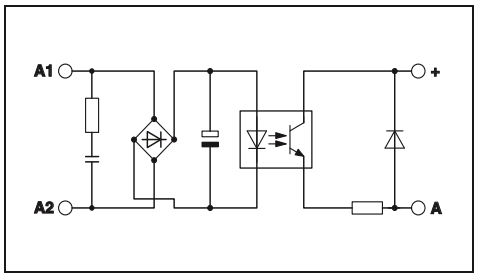
Derating curve for SIM-EI-OV-24 DC/24 DC/3

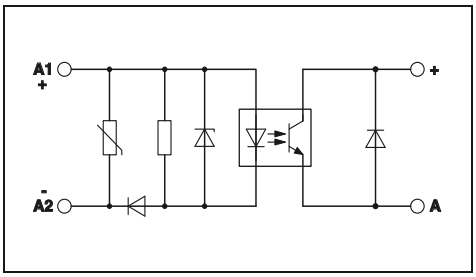
with TTL logic level output, max. = 100 mA

with DC voltage output Maximum = 100 mA, RC element in input

with DC voltage output max. = 3 A







Technical data

①	②	③	④	⑤	⑥	⑦	⑧
0.9 - 1.1	0.9 - 1.1	0.9 - 1.1	0.9 - 1.1	0.9 - 1.1	0.9 - 1.1	0.9 - 1.1	0.9 - 1.1
≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8	≥ 0.8
≤ 0.35	≤ 0.4	≤ 0.4	≤ 0.25	≤ 0.4	≤ 0.4	≤ 0.4	≤ 0.4
5.4	5.7	5.1	4.7	2.4	2.6	2.1	2.1
4000	4000	4000	4000	1000	1000	3	3
Protection against polarity reversal, Surge protection							
Protection against polarity reversal							

3 V DC ... 5.25 V DC
100 mA
0.3 V
-
3-conductor, ground-referenced
Protection against polarity reversal, Free running

2.5 kV (50 Hz, 1 min.)
-20°C ... 50°C
DIN VDE 0110
Any / Can be aligned with 2 mm spacing
13 mm / 29 mm / 25 mm

Technical data

⑦	⑧
0.9 - 1.1	0.9 - 1.1
≥ 0.8	≥ 0.8
≤ 0.4	≤ 0.4
2.2	2.5
3	3

RC element

8 V DC ... 48 V DC
100 mA
1 V
-
2-conductor, floating
Protection against polarity reversal

2.5 kV (50 Hz, 1 min.)
-20°C ... 50°C
DIN VDE 0110
Any / Can be aligned with 2 mm spacing
13 mm / 29 mm / 25 mm

Technical data

③
0.8 - 1.2
≥ 0.8
≤ 0.4
7
300

Protection against polarity reversal, Surge protection

3 V DC ... 33 V DC
3 A (see derating curve)
≤ 200 mV
15 A (10 ms)
2-conductor, floating
Protection against polarity reversal, Surge protection

2.5 kV (50 Hz, 1 min.)
-20°C ... 60°C
DIN VDE 0110
Any / Can be aligned with 2 mm spacing
13 mm / 29 mm / 25 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
SIM-EI- 5DC/TTL/100	**2271138**	10
SIM-EI- 12DC/TTL/100	**2271141**	10
SIM-EI- 24DC/TTL/100	**2271154**	10
SIM-EI- 60DC/TTL/100	**2271167**	10
SIM-EI-110DC/TTL/100	**2271170**	10
SIM-EI-220DC/TTL/100	**2271183**	10
SIM-EI-120AC/TTL/100	**2271196**	10
SIM-EI-230AC/TTL/100	**2271206**	10

Ordering data

Type	Order No.	Pcs. / Pkt.
SIM-EI-120AC/48DC/100/RC	**2271439**	10
SIM-EI-230AC/48DC/100/RC	**2271426**	10

Ordering data

Type	Order No.	Pcs. / Pkt.
SIM-EI-OV- 24DC/ 24DC/3	**2300096**	10

Accessories

SIM-ERSN	**2271484**	100
SIM-ERSN-HB-KSR	**2271468**	10
SIM-ERSN-HB-KSR/MET	**2271497**	10
SIM-ERSN-HB-MR	**2271471**	10
SIM-ERSN-HB-MR/MET	**2271510**	10

Accessories

SIM-ERSN	**2271484**	100
SIM-ERSN-HB-KSR	**2271468**	10
SIM-ERSN-HB-KSR/MET	**2271497**	10
SIM-ERSN-HB-MR	**2271471**	10
SIM-ERSN-HB-MR/MET	**2271510**	10

Accessories

SIM-ERSN	**2271484**	100
SIM-ERSN-HB-KSR	**2271468**	10
SIM-ERSN-HB-KSR/MET	**2271497**	10
SIM-ERSN-HB-MR	**2271471**	10
SIM-ERSN-HB-MR/MET	**2271510**	10

OV solid-state relay

Solid-state relays for electrical isolation can be mounted directly on the printed circuit board as interfaces or plugged in using the SIM-AMS solder-in socket.

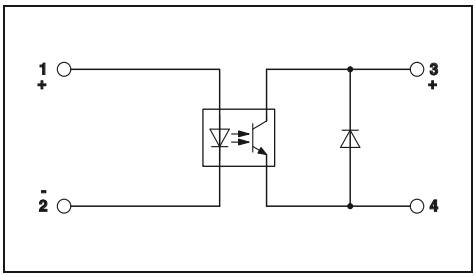
The solid-state relays are suitable for switching ohmic, capacitive or inductive loads. Relays for switching AC circuits have a zero voltage switch to switch the load on in the zero voltage crossing. It is switched off in the zero current crossing. The integrated RC element permits operation up to cos ϕ = 0.5.

Inductive DC loads must be equipped with a fast-acting freewheeling diode for semiconductor relay protection.

- Switching capacity up to 350 V DC/1 A, 60 V DC/4 A or 480 V AC/5 A
- No wear and tear even with high switching frequencies
- No contact bounce – no movable parts
- No electromagnetic interference
- Electrically insulated housings
- Small dimensions
- High test voltage of 4 kV between control and load circuits

Notes:
For derating curves see page 564
For suitable bases, see page 560
1) Turn-on/off time at U_N: Max. ½ period

with DC voltage output max. = 1 A



Technical data

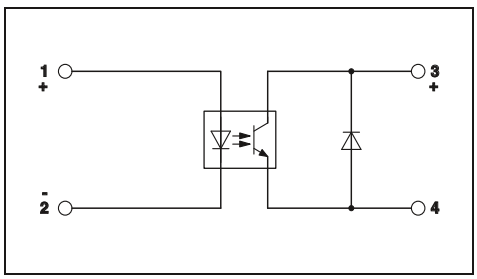
Input data		①
Input voltage range		4.25 V DC ... 32 V DC
Switching level	1 signal ("H") [V DC] ≥	3.3
	0 signal ("L") [V DC] ≤	1
Typ. input current at U_N	[mA]	15
Typ. switch-on time at U_N	[µs]	100
Typ. switch-off time at U_N	[µs]	250
Transmission frequency f_{limit}	[Hz]	100
Output data		
Operating voltage range		1 V DC ... 350 V DC
Periodic peak reverse voltage		-
Limiting continuous current		1 A (see derating curve)
Min. load current		1 mA
Surge current		20 A (tp = 1 s)
Residual voltage drop at "H"		0.5 V
Leakage current in off state		100 µA
Phase angle (cos ϕ)		-
Max. load value		-
Output protection		Protection against polarity reversal
General data		
Test voltage input/output		4 kV (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 80°C
Standards/regulations		EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 55011
Mounting position/mounting		Any / Can be aligned with > 9 mm spacing
Dimensions	W / H / D	10.5 mm / 43 mm / 25.4 mm

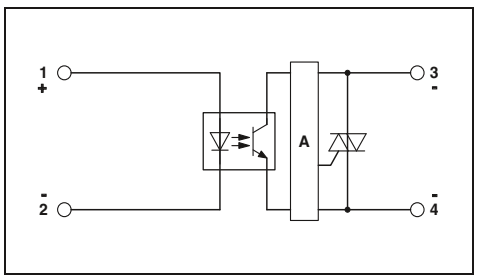
Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs. / Pkt.
Solid-state relay for signal amplification and electrical isolation of the control and load circuits, can be plugged into the solder-in plug-in base SIM-AMS or with PCB connection for direct mounting onto the PCB, Input: DC voltage Output: DC voltage	① 24 V DC	**OV-24DC/350DC/1**	**2982634**	10
Solid-state relay, same as before, however Input: DC voltage Output: AC voltage	① 24 V DC			

with DC voltage output
max. = 4 A

with AC voltage output
max. = 5 A





Technical data	
①	①
4.25 V DC ... 32 V DC	4 V DC ... 32 V DC
3.3	3.5
1	1.2
15	10
100	
250	
100	25
1 V DC ... 60 V DC	12 V AC ... 530 V AC (45/65 Hz)
-	1000 V
4 A (see derating curve)	5 A (see derating curve)
1 mA	20 mA
25 A (tp = 1 s)	80 A (tp = 20 ms)
0.5 V	1.2 V
100 µA	< 1 mA
-	0.5
-	50 A^2s
Protection against polarity reversal	-
4 kV (50 Hz, 1 min.)	4 kV (50 Hz, 1 min.)
-20°C ... 80°C	-20°C ... 70°C
EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 55011	EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6
Any / Can be aligned with > 20 mm spacing	Any / Can be aligned with > 20 mm spacing
10.5 mm / 43 mm / 25.4 mm	10.5 mm / 43 mm / 25.4 mm

Ordering data

Type	Order No.	Pcs. / Pkt.
OV-24DC/ 60DC/4	**2982647**	10

Ordering data

Type	Order No.	Pcs. / Pkt.
OV-24DC/480AC/5	**2982650**	10

Solder-in socket for solid-state relays and I/O modules

Modern interface solutions for computer and electronic controls are increasingly being designed as I/O systems which are system-independent and individually mountable. Electrical isolation and signal conditioning are carried out using standard I/O modules. These are produced by various manufacturers in pin-compatible versions for different functions. The I/O modules are either soldered directly into the PCB or plugged into component sockets for quick interchanging.

SIM sockets facilitate the plugging of I/O modules considerably. All standard I/O modules and solid-state relays with up to eight connections can be plugged into the solder-in plug-in socket.

The I/O modules are securely fixed to the socket using fastening screws which are specific to the module. They are thereby protected against being accidentally released. Optocouplers, now also available in plug-in versions, are secured using the latch which is attached to the socket and which can be labeled. For better identification, each module plug position has its own marking panel on the socket.

The SIM socket has been designed so that it can be used on existing printed circuit boards without any layout modifications. Peripheral components such as LEDs or fuse resistors remain accessible to the user.

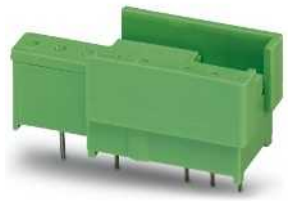
Notes:

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

Marking systems and mounting material
See Catalog 5

For dimensional drawings and pin assignments, see page 564

[1]) Applies only to the sockets SIM-AMS 1, SIM-AMS 1-R and SIM-AMSC in connection with the standard I/O modules with the corresponding AC voltage output.



Plug-in base for solid-state relays

Technical data

Operating voltage	250 V AC / 380 V AC[1])
Nominal current	5 A
Standards/regulations	DIN VDE 0110b, Gr. C for 250 V DC

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs. / Pkt.
Plug-in base, for solid-state relay and I/O modules, with different numbers of contacts, can be labeled with marker pins BN or BNB					
Partial assembly			**SIM-AMS 1**	**2271015**	10
Complete assembly			**SIM-AMS 2**	**2271028**	10
Plug-in base, as above, however, **with locking clips** for fastening					
Partial assembly					
Complete assembly					
Plug-in base, for standard I/O modules of generation 4 of the company Opto 22, can be labeled using marker pins BN or BNB					

Accessories

Marker pin, made of white plastic, lettering area 7.5 x 4 mm, unprinted for self-marking with B-STIFT		
	BN-TRK	**2701404**	100
Marker pen, not refillable, for manual labeling, line thickness 0.5 mm		
	B-STIFT	**1051993**	10

Plug-in base for solid-state relays with locking clip

Plug-in base for I/O modules

Technical data

250 V AC / 380 V AC[1])

5 A
DIN VDE 0110b, Gr. C for 250 V DC

Ordering data

Type	Order No.	Pcs. / Pkt.
SIM-AMS 1-R	**2271031**	10
SIM-AMS 2-R	**2271044**	10

Accessories

BN-TRK	**2701404**	100
B-STIFT	**1051993**	10

Technical data

250 V AC / 380 V AC[1])

5 A
DIN VDE 0110b, Gr. C for 250 V DC

Ordering data

Type	Order No.	Pcs. / Pkt.
SIM-AMSC1	**2271390**	50

Accessories

BN-TRK	**2701404**	100
B-STIFT	**1051993**	10

Modules for IEC 60603/DIN 41612 plug-in connectors

Cable housing suitable for snap-lock mechanism:

Manufacturer	Type F 32- and 48-pos.
HARTING	Types “B” and “D”

Cable housing suitable for screw locking:

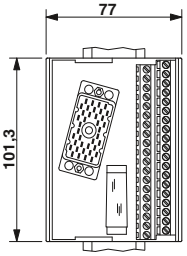
Manufacturer	Type C, 64-pos.	Type D, 32-pos.
ERNI	KSG 173...	KSG 173...
AMP	826196-1	826196-1

Cable housing suitable for screw locking:

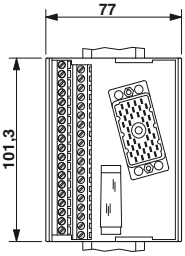
Manufacturer	Type E, 48-pos.	Type F, 32- and 48-pos.
ERNI	KSG 173...	KSG 203...
AMP	–	826198-1

Modules for ELCO plug-in connectors

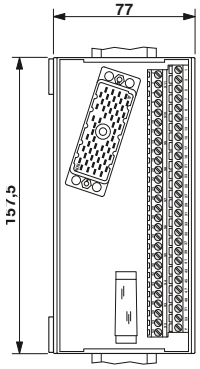
Dimensional drawing for UMK-EC38/38-XOL



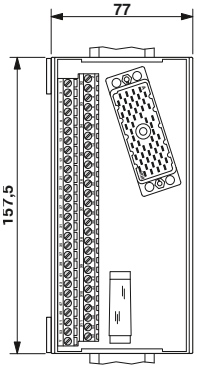
Dimensional drawing for UMK-EC38/38-XOR



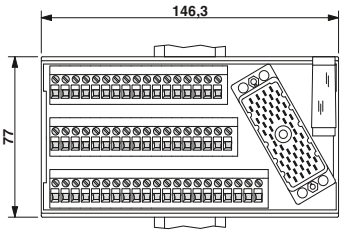
Dimensional drawing for UMK-EC56/56-XOL



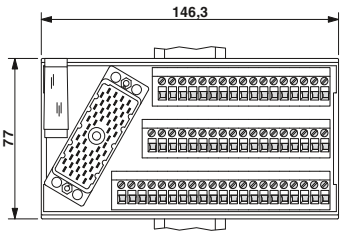
Dimensional drawing for UMK-EC56/56-XOR



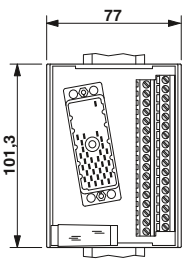
Dimensional drawing for UMK-EC56/FRONT 2,5V/R



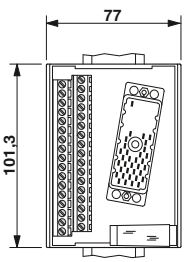
Dimensional drawing for UMK-EC56/FRONT 2,5V/L



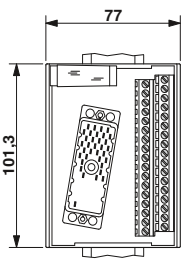
Dimensional drawing for UMK-EC56/32-XOL



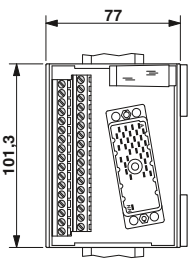
Dimensional drawing for UMK-EC56/32-XOR



Dimensional drawing for UMK-EC56/32-XUL



Dimensional drawing for UMK-EC56/32-XUR



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)

Modules for ELCO plug-in connectors with protection type Ex i

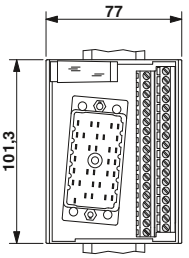
Pin assignment UMK-EC56/FRONT 2,5V/...

Terminal block	ELCO plug
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)

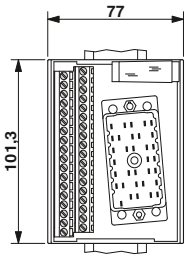
Pin assignment UMK-EC56/32-...

Terminal block	ELCO plug
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

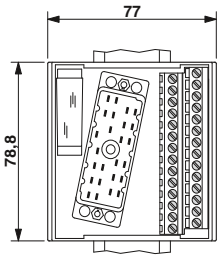
Dimensional drawing for UMK-EC90/32/EX-XUL



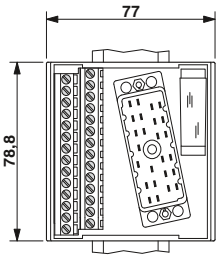
Dimensional drawing for UMK-EC90/32/EX-XUR



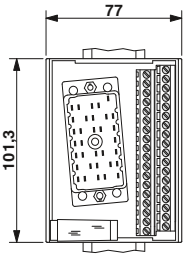
Dimensional drawing for UMK-EC56/25/EX-L



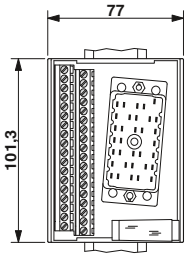
Dimensional drawing for UMK-EC56/25/EX-R



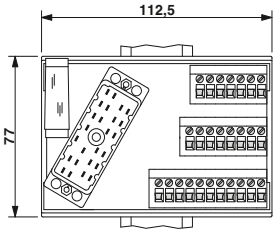
Dimensional drawing for UMK-EC90/32/EX-XOL



Dimensional drawing for UMK-EC90/32/EX-XOR



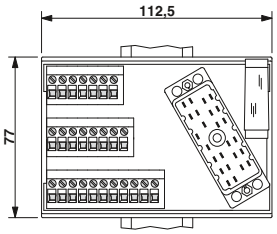
Dimensional drawing for UMK-EC 56/25/EX/FRONT 2,5 V/L



Pin assignment UMK-EC90/32/EX...

Terminal block	Pin strip	Channel
1 2	H J	1
3 4	L M	2
5 6	P X	3
7 8	Z AA	4
9 10	AC AD	5
11 12	AM AN	6
13 14	AR AS	7
15 16	AU BC	8
17 18	AZ BA	9
19 20	BJ BK	10
21 22	BM BN	11
23 24	BR BY	12
25 26	CA CB	13
27 28	CD CE	14
29 30	CN CP	15
31 32	CS CT	16
Y	DS	

Dimensional drawing for UMK-EC 56/25/EX/FRONT 2,5 V/R



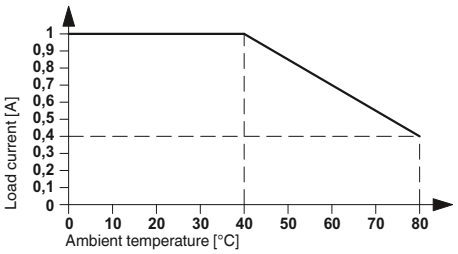
Pin assignment UMK-EC 56/25/EX/...

Terminal block	Pin strip	Channel
1 2	C D	1
3 4	E F	2
5 6	N P	3
7 8	R S	4
9 10	a b	5
11 12	d j	6
13 14	k l	7
15 16	s t	8
17 18	u v	9
19 20	BB CC	10
21 22	DD EE	11
23 24	MM NN	12
Y	Y	

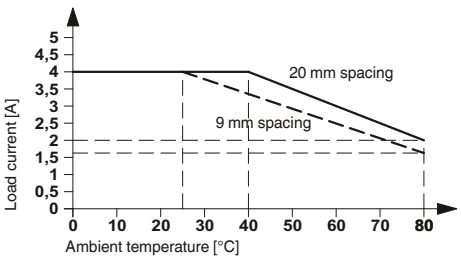
OV solid-state relays

Load current depending on ambient temperature
Operating time: 100% OT

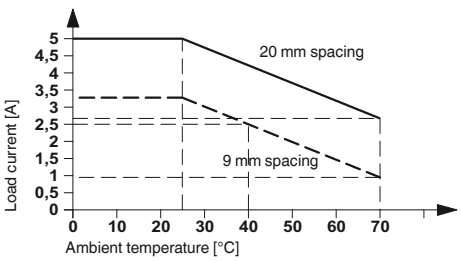
OV-24DC/350DC/1



OV-24DC/60DC/4

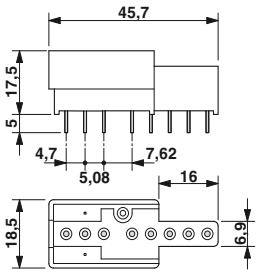


OV-24DC/480AC/5

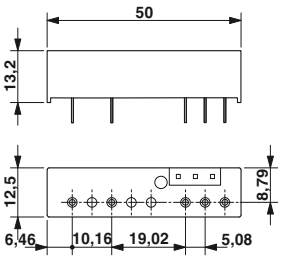


Solder-in SIM-AMS plug-in base for solid-state relays and I/O modules

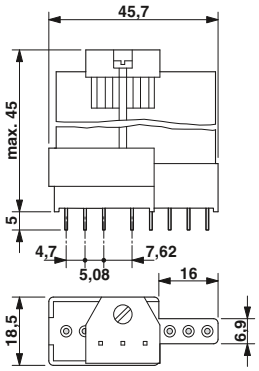
Dimensional drawing for SIM-AMS:



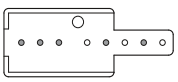
Dimensional drawing for SIM-AMSC:



Dimensional drawing for SIM-AMS...R:

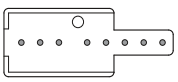


Contacts in the SIM-AMS plug-in base
1. Partial assembly for standard I/O modules



SIM-AMS 1

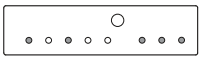
2. Complete assembly, e.g., for analog I/O modules



SIM-AMS 2

● With metal
○ Without metal

Contacts in the SIM-AMSC plug-in base:



● With metal
○ Without metal

Note:
4th generation optocoupler, available from Opto 22.

Quality in quantity

Integrated management system

The aim of the Phoenix Contact integrated management system is to coordinate all the requirements regarding products, processes, and organization.

Statutory and regulatory requirements, as well as those of international standards and our customers, are met and, in some cases, even exceeded in all phases of the product lifecycle.

In the Phoenix Contact management system, the integration of quality, environmental protection, and safety in the workplace is monitored each year for conformance by internationally recognized independent bodies. Certification in accordance with international standards ISO 9001, ISO 14001, and BS OHSAS 18001 is the result of our corporate philosophy of meeting the needs of our customers, staff, and environment as best as possible. They serve as the basis for innovative products with the familiar high Phoenix quality standard, actively practiced environmental protection, and responsibility in the field of occupational health and safety. Of course, we integrate all further requirements of standards, international approvals or special customer requirements into company processes.

This system provides a building block for the success of the Phoenix Contact Group and its products and services.

CE marking

The CE mark was introduced as an important instrument for the free movement of goods and services within the single European market. By attaching the mark to a product, the manufacturer confirms that it complies with all applicable European Union (EU) directives. EC directives describe the product properties with regard to device safety and avoiding danger. These are legally binding regulations of the European Union (EU). In other words, compliance with the requirements is a **statutory condition for marketing the product within the EU**.

Where applicable, the products that our company currently manufactures fall within the scope of the following directives:

- 2006/95/EC
  Electrical equipment designed for use within certain voltage limits (Low Voltage Directive)
- 2004/108/EC
  Electromagnetic compatibility (EMC Directive)
- 2006/42/EC
  Safety of machinery (Machinery Directive)
- 94/9/EC
  Equipment and protective systems intended for use in potentially explosive areas (ATEX Directive 100a)
- 1999/5/EC
  Radio and telecommunications terminal equipment (R&TTE)

The standards upon which the specified directives are based have been part of our standard of development for a long time. This guarantees conformance with European directives. The numbers of the directives indicate their version at the time of publication. In the event of changes to directives and/or standards, our products will undergo conformity assessment again in good time and a new declaration of conformity will be issued promptly. The current declarations for each product can also be found in our Download Center.

The EMC Directive occupies a special place among the European directives listed. It defines electromagnetic compatibility as a fundamental property of devices based on mandatory guidelines. European Law therefore acknowledges the electromagnetic compatibility of devices and systems as an important condition for error-free operation of machinery and systems. Phoenix Contact is one of the leading international companies in surge protection, and therefore possesses broad expertise in EMC. This expertise and the experience gained over years of developing and applying industrial interface and communication technology have resulted in our products having an extremely high standard of quality with regard to electromagnetic compatibility. It was with a view to providing other companies with this expertise that our associate company, Phoenix Testlab, was founded. Phoenix Testlab GmbH is an independent, accredited service provider offering EMC testing that conforms to European standards. At Phoenix Testlab, devices are also tested with regard to their electrical safety, mechanical influences, and their behavior in relation to environmental influences. Furthermore, Phoenix Testlab is a "Notified Body" in accordance with EMC Directive 2004/108/EC and according to R&TTE Directive 1999/5/EC for radio and telecommunications terminal equipment. As a "Telecom Certification Body" (TCB), Phoenix Testlab may also approve these products for markets in the USA, Canada, and Japan.

Standards and regulations

All relevant standards and regulations are used as the basis for the development and maintenance of our products.

International standards are subject to continuous changes as a result of harmonization and new developments. In line with this process, the current version of all standards that are relevant to our products is documented in the product area on our website at **www.phoenixcontact.net/products**.

Online product information service on the web

Phoenix Contact's product range is growing constantly.

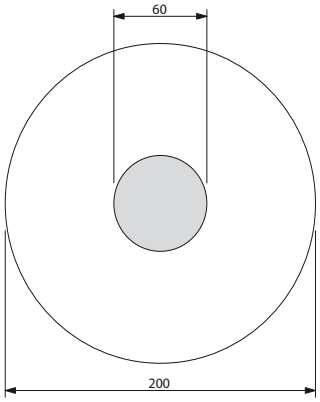
Due to our commitment to product monitoring, all products are subject to improvement.

The Internet is an ideal platform to quickly communicate new product developments and improvements to the market.

You can quickly access the relevant Phoenix Contact website for your region via www.phoenixcontact.com. Here, you will always find the latest overview of products, solutions, and services from Phoenix Contact. This includes technical documents, such as data sheets and user manuals, the latest driver and demo software, plus a means of contacting the appropriate contact person directly.

Shock protection

Touch proof



Back of hand safety

Example: pressure actuation

The accident prevention regulations BGV A 2 issued by the German employer's liability insurance association for precision mechanics and electrical engineering apply to the operators of electrical systems and are aimed at the prevention of electrical accidents by means of special safety requirements.

These regulations contain specifications regarding the safety distances for work, operation, and occasional handling in the proximity of "live parts" in low-voltage systems up to 1000 V ~ or 1500 V –.

- Work with live parts is only permitted once they have been de-energized. Operational activities are only permitted in the vicinity of live parts if these parts are de-energized or are protected against direct contact (§ 6). The following safety measures apply when working in the vicinity of active components:
- Provision of the de-energized state for the duration of the work
- Ensure shock protection is in place in the form of covers or barriers during the work
- Assurance that proximity limits will not be violated (§ 7)

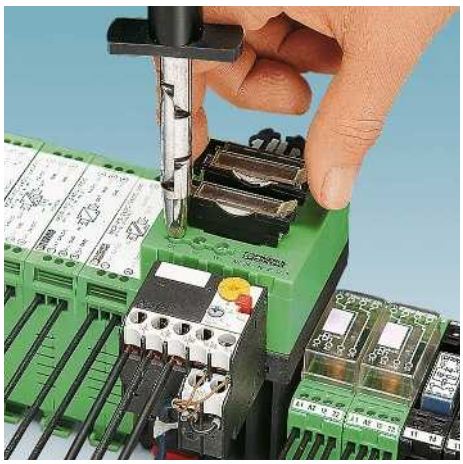
The term "occasional handling" has been introduced for the operation of elements such as pushbuttons, rocker arms or rotary buttons in the proximity of live parts.

In VDE 0105-1, this is covered by "operation with partial protection against direct contact".

Detailed specifications for "occasional handling" can be found in DIN VDE 0106-100. This specifies to what degree live parts in the proximity of operating elements are to be protected against contact. The basis for this is the definition of a "protection area for occasional handling"; this is the area into which the user must reach in order to handle the machine.

The most important thing is that an area formed by an even envelope curve 30 mm in radius must surround the live parts. This area must be **touch proof**, i.e., the live parts of the electrical device must not be within reach of the VDE test finger in accordance with IEC 60529/DIN VDE 0470-1 (test finger).

Back of hand safety is specified for the "rest of the area" up to 100 mm around the operating element. **Back of hand safety** means that when a force of 50 N is applied to a ball with a diameter of 50 mm, this does not come into contact with the live parts of the



equipment. No special measures for shock protection are provided outside this area.

Note: systems and equipment that are operated with SELV up to 25 V ~ or 60 V – are considered to be protected against direct contact.

According to § 5, Subsection 4 of the BGV A 2 regulations, there is no need to test the condition of the system prior to initial startup if the company has confirmation from the manufacturer or installer that the electrical

systems and equipment conform to BGV A 2. The confirmation required relates to systems and equipment that have been installed and are ready for operation and can only be issued by the installer or installation company. The manufacturer of the electrical equipment can only issue a confirmation that products have been produced in accordance with the relevant electrotechnical DIN VDE regulations stipulated in BGV A 2. The installer must bear this in mind when selecting the equipment to be used.

In the field of connection technology, Phoenix Contact offers a wide range of products that are touch proof or that can be protected against contact using covers. Depending on the conditions, all of this must be taken into account when selecting the individual types of terminal block and accessories.

Quality features of insulating housing

Thermoplastics

The majority of our insulating housing is made from thermoplastic materials. Roughly speaking, these can be divided into amorphous and semi-crystalline substances. Thermoplastics are processed using the efficient and environmentally-friendly injection molding process. They have good recycling properties and can be re-used. We use many materials that are modified in different ways to meet the demanding requirements that electrical and electronic modules, devices, and systems have to meet with regard to their mechanical, thermal, and electrical properties.

Behavior of plastics under the influence of temperature (operating temperatures, mechanical influences)

All plastics undergo a process referred to as thermal aging when they are subjected to heat over long periods. This process causes changes in the mechanical and electrical properties of the material. External influences, e.g., radiation, additional mechanical, chemical or electrical stresses, amplify this effect. Special tests on samples can yield characteristic data which provides a good means of drawing comparisons between different plastics. However, applying these characteristics to an evaluation of molded plastic parts is only possible to a limited extent, and can only give the designer a rough guide when it comes to selecting a plastic material. This catalog uses the following assessment criteria: the **RTI value** according to UL746B/ANSI 746 B (elec. based on dielectric strength) and the **Ti value** according to IEC 60216-1 (based on a 50% reduction in tensile strength after 20,000 hours).

IEC 60947-7-1/EN 60947-7-1 specifies a permissible temperature increase of 45 K for modular terminal blocks under nominal load. Phoenix Contact terminal blocks meet this requirement.

The properties of plastics are not only affected by the influence of heat as described above; they also undergo changes as a result of cold influences. When subjected to cold as well as low levels of humidity, plastics become increasingly brittle with the result that they are no longer capable of withstanding the same mechanical loads. As the table on the right shows, the plastics concerned can be used down to a temperature of -40°C, but only without a mechanical load. As far as the products presented in the catalog are concerned, it is the ambient temperature specified in each case that is to be regarded as definitive for operation. Regardless of the plastics used, this may be subject to further restrictions (e.g., limited to -20°C) as a result of the components used or other restrictive parameters.

At very low temperatures, this means that any form of mechanical load on the plastic components must be avoided (e.g., mounting of products on/removal of products from the DIN rail, actuation of terminal points, locking/ejection of relays from bases, prizing out of plug-in bridges, bending of cables and lines, etc.), as there is always an associated risk of damage. Unless otherwise indicated, it is recommended that you carry out the specified mounting/operational tasks in a temperature range from -10°C to +40°C.

Inflammability characteristics of plastics (UL 94)

Inflammability tests for plastics have been defined by Underwriters Laboratories (USA) in regulation UL 94. This applies to all areas of application, but in particular to electrical engineering. A horizontal or vertical test is carried out at the test laboratory to determine the inflammability of the plastic material with a naked flame. In order of increasing resistance to combustion, the evaluation classes are HB, V2, V1, V0, and 5V. Test results are recorded on "yellow cards" and are published annually in the **Recognized Component Directory.**

Thermoplastics: non-reinforced polyamide, PA

We use the modern, semi-crystalline polyamide insulation material, which has now become an essential component in electrical engineering and electronics. It has long occupied a leading position and is authorized for use by the relevant approval authorities such as the CSA, NEMKO, KEMA, PTB, SEV, UL, VDE, etc.

Polyamide also has excellent electrical, mechanical, chemical, and other properties, even at high operating temperatures. Brief peak temperatures up to approximately 200°C are permitted as a result of heat aging stabilization. Depending on the type (PA 4.6, 6.6, 6.10, etc.), its melting point is in the region of 215°C to 295°C.

Polyamide absorbs moisture from its surroundings, on average 2.8%. However, this moisture is not in the form of crystallization water in the plastic itself, but chemically bonded H_2O groups in the molecule structure. This makes the plastic flexible and resistant to breakage, even at temperatures as low as -40°C. According to UL 94, PA belongs to inflammability class V2 to V0.

Thermoplastics: polyester, PBT

We use the semi-crystalline thermoplastic polyester in non-reinforced and fiberglass-reinforced variants for special applications which require increased dimensional and form stability.

In addition to the high operating temperature, the material is characterized by excellent mechanical strength and hardness, and does not absorb moisture from its surroundings. PBT is therefore particularly suitable for strips, for example, which are soldered onto PCBs and subsequently have to pass a burn-in test while they are subjected to heat. According to UL 94, PBT belongs to inflammability class V2 to V0.

Thermoplastics: polycarbonate, PC

Polycarbonate combines many advantages such as rigidity, impact strength, transparency, dimensional stability, good insulation properties, and resistance to heat.

This amorphous material only absorbs moisture to a very limited degree, and is used for items such as large, rigid electronic component housing.

In its transparent form, polycarbonate is particularly suitable for use as cover profiles or marking materials.

PC has good resistance properties against mineral acids, saturated aliphatic hydrocarbons, gasoline, greases, and oils.

The material is less resistant to solvents, benzene, lyes, acetone, and ammonia. Strain cracks may result from contact with certain chemicals.

According to UL 94, PC belongs to inflammability class V2 to V0.

Thermoplastics: polycarbonate fiber-reinforced, PC-F

Compared to non-reinforced materials, fiber-reinforced polycarbonates feature greater rigidity, impact strength, and operating temperature. In other respects, their properties are largely identical to those of non-reinforced polycarbonate.

Thermoplastics: ABS

We use the thermoplastic molding compound ABS for products which must have good impact and notched impact properties in addition to high mechanical stability and rigidity. The products are resistant to chemicals and stress cracking due to their special surface quality and hardness.

The characteristic thermal properties provide good dimensional stability at both low and high temperatures. Products made from ABS can be coated with metallic surfaces, e.g., nickel.

According to UL 94, the molding compound used belongs to inflammability class HB to V0.

Dimensions: width / height / depth

The dimensions for "width / height / depth" are defined as follows for all DIN-rail-mountable products in the INTERFACE range:

- Width: measurement taken along the DIN rail
- Height: measurement taken across the DIN rail
- Depth: measurement taken starting from the mounting plate and including the NS 35/7,5 DIN rail (EN 60715)

The width, height, and depth never change, even if the products shown in this catalog happen to be photographed from two different perspectives (horizontal or vertical).

To make things easier for you, one of the following two symbols has been included next to each product photo:

Properties	Unit/level	Polyamide PA	Polyester PBT	Polycarbonate PC	Polycarbonate PC-F	ABS
Operating temperature RTI */**	°C	≤ 105	≤ 105	≤ 125	≤ 120	≤ 80
Minimum temperature (without mechanical load)	°C	-40	-40	-40	-40	-40
Dielectric strength according to IEC 60243-1/DIN VDE 0303-21	kV/cm	600	400	> 300		850
Creep resistance	CTI...M	550	225	175		200
IEC 60112/DIN VDE 0303-1	CTI...	600	225	175	175	600
Tropical and termite resistance		Good	Good	Good		
Specific contact resistance IEC 60093/VDE 0303 Part 30; IEC 60167/VDE 0303 Part 31	Ω cm	10^{12}	10^{16}	> 10^{16}	> 10^{14}	10^{14}
Surface resistance IEC 60093/VDE 0303 Part 30; IEC 60167/VDE 0303 Part 31	Ω	10^{10}	10^{13}	> 10^{14}		10^{13}
Inflammability class according to UL 94		V2 - V0	V0	V2 - V0	V0	HB - V0

* According to UL 746 B/ANSI 746 B (elec.) ** Minimum value

Connection cross section

The rated cross section of modular terminal blocks must be specified by the manufacturer in accordance with IEC 60947-7-1. The rated cross section is the maximum conductor cross section that can be connected in single-, multi- or fine-strand versions subject to specific thermal, mechanical, and electrical requirements.

The manufacturer must also specify the **rated connection capacity**, i.e., the area of the conductor that can be connected, as well as the number of conductors that can be connected simultaneously and the necessary preparation of the conductor ends. The conductors can be **solid (single or multi-strand)** or **stranded (fine-strand)**.

These values can be found in the product-specific technical data.

The rated connection capacity of Phoenix Contact modular terminal blocks usually exceeds standard requirements, which specify that it must only be possible to connect one conductor with one of the two next smallest cross sections, excluding the rated cross section (standardized for the cross section range from 0.2 to 35 mm²).

In addition, conductors with a rated cross section can usually be wired with ferrules with plastic sleeve.

Phoenix Contact modular terminal blocks are designed to allow copper conductors to be connected to them untreated. "Special treatment" or the use of ferrules – both permitted according to IEC 60947-7-1 – is not required. If ferrules are nevertheless used to protect stranded conductors against splicing, the connection capacity of the stranded conductor is generally reduced by one level.

Structure and dimensions of connecting cables

Cross section	Single-strand		Multi-strand		Fine-strand		American Wire Gauge [AWG]						
	Diameter max. dimension	Number of wires	Diameter max. dimension	Number of wires (minimum number)	Diameter max. dimension	Number of wires (guide value)	Gauge No.	Solid wires			Stranded wires		
[mm²]							AWG	[Ø mm]	[circ. mils]	[mm²]	[Ø mm]	[circ. mils]	[mm²]
0.2	0.5	1	–	–	–	–	24	0.51	404	0.21	–	–	–
0.5	0.9	1	1.1	7	1.1	16	20	0.81	1022	0.52	0.97	1111	0.56
0.75	1.0	1	1.2	7	1.3	24	18	1.02	1620	0.82	1.16	1600	0.82
1	1.2	1	1.4	7	1.5	32	(17)	1.15	2050	1.04			
–	–	–	–	–	–	–	16	1.29	2580	1.31	1.50	2580	1.32
1.5	1.5	1	1.7	7	1.8	30	(15)	1.45	3260	1.65			
–	–	–	–	–	–	–	14	1.63	4110	2.08	1.85	4100	2.09
2.5	1.9	1	2.2	7	2.3	50	(13)	1.83	5180	2.63			
–	–	–	–	–	–	–	12	2.05	6530	3.31	2.41	6500	3.32
4	2.4	1	2.7	7	2.9	56	(11)	2.30	8230	4.17			
–	–	–	–	–	–	–	10	2.59	10380	5.26	2.95	10530	5.37
6	2.9	1	3.3	7	3.9	84	(9)	2.91	13100	6.63			
–	–	–	–	–	–	–	8	3.26	16510	8.37	3.73	16625	8.48

Tightening torque of terminal block screws

IEC 60947-1/EN 60947-1, modified, Table 4 specifies tightening torques for screw connections based on the screw size for electrical and mechanical type tests.

Extract from IEC 60 947-1/EN 60 947-1, Table 4
The torque according to IEC and the recommended tightening torque for Phoenix Contact terminal blocks are specified.

Thread	Head screw with slot	
	Torque [Nm]	Recommended tightening torque [Nm]
M2.5 (M2.6)	0.4	0.4 - 0.5
M3	0.5	0.5 - 0.6
M3.5	0.8	0.8 - 1.0
M4	1.2	1.2 - 1.5

Current carrying capacity

Standard IEC 60947-7-1/ EN 60947-7-1/DIN VDE 0611-1 specifies the test currents for the individual conductor cross sections listed in the adjacent table. The corresponding currents are listed with the connection data for the individual terminal blocks. The type tests for modular terminal blocks are based on this data.

Test currents according to IEC 60947-7-1/EN 60947-7-1, Table 5

Rated cross section	[mm²]	0.2	0.5	0.75	1.0	1.5	2.5	4	6	10	16
Test current	[A]	4	6	9	13.5	17.5	24	32	41	57	76

Overview of certification bodies and safety marks

Certification bodies and approvals		Country code
CB scheme	IECEE CB Scheme (in combination with certifying body)	Interna-tional
CCA	CENELEC Certification Agreement (CCA inspection report) (in combination with certifying body)	EU
	Canadian Standards Association (CSA)	CA
	Underwriters Laboratories Inc. (UL)	US
	Underwriters Laboratories Inc. (UL) - UL approval for Canada -	CA
	Underwriters Laboratories Inc. (UL) Com-bined logo - UL approval for the USA and Canada -	US CA
	INSIEME PER LA QUALITA'E LA SICUREZZA	IT
	Gosudarstvenne Komitet Standartov (GOST)	RU
KEMA KEUR	DEKRA Certification B.V.	NL
ÖVE	Österreichischer Verband für Elektrotechnik	AT
SABS	South African Bureau of Standards	ZA
SEV	electrosuisse SEV Verband für Elektro-, Energie- und Informationstechnik	CH
VDE	Verband Deutscher Elektrotechniker e.V.(VDE) – Approval of drawings – Reports with production monitoring	DE
GS	Berufsgenossenschaft (BG) GS - Geprüfte Sicherheit	DE
TÜV	TÜV Rheinland Industrie Service GmbH	DE

Explosion protection		Country code
FM APPROVED	FM Approvals	US
DEKRA	DEKRA Certification B.V.	NL
PTB	Physikalisch-Technische Bundesanstalt	DE
QS International	QS Schaffhausen	CH
VTT	VTT Expert Services Oy	FI
IBExU	IBExU Institut für Sicherheitstechnik GmbH	DE
	TÜV Rheinland do Brasil	BR
	Underwriters Laboratories Inc. (UL)	US
TÜV NORD	TÜV Nord	DE
DEKRA	DEKRA EXAM GmbH	DE

Ship classification societies		Country code
	Bureau Veritas	FR
GL	Germanischer Lloyd AG	DE
Lloyds Register	Lloyd's Register EMEA	GB
ClassNK	Nippon Kaiji Kyokai	JP
	Det Norske Veritas	NO
	Polski Rejestr Statków	PL
	Russian Maritime Register of Shipping	RU
KR	Korean Register of Shipping	KR
ABS	American Bureau of Shipping	US

Note:

Subject to changes that serve the purpose of technical progress.

EMC: Class A product:

In accordance with statutory regulations, our products are indicated with this footnote if they are intended for use in industrial environments. This means that the permissible limit values for residential applications may be exceeded in the event of conducted and emitted interference. In such cases, the operator may have to take additional safety measures in order to ensure electromagnetic compatibility in residential applications.

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VIP-3/PT/PDM-2/48	2903800	549
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PHOENIX CONTACT
INSPIRING INNOVATIONS

LifeElectronics
Живое партнерство

ООО «ЛайфЭлектроникс» **“LifeElectronics” LLC**

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

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