5

Interface technology and switching devices

2019 / 2020

PHOENIX CONTACT
INSPIRING INNOVATIONS

Terminal blocks

- Terminal blocks

Sensor/actuator cabling and connectors

- Sensor/actuator cabling
- Cables and lines
- Connectors

Marking systems, tools, and mounting material

- Marking and labeling
- Tools
- Installation and mounting material

Surge protection, power supplies, and device circuit breakers

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

Interface technology and switching devices

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

Automation

- PLCnext Technology
- Industrial cloud computing
- Software
- PLCs and I/O systems
- Functional safety
- Industrial communication technology
- HMIs and industrial PCs
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Charging technology for electromobility

- Charging technology for electromobility

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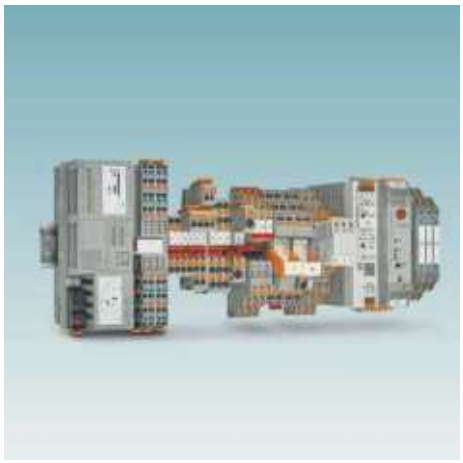
The comprehensive solution for the control cabinet

Easy planning, intuitive installation

COMPLETE line is a system comprising technologically leading and coordinated hardware and software products, consulting services, and system solutions that help you optimize your processes in control cabinet manufacturing. Engineering, purchasing, installation, and operation become significantly easier for you.

Your advantages at a glance:

- Intuitive handling, thanks to the uniform design, look, and function
- Time savings across the entire engineering process, thanks to consistent software support
- Reduced logistics costs with standardized accessories and reduced variety of parts
- Optimized processes in control cabinet manufacturing, thanks to custom services and innovative manufacturing solutions



Comprehensive product portfolio

With COMPLETE line, we offer a complete product portfolio of technologically leading products. These include:

– Controllers and I/O modules
– Power supplies and device circuit breakers
– Terminal blocks and distribution blocks
– Relay modules and motor starters
– Signal conditioners
– Safety technology
– Surge protection
– Heavy-duty connectors

Intuitive handling

Thanks to the simple, intuitive handling of the coordinated hardware components, you will save time during installation, startup, and maintenance. Push-in connection technology enables you to wire applications quickly – without using tools. The broad, technologically leading product portfolio will always provide you with the right product for standard or special applications.

Time savings across the entire engineering process

The PROJECT complete planning and marking software supports the entire control cabinet manufacturing process. The program features an intuitive user interface and enables the individual planning, automatic checking, and direct ordering of terminal strips.

Reduced logistics costs

Reduced variety of parts, thanks to standardized marking, bridging, and testing accessories. The COMPLETE line system coordinates products, design, and accessories enabling you to benefit from maximum reusability, thus reducing your logistics costs.

Optimized processes in control cabinet manufacturing

From engineering through to manufacturing, COMPLETE line supports you in making your control cabinet production as efficient as possible, thus creating a customized concept for optimizing your processes in control cabinet manufacturing. Our terminal strip production helps you to flexibly manage peak order times or to supply your control cabinet production with fully assembled DIN rails just-in-time.

Additional information:

Find out more about COMPLETE line and your comprehensive solutions for the control cabinet. Visit our website:

phoenixcontact.com/completeline

S-PORT
PROFIBUS "SUB D"
PWR
DAT
ERR
BF
SF
RESET/
SET
S-PORT
PWR
DAT
ERR
L
R
RESET/
SET
PWR
ERR
INIT
ON
RESET/
SET
max. 9 A
PWR
DAT
DIAG
L
R
RESET/
SET
max. 9 A
PWR
ERR
L
R
RESET/
SET

Electronic switchgear and motor control

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

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

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 active power measurement. The process data in all popular fieldbus systems can be supplied with the gateway and evaluated by a controller.

Product range overview

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Motor management

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Electronic motor management (EMM)

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

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

Power within limits

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

This state can only be deactivated via a defined reset. If the effective power consumed is determined as being above or below the signaling thresholds, all that occurs is that a check-back is returned for the duration for which the module was addressed.

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

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

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

Interface system

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

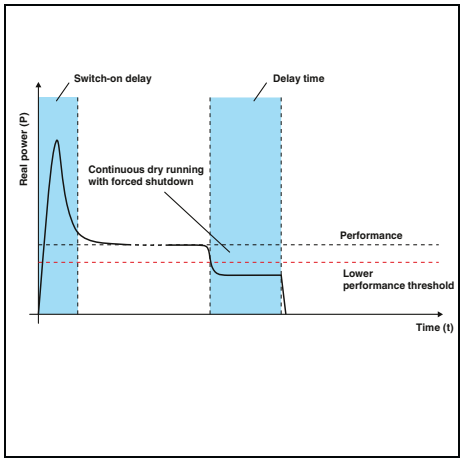
Interface system properties:

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

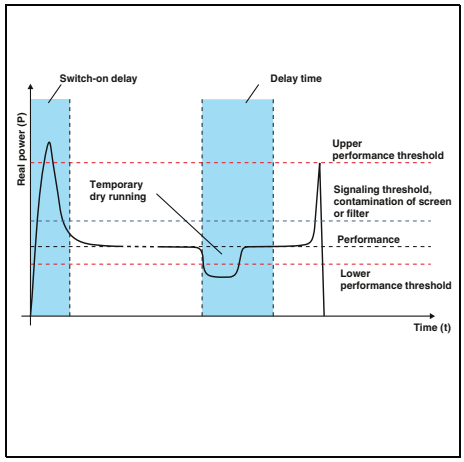
Protection against dry running, blocking, and cavitation, warning thresholds to indicate filter contamination.

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

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

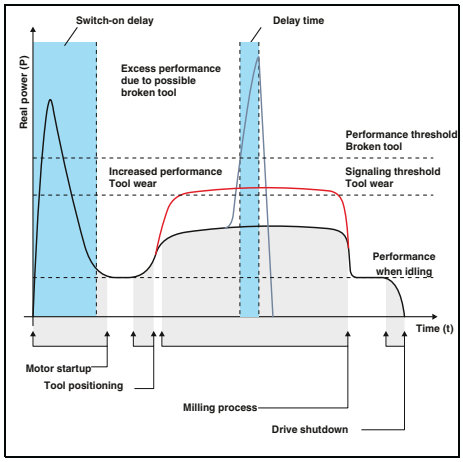


In the case of motor-driven pumps, the lower performance threshold provides reliable protection against hazardous dry running.



Forced shutdown of the drive is delayed by the "delay time".

This prevents forced shutdown in the event of air bubbles.



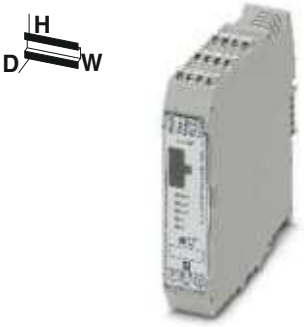
Machine tools are monitored and protected in a similar way when drilling, milling or grinding. If the feed value on a milling machine is set too high, a tool may break in the worst-case scenario. The power threshold, configured accordingly, can be used to resolve this issue.

Additionally, a signaling threshold signals tool wear in advance.

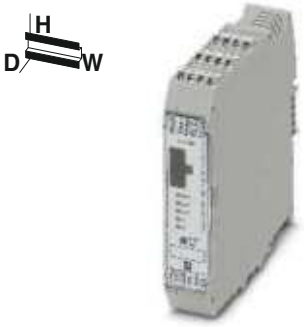
Electronic motor management

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

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

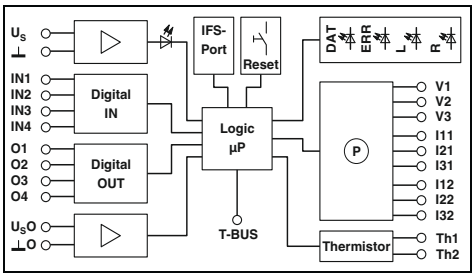


Allows the use of external current transformers



With integrated current transformers

Ex:



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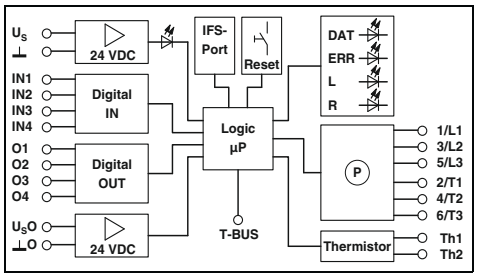


Technical data

Input data				
Rated control supply voltage U_S	24 V DC	230 V AC	24 V DC	230 V AC
Control supply voltage range	19.2 V DC ... 30 V DC	92 V AC ... 253 V AC	19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
Rated control supply current I_S at U_S	25 mA	10 mA	25 mA	10 mA
Input data, digital inputs	EMM 3- 24DC/500AC-IFS	EMM 3-230AC/500AC-IFS	EMM 3- 24DC/500AC-16-IFS	EMM 3-230AC/500AC-16-IFS
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	42 V AC ... 575 V AC	42 V AC ... 575 V AC
Nominal current, voltage measuring input	<0.5 mA	<0.5 mA	<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 data, checkback contacts				
O1 - O4 in the case of 1 signal	24 V DC (semiconductor output) / 500 mA	230 V AC (relay output) / 500 mA	24 V DC (semiconductor output) / 500 mA	230 V AC (relay output) / 500 mA
General data				
Rated insulation voltage	500 V		500 V	
Rated surge voltage	6 kV	6 kV	6 kV	6 kV
Ambient temperature (operation)	-25°C ... 70°C		-25°C ... 70°C	
Standards/regulations	DIN EN 50178 / EN 60947 / EN 60947-4-2		DIN EN 50178 / EN 60947 / EN 60947-4-2	
Degree of protection in accordance with IEC 60529/EN 60529	IP20		IP20	
Mounting position	Vertical (horizontal DIN rail)		Vertical (horizontal DIN rail)	
Screw connection rigid / flexible / AWG	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14		0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14	
Dimensions W / H / D	22.5 mm / 99 mm / 114.5 mm		22.5 mm / 99 mm / 114.5 mm	
EMC note	Class A product, see page 583		Class A product, see page 583	

Ordering data

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

Accessories

Configuration package for the EMM...IFS, comprising CONTACTRON-DTM-IFS, USB programming adapter, and user manual on CD	**MM-CONF-SET**	2297992	1
Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
DIN rail connector	**ME 22,5 TBUS 1,5/ 5-ST-3,81 GY**	2201937	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**	2986122	1
- Tall design	**IFS-CONFSTICK-L**	2901103	1
MINI COMBICON connectors			
- Female contact	**MC 1,5/ 5-ST-3,81**	1803604	250
- Male contact	**IMC 1,5/ 5-ST-3,81**	1857919	50

Technical data

Input data		
Rated control supply voltage U_S	24 V DC	230 V AC
Control supply voltage range	19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
Rated control supply current I_S at U_S	25 mA	10 mA
Input data, digital inputs	EMM 3- 24DC/500AC-16-IFS	EMM 3-230AC/500AC-16-IFS
Number of inputs	4 (IN1 - IN4)	4 (IN1 - IN4)
Rated actuating voltage U_C	24 V DC	230 V AC
Rated actuating current I_C	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	max. 16 A	max. 16 A
Output data, checkback contacts		
O1 - O4 in the case of 1 signal	24 V DC (semiconductor output) / 500 mA	230 V AC (relay output) / 500 mA
General data		
Rated insulation voltage	500 V	
Rated surge voltage	6 kV	6 kV
Ambient temperature (operation)	-25°C ... 70°C	
Standards/regulations	DIN EN 50178 / EN 60947 / EN 60947-4-2	
Degree of protection in accordance with IEC 60529/EN 60529	IP20	
Mounting position	Vertical (horizontal DIN rail)	
Screw connection rigid / flexible / AWG	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14	
Dimensions W / H / D	22.5 mm / 99 mm / 114.5 mm	
EMC note	Class A product, see page 583	

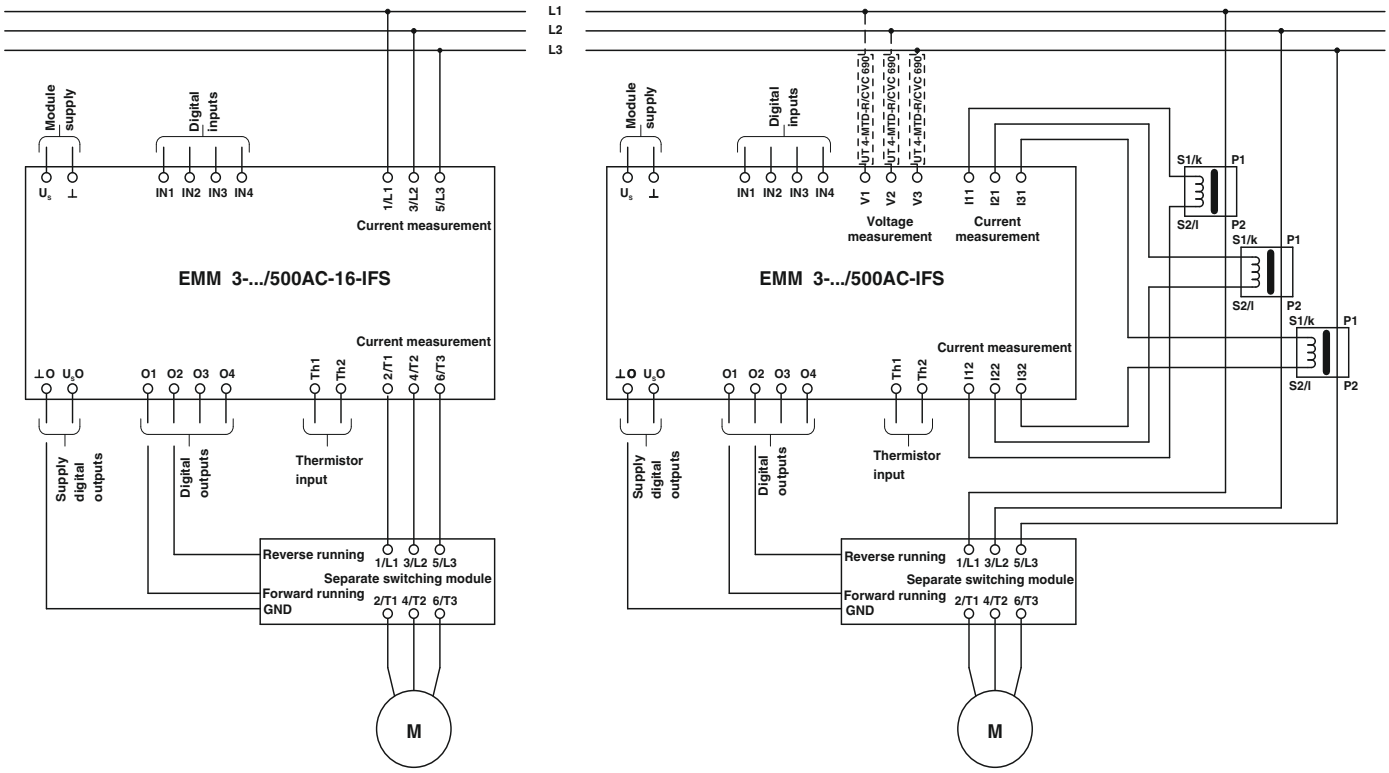
Ordering data

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

Accessories

MM-CONF-SET	2297992	1
IFS-USB-PROG-ADAPTER	2811271	1
ME 22,5 TBUS 1,5/ 5-ST-3,81 GY	2201937	50
IFS-CONFSTICK	2986122	1
IFS-CONFSTICK-L	2901103	1
MC 1,5/ 5-ST-3,81	1803604	250
IMC 1,5/ 5-ST-3,81	1857919	50

Electronic motor management



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

Up to 8 freely configurable switching, signaling 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, active, and reactive power
– Currents and voltages
– Phase angle
– Switching-cycle and operating-hour meters
– Power meter

Additional functions:

– Adjustable Class 5-40 bimetal function
– Thermistor monitoring
– Recording measured values
– GATEWAY connection via DIN rail connector
– Pre-configured motor feeders such as reversing starters, star-delta starters, etc.

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

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

Current transformer

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

DIN rail connectors

The DIN rail connector (Order No. 2201937) is used to supply several EMMs with 24 V DC or to couple up to 32 EMMs to the EM-PROFINET-GATEWAY-IFS, for example.

Switching element

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

Electronic machine management

Phoenix Contact's electronic motor and machine management combines precise energy measurement with display and monitoring for important parameters for motors, machines or other 3-phase loads.

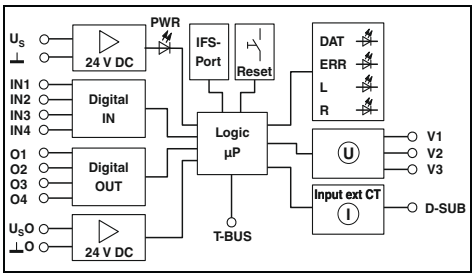
– Flexible use in the central control cabinet and in the decentral control box
– Increased system availability, thanks to predictive maintenance based on process data
– Continuous monitoring of mixed loads within an application
– Connects directly via DIN rail connector interfaces to all standard fieldbus systems

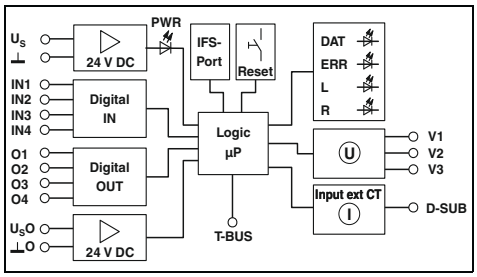
new

With external current transformers up to 90 A

new

With external current transformers up to 160 A





Technical data

Input data			
Rated control supply voltage U_S		24 V DC	24 V DC
Control supply voltage range		19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC
Rated control supply current I_S at U_S		33 mA	33 mA
Input data, digital inputs			
Number of inputs		4 (IN1 - IN4)	4 (IN1 - IN4)
Rated actuating voltage U_C		24 V DC	24 V DC
Rated actuating current I_C		3.3 mA	3.3 mA
Power measurement			
Voltage measuring input		-	-
Nominal current, voltage measuring input		-	-
Current measuring input		-	-
Output data, checkback contacts			
O1 - O4 in the case of 1 signal		24 V DC (semiconductor output) / 500 mA	24 V DC (semiconductor output) / 500 mA
General data			
Rated insulation voltage		500 V	500 V
Rated surge voltage		6 kV	6 kV
Ambient temperature (operation)		-25°C ... 50°C	-25°C ... 70°C
Standards/regulations		EN 60947-1 / EN 60947-4-2 / EN 61000-6-2 / EN 61000-6-3	EN 60947-1 / EN 60947-4-2 / EN 61000-6-2 / EN 61000-6-3
Degree of protection in accordance with IEC 60529/EN 60529		IP20	IP20
Mounting position		Any	Any
Screw connection rigid / flexible / 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						
– With external current transformers (90 A)	**EMM 3-24DC/500AC-90-EXM-IFS**	2908602	1			
– With external current transformers (160 A)				**EMM 3-24DC/500AC-160-EXM-IFS**	2908603	1

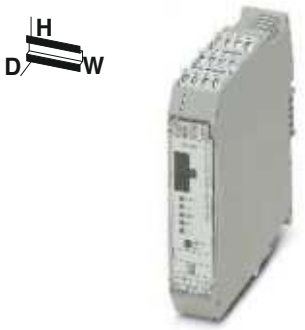
Accessories

Configuration package for the EMM...IFS, comprising CONTACTRON-DTM-IFS, USB programming adapter, and user manual on CD	**MM-CONF-SET**	2297992	1	**MM-CONF-SET**	2297992	1
Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1	**IFS-USB-PROG-ADAPTER**	2811271	1
DIN rail connector	**ME 22,5 TBUS 1,5/ 5-ST-3,81 GY**	2201937	50	**ME 22,5 TBUS 1,5/ 5-ST-3,81 GY**	2201937	50
Assembled shielded round cable						
- 0.5 m	**CABLE-D 9SUB/B/S/ 50/KONFEK/S**	2299987	1	**CABLE-D 9SUB/B/S/ 50/KONFEK/S**	2299987	1
- 1.0 m	**CABLE-D 9SUB/B/S/100/KONFEK/S**	2299990	1	**CABLE-D 9SUB/B/S/100/KONFEK/S**	2299990	1
- 1.5 m	**CABLE-D 9SUB/B/S/150/KONFEK/S**	2300009	1	**CABLE-D 9SUB/B/S/150/KONFEK/S**	2300009	1
- 2.0 m	**CABLE-D 9SUB/B/S/200/KONFEK/S**	2302010	1	**CABLE-D 9SUB/B/S/200/KONFEK/S**	2302010	1
- 3.0 m	**CABLE-D 9SUB/B/S/300/KONFEK/S**	2302023	1	**CABLE-D 9SUB/B/S/300/KONFEK/S**	2302023	1
Multi-functional memory block for the Interface system						
- Flat design	**IFS-CONFSTICK**	2986122	1	**IFS-CONFSTICK**	2986122	1

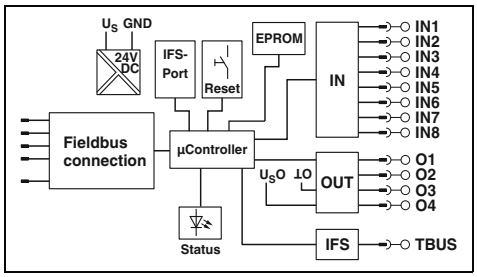
IFS gateways for Interface system devices

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

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



IFS gateway



Technical data

Input data		
Rated control supply voltage U_S		24 V DC -20% ... +25%
Rated control supply current I_S		85 mA (plus load current of the outputs)
Input circuit		Reverse polarity protection
Digital inputs		
Number of inputs		8
Rated actuating voltage U_C		24 V DC ±20%
Rated actuating current I_C		3 mA
Input circuit		Reverse polarity protection
Digital outputs		
Number of outputs		4
Maximum switching voltage		23 V DC (U_B - $U_{resid.}$ of the output)
Max. switching current		500 mA
Residual voltage		1 V
Output protection		Parallel protection against polarity reversal, note fusing
General data		
Ambient temperature (operation)		-35°C ... 50°C
Nominal operating mode		100% operating factor
Standards/regulations		EN 50178
Degree of protection		IP20
Mounting position/mounting		Any / in rows with zero spacing
Connection data solid/stranded/AWG		0.2 ... 2 mm² / 0.2 ... 2.5 mm² / 12 - 24
Dimensions	W / H / D	22.5 mm / 99 mm / 114.5 mm
EMC note		Class A product, see page 583

Ordering data

Description	Type	Order No.	Pcs./Pkt.
IFS gateway for			
PROFIBUS DP	**EM-PB-GATEWAY-IFS**	2297620	1
Modbus/TCP	**EM-MODBUS-GATEWAY-IFS**	2901528	1
CANopen®	**EM-CAN-GATEWAY-IFS**	2901504	1
PROFINET	**EM-PNET-GATEWAY-IFS**	2904472	1
EtherNet/IP™	**EM-ETH-GATEWAY-IFS**	2901988	1

Accessories

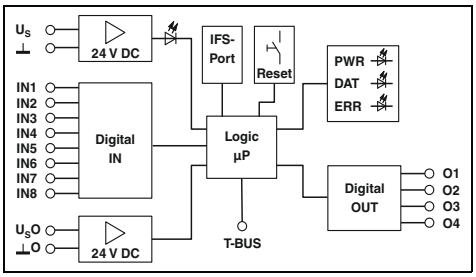
Configuration package for the EMM...IFS, comprising CONTACTRON-DTM-IFS, USB programming adapter, and user manual on CD	**MM-CONF-SET**	2297992	1
Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
DIN rail connector	**ME 22,5 TBUS 1,5/ 5-ST-3,81 GY**	2201937	50
MINI COMBICON connectors			
- Female contact	**MC 1,5/ 5-ST-3,81**	1803604	250
- Male contact	**IMC 1,5/ 5-ST-3,81**	1857919	50

IFS extension modules for the Interface system

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

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

IFS extension module



Technical data

Input data		
Rated control supply voltage U_S		24 V DC -20% ... +25%
Rated control supply current I_S		85 mA (plus load current of the outputs)
Input circuit		Reverse polarity protection
Digital inputs		
Number of inputs		8
Rated actuating voltage U_C		24 V DC ±20%
Rated actuating current I_C		3 mA
Input circuit		Reverse polarity protection
Digital outputs		
Number of outputs		4
Maximum switching voltage		23 V DC (U_B - $U_{resid.}$ of the output)
Max. switching current		500 mA (per output)
Residual voltage		1 V
Output protection		Parallel protection against polarity reversal, note fusing
General data		
Ambient temperature (operation)		-35°C ... 50°C
Nominal operating mode		100% operating factor
Standards/regulations		EN 61131-2
Degree of protection		IP20
Mounting position/mounting		Any / in rows with zero spacing
Connection data solid/stranded/AWG		0.2 ... 2 mm² / 0.2 ... 2.5 mm² / 12 - 24
Dimensions	W / H / D	22.5 mm / 99 mm / 114.5 mm

Ordering data

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

Accessories

Configuration package for the EMM...IFS, comprising CONTACTRON-DTM-IFS, USB programming adapter, and user manual on CD	**MM-CONF-SET**	2297992	1
Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
DIN rail connector	**ME 22,5 TBUS 1,5/ 5-ST-3,81 GY**	2201937	50
MINI COMBICON connectors			
- Female contact	**MC 1,5/ 5-ST-3,81**	1803604	250
- Male contact	**IMC 1,5/ 5-ST-3,81**	1857919	50

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

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

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

Switch motors safely and reliably with compact hybrid motor starters.

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

Hybrid motor 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 rail and 60 mm busbar systems.

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

Network-capable hybrid motor starters with reversing function

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

Featuring the following advantages:

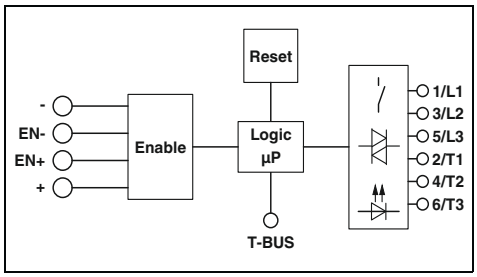
– Bus connection via Interface system (IFS) or via IO-Link
– Diagnostic functions using process data
– Reduced wiring effort
– Bi-metal function, adjustable up to 9 A
– Long service life
– Space-saving
– 3-phase loop bridging

Safety level in accordance with:

– IEC 61508-1: SIL 3
– ISO 13849: PL e

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

Motor protection, emergency stop and Interface system support



Technical data

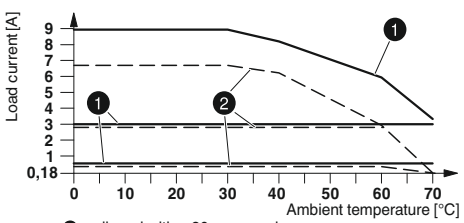
Input data		
Rated control supply voltage U_S		24 V DC
Control supply voltage range		19.2 V DC ... 30 V DC
Rated control supply current I_S at U_S		60 mA
Rated actuating voltage U_C EN+		24 V DC
Actuating voltage range		19.2 V DC ... 30 V DC
Rated actuating current I_C at U_C		7 mA
Input circuit		Surge protection, reverse polarity protection
Operating voltage / status / error indicator		Green LED / Yellow LED / Red LED
Output data load side		
Operating voltage range		42 V AC ... 550 V AC
Output protection		Surge protection
General data		
Rated insulation voltage		550 V
Rated surge voltage		6 kV
Ambient temperature (operation)		-5°C ... 60°C (observe derating)
Standards/regulations		IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849
Mounting position		Vertical (horizontal DIN rail, motor output below)
Mounting		Alignable, for spacing see derating
Connection data solid/stranded/AWG		0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
Dimensions	W / H / D	22.5 mm / 106.6 mm / 113.7 mm

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Load current 0.075 A ... 0.6 A			
Screw connection	**ELR H5-IES-SC/500AC-06-IFS**	2905151	1
Push-in connection	**ELR H5-IES-PT/500AC-06-IFS**	2905138	1
Load current 0.18 A ... 3 A			
Screw connection	**ELR H5-IES-SC/500AC-3-IFS**	2905152	1
Push-in connection	**ELR H5-IES-PT/500AC-3-IFS**	2905139	1
Load current 1.5 A ... 9 A			
Screw connection	**ELR H5-IES-SC/500AC-9-IFS**	2905153	1
Push-in connection	**ELR H5-IES-PT/500AC-9-IFS**	2905140	1

Accessories

DIN rail connector	**ME 22,5 TBUS 1,5/ 5-ST-3,81 GY**	2201937	50

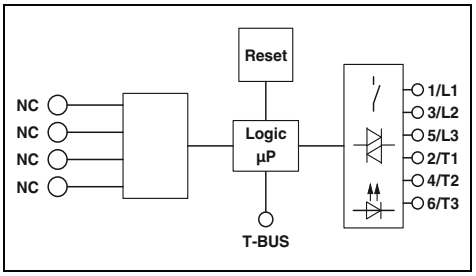


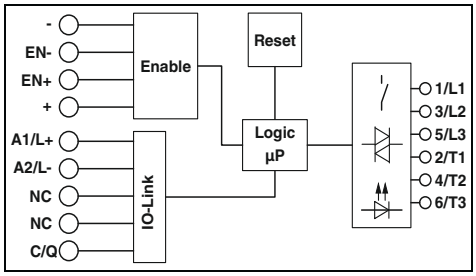
❶ = aligned with > 20 mm spacing
❷ = aligned without spacing

Derating curve

Motor protection and Interface system support

Motor protection, emergency stop and IO-Link support





Technical data

Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption	60 mA
Power dissipation	-
Power loss	-
Power loss	-
Protective circuit	Surge protection, reverse polarity protection
Status indicator	Green LED / Yellow LED / Red LED
Output voltage	42 V AC ... 550 V AC
Protective circuit	Surge protection
Rated voltage	550 V
Rated surge voltage	6 kV
Ambient temperature (operation)	-5°C ... 60°C (observe derating)
Conformance with standard	IEC 60947-1 / EN 60947-4-2
Mounting position	Vertical (horizontal DIN rail, motor output below)
Mounting	Alignable, for spacing see derating
Connection data	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
Dimensions	22.5 mm / 106.6 mm / 113.7 mm

Ordering data

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

Accessories

ME 22,5 TBUS 1,5/ 5-ST-3,81 GY	**2201937**	50

Technical data

Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC
Current consumption	65 mA
Power dissipation	24 V DC
Power loss	19.2 V DC ... 30 V DC
Power loss	7 mA
Protective circuit	Surge protection, reverse polarity protection
Status indicator	Green LED / Yellow LED / Red LED
Output voltage	42 V AC ... 550 V AC
Protective circuit	Surge protection
Rated voltage	550 V
Rated surge voltage	6 kV
Ambient temperature (operation)	-5°C ... 55°C (observe derating)
Conformance with standard	IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849
Mounting position	Vertical (horizontal DIN rail, motor output below)
Mounting	Alignable, for spacing see derating
Connection data	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
Dimensions	22.5 mm / 126.8 mm / 113.7 mm

Ordering data

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

Accessories

Modular hybrid motor starters with reversing function

In addition to the functions forward running, reverse running, motor protection, and emergency stop up to SIL 3/PL e, these modular 3-phase hybrid motor starters offer additional advantages such as:

– Safe group switch-off
– Modular expansion option
– Wiring and cost savings with DIN rail connector
– Slow tripping characteristic curve Class 10 up to 3 A

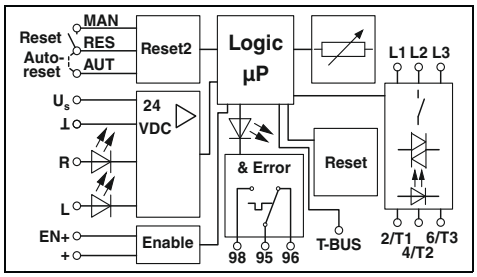
Safety level in accordance with:

– IEC 61508-1: SIL 3
– ISO 13849: PL e

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

new

Motor protection, emergency stop



Technical data

Input data		
Rated control supply voltage U_S		24 V DC
Control supply voltage range		19.2 V DC ... 30 V DC
Rated control supply current I_S at U_S		60 mA
Rated actuating voltage U_C EN+		24 V DC
Actuating voltage range		19.2 V DC ... 30 V DC
Rated actuating current I_C at U_C		7 mA
Input circuit		Surge protection, reverse polarity protection
Operating voltage / status / error indicator		Green LED / Yellow LED / Red LED
Output data load side		
Operating voltage range		42 V AC ... 550 V AC
Output protection		Surge protection
General data		
Rated insulation voltage		550 V
Rated surge voltage		6 kV
Ambient temperature (operation)		-25°C ... 70°C (observe derating)
Standards/regulations		EN 60947-1 / EN 60947-4-2 / EN 50495 / EN ISO 13849 / IEC 62061 / IEC 61508
Mounting position		Vertical (horizontal DIN rail, motor output below)
Mounting		Alignable, for spacing see derating
Connection data solid/stranded/AWG		0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
Dimensions	W / H / D	22.5 mm / 107.4 mm / 113.7 mm

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Load current 0.18 A ... 3 A			
Screw connection			
Push-in connection	**ELR H5-IES-PT- 24DC/500AC-3-P**	2909556	1
Load current 1.5 A ... 9 A			
Screw connection			
Push-in connection	**ELR H5-IES-PT- 24DC/500AC-9-P**	2909554	1

Accessories

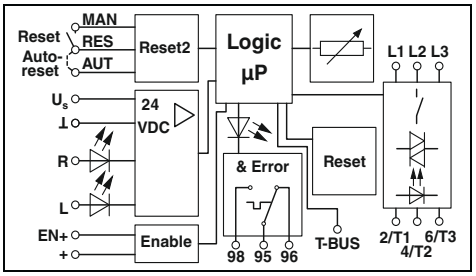
Extension module			
Screw connection	**EM-2RSC/21AU-R/L-P**	2908701	1
Push-in connection	**EM-2RPT/21AU-R/L-P**	2909573	1
Safety relay with interface for DIN rail connectors			
Screw connection	**PSR-MC38-2NO-1DO-24DC-SC**	1009831	1
Push-in connection	**PSR-MC38-2NO-1DO-24DC-PI**	1009832	1
DIN rail connector			
- For modular hybrid motor starters	**ELR-TBUS-22,5-P**	2203861	10
- For safety relay modules	**PSR-TBUS**	2890425	50

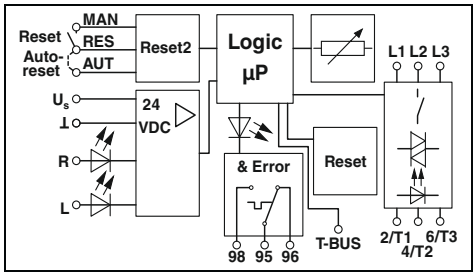
new

Motor protection, emergency stop

new

Motor protection





Technical data

24 V DC	24 V DC
19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC
60 mA	60 mA
24 V DC	24 V DC
19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC
7 mA	7 mA
Surge protection, reverse polarity protection	Surge protection, reverse polarity protection
Green LED / Yellow LED / Red LED	Green LED / Yellow LED / Red LED
42 V AC ... 550 V AC	42 V AC ... 550 V AC
-	-
550 V	550 V
6 kV	6 kV
-25°C ... 70°C (observe derating)	-25°C ... 55°C (observe derating)
EN 60947-1 / EN 60947-4-2 / EN ISO 13849 / IEC 62061 / IEC 61508	IEC 60947-1 / EN 60947-4-2
Vertical (horizontal DIN rail, motor output below)	Vertical (horizontal DIN rail, motor output below)
Alignable, for spacing see derating	Alignable, for spacing see derating
0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
22.5 mm / 106.6 mm / 113.7 mm	22.5 mm / 106.6 mm / 113.7 mm

Ordering data

Type	Order No.	Pcs./Pkt.
ELR H5-IS-SC- 24DC/500AC-3-P	2908699	1
ELR H5-IS-PT- 24DC/500AC-3-P	2909569	1
ELR H5-IS-SC- 24DC/500AC-9-P	2908697	1
ELR H5-IS-PT- 24DC/500AC-9-P	2909567	1

Accessories

EM-2RSC/21AU-R/L-P	2908701	1
EM-2RPT/21AU-R/L-P	2909573	1

Ordering data

Type	Order No.	Pcs./Pkt.
ELR H5-I-SC- 24DC/500AC-3-P	2908695	1
ELR H5-I-PT- 24DC/500AC-3-P	2909562	1
ELR H5-I-SC- 24DC/500AC-9-P	2908693	1
ELR H5-I-PT- 24DC/500AC-9-P	2909560	1

Accessories

EM-2RSC/21AU-R/L-P	2908701	1
EM-2RPT/21AU-R/L-P	2909573	1

Hybrid motor starters with reversing function

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

Featuring the following advantages:

– 22.5 mm wide
– Reduced wiring effort
– Bi-metal function, adjustable up to 9 A
– Long service life
– Space-saving
– 3-phase loop bridging

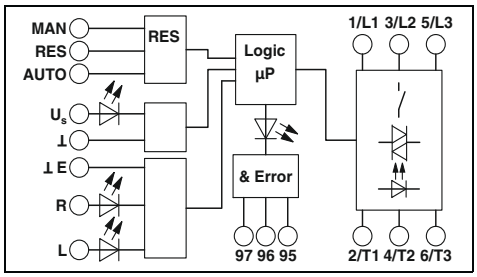
Safety level in accordance with:

– IEC 61508-1: SIL 3
– ISO 13849: PL e

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

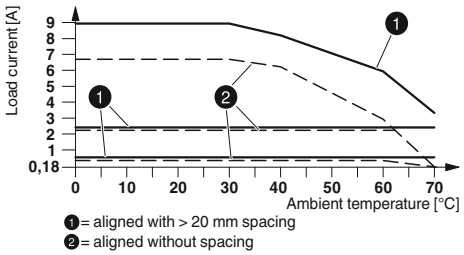
Motor protection and emergency stop

Ex:



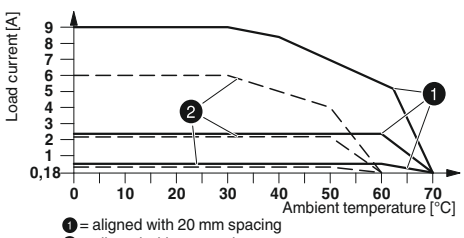
Technical data

Input data		
Rated control supply voltage U_S	24 V DC	230 V AC
Control supply voltage range	19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
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
Actuating voltage range	19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
Rated actuating current I_C at U_C	5 mA (input type 1)	7 mA (input type 1)
Input circuit	Surge protection, reverse polarity protection	Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED	
Output data load side		
Operating voltage range	42 V AC ... 550 V AC	42 V AC ... 550 V AC
Output protection	Surge protection	
General data		
Rated insulation voltage	500 V	
Rated surge voltage	6 kV	4 kV
Ambient temperature (operation)	-25°C ... 70°C (observe derating)	
Standards/regulations	IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849	
Mounting position	Vertical (horizontal DIN rail, motor output below)	
Mounting	Alignable, for spacing see derating	
Connection data solid/stranded/AWG	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14	
Dimensions W / H / D	22.5 mm / 106.6 mm / 113.7 mm	



❶ = aligned with > 20 mm spacing
❷ = aligned without spacing

Derating curve for ELR H5...24DC...

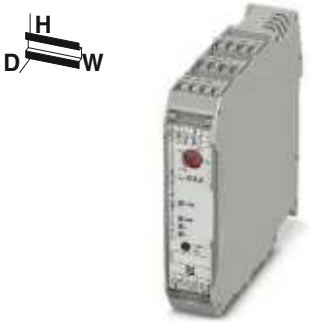


❶ = aligned with 20 mm spacing
❷ = aligned without spacing

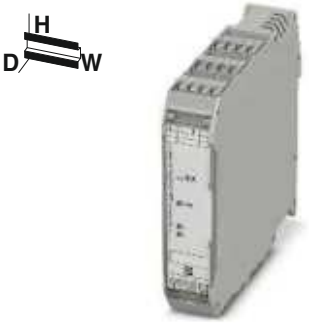
Derating curve for ELR H5...230AC...

Ordering data

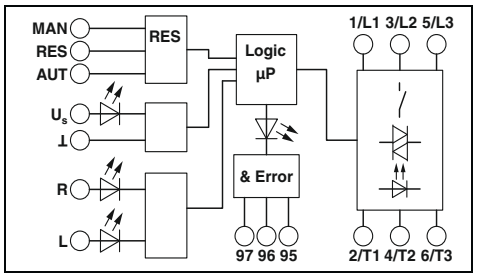
Description	Type	Order No.	Pcs./Pkt.
Load current 0.075 A ... 0.6 A			
Screw connection	**ELR H5-IES-SC- 24DC/500AC-0,6**	2900582	1
Push-in connection	**ELR H5-IES-PT- 24DC/500AC-0,6**	2903902	1
Load current 0.18 A ... 2.4 A			
Screw connection	**ELR H5-IES-SC- 24DC/500AC-2**	2900414	1
Push-in connection	**ELR H5-IES-PT- 24DC/500AC-2**	2903904	1
Screw connection	**ELR H5-IES-SC-230AC/500AC-2**	2900420	1
Load current 1.5 A ... 9 A			
Screw connection	**ELR H5-IES-SC- 24DC/500AC-9**	2900421	1
Push-in connection	**ELR H5-IES-PT- 24DC/500AC-9**	2903906	1
Screw connection	**ELR H5-IES-SC-230AC/500AC-9**	2900422	1
Load current 0 A ... 9 A			
Screw connection			
Screw connection			

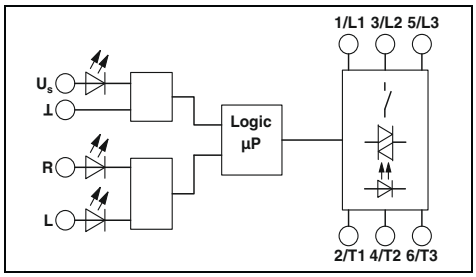


Motor protection



Reversing function only





Technical data

24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
40 mA	4 mA
24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
5 mA (input type 1)	7 mA (input type 1)
Surge protection, reverse polarity protection	Surge protection
Green LED / Yellow LED / Red LED	
42 V AC ... 550 V AC	42 V AC ... 550 V AC
Surge protection	
500 V	
6 kV	4 kV
-25°C ... 70°C (observe derating)	
IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849	
Vertical (horizontal DIN rail, motor output below)	
Alignable, for spacing see derating	
0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14	
22.5 mm / 106.6 mm / 113.7 mm	

Ordering data

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

Technical data

24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
40 mA	4 mA
24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
5 mA (input type 1)	7 mA (input type 1)
Surge protection, reverse polarity protection	Surge protection
Green LED / Yellow LED / -	
42 V AC ... 550 V AC	42 V AC ... 550 V AC
Surge protection	
500 V	
6 kV	4 kV
-25°C ... 70°C (observe derating)	
IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849	
Vertical (horizontal DIN rail, motor output below)	
Alignable, for spacing see derating	
0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14	
22.5 mm / 106.6 mm / 113.7 mm	

Ordering data

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

Network-capable hybrid motor starters with direct start function

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

Featuring the following advantages:

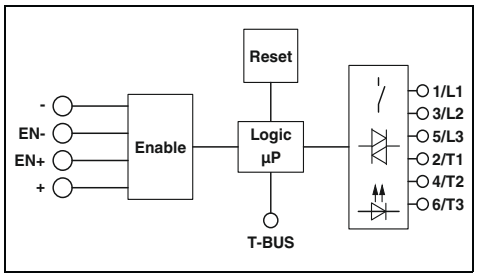
– Bus connection via Interface system (IFS) or via IO-Link
– Diagnostic functions using process data
– Reduced wiring effort
– Bi-metal function, adjustable up to 9 A
– Long service life
– Space-saving
– 3-phase loop bridging

Safety level in accordance with:

– IEC 61508-1: SIL 3
– ISO 13849: PL e

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

Motor protection, emergency stop and Interface system support



Technical data

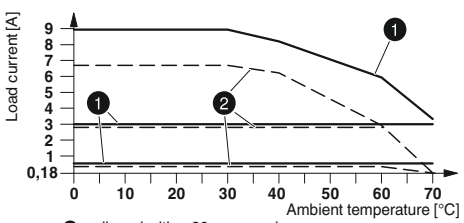
Input data		
Rated control supply voltage U_S		24 V DC
Control supply voltage range		19.2 V DC ... 30 V DC
Rated control supply current I_S at U_S		60 mA
Rated actuating voltage U_C EN+		24 V DC
Actuating voltage range		19.2 V DC ... 30 V DC
Rated actuating current I_C at U_C		7 mA
Input circuit		Surge protection, reverse polarity protection
Operating voltage / status / error indicator		Green LED / Yellow LED / Red LED
Output data load side		
Operating voltage range		42 V AC ... 550 V AC
Output protection		Surge protection
General data		
Rated insulation voltage		550 V
Rated surge voltage		6 kV
Ambient temperature (operation)		-5°C ... 60°C (observe derating)
Standards/regulations		IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849
Mounting position		Vertical (horizontal DIN rail, motor output below)
Mounting		Alignable, for spacing see derating
Connection data solid/stranded/AWG		0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
Dimensions	W / H / D	22.5 mm / 106.6 mm / 113.7 mm

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Load current 0.075 A ... 0.6 A			
Screw connection	**ELR H3-IES-SC/500AC-06-IFS**	2905154	1
Push-in connection	**ELR H3-IES-PT/500AC-06-IFS**	2905141	1
Load current 0.18 A ... 3 A			
Screw connection	**ELR H3-IES-SC/500AC-3-IFS**	2905155	1
Push-in connection	**ELR H3-IES-PT/500AC-3-IFS**	2905142	1
Load current 1.5 A ... 9 A			
Screw connection	**ELR H3-IES-SC/500AC-9-IFS**	2905156	1
Push-in connection	**ELR H3-IES-PT/500AC-9-IFS**	2905143	1

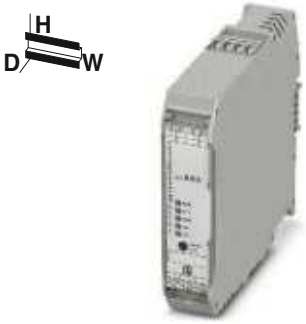
Accessories

DIN rail connector	**ME 22,5 TBUS 1,5/ 5-ST-3,81 GY**	2201937	50

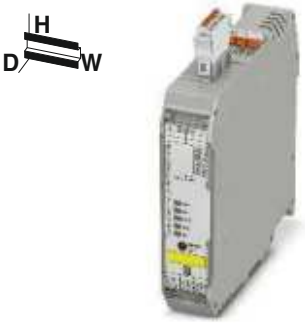


❶ = aligned with > 20 mm spacing
❷ = aligned without spacing

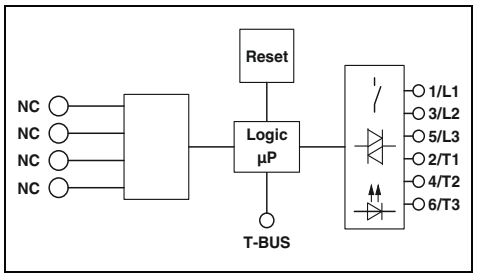
Derating curve

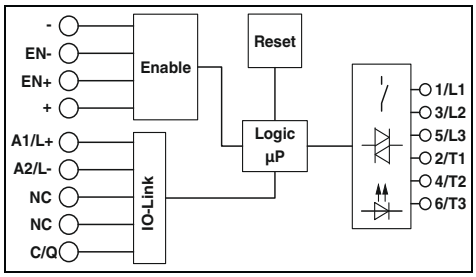


Motor protection and Interface system support



Motor protection, emergency stop and IO-Link support





Technical data

24 V DC	24 V DC
19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC
60 mA	65 mA
-	24 V DC
-	19.2 V DC ... 30 V DC
-	7 mA
Surge protection, reverse polarity protection	Surge protection, reverse polarity protection
Green LED / Yellow LED / Red LED	Green LED / Yellow LED / Red LED
42 V AC ... 550 V AC	42 V AC ... 550 V AC
Surge protection	Surge protection
550 V	550 V
6 kV	6 kV
-5°C ... 60°C (observe derating)	-5°C ... 55°C (observe derating)
IEC 60947-1 / EN 60947-4-2	IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849
Vertical (horizontal DIN rail, motor output below)	Vertical (horizontal DIN rail, motor output below)
Alignable, for spacing see derating	Alignable, for spacing see derating
0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
22.5 mm / 106.6 mm / 113.7 mm	22.5 mm / 126.8 mm / 113.7 mm

Ordering data

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

Accessories

ME 22,5 TBUS 1,5/ 5-ST-3,81 GY	2201937	50

Ordering data

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

Accessories

Modular hybrid motor starters with direct start function

In addition to the functions forward running, motor protection, and emergency stop up to SIL 3/PL e, these modular 3-phase hybrid motor starters offer additional advantages such as:

– Safe group switch-off
– Modular expansion option
– Wiring and cost savings with DIN rail connector
– Slow tripping characteristic curve Class 10 up to 3 A

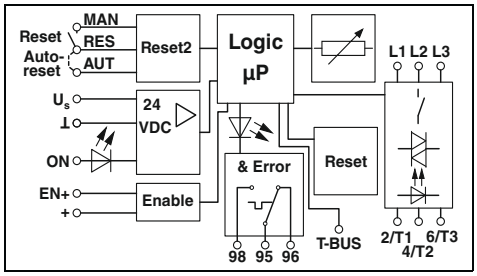
Safety level in accordance with:

– IEC 61508-1: SIL 3
– ISO 13849: PL e

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

new

Motor protection, emergency stop



Technical data

Input data		
Rated control supply voltage U_S		24 V DC
Control supply voltage range		19.2 V DC ... 30 V DC
Rated control supply current I_S at U_S		60 mA
Rated actuating voltage U_C EN+		24 V DC
Actuating voltage range		19.2 V DC ... 30 V DC
Rated actuating current I_C at U_C		7 mA
Input circuit		Surge protection, reverse polarity protection
Operating voltage / status / error indicator		Green LED / Yellow LED / Red LED
Output data load side		
Operating voltage range		42 V AC ... 550 V AC
Output protection		Surge protection
General data		
Rated insulation voltage		550 V
Rated surge voltage		6 kV
Ambient temperature (operation)		-25°C ... 70°C (observe derating)
Standards/regulations		EN 60947-1 / EN 60947-4-2 / EN 50495 / EN ISO 13849 / IEC 62061 / IEC 61508
Mounting position		Vertical (horizontal DIN rail, motor output below)
Mounting		Alignable, for spacing see derating
Connection data solid/stranded/AWG		0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
Dimensions	W / H / D	22.5 mm / 107.4 mm / 113.7 mm

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Load current 0.18 A ... 3 A			
Screw connection			
Push-in connection	**ELR H3-IES-PT- 24DC/500AC-3-P**	2909557	1
Load current 1.5 A ... 9 A			
Screw connection			
Push-in connection	**ELR H3-IES-PT- 24DC/500AC-9-P**	2909555	1

Accessories

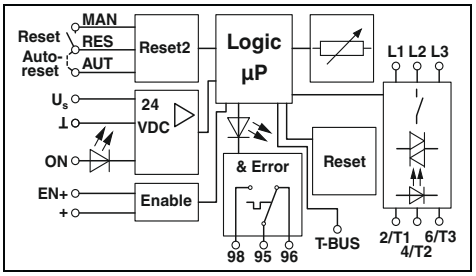
Extension module			
Screw connection	**EM-2RSC/21AU-R/L-P**	2908701	1
Push-in connection	**EM-2RPT/21AU-R/L-P**	2909573	1
Safety relay with interface for DIN rail connectors			
Screw connection	**PSR-MC38-2NO-1DO-24DC-SC**	1009831	1
Push-in connection	**PSR-MC38-2NO-1DO-24DC-PI**	1009832	1
DIN rail connector			
- For modular hybrid motor starters	**ELR-TBUS-22,5-P**	2203861	10
- For safety relay modules	**PSR-TBUS**	2890425	50

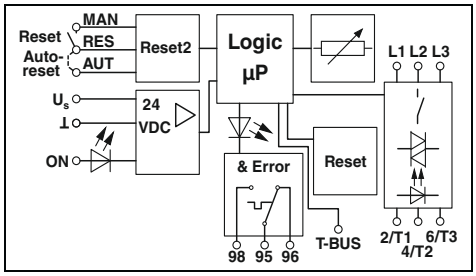
new

Motor protection, emergency stop

new

Motor protection





Technical data

24 V DC	24 V DC
19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC
60 mA	60 mA
24 V DC	24 V DC
19.2 V DC ... 30 V DC	19.2 V DC ... 30 V DC
7 mA	7 mA
Surge protection, reverse polarity protection	Surge protection, reverse polarity protection
Green LED / Yellow LED / Red LED	Green LED / Yellow LED / Red LED
42 V AC ... 550 V AC	42 V AC ... 550 V AC
-	-
550 V	550 V
6 kV	6 kV
-25°C ... 70°C (observe derating)	-25°C ... 70°C (observe derating)
EN 60947-1 / EN 60947-4-2 / EN ISO 13849 / IEC 62061 / IEC 61508	EN 60947-1 / EN 60947-4-2
Vertical (horizontal DIN rail, motor output below)	Vertical (horizontal DIN rail, motor output below)
Alignable, for spacing see derating	Alignable, for spacing see derating
0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
22.5 mm / 106.6 mm / 113.7 mm	22.5 mm / 106.6 mm / 113.7 mm

Ordering data

Type	Order No.	Pcs./Pkt.
ELR H3-IS-SC- 24DC/500AC-3-P	2908700	1
ELR H3-IS-PT- 24DC/500AC-3-P	2909570	1
ELR H3-IS-SC- 24DC/500AC-9-P	2908698	1
ELR H3-IS-PT- 24DC/500AC-9-P	2909568	1

Accessories

EM-2RSC/21AU-R/L-P	2908701	1
EM-2RPT/21AU-R/L-P	2909573	1

Ordering data

Type	Order No.	Pcs./Pkt.
ELR H3-I-SC- 24DC/500AC-3-P	2908696	1
ELR H3-I-PT- 24DC/500AC-3-P	2909563	1
ELR H3-I-SC- 24DC/500AC-9-P	2908694	1
ELR H3-I-PT- 24DC/500AC-9-P	2909561	1

Accessories

EM-2RSC/21AU-R/L-P	2908701	1
EM-2RPT/21AU-R/L-P	2909573	1

Hybrid motor starters with direct start function

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

Featuring the following advantages:

– 22.5 mm wide
– Reduced wiring effort
– Bi-metal function, adjustable up to 9 A
– Long service life
– Space-saving
– 3-phase loop bridging

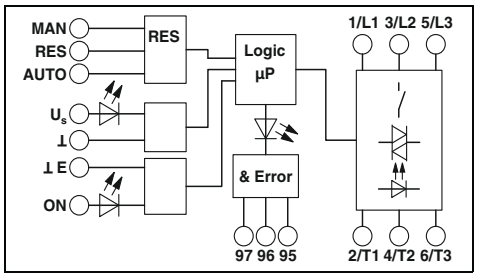
Safety level in accordance with:

– IEC 61508-1: SIL 3
– ISO 13849: PL e

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

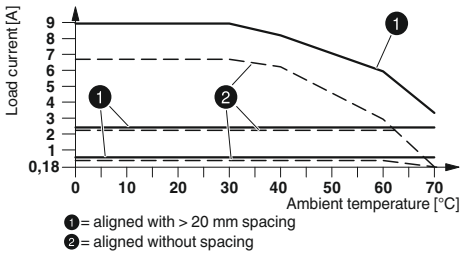
Motor protection and emergency stop

Ex:



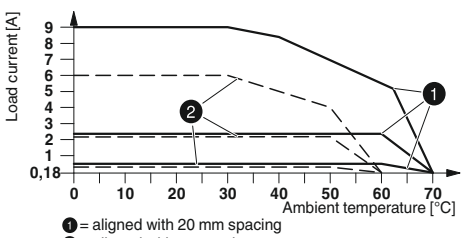
Technical data

Input data		
Rated control supply voltage U_S	24 V DC	230 V AC
Control supply voltage range	19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
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
Actuating voltage range	19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
Rated actuating current I_C at U_C	5 mA (input type 1)	7 mA (input type 1)
Input circuit	Surge protection, reverse polarity protection	Surge protection
Operating voltage / status / error indicator	Green LED / Yellow LED / Red LED	
Output data load side		
Operating voltage range	42 V AC ... 550 V AC	42 V AC ... 550 V AC
Output protection	Surge protection	
General data		
Rated insulation voltage	500 V	
Rated surge voltage	6 kV	4 kV
Ambient temperature (operation)	-25°C ... 70°C (observe derating)	
Standards/regulations	IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849	
Mounting position	Vertical (horizontal DIN rail, motor output below)	
Mounting	Alignable, for spacing see derating	
Connection data solid/stranded/AWG	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14	
Dimensions W / H / D	22.5 mm / 106.6 mm / 113.7 mm	



❶ = aligned with > 20 mm spacing
❷ = aligned without spacing

Derating curve for ELR H3...24DC...



❶ = aligned with 20 mm spacing
❷ = aligned without spacing

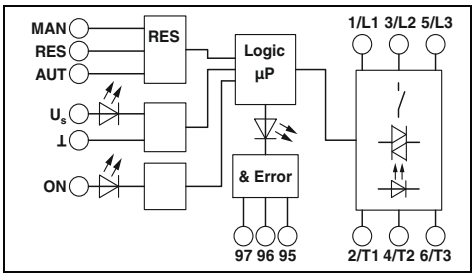
Derating curve for ELR H3...230AC...

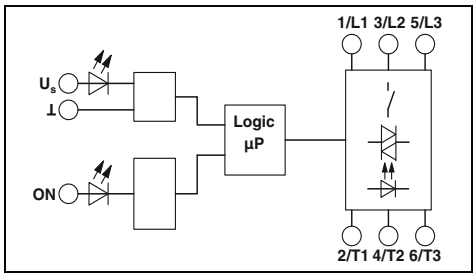
Ordering data

Description	Type	Order No.	Pcs./Pkt.
Load current 0.075 A ... 0.6 A			
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
Load current 0.18 A ... 2.4 A			
Screw connection	**ELR H3-IES-SC- 24DC/500AC-2**	2900567	1
Push-in connection	**ELR H3-IES-PT- 24DC/500AC-2**	2903916	1
Screw connection	**ELR H3-IES-SC-230AC/500AC-2**	2900568	1
Load current 1.5 A ... 9 A			
Screw connection	**ELR H3-IES-SC- 24DC/500AC-9**	2900569	1
Push-in connection	**ELR H3-IES-PT- 24DC/500AC-9**	2903918	1
Screw connection	**ELR H3-IES-SC-230AC/500AC-9**	2900570	1
Load current 0 A ... 9 A			
Screw connection			
Screw connection			

Motor protection

Direct start function only





Technical data

24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
40 mA	4 mA
24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
5 mA (input type 1)	7 mA (input type 1)
Surge protection, reverse polarity protection	Surge protection
Green LED / Yellow LED / Red LED	
42 V AC ... 550 V AC	42 V AC ... 550 V AC
Surge protection	
500 V	
6 kV	4 kV
-25°C ... 70°C (observe derating)	
IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849	
Vertical (horizontal DIN rail, motor output below)	
Alignable, for spacing see derating	
0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14	
22.5 mm / 106.6 mm / 113.7 mm	

Ordering data

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

Technical data

24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
40 mA	4 mA
24 V DC	230 V AC
19.2 V DC ... 30 V DC	85 V AC ... 253 V AC
5 mA (input type 1)	7 mA (input type 1)
Surge protection, reverse polarity protection	Surge protection
Green LED / Yellow LED / -	
42 V AC ... 550 V AC	42 V AC ... 550 V AC
Surge protection	
500 V	
6 kV	4 kV
-25°C ... 70°C (observe derating)	
IEC 60947-1 / IEC 60947-4-2 / IEC 61508 / ISO 13849	
Vertical (horizontal DIN rail, motor output below)	
Alignable, for spacing see derating	
0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14	
22.5 mm / 106.6 mm / 113.7 mm	

Ordering data

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

Hybrid motor starters with short-circuit protection

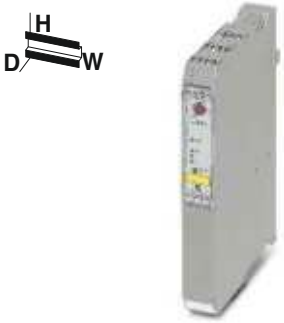
These short-circuit-proof 3-phase hybrid motor starters for mounting on 35 mm DIN rails, the CrossPowerSystem energy distribution board, or 60 mm power busbars combine four functions in one device: forward running, reverse running, motor protection, and emergency stop up to SIL 3/PL e.

Featuring the following advantages:
- 22.5 mm wide
- Bi-metal function, adjustable up to 9 A
- Long service life
- Space-saving
- Reduced wiring effort
- 3-phase loop bridging
- Plug-in motor output terminal block
- Coordination type 2 in accordance with IEC/EN 60947-4-2
- IEC 61508-1: SIL 3
- ISO 13849: PL e

Input data	
Rated control supply voltage U_S	
Control supply voltage range	
Rated control supply current I_S at U_S	
Rated actuating voltage U_C R/L	
Actuating voltage range	
Rated actuating current I_C at U_C	
Input circuit	
Operating voltage / status / error indicator	
Output data load side	
Operating voltage range	
Load current range	
Output protection	
General data	
Rated insulation voltage	
Rated surge voltage	
Ambient temperature (operation)	
Standards/regulations	
Mounting position	
Mounting	
Screw connection rigid / flexible / AWG	
Dimensions	W / H / D

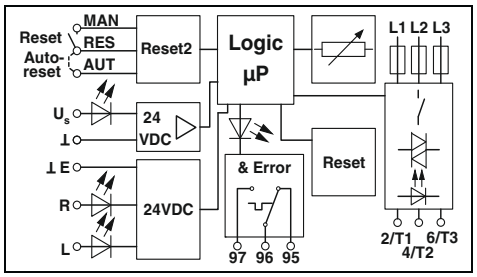
Description
Short-circuit-proof hybrid motor starters
Hybrid motor starter
DIN rail adapter
Busbar adapter, 160 mm
Busbar adapter, 200 mm
Set consisting of short-circuit-proof hybrid motor starter and adapter
- with DIN rail adapter
- with busbar adapter, 160 mm
- with busbar adapter, 200 mm

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



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

Ex:



Technical data

	24 V DC
	19.2 V DC ... 30 V DC
	40 mA
	24 V DC
	19.2 V DC ... 30 V DC
	5 mA
	Surge protection, reverse polarity protection
	Green LED / Yellow LED / Red LED
	42 V AC ... 550 V AC
	75 mA ... 600 mA (see derating)
	Surge protection, short-circuit protection
	500 V
	6 kV
	-25°C ... 70°C (observe derating)
	IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849
	Vertical (horizontal DIN rail, motor output below)
	Alignable, for spacing see derating
	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
	22.5 mm / 160 mm / 114.5 mm

Ordering data

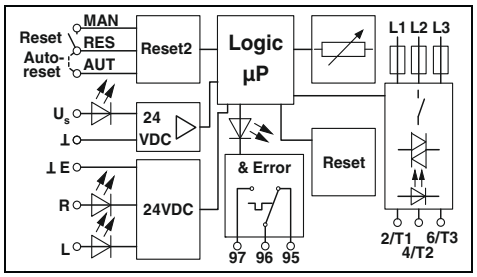
Type	Order No.	Pcs./Pkt.
ELR H51-IESSC-24DC500AC-06	2902746	1
EM RD-ADAPTER	2902747	1
EM RI-ADAPTER COMPACT	2902748	1
EM RI-ADAPTER CLASSIC	2902831	1
ELR H51-0.6-DIN-RAIL-SET	2902952	1
ELR-H51-0,6-BUSBAR-COMPACT-SET	2904333	1
ELR-H51-0,6-BUSBAR-CLASSIC-SET	2904334	1

Accessories

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

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

Ex:



Technical data

	24 V DC
	19.2 V DC ... 30 V DC
	40 mA
	24 V DC
	19.2 V DC ... 30 V DC
	5 mA
	Surge protection, reverse polarity protection
	Green LED / Yellow LED / Red LED
	42 V AC ... 550 V AC
	180 mA ... 2.4 A (see derating)
	Surge protection, short-circuit protection
	500 V
	6 kV
	-25°C ... 70°C (observe derating)
	IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849
	Vertical (horizontal DIN rail, motor output below)
	Alignable, for spacing see derating
	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
	22.5 mm / 160 mm / 114.5 mm

Ordering data

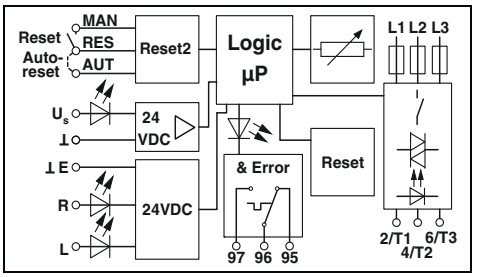
Type	Order No.	Pcs./Pkt.
ELR H51-IESSC-24DC500AC-2	2902744	1
EM RD-ADAPTER	2902747	1
EM RI-ADAPTER COMPACT	2902748	1
EM RI-ADAPTER CLASSIC	2902831	1
ELR H51-2.4-DIN-RAIL-SET	2902953	1
ELR-H51-2,4-BUSBAR-COMPACT-SET	2904335	1
ELR-H51-2,4-BUSBAR-CLASSIC-SET	2904336	1

Accessories

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

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

Ex:



Technical data

	24 V DC
	19.2 V DC ... 30 V DC
	40 mA
	24 V DC
	19.2 V DC ... 30 V DC
	5 mA
	Surge protection, reverse polarity protection
	Green LED / Yellow LED / Red LED
	42 V AC ... 550 V AC
	1.5 A ... 9 A (see derating)
	Surge protection, short-circuit protection
	500 V
	6 kV
	-25°C ... 70°C (observe derating)
	IEC 60947-1 / EN 60947-4-2 / IEC 61508 / ISO 13849
	Vertical (horizontal DIN rail, motor output below)
	Alignable, for spacing see derating
	0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 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
ELR-H51-9-BUSBAR-COMPACT-SET	2904337	1
ELR-H51-9-BUSBAR-CLASSIC-SET	2904338	1

Accessories

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

Loop bridges for hybrid motor starters

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

Features of the 3-phase loop bridge:

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

0.3 m connecting cable for hybrid motor starters, with screw connection

EAC

Technical data

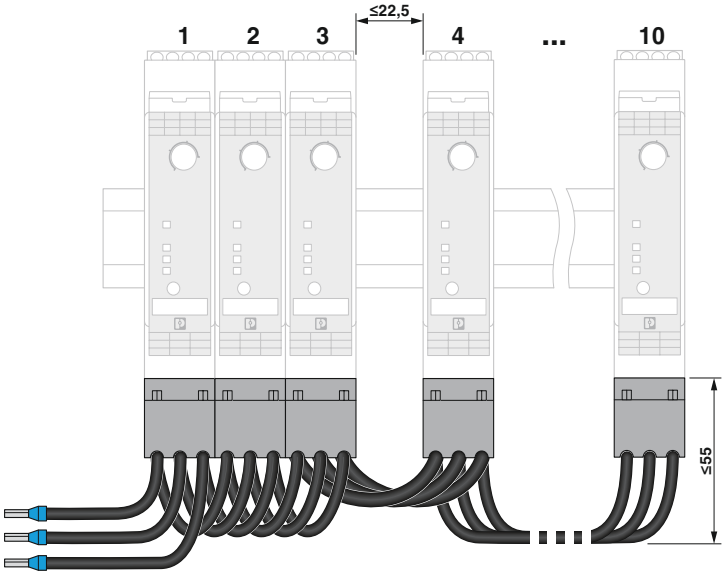
General data	
Nominal voltage U_N	42 V AC ... 575 V AC
Nominal current at U_N	≤25 A
Cross section	2.5 mm²

Ordering data

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

Accessories

Covering hood for unused connectors			
	BRIDGE COVER	2906240	10



3 m connecting cable for hybrid motor starters, with screw connection

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

EAC

Technical data

42 V AC ... 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

Accessories

BRIDGE COVER	**2906240**	10

EAC

Technical data

42 V AC ... 575 V AC
≤25 A
2.5 mm²

Ordering data

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

Accessories

BRIDGE COVER	**2906240**	10

Three-phase solid-state reversing contactors

The 3-phase solid-state reversing contactors with integrated locking circuit and load wiring are ideally suited for applications such as:
– Control valves
– Slides
– Switches
– Ship steering gear

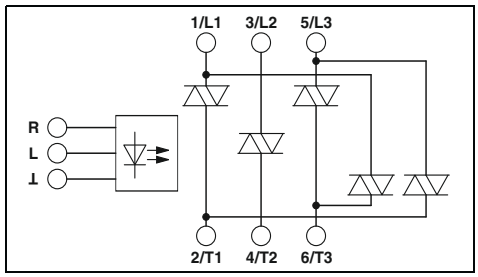
The power spectrum ranges from 575 V AC/3 x 2 A to 575 V AC/3 x 37 A. This corresponds to 1 kW to 18.5 kW.

Advantages of the 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 insulating housing: **ELR W 3...2, ELR W 3...9** Polyamide PA non-reinforced, color: gray **ELR W 3...37** Polyester PBT non-reinforced, color: gray
Marking systems and mounting material See Catalog 3

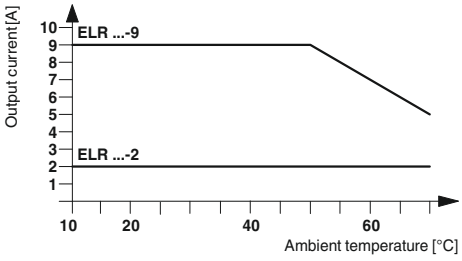
For reversing 3~ AC motors up to 575 V AC/3 x 2 A

DNV GL

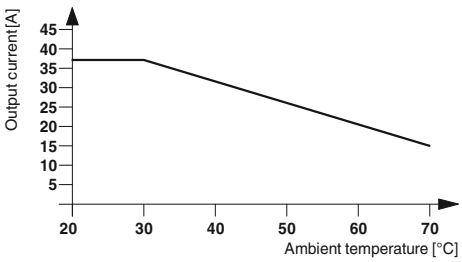


Technical data

Input data			
Rated actuating voltage U_C R/L		24 V DC	230 V AC
Actuating voltage range		19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
Rated actuating current I_C at U_C		12.7 mA	11.2 mA
Input circuit		Reverse polarity protection, surge protection	Surge protection
Operating voltage / status / error indicator		- / Yellow LED / Red LED	
Output data load side			
Operating voltage range		48 V AC ... 575 V AC	48 V AC ... 575 V AC
Periodic peak reverse voltage		1200 V	1200 V
Load current range		100 mA ... 2 A (see derating)	100 mA ... 2 A (see derating)
Residual voltage		<1.5 V	<1.5 V
Leakage current		6 mA	6 mA
Max. load value I^2 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	6 kV
Insulation		Basic insulation	
Reversing frequency		≤10 Hz	≤2 Hz
Switching frequency		max. 5 Hz	max. 1 Hz
Ambient temperature (operation)		-25°C ... 70°C	
Standards/regulations		DIN EN 50178 / EN 60947	
Degree of protection in accordance with IEC 60529/EN 60529		IP20	
Mounting position		Vertical (horizontal DIN rail)	
Mounting		Can be aligned with spacing = 20 mm	
Screw connection rigid / flexible / AWG			
- Control side		0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14	
- Load side		0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14	
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

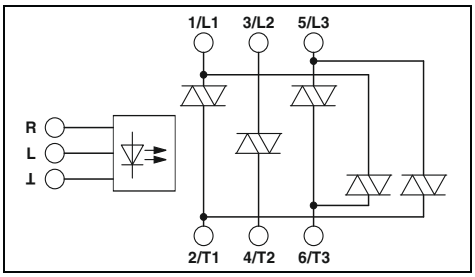
Accessories

Thermal fuse	**THERMAL FUSE TF104**	2900796	1

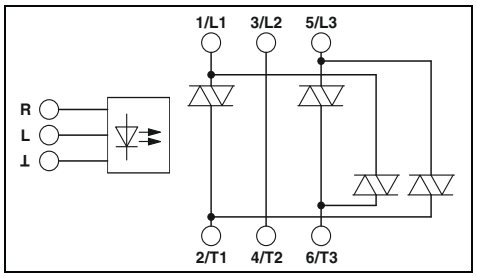
For reversing 3~ AC motors up to 575 V AC/3 x 9 A

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

DNV GL



DNV GL



Technical data

24 V DC	230 V AC
19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
12.7 mA	11.2 mA
Reverse polarity protection, surge protection	Surge protection
- / Yellow LED / Red LED	
48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
100 mA ... 9 A (see derating)	100 mA ... 9 A (see derating)
<1.5 V	<1.5 V
6 mA	6 mA
580 A^2s	580 A^2s
RCV circuit	
500 V	
6 kV	6 kV
Basic insulation	
≤10 Hz	≤2 Hz
max. 5 Hz	max. 1 Hz
-25°C ... 70°C	
DIN EN 50178 / EN 60947	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14	
0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14	
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
19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
12.7 mA	11.2 mA
Reverse polarity protection, surge protection	Surge protection
- / Yellow LED / Red LED	
48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
200 mA ... 37 A (see derating)	200 mA ... 37 A (see derating)
<1.5 V	<1.5 V
6 mA	6 mA
9,000 A^2s	9,000 A^2s
RCV circuit	
500 V	
6 kV	6 kV
Basic insulation	
≤10 Hz	≤2 Hz
max. 5 Hz	max. 1 Hz
-25°C ... 70°C	
DIN EN 50178 / EN 60947	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 40 mm	
0.2 - 4 mm^2 / 0.2 - 2.5 mm^2 / 24 - 12	
0.5 - 16 mm^2 / 0.5 - 16 mm^2 / 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 contactors

The 3-phase solid-state contactors are ideally suited for applications such as:
– Mixers
– Machine tools
– Conveying systems
– Pumps
– Fans

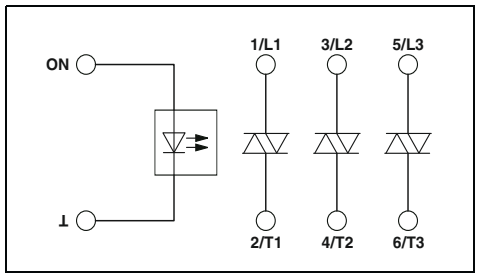
The power spectrum ranges from 575 V AC/3 x 2 A to 575 V AC/3 x 37 A. This corresponds to 1 kW to 18.5 kW.

Advantages of 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 insulating housing: **ELR W 3...2, ELR W 3...9** Polyamide PA non-reinforced, color: gray **ELR W 3...37** Polyester PBT non-reinforced, color: gray
Marking systems and mounting material See Catalog 3

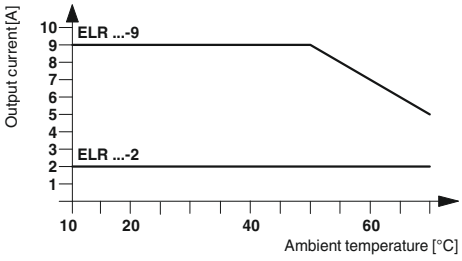
For switching 3~ AC motors up to 575 V AC/3 x 2 A

cULus EAC DNV GL

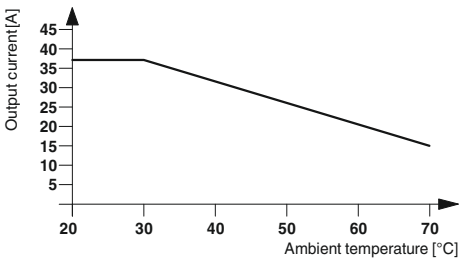


Technical data

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

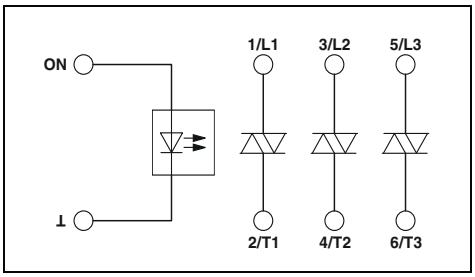
Accessories

Thermal fuse		
THERMAL FUSE TF104	2900796	1

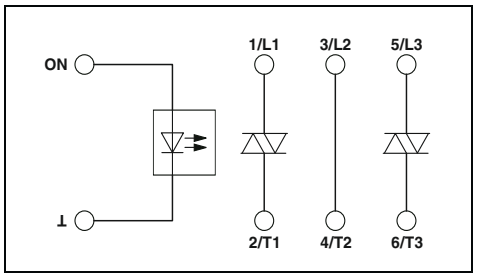
For switching 3~ AC motors up to 575 V AC/3 x 9 A

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

cULus EAC DNV GL



cULus EAC DNV GL



Technical data

24 V DC	230 V AC
19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
8.3 mA	12.5 mA
Reverse polarity protection, surge protection	Surge protection
- / Yellow LED / Red LED	
48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
100 mA ... 9 A (see derating)	100 mA ... 9 A (see derating)
<1.5 V	<1.5 V
6 mA	6 mA
580 A^2s	580 A^2s
RCV circuit	
500 V	
6 kV	6 kV
Basic insulation	
≤10 Hz	≤1 Hz
-25°C ... 70°C	
DIN EN 50178 / EN 60947	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 20 mm	
0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14	
0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14	
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
19.2 V DC ... 30 V DC	92 V AC ... 253 V AC
8.3 mA	12.5 mA
Reverse polarity protection, surge protection	Surge protection
- / Yellow LED / Red LED	
48 V AC ... 575 V AC	48 V AC ... 575 V AC
1200 V	1200 V
200 mA ... 37 A (see derating)	200 mA ... 37 A (see derating)
<1.5 V	<1.5 V
6 mA	6 mA
9,000 A^2s	9,000 A^2s
RCV circuit	
500 V	
6 kV	6 kV
Basic insulation	
≤10 Hz	≤1 Hz
-25°C ... 70°C	
DIN EN 50178 / EN 60947	
IP20	
Vertical (horizontal DIN rail)	
Can be aligned with spacing = 40 mm	
0.2 - 4 mm^2 / 0.2 - 2.5 mm^2 / 24 - 12	
0.5 - 16 mm^2 / 0.5 - 16 mm^2 / 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

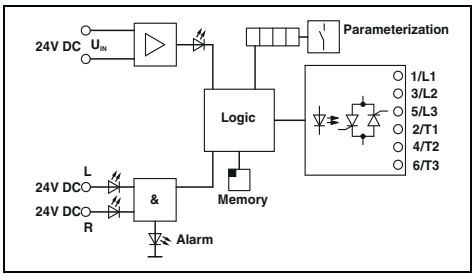
Semiconductor reversing contactors with soft starter

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

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

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

Solid-state reversing contactor with soft starter

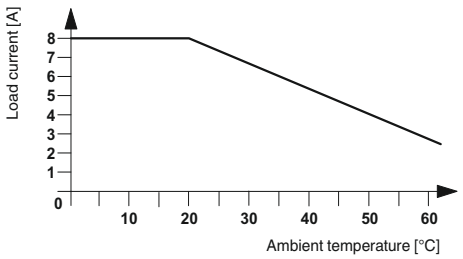


Technical data

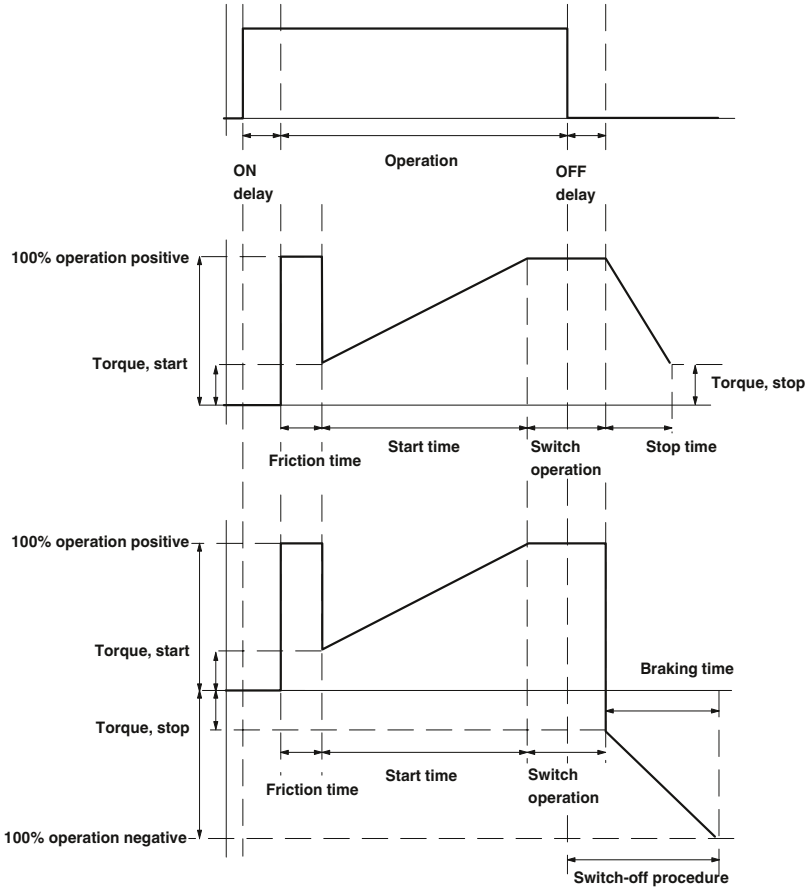
Input data		
Supply nominal voltage U_{VN}		24 V DC
Supply voltage range with reference to U_{VN}		0.8 ... 1.2
Quiescent current		85 mA
Control voltage U_{ST} right/left		24 V DC
Control voltage range in reference to U_{ST}		0.8 ... 1.2
Typ. input current at U_N		5 mA
Input circuit		Reverse polarity protection, surge protection
Operating voltage / status / error indicator		Green LED / Yellow LED / Red LED
Output data load side		
Max. switching voltage		440 V AC (L1/T1) 440 V AC (L2/T2) 440 V AC (L3/T3)
Operating voltage range		110 V AC ... 433 V AC
Periodic peak reverse voltage		1,000 V
Load current range		150 mA ... 8 A (at 20°C Tu, see derating)
Residual voltage		Typically 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
Degree of protection in accordance with IEC 60529/EN 60529		IP20
Mounting position		Vertical (horizontal DIN rail)
Mounting		Can be aligned with >20 mm spacing
Screw connection rigid / flexible / AWG		0.2 - 6 mm² / 0.2 - 4 mm² / 24 - 10
Dimensions	W / H / D	62 mm / 94 mm / 122 mm
EMC note		Class A product, see page 583

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Solid-state reversing contactor, with integrated soft switch			
	ELR W3/ 9-400 S	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 relays for DC motors

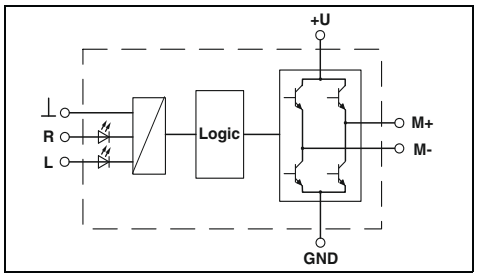
The ELR-DC electronic reversing load relays allow mechanically commutated DC motors to be switched. They reverse and reduce the speed of DC motors up to 24 V/6 A in a wear-free manner. A short-circuit, surge-voltage, and overload-proof output guarantees reliable use in the plant.

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

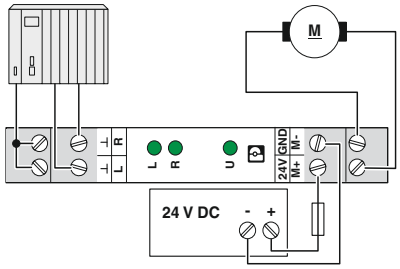
Thanks to the internal interlocking circuit and load wiring, wiring effort is reduced to a minimum.

Notes:
Type of housing: Polycarbonate PC, color: gray.
Marking systems and mounting material See Catalog 3
PWM = Pulse Width Modulation

Electronic reversing load relay for DC motors



Application example



Status table

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

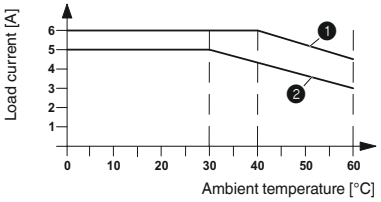
Technical data

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
Typical input current at U_N		3 mA	3 mA
Input circuit		Reverse polarity protection, surge protection	
Operating voltage / status / error indicator		Green LED / Yellow LED / -	
Output data load side			
Operating 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)
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		Reverse polarity protection, surge protection	
Operating voltage / status / error indicator		Green LED / - / -	
General data			
Test voltage input/output		2.5 kV_{rms}	
Ambient temperature (operation)		-20°C ... 60°C	
Nominal operating mode		100% operating factor	
Standards/regulations		EN 50178	
Degree of protection in accordance with IEC 60529/EN 60529		IP20	
Mounting position		Vertical (horizontal DIN rail, motor output below)	
Screw connection rigid / flexible / AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
Dimensions	W / H / D	12.5 mm / 99 mm / 114.5 mm	
EMC note		Class A product, see page 583	

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Electronic reversing load relay, for controlling DC motors			
	ELR W1/ 2-24DC	2963598	1
	ELR W1/ 6-24DC	2982090	1

Load current depending on ambient temperature
Operating time: 100% (ED)



❶ Stand-alone device
❷ Aligned without spacing

Single-phase solid-state contactors

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

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

They offer the following advantages:

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

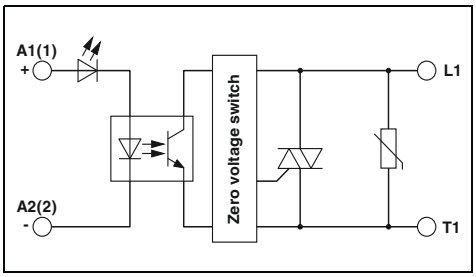
The areas of application are:

– Production machines
– Temperature controllers
– Conveyor equipment
– Lights and lighting systems

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

new

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



Technical data

Input data			
Actuating voltage range		4 V DC ... 32 V DC	24 V AC ... 275 V AC
Rated actuating current I_C at U_C		12 mA	17 mA
Switching level	1 signal (“H”)	≥4 V DC (“1” signal)	≥20 V AC/DC (“1” signal)
	0 signal (“L”)	≤1 V DC (“0” signal)	≤5 V AC/DC (“0” signal)
Transmission frequency f_{limit}		25 Hz	6 Hz
Operating voltage / status / error indicator		Green LED / - / -	
Output data load side			
Operating voltage range		42 V AC ... 660 V AC	42 V AC ... 660 V AC
Periodic peak reverse voltage		1200 V	1200 V
Load current range		150 mA ... 20 A (see derating)	150 mA ... 20 A (see derating)
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
Max. load value I^2 x t (t = 10 ms)		525 A^2s	525 A^2s
Output protection		Varistor	
General data			
Test voltage input/output		-	
Insulation		Basic insulation	
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 55011	
Mounting position		Vertical (horizontal DIN rail)	
Mounting		Can be aligned with ≥22.5 mm spacing	
Screw connection rigid / flexible / AWG			
- Control side		0.5 - 2.5 mm^2 / 0.5 - 2.5 mm^2 / 18 - 12	
- Load side		2.5 - 6 mm^2 / 1 - 4 mm^2 / 14 - 10	
Dimensions	W / H / D	17.8 mm / 110 mm / 103 mm	

Ordering data

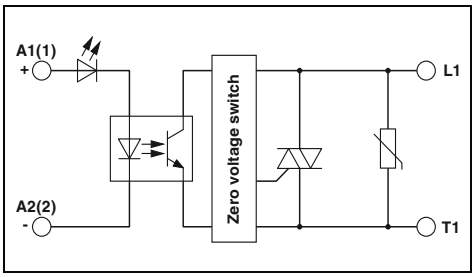
Description	Type	Order No.	Pcs./Pkt.
Single-phase electronic load relay			
	ELR 1-SC-24DC/600AC-20	1032919	1
	ELR 1-SC-230AC/600AC-20	1032920	1

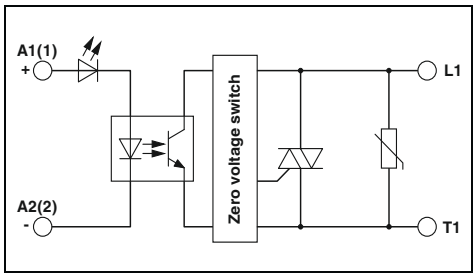
new

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

new

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
12 mA	17 mA
≥4 V DC (“1” signal)	≥20 V AC/DC (“1” signal)
≤1 V DC (“0” signal)	≤5 V AC/DC (“0” signal)
25 Hz	6 Hz
Green LED / - / -	
42 V AC ... 660 V AC	42 V AC ... 660 V AC
1200 V	1200 V
250 mA ... 25 A (see derating)	250 mA ... 25 A (see derating)
<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
Varistor	
-	
Basic insulation	
-30°C ... 70°C	
EN 61000-4-2 / EN 61000-4-3 / EN 61000-4-4 / EN 61000-4-5 / EN 55011	
Vertical (horizontal DIN rail)	
Can be aligned with ≥22.5 mm spacing	
0.5 - 2.5 mm^2 / 0.5 - 2.5 mm^2 / 18 - 12	
2.5 - 6 mm^2 / 1 - 4 mm^2 / 14 - 10	
17.8 mm / 110 mm / 103 mm	

Ordering data

Type	Order No.	Pcs./Pkt.
ELR 1-SC-24DC/600AC-30	1032921	1
ELR 1-SC-230AC/600AC-30	1032922	1

Technical data

4 V DC ... 32 V DC	24 V AC ... 275 V AC
12 mA	17 mA
≥4 V DC (“1” signal)	≥20 V AC/DC (“1” signal)
≤1 V DC (“0” signal)	≤5 V AC/DC (“0” signal)
25 Hz	6 Hz
Green LED / - / -	
42 V AC ... 660 V AC	42 V AC ... 660 V AC
1200 V	1200 V
500 mA ... 43 A (see derating)	500 mA ... 43 A (see derating)
<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
Varistor	
-	
Basic insulation	
-30°C ... 70°C	
EN 61000-4-2 / EN 61000-4-3 / EN 61000-4-4 / EN 61000-4-5 / EN 55011	
Vertical (horizontal DIN rail)	
Can be aligned with ≥22.5 mm spacing	
0.5 - 2.5 mm^2 / 0.5 - 2.5 mm^2 / 18 - 12	
2.5 - 6 mm^2 / 1 - 4 mm^2 / 14 - 10	
35 mm / 110 mm / 141 mm	

Ordering data

Type	Order No.	Pcs./Pkt.
ELR 1-SC-24DC/600AC-50	1032926	1
ELR 1-SC-230AC/600AC-50	1032927	1

The 3-phase CrossPowerSystem power distribution board is the new platform for modular and functional control cabinets. With just one click, the devices are mounted on the board without tools and a safe electrical connection to the three phases is established simultaneously – all in just one step.

The new CrossPowerSystem power distribution board now enables you to start up and monitor your motors more easily in your control cabinet. The CrossPowerSystem enables you to realize modular and functional solutions. Wherever necessary, simple modifications can be made or extensions can be added to adapt to new requirements.

The new 5 A power supply further reduces your wiring costs. It can be used to supply power to all hybrid motor starters on the board. Furthermore, to generate motor-relevant data for system monitoring, you can simply use the network-capable solution alongside the classic motor starter via IO-Link.

The TRIO POWER power supply features standard functionality, high quality, and reliability. It can be mounted directly on the power distribution board.

Short-circuit-proof hybrid motor starters with integrated fuses can be mounted directly on the power distribution board.

Device adapter with fuse holder for 16 A fuse (10x38/Class CC), CrossLink® interface and fixed DIN rail for IO-Link motor starters and direct starters.

Adapters for contactors and contactor combinations for loads with currents up to 45 A.

Power distribution boards

Modular power distribution boards with CrossLink® interface, 125 A, 3-pos., protected against contact and polarity reversal, width: 225 mm and 405 mm.

new

Power distribution board, 225 mm

new

Power distribution board, 405 mm

Description	Color	Ordering data: Type	Order No.	Pcs./Pkt.
Power distribution boards with CrossLink® interface				
		EM-CPS-225	1002634	1

Ordering data: Type	Order No.	Pcs./Pkt.
EM-CPS-405	1002635	1

Connection modules

3-pos. connection modules for maximum 63 A or 125 A.

new

63 A connection module

new

125 A connection module

Description	Color	Ordering data: Type	Order No.	Pcs./Pkt.
Connection module with integrated spring-loaded terminals for cables from 1.5 to 16 mm², 3-pos., maximum 63 A		**EM-CPS-TB3/63A**	1002633	4
Box terminal connection module for cables from 6 to 50 mm², maximum 125 A				

Ordering data: Type	Order No.	Pcs./Pkt.
EM-CPS-TB3/125A	1070299	4

Device adapters

new

Device adapter with CrossLink® interface for hybrid motor starters and miniature circuit breakers.

Device adapter

new

Adapter for miniature circuit breakers

Description	Color	Ordering data: Type	Order No.	Pcs./Pkt.
Device adapter with fuse holder for 16 A fuse (10x38/Class CC), CrossLink® interface and fixed DIN rail				
		EM-CPS-DA-22,5F/16A	1002668	1
Single-position adapters with CrossLink® interface for connecting miniature circuit breakers				
16 A, phase L1		**EM-CPS-DA-18S/16A-L1**	1089439	6
16 A, phase L2		**EM-CPS-DA-18S/16A-L2**	1089440	6
16 A, phase L3		**EM-CPS-DA-18S/16A-L3**	1089441	6
63 A, phase L1		**EM-CPS-DA-18S/63A-L1**	1089356	6
63 A, phase L2		**EM-CPS-DA-18S/63A-L2**	1089442	6
63 A, phase L3		**EM-CPS-DA-18S/63A-L3**	1089446	6

Device adapters

new

Device adapters with CrossLink® interface for contactors.

Standard device adapter

new

Comfort device adapter

Description	Color	Ordering data: Type	Order No.	Pcs./Pkt.
Standard device adapter with CrossLink® interface and fixed DIN rail				
Rated current: 16 A		**EM-CPS-DA-45S/16A**	1003291	4
Rated current: 32 A		**EM-CPS-DA-45S/32A**	1003292	4
Comfort device adapter with CrossLink® interface and moveable DIN rail				
Rated current: 16 A		**EM-CPS-DA-45C/16A**	1002666	4
Rated current: 25 A		**EM-CPS-DA-45C/25A**	1002665	4
Rated current: 32 A		**EM-CPS-DA-45C/32A**	1002664	4
Rated current: 45 A		**EM-CPS-DA-45C/45A**	1003289	4
Comfort DIN rail, additional DIN rail for Comfort device adapter				
		EM-CPS-TS-45	1003295	1

Accessories – Device adapters

Accessories for height and side extensions for 45 mm device adapter and contactor holder.

new

Extension

new

Device holder

Description	Color	Ordering data			Ordering data		
		Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Height extension for Comfort device adapter, width: 45 mm		EM-CPS-DAE-45	1003293	8			
Lateral extension of the height extension for Comfort device adapter, width: 45 mm		EM-CPS-DAES-45	1003294	1			
Siemens device mount, positioning element for Siemens S0 and S00 switching devices					EM-CPS-DHS-45	1003296	1
Eaton device mount, positioning element for Eaton PKZ switching devices					EM-CPS-DHE-45	1002663	1

Power supplies

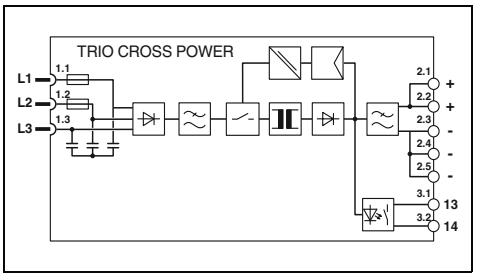
new

The new TRIO CROSS POWER power supply for the CrossPowerSystem power distribution board is perfectly adapted for use in machine building. All functions and the space-saving design are tailored to the stringent demands in this area. The Push-in connection enables quick and easy connection of a 24 V DC control voltage.

Additional features:

– Rapid startup: tool-free mounting and automatic contacting in one easy step
– Push-in connection enables quick and easy 24 V DC control voltage connection
– Reliable starting of high loads with dynamic boost

Power supply,
3 AC, 24 V DC, 5 A



Technical data

Input data	
Nominal input voltage range	3x 400 V AC ... 500 V AC 2x 400 V AC ... 500 V AC
Input voltage range	3x 400 V AC ... 500 V AC -20% ....+15% 2x 400 V AC ... 500 V AC -10% ... +15%
Frequency range	50 Hz ... 60 Hz
Current consumption (nominal load)	3x 0.4 A (400 V AC) / 3x 0.3 A (500 V AC) 2x 0.6 A (400 V AC) / 2x 0.5 A (500 V AC)
Inrush current limitation at 25°C / I^2t	≤22 A / ≤0.25 A^2s
Mains buffering (I_N)	Typically 20 ms (400 V AC) / typically 20 ms (500 V AC)
Output data	
Nominal output voltage	24 V DC ±1%
Setting range of the output voltage (U_{Set})	24 V DC ... 28 V DC (>24 V DC, constant capacity restricted)
Output current / dynamic boost	5 A / 7.5 A (5 s)
Can be connected in parallel/series	Yes, with redundancy module / Yes
Max. power dissipation (no load/nominal load)	<1 W (400 V AC) / <12 W (480 V AC)
Efficiency	Typically 91% (400 V AC)
Residual ripple	≤20 mV_{PP}
Signaling	
Signaling DC OK	LED, floating signal contact
General data	
Weight / dimensions W x H x D	0.7 kg / 36 x 160 x 159 mm
Connection	Cross Power System
Connection method	Snap-on connection
Input connection data (solid/stranded/AWG)	- mm^2 / - mm^2 / -
Output connection data (solid/stranded/AWG)	0.2 - 4 mm^2 / 0.2 - 2.5 mm^2 / 24 - 12
Degree of protection / protection class	IP20 / II
MTBF (IEC 61709, SN 29500)	>1,300,000 h (40°C)
Ambient temperature (operation)	-25°C ... 70°C (>60°C derating: 2.5%/K)
Standards/regulations	
Insulation voltage input/output	1.5 kV AC (routine test) / 3 kV AC (type test)
Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU
Electrical safety	IEC 61010-1 (SELV)
Electronic equipment for electrical power installations	EN 50178/VDE 0160 (PELV)
Safe isolation	DIN VDE 0100-410
UL approvals	UL Listed UL 61010-2-201
Limitation of harmonic line currents	EN 61000-3-2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Power supply unit, primary-switched	**EM-CPS-PS/3AC/24DC/5**	1064922	1

12.09

Measurement and control technology

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

Signal conditioners – Your advantages

– Achieve space savings of up to 65% compared to other isolators on the market with these highly compact signal conditioners
– Integrate field signals into industrial networks while also benefiting from safe electrical isolation with signal conditioners with a bus and network connection
– Precise transmission and high operational safety with signal conditioners with consistent SIL certification
– Maximum explosion protection for all Ex zones and gas groups: with single- and two-channel signal isolators for intrinsically safe circuits in the Ex area
– Integrate analog signals easily into the safety chain in accordance with the Machinery Directive: with signal conditioners with Performance Level

Process indicators and field devices – Your advantages

– Display, monitor, and control analog and temperature signals with the multifunctional process displays
– Interference-free transmission of analog signals as well as temperature measurement in the field, thanks to versatile signal conditioners and 2-conductor field devices

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Highly compact signal conditioners with plug-in connection technology

MINI Analog Pro

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Multiplexers

Multiplexers for HART signals

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Process indicators and field devices

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Signal conditioners with functional safety

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Highly compact signal conditioners

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Process indicators and field devices

Ex i process indicators and field devices

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Glossary/the most important terms related to signal conditioners

Input

Maximum input signal:
Describes the value achieved before any damage occurs to the module.

Input resistance:
A minor input signal load can be achieved with low impedance for current inputs and high impedance for voltage inputs.

Common mode rejection:
Characterizes the suppression of identical signals at the two inputs.

Analog output

Maximum output signal:
During uninterrupted operation, an overload at the input cannot cause greater values than at the output.

Zero/span adjustment:
Zero adjustment = setting the zero point
Span adjustment = adjustment of the analog output compared to the input, increasing/reducing the amplification factor of the output characteristic curve.

Load:
Load capacity at the output; total resistance that can be "driven".

Residual ripple/ripple:
A superimposed ripple can appear on the output signal due to signal conditioning required by the circuit.

Open-circuit behavior:
If values exceed or fall below a tolerance limit, a defined output signal is sent.

Digital output

In the case of signal conditioners, digital outputs can be realized either using relays or transistor outputs. The switching behavior of the digital outputs can be configured.

Active isolation:
With active isolation, the module has its own power supply. A differentiation is made between three methods of active isolation:
– 3-way isolation
– Input isolation
– Repeater power supply

Passive isolation:
The modules draw the power needed for signal transmission and electrical isolation from an active input or output circuit.
A differentiation is therefore made between
– Input loop-powered
– Output loop-powered

Resistance temperature detector

Resistance temperature detectors (e.g., Pt 100, Ni 1000, etc.) change their resistance value depending on the temperature. They require a constant measurement current. Signal conditioners detect this value and convert it into a proportional analog signal. With regard to the connection technology, a differentiation is made between:
– 2-conductor
– 3-conductor
– 4-conductor

Thermocouples

As opposed to resistance temperature detectors, thermocouples are active sources. They are composed of different metals and generate a voltage that – due to the Seebeck effect – is dependent on the ambient temperature.

Refer to the user manual for detailed information on the principles of MCR technology. It includes explanations on technical and physical fundamentals, application cases, and circuits. Moreover, the user manual provides information on the basic elements of functional safety, digital fieldbus systems, and an introduction into surge protection in MCR technology.

The user manual is available for download free of charge:
https://www.phoenixcontact.com/assets/downloads_ed/global/web_dwl_promotion/52007057_EN_MCR_technology_User_manual.pdf

Order No.: 105238

Non-intrinsically-safe signal transmission in potentially explosive areas

Electrical equipment operated in systems with potentially explosive areas is subject to different requirements, depending on the application. Signal conditioners and measuring transducers are generally deployed in the safe area (non-potentially explosive area). In a housing with degree of protection IP54 that is suitable for zone 2, it is also possible to install the signal conditioners and measuring transducers in a zone 2 Ex area. If enclosed in a pressure-tight encapsulated housing with type of protection Ex d, they can also be used in Ex zone 1. The respective stipulations of the corresponding type of protection and the Ex zone must be taken into consideration at all times.

The figure shows a range of options for installing electrical devices in areas with a danger of gas explosions.

Example: A sensor/actuator with type of protection "n" can be connected to an isolator from the MINI Analog Pro or MACX Analog families in zone 2.

Ex n

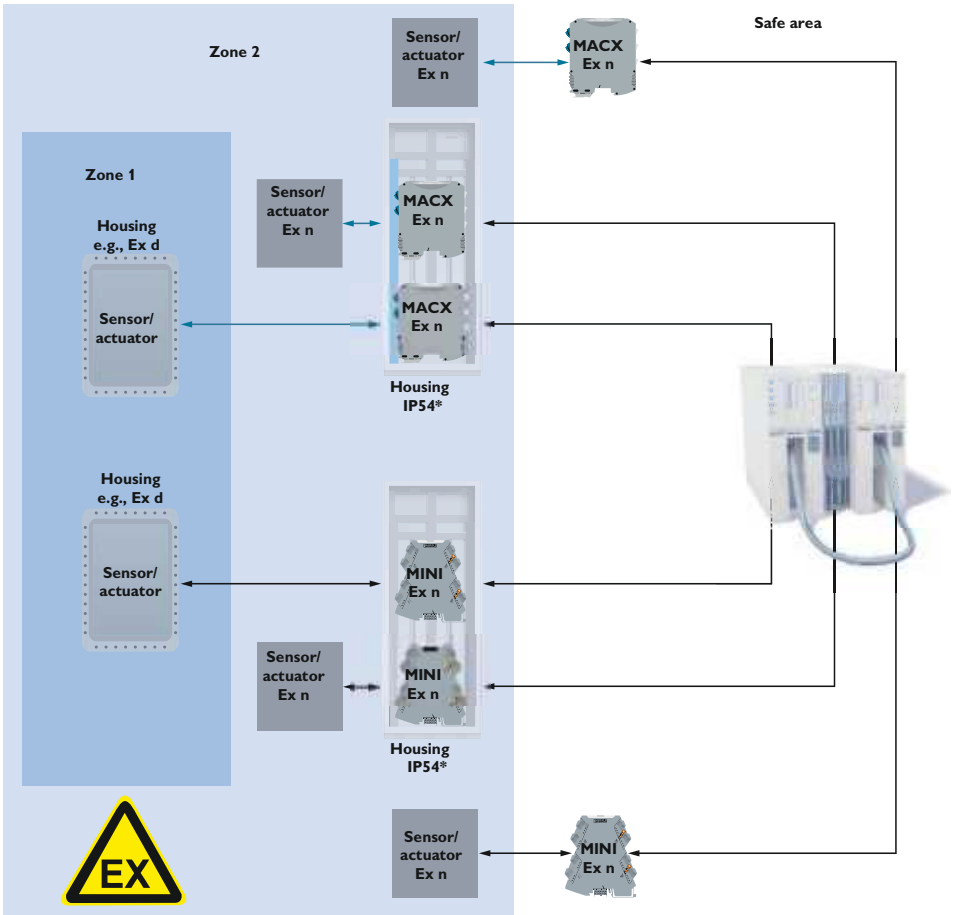
Ex n stands for type of protection n. In this case, it pertains to "non-sparking equipment", that at no time represents a source of ignition due to hot surfaces or electrically or mechanically generated sparks.

See our free brochure for detailed information on the topic of explosion protection:

https://www.phoenixcontact.com/assets/downloads_ed/global/web_dwl_promotion/5149416_EN_HQ_Explosion_protection_LoRes.pdf

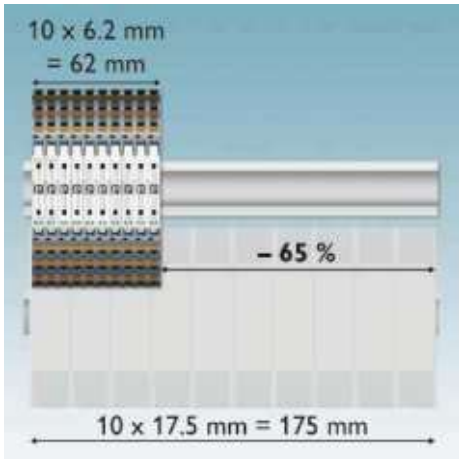
Order No.: 5149416

Installation of electrical devices for signal transmission



*Use of suitable housings approved for use in zone 2

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



Easier than ever but as slim as before

MINI Analog Pro offers you the easiest installation and startup in confined spaces.

– Space savings of up to 65%

Select from the following categories

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

Easy installation

– Easily visible and accessible terminal points and FASTCON Pro pluggable connection terminal blocks

Power bridging and fault monitoring

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

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

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

Measure current signals during operation

Measure signals conveniently for startup and servicing during operation, thanks to integrated measurement diodes.

– It is not necessary to break the circuit to integrate the measuring device into the signal circuit
– By setting the connector to the disconnect position, signal circuits can be easily interrupted during servicing and startup

Numerous configuration options

– Via DIP, PC or smartphone app

App functions via NFC communication

Access to information
– Access module information

DIP switch setting help
– Access module information
– Display DIP switch setting help on your smartphone

Configuration via smartphone
– Via Bluetooth or NFC
– Access module information
– Display DIP switch setting help
– Wireless configuration via smartphone

Service-friendly

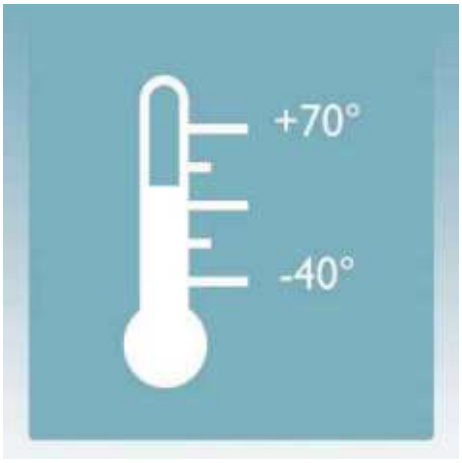
– Generous marking areas for complete loop identification using standard marking materials as well as permanently visible status LEDs on each module

Choice of connection technology

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

Optimum signal quality

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



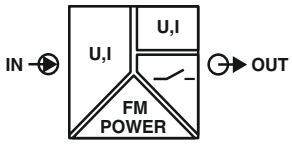
Suitable for any application

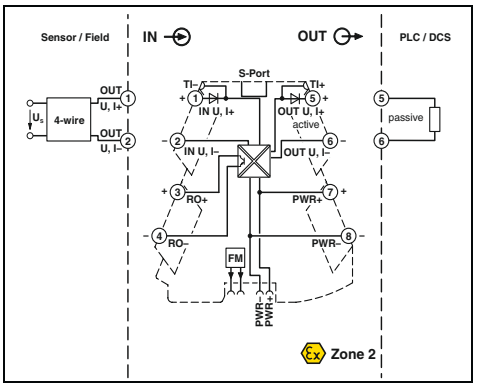
– Extended supply voltage and temperature range as well as multifunctional device types

The following parameters are generally valid for all MINI Analog Pro modules:

Test voltage input/output/power supply	3 kV (50 Hz, 1 min.)
Ambient temperature (operation)	-40°C ... 70°C
Dimensions (W / H / D)	6.2 / 110.5 / 120.5 mm
Push-in connection rigid / flexible / AWG	0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 24 - 12
Screw connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 12
Housing material	PBT
Mounting	Any

Analog IN/Analog OUT
4-way signal conditioners





Universal 4-way signal conditioner with switching output, configurable

Ex:

Housing width 6.2 mm

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

Notes:

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

Information on the programming adapters can be found on page 111

Information on MINI Analog Pro accessories can be found from page 107

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

Technical data

	U input	I input
Input data		
Input signal (configurable via DIP switch or freely via software)	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 1 V ... 5 V 10 V ... 0 V 10 V ... 2 V 5 V ... 0 V 5 V ... 1 V 0 V ... 12 V	0 mA ... 20 mA 4 mA ... 20 mA 0 mA ... 10 mA 2 mA ... 10 mA 20 mA ... 0 mA 20 mA ... 4 mA 10 mA ... 0 mA 10 mA ... 2 mA 0 mA ... 24 mA
Input resistance	>120 kΩ	Approx. 50 Ω (+ 0.7 V for test diode)
Output data	U output	I output
Output signal (configurable via DIP switch or freely via software)	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 1 V ... 5 V 0 V ... 10.5 V	0 mA ... 20 mA 4 mA ... 20 mA 0 mA ... 10 mA 2 mA ... 10 mA 0 mA ... 21 mA
Maximum output signal	Approx. 12.3 V	24.6 mA
Load R_B	≥10 kΩ	≤600 Ω (at 20 mA)
Ripple	<20 mV_{PP} (at 600 Ω)	<20 mV_{PP} (at 600 Ω)
Switching output		
Relay output	1 N/O contact	
Max. switching voltage	30 V DC	
Maximum switching current	100 mA (at 30 V)	
General data	U output	I output
Supply voltage range	9.6 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	32 mA (24 V DC)	63 mA (12 V DC)
Power consumption		≤1 W (at I_{OUT} = 20 mA, 9.6 V DC, 600 Ω load)
Maximum transmission error	0.1% (of final value)	
Temperature coefficient	0.01%/K, typically 0.01%/K	
Step response (10-90%)	Approx. 140 ms (15 Hz sample rate) Approx. 45 ms (60 Hz sample rate) Approx. 25 ms (240 Hz sample rate)	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6	
DNV GL	B, B, A, A	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
4-way signal conditioner with switching output, for electrical isolation of analog signals				
Standard configuration	Push-in connection	**MINI MCR-2-UNI-UI-UIRO-PT**	2902028	1
Standard configuration	Screw connection	**MINI MCR-2-UNI-UI-UIRO**	2902026	1
Order configuration	Push-in connection	**MINI MCR-2-UNI-UI-UIRO-PT-C**	2902027	1
Order configuration	Screw connection	**MINI MCR-2-UNI-UI-UIRO-C**	2902024	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1

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

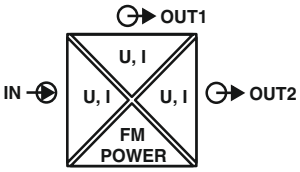
Order key for MINI MCR-2-UNI-UI-UIRO(-PT)(-C) 4-way signal conditioners (standard configuration entered as an example)

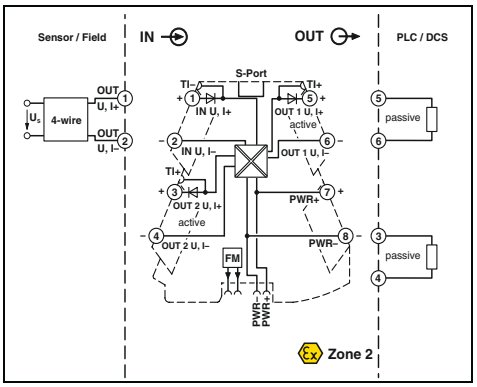
Order No.	Input			Output			Measuring range limit	Cut-off frequency	
	Input signal	Start	End	Output signal	Start	End			
2902024	**I**	**0.0**	**20.0**	**I**	**0.0**	**20.0**	**0**	**15**	**...**
2902024 ≙ MINI MCR-2-UNI-UI-UIRO-C 2902027 ≙ MINI MCR-2-UNI-UI-UIRO-PT-C	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 24 mA U: freely selectable between 0.0 ... 12 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 24 mA U: freely selectable between 0.0 ... 12 V	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	0 ≙ OFF 1 ≙ AN	15 ≙ 15 Hz 60 ≙ 60 Hz	
	Measuring range span at least 0.5 V / 1 mA Increment 0.1 V / 0.1 mA			Output signal span at least 0.5 V / 1 mA Increment 0.1 V / 0.1 mA					

Failure information

...	Behavior in the event of an error	Open circuit / short circuit	Measuring value over-range	Measured value under-range
	NE43DO	**0.0**	**0.0**	**0.0**
	FD ≙ Freely definable	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (free definition only for unlimited output) (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (free definition only for unlimited output) (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (free definition only for unlimited output) (signal type corresponds to selected output signal)
	Note: Failure information in accordance with NE 43 can only be selected for 4 ... 20 mA output			
	NE43UP ≙ NE 43 upscale NE43DO ≙ NE 43 downscale NE430 ≙ NE 43 0 mA NE43UD ≙ NE 43 upscale/downscale	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA

Analog IN/Analog OUT
4-way signal duplicators





4-way signal duplicator

Ex:

Housing width 6.2 mm

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

Notes:

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

Technical data

Input data	**U input**	**I input**
Input signal (configurable via DIP switch or freely via software)	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 1 V ... 5 V 0 V ... 12 V	0 mA ... 20 mA 4 mA ... 20 mA 0 mA ... 10 mA 20 mA ... 0 mA 0 mA ... 24 mA
Maximum input signal	12 V	24 mA
Input resistance	>120 kΩ	Approx. 50 Ω (+ 0.7 V for test diode)
Output data	**U output**	**I output**
Output signal (configurable via DIP switch or freely via software)	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 1 V ... 5 V 0 V ... 10.5 V	0 mA ... 20 mA 4 mA ... 20 mA 0 mA ... 10 mA 20 mA ... 0 mA 0 mA ... 21 mA
Maximum output signal	Approx. 12.3 V	24.6 mA
No-load voltage		≤18.5 V
Short-circuit current	≤25 mA	
Load R_B	≥10 kΩ	≤600 Ω (per channel)
Ripple	<20 mV_{PP} (at 600 Ω)	<20 mV_{PP} (at 600 Ω)
General data	**U output**	**I output**
Supply voltage range	9.6 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	55 mA (24 V DC)	110 mA (12 V DC)
Power consumption		1.5 W (at I_{OUT} = 20 mA, 9.6 V DC, 600 Ω load)
Maximum transmission error	0.05% (of final value)	
Temperature coefficient	0.01%/K	
Step response (10-90%)	Approx. 140 ms (15 Hz sample rate) Approx. 45 ms (60 Hz sample rate) Approx. 25 ms (240 Hz sample rate)	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
Degree of protection	IP20	
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6	
DNV GL	B, B, A, A	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
4-way signal duplicator, with independently adjustable outputs				
Standard configuration	Push-in connection	**MINI MCR-2-UNI-UI-2UI-PT**	2905028	1
Standard configuration	Screw connection	**MINI MCR-2-UNI-UI-2UI**	2905026	1
Order configuration	Push-in connection	**MINI MCR-2-UNI-UI-2UI-PT-C**	2905027	1
Order configuration	Screw connection	**MINI MCR-2-UNI-UI-2UI-C**	2905025	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1

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

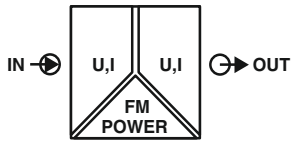
Order No.	Input			Output 1			Output 2			
	Input signal	Start	End	Output signal 1	Start	End	Output signal 2	Start	End	
2905027	**I**	**0.0**	**20.0**	**I**	**0.0**	**20.0**	**I**	**0.0**	**20.0**	**...**
2905025 ≙ MINI MCR-2-UNI-UI-2UI-C 2905027 ≙ MINI MCR-2-UNI-UI-2UI-PT-C	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 23.5 mA U: freely selectable between 0.0 ... 11.5 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 24 mA U: freely selectable between 0.5 ... 12 V	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 20 mA U: freely selectable between 0.0 ... 10.5 V	20.0 ≙ 20 mA I: freely selectable between 1.0 ... 21 mA U: freely selectable between 0.5 ... 11 V	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 20 mA U: freely selectable between 0.0 ... 10.5 V	20.0 ≙ 20 mA I: freely selectable between 1.0 ... 21 mA U: freely selectable between 0.5 ... 11 V	

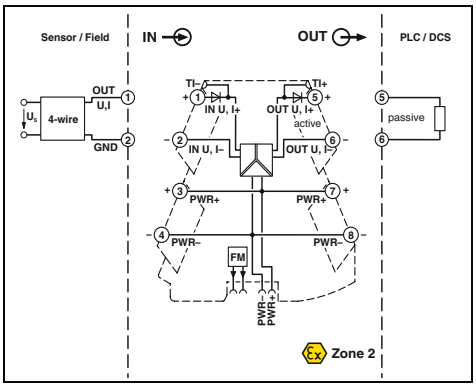
Measuring range span at least 0.5 V / 1 mA
Increment 0.1 V / 0.1 mA

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

...	Sample rate	Factory calibration certificate
	15	**None**
	15 ≙ 15 Hz 60 ≙ 60 Hz 250 ≙ 240 Hz	None ≙ no factory calibration certificate Yes ≙ certificate but no test data YesPlus ≙ certificate with test data

Analog IN/Analog OUT
3-way signal conditioners





Ex n

NFC

3-way signal conditioner for standard signals, configurable

Ex:

Housing width 6.2 mm

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

Notes:

Information on MINI Analog Pro accessories can be found from page 107

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

Technical data

Input data	**U input**	**I input**
Input signal (configurable using the DIP switch)	0 V ... 5 V 1 V ... 5 V -5 V ... 5 V 0 V ... 10 V 2 V ... 10 V -10 V ... 10 V 0 V ... 20 V 4 V ... 20 V -20 V ... 20 V 0 V ... 24 V 4.8 V ... 24 V -24 V ... 24 V 0 V ... 30 V 6 V ... 30 V -30 V ... 30 V	0 mA ... 20 mA 4 mA ... 20 mA -20 mA ... 20 mA
Input resistance	>1,000 kΩ	Approx. 63 Ω (+ 0.7 V for test diode)
Output data	**U output**	**I output**
Output signal (configurable using the DIP switch)	0 V ... 5 V 1 V ... 5 V -5 V ... 5 V 0 V ... 10 V 2 V ... 10 V -10 V ... 10 V	0 mA ... 20 mA 4 mA ... 20 mA
Maximum output signal		22 mA
No-load voltage		<17 V
Short-circuit current	<32 mA	
Load R_B	≥10 kΩ	≤600 Ω (at 20 mA)
Ripple	<20 mV_{PP} (at 600 Ω)	<20 mV_{PP} (at 600 Ω)
General data	**U output**	**I output**
Supply voltage range	9.6 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	25 mA (current output, at 24 V DC incl. load)	54 mA (current output, at 12 V DC incl. load)
Power consumption		≤800 mW (at I_{OUT} = 20 mA, 9.6 V DC, 600 Ω load)
Maximum transmission error	≤0.1% (of final value)	
Temperature coefficient	0.01%/K, typically 0.01%/K	
Limit frequency (3 dB)	30 Hz (via DIP switch)	
Step response (10-90%)	<8.5 ms (with 30 Hz filter)	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
Degree of protection	IP20	
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6	
DNV GL	C, EMC2	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
3-way signal conditioner, for electrical isolation of analog signals				
Standard configuration	Push-in connection	**MINI MCR-2-UI-UI-PT**	2902040	1
Standard configuration	Screw connection	**MINI MCR-2-UI-UI**	2902037	1
Order configuration	Push-in connection	**MINI MCR-2-UI-UI-PT-C**	2902039	1
Order configuration	Screw connection	**MINI MCR-2-UI-UI-C**	2902036	1

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

Order No.	Input	Output	Cut-off frequency
2902036	/ IN03	/ OUT01	/ 5K
2902036 ≙ MINI MCR-2-UI-UI-C	IN 01 ≙ 0 ... 20 mA IN 02 ≙ 4 ... 20 mA IN 03 ≙ 0 ... 10 V IN 04 ≙ 2 ... 10 V	OUT 01 ≙ 0 ... 20 mA OUT 02 ≙ 4 ... 20 mA OUT 03 ≙ 0 ... 10 V OUT 04 ≙ 2 ... 10 V	30 Hz 5 kHz
2902039 ≙ MINI MCR-2-UI-UI-PT-C	IN 05 ≙ 0 ... 5 V IN 06 ≙ 1 ... 5 V IN 21 ≙ -5 ... 5 V IN 22 ≙ -10 ... 10 V IN 23 ≙ -20 ... 20 V IN 32 ≙ 0 ... 20 V IN 35 ≙ -20 ... 20 mA IN 38 ≙ 0 ... 24 V IN 39 ≙ 0 ... 30 V IN 80 ≙ -30 ... 30 V IN 93 ≙ -24 ... 24 V IN 94 ≙ 4.8 ... 24 V IN 95 ≙ 6 ... 30 V IN 96 ≙ 4 ... 20 V	OUT 05 ≙ 0 ... 5 V OUT 06 ≙ 1 ... 5 V OUT 13 ≙ -5 ... 5 V OUT 14 ≙ -10 ... 10 V	

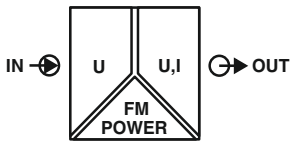
Signal combinations for MINI MCR-2-U-UI(-PT)(-C) signal conditioners

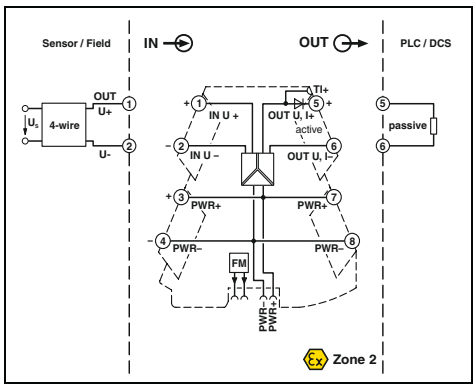
	Output							
Input	0 ... 20 mA	4 ... 20 mA	0 ... 5 V	1 ... 5 V	-5 ... 5 V	0 ... 10 V	2 ... 10 V	-10 ... 10 V
0 ... 20 mA	X	X	X	X	X	X	X	X
4 ... 20 mA	X	X	X	X	X	X	X	X
-20 ... 20 mA	X	X	X	X	X	X	X	X
0 ... 5 V	X	X	X	X	X	X	X	X
1 ... 5 V	X	X	X	X	X	X	X	X
-5 ... 5 V	X	X	X	X	X	X	X	X
0 ... 10 V	X	X	X	X	X	X	X	X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

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

Analog IN/Analog OUT
3-way signal conditioners

new





Ex n

NFC

3-way signal conditioner for standard signals, configurable

Housing width 6.2 mm

- Configurable 3-way signal conditioner with plug-in connection technology
- Input and output signal range configurable via DIP switches
- Input signal range from ±50 mV to ±30 V
- Bipolar input/output signals
- Calibrated measuring range switch-over
- Approval for Ex zone 2 (nA)
- Screw or Push-in connection
- Reinforced insulation in accordance with IEC 61010-1
- Supply voltage range of 9.6 V ... 30 V DC

Notes:

Information on MINI Analog Pro accessories can be found from page 107

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

Technical data

Input data		
Input signal (configurable using the DIP switch)	See table	
Input resistance	>10 kΩ	
Output data	U output	I output
Output signal (configurable using the DIP switch)	0 V ... 5 V 1 V ... 5 V -5 V ... 5 V 0 V ... 10 V 2 V ... 10 V -10 V ... 10 V	0 mA ... 20 mA 4 mA ... 20 mA
Maximum output signal		22 mA
No-load voltage		<17 V
Short-circuit current	<32 mA	
Load R_B	≥10 kΩ	≤600 Ω (at 20 mA)
Ripple	<20 mV_{PP} (at 600 Ω)	<20 mV_{PP} (at 600 Ω)
General data	U output	I output
Supply voltage range	9.6 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	25 mA (current output, at 24 V DC incl. load)	54 mA (current output, at 12 V DC incl. load)
Power consumption		≤800 mW (at I_{OUT} = 20 mA, 9.6 V DC, 600 Ω load)
Maximum transmission error	≤0.1% (of final value)	
Temperature coefficient	0.01%/K	
Limit frequency (3 dB)	30 Hz (via DIP switch)	
Step response (10-90%)	<8.5 ms (with 30 Hz filter)	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
Degree of protection	IP20	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	Ⓔx II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6	
DNV GL	-	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
Standard configuration	Push-in connection	**MINI MCR-2-U-UI-PT**	2902021	1
Standard configuration	Screw connection	**MINI MCR-2-U-UI**	2902019	1
Order configuration	Push-in connection	**MINI MCR-2-U-UI-PT-C**	2902020	1
Order configuration	Screw connection	**MINI MCR-2-U-UI-C**	2902018	1

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

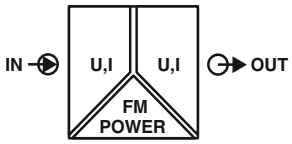
Order No.	Input		Output	Cut-off frequency
2902018 /	IN03		/ OUT01	/ 5K
2902018 ≙ MINI MCR-2-U-UI-C	IN40 ≙ 0 ... 50 mV	IN29 ≙ 0 ... 1 V	OUT 01 ≙ 0 ... 20 mA	30 Hz
	IN53 ≙ ±50 mV	IN18 ≙ ±1 V	OUT 02 ≙ 4 ... 20 mA	5 kHz
	IN24 ≙ 0 ... 60 mV	IN49 ≙ 0 ... 1.2 V	OUT 03 ≙ 0 ... 10 V	
	IN13 ≙ ±60 mV	IN62 ≙ ±1.2 V	OUT 04 ≙ 2 ... 10 V	
2902021 ≙ MINI MCR-2-U-UI-PT-C	IN41 ≙ 0 ... 75 mV	IN50 ≙ 0 ... 1.5 V	OUT 05 ≙ 0 ... 5 V	
	IN54 ≙ ±75 mV	IN63 ≙ ±1.5 V	OUT 06 ≙ 1 ... 5 V	
	IN42 ≙ 0 ... 80 mV	IN30 ≙ 0 ... 2 V	OUT 13 ≙ -5 ... 5 V	
	IN55 ≙ ±80 mV	IN19 ≙ ±2 V	OUT 14 ≙ -10 ... 10 V	
	IN25 ≙ 0 ... 100 mV	IN51 ≙ 0 ... 2.4 V		
	IN14 ≙ ±100 mV	IN64 ≙ ±2.4 V		
	IN43 ≙ 0 ... 120 mV	IN52 ≙ 0 ... 3 V		
	IN56 ≙ ±120 mV	IN65 ≙ ±3 V		
	IN44 ≙ 0 ... 150 mV	IN05 ≙ 0 ... 5 V		
	IN57 ≙ ±150 mV	IN21 ≙ ±5 V		
	IN26 ≙ 0 ... 200 mV	IN100 ≙ 0 ... 7.5 V		
	IN15 ≙ ±200 mV	IN107 ≙ ±7.5 V		
	IN45 ≙ 0 ... 240 mV	IN03 ≙ 0 ... 10 V		
	IN58 ≙ ±240 mV	IN22 ≙ ±10 V		
	IN27 ≙ 0 ... 300 mV	IN101 ≙ 0 ... 12 V		
	IN16 ≙ ±300 mV	IN108 ≙ ±12 V		
	IN28 ≙ 0 ... 500 mV	IN67 ≙ 0 ... 15 V		
	IN17 ≙ ±500 mV	IN79 ≙ ±15 V		
	IN46 ≙ 0 ... 600 mV	IN32 ≙ 0 ... 20 V		
	IN59 ≙ ±600 mV	IN23 ≙ ±20 V		
	IN47 ≙ 0 ... 750 mV	IN38 ≙ 0 ... 24 V		
	IN60 ≙ ±750 mV	IN93 ≙ ±24 V		
	IN48 ≙ 0 ... 800 mV	IN39 ≙ 0 ... 30 V		
	IN61 ≙ ±800 mV	IN80 ≙ ±30 V		

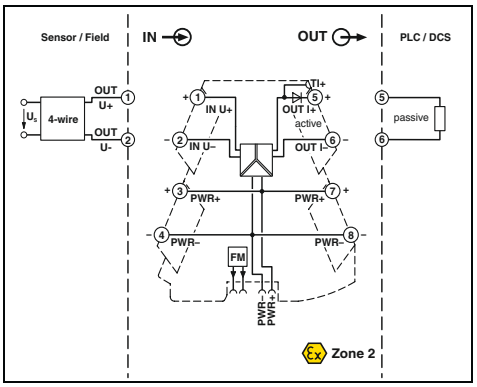
Signal combinations for MINI MCR-2-U-UI(-PT)(-C) signal conditioners

	Output							
Input	0 ... 20 mA	4 ... 20 mA	0 ... 5 V	1 ... 5 V	-5 ... 5 V	0 ... 10 V	2 ... 10 V	-10 ... 10 V
0 ... 50 mV (±50 mV)	X	X	X	X	X	X	X	X
0 ... 60 mV (±60 mV)	X	X	X	X	X	X	X	X
0 ... 75 mV (±75 mV)	X	X	X	X	X	X	X	X
0 ... 80 mV (±80 mV)	X	X	X	X	X	X	X	X
0 ... 100 mV (±100 mV)	X	X	X	X	X	X	X	X
0 ... 120 mV (±120 mV)	X	X	X	X	X	X	X	X
0 ... 150 mV (±150 mV)	X	X	X	X	X	X	X	X
0 ... 200 mV (±200 mV)	X	X	X	X	X	X	X	X
0 ... 240 mV (±240 mV)	X	X	X	X	X	X	X	X
0 ... 300 mV (±300 mV)	X	X	X	X	X	X	X	X
0 ... 500 mV (±500 mV)	X	X	X	X	X	X	X	X
0 ... 600 mV (±600 mV)	X	X	X	X	X	X	X	X
0 ... 750 mV (±750 mV)	X	X	X	X	X	X	X	X
0 ... 800 mV (±800 mV)	X	X	X	X	X	X	X	X
0 ... 1 V (±1 V)	X	X	X	X	X	X	X	X
0 ... 1.2 V (±1.2 V)	X	X	X	X	X	X	X	X
0 ... 1.5 V (±1.5 V)	X	X	X	X	X	X	X	X
0 ... 2 V (±2 V)	X	X	X	X	X	X	X	X
0 ... 2.4 V (±2.4 V)	X	X	X	X	X	X	X	X
0 ... 3 V (±3 V)	X	X	X	X	X	X	X	X
0 ... 5 V (±5 V)	X	X	X	X	X	X	X	X
0 ... 7.5 V (±7.5 V)	X	X	X	X	X	X	X	X
0 ... 10 V (±10 V)	X	X	X	X	X	X	X	X
0 ... 12 V (±12 V)	X	X	X	X	X	X	X	X
0 ... 15 V (±15 V)	X	X	X	X	X	X	X	X
0 ... 20 V (±20 V)	X	X	X	X	X	X	X	X
0 ... 24 V (±24 V)	X	X	X	X	X	X	X	X
0 ... 30 V (±30 V)	X	X	X	X	X	X	X	X

Unipolar or bipolar selection option available for input signal via DIP switch.

Analog IN/Analog OUT
3-way signal conditioners





Ex n

NFC

3-way signal conditioner
with fixed signal combinations

Ex:

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

Notes:

Information on MINI Analog Pro accessories can be found from page 107

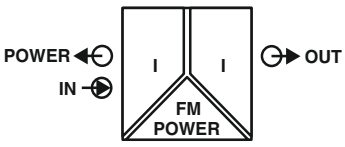
Technical data

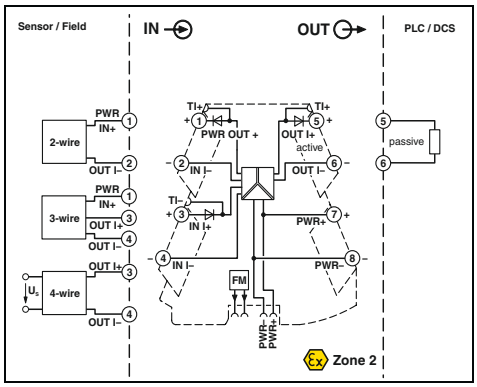
Input data	U input	I input
Input resistance	Approx. 1 MΩ	Approx. 63 Ω (+ 0.7 V for test diode)
Output data	U output	I output
Maximum output signal	11 V	22 mA
No-load voltage		<17 V
Short-circuit current	<15 mA	
Load R_B	≥10 kΩ	≤600 Ω (at 20 mA)
Ripple	<20 mV_{PP} (at 10 kΩ)	<20 mV_{PP} (at 600 Ω)
General data		
Supply voltage U_B	9.6 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Typ. current consumption	25 mA (24 V DC)	
Maximum transmission error	0.1% (of final value)	
Temperature coefficient	0.01%/K, typically 0.01%/K	
Limit frequency (3 dB)	Approx. 30 Hz	
Step response (10-90%)	Approx. 10 ms	
Degree of protection	IP20	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6	
DNV GL	C, EMC2	

Ordering data

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

Analog IN/Analog OUT
3-way repeater power supplies





Ex n

3-way repeater power supply

Ex:

Housing width 6.2 mm

- Highly compact repeater power supply 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
- Plug-in connection system
- Safe 3-way isolation
- Power supply and fault monitoring possible via DIN rail connector
- Status LED

Notes:

Information about power bridging, system cabling, and marking components can be found starting at page 102

Technical data

Input data	
Input signal	0 ... 20 mA, isolator operation / 4 ... 20 mA, repeater power supply and isolator operation
Input resistance	Approx. 68 Ω (+ 0.7 V for test diode)
Transmitter supply voltage	>19.5 V
Output data	
Output signal	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	24 mA
No-load voltage	<20 V
Load R_B	≤600 Ω (at 20 mA)
Ripple	<20 mV_{PP} (at 600 Ω)
General data	
Supply voltage range	9.6 V DC ... 30 V DC
Nominal supply voltage	24 V DC
Current consumption	25 mA (at 24 V DC and in isolator operation)
Power consumption	≤1400 mW (at I_{OUT} = 20 mA, 9.6 V DC, 600 Ω load)
Maximum transmission error	0.05% (of final value, at 4 mA ... 20 mA)
Temperature coefficient	0.0075%/K, typically 0.0075%/K
Limit frequency (3 dB)	>1.75 kHz (typically)
Step response (10-90%)	<200 µs (typically)
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1
Degree of protection	IP20
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC T5
DNV GL	C, EMC2

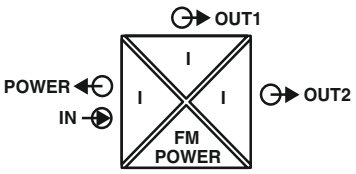
Ordering data

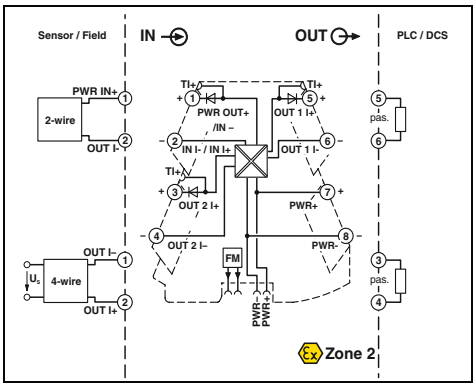
Description	Type	Order No.	Pcs./Pkt.
3-way repeater power supplies			
Push-in connection	**MINI MCR-2-RPSS-I-I-PT**	2902015	1
Screw connection	**MINI MCR-2-RPSS-I-I**	2902014	1

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

Analog IN / Analog OUT
Power supply doublers

new





Ex n

NFC

Power supply doubler with HART transmission

Ex:

Housing width 6.2 mm

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

Technical data

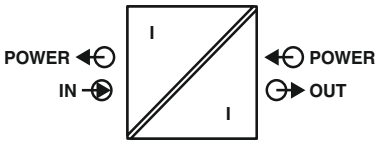
Input data	
Input signal	0 ... 20 mA, isolator operation / 4 ... 20 mA, repeater power supply and isolator operation
Input resistance	90 Ω (+1.6 V)
Transmitter supply voltage	>19.5 V
Output data	
Output signal	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	25 mA
No-load voltage	<20 V
Load R_B	≤500 Ω (per channel)
Ripple	<20 mV_{PP} (at 500 Ω)
General data	
Supply voltage range	9.6 V DC ... 30 V DC
Nominal supply voltage	24 V DC
Current consumption	40 mA (at 24 V DC and in isolator operation)
Power consumption	1.6 W (at I_{OUT} = 20 mA, 500 Ω load)
Maximum transmission error	0.05% (of final value)
Temperature coefficient	0.0075%/K,
Limit frequency (3 dB)	>1 kHz (typically)
Step response (10-90%)	<400 µs (typically)
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1
Degree of protection	IP20
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC T5
DNV GL	B, B, A, A

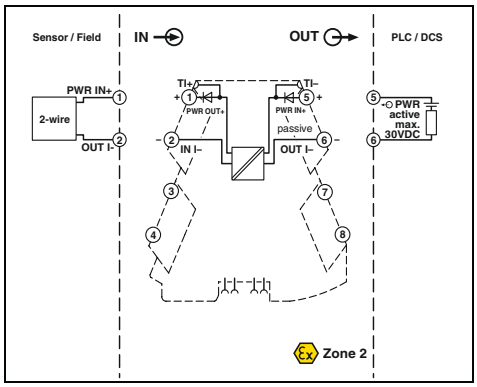
Ordering data

Description	Type	Order No.	Pcs./Pkt.
4-way power supply doubler, with HART transmission and automatic active/passive detection at the outputs			
Push-in connection	**MINI MCR-2-RPSS-I-2I-PT**	2905629	1
Screw connection	**MINI MCR-2-RPSS-I-2I**	2905628	1

Analog IN / Analog OUT
2-way repeater power supplies, output loop-powered

new





Ex n

NFC

Either 1- or 2-channel

Ex:

Housing width 6.2 mm

- The single or dual-channel output loop-powered 2-way repeater power supply with plug-in connection technology is used for the electrical isolation and filtering of analog signals
- This device allows operation on an active analog input module
- The module and the connected sensors are powered via the current loop of the controller
- As a result, no additional power supply is required
- Input signal = output signal: 0(4) mA ... 20 mA

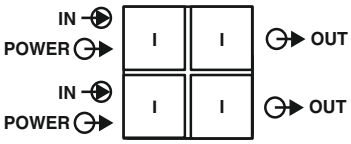
Technical data

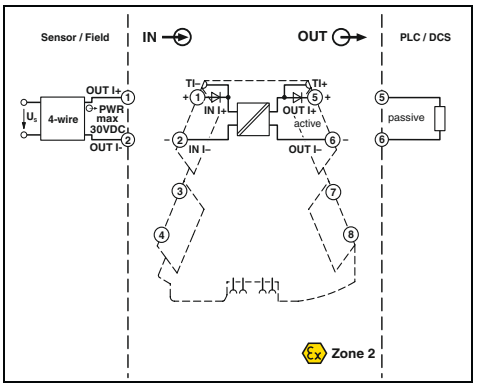
Input data	
Input signal	0 ... 20 mA / 4 ... 20 mA
Transmitter supply voltage	U_A - 5 V
Output data	
Output signal	0 ... 20 mA / 4 ... 20 mA
Output signal	5 V ... 30 V
General data	
Maximum transmission error	≤0.1% (at 5 V)
Additional error, depending on the input voltage	(U_A - 5 V) x 0.06%
Temperature coefficient	≤0.001%/K
Limit frequency (3 dB)	100 Hz
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1
Degree of protection	IP20
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Output loop-powered 2-way repeater power supply, for isolating current signals without auxiliary power			
Push-in connection	**MINI MCR-2-RPS-I-I-OLP-PT**	2906447	1
Screw connection	**MINI MCR-2-RPS-I-I-OLP**	2906446	1
Push-in connection	**MINI MCR-2-RPS-2I-2I-OLP-PT**	2906449	1
Screw connection	**MINI MCR-2-RPS-2I-2I-OLP**	2906448	1

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





Either 1- or 2-channel

Ex:

Housing width 6.2 mm

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

Notes:

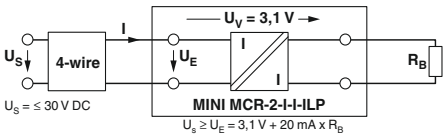
Information on MINI Analog Pro accessories can be found from page 107

Technical data

Input data	
Input signal	0 ... 20 mA / 4 ... 20 mA
Input voltage limitation	30 V
Voltage drop	3.1 V (I = 20 mA)
Response current	Approx. 200 µA
Output data	
Output signal	0 ... 20 mA / 4 ... 20 mA
Load R_B	<600 Ω (at I = 20 mA output signal)
Transmission Behavior	1:1 to input signal
General data	
Maximum transmission error	≤0.1% (of final value)
Additional error per 100 Ω load	<0.075% (of measured value / 100 Ω load)
Temperature coefficient	≤0.002%/K (of measured value / 100 Ω load)
Limit frequency (3 dB)	100 Hz
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1
Degree of protection	IP20
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6
GL	GL applied for

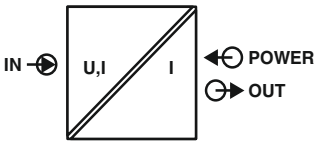
Ordering data

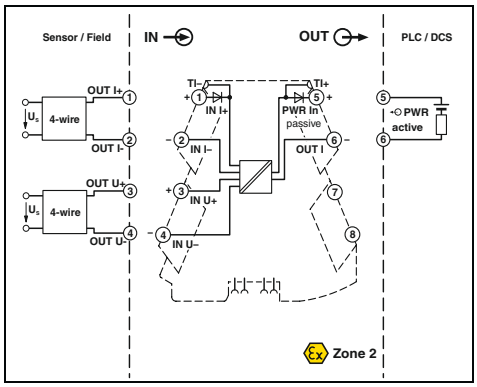
Description		Type	Order No.	Pcs./Pkt.
Input loop-powered 2-way isolator, for isolating current signals without auxiliary power				
single-channel	Push-in connection	**MINI MCR-2-I-I-ILP-PT**	2901995	1
single-channel	Screw connection	**MINI MCR-2-I-I-ILP**	2901994	1
two-channel	Push-in connection	**MINI MCR-2-2I-2I-ILP-PT**	2901997	1
two-channel	Screw connection	**MINI MCR-2-2I-2I-ILP**	2901996	1



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

new





Ex n

Configurable, up to 74 signal combinations

Ex:

Housing width 6.2 mm

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

Notes:

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

Information on MINI Analog Pro accessories can be found from page 107

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	<30 V	50 mA (dielectric strength up to 30 V)
Input resistance	Approx. 100 kΩ (at ≤1 V, otherwise approximately 1 MΩ)	25 Ω (+ 0.7 V for test diode)
Output data		
Output signal	4 ... 20 mA	
Maximum output signal	32 mA	
Load R_B	<1,000 Ω ($(U_B$ - 8 V) / 22 mA)	
Ripple	<10 mV_{rms} (at 600 Ω)	
General data		
Current consumption	≤20 mA	
Maximum transmission error	≤0.1% (of final value)	
Temperature coefficient	0.01%/K, typically 0.005%/K	
Limit frequency (3 dB)	Approx. 30 Hz	
Step response (10-90%)	20 ms	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
Degree of protection	IP20	
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC T5	
DNV GL	B, B, A, A	

Ordering data

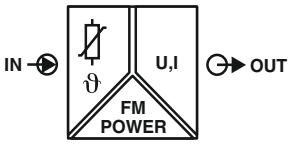
Description		Type	Order No.	Pcs./Pkt.
Output loop-powered 2-way isolator, for isolating current signals without auxiliary power				
Standard configuration	Push-in connection	**MINI MCR-2-UI-I-OLP-PT**	2902063	1
Standard configuration	Screw connection	**MINI MCR-2-UI-I-OLP**	2902061	1
Order configuration	Push-in connection	**MINI MCR-2-UI-I-OLP-PT-C**	2902062	1
Order configuration	Screw connection	**MINI MCR-2-UI-I-OLP-C**	2902060	1

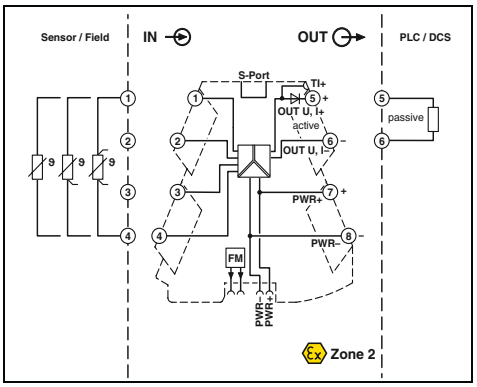
Order key for MINI MCR-2-UI-I-OLP(-PT)(-C)

Order No.	Input					
2902060	/ 0 mV ... 1,000 mV					
2902060 ≙ MINI MCR-2-UI-I-OLP-C 2902062 ≙ MINI MCR-2-UI-I-OLP-PT-C	0 mV ... 1,000 mV 0 mV ... 750 mV 0 mV ... 500 mV 0 mV ... 300 mV 0 mV ... 250 mV 0 mV ... 200 mV 0 mV ... 150 mV 0 mV ... 125 mV 0 mV ... 120 mV 0 mV ... 100 mV 0 mV ... 75 mV 0 mV ... 60 mV 0 mV ... 50 mV	0 V ... 10 V 0 V ... 7.5 V 0 V ... 5 V 0 V ... 3 V 0 V ... 2.5 V 0 V ... 2 V 0 V ... 1.5 V 0 V ... 1.25 V 0 V ... 1.2 V 0 V ... 30 V 0 V ... 25 V 0 V ... 20 V 0 V ... 12.5 V 0 V ... 12 V 0 V ... 15 V 2 V ... 10 V	-1,000 mV ... 1,000 mV -750 mV ... 750 mV -500 mV ... 500 mV -300 mV ... 300 mV -250 mV ... 250 mV -200 mV ... 200 mV -125 mV ... 125 mV -120 mV ... 120 mV -150 mV ... 150 mV -100 mV ... 100 mV -75 mV ... 75 mV -60 mV ... 60 mV -50 mV ... 50 mV	-10 V ... 10 V -7.5 V ... 7.5 V -5 V ... 5 V -3 V ... 3 V -2.5 V ... 2.5 V -2 V ... 2 V -1.25 V ... 1.25 V -1.2 V ... 1.2 V -1.5 V ... 1.5 V -30 V ... 30 V -25 V ... 25 V -20 V ... 20 V -12.5 V ... 12.5 V -12 V ... 12 V -15 V ... 15 V 1 V ... 5 V	0 mA ... 40 mA 0 mA ... 30 mA 0 mA ... 20 mA 0 mA ... 12 mA 0 mA ... 10 mA 0 mA ... 8 mA 0 mA ... 7.5 mA 0 mA ... 5 mA 0 mA ... 6 mA 0 mA ... 4 mA 0 mA ... 3 mA 0 mA ... 2.5 mA 0 mA ... 2 mA 4 mA ... 20 mA 2 mA ... 10 mA 1 mA ... 5 mA	-2 mA ... 2 mA -3 mA ... 3 mA -10 mA ... 10 mA -15 mA ... 15 mA -20 mA ... 20 mA -30 mA ... 30 mA -40 mA ... 40 mA

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

Temperature
Temperature transducers
for resistance thermometers





Ex n

NFC

Universal temperature transducer for resistance thermometers

Ex:

Housing width 6.2 mm

- Universally configurable, highly compact temperature transducer for electrical isolation, conversion, amplification, and filtering of resistance thermometer and remote resistance-type sensor signals
- For 2, 3 or 4-conductor sensors in accordance with IEC 751, JIS, GOST
- 2-conductor resistance measurement, up to 4,000 Ω
- Plug-in connection system
- Safe 3-way isolation
- Standard signal combinations configurable via DIP switches
- Freely-configurable with software or smartphone app
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

Notes:

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

Information on the programming adapters can be found on page 111

Information on MINI Analog Pro accessories can be found from page 107

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

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 depends on sensor type, range can be set freely via software or in increments from -150°C to 850°C via DIP switches)	
Measuring range span	≥20 K	
Linear resistance measuring range	0 Ω ... 4,000 Ω (minimum measuring span: 10% of the selected measuring range)	
Output data	U output	I output
Output signal (configurable via DIP switch or freely via software)	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
No-load voltage		<17.5 V
Short-circuit current	<31.5 mA	
Load R_B	≥10 kΩ	≤600 Ω (at 20 mA)
Ripple	<10 mV_{rms}	<10 mV_{rms} (at 600 Ω)
General data		
Supply voltage range	9.6 V DC ... 30 V DC	
Current consumption	32 mA (24 V DC)	
Power consumption	≤850 mW (at I_{OUT} = 20 mA, 9.6 V DC, 600 Ω load)	
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%)	Typically 200 ms (2-conductor) Typically 500 ms (3-conductor) Typically 500 ms (4-conductor)	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6	
DNV GL	C, EMC2	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
Temperature transducers for resistance thermometers				
Standard configuration	Push-in connection	**MINI MCR-2-RTD-UI-PT**	2902052	1
Standard configuration	Screw connection	**MINI MCR-2-RTD-UI**	2902049	1
Order configuration	Push-in connection	**MINI MCR-2-RTD-UI-PT-C**	2902051	1
Order configuration	Screw connection	**MINI MCR-2-RTD-UI-C**	2902048	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1

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

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

Order No.	Sensor type	Connection technology	Measuring unit	Measuring range Start	Measuring range End	Output Output signal	Output Start	Output End
2902048	PT100	3	C	-50	150	I	4.0	20.0
2902048 ≙ MINI MCR-2-RTD-UI-C 2902051 ≙ MINI MCR-2-RTD-UI-PT-C	PT100 ≙ Pt 100 IEC751 PT200 ≙ Pt 200 IEC751 PT500 ≙ Pt 500 IEC751 PT1000 ≙ Pt 1000 IEC751 PT100G ≙ Pt 100 GOST 6651-2009 (α = 0.00394) PT1000G ≙ Pt 1000 GOST 6651-2009 (α = 0.00394) PT100J ≙ Pt 100 JIS C1604/1997 PT1000J ≙ Pt 1000 JIS C1604/1997 NI100 ≙ Ni 100 DIN 43760 NI1000 ≙ Ni 1000 DIN 43760 CU50 ≙ Cu 50 GOST 6651-2009 (α = 0.00428) CU100 ≙ Cu 100 GOST 6651-2009 (α = 0.00428) CU53 ≙ Cu 53 GOST 6651-2009 (α = 0.00426)	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	C ≙ °C F ≙ °F	Freely selectable between -200°C ... 850°C (measuring range limits depend on sensor type)	Freely selectable between -200°C ... 850°C (measuring range limits depend on sensor type)	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V
				Minimum measuring span 20 K		Output signal span at least 0.5 V / 1 mA Increment 0.1 V / 0.1 mA		

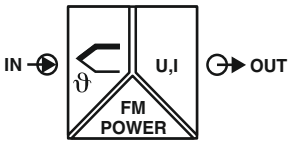
...	Failure information: Behavior in the event of an error	Failure information: Open circuit	Failure information: Short circuit	Failure information: Measuring value over-range	Failure information: Measured value under-range	Factory calibration certificate
...	NE43DO	0.0	0.0	0.0	0.0	None
	FD ≙ Freely definable	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	None ≙ no factory calibration certificate Yes ≙ certificate but no test data YesPlus ≙ certificate with test data
	Note: Failure information in accordance with NE 43 can only be selected for 4 ... 20 mA output					
	NE43UP ≙ NE 43 upscale NE43DO ≙ NE 43 downscale NE430 ≙ NE 43 0 mA NE43UD ≙ NE 43 upscale/ downscale	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	

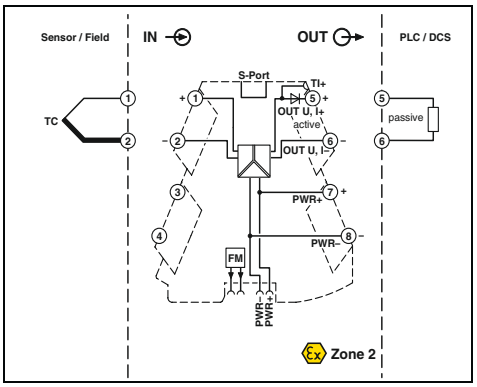
Sensor types and measuring ranges for MINI MCR-2-RTD-UI(-PT)(-C) temperature transducers

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

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

Temperature
Temperature transducers for thermocouples





Universal temperature transducer for thermocouples

Ex:
Housing width 6.2 mm

- Universally configurable, highly compact temperature transducer for electrical isolation, conversion, amplification, and filtering of thermocouple signals
- Voltage measurement from ±0 ... 15 mV to ±0 ... 500 mV, fully adjustable
- For thermocouples in accordance with IEC 584 and GOST
- Internal cold junction compensation
- Plug-in connection system
- Safe 3-way isolation
- Standard signal combinations configurable via DIP switches
- Freely-configurable with software or smartphone app
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

Notes:

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

Information on the programming adapters can be found on page 111

Information on MINI Analog Pro accessories can be found from page 107

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

Technical data

Input data		
Input signal (can be configured using DIP switches)	B, C, E, J, K, N, R, S, T, L, U, A-1, A-2, A-3, M, L	
Temperature range	-250°C ... 2500°C (range depends on sensor type, range can be set freely via software or in increments from -150°C to 1350°C via DIP switches)	
Measuring range span	min. 50 K	
Output data	U output	I output
Output signal (configurable via DIP switch or freely via software)	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
No-load voltage		<17.5 V
Short-circuit current	<31.5 mA	
Load R_B	≥10 kΩ	≤600 Ω (at 20 mA)
Ripple	<10 mV_{rms}	<10 mV_{rms} (at 600 Ω)
General data		
Supply voltage range	9.6 V DC ... 30 V DC	
Current consumption	32.7 mA (24 V DC)	
Power consumption	≤850 mW (at I_{OUT} = 20 mA, 9.6 V DC, 600 Ω load)	
Transmission error	0.1% * 600 K / set measuring range; 0.1% >600 K (C, E, J, K, N, T, L, U, M Gost, L Gost) 0.2% * 600 K / set measuring range; 0.2% >600 K (B, R, S, A1, A2, A3) 0.2% * 600 K / set measuring range; 0.2% >600 K (E, J, K, N, T, L, U, M Gost, L Gost); Highspeed Mode 0.4% * 600 K / set measuring range; 0.4% >600 K (B, R, S, A1, A2, A3); Highspeed Mode	
Cold junction errors	- (typically 2 K (2 K + (0,2 K * ΔT)))	
Temperature coefficient	≤0.01%/K	
Step response (0 - 99%)	Typically 400 ms (highspeed Mode: typically 150 ms)	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6	
DNV GL	C, EMC2	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
Temperature transducers for thermocouples				
Standard configuration	Push-in connection	**MINI MCR-2-TC-UI-PT**	2905249	1
Standard configuration	Screw connection	**MINI MCR-2-TC-UI**	2902055	1
Order configuration	Push-in connection	**MINI MCR-2-TC-UI-PT-C**	2905248	1
Order configuration	Screw connection	**MINI MCR-2-TC-UI-C**	2902053	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1

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

Order No.	Sensor type	Cold junction error compensation	Measuring unit	Measuring range Start	Measuring range End	Output Output signal	Output Start	Output End	
2902053	J	1	C	-200	1200	I	4.0	20.0	...
2902053 ≙ MINI MCR-2-TC-UI-C 2905248 ≙ MINI MCR-2-TC-UI-PT-C	B ≙ B IEC 584-1 (Pt30Rh-Pt6Rh) E ≙ E IEC 584-1 (NiCr-CuNi) J ≙ J IEC 584-1 (Fe-CuNi) K ≙ K IEC584-1(NiCr-Ni) N ≙ N IEC 584-1 (NiCrSi-NiSi) R ≙ R IEC 584-1 (Pt13Rh-Pt) S ≙ S IEC 584-1 (Pt10Rh-Pt) T ≙ T IEC 584-1 (Cu-CuNi) L ≙ L DIN 43760 (Fe-CuNi) U ≙ U DIN 43760 (Cu-CuNi) A1G ≙ A-1 GOST 8.585-2001 A2G ≙ A-2 GOST 8.585-2001 A3G ≙ A-3 GOST 8.585-2001 MG ≙ M GOST 8.585-2001 LG ≙ L GOST 8.585-2001	0 ≙ OFF 1 ≙ AN	C ≙°C F ≙°F	Freely selectable between -250°C ... 2500°C (measuring range limits depend on sensor type)	Freely selectable between -250°C ... 2500°C (measuring range limits depend on sensor type)	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	

Minimum measuring span 50 K

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

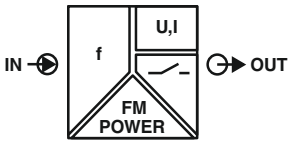
...	Failure information Behavior in the event of an error	Failure information Open circuit	Failure information Measuring value over-range	Failure information Measured value under-range	Factory calibration certificate
	NE43DO	0.0	0.0	0.0	None
	FD ≙ Freely definable	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	None ≙ no factory calibration certificate Yes ≙ certificate but no test data YesPlus ≙ certificate with test data
	Note: Failure information in accordance with NE 43 can only be selected for 4 ... 20 mA output				
	NE43UP ≙ NE 43 upscale NE43DO ≙ NE 43 downscale NE430 ≙ NE 43 0 mA NE43UD ≙ NE 43 upscale/downscale	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	

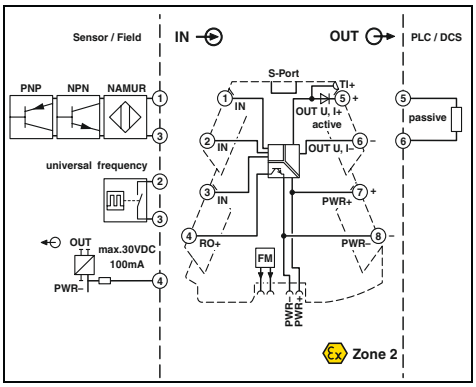
Sensor types and measuring ranges for MINI MCR-2-TC-UI(-PT)(-C) temperature transducers

Sensor type	Standard	Measuring range	Smallest measuring span	Adjustable using:
B	IEC 584-1	+500°C ... +1,820°C	50 K	Software or smartphone app
E	IEC 584-1	-230°C ... +1,000°C	50 K	Software or smartphone app
J	IEC 584-1	-210°C ... +1,200°C	50 K	DIP switch
K	IEC 584-1	-250°C ... +1,372°C	50 K	DIP switch
N	IEC 584-1	-200°C ... +1,300°C	50 K	Software or smartphone app
R	IEC 584-1	-50°C ... +1,768°C	50 K	Software or smartphone app
S	IEC 584-1	-50°C ... +1,768°C	50 K	Software or smartphone app
T	IEC 584-1	-200°C ... +400°C	50 K	Software or smartphone app
L	DIN 43710	-200°C ... +900°C	50 K	Software or smartphone app
U	DIN 43710	-200°C ... +600°C	50 K	Software or smartphone app
A-1	GOST 8.585	0°C ... +2,500°C	50 K	Software or smartphone app
A-2	GOST 8.585	0°C ... +1,800°C	50 K	Software or smartphone app
A-3	GOST 8.585	0°C ... +1,800°C	50 K	Software or smartphone app
M	GOST 8.585	-200°C ... +100°C	50 K	Software or smartphone app
L	GOST 8.585	-200°C ... +800°C	50 K	Software or smartphone app
Customer-specific characteristic curves		-250°C ... +2,500°C	50 K	Software or smartphone app

Frequency
Universal frequency transducers

new





Ex n

µC NFC

Configurable,
universal frequency or PWM input

Ex:

Housing width 6.2 mm

- Universally configurable, highly compact 3-way isolated frequency transducer with inverting transistor switching output
- Suitable for the connection of NAMUR proximity sensors (IEC 60947-5-6 and EN 50227) as well as for sensors with NPN and PNP outputs that generate a frequency signal
- For electrical isolation, conversion, amplification, and filtering of frequency and PWM signals
- Frequency signals in the range from 0.002 to 200 kHz and PWM signals up to 1 kHz
- Supports fault monitoring
- Plug-in connection system
- Safe 3-way isolation
- Standard behavior can be configured via DIP switches
- Freely configurable via software or smartphone app
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

Notes:

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

Information on the programming adapters can be found on page 111

Technical data

Input data		
Input sources	NAMUR initiators NPN/PNP transistor outputs Floating contact (dry contact) Frequency generator Incremental encoder (speed only) HTL encoders TTL rotary transducer S0 signal	
Frequency measuring range	0.002 Hz ... 200 kHz	
Maximum input signal	30 V (incl. DC voltage)	
PWM (range)	0.002 Hz ... 60 Hz (Duty cycle 2 ... 98%) 60 Hz ... 300 Hz (Duty cycle 5 ... 95%) 300 Hz ... 600 Hz (Duty cycle 10 ... 90%) 600 Hz ... 1,000 Hz (Duty cycle 20 ... 80%)	
Measuring range span	≥2 V	
Output data	U output	I output
Output signal	0 ... 10 V / 2 ... 10 V 0 ... 5 V / 1 ... 5 V	0 ... 20 mA / 4 ... 20 mA 0 ... 10 mA / 2 ... 10 mA
Maximum output signal	Approx. 12.3 V	24.6 mA
Load R_B	≥10 kΩ	≤600 Ω (at 20 mA)
Ripple	<20 mV_{PP} (at 600 Ω)	<20 mV_{PP} (at 600 Ω)
Switching output		
Relay output	1 N/O contact	
Max. switching voltage	30 V DC	
Maximum switching current	100 mA (30 V)	
Minimum switching current	100 µA	
General data		
Supply voltage range	9.6 V DC ... 30 V DC	
Current consumption	32 mA (24 V DC) 63 mA (12 V DC)	
Power consumption	≤1 W (at I_{OUT} = 20 mA, 9.6 V DC, 600 Ω load)	
Maximum transmission error	0.1% (Frequency) 1% (PWM signal)	
Temperature coefficient	0.01%/K, typically 0.01%/K	
Step response (0 - 99%)	<35 ms (f >500 Hz)	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC T5	
DNV GL	B, B, A, A	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
MCR frequency transducers				
Standard configuration	Push-in connection	**MINI MCR-2-F-UI-PT**	2902058	1
Standard configuration	Screw connection	**MINI MCR-2-F-UI**	2902056	1
Order configuration	Push-in connection	**MINI MCR-2-F-UI-PT-C**	2902059	1
Order configuration	Screw connection	**MINI MCR-2-F-UI-C**	2902057	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1
Constant voltage source			
with Push-in connection	**MINI MCR-2-SPS-24-15-PT**	1033201	1
with screw connection	**MINI MCR-2-SPS-24-15**	1033202	1

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

Order No.	Input				Frequency signal		PWM signal		Output signal	
	Input signal	Sensor	Low voltage level	High voltage level	Start	End	Start	End		
2902057	**f**	**NAMUR**	**0**	**30**	**0.002**	**200,000.000**	**2**	**98**	**I**	...
2902057 ≙ MINI MCR-2-F-UI-C 2902059 ≙ MINI MCR-2-F-UI-PT-C	f ≙ f PWM ≙ PWM	NAMUR ≙ NAMUR NPN ≙ NPN PNP ≙ PNP Frequency ≙ General frequency input	U: freely selectable between 0.0 ... 28 V The minimum measuring span must be 2 V.	U: freely selectable between 2.0 ... 30 V The minimum measuring span must be 2 V.	0.002 ≙ 0.002 Hz f: ≙ freely selectable between 0.002 ... 133,333.33 Hz	200,000.000 ≙ 200,000.000 Hz f: ≙ freely selectable between 0.003 ... 200,000 Hz	PWM: freely selectable between 2 ... 88%	PWM: freely selectable between 12 ... 98%	I ≙ I U ≙ U	
		Measuring range span at least 10%/see below* Increment 1% / 0.001 Hz					Output signal span at least 0.5 V / 1 mA Increment 0.1 V / 0.1 mA			

	Output		Switching output			Factory calibration certificate
	Start	End	Switching function	Low switching point (SPL)	High switching point (SPH)	
...	**4.0**	**20.0**	**0**	**0.0**	**0.0**	**NONE**
	0 ≙ 0 mA I: freely selectable between 0.0 ... 20 mA U: freely selectable between 0.0 ... 10 V	0 ≙ 0 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	0 ≙ L 1 ≙ H 2 ≙ L -->SPH -->H 3 ≙ H -->SPH -->L 4 ≙ L -->SPH -->H -->SPH -->L 5 ≙ H -->SPH -->L -->SPH -->H 6 ≙ L -->SPL -->H -->SPH -->L 7 ≙ H -->SPL -->L -->SPH -->H	f: ≙ freely selectable between 0.002 ... 133,333.33 Hz PWM: freely selectable between 2 ... 88% Only values for switching functions 4, 5, 6, 7 can be set Values depend on the input range selected	f: ≙ freely selectable between 0.003 ... 200,000 Hz PWM: freely selectable between 12 ... 98% Only values for switching functions 2, 3, 4, 5, 6, 7 can be set Values depend on the input range selected	NONE YES YES PLUS

Note:
L = Low (relay off)
H = High (relay on)
SPL = Setpoint Low
SPH = Setpoint High

*** Note:**
The minimum separation between the two values depends on the frequency range in which they are located.
If the start value is being set, then the maximum possible value that can be set depends on the already set final value.
If the final value is being set, then the smallest possible value that can be set depends on the already set start value.

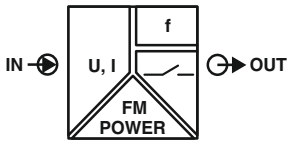
If the start value is being set:

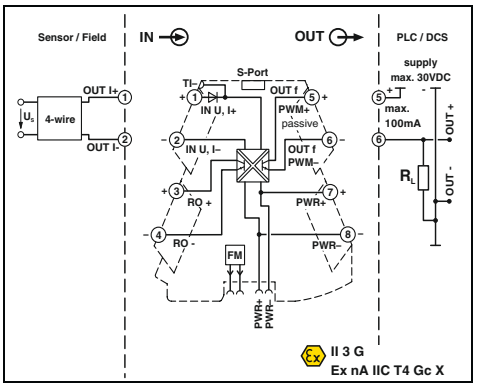
Final Value	Maximum possible start value that can be set
≤ 10.1 Hz	Final value 1.01
>10.1 Hz ... 110 Hz	Final value 1.1
>110 Hz ... 240 Hz	Final value 1.2
>240 Hz ... 364 Hz	Final value 1.3
>364 Hz ... 490 Hz	Final value 1.4
>490 Hz	Final value 1.5

If the final value is being set:

Start value	Smallest possible final value that can be set
≤ 10 Hz	Start value 1.01
>10 Hz ... 100 Hz	Start value 1.1
>100 Hz ... 200 Hz	Start value 1.2
>200 Hz ... 280 Hz	Start value 1.3
>280 Hz ... 350 Hz	Start value 1.4
>350 Hz	Start value 1.5

Frequency
Analog frequency transducers





Configurable,
frequency, PWM or switching output

Ex:

Housing width 6.2 mm

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

Notes:

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

Information on the programming adapters can be found on page 111

Information on MINI Analog Pro accessories can be found from page 107

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

Technical data

Input data	U input	I input
Input signal (configurable via DIP switch or freely via software)	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 1 V ... 5 V 10 V ... 0 V 10 V ... 2 V 5 V ... 0 V 5 V ... 1 V 0 V ... 12 V	0 mA ... 20 mA 4 mA ... 20 mA 0 mA ... 10 mA 2 mA ... 10 mA 20 mA ... 0 mA 20 mA ... 4 mA 10 mA ... 0 mA 10 mA ... 2 mA 0 mA ... 24 mA
Maximum input signal	12 V	24 mA
Input resistance	>120 kΩ	Approx. 50 Ω (+ 0.7 V for test diode)
Output data	Frequency output	PWM output
Output signal (configurable via DIP switch or freely via software)	0 Hz ... 10 kHz / 0 Hz ... 5 kHz 0 Hz ... 2.5 kHz / 0 Hz ... 1 kHz 0 Hz ... 500 Hz / 0 Hz ... 250 Hz 0 Hz ... 100 Hz / 0 Hz ... 50 Hz	15.6 kHz (10 bit) / 1.9 kHz (10 bit) 3.9 kHz (12 bit) / 488 Hz (12 bit) 977 Hz (14 bit) / 122 Hz (14 bit) 50 Hz (15 Bit) / 244 Hz (16 bit)
Minimum load	4 mA ≤(U_L / R_L) ≤100 mA	12 mA ≤(U_L / R_L) ≤100 mA
Load current maximum	100 mA	
Maximum switching voltage	30 V	
Overrange/underrange	Can be set (via software)	
General data		
Supply voltage range	9.6 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	27 mA (12 V DC) 13.5 mA (24 V DC)	
Power consumption	≤350 mW (9.6 V DC)	
Transmission error, maximum	≤0.1% (>7 kHz ≤0.2%)	
Temperature coefficient	<0.01%/K, typically 0.01%/K	
Step response (0 - 99%)	120 ms (15 Hz sample rate) Further values can be set via software	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
Degree of protection	IP20	
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6	
DNV GL	B, B, A, A	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
Analog frequency converter with limit value function				
Standard configuration	Push-in connection	**MINI MCR-2-UI-FRO-PT**	2902032	1
Standard configuration	Screw connection	**MINI MCR-2-UI-FRO**	2902031	1
Order configuration	Push-in connection	**MINI MCR-2-UI-FRO-PT-C**	2906202	1
Order configuration	Screw connection	**MINI MCR-2-UI-FRO-C**	2906201	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1

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

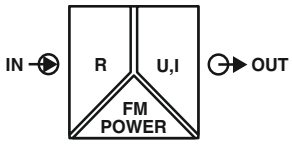
Order No.	Input			Output				Measuring range limit	
	Input signal	Start	End	Output signal	Carrier frequency	Start	End		
2906201	**I**	**0.0**	**20.0**	**I**	**0**	**0**	**1,000**	**15**	**...**
2906201 ≙ MINI MCR-2-UI-FRO-C	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 24 mA U: freely selectable between 0.0 ... 12 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 24 mA U: freely selectable between 0.0 ... 12 V	f ≙ f PWM ≙ PWM	0 ≙ at frequency output 15.6 k ≙ 15.6 kHz 15.6 kHz (10 bits) 1.9 kHz (10 bits) 7.8 kHz (11 bits) 977 Hz (11 bits) 3.9 kHz (12 bits) 488 Hz (12 bits) 1.9 kHz (13 bits) 244 Hz (13 bits) 977 Hz (14 bits) 122 Hz (14 bits) 488 Hz (15 bits) 61 Hz (15 bits) 244 Hz (16 bits) 31 Hz (16 bits)	0 ≙ 0 Hz f: freely selectable between 0 ... 10 kHz D: freely selectable between 0.0 ... 100%	10,000 ≙ 10 kHz f: freely selectable between 0 ... 10 kHz D: freely selectable between 0.0 ... 100%	0 ≙ off 1 ≙ on	
2906202 ≙ MINI MCR-2-UI-FRO-PT-C									

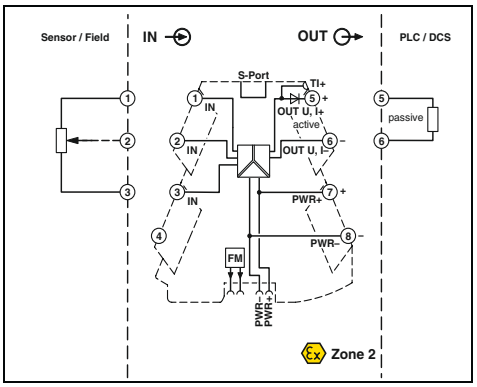
Measuring range span at least 0.5 V / 1 mA
Increment 0.1 V / 0.1 mA

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

...	Cut-off frequency	Failure information: Open circuit / short circuit	Failure information: Behavior in the event of an error	Measuring value over-range	Measured value under-range	Factory calibration certificate
	15	**0**	**FD**	**0**	**0**	**NONE**
	15 Hz ≙ 15 Hz 60 Hz ≙ 60 Hz 240 Hz ≙ 240 Hz	0 ≙ 0 Hz f: freely selectable between 0 ... 11 kHz D: freely selectable between 0.0 and 100% (free definition only for unlimited output) (signal type corresponds to selected output signal)	FD ≙ Freely definable Failure information only adjustable for unlimited output	0 ≙ 0 Hz f: freely selectable between 0 ... 11 kHz D: freely selectable between 0.0 and 100% (free definition only for unlimited output) (signal type corresponds to selected output signal)	0 ≙ 0 Hz f: freely selectable between 0 ... 11 kHz D: freely selectable between 0.0 and 100% (free definition only for unlimited output) (signal type corresponds to selected output signal)	None ≙ no factory calibration certificate Yes ≙ certificate but no test data YesPlus ≙ certificate with test data

Potentiometers
Potentiometer transducers





Ex n

µC NFC

Potentiometer transducer, configurable

Ex:

Housing width 6.2 mm

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

Notes:

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

Information on the programming adapters can be found on page 111

Information on MINI Analog Pro accessories can be found from page 107

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

Technical data

Input data		
Potentiometer	100 Ω ... 100 kΩ	
Output data	U output	I output
Output signal (configurable via DIP switch or freely via software)	1 ... 5 V / 10 ... 0 V	0 ... 20 mA / 4 ... 20 mA
	0 ... 5 V / 0 ... 10 V	20 ... 0 mA / 20 ... 4 mA
Maximum output signal	Approx. 12.3 V	24.6 mA
No-load voltage		<17.5 V
Short-circuit current	<31.5 mA	
Load R_B	≥10 kΩ	≤600 Ω (at 20 mA)
Ripple	<20 mV_{PP} (at 10 kΩ)	<20 mV_{PP}
Behavior in the event of a sensor error	configurable	
General data		
Supply voltage range	9.6 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	33 mA (24 V DC)	
Power consumption	≤850 mW (at I_{OUT} = 20 mA, 9.6 V DC, 600 Ω load)	
Maximum transmission error	<0.1% (R <240 Ω = <0,2%)	
Temperature coefficient	0.01%/K, typically 0.01%/K	
Step response (0 - 99%)	<60 ms	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
Degree of protection	IP20	
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC T5	
DNV GL	C, EMC2	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
Potentiometer transducer				
Standard configuration	Push-in connection	**MINI MCR-2-POT-UI-PT**	2902017	1
Standard configuration	Screw connection	**MINI MCR-2-POT-UI**	2902016	1
Order configuration	Push-in connection	**MINI MCR-2-POT-UI-PT-C**	2905006	1
Order configuration	Screw connection	**MINI MCR-2-POT-UI-C**	2905005	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1

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

Order No.	Automatic potentiometer detection	Output Output signal	Start	End	Sliding mean value	Open circuit detection	
2905005	**AUTO**	**I**	**4.0**	**20.0**	**1**	**ON**	**...**
2905005 ≙ MINI MCR-2-POT-UI-C 2905006 ≙ MINI MCR-2-POT-UI-PT-C	AUTO ≙ ON OFF ≙ OFF	I ≙ I U ≙ U	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	20.0 ≙ 20 mA I: freely selectable between 0.0 ... 21 mA U: freely selectable between 0.0 ... 10.5 V	1 2 3 4 5 6 7 8 9 10	ON ≙ ON OFF ≙ OFF	

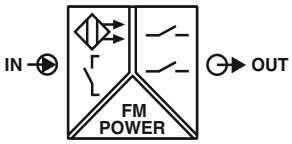
Output signal span at least 0.5 V / 1 mA
Increment 0.1 V / 0.1 mA

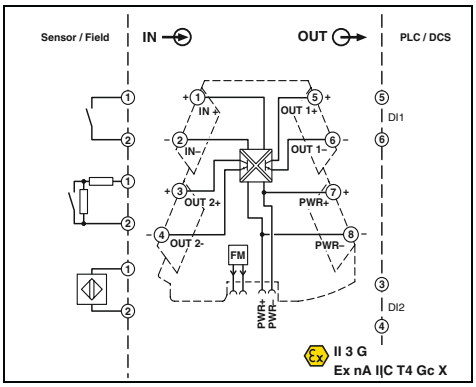
Failure information

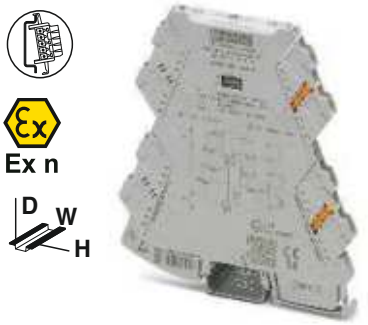
...	Behavior in the event of an error	Open circuit slider	Input open (no potentiometer connected)	Measuring value over-range	Measured value under-range
	NE43DO	**0.0**	**0.0**	**0.0**	**0.0**
	FD ≙ Freely definable	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (only if open circuit detection is on) (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)	0.0 ≙ 0 mA I: freely selectable between 0.0 ... 21.5 mA U: freely selectable between 0.0 ... 11 V (signal type corresponds to selected output signal)
	Note: Failure information in accordance with NE 43 can only be selected for 4 ... 20 mA output				
	NE43UP ≙ NE 43 upscale NE43DO ≙ NE 43 downscale NE430 ≙ NE 43 0 mA NE43UD ≙ NE 43 upscale/downscale	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 3.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA	21.5 mA 3.5 mA 0 mA 21.5 mA

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

Digital IN
Signal conditioners







Configurable, for NAMUR sensors and floating contacts

Ex:

Housing width 6.2 mm

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

Notes:

Information on MINI Analog Pro accessories can be found from page 107

Technical data

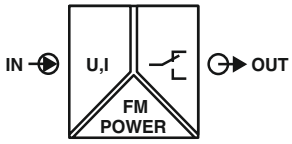
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) open circuit switch contacts Switch contacts with resistance circuit
Control circuit	
No-load voltage	8.2 V DC ±10%
Switching points (in accordance with IEC 60947-5-6)	<1.2 mA (blocking) >2.1 mA (conductive)
Line error detection	>6 mA (in the event of a short-circuit) <0.35 mA (with wire break)
Switching output	
Transistor output	N/O contact behavior 2x
Max. switching voltage	30 V DC
Max. switching current	50 mA
Switching frequency	5 kHz
General data	
Supply voltage range	9.6 V DC ... 30 V DC
Nominal supply voltage	24 V DC
Current consumption	18 mA (24 V DC) 35 mA (12 V DC)
Power consumption	450 mW (9.6 V DC)
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1
Degree of protection	IP20
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6
DNV GL	B, B, A, A

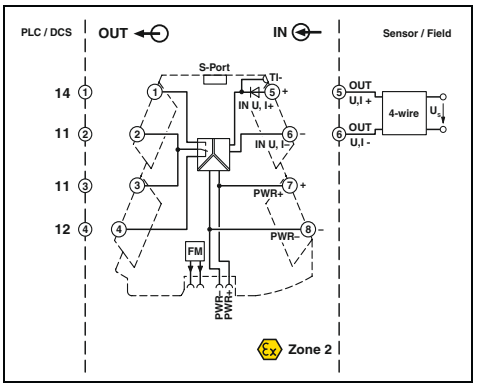
Ordering data

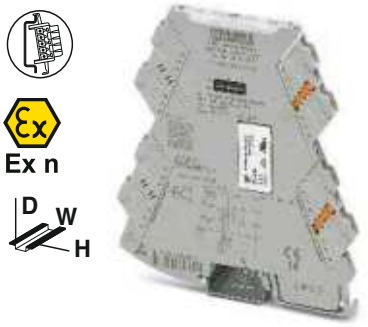
Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner			
Push-in connection	**MINI MCR-2-NAM-2RO-PT**	2902005	1
Screw connection	**MINI MCR-2-NAM-2RO**	2902004	1

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

Limit values, threshold value switches







Configurable, with relay PDT output

Ex:

Housing width 6.2 mm

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

Notes:

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

Information on the programming adapters can be found on page 111

Information on MINI Analog Pro accessories can be found from page 107

Technical data

Input data		
Input signal (configurable using the DIP switch)	U input	I input
Maximum input signal	0 ... 10 V / 0 ... 12 V	0 ... 20 mA / 0 ... 24 mA
Input resistance	12 V	24 mA
	>120 kΩ	Approx. 50 Ω (+ 0.7 V for test diode)
Specification of the switching point	Can be set via software or in steps via DIP switches	
Switching output		
Relay output	1 PDT	
Contact material	$AgSnO_2$, hard gold-plated	
Max. switching voltage	250 V AC	
Limiting continuous current	6 A	
Hysteresis (configurable using the DIP switch)	Can be set freely via software	
Setting range of the response delay (configurable using the DIP switch)	0 s ... 10 s (can be set freely via software)	
General data		
Supply voltage range	9.6 V DC ... 30 V DC	
Nominal supply voltage	24 V DC	
Current consumption	40 mA (12 V DC) 20 mA (24 V DC)	
Power consumption	≤0.5 W	
Maximum transmission error	0.1% (of final value)	
Temperature coefficient	0.01%/K	
Step response (0 - 99%)	Typically 140 ms (can be set via software)	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
Degree of protection	IP20	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA nC IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4A Class I, Zone 2, Group IIC T4A	
DNV GL	B, B, A, A	

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Limit value switch with relay PDT output, standard configuration			
Push-in connection	**MINI MCR-2-UI-REL-PT**	2902035	1
Screw connection	**MINI MCR-2-UI-REL**	2902033	1
Push-in connection	**MINI MCR-2-UI-REL-PT-C**	2909887	1
Screw connection	**MINI MCR-2-UI-REL-C**	2909886	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1

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

Order No.

Input

Input signal	Start	End	Cut-off frequency
2909886	**I**	**0.0**	**24.0**	**15** / ...
2909886 ≙ MINI MCR-2-UI-REL-C 2909887 ≙ MINI MCR-2-UI-REL-PT-C	I ≙ I U ≙ U	0 ≙ 0 mA I: freely selectable between 0.0 ... 23.5 mA U: freely selectable between 0.0 ... 11.5 V	0 ≙ 0 mA I: freely selectable between 1 ... 24 mA U: freely selectable between 0.5 ... 12 V	15 ≙ 15 Hz 60 ≙ 60 Hz 240 ≙ 240 Hz

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

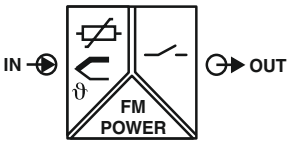
Output

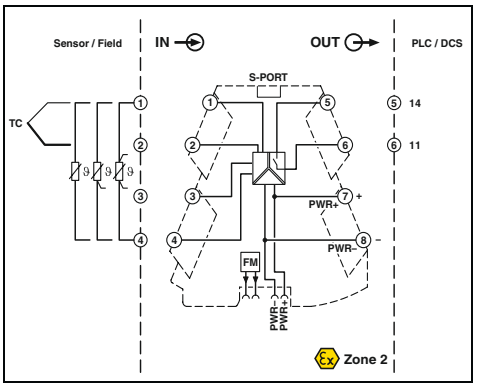
Switching function	Low switching point (SPL)	High switching point (SPH)	Switch-on delay	Switch-off delay	Error
... / **2**	**--**	**10**	**0.0**	**0.0**	**0**
0 ≙ L 1 ≙ H 2 ≙ L -->SPH -->H 3 ≙ H -->SPH -->L 4 ≙ L -->SPH -->H -->SPH -->L 5 ≙ H -->SPH -->L -->SPH -->H 6 ≙ L -->SPL -->H -->SPH -->L 7 ≙ H -->SPL -->L -->SPH -->H	-- ≙ Off I: ≙ freely selectable between 0.04 ... 23.96 mA U: freely selectable between 0.02 ... 11.98 V Only values for switching functions 4, 5, 6, 7 can be set	10 ≙ 10 mA I: ≙ freely selectable between 0.08 ... 24 mA U: freely selectable between 0.04 ... 12 V Only values for switching functions 2, 3, 4, 5, 6, 7 can be set	0 ≙ 0 sec. t: freely selectable between 0.0 ... 10 sec.	0 ≙ 0 sec. t: freely selectable between 0.0 ... 10 sec.	0 ≙ No response 1 ≙ 0 relay on 2 ≙ 0 relay off

Note:
L = Low (relay off)
H = High (relay on)
SPL = Setpoint Low
SPH = Setpoint High

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

Limit values
Temperature





Ex n

Configurable, temperature transducer with N/O relay output

Ex:

Housing width 6.2 mm

- Universally configurable, highly-compact temperature limit value switch for switching analog limit values from resistance thermometers and remote resistance-type sensor signals
- For 2-, 3- or 4-conductor RTD sensors in accordance with IEC 751, JIS, GOST
- For thermocouples in accordance with IEC 584 and GOST
- 2-conductor resistance measurement, up to 4,000 Ω
- Internal cold junction compensation
- Plug-in connection system
- Safe 3-way isolation
- Standard behavior can be configured via DIP switches
- Freely configurable via software or smartphone app
- N/O relay output (N/C function can be set via software)
- Limiting continuous current up to 6 A
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

Notes:

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

Information on the programming adapters can be found on page 111

Technical data

Input data	
Input signal (can be configured using DIP switches)	Pt, Ni, Cu sensors : 2-, 3-, 4-conductor
Temperature range	-250°C ... 2500°C
Measuring range span	min. 20 K
Linear resistance measuring range	0 Ω ... 4,000 Ω
Switching output	
Relay output	1 N/O contact
Contact material	$AgSnO_2$, hard gold-plated
Max. switching voltage	250 V AC
Maximum switching current	6 A (for 250 V AC)
Minimum switching current	100 mA (12 V DC)
Limiting continuous current	6 A
Hysteresis	Can be set freely via software
Setting range of the response delay	0 s ... 10 s (can be set freely via software)
General data	
Supply voltage range	9.6 V DC ... 30 V DC
Current consumption	44 mA (12 V DC) 22 mA (24 V DC)
Switching point accuracy	<0.1%
Power consumption	570 mW
Temperature coefficient	0.01%/K
Step response (0 - 99%)	Typically 300 ms Typically 570 ms Typically 380 ms Typically 300 ms Typically 570 ms
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA nC IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4A Class I, Zone 2, Group IIC T4A
DNV GL	B, B, A, A

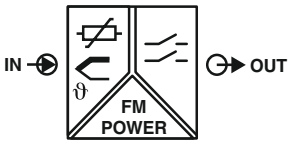
Ordering data

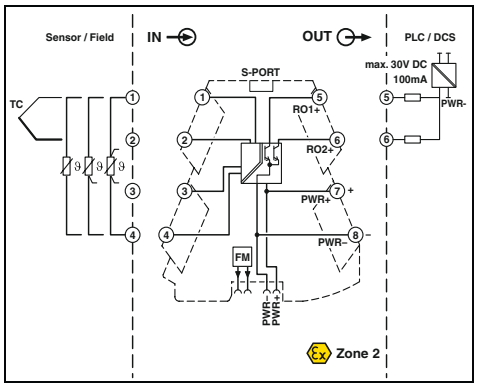
Description	Type	Order No.	Pcs./Pkt.
Temperature limit value switches			
Push-in connection	**MINI MCR-2-T-REL-PT**	2905633	1
Screw connection	**MINI MCR-2-T-REL**	2905632	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1

Limit values
Temperature





Ex n

Configurable, temperature transducer with transistor output

Ex:

Housing width 6.2 mm

- Universally configurable, highly-compact temperature limit value switch for switching analog limit values from resistance thermometers and remote resistance-type sensor signals
- For 2, 3 or 4-conductor RTD sensors in accordance with IEC 751, JIS, GOST
- For thermocouples in accordance with IEC 584 and GOST
- 2-conductor resistance measurement, up to 4,000 Ω
- Internal cold junction compensation
- Plug-in connection system
- Safe 3-way isolation
- Standard behavior can be configured via DIP switches
- Freely configurable via software or smartphone app
- 2 transistor switching contacts on the output
- Maximum switching current 30 V / 100 mA
- Power supply and fault monitoring possible via DIN rail connector
- Status and error indicator LEDs

Notes:

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

Information on the programming adapters can be found on page 111

Technical data

Input data	
Input signal (can be configured using DIP switches)	Pt, Ni, Cu sensors : 2-, 3-, 4-conductor
Temperature range	-250°C ... 2500°C
Measuring range span	min. 20 K
Linear resistance measuring range	0 Ω ... 4,000 Ω
Switching output	
Transistor output	2 N/O contacts
Max. switching voltage	30 V DC
Maximum switching current	100 mA (30 V (≤50°C))
General data	
Supply voltage range	9.6 V DC ... 30 V DC
Current consumption	20 mA (12 V DC) 10 mA (24 V DC)
Switching point accuracy	<0.1%
Power consumption	350 mW
Temperature coefficient	0.01%/K
Step response (0 - 99%)	Typically 300 ms Typically 570 ms Typically 380 ms Typically 300 ms Typically 570 ms
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6
DNV GL	B, B, A, A

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Temperature limit value switches			
Push-in connection	**MINI MCR-2-T-2RO-PT**	2906877	1
Screw connection	**MINI MCR-2-T-2RO**	2906876	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1

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

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

Further advantages:

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

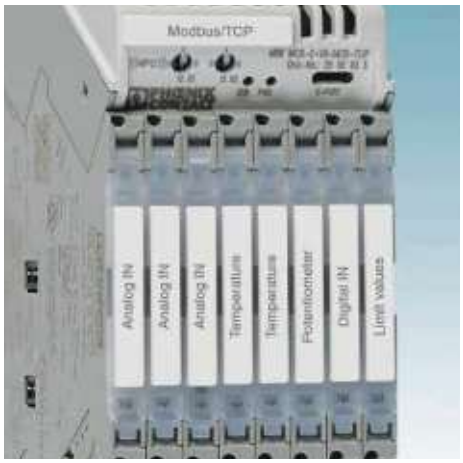
No need for input cards
– Cost and space savings, as signal-specific input cards are no longer needed

Modular and space-saving
– Space-saving network integration of freely combinable signal conditioners by means of plug-in gateways

Flexible configuration
– Quick configuration via rotary coding switch, software, web server or app

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

Easy startup and service
– Measure current signals during operation, without disconnecting current loops

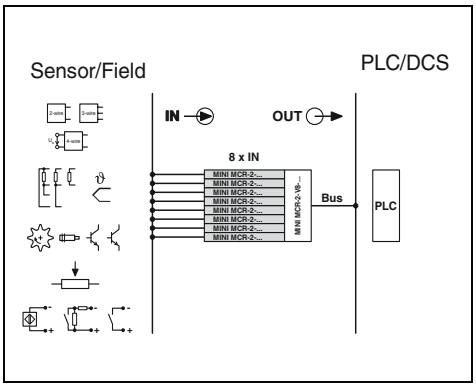


Easy maintenance
– Large-surface marking areas for standard marking material as well as permanently visible status and error LEDs on each module

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

MINI Analog Pro gateways

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



Ex n

Gateway for bus and network connection

Ex:

Housing width 51.1 mm

Notes:

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

Information on the programming adapters can be found on page 111

Technical data

Input data	
Number of inputs	8
Configurable/programmable	Yes
Current input signal	4 mA ... 20 mA
Maximum input current	24 mA
Input resistance of current input	50 Ω
Maximum input voltage	5 V
Output data	
Number of outputs	1
Data update rate	15 ms
General data	
Nominal supply voltage range	12 V ... 24 V
Supply voltage range	9.6 V ... 30 V
Power consumption	<1,000 mW
Maximum transmission error	0.1%
Temperature coefficient	0.01%
Test voltage, input/output/supply	0.5 kV
Ambient temperature (operation)	-40°C ... 65°C
Housing material	PBT 7% GF V0
Dimensions W/H/D	51.1 / 104.1 / 56.8 mm
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
UL, USA/Canada	UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC T5

Ordering data

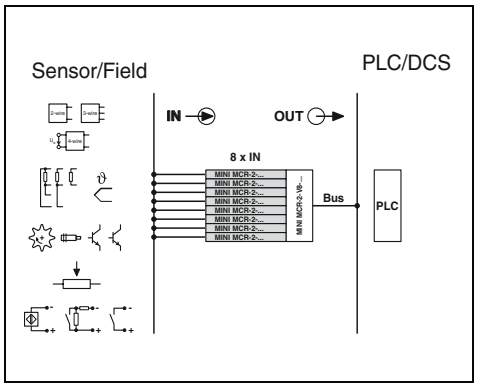
Description	Type	Order No.	Pcs./Pkt.
For bus and network connection			
Modbus/RTU	**MINI MCR-2-V8-MOD-RTU**	2905634	1
PROFIBUS DP	**MINI MCR-2-V8-PB-DP**	2905636	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1

MINI Analog Pro gateways

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



Ex n

NFC

Gateway for bus and network connection

Ex:

Housing width 51.1 mm

Notes:

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

Information on the programming adapters can be found on page 111

Technical data

Input data	
Number of inputs	8
Configurable/programmable	Yes
Current input signal	4 mA ... 20 mA
Maximum input current	24 mA
Input resistance of current input	50 Ω
Maximum input voltage	5 V
Output data	
Number of outputs	1
Data update rate	15 ms
General data	
Nominal supply voltage range	12 V ... 24 V
Supply voltage range	9.6 V ... 30 V
Power consumption	<1200 mW
Maximum transmission error	0.1%
Temperature coefficient	0.01%
Test voltage, input/output/supply	0.5 kV
Ambient temperature (operation)	-40°C ... 55°C
Housing material	PBT 7% GF V0
Dimensions W/H/D	51.1 / 104.1 / 61 mm
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC T5

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Gateways for bus and network connection			
Modbus/TCP	**MINI MCR-2-V8-MOD-TCP**	2905635	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
USB programming adapter for configuring modules with Windows software	**TWN4 MIFARE NFC USB ADAPTER**	2909681	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	2905872	1

System cabling solutions for your MINI Analog Pro signal conditioners

System cabling adapter for plugging on to up to eight MINI Analog Pro signal conditioners

Thanks to its innovative plug-in concept, the MINI MCR-2-V8-FLK 16 system adapter offers a time-saving wiring solution. Eight MINI Analog Pro signal converters connect easily to a controller using pluggable system cabling. This leads to a considerable reduction in cabling effort and the risk of wiring errors compared to individual wiring on the controller side: Using the system cabling allows you to connect the MINI Analog Pro modules by simply plugging them on to the PLC.

The FLK 16 system adapter also offers all the advantages of gateways to bus and network connection, such as configuration and readout of measurement values over NFC, continuous measurement of currents, a generous marking area, and always visible diagnostic and status LEDs.

Further advantages:

– Plug and Play solution for your MINI Analog Pro signal conditioners
– Safe galvanic isolation per channel combined with major time and cost savings
– Saves space, thanks to modular plugging of the system cabling adapter

Termination Carriers for your MINI Analog Pro signal conditioners

Select standard DIN rail device

Select module carrier

Select controller-specific front adapter and system cable

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

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

Compact

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

Rugged and reliable

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

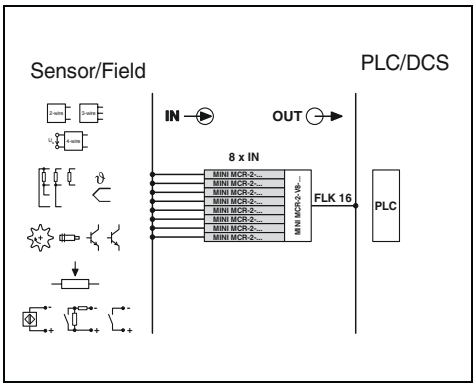
Flexible

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

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

MINI Analog Pro system adapters

- 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
- Easy attachment to the output side of MINI Analog Pro modules
- Especially easy to maintain, thanks to interruption-free current measurement function



Ex n

NFC

System cabling adapter

Ex:

Housing width 51.1 mm

Technical data

Input data	
Number of inputs	8
Configurable/programmable	no
Maximum input current	4 A (500 mA per ch.)
Maximum input voltage	30 V
Output data	
Number of outputs	8
Connection method	IDC/FLK pin strip
Configurable/programmable	no
General data	
Test voltage input/output	0.5 kV
Rated insulation voltage	50 V_{rms}
Degree of protection	IP20
Overvoltage category / Degree of pollution	II / 2
Ambient temperature (operation)	-40°C ... 70°C
Humidity	5% ... 95%
Maximum altitude for use above sea level	4,000 m
Housing material	PBT 7% GF V0
Dimensions W/H/D	51.1 / 104.1 / 56.8 mm
Conformance/approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA IIC Gc U
UL, USA/Canada	UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC T5
GL	GL applied for

Ordering data

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

Termination Carriers for your MINI Analog Pro signal conditioners

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

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

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

Notes:

Contact us: together, we can develop optimum solutions for your automation system with the Termination Carrier for MINI Analog Pro.

TC-D37SUB-ADIO16-MP-P-UNI (Order No. 2906639) is not a class A product.

Ex:

Housing width 136 mm

Technical data

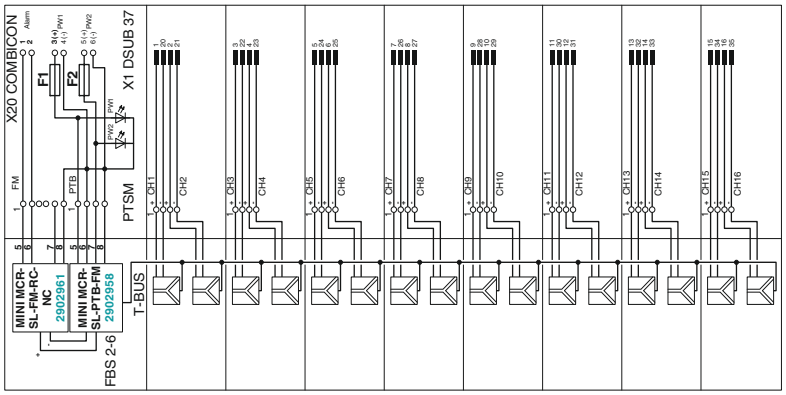
General data	
Connection to the control system level	D-SUB pin strip
No. of pos.	37
Maximum operating voltage	<30 V DC (per signal/channel)
Maximum permissible current	23 mA (signal/channel)
Rated insulation voltage	50 V (basic insulation)
Rated surge voltage	0.5 kV
Degree of pollution	2
Overvoltage category	II
Air clearances and creepage distances	DIN EN 50178 (basic insulation)
Ambient temperature range	-20°C ... 60°C (please observe module specifications)
Shock	15g, in accordance with IEC 60068-2-27
Vibration (operation)	2g, in accordance with IEC 60068-2-6
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	2x 2.5 A on PCB, slow-blow (replaceable)
Status indication	2 x red LED (error) 2x green LEDs (PWR1 and PWR2)
Switching output	1 N/C contact (alarm = open)

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Module carrier for 16 MINI Analog channels, power and feed-through module - With connection for MACX MCR-S-MUX HART multiplexer	**TC-D37SUB-AIO16-MP-PS-UNI**	2906640	1
	TC-D37SUB-ADIO16-MP-P-UNI	2906639	1

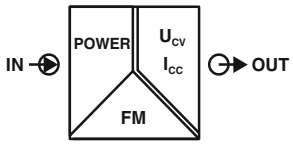
Accessories

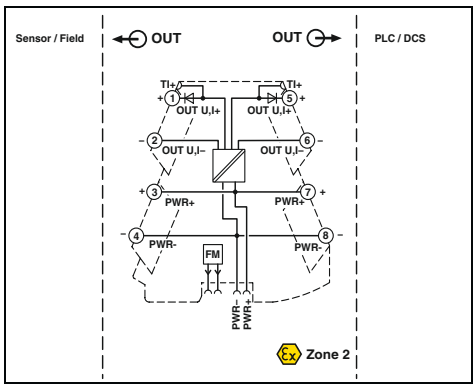
MINI Analog Pro power terminal block	**MINI MCR-2-PTB-PT**	2902067	1
MINI Analog Pro error signaling module	**MINI MCR-2-FM-RC-PT**	2904508	1
HART multiplexer, 32-chanel, including two 14-conductor flat-ribbon cable	**MACX MCR-S-MUX**	2865599	1



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

Accessories
Constant voltage/constant current sources





Configurable output signals

Ex:

Housing width 6.2 mm

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

Technical data

Input data		
Input signal	9.6 ... 30 V	
Output data	U output	I output
Output signal (can be configured using DIP switches)	10 V DC	20 mA
	8.75 V DC	17.5 mA
	7.5 V DC	15 mA
	6.25 V DC	12.5 mA
	5 V DC	10 mA
	3.75 V DC	7.5 mA
	2.5 V DC	5 mA
	1.25 V DC	2.5 mA
Short-circuit current	>32 mA	
Ripple	<20 mV_{PP} (at 600 Ω)	
General data		
Supply voltage range	9.6 V DC ... 30 V DC	
Power consumption	<1.1 W (9.6 V DC)	
Maximum transmission error	≤0.1% (of final value)	
Temperature coefficient	<0.01%/K	
Electrical isolation	Reinforced insulation in accordance with IEC 61010-1	
Degree of protection	IP20	
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6	
DNV GL	B, B, A, A	

Ordering data

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

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

With Push-in connection

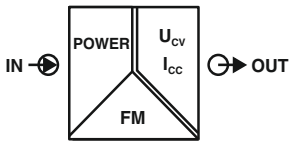
With screw connection

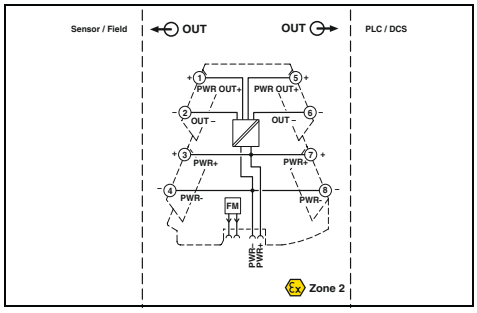
Technical data		
Technical data		
Connection data solid/stranded/AWG	0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 24 - 12	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 12

Ordering data					
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
FASTCON Pro connector set						
- with Push-in connection	**FASTCON PRO-SET-PT**	2906228	1			
- with screw connection				**FASTCON PRO-SET**	2906227	1

Accessories,
constant voltage sources

new





– Sensor feed from 2-conductor or 3-conductor 15 V / 30 mA sensors
– 15 V constant voltage source for sensors, encoders, etc.
– Plug-in connection system
– Input signal corresponds to power supply
– Input signal and therefore energy supply and fault monitoring via the DIN rail connector
– Status LED

Technical data		
Input data		
Input signal	9.6 ... 30 V	
Output data	U output	I output
Output signal (can be configured using DIP switches)	15 V DC	
Short-circuit current	>35 mA	
Ripple	<20 mV_{PP} (at 600 Ω)	
General data		
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	Ⓔx II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6	

Ordering data					
Description		Type	Order No.	Pcs./Pkt.
Constant voltage source				
with Push-in connection	Push-in connection	**MINI MCR-2-SPS-24-15-PT**	1033201	1
with screw connection	Screw connection	**MINI MCR-2-SPS-24-15**	1033202	1

Accessories
DIN rail connectors for bridging the supply voltage

ME 6,2 TBUS

– Module replacement without interrupting the supply to the remaining modules (hot swappable)
– One DIN rail connector for two MINI Analog Pro modules

ME 17,5 TBUS

– For use with a MINI POWER system power supply unit

For bridging the supply voltage

For system power supply

Description	Ordering data: Type	Order No.	Pcs./Pkt.
DIN rail connector, for bridging the supply voltage, can be snapped onto 35 mm DIN rails in accordance with EN 60715, UL-approved			
Color: gray	**ME 6,2 TBUS-2 1,5/5-ST-3,81 GY**	2695439	10
Color: green	**ME 6,2 TBUS-2 1,5/5-ST-3,81 GN**	2869728	10

Description	Ordering data: 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			
Color: green	**ME 17,5 TBUS 1,5/ 5-ST-3,81 GN**	2709561	10

Accessories
System power supplies

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

For applications with local voltages of over 100 V

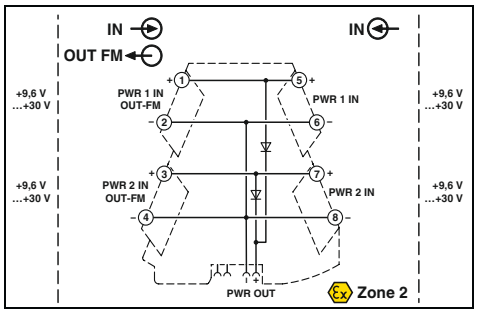
Description	Ordering data: Type	Order No.	Pcs./Pkt.
System power supply, primary-switched, with zone 2 approval. Further information can be found in Catalog 4, surge protection and power supplies.	**MINI-PS-100-240AC/24DC/1.5/EX**	2866653	1
System power supply, primary-switched (not for zone 2). You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

Accessories
Power terminal blocks

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

Notes:

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



Ex n

D W H

Redundant supply for existing 24 V

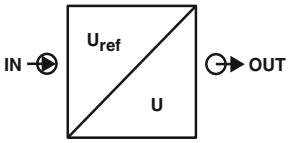
Technical data

Input data/output data	
Input voltage range	9.9 V DC ... 30 V DC
Output voltage	9.6 V DC ... 29.7 V DC
Output current	≤3.2 A
General data	
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
ATEX	Ⓔx II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6
DNV GL	C, EMC2

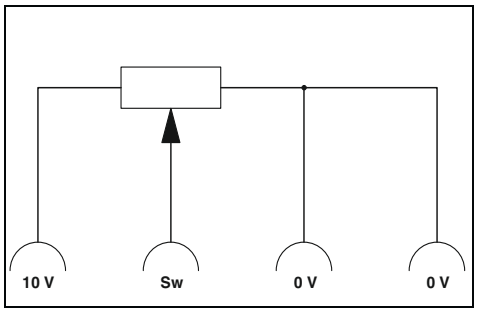
Ordering data

Description	Type	Order No.	Pcs./Pkt.
MINI Analog Pro power terminal block			
Push-in connection	**MINI MCR-2-PTB-PT**	2902067	1
Screw connection	**MINI MCR-2-PTB**	2902066	1

Accessories
Setpoint potentiometers



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



D W H

Technical data

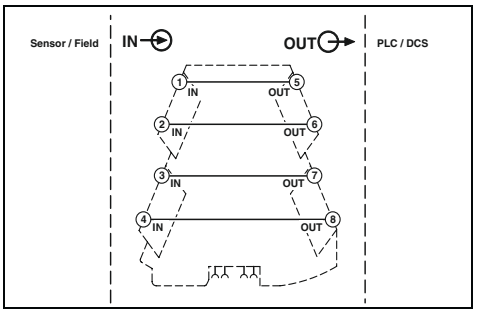
Input data	EMG 30-SP- 4K7LIN	EMG 30-SP-10K LIN
Resistance value	4.7 kΩ ±20%	10 kΩ ±20%
Linearity	5% (of final value)	5% (of final value)
Load capacity	0.5 W	0.5 W
General data		
Ambient temperature (operation)	0°C ... 40°C	
Mounting	Any	
Housing material	Polycarbonate fiber reinforced PC-F	
Dimensions W/H/D	30 / 75 / 68 mm	
Screw connection rigid / flexible / 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
Feed-through terminal blocks

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



Ex n

NFC

For signals already electrically isolated

Technical data

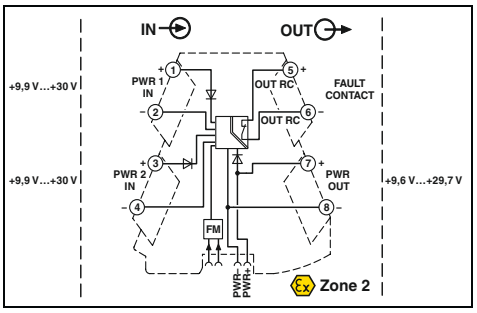
General data	
Degree of protection	IP20
Ambient temperature (operation)	-40°C ... 70°C
Mounting	any
Housing material	PBT
Dimensions W/H/D	6.2 / 110.5 / 120.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 12
Conformance/approvals	
Conformance	CE-compliant
ATEX	Ⓔx II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6
DNV GL	C, EMC2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
MINI Analog Pro feed-through terminal block			
Screw connection	**MINI MCR-2-TB**	2902068	1

Accessories
Error message modules

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



Ex n

D W H

For group error message and supply monitoring

Technical data

Input data/output data	
Input signal	9.9 V DC ... 30 V DC
Output signal	9.6 V DC ... 29.7 V DC
Switching output	
Max. switching voltage	30 V DC
Maximum switching current	50 mA
General data	
Test voltage input/output	1.5 kV AC (50 Hz, 1 min.)
EMC note	Class A product, see page 583
Conformance/approvals	
ATEX	Ⓔx II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6
DNV GL	C, EMC2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
MINI Analog Pro error signaling module			
Push-in connection	**MINI MCR-2-FM-RC-PT**	2904508	1
Screw connection	**MINI MCR-2-FM-RC**	2904504	1

Accessories
Programming adapters

IFS-USB-PROG-ADAPTER programming adapter for configuring Phoenix Contact INTERFACE modules with S-PORT interface.

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

Technical data

General data	
EMC note	Class A product, see page 583

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	**2811271**	1
Bluetooth programming adapter, with USB and S-PORT interface	**IFS-BT-PROG-ADAPTER**	**2905872**	1

Accessories
Marking labels for transparent cover

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

Unlabeled or labeled in accordance with customer specifications

Ordering data

Description	Color	Type	Order No.	Pcs./Pkt.
UniCard, for marking the CLIPFIX 35-5, 24-part end brackets, 8 individual labels per strip, lettering field size: 30 x 5 mm				
	white	**UCT-EM (30X5)**	**0801505**	10
Lettering field size: 30 x 5 mm	white	**UCT-EM (30X5) CUS**	**0801589**	1
10-section, lettering field size: 15 x 5 mm	white	**UC-EMLP (15X5)**	**0819301**	10
10-section, lettering field size: 15 x 5 mm	white	**UC-EMLP (15X5) CUS**	**0824550**	1
Continuous labels, can be marked with thermal transfer printer, can be separated with a cutter, pitch as desired, strip length up to 1,000 mm				
1 roll = 90 m continuous, height: 5.0 mm, 10 strips	white	**SK 5,0 WH:REEL**	**0805221**	1

MACX Analog – Signal conditioners with functional safety and explosion protection

Reliable and safe

In all phases of the product lifecycle, MACX signal conditioners have been developed and produced in accordance with IEC 61508 standards for functional safety. This ensures the highest level of safety for your machines and systems. Save planning and operating costs by combining high signal flexibility with comprehensive SIL certification.

SIL IEC 61508 Ex n

From the cost-effective standard signal conditioner to multifunctional universal devices, MACX signal conditioners provide you with comprehensive solutions for signal processing.

SIL IEC 61508 PL EN ISO 13849 Ex n Ex i IECEx

In addition to being SIL-certified, certain MACX signal conditioners also feature performance level PL d. This means that you can integrate analog signals easily into your safety application in accordance with the Machinery Directive.

Versions with PL d and Ex i approval are also available.

SIL IEC 61508 Ex n Ex i IECEx

All Ex i versions are SIL-certified and also have ATEX and IECEx approval. Single and two-channel signal isolators are available for intrinsically safe circuits up to zone 0 and zone 20 and for all gas and dust groups – with an overall width of just 12.5 mm. The products are type-tested by an independent NAMUR test laboratory in accordance with NE 95, ensuring that they satisfy the high requirements of the chemical industry.

Reliable and safe

Highest safety for your machines and systems.

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

Precise, interference-free signal transmission and long service life

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

Easy configuration and monitoring

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

Intelligent concept for supply and diagnostics

– 24 Volt power bridging via DIN rail connector for easy wiring, system expansion, or hot-swap module replacement. Direct feed via a MACX module or via supply and fault reporting module with the option of redundant, diode-decoupled supply and fault reporting
– Wide-range power supply: Versions with wide range input for direct installation in all power supply networks – anywhere in the world with no additional power supply unit required

Fast, error-free signal connection

– Compact Termination Carriers for quickly and smoothly connecting MACX DIN rail devices to automation system input and output cards using preassembled VARIOFACE system cabling – Plug and Play
– Saves up to 30% of space when compared to other solutions on the market
– High system availability, thanks to robust aluminum profile with mechanically decoupled PCB
– Easy to service, with a single engineering design for both DIN rail and system applications

Easy-maintenance connection technology

– Plug-in connection technology, with either screw connection or a spring-cage version with fast Push-in technology
– Coding and clear marking ensure reliable protection against polarity reversal and prevent unintentional mismatching of pre-conductord connection terminal blocks
– Integrated sockets for testing, or for connecting to HART communicators, for example

Intrinsically safe signal transmission in potentially explosive areas

Many process technology systems have areas where potentially explosive atmospheres may occur. As such, measuring and control circuits around the world are usually designed with intrinsic safety protection (Ex i).

The **intrinsic safety type of protection**, as opposed to other types of protection (such as increased safety, or Ex e), refers not only to an individual item of equipment but to the entire circuit. A circuit is described as intrinsically safe if the current and voltage are limited to such an extent that no spark or thermal effect can cause a potentially explosive atmosphere to ignite.

An intrinsically safe circuit typically consists of at least one item of intrinsically safe equipment (field device) and one item of associated equipment (Ex i signal conditioner) and the connecting cables. Intrinsically safe equipment and intrinsically safe parts of associated items of equipment are classed in accordance with IEC/EN 60079-11 in safety levels ia, ib, and ic. The demonstration of intrinsic safety that the user is required to carry out as described in IEC/EN 60079-14, among others, serves to ensure that the interconnection described above is intrinsically safe.

This type of protection offers the user the following advantages, among others:

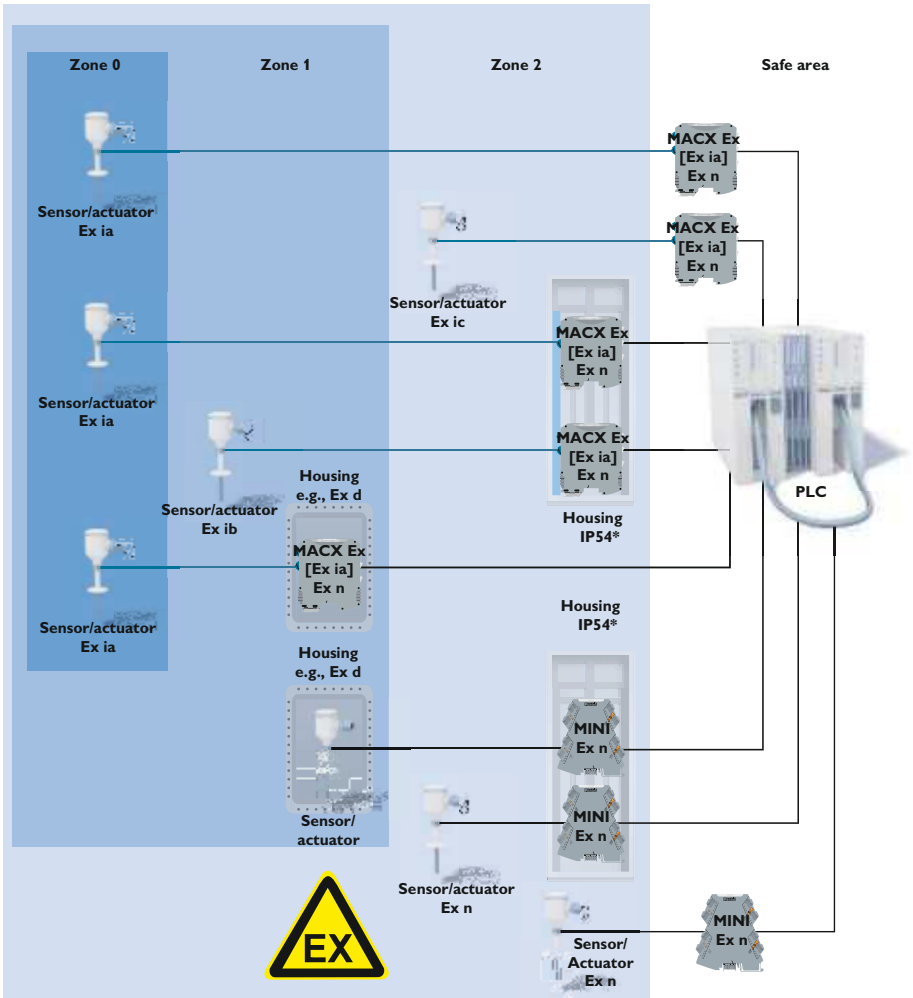
– Service and conversions while the system is operating requiring no special permits
– Cost-effective, thanks to the lack of expensive housing designs
– Ex i field devices and Ex i signal conditioners can be combined regardless of manufacturer

See our free brochure for detailed information on the topic of explosion protection:

https://www.phoenixcontact.com/assets/downloads_ed/global/web_dwl_promotion/5149416_EN_HQ_Explosion_protection_LoRes.pdf

Order No. 5149416

Installation examples for intrinsically safe circuits:



Functional safety (SIL)

The term SIL (safety integrity level) is an important one 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. If a device or system fails, a defined safe state is attained.

The basic standard **IEC 61508** "Functional safety of electrical/electronic/programmable electronic safety-related systems" describes the requirements that manufacturers must take into consideration for their devices or systems.

The standard **IEC 61511** "Functional safety – Safety instrumented systems for the process industry sector" describes the requirements for constructing systems with functional safety. The operator, proprietor, and planner are responsible for complying with this standard in observance of national regulations.

The attached table is an excerpt from IEC 61508 and IEC 61511 and describes the correlation between the average probability of failure and the SIL level of the safety instrumented function (SIF) attained and the reduction in risk.

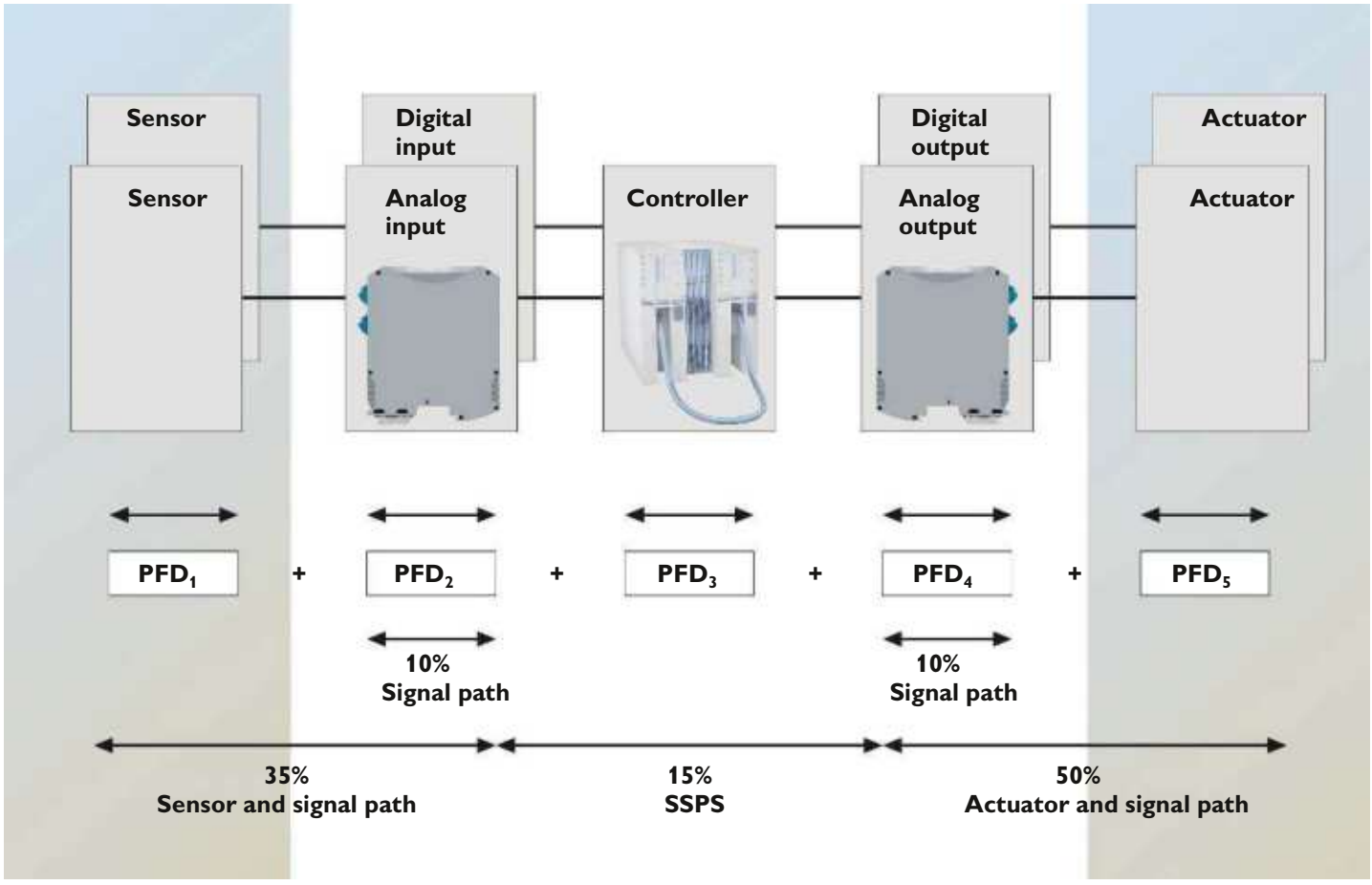
SIL Safety Integrity Level	PFD_{avg} Low demand mode (average probability of failure of the function on demand)	PFH High demand mode (Probability of a dangerous failure per hour)	RRF Risk reduction factor (Risk Reduction Factor)
SIL 1	$\geq 10^{-2} \ldots < 10^{-1}$	$\geq 10^{-6} \ldots < 10^{-5}$	≤ 100 ... >10
SIL 2	$\geq 10^{-3} \ldots < 10^{-2}$	$\geq 10^{-7} \ldots < 10^{-6}$	≤ 1,000 ... >100
SIL 3	$\geq 10^{-4} \ldots < 10^{-3}$	$\geq 10^{-8} \ldots < 10^{-7}$	≤ 10,000 ... >1,000
SIL 4	$\geq 10^{-5} \ldots < 10^{-4}$	$\geq 10^{-9} \ldots < 10^{-8}$	≤ 100,000 ... >10,000

Functional safety (PL)

The term Performance Level (PL) in accordance with EN ISO 13849 refers to safety of machinery. The attached table depicts the correlation between the required Performance Level (PL) and the average probability of a dangerous failure per hour (PFH_d).

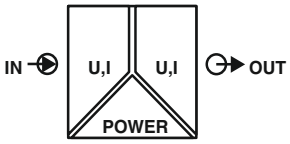
PL Performance level	PFH_d Probability of dangerous failure on average per hour
PL a	$10^{-5} \leq PFH_d < 10^{-4}$
PL b	$3 \times 10^{-6} \leq PFH_d < 10^{-5}$
PL c	$10^{-6} \leq PFH_d < 3 \times 10^{-6}$
PL d	$10^{-7} \leq PFH_d < 10^{-6}$
PL e	$10^{-8} \leq PFH_d < 10^{-7}$

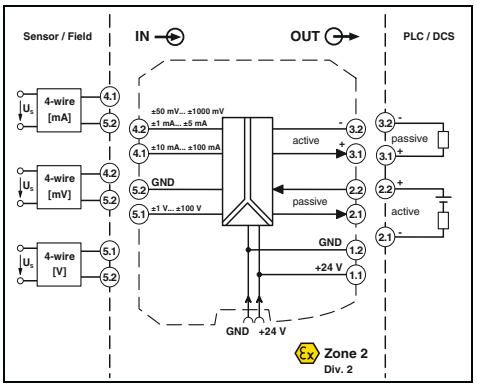
Furthermore, parameters such as category, degree of diagnostic coverage (DC), and mean time to dangerous failure ($MTTF_d$) must be taken into consideration for safety of machinery in accordance with EN ISO 13849.



Example of error distribution in a safety-related closed-loop control circuit with low demand rate in accordance with IEC 61508

Analog IN/Analog OUT
3-way signal conditioners





Ex n

SIL IEC 61508

3-way signal conditioner, universal, configurable, over 1600 signal combinations

Functional Safety
Ex:
Housing width 12.5 mm

Universal signal conditioners for operating 4-conductor measuring transducers.

- Analog signal conditioners for isolating, filtering, amplifying, and converting standard analog signals
- Configurable input and output signals, including bipolar current and voltage signals
- 3-way electrical isolation
- Over 1600 signal conversions can be set via DIP switches on the front
- 10 kHz limit frequency for time-critical applications
- Output active or passive
- Plug-in screw or Push-in connection technology
- Power supply via DIN rail connector possible
- Status indicator for supply voltage
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

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

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

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 0 ... 1 mA, configurable via DIP switches	
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 ... 10 V, configurable via DIP switches 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 range	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 (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))	
Test voltage, input/output/supply	2.5 kV (50 Hz, 1 min.)	
Degree of protection	IP20	
Ambient temperature (operation)	-20°C ... 70°C	
Mounting	any	
Housing material	PA 6.6-FR	
Dimensions W/H/D	12.5 / 99 / 114.5 mm	
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16	
EMC note		
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc	
IECEx	Ex nA IIC T4 Gc	
UL, USA/Canada	UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC	
SIL in accordance with IEC 61508	2	

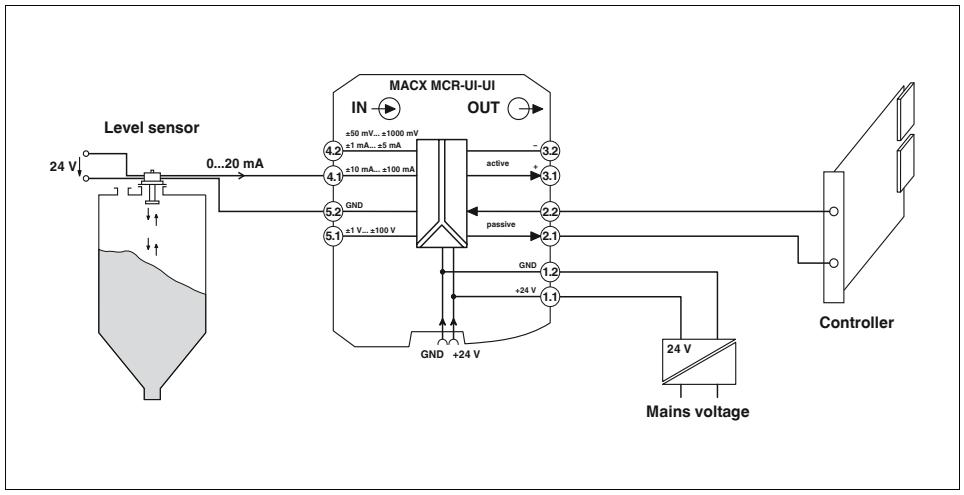
Ordering data

Description		Type	Order No.	Pcs./Pkt.
3-way signal conditioner, for electrical isolation of analog signals				
Order configuration	Screw connection	**MACX MCR-UI-UI**	2811284	1
Order configuration	Push-in connection	**MACX MCR-UI-UI-SP**	2811572	1
Standard configuration	Screw connection	**MACX MCR-UI-UI-NC**	2811446	1
Standard configuration	Push-in connection	**MACX MCR-UI-UI-SP-NC**	2811556	1

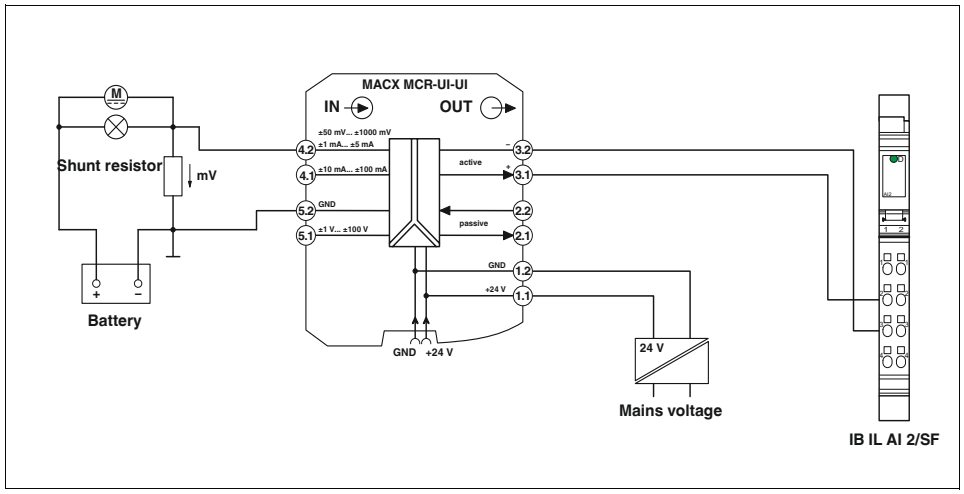
Order key for MACX MCR-UI-UI(-SP) (standard configuration entered as an example)

Order No.	Input			Output		Cut-off frequency	Factory calibration certificate (FCC)
2811284	/ IN03			/ OUT01		/ 10K	/ NONE
2811284 ≙ MACX MCR-UI-UI	IN40 ≙ 0 ... 50 mV IN24 ≙ 0 ... 60 mV IN41 ≙ 0 ... 75 mV IN25 ≙ 0 ... 100 mV IN43 ≙ 0 ... 120 mV	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 ≙ MACX MCR-UI-UI-SP	IN44 ≙ 0 ... 150 mV IN26 ≙ 0 ... 200 mV IN27 ≙ 0 ... 300 mV IN28 ≙ 0 ... 500 mV IN66 ≙ 0 ... 1,000 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	IN57 ≙ -150 ... +150 mV IN15 ≙ -200 ... +200 mV IN16 ≙ -300 ... +300 mV IN17 ≙ -500 ... +500 mV IN78 ≙ -1,000 ... +1,000 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	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	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	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		YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

Application example: Level measurement and active analog input card

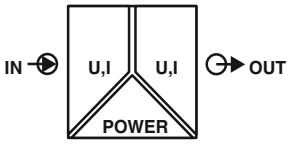


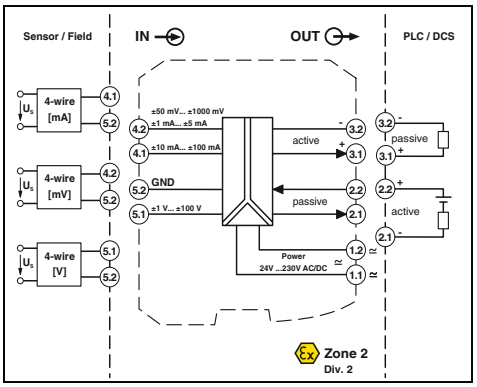
Application example: Shunt measurement and Inline terminal with passive analog input channels within an Inline station



(Information on automation solutions from Phoenix Contact is to be found in Catalog 6 and at phoenixcontact.net/products)

Analog IN/Analog OUT
3-way signal conditioners





3-way signal conditioner, configurable, over 1600 signal combinations

DNV GL Functional Safety
Ex:
Housing width 12.5 mm

- Analog signal conditioners for isolating, filtering, amplifying, and converting standard analog signals
- Configurable input and output signals, including bipolar current and voltage signals
- 3-way electrical isolation
- Over 1600 signal conversions can be set via DIP switches on the front
- Output active or passive
- Plug-in screw or Push-in connection technology
- Wide-range power supply of 19.2 to 253 V AC/DC
- Status indicator for supply voltage
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

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

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 0 ... 1 mA, configurable via DIP switches	
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 ... 10 V, configurable via DIP switches 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 range	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 (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))	
Degree of protection	IP20	
Ambient temperature (operation)	-20°C ... 70°C	
Housing material	PA 6.6-FR	
Dimensions W/H/D	12.5 / 99 / 114.5 mm	
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16	
EMC note		
Conformance/approvals		
Conformance	CE-compliant	
ATEX	II 3 G Ex nA IIC T4 Gc	
SIL in accordance with IEC 61508	2	

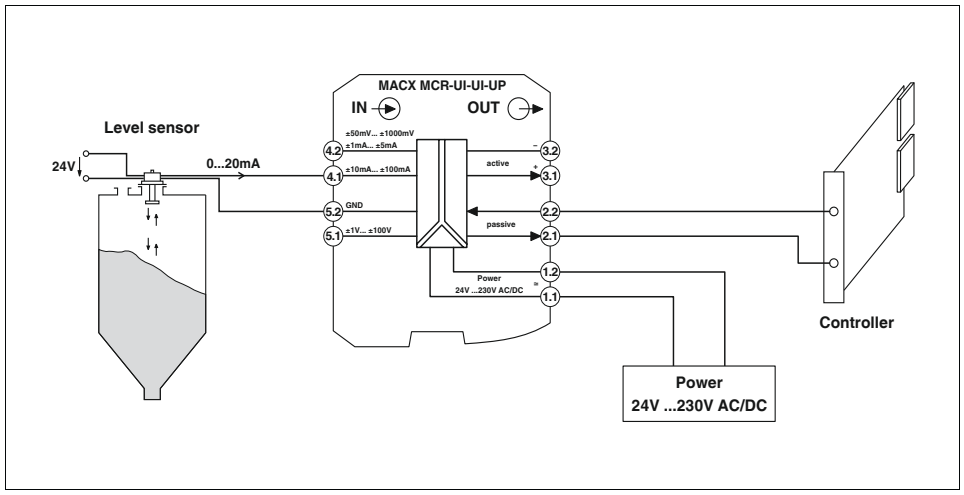
Ordering data

Description		Type	Order No.	Pcs./Pkt.
3-way signal conditioner, for electrical isolation of analog signals with long-range power supply				
Order configuration	Screw connection	**MACX MCR-UI-UI-UP**	2811459	1
Order configuration	Push-in connection	**MACX MCR-UI-UI-UP-SP**	2811585	1
Standard configuration	Screw connection	**MACX MCR-UI-UI-UP-NC**	2811297	1
Standard configuration	Push-in connection	**MACX MCR-UI-UI-UP-SP-NC**	2811569	1

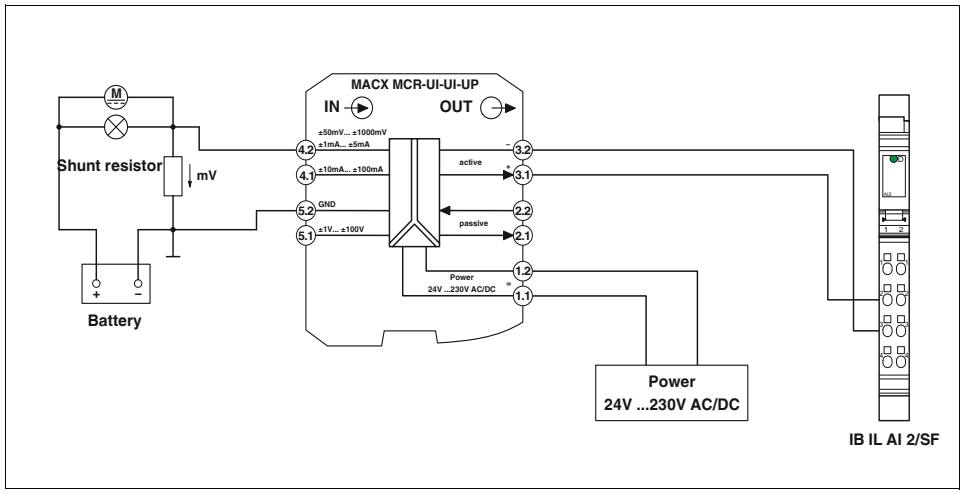
Order key for MACX MCR-UI-UI(-SP) (standard configuration entered as an example)

Order No.	Input			Output		Cut-off frequency	Factory calibration certificate (FCC)
2811459 /	IN03			OUT01		10K /	NONE
2811459 ≙ MACX MCR-UI-UI-UP 2811585 ≙ MACX MCR-UI-UI-UP-SP	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 ... 1,000 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 ≙ -1,000 ... +1,000 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

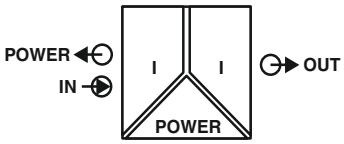


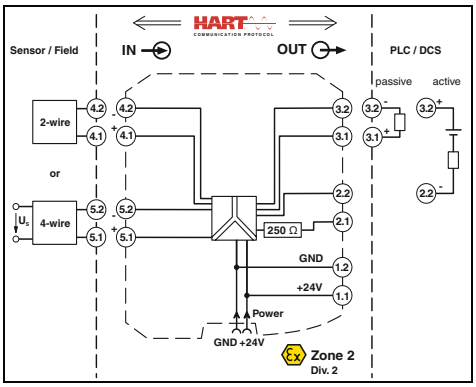
Application example: Shunt measurement and Inline terminal with analog input channels within an Inline station



(Information on automation solutions from Phoenix Contact is to be found in Catalog 6 and at phoenixcontact.net/products)

Analog IN / Analog OUT repeater power supplies





Repeater power supply and input signal conditioner

Functional Safety
Ex:
Housing width 12.5 mm

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

- 0/4 to 20 mA input (powered or not powered)
- 0/4 to 20 mA output (active or passive)
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- Terminal point with 250 Ω resistor to increase the HART impedance in the case of low-impedance systems
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Test plugs for test sockets can be found on page 177

Information on "Plug and play" connection using system cabling can be found from page 170

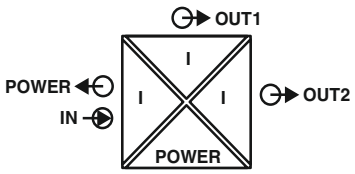
Technical data

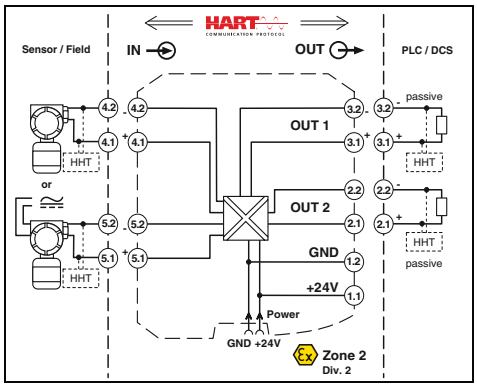
Input data		
Input signal		4 mA ... 20 mA
Transmitter supply voltage		>21.5 V (20 mA)
Voltage drop		<3.5 V (in input signal conditioner operation)
Output data		
Output signal		4 mA ... 20 mA (active) 4 mA ... 20 mA (14 ... 26 V ext. source voltage)
Load		<1,000 Ω (20 mA)
Output ripple		<20 mV_{rms}
General data		
Supply voltage range		19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Current consumption		<76 mA (24 V DC / 20 mA / 1,000 Ω) ; <55 mA (24 V DC / 20 mA / 250 Ω)
Power dissipation		<1.1 W (24 V DC/ 20 mA) <0.95 W (24 V DC / 20 mA / 250 Ω) <1.2 W (24 V DC / 20 mA / 0 Ω)
Temperature coefficient		<0.01%/K
Step response (10-90%)		<200 µs (for jump 4 mA ... 20 mA, load 600 Ω)
Transmission error, typical		<0.05% (of final value)
Maximum transmission error		<0.1% (of final value)
Under-/overload range		In accordance with NE 43
Electrical isolation		
	Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
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 6.6-FR
Dimensions W/H/D		12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / 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 II T4 Gc X
UL, USA/Canada		UL 61010 Listed UL 508 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4
SIL in accordance with IEC 61508		2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Repeater power supply, HART®-transparent			
Screw connection	**MACX MCR-SL-RPSSI-I**	2865955	1
Push-in connection	**MACX MCR-SL-RPSSI-I-SP**	2924207	1

Analog IN / Analog OUT repeater power supplies





Ex n

Repeater power supply and input signal conditioner, with two electrically isolated outputs

Functional Safety

Ex:

Housing width 12.5 mm

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

- 0/4 to 20 mA input (powered or not powered)
- Two electrically isolated outputs, 0/4 to 20 mA (active)
- Bidirectional transmission of digital HART communication signals (both outputs)
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- 4-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 2 in accordance with IEC 61508
- PL d in accordance with EN ISO 13849-1
- 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 175

Test plugs for test sockets can be found on page 177

Information on “Plug and play” connection using system cabling can be found from page 170

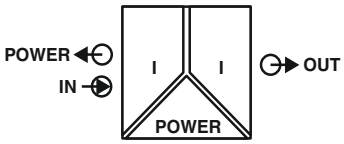
Technical data

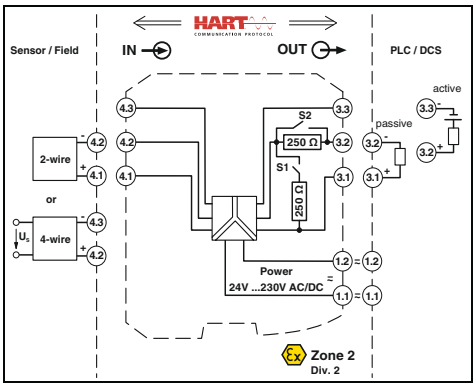
Input data		
Input signal		4 mA ... 20 mA / 0 mA ... 20 mA
Transmitter supply voltage		>21.5 V (20 mA)
Voltage drop		<3.9 V (in input signal conditioner operation)
Output data		
Output signal (per output)		4 mA ... 20 mA (active) 0 mA ... 20 mA
Load		<450 Ω (20 mA)
Output ripple		<20 mV_{rms}
General 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 jump 4 mA ... 20 mA, typical)
Transmission error, typical		<0.05% (of final value)
Maximum transmission error		<0.1% (of final value)
Under-/overload range		In accordance with NE 43
Electrical isolation		
	Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
	Output 1/output 2	1.5 kV AC (50 Hz, 1 min., test voltage)
Ambient temperature range		-20°C ... 60°C (any mounting position) -20°C ... 70°C (any mounting position, module distance> 5 mm, MTBF reduction factor 2.5, not assessed by UL)
Status indication		Green LED (PWR supply voltage)
SMART communication (per output)		Yes
Protocols supported		HART
Housing material		PA 6.6-FR
Dimensions W/H/D		12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance/approvals		
Conformance		CE-compliant, additionally EN 61326-1
ATEX		II 3 G Ex nA IIC T4 Gc X
SIL in accordance with IEC 61508		2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Repeater power supply, HART®-transparent			
Screw connection	**MACX MCR-SL-RPSSI-2I**	2924825	1
Push-in connection	**MACX MCR-SL-RPSSI-2I-SP**	2924838	1

Analog IN / Analog OUT repeater power supplies





Repeater power supply and input signal conditioner, wide-range power supply

Functional Safety
Ex:
Housing width 17.5 mm

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

- 0/4 to 20 mA input (powered or not powered)
- 0/4 to 20 mA output (active or passive), 0/1 to 5 V, can be selected via DIP switch
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- 250 Ω resistor that can be activated via DIP switches to increase the HART impedance in the case of low-impedance systems
- 3-way electrical isolation
- Wide-range power supply of 19.2 to 253 V AC/DC
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Test plugs for test sockets can be found on page 177

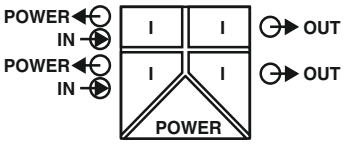
Technical data

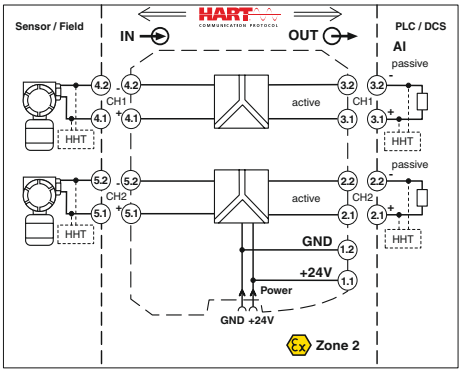
Input data		
Input signal		4 mA ... 20 mA
Transmitter supply voltage		>16 V (20 mA)
Voltage drop		<3.5 V (in input signal conditioner operation)
Output data		
Output signal		4 mA ... 20 mA (active) 4 mA ... 20 mA (14 ... 26 V ext. source voltage) 1 V ... 5 V (internal resistance, 250 Ω, 0.1%) Configurable via DIP switches
Load		<600 Ω (20 mA)
Output ripple		<20 mV_{rms}
General data		
Supply voltage range		19.2 V AC/DC ... 253 V AC/DC (24 V AC/DC ... 230 V AC/DC (-20% ... +10%, 50/60 Hz))
Current consumption		<75 mA (24 V DC / 20 mA)
Power dissipation		<1.6 W (24 V DC/ 20 mA)
Temperature coefficient		<0.01%/K
Step response (10-90%)		<600 µs (for 4 mA ... 20 mA step)
Transmission error, typical		<0.05% (of final value)
Maximum transmission error		<0.1% (of final value)
Under-/overload range		In accordance with NE 43
Electrical isolation		
	Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
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 6.6-FR
Dimensions W/H/D		17.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance/approvals		
Conformance		CE-compliant, additionally EN 61326-1
ATEX		II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada		UL 508 Listed UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4
SIL in accordance with IEC 61508		2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Repeater power supply, HART®-transparent			
Screw connection	**MACX MCR-SL-RPSSI-I-UP**	2865968	1
Push-in connection	**MACX MCR-SL-RPSSI-I-UP-SP**	2924210	1

Analog IN / Analog OUT repeater power supplies





Ex n

SIL IEC 61508 PL EN ISO 13849

2-channel repeater power supply

Functional Safety

Ex:

Housing width 12.5 mm

Repeater power supply for the operation of 2-conductor measuring transducers.

- 2-channel
- Input: 4 to 20 mA (powered)
- Output: 4 to 20 mA (active)
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- Safe 3-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 3 in accordance with IEC 61508
- PL d in accordance with EN ISO 13849-1
- 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 175

Test plugs for test sockets can be found on page 177

Information on “Plug and play” connection using system cabling can be found from page 170

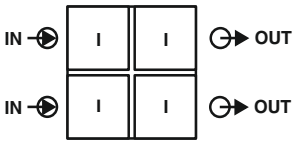
Technical data

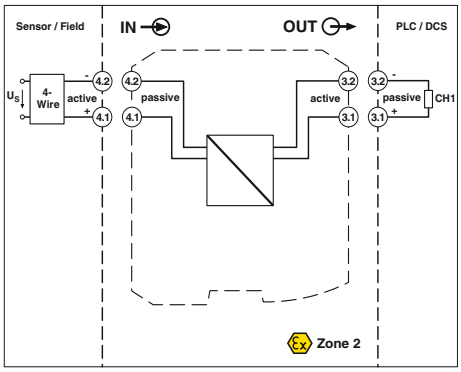
Input data		per channel
Input signal		4 mA ... 20 mA
Transmitter supply voltage		>16 V (at 20 mA)
Underload/overload signal range		0 mA ... 24 mA
Output data		per channel
Output signal		4 mA ... 20 mA (active)
Load		≤450 Ω (20 mA)
Underload/overload signal range		0 mA ... 24 mA
General data		
Supply 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	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
	Output 1/output 2/ power supply	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 6.6-FR
Dimensions W/H/D		12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / 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
UL, USA/Canada		UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4
SIL in accordance with IEC 61508		2 3
Systematic Capability		SC 3

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Repeater power supply, 2-channel, HART®-transparent			
Screw connection	**MACX MCR-SL-RPSS-2I-2I**	2904089	1
Push-in connection	**MACX MCR-SL-RPSS-2I-2I-SP**	2904090	1

Analog IN / Analog OUT passive isolators





Passive isolator, one and two channel

Ex: c UL us

Housing width 12.5 mm

The single- or dual-channel input loop-powered 2-way isolator with increased isolation voltage and plug-in connection technology is used for the electrical isolation and filtering of analog signals.

The device allows operation on active sensor technology with a supply voltage of 6 to 30 V DC.

The device is powered via the current loop of the sensor. As a result, no additional power supply is required.

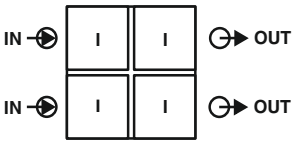
Technical data

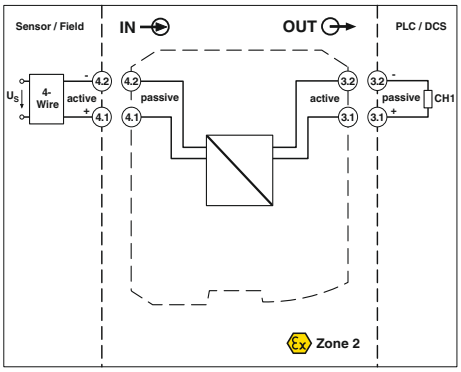
Input data	
Max. voltage input signal	<30.5 V
Input signal	0 mA ... 20 mA / 4 mA ... 20 mA
Input voltage limitation	30.5 V
Voltage dissipation	2.9 V (I = 20 mA)
Response current	Approx. 50 µA
Output data	
Max. voltage output signal	27.5 V
Output signal	0 mA ... 20 mA / 4 mA ... 20 mA
Residual ripple	<10 mV_{rms} (500 Ω load)
Transmission Behavior	1:1 to input signal
Load	≤1375 Ω (I = 20 mA)
General data	
Supply voltage range	no separate supply voltage necessary
Temperature coefficient	≤0.002%/K (of measured value / 100 Ω load)
Maximum transmission error	≤0.1% (of final value)
Electrical isolation	
Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-40°C ... 85°C
Humidity	5% ... 95% (non-condensing)
Degree of protection	IP20
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance/approvals	
Conformance	CE-compliant, additionally EN 61326-1
ATEX	Ex II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4
SIL in accordance with IEC 61508	3

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Passive isolator, one or two channel			
Screw connection	**MACX MCR-SL-I-I-ILP**	2905278	1
Push-in connection	**MACX MCR-SL-I-I-ILP-SP**	2905279	1
Screw connection	**MACX MCR-SL-2I-2I-ILP**	2905280	1
Push-in connection	**MACX MCR-SL-2I-2I-ILP-SP**	2905281	1

Analog IN / Analog OUT passive isolators





Ex n

Passive isolator, one and two channel 5 kV test voltage

Ex:

Housing width 12.5 mm

The single- or dual-channel input loop-powered 2-way isolator with increased isolation voltage and plug-in connection technology is used for the electrical isolation and filtering of analog signals.

The device allows operation on active sensor technology with a supply voltage of 6 to 30 V DC.

The device is powered via the current loop of the sensor. As a result, no additional power supply is required.

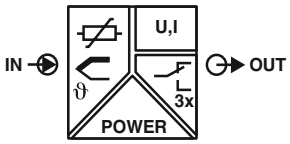
Technical data

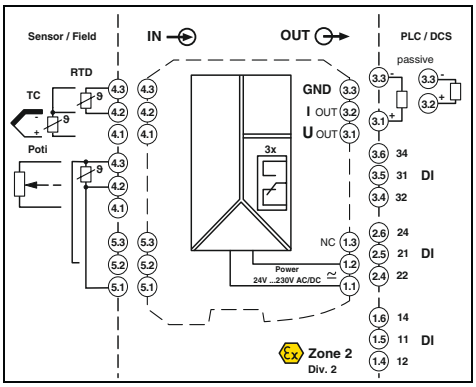
Input data	
Max. voltage input signal	<30.5 V
Input signal	0 mA ... 20 mA / 4 mA ... 20 mA
Input voltage limitation	30.5 V
Voltage dissipation	2.9 V (I = 20 mA)
Response current	Approx. 50 µA
Output data	
Max. voltage output signal	27.5 V
Output signal	0 mA ... 20 mA / 4 mA ... 20 mA
Residual ripple	<10 mV_{rms} (500 Ω load)
Transmission Behavior	1:1 to input signal
Load	≤1375 Ω (I = 20 mA)
General data	
Supply voltage range	no separate supply voltage necessary
Temperature coefficient	≤0.002%/K (of measured value / 100 Ω load)
Maximum transmission error	≤0.1% (of final value)
Electrical isolation	
Input/output/power supply	600 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-40°C ... 85°C
Humidity	5% ... 95% (non-condensing)
Degree of protection	IP20
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance/approvals	
Conformance	CE-compliant, additionally EN 61326-1
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4
SIL in accordance with IEC 61508	3

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Passive isolator, one or two channel			
Screw connection	**MACX MCR-SL-I-I-HV-ILP**	2907704	1
Push-in connection	**MACX MCR-SL-I-I-HV-ILP-SP**	2907705	1
Screw connection	**MACX MCR-SL-2I-2I-HV-ILP**	2907706	1
Push-in connection	**MACX MCR-SL-2I-2I-HV-ILP-SP**	2907707	1

Temperature, temperature transducers





Ex n

SIL IEC 61508 PL EN ISO 13849

Temperature transducer, universal, with three limit value relays, wide range supply

Functional Safety

Ex:

Housing width 35 mm

Universal temperature transducers 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)
- Programming during operation and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in screw or Push-in connection technology
- Cold junction compensation with separate connector
- Wide-range power supply of 19.2 to 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 in accordance with IEC 61508
- PL d in accordance with EN ISO 13849-1
- Installation in zone 2 permitted

Notes:

The configuration software can be downloaded from the Internet (phoenixcontact.net/products).

For information on the programming adapter, refer to page 173

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		-1,000 mV ... 1,000 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 (at 20 mA)
Behavior in the event of a sensor error	In accordance with NE 43 or freely configurable	
Switching output	Relay output	
Contact type	3 PDTs	
Contact material	$AgSnO_2$, hard gold-plated	
Max. 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	
Maximum transmission error	0.1% (e.g. for Pt 100, 300 K span, 4 ... 20 mA)	
Electrical isolation		
Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)	
Input/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	Typically 5% ... 95% (non-condensing)	
Inflammability class in accordance with UL 94	V0	
Housing material	PA 6.6-FR	
Dimensions W/H/D	35 / 99 / 114.5 mm	
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14	
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 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	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T6 Class I, Zone 2, Group IIC T6	
SIL in accordance with IEC 61508	2	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
Temperature transducer				
Standard configuration	Screw connection	**MACX MCR-T-UIREL-UP**	2811378	1
Standard configuration	Push-in connection	**MACX MCR-T-UIREL-UP-SP**	2811828	1
Order configuration	Screw connection	**MACX MCR-T-UIREL-UP-C**	2811514	1
Order configuration	Push-in connection	**MACX MCR-T-UIREL-UP-SP-C**	2811831	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
Cold junction compensation connector for thermocouples	**MACX MCR-CJC**	2924993	1

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

Order No.	SIL	Measuring unit	Sensor type	Connection technology	Measuring range: Start	Measuring range: End	Output signal	Switching function 1	Lower switching point 1	Upper switching point 1	Switching function 2	Lower switching point 2	Upper switching point 2	Factory calibration certificate
2811514	ON	C	PT100	4	-50	150	OUT02	0	99999	99999	0	99999	99999	NONE
2811514 ≙ MACX MCR-T-UIREL-UP-C 2811831 ≙ MACX MCR-T-UIREL-UP-SP-C	ON ≙ Active NONE ≙ Not active ON only with output range = OUT02	Celsius [C] Ω [O] Millivolts [V]	See below	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	See below	See below	0...20 mA [OUT01] 4...20 mA [OUT02] 0...10 V [OUT03] 2...10 V [OUT04] 0...5 V [OUT05] 1...5 V [OUT06] -5...+5 V [OUT13] -10...+10 V [OUT14] 0...5 mA [OUT15] 0...10 mA [OUT16] 1...5 mA [OUT25] 2...10 mA [OUT26]	L [0] H [1] L → SPH → H [2] H → SPH → L [3] L → SPH → H → SPL → L [4] H → SPH → L → SPL → H [5] L → SPL → H → SPH → L [6] H → SPL → L → SPH → H [7]	Free input, see web site for more	Free input, see web site for more		Free input, see web site for more	Free input, see web site for more	NONE ≙ Without FCC YES ≙ With FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

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

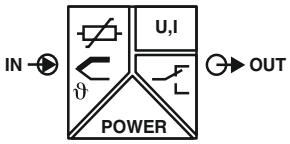
- Freely configurable user characteristic curve with 30 support points
- Output behavior in the event of a short circuit, sensor break or overrange/underrange can be freely configured or set in accordance with NE43 (standard configuration: NE43 upscale)
- Filter setting (standard configuration: 1)
- Restart after failsafe (standard configuration: ON)
- Switching behavior: switching output (limit values, times, etc.) (standard configuration: OFF)

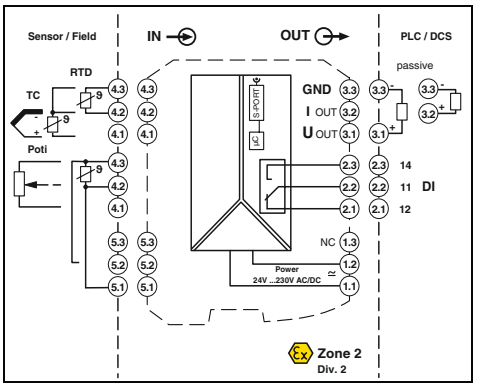
				Smallest measuring range span
Resistance temperature detector (RTD)	°C	PT50 ≙ Pt 50 IEC60751	-200	850	20k
	°C	PT100 ≙ Pt 100 IEC60751	-200	850	20k
	°C	PT200 ≙ Pt 200 IEC60751	-200	850	20k
	°C	PT500 ≙ Pt 500 IEC60751	-200	850	20k
	°C	PT1000 ≙ Pt 1000 IEC60751	-200	850	20k
	°C	PT2000 ≙ Pt 2000 IEC60751	-200	850	20k
	°C	PT5000 ≙ Pt 5000 IEC60751	-200	850	20k
	°C	PT50S ≙ PT50 SAMA RC21-4-1966	-200	850	20k
	°C	PT100S ≙ PT100 SAMA RC21-4-1966	-200	850	20k
	°C	PT200S ≙ PT200 SAMA RC21-4-1966	-200	850	20k
	°C	PT500S ≙ PT500 SAMA RC21-4-1966	-200	850	20k
	°C	PT1000S ≙ PT1000 SAMA RC21-4-1966	-200	850	20k
	°C	PT2000S ≙ PT2000 SAMA RC21-4-1966	-200	850	20k
	°C	PT5000S ≙ PT5000 SAMA RC21-4-1966	-200	850	20k
	°C	PT100G ≙ PT100 G GOST 6651-2009 (α=0.00391)	-200	850	20k
	°C	PT200G ≙ PT200 G GOST 6651-2009 (α=0.00391)	-200	850	20k
	°C	PT500G ≙ PT500 G GOST 6651-2009 (α=0.00391)	-200	850	20k
	°C	PT1000G ≙ PT1000 G GOST 6651-2009 (α=0.00391)	-200	850	20k
	°C	PT100J ≙ Pt 100 JIS C1604/1997	-200	850	20k
	°C	PT200J ≙ Pt 200 JIS C1604/1997	-200	850	20k
	°C	PT500J ≙ Pt 500 JIS C1604/1997	-200	850	20k
	°C	PT1000J ≙ Pt 1000 JIS C1604/1997	-200	850	20k
	°C	NI100 ≙ NI100 DIN 43760	-60	250	20k
	°C	NI200 ≙ NI200 DIN 43760	-60	250	20k
	°C	NI500 ≙ NI500 DIN 43760	-60	250	20k
	°C	NI1000 ≙ NI1000 DIN 43760	-60	250	20k
	°C	NI100S ≙ NI100 SAMA RC21-4-1966	-60	180	20k
	°C	NI200S ≙ NI200 SAMA RC21-4-1966	-60	180	20k
	°C	NI500S ≙ NI500 SAMA RC21-4-1966	-60	180	20k
	°C	NI1000S ≙ NI1000 SAMA RC21-4-1966	-60	180	20k
	°C	NI1000L ≙ NI1000 Landis&Gyr	-50	160	20k
	°C	CU10 ≙ CU10 SAMA RC21-4-1966	-70	500	20k
	°C	CU50 ≙ CU 50 GOST 6651-2009 (α=0.00428)	-50	200	20k
	°C	CU100 ≙ CU 100 GOST 6651-2009 (α=0.00428)	-50	200	20k
	°C	CU53 ≙ CU 53 GOST 6651-2009 (α=0.00426)	-50	180	20k
	°C	KTY81 ≙ KTY81 KTY81-110 (Philips)	-55	150	20k
	°C	KTY84 ≙ KTY81 KTY84-130 (Philips)	-40	300	20k
Thermocouples (TC)	°C	A1G ≙ A-1 GOST 8.585-2001	0	2,500	50k
	°C	A2G ≙ A-2 GOST 8.585-2001	0	1,800	50k
	°C	A3G ≙ A-3 GOST 8.585-2001	0	1,800	50k
	°C	B ≙ B IEC584-1 (Pt30Rh-Pt6Rh)	500	1,820	50k
	°C	C ≙ C ASTM E988	0	2,315	50k
	°C	D ≙ DA ASTM E988(2002)	0	2,315	50k
	°C	E ≙ E IEC584-1 (NiCr-CuNi)	-230	1,000	50k
	°C	J ≙ J IEC584-1(Fe-CuNi)	-210	1,200	50k
	°C	K ≙ K IEC584-1(NiCr-Ni)	-250	1372	50k
	°C	MG ≙ MG GOST 8.585-2001	-200	100	50k
	°C	N ≙ N IEC 584-1 (NiCrSi-NiSi)	-200	1,300	50k
	°C	R ≙ R IEC 584-1 (Pt13Rh-Pt)	-50	1,768	50k
	°C	S ≙ S IEC 584-1 (Pt10Rh-Pt)	-50	1,768	50k
	°C	T ≙ T IEC 584-1 (Cu-CuNi)	-200	400	50k
	°C	L ≙ L DIN 43760 (Fe-CuNi)	-200	900	50k
	°C	LG ≙ LG GOST 8.585-2001	-200	800	50k
	°C	U ≙ U DIN 43760 (Cu-CuNi)	-200	600	50k
Remote resistance-type sensors (R) (2-, 3-, 4-conductor)	Ω	RES12 ≙ Resistance 0…50,000 Ω For more values, visit www.phoenixcontact.com	0	50,000	10% of the selected measuring range
Potentiometers (3-conductor)	Ω	POT12 ≙ Potentiometer 0…50,000 Ω For more values, visit www.phoenixcontact.com	0	50,000	10% of the selected measuring range
Voltage signals (mV)	mV	V04 ≙ Voltage -1,000 mV…+1,000 mV For more values, visit www.phoenixcontact.com	-1,000	1,000	10% of nominal span

Temperature conversion guide for°C to°F:

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

Temperature, temperature transducers





Ex n

SIL IEC 61508

Temperature transducer, universal, with switching output, wide range supply

Functional Safety
Ex:
Housing width 17.5 mm

Universal temperature transducers 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)
- Programming during operation and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in screw or Push-in connection technology
- Cold junction compensation with separate connector
- Wide-range power supply of 19.2 to 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

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

The configuration software can be downloaded from the Internet (phoenixcontact.net/products).

For information on the programming adapter, refer to page 173

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		-1,000 mV ... 1,000 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	In accordance with NE 43 or freely configurable	
Switching output	Relay output	
Contact type	1 PDT	
Contact material	$AgSnO_2$, hard gold-plated	
Max. 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	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)	
Input/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	Typically 5% ... 95% (non-condensing)	
Inflammability class in accordance with UL 94	V0	
Housing material	PA 6.6-FR	
Dimensions W/H/D	17.5 / 99 / 114.5 mm	
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14	
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 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	
SIL in accordance with IEC 61508	2	

Ordering data

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

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
Cold junction compensation connector for thermocouples	**MACX MCR-CJC**	2924993	1

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

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

Order No.

2811873 ≙ MACX MCR-T-UI-UP-C

2811970 ≙ MACX MCR-T-UI-UP-SP-C

Safety Integrity Level (SIL)

ON ≙ Active

NONE ≙ Not active

ON only with output range = OUT02

Sensor type

See below

Connection technology

2 ≙ 2-conductor

3 ≙ 3-conductor

4 ≙ 4-conductor

Cold junction compensation

0 ≙ Off, e.g., with RTD, R, potentiometer, mV

1 ≙ On, e.g., with TC

Measuring range: Start / End

See below

Measuring unit

C ≙ °C
F ≙ °F
O ≙ Ω
P ≙ %
V ≙ mV

Output range

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

Factory calibration certificate = FCC

NONE ≙ Without FCC

YES ≙ With FCC (a fee is charged)

YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

			Start	End		Smallest measuring range span
Resistance temperature detector (RTD)	PT50	≙ Pt 50 IEC60751	-200	850	°C	20k
	PT100	≙ Pt 100 IEC60751	-200	850	°C	20k
	PT200	≙ Pt 200 IEC60751	-200	850	°C	20k
	PT500	≙ Pt 500 IEC60751	-200	850	°C	20k
	PT1000	≙ Pt 1000 IEC60751	-200	850	°C	20k
	PT2000	≙ Pt 2000 IEC60751	-200	850	°C	20k
	PT5000	≙ Pt 5000 IEC60751	-200	850	°C	20k
	PT50S	≙ PT50 SAMA RC21-4-1966	-200	850	°C	20k
	PT100S	≙ PT100 SAMA RC21-4-1966	-200	850	°C	20k
	PT200S	≙ PT200 SAMA RC21-4-1966	-200	850	°C	20k
	PT500S	≙ PT500 SAMA RC21-4-1966	-200	850	°C	20k
	PT1000S	≙ PT1000 SAMA RC21-4-1966	-200	850	°C	20k
	PT2000S	≙ PT2000 SAMA RC21-4-1966	-200	850	°C	20k
	PT5000S	≙ PT5000 SAMA RC21-4-1966	-200	850	°C	20k
	PT100G	≙ PT100 G GOST 6651-2009 (α=0.00391)	-200	850	°C	20k
	PT200G	≙ PT200 G GOST 6651-2009 (α=0.00391)	-200	850	°C	20k
	PT500G	≙ PT500 G GOST 6651-2009 (α=0.00391)	-200	850	°C	20k
	PT1000G	≙ PT1000 G GOST 6651-2009 (α=0.00391)	-200	850	°C	20k
	PT100J	≙ Pt 100 JIS C1604/1997	-200	850	°C	20k
	PT200J	≙ Pt 200 JIS C1604/1997	-200	850	°C	20k
	PT500J	≙ Pt 500 JIS C1604/1997	-200	850	°C	20k
	PT1000J	≙ Pt 1000 JIS C1604/1997	-200	850	°C	20k
	NI100	≙ NI100 DIN 43760	-60	250	°C	20k
	NI200	≙ NI200 DIN 43760	-60	250	°C	20k
	NI500	≙ NI500 DIN 43760	-60	250	°C	20k
	NI1000	≙ NI1000 DIN 43760	-60	250	°C	20k
	NI100S	≙ NI100 SAMA RC21-4-1966	-60	180	°C	20k
	NI200S	≙ NI200 SAMA RC21-4-1966	-60	180	°C	20k
	NI500S	≙ NI500 SAMA RC21-4-1966	-60	180	°C	20k
	NI1000S	≙ NI1000 SAMA RC21-4-1966	-60	180	°C	20k
	NI1000L	≙ NI1000 Landis&Gyr	-50	160	°C	20k
	CU10	≙ CU10 SAMA RC21-4-1966	-70	500	°C	20k
	CU50	≙ CU 50 GOST 6651-2009 (α=0.00428)	-50	200	°C	20k
	CU100	≙ CU 100 GOST 6651-2009 (α=0.00428)	-50	200	°C	20k
	CU53	≙ CU 53 GOST 6651-2009 (α=0.00426)	-50	180	°C	20k
	KTY81	≙ KTY81 KTY81-110 (Philips)	-55	150	°C	20k
	KTY84	≙ KTY81 KTY84-130 (Philips)	-40	300	°C	20k
Thermocouples (TC)	A1G	≙ A-1 GOST 8.585-2001	0	2,500	°C	50k
	A2G	≙ A-2 GOST 8.585-2001	0	1,800	°C	50k
	A3G	≙ A-3 GOST 8.585-2001	0	1,800	°C	50k
	B	≙ B IEC584-1 (Pt30Rh-Pt6Rh)	500	1,820	°C	50k
	C	≙ C ASTM E988	0	2,315	°C	50k
	D	≙ DA ASTM E988(2002)	0	2,315	°C	50k
	E	≙ E IEC584-1 (NiCr-CuNi)	-230	1,000	°C	50k
	J	≙ J IEC584-1 (Fe-CuNi)	-210	1,200	°C	50k
	K	≙ K IEC584-1(NiCr-Ni)	-250	1,372	°C	50k
	MG	≙ MG GOST 8.585-2001	-200	100	°C	50k
	N	≙ N IEC 584-1 (NiCrSi-NiSi)	-200	1,300	°C	50k
	R	≙ R IEC 584-1 (Pt13Rh-Pt)	-50	1,768	°C	50k
	S	≙ S IEC 584-1 (Pt10Rh-Pt)	-50	1,768	°C	50k
	T	≙ T IEC 584-1 (Cu-CuNi)	-200	400	°C	50k
	L	≙ L DIN 43760 (Fe-CuNi)	-200	900	°C	50k
	LG	≙ LG GOST 8.585-2001	-200	800	°C	50k
	U	≙ U DIN 43760 (Cu-CuNi)	-200	600	°C	50k
Remote resistance-type sensors (R) (2-, 3-, 4-conductor)	RES12	≙ Resistance 0…50,000 Ω For more values, visit www.phoenixcontact.com	0	50,000	Ω	10% of the selected measuring range
Potentiometers (3-conductor)	POT12	≙ Potentiometer 0…50,000 Ω For more values, visit www.phoenixcontact.com	0	50,000	Ω	10% of the selected measuring range
Voltage signals (mV)	V04	≙ Voltage -1,000 mV…+1,000 mV For more values, visit www.phoenixcontact.com	-1,000	1,000	mV	10% of nominal span

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

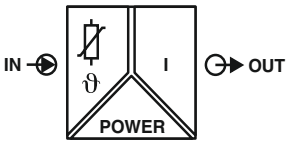
- Freely configurable user characteristic curve with 30 support points
- Output behavior in the event of a short circuit, sensor break or overrange/underrange can be freely configured or set in accordance with NE43 (standard configuration: NE43 upscale)
- Filter setting (standard configuration: 1)
- Restart after failsafe (standard configuration: ON)
- Switching behavior: switching output (limit values, times, etc.) (standard configuration: OFF)

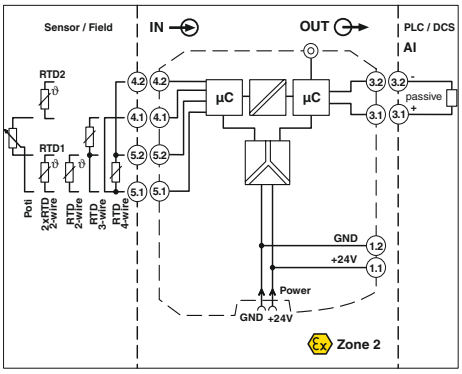
Temperature conversion guide for°C to°F:

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

Temperature, temperature transducers

new





Ex n

SIL IEC 61508

Temperature transducer for resistance thermometers and resistance-type sensors

Housing width 12.5 mm

Programmable temperature transducers for operating resistance thermometers and resistance-type sensors. The measured values are converted into a linear 0 to 20 mA or 4 to 20 mA signal.

- Input for resistance thermometers, potentiometers, and resistance-type sensors
- 0 to 20 mA or 4 to 20 mA output
- Configuration via software (FDT/DTM): Sensor type, connection method, measuring range, measuring unit, filter, alarm signal, and output range
- Programming during operation and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Status indicator for supply voltage, cable, sensor, and module errors
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Installation in zone 2 permitted
- Up to SIL 2 in accordance with IEC 61508

Technical data

Input data	
Resistance thermometers	Pt, Ni, Cu sensors: 2-, 3-, 4-conductor
Resistor	0 Ω ... 50 kΩ
Potentiometer	0 Ω ... 50 kΩ
Cable resistance	≤50 Ω per cable
Sensor input current	10 µA ... 210 µA (up to 2 x 210 µA for 3-conductor)
Measuring range span	≥50 K
Output data	
Output signal	0 mA ... 20 mA / 4 mA ... 20 mA (SIL)
Load	≤600 Ω
Behavior in the event of a sensor error	As per NE 43 or can be freely defined
Output ripple	<15 μA_{PP}
General data	
Supply voltage range	19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Current draw	≤40 mA (24 V DC)
Power dissipation	≤0.74 W
Temperature coefficient	0.01%/K
Step response (0 - 99%)	Typically 1 s ≤1.7 s
Transmission error, total	0.1% x 1,000 [K]/measuring span
ZERO / SPAN adjustment	± 5% / ± 5%
Electrical isolation	
Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Input/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	-40°C ... 70°C (any mounting position)
Humidity	5% ... 95% (non-condensing)
Status indication	Green LED (supply voltage, PWR) Red LED, flashing 2.4 Hz (cable error, sensor error on input or output, ERR) Red LED, flashing 1.2 Hz (service operation, ERR) Red LED, permanently on (module error, ERR)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / 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(1) G Ex ec ic [ia Ga] IIC T4 Gc X
IECEx	Ex ec ic [ia Ga] IIC T4 Gc
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
	MACX MCR-RTD-I	1050192	1
	MACX MCR-RTD-I-SP	1050201	1
	MACX MCR-RTD-I-C	1052472	1
	MACX MCR-RTD-I-SP-C	1052464	1

Accessories

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

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

Order No.	SIL ON/OF	Sensor type	Measuring unit	Connection technology	Measuring range: Start	Measuring range: End	Output signal	Sliding mean value	Alarm signal, short circuit	Alarm signal, sensor break	Factory calibration certificate
1052472	ON	PT100	C	4	-50	150	OUT02	1	I000	I000	NONE
1052472 ≙ MACX MCR-RTD-I-C 1052464 ≙ MACX MCR-RTD-I-SP-C	ON ≙ Active NONE ≙ Not active ON only with output range = OUT02	See below	Celsius [C] Ω [O] Millivolts [V]	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	See below	See below	0...20 mA [OUT01] 4...20 mA [OUT02] 0...5 mA [OUT15] 0...10 mA [OUT16] 1...5 mA [OUT25] 2...10 mA [OUT26]	1 - 10	0 mA [I000] 3.5 mA [I035] 21.5 mA [I215]	0 mA [I000] 3.5 mA [I035] 21.5 mA [I215]	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 temperature detector (RTD)	PT50	≙ Pt 50 IEC60751	°C	-200	850	20k
	PT100	≙ Pt 100 IEC60751	°C	-200	850	20k
	PT200	≙ Pt 200 IEC60751	°C	-200	850	20k
	PT500	≙ Pt 500 IEC60751	°C	-200	850	20k
	PT1000	≙ Pt 1000 IEC60751	°C	-200	850	20k
	PT2000	≙ Pt 2000 IEC60751	°C	-200	850	20k
	PT5000	≙ Pt 5000 IEC60751	°C	-200	850	20k
	PT50S	≙ PT50 SAMA RC21-4-1966	°C	-200	850	20k
	PT100S	≙ PT100 SAMA RC21-4-1966	°C	-200	850	20k
	PT200S	≙ PT200 SAMA RC21-4-1966	°C	-200	850	20k
	PT500S	≙ PT500 SAMA RC21-4-1966	°C	-200	850	20k
	PT1000S	≙ PT1000 SAMA RC21-4-1966	°C	-200	850	20k
	PT2000S	≙ PT2000 SAMA RC21-4-1966	°C	-200	850	20k
	PT5000S	≙ PT5000 SAMA RC21-4-1966	°C	-200	850	20k
	PT100G	≙ PT100 G GOST 6651-2009 (α=0.00391)	°C	-200	850	20k
	PT200G	≙ PT200 G GOST 6651-2009 (α=0.00391)	°C	-200	850	20k
	PT500G	≙ PT500 G GOST 6651-2009 (α=0.00391)	°C	-200	850	20k
	PT1000G	≙ PT1000 G GOST 6651-2009 (α=0.00391)	°C	-200	850	20k
	PT100J	≙ Pt 100 JIS C1604/1997	°C	-200	850	20k
	PT200J	≙ Pt 200 JIS C1604/1997	°C	-200	850	20k
	PT500J	≙ Pt 500 JIS C1604/1997	°C	-200	850	20k
	PT1000J	≙ Pt 1000 JIS C1604/1997	°C	-200	850	20k
	NI100	≙ NI100 DIN 43760	°C	-60	250	20k
	NI200	≙ NI200 DIN 43760	°C	-60	250	20k
	NI500	≙ NI500 DIN 43760	°C	-60	250	20k
	NI1000	≙ NI1000 DIN 43760	°C	-60	250	20k
	NI100S	≙ NI100 SAMA RC21-4-1966	°C	-60	180	20k
	NI200S	≙ NI200 SAMA RC21-4-1966	°C	-60	180	20k
	NI500S	≙ NI500 SAMA RC21-4-1966	°C	-60	180	20k
	NI1000S	≙ NI1000 SAMA RC21-4-1966	°C	-60	180	20k
	NI1000L	≙ NI1000 Landis&Gyr	°C	-50	160	20k
	CU10	≙ CU10 SAMA RC21-4-1966	°C	-70	500	100k
	CU50	≙ CU 50 GOST 6651-2009 (α=0.00428)	°C	-50	200	100k
	CU100	≙ CU 100 GOST 6651-2009 (α=0.00428)	°C	-50	200	100k
	CU53	≙ CU 53 GOST 6651-2009 (α=0.00426)	°C	-50	180	100k
	KTY81	≙ KTY81 KTY81-110 (Philips)	°C	-55	150	20k
	KTY84	≙ KTY81 KTY84-130 (Philips)	°C	-40	300	20k
Remote resistance-type sensors (R) (2-, 3-, 4-conductor)	RES02	≙ Resistance 0…75 Ω	Ω	0	75	10% of the selected measuring range
	RES03	≙ Resistance 0…150 Ω	Ω	0	150	
	RES04	≙ Resistance 0…300 Ω	Ω	0	300	
	RES05	≙ Resistance 0…600 Ω	Ω	0	600	
	RES06	≙ Resistance 0…1,200 Ω	Ω	0	1200	
	RES07	≙ Resistance 0…2,400 Ω	Ω	0	2400	
	RES08	≙ Resistance 0…4,800 Ω	Ω	0	4800	
	RES09	≙ Resistance 0…6,250 Ω	Ω	0	6250	
	RES10	≙ Resistance 0…12,500 Ω	Ω	0	12500	
	RES11	≙ Resistance 0…25,000 Ω	Ω	0	25000	
	RES12	≙ Resistance 0…50,000 Ω	Ω	0	50,000	

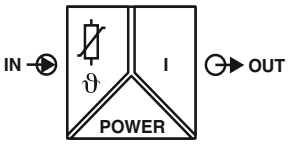
Other setting options can be configured with the IFS-CONF software:

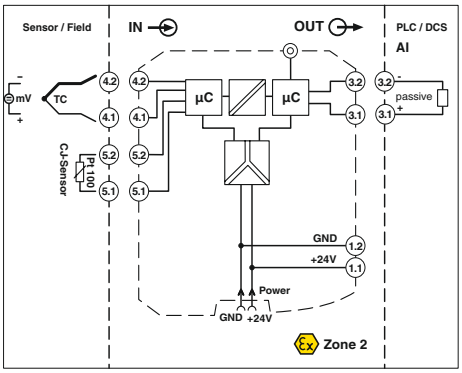
- Freely configurable user characteristic curve with 30 support points
- Output behavior in the event of a short circuit, sensor break or over-range/under-range can be freely configured or set in accordance with NE43 (standard configuration: NE43 upscale)
- Filter setting (standard configuration: 1)
- 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 transducers

new





Ex n

Temperature transducer for thermocouples

Housing width 12.5 mm

Programmable temperature transducers for operating thermocouples and mV sources. The measured values are converted into a linear 0 to 20 mA or 4 to 20 mA signal.

- Input for thermocouples and mV signals
- 0 to 20 mA or 4 to 20 mA output
- Configuration via software (FDT/DTM): Sensor type, connection method, measuring range, measuring unit, filter, alarm signal, and output range
- Programming during operation and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Status indicator for supply voltage, cable, sensor, and module errors
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Installation in zone 2 permitted
- Up to SIL 2 in accordance with IEC 61508

Technical data

Input data	
Thermocouple sensors	B, E, J, K, N, R, S, T, L, U, C, D, A-1, A-2, A-3, M, Lr
Voltage	-1,000 mV ... 1,000 mV
Measuring range span	Min. 50 K with thermocouple, 10% of the nominal span of the respective range with mV sources
Output data	
Output signal	0 mA ... 20 mA / 4 mA ... 20 mA (SIL)
Load	≤600 Ω
Behavior in the event of a sensor error	As per NE 43 or can be freely defined
Output ripple	<15 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 consumption	≤1 W
Power dissipation	≤0.74 W
Temperature coefficient	0.01%/K
Step response (0 - 99%)	Typically 700 ms ≤1,000 ms
Transmission error, total	0.1% x 600 [K]/measuring span; 0.1% >600 [K]
Cold junction errors	± 1 K
ZERO / SPAN adjustment	± 5% / ± 5%
Electrical isolation	
Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Input/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	-40°C ... 70°C (any mounting position)
Humidity	5% ... 95% (non-condensing)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Conformance/approvals	
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
	MACX MCR-TC-I	1050228	1
	MACX MCR-TC-I-C	1052459	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
Cold junction compensation connector for thermocouples	**IOA MCR-CJC-PT100**	1085776	1

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

Order No.	SIL	Sensor type	Measuring unit	Cold junction compensation	Measuring range: Start	Measuring range: End	Output signal	Sliding mean value	Alarm signal, short circuit	Alarm signal, sensor break	Factory calibration certificate
1052459	ON	K	C	ON	-50	150	OUT02	1	I000	I000	NONE
1052459 ≙ MACX MCR-TC-I-C	ON ≙ Active NONE ≙ Not active ON only with output range = OUT02	See below	Celsius [C] Ω [O] Millivolts [V]	ON OFF	See below	See below	0...20 mA [OUT01] 4...20 mA [OUT02] 0...5 mA [OUT15] 0...10 mA [OUT16] 1...5 mA [OUT25] 2...10 mA [OUT26]	1 - 10	0 mA [I000] 3.5 mA [I035] 21.5 mA [I215]	0 mA [I000] 3.5 mA [I035] 21.5 mA [I215]	NONE ≙ Without FCC YES ≙ With FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

				Smallest measuring range span
Thermocouples (TC)	A1G	≙ A-1 GOST 8.585-2001	°C	50k
	A2G	≙ A-2 GOST 8.585-2001	°C	50k
	A3G	≙ A-3 GOST 8.585-2001	°C	50k
	B	≙ B IEC584-1 (Pt30Rh-Pt6Rh)	°C	50k
	C	≙ C ASTM E988	°C	50k
	D	≙ DA ASTM E988(2002)	°C	50k
	E	≙ E IEC584-1 (NiCr-CuNi)	°C	50k
	J	≙ J IEC584-1 (Fe-CuNi)	°C	50k
	K	≙ K IEC584-1(NiCr-Ni)	°C	50k
	MG	≙ MG GOST 8.585-2001	°C	50k
	N	≙ N IEC 584-1 (NiCrSi-NiSi)	°C	50k
	R	≙ R IEC 584-1 (Pt13Rh-Pt)	°C	50k
	S	≙ S IEC 584-1 (Pt10Rh-Pt)	°C	50k
	T	≙ T IEC 584-1 (Cu-CuNi)	°C	50k
	L	≙ L DIN 43760 (Fe-CuNi)	°C	50k
	LG	≙ LG GOST 8.585-2001	°C	50k
	U	≙ U DIN 43760 (Cu-CuNi)	°C	50k
Voltage signals (mV)	V04	≙ Voltage -1,000 mV…+1,000 mV	mV	10% of nominal span
	V05	≙ Voltage -500 mV…+500 mV	mV	
	V06	≙ Voltage -250 mV…+250 mV	mV	
	V07	≙ Voltage -125 mV…+125 mV	mV	
	V08	≙ Voltage -60 mV…+60 mV	mV	
	V09	≙ Voltage -30 mV…+30 mV	mV	
	V10	≙ Voltage -15 mV…+15 mV	mV	

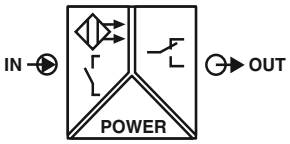
Sliding mean value	Alarm signal, short circuit	Alarm signal, sensor break
0	2,500	50k
0	1,800	50k
0	1,800	50k
500	1,820	50k
0	2,315	50k
0	2,315	50k
-230	1,000	50k
-210	1,200	50k
-250	1,372	50k
-200	100	50k
-200	1,300	50k
-50	1,768	50k
-50	1,768	50k
-200	400	50k
-200	900	50k
-200	800	50k
-200	600	50k
-1,000	1,000	
-500	500	
-250	250	
-125	125	
-60	60	
-30	30	
-15	150	

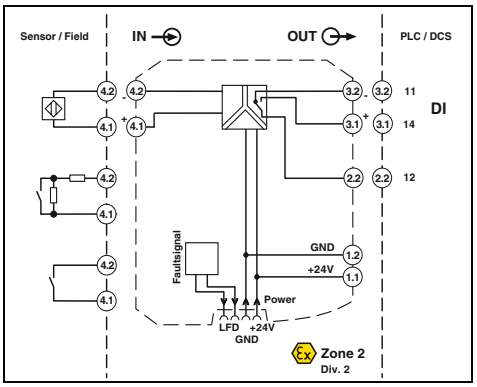
Other setting options can be configured with the IFS-CONF software:

- Freely configurable user characteristic curve with 30 support points
- Output behavior in the event of a short circuit, sensor break or over-range/under-range can be freely configured or set in accordance with 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 signal conditioners





NAMUR signal conditioner, signal output: PDT relay

DNV GL Functional Safety
Ex:
Housing width 12.5 mm

NAMUR signal conditioners for operating proximity sensors and mechanical contacts

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- Relay signal output (PDT)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing led and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Information about resistance circuits is given on page 177

Information on “Plug and play” connection using system cabling can be found from page 170

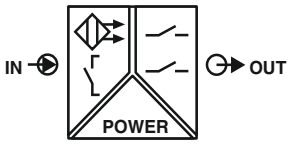
Technical data

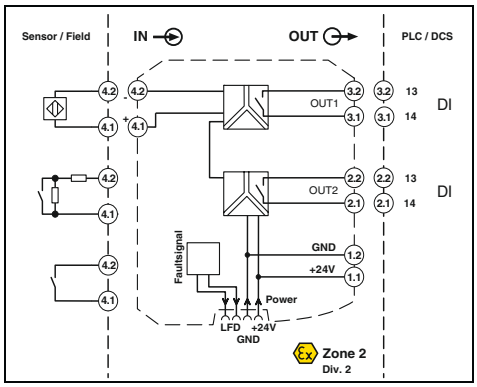
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) open circuit switch contacts Switch contacts with resistance circuit
No-load voltage	~ 8 V DC
Switching points	>2.1 mA (conductive) / <1.2 mA (blocking)
Switching hysteresis	<0.2 mA
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	**Relay output**
Contact type	1 PDT
Contact material	$AgSnO_2$, hard gold-plated
Max. 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 (24 V DC -20%...+25%)
Current consumption	21 mA (24 V DC)
Power dissipation	<650 mW
Electrical isolation	
Input/output	375 V (peak value in accordance with EN 60079-11)
Input/output/supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Output/input, supply, TBUS	300 V_{rms} (rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Input/supply, DIN rail connector	375 V (peak value in accordance with EN 60079-11)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance/approvals	
Conformance	CE-compliant, additionally EN 61326-1
ATEX	II 3 G Ex nA nC IIC T4 Gc X
UL, USA/Canada	UL 508 Listed UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioners			
Screw connection	**MACX MCR-SL-NAM-R**	2865997	1
Push-in connection	**MACX MCR-SL-NAM-R-SP**	2924252	1

Digital IN
NAMUR signal conditioners





Ex n

NAMUR signal conditioner, 2 signal outputs: N/O relay

DNV GL Functional Safety
Ex:
Housing width 12.5 mm

NAMUR signal conditioners for operating proximity sensors and mechanical contacts

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- 2 relay signal outputs (N/O contact), output 2 can also be used as an error signal output
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing led and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 4-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Information about resistance circuits is given on page 177

Information on “Plug and play” connection using system cabling can be found from page 170

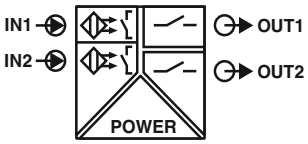
Technical data

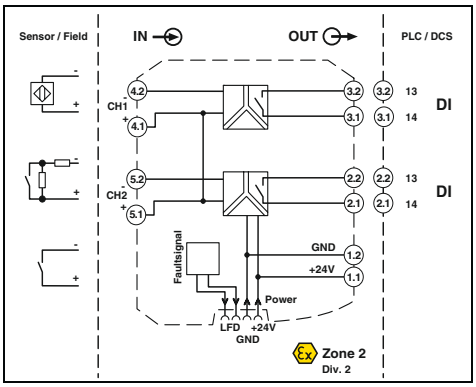
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) open circuit switch contacts Switch contacts with resistance circuit
No-load voltage	~ 8 V DC
Switching points	>2.1 mA (conductive) / <1.2 mA (blocking)
Switching hysteresis	<0.2 mA
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	**Relay output**
Contact type	2 N/O contacts
Contact material	$AgSnO_2$, hard gold-plated
Max. 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 (24 V DC -20%...+25%)
Current consumption	30 mA (24 V DC)
Power dissipation	<950 mW
Electrical isolation	
Input/supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
Output 1/output 2/input/power supply, DIN rail connector	2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Conformance/approvals	
Conformance	CE-compliant, additionally EN 61326-1
ATEX	II 3 G Ex nA nC IIC T4 Gc X
UL, USA/Canada	UL 508 Listed UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioners			
Screw connection	**MACX MCR-SL-NAM-2RO**	2865010	1
Push-in connection	**MACX MCR-SL-NAM-2RO-SP**	2924265	1

Digital IN
NAMUR signal conditioners





Ex n

SIL IEC 61508

NAMUR signal conditioner, 2-channel, output: 1 N/O contact per channel

DNV GL Functional Safety
Ex:
Housing width 12.5 mm

NAMUR signal conditioners for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- Relay signal output (N/O contact)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing led and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Information about resistance circuits is given on page 177

Information on “Plug and play” connection using system cabling can be found from page 170

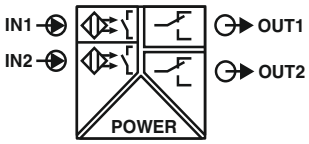
Technical data

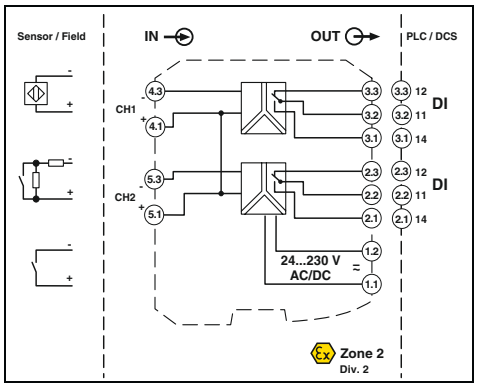
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) open circuit switch contacts Switch contacts with resistance circuit
No-load voltage	~ 8 V DC
Switching points	>2.1 mA (conductive) / <1.2 mA (blocking)
Switching hysteresis	<0.2 mA
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	**Relay output**
Contact type	1 N/O contact per channel
Contact material	$AgSnO_2$, hard gold-plated
Max. 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 (24 V DC -20%...+25%)
Current consumption	35 mA (24 V DC)
Power dissipation	<1 W
Electrical isolation	
Input/supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
Output 1/output 2/input, power supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1))
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	5% ... 95% (non-condensing)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance/approvals	
Conformance	CE-compliant, additionally EN 61326-1
ATEX	II 3 G Ex nA nC IIC T4 Gc X
UL, USA/Canada	UL 508 Listed UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner			
Screw connection	**MACX MCR-SL-2NAM-RO**	2865049	1
Push-in connection	**MACX MCR-SL-2NAM-RO-SP**	2924294	1

Digital IN
NAMUR signal conditioners





Ex n

SIL IEC 61508

NAMUR signal conditioner, 2-channel, output: 1 N/O contact per channel, with wide range supply

Functional Safety

Ex:

Housing width 17.5 mm

NAMUR signal conditioners for operating proximity sensors and mechanical contacts

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- Relay signal output (PDT)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing led and de-excitation of the output relay
- Wide-range power supply of 19.2 to 253 V AC/DC
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information on resistance circuits and marking material can be found on page 177

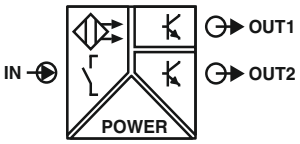
Technical data

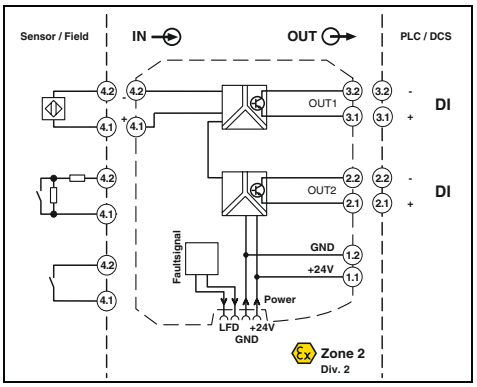
Input data		
Input signal		NAMUR proximity sensors (EN 60947-5-6) open circuit switch contacts Switch contacts with resistance circuit
No-load voltage		~ 8 V DC
Switching points		>2.1 mA (conductive) / <1.2 mA (blocking)
Switching hysteresis		<0.2 mA
Line error detection		Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output		Relay output
Contact type		1 PDT per channel
Contact material		$AgSnO_2$, hard gold-plated
Max. 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		19.2 V AC/DC ... 253 V AC/DC (24 V AC/DC ... 230 V AC/DC (-20% ... +10%, 50/60 Hz))
Current consumption		<80 mA ; <42 mA (24 V DC)
Power dissipation		≤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 (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV AC (50 Hz, 1 min., test voltage)
Ambient temperature range		-20°C ... 60°C
Humidity		10% ... 95% (non-condensing)
Inflammability class in accordance with UL 94		V0
Housing material		PA 6.6-FR
Dimensions W/H/D		17.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / AWG		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Conformance/approvals		
Conformance		CE-compliant, additionally EN 61326-1
ATEX		II 3 G Ex nA nC IIC T4 Gc X
UL, USA/Canada		UL 508 Listed UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4
SIL in accordance with IEC 61508		2

Ordering data

Description		Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner				
	Screw connection	**MACX MCR-SL-2NAM-R-UP**	2865052	1
	Push-in connection	**MACX MCR-SL-2NAM-R-UP-SP**	2924304	1

Digital IN
NAMUR signal conditioners





NAMUR signal conditioner:
2 signal outputs: transistor (passive)

DNV GL Functional Safety
Ex:
Housing width 12.5 mm

NAMUR signal conditioners for operating proximity sensors and mechanical contacts

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- 2 signal outputs transistor (passive), up to 5 kHz
- Signal output 2 can also be used as a fault signaling output
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and blocking the transistor output
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 4-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:
Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175
Information about resistance circuits is given on page 177
Information on “Plug and play” connection using system cabling can be found from page 170

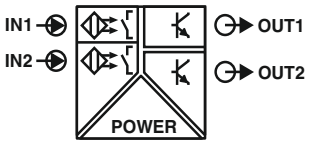
Technical data

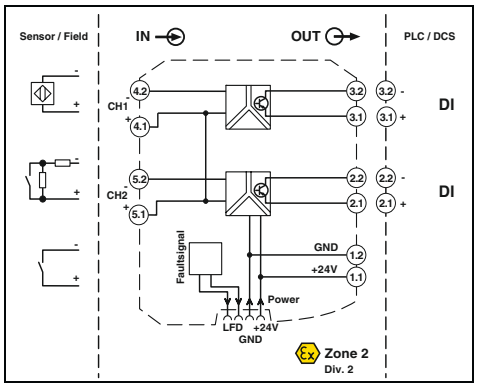
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) open circuit switch contacts Switch contacts with resistance circuit
No-load voltage	~ 8 V DC
Switching points	>2.1 mA (conductive) / <1.2 mA (blocking)
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	2 transistor outputs, passive
Max. switching voltage	30 V DC
Maximum switching current	50 mA (short-circuit-proof)
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 (24 V DC -20%...+25%)
Current consumption	<28 mA (24 V DC)
Power dissipation	≤800 mW
Electrical isolation	
Input/output/supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Output 1/output 2	50 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, basic insulation as per EN 61010-1)) 1 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Conformance/approvals	
Conformance	CE-compliant, additionally EN 61326-1
ATEX	II 3 G Ex nA IIC T4 Gc X
UL, USA/Canada	UL 508 Listed UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner			
Screw connection	**MACX MCR-SL-NAM-2T**	2865023	1
Push-in connection	**MACX MCR-SL-NAM-2T-SP**	2924278	1

Digital IN
NAMUR signal conditioners





NAMUR signal conditioner, 2-channel, signal output: transistor (passive)

DNV GL Functional Safety
Ex:
Housing width 12.5 mm

NAMUR signal conditioners for operating proximity sensors and mechanical contacts

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit
- Signal output transistor (passive), up to 5 kHz
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and blocking the transistor output
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Information about resistance circuits is given on page 177

Information on “Plug and play” connection using system cabling can be found from page 170

Technical data

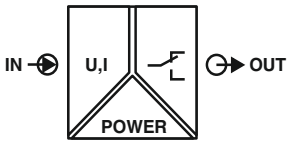
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) open circuit switch contacts Switch contacts with resistance circuit
No-load voltage	~ 8 V DC
Switching points	>2.1 mA (conductive) / <1.2 mA (blocking)
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	1 transistor output, passive (per channel)
Max. switching voltage	30 V DC
Maximum switching current	50 mA (short-circuit-proof)
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 (24 V DC -20%...+25%)
Current consumption	<34 mA (24 V DC)
Power dissipation	1,000 mW
Electrical isolation	
Input/output/supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Output 1/output 2	50 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, basic insulation as per EN 61010-1)) 1 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / 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
UL, USA/Canada	UL 508 Listed UL 61010 Listed Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC T4
SIL in accordance with IEC 61508	2

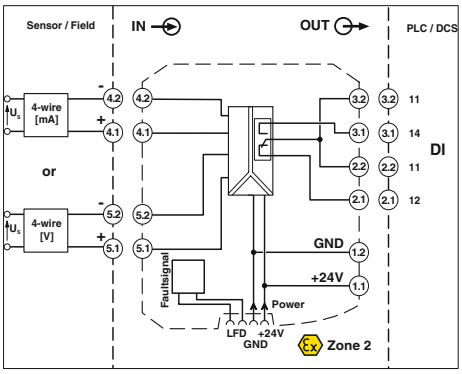
Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner			
Screw connection	**MACX MCR-SL-2NAM-T**	2865036	1
Push-in connection	**MACX MCR-SL-2NAM-T-SP**	2924281	1

Limit values, threshold value switches

new





Ex n

SIL IEC 61508

Configurable, with relay PDT output

Ex:

Housing width 12.5 mm

- Input for analog standard current and voltage signals for switching analog limit values
- Safe 3-way isolation
- Configure limit values via DIP switch
- PDT relay at output
- Limiting continuous current up to 6 A
- Energy can be supplied via the DIN rail connector
- Status and error indicator LEDs
- Up to SIL 3 in accordance with IEC 61508
- PLc in accordance with ISO 13849
- Installation in zone 2 possible

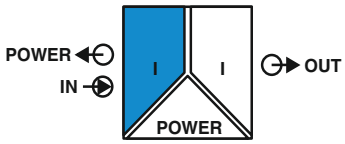
Technical data

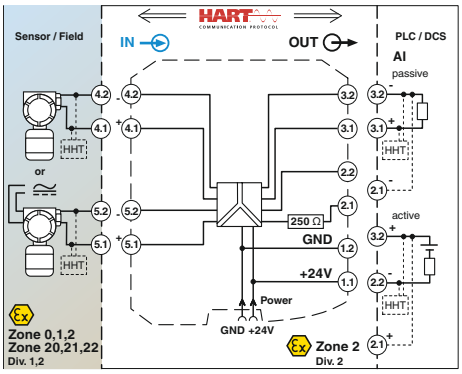
Input data		
Voltage input signal		0.1 V ... 10 V 0.1 V ... 10.5 V (maximum range)
Total error of the voltage input maximum		± 10 mV
Current input signal		0.2 mA ... 20 mA 0.18 mA ... 21 mA (maximum range)
Total error of the current input maximum		± 20 µA
Input resistance	Current/volatge input	<28 Ω / >100 kΩ
Switching points		- / configurable via DIP switch (in 1.25% increments) and potentiometer (linearly up to 2% of the switching threshold set via the DIP switch)
Switching hysteresis		Off: approx. 0.5%, on: approx. 1%
Line error detection		Break U <50 mV, I <0.1 mA Short circuit U >10.8 V, I >21.1 mA
Switching output		**Relay output**
Contact type		1 PDT
Maximum switching current		≤4 A AC (cos phi = 1)
Mechanical service life		≤10^7 cycles
Switching voltage		≤250 V AC ≤120 V DC
General data		
Supply voltage range		9.6 V DC ... 30 V DC (12 V DC ... 24 V DC (-20% ... +25%))
Current consumption, maximum		90 mA (10 V DC)
Current consumption, typical		38 mA (24 V DC)
Current draw		≤30 mA (30 V DC)
Power consumption		≤1.2 W
Power dissipation		<0.9 W
Temperature coefficient		0.01%/K
Step response (0 - 99%)		≤22 ms
Switching point accuracy		<0.1%
Maximum transmission error		0.1%
Electrical isolation		
	Input/output	375 V (peak value in accordance with EN 60079-11)
	Input/output/supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature (operation)		-20°C ... 65°C (any mounting position)
Ambient temperature (storage/transport)		-40°C ... 85°C
Humidity		5% ... 95% (non-condensing)
Altitude		≤2,000 m
Inflammability class in accordance with UL 94		V0
Dimensions W/H/D		12.5 / 99 / 114.5 mm
Conformance/approvals		
Conformance		CE-compliant, additionally EN 61326
ATEX		Ex II 3 G Ex ec nC IIC T4 Gc
UL, USA/Canada		UL applied for
SIL in accordance with IEC 61508		2 (single-channel) 3 (two-channel)

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Screw connection	**MACX MCR-SL-UI-REL**	2906169	1
Spring-cage connection	**MACX MCR-SL-UI-REL-SP**	2906170	1

Analog IN
Repeater power supplies, Ex i





Repeater power supply and input signal conditioner

Functional Safety
Ex: EAC Ex KC-s
Housing width 12.5 mm

Repeater power supply and input signal conditioners 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 to 20 mA input, [Ex ia] (powered or not powered)
- 0/4 to 20 mA output (active or passive)
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- Terminal point with 250 Ω resistor to increase the HART impedance in the case of low-impedance systems
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Test plugs for test sockets can be found on page 177

Information on "Plug and play" connection using system cabling can be found from page 170

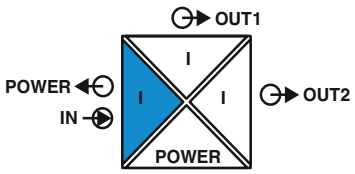
Technical data

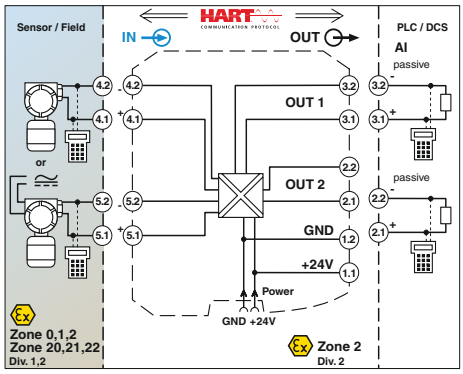
Input data		
Input signal		4 mA ... 20 mA
Transmitter supply voltage		>16 V (20 mA)
Voltage drop		<3.5 V (in input signal conditioner operation)
Output data		
Output signal		4 mA ... 20 mA (active) 4 mA ... 20 mA (14 ... 26 V ext. source voltage)
Load		<1,000 Ω (20 mA)
Output ripple		<20 mV_{rms}
General data		
Supply voltage range		19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Current consumption		<76 mA (24 V DC / 20 mA / 1,000 Ω) ; <55 mA (24 V DC / 20 mA / 250 Ω)
Power dissipation		<1.1 W (24 V DC / 20 mA / 1,000 Ω) <0.95 W (24 V DC / 20 mA / 250 Ω) <1.2 W (24 V DC / 20 mA / 0 Ω)
Temperature coefficient		<0.01%/K
Step response (10-90%)		<200 µs (for jump 4 mA ... 20 mA, load 600 Ω)
Transmission error, typical		<0.05% (of final value)
Maximum transmission error		<0.1% (of final value)
Under-/overload range		In accordance with NE 43
Electrical isolation		
	Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
	Input/output	375 V (peak value in accordance with EN 60079-11)
	Input/power supply	375 V (peak value in accordance with EN 60079-11)
Ambient temperature range		-20°C ... 60°C (any mounting position)
Humidity		10% ... 95% (non-condensing)
Status indication		Green LED (supply voltage)
SMART communication		Yes
Signal bandwidth		as per HART specifications
Protocols supported		HART
Inflammability class in accordance with UL 94		V0
Housing material		PA 6.6-FR
Dimensions W/H/D		12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX		
Maximum output voltage Uo		25.2 V
Maximum output current Io		93 mA
Maximum output power Po		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 II (1) D [Ex ia Da] IIIC II 3 (1) G Ex nA [ia Ga] IIC T4 Gc I (M1) [Ex ia Ma] I
IECEx		[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC T4 Gc
UL, USA/Canada		UL 61010 Listed Class I Div 2; IS for Class I, II, III Div 1
SIL in accordance with IEC 61508		2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Repeater power supply, HART®-transparent, intrinsically safe input			
Screw connection	**MACX MCR-EX-SL-RPSSI-I**	2865340	1
Push-in connection	**MACX MCR-EX-SL-RPSSI-I-SP**	2924016	1

Analog IN
Repeater power supplies, Ex i





Repeater power supply and input signal conditioner, with two electrically isolated outputs

Functional Safety
Ex: EAC Ex
Housing width 12.5 mm

Repeater power supply and input signal conditioners 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 to 20 mA input, [Ex ia] (powered or not powered)
- Two electrically isolated outputs, 0/4 to 20 mA (active)
- Bidirectional transmission of digital HART communication signals (both outputs)
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- 4-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 2 in accordance with IEC 61508
- PL d in accordance with EN ISO 13849-1
- 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 175

Test plugs for test sockets can be found on page 177

Information on "Plug and play" connection using system cabling can be found from page 170

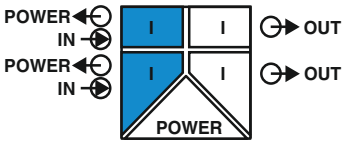
Technical data

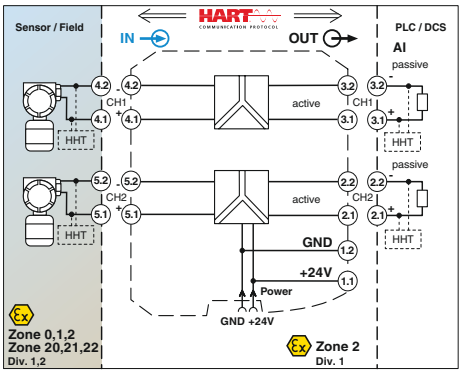
Input data		
Input signal		4 mA ... 20 mA / 0 mA ... 20 mA
Transmitter supply voltage		>16 V (20 mA)
Voltage drop		Approx. 3.9 V (in input signal conditioner operation)
Output data		
Output signal (per output)		4 mA ... 20 mA (output 1 and output 2 active)
Load		<450 Ω (20 mA)
Output ripple		<20 mV_{rms}
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 jump 4 mA ... 20 mA, typical)
Transmission error, typical		<0.05% (of final value)
Maximum transmission error		<0.1% (of final value)
Under-/overload range		In accordance with NE 43
Electrical isolation		
	Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
	Input/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 6.6-FR
Dimensions W/H/D		12.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG		0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX		
Maximum output voltage Uo		25.2 V
Maximum output current Io		93 mA
Maximum output power Po		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 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
SIL in accordance with IEC 61508		2

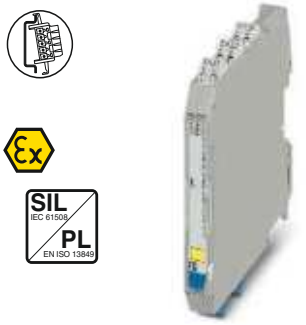
Ordering data

Description	Type	Order No.	Pcs./Pkt.
Repeater power supply, HART®-transparent, intrinsically safe input			
Screw connection	**MACX MCR-EX-SL-RPSSI-2I**	2865366	1
Push-in connection	**MACX MCR-EX-SL-RPSSI-2I-SP**	2924236	1
With just one HART-transparent output			
Screw connection	**MACX MCR-EX-SL-RPSSI-2I-1S**	2908855	1
Push-in connection	**MACX MCR-EX-SL-RPSSI-2I-1S-SP**	2908856	1

Analog IN
Repeater power supplies, Ex i







2-channel repeater power supply

Functional Safety
Ex: EAC Ex KC-s
Housing width 12.5 mm

Repeater power supply for the operation of intrinsically safe (Ex i) 2-conductor measuring transducers installed in the Ex area.

- 2-channel
- 4 to 20 mA input, [Ex ia] (powered)
- 4 to 20 mA output (active)
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- Safe 3-way electrical isolation
- Power supply via DIN rail connector possible
- Up to SIL 3 in accordance with IEC 61508
- PL d in accordance with EN ISO 13849-1
- 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 175

Test plugs for test sockets can be found on page 177

Information on “Plug and play” connection using system cabling can be found from page 170

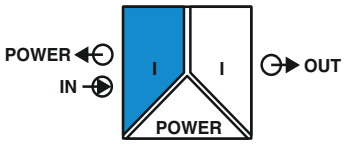
Technical data

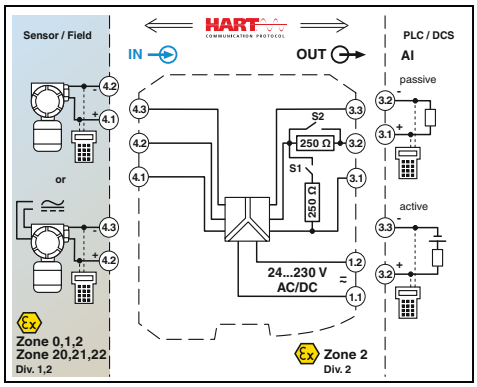
Input data		per channel
Input signal		4 mA ... 20 mA
Transmitter supply voltage		>16 V (20 mA)
Underload/overload signal range		0 mA ... 24 mA
Output data		per channel
Output signal		4 mA ... 20 mA (active)
Load		≤450 Ω (20 mA)
Underload/overload signal range		0 mA ... 24 mA
General data		
Supply voltage 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	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
	Input/output	375 V (peak value in accordance with EN 60079-11)
	Input/power supply	375 V (peak value in accordance with EN 60079-11)
	Output 1/output 2/ power supply	1.5 kV (50 Hz, 1 min., test voltage)
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 6.6-FR
Dimensions W/H/D		12.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / AWG		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX		
Maximum output voltage Uo		25.2 V
Maximum output current Io		93 mA
Maximum output power Po		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 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
SIL in accordance with IEC 61508		3

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Repeater power supply, 2-channel, HART®-transparent, intrinsically safe input			
Screw connection	**MACX MCR-EX-SL-RPSS-2I-2I**	2865382	1
Push-in connection	**MACX MCR-EX-SL-RPSS-2I-2I-SP**	2924676	1

Analog IN
Repeater power supplies with wide range power supply, Ex i





Repeater power supply and input signal conditioner, wide-range power supply

Functional Safety
Ex: EAC Ex // Applied for: GL
Housing width 17.5 mm

Repeater power supply and input signal conditioners 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 to 20 mA input, [Ex ia] (powered or not powered)
- 0/4 to 20 mA output (active or passive), 0/1 to 5 V, can be selected via DIP switch
- Bidirectional transmission of digital HART communication signals
- Plug-in screw or Push-in connection technology, with integrated sockets for HART communicators
- 250 Ω resistor that can be activated via DIP switches to increase the HART impedance in the case of low-impedance systems
- 3-way electrical isolation
- Wide-range power supply of 19.2 to 253 V AC/DC
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information on marking material can be found on page 178

Test plugs for test sockets can be found on page 177

Technical data

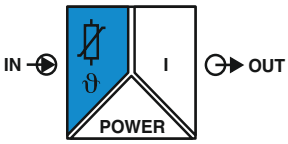
Input data	
Input signal	4 mA ... 20 mA
Transmitter supply voltage	>16 V (20 mA)
Voltage drop	<3.5 V (in input signal conditioner operation)
Output data	
Output signal (configurable using the DIP switch)	4 mA ... 20 mA (active) 4 mA ... 20 mA (14 ... 26 V ext. source voltage) 1 V ... 5 V (internal resistance, 250 Ω, 0.1%) Configurable via DIP switches
Load	<600 Ω (20 mA)
Output ripple	<20 mV_{rms}
General data	
Supply voltage range	24 V ... 230 V AC/DC (-20%/+10%, 50/60 Hz)
Current consumption	<80 mA (24 V DC / 20 mA)
Power dissipation	<1.6 W (24 V DC/ 20 mA)
Temperature coefficient	<0.01%/K
Step response (10-90%)	<600 µs (for 4 mA ... 20 mA step)
Transmission error, typical	<0.05% (of final value)
Maximum transmission error	<0.1% (of final value)
Under-/overload range	In accordance with NE 43
Electrical isolation	
Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Input/output	375 V (peak value in accordance with EN 60079-11)
Input/power supply	375 V (peak value in accordance with EN 60079-11)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Status indication	Green LED (supply voltage)
SMART communication	Yes
Signal bandwidth	as per HART specifications
Protocols supported	HART
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	17.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	25.2 V
Maximum output current Io	93 mA
Maximum output power Po	587 mW
Maximum voltage U_m	253 V AC/DC (supply terminals) 253 V AC (output terminals) 125 V DC (output terminals)
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
SIL in accordance with IEC 61508	2

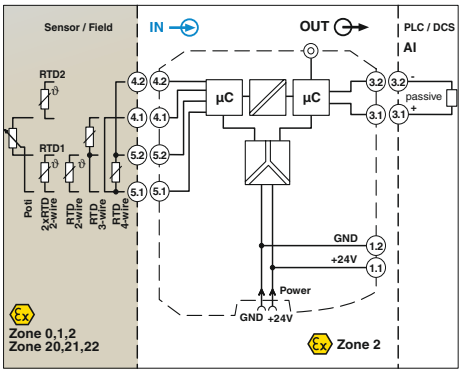
Ordering data

Description	Type	Order No.	Pcs./Pkt.
Repeater power supply, 2-channel, HART®-transparent, intrinsically safe input			
Screw connection	**MACX MCR-EX-SL-RPSSI-I-UP**	2865793	1
Push-in connection	**MACX MCR-EX-SL-RPSSI-I-UP-SP**	2924029	1

Temperature
Temperature transducers, Ex i

new





Temperature transducer for resistance thermometers and resistance-type sensors

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 to 20 mA or 4 to 20 mA signal.

- Input for resistance thermometers and resistance-type sensors, [Ex ia]
- 0 to 20 mA or 4 to 20 mA output
- Configuration via software (FDT/DTM): Sensor type, connection method, measuring range, measuring unit, filter, alarm signal, and output range
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Status indicator for supply voltage, cable, sensor, and module errors
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Installation in zone 2 permitted

Technical data

Input data	
Resistance thermometers	Sensors (2-, 3-, 4-conductor)
Resistor	0 Ω ... 50 kΩ
Cable resistance	≤50 Ω per cable
Sensor input current	10 µA ... 210 µA (up to 2 x 210 µA for 3-conductor)
Measuring range span	≥50 K
Output data	
Output signal	0 mA ... 20 mA / 4 mA ... 20 mA (SIL)
Load	≤600 Ω
Behavior in the event of a sensor error	As per NE 43 or can be freely defined
Output ripple	<15 μA_{PP}
General data	
Supply voltage range	19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Current draw	≤40 mA (24 V DC)
Power dissipation	≤0.74 W
Temperature coefficient	0.01%/K
Step response (0 - 99%)	Typically 1 s ≤1.7 s
Transmission error, total	0.1% x 1,000 [K]/measuring span
ZERO / SPAN adjustment	± 5% / ± 5%
Electrical isolation	
Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Input/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	-40°C ... 70°C (any mounting position)
Humidity	5% ... 95% (non-condensing)
Status indication	Green LED (supply voltage, PWR) Red LED, flashing 2.4 Hz (cable error, sensor error on input or output, ERR) Red LED, flashing 1.2 Hz (service operation, ERR) Red LED, permanently on (module error, ERR)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	6 V
Maximum output current Io	16.6 mA
Maximum output power Po	9.7 mW
Conformance/approvals	
Conformance	CE-compliant, additionally EN 61326
ATEX	Ex II (1) G [Ex ia Ga] IIC/IIB Ex II (1) D [Ex ia Da] IIIC Ex II 3(1) G Ex ec ic [ia Ga] IIC T4 Gc X
IECEx	[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex ec ic [ia Ga] IIC T4 Gc
UL, USA/Canada	-

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Screw connection	**MACX MCR-EX-RTD-I**	1050222	1
Push-in connection	**MACX MCR-EX-RTD-I-SP**	1050252	1
Screw connection	**MACX MCR-EX-RTD-I-C**	1052463	1
Push-in connection	**MACX MCR-EX-RTD-I-SP-C**	1052652	1

Accessories

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

Order key for MACX MCR-EX-RTD-I-(SP)-C temperature transducers (standard configuration entered as an example)

Order No.	SIL ON/OF	Sensor type	Measuring unit	Connection technology	Measuring range: Start	Measuring range: End	Output signal	Sliding mean value	Alarm signal, short circuit	Alarm signal, sensor break	Factory calibration certificate
1052463	ON	PT100	C	4	-50	150	OUT02	1	I000	I000	NONE
1052463 ≙ MACX MCR-EX-RTD-I-C 1052452 ≙ MACX MCR-EX-RTD-I-SP-C	ON ≙ Active NONE ≙ Not active ON only with output range = OUT02	See below	Celsius [C] Ω [O] Millivolts [V]	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	See below	See below	0...20 mA [OUT01] 4...20 mA [OUT02] 0...5 mA [OUT15] 0...10 mA [OUT16] 1...5 mA [OUT25] 2...10 mA [OUT26]	1 - 10	0 mA [I000] 3.5 mA [I035] 21.5 mA [I215]	0 mA [I000] 3.5 mA [I035] 21.5 mA [I215]	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 temperature detector (RTD)	PT50	≙ Pt 50 IEC60751	°C	-200	850	20k
	PT100	≙ Pt 100 IEC60751	°C	-200	850	20k
	PT200	≙ Pt 200 IEC60751	°C	-200	850	20k
	PT500	≙ Pt 500 IEC60751	°C	-200	850	20k
	PT1000	≙ Pt 1000 IEC60751	°C	-200	850	20k
	PT2000	≙ Pt 2000 IEC60751	°C	-200	850	20k
	PT5000	≙ Pt 5000 IEC60751	°C	-200	850	20k
	PT50S	≙ PT50 SAMA RC21-4-1966	°C	-200	850	20k
	PT100S	≙ PT100 SAMA RC21-4-1966	°C	-200	850	20k
	PT200S	≙ PT200 SAMA RC21-4-1966	°C	-200	850	20k
	PT500S	≙ PT500 SAMA RC21-4-1966	°C	-200	850	20k
	PT1000S	≙ PT1000 SAMA RC21-4-1966	°C	-200	850	20k
	PT2000S	≙ PT2000 SAMA RC21-4-1966	°C	-200	850	20k
	PT5000S	≙ PT5000 SAMA RC21-4-1966	°C	-200	850	20k
	PT100G	≙ PT100 G GOST 6651-2009 (α=0.00391)	°C	-200	850	20k
	PT200G	≙ PT200 G GOST 6651-2009 (α=0.00391)	°C	-200	850	20k
	PT500G	≙ PT500 G GOST 6651-2009 (α=0.00391)	°C	-200	850	20k
	PT1000G	≙ PT1000 G GOST 6651-2009 (α=0.00391)	°C	-200	850	20k
	PT100J	≙ Pt 100 JIS C1604/1997	°C	-200	850	20k
	PT200J	≙ Pt 200 JIS C1604/1997	°C	-200	850	20k
	PT500J	≙ Pt 500 JIS C1604/1997	°C	-200	850	20k
	PT1000J	≙ Pt 1000 JIS C1604/1997	°C	-200	850	20k
	NI100	≙ NI100 DIN 43760	°C	-60	250	20k
	NI200	≙ NI200 DIN 43760	°C	-60	250	20k
	NI500	≙ NI500 DIN 43760	°C	-60	250	20k
	NI1000	≙ NI1000 DIN 43760	°C	-60	250	20k
	NI100S	≙ NI100 SAMA RC21-4-1966	°C	-60	180	20k
	NI200S	≙ NI200 SAMA RC21-4-1966	°C	-60	180	20k
	NI500S	≙ NI500 SAMA RC21-4-1966	°C	-60	180	20k
	NI1000S	≙ NI1000 SAMA RC21-4-1966	°C	-60	180	20k
	NI1000L	≙ NI1000 Landis&Gyr	°C	-50	160	20k
	CU10	≙ CU10 SAMA RC21-4-1966	°C	-70	500	100k
	CU50	≙ CU 50 GOST 6651-2009 (α=0.00428)	°C	-50	200	100k
	CU100	≙ CU 100 GOST 6651-2009 (α=0.00428)	°C	-50	200	100k
	CU53	≙ CU 53 GOST 6651-2009 (α=0.00426)	°C	-50	180	100k
	KTY81	≙ KTY81 KTY81-110 (Philips)	°C	-55	150	20k
	KTY84	≙ KTY81 KTY84-130 (Philips)	°C	-40	300	20k
Remote resistance-type sensors (R) (2-, 3-, 4-conductor)	RES02	≙ Resistance 0…75 Ω	Ω	0	75	10% of the selected measuring range
	RES03	≙ Resistance 0…150 Ω	Ω	0	150	
	RES04	≙ Resistance 0…300 Ω	Ω	0	300	
	RES05	≙ Resistance 0…600 Ω	Ω	0	600	
	RES06	≙ Resistance 0…1,200 Ω	Ω	0	1200	
	RES07	≙ Resistance 0…2,400 Ω	Ω	0	2400	
	RES08	≙ Resistance 0…4,800 Ω	Ω	0	4800	
	RES09	≙ Resistance 0…6,250 Ω	Ω	0	6250	
	RES10	≙ Resistance 0…12,500 Ω	Ω	0	12500	
	RES11	≙ Resistance 0…25,000 Ω	Ω	0	25000	
	RES12	≙ Resistance 0…50,000 Ω	Ω	0	50,000	

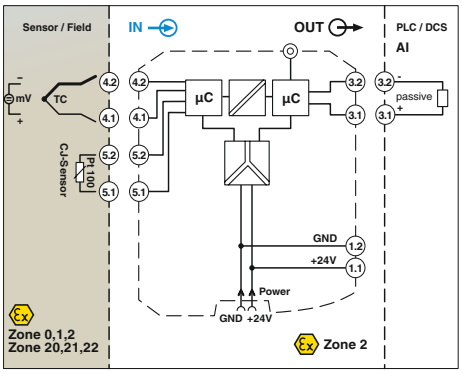
Other setting options can be configured with the IFS-CONF software:

- Freely configurable user characteristic curve with 30 support points
- Output behavior in the event of a short circuit, sensor break or over-range/under-range can be freely configured or set in accordance with 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 transducers, Ex i

new



Temperature transducer for thermocouples

Housing width 12.5 mm

Programmable temperature transducer for intrinsically safe operation of thermocouples and mV sources installed in Ex areas. The measured values are converted into a linear 0 to 20 mA or 4 to 20 mA signal.

- Input for thermocouples and mV sources, [Ex ia]
- 0 to 20 mA or 4 to 20 mA output
- Configuration via software (FDT/DTM): Sensor type, connection method, measuring range, measuring unit, filter, alarm signal, and output range
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Status indicator for supply voltage, cable, sensor, and module errors
- 3-way electrical isolation
- Power supply via DIN rail connector possible
- Installation in zone 2 permitted

Technical data

Input data		
Thermocouple sensors		B, E, J, K, N, R, S, T, L, U, C, D, A-1, A-2, A-3, M, Lr
Voltage		-1,000 mV ... 1,000 mV
Measuring range span		Min. 50 K with thermocouple, 10% of the nominal span of the respective range with mV sources
Output data		
Output signal		0 mA ... 20 mA / 4 mA ... 20 mA (SIL)
Load		≤600 Ω
Behavior in the event of a sensor error		As per NE 43 or can be freely defined
Output ripple		<15 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		≤0.74 W
Temperature coefficient		0.01%/K
Step response (0 - 99%)		Typically 700 ms ≤1,000 ms
Transmission error, total		0.1%
Cold junction errors		± 1 K
ZERO / SPAN adjustment		± 5% / ± 5%
Electrical isolation		
	Input/output/power supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
	Input/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		-40°C ... 70°C (any mounting position)
Humidity		5% ... 95% (non-condensing)
Status indication		Green LED (supply voltage, PWR) Red LED, flashing 2.4 Hz (cable error, sensor error on input or output, ERR) Red LED, flashing 1.2 Hz (service operation, ERR) Red LED, permanently on (module error, ERR)
Inflammability class in accordance with UL 94		V0
Housing material		PA 6.6-FR
Dimensions W/H/D		12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG		0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Safety data as per ATEX		
Maximum output voltage Uo		6 V
Maximum output current Io		4.3 mA
Maximum output power Po		9.7 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/IIB Ex II (1) D [Ex ia Da] IIIC Ex II 3(1) G Ex ec ic [ia Ga] IIC T4 Gc X
IECEx		[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex ec ic [ia Ga] IIC T4 Gc
UL, USA/Canada		-

Ordering data

Description	Type	Order No.	Pcs./Pkt.
	MACX MCR-EX-TC-I	1050233	1
	MACX MCR-EX-TC-I-C	1052458	1

Accessories

Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	1
Cold junction compensation connector for thermocouples	**IOA MCR-CJC-PT100**	1085776	1

Order key for MACX MCR-EX-TC-I-C temperature transducers (standard configuration entered as an example)

Order No.	SIL	Sensor type	Measuring unit	Cold junction compensation	Measuring range: Start	Measuring range: End	Output signal	Sliding mean value	Alarm signal, short circuit	Alarm signal, sensor break	Factory calibration certificate
1052458	ON	K	C	ON	-50	150	OUT02	1	I000	I000	NONE
1052458 ≙ MACX MCR-EX-TC-I-C	ON ≙ Active NONE ≙ Not active ON only with output range = OUT02	See below	Celsius [C] Ω [O] Millivolts [V]	ON OFF	See below	See below	0...20 mA [OUT01] 4...20 mA [OUT02] 0...5 mA [OUT15] 0...10 mA [OUT16] 1...5 mA [OUT25] 2...10 mA [OUT26]	1 - 10	0 mA [I000] 3.5 mA [I035] 21.5 mA [I215]	0 mA [I000] 3.5 mA [I035] 21.5 mA [I215]	NONE ≙ Without FCC YES ≙ With FCC (a fee is charged) YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

				Smallest measuring range span
Thermocouples (TC)	A1G	≙ A-1 GOST 8.585-2001	°C	50k
	A2G	≙ A-2 GOST 8.585-2001	°C	50k
	A3G	≙ A-3 GOST 8.585-2001	°C	50k
	B	≙ B IEC584-1 (Pt30Rh-Pt6Rh)	°C	50k
	C	≙ C ASTM E988	°C	50k
	D	≙ DA ASTM E988(2002)	°C	50k
	E	≙ E IEC584-1 (NiCr-CuNi)	°C	50k
	J	≙ J IEC584-1 (Fe-CuNi)	°C	50k
	K	≙ K IEC584-1 (NiCr-Ni)	°C	50k
	MG	≙ MG GOST 8.585-2001	°C	50k
	N	≙ N IEC 584-1 (NiCrSi-NiSi)	°C	50k
	R	≙ R IEC 584-1 (Pt13Rh-Pt)	°C	50k
	S	≙ S IEC 584-1 (Pt10Rh-Pt)	°C	50k
	T	≙ T IEC 584-1 (Cu-CuNi)	°C	50k
	L	≙ L DIN 43760 (Fe-CuNi)	°C	50k
	LG	≙ LG GOST 8.585-2001	°C	50k
	U	≙ U DIN 43760 (Cu-CuNi)	°C	50k
Voltage signals (mV)	V04	≙ Voltage -1,000 mV…+1,000 mV	mV	10% of nominal span
	V05	≙ Voltage -500 mV…+500 mV	mV	
	V06	≙ Voltage -250 mV…+250 mV	mV	
	V07	≙ Voltage -125 mV…+125 mV	mV	
	V08	≙ Voltage -60 mV…+60 mV	mV	
	V09	≙ Voltage -30 mV…+30 mV	mV	
	V10	≙ Voltage -15 mV…+15 mV	mV	

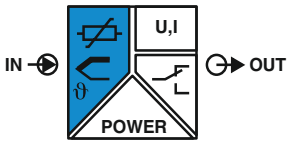
				0	2,500	50k
				0	1,800	50k
				0	1,800	50k
				500	1,820	50k
				0	2,315	50k
				0	2,315	50k
				-230	1,000	50k
				-210	1,200	50k
				-250	1,372	50k
				-200	100	50k
				-200	1,300	50k
				-50	1,768	50k
				-50	1,768	50k
				-200	400	50k
				-200	900	50k
				-200	800	50k
				-200	600	50k
				-250	1,000	
				-500	500	
				-250	250	
				-125	125	
				-60	60	
				-30	30	
				-15	150	

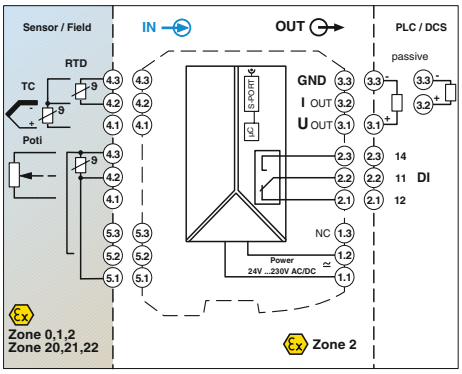
Other setting options can be configured with the IFS-CONF software:

- Freely configurable user characteristic curve with 30 support points
- Output behavior in the event of a short circuit, sensor break or overrange/underrange can be freely configured or set in accordance with 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: $T\,[°F] = \frac{9}{5} \times T\,[°C] + 32$

Temperature
Temperature transducers, Ex i





Temperature transducer, universal, with switching output, wide range supply

Functional Safety
Ex: EAC Ex KC-s
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)
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in screw or Push-in connection technology
- Cold junction compensation with separate connector
- Wide-range power supply of 19.2 to 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 in accordance with IEC 61508
- PL d in accordance with EN ISO 13849-1
- 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 (phoenixcontact.net/products).

For information on the programming adapter, refer to page 111

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	-1,000 mV ... 1,000 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	In accordance with NE 43 or freely configurable	
Switching output	Switching output	
Contact type	1 PDT	
Contact material	$AgSnO_2$, hard gold-plated	
Max. 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/supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))	
Ambient temperature range	-20°C ... 65°C	
Humidity	Typically 5% ... 95% (non-condensing)	
Inflammability class in accordance with UL 94	V0	
Housing material	PA 6.6-FR	
Dimensions W/H/D	17.5 / 99 / 114.5 mm	
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16	
Safety data as per ATEX		
Maximum output voltage Uo	6 V	
Maximum output current Io	7.4 mA	
Maximum output power Po	11 mW	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	Ex II (1) G [Ex ia Ga] IIC Ex II (1) D [Ex ia Da] IIIC Ex II 3 G Ex nA nC ic IIC T4 Gc X	
IECEx	[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC ic IIC T4 Gc X	
SIL in accordance with IEC 61508	2	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
Temperature transducer, intrinsically safe input				
Standard configuration	Screw connection	**MACX MCR-EX-T-UI-UP**	2865654	1
Standard configuration	Push-in connection	**MACX MCR-EX-T-UI-UP-SP**	2924689	1
Order configuration	Screw connection	**MACX MCR-EX-T-UI-UP-C**	2811763	1
Order configuration	Push-in connection	**MACX MCR-EX-T-UI-UP-SP-C**	2924692	1

Accessories

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

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

Order No.	Safety Integrity Level (SIL)	Sensor type	Connection technology	Cold junction compensation	Measuring range: Start	Measuring range: End	Measuring unit	Output range	Factory calibration certificate = FCC
2811763	ON	PT100	4	0	-50	150	C	OUT02	NONE

Order No.

2811763 ≙ MACX MCR-EX-T-UI-UP-C

2924692 ≙ MACX MCR-EX-T-UI-UP-SP-C

Safety Integrity Level (SIL)

ON ≙ Active

NONE ≙ Not active

ON only with output range = OUT02

Sensor type

See below

Connection technology

2 ≙ 2-conductor

3 ≙ 3-conductor

4 ≙ 4-conductor

Cold junction compensation

0 ≙ Off, e.g., with RTD, R, potentiometer, mV

1 ≙ On, e.g., with TC

Measuring range: Start / End

See below / See below

Measuring unit

C ≙ °C
F ≙ °F
O ≙ Ω
P ≙ %
V ≙ mV

Output range

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

Factory calibration certificate = FCC

NONE ≙ Without FCC

YES ≙ With FCC (a fee is charged)

YESPLUS ≙ FCC with 5 measuring points (a fee is charged)

			Start	End		Smallest measuring range span
Resistance temperature detector (RTD)	PT50	≙ Pt 50 IEC60751	-200	850	°C	20k
	PT100	≙ Pt 100 IEC60751	-200	850	°C	20k
	PT200	≙ Pt 200 IEC60751	-200	850	°C	20k
	PT500	≙ Pt 500 IEC60751	-200	850	°C	20k
	PT1000	≙ Pt 1000 IEC60751	-200	850	°C	20k
	PT2000	≙ Pt 2000 IEC60751	-200	850	°C	20k
	PT5000	≙ Pt 5000 IEC60751	-200	850	°C	20k
	PT50S	≙ PT50 SAMA RC21-4-1966	-200	850	°C	20k
	PT100S	≙ PT100 SAMA RC21-4-1966	-200	850	°C	20k
	PT200S	≙ PT200 SAMA RC21-4-1966	-200	850	°C	20k
	PT500S	≙ PT500 SAMA RC21-4-1966	-200	850	°C	20k
	PT1000S	≙ PT1000 SAMA RC21-4-1966	-200	850	°C	20k
	PT2000S	≙ PT2000 SAMA RC21-4-1966	-200	850	°C	20k
	PT5000S	≙ PT5000 SAMA RC21-4-1966	-200	850	°C	20k
	PT100G	≙ PT100 G GOST 6651-2009 (α=0.00391)	-200	850	°C	20k
	PT200G	≙ PT200 G GOST 6651-2009 (α=0.00391)	-200	850	°C	20k
	PT500G	≙ PT500 G GOST 6651-2009 (α=0.00391)	-200	850	°C	20k
	PT1000G	≙ PT1000 G GOST 6651-2009 (α=0.00391)	-200	850	°C	20k
	PT100J	≙ Pt 100 JIS C1604/1997	-200	850	°C	20k
	PT200J	≙ Pt 200 JIS C1604/1997	-200	850	°C	20k
	PT500J	≙ Pt 500 JIS C1604/1997	-200	850	°C	20k
	PT1000J	≙ Pt 1000 JIS C1604/1997	-200	850	°C	20k
	NI100	≙ NI100 DIN 43760	-60	250	°C	20k
	NI200	≙ NI200 DIN 43760	-60	250	°C	20k
	NI500	≙ NI500 DIN 43760	-60	250	°C	20k
	NI1000	≙ NI1000 DIN 43760	-60	250	°C	20k
	NI100S	≙ NI100 SAMA RC21-4-1966	-60	180	°C	20k
	NI200S	≙ NI200 SAMA RC21-4-1966	-60	180	°C	20k
	NI500S	≙ NI500 SAMA RC21-4-1966	-60	180	°C	20k
	NI1000S	≙ NI1000 SAMA RC21-4-1966	-60	180	°C	20k
	NI1000L	≙ NI1000 Landis&Gyr	-50	160	°C	20k
	CU10	≙ CU10 SAMA RC21-4-1966	-70	500	°C	20k
	CU50	≙ CU 50 GOST 6651-2009 (α=0.00428)	-50	200	°C	20k
	CU100	≙ CU 100 GOST 6651-2009 (α=0.00428)	-50	200	°C	20k
	CU53	≙ CU 53 GOST 6651-2009 (α=0.00426)	-50	180	°C	20k
	KTY81	≙ KTY81 KTY81-110 (Philips)	-55	150	°C	20k
	KTY84	≙ KTY81 KTY84-130 (Philips)	-40	300	°C	20k
Thermocouples (TC)	A1G	≙ A-1 GOST 8.585-2001	0	2,500	°C	50k
	A2G	≙ A-2 GOST 8.585-2001	0	1,800	°C	50k
	A3G	≙ A-3 GOST 8.585-2001	0	1,800	°C	50k
	B	≙ B IEC584-1 (Pt30Rh-Pt6Rh)	500	1,820	°C	50k
	C	≙ C ASTM E988	0	2,315	°C	50k
	D	≙ DA ASTM E988(2002)	0	2,315	°C	50k
	E	≙ E IEC584-1 (NiCr-CuNi)	-230	1,000	°C	50k
	J	≙ J IEC584-1 (Fe-CuNi)	-210	1,200	°C	50k
	K	≙ K IEC584-1 (NiCr-Ni)	-250	1,372	°C	50k
	MG	≙ MG GOST 8.585-2001	-200	100	°C	50k
	N	≙ N IEC 584-1 (NiCrSi-NiSi)	-200	1,300	°C	50k
	R	≙ R IEC 584-1 (Pt13Rh-Pt)	-50	1,768	°C	50k
	S	≙ S IEC 584-1 (Pt10Rh-Pt)	-50	1,768	°C	50k
	T	≙ T IEC 584-1 (Cu-CuNi)	-200	400	°C	50k
	L	≙ L DIN 43760 (Fe-CuNi)	-200	900	°C	50k
	LG	≙ LG GOST 8.585-2001	-200	800	°C	50k
	U	≙ U DIN 43760 (Cu-CuNi)	-200	600	°C	50k
Remote resistance-type sensors (R) (2-, 3-, 4-conductor)	RES12	≙ Resistance 0…50,000 Ω For more values, visit www.phoenixcontact.com	0	50,000	Ω	10% of the selected measuring range
Potentiometers (3-conductor)	POT12	≙ Potentiometer 0…50,000 Ω For more values, visit www.phoenixcontact.com	0	50,000	Ω	10% of the selected measuring range
Voltage signals (mV)	V04	≙ Voltage -1,000 mV…+1,000 mV For more values, visit www.phoenixcontact.com	-1,000	1,000	mV	10% of nominal span

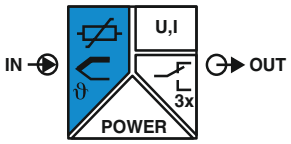
Other setting options can be configured with the IFS-CONF software:

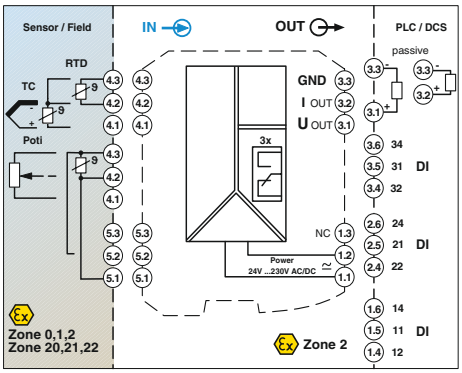
- Freely configurable user characteristic curve with 30 support points
- Output behavior in the event of a short circuit, sensor break or overrange/underrange can be freely configured or set in accordance with NE43 (standard configuration: NE43 upscale)
- Filter setting (standard configuration: 1)
- Restart after failsafe (standard configuration: ON)
- Switching behavior: switching output (limit values, times, etc.) (standard configuration: OFF)

Temperature conversion guide for°C to°F:

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

Temperature
Temperature transducers, Ex i





Temperature transducer, universal, with three limit value relays, wide range supply

Functional Safety
Ex: EAC Ex
Housing width 35 mm

Universal temperature transducer with freely configurable properties for intrinsically safe operation of resistance thermometers, thermocouples, resistance-type sensors, and potentiometers installed in Ex areas

- Input for resistance thermometers, thermocouples, resistance-type sensors, potentiometers, and mV sources, [Ex ia]
- Measure differential temperatures
- Freely programmable input and output
- Option of inverse output signal ranges
- Three limit value relays, can be used in combination as a safe limit value relay
- Configuration via software (FDT-DTM)
- Programming during operation with Ex measuring circuit connected and also voltage-free using IFS-USB-PROG-ADAPTER programming adapter
- Plug-in screw or Push-in connection technology
- Cold junction compensation with separate connector
- Wide-range power supply of 19.2 to 253 V AC/DC
- Status indicator for supply voltage, cable, sensor, and module errors
- Up to SIL 2 in accordance with IEC 61508
- PL d in accordance with EN ISO 13849-1
- Installation in zone 2 permitted

Notes:

The configuration software can be downloaded from the Internet (phoenixcontact.net/products).

For information on the programming adapter, refer to page 173

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		-1,000 mV ... 1,000 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	In accordance with NE 43 or freely configurable	
Switching output	Relay output	
Contact type	3 PDTs	
Contact material	$AgSnO_2$, hard gold-plated	
Max. 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	
Maximum transmission error	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/supply	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))	
Ambient temperature range	-20°C ... 65°C	
Humidity	Typically 5% ... 95% (non-condensing)	
Inflammability class in accordance with UL 94	V0	
Housing material	PA 6.6-FR	
Dimensions W/H/D	35 / 99 / 114.5 mm	
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14	
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16	
Safety data as per ATEX		
Maximum output voltage Uo	6 V	
Maximum output current Io	7.4 mA	
Maximum output power Po	11 mW	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	Ex II (1) G [Ex ia Ga] IIC Ex II (1) D [Ex ia Da] IIIC Ex II 3 G Ex nA nC ic IIC T4 Gc X	
IECEx	[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC ic IIC T4 Gc X	
SIL in accordance with IEC 61508	2	

Ordering data

Description		Type	Order No.	Pcs./Pkt.
Temperature transducer, intrinsically safe input				
Standard configuration	Screw connection	**MACX MCR-EX-T-UIREL-UP**	2865751	1
Standard configuration	Push-in connection	**MACX MCR-EX-T-UIREL-UP-SP**	2924799	1
Order configuration	Screw connection	**MACX MCR-EX-T-UIREL-UP-C**	2865722	1
Order configuration	Push-in connection	**MACX MCR-EX-T-UIREL-UP-SP-C**	2924809	1

Accessories

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

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

Order No.	SIL	Measuring unit	Sensor type	Connection technology	Measuring range: Start	Measuring range: End	Output signal	Switching function 1	Lower switching point 1	Upper switching point 1	Switching function 2	Lower switching point 2	Upper switching point 2	Factory calibration certificate
2865722	ON	C	PT100	4	-50	150	OUT02	0	99999	99999	0	99999	99999	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	Celsius [C] Ω [O] Millivolts [V]	See below	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	See below	See below	0...20 mA [OUT01] 4...20 mA [OUT02] 0...10 V [OUT03] 2...10 V [OUT04] 0...5 V [OUT05] 1...5 V [OUT06] -5...+5 V [OUT13] -10...+10 V [OUT14] 0...5 mA [OUT15] 0...10 mA [OUT16] 1...5 mA [OUT25] 2...10 mA [OUT26]	L [0] H [1] L → SPH → H [2] H → SPH → L [3] L → SPH → H → SPL → L [4] H → SPH → L → SPL → H [5] L → SPL → H → SPH → L [6] H → SPL → L → SPH → H [7]	Free input, see web site for more	Free input, see web site for more		Free input, see web site for more	Free input, see web site for more	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 temperature detector (RTD)	°C	PT50	≙ Pt 50 IEC60751	-200	850		20k
	°C	PT100	≙ Pt 100 IEC60751	-200	850		20k
	°C	PT200	≙ Pt 200 IEC60751	-200	850		20k
	°C	PT500	≙ Pt 500 IEC60751	-200	850		20k
	°C	PT1000	≙ Pt 1000 IEC60751	-200	850		20k
	°C	PT2000	≙ Pt 2000 IEC60751	-200	850		20k
	°C	PT5000	≙ Pt 5000 IEC60751	-200	850		20k
	°C	PT50S	≙ PT50 SAMA RC21-4-1966	-200	850		20k
	°C	PT100S	≙ PT100 SAMA RC21-4-1966	-200	850		20k
	°C	PT200S	≙ PT200 SAMA RC21-4-1966	-200	850		20k
	°C	PT500S	≙ PT500 SAMA RC21-4-1966	-200	850		20k
	°C	PT1000S	≙ PT1000 SAMA RC21-4-1966	-200	850		20k
	°C	PT2000S	≙ PT2000 SAMA RC21-4-1966	-200	850		20k
	°C	PT5000S	≙ PT5000 SAMA RC21-4-1966	-200	850		20k
	°C	PT100G	≙ PT100 G GOST 6651-2009 (α=0,00391)	-200	850		20k
	°C	PT200G	≙ PT200 G GOST 6651-2009 (α=0,00391)	-200	850		20k
	°C	PT500G	≙ PT500 G GOST 6651-2009 (α=0,00391)	-200	850		20k
	°C	PT1000G	≙ PT1000 G GOST 6651-2009 (α=0,00391)	-200	850		20k
	°C	PT100J	≙ Pt 100 JIS C1604/1997	-200	850		20k
	°C	PT200J	≙ Pt 200 JIS C1604/1997	-200	850		20k
	°C	PT500J	≙ Pt 500 JIS C1604/1997	-200	850		20k
	°C	PT1000J	≙ Pt 1000 JIS C1604/1997	-200	850		20k
	°C	NI100	≙ NI100 DIN 43760	-60	250		20k
	°C	NI200	≙ NI200 DIN 43760	-60	250		20k
	°C	NI500	≙ NI500 DIN 43760	-60	250		20k
	°C	NI1000	≙ NI1000 DIN 43760	-60	250		20k
	°C	NI100S	≙ NI100 SAMA RC21-4-1966	-60	180		20k
	°C	NI200S	≙ NI200 SAMA RC21-4-1966	-60	180		20k
	°C	NI500S	≙ NI500 SAMA RC21-4-1966	-60	180		20k
	°C	NI1000S	≙ NI1000 SAMA RC21-4-1966	-60	180		20k
	°C	NI1000L	≙ NI1000 Landis&Gyr	-50	160		20k
	°C	CU10	≙ CU10 SAMA RC21-4-1966	-70	500		20k
	°C	CU50	≙ CU 50 GOST 6651-2009 (α=0,00428)	-50	200		20k
	°C	CU100	≙ CU 100 GOST 6651-2009 (α=0,00428)	-50	200		20k
	°C	CU53	≙ CU 53 GOST 6651-2009 (α=0,00426)	-50	180		20k
	°C	KTY81	≙ KTY81 KTY81-110 (Philips)	-55	150		20k
	°C	KTY84	≙ KTY81 KTY84-130 (Philips)	-40	300		20k
Thermocouples (TC)	°C	A1G	≙ A-1 GOST 8.585-2001	0	2,500		50k
	°C	A2G	≙ A-2 GOST 8.585-2001	0	1,800		50k
	°C	A3G	≙ A-3 GOST 8.585-2001	0	1,800		50k
	°C	B	≙ B IEC584-1 (Pt30Rh-Pt6Rh)	500	1,820		50k
	°C	C	≙ C ASTM E988	0	2,315		50k
	°C	D	≙ DA ASTM E988(2002)	0	2,315		50k
	°C	E	≙ E IEC584-1 (NiCr-CuNi)	-230	1,000		50k
	°C	J	≙ J IEC584-1 (Fe-CuNi)	-210	1,200		50k
	°C	K	≙ K IEC584-1 (NiCr-Ni)	-250	1,372		50k
	°C	MG	≙ MG GOST 8.585-2001	-200	100		50k
	°C	N	≙ N IEC 584-1 (NiCrSi-NiSi)	-200	1,300		50k
	°C	R	≙ R IEC 584-1 (Pt13Rh-Pt)	-50	1,768		50k
	°C	S	≙ S IEC 584-1 (Pt10Rh-Pt)	-50	1,768		50k
	°C	T	≙ T IEC 584-1 (Cu-CuNi)	-200	400		50k
	°C	L	≙ L DIN 43760 (Fe-CuNi)	-200	900		50k
	°C	LG	≙ LG GOST 8.585-2001	-200	800		50k
	°C	U	≙ U DIN 43760 (Cu-CuNi)	-200	600		50k
Remote resistance-type sensors (R) (2-, 3-, 4-conductor)	Ω	RES12	≙ Resistance 0…50,000 Ω For more values, visit www.phoenixcontact.com	0	50,000		10% of the selected measuring range
Potentiometers (3-conductor)	Ω	POT12	≙ Potentiometer 0…50,000 Ω For more values, visit www.phoenixcontact.com	0	50,000		10% of the selected measuring range
Voltage signals (mV)	mV	V04	≙ Voltage -1,000 mV…+1,000 mV For more values, visit www.phoenixcontact.com	-1,000	1,000		10% of nominal span

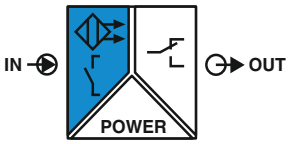
Other setting options can be configured with the IFS-CONF software:

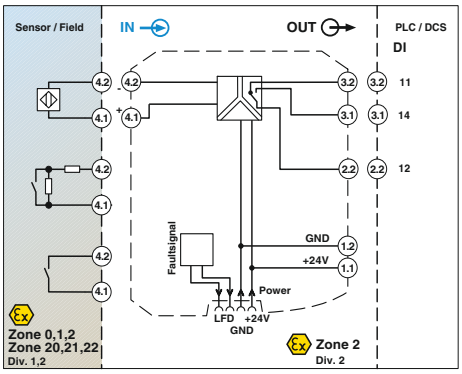
- Freely configurable user characteristic curve with 30 support points
- Output behavior in the event of a short circuit, sensor break or overrange/underrange can be freely configured or set in accordance with NE43 (standard configuration: NE43 upscale)
- Filter setting (standard configuration: 1)
- Restart after failsafe (standard configuration: ON)
- Switching behavior: switching output (limit values, times, etc.) (standard configuration: OFF)

Temperature conversion guide for°C to°F:

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

Digital IN
NAMUR signal conditioners, Ex i





NAMUR signal conditioner, signal output: PDT relay

DNV GL Functional Safety
Ex: EAC Ex KC-s
Housing width 12.5 mm

NAMUR signal conditioners for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- Relay signal output (PDT)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing led and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Information about resistance circuits is given on page 177

Information on “Plug and play” connection using system cabling can be found from page 170

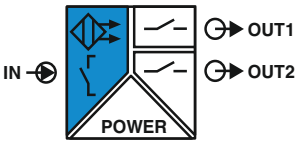
Technical data

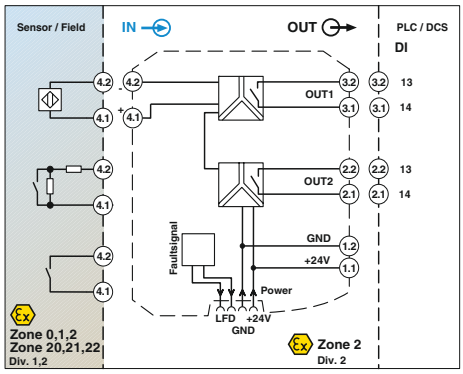
Input data	
Input signal	NAMUR proximity sensors (IEC/EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	~ 8 V DC
Switching points	>2.1 mA (conductive) / <1.2 mA (blocking)
Switching hysteresis	<0.2 mA
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	**Relay output**
Contact type	1 PDT
Contact material	$AgSnO_2$, hard gold-plated
Max. 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 (24 V DC -20%...+25%)
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/output/supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Output/input, supply, TBUS	300 V_{rms} (rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Inflammability class in accordance with UL 94	V0
Dimensions W/H/D	12.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	9.6 V
Maximum output current Io	10 mA
Maximum output power Po	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 (1) G Ex nA nC [ia Ga] IIC T4 Gc
IECEx	[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC [ia Ga] IIC T4 Gc
UL, USA/Canada	Class I Div 2; IS for Class I, II, III Div 1 UL 61010 Listed
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner, 1-channel, input intrinsically safe, output: PDT contact			
Screw connection	**MACX MCR-EX-SL-NAM-R**	2865434	1
Push-in connection	**MACX MCR-EX-SL-NAM-R-SP**	2924045	1

Digital IN
NAMUR signal conditioners, Ex i





NAMUR signal conditioner: 2 signal outputs: N/O relay

DNV GL Functional Safety
Ex: EAC Ex KC-s
Housing width 12.5 mm

NAMUR signal conditioners for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- 2 relay signal outputs (N/O contact), output 2 can also be used as an error signal output
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing led and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 4-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Information about resistance circuits is given on page 177

Information on “Plug and play” connection using system cabling can be found from page 170

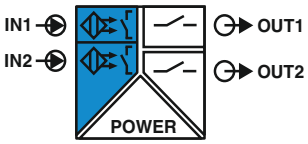
Technical data

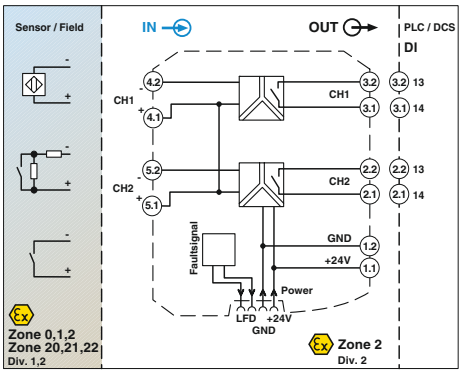
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	~ 8 V DC
Switching points	>2.1 mA (conductive) / <1.2 mA (blocking)
Switching hysteresis	<0.2 mA
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	**Relay output**
Contact type	2 N/O contacts
Contact material	$AgSnO_2$, hard gold-plated
Max. 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 (24 V DC -20%...+25%)
Current consumption	30 mA (24 V DC)
Power dissipation	<950 mW
Electrical isolation	
Input/output	375 V (peak value in accordance with EN 60079-11)
Input/supply, DIN rail connector	375 V (peak value in accordance with EN 60079-11) 300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
Output 1/output 2/input, power supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1))
Output 1/output 2/input/power supply, DIN rail connector	2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Inflammability class in accordance with UL 94	V0
Dimensions W/H/D	12.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	9.6 V
Maximum output current Io	10 mA
Maximum output power Po	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 (1) G Ex nA nC [ia Ga] IIC T4 Gc
IECEx	[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC [ia Ga] IIC T4 Gc
UL, USA/Canada	Class I Div 2; IS for Class I, II, III Div 1 UL 61010 Listed
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner, 1-channel, input intrinsically safe, output: 2 N/O contacts			
Screw connection	**MACX MCR-EX-SL-NAM-2RO**	2865450	1
Push-in connection	**MACX MCR-EX-SL-NAM-2RO-SP**	2924061	1

Digital IN
NAMUR signal conditioners, Ex i





NAMUR signal conditioner, 2-channel, signal output: N/O relay

DNV GL Functional Safety
Ex: EAC Ex KC-s
Housing width 12.5 mm

NAMUR signal conditioners for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- Relay signal output (N/O contact)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing led and de-excitation of the output relay
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Information about resistance circuits is given on page 177

Information on "Plug and play" connection using system cabling can be found from page 170

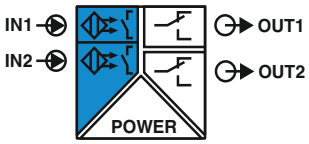
Technical data

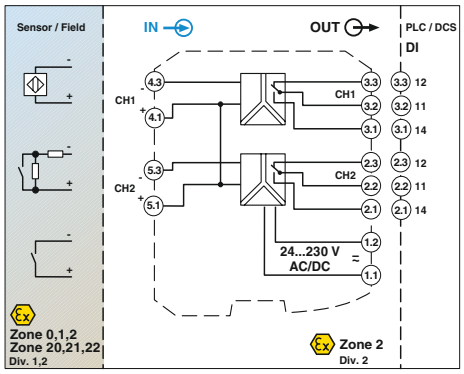
Input data	
Input signal	NAMUR proximity sensors (IEC/EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	~ 8 V DC
Switching points	>2.1 mA (conductive) / <1.2 mA (blocking)
Switching hysteresis	<0.2 mA
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	Relay output
Contact type	1 N/O contact per channel
Contact material	$AgSnO_2$, hard gold-plated
Max. 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 (24 V DC -20%...+25%)
Current consumption	35 mA (24 V DC)
Power dissipation	<1 W
Electrical isolation	
Input/output	375 V (peak value in accordance with EN 60079-11)
Input/supply, DIN rail connector	375 V (peak value in accordance with EN 60079-11) 300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1))
Output 1/output 2/input, power supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1))
Output 1/output 2/input/power supply, DIN rail connector	2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	5% ... 95% (non-condensing)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Inflammability class in accordance with UL 94	V0
Dimensions W/H/D	12.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	9.6 V
Maximum output current Io	10 mA
Maximum output power Po	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 (1) G Ex nA nC [ia Ga] IIC T4 Gc
IECEx	[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA nC [ia Ga] IIC T4 Gc
UL, USA/Canada	Class I Div 2; IS for Class I, II, III Div 1 UL 61010 Listed
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner, 2-channel, input intrinsically safe, output: N/O contact			
Screw connection	**MACX MCR-EX-SL-2NAM-RO**	2865476	1
Push-in connection	**MACX MCR-EX-SL-2NAM-RO-SP**	2924087	1

Digital IN
NAMUR signal conditioners, Ex i





NAMUR signal conditioner, 2–channel, signal output: PDT relay, wide range supply

Functional Safety
Ex: EAC Ex
Housing width 17.5 mm

NAMUR signal conditioners for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- Relay signal output (PDT)
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing led and de-excitation of the output relay
- Wide-range power supply of 19.2 to 253 V AC/DC
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information on resistance circuits and marking material can be found on page 177

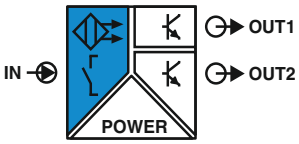
Technical data

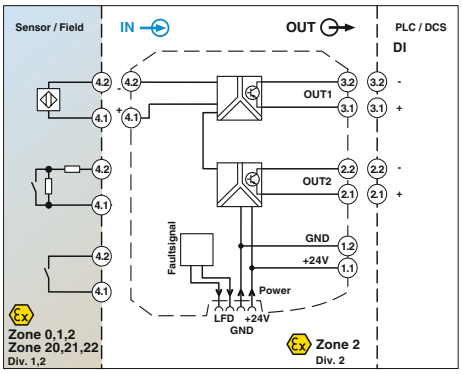
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Open circuit switch contacts Switch contacts with resistance circuit
No-load voltage	~ 8 V DC
Switching points	>2.1 mA (conductive) / <1.2 mA (blocking)
Switching hysteresis	<0.2 mA
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	Relay output
Contact type	1 PDT per channel
Contact material	$AgSnO_2$, hard gold-plated
Max. 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 Hz ... 60 Hz)
Current consumption	<80 mA ; <42 mA (24 V DC)
Power dissipation	≤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 (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV AC (50 Hz, 1 min., test voltage)
Output 1/output 2/input, power supply	300 V_{rms} (rated insulation voltage (overvoltage category III; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C
Humidity	10% ... 95% (non-condensing)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	17.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	9.56 V
Maximum output current Io	10.3 mA
Maximum output power Po	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
UL, USA/Canada	Class I Div 2; IS for Class I, II, III Div 1
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner, 2-channel, input intrinsically safe, output: Changeover contact			
Screw connection	**MACX MCR-EX-SL-2NAM-R-UP**	2865984	1
Push-in connection	**MACX MCR-EX-SL-2NAM-R-UP-SP**	2924249	1

Digital IN
NAMUR signal conditioners, Ex i





NAMUR signal conditioner:
2 signal outputs: transistor (passive)

DNV GL Functional Safety
Ex: EAC Ex
Housing width 12.5 mm

NAMUR signal conditioners for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- 2 signal outputs transistor (passive), up to 5 kHz
- Signal output 2 can also be used as a fault signaling output
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and blocking the transistor output
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 4-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Information about resistance circuits is given on page 177

Information on "Plug and play" connection using system cabling can be found from page 170

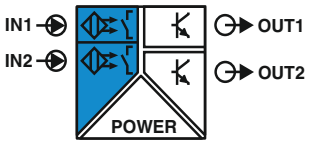
Technical data

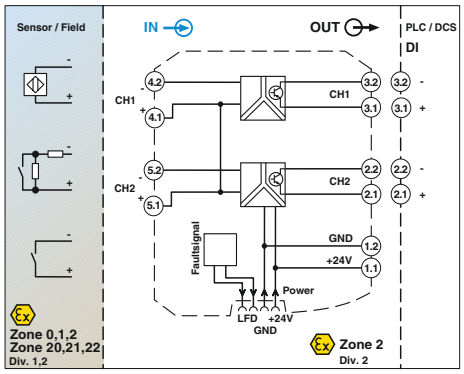
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	~ 8 V DC
Switching points	>2.1 mA (conductive) / <1.2 mA (blocking)
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	2 transistor outputs, passive
Max. switching voltage	30 V DC
Maximum switching current	50 mA (short-circuit-proof)
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 (24 V DC -20%...+25%)
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/output/supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Input/supply, DIN rail connector	375 V (peak value in accordance with EN 60079-11)
Output 1/output 2	50 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, basic insulation as per EN 61010-1)) 1 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	9.6 V
Maximum output current Io	10 mA
Maximum output power Po	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 (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
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner, input intrinsically safe, output: Transistor, passive			
Screw connection	**MACX MCR-EX-SL-NAM-2T**	2865463	1
Push-in connection	**MACX MCR-EX-SL-NAM-2T-SP**	2924074	1

Digital IN
NAMUR signal conditioners, Ex i





NAMUR signal conditioner, 2-channel, signal output: transistor (passive)

DNV GL Functional Safety
Ex: EAC Ex
Housing width 12.5 mm

NAMUR signal conditioners for intrinsically safe operation of proximity sensors and mechanical contacts installed in Ex areas.

- 2-channel
- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- Signal output transistor (passive), up to 5 kHz
- Reversible direction of action (operating current or closed-circuit current behavior)
- Line fault detection (LFD) can be activated and deactivated, error indicated by red flashing LED and blocking the transistor output
- Power supply and error indication possible via the DIN rail connector
- LED displays for indicating supply voltage, circuit state, and malfunctions to NAMUR NE 44
- 3-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information about the supply and error evaluation module as well as about the DIN rail connectors and marking material can be found from page 175

Information about resistance circuits is given on page 177

Information on “Plug and play” connection using system cabling can be found from page 170

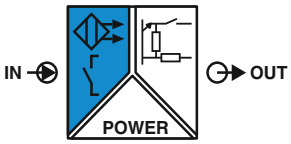
Technical data

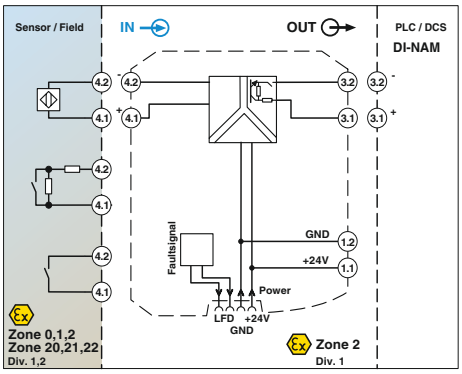
Input data	
Input signal	NAMUR proximity sensors (EN 60947-5-6) Floating switch contacts Switch contacts with resistance circuit
No-load voltage	~ 8 V DC
Switching points	>2.1 mA (conductive) / <1.2 mA (blocking)
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	1 transistor output, passive (per channel)
Max. switching voltage	30 V DC
Maximum switching current	50 mA (short-circuit-proof)
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 (24 V DC -20%...+25%)
Current consumption	<34 mA (24 V DC)
Power dissipation	≤1,000 mW
Number of channels	2
Electrical isolation	
Input/output	375 V (peak value in accordance with EN 60079-11)
Input/output/supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Input/supply, DIN rail connector	375 V (peak value in accordance with EN 60079-11)
Output 1/output 2	50 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, basic insulation as per EN 61010-1)) 1 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	9.6 V
Maximum output current Io	10 mA
Maximum output power Po	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 (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
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner, 2-channel, input intrinsically safe, output: Transistor, passive			
Screw connection	**MACX MCR-EX-SL-2NAM-T**	2865489	1
Push-in connection	**MACX MCR-EX-SL-2NAM-T-SP**	2924090	1

Digital IN
NAMUR signal conditioners, Ex i





NAMUR signal conditioner, with line fault transparency

Functional Safety
Ex: EAC Ex
Housing width 12.5 mm

NAMUR signal conditioners for the intrinsically safe operation of proximity sensors or mechanical contacts installed in the Ex area.

- Input for NAMUR proximity sensors (EN 60947-5-6), floating contacts or contacts with resistance circuit, [Ex ia]
- Signal output with resistive behavior (transistor)
- Signal output with line fault transparency: line 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 and deactivated
- Power supply and error indication possible via the DIN rail connector
- LED indicators for supply voltage, status, and fault in accordance with NAMUR NE 44
- Plug-in screw or Push-in connection technology
- Safe 3-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information on the supply and error evaluation module, DIN rail connectors, system cabling, and marking material can be found from page 175

Information about resistance circuits is given on page 177

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)
Line error detection	Break 0.05 mA <IIN <0.35 mA Short circuit 100 Ω <RSensor <360 Ω
Switching output	Resistive (transistor, passive)
Switching voltage	8.2 V DC ±10% (in accordance with 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	9.6 V DC ... 30 V DC (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/output/supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Input/supply, DIN rail connector	375 V (peak value in accordance with EN 60079-11)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm^2 / 0.2 ... 1.5 mm^2 / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	9.6 V
Maximum output current Io	10 mA
Maximum output power Po	25 mW
Maximum voltage U_m	253 V AC/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 3G Ex nA IIC T4 Gc X
IECEx	[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA IIC T4 Gc
SIL in accordance with IEC 61508	2

Ordering data

Description	Type	Order No.	Pcs./Pkt.
NAMUR signal conditioner, intrinsically safe input, output with line fault transparency			
Screw connection	**MACX MCR-EX-SL-NAM-NAM**	2866006	1
Push-in connection	**MACX MCR-EX-SL-NAM-NAM-SP**	2924883	1
Specifically for Yokogawa systems			
Screw connection	**MACX MCR-EX-SL-NAM-YO**	2905723	1
Push-in connection	**MACX MCR-EX-SL-NAM-YO-SP**	2905724	1
Specifically for Honeywell systems			
Screw connection	**MACX MCR-EX-SL-NAM-HO**	2907404	1
Push-in connection	**MACX MCR-EX-SL-NAM-HO-SP**	2907405	1

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:

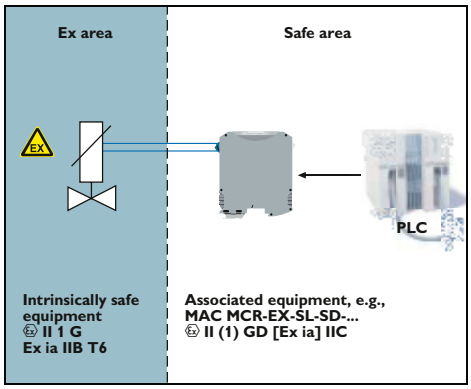
– Valve
– Cable with corresponding resistance
– Solenoid driver

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:
phoenixcontact.net/products

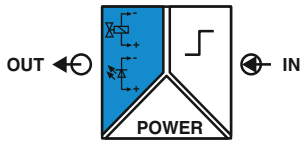
Example circuit

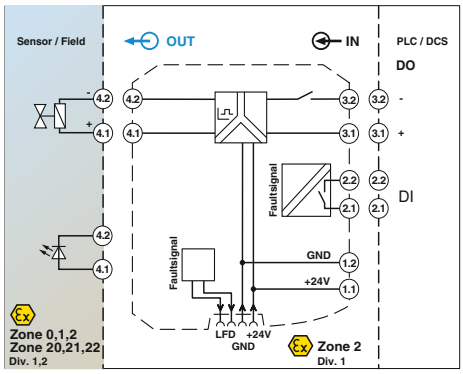


Valves overview

Manufacturer	Type Description		Ex certificate	Condition	MACX Analog Ex solenoid drivers			
					MACX MCR-EX-SL-SD-21-25-LP	MACX MCR-EX-SL-SD-21-40-LP	MACX MCR-EX-SL-SD-24-48-LP	MACX MCR-EX-SL-SD-21-60-LP
ASCO	Coil	195	LCIE 08 ATEX 6083			✓	✓	✓
	Coil	302 (12 V)	INERIS 03 ATEX 0249X				✓	✓
	Coil	302 (24 V)	INERIS 03 ATEX 0249X					✓
Bürkert	Coil	AC 10, standard	PTB 01 ATEX 2101			✓	✓	
	Coil	AC 10, high-resistance	PTB 01 ATEX 2101			✓	✓	
	Coil	AC 21, standard	PTB 01 ATEX 2175	700 mW / 65°C		✓	✓	
	Coil	AC 21, high-resistance	PTB 01 ATEX 2175	700 mW / 65°C		✓	✓	
	Coil	AC 21, standard	PTB 01 ATEX 2175	900 mW / 45°C		✓	✓	
	Coil	AC 21, high-resistance	PTB 01 ATEX 2175	900 mW / 45°C		✓	✓	
	Coil	AC 21, standard	PTB 01 ATEX 2175	900 mW / 60°C		✓	✓	
	Coil	AC 21, high-resistance	PTB 01 ATEX 2175	900 mW / 60°C		✓	✓	
	Coil	G1 642735, standard		600 mW / 50°C		✓		
	Coil	G1 642735, high-resistance		600 mW / 50°C		✓		
	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	1,000 mW / 40°C		✓	✓	
	Coil	G1 642735, high-resistance	PTB 01 ATEX 2173	1,000 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				✓	

Digital OUT
Solenoid drivers, Ex i





Solenoid driver, 48 mA current limitation with line fault detection

Functional Safety
Ex: EAC Ex KC-s
Housing width 12.5 mm

Solenoid drivers for the intrinsically safe control of Ex i solenoid valves, alarm transmitters or indicators installed in the Ex area.

- Input: logic (low/high signal)
- Output: 48 mA current limitation at 9.5 V, [Ex ia]
- Line fault detection (can be activated and deactivated)
  - Directly via signal channel
  - Or via switching output
- Transparent for test pulses
- Power supply and error indication possible via the DIN rail connector
- LED indicators for supply voltage, status, and fault in accordance with NAMUR NE 44
- Plug-in screw or Push-in connection technology
- Safe 3-way electrical isolation
- Up to SIL 2 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

Information on the supply and error evaluation module, DIN rail connectors, system cabling, and marking material can be found from page 175

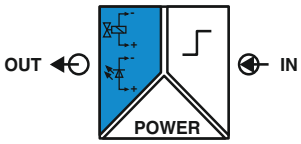
Technical data

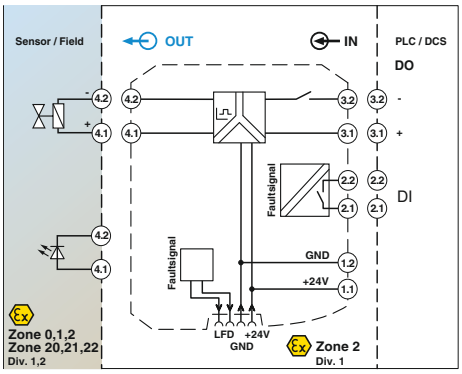
Input data	
Switching level 0 signal ("L")	0 V DC ... 5 V DC (open)
Switching level 1 signal ("H")	15 V DC ... 30 V DC
Current input signal	<12 mA
Input impedance in the event of a line fault at the output	3 MΩ (high resistance (Mega Ω))
Transparent for test pulses	Yes
Output data	
Output voltage	≥9.36 V DC (at 48 mA)
Current limitation	>48 mA (with cable error detection)
No-load voltage	>22.5 V DC
Internal resistance	≥269.3 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/O contact
Max. 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 (24 V DC)
Power dissipation	<1.8 W
Electrical isolation	
Output/input, error message output	375 V (peak value in accordance with EN 60079-11) 300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Degree of protection	IP20
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	25.3 V
Maximum output current Io	94 mA
Maximum output power Po	595 mW
Maximum voltage U_m	253 V AC/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 X
IECEx	[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC T4 Gc
SIL in accordance with IEC 61508	3

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
Push-in connection	**MACX MCR-EX-SL-SD-23-48-LFD-SP**	2924870	1

Digital OUT
Solenoid drivers, Ex i





Solenoid driver, 25.1 mA current limitation with line fault detection

Functional Safety
Ex:
Housing width 12.5 mm

Solenoid drivers for the intrinsically safe control of Ex i solenoid valves, alarm transmitters or indicators installed in the Ex area.

- Input: logic (low/high signal)
- Output: 25.1 mA current limitation at 4.64 V, [Ex ia]
- Line fault detection (can be activated and deactivated)
  - Directly via signal channel
  - Or via switching output
- Transparent for test pulses
- Power supply and error indication possible via the DIN rail connector
- LED indicators for supply voltage, status, and fault in accordance with NAMUR NE 44
- Plug-in screw or Push-in connection technology
- Safe 3-way electrical isolation
- Up to SIL 3 in accordance with IEC/EN 61508
- Installation in zone 2 permitted

Notes:

A list of suitable valves and notes for calculating a valve circuit are available from the download center at phoenixcontact.net/products.

Information on marking material can be found on page 178

Information on “Plug and play” connection using system cabling can be found from page 170

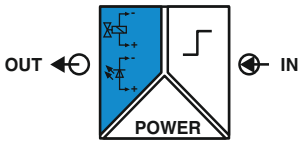
Technical data

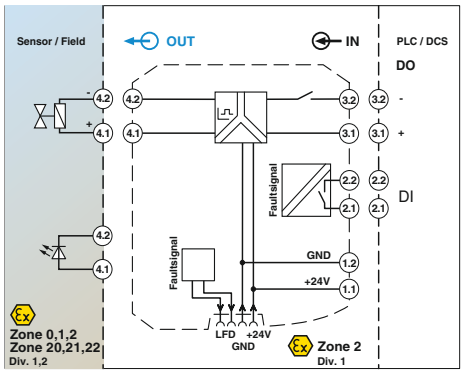
Input data	
Switching level 0 signal (“L”)	0 V DC ... 5 V DC (open)
Switching level 1 signal (“H”)	15 V DC ... 30 V DC
Current input signal	<12 mA
Input impedance in the event of a line fault at the output	3 MΩ (high resistance (Mega Ω))
Transparent for test pulses	Yes
Output data	
Output voltage	≥4.64 V DC (at 25.1 mA)
Current limitation	>25.1 mA (with cable error detection)
No-load voltage	>21.1 V DC
Internal resistance	≥641 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/O contact
Max. 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	<50 mA (24 V DC)
Power dissipation	<0.8 W
Electrical isolation	
Output/input, error message output	375 V (peak value in accordance with EN 60079-11) 300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Degree of protection	IP20
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	23.98 V
Maximum output current Io	37.4 mA
Maximum output power Po	224 mW
Maximum voltage U_m	253 V AC/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 X
IECEx	[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC T4 Gc
SIL in accordance with IEC 61508	3

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-21-25-LFD**	2905669	1
Push-in connection	**MACX MCR-EX-SL-SD-21-25-LFD-SP**	2905674	1

Digital OUT
Solenoid drivers, Ex i





Solenoid driver, 48 mA current limitation with line fault detection

Functional Safety
Ex:
Housing width 12.5 mm

Solenoid drivers 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 9.7 V, [Ex ia]
- Line fault detection (can be activated and deactivated)
  - Directly via signal channel
  - Or via switching output
- Transparent for test pulses
- Power supply and error indication possible via the DIN rail connector
- LED indicators for supply voltage, status, and fault in accordance with NAMUR NE 44
- Plug-in screw or Push-in connection technology
- Safe 3-way electrical isolation
- Up to SIL 3 in accordance with IEC/EN 61508
- Installation in zone 2 permitted

Notes:

A list of suitable valves and notes for calculating a valve circuit are available from the download center at phoenixcontact.net/products.

Information on marking material can be found on page 178

Information on "Plug and play" connection using system cabling can be found from page 170

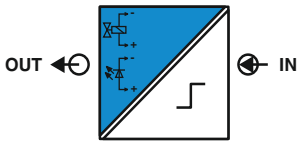
Technical data

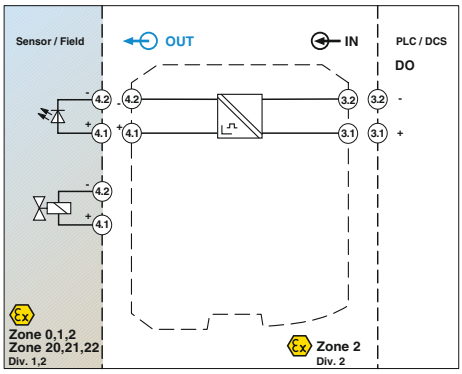
Input data	
Switching level 0 signal ("L")	0 V DC ... 5 V DC (open)
Switching level 1 signal ("H")	15 V DC ... 30 V DC
Current input signal	<12 mA
Input impedance in the event of a line fault at the output	3 MΩ (high resistance (Mega Ω))
Transparent for test pulses	Yes
Output data	
Output voltage	≥9.7 V DC (at 48 mA)
Current limitation	>48 mA (with cable error detection)
No-load voltage	>24.3 V DC
Internal resistance	≥297 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/O contact
Max. 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 (24 V DC)
Power dissipation	<1.62 W
Electrical isolation	
Output/input, error message output	375 V (peak value in accordance with EN 60079-11) 300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	10% ... 95% (non-condensing)
Status indication	Green LED (supply voltage) LED yellow (switching state) Red LED (line errors)
Degree of protection	IP20
Inflammability class in accordance with UL 94	V0
Housing material	PA 6.6-FR
Dimensions W/H/D	12.5 / 112.5 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX	
Maximum output voltage Uo	27.06 V
Maximum output current Io	91.11 mA
Maximum output power Po	616 mW
Maximum voltage U_m	253 V AC/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 X
IECEx	[Ex ia Ga] IIC, [Ex ia Da] IIIC, Ex nA [ia Ga] IIC T4 Gc
SIL in accordance with IEC 61508	3

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-24-48-LFD**	2906155	1
Push-in connection	**MACX MCR-EX-SL-SD-24-48-LFD-SP**	2906156	1

Digital OUT
Solenoid drivers, Ex i





Solenoid driver, current limitation 25 mA

Functional Safety
Ex: EAC Ex
Housing width 12.5 mm

Solenoid drivers for controlling intrinsically safe solenoid valves, alarm transmitters, and indicators installed in Ex areas.

- 20 to 30 V DC input
- Output [Ex ia]
- Various output characteristic curves compatible with the commercial solenoid valves
- Loop-powered: The required power is supplied via the control signal on the input side
- Mechanically compatible with DIN rail connector
- Galvanic 2-way isolation
- Up to SIL 3 in accordance with IEC 61508
- Installation in zone 2 permitted

Notes:

A list of suitable valves and notes for calculating a valve circuit are available from the download center at phoenixcontact.net/products.

Information on marking material can be found on page 178

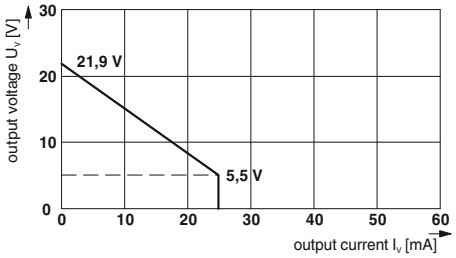
Information on “Plug and play” connection using system cabling can be found from page 170

Technical data

Input data		
Voltage input signal		19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
Current input signal		45 mA (at 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		641.1 Ω (internal resistance R_i)
Immunity to short-circuiting		Yes
Response time t_A		20 ms
General data		
Power dissipation		<0.845 W
Temperature coefficient		0.01%/K
Electrical isolation		
	Output/input	375 V (peak value in accordance with EN 60079-11) 300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature range		-40°C ... 60°C (any mounting position)
Status indication		Yellow LED (switching state / status, lights up when output circuit is active)
Degree of protection		IP20
Inflammability class in accordance with UL 94		V0
Dimensions W/H/D		12.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / AWG		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Safety data as per ATEX		
Maximum output voltage Uo		25.1 V
Maximum output current Io		39 mA
Maximum output power Po		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 (1)G Ex nA [ia IIC Ga] IIC T4 Gc X
IECEx		[Ex ia Ga] IIC/IIB/IIA, [Ex ia Da] IIIC, Ex nA [ia IIC Ga] IIC T4 Gc
UL, USA/Canada		Class I Div 2; IS for Class I, II, III Div 1
SIL in accordance with IEC 61508		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
Push-in connection	**MACX MCR-EX-SL-SD-21-25-LP-SP**	2924113	1



Solenoid driver, current limitation 40 mA

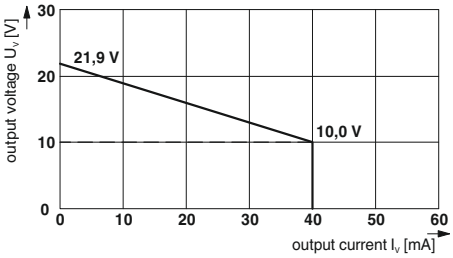
Functional Safety
Ex: EAC Ex
Housing width 12.5 mm

Technical data

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
65 mA (at 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
<1.055 W
0.01%/K
375 V (peak value in accordance with EN 60079-11) 300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
-40°C ... 60°C (any mounting position, pay attention to the derating curve in the data sheet)
Yellow LED (switching state / status, lights up when output circuit is active)
IP20
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 (1)G Ex nA [ia IIC Ga] IIC T4 Gc X
[Ex ia Ga] IIC/IIB/IIA
Class I Div 2; IS for Class I, II, III Div 1
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



Solenoid driver, current limitation 48 mA

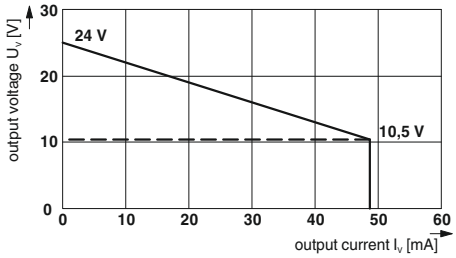
Functional Safety
Ex: EAC Ex
Housing width 12.5 mm

Technical data

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
85 mA (at U_e = 24 V DC)
10.5 V DC (at 48 mA)
48 mA
24 V DC
275.7 Ω (internal resistance R_i)
Yes
20 ms
<1.41 W
0.01%/K
375 V (peak value in accordance with EN 60079-11) 300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
-40°C ... 60°C (any mounting position, pay attention to the derating curve in the data sheet)
Yellow LED (switching state / status, lights up when output circuit is active)
IP20
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 (1)G Ex nA [ia IIC Ga] IIC T4 Gc X
[Ex ia Ga] IIC/IIB/IIA
Class I Div 2; IS for Class I, II, III Div 1
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



Solenoid driver, current limitation 58 mA, [Ex ia] IIB

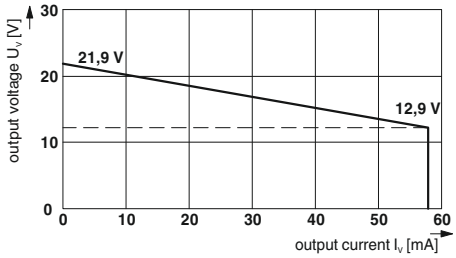
Functional Safety
Ex: EAC Ex
Housing width 12.5 mm

Technical data

19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
95 mA (at U_e = 24 V DC)
12.9 V DC (at 58 mA)
58 mA
21.9 V DC
133.4 Ω (internal resistance R_i)
Yes
20 ms
<1.325 W
0.01%/K
375 V (peak value in accordance with EN 60079-11) 300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
-40°C ... 60°C (any mounting position, pay attention to the derating curve in the data sheet)
Yellow LED (switching state / status, lights up when output circuit is active)
IP20
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 (1)G Ex nA [ia IIB Ga] IIC T4 Gc X
[Ex ia Ga] IIB/IIA
Class I Div 2; IS for Class I, II, III Div 1
3

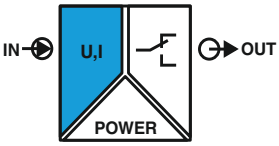
Ordering data

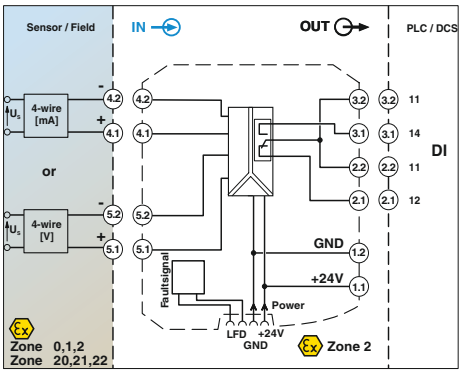
Type	Order No.	Pcs./Pkt.
MACX MCR-EX-SL-SD-21-60-LP	2865515	1
MACX MCR-EX-SL-SD-21-60-LP-SP	2924100	1



Limit values, threshold value switches

new





Configurable, with relay PDT output

Ex:

Housing width 12.5 mm

Limit switch with unlimited configurable limit values

- Input [Ex ia] for analog standard current and voltage signals from Ex area for switching analog limit values
- Safe 3-way isolation
- Configure limit values via DIP switch
- PDT relay at output
- Limiting continuous current up to 6 A
- Energy can be supplied via the DIN rail connector
- Status and error indicator LEDs
- Up to SIL 3 in accordance with IEC 61508
- PLc in accordance with ISO 13849
- Installation in zone 2 possible

Technical data

Input data		
Voltage input signal		0.1 V ... 10 V 0.1 V ... 10.5 V (maximum range)
Total error of the voltage input maximum		± 10 mV
Current input signal		0.2 mA ... 20 mA 0.18 mA ... 21 mA (maximum range)
Total error of the current input maximum		± 20 µA
Input resistance	Current/volatge input	<28 Ω / >100 kΩ
Switching points		- / configurable via DIP switch (in 1.25% increments) and potentiometer (linearly up to 2% of the switching threshold set via the DIP switch)
Switching hysteresis		off: approx. 0.5%, on: approx. 1%
Line error detection		Break U <50 mV, I <0.1 mA Short circuit U >10.8 V, I >21.1 mA
Switching output		**Relay output**
Contact type		1 PDT
Maximum switching current		≤4 A AC (cos phi = 1)
Mechanical service life		≤10^7 cycles
Switching voltage		≤250 V AC ≤120 V DC
General data		
Supply voltage range		9.6 V DC ... 30 V DC (12 V DC ... 24 V DC (-20% ... +25%))
Current consumption, maximum		90 mA (10 V DC)
Current consumption, typical		38 mA (24 V DC)
Current draw		≤30 mA (30 V DC)
Power consumption		≤1.2 W
Power dissipation		<0.9 W
Temperature coefficient		0.01%/K
Step response (0 - 99%)		≤22 ms
Switching point accuracy		<0.1%
Maximum transmission error		0.1%
Electrical isolation		
	Input/output	375 V (peak value in accordance with EN 60079-11)
	Input/output/supply, DIN rail connector	300 V_{rms} (rated insulation voltage (overvoltage category II; degree of pollution 2, safe isolation as per EN 61010-1)) 2.5 kV (50 Hz, 1 min., test voltage)
Ambient temperature (operation)		-20°C ... 65°C (any mounting position)
Ambient temperature (storage/transport)		-40°C ... 85°C
Humidity		5% ... 95% (non-condensing)
Altitude		≤2,000 m
Inflammability class in accordance with UL 94		V0
Dimensions W/H/D		12.5 / 99 / 114.5 mm
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 ec nC [ia Ga] IIC T4 Gc
UL, USA/Canada		UL applied for
SIL in accordance with IEC 61508		2 (single-channel) 3 (two-channel)

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Screw connection	**MACX MCR-EX-SL-UI-REL**	2906164	1
Spring-cage connection	**MACX MCR-EX-SL-UI-REL-SP**	2906165	1

Termination Carriers for MACX Analog signal conditioners

TC... Termination Carriers are compact solutions for quickly and smoothly connecting DIN rail devices from the MACX Analog series to input and output cards of automation systems using system cabling.

The Termination Carriers combine the advantages of modular DIN rail devices with those offered by plug and play rapid cabling solutions to provide a consistent solution for system technology.

Termination carriers are also available for MINI Analog Pro and PSR safety devices.

Compact
– Saves up to 30% of space due to compact design

Rugged 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 standard DIN rail device

Select module carrier

Select controller-specific front adapter and system cable

Termination Carriers for MACX Analog signal conditioners

The **TC-D37SUB-ADIO16-EX-P-UNI** universal Termination Carrier is a compact solution for connecting signal conditioners from the MACX Analog series to analog or binary input and 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-compatible field devices and a management system.

The **TC-D37SUB-ADIO16-2EX-P-UNI** universal Termination Carrier is a compact solution for connecting two-channel signal conditioners from the MACX Analog series to analog or binary input and output cards of automation systems.

– Connection of up to 16 single-channel (Ex i-)signal conditioners
– Universal 1:1 signal routing to a 37-pos. D-SUB connector
– For system cables with D-SUB socket and open ends for universal connection
– Redundant supply and monitoring in separate DIN rail module

Notes:

You will find information about signal conditioners from the MACX Analog product range in the INTERFACE catalog or at phoenixcontact.com.

You can find information about available system cables for D-SUB connectors in the INTERFACE catalog or at phoenixcontact.com.

Contact us: specific Termination Carriers designs for I/O modules of various automation systems are available, planned or can be implemented in accordance with your specification.

Ex:
Housing width 242 mm

Technical data

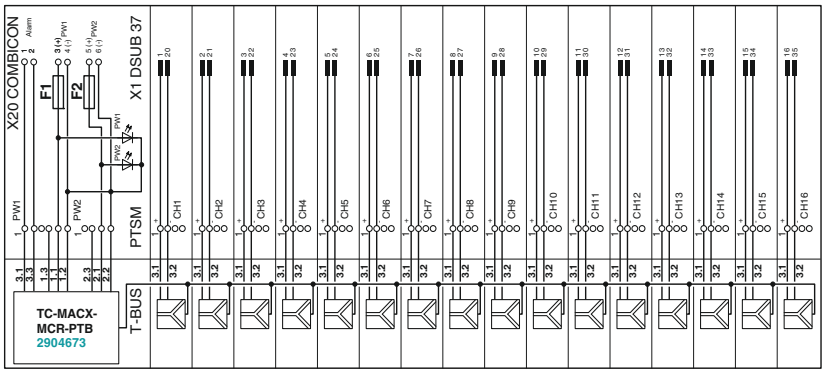
General data	
Connection to the control system level	D-SUB pin strip
No. of pos.	37
Maximum operating voltage	<30 V DC (per signal/channel)
Maximum permissible current	1 A (signal/channel)
Rated insulation voltage	50 V (basic insulation)
Rated surge voltage	0.5 kV
Degree of pollution	2
Overvoltage category	II
Air clearances and creepage distances	DIN EN 50178 (basic insulation)
Ambient temperature range	-20°C ... 60°C (please observe module specifications)
Shock	15g, in accordance with IEC 60068-2-27
Vibration (operation)	2g, in accordance with IEC 60068-2-6
Dimensions W/H/D	242 / 170 / 160 mm
EMC note	
Power supply via power module	
Input voltage range	19.2 V DC ... 30 V DC
Redundant supply	Yes, decoupled from diodes
Polarization and surge protection	Yes
Fuse	2x 2.5 A on PCB, slow-blow (replaceable)
Status indication	1x red LED (error) 2x green LEDs (PWR1 and PWR2)
Switching output	1 N/C contact (alarm = open)
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 single-channel MACX MCR isolators			
	TC-D37SUB-ADIO16-EX-P-UNI	2924854	1
- With connection for multiplexer	**TC-D37SUB-AIO16-EX-PS-UNI**	2902932	1
Universal Termination Carrier for 16 two-channel MACX MCR isolators			
	TC-2D37SUB-ADIO32-2EX-P-UNI	2904684	1

Accessories

Power and fault signaling module	**TC-MACX-MCR-PTB**	2904673	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

Multiplexers for digital connection of HART-compatible field devices (such as measuring transducers or control valves) to a PC or management system.

- Supports online configuration and diagnostics for the connected HART-compatibles 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

HART multiplexer, 32-channel

EAC

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 female connector
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% (non-condensing)
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-chanel, including two 14-conductor flat-ribbon cable	**MACX MCR-S-MUX**	2865599	1

Accessories

Universal Termination Carrier for 16 single-channel MACX MCR isolators - With connection for multiplexer	**TC-D37SUB-AIO16-EX-PS-UNI**	2902932	1
Module carrier for 16 MINI Analog channels, power and feed-through module - With connection for MACX MCR-S-MUX HART multiplexer	**TC-D37SUB-AIO16-M-PS-UNI**	2902934	1
HART connection board	**MACX MCR-S-MUX-TB**	2308124	1
Interface converter	**PSM-ME-RS232/RS485-P**	2744416	1
Repeater, for electrical isolation and increased range	**PSM-ME-RS485/RS485-P**	2744429	1

Accessories

Programming adapters

The IFS-USB-PROG-ADAPTER programming adapter is used for configuring Phoenix Contact Interface modules with S-PORT interface.

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

Description	Ordering data		
	Type	Order No.	Pcs./Pkt.
Programming adapter for configuring modules with S-PORT interface	**IFS-USB-PROG-ADAPTER**	2811271	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 connection to PLUGTRAB PT			
For Ø 3-6 mm	**SSA 3-6**	2839295	10
For Ø 5-10 mm	**SSA 5-10**	2839512	10

Accessories

ME 6,2 TBUS... DIN rail connectors

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

Ordering data

Description	Type	Order No.	Pcs./Pkt.
DIN rail connector, for bridging the supply voltage, can be snapped onto 35 mm DIN rails in accordance with EN 60715, UL-approved			
Color: gray	**ME 6,2 TBUS-2 1,5/5-ST-3,81 GY**	2695439	10
Color: green	**ME 6,2 TBUS-2 1,5/5-ST-3,81 GN**	2869728	10

Accessories

Dummy – MACX MCR-EX-DUMMY-ISOLATOR

Dummy module with no function for connecting unused intrinsically safe signal cables, with plug-in connection terminal blocks.

Ordering data

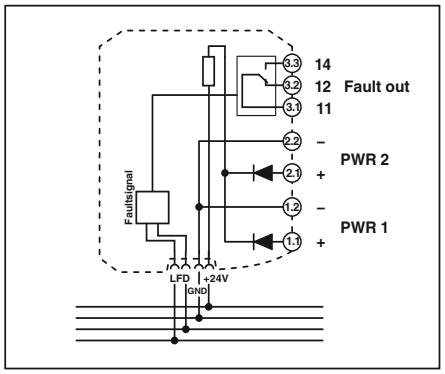
Description	Type	Order No.	Pcs./Pkt.
Dummy module with no function			
with screw connection	**MACX MCR-EX-DUMMY-ISOLATOR**	2904970	1
with Push-in connection	**MACX MCR-EX-DUMMY-ISOLATOR-SP**	2905846	1

Accessories

Power and error message modules

Power and fault signaling module for feeding the 24 V supply voltage to the DIN rail connectors and signaling line faults and power supply failures.

– One-time or redundant supply, decoupled from diode, protected against polarization
– Supply current up to 3.75 A
– Relay output (PDT) and flashing LED for error messages
– Error message in the event of a power supply failure or fuse fault
– Bus cable fault message for MACX MCR-...(2)NAM... devices connected via DIN rail connectors
– Replaceable fuse
– Installation in zone 2 permitted



Ex n

H
D W

Ex:
Housing width 17.5 mm

Technical data

Input data	
Voltage input signal	19.2 V DC ... 30 V DC (24 V DC -20%...+25%)
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)
Max. switching voltage	50 V AC (2 A) / 30 V DC (2 A) / 50 V DC (0.22 A)
General data	
Ambient temperature range	-20°C ... 60°C (any mounting position)
Humidity	5% ... 95% (non-condensing)
Fuse	5 A (replaceable), slow-blow 250 V AC
Status indication	1 x red LED (error) 2 x green LEDs (PWR1 and PWR2)
Inflammability class in accordance with UL 94	V0
Housing material	Polyamide (PA 6.6)
Dimensions W/H/D	17.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / 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 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC

Ordering data

Description	Type	Order No.	Pcs./Pkt.
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
Push-in connection	**MACX MCR-PTB-SP**	2924184	1

Accessories

Power and error message modules

Power and fault signaling module for supplying the 24 V supply voltage to the DIN rail connectors of the MACX Analog Termination Carriers and signaling line faults and energy supply failures.

– One-time or redundant supply, decoupled from diode, protected against polarization
– Feed-in current up to 2 A protected by Termination Carrier PCB
– Relay output (PDT) and flashing LED for error messages
– Error message in the event of a power supply failure or fuse fault
– Bus cable fault message for MACX MCR-...(2)NAM... devices connected via DIN rail connectors
– Installation in zone 2 possible

Ex:

Housing width 17.5 mm

Technical data

Input data	
Voltage input signal	19.2 V DC ... 30 V DC
Redundant supply	Yes, decoupled from diodes
Polarization and surge protection	Yes
Output data	
Maximum output signal	2 A (redundancy range)
Output voltage	Input voltage - 0.7 V
Switching output	Relay
Contact type	1 PDT
Contact material	Gold (Au)
Max. switching voltage	50 V AC/DC (33 V AC (2 A) / 50 V DC (0.3 A) / 30 V DC (2 A))
General data	
Ambient temperature range	-20°C ... 60°C (only on Termination Carrier)
Humidity	5% ... 95% (non-condensing)
Status indication	1 x red LED (error) 2 x green LEDs (PWR1 and PWR2)
Inflammability class in accordance with UL 94	V0
Housing material	Polyamide (PA 6.6)
Dimensions W/H/D	17.5 / 99 / 114.5 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
Push-in connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
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 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC

Ordering data

Description		Type	Order No.	Pcs./Pkt.
Power and fault signaling module without integrated fuse	Screw connection	**TC-MACX-MCR-PTB**	2904673	1

Accessories

Resistance circuits

Double-level terminal block with resistance circuit in accordance with NAMUR for line fault detection in the case of mechanical contacts

Important:

– For intrinsically safe circuits, only in combination with D-UKK 3/5 cover

		Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.
Double-level terminal block, with preassembled resistors				
with screw connection	gray	**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

Accessories

Test plugs

		Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.
Test plug, consisting of:				
Metal part for 2.3 mm Ø socket hole and	gray	**MPS-MT**	0201744	10
Insulating sleeve, for MPS metal part	red	**MPS-IH RD**	0201676	10
	black	**MPS-IH BK**	0201731	10
	gray	**MPS-IH GY**	0201728	10
	green	**MPS-IH GN**	0201702	10
	yellow	**MPS-IH YE**	0201692	10
	blue	**MPS-IH BU**	0201689	10
	white	**MPS-IH WH**	0201663	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 in accordance with customer specifications** For ordering details, see Catalog 3 or phoenixcontact.net/product.				
10-part, lettering field size: 11 x 9 mm	white	**UC-EMLP (11X9) CUS**	0824547	1

The Field Analog process indicators allow you to monitor and display analog and temperature signals as well as control them via digital and analog inputs and outputs.

Further advantages:

– 2-conductor sensors are powered by the integrated measuring transducer supply
– International use, thanks to UL and CSA approvals

Universal use

Field Analog process indicators are available for field and control panel installation. The universal inputs allow you to record current, voltage, RTDs, and TCs.

Everything at a glance

Real-time process values are easy to read on the five-digit backlit displays. The bar graph also provides you with a quick overview. You can recognize alarm statuses easily from a distance by their changing color.

Easy installation and startup

Thanks to the standardized housing dimensions and plug-in connection terminal blocks, the indicators are easy to install. The devices are easy to configure via the keyboard on the front or via FDT/DTM software.

Intrinsic safety zone 0, zone 20

Also for intrinsically safe circuits in the Ex area: versions with ATEX, CSA, and FM approval.

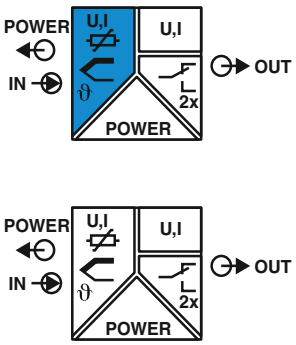
Distributed control cabinet installation

Measurement and control temperature transducer for resistance thermometers, thermocouples, resistance-type sensors, and voltage sensors are also available for control cabinet installation.

Head-mounted transducer

With head-mounted transducers you can record temperatures directly in the field and convert them into standard signals.

Multifunctional process indicators

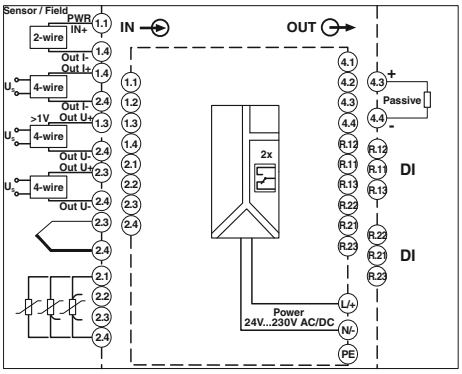


For installation in the control cabinet

- Multifunctional process indicator, in control panel component housing for monitoring and displaying analog measurement data
- Supply of 2-conductor sensors
- Safe 4-way isolation
- Configurable via software or hardware keyboard on the front
- Universal inputs for connection of current, voltage, RTDs, and TCs
- Limit value monitoring with two relay outputs
- Process signal transmission via analog output
- Display changes color in the event of an error

Notes:

The configuration software can be downloaded from the Internet (phoenixcontact.net/products).



Block diagram FA-MCR-D-TUI-UI-2REL-UP

Multifunctional process indicator for installation in the control cabinet

Housing width 96 mm

Technical data

Input data	U input	I input
Input signal	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 0 V ... 1 V 1 V ... 5 V -1 V ... 1 V -10 V ... 10 V -30 V ... 30 V -100 mV ... 100 mV	0 mA ... 20 mA +10% 4 mA ... 20 mA +10%
Input data	RTD	TC
Sensor types that can be used	Pt, Ni, Cu sensors	J, K, T, N, B, S, R, U. L, C, D
Connection method	2-, 3-, 4-conductor	-
Measuring rate	200 ms	200 ms
Temperature measuring range	-200°C ... 1,100°C (range depends on sensor type, adjustable)	-200°C ... 2,495°C (range depends on sensor type, adjustable)
Input resistance	-	10 Ω
Output data	U output	I output
Output signal	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 1 V ... 5 V	0 mA ... 20 mA 4 mA ... 20 mA
Display	7-segment LC display, with backlight, dot matrix for text/bar graph	
Number of the displayed positions	5	
Switching output	Transistor output, active	
	Open collector output	
Number of outputs	1	
Switching output	Relay output	
Contact type	2 PDT	
Max. switching voltage	30 V DC (3 A) / 230 V AC (3 A)	
Maximum switching current	3 A	
Minimum switching current	10 mA	
General data		
Supply voltage range	24 V DC ... 230 V DC	
Degree of protection	IP65 from the front	
Ambient temperature (operation)	-20°C ... 60°C	
Housing material	PC-GF10	
Dimensions W/H/D	96 / 48 / 151.8 mm	
Control panel cutout	92 x 45 mm	
Screw connection rigid / flexible / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16	
Conformance/approvals	FA MCR-D-TUI-UI-2REL-UP	FA MCR-EX-D-TUI-UI-2REL-UP
Conformance	CE-compliant	CE-compliant
ATEX	-	Ⓔx II (1) G [Ex ia Ga] IIC
UL, USA/Canada	UL 61010 Recognized	UL 61010 Recognized
FM approval	-	AIS, NI/I/2/ABCDEFG/T4
CSA	CSA GP	AIS, NI/I/2/ABCDEFG/T4
GL	GL EMC 1 C	EMC1 C

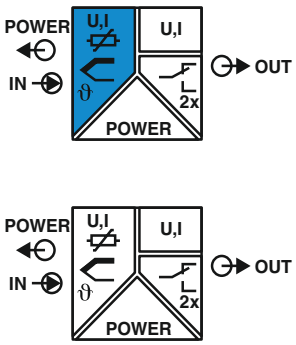
Ordering data

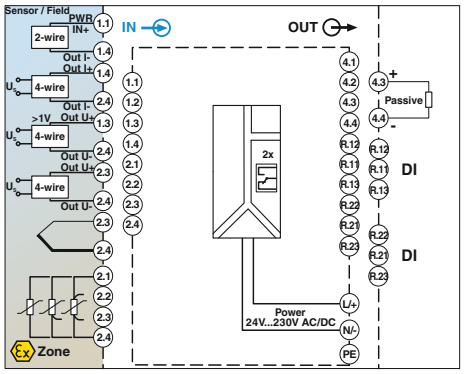
Description	Type	Order No.	Pcs./Pkt.
	FA MCR-EX-D-TUI-UI-2REL-UP	2907216	1
	FA MCR-D-TUI-UI-2REL-UP	2907064	1

Accessories

Programming adapter for configuring modules with T-PORT interface	**MCR-PAC-T-USB**	2309000	1
DIN rail adapters for displays	**FA MCR-D-RM**	1032996	1

Multifunctional process indicators





Block diagram FA MCR-EX-FD-TUI-UI-2REL-UP

Ex:

Housing width 199 mm

Field housing

- Multifunctional process indicator, in control panel component housing for monitoring and displaying analog measurement data
- Supply of 2-conductor sensors
- Safe 4-way isolation
- Configurable via software or hardware keyboard on the front
- Universal inputs for connection of current, voltage, RTDs, and TCs
- Limit value monitoring with two relay outputs
- Process signal transmission via analog output
- Display changes color in the event of an error

Technical data

Input data	U input	I input
Input signal	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 0 V ... 1 V 1 V ... 5 V -1 V ... 1 V -10 V ... 10 V -30 V ... 30 V -100 mV ... 100 mV	0 mA ... 20 mA +10% 4 mA ... 20 mA +10%
Input data	RTD	TC
Sensor types that can be used	Pt, Ni, Cu sensors	J, K, T, N, B, S, R, U. L, C, D
Connection method	2-, 3-, 4-conductor	-
Measuring rate	200 ms	200 ms
Temperature measuring range	-200°C ... 1,100°C (range depends on sensor type, adjustable)	-200°C ... 2,495°C (range depends on sensor type, adjustable)
Input resistance	-	10 Ω
Output data	U output	I output
Output signal	0 V ... 10 V 2 V ... 10 V 0 V ... 5 V 1 V ... 5 V	0 mA ... 20 mA 4 mA ... 20 mA
Display	7-segment LC display, with backlight, dot matrix for text/bar graph	
Number of the displayed positions	5	
Switching output	Transistor output, active	
	Open collector output	
Number of outputs	1	
Switching output	Relay output	
Contact type	2 PDT	
Max. switching voltage	30 V DC (3 A) / 230 V AC (3 A)	
Maximum switching current	3 A	
Minimum switching current	10 mA	
General data		
Supply voltage range	24 V DC ... 230 V DC	
Degree of protection	IP67	
Ambient temperature (operation)	-40°C ... 50°C (The readability of the display is no longer guaranteed at temperatures below -30°C (-22°F).)	
Housing material	PBT GF30	
Dimensions W/H/D	199 / 160 / 96 mm	
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance/approvals	FA MCR-EX-FD-TUI-UI-2REL-UP	FA MCR-FD-TUI-UI-2REL-UP
Conformance	CE-compliant	CE-compliant
ATEX	II (1) G [Ex ia Ga] IIC	-
UL, USA/Canada	UL 61010 Recognized	UL 61010 Recognized
FM approval	AIS / I / 1 / ABCDEFG	-
CSA	Associated Apparatus	CSA GP

Ordering data

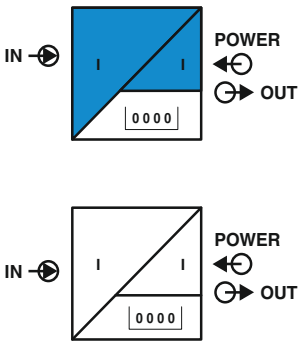
Description	Type	Order No.	Pcs./Pkt.
	FA MCR-EX-FD-TUI-UI-2REL-UP	2907781	1
	FA MCR-FD-TUI-UI-2REL-UP	2907780	1

Accessories

Programming adapter for configuring modules with T-PORT interface	**MCR-PAC-T-USB**	2309000	1
Pipe or wall mounting set, for use with multi-functional process indicator in field housing	**FA MCR-FD-PM**	2908739	1

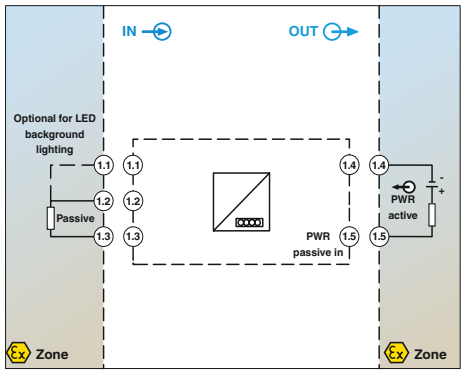
Loop-powered process indicators

new



For installation in the control cabinet

- Loop-powered
- Display of 4 to 20 mA or HART signals
- Low voltage drop
- 5-digit 7-segment display
- Display value can be scaled
- Low installation depth
- Configurable via front keyboard
- SIL-impact-free in accordance with EN61508
- Can be installed in zone 1



Block diagram FA MCR-EX-DS-I-I-OLP

Loop-powered process indicator with HART communication for installation in the control cabinet

Ex:

Housing width 96 mm

Technical data

Input data	I	HART
Input signal	4 mA ... 20 mA	up to 4x HART signals
Maximum input signal	200 mA	-
Voltage drop	≤1 V	≤1.9 V
	≤3.9 V (with display lighting)	≤4.8 V (with display lighting)
Input impedance	Approx. 50 Ω	R_x = 40 Ω / C_x = 2.3 nF
Output data		
Display	7-segment LC display, with backlight, dot matrix for text/bar graph	
Number of the displayed positions	5	
General data		
Supply voltage range	Loop-powered, no external supply necessary	
Resolution A/D	>13 bit	
Degree of protection	IP65 (front) IP20 (on the rear)	
Ambient temperature (operation)	-40°C ... 60°C	
Housing material	Aluminum / polycarbonate	
Dimensions W/H/D	96 / 48 / 41.5 mm	
Control panel cutout	92 x 45 mm	
Screw connection rigid / flexible / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16	
Conformance/approvals		
Conformance	CE-compliant	CE-compliant
ATEX	II 2G Ex ib IIC T6 Gb	-
UL, USA/Canada	UL 61010 Listed	UL 61010 Listed
FM approval	-	-
CSA	-	-

Ordering data

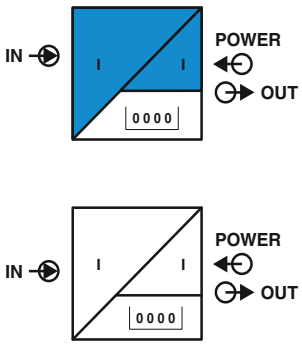
Description	Type	Order No.	Pcs./Pkt.
Output loop-powered process indicator inside the control panel housing for representing current or HART signals			
	FA MCR-EX-DS-I-I-OLP	2908800	1
	FA MCR-DS-I-I-OLP	2908781	1

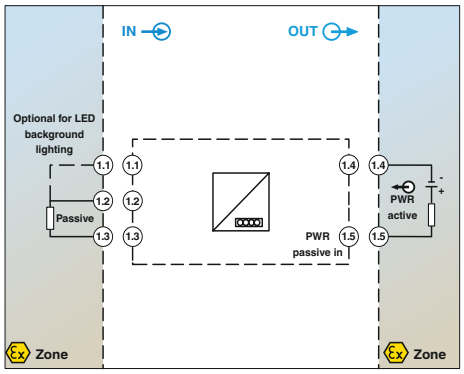
Accessories

DIN rail adapters for displays	**FA MCR-D-RM**	1032996	1

Loop-powered process indicators

new





FA MCR-EX-FDS-I-I-OLP

Ex:
Housing width 131 mm

Field housing

- Loop-powered
- Display of 4 to 20 mA or HART signals
- Low voltage drop
- 5-digit 7-segment display
- Display value can be scaled
- Low installation depth
- Configurable via front keyboard
- SIL-impact-free in accordance with EN61508
- Can be installed in zone 1

Technical data

Input data		
Input signal	I	HART
Maximum input signal	4 mA ... 20 mA	up to 4x HART signals
Voltage drop	200 mA	-
	≤1 V	≤1.9 V
	≤3.9 V (with display lighting)	≤4.8 V (with display lighting)
Input impedance	Approx. 50 Ω	R_x = 40 Ω / C_x = 2.3 nF
Output data		
Display	7-segment LC display, with backlight, dot matrix for text/bar graph	
Number of the displayed positions	5	
General data		
Supply voltage range	Loop-powered, no external supply necessary	
Resolution A/D	>13 bit	
Degree of protection	IP66/IP67 NEMA 4X	
Ambient temperature (operation)	-40°C ... 60°C	
Housing material	Aluminum	
Dimensions W/H/D	131 / 81.5 / 55.5 mm	
Screw connection rigid / flexible / AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16	
Conformance/approvals		
Conformance	CE-compliant	CE-compliant
ATEX	II 2G Ex ib IIC T6 Gb	-
UL, USA/Canada	UL 61010 Listed	UL 61010 Listed
FM approval	-	-
CSA	-	-

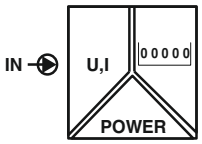
Ordering data

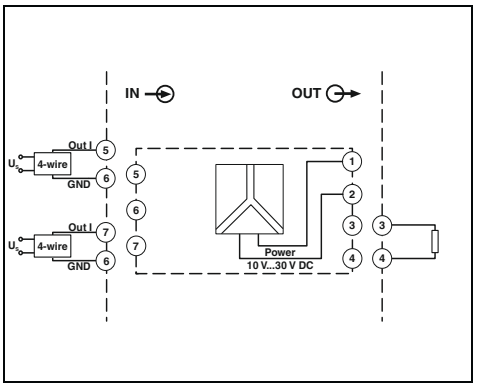
Description	Type	Order No.	Pcs./Pkt.
Output loop-powered process indicator inside field housing for representing current or HART signals	**FA MCR-EX-FDS-I-I-OLP**	2908801	1
	FA MCR-FDS-I-I-OLP	2908782	1

Accessories

Pipe or wall mounting set, for use with output loop-powered process indicator in field housing	**FA MCR-FDS-PM**	2908783	1

Displays
Standard signals





Block diagram MCR-SL-S-U-I

For analog standard signals, configurable

For installation in the control cabinet

- For 0 to 10 V and 0(4) to 20 mA standard analog signals
- Configurable
- 5 positions displayed
- 8 mm LED, 7-segment
- Galvanically isolated
- Minimum/maximum value storage
- Latch/hold function for storing the display value
- Display 48 x 24 mm
- Totalizing counter

Housing width 48 mm

Technical data

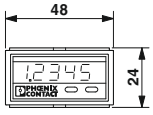
Input data		U input	I input
Input signal		0 ... 10 V / 2 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Maximum input signal		30 V DC	50 mA
Input resistance		>1 MΩ	Approx. 100 Ω with 5 mA / approx. 70 Ω with 20 mA
Resolution		1 mV	2 µA
Measuring rate		$0.1s^{-1}$ / $0.5s^{-1}$	
Input latch signal		Display stop	
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 range		10 V DC ... 30 V DC	
Current consumption		50 mA	
Mass storage		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)		-20°C ... 65°C	
Housing material		Macrolon 2405	
Dimensions W/H/D		48 / 24 / 68 mm	
Control panel cutout		22(+0.6)x45(+0.8) mm	
Screw connection rigid / flexible / AWG		0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16	
Conformance/approvals			
Conformance		CE-compliant	
UL, USA/Canada		UL 863	

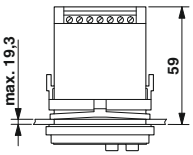
Ordering data

Description	Type	Order No.	Pcs./Pkt.
MCR process display, for measuring and displaying standard signals	**MCR-SL-D-U-I**	2864011	1

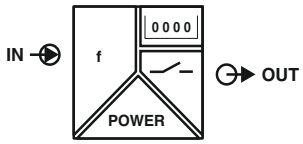
Accessories

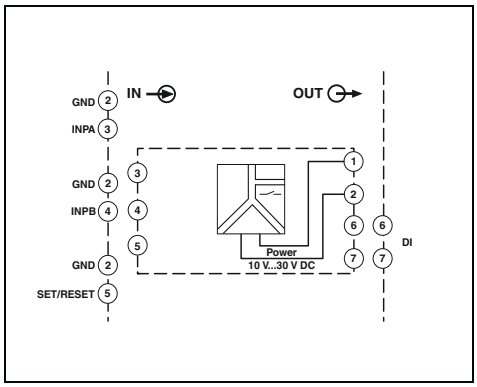
MCR DIN rail adapter for digital displays in a 24 x 48 mm housing	**MCR-SL-D-RA**	2810081	1





Displays
Frequency





Block diagram MCR-SL-D-FIT

Programmable digital display for frequencies, pulses and times

cULus EAC

Housing width 48 mm

For installation in the control cabinet

– For frequency signals up to max. 60 kHz
– Configurable
– 6 positions displayed
– LED 8 mm, 7 segment
– 48 x 24 mm display

Technical data

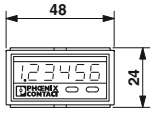
Input data		
Maximum input signal		60 kHz
Input resistance		10 kΩ
Switching level	1 signal (“H”)	4 V DC ... 30 V DC
	0 signal (“L”)	0 V DC ... 2 V DC
Output data		
Display		7-segment LED; 8 mm; red
Number of the displayed positions		6
Switching output		1 NPN optocoupler
Max. switching voltage		30 V DC
Maximum switching current		10 mA
General data		
Supply voltage range		10 V DC ... 30 V DC
Current consumption		max. 40 mA
Mass storage		EEPROM 1 mil. memory cycles or 10 years
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		22(+0.6)x45(+0.8) mm
Screw connection rigid / flexible / AWG		0.14 ... 1 mm² / 0.14 ... 1.5 mm² / 26 - 16
Conformance/approvals		
Conformance		CE-compliant
UL, USA/Canada		UL 863

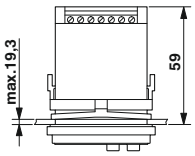
Ordering data

Description	Type	Order No.	Pcs./Pkt.
MCR digital display, for measurement and display of frequencies, pulses and times	**MCR-SL-D-FIT**	2864024	1

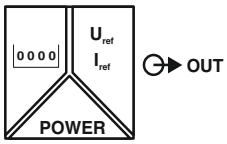
Accessories

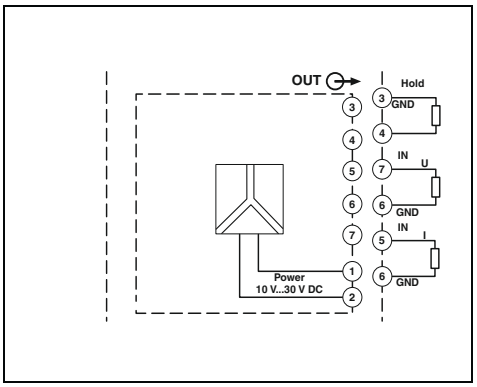
MCR DIN rail adapter for digital displays in a 24 x 48 mm housing	**MCR-SL-D-RA**	2810081	1





Displays
Setpoint adjusters





Block diagram MCR-SL-D-SPA-UI

With manual and automatic ramp function

For installation in the control cabinet

- Manual setpoint definition with step width setting
- Manual setpoint definition via direct input
- Automatic setpoint definition with hold function and 20 support points
- Flexible, adjustable signal ranges of 0 to 12 V or 0 to 24 mA
- Data backup in case of a power failure
- Display value configuration
- 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 range	10 V DC ... 30 V DC	
Power consumption	1 W (with 24 mA/12 V)	
Maximum transmission error	<0.2% ((full-scale) at rated voltage)	
Test voltage output/power supply	500 V AC (50 Hz, 1 min.)	
Degree of protection	IP65 from the front	
Ambient temperature (operation)	-20°C ... 65°C	
Housing material	Macrolon 2405	
Dimensions W/H/D	48 / 24 / 68 mm	
Control panel cutout	45(+0.6)x22.2(+0.3) mm	
Screw connection rigid / flexible / AWG	0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16	
Conformance/approvals		
Conformance	CE-compliant	
UL, USA/Canada	UL 863	

Ordering data

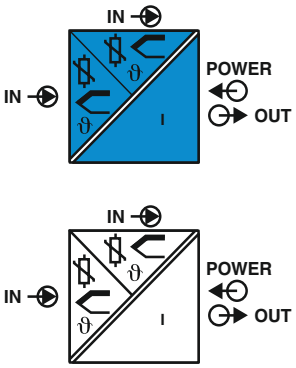
Description	Type	Order No.	Pcs./Pkt.
MCR digital setpoint encoder, for presetting current and voltage signals	**MCR-SL-D-SPA-UI**	2710314	1

Accessories

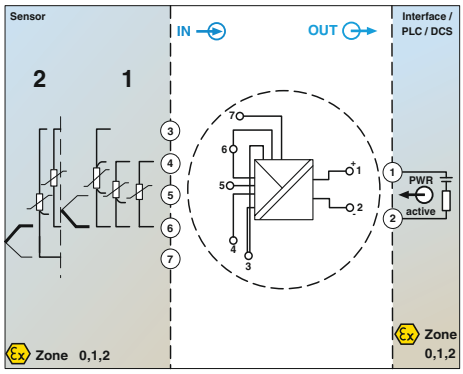
MCR DIN rail adapter for digital displays in a 24 x 48 mm housing	**MCR-SL-D-RA**	2810081	1

Temperature, temperature head-mounted transducers

new



- Output loop-powered temperature head-mounted transducers
- 2 universal inputs for RTD, TC, resistance-type sensors and voltage sensors (mV), Ex ia IIC
- 4 to 20 mA output
- HART communication
- Freely configurable
- SIL 2/3
- For mounting in the connecting head, form B
- Can be installed in zone 0



Block diagram for FA MCR-EX-HT-TS-I-OLP-PT

Loop-powered temperature head-mounted transducer

Functional Safety

Ex:

Technical data

Input data		
Resistance thermometers		Pt, Ni, Cu sensors: 2-, 3-, 4-conductor: -
Thermocouple sensors		A, B, C, D, E, J, K, L, N, R, S, T, U
Resistor		10 Ω ... 2,000 Ω (minimum measuring span: 10 Ω)
Input voltage range		-20 mV ... 100 mV
Output data		
Output signal		4 ... 20 mA, HART / 20 ... 4 mA
Maximum output signal		23 mA
Load R_B		(U_L - 11 V) / 0.023 A
Switch-on delay		Approx. 10 s (HART) Approx. 28 s (measured value)
General data		
Supply voltage range		11 V DC ... 42 V DC
Current consumption		23.5 mA
Step response (0 - 99%)		0.8 s (TC)
Electrical isolation		
	Input/output	2 kV AC
Degree of protection		IP33 (upon installation in field housing IP66/67, NEMA 4X)
Ambient temperature (operation)		-40°C ... 85°C
Screw connection rigid / flexible / AWG		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Conformance/approvals		
Conformance		CE-compliant
ATEX		II 1G Ex ia IIC T6...T4 Ga
UL, USA/Canada		UL 61010 Recognized
FM approval		NI / Class I / Div. 1, 2 / Group ABCD T6/T5/T4
CSA		Exia / Class I / Group ABCD T6/T5/T4
Conformance		CE-compliant
		II 3G Ex nA IIC T6...T4 Gc
		UL 61010 Recognized
		NI / Class I / Div. 1, 2 / Group ABCD T6/T5/T4
		NI, Class I, Div. 2, Groups A, B, C, D

Ordering data

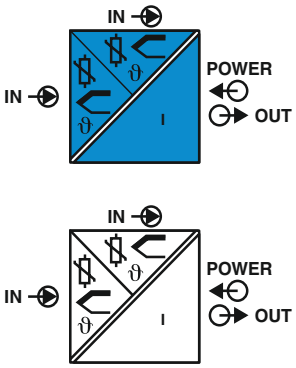
Description	Type	Order No.	Pcs./Pkt.
Output loop-powered temperature transducer, for RTD, TC, resistance-type sensors and voltage sensors (mV)			
	FA MCR-EX-HT-TS-I-OLP-PT	2908743	1
	FA MCR-HT-TS-I-OLP-PT	2908742	1

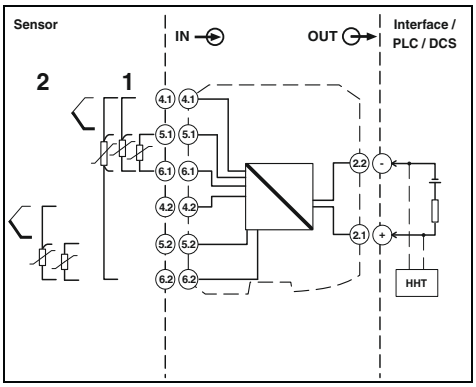
Accessories

Programming adapter for configuring modules with T-PORT interface	**MCR-PAC-T-USB**	2309000	1
Display unit for plugging directly into the FA MCR-... head-mounted transducer	**FA MCR-HT-D**	2908735	1
Adapter for control cabinet installation of head-mounted transducers	**MCR-DIN-RAIL-ADAPTER HT**	2864671	1
Field housing for head-mounted transducers, with display window and two cable entries	**FA MCR-HT-FH**	2908736	1
Wall fastening for FA MCR-HT-FH field housing	**FA MCR-HT-FH-WM**	2908737	1
Adapter cable, 1 m long, with USB connection, for HART configuration	**GW HART USB MODEM**	1003824	1

Temperature, temperature transducers

new





Output loop-powered temperature transducer

- Loop-powered temperature transducer
- 2 universal inputs for RTD, TC, resistance-type sensors and voltage sensors (mV), Ex ia IIC
- 4 to 20 mA output
- HART communication
- Freely configurable
- SIL 2/3
- For DIN rail mounting
- Can be installed in zone 0

Functional Safety
Ex:
Housing width 12.5 mm

Technical data

Input data		
Input signal (can be configured using DIP switches)	Pt, Ni, Cu sensors: 2-, 3-, 4-conductor: -	
Input signal (can be configured using DIP switches)	A, B, C, D, E, J, K, L, N, R, S, T, U	
Temperature range	-250°C ... 2,500°C (range depending on the sensor type)	
Linear resistance measuring range	10 Ω ... 2,000 Ω (minimum measuring span: 10 Ω)	
Input voltage range	-20 mV ... 100 mV	
Output data		
Output signal	4 ... 20 mA / 20 ... 4 mA	
Maximum output signal	23 mA	
Load R_B	(U_L - 11 V) / 0.023 A	
General data		
Supply voltage range	12 V DC ... 42 V DC	
Current consumption	≤23 mA	
Step response (0 - 99%)	0.8 s (TC)	
Electrical isolation of input/output	2 kV AC	
Ambient temperature (operation)	-40°C ... 85°C	
Altitude	≤4,000 m (above sea level)	
Dimensions W/H/D	12.5 / 99 / 114.5 mm	
Push-in connection rigid / flexible / AWG	0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16	
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance/approvals		
Conformance	CE-compliant	CE-compliant
ATEX	II 3G Ex nA IIC T6...T4 Gc	II 3G Ex nA IIC T6...T4 Gc
UL, USA/Canada	UL 61010 Recognized	UL 61010 Recognized
FM approval	NI, Class I, Div. 2, Groups A, B, C, D	NI, Class I, Div. 2, Groups A, B, C, D
CSA	NI / Class I / Div. 2 / ABCD T6/T5/T4	NI / Class I / Div. 2 / ABCD T6/T5/T4

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Output loop-powered temperature transducer, for RTD, TC, resistance-type sensors and voltage sensors (mV)			
Screw connection	**MACX MCR-TS-I-OLP**	2908662	1
Push-in connection	**MACX MCR-TS-I-OLP-SP**	2908664	1
Screw connection	**MACX MCR-TS-I-OLP-C**	1012249	1
Screw connection	**MACX MCR-EX-TS-I-OLP**	2908660	1
Push-in connection	**MACX MCR-EX-TS-I-OLP-SP**	2908661	1

Accessories

Programming adapter for configuring modules with T-PORT interface	**MCR-PAC-T-USB**	2309000	1

Order key for MACX MCR-TS-I-OLP-C output loop-powered temperature transducers (standard configuration entered as an example)

Order No.	Safety Integrity Level	Input Measuring unit	Sensor type	Connection technology	Measuring range Start	End	Error	Output
1012249	**ON**	**C**	**PT100**	**3**	**-200**	**850**	**MIN**	**3.58**
1012249 ≙ MACX MCR-TS-I-OLP-C	ON ≙ SIL ON OFF ≙ SIL OFF	C ≙ Celsius F ≙ Fahrenheit O ≙ Ω V ≙ Millivolts K ≙ Kelvin R ≙ Rankine	PT100 ≙ PT100 IEC 751 PT200 ≙ PT200 IEC 751 PT500 ≙ PT500 IEC 751 PT1000 ≙ PT1000 IEC 751 PT100J ≙ PT100 JIS C1604 NI100 ≙ NI100 DIN 43760 NI120 ≙ NI120 DIN 43760 NI100G ≙ NI100 OIML/GOST 6651-09 NI120G ≙ NI120 OIML/GOST 6651-09 PT50G ≙ PT50 G GOST 6651 (α=0.00391) PT100G ≙ PT100 G GOST 6651 (α=0.00391) CU50 ≙ CU 50 GOST (α=0.00428) CU50G ≙ CU 50 GOST (α=0.00426) CU100 ≙ CU 100 GOST (α=0.00428) A1G ≙ A-1 GOST 8.585-2001 B ≙ B IEC584-1 (Pt30Rh-Pt6Rh) C ≙ C ASTM E988 DA ≙ DA ASTM E988(2002) E ≙ E IEC584-1 (NiCr-CuNi) J ≙ J IEC584-1 (Fe-CuNi) K ≙ K IEC584-1 (NiCr-Ni) N ≙ N IEC 584-1 (NiCrSi-NiSi) R ≙ R IEC 584-1 (Pt13Rh-Pt) S ≙ S IEC 584-1 (Pt10Rh-Pt) T ≙ T IEC 584-1 (Cu-CuNi) L ≙ L DIN 43760 (Fe-CuNi) LG ≙ LG GOST 8.585-2001 U ≙ U DIN 43760 (Cu-CuNi) RES13 ≙ PT100 IEC751 RES14 ≙ PT100 IEC751 V11 ≙ PT100 IEC751	2 ≙ 2-conductor 3 ≙ 3-conductor 4 ≙ 4-conductor	Freely selectable between -250°C ... 2,500°C (measuring range limits depend on sensor type) Measurement range signal span of at least 10°K for RTD sensors/50°K for TC sensors	Freely selectable between -250°C ... 2,500°C (measuring range limits depend on sensor type)	MIN ≙ 3.58 mA MAX ≙ freely selectable between 21.5...23 mA	3.58 ≙ 3.58 mA Freely selectable between 21.5 ... 23 mA

Accessories for head-mounted transducers

– 2 cable entries
– Aluminum with polyester coating
– For use with head-mounted transducers
– Display window in cover

Field housing for head-mounted transducers

Technical data

General data	
Housing material	Aluminum

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Field housing for head-mounted transducers, with display window and two cable entries	**FA MCR-HT-FH**	2908736	1

Accessories

Wall fastening for FA MCR-HT-FH field housing	**FA MCR-HT-FH-WM**	2908737	1
Pipe fastening for FA MCR-HT-FH field housing	**FA MCR-HT-FH-PM**	2908738	1

Accessories for head-mounted transducers

– For snapping onto the DIN rail
– For control cabinet installation of head-mounted transducers
– Display unit for plugging directly into FA MCR-... head-mounted transducers
– Separately configurable
– Direct process value readout

Display unit for plugging directly into head-mounted transducers

Adapter for DIN rail mounting of head-mounted transducers

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Display unit for plugging directly into the FA MCR-... head-mounted transducer	**FA MCR-HT-D**	2908735	1

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Adapter for control cabinet installation of head-mounted transducers	**MCR-DIN-RAIL-ADAPTER HT**	2864671	1

Accessories for displays

new

– HART® communication resistor, 250 Ω, in combination with digital display FA MCR-(EX)-(F)DS-I-I-OLP
– DIN rail adapter for mounting on a 35 mm DIN rail in combination with digital display FA MCR-(EX)-D-TUI-UI-2REL-UP, FA MCR-(-EX)-(F)DS-I-I-OLP
See web site for more.

HART communication resistor

new

DIN rail adapter for displays

Description	Ordering data			Ordering data		
	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
HART communication resistor	FA MCR-FDS-R250	2908802	1			
DIN rail adapters for displays				FA MCR-D-RM	1032996	1

Accessories
Programming adapters

– Programming adapters with USB and T port interface, 2.4 m for programming FA MCR-..., MCR-...-LP-..., and MCR-...-HT-... modules
– HART USB modem for configuring MACX MCR-TS-I-OLP-..., MACX MCR-EX-TS-I-OLP-..., FA MCR-HT-TS-I-OLP-... and FA MCR-EX-HT-TS-I-OLP-... using the HART protocol

Programming adapter

HART USB MODEM

Description	Ordering data			Ordering data		
	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Programming adapter for configuring modules with T-PORT interface	MCR-PAC-T-USB	2309000	1			
HART USB modem, for configuring modules with HART communication				GW HART USB MODEM	1003824	1

EMpro
U12 400.0V
U23 400.0V
U31 400.0V
1 2 3 4

Monitoring

Your fastest route to energy measurement

The EMpro energy measuring devices can be configured and integrated into the network within minutes. Reduce your wiring and configuration effort and benefit from smart web server functions.

Convert and measure currents

For a new installation or for retrofitting: Our PACT current transformers offer a comprehensive product range for converting high alternating currents into low secondary currents. Current and voltage transducers convert currents or voltages into a standard analog signal.

Utilize solar electricity efficiently

SOLARCHECK PV string monitoring gives you reliable information about your photovoltaic system's power.

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.

Perfect timing

ETD timer relays from Phoenix Contact are the cost-effective alternative to a PLC for easy time control.

Fast error detection

EMG display modules simplify troubleshooting and provide help for monitoring control processes. EMG lamp testing modules can be used to test lamps individually or centrally.

Protection and decoupling

Protect your system against polarity reversal and decouple messages in the fault reporting system with EMG diode modules.

Product range overview

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Product overview

Measuring power and energy

EMpro energy meters for front-panel installation
Page 202

EMpro energy meters for DIN rail mounting
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EMpro energy measuring devices without display for DIN rail mounting
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Three-phase energy meters
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Current transformers

PACT bus-bar current transformers
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PACT window-type current transformers
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PACT winding current transformers
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Mounting accessories, shock protection
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MCR current protectors for AC currents, sinusoidal up to 16 A
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Voltage measurement

MCR voltage transducers for AC- and DC voltages up to 660 V
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Accessories
Configuration software and USB adapter cable
Page 239

Solar system monitoring

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Photovoltaic string monitoring
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Monitoring relays

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Compact monitoring relays
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Timer relays

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Ultra-narrow timer relays
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Current measurement

PACT RCP... current transformers for retrofitting
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PACT-RCP...-UV current transformers for retrofitting with UV protection
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MCR current transducers for AC/DC and distorted currents
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MCR current transducers for sinusoidal and distorted AC currents
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Passive, up to 5 A
Page 236

Special function modules

EMG
Diode modules, lamp testing modules, display modules
Page 266

Always the right product

Whether it's complex energy measurement or easy cost center billing, the wide range of multifunctional energy measuring device and MID-certified energy meter products available can cover every application.
In addition, a large selection of current transformers is also available, including for retrofits. All products meet high demands for convenient installation.

Uniquely convenient handling

Set up the communications interface, select the power network type, configure the measuring input: the EMpro energy measuring devices can be configured and integrated into the network in minutes. Save on wiring and configuration effort thanks to direct connection of manufacturer-independent current sensors. Digital services make analyzing and processing data easy.

Fast integration

Thanks to future-oriented industrial communication technology from Phoenix Contact, you can increase the degree of automation of your systems and easily integrate your energy data into higher-level control and management systems. Digitally processed data and global access provide you with a high degree of availability and transparency.

Only three steps needed for energy measurement

The user-controlled installation wizard enables intuitive configuration and quick startup. Benefit from the fast configuration baseline with only three steps:

– Set up the communication interface
– Select the power grid type
– Configure the current and voltage measuring input

Reduce wiring and configuration effort

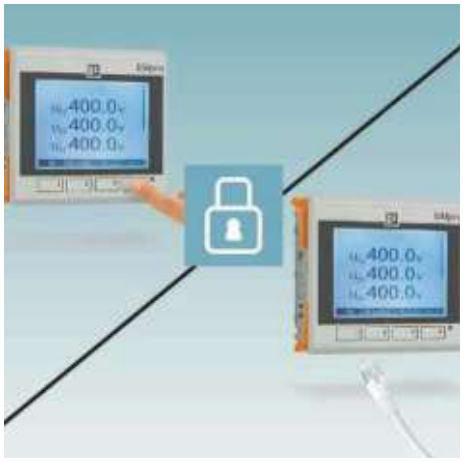
Using versions with Rogowski measuring input will save you a lot of time when it comes to wiring and configuration:

You can directly connect every currently available Rogowski coil, regardless of manufacturer. Since the device can process the output signal of the coil directly, there is no need for the usual measuring transducer.

Simple service functions

Whenever service and support is required, you can export the current configuration data and the historically recorded list of errors and messages. This gives you some quick initial insights into the problem and can save on expensive service assignments.

Errors and alarm statuses that occur in the system are quickly and clearly recognizable on site, thanks to a color change on the display.



Increased data security

Protect your energy data from unauthorized access: shutting down operating elements at the device will prevent tampering on site.

By deactivating the interfaces, you avoid unwanted access to your energy data or unintentional changes to the configuration.

Flexible network connection

You can integrate these energy measuring devices into the most common industrial network structures and fieldbus systems. This means that the measured values can also be made available at the controller or in the control center for further processing. Each device additionally has a fixed Modbus/TCP interface on board.

Cost-center-precise billing

MID energy meters are used for billing cost centers. The measuring devices record the most important electrical parameters and make the data available to higher-level control systems using common communication interfaces.

DC current measurement up to 80 A without current transformer or measurement via current transformer.

Energy measuring devices

Easy startup, monitoring, and servicing with the web server

The integrated user-guided web server simplifies startup, monitoring, and servicing.

Benefit from a variety of smart functions, such as:

- Intuitive configuration and startup
- Fast data duplication to multiple devices
- Easy inversion via web server in the event of the polarity reversal of current inputs
- Service-friendly recording and export of configuration data, and signal and error lists
- Secure remote deactivation of hardware operating elements and interfaces
- Easy monitoring of system states, thanks to built-in automatic operations and logic functions

Thanks to the simple structure of the web server, the entire range of functions is available at your fingertips, even in the case of complex applications.

Step 1: Set up the communication interface

Whether using DHCP or a static IP address, set up your communication interface in accordance with your application.

Step 2: Select the power grid type

Select the ideal grid type for your application from a variety of power grid types (2-, 3- or 4-conductor versions).

Step 3: Configure the current and voltage measuring input

You can create the basis for correct current and voltage measurements by configuring your upstream current sensors (or voltage transformers, as applicable).

Mean-value generation

Individually create up to 8 mean-value generations for your system with all current parameters with complete flexibility.

2+2 multiple tariff meter

Take advantage of the wide range of tariff meter options. Two tariff meters can be configured via the digital input. Two additional tariff meters can be configured by manual input or via Webserver.

Duplicate configuration files

Simply send the configuration file to other energy measuring devices in the same network using Webserver.

Firmware updates

Firmware updates allow you to be sure that your device is up to date at all times. You can also do individual specific updates.

Digital input with versatile functionality

Simply use the digital input with multiple functions that you can easily assign to the device during configuration.

Digital output with logic function capability

You can use the integrated logic function capability to configure individual behavior patterns with limit values at the digital output.

Energy meters

new

For front-panel installation

EMpro energy measuring devices are capable of detecting, monitoring, and analyzing any electrical parameters and forwarding them to higher-level systems.

Wide range of installation versions
– Front panel devices
– DIN rail devices with display
– DIN rail devices without display

Voltage measurement
– Direct up to 690 V AC or via transformer/transducer up to 2,000,000 V AC

Current measurement
– Via external current transformer up to 20,000 A, secondary adjustment 1/5 A

You will find the right accessories for measuring current using external current transformers starting on page 226.

– Via external directly connectable Rogowski coils

You will find the right accessories for measuring current using Rogowski coils starting on page 219.

Data logging
– Up to 8 mean values over a period of 90 days (15 min)
– Adjustable interval

Communication
– Modbus/TCP integrated
– Also available with Modbus/RTU, PROFINET, or EtherNet/IP™

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		
Input voltage range		
direct	18 V AC ... 690 V AC (Phase/Phase)	
direct	11 V AC ... 400 V AC (Phase/neutral conductor)	
via external transformers	60 V AC ... 2,000,000 V AC (primary)	
via external transformers	60 V AC ... 400 V AC (secondary)	
Accuracy	0.2%	
Current measuring input I1, I2, I3	EEM-Mxxx0	EEM-Mxxx1
Input current range	1 A (secondary) 5 A (secondary)	4,000 A
Overload capacity	6 A (I_{max})	I_{max}
Response threshold	10 mA (1 A) 50 mA (5 A)	5 A
Accuracy	0.2%	<1%
Input measuring range voltage		500 µV ... 400 mV (1,000 A)
Power measurement	EEM-Mxxx0	EEM-Mxxx1
Accuracy	0.5%	1%
Active energy (IEC 62053-22)	Class 0.5 S	Class 1
Reactive energy (IEC 62053-23)	Class 2	Class 2
Digital input in accordance with IEC/EN 61131-2 (type 3)		
Voltage input signal	24 V DC 0 V DC ... 30 V DC	
Digital output in accordance with IEC/EN 61131-2 (type 3)		
Voltage output signal	24 V DC	
Current output signal	2 mA ... 15 mA	
Display		
Type	LCD display, two-color, backlit	
Data update rate	Adjustable: 500 ms, 1 s, 1.5 s	
General data	EEM-Mxxx0	EEM-Mxxx1
Supply voltage range	100 V AC ... 400 V AC ±20% 150 V DC ... 250 V DC (± 20%)	100 V AC ... 400 V AC ±20% 150 V DC ... 250 V DC (± 20%)
Degree of protection	IP52 (display) IP30 (housing)	
Ambient temperature (operation)	-10°C ... 55°C	
Dimensions W/H/D	96 / 96 / 58 mm	
Connection cross section (solid / stranded / AWG)	0.2 ... 6 mm² / 0.2 ... 4 mm² / 24 - 10	
Conformance/approvals		
Conformance	CE-compliant	

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Energy measuring device, external current transformer required			
- Modbus/RTU (RS-485)	**EEM-MA770-R**	2907944	1
- Modbus/TCP (Ethernet)	**EEM-MA770**	2907945	1
- PROFINET (RJ45)	**EEM-MA770-PN**	2907946	1
- EtherNet/IP™ (RJ45)	**EEM-MA770-EIP**	2907953	1
Energy measuring device, external Rogowski coil required			
- Modbus/RTU (RS-485)	**EEM-MA771-R**	2908285	1
- Modbus/TCP (Ethernet)	**EEM-MA771**	2908286	1
- PROFINET (RJ45)	**EEM-MA771-PN**	2908301	1
- EtherNet/IP™ (RJ45)	**EEM-MA771-EIP**	2908302	1

new

For mounting on a DIN rail

new

For mounting on a DIN rail, without display

Technical data

True r.m.s. value measurement up to 63rd harmonic AC sine (50/60 Hz)		
18 V AC ... 690 V AC (Phase/Phase) 11 V AC ... 400 V AC (Phase/neutral conductor) 60 V AC ... 2,000,000 V AC (primary) 60 V AC ... 400 V AC (secondary) 0.2%		
EEM-Mxxx0	EEM-Mxxx1	
1 A (secondary) 5 A (secondary) 6 A (I_{max}) 10 mA (1 A) 50 mA (5 A) 0.2%	4,000 A I_{max} 5 A <1% 500 µV ... 400 mV (1,000 A)	
EEM-Mxxx0	EEM-Mxxx1	
0.5% Class 0.5 S Class 2	1% Class 1 Class 2	
24 V DC 0 V DC ... 30 V DC		
24 V DC 2 mA ... 15 mA		
LCD display, two-color, backlit Adjustable: 500 ms, 1 s, 1.5 s		
EEM-Mxxx0	EEM-Mxxx1	
100 V AC ... 230 V AC ±20% 150 V DC ... 250 V DC (± 20%)	100 V AC ... 230 V AC ±20% 150 V DC ... 250 V DC (± 20%)	
IP52 (display) IP30 (housing) -10°C ... 55°C 90 / 80 / 64 mm 0.2 ... 6 mm² / 0.2 ... 4 mm² / 24 - 10		
CE-compliant		

Technical data

True r.m.s. value measurement up to 63rd harmonic AC sine (50/60 Hz)		
18 V AC ... 690 V AC (Phase/Phase) 11 V AC ... 400 V AC (Phase/neutral conductor) 60 V AC ... 2,000,000 V AC (primary) 60 V AC ... 400 V AC (secondary) 0.2%		
EEM-Mxxx0	EEM-Mxxx1	
1 A (secondary) 5 A (secondary) 6 A (I_{max}) 10 mA (1 A) 50 mA (5 A) 0.2%	4,000 A I_{max} 5 A <1% 500 µV ... 400 mV (1,000 A)	
EEM-Mxxx0	EEM-Mxxx1	
0.5% Class 0.5 S Class 2	1% Class 1 Class 2	
24 V DC 0 V DC ... 30 V DC		
24 V DC 2 mA ... 15 mA		
- -		
EEM-Mxxx0	EEM-Mxxx1	
100 V AC ... 230 V AC ±20% 150 V DC ... 250 V DC (± 20%)	100 V AC ... 230 V AC ±20% 150 V DC ... 250 V DC (± 20%)	
IP30 (housing) -10°C ... 55°C 90 / 80 / 64 mm 0.2 ... 6 mm² / 0.2 ... 4 mm² / 24 - 10		
CE-compliant		

Ordering data

Type	Order No.	Pcs./Pkt.
EEM-MA370-R	2907980	1
EEM-MA370	2907983	1
EEM-MA371-R	2907985	1
EEM-MA371	2908307	1

Ordering data

Type	Order No.	Pcs./Pkt.
EEM-MB370	2907954	1
EEM-MB370-PN	2907984	1
EEM-MB370-EIP	2907971	1
EEM-MB371	2907955	1
EEM-MB371-PN	2908308	1
EEM-MB371-EIP	2907976	1

MID energy meters

new

- Capture electrical characteristics such as currents, voltages, power factors, powers, energy meters in all 4 quadrants and deliver them via bus or network interface
- Sealed covers, suitable for billing purposes
- For your energy management needs: mean values over configurable intervals, e.g., 10 s, 10 min, or 15 min

Direct measurement

- Measuring without external current transformers up to 80 A saves time and money

Measurement via external current transformers

- Configurable current transformer ratio
- Configurable input for secondary side 1 A or 5 A

Modbus/RTU and M-Bus

- Bus-compatible for your existing bus systems
- Can be configured via LC display or interface
- 2 tariffs, switchable via digital input

Ethernet

- Network-compatible for Modbus/TCP applications and/or web-based management
- Can be configured via LC display and buttons or via the integrated web-based management
- Store mean values (e.g., 10 s, 10 min, 15 min) and/or energy meter values in a circular buffer with multiple-month capacity (depending on settings)

Measuring device with M-Bus interface

EAC

Technical data

Input data		
	EEM-EM325	EEM-EM327
Input voltage range	3x 184 V ... 288 V (320 V ... 500 V)	3x 184 V ... 288 V (320 V ... 500 V)
Frequency range	45 Hz ... 65 Hz	45 Hz ... 65 Hz
Start current I_{st}	0.002 A	0.02 A
Nominal current I_{ref}	1 A	5 A
Maximum current I_{max}	6 A	80 A
Communication interface		
Communication protocol	M-Bus	
Communication standard	EN 13757-1-2-3	
Transmission speed	300 bps ... 9600 bps	
General data		
Degree of protection	IP51 (front) IP20 (connections)	
Ambient temperature (operation)	-25°C ... 55°C	
Ambient temperature (storage/transport)	-25°C ... 75°C	
Humidity	80%	
Dimensions W/H/D	72 / 90 / 67 mm	
Connection data		
Measurement connection	Screw connection	
Conductor cross section solid/stranded/AWG	1.5 ... 6 mm²	1.5 ... 35 mm²
Tightening torque	1.5 Nm	2 Nm
Other connections	Screw connection	
Conductor cross section solid/stranded/AWG	0.14 ... 2.5 mm²	0.14 ... 2.5 mm²
Tightening torque	0.5 Nm	0.5 Nm
Conformance/approvals		
Conformance	CE-compliant MID-compliant	
Standards/regulations	EN 50470-1 / EN 50470-3	

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Three-phase energy meter for active power measurement with 1A/5A current transformer measurement in networks up to 500 V, with S0 output, certified in accordance with the MID directive	**EEM-EM325**	**2908576**	1
Three-phase energy meter for active power measurement with direct measurement in networks up to 500 V/80 A, with S0 output, certified in accordance with the MID directive	**EEM-EM327**	**2908586**	1

new

Measuring device with Modbus/RTU interface

new

Measuring device with Ethernet interface

Technical data

EEM-EM355	EEM-EM357
3x 184 V ... 288 V (320 V ... 500 V)	3x 184 V ... 288 V (320 V ... 500 V)
45 Hz ... 65 Hz	45 Hz ... 65 Hz
0.002 A	0.02 A
1 A	5 A
6 A	80 A
Modbus	
RS-485	
300 bps ... 57600 bps	
IP51 (front)	
IP20 (connections)	
-25°C ... 55°C	
-25°C ... 75°C	
80%	
72 / 90 / 67 mm	
Screw connection	
1.5 ... 6 mm²	1.5 ... 35 mm²
1.5 Nm	2 Nm
Screw connection	
0.14 ... 2.5 mm²	0.14 ... 2.5 mm²
0.5 Nm	0.5 Nm
CE-compliant	
MID-compliant	
EN 50470-1 / EN 50470-3	

Ordering data

Type	Order No.	Pcs./Pkt.
EEM-EM355	2908578	1
EEM-EM357	2908588	1

Technical data

EEM-EM375	EEM-EM377
3x 184 V ... 288 V (320 V ... 500 V)	3x 184 V ... 288 V (320 V ... 500 V)
45 Hz ... 65 Hz	45 Hz ... 65 Hz
0.002 A	0.02 A
1 A	5 A
6 A	80 A
Modbus/TCP	
IEEE 802.3	
10 Mbps ... 100 Mbps	
IP51 (front)	
IP20 (connections)	
-25°C ... 55°C	
-25°C ... 75°C	
80%	
72 / 90 / 67 mm	
Screw connection	
1.5 ... 6 mm²	1.5 ... 35 mm²
1.5 Nm	2 Nm
Screw connection	
0.14 ... 2.5 mm²	0.14 ... 2.5 mm²
0.5 Nm	0.5 Nm
CE-compliant	
MID-compliant	
EN 50470-1 / EN 50470-3	

Ordering data

Type	Order No.	Pcs./Pkt.
EEM-EM375	2908581	1
EEM-EM377	2908590	1

Controller solutions for usage data acquisition

The EMlog software from Phoenix Contact provides an efficient solution for recording energy data relating to heat, cold, air, and electricity when used in conjunction with the ILC 191 ME/AN modular Inline controller. This allows you to keep an eye on your resources and manage the consumption levels of your machines and systems.

Your advantages:
- Easy startup without programming knowledge
- Easy configuration, thanks to web-based interface
- Direct configuration of predefined sensors
- Existing configurations can be reused

Solution for usage data acquisition

Ex:

Technical data

Interfaces		
INTERBUS local bus (master)		Inline data jumper
Ethernet		2 x RJ45 socket
Configuration/operation/diagnostics		1 x 6-pos. MINI DIN socket (PS/2)
INTERBUS master		
Number of devices with parameter channel		Max. 24
Number of supported devices		Max. 128
Amount of process data		Max. 4096 Bit (INTERBUS) Max. 32768 Bit (internal Modbus /TCP client)
Digital inputs/outputs		
Number of inputs		8
Number of outputs		4
Analog inputs/outputs		
Number of inputs		2
Number of outputs		2
IEC-61131 runtime system		
Programming tool		PC WORX PC WORX EXPRESS
Processor		Altera Nios II 64 MHz
Program memory		1 Mbyte
Mass storage		1 Mbyte
Retentive mass storage		48 kByte (NVRAM)
Number of data blocks		Depends on mass storage
Number of timers, counters		Depends on mass storage
Number of control tasks		8
Realtime clock		Yes
Power supply		
Supply voltage		24 V DC
Supply voltage range		19.2 V DC ... 30 V DC
Typical current consumption		310 mA
General data		
Dimensions	W / H / D	164 mm / 136.8 mm / 71.5 mm
Degree of protection		IP20
Ambient temperature (operation)		-25°C ... 55°C
EMC note		Class A product, see page 583

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Compact controller, complete with accessories (connector plug and labeling field) - Analog inputs/outputs	**ILC 191 ME/AN**	2700074	1
Program and configuration memory, plug-in, 2 GB with license key and user program for reading from measuring devices	**SD FLASH 2GB EMLOG**	2403484	1

Accessories

Description	Type	Order No.	Pcs./Pkt.
Programming cable	**COM CAB MINI DIN**	2400127	1

Complete packages for data logging

The PSK RTU 50 is a multifunctional RTU (Remote Telemetry Unit), which combines the functions of a data logger, gateway, and alarm manager. The PSK RTU 50 offers various communication options, was developed with low power technology and allows independent operation, e.g., with batteries or solar cells.

Your advantages:
– GSM/GPRS modem
– Ethernet interface
– IEC 60870-5-101
– IEC 60870-5-104
– Modbus/RTU

Multifunctional data logger

Technical data

Interfaces	
Interfaces	RS-232 RS-232/-485 Serial Ethernet
Digital inputs/outputs	
Number of inputs	4
Number of outputs	2 (relay output)
Analog inputs	
Number of inputs	2
IEC-61131 runtime system	
Program memory	832 kByte
Retentive mass storage	1 Mbyte
Realtime clock	Yes (battery-backed)
Power supply	
Supply voltage	24 V DC
Typical current consumption	5 mA
General data	
Weight	475 g
Width	210 mm
Height	110 mm
Depth	45 mm
Degree of protection	IP20
Ambient temperature (operation)	-20°C ... 65°C

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Multifunctional data logger	**PSK RTU 50**	2400018	1

Extremely versatile

PACT current transformers offer a complete product range for converting alternating currents up to 4,000 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 3,000 versions for your current measurement requirements.

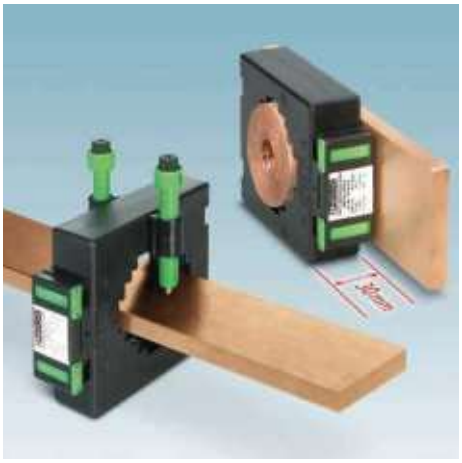
Also available for higher accuracy classes

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

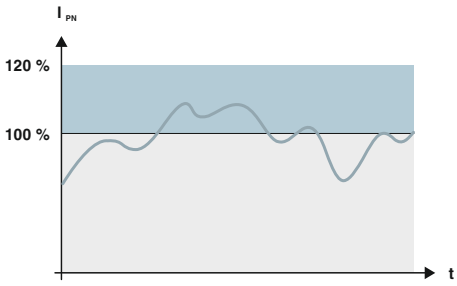
The current transformer quick-action mechanism offers the following advantages:
– Tool-free mounting
– Considerable reduction in installation time
– Easy handling and secure fastening by pressing with finger
– Current transformers align themselves – no need for subsequent alignment



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.

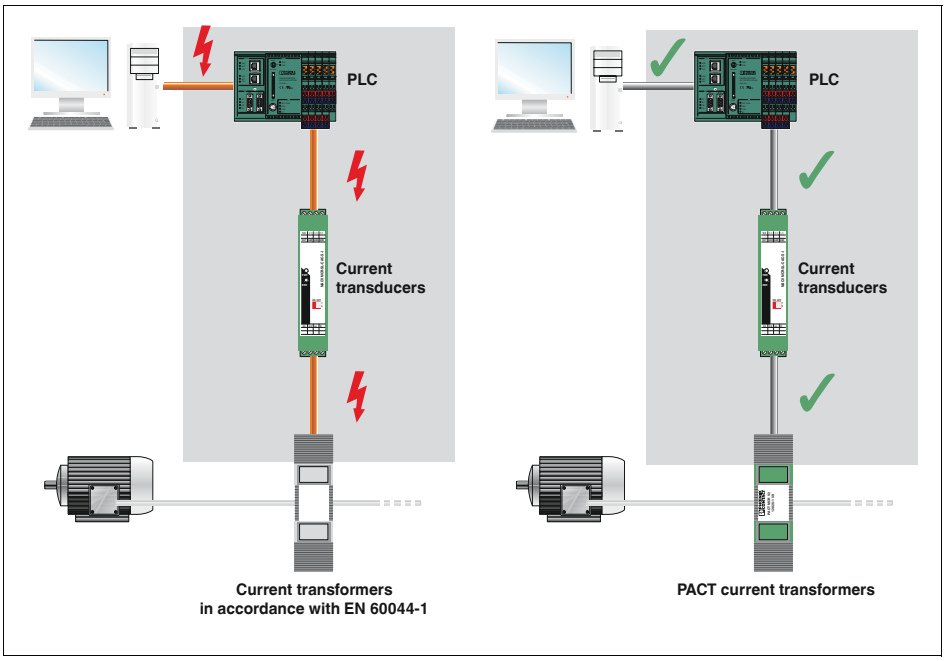
All PACT current transformers are just 30 mm wide. This saves space – for example with flat mounting when measuring branch outlets.



Safely detecting current peaks

PACT current transformers can be used to safely detect current peaks greater than the rated nominal current strength – without resulting in any damage. The transformers are designed for a thermal nominal continuous current of 120% of the primary rated current strength.

Example: a PACT transformer with a specified rated power of 10 VA actually delivers 14.4 VA on a continual basis.



Safe isolation

PACT current transformers are manufactured 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 clearances and creepage distances
– PACT current transformers ensure that there is no sparkover on the secondary side of the transformer and human life is protected inside and outside the control cabinet
– Up to 1,000 V (L-N) operating voltage possible
– Routine testing with 12 kV (1.2/50 µs)
– Meets overvoltage category 3

Current transformer selection guide

- Complete range consisting of winding, bus-bar, and window-type current transformers
- Popular types available from stock; alternatively, order key can be used for custom dimensioning
- Versions available to support official calibration

Selection

- Select your 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 50 Hz
Surge current limitation factor	FS 5
General data	
Rated insulation voltage	1 kV (Phase/neutral conductor)
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	EN 50178, EN 61869
Housing material	PA 6.6
UL data	
Ambient temperature (operation)	-25°C ... 30°C (up to a primary rated current of 1600 A AC)
Temperature increase	55°C (at a primary rated current of 50 A AC ... 400 A AC) 65°C (at a primary rated current of 500 A AC ... 800 A AC) 80°C (at a primary rated current of 1,000 A AC ...1600 A AC)

Calculation guide

Determination of the secondary side rated power S_n

All the occurring loads must be added:
- Calculate the power requirement of the copper wire (forward and return line)
- Take into account the power requirement of the connected devices (measuring devices)
- Add a reserve requirement

S_n total = S_n copper wire + S_n measuring device + S_n reserve

Power requirement of copper wires 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 wire = cable length x 2 x rated power
S_n copper wire = 10 m x 2 x 0.1750 VA/m = 3.50 VA

S_n measuring device = 2 VA

S_n reserve <0.5 x (S_n copper wire + S_n measuring device)
S_n reserve = 2 VA

S_n total = S_n copper wire + S_n measuring device + S_n reserve
S_n total = 3.5 VA + 2 VA + 2 VA = 7.5 VA

Order key - example for PACT MCR-V2-3015-60

Preferred types that can be ordered directly are marked in green in the selection table.

Order No.	Primary current I_{pn}	Secondary current I_{sn}	Class	Rated power S_n
2277271	**IP02000**	**IS05**	**C10**	**P750**
	IP00600 ≙ 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
1 A	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
5 A	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

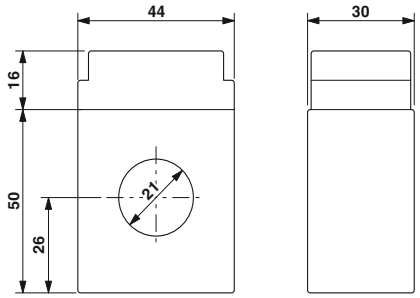
Rated power S_n [VA]

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 phoenixcontact.net/products, makes ordering easy.



Bus-bar current transformer, official calibration as an option

EAC

Description	Rated power S_n	Ordering data: Type	Order No.	Pcs./Pkt.
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, note the following ordering 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)

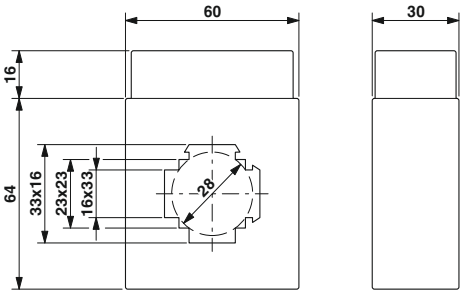
I_{sn}	Cl.	Primary rated current amperage I_{pn} [A] 50	75	100	125	150	200	250	300	400	Rated power S_n [VA]
IS01 ≙ 1 A	C05 ≙ 0.5			1.25		2.5	2.5				
						3.75	5				
	C10 ≙ 1	1.25	2.5	2.5		2.5	2.5				
						5	5				
IS05 ≙ 5 A	C05 ≙ 0.5			1.25		1.25	2.5				
				1.5		2.5	3.75				
	C10 ≙ 1	1.25	2.5	2.5							
					3.75	5	5	5		5	
									10		

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 phoenixcontact.net/products, makes ordering easy.



Window-type current transformer, official calibration as an option

EAC

Ordering data

Description	Rated power S_n	Type	Order No.	Pcs./Pkt.
Primary rated current I_{pn}:				
- 60 A	1.25 VA	**PACT MCR-V2-3015- 60- 60-5A-1**	2277815	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	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 ordering key for determining the desired current transformer type				
with screw connection		**PACT MCR-V2- 3015- 60**	2277271	1
with Push-in connection		**PACT MCR-V2-3015-60-PT**	2907413	1

Accessories

Quick-action mechanism				
Fixing pin length 40 mm		**PACT-FAST-MNT-W16-L40**	2276638	1
Fixing pin length 65 mm		**PACT-FAST-MNT-W16-L65**	2276641	1

Add **order key** from the selection table (ordering example marked in orange)

Order No.		Primary current I_{pn}		Secondary current I_{sn}		Class		Rated power S_n
2277271	/	IP07500	/	IS01	/	C05	/	P1500

Selection table PACT MCR-V2-3015-60 (Order No.: 2277271)

I_{sn}	Cl.	Primary rated current amperage I_{pn} [A]												
		60	80	100	125	150	200	250	300	400	500	600	750	Rated power S_n [VA]
IS01 ≙ 1A	C05 ≙ 0.5			1.25		2.5		2.5		2.5				
							3.75		5	5				
	C10 ≙ 1	1.25		2.5		2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	
						5	5							
								7.5						
IS05 ≙ 5 A	C05 ≙ 0.5							2.5						
							3.75	5	5					
										10				
	C10 ≙ 1	1.25	1.25	2.5										
					3.75	3.75	5							
						5	7.5	7.5	7.5	10	10	10	10	
								10						

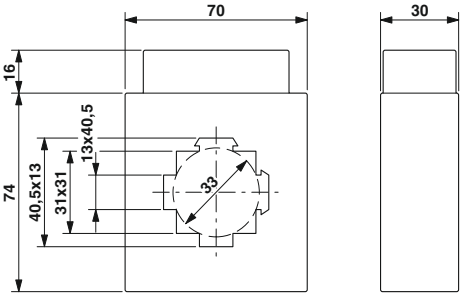
Current transformers

PACT MCR-V2-4012-70

– Primary rated current I_{pn}:
  0...(75...1,000) A
– Round conductor dimensions: Ø 33 mm
– Rail dimensions:
  40x12 mm, 2x 30x10 mm

Notes:

Our configurator, which is available at phoenixcontact.net/products, makes ordering easy.



Window-type current transformer, official calibration as an option

EAC

Ordering data

Description	Rated power S_n	Type	Order No.	Pcs./Pkt.
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
- 1,000 A	10 VA	**PACT MCR-V2-4012- 70-1000-5A-1**	2277158	1
Current transformers, pay attention to the following ordering key for determining the desired current transformer type				
with screw connection		**PACT MCR-V2- 4012- 70**	2277284	1
with Push-in connection		**PACT MCR-V2-4012-70-PT**	2907414	1

Accessories

Quick-action mechanism				
Fixing pin length 40 mm		**PACT-FAST-MNT-W13-L40**	2276612	1
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)

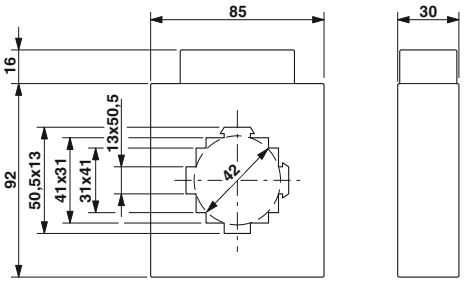
I_{sn}	Cl.	Primary rated current amperage I_{pn} [A]																Rated power S_n [VA]
		100	150	200	250	300	400	500	600	750	800	1000						
IS01 ≙ 1A	C05 ≙ 0.5		2.5		2.5	2.5												
							5		5									
	C10 ≙ 1	2.5					2.5		2.5									
			5	5	5		5		5									
						7.5	7.5		10									
IS05 ≙ 5 A	C05 ≙ 0.5		2.5				2.5		2.5									
					5	5	5		5									
							7.5		10									
	C10 ≙ 1	2.5																
			5	5	5													
						7.5	7.5	10	10	10	10	10						

PACT MCR-V2-5012-85

– Primary rated current I_{pn}:
  0...(100...1,500) A
– Round conductor dimensions: Ø 42 mm
– Rail dimensions:
  50x12 mm, 2x 40x10 mm

Notes:

Our configurator, which is available at phoenixcontact.net/products, makes ordering easy.



Window-type current transformer, official calibration as an option

EAC

Ordering data

Description	Rated power S_n	Type	Order No.	Pcs./Pkt.
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
- 1,000 A	10 VA	**PACT MCR-V2-5012- 85-1000-5A-1**	2276463	1
- 1,000 A	15 VA	**PACT MCR-V2-5012- 85-1000-5A-1**	2277190	1
- 1.250 A	15 VA	**PACT MCR-V2-5012- 85-1250-5A-1**	2277200	1
- 1,500 A	15 VA	**PACT MCR-V2-5012- 85-1500-5A-1**	2276188	1
Current transformers, pay attention to the following ordering key for determining the desired current transformer type				
with screw connection		**PACT MCR-V2- 5012- 85**	2277297	1
with Push-in connection		**PACT MCR-V2-5012-85-PT**	2907416	1

Accessories

Quick-action mechanism				
Fixing pin length 40 mm		**PACT-FAST-MNT-W13-L40**	2276612	1
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	150	200	250	300	400	500	600	750	800	1000	1250	1500	
IS01 ≙ 1A	C05 ≙ 0.5		1.25	2.5			2.5								
									5	5	5		5		
													10		
	C10 ≙ 1	1.25			2.5			2.5							
											5				
													15		
IS05 ≙ 5 A	C05 ≙ 0.5		1.25												
				5		5			5	5					
									10			10			
	C10 ≙ 1	1.25													
			3.75	5					10			10			
					7.5	10	10	15	15	10	10	15	15	15	

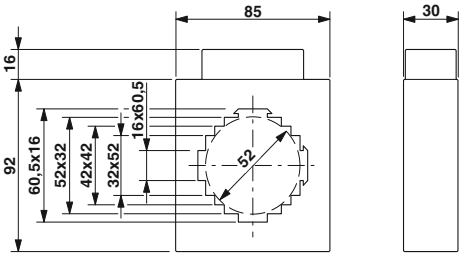
Current transformers

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 phoenixcontact.net/products, makes ordering easy.



Window-type current transformer, official calibration as an option

EAC

Ordering data

Description	Rated power S_n	Type	Order No.	Pcs./Pkt.
Primary rated current I_{pn}:				
- 200 A	2.5 VA	**PACT MCR-V2-6015- 85- 200-5A-1**	2277873	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
- 1,000 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
Current transformers, pay attention to the following ordering key for determining the desired current transformer type				
with screw connection		**PACT MCR-V2- 6015- 85**	2277336	1
with Push-in connection		**PACT MCR-V2-6015-85-PT**	2907417	1

Accessories

Quick-action mechanism				
Fixing pin length 40 mm		**PACT-FAST-MNT-W16-L40**	2276638	1
Fixing pin length 65 mm		**PACT-FAST-MNT-W16-L65**	2276641	1

Add **order key** from the selection table (ordering example marked in orange)

Order No.	Primary current I_{pn}	Secondary current I_{sn}	Class	Rated power S_n
2277336	/ IP05000	/ IS01	/ C10	/ P375

Selection table PACT MCR-V2-6015-85 (Order No.: 2277336)

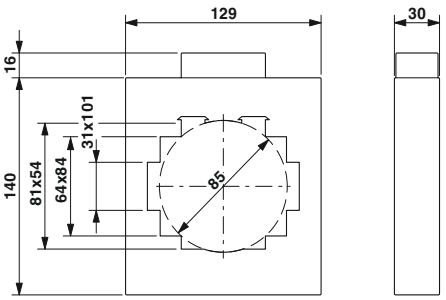
I_{sn}	Cl.	Primary rated current strength I_{pn} [A]										Rated power S_n [VA]
		200	300	400	500	600	750	800	1000	1250	1500	
IS01 ≙ 1A	C05 ≙ 0.5		1.25		2.5		2.5		2.5			
	C10 ≙ 1		2.5			2.5		2.5	3.75	3.75		
IS05 ≙ 5 A	C05 ≙ 0.5					5		5	5	10		
									10	15		
									15			
	C10 ≙ 1	2.5		2.5	5					10		
						10	10	10	15	15	15	

PACT MCR-V2-10020-129

– Primary rated current I_{pn}:
  0...(400...4,000) A
– Round conductor dimensions: Ø 85 mm
– Rail dimensions:
  2x100x10 mm, 80x64 mm

Notes:

Our configurator, which is available at phoenixcontact.net/products, makes ordering easy.



Window-type current transformer, official calibration as an option

EAC

Ordering data

Description	Rated power S_n	Type	Order No.	Pcs./Pkt.
Primary rated current I_{pn}:				
- 2500 A	15 VA	**PACT MCR-V2-10020-129-2500-5A**	2276395	1
Current transformers, pay attention to the following ordering key for determining the desired current transformer type		**PACT MCR-V2-10020-129**	2277378	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] 800	1000	1500	2000	2500	3000	4000	Rated power S_n [VA]
IS01 ≙ 1A	C05 ≙ 0.5		5						
			10		10		10		
					15		15		
	C10 ≙ 1						5		
			10	10	10				
					15		15		
							30		
IS05 ≙ 5 A	C05 ≙ 0.5		5						
				10	10	10			
					15	15	15		
								25	
	C10 ≙ 1	10	10	10			10		
					15	15			
					25				

Current transformers

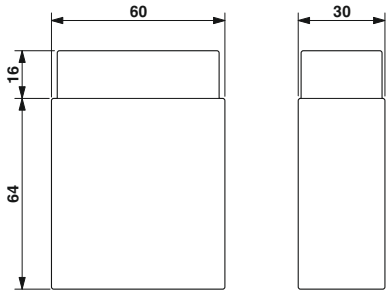
PACT MCR-V3-60

– Primary rated current I_{pn}: 0...(1...40) A

– Current-carrying copper lines connected directly to the screw terminal blocks on the primary side

Notes:

Our configurator, which is available at phoenixcontact.net/products, makes ordering easy.



Winding current transformer

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Current transformers, pay attention to the following ordering 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 amperage I_{pn} [A]									Rated power S_n [VA]
		1	2	5	10	15	20	25	30	40	
IS01 ≙ 1A	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	
	C10 ≙ 1			2.5	2.5	2.5	2.5	2.5	2.5	2.5	
				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	
				5	5	5	5	5	5	5	
	C10 ≙ 1			2.5	2.5	2.5	2.5	2.5	2.5	2.5	
				5	5	5	5	5	5	5	

Accessories

Quick-action mechanism for PACT current transformers

– No tools necessary for mounting
– Extremely easy handling, thanks to secure fastening by pressing with finger
– Set consisting of two fixing pins and a holding latch

Notes:

The 16 mm wide quick-action mechanism can also be used for larger current transformers if the length of the fixing pins is sufficient.

For: ...-V2-4012-70..., ...-V2-5012-85...

For: ...-V2-3015-60..., ...-V2-6015-85..., ...-V2-6315-95...

Technical data

General data		
Ambient temperature (operation)	-25°C ... 120°C	-25°C ... 120°C
Width of the retaining bracket [mm]	13	16

Ordering data

Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Quick-action mechanism						
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						
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

– DIN rail adapter

DIN rail adapter

Ordering data

Description	Type	Order No.	Pcs./Pkt.
DIN rail adapter			
	PACT MCR-RA	2277598	12

Accessories

new

PACT RCP Rogowski coils

- For direct connection to EMpro energy measuring devices, see page 210
- Practical handling due to the flexible measuring coil for opening
- The large bandwidth from 40 Hz to 20,000 Hz enables harmonics and transients to be detected
- It is not possible for dangerous open circuit voltages to occur
- The bracket ensures optimum alignment of the measuring coil to the power rail
- Low space requirement in the control cabinet

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Length: measuring coil 300 mm, signal line 3 m	**PACT RCP-D95**	2904890	1
Length: measuring coil 450 mm, signal line 3 m	**PACT RCP-D140**	2904891	1
Length: measuring coil: 600 mm, signal line 3 m	**PACT RCP-D190**	2904892	1
Length: measuring coil 300 mm, signal line 5 m	**PACT RCP-D95-5M**	2910322	1
Length: measuring coil 300 mm, signal line 10 m	**PACT RCP-D95-10M**	2910323	1
Length: measuring coil 450 mm, signal line 10 m	**PACT RCP-D140-10M**	1033482	1
Length: measuring coil 600 mm, signal line 10 m	**PACT RCP-D190-10M**	2910324	1

Recommendation for the use of coil lengths and busbars

Busbar [mm x mm]	Diameter/coil length [mm]	1 busbar per phase	2 busbars per phase	3 busbars per phase
30 x 10	95/300	X	X	-
40 x 10	95/300	X	X	-
40 x 10	140/450	-	-	X
50 x 10	95/300	X	-	-
50 x 10	140/450	-	X	X
60 x 10	95/300	X	-	-
60 x 10	140/450	-	X	X
80 x 10	140/450	X	X	X
100 x 10	140/450	X	X	-
100 x 10	190/600	-	-	X
120 x 10	140/450	X	-	-
120 x 10	190/600	-	X	X
160 x 10	190/600	X	X	X

Fast installation in a confined space

PACT RCP current transformers for retrofitting can be conveniently mounted where there is not enough space for split core current transformers. System downtimes are reduced as system parts do not have to be removed for installation.

Your advantages:

– High system availability due to reduced downtimes: fast installation without removing system parts
– Safe installation and operation: no dangerous open circuit voltages
– No magnetic saturation
– High linearity, even at high currents
– Responds to fast current changes
– The coil is protected against electromagnetic interference
– The current can rise up to the short-circuit current without necessarily destroying the coil
– High nominal isolation voltage

Professional holding device for busbars

The PACT RCP-CLAMP holding device offers the following advantages:

– Suitable for industrial applications
– Steel bracket ensures permanent fixed seating at high busbar temperatures
– Designed for rails with a thickness of 10 to 15 mm
– Rogowski coil is snapped onto the fixing element
– Rogowski coil has a safe and defined place on the busbar
– Rogowski coil can be rotated in 15°-steps for optimum alignment
– PACT RCP avoids direct contact of the measuring coil to its own or adjacent busbar
– This allows installations on warm busbars to remain under control

Easy and safe installation

Simply place the handy Rogowski coil quickly around power rails and circular conductors. The measuring transducer connected downstream supplies the same typical secondary currents as a standard current transformer.

Fast installation in a confined space

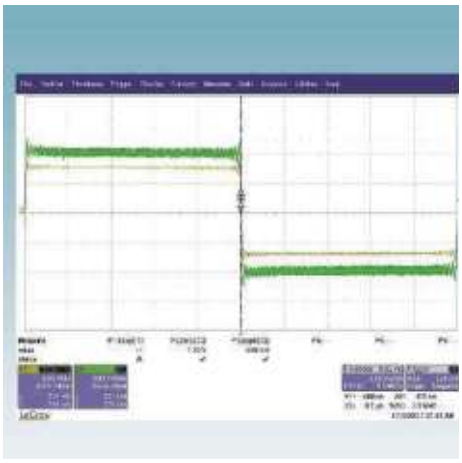
PACT RCP current transformers save space and are handy as the size and weight of the Rogowski coil are not dependent on the amperage and unlike split core current transformers, remain the same.

One measuring system for all amperages

Acquire alternating currents up to 4,000 A using a single coil type. Rogowski coils are available in three different lengths for optimum adjustment to the busbar and circular conductor dimensions.

Eight current measuring ranges

The measuring transducer connected downstream supplies the same typical secondary currents as a standard current transformer. Choose between eight different current measuring ranges via DIP switches. For optimum measuring accuracy, compensate for the different coil lengths by simply using a potentiometer.



Detect harmonics and transients

PACT RCP current transformers for retrofitting cover a large frequency range from 10 to 5,000 Hz. You can therefore measure harmonics and transients with phase accuracy.

UV protection for permanent outdoor use

The PACT RCP current transformer set is also available for outdoor use. The Rogowski coil of the UV version is equipped with a UV-resistant housing and UV-protected cables. This enables permanent installation outdoors.

Current transformers for retrofitting

PACT RCP

– Practical handling due to the flexible measuring coil for opening
– Universal application possibilities through 8 different current measuring ranges in one device: (0 ... 100/ ... / ... /4,000 A)
– The large bandwidth from 40 Hz to 20,000 Hz enables harmonics and transients to be detected
– It is not possible for dangerous open circuit voltages to occur
– The bracket ensures optimum alignment of the measuring coil to the power rail
– Low space requirement in the control cabinet

Current transformer for retrofitting in the field

EAC

Technical data

Measuring coil input data	
Frequency range	40 Hz ... 20,000 Hz
Measuring coil signal output	
Output signal (at 50 Hz)	100 mV (no load, at 1,000 A)
General data, measuring coil	
Rated insulation voltage	1,000 V AC (rms CAT III) 600 V AC (rms CAT IV)
Test voltage	10.45 kV (DC / 1 min.)
Ambient temperature (operation)	-30°C ... 80°C (measuring coil)
Ambient temperature (storage/transport)	-40°C ... 80°C (measuring coil)
Measuring transducer input data	
Measuring ranges (current) via DIP switch	100 A, 250 A, 400 A, 630 A, 1,000 A, 1,500 A, 2,000 A, 4,000 A
Phase angle	<1 °
Measuring transducer signal input	
Input signal (at 50 Hz)	100 mV (1,000 A)
Measuring transducer signal output	
Current output signal	0 A AC ... 1 A
Miscellaneous data for measuring transducer	
Nominal supply voltage	24 V DC -20% ... +25%
Nominal supply voltage range	19.2 V DC ... 30 V DC
Transmission error, maximum	≤0.5% (from the range end value)
Linearity error	<0.5% (from the range end value)
Frequency range	45 Hz ... 65 Hz
Maximum detectable harmonics	<2 kHz
Degree of protection	IP20
Test voltage	1.5 kV AC (supply/input and output: 50 Hz, 1 min)
Dimensions W/H/D	22.5 / 85 / 70.4 mm
Ambient temperature (operation)	-20°C ... 70°C (measuring transducer)
Ambient temperature (storage/transport)	-25°C ... 85°C (measuring transducer)
General data for the set	
Altitude	<2,000 m
Permissible humidity (operation)	5% ... 95% (non-condensing)
Approvals/conformities	
Standards/specifications	IEC 61010-1 IEC 61010-2-032

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Current transformer for retrofitting, set consisting of Rogowski coil and measuring transducer, output signal: 1 A AC (effective for sine)			
Length: measuring coil 300 mm, signal line 3 m	**PACT RCP-4000A-1A-D95**	2904921	1
Length: measuring coil 300 mm, signal line 5 m	**PACT RCP-4000A-1A-D95-5M**	2910325	1
Length: measuring coil 300 mm, signal line 10 m	**PACT RCP-4000A-1A-D95-10M**	2910326	1
Length: measuring coil 450 mm, signal line 3 m	**PACT RCP-4000A-1A-D140**	2904922	1
Length: measuring coil 450 mm, signal line 10 m	**PACT RCP-4000A-1A-D140-10M**	1033483	1
Length: measuring coil 600 mm, signal line 3 m	**PACT RCP-4000A-1A-D190**	2904923	1
Length: measuring coil 600 mm, signal line 10 m	**PACT RCP-4000A-1A-D190-10M**	2910327	1

Accessories

Holding device for power rail			
for busbar thicknesses of 5 to 10 mm	**PACT RCP-CLAMP-5-10**	2907888	1
for busbar thicknesses of 10 to 15 mm	**PACT RCP-CLAMP**	2904895	1

Recommendations for the use of coil lengths and busbar dimensions

Busbar [mm x mm]	Diameter/ coil length [mm]	1 busbar per phase	2 busbars per phase	3 busbars per phase
30 x 10	95/300	✓	✓	
40 x 10	95/300	✓	✓	
40 x 10	140/450			✓
50 x 10	95/300	✓		
50 x 10	140/450		✓	✓
60 x 10	95/300	✓		
60 x 10	140/450		✓	✓
60 x 10	140/450	✓	✓	✓
100 x 10	140/450	✓	✓	
100 x 10	190/600			✓
120 x 10	140/450	✓		
120 x 10	190/600		✓	✓
160 x 10	190/600	✓	✓	✓

Current transformers for retrofitting

PACT RCP

- Universal application possibilities through 8 different current measuring ranges in one device: (0 ... 100/ ... / ... /4,000 A)
- Detection of harmonics and transients in the frequency range from 40 Hz to 20,000 Hz
- Large number of different standard signals on output side
- Freely configurable 4- way signal conditioner with switching output
- FASTCON Pro plug-in connection system
- Design width of just 6.2 mm
- Easy configuration e.g., via DIP switches, programmable software, via smartphone app or FDT/DTM

Current transformer for retrofitting in the field

EAC

Technical data

Measuring coil input data	
Frequency range	40 Hz ... 20,000 Hz
Measuring coil signal output	
Output signal (at 50 Hz)	100 mV (no load, at 1,000 A)
General data, measuring coil	
Length of signal cable	3000 mm
Rated insulation voltage	1,000 V AC (rms CAT III) 600 V AC (rms CAT IV)
Test voltage	10.45 kV (DC / 1 min.)
Ambient temperature (operation)	-30°C ... 80°C (measuring coil)
Measuring transducer input data	
Measuring ranges (current) via DIP switch	100 A, 250 A, 400 A, 630 A, 1,000 A, 1,500 A, 2,000 A, 4,000 A
Measuring transducer signal input	
Input signal (at 50 Hz)	100 mV (1,000 A)
Measuring transducer signal output	
Current output signal	0 mA ... 20 mA (via DIP switch) 4 mA ... 20 mA (via DIP switch) 0 mA ... 10 mA (via DIP switch) 2 mA ... 10 mA (via DIP switch) 0 mA ... 21 mA (can be set via software)
Output signal Voltage	0 V ... 10 V (via DIP switch) 2 V ... 10 V (via DIP switch) 0 V ... 5 V (via DIP switch) 1 V ... 5 V (via DIP switch) 0 V ... 10.5 V (can be set via software)
Miscellaneous data for measuring transducer	
Nominal supply voltage	24 V DC
Nominal supply voltage range	9.6 V DC ... 30 V DC
Transmission error, maximum	≤0.5% (from the range end value)
Frequency range	16 Hz ... 1,000 Hz
Degree of protection	IP20
Test voltage	3 kV (50 Hz, 1 min.)
Dimensions W/H/D	6.2 / 110.5 / 120.5 mm
Ambient temperature (operation)	-40°C ... 70°C (measuring transducer)
General data for the set	
Altitude	>4,000 m
Permissible humidity (operation)	5% ... 95% (non-condensing)
Approvals/conformities	
Standards/specifications	IEC 61010-1 IEC 61010-2-032

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Current transformer with screw connection for retrofitting, set consisting of Rogowski coil and 4-way signal conditioner with switching output			
Length of measuring coil 300 mm	**PACT RCP-4000A-UIRO-D95**	2906231	1
Length of measuring coil 450 mm	**PACT RCP-4000A-UIRO-D140**	2906232	1
Length of measuring coil 600 mm	**PACT RCP-4000A-UIRO-D190**	2906233	1
Current transformer with Push-in connection in for retrofitting, set consisting of Rogowski coil and 4-way signal conditioner with switching output			
Length of measuring coil 300 mm	**PACT RCP-4000A-UIRO-PT-D95**	2906234	1
Length of measuring coil 450 mm	**PACT RCP-4000A-UIRO-PT-D140**	2906235	1
Length of measuring coil 600 mm	**PACT RCP-4000A-UIRO-PT-D190**	2906236	1

Accessories

Holding device for power rail			
for busbar thicknesses of 5 to 10 mm	**PACT RCP-CLAMP-5-10**	2907888	1
for busbar thicknesses of 10 to 15 mm	**PACT RCP-CLAMP**	2904895	1

Current transformers for retrofitting

new

PACT RCP...-UV

- For permanent installation outdoors in the field
- UV-resistant Rogowski coil and UV-resistant cables
- Practical handling due to the flexible measuring coil for opening
- Universal application possibilities through 8 different current measuring ranges in one device: (0 ... 100/ ... / ... /4,000 A)
- The large bandwidth from 40 Hz to 20,000 Hz enables harmonics and transients to be detected
- It is not possible for dangerous open circuit voltages to occur
- The bracket ensures optimum alignment of the measuring coil to the power rail
- Low space requirement in the control cabinet

Current transformer for retrofitting in the field

EAC

Technical data

Measuring coil input data	
Frequency range	40 Hz ... 20,000 Hz
Measuring coil signal output	
Output signal (at 50 Hz)	100 mV (no load, at 1,000 A)
General data, measuring coil	
Rated insulation voltage	1,000 V AC (rms CAT III) 600 V AC (rms CAT IV)
Test voltage	10.45 kV (DC / 1 min.)
Degree of protection	IP67 (not assessed by UL)
Ambient temperature (operation)	-30°C ... 80°C (measuring coil)
Ambient temperature (storage/transport)	-
Measuring transducer input data	
Measuring ranges (current) via DIP switch	100 A, 250 A, 400 A, 630 A, 1,000 A, 1,500 A, 2,000 A, 4,000 A
Phase angle	<1 °
Measuring transducer signal input	
Input signal (at 50 Hz)	100 mV (1,000 A)
Measuring transducer signal output	
Current output signal	0 A AC ... 1 A
Miscellaneous data for measuring transducer	
Nominal supply voltage	24 V DC -20% ... +25%
Nominal supply voltage range	19.2 V DC ... 30 V DC
Transmission error, maximum	≤0.5% (from the range end value)
Linearity error	<0.5% (from the range end value)
Frequency range	45 Hz ... 65 Hz
Maximum detectable harmonics	<2 kHz
Degree of protection	IP20
Test voltage	1.5 kV AC (supply/input and output: 50 Hz, 1 min)
Dimensions W/H/D	22.5 / 85 / 70.4 mm
Ambient temperature (operation)	-20°C ... 70°C (measuring transducer)
Ambient temperature (storage/transport)	-
General data for the set	
Altitude	<2,000 m
Permissible humidity (operation)	5% ... 95% (non-condensing)
Approvals/conformities	
Standards/specifications	IEC 61010-1 IEC 61010-2-032

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Current transformer for retrofitting, set consisting of UV-resistant Rogowski coil and measuring transducer, output signal: 1 A AC (effective for sine)			
Length: measuring coil 600 mm, signal line 3 m	**PACT RCP-4000A-1A-D190-3M-UV**	1033485	1
Length: measuring coil 450 mm, signal line 3 m	**PACT RCP-4000A-1A-D140-3M-UV**	1058044	1

Accessories

Holding device for power rail			
for busbar thicknesses of 5 to 10 mm	**PACT RCP-CLAMP-5-10**	2907888	1
for busbar thicknesses of 10 to 15 mm	**PACT RCP-CLAMP**	2904895	1

With flexible power supply – current transducers up to 12 A AC

Active current transducers convert sinusoidal alternating currents up to 12 A. The integrated wide-range power supply unit enables use in various different countries.

With hinged Rogowski sensor – current transducers up to 200 A AC

The AC current transducers measure sinusoidal and non-sinusoidal alternating currents up to 200 A. The hinged Rogowski sensor ensures very easy installation, as cables that are to be measured do not have to be isolated. This enables mounting to be carried out without interruptions.

Limit value monitoring with the current protector

At the current protector, a desired amperage is specified at which a PDT contact switches a load on or off.

Flexible signal conditioning – current transducers up to 55 A AC/DC

Current transducers up to 55 A offer an infinitely adjustable measuring range. This range is mapped over the entire output signal range. This ensures extremely accurate resolution of measured values. Basic configuration can be performed quickly via the DIP switches. Additional useful device functions can be set via the software.

For high currents – current transducers up to 600 A AC/DC

The universal current transducers are the ideal solution for measuring high currents with any waveform up to 600 A AC/DC. The product range offers various different devices in graded measuring ranges with current or voltage output.

For sinusoidal alternating currents up to 12 A
– 3-way electrical isolation
– Wide-range version from 19.2 to 253 V AC/DC
– Voltage bridging with DIN rail connector
– Input and output can be configured via DIP switches
– Suitable for potentially explosive areas, thanks to ATEX approval for Ex zone 2

For sinusoidal and non-sinusoidal alternating currents up to 200 A
– Distorted alternating currents up to 6,000 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 0 to 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

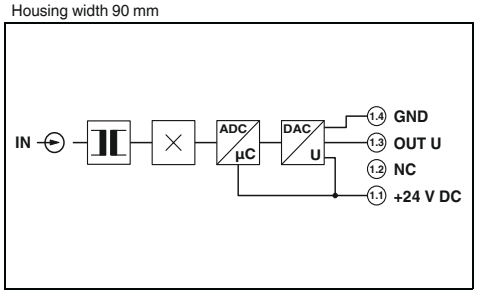
Current transducers for AC, DC, and distorted currents

The **MCR-SL-CUC-...** current transducers measure DC, AC, and distorted currents from 0 to 600 A.

– Universal current measurement, no shunt required
– Compact dimensions also enable distributed use
– Variable mounting on DIN rail and mounting plate
– Simple connection method thanks to COMBICON plug-in connection terminal blocks
– 3-way isolation

For DC, AC, and distorted currents of 0 ... 300 A, voltage output

Housing width 90 mm



Technical data

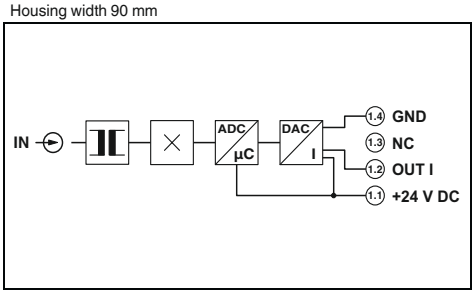
Input data	
Frequency range	20 Hz ... 6,000 Hz (0 Hz)
Curve type	AC, DC or distorted currents
Connection method	Cable design: 32 mm diameter
Output data	
Output signal	0 ... 10 V
Maximum output signal	
Load R_B	≥10 kΩ
General data	
Supply voltage U_B	20 V DC ... 30 V DC
Maximum transmission error	<± 1% (of final value)
Temperature coefficient	Typically 0.02%/K (0 ... 60°C) 0.04%/K (-40°C ... 65°C)
Step response (10-90%)	150 ms
Safe isolation	In accordance with EN 61010
Rated insulation voltage	300 V AC
Surge voltage category/degree of pollution	III / 2
Degree of protection	IP20
Ambient temperature range	-40°C ... 65°C
Dimensions W/H/D	90 / 33.8 / 85 mm
Spring-cage connection (solid/stranded/AWG)	0.25 ... 2.5 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}			

For DC, AC, and distorted currents of 0 ... 600 A, current output

Housing width 90 mm



Technical data

20 Hz ... 6,000 Hz (0 Hz)
AC, DC or distorted currents
Cable design: 32 mm diameter

4 ... 20 mA
<25 mA
<300 Ω

20 V DC ... 30 V DC
<± 1% (of final value)
Typically 0.02%/K (0 ... 60°C) 0.04%/K (-40°C ... 65°C)

150 ms
In accordance with EN 61010
300 V AC
III / 2
IP20
-40°C ... 65°C
90 / 33.8 / 85 mm
0.25 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 12

CE-compliant
UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs./Pkt.
MCR-SL-CUC-100-I	2308027	1
MCR-SL-CUC-200-I	2308030	1
MCR-SL-CUC-300-I	2308043	1
MCR-SL-CUC-400-I	2308072	1
MCR-SL-CUC-500-I	2308085	1
MCR-SL-CUC-600-I	2308098	1

Current transducers for AC, DC, and distorted currents

The **MCR-S-...-UI(-SW)-DCI** current transducers measure direct, alternating and distorted currents.

– Device can be set via DIP switches or MCR/PI-CONF-WIN configuration software
– True r.m.s. value measurement
– 3-way isolation
– With optional relay and transistor output

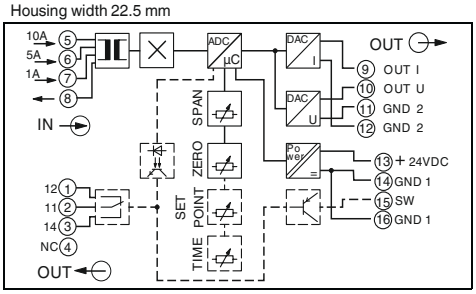
Notes:

To order a configurable product, please enter the desired configuration using the order key, see page 232

For DC, AC, and distorted currents
0 ... 11 A

Ex:

Housing width 22.5 mm



Technical data

Input data		
Input current	0 A ... 11 A (AC/DC)	
Response 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	
Relay output, 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)	
Transistor output pnp, Output voltage	19 V ... 29 V (supply voltage - 1 V)	
Transistor output pnp, Continuous load current	80 mA (not short-circuit proof)	
Setting range of the threshold value	1% ... 110%	
Response delay	0.1 s ... 20 s	
Status indication	Yellow LED	
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	Typically <0.025%/K	
Step response (10-90%)	330 ms (with AC) 40 ms (with DC)	
Safe isolation	In accordance with EN 50178, EN 61010	
Rated insulation voltage	300 V AC (to earth)	
Surge voltage category/degree of pollution	III / 2	
Test voltage input/output	4 kV (50 Hz, 1 min.)	
Test voltage input/power supply	4 kV (50 Hz, 1 min.)	
Test voltage output/power supply	500 V (50 Hz, 1 min.)	
Degree of protection	IP20	
Dimensions W/H/D	22.5 / 99 / 114.5 mm	
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
UL, USA/Canada	Class I, Zone 2, AEx nA nC IIC T4, Ex nA nC IIC T4 Gc X	

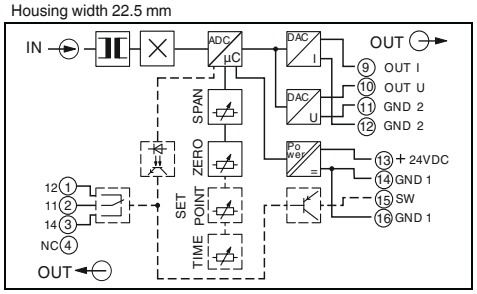
Ordering data

Description	Type	Order No.	Pcs./Pkt.
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**	2814650	1
Standard product	**MCR-S-1-5-UI-SW-DCI-NC**	2814731	1
Configurable product, without switching output	**MCR-S-1-5-UI-DCI**	2814634	1
Standard product, without switching output	**MCR-S-1-5-UI-DCI-NC**	2814715	1

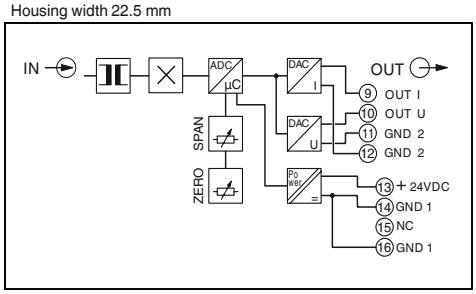
For DC, AC, and distorted currents
0 ... 55 A

For DC, AC, and distorted currents
0 to 100 A

Ex:
Housing width 22.5 mm



Housing width 22.5 mm



Technical data

-	
0.8% (of measuring range nominal value 50 A)	
15 Hz ... 400 Hz	
AC, DC or distorted currents	
Depending on through connected conductor	
Depending on through connected conductor	
Through connection, diameter 10.5 mm	
U output	I output
0 ... 5 V / 1 ... 5 V / 0 ... 10 V	0 ... 20 mA / 4 ... 20 mA
2 ... 10 V / -5 ... 5 V / -10 ... 10 V	
>10 kΩ	<500 Ω
1 PDT / AgSnO, hard gold-plated	
50 mA (for gold layer, 30 V AC/ 36 V DC)	
2 A (in case of a destroyed gold layer, 250 V AC)	
19 V ... 29 V (supply voltage - 1 V)	
80 mA (not short-circuit proof)	
1% ... 110%	
0.1 s ... 20 s	
Yellow LED	
20 V DC ... 30 V DC	
<50 mA (without load)	
<0.5% (of nominal range value under nominal conditions)	
Typically <0.025%/K	
330 ms (with AC) 40 ms (with DC)	
In accordance with EN 50178, EN 61010	
300 V AC (to earth)	
III / 2	
4 kV (50 Hz, 1 min.)	
4 kV (50 Hz, 1 min.)	
500 V (50 Hz, 1 min.)	
IP20	
22.5 / 99 / 114.5 mm	
0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Class A product, see page 583	
CE-compliant	
Class I, Zone 2, AEx nA nC IIC T4, Ex nA nC IIC T4 Gc X	

Ordering data

Type	Order No.	Pcs./Pkt.
MCR-S-10-50-UI-SW-DCI	2814663	1
MCR-S10-50-UI-SW-DCI-NC	2814744	1
MCR-S-10-50-UI-DCI	2814647	1
MCR-S10-50-UI-DCI-NC	2814728	1

Technical data

0 A AC ... 100 A AC (± 100 A DC)	
1% (of measuring range nominal value 100 A)	
15 Hz ... 400 Hz	
AC, DC or distorted currents	
Depending on through connected conductor	
Depending on through connected conductor	
Through connection, diameter 10.5 mm	
U output	I output
0 ... 5 V / 1 ... 5 V / 0 ... 10 V	0 ... 20 mA / 4 ... 20 mA
2 ... 10 V / -5 ... 5 V / -10 ... 10 V	
>10 kΩ	<500 Ω
- / -	
-	
-	
-	
-	
-	
-	
20 V DC ... 30 V DC	
<40 mA (without load)	
<0.5% (of nominal range value under nominal conditions)	
Typically <0.025%/K	
330 ms (AC) 40 ms (DC)	
In accordance with EN 50178, EN 61010	
300 V AC (to earth)	
III / 2	
4 kV (50 Hz, 1 min.)	
4 kV (50 Hz, 1 min.)	
500 V (50 Hz, 1 min.)	
IP20	
22.5 / 99 / 114.5 mm	
0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Class A product, see page 583	
CE-compliant	
Class I, Zone 2, AEx nA nC IIC T4, Ex nA nC IIC T4 Gc X	

Ordering data

Type	Order No.	Pcs./Pkt.
MCR-S-20-100-UI-DCI	2908798	1

Current measurement

Order key for current transducers (standard configuration entered as an example)

Order No.	Measuring range: Start	Measuring range: End	Output	Threshold value	Suppression time	Switching behavior of relay and transistor	
2814634	0.00	5.00	OUT01				

Order No.	Measuring range: Start	Measuring range: End	Output	Threshold value	Suppression time	Switching behavior of relay and transistor	
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 initial value 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 ... 2 V OUT11 ≙ 5 ... 0 V OUT12 ≙ 5 ... 1 V OUT13 ≙ -5 ... +5 V OUT14 ≙ -10 ... +10 V OUT17 ≙ +10 ... -10 V OUT18 ≙ +5 ... -5 V	Switching threshold between 1 ... 110% 50 ≙ 50% of the set measuring range final value (here 2.5 A)	between 0.1 ... 20 s 3.0 ≙ 3 s	A ≙ Operating-current-controlled R ≙ Closed-circuit-current-controlled	O ≙ Over-range U ≙ Under-range

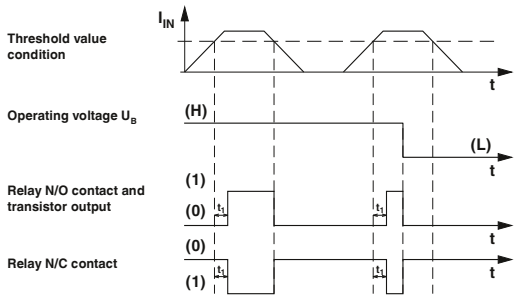
Order No.	Measuring range: Start	Measuring range: End	Output	Threshold value	Suppression time	Switching behavior of relay and transistor	
2814647	0.0	50.0	OUT01				

Order No.	Measuring range: Start	Measuring range: End	Output	Threshold value	Suppression time	Switching behavior of relay and transistor	
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 initial value between 0.0 ... 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 ... 2 V OUT11 ≙ 5 ... 0 V OUT12 ≙ 5 ... 1 V OUT13 ≙ -5 ... +5 V OUT14 ≙ -10 ... +10 V OUT17 ≙ +10 ... -10 V OUT18 ≙ +5 ... -5 V	Switching threshold between 1 ... 110% 50 ≙ 50% of the set measuring range final value (here 25 A)	between 0.1 ... 20 s 3.0 ≙ 3 s	A ≙ Operating-current-controlled R ≙ Closed-circuit-current-controlled	O ≙ Over-range U ≙ Under-range

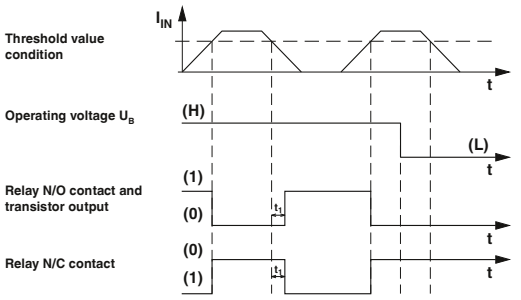
Order No.	Measuring range: Start	Measuring range: End	Output
2908798	0.0	100.0	OUT01
2908798 ≙ MCR-S-20-100-UI-DCI	Measuring range initial value between 0.0 ... 75 A 0.0 ≙ 0.0 A	Measuring range final value between 19 ... 110 A 100 ≙ 100 A	OUT01 ≙ 0 ... 20 mA OUT02 ≙ 4 ... 20 mA OUT03 ≙ 0 ... 10 V OUT04 ≙ 2 ... 10 V OUT05 ≙ 0 ... 5 V OUT06 ≙ 1 ... 5 V OUT07 ≙ 20 ... 0 mA OUT08 ≙ 20 ... 4 mA OUT09 ≙ 10 ... 0 V OUT10 ≙ 10 ... 2 V OUT11 ≙ 5 ... 0 V OUT12 ≙ 5 ... 1 V OUT13 ≙ -5 ... +5 V OUT14 ≙ -10 ... +10 V OUT17 ≙ +10 ... -10 V OUT18 ≙ +5 ... -5 V

Function chart: switching behavior of relay and transistor output:

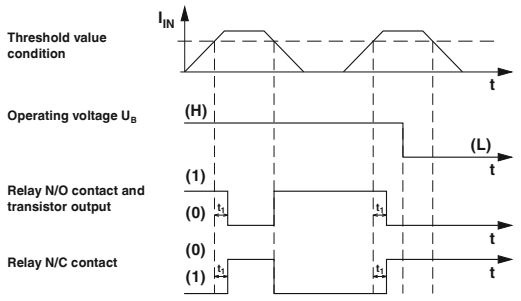
1) Operating-current-controlled when above the threshold value (TV)



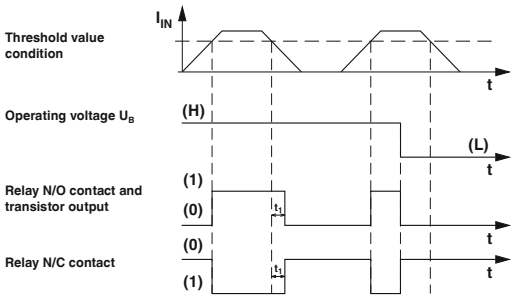
2) Operating-current-controlled when below the threshold value (TV)



3) Closed-circuit-current-controlled when above the threshold value (TV)



4) Closed-circuit-current-controlled when below the threshold value (TV)

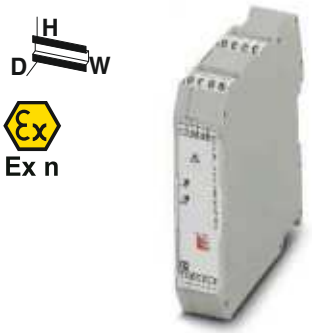


(0) ≙ N/O contact and transistor open / N/C contact closed
(1) ≙ N/O contact and transistor closed / N/C contact open

AC current transducers, sinusoidal

The **MCR-SL-CAC-...** current transducers measure sinusoidal alternating currents from 0 to 1/5/12 A.

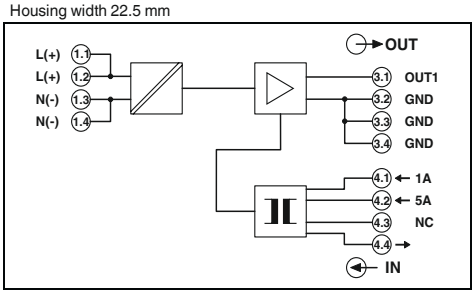
– Wide range version from 19.2 to 253 V AC/DC
– 3-way isolation
– Input and output can be configured via DIP switches



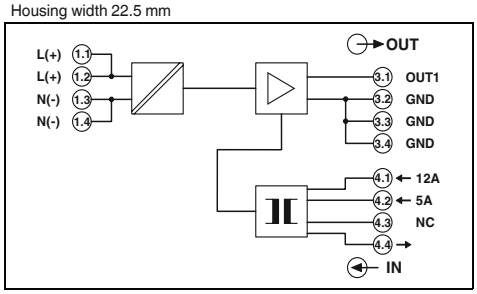
For sinusoidal alternating currents 0 ... 1 A/0 ... 5 A

For sinusoidal alternating currents 0 ... 5 A/0 ... 12 A

Ex:
Housing width 22.5 mm



Ex:
Housing width 22.5 mm



Technical data

Input data		
Input current (configurable)	0 A AC ... 1 A (configurable) / 0 A AC ... 5 A (configurable)	
Nominal frequency	50 Hz	
Frequency range	45 Hz ... 65 Hz	
Curve type	Sine	
Overload capacity	2 x I_N (continuous)	
Surge strength	20 x I_N (1 s)	
Connection method	Screw terminal block	
Output data		
Output signal (configurable)	0 ... 20 mA / 4 ... 20 mA	
Maximum output signal	25 mA	
Load R_B	<500 Ω (at 20 mA)	
Ripple	<10 mV_{PP} (for 500 Ω at 20 mA)	
General data	MACX MCR-SL-CAC- 5-I	MACX MCR-SL-CAC- 5-I-UP
Supply voltage U_B	19.2 V DC ... 30 V 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)
Maximum transmission error	≤0.5% (of nominal range value under nominal conditions)	≤0.5% (of nominal range value under nominal conditions)
Temperature coefficient	<0.02%/K	<0.02%/K
Step response (10-90%)	Max. 300 ms typically 200 ms	Max. 300 ms typically 200 ms
Safe isolation	In accordance with EN 61010	In accordance with EN 61010
Rated insulation voltage	-	-
Overvoltage category Input/output	-	-
Degree of pollution	2	2
Test voltage input/output	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.)
Degree of protection	IP20	IP20
Ambient temperature range	-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
Screw connection rigid / flexible / 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
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	Ex II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	UL 508 Recognized	

Technical data

General data	MACX MCR-SL-CAC-12-I-UP	
Supply voltage U_B	19.2 V AC/DC ... 253 V AC/DC	-
Current consumption	<33 mA (at 24 V DC)	
Maximum transmission error	≤0.5% (of nominal range value under nominal conditions)	-
Temperature coefficient	<0.02%/K	-
Step response (10-90%)	<300 ms	-
Safe isolation	In accordance with EN 61010	-
Rated insulation voltage	300 V AC (to earth)	-
Overvoltage category Input/output	III	-
Degree of pollution	2	-
Test voltage input/output	4 kV (50 Hz, 1 min.)	-
Test voltage output/power supply	2 kV (50 Hz, 1 min.)	-
Degree of protection	IP20	-
Ambient temperature range	-20°C ... 65°C (-4°F...149°F)	-
Dimensions W/H/D	22.5 / 104 / 114.5 mm	- / - / -
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14	- ... - / - ... - / -
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	
ATEX	Ex II 3 G Ex nA IIC T4 Gc X	
UL, USA/Canada	-	

Ordering data

Description	Type	Order No.	Pcs./Pkt.
MCR current measuring transducers for sinusoidal alternating currents			
Supply voltage 19.2 ... 30 V DC	**MACX MCR-SL-CAC- 5-I**	2810612	1
Supply voltage 19.2 ... 253 V AC/DC	**MACX MCR-SL-CAC- 5-I-UP**	2810625	1

Ordering data

Type	Order No.	Pcs./Pkt.
MACX MCR-SL-CAC-12-I-UP	2810638	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

Accessories

AC current transducers, sinusoidal and distorted

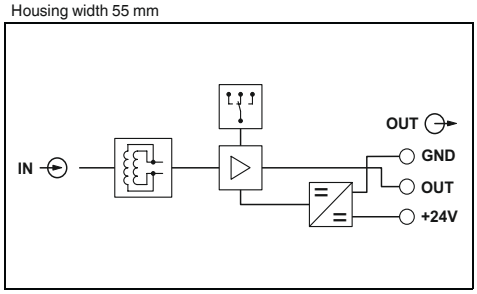
The **MCR-SL-S-...00-...** current transducers measure sinusoidal and non-sinusoidal alternating currents within the range 0 to 200 A.

- 30 to 6,000 Hz true r.m.s. value measurement
- Measuring range selection with slide switch
- Loop-powered
- Can be retrofitted with the open-up Rogowski coil

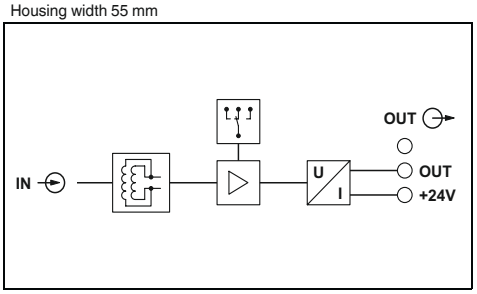
For sinusoidal and non-sinusoidal alternating currents, 0 ... 200 A, voltage output

For sinusoidal and non-sinusoidal alternating currents, 0 ... 200 A, current output (loop-powered)

Housing width 55 mm



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)
Response threshold	1% (of final value)	
Frequency range	30 Hz ... 6,000 Hz	
Curve type	Sinusoidal and non-sinusoidal	
Overload capacity	Depending on laid conductor	
Surge strength	Depending on through connected conductor	
Connection method	-	
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	In accordance with IEC 61010-1 and IEC 61326	
Rated insulation voltage	300 V AC (to earth)	
Surge voltage category/degree of pollution	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 rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance/approvals		
Conformance	CE-compliant	
UL, USA/Canada	UL/C-UL listed UL 508	

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)
Response threshold	1% (of final value)	
Frequency range	30 Hz ... 6,000 Hz	
Curve type	Sinusoidal and non-sinusoidal	
Overload capacity	Depending on laid conductor	
Surge strength	Depending on through connected conductor	
Connection method	-	
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	In accordance with IEC 61010-1 and IEC 61326	
Rated insulation voltage	300 V AC (to earth)	
Surge voltage category/degree of pollution	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 rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance/approvals		
Conformance	CE-compliant	
UL, USA/Canada	UL/C-UL listed UL 508	

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

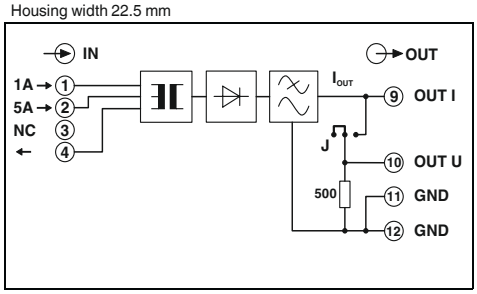
Passive AC current transducers, sinusoidal

The **MCR-SLP-1-5-UI-0** passive current transducer measures sinusoidal alternating currents within the range from 0 to 1 A/ 0 to 5 A.

– Loop-powered
– Measuring ranges 1 and 5 A AC reconnectable

For sinusoidal alternating currents 0 ... 1 A/0 ... 5 A

Housing width 22.5 mm



Technical data

Input data	1 A input	5 A input
Input current	0 A AC ... 1 A	0 A AC ... 5 A
Frequency range	45 Hz ... 60 Hz	45 Hz ... 60 Hz
Curve type	Sine	Sine
Overload capacity	2 x I_N (5 min. at 60°C ambient temperature)	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	In accordance with EN 50178, EN 61010	
Rated insulation voltage	300 V AC (to earth)	
Surge voltage category/degree of pollution	III / 2	
Degree of protection	IP20	
Ambient temperature range	-25°C ... 60°C	
Dimensions W/H/D	22.5 / 99 / 114.5 mm	
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm^2 / 0.2 ... 2.5 mm^2 / 24 - 14	
EMC note	Class A product, see page 583	
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**	**2814359**	1

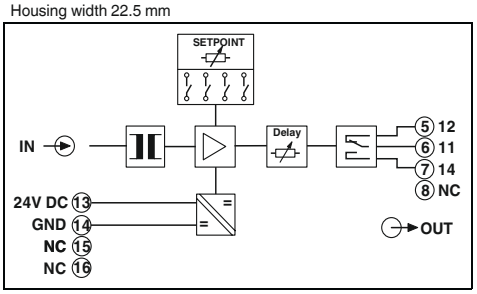
AC current protectors, sinusoidal

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 to 16 A AC
– Changeover relay output
– Adjustable switch hysteresis
– 3-way isolation
– Settable operating current / quiescent current behavior

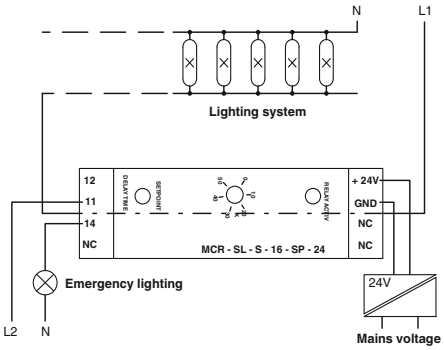
For sinusoidal alternating currents, 0 ... 16 A AC

Housing width 22.5 mm



Technical data

Input data	
Input current	0 A AC ... 16 A
Frequency range	45 Hz ... 65 Hz
Curve type	Sine
Overload capacity	2 x I_N (continuous)
Connection method	-
Switching output	Relay output
Contact type	1 PDT
Contact material	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)
Switching hysteresis	Adjustable using a DIP switch (0.5%, 5%, 10%, 15%)
Response delay	Typically 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	acc. to EN 50178, EN 61010-1
Rated insulation voltage	300 V AC (to earth)
Surge voltage category/degree of pollution	III / 2
Test voltage input/output	3.5 kV (50 Hz, 1 min.)
Test voltage input/power supply	3.5 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 rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant



Lighting system with emergency lighting

Ordering data

Description	Type	Order No.	Pcs./Pkt.
MCR current protector for sinusoidal alternating currents	**MCR-SL-S- 16-SP- 24**	2864464	1

Voltage transducers

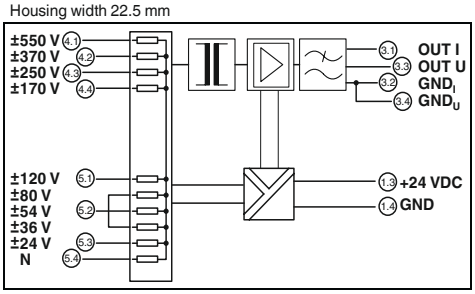
The MACX MCR-VDC voltage transducer measures DC voltages within the range of 0 to ±660 V DC. The MACX MCR-VAC module measures sinusoidal AC voltages from 0 to 660 V AC.

– Bidirectional output signals
– 9 voltage measuring ranges
– Voltage measuring ranges can be freely adjusted
– ZERO/SPAN adjustment ±20%
– 3-way isolation

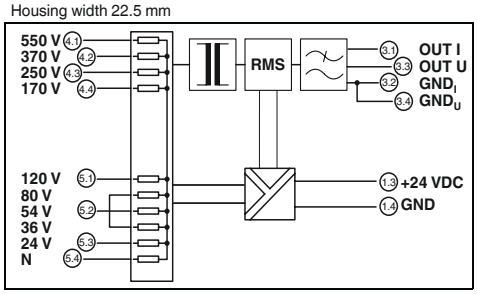
For DC voltages from 0 to ±660 V DC

For sinusoidal AC voltages 0 ... 660 V AC

Housing width 22.5 mm



Housing width 22.5 mm



Technical data

Input data				
Input voltage range / resistor	-550 V DC ... 550 V DC	5,500 kΩ	0 V ... 550 V AC	5,500 kΩ
	-370 V DC ... 370 V DC	3,700 kΩ	0 V ... 370 V AC	3,700 kΩ
	-250 V DC ... 250 V DC	2,500 kΩ	0 V ... 250 V AC	2,500 kΩ
	-170 V DC ... 170 V DC	1,700 kΩ	0 V ... 170 V AC	1,700 kΩ
	-120 V DC ... 120 V DC	1,200 kΩ	0 V ... 120 V AC	1,200 kΩ
	-80 V DC ... 80 V DC	800 kΩ	0 V ... 80 V AC	800 kΩ
	-54 V DC ... 54 V DC	800 kΩ	0 V ... 54 V AC	800 kΩ
	-36 V DC ... 36 V DC	800 kΩ	0 V ... 36 V AC	800 kΩ
	-24 V DC ... 24 V DC	240 kΩ	0 V ... 24 V AC	240 kΩ
ZERO / SPAN adjustment	± 20% / ± 20%		± 20% / ± 20%	
Frequency range	-		45 Hz ... 405 Hz	
Maximum input voltage	± 660 V DC		+ 660 V AC	
Output data	U output	I output	U output	I output
Output signal	-10 ... 10 V	-20 ... 20 mA	0 ... 10 V / 2 ... 10 V	0 ... 20 mA / 4 ... 20 mA
Maximum output signal	≤11 V	≤22 mA	≤11 V	≤22 mA
Load R_B	>10 kΩ	<500 Ω	>10 kΩ	<500 Ω
Ripple	50 mV	50 mV	50 mV	50 mV
General data				
Supply voltage U_B	19.2 V DC ... 30 V DC		19.2 V DC ... 30 V DC	
Current consumption	<60 mA		<45 mA	
Maximum transmission error	<1% (of measuring range end value)		<1% (from a measuring range final value, 45 ... 65 Hz)	
Temperature coefficient	<0.015%/K		<0.015%/K	
Step response (10-90%)	<16 ms		<180 ms	
Safe isolation	In accordance with IEC 61010-1		In accordance with EN 50178	
Degree of pollution	2		2	
Degree of protection	IP20		IP20	
Dimensions W/H/D	22.5 / 99 / 114.5 mm		22.5 / 99 / 114.5 mm	
Connection data solid/stranded/AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14	
Conformance/approvals				
Conformance	CE-compliant		CE-compliant	
UL, USA/Canada	UL 61010 Listed		UL 61010 Listed	

Ordering data

Description	Type	Order No.	Pcs./Pkt.
MCR-voltage transducer, for DC voltages from 0 to ±20 V DC to 0 to ±660 V DC			
- with screw connection	**MACX MCR-VDC**	2906242	1
- with Push-in connection	**MACX MCR-VDC-PT**	2906243	1
MCR voltage transducer, for sinusoidal AC voltages from 0 to 20 V AC to 0 to 660 V AC			
- with screw connection	**MACX MCR-VAC**	2906239	1
- with Push-in connection	**MACX MCR-VAC-PT**	2906244	1

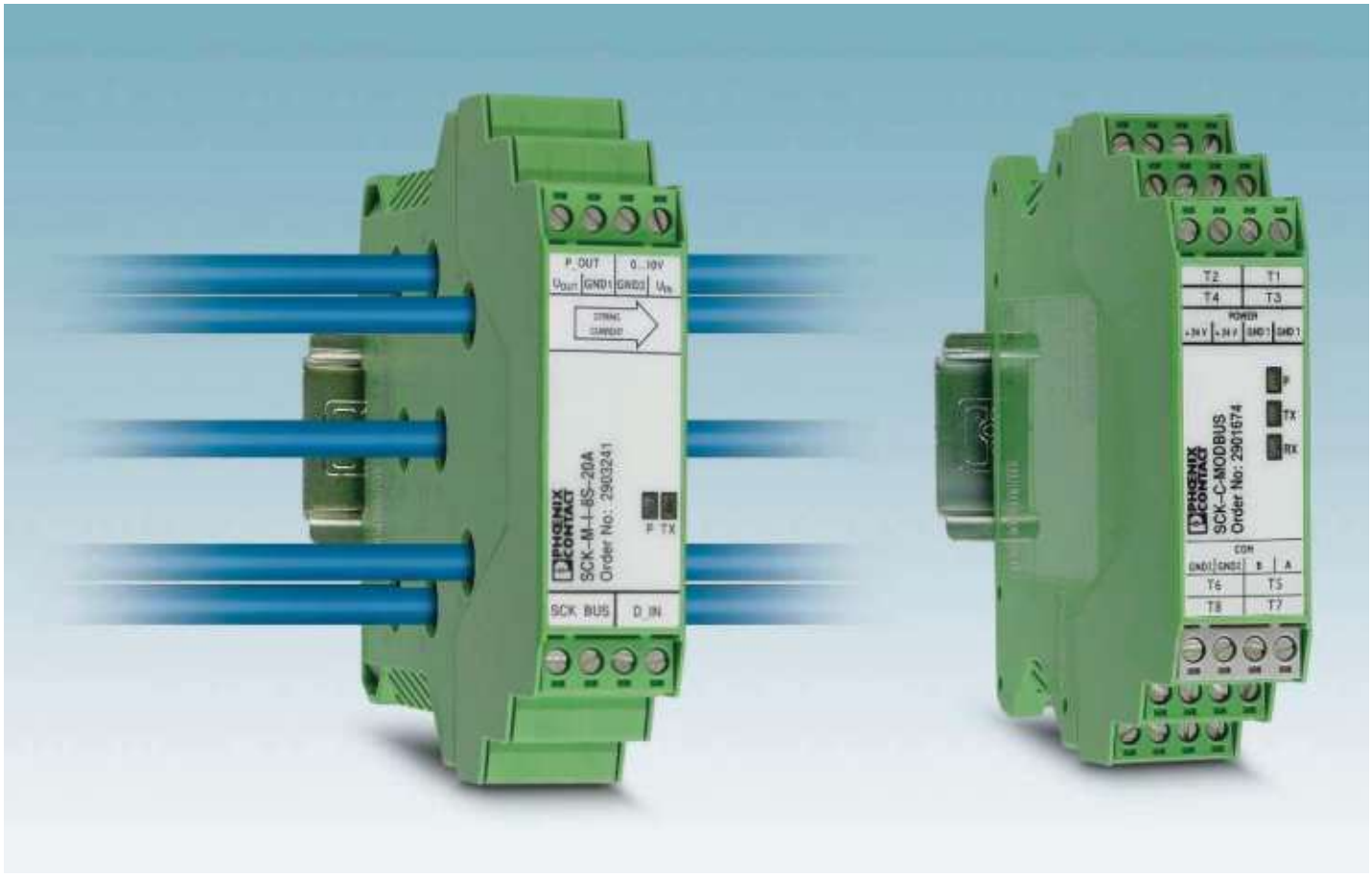
USB adapter cables
Software adapter cables

The following adapter cables are available for programming the MCR-S... current transducers:
– USB adapter cable
– Software adapter cable

For MCR-S-... current transducer

EAC

Description	Ordering data		
	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 (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



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.

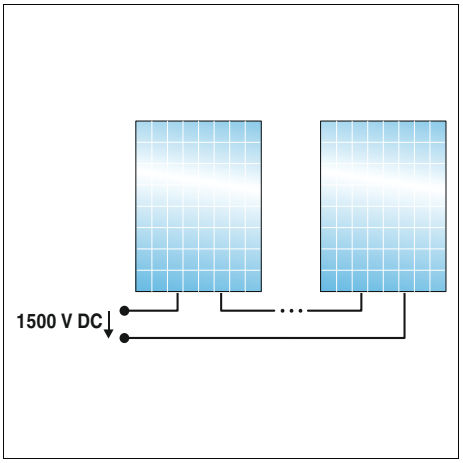
Current topic: reliable monitoring

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. The brochure "Solar power – Solutions for photovoltaics" includes additional innovative solutions for your photovoltaic system, such as:

– Connection technology
– Surge protection
– Hardware and software solutions
– Generator connection boxes
– Integral park management



Contact-free current measurement

Contact-free measurement using Hall sensors offers many advantages:

– Safe isolation is already ensured by the cable insulation
– No contact resistance due to additional contact points
– Reliable current transfer, as there is no direct intervention in the string circuit

Space-saving installation without an additional power supply

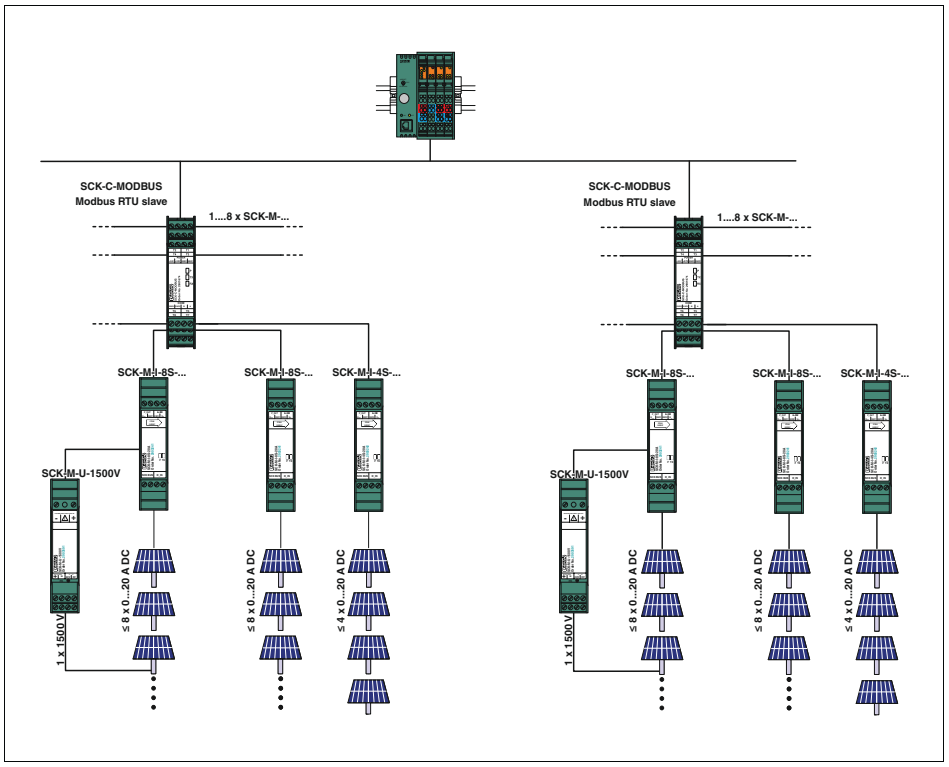
With a width of just 22.5 mm, the narrow measuring module bundles the cables in a confined space.

– The 2-conductor communication cable is also used to supply the measuring modules
– This means that one communication module supplies up to eight measuring modules – without an additional power supply

Flexible expansion

Optional extension of voltage measurement up to 1,500 V DC

– Also suitable for grounded systems
– Suitable for PV systems with extra high system voltages
– Flexible use, even outside the SOLARCHECK system



Easy integration in monitoring systems

The modular SOLARCHECK monitoring system consists of various measuring modules for current and voltage measurement and an associated communication module.

The communication module collects the measured values from the current measuring modules and forwards them to a higher-level controller. You can acquire up to eight or four string currents with one current measuring module each. A maximum of eight current measuring modules of any type can be connected to one communication module. The 2-conductor communication cable is also used to supply the measuring modules with power. This means that no additional power supply is required in the field.

The voltage measuring module is connected to and also supplied via the analog input provided on the 8-channel current measuring modules.

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:

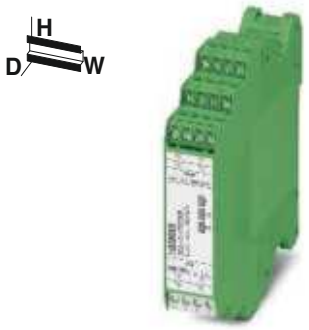
– For connecting and collecting measured values from up to eight measuring modules
– Provision of data for transfer to higher-level controllers

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

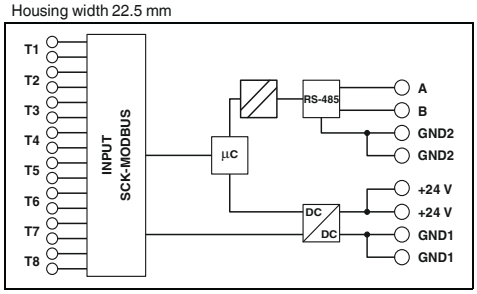
Voltage measuring module

– Voltage measurement up to 1,500 V DC in any grounded PV system
– Connection and supply is usually via the analog input (0 to 10 V) provided on the 8-channel SOLARCHECK current measuring module
– Voltage measurement is output as an analog signal 2 to 10 V
– As an option, can also be removed from the SOLARCHECK group and used separately



Communication module RS-485 (Modbus RTU)

Housing width 22.5 mm

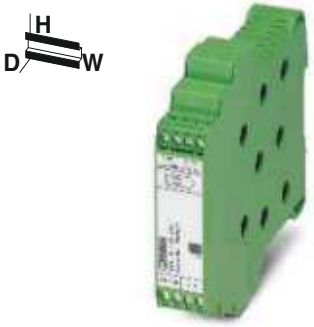


Technical data

Supply	
Supply voltage	24 V DC -10% ... +25%
Own current consumption	22 mA (typical)
Measuring input	
Current measuring range	-
Transmission error, maximum	-
Temperature coefficient	-
Reverse current detection	-
Number of measuring channels	-
Voltage measuring range	-
Connection method	-
Digital input	
Controlled by external floating contact	-
Analog input	
Input voltage range	-
Analog output	
Output voltage range	-
SCK-C-MODBUS data interface	
Cable length (for 0.15 mm²)	-
Communication protocol	Proprietary
Serial port	RS-485
Serial transmission speed	9.6/14.4/19.2/38.4 kbps
Cable length	≤1200 m
Communication protocol	Modbus/RTU
General data	
Degree of protection	IP20
Ambient temperature range	-20°C ... 70°C
Dimensions W/H/D	22.5 / 102 / 106 mm
Screw connection rigid / flexible / AWG	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 12
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
UL, USA	1741 Recognized
UL, USA/Canada	508 Listed

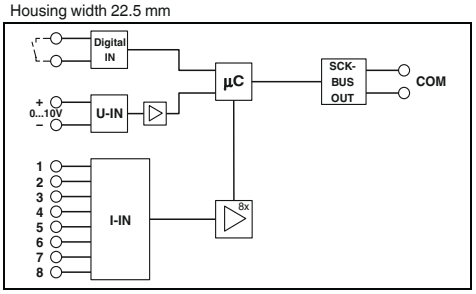
Ordering data

Description	Type	Order No.	Pcs./Pkt.
Communication module			
	SCK-C-MODBUS	2901674	1
Current measuring module, 8-channel			
Current measuring module, 4-channel for extension			
Voltage measuring module			



Current measuring module, 20 A DC, 8-channel

Housing width 22.5 mm



Technical data

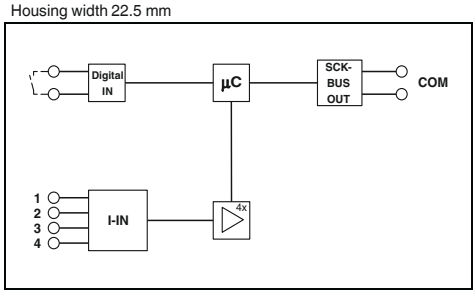
Via SCK-C-MODBUS	
43 mA (typical)	
0 A DC ... 20 A (UL: 0 A DC...25 A DC) ± 1% (from the measuring range final value)	
0.02%/K (T_{K20}) -1 A DC ... 0 mA 8 - Through connection, 9.5 mm diameter	
Floating switch contacts	
0 V ... 10 V	
-	
≤300 m (0.14 mm²) Proprietary	
- - -	
IP20 -20°C ... 70°C 22.5 / 102 / 128.5 mm 0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 12 Class A product, see page 583	
CE-compliant 1741 Recognized 508 Listed	

Ordering data

Type	Order No.	Pcs./Pkt.
SCK-M-I-8S-20A	2903241	1

Extension module, 4-channel Current measurement 20 A DC

Housing width 22.5 mm



Technical data

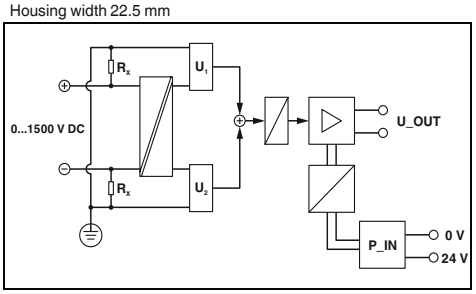
Via SCK-C-MODBUS	
43 mA (typical)	
0 A DC ... 20 A (UL: 0 A DC...25 A DC) ± 1% (from the measuring range final value)	
0.02%/K (T_{K20}) -1 A DC ... 0 mA 4 - Through connection, 9.5 mm diameter	
Floating switch contacts	
-	
-	
≤300 m (0.14 mm²) Proprietary	
- - -	
IP20 -20°C ... 70°C 22.5 / 102 / 128.5 mm 0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 12 Class A product, see page 583	
CE-compliant 1741 Recognized 508 Listed	

Ordering data

Type	Order No.	Pcs./Pkt.
SCK-M-I-4S-20A	2903242	1

Voltage measuring module, 0...1,500 V DC

Housing width 22.5 mm



Technical data

24 V DC -10% ... +25% (or via SSCK-M-I-8S-20A)	
8 mA (typical)	
- ± 1% (after additional tuning (valid for 100 - 1,500 V DC))	
<0.01%/K - 1 0 V DC ... 1,500 V DC Screw connection	
-	
-	
2 V DC ... 10 V DC	
- -	
- - -	
IP20 -20°C ... 70°C 22.5 / 102 / 128.5 mm 0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 12	
CE-compliant 1741 Recognized 508 Listed	

Ordering data

Type	Order No.	Pcs./Pkt.
SCK-M-U-1500V	2903591	1

For high system availability

EMD monitoring relays can be used to detect deviations in important system parameters at an early stage. These can be indicated or system parts can be shut down selectively. EMD monitoring relays ensure error-free and cost-effective operation of your system. They are an inexpensive solution for numerous monitoring functions.

– Surge voltage and undervoltage
– Overcurrent and undercurrent
– Phase failure, phase sequence, and phase asymmetry
– Power factor and active 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.

– Overall 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

Monitoring relays

Single-phase current monitoring

The **EMD-BL-C-10** monitors AC currents from 0 to 10 A.

– Adjustable response delay
– 0 to 5 A or 0 to 10 A measuring range
– Adjustable via rotary switch on the front

Single-phase voltage monitoring

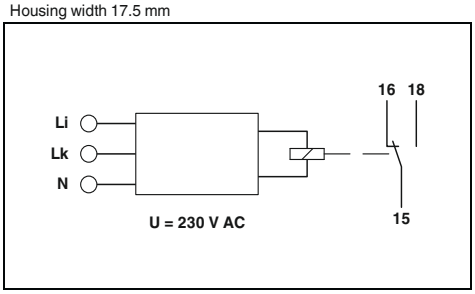
The **EMD-BL-V-230** monitors DC and AC voltages.

– 24 V AC/DC or 230 V AC
– Separately adjustable response delay
– Adjustable monitoring range
– Adjustable via potentiometer on front

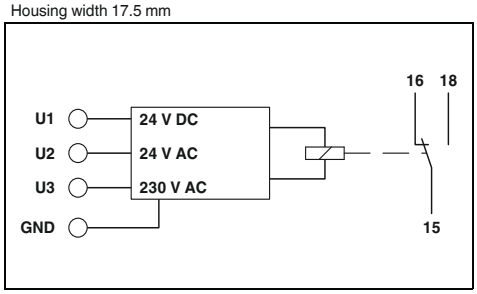
Current monitoring, 1-phase
Overcurrent, undercurrent, window

Voltage monitoring, 1-phase
Undervoltage, window

Housing width 17.5 mm



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 0 A ... 10 A Configurable via rotary switches	-
Input resistance	3 mΩ	-
Minimum setting range	5% ... 95% (from I_N)	75% ... 115% (from U_N)
Maximum 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	1x 10^5 cycles	1x 10^5 cycles
Mechanical service life	15x 10^6 cycles	15x 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 (operation)	-25°C ... 55°C	-25°C ... 55°C
Dimensions W/H/D	17.5 / 88 / 65.5 mm	17.5 / 88 / 65.5 mm
Push-in connection rigid / flexible / 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
Screw connection rigid / flexible / 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
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.
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

Monitoring relays

Three-phase voltage monitoring

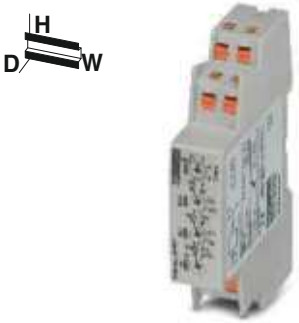
The **EMD-BL-3V-400** monitors three-phase AC voltages.

– 3~ 400 V AC/230 V AC ±30%
– Separately adjustable response delay
– Adjustable monitoring range
– Adjustable via potentiometer on front
– Supply from the measuring circuit

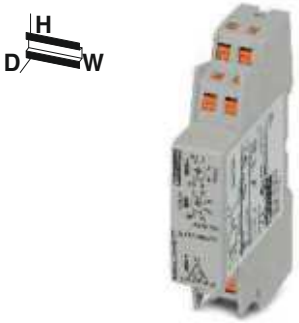
Phase monitoring

The **EMD-BL-PH-400** monitors three-phase AC voltages.

– 3~ 208 to 480 V AC / 120 to 277 V AC
– Adjustable response delay
– Adjustable asymmetry: 5 to 25% / OFF
– Adjustable via potentiometer on front
– Supply from the measuring circuit

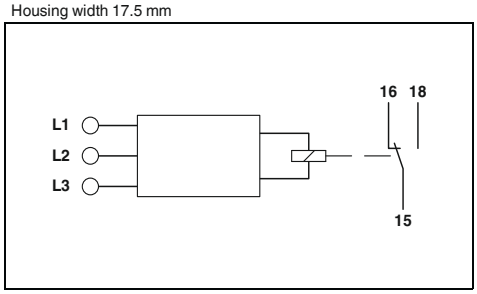


Voltage monitoring, 3-phase
Window, phase sequence

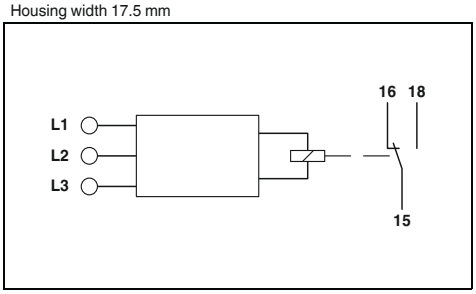


Phase monitoring
Phase sequence, phase failure, asymmetry

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
Minimum setting range	70% ... 120% (from U_N)	-
Maximum 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	1x 10^5 cycles	1x 10^5 cycles
Mechanical service life	15x 10^6 cycles	15x 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 (operation)	-25°C ... 55°C	-25°C ... 55°C
Dimensions W/H/D	17.5 / 88 / 65.5 mm	17.5 / 88 / 65.5 mm
Push-in connection rigid / flexible / AWG	0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14	0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14
Screw connection rigid / flexible / AWG	0.5 ... 2.5 mm² / 0.5 ... 2.5 mm² / 20 - 14	0.5 ... 2.5 mm² / 0.5 ... 2.5 mm² / 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.
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

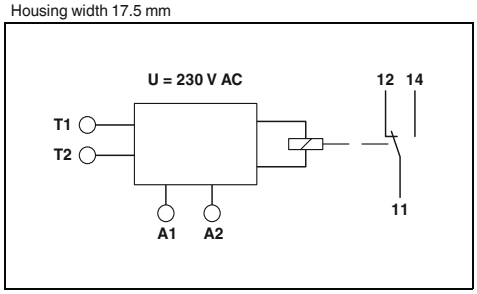
Thermistor monitoring

The EMD-SL-PTC monitors the temperature of motor windings.

– Response value ≥ 3.6 kΩ
– Release value ≤1.6 kΩ
– DIN 44081- / DIN 44082-compliant
– Sensors can be connected in series

Temperature monitoring (motor windings)

Housing width 17.5 mm



Technical data

Functions	
	Winding temperature monitoring
Input	
Total cold resistance	≤1.5 kΩ
Response value	≥3.6 kΩ (relay drops out)
Release value	≤1.6 kΩ (relay picks up)
Basic accuracy	± 10% (of scale end value)
Relay output	
Contact type	1 floating PDT
Switching capacity	1250 VA (5 A / 250 V AC)
Electrical service life	1x 10^5 cycles
Mechanical service life	15x 10^6 cycles
Output fuse	5 A (fast-blow)
General data	
Supply voltage	230 V AC (-15% ... +10%)
Nominal power consumption	3.5 VA (0.5 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature (operation)	-25°C ... 55°C
Dimensions W/H/D	17.5 / 88 / 65.5 mm
Push-in connection rigid / flexible / AWG	0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14
Screw connection rigid / flexible / AWG	0.5 ... 2.5 mm^2 / 0.5 ... 2.5 mm^2 / 20 - 14
Conformance/approvals	
Conformance	CE-compliant

Ordering data

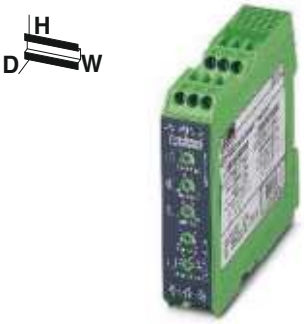
Description	Type	Order No.	Pcs./Pkt.
Compact monitoring relays			
with Push-in connection	**EMD-BL-PTC-PT**	2906253	1
with screw connection	**EMD-BL-PTC**	2906252	1

Monitoring relays

Single-phase current monitoring

EMD-...C... monitoring relays monitor DC and AC currents within the range of 0 to 10 A.

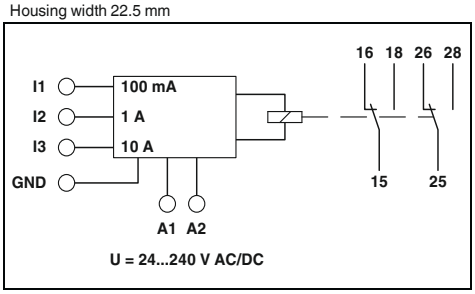
– Separately adjustable startup and release delays
– Variable supply voltage range
– Adjustable via potentiometer on front



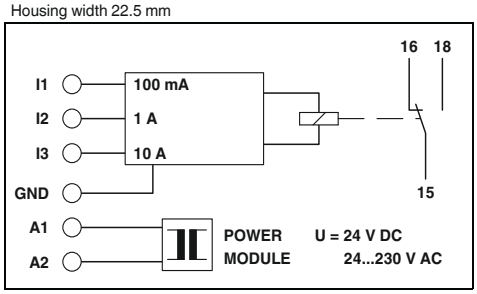
Overcurrent and undercurrent monitoring

Over or undercurrent monitoring

Housing width 22.5 mm



Housing width 22.5 mm

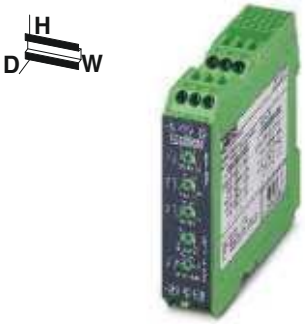


	Technical data	Technical data	
Functions		EMD-SL-C-OC-10	EMD-SL-C-UC-10
	Overcurrent, undercurrent, window, error memory	Overcurrent	Undercurrent
Input			
Input ranges	0 mA ... 100 mA (connection terminals: I1 and GND) 0 A ... 1 A (connection terminals: I2 and GND) 0 A ... 10 A (connection terminals: I3 and GND)	0 mA ... 100 mA (connection terminals: I1 and GND) 0 A ... 1 A (connection terminals: I2 and GND) 0 A ... 10 A (connection terminals: I3 and GND)	
Input resistance	470 mΩ (at I_N = 100 mA) ; 47 mΩ (at I_N = 1 A) ; 5 mΩ (at I_N = 10 A)	470 mΩ (at I_N = 100 mA) ; 47 mΩ (at I_N = 1 A) ; 5 mΩ (at I_N = 10 A)	
Minimum setting range	5% ... 95% (from I_N)	5% ... 95% (from I_N)	
Maximum setting range	10% ... 100% (from I_N)	10% ... 100% (from I_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	2x 10^5 cycles at ohmic load, 1,000 VA	2x 10^5 cycles at ohmic load, 1,000 VA	
Mechanical service life	Approx. 2x 10^7 cycles	Approx. 2x 10^7 cycles	
Output fuse	5 A (fast-blow)	5 A (fast-blow)	
General data			
Supply voltage range	24 V AC ... 240 V AC -15% ... +10% 24 V DC ... 240 V DC -20% ... +25%	24 V AC ... 230 V AC (see Power modules) 24 V DC (see Power modules)	
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 (operation)	-25°C ... 55°C	-25°C ... 55°C	
Dimensions W/H/D	22.5 / 90 / 113 mm	22.5 / 90 / 113 mm	
Screw connection rigid / flexible / 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	
EMC note	Class A product, see page 583		
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-C-10	2866022	1	**EMD-SL-C-OC-10**	2866019	1
				EMD-SL-C-UC-10	2867937	1
Power module						
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

Monitoring relays

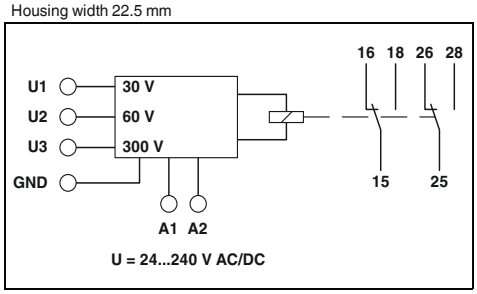
Single-phase voltage monitoring
EMD-...V... monitoring relays monitor DC and AC voltages within the range 0 to 300 V.
– Separately adjustable startup and release delays
– Variable supply voltage range
– Adjustable via potentiometer on front



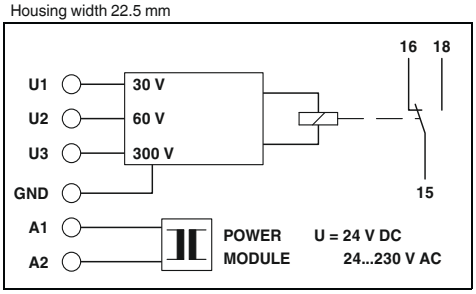
Undervoltage and overvoltage monitoring

Undervoltage monitoring

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)
Minimum setting range	5% ... 95% (from U_N)	5% ... 95% (from U_N)
Maximum 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	2x 10^5 cycles at ohmic load, 1,000 VA	2x 10^5 cycles at ohmic load, 1,000 VA
Mechanical service life	Approx. 2x 10^7 cycles	Approx. 2x 10^7 cycles
Output fuse	5 A (fast-blow)	5 A (fast-blow)
General data		
Supply voltage range	24 V AC ... 240 V AC -15% ... +10% 24 V DC ... 240 V DC -20% ... +25%	24 V AC ... 230 V AC (see Power modules) 24 V DC (see Power modules)
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 (operation)	-25°C ... 55°C	-25°C ... 55°C
Dimensions W/H/D	22.5 / 90 / 113 mm	22.5 / 90 / 113 mm
Screw connection rigid / flexible / 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
EMC note	Class A product, see page 583	
Conformance/approvals		
Conformance	CE-compliant	CE-compliant
UL, USA/Canada	UL/C-UL listed UL 508	UL/C-UL listed UL 508

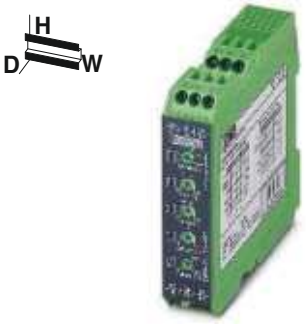
	Ordering data			Ordering data		
Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Electronic monitoring relay						
	EMD-FL-V-300	2866048	1	**EMD-SL-V-UV-300**	2866035	1
Power module						
Supply voltage 20 ... 30 V DC				**EMD-SL-PS- 24DC**	2885359	1
Supply voltage 20.2 ... 26.4 V AC				**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

Monitoring relays

Three-phase voltage monitoring

EMD-...-3V... monitoring relays monitor three-phase AC voltages of 160 to 897 V AC (depending on the device concerned).

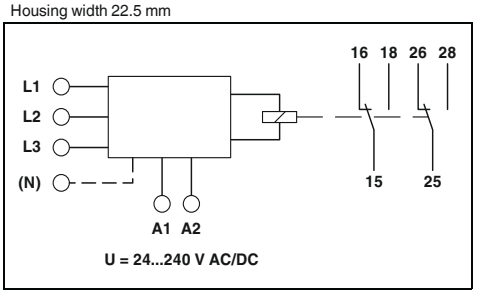
– Adjustable response delay
– Variable supply voltage range thanks to pluggable power module (order separately)
– Adjustable via potentiometer on front
– Adjustable asymmetry



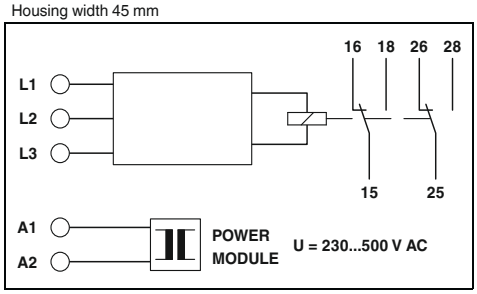
Undervoltage and phase monitoring, 400 V or 230 V

Undervoltage and phase monitoring, 500 V or 690 V

Housing width 22.5 mm



Housing width 45 mm



Technical data

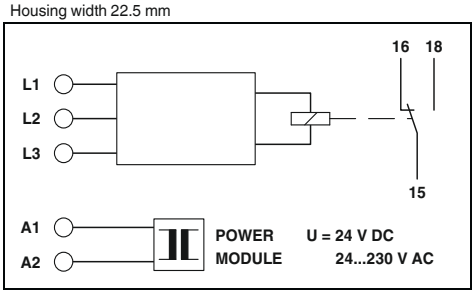
Functions	EMD-FL-3V-400	EMD-FL-3V-230	EMD-FL-3V-690	EMD-FL-3V-500
	Undervoltage, window, asymmetry, phase sequence, phase failure	Undervoltage, window, asymmetry, phase sequence, phase failure	Undervoltage, window, asymmetry, phase sequence, phase failure	Undervoltage, window, asymmetry, phase sequence, phase failure
Input				
Monitoring range	280 V AC ... 520 V AC	161 V AC ... 299 V AC	483 V AC ... 897 V AC	350 V AC ... 650 V AC
Input ranges	3 N ~ 400/230 V	3 N ~ 230/132 V	3 ~ 690 V	3 ~ 500 V
Input resistance	1 MΩ	470 kΩ	1 MΩ	1 MΩ
Minimum setting range	-30% ... 20% (from U_N)		-30% ... 20% (from U_N)	
Maximum setting range	-20% ... 30% (from U_N)		-20% ... 30% (from U_N)	
Setting range for response delay	0.1 s ... 10 s		0.1 s ... 10 s	
Asymmetry	5% ... 25% / OFF	5% ... 25% / OFF	5% ... 25% / OFF	5% ... 25% / OFF
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		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	2x 10^5 cycles at ohmic load, 1,000 VA		2x 10^5 cycles at ohmic load, 1,000 VA	
Mechanical service life	Approx. 2x 10^7 cycles		Approx. 2x 10^7 cycles	
Output fuse	5 A (fast-blow)		5 A (fast-blow)	
General data				
Supply voltage	230 V AC			
Supply voltage range	24 V AC ... 240 V AC -15% ... +10% 24 V DC ... 240 V DC -20% ... +25%		230 V AC ... 500 V AC (see Power modules)	
Nominal power consumption	4.5 VA (1.5 W)		4.5 VA (1.5 W)	
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)		IP40 (housing) / IP20 (connection terminal blocks)	
Ambient temperature (operation)	-25°C ... 55°C		-25°C ... 55°C	
Dimensions W/H/D	22.5 / 90 / 113 mm		45 / 90 / 113 mm	
Screw connection rigid / flexible / 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	
EMC note	Class A product, see page 583			
Conformance/approvals				
Conformance	CE-compliant		CE-compliant	
UL, USA/Canada	UL/C-UL listed UL 508		UL/C-UL listed UL 508	

Ordering data

Description	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Electronic monitoring relay						
	EMD-FL-3V-400	2866064	1	**EMD-FL-3V-690**	2885249	1
	EMD-FL-3V-230	2885773	1	**EMD-FL-3V-500**	2867979	1
Power module						
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				**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

Undervoltage/overvoltage monitoring, 400 V with/without neutral conductor

Housing width 22.5 mm



Technical data

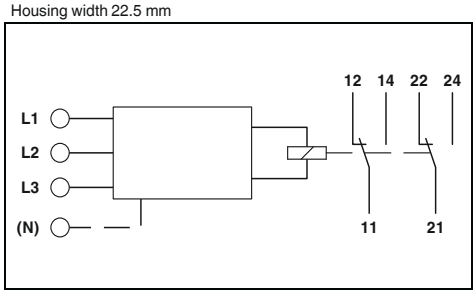
EMD-SL-3V-400	EMD-SL-3V-400-N
Window, without neutral conductor connection	Window, with neutral conductor connection
280 V AC ... 520 V AC	280 V AC ... 520 V AC
3 ~ 400 V	3 N ~ 400/230 V
1 MΩ	1 MΩ
-30% ... 20% (from U_N)	
-20% ... 30% (from U_N)	
0.2 s ... 10 s	
± 5% (of scale end value)	
≤5% (of scale 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)	
2x 10^5 cycles at ohmic load, 1,000 VA	
Approx. 2x 10^7 cycles	
5 A (fast-blow)	
24 V AC ... 230 V AC (see Power modules)	
24 V DC (see Power modules)	
2 VA (1.5 W)	
IP40 (housing) / IP20 (connection terminal blocks)	
-25°C ... 55°C	
22.5 / 90 / 113 mm	
0.5 ... 2.5 mm^2 / 0.25 ... 2.5 mm^2 / 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

Phase monitoring, 400 V

Housing width 22.5 mm



Technical data

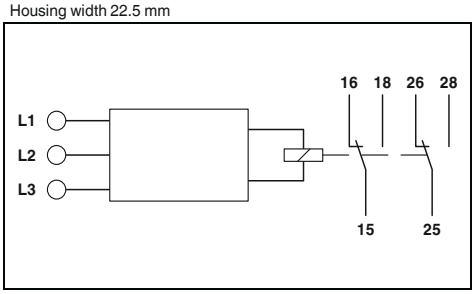
Phase sequence, phase failure, asymmetry
342 V AC ... 457 V AC
3 N ~ 400/230 V
15 kΩ
-
-
≤350 ms (fixed setting)
Fixed, approx. 30%
-
-
-
2 floating PDT contacts
750 VA (3 A/250 V AC, module aligned, ≤5 mm spacing)
1250 VA (5 A/250 V AC, module not aligned, ≥5 mm spacing)
2x 10^5 cycles at ohmic load, 1,000 VA
Approx. 2x 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 mm^2 / 0.25 ... 2.5 mm^2 / 20 - 14
CE-compliant
UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs./Pkt.
EMD-SL-PH-400	2866077	1

Phase monitoring, 690 V

Housing width 22.5 mm



Technical data

Undervoltage, phase sequence, phase failure
177 V AC ... 794 V AC
3~ 208 V ... 690 V
-
-
-
0.1 s ... 10 s
25%
≤3% (of scale end value)
≤5% (of scale end value)
≤2%
2 floating PDT contacts
1250 VA (5 A/250 V AC at +55°C)
150 VA (5 A/30 V DC at +55°C)
2x 10^5 cycles
20x 10^6 cycles
5 A (fast-blow)
±15% (= measuring voltage)
±15% (= measuring voltage)
2 VA (1.2 W)
IP40 (housing) / IP20 (connection terminal blocks)
-25°C ... 70°C (C300)
22.5 / 90 / 113 mm
0.5 ... 2.5 mm^2 / 0.5 ... 2.5 mm^2 / 20 - 14
CE-compliant
UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs./Pkt.
EMD-SL-PH-690	2905597	1

Monitoring relays

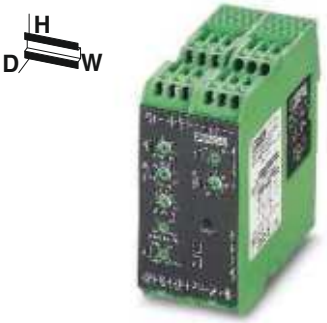
Effective power monitoring

The active power in single and 3-phase networks is monitored with the **EMD-FL-RP-480** active 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)

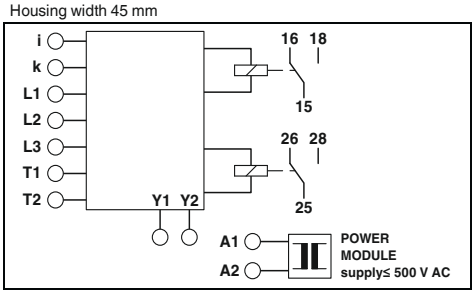
The **EMD-FL-PF-400** monitoring relay is a cos ϕ monitor for load monitoring in single or three-phase networks.



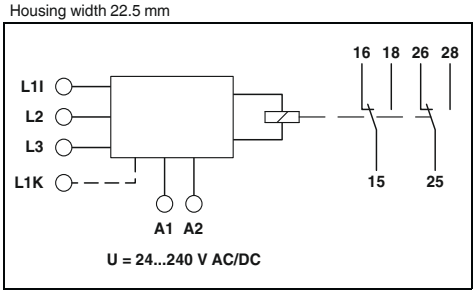
Effective power monitoring

Load monitoring (cos ϕ)

EAC
Housing width 45 mm



EAC
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)
Minimum setting range		5% ... 110% (of P_N)	-
Maximum 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		2x 10^5 cycles at ohmic load, 1,000 VA	2x 10^5 cycles at ohmic load, 1,000 VA
Mechanical service life		Approx. 2x 10^7 cycles	Approx. 2x 10^7 cycles
Output fuse		5 A (fast-blow)	5 A (fast-blow)
General data			
Supply voltage range		110 V AC ... 500 V AC (see Power modules)	24 V AC ... 240 V AC -15% ... +10% 24 V DC ... 240 V DC (-20% ... +25%)
Nominal power consumption		3.5 VA (3 W)	4.5 VA (1.5 W)
Rated insulation voltage		300 V (in accordance with EN 50178)	300 V (in accordance with EN 50178)
Degree of protection		IP40 (housing) / IP20 (connection terminal blocks)	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature (operation)		-25°C ... 55°C	-25°C ... 55°C
Dimensions W/H/D		45 / 90 / 113 mm	22.5 / 90 / 113 mm
Screw connection rigid / flexible / 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
EMC note			Class A product, see page 583
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**	2885809	1
Power module, plug-in, please order at the same time!						
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			

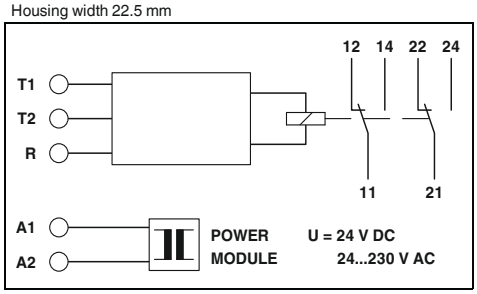
Filling level monitoring

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

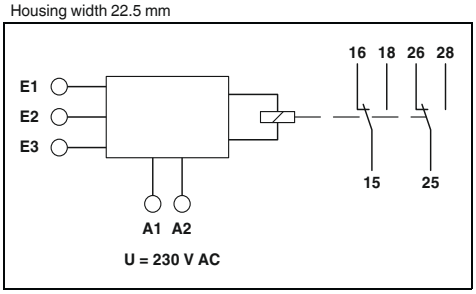
Temperature monitoring (motor windings)

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	
Maximum probe voltage	-	16 V AC	
Maximum probe current	-	7 mA	
Length of probe cable	-	<1,000 m (line capacity 100 nF/km; set value <50%) <100 m (line capacity 100 nF/km; set value 100%)	
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	2x 10^5 cycles at ohmic load, 1,000 VA	2x 10^5 cycles at ohmic load, 1,000 VA	
Mechanical service life	Approx. 2x 10^7 cycles	Approx. 2x 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
Supply voltage range	24 V AC ... 230 V AC (see Power modules) 24 V DC (see Power modules)		
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 (operation)	-25°C ... 55°C	-25°C ... 55°C	
Dimensions W/H/D	22.5 / 90 / 113 mm	22.5 / 90 / 113 mm	
Screw connection rigid / flexible / 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	
EMC note	Class A product, see page 583		
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						
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			

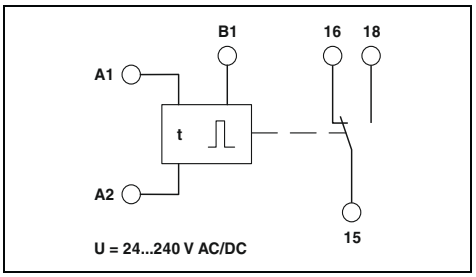
Compact timer relays

The multifunctional timer relay offers universal use thanks to a variety of functions and various time settings. The rotary switches on the front of the housing allow easy configuration. The compact design also allows flexible use.

Main features:

– Adjustable time
– Time range: 50 ms to 1 h
– Non-floating control input
– Delay functions
– Wiper functions
– Output: one electrically isolated PDT
– Clear diagnostics via status LED

Multifunctional timer relay



Technical data

Functions	
	E: with switch-on delay Rs: with release delay and control contact Es: with switch-on delay and control contact Ws: with single shot leading edge and control contact
Control contact	
Connection	Non-floating, terminals A1-B1
Control pulse length	≥50 ms (DC)
Relay output	
Contact type	1 floating PDT
Switching capacity	1250 VA (5 A / 250 V AC)
Mechanical service life	15x 10^6 cycles
General data	
Supply voltage	24 V DC ... 240 V DC -20% ... +25%
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature range	-25°C ... 55°C
Dimensions W/H/D	17.5 / 88 / 65.5 mm
Push-in connection rigid / flexible / AWG	0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14
Screw connection rigid / flexible / AWG	0.5 ... 2.5 mm^2 / 0.5 ... 2.5 mm^2 / 20 - 14
Conformance/approvals	
Conformance	CE-compliant
UL, USA/Canada	UL 508 Listed

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Compact timer relay, multifunctional, with screw connection	**ETD-BL-1T-230**	2905813	1
Compact timer relay, multifunctional, with Push-in connection	**ETD-BL-1T-230-PT**	2905814	1

Compact timer relays

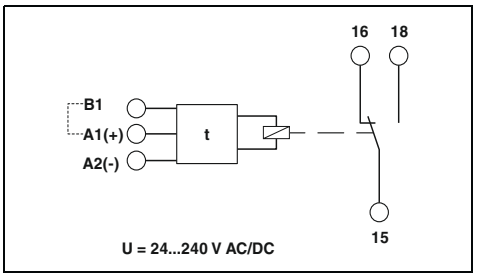
As an impulse encoder with adjustable times, the ETD-BL-2T-I-230 offers a range of flashing functions. The rotary switches on the front of the housing allow easy configuration. The compact design also allows flexible use.

Main features:

– Two adjustable times
– Time ranges: 50 ms to 100 h
– Flashing function
– Wide-range power supply unit
– Output: two floating changeover contacts
– Clear diagnostics via status LED

Impulse encoder, adjustable pulse and pause times

EAC



Technical data

Functions	
	Ip: switched-mode beginning with the pause Ii: switched-mode beginning with the pulse
Time ranges	
Setting range	50 ms ... 100 h (7 time end ranges)
Control contact	
Connection	Non-floating, terminals A1-B1
Control pulse length	≥50 ms (DC)
Relay output	
Contact type	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)
Mechanical service life	Approx. 2x 10^7 cycles
General data	
Supply voltage	24 V AC/DC ... 240 V AC/DC -10% ... +15%
Nominal power consumption	2.5 VA (1 W)
Degree of protection	IP40 (housing) / IP20 (connection terminal blocks)
Ambient temperature range	-25°C ... 55°C
Dimensions W/H/D	17.5 / 88 / 65.5 mm
Push-in connection rigid / flexible / AWG	0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14
Screw connection rigid / flexible / AWG	0.5 ... 2.5 mm^2 / 0.5 ... 2.5 mm^2 / 20 - 14
Conformance/approvals	
Conformance	CE-compliant

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Compact timer relay, impulse encoder			
- with Push-in connection	**ETD-BL-2T-I-230-PT**	2907714	1
- with screw connection	**ETD-BL-2T-I-230**	2907713	1

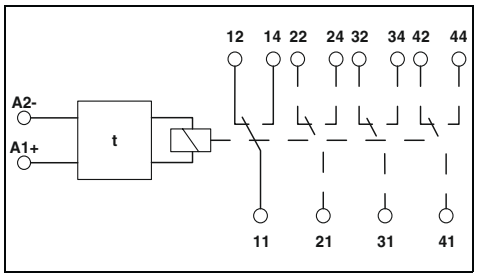
Plug-in timer modules for RIF-1, RIF-2, RIF-3, and RIF-4

The multifunctional plug-in timer module transforms a relay module into a timer relay. RIF-1 to RIF-4 bases can be equipped with this module. Using DIP switches, three time functions and four time ranges can be selected. Detailed time settings are made using a potentiometer. Relays can be operated with an input voltage of 12, or 24 V AC/DC.

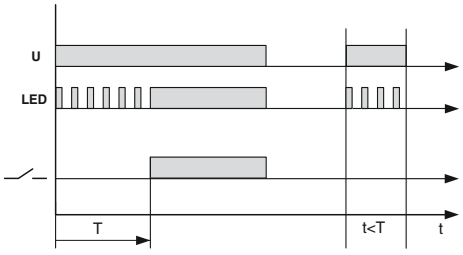
The time functions:
– With switch-on delay
– With passing make contact
– Pulse generator

Time ranges:
– 0.5 to 10 s
– 5 to 100 s
– 0.5 to 10 min
– 5 to 100 min

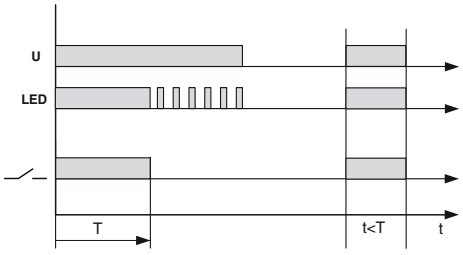
Timer module for RIF-1 to RIF-4 relay modules for 12 to 24 V AC/DC input voltage



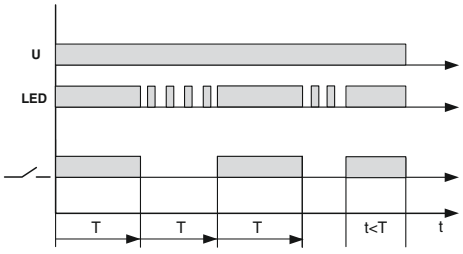
With switch-on delay



Passing make contact



Pulse generator



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

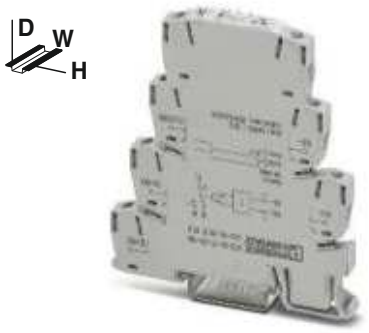
Ordering data

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

Ultra-narrow timer relays

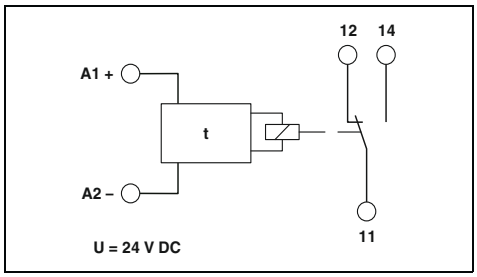
The **ETD-BL-1T-...** ultra-narrow timer relays show their strengths in applications that involve set parameters for functionality and time range.

– Application-oriented device selection: One function, one time range
– High level of setting accuracy, thanks to labeled and illuminated thumb wheel
– 6.2 mm slim design width



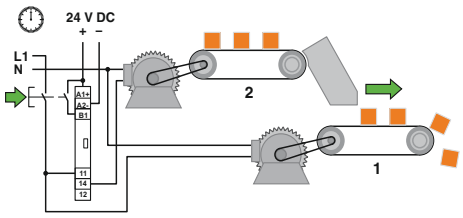
Timer relay with switch-on delay, voltage controlled

Ex:

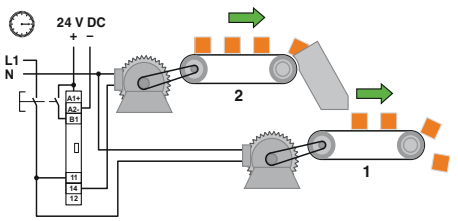


Technical data

Functions	
	ON: with switch-on delay
Control contact	
Connection	-
Control pulse length	min. 50 ms
Relay output	
Contact type	1 floating PDT
Switching capacity	1,500 VA (6 A / 250 V AC)
Mechanical service life	Approx. 2x 10^7 cycles
General data	
Supply voltage	24 V DC (19.2 V DC ...30 V DC)
Typical nominal current	15 mA (relay ON) 7 mA (relay OFF)
Impulse withstand voltage	6 kV (in accordance with EN 50178)
Degree of protection	IP20
Ambient temperature range	-20°C ... 65°C
Dimensions W/H/D	6.2 / 80 / 86 mm
Screw connection rigid / flexible / AWG	0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 30 - 12
Push-in connection rigid / flexible / AWG	0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14
Conformance/approvals	
Conformance	CE-compliant
ATEX	II 3 G Ex nA nC IIC T4 Gc X
UL, USA/Canada	UL/C-UL listed UL 508



Conveyor belt 1 starts immediately



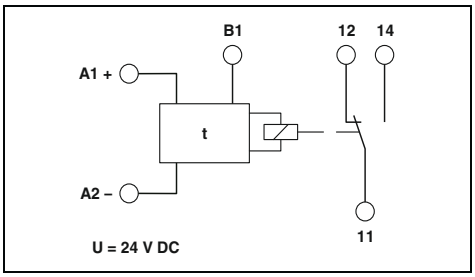
Conveyor belt 2 stars with a time delay

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 connection			
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

Timer relay with switch-on delay, with control contact

Ex:



Technical data

ON-CC: with switch-on delay with control contact

Non-floating, terminals A1-B1
min. 50 ms

1 floating PDT
1,500 VA (6 A / 250 V AC)
Approx. 2x 10^7 cycles

24 V DC (19.2 V DC ...30 V DC)
15 mA (relay ON)
7 mA (relay OFF)
6 kV (in accordance with EN 50178)
IP20
-20°C ... 65°C
6.2 / 80 / 86 mm
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 30 - 12
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14

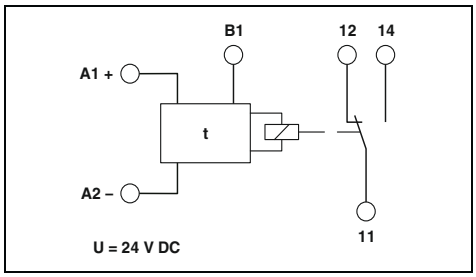
CE-compliant
Ex II 3 G Ex nA nC IIC T4 Gc X
UL/C-UL listed UL 508

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

Timer relay with off delay, with control contact

Ex:



Technical data

OFF-CC: off delay with control contact

Non-floating, terminals A1-B1
min. 50 ms

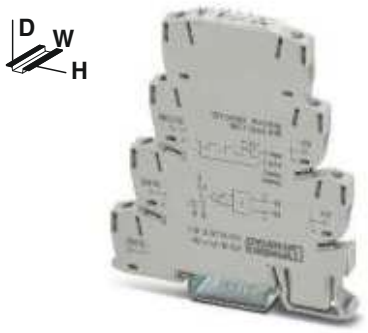
1 floating PDT
1,500 VA (6 A / 250 V AC)
Approx. 2x 10^7 cycles

24 V DC (19.2 V DC ...30 V DC)
15 mA (relay ON)
7 mA (relay OFF)
6 kV (in accordance with EN 50178)
IP20
-20°C ... 65°C
6.2 / 80 / 86 mm
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 30 - 12
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14

CE-compliant
Ex II 3 G Ex nA nC IIC T4 Gc X
UL/C-UL listed UL 508

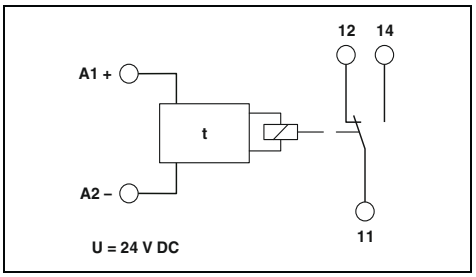
Ordering data

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



Timer relay with flashing indic. function, beginning with the pulse

Ex:



Technical data

F: flashing beginning with pulse

-
min. 50 ms

1 floating PDT
1,500 VA (6 A / 250 V AC)
Approx. 2x 10^7 cycles

24 V DC (19.2 V DC ...30 V DC)
15 mA (relay ON)
7 mA (relay OFF)
6 kV (in accordance with EN 50178)
IP20
-20°C ... 65°C
6.2 / 80 / 86 mm
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 30 - 12
0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 26 - 14

CE-compliant
Ex II 3 G Ex nA nC IIC T4 Gc X
UL/C-UL listed UL 508

Ordering data

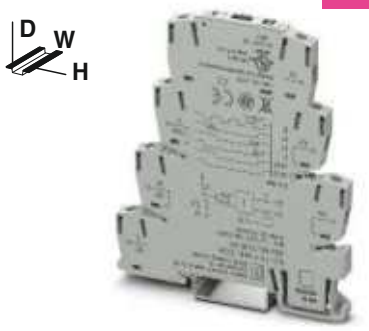
Type	Order No.	Pcs./Pkt.
ETD-BL-1T-F- 10S	**2917492**	1
ETD-BL-1T-F-300S	**2917502**	1
ETD-BL-1T-F- 30MIN	**2917515**	1
ETD-BL-1T-F-300MIN	**2917528**	1
ETD-BL-1T-F- 10S-PT	**2901489**	1
ETD-BL-1T-F-300S-PT	**2901490**	1
ETD-BL-1T-F- 30MIN-PT	**2901491**	1
ETD-BL-1T-F-300MIN-PT	**2901492**	1

Ultra-narrow multifunctional timer relays

new

Ultra-narrow multifunctional TR-PLC timer relays are the most cost-effective and space-saving solution for simple time control applications.

- Four time range settings
- Four function selections
- Select devices with ease: Choose the function and time range you want using DIP switches
- Illuminated thumbwheel for accurate time settings
- Space-saving: overall width of just 6.2 mm



Multifunctional timer relay

Housing width 6.2 mm

Technical data

Functions	
	E: with switch-on delay Es: with switch-on delay and control contact Rs: with release delay and control contact Bi: flashing beginning with pulse
Time ranges	
Setting range	0.1 s ... 300 min. (4 time end ranges)
Control contact	
Connection	Non-floating, terminals A1-B1
Control pulse length	≥50 ms
Relay output	
Contact type	1 floating PDT
Switching capacity	1,500 VA (6 A / 250 V AC)
Mechanical service life	Approx. 2x 10^7 cycles
General data	
Supply voltage	24 V DC (19.2 V DC ... 30 V DC)
Nominal power consumption	0.45 W (at 24 V DC)
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 rigid / flexible / AWG	0.14 ... 2.5 mm^2 / 0.14 ... 2.5 mm^2 / 30 - 12
Conformance/approvals	
Conformance	CE-compliant
UL, USA/Canada	UL/C-UL listed UL 508

Ordering data

Description	Type	Order No.	Pcs./Pkt.
Multifunctional timer relays with adjustable functions and time, with screw connection	**PLC-TR-1T-MUL-300M**	2910140	1
Multifunctional timer relays with adjustable functions and time, with Push-in connection	**PLC-TR-1T-MUL-300M-PT**	2910141	1

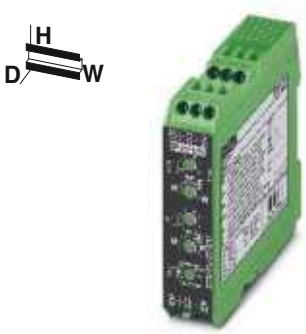
The desired function and time range can be set using the DIP switches on the side of the device:

DIP switch		Function	DIP switch		Time range
S3	S4		S2	S1	
OFF	OFF	E	OFF	OFF	0.1 … 10 s
OFF	ON	Es	OFF	ON	3 … 300 s
ON	OFF	Rs	ON	OFF	0.3 … 30 min
ON	ON	Bi	ON	ON	3 … 300 min

Multifunctional timer relays

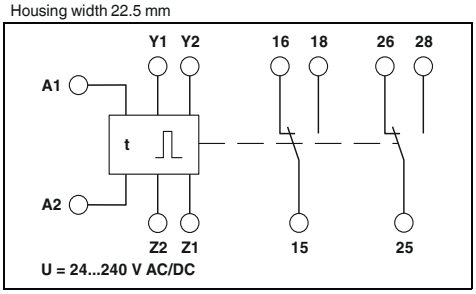
The full range of conventional applications can be accommodated by the three versions of the **ETD** multifunctional timer relay.

– 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



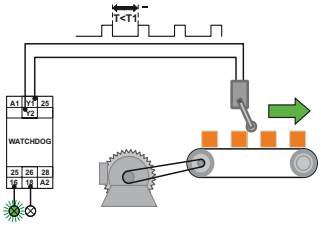
Multifunctional timer relay, two adjustable times

Housing width 22.5 mm

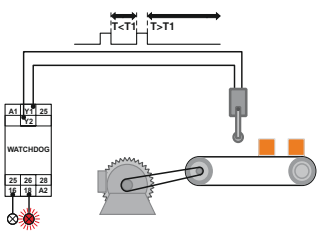


Technical data

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	<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. 2x 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 rigid / flexible / AWG	0.5 ... 2.5 mm² / 0.5 ... 2.5 mm² / 20 - 14
EMC note	Class A product, see page 583
Conformance/approvals	
Conformance	CE-compliant
UL, USA/Canada	UL/C-UL listed UL 508



Function: pulse sequence evaluation



Message for incorrect pulse

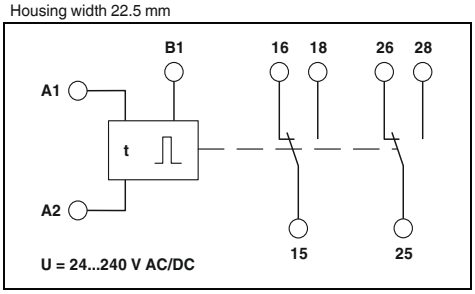
Ordering data

Description	Type	Order No.	Pcs./Pkt.
Electronic timer relay with adjustable functions and times	**ETD-FL-2T-DTI**	2866187	1

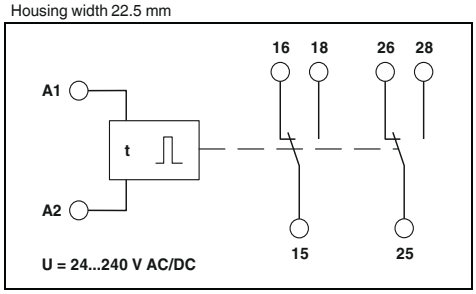
Multifunctional timer relay, one adjustable time

Impulse encoder, adjustable pulse and pause times

Housing width 22.5 mm



Housing width 22.5 mm



Technical data

E: with switch-on delay
Rs: with release delay and control contact
Es: with switch-on delay and control contact
Wu: with single shot leading edge, voltage controlled
Ws: with single shot leading edge and control contact
Wa: with single shot trailing edge and control contact
Bi: flashing beginning with pulse
Bp: flashing beginning with pause

50 ms ... 100 h (7 time end ranges)

Non-floating, terminals A1-B1

Parallel switched minimum load current 1 VA (0.5 W), terminals A2-B1
<10 m
min. 70 ms

2 floating PDT contacts
750 VA (3 A/250 V AC, module aligned, ≤5 mm spacing)
1250 VA (5 A/250 V AC, module not aligned, ≥5 mm spacing)

Approx. 2x 10^7 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
Class A product, see page 583

CE-compliant
UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs./Pkt.
ETD-SL-1T-DTF	2866161	1

Technical data

Ip: switched-mode beginning with the pause
Ii: switched-mode beginning with the pulse

50 ms ... 100 h (7 time end ranges)

-

-
-
-

2 floating PDT contacts
750 VA (3 A/250 V AC, module aligned, ≤5 mm spacing)
1250 VA (5 A/250 V AC, module not aligned, ≥5 mm spacing)

Approx. 2x 10^7 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
Class A product, see page 583

CE-compliant
UL/C-UL listed UL 508

Ordering data

Type	Order No.	Pcs./Pkt.
ETD-SL-2T-I	2866174	1

Diode modules

Diode circuits perform various tasks in electrical control systems, particularly in electronic ones:

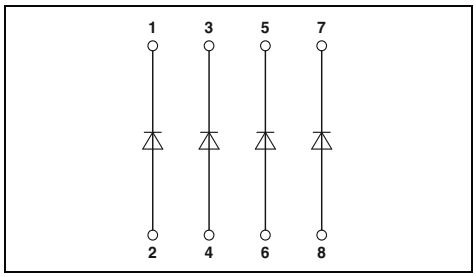
– Electrical decoupling of messages in fault signaling systems
– Spark-suppression diodes for limiting surge voltages of inductive loads, (solenoid valves, DC relays or similar)
– Can be supplied as “diode gates” combined with anode or cathode or as freely assignable diodes

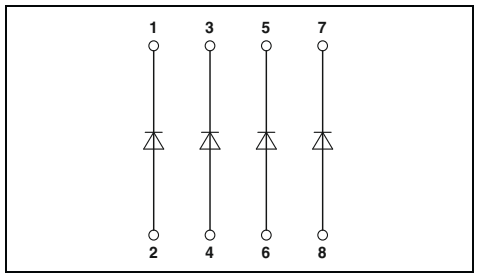
With diode type 1 N 4007

With diode type 1 N 5408

Notes:

Further circuit diagrams can be found in the data sheet at phoenixcontact.net/products.





Technical data

Diodes	4E / 8E / 17E / 7P / 7M	14P / 14M / 32P / 32M	4E-... / 4P-... / 4M-... / 8E-...	8P-... / 8M-...
Max. operating voltage U_{max}				
Peak reverse voltage per diode	1300 V	1300 V	1,000 V	1,000 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	
Degree of pollution	2 (in accordance with EN 50178)		2 (in accordance with 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 rigid / flexible / 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

Lamp testing modules for checking lamps that are installed and ready for operation:

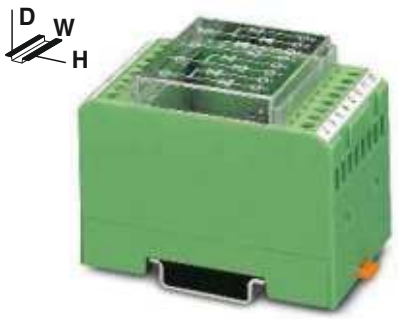
– Individual checking of separate lamps (EMG...-E/LP)
– Centrally controlled checking of lamps (EMG...-M/LP)

Display modules

– Light indicator modules facilitate the monitoring of processes on electronic control systems during troubleshooting

Notes:

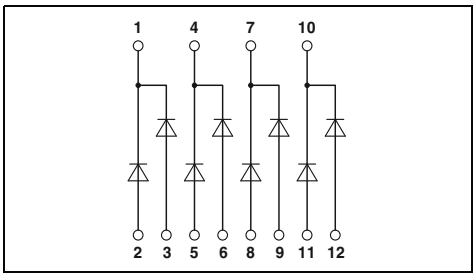
Further circuit diagrams can be found in the data sheet at phoenixcontact.net/products.



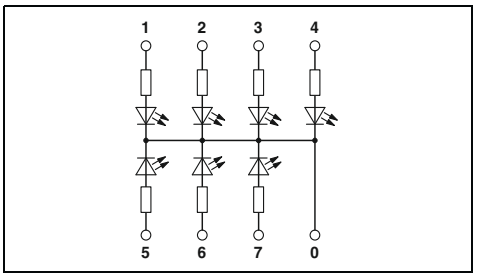
Lamp testing module, groups of 2 diodes with common cathode

Light indicator module, with common return line

EAC



EAC



Technical data

Diodes	8E/16E	14M/32M
Max. operating voltage U_{max}		
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	
Degree of pollution	2 (in accordance with EN 50178)	
Mounting position	Any	
Mounting	In rows with zero spacing	
Dimensions H / D	75 / 55 mm	
Screw connection rigid / flexible / 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		
2 (in accordance with 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 LEDs and shared return line	22.5 mm			
Light indicator module, 24 V DC input voltage				
7 red LEDs and shared return line	22.5 mm			
14 red LEDs and shared return line	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

K1 K2 K3 K4
K9
K10

Relay modules

The importance of the reliability of industrial automation equipment is growing with the increase in use of electronic modules.

Modern relays or solid-state relay interfaces perform a wide range of tasks. No matter what the field – production technology, electrical equipment for machines, control engineering for power distribution, building automation, or process engineering – the aim is to ensure signal exchange between process peripherals and the higher-level central control systems. And this exchange must be reliable, floating, and electrically unambiguous. Safe electrical interface modules that meet the requirements of modern system concepts must include the following features:

– Coupling of different signal levels
– Safe electrical isolation between input and output
– High interference insensitivity

In practice, a relay interface comes into use when a flexible interface configuration with a large switching capacity range and the possibility of combining different types of contact is required. 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
– Simple handling

Solid-state relay modules are used when an interface between the process peripherals and electronics is subject to the following requirements:

– Low control power
– High switching frequencies
– Wear-resistant and bounce-free switching
– Insensitive to vibrations and shocks
– Long service life

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General information

Electromechanical relays are used as interface modules between the process I/O devices, on the one hand, and the open-loop/closed-loop control and signaling equipment, on the other, for level and power adjustment purposes.

Essentially, electromechanical relays can be divided into two main groups: mono-stable and bi-stable 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 bi-stable relays, the contacts remain in their present switch position when the excitation current is switched off.

The documented relay data is based on test conditions and design criteria in accordance with IEC 61810. Data may vary or be limited when mounting relays on DIN rail bases or on PCBs. Numerous parameters, such as:

– Operating time
– Load current
– Input voltage
– Dense mounting arrangement
– Heat dissipation into the environment and the layout for PCB applications ultimately determine the data for the overall arrangement

The Phoenix Contact supply range features numerous ready-mounted relay combinations and base combinations, including some with additional input plug-in modules. These are tested under worst case conditions. The documented data then applies to the combinations.

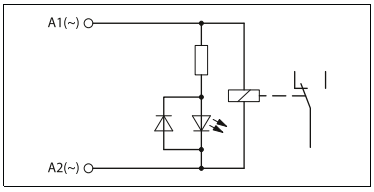
Coil side

Input circuits and voltage types

There are various kinds of input circuits depending on the type of relay used and the nature of the control voltage.

If pure AC relays are used (AC input), the input circuit is generally nothing more than a visual switching status indicator.

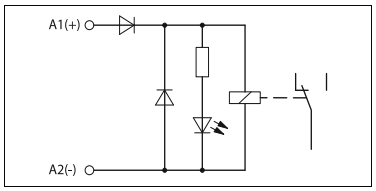
Unless otherwise specified,the frequency of the control voltage is 50/60 Hz.



Basic structure of a relay with AC input

In the case of a pure DC input, the most important addition to the circuit is a freewheeling diode. This limits the voltages induced on the coil on circuit interruption to a value of approximately 0.7 V, which does not pose a danger to any connected control electronics.

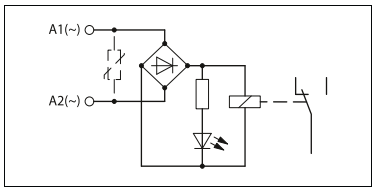
As the freewheeling diode can only perform its required function if the polarity of the voltage connection is correct, a polarity protection diode is also integrated into the input circuit.



Basic structure of a relay with DC input

To allow DC or AC voltage operation, a bridge rectifier is connected in the input circuit. The diodes are simultaneously responsible for performing rectification, freewheeling, and polarity reversal protection functions. The interrupting voltage of the coil is limited to approximately 1.4 V

To protect the input circuit against overvoltages, a varistor is also connected (depending on the type) upstream of the bridge rectifier.

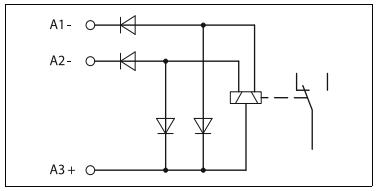


Basic structure of a relay with AC/DC input

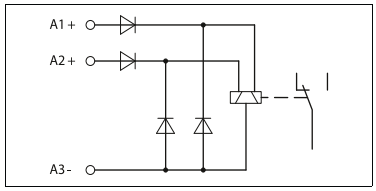
Bi-stable latching relays with a double winding are only ever operated with DC voltage.

With these types of relays, there are three coil connections on the coil side. In addition to the common connection, there are separate connections for “setting” and “resetting”; these are controlled by short pulses only. As a result, the relays hardly heat up at all. Simultaneous control of both control inputs is not permitted.

A distinction is made between negative switching (M) and positive switching (P) types, depending on the polarity of the freewheeling and polarity protection diodes.



Basic structure of a bi-stable relay, negative switching type



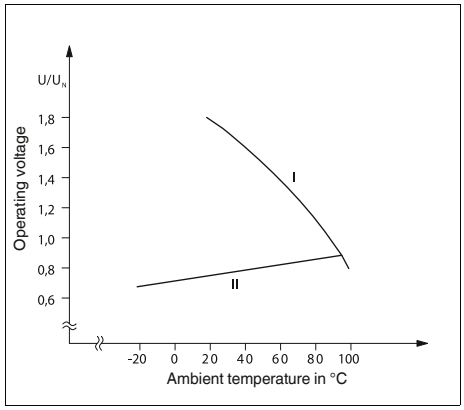
Basic structure of a bi-stable relay, positive switching type

Operating voltage range

The ambient temperature prevailing at the location of use has a major impact on certain relay operating parameters.

As the ambient temperature increases, the coil winding heats up, causing the operate and release voltages to rise. At the same time, the maximum permissible coil voltage decreases, which means that the usable working range becomes restricted as a result.

The diagram below illustrates how the operating voltage behaves as a function of the ambient temperature.



Basic curve of a relay operating voltage

I: Maximum permissible voltage with 100% operating time (OT) and compliance with the coil temperature limit
II: Minimum sparkover voltage

Interference voltages and interference currents on the coil side

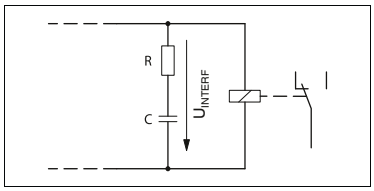
When inductive or capacitive interference voltages are coupled into the long supply lines of a relay, this can prevent the relay from operating safely.

If the coupled-in voltage exceeds the release voltage required by the “relay standard”, IEC 61810-1, the relay may fail to release in extreme cases. In the case of

DC relays, this release voltage is ≥ 0.05 x U_N and for purely AC relays, it is ≥ 0.15 x 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 range of a few mA) provides sufficient control power to prevent the downstream relay from releasing or even enough power to excite it.

The disturbance level of any interference voltages that are present can be reduced by connecting an RC element in parallel to the relay coil. This measure also subjects the interference voltage to a capacitive load, causing it to collapse.



External RC interference suppressor to prevent interference voltage coupling

The following values are recommended for the purpose of dimensioning the RC element:
– R = 100 to 220 Ω
– C = 220 to 470 nF

The SO46 series has been developed to provide even higher levels of immunity to interference. These products already contain an integrated RCZ filter. See, for example, PLC...SO46.

Contact side, contact materials

Given the wide variety of potential applications in the different industrial sectors, the relays used must be matched to the various tasks that need to be performed by selecting the right kind of contact material.

The voltage, current, and power values play an important role when determining the suitability of contact materials. Other criteria include:
– Contact resistance
– Erosion resistance
– Material migration
– Welding tendency
– Chemical influences

In this way, the various contact materials (generally precious-metal alloys) can be matched to the relevant areas of application.

The adjacent table provides details of some of the key materials.

Contact protection circuit

Every electrical consumer constitutes a mixed load with resistive, capacitive, and inductive components.

Contact material	Typical properties	Typical applications	Guide values for the area of application*
Gold Au	Largely insensitive to industrial atmospheres, low and constant contact resistances in the range of small switching capacities with nickel (AuNi) or silver (AuAg) alloys.	Dry measuring and switching circuits, control inputs	µA ... 0.2 A µV ... 30 V
Silver Ag	High electrical conductivity, sensitive to sulfur, therefore often gold-flashed (approximately 0.2 m) as protection; nickel (AgNi) or copper (AgCu) alloys increase the mechanical resistance and erosion resistance and reduce the welding tendency.	Universal, suitable for medium loads; nickel alloys (AgNi 0.15) for DC circuits with medium to large loads	≥ 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., incandescent 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., incandescent 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.

When these loads are switched, the switching contact is in turn subjected to a load, to either a lesser or greater extent. This load can be reduced by including a suitable contact protection circuit.

In view of the fact that consumers with a large inductive component are predominantly used in practice (e.g., contactors, solenoid valves, motors, etc.), these application scenarios are worth considering in more detail.

On interruption, voltage peaks with values of up to several thousand volts occur due to the energy stored in the coil.

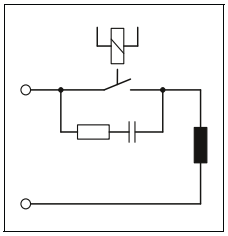
These high voltages cause an electric arc on the switching contact which can destroy the contact due to material vaporization and material migration. The electrical service life is reduced considerably as a result. In extreme cases, the relay may fail in the very first switching cycle with DC voltage and a static electric arc.

A protective circuit must be used to suppress the formation of an electric arc. With optimum dimensioning, almost the same number of switching cycles can be achieved as with a resistive load.

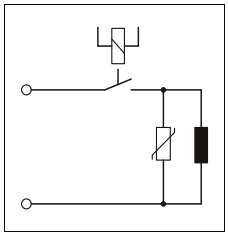
Basics of relay technology

In principle, there are a number of possible ways of achieving an effective circuit:

1. Wiring the contact
2. Wiring the consumer
3. Combination of both wiring methods.



Wiring the contact



Wiring the inductive consumer

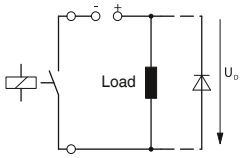
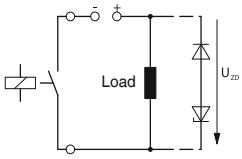
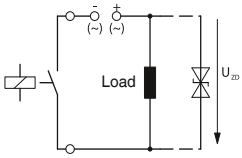
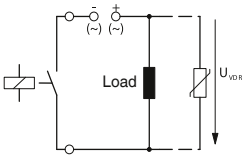
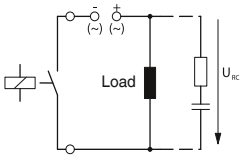
In principle, protective measures should intervene directly at the source of the interference.

Wiring a consumer should therefore be given priority over wiring the contact.

The following points are advantageous for the consumer circuit (image on right):

1. The circuit is only loaded with the induction voltage during interruption. By contrast, the sum of the operating voltage and the induction voltage is applied to the contact circuit.
2. When the contact is open, the load is electrically isolated from the operating voltage.
3. It is not possible for the load to be activated or to "stick" due to undesired operating currents, e.g., from RC elements.
4. Cut-off peaks of the load cannot be coupled into parallel control lines.

Nowadays, solenoid valves are usually connected using valve connectors that are also supplied with LEDs and components that limit the induction voltage. Valve connectors with an RC element, varistor or Zener diode often do not quench the arc and only serve to comply with legislation governing EMC. Only valve connectors with an integrated 1N4007 freewheeling diode quench the arc quickly and safely, thereby increasing the service life of the relay by a factor of 5 to 10. Valve connectors with LED, integrated 1N4007, and free cable end can be supplied on request as part of the SAC range.

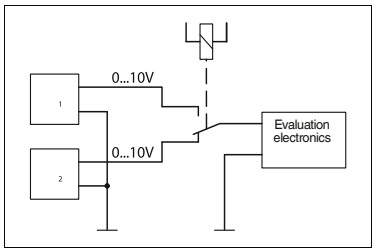
Load wiring	Additional dropout delay	Defined induction voltage limitation	Effective bipolar attenuation	Advantages and disadvantages
Diode 	Large	Yes (U_D)	No	**Advantages:** • Good effect in terms of extending the service life of the contacts • Easy implementation • Inexpensive • Reliable • Dimensioning not critical • Low induction voltage **Disadvantages:** • Attenuation only via load resistor • Long dropout delay
Series connection diode/Zener diode 	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 voltage **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 voltage **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 voltage • Level-independent attenuation **Disadvantages:** • Precise dimensioning required • High inrush current surge • Minimal effect in terms of extending the service life of the contacts

Switching small loads

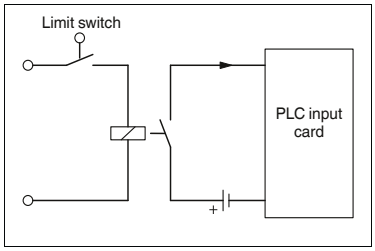
Small loads have to be processed mainly in applications where signals have to be forwarded to control inputs (e.g., of a PLC).

With these loads, no switching sparks (electric arcs) occur on the contacts in the small load range.

In addition to the constant cleaning effect due to contact friction, this switching spark assumes the function of penetrating non-conductive contamination layers that are formed on the contact surfaces of power contacts.



Application example: Measurement point changeover



Application example: PLC input signal

These contamination layers are usually oxidation or sulfidation products of the contact materials silver (Ag) or silver alloys such as silver nickel (AgNi) or silver tin oxide (AgSnO). As a result, the contact resistance may rise so considerably within a short time that reliable switching is no longer possible in the case of small loads.

Due to these properties, the power contact materials mentioned are not suitable for small load applications.

Gold (Au) has become accepted as the contact material of choice for these areas of application mainly on account of its low and constant contact resistances even with small loads and its insensitivity to sulfurous atmospheres.

For the smallest of loads and even greater contact reliability, double contact relays with gold contacts are used.

The slotted contact spring in this design provides two parallel contact points with even lower contact resistances and considerably higher contact reliability.

Switching large loads

A few important points also need to be considered with regard to switching operations in the large load range that involve power contacts made of either silver (Ag) or silver tin oxide (AgSnO).

A basic distinction must be made between switching DC and AC loads.

Switching large AC loads

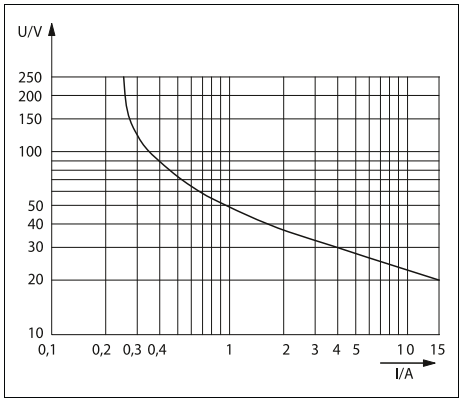
When switching large AC loads, the relay can be operated up to the corresponding maximum values for switching voltage, current, and power. The electric arc that occurs during interruption depends on the current, voltage, and phase relation. This cut-off arc usually disappears automatically the next time the load current passes through zero.

In applications with an inductive load, an effective protective circuit must be provided, otherwise the service life of the system will be reduced considerably.

Switching large DC loads

Conventional switching relays can only switch off relatively small direct currents (which contrasts with their ability to switch off the maximum permissible AC current), since there is no zero crossing to extinguish the arc automatically. This maximum DC value is also dependent to a large extent on the switching voltage and is determined, among other things, by constructional features such as contact spacing and contact opening speed.

The corresponding current and voltage values are documented by relay manufacturers in electric arc or load limit curves.



Example of a load limit curve (dependent on the type)

A non-attenuated inductive DC load further reduces the values given for switchable currents. The energy stored in the inductance can cause an electric arc to occur, which forwards the current through the open contacts.

With an effective contact protection circuit, preferably freewheeling diodes of the type 1N4007, the service life can be increased by a factor of 5 to 10 in relation to unprotected or unfavorably protected inductive loads (see also chapter Contact Protection Circuits).

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 6,060 switching cycles to be performed by way of a minimum requirement.

A much more reliable way to determine the switching capacity and the anticipated service life is to refer to the specific application data. Using a comprehensive data bank, the service life can be accurately estimated for most applications and, if necessary, suggestions for improvement can be made. In the case of critical applications, the user is advised to gather service life information based on empirical data.

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.

A suitable input circuit is provided to accommodate all of the voltages required for industrial applications between 5 V and 230 V. The inputs for DC voltage and AC voltage must always be differentiated.

DC input

Adjustments are made in accordance with the various voltage levels by adding electronics which have been specially adapted to the desired voltage range. In the case of most modules, a polarity protection diode provides reliable protection against destruction in the event of a control voltage being connected incorrectly. Specially coordinated filters reliably suppress possible high-frequency noise emissions.

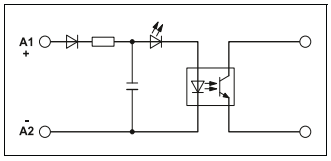


Figure 1: Block diagram for DC input

AC input

The solid-state relay element requires a stable control voltage to ensure reliable operation. In the case of the AC input, this is achieved by connecting a rectifier and filter capacitor upstream. The rectification is followed, in principle, by the same circuit architecture as the DC input.

The switching frequency always lies below half the mains frequency. Due to the filter capacitor, a higher switching frequency cannot be achieved. This results in continuous through-switching.

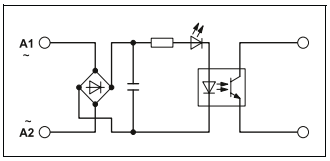


Figure 2: Block diagram for AC input

Load side

Depending on the application and the type of load, the solid-state relay output must meet various requirements. The following are crucial:

– Power amplification
– Matching the switching voltage and the switching current (AC/DC)
– Short-circuit protection

For these different applications, the solid-state relay element must also be processed using additional electronics on the output side.

DC output

In order to achieve the necessary output power, the solid-state relay element is supplemented by one or more semiconductor components.

The on-site user should nevertheless simply regard the connection terminal blocks of the output as conventional switch connections. Observing the specified polarity is the only essential requirement.

For practical reasons, the following criteria should be taken into account when selecting a suitable solid-state relay:

1. Operating voltage range
   (e.g., 12 ... 60 V DC).
   This determines the minimum or maximum voltage to be switched. The lower value must be observed in order to ensure reliable operation. In order to protect the output transistor, the upper value must not be exceeded.
2. Maximum continuous current
   (e.g., 1 A).
   This value indicates the maximum continuous current. If this value is exceeded continuously, the output semiconductor will be destroyed. The dependence of the output current on the ambient temperature of the solid-state relay should also be taken into consideration. A derating curve is therefore generally specified for solid-state power relays. This shows the maximum load current as a function of the ambient temperature.
3. Output configuration.
   The 2-conductor output is similar to a mechanical contact. Only the polarity of the connections is specified and must be observed.

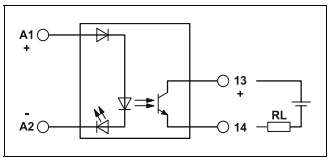


Figure 3: 2-conductor output

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.

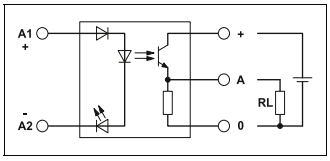


Figure 4: 3-conductor output

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.

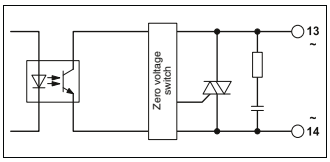


Figure 5: Basic circuit diagram of AC output

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 load type,

– a freewheeling diode/suppressor diode (DC only),
– a varistor (AC and DC)
– or an RC element (AC only)

can provide the necessary protection.

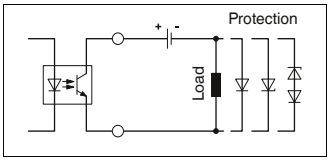


Figure 6: Protective circuit with DC voltage output

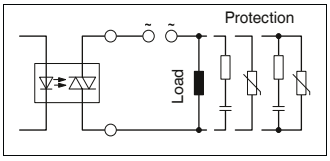


Figure 7: Protective circuit with AC voltage output

Application notes

Input solid-state relays acting in the direction from the I/O devices to the controller (signaling, controlling, monitoring)

Pluggable versions:
– PLC-O...

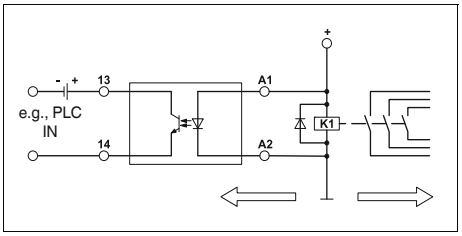
Modular versions:
– DEK-OE...
– EMG 10-OE...
– SIM-EI...
– OPT...

Output (power) solid-state relays acting in the direction from the controller to the I/O devices (switching, amplifying, controlling)

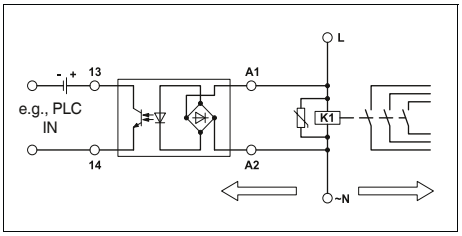
Pluggable versions:
– PLC-O...

Modular versions:
– DEK-OV...
– EMG 10-OV
– EMG 12-OV
– EMG 17-OV
– OV...
– OPT...

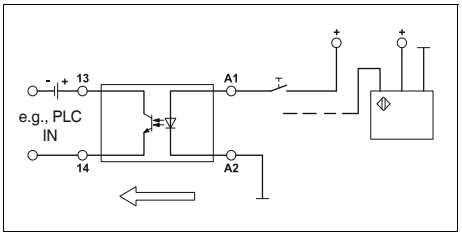
Example: Load protection monitoring (DC contactor)



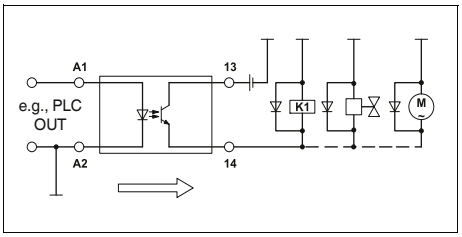
Example: Load protection monitoring (AC contactor)



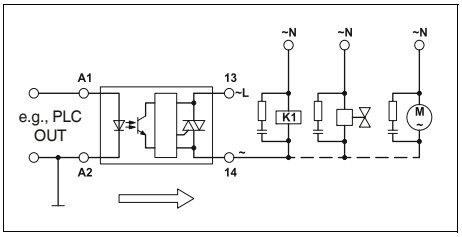
Example: Position indication with limit stop contact or initiator



Example: Contactor, solenoid valve or motor (DC load) switching



Example: Contactor, solenoid valve or motor (AC load) switching



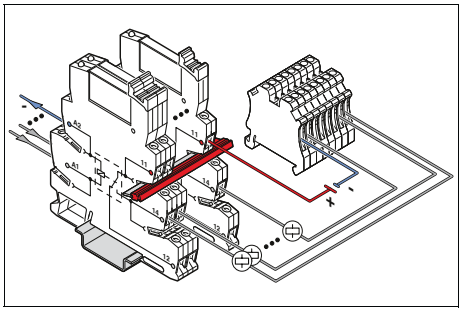
Remarks:

[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.

Configuration aid for connecting sensors and actuators

Electromechanical relays or solid-state relays are used as the coupling element between the controller and the sensors or actuators in the field. This interface ensures appropriate signal conditioning with respect to current and voltage between the controller and field level.

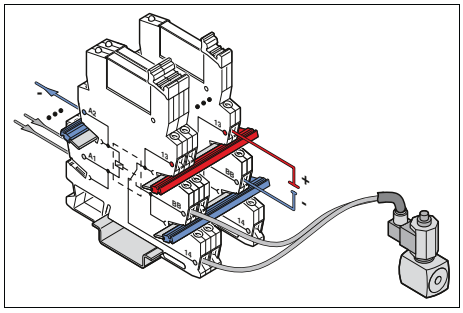
Conventional connection of actuators



If actuators such as solenoid valves are connected to the controller via a universal relay with changeover contact, an additional terminal block strip must be used for the common load return line. The positive potential of the loads is applied to connection terminal block 11 (changeover contact) at the relay modules. This can be distributed over all relay modules using plug-in bridges. This means that only the direct connection of the potential to one relay is necessary. The loads are connected to connection terminal block 14 (N/O contact). The negative potential required is supplied at a terminal block. This is then distributed to further terminal blocks by means of plug-in bridges. However, load return lines for the individual actuators are applied to every terminal block. This results in a common load return line potential for all actuators via the additional terminal block.

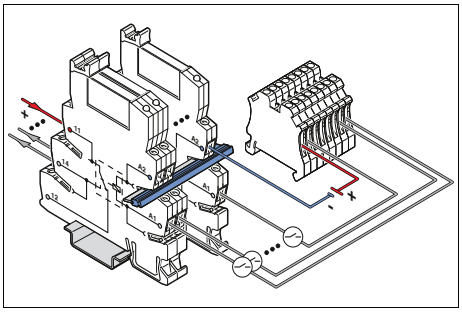
Because of the increased space requirement and additional wiring to the terminal block, the use of additional terminal blocks for distributing potential requires a great deal of effort.

Easy wiring of actuators



The PLC...ACT relay modules enable fast and easy connection of actuators. The positive potential of the loads is applied to connection terminal block 13. This can be distributed over all relay modules using plug-in bridges. This makes only the direct connection to one module necessary here as well. The actuators are connected to contact 14 (N/O contact). In the case of PLC...ACT relay modules, an N/C contact is not required. Instead, the BB connection serves as an option for connecting the load return line. Here the common negative potential is supplied and distributed by means of plug-in bridges. The terminal block for conventional wiring is not necessary due to the direct connection of the load return line potential to the relay module. This means that no additional space is required in the control cabinet and simpler wiring minimizes the risk of error.

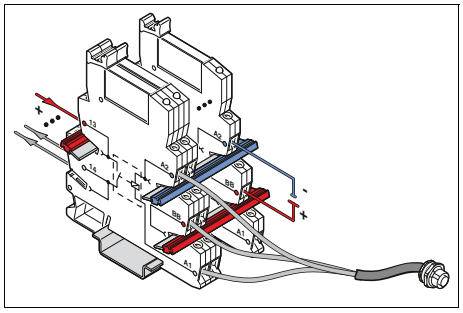
Conventional connection of sensors



If sensors such as proximity switches are connected via a universal relay to a controller with a changeover contact, an additional terminal block strip must be used for the common sensor supply voltage. It is also important to note that either the wiring in the control cabinet must be implemented the other way round because control of the relay now takes place from the field level and not via the controller, or the relay module must be installed into the control cabinet rotated by 180°. The negative potential of the sensors is applied at connection terminal block A2 on the relay module. This can be distributed over all relay modules using plug-in bridges. This means that direct connection to only one relay is necessary. The sensors are connected to connection terminal block A1. The necessary positive potential is supplied to a terminal block and distributed to further terminal blocks by means of plug-in bridges. However, the supply for the individual sensors is applied to every terminal block. This results in a common supply signal for all sensors via the additional terminal blocks.

Because of the increased space requirement and additional wiring to the terminal block, the use of additional terminal blocks for distributing potential requires a great deal of effort.

Easy wiring of sensors

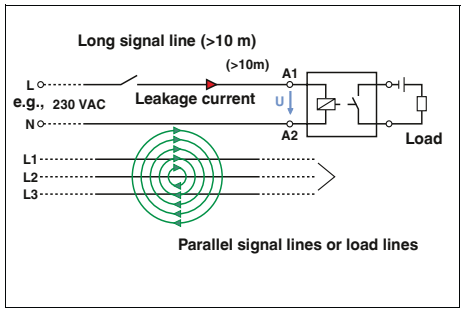


Sensors can be efficiently coupled with the controller with the PLC...SEN relay modules. The input and output side on the module are already interchanged so that the signal direction from the field to the controller can be ideally represented. Therefore, three connection terminal blocks (A1, A2, and BB) are located on the control side of the relay. The common negative potential of the sensors is connected to A2 and distributed to further relay modules by means of plug-in bridges. The sensors are connected directly to the A1 connections. Connection BB is used for the common supply potential of the sensors. The potential is distributed to all connected sensors by means of the plug-in bridges. However, only connections 13 and 14 for the N/O contact are located on the contact side. Signal feedback to the controller takes place over these contacts. The terminal block for conventional wiring can be dispensed with, thanks to the direct connection of the sensor supply voltage to the relay module. This means that no additional space is required in the control cabinet and simpler wiring minimizes the risk of error.

Configuration aid for handling interference signals

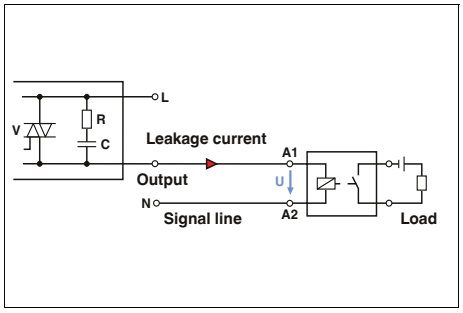
In accordance with IEC 61810-1, the standard release voltage of a relay is 5% of the nominal voltage for DC coils and 15% for AC coils. That means that a relay with a nominal voltage of 230 V AC is only switched off when the control voltage is 0.15 x 230 V AC = 34.5 V AC. If interference signals occur on the control side of a relay that are greater than the release voltage, defined switch-off is no longer possible. In the worst case, the interference is large enough to energize the relay. The application is still switched on although no signal is issued by the controller. There can be various reasons for this.

Coupling of interference signals from parallel lines



If the control lines to the relay are very long, interference can occur from cables running in parallel. These influence the actual control line and couple the signals to it. This interference voltage can be measured on the control side, even if no signal is issued by the controller.

Leakage current with AC voltage output card



Leakage current on the signal line occurs if control of a relay takes place via an output card with AC voltage. This is caused by the RC wiring of the AC voltage output. Typically, the leakage current has a control power that is large enough not to switch off the relay reliably.

Safe shutdown even with interference signals

The PLC...SO46 series is equipped with RCZ wiring in the base. The release voltage of the relay is increased by this circuit of resistor, capacitor, and Zener diode so that the relay is resistant to interference voltages. In the case of a relay for 230 V AC, the standard release voltage is 34.5 V AC. The PLC...230UC...SO46 modules have a release voltage of 80 V AC. This enables the relay to switch off reliably at interference voltages of 80 V AC. The PLC...SO46 bases are also available with further voltages. They can be fitted with both electromechanical relays or solid-state relays. Screw connection or Push-in connection is available as the connection technology.

RIFLINE complete – Industrial relay system

RIFLINE complete is a cost-effective relay system with various accessories. It consists of DIN rail bases, electromechanical or solid-state relays, plug-in interference suppression modules, marking material, and bridging material. The range of accessories is rounded off with a timer module. This is used to transform a basic relay into a 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 or screw connection technology. Push-in connection technology enables quick and tool-free conductor contacting. The RIF-1 to RIF-4 bases offer double the contact options on both the input and output side.

On the input side of all bases, the negative potential (A2) can be bridged – regardless of the base size. On the output side, the grouped contact (11) can be bridged within the RIF-0 base version. This connection can also be bridged within the RIF-1 base size.

To offer diverse marking options, the engagement lever can be fitted with a zack marker strip. In addition, marker carriers can be mounted on the bases so that additional marking surfaces are available.

RIFLINE complete can be extended using many elements from the CLIPLINE complete accessories range. This includes marking material, bridges, and test adapters.

To make ordering and management easier, RIFLINE complete modules are provided in the most popular voltages as complete modules with relay and interference suppression module. For individual assembly, tailored to the requirements of the application, additional voltage levels are offered in the modular system.

RIF-0

The 6.2 mm narrow RIF-0 base series is suitable for a 1-changeover-contact relay. Switching currents up to 6 A are implemented here. Two base versions are available: 1 N/O contact and 1 changeover contact. RIF-0 is therefore a good choice for all coupling applications.

RIF-1

The 16 mm narrow RIF-1 base series is suitable for a 2-changeover-contact relay. Currents up to 13 A can be switched when using the FBS 2-8 plug-in bridge. This relay is ideal for power switching and signal duplication.

RIF-2

The 31 mm wide RIF-2 base series is designed for industrial relays with up to 4 contacts. Currents up to 12 A are no problem for these bases. This relay is ideal for applications that require power and signal multiplication.

RIF-3

The 40 mm wide RIF-3 base series is designed for octal relays with up to 3 contacts. Switching currents up to 10 A are implemented here. Two base versions are available: 2 changeover contacts and 3 changeover contacts. RIF-3 bases are ideal for all applications that require power and signal multiplication.

RIF-4

The 43 mm wide RIF-4 base series is designed for power relays with up to 3 contacts. Currents up to 16 A can be switched. RIF-4 bases are a good choice for applications that require power and signal multiplication, e.g., in miniature contactor applications.

Accessories

A wide range of accessories are available for the RIFLINE complete relay system that round off the range. These include bridges, professional marking material, special function modules, test plugs, and end brackets.

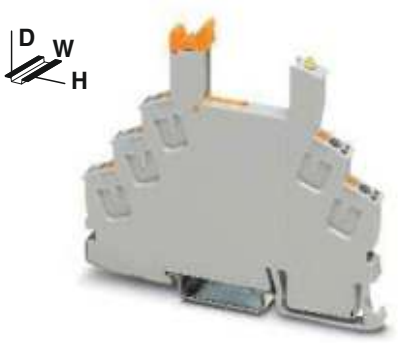
Modular RIF-0 relay bases

Relay bases 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 in accordance with DIN EN 50178 between coil and contact
- Professional marking material
- Holders for test plugs
- Professional bridging of adjacent modules saves wiring time (A2 and 11/13)
- FBS 2-6 plug-in bridges for the input and output side

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272



1-changeover-contact relay base with Push-in connection technology

Technical data

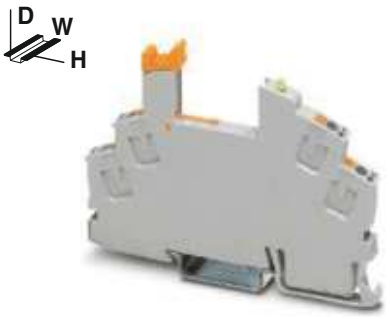
Nominal voltage U_N	250 V AC/DC (contact side)
Nominal current at U_N	Max. 8 A (depends on application/assembly)
General data	
Ambient temperature (operation)	-40°C ... 85°C (depends on application/assembly)
Connection data solid/stranded/AWG	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 24 - 16
Maximum tightening torque	-
Dimensions	
Width	6.2 mm
Depth	78 mm
Height	93 mm

Ordering data

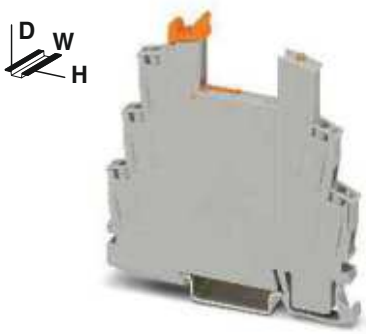
Description	Type	Order No.	Pcs./Pkt.
RIF-0 relay base, PDT version, safe isolation I/O With Push-in connection	**RIF-0-BPT/21**	**2900958**	10
RIF-0 relay base, N/O contact version, safe isolation I/O With Push-in connection			
RIF-0 relay base, PDT version, safe isolation I/O With screw connection			
RIF-0 relay base, N/O contact version, safe isolation I/O With screw connection			
RIF-0 relay base, negative switching, PDT version, safe isolation I/O With Push-in connection	**RIF-0-BPT-M/ 21**	**2907468**	10

Accessories

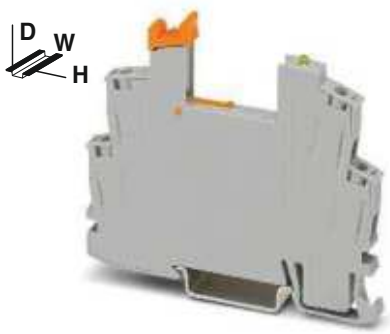
Plug-in bridge				
2-pos. red, 24 A		**FBSR 2-6**	**3033715**	50
2-pos. red, 32 A		**FBS 2-6**	**3030336**	50
2-pos. blue, 32 A		**FBS 2-6 BU**	**3036932**	50
2-pos. gray, 32 A		**FBS 2-6 GY**	**3032237**	50
3-pos. red, 24 A		**FBSR 3-6**	**3001594**	50
4-pos. red, 24 A		**FBSR 4-6**	**3001595**	50
5-pos. red, 24 A		**FBSR 5-6**	**3001596**	50
5-pos. red, 32 A		**FBS 5-6**	**3030349**	50
10-pos. red, 32 A		**FBS 10-6**	**3030271**	10
20-pos. red, 32 A		**FBS 20-6**	**3030365**	10
50-pos. red, 32 A		**FBS 50-6**	**3032224**	10
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	gray	**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: each pack contains enough to label 100 terminal blocks				
10-section		**ZB 6:UNBEDRUCKT**	**1051003**	10



1 N/O contact relay base for Miniature power relay



1-changeover-contact relay base with screw connection technology



1-N/O-contact relay base with screw connection technology

Technical data

250 V AC/DC (contact side) Max. 8 A (depends on application/assembly)		
-40°C ... 85°C (depends on application/assembly)		
0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 24 - 16 -		
6.2 mm 66 mm 93 mm		

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-BPT/1	2901873	10

Accessories

FBSR 2-6	3033715	50
FBS 2-6	3030336	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
FBSR 3-6	3001594	50
FBSR 4-6	3001595	50
FBSR 5-6	3001596	50
FBS 5-6	3030349	50
FBS 10-6	3030271	10
FBS 20-6	3030365	10
FBS 50-6	3032224	10
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 6:UNBEDRUCKT	1051003	10

Technical data

250 V AC/DC (contact side) Max. 8 A (depends on application/assembly)		
-40°C ... 85°C (depends on application/assembly)		
0.5 ... 4 mm² / 0.5 ... 2.5 mm² / 20 - 12 0.6 Nm		
6.2 mm 82 mm 84 mm		

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-BSC/21	2900957	10

Accessories

FBSR 2-6	3033715	50
FBS 2-6	3030336	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
FBSR 3-6	3001594	50
FBSR 4-6	3001595	50
FBSR 5-6	3001596	50
FBS 5-6	3030349	50
FBS 10-6	3030271	10
FBS 20-6	3030365	10
FBS 50-6	3032224	10
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 6:UNBEDRUCKT	1051003	10

Technical data

250 V AC/DC (contact side) Max. 8 A (depends on application/assembly)		
-40°C ... 85°C (depends on application/assembly)		
0.5 ... 4 mm² / 0.5 ... 2.5 mm² / 20 - 12 0.6 Nm		
6.2 mm 68 mm 84 mm		

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-BSC/ 1	2901872	10

Accessories

FBSR 2-6	3033715	50
FBS 2-6	3030336	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
FBSR 3-6	3001594	50
FBSR 4-6	3001595	50
FBSR 5-6	3001596	50
FBS 5-6	3030349	50
FBS 10-6	3030271	10
FBS 20-6	3030365	10
FBS 50-6	3032224	10
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 6:UNBEDRUCKT	1051003	10

Plug-in miniature power relays

Plug-in relays with one changeover contact, suitable for RIF-0 and PLC-INTERFACE relay bases.

The advantages:

– Power contacts up to 6 A
– Multi-layer gold contact or power contact
– High degree of protection, RT III (wash-proof), or RT II for relay with one changeover contact with manual operation
– Safe isolation in accordance with DIN EN 50178 between coil and contact
– Can be soldered in on PCB

Notes:

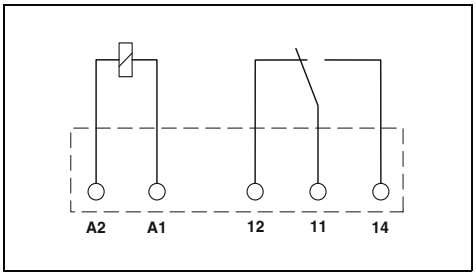
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.

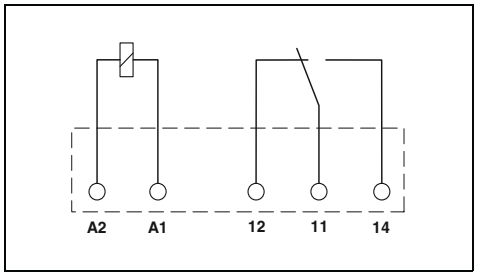
For dimensional drawings and perforations for assembly, see page 400

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272

Relay with one changeover contact, max. 6 A

Relay with one changeover contact, with manual operation, max. 6 A





Technical data

		①	②
Input data			
Permissible range (with reference to U_N)		See diagram	
Typical input current at U_N	[mA]	14	7
Typical response time at U_N	[ms]	5	5
Typical release time at U_N	[ms]	2.5	2.5
Output data			
Contact type		1 PDT	1 PDT
Contact material		AgSnO	AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Minimum switching voltage		5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current		6 A	50 mA
Maximum switch-on current		10 A (4 s)	50 mA
Minimum switching current		10 mA (at 12 V)	1 mA (at 24 V)
General data			
Test voltage (winding/contact)		4 kV AC (50 Hz, 1 min.)	
Ambient temperature (operation)		-40°C ... 85°C	
Nominal operating mode		100% operating factor	
Mechanical service life		2x 10^7 cycles	
Standards/regulations		IEC 60664, EN 50178, EN 61810-1	
Mounting position/mounting		Any / in rows with zero spacing	
Dimensions	W / H / D	5 mm / 28 mm / 15 mm	

Technical data

		①	②
Input data			
Permissible range (with reference to U_N)		See diagram	
Typical input current at U_N	[mA]	14	7
Typical response time at U_N	[ms]	5	5
Typical release time at U_N	[ms]	2.5	2.5
Output data			
Contact type		1 PDT	1 PDT
Contact material		AgSnO	AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Minimum switching voltage		5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current		6 A	50 mA
Maximum switch-on current		10 A (4 s)	50 mA
Minimum switching current		10 mA (at 12 V)	1 mA (at 24 V)
General data			
Test voltage (winding/contact)		4 kV AC (50 Hz, 1 min.)	
Ambient temperature (operation)		-40°C ... 85°C	
Nominal operating mode		100% operating factor	
Mechanical service life		1x 10^7 cycles	
Standards/regulations		IEC 60664, EN 50178, EN 61810-1	
Mounting position/mounting		Any / in rows with zero spacing	
Dimensions	W / H / D	5 mm / 28 mm / 16 mm	

Ordering data

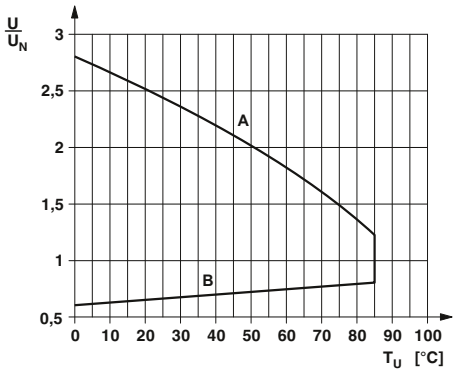
Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
Plug-in miniature power relays, with power contacts				
①	12 V DC	**REL-MR- 12DC/21**	2961150	10
②	24 V DC	**REL-MR- 24DC/21**	2961105	10
Plug-in miniature power relays, with multi-layer gold contacts				
①	12 V DC	**REL-MR- 12DC/21AU**	2961163	10
②	24 V DC	**REL-MR- 24DC/21AU**	2961121	10

Ordering data

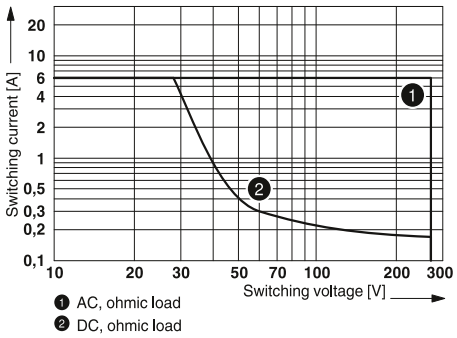
Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
Plug-in miniature power relays, with power contacts				
①	12 V DC	**REL-MR- 12DC/21/MS**	2909641	10
②	24 V DC	**REL-MR- 24DC/21/MS**	2909642	10
Plug-in miniature power relays, with multi-layer gold contacts				
①	12 V DC	**REL-MR- 12DC/21AU/MS**	2909644	10
②	24 V DC	**REL-MR- 24DC/21AU/MS**	2909645	10

REL-MR-.../21... (1 changeover contact)

Input voltage range

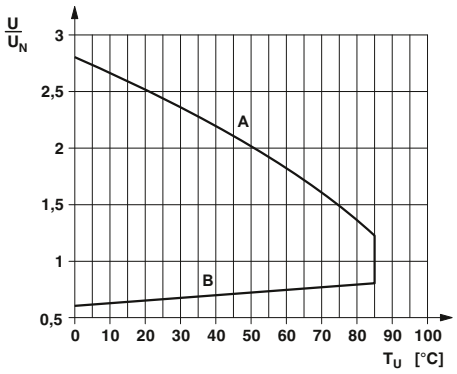


Interrupting rating

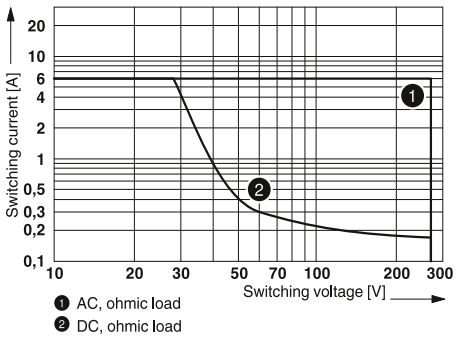


REL-MR-.../21.../MS (1 changeover contact)

Input voltage range



Interrupting rating



Plug-in solid-state relays

Plug-in solid-state relays suitable for RIF-0 and PLC-INTERFACE relay bases.

The advantages:

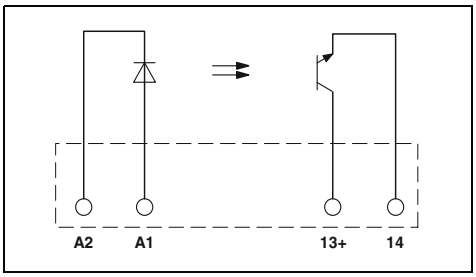
– Switching current of up to 3 A
– RT III seal (wash-proof)
– Vibration- and shock-resistant
– Wear-free and long-lasting
– Zero voltage switch at AC output
– Can be soldered in on PCB

Notes:

For dimensional drawings and perforations for assembly, see page 401

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272

Solid-state relay, DC output max. 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
Typical input current at U_N	[mA]	7
Typical switch-on time at U_N	[µs]	20
Typical switch-off time at U_N	[µs]	300
Transmission frequency f_{limit}	[Hz]	300
Output data		
Max. switching voltage		33 V DC
Minimum switching voltage		3 V DC
Limiting continuous current		3 A (see derating curve)
Minimum load current		-
Maximum switch-on current		15 A (10 ms)
Leakage current in off state		-
Phase angle (cos ϕ)		-
Output circuit		2-conductor, floating
Max. load value		-
Output protection		Reverse polarity protection, surge protection
Voltage drop at maximum 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
Degree of pollution/surge voltage category		2 / III
Mounting position/mounting		Any / in rows with zero spacing
Dimensions	W / H / D	5 mm / 28 mm / 15 mm

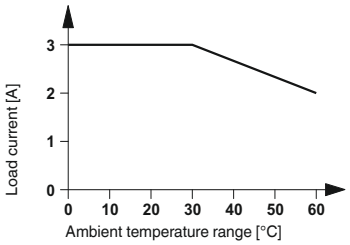
Ordering data

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			

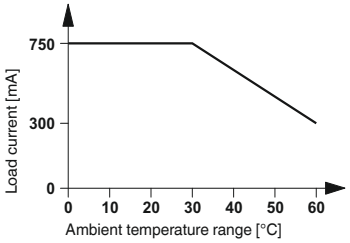
**Solid-state relay,
DC output max. 100 mA**

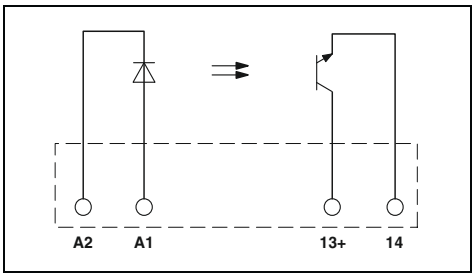
**Solid-state relay,
AC output max. 750 mA**

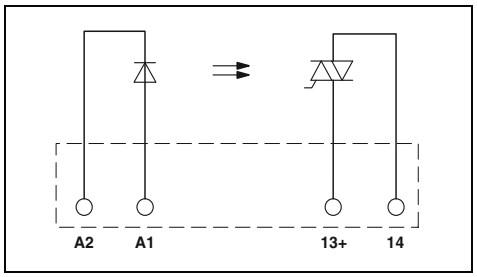
Derating curve for OPT...DC/24DC/2 and PLC-OS.../24DC/2 solid-state relays



Derating curve for OPT...DC/230AC/1 and PLC-OS.../230AC/1 solid-state relays







Technical data

①	
0.8 - 1.2	0.8 - 1.2
16	10
10	5
7	6
20	6,000
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
Reverse polarity protection, 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 60664, EN 50178
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

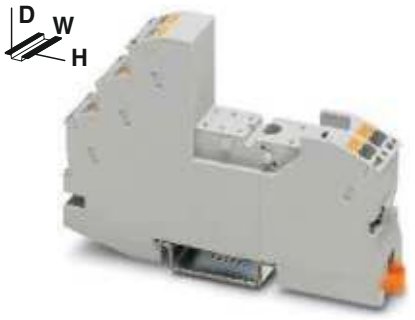
Type	Order No.	Pcs./Pkt.
OPT-24DC/230AC/ 1	**2967950**	10

Modular RIF-1 relay bases

Relay bases that can be fitted with 1 or 2 PDT relays or solid-state relays.
Range of accessories includes:

- Plug-in interference suppression module
- Plug-in timer module
- Relay retaining bracket with ejector function and holder for marking material
- Comprehensive range of marking material
- Test plug
- FBS 2-6 plug-in bridges for the input side (A2)
- FBS 2-8 plug-in bridges for the output side (11/21)

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272



2-changeover-contact relay base with Push-in connection technology

Technical data

Nominal voltage U_N	250 V AC/DC
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	96 mm

Ordering data

Description	Type	Order No.	Pcs./Pkt.
RIF-1 relay base, plug-in option for interference suppression module, safe isolation I/O with Push-in connection	**RIF-1-BPT/2X21**	2900931	10
RIF-1 relay base, plug-in option for interference suppression module, safe isolation I/O with screw connection			
Relay retaining bracket, with ejector function and holder for marking material, suitable for RIF-1 relay base			
- for 16 mm high miniature power and solid-state relays			
- for 25 mm high miniature power relays			
Relay retaining bracket, wire model, suitable for RIF-1 relay base			
- for 16 mm high miniature power and solid-state relays			
- for 25 mm high miniature power relays			

Accessories

Plug-in bridge				
2-pos. red, 32 A		**FBS 2-6**	3030336	50
2-pos. red, 24 A		**FBSR 2-6**	3033715	50
2-pos. red, 32 A		**FBSR 2-8**	3033808	10
2-pos. blue, 32 A		**FBS 2-6 BU**	3036932	50
2-pos. gray, 32 A		**FBS 2-6 GY**	3032237	50
2-pos. red, 41 A		**FBS 2-8**	3030284	10
2-pos. blue, 41 A		**FBS 2-8 BU**	3032567	10
2-pos. gray, 41 A		**FBS 2-8 GY** 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
Test plug, consisting of:				
Metal part for 2.3 mm Ø socket hole and	gray	**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

2-changeover-contact relay base with screw connection technology

Plastic relay retaining bracket for RIF-1 base

Metal wire relay retaining bracket for RIF-1 base

Technical data

250 V AC/DC	-	-
Max. 15.5 A (depends on application/assembly)	-	-
-40°C ... 85°C (depends on application/assembly)	-	-
0.5 ... 4 mm² / 0.5 ... 4 mm² / 20 - 10	-	-
16 mm	-	-
75 mm	-	-
89 mm	-	-

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-1-BSC/2X21	2900930	10

Type	Order No.	Pcs./Pkt.
RIF-RH-1	2900953	10
RIF-RH-1-H	2904468	10

Type	Order No.	Pcs./Pkt.
RIF-RHM-1	2905986	10
RIF-RHM-1-H	2905985	10

Accessories

FBS 2-6		3030336	50
FBSR 2-6		3033715	50
FBSR 2-8		3033808	10
FBS 2-6 BU		3036932	50
FBS 2-6 GY		3032237	50
FBS 2-8		3030284	10
FBS 2-8 BU		3032567	10
FBS 2-8 GY	7042	3032541	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 5 :UNBEDRUCKT		1050004	10
ZB 15:UNBEDRUCKT		0811972	10
STP 5-2		0800967	100

Plug-in miniature power relays

Plug-in miniature power relays with 1 or 2 changeover contacts, suitable for the RIF-1 and PLC-INTERFACE relay bases.

The advantages:

– Power contacts up to 16 A
– Multi-layer gold contact or power contact
– High degree of protection up to RT III depending on type (wash-proof)

Notes:

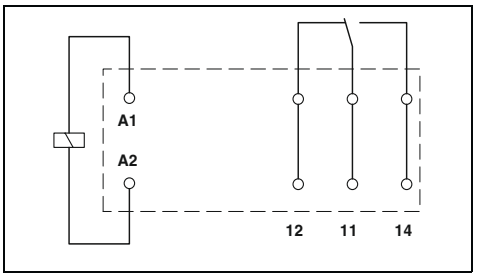
Notes:

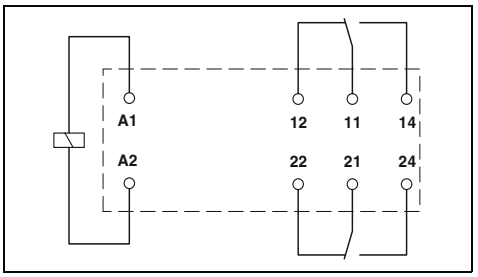
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272

Relay with one changeover contact, 16 A, maximum

Relay with two changeover contacts, 2 x 8 A, maximum





Technical data

Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		See diagram							
Typical input current at U_N	[mA]	33	17	8.7	8.2	4.1	32	7	3
Typical response time at U_N	[ms]	7	7	7	7	7			
Typical response time at U_N (depending on phase relation)	[ms]						3 - 12	3 - 12	3 - 12
Typical release time at U_N	[ms]	3	3	3	3	3			
Typical release time at U_N (depending on phase relation)	[ms]						2 - 9	2 - 9	2 - 9
Output data									
Contact type		1 PDT		1 PDT					
Contact material		AgNi		AgNi, hard gold-plated					
Max. switching voltage		250 V AC/DC		30 V AC / 36 V DC					
Minimum switching voltage		12 V (at 10 mA)		100 mV (at 10 mA)					
Limiting continuous current		16 A		50 mA					
Maximum switch-on current AC		25 A (20 ms)		50 mA					
Maximum switch-on current DC		50 A (20 ms)		50 mA					
Minimum 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		1x 10^7 cycles							
Mechanical service life, DC		3x 10^7 cycles							
Standards/regulations		IEC 60664, EN 50178, EN 61810-1							

Technical data

Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		See diagram							
Typical input current at U_N	[mA]	33	17	8.7	8.2	4.1	32	7	3
Typical response time at U_N	[ms]	7	7	7	7	7			
Typical response time at U_N (depending on phase relation)	[ms]						3 - 12	3 - 12	3 - 12
Typical release time at U_N	[ms]	3	3	3	3	3			
Typical release time at U_N (depending on phase relation)	[ms]						2 - 9	2 - 9	2 - 9
Output data									
Contact type		2 PDT		2 PDT					
Contact material		AgNi		AgNi, hard gold-plated					
Max. switching voltage		250 V AC/DC		30 V AC / 36 V DC					
Minimum switching voltage		5 V (at 10 mA)		100 mV (at 10 mA)					
Limiting continuous current		8 A		50 mA					
Maximum switch-on current AC		12 A (20 ms)		50 mA					
Maximum switch-on current DC		25 A (20 ms)		50 mA					
Minimum 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		1x 10^7 cycles							
Mechanical service life, DC		3x 10^7 cycles							
Standards/regulations		IEC 60664, EN 50178, EN 61810-1							

Ordering data

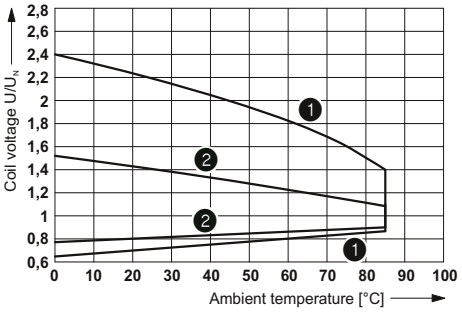
Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
Plug-in miniature power relays, with power contacts				
①	12 V DC	**REL-MR- 12DC/21HC**	2961309	10
②	24 V DC	**REL-MR- 24DC/21HC**	2961312	10
③	48 V DC	**REL-MR- 48DC/21HC**	2834821	10
④	60 V DC	**REL-MR- 60DC/21HC**	2961325	10
⑤	110 V DC	**REL-MR-110DC/21HC**	2961338	10
⑥	24 V AC	**REL-MR- 24AC/21HC**	2961406	10
⑦	120 V AC	**REL-MR-120AC/21HC**	2961419	10
⑧	230 V AC	**REL-MR-230AC/21HC**	2961422	10
Plug-in miniature power relays, with multi-layer gold contacts				
①	12 V DC	**REL-MR- 12DC/21HC AU**	2961532	10
②	24 V DC	**REL-MR- 24DC/21HC AU**	2961545	10
③	48 V DC			
④	60 V DC			
⑤	110 V DC	**REL-MR-110DC/21HC AU**	2961561	10
⑥	24 V AC	**REL-MR- 24AC/21HC AU**	2961503	10
⑦	120 V AC	**REL-MR-120AC/21HC AU**	2961516	10
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

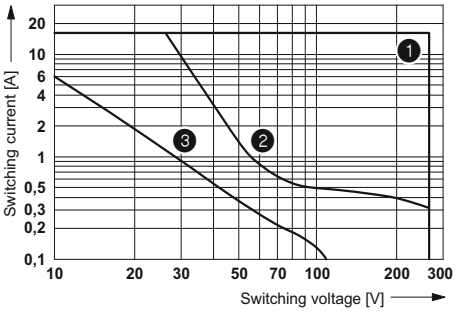
REL-MR...21HC... (1 changeover contact)

Operating voltage range



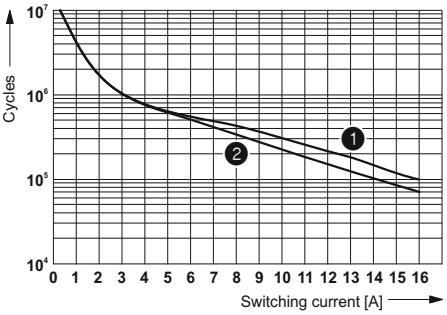
❶ DC coils
❷ AC coils

Interrupting rating



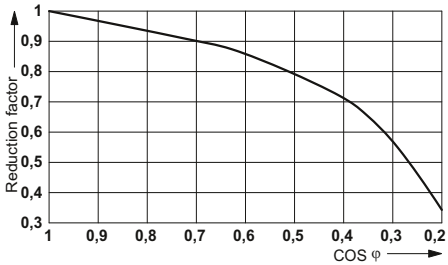
❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Electrical service life



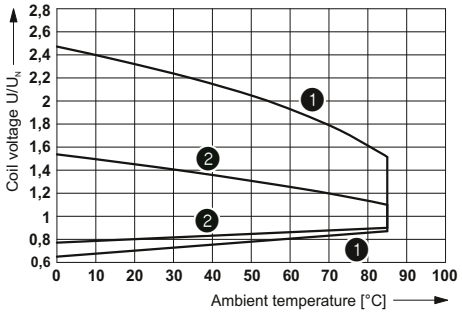
❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

Service life reduction factor with various cos phi



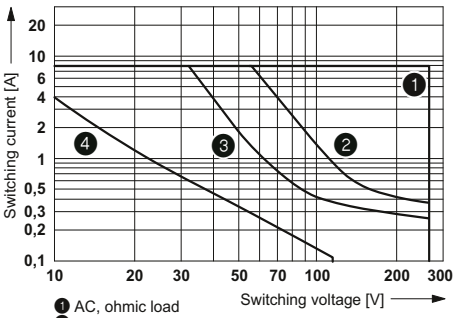
REL-MR...21-21... (2 changeover contacts)

Operating voltage range



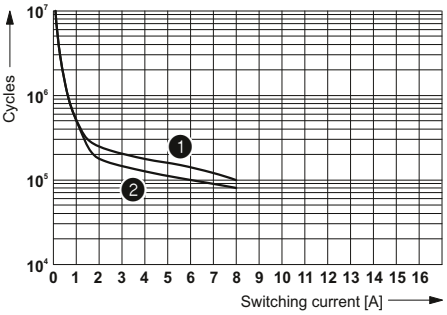
❶ DC coils
❷ AC coils

Interrupting rating



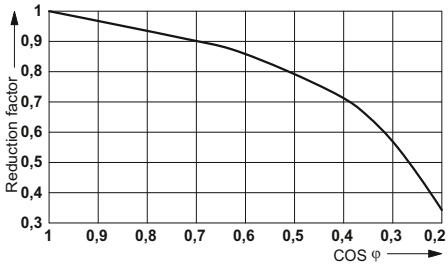
❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

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 changeover contacts, compatible for the RIF-1 relay base.

The advantages:

– Switching current of up to 16 A
– With lockable manual operation
– Mechanical switch position indicator
– Integrated status LED
– Multi-layer gold contact or power contact
– DC types with integrated free-wheeling diode
– Can be soldered in on PCB

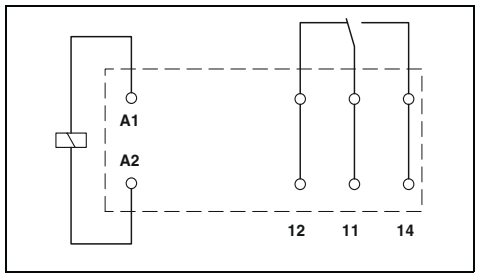
Relay with one changeover contact with manual operation, 16 A, maximum

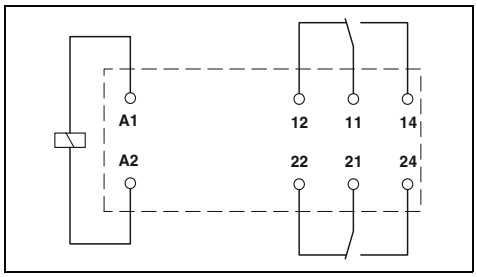
Relay with two changeover contacts with manual operation, 2 x 8 A, maximum

Notes:

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

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272





Technical data

Input data		①	②	③	④
Permissible range (with reference to U_N)		See diagram			
Typical input current at U_N	[mA]	18	32	7	3.5
Typical response time at U_N	[ms]	9			
Typical response time at U_N (depending on phase relation)	[ms]		3 - 12	3 - 12	
Typical release time at U_N	[ms]	6			
Typical release time at U_N (depending on phase relation)	[ms]		2 - 8	2 - 8	2 - 8

Output data		
Contact type	1 PDT	1 PDT
Contact material	AgNi	AgNi, hard gold-plated
Max. switching voltage	250 V AC/DC	30 V AC / 36 V DC
Minimum switching voltage	12 V (at 10 mA)	12 V (at 1 mA)
Limiting continuous current	16 A	50 mA
Maximum switch-on current AC	32 A (20 ms)	50 mA
Maximum switch-on current DC	32 A (20 ms)	50 mA
Minimum switching current	10 mA (at 12 V)	1 mA (at 12 V)

General data	
Test voltage (winding/contact)	5 kV AC (50 Hz, 1 min.)
Test voltage (contact / contact)	-
Ambient temperature (operation), AC	-40°C ... 70°C
Ambient temperature (operation), DC	-40°C ... 70°C
Mechanical service life, AC	5x 10^6 cycles
Mechanical service life, DC	5x 10^6 cycles
Standards/regulations	EN 61810-1, VDE 0435-201, EN 50178

Technical data

Input data		①	②	③	④
Permissible range (with reference to U_N)		See diagram			
Typical input current at U_N	[mA]	18	32	7	3.5
Typical response time at U_N	[ms]	9			
Typical response time at U_N (depending on phase relation)	[ms]		3 - 12	3 - 12	3 - 12
Typical release time at U_N	[ms]	6			
Typical release time at U_N (depending on phase relation)	[ms]		2 - 8	2 - 8	2 - 8

Output data		
Contact type	2 PDT	2 PDT
Contact material	AgNi	AgNi, hard gold-plated
Max. switching voltage	250 V AC/DC	30 V AC / 36 V DC
Minimum switching voltage	12 V (at 10 mA)	12 V (at 1 mA)
Limiting continuous current	8 A	50 mA
Maximum switch-on current AC	16 A (20 ms)	50 mA
Maximum switch-on current DC	16 A (20 ms)	50 mA
Minimum switching current	10 mA (at 12 V)	1 mA (at 12 V)

General data	
Test voltage (winding/contact)	5 kV AC (50 Hz, 1 min.)
Test voltage (contact / contact)	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	5x 10^6 cycles
Mechanical service life, DC	5x 10^6 cycles
Standards/regulations	EN 61810-1, VDE 0435-201, EN 50178

Ordering data

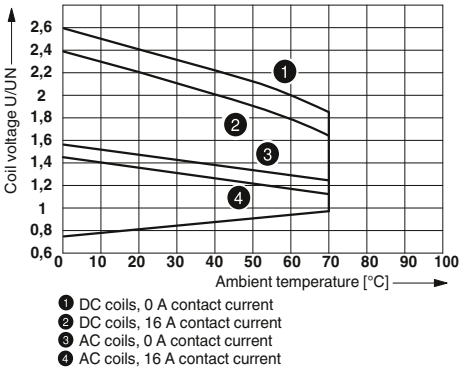
Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Plug-in miniature power relays, with power contacts					
- Status LED, freewheeling diode A1+, A2-	①	24 V DC	**REL-MR- 24DC/21HC/MS**	2987888	10
- Status LED	②	24 V AC	**REL-MR- 24AC/21HC/MS**	2987891	10
- Status LED	③	120 V AC	**REL-MR-120AC/21HC/MS**	2987901	10
- Status LED	④	230 V AC	**REL-MR-230AC/21HC/MS**	2987914	10
Plug-in miniature power relays, with multi-layer gold contacts, with manual operation, mechanical switch position indicator					
- Status LED, freewheeling diode A1+, A2-	①	24 V DC	**REL-MR- 24DC/21HC AU/MS**	2987927	10
- Status LED	⑤	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

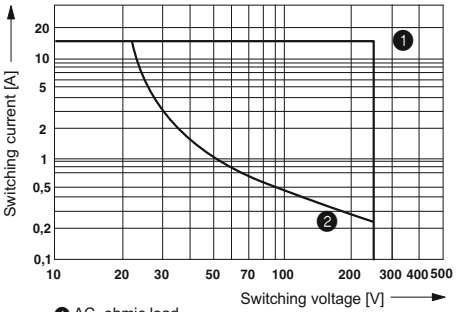
REL-MR...21HC...MS (1 changeover contact)

Operating voltage range



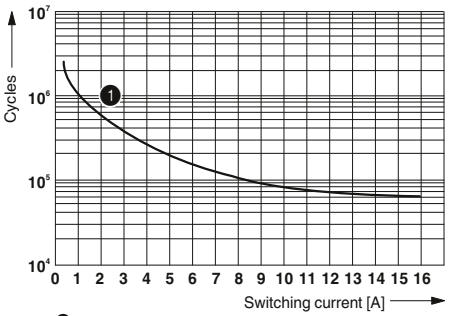
1 DC coils, 0 A contact current
2 DC coils, 16 A contact current
3 AC coils, 0 A contact current
4 AC coils, 16 A contact current

Interrupting rating



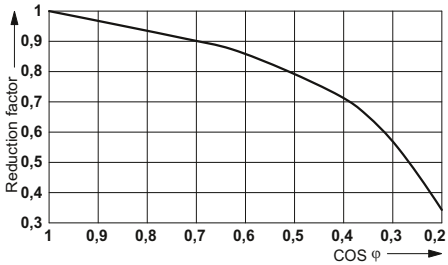
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



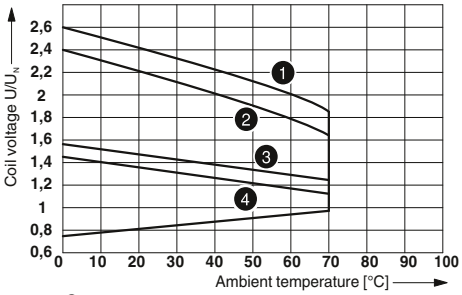
1 250 V AC, ohmic load

Service life reduction factor with various cos phi



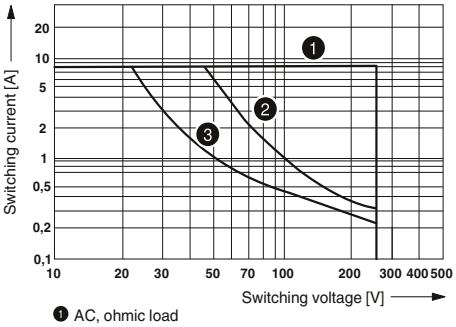
REL-MR...21-21...MS (2 changeover contacts)

Operating voltage range



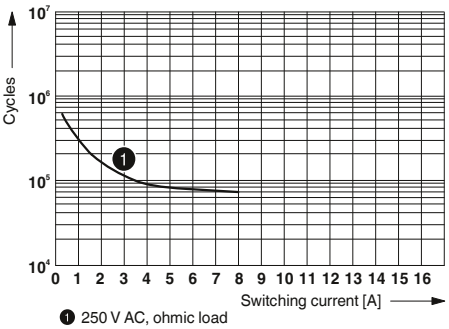
1 DC coils, 0 A contact current
2 DC coils, 8 A contact current
3 AC coils, 0 A contact current
4 AC coils, 8 A contact current

Interrupting rating



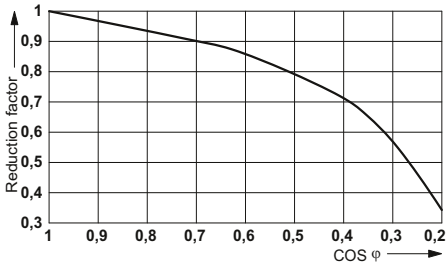
1 AC, ohmic load
2 DC, ohmic load, contacts in series
3 DC, ohmic load

Electrical service life



1 250 V AC, ohmic load

Service life reduction factor with various cos phi



Non-polarized plug-in miniature power relays

Non-polarized plug-in miniature power relays with 1 or 2 changeover contacts, compatible with the RIF-1 relay base.

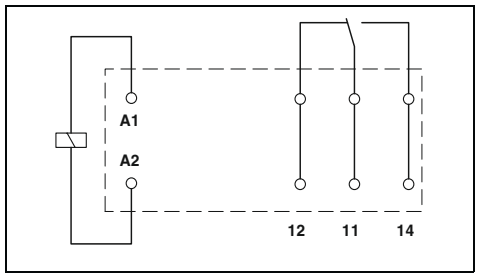
The advantages:

– Switching current of up to 16 A
– With lockable manual operation
– Mechanical switch position indicator
– Multi-layer power contact
– Can be soldered in on PCB
– Special voltages (100 and 200 V AC)

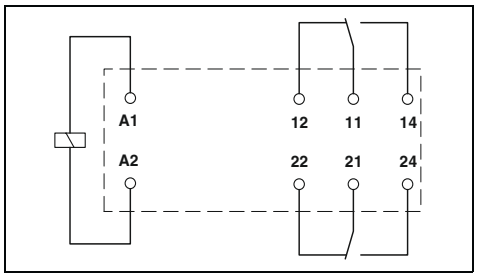
Notes:

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272

Relay with one changeover contact (non-polarized) with manual operation, 16 A, maximum



Relay with two changeover contacts (non-polarized) with manual operation, 2 x 8 A, maximum



Technical data

Input data		①	②	③
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	17	8	4
Typical response time at U_N	[ms]	9		
Typical response time at U_N (depending on phase relation)	[ms]		3 - 12	3 - 12
Typical release time at U_N	[ms]	6		
Typical release time at U_N (depending on phase relation)	[ms]		2 - 8	2 - 8
Output data				
Contact type		1 PDT		
Contact material		AgNi		
Max. switching voltage		250 V AC/DC		
Minimum switching voltage		12 V (at 10 mA)		
Limiting continuous current		16 A		
Maximum switch-on current AC		32 A (20 ms)		
Maximum switch-on current DC		32 A (20 ms)		
Minimum switching current		10 mA (at 12 V)		
General data				
Test voltage (winding/contact)		5 kV AC (50 Hz, 1 min.)		
Ambient temperature (operation), AC		-40°C ... 70°C		
Ambient temperature (operation), DC		-40°C ... 70°C		
Mechanical service life, AC		5x 10^6 cycles		
Mechanical service life, DC		5x 10^6 cycles		
Standards/regulations		IEC 61810, IEC 60664		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Non-polarized plug-in miniature power relays, with power contacts					
	①	24 V DC	**REL-MR-BL-24DC/21HC/MS**	2908180	10
	②	100 V AC	**REL-MR-BL-100AC/21HC/MS**	2908179	10
	③	200 V AC	**REL-MR-BL-200AC/21HC/MS**	2908178	10

Technical data

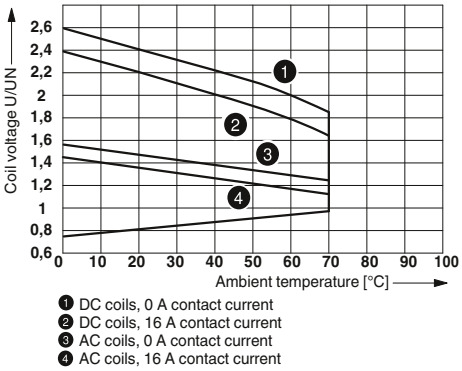
Input data		①	②	③
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	17	8	4
Typical response time at U_N	[ms]	9		
Typical response time at U_N (depending on phase relation)	[ms]		3 - 12	3 - 12
Typical release time at U_N	[ms]	6		
Typical release time at U_N (depending on phase relation)	[ms]		2 - 8	2 - 8
Output data				
Contact type		2 PDT		
Contact material		AgNi		
Max. switching voltage		250 V AC/DC		
Minimum switching voltage		12 V (at 10 mA)		
Limiting continuous current		8 A		
Maximum switch-on current AC		16 A (20 ms)		
Maximum switch-on current DC		16 A (20 ms)		
Minimum switching current		10 mA (at 12 V)		
General data				
Test voltage (winding/contact)		5 kV AC (50 Hz, 1 min.)		
Ambient temperature (operation), AC		-40°C ... 70°C		
Ambient temperature (operation), DC		-40°C ... 70°C		
Mechanical service life, AC		5x 10^6 cycles		
Mechanical service life, DC		5x 10^6 cycles		
Standards/regulations		IEC 61810, IEC 60664		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Non-polarized plug-in miniature power relays, with power contacts					
	①	24 V DC	**REL-MR-BL-24DC/21-21/MS**	2908181	10
	②	100 V AC	**REL-MR-BL-100AC/21-21/MS**	2908183	10
	③	200 V AC	**REL-MR-BL-200AC/21-21/MS**	2908182	10

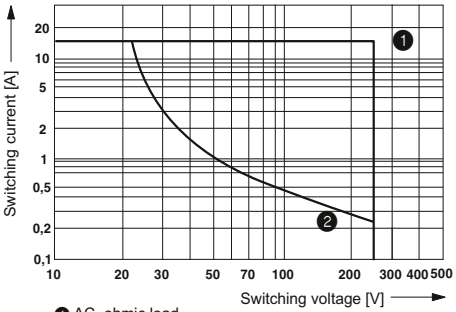
REL-MR-BL...21HC/MS (1 changeover contact)

Operating voltage range



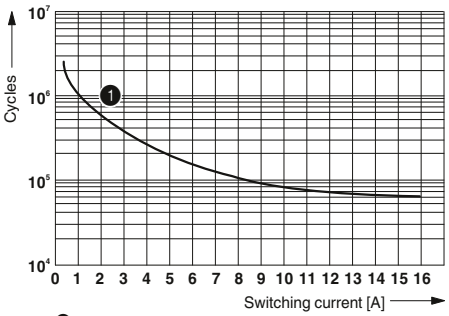
1 DC coils, 0 A contact current
2 DC coils, 16 A contact current
3 AC coils, 0 A contact current
4 AC coils, 16 A contact current

Interrupting rating



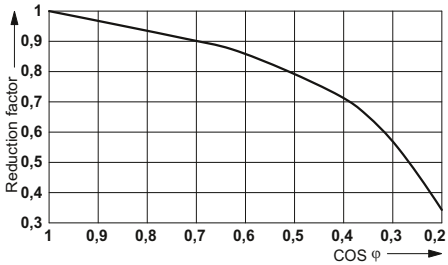
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



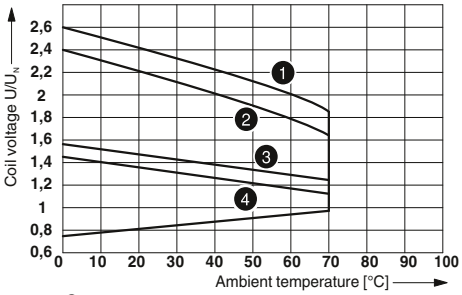
1 250 V AC, ohmic load

Service life reduction factor with various cos phi



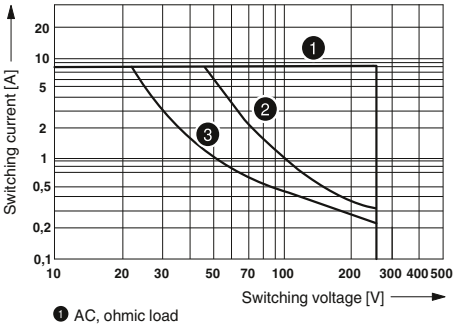
REL-MR-BL...21-21/MS (2 changeover contacts)

Operating voltage range



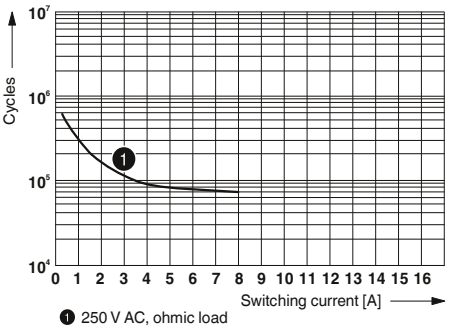
1 DC coils, 0 A contact current
2 DC coils, 8 A contact current
3 AC coils, 0 A contact current
4 AC coils, 8 A contact current

Interrupting rating



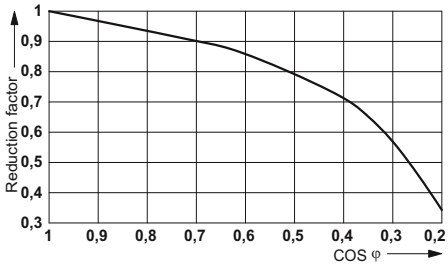
1 AC, ohmic load
2 DC, ohmic load, contacts in series
3 DC, ohmic load

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 are compatible for both relay bases RIF-1 and PLC-INTERFACE.

The advantages:

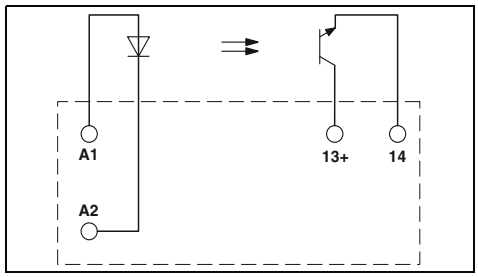
– Switching current of up to 5 A
– RT III seal (wash-proof)
– Vibration- and shock-resistant
– Wear-free and long-lasting
– Zero voltage switch at AC output
– Can be soldered in on PCB

Notes:

For dimensional drawings and perforations for assembly, see page 401

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272

Solid-state relay, DC output max. 5 A



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	35
	0 signal (“L”) [V DC] ≤	0.8	10	20
Typical input current at U_N	[mA]	9	7	3
Typical switch-on time at U_N	[µs]	10	20	25
Typical switch-off time at U_N	[µs]	400	400	400
Transmission frequency f_{limit}	[Hz]	300	300	300

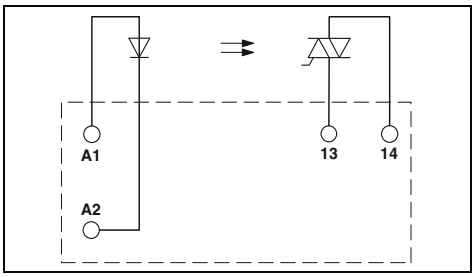
Output data	
Max. switching voltage	33 V DC
Minimum switching voltage	3 V DC
Limiting continuous current	5 A (see derating curve)
Minimum load current	-
Maximum switch-on current	15 A (10 ms)
Leakage current in off state	-
Output circuit	2-conductor, floating
Max. load value	-
Output protection	Reverse polarity protection, surge protection
Voltage drop at maximum 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
Degree of pollution/surge voltage category	2 / III
Mounting position/mounting	Any / in rows with zero spacing
Dimensions W / H / D	12.7 mm / 29 mm / 15.7 mm

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Plug-in solid-state relays					
Solid-state power relays	①	5 V DC	**OPT- 5DC/ 24DC/ 5**	2982113	10
Solid-state power relays	②	24 V DC	**OPT-24DC/ 24DC/ 5**	2982100	10
Solid-state power relays	③	60 V DC	**OPT-60DC/ 24DC/ 5**	2982126	10

**Solid-state relay,
AC output max. 2 A**



Technical data

①	②
0.8 - 1.2	0.8 - 1.2
3	18
1	8.4
15	7
10,000	10,000
10,000	10,000
10	10

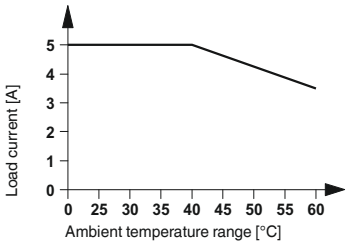
253 V AC
24 V AC
2 A (see derating curve)
25 mA
30 A (10 ms)
<1 mA
2-conductor floating, zero voltage switch
4 A²s (tp = 10 ms, at 25°C)
Surge protection
≤1 V

Basic insulation
2.5 kV (50 Hz, 1 min.)
-25°C ... 60°C
100% operating factor
IEC 60664, EN 50178
2 / III
Any / see derating curve
12.7 mm / 29 mm / 15.7 mm

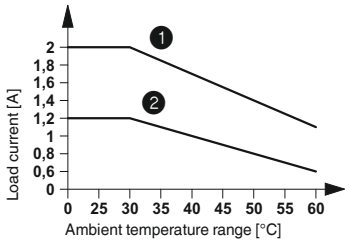
Ordering data

Type	Order No.	Pcs./Pkt.
OPT- 5DC/230AC/ 2	**2982168**	10
OPT-24DC/230AC/ 2	**2982171**	10

Derating curve for OPT...DC/24DC/5 solid-state relays



Derating curve for OPT...DC/230AC/2 solid-state relays



1 Aligned with >10 mm spacing
2 Aligned without spacing

Modular RIF-2 relay bases

Relay bases for assembly with 2 or 4-changeover-contact industrial relay.

Range of accessories includes:

– Plug-in interference suppression module
– Plug-in timer module
– Relay retaining bracket with ejector function and holder for marking material
– Comprehensive range of marking material
– Test plug
– FBS 2-6 plug-in bridges for the input side (A2)

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272

4-changeover-contact relay base with Push-in connection technology for industrial relays

Technical data

Nominal voltage U_N	250 V AC/DC
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	96 mm

Ordering data

Description	Type	Order No.	Pcs./Pkt.
RIF-2 relay base, plug-in option for interference suppression module, safe isolation I/O with Push-in connection	**RIF-2-BPT/4X21**	2900934	10
RIF-2 relay base, plug-in option for interference suppression module, safe isolation I/O with screw connection			
Plastic relay retaining bracket, with ejector function and holder for marking material, suitable for RIF-2 relay base			
Reinforced plastic relay retaining bracket, with ejector function and holder for marking material, compatible for RIF-2 relay base			
Relay retaining bracket, wire model, suitable for RIF-2 relay base			

Accessories

Plug-in bridge				
2-pos. red, 32 A		**FBS 2-6**	3030336	50
2-pos. red, 24 A		**FBSR 2-6**	3033715	50
2-pos. blue, 32 A		**FBS 2-6 BU**	3036932	50
2-pos. gray, 32 A		**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	gray	**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

4-changeover-contact relay base with screw connection technology for industrial relays

Plastic relay retaining bracket for RIF-2 base

Metal wire relay retaining bracket for RIF-2 base

Technical data

250 V AC/DC	-	-
Max. 12 A (depends on application/assembly)	-	-
-40°C ... 85°C (depends on application/assembly)	-	-
0.5 ... 4 mm² / 0.5 ... 4 mm² / 20 - 10	-	-
27 mm	-	-
75 mm	-	-
89 mm	-	-

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-2-BSC/4X21	2900932	10

Type	Order No.	Pcs./Pkt.
RIF-RH-2	2900954	10
RIF-RHS-2	2908043	10

Type	Order No.	Pcs./Pkt.
RIF-RHM-2	2905984	10

Accessories

FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100

Plug-in industrial relays

Plug-in industrial relays with 2 or 4 changeover contacts, compatible for RIF-2 relay base.

The advantages:

– With lockable manual operation
– Mechanical switch position indicator
– Integrated status LED
– Multi-layer gold contact or power contact
– DC types with integrated free-wheeling diode

Notes:

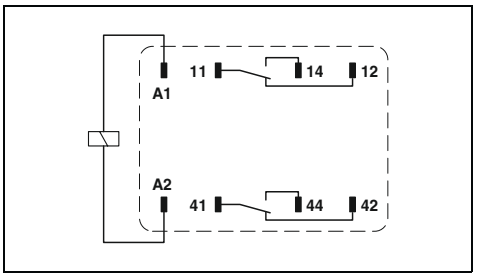
For more voltages, see phoenixcontact.com/products

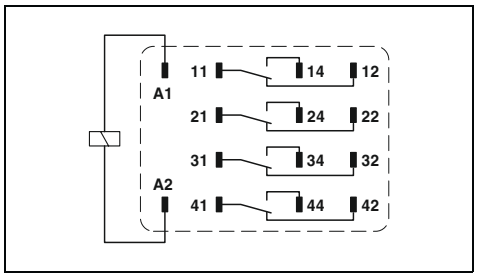
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272

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.

Industrial relay with two changeover contacts with manual operation, 2 x 12 A, maximum

Industrial relay with four changeover contacts with manual operation, 4 x 6 A, maximum





Technical data

Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		See diagram							
Typical input current at U_N	[mA]	78	42	8	7.7	4	66	13	6.5
Typical response time at U_N	[ms]	13	13	13	13	13			
Typical response time at U_N (depending on phase relation)	[ms]						5 - 15	5 - 15	5 - 15
Typical release time at U_N	[ms]	14	14	14	14	14			
Typical release time at U_N (depending on phase relation)	[ms]						5 - 20	5 - 20	5 - 20
Output data									
Contact type		2 PDT							
Contact material		AgNi							
Max. switching voltage		250 V AC/DC							
Minimum switching voltage		5 V (at 24 mA)							
Limiting continuous current		12 A							
Maximum switch-on current AC		30 A (20 ms, N/O contact)							
Maximum switch-on current DC		30 A (20 ms, N/O contact)							
Minimum switching current		5 mA (at 24 V)							
General data									
Test voltage (winding/contact)		2.5 kV_{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. 2x 10^7 cycles							
Mechanical service life, DC		Approx. 2x 10^7 cycles							
Standards/regulations		IEC 60664, IEC 61810							

Technical data

Input data		①	②	③	④	⑤	⑥	⑦	⑧
Permissible range (with reference to U_N)		See diagram							
Typical input current at U_N	[mA]	78	42	8	7.7	4	66	13	6.5
Typical response time at U_N	[ms]	13	13	13	13	13			
Typical response time at U_N (depending on phase relation)	[ms]						5 - 15	5 - 15	5 - 15
Typical release time at U_N	[ms]	14	14	14	14	14			
Typical release time at U_N (depending on phase relation)	[ms]						5 - 20	5 - 20	5 - 20
Output data									
Contact type		4 PDTs					4 PDTs		
Contact material		AgNi					AgNi, hard gold-plated		
Max. switching voltage		250 V AC/DC					30 V AC / 36 V DC		
Minimum switching voltage		5 V (at 24 mA)					2 V (at 24 mA)		
Limiting continuous current		6 A					50 mA		
Maximum switch-on current AC		16 A (20 ms, N/O contact)					50 mA		
Maximum switch-on current DC		16 A (20 ms, N/O contact)					50 mA		
Minimum switching current		5 mA (at 24 V)					2 mA (24 V DC)		
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. 2x 10^7 cycles							
Mechanical service life, DC		Approx. 2x 10^7 cycles							
Standards/regulations		IEC 60664, IEC 61810							

Ordering data

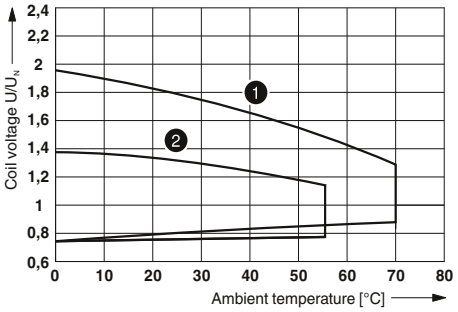
Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Plug-in industrial relays, with power contacts					
With freewheeling diode	①	12 V DC	**REL-IR2/LDP- 12DC/2X21**	2903659	10
With freewheeling diode	②	24 V DC	**REL-IR2/LDP- 24DC/2X21**	2903660	10
With freewheeling diode	③	110 V DC	**REL-IR2/LDP-110DC/2X21**	2903663	10
With freewheeling diode	④	125 V DC	**REL-IR2/LDP-125DC/2X21**	2903664	10
With freewheeling diode	⑤	220 V DC	**REL-IR2/LDP-220DC/2X21**	2903665	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	110 V DC			
With freewheeling diode	④	125 V DC			
With freewheeling diode	⑤	220 V DC			
	⑥	24 V AC			
	⑦	120 V AC			
	⑧	230 V AC			

Ordering data

Type	Order No.	Pcs./Pkt.
REL-IR4/LDP- 12DC/4X21	2903676	10
REL-IR4/LDP- 24DC/4X21	2903677	10
REL-IR4/LDP-110DC/4X21	2903680	10
REL-IR4/LDP-125DC/4X21	2903681	10
REL-IR4/LDP-220DC/4X21	2903682	10
REL-IR4/L- 24AC/4X21	2903686	10
REL-IR4/L-120AC/4X21	2903687	10
REL-IR4/L-230AC/4X21	2903688	10
REL-IR4/LDP- 12DC/4X21AU	2903669	10
REL-IR4/LDP- 24DC/4X21AU	2903670	10
REL-IR4/LDP-110DC/4X21AU	2903673	10
REL-IR4/LDP-125DC/4X21AU	2903674	10
REL-IR4/LDP-220DC/4X21AU	2903675	10
REL-IR4/L- 24AC/4X21AU	2903683	10
REL-IR4/L-120AC/4X21AU	2903684	10
REL-IR4/L-230AC/4X21AU	2903685	10

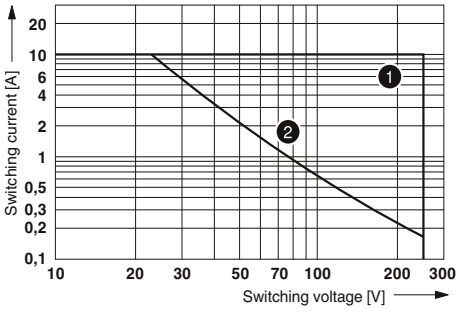
REL-IR2... (2 changeover contacts)

Operating voltage range



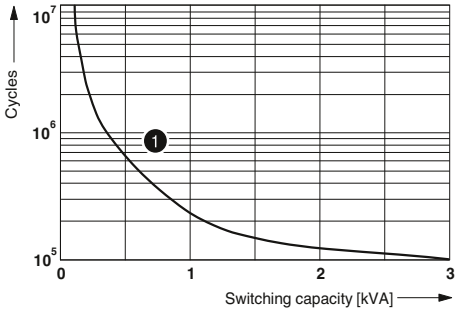
1 DC coils
2 AC coils

Interrupting rating



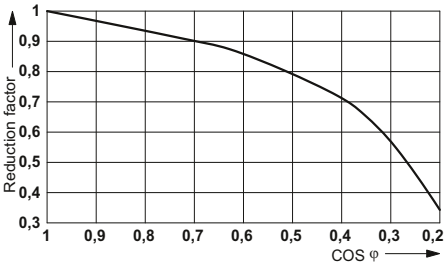
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



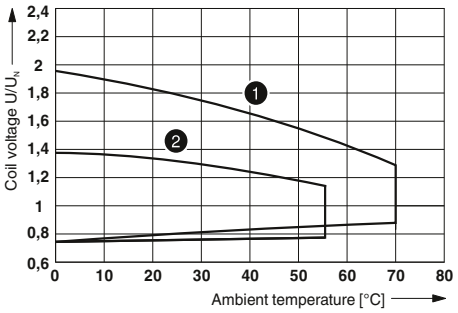
1 250 V AC, ohmic load

Service life reduction factor



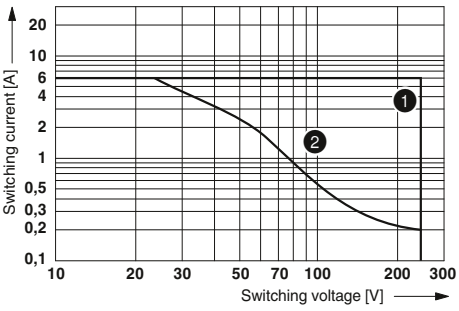
REL-IR4... (4 changeover contacts)

Operating voltage range



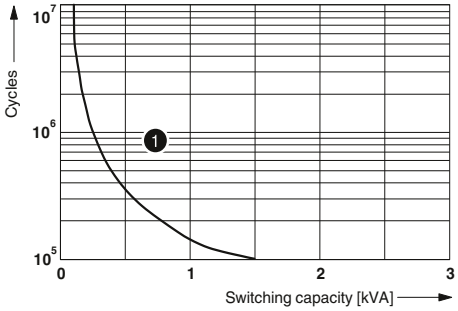
1 DC coils
2 AC coils

Interrupting rating



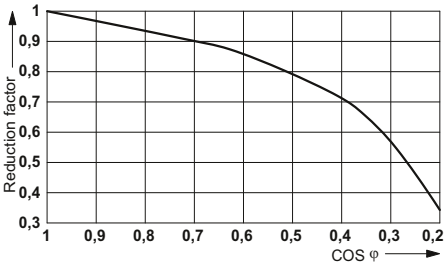
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



1 250 V AC, ohmic load

Service life reduction factor



Non-polarized plug-in industrial relays

Non-polarized plug-in industrial relays with 2 or 4 changeover contacts, compatible with RIF-2 relay base.

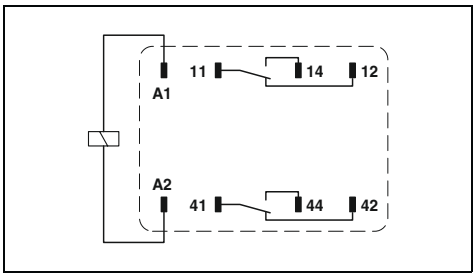
The advantages:

– Switching current of up to 12 A
– With lockable manual operation
– Mechanical switch position indicator
– Special voltages (100 and 200 V AC)

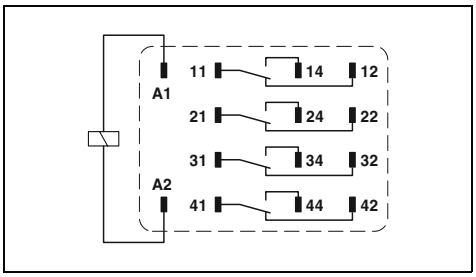
Notes:

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272

Industrial relay with two changeover contacts (non-polarized) with manual operation, 2 x 12 A, maximum



Industrial relay with four changeover contacts (non-polarized) with manual operation, 4 x 6 A, maximum



Technical data

Input data		①	②	③
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	38	14.8	7.1
Typical response time at U_N	[ms]	13		
Typical response time at U_N (depending on phase relation)	[ms]		5 - 15	5 - 15
Typical release time at U_N	[ms]	3		
Typical release time at U_N (depending on phase relation)	[ms]		5 - 20	5 - 20
Output data				
Contact type		2 PDT		
Contact material		AgNi		
Max. switching voltage		250 V AC/DC		
Minimum switching voltage		5 V (at 24 mA)		
Limiting continuous current		12 A		
Maximum switch-on current AC		30 A (20 ms, N/O contact)		
Maximum switch-on current DC		30 A (20 ms, N/O contact)		
Minimum switching current		5 mA (at 24 V)		
General data				
Test voltage (winding/contact)		2.5 kV_{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. 2x 10^7 cycles		
Mechanical service life, DC		Approx. 2x 10^7 cycles		
Standards/regulations		IEC 60664, IEC 61810		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Non-polarized plug-in industrial relays, with power contacts					
	①	24 V DC	**REL-IR2/24DC/2X21**	2907051	10
	②	100 V AC	**REL-IR2/100AC/2X21**	2907052	10
	③	200 V AC	**REL-IR2/200AC/2X21**	2907053	10

Technical data

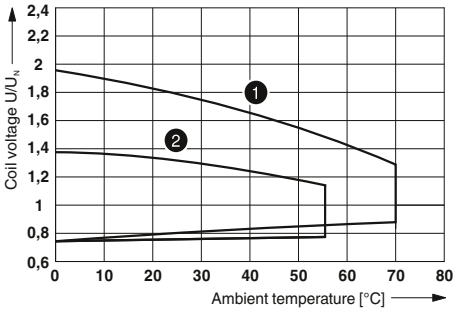
Input data		①	②	③
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	38	14.8	7.1
Typical response time at U_N	[ms]	13		
Typical response time at U_N (depending on phase relation)	[ms]		5 - 15	5 - 15
Typical release time at U_N	[ms]	3		
Typical release time at U_N (depending on phase relation)	[ms]		5 - 20	5 - 20
Output data				
Contact type		4 PDTs		
Contact material		AgNi		
Max. switching voltage		250 V AC/DC		
Minimum switching voltage		5 V (at 24 mA)		
Limiting continuous current		6 A		
Maximum switch-on current AC		16 A (20 ms, N/O contact)		
Maximum switch-on current DC		16 A (20 ms, N/O contact)		
Minimum switching current		5 mA (at 24 V)		
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		1x 10^7 cycles, approximately		
Mechanical service life, DC		1x 10^7 cycles, approximately		
Standards/regulations		IEC 60664, IEC 61810		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Non-polarized plug-in industrial relays, with power contacts					
	①	24 V DC	**REL-IR4/24DC/4X21**	2907054	10
	②	100 V AC	**REL-IR4/100AC/4X21**	2907055	10
	③	200 V AC	**REL-IR4/200AC/4X21**	2907056	10

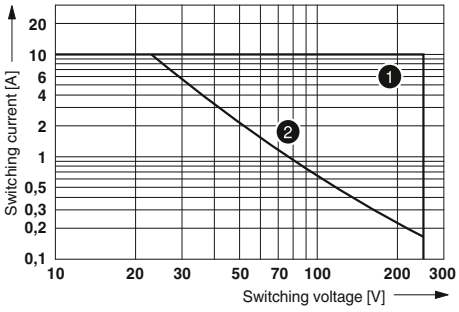
REL-IR2... (2 changeover contacts)

Operating voltage range



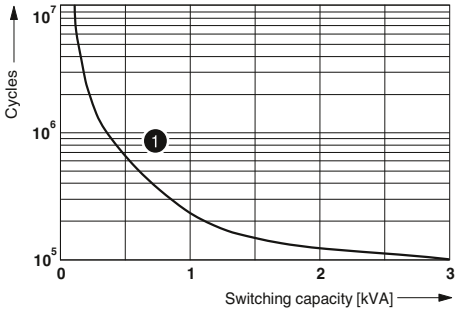
1 DC coils
2 AC coils

Interrupting rating



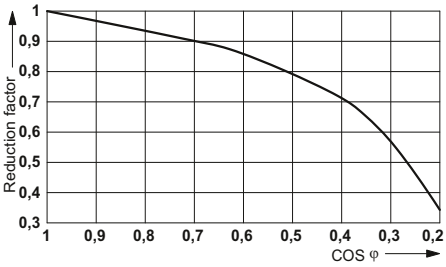
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



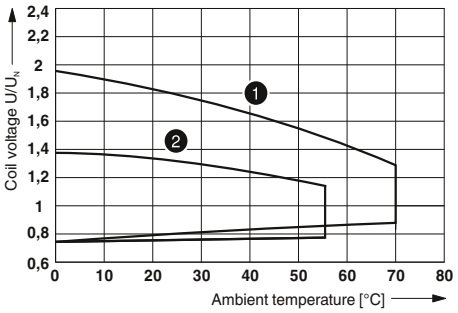
1 250 V AC, ohmic load

Service life reduction factor



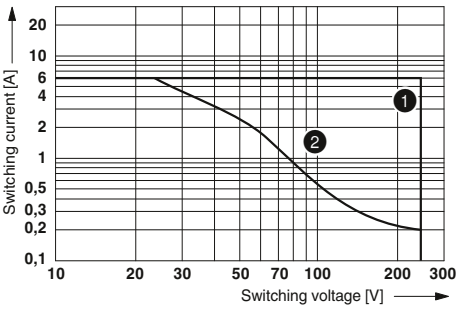
REL-IR4... (4 changeover contacts)

Operating voltage range



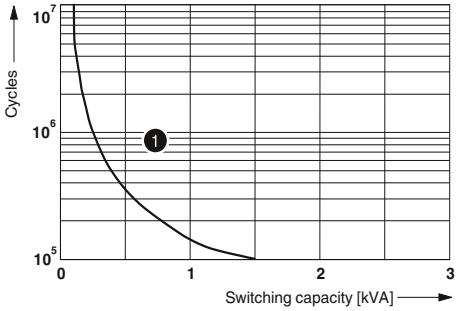
1 DC coils
2 AC coils

Interrupting rating



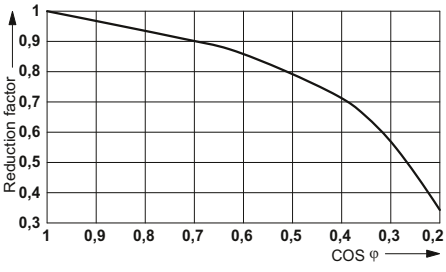
1 AC, ohmic load
2 DC, ohmic load

Electrical service life



1 250 V AC, ohmic load

Service life reduction factor



Modular RIF-3 relay bases

Relay bases that can be fitted with 2 or 3 PDT relays.

Range of accessories includes:

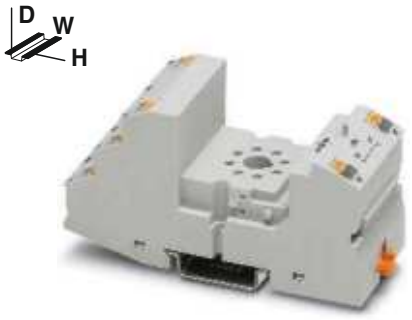
– Plug-in interference suppression module
– Plug-in timer module
– Relay retaining bracket with ejector function and holder for marking material
– Comprehensive range of marking material
– Test plug
– FBS 2-6 plug-in bridges for the input side (A2)

Notes:

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

For further marking systems and mounting material, see Catalog 3.

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272



2-changeover-contact relay base with Push-in connection technology for octal relays

Technical data

Nominal voltage U_N	250 V AC/DC
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	103 mm

Ordering data

Description	Type	Order No.	Pcs./Pkt.
RIF-3 relay base, 2-PDT version, plug-in option for 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 interference suppression module, safe isolation I/O with Push-in connection			
Plastic relay retaining bracket, with holder for marking material, suitable for RIF-3 relay base			
Relay retaining bracket, wire model, suitable for RIF-3 relay base			

Accessories

Plug-in bridge				
2-pos. red, 32 A		**FBS 2-6**	3030336	50
2-pos. red, 24 A		**FBSR 2-6**	3033715	50
2-pos. blue, 32 A		**FBS 2-6 BU**	3036932	50
2-pos. gray, 32 A		**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	gray	**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

3-changeover-contact relay base with Push-in connection technology for octal relays

Plastic relay retaining bracket for RIF-3 base

Metal wire relay retaining bracket for RIF-3 base

Technical data

250 V AC/DC	-	-
Max. 12 A (depends on application/assembly)	-	-
-40°C ... 85°C (depends on application/assembly)	-	-
0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16	-	-
40 mm	-	-
90 mm	-	-
103 mm	-	-

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-3-BPT/3X21	2900938	10

Type	Order No.	Pcs./Pkt.
RIF-RH-3	2900955	10

Type	Order No.	Pcs./Pkt.
EL3-M52	2833628	10

Accessories

FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100

Modular RIF-3 relay bases

Relay bases for assembly with 2 or 3-changeover-contact octal relay. Range of accessories includes:

- Plug-in interference suppression module
- Plug-in timer module
- Relay retaining bracket with ejector function and holder for marking material
- Comprehensive range of marking material
- Test plug
- FBS 2-6 plug-in bridges for the input side (A2)

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272

2-changeover-contact relay base with screw connection technology for octal relays

Technical data

Nominal voltage U_N	250 V AC/DC
Nominal current at U_N	Max. 12.5 A (depends on application/assembly)
General data	
Ambient temperature (operation)	-40°C ... 85°C (depends on application/assembly)
Connection data solid/stranded/AWG	0.5 ... 4 mm² / 0.5 ... 4 mm² / 20 - 10
Dimensions	
Width	40 mm
Depth with retaining bracket	90 mm
Height	96 mm

Ordering data

Description	Type	Order No.	Pcs./Pkt.
RIF-3 relay base, 2-PDT version, plug-in option for interference suppression module, safe isolation I/O with screw connection	**RIF-3-BSC/2X21**	2900935	10
RIF-3 relay base, 3-PDT version, plug-in option for interference suppression module, safe isolation I/O with screw connection			
Plastic relay retaining bracket, with holder for marking material, suitable for RIF-3 relay base			
Relay retaining bracket, wire model, suitable for RIF-3 relay base			

Accessories

Plug-in bridge				
2-pos. red, 32 A		**FBS 2-6**	3030336	50
2-pos. red, 24 A		**FBSR 2-6**	3033715	50
2-pos. blue, 32 A		**FBS 2-6 BU**	3036932	50
2-pos. gray, 32 A		**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	gray	**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

3-changeover-contact relay base with screw connection technology for octal relays

Plastic relay retaining bracket for RIF-3 base

Metal wire relay retaining bracket for RIF-3 base

Technical data

250 V AC/DC	-	-
Max. 10.5 A (depends on application/assembly)	-	-
-40°C ... 85°C (depends on application/assembly)	-	-
0.5 ... 4 mm² / 0.5 ... 4 mm² / 20 - 10	-	-
40 mm	-	-
90 mm	-	-
96 mm	-	-

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-3-BSC/3X21	2900936	10

Type	Order No.	Pcs./Pkt.
RIF-RH-3	2900955	10

Type	Order No.	Pcs./Pkt.
EL3-M52	2833628	10

Accessories

FBS 2-6	3030336	50
FBSR 2-6	3033715	50
FBS 2-6 BU	3036932	50
FBS 2-6 GY	3032237	50
CLIPFIX 35	3022218	50
MPS-MT	0201744	10
MPS-IH RD	0201676	10
MPS-IH WH	0201663	10
MPS-IH BU	0201689	10
MPS-IH YE	0201692	10
MPS-IH GN	0201702	10
MPS-IH GY	0201728	10
MPS-IH BK	0201731	10
ZB 5 :UNBEDRUCKT	1050004	10
ZB 15:UNBEDRUCKT	0811972	10
STP 5-2	0800967	100

Plug-in octal relays

Plug-in octal relays with 2 or 3 changeover contacts, compatible for RIF-3 relay base.

The advantages:

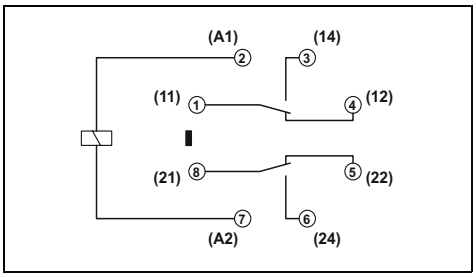
– With lockable manual operation
– Mechanical switch position indicator
– Integrated status LED
– DC types with integrated free-wheeling diode

Notes:

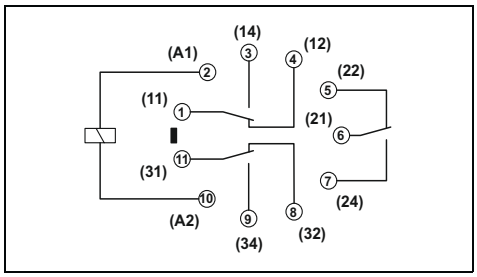
For more voltages, see phoenixcontact.com/products

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272

Octal relay with two changeover contacts with manual operation, 2 x 10 A, maximum



Octal relay with three changeover contacts with manual operation, 3 x 10 A, maximum



Technical data

		①	⑤	⑥	⑦	⑧
Input data						
Permissible range (with reference to U_N)		See diagram				
Typical input current at U_N	[mA]	60	8	108	23	13
Typical response time at U_N	[ms]	18	18			
Typical response time at U_N (depending on phase relation)	[ms]			5 - 15	5 - 15	5 - 15
Typical release time at U_N	[ms]	20	7			
Typical release time at U_N (depending on phase relation)	[ms]			5 - 20	5 - 20	5 - 20
Input circuit AC		-				
Input circuit DC		-				
Output data						
Contact type		2 PDT				
Contact material		AgNi				
Max. switching voltage		250 V AC/DC				
Minimum switching voltage		10 V (at 24 mA)				
Limiting continuous current		10 A				
Maximum switch-on current AC		30 A (20 ms, N/O contact)				
Maximum switch-on current DC		30 A (20 ms, N/O contact)				
Minimum switching current		10 mA (at 24 V)				
General data						
Test voltage (winding/contact)		2.5 kV_{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. 2x 10^7 cycles				
Mechanical service life, DC		Approx. 2x 10^7 cycles				
Standards/regulations		IEC 60664, IEC 61810				
Mounting position/mounting		Any				
Dimensions	W / H / D	35 mm / 35 mm / 54.4 mm				

Technical data

		①	②	③	④	⑤	⑥	⑦	⑧
Input data									
Permissible range (with reference to U_N)		-							
Typical input current at U_N	[mA]	60			14	8	108	23	13
Typical response time at U_N	[ms]	18	18	18	18	18			
Typical response time at U_N (depending on phase relation)	[ms]						5 - 15	5 - 15	5 - 15
Typical release time at U_N	[ms]	20	20	20	20	7			
Typical release time at U_N (depending on phase relation)	[ms]						5 - 20	5 - 20	5 - 20
Input circuit AC		-							
Input circuit DC		-							
Output data									
Contact type		3 PDTs							
Contact material		AgNi							
Max. switching voltage		250 V DC / 440 V AC							
Minimum switching voltage		10 V (at 24 mA)							
Limiting continuous current		10 A							
Maximum switch-on current AC		30 A (20 ms, N/O contact)							
Maximum switch-on current DC		30 A (20 ms, N/O contact)							
Minimum switching current		10 mA (at 24 V)							
General data									
Test voltage (winding/contact)		2.5 kV_{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. 2x 10^7 cycles							
Mechanical service life, DC		Approx. 2x 10^7 cycles							
Standards/regulations		IEC 60664, IEC 61810							
Mounting position/mounting		Any							
Dimensions	W / H / D	35 mm / 35 mm / 54.4 mm							

Ordering data

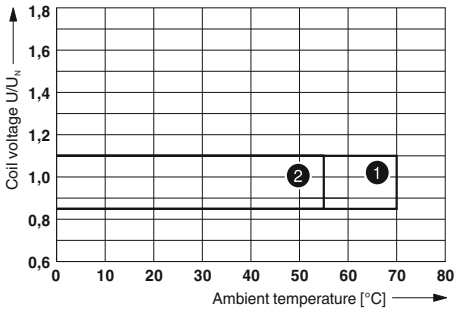
Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Plug-in octal relays, with power contacts					
With freewheeling diode	①	24 V DC	**REL-OR2/LDP- 24DC/2X21**	2903689	10
With freewheeling diode	②	48 V DC			
With freewheeling diode	③	110 V DC			
With freewheeling diode	④	125 V DC			
With freewheeling diode	⑤	220 V DC	**REL-OR2/LDP-220DC/2X21**	2907026	10
	⑥	24 V AC	**REL-OR2/L- 24AC/2X21**	2903690	10
	⑦	120 V AC	**REL-OR2/L-120AC/2X21**	2903691	10
	⑧	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/LDP-48DC/3X21	2908897	10
REL-OR3/LDP-110DC/3X21	2908898	10
REL-OR3/LDP-125DC/3X21	2909207	10
REL-OR3/LDP-220DC/3X21	2907027	10
REL-OR3/L- 24AC/3X21	2903694	10
REL-OR3/L-120AC/3X21	2903695	10
REL-OR3/L-230AC/3X21	2903696	10

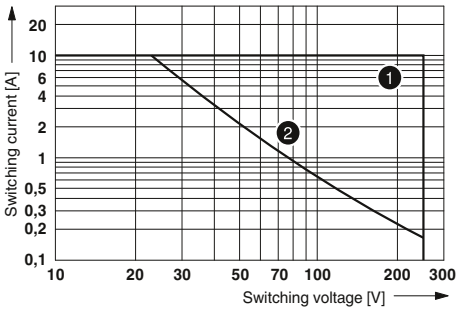
REL-OR2... (2 changeover contacts)

Operating voltage range



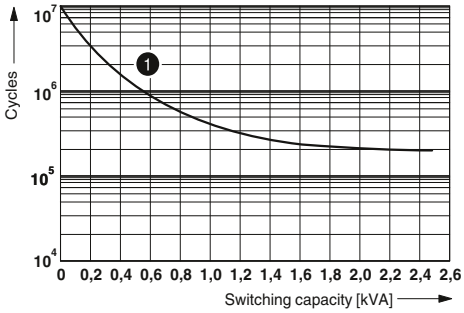
❶ DC coils
❷ AC coils

Interrupting rating



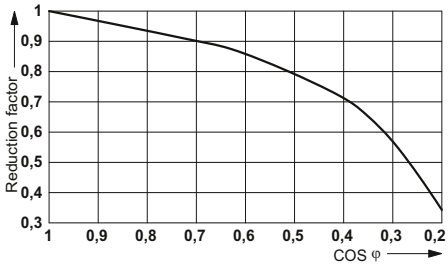
❶ AC, ohmic load
❷ DC, ohmic load

Electrical service life



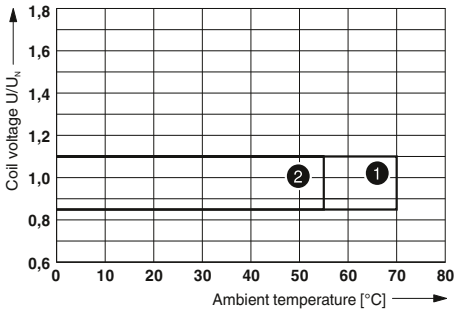
❶ 250 V AC, ohmic load

Service life reduction factor



REL-OR3... (3 changeover contacts)

Operating voltage range

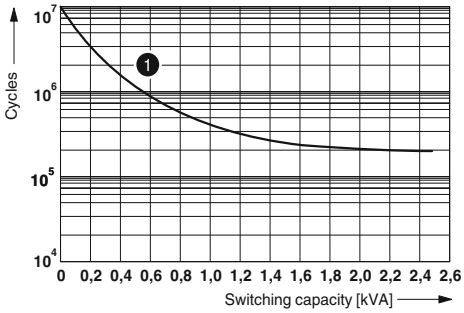


❶ DC coils
❷ AC coils

Interrupting rating

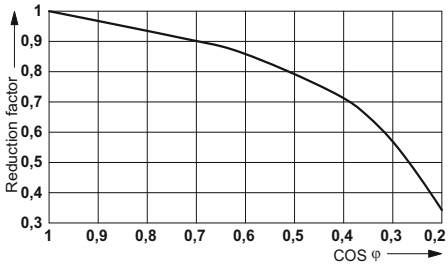
❶ AC, ohmic load
❷ DC, ohmic load

Electrical service life



❶ 250 V AC, ohmic load

Service life reduction factor



Modular RIF-4 relay bases

Relay bases that can be fitted with 2 or 3 PDT relays or 3 N/O relays.
Range of accessories includes:

- Plug-in interference suppression module
- Plug-in timer module
- Relay retaining bracket with ejector function and holder for marking material
- Comprehensive range of marking material
- Test plug
- FBS 2-6 plug-in bridges for the input side (A2)

Notes:
Type of insulating housing: Polyamide PA non-reinforced, color: gray.
For further marking systems and mounting material, see Catalog 3.
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272

3-changeover-contact relay base with Push-in connection technology for high-power relays

Technical data

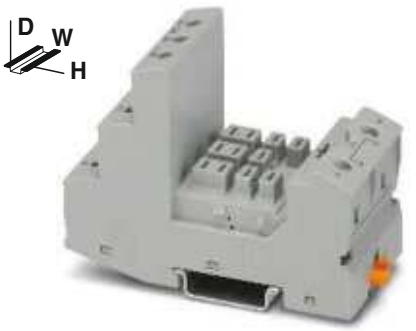
Nominal voltage U_N	440 V AC / 250 V DC
Nominal current at U_N	Max. 16 A (depends on application/assembly)
General data	
Ambient temperature (operation)	-40°C ... 85°C (depends on application/assembly)
Connection data solid/stranded/AWG	
Input side	0.14 ... 1.5 mm² / 0.14 ... 1.5 mm² / 26 - 16
Output side	0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14
Dimensions	
Width	43 mm
Depth with retaining bracket	90 mm
Height	111 mm

Ordering data

Description	Type	Order No.	Pcs./Pkt.
RIF-4 relay base, plug-in option for interference suppression module, safe isolation I/O with Push-in connection	**RIF-4-BPT/3X21**	2900961	10
RIF-4 relay base, plug-in option for interference suppression module, safe isolation I/O with screw connection			
Relay retaining bracket, with holder for marking material, suitable for RIF-4 relay base			
Relay retaining bracket, wire model, suitable for RIF-4 relay base			

Accessories

Plug-in bridge				
2-pos. red, 32 A		**FBS 2-6**	3030336	50
2-pos. red, 24 A		**FBSR 2-6**	3033715	50
2-pos. blue, 32 A		**FBS 2-6 BU**	3036932	50
2-pos. gray, 32 A		**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	gray	**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



3-changeover-contact relay base with screw connection technology for high-power relays

Plastic relay retaining bracket for RIF-4 base

Metal wire relay retaining bracket for RIF-4 base

Technical data

440 V AC / 250 V DC	-	-
Max. 13 A (depends on application/assembly)	-	-
-40°C ... 85°C (depends on application/assembly)	-	-
0.5 ... 4 mm² / 0.5 ... 4 mm² / 20 - 10	-	-
0.5 ... 4 mm² / 0.5 ... 4 mm² / 20 - 10	-	-
44 mm	-	-
91 mm	-	-
96 mm	-	-

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-4-BSC/3X21	2900960	10

Type	Order No.	Pcs./Pkt.
RIF-RH-4	2900956	10

Type	Order No.	Pcs./Pkt.
RIF-RHM-4	2905983	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

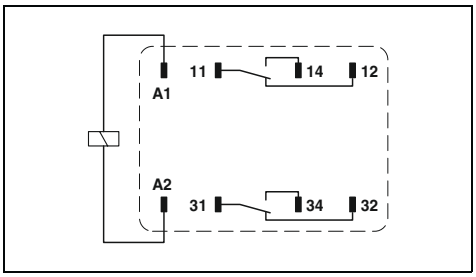
Notes:

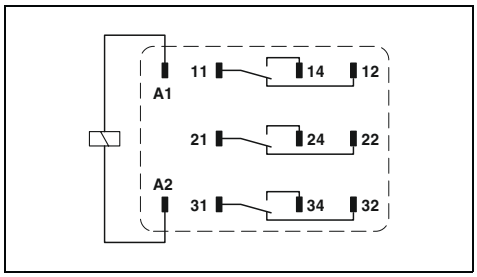
For more voltages, see phoenixcontact.com/products

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272

High-power relay with two changeover contacts, 2 x 16 A, maximum

High-power relay with three changeover contacts, 3 x 16 A, maximum





Technical data

Input data		①	②	③	④
Permissible range (with reference to U_N)		See diagram			
Typical input current at U_N	[mA]	56	116	23	12
Typical response time at U_N	[ms]	20			
Typical response time at U_N (depending on phase relation)	[ms]		5 - 25	5 - 25	5 - 25
Typical release time at U_N	[ms]	15			
Typical release time at U_N (depending on phase relation)	[ms]		5 - 20	5 - 20	5 - 20
Output data					
Contact type		2 PDT			
Contact material		AgNi			
Max. switching voltage		440 V AC / 250 V DC			
Minimum switching voltage		10 V (at 24 mA)			
Limiting continuous current		16 A			
Maximum switch-on current AC		50 A (20 ms, N/O contact)			
Maximum switch-on current DC		50 A (20 ms, N/O contact)			
Minimum switching current		10 mA (at 24 V)			
Maximum interrupting rating, ohmic load					
	250 V AC	4,000 VA			
	440 V AC	4,000 VA			
Motor load in accordance with UL 508		1/3 HP, 120 V AC (N/O contact) 1/2 HP, 240 V AC (N/O contact)			
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, IEC 61810			
Mounting position/mounting		Any			
Dimensions	W / H / D	38.6 mm / 36.1 mm / 45.5 mm			

Technical data

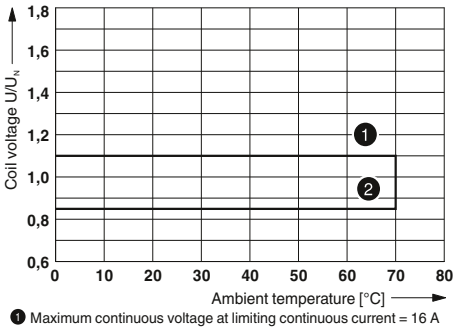
Input data		①	②	③	④	⑤	⑥
Permissible range (with reference to U_N)		-					
Typical input current at U_N	[mA]	56	12	6	116	23	12
Typical response time at U_N	[ms]	20	20	20			
Typical response time at U_N (depending on phase relation)	[ms]				5 - 25	5 - 25	5 - 25
Typical release time at U_N	[ms]	15	15	15			
Typical release time at U_N (depending on phase relation)	[ms]				5 - 20	5 - 20	5 - 20
Output data							
Contact type		3 PDTs					
Contact material		AgNi					
Max. switching voltage		440 V AC / 250 V DC					
Minimum switching voltage		10 V (at 24 mA)					
Limiting continuous current		16 A					
Maximum switch-on current AC		50 A (20 ms, N/O contact)					
Maximum switch-on current DC		50 A (20 ms, N/O contact)					
Minimum switching current		10 mA (at 24 V)					
Maximum interrupting rating, ohmic load							
	250 V AC	4,000 VA					
	440 V AC	4,000 VA					
Motor load in accordance with 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, IEC 61810					
Mounting position/mounting		Any					
Dimensions	W / H / D	38.6 mm / 36.1 mm / 45.5 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	110 V DC	**REL-PR3-110DC/3X21**	2908893	1
③	220 V DC	**REL-PR3-220DC/3X21**	2909055	1
④	24 V AC	**REL-PR3- 24AC/3X21**	2903703	1
⑤	120 V AC	**REL-PR3-120AC/3X21**	2903704	1

REL-PR2... (2 changeover contacts)

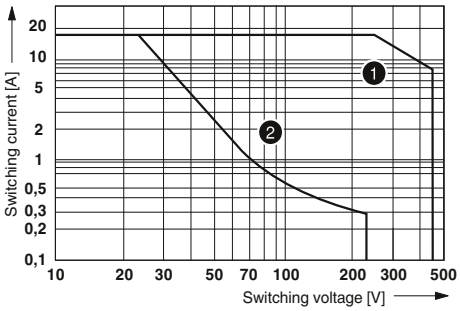
Operating voltage range



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

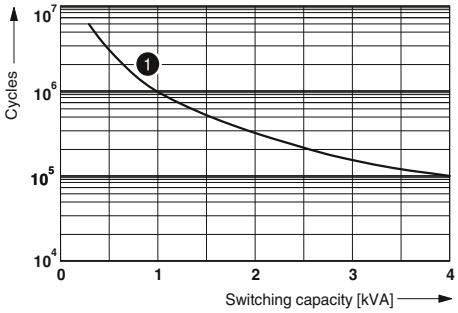
Interrupting rating



1 AC, ohmic load

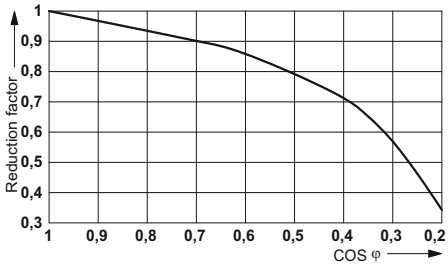
2 DC, ohmic load

Electrical service life



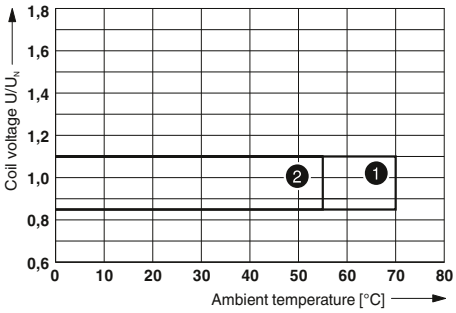
1 250 V AC, ohmic load

Service life reduction factor



REL-PR3... (3 changeover contacts)

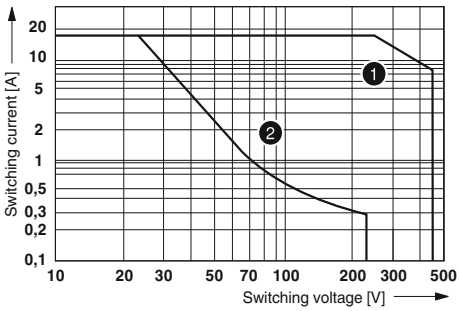
Operating voltage range



1 DC coils

2 AC coils

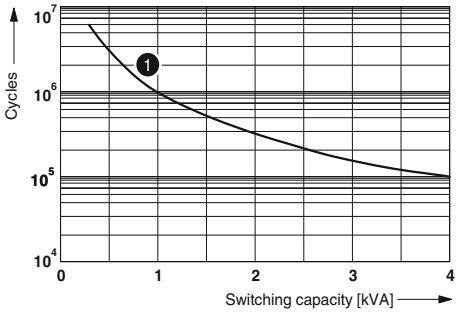
Interrupting rating



1 AC, ohmic load

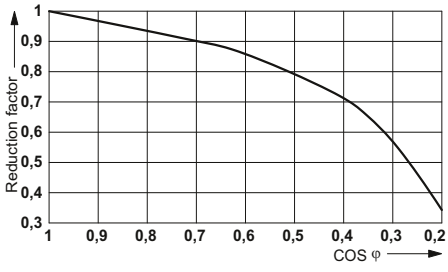
2 DC, ohmic load

Electrical service life



1 250 V AC, ohmic load

Service life reduction factor



Plug-in high-power relays

Plug-in high-power relays with 3 N/O contacts suitable for the RIF-4 relay base.

The advantages:

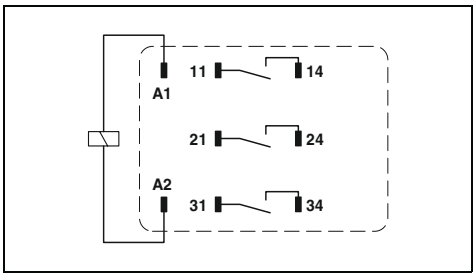
– Use in miniature contactor applications
– Switching current of up to 16 A
– Up to 440 V AC switching voltage
– Full shutdown by means of ≥3 mm contact opening

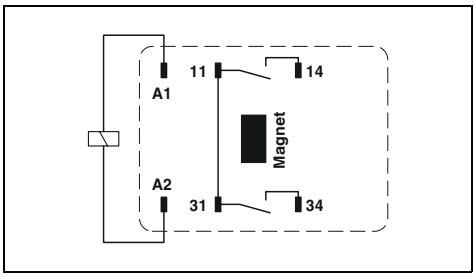
Notes:

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272

High-power relay with three N/O contacts, 3 x 16 A, maximum

High-power relay with one N/O contact with blowing magnet for switching high DC loads





Technical data

Input data		①	②	③	④
Permissible range (with reference to U_N)		See diagram			
Typical input current at U_N	[mA]	70	116	23	12
Typical response time at U_N	[ms]	20			
Typical response time at U_N (depending on phase relation)	[ms]		5 - 25	5 - 25	5 - 25
Typical release time at U_N	[ms]	15			
Typical release time at U_N (depending on phase relation)	[ms]		5 - 20	5 - 20	5 - 20
Output data					
Contact type		3 N/O contacts			
Contact material		AgNi			
Max. switching voltage		440 V AC / 250 V DC			
Minimum switching voltage		10 V (at 24 mA)			
Limiting continuous current		16 A			
Maximum switch-on current AC		50 A (20 ms, N/O contact)			
Maximum switch-on current DC		50 A (20 ms, N/O contact)			
Minimum switching current		10 mA (at 24 V)			
Maximum interrupting rating, ohmic load					
	250 V AC	4,000 VA			
	440 V AC	4,000 VA			
Motor load in accordance with UL 508		1/3 HP, 120 V AC (N/O contact) 1/2 HP, 240 V AC (N/O contact)			
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, IEC 61810			
Mounting position/mounting		Any			
Dimensions	W / H / D	38.6 mm / 36.1 mm / 45.5 mm			

Technical data

Input data		①	②	③	④
Permissible range (with reference to U_N)		See diagram			
Typical input current at U_N	[mA]	70	15	7.3	12
Typical response time at U_N	[ms]	20	20	20	
Typical response time at U_N (depending on phase relation)	[ms]				5 - 25
Typical release time at U_N	[ms]	15	15	15	
Typical release time at U_N (depending on phase relation)	[ms]				5 - 18
Output data					
Contact type		1 N/O contact			
Contact material		AgNi			
Max. switching voltage		440 V AC / 250 V DC			
Minimum switching voltage		5 V (at 24 mA)			
Limiting continuous current		16 A			
Maximum switch-on current AC		50 A (20 ms)			
Maximum switch-on current DC		50 A (20 ms)			
Minimum switching current		5 mA (at 24 V)			
Maximum interrupting rating, ohmic load					
	250 V AC	4,000 VA			
	440 V AC	-			
Motor load in accordance with UL 508					
General data					
Test voltage (winding/contact)		2.5 kV			
Ambient temperature (operation), AC		-40°C ... 70°C			
Ambient temperature (operation), DC		-40°C ... 70°C			
Nominal operating mode		100% operating factor			
Mechanical service life, AC		Approx. 2x 10^7 cycles			
Mechanical service life, DC		Approx. 2x 10^7 cycles			
Standards/regulations		IEC 60664, IEC 61810			
Mounting position/mounting		Any			
Dimensions	W / H / D	38.6 mm / 36.1 mm / 45.5 mm			

Ordering data

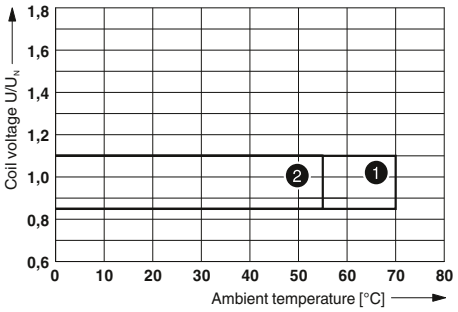
Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Plug-in high-power relays, 3 N/O contacts with power contacts					
	①	24 V DC	**REL-PR3- 24DC/3X1**	2903706	1
	②	24 V AC	**REL-PR3- 24AC/3X1**	2903707	1
	③	120 V AC	**REL-PR3-120AC/3X1**	2903708	1
	④	230 V AC	**REL-PR3-230AC/3X1**	2903709	1
Plug-in high-power relays, 1-N/O contact with blow magnet and power contacts					
	①	24 V DC			
	②	110 V DC			
	③	220 V DC			
	④	230 V AC			

Ordering data

Type	Order No.	Pcs./Pkt.
REL-PR1-24DC/1/MB	2908040	1
REL-PR1-110DC/1/MB	2908044	1
REL-PR1-220DC/1/MB	2908046	1
REL-PR1-230AC/1/MB	2908047	1

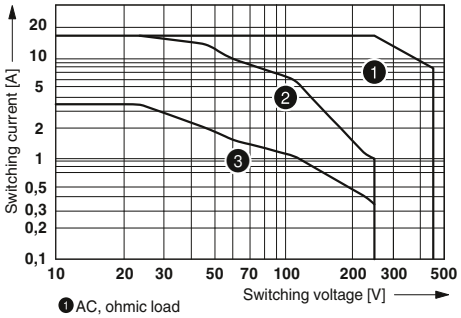
REL-PR3... (3 N/O contacts)

Operating voltage range



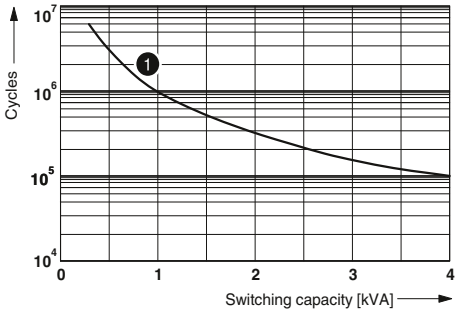
❶ DC coils
❷ AC coils

Interrupting rating



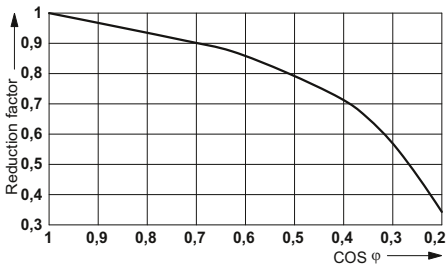
❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Electrical service life



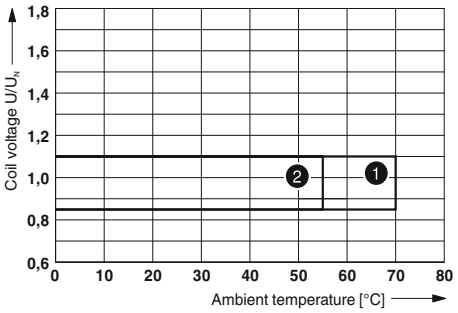
❶ 250 V AC, ohmic load

Service life reduction factor



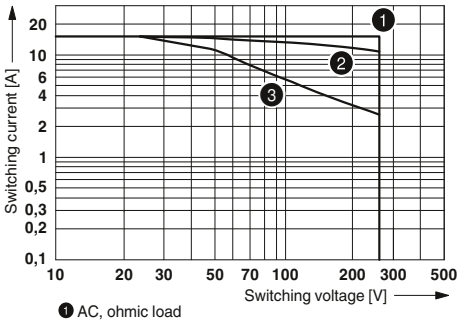
REL-PR1... (1 N/O contact with blow magnet)

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

Plug-in interference suppression modules for RIF-1, RIF-2, RIF-3, and RIF-4

Plug-in interference suppression modules for optional assembly of RIF-1 to RIF-4 relay bases.

The advantages:

– Attenuation of reverse voltage induced in coil
– Mechanical coding to protect against incorrect connection

Interference suppression modules for RIF-1 to RIF-4

Description	Type	Order No.	Pcs./Pkt.
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/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/DC ± 20% (100 nF/470 Ω)	**RIF-RC-120-230 UC**	2900951	10
Plug-in module, **with bridge rectifier** for controlling electromechanical DC voltage relay, input voltage:			
- 12 ... 230 V AC	**RIF-BR-12-230 AC**	2907060	10
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-LDM-12-24 DC**	2907057	10
Plug-in module, with LED status indicator and varistor to limit the coil induction voltage and/or external interference peaks, polarity **A1-, A2+,** input voltage:			
- 120-230 V AC/110 V DC ± 20% (275-V-varistor)	**RIF-LVM-100-200 AC/110 DC**	2907058	10

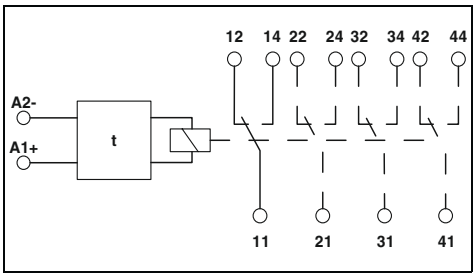
Plug-in timer modules for RIF-1, RIF-2, RIF-3, and RIF-4

The multifunctional plug-in timer module transforms a relay module into a timer relay. RIF-1 to RIF-4 bases can be equipped with this module. Using DIP switches, three time functions and four time ranges can be selected. Detailed time settings are made using a potentiometer. Relays can be operated with an input voltage of 12, or 24 V AC/DC.

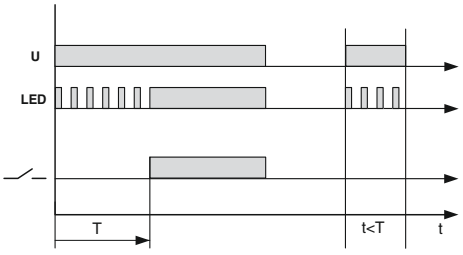
The time functions:
– With switch-on delay
– With passing make contact
– Pulse generator

Time ranges:
– 0.5 to 10 s
– 5 to 100 s
– 0.5 to 10 min
– 5 to 100 min

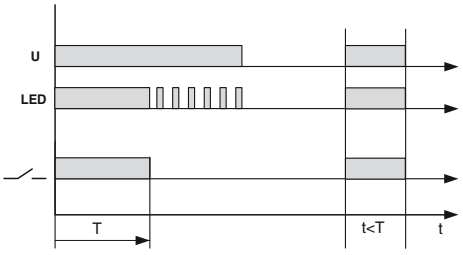
Timer module for RIF-1 to RIF-4 relay modules for 12 to 24 V AC/DC input voltage



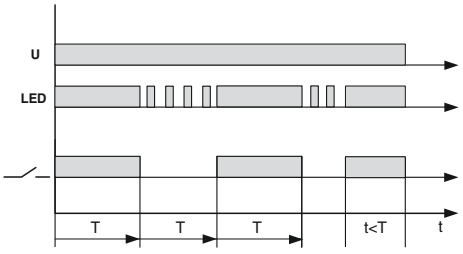
With switch-on delay



Passing make contact



Pulse generator



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

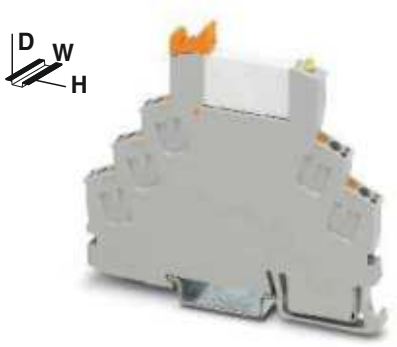
Fully mounted RIF-0 relay modules, consisting of:
– Relay base with Push-in connection
– 1 N/O contact or 1 PDT relay
– Relay ejector lever on the housing

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

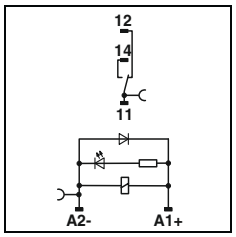
– For FBS 2-6 plug-in bridges for the input and output side, see page 358

Notes:

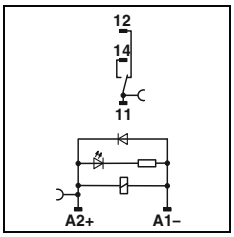
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



1-changeover-contact relay module with Push-in connection



DC coils



DC coil negative switching

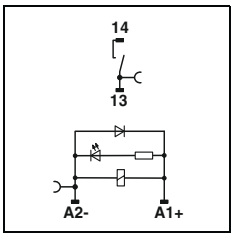
Technical data

Input data		①	②
Permissible range (with reference to U_N)		See diagram	
Typical input current at U_N	[mA]	16	9
Typical response time at U_N	[ms]	5	5
Typical release time at U_N	[ms]	8	8
Input protection:		Yellow LED, damping diode	
Output data			
Contact type		1 PDT	1 PDT
Contact material		AgSnO	AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Minimum switching voltage		5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current		6 A	50 mA
Minimum 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. 2x 10^7 cycles	
Standards/regulations		DIN EN 50178	
Degree of pollution/surge voltage category		2 / III	
Mounting position/mounting		Any / in rows with zero spacing	
Connection data solid/stranded/AWG		0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 24 - 16	
Dimensions	W / H / D	6.2 mm / 93 mm / 78 mm	
EMC note		Class A product, see page 583	

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
Coupling relay modules with power contact relay and Push-in connection				
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 multi-layer gold contact relay, with Push-in connection				
①	12 V DC	**RIF-0-RPT-12DC/21AU**	2903369	10
②	24 V DC	**RIF-0-RPT-24DC/21AU**	2903368	10
Coupling relay modules with power contact relay and Push-in connection, negative switching				
②	24 V DC	**RIF-0-RPT-M-24DC/21**	2908327	10

1-N/O-contact relay module with Push-in connection



DC coils

Technical data

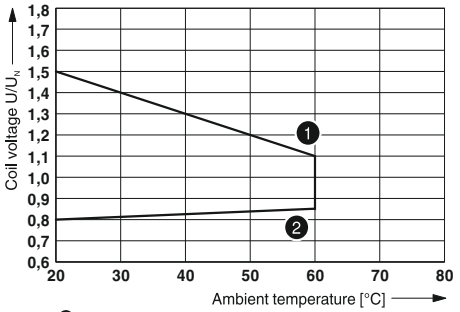
①	②
See diagram	
16	9
5	5
8	8
Yellow LED, damping diode	
1 N/O contact	1 N/O contact
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
10 mA (at 12 V)	1 mA (at 12 V)
4 kV_{rms} (50 Hz, 1 min.)	
-40°C ... 60°C	
100% operating factor	
Approx. 2x 10^7 cycles	
DIN EN 50178	
2 / III	
Any / in rows with zero spacing	
0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 24 - 16	
6.2 mm / 93 mm / 66 mm	
Class A product, see page 583	

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

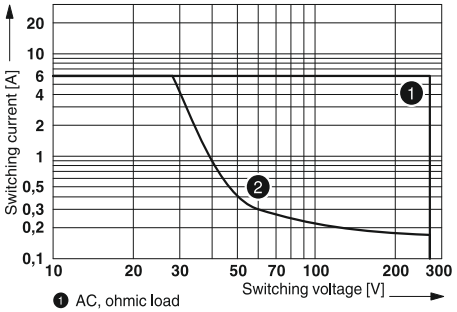
RIF-0-RPT.../21... (1 changeover contact)

Operating voltage range



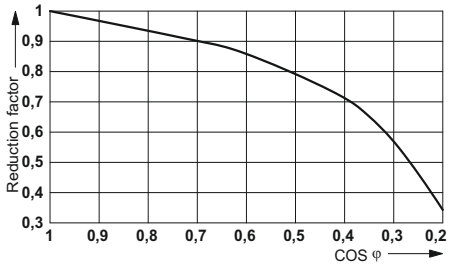
1 Maximum continuous voltage at limiting continuous current = 6 A
2 Minimum operate voltage
For pre-excitation with U_N and limiting continuous current = 6 A

Interrupting rating

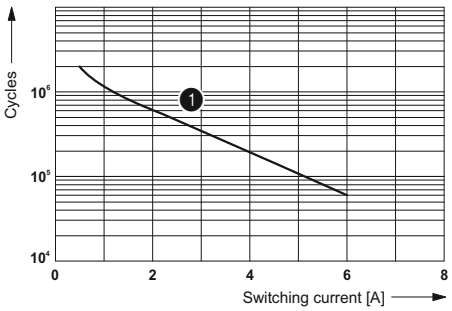


1 AC, ohmic load
2 DC, ohmic load

Service life reduction factor



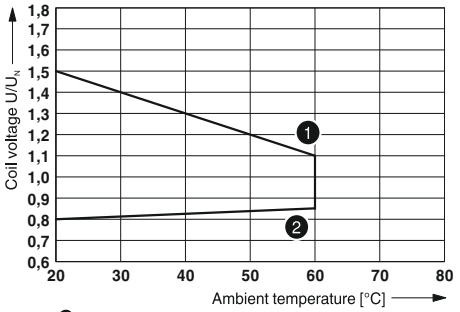
Electrical service life



1 250 V AC, ohmic load

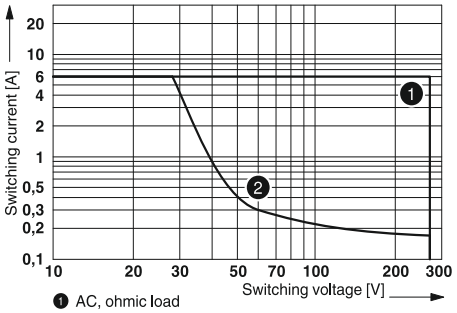
RIF-0-RPT.../1... (1 N/O contact)

Operating voltage range



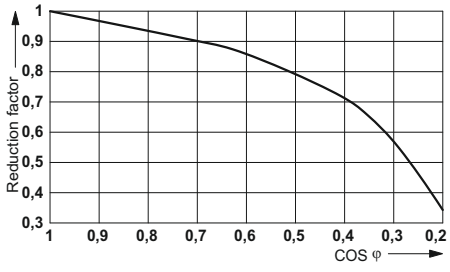
1 Maximum continuous voltage at limiting continuous current = 6 A
2 Minimum operate voltage
For pre-excitation with U_N and limiting continuous current = 6 A

Interrupting rating

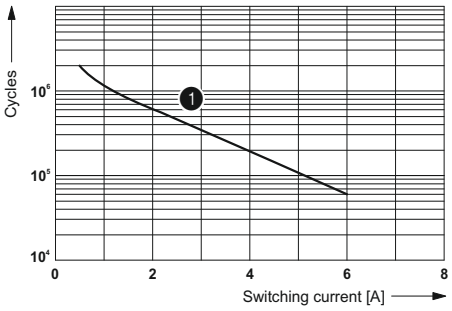


1 AC, ohmic load
2 DC, ohmic load

Service life reduction factor



Electrical service life



1 250 V AC, ohmic load

Fully mounted RIF-0 relay modules

Fully mounted RIF-0 relay modules, consisting of:
– Relay base with screw connection
– 1-PDT or 1-N/O-contact 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

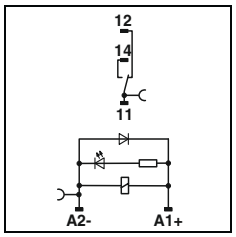
– For FBS 2-6 plug-in bridges for the input and output side, see page 358

Notes:

General conditions:
Direct alignment in the block, all devices 100% operating time, horizontal or vertical mounting.

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-changeover-contact relay module with screw connection



DC coils

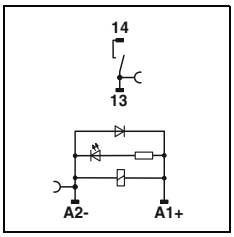
Technical data

Input data		①	②
Permissible range (with reference to U_N)		See diagram	
Typical input current at U_N	[mA]	16	9
Typical response time at U_N	[ms]	5	5
Typical release time at U_N	[ms]	8	8
Input protection:		Yellow LED, damping diode	
Output data			
Contact type		1 PDT	1 PDT
Contact material		AgSnO	AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Minimum switching voltage		5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current		6 A	50 mA
Minimum switching current		10 mA (at 12 V)	1 mA (at 12 V)
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. 2x 10^7 cycles	
Standards/regulations		DIN EN 50178	
Degree of pollution/surge voltage category		2 / III	
Mounting position/mounting		Any / in rows with zero spacing	
Connection data solid/stranded/AWG		0.5 ... 4 mm^2 / 0.5 ... 2.5 mm^2 / 20 - 12	
Maximum tightening torque		0.6 Nm	
Dimensions	W / H / D	6.2 mm / 84 mm / 82 mm	
EMC note		Class A product, see page 583	

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
Coupling relay modules with power contact relay and screw connection				
①	12 V DC	**RIF-0-RSC-12DC/21**	2903375	10
②	24 V DC	**RIF-0-RSC-24DC/21**	2903374	10
Coupling relay modules with multi-layer gold contact relay, with screw connection				
①	12 V DC	**RIF-0-RSC-12DC/21AU**	2903373	10
②	24 V DC	**RIF-0-RSC-24DC/21AU**	2903372	10

1-N/O-contact relay module with screw connection



DC coils

Technical data

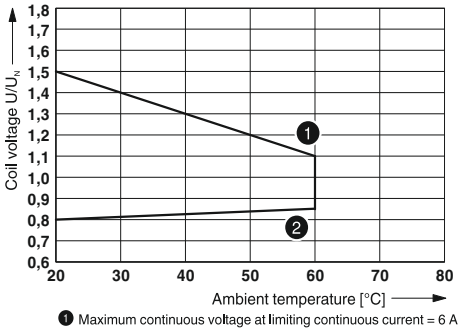
①	②
See diagram	
16	9
5	5
8	8
Yellow LED, damping diode	
1 N/O contact	1 N/O contact
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
10 mA (at 12 V)	1 mA (at 12 V)
4 kV_{rms} (50 Hz, 1 min.)	
-40°C ... 60°C	
100% operating factor	
Approx. 2x 10^7 cycles	
DIN EN 50178	
2 / III	
Any / in rows with zero spacing	
0.5 ... 4 mm^2 / 0.5 ... 2.5 mm^2 / 20 - 12	
0.6 Nm	
6.2 mm / 84 mm / 68 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-RSC-12DC/ 1	**2903367**	10
RIF-0-RSC-24DC/ 1	**2903366**	10
RIF-0-RSC-12DC/ 1AU	**2903365**	10
RIF-0-RSC-24DC/ 1AU	**2903364**	10

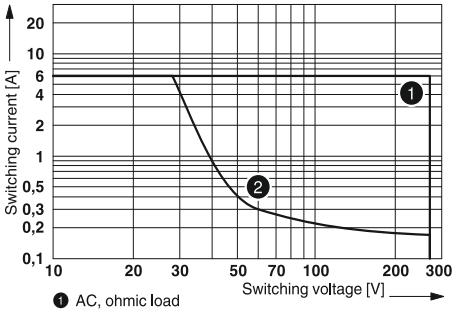
RIF-0-RSC.../21... (1 changeover contact)

Operating voltage range



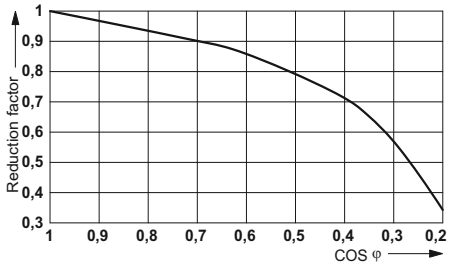
❶ Maximum continuous voltage at limiting continuous current = 6 A
❷ Minimum operate voltage
For pre-excitation with U_N and limiting continuous current = 6 A

Interrupting rating

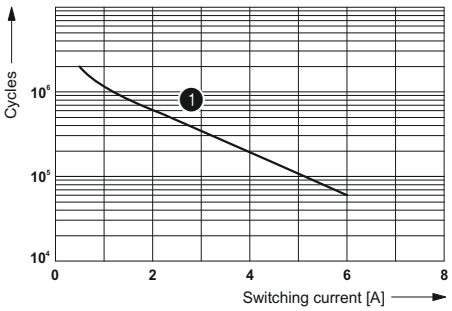


❶ AC, ohmic load
❷ DC, ohmic load

Service life reduction factor with various cos phi



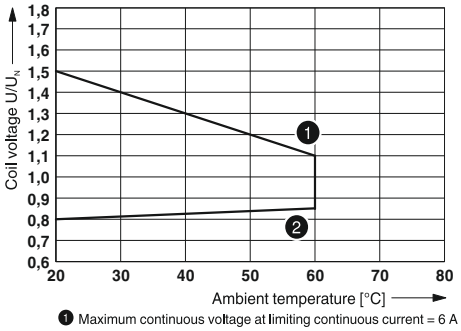
Electrical service life



❶ 250 V AC, ohmic load

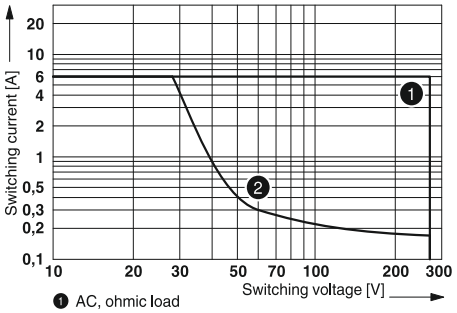
RIF-0-RSC.../1... (1 N/O contact)

Operating voltage range



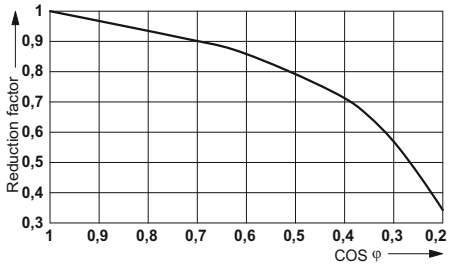
❶ Maximum continuous voltage at limiting continuous current = 6 A
❷ Minimum operate voltage
For pre-excitation with U_N and limiting continuous current = 6 A

Interrupting rating

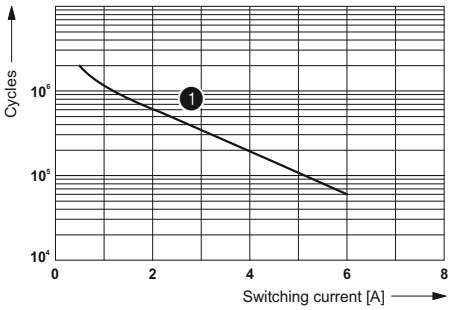


❶ AC, ohmic load
❷ DC, ohmic load

Service life reduction factor



Electrical service life



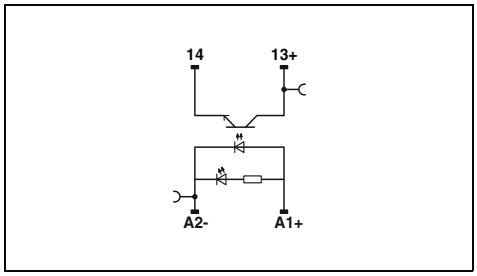
❶ 250 V AC, ohmic load

Fully mounted RIF-0 relay modules

Fully mounted RIF-0 relay modules, consisting of:
– Relay base with Push-in connection
– Solid-state relays
– Relay ejector lever on the housing

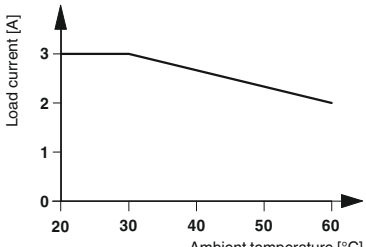
The advantages:
– Status LED integrated into the base
– RTIII sealed solid-state relay
– Zero voltage switch at AC output
– Professional bridging of adjacent modules saves wiring time

Solid-state relay module with Push-in connection, DC output max. 3 A

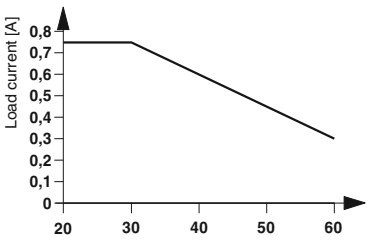


Technical data

Input data		①
Rated actuating voltage range with reference to U_C		0.8 - 1.2
Rated actuating current I_C	[mA]	8.5
Switching level (with reference to U_C)	1 signal (“H”)	>0.8
	0 signal (“L”)	<0.4
Typical switch-on time at U_N	[ms]	0.02
Typical switch-off time at U_N	[ms]	0.3
Transmission frequency f_{limit}	[Hz]	300
Input circuit DC		Yellow LED, free-wheeling diode
Output data		
Max. switching voltage		33 V DC
Minimum switching voltage		3 V DC
Maximum switch-on current		15 A (10 ms)
Minimum/maximum switching current		- / 3 A (see derating curve)
Output protection		Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current		<200 mV
Leakage current in off state		-
Phase angle (cos ϕ)		-
Max. load value		-
General data		
Test voltage input/output		2.5 kV_{rms} (50 Hz, 1 min.)
Ambient temperature (operation)		-25°C ... 60°C
Standards/regulations		DIN EN 50178
Degree of pollution/surge voltage category		2 / III
Connection data solid/stranded/AWG		0.14 - 1.5 mm^2 / 0.14 - 1.5 mm^2 / 24 - 16
Dimensions	W / H / D	6.2 mm / 93 mm / 66 mm
EMC note		Class A product, see page 583



Derating curve for RIF-0-OPT-24DC/24DC/2



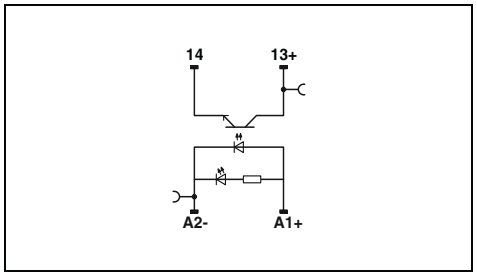
Derating curve for RIF-0-OPT-24DC/230AC/1

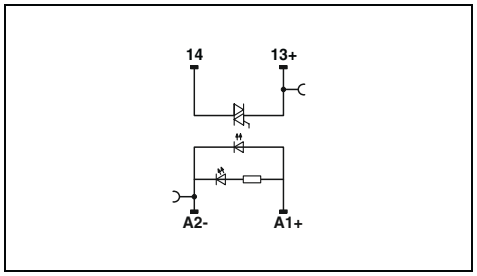
Ordering data

Description	Rated actuating voltage U_C	Type	Order No.	Pcs./Pkt.
Coupling relay modules with solid-state relay and Push-in connection				
①	24 V DC	**RIF-0-OPT-24DC/24DC/2**	2905293	10

Solid-state relay module with Push-in connection, DC output max. 100 mA

Solid-state relay module with Push-in connection, AC output max. 750 mA





Technical data

①	
0.8 - 1.2	0.8 - 1.2
8.5	8
>0.8	>0.8
<0.4	<0.4
0.02	10
0.3	10
300	10
Yellow LED, free-wheeling diode	Yellow LED, free-wheeling diode
48 V DC	253 V AC
3 V DC	24 V AC
-	30 A (10 ms)
- / 100 mA	10 mA / 0.75 A (see derating curve)
Reverse polarity protection, surge protection	RCV circuit
<1 V	<1 V
-	1 mA (in off state)
-	0.5
-	4.5 A^2s (tp = 10 ms, at 25°C)
2.5 kV_{rms} (50 Hz, 1 min.)	2.5 kV_{rms} (50 Hz, 1 min.)
-25°C ... 60°C	-25°C ... 60°C
DIN EN 50178	DIN EN 50178
2 / III	2 / III
0.14 - 1.5 mm^2 / 0.14 - 1.5 mm^2 / 24 - 16	0.14 - 1.5 mm^2 / 0.14 - 1.5 mm^2 / 24 - 16
6.2 mm / 93 mm / 66 mm	6.2 mm / 93 mm / 66 mm
Class A product, see page 583	Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-OPT-24DC/48DC/100	2905294	10

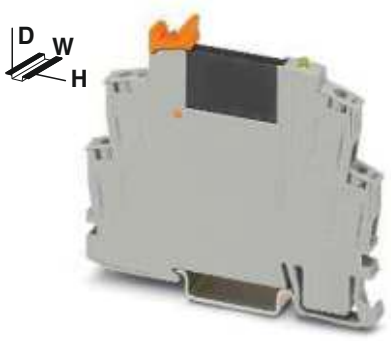
Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-OPT-24DC/230AC/1	2905295	10

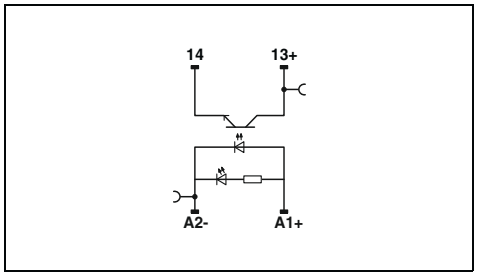
Fully mounted RIF-0 relay modules

Fully mounted RIF-0 relay modules, consisting of:
– Relay base with screw connection
– Solid-state relays
– Relay ejector lever on the housing

The advantages:
– Status LED integrated into the base
– RTIII sealed solid-state relay
– Zero voltage switch at AC output
– Professional bridging of adjacent modules saves wiring time

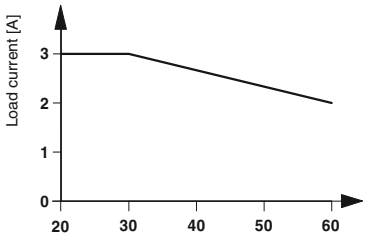


Solid-state relay module with screw connection, DC output max. 3 A

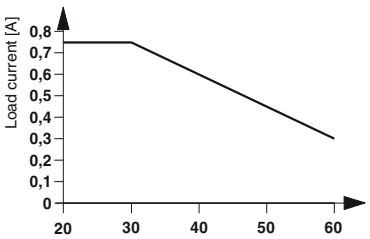


Technical data

Input data		①
Rated actuating voltage range with reference to U_C		0.8 - 1.2
Rated actuating current I_C	[mA]	8.5
Switching level (with reference to U_C)	1 signal (“H”)	>0.8
	0 signal (“L”)	<0.4
Typical switch-on time at U_N	[ms]	0.02
Typical switch-off time at U_N	[ms]	0.3
Transmission frequency f_{limit}	[Hz]	300
Input circuit DC		Yellow LED, free-wheeling diode
Output data		
Max. switching voltage		33 V DC
Minimum switching voltage		3 V DC
Maximum switch-on current		15 A (10 ms)
Minimum/maximum switching current		- / 3 A (see derating curve)
Output protection		Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current		<200 mV
Leakage current in off state		-
Phase angle (cos ϕ)		-
Max. load value		-
General data		
Test voltage input/output		2.5 kV_{rms} (50 Hz, 1 min.)
Ambient temperature (operation)		-25°C ... 60°C
Standards/regulations		DIN EN 50178
Degree of pollution/surge voltage category		2 / III
Connection data solid/stranded/AWG		0.5 - 4 mm^2 / 0.5 - 2.5 mm^2 / 20 - 12
Maximum tightening torque		0.6 Nm
Dimensions	W / H / D	6.2 mm / 84 mm / 68 mm
EMC note		Class A product, see page 583



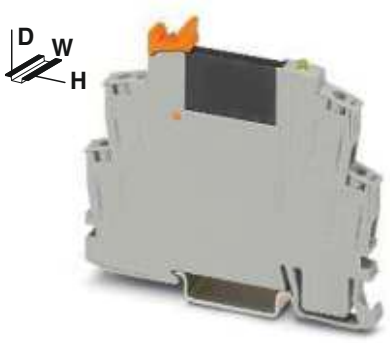
Derating curve for RIF-0-OSC-24DC/24DC/2



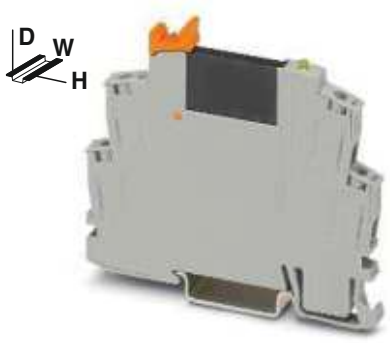
Derating curve for RIF-0-OSC-24DC/230AC/1

Ordering data

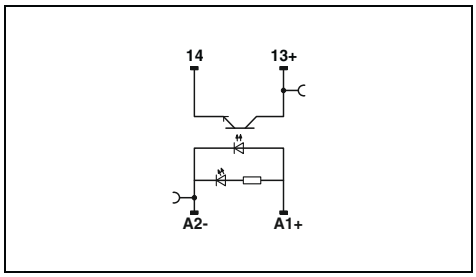
Description	Rated actuating voltage U_C	Type	Order No.	Pcs./Pkt.
Coupling relay modules with solid-state relay and screw connection				
①	24 V DC	**RIF-0-OSC-24DC/24DC/2**	2905657	10

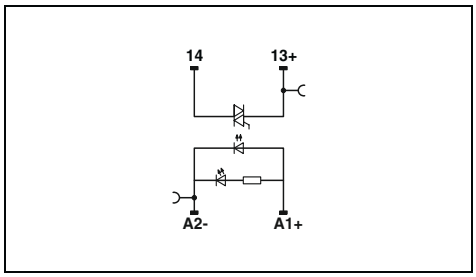


Solid-state relay module with screw connection, DC output max. 100 mA



Solid-state relay module with screw connection, AC output max. 750 mA





Technical data

①	
0.8 - 1.2	
8.5	
>0.8	
<0.4	
0.02	
0.3	
300	
Yellow LED, free-wheeling diode	
48 V DC	
3 V DC	
-	
- / 100 mA	
Reverse polarity protection, surge protection	
<1 V	
-	
-	
-	
2.5 kV_{rms} (50 Hz, 1 min.)	
-25°C ... 60°C	
DIN EN 50178	
2 / III	
0.5 - 4 mm^2 / 0.5 - 2.5 mm^2 / 20 - 12	
0.6 Nm	
6.2 mm / 84 mm / 68 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-OSC-24DC/48DC/100	2905658	10

Technical data

①	
0.8 - 1.2	
8	
>0.8	
<0.4	
10	
10	
10	
Yellow LED, free-wheeling diode	
253 V AC	
24 V AC	
30 A (10 ms)	
10 mA / 0.75 A (see derating curve)	
RCV circuit	
<1 V	
1 mA (in off state)	
0.5	
4.5 A^2s (tp = 10 ms, at 25°C)	
2.5 kV_{rms} (50 Hz, 1 min.)	
-25°C ... 60°C	
DIN EN 50178	
2 / III	
0.5 - 4 mm^2 / 0.5 - 2.5 mm^2 / 20 - 12	
0.6 Nm	
6.2 mm / 84 mm / 68 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-0-OSC-24DC/230AC/1	2905656	10

Fully mounted RIF-1 relay modules

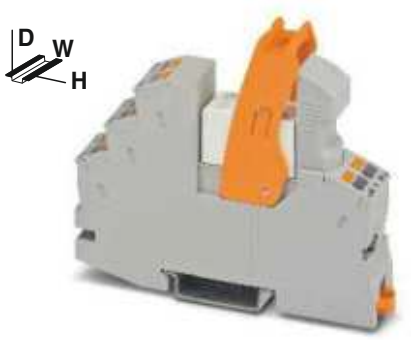
Fully mounted RIF-1 relay modules, consisting of:
– Relay base with Push-in connection
– 1 or 2 PDT relays
– Relay retaining bracket
– Interference suppression module

The advantages:
– Logical contact arrangement, thanks to 1/3-level relay base
– Operational reliability, thanks to sealed relay
– Safe isolation between coil and contact side
– Professional bridging of adjacent modules saves wiring time

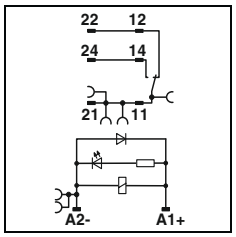
– For FBS 2-6 plug-in bridges for the input side (A2), see page 358
– For FBS 2-8 plug-in bridges for the output side (11/21), see page 358

Notes:

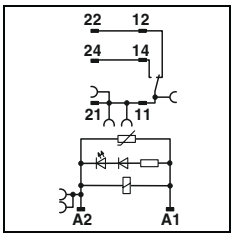
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



1-changeover-contact relay module with Push-in connection



DC coils



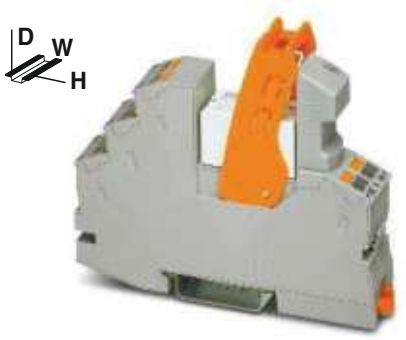
AC coils

Technical data

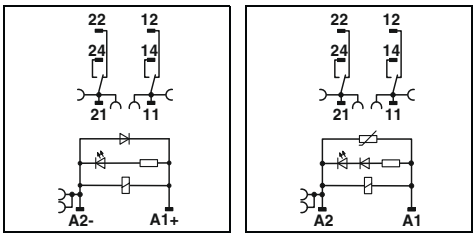
		①	②	③	④	⑤
Input data						
Permissible range (with reference to U_N)		See diagram				
Typical input current at U_N	[mA]	33	18	33	8	6
Typical response time at U_N	[ms]	8	8	3 - 12	3 - 12	3 - 12
Typical release time at U_N	[ms]	10	10	3 - 20	3 - 20	3 - 20
Input circuit AC		Yellow LED, Varistor				
Input circuit DC		Yellow LED, damping diode				
Output data						
Contact type		1 PDT				1 PDT
Contact material		AgNi				AgNi, hard gold-plated
Max. switching voltage		250 V AC/DC				30 V AC / 36 V DC
Minimum switching voltage		12 V (at 10 mA)				100 mV (at 10 mA)
Limiting continuous current		11 A (see diagram)				50 mA
Maximum switch-on current AC		25 A (20 ms, N/O contact)				50 mA
Maximum switch-on current DC		50 A (20 ms, N/O contact)				50 mA
Minimum 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 ... 50°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. 3x 10^7 cycles				
Standards/regulations		DIN EN 50178				
Degree of pollution/surge voltage category		2 / III				
Mounting position/mounting		Any / in rows with zero spacing				
Connection data solid/stranded/AWG		0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16				
Dimensions	W / H / D	16 mm / 93 mm / 75 mm				
EMC note		Class A product, see page 583				

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Coupling relay modules with power contact relay and Push-in connection					
	①	12 V DC	**RIF-1-RPT-LDP-12DC/1X21**	2906224	10
	②	24 V DC	**RIF-1-RPT-LDP-24DC/1X21**	2903342	10
	③	24 V AC	**RIF-1-RPT-LV-24AC/1X21**	2903341	10
	④	120 V AC	**RIF-1-RPT-LV-120AC/1X21**	2903340	10
	⑤	230 V AC	**RIF-1-RPT-LV-230AC/1X21**	2903339	10
Coupling relay modules with multi-layer gold contact relay, with Push-in connection					
	①	24 V DC	**RIF-1-RPT-LDP-24DC/1X21AU**	2903338	10
	②	24 V AC	**RIF-1-RPT-LV-24AC/1X21AU**	2903337	10
	③	120 V AC	**RIF-1-RPT-LV-120AC/1X21AU**	2903336	10
	④	230 V AC	**RIF-1-RPT-LV-230AC/1X21AU**	2903335	10



2-changeover-contact relay module
with Push-in connection



DC coils | AC coils

Technical data

①	②	③	④	⑤
See diagram				
33	18	33	8	6
8	8	3 - 12	3 - 12	3 - 12
10	10	3 - 20	3 - 20	3 - 20
Yellow LED, Varistor				
Yellow LED, damping diode				

2 PDT	2 PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 10 mA)	100 mV (at 10 mA)
8 A (see diagram)	50 mA
12 A (20 ms, N/O contact)	50 mA
25 A (20 ms, N/O contact)	50 mA
10 mA (at 5 V)	1 mA (at 24 V)

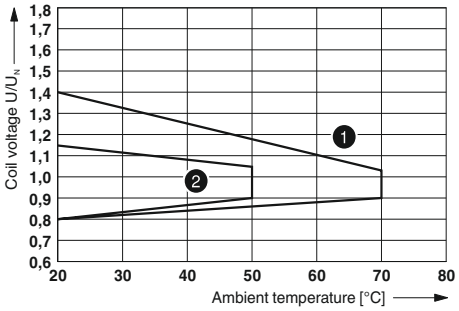
4 kV_{rms} (50 Hz, 1 min.)
-40°C ... 50°C
-40°C ... 70°C
100% operating factor
Approx. 10^7 cycles
Approx. 3x 10^7 cycles
DIN EN 50178
2 / III
Any / in rows with zero spacing
0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16
16 mm / 93 mm / 75 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-1-RPT-LDP-12DC/2X21	2906223	10
RIF-1-RPT-LDP-24DC/2X21	2903334	10
RIF-1-RPT-LV-24AC/2X21	2903333	10
RIF-1-RPT-LV-120AC/2X21	2903332	10
RIF-1-RPT-LV-230AC/2X21	2903331	10
RIF-1-RPT-LDP-24DC/2X21AU	2903330	10
RIF-1-RPT-LV-24AC/2X21AU	2903329	10
RIF-1-RPT-LV-120AC/2X21AU	2903328	10
RIF-1-RPT-LV-230AC/2X21AU	2903327	10

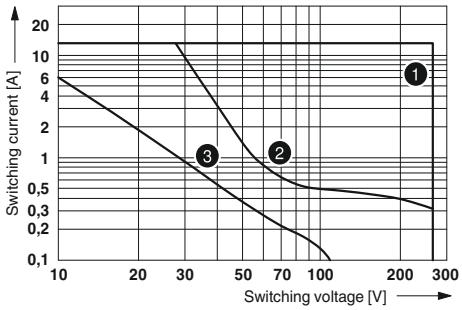
RIF-1-RPT.../1X21... (1 changeover contact)

Operating voltage range



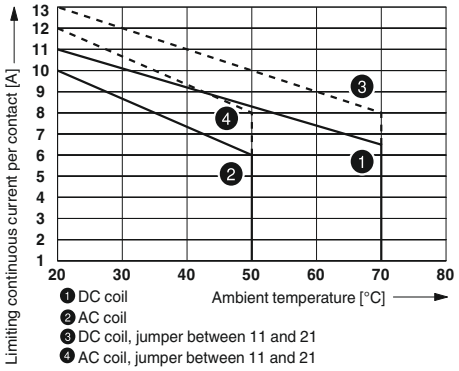
❶ DC coils
❷ AC coils

Interrupting rating



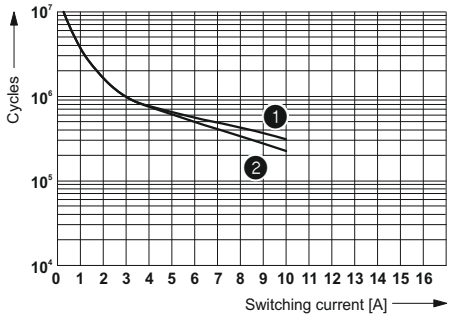
❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Contact derating



❶ DC coil
❷ AC coil
❸ DC coil, jumper between 11 and 21
❹ AC coil, jumper between 11 and 21

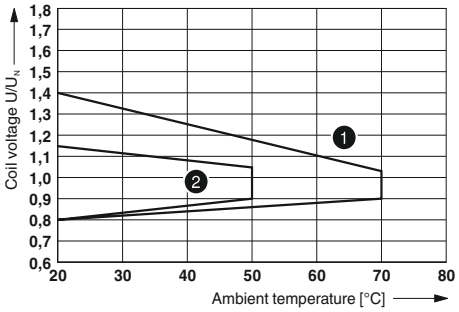
Electrical service life



❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

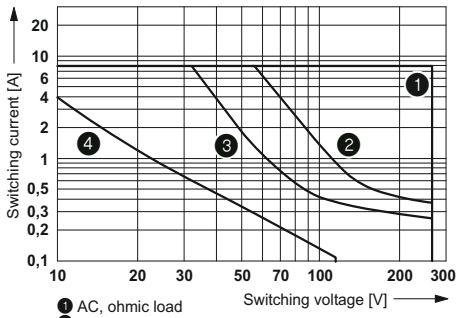
RIF-1-RPT.../2X21... (2 changeover contacts)

Operating voltage range



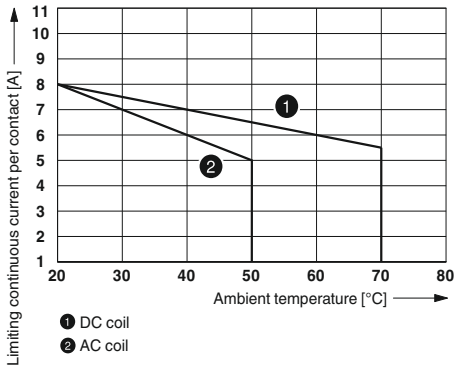
❶ DC coils
❷ AC coils

Interrupting rating



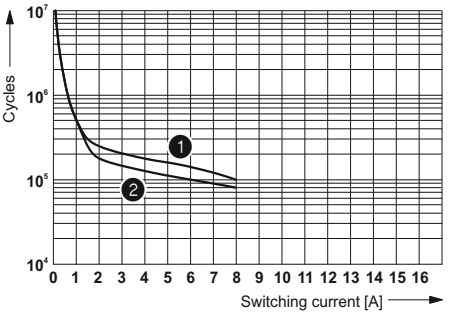
❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

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-1 relay modules

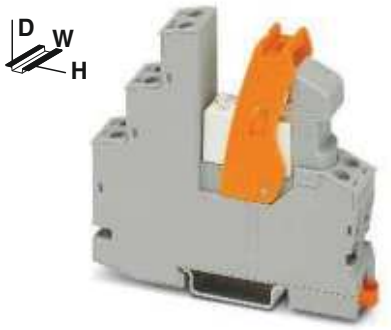
Fully mounted RIF-1 relay modules, consisting of:
– Relay base with screw connection
– 1 or 2 PDT relays
– Relay retaining bracket
– Interference suppression module

The advantages:
– Logical contact arrangement, thanks to 1/3-level relay base
– Operational reliability, thanks to sealed relay
– Safe isolation between coil and contact side
– Professional bridging of adjacent modules saves wiring time

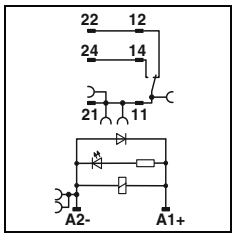
– For FBS 2-6 plug-in bridges for the input side (A2), see page 358
– For FBS 2-8 plug-in bridges for the output side (11/21), see page 358

Notes:

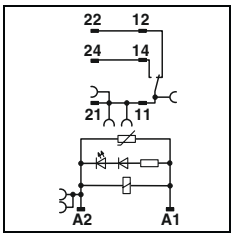
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.



1-changeover-contact relay module with screw connection



DC coils



AC coils

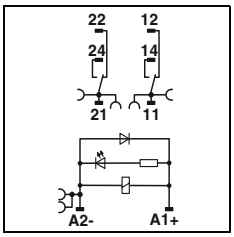
Technical data

		①	②	③	④	⑤
Input data						
Permissible range (with reference to U_N)		See diagram				
Typical input current at U_N	[mA]	33	18	33	8	6
Typical response time at U_N	[ms]	8	8	3 - 12	3 - 12	3 - 12
Typical release time at U_N	[ms]	10	10	3 - 20	3 - 20	3 - 20
Input circuit AC		Yellow LED, Varistor				
Input circuit DC		Yellow LED, damping diode				
Output data						
Contact type		1 PDT				1 PDT
Contact material		AgNi				AgNi, hard gold-plated
Max. switching voltage		250 V AC/DC				30 V AC / 36 V DC
Minimum switching voltage		12 V (at 10 mA)				100 mV (at 10 mA)
Limiting continuous current		11 A (see diagram)				50 mA
Maximum switch-on current AC		25 A (20 ms, N/O contact)				25 A (20 ms, N/O contact)
Maximum switch-on current DC		50 A (20 ms, N/O contact)				50 mA
Minimum 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 ... 50°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. 3x 10^7 cycles				
Standards/regulations		DIN EN 50178				
Degree of pollution/surge voltage category		2 / III				
Mounting position/mounting		Any / in rows with zero spacing				
Connection data solid/stranded/AWG		0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10				
Dimensions	W / H / D	16 mm / 89 mm / 75 mm				
EMC note		Class A product, see page 583				

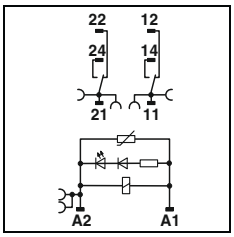
Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Coupling relay modules with power contact relay and screw connection					
	①	12 V DC	**RIF-1-RSC-LDP-12DC/1X21**	2908500	10
	②	24 V DC	**RIF-1-RSC-LDP-24DC/1X21**	2903358	10
	③	24 V AC	**RIF-1-RSC-LV-24AC/1X21**	2903357	10
	④	120 V AC	**RIF-1-RSC-LV-120AC/1X21**	2903356	10
	⑤	230 V AC	**RIF-1-RSC-LV-230AC/1X21**	2903355	10
Coupling relay modules with multi-layer gold contact relay, with screw connection					
	①	24 V DC	**RIF-1-RSC-LDP-24DC/1X21AU**	2903354	10
	②	24 V AC	**RIF-1-RSC-LV-24AC/1X21AU**	2903353	10
	③	120 V AC	**RIF-1-RSC-LV-120AC/1X21AU**	2903352	10
	④	230 V AC	**RIF-1-RSC-LV-230AC/1X21AU**	2903351	10

2-changeover-contact relay module with screw connection



DC coils



AC coils

Technical data

①	②	③	④	⑤
See diagram				
33	18	33	8	6
8	8	3 - 12	3 - 12	3 - 12
10	10	3 - 20	3 - 20	3 - 20
Yellow LED, Varistor				
Yellow LED, damping diode				

2 PDT	2 PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 10 mA)	100 mV (at 10 mA)
8 A (see diagram)	50 mA
12 A (20 ms, N/O contact)	50 mA
25 A (20 ms, N/O contact)	50 mA
10 mA (at 5 V)	1 mA (at 24 V)

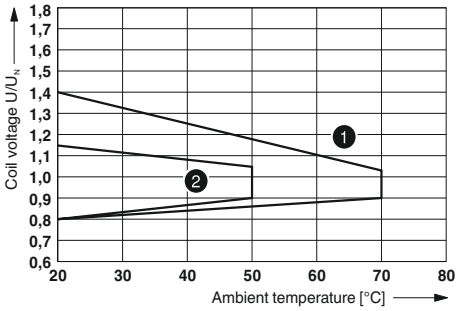
4 kV_{rms} (50 Hz, 1 min.)
-40°C ... 50°C
-40°C ... 70°C
100% operating factor
Approx. 10^7 cycles
Approx. 3x 10^7 cycles
DIN EN 50178
2 / III
Any / in rows with zero spacing
0.5 ... 4 mm² / 0.5 ... 4 mm² / 20 - 10
16 mm / 89 mm / 75 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-1-RSC-LDP-12DC/2X21	2908501	10
RIF-1-RSC-LDP-24DC/2X21	2903350	10
RIF-1-RSC-LV-24AC/2X21	2903349	10
RIF-1-RSC-LV-120AC/2X21	2903348	10
RIF-1-RSC-LV-230AC/2X21	2903347	10
RIF-1-RSC-LDP-24DC/2X21AU	2903346	10
RIF-1-RSC-LV-24AC/2X21AU	2903345	10
RIF-1-RSC-LV-120AC/2X21AU	2903344	10
RIF-1-RSC-LV-230AC/2X21AU	2903343	10

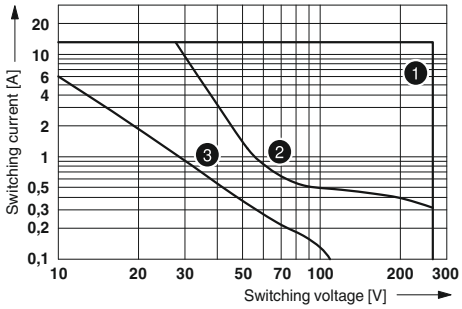
RIF-1-RSC.../1X21... (1 changeover contact)

Operating voltage range



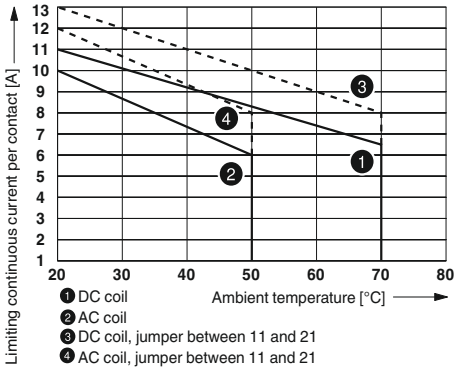
❶ DC coils
❷ AC coils

Interrupting rating



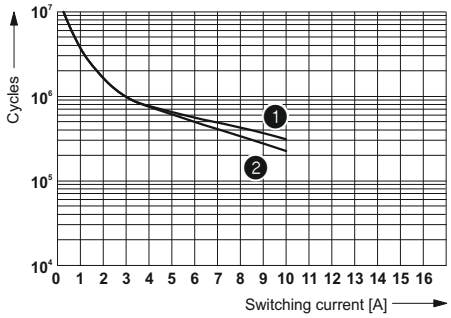
❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Contact derating



❶ DC coil
❷ AC coil
❸ DC coil, jumper between 11 and 21
❹ AC coil, jumper between 11 and 21

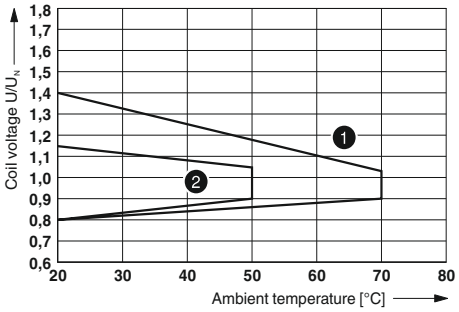
Electrical service life



❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

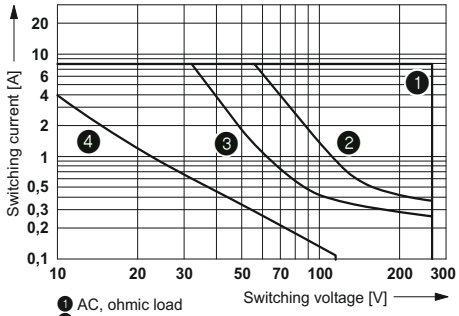
RIF-1-RSC.../2X21... (2 changeover contacts)

Operating voltage range



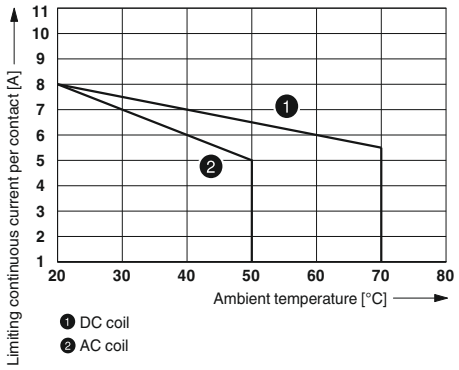
❶ DC coils
❷ AC coils

Interrupting rating



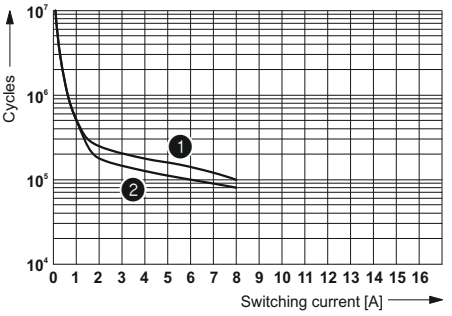
❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

Contact derating



❶ DC coil
❷ AC coil

Electrical service life

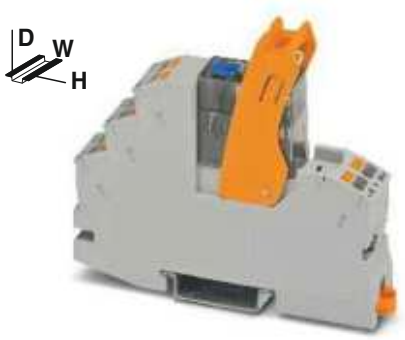


❶ 250 V AC, ohmic load (DC coils)
❷ 250 V AC, ohmic load (AC coils)

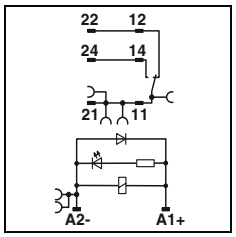
Fully mounted RIF-1 relay modules

Fully mounted RIF-1 relay modules, consisting of:
– Relay base with Push-in connection
– 1 or 2 PDT relays with detectable manual operation
– Relay retaining bracket
– Interference suppression module (AC types only)

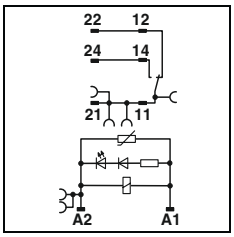
The advantages:
– Relay with lockable manual operation and status LED
– With DC types, free-wheeling diode is integrated into relay
– Mechanical switch position indicator
– Professional bridging of adjacent modules saves wiring time



1-changeover-contact relay module with Push-in connection and manual operation



DC coils



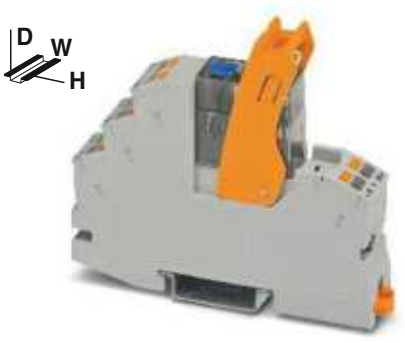
AC coils

Technical data

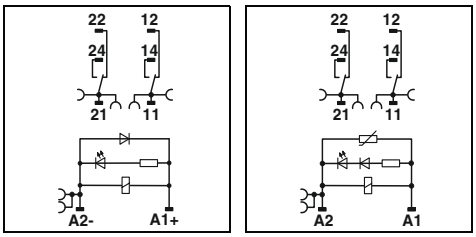
Input data		①	②	③
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	18	7	3.5
Typical response time at U_N	[ms]	9	4 - 10	4 - 10
Typical release time at U_N	[ms]	10	3 - 20	3 - 20
Input circuit AC		Yellow LED, Varistor		
Input circuit DC		Yellow LED, damping diode		
Output data				
Contact type		1 PDT		
Contact material		AgNi		
Max. switching voltage		250 V AC/DC		
Minimum switching voltage		12 V (at 10 mA)		
Limiting continuous current		See diagram		
Maximum switch-on current AC		32 A (20 ms, N/O contact)		
Maximum switch-on current DC		24 A (20 ms, N/O contact)		
Minimum switching current		10 mA (at 12 V)		
General data				
Test voltage (winding/contact)		4 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		Approx. 5x 10^6 cycles		
Standards/regulations		DIN EN 50178		
Degree of pollution/surge voltage category		2 / III		
Mounting position/mounting		Any / in rows with zero spacing		
Connection data solid/stranded/AWG		0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16		
Dimensions	W / H / D	16 mm / 93 mm / 75 mm		
EMC note		Class A product, see page 583		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Coupling relay modules with power contact relay with manual operation and Push-in connection					
	①	24 V DC	**RIF-1-RPT-LDP-24DC/1X21MS**	2905289	10
	②	120 V AC	**RIF-1-RPT-LV-120AC/1X21MS**	2909776	10
	③	230 V AC	**RIF-1-RPT-LV-230AC/1X21MS**	2905290	10



2-changeover-contact relay module with Push-in connection and manual operation



DC coils | AC coils

Technical data

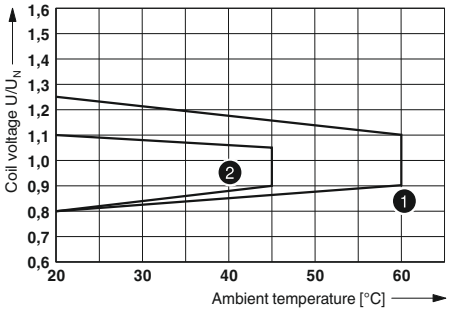
①	②	③
See diagram		
18	7	3.5
9	4 - 10	4 - 10
10	3 - 20	3 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		
2 PDT		
AgNi		
250 V AC/DC		
12 V (at 10 mA)		
See diagram		
16 A (20 ms, N/O contact)		
12 A (20 ms, N/O contact)		
10 mA (at 12 V)		
4 kV_{rms} (50 Hz, 1 min.)		
-40°C ... 45°C		
-40°C ... 60°C		
100% operating factor		
Approx. 5x 10^6 cycles		
DIN EN 50178		
2 / III		
Any / in rows with zero spacing		
0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16		
16 mm / 93 mm / 75 mm		
Class A product, see page 583		

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-1-RPT-LDP-24DC/2X21MS	2905291	10
RIF-1-RPT-LV-120AC/2X21MS	2909775	10
RIF-1-RPT-LV-230AC/2X21MS	2905292	10

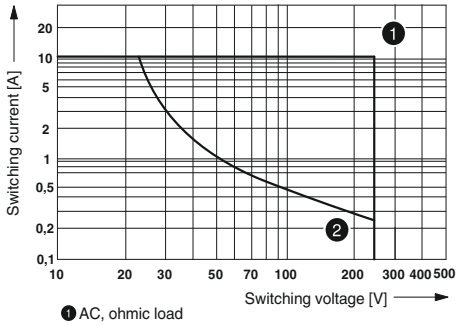
RIF-1-RPT.../1X21... (1 changeover contact)

Operating voltage range



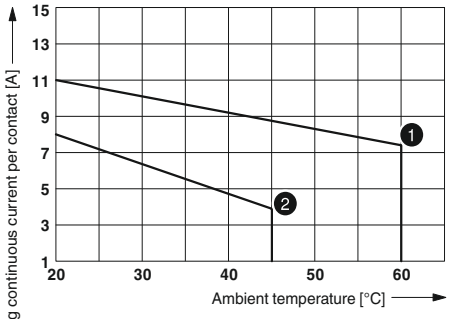
❶ DC coils
❷ AC coils

Interrupting rating



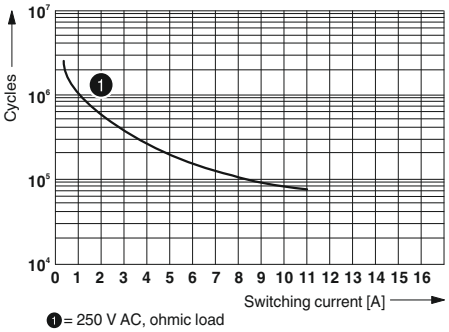
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

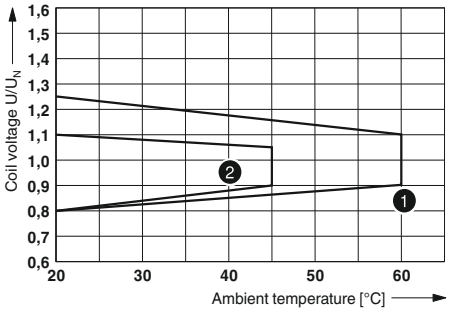
Electrical service life



❶ = 250 V AC, ohmic load

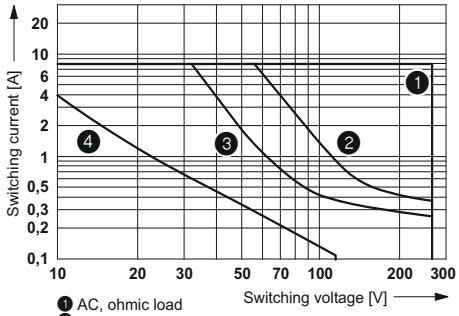
RIF-1-RPT.../2X21... (2 changeover contacts)

Operating voltage range



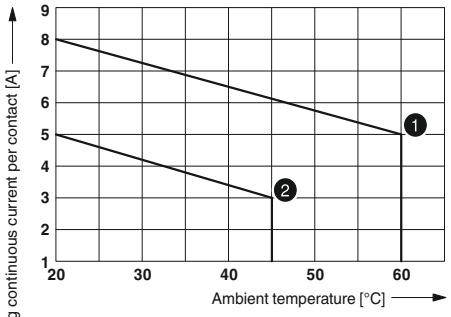
❶ DC coils
❷ AC coils

Interrupting rating



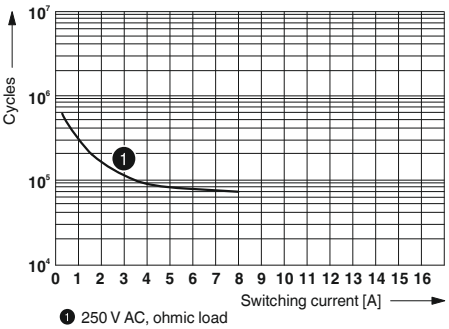
❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

Contact derating



❶ DC coil
❷ AC coil

Electrical service life

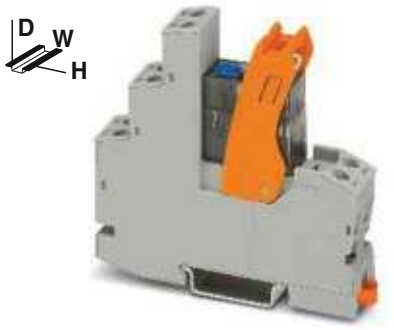


❶ 250 V AC, ohmic load

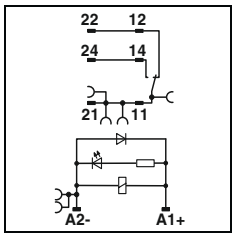
Fully mounted RIF-1 relay modules

Fully mounted RIF-1 relay modules, consisting of:
– Relay base with screw connection
– 1 or 2 PDT relays with detectable manual operation
– Relay retaining bracket
– Interference suppression module (AC types only)

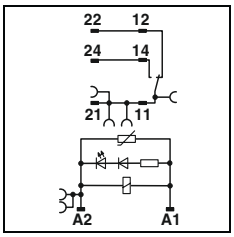
The advantages:
– Relay with lockable manual operation and status LED
– With DC types, free-wheeling diode is integrated into relay
– Mechanical switch position indicator
– Professional bridging of adjacent modules saves wiring time



1-changeover-contact relay module with screw connection and manual operation



DC coils



AC coils

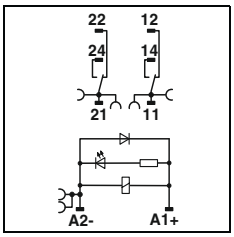
Technical data

		①	②	③
Input data				
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	18	7	4.5
Typical response time at U_N	[ms]	9	4 - 10	4 - 12
Typical release time at U_N	[ms]	10	3 - 20	4 - 20
Input circuit AC		Yellow LED, Varistor		
Input circuit DC		Yellow LED, damping diode		
Output data				
Contact type		1 PDT		
Contact material		AgNi		
Max. switching voltage		250 V AC/DC		
Minimum switching voltage		12 V (at 10 mA)		
Limiting continuous current		See diagram		
Maximum switch-on current AC		32 A (20 ms, N/O contact)		
Maximum switch-on current DC		24 A (20 ms, N/O contact)		
Minimum switching current		10 mA (at 12 V)		
General data				
Test voltage (winding/contact)		4 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		Approx. 5x 10^6 cycles		
Standards/regulations		DIN EN 50178		
Degree of pollution/surge voltage category		2 / III		
Mounting position/mounting		Any / in rows with zero spacing		
Connection data solid/stranded/AWG		0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10		
Dimensions	W / H / D	16 mm / 89 mm / 75 mm		
EMC note		Class A product, see page 583		

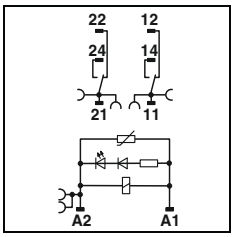
Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Coupling relay modules with power contact relay with manual operation and screw connection					
	①	24 V DC	**RIF-1-RSC-LDP-24DC/1X21MS**	2905659	10
	②	120 V AC	**RIF-1-RSC-LV-120AC/1X21MS**	2909774	10
	③	230 V AC	**RIF-1-RSC-LV-230AC/1X21MS**	2905661	10

2-changeover-contact relay module with screw connection and manual operation



DC coils



AC coils

Technical data

①	②	③
See diagram		
18	7	4.5
9	4 - 10	4 - 12
10	3 - 20	4 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		

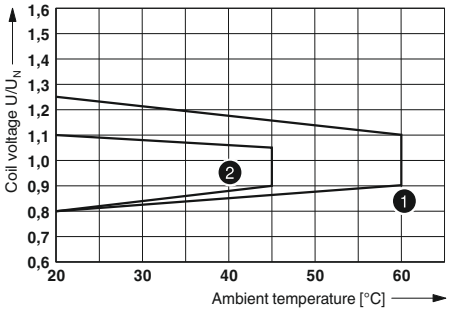
2 PDT	
AgNi	
250 V AC/DC	
12 V (at 10 mA)	
See diagram	
16 A (20 ms, N/O contact)	
12 A (20 ms, N/O contact)	
10 mA (at 12 V)	
4 kV_{rms} (50 Hz, 1 min.)	
-40°C ... 45°C	
-40°C ... 60°C	
100% operating factor	
Approx. 5x 10^6 cycles	
DIN EN 50178	
2 / III	
Any / in rows with zero spacing	
0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10	
16 mm / 89 mm / 75 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-1-RSC-LDP-24DC/2X21MS	2905660	10
RIF-1-RSC-LV-120AC/2X21MS	2909773	10
RIF-1-RSC-LV-230AC/2X21MS	2905662	10

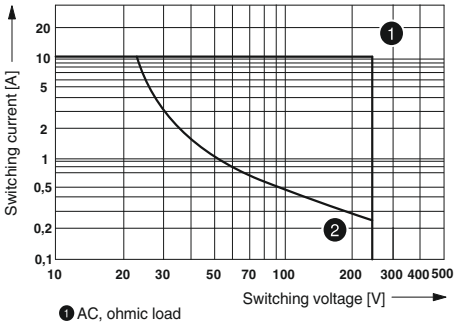
RIF-1-RSC.../1X21... (1 changeover contact)

Operating voltage range



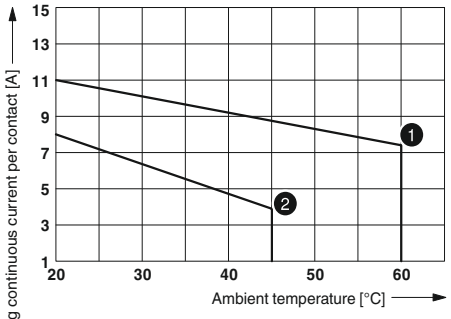
❶ DC coils
❷ AC coils

Interrupting rating



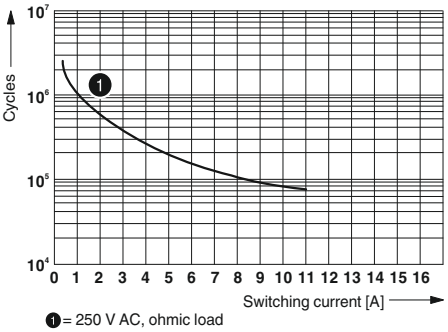
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

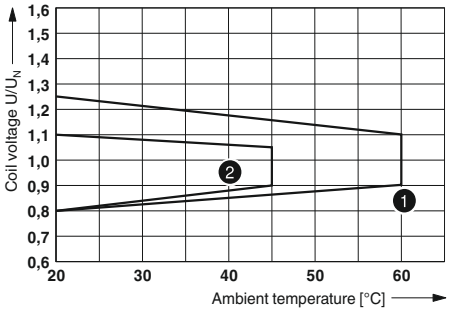
Electrical service life



❶ = 250 V AC, ohmic load

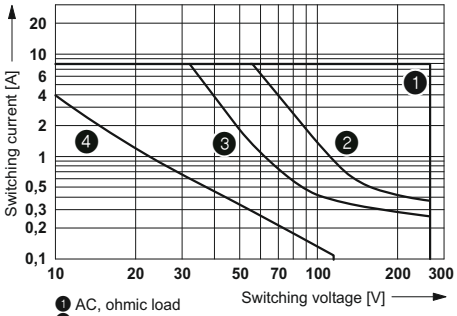
RIF-1-RSC.../2X21... (2 changeover contacts)

Operating voltage range



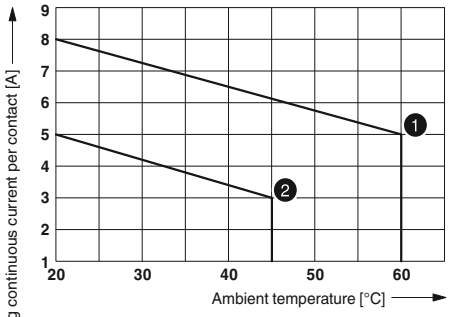
❶ DC coils
❷ AC coils

Interrupting rating



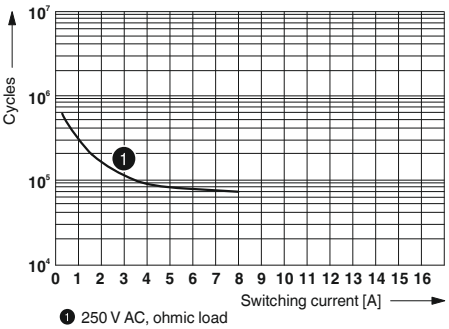
❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

Contact derating



❶ DC coil
❷ AC coil

Electrical service life



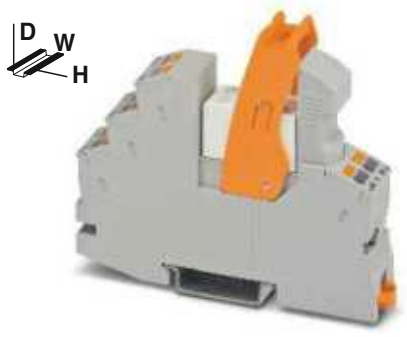
❶ 250 V AC, ohmic load

Fully mounted relays for high inrush currents, e.g., LEDs

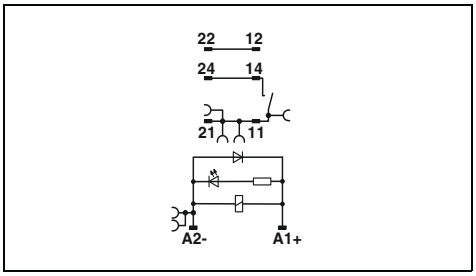
Fully mounted RIF-1 relay modules, consisting of:
– Relay base with Push-in connection
– 1-N/O-contact relay
– Relay retaining bracket

The advantages:
– Maximum inrush current up to 130 A
– Logical contact arrangement, thanks to 1/3-level relay base
– Operational reliability, thanks to sealed relay
– Safe isolation between coil and contact side
– Professional bridging of adjacent modules saves wiring time

– For FBS 2-6 plug-in bridges for the input side (A2), see page 358
– For FBS 2-8 plug-in bridges for the output side (11/21), see page 358



1-N/O-contact relay module with Push-in and screw connection



Technical data

Input data		①
Permissible range (with reference to U_N)		See diagram
Typical input current at U_N	[mA]	18
Typical response time at U_N	[ms]	8
Typical release time at U_N	[ms]	10
Input circuit DC		Yellow LED, damping diode
Output data		
Contact type		1 N/O contact
Contact material		AgSnO
Max. switching voltage		250 V AC/DC
Minimum switching voltage		12 V AC/DC (at 100 mA)
Limiting continuous current		6 A
Maximum switch-on current DC		80 A (for 20 ms) / 130 A (peak, at capacitive load, 230 V AC, 24 µF)
Minimum switching current		100 mA (at 12 V DC)
General data		
Test voltage (winding/contact)		4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation), DC		-40°C ... 70°C
Nominal operating mode		100% operating factor
Mechanical service life, DC		3x 10^7 cycles
Standards/regulations		EN 50178, EN 61810-1
Degree of pollution/surge voltage category		2 / III
Mounting position/mounting		Any / in rows with zero spacing
Connection data solid/stranded/AWG		0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16
Dimensions	W / H / D	16 mm / 93 mm / 75 mm

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Coupling relay modules for high inrush currents					
with Push-in connection	①	12 V DC	**RIF-1-RPT-LDP-12DC/1IC**	1078802	10
with Push-in connection	②	24 V DC	**RIF-1-RPT-LDP-24DC/1IC**	2909884	10
with screw connection	③	12 V DC	**RIF-1-RSC-LDP-12DC/1IC**	1078803	10
with screw connection	④	24 V DC	**RIF-1-RSC-LDP-24DC/1IC**	2909885	10

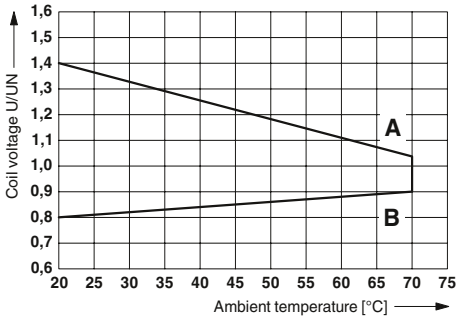
Operating voltage range

Curve A

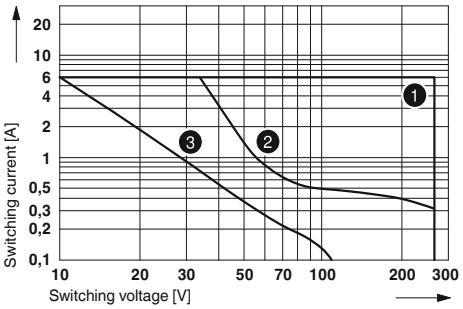
Maximum permissible continuous voltage U_{max} with limiting continuous current on the contact side (see relevant technical data).

Curve B

Minimum permitted pick-up voltage U_{op} after pre-excitation (see relevant technical data).



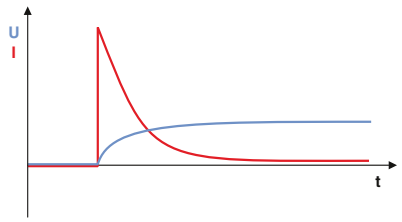
Interrupting rating



❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Basic behavior of capacitive loads:

- Very high input current
- Voltage increases with an e-function



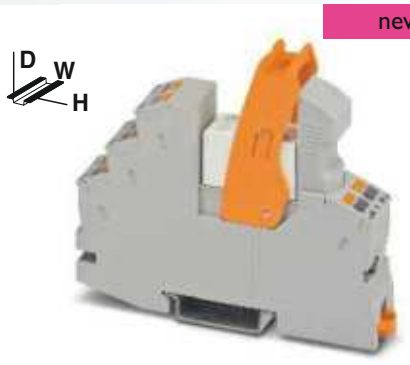
Fully mounted relay modules with tungsten lead contact relay

Fully mounted RIF-1 relay modules for very high inrush currents, e.g., from LEDs, consisting of:
– Relay base with Push-in connection
– 1-N/O-contact relay
– Relay retaining bracket

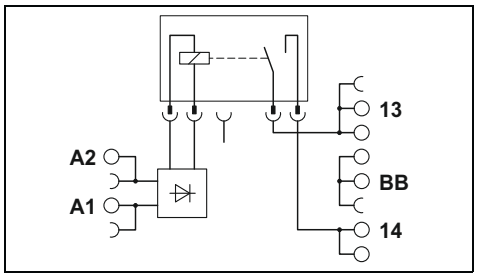
The advantages:
– Maximum inrush current up to 800 A peak
– Logical contact arrangement, thanks to 1/3-level relay base
– Operational reliability, thanks to sealed relay
– Safe isolation between coil and contact side
– Professional bridging of adjacent modules saves wiring time

– For FBS 2-6 plug-in bridges for the input side (A2), see page 358
– For FBS 2-8 plug-in bridges for the output side (11/21), see page 358

new



1-N/O-contact relay module with Push-in and screw connection



Technical data

Input data		①
Permissible range (with reference to U_N)		See diagram
Typical input current at U_N	[mA]	18
Typical response time at U_N	[ms]	8
Typical release time at U_N	[ms]	10
Input circuit DC		Yellow LED, polarity protection diode, damping diode
Output data		
Contact type		1 N/O contact
Contact material		AgSnO
Max. switching voltage		250 V AC/DC
Minimum switching voltage		12 V (at 100 mA)
Limiting continuous current		6 A
Maximum switch-on current DC		165 A (20 ms) / 800 A (peak, at capacitive load, 230 V AC, 24 µF)
Minimum switching current		100 mA (at 12 V DC)
General data		
Test voltage (winding/contact)		4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation), DC		-40°C ... 70°C
Nominal operating mode		100% operating factor
Mechanical service life, DC		3x 10^7 cycles
Standards/regulations		EN 50178, EN 61810-1
Degree of pollution/surge voltage category		2 / III
Mounting position/mounting		Any / in rows with zero spacing
Connection data solid/stranded/AWG		0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16
Dimensions	W / H / D	16 mm / 93 mm / 75 mm

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Coupling relay modules with tungsten lead contact relay					
with Push-in connection	①	24 V DC	**RIF-1-RPT-LDP-24DC/1ICT**	1078686	10
with screw connection	②	24 V DC	**RIF-1-RSC-LDP-24DC/1ICT**	1078681	10

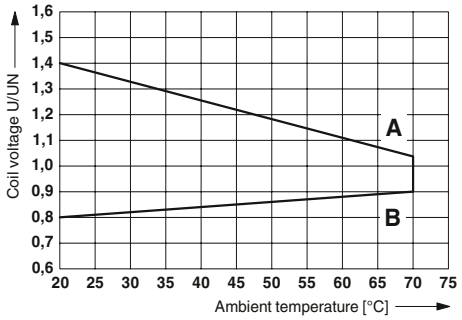
Operating voltage range

Curve A

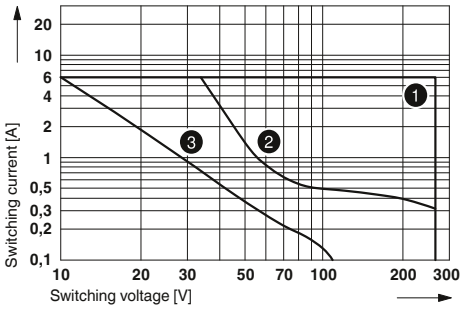
Maximum permissible continuous voltage U_{max} with limiting continuous current on the contact side (see relevant technical data).

Curve B

Minimum permitted pick-up voltage U_{op} after pre-excitation (see relevant technical data).



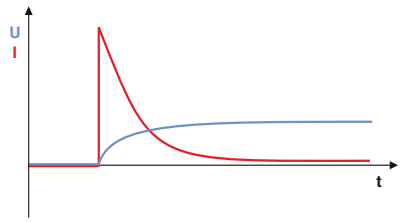
Interrupting rating



❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Basic behavior of capacitive loads:

- Very high input current
- Voltage increases with an e-function



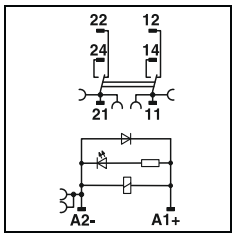
Fully assembled RIF-1 coupling relay modules with force-guided contacts

Fully assembled RIF-1 coupling relay module with force-guided contacts, consisting of:
– Relay base with Push-in connection
– 2-changeover-contact relay with force-guided contacts in accordance with EN 50205
– Relay retaining bracket
– Interference suppression module

The advantages:
– Switching current of up to 2x 6 A
– Single-channel control
– Forcibly guided contacts in accordance with EN 50205
– Professional bridging of adjacent modules saves wiring time
– Integrated status LED and freewheeling diode
– The requirements for type A in accordance with DIN EN 50205 are satisfied if the circuit is designed as 1 N/O contact / 1 N/C contact

Notes:
Further voltage variants on request

2-changeover-contact relay module with force-guided contacts, max. 2 x 6 A



Technical data

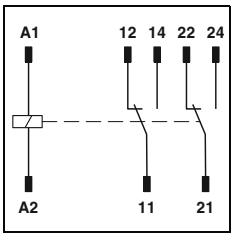
Input data		①
Permissible range (with reference to U_N)		See diagram
Typical input current at U_N	[mA]	30
Typical response time at U_N	[ms]	10
Typical release time at U_N	[ms]	10
Input circuit DC		Yellow LED, damping diode
Output data		
Contact type		2 changeover contacts, forcibly actuated
Contact material		AgNi
Max. switching voltage		250 V AC/DC
Minimum switching voltage		15 V AC/DC
Limiting continuous current		6 A
Maximum switch-on current		6 A
Minimum switching current		10 mA
General data		
Ambient temperature (operation)		-20°C ... 50°C
Nominal operating mode		100% operating factor
Mechanical service life		Approx. 10^7 cycles
Standards/regulations		DIN EN 50178/VDE 0160, EN 50205
Degree of pollution/surge voltage category		2 / III
Mounting position/mounting		Any / in rows with zero spacing
Connection data solid/stranded/AWG		0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16
Dimensions	W / H / D	16 mm / 93 mm / 70 mm
Conformance/approvals		
Conformance		CE-compliant
ATEX		-
IECEx		-
UL, USA		-
UL, USA/Canada		cULus listed UL 508
UL, Canada		-
EMC note		Class A product, see page 583

Ordering data

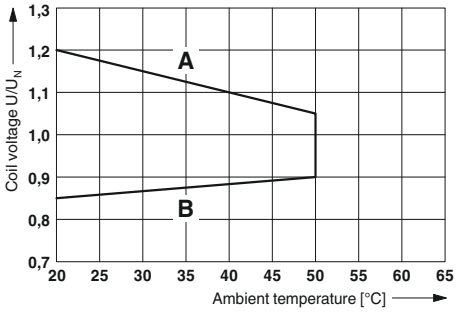
Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Coupling relay module with power contact relay and force-guided contacts					
with Push-in connection	①	24 V DC	**RIF-1-RPT-LDP-24DC/2X21/FG**	2908215	10
with screw connection	①	24 V DC	**RIF-1-RSC-LDP-24DC/2X21/FG**	2909848	10
Force-guided coupling relay with power contacts					
	①	24 V DC			

RIF-1-RPT-LDP-24DC/2X21/FG

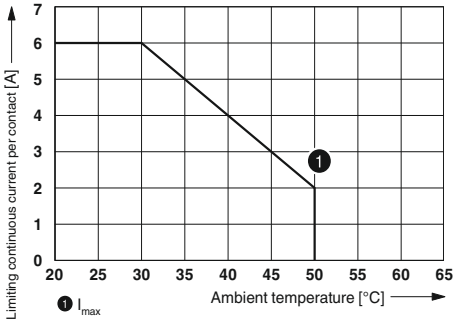
Relay with two changeover contacts with force-guided contacts, max. 2 x 6 A



Operating voltage range



Contact derating



Technical data

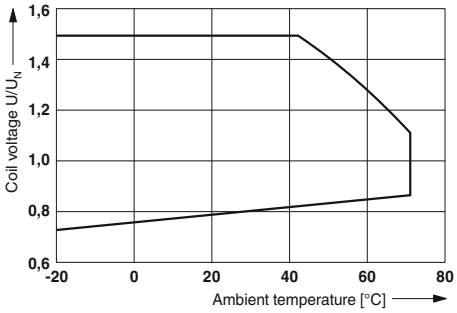
①	
See diagram	
29	
10	
4	
2 PDT	
AgNi	
250 V AC/DC	
15 V	
6 A	
6 A	
10 mA	
-25°C ... 70°C	
100% operating factor	
Approx. 10^7 cycles	
DIN EN 50178, IEC 60664-1	
2 / III	
-	
- ... - / - ... - / -	
12.6 mm / 29 mm / 25.5 mm	
-	
-	
-	
-	
-	
-	

Ordering data

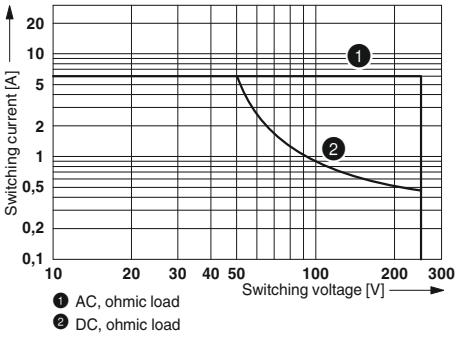
Type	Order No.	Pcs./Pkt.
REL-SR- 24DC/2X21/FG	**2908777**	20

REL-SR- 24DC/2X21/FG

Operating voltage range



Interrupting rating

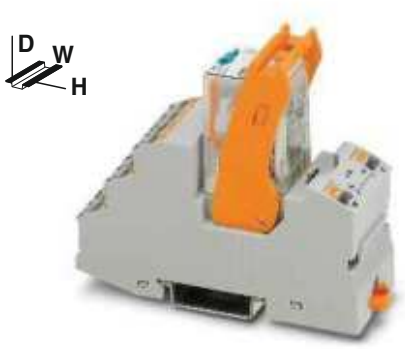


Fully mounted RIF-2 relay modules

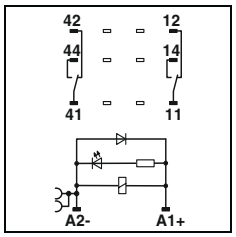
Fully mounted RIF-2 relay modules, consisting of:
– Relay base with Push-in connection
– 2- or 4-changeover-contact industrial relay
– Relay retaining bracket
– Varistor interference suppression module (AC types only)

The advantages:
– Relay with lockable manual operation and status LED
– With DC types, free-wheeling 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

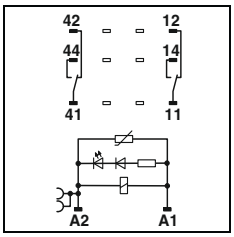
– For FBS 2-6 plug-in bridges for the input side (A2), see page 358



2-changeover-contact industrial relay module with Push-in connection and manual operation



DC coils



AC coils

Technical data

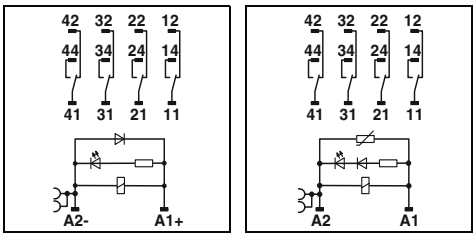
Input data		①	②	③	④
Permissible range (with reference to U_N)		See diagram			
Typical input current at U_N	[mA]	42	66	13	6.5
Typical response time at U_N	[ms]	13	5 - 15	5 - 15	5 - 15
Typical release time at U_N	[ms]	14	5 - 20	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor			
Input circuit DC		Yellow LED, damping diode			
Output data					
Contact type		2 PDT			
Contact material		AgNi			
Max. switching voltage		250 V AC/DC			
Minimum switching voltage		5 V (at 24 mA)			
Limiting continuous current		10 A (see diagram)			
Maximum switch-on current AC		30 A (20 ms, N/O contact)			
Maximum switch-on current DC		30 A (20 ms, N/O contact)			
Minimum switching current		5 mA (at 24 V)			
General data					
Test voltage (winding/contact)		2.5 kV_{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. 2x 10^7 cycles			
Mechanical service life, DC		Approx. 2x 10^7 cycles			
Standards/regulations		DIN EN 50178			
Degree of pollution/surge voltage category		2 / III			
Mounting position/mounting		Any / in rows with zero spacing			
Connection data solid/stranded/AWG		0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16			
Dimensions	W / H / D	31 mm / 96 mm / 75 mm			
EMC note		Class A product, see page 583			

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules with power contact relay and Push-in connection					
	①	24 V DC	**RIF-2-RPT-LDP-24DC/2X21**	2903315	10
	②	24 V AC	**RIF-2-RPT-LV-24AC/2X21**	2903313	10
	③	120 V AC	**RIF-2-RPT-LV-120AC/2X21**	2903311	10
	④	230 V AC	**RIF-2-RPT-LV-230AC/2X21**	2903310	10

D W H

4-changeover-contact industrial relay module with Push-in connection and manual operation



DC coils | AC coils

Technical data

①	②	③	④
See diagram			
42	66	13	6.5
13	5 - 15	5 - 15	5 - 15
14	5 - 20	5 - 20	5 - 20
Yellow LED, Varistor			
Yellow LED, damping diode			

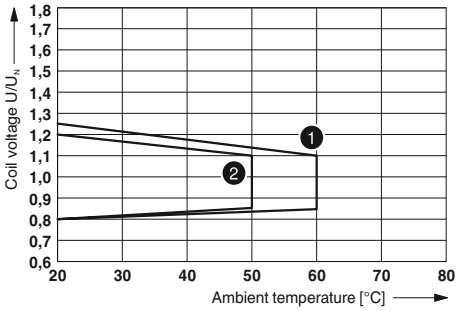
4 PDTs	
AgNi	
250 V AC/DC	
5 V (at 24 mA)	
6 A (see diagram)	
16 A (20 ms, N/O contact)	
16 A (20 ms, N/O contact)	
5 mA (at 24 V)	
2.5 kV_{rms} (50 Hz, 1 min.)	
-40°C ... 50°C	
-40°C ... 60°C	
100% operating factor	
Approx. 2x 10^7 cycles	
Approx. 2x 10^7 cycles	
DIN EN 50178	
2 / II	
Any / in rows with zero spacing	
0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16	
31 mm / 96 mm / 75 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-2-RPT-LDP-24DC/4X21	2903308	10
RIF-2-RPT-LV-24AC/4X21	2903306	10
RIF-2-RPT-LV-120AC/4X21	2903305	10
RIF-2-RPT-LV-230AC/4X21	2903304	10

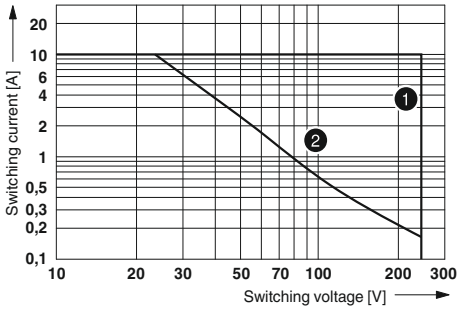
RIF-2-RPT.../2X21 (2 changeover contacts)

Operating voltage range



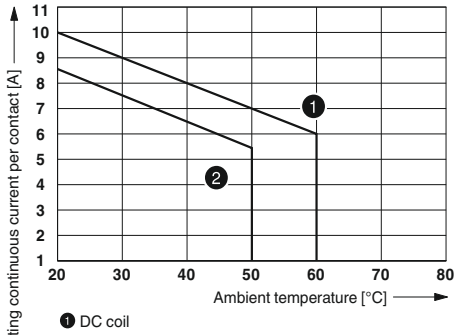
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



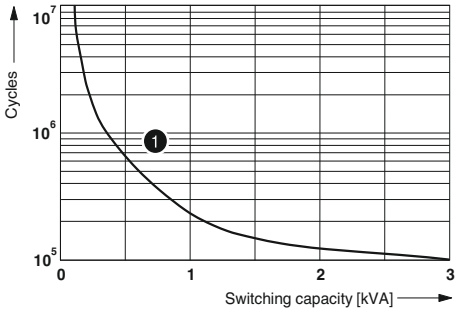
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

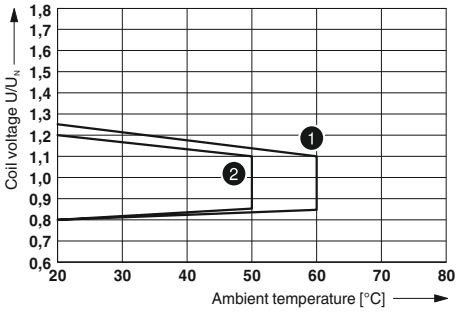
Electrical service life



❶ 250 V AC, ohmic load

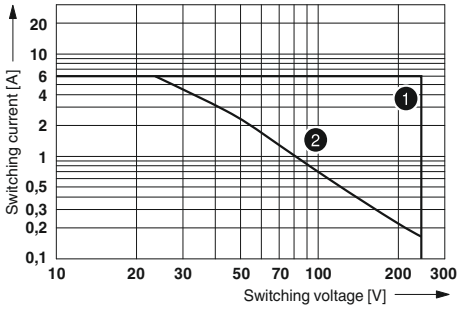
RIF-2-RPT.../4X21 (4 changeover contacts)

Operating voltage range



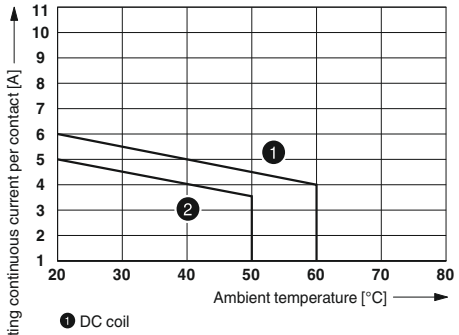
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



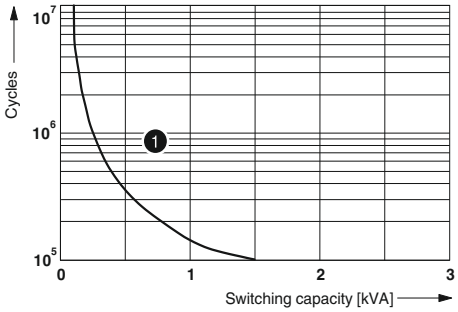
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

Electrical service life



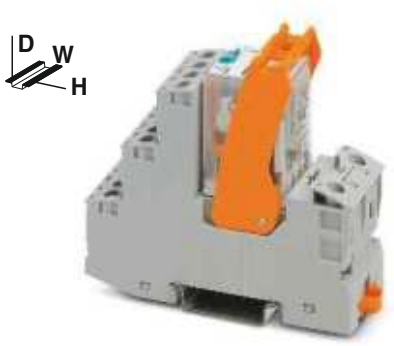
❶ 250 V AC, ohmic load

Fully mounted RIF-2 relay modules

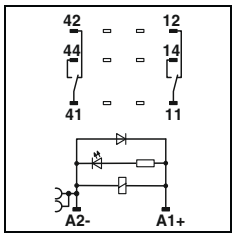
Fully mounted RIF-2 relay modules, consisting of:
– Relay base with screw connection
– 2 or 4 changeover contacts relay
– Relay retaining bracket
– Interference suppression module (AC types only)

The advantages:
– Relay with lockable manual operation and status LED
– With DC types, free-wheeling 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

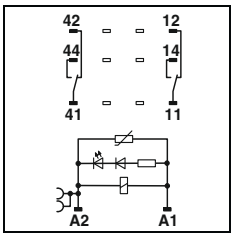
– For FBS 2-6 plug-in bridges for the input side (A2), see page 358



2-changeover-contact industrial relay module with screw connection and manual operation



DC coils



AC coils

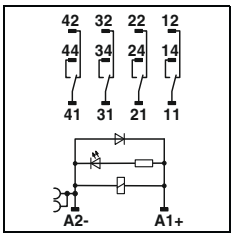
Technical data

		①	②	③	④	⑤
Input data						
Permissible range (with reference to U_N)		See diagram				
Typical input current at U_N	[mA]	42	7.5	66	13	6.5
Typical response time at U_N	[ms]	13	13	5 - 15	5 - 15	5 - 15
Typical release time at U_N	[ms]	14	14	5 - 20	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor				
Input circuit DC		Yellow LED, damping diode				
Output data						
Contact type		2 PDT				
Contact material		AgNi				
Max. switching voltage		250 V AC/DC				
Minimum switching voltage		5 V (at 24 mA)				
Limiting continuous current		10 A (see diagram)				
Maximum switch-on current AC		30 A (20 ms, N/O contact)				
Maximum switch-on current DC		30 A (20 ms, N/O contact)				
Minimum switching current		5 mA (at 24 V)				
General data						
Test voltage (winding/contact)		2.5 kV_{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. 2x 10^7 cycles				
Mechanical service life, DC		Approx. 2x 10^7 cycles				
Standards/regulations		DIN EN 50178				
Degree of pollution/surge voltage category		2 / III				
Mounting position/mounting		Any / in rows with zero spacing				
Connection data solid/stranded/AWG		0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10				
Dimensions	W / H / D	27 mm / 89 mm / 75 mm				
EMC note		Class A product, see page 583				

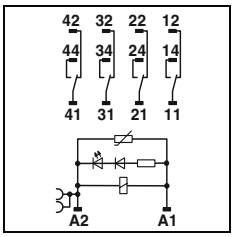
Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules with power contact relay and screw connection					
	①	24 V DC	**RIF-2-RSC-LDP-24DC/2X21**	2903326	10
	②	125 V DC	**RIF-2-RSC-LDP-125DC/2X21**	2903324	10
	③	24 V AC	**RIF-2-RSC-LV-24AC/2X21**	2903323	10
	④	120 V AC	**RIF-2-RSC-LV-120AC/2X21**	2903322	10
	⑤	230 V AC	**RIF-2-RSC-LV-230AC/2X21**	2903321	10

4-changeover-contact industrial relay module with screw connection and manual operation



DC coils



AC coils

Technical data

①	②	③	④	⑤
See diagram				
42	7.5	66	13	6.5
13	13	5 - 15	5 - 15	5 - 15
14	14	5 - 20	5 - 20	5 - 20
Yellow LED, Varistor				
Yellow LED, damping diode				

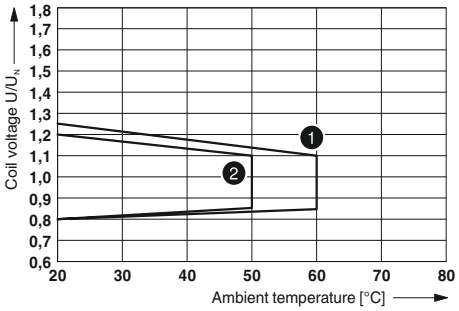
4 PDTs	
AgNi	
250 V AC/DC	
5 V (at 24 mA)	
6 A (see diagram)	
16 A (20 ms, N/O contact)	
16 A (20 ms, N/O contact)	
5 mA (at 24 V)	
2.5 kV_{rms} (50 Hz, 1 min.)	
-40°C ... 50°C	
-40°C ... 60°C	
100% operating factor	
Approx. 2x 10^7 cycles	
Approx. 2x 10^7 cycles	
DIN EN 50178	
2 / II	
Any / in rows with zero spacing	
0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10	
27 mm / 89 mm / 75 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-2-RSC-LDP-24DC/4X21	2903320	10
RIF-2-RSC-LDP-125DC/4X21	2903319	10
RIF-2-RSC-LV-24AC/4X21	2903318	10
RIF-2-RSC-LV-120AC/4X21	2903317	10
RIF-2-RSC-LV-230AC/4X21	2903316	10

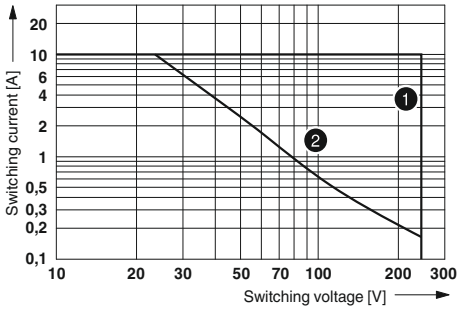
RIF-2-RSC.../2X21 (2 changeover contacts)

Operating voltage range



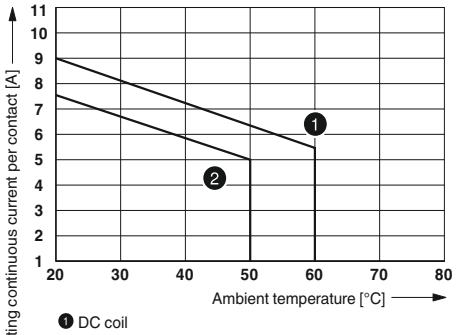
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



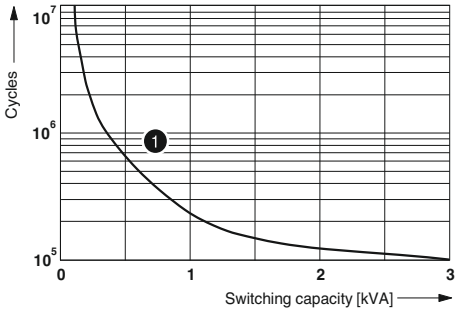
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

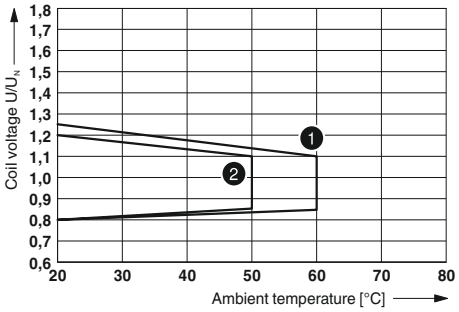
Electrical service life



❶ 250 V AC, ohmic load

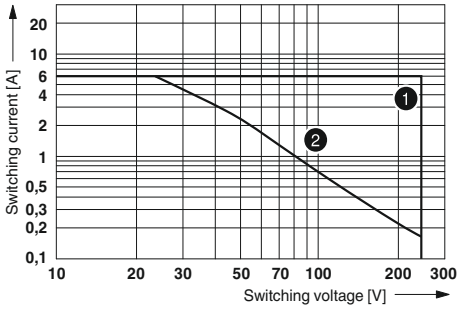
RIF-2-RSC.../4X21 (4 changeover contacts)

Operating voltage range



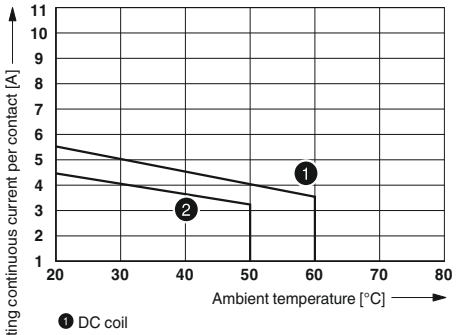
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



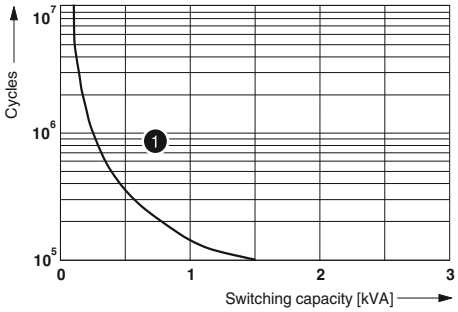
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

Electrical service life



❶ 250 V AC, ohmic load

Fully mounted RIF-2 relay modules for the Ex area

Relay modules with ATEX, IECEx, and/or Class 1, Division 2 approval for potentially explosive applications

The advantages:

– ATEX, IECEx, and Class1 Division 2 approval in screw and Push-in connection technology
– Safe isolation in accordance with DIN EN 50178 between coil and contact

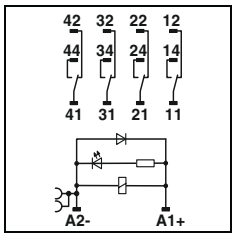
Fully mounted RIF-2 relay modules, consisting of:

– Relay base with screw or PT connection
– Relay retaining bracket
– Plug-in interference suppression modules
– Sealed 4-changeover-contact industrial relays
– Mechanical switch position indicator
– Logical contact arrangement, thanks to 1/3-level relay base
– Professional bridging of adjacent modules saves wiring time

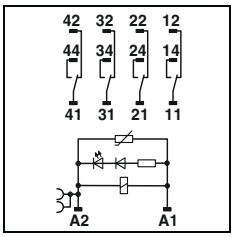
new

4-changeover-contact industrial relay module with IECEx, ATEX, and Cl. 1 Div. 2 approval

Ex:



DC coils



AC coils

Technical data

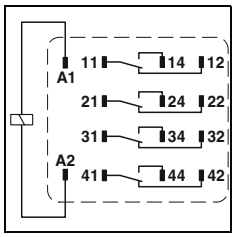
		①	②	③
Input data				
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	42	13	6.5
Typical response time at U_N	[ms]	13	5 - 15	5 - 15
Typical release time at U_N	[ms]	14	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor		
Input circuit DC		Yellow LED, damping diode		
Output data				
Contact type		4 PDTs		
Contact material		AgNi		
Max. switching voltage		250 V AC/DC		
Minimum switching voltage		5 V (at 24 mA)		
Limiting continuous current		6 A (see diagram)		
Maximum switch-on current AC		16 A (20 ms, N/O contact)		
Maximum switch-on current DC		16 A (20 ms, N/O contact)		
Minimum switching current		5 mA (at 24 V)		
General data				
Test voltage (winding/contact)		2.5 kV_{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. 2x 10^7 cycles		
Mechanical service life, DC		Approx. 2x 10^7 cycles		
Standards/regulations		DIN EN 50178, IEC 61508-1		
Degree of pollution/surge voltage category		2 / III		
Mounting position/mounting		Any / in rows with zero spacing		
Connection data solid/stranded/AWG		0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16		
Dimensions	W / H / D	31 mm / 96 mm / 75 mm		
Conformance/approvals				
ATEX		II 3G Ex ec nC IIC T4 Gc (IBExU17ATEXB014X)		
IECEx		Ex ec nC IIC T4 Gc (IECEx IBE 17.0032X)		
UL, USA/Canada		Class I, Div. 2, Groups A, B, C, D T4 Class I, Zone 2, Group IIC		
EMC note		Class A product, see page 583		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules for the Ex area					
with Push-in connection	①	24 V DC	**RIF-2-RPT-LDP-24DC/4X21/EX**	2909741	10
with Push-in connection	②	120 V AC	**RIF-2-RPT-LV-120AC/4X21/EX**	2909740	10
with Push-in connection	③	230 V AC	**RIF-2-RPT-LV-230AC/4X21/EX**	2909739	10
with screw connection	④	24 V DC	**RIF-2-RSC-LDP-24DC/4X21/EX**	2909845	10
with screw connection	⑤	120 V AC	**RIF-2-RSC-LV-120AC/4X21/EX**	2909846	10
with screw connection	⑥	230 V AC	**RIF-2-RSC-LV-230AC/4X21/EX**	2909847	10
Single relay					
	①	24 V DC			
	②	120 V AC			
	③	230 V AC			

new

Sealed industrial relay with four changeover contacts, 4 x 6 A, maximum



Technical data

①	②	③
See diagram		
38	13	6.5
13	5 - 15	5 - 15
3	5 - 20	5 - 20

4 PDTs
AgNi
250 V AC/DC
5 V (at 24 mA)
6 A
16 A (20 ms, N/O contact)
16 A (20 ms, N/O contact) / 12 A (4 s, 4 N/O contacts)

5 mA (at 24 V)

2.5 kV_{rms} (50 Hz, 1 min.)
-40°C ... 55°C
-40°C ... 70°C
100% operating factor
Approx. 2x 10^7 cycles
1x 10^7 cycles, approximately
IEC 60664, IEC 61810
2 / II
any
- ... - / - ... - / -
21.2 mm / 27.5 mm / 35.6 mm

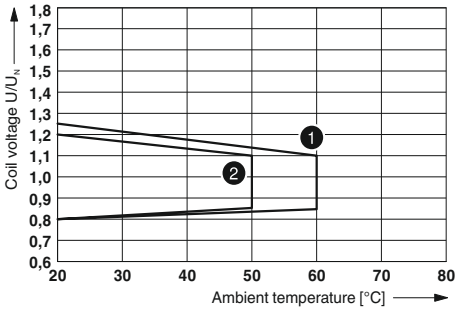
-
-
-

Ordering data

Type	Order No.	Pcs./Pkt.
REL-IR4/24DC/4X21/EX	2909738	10
REL-IR4/120AC/4X21/EX	2909744	10
REL-IR4/230AC/4X21/EX	2909742	10

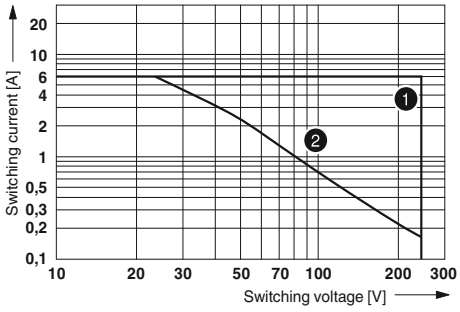
RIF-2-R.../4X21/EX

Operating voltage range



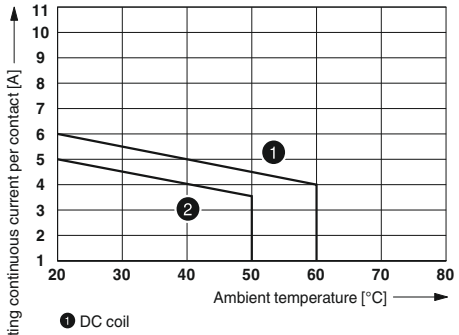
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



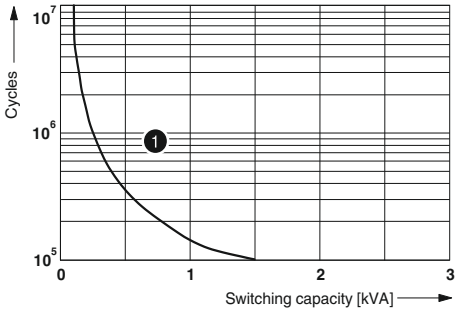
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

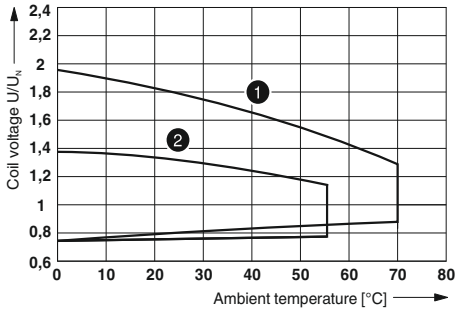
Electrical service life



❶ 250 V AC, ohmic load

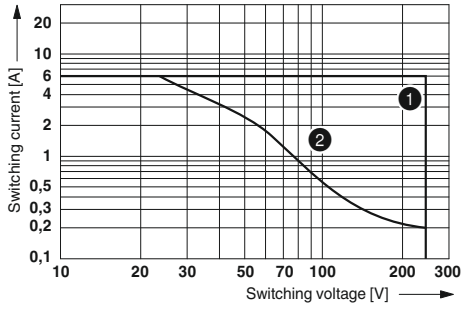
REL-IR4/.../4X21/EX

Operating voltage range



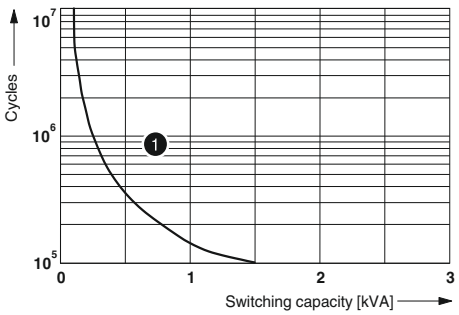
❶ DC coils
❷ AC coils

Interrupting rating



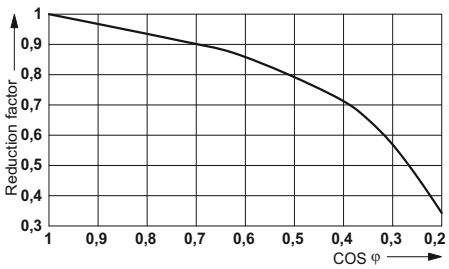
❶ AC, ohmic load
❷ DC, ohmic load

Electrical service life



❶ 250 V AC, ohmic load

Service life reduction factor

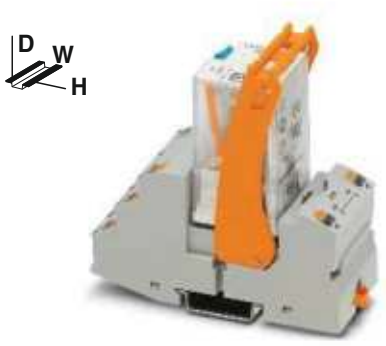


Fully mounted RIF-3 relay modules

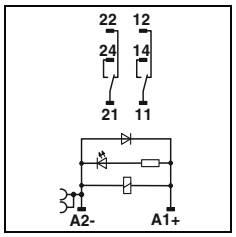
Fully mounted RIF-3 relay modules, consisting of:
– Relay base with Push-in connection
– 2 or 3-changeover-contact octal relay
– Relay retaining bracket
– Interference suppression module (AC types only)

The advantages:
– Relay with lockable manual operation and status LED
– With DC types, free-wheeling 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

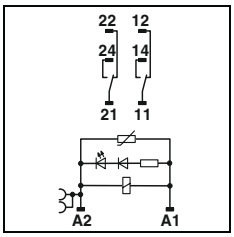
– For FBS 2-6 plug-in bridges for the input side (A2), see page 358



2-changeover-contact octal relay module with Push-in connection and manual operation



DC coils



AC coils

Technical data

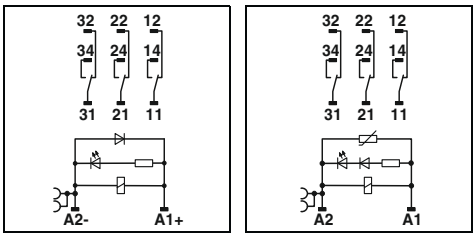
Input data		①	②	③
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	60	23	13
Typical response time at U_N	[ms]	18	5 - 15	5 - 15
Typical release time at U_N	[ms]	20	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor		
Input circuit DC		Yellow LED, damping diode		
Output data				
Contact type		2 PDT		
Contact material		AgNi		
Max. switching voltage		250 V AC/DC		
Minimum switching voltage		10 V (at 24 mA)		
Limiting continuous current		10 A (see diagram)		
Maximum switch-on current AC		30 A (20 ms, N/O contact)		
Maximum switch-on current DC		30 A (20 ms, N/O contact)		
Minimum switching current		10 mA (at 24 V)		
General data				
Test voltage (winding/contact)		2.5 kV_{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. 2x 10^7 cycles		
Mechanical service life, DC		Approx. 2x 10^7 cycles		
Standards/regulations		DIN EN 50178		
Degree of pollution/surge voltage category		2 / III		
Mounting position/mounting		Any / in rows with zero spacing		
Connection data solid/stranded/AWG		0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16		
Dimensions	W / H / D	40 mm / 103 mm / 90 mm		
EMC note		Class A product, see page 583		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules with power contact relay and Push-in connection					
	①	24 V DC	**RIF-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

D W H

3-changeover-contact octal relay module with Push-in connection and manual operation



Technical data

①	②	③
See diagram		
60	23	13
18	5 - 15	5 - 15
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		

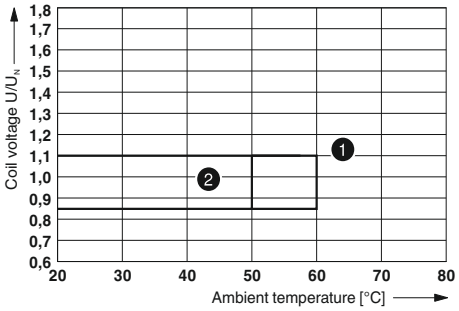
3 PDTs
AgNi
250 V AC/DC
10 V (at 24 mA)
8.5 A (see diagram)
30 A (20 ms, N/O contact)
30 A (20 ms, N/O contact)
10 mA (at 24 V)
2.5 kV_{rms} (50 Hz, 1 min.)
-40°C ... 50°C
-40°C ... 60°C
100% operating factor
Approx. 2x 10^7 cycles
Approx. 2x 10^7 cycles
DIN EN 50178
2 / III
Any / in rows with zero spacing
0.14 ... 1.5 mm^2 / 0.14 ... 1.5 mm^2 / 26 - 16
40 mm / 103 mm / 90 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-3-RPT-LDP-24DC/3X21	2903294	5
RIF-3-RPT-LV-120AC/3X21	2903293	5
RIF-3-RPT-LV-230AC/3X21	2903292	5

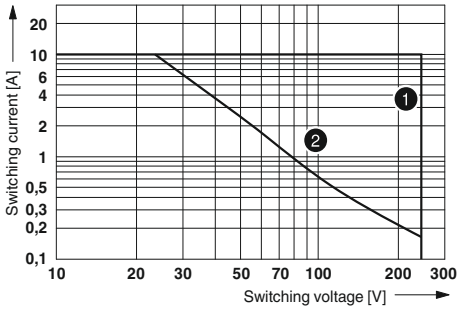
RIF-3-RPT.../2X21 (2 changeover contacts)

Operating voltage range



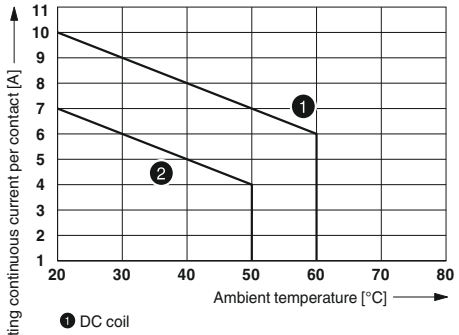
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



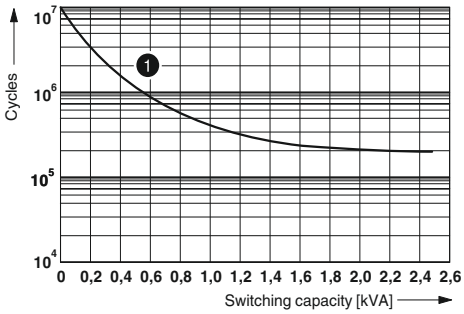
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

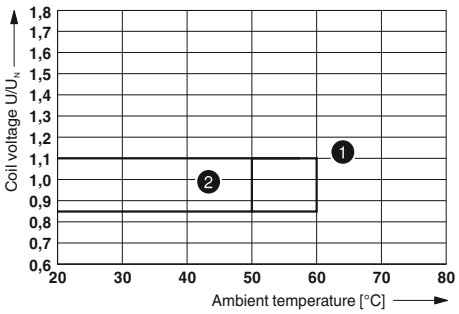
Electrical service life



❶ 250 V AC, ohmic load

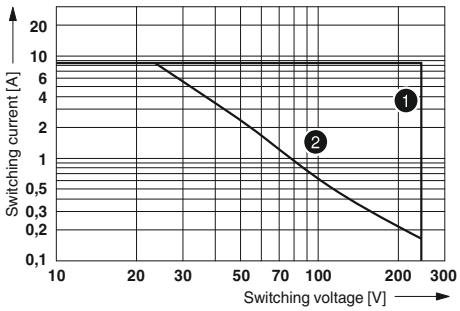
RIF-3-RPT.../3X21 (3 changeover contacts)

Operating voltage range



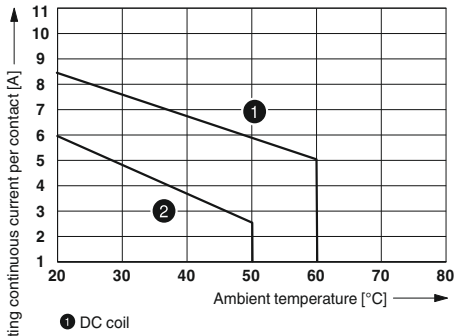
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



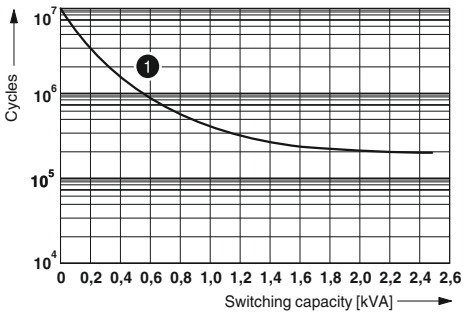
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

Electrical service life



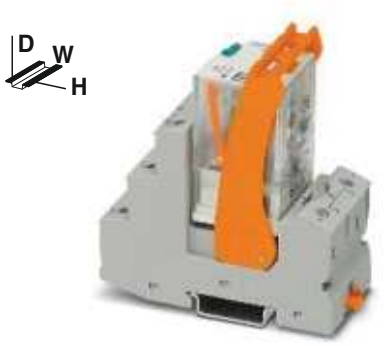
❶ 250 V AC, ohmic load

Fully mounted RIF-3 relay modules

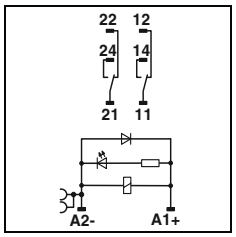
Fully mounted RIF-3 relay modules, consisting of:
– Relay base with screw connection
– 2 or 3-changeover-contact octal relay
– Relay retaining bracket
– Varistor interference suppression module (AC types only)

The advantages:
– Relay with lockable manual operation and status LED
– With DC types, free-wheeling 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

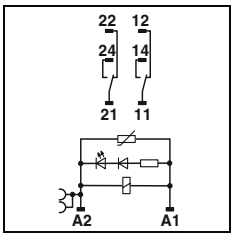
– For FBS 2-6 plug-in bridges for the input side (A2), see page 358



2-changeover-contact octal relay module with screw connection and manual operation



DC coils



AC coils

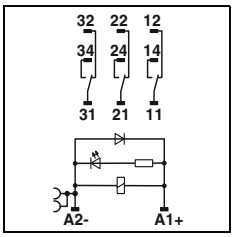
Technical data

Input data		①	②	③
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	60	23	13
Typical response time at U_N	[ms]	18	5 - 15	5 - 15
Typical release time at U_N	[ms]	20	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor		
Input circuit DC		Yellow LED, damping diode		
Output data				
Contact type		2 PDT		
Contact material		AgNi		
Max. switching voltage		250 V AC/DC		
Minimum switching voltage		10 V (at 24 mA)		
Limiting continuous current		10 A (see diagram)		
Maximum switch-on current AC		30 A (20 ms, N/O contact)		
Maximum switch-on current DC		30 A (20 ms, N/O contact)		
Minimum switching current		10 mA (at 24 V)		
General data				
Test voltage (winding/contact)		2.5 kV_{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. 2x 10^7 cycles		
Mechanical service life, DC		Approx. 2x 10^7 cycles		
Standards/regulations		DIN EN 50178		
Degree of pollution/surge voltage category		2 / III		
Mounting position/mounting		Any / in rows with zero spacing		
Connection data solid/stranded/AWG		0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10		
Dimensions	W / H / D	40 mm / 96 mm / 90 mm		
EMC note		Class A product, see page 583		

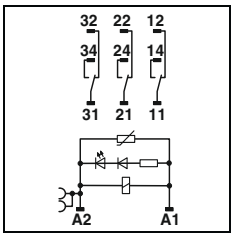
Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules with power contact relay and screw connection					
	①	24 V DC	**RIF-3-RSC-LDP-24DC/2X21**	2903303	5
	②	120 V AC	**RIF-3-RSC-LV-120AC/2X21**	2903302	5
	③	230 V AC	**RIF-3-RSC-LV-230AC/2X21**	2903301	5

3-changeover-contact octal relay module with screw connection and manual operation



DC coils



AC coils

Technical data

①	②	③
See diagram		
60	23	13
18	5 - 15	5 - 15
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		

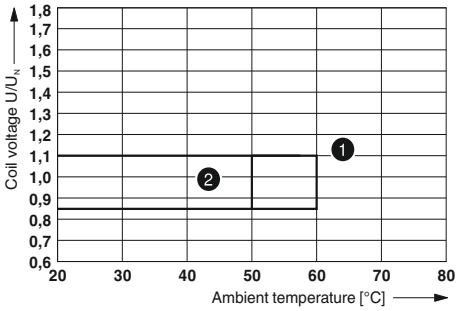
3 PDTs
AgNi
250 V AC/DC
10 V (at 24 mA)
8.5 A (see diagram)
30 A (20 ms, N/O contact)
30 A (20 ms, N/O contact)
10 mA (at 24 V)
2.5 kV_{rms} (50 Hz, 1 min.)
-40°C ... 50°C
-40°C ... 60°C
100% operating factor
Approx. 2x 10^7 cycles
Approx. 2x 10^7 cycles
DIN EN 50178
2 / III
Any / in rows with zero spacing
0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10
40 mm / 96 mm / 90 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-3-RSC-LDP-24DC/3X21	2903300	5
RIF-3-RSC-LV-120AC/3X21	2903299	5
RIF-3-RSC-LV-230AC/3X21	2903298	5

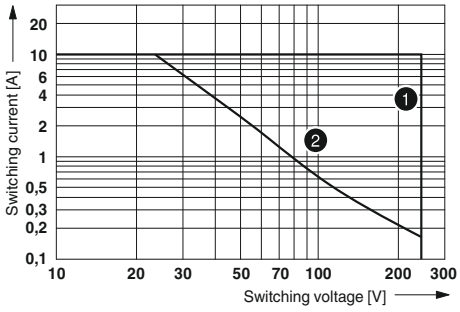
RIF-3-RSC.../2X21 (2 changeover contacts)

Operating voltage range



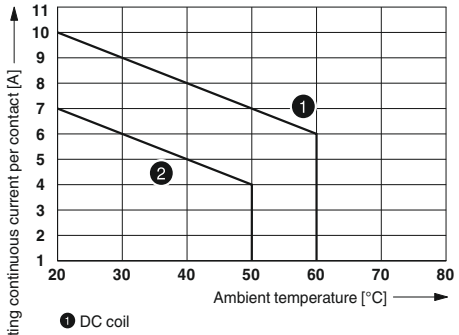
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



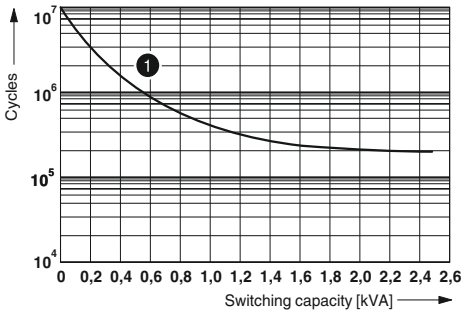
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

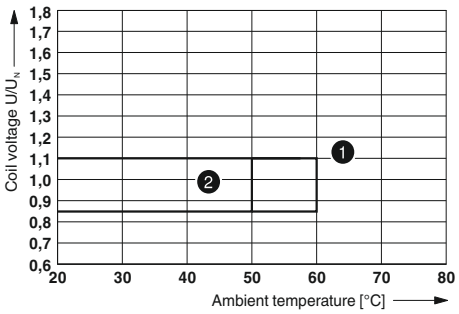
Electrical service life



❶ 250 V AC, ohmic load

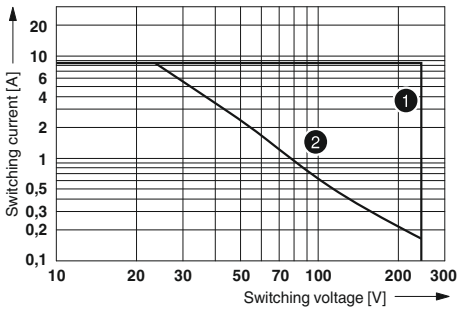
RIF-3-RSC.../3X21 (3 changeover contacts)

Operating voltage range



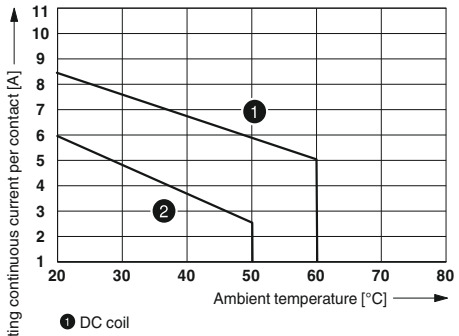
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



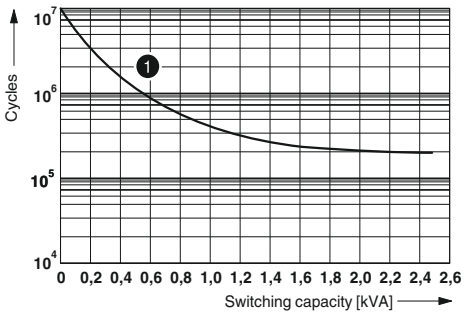
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

Electrical service life



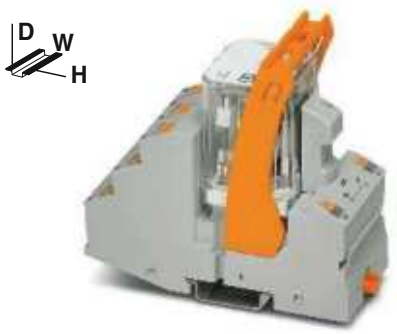
❶ 250 V AC, ohmic load

Fully mounted RIF-4 relay modules

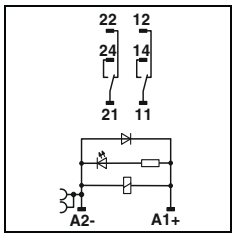
Fully mounted RIF-4 relay modules, consisting of:
– Relay base with Push-in connection
– 2 or 3-PDT high-power relay
– Relay retaining bracket
– Varistor interference suppression module (AC types only)

The advantages:
– Logical contact arrangement, thanks to 1/3-level relay base
– Professional bridging of adjacent modules saves wiring time

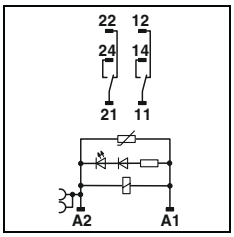
– For FBS 2-6 plug-in bridges for the input side (A2), see page 358



2-changeover-contact high-power relay module with Push-in connection



DC coils



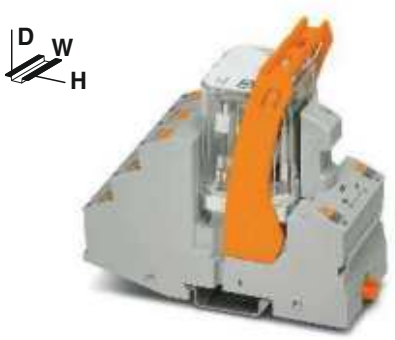
AC coils

Technical data

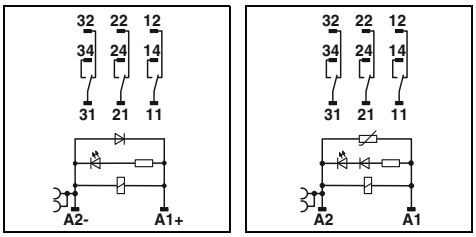
		①	②	③
Input data				
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	56	24	14
Typical response time at U_N	[ms]	20	5 - 25	5 - 25
Typical release time at U_N	[ms]	20	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor		
Input circuit DC		Yellow LED, damping diode		
Output data				
Contact type		2 PDT		
Contact material		AgNi		
Max. switching voltage		440 V AC / 250 V DC		
Minimum switching voltage		10 V (at 24 mA)		
Limiting continuous current		11 A (see diagram)		
Maximum switch-on current AC		50 A (20 ms, N/O contact)		
Maximum switch-on current DC		50 A (20 ms, N/O contact)		
Minimum switching current		10 mA (at 24 V)		
Maximum interrupting rating, ohmic load				
	250 V AC	2500 VA		
	440 V AC	4,000 VA		
Motor load in accordance with 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		
Degree of pollution/surge voltage category		2 / III		
Mounting position/mounting		Any / in rows with zero spacing		
Connection data solid/stranded/AWG				
Input side		0.14 ... 1.5 mm^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 / 111 mm / 90 mm		
EMC note		Class A product, see page 583		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules with power contact relay and Push-in connection					
	①	24 V DC	**RIF-4-RPT-LDP-24DC/2X21**	2903281	5
	②	120 V AC	**RIF-4-RPT-LV-120AC/2X21**	2903280	5
	③	230 V AC	**RIF-4-RPT-LV-230AC/2X21**	2903279	5



3-changeover-contact high-power relay module with Push-in connection



DC coils | AC coils

Technical data

①	②	③
See diagram		
56	24	14
20	5 - 25	5 - 25
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		

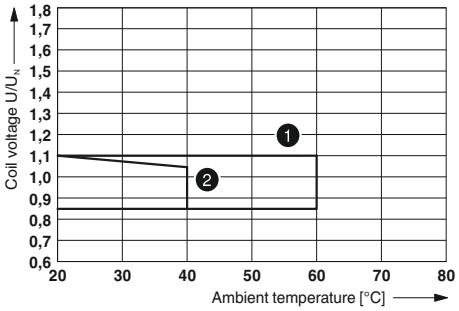
3 PDTs
AgNi
440 V AC / 250 V DC
10 V (at 24 mA)
10 A (see diagram)
50 A (20 ms, N/O contact)
50 A (20 ms, N/O contact)
10 mA (at 24 V)
2500 VA
4,000 VA
1/3 HP, 120 V AC (single-phase AC motor)
1/2 HP, 240 V AC (single-phase AC motor)
1/2 HP, 240 V AC (three-phase induction motor)
2.5 kV_{rms} (50 Hz, 1 min.)
-40°C ... 40°C
-40°C ... 60°C
100% operating factor
Approx. 10^7 cycles
Approx. 10^7 cycles
DIN EN 50178
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 / 111 mm / 90 mm
Class A product, see page 583

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

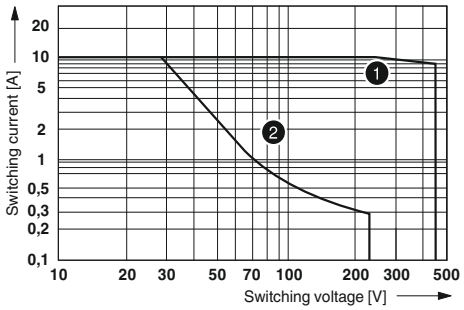
RIF-4-RPT.../2X21 (2 changeover contacts)

Operating voltage range



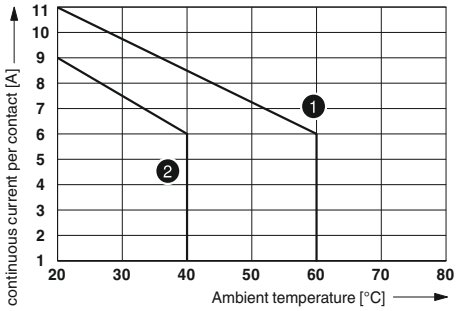
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



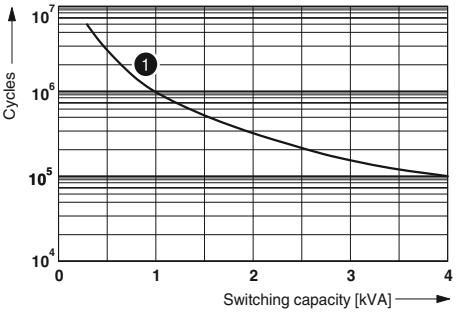
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

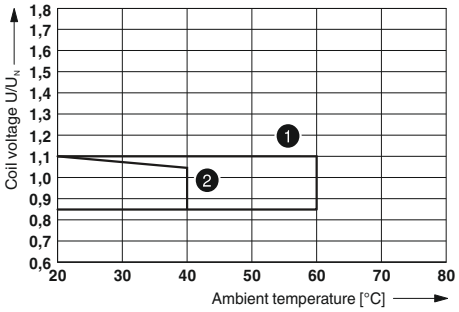
Electrical service life



❶ 250 V AC, ohmic load

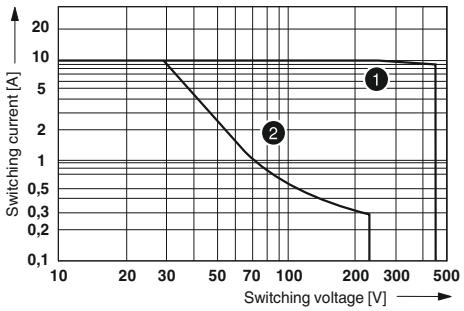
RIF-4-RPT.../3X21 (3 changeover contacts)

Operating voltage range



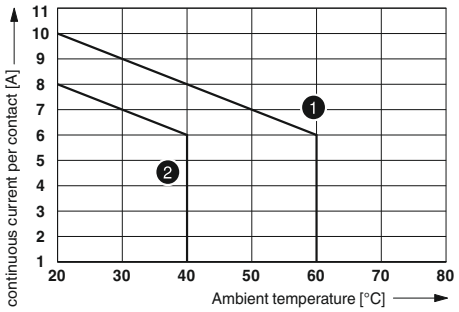
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



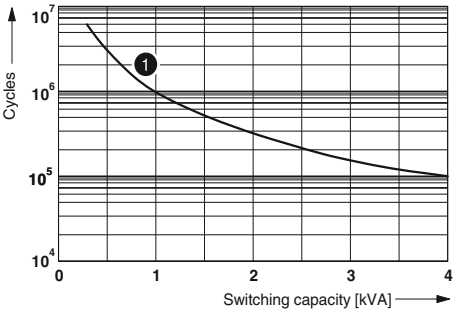
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

Electrical service life



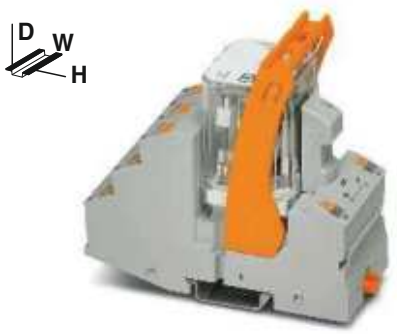
❶ 250 V AC, ohmic load

Fully mounted RIF-4 relay modules

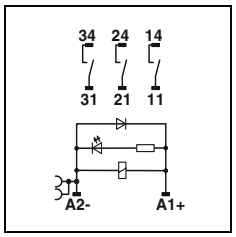
Fully mounted RIF-4 relay modules, consisting of:
– Relay base with Push-in connection
– 3-N/O high-power relay
– Relay retaining bracket
– Varistor interference suppression module (AC types only)

The advantages:
– Logical contact arrangement, thanks to 1/3-level relay base
– Full shutdown by means of ≥3 mm contact opening
– Professional bridging of adjacent modules saves wiring time

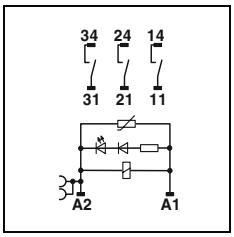
– For FBS 2-6 plug-in bridges for the input side (A2), see page 358



3-N/O-contact high-power relay module with Push-in connection



DC coils



AC coils

Technical data

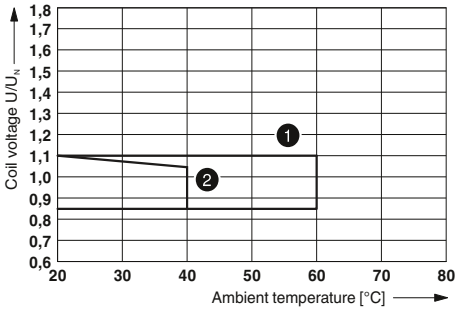
		①	②	③
Input data				
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	70	24	14
Typical response time at U_N	[ms]	20	5 - 25	5 - 25
Typical release time at U_N	[ms]	20	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor		
Input circuit DC		Yellow LED, damping diode		
Output data				
Contact type		3 N/O contacts		
Contact material		AgNi		
Max. switching voltage		440 V AC / 250 V DC		
Minimum switching voltage		10 V (at 24 mA)		
Limiting continuous current		10 A (see diagram)		
Maximum switch-on current AC		50 A (20 ms, N/O contact)		
Maximum switch-on current DC		50 A (20 ms, N/O contact)		
Minimum switching current		10 mA (at 24 V)		
Maximum interrupting rating, ohmic load				
	250 V AC	2500 VA		
	440 V AC	4,000 VA		
Motor load in accordance with 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		
Degree of pollution/surge voltage category		2 / III		
Mounting position/mounting		Any / in rows with zero spacing		
Connection data solid/stranded/AWG				
Input side		0.14 ... 1.5 mm^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 / 111 mm / 90 mm		
EMC note		Class A product, see page 583		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules with power contact relay and Push-in connection					
	①	24 V DC	**RIF-4-RPT-LDP-24DC/3X1**	2903275	5
	②	120 V AC	**RIF-4-RPT-LV-120AC/3X1**	2903274	5
	③	230 V AC	**RIF-4-RPT-LV-230AC/3X1**	2903273	5

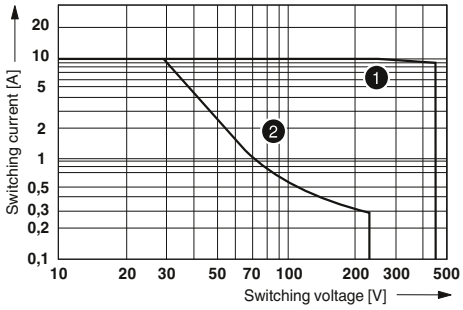
RIF-4-RPT.../3X1 (3 N/O contacts)

Operating voltage range



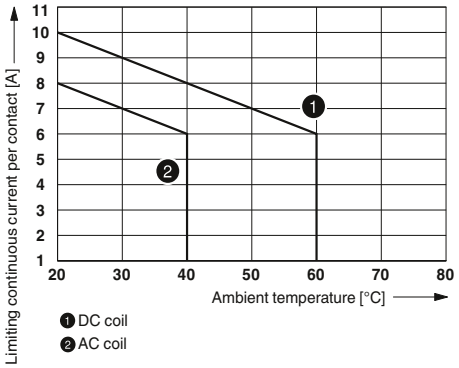
1 DC coil (observe contact derating)
2 AC coil (observe contact derating)

Interrupting rating



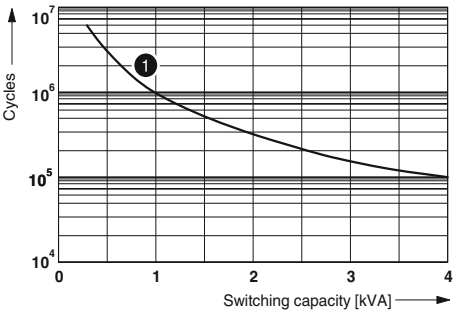
1 AC, ohmic load
2 DC, ohmic load

Contact derating



1 DC coil
2 AC coil

Electrical service life



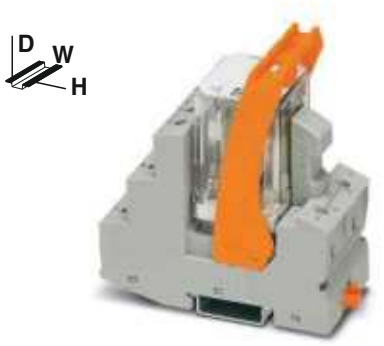
1 250 V AC, ohmic load

Fully mounted RIF-4 relay modules

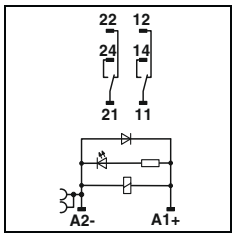
Fully mounted RIF-4 relay modules, consisting of:
– Relay base with screw connection
– 3-PDT high-power relay
– Relay retaining bracket
– Varistor interference suppression module (AC types only)

The advantages:
– Logical contact arrangement, thanks to 1/3-level relay base
– Professional bridging of adjacent modules saves wiring time

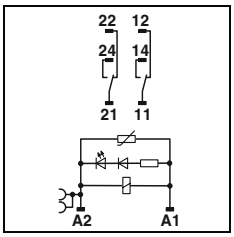
– For FBS 2-6 plug-in bridges for the input side (A2), see page 358



2 changeover-contact high-power relay module with screw connection



DC coils



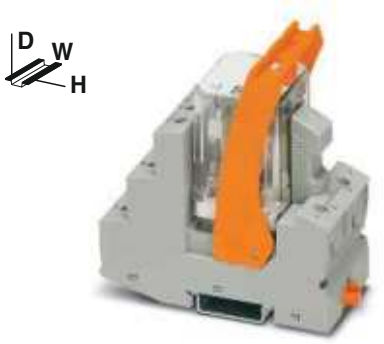
AC coils

Technical data

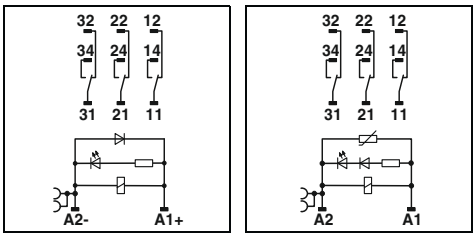
		①	②	③
Input data				
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	56	24	14
Typical response time at U_N	[ms]	20	5 - 25	5 - 25
Typical release time at U_N	[ms]	20	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor		
Input circuit DC		Yellow LED, damping diode		
Output data				
Contact type		2 PDT		
Contact material		AgNi		
Max. switching voltage		440 V AC / 250 V DC		
Minimum switching voltage		10 V (at 24 mA)		
Limiting continuous current		11 A (see diagram)		
Maximum switch-on current AC		50 A (20 ms, N/O contact)		
Maximum switch-on current DC		50 A (20 ms, N/O contact)		
Minimum switching current		10 mA (at 24 V)		
Maximum interrupting rating, ohmic load				
	250 V AC	2500 VA		
	440 V AC	4,000 VA		
Motor load in accordance with 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		
Degree of pollution/surge voltage category		2 / III		
Mounting position/mounting		Any / in rows with zero spacing		
Connection data solid/stranded/AWG				
Input side		0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10		
Output side		0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10		
Dimensions	W / H / D	44 mm / 96 mm / 91 mm		
EMC note		Class A product, see page 583		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules with power contact relay and screw connection					
	①	24 V DC	**RIF-4-RSC-LDP-24DC/2X21**	2903291	5
	②	120 V AC	**RIF-4-RSC-LV-120AC/2X21**	2903290	5
	③	230 V AC	**RIF-4-RSC-LV-230AC/2X21**	2903289	5



3 changeover-contact high-power relay module with screw connection



DC coils AC coils

Technical data

①	②	③
See diagram		
56	24	14
20	5 - 25	5 - 25
20	5 - 20	5 - 20
Yellow LED, Varistor		
Yellow LED, damping diode		

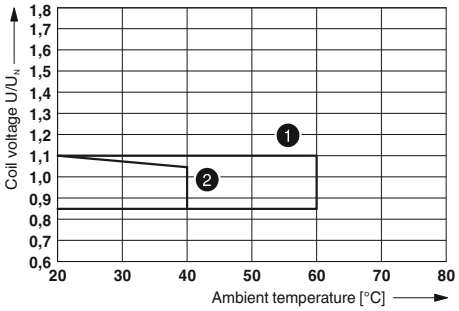
3 PDTs
AgNi
440 V AC / 250 V DC
10 V (at 24 mA)
10 A (see diagram)
50 A (20 ms, N/O contact)
50 A (20 ms, N/O contact)
10 mA (at 24 V)
2500 VA
4,000 VA
1/3 HP, 120 V AC (single-phase AC motor)
1/2 HP, 240 V AC (single-phase AC motor)
1/2 HP, 240 V AC (three-phase induction motor)
2.5 kV_{rms} (50 Hz, 1 min.)
-40°C ... 40°C
-40°C ... 60°C
100% operating factor
Approx. 10^7 cycles
Approx. 10^7 cycles
DIN EN 50178
2 / III
Any / in rows with zero spacing
0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10
0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10
44 mm / 96 mm / 91 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
RIF-4-RSC-LDP-24DC/3X21	2903288	5
RIF-4-RSC-LV-120AC/3X21	2903287	5
RIF-4-RSC-LV-230AC/3X21	2903285	5

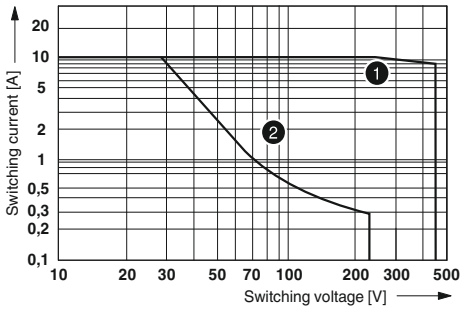
RIF-4-RSC.../2X21 (2 changeover contacts)

Operating voltage range



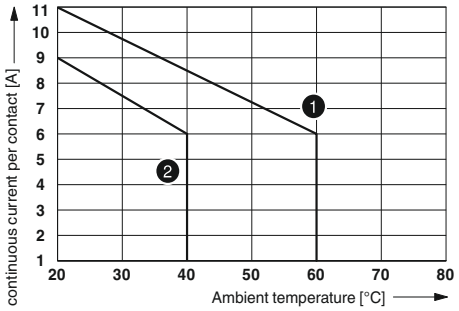
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



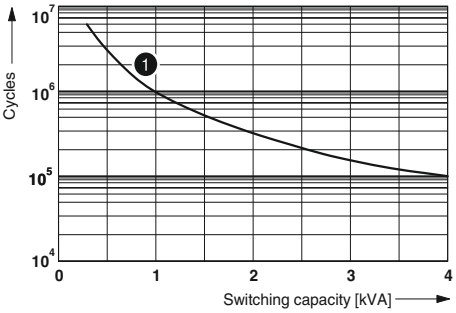
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

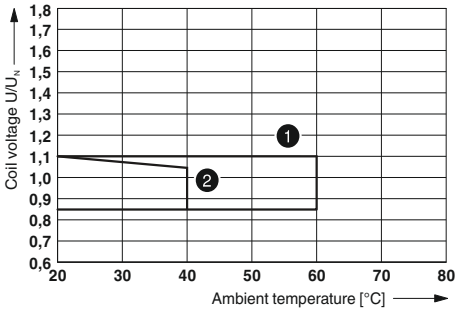
Electrical service life



❶ 250 V AC, ohmic load

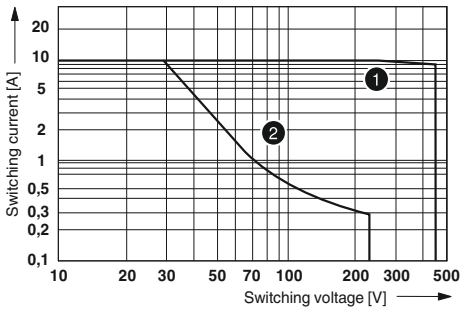
RIF-4-RSC.../3X21 (3 changeover contacts)

Operating voltage range



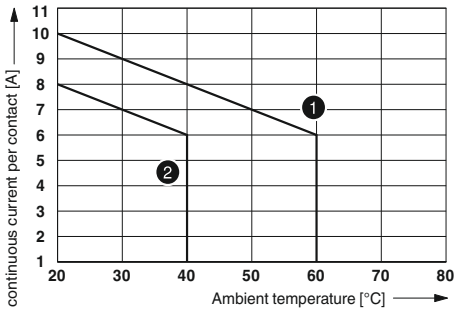
❶ DC coil (observe contact derating)
❷ AC coil (observe contact derating)

Interrupting rating



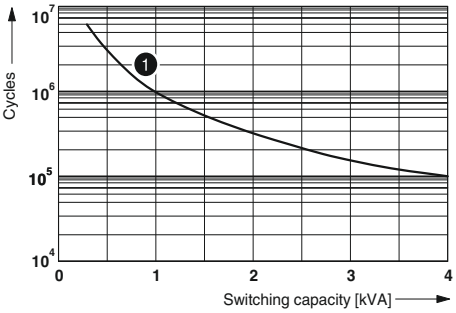
❶ AC, ohmic load
❷ DC, ohmic load

Contact derating



❶ DC coil
❷ AC coil

Electrical service life



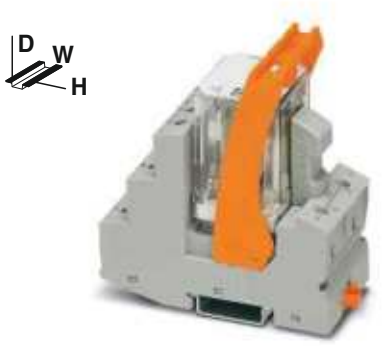
❶ 250 V AC, ohmic load

Fully mounted RIF-4 relay modules

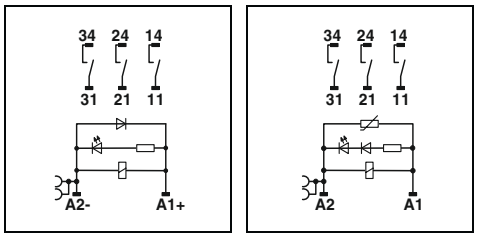
Fully mounted RIF-4 relay modules, consisting of:
– Relay base with screw connection
– 3-N/O high-power relay
– Relay retaining bracket
– Varistor interference suppression module (AC types only)

The advantages:
– Logical contact arrangement, thanks to 1/3-level relay base
– Full shutdown by means of ≥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 358



3-N/O-contact high-power relay module with screw connection



DC coils | AC coils

Technical data

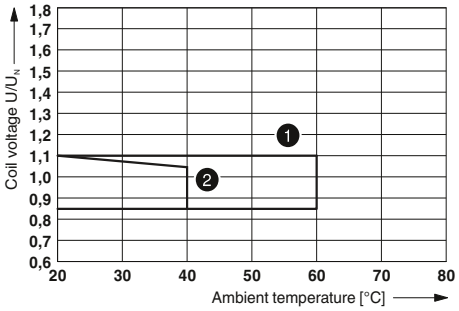
Input data		①	②	③
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	70	24	14
Typical response time at U_N	[ms]	20	5 - 25	5 - 25
Typical release time at U_N	[ms]	20	5 - 20	5 - 20
Input circuit AC		Yellow LED, Varistor		
Input circuit DC		Yellow LED, damping diode		
Output data				
Contact type		3 N/O contacts		
Contact material		AgNi		
Max. switching voltage		440 V AC / 250 V DC		
Minimum switching voltage		10 V (at 24 mA)		
Limiting continuous current		10 A (see diagram)		
Maximum switch-on current AC		50 A (20 ms, N/O contact)		
Maximum switch-on current DC		50 A (20 ms, N/O contact)		
Minimum switching current		10 mA (at 24 V)		
Maximum interrupting rating, ohmic load				
	250 V AC	2500 VA		
	440 V AC	4,000 VA		
Motor load in accordance with 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		
Degree of pollution/surge voltage category		2 / III		
Mounting position/mounting		Any / in rows with zero spacing		
Connection data solid/stranded/AWG				
Input side		0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10		
Output side		0.5 ... 4 mm^2 / 0.5 ... 4 mm^2 / 20 - 10		
Dimensions	W / H / D	44 mm / 96 mm / 91 mm		
EMC note		Class A product, see page 583		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Pre-assembled coupling relay modules with power contact relay and screw connection					
	①	24 V DC	**RIF-4-RSC-LDP-24DC/3X1**	2903284	5
	②	120 V AC	**RIF-4-RSC-LV-120AC/3X1**	2903283	5
	③	230 V AC	**RIF-4-RSC-LV-230AC/3X1**	2903282	5

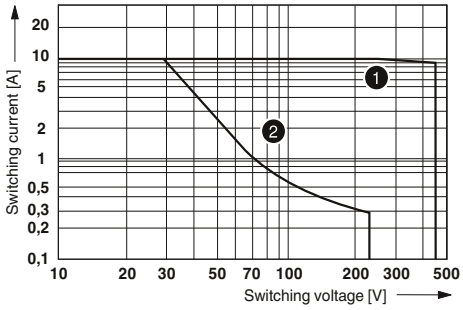
RIF-4-RSC.../3X1 (3 N/O contacts)

Operating voltage range



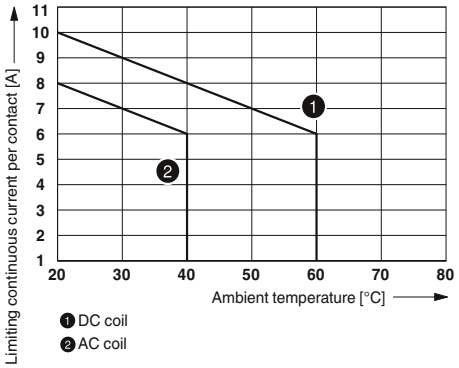
1 DC coil (observe contact derating)
2 AC coil (observe contact derating)

Interrupting rating



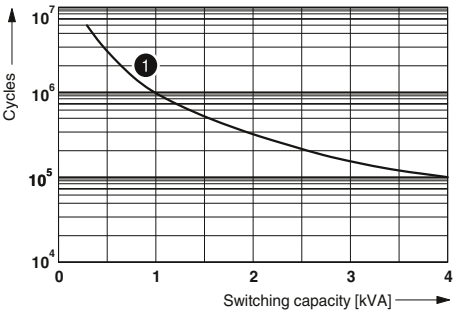
1 AC, ohmic load
2 DC, ohmic load

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.

Plug-in bridge

End clamp

Description	Color	Ordering data: Type		Order No.	Pcs./Pkt.	Ordering data: Type	Order No.	Pcs./Pkt.
Plug-in bridge								
2-pos. red, 32 A		**FBS 2-6**		3030336	50			
2-pos. blue, 32 A		**FBS 2-6 BU**		3036932	50			
2-pos. gray, 32 A		**FBS 2-6 GY**		3032237	50			
5-pos. red, 32 A		**FBS 5-6**		3030349	50			
10-pos. red, 32 A		**FBS 10-6**		3030271	10			
20-pos. red, 32 A		**FBS 20-6**		3030365	10			
50-pos. red, 32 A		**FBS 50-6**		3032224	10			
2-pos. red, 41 A		**FBS 2-8**		3030284	10			
2-pos. blue, 41 A		**FBS 2-8 BU**		3032567	10			
2-pos. gray, 41 A		**FBS 2-8 GY**	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 band 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. It is inserted directly in the function shaft of the Push-in connection.

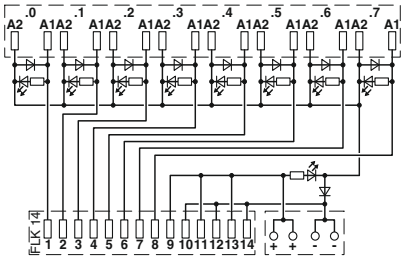
2.3 mm test plug

Ordering data

Description	Color	Type	Order No.	Pcs./Pkt.
Test plug, consisting of:				
Metal part for 2.3 mm Ø socket hole and	gray	**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

Adapter for RIFLINE complete RF-1

RIF-1-V8... is the VARIOFACE adapter which connects the RIF-1 relay module with the VARIOFACE system cabling. This allows easy connection of eight relay modules to a controller.



VARIOFACE adapter for RIFLINE complete RIF-1

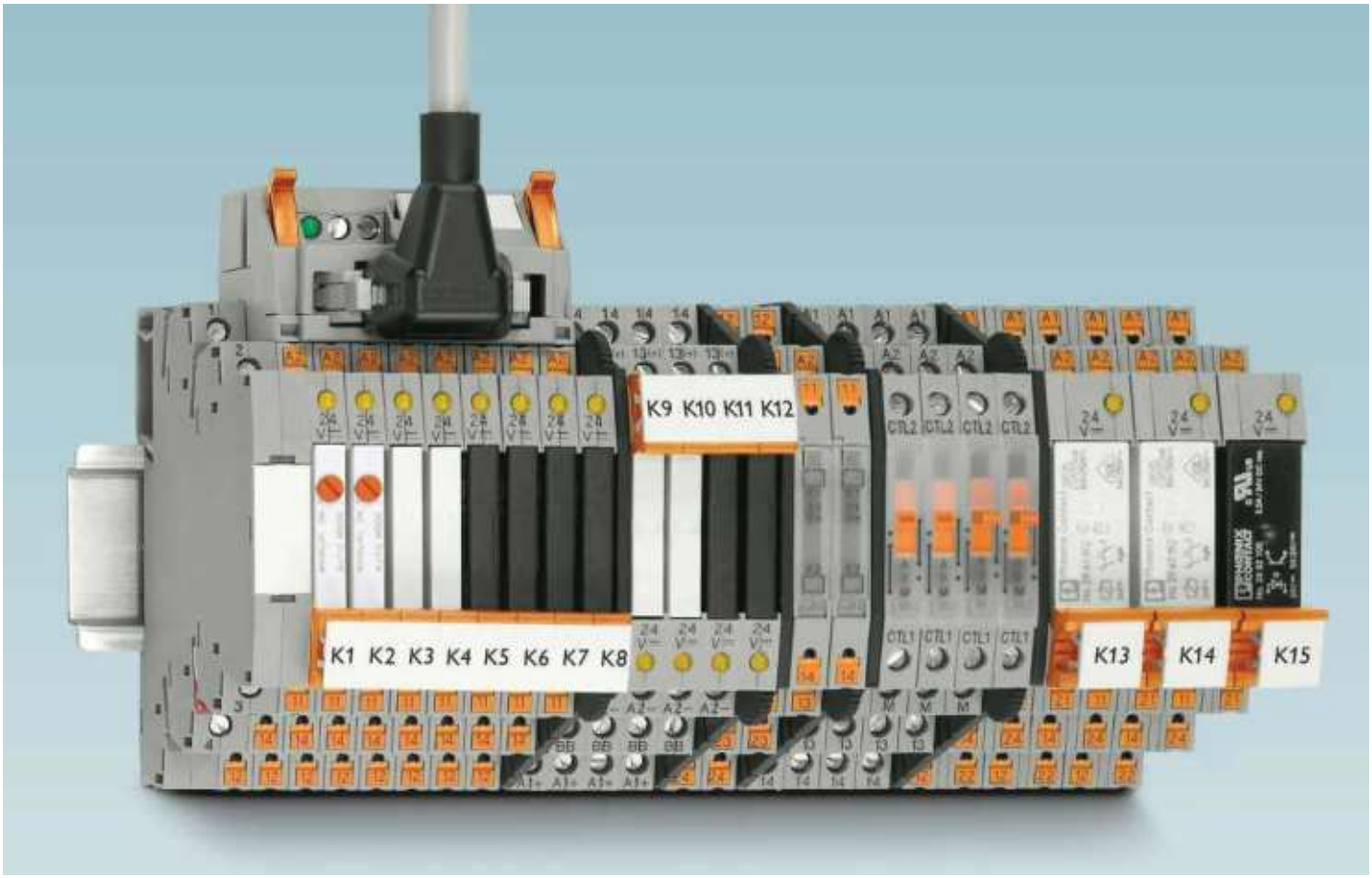
Technical data

Maximum permissible operating voltage		30 V DC
Maximum permissible current (per branch)		1 A (per signal path)
Maximum total current (voltage supply)		3 A
Rated surge voltage		0.6 kV (functional insulation)
Ambient temperature (operation)		-40°C ... 60°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Controller level	IDC/FLK pin strip
	Supply	Push-in connection
Connection data solid/stranded/AWG		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Dimensions	H / D	101 mm / 75 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
V8 adapter, for eight RIF-1 relay modules, with IDC/FLK pin strip for PLC system cabling, **positive switching**					
	14	128 mm	**RIF-1-V8/PT/FLK14/OUT**	2905195	1

PLC-INTERFACE – Highly-compact relay modules



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 in accordance with DIN EN 50178 (VDE 0160).

PLC-INTERFACE is available in three connection technologies. Depending on the usage range, screw or Push-in connection can be selected.

In addition to the universal types, PLC-INTERFACE is also available in numerous special versions. These include:

– Sensor and actuator modules that can accommodate all connections directly on the interface
– Modules for high inrush or continuous currents
– Railway modules, which meet specific railway requirements
– Filter modules, which filter out interference on the input side

Plug-in bridges are available for all modules for simple potential distribution. In addition, solutions from system cabling applications offer easy connection to the plant control system. VARIOFACE adapters can be used to reduce wiring effort considerably. Installation is simplified significantly thanks to the integrated input and protective circuit.

Standard marking material from CLIPLINE complete modular terminal blocks can be used to mark PLC-INTERFACE.

Universal modules

PLC-R... and PLC-O... relay and solid-state relay modules with PDT or N/O contact, designed for universal use. Available in an overall width of 6.2 mm with one contact or in 14 mm with two contacts.

Available either with screw or Push-in connection.

Sensors/actuators

PLC...SEN and PLC...ACT offer space-saving sensor and actuator wiring without additional supply or output terminal blocks. The sensor or actuator connections are incorporated directly at the relay module.

Available either with screw or Push-in connection.

High currents

PLC...IC is particularly suitable for applications with high switch-on currents, e.g. from lamp loads. The PLC...HC relay modules are designed for applications with high continuous currents.

Available either with screw or Push-in connection.

Railway applications

PLC...RW relay or solid-state relay modules are suitable for railway requirements. These cover, for example, the extended temperature and input voltage range of railway applications.

Interference signals on the input side

PLC-B...SO46 basic terminal blocks are used for filtering interference currents and interference voltages on the input side.

Available either with screw or Push-in connection.

Accessories

The entire PLC-INTERFACE system can be extended by a range of accessories such as power terminals, adapters for system cabling or bridges for distribution of potential.

Product overview

Highly compact relay modules – Special versions and accessories

			Page	Web code
Actuator series		**PLC-R…/1/ACT** Assembled with a plug-in power contact relay	374	#0618
		PLC-R-…/1IC/ACT Assembled with a plug-in miniature relay for high inrush currents	382	
		PLC-O…/24DC/2/ACT Assembled with a plug-in solid-state power relay	376	
		PLC-OSC…/230AC/1/ACT Assembled with a plug-in solid-state power relay	377	
Sensor series		**PLC-R.../1AU/SEN** Assembled with a plug-in relay for small switching capacities, with gold-plated multi-layer contact	380	#0617
		PLC-O.../48DC/100/SEN Assembled with a plug-in solid-state input relay	381	
Filter series		**PLC-B...UC/21/SO46** For assembly with electromechanical or solid-state relays	388	#0689
		PLC-B...UC/1/SEN/SO46 For assembly with electromechanical or solid-state relays	389	
		PLC-BSC...UC/21-21/SO46 For assembly with relays	389	
		PLC-BSC...UC/21/HC/SO46 For assembly with relays	389	
Switch modules		**PLC-RS...-24UC/1/S...** Relay and switch integrated	406	#0898
		PLC-S...-S/... Switch integrated	407	
Solid-state relays		**PLC-O.../24DC/...** Optocoupler modules for universal use	372	#0899
		PLC-O.../230AC/... Switching capacity up to 230 V AC and 2.4 A in 6.2 mm	410	
		PLC-O.../300DC/... DC voltage output up to 300 V DC	408	
Ex relays		**PLC-R.../21/EX** 1 changeover contact with power contact	386	#0690
		PLC-R.../21-21/EX 2 changeover contacts with power contact	386	
		PLC-R.../21/HC/EX 1 changeover contact up to 10 A	387	
		PLC-O...C1D2 DC voltage output	387	

Hybrid solid-state relays	PLC-INTERFACE for railway applications	PLC-INTERFACE for high inrush currents	Reversing load relays
PLC-H...24DC/230AC/10 Hybrid solid-state relays with AC voltage output, max. 10 A **Page: 385** **Web code: #0691**	**PLC…/RW** Relay modules with extended input voltage and temperature range, specifically designed for use in railway applications **Page: 418** **Web code: #0900**	**PLC...1IC/ACT** Maximum inrush current of 130 A, suitable for capacitive loads, available with screw and Push-in connection technology **Page: 382** **Web code: #0901**	**PLC-S...-ELR W 1/2-24DC** Electronic reversing load relay for motors up to 24 V DC / 2 A **Page: 423** **Web code: #0693**

Accessories			Web code: #0692 Page: 426
	Continuous plug-in bridge 500 mm long, insulated, can be cut to length, for potential distribution with PLC-INTERFACE	**Plug-in bridge** 2-pos., 6 mm long, bridges potentials of adjacent PLC-INTERFACE devices	**Plug-in bridge** 2-pos., 8 mm long, bridges potentials of adjacent PLC-INTERFACE devices with separating plate
Plug-in bridge 2-pos., for connecting adjacent connections on a 14 mm PLC-INTERFACE device	**Separating plate** 2 mm thick, required at the start and end of every PLC terminal strip	**Passive feed-through bridge** Can be inserted instead of a relay or solid-state relay, bridges terminal points A1 and 14	**Power terminal** For supplying up to four potentials

Logic modules			Web code: #0694 Page: 430
	PLC-V8C…/SAM2 **Stand-alone module** With 16 I/Os, cannot be extended, connection to PC via micro USB socket. Integrated real-time clock, accommodates external IFS-CONFSTICK memory module.	**PLC-V8C…/BM2** **Basic module** With 16 I/Os, can be extended up to a maximum of 48 I/Os. Connection to PC via micro USB socket. Integrated real-time clock. Accommodates external IFS-CONFSTICK memory module. Optional connection to IFS gateways.	**PLC-V8C…/EM** **Extension module** With 16 I/Os, for extending the basic module. A maximum of two extension modules can be connected to each basic module.

System cabling adapters for PLC-INTERFACE			Web code: #0897 Page: 427
	PLC-V8/FLK14… For 6.2 mm relay, with 14-pos. IDC/FLK pin strip, module width: 49.6 mm	**PLC-V8/D15S/…** For 6.2 mm relay, with 15-pos. D-SUB socket strip, module width: 49.6 mm	**PLC-V8L/FLK14/…** For 14 mm relay, with 14-pos. IDC/FLK pin strip, module width: 112.3 mm

Universal PLC series with changeover contact relay

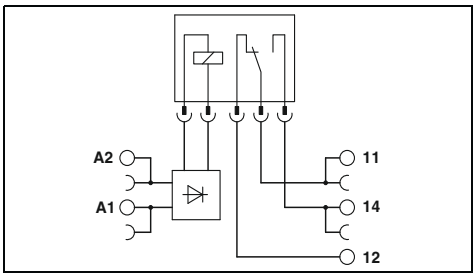
PLC-R... is the relay series that can be used universally and consists of basic terminal blocks and plug-in relays with changeover contacts.

The advantages:

– Slim design
– Screw and Push-in connection technology
– Functional plug-in bridges
– Integrated input and interference suppression circuit
– High degree of protection, RT III (wash-proof), or RT II for relay with one changeover contact with manual operation
– Safe isolation in accordance with DIN EN 50178 between coil and contact
– Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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 399
Inflammability class V0 (UL 94)
See the website for more information on connection cross sections with ferrules.
[1]) 120 and 230 V types up to 55°C

1-changeover-contact relay module, 6 A, maximum



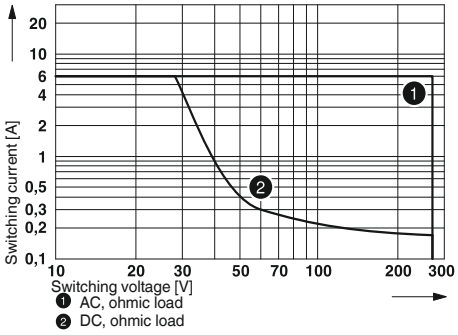
Technical data

		①	②	③	④	⑤	⑥	⑦
Input data								
Typical 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, reverse polarity protection, free-wheeling diode						
Input circuit AC/DC		Yellow LED, bridge rectifier						
Output data								
Contact material		AgSnO						
Max. switching voltage		250 V AC/DC						
Minimum switching voltage		5 V (at 100 mA)						
Limiting continuous current		6 A						
Maximum switch-on current		10 A (4 s)						
Minimum switching current		10 mA (at 12 V)						
General data								
Test voltage input/output		4 kV AC (50 Hz, 1 min.)						
Ambient temperature (operation)		-40°C ... 60°C[1])						
Mechanical service life		2x 10^7 cycles						
Standards/regulations		IEC 60664, EN 50178						
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						
EMC note		Class A product, see page 583						

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**	2966906	10
	②	24 V DC	**PLC-RSC- 24DC/21**	2966171	10
	③	24 V AC/DC	**PLC-RSC- 24UC/21**	2966184	10
	④	48 V DC	**PLC-RSC- 48DC/21**	2966113	10
	⑤	60 V DC	**PLC-RSC- 60DC/21**	2966139	10
	⑥	120 V AC / 110 V DC	**PLC-RSC-120UC/21**	2966197	10
	⑦	230 V AC / 220 V DC	**PLC-RSC-230UC/21**	2966207	10
PLC-INTERFACE, with **Push-in connection**					
	①	12 V DC	**PLC-RPT- 12DC/21**	2900316	10
	②	24 V DC	**PLC-RPT- 24DC/21**	2900299	10
	③	24 V AC/DC	**PLC-RPT- 24UC/21**	2900300	10
	④	48 V DC	**PLC-RPT- 48DC/21**	2900301	10
	⑤	60 V DC	**PLC-RPT- 60DC/21**	2900303	10
	⑥	120 V AC / 110 V DC	**PLC-RPT-120UC/21**	2900304	10
	⑦	230 V AC / 220 V DC	**PLC-RPT-230UC/21**	2900305	10

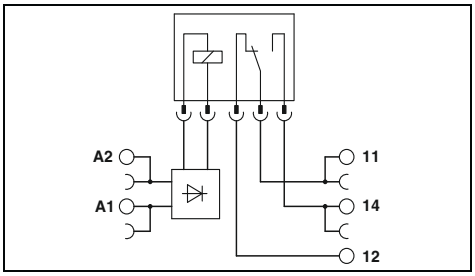
Electrical interrupting rating for PLC...21 with 1 PDT relay

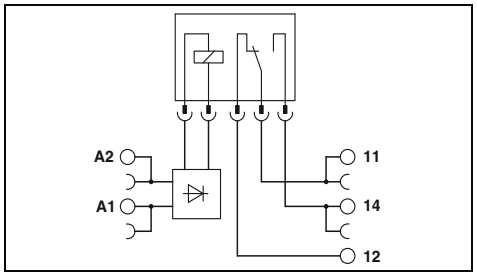


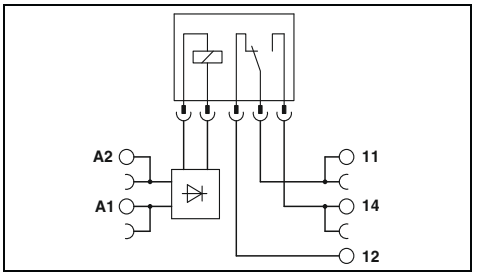
1-changeover-contact relay module, 50 mA, maximum

1-changeover-contact relay module with manual operation, max. 6 A

1-changeover-contact relay module with manual operation, max. 50 mA







Technical data

①	②	③	④	⑤	⑥	⑦
15.3	9	11	9.2	4.8	3.5	3.2
5 / 8	5 / 8	6 / 15	5 / 8	5 / 8	6 / 15	7 / 15

Yellow LED, reverse polarity protection, free-wheeling 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])
2x 10^7 cycles
IEC 60664, EN 50178
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
6.2 mm / 80 mm / 94 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21AU	2966919	10
PLC-RSC- 24DC/21AU	2966265	10
PLC-RSC- 24UC/21AU	2966278	10
PLC-RSC- 48DC/21AU	2966126	10
PLC-RSC- 60DC/21AU	2966142	10
PLC-RSC-120UC/21AU	2966281	10
PLC-RSC-230UC/21AU	2966294	10
PLC-RPT- 12DC/21AU	2900317	10
PLC-RPT- 24DC/21AU	2900306	10
PLC-RPT- 24UC/21AU	2900307	10
PLC-RPT- 48DC/21AU	2900308	10
PLC-RPT- 60DC/21AU	2900309	10
PLC-RPT-120UC/21AU	2900310	10
PLC-RPT-230UC/21AU	2900311	10

Technical data

①	②	③	⑥	⑦
15.3	9	11	3.5	3.2
5 / 8	5 / 8	6 / 15	6 / 15	7 / 15

Yellow LED
Yellow LED, bridge rectifier

AgSnO
250 V AC/DC
5 V (at 100 mA)
6 A
10 A (4 s)
10 mA (at 12 V)

4 kV AC (50 Hz, 1 min.)
-40°C ... 60°C
1x 10^7 cycles
IEC 60664, EN 50178
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
6.2 mm / 80 mm / 94 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21/MS	2909648	10
PLC-RSC- 24DC/21/MS	2909649	10
PLC-RSC- 24UC/21/MS	2909650	10
PLC-RSC-120UC/21/MS	2909651	10
PLC-RSC-230UC/21/MS	2909653	10
PLC-RPT- 12DC/21/MS	2909666	10
PLC-RPT- 24DC/21/MS	2909667	10
PLC-RPT- 24UC/21/MS	2909668	10
PLC-RPT-120UC/21/MS	2909669	10
PLC-RPT-230UC/21/MS	2909670	10

Technical data

①	②	③	⑥	⑦
15.3	9	11	3.5	3.2
5 / 8	5 / 8	6 / 15	6 / 15	7 / 15

Yellow LED, reverse polarity protection, free-wheeling 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
2x 10^7 cycles
IEC 60664, EN 50178
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
6.2 mm / 80 mm / 94 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21AU/MS	2909654	10
PLC-RSC- 24DC/21AU/MS	2909655	10
PLC-RSC- 24UC/21AU/MS	2909656	10
PLC-RSC-120UC/21AU/MS	2909657	10
PLC-RSC-230UC/21AU/MS	2909660	10
PLC-RPT- 12DC/21AU/MS	2909671	10
PLC-RPT- 24DC/21AU/MS	2909672	10
PLC-RPT- 24UC/21AU/MS	2909673	10
PLC-RPT-120UC/21AU/MS	2909674	10
PLC-RPT-230UC/21AU/MS	2909676	10

Universal PLC series with changeover contact relay

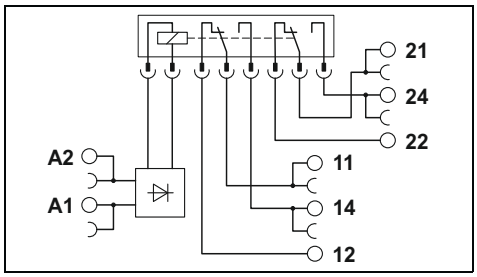
PLC-R... is the relay series that can be used universally and consists of basic terminal blocks and plug-in relays with changeover contacts.

The advantages:

– Slim design
– Screw and Push-in connection technology
– Functional plug-in bridges
– Integrated input and interference suppression circuit
– RT III sealed relay
– Safe isolation in accordance with DIN EN 50178 between coil and contact
– Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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 399
Inflammability class V0 (UL 94)
See the website for more information on connection cross sections with ferrules.
[1]) 230 V types up to 55°C
[2]) If the specified maximum values are exceeded for multi-layer contact relays, the gold layer will be destroyed. During further use, the maximum values of the power contact relays apply. This may then result in a shorter service life than a dedicated power contact.

2-changeover-contact relay module, 2 x 6 A, maximum



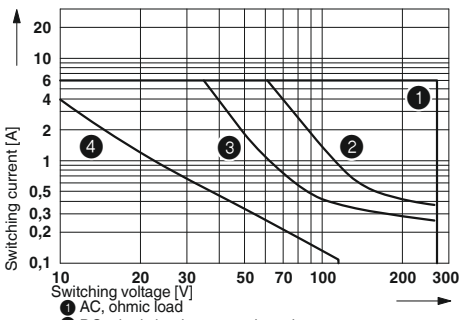
Technical data

		①	②	③	④	⑤	⑥	⑦
Input data								
Typical input current at U_N	[mA]	33	18	17.5	20	10	4.5	4.5
Response/release time at U_N	[ms]	8 / 10	8 / 10	8 / 10	8 / 10	8 / 10	7 / 10	7 / 10
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode						
Input circuit AC/DC		Yellow LED, bridge rectifier						
Output data								
Contact material		AgNi						
Max. switching voltage		250 V AC/DC						
Minimum switching voltage		5 V AC/DC (at 10 mA)						
Limiting continuous current		6 A						
Maximum switch-on current		15 A (300 ms)						
Minimum switching current		10 mA (at 5 V)						
General data								
Test voltage input/output		4 kV AC (50 Hz, 1 min.)						
Ambient temperature (operation)		-40°C ... 60°C[1])						
Mechanical service life		3x 10^7 cycles						
Standards/regulations		IEC 60664, EN 50178						
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						
EMC note		Class A product, see page 583						

Ordering data

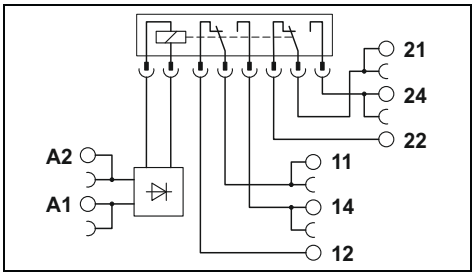
Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**					
	①	12 V DC	**PLC-RSC- 12DC/21-21**	2967235	10
	②	24 V DC	**PLC-RSC- 24DC/21-21**	2967060	10
	③	24 V AC/DC	**PLC-RSC- 24UC/21-21**	2967073	10
	④	48 V DC	**PLC-RSC- 48DC/21-21**	2967248	10
	⑤	60 V DC	**PLC-RSC- 60DC/21-21**	2967293	10
	⑥	120 V AC / 110 V DC	**PLC-RSC-120UC/21-21**	2967086	10
	⑦	230 V AC / 220 V DC	**PLC-RSC-230UC/21-21**	2967099	10
PLC-INTERFACE, with **Push-in connection**					
	①	12 V DC	**PLC-RPT- 12DC/21-21**	2900329	10
	②	24 V DC	**PLC-RPT- 24DC/21-21**	2900330	10
	③	24 V AC/DC	**PLC-RPT- 24UC/21-21**	2900332	10
	④	48 V DC	**PLC-RPT- 48DC/21-21**	2900333	10
	⑤	60 V DC	**PLC-RPT- 60DC/21-21**	2900334	10
	⑥	120 V AC / 110 V DC	**PLC-RPT-120UC/21-21**	2900335	10
	⑦	230 V AC / 220 V DC	**PLC-RPT-230UC/21-21**	2900336	10

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

2-changeover-contact relay module, 2 x 50 mA, maximum



Technical data

①	②	③	④	⑤	⑥	⑦
33	18	17.5	20	10	4.5	4.5
8 / 10	8 / 10	8 / 10	8 / 10	8 / 10	7 / 10	7 / 10

Yellow LED, reverse polarity protection, free-wheeling diode
Yellow LED, bridge rectifier

AgNi, hard gold-plated
30 V AC / 36 V DC
100 mV (at 10 mA)
50 mA[2])
50 mA[2])
1 mA (at 24 V)

4 kV AC (50 Hz, 1 min.)
-40°C ... 60°C[1])
3x 10^7 cycles
IEC 60664, EN 50178
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
14 mm / 80 mm / 94 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC- 12DC/21-21AU	**2967277**	10
PLC-RSC- 24DC/21-21AU	**2967125**	10
PLC-RSC- 24UC/21-21AU	**2967112**	10
PLC-RSC- 48DC/21-21AU	**2967280**	10
PLC-RSC- 60DC/21-21AU	**2967303**	10
PLC-RSC-120UC/21-21AU	**2967138**	10
PLC-RSC-230UC/21-21AU	**2967141**	10
PLC-RPT- 12DC/21-21AU	**2900337**	10
PLC-RPT- 24DC/21-21AU	**2900338**	10
PLC-RPT- 24UC/21-21AU	**2900339**	10
PLC-RPT- 48DC/21-21AU	**2900340**	10
PLC-RPT- 60DC/21-21AU	**2900341**	10
PLC-RPT-120UC/21-21AU	**2900342**	10
PLC-RPT-230UC/21-21AU	**2900343**	10

Universal PLC series with changeover contact relays with lockable manual operation

PLC-R... is the relay series that can be used universally and consists of a basic terminal block and plug-in relay with changeover contacts and lockable manual operation.

The advantages:

– Slim design
– Screw and Push-in connection technology
– Functional plug-in bridges
– Integrated input and interference suppression circuit
– Safe isolation in accordance with DIN EN 50178 between coil and contact
– Efficient connection to system cabling using V8 adapter

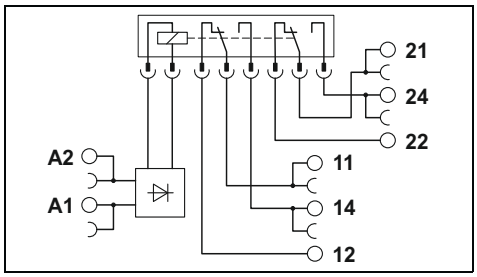
Notes:

See the website for more information on connection cross sections with ferrules.

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.

new

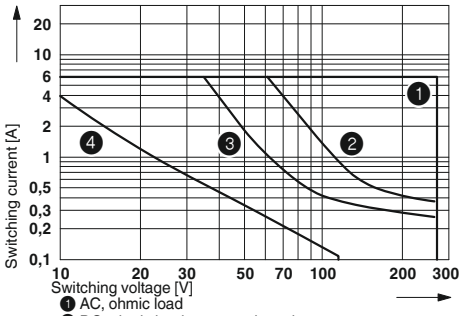
Relay module with 2 changeover contacts with lockable manual operation, max. 2 x 6 A



Technical data

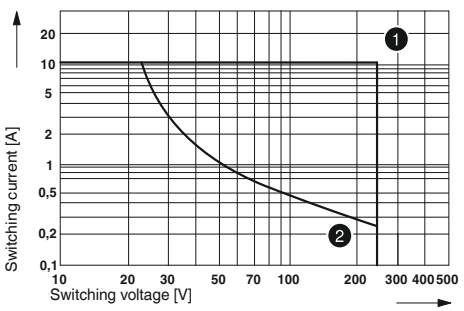
		①	②	③	④	⑤
Input data						
Typical input current at U_N	[mA]	18	18	19	5	5
Typical response time at U_N	[ms]	10	3 - 15	6	6	6
Typical release time at U_N	[ms]	10	3 - 15	10	10	10
Input circuit DC		Yellow LED, free-wheeling diode				
Input circuit AC/DC		Yellow LED, bridge rectifier				
Output data						
Contact material		AgNi				
Max. switching voltage		250 V AC/DC				
Minimum switching voltage		12 V (10 mA)				
Limiting continuous current		6 A				
Maximum switch-on current		12 A (20 ms)				
Minimum switching current		10 mA (12 V)				
General data						
Test voltage input/output		4 kV AC (50 Hz, 1 min.)				
Ambient temperature (operation)		-20°C ... 60°C				
Mechanical service life		5x 10^6 cycles				
Standards/regulations		EN 50178				
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 / 104 mm				
EMC note		Class A product, see page 583				

Electrical interrupting rating for PLC...21-21/MS with 2 PDT relays



❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

Electrical interrupting rating for PLC...21HC/MS with 1 PDT relay



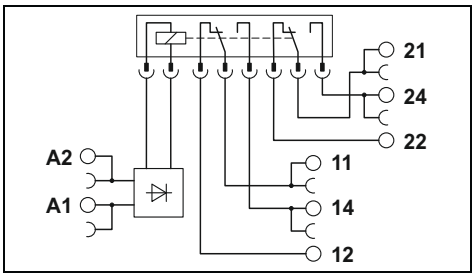
❶ AC, ohmic load
❷ DC, ohmic load

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**					
	①	24 V DC	**PLC-RSC- 24DC/21-21/MS**	2910502	10
	②	24 V AC/DC	**PLC-RSC- 24UC/21-21/MS**	2910503	10
	③	48 V DC	**PLC-RSC- 48DC/21-21/MS**	2910504	10
	④	120 V AC / 110 V DC	**PLC-RSC-120UC/21-21/MS**	2910505	10
	⑤	230 V AC / 220 V DC	**PLC-RSC-230UC/21-21/MS**	2910506	10
PLC-INTERFACE, with **Push-in connection**					
	①	24 V DC	**PLC-RPT- 24DC/21-21/MS**	2910519	10
	②	24 V AC/DC	**PLC-RPT- 24UC/21-21/MS**	2910520	10
	③	48 V DC	**PLC-RPT- 48DC/21-21/MS**	2910521	10
	④	120 V AC / 110 V DC	**PLC-RPT-120UC/21-21/MS**	2910522	10
	⑤	230 V AC / 220 V DC	**PLC-RPT-230UC/21-21/MS**	2910523	10

new

Relay module with 2 changeover contacts with lockable manual operation, max. 2 x 50 mA



Technical data

①	②	③	④	⑤
18	18	19	5	5
10	3 - 15	6	6	6
10	3 - 15	10	10	10

Yellow LED, free-wheeling diode
Yellow LED, bridge rectifier

AgNi + Au
30 V AC / 36 V DC
12 V (1 mA)
50 mA
50 mA
1 mA (12 V)

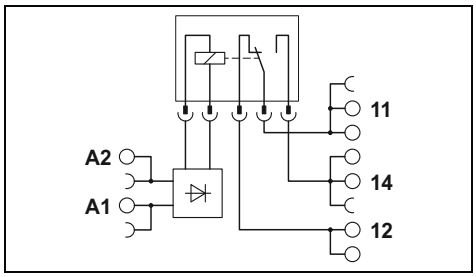
4 kV AC (50 Hz, 1 min.)
-20°C ... 60°C
5x 10^6 cycles
EN 50178
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
14 mm / 80 mm / 104 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/21-21AU/MS	2910507	10
PLC-RSC- 24UC/21-21AU/MS	2910508	10
PLC-RSC- 48DC/21-21AU/MS	2910510	10
PLC-RSC-120UC/21-21AU/MS	2910511	10
PLC-RSC-230UC/21-21AU/MS	2910513	10
PLC-RPT- 24DC/21-21AU/MS	2910524	10
PLC-RPT- 24UC/21-21AU/MS	2910526	10
PLC-RPT- 48DC/21-21AU/MS	2910527	10
PLC-RPT-120UC/21-21AU/MS	2910528	10
PLC-RPT-230UC/21-21AU/MS	2910529	10

new

Relay module with 1 changeover contact with lockable manual operation, max. 10 A



Technical data

①	②	③	④	⑤
18	18	19	5	5
10	3 - 15	6	6	6
10	3 - 15	10	8	8

Yellow LED, reverse polarity protection, free-wheeling diode
Yellow LED, bridge rectifier

AgNi
250 V AC/DC
12 V (10 mA)
10 A
24 A (20 ms)
10 mA (12 V)

4 kV_{rms} (50 Hz, 1 min.)
-20°C ... 60°C
5x 10^6 cycles
EN 50178
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
14 mm / 80 mm / 104 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/21HC/MS	2910514	10
PLC-RSC- 24UC/21HC/MS	2910515	10
PLC-RSC- 48DC/21HC/MS	2910516	10
PLC-RSC-120UC/21HC/MS	2910517	10
PLC-RSC-230UC/21HC/MS	2910518	10
PLC-RPT- 24DC/21HC/MS	2910530	10
PLC-RPT- 24UC/21HC/MS	2910531	10
PLC-RPT- 48DC/21HC/MS	2910532	10
PLC-RPT-120UC/21HC/MS	2910533	10
PLC-RPT-230UC/21HC/MS	2910534	10

PLC-INTERFACE
with force-guided contacts

Fully assembled coupling relay module with pluggable relay with force-guided contacts, consisting of:
– Relay base with Push-in or screw connection
– 2-changeover-contact relay with force-guided contacts in accordance with EN 50205

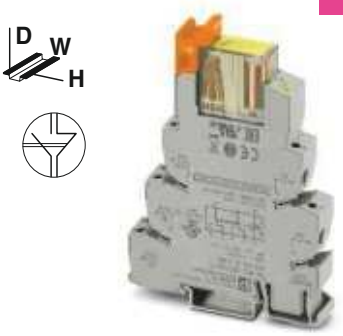
The advantages:
– Switching current of up to 2x 6 A
– Forcibly guided contacts in accordance with EN 50205
– Professional bridging of adjacent modules
– Integrated status LED and freewheeling diode

The requirements for type A in accordance with DIN EN 50205 are satisfied if the circuit is designed as 1 N/O contact / 1 N/C contact.

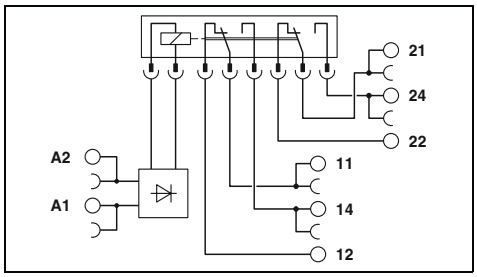
Notes:

See the website for more information on connection cross sections with ferrules.

new



2 changeover-contact relay module with force-guided contacts



Technical data

Input data		①	②
Typical input current at U_N	[mA]	30	30
Typical response time at U_N	[ms]	10	3 - 15
Typical release time at U_N	[ms]	10	3 - 15
Input circuit DC		Yellow LED	
Input circuit AC/DC		Yellow LED	
Output data			
Contact material		AgNi	
Max. switching voltage		250 V AC/DC	
Minimum switching voltage		5 V (10 mA)	
Limiting continuous current		6 A	
Maximum switch-on current		6 A	
Minimum switching current		10 mA (5 V)	
General data			
Test voltage input/output		4 kV_{rms} (50 Hz, 1 min.)	
Ambient temperature (operation)		-20°C ... 60°C	
Mechanical service life		Approx. 10^7 cycles	
Standards/regulations		EN 50178	
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 / 104 mm	
EMC note		Class A product, see page 583	
Conformance/approvals			
Conformance		-	
UL, USA		UL 508	
UL, USA/Canada		cUL 508	
UL, Canada		-	

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	24 V DC	**PLC-RSC- 24DC/2X21/FG**	2910535	10
②	24 V AC/DC	**PLC-RSC- 24UC/2X21/FG**	2910536	10
PLC-INTERFACE, with **Push-in connection**				
①	24 V DC	**PLC-RPT- 24DC/2X21/FG**	2910537	10
②	24 V AC/DC	**PLC-RPT- 24UC/2X21/FG**	2910539	10

PLC-INTERFACE – Highly-compact relay modules

Universal PLC series with solid-state relays

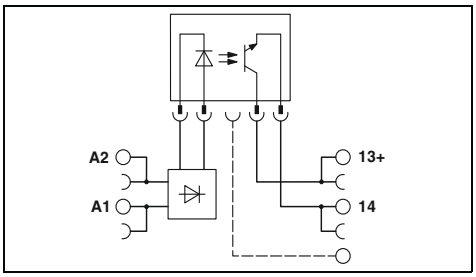
PLC-O... is the solid-state relay series that can be used universally comprising basic terminal blocks and plug-in solid-state relays.

The advantages:

– Slim design
– Screw and Push-in connection technology
– Functional plug-in bridges
– Integrated input circuit
– RT-III sealed solid-state relays
– High switching capacity
– Zero voltage switch at AC output
– Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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 401
See the website for more information on connection cross sections with ferrules.

Solid-state relay module, DC output max. 100 mA



Technical data

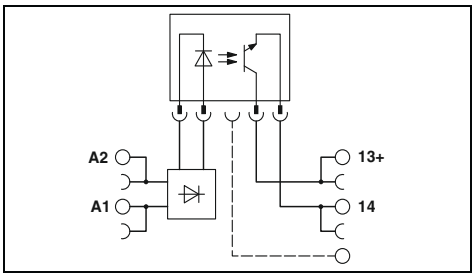
Input data		①	②	③	④	⑤	⑥
Permissible range (with reference to U_N)		0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.9 - 1.1	0.9 - 1.1
Switching level (with reference to U_N)	1 signal (“H”)	≥0.8	≥0.8	≥0.8	≥0.8	≥0.9	≥0.8
	0 signal (“L”)	≤0.4	≤0.3	≤0.4	≤0.4	≤0.3	≤0.3
Typical input current at U_N	[mA]	8.5	9	5	3	3.5	3.5
Typical switch-on time at U_N	[ms]	0.02	0.03	0.04	1	3	3
Typical 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, reverse polarity protection, free-wheeling diode					
Input circuit AC/DC		Yellow LED, bridge rectifier					
Output data							
Max. switching voltage		48 V DC					
Minimum switching voltage		3 V DC					
Maximum switch-on current		-					
Minimum/maximum switching current		- / 100 mA					
Output protection		Reverse polarity protection, surge protection					
Voltage drop at maximum limiting continuous current		≤1 V					
Leakage current in off state		-					
Max. load value		-					
General data							
Test voltage input/output		2.5 kV (50 Hz, 1 min.)					
Ambient temperature (operation)		-25°C ... 60°C					
Standards/regulations		IEC 60664, EN 50178					
Degree of pollution/surge voltage category		2 / III					
Connection data solid/stranded/AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14					
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm					
EMC note		Class A product, see page 583					

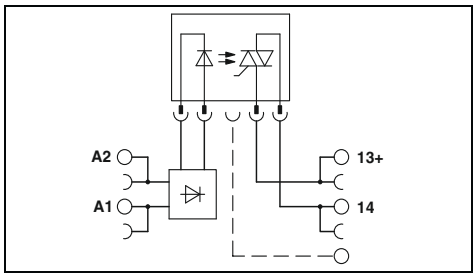
Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	24 V DC	**PLC-OSC- 24DC/ 48DC/100**	2966728	10
②	48 V DC	**PLC-OSC- 48DC/ 48DC/100**	2966993	10
③	60 V DC	**PLC-OSC- 60DC/ 48DC/100**	2967455	10
④	125 V DC	**PLC-OSC-125DC/ 48DC/100**	2980047	10
⑤	120 V AC / 110 V DC	**PLC-OSC-120UC/ 48DC/100**	2966744	10
⑥	230 V AC / 220 V DC	**PLC-OSC-230UC/ 48DC/100**	2966757	10
PLC-INTERFACE, with **Push-in connection**				
①	24 V DC	**PLC-OPT- 24DC/ 48DC/100**	2900352	10
②	48 V DC	**PLC-OPT- 48DC/ 48DC/100**	2900353	10
③	60 V DC	**PLC-OPT- 60DC/ 48DC/100**	2900354	10
⑤	120 V AC / 110 V DC	**PLC-OPT-120UC/ 48DC/100**	2900355	10
⑥	230 V AC / 220 V DC	**PLC-OPT-230UC/ 48DC/100**	2900356	10

Solid-state relay module, DC output max. 3 A

Solid-state relay module, AC output max. 750 mA





Technical data

①	②	③	④	⑤	⑥
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.1	0.9 - 1.1	0.9 - 1.1
≥0.8	≥0.8	≥0.8	≥0.8	≥0.8	≥0.8
≤0.4	≤0.4	≤0.3	≤0.3	≤0.3	≤0.3
8.5	9	5	3	3.5	3.5
0.02	0.03	0.04	0.04	3.5	4
0.3	0.3	0.5	0.6	7	7
300	300	100	100	10	10

Yellow LED, reverse polarity protection, free-wheeling diode
Yellow LED, bridge rectifier

33 V DC
3 V DC
15 A (10 ms)
- / 3 A (see derating curve)
Reverse polarity protection, surge protection
≤200 mV

-
-

2.5 kV (50 Hz, 1 min.)
-25°C ... 60°C
IEC 60664, EN 50178
2 / III

0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
6.2 mm / 80 mm / 94 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/ 24DC/ 2	**2966634**	10
PLC-OSC- 48DC/ 24DC/ 2	**2967002**	10
PLC-OSC- 60DC/ 24DC/ 2	**2967468**	10
PLC-OSC-125DC/ 24DC/ 2	**2980050**	10
PLC-OSC-120UC/ 24DC/ 2	**2966650**	10
PLC-OSC-230UC/ 24DC/ 2	**2966663**	10
PLC-OPT- 24DC/ 24DC/2	**2900364**	10
PLC-OPT- 48DC/ 24DC/2	**2900365**	10
PLC-OPT- 60DC/ 24DC/2	**2900366**	10
PLC-OPT-120UC/ 24DC/2	**2900367**	10
PLC-OPT-230UC/ 24DC/2	**2900368**	10

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, reverse polarity protection, free-wheeling 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)
4.5 A²s

2.5 kV (50 Hz, 1 min.)
-25°C ... 60°C
IEC 60664, EN 50178
2 / III

0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
6.2 mm / 80 mm / 94 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/230AC/ 1	**2967840**	10
PLC-OSC- 48DC/230AC/ 1	**2967853**	10
PLC-OSC- 60DC/230AC/ 1	**2967866**	10
PLC-OSC-125DC/230AC/ 1	**2980063**	10
PLC-OSC-120UC/230AC/ 1	**2967879**	10
PLC-OSC-230UC/230AC/ 1	**2967882**	10
PLC-OPT- 24DC/230AC/1	**2900369**	10
PLC-OPT- 48DC/230AC/1	**2900370**	10
PLC-OPT- 60DC/230AC/1	**2900371**	10
PLC-OPT-120UC/230AC/1	**2900372**	10
PLC-OPT-230UC/230AC/1	**2900374**	10

PLC actuator series for output functions

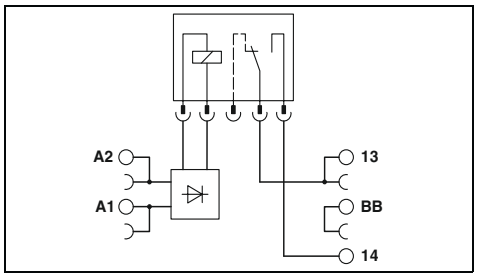
The PLC actuator series couples controllers and actuators such as motors, contactors, and valves.

The advantages:

– Direct connection of actuator to relay module including load return line
– No need for additional modular terminal blocks
– Space savings of up to 80%
– Time savings of up to 60%
– Screw and Push-in connection technology
– Relay modules with safe isolation in accordance with DIN EN 50178 between coil and contact
– Functional plug-in bridges
– Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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 399
For derating curves see page 401
See the website for more information on connection cross sections with ferrules.

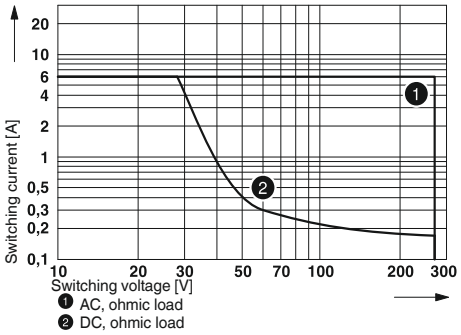
1-N/O-contact relay module with additional floating terminal point



Technical data

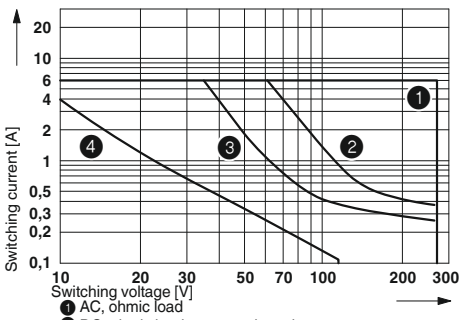
Input data		①
Permissible range (with reference to U_N)		See diagram
Typical input current at U_N	[mA]	9
Typical response time/switch-on time at U_N	[ms]	5
Typical release time/switch-off time at UN	[ms]	8
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode
Output data		
Contact material		AgSnO
Max. switching voltage		250 V AC/DC
Minimum switching voltage		5 V (at 100 mA)
Limiting continuous current		6 A
Maximum switch-on current		10 A (4 s)
Minimum switching current		10 mA (at 12 V)
General data		
Test voltage input/output		4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)		-40°C ... 60°C
Mechanical service life		2x 10^7 cycles
Standards/regulations		IEC 60664, EN 50178
Degree of pollution/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
EMC note		Class A product, see page 583

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 relays



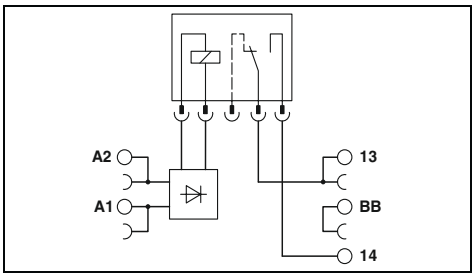
❶ AC, ohmic load
❷ DC, ohmic load, contacts in series
❸ DC, ohmic load
❹ DC, L/R = 40 ms

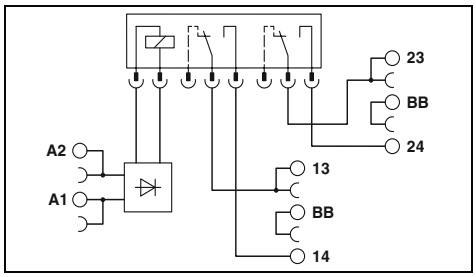
Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	24 V DC	**PLC-RSC- 24DC/ 1/ACT**	2966210	10
PLC-INTERFACE, with **Push-in connection**				
①	24 V DC	**PLC-RPT- 24DC/ 1/ACT**	2900312	10

1-N/O-contact relay module with manual operation and additional floating terminal point

2-N/O-contact relay module with additional floating terminal points





Technical data

①	
See diagram	
9	
5	
8	
Yellow LED, reverse polarity protection, free-wheeling diode	
AgSnO	
250 V AC/DC	
5 V (at 100 mA)	
6 A	
10 A (4 s)	
10 mA (at 12 V)	
4 kV AC (50 Hz, 1 min.)	
-40°C ... 60°C	
1x 10^7 cycles	
IEC 60664, EN 50178	
3 / III	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
6.2 mm / 80 mm / 94 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/ 1/MS/ACT	2909661	10
PLC-RPT- 24DC/ 1/MS/ACT	2909677	10

Technical data

①	
See diagram	
18	
8	
10	
Yellow LED, reverse polarity protection, free-wheeling 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	
3x 10^7 cycles	
IEC 60664, EN 50178	
3 / III	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
14 mm / 80 mm / 94 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/ 1- 1/ACT	2967109	10

PLC actuator series for output functions

The PLC actuator series couples controllers and actuators such as motors, contactors, and valves.

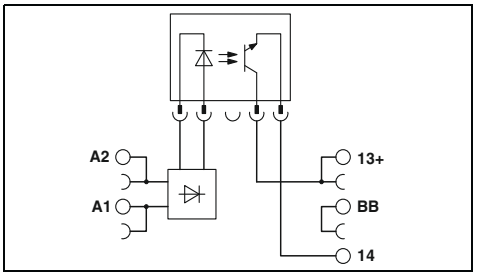
The advantages:

– Direct connection of actuator to relay module including load return line
– No need for additional modular terminal blocks
– Space savings of up to 80%
– Time savings of up to 60%
– Screw and Push-in connection technology
– Relay modules with safe isolation in accordance with DIN EN 50178 between coil and contact
– Functional plug-in bridges
– Efficient connection to system cabling using V8 adapter

Notes:

See the website for more information on connection cross sections with ferrules.

Solid-state relay module with additional floating terminal point, DC output max. 3 A



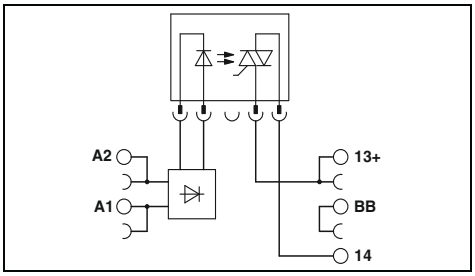
Technical data

Input data		①	②
Permissible range (with reference to U_N)		0.8 - 1.2	0.8 - 1.2
Switching level (with reference to U_N)	1 signal (“H”)	≥0.8	≥0.8
	0 signal (“L”)	≤0.25	≤0.4
Typical input current at U_N	[mA]	9.5	8.5
Typical response time/switch-on time at U_N	[ms]	0.02	0.02
Typical release time/switch-off time at UN	[ms]	0.3	0.3
Transmission frequency f_{limit}	[Hz]	300	300
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode	
Output data			
Max. switching voltage		33 V DC	
Minimum switching voltage		3 V DC	
Limiting continuous current		3 A (see derating curve)	
Maximum switch-on current		15 A (10 ms)	
Minimum switching current		-	
Output protection		Reverse polarity protection, surge protection	
Voltage drop at maximum limiting continuous current		≤200 mV	
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	
Degree of pollution/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	
EMC note		Class A product, see page 583	

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	5 V DC	**PLC-OSC- 5DC/ 24DC/ 2/ACT**	2980144	10
②	24 V DC	**PLC-OSC- 24DC/ 24DC/ 2/ACT**	2966676	10
PLC-INTERFACE, with **Push-in connection**				
①	5 V DC	**PLC-OPT- 5DC/ 24DC/2/ACT**	2900375	10
②	24 V DC	**PLC-OPT- 24DC/ 24DC/2/ACT**	2900376	10

Solid-state relay module with additional floating terminal point, AC output max. 750 mA



Technical data

	②
	0.8 - 1.2
	≥0.8
	≤0.25
	9
	3
	9
	10
	Yellow LED, reverse polarity protection, free-wheeling diode
	253 V AC
	24 V AC
	0.75 A (see derating curve)
	30 A (10 ms)
	10 mA
	RCV circuit
	<1 V
	<1 mA (in off state)
	0.5
	4.5 A^2s
	2.5 kV (50 Hz, 1 min.)
	-25°C ... 60°C
	IEC 60664, EN 50178
	2 / III
	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
	6.2 mm / 80 mm / 94 mm
	Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/230AC/ 1/ACT	**2967947**	10

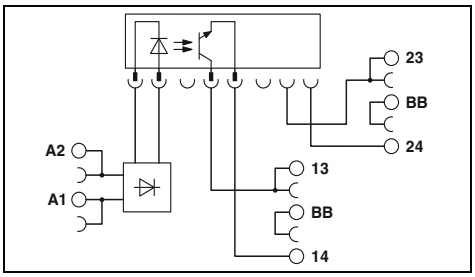
PLC actuator series for output functions

PLC actuator series with solid-state power relays for coupling the controller and actuators, such as motors, contactors, valves, etc.

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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 401
See the website for more information on connection cross sections with ferrules.

D W H

Solid-state relay module with additional floating terminal point, DC output max. 5 A



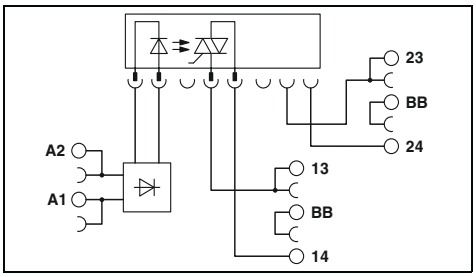
Technical data

Input data		①
Permissible range (with reference to U_N)		0.8 - 1.2
Switching level (with reference to U_N)	1 signal (“H”)	≥0.8
	0 signal (“L”)	≤0.4
Typical input current at U_N	[mA]	9
Typical switch-on time at U_N	[ms]	0.02
Typical switch-off time at U_N	[ms]	0.4
Transmission frequency f_{limit}	[Hz]	300
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode
Output data		
Maximum/minimum switching voltage		33 V DC / 3 V DC
Maximum switch-on current		15 A (10 ms)
Minimum/maximum switching current		- / 5 A (see derating curve)
Output protection		Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current		≤200 mV
Leakage current in off state		-
Phase angle (cos ϕ)		-
Max. load value		-
General data		
Rated insulation voltage		-
Rated surge voltage		Basic insulation
Ambient temperature (operation)		-20°C ... 60°C
Standards/regulations		IEC 60664, EN 50178
Degree of pollution/surge voltage category		2 / III
Mounting position/mounting		See 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
EMC note		Class A product, see page 583

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

Solid-state relay module with additional floating terminal point, AC output max. 2 A



Technical data

Input data		①
Permissible range (with reference to U_N)		0.8 - 1.2
Switching level (with reference to U_N)	1 signal (“H”)	≥0.8
	0 signal (“L”)	≤0.4
Typical input current at U_N	[mA]	9
Typical switch-on time at U_N	[ms]	10
Typical switch-off time at U_N	[ms]	10
Transmission frequency f_{limit}	[Hz]	10
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode
Output data		
Maximum/minimum switching voltage		253 V AC / 24 V AC
Maximum switch-on current		30 A (10 ms)
Minimum/maximum switching current		25 mA / 2 A (see derating curve)
Output protection		Surge protection
Voltage drop at maximum limiting continuous current		≤1 V
Leakage current in off state		Typically 1 mA
Phase angle (cos ϕ)		0.5
Max. load value		4 A²s (tp = 10 ms, at 25°C)
General data		
Rated insulation voltage		-
Rated surge voltage		Basic insulation
Ambient temperature (operation)		-20°C ... 60°C
Standards/regulations		IEC 60664, EN 50178
Degree of pollution/surge voltage category		2 / III
Mounting position/mounting		See 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
EMC note		Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/230AC/ 2/ACT	2982760	10

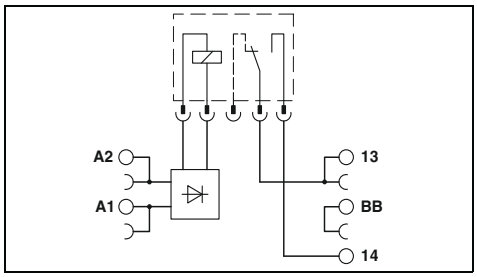
PLC actuator series for output functions

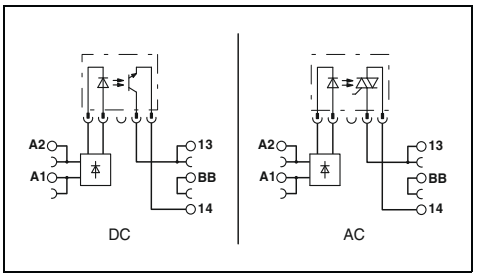
PLC actuator basic terminal blocks that can be fitted with a mechanical or solid-state relay. For coupling the controller and actuators, such as motors, contactors, valves, etc.

Notes:
Maximum interrupting rating diagrams, see page 402
For derating curves see page 401
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See "General" section in "Fundamentals of relay technology" on page 272
See the website for more information on connection cross sections with ferrules.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.

Basic terminal block with additional floating terminal point for assembly with relay

Basic terminal block with additional floating terminal point for assembly with solid-state relay





Technical data

Input data			
Permissible range (with reference to U_N)	0.8 ... 1.2		
Typical input current at U_N (50/60 Hz)	15.6 mA / 8.5 mA		
Typical response time at U_N	5 ms		
Typical release time at U_N	30 ms		
Input circuit	Yellow LED, bridge rectifier		
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	
Minimum switching voltage	100 mV (at 10 mA)	5 V (at 100 mA)	
Limiting continuous current	50 mA	6 A	
Minimum switching current	1 mA (at 24 V)	10 mA (at 12 V)	
Output protection	-	-	
Voltage drop at limiting continuous current	-	-	
Leakage current in off state	-	-	
Max. load value $I^2 \times t$ (t = 10 ms)	-	-	
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 clearances and creepage distances	EN 50178		
Degree of pollution/overvoltage 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		
Typical input current at U_N (50/60 Hz)	15 mA / 8.3 mA		
Typical response time at U_N	10 ms		
Typical release time at U_N	20 ms		
Input circuit	Yellow LED, bridge rectifier		
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
Minimum switching voltage	3 V DC	3 V DC	24 V AC
Limiting continuous current	100 mA	3 A (see derating curve)	0.75 A (see derating curve)
Minimum switching current			-
Output protection	Reverse polarity protection, surge protection		RCV circuit
Voltage drop at limiting continuous current	≤1 V	≤150 mV	≤1 V
Leakage current in off state	-	-	≤1 mA
Max. load value $I^2 \times t$ (t = 10 ms)	-	-	4.5 A^2s (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 clearances and creepage distances	EN 50178		
Degree of pollution/overvoltage 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 **Push-in connection**	24 V AC/DC	**PLC-BPT- 24UC/ 1/ACT**	2900450	10

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-BSC- 24UC/ 1/ACT	2982799	10
PLC-BPT- 24UC/ 1/ACT	2900450	10

Accessories

Plug-in miniature power relays, with multi-layer gold contacts			
	REL-MR- 24DC/21AU	2961121	10
	REL-MR- 24DC/21	2961105	10
Pluggable 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

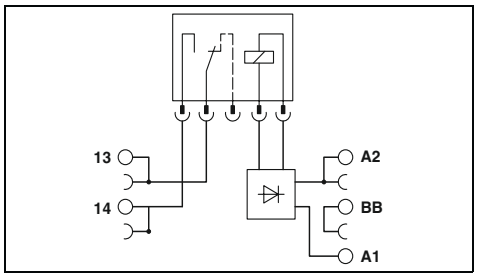
PLC sensor series for coupling controller and sensors, such as proximity switches, limit switches or auxiliary contacts

The advantages:

– Direct connection of sensor to relay module including sensor supply
– No need for additional modular terminal blocks
– Space savings of up to 80%
– Time savings of up to 60%
– Screw and Push-in connection technology
– Relay modules with safe isolation in accordance with DIN EN 50178 between coil and contact
– Functional plug-in bridges
– Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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 399
See the website for more information on connection cross sections with ferrules.
1) 120 and 230 V types up to 55°C
2) If the specified maximum values are exceeded for multi-layer contact relays, the gold layer will be destroyed. During further use, the maximum values of the power contact relays apply. This may then result in a shorter service life than a dedicated power contact.

1-N/O-contact relay module with additional floating terminal point



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")			
Typical input current at U_N	[mA]	9	3.5	3.2
Typical response time/switch-on time at U_N	[ms]	5	6	7
Typical release time/switch-off time at UN	[ms]	8	15	15
Transmission frequency f_{limit}	[Hz]			
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode		
Input circuit AC/DC		Yellow LED, bridge rectifier		
Output data				
Contact material		AgSnO, hard gold-plated		
Max. switching voltage		30 V AC / 36 V DC		
Minimum switching voltage		100 mV (at 10 mA)		
Limiting continuous current		50 mA		
Maximum switch-on current		50 mA		
Minimum switching current		1 mA (at 24 V)		
Output protection		-		
Voltage drop at maximum limiting continuous current		-		
General data				
Test voltage input/output		4 kV AC (50 Hz, 1 min.)		
Ambient temperature (operation)		-40°C ... 60°C[1])		
Mechanical service life		2x 10^7 cycles		
Standards/regulations		IEC 60664, EN 50178		
Degree of pollution/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		
EMC note		Class A product, see page 583		

Ordering data

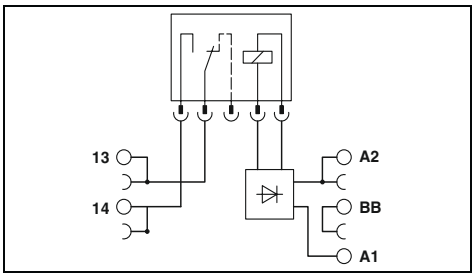
Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	24 V DC	**PLC-RSC- 24DC/ 1AU/SEN**	2966317	10
②	120 V AC / 110 V DC	**PLC-RSC-120UC/ 1AU/SEN**	2966320	10
③	230 V AC / 220 V DC	**PLC-RSC-230UC/ 1AU/SEN**	2966333	10
PLC-INTERFACE, with **Push-in connection**				
①	24 V DC	**PLC-RPT- 24DC/ 1AU/SEN**	2900313	10
②	120 V AC / 110 V DC	**PLC-RPT-120UC/ 1AU/SEN**	2900314	10
③	230 V AC / 220 V DC	**PLC-RPT-230UC/ 1AU/SEN**	2900315	10

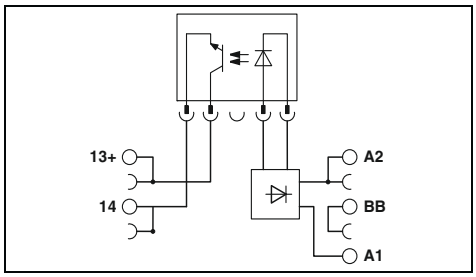
D W H

1-N/O-contact relay module with manual operation and additional floating terminal point

D W H

Solid-state relay module with additional floating terminal point, DC output max. 100 mA





Technical data

①	②	③
See diagram		
9	3.5	3.2
5	6	7
8	15	15
Yellow LED, reverse polarity protection, free-wheeling diode		
Yellow LED, bridge rectifier		
AgSnO, hard gold-plated		
30 V AC / 36 V DC		
100 mV (at 10 mA)		
50 mA[2])		
50 mA[2])		
1 mA (at 24 V)		
-		
-		
4 kV AC (50 Hz, 1 min.)		
-40°C ... 60°C[1])		
1x 10^7 cycles		
IEC 60664, EN 50178		
3 / III		
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14		
6.2 mm / 80 mm / 94 mm		
Class A product, see page 583		

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC- 24DC/ 1AU/MS/SEN	2909663	10
PLC-RSC-120UC/ 1AU/MS/SEN	2909664	10
PLC-RSC-230UC/ 1AU/MS/SEN	2909665	10
PLC-RPT- 24DC/ 1AU/MS/SEN	2909678	10
PLC-RPT-120UC/ 1AU/MS/SEN	2909679	10
PLC-RPT-230UC/ 1AU/MS/SEN	2909680	10

Technical data

①	②	③
0.8 - 1.2	0.8 - 1.1	0.8 - 1.1
≥0.8	≥0.8	≥0.8
≤0.4	≤0.3	≤0.3
8.5	3.5	3.5
0.02	6	3
0.3	10	5
300	10	10
Yellow LED, reverse polarity protection, free-wheeling diode		
Yellow LED, bridge rectifier		
-		
48 V DC		
3 V DC		
100 mA		
-		
-		
Reverse polarity protection, surge protection		
≤1 V		
2.5 kV (50 Hz, 1 min.)		
-25°C ... 60°C		
-		
IEC 60664, EN 50178		
2 / III		
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14		
6.2 mm / 80 mm / 94 mm		
Class A product, see page 583		

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/ 48DC/100/SEN	2966773	10
PLC-OSC-120UC/ 48DC/100/SEN	2966799	10
PLC-OSC-230UC/ 48DC/100/SEN	2966809	10
PLC-OPT- 24DC/ 48DC/100/SEN	2900358	10
PLC-OPT-120UC/ 48DC/100/SEN	2900359	10
PLC-OPT-230UC/ 48DC/100/SEN	2900361	10

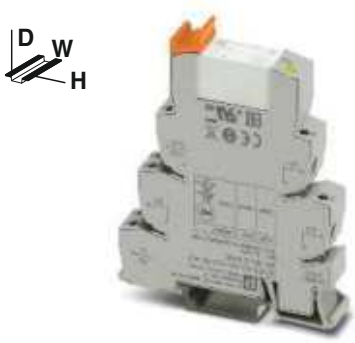
PLC-INTERFACE for high inrush currents, e.g., LEDs

PLC relay modules for high switch-on currents due, for example, to capacitive loads.

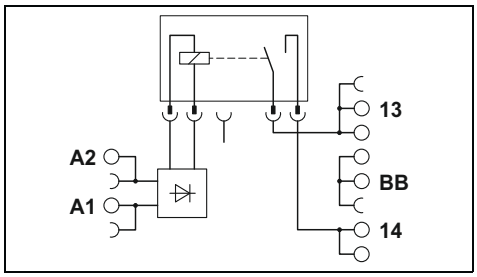
The advantages:

– Maximum inrush current 130 A peak
– Direct connection of load return line thanks to actuator type
– Screw and Push-in connection technology
– Safe isolation in accordance with DIN EN 50178 between coil and contact
– Functional plug-in bridges
– Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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 399
See the website for more information on connection cross sections with ferrules.



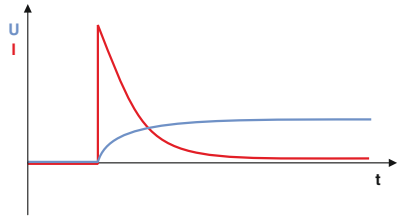
1-N/O-contact relay module with additional floating terminal point, max. 130 A peak



Technical data

Input data		①	②
Typical input current at U_N	[mA]	33	18
Response/release time at U_N	[ms]	8 / 10	8 / 10
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode	
Output data			
Contact material		AgSnO	
Max. switching voltage		250 V AC/DC	
Minimum switching voltage		12 V (at 100 mA)	
Maximum switch-on 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		3x 10^7 cycles	
Standards/regulations		EN 50178, EN 61810-1	
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	

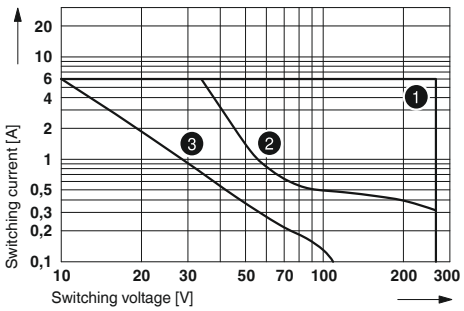
Basic behavior of capacitive loads:
- Very high input current
- Voltage increases with an e-function



Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	12 V DC	**PLC-RSC- 12DC/ 1IC/ACT**	1078800	10
②	24 V DC	**PLC-RSC- 24DC/ 1IC/ACT**	2967604	10
PLC-INTERFACE, with **Push-in connection**				
①	12 V DC	**PLC-RPT- 12DC/ 1IC/ACT**	1078801	10
②	24 V DC	**PLC-RPT- 24DC/ 1IC/ACT**	2900298	10

Maximum interrupting rating



1 AC, ohmic load
2 DC, ohmic load
3 DC, L/R = 40 ms

PLC-INTERFACE
with tungsten lead contact relay

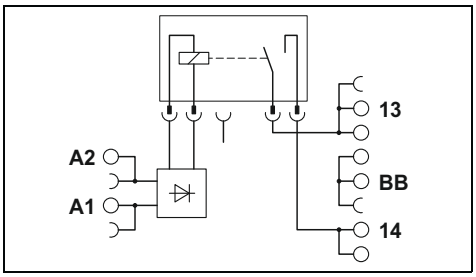
PLC-INTERFACE with tungsten lead contact relay, e.g., LEDs

The advantages:
- Maximum inrush current up to 800 A peak through tungsten lead contact
- Direct connection of load return line thanks to actuator type
- Screw and Push-in connection technology
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Functional plug-in bridges
- Efficient connection to system cabling using V8 adapter

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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 399
See the website for more information on connection cross sections with ferrules.

new

1-N/O-contact relay module with additional floating terminal point, 800 A peak, maximum



Technical data

Input data		①
Typical input current at U_N	[mA]	18
Response/release time at U_N	[ms]	8 / 10
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode
Input circuit AC/DC		
Output data		
Contact material		AgSnO
Max. switching voltage		250 V AC/DC
Minimum switching voltage		12 V (at 100 mA)
Limiting continuous current		6 A
Maximum switch-on current		165 A (20 ms) / 800 A (peak, at capacitive load, 230 V AC, 24 µF)
Minimum switching current		100 mA (at 12 V DC)
General data		
Test voltage input/output		4 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)		-40°C ... 60°C
Mechanical service life		3x 10^7 cycles
Standards/regulations		EN 50178, EN 61810-1
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

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	24 V DC	**PLC-RSC- 24DC/ 1ICT/ACT**	1078680	10
PLC-INTERFACE, with **Push-in connection**				
①	24 V DC	**PLC-RPT- 24DC/ 1ICT/ACT**	1078683	10

PLC-INTERFACE
for high continuous currents

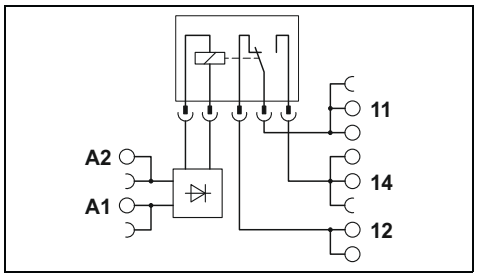
PLC relay modules for high continuous switching currents

The advantages:

– Maximum continuous current 10 A
– Safe isolation in accordance with DIN EN 50178 between coil and contact
– Screw and Push-in connection technology
– Functional plug-in bridges
– Efficient connection to system cabling using V8 adapter
– Long electrical service life, thanks to 16 A relay
– All common input voltages of 12 V DC to 230 V AC

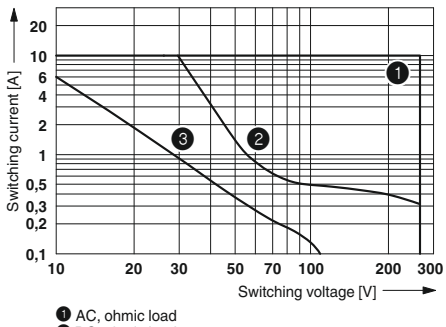
Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 399
See the website for more information on connection cross sections with ferrules.
1) 230 V types up to 55°C

1-changeover-contact relay module, max. 10 A



Technical data

		①	②	③	④	⑤	⑥	⑦
Input data								
Typical input current at U_N	[mA]	33	18	17.5	20	10	4.2	4.5
Response/release time at U_N	[ms]	8 / 10	8 / 10	8 / 10	8 / 10	8 / 10	7 / 10	7 / 10
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode						
Input circuit AC/DC		Yellow LED, bridge rectifier						
Output data								
Contact material		AgNi						
Max. switching voltage		250 V AC/DC						
Minimum switching voltage		12 V AC/DC						
Limiting continuous current		10 A						
Maximum switch-on current		30 A (300 ms)						
Minimum switching current		10 mA (at 12 V)						
General data								
Test voltage input/output		4 kV AC (50 Hz, 1 min.)						
Ambient temperature (operation)		-40°C ... 60°C1)						
Mechanical service life		3x 10^7 cycles						
Standards/regulations		IEC 60664, EN 50178						
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						
EMC note		Class A product, see page 583						



❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Max. interrupting rating

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	12 V DC	**PLC-RSC- 12DC/21HC**	2967617	10
②	24 V DC	**PLC-RSC- 24DC/21HC**	2967620	10
③	24 V AC/DC	**PLC-RSC- 24UC/21HC**	2967633	10
④	48 V DC	**PLC-RSC- 48DC/21HC**	2967646	10
⑤	60 V DC	**PLC-RSC- 60DC/21HC**	2967659	10
⑥	120 V AC / 110 V DC	**PLC-RSC-120UC/21HC**	2967662	10
⑦	230 V AC / 220 V DC	**PLC-RSC-230UC/21HC**	2967675	10
PLC-INTERFACE, with **Push-in connection**				
①	12 V DC	**PLC-RPT- 12DC/21HC**	2900290	10
②	24 V DC	**PLC-RPT- 24DC/21HC**	2900291	10
③	24 V AC/DC	**PLC-RPT- 24UC/21HC**	2900293	10
④	48 V DC	**PLC-RPT- 48DC/21HC**	2900294	10
⑤	60 V DC	**PLC-RPT- 60DC/21HC**	2900295	10
⑥	120 V AC / 110 V DC	**PLC-RPT-120UC/21HC**	2900296	10
⑦	230 V AC / 220 V DC	**PLC-RPT-230UC/21HC**	2900297	10

PLC-INTERFACE with hybrid solid-state relay

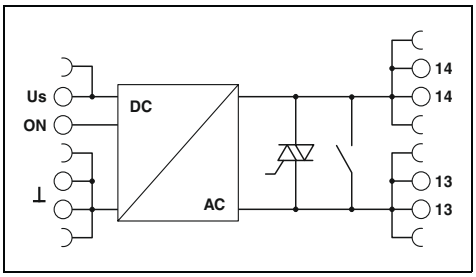
The solid-state relay, combined with a mechanical relay, offers the following advantages:

– Higher electrical service life
– Lower power dissipation
– Option of bridging adjacent modules
– Status display
– Protection circuits in input and output
– Switching capacity up to 230 V AC/10 A
– Screw and Push-in connection technology

Notes:

See the website for more information on connection cross sections with ferrules.

Hybrid solid-state relay, AC output max. 10 A and bypass relay



Technical data

Input data		①
Rated control supply voltage U_S	[V DC]	24
Rated control supply voltage range with reference to U_S		0.8 - 1.2
Rated control supply current I_S		14 mA (input low, output low) 19 mA (input high, output high)
Rated actuation voltage U_C ON	[V DC]	24
Rated actuating voltage range with reference to U_C		0.8 - 1.2
Rated actuating current I_C	[mA]	6.8
Input circuit DC		Yellow LED, reverse polarity protection, surge protection
Output data		
Max. switching voltage		253 V AC
Minimum switching voltage		24 V AC
Minimum/maximum switching current		100 mA / 10 A (see derating curve)
Output protection		RCV circuit
Leakage current in off state		<1 mA
Max. load value		350 A^2s (tp = 10 ms, at 25°C)
General data		
Rated insulation voltage		260 V AC
Rated surge voltage		6 kV
Insulation		safe isolation
Ambient temperature (operation)		-25°C ... 60°C
Standards/regulations		DIN EN 50178
Degree of pollution/surge voltage category		2 / III
Connection data solid/stranded/AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
Dimensions	W / H / D	14 mm / 80 mm / 94 mm
EMC note		Class A product, see page 583

Ordering data

Description	Rated actuating voltage U_C	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	24 V DC	**PLC-HSC-24DC/230AC/10**	2905214	1
PLC-INTERFACE, with **Push-in connection**				
①	24 V DC	**PLC-HPT-24DC/230AC/10**	2905215	1

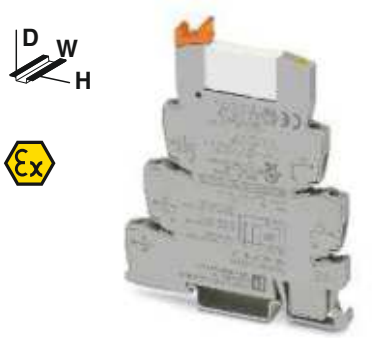
PLC-INTERFACE
for hazardous areas

Relay modules with ATEX, IECEx, and Class 1, Division 2 approval for potentially explosive applications as well as solid-state relays with Class 1, Division 2 approval.

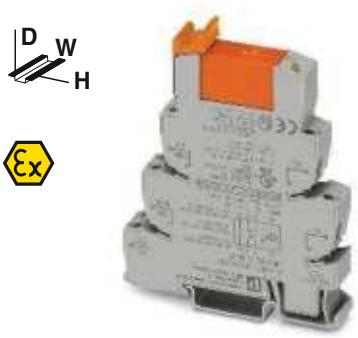
The advantages:

– Slim design
– Functional plug-in bridges
– Integrated input and interference suppression circuit
– RTIII-sealed relays
– Safe isolation in accordance with DIN EN 50178 between coil and contact

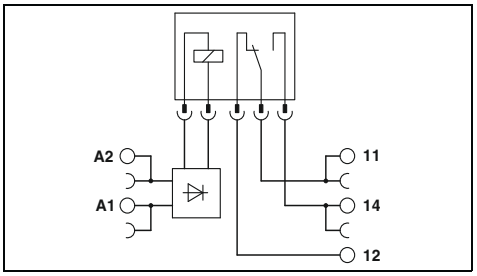
Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
See the website for more information on connection cross sections with ferrules.
[1]) Ambient temperature (operation): -40°C ... 55°C (ATEX / IECEx)

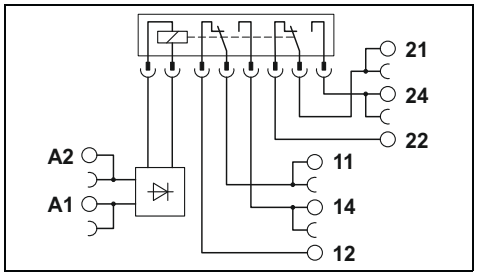


1-changeover-contact relay module, 6 A, maximum



2-changeover-contact relay module, 2 x 6 A, maximum





Technical data

		①	②	③	④
Input data					
Permissible range (with reference to U_N)		See diagram			
Switching level (with reference to U_N)	1 signal ("H") 0 signal ("L")				
Typical input current at U_N	[mA]	15.3	9	3.5	3.2
Typical response time/switch-on time at U_N	[ms]	5	5	6	7
Typical release time/switch-off time at UN	[ms]	8	8	15	15
Transmission frequency f_{limit}	[Hz]				
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode			
Input circuit AC/DC		Yellow LED, bridge rectifier			
Output data					
Contact material		AgSnO			
Max. switching voltage		250 V AC/DC			
Minimum switching voltage		5 V (at 100 mA)			
Limiting continuous current		6 A			
Maximum switch-on current		10 A (4 s)			
Minimum switching current		10 mA (at 12 V)			
Output protection		-			
Voltage drop at maximum limiting continuous current		-			
General data					
Test voltage input/output		4 kV AC (50 Hz, 1 min.)			
Ambient temperature (operation)		-20°C ... 60°C (UL), -40°C ... 60°C (ATEX / IECEx)			
Mechanical service life		2x 10^7 cycles			
Standards/regulations		IEC 60664, EN 50178, EN 60079-0, -7, -15			
Degree of pollution/surge voltage category		3 / III			
Connection data solid/stranded/AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14			
Dimensions	W / H / D	6.2 mm / 80 mm / 94 mm			
EMC note		Class A product, see page 583			
Conformance/approvals					
Conformance		CE-compliant			
ATEX		II 3G Ex ec nC IIC T4 Gc (IBExU16ATEXB015 X)			
IECEx		Ex ec nC IIC T4 Gc (IECEx IBE 16.0029X)			
UL, USA		Class I, Zone 2, AEx nA nC IIC T6			
UL, USA/Canada		Class I, Div. 2, Groups A, B, C, D			
UL, Canada		Class I, Zone 2, Ex nA nC IIC Gc T6 X			

Technical data

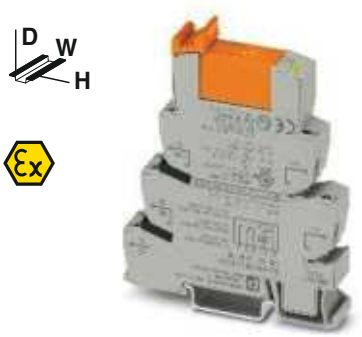
		①	②	③	④
Input data					
Permissible range (with reference to U_N)		See diagram			
Switching level (with reference to U_N)	1 signal ("H") 0 signal ("L")				
Typical input current at U_N	[mA]	33	18	4.5	4.5
Typical response time/switch-on time at U_N	[ms]	8	8	7	7
Typical release time/switch-off time at UN	[ms]	10	10	10	10
Transmission frequency f_{limit}	[Hz]				
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode			
Input circuit AC/DC		Yellow LED, bridge rectifier			
Output data					
Contact material		AgNi			
Max. switching voltage		250 V AC/DC			
Minimum switching voltage		5 V AC/DC (at 10 mA)			
Limiting continuous current		6 A			
Maximum switch-on current		15 A (300 ms)			
Minimum switching current		10 mA (at 5 V)			
Output protection		-			
Voltage drop at maximum limiting continuous current		-			
General data					
Test voltage input/output		4 kV AC (50 Hz, 1 min.)			
Ambient temperature (operation)		-20°C ... 60°C (UL), -40°C ... 60°C (ATEX / IECEx)			
Mechanical service life		3x 10^7 cycles			
Standards/regulations		IEC 60664, EN 50178, EN 60079-0, -7, -15			
Degree of pollution/surge voltage category		2 / III			
Connection data solid/stranded/AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14			
Dimensions	W / H / D	14 mm / 80 mm / 94 mm			
EMC note		Class A product, see page 583			
Conformance/approvals					
Conformance		CE-compliant			
ATEX		II 3G Ex ec nC IIC T4 Gc (IBExU16ATEXB015 X)			
IECEx		Ex ec nC IIC T4 Gc (IECEx IBE 16.0029X)			
UL, USA		Class I, Zone 2, AEx nA nC IIC T6			
UL, USA/Canada		Class I, Div. 2, Groups A, B, C, D			
UL, Canada		Class I, Zone 2, Ex nA nC IIC Gc T6 X			

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	12 V DC	**PLC-RSC-12DC/21/EX**	2909522	10
②	24 V DC	**PLC-RSC-24DC/21/EX**	2909524	10
③	120 V AC / 110 V DC	**PLC-RSC-120UC/21/EX**	2909525	10
④	230 V AC / 220 V DC	**PLC-RSC-230UC/21/EX[1])**	2909526	10
PLC-INTERFACE, with **Push-in connection**				
①	12 V DC	**PLC-RPT-12DC/21/EX**	2909527	10
③	24 V DC	**PLC-RPT-24DC/21/EX**	2909528	10
④	120 V AC / 110 V DC	**PLC-RPT-120UC/21/EX**	2909529	10
⑤	230 V AC / 220 V DC	**PLC-RPT-230UC/21/EX[1])**	2909530	10

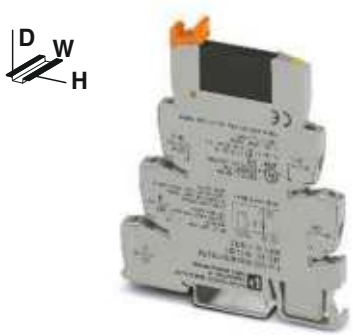
Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	12 V DC	**PLC-RSC-12DC/21-21/EX**	2909517	10
②	24 V DC	**PLC-RSC- 24DC/21-21/EX**	2909509	10
③	120 V AC / 110 V DC	**PLC-RSC-120UC/21-21/EX**	2909511	10
④	230 V AC / 220 V DC	**PLC-RSC-230UC/21-21/EX[1])**	2909512	10
PLC-INTERFACE, with **Push-in connection**				
①	12 V DC	**PLC-RPT-12DC/21-21/EX**	2909513	10
③	24 V DC	**PLC-RPT- 24DC/21-21/EX**	2909514	10
④	120 V AC / 110 V DC	**PLC-RPT-120UC/21-21/EX**	2909515	10
⑤	230 V AC / 220 V DC	**PLC-RPT-230UC/21-21/EX[1])**	2909516	10

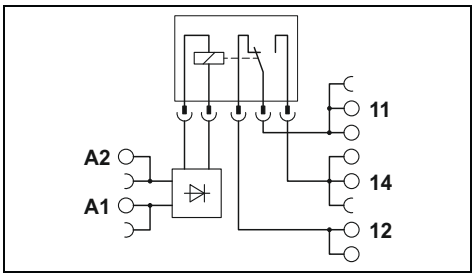


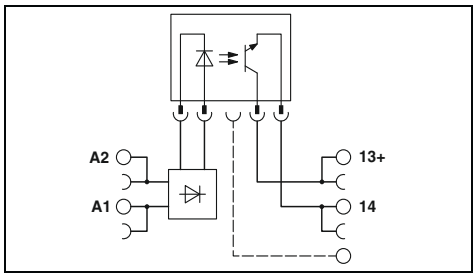
1-changeover-contact relay module, max. 10 A

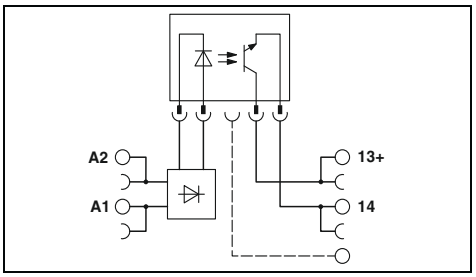
Solid-state relay module, DC output max. 3 A



Solid-state relay module, DC output max. 100 mA







Technical data

①	②	③	④
See diagram			
33	18	4.5	4.5
8	8	7	7
10	10	10	10
Yellow LED, reverse polarity protection, free-wheeling diode			
Yellow LED, bridge rectifier			
AgNi			
250 V AC/DC			
12 V AC/DC			
10 A			
30 A (300 ms)			
10 mA (at 12 V)			
-			
-			
4 kV AC (50 Hz, 1 min.)			
-20°C ... 60°C (UL), -40°C ... 60°C (ATEX / IECEx)			
3x 10^7 cycles			
IEC 60664, EN 50178, EN 60079-0, -7, -15			
2 / III			
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14			
14 mm / 80 mm / 94 mm			
Class A product, see page 583			
CE-compliant			
Ⓔx II 3G Ex ec nC IIC T4 Gc (IBExU16ATEXB015 X)			
Ex ec nC IIC T4 Gc (IECEx IBE 16.0029X)			
Class I, Zone 2, AEx nA nC IIC T6			
Class I, Div. 2, Groups A, B, C, D			
Class I, Zone 2, Ex nA nC IIC Gc T6 X			

Technical data

②	③
0.8 - 1.2	0.9 - 1.1
≥0.8	≥0.8
≤0.4	≤0.3
8.5	3.5
0.02	3.5
0.3	7
300	10
Yellow LED, reverse polarity protection, free-wheeling diode	
Yellow LED, bridge rectifier	
-	
33 V DC	
3 V DC	
3 A	
15 A (10 ms)	
-	
Reverse polarity protection, surge protection	
≤200 mV	
2.5 kV (50 Hz, 1 min.)	
-20°C ... 60°C	
-	
IEC 60664, EN 50178	
2 / III	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
6.2 mm / 80 mm / 94 mm	
Class A product, see page 583	
CE-compliant	
-	
-	
Class I, Zone 2, AEx nA nC IIC T6	
Class I, Div. 2, Groups A, B, C, D	
Class I, Zone 2, Ex nA nC IIC Gc T6 X	

Technical data

②	③
0.8 - 1.2	0.9 - 1.1
≥0.8	≥0.9
≤0.4	≤0.3
8.5	3.5
0.02	3
0.3	4
300	10
Yellow LED, reverse polarity protection, free-wheeling diode	
Yellow LED, bridge rectifier	
-	
48 V DC	
3 V DC	
100 mA	
-	
-	
Reverse polarity protection, surge protection	
≤1 V	
2.5 kV (50 Hz, 1 min.)	
-20°C ... 60°C	
-	
IEC 60664, EN 50178	
2 / III	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
6.2 mm / 80 mm / 94 mm	
Class A product, see page 583	
CE-compliant	
-	
-	
Class I, Zone 2, AEx nA nC IIC T6	
Class I, Div. 2, Groups A, B, C, D	
Class I, Zone 2, Ex nA nC IIC Gc T6 X	

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RSC-12DC/21HC/EX	2909518	10
PLC-RSC-24DC/21HC/EX	2909519	10
PLC-RSC-120UC/21HC/EX	2909520	10
PLC-RSC-230UC/21HC/EX[1])	2909521	10
PLC-RPT-12DC/21HC/EX	2909531	10
PLC-RPT-24DC/21HC/EX	2909532	10
PLC-RPT-120UC/21HC/EX	2909533	10
PLC-RPT-230UC/21HC/EX[1])	2909534	10

Ordering data

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

Ordering data

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

PLC-INTERFACE – Highly-compact relay modules

Basic terminal blocks with interference current filter that can be fitted with relays

PLC basic terminal blocks with integrated filter to protect against interference voltages or currents due, for example, to long control lines.

The advantages:

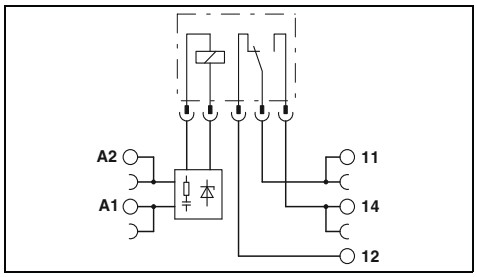
– Resistant to interference currents
– High relay release voltage

Typical applications:

– Applications with long control lines
– Use of AC output boards, resulting in residual AC currents
– Screw and Push-in connection technology

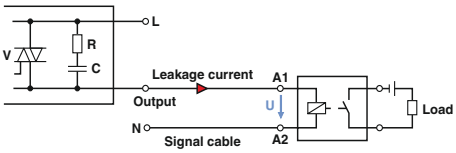
Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
Separating plate PLC-ATP must be installed for voltages larger than 250 V (L1, L2, L3) between identical terminal blocks in adjacent modules. Potential bridging is then carried out with FBST 8-PLC... or FBST 500....
For diagrams of operating voltage ranges, see page 399
Maximum interrupting rating diagrams, see page 402
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272
See the website for more information on connection cross sections with ferrules.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.

Basic terminal block with Input filter

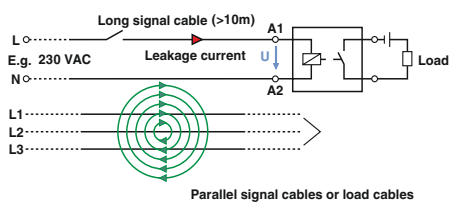


Technical data

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
Typical release voltage (relay assembly)		50 V AC	80 V AC
Typical input current at U_N (50/60 Hz)		7 mA / 8 mA	8.8 mA / 10 mA
Typical response time at U_N		7 ms	7 ms
Typical 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
Minimum switching voltage		5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current		6 A	50 mA
Maximum switch-on current		on request	50 mA
Minimum switching current		10 mA (at 12 V)	1 mA (at 24 V)
General data			
Test voltage input/output		4 kV (50 Hz, 1 min.)	
Ambient temperature (operation)		-20°C ... 55°C	
Mechanical service life		2x 10^7 cycles	
Standards/regulations		IEC 60664, EN 50178	
Degree of pollution/overvoltage 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	
EMC note		Class A product, see page 583	



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 pluggable miniature relays or solid-state relays				
with screw connection	120 V AC	**PLC-BSC-120UC/21/SO46**	2980319	10
with screw connection	230 V AC	**PLC-BSC-230UC/21/SO46**	2980335	10
with Push-in connection	120 V AC	**PLC-BPT-120UC/21/SO46**	2900453	10
with Push-in connection	230 V AC	**PLC-BPT-230UC/21/SO46**	2900455	10

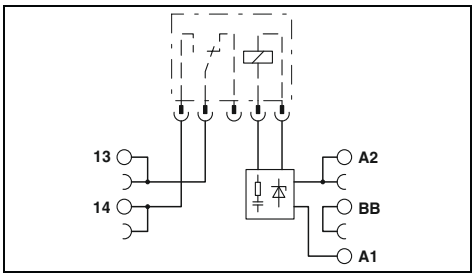
Accessories

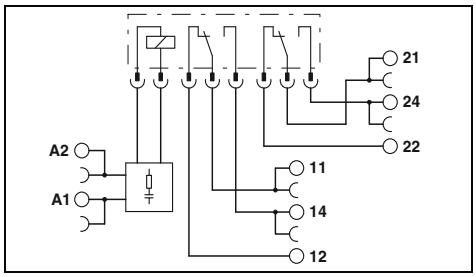
Plug-in miniature power relays, with multi-layer gold contacts		
REL-MR- 60DC/21AU	2961134	10
REL-MR- 60DC/21	2961118	10

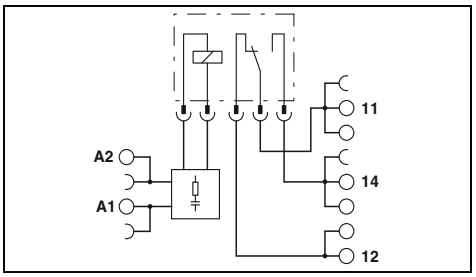
Basic terminal block with additional floating terminal point and input filter

2-changeover-contact basic terminal block with input filter

1-changeover-contact basic terminal block for high continuous currents with input filter







Technical data

120 V AC	230 V AC
0.8 ... 1.4	0.78 ... 1.14
50 V AC	80 V AC
7 mA / 8 mA	8.8 mA / 10 mA
7 ms	7 ms
20 ms	20 ms
Yellow LED, bridge rectifier, filter	
REL-MR-60DC/21	REL-MR-60DC/21AU
Single contact, 1 N/O contact	Single contact, 1 N/O contact
AgSnO	AgSnO, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 100 mA)	100 mV (at 10 mA)
6 A	50 mA
on request	50 mA
10 mA (at 12 V)	1 mA (at 24 V)
4 kV (50 Hz, 1 min.)	
-20°C ... 55°C	
2x 10^7 cycles	
IEC 60664, EN 50178	
3 / III	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
6.2 mm / 80 mm / 94 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-BSC-120UC/ 1/SEN/SO46	**2980322**	10
PLC-BSC-230UC/ 1/SEN/SO46	**2980348**	10
PLC-BPT-120UC/ 1/SEN/SO46	**2900456**	10
PLC-BPT-230UC/ 1/SEN/SO46	**2900457**	10

Accessories

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	
3x 10^7 cycles	
IEC 60664, EN 50178	
3 / III	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
14 mm / 80 mm / 94 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-BSC-120UC/21-21/SO46	**2980416**	10
PLC-BSC-230UC/21-21/SO46	**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	
3x 10^7 cycles	
IEC 60664, EN 50178	
3 / III	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
14 mm / 80 mm / 94 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-BSC-120UC/21HC/SO46	**2980432**	10
PLC-BSC-230UC/21HC/SO46	**2980445**	10

Accessories

REL-MR-110DC/21HC	**2961338**	10

PLC-INTERFACE – Highly-compact relay modules

Basic terminal blocks with interference current filter that can be fitted with solid-state relays

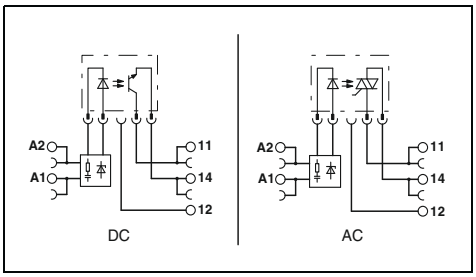
PLC basic terminal blocks with integrated filter to protect against interference voltages or currents due, for example, to long control lines.

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

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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 399
Maximum interrupting rating diagrams, see page 402
When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272
See the website for more information on connection cross sections with ferrules.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating is destroyed. The maximum values of the power contact relay are then valid. This can result in a shorter service life than with a pure power contact.

Basic terminal block with input filter



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
Typical input current at U_N (50/60 Hz)		7 mA / 8 mA	8.8 mA / 10 mA
Typical response time/switch-on time at U_N		6 ms	6 ms
Typical 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
Minimum switching voltage		3 V DC	3 V DC 24 V AC
Limiting continuous current		100 mA	3 A 0.75 A
Maximum switch-on current			15 A (10 ms) 30 A (10 ms)
Output protection		Reverse polarity protection, surge protection	RCV circuit
Voltage drop at limiting continuous current		<1 V	<200 mV <1 V
Leakage current in off state		-	- <1 mA
Maximum phase shift (inductive consumer)		-	- 0.5
Max. load value $I^2 \times t$ (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	
Degree of pollution/overvoltage 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	
EMC note		Class A product, see page 583	

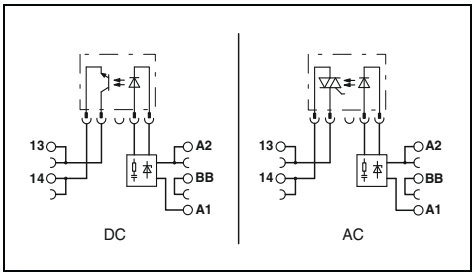
Ordering data

Description	Voltage U_N	Type	Order No.	Pcs./Pkt.
PLC-INTERFACE basic terminal block, for pluggable miniature relays or solid-state relays				
with screw connection	120 V AC	**PLC-BSC-120UC/21/SO46**	2980319	10
with screw connection	230 V AC	**PLC-BSC-230UC/21/SO46**	2980335	10
with Push-in connection	120 V AC	**PLC-BPT-120UC/21/SO46**	2900453	10
with Push-in connection	230 V AC	**PLC-BPT-230UC/21/SO46**	2900455	10

Accessories

Pluggable 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

Basic terminal block
with additional floating terminal point
and input filter



Technical data

120 V AC		230 V AC
0.85 ... 1.1		0.8 ... 1.1
≤0.4		≤0.4
7 mA / 8 mA		8.8 mA / 10 mA
6 ms		6 ms
10 ms		10 ms
Yellow LED, bridge rectifier, filter		
OPT...48DC/...	OPT...24DC/...	OPT...230AC/...
48 V DC	30 V DC	253 V AC
3 V DC	3 V DC	24 V AC
100 mA	3 A	0.75 A
	15 A (10 ms)	30 A (10 ms)
Reverse polarity protection, surge protection		RCV circuit
<1 V	<200 mV	<1 V
-	-	<1 mA
-	-	0.5
-	-	4.5 A^2s

2.5 kV (50 Hz, 1 min.)
-20°C ... 55°C
IEC 60664, EN 50178
2 / III
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
6.2 mm / 80 mm / 94 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-BSC-120UC/ 1/SEN/SO46	2980322	10
PLC-BSC-230UC/ 1/SEN/SO46	2980348	10
PLC-BPT-120UC/ 1/SEN/SO46	2900456	10
PLC-BPT-230UC/ 1/SEN/SO46	2900457	10

Accessories

OPT-60DC/ 48DC/100	2966621	10
OPT-60DC/ 24DC/ 2	2966605	10
OPT-60DC/230AC/ 1	2967963	10

PLC-INTERFACE – Highly-compact relay modules

Relay modules with filter and predefined switch-on and switch-off thresholds to protect against high interference signals

PLC relay module with integrated wiring to protect against interference voltages or currents due, for example, to long control lines.

The advantages:

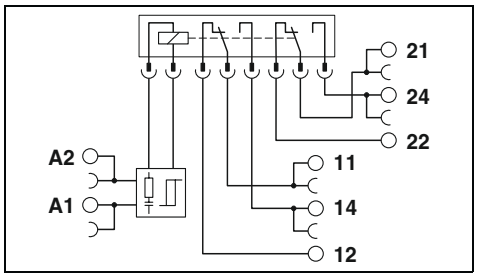
– Resistant to high interference signals, thanks to hysteresis
– High relay release voltage up to 180 V AC

Typical applications:

– Applications with long control lines
– Use of AC output boards, resulting in residual AC currents
– Screw and Push-in connection technology

new

2-changeover contact with predefined switch-on and switch-off threshold



Technical data

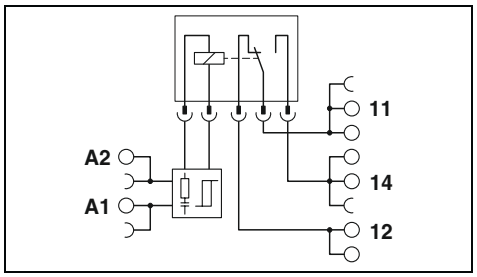
Input data		①	②
Typical input current at U_N	[mA]	4.5	4.5
Response/release time at U_N	[ms]	7 / 10	7 / 10
Switch-on threshold		190 V AC	190 V AC
Switch-off threshold		180 V AC	180 V AC
Input circuit AC/DC		Yellow LED, bridge rectifier	
Output data			
Contact material		AgNi	
Max. switching voltage		250 V AC/DC	
Minimum switching voltage		5 V AC/DC (at 10 mA)	
Limiting continuous current		6 A	
Maximum switch-on current		15 A (300 ms)	
Minimum switching current		10 mA (at 5 V)	
General data			
Test voltage input/output		4 kV AC (50 Hz, 1 min.)	
Ambient temperature (operation)		-40°C ... 55°C	
Mechanical service life		3x 10^7 cycles	
Standards/regulations		IEC 60664, EN 50178	
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	

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC-INTERFACE					
- with screw connection	①	230 V AC	**PLC-RSC-230AC/21-21/SO46/HI**	1079387	10
- with Push-in connection	②	230 V AC	**PLC-RPT-230AC/21-21/SO46/HI**	1079389	10

new

**1-changeover contact
for high continuous currents with
predefined switch-on and switch-off threshold**



Technical data

①	②
4.5	4.5
7 / 10	7 / 10
190 V AC	190 V AC
180 V AC	180 V AC
Yellow LED, bridge rectifier	
AgNi	
250 V AC/DC	
12 V (at 10 mA)	
10 A	
30 A (300 ms)	
10 mA (at 12 V)	
4 kV AC (50 Hz, 1 min.)	
-40°C ... 55°C	
3x 10^7 cycles	
IEC 60664, EN 50178	
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-RSC-230AC/21HC/SO46/HI	1079402	10
PLC-RPT-230AC/21HC/SO46/HI	1079404	10

Plug-in miniature power relays

Plug-in miniature power relays are compatible for PLC-INTERFACE and RIF-0 and RIF-1 relay base.

The advantages:

– Power contacts up to 16 A
– Multi-layer gold contact or power contact
– High degree of protection up to RT III depending on type (wash-proof)
– Safe isolation in accordance with 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.

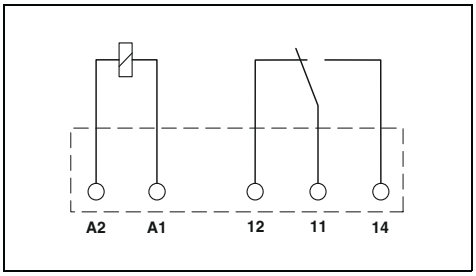
For dimensional drawings and perforations for assembly, see page 400

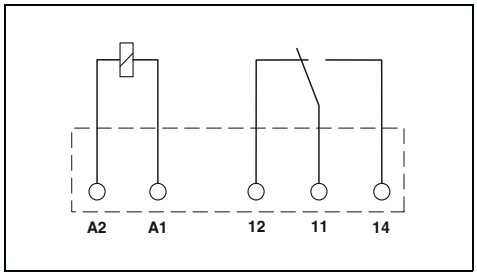
For diagrams of operating voltage ranges, see page 399

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272

Relay with one changeover contact, max. 6 A

Relay with one changeover contact, with manual operation, max. 6 A





Technical data

		①	②	③	④	⑤
Input data						
Permissible range (with reference to U_N)		See diagram				
Typical input current at U_N	[mA]	38	14	9	7	3
Typical response time at U_N	[ms]	5	5	5	5	5
Typical release time at U_N	[ms]	2.5	2.5	2.5	2.5	2.5
Output data						
Contact type		1 PDT				1 PDT
Contact material		AgSnO				AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC				30 V AC / 36 V DC
Minimum switching voltage		5 V (at 100 mA)				100 mV (at 10 mA)
Limiting continuous current		6 A				50 mA
Maximum switch-on current		10 A (4 s)				on request
Minimum switching current		10 mA (at 12 V)				1 mA (at 24 V)
Maximum 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	1,500 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		2x 10^7 cycles				
Standards/regulations		IEC 60664, EN 50178, EN 61810-1				
Mounting position/mounting		Any / in rows with zero spacing				
Dimensions	W / H / D	5 mm / 28 mm / 15 mm				

Technical data

		②	④	⑤
Input data				
Permissible range (with reference to U_N)		See diagram		
Typical input current at U_N	[mA]	14	7	3
Typical response time at U_N	[ms]	5	5	5
Typical release time at U_N	[ms]	2.5	2.5	2.5
Output data				
Contact type		1 PDT		1 PDT
Contact material		AgSnO		AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC		30 V AC / 36 V DC
Minimum switching voltage		5 V (at 100 mA)		100 mV (at 10 mA)
Limiting continuous current		6 A		50 mA
Maximum switch-on current		10 A (4 s)		50 mA
Minimum switching current		10 mA (at 12 V)		1 mA (at 24 V)
Maximum 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	1,500 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		1x 10^7 cycles		
Standards/regulations		IEC 60664, EN 50178, EN 61810-1		
Mounting position/mounting		Any / in rows with zero spacing		
Dimensions	W / H / D	5 mm / 28 mm / 16 mm		

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Plug-in miniature power relays, with power contacts					
	①	4.5 V DC	**REL-MR- 4,5DC/21**	2961367	10
	②	12 V DC	**REL-MR- 12DC/21**	2961150	10
	③	18 V DC	**REL-MR- 18DC/21**	2961383	10
	④	24 V DC	**REL-MR- 24DC/21**	2961105	10
	⑤	60 V DC	**REL-MR- 60DC/21**	2961118	10
	⑥	110 V DC			
Plug-in miniature power relays, with multi-layer gold contacts					
	①	4.5 V DC	**REL-MR 4,5DC/21AU**	2961370	10
	②	12 V DC	**REL-MR- 12DC/21AU**	2961163	10
	③	18 V DC	**REL-MR- 18DC/21AU**	2961493	10
	④	24 V DC	**REL-MR- 24DC/21AU**	2961121	10
	⑤	60 V DC	**REL-MR- 60DC/21AU**	2961134	10
	⑥	110 V DC			

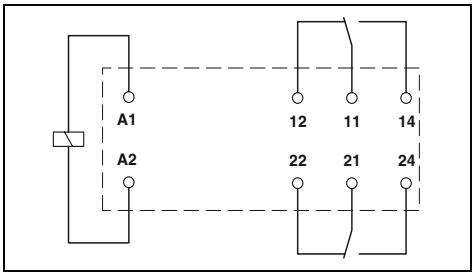
Ordering data

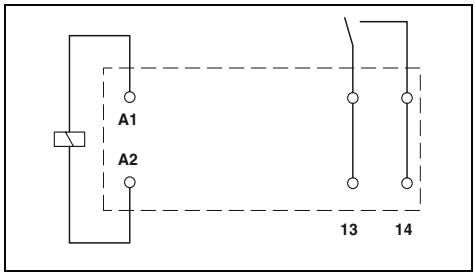
Type	Order No.	Pcs./Pkt.
REL-MR- 12DC/21/MS	2909641	10
REL-MR- 24DC/21/MS	2909642	10
REL-MR- 60DC/21/MS	2909643	10
REL-MR- 12DC/21AU/MS	2909644	10
REL-MR- 24DC/21AU/MS	2909645	10
REL-MR- 60DC/21AU/MS	2909647	10

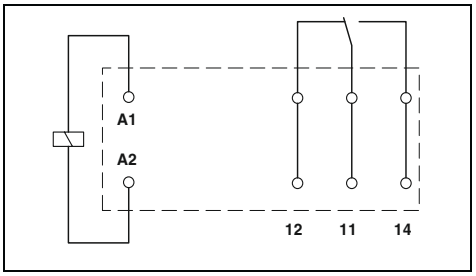
Relay with two changeover contacts, 2 x 8 A, maximum

Relay with one N/O contact for high inrush currents, 130 A peak, maximum

Relay with one changeover contact, 16 A, maximum







Technical data

②	④	⑤	⑥
See diagram			
33	17	8.2	4.1
7	7	7	7
3	3	3	3
2 PDT	2 PDT		
AgNi	AgNi, hard gold-plated		
250 V AC/DC	30 V AC / 36 V DC		
5 V (at 10 mA)	100 mV (at 10 mA)		
8 A	50 mA		
25 A (20 ms)	50 mA		
10 mA (at 5 V)	1 mA (at 24 V)		
190 W	1.2 W		
85 W	-		
60 W	-		
44 W	-		
60 W	-		
2,000 VA	-		
5 kV AC (50 Hz, 1 min.)			
-40°C ... 85°C			
100% operating factor			
3x 10^7 cycles			
IEC 60664, EN 50178, EN 61810-1			
Any / can be aligned without spacing (>70°C ≥2.5 mm)			
12.7 mm / 29 mm / 15.7 mm			

Ordering data

Type	Order No.	Pcs./Pkt.
REL-MR- 12DC/21-21	2961257	10
REL-MR- 24DC/21-21	2961192	10
REL-MR- 60DC/21-21	2961273	10
REL-MR-110DC/21-21	2961202	10
REL-MR- 12DC/21-21AU	2961299	10
REL-MR- 24DC/21-21AU	2961215	10
REL-MR- 60DC/21-21AU	2961286	10
REL-MR-110DC/21-21AU	2961228	10

Technical data

④
See diagram
17
8
3
1 N/O contact
AgSnO
250 V AC/DC
12 V (100 mA)
16 A
80 A (20 ms) / 130 A (peak, at capacitive load, 230 V AC, 24 µF)
100 mA (at 12 V DC)
384 W
58 W
48 W
50 W
80 W
4,000 VA
5 kV AC (50 Hz, 1 min.)
-40°C ... 85°C
100% operating factor
3x 10^7 cycles
EN 50178, EN 61810-1
Any / can be aligned without spacing (>70°C ≥2.5 mm)
12.7 mm / 29 mm / 15.7 mm

Ordering data

Type	Order No.	Pcs./Pkt.
REL-MR- 24DC/1IC	2961341	10

Technical data

②	④	⑤	⑥
See diagram			
33	17	8.2	4.1
7	7	7	7
3	3	3	3
1 PDT			
AgNi			
250 V AC/DC			
12 V (at 10 mA)			
16 A			
50 A (20 ms)			
10 mA (at 12 V)			
384 W			
58 W			
48 W			
50 W			
80 W			
4,000 VA			
5 kV AC (50 Hz, 1 min.)			
-40°C ... 85°C			
100% operating factor			
3x 10^7 cycles			
IEC 60664, EN 50178, EN 61810-1			
Any / can be aligned without spacing (>70°C ≥2.5 mm)			
12.7 mm / 29 mm / 15.7 mm			

Ordering data

Type	Order No.	Pcs./Pkt.
REL-MR- 12DC/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 are compatible for both PLC-INTERFACE and RIF-0 and RIF-1 relay base.

The advantages:

– Switching current of up to 5 A
– RT III seal (wash-proof)
– Vibration- and shock-resistant
– Wear-free and long-lasting
– Zero voltage switch at AC output
– Can be soldered in on PCB

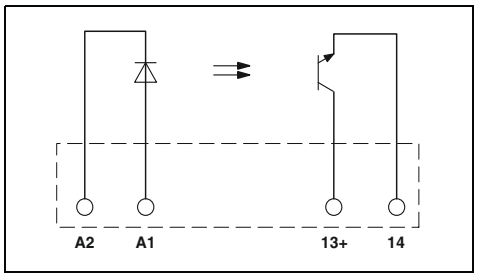
Notes:

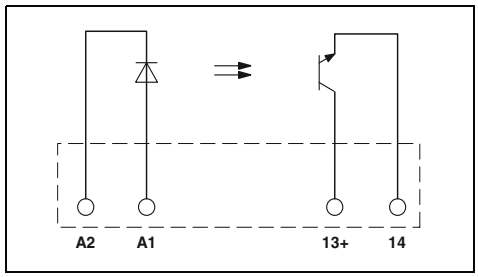
For dimensional drawings and perforations for assembly, see page 401

When mounting relays on a DIN rail base or PCB, data may be limited, especially with regard to the limiting continuous current and/or ambient temperature range. See “General” section in “Fundamentals of relay technology” on page 272

Solid-state relay, DC output max. 3 A

Solid-state relay, DC output max. 100 mA





Technical data

		①	②	③
Input data				
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
Typical input current at U_N	[mA]	9	7	3
Typical switch-on time at U_N	[µs]	20	20	40
Typical 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		
Minimum switching voltage		3 V DC		
Limiting continuous current		3 A (see derating curve)		
Minimum load current		-		
Maximum switch-on current		15 A (10 ms)		
Leakage current in off state		-		
Phase angle (cos ϕ)		-		
Output circuit		2-conductor, floating		
Max. load value		-		
Output protection		Reverse polarity protection, surge protection		
Voltage drop at maximum 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		
Degree of pollution/surge voltage category		2 / III		
Mounting position/mounting		Any / in rows with zero spacing		
Dimensions	W / H / D	5 mm / 28 mm / 15 mm		

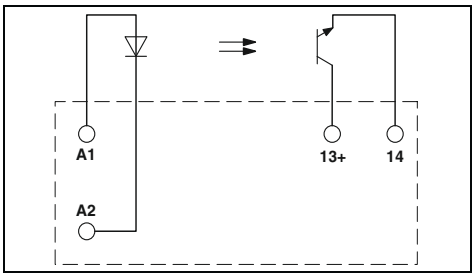
Ordering data

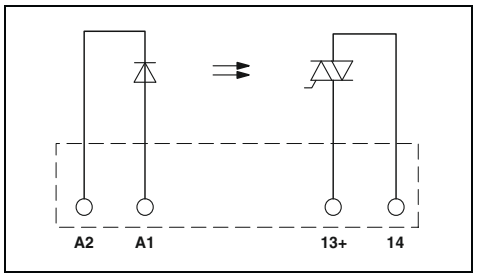
Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Plug-in solid-state relays					
Solid-state power relays	①	5 V DC	**OPT- 5DC/ 24DC/ 2**	2967989	10
Solid-state power relays	②	24 V DC	**OPT-24DC/ 24DC/ 2**	2966595	10
Solid-state power relays	③	60 V DC	**OPT-60DC/ 24DC/ 2**	2966605	10
Plug-in solid-state 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

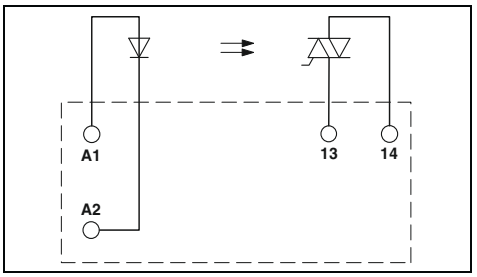
**Solid-state relay,
DC output max. 5 A**

**Solid-state relay,
AC output max. 750 mA**

**Solid-state relay,
AC output max. 2 A**







Technical data

①	②	③
0.8 - 1.2	0.8 - 1.2	0.9 - 1.1
2.5	16	35
0.8	10	20
9	7	3
10	20	25
400	400	400
300	300	300
33 V DC		
3 V DC		
5 A (see derating curve)		
-		
15 A (10 ms)		
-		
-		
2-conductor, floating		
-		
Reverse polarity protection, surge protection		
≤200 mV		
Basic insulation		
2.5 kV (50 Hz, 1 min.)		
-25°C ... 60°C		
100% operating factor		
IEC 60664, EN 50178		
2 / III		
Any / in rows with zero spacing		
12.7 mm / 29 mm / 15.7 mm		

Technical data

②	③
0.8 - 1.2	0.9 - 1.1
10	50
5	15
6	3
6,000	9,000
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 A^2s	
RCV circuit	
<1 V	
Basic insulation	
2.5 kV (50 Hz, 1 min.)	
-25°C ... 60°C	
100% operating factor	
IEC 60664, EN 50178	
2 / III	
Any / in rows with zero spacing	
5 mm / 28 mm / 15 mm	

Technical data

①	②
0.8 - 1.2	0.8 - 1.2
3	18
1	8.4
15	7
10,000	10,000
10,000	10,000
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	
2 / III	
Any / see derating curve	
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

Ordering data

Type	Order No.	Pcs./Pkt.
OPT-24DC/230AC/ 1	2967950	10
OPT-60DC/230AC/ 1	2967963	10

Ordering data

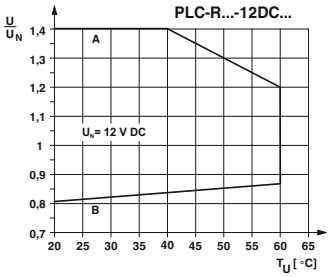
Type	Order No.	Pcs./Pkt.
OPT- 5DC/230AC/ 2	2982168	10
OPT-24DC/230AC/ 2	2982171	10

Relay options for PLC basic terminal blocks

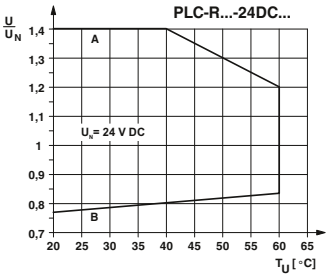
Options for assembly with relays or solid-state relays		1 changeover contact basic terminal block										2 changeover contact basic terminal block										HC basic terminal block										Sensor basic terminal block					Actuator basic terminal block					IC basic terminal block		
Screw connection			2980225	2966896	2966016	2966029	2966090	2966100	2966032	2980018	2966045		2967251	2967015	2967028	2967264	2967316	2967031	2967044		2967769	2967772	2967785	2967798	2967808	2967811	2967824		2980267	2966061	2966074	2966087		2980241	2966058	2982799			2967837
Push-in connection			2900443	2900444	2900445	2900446	2900447	2900279	2900280		2900281		2900282	2900283	2900284	2900285	2900286	2900287	2900288		2900253	2900254	2900255	2900256	2900257	2900258	2900259		2900262	2900451	2900452		2900448	2900449	2900450	2900261		2900260	
			PLC-BPT-5DC/21	PLC-BPT-12DC/21	PLC-BPT-24DC/21	PLC-BPT-24UC/21	PLC-BPT-48DC/21	PLC-BPT-60DC/21	PLC-BPT-120UC/21		PLC-BPT-230UC/21		PLC-BPT-12DC/21-21	PLC-BPT-24DC/21-21	PLC-BPT-24UC/21-21	PLC-BPT-48DC/21-21	PLC-BPT-60DC/21-21	PLC-BPT-120UC/21-21	PLC-BPT-230UC/21-21		PLC-BPT-12DC/21HC	PLC-BPT-24DC/21HC	PLC-BPT-24UC/21HC	PLC-BPT-48DC/21HC	PLC-BPT-60DC/21HC	PLC-BPT-120UC/21HC	PLC-BPT-230UC/21HC		PLC-BPT-24DC/1/SEN	PLC-BPT-120UC/1/SEN	PLC-BPT-230UC/1/SEN		PLC-BPT-5DC/1/ACT	PLC-BPT-24DC/1/ACT	PLC-BPT-24UC/1/ACT	PLC-BPT-24DC/21RW		PLC-BPT-24DC/1IC/ACT	
REL-MR-4,5DC/21	2961367		✓																										✓				✓							
REL-MR-4,5DC/21AU	2961370		✓																										✓											
REL-MR-12DC/21	2961150			✓																																				
REL-MR-12DC/21/MS	2909641			✓																																				
REL-MR-12DC/21AU	2961163			✓																																				
REL-MR-12DC/21AU/MS	2909644			✓																																				
REL-MR-24DC/21	2961105				✓	✓	✓																							✓					✓	✓					
REL-MR-24DC/21/MS	2909642				✓	✓	✓																							✓					✓	✓					
REL-MR-24DC/21AU	2961121				✓	✓	✓																							✓					✓	✓					
REL-MR-24DC/21AU/MS	2909645				✓	✓	✓																							✓					✓	✓					
REL-MR-60DC/21	2961118							✓	✓	✓	✓																				✓	✓									
REL-MR- 60DC/21/MS	2909643							✓	✓	✓	✓																				✓	✓									
REL-MR-60DC/21AU	2961134							✓	✓	✓	✓																				✓	✓									
REL-MR- 60DC/21AU/MS	2909647							✓	✓	✓	✓																				✓	✓									
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																✓								✓																

Operating voltage ranges for PLC-INTERFACE, 6.2 mm versions, equipped with relay

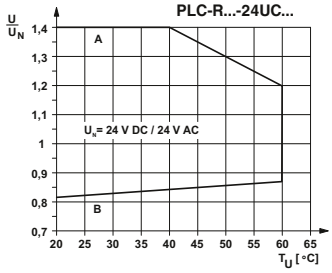
PLC-R...-12DC...



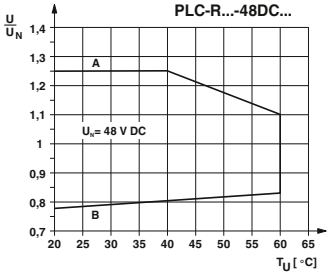
PLC-R...-24DC...



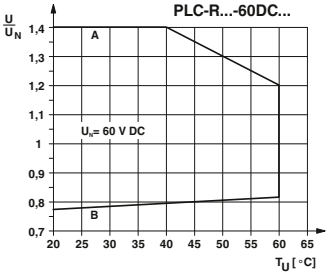
PLC-R...-24UC...



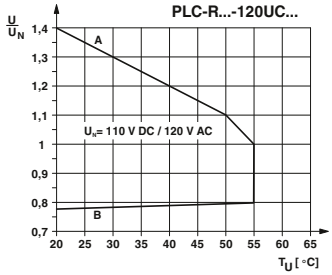
PLC-R...-48DC...



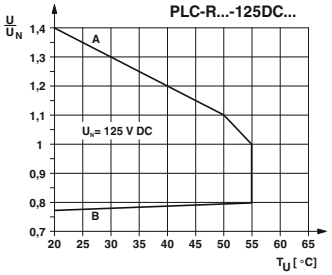
PLC-R...-60DC...



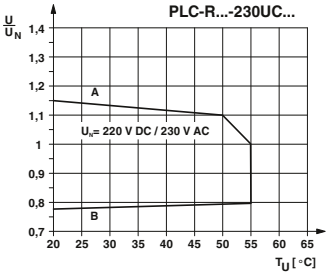
PLC-R...-120UC...



PLC-R...-125DC...

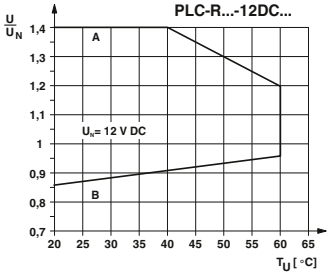


PLC-R...-230UC...

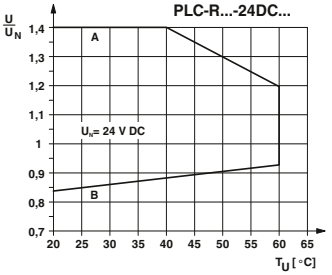


Operating voltage ranges for PLC-INTERFACE, 14 mm versions, equipped with relay

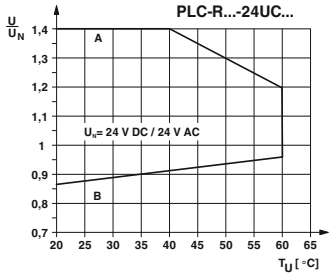
PLC-R...-12DC...



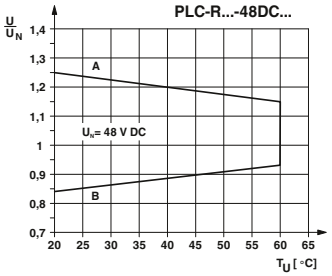
PLC-R...-24DC...



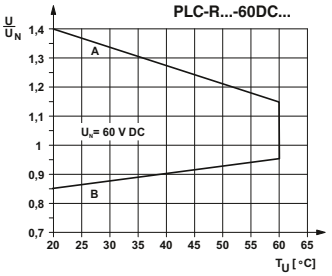
PLC-R...-24UC...



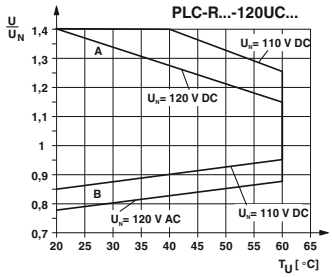
PLC-R...-48DC...



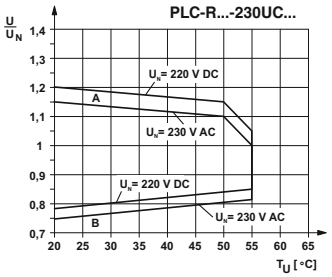
PLC-R...-60DC...



PLC-R...-120UC...



PLC-R...-230UC...



General conditions:
Direct alignment in the block, all devices 100% operating time, horizontal or vertical mounting.

Curve A
Maximum permissible continuous voltage U_{max} with limiting continuous current on the contact side (see relevant technical data).

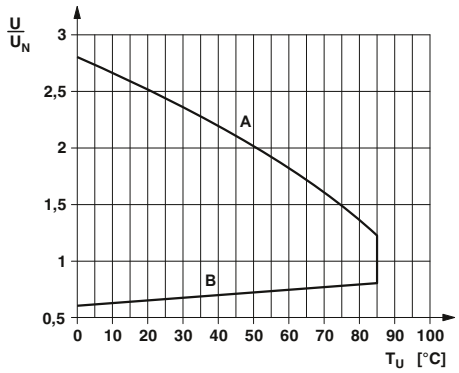
Curve B
Minimum permitted pick-up voltage U_{op} after pre-excitation[1]) (see relevant technical data).

[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 1-changeover-contact relays and 2-changeover contact relays

REL-MR...21

Permissible input voltage range for REL-MR...21



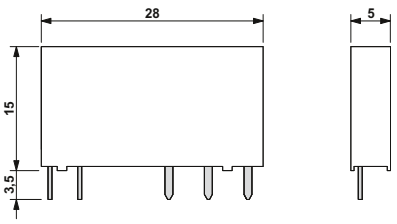
General conditions:
Direct alignment in the block, all devices 100% operating time, horizontal or vertical mounting.

Curve A
Maximum permissible continuous voltage U_{max} with limiting continuous current on the contact side (see relevant technical data).

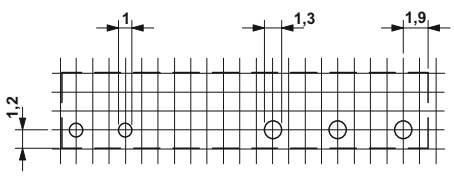
Curve B
Minimum permitted pick-up voltage U_{op} after pre-excitation[1])
(see relevant technical data).

[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.

5 mm overall width



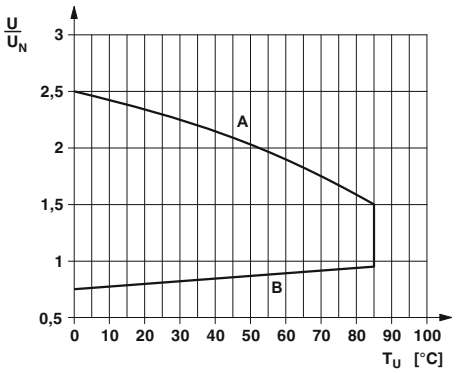
Perforations for assembly: view of the connections



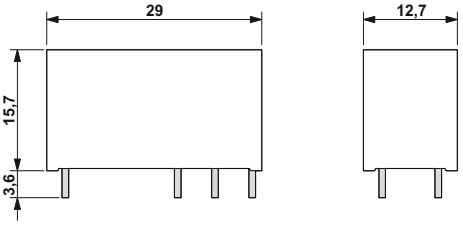
Pitch division: 1.25 mm and 1.27 mm

REL-MR...21-21

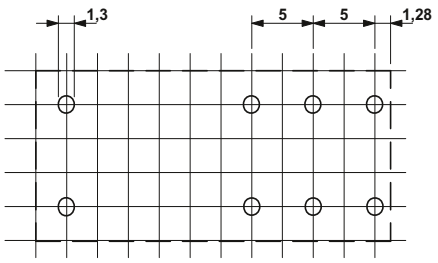
Permissible input voltage range for REL-MR...21-21, REL-MR-24DC/1IC, REL-MR...21HC



12.7 mm overall width



Perforations for assembly: view of the connections

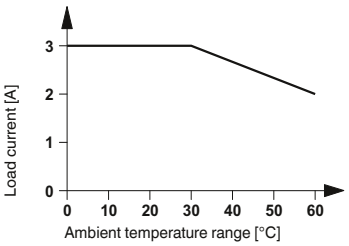


Pitch division: 2.5 mm

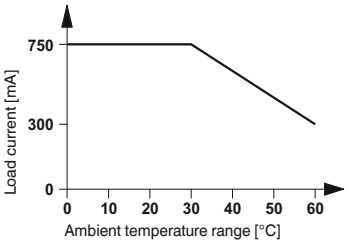
Plug-in solid-state relays

OPT...DC/24DC/2
OPT...DC/230AC/1

Derating curve for OPT...DC/24DC/2 and PLC-OS.../24DC/2 solid-state relays

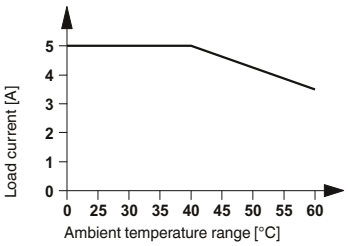


Derating curve for OPT...DC/230AC/1 and PLC-OS.../230AC/1 solid-state relays

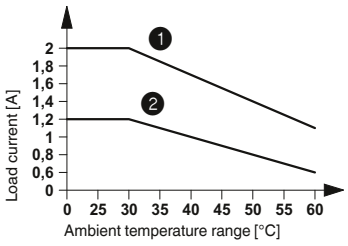


OPT...DC/24DC/5
OPT...DC/230AC/2

Derating curve for OPT...DC/24DC/5 and PLC-OS.../24DC/5/ACT solid-state relays

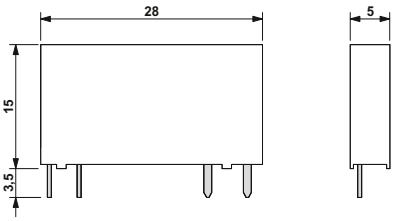


Derating curve for OPT...DC/230AC/2 and PLC-OS.../230AC/2/ACT solid-state relays

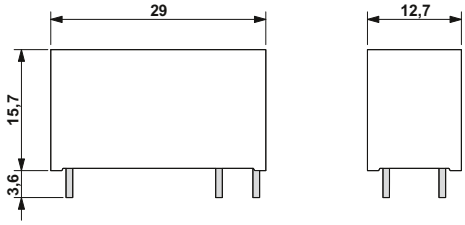


❶ Aligned with >10 mm spacing
❷ Aligned without spacing

5 mm overall width

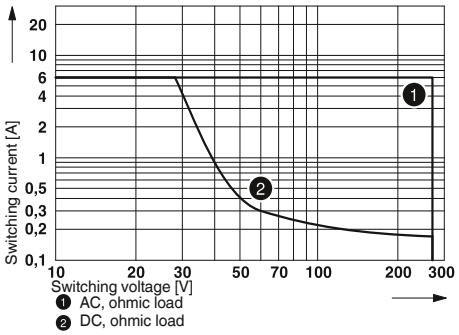


12.7 mm overall width



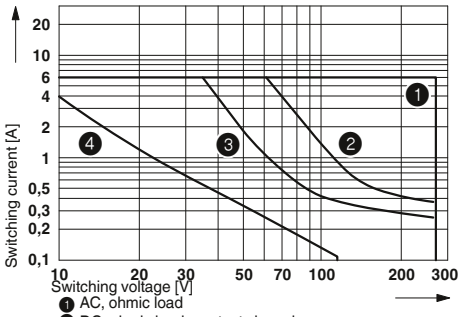
Electrical interrupting rating for PLC-INTERFACE

Electrical interrupting rating for PLC...21 with 1 PDT relay



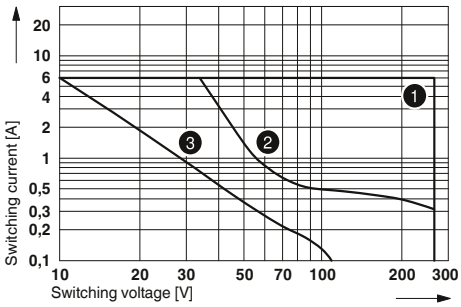
1 AC, ohmic load
2 DC, ohmic load

Electrical interrupting rating for PLC...21-21 with 2 PDT relays



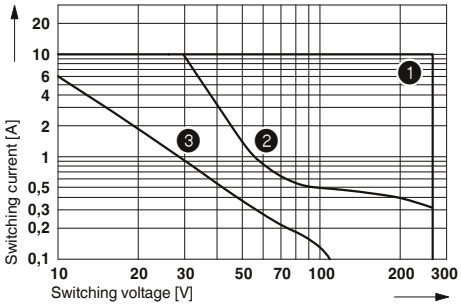
1 AC, ohmic load
2 DC, ohmic load, contacts in series
3 DC, ohmic load
4 DC, L/R = 40 ms

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

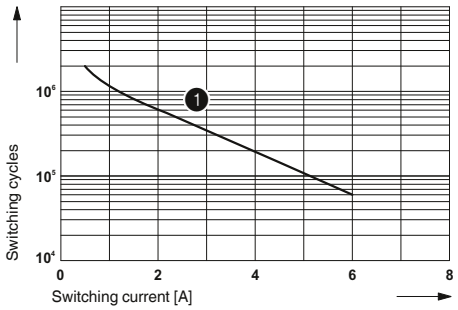
Electrical interrupting rating for PLC...21HC for high continuous currents



1 AC, ohmic load
2 DC, ohmic load
3 DC, L/R = 40 ms

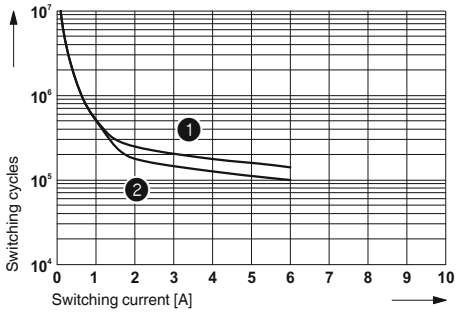
Electrical service life for PLC-INTERFACE

Electrical service life for PLC-R.../21...



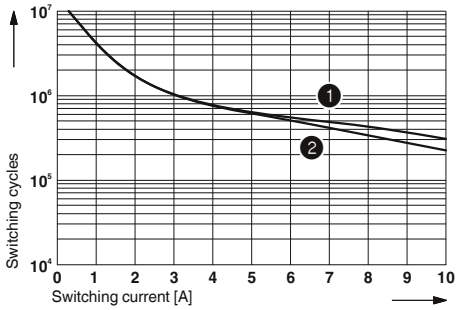
1 250 V AC, ohmic load

Electrical service life for PLC-R.../21-21...



1 250 V AC, ohmic load (DC coils)
2 250 V AC, ohmic load (AC coils)

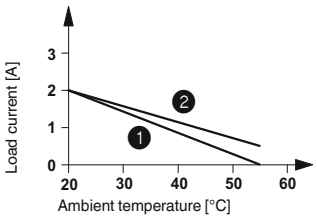
Electrical service life for PLC-R.../21HC...



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

PLC-INTERFACE
with two integrated relays

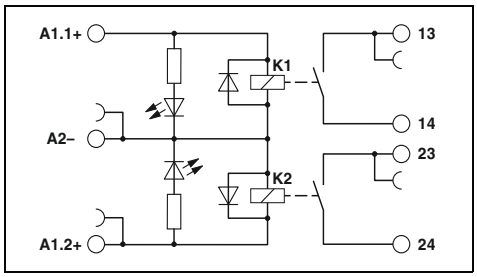
Relay module with two permanently soldered-in power relays

The advantages:

– 100% more channel density than the conventional 6.2 mm relay
– Two switching channels in a 6.2 mm housing
– Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
See the website for more information on connection cross sections with ferrules.

Relay module with two integrated, independent relays up to 3.5 A for high channel density



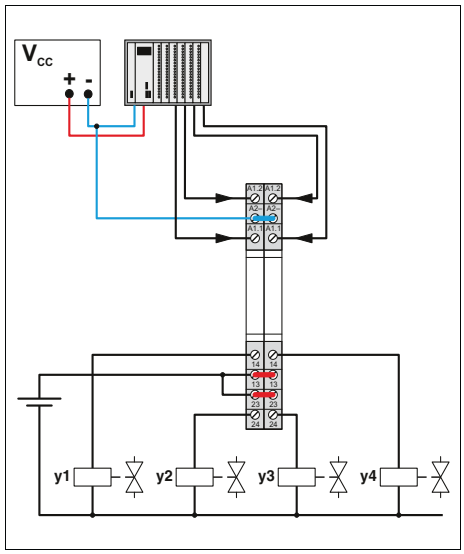
Technical data

Input data		①
Typical input current at U_N	[mA]	7
Response/release time at U_N	[ms]	4 / 6
Input circuit DC		Yellow LED, reverse polarity protection, free-wheeling diode
Output data		
Contact material		AgNi
Max. switching voltage		250 V AC / 30 V DC
Minimum switching voltage		24 V AC/DC
Limiting continuous current		3.5 A
Minimum switching current		5 mA
General data		
Test voltage input/output		3 kV AC (50 Hz, 1 min.)
Test voltage output/output		3 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 60°C
Mechanical service life		2x 10^7 cycles
Standards/regulations		IEC 60664, EN 50178
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
EMC note		Class A product, see page 583

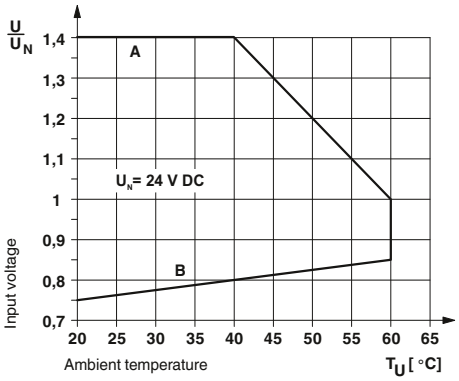
Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	24 V DC	**PLC-2RSC-24DC/ 1**	2987309	10
PLC-INTERFACE, with **Push-in connection**				
①	24 V DC	**PLC-2RPT-24DC/1**	2901639	10

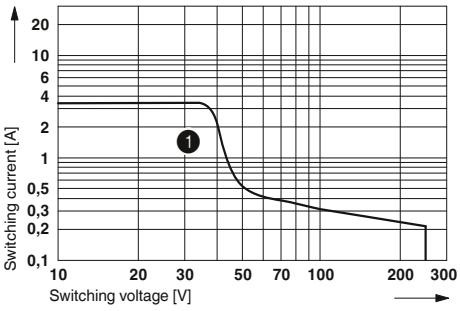
Application example for PLC-2RS...24DC/1



Operating voltage range



Interrupting rating



❶ DC, ohmic load

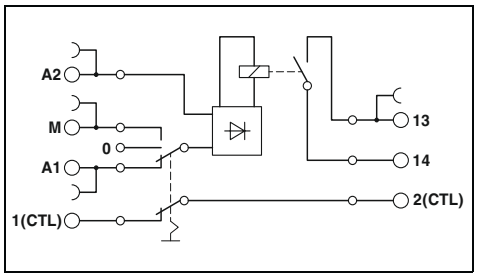
PLC-INTERFACE
with manual switch and relay

Relay module with manual switch and integrated power relay for manual, zero, and automatic functions

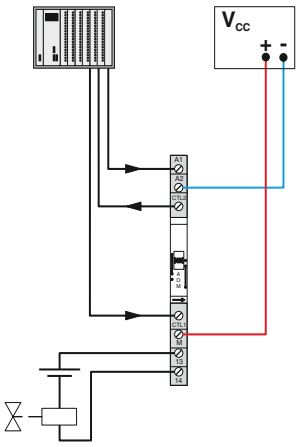
The advantages are:
- Maximum switching current 6 A
- Width of only 6.2 mm
- Floating checkback contact
- Safe isolation in accordance with DIN EN 50178 between coil and contact
- Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
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
See the website for more information on connection cross sections with ferrules.

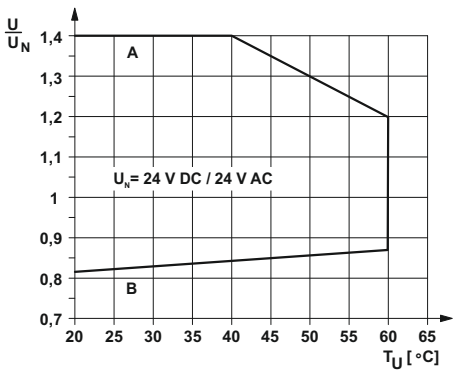
Relay module with manual switch and integrated relay



Application example for PLC-RS...24UC/1/S...



Permissible input voltage range for PLC-RS...24UC/1/S...



Curve A
Maximum continuous voltage when limiting continuous current = 6 A

Curve B
Minimum pick-up voltage for pre-excitation with U_N and limiting continuous current = 6 A

Technical data

Input data		①
Typical input current at U_N	[mA]	11
Response/release time at U_N	[ms]	6 / 15
Input circuit AC/DC		Yellow LED, bridge rectifier
Output data		
Contact material		AgSnO
Max. switching voltage		250 V AC/DC
Minimum switching voltage		5 V (at 100 mA)
Limiting continuous current		6 A
Maximum switch-on current		On request
Minimum switching current		10 mA (at 12 V)
Feedback		
Operating mode “Automatic” floating		Max. 30 V AC/DC / 50 mA Min. 2 V AC/DC / 1 mA
General data		
Rated insulation voltage		250 V AC
Rated surge voltage		-
Ambient temperature (operation)		-20°C ... 60°C
Standards/regulations		IEC 60664, EN 50178
Degree of pollution/surge voltage category		2 / III
Connection data solid/stranded/AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	W / H / D	6.2 mm / 80 mm / 90 mm
EMC note		Class A product, see page 583

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
PLC-INTERFACE, with **Push-in connection**				
①	24 V AC/DC	**PLC-RPT- 24UC/ 1/S/H**	2900328	10

PLC-INTERFACE
with manual switch without relay

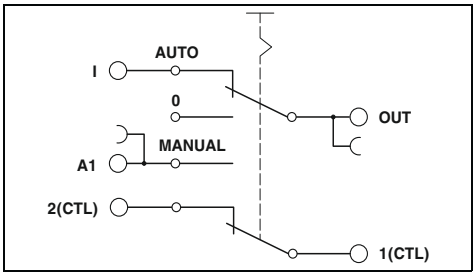
Switching module without relay for manual, zero, and automatic functions

The advantages:

– Width of only 6.2 mm
– Floating checkback contact
– Screw connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
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
See the website for more information on connection cross sections with ferrules.

Module with manual switch without relay



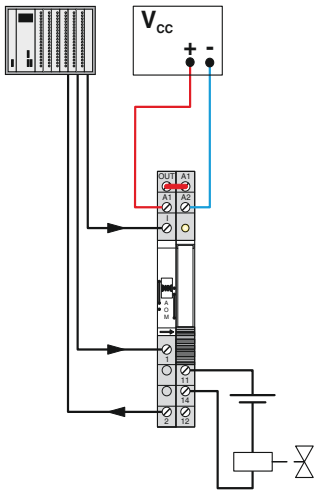
Technical data

Max. switching voltage		72 V DC
Minimum switching voltage		2 V DC
Maximum switch-on current		50 mA
Minimum switching current		1 mA
Switching cycles, max.		100 (at 72 V DC / 50 mA) / 10,000 (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
Insulation		Basic insulation
Ambient temperature (operation)		-20°C ... 60°C
Standards/regulations		IEC 60664, EN 50178
Degree of pollution/surge voltage category		2 / III
Connection data solid/stranded/AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
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

Application example for PLC-S...S...



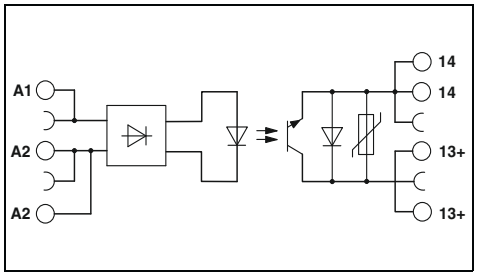
PLC-INTERFACE
with one integrated solid-state relay

The slim 6.2 mm PLC housing with integrated electronics in various versions offers the following advantages:

– Option of bridging adjacent modules
– Status display
– Protection circuits in input and output
– Wear-resistant and bounce-free switching
– Integrated protection circuit
– DC outputs of up to 300 V DC/1 A or up to 24 V DC/10 A
– Electronic PDT output of up to 48 V DC/500 mA
– Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
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-O...-...-300DC/1 - PLC-O...-24DC/24DC/10/R
See the website for more information on connection cross sections with ferrules.

Solid-state relay module, DC output max. 300 V DC/1 A

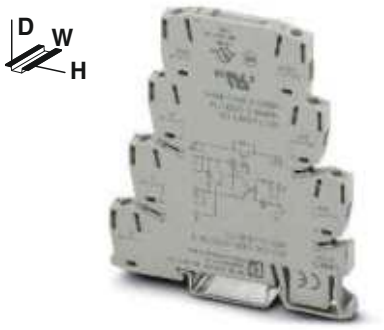


Technical data

		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
Typical 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									
Maximum/minimum switching voltage		300 V DC / 12 V DC							
Limiting continuous current		1 A (see derating curve)							
Voltage drop at maximum limiting continuous current		<500 mV							
General data									
Rated insulation voltage		300 V							
Rated surge voltage		Basic insulation							
Ambient temperature (operation)		-25°C ... 60°C							
Standards/regulations		IEC 60664, 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							
EMC note		Class A product, see page 583							

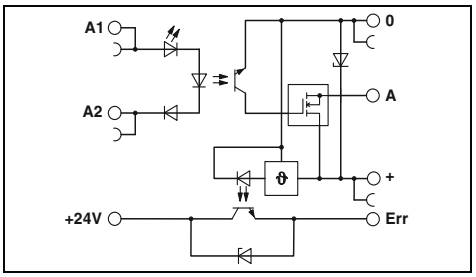
Ordering data

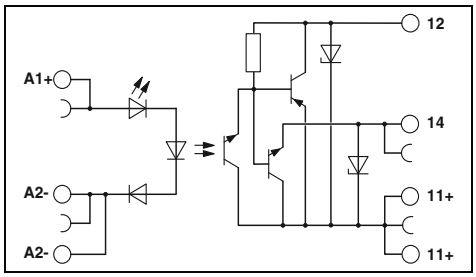
Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**					
	①	5 V DC	**PLC-OSC- 5DC/300DC/ 1**	2980652	10
	②	12 V DC	**PLC-OSC- 12DC/300DC/ 1**	2980665	10
	③	24 V DC	**PLC-OSC- 24DC/300DC/ 1**	2980678	10
48 V DC ... 60 V DC	④	60 V DC	**PLC-OSC- 60DC/300DC/ 1**	2980681	10
	⑤	110 V DC	**PLC-OSC-110DC/300DC/ 1**	2980694	10
	⑥	220 V DC	**PLC-OSC-220DC/300DC/ 1**	2980704	10
	⑦	120 V AC	**PLC-OSC-120AC/300DC/ 1**	2980717	10
	⑧	230 V AC	**PLC-OSC-230AC/300DC/ 1**	2980720	10
PLC-INTERFACE, with **Push-in connection**					
	①	5 V DC	**PLC-OPT- 5DC/300DC/1**	2900381	10
	②	12 V DC	**PLC-OPT- 12DC/300DC/1**	2900382	10
	③	24 V DC	**PLC-OPT- 24DC/300DC/1**	2900383	10
48 V DC ... 60 V DC	④	60 V DC	**PLC-OPT- 60DC/300DC/1**	2900384	10
	⑤	110 V DC	**PLC-OPT-110DC/300DC/1**	2900385	10
	⑥	220 V DC	**PLC-OPT-220DC/300DC/1**	2900387	10
	⑦	120 V AC	**PLC-OPT-120AC/300DC/1**	2900388	10
	⑧	230 V AC	**PLC-OPT-230AC/300DC/1**	2900389	10



Solid-state relay module, short-circuit-proof DC output max. 10 A, with feedback

Solid-state relay module, DC output max. 500 mA, with electronic changeover contact





Technical data	
③	
	0.8 - 1.2
	≥0.8
	≤0.4
	3
	100
3 V DC ... 33 V DC (high active) / 100 mA	
33 V DC / 5 V DC	
10 A (see derating curve)	
≤50 mV	
-	
Basic insulation	
-25°C ... 60°C	
IEC 60664, EN 50178	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
6.2 mm / 80 mm / 86 mm	
Class A product, see page 583	

Technical data	
③	
	0.8 - 1.2
	≥0.8
	≤0.4
	3
	1,000
- / -	
48 V DC / 3 V DC	
500 mA (see derating curve)	
<1.2 V	
300 V	
Basic insulation	
-25°C ... 60°C	
IEC 60664, EN 50178	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
6.2 mm / 80 mm / 86 mm	
Class A product, see page 583	

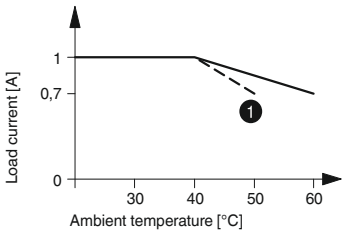
Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/ 24DC/ 10/R	2982702	10
PLC-OPT- 24DC/ 24DC/10/R	2900398	10

Ordering data

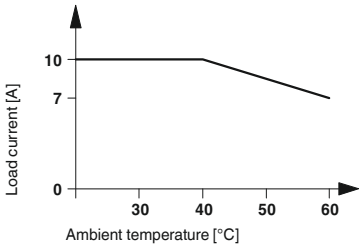
Type	Order No.	Pcs./Pkt.
PLC-OSC- 24DC/ 48DC/500/W	2980636	10
PLC-OPT- 24DC/ 48DC/500/W	2900378	10

Derating curve for PLC...300DC/1

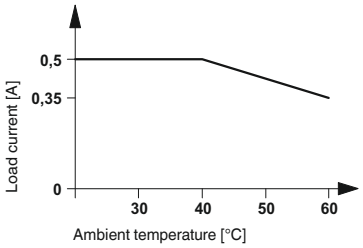


❶ For input voltages of 220 V DC and 230 V AC

Derating curve for PLC-...24DC/24DC/10/R



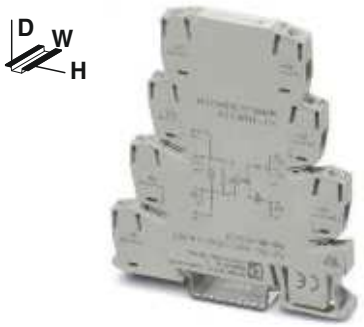
Derating curve for PLC...24DC/48DC/500/W



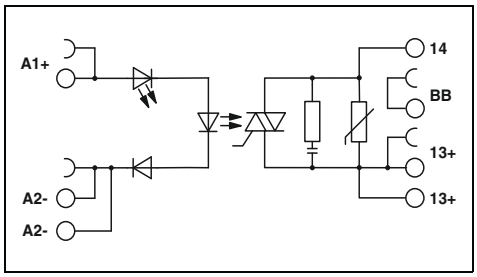
PLC-INTERFACE
with one integrated solid-state relay

6.2 mm narrow solid-state relay for switching AC loads
– Status display
– Protection circuits in input and output
– Wear-free
– Switching capacity up to 230 V AC/2.4 A
– Screw and Push-in connection technology

Notes:
See the website for more information on connection cross sections with ferrules.



Solid-state relay module with additional floating terminal point, AC output max. 2.4 A

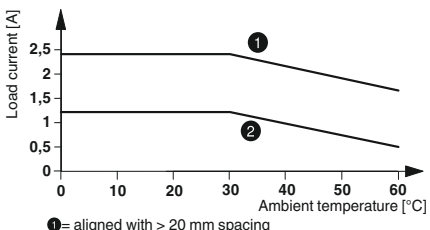


Technical data

Input data		①
Rated actuating voltage range with reference to U_C		0.8 - 1.2
Rated actuating current I_C	[mA]	8
Switching level (with reference to U_C)	1 signal (“H”)	>0.8
	0 signal (“L”)	<0.4
Typical switch-on time at U_N	[ms]	10
Typical switch-off time at U_N	[ms]	10
Transmission frequency f_{limit}	[Hz]	10
Input circuit DC		Yellow LED, reverse polarity protection, surge protection
Output data		
Max. switching voltage		253 V AC
Minimum switching voltage		24 V AC
Maximum switch-on current		250 A (20 ms)
Minimum/maximum switching current		10 mA / 2.4 A (see derating)
Output protection		RCV circuit
Voltage drop at maximum limiting continuous current		<1 V
Leakage current in off state		<3 mA
Max. load value		340 A²s (tp = 10 ms, at 25°C)
General data		
Rated insulation voltage		260 V AC
Rated surge voltage		4 kV
Insulation		Basic insulation
Ambient temperature (operation)		-25°C ... 60°C
Standards/regulations		DIN EN 50178
Degree of pollution/surge voltage category		2 / III
Connection data solid/stranded/AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm
EMC note		Class A product, see page 583

Ordering data

Description	Rated actuating voltage U_C	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**				
①	24 V DC	**PLC-OSC- 24DC/230AC/2.4/ACT**	2904631	10
PLC-INTERFACE, with **Push-in connection**				
①	24 V DC	**PLC-OPT- 24DC/230AC/2.4/ACT**	2904632	10



❶= aligned with > 20 mm spacing
❷= aligned without spacing

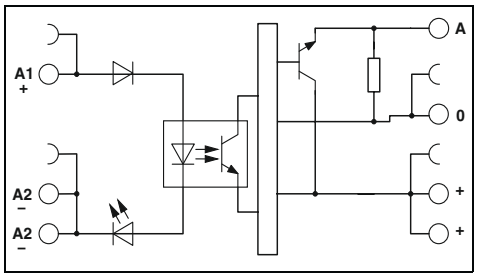
Load current as a function of the ambient temperature
Operating time: 100% operating factor

PLC-INTERFACE
Solid-state relays up to 100 kHz

Solid-state relays for the safe acquisition of short pulses.
– Status display
– Bridging options
– Limit frequency of up to 100 kHz
– Push-pull stage on output side
– Features a capacitor on the input side for interference suppression

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
See the website for more information on connection cross sections with ferrules.

**Solid-state relay module,
DC output,
transmission frequency of 100 kHz**



Technical data

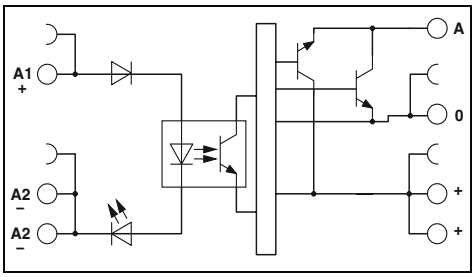
Input data		①	②
Permissible range (with reference to U_N)		0.8 - 1.2	0.8 - 1.2
Switching level with reference to U_N	1 signal (“H”)	>0.8	>0.8
	0 signal (“L”)	<0.4	<0.4
Typical input current at U_N	[mA]	7	6
Typical switch-on time at U_N	[µs]	1.5	1.5
Typical switch-off time at U_N	[µs]	2	2
Transmission frequency f_{limit}	[kHz]	100	100
Input protection:		Yellow LED, reverse polarity protection, surge protection	
Output data			
Operating voltage range		4 V DC ... 30 V DC	
Limiting continuous current		50 mA	
Quiescent current		4.3 mA	
Residual voltage drop at “H”		<0.5 V	
Output circuit		3-conductor, ground-referenced	
Output protection		Reverse polarity protection, surge protection	
General data			
Test voltage input/output		2.5 kV_{rms} (50 Hz, 1 min.)	
Ambient temperature (operation)		-20°C ... 60°C	
Standards/regulations		DIN EN 50178	
Degree of pollution/surge voltage category		2 / II	
Connection data solid/stranded/AWG		0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm	
EMC note		Class A product, see page 583	

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
Input solid-state relay with screw connection				
①	5 V DC	**PLC-OSC- 5DC/ 24DC/100KHZ**	2902963	1
②	24 V DC	**PLC-OSC- 24DC/ 24DC/100KHZ**	2902964	1
Input solid-state relay with Push-in connection				
①	5 V DC	**PLC-OPT- 5DC/ 24DC/100KHZ**	2902969	1
②	24 V DC	**PLC-OPT- 24DC/24DC/100KHZ**	2902970	1

D W H

Solid-state relay module, DC push-pull output, transmission frequency of 100 kHz



Technical data

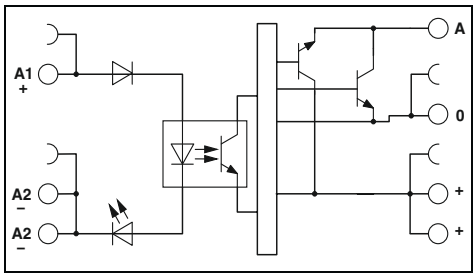
①	②
0.5 - 1.2	0.8 - 1.2
>0.5	>0.8
<0.3	<0.4
8	8
1	1
2	2
100	100
Yellow LED, reverse polarity protection, surge protection	
4 V DC ... 18 V DC	
50 mA	
8.5 mA	
<1.2 V	
3-conductor push-pull, ground referenced	
Reverse polarity protection, surge protection	
2.5 kV_{rms} (50 Hz, 1 min.)	
-20°C ... 60°C	
DIN EN 50178	
2 / II	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
6.2 mm / 80 mm / 86 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 5DC/ 5DC/100KHZ-G	2902965	1
PLC-OSC- 24DC/ 5DC/100KHZ-G	2902966	1
PLC-OPT- 5DC/ 5DC/100KHZ-G	2902971	1
PLC-OPT- 24DC/ 5DC/100KHZ-G	2902972	1

D W H

Solid-state relay module, DC push-pull output, transmission frequency of 100 kHz



Technical data

①	②
0.5 - 1.2	0.8 - 1.2
>0.5	>0.8
<0.3	<0.4
8	8
1	1
2	2
100	100
Yellow LED, reverse polarity protection, surge protection	
14 V DC ... 30 V DC	
50 mA	
15 mA	
<2.2 V	
3-conductor push-pull, ground referenced	
Reverse polarity protection, surge protection	
2.5 kV_{rms} (50 Hz, 1 min.)	
-20°C ... 60°C	
DIN EN 50178	
2 / II	
0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
6.2 mm / 80 mm / 86 mm	
Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OSC- 5DC/ 24DC/100KHZ-G	2902967	1
PLC-OSC- 24DC/ 24DC/100KHZ-G	2902968	1
PLC-OPT- 5DC/24DC/100KHZ-G	2902973	1
PLC-OPT- 24DC/24DC/100KHZ-G	2902974	1

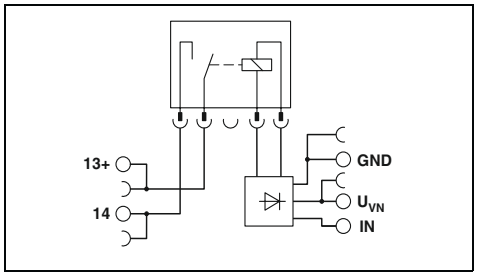
PLC-INTERFACE
for the TTL signal at input

The PLC-BS...TTL/1 basic terminal block is controlled with a TTL (5 V)input signal. It is equipped with either a mechanical relay or a solid-state relay. The basic terminal block equipped with a robust miniature relay offers the following advantages:

– 6.2 mm slim design width
– Bridging options
– Status display
– RTIII degree of protection
– Safe isolation in accordance with EN 50178 (VDE 0160)
– 4 kV_{rms} electrical isolation between coil and contact
– Screw and Push-in connection technology

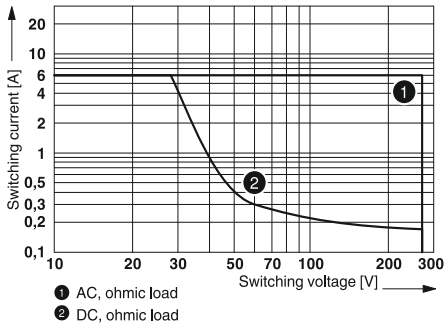
Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
See the website for more information on connection cross sections with ferrules.
If the specified maximum values for multi-layer contact relays are exceeded, the gold plating 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-N/O basic terminal block
for assembly with relay for TTL (5 V)



Technical data

Input data			
Rated control supply voltage U_{VN}		5 V DC	
Rated control supply voltage range with reference to U_{VN}		0.9 ... 1.2	
Rated control supply current I_{VN}		41 mA	
Rated actuating voltage U_c (IN)		5 V DC (TTL)	
Rated actuating voltage range with reference to U_C		0.9 ... 1.2	
Rated actuating current I_C		2.5 mA	
Typical response time at Uc		4.5 ms	
Typical release time at Uc		3.5 ms	
Input circuit		Yellow LED, reverse polarity protection, 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
Minimum switching voltage		100 mV (at 10 mA)	5 V (at 100 mA)
Limiting continuous current		50 mA	6 A
Maximum switch-on current		50 mA	On request
Minimum switching current		1 mA (at 24 V)	10 mA (at 12 V)
General data			
Rated insulation voltage		250 V	
Rated surge voltage/insulation		6 kV	
Ambient temperature (operation)		-20°C ... 60°C	
Mechanical service life		2x 10^7 cycles	
Air clearances and creepage distances between the power circuits		IEC 60664, EN 50178	
Degree of pollution/overvoltage category		2 / 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	6.2 mm / 80 mm / 94 mm	
EMC note		Class A product, see page 583	



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**	2982689	10
with Push-in connection	**PLC-BPT-TTL/1**	2900458	10

Accessories

Plug-in miniature power relays, with multi-layer gold contacts			
	REL-MR 4,5DC/21AU	2961370	10
	REL-MR- 4,5DC/21	2961367	10

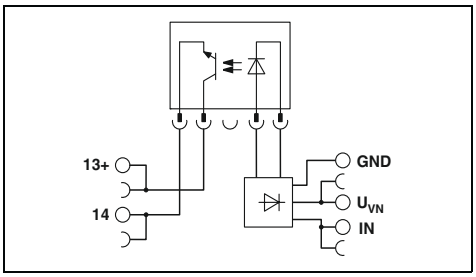
PLC-INTERFACE
for the TTL signal at input

The PLC-BS...TTL/1 basic terminal block is controlled with a TTL (5 V)input signal. It is equipped with either a mechanical relay or a solid-state relay. The basic terminal block equipped with a solid-state relay offers the following advantages:

- 6.2 mm slim design width
- Bridging options
- Status display
- IP67-protected solid-state relay electronic unit
- Switching capacity of up to 24 V DC/3 A
- Alternative input or power solid-state relay
- Wear-free and output-free
- Integrated protection circuit
- Integrated protective circuit
- 2.5 kV_{rms} electrical isolation between input and output
- Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
See the website for more information on connection cross sections with ferrules.
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-N/O basic terminal block for assembly with relay for TTL (5 V)



Technical data

Input data			
Rated control supply voltage U_{VN}		5 V DC	
Rated control supply voltage range with reference to U_{VN}		0.9 ... 1.2	
Rated control supply current I_{VN}		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	
Typical response time/switch-on time at U_c		35 µs	
Typical switch-off time at U_c		320 µs	
Input circuit		Yellow LED, reverse polarity protection, surge protection	
Output data with:		OPT-5DC/48DC/100	OPT-5DC/24DC/2
Max. switching voltage		48 V DC	33 V DC
Minimum switching voltage		3 V DC	3 V DC
Limiting continuous current		100 mA	3 A
Output protection		Reverse polarity protection, surge protection	Reverse polarity protection, 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 clearances and creepage distances between the power circuits		IEC 60664, EN 50178	
Degree of pollution/overvoltage 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	
EMC note		Class A product, see page 583	

Ordering data

Description	Type	Order No.	Pcs./Pkt.
PLC-INTERFACE			
with screw connection	**PLC-BSC-TTL/1**	2982689	10
with Push-in connection	**PLC-BPT-TTL/1**	2900458	10

Accessories

Pluggable 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 output

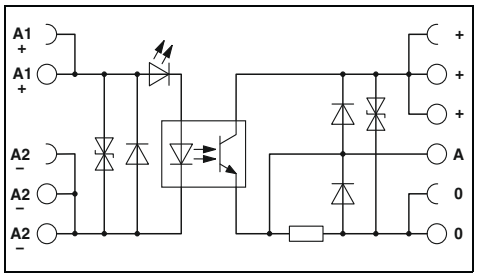
The PLC-OS...24DC/TTL with a built-in solid-state relay can be used for fast and wear-free switching of TTL (5 V) signals.

The module offers the following advantages:

– Switching capacity TTL (5 V), fan out = 1
– 6.2 mm slim design width
– Bridging options
– Status display
– Integrated protection circuit
– Integrated protective circuit
– Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
See the website for more information on connection cross sections with ferrules.

Input solid state relays with TTL (5 V) output



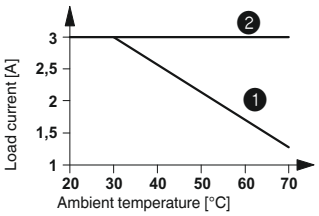
Technical data

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
Typical switch-on time at U_c		35 µs
Typical switch-off time at U_c		35 µs
Transmission frequency f_{limit}		1 kHz
Input circuit DC		Yellow LED, reverse polarity protection, 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		Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current		<80 mV
General data		
Rated insulation voltage		250 V DC
Rated surge voltage		4 kV
Insulation		Basic insulation
Ambient temperature (operation)		-25°C ... 60°C
Air clearances and creepage distances between the power circuits		IEC 60664, EN 50178
Degree of pollution/surge voltage category		2 / III
Connection data solid/stranded/AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm
EMC note		Class A product, see page 583

Ordering data

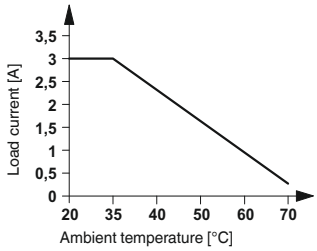
Description	Type	Order No.	Pcs./Pkt.
PLC-INTERFACE			
with screw connection	**PLC-OSC- 24DC/TTL**	2982728	10
with Push-in connection	**PLC-OPT- 24DC/TTL**	2900363	10

Derating curve for PLC-OSP...24DC/3RW



❶ Aligned without spacing
❷ Aligned with ? 20 mm spacing

Derating curve for PLC-OSP...110DC/3RW



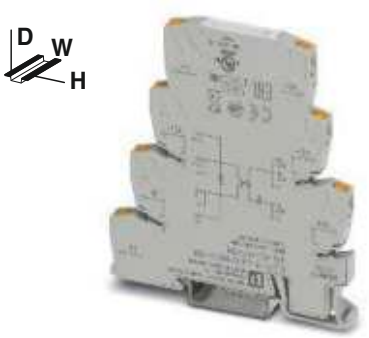
PLC-INTERFACE
with solid-state relays for railway applications

The PLC-OSP...RW interface modules are suitable for use in accordance with DIN EN 50155 (VDE 0115 Part 200) "Railway applications – Electronic equipment used on rolling stock".

The advantages:

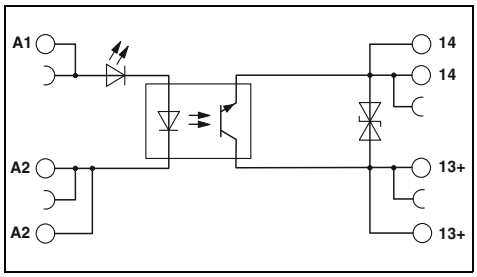
– Temperature range -25°C to +70°C
– Input voltage range 0.7-1.25 x U_N
– Shock resistance in accordance with DIN 50155 (requirements in accordance with EN 61373)
– Spring cage and Push-in connection method

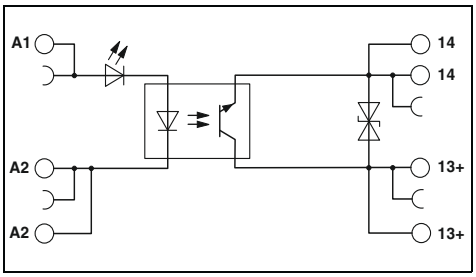
Solid-state relay module, DC output max. 3 A



Solid-state relay module, DC output max. 110 V DC/3 A

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
For derating curves see page 416
See the website for more information on connection cross sections with ferrules.





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
Typical input current at U_N	[mA]	8.5	3
Typical switch-on time at U_N	[ms]	0.04	0.08
Typical switch-off time at U_N	[ms]	0.2	0.6
Transmission frequency f_{limit}	[Hz]	300	100
Input circuit DC		Yellow LED, reverse polarity protection	
Output data			
Max. switching voltage		33 V DC	
Minimum switching voltage		3 V DC	
Limiting continuous current		3 A (see derating curve)	
Output protection		Reverse polarity protection, surge protection	
Voltage drop at maximum limiting continuous current		<200 mV	
General data			
Rated insulation voltage		250 V	
Rated surge voltage		Basic insulation	
Ambient temperature (operation)		-25°C ... 70°C	
Standards/regulations		IEC 60664, EN 50178	
Degree of pollution/surge voltage category		2 / III	
Connection data solid/stranded/AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm	
EMC note		Class A product, see page 583	

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
Typical input current at U_N	[mA]	12	12	5.5	5.5	5.5	5.5
Typical switch-on time at U_N	[ms]	0.4	0.4	0.04	0.04	0.04	0.4
Typical 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, reverse polarity protection, surge protection					
Output data							
Max. switching voltage		140 V DC					
Minimum switching voltage		12 V DC					
Limiting continuous current		3 A (see derating curve)					
Output protection		Reverse polarity protection, surge protection					
Voltage drop at maximum limiting continuous current		<150 mV					
General data							
Rated insulation voltage		160 V DC					
Rated surge voltage		Basic insulation					
Ambient temperature (operation)		-25°C ... 70°C					
Standards/regulations		IEC 60664, EN 50178					
Degree of pollution/surge voltage category		2 / III					
Connection data solid/stranded/AWG		0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14					
Dimensions	W / H / D	6.2 mm / 80 mm / 86 mm					
EMC note		Class A product, see page 583					

Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC-INTERFACE, with **Push-in connection**				
①	24 V DC	**PLC-OPT- 24DC/ 24DC/3RW**	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**	2900380	10

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-OPT- 24DC/110DC/3RW	2900391	10
PLC-OPT- 36DC/110DC/3RW	2900392	10
PLC-OPT- 48DC/110DC/3RW	2900393	10
PLC-OPT- 72DC/110DC/3RW	2900394	10
PLC-OPT- 96DC/110DC/3RW	2900395	10
PLC-OPT-110DC/110DC/3RW	2900396	10

PLC-INTERFACE
for railway applications

Relay modules with extended input voltage and temperature range, specifically for use in railway applications

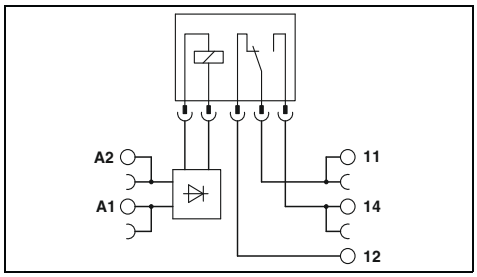
The advantages:

– Temperature range -25°C to +70°C
– Input voltage range 0.7 to 1.25 x U_N
– Vibration and shock resistance to EN 50155
– Safe isolation in accordance with DIN EN 50178 between coil and contact
– Push-in connection technology

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

Basic terminal block for assembly with 1-changeover-contact relay up to 6 A

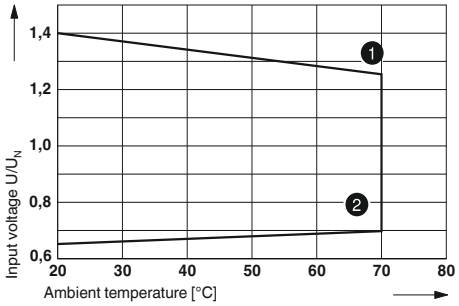
cULus EAC DNV GL



Technical data

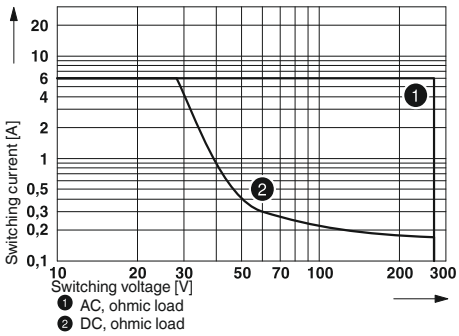
Input data			
Nominal input voltage U_N		24 V DC	
Permissible range (with reference to U_N)		See diagram	
Typical input current at U_N		12 mA	
Typical response time at U_N		5 ms	
Typical release time at U_N		8 ms	
Input circuit		Yellow LED, reverse polarity protection, free-wheeling diode	
Output data 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
Minimum switching voltage		5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current		3 A	50 mA
Maximum switch-on current		On request	50 mA
Minimum switching current		10 mA (at 12 V)	1 mA (at 24 V)
General data			
Test voltage input/output		4 kV (50 Hz, 1 min.)	
Ambient temperature (operation)		-25°C ... 70°C	
Mechanical service life		2x 10^7 cycles	
Standards/regulations		IEC 60664, EN 50178	
Degree of pollution/overvoltage 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	
EMC note		Class A product, see page 583	

Permissible input voltage range for PLC-BSP-24DC/21RW (with REL-MR-18DC/21... relay)



❶ Maximum continuous voltage when
❷ limiting continuous current = 3 A
Minimum pick-up voltage for pre-excitation with U_N and limiting continuous current = 3 A

Electrical interrupting rating for PLC...21 with 1 PDT relay



❶ AC, ohmic load
❷ DC, ohmic load

Ordering data

Description	Voltage U_N	Type	Order No.	Pcs./Pkt.
PLC-INTERFACE basic terminal block, for pluggable miniature relay with Push-in connection	24 V DC	**PLC-BPT- 24DC/21RW**	2900261	10

Accessories

Pluggable miniature relays		
REL-MR- 18DC/21	2961383	10
REL-MR- 18DC/21AU	2961493	10

PLC-INTERFACE
for railway applications

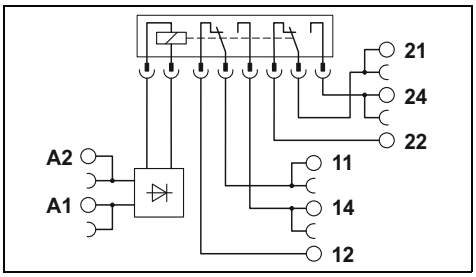
Relay module for input voltages with a nominal frequency of 16.7 Hz

The advantages:

– Input nominal frequency 16.7 Hz
– Vibration and shock resistance to EN 50155
– Safe isolation in accordance with DIN EN 50178 between coil and contact
– Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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.
See the website for more information on connection cross sections with ferrules.

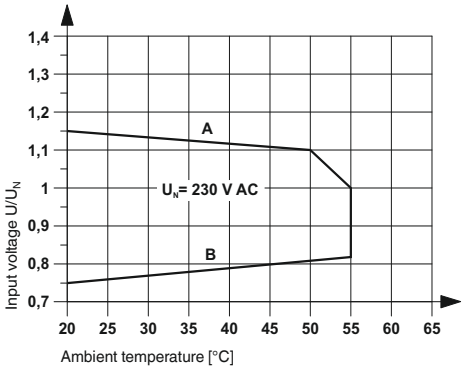
2-changeover-contact relay module for 16.7 Hz input frequency, max. 2 x 6 A



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)	See diagram	
Typical response time at U_N	20 ms	
Typical release time at U_N	60 ms	
Input circuit	Yellow LED, bridge rectifier	
Output data		
Contact type	2 PDT	
Contact material	AgNi, hard gold-plated	
Max. switching voltage	30 V AC / 36 V DC	(250 V AC/DC)
Minimum switching voltage	100 mV	(5 V AC/DC)
Limiting continuous current	50 mA	(6 A)
Maximum switch-on current	50 mA	(8 A)
Minimum switching current	1 mA	(10 mA)
General data		
Test voltage input/output	6 kV	
Ambient temperature (operation)	-25°C ... 55°C	
Mechanical service life	Approx. 3x 10^7 cycles	
Standards/regulations	IEC 60664, EN 50178	
Degree of pollution/overvoltage category	2 / III	
Connection data solid/stranded/AWG	0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14	
Dimensions W / H / D	14 mm / 80 mm / 94 mm	
EMC note	Class A product, see page 583	

Permissible input voltage range for PLC-RSP-230UC/21-21AU/RWF



Curve A
Maximum continuous voltage when limiting continuous current = 6 A

Curve B
Minimum pick-up voltage for pre-excitation with U_N and limiting continuous current = 6 A

Ordering data

Description	Voltage U_N	Type	Order No.	Pcs./Pkt.
PLC-INTERFACE with Push-in connection	230 V AC	**PLC-RPT-230UC/21-21AU/RWF**	2900345	10

PLC-INTERFACE
for railway applications

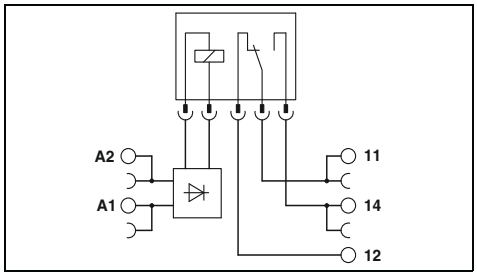
Relay modules with extended input voltage and temperature range, specifically designed for railway applications

The advantages:

– Certified to EN 50155
– Optimum relay operation, thanks to wide-range electronics
– Temperature range -40 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 in accordance with DIN EN 50178 between coil and contact
– Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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 402
See the website for more information on connection cross sections with ferrules.

1-changeover-contact relay module, 6 A, maximum



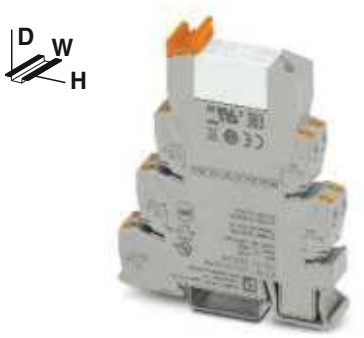
Technical data

		①	②	③
Input data				
Permissible range (with reference to U_N)		0.7 - 1.25		0.7 - 1.25
Typical input current at U_N	[mA]	9	3	2
Typical response time at U_N	[ms]	4	4	4
Typical release time at U_N	[ms]	4	4	4
Input protection:		Yellow LED, bridge rectifier, free-wheeling diode		

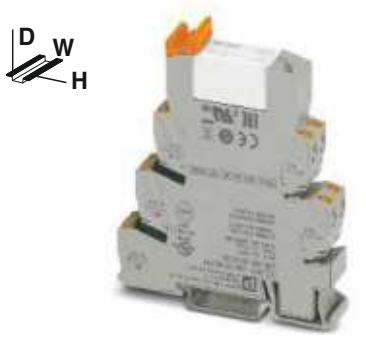
Output data			
Contact type		1 PDT	1 PDT
Contact material		AgSnO	AgSnO, hard gold-plated
Max. switching voltage		250 V AC/DC	30 V AC / 36 V DC
Minimum switching voltage		5 V (at 100 mA)	100 mV (at 10 mA)
Limiting continuous current		6 A	50 mA
Maximum switch-on current		10 A (4 s)	50 mA
Minimum switching current		10 mA (at 12 V)	1 mA (at 24 V)
General data			
Test voltage (winding/contact)		4 kV_{rms} (50 Hz, 1 min.)	
Ambient temperature (operation)		-40°C ... 70°C (temperature class TX)	
Mechanical service life		Approx. 2x 10^7 cycles	
Standards/regulations		EN 50155 (VDE 0115 part 200), EN 50178, 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	
EMC note		Class A product, see page 583	

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
PLC-INTERFACE, with **power contact**					
with Push-in connection	①	24 V DC	**PLC-RPT- 24UC/21/RW**	2900318	10
	②	72 V DC	**PLC-RPT- 72UC/21/RW**	2900319	10
	③	110 V DC	**PLC-RPT-110UC/21/RW**	2900320	10
PLC-INTERFACE, with **hard gold-plated contact**					
with Push-in connection	①	24 V DC	**PLC-RPT- 24UC/21AU/RW**	2900321	10
	②	72 V DC	**PLC-RPT- 72UC/21AU/RW**	2900322	10
	③	110 V DC	**PLC-RPT-110UC/21AU/RW**	2900323	10

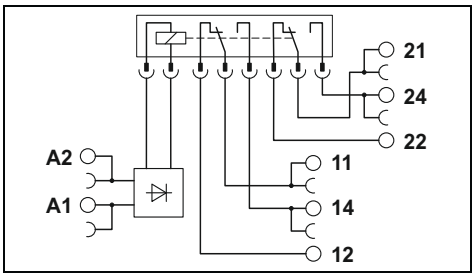


2-changeover-contact relay module, 2 x 6 A, maximum

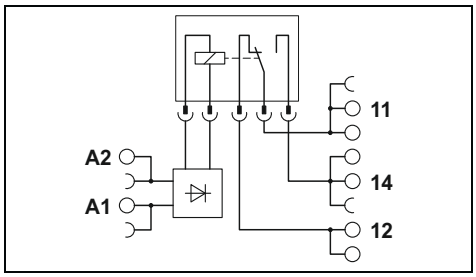


1-changeover-contact relay module, max. 10 A

cULus EAC DNV GL



cULus EAC DNV GL



Technical data

①	②	③
0.7 - 1.25		0.7 - 1.25
20	6	4.5
5	5	5
11	11	11

Yellow LED, bridge rectifier, free-wheeling diode

2 PDT	2 PDT
AgNi	AgNi, hard gold-plated
250 V AC/DC	30 V AC / 36 V DC
5 V (at 10 mA)	100 mV (at 10 mA)
6 A	50 mA
15 A (300 ms)	50 mA
10 mA (at 5 V)	1 mA (at 24 V)

5 kV_{rms} (50 Hz, 1 min.)
-40°C ... 70°C (temperature class TX)
Approx. 3x 10^7 cycles
EN 50155 (VDE 0115 part 200), EN 50178, EN 61373, EN 50121

0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
14 mm / 80 mm / 94 mm
Class A product, see page 583

Technical data

①	②	③
0.7 - 1.25		0.7 - 1.25
20	6	4.5
5	5	5
11	11	11

Yellow LED, bridge rectifier, free-wheeling diode

1 PDT
AgNi
250 V AC/DC
12 V (at 10 mA)
10 A (with inserted bridge 2967691)
30 A (300 ms)
10 mA (at 12 V)

5 kV_{rms} (50 Hz, 1 min.)
-40°C ... 70°C (temperature class TX)
Approx. 3x 10^7 cycles
EN 50155 (VDE 0115 part 200), EN 50178, EN 61373, EN 50121

0.14 - 2.5 mm^2 / 0.14 - 2.5 mm^2 / 26 - 14
14 mm / 80 mm / 94 mm
Class A product, see page 583

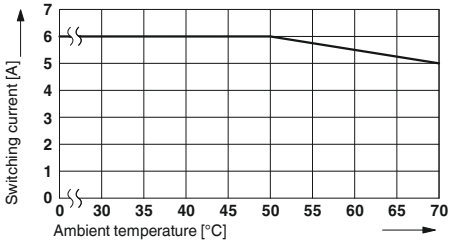
Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RPT- 24UC/21-21/RW	2900346	10
PLC-RPT- 72UC/21-21/RW	2900347	10
PLC-RPT-110UC/21-21/RW	2900348	10
PLC-RPT- 24UC/21-21AU/RW	2900349	10
PLC-RPT- 72UC/21-21AU/RW	2900350	10
PLC-RPT-110UC/21-21AU/RW	2900351	10

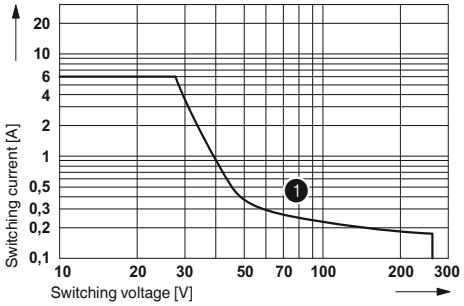
Ordering data

Type	Order No.	Pcs./Pkt.
PLC-RPT- 24UC/21HC/RW	2900324	10
PLC-RPT- 72UC/21HC/RW	2900325	10
PLC-RPT-110UC/21HC/RW	2900326	10

Derating curve for **PLC-RSP...21/RW**
PLC-RSP...21AU/RW
PLC-RSP...21-21/RW
PLC-RSP...21-21AU/RW

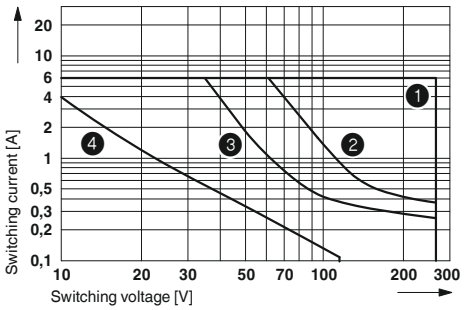


Interrupting rating for PLC-RSP...UC/21RW



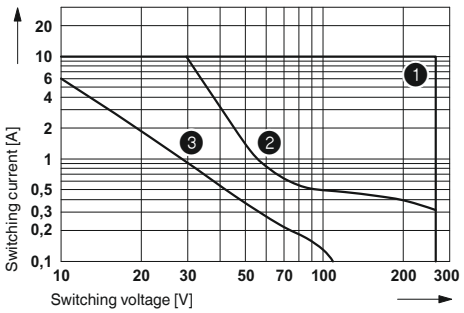
❶ Ohmic load

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 blocks for NAMUR proximity sensors

The electronic sensor terminal block, PLC-...-EIK 1-SVN from Phoenix converts the changeable resistance of a NAMUR sensor unit into a digital signal that can be read by all PLCs.

In addition, the electronics monitors the sensor side for a short circuit or open circuit and indicates these errors via an integrated LED.

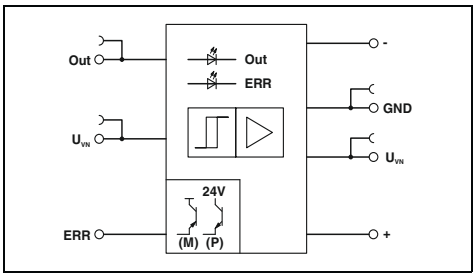
Due to a corresponding resistance circuit, the PLC-...-EIK 1-SVN can be used to monitor all mechanical switches (N/C contact or N/O contact) for short-circuits and/or wire break.

In addition to a high packing density, this switching amplifier features the following:

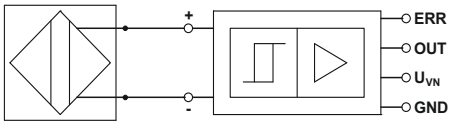
– Regulated power supply for the NAMUR proximity switch
– 24 V/50 mA digital output for directly connecting programmable logic controls
– Connection option for PLC-V8 adapter
– Screw and Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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.
See the website for more information on connection cross sections with ferrules.

For inductive proximity sensors in accordance with NAMUR, with light indicators for sensor signal and faults,

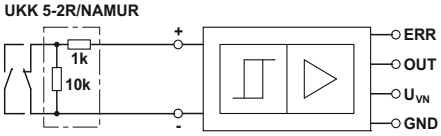


Application 1



NAMUR initiator

Application 2



Limit switch

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

Technical data

Supply		
Input supply nominal voltage U_{VN}		24 V DC
Typical input current at U_{VN}		Approx. 14 mA
Transmission frequency f_{limit}		Approx. 350 Hz
Input circuit		Green LED, reverse polarity protection, 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 maximum 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 maximum limiting continuous current		≤1.5 V (U_R)
Output protection		Surge protection
General data		
Rated insulation voltage		50 V DC
Rated surge voltage		0.4 kV
Insulation		Basic insulation
Ambient temperature (operation)		-25°C ... 50°C
Standards/regulations		IEC 60664, EN 50178
Degree of pollution/overvoltage 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
EMC note		Class A product, see page 583

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**	2982663	10
with Push-in connection	**PLC-PT-EIK 1-SVN 24P/P**	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

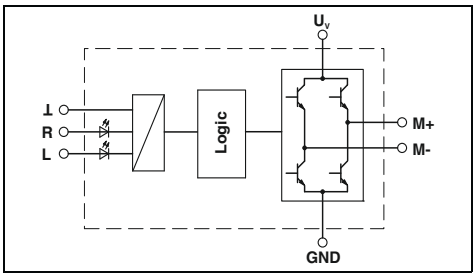
PLC series
Electronic reversing load relays for DC motors

The PLC-S...-ELR W 1/2-24DC electronic reversing load relays are used to switch mechanically commutated DC motors up to 24 V/2 A.

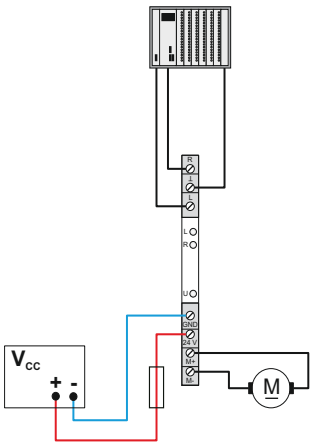
– Wear-free reversing
– Braking by controlling both inputs
– Short-circuit and surge and overload-proof output
– Integrated locking circuit and load wiring
– Screw or Push-in connection technology

Notes:
Type of insulating housing: Polyamide PBT non-reinforced, color: gray.
Marking systems and mounting material See Catalog 3
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
See the website for more information on connection cross sections with ferrules.

DC reversing load relay with overload and short-circuit-proof output



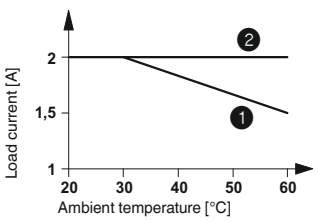
Application example for PLC-S...ELR W 1/2-24DC



Status table

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

Derating curve for PLC-S...ELR W 1/2-24DC



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, reverse polarity protection, surge protection
PWM option		
Maximum clock frequency of the PWM at the control inputs		1,000 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, reverse polarity protection, 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
Rated surge voltage / insulation		0.5 kV / basic insulation
Ambient temperature (operation)		-25°C ... 60°C
Standards/regulations		IEC 60664, EN 50178
Degree of pollution/overvoltage 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
EMC note		Class A product, see page 583

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**	2980539	1
with Push-in connection	**PLC-PT-ELR W1/ 2-24DC**	1069556	1

PLC-INTERFACE
Pulse expansion modules

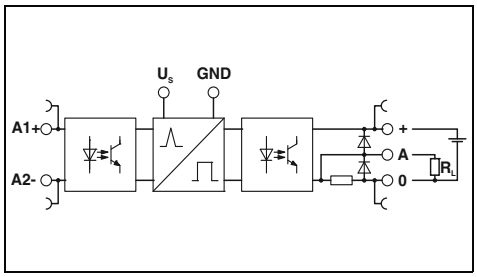
Solid-state relays for acquiring and extending short pulses.

– 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

Notes:

See the website for more information on connection cross sections with ferrules.

Solid-state relay module for the extension of input pulses, DC output max. 100 mA

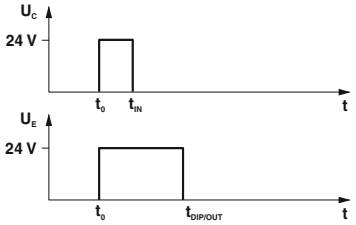


Technical data

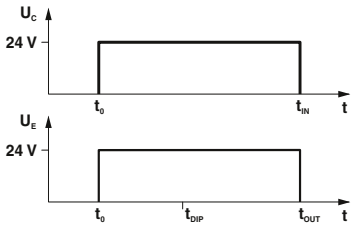
Input data		
Rated control supply voltage U_S		24 V DC
Rated control supply voltage range with reference to U_S		0.8 ... 1.2
Rated control supply current I_S		
- Input low, output low		13 mA
- Input high, output high		19 mA
Rated actuating voltage U_C		24 V DC
Rated actuating current I_C		3 mA
Switching 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		Reverse polarity protection, surge protection
Output data		
Output voltage range U_E		3 V DC ... 48 V DC
Limiting continuous current		100 mA
Voltage drop at maximum limiting continuous current		<1 V DC
Output circuit		3-conductor, ground-referenced
Output protection		Reverse polarity protection, surge protection, free running
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
EMC note		Class A product, see page 583

Ordering data

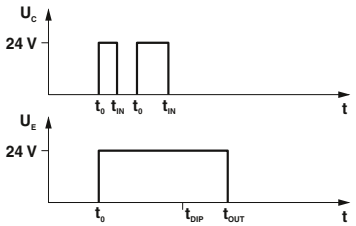
Description	Type	Order No.	Pcs./Pkt.
PLC INTERFACE, with **screw connection**	**PLC-OSC-LPE-24DC/48DC/100**	2903171	1
PLC-INTERFACE, with **Push-in connection**	**PLC-OPT-LPE-24DC/48DC/100**	2903173	1



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 power terminal **PLC-ESK** helps in supplying the bridge potentials, the partition plate **PLC-ATP** helps in optical and safe disconnection of the adjacent PLC modules. The passive feed-through bridge **PLC-BP (A1-14)** is used instead of a relay and connects the A1 and 14 terminal points.

Feed-in terminal and partition plate

Feed-through bridge

Description	Color	Ordering data: Type	Order No.	Pcs./Pkt.	Ordering data: Type	Order No.	Pcs./Pkt.
Power terminal, 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 also serves in 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				**PLC-BP A1-14**	2980283	10

PLC accessories

The colored isolated FBST plug-in bridges are not required for the PLC interface to up to 70%. The 500 mm long "Endless bridges" **FBST 500-PLC** are especially effective. The 2-pos. single plug-in bridges **FBST 6** are especially suited for bridging a smaller number of PLC modules.

Plug-in bridge systems

Marking material

Description	Color	Ordering data: Type	Order No.	Pcs./Pkt.	Ordering data: Type	Order No.	Pcs./Pkt.
Continuous 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					**ZB 6,LGS:FORTL.ZAHLEN**	1051016	10

Adapters for PLC-INTERFACE

PLC-V8/... are the VARIOFACE adapters which connect the narrow PLC-INTERFACE modules to the VARIOFACE system cabling:

Notes:

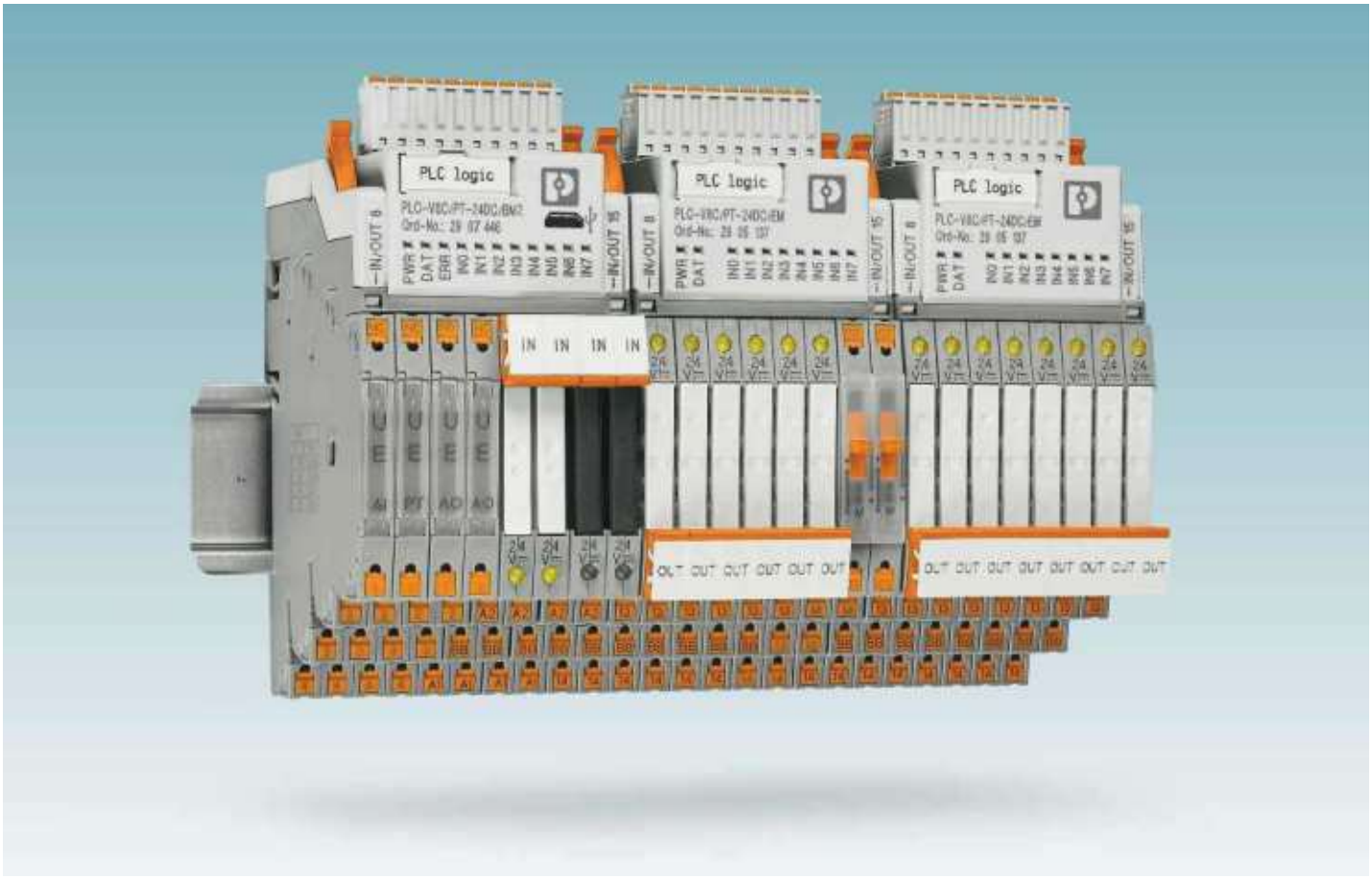
Cross list with matching PLC-INTERFACE modules, see page 534

VARIOFACE adapter for 6.2 mm PLC-INTERFACE

VARIOFACE adapter for 14 mm PLC-INTERFACE

		Technical data	Technical data
Maximum permissible operating voltage		30 V DC	30 V DC
Maximum permissible current (per branch)		1 A (per signal path)	1 A (per signal path)
Maximum total current (voltage supply)		3 A	3 A
Ambient temperature (operation)		-40°C ... 70°C	-40°C ... 70°C
Standards/regulations		IEC 60664, DIN EN 50178	IEC 60664, DIN EN 50178
Connection method	Supply	Screw connection	Screw connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
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	39 mm / 56 mm	39 mm / 56 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 IDC/FLK pin strip, for PLC system cabling, **positive switching**								
Output	14	50 mm	**PLC-V8/FLK14/OUT**	2295554	1			
Input	14	50 mm	**PLC-V8/FLK14/IN**	2296553	1			
V8 adapter, for 8 PLC-INTERFACES (6.2 mm), with IDC/FLK pin strip, for PLC system cabling, **negative switching**								
Output	14	50 mm	**PLC-V8/FLK14/OUT/M**	2304102	1			
Input	14	50 mm	**PLC-V8/FLK14/IN/M**	2304115	1			
V8 output adapter, for 8 PLC-INTERFACES (6.2 mm), with D-SUB connection								
Pin strip	15	50 mm	**PLC-V8/D15S/OUT**	2296058	1			
Socket strip	15	50 mm	**PLC-V8/D15B/OUT**	2296061	1			
V8 input adapter, for 8 PLC-INTERFACES (6.2 mm), with D-SUB connection								
Pin strip	15	50 mm	**PLC-V8/D15S/IN**	2296074	1			
Socket strip	15	50 mm	**PLC-V8/D15B/IN**	2296087	1			
V8 adapter, for 8 PLC-INTERFACES (14 mm), with IDC/FLK pin strip, for PLC system cabling, **positive switching**								
	14	112.5 mm				**PLC-V8L/FLK14/OUT**	2299660	1
V8 adapter, for 8 PLC-INTERFACES (14 mm), with IDC/FLK pin strip, for PLC system cabling, **negative switching**								
	14	112.5 mm				**PLC-V8L/FLK14/OUT/M**	2304306	1



Extremely compact control

The PLC logic programmable logic relay system is the extremely compact way to carry out small automation tasks easily and flexibly. It consists of the PLC-V8C logic modules, the PLC-INTERFACE relay system, and the LOGIC+ software. The logic modules are simply plugged into a row of eight PLC-INTERFACE terminal blocks and combine the logic and interface level in one unit. Depending on the switching requirements, plug-in electromechanical and solid-state relays can be combined in order to flexibly switch and control the I/O signals.

PLC logic processes digital and analog input signals as well as logic functions and timer modules – and replaces conventional switching and control devices. Up to 16 I/O signals can be processed using the stand-alone logic modules – that's with a design width of just 50 mm. If more I/O signals are required, a maximum of 48 I/O signals can be linked using the basic and extension modules.

Switching and controlling with plug-in relays

– PLC logic brings together the standard combination of logic module and separate plug-in relay and eliminates the wiring effort and additional switching elements
– Convenient connections with screw or Push-in connection technology, which also accommodate return conductors, remove the need for separate potential terminal blocks
– Each channel can be freely configured as an input or output and with relay or analog modules

Intuitive programming

Programming is quick and easy with the intuitive LOGIC+ programming software. Ladder (LD) and function block diagrams (FBD) can be created by selecting the relevant functions and their connection using drag & drop. The graphical representation of PLC logic in the hardware editor supports intuitive operation. The programs created can be simulated offline on the PC and tested online during operation. Basic functions, such as AND, OR, NOT, etc. are complemented by special functions, such as counters, seven-day timers, timer modules, and mathematical functions, to name a few.

Logic modules with plug-in relays

PLC logic combines a logic module and plug-in relay and eliminates the wiring effort and additional switching elements. Each relay channel can be flexibly equipped with an electromechanical or a solid-state relay. PLC logic processes 16 I/O signals with just one logic module and boasts an extremely compact design width of just 50 mm.

Intuitive programming with LOGIC+

– Function block diagram or ladder diagram
– Numerous integrated function blocks
– Specific function blocks are available to download
– Hardware view in the program
– Can be downloaded free of charge

Your web code: #0139

Visualization using a touch panel

For jobs requiring control, operation, and monitoring, the BTP 2000 series HMIs go perfectly with PLC logic. Basic touch panels can be used to visualize all the logic module process data. Three different display sizes enable clear representation, from simple alphanumeric images to graphics-intensive images with object animation.

Easily connect extension modules

The basic module and the extension module are connected via integrated connectors – no tools required. A maximum of two extension modules can be connected to a basic module. This means that PLC logic can work with up to 48 I/Os.

Control and monitor via Bluetooth adapter

Together with the PLC logic app, the Bluetooth adapter is available for wireless access to process data between the logic module and the mobile end device, and can be used for operation and monitoring purposes.

The Bluetooth connection enables efficient monitoring of multiple logic modules, with just one visualization device.

Integration into common bus systems

PLC logic is integrated into various networks via optional adaptable fieldbus gateways. This enables bidirectional communication with a higher-level controller for remote control as well as diagnostics and visualization.

Gateways are available for transmitting data via PROFIBUS DP, Modbus/TCP, CANopen®, PROFINET, and EtherNet/IP™.

Logic modules

PLC-V8C devices are the plug-in logic modules which form the PLC logic relay system in conjunction with the narrow 6.2 mm PLC-INTERFACE terminal blocks. Eight freely-selectable PLC-INTERFACE terminal blocks must be separately ordered for each logic module. You can find an overview of matching PLC-INTERFACE terminal blocks on page 436.

All logic modules feature these properties:

– 8 integrated digital inputs (two of which can be configured as analog inputs)
– A further 8 channels can be configured with matching PLC-INTERFACE terminal blocks as inputs or outputs
– Programming with LOGIC+ software

PLC-V8C.../SAM2

– Stand-alone logic module with 16 I/Os, not extendable
– Connection to PC via micro USB socket
– Integrated realtime clock (RTC)
– Accommodates external IFS-CONFSTICK memory block
– Relay and analog modules can be used

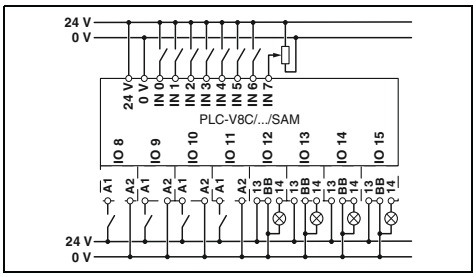
PLC-V8C.../BM2

– Basic logic module with 16 I/Os, can be extended with a maximum of two extension modules (PLC-V8C.../EM) to 48 I/Os
– Connection to PC via micro USB socket
– Integrated realtime clock (RTC)
– Accommodates external IFS-CONFSTICK memory block
– Optional connection to IFS gateways
– Relay and analog modules can be used

PLC-V8C.../EM

– Extension logic module with 16 I/Os, for extending the basic module
– Relay modules can be used

Stand-alone module



Technical data

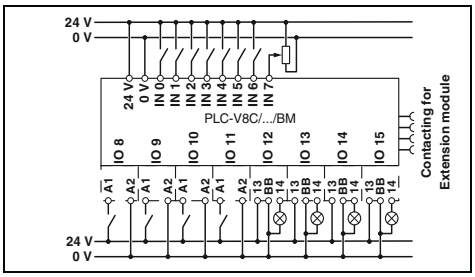
Supply	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 26.4 V DC
Maximum input current at U_N	160 mA
Input data (digital)	
Number of inputs	8 (2 configurable as analog)
Input voltage	24 V DC
Description of the input	EN 61131-2, type 3
Input current 0-signal	<1 mA
Input current 1-signal	Typically 2.5 mA
Input data (analog)	
Number of inputs	2 (IN6 and IN7 are configurable as analog)
Input voltage range	0 V ... 10 V
Input resistance	>3.5 kΩ
Input data (PLC-INTERFACE)	
Number of inputs	≤8
Output data (for controlling PLC-INTERFACE)	
Number of outputs	≤8
Nominal voltage	24 V DC
Nominal current	9 mA
Realtime clock (basic module only)	
Buffer time (capacitor)	96 h (capacitor)
Realtime clock accuracy	±2 s/d
General data	
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Permissible humidity (operation)	95%
Air clearances and creepage distances between the power circuits	DIN EN 50178
Rated insulation voltage	50 V
Rated surge voltage	0.8 kV
Insulation	Basic insulation
Mounting type	Can be plugged onto 8 x PLC-INTERFACE terminal blocks
Degree of protection	IP20
Screw connection rigid / flexible / AWG	0.14 - 1.5 mm² / 0.14 - 1.5 mm² / 26 - 16
Push-in connection rigid / flexible / AWG	0.14 - 1.5 mm² / 0.14 - 1.5 mm² / 26 - 16

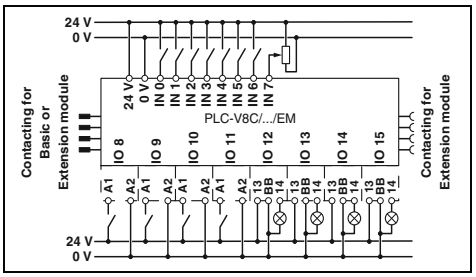
Ordering data

Description	Type	Order No.	Pcs./Pkt.
PLC-V8C plug-in logic modules with Push-in connection	**PLC-V8C/PT-24DC/SAM2**	2907443	1

Basic module
(can be extended)

Extension module





Technical data

24 V DC	
19.2 V DC ... 26.4 V DC	
160 mA	
8 (2 configurable as analog)	
24 V DC	
EN 61131-2, type 3	
<1 mA	
Typically 2.5 mA	
2 (IN6 and IN7 are configurable as analog)	
0 V ... 10 V	
>3.5 kΩ	
≤8	
≤8	
24 V DC	
9 mA	
96 h (capacitor)	
±2 s/d	
-20°C ... 50°C	
-20°C ... 70°C	
95%	
DIN EN 50178	
50 V	
0.8 kV	
Basic insulation	
Can be plugged onto 8 x PLC-INTERFACE terminal blocks	
IP20	
0.14 - 1.5 mm² / 0.14 - 1.5 mm² / 26 - 16	
0.14 - 1.5 mm² / 0.14 - 1.5 mm² / 26 - 16	

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-V8C/PT-24DC/BM2	2907446	1

Technical data

24 V DC	
19.2 V DC ... 26.4 V DC	
65 mA	
8 (2 configurable as analog)	
24 V DC	
EN 61131-2, type 3	
<1 mA	
Typically 2.5 mA	
2 (IN6 and IN7 are configurable as analog)	
0 V ... 10 V	
>3.5 kΩ	
≤8	
≤8	
24 V DC	
9 mA	
-	
-	
-20°C ... 45°C	
-20°C ... 70°C	
95%	
DIN EN 50178	
50 V	
0.8 kV	
Basic insulation	
Can be plugged onto 8 x PLC-INTERFACE terminal blocks	
IP20	
0.14 - 1.5 mm² / 0.14 - 1.5 mm² / 26 - 16	
0.14 - 1.5 mm² / 0.14 - 1.5 mm² / 26 - 16	

Ordering data

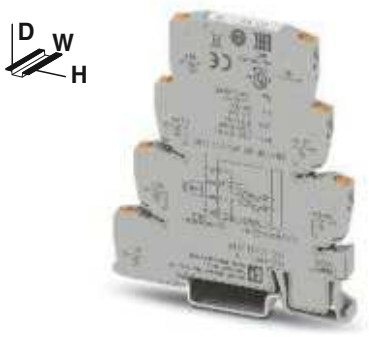
Type	Order No.	Pcs./Pkt.
PLC-V8C/PT-24DC/EM	2905137	1

Analog modules

Together with the PLC logic modules, the analog modules enable analog standard signals to be processed.

The analog modules are connected to PLC logic stand-alone modules or basic modules.

– Status indicator for supply voltage and diagnostics
– Standard configuration: 4 to 20 mA or Pt 100



Analog input

Analog input

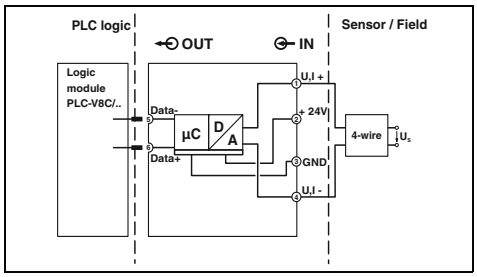
– Available standard signals: 0 to 20 mA, 4 to 20 mA, 0 to 10 V or 2 to 10 V (configurable via DIP switch)

Temperature transducer

– 2-conductor Pt 100 or Pt 1000 (configurable via DIP switch)
– Temperature measuring range: -50 to 200°C

Analog output

– Available standard signals: 0 to 20 mA, 4 to 20 mA, 0 to 10 V or 2 to 10 V (configurable via DIP switch)



Technical data

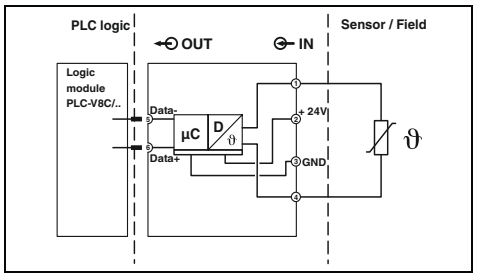
Supply		
Rated control supply voltage U_S	24 V DC	
Rated control supply voltage range with reference to U_S	0.8 ... 1.1	
Rated control supply current I_S	13 mA	
Operating voltage display	Green LED	
Input signal	Voltage input	Current input
Input signal	0 V ... 10 V 2 V ... 10 V	0 mA ... 20 mA 4 mA ... 20 mA
Input resistance	>120 kΩ	~ 40 Ω
Output data		
Output signal	-	
Maximum output signal	-	
Load R_B	-	
Ripple	-	
General data		
Ambient temperature (operation)	-20°C ... 50°C	
Ambient temperature (storage/transport)	-20°C ... 70°C	
Air clearances and creepage distances between the power circuits	DIN EN 50178	
Rated insulation voltage	50 V	
Rated surge voltage	0.5 kV	
Insulation	Basic insulation	
Mounting type	In rows with zero spacing	
Degree of protection	IP20	
Screw connection rigid / flexible / AWG	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
Push-in connection rigid / flexible / AWG	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	

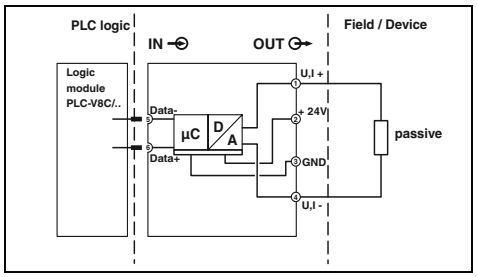
Ordering data

Description	Type	Order No.	Pcs./Pkt.
with Push-in connection	**PLC-APT-UI-IN**	2906917	1
with Push-in connection			
with Push-in connection			

Temperature transducer

Analog output





Technical data

24 V DC	
0.8 ... 1.1	
14 mA	
Green LED	
Temperature range	
-50°C ... 200°C	
-	
-	
-	
-	
-	
-20°C ... 50°C	
-20°C ... 70°C	
DIN EN 50178	
50 V	
0.5 kV	
Basic insulation	
In rows with zero spacing	
IP20	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-APT-PT100-IN	2906919	1

Technical data

24 V DC	
0.8 ... 1.1	
≤28 mA	
Green LED	
-	
-	
Voltage output	Current output
0 V ... 10 V 2 V ... 10 V	0 mA ... 20 mA 4 mA ... 20 mA
12.3 V	24.6 mA
10 kΩ	500 Ω (20 mA)
<20 mV_{PP}	-
-20°C ... 50°C	
-20°C ... 70°C	
DIN EN 50178	
50 V	
0.5 kV	
Basic insulation	
In rows with zero spacing	
IP20	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	
0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14	

Ordering data

Type	Order No.	Pcs./Pkt.
PLC-APT-UI-OUT	2906921	1

Accessories
Programming cable and memory block

– The programming cable (MICRO USB B to USB A) is used to connect PLC logic to a PC, length: 2 m
– PLC logic programs are saved by the memory block or can be easily copied to other devices

Cable for programming

Memory block

	Technical data	Technical data
General data		
EMC note		Class A product, see page 583

	Ordering data			Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Programming cable							
		CAB-USB A/MICRO USB B/2,0M	2701626	1			
Multi-functional memory block for the Interface system							
- Flat design					**IFS-CONFSTICK**	2986122	1

Accessories
PLC logic starter kit

The PLC logic starter kit with 8 inputs and 8 outputs contains all the components needed to get started quickly and easily with PLC logic with Push-in connection technology.
– PLC-V8C-PT/24DC/SAM2 plug-in logic module
– PLC-RPT-24DC/1/ACT eight relay output terminal blocks
– Micro USB programming cable

Starter kit with stand-alone module

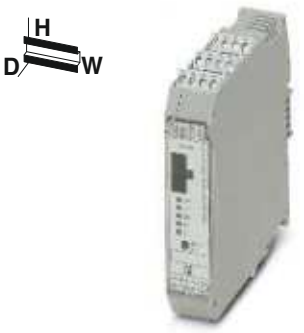
	Ordering data		
Description	Color	Type	Order No.	Pcs./Pkt.
PLC logic starter kit 3, consisting of: plug-in stand-alone logic module, eight relay output terminal blocks with Push-in connection (250 V AC/DC, max. 6 A), and micro USB programming cable		**PLC-LOGIC-STARTERKIT3**	2909916	1

Accessories
IFS gateways and Bluetooth adapter

– The gateways are connected to the PLC-V8C.../BM PLC logic basic module via the DIN rail connector and the connecting cable
– The Bluetooth adapter is connected to the logic module via the memory connection

Current values are monitored and controlled via the PLC logic app.

INTERFACE system bus master terminal (IB IL IFS-MA-PAC, 2692720) for connecting PLC logic to a Inline controller, see Catalog 6, Automation



IFS gateway

Bluetooth adapter

Technical data

General data

EMC note	Class A product, see page 583

Ordering data

Description	Color	Type	Order No.	Pcs./Pkt.
IFS gateway for				
PROFIBUS DP	gray	**EM-PB-GATEWAY-IFS**	2297620	1
Modbus/TCP	gray	**EM-MODBUS-GATEWAY-IFS**	2901528	1
CANopen®	gray	**EM-CAN-GATEWAY-IFS**	2901504	1
PROFINET	gray	**EM-PNET-GATEWAY-IFS**	2904472	1
EtherNet/IP™	gray	**EM-ETH-GATEWAY-IFS**	2901988	1
Programming adapter for configuring modules with S-PORT interface				
Cable length: 3 m		**IFS-USB-DATACABLE**	2320500	1
DIN rail connector	green	**ME 22,5 TBUS 1,5/ 5-ST-3,81 GN**	2707437	50
Connecting cable for connecting PLC logic with the ME 22,5 TBUS DIN rail connector, cable length: 0.3 m		**PLC-V8C/CAB/TBUS/0,3M**	2905263	1

Technical data

Ordering data

Type	Order No.	Pcs./Pkt.
Bluetooth programming adapter, with USB and S-PORT interface		
IFS-BT-PROG-ADAPTER	2905872	1

Selection table for PLC-INTERFACE

	Push-in connection		Screw connection	
Relay output	**Type**	**Order No.:**	**Type**	**Order No.:**
1 changeover contact, output data: 6 A, 250 V AC/DC	PLC-RPT-24DC/21	2900299	PLC-RSC-24DC/21	2966171
1 changeover contact, output data: 50 mA, 36 V DC, gold contact	PLC-RPT-24DC/21AU	2900306	PLC-RSC-24DC/21AU	2966265
1 N/O contact, output data: 6 A, 250 V AC/DC, actuator type	PLC-RPT-24DC/1/ACT	2900312	PLC-RSC-24DC/1/ACT	2966210
1 N/O contact with switch, output data: 6 A, 250 V AC/DC	PLC-RPT-24UC/1/S/H	2900328	PLC-RSC-24UC/1/S/H	2982236
Solid-state relay output				
Output data: 100 mA, 3 V DC - 48 V DC	PLC-OPT-24DC/48DC/100	2900352	PLC-OSC-24DC/48DC/100	2966728
Output data: 3 A, 3 V DC - 33 V DC	PLC-OPT-24DC/24DC/2	2900364	PLC-OSC-24DC/24DC/2	2966634
Output data: 750 mA, 24 V AC - 253 V AC	PLC-OPT-24DC/230AC/1	2900369	PLC-OSC-24DC/230AC/1	2967840
Output data: 3 A, 3 V DC - 33 V DC, actuator type	PLC-OPT-24DC/24DC/2/ACT	2900376	PLC-OSC-24DC/24DC/2/ACT	2966676
Output data: 750 mA, 24 V AC - 253 V AC, actuator type			PLC-OSC-24DC/230AC/1/ACT	2967947
Output data: 1 A, 12 V DC - 300 V DC	PLC-OPT-24DC/300DC/1	2900383	PLC-OSC-24DC/300DC/1	2980678
Output data: 500 mA, 3 V DC - 48 V DC, electronic changeover contact	PLC-OPT-24DC/48DC/500/W	2900378	PLC-OSC-24DC/48DC/500/W	2980636
Output data, TTL, 50 mA, 5 V DC	PLC-OPT-24DC/TTL	2900363	PLC-OSC-24DC/TTL	2982728
Analog output				
Output signal: 0 V ... 10 V, 2 V ... 10 V, 0 mA ... 20 mA, 2 mA ... 20 mA	PLC-APT-UI-OUT	2906921	PLC-ASC-UI-OUT	2906920
Relay input				
Input voltage: 24 V DC	PLC-RPT-24DC/1AU/SEN	2900313	PLC-RSC-24DC/1AU/SEN	2966317
Input voltage: 120 V AC/DC	PLC-RPT-120UC/1AU/SEN	2900314	PLC-RSC-120UC/1AU/SEN	2966320
Input voltage: 230 V AC/DC	PLC-RPT-230UC/1AU/SEN	2900315	PLC-RSC-230UC/1AU/SEN	2966333
Input voltage: 5 V DC (basic terminal block without relay)			PLC-BSC- 5DC/ 1/SEN	2980267
Relay for 5 V DC basic terminal block			REL-MR-4,5DC/21AU	2961370
Solid-state relay input				
Input voltage: 24 V DC	PLC-OPT-24DC/V8C/SEN	2908172	PLC-OSC-24DC/V8C/SEN	2908173
Input voltage: 120 V AC/DC	PLC-OPT-120UC/V8C/SEN	2908174	PLC-OSC-120UC/V8C/SEN	2908175
Input voltage: 230 V AC/DC	PLC-OPT-230UC/V8C/SEN	2908176	PLC-OSC-230UC/V8C/SEN	2908177
Analog input				
Input signal: 0 V ... 10 V, 2 V ... 10 V, 0 mA ... 20 mA, 2 mA ... 20 mA	PLC-APT-UI-IN	2906917	PLC-ASC-UI-IN	2906916
Input signal: Pt 100 or Pt 1000 sensor	PLC-APT-PT100-IN	2906919	PLC-ASC-PT100-IN	2906918
Dummy or reserve				
Basic terminal blocks: output	PLC-BPT-24DC/21	2900445	PLC-BSC-24DC/21	2966016
Basic terminal blocks: input	PLC-BPT-24DC/1/SEN	2900262	PLC-BSC-24DC/1/SEN	2966061

LOGIC+ programming software

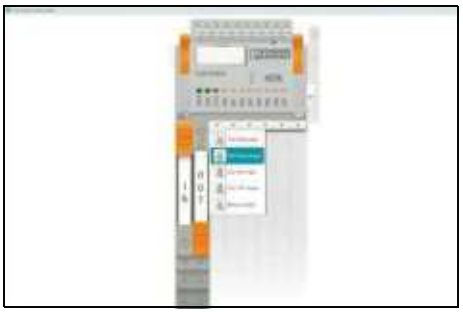
Integrated web server

PLC logic basic settings are easily configured via the integrated web server. The LOGIC+ software does not need to be installed in order to do so.

– Time and date
– Password and access control
– Firmware update
– Status indicators for inputs and outputs
– General device information

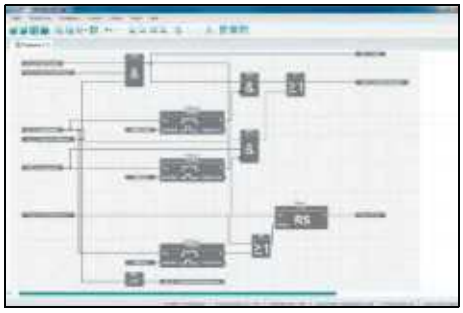
Logic+ user interface

– Clear separation in program editor, toolbox, hardware view, and signaling window
– All elements can be easily placed using drag & drop
– Notes and errors are highlighted in color in the program editor



Hardware configurator

– Each channel can be configured as an input or output and with relay or analog modules
– Clear assignment of the inputs and outputs, thanks to the graphical representation of the hardware connections



Function blocks

– Basic functions: AND, OR, NOT, XOR
– Mathematical functions: add, divide, multiply, subtract, generate absolute value
– Positive and negative edge detection
– RS and SR flip-flops
– Switch-on and switch-off delay, pulse encoder, pulse stretching, weekly clock timer
– Up and down counter
– Analog and digital comparators
– Special functions, for example, roller shutter control or pulse width modulation are available to download

Simulation and online values

Offline simulation:

– Simulation of the created program directly in LOGIC+
– Virtualization of the values in the program editor, hardware view, and in the observation window

Online values:

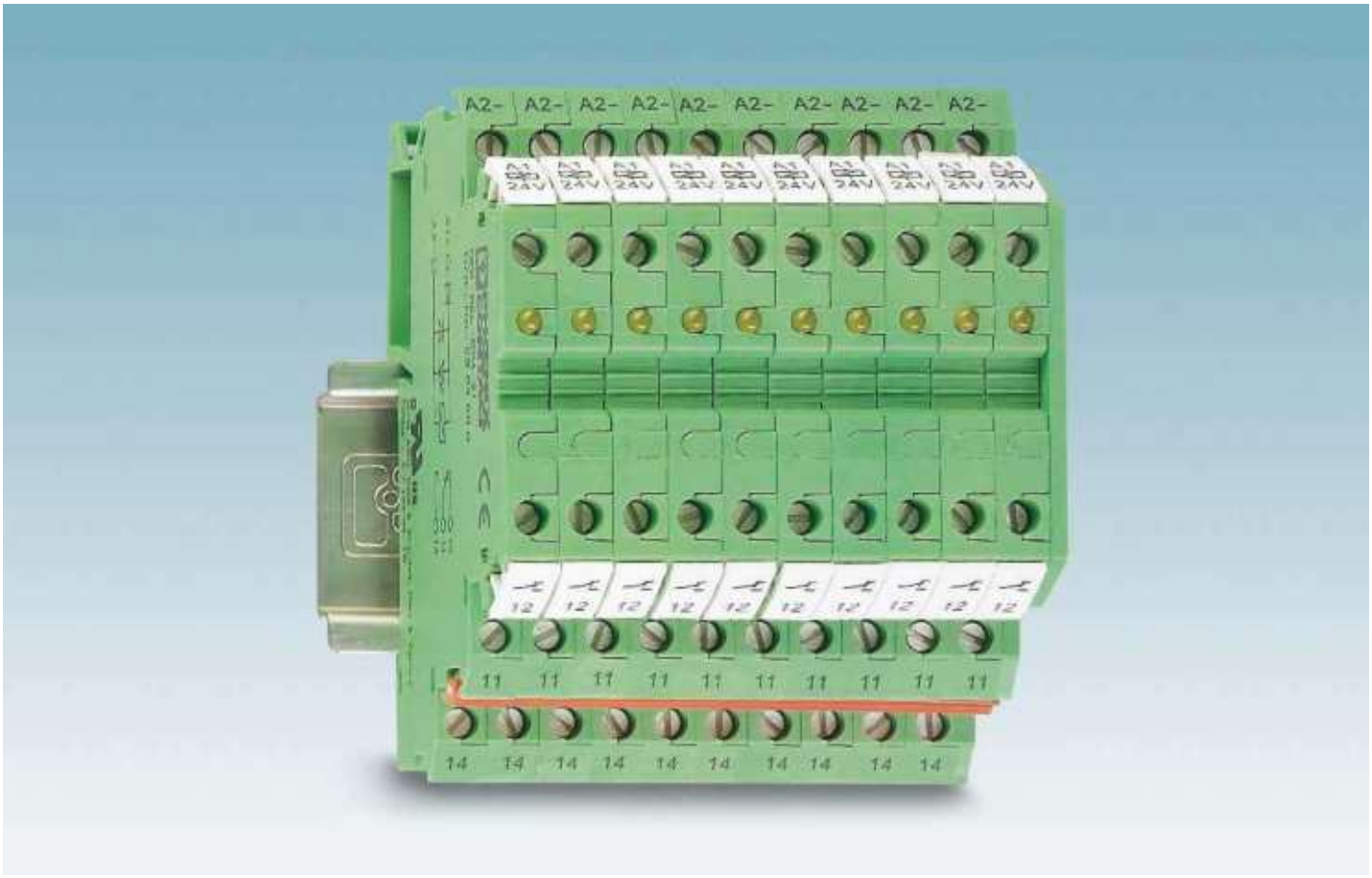
– Representation of the program running on the hardware in LOGIC+ with online values
– Overwriting values from LOGIC+

PLC logic app

Once the app is installed on your smartphone or tablet, it can be used to make parameter adjustments to the logic modules. The visualization view is created via the editor of the web server integrated in the logic modules. The app can be used for operation and monitoring, as it can access all program variables.

– Inputs and outputs (digital, analog)
– Flags
– Numerical values
– Time values

Relay modules in terminal block design – DEK series



The Phoenix Contact interface terminal blocks DEK 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 relay terminal block DEK-REL... and the solid-state relay terminal block DEK-OV....

The wear-free DEK-OV... power-level terminal is used in applications with high switching rates where electromechanical relays quickly exhaust their service life.

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 insertion bridges EB-DIK for the supply and ground signals make it possible to design the circuit simply and effectively.

Integrated protective circuits such as free-wheeling diodes, polarity reversal protection diodes and surge protection elements protect the coupling modules and ensure optimum availability of the system.

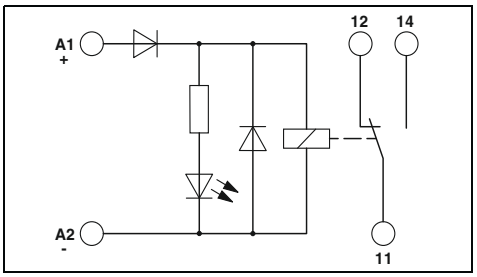
Relay terminal blocks DEK-REL-...

The Phoenix relay terminal block with PDT contact offers the following advantages:

- Width of only 6.2 mm
- High switching capacity of 250 V AC / 6 A
- Less storage, because changeover, 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 in accordance with DIN EN 50178 (VDE 0160)
- Light indicator for signalizing the switching status

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.
Other insertion bridges EB...DIK... refer to page 445

For medium to high powers
1 changeover contact (21)



Technical data

Input data		①
Permissible range (with reference to U_N)		0.8 - 1.1
Typical input current at U_N	[mA]	9
Response/release time at U_N	[ms]	8 / 5
Input protection:		Yellow LED, reverse polarity protection, free-wheeling diode
Output data		
Contact type		1 PDT
Contact material		AgSnO
Max. switching voltage		250 V AC/DC
Minimum switching voltage		12 V AC/DC
Limiting continuous current		6 A
Maximum switch-on current		6 A
Minimum switching current		10 mA
Maximum interrupting rating, ohmic load		
	24 V DC	140 W
	48 V DC	20 W
	60 V DC	18 W
	110 V DC	23 W
	220 V DC	40 W
	250 V AC	1,500 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
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
EMC note		Class A product, see page 583

Ordering data

Description		Input voltage U_N	Type		Order No.	Pcs./Pkt.
Relay terminal block with power relay						
	①	24 V DC	**DEK-REL-G24/21**		2964500	10

Accessories

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

Input interface DEK-REL-24/1/SEN and output interface DEK-REL-24/1/AKT

In addition to the familiar advantages of the electronic terminal blocks DEK-REL... 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

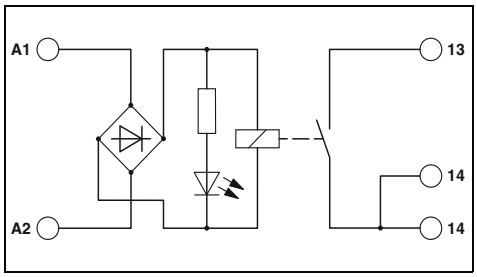
With this terminal block, all connections for a sensor or actuator are provided over a width of just 6.2 mm!

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

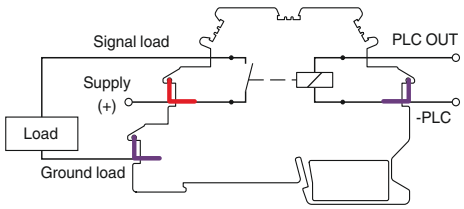
Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.
Other insertion bridges EB...DIK... refer to page 445

For low to medium powers
1 N/O contact (1)

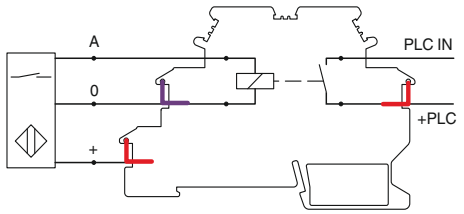


Technical data

Input data		①	②
Permissible range (with reference to U_N)		0.9 - 1.1	0.8 - 1.1
Typical 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		1 N/O contact (double contact)	
Contact material		AgNi, hard gold-plated	
Max. switching voltage		250 V AC / 125 V DC	
Minimum switching voltage		0.1 V	
Limiting continuous current		3 A (5 A up to 35°C at 24 V DC)	
Maximum switch-on current		5 A	
Minimum switching current		1 mA	
Maximum interrupting rating, ohmic load			
	24 V DC	72 W	
	48 V DC	60 W	
	60 V DC	50 W	
	110 V DC	50 W	
	250 V AC	750 VA	
General data			
Test voltage (winding/contact)		2 kV AC (50 Hz, 1 min.)	
Ambient temperature (operation)		-20°C ... 50°C	
Mechanical service life		Approx. 2x 10^7 cycles	
Standards/regulations		IEC 60664, EN 50178	
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	
EMC note		Class A product, see page 583	



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**	2941183	10
	②	24 V AC/DC	**DEK-REL- 24/I/1**	2940171	10

Accessories

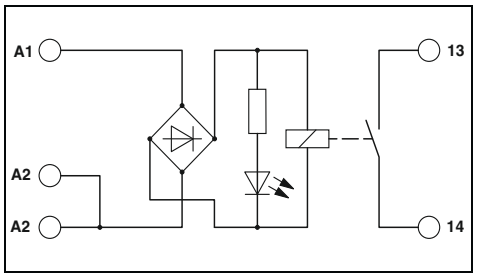
Terminal block, with three through contacts, for mounting on NS 35... For busbar feeding					
Cover			**D-DEK 1,5 GN**	2716949	10
Insertion bridge, for middle and lower levels	No. of pos.	Color			
	80	blue	**EB 80- DIK BU**	2715940	1
	80	red	**EB 80- DIK RD**	2715953	1
	80	white	**EB 80- DIK WH**	2715788	1

For low to medium powers
1 N/O contact (1)

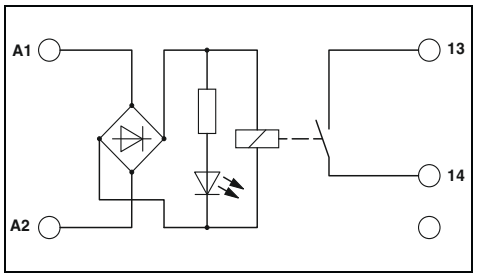
For low to medium powers
1 N/O contact (1)

For low to medium powers
1 N/O contact (1)

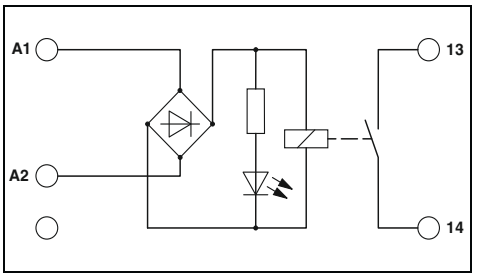
EAC



cULus EAC



cULus EAC



Technical data

	①	②
Width	0.9 - 1.1	0.8 - 1.1
Height	23	6.5
Depth	8 / 15	5 / 15
Notes	Yellow LED, bridge rectifier	
Contact type	1 N/O contact (double contact)	
Contact material	AgNi, hard gold-plated	
Switching voltage	250 V AC / 125 V DC	
Minimum switching voltage	0.1 V	
Maximum switching current	3 A (5 A up to 35°C at 24 V DC)	
Inrush current	5 A	
Minimum switching current	1 mA	
Nominal power AC	72 W	
Nominal power DC	60 W	
Nominal power DC	50 W	
Nominal power DC	50 W	
Nominal power AC	750 VA	
Dielectric strength	2 kV AC (50 Hz, 1 min.)	
Ambient temperature (operation)	-20°C ... 50°C	
Mechanical service life	Approx. 2x 10^7 cycles	
Standards	IEC 60664, EN 50178	
Connection data	0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14	
Dimensions	6.2 mm / 80 mm / 56 mm	
Note	Class A product, see page 583	

Ordering data

Type	Order No.	Pcs./Pkt.
DEK-REL- 5/O/1	**2941170**	10
DEK-REL- 24/O/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

	②
Width	0.8 - 1.1
Height	6.5
Depth	5 / 15
Notes	Yellow LED, bridge rectifier
Contact type	1 N/O contact
Contact material	AgNi, hard gold-plated
Switching voltage	250 V AC / 125 V DC
Minimum switching voltage	0.1 V
Maximum switching current	3 A (5 A up to 35°C at 24 V DC)
Inrush current	5 A
Minimum switching current	1 mA
Nominal power AC	72 W
Nominal power DC	60 W
Nominal power DC	50 W
Nominal power DC	50 W
Nominal power AC	750 VA
Dielectric strength	2 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 50°C
Mechanical service life	Approx. 2x 10^7 cycles
Standards	IEC 60664, EN 50178
Connection data	0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14
Dimensions	6.2 mm / 80 mm / 56 mm
Note	Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
DEK-REL- 24/1/AKT	**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

	②
Width	0.8 - 1.1
Height	6.5
Depth	5 / 15
Notes	Yellow LED, bridge rectifier
Contact type	1 N/O contact
Contact material	AgNi, hard gold-plated
Switching voltage	250 V AC / 125 V DC
Minimum switching voltage	0.1 V
Maximum switching current	3 A (5 A up to 35°C at 24 V DC)
Inrush current	5 A
Minimum switching current	1 mA
Nominal power AC	72 W
Nominal power DC	60 W
Nominal power DC	50 W
Nominal power DC	50 W
Nominal power AC	750 VA
Dielectric strength	2 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)	-20°C ... 50°C
Mechanical service life	Approx. 2x 10^7 cycles
Standards	IEC 60664, EN 50178
Connection data	0.2 - 2.5 mm^2 / 0.2 - 2.5 mm^2 / 24 - 14
Dimensions	6.2 mm / 80 mm / 56 mm
Note	Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
DEK-REL- 24/1/SEN	**2964050**	10

Accessories

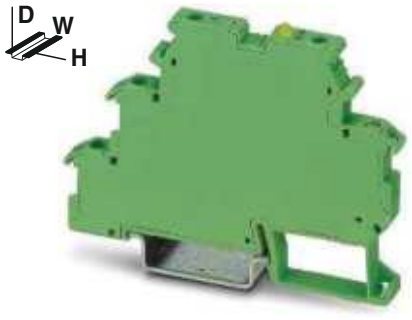
DIKD 1,5		**2715979**	50
D-DEK 1,5 GN		**2716949**	10
EB 80- DIK BU	26 A	**2715940**	1
EB 80- DIK RD	26 A	**2715953**	1
EB 80- DIK WH	26 A	**2715788**	1

Solid-state relay terminal blocks DEK-OE... and DEK-OV...

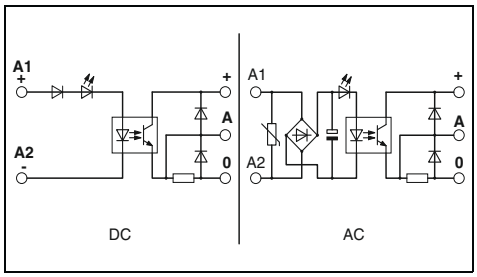
Phoenix Contact DEK-OE and DEK-OV interface terminal blocks are only 6.2 mm wide but still provide a complete input or output interface with:

- Electrical isolation between input and output at up to 2.5 kV_{rms}
- Integrated input circuit
- Status display
- Insertion bridges EB-DIK
- 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.

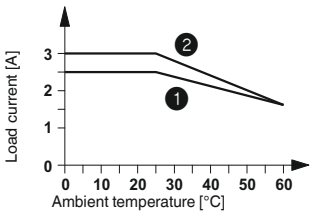
Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
Other insertion bridges EB...DIK... refer to page 445



With DC voltage output max. = 100 mA

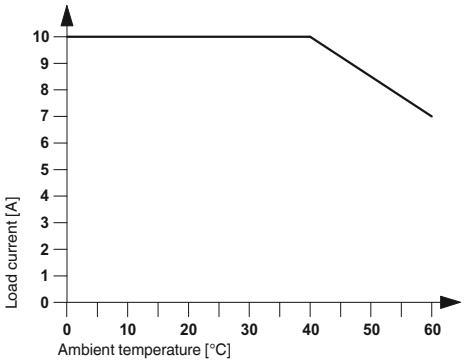


Derating curve for DEK-OV...24DC/3 and DEK-OV-24DC/24DC/3/AKT

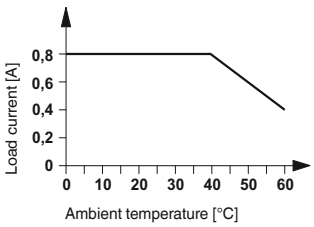


❶ Horizontal mounting
❷ Vertical mounting

Derating curve for DEK-OV-24DC/24DC/10



Derating curve for DEK-OV...240AC/800



Technical data

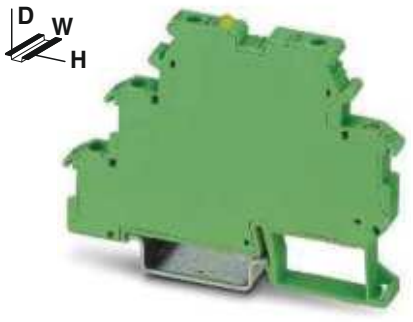
		①	②	③	④	⑤	⑥
Input data							
Permissible range (with reference to U_N)		0.9 - 1.1	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.9 - 1.1	0.9 - 1.1
Switching level with reference to U_N	1 signal ("H")	≥0.8	≥0.8	≥0.8	≥0.8	≥0.8	≥0.9
	0 signal ("L")	≤0.4	≤0.4	≤0.4	≤0.4	≤0.4	≤0.4
Typical input current at U_N	[mA]	6.5	11	7	4	3.2	2.5
Transmission frequency f_{limit}	[Hz]	300	300	300	300	3	3
Input circuit AC		Yellow LED, reverse polarity protection, surge protection					
Input circuit DC		Yellow LED, reverse polarity protection					
Output data							
Operating voltage range		3 V DC ... 48 V DC					
Periodic peak reverse voltage		-					
Limiting continuous current		100 mA					
Minimum load current		-					
Surge current		-					
Leakage current in off state		-					
Max. load value		-					
Output protection		Reverse polarity protection, free-wheeling diode					
Voltage drop at maximum 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					
Degree of pollution/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					
EMC note		Class A product, see page 583					

Ordering data

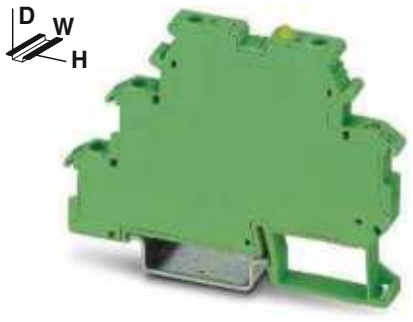
Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Solid-state input relays					
	①	5 V DC	**DEK-OE- 5DC/ 48DC/100**	2940223	10
	②	12 V DC	**DEK-OE- 12DC/ 48DC/100**	2964487	10
	③	24 V DC	**DEK-OE- 24DC/ 48DC/100**	2940207	10
	④	60 V DC	**DEK-OE- 60DC/ 48DC/100**	2941536	10
	⑤	120 V AC	**DEK-OE-120AC/ 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

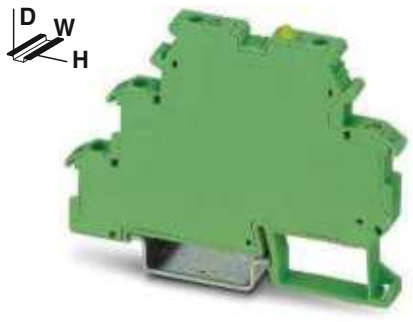
Insertion bridge, for middle and lower levels	No. of pos.	Color			
	80	blue	**EB 80- DIK BU**	26 A	2715940	1
	80	red	**EB 80- DIK RD**	26 A	2715953	1
	80	white	**EB 80- DIK WH**	26 A	2715788	1



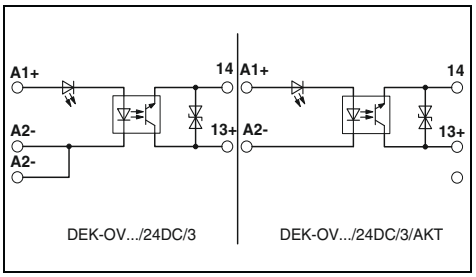
With DC voltage output
max. = 3 A

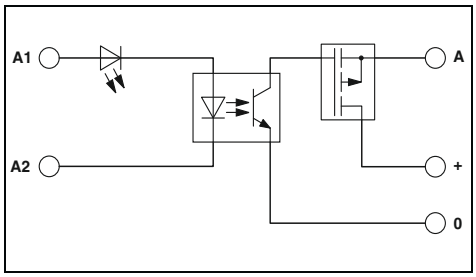


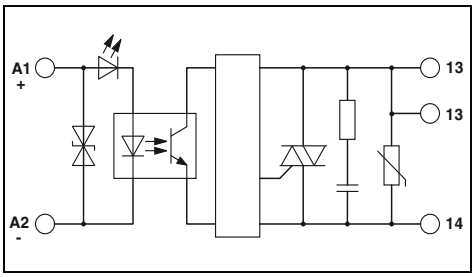
With DC voltage output
max. = 10 A



With AC voltage output
max. = 800 mA







Technical data

①	②	③	⑦
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2	0.8 - 1.2
≥0.8	≥0.8	≥0.8	≥0.8
≤0.4	≤0.4	≤0.4	≤0.4
11	8.5	7	7
300	300	300	300

Yellow LED, reverse polarity protection

3 V DC ... 30 V DC
-
3 A (see derating curve)
-
-
-
-
Reverse polarity protection, surge protection
≤0.2 V

2.5 kV (50 Hz, 1 min.)
-20°C ... 60°C
IEC 60664, EN 50178
2 / III
0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
6.2 mm / 80 mm / 56 mm
Class A product, see page 583

Technical data

①	②	③
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2
≥0.8	≥0.8	≥0.8
≤0.4	≤0.4	≤0.4
5.1	4.7	3.5
100	100	100

Yellow LED, reverse polarity protection, surge protection

5 V DC ... 30 V DC
-
10 A (see derating curve)
-
100 A (t = 20 ms)
-
-
Reverse polarity protection, surge protection
<50 mV

2.5 kV (50 Hz, 1 min.)
-20°C ... 60°C
IEC 60664, EN 50178
2 / III
0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 14
6.2 mm / 80 mm / 56 mm
Class A product, see page 583

Technical data

①	②	③
0.8 - 1.2	0.8 - 1.2	0.8 - 1.2
≥0.8	≥0.8	≥0.8
≤0.4	≤0.4	≤0.4
10.2	10.5	10.7
10	10	10

Yellow LED, reverse polarity protection, 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
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/ 24DC/ 3	2941361	10
DEK-OV- 12DC/ 24DC/ 3	2941387	10
DEK-OV- 24DC/ 24DC/ 3	2941374	10
DEK-OV- 24DC/ 24DC/ 3/AKT	2964296	10

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

Ordering data

Type	Order No.	Pcs./Pkt.
DEK-OV- 5DC/ 24DC/ 10	2961752	10
DEK-OV- 12DC/ 24DC/ 10	2961749	10
DEK-OV- 24DC/ 24DC/ 10	2964322	10

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

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

Switch/relay terminal blocks DEK-REL-24/1/S

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.

Relay interfaces for switching lamp loads ST-REL... and EMG 17-REL...

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.

Plug-in solid-state power relays ST-OV 3-24DC/400/3

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 relays, with signal logic

These modules combine the features of a short-circuit proof power solid-state relay and those of a thermomagnetic protection element.

100-kHz input solid-state relay DEK-OE-...100KHZ

Input solid-state relay for reliable transmission of high-frequency signals, such as those that occur with incremental encoders, for example.

Electronic sensor terminal blocks for NAMUR proximity sensors

For converting the changeable resistance of a NAMUR sensor into a digital signal that can be read by a PLC.

Inverter module DEK-TR/INV

Module for converting NPN outputs to PNP outputs and PNP to NPN.

Relay modules with manual switch

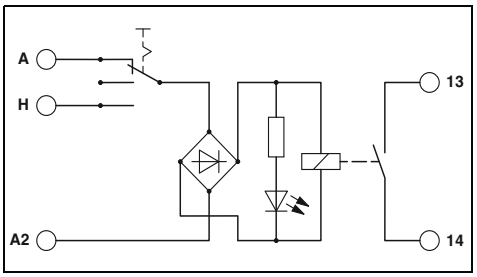
Relay modules with manual switch and integrated power relay for manual, zero, and automatic functions

The advantages:

– Maximum switching current 5 A
– Width of only 6.2 mm
– Increased contact stability thanks to double contact
– Safe isolation in accordance with DIN EN 50178 between coil and contact

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
For the protection of input and output, inductive loads must be dampened with an effective protection circuit.
Use of EB 80-DIK... bridges in the DEK terminal blocks: Absorption of humidity from the ambient air as well as an unfavorable tolerance between a larger number of DEK terminal blocks and the EB 80-DIK... bridge may cause (minor) expansion of the DEK housing. When the EB 80-DIK... bridges are used, therefore, it is recommended that these be disconnected after about 10 to 12 DEK terminal blocks and a wire bridge to the next DEK terminal block be inserted in their place.

Relay module with manual switch and integrated relay



Technical data

Input data		①
Permissible range (with reference to U_N)		0.8 - 1.1
Typical input current at U_N	[mA]	6.5
Response/release time at U_N	[ms]	5 / 15
Input protection:		Yellow LED, bridge rectifier
Output data		
Contact type		1 N/O contact
Contact material		AgNi, hard gold-plated
Max. switching voltage		250 V AC / 125 V DC
Minimum switching voltage		0.1 V
Limiting continuous current		3 A (5 A up to 35°C at 24 V DC)
Maximum switch-on current		5 A
Minimum switching current		1 mA
Maximum interrupting rating, ohmic load		
	24 V DC	72 W
	48 V DC	60 W
	60 V DC	50 W
	110 V DC	50 W
	250 V AC	750 VA
General data		
Test voltage (winding/contact)		2 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 50°C
Mechanical service life		Approx. 2x 10^7 cycles
Standards/regulations		IEC 60664, EN 50178
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
EMC note		Class A product, see page 583

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Relay module with power relay					
	①	24 V AC/DC	**DEK-REL- 24/1/S**	2964131	10

Accessories

Cover			**D-DEK 1,5 GN**	2716949	10
Insertion bridge	Poles	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
	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

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

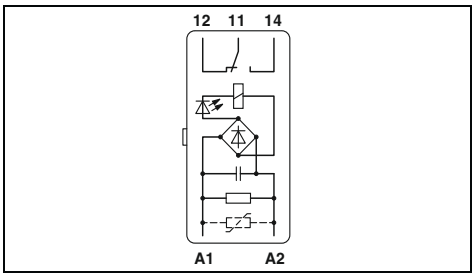
Notes:

Load current diagrams, see page 402

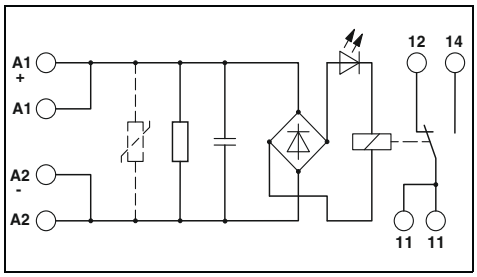
1 changeover contact, plug-in relay

1 changeover contact, soldered-in relay

EAC



EAC



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
Typical 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
Maximum switch-on current		8 A	0.2 A
Maximum 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	1,500 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. 2x 10^7 cycles
Standards/regulations		IEC 60664, EN 50178
Connection data solid/stranded/AWG		- / - / -
Dimensions	W / H / D	20.8 mm / 42.5 mm / 112 mm
EMC note		

Technical data

Input data		③
Permissible range (with reference to U_N)		0.9 - 1.1
Typical input current at U_N	[mA]	18
Response/release time at U_N	[ms]	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
Maximum switch-on current		8 A	0.2 A
Maximum 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	1,500 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. 2x 10^7 cycles
Standards/regulations		IEC 60664, EN 50178
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
EMC note		Class A product, see page 583

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			

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

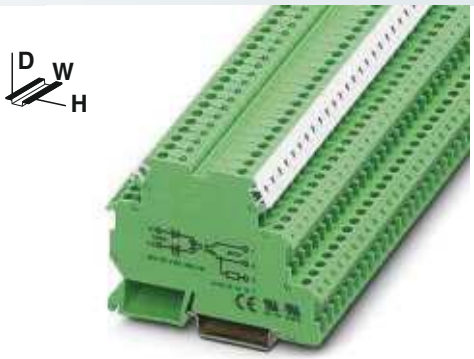
Notes:

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 3

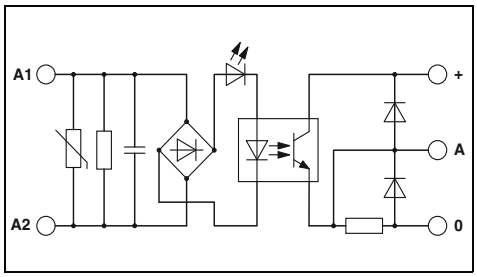
For derating curve, refer to page 401

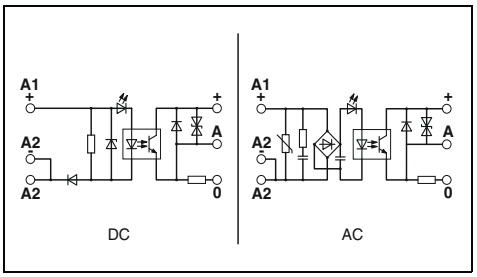
Use of EB 80-DIK... bridges in the DEK terminal blocks: Absorption of humidity from the ambient air as well as an unfavorable tolerance between a larger number of DEK terminal blocks and the EB 80-DIK... bridge may cause (minor) expansion of the DEK housing. When the EB 80-DIK... bridges are used, therefore, it is recommended that these be disconnected after about 10 to 12 DEK terminal blocks and a wire bridge to the next DEK terminal block be inserted in their place.



Solid-state input relay
max. 100 mA

Solid-state power relay
max. 2 A





Technical data

Input data		②	①
Permissible range (with reference to U_N)		0.9 - 1.1	0.8 - 1.2
Switching level	1 signal ("H") [V DC] ≥	207	16.8
	0 signal ("L") [V DC] ≤	92	16
Typical input current at U_N	[mA]	2.5	8
Typical switch-on time at U_N	[ms]	4.4	0.02
Typical switch-off time at U_N	[ms]	14	0.2
Transmission frequency f_{limit}	[Hz]	5	300
Input circuit AC		Yellow LED, surge protection, RC element	
Input circuit DC			Reverse polarity protection
Output data			
Max. switching voltage		48 V DC	48 V DC
Minimum switching voltage		3 V DC	12 V DC
Limiting continuous current		100 mA	2 A (see derating curve)
Maximum switch-on current		-	5 A (t = 1 s)
Output circuit		3-conductor, ground-referenced	3-conductor, ground-referenced
Output protection		Reverse polarity protection, free running	Reverse polarity protection, surge protection
Voltage drop at maximum limiting continuous current		≤0.9 V	1.1 V
General data			
Test voltage input/output		2.5 kV AC	3.5 kV AC
Ambient temperature (operation)		0°C ... 50°C	-10°C ... 55°C
Standards/regulations		IEC 60664, EN 50178	IEC 60664, EN 50178
Degree of pollution/surge voltage category		2 / III	2 / III
Mounting position/mounting		Any / in rows with zero spacing	- / mounted in rows with zero spacing: horizontal/not in rows: any
Connection data solid/stranded/AWG		0.2 - 2.5 mm² / 0.2 - 2.5 mm² / 24 - 12	0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions	W / H / D	6.2 mm / 80 mm / 56 mm	17.5 mm / 75 mm / 102 mm
EMC note			Class A product, see page 583

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		

Ordering data

Type	Order No.	Pcs./Pkt.
EMG 17-OV- 24DC/ 48DC/2	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 model EMG 17-REL...2E/SO38, this switching capacity is reached using a power relay with a set of silver tin oxide (AgSnO) contacts.

The module is available in two versions:

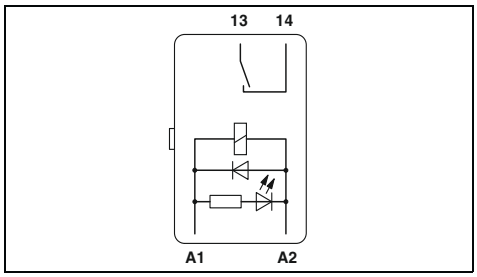
– Modular EMG housing that can be mounted on a DIN rail, with an overall width of 17.5 mm
– Convenient plug-in housing ST-REL from the Phoenix ST series for mounting on the basic terminal blocks URELG or UDK-RELG

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 3

Medium to high powers
1 N/O contact (1)



Technical data

Input data		①
Permissible range (with reference to U_N)		0.85 - 1.1
Typical input current at U_N	[mA]	28
Response/release time at U_N	[ms]	13 / 15
Input protection:		Yellow LED, free-wheeling diode
Output data		
Contact type		1 N/O contact with lead contact
Contact material		AgCdO
Max. switching voltage		250 V AC
Limiting continuous current		10 A
Maximum switch-on current		80 A (20 ms)
Maximum interrupting rating, ohmic load		
	24 V DC	-
	48 V DC	-
	60 V DC	-
	110 V DC	-
	220 V DC	-
	250 V AC	2500 VA
General data		
Test voltage (winding/contact)		2.5 kV AC (50 Hz, 1 min.)
Ambient temperature (operation)		-20°C ... 50°C
Mechanical service life		Approx. 10^7 cycles
Standards/regulations		IEC 60664, EN 50178
Mounting position/mounting		- / horizontal with zero spacing, vertical with spacing
Connection data solid/stranded/AWG		- / - / -
Dimensions	W / H / D	20.8 mm / 42.5 mm / 112 mm
EMC note		

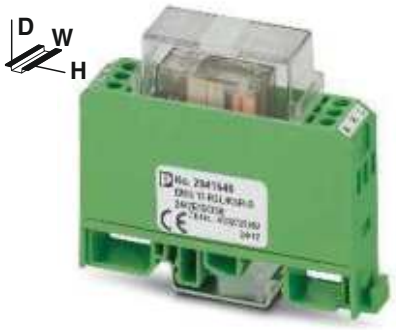
Ordering data

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

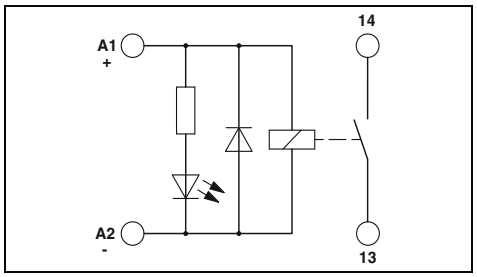
Basic terminal block, complete with end cover	**URELG 3**	2820136	10
Equipment marker			

Medium to high powers
1 N/O contact (1)

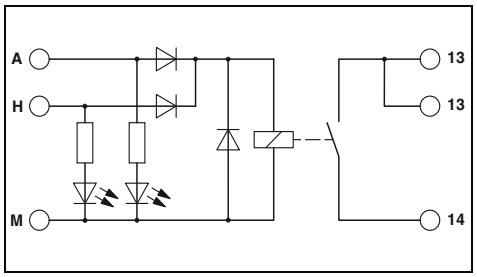


Medium to high powers
1 N/O contact (1)

EAC



EAC



Technical data

①	
0.85 - 1.1	0.9 - 1.1
28	23
13 / 15	9 / 10
Yellow LED, free-wheeling diode	Automatic: yellow LED, manual: red LED, free-wheeling diode, reverse polarity protection
1 N/O contact with lead contact	Single contact, 1 N/O contact
$AgSnO_2$	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	3x 10^7 cycles
IEC 60664, EN 50178	IEC 60664, EN 50178
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
Class A product, see page 583	Class A product, see page 583

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

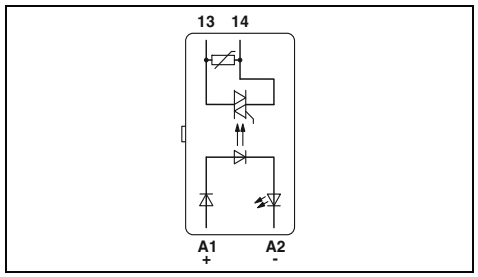
Pluggable solid-state power relays ST-OV 3

The pluggable 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)
– Pluggable

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
Typical input current at U_N	[mA]	7
Transmission frequency f_{limit}	[Hz]	10
Input protection:		Yellow LED, reverse polarity protection, RC element
Output data		
Operating voltage		400 V AC
Operating voltage range		24 V AC ... 420 V AC
Periodic peak reverse voltage		800 V
Limiting continuous current		3 A (see derating curve)
Minimum load current		50 mA
Surge current		125 A (t = 10 ms)
Residual voltage drop at “H”		≤1.2 V
Leakage current in off state		Approx. 12 mA
Output protection		Surge protection, RC element
General data		
Test voltage input/output		2.5 kV AC
Ambient temperature (operation)		0°C ... 60°C
Standards/regulations		IEC 60664, EN 50178
Degree of pollution/surge voltage category		2 / III
Mounting position/mounting		Horizontal DIN rail / -
Dimensions	W / H / D	20.8 mm / 42.5 mm / 112 mm

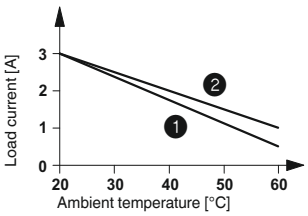
Ordering data

Description	Input voltage U_N	Type	Order No.	Pcs./Pkt.
Solid-state power relays				
①	24 V DC	**ST-OV3- 24DC/400AC/3**	2905417	10

Accessories

Basic terminal block, complete with end cover	**URELG 3**	2820136	10

Derating curve for ST-OV 3-24DC/400AC/3



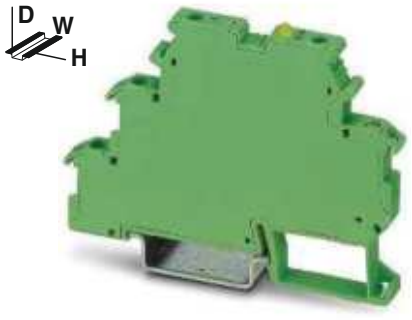
❶ Aligned without spacing
❷ Aligned with ? 20 mm spacing

100-kHz input solid-state relays DEK-OE

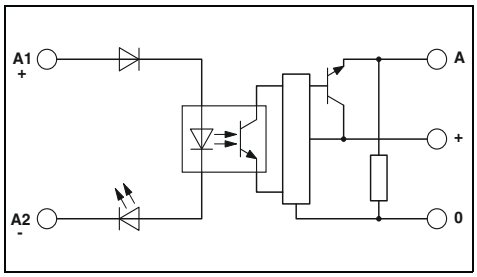
A solid-state relay for the reliable detection of short pulses

– Limit frequency of up to 100 kHz
– Push-pull stage on output side
– Includes signal inputs on PLC counter boards
– Features a capacitor on the input side for interference suppression

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
Use of EB 80-DIK... bridges in the DEK terminal blocks: Absorption of humidity from the ambient air as well as an unfavorable tolerance between a larger number of DEK terminal blocks and the EB 80-DIK... bridge may cause (minor) expansion of the DEK housing. When the EB 80-DIK... bridges are used, therefore, it is recommended that these be disconnected after about 10 to 12 DEK terminal blocks and a wire bridge to the next DEK terminal block be inserted in their place.



With DC voltage output
Transmission frequency 100 kHz

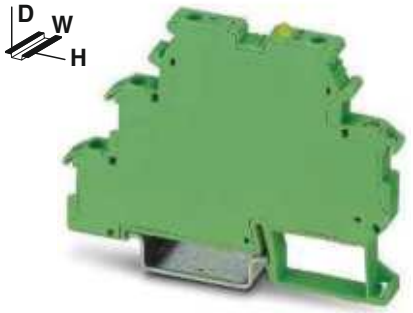


Technical data

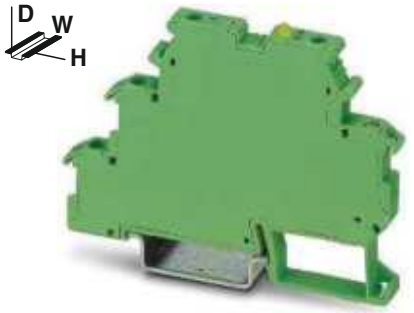
		①	②
Input data			
Permissible range (with reference to U_N)		0.8 - 1.2	0.8 - 1.2
Switching level with reference to U_N	1 signal (“H”)	≥0.8	≥0.8
	0 signal (“L”)	≤0.4	≤0.4
Typical input current at U_N	[mA]	7	6
Typical switch-on time at U_N	[µs]	1.5	1.5
Typical switch-off time at U_N	[µs]	2	2
Transmission frequency f_{limit}	[kHz]	100	100
Input protection:		Yellow LED, reverse polarity protection, surge protection	
Output data			
Operating voltage range		4 V DC ... 30 V DC	
Limiting continuous current		50 mA	
Quiescent current		4.3 mA	
Residual voltage drop at “H”		≤0.5 V DC	
Output circuit		3-conductor, ground-referenced	
Output protection		Surge protection	
General data			
Test voltage input/output		2.5 kV AC	
Ambient temperature (operation)		-20°C ... 60°C	
Standards/regulations		IEC 60664, EN 50178	
Degree of pollution/surge voltage category		2 / II	
Connection data solid/stranded/AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12	
Dimensions	W / H / D	6.2 mm / 80 mm / 56 mm	
EMC note		Class A product, see page 583	

Ordering data

Description		Input voltage U_N	Type	Order No.	Pcs./Pkt.
Solid-state input relays					
	①	5 V DC	**DEK-OE- 5DC/ 24DC/100KHZ**	2964270	10
	②	24 V DC	**DEK-OE- 24DC/ 24DC/100KHZ**	2964283	10

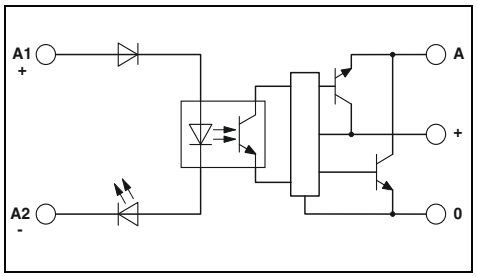


With DC voltage output push-pull
Transmission frequency 100 kHz

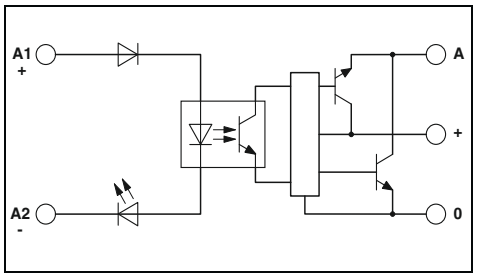


With DC voltage output push-pull
Transmission frequency 100 kHz

EAC



EAC



Technical data

①	②
0.5 - 1.2	0.8 - 1.2
≥0.5	≥0.8
≤0.3	≤0.4
8	8
1	1
2	2
100	100
Yellow LED, reverse polarity protection, surge protection	

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
2 / II
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
6.2 mm / 80 mm / 56 mm
Class A product, see page 583

Ordering data

Type	Order No.	Pcs./Pkt.
DEK-OE- 5DC/ 5DC/100KHZ-G	**2964542**	10
DEK-OE- 24DC/ 5DC/100KHZ-G	**2964364**	10

Technical data

①	②
0.5 - 1.2	0.8 - 1.2
≥0.5	≥0.8
≤0.3	≤0.4
8	8
1	1
2	2
100	100
Yellow LED, reverse polarity protection, surge protection	

14 V DC ... 30 V DC
50 mA
15 mA
≤2.2 V DC
3-conductor push-pull, ground referenced
Surge protection

2.5 kV AC
-20°C ... 60°C
IEC 60664, EN 50178
2 / II
0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
6.2 mm / 80 mm / 56 mm
Class A product, see page 583

Ordering data

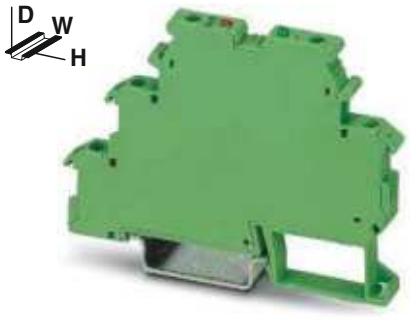
Type	Order No.	Pcs./Pkt.
DEK-OE- 5DC/ 24DC/100KHZ-G	**2964555**	10
DEK-OE- 24DC/ 24DC/100KHZ-G	**2964348**	10

Electronic sensor terminal blocks for NAMUR proximity sensors

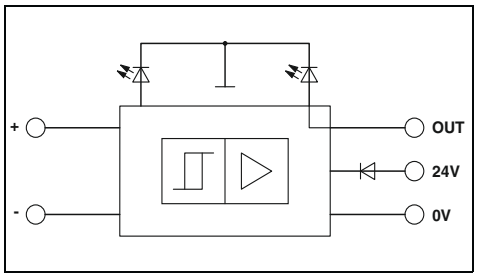
The electronic sensor terminal block, EIK 1-SVN 24-P from Phoenix converts the changeable resistance of a NAMUR sensor unit into a digital signal that can be read by all PLCs.

– Monitoring of initiator side for short circuits or strand breaks
– Suitable resistance circuit to enable monitoring of mechanical switches (see application 2)
– LED error display
– Status display (high signal) via green LED
– 24 V/50 mA digital output
– Bridging and marking with standard terminal accessories

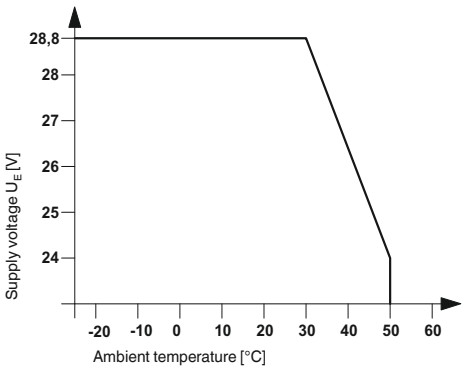
Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
Use of EB 80-DIK... bridges in the DEK terminal blocks: Absorption of humidity from the ambient air as well as an unfavorable tolerance between a larger number of DEK terminal blocks and the EB 80-DIK... bridge may cause (minor) expansion of the DEK housing. When the EB 80-DIK... bridges are used, therefore, it is recommended that these be disconnected after about 10 to 12 DEK terminal blocks and a wire bridge to the next DEK terminal block be inserted in their place.



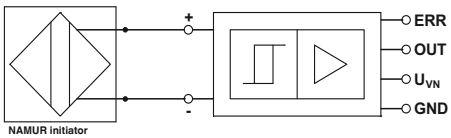
For inductive proximity sensors in accordance with NAMUR



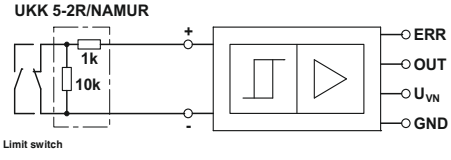
Derating curve for EIK 1-SVN 24 P



Application 1



Application 2



Technical data

Supply		
Input supply nominal voltage U_{VN}		18.5 V DC ... 28.8 V DC (U_{VN}, see derating curve)
Ripple		In accordance with DIN 19240
Current consumption I_{max}		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		
Maximum output current I_{Amax}		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 free-wheeling 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
Degree of pollution/overvoltage category		2 / III
Screw connection rigid / flexible / AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions	W / H / D	6.2 mm / 80 mm / 56 mm
EMC note		Class A product, see page 583

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**	2940799	10

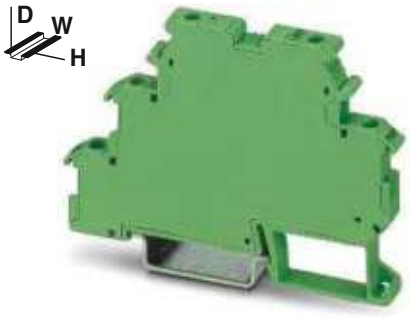
Accessories

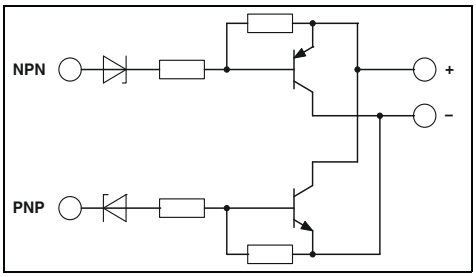
Terminal block, with three through contacts, for mounting on NS 35...	**DIKD 1,5**	2715979	50
Double-level terminal block, with preassembled resistors	**UKK 5-2R/NAMUR**	2941662	50
Insertion bridge	**EB...-DIK...** **Ordering data at DEK-REL...**		

Inverter modules DEK-TR/INV

The DEK-TR/INV inverter module inverts the signals of ground-switching NPN transistor outputs into positive switching PNP outputs, as well as signals from PNP into NPN signals. See application example.

Notes:
Type of housing: Polyamide PA non-reinforced, color: green.
Marking systems and mounting material See Catalog 3
Use of EB 80-DIK... bridges in the DEK terminal blocks: Absorption of humidity from the ambient air as well as an unfavorable tolerance between a larger number of DEK terminal blocks and the EB 80-DIK... bridge may cause (minor) expansion of the DEK housing. When the EB 80-DIK... bridges are used, therefore, it is recommended that these be disconnected after about 10 to 12 DEK terminal blocks and a wire bridge to the next DEK terminal block be inserted in their place.





Technical data

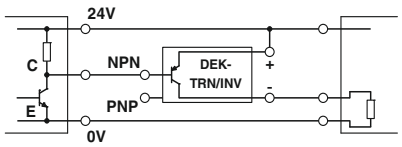
Supply voltage		20 V DC ... 30 V DC (U_V)
Continuous current		200 mA
Residual voltage drop		<1 V
Leakage current		<1 mA
Maximum transmission frequency		15 kHz
NPN input/PNP output		
Switch-on threshold		<5 V (at U_V = 24 V; <(U_V - 19 V))
Switch-off threshold		>15 V (at U_V = 24 V; >(U_V - 9 V))
Minimum limit values		-2 V
Maximum limit values		26 V (at U_V = 24 V; U_V + 2 V)
Control circuit		
Switch-on threshold		>19 V
Switch-off threshold		<9 V
Minimum limit values		-2 V
Maximum limit values		26 V (at U_V = 24 V; U_V + 2 V)
General data		
Ambient temperature (operation)		-20°C ... 50°C
Standards/regulations		IEC 60664 Basic insulation
Degree of pollution/overvoltage category		2 / II
Screw connection rigid / flexible / 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

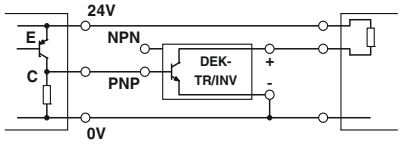
Description	Type	Order No.	Pcs./Pkt.
Inverter module	**DEK-TR/INV**	2964319	10

Connection examples:

NPN output **Load**



PNP output **Load**



Hybrid relay modules

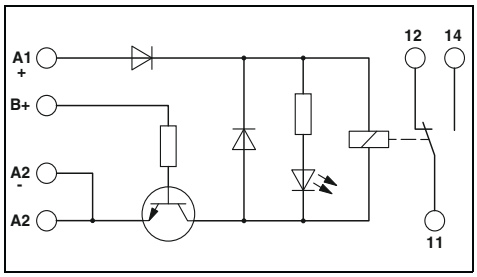
With its integrated transistor level, the hybrid relay module is able to amplify weak input signals. This serves as the basis for reliable relay operation.

The advantages:

– Low control current (terminal B), type-dependent as of 0.5 mA
– Integrated input and interference suppression circuit
– Safe isolation in accordance with DIN EN 50178 between coil and contact

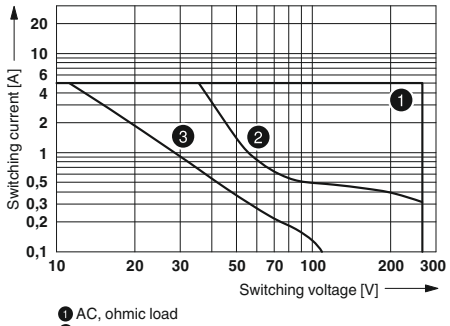
Notes:
Type of housing: Polycarbonate fiber reinforced PC-F, color: green.
Marking systems and mounting material See Catalog 3
For the protection of relay coils and contacts, inductive loads must be dampened with an efficient protection circuit.

Positive switching hybrid relay



Technical data

		①	②	③
Input data				
Relay supply voltage U_N ± 10%	[V DC]	24	24	24
Minimum control voltage	[V DC]	2.7	5	15
Maximum control voltage	[V DC]	5.25	13.2	35
Minimum control current	[mA]	2.6	0.5	0.5
Maximum control current	[mA]	7.7	1	1
Typical input current at U_N	[mA]	21	21	21
Response/release time at U_N	[ms]	9 / 10	9 / 10	9 / 10
Input protection:		Yellow LED, reverse polarity protection, free-wheeling diode		
Output data				
Contact type		Single contact, 1-PDT		
Contact material		AgNi		
Max. switching voltage		250 V AC/DC		
Limiting continuous current		5 A		
Maximum switch-on current		8 A		
Maximum interrupting rating, ohmic load				
	24 V DC	120 W		
	48 V DC	60 W		
	60 V DC	50 W		
	110 V DC	50 W		
	220 V DC	80 W		
	250 V AC	1250 VA		
General data				
Test voltage (winding/contact)		4 kV AC (50 Hz, 1 min.)		
Ambient temperature (operation)		-20°C ... 50°C		
Mechanical service life		Approx. 5x 10^7 cycles		
Standards/regulations		IEC 60664, EN 50178		
Degree of pollution/surge voltage category		2 / III		
Connection data solid/stranded/AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12		
Dimensions	W / H / D	22.5 mm / 75 mm / 62.5 mm		
EMC note		Class A product, see page 583		



❶ AC, ohmic load
❷ DC, ohmic load
❸ DC, L/R = 40 ms

Interrupting rating

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**	2949787	10
	② 12 V DC	**EMG 22-REL/KSR-G 24/TRN12**	2952363	10
	③ 24 V DC	**EMG 22-REL/KSR-G 24/TRN35**	2952350	10

Accessories

Equipment marker	**EMG-GKS 12**	2947035	50

Y.182
B0.0
B0.1
B0.2
B0.3
B0.4
B0.5
B0.6
B0.7

System cabling for controllers

Wiring I/O modules with individual wires is an extremely time-consuming process. Wiring errors and tedious troubleshooting cannot be ruled out.

VARIOFACE system components reduce assembly costs by using plug-in components to carry out wiring quickly, clearly, and without errors.

In the case of **controller-specific system cabling**, front adapters, system cables, and modules are specially matched to each other. Individual solutions exist for the following controllers:

- **ABB**
- **Allen Bradley**
- **Emerson**
- **Honeywell**
- **Phoenix Contact**
- **Mitsubishi Electric**
- **OMRON**
- **Schneider Electric**
- **Siemens**
- **Yokogawa**

If automation components with high-pos. connectors such as D-SUB are in the control cabinet, **universal modules** and cables are suitable for signal connection. The 1:1 connection is characteristic for these universal all-purpose modules. The modules allow orderly connection of field signals to screw, spring-cage or Push-in Technology.

Universal cables connect the control and signal level fast and without errors.

A wide variety of **potential distributors** are available for splitting the control and operating voltage. The different potential levels and the connection terminal blocks make flexible use possible.

Individual application requirements can be realized with customer-specific products (see page 466).

Product range overview

Introduction	**460**
Product overview	**462**
Customer-specific products	**466**

Controller-specific system cabling

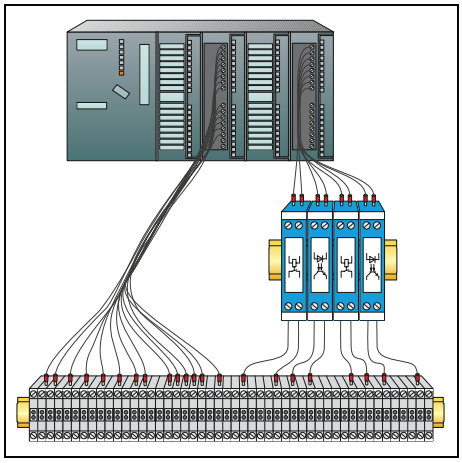
For ABB S800 I/O	**468**
For Allen Bradley, ControlLogix, SLC 500, and PlantScape	**470**
For Emerson DeltaV	**476**
For Honeywell C300 Series C I/O and PlantScape	**480**
For Mitsubishi MELSEC Q and L	**482**
For OMRON CJ1, CS1, and C200H	**484**
For Phoenix Contact Axioline and Inline	**485**
For Schneider Electric Modicon	**488**
For Siemens SIMATIC® S7-1500	**492**
For Siemens SIMATIC® S7-300	**496**
For Siemens SIMATIC® S7-400	**508**
For Siemens SIMATIC® ET 200SP HA	**512**
For Yokogawa CENTUM VP, ProSafe-RS	**514**
Passive modules	**516**
Active modules	**524**
V8 adapter for PLC-INTERFACE	**528**
System and splitting cable	**537**
Retrofit and modernization components	**538**

Universal modules

With IDC/FLK connectors	**548**
With D-SUB connectors	**552**
With high-density D-SUB connectors	**558**
With RJ45 connectors	**559**
With ELCO connectors	**560**

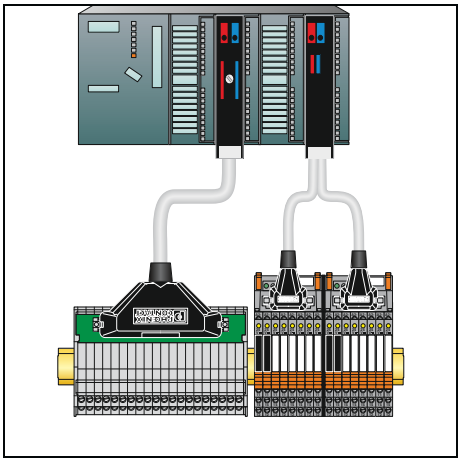
Universal cables

With IDC/FLK connectors	**562**
With D-SUB connectors	**570**
Potential distributors	**578**



Wiring with single wires

– Time-consuming
– Confusing wiring
– Risk of mixing wires
– Time-consuming troubleshooting



Wiring with the controller-specific system cabling:

– Fast, fault-free wiring
– Plug and Play solution
– Orderly structure
– Considerable time savings

The matching components are selected with the help of the "system cabling for controllers" online configurator:
– Front adapter
– System cables
– Module

For the online configurator, use the web code:

Your web code: #0007

Simply enter "#0007" into the search field on our website.

Front adapters
– Tailored to controller-specific I/O modules
– Plug-in components
– Connection via system cables

8 and 32-channel modules
– Passive modules
– Relay modules
– Controller-specific layout
– Screw or Push-in connection technology

PLC-V8 adapters
– Connection of 8 channels via the "PLC series"
– Feasible functions: relay, solid-state relay or feed-through
– Individual function selection per channel
– Screw or Push-in connection technology

Universal modules
– Connector: IDC/FLK, D-SUB, or ELCO
– 1:1 connection
– Screw or Push-in connection technology
– Optional status indicator

Universal cables
– With IDC/FLK connector
– With D-SUB plug connector
– Optionally with open end

Potential distributors
– Up to 30 A / 250 V
– Two potential levels
– Screw or Push-in connection technology

Controller-specific system cabling

System component		Version	Controller									
			ABB	Allen Bradley		Emerson	Honeywell		Mitsubishi	OMRON CJ1	Phoenix Contact	
			S800 I/O	Control Logix	SLC 500	DeltaV	C300 Series CI/O, ML 200	PlantScape	MELSEC Q, L	CS1, CQM1, C200H	Axioline Inline	
			Page	Page	Page	Page	Page	Page	Page	Page	Page	
Front adapters			not required	470		not required	480	470	not required	not required	486	
System cables		Standard	570	536		566	570	536			536	
		Controller-specific	469		474	476	483		482	484		
Interface modules		Passive Standard	516	516	516	516	481	516	516	516	516	
		Passive Controller-specific	468	489		477						
		Active Standard	524	524	524	524	524	524	524	524	524	
		V8 adapter	530	530	530	530	530	530	530	530	530	
		Relay/optocoupler	360	360	360	360	360	360	360	360	360	

	Schneider		Siemens					Yokogawa	
	TSX Quantum™	M340	S7 1500	S7 300	S7 400	ET 200SP HA	Conversion S5 to S7	CENTUM VP	ProSafe RS
	Page	Page	Page	Page	Page	Page	Page	Page	Page
	488	490	492	496	508		540	not required	not required
	536	536	536	536	536				
		491		504				514	514
	516	516	516	516	516				
	489		492	506	506				
	524	524	524	524	524				
	530	530	530	530	530			530	
	360	360	360	360	360			360	

Product overview

Universal modules and cables

		Passive modules (connection technology)			
		IDC/FLK strips	D-SUB strips	ELCO strips	Potential distributors
Device series					
		Page	Page	Page	Page
VIP Line		548	552 558		578
Standard Line				560	
Feed-through modules			556		
Cables		562	570		

From the enquiry to the product

We develop your product from the idea to series production.

Concept phase

– Realization test in accordance with your specifications
– Personal consultation
– Tendering including draft drawing

Realization phase

– Development in accordance with product creation process
– Circuit diagram and PCB layout
– Component selection
– Creation of functional samples
– Creation of prototypes
– Tests in every phase of development
– EC conformance
– Preparation and implementation of approval procedures
– Environmental tests in accordance with standards
– Documentation

Series phase

– Production in accordance with IPC-A-610 Class 2
– 100% end test with automated test systems
– Lifecycle management

Directives and standards

– Low-voltage directive
– EMC directive
– IEC 60664-1
  Insulation coordination for electrical equipment within low-voltage systems
– EN 50178
  Electronic equipment for use in power installations
– EN 61000-6
  Electromagnetic compatibility
– IPC A-600
  Acceptance criteria for PCBs
– IPC-A-610
  Acceptance criteria for electronic modules

Components used

We use connection technology and housings from the comprehensive Phoenix Contact portfolio.

Here you find all common market technologies:

– Screw and spring-cage connection
– Push-in spring connection
– Knife disconnection
– Modular component housing
– Building installation housings
– Profile module carriers

Furthermore, we use components, connectors, cables as well as PCBs from qualified and certified suppliers.

Product range

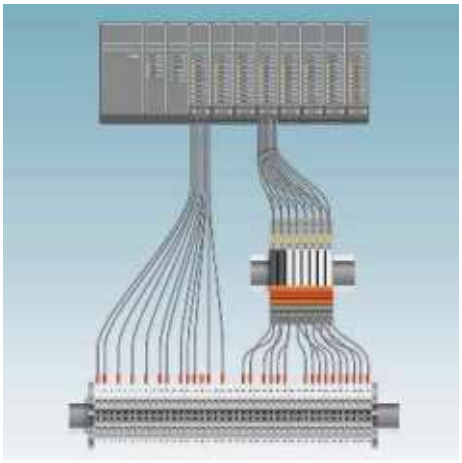
We create versions from catalog production for you or new products in accordance with your specifications from the following portfolio:

– Function modules such as diode gates
– Relay and optocoupler modules
– 1:1-Installation modules (connector on terminal block)
– Potential distributors
– System cables with high-pos. connectors
– System adapters for controllers and control systems
– Transfer modules for use between controller and field level
– Output modules with electrical isolation
– Module carrier for system cabling of signal conditioners or safe coupling relays

Your direct line to us

Do you have a specific question? Talk to us about it.

Simplified installation
Objectives
– Reduce assembly costs
– Minimize installation time
– Optimize space in the control cabinet
Implementation
– Analysis of the application
– Draft of concept
Result
– Tailor-made solution from system components (standard and customer-specific)
– Fault-free wiring



Retrofitting systems
Task
– Extension
– Retrofitting
Objectives
– System availability
– Fulfillment of statutory specifications
Solution
– Use adaptation solutions and high-pos. system cables
Result
– Minimum downtimes

Pre-assembled system cables
With high-position connectors
– D-SUB strips
– IDC/FLK pin strips (2.54 mm)
– Pre-assembled at one or both ends
Cables
– Shielded, unshielded, halogen-free
– 0.14 mm²/AWG 26 and 0.25 mm²/24 AWG
Quality
– Continuity and dielectric test
Other versions available on request

Installation modules
– 1:1-marshalling terminal block to high-pos. connector (D-SUB, HE10, ELCO...)
– Passive interface modules with system connection
– Potential distributors
– Fuse modules
– Diode modules
– Other modules on request

Relay and optocoupler modules
– With electromechanical relays
– With solid-state relays
– Multi-channel
– With system connection
– N/O contact or PDT contact
– LED status display
– Freewheeling diode
– Reverse polarity protection
– Redundant power supply

Termination Carrier module carriers
The compact Termination Carrier connects
– Signal conditioners
– Signal conditioners for Ex i circuits
– Signal conditioners for SIL applications
– Safe coupling relays
easily with the automation system via system cables.
The advantages are clear:
– Quick startup
– Fault minimization

ABB S800 I/O
Termination boards with knife disconnection

The ABB S800 I/O system can be used to install the process wiring via D-SUB connectors. The ABB TU 812 Compact MTU is available for this purpose.

The FLKM-D25SUB/B/KDS3-MT/... modules are connected to the I/O modules via assembled D-SUB cables (see page 570).

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 553.

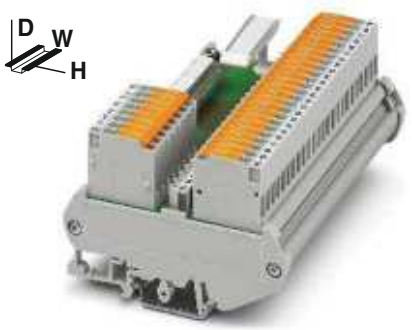
Web code for the online configurator

Your web code: #0007

Connectable I/O modules

Card type	FLKM-D25SUB...		
	...TU810	...TU810/P	...TU830
Digital input	DI 814	DI 810 DI 811 DI 818 DI 830 DI 831 DI 840 DI 885	DI 810 DI 811 DI 814 DI 818 DI 830 DI 831 DI 840 DI 885
Digital output	DO 810 DO 818 DO 840	DO 814	DO 810 DO 814 DO 818 DO 840
Analog input	AI 810 AI 815 AI 820 AI 830 AI 835 AI 845	AI 810 AI 815 AI 845	AI 810 AI 815 AI 820 AI 830 AI 835 AI 845
Analog output	AO 810 AO 815 AO 820 AO 845		AO 810 AO 815 AO 820 AO 845
Other	DP 820		DP 820

Explanation:
IDC/FLK strip
Connection to I/O card
Screw terminal blocks for separate supply



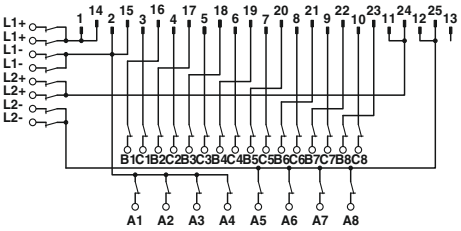
Interface module with knife disconnect terminal blocks

Technical data

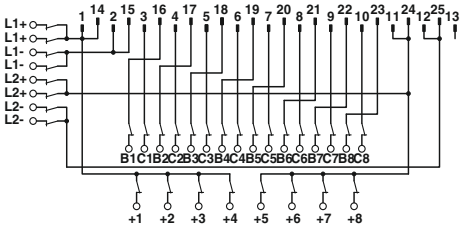
Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible current (per branch)		2 A
Maximum total current (voltage supply)		4 A (8 A L1-/L2-)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		any
Standards/regulations		DIN EN 50178, IEC 60664
Connection method	Field level	Screw connection with disconnect knife
	Controller 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

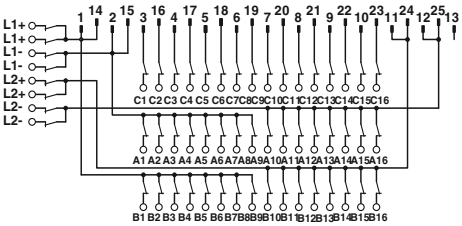
Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE module, with knife disconnect terminal blocks in ABB-specific marking:					
- with 8 negative terminal blocks	25	126.5 mm	**FLKM-D25 SUB/B/KDS3-MT/TU810**	2304513	1
- with 8 positive terminal blocks	25	126.5 mm	**FLKM-D25 SUB/B/KDS3-MT/TU810/P**	2304539	1
- each with 16 positive and negative terminal blocks	25	247.5 mm	**FLKM-D25 SUB/B/KDS3-MT/TU830**	2304526	1



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 cables

The ABB S800 I/O system can be used to install the process wiring via D-SUB connectors. The ABB TU 812 Compact MTU is available for this purpose.

The CABLE-D25SUB/B/2X14/.../TU812 system cables convert digital signals from a D-SUB socket strip to two IDC/FLK socket strips. Therefore, all 8-channel termination boards of the system cabling are connected to S800 I/O modules. Two termination boards are used per module.

Notes:

Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516

Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427

System cable

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Ambient temperature (operation)	-20°C ... 50°C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 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. IDC/FLK socket strips, 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. IDC/FLK socket strips, in variable lengths					
	25		**CABLE-D25SUB/B/2X14/TU812/...**	2304681	1

Connectable I/O modules

Card type	CABLE-D25SUB/B/2X14/.../ TU812
Digital input	DI 810 DI 811 DI 814 DI 818 DI 830 DI 831 DI 840 DI 885
Digital output	DO 810 DO 814 DO 818 DO 840

Color code and pin assignment CABLE-D25SUB/B/2X14...TU812

D-SUB connector 25-pos.	FLK 14 1st connector	FLK 14 2nd connector	Wire color
1	9		Gray
2	10		White
3	1		Black
4	3		Red
5	5		Yellow
6	7		Blue
7		1	Black
8		3	Red
9		5	Yellow
10		7	Blue
11		9	Orange
12		10	White
13	NC	NC	–
14	11		White-black
15	12		White-brown
16	2		Brown
17	4		Orange
18	6		Green
19	8		Violet
20		2	Brown
21		4	Orange
22		6	Green
23		8	Violet
24		11	White-black
25		12	White-brown

Ordering example for system cable:

– Cable for ABB S800, 12.75 m long

Quantity	Order No.	Length [m] [1]
1	2304681 /	12.75

[1] min. 0.20 m

Allen Bradley ControlLogix, Honeywell PlantScape Front adapters

I/O modules with 32 channels or of this type

The front adapters are pushed into the tall 1756-TBE covers (not supplied as standard, original accessories must be ordered directly from manufacturer) of the controller.
A 50-pos. system cable can connect a maximum of 32 channels to the field level.

Perfectly-fitting VARIOFACE termination boards round off this system concept.

Web code for the online configurator

Your web code: #0007

Notes:
Front adapters can also be used without cover.
Controller-specific modules from page 472
Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516
For system cables, see page 536
Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427

32-channel front adapter with 50-pos. FLK strip

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	1 A (per path) 8 A (per connection, supply via separate power supply)
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	DIN EN 50178 / IEC 60664

Ordering data

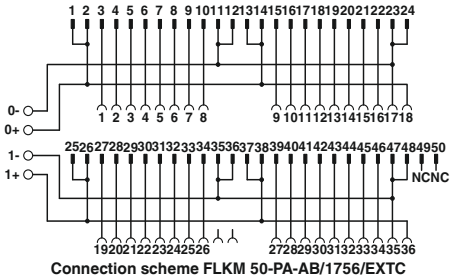
Description	No. of pos.	Type	Order No.	Pcs./Pkt.
VARIOFACE front adapter, for ControlLogix:				
- A maximum of 1 x 32 channels can be connected	50	**FLKM 50-PA-AB/1756/EXTC**	2302735	1
- IB 32 input board	50	**FLKM 50-PA-AB/1756/IN/EXTC**	2302748	1

Front adapters for I/O modules of the Allen°Bradley ControlLogix and Honeywell PlantScape automation devices

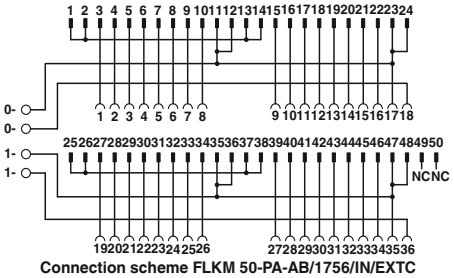
Card type	FLKM 50-PA-AB/1756/EXTC
Digital input	1756-IB 16 D* or TC-IDX 161* 1756-IB 16 I* or TC-IDJ 161* 1756-IH 16 I*
Digital output	1756-OB 32 or TC-ODD 321
Analog input	1756-IF 8* 1756-IF 16 I* or TC-IAH 161* 1756-IF 8H* or TC-HAI 081*
Counter	1756-HSC*
Servo	1756-M02 AE*

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
VIP-2/PT/FLK50/AB-1756, Order No.: 2904286
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:
IDC/FLK 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 of this type

The front adapters are pushed into the tall 1756-TBE covers (not supplied as standard, original accessories must be ordered directly from manufacturer) of the controller. Two 14-pos. system cables are used to connect up to 2 x 8 channels to the field level.

Perfectly-fitting VARIOFACE termination boards round off this system concept.

Web code for the online configurator

Your web code: #0007

Notes:
Front adapters can also be used without cover.
Controller-specific modules from page 473
Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516
For system cables, see page 536
Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427

16-channel front adapter with two 14-pos. FLK strips

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	1 A (per path) 8 A (per connection, supply via separate power supply)
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	DIN EN 50178 / IEC 60664

Ordering data

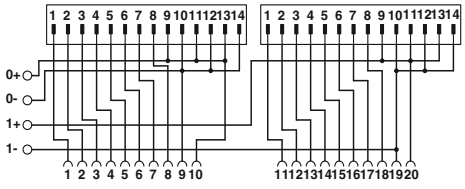
Description	No. of pos.	Type	Order No.	Pcs./Pkt.
VARIOFACE front adapter, for ControlLogix:				
– Up to 2 x 8 channels can be connected	14	**FLKM 14-PA-AB/1756/EXTC**	2302861	1
– IA 16, IB 16, IC 16, IN 16 input card	14	**FLKM 14-PA-AB/1756/IN/EXTC**	2302874	1

Front adapters for I/O modules of the Allen°Bradley ControlLogix and Honeywell PlantScape automation devices

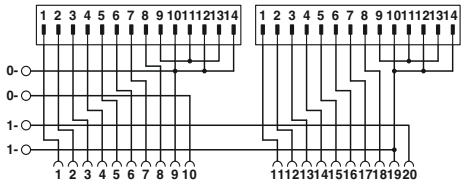
Card type	FLKM 14-PA-AB/1756/EXTC
Digital output	1756-OB 16 E
Analog input	1756-IF 6 CIS** 1756-IF 6 I** or TC-IAH 061** 1756-IR 6 I** or TC-IXR 061** 1756-IT 6 I** or TC-IXL 061**
Analog output	1756-OF 4 I** 1756-OF 6 CI** or TC-OAH 061** 1756-OF 6 VI** or TC-OAV 061** 1756-OF 8** or TC-OAV 081** 1756-OF 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**

** Only in conjunction with
VIP-2/SC/2FLK14/AB-1756, Order No.: 2322333
VIP-2/PT/2FLK14/AB-1756, Order No.: 2904288
There must be no voltage supply at the front adapter.
Risk of short circuit!



Connection scheme FLKM 14-PA-AB/1756/EXTC



Connection scheme FLKM 14-PA-AB/1756/IN/EXTC

Explanation:
IDC/FLK strip
Connection to I/O card
Screw terminal blocks for separate supply

Allen Bradley ControlLogix VIP interface modules

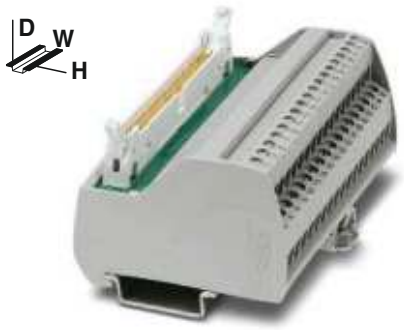
These VIP – VARIOFACE Professional modules are used in combination with 50-pos. system cables and the relevant front adapters.

Features:

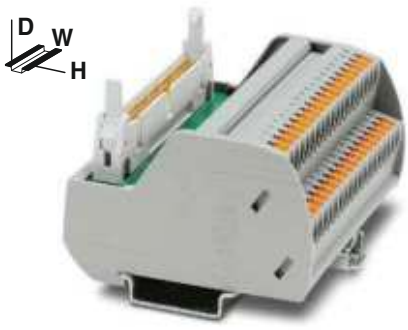
– Numerical marking (1-36)
– Specially for ControlLogix

Notes:

For marking systems (e.g., “ZB 22:UNBEDRUCKT”; Order No, 0811862) and mounting material, see Catalog 3.



Passive termination board for Allen Bradley ControlLogix with screw connection



Passive termination board for Allen Bradley ControlLogix with Push-in connection

Technical data

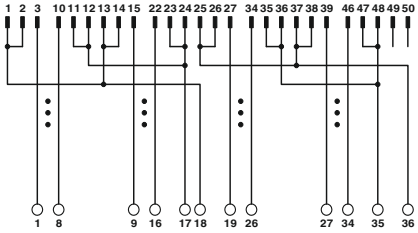
Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Field level	Screw connection
	Controller level	IDC/FLK pin strip
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

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V
Maximum permissible current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Field level	Push-in connection
	Controller level	IDC/FLK pin strip
Connection data solid/stranded/AWG		0.14 ... 1.5 mm² / 0.14 ... 1.5 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 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/AB-1756

Allen Bradley ControlLogix VIP interface modules

These VIP – VARIOFACE Professional modules are used in combination with two 14-pos. system cables and the relevant front adapters for Allen Bradley.

Features:

– Numerical marking (1-20)
– Specially for ControlLogix

Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No, 0811862) and mounting material, see Catalog 3.

Passive termination board for Allen Bradley ControlLogix with screw connection

Passive termination board for Allen Bradley ControlLogix with Push-in connection

Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Field level	Screw connection
	Controller level	IDC/FLK pin strip
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

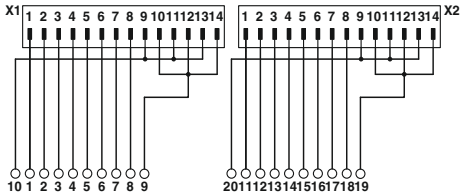
Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE interface module, with ControlLogix-specific marking from 1 to 20					
- with screw connection	14	80.6 mm	**VIP-2/SC/2FLK14/AB-1756**	2322333	1
- with Push-in connection	14	82.5 mm	**VIP-2/PT/2FLK14/AB-1756**	2904288	1

Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V
Maximum permissible current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Field level	Push-in connection
	Controller level	IDC/FLK pin strip
Connection data solid/stranded/AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14
Dimensions	H / D	72.1 mm / 56 mm

Ordering data

Type	Order No.	Pcs./Pkt.
VIP-2/PT/2FLK14/AB-1756	2904288	1



Connection scheme VIP-2/.../2FLK14/AB-1756

Allen Bradley SLC 500
System cables for 32 channels

The 32-channel I/O cards of the SLC 500 are connected using 40-pos. connectors (already integrated into the I/O modules). Passive interface modules (-3/SC/FLK40, etc.) are connected to the I/O cards using the **FLK 40/EZ-DR/.../SLC** system cables.

Web code for the online configurator

Your web code: #0007

Notes:

Digital modules such as VIP-3/SC/FLK40 (2315078) can be found starting on page 548

System cable for 32-channel I/O cards of the SLC 500 (OB32, OV32, IB32, IV32)

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Ambient temperature (operation)	-20°C ... 50°C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	
40 -position	10 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt.
Assembled round cable, with two 40-pos. IDC/FLK socket strips in fixed lengths (50 cm steps) for connection to 32-channel I/O cards of the SLC 500					
	40	0.5 m	**FLK 40/EZ-DR/ 50/SLC**	2294610	1
	40	1 m	**FLK 40/EZ-DR/ 100/SLC**	2294623	1
	40	1.5 m	**FLK 40/EZ-DR/ 150/SLC**	2294636	1
	40	2 m	**FLK 40/EZ-DR/ 200/SLC**	2294649	1
	40	3 m	**FLK 40/EZ-DR/ 300/SLC**	2294652	1

Allen Bradley SLC 500
System cables for 32 channels

The 32-channel I/O cards of the SLC 500 are connected through 40-pos. connectors (already integrated on the I/O modules). 32 channels are split into 4x8 channels using the FLK 40/4X14/EZ-DR/... system cables.

The following 8-channel system cabling modules can be coupled:

– OB32 and IB32
  passive and active modules plus V8 adapter
– OV32 and IV32
  passive modules without status indicator

Web code for the online configurator

Your web code: #0007

Notes:

Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516

Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427

System cable for splitting max. 32 channels into 4 x 8 channels (OB32, IB32)

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Ambient temperature (operation)	-20°C ... 50°C
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated
Outside diameter	
40 -position	7.8 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt.
Assembled round cable, for connection to Allen Bradley SLC500, OB32, and IB32, with a 40-pos. IDC/FLK socket strip and four 14-pos. IDC/FLK socket strips, for splitting max. 32 channels into 4 x 8 channels.					
for OB32	40	0.5 m	**FLK 40/4X14/EZ-DR/ 50/OB32**	2296786	1
	40	1 m	**FLK 40/4X14/EZ-DR/ 100/OB32**	2298483	1
	40	2 m	**FLK 40/4X14/EZ-DR/ 200/OB32**	2298522	1
	40	3 m	**FLK 40/4X14/EZ-DR/ 300/OB32**	2298535	1
for IB32	40	0.5 m	**FLK 40/4X14/EZ-DR/ 50/IB32**	2296812	1
	40	1 m	**FLK 40/4X14/EZ-DR/ 100/IB32**	2296825	1
	40	2 m	**FLK 40/4X14/EZ-DR/ 200/IB32**	2296838	1
	40	3 m	**FLK 40/4X14/EZ-DR/ 300/IB32**	2296841	1

Emerson DeltaV
System cables

The DeltaV system can be used to install the process wiring via "mass termination blocks" (MTBs) using IDC/FLK connectors. In addition to the 10, 16, and 20-pos. system cables of system cabling (see page 536), the following system-specific cables are available:.

- **FLK 16/14/DV-OUT/...**, for digital assemblies with 16-pos. MTB for connection with PLC-INTERFACE
- **FLK 16/14/DV-IN/...**, for digital modules with 16-pos. MTB for connection to PLC-INTERFACE
- **FLK 20/2FLK14/EZ-DR/...**, for digital assemblies with 40-pos. MTB for connection with PLC-INTERFACE
- **FLK 16/24/DV-AI/EZ-DR/...**, for analog assemblies with 24-pos. MTB
- **FLK 50/2FLK20/EZ-DR/.../DV** system cables are specifically designed for 32-channel I/O modules with 40-pin MTBfor the purpose of connecting I/O modules with 32-channel VARIOFACE interface modules

System cable for DeltaV

Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current carrying capacity per path		1 A
Maximum 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. IDC/FLK socket strip for connection with PLC-INTERFACE					
	16	0.3 m	**FLK 16/14/DV-OUT/ 30**	2304348	1
	16	0.5 m	**FLK 16/14/DV-OUT/ 50**	2304351	1
	16	1 m	**FLK 16/14/DV-OUT/100**	2300575	1
	16	2 m	**FLK 16/14/DV-OUT/200**	2300588	1
	16	3 m	**FLK 16/14/DV-OUT/300**	2304364	1
Variable cable length	16		**FLK 16-14-DV-OUT/...**	2304377	1
System cable, for 16-pos. "mass termination blocks" with a 16-pos. and a 14-pos. IDC/FLK socket strip for connection with PLC-INTERFACE					
	16	0.5 m	**FLK 16/14/DV-IN/ 50**	2304393	1
	16	1 m	**FLK 16/14/DV-IN/100**	2300559	1
	16	2 m	**FLK 16/14/DV-IN/200**	2300562	1
	16	3 m	**FLK 16/14/DV-IN/300**	2304403	1
	16	4 m	**FLK 16/14/DV-IN/400**	2305185	1
Variable cable length	16		**FLK 16-14-DV-IN/...**	2304416	1
System cable, for 40-pos. (2 x 20) "mass termination blocks" with a 20-pos. and two 14-pos. IDC/FLK socket strips for connection with PLC-INTERFACE (two cables should be used per 32-channel I/O card)					
	20	1 m	**FLK 20/2FLK14/EZ-DR/100/KONFEK**	2298470	1
	20	2 m	**FLK 20/2FLK14/EZ-DR/200/KONFEK**	2298438	1
	20	3 m	**FLK 20/2FLK14/EZ-DR/300/KONFEK**	2300818	1
Variable cable length	20		**FLK 20/2FLK14/EZ-DR/...**	2304487	1
System cable, for 24-pos. "mass termination blocks" with a 24-pos. and a 16-pos. IDC/FLK socket strip 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

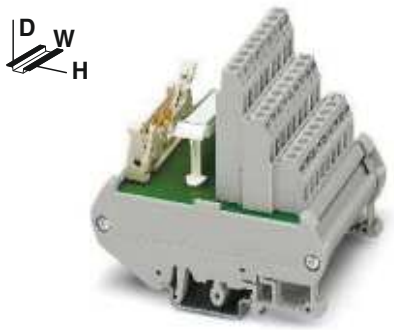
Emerson DeltaV
Controller boards for eight channels

These system-specific termination boards for DeltaV modules are used in combination with the relevant system cables. They are connected to 8-channel modules via "mass termination blocks" with IDC/FLK connection.

FLKM 16/DV
– Universal module
– 1:1 connection

FLKM 16/AI/DV
– 1:1 connection
– Separate equipotential terminals per channel

FLKM 16/AO/SI/DV
– 1:1 connection
– 5 x 20, 50 mA T, IEC 60127-2/3 fuse per channel



Interface module for 8 channels

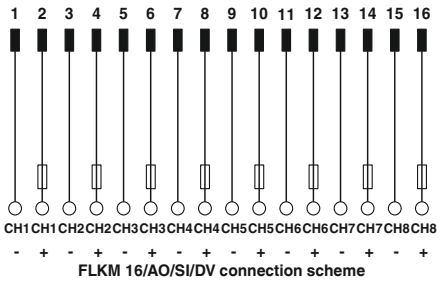
EAC

Technical data

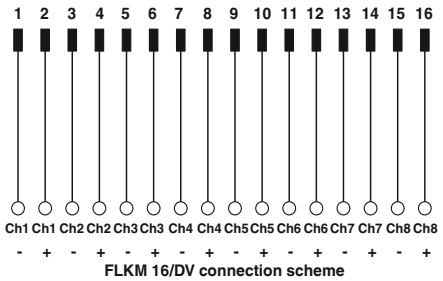
		FLKM 16/.../DV	FLKM 16/.../SI/.../DV
Maximum permissible operating voltage		25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible current (per branch)		1 A (per signal path)	50 mA (in delivered state, with one 50 mA fuse, max. 1 A permitted)
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		DIN EN 50178, IEC 60664	
Connection method	Field level	Screw connection	Screw connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
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

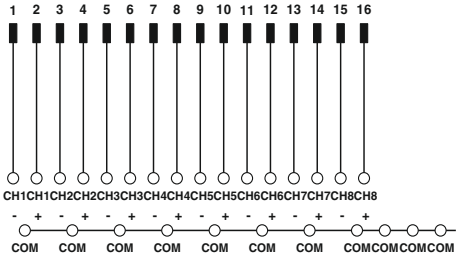
Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
Interface module, with 1:1 connection	16	45 mm	**FLKM 16/DV**	2304432	1
Interface module, with 1:1 connection and separate potential terminal blocks per channel	16	57 mm	**FLKM 16/AI/DV**	2304429	1
Interface module, with fuses per channel	16	90 mm	**FLKM 16/AO/SI/DV**	2304445	1



FLKM 16/AO/SI/DV connection scheme



FLKM 16/DV connection scheme



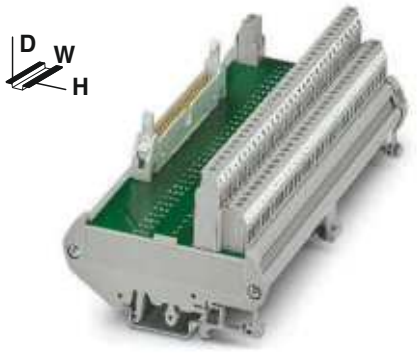
FLKM 16/AI/DV connection scheme

Emerson DeltaV
Controller boards for 32 channels

These system-specific termination boards for DeltaV modules are used in combination with FLK 50/2FLK20/EZ-DR/.../DV system cables. They are connected to 32-channel modules via 40-pos. “mass termination blocks” with IDC/FLK connection.

FLKM 50/32M/DV
– Can be used for 32-channel input and output cards
– Two-conductor connection with a separate negative terminal per channel

FLKM 50/32M/IN/LA/DV
– Can be used for 32-channel input modules
– LED status display per channel
– Two-conductor connection with a separate negative terminal per channel (Dry Contact)



Termination board for DeltaV
With 2-conductor screw connection

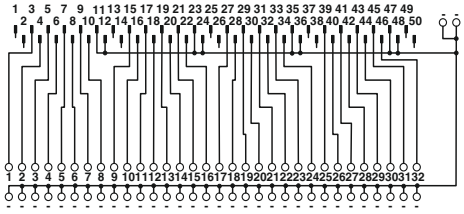
EAC

Technical data

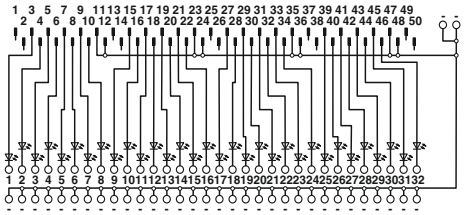
		FLKM 50/32M/DV	FLKM 50/32M/IN/LA/DV
Maximum permissible operating voltage		25 V AC / 60 V DC	30 V DC
Maximum permissible current (per branch)		1 A	1 A
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		any	any
Standards/regulations		DIN EN 50178, IEC 60664	
Connection method	Field level	Screw connection	Screw connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
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



Connection scheme FLKM 50/32M/DV



Connection scheme FLKM 50/32M/IN/LA/DV

Emerson DeltaV VIP controller board with fuses for 8 channels

System-specific interface module for use in combination with the respective system cables. The controller board is connected to 8-channel modules through 16-position "mass termination blocks" with flat ribbon cable connection.

Features:

– Fuse per channel
– Separate equipotential terminals per channel
– Knife disconnection for each channel
– Push-in connection

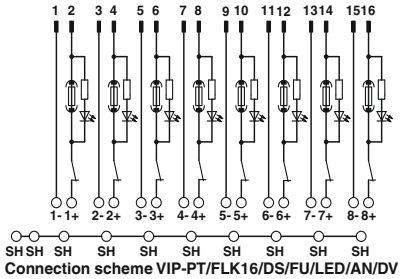
Fuse module for DeltaV for 8 channels With Push-in connection

Technical data

Maximum permissible operating voltage		24 V DC
Maximum permissible operating voltage UL / CSA		24 V / 24 V
Maximum permissible current (per branch)		63 mA (in as supplied state, with one 63 mA fuse)
Ambient temperature (operation)		-20°C ... 60°C
Mounting position		any
Standards/regulations		DIN EN 50178
Connection method	Field level	Push-in connection
	Controller level	IDC/FLK pin strip
Connection data solid/stranded/AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14
Dimensions	H / D	109.8 mm / 63 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE termination board, for 8-channel modules	16	57.1 mm	**VIP-PT/FLK16/DS/FU/LED/AN/DV**	2903599	1



Connection scheme VIP-PT/FLK16/DS/FU/LED/AN/DV

Honeywell C300, Series C I/O Front adapters

The front adapters mean that pre-assembled system cables can be directly connected to I/O modules.

FLKM-PA-D37/HW/DIO/C300
– Front adapter with D-SUB connector
– Connection of a maximum of 16 digital channels
– Specifically for digital I/O cards

FLKM-PA-D37/HW/AN/C300
– Front adapter with D-SUB connector
– Connection of analog modules

FLKM-PA-2D15/HW/.../C300
– Front adapter with two 15-pos. D-SUB connectors
– Connection of a maximum of 2 x 8 digital inputs/outputs per adapter
– Specifically for connecting PLC-V8/D15.../OUT or PLC-V8/D15.../IN

Web code for the online configurator

Your web code: #0007

Notes:
Matching system cable fitted with D-SUB female connector at both ends, see page 571
1) No UL approval

Honeywell C300 front adapter

c UL us EAC

Technical data

Maximum permissible operating voltage	60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	1 A (per path)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Mounting position	Any
Standards/regulations	IEC 60664 / DIN EN 50178

Ordering data

Description	No. of pos.	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**1)	2900924	1
- For digital input modules	15	**FLKM-PA-2D15/HW/DI/C300**1)	2901879	1

Front adapters for I/O modules of the C300 and C I/O series

Card type	FLKM-PA-D37/HW/DIO/C300
Digital input	TDIL 11* TDIL 01*
Digital output	TDOB 11* TDOB 01*

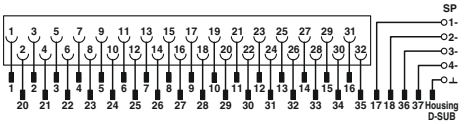
Card type	FLKM-PA-D37/HW/AN/C300
Analog input	TAIX 01** TAIX 11**
Analog output	TAOX 01** TAOX 11**

Card type	FLKM-PA-2D15/HW/DO/C300
Digital output	TDOB 01* TDOB 11*

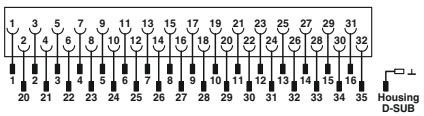
Card type	FLKM-PA-2D15/HW/DI/C300
Digital input	TDIL 01* TDIL 11*

* Two front adapters are required for each module.

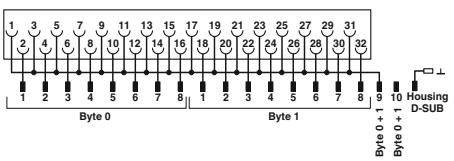
** For three-conductor operation (channels 13 - 16) of input modules:
only in conjunction with
VIP-3/SC/D37SUB/M/HW/C300, Order No.: 2900675
VIP-3/PT/D37SUB/M/HW/C300, Order No.: 2904276



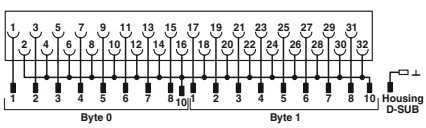
Connection scheme FLKM-PA-D37/HW/AN/C300



Connection scheme: FLKM-PA-D37/HW/DIO/C300



Connection scheme FLKM-PA-2D15/HW/DI/C300



Connection scheme: FLKM-PA-2D15/HW/DO/C300

Explanation:
Connectors
Connection to I/O card
Screw terminal blocks for separate supply

Honeywell C300, Series C I/O Interface modules

These VIP – VARIOFACE Professional modules are used in combination with 37-pos. D-SUB cables and the relevant front adapters. The three module versions are available with screw or Push-in connection technology.

VIP-2/.../D37SUB/M

– In conjunction with FLKM-PA-D37/HW/C300 or FLKM-PA-D37/HW/AN/C300 front adapter
– Universal module
– Field connection via double-level terminal blocks

VIP-2/.../D37SUB/M/SO

– In conjunction with FLKM-PA-D37/HW/C300 front adapter
– System-specific 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

Web code for the online configurator

Your web code: #0007

37-pos. with screw or Push-in connection

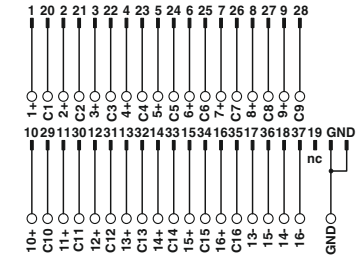
Notes:
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No, 0811862) and mounting material, see Catalog 3.
[1]) No UL approval

Technical data

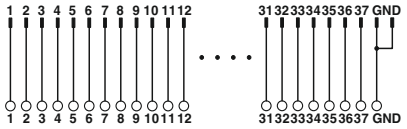
		VIP-2/...	VIP-3/...C300
Maximum permissible operating voltage		25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / 105 V	125 V / 105 V
Maximum permissible current (per branch)		2 A	2 A
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		DIN EN 50178	
Connection method	Controller level	D-SUB pin strip	D-SUB pin strip
Screw connection rigid / flexible / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Push-in connection rigid / flexible / AWG		0.14 ... 4 mm² / 0.14 ... 2.5 mm² / 26 - 14	
Dimensions	H / D	72.1 mm / 46.6 mm	75.8 mm / 63 mm

Ordering data

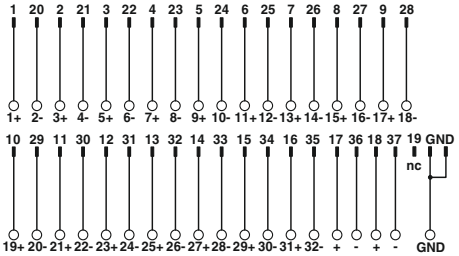
Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE interface module, with D-SUB pin strip and universal labeling,					
- with screw connection	37	101 mm	**VIP-2/SC/D37SUB/M**	2900676	1
- with Push-in connection	37	102.8 mm	**VIP-2/PT/D37SUB/M**	2904277	1
VARIOFACE interface module, with D-SUB pin strip and system specific labeling,					
- with screw connection	37	101 mm	**VIP-2/SC/D37SUB/M/SO[1])**	2900786	1
- with Push-in connection	37	102.8 mm	**VIP-2/PT/D37SUB/M/SO[1])**	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 Q

System cables

For 32- / 64-channel I/O cards with 37-pos. D-SUB connectors. System cables are available for connecting 1 x 32 channels or 4 x 8 channels.

Web code for the online configurator

Your web code: #0007

Notes:
Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516
Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427

System cable, D-SUB socket strip to IDC/FLK socket strip, number of positions: 37 to 50

Splitting cable, D-SUB socket strip to IDC/FLK socket strip, number of positions 37 to 4 x 14

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -	125 V / -
Maximum permissible current carrying capacity per path	1 A	1 A
Maximum 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 -position	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, 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, 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 connectors.

CABLE-FCN40/1X50/...

– Signal transmission of 32 channels

CABLE-FCN40/4X14/...

– Splitting up 32 channels into 4 x 8 channels

Web code for the online configurator

Your web code: #0007

Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 50

Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 4 x 14

	Technical data	Technical data
Maximum permissible operating voltage	25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -	125 V / -
Maximum permissible current carrying capacity per path	1 A	1 A
Maximum 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

Description	No. of pos.	Cable length	Ordering data: Type	Order No.	Pcs./Pkt.	Ordering data: 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 cables

These system cables are plugged onto the I/O cards that are connected using Fujitsu connectors.

FLK 50/EZ-DR/...
– Signal transmission of 32 channels

CABLE-FCN40...
– Splitting up 32 channels into 4 x 8 channels

Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 50

Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 4 x 14

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20°C ... 50°C
Conductor cross section	AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material	7 / Cu tin-plated

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum 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

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

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. connector, encapsulated
– 8 pre-assembled open ends, for connection to the Axioline realtime I/O system
– Transmission of groups of 8 channels

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 encapsulated connectors:
UM 45-FLK14/ 8IM/ZFKDS/PLC, 2965211
UM 45- 8RM/MR-G24/1/PLC, 2962900

Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516

Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427

System cable for 8 channels

Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current carrying capacity per path		1 A
Maximum conductor resistance		0.16 Ω/m
Ambient temperature (operation)		-20°C ... 50°C
Assembly		Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section		AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter	8 -position	6.4 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt.
Round cable with an open end (8 individual wires)					
	8	0.5 m	**VIP-CAB-FLK14/AXIO/0,14/0,5M**	2901604	1
	8	1 m	**VIP-CAB-FLK14/AXIO/0,14/1,0M**	2901605	1
	8	1.5 m	**VIP-CAB-FLK14/AXIO/0,14/1,5M**	2901606	1
	8	2 m	**VIP-CAB-FLK14/AXIO/0,14/2,0M**	2901607	1
	8	2.5 m	**VIP-CAB-FLK14/AXIO/0,14/2,5M**	2901608	1
	8	3 m	**VIP-CAB-FLK14/AXIO/0,14/3,0M**	2901609	1
	8	4 m	**VIP-CAB-FLK14/AXIO/0,14/4,0M**	2901610	1
	8	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-position system cables
– Transmission of 4 x 8 channels over four 14-position system cables

Perfectly-fitting VARIOFACE termination boards round off this system concept.

Web code for the online configurator

Your web code: #0007

Notes:
Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516
Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427
For system cables, see page 536

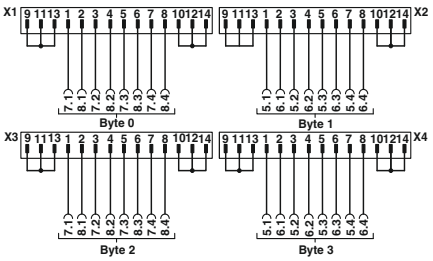
Front adapter for Inline

Technical data

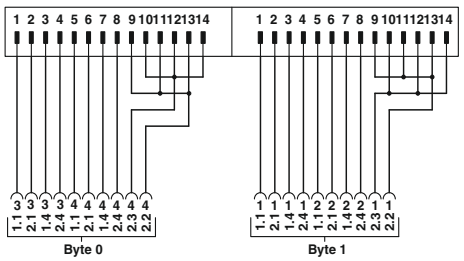
Maximum permissible operating voltage	60 V DC
Maximum permissible current	1 A (per path)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Mounting position	Any
Standards/regulations	IEC 60664 / DIN EN 50178

Ordering data

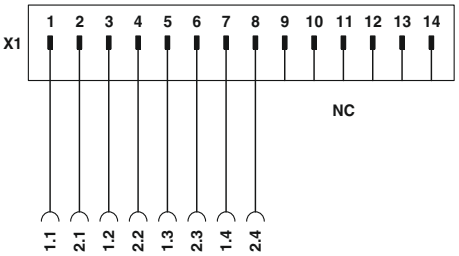
Description	No. of pos.	Type	Order No.	Pcs./Pkt.
VARIOFACE front adapter, for 8-channel Inline modules				
Input: IB IL 24 D I8/HD-PAC Output: IB IL 24 DO 8/HD-PAC	14	**FLKM 14-PA-INLINE/DIO8**	2900889	1
VARIOFACE front adapter, for 16-channel Inline modules				
Input: IB IL 24 DI 16-PAC	14	**FLKM 14-PA-INLINE/IN16**	2302751	1
Output: IB IL 24 DO 16-PAC	14	**FLKM 14-PA-INLINE/OUT16**	2302764	1
VARIOFACE front adapter, for 32-channel Inline modules				
Input: IB IL 24 DI 32/HD-PAC and IB IL 24 DI 32/HD-NPN-PAC Output: IB IL 24 DO 32/HD-PAC	14	**FLKM 14-PA-INLINE/32**	2302777	1



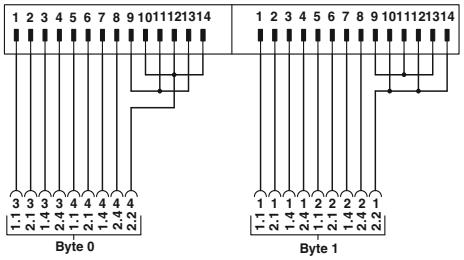
Connection scheme: FLKM 14-PA-INLINE/32



Connection scheme: FLKM 14-PA-INLINE/IN16



Connection scheme for FLKM 14-PA-INLINE/DIO8



Connection scheme: FLKM 14-PA-INLINE/OUT16

Explanation:
IDC/FLK strip
Connection to I/O card
Screw terminal blocks for separate supply

Schneider Electric Modicon® TSX Quantum™ Front adapters

The front adapters mean that preassembled system cables can be directly connected to I/O modules. There are two connection possibilities available:

– Transfer of max. 32 channels over one 50-position system cable
– Transmission of 4 x 8 channels over four 14-position system cables

Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.

Web code for the online configurator

Your web code: #0007

Notes:
Controller-specific modules from page 489
Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516
Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427
For system cables, see page 536

Front adapter for Modicon® TSX Quantum™

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum 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	IEC 60664 / 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

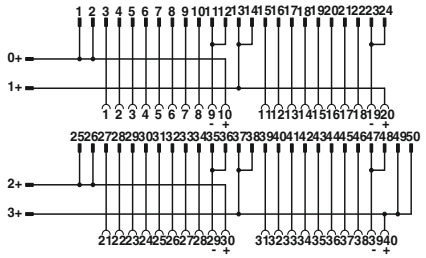
Front adapters for I/O modules of the Modicon TSX Quantum™ automation devices

Card type	FLKM 50-PA-MODI-TSX/Q
Digital input	DDI 353 DDI 841* DDI 853 DAI 340* DAI 353** DAI 440*
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*

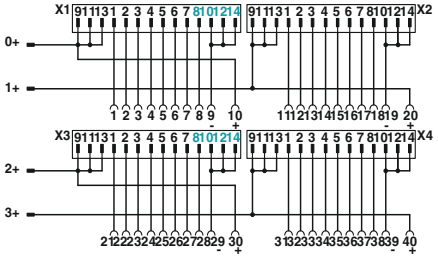
Card type	FLKM 50/4-FLK14/PA-MODI-TSX/Q
Digital input	DDI 353 DDI 853 DAI 353**
Digital output	DDO 353

* Only in conjunction with
VIP-2/SC/FLK50/MODI-TSX/Q, Order No.: 2322304
VIP-2/PT/FLK50/MODI-TSX-Q, Order No.: 2904285
** Only in conjunction with passive interface modules without LED.

Explanation:
IDC/FLK strip
Connection to I/O card
Screw terminal blocks for separate supply



Connection scheme FLKM 50-PA-MODI-TSX/Q



Connection scheme FLKM 50/ 4-FLK14/PA-MODI-TSX/Q

Schneider Electric Modicon® TSX Quantum™ VIP interface modules

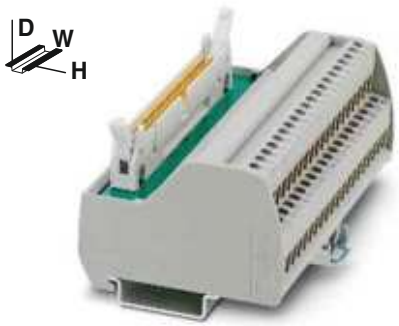
These VIP – VARIOFACE Professional modules are used in combination with 50-pos. system cables and the relevant front adapters.

Features:

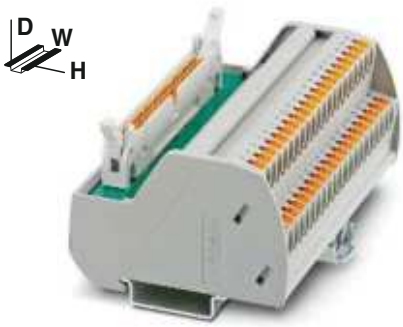
– Specific marking
– Specifically for Modicon® TSX Quantum™

Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No, 0811862) and mounting material, see Catalog 3.



Passive termination board For Modicon® TSX Quantum™ with screw connection



Passive termination board For Modicon® TSX Quantum™ with Push-in connection

Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Field level	Screw connection
	Controller level	IDC/FLK pin strip
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

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V
Maximum permissible current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Field level	Push-in connection
	Controller level	IDC/FLK pin strip
Connection data solid/stranded/AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14
Dimensions	H / D	72.1 mm / 56 mm

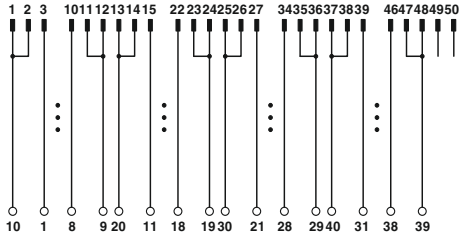
Description	No. of pos.	Module width W
VARIOFACE termination board, with Modicon® TSX Quantum™-specific marking from 1 to 40		
- with screw connection	50	106.1 mm
- with Push-in connection	50	107.9 mm

Ordering data

Type	Order No.	Pcs./Pkt.
VIP-2/SC/FLK50/MODI-TSX/Q	2322304	1

Ordering data

Type	Order No.	Pcs./Pkt.
VIP-2/PT/FLK50/MODI-TSX/Q	2904285	1



Connection scheme VIP-2/.../FLK50/MODI-TSX/Q

Schneider Electric Modicon® M340™ Front adapters

Pre-assembled system cables are connected directly to the 16-channel I/O modules using the front adapter. The adapters connect 2 x 8 channels of the controller via two 14-pos. system cables. Tailor-made VARIOFACE termination boards with a variety of functions and connection options are available for connection to field level. They round off this system concept.

Web code for the online configurator

Your web code: #0007

Notes:
Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516
Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427
For system cables, see page 536

Schneider Electric Modicon M340™® front adapter

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	50 V / 50 V
Maximum permissible current	1 A (per path)
Maximum permissible total current	3 A (per system cable when supplying from the module side) 10 A (when supplying via the front adapter)
Ambient temperature (operation)	-20°C ... 60°C
Ambient temperature (storage/transport)	-20°C ... 60°C
Mounting position	any
Standards/regulations	IEC 60664 / DIN EN 50178

Ordering data

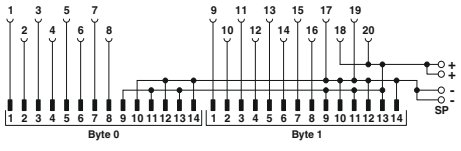
Description	No. of pos.	Type	Order No.	Pcs./Pkt.
VARIOFACE front adapter, for Modicon® M340™ with two FLK pin strips	14	**FLKM 14-PA-MODI/M340**	2903208	1

Front adapters for I/O modules of the Modicon® M340™ series

Card type	FLKM 14-PA-MODI/M340
Digital input	BMX DDI1602 BMX DDI1603 BMX DAI1602 BMX DAI1603
Digital output	BMX DDO1602 BMX DDO1612

Assignment table

Contacts of front adapter/ controller	Connectors (Byte 0)	Connectors (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 cables

These system cables are plugged onto the I/O cards that are connected using Fujitsu connectors.

CABLE-FCN40/1X50/...
– Signal transmission of 32 channels

CABLE-FCN40/4X14/...
– Splitting up 32 channels into 4 x 8 channels

Web code for the online configurator

Your web code: #0007

Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 50

Fujitsu FCN connector to IDC/FLK socket strip, number of positions: 40 to 4 x 14

	Technical data	Technical data
Maximum permissible operating voltage	25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -	125 V / -
Maximum permissible current carrying capacity per path	1 A	1 A
Maximum 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

Siemens SIMATIC® S7-1500 Front adapters

Digital I/O modules with 32 channels

There are two connection possibilities available:

– Transfer of max. 32 channels over one 50-position system cable
– Transmission of 4 x 8 channels via a 14-pos. system cable

Digital I/O modules with 16 channels

– Transmission of 2 x 8 channels over two 14-position system cables.

Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.

Web code for the online configurator

Your web code: #0007

Notes:
Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516
Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427
For system cables, see page 536

Front adapter for SIMATIC® S7-1500 digital I/O cards

Technical data

Maximum permissible operating voltage	<50 V DC
Maximum permissible current	1 A (per path)
Maximum permissible total current	2 A (per byte when supplying from the module side) 12 A (when supplying via the front adapter)
Ambient temperature (operation)	-25°C ... 60°C
Ambient temperature (storage/transport)	-40°C ... 70°C
Standards/regulations	IEC 61131-2
Connection method	IDC/FLK pin strip

Ordering data

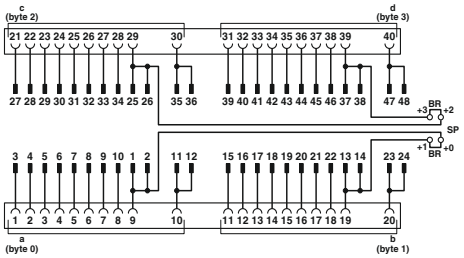
Description	No. of pos.	Type	Order No.	Pcs./Pkt.
VARIOFACE front adapter, for SIMATIC® S7-1500 digital 35 mm modules, 1 x 32 channels can be connected				
- with screw connection	50	**FLKM 50-PA/SC/DIO/S7-1500**	2907383	1
- with Push-in connection	50	**FLKM 50-PA/PT/DIO/S7-1500**	2907384	1
VARIOFACE front adapter, for SIMATIC® S7-1500 digital 35 mm modules, 4 x 8 or 2 x 8 channels can be connected				
- with screw connection	14	**FLKM 4X14-PA/SC/DIO/S7-1500**	2907381	1
- with Push-in connection	14	**FLKM 4X14-PA/PT/DIO/S7-1500**	2907382	1

Front adapters for 32-channel digital cards of the SIMATIC® S7-1500

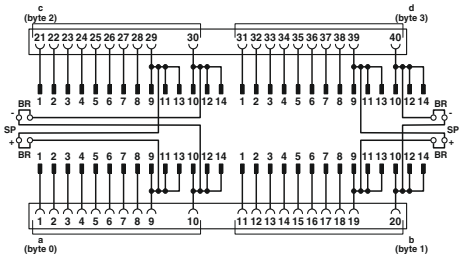
Card type	FLKM 50-PA/.../DIO/S7-1500 FLKM 4X14-PA/.../DIO/S7-1500
Digital input	6ES7 521-1BL00-0AB0
Digital output	6ES7 522-1BL00-0AB0 6ES7 522-1BL01-0AB0

Front adapters for 16-channel digital cards of the SIMATIC® S7-1500

Card type	FLKM 4X14-PA/.../DIO/S7-1500
Digital input	6ES7 521-1BH00-0AB0 6ES7 521-1BH50-0AA0
Digital output	6ES7 522-1BH00-0AB0 6ES7 522-1BH01-0AB0



Connection scheme for FLKM 50-PA/.../DIO/S7-1500



Connection scheme for FLKM 4X14-PA/.../DIO/S7-1500

Note:
The front adapters are non-isolated on delivery.
Electrical isolation is achieved by removing the wire bridges (in groups of 8).

Explanation:
IDC/FLK strip
Connection to I/O card
Screw terminal blocks for separate supply

Siemens SIMATIC® S7-1500 Front adapters

Analog I/O modules with 8 channels

There are two connection possibilities available:

– Transmission of a maximum of 8 channels via a 50-pos. system cable
– Transmission of 4 x 2 channels via a 14-pos. system cable

Analog I/O modules with 4 channels

– Transmission of 2 x 2 channels via two 14-pos. system cables

Web code for the online configurator

Your web code: #0007

Notes:
Controller-specific modules from page 494
For system cables, see page 536

Front adapter for SIMATIC® S7-1500 analog I/O cards

Technical data

Maximum permissible operating voltage	<50 V DC
Maximum permissible current	1 A (per path)
Ambient temperature (operation)	-25°C ... 60°C
Ambient temperature (storage/transport)	-40°C ... 70°C
Standards/regulations	IEC 61131-2
Connection method	IDC/FLK pin strip

Ordering data

Description	No. of pos.	Type	Order No.	Pcs./Pkt.
VARIOFACE front adapter, for SIMATIC® S7-1500 analog 35 mm modules				
- 8 channels can be connected	50	**FLKM 50-PA/AN/S7-1500**	2907386	1
- 4 x 2 or 2 x 2 channels can be connected	14	**FLKM 4X14-PA/AN/S7-1500**	2907385	1

Front adapters for 8-channel analog cards of the SIMATIC® S7-1500 (only one 50-pos. cable is connected)

Card type	FLKM 50-PA/AN/S7-1500
Analog input	6ES7 531-7KF00-0AB0* 6ES7 531-7NF00-0AB0* 6ES7 531-7NF10-0AB0* 6ES7 531-7PF00-0AB0*
Analog output	6ES7 532-5HF00-0AB0*

Front adapters for 8-channel analog cards of the SIMATIC® S7-1500 (four 14-pos. cables are connected)

Card type	FLKM 4X14-PA/AN/S7-1500
Analog input	6ES7 531-7KF00-0AB0** 6ES7 531-7NF00-0AB0** 6ES7 531-7NF10-0AB0** 6ES7 531-7PF00-0AB0**
Analog output	6ES7 532-5HF00-0AB0**

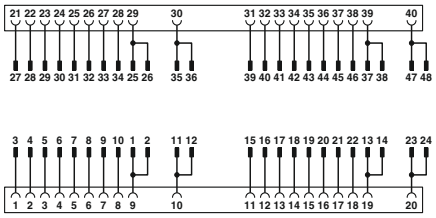
Front adapters for 4-channel analog cards of the SIMATIC® S7-1500 (only two 14-pos. cables are connected)

Card type	FLKM 4X14-PA/AN/S7-1500
Analog output	6ES7 532-5HD00-0AB0*** 6ES7 532-5ND00-0AB0***

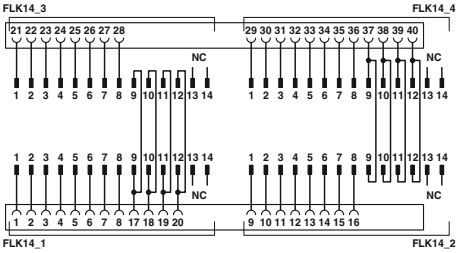
* Only in conjunction with
VIP-3/PT/FLK50/AN/S7-1500, Order No.: 2908496
VIP-3/SC/FLK50/AN/S7-1500, Order No.: 2908495
VIP-3/PT/FLK50/AN/2P/S7-1500, Order No.: 2908499
VIP-3/SC/FLK50/AN/2P/S7-1500, Order No.: 2908497
FLKM 50/KDS3-MT/PPA/S7-1500, Order No.: 2909893

** Only in conjunction with
VIP-3/PT/2FLK14/AN/2P/S7-1500A, Order No.: 2908465
VIP-3/SC/2FLK14/AN/2P/S7-1500A, Order No.: 2908464
VIP-3/PT/2FLK14/AN/2P/S7-1500B, Order No.: 2908846
VIP-3/SC/2FLK14/AN/2P/S7-1500B, Order No.: 2908845
FLKM-2FLK14/KDS3-MT/AN/S7-1500, Order No.: 2909894

***Only in conjunction with
VIP-3/PT/2FLK14/AN/2P/S7-1500A, Order No.: 2908465
VIP-3/SC/2FLK14/AN/2P/S7-1500A, Order No.: 2908464
FLKM-2FLK14/KDS3-MT/AN/S7-1500, Order No.: 2909894



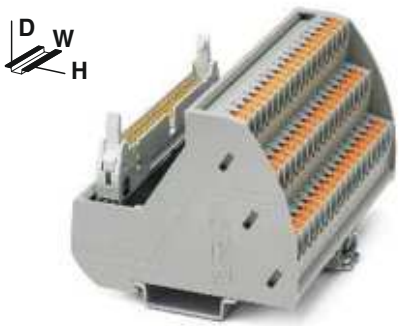
Connection scheme FLKM 50-PA/AN/S7-1500



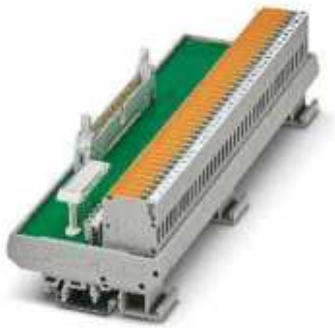
Connection scheme FLKM 4X14-PA/AN/S7-1500

Siemens SIMATIC® S7-1500 Analog interface modules

VARIOFACE termination boards with SIMATIC® S7-1500-specific marking.
– One 50-pos. IDC/FLK pin strip
– Numerical marking (1-40)
– Optional: separate potentials L+, M, P1, and P2
– Specifically for S7-1500



Passive termination board for SIMATIC® S7-1500 with separate potentials



Passive termination board for SIMATIC® S7-1500 with knife disconnect terminal blocks

Technical data

		VIP-3/PT/FLK50/AN.../S7-1500	VIP-3/SC/FLK50/AN.../S7-1500
Maximum permissible operating voltage		25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		60 V / 60 V	60 V / 60 V
Maximum permissible current (per branch)		1 A	1 A
Maximum total current (voltage supply)		7 A	7 A
Ambient temperature (operation)		-20°C ... 60°C	-20°C ... 60°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178	
Connection method	Field level	Push-in connection	Screw connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
Screw connection rigid / flexible / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Push-in connection rigid / flexible / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14	
Dimensions	H / D	75.8 mm / 63 mm	68.8 mm / 60.7 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE termination board for SIMATIC® S7-1500, marking 1 through 40, with potentials L+ and M					
- with Push-in connection	50	97.7 mm	**VIP-3/PT/FLK50/AN/S7-1500**	2908496	1
- with screw connection	50	97.7 mm	**VIP-3/SC/FLK50/AN/S7-1500**	2908495	1
VARIOFACE termination board for SIMATIC® S7-1500, marking 1 through 40, with potentials L+, M, P1, and P2					
- with Push-in connection	50	128.2 mm	**VIP-3/PT/FLK50/AN/2P/S7-1500**	2908499	1
- with screw connection	50	128.2 mm	**VIP-3/SC/FLK50/AN/2P/S7-1500**	2908497	1

Technical data

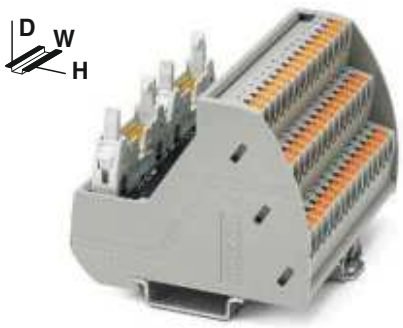
	FLKM 50/KDS3-MT/PPA/S7-1500
Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	- / -
Maximum permissible current (per branch)	1 A
Maximum total current (voltage supply)	-
Ambient temperature (operation)	-20°C ... 70°C
Mounting position	Any
Standards/regulations	DIN EN 50178
Connection method	Screw connection with disconnect knife
	IDC/FLK pin strip
Screw connection rigid / flexible / AWG	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Push-in connection rigid / flexible / AWG	- ... - / - ... - / -
Dimensions H / D	77 mm / 61 mm - / -

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE termination board for SIMATIC® S7-1500, marking 1 through 40, knife disconnect terminal blocks and test sockets		213.8 mm	**FLKM 50/KDS3-MT/PPA/S7-1500**	2909893	1

Siemens SIMATIC® S7-1500 Analog interface modules

VARIOFACE termination boards with SIMATIC® S7-1500-specific marking.
– Two 14-pos. IDC/FLK pin strips
– Numerical marking (1-20 or 21-40)
– Optional: separate potentials L+, M, P1, and P2
– Specifically for S7-1500



Passive termination board for SIMATIC® S7-1500 with separate potentials

Passive termination board for SIMATIC® S7-1500 with knife disconnect terminal blocks

Technical data

		VIP-3/PT/2FLK14/AN/2P/S7-11500...	VIP-3/SC/2FLK14/AN/2P/S7-1500...
Maximum permissible operating voltage		25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		60 V / 60 V	60 V / 60 V
Maximum permissible current (per branch)		1 A	1 A
Maximum total current (voltage supply)		7 A	7 A
Ambient temperature (operation)		-20°C ... 60°C	-20°C ... 60°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178	
Connection method	Field level	Push-in connection	Screw connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
Screw connection rigid / flexible / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Push-in connection rigid / flexible / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14	
Dimensions	H / D	75.8 mm / 63 mm	68.8 mm / 60.7 mm

Technical data

		FLKM-2FLK14/KDS3-MT/AN/S7-1500
Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		- / -
Maximum permissible current (per branch)		1 A
Maximum total current (voltage supply)		-
Ambient temperature (operation)		-20°C ... 70°C
Mounting position		Any
Standards/regulations		DIN EN 50178
Connection method	Field level	Screw connection with disconnect knife
	Controller level	IDC/FLK pin strip
Screw connection rigid / flexible / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Push-in connection rigid / flexible / AWG		- ... - / - ... - / -
Dimensions	H / D	77 mm / 61 mm - / -

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE termination board for SIMATIC® S7-1500, marking 1 through 20, with potentials L+, M, P1, and P2					
- with Push-in connection	14	82.5 mm	**VIP-3/PT/2FLK14/AN/2P/S7-1500A**	2908465	1
- with screw connection	14	82.5 mm	**VIP-3/SC/2FLK14/AN/2P/S7-1500A**	2908464	1
VARIOFACE termination board for SIMATIC® S7-1500, marking 21 through 40, with potentials L+, M, P1, and P2					
- with Push-in connection	14	82.5 mm	**VIP-3/PT/2FLK14/AN/2P/S7-1500B**	2908846	1
- with screw connection	14	82.5 mm	**VIP-3/SC/2FLK14/AN/2P/S7-1500B**	2908845	1
VARIOFACE termination board for SIMATIC® S7-1500, marking 1 through 20 or 21 through 40, knife disconnect terminal blocks and test sockets		135 mm	**FLKM-2FLK14/KDS3-MT/AN/S7-1500**	2909894	1

VIP – power cabling
Universal front adapters for Siemens SIMATIC® S7-300

Two versions are available:

– Connection of 40-pos. modules via four cables, each with a 10-pos. COMBI connector
– Connection of 20-pos. modules via two cables, each with a 10-pos. COMBI connector

The front adapters have the following features:

– Can be screwed on/snapped in with the I/O module
– Suitable for all common S7-300 modules, up to max. 250 V AC/DC, 6 A
– Universal 1:1 connection
– Numerically marked connectors

Combination example:

A front adapter with attached 10-pos. COMBI connectors is combined with the following terminal blocks for field connection:

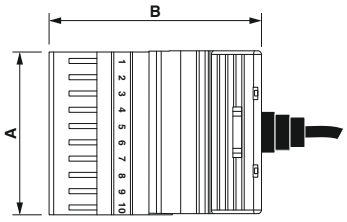
Overall width of 52 mm per connector:

– 3045017 UT 2,5/1P
– 3210033 PT 2,5/1P
– 3040012 ST 2,5/1P
– 3040766 ST 2,5-TWIN-MT/1P

Reduced overall width of 35 mm per connector:

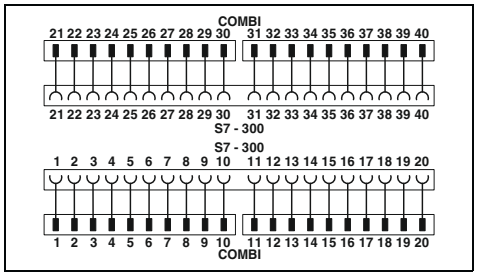
– 3208582 PT 1,5/S/1P
– 3212439 PTTB 1,5/S/2P

You can find further versions, accessories, and combination options in Catalog 1 “Terminal blocks” in the “Plug-in COMBI connection solutions” section or online at phoenixcontact.net/products.



	A	B
...4X10COMBI...	52	70
...2X10COMBI...		
...4X10 PT...	35	62
...2X10 PT...		

Front adapter with punched-on connectors for 40 plug-in modular terminal blocks



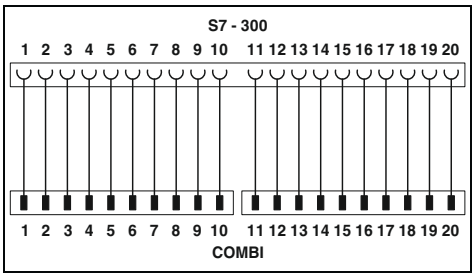
Technical data

Maximum permissible operating voltage		250 V AC/DC
Maximum permissible operating voltage UL / CSA		250 V / 250 V
Maximum permissible current		6 A (per single wire at 40°C) 4 A (per single wire at 60°C)
Maximum permissible total current		20 A (per cable at 40°C) 16 A (per cable at 60°C)
Maximum conductor resistance		39 Ω/km
Conductor cross section		AWG 21 / 0.5 mm²
Conductor structure: stranded wires / material		16 / Cu uninsulated
Outside diameter		9 mm
Ambient temperature range		-20°C ... 60°C
Standards/regulations		DIN EN 50178, IEC 60664
Connection method	Controller level	Plug connection
	Field level	COMBICON connectors

Ordering data

Description	Cable length	Type	Order No.	Pcs./Pkt.
VIP - power cabling front adapter, for universal connection of the SIMATIC® S7-300, with an overall width of 52 mm per connector				
	1 m	**VIP-PA-PWR/4X10COMBI/ 1,0M/S7**	2904703	1
	1.5 m	**VIP-PA-PWR/4X10COMBI/ 1,5M/S7**	2904704	1
	2 m	**VIP-PA-PWR/4X10COMBI/ 2,0M/S7**	2904705	1
	2.5 m	**VIP-PA-PWR/4X10COMBI/ 2,5M/S7**	2904706	1
	3 m	**VIP-PA-PWR/4X10COMBI/ 3,0M/S7**	2904707	1
	4 m	**VIP-PA-PWR/4X10COMBI/ 4,0M/S7**	2904708	1
	10 m	**VIP-PA-PWR/4X10COMBI/10,0M/S7**	2904712	1
VIP - power cabling front adapter, for universal connection of the SIMATIC® S7-300, with reduced overall width of 35 mm per connector				
	1 m	**VIP-PA-PWR/4X10 PT/ 1,0M/S7**	2905517	1
	1.5 m	**VIP-PA-PWR/4X10 PT/ 1,5M/S7**	2905518	1
	2 m	**VIP-PA-PWR/4X10 PT/ 2,0M/S7**	2905519	1
	2.5 m	**VIP-PA-PWR/4X10 PT/ 2,5M/S7**	2905520	1
	3 m	**VIP-PA-PWR/4X10 PT/ 3,0M/S7**	2905521	1
	4 m	**VIP-PA-PWR/4X10 PT/ 4,0M/S7**	2905522	1
	10 m	**VIP-PA-PWR/4X10 PT/10,0M/S7**	2905526	1

Front adapter with punched-on connectors for 20 plug-in modular terminal blocks



Technical data

250 V AC/DC
250 V / 250 V

6 A (per single wire at 40°C)
4 A (per single wire at 60°C)
20 A (per cable at 40°C)
16 A (per cable at 60°C)
39 Ω/km
AWG 21 / 0.5 mm²
16 / Cu uninsulated
9 mm
-20°C ... 60°C
DIN EN 50178, IEC 60664
Plug connection
COMBICON connectors

Ordering data

Type	Order No.	Pcs./Pkt.
VIP-PA-PWR/2X10COMBI/ 1,0M/S7	**2904714**	1
VIP-PA-PWR/2X10COMBI/ 1,5M/S7	**2904715**	1
VIP-PA-PWR/2X10COMBI/ 2,0M/S7	**2904716**	1
VIP-PA-PWR/2X10COMBI/ 2,5M/S7	**2904717**	1
VIP-PA-PWR/2X10COMBI/ 3,0M/S7	**2904718**	1
VIP-PA-PWR/2X10COMBI/ 4,0M/S7	**2904719**	1
VIP-PA-PWR/2X10COMBI/10,0M/S7	**2904723**	1
VIP-PA-PWR/2X10 PT/ 1,0M/S7	**2905529**	1
VIP-PA-PWR/2X10 PT/ 1,5M/S7	**2905531**	1
VIP-PA-PWR/2X10 PT/ 2,0M/S7	**2905532**	1
VIP-PA-PWR/2X10 PT/ 2,5M/S7	**2905533**	1
VIP-PA-PWR/2X10 PT/ 3,0M/S7	**2905534**	1
VIP-PA-PWR/2X10 PT/ 4,0M/S7	**2905535**	1
VIP-PA-PWR/2X10 PT/10,0M/S7	**2905539**	1

VIP – power cabling
Universal front adapters for Siemens SIMATIC® S7-300

Four versions are available:

– Connection of 40-pos. modules via 40 individual wires in rope structure (not assembled), PVC insulation
– Connection of 20-pos. modules via 20 individual wires in rope structure (not assembled), PVC insulation
– Connection of 40-pos. modules via 40 individual wires in rope structure (not assembled), insulation made from halogen-free material
– Connection of 20-pos. modules via 20 individual wires in rope structure (not assembled), insulation made from halogen-free material

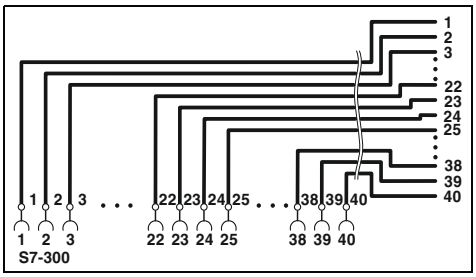
The front adapters have the following features:

– Can be screwed on/snapped in with the I/O module
– Suitable for all common S7-300 modules, up to max. 250 V AC/DC, 6 A
– Universal 1:1 connection
– Numerically marked wires

Additional accessories, such as connection terminal blocks, can be found in Catalog 1 “Terminal blocks” or at phoenixcontact.net/products.

Front adapter with 40 open cable ends, PVC insulation

EAC



Technical data

Maximum permissible operating voltage		250 V AC/DC
Maximum permissible current		6 A (per single wire at 40°C) 4 A (per single wire at 60°C) 750 mA (per single wire at 75°C)
Maximum permissible total current		20 A (per cable at 40°C) 16 A (per cable at 60°C)
Maximum conductor resistance		39 Ω/km
Conductor cross section		AWG 21 / 0.5 mm²
Conductor structure: stranded wires / material		16 / Cu uninsulated
Outside diameter		13 mm
Ambient temperature range		-20°C ... 60°C
Standards/regulations		DIN EN 50178, IEC 60664
Connection method	Controller level	Plug connection
	Field level	Open cable end

Ordering data

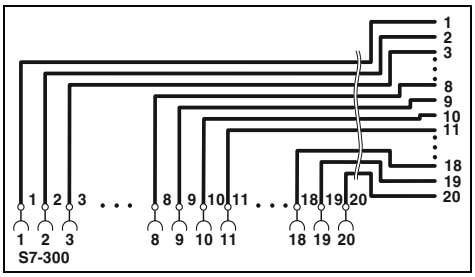
Description	Cable length	Type	Order No.	Pcs./Pkt.
Front adapter with 40 open cable ends for connecting 40-pos. modules				
	1 m	**VIP-PA-PWR/40XOE/ 1,0M/S7**	2904731	1
	2 m	**VIP-PA-PWR/40XOE/ 2,0M/S7**	2904732	1
	3 m	**VIP-PA-PWR/40XOE/ 3,0M/S7**	2904733	1
	4 m	**VIP-PA-PWR/40XOE/ 4,0M/S7**	2904734	1
	10 m	**VIP-PA-PWR/40XOE/10,0M/S7**	2904737	1
Front adapter with 20 open cable ends for connecting 20-pos. modules				
	1 m			
	2 m			
	3 m			
	4 m			
	10 m			

Front adapter with 20 open cable ends, PVC insulation

Front adapter with 40 open cable ends, halogen-free

Front adapter with 20 open cable ends, halogen-free

EAC



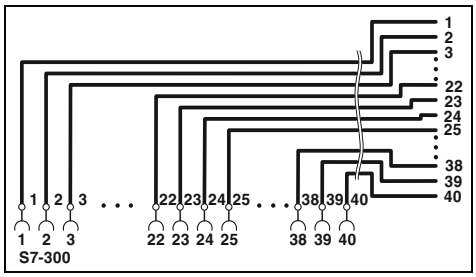
Technical data

250 V AC/DC
6 A (per single wire at 40°C)
4 A (per single wire at 60°C)
750 mA (per single wire at 75°C)
20 A (per cable at 40°C)
16 A (per cable at 60°C)
39 Ω/km
AWG 21 / 0.5 mm²
16 / Cu uninsulated
9 mm
-20°C ... 60°C
DIN EN 50178, IEC 60664
Plug connection
Open cable end

Ordering data

Type	Order No.	Pcs./Pkt.
VIP-PA-PWR/20XOE/ 1,0M/S7	**2904724**	1
VIP-PA-PWR/20XOE/ 2,0M/S7	**2904725**	1
VIP-PA-PWR/20XOE/ 3,0M/S7	**2904726**	1
VIP-PA-PWR/20XOE/ 4,0M/S7	**2904727**	1
VIP-PA-PWR/20XOE/10,0M/S7	**2904730**	1

EAC



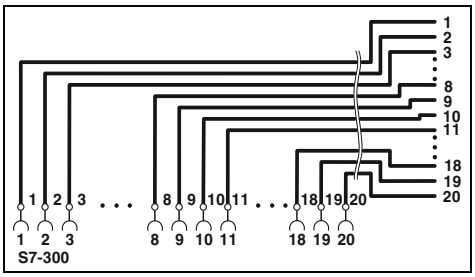
Technical data

250 V AC/DC
6 A (per single wire at 40°C)
4 A (per single wire at 60°C)
750 mA (per single wire at 75°C)
20 A (per cable at 40°C)
16 A (per cable at 60°C)
39 Ω/km
AWG 21 / 0.5 mm²
16 / Cu uninsulated
13 mm
-20°C ... 60°C
DIN EN 50178, IEC 60664
Plug connection
Open cable end

Ordering data

Type	Order No.	Pcs./Pkt.
VIP-PA-PWR/40XOE/HF/ 1,0M/S7	**2908909**	1
VIP-PA-PWR/40XOE/HF/ 2,0M/S7	**2908908**	1
VIP-PA-PWR/40XOE/HF/ 3,0M/S7	**2908907**	1
VIP-PA-PWR/40XOE/HF/ 4,0M/S7	**2908905**	1
VIP-PA-PWR/40XOE/HF/10,0M/S7	**2908902**	1

EAC



Technical data

250 V AC/DC
6 A (per single wire at 40°C)
4 A (per single wire at 60°C)
750 mA (per single wire at 75°C)
20 A (per cable at 40°C)
16 A (per cable at 60°C)
39 Ω/km
AWG 21 / 0.5 mm²
16 / Cu uninsulated
9 mm
-20°C ... 60°C
DIN EN 50178, IEC 60664
Plug connection
Open cable end

Ordering data

Type	Order No.	Pcs./Pkt.
VIP-PA-PWR/20XOE/HF/ 1,0M/S7	**2908916**	1
VIP-PA-PWR/20XOE/HF/ 2,0M/S7	**2908915**	1
VIP-PA-PWR/20XOE/HF/ 3,0M/S7	**2908914**	1
VIP-PA-PWR/20XOE/HF/ 4,0M/S7	**2908913**	1
VIP-PA-PWR/20XOE/HF/10,0M/S7	**2908910**	1

VIP – VARIOFACE Professional Front adapters for Siemens SIMATIC® S7-300

Three connection options are available:

– Transfer of max. 32 channels via two 50-pos. system cables (32-channel cards or this design)
– Transfer of 4 x 8 channels via two 14-pos. system cables (32-channel cards or their type)
– Transfer of 2 x 8 channels via two 14-pos. system cables (16-channel cards or their type)

The front adapters have the following features:

– Can be screwed with I/O module
– Voltage supply via terminal blocks with spring-cage double connection
– Encapsulated IDC/FLK socket strips for module side

Special lengths are configured using separate order numbers.

Ordering example:

A front adapter with a connected 50-pos. system cable (32-channel cards), 12.75 m in length:

1 pcs. 2900885/12,75

Web code for the online configurator

Your web code: #0007

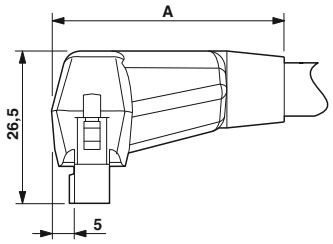
Notes:

The following modules cannot be coupled due to the larger outer contour of the molded connectors:
UM 45-FLK14/ 8IM/ZFKDS/PLC, 2965211
UM 45-FLK50/32IM/ZFKDS/PLC, 2965224
UM 45- 8RM/MR-G24/1/PLC, 2962900
UM 45-16RM/MR-G24/1/PLC, 2962913

Controller-specific modules from page 506

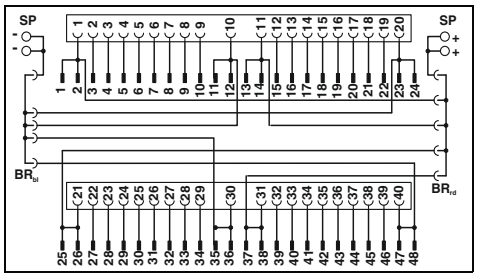
Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516

Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427



	A
...FLK14...	37
...FLK50...	42

Front adapter with system cable 1 x 32 channels can be connected



Technical data

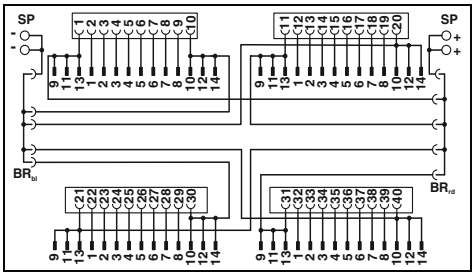
Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		50 V / -
Maximum permissible current		1 A (per path) 8 A (separate power supply)
Maximum conductor resistance		0.16 Ω/m
Conductor cross section		AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter		10.3 mm
Ambient temperature range		-20°C ... 50°C
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Control side	Plug connection
	Field level	IDC/FLK socket strip
Connection data solid/stranded/AWG		0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14

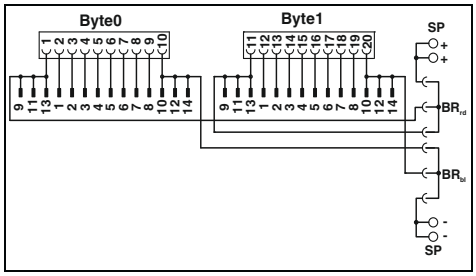
Ordering data

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
	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

	25 V AC / 60 V DC
	50 V / -
	1 A (per path)
	8 A (separate power supply)
	0.16 Ω/m
	AWG 26 / 0.14 mm²
	7 / Cu tin-plated
	6.4 mm
	-20°C ... 50°C
	IEC 60664, DIN EN 50178
	Plug connection
	IDC/FLK socket strip
	0.2 ... 2.5 mm² / 0.2 ... 2.5 mm² / 24 - 14

Technical data

	25 V AC / 60 V DC
	50 V / -
	1 A (per path)
	8 A (separate power supply)
	0.16 Ω/m
	AWG 26 / 0.14 mm²
	7 / Cu tin-plated
	6.4 mm
	-20°C ... 50°C
	IEC 60664, DIN EN 50178
	Plug connection
	IDC/FLK socket strip
	0.2 ... 2.5 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-FLK50/4X14/10,0M/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-FLK14/10,0M/S7	2322760	1
VIP-PA-FLK14-S7/...	2900887	1

Front adapters for 32-channel cards of the SIMATIC® S7-300

Card type	VIP-PA-FLK50/...M/S7
Digital input	6ES7 321-1BL00-0AA0
Digital output	6ES7 322-1BL00-0AA0
Digital input/output	6ES7 323-1BL00-0AA0
Analog input	6ES7 331-7PF01-0AB0* 6ES7 331-7PF11-0AB0* 6ES7 331-7NF00-0AB0* 6ES7 331-7NF10-0AB0* 6ES7 331-1KF01-0AB0*
Analog output	6ES7 332-5HF00-0AB0*
CPU	312C, 313C, 314C, 313C-2PtP 313C-2DP, 314C-2DP
Other modules	6ES7 350-2AH01-0AE0* 6ES7 357-4AH01-0AE0*

Card type	VIP-PA-FLK50/4X14/...M/S7
Digital input	6ES7 321-1BL00-0AA0
Digital output	6ES7 322-1BL00-0AA0
Digital input/output	6ES7 323-1BL00-0AA0
CPU	313C, 314C, 313C-2PtP 313C-2DP, 314C-2DP

* Only in conjunction with
VIP-2/SC/FLK50 (1-40)/S7, Order No.: 2315243,
VIP-2/PT/FLK50 (1-40)/S7, Order No.: 2903804,
FLKM 50/KDS3-MT/PPA/S7-300, Order No.: 2304490.
All bridges (BR) on the adapter must be removed.

Front adapters for 16-channel cards of SIMATIC® S7-300

Card type	VIP-PA-FLK14/...M/S7
Digital input	6ES7 321-1BH02-0AA0 6ES7 321-1BH10-0AA0 6ES7 321-1BH50-0AA0* 6ES7 321-7BH01-0AB0*
Digital output	6ES7 322-1BH01-0AA0 6ES7 322-1BH10-0AA0 6ES7 322-8BF00-0AB0*
Digital input/output	6ES7 323-1BH01-0AA0
Analog input	6ES7 331-7KF02-0AB0* 6ES7 331-7HF01-0AB0* 6ES7 331-7KB02-0AB0* 6ES7 331-7TF01-0AB0*
Analog output	6ES7 332-5HD01-0AB0* 6ES7 332-5HB01-0AB0* 6ES7 332-7ND02-0AB0*
Analog input/output	6ES7 334-0CE01-0AA0* 6ES7 334-0KE00-0AB0* 6ES7 335-7HG01-0AB0*
Other modules	6ES7 338-4BC01-0AB0* 6ES7 350-1AH03-0AE0* 6ES7 351-1AH01-0AE0* 6ES7 352-1AH02-0AE0* 6ES7 353-1AH01-0AE0* 6ES7 354-1AH01-0AE0* 6ES7 355-0VH10-0AE0* 6ES7 355-1VH10-0AE0*

* Only in conjunction with
VIP-2/SC/2FLK14 (1-20)/S7, Order No.: 2315230
VIP-2/PT/2FLK14 (1-20)/S7, Order No.: 2903802
FLKM-2FLK14/KDS 3-MT/PPA/S7, Order No.: 2295062
All bridges (BR) on the adapter must be disconnected.

Note:
The front adapters are non-isolated on delivery.
Electrical isolation can be achieved by removing the bridges (in groups of 8).

Explanation:
IDC/FLK strip
Connection to I/O card

SP: Separate feed-in terminals
BR$_{bl}$: Blue plug-in bridge
BR$_{rd}$: Red plug-in bridge

Siemens SIMATIC® S7-300 Front adapters

I/O modules with 32 channels or with this design

There are two connection possibilities available:

– Transfer of max. 32 channels over one 50-position system cable
– Transmission of 4 x 8 channels over four 14-position system cables

Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.

Web code for the online configurator

Your web code: #0007

Notes:
Controller-specific modules from page 506
Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516
Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427
For system cables, see page 536

Front adapter for SIMATIC® S7-300, I/O cards with max. 32 channels

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	1 A (per path) 8 A (per connection, supply via separate power supply (2.8 x 0.8 mm))
Maximum permissible total current	2 A (per Byte, for supply via connector) 8 A (during supply via a separate bridged power supply)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Standards/regulations	IEC 60664 / DIN EN 50178
Connection method	IDC/FLK pin strip

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 adapters for 32-channel cards of the SIMATIC® S7-300

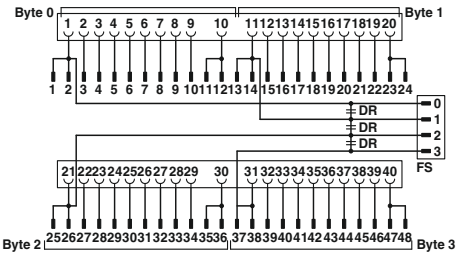
Card type	FLKM 50-PA-S300
Digital input	6ES7 321-1BL00-0AA0
Digital output	6ES7 322-1BL00-0AA0
Digital input/output	6ES7 323-1BL00-0AA0
Analog input	6ES7 331-7PF01-0AB0* 6ES7 331-7PF11-0AB0* 6ES7 331-7NF00-0AB0* 6ES7 331-7NF10-0AB0* 6ES7 331-1KF01-0AB0*
Analog output	6ES7 332-5HF00-0AB0*
CPU	312C, 313C, 314C, 313C-2PtP 313C-2DP, 314C-2DP
Other modules	6ES7 350-2AH01-0AE0* 6ES7 357-4AH01-0AE0*

Card type	FLKM 50/4-FLK14/PA-S300
Digital input	6ES7 321-1BL00-0AA0
Digital output	6ES7 322-1BL00-0AA0
Digital input/output	6ES7 323-1BL00-0AA0
CPU	313C, 314C, 313C-2PtP 313C-2DP, 314C-2DP

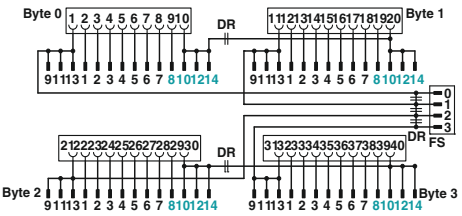
* Only in conjunction with
VIP-2/SC/FLK50(1-40)/S7, Order No.: 2315243,
VIP-2/PT/FLK50(1-40)/S7, Order No.: 2903804,
FLKM 50/KDS3-MT/PPA/S7-300, Order No.: 2304490.
All wire bridges (DR) on the adapter must be disconnected!
There must be no voltage supply at the front adapter (flowing via the slip-on connections)!

Note:
The front adapters are non-isolated on delivery.
Electrical isolation is achieved by removing the wire bridges (in groups of 8).

Explanation:
IDC/FLK strip
Connection to I/O card
Screw terminal blocks for separate supply



Connection scheme FLKM 50-PA-S300



Connection scheme FLKM 50/4-FLK14/PA-S300

Siemens SIMATIC® S7-300 Front adapters

I/O modules with 16 channels or with this design

– Up to 2 x 8 channels are connected via two 14-position system cables.
Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.

Web code for the online configurator

Your web code: #0007

Notes:
Controller-specific modules from page 506
Digital modules such as VIP-2/SC/2FLK14 (1-20) /S7 (2315230) can be found starting on page 507
Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427
For system cables, see page 536

Front adapter for SIMATIC® S7-300, I/O cards with max. 16 channels

Technical data

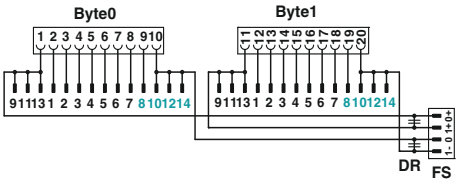
Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	1 A (per path) 8 A (per connection, supply via separate power supply (2.8 x 0.8 mm))
Maximum permissible total current	2 A (per Byte, for supply via connector) 8 A (during supply via a separate bridged power supply)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Standards/regulations	IEC 60664 / DIN EN 50178
Connection method	IDC/FLK pin strip

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 adapters for 16-channel cards of the SIMATIC® S7-300

Card type	FLKM 14-PA-S300
Digital input	6ES7 321-1BH02-0AA0 6ES7 321-1BH10-0AA0 6ES7 321-1BH50-0AA0* 6ES7 321-7BH01-0AB0*
Digital output	6ES7 322-1BH01-0AA0 6ES7 322-1BH10-0AA0 6ES7 322-8BF00-0AB0*
Digital input/output	6ES7 323-1BH01-0AA0
Analog input	6ES7 331-7KF02-0AB0* 6ES7 331-7HF01-0AB0* 6ES7 331-7KB02-0AB0* 6ES7 331-7TF01-0AB0*
Analog output	6ES7 332-5HD01-0AB0* 6ES7 332-5HB01-0AB0* 6ES7 332-7ND02-0AB0*
Analog input/output	6ES7 334-0CE01-0AA0* 6ES7 334-0KE00-0AB0* 6ES7 335-7HG01-0AB0*
Other modules	6ES7 338-4BC01-0AB0* 6ES7 350-1AH03-0AE0* 6ES7 351-1AH01-0AE0* 6ES7 352-1AH02-0AE0* 6ES7 353-1AH01-0AE0* 6ES7 354-1AH01-0AE0* 6ES7 355-0VH10-0AE0* 6ES7 355-1VH10-0AE0*



Connection scheme FLKM 14-PA-S300

* Only in conjunction with
VIP-2/SC/2FLK14 (1-20)/S7, Order No.: 2315230
VIP-2/PT/2FLK14 (1-20)/S7, Order No.: 2903802
FLKM-2FLK14/KDS 3-MT/PPA/S7, Order No.: 2295062
All wire bridges (DR) on the adapter must be disconnected.
There must be no voltage supply at the front adapter (flowing via the slip-on connections)!

Note:
The front adapters are non-isolated on delivery.
Electrical isolation is achieved by removing the wire bridges (in groups of 8).

Explanation:
IDC/FLK strip
Connection to I/O card
Screw terminal blocks for separate supply

Siemens SIMATIC® S7-300 System cables for 64-channel I/O cards

These system cables are plugged onto the 64-channel (2x32) I/O cards that are directly connected using connectors.

CABLE-FCN40/1X50/...

– Signal transmission of 1x32 channels
– System cable: 40-pos. connector to 50-pos. IDC/FLK socket strip

CABLE-FCN40/4X14/...

– Signal transmission of 4x8 channels
– Splitting cable: 40-pos. connector to four 14-pos. IDC/FLK socket strips

Notes:

Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516

Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427

System cable

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum 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, 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
	40	1 m	**CABLE-FCN40/1X50/ 1,0M/S7-OUT**	2321020	1
	40	2 m	**CABLE-FCN40/1X50/ 2,0M/S7-OUT**	2321033	1
	40	3 m	**CABLE-FCN40/1X50/ 3,0M/S7-OUT**	2321046	1
	40	4 m	**CABLE-FCN40/1X50/ 4,0M/S7-OUT**	2321059	1
	40	6 m	**CABLE-FCN40/1X50/ 6,0M/S7-OUT**	2321062	1
	40	8 m	**CABLE-FCN40/1X50/ 8,0M/S7-OUT**	2321075	1
	40	10 m	**CABLE-FCN40/1X50/10,0M/S7-OUT**	2321088	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
	40	1 m	**CABLE-FCN40/1X50/ 1,0M/S7-IN**	2321101	1
	40	2 m	**CABLE-FCN40/1X50/ 2,0M/S7-IN**	2321114	1
	40	3 m	**CABLE-FCN40/1X50/ 3,0M/S7-IN**	2321127	1
	40	4 m	**CABLE-FCN40/1X50/ 4,0M/S7-IN**	2321130	1
	40	6 m	**CABLE-FCN40/1X50/ 6,0M/S7-IN**	2321143	1
	40	8 m	**CABLE-FCN40/1X50/ 8,0M/S7-IN**	2321156	1
	40	10 m	**CABLE-FCN40/1X50/10,0M/S7-IN**	2321169	1

Splitting cable

Technical data

25 V AC / 60 V DC
125 V / -

1 A

0.16 Ω/m
-20°C ... 50°C
AWG 26 / 0.14 mm²
7 / Cu tin-plated

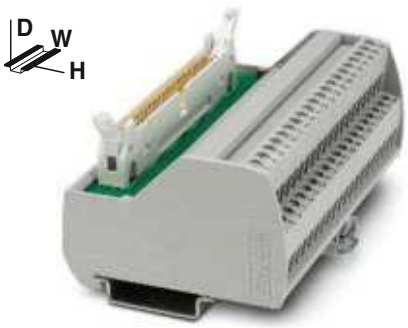
Ordering data

Type	Order No.	Pcs./Pkt.
CABLE-FCN40/4X14/ 0,5M/S7-OUT	2321172	1
CABLE-FCN40/4X14/ 1,0M/S7-OUT	2321185	1
CABLE-FCN40/4X14/ 2,0M/S7-OUT	2321198	1
CABLE-FCN40/4X14/ 3,0M/S7-OUT	2321208	1
CABLE-FCN40/4X14/ 4,0M/S7-OUT	2321211	1
CABLE-FCN40/4X14/ 6,0M/S7-OUT	2321224	1
CABLE-FCN40/4X14/ 8,0M/S7-OUT	2321237	1
CABLE-FCN40/4X14/10,0M/S7-OUT	2321240	1
CABLE-FCN40/4X14/ 0,5M/S7-IN	2321253	1
CABLE-FCN40/4X14/ 1,0M/S7-IN	2321266	1
CABLE-FCN40/4X14/ 2,0M/S7-IN	2321279	1
CABLE-FCN40/4X14/ 3,0M/S7-IN	2321282	1
CABLE-FCN40/4X14/ 4,0M/S7-IN	2321295	1
CABLE-FCN40/4X14/ 6,0M/S7-IN	2321305	1
CABLE-FCN40/4X14/ 8,0M/S7-IN	2321318	1
CABLE-FCN40/4X14/10,0M/S7-IN	2321321	1

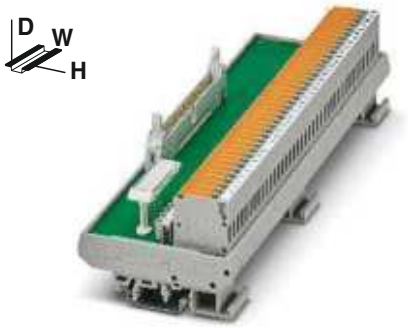
Siemens SIMATIC® S7-300 Interface modules

These VIP – VARIOFACE Professional modules are used in combination with 50-pos. system cables and the relevant front adapters for S7-300.

Features:
– One 50-pos. IDC/FLK pin strip
– Numerical marking (1-40)
– Specifically for SIMATIC® S7-300



Passive interface module for SIMATIC® S7-300



Passive termination board for SIMATIC® S7-300 with knife disconnect terminal blocks

Technical data

		VIP-2/SC/FLK50 (1-40) /S7	VIP-2/PT/FLK50 (1-40) /S7
Maximum permissible operating voltage		25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V	125 V / 125 V
Maximum permissible current (per branch)		1 A	1 A
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178	
Connection method	Field level	Screw connection	Push-in connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
Screw connection rigid / flexible / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Push-in connection rigid / flexible / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14	
Dimensions	H / D	65.5 mm / 56 mm	72.1 mm / 56 mm

Technical data

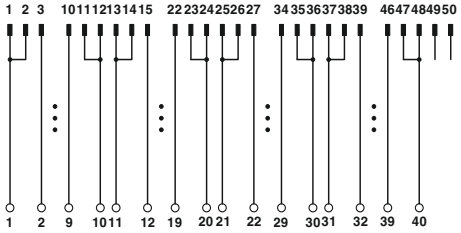
		FLKM 50/KDS3-MT/PPA/S7-300	
Maximum permissible operating voltage		60 V DC	
Maximum permissible operating voltage UL / CSA		24 V / -	
Maximum permissible current (per branch)		1 A	
Ambient temperature (operation)		-20°C ... 50°C	
Mounting position		Any	
Standards/regulations		DIN EN 50178, IEC 60664	
Connection method	Field level	Screw connection with disconnect knife	
	Controller level	IDC/FLK pin strip	
Screw connection rigid / flexible / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Push-in connection rigid / flexible / AWG		- ... - / - ... - / -	
Dimensions	H / D	77 mm / 61 mm	- / -

Ordering data

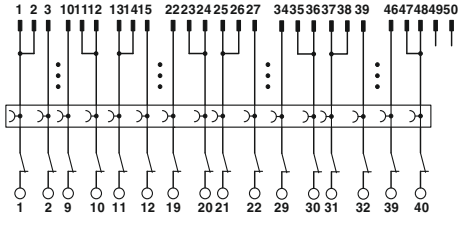
Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE interface module, with SIMATIC® S7-300-specific marking from 1 to 40					
- with screw connection	50	106.1 mm	**VIP-2/SC/FLK50 (1-40) /S7**	2315243	1
- with Push-in connection	50	107.9 mm	**VIP-2/PT/FLK50 (1-40) /S7**	2903804	1

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE termination board, with SIMATIC® S7-300-specific marking from 1 to 40, knife disconnect terminal blocks and test sockets for field and system side	50	214 mm	**FLKM 50/KDS3-MT/PPA/S7-300**	2304490	1



Connection scheme VIP-2/.../FLK50 (1-40) /S7

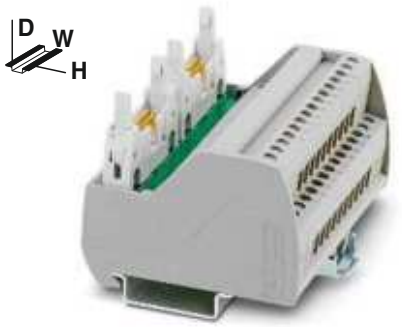


Connection scheme FLKM 50/KDS3-MT/PPA/S7-300

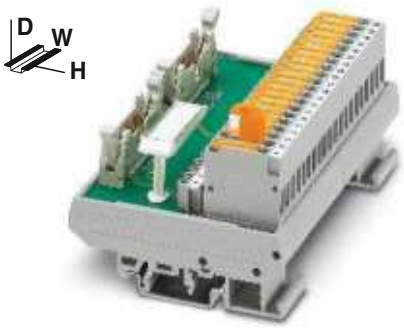
Siemens SIMATIC® S7-300 Interface modules

These VARIOFACE termination boards are used in combination with two 14-pos. system cables and the corresponding front adapters for SIMATIC® S7-300.

Features:
– Two 14-pos. IDC/FLK pin strips
– Numerical marking (1-20)
– Specifically for SIMATIC® S7-300



Passive interface module for SIMATIC® S7-300



Passive termination board for SIMATIC® S7-300 with knife disconnect terminal blocks

Technical data

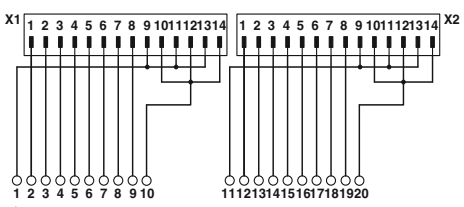
		VIP-2/SC/2FLK14 (1-20) /S7	VIP-2/PT/2FLK14 (1-20) /S7
Maximum permissible operating voltage		25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V	125 V / 125 V
Maximum permissible current (per branch)		1 A	1 A
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178	
Connection method	Field level	Screw connection	Push-in connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
Screw connection rigid / flexible / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Push-in connection rigid / flexible / AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14	
Dimensions	H / D	65.5 mm / 56 mm	

Technical data

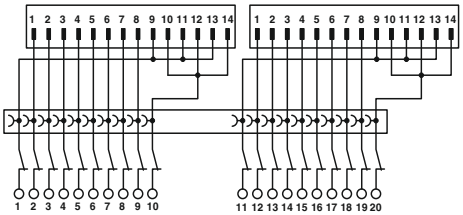
		FLKM-2FLK14/KDS3-MT/PPA/S7
Maximum permissible operating voltage		60 V DC
Maximum permissible operating voltage UL / CSA		24 V / -
Maximum permissible current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		DIN EN 50178, IEC 60664
Connection method	Field level	Screw connection with disconnect knife
	Controller level	IDC/FLK pin strip
Screw connection rigid / flexible / AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Push-in connection rigid / flexible / AWG		- ... - / - ... - / -
Dimensions	H / D	77 mm / 61 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
VARIOFACE termination board, for SIMATIC® S7-300 with SIMATIC-specific marking (1-20), knife disconnect terminal blocks and test sockets for field and system side	14	113 mm	**FLKM-2FLK14/KDS3-MT/PPA/S7**	2295062	1



Connection scheme: VIP-2/.../2FLK14 (1-20) /S7



Connection scheme FLKM-2FLK14/KDS3-MT/PPA/S7

Siemens SIMATIC® S7-400 Front adapters

Digital I/O modules

– Transmission of a maximum of 32 channels is done via a 50-pos. system cable. As an alternative, the 32 channels can be divided across 4 x 8 channels with a splitter cable
Perfectly-fitting VARIOFACE termination boards with a variety of functions and connection possibilities round off this system concept.

Web code for the online configurator

Your web code: #0007

Notes:
Controller-specific modules page 510
Digital modules such as VIP-2/SC/FLK14/PLC (2315214) can be found starting on page 516
Relay connections using PLC-V8/FLK14/OUT (2295554) and the like can be found starting on page 427
For system cables, see page 536

Front adapter for SIMATIC® S7-400 digital I/O cards

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	1 A (per path) 8 A (per connection, supply via separate power supply)
Maximum permissible total current	2 A (per Byte, for supply via connector) 8 A (during supply via a separate bridged power supply)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Mounting position	Any
Standards/regulations	IEC 60664 / DIN EN 50178

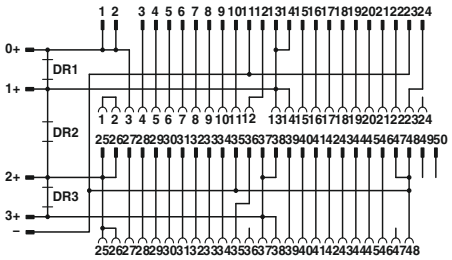
Ordering data

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

Front adapter for I/O modules of the Siemens automation devices 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

* Only in conjunction with
VIP-2/SC/FLK50/S7/A-S400, Order No.: 2322359
VIP-2/PT/FLK50/S7/A-S400, Order No.: 2904289
All DR wire bridges on the adapter must be disconnected.



Connection scheme FLKM 50-PA-S400

Explanation:
IDC/FLK strip
Connection to I/O card
Screw terminal blocks for separate supply

Siemens SIMATIC® S7-400 Front adapters

Analog I/O modules

– Analog channels are connected via a 50-pos. system cable. The 1:1 adapter connection connects the corresponding termination boards 1:1 here

Web code for the online configurator

Your web code: #0007

Notes:
Controller-specific VIP-3...FLK50 modules can be found starting on page 549
Controller-specific FLKM 50/KDS 3-MT/PPA/AN/PLC (2291587) modules can be found starting on page 511
For system cables, see page 536

Front adapter for SIMATIC® S7-400 analog I/O cards

EAC

Technical data	
	FLKM 50-PA-S400(3-48)
Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible current	1 A (per path)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Mounting position	Any
Standards/regulations	IEC 60664 / DIN EN 50178

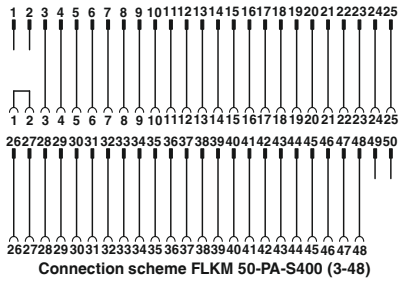
Ordering data

Description	No. of pos.	Type	Order No.	Pcs./Pkt.
VARIOFACE front adapter, for - SIMATIC® S7-400, only analog	50	**FLKM 50-PA-S400(3-48)**	2294908	2

Front adapter for I/O modules of the Siemens automation devices SIMATIC® S7-400

Card type	FLKM 50-PA-S400 (3-48)
Analog input	6ES7 431-0HH00-0AB0** 6ES7 431-1KF00-0AB0** 6ES7 431-1KF10-0AB0** 6ES7 431-1KF20-0AB0** 6ES7 431-7KF00-0AB0** 6ES7 431-7KF10-0AB0** 6ES7 431-7QH00-0AB0**
Analog output	6ES7 432-1HF00-0AB0**

** Only in conjunction with
VIP-3/SC/FLK50, Order No.: 2315081
VIP-3/PT/FLK50, Order No.: 2903794
FLKM 50/KDS 3-MT/PPA/AN/PLC, Order No.: 2291587



Connection scheme FLKM 50-PA-S400 (3-48)

Explanation:
IDC/FLK strip
Connection to I/O card
Screw terminal blocks for separate supply

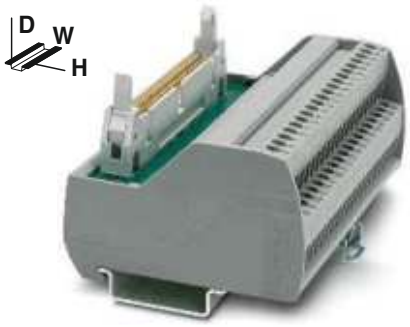
Siemens SIMATIC® S7-400 VIP interface modules

Digital I/O modules

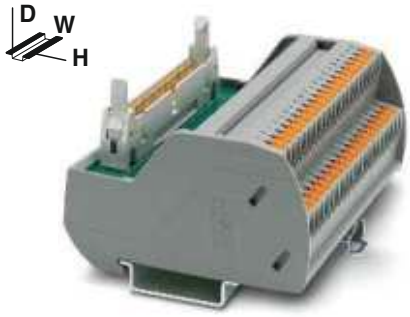
These VIP – VARIOFACE Professional modules are used in combination with 50-pos. system cables and the FLKM 50-PA-S400 front adapter (Order No.: 2294500).

Features:

– One 50-pos. IDC/FLK pin strip
– Numerical marking
– Specifically for SIMATIC® S7-400



Passive interface modules for SIMATIC® S7-400 with srew connection



Passive interface modules for SIMATIC® S7-400 with Push-in connection

Technical data

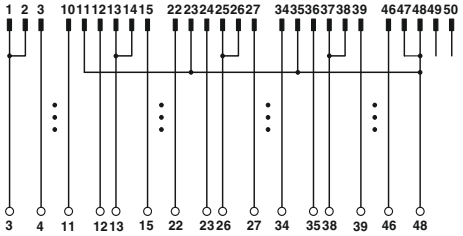
Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Field level	Screw connection
	Controller level	IDC/FLK pin strip
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

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V
Maximum permissible current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Field level	Push-in connection
	Controller level	IDC/FLK pin strip
Connection data solid/stranded/AWG		0.14 ... 2.5 mm² / 0.14 ... 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 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/S7/A-S400

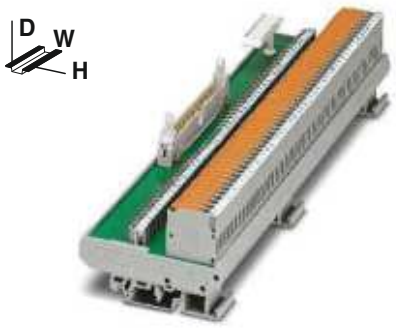
Siemens SIMATIC® S7-400 Interface modules with knife disconnect terminal blocks

Analog I/O modules

This interface module is used in combination with 50-pos. system cables and the FLKM 50-PA-S400(3-48) front adapter (Order No.: 2294908).

Features

– One 50-pos. IDC/FLK pin strip
– Numerical marking (1-50)
– Knife disconnect terminal blocks and test point



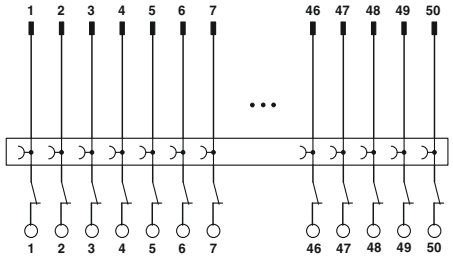
Passive termination board for SIMATIC® S7-400 with knife disconnect terminal blocks

Technical data

Maximum permissible operating voltage		60 V DC
Maximum permissible operating voltage UL / CSA		24 V / -
Maximum permissible current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		DIN EN 50178, IEC 60664
Connection method	Field level	Screw connection with disconnect knife
	Controller level	IDC/FLK pin strip
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 termination board, with marking from 1 to 50, knife disconnect terminal blocks and test sockets for field and system side	50	259 mm	**FLKM 50/KDS3-MT/PPA/AN/PLC**	2291587	1



Connection scheme FLKM 50/KDS3-MT/PPA/AN/PLC

Siemens SIMATIC® ET200SP HA Front adapters

The front adapters mean that preassembled system cables can be directly connected to I/O modules. The front adapters plug directly onto the peripheral module terminal blocks. A single plugging operation connects all 36 terminal block connections.
Once plugged in, the front adapter and terminal block form a single unit and can no longer be separated.

– Front adapter with D-SUB connector
– Connection of a maximum of 32 channels
– Connection to suitable VARIOFACE interface modules

Notes:

Matching system cable fitted with D-SUB female connector at both ends, see page 571

new

SIMATIC® ET200SP HA front adapter

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible current	1 A (per path)
Maximum permissible total current	2 A (with operating voltage supply via D-SUB male strip) 10 A (with operating voltage feed over screw connection)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Mounting position	any
Standards/regulations	DIN EN 50178

Ordering data

Description	No. of pos.	Type	Order No.	Pcs./Pkt.
VARIOFACE front adapter for ET 200SP HA with one D-SUB male strip for digital 24 V DC and analog peripheral modules, 37-pos.	37	**FLKM-PA-D37/ETHA**	1076338	1

Front adapters for SIMATIC® ET 200SP HA I/O modules

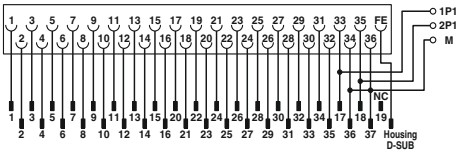
Card type	
Digital input	6DL1131-6BH00-0PH1 6DL1131-6TH00-0PH1 6DL1131-6BL00-0PH1
Digital output	6DL1132-6BH00-0PH1 6DL1132-6BL00-0PH1

Card type	FLKM-PA-D37/HW/AN/C300
Analog input	6DL1134-6TH00-0PH1 6DL1134-6JH00-0PH1
Analog output	6DL1135-6TF00-0PH1

Terminal blocks	
TB22-P32 (dark) TB22-P32 (light)	6DL1193-6TP00-0BH1 6DL1193-6TP00-0DH1
TB45R-P32 (dark) TB45R-P32 (light)	6DL1193-6TP00-0BM1 6DL1193-6TP00-0DM1

* Once plugged in, the front adapter and terminal block can no longer be separated.

Suitable VARIOFACE interface modules with system-specific marking:
VIP-2/SC/D37SUB/M/ET200SP-HA, Order No.: 1100967
VIP-2/PT/D37SUB/M/ET200SP-HA, Order No.: 1100964



Connection scheme: FLKM-PA-D37/ETHA

Explanation:
Connectors
Connection to I/O card
Screw terminal blocks for separate supply

Yokogawa CENTUM VP and ProSafe-RS Front adapters

These front adapters for digital (50-pos.) and analog (40-pos.) I/O modules are connected directly to the modules.

Features:

– Molded connector
– Can be screwed
– Lateral cable outlet of the I/O module
– KS or AKB-compatible connectors on the module side

Shielded

Shielded and halogen-free

	Technical data	Technical data
Maximum permissible operating voltage	30 V DC	30 V DC
Maximum permissible operating voltage UL / CSA	125 V / -	125 V / -
Maximum permissible current	500 mA (per path at 70°C)	500 mA (per path at 70°C)
Maximum conductor resistance	0.16 Ω/m	-
Conductor cross section	AWG 26 / 0.14 mm²	AWG 26 / 0.14 mm²
Outside diameter		
50 -position	11 mm	11 mm
40 -position	9.8 mm	9.8 mm
Ambient temperature range	-20°C ... 70°C	-20°C ... 70°C

		Ordering data			Ordering data		
Description	Cable length	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Front adapter, for digital I/O modules, 50-pos.							
	1 m	FLK 50-PA/EZ-DR/KS/ 100/YUC	2900991	1	FLK 50-PA/EZ-DR/HF/KS/ 100/YUC	2904739	1
	2 m	FLK 50-PA/EZ-DR/KS/ 200/YUC	2314299	1	FLK 50-PA/EZ-DR/HF/KS/ 200/YUC	2904740	1
	3 m	FLK 50-PA/EZ-DR/KS/ 300/YUC	2314309	1	FLK 50-PA/EZ-DR/HF/KS/ 300/YUC	2904741	1
	4 m	FLK 50-PA/EZ-DR/KS/ 400/YUC	2314312	1	FLK 50-PA/EZ-DR/HF/KS/ 400/YUC	2904742	1
	5 m	FLK 50-PA/EZ-DR/KS/ 500/YUC	2321499	1	FLK 50-PA/EZ-DR/HF/KS/ 500/YUC	2904636	1
	6 m	FLK 50-PA/EZ-DR/KS/ 600/YUC	2314927	1	FLK 50-PA/EZ-DR/HF/KS/ 600/YUC	2904743	1
	7 m	FLK 50-PA/EZ-DR/KS/ 700/YUC	2321509	1	FLK 50-PA/EZ-DR/HF/KS/ 700/YUC	2904744	1
	8 m	FLK 50-PA/EZ-DR/KS/ 800/YUC	2314930	1	FLK 50-PA/EZ-DR/HF/KS/ 800/YUC	2904745	1
	9 m	FLK 50-PA/EZ-DR/KS/ 900/YUC	2321512	1	FLK 50-PA/EZ-DR/HF/KS/ 900/YUC	2904746	1
	10 m	FLK 50-PA/EZ-DR/KS/1000/YUC	2314325	1	FLK 50-PA/EZ-DR/HF/KS/1000/YUC	2904637	1
	15 m	FLK 50-PA/EZ-DR/KS/1500/YUC	2314338	1	FLK 50-PA/EZ-DR/HF/KS/1500/YUC	2904638	1
	20 m	FLK 50-PA/EZ-DR/KS/2000/YUC	2314503	1	FLK 50-PA/EZ-DR/HF/KS/2000/YUC	2904487	1
	25 m	FLK 50-PA/EZ-DR/KS/2500/YUC	2314516	1	FLK 50-PA/EZ-DR/HF/KS/2500/YUC	2904639	1
	30 m	FLK 50-PA/EZ-DR/KS/3000/YUC	2314529	1	FLK 50-PA/EZ-DR/HF/KS/3000/YUC	2904640	1
Front adapter, for analog I/O modules, 40-pos.							
	1 m	FLK 40-PA/EZ-DR/KS/ 100/YUC	2322786	1	FLK 40-PA/EZ-DR/HF/KS/ 100/YUC	2904747	1
	2 m	FLK 40-PA/EZ-DR/KS/ 200/YUC	2314341	1	FLK 40-PA/EZ-DR/HF/KS/ 200/YUC	2904748	1
	3 m	FLK 40-PA/EZ-DR/KS/ 300/YUC	2314354	1	FLK 40-PA/EZ-DR/HF/KS/ 300/YUC	2904749	1
	4 m	FLK 40-PA/EZ-DR/KS/ 400/YUC	2314367	1	FLK 40-PA/EZ-DR/HF/KS/ 400/YUC	2904750	1
	5 m	FLK 40-PA/EZ-DR/KS/ 500/YUC	2321570	1	FLK 40-PA/EZ-DR/HF/KS/ 500/YUC	2904645	1
	6 m	FLK 40-PA/EZ-DR/KS/ 600/YUC	2314943	1	FLK 40-PA/EZ-DR/HF/KS/ 600/YUC	2904751	1
	7 m	FLK 40-PA/EZ-DR/KS/ 700/YUC	2321583	1	FLK 40-PA/EZ-DR/HF/KS/ 700/YUC	2904752	1
	8 m	FLK 40-PA/EZ-DR/KS/ 800/YUC	2314956	1	FLK 40-PA/EZ-DR/HF/KS/ 800/YUC	2904753	1
	9 m	FLK 40-PA/EZ-DR/KS/ 900/YUC	2321415	1	FLK 40-PA/EZ-DR/HF/KS/ 900/YUC	2904754	1
	10 m	FLK 40-PA/EZ-DR/KS/1000/YUC	2314370	1	FLK 40-PA/EZ-DR/HF/KS/1000/YUC	2904646	1
	15 m	FLK 40-PA/EZ-DR/KS/1500/YUC	2314383	1	FLK 40-PA/EZ-DR/HF/KS/1500/YUC	2904647	1
	20 m	FLK 40-PA/EZ-DR/KS/2000/YUC	2314532	1	FLK 40-PA/EZ-DR/HF/KS/2000/YUC	2904488	1
	25 m	FLK 40-PA/EZ-DR/KS/2500/YUC	2314545	1	FLK 40-PA/EZ-DR/HF/KS/2500/YUC	2904648	1
	30 m	FLK 40-PA/EZ-DR/KS/3000/YUC	2314558	1	FLK 40-PA/EZ-DR/HF/KS/3000/YUC	2904649	1

Yokogawa CENTUM VP
Front adapters

These front adapters for digital I/O modules are connected directly to the modules.
Features:
– Lateral cable outlet of the I/O module
– Four 14-pos. connectors on the module side for connection of four 8-channel VARIOFACE modules of the system cabling

Shielded

Technical data

Maximum permissible operating voltage	30 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	500 mA (per path at 70°C)
Maximum conductor resistance	0.16 Ω/m
Conductor cross section	AWG 26 / 0.14 mm²
Outside diameter	11 mm
Ambient temperature range	-20°C ... 50°C

Ordering data

Description	Cable length	Type	Order No.	Pcs./Pkt.
Front adapter for digital I/O modules for coupling four 8-channel VARIOFACE modules, 50-pos.				
	2 m	**CABLE-50/4FLK14/ 2,0M/YUC**	2314655	1
	4 m	**CABLE-50/4FLK14/ 4,0M/YUC**	2314671	1
	6 m	**CABLE-50/4FLK14/ 6,0M/YUC**	2318978	1
	10 m	**CABLE-50/4FLK14/10,0M/YUC**	2314684	1
	15 m	**CABLE-50/4FLK14/15,0M/YUC**	2322773	1
	20 m	**CABLE-50/4FLK14/20,0M/YUC**	2314778	1

Yokogawa CENTUM VP
Front adapters for
MINI Analog system cabling

This front adapter enables 16 MINI Analog modules to be connected to a Yokogawa controller. Together with two MINI MCR-2-V8-FLK 16 MINI Analog system adapters, the Yokogawa system cable is a simple, cost-effective "Plug and Play" solution.

The front adapter is connected directly to the Yokogawa module. Two 16-pos. IDC/FLK socket strips are attached for connecting the module to the MINI Analog system adapters.

Together with **4-conductor measuring transducers**, the front adapter is suitable for the following analog cards:
– AAI 141
– AAI 143

Shielded

Technical data

Maximum permissible operating voltage	30 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current	500 mA (per path at 70°C)
Maximum conductor resistance	0.16 Ω/m
Conductor cross section	AWG 26 / 0.14 mm²
Outside diameter	11 mm
Ambient temperature range	-20°C ... 50°C

Ordering data

Description	Cable length	Type	Order No.	Pcs./Pkt.
Front adapter, for analog I/O modules for coupling two 8-channel MINI analog system adapters, 40-pos.				
	2 m	**CABLE-40/2FLK16/ 2,0M/YUC**	2321334	1
	4 m	**CABLE-40/2FLK16/ 4,0M/YUC**	2321347	1
	10 m	**CABLE-40/2FLK16/10,0M/YUC**	2321350	1
	15 m	**CABLE-40/2FLK16/15,0M/YUC**	2321376	1
	20 m	**CABLE-40/2FLK16/20,0M/YUC**	2321363	1

VIP termination boards for 8 channels

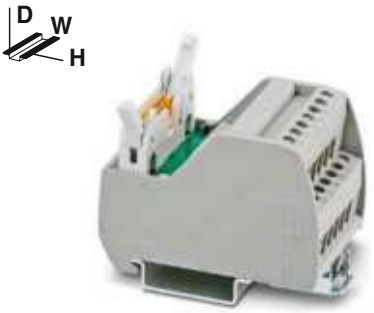
These VIP – VARIOFACE Professional modules are used in combination with 14-pos. system cables and the relevant front adapters.

Features:

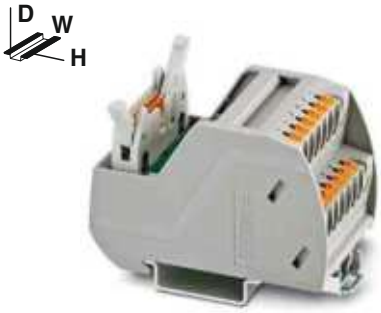
– Byte-wise labeling
– For digital I/O modules
– Optionally with LED

Notes:

For marking systems (e.g., “ZB 22:UNBEDRUCKT”; Order No, 0811862) and mounting material, see Catalog 3.



Passive interface module for input/output with screw connection



Passive interface module for input/output with Push-in connection

Technical data

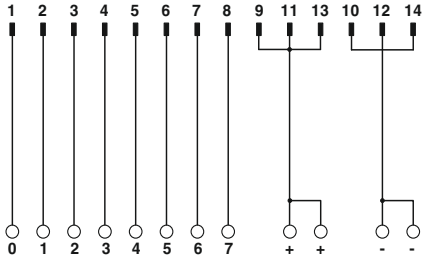
		VIP-2/.../FLK14/PLC	VIP-2/.../FLK14/LED/PLC
Maximum permissible operating voltage		25 V AC / 60 V DC	24 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V	24 V / 24 V
Maximum permissible current (per branch)		1 A	1 A
Maximum total current (voltage supply)		3 A	3 A
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178	
Connection method	Field level	Screw connection	Screw connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
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

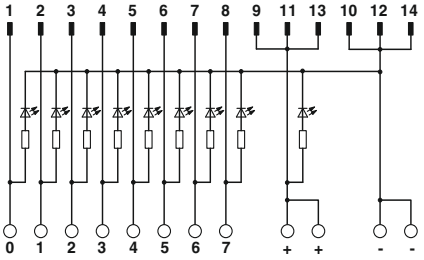
		VIP-2/.../FLK14/PLC	VIP-2/.../FLK14/LED/PLC
Maximum permissible operating voltage		25 V AC / 60 V DC	24 V DC
Maximum permissible operating voltage UL / CSA		- / -	24 V / 24 V
Maximum permissible current (per branch)		1 A	1 A
Maximum total current (voltage supply)		3 A	3 A
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178	
Connection method	Field level	Push-in connection	Push-in connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
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,					
- with screw connection	14	39.8 mm	**VIP-2/SC/FLK14/PLC**	2315214	1
- with Push-in connection	14	41.9 mm	**VIP-2/PT/FLK14/PLC**	2903801	1
VARIOFACE interface module, for eight channels with light indicator,					
- with screw connection	14	39.8 mm	**VIP-2/SC/FLK14/LED/PLC**	2322249	1
- with Push-in connection	14	41.9 mm	**VIP-2/PT/FLK14/LED/PLC**	2904279	1



Connection scheme VIP-2/SC/FLK14/PLC



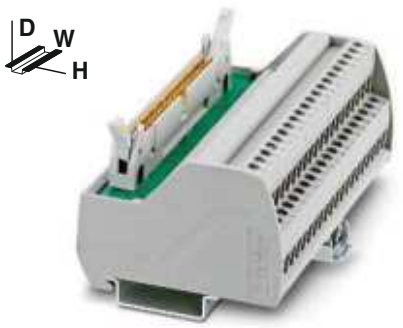
Connection scheme VIP-2/SC/FLK14/LED/PLC

VIP termination boards for 32 channels

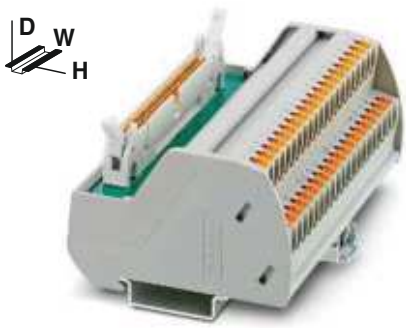
These VIP – VARIOFACE Professional modules are used in combination with 50-pos. system cables and the relevant front adapters.

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 3.



Passive interface module for input/output with screw connection



Passive interface module for input/output with Push-in connection

Technical data

		VIP-2/.../FLK50/PLC	VIP-2/.../FLK50/LED/PLC
Maximum permissible operating voltage		25 V AC / 60 V DC	24 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V	24 V / 24 V
Maximum permissible current (per branch)		1 A	1 A
Maximum total current (voltage supply)		2 A (per byte)	2 A (per byte)
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178	
Connection method	Field level	Screw connection	Screw connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
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
Maximum permissible operating voltage		25 V AC / 60 V DC	24 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V	24 V / 24 V
Maximum permissible current (per branch)		1 A	1 A
Maximum total current (voltage supply)		2 A (per byte)	2 A (per byte)
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178	
Connection method	Field level	Push-in connection	Push-in connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
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	

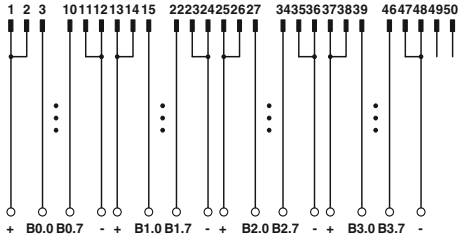
Description	No. of pos.	Module width W
VARIOFACE interface module, for 32 channels,		
- with screw connection	50	106.1 mm
- with Push-in connection	50	107.9 mm
VARIOFACE interface module, for 32 channels with light indicator,		
- with screw connection	50	106.1 mm
- with Push-in connection	50	107.9 mm

Ordering data

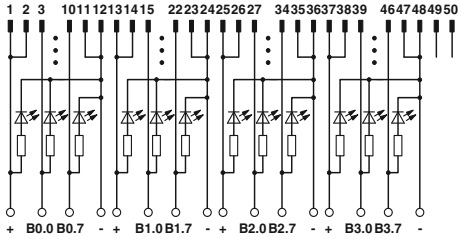
Type	Order No.	Pcs./Pkt.
VIP-2/SC/FLK50/PLC	2315227	1
VIP-2/SC/FLK50/LED/PLC	2322252	1

Ordering data

Type	Order No.	Pcs./Pkt.
VIP-2/PT/FLK50/PLC	2903803	1
VIP-2/PT/FLK50/LED/PLC	2904280	1



Connection scheme VIP-2/SC/FLK50/PLC



Connection scheme VIP-2/SC/FLK50/LED/PLC

VIP termination boards in 2-conductor connection technology for 8 channels

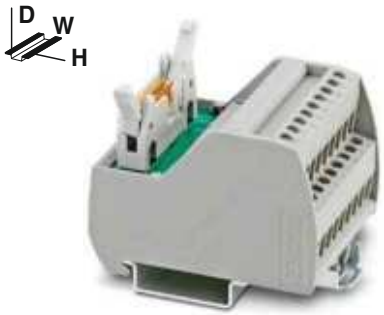
These VIP – VARIOFACE Professional modules are used in combination with 14-pos. system cables and the relevant front adapters.

Features:

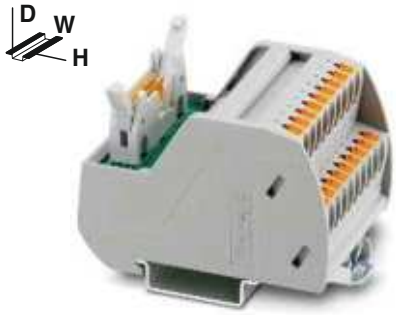
– Byte-wise labeling
– For digital I/O modules
– Negative or positive connection per signal

Notes:

For marking systems (e.g., “ZB 22:UNBEDRUCKT”; Order No, 0811862) and mounting material, see Catalog 3.



Passive interface module with screw connection



Passive interface module with Push-in connection

Technical data

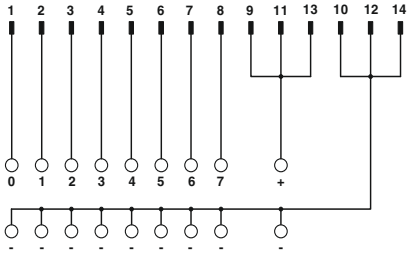
Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current (per branch)		1 A
Maximum total current (voltage supply)		3 A (per byte)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Field level	Screw connection
	Controller level	IDC/FLK pin strip
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

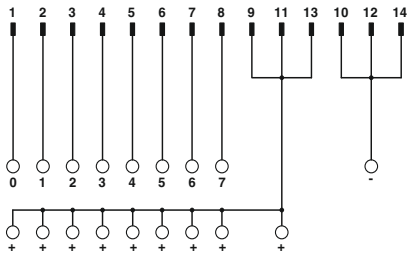
Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V
Maximum permissible current (per branch)		1 A
Maximum total current (voltage supply)		3 A (per byte)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Field level	Push-in connection
	Controller level	IDC/FLK pin strip
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 in 2-conductor connection technology for 32 channels

These VARIOFACE modules are used in combination with 50-pos. system cables and the relevant front adapters.

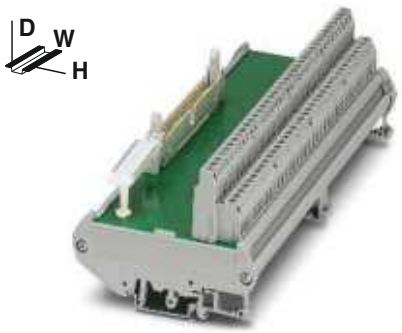
The following module types with 2-conductor connection technology are available:

FLKM 50/32M/PLC

– Byte-wise 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



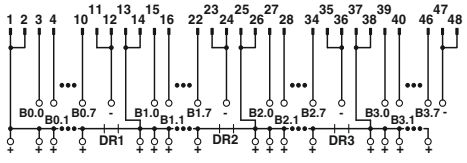
Passive interface module with screw connection

Technical data

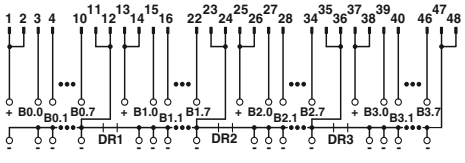
Maximum permissible operating voltage		60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current (per branch)		1 A
Maximum total current (voltage supply)		8 A (per byte)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		DIN EN 50178, IEC 60664
Connection method	Field level	Screw connection
	Controller level	IDC/FLK pin strip
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 in 2-conductor connection method

These VARIOFACE modules are used in combination with 14 or 50-pos. system cables and the relevant front adapters.

– Byte-wise labeling
– Can be used for digital I/O modules
– TR5® plug-in fuse (IEC 60127-3, 1AF) per signal path (F1)
– TR5® plug-in fuse (IEC 60127-3, 2AF) per voltage supply (F2)
– Negative connection for each signal

FLKM 14/8M/SI/PLC (for 8 channels)
FLKM 50/32M/SI/PLC (for 32 channels)

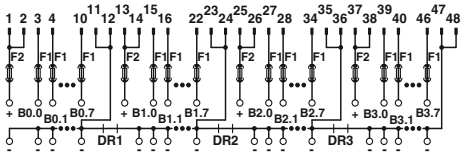
Passive fuse module for 8 or 32 channels

Technical data

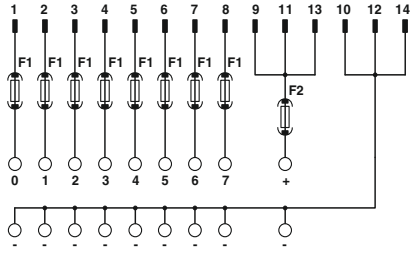
		FLKM 14/8M/SI/PLC	FLKM 50/32M/SI/PLC
Maximum permissible operating voltage		60 V DC	60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -	125 V / -
Maximum permissible current (per branch)		1 A	1 A
Maximum total current (voltage supply)		2 A	2 A (per byte)
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		DIN EN 50178, IEC 60664	
Connection method	Field level	Screw connection	Screw connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
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

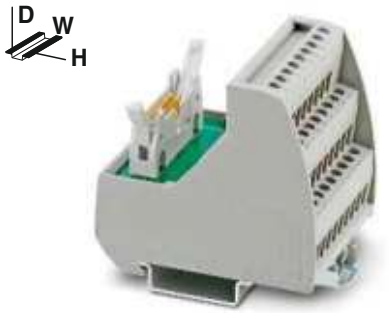
These VIP – VARIOFACE Professional modules are used in combination with 14-pos. system cables and the relevant front adapters.

Features:

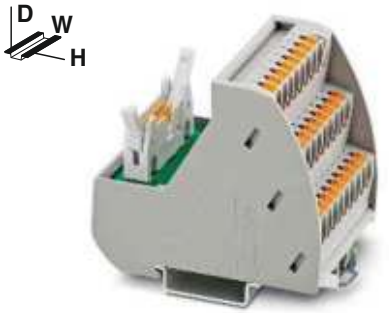
– Byte-wise labeling
– For digital I/O modules
– Positive and negative connection per signal
– Optionally with LED

Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No, 0811862) and mounting material, see Catalog 3.



Initiator module for 8 channels with screw connection



Initiator module for 8 channels with Push-in connection

Technical data

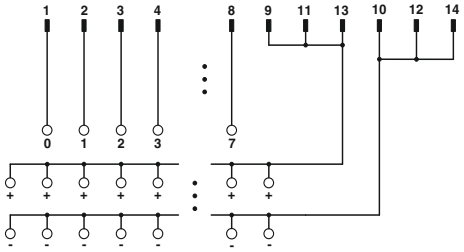
		VIP-3/SC/FLK14/8IM/PLC	VIP-3/SC/FLK14/8IM/LED/PLC
Maximum permissible operating voltage		25 V AC / 60 V DC	24 V DC
Maximum permissible operating voltage UL / CSA		125 V / -	24 V / 24 V
Maximum permissible current (per branch)		1 A	1 A
Maximum total current (voltage supply)		3 A	3 A
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		IEC 60664, DIN EN 50178	
Connection method	Field level	Screw connection	Screw connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
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

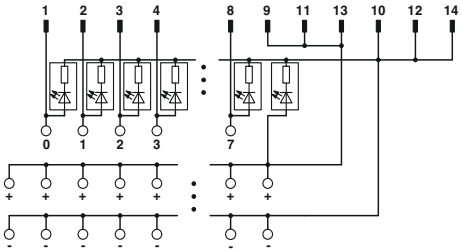
	VIP-3/PT/FLK14/8IM/PLC	VIP-3/PT/FLK14/8IM/LED/PLC
Maximum permissible operating voltage	25 V AC / 60 V DC	24 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V	24 V / 24 V
Maximum permissible current (per branch)	1 A	1 A
Maximum total current (voltage supply)	3 A	3 A
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C
Mounting position	Any	Any
Standards/regulations	IEC 60664, DIN EN 50178	
Connection method	Push-in connection	Push-in connection
	IDC/FLK pin strip	IDC/FLK pin strip
Connection data solid/stranded/AWG	0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14	
Dimensions	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



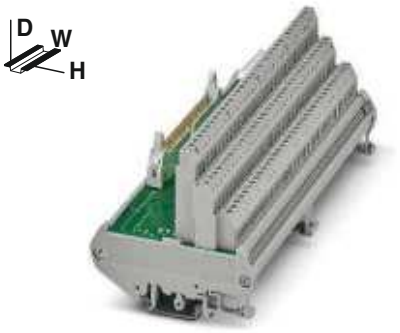
Connection scheme VIP-3/.../FLK14/8IM/LED/PLC

Initiator modules for 32 channels

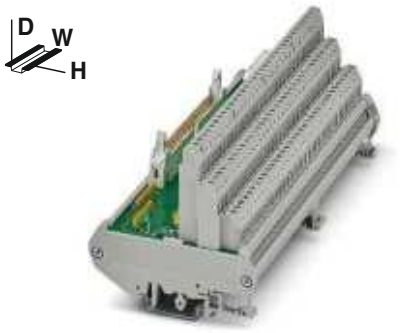
These VARIOFACE modules are used in combination with 50-pos. system cables and the relevant front adapters for digital I/O modules.

Features:

– Byte-wise labeling
– Positive and negative connection per signal
– Optionally with LED
– Can be used for digital I/O modules



Initiator module for 32 channels, with screw connection



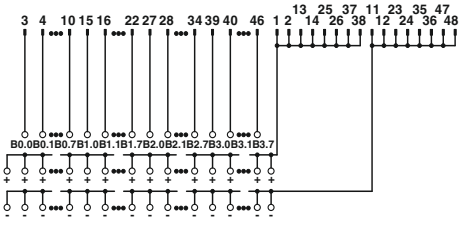
Initiator module for 32 channels, with screw connection and LED display

Technical data

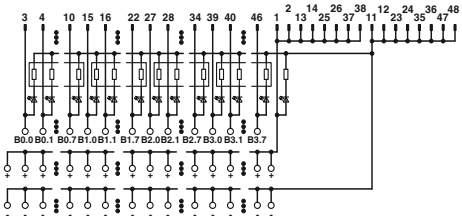
Maximum permissible operating voltage		60 V DC	30 V DC
Maximum permissible operating voltage UL / CSA		125 V / -	24 V / -
Maximum permissible current (per branch)		1 A	1 A
Maximum total current (voltage supply)		2 A (per byte)	2 A (per byte)
Status indication		-	LED
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		DIN EN 50178, IEC 60664	DIN EN 50178, IEC 60664
Connection method	Field level	Screw connection	Screw connection
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
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	90 mm / 81 mm	90 mm / 81 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



Connection scheme FLKMS 50/32IM/PLC

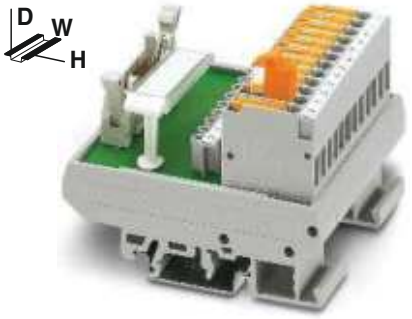


Connection scheme FLKMS 50/32IM/LA/PLC

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



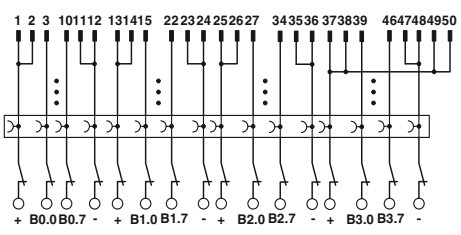
Passive termination board for 8 or 32 channels with knife disconnect terminal blocks

Technical data

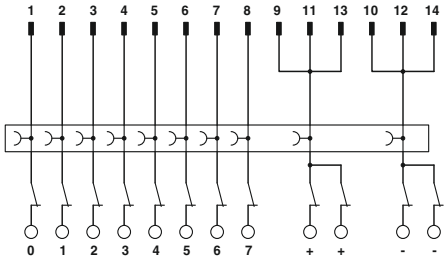
		FLKM...14/KDS 3-MT...	FLKM 50/KDS 3-MT...
Maximum permissible operating voltage		60 V DC	60 V DC
Maximum permissible operating voltage UL / CSA		24 V / -	24 V / -
Maximum permissible current (per branch)		1 A	1 A
Maximum total current (voltage supply)		3 A	2 A (per byte)
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		DIN EN 50178, IEC 60664	
Connection method	Field level	Screw connection with disconnect knife	Screw connection with disconnect knife
	Controller level	IDC/FLK pin strip	IDC/FLK pin strip
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



Connection scheme FLKM 50/KDS3-MT/PPA/PLC

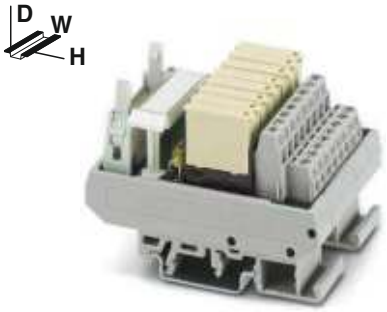


Connection scheme FLKM 14/KDS3-MT/PPA/PLC

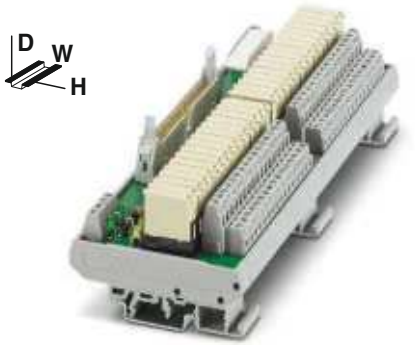
Output modules with relays, one N/O contact

These VARIOFACE output modules are used in combination with the respective front adapters.

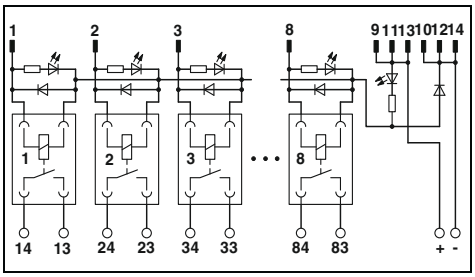
- Plug-in miniature relays, each with an N/O contact
- Universal applications from 1 mA to 3 A continuous current through 2-layer double contact with hard gold plating
- Slim construction widths of only 55 mm (8 channels) or 202 mm (32 channels)
- LED status display for each signal path and supply voltage
- Free-wheeling and reverse polarity protection diode for each signal path

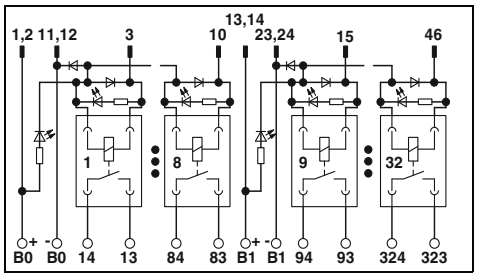


Output module with eight miniature relays, 1 N/O contacts



Output module with 32 miniature relays, 1 N/O contact





		Technical data	Technical data
Coil side			
Operating voltage U_N		24 V DC	24 V DC
Typical input current at U_N		6.5 mA	6.5 mA
Typical response time at U_N		5 ms	5 ms
Typical release time at U_N		15 ms	15 ms
Input circuit		Free-wheeling diode, reverse polarity protection	Free-wheeling diode, reverse polarity protection
Status indicator per channel		Yellow LED	Yellow LED
Connection method		IDC/FLK pin strip	IDC/FLK pin strip
No. of pos.		14	50
Contact side			
Contact type		1 N/O contact	1 N/O 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
Minimum switching voltage		5 V	5 V
Maximum switch-on current		5 A	5 A
Limiting continuous current		3 A	3 A
Minimum switching current		1 mA	1 mA
Maximum 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			
Rated insulation voltage		260 V AC	260 V AC
Rated surge voltage		4 kV (basic insulation)	4 kV (basic insulation)
Degree of pollution/overvoltage 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		2x 10^7 cycles	2x 10^7 cycles
Standards/regulations		DIN EN 50178, IEC 60664	DIN EN 50178, IEC 60664
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
EMC note		Class A product, see page 583	Class A product, see page 583

Ordering data

Description	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE output module, with eight miniature relays, plugged, for 24 V DC (incl. relays)	56	**UMK- 8 RM/MR-G24/ 1/PLC**	2979469	1
VARIOFACE output module, with eight miniature relays, plugged, for 24 V DC (incl. relays)	202	**UMK-32 RM/MR-G24/1/PLC**	2979472	1

Accessories

Pluggable miniature relays	**REL-MR-G 24/1**	2961037	8

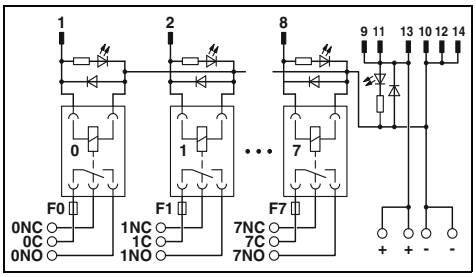
VIP output modules with relay, 1 changeover contact with fuse

These VIP – VARIOFACE Professional output modules are used in combination with the respective front adapters. Like the front adapters, the modules are connected via 14-pole system cables.

Features:

– Plug-in miniature relays, each with a PDT contact
– LED status display for each signal path and supply voltage
– TE5® plug-in fuse (IEC 60127-3, 6,3AT) per signal path (F0...F7)
– Free-wheeling diode for each signal path
– Push-in connection

Output module with 8 miniature relays, 1 PDT and fuse per output circuit



Technical data

Coil side		
Operating voltage U_N		24 V DC
Typical input current at U_N		9 mA
Typical response time at U_N		5 ms
Typical release time at U_N		8 ms
Input circuit		Free-wheeling diode
Status indicator per channel		Yellow LED
Connection method		IDC/FLK pin strip
No. of pos.		14
Contact side		
Contact type		Single contact, 1-PDT
Contact material		AgSnO
Max. switching voltage		250 V AC/DC
Minimum switching voltage		12 V AC/DC
Limiting continuous current		5 A (observe derating)
Minimum switching current		10 mA
Maximum interrupting rating:	24 V DC	120 W
	48 V DC	20 W
	60 V DC	18 W
	110 V DC	23 W
	220 V DC	40 W
	250 V AC	1250 VA
Connection method		Push-in connection
Connection data solid/stranded/AWG		0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14
General data		
Ambient temperature (operation)		-20°C ... 60°C
Nominal operating mode		100% operating factor
Mechanical service life		2x 10^7 cycles
Standards/regulations		DIN EN 50178
Mounting position		Any
Mounting		In rows with zero spacing
Dimensions	H / D	109.8 mm / 63 mm
EMC note		Class A product, see page 583

Ordering data

Description	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE output module, with eight miniature relays, plugged, for 24 V DC (incl. relays)	87.6	**VIP-8RPT-24DC/21/DO/FU/PLC**	2903601	1

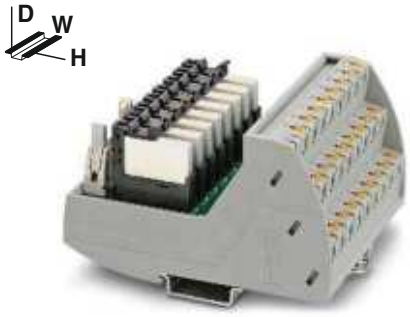
VIP input modules

These VIP – VARIOFACE Professional input modules are used in combination with the respective front adapters. Like the front adapters, the modules are connected via 14-pole system cables.

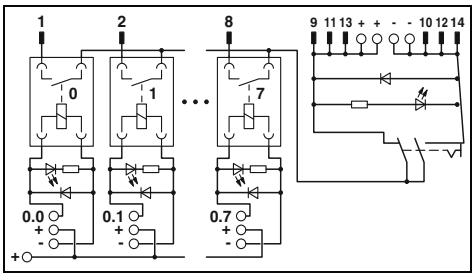
Features:

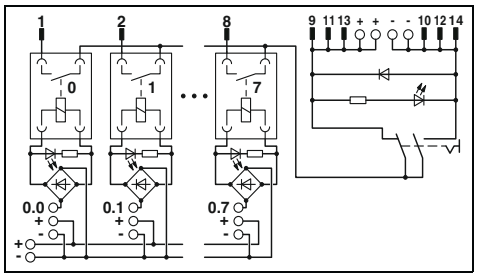
– Plug-in miniature relays, each with an N/O contact
– LED status display for each signal path and supply voltage
– Free-wheeling diode for each signal path
– Push-in connection

Digital input module with 8 channels for 24 V DC



Digital input module with 8 channels for 120 V AC





Technical data

Coil side		
Operating voltage U_N	24 V DC ±10% (supply, 2 A)	120 V AC ±10% (supply, 2 A)
Typical input current at U_N	9 mA (per channel)	3.5 mA (per channel)
Typical response time at U_N	5 ms	6 ms
Typical release time at U_N	8 ms	15 ms
Input circuit	Free-wheeling diode	Free-wheeling diode
Status indicator per channel	Yellow LED	Yellow LED
Connection method	Push-in connection	Push-in connection
Connection data solid/stranded/AWG	0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14	0.14 ... 2.5 mm² / 0.14 ... 2.5 mm² / 26 - 14
Contact side		
Contact type	1 N/O contact	1 N/O contact
Contact material	AgSnO, hard gold-plated	AgSnO, hard gold-plated
Limiting continuous current	50 mA	50 mA
Connection method	IDC/FLK pin strip	IDC/FLK pin strip
No. of pos.	14	14
General data		
Ambient temperature (operation)	-20°C ... 60°C	-20°C ... 60°C
Nominal operating mode	100% operating factor	100% operating factor
Mechanical service life	2x 10^7 cycles	2x 10^7 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	109.8 mm / 63 mm	109.8 mm / 63 mm
EMC note	Class A product, see page 583	Class A product, see page 583

Ordering data

Description	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE interface module, for eight channels,				
24 V DC (incl. relays)	92.7	**VIP-8RPT-24DC/1AU/DI/PLC**	2903600	1
120 V AC (incl. relays)	92.7	**VIP-8RPT-120AC/1AU/DI/PLC**	2904576	1

PLC-V8 adapters

The system cabling adapter allows fast and error-free connection of eight relay channels to the control level. This solution combines the product features of the PLC-INTERFACE and VARIOFACE system cabling relay family.

The advantages:

– High flexibility, because the modular design enables channel-specific configuration of the relay module
– Plug-in relays can be quickly replaced during maintenance work
– Space-saving wiring in the control cabinet thanks to compact design (eight channels on 50 mm)
– Sensor and actuator series enables direct connection of supply and return conductors
– Simple potential distribution using plug-in bridges

A cross-reference list with matching PLC-INTERFACE components is available for help in selecting the different functions: see Page 534.

Coupling to digital OUTPUT cards

V8 adapters with the designation "PLC-V8/.../OUT..." can be coupled to digital OUTPUT cards. This adapter plugs into eight PLC-INTERFACE boards (see "PLC Universal Series" or "PLC Actuator Series" at right).

Ordering example:
One OUTPUT V8 adapter for eight relays (coil: 24 V DC; power changeover contact: 230 V AC/6 A) with Push-in connection technology.
1 pc. 2295554 PLC-V8/FLK14/OUT
8 pcs. 2900299 PLC-RPT-24DC/21

Coupling to digital INPUT cards

"PLC-V8/.../IN..." type adapters connect digital INPUT cards with eight PLC-INTERFACE boards (see "PLC Sensor Series" at right).

Ordering example:
One INPUT V8 adapter for eight relays (coil: 230 V AC/DC; signal N/O contact: 24 V DC/50 mA) with screw connection technology.
1 pc. 2296553 PLC-V8/FLK14/IN
8 pcs. 2966333 PLC-RSC-230UC/1AU/SEN

The flexible unit with plug-in relays

Different functions can be selected for each channel:
– Electromechanical relay
– Solid-state relays
– Feed-through connection

Connection technology options include screw and Push-in connection.

Available in two overall widths

In addition to the narrow relay boards (6.2 mm), 14 mm-wide boards are also available for high currents.
This means that eight relay channels in combination with the V8 adapter can yield overall widths of 50 mm and 112 mm with high performance.

Variety of system connection options

Choose from among the following connector options as system connections for assembled cables:
– IDC/FLK, 14-pos.
– D-SUB socket strip, 15-pos.
– D-SUB male strip, 15-pos.

PLC universal series

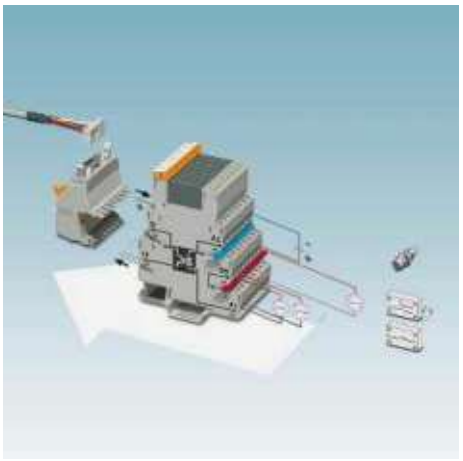
The Universal series can be used as an input or output interface. Each product consists of a basic terminal block with a pluggable miniature relay (changeover contact) or a pluggable solid-state relay.

The V8 OUTPUT adapter is plugged into the eight-relay board bridge shafts on the coil side.

PLC actuator series

When used as an interface between the PLC and actuators, such as motors, contactors or solenoid valves, only one N/O contact function is normally required. The PLC...ACT output interface is used here. All actuator connections, including the load return line, are connected directly. This eliminates the need for additional output terminal blocks.

The V8 OUTPUT adapter is plugged into the eight-relay board bridge shafts on the coil side.



PLC sensor series

When used as an interface between the PLC and sensors, such as proximity switches, limit switches or auxiliary contacts, often only one N/O contact function is required. The PLC...SEN input interface is used here. All sensor connections, including the supply voltage for the sensors and switches, are connected directly. This eliminates the need for additional terminal blocks.

The V8 INPUT adapter is plugged into the eight relay board bridge shafts on the contact side.

Adapters 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

PLC-V8/.../OUT(/M)

V8 adapter for coupling to digital OUTPUT cards

PLC-V8/.../IN(/M)

V8 adapter for coupling to digital INPUT cards

Notes:

Cross list with matching PLC-INTERFACE modules, see page 534

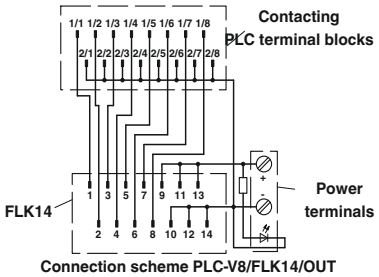
VARIOFACE adapter for 6.2 mm PLC-INTERFACE

Technical data

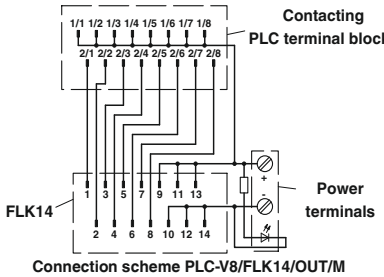
Maximum permissible operating voltage		30 V DC
Maximum permissible operating voltage UL / CSA		24 V / -
Maximum permissible current (per branch)		1 A (per signal path)
Maximum total current (voltage supply)		3 A
Ambient temperature (operation)		-40°C ... 70°C
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Controller level	IDC/FLK pin strip
	Supply	Screw connection
Connection data solid/stranded/AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	39 mm / 56 mm

Ordering data

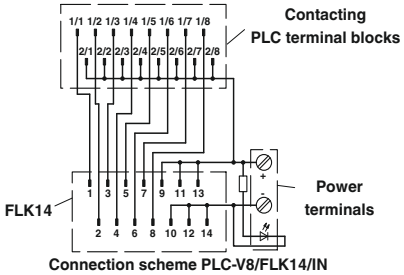
Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
V8 adapter, for 8 PLC-INTERFACES (6.2 mm), with IDC/FLK pin strip, for PLC system cabling, **positive switching**					
Output	14	50 mm	**PLC-V8/FLK14/OUT**	2295554	1
Input	14	50 mm	**PLC-V8/FLK14/IN**	2296553	1
V8 adapter, for 8 PLC-INTERFACES (6.2 mm), with IDC/FLK pin strip, for PLC system cabling, **negative switching**					
Output	14	50 mm	**PLC-V8/FLK14/OUT/M**	2304102	1
Input	14	50 mm	**PLC-V8/FLK14/IN/M**	2304115	1
V8 output adapter,, for 8 PLC-INTERFACES (6.2 mm), with D-SUB connection					
Pin strip	15	50 mm	**PLC-V8/D15S/OUT**	2296058	1
Socket strip	15	50 mm	**PLC-V8/D15B/OUT**	2296061	1
V8 input adapter, for 8 PLC-INTERFACES (6.2 mm), with D-SUB connection					
Pin strip	15	50 mm	**PLC-V8/D15S/IN**	2296074	1
Socket strip	15	50 mm	**PLC-V8/D15B/IN**	2296087	1



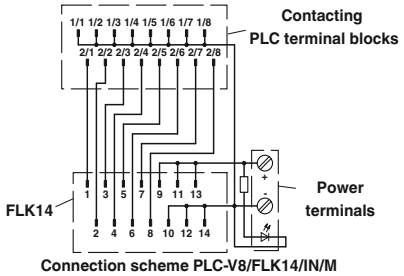
Connection scheme PLC-V8/FLK14/OUT



Connection scheme PLC-V8/FLK14/OUT/M



Connection scheme PLC-V8/FLK14/IN



Connection scheme PLC-V8/FLK14/IN/M

Adapters 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
- Coupling to digital OUTPUT cards

Notes:
Cross list with matching PLC-INTERFACE modules, see page 534

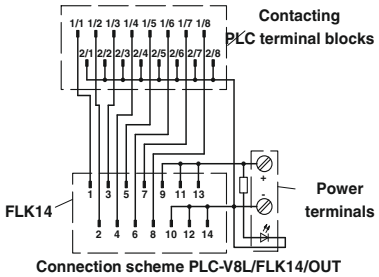
VARIOFACE adapter for 14 mm PLC-INTERFACE

Technical data

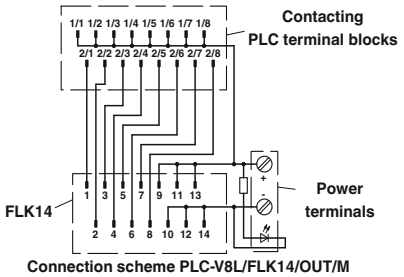
Maximum permissible operating voltage		30 V DC
Maximum permissible operating voltage UL / CSA		24 V / -
Maximum permissible current (per branch)		1 A (per signal path)
Maximum total current (voltage supply)		3 A
Ambient temperature (operation)		-40°C ... 70°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Controller level	IDC/FLK pin strip
	Supply	Screw connection
Connection data solid/stranded/AWG		0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12
Dimensions	H / D	39 mm / 56 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
V8 adapter, for 8 PLC-INTERFACES (14 mm), with IDC/FLK pin strip, for PLC system cabling, **positive switching**	14	112.5 mm	**PLC-V8L/FLK14/OUT**	2299660	1
V8 adapter, for 8 PLC-INTERFACES (14 mm), with IDC/FLK pin strip, for PLC system cabling, **negative switching**	14	112.5 mm	**PLC-V8L/FLK14/OUT/M**	2304306	1



Connection scheme PLC-V8L/FLK14/OUT



Connection scheme PLC-V8L/FLK14/OUT/M

Feed-through terminal blocks for PLC-INTERFACE

The VARIOFACE PLC-VT terminals are passive feed-through terminal blocks, with the same shape as the 6.2 mm slim relay and optocoupler interfaces PLC-INTERFACE. It is thus 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
–
–
–
–
–
–

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 block for PLC-INTERFACE universal series

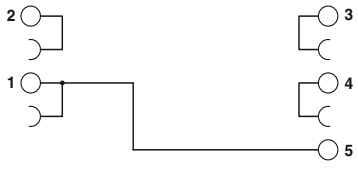
Technical data

	PLC-VT, PLC-VT/ACT	PLC-VT/LA, PLC-VT/ACT/LA
Maximum permissible operating voltage	250 V AC/DC	30 V DC
Maximum permissible operating voltage UL / CSA	220 V / -	20 V / -
Maximum permissible 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 60664	
Connection data solid/stranded/AWG	0.2 ... 4 mm² / 0.2 ... 2.5 mm² / 24 - 12	
Dimensions H / D	80 mm / 94 mm	

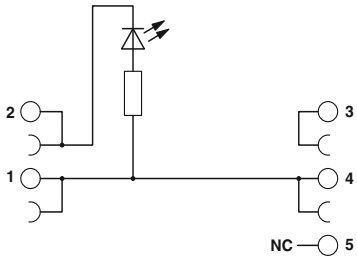
Ordering data

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
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

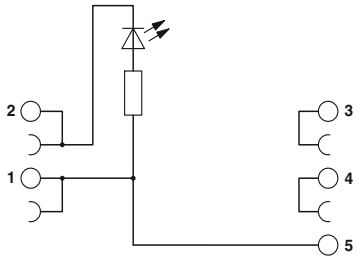
Connection scheme PLC-VT



Connection scheme PLC-VT/ACT



Connection scheme PLC-VT/LA



Connection scheme PLC-VT/ACT/LA

Adapters for RIFLINE complete RF-1

RIF-1-V8/... if they are VARIOFACE adapters, connect the eight RIF-1 relay modules with the system cabling:
– Can be plugged in to eight RIF-1 relay modules in series
– The adapter has one LED indicator and one freewheeling diode per relay

The following RIF-1 relay modules can be connected with the adapters:

With Push-in connection:
– RIF-1-RPT-LDP-24DC/1IC, Order No. 2909884*
– RIF-1-BPT/2X21, Order No. 2900931
– RIF-1-RPT-LDP-24DC/1X21, Order No. 2903342*
– RIF-1-RPT-LDP-24DC/1X21 AU, Order No. 2903338*
– RIF-1-RPT-LDP-24DC/2X21, Order No. 2903334*
– RIF-1-RPT-LDP-24DC/2X21 AU, Order No. 2903330*
– RIF-1-RPT-LDP-24DC/1X21MS, Order No. 2905289
– RIF-1-RPT-LDP-24DC/2X21MS, Order No. 2905291

With screw connection:
– RIF-1-RSC-LDP-24DC/1IC, Order No. 2909885*
– RIF-1-BSC/2X21, Order No. 2900930
– RIF-1-RSC-LDP-24DC/1X21, Order No. 2903358*
– RIF-1-RSC-LDP-24DC/1X21 AU, Order No. 2903354*
– RIF-1-RSC-LDP-24DC/2X21, Order No. 2903350*
– RIF-1-RSC-LDP-24DC/2X21 AU, Order No. 2903346*
– RIF-1-RSC-LDP-24DC/1X21MS Order No. 2905659
– RIF-1-RSC-LDP-24DC/2X21MS, Order No. 2905660

* If completely assembled RIF-1 relay modules are used, the indicator/interference suppression modules must be removed before installation.

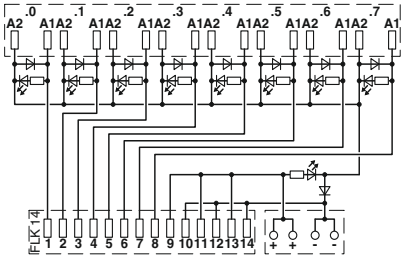
VARIOFACE adapter for RIFLINE complete RIF-1

Technical data

Maximum permissible operating voltage		30 V DC
Maximum permissible operating voltage UL / CSA		24 V / -
Maximum permissible current (per branch)		1 A (per signal path)
Maximum total current (voltage supply)		3 A
Ambient temperature (operation)		-40°C ... 60°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178
Connection method	Controller level	IDC/FLK pin strip
	Supply	Push-in connection
Connection data solid/stranded/AWG		0.2 ... 1.5 mm² / 0.2 ... 1.5 mm² / 24 - 16
Dimensions	H / D	101 mm / 75 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
V8 adapter, for eight RIF-1 relay modules, with IDC/FLK pin strip for PLC system cabling, **positive switching**	14	128 mm	**RIF-1-V8/PT/FLK14/OUT**	2905195	1



Connection scheme for RIF-1-V8/PT/FLK14/OUT

Cross-reference list for PLC-V8 adapters with matching PLC-INTERFACE modules

Series	Function	Contact	Input	Output	Page
Universal	Relay	1 changeover contact	24 V DC	250 V AC/DC / 6 A	364
			24 V DC	250 V AC/DC / 10 A	384
			12 V DC	30 V AC/36 V DC / 50 mA	365
			24 V DC	30 V AC/36 V DC / 50 mA	365
			24 V AC/DC	30 V AC/36 V DC / 50 mA	365
			48 V DC	30 V AC/36 V DC / 50 mA	365
			60 V DC	30 V AC/36 V DC / 50 mA	365
			120 V AC/DC	30 V AC/36 V DC / 50 mA	365
			230 V AC/DC	30 V AC/36 V DC / 50 mA	365
			120 V AC	30 V AC/36 V DC / 50 mA[1]	388
			230 V AC	30 V AC/36 V DC / 50 mA[1]	388
		1 changeover contact with manual operation	24 V DC	250 V AC/DC / 6 A	365
			24 V DC	250 V AC/DC / 10 A	369
			12 V DC	30 V AC/36 V DC / 50 mA	365
			24 V DC	30 V AC/36 V DC / 50 mA	365
			24 V AC/DC	30 V AC/36 V DC / 50 mA	365
			120 V AC/DC	30 V AC/36 V DC / 50 mA	365
			230 V AC/DC	30 V AC/36 V DC / 50 mA	365
		2 changeover contacts	24 V DC	250 V AC/DC / 6 A	366
			24 V DC	30 V AC/DC / 50 mA	367
		2 changeover contacts with manual operation	24 V DC	250 V AC/DC / 6 A	368
			24 V DC	30 V AC/36 V DC / 50 mA	369
	Relay switch	1 N/O contact	24 V AC/DC	250 V AC/DC / 6 A	406
			24 V AC/DC	250 V AC/DC / 6 A	406
	Optocoupler	1 N/O contact, electronic	24 V DC	24 V DC / 3 A	373
			24 V DC	24 V DC / 10 A	409
			24 V DC	250 V AC / 0.75 A	373
			24 V DC	300 V DC / 1 A	408
			24 V DC	48 V DC / 100 mA	372
			48 V DC	48 V DC / 100 mA	372
			60 V DC	48 V DC / 100 mA	372
			120 V AC/DC	48 V DC / 100 mA	372
			230 V AC/DC	48 V DC / 100 mA	372
			NAMUR	24 V DC / 50 mA	422
			120 V AC	48 V DC / 100 mA[2]	388
			230 V AC	48 V DC / 100 mA[2]	388
		1 changeover contact, electronic	24 V DC	48 V DC / 0.5 A	409
	Feed-through	–	250 V AC/DC	250 V AC/DC	532
			24 V DC	24 V DC	532
Actuator	Relay	1 N/O contact	24 V DC	250 V AC/DC / 6 A	374
			24 V DC	250 V AC/DC / 10 A (80 A, 20 ms)	382
		1 N/O contact with manual operation	24 V DC	250 V AC/DC / 6 A	375
		2 N/O contacts	24 V DC	250 V AC/DC / 6 A	375
	Optocoupler	1 N/O contact, electronic	24 V DC	24 V DC / 3 A	376
			24 V DC	24 V DC / 5 A	378
			24 V DC	250 V AC / 0.75 A	377
			24 V DC	250 V AC / 2 A	378
	Feed-through	–	250 V AC/DC	250 V AC/DC	532
			24 V DC	24 V DC	532
Sensor[4])	Relay	1 N/O contact	24 V DC	30 V AC/36 V DC / 50 mA	380
			120 V AC/DC	30 V AC/36 V DC / 50 mA	380
			230 V AC/DC	30 V AC/36 V DC / 50 mA	380
			120 V AC	30 V AC/36 V DC / 50 mA[1]	389
			230 V AC	30 V AC/36 V DC / 50 mA[1]	389
		1 N/O contact with manual operation	24 V DC	30 V AC/36 V DC / 50 mA	381
			120 V AC/DC	30 V AC/36 V DC / 50 mA	381
			230 V AC/DC	30 V AC/36 V DC / 50 mA	381
	Optocoupler	1 N/O contact, electronic	24 V DC	48 V DC / 100 mA	381
			120 V AC/DC	48 V DC / 100 mA	381
			230 V AC/DC	48 V DC / 100 mA	381
			120 V AC	48 V DC / 100 mA[2]	389
			230 V AC	48 V DC / 100 mA[2]	389

[1]) Plug-in miniature relay insert: REL-MR-60DC/21AU, 2961134
[2]) Plug-in solid-state relay insert: OPT-60DC/48DC/100, 2966621
[3]) PLC-...SO46 is supplied as a basic terminal block with filter, but without relay or solid-state relay.
[4]) Cannot be mixed with the Universal series (within a byte)

Push-in connection	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	✓		
PLC-RPT-24DC/21HC	2900291	PLC-RSC-24DC/21HC	2967620			✓
PLC-RPT-12DC/21AU	2900317	PLC-RSC-12DC/21AU	2966919		✓	
PLC-RPT-24DC/21AU	2900306	PLC-RSC-24DC/21AU	2966265	✓	✓	
PLC-RPT-24UC/21AU	2900307	PLC-RSC-24UC/21AU	2966278	✓	✓	
PLC-RPT-48DC/21AU	2900308	PLC-RSC-48DC/21AU	2966126		✓	
PLC-RPT-60DC/21AU	2900309	PLC-RSC-60DC/21AU	2966142		✓	
PLC-RPT-120UC/21AU	2900310	PLC-RSC-120UC/21AU	2966281		✓	
PLC-RPT-230UC/21AU	2900311	PLC-RSC-230UC/21AU	2966294		✓	
PLC-RPT-120UC/21/SO46	2900453[3])	PLC-BSC-120UC/21/SO46	2980319[3])		✓	
PLC-RPT-230UC/21/SO46	2900455[3])	PLC-BSC-230UC/21/SO46	2980335[3])		✓	
PLC-RPT- 24DC/21/MS	2909667	PLC-RSC- 24DC/21/MS	2909649	✓		
PLC-RPT- 24DC/21HC/MS	2910530	PLC-RSC- 24DC/21HC/MS	2910514			✓
PLC-RPT- 12DC/21AU/MS	2909671	PLC-RSC- 12DC/21AU/MS	2909654		✓	
PLC-RPT- 24DC/21AU/MS	2909672	PLC-RSC- 24DC/21AU/MS	2909655	✓	✓	
PLC-RPT- 24UC/21AU/MS	2909673	PLC-RSC- 24UC/21AU/MS	2909656	✓	✓	
PLC-RPT-120UC/21AU/MS	2909674	PLC-RSC-120UC/21AU/MS	2909657		✓	
PLC-RPT-230UC/21AU/MS	2909676	PLC-RSC-230UC/21AU/MS	2909660		✓	
PLC-RPT-24DC/21-21	2900330	PLC-RSC-24DC/21-21	2967060			✓
PLC-RPT-24DC/21-21AU	2900338	PLC-RSC-24DC/21-21AU	2967125			✓
PLC-RPT- 24DC/21-21/MS	2910519	PLC-RSC- 24DC/21-21/MS	2910502			✓
PLC-RPT- 24DC/21-21AU/MS	2910524	PLC-RSC- 24DC/21-21AU/MS	2910507			✓
PLC-RPT-24UC/1/S/H	2900328	PLC-RSC-24UC/1/S/H	2982236	✓		
PLC-RPT-24UC/1/S/L	2900327	PLC-RSC-24UC/1/S/L	2834876	✓		
PLC-OPT-24DC/24DC/2	2900364	PLC-OSC-24DC/24DC/2	2966634	✓		
PLC-OPT-24DC/24DC/10/R	2900398	PLC-OSC-24DC/24DC/10/R	2982702	✓		
PLC-OPT-24DC/230AC/1	2900369	PLC-OSC-24DC/230AC/1	2967840	✓		
PLC-OPT-24DC/300DC/1	2900383	PLC-OSC-24DC/300DC/1	2980678	✓		
PLC-OPT-24DC/48DC/100	2900352	PLC-OSC-24DC/48DC/100	2966728	✓	✓	
PLC-OPT-48DC/48DC/100	2900353	PLC-OSC-48DC/48DC/100	2966993		✓	
PLC-OPT-60DC/48DC/100	2900354	PLC-OSC-60DC/48DC/100	2967455		✓	
PLC-OPT-120UC/48DC/100	2900355	PLC-OSC-120UC/48DC/100	2966744		✓	
PLC-OPT-230UC/48DC/100	2900356	PLC-OSC-230UC/48DC/100	2966757		✓	
PLC-PT-EIK 1-SVN 24P/P	2900397	PLC-SC-EIK 1-SVN 24P/P	2982663		✓	
PLC-BPT-120UC/21/SO46	2900453[3])	PLC-BSC-120UC/21/SO46	2980319[3])		✓	
PLC-BPT-230UC/21/SO46	2900455[3])	PLC-BSC-230UC/21/SO46	2980335[3])		✓	
PLC-OPT-24DC/48DC/500/W	2900378	PLC-OSC-24DC/48DC/500/W	2980636	✓		
–		PLC-VT	2296870	✓	✓	
–		PLC-VT/LA	2296854	✓	✓	
PLC-RPT-24DC/1/ACT	2900312	PLC-RSC-24DC/1/ACT	2966210	✓		
PLC-RPT-24DC/1IC/ACT	2900298	PLC-RSC-24DC/1IC/ACT	2967604			✓
PLC-RPT- 24DC/ 1/MS/ACT	2909677	PLC-RSC- 24DC/ 1/MS/ACT	2909661	✓		
–		PLC-RSC-24DC/1-1/ACT	2967109			✓
PLC-OPT-24DC/24DC/2/ACT	2900376	PLC-OSC-24DC/24DC/2/ACT	2966676	✓		
–		PLC-OSC-24DC/24DC/5/ACT	2982786			✓
–		PLC-OSC-24DC/230AC/1/ACT	2967947	✓		
–		PLC-OSC-24DC/230AC/2/ACT	2982760			✓
–		PLC-VT/AKT	2295567	✓		
–		PLC-VT/AKT/LA	2296867	✓		
PLC-RPT-24DC/1AU/SEN	2900313	PLC-RSC-24DC/1AU/SEN	2966317		✓	
PLC-RPT-120UC/1AU/SEN	2900314	PLC-RSC-120UC/1AU/SEN	2966320		✓	
PLC-RPT-230UC/1AU/SEN	2900315	PLC-RSC-230UC/1AU/SEN	2966333		✓	
PLC-BPT-120UC/1/SEN/SO46	2900456[3])	PLC-BSC-120UC/1/SEN/SO46	2980322[3])		✓	
PLC-BPT-230UC/1/SEN/SO46	2900457[3])	PLC-BSC-230UC/1/SEN/SO46	2980348[3])		✓	
PLC-RPT- 24DC/ 1AU/MS/SEN	2909678	PLC-RSC- 24DC/ 1AU/MS/SEN	2909663		✓	
PLC-RPT-120UC/ 1AU/MS/SEN	2909679	PLC-RSC-120UC/ 1AU/MS/SEN	2909664		✓	
PLC-RPT-230UC/ 1AU/MS/SEN	2909680	PLC-RSC-230UC/ 1AU/MS/SEN	2909665		✓	
PLC-OPT-24DC/48DC/100/SEN	2900358	PLC-OSC-24DC/48DC/100/SEN	2966773		✓	
PLC-OPT-120UC/48DC/100/SEN	2900359	PLC-OSC-120UC/48DC/100/SEN	2966799		✓	
PLC-OPT-230UC/48DC/100/SEN	2900361	PLC-OSC-230UC/48DC/100/SEN	2966809		✓	
PLC-BPT-120UC/1/SEN/SO46	2900456[3])	PLC-BSC-120UC/1/SEN/SO46	2980322[3])		✓	
PLC-BPT-230UC/1/SEN/SO46	2900457[3])	PLC-BSC-230UC/1/SEN/SO46	2980348[3])		✓	

System cables with IDC/FLK socket strips

– 1:1 connection
– 14 and 50-pos.
– Connectors as per IEC 60603-13
– Shielded or unshielded
– Halogen-free see page 565
– Special lengths see page 569

Not shielded

Shielded with shield connection on one end

	Technical data	Technical data
Maximum permissible operating voltage	25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -	125 V / -
Maximum permissible current carrying capacity per path	-	-
Maximum 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
Outside diameter	6.4 mm	6.7 mm
Outside diameter		
Outside diameter	6.4 mm	6.7 mm

Description	No. of pos.	Cable length	Ordering data: Type	Order No.	Pcs./Pkt.	Ordering data: Type	Order No.	Pcs./Pkt.
Assembled round cable, with two 14-pos. IDC/FLK socket strips in fixed lengths for transfer of 8 channels								
	14	0.3 m	**FLK 14/EZ-DR/ 30/KONFEK**	2295729	5			
	14	0.5 m	**FLK 14/EZ-DR/ 50/KONFEK**	2288901	5	**FLK 14/EZ-DR/ 50/KONFEK/S**	2296977	1
	14	1 m	**FLK 14/EZ-DR/ 100/KONFEK**	2288914	1	**FLK 14/EZ-DR/ 100/KONFEK/S**	2296980	1
	14	1.5 m	**FLK 14/EZ-DR/ 150/KONFEK**	2288927	1	**FLK 14/EZ-DR/ 150/KONFEK/S**	2296993	1
	14	2 m	**FLK 14/EZ-DR/ 200/KONFEK**	2288930	1	**FLK 14/EZ-DR/ 200/KONFEK/S**	2297002	1
	14	2.5 m	**FLK 14/EZ-DR/ 250/KONFEK**	2288943	1			
	14	3 m	**FLK 14/EZ-DR/ 300/KONFEK**	2288956	1	**FLK 14/EZ-DR/ 300/KONFEK/S**	2299013	1
	14	3.5 m	**FLK 14/EZ-DR/ 350/KONFEK**	2288969	1			
	14	4 m	**FLK 14/EZ-DR/ 400/KONFEK**	2288972	1	**FLK 14/EZ-DR/ 400/KONFEK/S**	2299026	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	**FLK 14/EZ-DR/ 600/KONFEK/S**	2299039	1
	14	8 m	**FLK 14/EZ-DR/ 800/KONFEK**	2299563	1	**FLK 14/EZ-DR/ 800/KONFEK/S**	2299042	1
	14	10 m	**FLK 14/EZ-DR/1000/KONFEK**	2299576	1	**FLK 14/EZ-DR/1000/KONFEK/S**	2299055	1
Assembled round cable, with two 50-pos. IDC/FLK socket strips in fixed lengths for transfer of 32 channels								
	50	0.5 m	**FLK 50/EZ-DR/ 50/KONFEK**	2289065	5	**FLK 50/EZ-DR/ 50/KONFEK/S**	2299097	1
	50	1 m	**FLK 50/EZ-DR/ 100/KONFEK**	2289078	1	**FLK 50/EZ-DR/ 100/KONFEK/S**	2299107	1
	50	1.5 m	**FLK 50/EZ-DR/ 150/KONFEK**	2289081	1	**FLK 50/EZ-DR/ 150/KONFEK/S**	2299110	1
	50	2 m	**FLK 50/EZ-DR/ 200/KONFEK**	2289094	1	**FLK 50/EZ-DR/ 200/KONFEK/S**	2299123	1
	50	2.5 m	**FLK 50/EZ-DR/ 250/KONFEK**	2289104	1			
	50	3 m	**FLK 50/EZ-DR/ 300/KONFEK**	2289117	1	**FLK 50/EZ-DR/ 300/KONFEK/S**	2299136	1
	50	3.5 m	**FLK 50/EZ-DR/ 350/KONFEK**	2289120	1			
	50	4 m	**FLK 50/EZ-DR/ 400/KONFEK**	2289133	1	**FLK 50/EZ-DR/ 400/KONFEK/S**	2299149	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	**FLK 50/EZ-DR/ 600/KONFEK/S**	2299152	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	**FLK 50/EZ-DR/ 800/KONFEK/S**	2299165	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	**FLK 50/EZ-DR/1000/KONFEK/S**	2299178	1

Splitting cables with IDC/FLK socket strips

– Splitting of 32 channels to 4 x 8 channels
– 50-pos. connector at one end
– 4 x 14-pos. connector at one end
– Connectors as per IEC 60603-13
– Shielded or unshielded
– Special lengths

Splitting cable unshielded 50 positions on 4 x 14

Splitting cable shielded 50 positions on 4 x 14

Technical data		Technical data	
Maximum permissible operating voltage	25 V AC / 60 V DC		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -		125 V / -
Maximum permissible current carrying capacity per path	1 A		1 A
Maximum 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 plugs 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.
Assembled round cable, with a 50-pos. IDC/FLK socket strip and four 14-pos. IDC/FLK socket strips, for splitting 32 channels into 4 x 8 channels.								
	50	0.5 m	**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

Intermediate adapters for SIMATIC® S5 to SIMATIC® S7-400

The S5 connector is plugged directly into the I/O card using the intermediate adapter. A new S7-400 is installed in place of the S5. The existing field wiring is retained.

Conversion adapters from SIMATIC® S5 to SIMATIC® S7-300

Using the adapters, the signals of the S5 front adapter are converted to a 50-pos. strip. The signals are routed to the S7-300 I/O module via a system cable and front adapter.

Startup adapters for test purposes

The universal startup adapters extend all signals of the existing S5 wiring. The open cable end can be connected to different controllers such as S7-400 or S7-300.

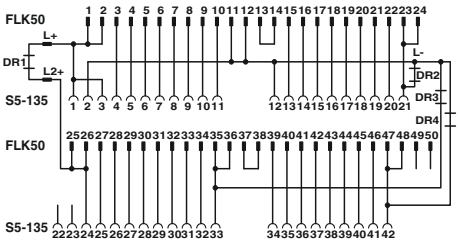
Siemens SIMATIC® S7-300 Adapters for conversion from S5-135/155 to S7-300

S5-S7 adapters connect the S5-135 front adapters wired with individual wires to the I/O modules of the S7.

With the aid of the FLKM S135/S7/FLK50 converter module, the signals of the S5-135 front adapter can be converted to a 50-pos. strip. A FLK 50/EZ-DR/.../KONFEK 50-pos. system cable and a front adapter for S7-300 (FLKM 50-PA-S300) connect the signals to the I/O module.

Notes:

Due to the geometry, it is not possible to couple any molded FLK connectors (e.g., VIP-PA...S7).



Connection scheme FLKM S135/S7/FLK50/PLC

Converter for SIMATIC® S5-135 to 50-pos. FLK strip

Technical data

Maximum permissible operating voltage	60 V DC
Maximum permissible current	1 A (per path)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Mounting position	Any
Standards/regulations	IEC 60664 / DIN EN 50178

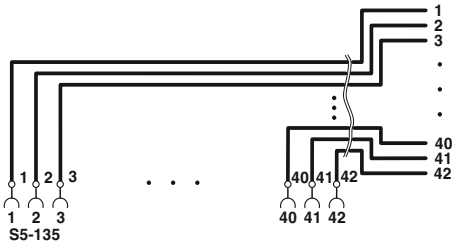
Ordering data

Description	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 adapters 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. Thus, the existing field wiring of S5-135 can communicate with the new controller for test purposes. Since the new control unit is temporarily arranged before the control cabinet, the original status of the system can be restored if required.

The S5-135 is replaced once the system operates without errors with the new controller.



Startup adapter for S5-135/155 field wiring

Technical data

Maximum permissible operating voltage	250 V AC/DC
Maximum 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	IEC 60664 / DIN EN 50178

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
Connection of all S5-135 connections (1 to 42) without cable	**FLKM S135/42XMKDSN**	2901603	1

Siemens SIMATIC® S7-400 Adapters for conversion from S5-135/155 to S7-400

The FLKM S135/... adapters directly connect an S5 connector wired with single wires to the S7-400 basic card.

The S5 connector is plugged directly into an S7-400 I/O card with the aid of the FLKM S135/... intermediate adapter.

A new S7-400 is installed in place of the S5. The existing field wiring is retained.

Attention:

The LEDs of the S7-400 module are hidden.

Adapter for digital input modules

EAC

Technical data

		...SO120, ...S400	...SO121
Maximum permissible operating voltage		60 V DC	60 V DC
Maximum permissible current		4 A (per path) 4 A (per connection, supply via separate power supply)	2 A (per path) 2 A (during supply via separate power supply)
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Connection method	Field level	SIEMENS S5-135 U pin strip	SIEMENS S5-135 U pin strip
Standards/regulations		IEC 60664 / DIN EN 50178	IEC 60664 / DIN EN 50178

Ordering data

Description	Module width W	Type	Order No.	Pcs./Pkt.
Digital IN 24 V DC				
6ES5 420-4UA14 on 6ES7 421-1BL01-0AA0		**FLKM S135/S400/SO120**	2301723	1
6ES5 430-4UA14 on 6ES7 421-1BL01-0AA0		**FLKM S135/S400/SO121**	2301736	1
6ES5 431-4UA12 to 6ES7 421-7DH00-0AB0		**FLKM S135-431-4UA/S400**	2314846	1
Digital OUT 24 V DC				
6ES5 441-4UA12 to 6ES7 422-1BL00-0AA0				
6ES5 451-4UA14 to 6ES7 422-1BL00-0AA0				
Analog IN				
Pt 100				
6ES5 465-4UA13 to 6ES7 431-7KF10-0AB0				
Current and voltage measurement				
6ES5 465-4UA13 to 6ES7 431-0HH00-0AB0				
6ES5 465-4UA13 to 6ES7 431-7QH00-0AB0				
Current measurement				
6ES5 460-4UA13 to 6ES7 431-1KF00-0AB0				
Analog OUT				
Current output				
6ES5 470-4UA13 to 6ES7 432-1HF00-0AB0				
6ES5 470-4UC13 to 6ES7 432-1HF00-0AB0				
Voltage output				
6ES5 470-4UA13 to 6ES7 432-1HF00-0AB0				
6ES5 470-4UB13 to 6ES7 432-1HF00-0AB0				
6ES5 470-4UC13 to 6ES7 432-1HF00-0AB0				

Adapter for digital output modules

Adapter for analog input modules

Adapter for analog output modules

EAC

Technical data

60 V DC
4 A (per path)
4 A (per connection, supply via separate power supply)

-20°C ... 50°C
SIEMENS S5-135 U pin strip

IEC 60664 / DIN EN 50178

Ordering data

Type	Order No.	Pcs./Pkt.
FLKM S135/S400/SO125	2301778	1
FLKM S135/S400/SO126	2301781	1

EAC

Technical data

...T/S400	...UI/S400, ...I/S400
60 V DC	60 V DC
2 A (per path)	4 A (per path)
2 A (per connection, supply via separate power supply)	4 A (per connection, supply via separate power supply)
-20°C ... 50°C	-20°C ... 50°C
SIEMENS S5-135 U pin strip	SIEMENS S5-135 U pin strip
IEC 60664 / DIN EN 50178	IEC 60664 / DIN EN 50178

Ordering data

Type	Order No.	Pcs./Pkt.
FLKM S135-465-4UA/T/S400	2314875	1
FLKM S135-465-4UA/UI/S400	2314888	1
FLKM S135-460-4UA/I/S400	2314613	1

EAC

Technical data

60 V DC
4 A (per path)
4 A (per connection, supply via separate power supply)

-20°C ... 50°C
SIEMENS S5-135 U pin strip

IEC 60664 / DIN EN 50178

Ordering data

Type	Order No.	Pcs./Pkt.
FLKM S135-470-4UC/I/S400	2314626	1
FLKM S135-470-4UC/U/S400	2314891	1

Siemens SIMATIC® S7-400 Adapters for conversion from S5-115 to S7-400

The FLKM S115/... adapters directly connect an S5 connector wired with single wires to the S7-400 basic card.

The S5 connector is plugged directly into an S7-400 I/O card with the aid of the FLKM S115/... intermediate adapter.

A new S7-400 is installed in place of the S5. The existing field wiring is retained.

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.

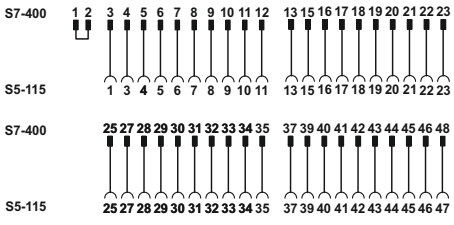
Adapter for SIMATIC® S5-115/S7-400

Technical data

Maximum permissible operating voltage	60 V DC
Maximum 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	Any
Standards/regulations	IEC 60664 / 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



Connection scheme: FLKM S115/S400/SO155

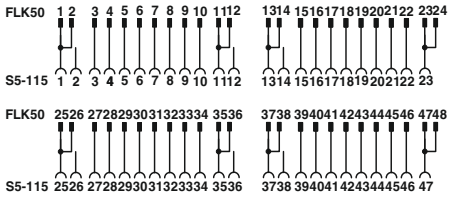
Siemens SIMATIC® S7-300 Adapters for conversion from S5-115 to S7-300

S5-S7 adapters connect the S5-115 front adapters wired with individual wires to the I/O modules of S7-300.

With the aid of the FLKM S115/S7/FLK50/SO137 converter module, the signals of the S5-115 front adapter can be converted to a 50-pos. strip. A FLK 50/EZ-DR/.../KONFEK 50-pos. system cable and a front adapter for S7-300 (FLKM 50-PA-S300) connect the signals to the I/O module.

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 SIMATIC® S5-115 to 50-pos. FLK strip

Technical data

Maximum permissible operating voltage	60 V DC
Maximum permissible current	1 A (per path)
Maximum permissible total current	2 A (per byte)
Ambient temperature (operation)	-20°C ... 50°C
Ambient temperature (storage/transport)	-20°C ... 70°C
Standards/regulations	IEC 60664 / 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. Thus, the existing field wiring of S5-115 can communicate with the new controller for test purposes. Since the new control unit is temporarily arranged before the control cabinet, the original status of the system can be restored if required.

The S5-115 is replaced once the system operates without errors with the new controller.

Startup adapter for S5-115 field wiring

Technical data

Maximum permissible operating voltage	250 V AC/DC
Maximum 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	DIN EN 50178 / IEC 60664

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

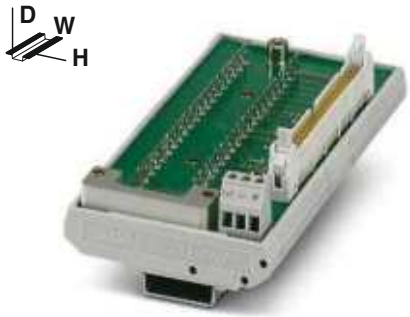
Siemens SIMATIC® S7-300 Adapters for conversion from S5-95U to S7-300

S5-S7 adapters connect the S5-95U front adapters wired with individual wires to the I/O modules of the S7-300.

With the aid of the UM-S95U/S/FLK50/PLC converter module, the signals can be converted to a 50-pos. strip. A FLK 50/EZ-DR/.../KONFEK 50-pos. cable and the front adapter for SIMATIC® S7-300 (FLKM 50-PA-S300) establish a connection to the I/O module.

Notes:

Due to the geometry, it is not possible to couple any molded FLK connectors (e.g., VIP-PA...S7).



Converter for SIMATIC® S5-95U to 50-pos. IDC/FLK pin strip

Technical data

Maximum permissible operating voltage		30 V DC
Maximum permissible current (per branch)		1 A
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		DIN EN 50178: 1998-04
Connection method	Field level	Slip-on connection
	Controller level	IDC/FLK pin strip
Dimensions	H / D	77 mm / 49 mm

Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
Digital 16 IN/16 OUT, 24 V DC from S5-95U/100U to S7-300 S5-100U: 6ES5 482-8MA13 to 6ES7 323-1BL00-AA0 S5-95U: 6ES5 095-8MA03 to 6ES7 323-1BL00-AA0		135 mm	**UM-S95U/S7/FLK50/PLC**	2907030	1

Allen Bradley PLC-5 (1771) Adapters for conversion from PLC-5 to S7-1500

Migration adapters contact the existing field wiring of an Allen Bradley PLC-5 (1771) controller. “1771-WG” or “1771-WH” front connectors can be connected.

There are three coupling options available:

– From Allen Bradley PLC-5 to SIMATIC® S7-1500
– From Allen Bradley PLC-5 to single wire (open cable end)
– From Allen Bradley PLC-5 to screw terminal block

new

Adaptation from Allen Bradley PLC-5 to SIMATIC® S7-1500

Technical data

Maximum permissible operating voltage		264 V AC/DC
Maximum permissible current		2 A (per path)
Ambient temperature (operation)		-20°C ... 60°C
Connection method	Allen-Bradley PLC-5®	Plug connection
Standards/regulations		DIN EN 50178

Ordering data

Description	Module width W	Type	Order No.	Pcs./Pkt.
Migration adapter from Allen Bradley PLC-5 to SIMATIC® S7-1500				
1771-IAD to 6ES7 521-1FH00-0AA0		**FLKM-1771-WH/S7-521-1FH/0,5M**	2910089	1
1771-IND / 1771-IBD / 1771-ICD to 6ES7 521-1BH00-0AB0		**FLKM-1771-WH/S7-521-1BH/0,5M**	2910090	1
1771-IAD / 1771-IND / 1771-IBD / 1771-ICD to 6ES7 521-7EH00-0AB0		**FLKM-1771-WH/S7-521-7EH/0,5M**	2910092	1
1771-OBD / 1771-OBDS to 6ES7 522-5EH00-0AB0		**FLKM-1771-WH/S7-522-5EH/0,5M**	2910093	1
1771-OAD / 1771-OMD to 6ES7 522-5FH00-0AB0		**FLKM-1771-WH/S7-522-5FH/0,5M**	2910094	1
1771-OAD / 1771-OMD to 6ES7 522-5HH00-0AB0		**FLKM-1771-WH/S7-522-5HH/0,5M**	2910095	1
1771-OBD / 1771-OBDS to 6ES7 522-1BH00-0AB0		**FLKM-1771-WH/S7-522-1BH/0,5M**	2910096	1
1771-IFE to 6ES7 531-7NF10-0AB0 (current measurement)		**FLKM-1771-WG/S7-531-7NF/I/0,5M**	2910097	1
1771-IFF to 6ES7 531-7NF10-0AB0 (voltage measurement)		**FLKM-1771-WG/S7-531-7NF/U/0,5M**	2910098	1
Migration adapter from Allen Bradley PLC-5 to open cable end				
– For “1771 WH” front connectors				
– For “1771 WG” front connectors				
Migration adapter from Allen Bradley PLC-5 to screw connection terminal blocks (kit)				
– For “1771 WH” front connectors				
– For “1771 WG” front connectors				

new

Adaptation from Allen Bradley PLC-5 to single wire

new

Adaptation from Allen Bradley PLC-5 to screw connection terminal blocks

Technical data

264 V AC/DC
2 A (per path)
-20°C ... 60°C
Plug connection
DIN EN 50178

Ordering data

Type	Order No.	Pcs./Pkt.
FLKM-1771-WH/OE/21X0,5/0,7M	**2910099**	1
FLKM-1771-WG/OE/21X0,5/0,7M	**2910100**	1

Technical data

264 V AC/DC
2 A (per path)
-20°C ... 60°C
Plug connection
DIN EN 50178

Ordering data

Type	Order No.	Pcs./Pkt.
FLKM-1771-WH/SMKDS	**2910102**	1
FLKM-1771-WG/SMKDS	**2910103**	1

VIP – VARIOFACE Professional Modules with IDC/FLK pin strip

– 1:1 connection
– 10 to 64-pos.
– Screw connection
– Metal foot
– As per IEC 60603-13

Low and high engagement latches are supplied with all modules.

Notes:

For marking systems (e.g., “ZB 22:UNBEDRUCKT”; Order No, 0811862) and mounting material, see Catalog 3.

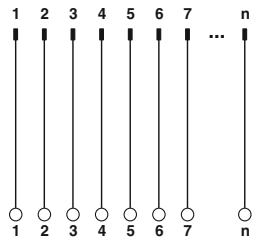
10 to 20 positions with screw connection

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178
Connection data solid/stranded/AWG	0.2 - 4 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					
	26	57.10			
	34	67.30			
	40	77.40			
	50	92.70			
	60	108.00			
	64	118.00			



26 to 64 positions with screw connection

Technical data

25 V AC / 60 V DC
125 V / 125 V

1 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178
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

VIP – VARIOFACE Professional Modules with IDC/FLK pin strip

– 1:1 connection
– 10 to 64-pos.
– Push-in connection
– Metal foot
– As per IEC 60603-13
Low and high engagement latches are supplied with all modules.

Notes:

For marking systems (e.g., “ZB 22:UNBEDRUCKT”; Order No, 0811862) and mounting material, see Catalog 3.

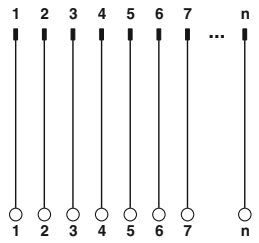
10 to 20 positions with Push-in connection

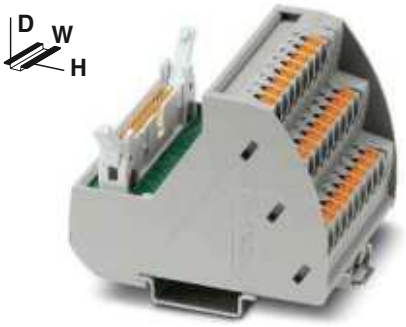
Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current (per branch)	1 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 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					
	26	57.10			
	34	67.30			
	40	77.40			
	50	92.70			
	60	107.90			
	64	118.10			





26 to 64 positions with Push-in connection

Technical data

25 V AC / 60 V DC
125 V / 125 V

1 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178
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

VIP – VARIOFACE Professional Modules with D-SUB connectors

– 1:1 connection
– 9 to 50-pos.
– Screw connection
– Metal foot
– As per IEC 60807-2

The D-SUB-4-40 UNC threads are led on to a connecting terminal block directly.

Notes:

For marking systems (e.g., “ZB 22:UNBEDRUCKT”; Order No, 0811862) and mounting material, see Catalog 3.

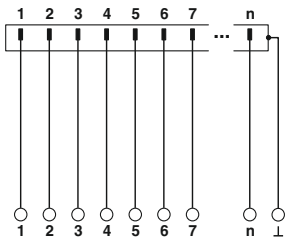
9 to 15 positions with screw connection

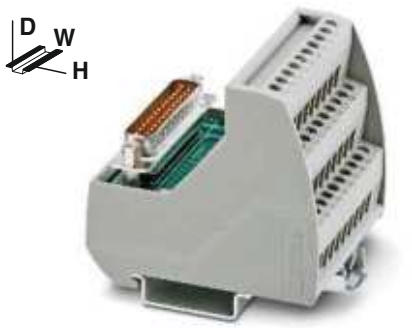
Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 105 V
Maximum permissible current (per branch)	2 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178
Connection data solid/stranded/AWG	0.2 - 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-Subminiature 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-Subminiature pin strip					
	25	57.40			
	37	72.70			
	50	98.20			
VARIOFACE module, with D-Subminiature socket					
	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-Subminiature socket					
	25	57.40			
	37	72.70			
	50	98.20			





25 to 50 positions with screw connection

Technical data

25 V AC / 60 V DC
125 V / 105 V

2 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178
0.2 - 4 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

VIP – VARIOFACE Professional Modules with D-SUB connectors

– 1:1 connection
– 9 to 50-pos.
– Push-in connection
– Metal foot
– As per IEC 60807-2

The D-SUB-4-40 UNC threads are led on to a connecting terminal block directly.

Notes:

For marking systems (e.g., “ZB 22:UNBEDRUCKT”; Order No, 0811862) and mounting material, see Catalog 3.

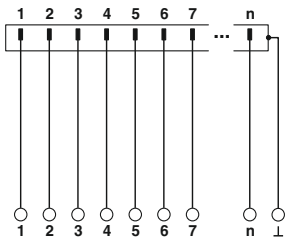
9 to 15 positions with Push-in connection

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 105 V
Maximum permissible current (per branch)	2 A
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178
Connection data solid/stranded/AWG	0.14 - 2.5 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-Subminiature 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-Subminiature pin strip					
	25	57.10			
	37	72.30			
	50	97.70			
VARIOFACE module, with D-Subminiature socket					
	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-Subminiature socket					
	25	57.10			
	37	72.30			
	50	97.70			



25 to 50 positions with Push-in connection

Technical data

25 V AC / 60 V DC
125 V / 105 V

2 A
-20°C ... 50°C
Any
IEC 60664, DIN EN 50178
0.14 - 2.5 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

Feed-through modules for D-SUB connectors with screw connection

– 1:1 connection
– 9- to 50-pos.
– Screw connection
– As per IEC 60807-2
– D-SUB 4-40 UNC thread
– 9- to 37-pos.: Separate ground tap
– 50-pos.: No ground tap

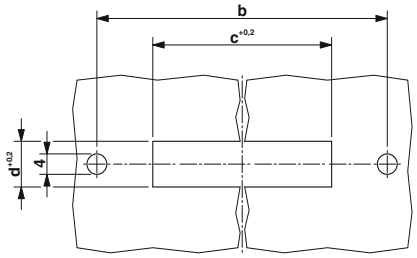
With D-SUB pin strip

With D-SUB socket strip

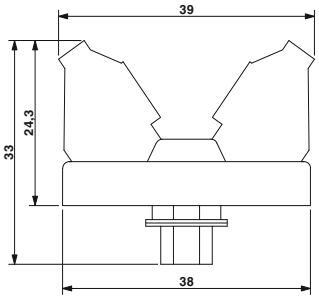
	Technical data	Technical data
Maximum permissible operating voltage	25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -	125 V / -
Maximum permissible current (per branch)	2.5 A	2.5 A
Ambient temperature (operation)	-20°C ... 50°C	-20°C ... 50°C
Mounting position	Any	Any
Standards/regulations	IEC 60664, DIN EN 50178	IEC 60664, DIN EN 50178
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

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 male 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

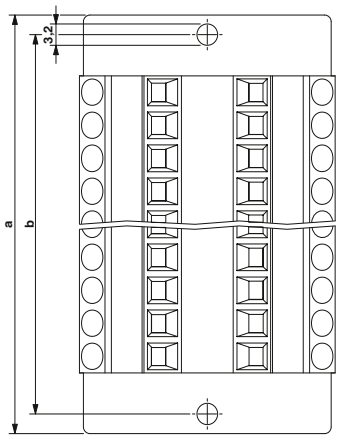
Dimensioning of the housing cutout



Dimensional drawing DFLK-D...SUB



Type	a	b	c	d
With pin strip				
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
With socket strip				
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



VIP – VARIOFACE Professional Modules for high density D-SUB connectors

– 1:1 connection
– 15- to 62-pos.
– Screw and Push-in connection
– Metal foot

The D-SUB-4-40 UNC threads are led directly to a connection terminal block.

Notes:

For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No, 0811862) and mounting material, see Catalog 3.

[1]) Module with double-level terminal blocks

15- to 62-pos. with screw connection

15- to 62-pos. with Push-in connection

		Technical data	Technical data
Maximum permissible operating voltage		25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -	125 V / 105 V
Maximum permissible current (per branch)		1 A	1 A
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		EN 50178	EN 50178
Connection data solid/stranded/AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	H / D	69 mm / 62 mm	75.8 mm / 63 mm

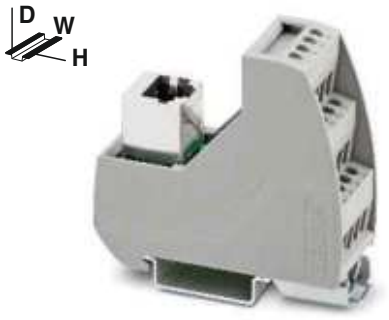
Description	No. of pos.	Module width W	Ordering data: Type	Order No.	Pcs./Pkt.	Ordering data: Type	Order No.	Pcs./Pkt.
VARIOFACE module, with D-Subminiature pin strip								
with screw connection	26	52.30	**VIP-3/SC/HD26SUB/M**	2322375	1			
with screw connection	44	82.90	**VIP-3/SC/HD44SUB/M**	2322388	1			
with screw connection	62	113.50	**VIP-3/SC/HD62SUB/M**	2322391	1			
with Push-in connection	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-Subminiature socket								
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 with RJ45 connector

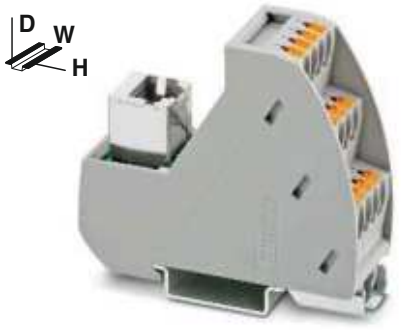
- 1:1 connection
- 8-positions, RJ45 connector
- Screw or Push-in connection (direct plug-in technology)
- Connector housing led to separate connection terminal blocks

Notes:

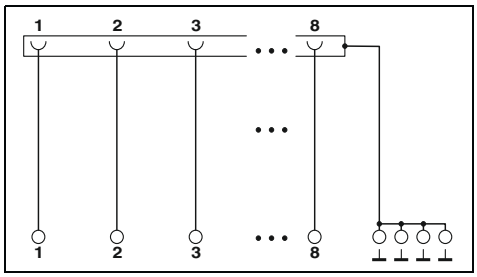
For marking systems (e.g., "ZB 22:UNBEDRUCKT"; Order No, 0811862) and mounting material, see Catalog 3.

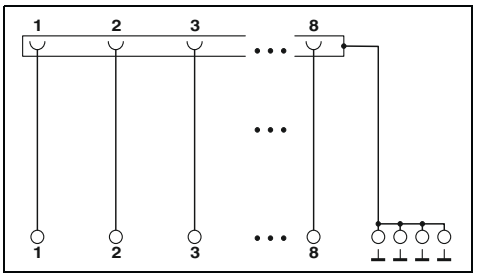


**8-pos.
with srew connection**



**8-pos.
with Push-in connection**





Technical data

Maximum permissible operating voltage		48 V AC/DC	48 V AC/DC
Maximum permissible current (per branch)		1 A	1 A
Ambient temperature (operation)		-20°C ... 50°C	-20°C ... 50°C
Mounting position		Any	Any
Standards/regulations		DIN EN 50178	EN 50178
Connection data solid/stranded/AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
Dimensions	H / D	69 mm / 62 mm	75.8 mm / 63 mm

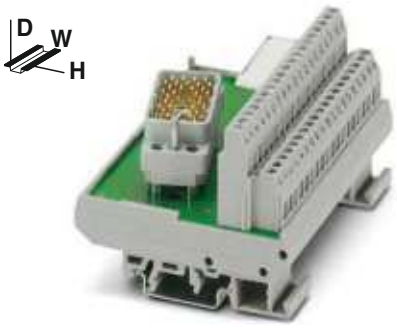
Ordering data

Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE module, with RJ45 connector					
with screw connection	8	26.90	**VIP-3/SC/RJ45**	2900701	1
with Push-in connection	8	26.60	**VIP-3/PT/RJ45**	2904290	1

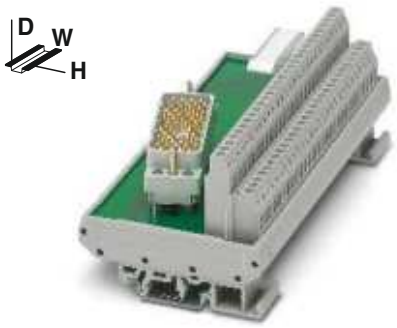
Modules for ELCO connectors

These modules can be used to connect ELCO connectors of the 8016 series to screw connection terminal blocks.

Thanks to the slanted placement of the ELCO connector, the cables which are fed out of the side of the cable housing are led away without affecting the neighboring modules.



38-pos.



56-pos.

Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible current (per branch)		2 A
Total current		76 A
Ambient temperature (operation)		-20°C ... 40°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178
Connection data solid/stranded/AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions	H / D	77 mm / 58.5 mm

Technical data

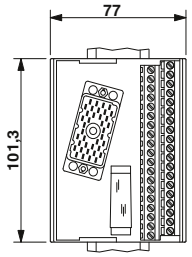
Maximum permissible operating voltage		125 V AC/DC
Maximum permissible current (per branch)		1.5 A
Total current		28 A (56 branches with 0.5 A each)
Ambient temperature (operation)		-20°C ... 50°C
Mounting position		Any
Standards/regulations		IEC 60664, DIN EN 50178
Connection data solid/stranded/AWG		0.2 - 4 mm² / 0.2 - 2.5 mm² / 24 - 12
Dimensions	H / D	77 mm / 58.5 mm

Ordering data

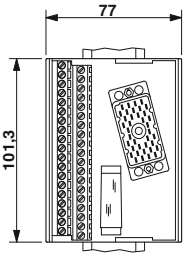
Description	No. of pos.	Module width W	Type	Order No.	Pcs./Pkt.
VARIOFACE module, with:					
- Pin strip 8016 right	38	101.50	**UMK- EC38/38-XOR**	2976297	1
- Pin strip 8016 left	38	101.50	**UMK- EC38/38-XOL**	2976284	1
VARIOFACE module, with:					
- Pin strip 8016 right	56	157.50	**UMK- EC56/56-XOR**	2975900	1
- Pin strip 8016 left	56	157.50	**UMK- EC56/56-XOL**	2975890	1

Modules for ELCO connectors

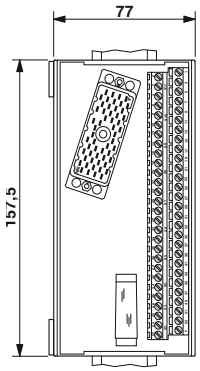
Dimensional drawing for UMK-EC38/38-XOL



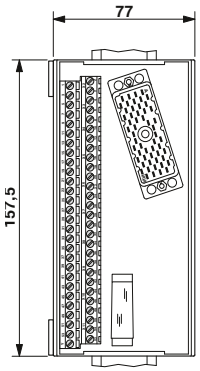
Dimensional drawing for UMK-EC38/38-XOR



Dimensional drawing for UMK-EC56/56-XOL



Dimensional drawing for UMK-EC56/56-XOR



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)

System cables with IDC/FLK socket strip and an open end

– 1:1 connection
– 10-, 14-, and 16-pos.
– IDC/FLK connector in accordance with 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.

Not shielded

Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current carrying capacity per path		1 A
Maximum conductor resistance		0.16 Ω/m
Ambient temperature (operation)		-20°C ... 50°C
Assembly		Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section		AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter		
	10 -position	6.1 mm
	14 -position	6.4 mm
	16 -position	6.5 mm

Ordering data

Description	No. of pos.	Cable length	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	**CABLE-FLK14/OE/0,14/ 50**	2305761	1
	14	1 m	**CABLE-FLK14/OE/0,14/ 100**	2305253	1
	14	1.5 m	**CABLE-FLK14/OE/0,14/ 150**	2305266	1
	14	2 m	**CABLE-FLK14/OE/0,14/ 200**	2305279	1
	14	2.5 m	**CABLE-FLK14/OE/0,14/ 250**	2305282	1
	14	3 m	**CABLE-FLK14/OE/0,14/ 300**	2305295	1
	14	4 m	**CABLE-FLK14/OE/0,14/ 400**	2305774	1
	14	6 m	**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
	16	0.5 m	**CABLE-FLK16/OE/0,14/ 0,5M**	2318127	1
	16	1 m	**CABLE-FLK16/OE/0,14/ 1,0M**	2318130	1
	16	1.5 m	**CABLE-FLK16/OE/0,14/ 1,5M**	2318143	1
	16	2 m	**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	**CABLE-FLK16/OE/0,14/ 3,0M**	2318172	1
	16	4 m	**CABLE-FLK16/OE/0,14/ 4,0M**	2318185	1
	16	6 m	**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 cables with IDC/FLK socket strip and an open end

– 1:1 connection
– 20- and 50-pos.
– IDC/FLK connector in accordance with 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.

Not shielded

Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current carrying capacity per path		1 A
Maximum conductor resistance		0.16 Ω/m
Ambient temperature (operation)		-20°C ... 50°C
Assembly		Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section		AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter		
	20 -position	7.6 mm
	50 -position	10.3 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt.
Round cable with an open end					
	20	0.5 m	**CABLE-FLK20/OE/0,14/ 50**	2305826	1
	20	1 m	**CABLE-FLK20/OE/0,14/ 100**	2305305	1
	20	1.5 m	**CABLE-FLK20/OE/0,14/ 150**	2305318	1
	20	2 m	**CABLE-FLK20/OE/0,14/ 200**	2305321	1
	20	2.5 m	**CABLE-FLK20/OE/0,14/ 250**	2305334	1
	20	3 m	**CABLE-FLK20/OE/0,14/ 300**	2305347	1
	20	4 m	**CABLE-FLK20/OE/0,14/ 400**	2305839	1
	20	6 m	**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	**CABLE-FLK50/OE/0,14/ 50**	2305871	1
	50	1 m	**CABLE-FLK50/OE/0,14/ 100**	2305350	1
	50	1.5 m	**CABLE-FLK50/OE/0,14/ 150**	2305363	1
	50	2 m	**CABLE-FLK50/OE/0,14/ 200**	2305376	1
	50	2.5 m	**CABLE-FLK50/OE/0,14/ 250**	2305389	1
	50	3 m	**CABLE-FLK50/OE/0,14/ 300**	2305392	1
	50	4 m	**CABLE-FLK50/OE/0,14/ 400**	2305884	1
	50	6 m	**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 cables with IDC/FLK socket strips

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

The cables are assembled on both ends with IDC/FLK socket strips in accordance with IEC 60603-13 (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 568.

Not shielded

Technical data

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -
Maximum permissible current carrying capacity per path	1 A
Maximum conductor resistance	0.16 Ω/m
Ambient temperature (operation)	-20°C ... 50°C
Shield	-
Assembly	Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section	AWG 26 / 0.14 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 cable[1]), with two 14-pos. IDC/FLK socket strips in fixed lengths, for transfer of 8 channels, for example					
	14	0.3 m	**FLK 14/EZ-DR/ 30/KONFEK**	2295729	5
	14	0.5 m	**FLK 14/EZ-DR/ 50/KONFEK**	2288901	5
	14	1 m	**FLK 14/EZ-DR/ 100/KONFEK**	2288914	1
	14	1.5 m	**FLK 14/EZ-DR/ 150/KONFEK**	2288927	1
	14	2 m	**FLK 14/EZ-DR/ 200/KONFEK**	2288930	1
	14	2.5 m	**FLK 14/EZ-DR/ 250/KONFEK**	2288943	1
	14	3 m	**FLK 14/EZ-DR/ 300/KONFEK**	2288956	1
	14	3.5 m	**FLK 14/EZ-DR/ 350/KONFEK**	2288969	1
	14	4 m	**FLK 14/EZ-DR/ 400/KONFEK**	2288972	1
	14	4.5 m	**FLK 14/EZ-DR/ 450/KONFEK**	2290847	1
	14	5 m	**FLK 14/EZ-DR/ 500/KONFEK**	2290834	1
	14	5.5 m	**FLK 14/EZ-DR/ 550/KONFEK**	2290850	1
	14	6 m	**FLK 14/EZ-DR/ 600/KONFEK**	2290863	1
	14	7 m			
	14	8 m	**FLK 14/EZ-DR/ 800/KONFEK**	2299563	1
	14	10 m	**FLK 14/EZ-DR/1000/KONFEK**	2299576	1
Assembled round cable[2]), with two 50-pos. IDC/FLK socket strips in fixed lengths, for transfer of 32 channels, for example					
	50	0.5 m	**FLK 50/EZ-DR/ 50/KONFEK**	2289065	5
	50	1 m	**FLK 50/EZ-DR/ 100/KONFEK**	2289078	1
	50	1.5 m	**FLK 50/EZ-DR/ 150/KONFEK**	2289081	1
	50	2 m	**FLK 50/EZ-DR/ 200/KONFEK**	2289094	1
	50	2.5 m	**FLK 50/EZ-DR/ 250/KONFEK**	2289104	1
	50	3 m	**FLK 50/EZ-DR/ 300/KONFEK**	2289117	1
	50	3.5 m	**FLK 50/EZ-DR/ 350/KONFEK**	2289120	1
	50	4 m	**FLK 50/EZ-DR/ 400/KONFEK**	2289133	1
	50	4.5 m	**FLK 50/EZ-DR/ 450/KONFEK**	2289573	1
	50	5 m	**FLK 50/EZ-DR/ 500/KONFEK**	2289586	1
	50	5.5 m	**FLK 50/EZ-DR/ 550/KONFEK**	2289599	1
	50	6 m	**FLK 50/EZ-DR/ 600/KONFEK**	2289609	1
	50	6.5 m	**FLK 50/EZ-DR/ 650/KONFEK**	2289612	1
	50	7 m	**FLK 50/EZ-DR/ 700/KONFEK**	2289625	1
	50	7.5 m	**FLK 50/EZ-DR/ 750/KONFEK**	2289638	1
	50	8 m	**FLK 50/EZ-DR/ 800/KONFEK**	2289641	1
	50	8.5 m	**FLK 50/EZ-DR/ 850/KONFEK**	2289654	1
	50	9 m	**FLK 50/EZ-DR/ 900/KONFEK**	2289667	1
	50	9.5 m	**FLK 50/EZ-DR/ 950/KONFEK**	2289670	1
	50	10 m	**FLK 50/EZ-DR/1000/KONFEK**	2289683	1

Shielded with shield connection on one end

Halogen-free (only the cable)

Technical data

	25 V AC / 60 V DC
	125 V / -
	1 A
	0.16 Ω/m
	-20°C ... 50°C
	Tinned copper-braided shield, approx. 85% covering
	Insulation displacement, IEC 60352-4/DIN EN 60352-4
	AWG 26 / 0.14 mm²
	7 / Cu tin-plated
	6.7 mm
	11 mm

Technical data

	25 V AC / 60 V DC
	125 V / -
	1 A
	0.16 Ω/m
	-20°C ... 50°C
	-
	Insulation displacement, IEC 60352-4/DIN EN 60352-4
	AWG 26 / 0.14 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

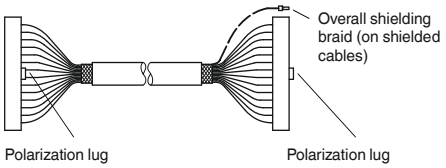
Ordering data

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

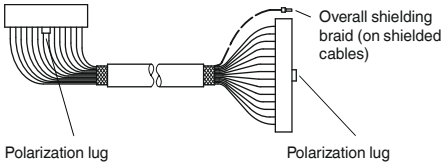
Color code of system cables

Wire No.	Pin	Wire color
	1	Black
	2	Brown
	3	Red
	4	Orange
	5	Yellow
	6	Green
	7	Blue
	8	Violet
	9	Gray
10-pos.	10	White
	11	White-black
	12	White-brown
	13	White-red
14-pos.	14	White-orange
	15	White-yellow
16-pos.	16	White-green
	17	White-blue
	18	White-violet
	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]) IDC/FLK socket strip assembled straight at both ends.



[2]) IDC/FLK socket strip assembled straight at one end and angled at the other.



System cables with IDC/FLK socket strips

Standard lengths

Pre-assembled round cables to couple the VARIOFACE interface modules.

The cables are assembled on both ends with IDC/FLK socket strips in accordance with IEC 60603-13 (1:1 connection).

Special lengths are defined using an order key, refer to page 568.

Not shielded

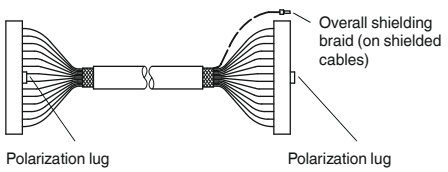
Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current carrying capacity per path		1 A
Maximum conductor resistance		0.16 Ω/m
Ambient temperature (operation)		-20°C ... 50°C
Assembly		Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section		AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter		
	10 -position	6 mm
	16 -position	6.5 mm
	20 -position	7.6 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt.
Round cable[1]), with two IDC/FLK 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 IDC/FLK 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 IDC/FLK 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

[1]) IDC/FLK socket strip assembled straight at both ends.



System cables with IDC/FLK socket strips

Standard lengths

Pre-assembled round cables to couple the VARIOFACE interface modules.

The cables are assembled on both ends with IDC/FLK socket strips in accordance with IEC 60603-13 (1:1 connection).

Special lengths are defined using an order key, refer to page 568.

Not shielded

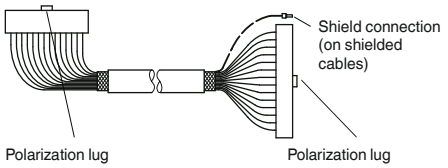
Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / -
Maximum permissible current carrying capacity per path		1 A
Maximum conductor resistance		0.16 Ω/m
Ambient temperature (operation)		-20°C ... 50°C
Assembly		Insulation displacement, IEC 60352-4/DIN EN 60352-4
Conductor cross section		AWG 26 / 0.14 mm²
Conductor structure: stranded wires / material		7 / Cu tin-plated
Outside diameter		
	26 -position	7.8 mm
	34 -position	8.7 mm
	40 -position	9.9 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt.
Round cable[1]), with two IDC/FLK 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 IDC/FLK 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
Round cable[2]), with two IDC/FLK 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

[2]) IDC/FLK socket strip assembled straight at one end and angled at the other.



System cables with IDC/FLK socket strip

Special lengths

Pre-assembled round cables for connecting, e.g., PLC front adapters to the corresponding VARIOFACE termination boards. The cables are assembled with IDC/FLK socket strips on both ends in accordance with IEC 60603-13. For shielded cables, a cable end with ferrule is also available as a shield 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 of the specific cable.

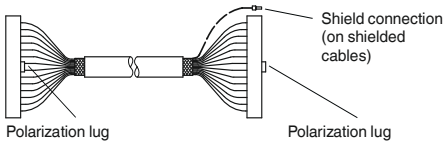
Assembly

– None,
the cable is not assembled at either end,
– 10-pos. IDC/FLK socket strip at both ends,
the cable is assembled at both ends with 10-pos. IDC/FLK socket strips (1:1 connection),
– 14-pos. IDC/FLK socket strip at both ends,
the cable is assembled at both ends with 14-pos. IDC/FLK socket strips (1:1 connection), etc. to
– 50-pos. IDC/FLK socket strip at both ends,
the cable is assembled at both ends with 50-pos. IDC/FLK socket strips (1:1 connection),
– 14-pos. IDC/FLK socket strip at one end,
16-pos. IDC/FLK socket strip at one end,
the cable is assembled with a 14-pos. IDC/FLK socket strip at one end and a 16-pos. IDC/FLK socket strip at one end (for SIMATIC® S7, no 1:1 connection).

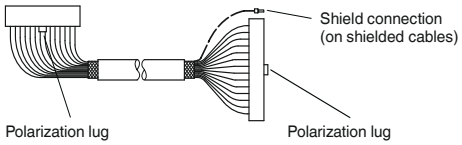
Features of permissible configurations:

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. IDC/FLK at both ends	**10U/C55/...**[1]											
14-pos. IDC/FLK at both ends		**14U/C23/...**[1]							**14S/C23/...**[1]			
16-pos. IDC/FLK at both ends			**16U/C58/...**[1]							**16S/C58/...**[1]		
20-pos. IDC/FLK at both ends				**20U/C61/...**[1]								
26-pos. IDC/FLK at both ends					**26U/C63/...**[1]							
34-pos. IDC/FLK at both ends						**34U/C65/...**[1]						
40-pos. IDC/FLK at both ends							**40U/C30/...**[3]				**40S/C30/...**[3]	
50-pos. IDC/FLK at both ends								**50U/C38/...**[2]				**50S/C38/...**[2]
14-pos. IDC/FLK at one end, 16-pos. IDC/FLK at one end		**14U/C52/...**[1]							**14S/C52/...**[1]			

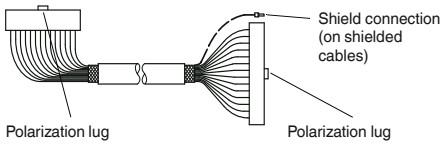
[1]) IDC/FLK socket strip assembled straight at both ends.



[2]) IDC/FLK socket strip assembled straight at one end and angled at the other.



[3]) IDC/FLK socket strip assembled straight at one end and angled at the other.



Ordering example for **unshielded** round cable:

– unshielded 50-pos. round cable, assembled with two 50-pos. IDC/FLK socket strips, 11.5 m long

Quantity	Order No.	Cable type	Assembly	Length [m][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. IDC/FLK socket strip at both ends
C23 ≙ 14-pos. IDC/FLK socket strip at both ends
C52 ≙ 14-pos. IDC/FLK socket strip at one end, 16-pos. IDC/FLK socket strip at one end (for S7)
C58 ≙ 16-pos. IDC/FLK socket strip at both ends
C61 ≙ 20-pos. IDC/FLK socket strip at both ends
C63 ≙ 26-pos. IDC/FLK socket strip at both ends
C65 ≙ 34-pos. IDC/FLK socket strip at both ends
C30 ≙ 40-pos. IDC/FLK socket strip at both ends
C38 ≙ 50-pos. IDC/FLK socket strip at both ends

[4]) min. 0.20 m

Ordering example for **shielded** round cable:

– shielded 14-pos. round cable, assembled with two 14-pos. IDC/FLK socket strips, 12.75 m long

Quantity	Order No.	Cable type	Assembly	Length [m][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. IDC/FLK socket strip at both ends
C52 ≙ 14-pos. IDC/FLK socket strip at one end, 16-pos. IDC/FLK socket strip at one end (for S7)
C58 ≙ 16-pos. IDC/FLK socket strip at both ends
C30 ≙ 40-pos. IDC/FLK socket strip at both ends
C38 ≙ 50-pos. IDC/FLK socket strip at both ends

[4]) min. 0.20 m

Not shielded

Shielded

	Technical data	Technical data
Maximum permissible operating voltage	25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / -	125 V / -
Maximum permissible current carrying capacity per path	1 A	1 A
Maximum 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	Cable length	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Assembled round cables, with socket strips in variable lengths							
		FLK EZ-DR.../.../...	2295059	1	**FLK EZ-DR-S.../.../...**	2295046	1

System cables with DSUB socket and pin strip

Standard lengths

– 1:1 connection
– Shielded round cables
– Connector in accordance with IEC 60807-2/DIN 41652
– Screw connection: 2 UNC 4-40 screws
Assembly versions:
– D-SUB socket strip on one side and D-SUB pin strip on the other
– D-SUB sockets on both sides
– DSUB pin strips on both sides

Special lengths are defined using an order key, refer to page 574.

Socket at one end and pin strip at the other

Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V
Maximum permissible current carrying capacity per path		2 A
Maximum conductor resistance		0.09 Ω/m
Ambient temperature (operation)		-20°C ... 50°C
Shield		Tinned copper-braided shield, approx. 85% covering
Insertion/withdrawal cycles		>200
Conductor cross section		AWG 24 / 0.25 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	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

Male connector at both ends

Technical data

25 V AC / 60 V DC
125 V / 125 V
2 A
0.09 Ω/m
-20°C ... 50°C
Tinned copper-braided shield, approx. 85% covering

>200
AWG 24 / 0.25 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

Technical data

25 V AC / 60 V DC
125 V / 125 V
2 A
0.09 Ω/m
-20°C ... 50°C
Tinned copper-braided shield, approx. 85% covering

>200
AWG 24 / 0.25 mm²

7.5 mm
9 mm
10.5 mm
12 mm
13.5 mm

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

System cables with DSUB socket and pin strip

Standard lengths

– 1:1 connection
– Halogen-free shielded round cables
– Screw connection: 2 UNC 4-40 screws
– Connector in accordance with IEC 60807-2/DIN 41652

Assembly versions:
– D-SUB socket strip on one side and D-SUB pin strip on the other
– D-SUB sockets on both sides
– DSUB pin strips on both sides

Special lengths are configured using separate order numbers.

Ordering example:
One halogen-free system cable assembled with two 37-pos. D-SUB socket strips in a length of 14.50 m:
1 pc. 1075563/14.50

Notes:
[1])Maximum permissible current carrying capacity per path for 37- and 50-pos. cables: 1.5 A

new

Socket strip at one end and pin strip at the other Halogen-free

Technical data

Maximum permissible operating voltage		25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V
Maximum permissible current carrying capacity per path		2 A[1])
Maximum conductor resistance		0.09 Ω/m
Ambient temperature (operation)		-20°C ... 50°C
Shield		Tinned copper braided shield
Insertion/withdrawal cycles		>200
Conductor cross section		AWG 24 / 0.25 mm²
Outside diameter		
	9 -position	7.1 mm
	15 -position	8.3 mm
	25 -position	10.2 mm
	37 -position	11.2 mm
	50 -position	13.2 mm

Ordering data

Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt.
Shielded halogen-free round cable, fitted with two D-SUB strips					
	9	1 m	CABLE-D 9SUB/B/S/HF/S/ 1,0M	1066591	1
	9	2 m	CABLE-D 9SUB/B/S/HF/S/ 2,0M	1066592	1
	9	3 m	CABLE-D 9SUB/B/S/HF/S/ 3,0M	1066593	1
Round cable, same as before, however in variable lengths					
	9		CABLE-D 9SUB-B-S-HF-S/...	1075568	1
Shielded halogen-free round cable, fitted with two D-SUB strips					
	15	1 m	CABLE-D15SUB/B/S/HF/S/ 1,0M	1066600	1
	15	2 m	CABLE-D15SUB/B/S/HF/S/ 2,0M	1066602	1
	15	3 m	CABLE-D15SUB/B/S/HF/S/ 3,0M	1066603	1
Round cable, same as before, however in variable lengths					
	15		CABLE-D15SUB-B-S-HF-S/...	1075565	1
Shielded halogen-free round cable, fitted with two D-SUB strips					
	25	1 m	CABLE-D25SUB/B/S/HF/S/ 1,0M	1066665	1
	25	2 m	CABLE-D25SUB/B/S/HF/S/ 2,0M	1066666	1
	25	3 m	CABLE-D25SUB/B/S/HF/S/ 3,0M	1066667	1
Round cable, same as before, however in variable lengths					
	25		CABLE-D25SUB-B-S-HF-S/...	1075559	1
Shielded halogen-free round cable, fitted with two D-SUB strips					
	37	1 m	CABLE-D37SUB/B/S/HF/S/ 1,0M	1066608	1
	37	2 m	CABLE-D37SUB/B/S/HF/S/ 2,0M	1066609	1
	37	3 m	CABLE-D37SUB/B/S/HF/S/ 3,0M	1066611	1
Round cable, same as before, however in variable lengths					
	37		CABLE-D37SUB-B-S-HF-S/...	1075562	1
Shielded halogen-free round cable, fitted with two D-SUB strips					
	50	1 m	CABLE-D50SUB/B/S/HF/S/ 1,0M	1066678	1
	50	2 m	CABLE-D50SUB/B/S/HF/S/ 2,0M	1066679	1
	50	3 m	CABLE-D50SUB/B/S/HF/S/ 3,0M	1066681	1
Round cable, same as before, however in variable lengths					
	50		CABLE-D50SUB-B-S-HF-S/...	1075554	1

new

Socket strip at both ends
Halogen-free

new

Pin strip at both ends
Halogen-free

Technical data

	25 V AC / 60 V DC
	125 V / 125 V
	2 A
	0.09 Ω/m
	-20°C ... 50°C
	Tinned copper braided shield
	>200
	AWG 24 / 0.25 mm²
	7.1 mm
	8.3 mm
	10.2 mm
	11.2 mm
	13.2 mm

Ordering data

Type	Order No.	Pcs./Pkt.
CABLE-D 9SUB/B/B/HF/S/ 1,0M	1066587	1
CABLE-D 9SUB/B/B/HF/S/ 2,0M	1066588	1
CABLE-D 9SUB/B/B/HF/S/ 3,0M	1066589	1
CABLE-D 9SUB-B-B-HF-S/...	1075569	1
CABLE-D15SUB/B/B/HF/S/ 1,0M	1066597	1
CABLE-D15SUB/B/B/HF/S/ 2,0M	1066598	1
CABLE-D15SUB/B/B/HF/S/ 3,0M	1066599	1
CABLE-D15SUB-B-B-HF-S/...	1075566	1
CABLE-D25SUB/B/B/HF/S/ 1,0M	1066657	1
CABLE-D25SUB/B/B/HF/S/ 2,0M	1066660	1
CABLE-D25SUB/B/B/HF/S/ 3,0M	1066664	1
CABLE-D25SUB-B-B-HF-S/...	1075560	1
CABLE-D37SUB/B/B/HF/S/ 1,0M	2908516	1
CABLE-D37SUB/B/B/HF/S/ 2,0M	2908517	1
CABLE-D37SUB/B/B/HF/S/ 3,0M	2908518	1
CABLE-D37SUB-B-B-HF-S/...	1075563	1
CABLE-D50SUB/B/B/HF/S/ 1,0M	1066672	1
CABLE-D50SUB/B/B/HF/S/ 2,0M	1066673	1
CABLE-D50SUB/B/B/HF/S/ 3,0M	1066674	1
CABLE-D50SUB-B-B-HF-S/...	1075557	1

Technical data

	25 V AC / 60 V DC
	125 V / 125 V
	2 A
	0.09 Ω/m
	-20°C ... 50°C
	Tinned copper braided shield
	>200
	AWG 24 / 0.25 mm²
	7.1 mm
	8.3 mm
	10.2 mm
	11.2 mm
	13.2 mm

Ordering data

Type	Order No.	Pcs./Pkt.
CABLE-D 9SUB/S/S/HF/S/ 1,0M	1066594	1
CABLE-D 9SUB/S/S/HF/S/ 2,0M	1066595	1
CABLE-D 9SUB/S/S/HF/S/ 3,0M	1066596	1
CABLE-D 9SUB-S-S-HF-S/...	1075567	1
CABLE-D15SUB/S/S/HF/S/ 1,0M	1066604	1
CABLE-D15SUB/S/S/HF/S/ 2,0M	1066606	1
CABLE-D15SUB/S/S/HF/S/ 3,0M	1066607	1
CABLE-D15SUB-S-S-HF-S/...	1075564	1
CABLE-D25SUB/S/S/HF/S/ 1,0M	1066668	1
CABLE-D25SUB/S/S/HF/S/ 2,0M	1066669	1
CABLE-D25SUB/S/S/HF/S/ 3,0M	1066671	1
CABLE-D25SUB-S-S-HF-S/...	1075558	1
CABLE-D37SUB/S/S/HF/S/ 1,0M	1066612	1
CABLE-D37SUB/S/S/HF/S/ 2,0M	1066614	1
CABLE-D37SUB/S/S/HF/S/ 3,0M	1066615	1
CABLE-D37SUB-S-S-HF-S/...	1075561	1
CABLE-D50SUB/S/S/HF/S/ 1,0M	1066682	1
CABLE-D50SUB/S/S/HF/S/ 2,0M	1066683	1
CABLE-D50SUB/S/S/HF/S/ 3,0M	1066684	1
CABLE-D50SUB-S-S-HF-S/...	1075553	1

System cables with D-SUB socket and pin strips

Special lengths

Pre-assembled, shielded **round cables** for connecting VARIOFACE termination boards. The cables are assembled with D-SUB strips in accordance with IEC 60807-2/DIN 41652.

The order key is described using three features.

The order of the features is as follows:
– Cable type
– Assembly
– Length in meters

There are three assembly versions for the shielded round cable:
– CABLE D-SUB-S/.../.../... D-SUB socket strip at one end and D-SUB pin strip at the other end,
– CABLE D-SUB-B-B-S/.../.../... D-SUB socket strips at both ends,
– CABLE D-SUB-S-S-S/.../.../... D-SUB pin strips at both ends

To ensure clear specification when ordering, the features are described in detail below:

Cable type

– This specifies the number of individual cables of the specific cable.

Assembly

– (Example for CABLE D-SUB-S/.../.../...)
– None, the cable is not assembled at either end,
– 9-pos. D-SUB socket strip at one end, 9-pos. D-SUB pin strip at the other end, the cable connects (1:1) a 9-pos. D-SUB socket and pin strip,
– 15-pos. D-SUB socket strip at one end, 15-pos. D-SUB pin strip at the other end, the cable connects (1:1) a 15-pos. D-SUB socket and pin strip, etc. to
– 50-pos. D-SUB socket strip at one end, 50-pos. D-SUB pin strip at the other end, the cable connects (1:1) a 50-pos. D-SUB socket and pin strip.

Ordering example for round cable assembled with pin strip at one end and socket strip at the other end
– shielded 25-pos. round cable, assembled with a 25-pos. D-SUB socket strip and a 25-pos. D-SUB pin strip, 11.5 mm long

Quantity	Order No.	Cable type	Assembly	Length [m][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

Ordering example for round cable assembled with socket strip at both ends
– shielded 37-pos. round cable, assembled with two D-SUB 37 socket strips, 12.75 m long

Quantity	Order No.	Cable type	Assembly	Length [m][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

Ordering example for round cable assembled with pin strip at both ends
– shielded 15-pos. round cable, assembled with two D-SUB 15 pin strips, 8.5 m long

Quantity	Order No.	Cable type	Assembly	Length [m][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

Maximum permissible operating voltage	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V
Maximum permissible current carrying capacity per path	2 A
Maximum conductor resistance	0.09 Ω/m
Ambient temperature (operation)	-20°C ... 50°C
Shield	Tinned copper-braided shield, approx. 85% covering
Insertion/withdrawal cycles	>200
Conductor cross section	AWG 24 / 0.25 mm²

Ordering data

Description	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 cables with D-SUB female connector or pin strip and one open end

- 1:1 connection
- D-SUB female connector or pin strip at one end
- Connector in accordance with IEC 60807-2/DIN 41652
- Screw connection: 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

Female connector 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
Maximum permissible operating voltage	25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA	125 V / 125 V	125 V / 125 V
Maximum permissible current carrying capacity per path	2 A	2 A
Maximum 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 are configured using separate order numbers.

Ordering example:

One system cable assembled with a 37-pos. D-SUB female connector and one open end, 12.75 m in length:

1 pcs. 2900907/12,75

Female connector 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
Maximum permissible operating voltage		25 V AC / 60 V DC	25 V AC / 60 V DC
Maximum permissible operating voltage UL / CSA		125 V / 125 V	125 V / 125 V
Maximum permissible current carrying capacity per path		2 A	2 A
Maximum 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

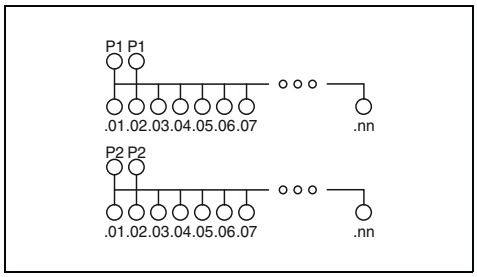
			Ordering data			Ordering data		
Description	No. of pos.	Cable length	Type	Order No.	Pcs./Pkt.	Type	Order No.	Pcs./Pkt.
Round cable with an open end								
	37	0.5 m	CABLE-D-37SUB/F/OE/0,25/S/0,5M	2926221	1	CABLE-D-37SUB/M/OE/0,25/S/0,5M	2926577	1
	37	1 m	CABLE-D-37SUB/F/OE/0,25/S/1,0M	2926234	1	CABLE-D-37SUB/M/OE/0,25/S/1,0M	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

Modules as compact potential distributors

The VIP-2/.../PDM... modules offer the following features:
– Two potential levels
– Separate supply
– Screw or Push-in connection
– Consecutive marking
– Optionally with fuse

Notes:
Marking systems and mounting material See Catalog 3
1) No UL approval

With screw connection and 2 potential levels



Technical data

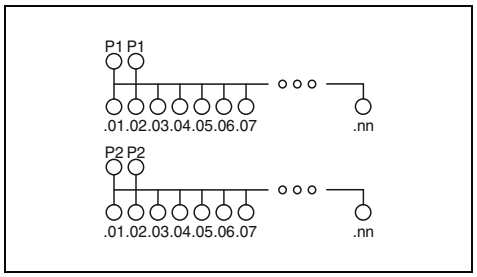
Maximum permissible operating voltage	250 V AC/DC
Maximum permissible operating voltage UL / CSA	250 V / 250 V
Maximum permissible current (per branch)	15 A
Total current	30 A (per potential)
Ambient temperature (operation)	-20°C ... 50°C
Mounting position	Any
Standards/regulations	IEC 60664, DIN EN 50178
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

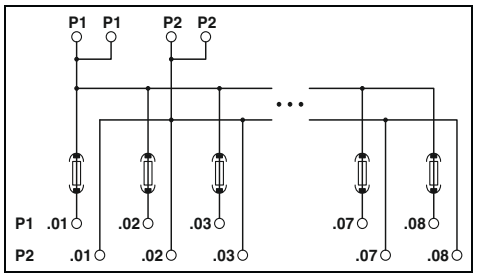
Ordering data

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**[1]	2903717	1
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			
VARIOFACE module with 2 busbars for potential distribution					
- 2 power terminal blocks/ 8 distributor blocks		97.70			

With Push-in connection and 2 potential levels

With Push-in connection and 2 potential levels and eight 6.3 A fuses





Technical data

	250 V AC/DC
	250 V / 250 V
	15 A
	30 A (per potential)
	-20°C ... 50°C
	Any
	IEC 60664, DIN EN 50178
	0.25 - 6 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

Technical data

	250 V AC/DC
	250 V / 250 V
	6.3 A (fuse limited)
	30 A (per potential)
	-20°C ... 60°C
	Any
	IEC 60664, DIN EN 50178
	0.2 - 10 mm² / 0.2 - 6 mm² / 24 - 8
	0.14 - 2.5 mm² / 0.14 - 2.5 mm² / 26 - 14
	109.8 mm / 51 mm

Ordering data

Type	Order No.	Pcs./Pkt.
VIP-2/PT/PDM-2/16/FU 6.3A	2903603	1

Quality in quantity

Integrated management system

The objective of the Phoenix Contact integrated management system is to integrate all requirements pertaining to products, processes, and the organization.

Statutory and regulatory requirements, as well as those of international standards and our customers, are met and, in some cases, even exceeded in all phases of the product lifecycle.

The Phoenix Contact management system is monitored by internationally recognized independent bodies each year to ensure that quality, environmental protection, energy efficiency, and occupational safety have been integrated in conformance with the relevant requirements. Certification in accordance with international standards ISO 9001, ISO 14001, ISO 50001, and BS OHSAS 18001 is the result of our corporate philosophy of meeting the needs of our customers, staff, and environment as best as possible. This serves as the basis for innovative products with the familiar high Phoenix Contact quality standard, actively practiced environmental protection through efficient production and products that conserve resources, and responsibility in the field of occupational health and safety. It goes without saying that we integrate all further requirements of standards, international approvals or special customer requirements into our company processes.

The result of this system is a building block for the success of the Phoenix Contact Group as well as its products and services.

CE marking

CE marking was introduced as an important instrument for the free movement of goods and services within the single European market. By applying the mark to a product, the manufacturer confirms its compliance with all EU directives applicable to this product. The EU directives describe the product characteristics with regard to device safety and the avoidance of risks. They have been incorporated in national legislation. Compliance with the requirements is a **condition for placing the product on the market within the EU**.

Where applicable, our products currently fall within the scope of the following directives in particular:

– 2014/35/EU
Electrical equipment designed for use within certain voltage limits (Low Voltage Directive)
– 2014/30/EU
Electromagnetic compatibility (EMC Directive)
– 2014/32/EU
Measuring instruments
– 2006/42/EC
Safety of machinery (Machinery Directive)
– 2014/34/EU
Equipment and protective systems intended for use in potentially explosive atmospheres (ATEX Directive)
– 2014/53/EU
Radio equipment (RED)
– 2011/65/EU
Restriction of the use of certain hazardous substances (RoHS Directive)
– 2012/19/EU
Waste electrical and electronic equipment (WEEE Directive)

The standards used as the basis for the aforementioned directives have been at the heart of our development standard for some time as a way of ensuring compliance with European directives. The numbers of the directives indicate their version at the time of publication. In the event of changes to directives and/or standards, our products will undergo conformity assessment again in good time and a new declaration of conformity will be issued promptly. The current declarations for each product can also be found in our download area.

Among the aforementioned European directives, the EMC Directive plays a particularly important role. It uses a directive enshrined in national legislation as the basis for defining electromagnetic compatibility as a fundamental device property. European legislation therefore places great emphasis on the electromagnetic compatibility of devices and systems as a basic prerequisite for the error-free operation of machines and systems. As an international leader in the field of surge protection, Phoenix Contact has extensive expertise in EMC. This expertise and the experience gained over many years in the development and application of industrial interface and communication technology have resulted in an extremely high standard of quality for our products when it comes to electromagnetic compatibility. Our independent laboratory, Phoenix Testlab, was founded in order to share this expertise with other companies. Phoenix Testlab GmbH is an accredited service company, which carries out EMC testing in compliance with European standards. At Phoenix Testlab, devices are also tested with regard to their electrical safety, mechanical influences, and their behavior in relation to environmental influences. Phoenix Testlab is also a notified body in accordance with EMC Directive 2014/30/EU and Radio Equipment Directive (RED) 2014/53/EU. As a certification body (TCB, FCB, and RCB), Phoenix Testlab is also able to approve these products for the markets in the USA, Canada, and Japan.

Standards and regulations

All relevant standards and regulations are used as the basis for the development and maintenance of our products.

International standards are subject to continuous changes as a result of harmonization and new developments. In line with this process, the current version of all standards that are relevant to our products is documented in the product area on our website at **phoenixcontact.net/products**

Online product information service on the world wide web

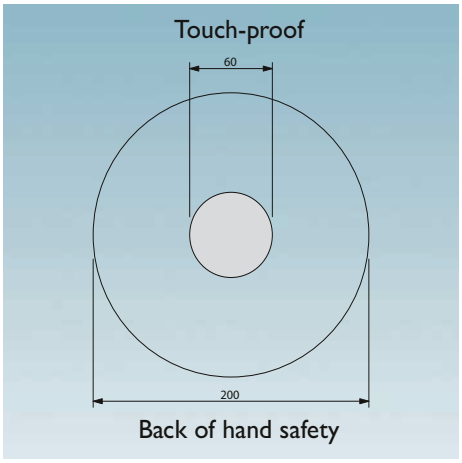
Phoenix Contact is continuously extending its product range.

Within the scope of our product monitoring obligation, all products are subject to an improvement process.

The Internet is an ideal platform to quickly communicate new product developments and improvements to the market.

You can quickly access the relevant Phoenix Contact website for your region via phoenixcontact.com. There you will always find an up-to-date overview of products, solutions, and services from Phoenix Contact. This includes technical documents such as data sheets and user manuals, current driver and demo software, and a direct link to the relevant contact person.

Touch protection



Example: pressure actuation

Touch-proof

Back of hand safety

The accident prevention regulations BGV A 2 issued by the German employer's liability insurance association for precision mechanics and electrical engineering apply to the operators of electrical systems and are aimed at the prevention of electrical accidents by means of special safety requirements.

These regulations contain specifications regarding the safety distances for work, operation, and occasional handling in the proximity of "live parts" in low-voltage systems up to 1,000 V ~ or 1,500 V –.

– Work with live parts is only permitted once they have been de-energized. Operation in the proximity of live parts is only permitted if these parts are de-energized or are protected against direct contact (§ 6). The following safety measures apply when working in the proximity of live parts:
– Provision of the de-energized state for the duration of the work
– Ensure shock protection is in place in the form of covers or barriers during the work
– Assurance that proximity limits will not be violated (§ 7)

The term "occasional handling" has been introduced for the operation of elements such as pushbuttons, rocker arms or rotary buttons in the proximity of live parts.

According to 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 ensuring contact safety are stipulated outside this area.

Note: systems and equipment that are operated with PELV up to 25 V ~ or 60 V – are considered to be protected against "direct contact".

According to § 5, Subsection 4 of the BGV A 2 regulations, there is no need to test the condition of the system prior to initial startup if the company has confirmation from the manufacturer or installer that the electrical systems and equipment conform to BGV A 2. The confirmation required relates to systems and equipment that have been installed and are ready for operation and can only be issued by the installer or installation company. The manufacturer of the electrical equipment can only issue a confirmation that products have been produced in accordance with the relevant electrotechnical DIN VDE regulations stipulated in BGV A 2. The installer must bear this in mind when selecting the equipment to be used.

In the field of connection technology, Phoenix Contact offers a wide range of products which are touch-proof or can be protected against contact by means of covers. Depending on the conditions, all of this must be taken into account when selecting the individual types of terminal blocks and accessories.

Quality features of insulating housings

Thermoplastics

The majority of our insulating housing is made from thermoplastic materials. Roughly speaking, these can be divided into amorphous and semi-crystalline substances. Thermoplastics are processed using the efficient and environmentally-friendly injection molding process. They have good recycling properties and can be re-used. We use many materials that are modified in different ways to meet the demanding requirements of electrical and electronic modules, devices, and systems with regard to their mechanical, thermal, and electrical properties.

Behavior of plastics under the influence of temperature (operating temperatures, mechanical influences)

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 such as radiation and additional mechanical, chemical, and 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** in accordance with UL746B/ANSI 746 B (elec. based on electric strength) and the **Ti value** in accordance with IEC 60216-1 (based on a 50% reduction in tensile strength after 20,000 hours).

IEC 60947-7-1/EN 60947-7-1 specifies a permissible temperature increase of 45 K for terminal blocks under nominal load. Phoenix Contact terminal blocks satisfy 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)

The inflammability tests for plastics have been defined by the Underwriters Laboratory (USA) in regulation UL 94. This applies to all areas of application, particularly in electrical engineering. A horizontal or vertical test is carried out at the test laboratory to determine the inflammability of the plastic material with a naked flame. In order of increasing flame-retardant behavior, the evaluation classes are HB, V2, V1, V0, and 5V. Test results are recorded on "yellow cards" and are published annually in the **Recognized Component Directory.**

Thermoplastics: non-reinforced polyamide, PA

We use the modern, semi-crystalline insulation material, polyamide, which is now an essential component in electrical engineering and electronics. It has long occupied a leading position and is authorized for use by the relevant approval authorities such as the CSA, NEMKO, KEMA, PTB, SEV, UL, VDE, etc.

Polyamide has excellent electrical, mechanical, chemical, and other properties even at high operating temperatures. Brief peak temperatures of up to approximately 200°C are permitted as a result of heat aging stabilization. Depending on the type (PA 4.6, 6.6, 6.10, etc.), its melting point is in the region of 215°C to 295°C.

Polyamide absorbs moisture from its surroundings, on average 2.8%. However, this moisture is not crystallization water in the plastic itself, but chemically bonded H_2O groups in the molecular structure. This makes the plastic flexible and resistant to breakage, even at temperatures as low as -40°C. As per UL 94, PA has a flammability rating of 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. Polyester does not absorb moisture from its surroundings. Therefore, PBT is particularly suitable for strips, for example, that are soldered onto PCBs and are subsequently required to pass a burn-in test where they are subjected to the influence of heat. As per UL 94, PBT has a flammability rating of 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.

The amorphous material only absorbs moisture to a very limited degree, and is used for items such as large, rigid electronic component housings.

In its transparent form, polycarbonate is particularly suitable for use as a material for cover profiles or marking materials.

PC has good resistance properties against mineral acids, saturated aliphatic hydrocarbons, gasoline, greases, and oils.

This material is not very resistant to solvents, benzene, alkalis, acetone, and ammonia. Strain cracks may result from contact with certain chemicals.

As per UL 94, PC has a flammability rating of V2 to V0.

Thermoplastics: polycarbonate fiber-reinforced, PC-F

Compared to non-reinforced materials, fiber-reinforced polycarbonates feature greater rigidity and impact strength, and have a higher operating temperature. Otherwise, their properties are largely the same as 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 characterized by their resistance 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.

As per UL 94, the molding compound used has a flammability rating of HB to V0.

Properties	Unit/level	Polyamide PA	Polyester PBT	Polycarbonate PC	Polycarbonate PC-F	ABS
Operating temperature RTI */**	°C	≤ 105	≤ 105	≤ 125	≤ 120	≤ 80
Minimum temperature (without mechanical load)	°C	-40	-40	-40	-40	-40
Electric strength IEC 60243-1/DIN VDE 0303-21	kV/cm	600	400	>300		850
Resistance to creepage IEC 60112/DIN VDE 0303-1	CTI...M	550	225	175		200
	CTI...	600	225	175	175	600
Tropical and termite resistance		Good	Good	Good		
Specific contact resistance IEC 60093/VDE 0303 Part 30; IEC 60167/VDE 0303 Part 31	Ω cm	10^{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}
Flammability rating UL 94		V2-V0	V0	V2-V0	V0	HB-V0

* As per UL 746 B/ANSI 746 B (elec.)

** Minimum value

Dimensions

Dimensions: Width/**H**eight/**D**epth

The dimensions "**W**idth/**H**eight/**D**epth" are defined as follows for all DIN-rail-mountable products:

– **W**idth: measurement taken along the DIN rail
– **H**eight: measurement taken across the DIN rail
– **D**epth: 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 two symbols shown above has been included next to each product photo:

EMC: Class A product:

In accordance with statutory regulations, our products are indicated with this footnote if they are intended for use in industrial environments. This means that the permitted limit values for residential applications may be exceeded in the event of conducted and emitted disturbance variables. In such cases, the operator may have to take additional safety measures in order to ensure electromagnetic compatibility in residential applications.

Note:

Subject to changes that serve the purpose of technical progress.

Connection cross section

The rated cross section of terminal blocks must be specified by the manufacturer in accordance with IEC 60947-7-1. The rated cross section is the maximum conductor cross section that can be connected in solid, multi-stranded or fine-stranded versions subject to specific thermal, mechanical, and electrical requirements.

The manufacturer must also specify the **rated connection capacity**, i.e., the area of connectable conductors as well as the number of conductors which can be connected simultaneously and the necessary preparation of the conductor ends. The conductors can be **rigid (solid or multi-stranded)** or flexible **(fine-stranded)**.

These values can be found in the product-specific technical data.

The rated connection capacity of Phoenix Contact terminal blocks usually exceeds standard requirements, which specify that it must only be possible to connect one conductor with one of the two next smallest cross sections, excluding the rated cross section (standardized for the cross section range from 0.2 to 35 mm²).

In addition, conductors with a rated cross section can usually be wired with ferrules with plastic sleeve.

Phoenix Contact terminal blocks are designed to allow copper wires to be connected to them untreated. "Special treatment" or the use of ferrules – both permitted in accordance with IEC 60947-7-1 – is not required. If ferrules are nevertheless used to protect flexible conductors against splicing, the connection capacity of the flexible conductor is generally reduced by one level.

Structure and dimensions of connecting cables

Cross section	Solid		Multi-stranded		Fine-stranded		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.	Rigid wires			Flexible 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 60947-1/EN 60947-1, Table 4

The IEC torque and the recommended 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 of terminal blocks are based on this data.

Test currents in accordance with 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

Certification authorities and marks

Certification authorities and approvals		Country code
CB scheme	IECEE CB Scheme (in combination with certifying body)	International
CCA	CENELEC Certification Agreement (CCA inspection report) (in combination with certifying body)	EU
	Canadian Standards Association (CSA)	CA
	Canadian Standards Association (CSA) - CSA approval for the USA -	US
	Canadian Standards Association (CSA) combined logo - CSA approval for Canada and the USA -	CA US
	Underwriters Laboratories Inc. (UL)	US
	Underwriters Laboratories Inc. (UL) - UL approval for Canada -	CA
	Underwriters Laboratories Inc. (UL) combined logo - UL approval for the USA and Canada -	US CA
	INSIEME PER LA QUALITA'E LA SICUREZZA	IT
EAC	Eurasian Conformity	EAEU
KEMA KEUR	DEKRA Certification B.V.	NL
ÖVE	Österreichischer Verband für Elektrotechnik	AT
SEV	Eurofins Electrosuisse Product Testing AG SEV certification scheme	CH
VDE	Verband Deutscher Elektrotechniker e.V. (VDE) – Approval of drawings – Reports with production monitoring	DE
DGUV Test	Berufsgenossenschaft (BG) GS – Geprüfte Sicherheit (tested safety)	DE
Intertek	Intertek ETL Listed - Approval for the USA -	US
Intertek	Intertek ETL Listed - Approval for Canada -	CA
Intertek	Intertek ETL Listed - Approval for the USA and Canada -	US CA
TÜV	TÜV Rheinland Industrie Service GmbH	DE
CCC	China Compulsory Certification	CN
KC	Korean Certification Mark	KR

Explosion protection		Country code
IECEx	International Electrotechnical Commission	International
Ex	ATEX Directive	EU
	Canadian Standards Association (CSA)	CA
	Canadian Standards Association (CSA) - CSA approval for the USA -	US
	Canadian Standards Association (CSA) combined logo - CSA approval for Canada and the USA -	CA US
	Underwriters Laboratories Inc. (UL)	US
	Underwriters Laboratories Inc. (UL) - UL approval for Canada -	CA
	Underwriters Laboratories Inc. (UL) combined logo - UL approval for the USA and Canada -	US CA
FM APPROVED	FM Approvals	US
FM APPROVED	FM Approvals - FM approval for Canada -	CA
FM APPROVED	FM Approvals - FM approval for the USA and Canada -	US CA
EAC Ex	Eurasian Conformity for Ex-products	EAEU
KCS	Korean Certification Mark for Ex-products	KR
INMETRO	National Institute of Metrology, Standardization and Industrial Quality	BR
Ex NEPSI	National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation	CN
CIDET	Corp. Centro de Investigación y Desarrollo Tecnólogico del Sector Eléctrico	CO

Marine classification societies		Country code
DNV GL MARITIME	DNV GL - MARITIME	DE
BUREAU VERITAS	Bureau Veritas	FR
Lloyd's Register	Lloyd's Register of Shipping	GB
ClassNK	Nippon Kaiji Kyokai	JP
	Polski Rejestr Statków	PL
	Russian Maritime Register of Shipping	RU
KR KOREAN REGISTER	Korean Register of Shipping	KR
ABS	American Bureau of Shipping	US
RINA	Registro Italiano Navale	IT

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CABLE-D- 9SUB/M/OE/0,25/S/2,0M	2926399	576
CABLE-D- 9SUB/M/OE/0,25/S/3,0M	2926409	576
CABLE-D- 9SUB/M/OE/0,25/S/4,0M	2926412	576
CABLE-D- 9SUB/M/OE/0,25/S/6,0M	2926425	576
CABLE-D-15SUB-F-OE-0,25-S/...	2900905	576
CABLE-D-15SUB-M-OE-0,25-S/...	2900910	576
CABLE-D-15SUB/F/OE/0,25/S/0,5M	2926085	576
CABLE-D-15SUB/F/OE/0,25/S/1,0M	2926098	576
CABLE-D-15SUB/F/OE/0,25/S/1,5M	2926108	576
CABLE-D-15SUB/F/OE/0,25/S/2,0M	2926111	576
CABLE-D-15SUB/F/OE/0,25/S/3,0M	2926124	576
CABLE-D-15SUB/F/OE/0,25/S/4,0M	2926137	576
CABLE-D-15SUB/F/OE/0,25/S/6,0M	2926140	576
CABLE-D-15SUB/M/OE/0,25/S/0,5M	2926438	576
CABLE-D-15SUB/M/OE/0,25/S/1,0M	2926441	576
CABLE-D-15SUB/M/OE/0,25/S/1,5M	2926454	576
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CABLE-D-15SUB/M/OE/0,25/S/3,0M	2926470	576
CABLE-D-15SUB/M/OE/0,25/S/4,0M	2926483	576
CABLE-D-15SUB/M/OE/0,25/S/6,0M	2926496	576
CABLE-D-25SUB-F-OE-0,25-S/...	2900906	576
CABLE-D-25SUB-M-OE-0,25-S/...	2900911	576
CABLE-D-25SUB/F/OE/0,25/S/0,5M	2926153	576
CABLE-D-25SUB/F/OE/0,25/S/1,0M	2926166	576
CABLE-D-25SUB/F/OE/0,25/S/1,5M	2926179	576
CABLE-D-25SUB/F/OE/0,25/S/2,0M	2926182	576
CABLE-D-25SUB/F/OE/0,25/S/3,0M	2926195	576
CABLE-D-25SUB/F/OE/0,25/S/4,0M	2926205	576
CABLE-D-25SUB/F/OE/0,25/S/6,0M	2926218	576
CABLE-D-25SUB/M/OE/0,25/S/0,5M	2926506	576
CABLE-D-25SUB/M/OE/0,25/S/1,0M	2926519	576
CABLE-D-25SUB/M/OE/0,25/S/1,5M	2926522	576
CABLE-D-25SUB/M/OE/0,25/S/2,0M	2926535	576
CABLE-D-25SUB/M/OE/0,25/S/3,0M	2926548	576
CABLE-D-25SUB/M/OE/0,25/S/4,0M	2926551	576
CABLE-D-25SUB/M/OE/0,25/S/6,0M	2926564	576
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CABLE-D-37SUB/F/OE/0,25/S/1,0M	2926234	577
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CABLE-D-37SUB/F/OE/0,25/S/2,0M	2926250	577
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CABLE-D-37SUB/F/OE/0,25/S/4,0M	2926276	577
CABLE-D-37SUB/F/OE/0,25/S/6,0M	2926289	577
CABLE-D-37SUB/M/OE/0,25/S/0,5M	2926577	577
CABLE-D-37SUB/M/OE/0,25/S/1,0M	2926580	577
CABLE-D-37SUB/M/OE/0,25/S/1,5M	2926593	577
CABLE-D-37SUB/M/OE/0,25/S/2,0M	2926603	577
CABLE-D-37SUB/M/OE/0,25/S/3,0M	2926616	577
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CABLE-D-50SUB/F/OE/0,25/S/1,0M	2926302	577
CABLE-D-50SUB/F/OE/0,25/S/1,5M	2926315	577
CABLE-D-50SUB/F/OE/0,25/S/2,0M	2926328	577
CABLE-D-50SUB/F/OE/0,25/S/3,0M	2926331	577
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CABLE-D-50SUB/M/OE/0,25/S/0,5M	2926645	577
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CABLE-D15SUB/B/S/200/KONFEK/S	2302081	570
CABLE-D15SUB/B/S/300/KONFEK/S	2302094	570
CABLE-D15SUB/B/S/400/KONFEK/S	2302104	570
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CABLE-D15SUB/B/S/HF/S/ 1,0M	1066600	572
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CABLE-D25SUB/B/S/200/KONFEK/S	2302159	570
CABLE-D25SUB/B/S/300/KONFEK/S	2302162	570
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CABLE-D50SUB/B/S/150/KONFEK/S	2302285	570
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