

MINI MCR-SL-UI-REL

Configurable threshold value switch



Data sheet
102132_en_04

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1 Description

The configurable 3-way threshold value switch MINI MCR-SL-UI-REL(-SP) is used to control and monitor standard analog signals.

On the input side, the standard analog signals 0 mA ... 20 mA or 0 V ... 10 V can be set via DIP switch. On the output side, a relay with PDT is available. The switching thresholds are set via potentiometer.

The DIP switches located on the side of the housing have the following functions:

- Configuration of the switching hysteresis
- Configuration of the operating and closed circuit current behavior
- Selection of the input signal type
- Setting of relay pickup times
- Setting of dropout delays

The relay status is indicated by a yellow LED on the front of the housing.

The power supply (19.2 V DC ... 30 V DC) can be supplied either via connection terminal blocks "7" and "8" on the modules or in conjunction with the DIN rail connector. Please refer to the section titled "Power supply" for more information.

Features

- Configurable 3-way threshold value switch
- Input range 0 ... 20 mA or 0 ... 10 V
- Relay output with PDT
- Approval for Ex-zone 2 (nA)
- Screw or spring-cage connection can be provided



Attention: Correct usage in potentially explosive areas

The module is a category 3 item of electrical equipment. It is absolutely vital to follow the instructions provided here during installation and observe the information in the "Safety regulations and installation notes".



Make sure you always use the latest documentation.
It can be downloaded from the product at www.phoenixcontact.net/catalog.



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3 Ordering data

Description	Type	Order No.	Pcs. / Pkt.
MCR limit value switch, with adjustable hysteresis and delay time, with screw connection	MINI MCR-SL-UI-REL	2864480	1
MCR limit value switch, with adjustable hysteresis and delay time, with spring-cage connection	MINI MCR-SL-UI-REL-SP	2864493	1
Accessories	Type	Order No.	Pcs. / Pkt.
DIN rail connector (TBUS), 5-pos., for bridging the supply voltage, can be snapped onto NS 35/... DIN rails according to EN 60715	ME 6,2 TBUS-2 1,5/5-ST-3,81 GN	2869728	10
MCR power terminal block for supplying several MINI Analog modules via the DIN rail connectors, with screw connection, current consumption up to max. 2 A	MINI MCR-SL-PTB	2864134	1
MCR power terminal block for supplying several MINI-ANALOG modules via the DIN rail connectors, with spring-cage connection, current consumption up to max. 2 A	MINI MCR-SL-PTB-SP	2864147	1
DIN rail power supply unit, primary-switched mode, slim design, output: 24 V DC / 1.5 A	MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
DIN rail power supply unit, primary-switched mode, slim design, output: 24 V DC / 1.5 A, ATEX approval	MINI-PS-100-240AC/24DC/1.5/EX	2866653	1
Eight MINI analog signal converters with screw connection method can be connected to a control system using a system adapter and system cabling with a minimum of wiring and very low error risk.	MINI MCR-SL-V8-FLK 16-A	2811268	1
Fold up transparent cover for MINI MCR modules with additional labeling option using insert strips and flat Zack marker strip 6.2 mm	MINI MCR DKL	2308111	10
Label for extended marking of MINI MCR modules in connection with the MINI MCR-DKL	MINI MCR-DKL-LABEL	2810272	10

4 Technical data

Input	
Voltage input signal	0 V ... 10 V
Max. voltage input signal	30 V
Current input signal	0 mA ... 20 mA
Max. current input signal	100 mA
Input resistance of voltage input	> 100 kΩ
Input resistance current input	50 Ω
Specification of the switching point	With 25-speed potentiometer
Output	
Output description	Relay output
Contact type	1 PDT
Contact material	AgSnO ₂ , hard gold-plated
Maximum switching voltage	250 V AC
Limiting continuous current	2 A
Setting range of the response delay	0 s ... 10 s (0 s; 1 s; 2 s; 3 s; 4 s; 6 s; 8 s; 10 s)
Internal hysteresis	(0.1 %; 1 %; 2.5 %; 5 %)
Operating and closed circuit current behavior	Switchable using DIP switch

Supply

Nominal supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (to bridge the supply voltage, the DIN rail connector (ME 6,2 TBUS-2 1,5/5-ST-3,81 GN, Order No. 2869728) can be used. It can be snapped onto a 35 mm DIN rail according to EN 60715)
Max. current consumption	< 14 mA (at 24 V DC)
Power consumption	< 330 mW (at 24 V DC)

General data

Maximum temperature coefficient	< 0.02 %/K
Step response (0–99%)	< 35 ms
Linearity error	< 0.05 % (of final value)
Electrical isolation	Basic insulation according to EN 61010
Surge voltage category	II
Mounting position	Any
Degree of protection	IP20
Pollution degree	2
Rated insulation voltage	50 V AC/DC
Test voltage input/power supply	1.5 kV AC (50 Hz, 1 min.)
Dimensions W / H / D	6.2 mm / 93.1 mm / 102.5 mm
Type of housing	PBT green

Connection data**Screw connection****Spring-cage conn.**

Conductor cross section, solid	0.2 mm ² ... 2.5 mm ²	0.2 mm ² ... 2.5 mm ²
Conductor cross section, stranded	0.2 mm ² ... 2.5 mm ²	0.2 mm ² ... 2.5 mm ²
Stripping length	12 mm	8 mm

Ambient conditions

Ambient temperature (operation)	-20 °C ... 65 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C

Conformance with EMC Directive 2004/108/EC

Noise immunity according to EN 61000-6-2
Noise emission according to EN 61000-6-4

Conformance / approvals

Conformance	CE-compliant
ATEX	Ⓜ II 3 G Ex nA nC IIC T4 Gc X
UL, USA	Class I, Zone 2, AEx nC IIC T6
UL, USA / Canada	UL 508 Recognized
UL, Canada	Class I, Zone 2, Ex nC IIC T6
Shipbuilding	GL EMC 2 D

5 Safety regulations and installation notes

5.1 Installation notes

- The category 3 device is suitable for installation in the zone 2 potentially explosive area. It fulfills the requirements of EN 60079-0:2009 and EN 60079-15:2010.
- Installation, operation, and maintenance may only be carried out by qualified electricians. Follow the installation instructions described. When installing and operating the device, the applicable regulations and safety directives (including national safety directives), as well as general technical regulations, must be observed. The technical data is provided in this package slip and on the certificates (conformity assessment, additional approvals where applicable).
- It is not permissible to open or modify the device. Do not repair the device yourself but replace it with an equivalent device. Repairs may only be carried out by the manufacturer. The manufacturer is not liable for damage resulting from violation.
- The IP20 degree of protection (IEC 60529/EN 60529) of the device is intended for use in a clean and dry environment. Do not subject the device to any load that exceeds the described limits.
- The device is not designed for use in atmospheres with a danger of dust explosions.

5.2 Installation in the Ex area (zone 2)

- Observe the specified conditions for use in potentially explosive areas.
- The device must be installed in a housing (control or distributor box) which meets the requirements of EN 60079-15 and provides at least IP54 (EN 60529) degree of protection.
- During installation and when connecting the supply and signal circuits, observe the requirements of EN 60079-14. Devices may only be connected to circuits in zone 2 if they are suitable for operation in Ex zone 2 and for the prevailing conditions at the place of use.
- In potentially explosive areas, terminals may only be snapped onto or off the DIN rail connector and wires may only be connected or disconnected when the power is switched off.
- The device must be stopped and immediately removed from the Ex area if it is damaged, has been subjected to an impermissible load, has been stored incorrectly, or if it malfunctions.
- You can download the latest documents for these devices from www.phoenixcontact.net/catalog.

6 Installation

6.1 Connection notes



Attention: Electrostatic discharge!

The device contains components that can be damaged or destroyed by electrostatic discharge. When handling the device, observe the necessary safety precautions against electrostatic discharge (ESD) according to EN 61340-5-1 and EN 61340-5-2.

6.2 Structure

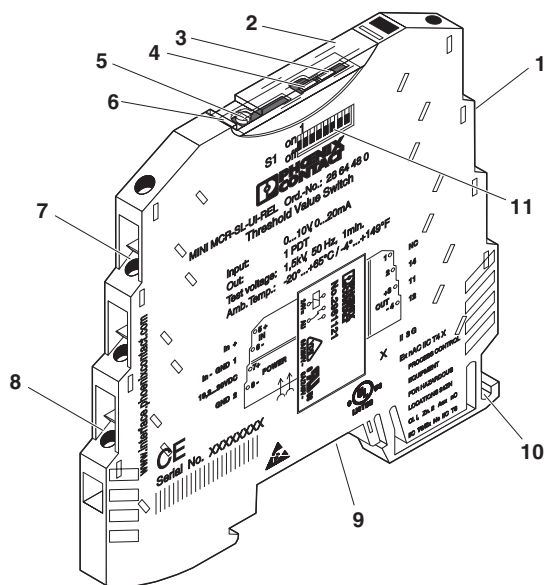


Figure 1 Structure

1. Relay output
2. Cover
3. Yellow LED: Status indicator
4. Red LED: Error messages
5. Potentiometer for switching threshold
6. Groove for ZBF 6 zack marker strip
7. Input: Standard signals
8. Supply voltage
9. Connection option for DIN rail connector
10. Universal snap-on foot for EN DIN rails
11. DIP switch S1

6.3 Block diagram

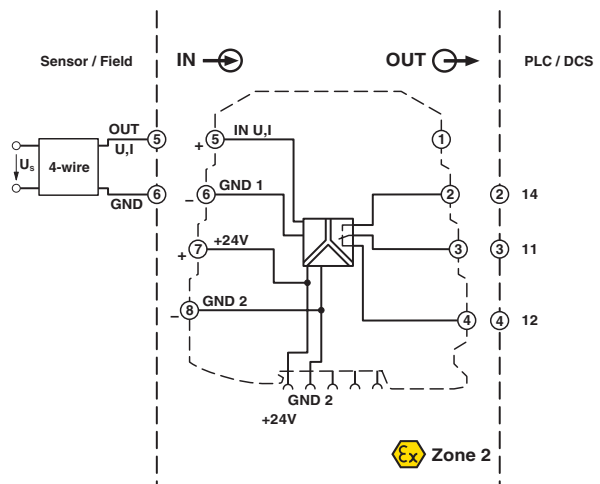


Figure 2 Block diagram

6.4 Power supply



ATTENTION:

Never connect the supply voltage directly to the DIN rail connector. It is not permitted to draw power from the DIN rail connector or from individual modules.

Supply via the module

Where the total current consumption of the aligned modules does not exceed 400 mA, the power can be supplied directly at the connection terminal blocks of the module.

A 400 mA fuse should be connected upstream.

Supply via a power terminal block

The MINI MCR-SL-PTB power terminal block (Order No. 2864134) or the MINI MCR-SL-PTB-SP power terminal block (Order No. 2864147), which are the same shape, are used to feed the supply voltage to the DIN rail connector.

A 2 A fuse should be connected upstream.

Supply via a system power supply unit

The system power supply unit with 1.5 A output current connects the DIN rail connector to the supply voltage and can therefore be used to supply several modules from the mains.

- MINI-SYS-PS-100-240AC/24DC/1.5 (Order No. 2866983)
- Potentially explosive areas:
MINI-PS-100-240AC/24DC/1.5/EX (Order No. 2866653)

6.5 Assembly

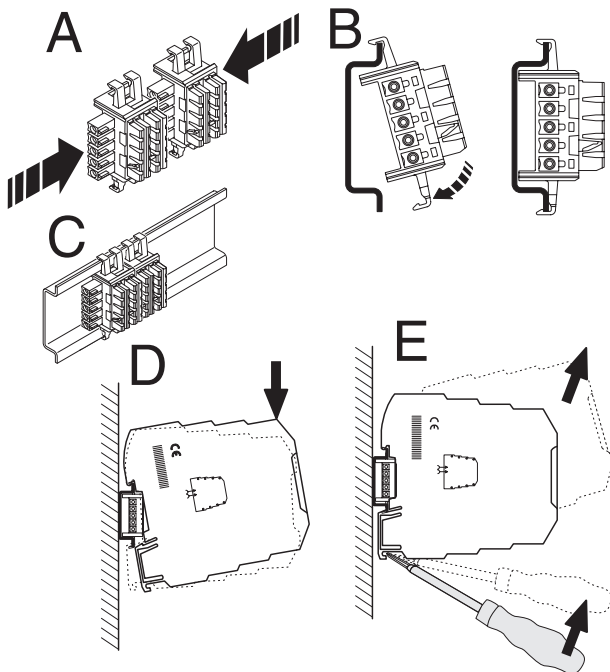


Figure 3 Mounting and removing

- Mount the module on a 35 mm DIN rail according to EN 60715.
- When using the DIN rail connector, first place it into the DIN rail (see A – C). It is used to bridge the power supply. It is also absolutely vital that you snap the module and the DIN rail connector into position in the correct direction: the snap-on foot should be at the bottom and the connector on the left.

6.6 Connecting the wires

The MINI MCR-SL-UI-REL... is available with two types of connection:

- Screw terminal blocks (MINI MCR-SL-UI-REL)
- Spring-cage terminal blocks (MINI MCR-SL-UI-REL-SP)

Screw connection:

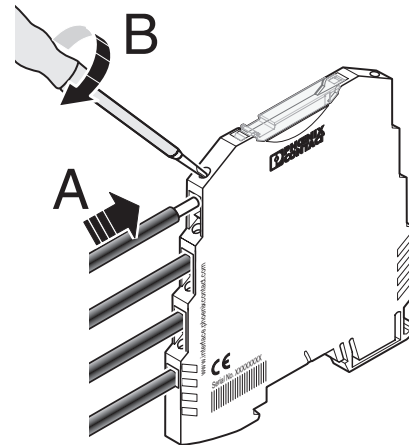


Figure 4 Screw connection

- Insert the wire into the corresponding connection terminal block.
- Use a screwdriver to tighten the screw in the opening above the connection terminal block.

Spring-cage connection:

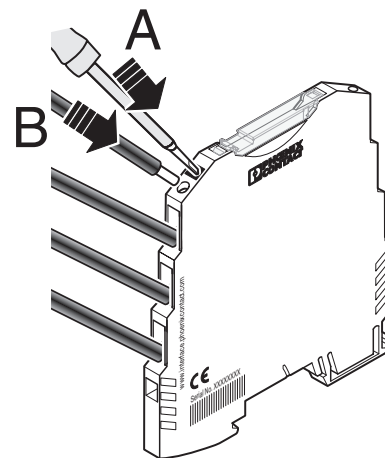


Figure 5 Spring-cage connection

- Insert a screwdriver into the opening above the connection terminal block.
- Insert the wire into the corresponding connection terminal block.

7 Configuration

Setting the switching thresholds

The potentiometer which is used to set the switching thresholds is located underneath the cover.

To set the switching thresholds, deactivate the hysteresis and delay time.

Delay time

- In the operating current setting, the delay time delays switching on. Switching off is not delayed.
- In the closed circuit current setting, the delay time delays switching off. Switching on is not delayed.

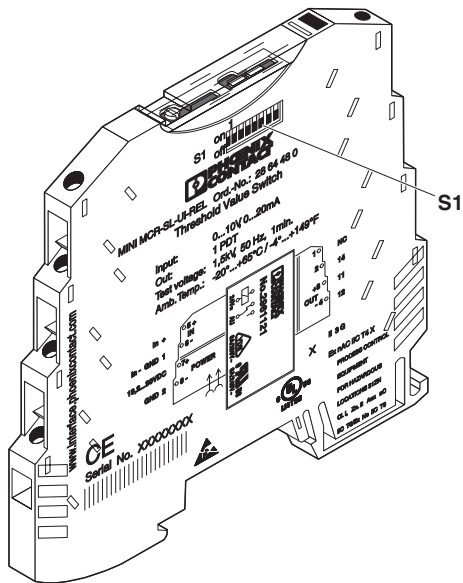


Figure 6 DIP switches

DIP switches

DIP switch S1 can be used to specify the input signal range, the switching hysteresis, the relay pickup/relay dropout delay, and to switch between operating current/closed circuit current behavior.

7.1 Configuration table

DIP S1		Input		Switching hysteresis		Delay time			Operating current/closed circuit current switch-over	
1	2	0 ... 10 V		3	4	0 s			Operating current	
•	•	0 ... 20 mA		•	•	1 s			• Closed circuit current	
				•	•	2 s				
				•	•	3 s				
				•	•	4 s				
				•	•	6 s				
				•	•	8 s				
				•	•	10 s				

• ≙ ON
 ≙ OFF

8 Diagnostics LED

The yellow LED on the front of the device indicates that voltage is being applied to the PDT relay coil, i.e., that the relay has switched.

The red LED which is visible on the front displays the following faults:

- LED ON: Overrange > 102.5%
- LED flashing: Module faulty