MINI MCR-SL-UI-I-LP-NC



Input isolator

Data sheet
105263_en_04

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1 Description

The configurable 2-way signal conditioner is used for electrical isolation, conversion, and filtering of standard signals.

You can configure analog voltage or current signal areas on the input side using the DIP switch.

The output loop-powered signal conditioner enables connection to an active analog input module of a controller. Supply takes place via the active 4 mA ... 20 mA loop of the controller.

Features

- Configurable 2-way signal conditioner
- Screw connection available

Make sure you always use the latest documentation.
It can be downloaded from the product at phoenixcontact.com/products.

This document is valid for the products listed in the “Ordering data” chapter.

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3 Ordering data

Description	Type	Item no.	Pcs./Pkt.
2-way loop-powered isolating amplifier (supplied on the output side), can be configured via DIP switches, with screw connection technology and standard configuration.	MINI MCR-SL-UI-I-LP-NC	2902829	1

Accessories	Type	Item no.	Pcs./Pkt.
The partition plate is used to maintain Ex i isolating distances when Ex i and non-Ex i devices are mounted side by side on a DIN rail.	MCR-DP	1430594	1
Universal termination carrier for connecting 16 MINI Analog signal conditioners to digital or analog I/O cards, via D-SUB connector, 37-pos. (1:1 connection), with HART multiplexer connection	TC-D37SUB-AIO16-M-PS-UNI	2902934	1
Universal termination carrier for connecting 16 MINI Analog signal conditioners to digital or analog I/O cards, via D-SUB connector, 37-pos. (1:1 connection)	TC-D37SUB-ADIO16-M-P-UNI	2902933	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
Actuation tool, for ST terminal blocks, insulated, also suitable for use as a bladed screwdriver, size: 0.6 x 3.5 x 100 mm, 2-component grip, with non-slip grip	SZS 0,6X3,5	1205053	10

4 Technical data

Input Voltage/current input	
Number of inputs	1
Voltage input signal	0 mV ... 1000 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 -1000 mV ... 1000 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

Input Voltage/current input	
Voltage input signal [...]	-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 200 mV ... 1000 mV 150 mV ... 750 mV 100 mV ... 500 mV 60 mV ... 300 mV 50 mV ... 250 mV 40 mV ... 200 mV 25 mV ... 125 mV 24 mV ... 120 mV 30 mV ... 150 mV 20 mV ... 100 mV 15 mV ... 75 mV 12 mV ... 60 mV 10 mV ... 50 mV 2 V ... 10 V 1.5 V ... 7.5 V 1 V ... 5 V 0.6 V ... 3 V 0.5 V ... 2.5 V 0.4 V ... 2 V 0.25 V ... 1.25 V 0.24 V ... 1.2 V 0.3 V ... 1.5 V 6 V ... 30 V 5 V ... 25 V 4 V ... 20 V 2.5 V ... 12.5 V 2.4 V ... 12 V 3 V ... 15 V
Max. voltage input signal	< 40 V

Input Voltage/current input	
Current input signal	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 -40 mA ... 40 mA -30 mA ... 30 mA -20 mA ... 20 mA -12 mA ... 12 mA -10 mA ... 10 mA -8 mA ... 8 mA -7.5 mA ... 7.5 mA -5 mA ... 5 mA -6 mA ... 6 mA -4 mA ... 4 mA -3 mA ... 3 mA -2.5 mA ... 2.5 mA -2 mA ... 2 mA 8 mA ... 40 mA 6 mA ... 30 mA 4 mA ... 20 mA 2.4 mA ... 12 mA 2 mA ... 10 mA 1.6 mA ... 8 mA 1.5 mA ... 7.5 mA 1 mA ... 5 mA 1.2 mA ... 6 mA 0.8 mA ... 4 mA 0.6 mA ... 3 mA 0.5 mA ... 2.5 mA 0.4 mA ... 2 mA
Max. current input signal	< 50 mA (Dielectric strength up to 30 V)
Input resistance of voltage input	100 kΩ (≤ 1 V) 1 MΩ (≥ 1 V)
Input resistance current input	≤ 50 Ω

Output Current output	
Number of outputs	1
Current output signal	4 mA ... 20 mA
Max. current output signal	35 mA (output limit)
Configurable/programmable	Yes, preconfigured
Ripple	< 20 mV_{PP} (at 500 Ω)
Load/output load current output	< 1000 Ω ((U_B - 8 V) / 22 mA)

Supply	
Supply voltage range	loop-powered, no external supply necessary
Current consumption	< 3.5 mA (without signal current)
Power consumption	28 mW (without signal)
General data	
Limit frequency (3 dB)	approx. 30 Hz
Maximum transmission error	< 0.1 % (of final value) < 0.2 % (Without adjustment)
Temperature coefficient, typical	0.005 %/K
Maximum temperature coefficient	0.01 %/K
Alignment zero	± 2 %
Alignment span	± 2 %
Step response (10-90%)	approx. 16 ms
Degree of protection	IP20
Mounting position	any
Dimensions W/H/D	6.2 mm / 93.1 mm / 101.2 mm
Type of housing	PBT
Electrical isolation	
Electrical isolation	2-way isolation
Overvoltage category Pollution degree	II 2
Input/output Standards/regulations Rated insulation voltage Test voltage Insulation	 IEC/EN 61010 50 V AC/DC 1.5 kV AC (50 Hz, 60 s) Basic insulation
Connection data	
Connection method	Screw connection
Conductor cross-section rigid	0.2 mm² ... 2.5 mm²
Conductor cross-section flexible	0.2 mm² ... 2.5 mm²
Conductor cross-section AWG	26 ... 12
Stripping length	12 mm
FLK connector	Screw connection
Ambient conditions	
Ambient temperature (operation)	-25 °C ... 70 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Permissible humidity (operation)	5 % ... 95 % (non-condensing)
Maximum altitude for use above sea level	≤ 2000 m
Conformance with EMC directive	
Immunity in accordance with EN 61000-6-2 When being exposed to interference, there may be minimal deviations.	
Noise emission in accordance with EN 61000-6-4	

Conformance/approvals	
CE CE-compliant	
UL, USA/Canada	UL 508 Listed Class I, Div. 2, Groups A, B, C, D T5 Class I, Zone 2, Group IIC

5 Safety regulations and installation notes

5.1 Installation notes

- Installation, operation, and maintenance may only be carried out by qualified electricians. Follow the installation instructions as described.
- When installing and operating the device, observe the applicable regulations and safety directives (including national safety directives), as well as the generally recognized technical regulations.
- Observe the safety information, conditions, and limits of use specified in the product documentation. Comply with them.
- The device must not be opened or modified. Do not repair the device yourself, 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/EN 60529) specifies that the device is intended for use in a clean and dry environment. Do not subject the device to mechanical and/or thermal stress that exceeds the specified limits.
- The device is not designed for use in atmospheres with a danger of dust explosions.

5.2 UL notes

PROCESS CONTROL EQUIPMENT FOR HAZARDOUS LOCATIONS 31ZN

1 Suitable for use in class 1, division 2, groups A, B, C and D hazardous locations, or nonhazardous locations only.

2 WARNING - EXPLOSION HAZARD: Do not disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations.

3 WARNING - EXPLOSION HAZARD: Substitution of any components may impair suitability for Class I, Division 2.

4 CAUTION: Use copper supply wires that are approved up to 60 °C.

6 Installation

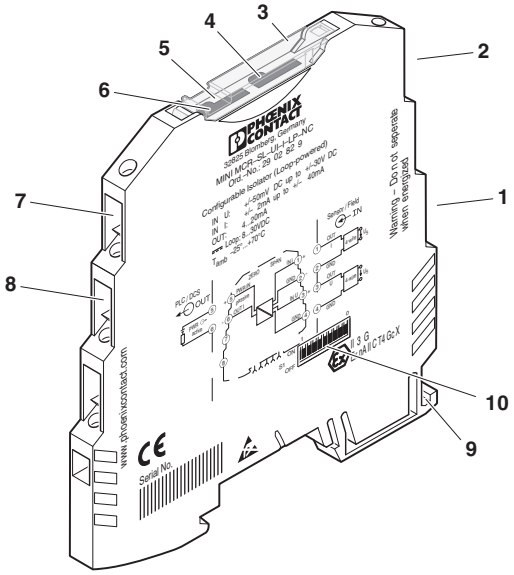
6.1 Connection notes

NOTE: 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

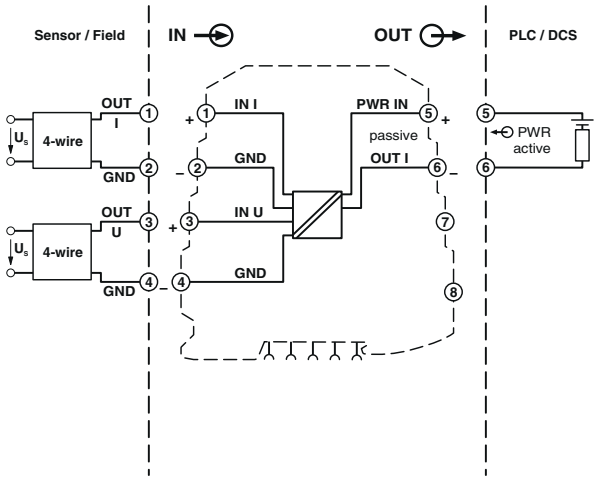
Figure 1 Structure



1 Input: Voltage signals
2 Input: Current signals
3 Cover
4 ZERO potentiometer
5 Groove for ZBF 6 Zack marker strip
6 SPAN potentiometer
7 Input supply voltage
8 Output 4 mA ... 20 mA
9 Universal snap-on foot for EN DIN rails
10 DIP switch S1

6.3 Block diagram

Figure 2 Block diagram



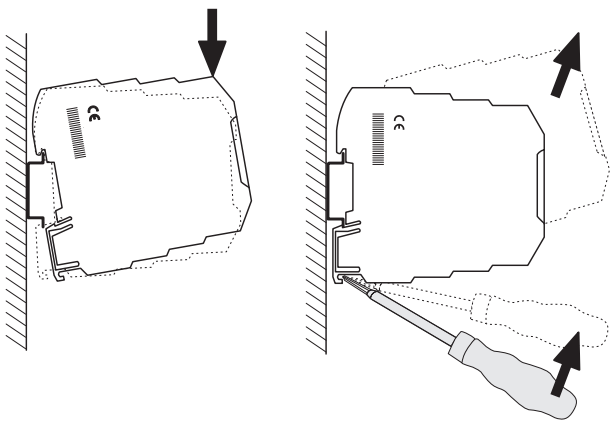
6.4 Power supply

An ME 6,2 TBUS-2 DIN rail connector (Item No.: 2869728) is used to supply active devices. A DIN rail connector is not necessary for operation of this loop-powered device.

This device can be snapped onto a DIN rail connector - an electrically conductive connection is not established. This means that you do not need to disconnect an existing DIN rail connector element connection.

6.5 Mounting

Figure 3 Mounting and removing



– Mount the module on a 35 mm DIN rail in accordance with EN 60715.

6.6 Partition plate

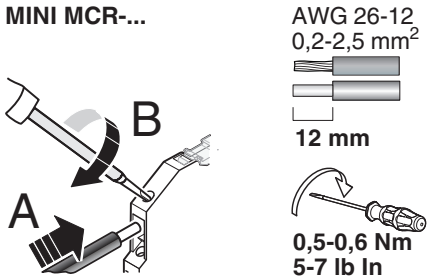
If you want to mount Ex i and non-Ex i devices next to each other on a DIN rail, you will require the MCR-DP partition plate (item no. 1430594). The partition plate ensures that Ex i isolating distances are maintained.

The partition plate is tailored to the MINI Analog, MINI Analog Pro, and MACX Analog device series and the QUINT4 system power supply (item no. 2904614).

The partition plate is compatible with the ME … TBUS DIN rail connectors (e.g., item no. 1090049, 2695439).

6.7 Connection of the cables

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.

7 Configuration

DIP switch S1 is used to specify the combination of input and output standard signal ranges (see "Configuration table").

Standard Configuration

If it is an "NC version", the device has the standard configuration:

– Input 2 V ... 10 V

– Output 4 mA ... 20 mA

(All DIP switches are set to the “off” position, transmission error < 0.1%.)

7.1 Configuration table

DIP switch S1 is used to specify the combination of input and output standard signal ranges (see "Configuration table").

IN			• ≙ ON	DIP S1										Terminal	
Unipolar	Bipolar	Live Zero		1	2	3	4	5	6	7	8	9	0		
0 ... 40 mA														(1)	(2)
0 ... 30 mA											•			(1)	(2)
0 ... 20 mA		4 ... 20 mA								•				(1)	(2)
0 ... 12 mA									•		•			(1)	(2)
0 ... 10 mA		2 ... 10 mA							•	•				(1)	(2)
0 ... 8 mA								•						(1)	(2)
0 ... 7.5 mA								•			•			(1)	(2)
0 ... 5 mA		1 ... 5 mA						•	•	•				(1)	(2)
0 ... 6 mA							•							(1)	(2)
0 ... 4 mA							•		•	•	•			(1)	(2)
0 ... 3 mA						•			•		•			(1)	(2)
0 ... 2.5 mA						•		•		•				(1)	(2)
0 ... 2 mA						•	•		•	•	•			(1)	(2)
0 ... 1000 mV	±1000 mV			•										(3)	(4)
0 ... 750 mV	±750 mV			•							•			(3)	(4)
0 ... 500 mV	±500 mV			•						•				(3)	(4)
0 ... 300 mV	±300 mV			•					•		•			(3)	(4)
0 ... 250 mV	±250 mV			•					•	•				(3)	(4)
0 ... 200 mV	±200 mV			•				•						(3)	(4)
0 ... 125 mV	±125 mV			•				•	•	•				(3)	(4)
0 ... 120 mV	±120 mV			•				•	•	•	•			(3)	(4)
0 ... 150 mV	±150 mV			•			•							(3)	(4)
0 ... 100 mV	±100 mV			•			•		•	•	•			(3)	(4)
0 ... 75 mV	±75 mV			•		•			•		•			(3)	(4)
0 ... 60 mV	±60 mV			•		•	•							(3)	(4)
0 ... 50 mV	±50 mV			•		•	•		•	•	•			(3)	(4)
0 ... 10 V	±10 V	2 ... 10 V												(3)	(4)
0 ... 7.5 V	±7.5 V										•			(3)	(4)
0 ... 5 V	±5 V	1 ... 5 V								•				(3)	(4)
0 ... 3 V	±3 V								•		•			(3)	(4)
0 ... 2.5 V	±2.5 V								•	•				(3)	(4)
0 ... 2 V	±2 V							•						(3)	(4)
0 ... 1.25 V	±1.25 V							•	•	•				(3)	(4)
0 ... 1.2 V	±1.2 V							•	•	•	•			(3)	(4)
0 ... 1.5 V	±1.5 V						•							(3)	(4)
0 ... 30 V	±30 V				•				•		•			(3)	(4)
0 ... 25 V	±25 V				•				•	•				(3)	(4)
0 ... 20 V	±20 V				•			•						(3)	(4)
0 ... 12.5 V	±12.5 V				•			•	•	•				(3)	(4)
0 ... 12 V	±12 V				•			•	•	•	•			(3)	(4)
0 ... 15 V	±15 V				•		•							(3)	(4)
Signal conversion	IN bipolar	/	OUT Live zero (4 ... 20 mA)										•		
	IN unipolar	/	OUT Live zero (4 ... 20 mA)									•			
	IN Live zero	/	OUT Live zero (4 ... 20 mA)												

Additional signal combinations that are not listed in the table are available on request.

8 Adjustment

Two potentiometers are located under the cover. These are used for fine adjustment of the analog signals after the configuration of the DIP switches has been changed.

The transmission error without adjustment is < 0.2 %. The transmission error without adjustment is <0.1%.

You require measuring equipment with the corresponding accuracy for exact adjustment!

8.1 Easy adjustment

Adjustment of the module via two potentiometers.

- ZERO potentiometer: zero point adjustment
- SPAN potentiometer: final value adjustment

8.2 Output with adjustment point calculation

- Specify the final value of the input signal with a calibration source initial and final value.
- Note the respective measured output value.

Output signal: 4 mA ... 20 mA

Specification (input)	Measured value (output)
Initial value	MV 1 [mA]
Final value	MV 2 [mA]

Calculate the FS adjustment point A

- Specify the initial value of the input signal with a calibration source.
- SPAN potentiometer: FS adjustment point A ± 1 µA
- ZERO potentiometer: 20 mA ± 1 µA

$$A = \frac{MV\ 2 \times 16\ mA}{MV\ 2 - MV\ 1}$$