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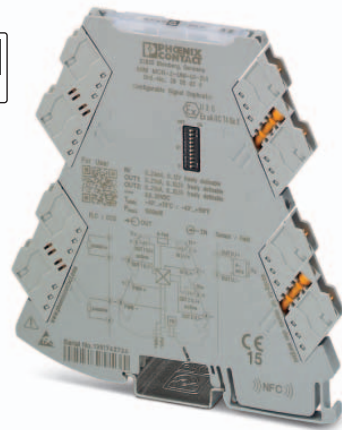

Contact us

MINI MCR-2-UNI-UI-2UI(-PT)(-C)

Ex n

µC NFC

Universal 4-way signal duplicator

Data sheet
106732_en_01

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1 Description

Configurable, freely adjustable 4-way signal duplicator with plug-in connection technology for the duplication, electrical isolation, conversion, amplification, and filtering of standard signals.

On the input side, current signals between 0 and 24 mA and voltage signals between 0 and 12 V can be processed.

Signals between 0 ... 21 mA and 0 ... 10.5 V are possible at the output side respectively. Both output signals can be set independently of each other.

The minimum measurement span is 1 mA or 0.5 V. Full precision is achieved with a span of more than 10 mA or 5 V.

You can optionally configure the device using DIP switches, or with enhanced functionality via the S-PORT using the standard Analog-Conf software via FDT/DTM, or without further accessories using the Mini Analog Pro Smartphone app.

Features

– Configurable, freely adjustable 4-way signal duplicator with plug-in connection technology
– Freely adjustable input and outputs
– Approval for Ex-zone 2 (nA)
– Screw or push-in connection available
– Can be supplied configured or unconfigured
– Reinforced insulation according to IEC 61010-1
– Supply voltage range 9.6 ... 30 V DC

⊘	**WARNING: 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".
µC NFC	This device offers the option of NFC communication. You can use the MINI Analog Pro Smartphone app via the NFC interface of your Smartphone to configure the device and to call-up DIP switch setting help and comprehensive module information. The MINI Analog Pro Smartphone app is available to you free.
ℹ	Make sure you always use the latest documentation. It can be downloaded from the product at phoenixcontact.net/products. This document is valid for the products listed in the "Ordering data".

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INSPIRING INNOVATIONS

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3   Ordering data

Description	Type	Order No.	Pcs./Pkt.
Universally configurable 4-way signal duplicator, with plug-in connection technology for the electrical isolation and duplication of analog signals. Configurable via DIP switch or software. Screw connection technology, standard configuration.	MINI MCR-2-UNI-UI-2UI	2905026	1
Universally configurable 4-way signal duplicator, with plug-in connection technology for the electrical isolation and duplication of analog signals. Configurable via DIP switch or software. Push-in connection technology, standard configuration.	MINI MCR-2-UNI-UI-2UI-PT	2905028	1
Universally configurable 4-way signal duplicator, with plug-in connection technology for the electrical isolation and duplication of analog signals. Configurable via DIP switch or software. Screw connection technology, order configuration.	MINI MCR-2-UNI-UI-2UI-C	2905025	1
Universally configurable 4-way signal duplicator, with plug-in connection technology for the electrical isolation and duplication of analog signals. Configurable via DIP switch or software. Push-in connection technology, order configuration.	MINI MCR-2-UNI-UI-2UI-PT-C	2905027	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 GY	2695439	10
DIN rail connector for DIN rail mounting. Universal for TBUS housing. Gold-plated contacts, 5-pos. Plug component, number of positions: 5, pitch: 3.81 mm	ME 6,2 TBUS-2 1,5/5-ST-3,81 GN	2869728	10
Power terminal with plug-in connection technology for delivering the supply voltage to the DIN rail connector. Monitoring of the supply voltages in combination with the fault monitoring module. Screw connection technology	MINI MCR-2-PTB	2902066	1
Power terminal with plug-in connection technology for delivering the supply voltage to the DIN rail connector. Monitoring of the supply voltages in combination with the fault monitoring module. Push-in connection technology	MINI MCR-2-PTB-PT	2902067	1
Fault monitoring module with plug-in connection technology for evaluating and reporting group errors from the FM system and for monitoring the supply voltages. Error message via N/C contact. Screw connection technology, standard configuration	MINI MCR-2-FM-RC	2904504	1
Fault monitoring module with plug-in connection technology for evaluating and reporting group errors from the FM system and for monitoring the supply voltages. Error message via N/C contact. Push-in connection technology, standard configuration	MINI MCR-2-FM-RC-PT	2904508	1

Accessories	Type	Order No.	Pcs./Pkt.
Primary-switched MINI POWER supply for DIN rail mounting, input: 1-phase, output: 24 V DC/1.5 A	MINI-SYS-PS-100-240AC/ 24DC/1.5	2866983	1
Primary-switched power supply MINI POWER for DIN rail mounting, input: 1-phase, output: 24 V DC/1,5 A, for the potentially explosive area	MINI-PS-100-240AC/24DC/ 1.5/EX	2866653	1
Programming adapter with USB interface, for programming with software. The USB driver is included in the software solutions for the products to be programmed, such as measuring transducers or motor managers.	IFS-USB-PROG-ADAPTER	2811271	1
Near Field Communication (NFC) programming adapter with USB interface for the wireless configuration of NFC-capable products from PHOENIX CONTACT with software. No separate USB driver is required.	NFC-USB-PROG-ADAPTER	2900013	1
Eight MINI Analog Pro signal conditioners and measuring transducers can be connected to a controller with minimal cabling effort and without any errors using system adapters and system cabling.	MINI MCR-2-V8-FLK 16	2901993	1
Eight MINI Analog Pro signal conditioners and measuring transducers can be quickly and easily integrated into a Modbus/RTU network via a communication adapter.	MINI MCR-2-V8-MOD-RTU	2905634	1
Eight MINI Analog Pro signal conditioners and measuring transducers can be quickly and easily integrated into a Modbus/TCP network via a communication adapter.	MINI MCR-2-V8-MOD-TCP	2905635	1
Eight MINI Analog Pro signal conditioners and measuring transducers can be quickly and easily integrated into a PROFIBUS DP network via a communication adapter.	MINI MCR-2-V8-PB-DP	2905636	1
Marker for end clamp, Sheet, white, unlabeled, can be labeled with: THERMOMARK PRIME, THERMOMARK CARD, BLUEMARK CLED, BLUEMARK LED, TOPMARK LASER, Mounting type: snapped into marker carrier, Lettering field: 30 x 5 mm	UCT-EM (30X5)	0801505	10
Marker for end clamp, can be ordered: by sheet, white, labeled according to customer specifications, Mounting type: snapped into marker carrier, Lettering field: 30 x 5 mm	UCT-EM (30X5) CUS	0801589	1
Marker for end clamp, Sheet, yellow, unlabeled, can be labeled with: THERMOMARK PRIME, THERMOMARK CARD, BLUEMARK CLED, BLUEMARK LED, TOPMARK LASER, Mounting type: snapped into marker carrier, Lettering field: 30 x 5 mm	UCT-EM (30X5) YE	0830340	10
Marker for end clamp, can be ordered: by sheet, yellow, labeled according to customer specifications, Mounting type: snapped into marker carrier, Lettering field: 30 x 5 mm	UCT-EM (30X5) YE CUS	0830348	1
Plastic label, Sheet, white, unlabeled, can be labeled with: BLUEMARK CLED, BLUEMARK LED, CMS-P1-PLOTTER, PLOTMARK, Mounting type: adhesive, Lettering field: 15 x 5 mm	UC-EMLP (15X5)	0819301	10

Accessories	Type	Order No.	Pcs./Pkt.
Plastic label, can be ordered: by sheet, white, labeled according to customer specifications, Mounting type: adhesive, Lettering field: 15 x 5 mm	UC-EMLP (15X5) CUS	0824550	1
Plastic label, Sheet, white, unlabeled, can be labeled with: BLUEMARK CLED, BLUEMARK LED, CMS-P1-PLOTTER, THERMOMARK CARD, THERMOMARK PRIME, PLOTMARK, Mounting type: adhesive, Lettering field: 15 x 5 mm	UC-EMLP (15X5)L	0820138	5
Plastic label, can be ordered: by sheet, white, labeled according to customer specifications, Mounting type: adhesive, Lettering field: 15 x 5 mm	UC-EMLP (15X5)L CUS	0824552	1
Plastic label, Sheet, yellow, unlabeled, can be labeled with: BLUEMARK CLED, BLUEMARK LED, CMS-P1-PLOTTER, PLOTMARK, Mounting type: adhesive, Lettering field: 15 x 5 mm	UC-EMLP (15X5) YE	0822615	10
Plastic label, can be ordered: by sheet, yellow, labeled according to customer specifications, Mounting type: adhesive, Lettering field: 15 x 5 mm	UC-EMLP (15X5) YE CUS	0824551	1
Plastic label, Sheet, yellow, unlabeled, can be labeled with: BLUEMARK CLED, BLUEMARK LED, CMS-P1-PLOTTER, Mounting type: adhesive, Lettering field: 15 x 5 mm	UC-EMLP (15X5)L YE	0825325	5
Plastic label, can be ordered: by sheet, yellow, labeled according to customer specifications, Mounting type: adhesive, Lettering field: 15 x 5 mm	UC-EMLP (15X5)L YE CUS	0826680	1
Plastic label, Sheet, silver, unlabeled, can be labeled with: BLUEMARK CLED, BLUEMARK LED, CMS-P1-PLOTTER, PLOTMARK, Mounting type: adhesive, Lettering field: 15 x 5 mm	UC-EMLP (15X5) SR	0828095	10
Plastic label, can be ordered: by sheet, silver, labeled according to customer specifications, Mounting type: adhesive, Lettering field: 15 x 5 mm	UC-EMLP (15X5) SR CUS	0828099	1
Plastic label, Sheet, silver, unlabeled, can be labeled with: BLUEMARK CLED, BLUEMARK LED, CMS-P1-PLOTTER, PLOTMARK, Mounting type: adhesive, Lettering field: 15 x 5 mm	UC-EMLP (15X5)L SR	0828103	5
Plastic label, Card, white, unlabeled, can be labeled with: THERMOMARK PRIME, THERMOMARK CARD, Mounting type: adhesive, Lettering field: 15 x 5 mm	US-EMLP (15X5)	0828790	10
Plastic label, can be ordered: By card, white, labeled according to customer specifications, Mounting type: adhesive, Lettering field: 15 x 5 mm	US-EMLP (15X5) CUS	0830076	1
Plastic label, Card, yellow, unlabeled, can be labeled with: THERMOMARK PRIME, THERMOMARK CARD, Mounting type: adhesive, Lettering field: 15 x 5 mm	US-EMLP (15X5) YE	0828873	10
Plastic label, can be ordered: By card, yellow, labeled according to customer specifications, Mounting type: adhesive, Lettering field: 15 x 5 mm	US-EMLP (15X5) YE CUS	0830077	1

Accessories	Type	Order No.	Pcs./Pkt.
Plastic label, Card, silver, unlabeled, can be labeled with: THERMOMARK PRIME, THERMOMARK CARD, Mounting type: adhesive, Lettering field: 15 x 5 mm	US-EMLP (15X5) SR	0828874	10
Plastic label, can be ordered: By card, silver, labeled according to customer specifications, Mounting type: adhesive, Lettering field: 15 x 5 mm	US-EMLP (15X5) SR CUS	0830078	1
Marker strip, Roll, white, unlabeled, can be labeled with: THERMOMARK ROLL, THERMOMARK ROLL X1, THERMOMARK ROLLMASTER 300/600, THERMOMARK X1.2, THERMOMARK S1.1, Mounting type: adhesive, for terminal block width: 5 mm, Lettering field: continuous x 5 mm	SK 5,0 WH:REEL	0805221	1

4 Technical data

Input	
Number of inputs	1
Configurable/programmable	Yes
Voltage input signal	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 ... 12 V (can be set via software)
Max. voltage input signal	12 V
Current input signal	0 mA ... 20 mA (via DIP switch) 4 mA ... 20 mA (via DIP switch) 0 mA ... 10 mA (via DIP switch) 20 mA ... 0 mA (via DIP switch) 0 mA ... 24 mA (can be set via software)
Max. current input signal	24 mA
Input resistance of voltage input	> 120 kΩ
Input resistance current input	approx. 50 Ω (+ 0.7 V for test diode)

Output	
Number of outputs	2
Voltage output signal	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)
Max. voltage output signal	approx. 12.3 V
Short-circuit current	≤ 25 mA
Current output signal	0 mA ... 20 mA (via DIP switch) 4 mA ... 20 mA (via DIP switch) 0 mA ... 10 mA (via DIP switch) 20 mA ... 0 mA (via DIP switch) 0 mA ... 21 mA (can be set via software)
Max. current output signal	24.6 mA
Non-load voltage	≤ 18.5 V
Load/output load voltage output	≥ 10 kΩ
Ripple	< 20 mV$_{PP}$ (at 600 Ω)
Load/output load current output	≤ 600 Ω (per channel)

Supply	
Nominal supply voltage	24 V DC
Supply voltage range	9.6 V DC ... 30 V DC (The DIN rail bus connector (ME 6,2 TBUS-2 1,5/5-ST-3,81 GN, Order No. 2869728) can be used to bridge the supply voltage. It can be snapped onto a 35 mm DIN rail according to EN 60715))
Typical 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)

Status and diagnostics indicators	
Indication	Red LED
Operating voltage display	Green LED

General data	
Maximum transmission error	0.05 % (of final value)
Maximum temperature coefficient	0.01 %/K
Step response (0–99%)	typ. 140 ms (freely adjustable)
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
Overvoltage category	II
Mounting position	any
Degree of pollution	2
Rated insulation voltage	300 V
Test voltage, input/output/supply	3 kV (50 Hz, 1 min.)
Dimensions W/H/D	6.2 mm / 110.5 mm / 120.5 mm
Type of housing	PBT gray

Connection data	Screw connection	Push-in connection
Solid conductor cross section with ferrule	0.2 mm² ... 1.5 mm²	0.14 mm² ... 2.5 mm²
Solid conductor cross section without ferrule	0.2 mm² ... 2.5 mm²	0.14 mm² ... 2.5 mm²
Conductor cross section, flexible	0.2 mm² ... 1.5 mm²	0.14 mm² ... 2.5 mm²
Conductor cross section AWG	24 ... 12	24 ... 12
Stripping length	10 mm	10 mm

Ambient conditions	
Ambient temperature (operation)	-40 °C ... 70 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Permissible humidity (operation)	5 % ... 95 % (non-condensing)

Conformance with EMC directive	
Noise immunity according to EN 61000-6-2 When being exposed to interference, there may be minimal deviations.	
Noise emission according to EN 61000-6-4	

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

5 Safety regulations and installation notes

5.1 Installation notes

- The category 3 device is designed for installation in zone 2 potentially explosive areas. It meets the requirements of EN 60079-0:2012+A11:2013 and EN 60079-15:2010.

- Installation, operation, and maintenance may only be carried out by qualified electricians. Follow the installation instructions as described. When installing and operating the device, the applicable regulations and safety directives (including national safety directives), as well as generally approved technical regulations, must be observed. The safety data is provided in this package slip and on the certificates (conformity assessment, additional approvals where applicable).

- While the devices are in operation, contact-dangerous voltages may be present on the control elements. For this reason parameterization, conductor connection, and opening of the module lid are allowed only when devices are in a de-energized state unless the connected circuits are exclusively SELV or PELV circuits.

- 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 protection (IEC 60529/EN 60529) of the device is intended for use in a clean and dry environment. The device must not be subject to mechanical strain and/or thermal loads, which exceed the limits described.

- The device is not designed for use in atmospheres with a danger of dust explosions.

- The device complies with the EMC regulations for industrial areas (EMC class A). When using the device in residential areas, it may cause radio interference.

- If the device is not used as described in the documentation, the intended protection can be negatively affected.

- To protect the device against mechanical or electrical damage, install it in a suitable housing with appropriate degree of protection as per IEC 60529.

- Provide a switch/circuit breaker close to the device, which is labeled as the disconnecting device for this device.

- Provide for a overcurrent protection device ($I \leq 4$ A) in the installation.

- There is a double isolation of 300 V_{eff} between neighboring modules of the same type oriented the same way. The device has a base isolation of 150 V_{eff} to other neighboring modules on the side with the DIP switch.

- The voltages present at the input, output and supply are extra-low voltages (ELV). Depending on the application, dangerous voltage (> 30 V) against ground could occur. For this event, safe electrical isolation from the other connections has been implemented.

- The device must be stopped if it is damaged, has been subjected to an impermissible load, stored incorrectly, or if it malfunctions.

- Only use copper connecting cables providing the permitted temperature range (60°C/75°C).

5.2 Installation in Zone 2

- Observe the specified conditions for use in potentially explosive areas! Install the device in a suitable, approved housing that meets the requirements of IEC/EN 60079-15 and has at least IP54 protection. Also observe the requirements of IEC/EN 60079-14.

- Only devices which are designed for operation in Ex zone 2 and are suitable for the conditions at the installation location may be connected to the circuits in the Ex zone.

- 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, was subject to an impermissible load, stored incorrectly or if it malfunctions.

- In Ex zone 2, the device may only be operated when all connectors are fully plugged in.

5.3 UL Notes

INDUSTRIAL CONTROL EQUIPMENT FOR HAZARDOUS LOCATIONS 45FP

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 unless power has been removed or the area is known to be non-hazardous.

3 This device is open-type and is required to be installed in an enclosure suitable for the environment and can only be accessed with the use of a tool or key.

4 NFC communication and Bluetooth communication must not be used unless the area is known to be non-hazardous.

6 Installation

6.1 Connection notes

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 IEC 61340-5-1.
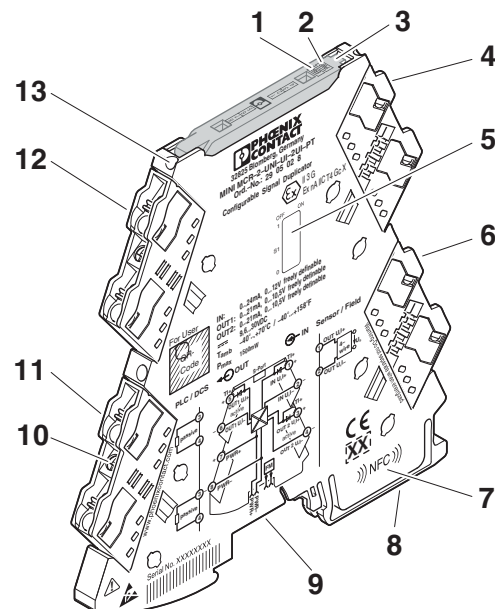
6.2 Structure

Figure 1   Structure

1 Error indicator "ERR" red LED

2 Green "PWR" LED, power supply

3 Cover with labeling option

4 Input: Standard and normalized signals

5 DIP switch S1

6 Output 2: standard and normalized signals

7 NFC coil

8 Universal snap-on foot for EN DIN rails

9 Connection for DIN rail connector

10 Spindle screw

11 Supply voltage

12 Output 1: standard and normalized signals

13 Current measuring socket

6.3 Block diagram
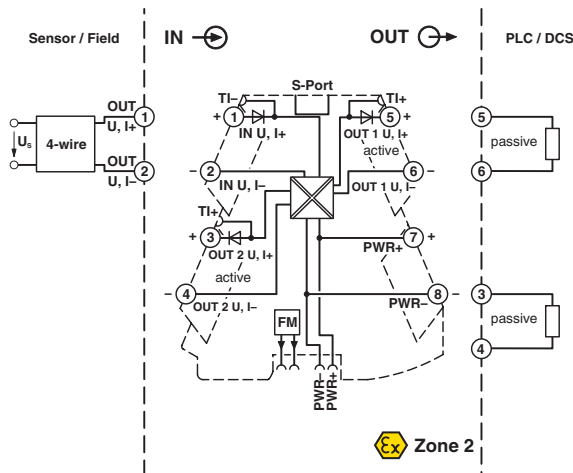

Figure 2   Block diagram

6.4 Power supply

You must refer to the MACX and MINI Analog power manual for the design of the power supply.

> **NOTE**
>
> **Never connect the supply voltage directly to the DIN rail connector. Drawing power from individual devices is not permitted!**.

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.

We recommend connecting a 630 mA fuse (normal-blow or slow-blow) upstream.

Supply via a power terminal block

The MINI MCR-2-PTB power terminal block (Order No. 2902066) or the MINI MCR-2-PTB-PT power terminal block (Order No. 2902067) of the same shape is used to supply the supply voltage to the DIN rail connector.

We recommend connecting a 4 A fuse 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 thus 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)
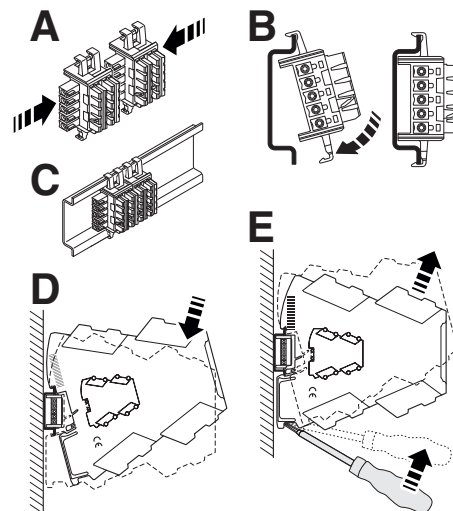
6.5 Assembly

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 FASTCON Pro plugs

The device has pluggable connection terminals with an integrated test disconnect terminal block, with either push-in or screw-in connection technology.

You can plug or screw the FASTCON Pro plugs onto the device directly without tools. You can use the integrated spindle screw to easily remove the plugs from the module or set the isolating position, even when the plugs are connected. For this purpose, use a screwdriver of sufficient width, e.g. SZF 1-0.6x3.5 (order number: 1204517).

4-way coding prevents incorrect insertion into the module.

Screw connection:

MINI MCR-2-…

AWG 26-16
0,2-1,5 mm²

10 mm
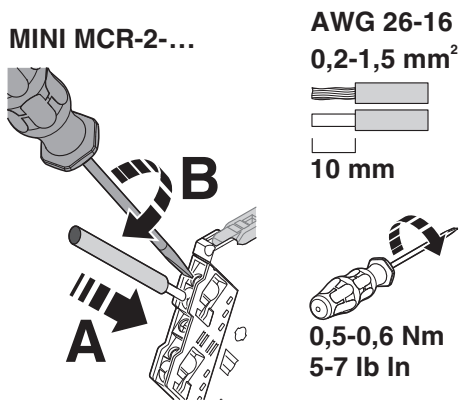
0,5-0,6 Nm
5-7 lb In

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.
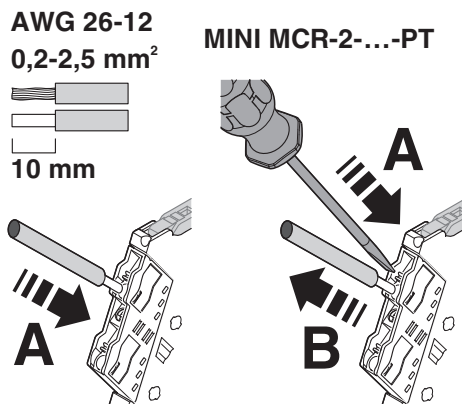
Push-in connection:

AWG 26-12
0,2-2,5 mm²

10 mm

MINI MCR-2-…-PT

Figure 5   Push-in connection

- Insert the wire into the corresponding connection terminal block.

6.7   Fault monitoring FM

In addition to module and power supply failures, known faults in the signal input of the module are reported via the DIN rail connector to the form-matched MINI MCR-2-FM-RC (order number 2904504) or MINI MCR-2-FM-RC-PT (order number 2904508) fault monitoring module. The module reports the error centrally via an N/C contact.

A fault monitoring module is only required once in a group. There is no need for individual evaluation of up to 115 connected Mini Analog Pro signal conditioners.

For the behavior of the fault monitoring contact for the different DIP switch configurations, please refer to the corresponding table.

6.8   Current measurement

The device allows current measurement without disconnection of the conductors by means of integrated test disconnect terminals.

Test sockets which support current measurement are marked TI+ or TI-.

For the current measurement, use 2 mm probe tips of the type Fluke TL75-1 or probe tips with a comparable tip shape.
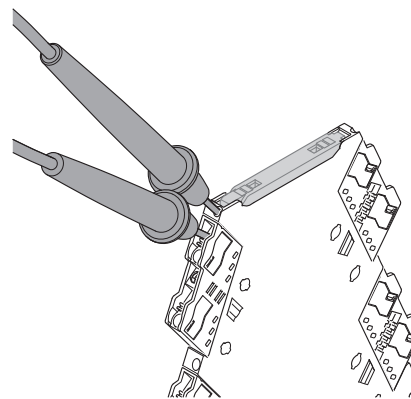
Figure 6   Test disconnect terminal block

Furthermore, individual circuits can be specifically disconnected, e.g. for commissioning.

You can set the isolating position by turning the integrated spindle screw through 180°. The isolating position is indicated by the marking on the plugs.

Figure 7   Disconnect position

6.9   Marking

Standard UCT-EM... or UC-EMLP tags are available for marking the devices and can be printed as per customer requirements. In addition, the covers provide enough space for the use of freely chosen sticky labels such as SK 5.0 WH:REEL without concealing the LED diagnostic indicators.

7   Configuration
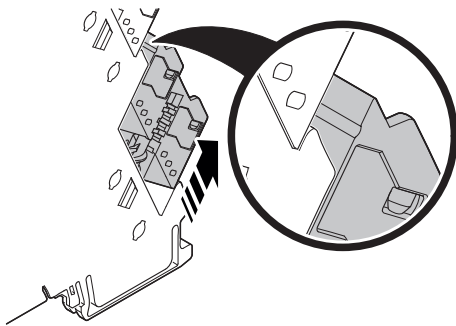
Standard configuration for devicesnot configured to order:

Input 0 ... 20 mA, output 1: 0 ... 20 mA, output 2: 0 ... 20 mA;
no limitation of outputs; fault evaluation as per NE43
(downscale); fault monitoring contact reacts for all faults;
configurable via software

Configuration without supply voltage is possible for all
configuration variants except configuration via Bluetooth
with the IFS-BT-PROG-ADAPTER (item no.: 2905872).

7.1   Configuration via DIP switches

At delivery, all DIP switches are in the "OFF" position.

Configure the DIP switches according to the planned
application using the configuration tables.

The following values are output during DIP switch operation
(S1-0 = "1") in case of faults.

Output	Open circuit/short circuit (input)	Overrange (input)	Underrange (input)
0 mA ... 20 mA	0 mA	20.5 mA	0 mA
4 ... 20 mA	3 mA	20.5 mA	3.5 mA
0 ... 10 mA	0 mA	10.25 mA	0 mA
20 ... 0 mA	0 mA	20.5 mA	0 mA
0 ... 10 V	0 V	10.25 V	0 V
2 ... 10 V	1.5 V	10.25 V	1.75 V
0 ... 5 V	0 V	5.125 V	0 V
1 ... 5 V	0.75 V	5.125 V	0.875 V

Configuration tables

		1	2	3	4	5	6	7	8	9	0
• ≙ ON DIP S1											
Default											
DIP switch configuration off		▨	▨	▨	▨	▨	▨	▨	▨	▨	
DIP switch configuration on		▨	▨	▨	▨	▨	▨	▨	▨	▨	•
Input signal	0...20 mA				▨	▨	▨	▨	▨	▨	•
	0...10 mA	•			▨	▨	▨	▨	▨	▨	•
	4 ... 20 mA		•		▨	▨	▨	▨	▨	▨	•
	20...0 mA	•	•		▨	▨	▨	▨	▨	▨	•
	0...10 V			•	▨	▨	▨	▨	▨	▨	•
	2...10 V	•		•	▨	▨	▨	▨	▨	▨	•
	0...5 V		•	•	▨	▨	▨	▨	▨	▨	•
	1...5 V	•	•	•	▨	▨	▨	▨	▨	▨	•
Output signal 1	0...20 mA	▨	▨	▨				▨	▨	▨	•
	0...10 mA	▨	▨	▨	•			▨	▨	▨	•
	4 ... 20 mA	▨	▨	▨		•		▨	▨	▨	•
	20...0 mA	▨	▨	▨	•	•		▨	▨	▨	•
	0...10 V	▨	▨	▨			•	▨	▨	▨	•
	2...10 V	▨	▨	▨	•		•	▨	▨	▨	•
	0...5 V	▨	▨	▨		•	•	▨	▨	▨	•
	1...5 V	▨	▨	▨	•	•	•	▨	▨	▨	•
Output signal 2	0...20 mA	▨	▨	▨	▨	▨	▨				•
	0...10 mA	▨	▨	▨	▨	▨	▨	•			•
	4 ... 20 mA	▨	▨	▨	▨	▨	▨		•		•
	20...0 mA	▨	▨	▨	▨	▨	▨	•	•		•
	0...10 V	▨	▨	▨	▨	▨	▨			•	•
	2...10 V	▨	▨	▨	▨	▨	▨	•		•	•
	0...5 V	▨	▨	▨	▨	▨	▨		•	•	•
	1...5 V	▨	▨	▨	▨	▨	▨	•	•	•	•

7.2 Configuration via software

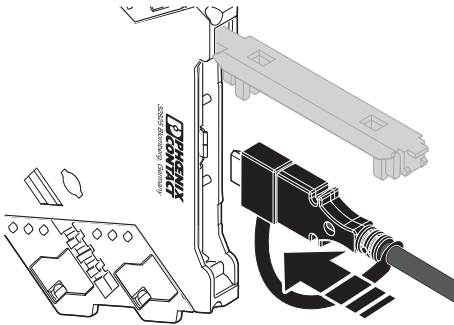| ℹ	Use the IFS-USB-PROG-ADAPTER programming adapter (Order No.: 2811271), the NFC-USB-PROG-ADAPTER (Order No.: 2900013), or the IFS-BT-PROG-ADAPTER (Order No.: 2905872) for connection of the device and PC.

Figure 8   Programming connection

In addition to DIP switch settings, software configuration offers enhanced setting options and a monitoring function for maintenance purposes.

The following free software solutions are available for you to download from the Internet.

– ANALOG-CONF standard software
– FDT/DTM solutions: FDT frame application and DTM packages

7.3 Configuration via MINI Analog Pro app

In addition to DIP switch settings, app configuration offers enhanced setting options.

Using the MINI Analog Pro Smartphone app via the NFC interface of your Smartphone you can configure the module without an additional programming adapter or cables.

Alternatively, you can use the Bluetooth programming adapter (Order No. 2905872).
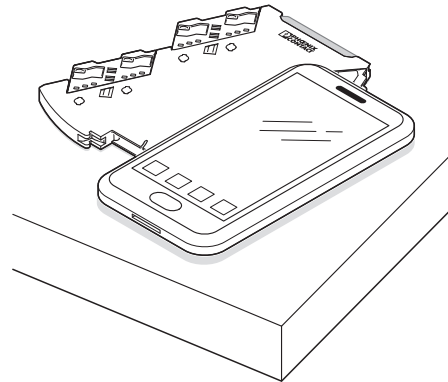

Figure 9   Configuration

8 Function description

8.1 Analog switching output

If you configure the device using one of the software or app solutions, this additional function is available. It allows you to implement a threshold value switch without having to integrate an extra switching output or use a separate threshold value switch.

Both analog outputs can be used as an analog switching output independently of one another.

A low level or high level is output at the analog output. The low level is around 0 mA or 0 mV. The high level can be freely adjusted within the analog output range from 1 mA ... 20 mA or 0.5 V ... 10 V.

Switching points

The switching points are set finitely and in the selected unit (V, mA) and relate to the measuring input.

A fixed mini hysteresis exists for each switching point, which is independent of the respective input signal. The mini hysteresis for the switching point is ±0.1% of the nominal input range.

The two switching points can be configured within the input signal range as follows.

Nominal measuring range	Input signal range
0 V ... 10 V	0.020 V ... 11.980 V
0 V ... 5 V	0.010 V ... 5.990 V
0 V ... 2.5 V	0.005 V ... 2.995 V
0 mA ... 20 mA	0.040 mA ... 23.960 mA
0 mA ... 10 mA	0.020 mA ... 11.980 mA
0 mA ... 5 mA	0.010 mA ... 5.990 mA

Switching points (including the mini hysteresis) must not exceed the maximum measuring range.

Switching behavior

Function of the switching output: signal high level after the switching point is exceeded; before this signal low level.

8.2 Limiting behavior of the analog output

In some applications it is important that the standard signal at the output remains within its limits. In the case of a 4 mA ... 20 mA signal, for example, this means that the signal does not drop below 4 mA or exceed 20 mA.

You can set this behavior under "Analog output > Error signaling > Limitation" for both outputs independently of one another. The best way to do this is via the software or app solutions.

8.3 Monitoring

A monitoring function can be used with the software or app solutions. This means that you can display and note down current measured values via the software interface.

8.4 Diagnostic functions and error messages

Errors such as open circuit, short circuit, overrange, underrange, and module errors are detected by the modules. The errors are indicated via fault monitoring. At the same time, the set error signaling is indicated by a red LED.

The respective error displays are removed when the error is eliminated.

The software and app solutions allow you to freely select and adjust all signaling variants.

Analog input

A short circuit/open circuit in the current input can be detected if a live-zero signal is used (measuring range starts at 1 mA). A signal is defined as a short circuit/open circuit when it is less than 0.1% of the applicable nominal range.

A short circuit/open circuit in the voltage input can be detected if a live-zero signal is used (measuring range starts at 0.5 V). A signal is defined as a short circuit/open circuit when it is less than 0.1% of the applicable nominal range.

The setting options for signaling in the analog outputs only appear in the software interfaces if a live-zero signal is set as described above.

Analog output

The current outputs can also be monitored for open circuit.

You can activate or deactivate the function in the "Analog output" tab of the software or app solutions.

8.5   Simulation mode/force

During startup it must be possible to specify analog values without a pending sensor signal from the field.

The ANALOG-CONF and FDT/DTM software solutions allow you to simulate analog signals at the output.

You can set this behavior via "Service > Force analog output". It can be specified as a percentage in relation to the set input or as an absolute value of the output signal range.

8.6   Sample rate and accuracy

With the measuring rate (sample rate) you can use the software solutions to achieve a higher device speed.

The accuracy of the device depends on the set sample rate and measuring span.

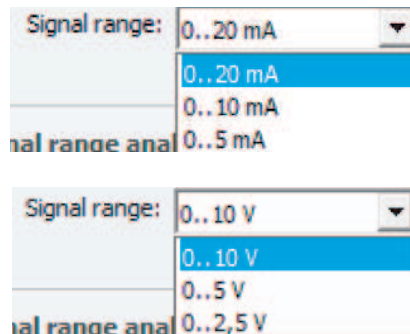The figure below shows the measuring spans that can be set on the hardware side.

Figure 10   Measuring span

The full accuracy of 0.05% applies for these hardware-side measuring spans. This applies for a sample rate of 15 Hz as well as for 240 Hz.

The table below shows the response times and accuracy of the analog output and switching output when the above measuring spans are further reduced on the software side (e.g., 0 ... 1 mA).

Sample rate	Jump	Filter	Output	Response time	Transmission error
15 Hz	0 % ... 99.9 %	1	Current/voltage output	approx. 140 ms	< 0.1 %
15 Hz	-	1	Switching output	approx. 130 ms	< 0.1 %
60 Hz	0 % ... 99.9 %	1	Current/voltage output	approx. 45 ms	< 0.5%
60 Hz	-	1	Switching output	approx. 35 ms	< 0.5%
240 Hz	0 % ... 99.9 %	1	Current/voltage output	approx. 25 ms	< 2 %
240 Hz	-	1	Switching output	approx. 15 ms	< 2 %

9 Diagnostics and status indicators

Green LED	PWR	Supply voltage
	Lit	Supply voltage present
Red LED	ERR	Fault display or simulation mode
	Flashing fast (2.8 Hz)	Sensor fault or invalid DIP switch configuration
	Flashing slowly (1.4 Hz)	Simulation mode
	Lit	Internal device error