MINI MCR-SL-R-UI

Potiposition transducer



Data sheet
102807_en_11

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1 Description

The narrow 6.2 mm MINI MCR-SL-R-UI... potiposition transducer converts potentiometer positions into a standard analog signal on a percentage basis. If the potentiometer range cannot be utilized to the full, an externally accessible slide switch is used to set the upper and lower potentiometer final values. The output signal of between 0% ... 100% is based on this set final value.

The DIP switches are accessible on the side of the housing and allow the following parameters to be configured:

- output signal,
- automatic potentiometer detection,
- Wire-break detection slider as well as
- error indication type.

Power (19.2 V DC ... 30 V DC) can either be supplied via the connection terminal blocks of the modules or in conjunction with the DIN rail connector.

Features

- Configurable potipostion transducer
- Output signal range can be configured using a DIP switch
- 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.
MCR potiposition transducer for conversion of potentiometer positions into a standard analog signal, 0 Ω input... 100 Ω to 0 kΩ ... 100 kΩ	MINI MCR-SL-R-UI	2864095	1

Accessories	Type	Item no.	Pcs./Pkt.
DIN rail bus connector (TBUS), 5-pos., for bridging the supply voltage, can be snapped onto NS 35/... DIN rail in accordance with EN 60715	ME 6,2 TBUS-2 1,5/5-ST-3,81 GY	2695439	10
DIN rail bus connector for DIN rail mounting. Universal for TBUS housing. Gold-plated contacts, 5-pos.	ME 6,2 TBUS-2 1,5/5-ST-3,81 GN	2869728	10
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
MCR power terminal block for supplying several MINI Analog modules via the DIN rail connector, with screw connection, maximum current consumption of up to 2 A	MINI MCR-SL-PTB	2864134	1
Primary-switched power supply, QUINT POWER, screw connection, DIN rail mounting, supply of devices possible via the TBUS DIN rail connector, protective coating, input: single-phase, output: 24 V DC/2.5 A	QUINT4-SYS-PS/1AC/24DC/2.5/SC	2904614	1
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 Potentiometer	
Number of inputs	1
Resistance range	100 Ω ... 100 kΩ
Output Voltage output / current output	
Number of outputs	1
Voltage output signal	0 V ... 5 V 1 V ... 5 V 0 V ... 10 V 10 V ... 0 V
Max. voltage output signal	12.5 V
Short-circuit current	≈ 10 mA
Current output signal	0 mA ... 20 mA 4 mA ... 20 mA 20 mA ... 0 mA 20 mA ... 4 mA
Max. current output signal	23 mA
Open-circuit voltage	≈ 12.5 V
Load/output load voltage output	> 10 kΩ
Ripple	< 20 mV_{PP} (500 Ω)
Load/output load current output	< 500 Ω (20 mA)
Behavior in the event of a sensor error	0 % ... 105 % (configurable)
Supply	
Nominal supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (The DIN rail connector (ME 6,2 TBUS-2 1,5/5-ST-3,81 GN, item no. 2869728) can be used to bridge the supply voltage. It can be snapped onto a 35 mm DIN rail in accordance with EN 60715)
Typical current consumption	< 25 mA (at 24 V DC)
Power consumption	< 500 mW
General data	
Maximum transmission error	< 0.2 %
Temperature coefficient, typical	< 0.02 %/K
Maximum temperature coefficient	< 0.02 %/K
Step response (0–99%)	< 30 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	3-way isolation
Overvoltage category Pollution degree	II 2
Input/output/power supply Standards/regulations Rated insulation voltage Test voltage Insulation	 IEC/EN 61010 30 V AC 50 V 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

Ambient conditions	
Ambient temperature (operation)	-20 °C ... 65 °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 Recognized Class I, Div. 2, Groups A, B, C, D T4

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.
- Only use copper conductors providing the permitted temperature range (60 °C / 75 °C) as connecting cables.
- The device must be stopped if it is damaged, has been subjected to an impermissible load, stored incorrectly, or if it malfunctions.
- Connect the measuring transducer only to SELV and PELV circuits.
- If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.

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.

6 Installation

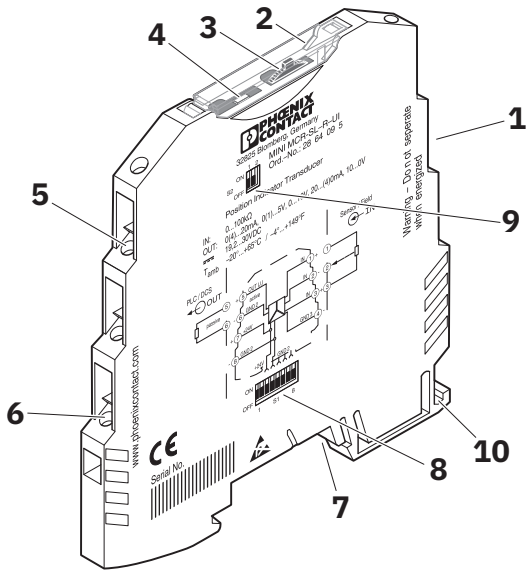
6.1 Connection notes

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

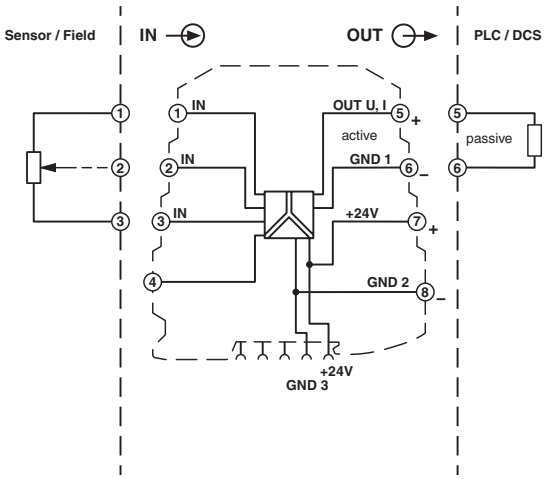
Figure 1 Structure



1 Input: Potentiometer
2 Cover
3 Press/slide button for teach-in
4 Diagnostics LED
5 Output: Standard signals
6 Supply voltage
7 Connection for DIN rail connector
8 DIP switch S1
9 DIP switch S2
10 Universal snap-on foot for EN DIN rails

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; it is available to download at www.phoenixcontact.com/products under the item listing.

NOTE:

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 MINI Analog 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 (Item No. 2864134) of the same shape is used to feed in the supply voltage to the DIN rail connector.

A 2 A fuse should be connected upstream.

Supply via a system power supply unit

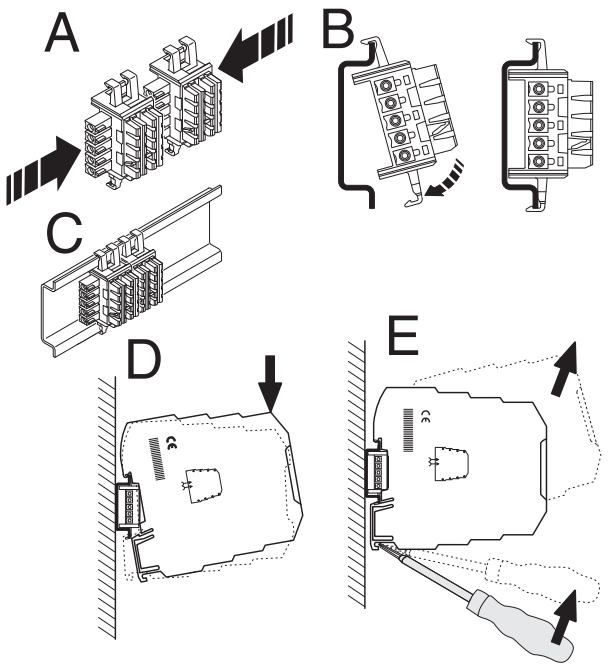
Use the QUINT4-SYS-PS/1AC/24DC/2.5/SC (Item No. 2904614) as the system power supply.

The power supply can be installed on all 35 mm DIN rails in accordance with EN 60715. The normal mounting position is horizontal (input terminals facing down). The minimum clearance to other devices is 30 mm above/below.

If you would like to supply adjacent items using the power supply, use a DIN rail bus distributor. To do so, insert the DIN rail bus adapter ME 22,5 TBUS ADAPTER KMGY (Item No.: 2201756) and the DIN rail connector ME 17,5 TBUS 1,5/ 5-ST-3,81 KMGY (Item No.: 2713645) plugged together in the DIN rail.

6.5 Mounting

Figure 3 Mounting and removing



– Mount the module on a 35 mm DIN rail in accordance with 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 Partition plate

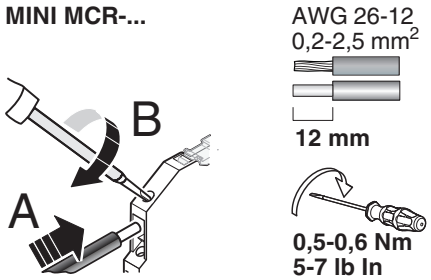
If you want to mount Ex i and non-Ex i devices next to each other on a DIN rail, you will require the MCR-DP partition plate (item no. 1430594). The partition plate ensures that Ex i isolating distances are maintained.

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

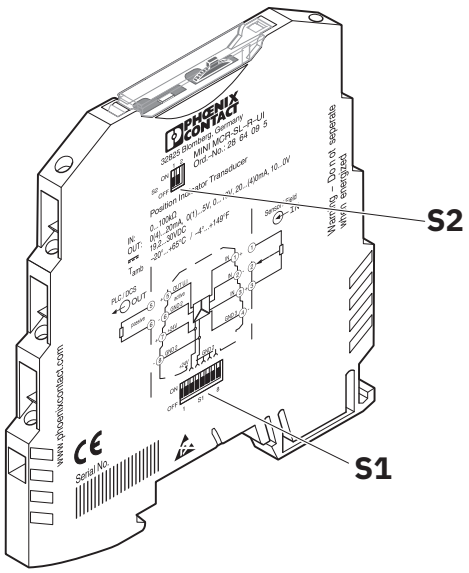
If the modules are not configured (all DIP switches set to position 0), the module does not have a defined function until the DIP switches have been set.

Use the DIP switch to specify the output signal range, potentiometer detection/wire-break detection, and error evaluation.

Activate automatic potentiometer detection to obtain optimum measurement results.

You can use the S2 DIP switch to select the voltage and current output.

Figure 5 Location of the DIP switches



7.1 Configuration tables

DIP S1

1	2	3	Output signal range OUT
			0...20 mA
•			20...0 mA
	•		4...20 mA
•	•		20...4 mA
		•	0...10 V
•		•	10...0 V
	•	•	0...5 V
•	•	•	1...5 V

4	Automatic potentiometer detection
	on
•	off

5	Open circuit detection slider
•	on
	off

6	Transmission Behavior
	Fault evaluation in acc. with DIP 1 (7+8)
•	Output in acc. with NE 43 Open circuit 0 mA (0 V) Linear behavior 3.8 mA ... 20.5 mA (0.95 V ... 5.12 V) **Only active for 4...20 mA (1...5 V) OUT**

	7	8	Open circuit	Measuring range overrange	Measuring range underrange
A			End of measuring range +5 %	End of measuring range +2.5 %	Start of measuring range
B	•		End of measuring range +5 %	End of measuring range +2.5 %	Start of measuring range -12.5 %
C		•	End of measuring range +5 %	End of measuring range	Start of measuring range
D	•	•	Start of measuring range	End of measuring range	Start of measuring range

DIP S2

1	2	Output signal OUT
•		0...20 mA, 4...20 mA, 20...0 mA, 20...4 mA
	•	0...10 V, 10...0 V, 0...5 V, 1...5 V
•	•	**Not allowed!**

• ≙ ON
≙ OFF

8 Diagnostics LED

The LED indicates the following error states:

State	Meaning
LED ON	Line break, measuring value overrange, measuring value underrange

9 Teach-In

The "Teach-In" function serves to adjust the potentiometer range if it is not possible to use the entire range even though the output signal is to be fully used. The press/slide button located under the transparent cover is used for making the settings.

Setting to the lower Teach-In value

Set the potentiometer to the lowest Teach-In value and press the button downwards for approx. 1 second (towards terminal 1). If the value is saved successfully, the LED flashes once.

Setting to the upper Teach-In value

Set the potentiometer to the highest Teach-In value and press the button upwards for approx. 1 second (towards terminal 5). If the value is saved successfully, the LED flashes once.

Resetting to the lower potentiometer value

If the button is pressed downwards for more than 3 seconds (towards terminal 1), the lower Teach-In value is reset to the lower potentiometer value. After successful deletion of the the values, the LED flashes twice.

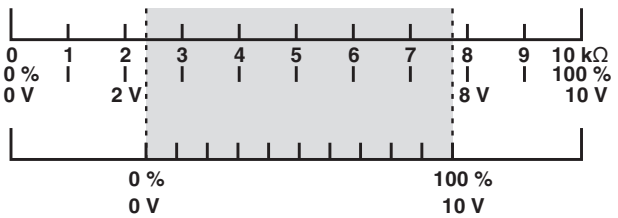
If the button is pressed for longer that 3 seconds, both Teach-In values are reset and the full potentiometer range (0 % ... 100 %) is used.

Resetting to the upper potentiometer value

If the button is pressed upwards for more than 3 seconds (direction of terminal 5), the upper Teach-In value is reset to the upper potentiometer value. After successful deletion of the the values, the LED flashes twice.

If the button is pressed for longer that 3 seconds, both Teach-In values are reset and the full potentiometer range (0 % ... 100 %) is used.

Figure 6 Example, determining the potentiometer range



10 Connection/application example

Positioning table with positioner/controller

Figure 7 Connection example

