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MINI MCR-SL-RPSS-I-I

MCR repeater power supply with HART transmission



Data sheet
103230_en_04

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1 Description

The 6.2 mm wide MINI MCR-SL-RPSS-I-I... repeater power supply supplies all transmitters located in the field with simultaneous 3-way electrical isolation between input, output and supply. HART data protocols can be transmitted bidirectionally. The module can be used in both isolator and repeater power supply operation. Electrically isolated 0...20 mA or 4...20 mA analog standard signals are available on the input and output side. The voltage (20.4 V DC to 30 V DC) can be supplied via the connection terminals on the modules or in conjunction with the DIN rail connector.

Features

- Input and output signal range 0...20 mA or 4...20 mA
- 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 repeater power supply with HART transmission, input signal 4...20 mA, output signal 4...20 mA, with screw connection.	MINI MCR-SL-RPSS-I-I	2864079	1
MCR repeater power supply with HART transmission, input signal 4...20 mA, output signal 4...20 mA, with spring-cage connection.	MINI MCR-SL-RPSS-I-I-SP	2810230	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

4 Technical data

Input	
Description of the input	Current input (sensor circuit)
Current input signal	4 mA ... 20 mA (repeater power supply and isolator operation) 0 mA ... 20 mA (isolator operation)
Max. current input signal	28 mA
Input resistance current input	Approx. 50 Ω
Transmitter supply voltage	16.5 V
Output	
Output description	Current output
Non-load voltage	Approx. 12.5 V
Current output signal	4 mA ... 20 mA (repeater power supply and isolator operation) 0 mA ... 20 mA (isolator operation)
Max. current output signal	> 21 mA (22.5 mA, typical)
Ripple	< 20 mV _{rms} (at 500 Ω)
Load/output load current output	\leq 500 Ω (at I = 20 mA)
Supply	
Nominal supply voltage	24 V DC
Supply voltage range	20.4 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)
Power consumption	< 900 mW (at 24 V DC and in repeater power supply operation) < 600 mW (at 24 V DC and in isolator operation)

General data

HART function	Yes
Limit frequency (3 dB)	175 Hz (typ.)
Measuring principle	Signal isolator
Transmission error, typical	≤ 0.1 % (of final value)
Maximum transmission error	≤ 0.2 % (of final value)
Temperature coefficient, typical	< 0.002 %/K
Maximum temperature coefficient	< 0.005 %/K
Step response (10-90%)	< 2 ms (typ.)
Communication	HART specification in both operating modes (RPSS isolator / RPSS repeater power supply)
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/output/supply	1.5 kV (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.
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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 ... 60 °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 IIC T4 Gc X
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

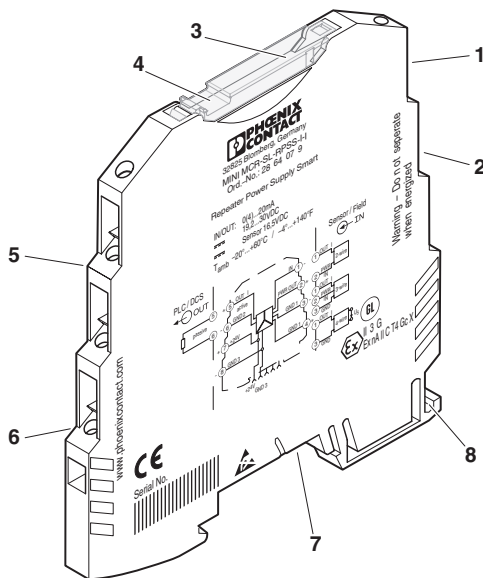


Figure 1 Structure

1. Input: Standard signals
2. Output: Transmitter supply voltage
3. Cover
4. Groove for ZBF 6 zack marker strip
5. Output: Standard signals
6. Supply voltage
7. Connection option for DIN rail connector
8. Universal snap-on foot for EN DIN rails

6.3 Block diagram

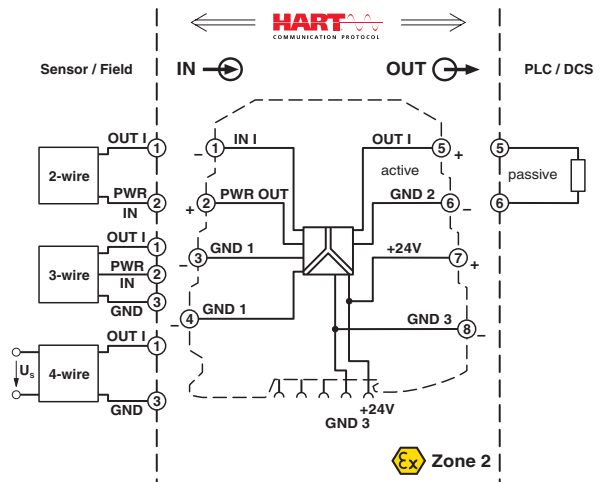


Figure 2 Block diagram

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

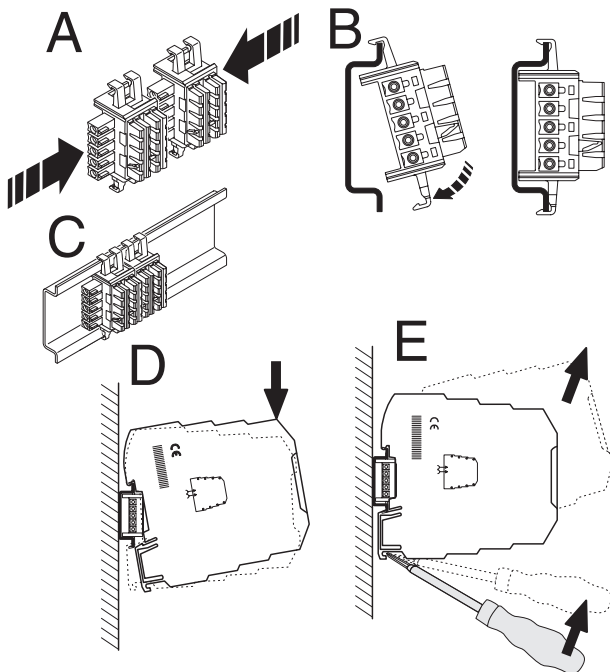


Figure 3 Mounting and removing

- 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-SL-RPSS-I-I... is available in two connection variants:

- Screw terminal block (MINI-MCR-SLPT100-UI)
- Spring-cage terminal block (MINI-MCR-SLPT100-UI-SP)

Screw connection:

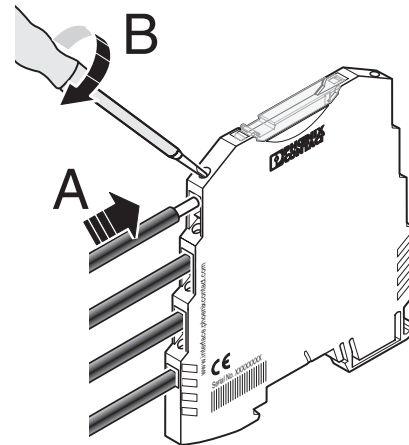


Figure 4 Screw connection

- 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:

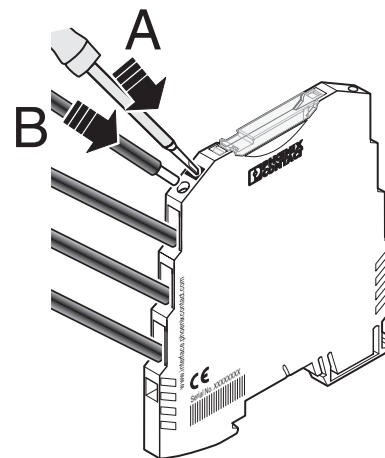


Figure 5 Spring-cage connection

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

7 HART Signal Transmission

In the case of the HART protocol, a digital signal is modulated to the analog measurement signal. Data communication between the transmitter and the control device of the process control system can therefore take place.

The MINI MCR-SL-RPSS-I-I... repeater power supply allows bidirectional HART communication from the transmitter to the control system with simultaneous electrical isolation.

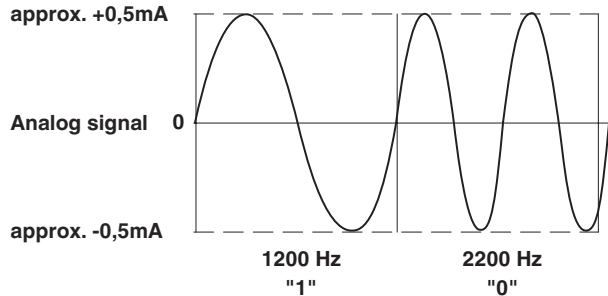
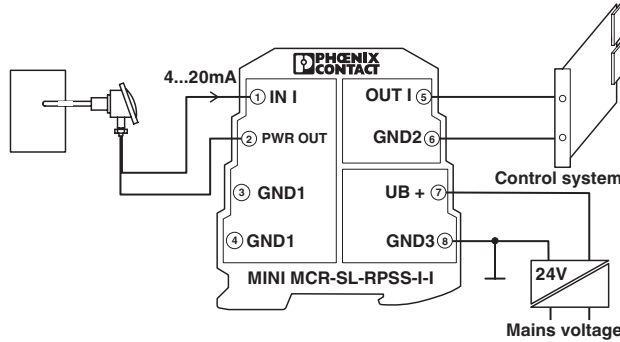


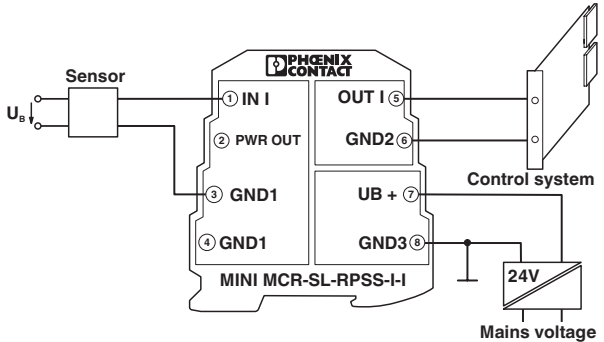
Figure 6 Isolator operation with an active sensor

8 Connection/application example

8.1 Repeater power supply operation with passive sensor



8.2 Isolator operation with active sensor



8.3 Isolator operation at the analog output module

