

# MINI MCR-SL-R-UI(-SP)

## Resistance/potiposition transducer

### INTERFACE

Data Sheet  
102807\_en\_05

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### Description

The slim MINI MCR-SL-R-UI... potiposition transducer has a width of only 6.2 mm and converts potentiometer positions as a percentage to an analog standard signal. If the potentiometer range cannot be utilized to the full, an externally accessible slide switch is used to set the upper and lower potiposition end values. The output signal between 0 and 100% is based on this fixed end 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,
- Open circuit detection slider and
- Fault evaluation type.

Power (19.2 V DC to 30 V DC) can be supplied through connection terminals on the modules or in conjunction with the DIN rail connector.

### Features

- Configurable potiposition transducer
- Output signal range can be configured using a DIP switch
- Approval for Ex zone 2 (nA)
- Can be supplied with screw or spring-cage connection



#### **WARNING: Correct usage in potentially explosive areas**

The module is a category 3 item of electrical equipment. Follow the instructions provided here during installation and observe the safety instructions.



Make sure you always use the the latest documentation.  
It can be downloaded at [www.download.phoenixcontact.com](http://www.download.phoenixcontact.com).

A conversion table is available on the Internet at  
[www.download.phoenixcontact.com/general/7000\\_en\\_00.pdf](http://www.download.phoenixcontact.com/general/7000_en_00.pdf).



This data sheet is valid for all products listed on the following page:

## Ordering data

Description	Type	Order No.	Pcs. Pkt.
Resistance/potipotision transducer, Screw connection	MINI MCR-SL-R-UI	2864095	1
Resistance/potipotision transducer, Spring-cage conn.	MINI MCR-SL-R-UI-SP	2810256	1
Accessories	Type	Order No.	Pcs. Pkt.
DIN rail connector (T-BUS), 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
MINI MCR power terminal block, with screw connection, current consumption up to 2 A, maximum	MINI MCR-SL-PTB	2864134	1
MINI MCR power terminal block, with spring-cage connection, current consumption up to 2 A, maximum	MINI MCR-SL-PTB-SP	2864147	1
Power supply unit, primary switched, slim design, output: 24 V DC / 1.5 A	MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
Power supply unit, primary switched, slim design, output: 24 V DC / 1.5 A, ATEX approval	MINI-PS-100-240AC/24DC/1.5/EX	2866653	1

## Technical data

Potentiometer input	
Potentiometer resistance range	100 Ω ... 100 kΩ
Reference voltage source	< 3.6 V
Signal output	
Voltage output signal	0 V ... 5 V 0 V ... 10 V 1 V ... 5 V 10 V ... 0 V
Max. voltage output signal	12.5 V
Non-load voltage	Approx. 12.5 V
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
Short-circuit current	Approx. 10 mA
Load/output load voltage output	> 10 kΩ
Ripple	< 20 mV <sub>PP</sub> (at 500 Ω)
Load/output load current output	< 500 Ω (20 mA)
Behavior in the event of a sensor error	Configurable 0 % ... 105 %
Power supply	
Nominal supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC
Typical current consumption	< 25 mA (for 24 V DC)
Power consumption	< 500 mW

**General data**

Transmission error, max.	< 0.2 %
Maximum temperature coefficient	< 0.02 %/K
Step response (10-90%)	< 30 ms
Mounting position	Any
Degree of protection	IP20
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	0.14 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross-section, stranded	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Stripping length	12 mm	8 mm

**Safe isolation**

Test voltage, input/output/supply	1.5 kV (50 Hz, 1 min.)
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**Ambient conditions**

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

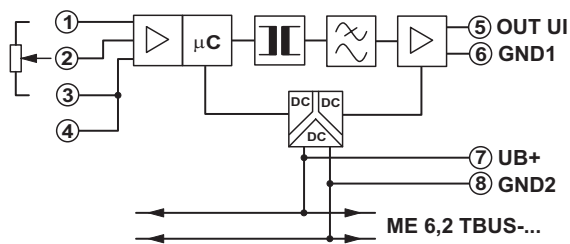
**Conformance / approvals**

Conformance	CE-compliant
ATEX approval	Ⓔ II 3 G Ex nA II T4 X
UL, USA / Canada	UL applied for

**Conformance with EMC directive 2004/108/EC**

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

**Block diagram**



## Safety notes



### WARNING: Correct usage in potentially explosive areas

The module is a category 3 item of electrical equipment. Follow the instructions provided here during installation.

Install the module in housing with IP54 protection according to EN 60529. The specified limits for mechanical strain or thermal loads for the module must not be exceeded.

Only modules suitable for operation in zone 2 potentially explosive areas may be connected.

Repairs must not be carried out by the user.

In potentially explosive areas, snap the module onto the DIN rail and connect the cables only when the power is disconnected.



### CAUTION

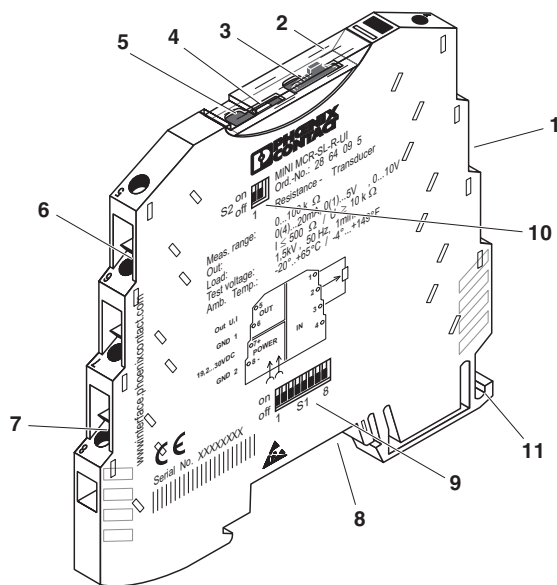
Installation, operation, and maintenance may only be carried out by qualified electricians. When installing and operating the device, the applicable safety directives (including national directives), accident prevention regulations, as well as general technical regulations, must be observed.



### CAUTION: Electrostatic discharge

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

## Structure



- 1 Input: Potentiometer
- 2 Transparent cover
- 3 Press/Slide button for adjustment
- 4 Diagnostics LED
- 5 Groove for ZBF 6 Zack marker strip
- 6 Output: Standard signals
- 7 Supply voltage
- 8 Connection option for DIN rail connector
- 9 DIP switch S1
- 10 DIP switch S2
- 11 Universal snap-on foot for EN DIN rails

## 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 MINI Analog modules.

### Supply via the MINI Analog Module

Where the total current consumption of the aligned MINI Analog modules does not exceed 400 mA, the power can be supplied directly at the connection terminal blocks of one MINI Analog module. A 400 mA fuse should be connected.

### Supply via a Power Terminal Block

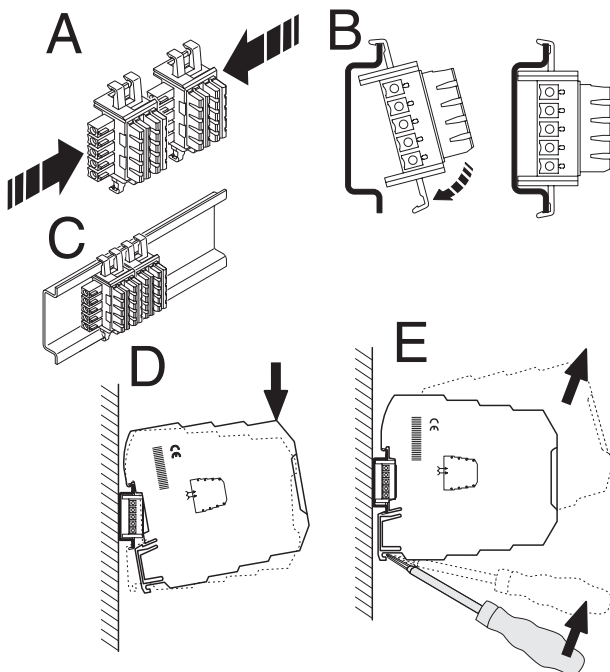
The MINI MCR-SL-PTB power terminal block (Order No. 2864134) or the MINI MCR-SL-PTB-SP power terminal block (Order No. 2864147), which are the same shape, are used to supply the supply voltage to the DIN rail connector. A 2 A fuse should be connected.

### Supply via the 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)

## Installation



### WARNING

In potentially explosive areas, snap the module onto the DIN rail and connect the cables only when the power is disconnected.

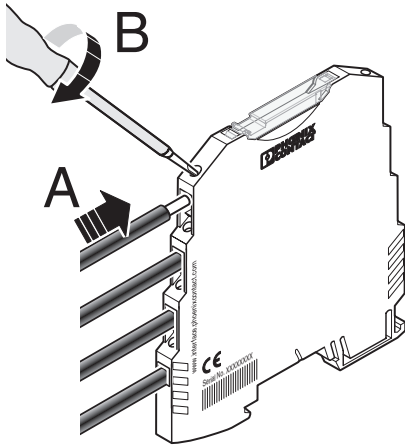


### ATTENTION

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 MINI Analog modules.

The assignment of the connection terminal blocks is shown in the block diagram. The module can be snapped onto all 35 mm DIN rails according to EN 60715.

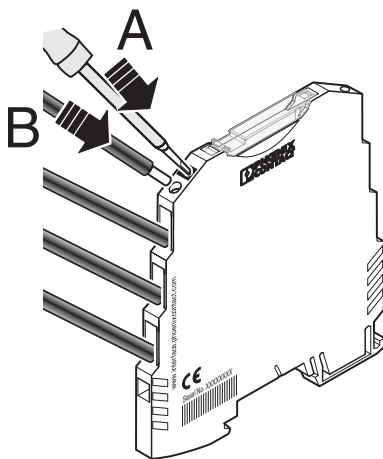
When using T-BUS DIN rail connectors, first insert the DIN rail connector in the DIN rail to bridge the power supply (see assembly). Direction: Snap-on foot below and connector left.



**Screw connection (MINI MCR-...)**

Insert the wires in the corresponding connection terminal block.

Use a screwdriver to tighten the screw in the opening above the connection terminal block.

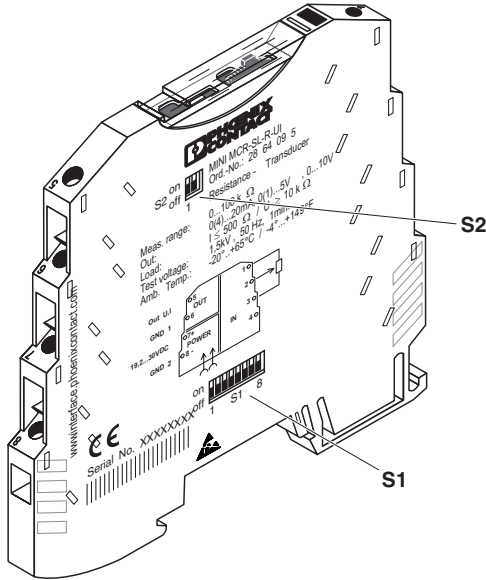


**Spring-cage connection (MINI MCR-...-SP)**

Insert a screwdriver in the opening above the connection terminal block.

Insert the wires in the corresponding connection terminal block.

## Configuration



### CAUTION: Electrostatic discharge

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

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

You can use the S1 DIP switch to prescribe the output signal range, potentiometer/open circuit detection and fault evaluation.

Activate automatic potentiometer detection to obtain optimum measurement results.

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

## Diagnostics

The LED indicates the following error states:

- LED ON: In the event of a wire break on the sensor side, measured value overrange or measured value under-range

## DIP switches

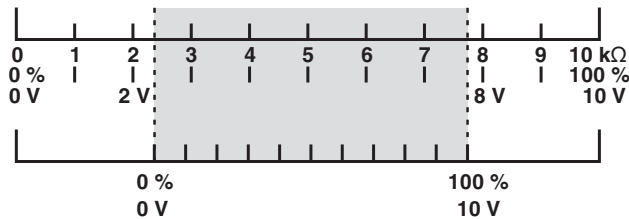
DIP S1	Output signal range OUT			4 Automatic potentiometer detection	5 Open circuit detection slider	6 Transmission Behavior
	1	2	3			
				on	on	Fault evaluation in acc. with DIP 1 (7+8)
•				off	off	
	•					Output in acc. with NE 43 Open circuit 0 mA (0 V) Linear behavior 3.8 mA ... 20.5 mA (0.95 V ... 5.12 V) <b>Only active for 4...20 mA (1...5 V) OUT</b>
	•	•				
	•	•	•			
		•	•			
		•	•			
	•	•	•			

	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		Output signal OUT
1	2	
•		0...20 mA, 4...20 mA, 20...0 mA, 20...4 mA
	•	0...10 V, 10...0 V, 0...5 V, 1...5 V
•	•	<b>Not allowed!</b>

• ≙ ON  
≙ OFF

## Adjustment (Teach In)



The "Teach In" function serves to adjust the potentiometer range if it is not possible to exploit the entire range and yet the output signal is to be exploited to the full. The press/slide button provided under the transparent cover is used for configuring 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 deleting the values successfully, the LED flashes twice.

If the button is pressed for more than 3 seconds, both Teach In values are reset and the entire potentiometer range (0 % to 100 %) is used.

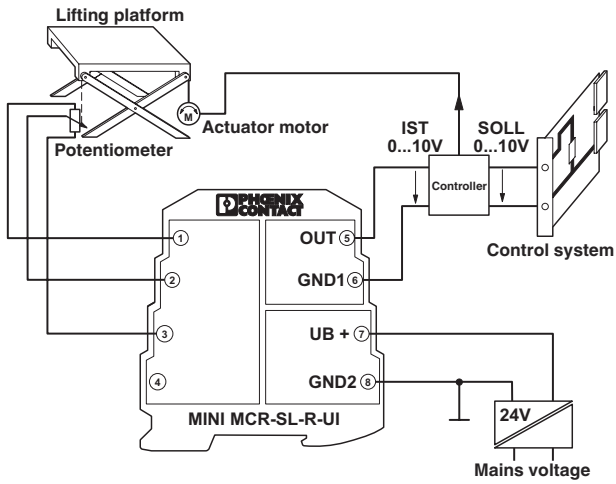
### Resetting to the upper potentiometer value

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

If the button is pressed for more than 3 seconds, both Teach In values are reset and the entire potentiometer range (0 % to 100 %) is used.



## Connection example



Height adjustment of a lifting platform with setpoint and actual value