

# Resistance Repeater KCD2-RR2-Ex1

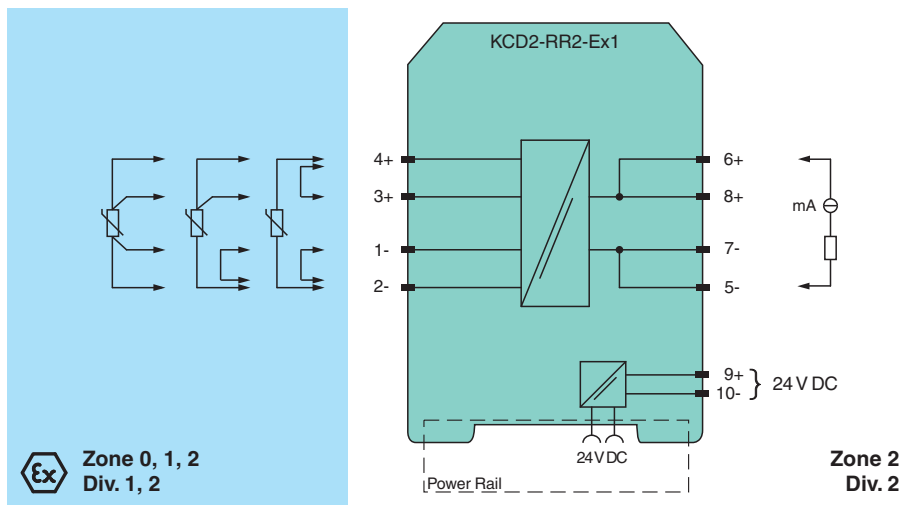
- 1-channel isolated barrier
- 24 V DC supply (Power Rail)
- Resistance and RTD input (Pt100, Pt500, Pt1000)
- Resistance output
- Accuracy 0.1 %
- Line fault detection (LFD) for Pt100
- Housing width 12.5 mm
- Up to SIL 2 (SC 3) acc. to IEC/EN 61508



## Function

This isolated barrier is used for intrinsic safety applications.  
It transfers resistance values of RTDs or potentiometers from hazardous areas to safe areas.  
A 2-, 3-, or 4-wire technique is available depending on the required accuracy.  
The input card of the control system measures the same load as if it were connected directly to the resistance in a hazardous area.

## Connection



## Technical Data

### General specifications

Signal type Analog input

### Functional safety related parameters

Safety Integrity Level (SIL) SIL 2

Systematic capability (SC) SC 3

### Supply

Connection Power Rail or terminals 9+, 10-

Rated voltage  $U_r$  19 ... 30 V DC

Ripple within the supply tolerance

Rated current  $I_r$  < 28 mA

Power consumption 0.35 W (24 V and 1 mA sense current), 0.85 W (30 V and 10 mA sense current)

### Input

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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## Technical Data

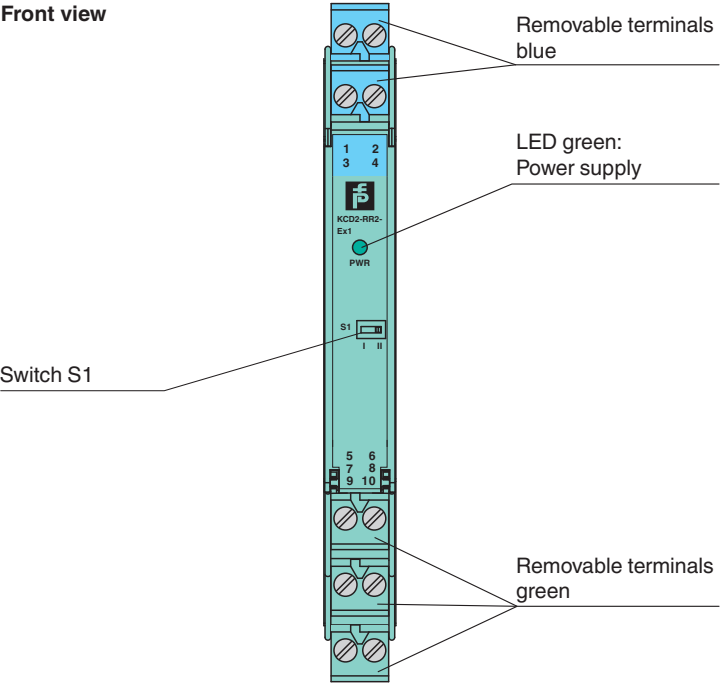
Connection side		field side
Connection		terminals 1, 2, 3, 4
Line fault detection		yes, at Pt100
Lead resistance		≤ 10 % of resistance value
Transmission range		0 ... 10 mA
Available voltage		7 V
Line fault detection		< 30 nA
<b>Output</b>		
Connection side		control side
Connection		terminals 5-, 7-, 6+, 8+
Current		0 ... 10 mA
Available voltage		0 ... 4.2 V
Fault signal		field voltage < 150 mV or > 4 V, depending on lead disconnected
Reverse polarity protection		for I < 10 mA or U < 20 V
<b>Transfer characteristics</b>		
Accuracy		0.1 %
Deviation		$I_m \geq 1 \text{ mA}$ : $\pm 0.1 \%$ of $R_m$ or $\pm 0.1 \Omega$ (the larger value is applicable) $I_m < 1 \text{ mA}$ : accuracy reduces in proportion to $I_m$ . e. g. $I_m = 0.1 \text{ mA}$ : $\pm 1 \%$ of $R_m$ or $1 \Omega$ (the larger value is applicable).
Influence of ambient temperature		$I_m \geq 1 \text{ mA}$ , $R_m \geq 100 \Omega$ : $0.01 \%/K$ in the range $-20 \dots +70 \text{ }^\circ\text{C}$ ( $-4 \dots 158 \text{ }^\circ\text{F}$ ) $I_m < 1 \text{ mA}$ or $R_m < 100 \Omega$ : temperature stability reduces in proportion to $I_m$ or $R_m$
Settling time		≤ 5 ms
Rise time/fall time		≤ 2 ms (10 ... 90%)
<b>Galvanic isolation</b>		
Output/power supply		functional insulation, rated insulation voltage 50 V AC
<b>Indicators/settings</b>		
Display elements		LED
Control elements		DIP switch
Configuration		via DIP switches
Labeling		space for labeling at the front
<b>Directive conformity</b>		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326-1:2013 (industrial locations)
<b>Conformity</b>		
Electromagnetic compatibility		NE 21:2017 EN IEC 61326-3-2:2018
Degree of protection		IEC 60529:2001
Protection against electrical shock		UL 61010-1:2012
<b>Ambient conditions</b>		
Ambient temperature		$-40 \dots 70 \text{ }^\circ\text{C}$ ( $-40 \dots 158 \text{ }^\circ\text{F}$ )
<b>Mechanical specifications</b>		
Degree of protection		IP20
Connection		screw terminals
Mass		approx. 100 g
Dimensions		12.5 x 119 x 114 mm (0.5 x 4.7 x 4.5 inch) (W x H x D), housing type A2
Mounting		on 35 mm DIN mounting rail acc. to EN 60715:2001
<b>Data for application in connection with hazardous areas</b>		
EU-type examination certificate		BASEEFA 10 ATEX 0061X
Marking		Ⓔ II (1)G [Ex ia Ga] IIC Ⓔ II (1)D [Ex ia Da] IIIC Ⓔ I (M1) [Ex ia Ma] I
Input		[Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I
Voltage	$U_o$	9.5 V
Current	$I_o$	39.22 mA
Power	$P_o$	93 mW

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Technical Data







Supply			
Maximum safe voltage	U <sub>m</sub>	250 V (Attention! The rated voltage can be lower.)	
Output			
Maximum safe voltage	U <sub>m</sub>	250 V (Attention! The rated voltage can be lower.)	
Certificate		BASEEFA 10 ATEX 0062X	
Marking		Ⓔ II 3G Ex ec IIC T4 Gc	
Galvanic isolation			
Input/Output		safe electrical isolation acc. to IEC/EN 60079-11:2007, voltage peak value 375 V	
Input/power supply		safe electrical isolation acc. to IEC/EN 60079-11:2007, voltage peak value 375 V	
Directive conformity			
Directive 2014/34/EU		EN IEC 60079-0:2018 , EN 60079-7:2015+A1:2018 , EN 60079-11:2012	
International approvals			
FM approval			
FM certificate		FM 19 CA 0039 X , FM 19 US 0067 X	
Control drawing		116-0457 (cFMus)	
UL approval		E106378	
Control drawing		116-0332 (cULus)	
IECEX approval			
IECEX certificate		IECEX BAS 10.0024X IECEX BAS 10.0025X	
IECEX marking		[Ex ia Ga] IIC , [Ex ia Da] IIIC , [Ex ia Ma] I Ex ec IIC T4 Gc	
General information			
Supplementary information		Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a> .	

Assembly







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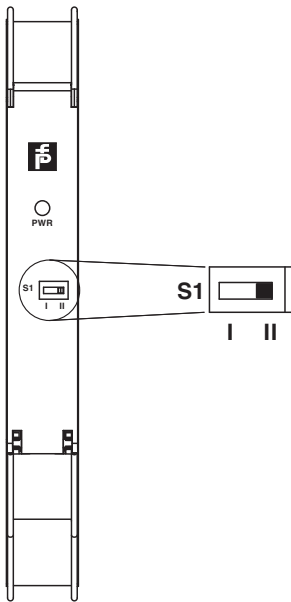
## Matching System Components

	<b>KFD2-EB2</b>	Power Feed Module
	<b>UPR-03</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 2 m
	<b>UPR-03-M</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 1,6 m
	<b>UPR-03-S</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 0.8 m
	<b>K-DUCT-BU</b>	Profile rail, wiring comb field side, blue
	<b>K-DUCT-BU-UPR-03</b>	Profile rail with UPR-03- * insert, 3 conductors, wiring comb field side, blue

## Accessories

	<b>EBP 2- 5</b>	Insertion bridge for connectors, 2-pin, fully insulated
	<b>KC-ST-5GN</b>	Terminal block for KC modules, 2-pin screw terminal, green
	<b>KC-ST-5BU</b>	Terminal block for KC modules, 2-pin screw terminal, blue
	<b>KF-CP</b>	Red coding pins, packaging unit: 20 x 6

Configuration



Switch position

Switch	Input	Position
S1	2-wire technique	II
	3-wire technique	I
	4-wire technique	II

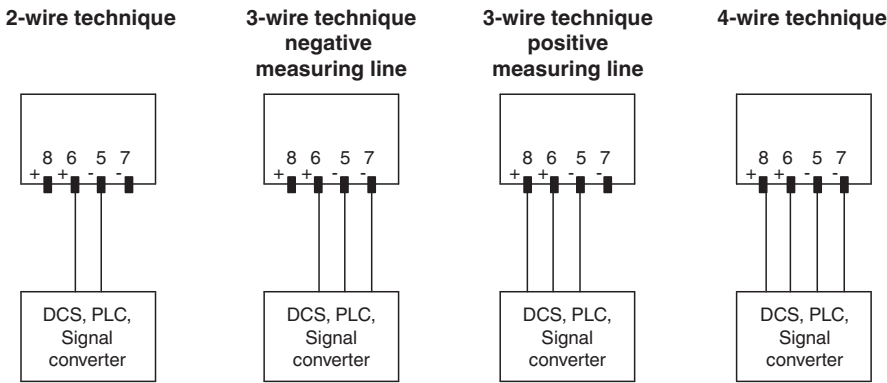
Factory settings: switch 1, in position I  
Refer to the next section for connection information.

Additional Information

Function

When a signal converter, a DCS or PLC is connected to terminals 5, 6, 7, and 8 (control side), the measuring current is transferred to terminals 2 and 4 (field side). The resulting voltage at terminals 1, and 3 is transferred to terminals 5, 6, 7, and 8. In the case of fast multiplex input cards, transmission problems might be experienced in connection with low resistance values and/or high sensor currents. For data see rise time. The quoted accuracy is for a 4-wire technique connection. The accuracy in 3-wire technique will depend on the matching of the line resistance.

Connection types control side (safe area)



Connection types field side (hazardous area)

The resistance in the hazardous area can be measured with a 2-, 3- or 4-wire technique.

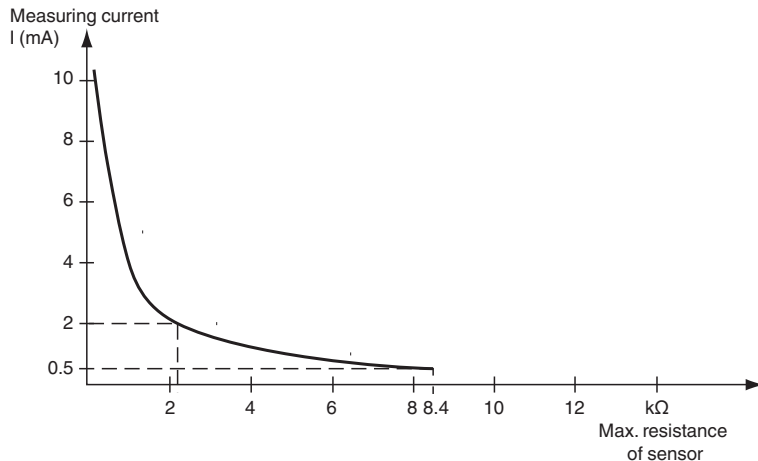
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- 2-wire technique:  
Link terminals 1 and 2 and terminals 3 and 4. Connect the resistance to terminal 4 and terminal 2. Switch S1 in the position II.
- 3-wire technique:  
Link terminals 1 and 2. Connect the resistance to terminals 3 and 4 and terminal 2. Switch S1 in the position I.
- 4-wire technique  
Connect the resistance to terminals 3 and 4 and terminals 1 and 2. Switch S1 in the position II.

### Measurement range

The resistance repeater can convey a maximum of 10 mA and a maximum of 4.2 V. The maximum connectable resistance value can be calculated with the following equation: resistance value = 4.2 V / measuring current

The measuring current is determined by control.



An example of the maximum transferable resistance value:

- 4.2 kΩ at 1 mA measuring current
- 420 Ω at 10 mA measuring current

### Line Fault Detection (LFD)

The output will indicate less than 15 Ω or greater than 400 Ω for a lead breakage at terminals 1, 2, 3 or 4 for measuring current of less than or equal to 10 mA i. e. out of range for Pt100.