Resistance Repeater

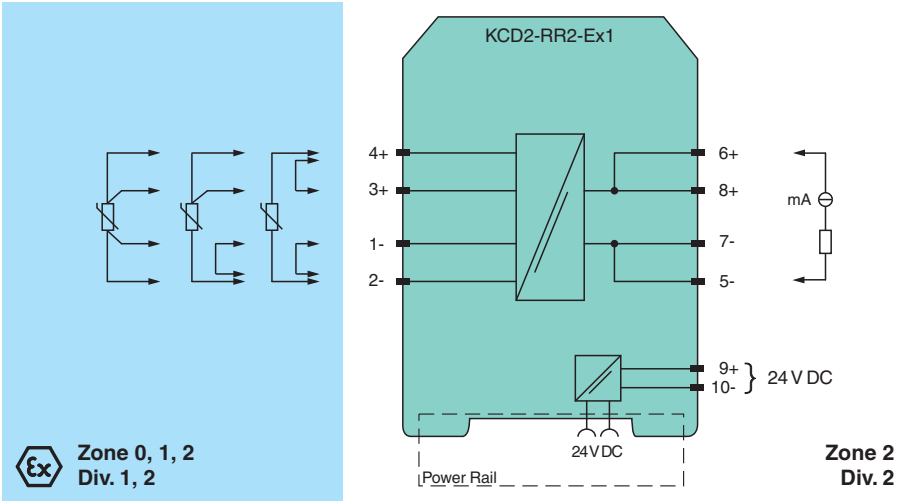
KCD2-RR2-Ex1-AB

- 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		
Connection side		field side

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Technical Data

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
Output		
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
Transfer characteristics		
Accuracy		0.1 %
Deviation		I_m ≥ 1 mA: ±0.1 % of R_m or ± 0.1 Ω (the larger value is applicable) I_m < 1 mA: accuracy reduces in proportion to I_m. e. g. I_m = 0.1 mA: ± 1 % of R_m or 1 Ω (the larger value is applicable).
Influence of ambient temperature		I_m ≥ 1 mA, R_m ≥ 100 Ω: 0.01 %/K in the range -20 ... +70 °C (-4 ... 158 °F) I_m < 1 mA or R_m < 100 Ω: temperature stability reduces in proportion to I_m or R_m
Settling time		≤ 5 ms
Rise time/fall time		≤ 2 ms (10 ... 90%)
Galvanic isolation		
Output/power supply		functional insulation, rated insulation voltage 50 V AC
Indicators/settings		
Display elements		LED
Control elements		DIP switch
Configuration		via DIP switches
Labeling		space for labeling at the front
Directive conformity		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326-1:2013 (industrial locations)
Conformity		
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
Ambient conditions		
Ambient temperature		-40 ... 70 °C (-40 ... 158 °F)
Mechanical specifications		
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
Data for application in connection with hazardous areas		
EU-type examination certificate		BASEEFA 10 ATEX 0061X
Marking		⟨Ex⟩ II (1)G [Ex ia Ga] IIC ⟨Ex⟩ II (1)D [Ex ia Da] IIIC ⟨Ex⟩ 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
Supply		

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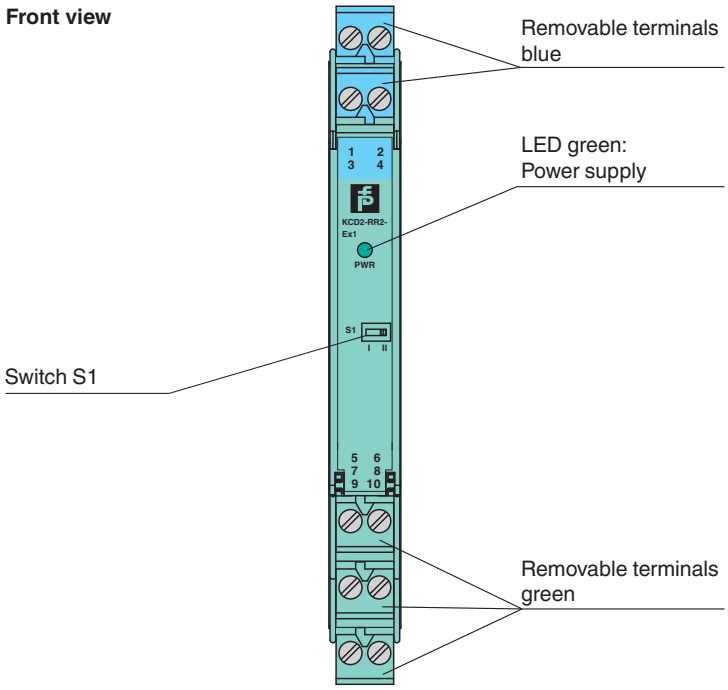
Maximum safe voltage	U_m	250 V (Attention! The rated voltage can be lower.)
Output		
Maximum safe voltage	U_m	250 V (Attention! The rated voltage can be lower.)
Certificate		BASEEFA 10 ATEX 0062X
Marking		Ⓔx II 3G Ex ec IIC T4 Gc
Galvanic isolation		
Input/Output		safe electrical isolation acc. to IEC/EN 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 www.pepperl-fuchs.com.

Assembly

Front view



Matching System Components

	**KFD2-EB2**	Power Feed Module

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Matching System Components

	**UPR-03-AB**	Universal Power Rail with end caps and cover, 3 conductors, length: 2 m
	**UPR-03-S-AB**	Universal Power Rail with end caps and cover, 3 conductors, length: 0.8 m
	**K-DUCT-BU**	Profile rail, wiring comb field side, blue
	**K-DUCT-BU-UPR-03**	Profile rail with UPR-03- * insert, 3 conductors, wiring comb field side, blue

Accessories

	**KC-ST-5GN**	Terminal block for KC modules, 2-pin screw terminal, green
	**KC-ST-5BU**	Terminal block for KC modules, 2-pin screw terminal, blue
	**KF-CP**	Red coding pins, packaging unit: 20 x 6

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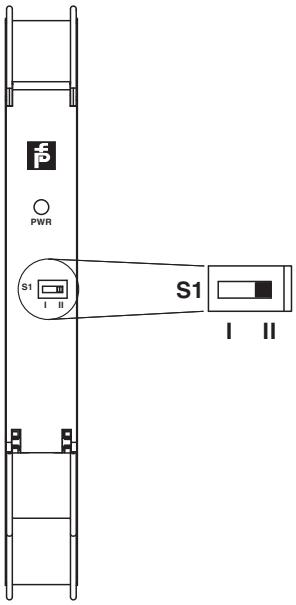
Configuration



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

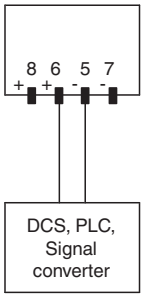
When a signal converter, a DCS or PLC is connected to terminals 5, 6, 7, and 8 (control side), the measuring current is transferred to terminals 2 and 4 (field side). The resulting voltage at terminals 1, and 3 is transferred to terminals 5, 6, 7, and 8.

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.

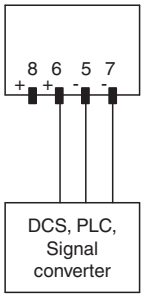
The quoted accuracy is for a 4-wire technique connection. The accuracy in 3-wire technique will depend on the matching of the line resistance.

Connection types control side (safe area)

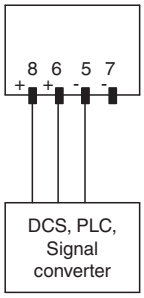
2-wire technique



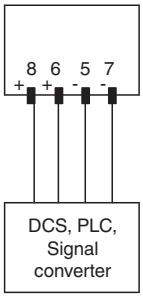
3-wire technique negative measuring line



3-wire technique positive measuring line



4-wire technique



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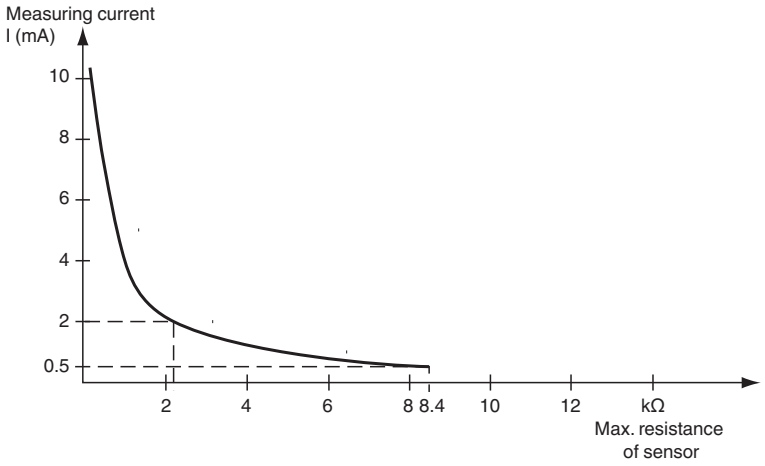
- 2-wire technique:
  Link terminals 1 and 2 and terminals 3 and 4. Connect the resistance to terminal 4 and terminal 2. Switch S1 in the position II.
- 3-wire technique:
  Link terminals 1 and 2. Connect the resistance to terminals 3 and 4 and terminal 2. Switch S1 in the position I.
- 4-wire technique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

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