

Resistance Repeater

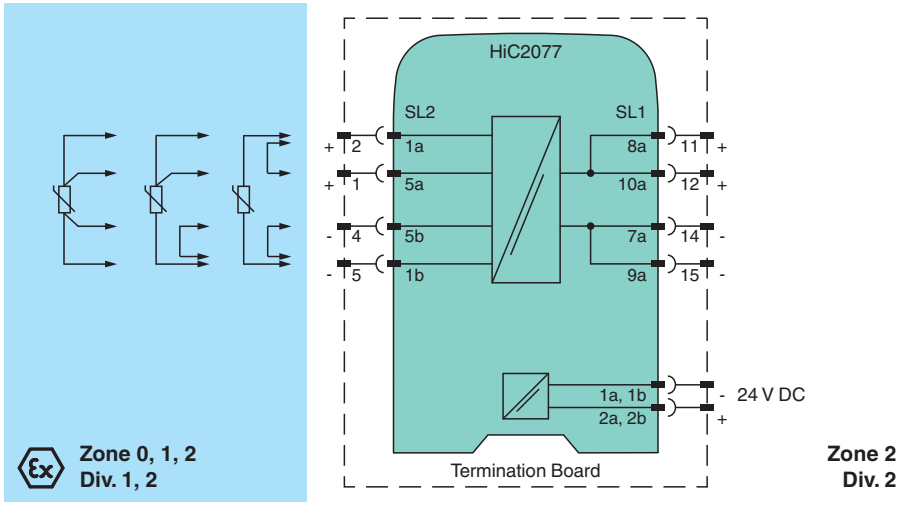
HiC2077

- 1-channel isolated barrier
- 24 V DC supply
- Resistance and RTD input (Pt100, Pt500, Pt1000)
- Resistance output
- Accuracy 0.1 %
- Line fault detection (LFD) for Pt100
- Up to SIL 2 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
Supply		
Connection		SL1: 1a(-), 1b(-); 2a(+), 2b(+)
Rated voltage	U_r	20 ... 30 V DC bus powered via Termination Board
Ripple		within the supply tolerance
Rated current	I_r	< 20 mA
Power consumption		0.35 W (24 V and 1 mA sense current)
Input		

Release date: 2022-01-10 Date of issue: 2022-01-10 Filename: 220200_eng.pdf

Technical Data

Connection side		field side
Connection		SL2: 5a(+), 1a(+), 1b(-), 5b(-)
Line fault detection		at Pt100
Lead resistance		≤ 10 % of resistance value
Transmission range		0 ... 10 mA
Available voltage		9 V
Line fault detection		8 nA
Output		
Connection side		control side
Connection		SL1: 8a(+), 10a(+), 7a(-), 9a(-)
Current		0 ... 10 mA
Available voltage		0 ... 4.2 V
Fault signal		< 18 Ω or > 400 Ω, depending on lead disconnected (measuring current ≤ 1mA)
Transfer characteristics		
Accuracy		< ± 0.1 % of full-scale value
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 ... +60 °C (-4 ... 140 °F) I_m < 1 mA or R_m < 100 Ω: temperature stability reduces in proportion to I_m or R_m
Rise time		signal response time ≤ 2 ms (10 ... 90 %) response to application of I_m: R_m > 50 Ω and I_m < 5mA: < 5ms response to application of I_m: R_m > 30 Ω and I_m < 5mA: < 10ms response to application of I_m: R_m > 18 Ω and I_m < 5mA: < 20ms
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 21:2006 For further information see system description.
Degree of protection		IEC 60529
Protection against electrical shock		UL 61010-1
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications		
Degree of protection		IP20
Mass		approx. 100 g
Dimensions		12.5 x 106 x 128 mm (0.5 x 4.2 x 5.1 inch) (W x H x D)
Mounting		on Termination Board
Coding		pin 1, 3 and 4 trimmed For further information see system description.
Data for application in connection with hazardous areas		
EU-type examination certificate		BASEEFA 10 ATEX 0263X
Marking		⟨Ex⟩ II (1)GD, I (M1), [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]
Voltage	U_o	12.4 V
Current	I_o	17.4 mA
Power	P_o	54 mW
Supply		

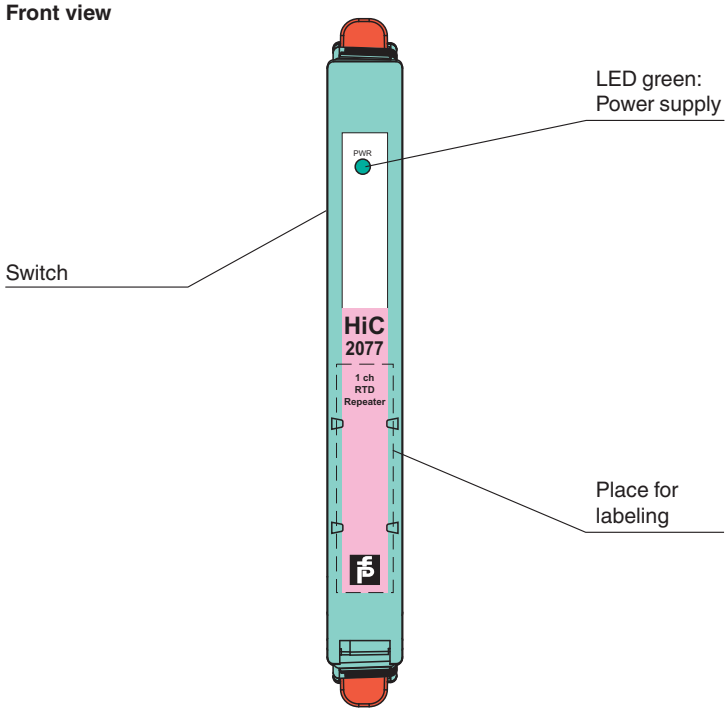
Release date: 2022-01-10 Date of issue: 2022-01-10 Filename: 220200_eng.pdf

Technical Data

Maximum safe voltage	U_m	253 V (Attention! The rated voltage can be lower.)
Output		
Maximum safe voltage	U_m	253 V (Attention! The rated voltage can be lower.)
Certificate		BASEEFA 10 ATEX 0264X
Marking		Ⓔx II 3G Ex nA II T4
Galvanic isolation		
Input/Output		safe galvanic isolation acc. to IEC 60079-11, voltage peak value 375 V
Input/power supply		safe galvanic isolation acc. to IEC 60079-11, voltage peak value 375 V
Directive conformity		
Directive 2014/34/EU		EN 60079-0:2012+A11:2013 , EN 60079-11:2012 , EN 60079-15:2010
International approvals		
UL approval		
Control drawing		116-0333 (cULus)
IECEx approval		
IECEx certificate		IECEx BAS 10.0122X IECEx BAS 10.0123X
IECEx marking		[Zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I Ex nA II T4
General information		
Supplementary information		Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com.

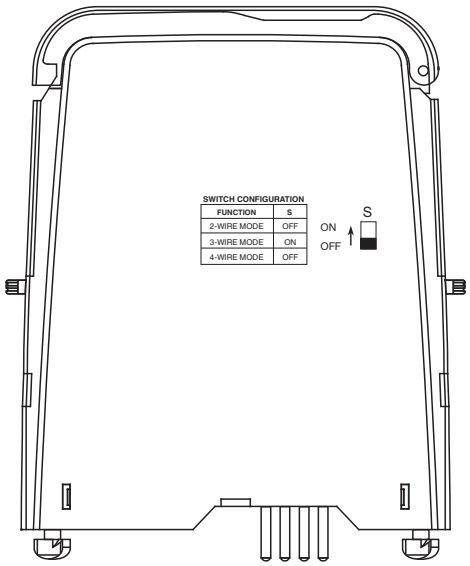
Assembly

Front view



Release date: 2022-01-10 Date of issue: 2022-01-10 Filename: 220200_eng.pdf

Configuration



Switch position

Function	S
2-wire mode	OFF
3-wire mode	ON
4-wire mode	OFF

Factory setting: 2-/4-wire mode

Configuration

Configure the device in the following way:

- Push the red Quick Lok Bars on each side of the device in the upper position.
- Remove the device from Termination Board.
- Set the DIP switches according to the figure.

The pins for this device are trimmed to polarize it according to its safety parameter. Do not change!
For further information see system description.

Additional Information

Function

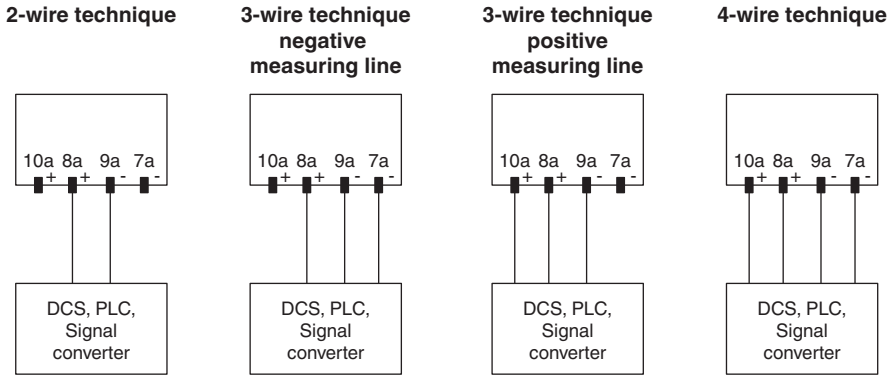
When a signal converter, a DCS or PLC is connected to terminals 8a, 10a, 7a and 9a (control side), the measuring current is transferred to terminals 1b and 1a (field side). The resulting voltage at terminals 5b, and 5a is transferred to terminals 8a, 10a, 7a and 9a.

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)

Release date: 2022-01-10 Date of issue: 2022-01-10 Filename: 220200_eng.pdf



Connection types field side (hazardous area)

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

- 2-wire technique:
  Link terminals 5b and 1b and terminals 5a and 1a. Connect the resistance to terminal 1a and terminal 1b. Switch S in the position OFF.
- 3-wire technique:
  Link terminals 5b and 1b. Connect the resistance to terminals 5a and 1a and terminal 1b. Switch S in the position ON.
- 4-wire technique
  Connect the resistance to terminals 5a and 1a and terminals 5b and 1b. Switch S in the position OFF.

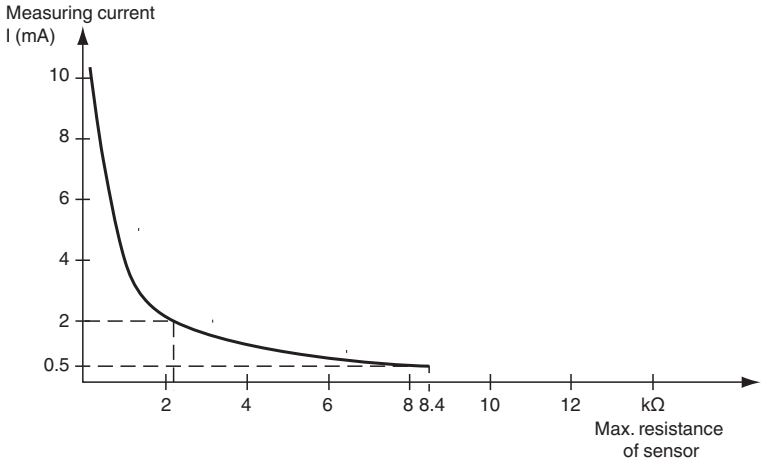
Measurement range

The resistance repeater can convey a maximum of 10 mA and a maximum of 7 V. The maximum connectable resistance value can be calculated with the following equations

- Resistance value = 4.2 V / measuring current
- Resistance value = 9 V / measuring current - 758 Ω

Use the smaller of these two resistance values as maximum allowed load.

The measuring current is determined by control.



An example of the maximum transferable resistance value:

- 8.4 kΩ at 0.5 mA measuring current
- 2.1 kΩ at 2 mA measuring current

Release date: 2022-01-10 Date of issue: 2022-01-10 Filename: 220200_eng.pdf

Line Fault Detection (LFD)

The output will indicate less than 10 Ω or greater than 400 Ω for a lead breakage at terminals 5a, 1a, 5b or 1b for measuring current of less than or equal to 1 mA i.e. out of range for Pt100.

Release date: 2022-01-10 Date of issue: 2022-01-10 Filename: 220200_eng.pdf