



# Resistance Repeater

## HiC2077

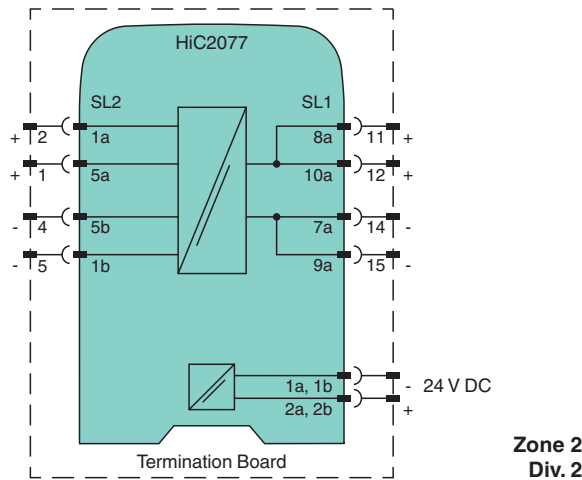
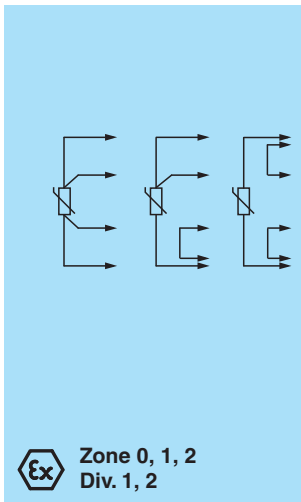
- 1-channel isolated barrier
- 24 V DC supply
- Resistance and RTD input (Pt100, Pt500, Pt1000)
- Resistance output
- Accuracy 0.1 %
- Line fault detection (LFD) for Pt100
- Up to SIL 2 acc. to IEC/EN 61508



### 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

<b>General specifications</b>	
Signal type	Analog input
<b>Functional safety related parameters</b>	
Safety Integrity Level (SIL)	SIL 2
<b>Supply</b>	
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)
<b>Input</b>	
Connection side	field side

Release date: 2023-06-05 Date of issue: 2023-06-05 Filename: 220200\_eng.pdf

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

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## Technical Data

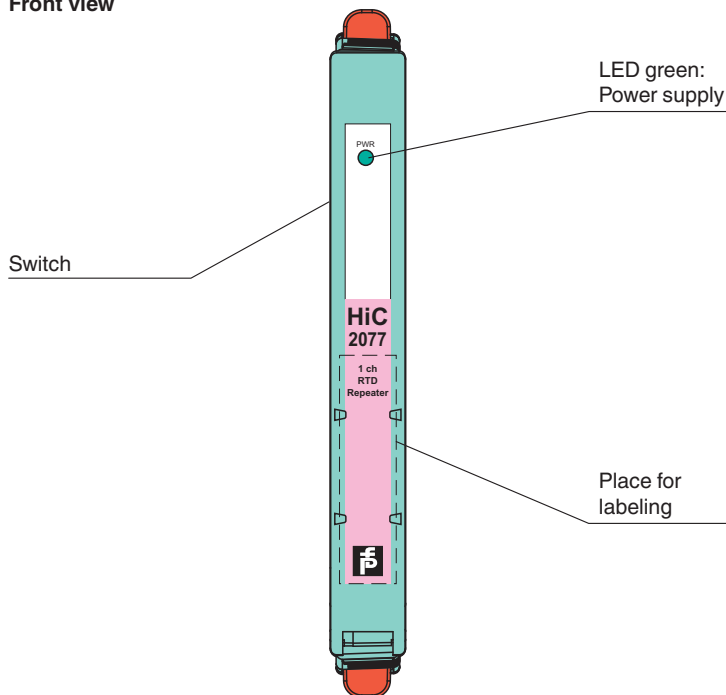
Connection		SL2: 5a(+), 1a(+), 1b(-), 5b(-)
Line fault detection		at Pt100
Lead resistance		≤ 10 % of resistance value
Transmission range		0 ... 10 mA
Available voltage		9 V
Line fault detection		8 nA
<b>Output</b>		
Connection side		control side
Connection		SL1: 8a(+), 10a(+), 7a(-), 9a(-)
Current		0 ... 10 mA
Available voltage		0 ... 4.2 V
Fault signal		< 18 Ω or > 400 Ω, depending on lead disconnected (measuring current ≤ 1mA)
<b>Transfer characteristics</b>		
Accuracy		< ± 0.1 % of full-scale value
Deviation		$I_m \geq 1 \text{ mA}$ : ±0.1 % of $R_m$ or ± 0.1 Ω (the larger value is applicable) $I_m < 1 \text{ mA}$ : accuracy reduces in proportion to $I_m$ . e. g. $I_m = 0.1 \text{ mA}$ : ± 1 % of $R_m$ or 1 Ω (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 ... +60 °C (-4 ... 140 °F) $I_m < 1 \text{ mA}$ or $R_m < 100 \Omega$ : temperature stability reduces in proportion to $I_m$ or $R_m$
Rise time		signal response time ≤ 2 ms (10 ... 90 %) response to application of $I_m$ : $R_m > 50 \Omega$ and $I_m < 5 \text{ mA}$ : < 5ms response to application of $I_m$ : $R_m > 30 \Omega$ and $I_m < 5 \text{ mA}$ : < 10ms response to application of $I_m$ : $R_m > 18 \Omega$ and $I_m < 5 \text{ mA}$ : < 20ms
<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 21:2006 For further information see system description.
Degree of protection		IEC 60529
Protection against electrical shock		UL 61010-1
<b>Ambient conditions</b>		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
<b>Mechanical specifications</b>		
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.
<b>Data for application in connection with hazardous areas</b>		
EU-type examination certificate		BASEEFA 10 ATEX 0263X
Marking		⊕ II (1)GD, I (M1), [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T <sub>amb</sub> ≤ 60 °C) [circuit(s) in zone 0/1/2]
Voltage	U <sub>o</sub>	12.4 V
Current	I <sub>o</sub>	17.4 mA
Power	P <sub>o</sub>	54 mW
<b>Supply</b>		
Maximum safe voltage	U <sub>m</sub>	253 V (Attention! The rated voltage can be lower.)

## Technical Data

<b>Output</b>	
Maximum safe voltage	$U_m$ 253 V (Attention! The rated voltage can be lower.)
Certificate	BASEEFA 10 ATEX 0264X
Marking	Ⓜ II 3G Ex nA II T4
<b>Galvanic isolation</b>	
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
<b>Directive conformity</b>	
Directive 2014/34/EU	EN 60079-0:2012+A11:2013 , EN 60079-11:2012 , EN 60079-15:2010
<b>International approvals</b>	
<b>UL approval</b>	
Control drawing	116-0333 (cULus)
<b>IECEX approval</b>	
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
<b>General information</b>	
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

### Front view



## Configuration

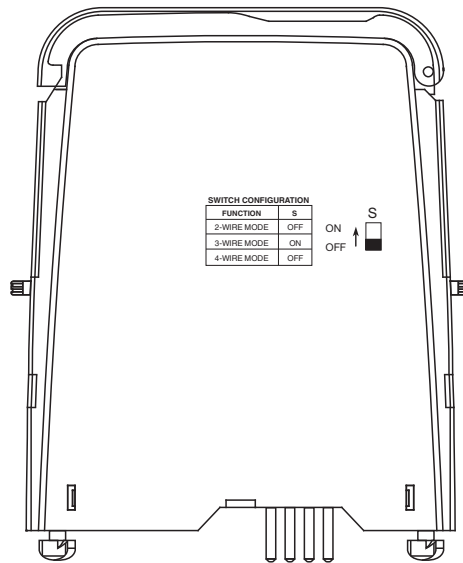
Configure the device in the following way:

- Push the red Quick Lok Bars on each side of the device in the upper position.
- Remove the device from termination board.
- Set the switches according to the figure in the **Configuration** section.

### Note

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

**Configuration**



**Switch position**

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

Factory setting: 2-/4-wire mode

**Additional Information**

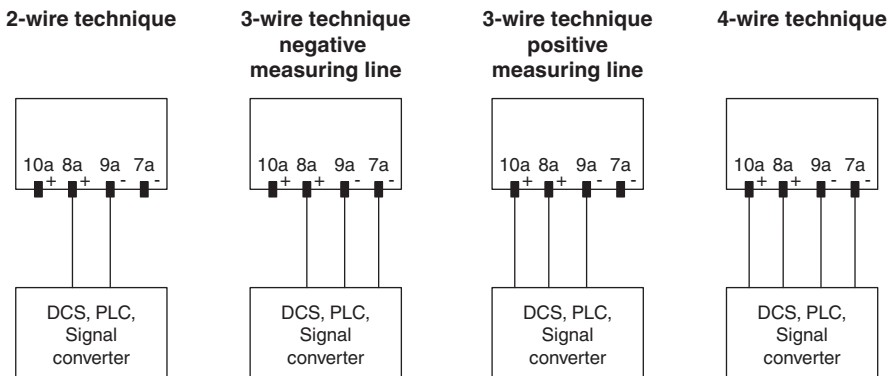
**Function**

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)**



**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.

Release date: 2023-06-05 Date of issue: 2023-06-05 Filename: 220200\_eng.pdf

- 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.

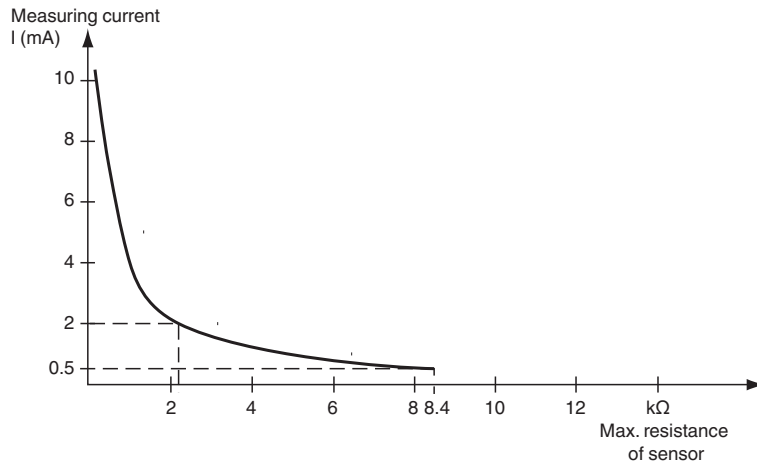
### Measurement range

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 =  $4.2 \text{ V} / \text{measuring current}$
- Resistance value =  $9 \text{ V} / \text{measuring current} - 758 \Omega$

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 k $\Omega$  at 0.5 mA measuring current
- 2.1 k $\Omega$  at 2 mA measuring current

## Line Fault Detection (LFD)

The output will indicate less than 10  $\Omega$  or greater than 400  $\Omega$  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.

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