SMART Transmitter Power Supply

HiC2027DE

- 1-channel isolated barrier
- 24 V DC supply (bus powered)
- Input for 2-wire SMART transmitters and current sources
- Signal splitter (1 input and 2 outputs)
- Dual output 0/4 mA ... 20 mA or 0/1 V ... 5 V
- Up to SIL 2 acc. to IEC/EN 61508

Function

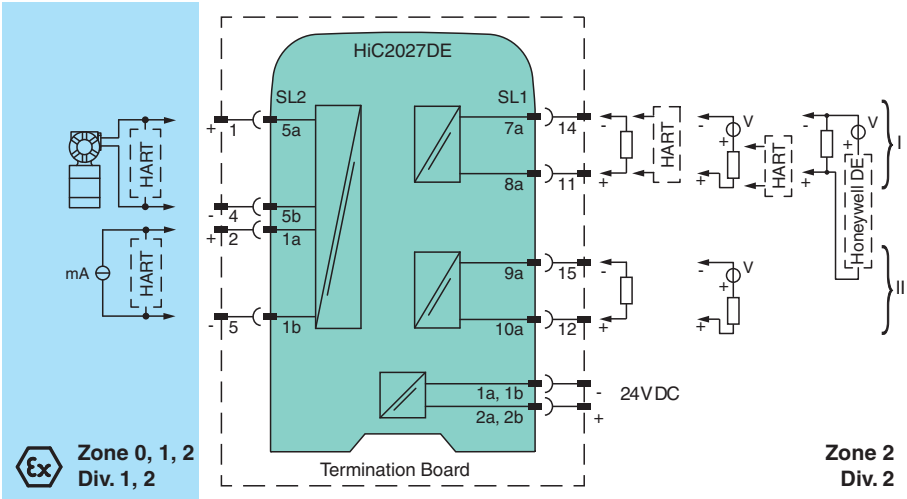
This isolated barrier is used for intrinsic safety applications.
The device supplies 2-wire transmitters in the hazardous area, and can also be used with current sources.
It transfers the analog input signal to the safe area as two isolated output signals.
Bi-directional communication is supported for SMART transmitters that use current modulation to transmit data and voltage modulation to receive data.
The output is selected as a current source, current sink, or voltage source via switches.
This device mounts on a HiC Termination Board.

Application

The device supports the following SMART protocols:

- HART
- BRAIN
- Honeywell DE

Connection



Technical Data

General specifications	
Signal type	Analog input
Functional safety related parameters	
Safety Integrity Level (SIL)	SIL 2
Supply	

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Technical Data

Connection		SL1: 1a, 1b(-); 2a, 2b(+)
Rated voltage	U_r	20 ... 30 V DC bus powered via Termination Board
Ripple		within the supply tolerance
Power dissipation		approx. 1.4 W at 20 mA transfer current, 250 Ω in both outputs
Power consumption		2 W
Input		
Connection side		field side
Connection		SL2: 5a(+), 5b(-): sink SL2: 1a(+), 1b(-), 7a(-): source
Input signal		0/4 ... 20 mA
Voltage drop		SL2: 1a(+), 1b(-), 7a(-): ≤ 6.1 V at 20 mA
Short-circuit current		SL2: 5a(+), 5b(-): 25 mA , wake up pulse: 36 mA, 20 ms (Honeywell DE)
Input resistance		SL2: 5a(+), 5b(-): max. 500 Ω (BRAIN) (250 Ω load)
Available voltage		SL2: 5a(+), 5b(-): ≥ 16 V at 20 mA , ≥ 18.5 V at 4 mA
Output		
Connection side		control side
Connection		SL1: 8a(+), 7a(-), channel 1: source and sink SL1: 10a(+), 9a(-), channel 2: source and sink
Load		channel 1: 0 ... 500 Ω (20 mA)/> 1 MΩ (5 V) channel 2: 0 ... 500 Ω (20 mA)/> 1 MΩ (5 V)
Output signal		0/4 ... 20 mA or 0/1 ... 5 V
Ripple		max. 50 µA $_{rms}$
Transfer characteristics		
Deviation		I_{out} < 20 µA (0.1 %); V_{out} < 10 mV (0.2 %) incl. calibration, linearity, hysteresis and fluctuation of supply voltage, at 20 °C (68 °F), 0/4 ... 20 mA, 0/1 ... 5 V
Influence of ambient temperature		current output: 0.25 µA/K voltage output: 80 µV/K
Frequency range		field side into the control side: bandwidth with 0.5 V_{pp} signal 0 ... 6 kHz (-3 dB) control side into the field side: bandwidth with 0.5 V_{pp} signal 0.3 ... 6 kHz (-3 dB) [DE 1 kHz (-3 dB)]
Settling time		6 ms
Rise time/fall time		2 ms
Galvanic isolation		
Output/power supply		functional insulation, rated insulation voltage 50 V AC
Output/Output		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 21:2012 EN 61326-3-2:2008
Degree of protection		IEC 60529:2001
Protection against electrical shock		UL 61010-1:2012
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

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Technical Data

Coding		pin 2 and 3 trimmed For further information see system description.
Data for application in connection with hazardous areas		
EU-type examination certificate		BASEEFA 13 ATEX 0075 X
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
Supply		
Maximum safe voltage	U_m	250 V (Attention! The rated voltage can be lower.)
Equipment		terminals 5a, 5b
Voltage	U_o	25.2 V
Voltage	U_q	28.2 V
Current	I_o	93 mA
Power	P_o	656 mW
Internal capacitance	C_i	12 nF
Internal inductance	L_i	0 mH
Equipment		terminals 1a, 1b, 7a
Voltage	U_i	30 V
Current	I_i	115 mA
Power	P_i	700 mW
Voltage	U_o	5 V
Current	I_o	6.8 mA
Power	P_o	1.6 mW
Output		
Maximum safe voltage	U_m	250 V (Attention! The rated voltage can be lower.)
Certificate		BASEEFA 13 ATEX 0076 X
Marking		⟨Ex⟩ II 3G Ex nA IIC T4 Gc
Galvanic isolation		
Input/Output		safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Input/power supply		safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Directive conformity		
Directive 2014/34/EU		EN IEC 60079-0:2018+AC:2020 , EN 60079-11:2012 , EN 60079-15:2010
International approvals		
UL approval		E106378
Control drawing		116-0349 (cULus)
IECEx approval		
IECEx certificate		IECEx BAS 13.0042X
IECEx marking		[Ex ia Ga] IIC , [Ex ia Da] IIIC , [Ex ia Ma] I
General information		
Note		Both output loads must be connected to ensure complete and correct operation within the technical specification.
Supplementary information		Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com.

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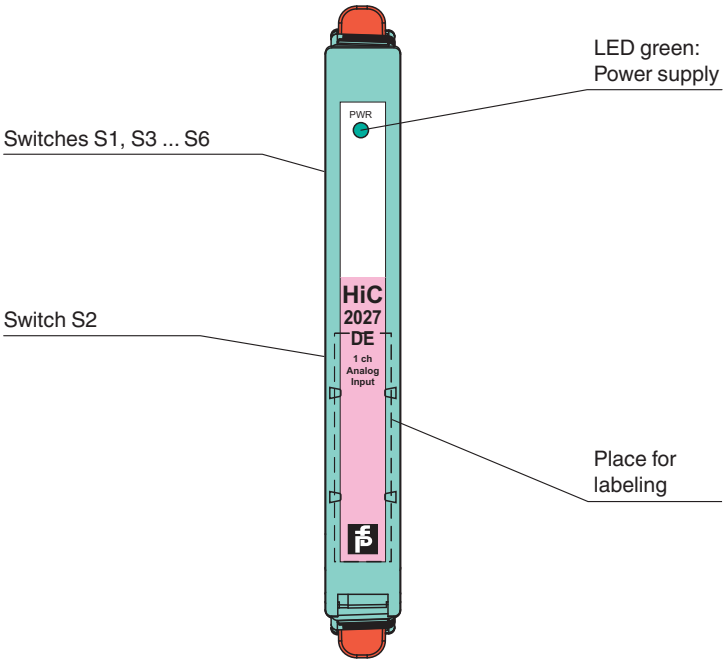
Assembly

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.

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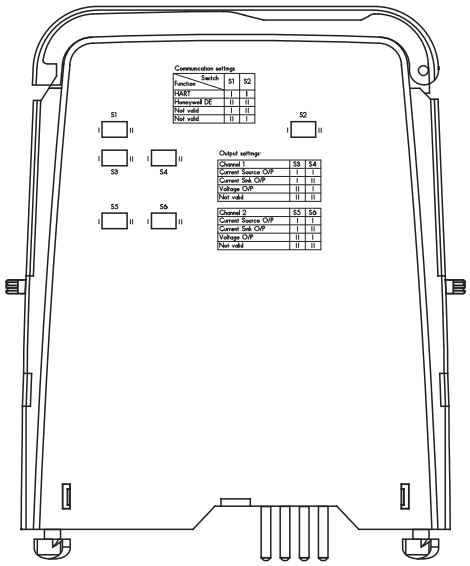
Configuration



Communication switch settings

Function	S1	S2
HART transparency	I	I
Honeywell DE transparency	II	II
Not valid	I	II
Not valid	II	I

Output switch settings

Channel 1	S3	S4
Current source output	I	I
Current sink output	I	II
Voltage output	II	I
Not valid	II	II

Channel 2	S5	S6
Current source output	I	I
Current sink output	I	II
Voltage output	II	I
Not valid	II	II

Factory settings: current source output, for both channels with HART transparency.

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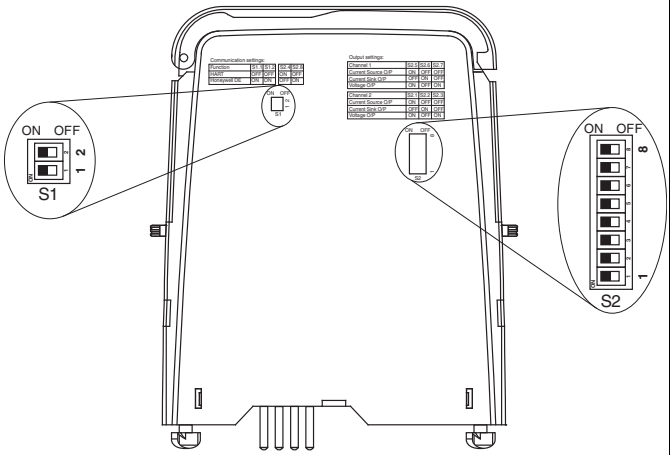
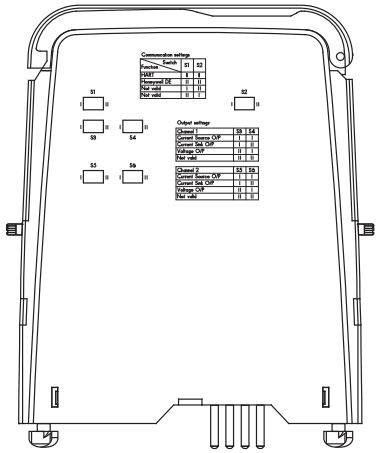
The device has a predecessor which has other position and function of the switches. The differences between the switches and their function can be seen in the following table.

Previous device	**New device**
HiC2027DE, part number 230687	**HiC2027DE, part number 272953**
	

Communication switch settings

Function	**S1.1**	**S1.2**	**S2.4**	**S2.8**
HART transparency	OFF	OFF	ON	OFF
Honeywell DE transparency	ON	ON	OFF	ON
–				
–				

Output switch settings

Channel 1	**S2.5**	**S2.6**	**S2.7**
Current source output	ON	OFF	OFF
Current sink output	OFF	ON	OFF
Voltage output	ON	OFF	ON
–			

Channel 2	**S2.1**	**S2.2**	**S2.3**
Current source output	ON	OFF	OFF
Current sink output	OFF	ON	OFF
Voltage output	ON	OFF	ON
–			

Communication switch settings

Function	**S1**	**S2**
HART transparency	I	I
Honeywell DE transparency	II	II
Not valid	I	II
Not valid	II	I

Output switch settings

Channel 1	**S3**	**S4**
Current source output	I	I
Current sink output	I	II
Voltage output	II	I
Not valid	II	II

Channel 2	**S5**	**S6**
Current source output	I	I
Current sink output	I	II
Voltage output	II	I
Not valid	II	II

Factory settings: current source output, for both channels with HART transparency.

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