



Voltage Repeater HiD2096

SIL 2

- 2-channel isolated barrier
- 24 V DC supply (bus powered)
- Voltage input 0 V ... -20 V
- Vibration sensor inputs
- Voltage/current field supply
- Voltage output 0 V ... -20 V
- Up to SIL 2 acc. to IEC 61508



Function

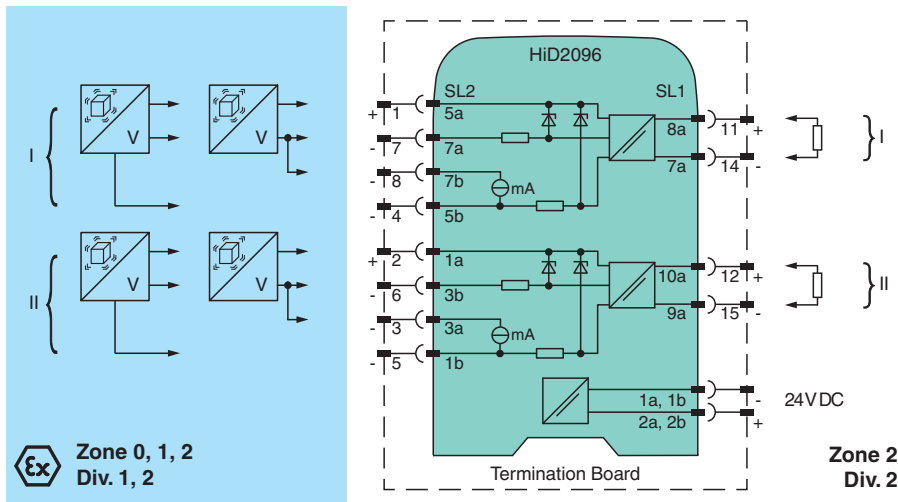
This isolated barrier is used for intrinsic safety applications.

It provides a floating output to power a vibration sensor (e. g., Bently Nevada) or accelerometer in a hazardous area and transfers the voltage signal from that sensor to the safe area.

The device is designed to provide a voltage or current supply to the vibration sensor. Depending on DIP switch setting the barrier provides 3.7 mA, 5.3 mA, or 9.0 mA supply current for 2-wire sensors, or 18 V at 20 mA for 3-wire sensors.

This barrier mounts on a HiD system termination board.

Connection



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

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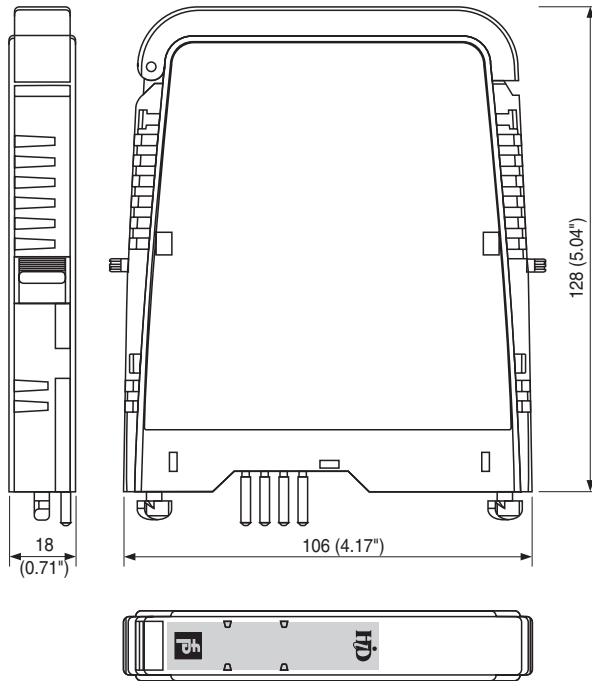
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Dimensions



Technical Data

General specifications

Signal type	Analog input
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Functional safety related parameters

Safety Integrity Level (SIL)	SIL 2
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Supply

Connection	SL1: 1a(-), 1b(-); 2a(+), 2b(+)
Rated voltage	U_r 20.4 ... 30 V DC bus powered via Termination Board
Ripple	within the supply tolerance
Power consumption	≤ 2.6 W

Input

Connection side	field side
Connection	SL2: 5a (common), 5b or 7b (supply -), 7a (input -) 1a (common), 1b or 3a (supply -), 3b (signal -)
Input resistance	10 k Ω terminals 5a and 7a and terminals 1a and 3b
Output rated operating current	SL2: 5a (common), 5b: > 10 mA at -21 V or > 20 mA at -18 V SL2: 1a (common), 1b: > 10 mA at -21 V or > 20 mA at -18 V SL2: 5a (common), 7b: 3.7 ± 0.26 mA, 5.3 ± 0.34 mA or 9.0 ± 0.55 mA, dependent on switch settings (see configuration) SL2: 1a (common), 3a: 3.7 ± 0.26 mA, 5.3 ± 0.34 mA or 9.0 ± 0.55 mA, dependent on switch settings (see configuration)
Transmission range	0 ... -20 V

Output

Connection side	control side
Connection	SL1: 8a(+), 7a(-); 10a(+), 9a(-)
Voltage	0 ... -20 V
Load	min. 9 k Ω
Output resistance	24 Ω typ., 27 Ω maximum Since this is much less than the end-to-end resistance of a zener barrier, it may be necessary to specify a monitor intended for use without a barrier. Please follow the advice of the monitor manufacturer.

Transfer characteristics

Deviation	DC transfer error (with 10 k Ω load) < 10 mV
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Technical Data

After calibration	additional error with AC superimposed is ± 5 mV at 20 °C (68 °F) at any point within the span, provided that the alternating component of the input voltage is not excessive, e. g. - square waves (0 ... 20 kHz): 5 V _{pp} - sine waves (0 ... 20 kHz): the full span of 20 V _{pp} (= 100 g peak acceleration at 100 mV/g) is acceptable.	
Influence of ambient temperature	(< 100 ppm of span)/K at any point within the span	
Bandwidth	-0.1 dB at 10 kHz; -1 dB at 20 kHz	
Time delay relative to input	7.0 ± 0.3 μs	
Ripple	in 200 kHz bandwidth < 20 mV _{rms} in 20 kHz bandwidth < 3 mV _{rms}	
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. 140 g	
Dimensions	18 x 106 x 128 mm (0.7 x 4.2 x 5 inch)	
Mounting	on Termination Board	
Coding	pin 2 trimmed For further information see system description.	
Data for application in connection with hazardous areas		
EU-type examination certificate	BASEEFA 11 ATEX 0021X	
Marking	Ⓜ II (1)GD, I (M1) [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I (-20 °C ≤ T _{amb} ≤ 60 °C) , [circuit(s) in zone 0/1/2]	
Voltage	U _o	26.4 V
Current	I _o	93 mA
Power	P _o	583 mW
Output		
Maximum safe voltage	U _m	253 V (Attention! The rated voltage is lower.)
Certificate	BASEEFA 11 ATEX 0022X	
Marking	Ⓜ II 3G Ex ec IIC T4 Gc [device in zone 2]	
Galvanic isolation		
Input/Output	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V	
Directive conformity		
Directive 2014/34/EU	EN 60079-0:2012+A11:2013 , EN 60079-11:2012 , EN 60079-7:2015	
International approvals		
UL approval		
Control drawing	116-0346 (cULus)	
IECEx approval		
IECEx certificate	IECEx BAS 11.0012X IECEx BAS 11.0013X	

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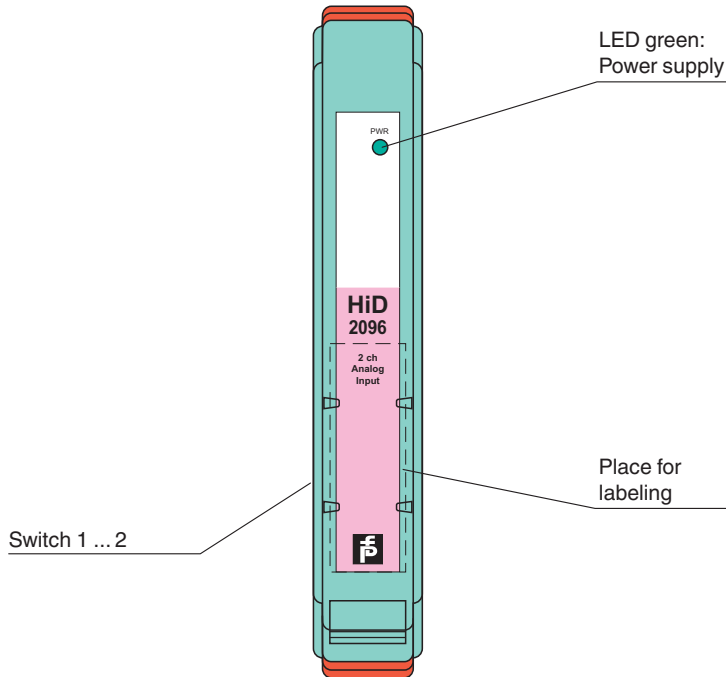
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Technical Data

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



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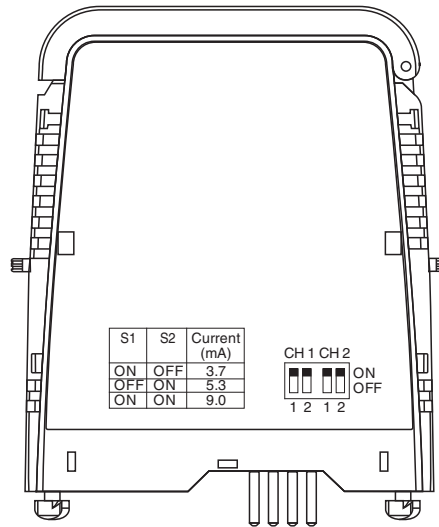
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Configuration



Switch position

Function	CH 1		CH 2	
	S1	S2	S1	S2
Current 3.7 mA	ON	OFF	ON	OFF
Current 5.3 mA	OFF	ON	OFF	ON
Current 9.0 mA	ON	ON	ON	ON

Factory setting: current 9.0 mA

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.

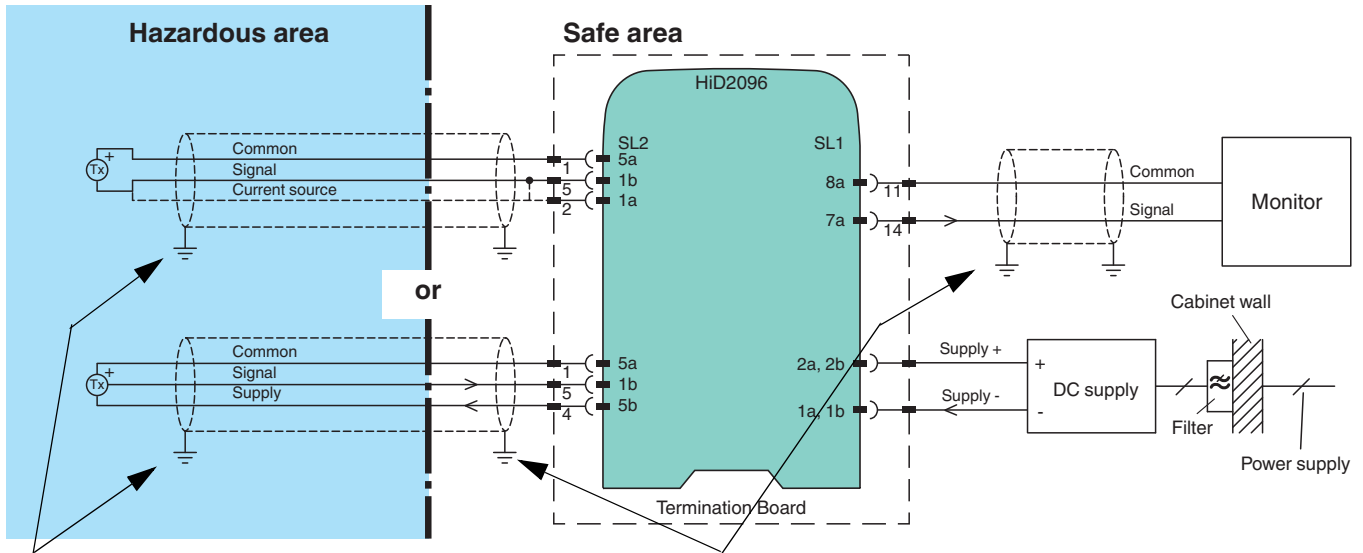
Additional Information

Installation



The terminal numbers below refer to channel 1. For channel 2 terminals see connection diagram and technical data.

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If the transducer and probe are isolated from ground, the cable screen may be left unconnected at this end but must be securely insulated. If the transducer circuitry is connected or decoupled to ground the screen must be securely grounded.

Cable screens should be grounded in the gland where the cable enters the barrier cabinet.

In general, please follow the recommendations of the transducer manufacturer.

Function

Vibration monitoring sensors with 2-wire connection:

2-wire accelerometers and velocity indication devices are supplied with a fixed current and indicate what they are sensing by varying their own supply voltage - often by ± 5 V about a quiescent level of about 10 V. Those sensors are connected to terminals 5a (1) and 7b (8) with a link between terminals 7b (8) and 7a (7).

Terminal 7b (8) provides a constant current which can be set by means of switches to approximately 3.7 mA, 5.3 mA or 9.0 mA. The switches are accessible via a hole situated in the side of the housing.

Example:

As an example, a 2-wire accelerometer requiring a minimum of 4 mA supply current (S1 = OFF, S2 = ON) and changing its own supply voltage by 100 mV for each "g" that it experiences would be connected between terminals 5a (1) and 7b (8) with a link between terminals 7b (8) and 7a (7). In that condition there may be around 10 V between terminals 5a (1) and 7b (8) under quiescent conditions. If it were capable of indication up to 50 g in each direction then the voltage between terminals 8a (11) and 7a (14) would vary between 5 V (indicating +50 g) and 15 V (indicating -50 g).

Vibration monitoring sensors with 3-wire connection:

Commonly 3-wire analog proximity sensors are used to indicate shaft proximity and can "see" movements due to vibration which they indicate as a varying voltage level on the 3rd wire. Those sensors are connected to terminals 5a (1), 5b (4) and 7a (7) with power supplied through terminals 5a (1) and 5b (4) and the signal connected to terminal 7a (7). For a 3-wire sensor taking 10 mA, terminal 5b (4) would be at approximately -21 V with respect to the common terminal 5a (1) and the signal on the 3rd wire, connected to terminal 7a (7), would be able to vary between 0 and -19 V, or so, with respect to common.

Terminal 5a (1), the most positive terminal on the hazardous side, is regarded as "common". There is an open circuit voltage of about 24 V DC between terminals 5a (1) and 5b (4) but terminal 5b (4) has a resistance of about 300 Ω in series with it so the voltage falls to about 21 V at 10 mA and about 18 V at 20 mA. The DC voltage at terminal 7a (7) (referred to the "common") is repeated at terminal 7a (14) using terminal 8a (11) as the "common" on the safe side of the circuit.

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