

Solenoid Driver

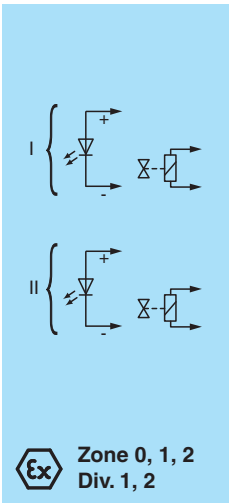
HiD2876

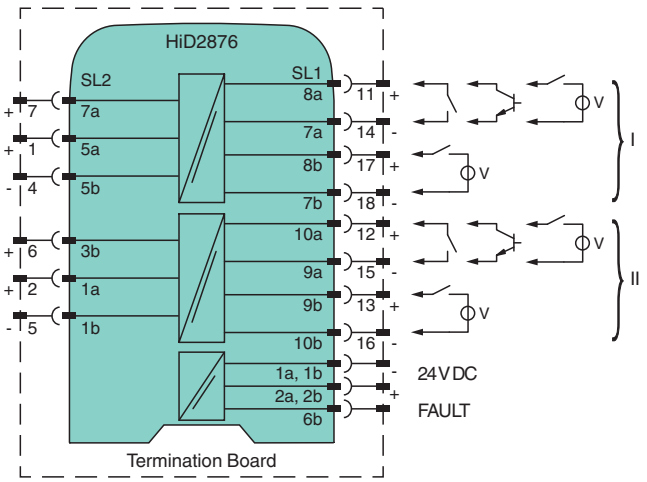
- 2-channel isolated barrier
- 24 V DC supply (bus or loop powered)
- Output 40 mA at 11.2 V DC, 55 mA current limit
- Contact or logic control input
- Entity parameter I_o/I_{sc} = 93 mA
- Line fault detection (LFD)
- Up to SIL 3 acc. to IEC/EN 61508 (loop powered)

Function

This isolated barrier is used for intrinsic safety applications.
It supplies power to solenoids, LEDs, and audible alarms, located in a hazardous area.
It is controlled with a loop-powered control signal, switch contact, transistor, or logic signal.
At full load, 11.2 V at 40 mA (with 55 mA current limit) is available for the hazardous area application.
An alternative low current output is available for driving a single LED without installing an external current limiting resistor.
Line fault detection of the field circuit is indicated by a red LED and an output on the fault bus.
This device mounts on a HiD Termination Board.

Connection





Technical Data

General specifications		
Signal type		Digital Output
Functional safety related parameters		
Safety Integrity Level (SIL)		SIL 3
Systematic capability (SC)		SC 3
Supply		
Connection		SL1: 1a(-), 1b(-); 2a(+), 2b(+)
Rated voltage	U_r	20.4 ... 30 V DC loop powered 20.4 ... 30 V DC bus powered via Termination Board
Input current		62 mA at 24 V, 300 Ω load (per channel)

Release date: 2022-01-05 Date of issue: 2022-01-05 Filename: 278767_eng.pdf

Technical Data

Power dissipation		1 W at 24 V, 300 Ω load (per channel)
Input		
Connection side		control side
Connection		SL1: 8a(+), 7a(-); 10a(+), 9a(-) bus powered SL1: 8b(+), 7b(-); 9b(+), 10b(-) loop powered
Control input		external switch (dry contact or open collector) non isolated or logic signal input fully floating
Signal level		1-signal: 15...30 V DC (current limited at 3 mA) or contact close (internal 10 kΩ pull-up) 0-signal: 0...5 V DC or contact open
Power dissipation		1 W at 24 V, 300 Ω load (per channel) for loop powered
Inrush current		0.2 A , 15 ms loop powered
Output		
Connection side		field side
Connection		SL2: 5a(+), 5b(-), 7a(+); 1a(+), 1b(-), 3b(+)
Internal resistor	R_i	approx. 280 Ω
Current	I_e	≤ 40 mA
Voltage	U_e	≥ 11.2 V
Current limit	I_{max}	55 mA
Open loop voltage	U_s	approx. 22.5 V
Load		nominal 0.1 ... 5 kΩ
Switching frequency	f	- bus powered: filter OFF: max. 150 Hz, filter ON: max. 15 Hz - loop powered: max. 10 Hz
Energized/De-energized delay		- bus powered: filter OFF: 1 ms, filter ON: 10 ms - loop powered: switch-on 50 ms, switch-off 6 ms (300 Ω load)
Fault indication output		
Connection		SL1: 6b
Output type		open collector transistor (internal fault bus)
Fault current		4 mA pulsing (20 ms ON, 200 ms OFF)
Fault level		lead short-circuit detection at < 25 Ω lead breakage detection at > 100 kΩ typical
Galvanic isolation		
Output/Output		safe electrical isolation acc. to EN 60079-11: 2007, voltage peak value 60 V
Output/power supply, inputs, and collective error		safe electrical isolation acc. to EN 60079-11: 2007, voltage peak value 375 V
Indicators/settings		
Display elements		LEDs
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 60529:2001
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
Relative humidity		5 ... 90 %, non-condensing up to 35 °C (95 °F)
Mechanical specifications		
Degree of protection		IP20
Mass		approx. 140 g
Dimensions		18 x 114 x 130 mm (0.7 x 4.5 x 5.1 inch) (W x H x D)
Mounting		on Termination Board
Coding		pin 1 and 3 trimmed For further information see system description.

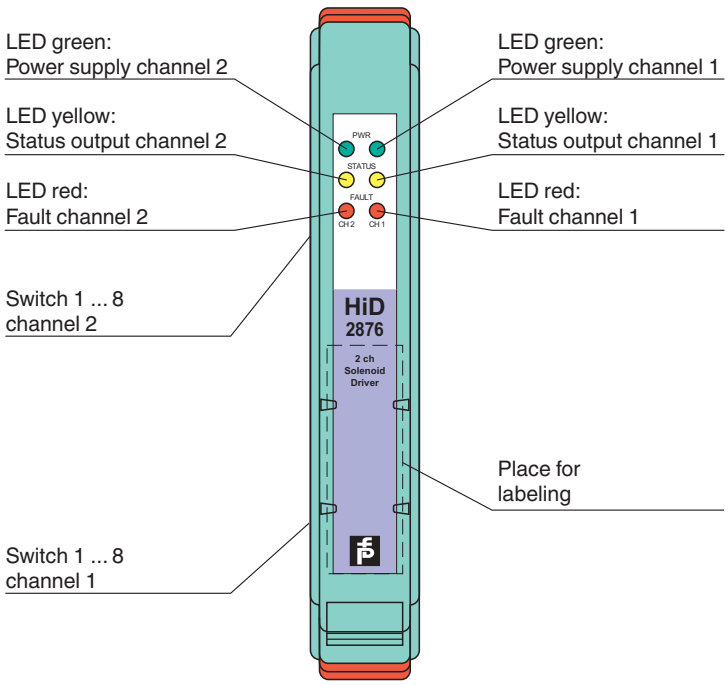
Release date: 2022-01-05 Date of issue: 2022-01-05 Filename: 278767_eng.pdf

Technical Data

Data for application in connection with hazardous areas		
EU-type examination certificate		CESI 10 ATEX 036
Marking		⟨Ex⟩ II (1)G [Ex ia Ga] IIC ⟨Ex⟩ II (1)D [Ex ia Da] IIIC ⟨Ex⟩ I (M1) [Ex ia Ma] I
Output		Ex ia Ga, Ex ia Da, Ex ia Ma
Voltage	U_o	26 V
Current	I_o	93 mA
Power	P_o	605 mW
Supply		
Maximum safe voltage	U_m	253 V AC (Attention! U_m is no rated voltage.)
Certificate		PF 10 CERT 1729 X
Marking		⟨Ex⟩ II 3G Ex nA IIC T4 Gc
Directive conformity		
Directive 2014/34/EU		EN 60079-0:2012+A11:2013 , EN 60079-11:2012 , EN 60079-15:2010
International approvals		
CSA approval		
Control drawing		366-005CS-12B (cCSAus)
IECEx approval		
IECEx certificate		IECEx CES 10.0013
IECEx marking		[Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I
General information		
Supplementary information		Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com.

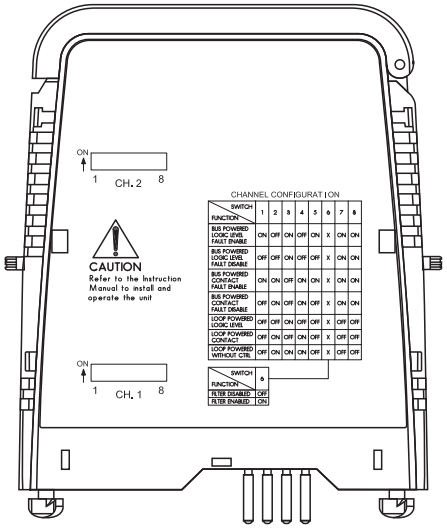
Assembly

Front view



Release date: 2022-01-05 Date of issue: 2022-01-05 Filename: 278767_eng.pdf

Configuration



Switch settings

Switches for channel I and II	S1	S2	S3	S4	S5	S6	S7	S8
Function								
• Bus powered • Control input: logic signal • Line fault detection enabled	ON	OFF	ON	OFF	ON	X	ON	ON
• Bus powered • Control input: logic signal • Line fault detection disabled	OFF	OFF	ON	OFF	OFF	X	ON	ON
• Bus powered • Control input: contact • Line fault detection enabled	ON	ON	OFF	ON	ON	X	ON	ON
• Bus powered • Control input: contact • Line fault detection disabled	OFF	ON	OFF	ON	OFF	X	ON	ON
• Loop powered • Control input: logic signal • Line fault detection disabled	OFF	OFF	ON	OFF	OFF	X	OFF	OFF
• Loop powered • Control input: contact • Line fault detection disabled	OFF	ON	OFF	ON	OFF	X	OFF	OFF
• Loop powered • Control input: without control • Line fault detection disabled	OFF	ON	ON	ON	OFF	X	OFF	OFF

Switches for channel I and II	S6
Function	
Filter disable	OFF
Filter enable	ON

Factory setting: bus powered, control input: contact, line fault detection enabled, filter disabled

To reduce the power consumption of the device, we recommend to set the DIP switches of channel II in the OFF condition, when channel II is not used (single channel application).

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.

Release date: 2022-01-05 Date of issue: 2022-01-05 Filename: 278767_eng.pdf

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

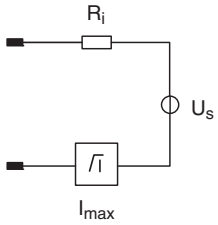
Installation Conditions

When both channels of the solenoid driver are operated in normally energised condition, either the load must be reduced or increased spacing/ventilation be applied to reduce the temperature rise. Contact Pepperl+Fuchs for guidance.

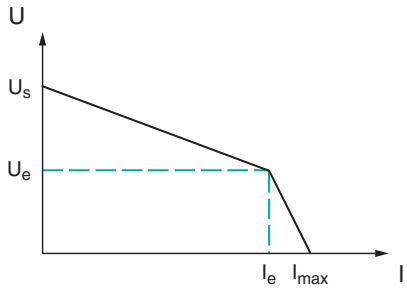
Characteristic Curve

Output characteristics

Output circuit diagram



Output characteristic



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