Solenoid Driver

KFD2-SLD-Ex1.13100

- 1-channel isolated barrier
- 24 V DC supply (Power Rail)
- Logic input
- Output 100 mA at 13 V DC
- Alternating outputs for the operation of solenoids with 2 coils
- High output power for IIB gas group
- Line fault transparency (LFT)
- Test pulse immunity
- Up to SIL 3 acc. to IEC/EN 61508

Function

This isolated barrier is used for intrinsic safety applications.
The device supplies power to solenoids, LEDs and audible alarms located in the explosion-hazardous area.
The device has 2 alternating outputs, in order to be able to operate a valve with 2 coils.
If both inputs are energized, then only output 1 is energized.
The device is immune to the test pulses of various control systems.
The line fault transparency function can display a line fault in the field by a change in impedance at the switching input of the solenoid driver.
A fault is signalized by LEDs and a separate collective error message output.

Application

Device function with 2 alternating outputs
The device has 2 alternating outputs, in order to be able to operate a valve with 2 coils. The table shows the behavior of input to output in relationship with the alternating outputs.

Input 1	Input 2	Active output
High signal	Low signal	Output 1
Low signal	High signal	Output 2
High signal	High signal	Output 1
Low signal	Low signal	No output

Input current setting
For DO cards that require a minimum load, the input current can be adapted via an external resistor. The device has an auxiliary terminal at each input for connecting the external resistor.

For example
The minimum load of the DO card is 20 mA. Subtract the input current of the isolator from the minimum load of the DO card. This results in 20 mA – 6 mA = 14 mA. In this case, create a bypass with 14 mA. With an output voltage of the DO card of 24 V, this results in 1714 Ω. The suitable external resistor R_{ext} is 1.5 kΩ/1 W.

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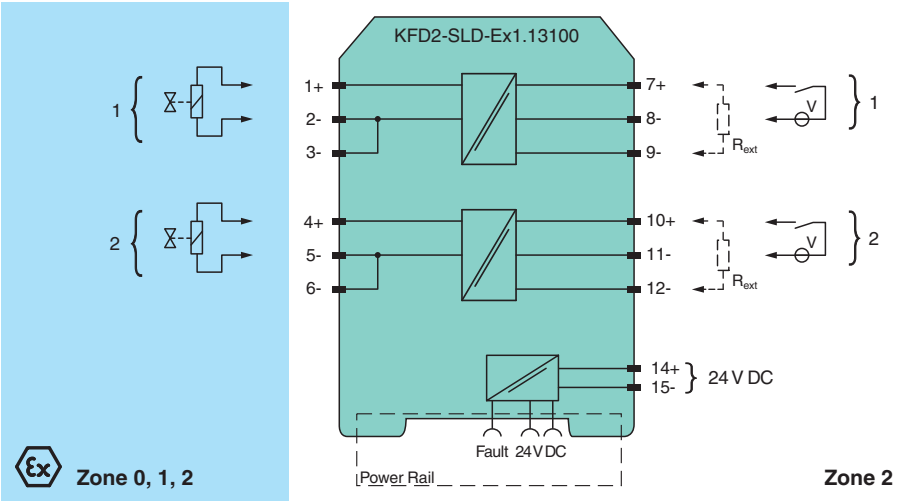
Wiring Diagram



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		Power Rail or terminals 14+, 15-
Rated voltage	U_r	19 ... 30 V DC loop powered
Input current		115 mA at 24 V , 130 Ω load
Power dissipation		1.5 W at 24 V , 130 Ω load
Input		
Connection side		control side
Connection		input 1: terminals 7+, 8- , optional R_{ext} between terminals 7 and 9 input 2: terminals 10+, 11- , optional R_{ext} between terminals 10 and 12
Test pulse length		max. 2 ms from DO card
Input current		approx. 6 mA at 24 V DC If necessary, the current value can be increased by resistor R_{ext}.
Signal level		1-signal: 15 ... 30 V DC 0-signal: 0 ... 5 V DC
Output		
Connection side		field side
Connection		output 1: terminals 1+, 2-, 3 output 2: terminals 4+, 5-, 6-
Internal resistor	R_i	approx. 64 Ω
Current	I_e	typ. 100 mA
Voltage	U_e	≥ 13 V
Current limit	I_{max}	105 mA
Open loop voltage	U_s	typ. 19.2 V
Load		nominal 0.08 ... 1 kΩ
Switching frequency	f	max. 2 Hz
Energized/De-energized delay		30 ms / 30 ms
Galvanic isolation		
Input/power supply		basic insulation according to IEC/EN 61010-1, rated insulation voltage 60 V_{eff}
Input/input		basic insulation according to IEC/EN 61010-1, rated insulation voltage 60 V_{eff}
Output/Output		basic insulation according to IEC/EN 61010-1, rated insulation voltage 60 V_{eff}
Output/other circuits		basic insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Indicators/settings		

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Technical Data

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 21:2011 For further information see system description.
Degree of protection		IEC 60529:2001
Protection against electrical shock		EN 61010-1:2010
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications		
Degree of protection		IP20
Connection		screw terminals
Mass		approx. 200 g
Dimensions		20 x 119 x 115 mm (0.8 x 4.7 x 4.5 inch) (W x H x D) , housing type B2
Mounting		on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with hazardous areas		
EU-type examination certificate		EXA 17 ATEX 0076X
Marking		⟨Ex⟩ II 3(1)G Ex ec [ia IIB Ga] IIC T4 Gc ⟨Ex⟩ II (1)D [Ex ia Da] IIIC ⟨Ex⟩ I (M1) [Ex ia Ma] I
Voltage	U_o	22.2 V
Current	I_o	360 mA
Power	P_o	1990 mW
Supply		
Maximum safe voltage	U_m	60 V (Attention! The rated voltage can be lower.)
Input		
Maximum safe voltage	U_m	60 V (Attention! The rated voltage can be lower.)
Galvanic isolation		
Output/Output		safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 60 V
Output/other circuits		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 60079-7:2015+A1:2018 , EN 60079-11:2012
International approvals		
IECEx approval		
IECEx certificate		IECEx EXA 17.0019X
IECEx marking		Ex ec [ia IIB Ga] IIC T4 Gc [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.

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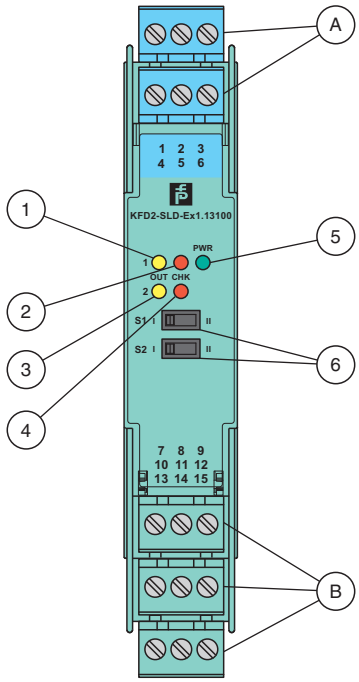
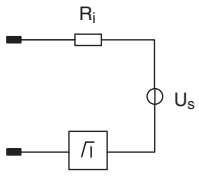
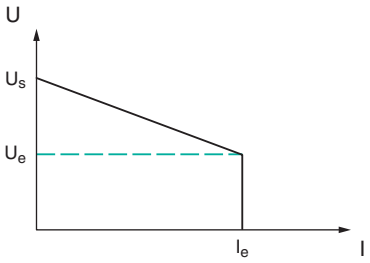
Assembly



1	LED yellow: Status output 1
2	LED red: LB/SC output 1
3	LED yellow: Status output 2
4	LED red: LB/SC output 2
5	LED green: power supply
6	Switches S1, S2
A	Removable terminals, blue
B	Removable terminals, green

Characteristic Curve





Output Characteristics

Output circuit diagram	Output characteristic

Refer to technical data for specific values.

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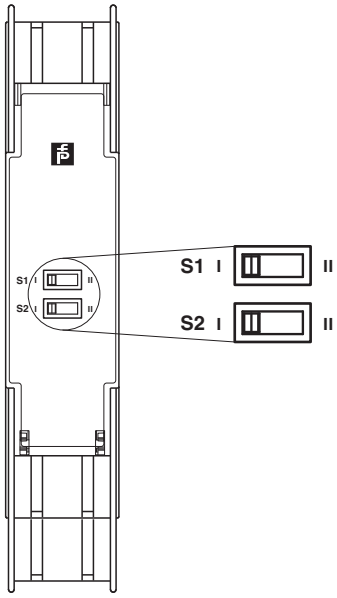
Configuration



Switch Settings

Switch	Function		Position
S1	Line fault detection (LB/SC)	enabled	**I**
		disabled	**II**
S1	Line fault transparency (LFT)	enabled	**I**
		disabled	**II**

Factory setting: line fault detection enabled, line fault transparency enabled

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