

# 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



# SIL 3

### Function

This isolated barrier is used for intrinsic safety applications. The device supplies power to solenoids, LEDs and audible alarms located in a 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 I 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 signaled by LEDs acc. to NAMUR NE44 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 I	Input II	Active output
High signal	Low signal	Output I
Low signal	High signal	Output II
High signal	High signal	Output I
Low signal	Low signal	No output

#### Input current setting

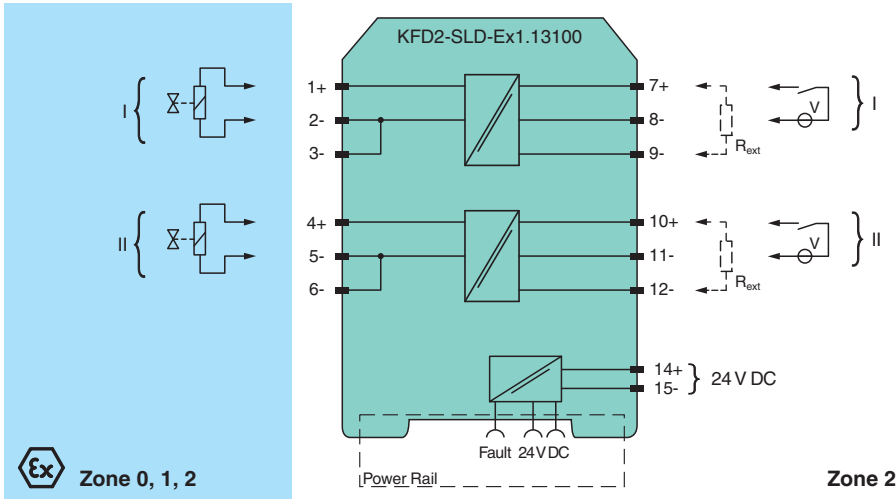
For DO cards that require a minimum load, the input current can be adapted via an external resistor. The device has an auxiliary terminal at each input for connecting the external resistor.

#### 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  $20\text{ mA} - 6\text{ mA} = 14\text{ mA}$ . In this case, create a bypass with 14 mA. With an output voltage of the DO card of 24 V, this results in  $1714\ \Omega$ . The suitable external resistor  $R_{ext}$  is 1.5 k $\Omega$ /1 W.

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Connection



Technical Data

<b>General specifications</b>		
Signal type	Digital Output	
<b>Functional safety related parameters</b>		
Safety Integrity Level (SIL)	SIL 3	
Systematic capability (SC)	SC 3	
<b>Supply</b>		
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 $\Omega$ load	
Power dissipation	1.5 W at 24 V , 130 $\Omega$ load	
<b>Input</b>		
Connection side	control side	
Connection	channel 1: terminals 7+, 8- , optional $R_{ext}$ between terminals 7 and 9 channel 2: terminals 10+, 11- , optional $R_{ext}$ between terminals 10 and 12	
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	
<b>Output</b>		
Connection side	field side	
Connection	channel 1: terminals 1+, 2-, 3 channel 2: terminals 4+, 5-, 6-	
Internal resistor	$R_i$	approx. 64 $\Omega$
Current	$I_e$	typ. 100 mA
Voltage	$U_e$	$\geq 13$ V
Current limit	$I_{max}$	105 mA
Open loop voltage	$U_s$	typ. 19.2 V
Load	nominal 0.08 ... 1 k $\Omega$	
Switching frequency	f	max. 2 Hz
Energized/De-energized delay	30 ms / 30 ms	
Line fault detection	signal at short-circuit $R_{load} < 30 \Omega$ , lead breakage $R_{load} > 10 k\Omega$ , test current < 4 mA pulsing (20 ms On, 200 ms Off)	
<b>Galvanic isolation</b>		
Input/power supply	basic insulation according to IEC/EN 61010-1, rated insulation voltage 60 V <sub>eff</sub>	
Input/input	basic insulation according to IEC/EN 61010-1, rated insulation voltage 60 V <sub>eff</sub>	
Output/Output	basic insulation according to IEC/EN 61010-1, rated insulation voltage 60 V <sub>eff</sub>	
Output/other circuits	basic insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub>	

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

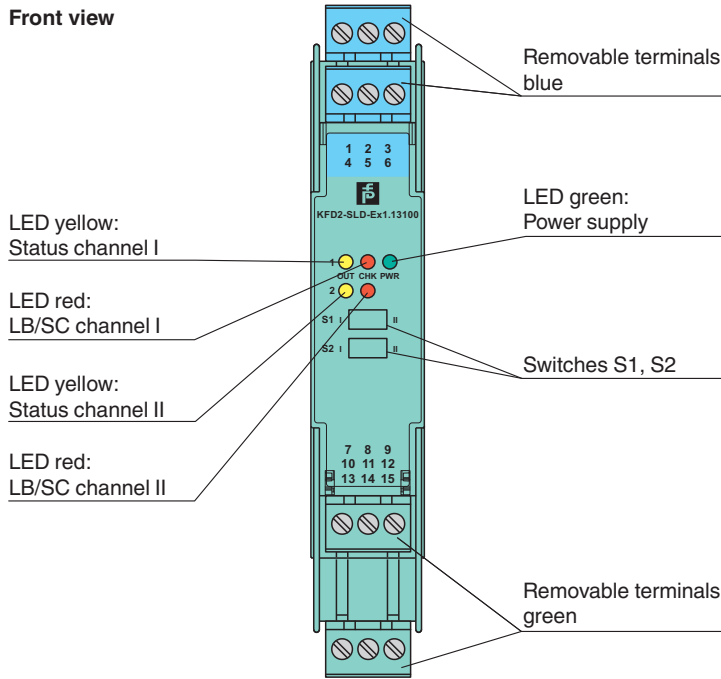
## Technical Data

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 21:2011 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	⊕ II 3(1)G Ex ec [ia IIB Ga] IIC T4 Gc ⊕ II (1)D [Ex ia Da] IIIC ⊕ I (M1) [Ex ia Ma] I
Voltage	U <sub>o</sub> 22.2 V
Current	I <sub>o</sub> 360 mA
Power	P <sub>o</sub> 1990 mW
Supply	
Maximum safe voltage	U <sub>m</sub> 60 V (Attention! The rated voltage can be lower.)
Input	
Maximum safe voltage	U <sub>m</sub> 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 <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a> .







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## Assembly




Front view



## Matching System Components

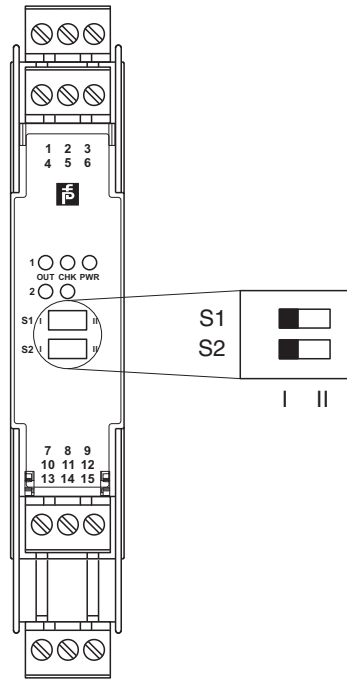
	<b>KFD2-EB2</b>	Power Feed Module
	<b>UPR-03</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 2 m
	<b>UPR-03-M</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 1,6 m
	<b>UPR-03-S</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 0.8 m
	<b>K-DUCT-BU</b>	Profile rail, wiring comb field side, blue
	<b>K-DUCT-BU-UPR-03</b>	Profile rail with UPR-03- * insert, 3 conductors, wiring comb field side, blue

## Accessories

	<b>KF-ST-5GN</b>	Terminal block for KF modules, 3-pin screw terminal, green
	<b>KF-ST-5BU</b>	Terminal block for KF modules, 3-pin screw terminal, blue
	<b>KF-CP</b>	Red coding pins, packaging unit: 20 x 6

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**Configuration**



**Switch settings**

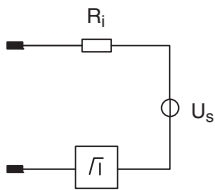
Switch	Function		Position
S1	Line fault detection (LB/SC)	enabled	I
		disabled	II
S2	Line fault transparency (LFT)	enabled	I
		disabled	II

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

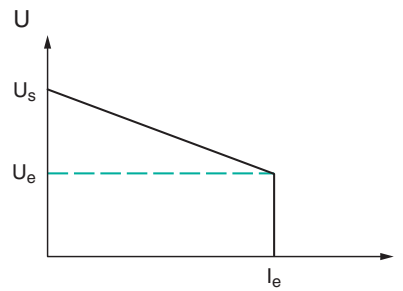
**Characteristic Curve**

**Output characteristics**

**Output circuit diagram**



**Output characteristic**



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