



# SMART Current Driver

## KFD2-SCD2-Ex1.LK

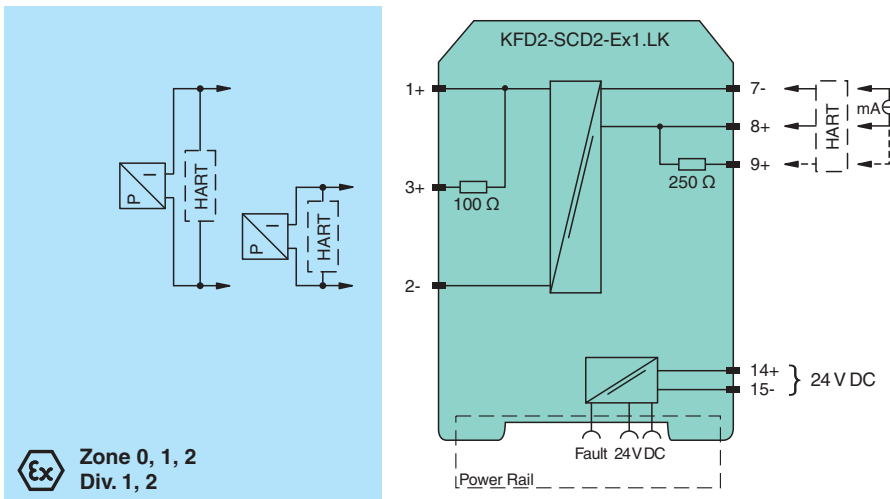
- 1-channel isolated barrier
- 24 V DC supply (Power Rail)
- Current output up to 650  $\Omega$  load
- HART-IP and valve positioner
- Line fault detection (LFD)
- Accuracy 0.1 %
- Up to SIL 2 (SC 3) acc. to IEC/EN 61508



### Function

This isolated barrier is used for intrinsic safety applications. The device drives SMART I/P converters, electrical valves, and positioners in hazardous areas. Digital signals are superimposed on the analog values at the field side or control side and are transferred bi-directionally. Current transferred across the DC/DC converter is repeated at terminals 1 and 2. Terminals 2 and 3 are used when no short circuit detection is required. An open or short field circuit presents a high impedance to the control side to allow alarm conditions to be monitored by the control system. If the HART communication resistance in the loop is too low, the internal resistance can be used. Test sockets for the connection of HART communicators are integrated into the terminals of the device. A fault is signaled by LEDs and a separate collective error message output.

### Connection



**Ex** Zone 0, 1, 2  
Div. 1, 2

### Technical Data

<b>General specifications</b>	
Signal type	Analog output
<b>Functional safety related parameters</b>	
Safety Integrity Level (SIL)	SIL 2
Systematic capability (SC)	SC 3
<b>Supply</b>	
Connection	Power Rail or terminals 14+, 15-
Rated voltage	$U_r$ 19 ... 30 V DC
Ripple	$\leq 10\%$

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

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## Technical Data

Rated current	$I_r$	$\leq 30 \text{ mA at } 24 \text{ V}$
Power dissipation		$\leq 600 \text{ mW at } 20 \text{ mA and } 500 \Omega \text{ load}$
Power consumption		$\leq 700 \text{ mW}$
<b>Input</b>		
Connection side		control side
Connection		terminals 7-, 8+, (9+)
Input signal		4 ... 20 mA , limited to approx. 30 mA
Input voltage		open loop voltage of the control system $\leq 30 \text{ V}$
Voltage drop		approx. 6 V at 20 mA
Input resistance		field wiring open circuit : $> 100 \text{ k}\Omega$ field wiring $< 50 \Omega$ : $> 100 \text{ k}\Omega$ when using terminals 1 and 2
<b>Output</b>		
Connection side		field side
Connection		terminals 1+, 2- terminals 3+, 2- (no short circuit detection)
Voltage		$\geq 13 \text{ V at } 20 \text{ mA}$
Current		4 ... 20 mA
Load		100 ... 650 $\Omega$ , for terminals 1, 2 0 ... 550 $\Omega$ , for terminals 2, 3
Ripple		20 mV rms
Line fault detection		breakage, load $> 100 \text{ k}\Omega$ , short-circuit, load $< 50 \Omega$
<b>Fault indication output</b>		
Output type		open collector transistor (internal fault bus)
<b>Transfer characteristics</b>		
Deviation		at 20 °C (68 °F), 4 ... 20 mA $< 0.1 \%$ of full scale, incl. non-linearity and hysteresis
Influence of ambient temperature		$< 2 \mu\text{A/K}$ (-20 ... 70 °C (-4 ... 158 °F)); $< 4 \mu\text{A/K}$ (-40 ... -20 °C (-40 ... -4 °F))
Frequency range		field side into the control side: bandwidth with 0.5 V <sub>pp</sub> signal 0 ... 3 kHz (-3 dB) control side into the field side: bandwidth with 0.5 V <sub>pp</sub> signal 0 ... 3 kHz (-3 dB)
Rise time		10 to 90 % $\leq 10 \text{ ms}$
<b>Galvanic isolation</b>		
Input/Output		basic insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub>
Input/power supply		basic insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub>
Output/power supply		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub>
<b>Indicators/settings</b>		
Display elements		LEDs
Labeling		space for adhesive label at the front
<b>Directive conformity</b>		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326-1:2013 (industrial locations)
<b>Conformity</b>		
Electromagnetic compatibility		NE 21:2017 EN 61326-3-2:2018
Degree of protection		IEC 60529
Protection against electrical shock		UL 61010-1:2012
<b>Ambient conditions</b>		
Ambient temperature		-40 ... 70 °C (-40 ... 158 °F)
<b>Mechanical specifications</b>		
Degree of protection		IP20
Connection		screw terminals
Mass		approx. 115 g
Dimensions		20 x 124 x 115 mm (0.8 x 4.9 x 4.5 inch) (W x H x D) , housing type B2
Mounting		on 35 mm DIN mounting rail acc. to EN 60715:2001
<b>Data for application in connection with hazardous areas</b>		
EU-type examination certificate		BAS 00 ATEX 7240 X

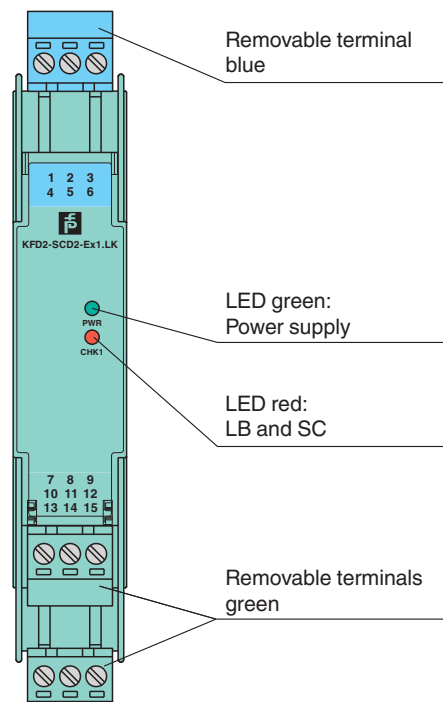
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**Technical Data**

Marking		Ⓜ II (1)G [Ex ia Ga] IIC Ⓜ II (1)D [Ex ia Da] IIIC Ⓜ I (M1) [Ex ia Ma] I
Output		Ex ia, Ex iaD
Voltage	$U_o$	25.2 V
Current	$I_o$	93 mA
Power	$P_o$	585.3 mW
Internal capacitance	$C_i$	1.05 nF
Internal inductance	$L_i$	0
<b>Supply</b>		
Maximum safe voltage	$U_m$	250 V <sub>rms</sub> (Attention! The rated voltage can be lower.)
<b>Input</b>		
Maximum safe voltage	$U_m$	250 V <sub>rms</sub> (Attention! The rated voltage can be lower.)
Certificate		FIDI 22 ATEX 0002X
Marking		Ⓜ II 3G Ex ec IIC T4 Gc
<b>Galvanic isolation</b>		
Input/Output		safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Output/power supply		safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
<b>Directive conformity</b>		
Directive 2014/34/EU		EN IEC 60079-0:2018 , EN 60079-11:2012 , EN IEC 60079-7:2015+A1:2018
<b>International approvals</b>		
UL approval		E106378
Control drawing		116-0345 (cULus)
<b>IECEX approval</b>		
IECEX certificate		IECEX BAS 04.0014X
IECEX marking		[Ex ia Ga] IIC , [Ex ia Da] IIIC , [Ex ia Ma] I Ex ec IIC T4 Gc
<b>General information</b>		
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> .

**Assembly**

Front view



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## Operation







### Lead monitoring, input characteristics

During lead breakage ( $> 16\text{ V}$ ) in the field the input resistance is  $> 100\text{ k}\Omega$ , the field current is  $0\text{ mA}$ , the input current is  $< 0.3\text{ mA}$  and the red LED is flashing.




During short circuit ( $< 50\ \Omega$ ) in the field the input resistance is  $> 100\text{ k}\Omega$ , the input current is  $< 100\ \mu\text{A}$ , the field current is  $< 2.5\text{ mA}$  and the red LED is flashing.

The voltage drop at the current input (terminals 7-, 8+) is lower than  $6\text{ V}$ .

## 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