



# Switch Amplifier

## KFD2-SH-Ex1.T.OP

- 1-channel isolated barrier
- 24 V DC supply (Power Rail)
- Input for approved dry contacts or SN/S1N sensors
- Active voltage output
- Relay contact output
- Fault indication output
- Line fault detection (LFD)
- Up to SIL 3 acc. to IEC/EN 61508
- Up to PL d acc. to EN/ISO 13849

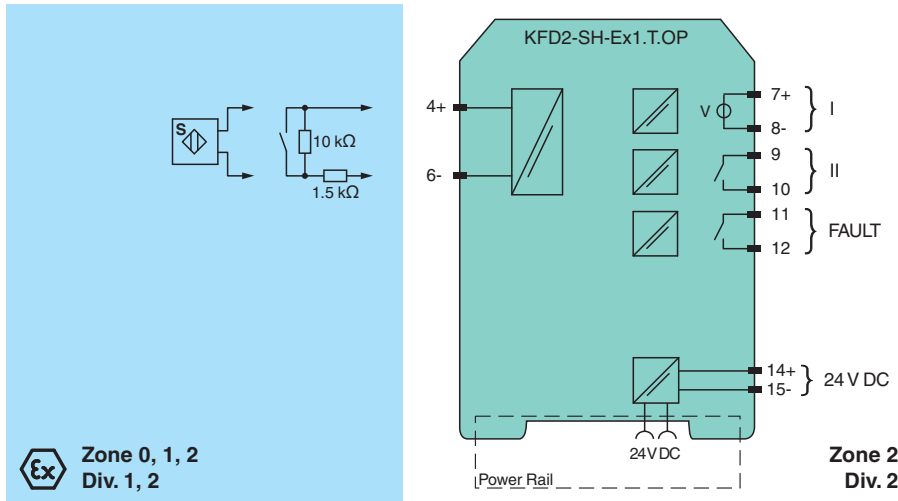


# SIL 3 PL d

### Function

This isolated barrier is used for intrinsic safety applications. The device transfers digital signals (SN/S1N proximity sensors or approved dry contacts) from a hazardous area to a safe area. The input controls one active voltage output and one relay contact output with a NO contact. Unlike an SN/S1N series proximity sensor, a mechanical contact requires a 10 kΩ resistor to be placed across the contact in addition to a 1.5 kΩ resistor in series. Lead breakage (LB) and short circuit (SC) conditions of the control circuit are continuously monitored. During an fault condition, the fault indication output and the outputs I and II de-energize. For safety applications up to SIL3, output I must be used. For safety applications up to SIL2, output I and output II can be used.

### Connection



### Technical Data

General specifications		
Signal type	Digital Input	
Functional safety related parameters		
Safety Integrity Level (SIL)	SIL 3	
Performance level (PL)	PL d	
Supply		
Connection	Power Rail or terminals 14+, 15-	
Rated voltage	$U_r$	20 ... 30 V DC
Ripple	≤ 10 %	
Rated current	$I_r$	≤ 100 mA

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

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## Technical Data

Power dissipation	1.5 W
Power consumption	max. 1.7 W
<b>Input</b>	
Connection side	field side
Connection	terminals 4+, 6-
Open circuit voltage/short-circuit current	approx. 8.4 V DC / approx. 11.7 mA
Lead resistance	max. 50 Ω , cable capacitances and inductances must be observed in hazardous areas
<b>Switching point</b>	
Relay de-energized	$I < 2.1 \text{ mA}$ and $I > 5.9 \text{ mA}$ , output switched off
Relay energized	$2.8 \text{ mA} < I < 5.3 \text{ mA}$ , output switched on
Response delay	≤ 1 ms
<b>Output</b>	
Connection side	control side
Connection	output I: terminals 7+, 8- ; output II: terminals 9, 10 ; output III: terminals 11, 12
Output I	active voltage output, short-circuit proof 0-signal: 0 V 1-signal: 19 V DC at 15 mA ... 31 V DC at no-load fault: 0 V
Output II	relay
Contact loading	48 V AC/DC 250 mA
Mechanical life	≤ 20 x 10 <sup>6</sup> switching cycles
Output III	relay , fault signal
Contact loading	48 V AC/DC 250 mA
Mechanical life	≤ 20 x 10 <sup>6</sup> switching cycles
<b>Transfer characteristics</b>	
Switching frequency	
Output I	≤ 50 Hz
Output II	≤ 5 Hz
Output III	≤ 5 Hz
<b>Indicators/settings</b>	
Display elements	LEDs
Labeling	space for labeling at the front
<b>Directive conformity</b>	
Electromagnetic compatibility	
Directive 2014/30/EU	EN 61326-1:2013 (industrial locations)
Machinery Directive	
Directive 2006/42/EC	EN/ISO 13849-1:2015
<b>Conformity</b>	
Electromagnetic compatibility	
Degree of protection	IEC 60529:2001
Safety	IEC/EN 61508:2010
<b>Ambient conditions</b>	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
<b>Mechanical specifications</b>	
Degree of protection	IP20
Connection	screw terminals
Mass	approx. 150 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
<b>Data for application in connection with hazardous areas</b>	
EU-type examination certificate	PTB 00 ATEX 2041
Marking	Ⓔ II (1)G [Ex ia Ga] IIC , Ⓔ II (1)D [Ex ia Da] IIIC

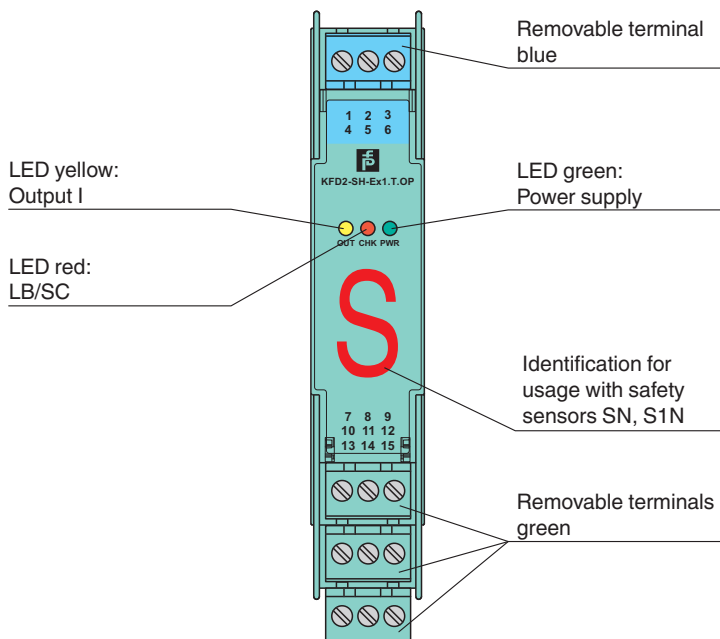
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**Technical Data**

Input		Ex ia	
Voltage	U <sub>o</sub>	9.56 V	
Current	I <sub>o</sub>	16.8 mA	
Power	P <sub>o</sub>	41 mW (linear characteristic)	
Supply			
Maximum safe voltage	U <sub>m</sub>	40 V AC/DC (Attention! The rated voltage can be lower.)	
Output			
Contact loading		48 V AC/DC 250 mA	
Maximum safe voltage	U <sub>m</sub>	60 V AC/DC (Attention! The rated voltage can be lower.)	
Certificate		TÜV 99 ATEX 1493 X	
Marking		Ⓜ II 3G Ex ec nC IIC T4 Gc	
Galvanic isolation			
Input/Output		safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V	
Input/power supply		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 , EN IEC 60079-15:2019	
<b>International approvals</b>			
IECEx approval			
IECEx certificate		IECEx PTB 21.0010 IECEx TUN 19.0013X	
IECEx marking		[Ex ia Ga] IIC [Ex ia Da] IIC Ex ec nC 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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## 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

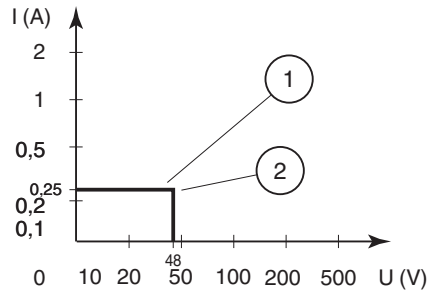
	<b>KF-ST-5GN</b>	Terminal block for KF modules, 3-pin screw terminal, green
	<b>KF-ST-5BU</b>	Terminal block for KF modules, 3-pin screw terminal, blue
	<b>KF-CP</b>	Red coding pins, packaging unit: 20 x 6

## Characteristic Curve

### Maximum switching power of the output contacts

The maximum number of switching cycles is depending on the electrical load and may be higher if reduced currents and voltages are applied.

For devices that are not used in applications with functional safety, 50 % more switching cycles are assumed.



- 1 Resistive load AC/DC
- 2 Electrical life max.  $2 \times 10^5$  switching cycles