

# 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 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.

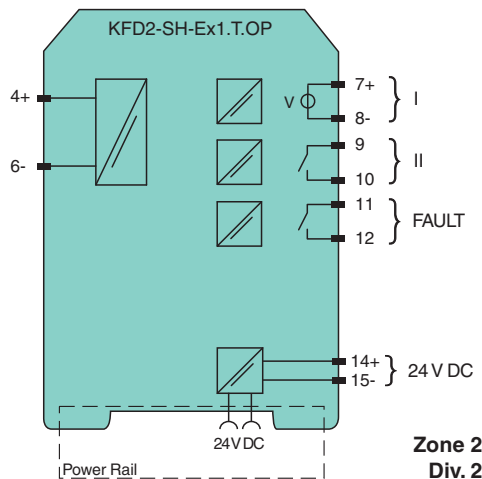
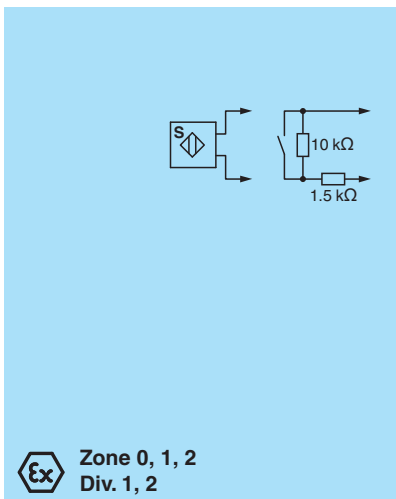
Unlike an SN/S1N series proximity sensor, a mechanical contact requires a 10 kΩ resistor to be placed across the contact in addition to a 1.5 kΩ resistor in series.

Lead breakage (LB) and short circuit (SC) conditions of the control circuit are continuously monitored.

During a 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



Zone 2  
Div. 2

### Technical Data

<b>General specifications</b>	
Signal type	Digital Input
<b>Functional safety related parameters</b>	
Safety Integrity Level (SIL)	SIL 3
Performance level (PL)	PL d
<b>Supply</b>	
Connection	Power Rail or terminals 14+, 15-
Rated voltage	U <sub>r</sub> 20 ... 30 V DC
Ripple	≤ 10 %

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## Technical Data

Rated current	$I_r$	$\leq 100 \text{ mA}$
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 $\Omega$ , 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		$\leq 1 \text{ ms}$
<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		$\leq 20 \times 10^6$ switching cycles
Output III		relay , fault signal
Contact loading		48 V AC/DC 250 mA
Mechanical life		$\leq 20 \times 10^6$ switching cycles
<b>Transfer characteristics</b>		
Switching frequency		
Output I		$\leq 50 \text{ Hz}$
Output II		$\leq 5 \text{ Hz}$
Output III		$\leq 5 \text{ Hz}$
<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		NE 21:2017 , EN 61326-3-2:2008
Degree of protection		IEC 60529:2001
Safety		IEC/EN 61508:2010
<b>Ambient conditions</b>		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F) extended ambient temperature range up to 70 °C (158 °F), refer to manual for necessary mounting conditions
<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) , 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>		

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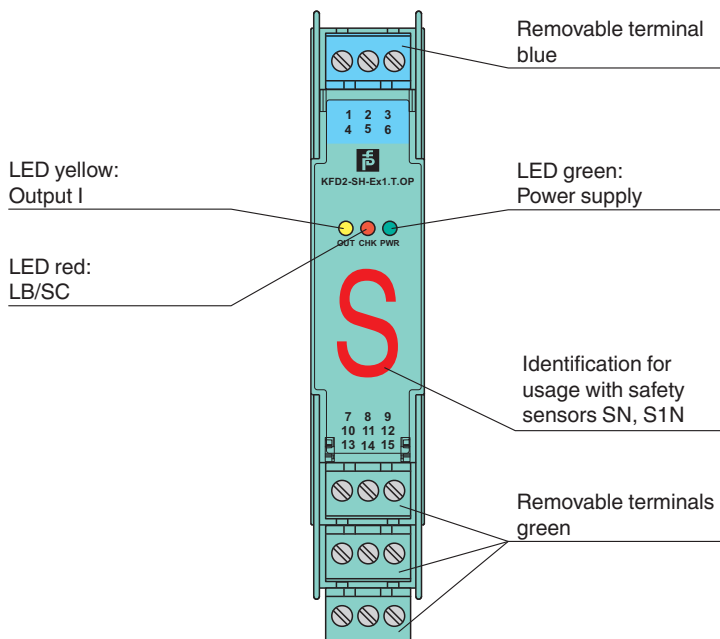
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**Technical Data**

EU-type examination certificate	PTB 00 ATEX 2041	
Marking	⊕ II (1)GD [Ex ia] IIC [circuit(s) in zone 0/1/2]	
Input	Ex ia IIC	
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)
<b>Supply</b>		
Maximum safe voltage	U <sub>m</sub>	40 V AC/DC (Attention! The rated voltage can be lower.)
<b>Output</b>		
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	
<b>Galvanic isolation</b>		
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	
<b>Directive conformity</b>		
Directive 2014/34/EU	EN 60079-0:2012+A11:2013 , EN 60079-7:2015 , EN 60079-11:2012	
<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

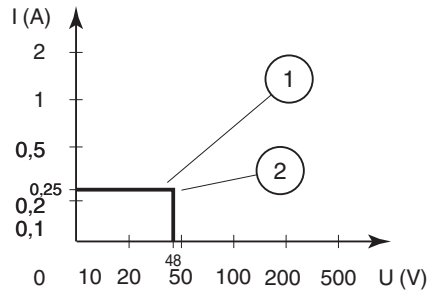
	<b>KF-ST-5GN</b>	Terminal block for KF modules, 3-pin screw terminal, green
	<b>KF-ST-5BU</b>	Terminal block for KF modules, 3-pin screw terminal, blue
	<b>KF-CP</b>	Red coding pins, packaging unit: 20 x 6

## 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