Switch Amplifier

KFD2-SH-Ex1.T.OP

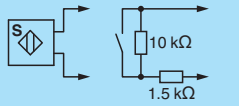
- 1-channel isolated barrier
- 24 V DC supply (Power Rail)
- Input for approved dry contacts or SN/S1N sensors
- Active voltage output
- Relay contact output
- Fault indication output
- Line fault detection (LFD)
- Up to SIL 3 acc. to IEC/EN 61508
- Up to PL d acc. to EN/ISO 13849

SIL 3 PL d

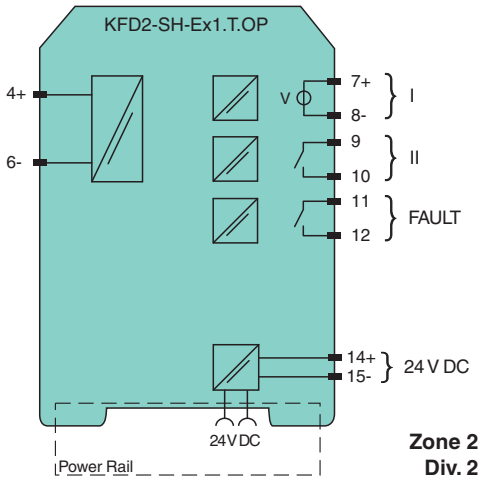
Function

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.

Wiring Diagram



Zone 0, 1, 2
Div. 1, 2



Zone 2
Div. 2

Technical Data

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

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Technical Data

Rated current	I_r	≤ 100 mA
Power dissipation		1.5 W
Power consumption		max. 1.7 W
Input		
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
Switching point		
Relay de-energized		I < 2.1 mA and I > 5.9 mA , output switched off
Relay energized		2.8 mA < I < 5.3 mA , output switched on
Response delay		≤ 1 ms
Output		
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 10^6 switching cycles
Output III		relay , fault signal
Contact loading		48 V AC/DC 250 mA
Mechanical life		≤ 20 x 10^6 switching cycles
Transfer characteristics		
Switching frequency		
Output I		≤ 50 Hz
Output II		≤ 5 Hz
Output III		≤ 5 Hz
Indicators/settings		
Display elements		LEDs
Labeling		space for labeling at the front
Directive conformity		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326-1:2013 (industrial locations)
Machinery Directive		
Directive 2006/42/EC		EN/ISO 13849-1:2015
Conformity		
Electromagnetic compatibility		NE 21:2017 , EN 61326-3-2:2008
Degree of protection		IEC 60529:2001
Safety		IEC/EN 61508:2010
Ambient conditions		
Ambient temperature		-20 ... 70 °C (-4 ... 158 °F) extended ambient temperature range up to 70 °C (158 °F) , refer to manual and derating characteristics in the datasheet for necessary mounting conditions
Mechanical specifications		
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
Data for application in connection with hazardous areas		

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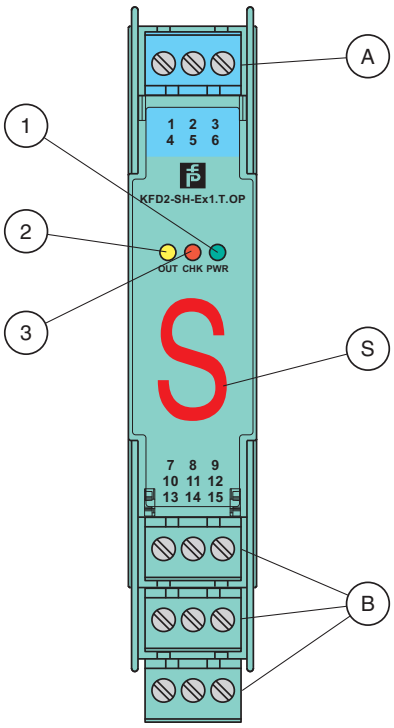
Technical Data

EU-type examination certificate		PTB 00 ATEX 2041
Marking		⟨Ex⟩ II (1)G [Ex ia Ga] IIC , ⟨Ex⟩ II (1)D [Ex ia Da] IIIC
Input		Ex ia
Voltage	U_o	9.56 V
Current	I_o	16.8 mA
Power	P_o	41 mW (linear characteristic)
Supply		
Maximum safe voltage	U_m	40 V AC/DC (Attention! The rated voltage can be lower.)
Output		
Contact loading		48 V AC/DC 250 mA
Maximum safe voltage	U_m	60 V AC/DC (Attention! The rated voltage can be lower.)
Certificate		TÜV 99 ATEX 1493 X
Marking		⟨Ex⟩ 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
International approvals		
IECEx approval		
IECEx certificate		IECEx PTB 21.0010 IECEx TUN 19.0013X
IECEx marking		[Ex ia Ga] IIC [Ex ia Da] IIIC Ex ec nC IIC T4 Gc
General information		
Supplementary information		Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com.

Assembly



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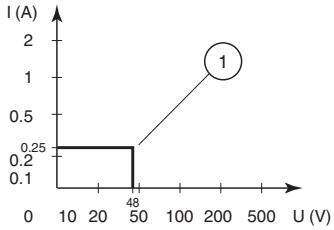
1	LED green: Power supply
2	LED yellow: Output I
3	LED red: Lead breakage/short circuit
A	Removable terminal, blue
B	Removable terminals, green
S	Identification for usage with safety sensors SN, S1N

Characteristic Curve



Maximum Switching Power of Output Contacts

————	Resistive load AC/DC
1	max. 2 x 10^5 switching cycles

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.

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