

Switch Amplifier

KFD2-SH-Ex1

SIL 3

- 1-channel isolated barrier
- 24 V DC supply (Power Rail)
- Input for approved dry contacts or SN/S1N sensors
- 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

24 V DC



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 relay contact output with 3 NO contacts (one output is in series to the both output relays for the safety function), one relay contact output with one NO contact, and one passive transistor output. 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 energizes and 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.

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 22+, 23+, 24-		
Rated voltage	U_r	20 ... 35 V DC	
Ripple	≤ 10 %		
Rated current	I_r	≤ 130 mA	
Power dissipation	2.1 W		
Power consumption	max. 2.3 W		
Input			
Connection side	field side		
Connection	terminals 10+, 12-		
Open circuit voltage/short-circuit current	approx. 8.4 V DC / approx. 11.7 mA		
Lead resistance	≤ 50 Ω, in hazardous area cable capacitances and inductivities are to be taken into account		
Switching point			
Relay de-energized	$I < 2.1 \text{ mA}$ and $I > 5.9 \text{ mA}$		
Relay energized	$2.8 \text{ mA} < I < 5.3 \text{ mA}$		
Response delay	≤ 1 ms		
Output			
Connection side	control side		
Connection	output I: terminals 13, 14 ; output II: terminals 15, 21 ; output III: terminals 16+, 17-		

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

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Technical Data

Output I		relay , signal
Contact loading		50 V AC/1 A/cos $\phi > 0.7$; 24 V DC/1 A resistive load
Mechanical life		50 x 10 ⁶ switching cycles
Output II		relay , signal
Contact loading		50 V AC/1 A/cos $\phi > 0.7$; 24 V DC/1 A resistive load
Mechanical life		50 x 10 ⁶ switching cycles
Output III		electronic output, passive , fault signal
Rated voltage		10 ... 30 V DC
Signal level		1-signal: (L+) -2.5 V (7 mA, short-circuit proof) / 0-signal: blocked output (Leakage current $\leq 10 \mu\text{A}$)
Transfer characteristics		
Switching frequency		5 Hz
Galvanic isolation		
Output/power supply		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Mutual output I, II, III		basic insulation according to IEC/EN 61010-1, rated insulation voltage 50 V _{eff}
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)
Low voltage		
Directive 2014/35/EU		EN 61010-1:2010
Machinery Directive		
Directive 2006/42/EC		EN/ISO 13849-1:2008
Conformity		
Electromagnetic compatibility		NE 21:2011
Degree of protection		IEC 60529:2001
Safety		IEC/EN 61508:2010
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications		
Degree of protection		IP20
Connection		screw terminals
Mass		approx. 280 g
Dimensions		40 x 107 x 115 mm (1.6 x 4.2 x 4.5 inch) , housing type C1
Mounting		on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with hazardous areas		
EU-type examination certificate		PTB 00 ATEX 2042
Marking		Ⓜ II (1)GD [EEEx ia] IIC [circuit(s) in zone 0/1/2]
Input		EEEx ia IIC
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		
Maximum safe voltage	U _m	output I/output II: 253 V AC/DC (Attention! U _m is no rated voltage.) output III: 60 V AC/DC (Attention! U _m is no rated voltage.)
Certificate		
Marking		TÜV 99 ATEX 1493 X
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

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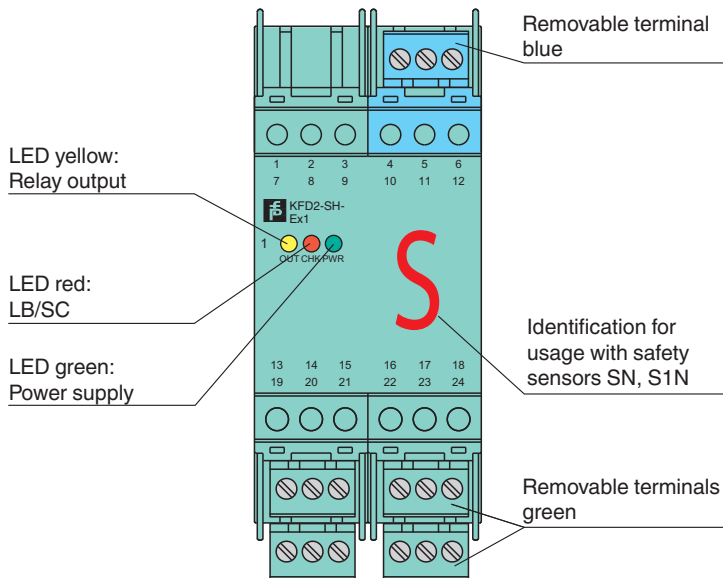
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Technical Data

Directive conformity	
Directive 2014/34/EU	EN IEC 60079-0:2018 , EN 60079-7:2015+A1:2018 , EN 60079-11:2012 , EN IEC 60079-15:2019
International approvals	
FM approval	
Control drawing	116-0158
IECEX approval	
IECEX certificate	IECEX TUN 19.0013X
IECEX marking	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 .
Accessories	
Optional accessories	<ul style="list-style-type: none"> - power feed module KFD2-EB2(.R4A.B)(.SP) - universal power rail UPR-03(-M)(-S) - profile rail K-DUCT-BU(-UPR-03)

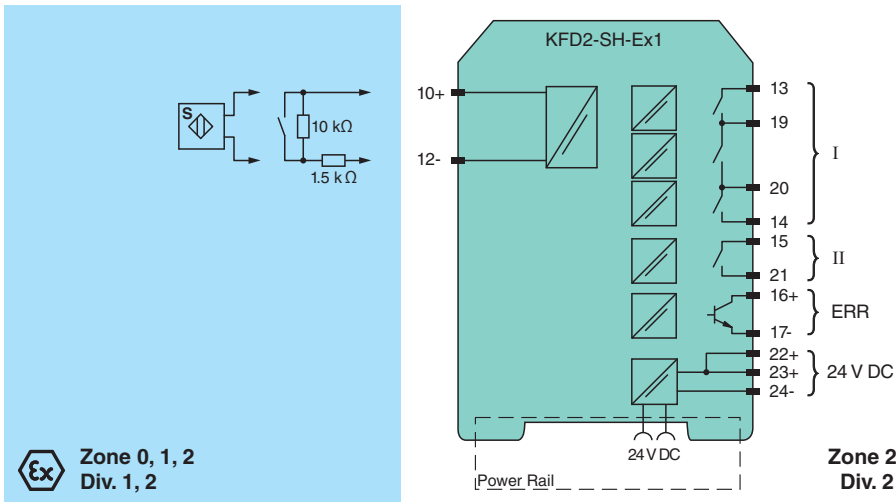
Assembly

Front view



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Connection



Accessories

	KFD2-EB2	Power Feed Module
	KFD2-EB2.R4A.B	Power feed module, redundant supply
	KFD2-EB2.R4A.B.SP	Power feed module with spring terminals, redundant supply
	KFD2-EB2.SP	Power feed module with spring terminals
	UPR-03	Universal Power Rail with end caps and cover, 3 conductors, length: 2 m
	UPR-03-M	Universal Power Rail with end caps and cover, 3 conductors, length: 1,6 m
	UPR-03-S	Universal Power Rail with end caps and cover, 3 conductors, length: 0.8 m
	K-DUCT-BU	
	K-DUCT-BU-UPR-03	Profile rail with UPR-03- * insert, 3 conductors, wiring comb field side blue

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Function

The input (terminals 10, 12) may generally be operated only with **potentially free** (passive) switches.

Single channel operations up to SIL3 **must** occur via terminals 13 and 14. The center tap of the contacts (terminals 19, 20) can **also** be used if an operation is to occur a redundant branch.

If the device is used for safety operations the information in the test documents should be observed. The output III error message delivers a "1"-signal when the control circuit experiences lead breakage (LB) or a short circuit (LK).

The device has removable terminals.

Maximal switching power of the output

