



Switch Amplifier

KFD2-SH-Ex1

- 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/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 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.

Application

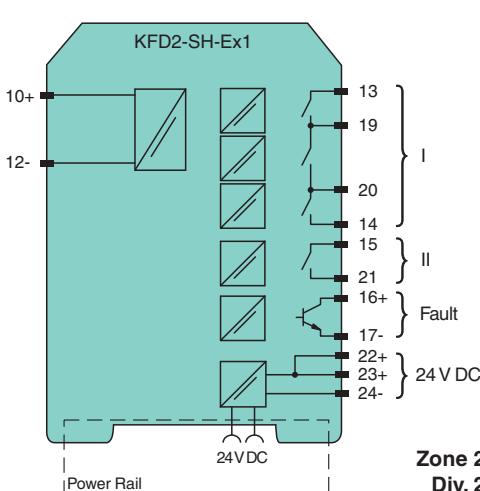
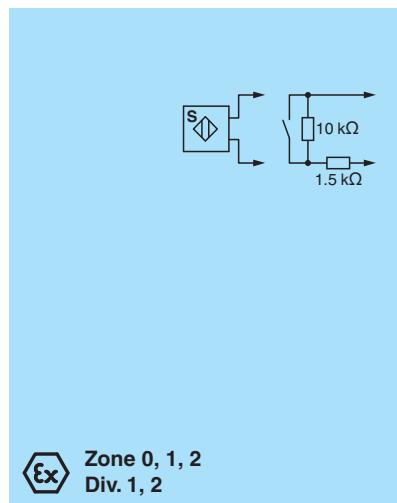
The input (terminals 10, 12) may generally be operated only with **potentially** free (passive) switches.

Single channel operations up to SIL 3 **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 **fault message** output III delivers an 1-signal when the control circuit experiences lead breakage (LB) or a short circuit (LK).

The device has removable terminals.

Connection



Technical Data

General specifications

Signal type

Digital Input

Functional safety related parameters

Technical Data

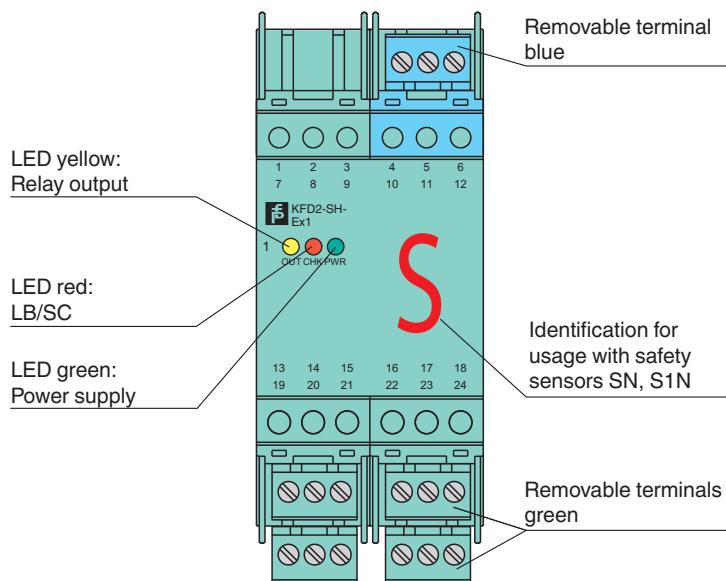
Safety Integrity Level (SIL)	SIL 3	
Systematic capability (SC)	SC 3	
Performance level (PL)	PL d	
Supply		
Connection	Power Rail or terminals 22+, 23+, 24-	
Rated voltage	U_r	20 ... 35 V DC
Ripple	$\leq 10\%$	
Rated current	I_r	$\leq 130\text{ mA}$
Power dissipation	2.1 W	
Power consumption	max. 2.3 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	$\leq 50\Omega$, 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	$\leq 1\text{ ms}$	
Output		
Connection side	control side	
Connection	output I: terminals 13, 14 ; output II: terminals 15, 21 ; output III: terminals 16+, 17-	
Output I	relay , signal	
Contact loading	50 V AC/1 A/cos $\phi > 0.7$; 24 V DC/1 A resistive load	
Mechanical life	50×10^6 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	50×10^6 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)	
Machinery Directive		
Directive 2006/42/EC	EN/ISO 13849-1:2015	
Conformity		
Electromagnetic compatibility	NE 21:2017 , EN 61326-3-1:2017	
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	

Technical Data

Connection	screw terminals	
Mass	approx. 280 g	
Dimensions	40 x 107 x 115 mm (1.6 x 4.2 x 4.5 inch) (W x H x D) , 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)G [Ex ia Ga] IIC  II (1)D [Ex ia Da] IIC  I (M1) [Ex ia Ma] I	
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		
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	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	
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 .	

Assembly

Front view



Characteristic Curve

Maximal switching power of the output

