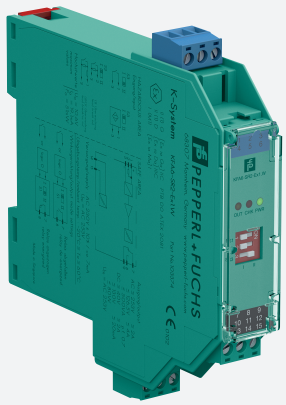


Switch Amplifier

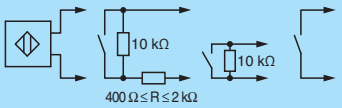
KFA6-SR2-Ex1.W

- 1-channel isolated barrier
- 230 V AC supply
- Dry contact or NAMUR inputs
- Relay contact output
- Line fault detection (LFD)
- Reversible mode of operation
- Up to SIL 2 acc. to IEC/EN 61508 / IEC/EN 61511

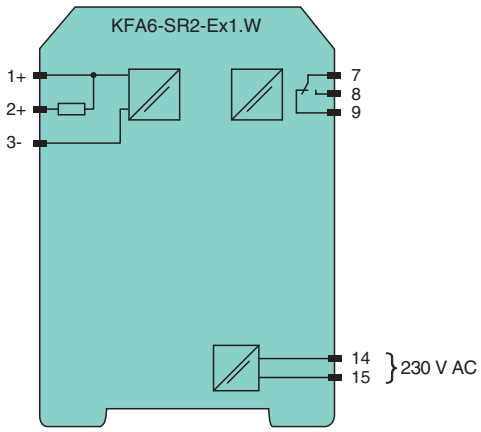
Function

This isolated barrier is used for intrinsic safety applications. It transfers digital signals (NAMUR sensors/mechanical contacts) from a hazardous area to a safe area.
The proximity sensor or switch controls a form C changeover relay contact for the safe area load. The barrier output changes state when the input signal changes state. The normal output state can be reversed using switch S1. Switch S3 is used to enable or disable line fault detection of the field circuit.
During an error condition, relays revert to their de-energized state and LEDs indicate the fault according to NAMUR NE44.

Connection



Zone 0, 1, 2
Div. 1, 2



Technical Data

General specifications		
Signal type		Digital Input
Functional safety related parameters		
Safety Integrity Level (SIL)		SIL 2
Supply		
Connection		terminals 14, 15
Rated voltage	U_r	207 ... 253 V AC, 45 ... 65 Hz
Power dissipation		1 W
Power consumption		max. 1 W
Input		
Connection side		field side

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Technical Data

Connection		terminals 1+, 2+, 3-
Rated values		acc. to EN 60947-5-6 (NAMUR)
Open circuit voltage/short-circuit current		approx. 8 V DC / approx. 8 mA
Switching point/switching hysteresis		1.2 ... 2.1 mA / approx. 0.2 mA
Line fault detection		breakage I ≤ 0.1 mA , short-circuit I > 6 mA
Pulse/Pause ratio		min. 20 ms / min. 20 ms
Output		
Connection side		control side
Connection		terminals 7, 8, 9
Output		signal ; relay
Contact loading		253 V AC/2 A/cos ϕ > 0.7; 126.5 V AC/4 A/cos ϕ > 0.7; 40 V DC/2 A resistive load
Energized/De-energized delay		approx. 20 ms / approx. 20 ms
Mechanical life		10^7 switching cycles
Transfer characteristics		
Switching frequency		< 10 Hz
Galvanic isolation		
Input/Output		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Input/power supply		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Output/power supply		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 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
Conformity		
Electromagnetic compatibility		NE 21:2006
Degree of protection		IEC 60529:2001
Input		EN 60947-5-6:2000
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
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		
EU-type examination certificate		PTB 00 ATEX 2081
Marking		⟨Ex⟩ II (1)G [Ex ia Ga] IIC ⟨Ex⟩ II (1)D [Ex ia Da] IIIC ⟨Ex⟩ I (M1) [Ex ia Ma] I
Input		Ex ia
Voltage	U_o	10.6 V
Current	I_o	19.1 mA
Power	P_o	51 mW (linear characteristic)
Supply		
Maximum safe voltage	U_m	253 V AC (Attention! U_m is no rated voltage.)
Output		
Contact loading		253 V AC/2 A/cos ϕ > 0.7; 126.5 V AC/4 A/cos ϕ > 0.7; 40 V DC/2 A resistive load
Maximum safe voltage	U_m	253 V AC (Attention! The rated voltage can be lower.)
Galvanic isolation		

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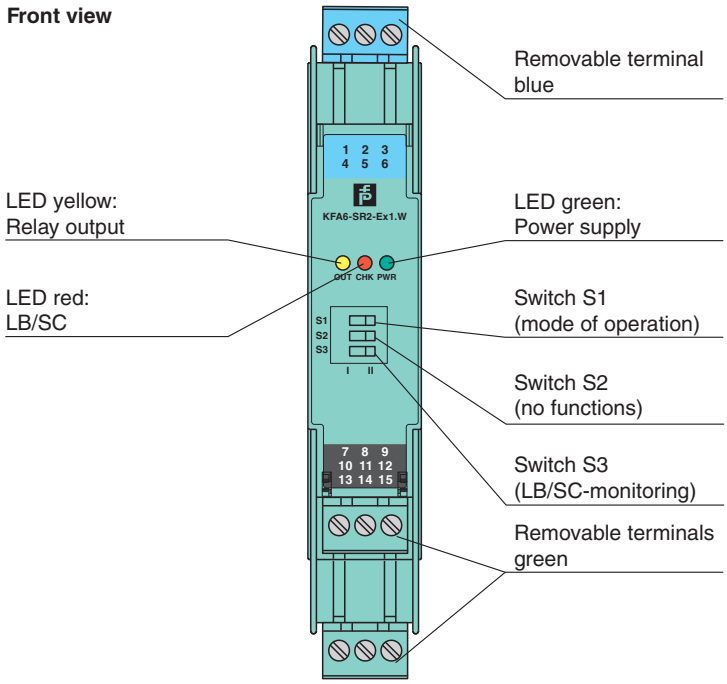
Technical Data

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 60079-11:2012
International approvals		
FM approval		
Control drawing		116-0035
UL approval		
Control drawing		116-0145
CSA approval		
Control drawing		116-0047
IECEx approval		
IECEx certificate		IECEx PTB 11.0031
IECEx marking		[Ex ia Ga] IIC [Ex ia Da] IIIC [Ex ia Ma] I
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



Matching System Components

	**K-DUCT-BU**	Profile rail, wiring comb field side, blue

Accessories

	**F-NR3-Ex1**	NAMUR Resistor Network

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Accessories

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

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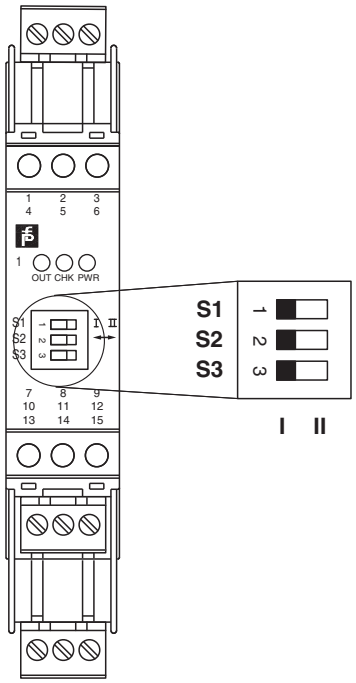
Configuration



Switch position

S	Function		Position
1	Mode of operation output (relay) energized	with high input current	I
		with low input current	II
2	No function		
3	Line fault detection	ON	I
		OFF	II

Operating states

Control circuit	Input signal
Initiator high impedance/contact opened	low input current
Initiator low impedance/contact closed	high input current
Lead breakage, lead short circuit	Line fault

Factory setting: switch 1, 2 and 3 in position I

Characteristic Curve

Maximum switching power of output contacts

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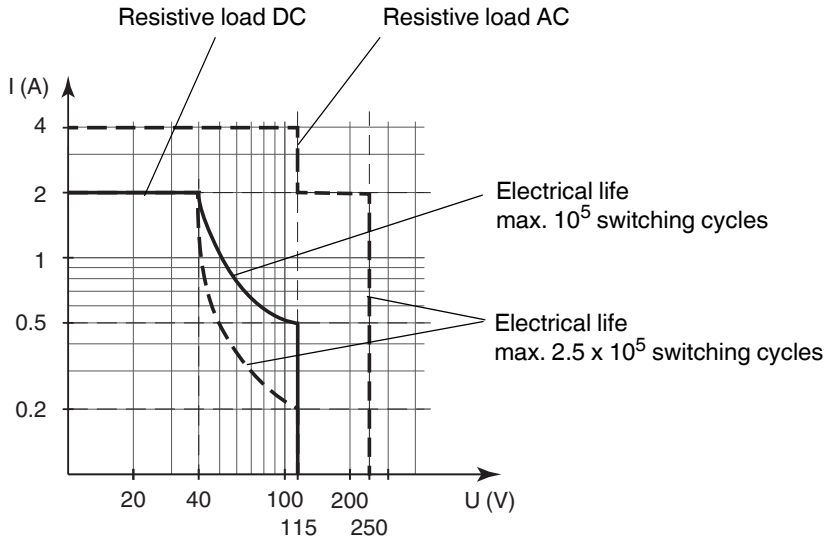

The maximum number of switching cycles is depending on the electrical load and may be higher when reduced currents and voltages are applied.

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Isolated switch amplifiers

KF-SR2-Ex1.W**
Output: relay

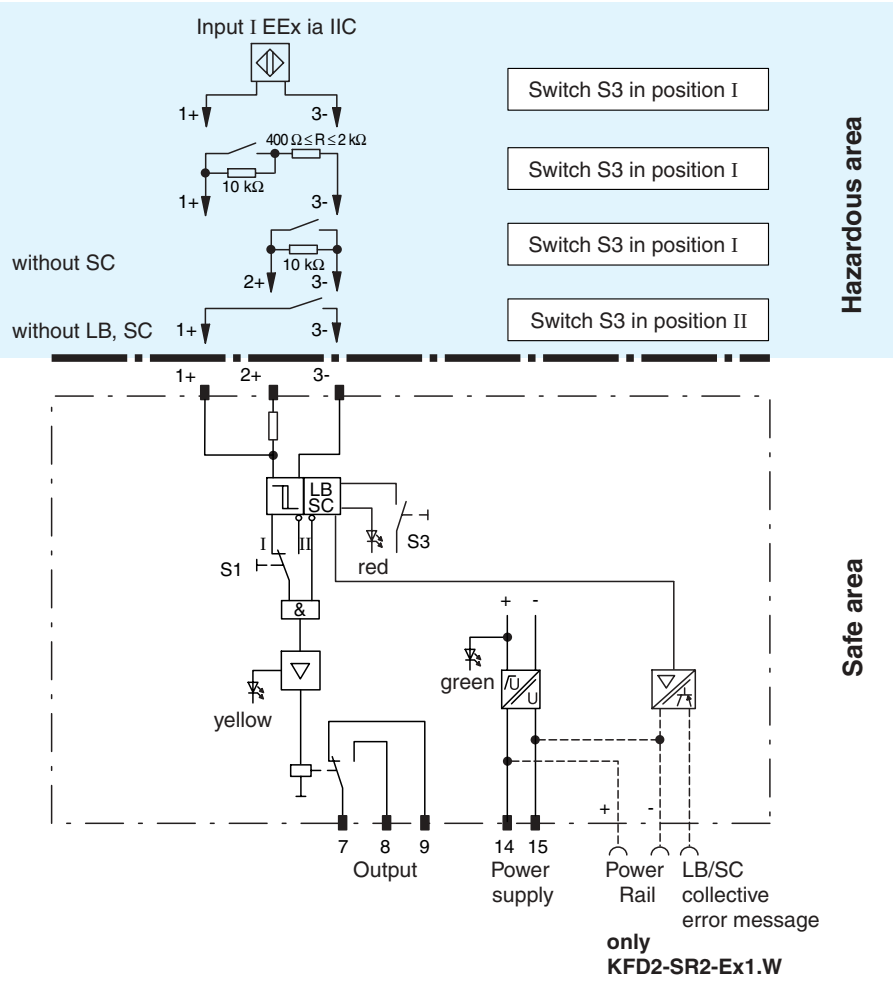
- 1-channel
- Control circuit EEx ia IIC
- Reversible mode of operation
- 1 relay output with 1 changeover contact
- EMC acc. to NAMUR NE 21
- LB/SC monitoring
- Usable up to SIL 2 acc. to IEC 61508
- LB/SC collective error message via Power Rail

24 V DC
KFD2-SR2-Ex1.W
115 V AC
KFA5-SR2-Ex1.W
230 V AC
KFA6-SR2-Ex1.W

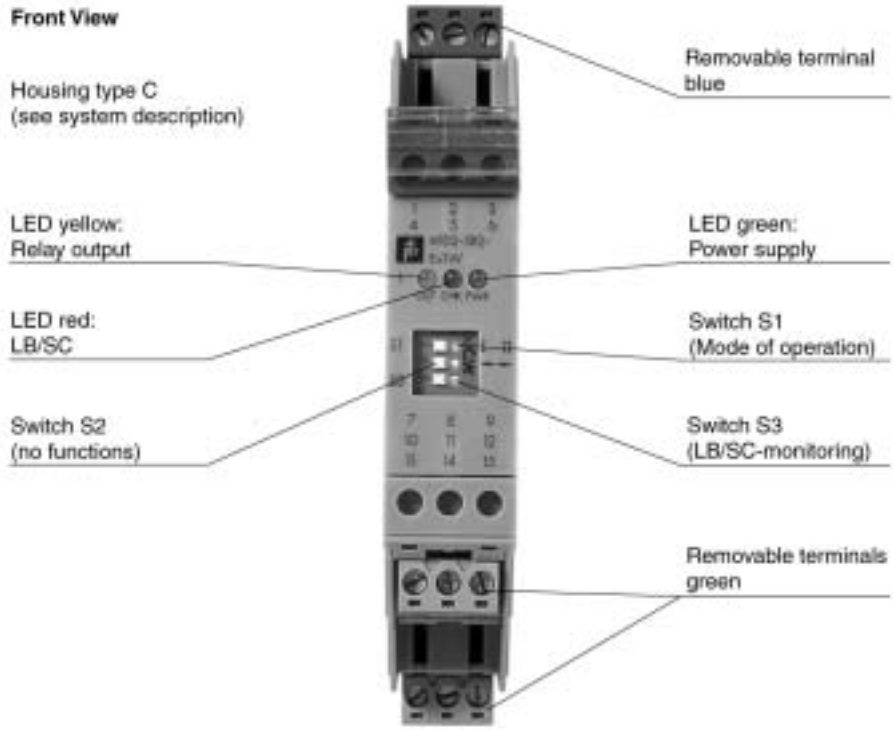
Function

The transformer isolated barrier transfers digital signals from the hazardous area. Sensors per DIN EN 60947-5-6 (NAMUR) and mechanical contacts may be used as alarms. Control circuits are monitored for lead breakage (LB) and short circuit (SC). The external faults are indicated according to NAMUR NE44 by a red flashing LED. For type KFD2-SR2-Ex1.W, an LB/SC collective error message is in addition transferred through the Power Rail to the power feed module. The intrinsically safe input is per DIN EN 50020 safely isolated from the output and the power supply. The relay output is in accordance with IEC 61140 safely isolated from the power supply.

Connection



Composition



	KFD2-SR2-Ex1.W	KFA5-SR2-Ex1.W	KFA6-SR2-Ex1.W
Supply			
Connection	Power Rail or terminals 14+, 15-	terminals 14, 15	terminals 14, 15
Rated voltage	20 ... 30 V DC	103.5 ... 126 V AC, 45 ... 65 Hz	207 ... 253 V AC, 45 ... 65 Hz
Ripple	≤ 10 %	-	-
Rated current	20 ... 23 mA	-	-
Power loss	-	-	1 W
Power consumption	-	1 W	≤ 1 W
Input			
Connection	terminals 1+, 2+, 3-		
Rated values	acc. to IEC 60947-5-6 (NAMUR, DIN 19234), see system description for electrical data		
Open circuit voltage/Short-circuit current	approx. 8 V DC/approx. 8 mA		
Switching point/Switching hysteresis	1.2 ... 2.1 mA/approx. 0.2 mA		
Pulse/Pause ratio	≥ 20 ms/≥ 20 ms		
Lead monitoring	breakage I ≤ 0.1 mA, short-circuit I > 6 mA		
Output			
Connection	terminals 7, 8, 9		
Output	signal; relay		
Contact loading	253 V AC/2 A/cos φ > 0.7; 126.5 V AC/4 A/cos φ > 0.7; 40 V DC/2 A resistive load		
Energised/De-energised delay	approx. 20 ms/approx. 20 ms		
Mechanical life	10^7 switching cycles		
Transfer characteristics			
Switching frequency	< 10 Hz		
Electrical isolation			
Output/Power supply	reinforced insulation according to IEC 61140, rated insulation voltage 300 V_{eff}		
Directive conformity			
Electromagnetic compatibility			
Directive 89/336/EG	EN 61326, EN 50081-2, NE 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (253 ... 333 K)		
Mechanical specifications			
Protection degree	IP20		
Mass	approx. 150 g		
Data for application in conjunction with hazardous areas			
EC-Type Examination Certificate	PTB 00 ATEX 2080, for additional certificates see www.pepperl-fuchs.com	PTB 00 ATEX 2081, for additional certificates see www.pepperl-fuchs.com	PTB 00 ATEX 2081, for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	⟨Ex⟩ II (1) G D [EEx ia] IIC [circuit(s) in zone 0/1/2]	⟨Ex⟩ II (1) G D [EEx ia] IIC [circuit(s) in zone 0/1/2]	⟨Ex⟩ II (1) G D [EEx ia] IIC [circuit(s) in zone 0/1/2]
Input	EEx ia IIC	EEx ia IIC	EEx ia IIC
Voltage U_0	10.5 V	10.6 V	10.6 V
Current I_0	13 mA	19.1 mA	19.1 mA
Power P_0	34 mW (linear characteristic)	51 mW (linear characteristic)	51 mW (linear characteristic)
Statement of conformity	TÜV 99 ATEX 1493 X, observe statement of conformity	-	-
Group, category, type of protection, Temperature classification	⟨Ex⟩ II 3 G EEx nAC IIC T4 [device in zone 2]	-	-
Supply			
Safety maximum voltage U_m	125 V DC/253 V AC (Attention! The rated voltage can be lower)	126.5 V AC/253 V AC (Attention! The rated voltage can be lower)	126.5 V AC/253 V AC (Attention! The rated voltage can be lower)
Output			
Contact loading	253 V AC/2 A/cos φ > 0.7; 126.5 V AC/4 A/cos φ > 0.7; 40 V DC/2 A resistive load (PTB 00 ATEX 2080) 50 V AC/4 A/cos φ > 0.7; 40 V DC/2 A resistive load (TÜV 99 ATEX 1493 X)	253 V AC/2 A/cos φ > 0.7; 126.5 V AC/4 A/cos φ > 0.7; 40 V DC/2 A resistive load	253 V AC/2 A/cos φ > 0.7; 126.5 V AC/4 A/cos φ > 0.7; 40 V DC/2 A resistive load
Safety maximum voltage U_m	253 V AC (Attention! The rated voltage can be lower)	253 V AC (Attention! The rated voltage can be lower)	253 V AC (Attention! The rated voltage can be lower)
Electrical isolation			
Input/Output	safe electrical isolation acc. to EN 50020, voltage peak value 375 V	safe electrical isolation acc. to EN 50020, voltage peak value 375 V	safe electrical isolation acc. to EN 50020, voltage peak value 375 V
Input/Power supply	safe electrical isolation acc. to EN 50020, voltage peak value 375 V	safe electrical isolation acc. to EN 50020, voltage peak value 375 V	safe electrical isolation acc. to EN 50020, voltage peak value 375 V
Directive conformity			
Directive 94/9 EU	EN 50014, EN 50020, EN 50021	EN 50014, EN 50020	EN 50014, EN 50020

Entity parameter			
Certification number	J.I.3002773		
FM control drawing	No. 116-0035		
Suitable for installation in division 2	yes		
Connection	terminals 1, 3; 2, 3; 4, 6; 5, 6		
Input I			
Voltage V_{OC}	12.9 V		
Current I_t	19.8 mA		
Explosion group	A&B	C&E	D, F&G
Max. external capacitance C_a	1.273 µF	3.82 µF	10.18 µF
Max. external inductance L_a	84.8 mH	254.4 mH	678.4 mH
Safety parameter			
UL control drawing	E 106378		
CSA control drawing	LR 36087-19		
Control drawing	No. 116-0047		
Connection	terminals 1, 3; 2, 3; 4, 6; 5, 6		
Input I			
Safety parameter	12.6 V/650 Ohm		
Voltage V_{OC}	12.9 V		
Current I_{SC}	19.8 mA		
Explosion group	A&B	C&E	D, F&G
Max. external capacitance C_a	1.273 µF	3.82 µF	10.18 µF
Max. external inductance L_a	84.88 mH	298.7 mH	744.4 mH

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed.
For information see www.pepperl-fuchs.com.

PR-03 Power Rail
UPR-03 Power Rail
KFD2-EB2 power feed module
The KFD2-EB2 power feed module and the PR-03 or the UPR-03 Power Rail are used to supply the devices with 24 VDC and at the same time to evaluate collective error message.
Each power feed module monitors and provides protection for up to 100 individual devices. The PR-03 Power Rail is an insert component for the DIN rail. The UPR-03 Power Rail is a complete unit consisting of an electrical insert and an aluminium DIN rail measuring 35 mm x 15 mm x 2000 mm. The devices are simply snapped in place to make electrical contact.
If a Power Rail is not being used, power can be supplied to the devices directly through the device terminals.