

# Switch Amplifier KFD2-SRA-Ex4



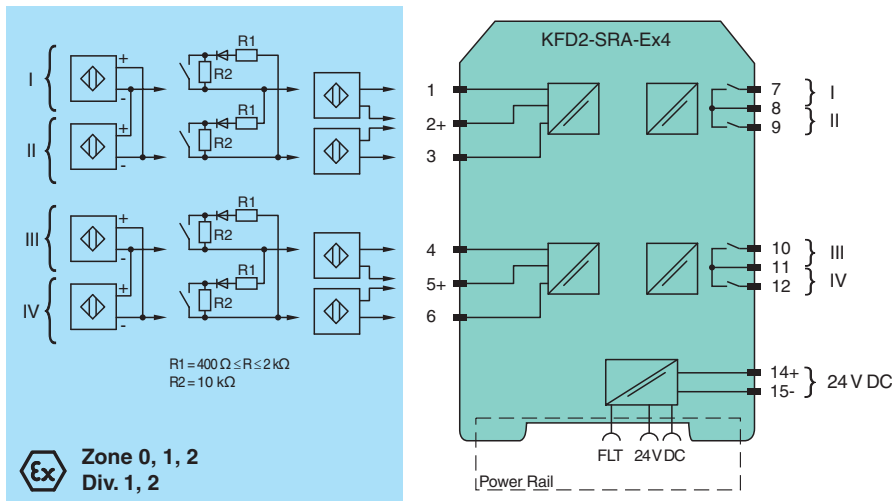
- 4-channel isolated barrier
- 24 V DC supply (Power Rail)
- Dry contact or NAMUR inputs
- 50 % less wiring, 2:1 technology
- Relay contact output
- Line fault detection (LFD)
- Reversible mode of operation



## 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. Each sensor or switch controls one form A normally open relay contact for the safe area load. A special 2:1 wiresaving technology is available on this isolator, reducing field wiring by 50 %. Switch S1 is used to enable or disable line fault detection of the field circuit. The 2:1 mode is selected with switch S2 while the remaining switches, S3 ... S6, are used for reversing the normal output state of the relays. A unique collective error messaging feature is available when used with the Power Rail system.

## Connection



## Technical Data

General specifications	
Signal type	Digital Input
<b>Supply</b>	
Connection	Power Rail or terminals 14+, 15-
Rated voltage	$U_r$ 19 ... 30 V DC
Ripple	$\leq 10 \%$
Rated current	$I_r$ 45 ... 70 mA
Power dissipation	1.2 W
<b>Input</b>	
Connection side	field side

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

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## Technical Data

Connection		terminals 1-, 2+, 3-; 4-, 5+, 6-
Rated values		acc. to EN 60947-5-6 (NAMUR), see manual 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		min. 35 ms / min. 35 ms (non-AC operation) min. 70 ms / min. 70 ms (AC operation)
Line fault detection		breakage $I \leq 0.15$ mA , short-circuit $I > 6$ mA
<b>Output</b>		
Connection side		control side
Connection		output I: terminals 7, 8 ; output II: terminals 8, 9 ; output III: terminals 10, 11 ; output IV: terminals 11, 12
Output I ... IV		Signal I ... Signal IV ; relay
Contact loading		253 V AC/2 A /cos $\phi > 0.7$ ; 40 V DC/2 A resistive load;
Energized/De-energized delay		approx. 30 ms / approx. 30 ms
Mechanical life		5 x 10 <sup>6</sup> switching cycles
Collective error message		Power Rail
<b>Transfer characteristics</b>		
Switching frequency		$\leq 10$ Hz (non-AC operation) $\leq 3$ Hz (AC operation)
<b>Galvanic isolation</b>		
Input/Output		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub>
Input/power supply		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub>
Output/power supply		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub>
Output/Output		basic insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub>
<b>Indicators/settings</b>		
Display elements		LEDs
Control elements		DIP-switch
Configuration		via DIP switches
Labeling		space for labeling at the front
<b>Directive conformity</b>		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61326-1:2013 (industrial locations)
Low voltage		
Directive 2014/35/EU		EN 61010-1:2010
<b>Conformity</b>		
Electromagnetic compatibility		NE 21:2006
Degree of protection		IEC 60529:2001
Input		EN 60947-5-6:2000
<b>Ambient conditions</b>		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
<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>		
EU-type examination certificate		ZELM 99 ATEX 0009
Marking		⊕ II (1)G [Ex ia Ga] IIC ⊕ II (1)D [Ex ia Da] IIIC ⊕ I (M1) [Ex ia Ma] I
Input		Ex ia IIC
Voltage	U <sub>o</sub>	10 V
Current	I <sub>o</sub>	14 mA
Power	P <sub>o</sub>	35 mW (linear characteristic)
Supply		

**Technical Data**

Maximum safe voltage	U <sub>m</sub>	40 V DC (Attention! U <sub>m</sub> is no rated voltage.)
Output		
Contact loading		230 V AC + 10 % / 2 A / 100 VA / cos φ ≥ 0.7; 40 V DC / 2 A resistive load
Fault indication output		
Maximum safe voltage	U <sub>m</sub>	40 V DC
Galvanic isolation		
Input/input		not available
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 60079-0:2012+A11:2013 , EN 60079-11:2012 , EN 60079-26:2007 , EN 50303:2000

**International approvals**

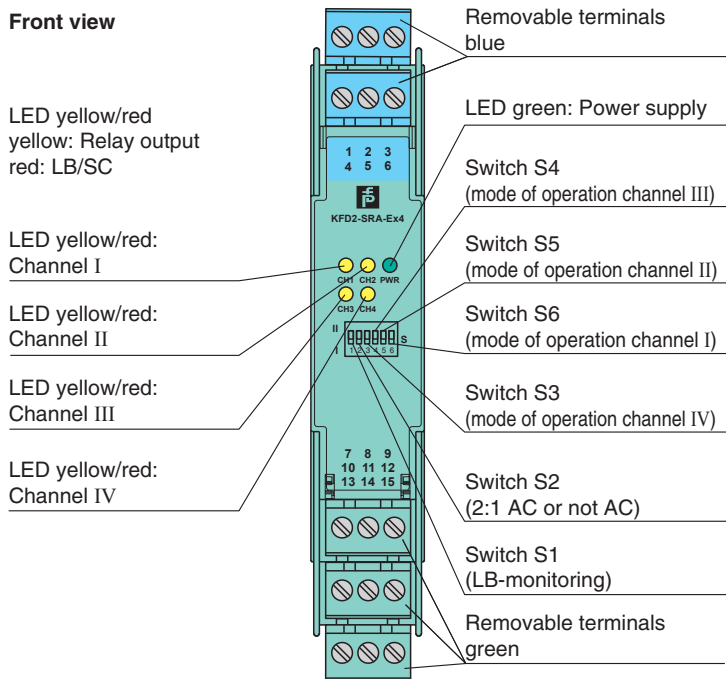
UL approval		
Control drawing		116-0145
IECEX approval		
IECEX certificate		IECEX TUN 04.0003
IECEX marking		[Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I

**General information**

Supplementary information		Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a> .
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**Assembly**

**Front view**



**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

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



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## Matching System Components

	<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

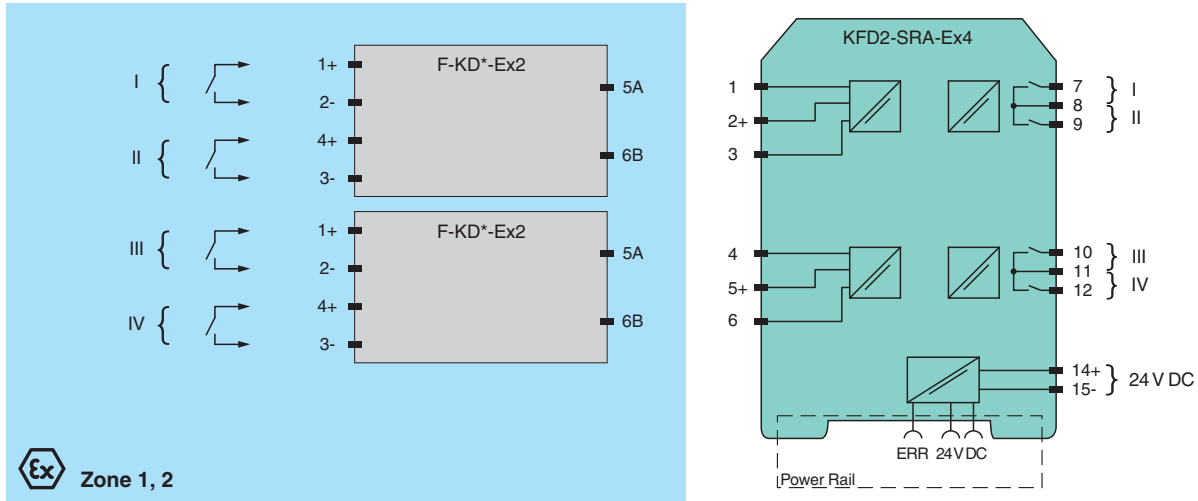
	<b>F-KD-Ex2</b>	Terminal module for NAMUR sensors
	<b>F-KDR-Ex2</b>	Terminal module for mechanical contacts
	<b>F-NR2-Ex1</b>	NAMUR Resistor Network
	<b>KF-ST-5GN</b>	Terminal block for KF modules, 3-pin screw terminal, green
	<b>KF-ST-5BU</b>	Terminal block for KF modules, 3-pin screw terminal, blue

**Application**

**Requirements for using the 2:1-transfer method**

In the 2:1-transfer method the switch amplifier transfers digital signals from the hazardous area by means of the patented new 2:1-transfer method. This method allows to transfer two independent digital signals by means of a single pair of conductors.

The prerequisite for the use of the 2:1-transfer method is that sensors with reverse polarity protected diode are used. Pepperl+Fuchs offers suitable sensors for alternating polarity. When using sensors without integrated reverse polarity protection diode, clamp modules F-KD-Ex2 or F-KDR-Ex2 (with diode network) have to be fitted. In case of F-KDR-Ex2, a resistor combination has been fitted in addition for line fault detection of mechanical switches.



**Comments**

When installing a serial diode, it has to be assured that the current in reverse direction is below a value of 0.15 mA in order to enable the line fault detection.

**Additional Information**

**Functions of the switches**

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Line fault detection	Pos.	Input	
<p>S1 S2 S3 S4 S5 S6</p>	I		Line fault detection
<p>S1 S2 S3 S4 S5 S6</p>	II		no Line fault detection

AC function	Pos.	Input	
<p>S1 S2 S3 S4 S5 S6</p>	I		AC function (2:1 transfer technique)
<p>S1 S2 S3 S4 S5 S6</p>	II		none AC function

Mode of operation	Pos.	Input	
<p>S1 S2 S3 S4 S5 S6</p> <p>S3: channel IV S4: channel III S5: channel II S6: channel I</p>	I	<p>1 signal</p> <p>0 signal</p>	energized  de-energized
<p>S1 S2 S3 S4 S5 S6</p> <p>S3: channel IV S4: channel III S5: channel II S6: channel I</p>	II	<p>0 signal</p> <p>1 signal</p>	energized  de-energized

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## Pepperl+Fuchs sensors for alternating polarity

Model number	Housing
NCB1,5-6,5M25-N0	6.5 mm metal
NCB1,5-6,5M25-N0-10M	6.5 mm metal
NCB1,5-6,5M25-N0-5M	6.5 mm metal
NCB1,5-6,5M25-N0-V1	6.5 mm metal
NCB1,5-8GM25-N0	M8 metal
NCB1,5-8GM25-N0-10M	M8 metal
NCB1,5-8GM25-N0-5M	M8 metal
NCB1,5-8GM25-N0-V1	M8 metal
NCB10-30GM40-N0	M30 metal
NCB10-30GM40-N0-10M	M30 metal
NCB10-30GM40-N0-15M	M30 metal
NCB10-30GM40-N0-5M	M30 metal
NCB10-30GM40-N0-V1	M30 metal
NCB15-30GM40-N0	M30 metal
NCB15-30GM40-N0-V1	M30 metal
NCB2-12GK35-N0	M12 plastic
NCB2-12GM35-N0	M12 metal
NCB2-12GM35-N0-10M	M12 metal
NCB2-12GM35-N0-21M	M12 metal
NCB2-12GM35-N0-5M	M12 metal
NCB2-12GM35-N0-V1	M12 metal
NCB2-F1-N0	F1
NCB2-V3-N0	V3
NCB2-V3-N0-V5	V3
NCB4-12GM40-N0	M12 metal
NCB4-12GM40-N0-V1	M12 metal
NCB5-18GK40-N0	M18 plastic
NCB5-18GM40-N0	M18 metal
NCB5-18GM40-N0-10M	M18 metal
NCB5-18GM40-N0-15M	M18 metal
NCB5-18GM40-N0-5M	M18 metal
NCB5-18GM40-N0-V1	M18 metal
NCB5-18GM70-N0	M18 metal
NCB8-18GM40-N0	M18 metal
NCB8-18GM40-N0-V1	M18 metal
NCN15-30GM40-N0	M30 metal
NCN15-30GM40-N0-10M	M30 metal
NCN15-30GM40-N0-20M	M30 metal
NCN15-30GM40-N0-V1	M30 metal
NCN3-F25F-N4-V1	F25
NCN3-F25F-N4-Y188326	F25
NCN3-F25F-N4-Y41364	F25
NCN3-F25F-N4-Y47292	F25
NCN3-F25-N4	F25
NCN3-F25-N4-0,14	F25
NCN3-F25-N4-5M	F25
NCN3-F25-N4-K1V1	F25
NCN3-F25-N4-V1	F25
NCN3-F25-N4-V1-Y205258	F25
NCN3-F31K-N4	F31
NCN3-F31K-N4-K	F31
NCN3-F31K-N4-V1-V1	F31
NCN3-F31-N4-K	F31
NCN3-F31-N4-K-K	F31
NCN3-F31-N4-V1	F31
NCN3-F31-N4-V16-K	F31
NCN3-F31-N4-V16-V16	F31
NCN3-F31-N4-V16-V1-Y201296	F31
NCN3-F31-N4-V18	F31
NCN3-F31-N4-V18-Y202412	F31
NJ4-12GK-N-5M	M12 plastic

Model number	Housing
NCN3-F31-N4-V1-Y186239	F31
NCN3-F31-N5-V18-V1	F31
NCN4-12GK35-N0	M12 plastic
NCN4-12GM35-N0	M12 metal
NCN4-12GM35-N0-10M	M12 metal
NCN4-12GM35-N0-5M	M12 metal
NCN4-12GM35-N0-V1	M12 metal
NCN4-V3-N0	V3
NCN8-18GK40-N0	M18 plastic
NCN8-18GM40-N0	M18 metal
NCN8-18GM40-N0-10M	M18 metal
NCN8-18GM40-N0-5M	M18 metal
NCN8-18GM40-N0-V1	M18 metal
NJ0,8-4,5-N	4.5 mm metal
NJ0,8-5GM-N	M5 metal
NJ0,8-5GM-N-10M	M5 metal
NJ0,8-5GM-N-5M	M5 metal
NJ1,5-6,5-N	6.5 mm metal
NJ1,5-6,5-N-15M	6.5 mm metal
NJ1,5-6,5-N-5M	6.5 mm metal
NJ1,5-6,5-N-Y10324	6.5 mm metal
NJ1,5-8GM-N	M8 metal
NJ1,5-8GM-N-10M	M8 metal
NJ1,5-8GM-N-5M	M8 metal
NJ1,5-8GM-N-D	M18 metal
NJ1,5-8GM-N-D-10M	M18 metal
NJ1,5-8GM-N-D-V1	M18 metal
NJ1,5-8GM-N-D-V1-Y29033	M18 metal
NJ1,5-8GM-N-V1	M8 metal
NJ10-30GK-SN	M30 plastic
NJ10-30GK-SN-10M	M30 plastic
NJ10-30GK-SN-15M	M30 plastic
NJ10-30GM-N	M30 metal
NJ15-30GK-SN	M30 plastic
NJ15-30GK-SN-20M	M30 plastic
NJ2-11-N	11 mm plastic
NJ2-11-N-G	M14 metal
NJ2-11-N-G-15M	M14 metal
NJ2-11-N-G-5M	M14 metal
NJ2-11-N-G-Y28795	M14 metal
NJ2-11-SN	11 mm plastic
NJ2-11-SN-G	M14 metal
NJ2-11-SN-G-10M	M14 metal
NJ2-11-SN-G-5M	M14 metal
NJ2-12GK-N	M12 plastic
NJ2-12GK-N-5M	M12 plastic
NJ2-12GK-SN	M12 plastic
NJ2-12GK-SN-10M	M12 plastic
NJ2-12GM-N	M12 metal
NJ2-12GM-N-10M	M12 metal
NJ2-12GM-N-21M	M12 metal
NJ2-12GM-N-5M	M12 metal
NJ2-12GM-N-V1	M12 metal
NJ2-14GM-N-V1-Y19784	M14 metal
NJ2-F1-N	F1
NJ2-V3-N	V3
NJ2-V3-N-V5	V3
NJ3-18GK-S1N	M18 plastic
NJ4-12GK-N	M12 plastic
NJ4-12GK-N-10M	M12 plastic
PL1-F25-N4-K	Platine

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Model number	Housing
NJ4-12GM-N	M12 metal
NJ4-12GM-N-10M	M12 metal
NJ4-12GM-N-20M	M12 metal
NJ4-12GM-N-5M	M12 metal
NJ4-12GM-N-V1	M12 metal
NJ4-30GM-N-200	M30 metal
NJ4-30GM-N-200-10M	M30 metal
NJ5-11-N	11 mm plastic
NJ5-11-N-15M	11 mm plastic
NJ5-11-N-5M	11 mm plastic
NJ5-11-N-G	M14 metal
NJ5-11-N-G-10M	M14 metal
NJ5-11-N-G-5M	M14 metal
NJ5-11-N-G-6M	M14 metal
NJ5-18GK-N	M18 plastic
NJ5-18GK-N-10M	M18 plastic
NJ5-18GK-N-5M	M18 plastic
NJ5-18GK-SN	M18 plastic
NJ5-18GK-SN-10M	M18 plastic
NJ5-18GK-SN-5M	M18 plastic
NJ5-18GM-N	M18 metal
NJ5-18GM-N-10M	M18 metal
NJ5-18GM-N-5M	M18 metal
NJ5-18GM-N-V1	M18 metal
NJ5-30GK-S1N	M30 plastic
NJ5-30GK-S1N-10M	M30 plastic
NJ5-30GK-S1N-5M	M30 plastic
NJ6-22-SN	22 mm plastic
NJ6-22-SN-G	PG21 metal
NJ6-22-SN-G-10M	PG21 metal
NJ6-22-SN-G-3M	PG21 metal
NJ8-18GK-N	M18 plastic
NJ8-18GK-N-10M	M18 plastic
NJ8-18GM-N	M18 metal
NJ8-18GM-N-5M	M18 metal
NJ8-18GM-N-V1	M18 metal

Model number	Housing
PL2-F25-N4-K	Platine
PL2-F25-SN4-K	Platine
PL3-F25-N4-K	Platine
PL3-F25-SN4-K	Platine
PL4-F25-N4-K	Platine
RC10-14-N0	Ring
RC15-14-N0	Ring
SC2-N0	Slot 2 mm
SC3,5-G-N0	Slot 3.5 mm
SC3,5-G-N0-6M	Slot 3.5 mm
SC3,5-N0	Slot 3.5 mm
SC3,5-N0-BU	Slot 3.5 mm
SC3,5-N0-GN	Slot 3.5 mm
SC3,5-N0-WH	Slot 3.5 mm
SC3,5-N0-Y37317	Slot 3.5 mm
SC3,5-N0-YE	Slot 3.5 mm
SJ2-N	Slot 2 mm
SJ2-S1N	Slot 2 mm
SJ2-SN	Slot 2 mm
SJ3,5-N	Slot 3.5 mm
SJ3,5-G-N	Slot 3.5 mm
SJ3,5-G-N-Y26478	Slot 3.5 mm
SJ3,5-N-BU	Slot 3.5 mm
SJ3,5-N-GN	Slot 3.5 mm
SJ3,5-N-LED	Slot 3.5 mm
SJ3,5-N-LED-Y43416	Slot 3.5 mm
SJ3,5-N-WEISS	Slot 3.5 mm
SJ3,5-N-Y08944	Slot 3.5 mm
SJ3,5-N-Y33714	Slot 3.5 mm
SJ3,5-N-Y41400-WEISS	Slot 3.5 mm
SJ3,5-N-YE	Slot 3.5 mm
SJ3,5-S1N	Slot 3.5 mm
SJ3,5-SN	Slot 3.5 mm
SJ3,5-SN-Y27487	Slot 3.5 mm
SJ3,5-SN-Y41402	Slot 3.5 mm