

# Switch Amplifiers

For limit switches with inductive contacts  
– intrinsically safe –



SIL 2

KF..-SR2..

## Application

These switch amplifiers are suitable for intrinsically safe applications. The devices transmit binary signals of limit switches, preferably with inductive contacts (NAMUR sensors), from potentially explosive areas to safe areas.

The proximity sensor or the switch controls the safe area load via a change-over relay contact. The output status changes when the status of the input signal changes.

The normal output status can be reversed using switch S1.

Switch S3 is used to activate or deactivate the line fault detection of the field circuit. In the event of a failure, the relays drop out and the LEDs indicate the error according to NAMUR NE44.

Devices with bistable relays (KFA6-SR2-Ex2.W.IR) are used for level control, pump control and other switching applications.

The device is set by an active signal at input I and reset by an active signal at input II. The direction of action of inputs I and II is programmable.

Switch S3 is used to activate and deactivate the line fault detection of the field circuit. In the event of a failure or during a power failure, the change-over relay contact drops out and the LEDs indicate the error according to NAMUR NE44. When the line fault is remedied, the relay switches back to the state prior to the error message.

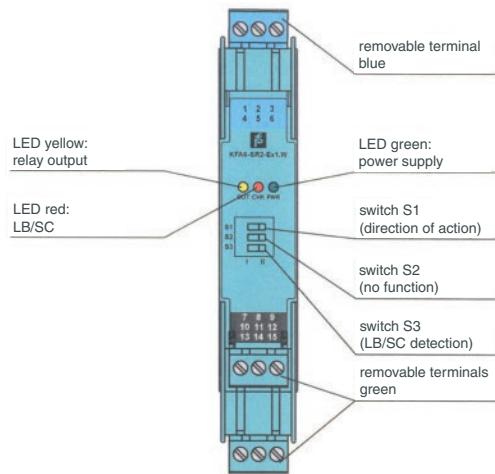
When the power supply is restored after a power failure, the relays switch back to the initial state.

## Versions

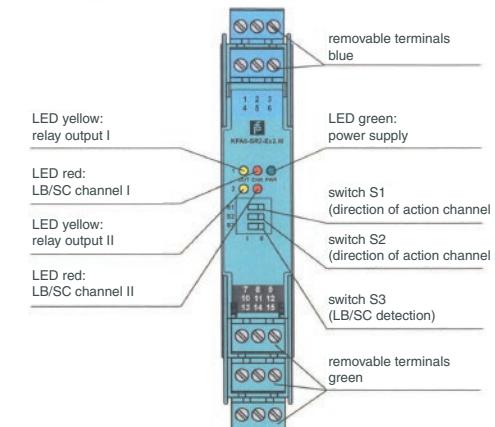
Mains voltage	1-channel	2-channel	bistable
230 V AC	KFA6-SR2-Ex1.W	KFA6-SR2-Ex2.W	KFA6-SR2-Ex2.W.IR
115 V AC or 24 V DC upon request			

## Front View

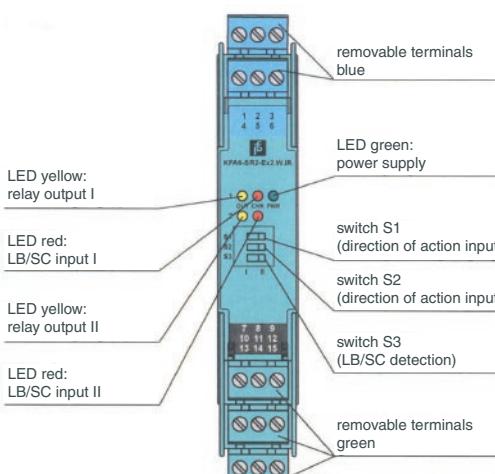
### KFA6-SR2-Ex1.W (1-channel)



### KFA6-SR2-Ex2.W (2-channel)



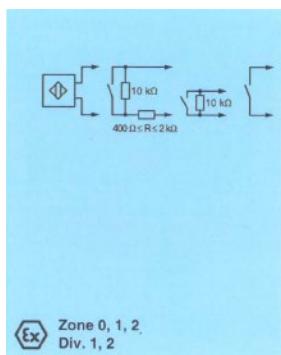
### KFA6-SR2-Ex2.W.IR (2-channel, bistable)



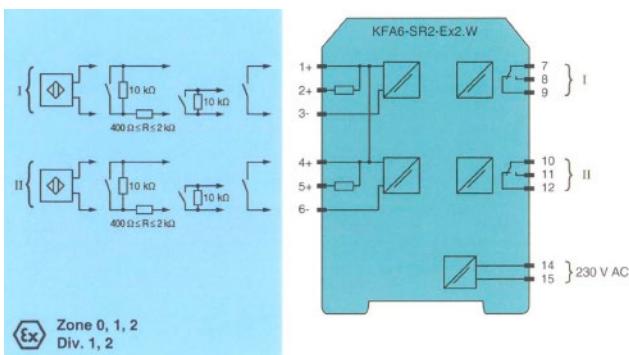
# Connection and Configuration

## Connection

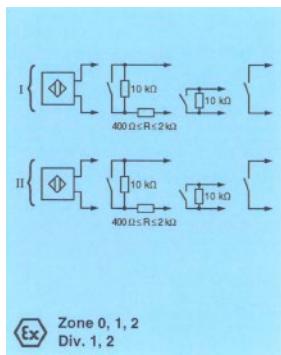
**KFA6-SR2-Ex1.W**



**KFA6-SR2-Ex2.W**

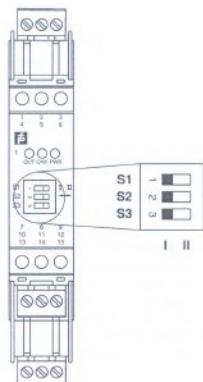


**KFA6-SR2-Ex2.W.IR**



## Configuration

**KFA6-SR2-Ex1.W**

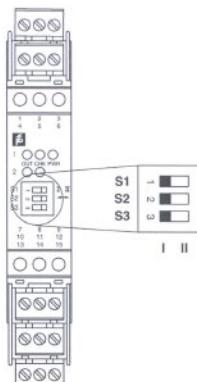


Switch Position		
S	Function	Position
1	direction of action output I (relay) energised	I with high input current
		II with low input current
2	no function	
3	line fault detection	ON I
		OFF II

Operating Conditions	
Control circuits	Input signal
initiator high impedance / contact opened	low input current
initiator low impedance / contact closed	high input current
line breakage, short circuit on line	line fault

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

**KFA6-SR2-Ex2.W**

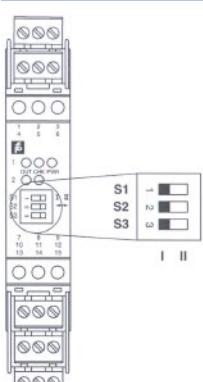


Switch Position		
S	Function	Position
1	direction of action output I (relay) energised	I with high input current
		II with low input current
2	direction of action output II (relay) energised	I with high input current
		II with low input current
3	line fault detection	ON I
		OFF II

Operating Conditions	
Control circuits	Input signal
initiator high impedance / contact opened	low input current
initiator low impedance / contact closed	high input current
line breakage, short circuit on line	line fault

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

**KFA6-SR2-Ex2.W.IR**



Switch Position		
S	Function	Position
1	direction of action output I (relay) energised	I with high input current
		II with low input current
2	direction of action output II (relay) energised	I with high input current
		II with low input current
3	line fault detection	ON I
		OFF II

Operating Conditions	
Control circuits	Input signal
initiator high impedance / contact opened	low input current
initiator low impedance / contact closed	high input current
line breakage, short circuit on line	line fault

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

## Technical Data, Dimensional Data and Weight

Switch Amplifier 1-channel		KFA6-SR2-Ex1.W	
<b>Power supply</b>	mains voltage	terminals 14, 15 207...253 V AC, 45...65 Hz	
	maximum safety voltage $U_m$	253 V DC	
	ripple	-	
	rated current	-	
	power consumption	$\leq 1 \text{ W}$	
<b>Input (intrinsically safe)</b>		<b>terminals 1+ , 3-</b>	
	nominal values	according to DIN 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	
	input pulse length / input pulse pause	$\geq 20 \text{ ms} / \geq 20 \text{ ms}$	
	line fault detection	breakage $I \leq 0.1 \text{ mA}$ , short circuit $I > 6 \text{ mA}$	
<b>Maximum values according to declaration of conformity</b>	<b>PTB 00 ATEX 2081</b>		
	voltage $U_0$	10.6 V	
	current $I_0$	19 mA	
	power $P_0$	51 mW	
<b>Permissible connection values</b>	<b>ignition protection type, category</b>	<b>[Ex ia]</b>	
	explosion group	IIB / IIC	
	external capacitance	2.1 $\mu\text{F}$ / 0.59 $\mu\text{F}$	
	external inductance	5 mH / 3 mH	
	<b>ignition protection type, category</b>	<b>[Ex ib]</b>	
	explosion group	IIB / IIC	
	external capacitance	20 $\mu\text{F}$ / 2.9 $\mu\text{F}$	
	external inductance	360 mH / 100 mH	
<b>Output (not intrinsically safe)</b>	<b>output</b>	terminals 7, 8, 9	
	contact load	253 V AC / 2 A / $\cos \phi > 0.7$ ; 40 V DC / 2 A ohmic load	
	mechanical life	$10^7$ switching cycles	
	on-delay / release delay	approx. 20 ms / approx. 20 ms	
<b>Transfer characteristics</b>	switching frequency	< 10 Hz	
<b>Galvanic isolation</b>	input / output	reinforced insulation according to EN IEC 61010-1,	
	input / power supply	rated insulation voltage 300 V <sub>eff</sub>	
	output / power supply		
<b>Conformity with directives</b>	electromagnetic compatibility	directive 2014/30/EU	EN 61326-1:2013
	low voltage	directive 2014/35/EU	EN 61010-1:2010
	ATEX	directive 2014/34/EU	EN IEC 60079-0:2018 / AC:2020 EN 60079-11:2012
<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 (253 – 333 K)	
<b>Mechanical data</b>	degree of protection	IP20	
	weight	approx. 150 g	
	dimensions	20x119x115 mm, housing type B2	
<b>International approvals among others</b>	FM approval	control drawing	116-0035
	UL approval	control drawing	116-0145
	CSA approval	control drawing	116-0047

## Technical Data, Dimensional Data and Weight

Switch Amplifier 2-channel		KFA6-SR2-Ex2.W	KFA6-SR2-Ex2.W.IR
<b>Power supply</b>	mains voltage maximum safety voltage $U_m$ ripple rated current power consumption	terminals 14, 15 207...253 V AC, 45...65 Hz 253 V DC – – $\leq 1.3 \text{ W}$	$\leq 1.5 \text{ W}$
<b>Input (intrinsically safe)</b>	nominal values open circuit voltage / short circuit current switching point / switching hysteresis input pulse length / input pulse pause line fault detection	terminals 1+, 3-, 4+, 6- according to DIN EN 60947-5-6 (NAMUR) approx. 8 V DC / approx. 8 mA 1.2...2.1 mA / approx. 0.2 mA $\geq 20 \text{ ms} / \geq 20 \text{ ms}$ breakage $I \leq 0.1 \text{ mA}$ , short circuit $I > 6 \text{ mA}$	terminals 1+, 2+, 3-, 4+, 5+, 6- $\geq 10 \text{ ms} / \geq 10 \text{ ms}$
<b>Maximum values according to declaration of conformity</b>	<b>PTB 00 ATEX 2081</b>		
voltage $U_0$	10.6 V		
current $I_0$	19 mA		
power $P_0$	51 mW		
<b>Permissible connection values</b>	<b>ignition protection type, category</b> explosion group external capacitance external inductance <b>ignition protection type, category</b> explosion group external capacitance external inductance	[Ex ia] IIB / IIC 2.1 $\mu\text{F}$ / 0.59 $\mu\text{F}$ 5 mH / 3 mH [Ex ib] IIB / IIC 20 $\mu\text{F}$ / 2.9 $\mu\text{F}$ 360 mH / 100 mH	
<b>Output (not intrinsically safe)</b>	<b>output I</b> <b>output II</b> contact load mechanical life on-delay / release delay	terminals 7, 8, 9 terminals 10, 11, 12 253 V AC / 2 A / $\cos \phi > 0.7$ ; 40 V DC / 2 A ohmic load 10 <sup>7</sup> switching cycles approx. 20 ms / approx. 20 ms	
<b>Transfer characteristics</b>	switching frequency	< 10 Hz	
<b>Galvanic isolation</b>	input / output input / power supply output / power supply output / output	reinforced insulation according to EN IEC 61010-1, rated insulation voltage 300 V <sub>eff</sub>	
<b>Conformity with directives</b>	electromagnetic compatibility low voltage ATEX	directive 2014/30/EU directive 2014/35/EU directive 2014/34/EU	EN 61326-1:2013 EN 61010-1:2010 EN IEC 60079-0:2018 / AC:2020 EN 60079-11:2012
<b>Conformity</b>	electromagnetic compatibility degree of protection input	NE 21:2006 IEC 60529:2001 EN 60947-5-6:2000	
<b>Ambient conditions</b>	ambient temperature	–20 / +60 °C (253 – 333 K)	
<b>Mechanical data</b>	degree of protection weight dimensions	IP20 approx. 150 g 20x119x115 mm, housing type B2	
<b>International approvals among others</b>	FM approval UL approval CSA approval	control drawing control drawing control drawing	116-0035 116-0145 116-0047