

Switch Amplifiers

For limit switch contact assemblies with inductive limit switch assembly
- intrinsically safe -

KF..-SR2..

Application

These switch amplifiers are suitable for intrinsically safe applications. The instruments transfer binary signals of limit switch contact assemblies preferably with inductive limit switch assemblies (NAMUR-sensors), from the potentially explosive area into the secure area.

The proximity sensor or switch controls the load in the secure area via a change-over relay contact. The output changes the status if the status of the input signal is being changed. The normal output status can be reversed via switch S1. Switch S3 is being used to switch the lead error detection of the field circuitry on or off. During the error status the relays fall and the error is being indicated via the LAD according to NAMUR NE44.

Instruments with bistable relays (KFA6-SR2-Ex2.W.IR) are being applied for filling level- and pump control and in other switch applications. The instrument is being set by an active signal at input I and is being reset by an active signal at input II. The direction of action of the inputs I and II is programmable.

The lead error control of the field circuitry is being switched on and off via switch 3. During an error condition or a power failure the change-over relay contact falls and the error is being displayed via NAMUR NE 44. If the lead error is remedied, the relay backspaces in the condition of the error indication.

If the instrument is being supplied with energy after the power failure, the relays backspace into the initial status.

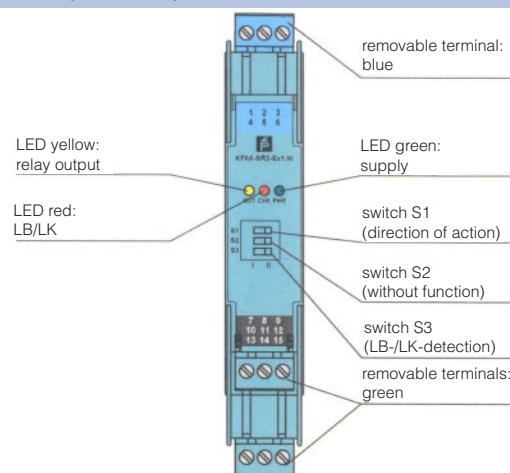


Versions

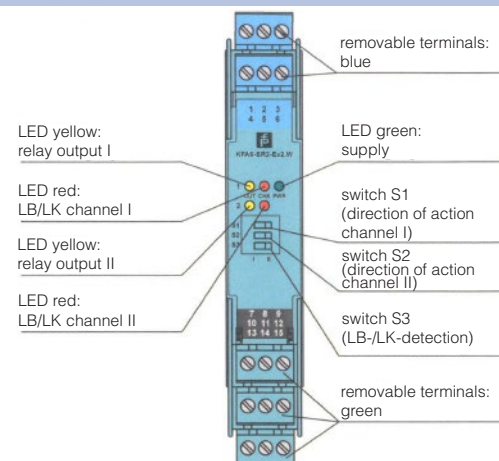
Mains voltage	1-channel	2-channel	
			bistable
AC 230 V	KFA6-SR2-Ex1.W	KFA6-SR2-Ex2.W	KFA6-SR2-Ex2.W.IR
AC 115 resp. DC 24 V upon request			

Front Views

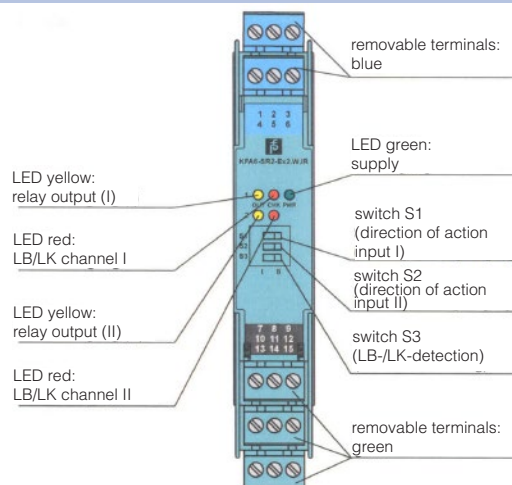
KFA6-SR2-Ex1.W (1-channel)



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



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



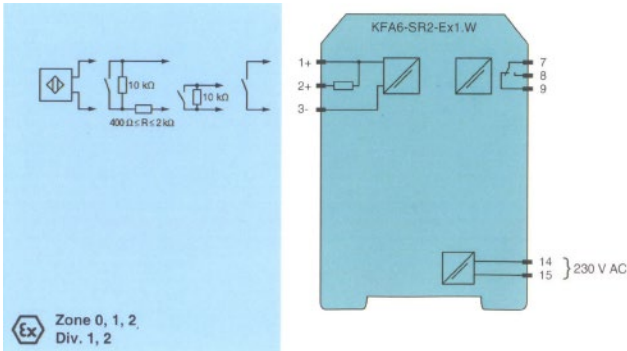
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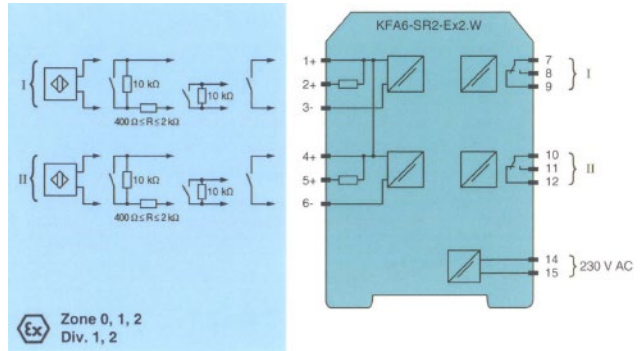
Connection and Configuration

Connection

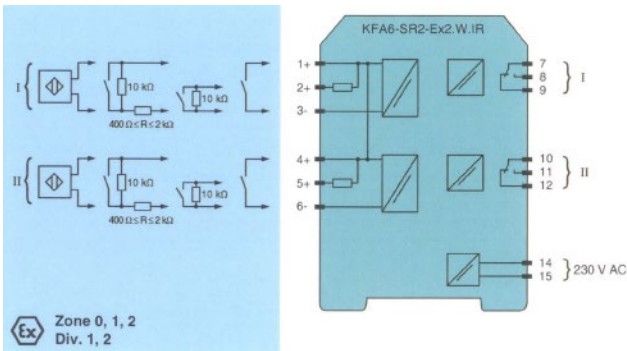
KFA6-SR2-Ex1.W



KFA6-SR2-Ex2.W

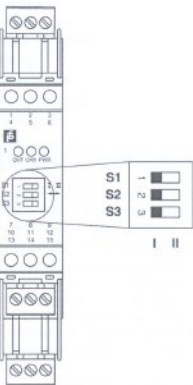


KFA6-SR2-Ex2.W.IR



Configuration

KFA6-SR2-Ex1.W



Switch position

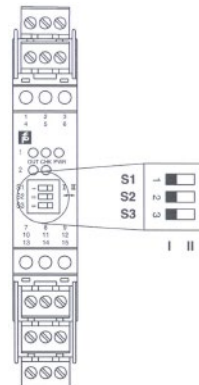
S	Function	Position
1	direction of action output I (relay) tightened for high input current for low input current	I II
2	no function	
3	lead error detection ON OFF	I II

Operating conditions

Control circuit	Input signal
initiator high ohmic contact opened	low input current
initiator low ohmic contact closed	high input current
cable break short circuit on line	lead error

adjusted ex works: switch 1, 2, and 3 on position I

KFA6-SR2-Ex2.W



Switch position

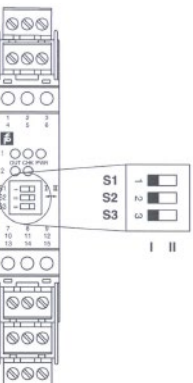
S	Function	Position
1	direction of action output I (relay) tightened for high input current for low input current	I II
2	direction of action output II (relay) tightened for high input current for low input current	I II
3	lead error detection ON OFF	I II

Operating conditions

Control circuit	Input signal
initiator high ohmic contact opened	low input current
initiator low ohmic contact closed	high input current
cable break short circuit on line	lead error

adjusted ex works: switch 1, 2, and 3 on position I

KFA6-SR2-Ex2.W.IR



Switch position

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Operating conditions

Control circuit	Input signal
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cable break short circuit on line	lead error

adjusted ex works: switch 1, 2, and 3 on position I

Technical Data, Dimensional Data and Weights

Technical Data, Switch Amplifier 1-channel

KFA6-SR2-Ex1.W

Mains	
Rated voltage	terminal 14, 15 AC 207 V...253 V, 45 Hz...65 Hz
Safety-related maximum voltage U_m	DC 253 V
Waviness	–
Rated current	–
Power consumption	≤ 1 W
Input (intrinsically safe)	
Nominal data	terminals 1+, 3- according to EN 60 947-5-6 (NAMUR)
No-load voltage / short circuit current	approx. DC 8 V / approx. 8 mA
Switch point / switching hysteresis	1.2 mA...2.1 mA / approx. 0.2 mA
Input pulse length / -impulse pause	≥ 20 ms / ≥ 20 ms
Lead control	break I ≤ 0.1 mA, short circuit I > 6 mA
Highest values acc. to decl. of conformity PTB 00 ATEX 2081	
Voltage U_o	10.6 V
Current I_o	19 mA
Output P_o	51 mW
Allowed connection value	
Type of protection, category [Ex ia]	
Explosion group	IIB / IIC
External capacity	2.1 μF / 0.59 μF
External inductance	5 mH / 3 mH
Type of protection, category [Ex ib]	
Explosion group	IIB / IIC
External capacity	20 μF / 2.9 μF
External inductance	360 mH / 100 mH
Output (not intrinsically safe)	
Output	
Contact load	terminals 7, 8, 9 AC: 253 V / 2 A / cos φ > 0,7; DC: 40 V / 2 A ohmic load
Mechanical durability	10 ⁷ switching cycles
On-delay / delayed release	approx. 20 ms / approx. 20 ms
Transfer features	
Switching frequency	< 10 Hz
Galvanic separation	
Input / output	secure galvanic separation according to EN 50 020, peak value of the voltage 375 V
Input / mains	secure galvanic separation according to EN 50 020, peak value of the voltage 375 V
Output / mains	reinforced insulation according to IEC 61 140, rated insulation voltage 300 V _{eff}
Standard conformity	
Electromagnetic compatibility	
standard 2004 / 108 / EG	EN 61 326-1:2006
Low voltage	
standard 2006 / 95 / EG	EN 50 178: 1997
ATEX	
standard 94 / 9 / EG	EN 50 014, EN 50 020
Conformity	
Electromagnetic compatibility	NE 21
Protection type	IEC 60 529
Protection against electric shock	IEC 61 140
Environmental conditions	
Ambient temperature	-20... 60 °C (253...333 K)
Mechanical data	
Protection type	IP 20
Weight	approx. 150 g
Dimensions	20 x 119 x 115 mm, case model B2
International approval and others	
FM-approval	
Control Drawing	116-0035
UL-approval	
Control Drawing	116-0145
CSA-approval	
Control Drawing	116-0047

Technical Data, Dimensional Data and Weights

Technical Data, Switch Amplifier 2-channel

	KFA6-SR2-Ex2.W	KFA6-SR2-Ex2.W.IR
Mains		
Rated voltage	terminals 14, 15 AC 207 V...253 V, 45 Hz...65 Hz	terminals 14, 15 AC 207 V...253 V, 45 Hz... 65 HZ
Safety-related maximum voltage U_m	DC 253	DC 253
Waviness	–	–
Rated current	–	–
Power consumption	≤ 1.3 W	≤ 1.5 W
Input (intrinsically safe)		
Nominal data	terminals 1+, 3-, 4+, 6-	terminals 1+,2+ 3-, 4+, 5+,6-
No-load voltage / short circuit current	according to EN 60 947-5-6 (NAMUR) approx. DC 8 V / approx. 8 mA	
Switch point / switching hysteresis	1.2 mA...2.1 mA / approx. 0.2 mA	
Input pulse length / -impulse pause	≥ 20 ms / ≥ 20 ms	
Lead control	break I ≤ 0.1 mA, short circuit I > 6 mA	
Highest values acc. to decl. of conformity		
Voltage U_0	10.6 V	10.6 V
Current I_0	19 mA	19 mA
Output P_0	51 mW	51 mW
Allowed connection value		
Type of protection, category [Ex ia]		
Explosion group	IIB / IIC	IIB / IIC
External capacity	2.1 μF / 0.59 μF	2.1 μF / 0.59 μF
External inductance	5 mH / 3 mH	5 mH / 3 mH
Type of protection, category [Ex ib]		
Explosion group	IIB / IIC	IIB / IIC
External capacity	20 μF / 2.9 μF	20 μF / 2.9 μF
External inductance	360 mH / 100 mH	360 mH / 100 mH
Output (not intrinsically safe)		
Output I	terminals 7, 8, 9	
Output II	terminals 10, 11, 12	
Contact load	AC: 253 V / 2 A / cos φ > 0.7; DC: 40 V / 2 A ohmic load	
Mechanical durability	10 ⁷ switching cycles	
On-delay / delayed release	approx. 20 ms / approx. 20 ms	
Transfer features		
Switching frequency	< 10 Hz	
Galvanic separation		
Input / output	secure galvanic separation according to EN 50 020, peak value of the voltage 375 V	
Input / mains	secure galvanic separation according to EN 50 020, peak value of the voltage 375 V	
Output / mains	reinforced insulation according to IEC 61 140, rated insulation voltage 300 V _{eff}	
Output / output	basic insulation according to IEC 61 140, rated insulation voltage 300 V _{eff}	
Standard conformity		
Electromagnetic compatibility	standard 2004 / 108 / EG EN 61 326-1:2006	
Low voltage	standard 2006 / 95 / EG EN 50 178: 1997	
ATEX	standard 94 / 9 / EG EN 50 014, EN 50 020	
Conformity		
Electromagnetic compatibility	NE 21	
Protection type	IEC 60 529	
Protection against electric shock	IEC 61 140	
Environmental conditions		
Ambient temperature	-20... 60 °C (253...333 K)	
Mechanical data		
Protection type	IP 20	
Weight	approx. 150 g	
Dimensions	20 x 119 x 115 mm, case model B2	
International approval		
FM-approval		
Control Drawing	116-0035	
UL-approval		
Control Drawing	116-0145	
CSA-approval		
Control Drawing	116-0047	