

Switch Amplifier

KFA6-SR-2.3L

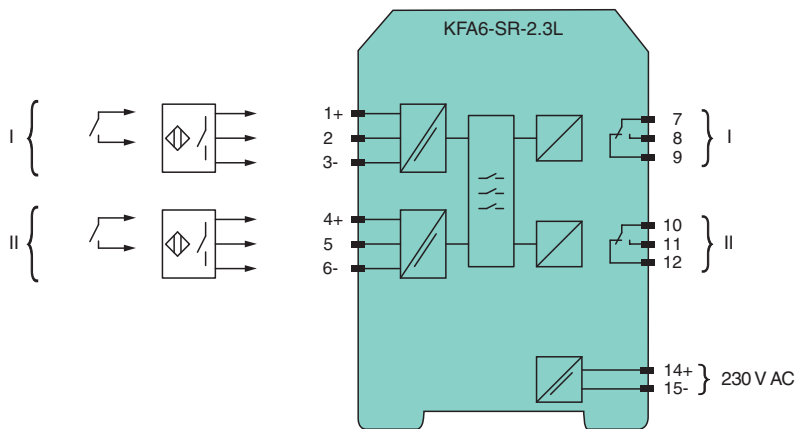
- 2-channel signal conditioner
- 115/230 V AC supply
- 3-wire PNP/NPN sensor or push-pull input
- Relay contact output
- DIP switch selectable functions
- Minimum/maximum control
- Up to SIL 2 acc. to IEC/EN 61508 / IEC/EN 61511

CE SIL2

Function

This signal conditioner provides the galvanic isolation between field circuits and control circuits. The device transfers the status of 2-wire and 3-wire sensors to the relay contact output. The device has 2 inputs and 2 relay contact outputs. The device can be used either as dual channel signal conditioner or as a two-point level controller. The device is easily configured by the use of DIP switches. A fault is signaled by LEDs.

Connection



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 90 ... 253 V AC , 45 ... 65 Hz
Rated current	I_r ≤ 150 mA
Power dissipation	2.5 W
Power consumption	max. 7 W
Input	

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

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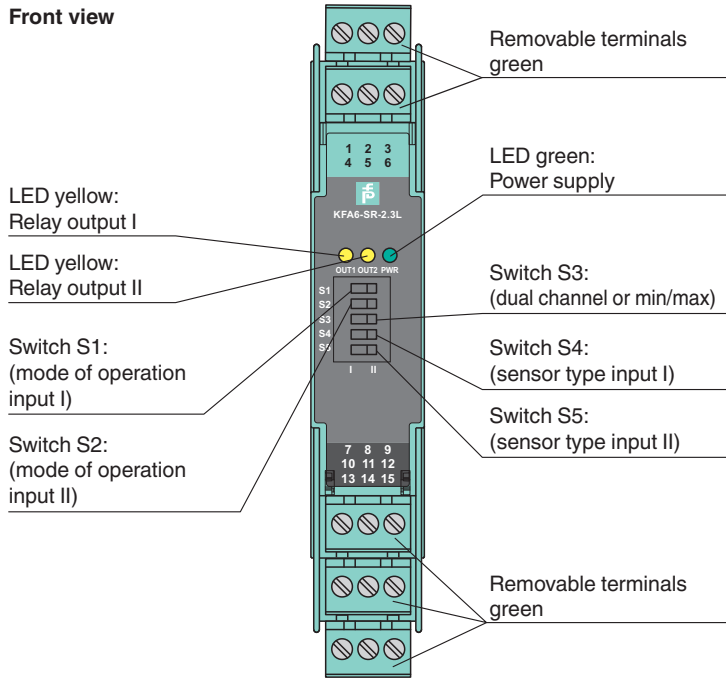
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Technical Data


Connection side	field side
Connection	Input I: terminals 1+, 2, 3-; Input II: terminals 4+, 5, 6-
Rated values	22 ... 24 V DC / 100 mA, see notes
NPN sensor	
Switching point	4 ... 13 V
PNP sensor	
Switching point	4 ... 13 V
Short-circuit current	110 mA
Switching point	0-signal: < 5 V 1-signal: > 13 V
Output	
Connection side	control side
Connection	output I: terminals 7, 8, 9 output II: terminals 10, 11, 12
Output I, II	
Contact loading	250 V AC / 4 A / $\cos \phi > 0.7$; 40 V DC / 2 A resistive load
Energized/De-energized delay	max. 6 ms
Mechanical life	10^7 switching cycles
Transfer characteristics	
Switching frequency	≤ 10 Hz
Galvanic isolation	
Input/Output	safe galvanic isolation per EN 50178, voltage peak value 253 V
Input/power supply	safe galvanic isolation per EN 50178, voltage peak value 253 V
Output/power supply	safe galvanic isolation per EN 50178, voltage peak value 253 V
Output/Output	basic insulation acc. to EN 50178, rated insulation voltage 253 V _{eff}
Indicators/settings	
Display elements	LEDs
Labeling	space for labeling at the front
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	
Directive 2006/95/EC	EN 50178:1997
Conformity	
Galvanic isolation	EN 50178
Electromagnetic compatibility	NE 21
Degree of protection	IEC 60529
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
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-GY	Profile rail, wiring comb field side, gray
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Accessories

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

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Additional Information

Function

The device has two inputs and two relay outputs (change-over contact) and is usable either as dual channel isolated amplifier or as two-point control (min/max control).

The inputs are designed in a way, that the signals of sensors which have PNP or NPN output transistors as well as push-pull outputs, can be processed. In the case of sensors with push-pull outputs the switches S4 or S5 have to be set to position I. For sensors with PNP or NPN output transistors, the switches S4 or S5 have to be set to position II. The operating behaviour of the sensor can be selected: NO S1/S2 in position I; NC S1/S2 in position II.

Dual channel switching amplifier for binary sensors or contacts

With this function (S3 in position I) contact or sensor signals from the input are transmitted to the relay output.

Parallel operation (1 input, 2 outputs)

A signal duplication can be realized by the following measures:

- Jumper terminal 2 to terminal 5.
- One sensor to input I or II.

Two-point control (min/max control) with storage of status

On this setting (S3 in position II) the information from the two inputs is combined.

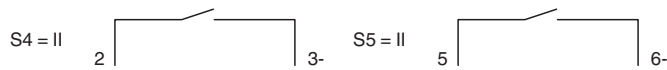
When the supply voltage is switched on, relay 1 is energised until input 2 is activated (reset input). Input 1 works as an set input.

Truth table (min/max control)

Conditions	Inputs		Outputs relay I and II
	E I	E II	
Activation of the supply voltage	not activated	not activated	relay energised
	activated	not activated	relay energised
	activated	activated	relay de-energised
Normal operation	activated	transition: not activated/activated	relay de-energising
	transition: activated/not activated	not activated	relay energising

Sensor connection

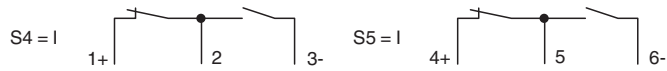
NPN output stage/contact



PNP output stage/contact



Push-pull output stage



Function of the DIP switches

Function	Switch function	Switch/position
Operating behaviour of the sensor input	input 1 is activated if sensor 1 is closed	S1/I
	input 1 is activated if sensor 1 is open	S1/II
	input 2 is activated if sensor 2 is closed	S2/I
	input 2 is activated if sensor 2 is open	S2/II
Dual channel or min/max	dual channel independent	S3/I
	min/max function with storage of the status	S3/II
Sensor type	input 1: push-pull output stage, NO	S4/I
	input 1: PNP/NPN, NO	S4/II
	input 2: push-pull output stage, NO	S5/I
	input 2: PNP/NPN, NO	S5/II

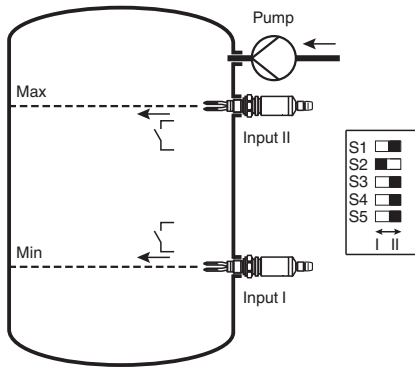
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Example 1: filling of a vessel (two-point level control, S3 in position II)

Min contact or min sensor is connected to input 1 (set), max contact or max sensor is connected to input 2 (reset). Switch S1 is in position I and switch S2 is in position II. A filling pump is connected to output 1 or 2 (terminals 7/8 or 10/11).

All data refer to NO sensors.



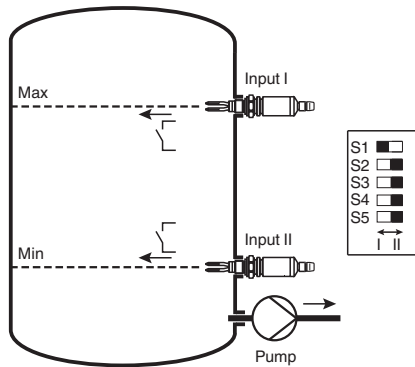
with vibration limit switch

When the supply voltage of the KFA6-SR-2.3L is switched on, the pump will also switched on as long as the Max contact is not activated. During operation the pump is switched off as soon as the level has reached max position. If the level reach min position, the pump is switched on. If the KFA6-SR-2.3L has no power supply, the pump is switched off.

Example 2: emptying of a vessel (two-point level control, S3 in position II)

Max contact or max sensor is connected to input 1 (set), min contact or min sensor is connected to input 2 (reset). Switch S1 is in position II and switch S2 is in position I. An emptying pump is connected to output 1 or 2 (terminals 7/9 or 10/12).

All data refer to NO sensors.



with vibration limit switch

When the supply voltage of the KFA6-SR-2.3L is switched on, the pump will also switched on, if max contact is activated. During operation the pump is switched off as soon as the level has reached min position. If the level reach max position, the pump switched on. If the KFA6-SR-2.3L has no power supply, the pump is switched on.

Comments:

1. NO with push-pull output stage means that the closing contact or transistor is connected to terminal 2 and 3 (5 and 6).
NC with push-pull output stage means that the opening contact or transistor is connected to terminal 2 and 3 (5 and 6).
2. In dip switch position S3/I (dual channel, independent) an output relay is activated if the corresponding input is activated.

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Derating of the sensor currents in dependence of the ambient temperature

The maximum value of the sensor currents is controlled by a thermal overload protection of the device.



Attention

The device determines its ambient temperature and limits the sensor currents accordingly (see figure). An inadmissibly high ambient temperature can limit the function of the sensors.

