# Switch Amplifiers

## For limit switches with inductive contacts – intrinsically safe –

SIL 2

**KFU8-SR-...W**

### Application

These 1- or 2-channel 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 save 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.

### Versions

| Mains voltage | 1-channel | 2-channel |
|---|---|---|
| 19...30 V DC<br>90...253 V AC, 50...60 Hz | **KFU8-SR-Ex1.W** | **KFU8-SR-Ex2.W** |

### Front View

**KFU8-SR-Ex1.W (1-channel)**


**KFU8-SR-Ex2.W (2-channel)**




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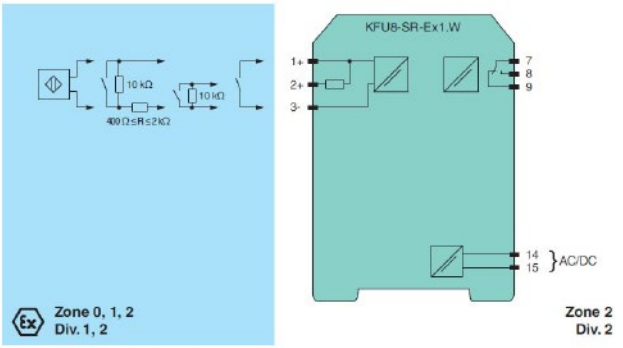
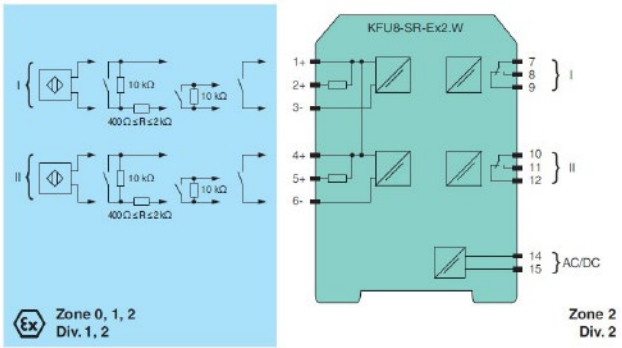
# Connection and Configuration

## Connection

### KFU8-SR-Ex1.W

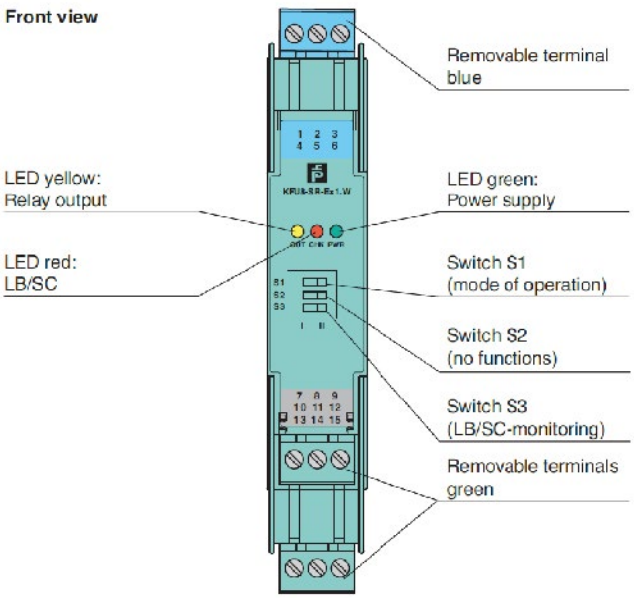



### KFU8-SR-Ex2.W




## Configuration

### KFU8-SR-Ex1.W




**Switch Position**

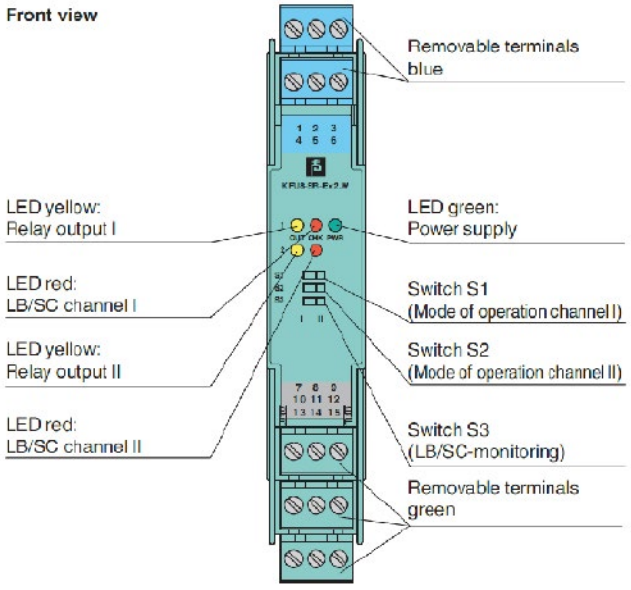
| S | Function | | Position |
|---|---|---|---|
| 1 | mode of operation output I (relay) energised | with high input current | I |
| | | with low input current | II |
| 2 | no function | | |
| 3 | line fault detection | ON | I |
| | | OFF | II |

**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

### KFU8-SR-Ex2.W




**Switch Position**

| S | Function | | Position |
|---|---|---|---|
| 1 | mode of operation output I (relay) energised | with high input current | I |
| | | with low input current | II |
| 2 | mode of operation output II (relay) energised | with high input current | I |
| | | with low input current | II |
| 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

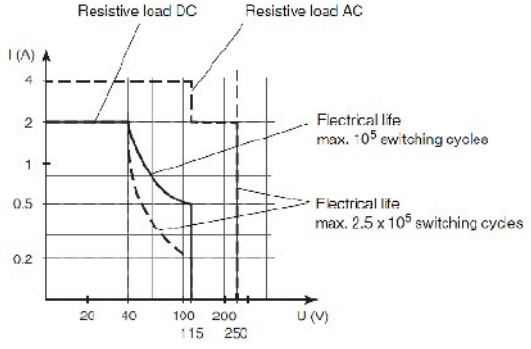
| Switch Amplifier | | KFU8-SR-Ex1.W<br>1-channel | KFU8-SR-Ex2.W<br>2-channel |
|---|---|---|---|
| **General specifications** | signal type | binary input | |
| **Parameters functional safety** | safety integrity level (SIL) | SIL 2 | |
| | systematic capability (SC) | SC 3 | |
| **Supply** | connection | terminals 14, 15 | |
| | rated voltage | 19...30 V DC / 90...253 V AC, 50...60 Hz | |
| | power dissipation / power consumption | ≤ 1 W / ≤ 1 W; 3 VA | ≤ 1.3 W / ≤ 1.3 W; 3.6 VA |
| **Input** | connection side | field side | |
| | connection | terminals 1+, 2+, 3– | terminals 1+, 2+, 3–; 4+, 5+, 6– |
| | rated values | according 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 I: terminals 7, 8, 9<br>output II: terminals 10, 11, 12 |
| | output | signal; relay | |
| | contact load | 250 V AC / 2 A / cos ϕ > 0.75;<br>126.5 V AC / 4 A / cos ϕ > 0.75;<br>40 V DC / 2 A ohmic load | |
| | minimum switch current | 2 mA / 24 V DC | |
| | on-delay / release 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,<br>rated insulation voltage 300 $V_{eff}$ | |
| | input / power supply | reinforced insulation according to IEC / EN 61010-1,<br>rated insulation voltage 300 $V_{eff}$ | |
| | output / power supply | reinforced insulation according to IEC / EN 61010-1,<br>rated insulation voltage 300 $V_{eff}$ | |
| | output / output | – | reinforced insulation according to IEC / EN 61010-1,<br>rated insulation voltage 300 $V_{eff}$ |
| **Indication / settings** | indication elements | LEDs | |
| | control elements | DIP switch | |
| | configuration | via DIP switch | |
| | labelling | free space for labelling at the front | |
| **Conformity with directives** | electromagnetic compatibility | directive 2014/30/EU | EN 61326-1:2013 (industry sectors) |
| | low voltage | directive 2014/35/EU | EN 61010-1:2010+A1:2019+<br>A1:2019 / AC:2019 |
| **Conformity** | electromagnetic compatibility | NE 21:2017,<br>EN 61326-3-1:2017,<br>EN IEC 61326-3-2:2018,<br>EN IEC 61326-1:2021<br>(industry sectors) | |
| | degree of protection | IEC 60529:1989+A1:1999+A2:2013 | |
| | input | EN 60947-5-6:2000 | |
| **Ambient conditions** | ambient temperature | –40 / +60 °C (–40 / +140 °F)<br>extended ambient temperature range up to 70 °C (158 °F),<br>please refer to manual for necessary mounting conditions | |

## Technical Data, Dimensional Data and Weight

| Switch Amplifier | | KFU8-SR-Ex1.W<br>1-channel | KFU8-SR-Ex2.W<br>2-channel |
|---|---|---|---|
| **Mechanical data** | degree of protection | IP20 | |
| | connection | screw terminals | |
| | weight | approx. 150 g | |
| | dimensions | 20 x 119 x 115 mm (W x H x D), housing type B2 | |
| | mounting | on 35 mm DIN rail according to EN 60715:2001 | |
| **Data for the application in connection with explosion-hazardous areas** | EU type examination certificate | FIDI 22 ATEX 0029 X | |
| | marking | ⟨Ex⟩ 1 II 3(1)G Ex ec nC [ia Ga] IIC T4 Gc<br>⟨Ex⟩ 1 II (1)D [Ex ia Da] IIIC<br>⟨Ex⟩ 1 I (M1) [Ex ia Ma] I | |
| | input | Ex ia | |
| | voltage | $U_o$ = 10.5 V | |
| | current | $I_o$ = 13 mA | |
| | power | $P_o$ = 34 mW (linear characteristic curve) | |
| | supply | | |
| | maximum safety voltage | $U_m$ = 253 V AC<br>(Please note! $U_m$ is no rated voltage.) | |
| | output | | |
| | maximum safety voltage | $U_m$ = 253 V AC<br>(Please note! The rated voltage can be lower.) | |
| | galvanic isolation | | |
| | input / input | – | not available |
| | input / output | safe galvanic isolation according to IEC / EN 60079-11, voltage peak value 375 V | |
| | input / power supply | safe galvanic isolation according to IEC / EN 60079-11, voltage peak value 375 V | |
| | conformity with directive | | |
| | directive 2014/34/EU | EN IEC 60079-0:2018,<br>EN 60079-7:2015+A1:2018,<br>EN 60079-11:2012,<br>EN IEC 60079-15:2019 | |
| **International approvals** | UL approval | E106378 | |
| | control drawing | 116-0489 | |
| | contact load | 250 V AC / 2 A / cos ϕ > 0.75;<br>126.5 V AC / 4 A / cos ϕ > 0.75;<br>30 V DC / 2 A ohmic load | |
| | IECEx approval | | |
| | IECEx certificate | IECEx FIDI 22.0003X | |
| | IECEx marking | Ex ec nC [ia Ga] IIC T4 Gc,<br>[Ex ia Da] IIIC,<br>[Ex ia Ma] I | |
| **General information** | additional information | If applicable, please refer to the certificates, declarations of conformity, operating instructions and manuals at www.pepperl-fuchs.com. | |

### Characteristic Curve

**Maximum switching capacity of the output contacts**




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