

# Relay Module

## KFD2-RSH-1.2E.L3

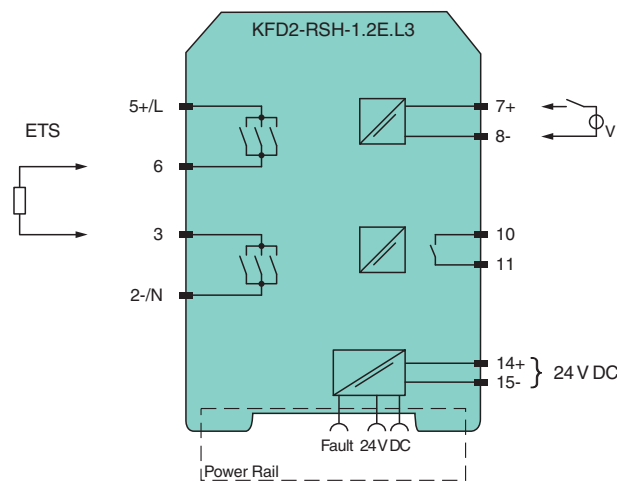
- 1-channel signal conditioner
- 24 V DC supply
- Logic input 19 V DC ... 26.4 V DC
- Recommended connectable voltage 50 V AC ... 230 V AC, 60 V DC ... 110 V DC
- Relay contact output for energized to safe function
- Line fault transparency (LFT)
- Diagnostic function
- Up to SIL 3 acc. to IEC/EN 61508

# CE SIL3

### Function

This signal conditioner provides the galvanic isolation between field circuits and control circuits. The device is a relay module that is suitable for safely switching applications of a load circuit. The device isolates load circuits up to 230 V AC and the 24 V DC control circuit. The energized to safe (ETS) function is permitted for SIL 3 applications. An internal fault or a line fault is signaled by the impedance change of the relay contact input and an additional relay contact output. A fault is signaled by LEDs and a separate collective error message output.

### Wiring Diagram



### Technical Data

|   |   |
|---|---|
| <b>General specifications</b>               |   |
| Signal type                                 | Digital Output  |
| <b>Functional safety related parameters</b> |   |
| Safety Integrity Level (SIL)                | SIL 3   |
| Systematic capability (SC)                  | SC 3  |
| <b>Supply</b>                               |   |
| Connection                                  | Power Rail or terminals 14+, 15-  |
| Rated voltage                               | $U_r$ 19 ... 26.4 V DC  |
| Input current                               | max. 35 mA at 24 V DC , max. 44 mA at 19 V DC , with enabled internal fault detection |
| Power consumption                           | < 1.7 W , includes the power consumption of the digital input , see derating curves   |
| <b>Input</b>                                |   |

Release date: 2025-10-13 Date of issue: 2025-10-13 Filename: 274896\_eng.pdf

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

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## Technical Data

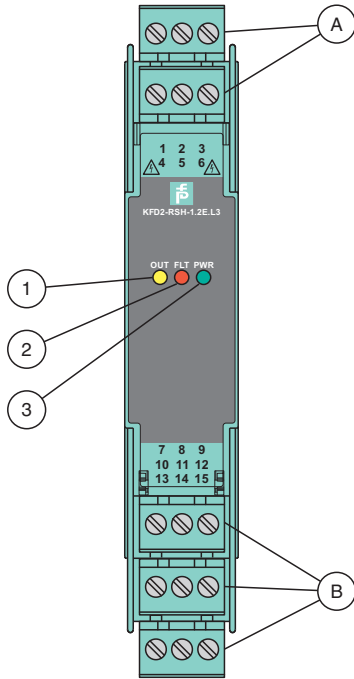
|                                  |       |   |
|----------------------------------|-------|---|
| Connection side                  |       | control side  |
| Connection                       |       | terminals 7+, 8-  |
| Pulse/Pause ratio                |       | min. 150 ms / min. 150 ms with disabled internal fault detection<br>min. 1 s / min. 1 s with enabled internal fault detection   |
| Test pulse length                |       | max. 2 ms from DO card  |
| Signal level                     |       | 0-signal: -5 ... 5 V DC<br>1-signal: 19 ... 26.4 V DC   |
| Rated current                    | $I_r$ | 0-signal: typ. 1.6 mA at 1.5 V DC; typ. 8 mA at 3 V DC (maximum leakage current DO card)<br>1-signal: $\geq 36$ mA (minimum load current DO card)                             |
| Inrush current                   |       | $< 200$ mA after 100 $\mu$ s  |
| <b>Output</b>                    |       |   |
| Connection side                  |       | field side  |
| Connection                       |       | external voltage : terminals 5+/L, 2-/N<br>load : terminals 6, 3  |
| Connectable voltage              |       | 50 ... 230 V AC<br>60 ... 110 V DC  |
| Power dissipation                |       | $< 3.3$ W at 5 A , see derating curves  |
| Contact loading                  |       | 253 V AC/5 A/cos $\phi$ 0.7; 30 V DC/5 A resistive load , see derating curves   |
| Minimum switch current           |       | 10 mA   |
| Mechanical life                  |       | $5 \times 10^6$ switching cycles  |
| Line fault detection             |       | low voltage $< 35$ V AC<br>undercurrent: 10 mA AC; overcurrent: 5.5 A AC (relay energized)<br>breakage: 48 k $\Omega$ ; short-circuit: 29 $\Omega$ (load, relay de-energized) |
| <b>Fault indication output</b>   |       |   |
| Connection                       |       | terminals 10, 11  |
| Contact loading                  |       | 30 V DC/ 0.5 A resistive load   |
| Reaction time                    |       | $< 2$ s   |
| Mechanical life                  |       | $10^5$ switching cycles   |
| <b>Transfer characteristics</b>  |       |   |
| Switching frequency              |       | $< 3$ Hz with disabled internal fault detection<br>$< 0.5$ Hz with enabled internal fault detection   |
| <b>Galvanic isolation</b>        |       |   |
| Input/power supply               |       | basic insulation according to IEC/EN 61010-1, rated insulation voltage 60 V <sub>eff</sub>  |
| Input/fault indication output    |       | basic insulation according to IEC/EN 61010-1, rated insulation voltage 30 V <sub>eff</sub>  |
| Output/other circuits            |       | reinforced 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 21:2017 , IEC/EN 61326-3-2:2018 , EN 61326-3-1:2017  |
| Degree of protection             |       | IEC 60529:2013  |
| <b>Ambient conditions</b>        |       |   |
| Ambient temperature              |       | -20 ... 60 °C (-4 ... 140 °F)<br>Observe the temperature range limited by derating, see section derating.   |
| <b>Mechanical specifications</b> |       |   |
| Degree of protection             |       | IP20  |
| Connection                       |       | screw terminals   |
| Mass                             |       | approx. 134 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  |

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**Technical Data**

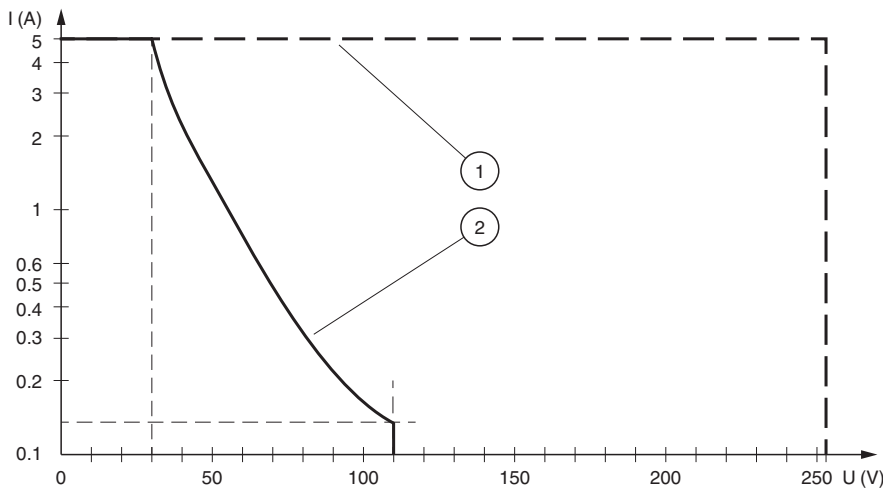
|                            |   |
|----------------------------|---|
| Mounting                   | on 35 mm DIN mounting rail acc. to EN 60715:2001  |
| <b>General information</b> |   |
| Supplementary information  | Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a> . |

**Assembly**



|   |                            |
|---|----------------------------|
| 1 | LED yellow: Relay output   |
| 2 | LED red: Fault             |
| 3 | LED green: Power supply    |
| A | Removable terminals, green |
| B | Removable terminals, green |

**Characteristic Curve**



**Maximum Switching Power of Output Contacts**

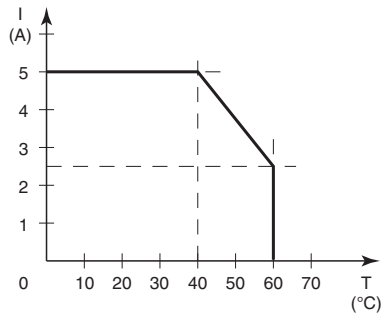
|       |                                       |
|-------|---------------------------------------|
| ————  | Resistive load DC                     |
| ----- | Resistive load AC                     |
| 1     | max. 10 <sup>5</sup> switching cycles |
| 2     | max. 10 <sup>5</sup> switching cycles |

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The maximum number of switching cycles is depending on the electrical load and may be higher if reduced currents and voltages are applied.

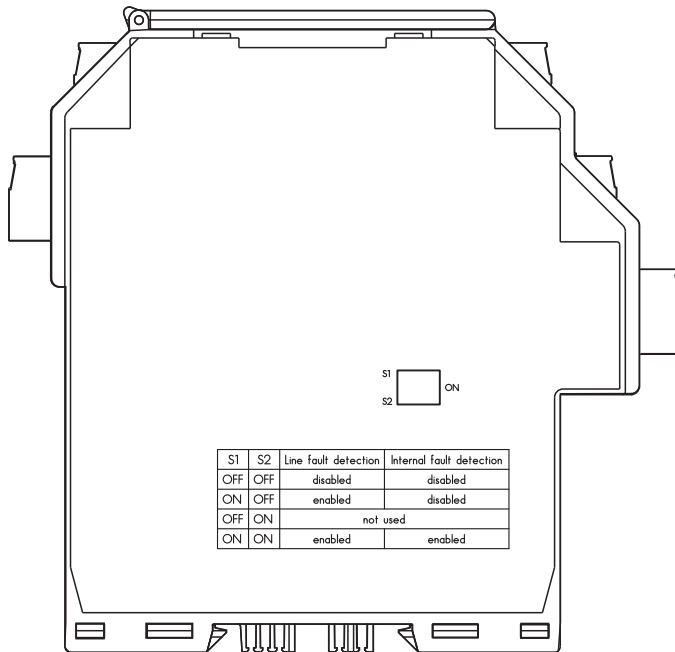
## Characteristic Curve



### Derating

|                      |         |
|----------------------|---------|
|                      | unfused |
| <b>U<sub>i</sub></b> | 26.4 V  |

## Configuration



### Switch Settings

| Line fault detection | Internal fault detection | S1  | S2  |
|----------------------|--------------------------|-----|-----|
| disabled             | disabled                 | OFF | OFF |
| enabled              | disabled                 | ON  | OFF |
| not used             |                          | OFF | ON  |
| enabled              | enabled                  | ON  | ON  |

Factory setting: line fault detection enabled, internal fault detection enabled

During a switching event the device detects an internal fault. A full test of all 3 redundant relay channels requires 3 consecutive switching events.

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