

## Relay Module

### KFD2-RSH-1.2D.FL2

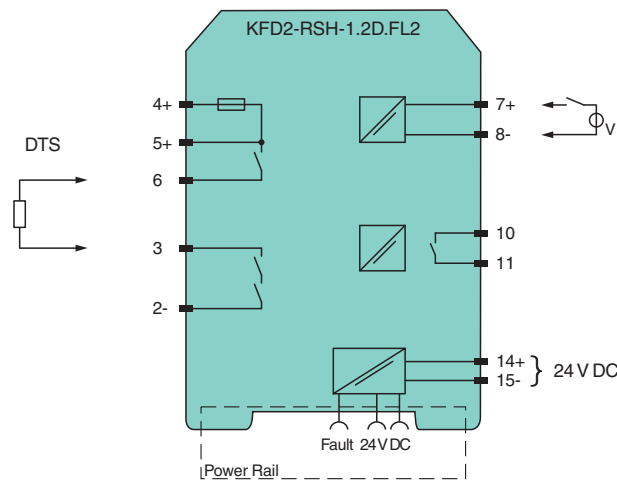
- 1-channel signal conditioner
- 24 V DC supply
- Logic input 19 V DC ... 26.4 V DC
- Recommended connectable voltage 8 V DC ... 60 V DC
- Relay contact output for de-energized to safe function
- Line fault transparency (LFT)
- Diagnostic function
- Up to SIL 3 acc. to IEC/EN 61508
- Up to PL e acc. to EN/ISO 13849

# CE SIL3 PL e

## 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 60 V DC and the 24 V DC control circuit. The de-energized to safe (DTS) function is permitted for SIL 3 and PL e 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. The output must be protected against contact welding by an internal fuse or an external current limitation.

## Connection



## Technical Data

General specifications	
Signal type	Digital Output
Functional safety related parameters	
Safety Integrity Level (SIL)	SIL 3
Systematic capability (SC)	SC 3
Performance level (PL)	PL e
Supply	
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

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

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## Technical Data

Power consumption		< 1.7 W , includes the power consumption of the digital input , see derating curves
<b>Input</b>		
Connection side		control side
Connection		terminals 7+, 8-
Pulse/Pause ratio		min. 150 ms / min. 150 ms with disabled internal fault detection 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 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) 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 4+, 5+, 2- load : terminals 6, 3
Connectable voltage		8 ... 60 V DC
Power dissipation		< 3.3 W at 5 A , see derating curves
Contact loading		30 V DC / 5 A resistive load , see derating curves
Minimum switch current		10 mA
Mechanical life		5 x 10 <sup>6</sup> switching cycles
Line fault detection		low voltage < 5 V DC undercurrent: 10 mA DC; overcurrent: 2.2 A DC (relay energized) breakage: 8.2 k $\Omega$ ; short-circuit: 11 $\Omega$ (load, relay de-energized)
Fuse rating		2.5 A (scope of delivery) max. 5 AT, recommended maximum utilization of the fuse: 80 %
<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 <sup>5</sup> switching cycles
<b>Transfer characteristics</b>		
Switching frequency		< 3 Hz with disabled internal fault detection < 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)
Machinery Directive		
Directive 2006/42/EC		EN 62061:2005+AC:2010+A1:2013+A2:2015 , EN/ISO 13849-1:2015
<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
Protection against electrical shock		EN 61010-1:2010
<b>Ambient conditions</b>		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F) Observe the temperature range limited by derating, see section derating.
<b>Mechanical specifications</b>		

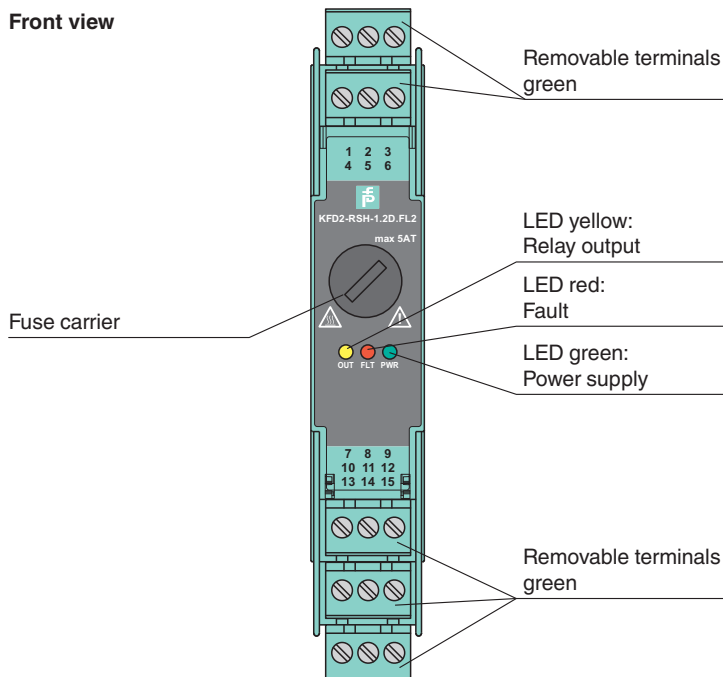
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**Technical Data**

Degree of protection	IP20
Connection	screw terminals
Mass	approx. 142 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
Height	119 mm
Width	20 mm
Depth	115 mm
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> .

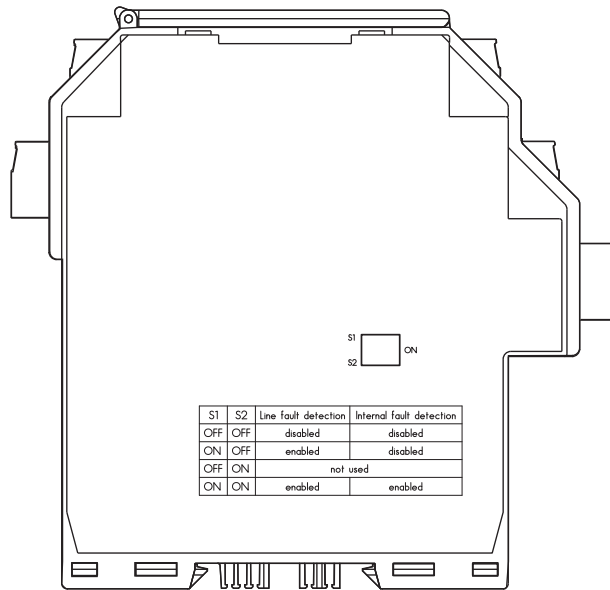
**Assembly**

Front view



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**Configuration**



**Output switch settings**

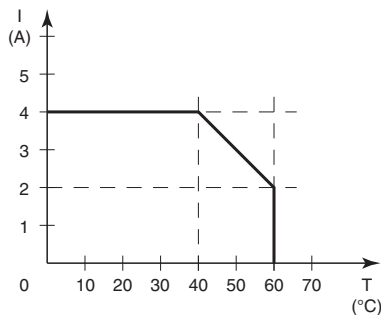
S1	S2	Line fault detection	Internal fault detection
OFF	OFF	disabled	disabled
ON	OFF	enabled	disabled
OFF	ON	not used	
ON	ON	enabled	enabled

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

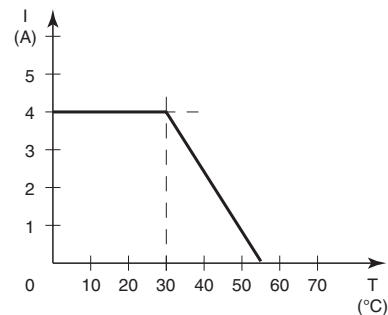
During a switching event the device detects an internal fault. A full test of all 3 redundant relay channels requires 3 consecutive switching events.

**Characteristic Curve**

**Derating**

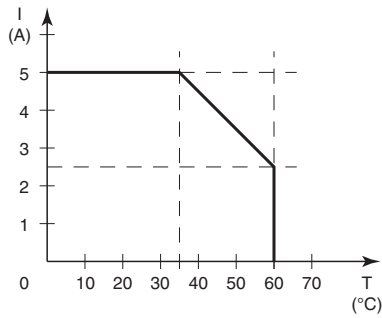


— fused, non-hazardous area  
 $U_i$  26.4 V

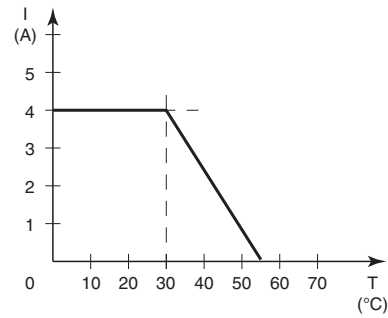


— fused, Zone 2  
 $U_i$  26.4 V

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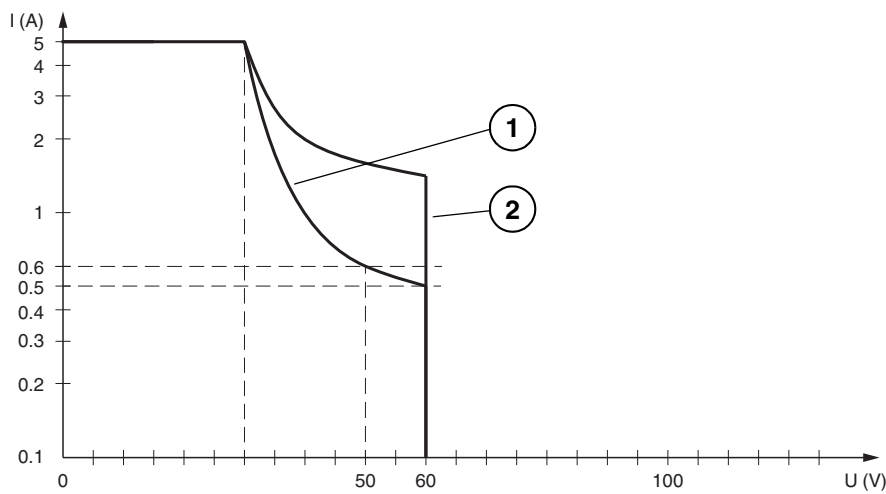
— unfused, non-hazardous area  
 $U_i$  26.4 V



— unfused, Zone 2  
 $U_i$  26.4 V

## Characteristic Curve

### Maximum Switching Power of Output Contacts



— Resistive load DC  
**1** max.  $10^5$  switching cycles  
**2** max.  $3 \times 10^4$  switching cycles

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