

# Relay Module

## KFD2-RSH-1.2D.FL3-Y1

- 1-channel signal conditioner
- 24 V DC supply
- Logic input 20.5 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 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

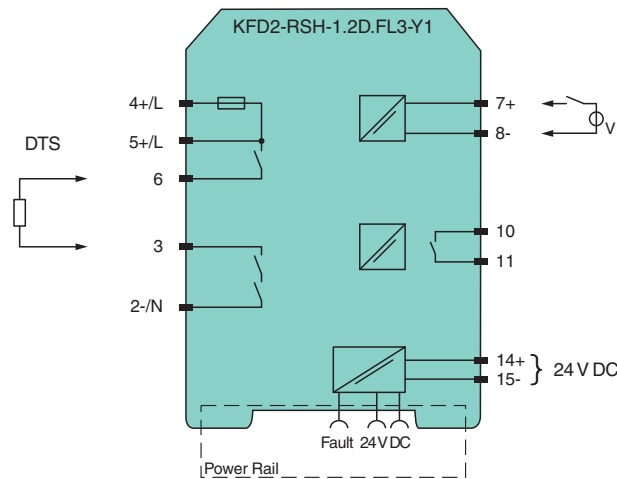


SIL 3 PL e

### 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 230 V AC 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

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

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## Technical Data

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>		
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: 20.5 ... 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+/L, 5+/L, 2-/N load : terminals 6, 3
Connectable voltage		50 ... 230 V AC 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 x 10 <sup>6</sup> switching cycles
Line fault detection		low voltage < 35 V AC undercurrent: 10 mA AC; overcurrent: 5.5 A AC (relay energized) breakage: 48 k $\Omega$ ; short-circuit: 29 $\Omega$ (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)
Low voltage		
Directive 2014/35/EU		EN 61010-1:2010
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
<b>Ambient conditions</b>		

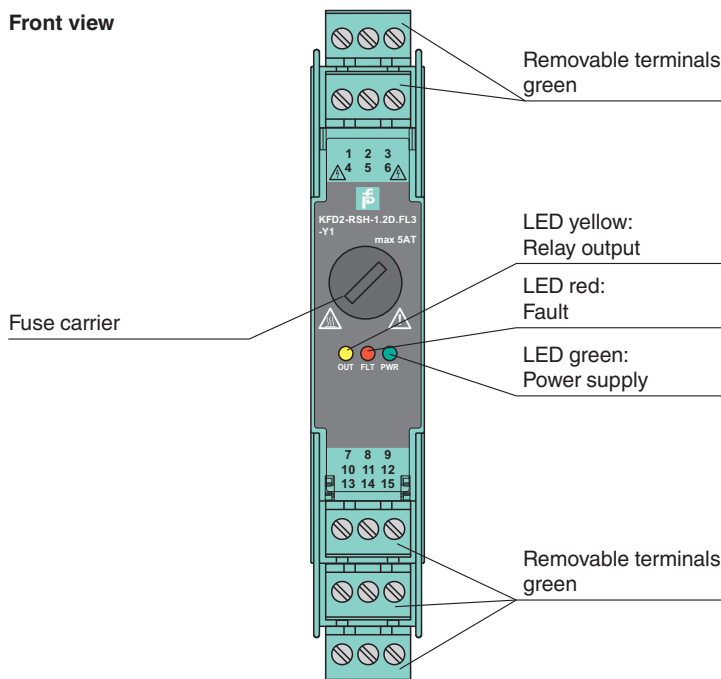
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**Technical Data**

Ambient temperature	-20 ... 60 °C (-4 ... 140 °F) Observe the temperature range limited by derating, see section derating.
<b>Mechanical specifications</b>	
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
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





**Matching System Components**

	<b>KFD2-EB2</b>	Power Feed Module
	<b>UPR-03</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 2 m
	<b>UPR-03-M</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 1,6 m
	<b>UPR-03-S</b>	Universal Power Rail with end caps and cover, 3 conductors, length: 0.8 m
	<b>K-DUCT-GY</b>	Profile rail, wiring comb field side, gray
	<b>K-DUCT-GY-UPR-03</b>	Profile rail with UPR-03-* insert, 3 conductors, wiring comb field side, gray

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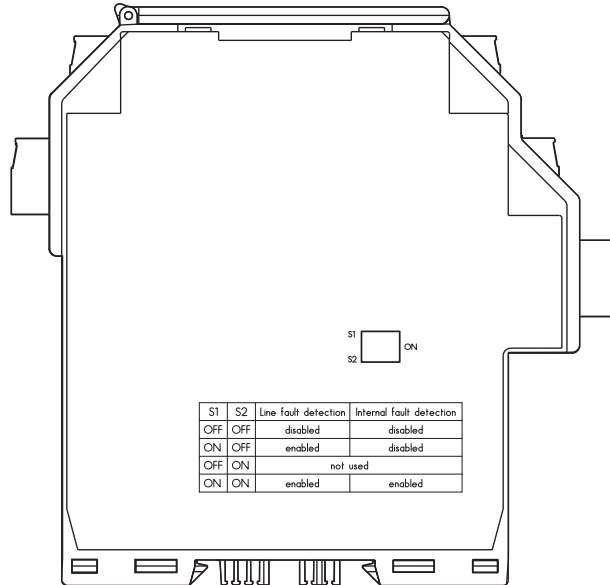
**Accessories**

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

## Application

This device is compatible to the following control: Emerson DeltaV CHARM.  
 Compatibility check to other ESD/DCS systems on request.

## Configuration



### Output switch settings

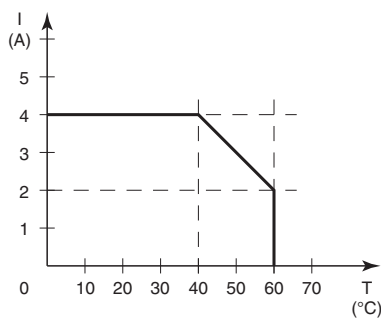
S1	S2	Line fault detection	Internal fault detection
OFF	OFF	disabled	disabled
ON	OFF	enabled	disabled
OFF	ON	not used	
ON	ON	enabled	enabled

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.

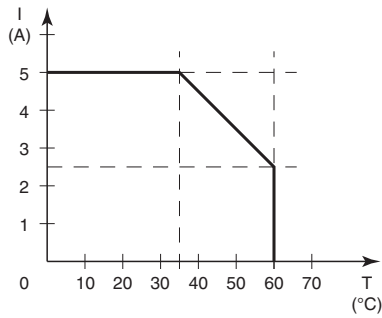
## Characteristic Curve

### Derating



— fused  
 $U_i$  26.4 V

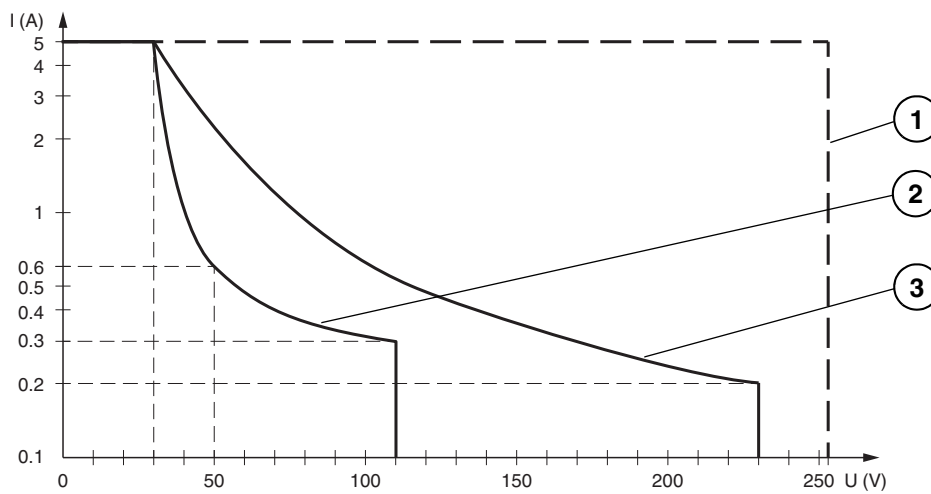
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— unfused  
 U<sub>i</sub> 26.4 V

## 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  
**3** max. 3 x 10<sup>4</sup> 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.