Features

- 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 de-energized to safe function
- Line fault transparency (LFT)
- Diagnostic function
- Up to SIL 3 acc. to IEC 61508
- Up to PL e acc. to EN/ISO 13849

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.

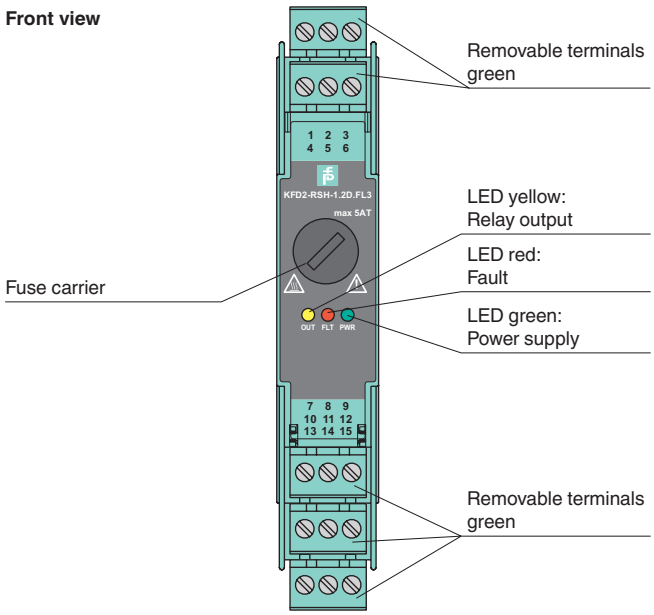
An internal fault or a line fault is signalized by the impedance change of the relay contact input and an additional relay contact output.

A fault is signalized 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.

Assembly

Front view

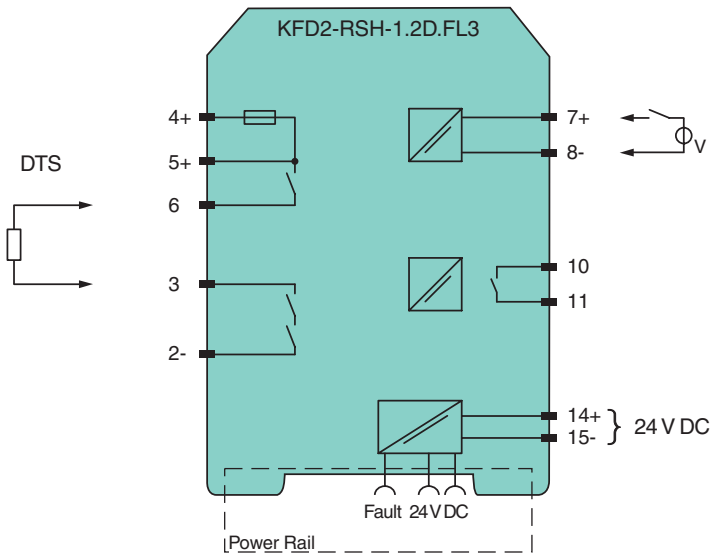


CE

SIL 3

PL e

Connection



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General specifications		
Signal type		Digital Output
Functional safety related parameters		
Safety Integrity Level (SIL)		SIL 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		35 mA at 24 V DC , ≤ 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
Input		
Connection side		control side
Connection		terminals 7+, 8-
Pulse/Pause ratio		≥ 150 ms / ≥ 150 ms with disabled internal fault detection ≥ 1 s / ≥ 1 s with enabled internal fault detection
Test pulse length		≤ 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: ≥ 36 mA (minimum load current DO card)
Inrush current		< 200 mA after 100 µs
Output		
Connection side		field side
Connection		external voltage : terminals 4+, 5+, 2- 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 ϕ 0.7; 30 V DC/5 A resistive load , see derating curves
Minimum switch current		10 mA
Mechanical life		5 x 10^6 switching cycles
Line fault detection		low voltage < 35 V AC undercurrent: 10 mA AC; overcurrent: 5.5 A AC (relay energized) breakage: 48 kΩ; short-circuit: 29 Ω (load, relay de-energized)
Fuse rating		2.5 A (scope of delivery) max. 5 AT, recommended maximum utilization of the fuse: 80 %
Fault indication output		
Connection		terminals 10, 11
Contact loading		30 V DC/ 0.5 A resistive load
Reaction time		< 2 s
Mechanical life		10^5 switching cycles
Transfer characteristics		
Switching frequency		< 3 Hz with disabled internal fault detection < 0.5 Hz with enabled internal fault detection
Galvanic isolation		
Input/power supply		basic insulation according to IEC/EN 61010-1, rated insulation voltage 60 V_{eff}
Input/fault indication output		basic insulation according to IEC/EN 61010-1, rated insulation voltage 30 V_{eff}
Output/other circuits		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Indicators/settings		
Display elements		LEDs
Control elements		DIP-switch
Configuration		via DIP switches
Labeling		space for labeling at the front
Directive conformity		
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
Conformity		
Electromagnetic compatibility		NE 21:2012 , EN 61326-3-2:2008 , EN 61326-3-1:2008
Degree of protection		IEC 60529:2013
Ambient conditions		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F) Observe the temperature range limited by derating, see section derating.

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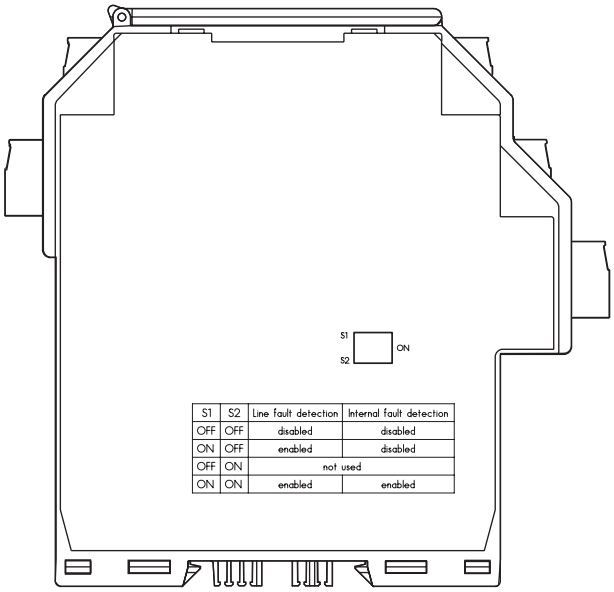
Mechanical specifications	
Degree of protection	IP20
Connection	screw terminals
Mass	approx. 142 g
Dimensions	20 x 119 x 115 mm (0.8 x 4.7 x 4.5 inch) , housing type B2
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
General information	
Supplementary information	Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com.

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.

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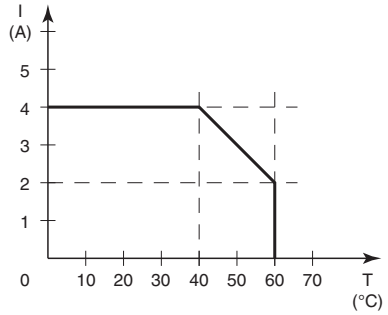
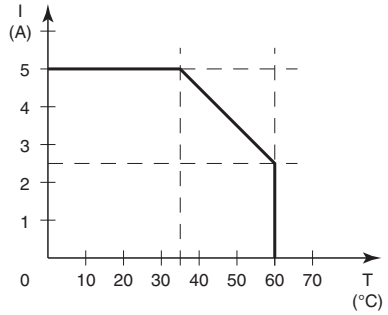
Derating



——— fused

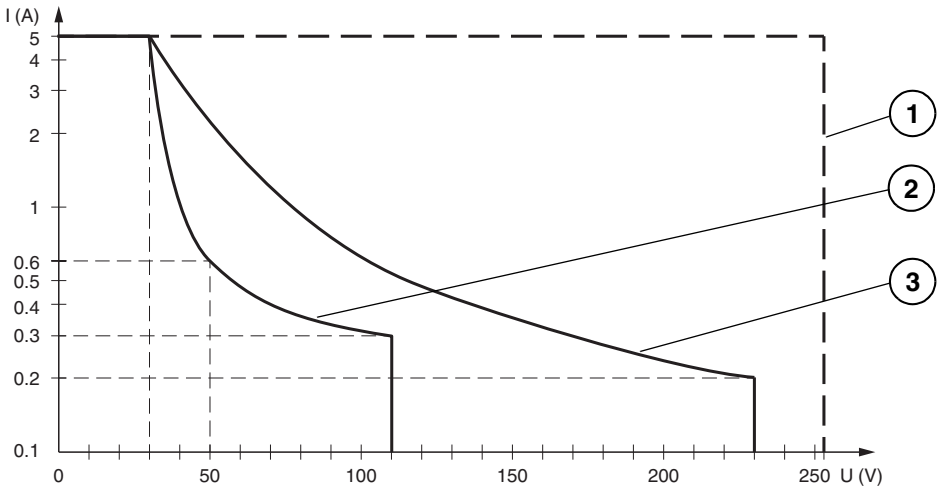
U_i 26.4 V



——— unfused

U_i 26.4 V

Maximum Switching Power of Output Contacts



——— Resistive load DC

– – – – Resistive load AC

1 max. 10^5 switching cycles

2 max. 10^5 switching cycles

3 max. 3 x 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.

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Accessories

Power feed module KFD2-EB2

The power feed module is used to supply the devices with 24 V DC via the Power Rail. The fuse-protected power feed module can supply up to 150 individual devices depending on the power consumption of the devices. Collective error messages received from the Power Rail activate a galvanically-isolated mechanical contact.

Power Rail UPR-03

The Power Rail UPR-03 is a complete unit consisting of the electrical insert and an aluminium profile rail 35 mm x 15 mm. To make electrical contact, the devices are simply engaged.

Profile Rail K-DUCT with Power Rail

The profile rail K-DUCT is an aluminum profile rail with Power Rail insert and two integral cable ducts for system and field cables. Due to this assembly no additional cable guides are necessary.

Power Rail and Profile Rail must not be fed via the device terminals of the individual devices!

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