

Temperature Converter with Trip Values

SIL 2

KFD2-GUT-Ex1.D

- 1-channel isolated barrier
- 24 V DC supply (Power Rail)
- Thermocouple, RTD, potentiometer or voltage input
- Redundant TC input
- Current output 0/4 mA ... 20 mA
- 2 relay contact outputs
- Configurable by PACTware or keypad
- Line fault (LFD) and sensor burnout detection
- Up to SIL 2 acc. to IEC 61508/IEC 61511



Function

This isolated barrier is used for intrinsic safety applications.

The device converts the signal of a resistance thermometer, thermocouple, potentiometer, or voltage source to a proportional output current. It also provides a relay trip value.

The removable terminal block K-CJC-** is available as an accessory for internal cold junction compensation of thermocouples.

A fault is signaled by LEDs acc. to NAMUR NE44 and a separate collective error message output.

The device is easily configured by the use of the PACTware configuration software.

For additional information, refer to the manual and www.pepperl-fuchs.com.

Technical Data

General specifications	
Signal type	Analog input
Functional safety related parameters	
Safety Integrity Level (SIL)	SIL 2
Supply	
Connection	terminals 23+, 24- or power feed module/Power Rail
Rated voltage	U_r 20 ... 30 V DC
Rated current	I_r approx. 100 mA
Power dissipation/power consumption	≤ 2 W / 2.2 W
Interface	
Programming interface	programming socket
Input	
Connection side	field side
Connection	terminals 1, 2, 3, 4, 6
RTD	Pt100, Pt500, Pt1000, Ni100, Ni1000
Types of measuring	2-, 3-, 4-wire technology
Lead resistance	max. 50 Ω
Measurement loop monitoring	sensor breakage, sensor short-circuit
Thermocouples	type B, E, J, K, L, N, R, S, T (IEC 584-1: 1995)
Cold junction compensation	external and internal
Measurement loop monitoring	sensor breakage
Potentiometer	0.8 ... 20 k Ω
Types of measuring	2-, 3-, 5-wire technology
Voltage	0 ... 10 V, 2 ... 10 V, 0 ... 1 V, -100 ... 100 mV

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

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Technical Data

Input resistance	$\geq 250 \text{ k}\Omega$ (0 ... 10 V) min. $1 \text{ M}\Omega$ (0 ... 1 V, -100 ... 100 mV)
Measuring current	approx. 400 μA with resistance measuring sensor
Output	
Connection side	control side
Connection	output I: terminals 10, 11, 12 output II: terminals 16, 17, 18 output III: terminals 8+, 7-
Output I, II	relay
Contact loading	250 V AC / 2 A / $\cos \phi \geq 0.7$; 40 DC / 2 A
Mechanical life	5×10^7 switching cycles
Energized/De-energized delay	approx. 20 ms / approx. 20 ms
Output III	Analog current output
Current range	0 ... 20 mA or 4 ... 20 mA
Open loop voltage	max. 24 V DC
Load	max. 650 Ω
Fault signal	downscale I $\leq 3.6 \text{ mA}$, upscale I $\geq 21 \text{ mA}$ (acc. NAMUR NE43)
Collective error message	Power Rail
Transfer characteristics	
Deviation	
Temperature effect	Input: 0.005 %/K (50 ppm) of span ; current output: 0.005 %/K (50 ppm) of span
RTD	max. 0.2 % of span
Thermocouples	max. 10 μV deviation of CJC: $\pm 0.8 \text{ K}$
Voltage	0.1 % of span
Potentiometer	0.1 % of span when $< 5 \text{ k}\Omega$ 0.5 % of span when $> 5 \text{ k}\Omega$
Current output	max. 20 μA
Sampling rate	approx. 700 ms
Galvanic isolation	
Input/Other circuits	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output I, II against eachother	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output I, II/other circuits	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Output III/power supply and collective error	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Interface/power supply	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V _{eff}
Indicators/settings	
Display elements	LEDs , display
Control elements	Control panel
Configuration	via operating buttons via PACTware
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
Conformity	
Electromagnetic compatibility	NE 21:2007
Degree of protection	IEC 60529:2001
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Degree of protection	IP20
Connection	screw terminals
Mass	300 g

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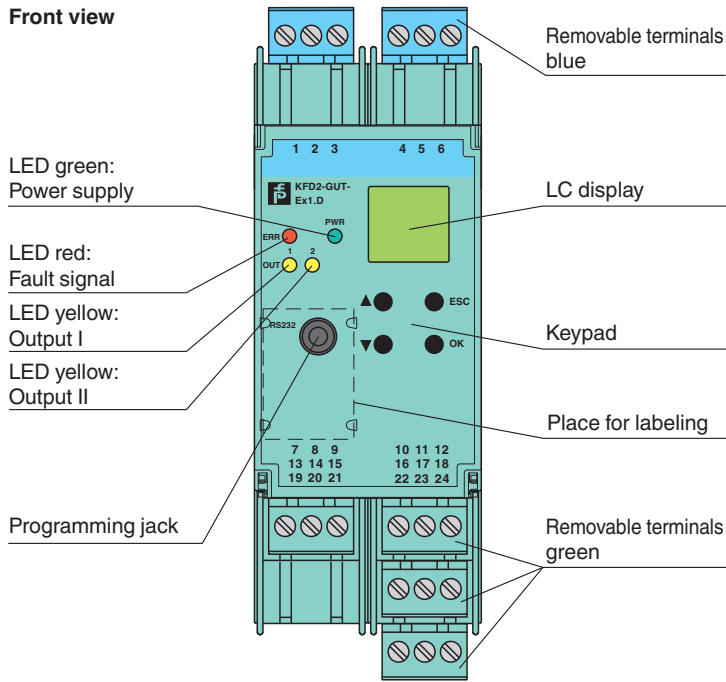
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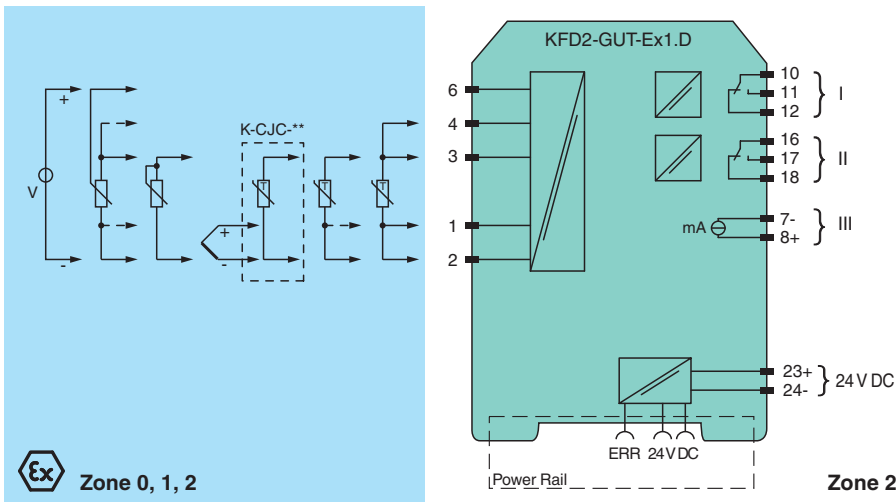
Technical Data

Dimensions	40 x 119 x 115 mm (1.6 x 4.7 x 4.5 inch) , housing type C3	
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001	
Data for application in connection with hazardous areas		
EU-type examination certificate	TÜV 03 ATEX 2140	
Marking	Ⓔ II (1)G [Ex ia] IIC , Ⓔ II (1)D [Ex iaD]	
Input	Ex ia IIC, Ex iaD	
Supply		
Maximum safe voltage	U_m	40 V DC (Attention! The rated voltage can be lower.)
Input	terminals 2, 6 (for active equipment)	
Voltage	U_o	13.1 V
Current	I_o	8 mA
Power	P_o	67 mW
Voltage	U_i	29 V
Current	I_i	11 mA
Power	P_i	200 mW
Inputs	terminals 1, 2, 3, 4, 6 (for passive equipment)	
Voltage U_o	13.1 V	
Current I_o	21 mA	
Power P_o	67 mW	
Output		
Contact loading	253 V AC/2 A/cos $\phi > 0.7$; 40 V DC/2 A resistive load (TÜV 03 ATEX 2140)	
Analog output		
Maximum safe voltage	U_m	40 V (Attention! The rated voltage can be lower.)
Interface		
Maximum safe voltage	U_m	40 V (Attention! The rated voltage can be lower.) , RS 232
Certificate	PF 08 CERT 1213 X	
Marking	Ⓔ II 3G Ex nA nC IIC T4 Gc	
Output I, II		
Contact loading	50 V AC/2 A/cos $\phi > 0.7$; 40 V DC/1 A resistive load	
Galvanic isolation		
Input/Other circuits	safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V	
Directive conformity		
Directive 2014/34/EU	EN 60079-0:2012+A11:2013 , EN 60079-11:2012 , EN 60079-15:2010	
International approvals		
IECEx approval		
IECEx certificate	IECEx TUN 09.0019	
IECEx marking	[Ex ia Ga] IIC , [Ex ia Da] IIIC , [Ex ia Ma] I	
General information		
Supplementary information	Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com .	

Assembly



Connection



Accessories

	DTM Interface Technology	
	PACTware 5.X	FDT Framework
	K-ADP-USB	
	KFD2-EB2	Power Feed Module
	UPR-03	Universal Power Rail with end caps and cover, 3 conductors, length: 2 m

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




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Accessories

	UPR-03-M	Universal Power Rail with end caps and cover, 3 conductors, length: 1,6 m
	UPR-03-S	Universal Power Rail with end caps and cover, 3 conductors, length: 0.8 m
	K-DUCT-BU	
	K-DUCT-BU-UPR-03	Profile rail with UPR-03- * insert, 3 conductors, wiring comb field side blue
	K-CJC-BU	

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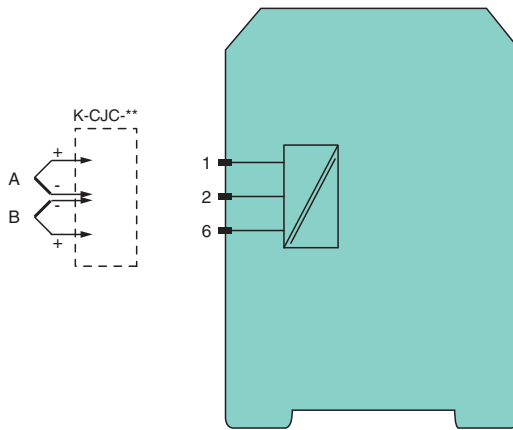
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Application



Redundant thermocouple

For higher availability it is possible to connect a second redundant thermocouple (B) of the same type to the temperature converter. The cold junction temperature is taken from the connected terminal block.

If the deviation of the both thermocouples (A and B) exceed the selected tolerance, an error will occur. If a lead breakage of one thermocouple (e. g. A) has been detected, an error message occurs and the value of the second thermocouple (B) will be taken for further calculation.

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