Temperature Converter with Trip Values

KFU8-GUT-Ex1.D

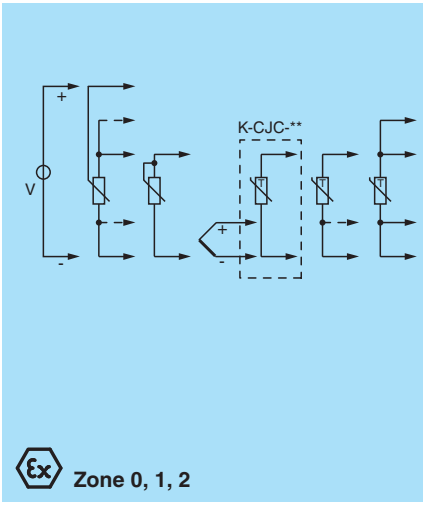
- 1-channel isolated barrier
- Universal usage at different power supplies
- Thermocouple, RTD, potentiometer or voltage input
- Redundant TC input
- Current output 0/4 mA ... 20 mA
- 2 relay contact outputs
- Configurable by PACTware or keypad
- Line fault (LFD) and sensor burnout detection
- Up to SIL 2 acc. to IEC 61508/IEC 61511

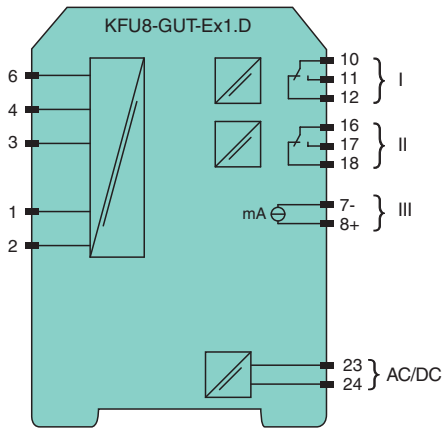
SIL 2

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 signalized by LEDs acc. to NAMUR NE44.
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.

Connection





Technical Data

General specifications		
Signal type		Analog input
Functional safety related parameters		
Safety Integrity Level (SIL)		SIL 2
Supply		
Connection		terminals 23, 24
Rated voltage	U_r	20 ... 90 V DC / 48 ... 253 V AC
Power dissipation/power consumption		≤ 2 W ; 2.5 VA / 2.2 W ; 3 VA
Interface		

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Technical Data

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 kΩ
Types of measuring	2-, 3-, 5-wire technology
Voltage	0 ... 10 V , 2 ... 10 V , 0 ... 1 V , -100 ... 100 mV
Input resistance	≥ 250 kΩ (0 ... 10 V) min. 1 MΩ (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 ϕ ≥ 0.7 ; 40 DC / 2 A
Mechanical life	5 x 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 ≤ 3.6 mA, upscale I ≥ 21 mA (acc. NAMUR NE43)
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. 10µV deviation of CJC: ±0.8 K
Voltage	0.1 % of span
Potentiometer	0.1 % of span when < 5 kΩ 0.5 % of span when > 5 kΩ
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	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	

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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
Dimensions		40 x 119 x 115 mm (1.6 x 4.7 x 4.5 inch) (W x H x D) , housing type C2
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		⟨Ex⟩ II (1)G [Ex ia] IIC , ⟨Ex⟩ 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 ϕ > 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
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
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.

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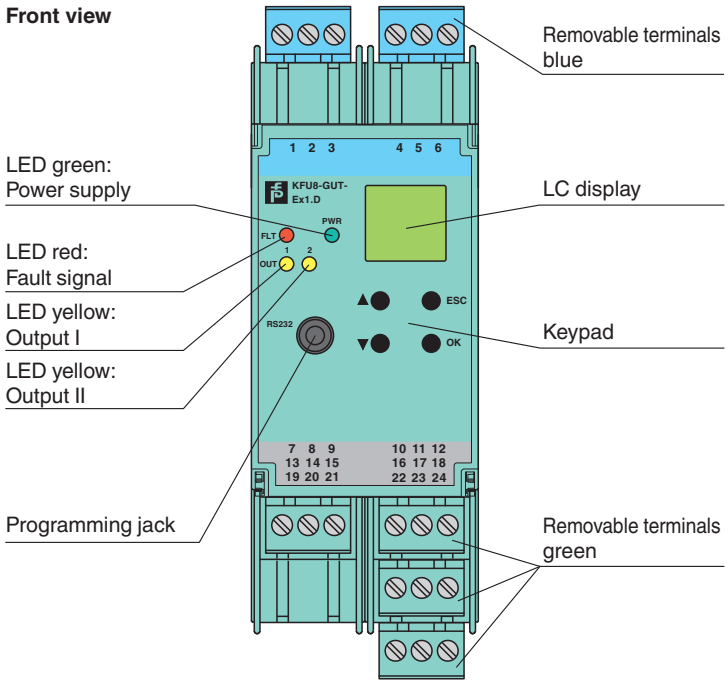
Assembly

Front view



Matching System Components

	DTM Interface Technology	Device type manager (DTM) for interface technology
	PACTware 5.X	FDT Framework
	K-ADP-USB	Programming adapter with USB interface
	K-DUCT-BU	Profile rail, wiring comb field side, blue

Accessories

	K-250R	Measuring resistor
	K-500R0%1	Measuring resistor
	K-CJC-BU	Terminal block for cold junction compensation, 3-pin screw terminal, blue
	KF-ST-5GN	Terminal block for KF modules, 3-pin screw terminal, green
	KF-ST-5BU	Terminal block for KF modules, 3-pin screw terminal, blue
	KF-CP	Red coding pins, packaging unit: 20 x 6

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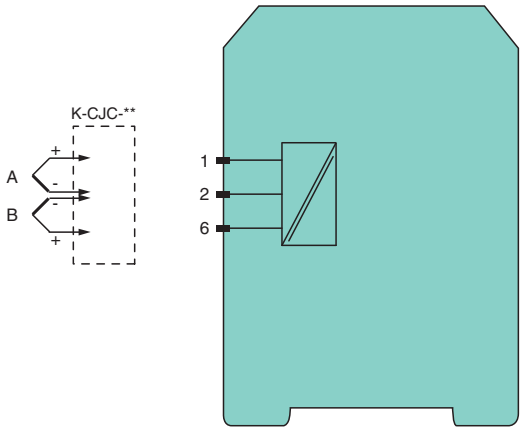
Application



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 futher calculation.

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