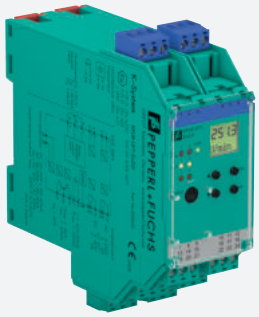


Frequency Converter with Direction and Synchronization Monitor

KFU8-UFT-Ex2.D

- 2-channel isolated barrier
- Universal usage at different power supplies
- Dry contact or NAMUR inputs
- Input frequency 1 mHz ... 1 kHz
- Current output 0/4 mA ... 20 mA
- Relay contact and transistor output
- Start-up override
- Configurable by PACTware or keypad
- Line fault detection (LFD)

Function

This isolated barrier is used for intrinsic safety applications. It analyzes 2 digital signals (NAMUR sensor/mechanical contact) from a hazardous area and functions as a rotation direction indicator, slip monitor, frequency monitor or synchronization monitor.
Each proximity sensor or switch controls a passive transistor output. The 2 relay outputs indicate if the input signal is above or below the trip value or the rotational direction.
The analog output can be programmed to be proportional to the input frequency or slip differential.
The unit is easily programmed by the use of a keypad located on the front of the unit or with the PACTware™ configuration software.
Line fault detection of the field current is indicated by a red LED.
For additional information, refer to the manual and www.pepperl-fuchs.com.

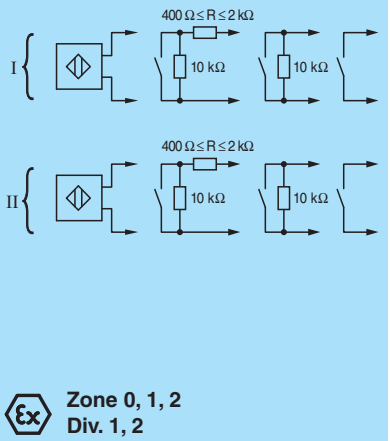
Application

The device processes 2 input frequencies up to a max. of 1 kHz. The following functions are provided by the device:

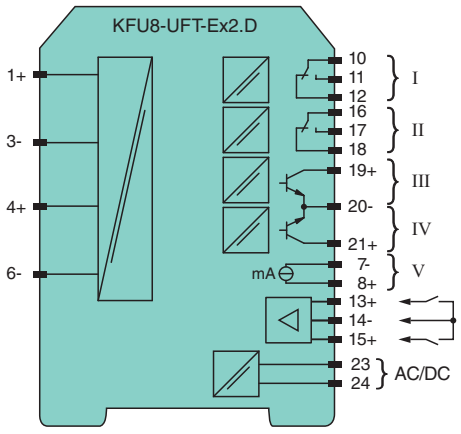
- Frequency measurement with freely adjustable trip value monitoring for high and low alarm as well as for frequency current conversion (0/4 mA to 20 mA)
- Slip monitoring: The slip is calculated from the 2 input frequencies at channel I and II. If the freely parameterisable trip value is exceeded, the respective output switches.
- Rotation direction signalling: The rotation direction is evaluated from the 2 input signals with the same frequency and a phase shift of 90°. The corresponding outputs switch according to the direction of rotation.
- The frequency monitoring can be used in combination with rotation direction signalling or slip monitoring.
- Synchronisation monitor: The synchronisation monitor compares the pulse counts of the 2 inputs. If the measured difference in the pulses is greater than the programmed value the corresponding outputs are switching.

The 2 electronic outputs serve to repeat the input signals.

Connection



Zone 0, 1, 2
Div. 1, 2



Release date: 2023-05-31 Date of issue: 2023-05-31 Filename: 231202_eng.pdf

Technical Data

General specifications		
Signal type		Digital Input
Supply		
Connection		terminals 23, 24
Rated voltage	U_r	20 ... 90 V DC / 48 ... 253 V AC 50 ... 60 Hz
Rated current	I_r	approx. 130 mA
Power dissipation		2.2 W / 3.5 VA
Power consumption		2.5 W / 5 VA
Interface		
Programming interface		programming socket
Input		
Connection side		field side
Connection		input I: terminals 1+, 3- input II: terminals 4+, 6- input III: terminals 13+, 14- (control input 1) input IV: terminals 15+, 14- (control input 2)
Input I, II		2-wire sensor, sensor acc. to EN 60947-5-6 (NAMUR) or mechanical contact
Open circuit voltage/short-circuit current		8.2 V / 10 mA
Pulse duration		min. 250 µs , overlap on direction of rotation signal: ≥ 125 µs
Input frequency		rotation direction monitoring 0.001 ... 1000 Hz slip monitoring 10 ... 1000 Hz
Line fault detection		breakage I ≤ 0.15 mA; short-circuit I > 6.5 mA
Input III, IV		
Active/Passive		I > 4 mA (for min. 100 ms) / I < 1.5 mA
Open circuit voltage/short-circuit current		18 V / 5 mA
Output		
Connection side		control side
Connection		output I: terminals 10, 11, 12 output II: terminals 16, 17, 18 output III: terminals 19+, 20- output IV: terminals 21+, 20- output V: terminals 7-, 8+
Output I, II		signal , relay
Contact loading		250 V AC / 2 A / cos ϕ ≥ 0.7 ; 40 V DC / 2 A
Mechanical life		5 x 10^7 switching cycles
Energized/De-energized delay		approx. 20 ms / approx. 20 ms
Output III and IV		signal , electronic output, passive
Contact loading		40 V DC
Signal level		1-signal: (L+) -2.5 V (50 mA, short-circuit/overload proof) 0-signal: switched off (off-state current ≤ 10 µA)
Output V		analog
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 ≥ 21.5 mA (acc. NAMUR NE43)
Transfer characteristics		
Input I and II		
Measurement range		0.001 ... 1000 Hz
Resolution		slip monitoring: 1% frequency measurement: 0,1% of measured value; but >0.001Hz
Accuracy		slip monitoring: 1% frequency measurement: 0.5% of measured value; but >0.001Hz
Measuring time		frequency measurement: < 100 ms
Influence of ambient temperature		0.003 %/K (30 ppm)
Output I, II		
Response delay		≤ 200 ms
Output V		
Resolution		< 10 µA
Accuracy		< 30 µA

Release date: 2023-05-31 Date of issue: 2023-05-31 Filename: 231202_eng.pdf

Technical Data

Influence of ambient temperature		0.005 %/K (50 ppm)
Accuracy		0.1 %
Galvanic isolation		
Input I, II/other circuits		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Input III, IV/power supply		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}
Mutual output I, II, III		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Mutual output I, II, IV		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Output III, IV/power supply		reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V_{eff}
Output III, IV/input III, IV		basic insulation according to IEC/EN 61010-1, rated insulation voltage 50 V_{eff}
Output III, IV/V		basic insulation according to IEC/EN 61010-1, rated insulation voltage 50 V_{eff}
Output V/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}
Interface/output III, IV		basic insulation according to IEC/EN 61010-1, rated insulation voltage 50 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 21:2006
Degree of protection		IEC 60529:2001
Input		EN 60947-5-6:2000
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 99 ATEX 1471
Marking		⟨Ex⟩ II (1)G [Ex ia Ga] IIC ⟨Ex⟩ II (1)D [Ex ia Da] IIIC ⟨Ex⟩ I (M1) [Ex ia Ma] I
Supply		
Maximum safe voltage	U_m	253 V AC / 125 V DC (Attention! U_m is no rated voltage.)
Input I and II		terminals 1+, 3-; 4+, 6-: Ex ia
Voltage U_o		10.1 V
Current I_o		13.5 mA
Power P_o		34 mW (linear characteristic)
Input III and IV		terminals 13+, 14-; 15+, 14- non-intrinsically safe
Maximum safe voltage U_m		40 V (Attention! U_m is no rated voltage.)
Output I, II		terminals 10, 11, 12; 16, 17, 18 non-intrinsically safe
Maximum safe voltage	U_m	253 V (Attention! The rated voltage can be lower.)
Contact loading		253 V AC/2 A/cos ϕ > 0.7; 40 V DC/2 A resistive load (TÜV 99 ATEX 1471)

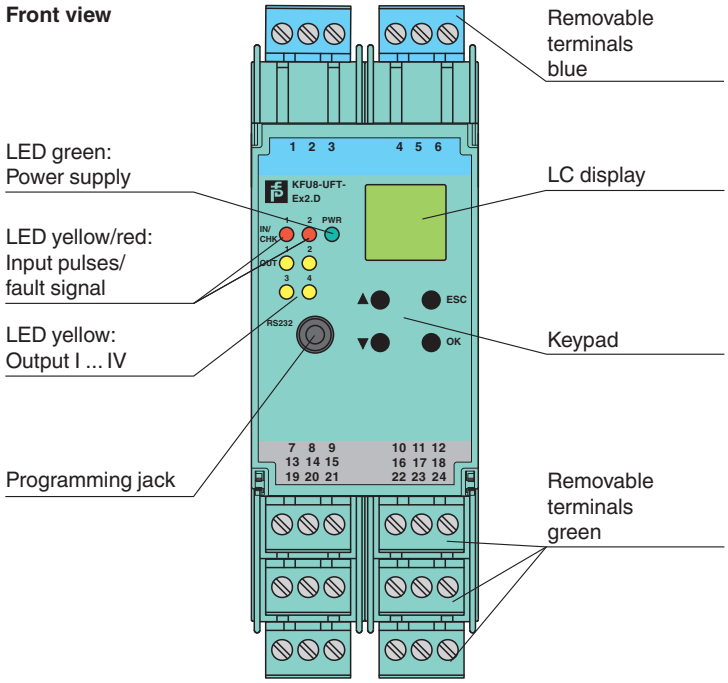
Release date: 2023-05-31 Date of issue: 2023-05-31 Filename: 231202_eng.pdf

Technical Data

Output III and IV		terminals 19, 20, 21 non-intrinsically safe
Maximum safe voltage U_m	U_m	40 V (Attention! U_m is no rated voltage.)
Output V		terminals 8+, 7- non-intrinsically safe
Maximum safe voltage U_m	U_m	40 V DC (Attention! U_m is no rated voltage.)
Interface		RS 232
Maximum safe voltage	U_m	40 V (Attention! U_m is no rated voltage.)
Galvanic isolation		
Input I, II/other circuits		safe electrical isolation acc. to IEC/EN 60079-11, voltage peak value 375 V
Directive conformity		
Directive 2014/34/EU		EN IEC 60079-0:2018 , EN 60079-11:2012
International approvals		
FM approval		
Control drawing		16-538FM-12
IECEx approval		
IECEx certificate		IECEx TUN 04.0007
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

Front view



Matching System Components

	DTM Interface Technology	Device type manager (DTM) for interface technology
	PACTware 5.0	FDT Framework

Release date: 2023-05-31 Date of issue: 2023-05-31 Filename: 231202_eng.pdf

Matching System Components

	**K-ADP-USB**	Programming adapter with USB interface
	**K-DUCT-GY**	Profile rail, wiring comb field side, gray

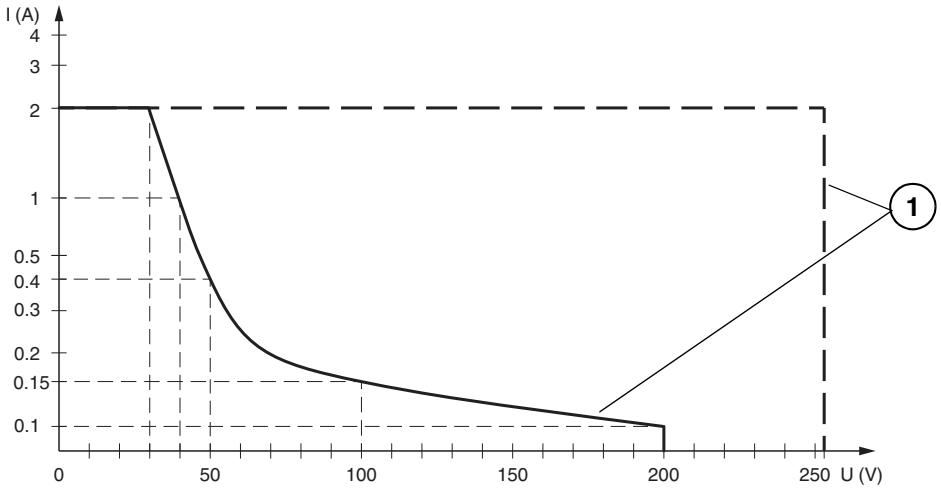
Accessories

	**F-NR3-Ex1**	NAMUR Resistor Network
	**K-250R**	Measuring resistor
	**K-500R0%1**	Measuring resistor
	**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

Release date: 2023-05-31 Date of issue: 2023-05-31 Filename: 231202_eng.pdf

Characteristic Curve

Maximum Switching Power of Output Contacts



Resistive load DC

Resistive load AC

1 max. 10^5 switching cycles

Release date: 2023-05-31 Date of issue: 2023-05-31 Filename: 231202_eng.pdf