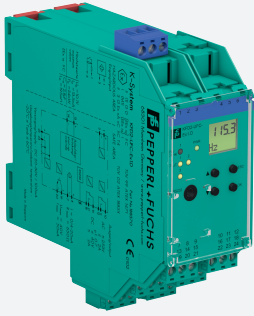


# Frequency Converter with Trip Values

## KFD2-UFC-Ex1.D



- 1-channel isolated barrier
- 24 V DC supply (Power Rail)
- Input for NAMUR sensors or dry contacts
- Input frequency 1 mHz ... 5 kHz
- Current output 0/4 mA ... 20 mA
- Relay contact and transistor output
- Start-up override
- Line fault detection (LFD)
- Up to SIL 2 acc. to IEC 61508/IEC 61511



### Function

This isolated barrier is used for intrinsic safety applications.

The device is a universal frequency converter that changes a digital input signal into a proportional free adjustable 0/4 mA ... 20 mA analog output signal and functions as a switch amplifier and a trip alarm.

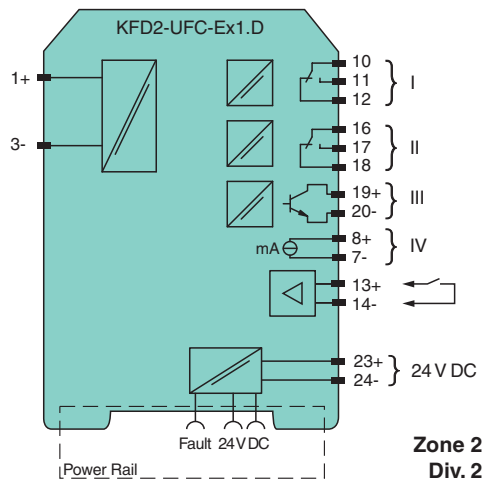
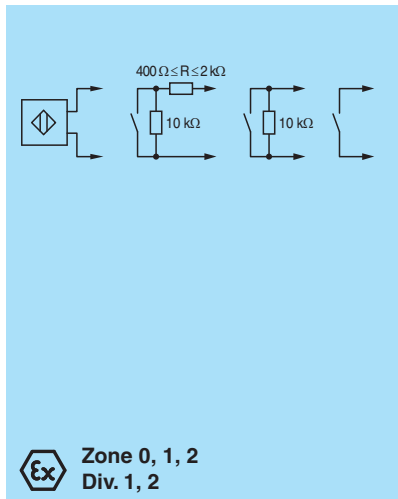
The functions of the switch outputs (2 relay outputs and 1 potential free transistor output) are easily adjustable [trip value display (min/max alarm), serially switched output, pulse divider output, error signal output].

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

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

For additional information, refer to the manual and [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

### Connection



### Technical Data

#### General specifications

Signal type Digital 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  $\leq 2$  W / 2.2 W

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## Technical Data

Interface	
Programming interface	programming socket
Input	
Connection side	field side
Connection	Input I: intrinsically safe: terminals 1+, 3- Input II: non-intrinsically safe: terminals 13+, 14-
Input I	sensor acc. to EN 60947-5-6 (NAMUR) or mechanical contact
Pulse duration	> 50 $\mu$ s
Input frequency	0.001 ... 5000 Hz
Line fault detection	breakage I $\leq$ 0.15 mA; short-circuit I > 6.5 mA
Input II	startup override: 1 ... 1000 s, adjustable in steps of 1 s
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 8+, 7-
Output I, II	signal, relay
Contact loading	253 V AC / 2 A / $\cos \phi \geq 0.7$ ; 40 V DC / 2 A
Mechanical life	5 x 10 <sup>7</sup> switching cycles
Energized/De-energized delay	approx. 20 ms / approx. 20 ms
Output III	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 $\leq$ 10 $\mu$ A)
Output IV	analog
Current range	0 ... 20 mA or 4 ... 20 mA
Open loop voltage	max. 24 V DC
Load	max. 650 $\Omega$
Fault signal	downscale I $\leq$ 3.6 mA , upscale $\geq$ 21.5 mA (acc. NAMUR NE43)
Collective error message	Power Rail
Transfer characteristics	
Input I	
Measurement range	0.001 ... 5000 Hz
Resolution	0.1 % of the measurement value , $\geq$ 0.001 Hz
Accuracy	0.1 % of the measurement value , > 0.001 Hz
Measuring time	< 100 ms
Influence of ambient temperature	0.003 %/K (30 ppm)
Output I, II	
Response delay	$\leq$ 200 ms
Output IV	
Resolution	< 10 $\mu$ A
Accuracy	< 20 $\mu$ A
Influence of ambient temperature	0.005 %/K (50 ppm)
Galvanic isolation	
Input I/other circuits	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub>
Output I, II/other circuits	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub>
Mutual output I, II, III	reinforced insulation according to IEC/EN 61010-1, rated insulation voltage 300 V <sub>eff</sub>
Output III/power supply and collective error	basic insulation according to IEC/EN 61010-1, rated insulation voltage 50 V <sub>eff</sub>
Output III/start-up override	basic insulation according to IEC/EN 61010-1, rated insulation voltage 50 V <sub>eff</sub>
Output III/IV	basic insulation according to IEC/EN 61010-1, rated insulation voltage 50 V <sub>eff</sub>
Output IV/power supply and collective error	functional insulation acc. to IEC 62103, rated insulation voltage 50 V <sub>eff</sub>

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**Technical Data**

Start-up override/power supply and collective error		functional insulation acc. to IEC 62103, rated insulation voltage 50 V <sub>eff</sub>
Interface/power supply and collective error		functional insulation acc. to IEC 62103, rated insulation voltage 50 V <sub>eff</sub>
Interface/output III		basic insulation according to IEC/EN 61010-1, rated insulation voltage 50 V <sub>eff</sub>
<b>Indicators/settings</b>		
Display elements		LEDs , display
Control elements		Control panel
Configuration		via operating buttons via PACTware
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
<b>Conformity</b>		
Electromagnetic compatibility		NE 21:2006
Degree of protection		IEC 60529:2001
Input		EN 60947-5-6:2000
<b>Ambient conditions</b>		
Ambient temperature		-20 ... 60 °C (-4 ... 140 °F)
<b>Mechanical specifications</b>		
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
<b>Data for application in connection with hazardous areas</b>		
EU-type examination certificate		TÜV 99 ATEX 1471
Marking		⊕ II (1)G [Ex ia Ga] IIC ⊕ II (1)D [Ex ia Da] IIIC ⊕ I (M1) [Ex ia Ma] I
Supply		
Maximum safe voltage	U <sub>m</sub>	40 V DC (Attention! U <sub>m</sub> is no rated voltage.)
Input I		
Voltage U <sub>o</sub>		10.1 V
Current I <sub>o</sub>		13.5 mA
Power P <sub>o</sub>		34 mW (linear characteristic)
Input II		
Maximum safe voltage U <sub>m</sub>		40 V (Attention! The rated voltage can be lower.)
Output I, II		
Maximum safe voltage	U <sub>m</sub>	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
Output III		
Maximum safe voltage U <sub>m</sub>	U <sub>m</sub>	40 V (Attention! U <sub>m</sub> is no rated voltage.)
Output IV		
Maximum safe voltage	U <sub>m</sub>	40 V DC (Attention! U <sub>m</sub> is no rated voltage.)
Interface		
Maximum safe voltage	U <sub>m</sub>	40 V (Attention! U <sub>m</sub> is no rated voltage.)
Certificate		
Marking		⊕ II 3G Ex nA nC IIC T4 Gc
Output I, II		
Contact loading		50 V AC/2 A/cos φ > 0.7; 40 V DC/2 A resistive load
Galvanic isolation		

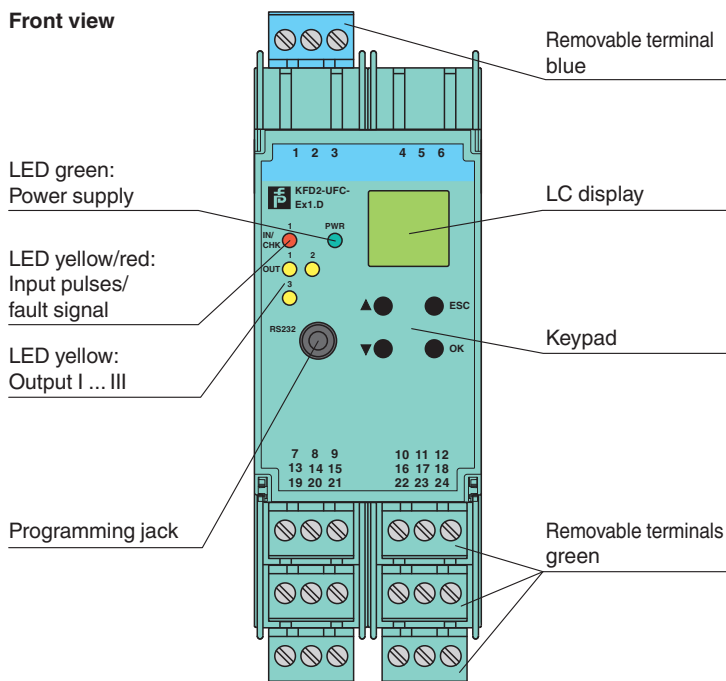
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**Technical Data**

Input I/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
<b>International approvals</b>	
FM approval	
Control drawing	16-538FM-12
UL approval	E223772
IECEX approval	
IECEX certificate	IECEX TUN 04.0007 IECEX TSA 18.0007X
IECEX marking	[Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I Ex ec nC IIC T4 Gc
<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**



**Matching System Components**

	<b>DTM Interface Technology</b>	Device type manager (DTM) for interface technology
	<b>PACTware 5.X</b>	FDT Framework
	<b>K-ADP-USB</b>	Programming adapter with USB interface
	<b>KFD2-EB2</b>	Power Feed Module

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




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### Matching System Components

	<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-BU</b>	Profile rail, wiring comb field side, blue
	<b>K-DUCT-BU-UPR-03</b>	Profile rail with UPR-03- * insert, 3 conductors, wiring comb field side, blue

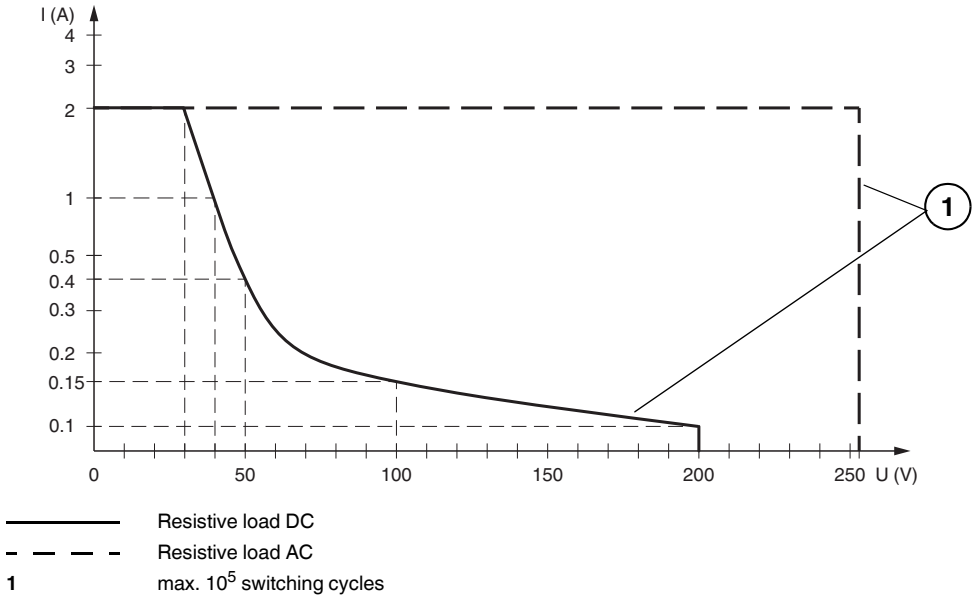
### Accessories

	<b>F-NR3-Ex1</b>	NAMUR Resistor Network
	<b>K-250R</b>	Measuring resistor
	<b>K-500R0%1</b>	Measuring resistor
	<b>KF-ST-5GN</b>	Terminal block for KF modules, 3-pin screw terminal, green
	<b>KF-ST-5BU</b>	Terminal block for KF modules, 3-pin screw terminal, blue
	<b>KF-CP</b>	Red coding pins, packaging unit: 20 x 6

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**Characteristic Curve**

**Maximum Switching Power of Output Contacts**



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