- 2 frequency inputs
- 2 control inputs
- 2 relay outputs
- 2 electronic outputs, isolated
- Analogue output 0/4 mA ... 20 mA
- Lead monitoring (can be deactivated)
- Parameterization via keypad
- Input frequency 1mHz ... 1 kHz (slip monitor function 10 Hz ... 1 kHz)

KFD2-UFT-Ex2.D

Function

The following functions are provided by device (short description see last page):

- Frequency measurement
- Slip monitoring
- Rotation direction monitoring
- Synchronisation monitoring

The frequency monitoring can be used in combination with slip monitoring or rotation direction signalling.

The relay outputs can be used for indicating if the signal is below or above the trip value or for the indication of the rotation direction.

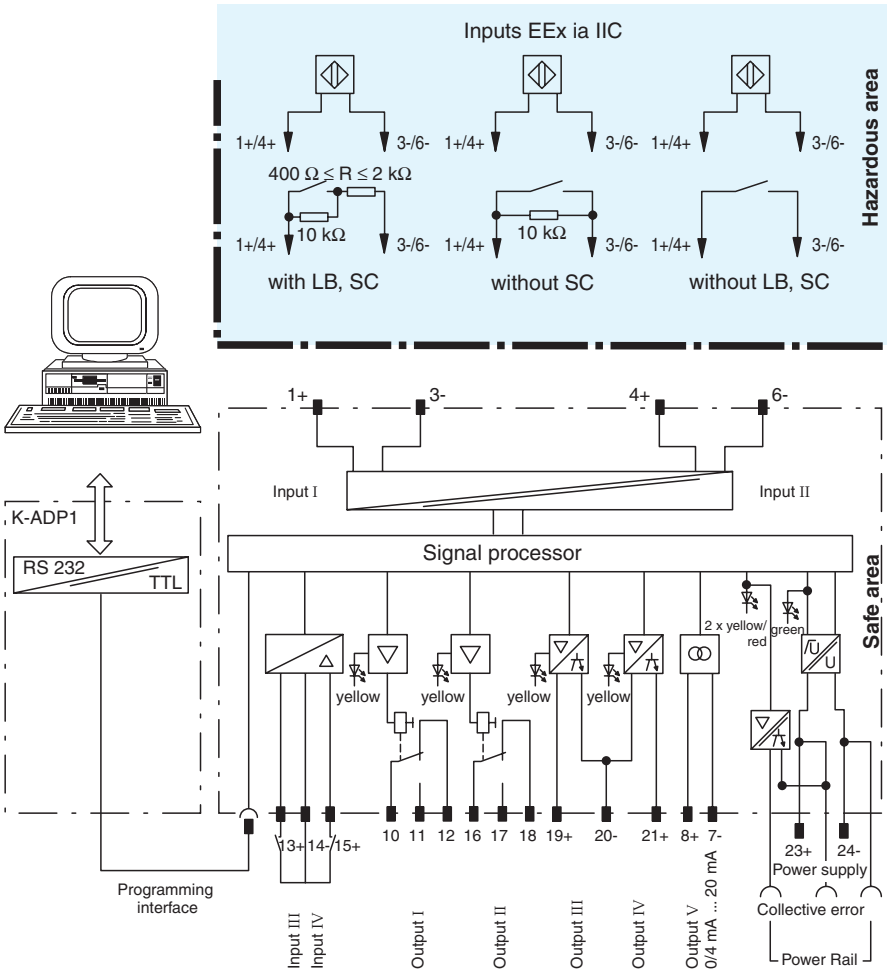
The two electronic outputs repeat the input signals

By means of the analogue output the actual slip or the differential pulses of the synchronisation monitoring can be indicated. It is also possible a current which is proportional to the frequency in relation to input I to indicate.

The input and output circuits are galvanically isolated.

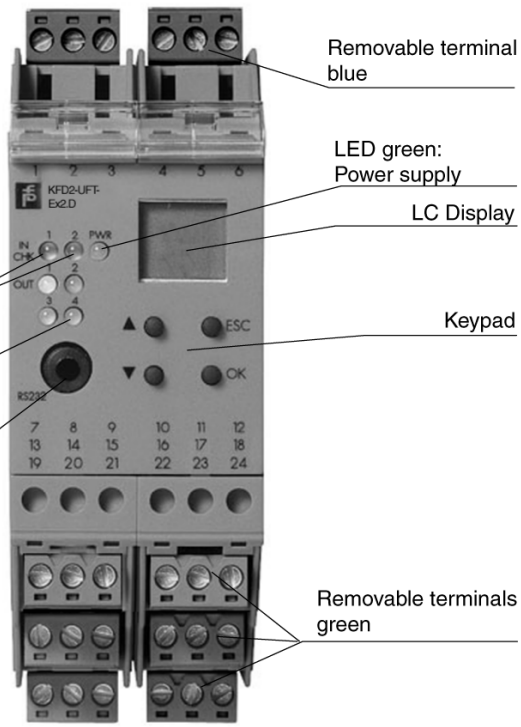
The Power Rail can assume the power supply and collective error message functions.

Connection



Composition

Front View



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Supply	
Connection	terminals 23+, 24- or power feed module/Power Rail
Rated voltage	20 ... 30 V DC
Rated current	approx. 130 mA
Power loss	2.2 W
Power consumption	2.5 W
Input	
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	acc. to EN 60947-5-6 (NAMUR)
Open circuit voltage/short-circuit current	8.2 V / 10 mA
Pulse duration	≥ 250 µs , overlap on direction of rotation signal: ≥ 125 µs
Input frequency	rotation direction monitoring 0.001 ... 1000 Hz slip monitoring 10 ... 1000 Hz
Lead monitoring	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	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+
Collective error message	Power Rail
Output I, II	signal , 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 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 circuit voltage	max. 24 V DC
Load	max. 650 Ω
Fault signal	downscale I ≤ 3.6 mA, upscale I ≥ 21.5 mA (acc. NAMUR NE43)
Programming interface	
Connection	programming jack
Interface	RS 232
Transfer characteristics	
Input I and II	
Measuring 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 %/°C (30 ppm)
Output I, II	
Response delay	≤ 200 ms
Output V	
Resolution	< 10 µA
Accuracy	< 30 µA
Influence of ambient temperature	0.005 %/°C (50 ppm)
Electrical isolation	
Input III, IV/power supply and collective error	reinforced insulation acc. to IEC 61140, rated insulation voltage 300 V_{rms}
Output I, II/other circuits	reinforced insulation acc. to IEC 61140, rated insulation voltage 300 V_{rms}
Mutual output I, II, III	reinforced insulation acc. to IEC 61140, rated insulation voltage 300 V_{rms}
Mutual output I, II, IV,	reinforced insulation acc. to IEC 61140, rated insulation voltage 300 V_{rms}
Output III, IV/power supply and collective error	reinforced insulation acc. to IEC 61140, rated insulation voltage 300 V_{rms}
Output III, IV/input III, IV	basic insulation according to EN 50178, rated insulation voltage 300 V_{rms}

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Output III, IV/V	basic insulation according to EN 50178, rated insulation voltage 300 V_{rms}
Output V/power supply and collective error	basic insulation according to EN 50178, rated insulation voltage 300 V_{rms}
Interface/power supply and collective error	reinforced insulation acc. to IEC 61140, rated insulation voltage 300 V_{rms}
Interface/output III, IV	functional insulation acc. to EN 50178, rated insulation voltage 300 V_{rms}
Directive conformity	
Electromagnetic compatibility	
Directive 89/336/EEC	EN 61326
Low voltage	
Directive 73/23/EEC	EN 50178
Conformity	
Insulation coordination	EN 50178
Electrical isolation	EN 50178
Electromagnetic compatibility	NE 21
Protection degree	IEC 60529
Protection against electric shock	IEC 61140
Ambient conditions	
Ambient temperature	-20 ... 50 °C (253 ... 323 K)
Mechanical specifications	
Protection degree	IP20
Mass	300 g
Dimensions	40 x 100 x 115 mm (1.6 x 3.9 x 4.5 in)
Data for application in conjunction with hazardous areas	
EC-Type Examination Certificate	TÜV 99 ATEX 1471 , for additional certificates see www.pepperl-fuchs.com
Group, category, type of protection	⟨Ex⟩ II (1)GD [EEx ia] IIC [circuit(s) in zone 0/1/2]
Supply	
Safety maximum voltage U_m	40 V DC (Attention! U_m is no rated voltage.)
Input I and II	terminals 1+, 3-; 4+, 6- EEx ia IIC
Voltage U_o	10.1 V
Current I_o	13 mA
Power P_o	34 mW (linear characteristic)
Input III and IV	terminals 13+, 14-; 15+, 14- non-intrinsically safe
Safety maximum voltageU_m	40 V DC (Attention! U_m is no rated voltage.)
Output I, II	terminals 10, 11, 12; 16, 17, 18 non-intrinsically safe
Safety maximum voltage U_m	253 V AC / 40 V DC (Attention! U_m is no rated voltage.)
Contact loading	253 V AC/2 A/cos ϕ > 0.7; 40 V DC/2 A resistive load (TÜV 99 ATEX 1471) 50 V AC/2 A/cos ϕ > 0.7; 40 V DC/2 A resistive load (TÜV 02 ATEX 1885 X)
Output III and IV	terminals 19, 20, 21 non-intrinsically safe
Safety maximum voltageU_m U_m	40 V DC (Attention! U_m is no rated voltage.)
Output V	terminals 8+, 7- non-intrinsically safe
Safety maximum voltageU_m U_m	40 V DC (Attention! U_m is no rated voltage.)
Interface	RS 232
Safety maximum voltage U_m	40 V DC (Attention! U_m is no rated voltage.)
Statement of conformity	TÜV 02 ATEX 1885 X , observe statement of conformity
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G EEx nAC IIC T4 [device in zone 2]
Electrical isolation	
Input/other circuits	safe electrical isolation acc. to EN 50020, voltage peak value 375 V
Directive conformity	
Directive 94/9/EC	EN 50014, EN 50020, EN 50021

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. For information see www.pepperl-fuchs.com.

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Function

The device processes two 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 ... 20 mA)
- Slip monitoring: The slip is calculated from the two input frequencies at channel 1 and 2. If the freely parameterisable trip value is exceeded, the respective output switches.
- Rotation direction signalling: The rotation direction is evaluated from the two 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 two inputs. If the measured difference in the pulses is greater than the programmed value the corresponding outputs are switching.

The two electronic outputs serve to repeat the input signals.

Accessories

Power feed modules 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 100 individual devices depending on the power consumption of the devices. A galvanically isolated mechanical contact uses the Power Rail to transmit collective error messages.

Power Rail UPR-03

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

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

PACT*ware*™

Device-specific drivers (DTM)

Adapter K-ADP1

Programming adapter for parameterisation via the serial RS 232 interface of a PC/Notebook

For programming, please use the new version of adapter K-ADP1 (part no. 181953, connector length 14mm). When using the previous version K-ADP1 (connector length 18 mm) the plug is exposed by approx. 3 mm. The function is not affected.

Adapter K-ADP-USB

Programming adapter for parameterisation via the serial USB interface of a PC/Notebook

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