Model Number

KFU8-DW-1.D

Rotation Speed Monitor

Features

- Speed monitoring up to 40 kHz
- 1 pre-select value with relay output and LED indicator
- 2-, 3-, 4-wire and NAMUR sensors as well as rotary encoder connectable
- Start-up delay
- Menu driven operation via 4 front keys
- Period measurement
- Output signal can be inverted
- Display devices can be set between 0.1 ... 2.5 sec.

Technical data

General specifications
- Signal type: Digital Input

Functional safety related parameters
- MTTFd: 100 a

Supply
- Rated voltage: U_r = 200 ... 230 V AC ; 100 ... 130 V AC; 50/60 Hz
- 20 VDC ... 30 VDC
- Fusing: external fusing 4 A
- Power consumption: AC: < 5 VA
- DC: < 5 W

Input
- Connection side: field side

Input 1
- Connection terminals B-, 9+
- Connectable sensor types: NAMUR sensors according to DIN EN 60947-5-6
- Open loop voltage: 8.2 V DC
- Short-circuit current: 6.5 mA
- Switching point: 1.2 ... 2.1 mA Switching hysteresis approx. 0.2 mA
- Impedance: 1.2 kΩ

Input 2
- Switching point: high: 16 ... 30 V DC; max. 10 mA due to integrated constant current sink; R_i = 3 kΩ
- Input frequency: 0.002 ... 40000 Hz, pulse length/duration: ≥ 12μs
- Connection terminals 7+, 13- sensor supply terminals 14, 15 NPN/PNP input (galvanically isolated)
- Connectable sensor types: Two, three, or four-wire proximity switch, incremental rotary encoder, or externally generated pulses 16 ... 30 V
- Sensor supply: 19 ... 28 V DC non-stabilised; ≤ 30 mA short-circuit protected

Input 3
- Start-up override: Triggering by external signal 16 ... 30 V or Place jumper between terminals 2/3 or by switching on supply voltage (terminal 2 and terminal 3 permanently bridged)
- Jumping time: 0.1 ... 999.9 s (External trigger signal)

Output
- Connection side: control side
- Relay: 1 changeover contact
- NO, NC, COM
- Sensor supply: 24 V DC ± 10 %, 30 mA , short-circuit-protected
- Contact loading: 250 V AC/2 A/ cos φ ≤ 0.7
- 40 V DC/2 A
- Delay: ≤ 20 ms (incl. calculation time)
- Mechanical life: ≥ 30,000,000 switching cycles

Transfer characteristics
- Changing interval: 5 ms (Internal processing time)
- Time delay before availability: ≤ 400 ms
- Measuring error: 0 ... 40000 Hz: ± ±0,10%
- Display: ±1 digit
- Timer function: ON-delay, OFF-delay, one shot, pulse extension
- Time: 0 ... 999.9 s ; mode of operation reversible

Indicators/settings
- Display elements: display , 4-digit, 7-segment red display, 7 mm digit height and LED
- LED indication: yellow LED : switching state
- Display indication: 0.002 ... 9999 Hz or 0.01 ... 9999 min⁻¹
- Control elements: Control panel
- Configuration: via operating buttons
- Labeling: space for labeling at the front

Standard conformity
- Electromagnetic compatibility: acc. to EN 50081-2 / EN 50082-2

Ambient conditions
- Ambient temperature: -25 ... 40 °C (-13 ... 104 °F)
- Storage temperature: -40 ... 85 °C (-40 ... 185 °F)
- Relative humidity: max. 80 %, not condensing
- Altitude: 0 ... 2000 m
- Operating conditions: The device has only to be used in an indoor area.

Mechanical specifications
- Connection assembly: Caution: Please be aware that the device may only be connected to a switchable power supply. The switch or circuit breaker must be easy to reach and identified as the separator for the device.
- Degree of protection: IP20
- Connection: coded, removable terminals , max. core cross section 0.34 ... 2.5 mm²
### Rotation Speed Monitor

<table>
<thead>
<tr>
<th>Construction type</th>
<th>modular terminal housing in Makrolon, System KF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting</td>
<td>snap-on to 35 mm standard rail or screw fixing</td>
</tr>
</tbody>
</table>
**Rotation Speed Monitor KFU8-DW-1.D**

### Dimensions

![Diagram of the Rotation Speed Monitor KFU8-DW-1.D](image)

### Electrical connection

**NAMUR Sensor**
- DC-3-wire sensor, PNP
- DC-2-wire sensor, PNP
- Encoder, push-pull

**NAMUR Encoder**
- DC-3-wire sensor, NPN
- DC-2-wire sensor, NPN
- Encoder, push-pull
- External rectangular signal

**Power supply**
- 24 V DC
- 230 V AC
- 115 V AC

**Sensor power**
- 24 V DC
- Supply GND

**Trigger input for start-up bypass**
- External trigger signal
- Bridge fitted: start-up bypass triggered by switching on the power supply

**Relay output**
- External rectangular signal
- Galvanically isolated input

**NC**
- Not connected

**NO**
- L1 (230 V)
- L1 (115 V)

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

Device description

The KFU8-DW-1.D Speed Monitor is a device for the indication and monitoring of periodic signals, which occur in almost all areas of automation and process technology, i.e. of frequencies in general and rotational speeds in special cases. The input signals are evaluated in accordance with the cycle method, i.e. by measurement of the period of oscillation and conversion into frequency or rotational speed by a very fast µ controller.

The frequently occurring special case of rotational speed measurement has been paid particular attention in the development of the device. Thus indication and input can be either in Hz or in rpm. It is also possible, in applications involving slow processes, in which the signal sensors provide many pulses per revolution, to operate automatically with the actual rotational speed of the drive by specifying the number of pulses per revolution.

The indication of the measured value is provided on a 4-digit, 7-segment LED display on the front of the device, with up to 3 places after the decimal point.

The monitoring function is achieved on the basis of a limit value, whose upper and lower hysteresis value is freely selectable within the respective display range.

The output signal is generated by a relay with a changeover contact, when the hysteresis limits are violated. Thanks to a high switching capability, the relay output can be used for the direct activation of an actuating element or as an input signal for a higher level control system.

Also, the switching status of the relay is indicated by means of a yellow LED on the front of the device. A function block is connected in series with the relay, which provides for various timer functions and thus obviates the requirement for the subsequent addition of a timer relay. In addition to the pull-in and drop-out delay, passing make contact and and pulse extension, the direction of operation of the relay, i.e. monitoring of speed fluctuation about a nominal value, can also be selected.

The built-in start-up override, initiated when the power supply is switched on, or by an external signal, prevents error signals during the running up of the monitored system.

The speed monitor can be supplied with 115 V AC, 230 V AC or by a 24 V DC supply and when connected to an alternating voltage it provides a 24 V DC source to supply the signal sensor.

All current two, three and four-wire proximity switches and incremental encoders can be accepted as the signal sensor. In addition, two terminals are reserved for the connection of proximity switches in accordance with DIN 19234 (NAMUR).

Terminal assignment

T. 1: Signal sensor supply GND
T. 2: Trigger input for start-up override
T. 3: Signal sensor supply +24 V DC
T. 4: Power supply + 24 V DC
T. 5: Power supply GND
T. 6: Not connected.
T. 7: Signal sensor supply +24 V DC
T. 8: NAMUR input L-
T. 9: NAMUR input L+
T. 10: Relay make contact, NO
T. 11: Relay break contact, NC
T. 12: Relay root, COM
T. 13: Signal sensor supply GND
T. 14: Signal sensor NPN input
T. 15: Signal sensor PNP input
T. 16: Power supply L1, 230 V AC
T. 17: Power supply L1, 115 V AC
T. 18: Power supply N
Rotation Speed Monitor KFU8-DW-1.D

Timer functions, reversal of operating direction of the output relay

<table>
<thead>
<tr>
<th>Function</th>
<th>No.</th>
</tr>
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<tbody>
<tr>
<td>No timer function</td>
<td>0</td>
</tr>
<tr>
<td>ON delay</td>
<td>1</td>
</tr>
<tr>
<td>OFF delay</td>
<td>2</td>
</tr>
<tr>
<td>Defined ON time</td>
<td>3</td>
</tr>
<tr>
<td>Pulse lengthening</td>
<td>4</td>
</tr>
<tr>
<td>No timer function, inverted</td>
<td>5</td>
</tr>
<tr>
<td>ON delay, inverted</td>
<td>6</td>
</tr>
<tr>
<td>OFF delay, inverted</td>
<td>7</td>
</tr>
<tr>
<td>Defined ON time, inverted</td>
<td>8</td>
</tr>
<tr>
<td>Pulse lengthening, inverted</td>
<td>9</td>
</tr>
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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".
Operating principle

**Operating mode**

- X=0: frequency measurement 0.002 Hz ... 40000 Hz
- X=1: rotational speed measurement 0.01 rpm ... 9999 rpm
  - Preset at the factory: X=1

**Number of pulses per revolution for rotational speed measurement**

- 1 ≤ XXXX ≤ 1200
  - Preset at the factory: XXXX=1

**Measuring and display range**

- Frequency measurement: 0 ≤ X ≤ 3
  - Rotational speed measurement: 0 ≤ X ≤ 2
  - Preset at the factory: X=1

**Upper hysteresis limit of switching point**

- 0 ≤ XXX ≤ 9999 (depending on the measuring range)
  - Preset at the factory: XXX=200

**Timer function of switching relay**

- Period for the timer function of switching relay: 0.1 s ≤ XXX.X ≤ 999.9 s
  - Preset at the factory: XXX.X=1.0 s

**Timer function of switching relay**

- Preset at the factory: X=0

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**Start-up bypass**

- 0.1 s ≤ XXX.X ≤ 999.9 s
  - Preset at the factory: XXX.X=1.5 s

**Display rate**

- 0.01 s ≤ XX.X ≤ 2.5 s
  - Preset at the factory: XX.X=0.33 s

The number of the software version can be read only.

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Refer to “General Notes Relating to Pepperl+Fuchs Product Information.”

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