Rotation Speed Monitor

KFU8-DW-1.D

- 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

<table>
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<th>General specifications</th>
<th>Digital Input</th>
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</thead>
<tbody>
<tr>
<td>Functional safety related parameters</td>
<td></td>
</tr>
<tr>
<td>MTTF&lt;sub&gt;0&lt;/sub&gt;</td>
<td>100 a</td>
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</tbody>
</table>

Supply

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>U&lt;sub&gt;r&lt;/sub&gt;</th>
<th>200 ... 230 V AC; 100 ... 130 V AC; 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fusing</td>
<td>external fusing 4 A</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>AC: &lt; 5 VA; DC: &lt; 5 W</td>
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Input

<table>
<thead>
<tr>
<th>Connection side</th>
<th>field side</th>
</tr>
</thead>
<tbody>
<tr>
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<td>terminals 8-, 9+</td>
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<tr>
<td>Connectable sensor types</td>
<td>NAMUR sensors according to DIN EN 60947-5-6</td>
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<tr>
<td>Open loop voltage</td>
<td>8.2 V DC</td>
</tr>
<tr>
<td>Short-circuit current</td>
<td>6.5 mA</td>
</tr>
<tr>
<td>Switching point</td>
<td>1.2 ... 2.1 mA; Switching hysteresis approx. 0.2 mA</td>
</tr>
<tr>
<td>Input frequency</td>
<td>0.002 ... 10000 Hz; pulse length/duration: ≥ 20µs</td>
</tr>
<tr>
<td>Impedance</td>
<td>1.2 kΩ</td>
</tr>
</tbody>
</table>

Input 2

| Switching point | high: 16 ... 30 V DC; max.10 mA due to integrated constant current sink; R<sub>i</sub> ≤ 3 kΩ; low: 0 ... 6 V DC |
| 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) |
| Jumpering time | 0.1 ... 999.9 s (External trigger signal) |

Output

| Connection side | control side |
## Technical Data

**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 \(\cos \phi \geq 0.7\)
- 40 V DC/2 A

**Delay**
- \(\leq 20\) ms (incl. calculation time)

**Mechanical life**
- \(\geq 30.000.000\) switching cycles

### Transfer characteristics

**Changing interval**
- 5 ms (Internal processing time)

**Time delay before availability**
- \(\leq 400\) ms

**Measuring error**
- 0 ... 40000 Hz: \(\leq 0.10\%\)
- Display: \(\pm 1\) 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 mm\(^2\)

- **Construction type**
  - modular terminal housing in Makrolon, System KF

- **Mounting**
  - snap-on to 35 mm standard rail or screw fixing

### General information

- **Supplementary information**
  - Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com.
Assembly

Yellow LED, Relay switch state indication
7-segment-display
Control keys

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
Power supply 230 V AC
Power supply 115 V AC

Sensor power supply 24 V DC
Sensor power supply GND
Sensor power supply GND

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

Relay output
Not connected
0 V
16-30 V

Yellow LED,
Relay switch state indication
7-segment-display
Control keys

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

Pepperl+Fuchs Group
USA: +1 330 486 0002
www.pepperl-fuchs.com
pa-info@us.pepperl-fuchs.com

Germany: +49 621 776 2222
pa-info@gds.pepperl-fuchs.com

Singapore: +65 6779 9091
pa-info@sg.pepperl-fuchs.com

www.pepperl-fuchs.com
pa-info@de.pepperl-fuchs.com

3
Rotation Speed Monitor

Additional Information

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 |

Timer functions, reversal of operating direction of the output relay
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**
- 0.001 ≤ XXXX ≤ 9999 (depending on the measuring range)
  - Preset at the factory: XXXX=200

**Lower hysteresis limit of switching point**
- 0 ≤ XXXX ≤ 9998 (depending on the measuring range)
  - Preset at the factory: XXXX=100

**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**

<table>
<thead>
<tr>
<th>X</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No timer function</td>
</tr>
<tr>
<td>1</td>
<td>ON delay</td>
</tr>
<tr>
<td>2</td>
<td>OFF delay</td>
</tr>
<tr>
<td>3</td>
<td>Defined ON time, inverted</td>
</tr>
<tr>
<td>4</td>
<td>Pulse lengthening, inverted</td>
</tr>
<tr>
<td>5</td>
<td>No timer function, inverted</td>
</tr>
<tr>
<td>6</td>
<td>ON delay, inverted</td>
</tr>
<tr>
<td>7</td>
<td>OFF delay, inverted</td>
</tr>
<tr>
<td>8</td>
<td>Defined ON time, inverted</td>
</tr>
<tr>
<td>9</td>
<td>Pulse lengthening, inverted</td>
</tr>
</tbody>
</table>

**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.