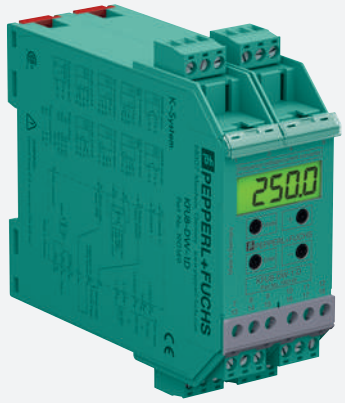


# Rotation Speed Monitor

# 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.

Rotation Speed Monitor

## Technical Data

| | | |
|---|---|---|
| **Functional safety related parameters** | | |
| $MTTF_d$ | | 100 a |
| **Supply** | | |
| Rated voltage | $U_r$ | 200 ... 230 V AC ; 100 … 130 V AC; 50/60 Hz<br>20 VDC ... 30 VDC |
| Fusing | | external fusing 4 A |
| Power consumption | | AC: < 5 VA<br>DC: < 5 W |
| **Input 1** | | |
| Connection | | terminals 8-, 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 |
| Input frequency | | 0.002 ... 10000 Hz, pulse length/duration: ≥ 20µs |
| Impedance | | 1.2 kΩ |
| **Input 2** | | |
| Switching point | | high: 16 ... 30 V DC; max.10 mA due to integrated constant current sink; $R_i \cong 3$ kΩ<br>low: 0 ... 6 V DC |
| Input frequency | | 0.002 ... 40000 Hz, pulse length/duration: ≥ 12µs |
| Connection | | terminals 7+, 13- sensor supply<br>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) |
| Hold-up time | | 0.1 ... 999.9 s (External trigger signal) |
| **Output** | | |
| Relay | | 1 changeover contact<br>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<br>40 V DC/2 A |
| Delay | | ≤ 20 ms (incl. calculation time) |
| Mechanical life | | ≥ 30.000.000 switching cycles |

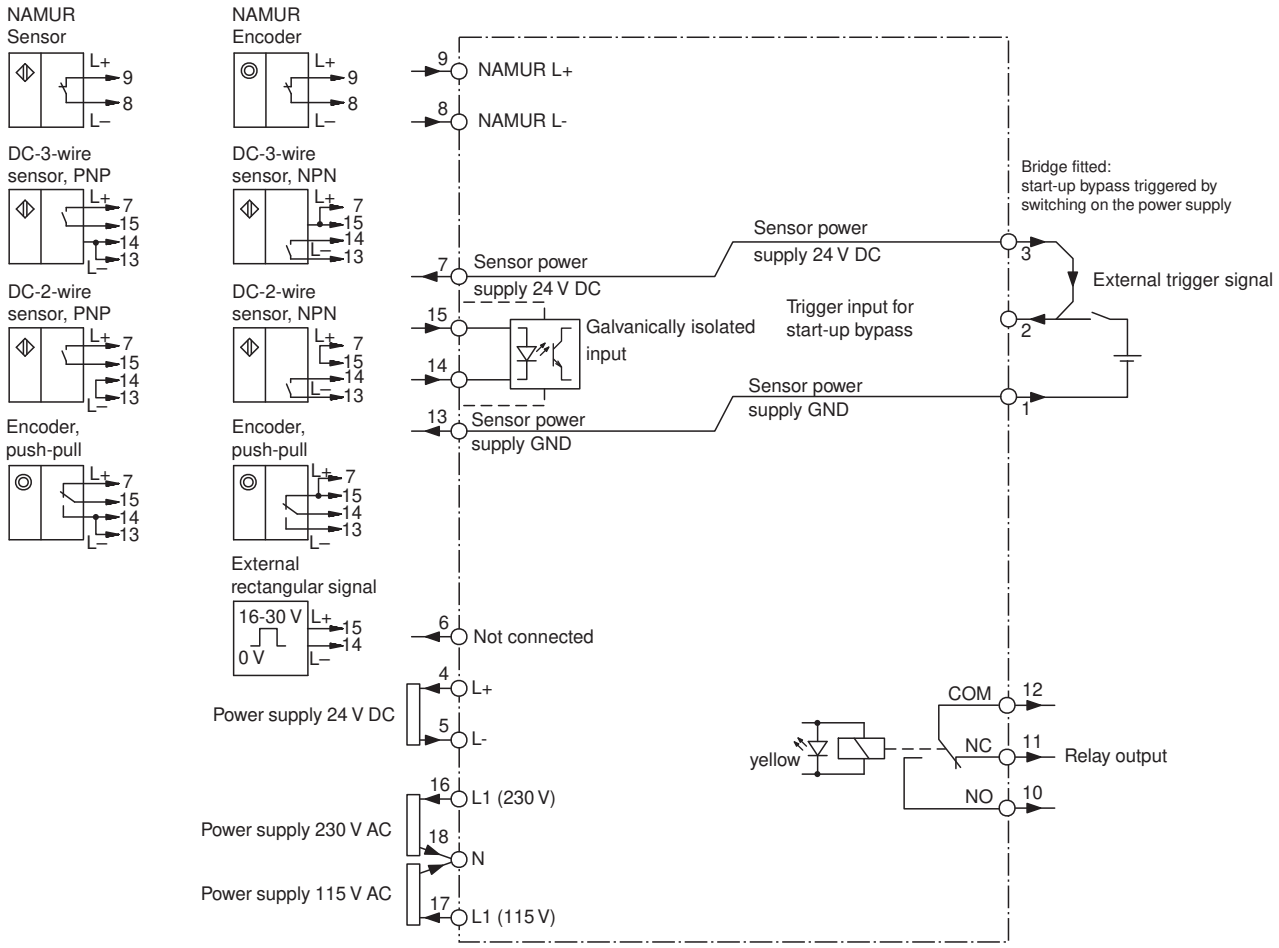
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## Technical Data

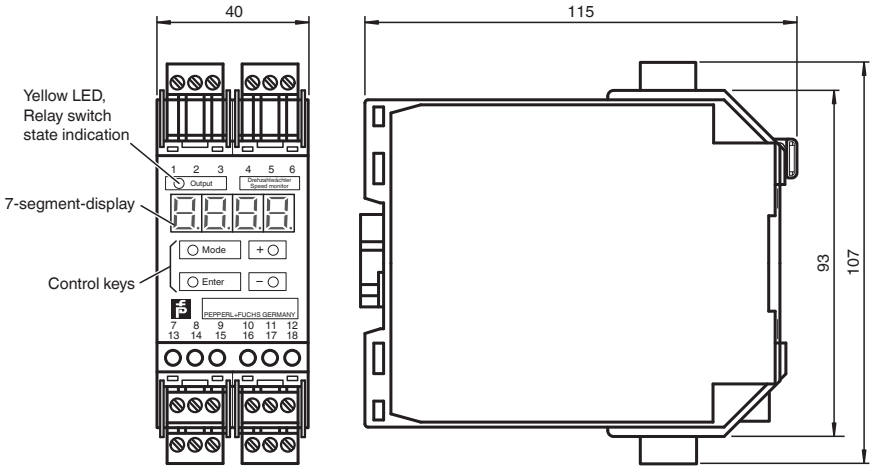
| | | |
|---|---|---|
| **Transfer characteristics** | | |
| Changing interval | | 5 ms (Internal processing time) |
| Time delay before availability | | ≤ 400 ms |
| Measuring error | | 0 ... 40000 Hz: ≤ ±0,10%<br>Display: ±1 digit |
| Timer function | | ON-delay, OFF-delay, one shot, pulse extension |
| Time | | 0 ... 999.9 s ; mode of operation reversible |
| **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<br>For use in the switch cabinet/switch cabinet module |
| Mounting | | snap-on to 35 mm standard rail or screw fixing |

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## Connection




## Assembly




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## 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 **10 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**.

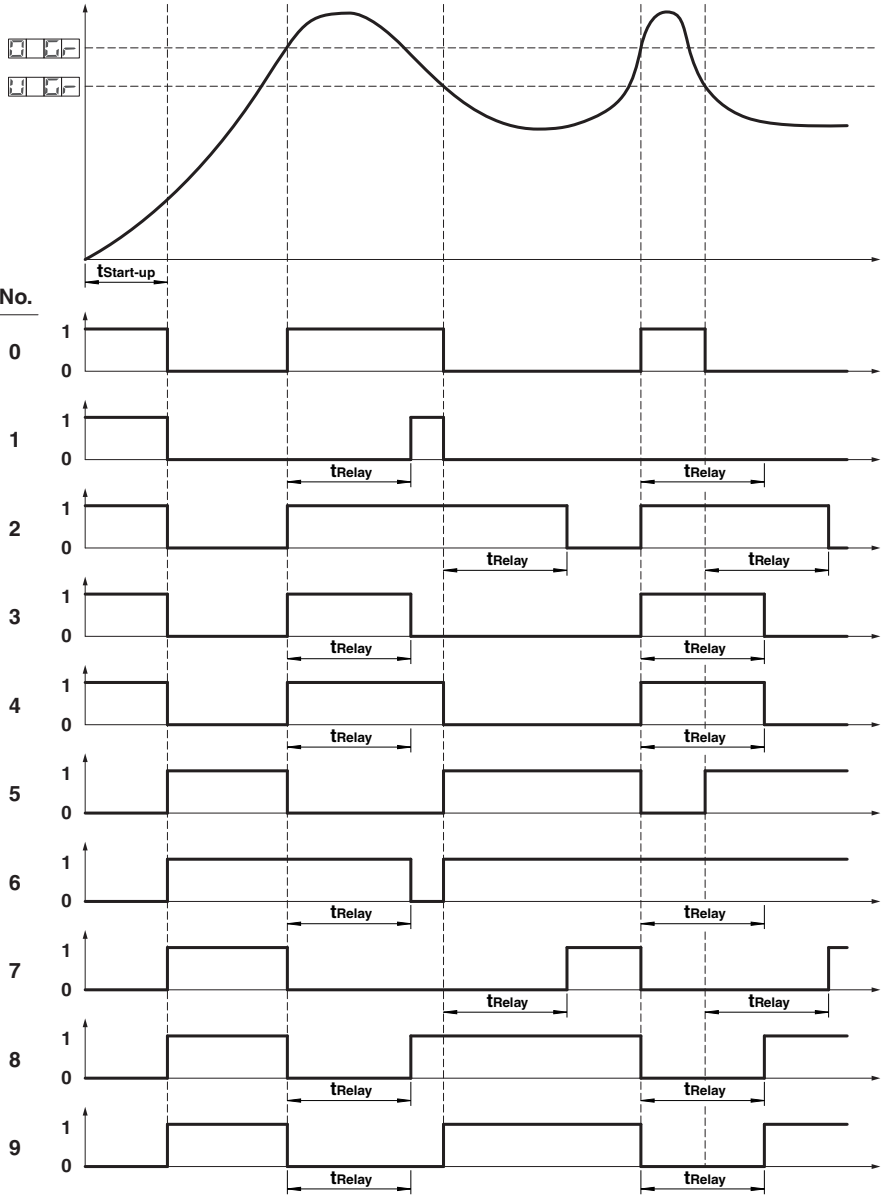
All current **two, three and four-wire proximity switches** and incremental **encoders** can be accepted as the signal sensor.In addition, two terminals are reserved for the connection of **proximity switches in accordance with DIN 19234 (NAMUR)**.

### 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

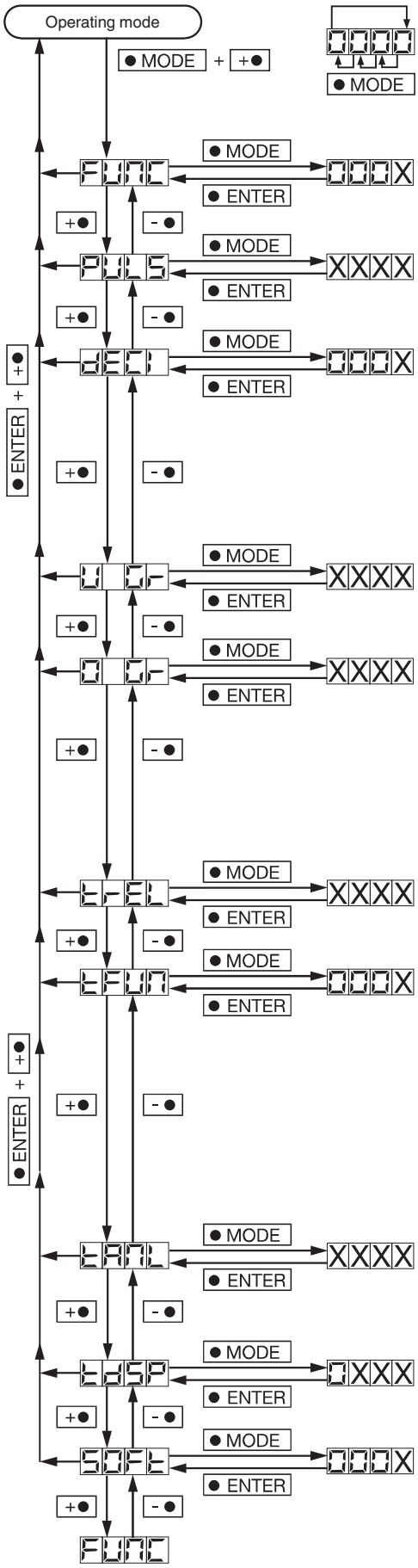
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| Function | No. |
|---|---|
| No timer function | 0 |
| ON delay | 1 |
| OFF delay | 2 |
| Defined ON time | 3 |
| Pulse lengthening | 4 |
| No timer function, inverted | 5 |
| ON delay, inverted | 6 |
| OFF delay, inverted | 7 |
| Defined ON time, inverted | 8 |
| Pulse lengthening, inverted | 9 |

## Operating principle

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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 (will be ignored for frequency 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

| X | Frequency range in Hz | Rotational speed in rpm |
|---|---|---|
| 0000 | 0 ... 9999 | |
| 000.1 | 0.0 ... 999.9 | |
| 00.02 | 0.0 ... 99.99 | |
| 0.003 | 0.0 ... 9.999 | — |

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

Upper hysteresis limit of switching point
0.001 ≤ XXXX ≤ 9999 (depending on the measuring range)
Preset at the factory: XXXX=200

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

| X | Function |
|---|---|
| 0 | No timer function |
| 1 | ON delay |
| 2 | OFF delay |
| 3 | Defined ON time |
| 4 | Pulse lengthening |
| 5 | No timer function, inverted |
| 6 | ON delay, inverted |
| 7 | OFF delay, inverted |
| 8 | Defined ON time, inverted |
| 9 | Pulse lengthening, inverted |

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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