



## Model number

KHU8-DW-1.D



## Features

- Rotational speed monitoring up to 5 kHz
- 1 pre-select value with relay output and LED indicator
- Multi-range power pack
- 2-, 3-, 4-wire and NAMUR sensors as well as rotary encoder connectable
- Start-up delay
- Auxiliary power output for sensors
- Connection via Power Rail
- Menu driven operation via 4 front keys
- Period measurement
- Indication in Hz or 1/min
- Password protection
- Output signal can be inverted
- Display devices can be set between 0.1 ... 2.5 sec.
- Protection degree IP20

## Technical data

### General specifications

Pre-selection	single
Programming	keypad-driven menu

### Supply

Rated voltage	24 V DC +15 %/-10 %; 115 V AC ±10 %; 230 V AC ±10 %
Power consumption	5 W / 5 VA

### Indicators/operating means

Type	7-segment LED display, red
Number of decades	4
Display value	digit height 7 mm, in Hz or 1/min
LED yellow	switching state
Decimal point	freely adjustable
Accuracy	± 1 digit

### Input

Control input	NAMUR: 1,2 mA ≤ x ≤ 2,1 mA (terminal 8, 9), max. 8.2 V and 6.5 mA, impedance 1.2 kOhm PNP sensor: 12 V (terminal 15), max. 30 V, impedance 2.8 kOhm NPN sensor: 12 V (terminal 14), impedance 3.3 kOhm
Trigger input	12 V (terminal 2), max. 30 V, impedance 2.8 kOhm
Pulse duration	20 μs

### Output

Relay	1 changeover contact
Sensor supply	24 V DC ± 10 %, 30 mA, short-circuit proof
Contact loading	250 V AC/2 A/ cosφ ≥ 0.7 40 V DC/2 A

Duration of momentary impulse	0 ... 999.9 s
Measuring error	up to 100 Hz < 0.1% up to 1 kHz < 0.3% up to 5 kHz < 1.5%

### Delay times

Time delay before availability	≤ 400 ms
Start-up override	0,1 ... 999,9 s (External trigger signal)
Relay	≤ 20 ms
Timer function	ON/OFF delay

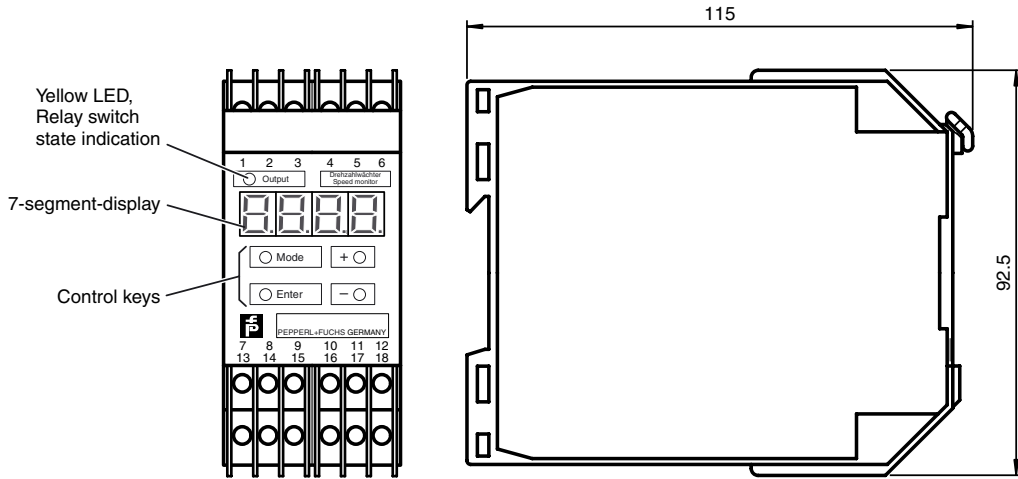
### Ambient conditions

Ambient temperature	-25 ... 70 °C (248 ... 343 K)
Storage temperature	-40 ... 85 °C (233 ... 358 K)

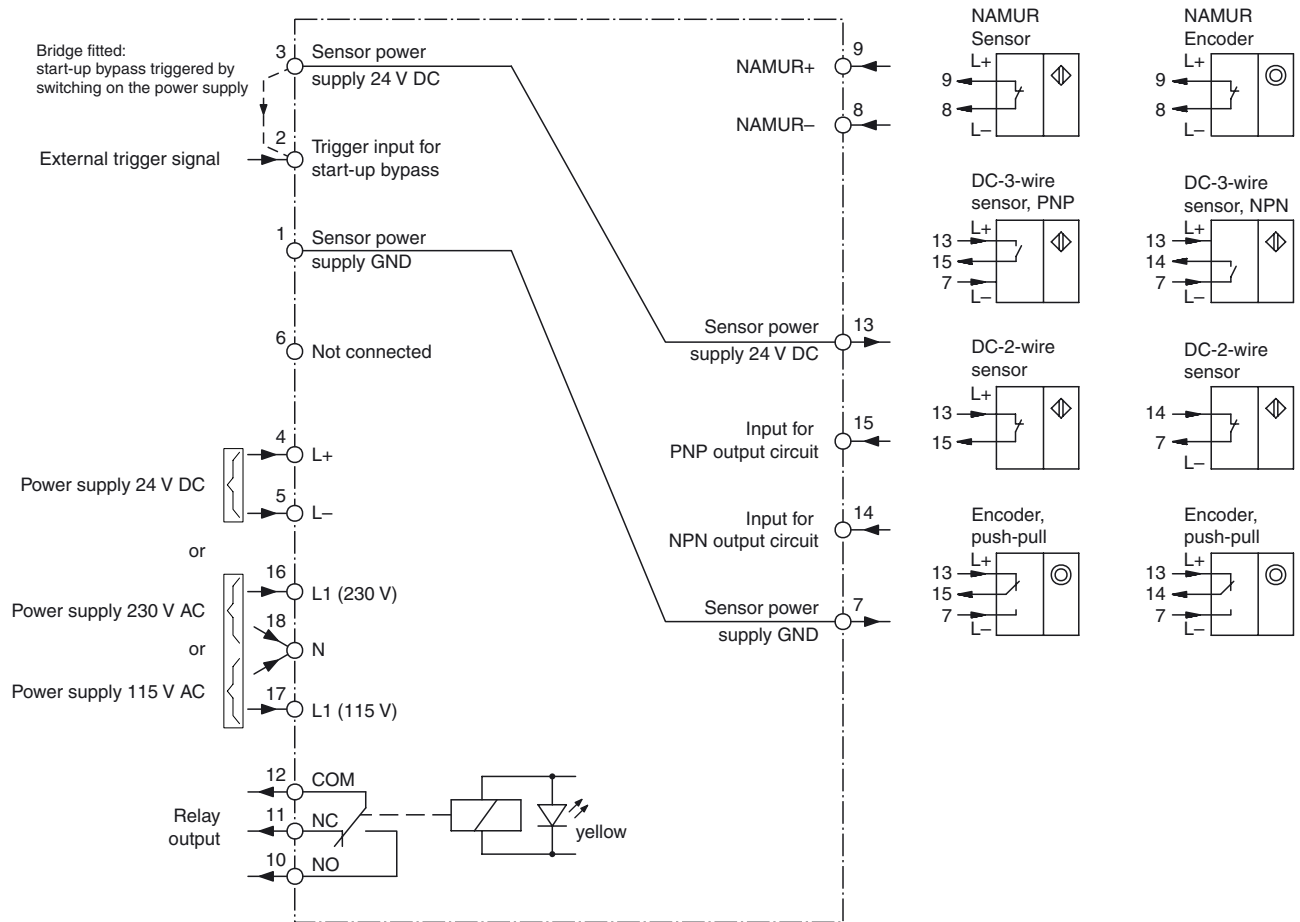
### Mechanical specifications

Lifetime	30 x 10 <sup>6</sup> switching cycles
Connection	self-opening apparatus connection terminals, max. core cross-section 0.34 ... 2.5 mm <sup>2</sup>
Dimensions	40 mm x 92.5 mm x 115 mm
Construction type	modular terminal housing in Makrolon, System KH
Mounting	snap-on to 35 mm standard rail or screw fixing

Indicating / Operating means / Dimensions



Electrical connection



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## Notes

### Device description

The KHU8-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 microcontroller.

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 **1/min**. 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 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.

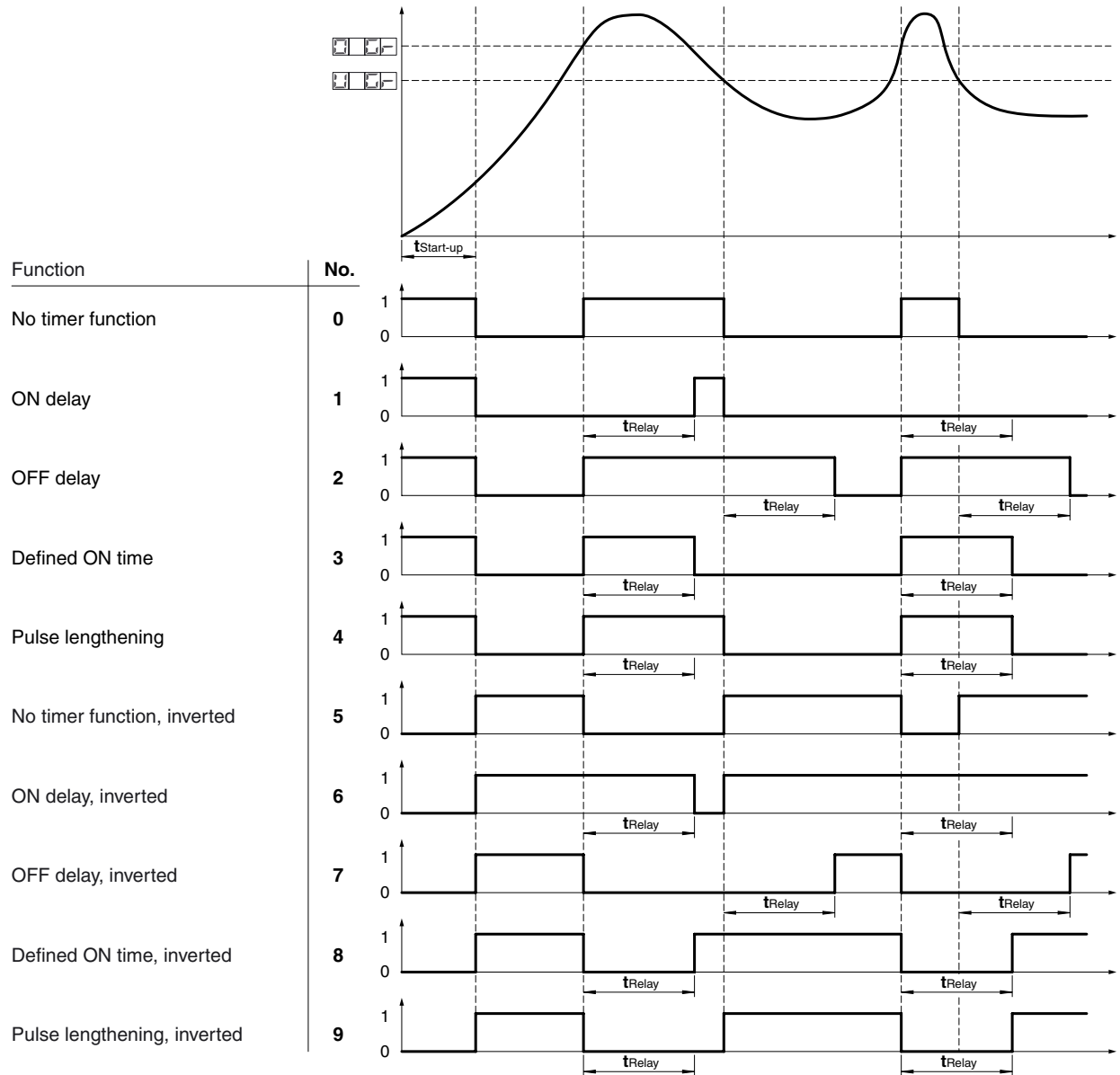
The speed monitor can be supplied with **115 V AC, 230 V AC or by a 24 V DC** supply and when connected to an alternating voltage it provides a **24 V DC source to supply the signal sensor**.

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)**.

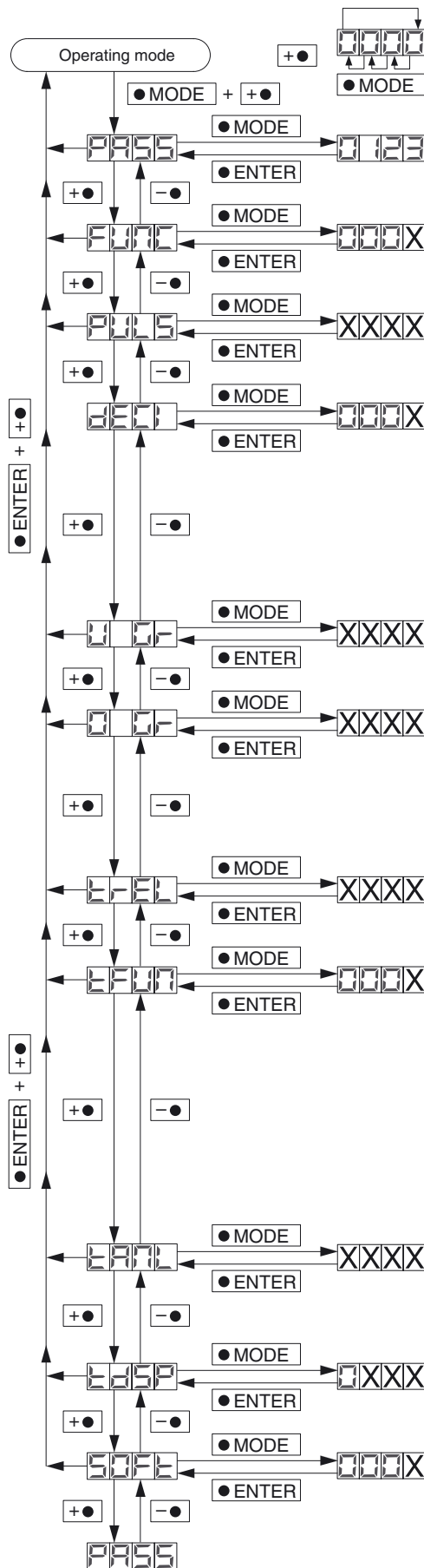
### Terminal assignment

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 GND
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 +24 V DC
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



Password protection not activated.  
Password may not be edited.

X=0: frequency measurement 0.001 Hz...5000 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)  
 $1 \leq XXXX \leq 1200$   
Preset at the factory: XXXX=1

Measuring and display range  
Frequency measurement:  $0 \leq X \leq 3$   
Rotational speed measurement:  $0 \leq X \leq 2$   
Preset at the factory: X=1

X	Frequency range in Hz	Rotational speed in rpm
0000	0 ... 5000	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  
 $0 \leq XXXX \leq 9998$  (depending on the measuring range)  
Preset at the factory: XXXX=1

Upper hysteresis limit of switching point  
 $0.001 \leq XXXX \leq 9999$  (depending on the measuring range)  
Preset at the factory: XXXX=2

Period for the timer function of switching relay  
 $0.1 \text{ s} \leq XXX.X \leq 999.9 \text{ s}$   
Preset at the factory: XXX.X=1.0 s

Timer function of switching relay  
Preset at the factory: X=1

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  
 $0.1 \text{ s} \leq XXX.X \leq 999.9 \text{ s}$   
Preset at the factory: XXX.X=3.0 s

Display rate  
 $0.01 \text{ s} \leq XX.X \leq 2.5 \text{ s}$   
Preset at the factory: XX.X=0.33 s

The number of the software version can be read only.