

Ultrasonic sensor UB500-18GM75-E4-V15

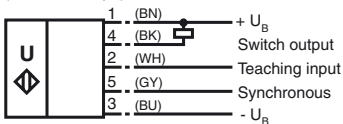


Features

- Switch output
- 5 different output functions can be set
- Selectable sound lobe width
- TEACH-IN input
- Synchronisation options
- Deactivation option
- Temperature compensation
- Very small unusable area

Electrical connection

Standard symbol/Connections:
(version E4, npn)

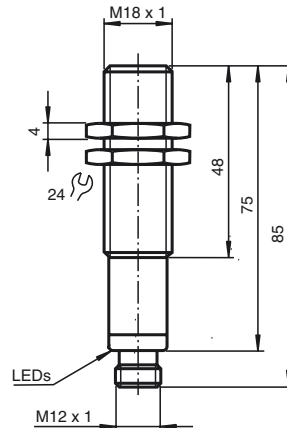


Core colours in accordance with EN 60947-5-2.

Connector V15



Dimensions



Technical data



General specifications

| | |
|-----------------------|-----------------|
| Sensing range | 30 ... 500 mm |
| Adjustment range | 50 ... 500 mm |
| Unusable area | 0 ... 30 mm |
| Standard target plate | 100 mm x 100 mm |
| Transducer frequency | approx. 380 kHz |
| Response delay | approx. 50 ms |

Indicators/operating means

| | |
|------------|--|
| LED yellow | indication of the switching state flashing: TEACH-IN function object detected |
| LED red | "Error", object uncertain in TEACH-IN function: No object detected |

Electrical specifications

| | |
|---------------------------------------|---|
| Operating voltage | 10 ... 30 V DC, ripple 10 % _{SS} |
| No-load supply current I ₀ | ≤ 50 mA |

Input/Output

| | |
|-----------------|--|
| Synchronisation | 1 synchronous input, bi-directional 0-level: -U _B ...+1 V 1-level: +4 V...+U _B input impedance: > 12 kΩ synchronisation pulse: ≥ 100 μs, synchronisation interpulse period: ≥ 2 ms |
|-----------------|--|

| | |
|---------------------------|----------------------------------|
| Synchronisation frequency | ≤ 95 Hz |
| Common mode operation | ≤ 95/n Hz, n = number of sensors |

Input

| | |
|------------|---|
| Input type | 1 TEACH-IN input, operating range 1: -U _B ... +1 V, operating range 2: +4 V ... +U _B input impedance: > 4.7 kΩ; TEACH-IN pulse: ≥ 1 s |
|------------|---|

Output

| | |
|--|--|
| Output type | 1 switch output E4, npn NO/NC, parameterisable |
| Repeat accuracy | ≤ 1 % |
| Rated operational current I _e | 200 mA, short-circuit/overload protected |
| Voltage drop U _d | ≤ 3 V |
| Switching frequency f | max. 8 Hz |
| Range hysteresis H | 1 % of the set operating distance |
| Temperature influence | ± 1,5 % of full-scale value |

Standard conformity

| | |
|-----------|--------------|
| Standards | EN 60947-5-2 |
|-----------|--------------|

Ambient conditions

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

Mechanical specifications

| | |
|-------------------|---|
| Protection degree | IP65 |
| Connection | connector V15 (M12 x 1), 5 pin |
| Material | |
| Housing | brass, nickel-plated |
| Transducer | epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT |
| Mass | 60 g |

Synchronisation

The sensor features a synchronisation input for the suppression of mutual interference. If this input is not used, the sensor will operate using an internally generated clock rate. The synchronisation of multiple sensors can be realised as follows:

External synchronisation

The sensor can be synchronised by the external application of a square wave voltage. A synchronisation pulse at the synchronisation input starts a measuring cycle. The pulse must have a duration greater than 100 µs. The measuring cycle starts with the falling edge of a synchronisation pulse. A low level > 1 s or an open synchronisation input will result in the normal operation of the sensor. A high level at the synchronisation input disables the sensor.

Two operating modes are available

1. Multiple sensors can be controlled by the same synchronisation signal. The sensors are synchronised.
2. The synchronisation pulses are sent cyclically to individual sensors. The sensors operate in multiplex mode.

Internal synchronisation

The synchronisation connections of up to 5 sensors capable of internal synchronisation are connected to one another. When power is applied, these sensors will operate in multiplex mode. The response delay increases according to the number of sensors to be synchronised. Synchronisation cannot be performed during TEACH-IN and vice versa. The sensors must be operated in an unsynchronised manner to teach the switching point.

Note:

If the option for synchronisation is not used, the synchronisation input has to be connected to ground (0V) or the sensor has to be operated via a V1 cable connector (4-pin).

Adjusting the switching points

The ultrasonic sensor features a switch output with two teachable switching points. These are set by applying the supply voltage $-U_B$ or $+U_B$ to the TEACH-IN input. The supply voltage must be applied to the TEACH-IN input for at least 1 s. LEDs indicate whether the sensor has recognised the target during the TEACH-IN procedure. Switching point A1 is taught with $-U_B$, A2 with $+U_B$.

Five different output functions can be set

1. Window mode, normally-open function
2. Window mode, normally-closed function
3. One switch point, normally-open function
4. One switch point, normally-closed function
5. Detection of object presence

TEACH-IN window mode, normally-open function

- Set target to near switching point
- TEACH-IN switching point A1 with $-U_B$
- Set target to far switching point
- TEACH-IN switching point A2 with $+U_B$

TEACH-IN window mode, normally-closed function

- Set target to near switching point
- TEACH-IN switching point A2 with $+U_B$
- Set target to far switching point
- TEACH-IN switching point A1 with $-U_B$

TEACH-IN switching point, normally-open function

- Set target to near switching point
- TEACH-IN switching point A2 with $+U_B$
- Cover sensor with hand or remove all objects from sensing range
- TEACH-IN switching point A1 with $-U_B$

TEACH-IN switching point, normally-closed function

- Set target to near switching point
- TEACH-IN switching point A1 with $-U_B$
- Cover sensor with hand or remove all objects from sensing range
- TEACH-IN switching point A2 with $+U_B$

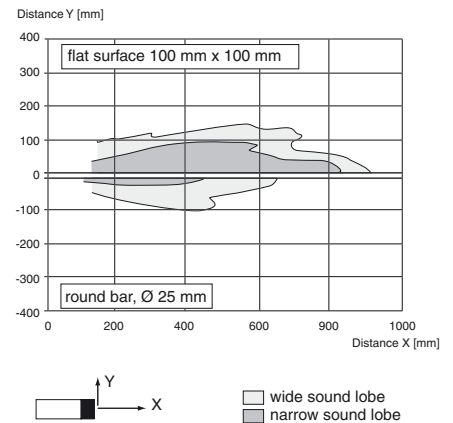
TEACH-IN detection of object presence

- Cover sensor with hand or remove all objects from sensing range

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Characteristic curves/additional information

Characteristic response curve



Programmed switching output function

1. Window mode, normally open function
A1 < A2:
2. Window mode, normally closed function
A2 < A1:
3. One switch point, normally open function
A1 -> ∞:
4. One switch point, normally closed function
A2 -> ∞:
5. A1 -> ∞, A2 -> ∞: Detection of object presence
Object detected: Switch output closed
No object detected: Switch output open

Accessories

Programming device

UB-PROG2

Mounting aids/fixing flanges

OMH-04

BF 18

BF 18F

BF 5-30

Sound deflector

UVW90-K18

Cable sockets^{*)}

V15-G-2M-PVC

V15-W-2M-PUR

^{*)} For additional cable sockets see section „Accessories“.

- TEACH-IN switching point A1 with $-U_B$
- TEACH-IN switching point A2 with $+U_B$

Default setting of switching points

A1 = unusable area

A2 = nominal sensing range

LED Displays

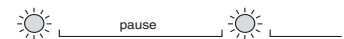
| Displays in dependence on operating mode | Red LED | Yellow LED |
|--|---------|-----------------|
| TEACH-IN switching point: | | |
| Object detected | off | flashes |
| No object detected | flashes | off |
| Object uncertain (TEACH-IN invalid) | on | off |
| Normal operation | off | switching state |
| Fault | on | previous state |

Adjusting the sound cone characteristics:

The ultrasonic sensor enables two different shapes of the sound cone, a wide angle sound cone and a small angle sound cone.

1. Small angle sound cone

- switch off the power supply
- connect the Teach-input wire to $-U_B$
- switch on the power supply
- the red LED flashes once with a pause before the next.
- yellow LED: permanently on: indicates the presence of an object or disturbing object within the sensing range
- disconnect the Teach-input wire from $-U_B$ and the changing is saved



2. Wide angle sound cone

- switch off the power supply
- connect the Teach-input wire with $+U_B$
- switch on the power supply
- the red LED double-flashes with a long pause before the next.
- yellow LED: permanently on: indicates an object or disturbing object within the sensing range
- disconnect the Teach-input wire from $+U_B$ and the changing is saved



Installation conditions

If the sensor is installed at places, where the environment temperature can fall below 0 °C, for the sensors fixation, one of the mounting flanges BF18, BF18-F or BF 5-30 must be used.

In case of direct mounting of the sensor in a through hole using the steel nuts, it has to be fixed at the middle of the housing thread. If a fixation at the front end of the threaded housing is required, plastic nuts with centering ring (accessories) must be used.