## Technical data

### General specifications

| | |
|---|---|
| Sensing range | 70 ... 1000 mm |
| Adjustment range | 90 ... 1000 mm |
| Unusable area | 0 ... 70 mm |
| Standard target plate | 100 mm x 100 mm |
| Transducer frequency | approx. 255 kHz |
| Response delay | approx. 125 ms |

### Indicators/operating means

| | |
|---|---|
| LED yellow | solid yellow: object in the evaluation range<br>yellow, flashing: program function, object detected |
| LED red | solid red: Error<br>red, flashing: program function, object not detected |

### Electrical specifications

| | |
|---|---|
| Operating voltage $U_B$ | 15 ... 30 V DC , ripple 10 %$_{SS}$ |
| No-load supply current $I_0$ | ≤ 50 mA |

### Input/Output

| | |
|---|---|
| Synchronization | 1 synchronous connection, bi-directional<br>0-level: $-U_B$...+1 V<br>1-level: +4 V...+$U_B$<br>input impedance: > 12 kΩ<br>synchronization pulse: ≥ 100 µs, synchronization interpulse period: ≥ 2 ms |
| Synchronization frequency | |
|   Common mode operation | ≤ 40 Hz |
|   Multiplex operation | ≤ 40 Hz /n, n = number of sensors |

### Input

| | |
|---|---|
| Input type | 1 program input<br>lower evaluation limit A1: $-U_B$ ... +1 V, upper evaluation limit A2: +4 V ... +$U_B$<br>input impedance: > 4.7 kΩ, pulse duration: ≥ 1 s |

### Output

| | |
|---|---|
| Output type | 1 analog output 0 ... 10 V |
| Resolution | 0.35 mm |
| Deviation of the characteristic curve | ± 1 % of full-scale value |
| Repeat accuracy | ± 0.1 % of full-scale value |
| Load impedance | > 1 kOhm |
| Temperature influence | ± 1.5 % of full-scale value |

### Ambient conditions

| | |
|---|---|
| Ambient temperature | -25 ... 70 °C (-13 ... 158 °F) |
| Storage temperature | -40 ... 85 °C (-40 ... 185 °F) |

### Mechanical specifications

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

### Compliance with standards and directives

| | |
|---|---|
| Standard conformity | |
|   Standards | EN 60947-5-2:2007<br>IEC 60947-5-2:2007<br>EN 60947-5-7:2003<br>IEC 60947-5-7:2003 |

### Approvals and certificates

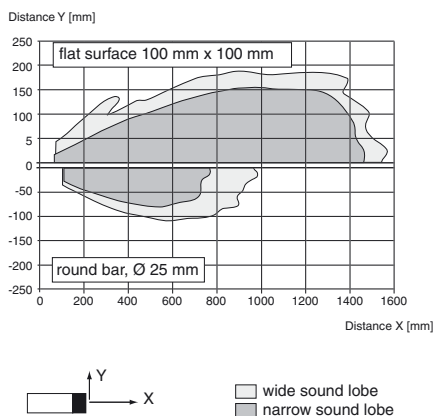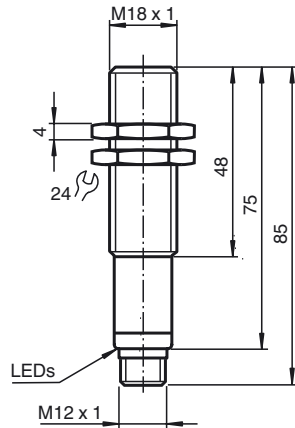| | |
|---|---|
| UL approval | cULus Listed, General Purpose |
| CSA approval | cCSAus Listed, General Purpose |

## Model Number

**UB1000-18GM75-U-V15**

Single head system

## Features

- **Analog output 0 ... 10 V**
- **Measuring window adjustable**
- **Selectable sound lobe width**
- **Program input**
- **Synchronization options**
- **Deactivation option**
- **Temperature compensation**
- **Very small unusable area**

## Diagrams

### Characteristic response curve



flat surface 100 mm x 100 mm
round bar, Ø 25 mm

Distance Y [mm]
Distance X [mm]

wide sound lobe
narrow sound lobe

## Dimensions

M18 x 1

4

48

75

85

24

LEDs

M12 x 1

## Electrical Connection

**Standard symbol/Connections:**
(version U)

| | | |
|---|---|---|
| 1 | (BN) | + U$_B$ |
| 2 | (WH) | Teaching input |
| 5 | (GY) | Sync. |
| 4 | (BK) | Analog output |
| 3 | (BU) | - U$_B$ |

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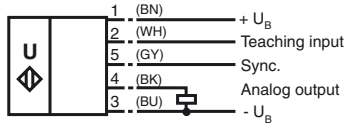
Core colours in accordance with EN 60947-5-2.

## Pinout

1
5
2
4
3
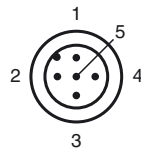
Wire colors in accordance with EN 60947-5-2

| | | |
|---|---|---|
| 1 | BN | (brown) |
| 2 | WH | (white) |
| 3 | BU | (blue) |
| 4 | BK | (black) |
| 5 | GY | (gray) |

## Additional Information

### Programmed analogue output function

Rising ramp
A1 < A2:

A1    A2    object range

Falling ramp
A2 < A1:

A2    A1
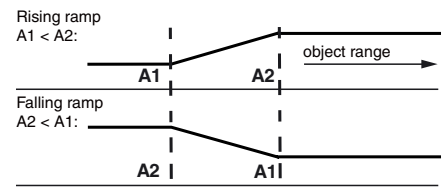
## Accessories

**UB-PROG2**
Programming unit

**OMH-04**
Mounting aid for round steel ø 12 mm or
sheet 1.5 mm ... 3 mm

**BF 18**
Mounting flange, 18 mm

**BF 18-F**
Mounting flange with dead stop, 18 mm

**BF 5-30**
Universal mounting bracket for cylindrical
sensors with a diameter of 5 ... 30 mm

**UVW90-K18**
Ultrasonic -deflector

**V15-G-2M-PVC**
Cable socket, M12, 5-pin, PVC cable

**V15-W-2M-PUR**
Cable socket, M12, 5-pin, PUR cable

**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 evaluation limits.

**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 evaluation limits**

The ultrasonic sensor features an analogue output with two teachable evaluation limits. 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. The lower evaluation limit A1 is taught with $-U_B$, A2 with $+U_B$.

Two different output functions can be set:

1. Analogue value increases with rising distance to object (rising ramp)
2. Analogue value falls with rising distance to object (falling ramp)

☞ Evaluation limits may only be specified within the first 5 minutes after Power on. To modify the evaluation limits later, the user may specify the desired values only after a new Power On.

**TEACH-IN rising ramp (A2 > A1)**
- Position object at lower evaluation limit
- TEACH-IN lower limit A1 with $-U_B$
- Position object at upper evaluation limit
- TEACH-IN upper limit A2 with $+U_B$

**TEACH-IN falling ramp (A1 > A2):**
- Position object at lower evaluation limit
- TEACH-IN lower limit A2 with $+U_B$
- Position object at upper evaluation limit
- TEACH-IN upper limit A1 with $-U_B$

**Default setting**

A1:                    unusable area
A2:                    nominal sensing range
Mode of operation:     rising ramp

**LED Displays**

| Displays in dependence on operating mode | Red LED | Yellow LED |
|---|---|---|
| **TEACH-IN evaluation limit** | | |
| Object detected | off | flashes |
| No object detected | flashes | off |
| Object uncertain (TEACH-IN invalid) | on | off |
| Normal mode (evaluation range) | off | on |
| 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
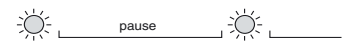
**2. Wide angle sound cone**
- switch off the power supply
- connect the Teach-input wire with $+U_B$
- switch on the power supply
- the red LED double-flashes with a long pause before the next.

-    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.

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