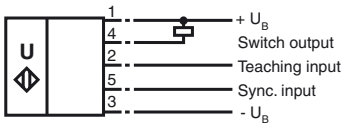
## Ultrasonic sensor
# UB4000-30GM-E0-V15

## Features

- Switch output
- 5 different output functions can be set
- TEACH-IN input
- Synchronisation options
- Deactivation option

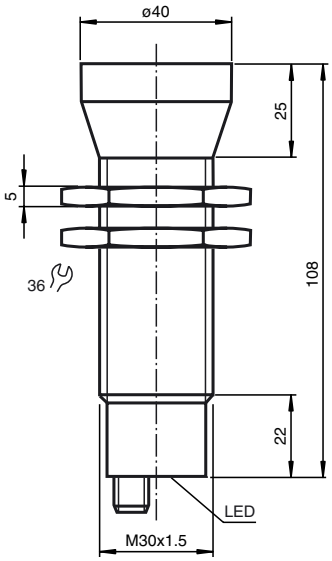
## Electrical connection

**Standard symbol/Connections:**
(version E0, npn)




## Connector V15


## Dimensions




## Technical data

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|---|---|
| **General specifications** | |
| Sensing range | 500 ... 4000 mm |
| Unusable area | 0 ... 500 mm |
| Standard target plate | 100 mm x 100 mm |
| Transducer frequency | approx. 85 kHz |
| Response delay | approx. 280 ms |
| **Indicators/operating means** | |
| LED green | "Power on", TEACH-IN function object detected |
| LED yellow | indication of the switching state, TEACH-IN function-no object detected |
| LED red | "Error", object uncertain |
| **Electrical specifications** | |
| Operating voltage | 20 ... 30 V DC , ripple 10 $\%_{SS}$ |
| No-load supply current $I_0$ | ≤ 60 mA |
| **Input** | |
| Input type | 1 TEACH-IN input,<br>operating distance 1: $-U_B$ ... ($-U_B$ +2 V), operating distance 2: ($+U_B$ -2 V) ... $+U_B$ 1 synchronous input<br>level 0: $-U_B$ ... ($-U_B$ + 1 V), level 1: ($-U_B$ + 5 V) ... $+U_B$<br>Input impedance 27 kOhm |
| Pulse length | Synchronisation pulse: ≥ 100 µs<br>Synchronisation pulse pause: ≥ 100 µs |
| Synchronisation frequency | |
| Common mode operation | ≤ 20 Hz |
| Multiplex operation | ≤ 20/n Hz , n = number of sensors |
| **Output** | |
| Output type | 1 switch output E0/E1, npn, normally open/closed, programmable |
| Repeat accuracy | ≤ 1 % |
| Rated operational current $I_e$ | 200 mA , short-circuit/overload protected |
| Voltage drop $U_d$ | ≤ 3 V |
| Switching frequency f | max. 1.7 Hz |
| Range hysteresis H | ≤ 1 % of the set operating distance |
| Temperature influence | 0.17 % / K |
| **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, plastic components PBT |
| Transducer | epoxy resin/hollow glass sphere mixture; polyurethane foam |
| Mass | 180 g |

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## Notes

## Model number

**UB4000-30GM-E0-V15**

### Function

**Synchronization**
The sensor features a synchronization input for the suppression of mutual interference. It can be synchronized by applying a square wave voltage. The falling edge of a synchronization pulse at the synchronization input starts a measuring cycle. A low level > 1 s or an open synchronization input will result in the non-synchronized normal operation of the sensor. A high level at the synchronization input disables the sensor. Synchronization cannot be performed during TEACH-IN and vice versa.

Two operating modes are possible:

1. The sync. inputs of 2 ... 5 Sensors are connected with each other. The sensors synchronize themselves and operate cyclically (multiplex mode).
2. Multiple sensors can be controlled by the same synchronization signal. The sensors are synchronized.
3. The synchronization pulses are sent cyclically to individual sensors. The sensors operate in multiplex mode.

In case of synchronized operation, the response time of the sensor increases due to a longer measuring cycle time caused by synchronization.

**Note:**

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

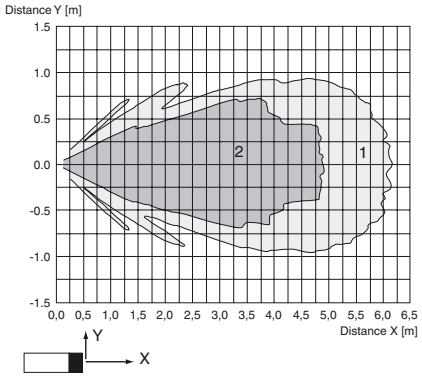
**Setting the switching points**
The ultrasonic sensor features a switch output with two teachable switching points. These are set by applying the supply voltage -UB or +UB to the TEACH-IN input. The supply voltage must be applied to the TEACH-IN input for at least 1 s. LEDs indicate whether the sensor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

Five different output functions can be set:

| Function | TEACH-IN procedure |
|---|---|
| Window mode, close function | - Set object to near switching point<br>- Teach switching point A1 with -UB<br>- Set object to far switching point<br>- Teach switching point A2 with +UB |
| Window mode, open function | - Set object to near switching point<br>- Teach switching point A2 with +UB<br>- Set object to far switching point<br>- Teach switching point A1 with -UB |
| 1 switching point, close function | - Set object to near switching point<br>- Teach switching point A2 with +UB<br>- Cover sensor or remove all objects from sensing range<br>- Teach switching point A1 with -UB |
| 1 switching point, open function | - Set object to near switching point<br>- Teach switching point A1 with -UB<br>- Cover sensor or remove all objects from sensing range<br>- Teach switching point A2 with +UB |
| Detection of object presence | - Cover sensor or remove all objects from sensing range<br>- Teach switching point A1 with -UB<br>- Teach switching point A2 with +UB |

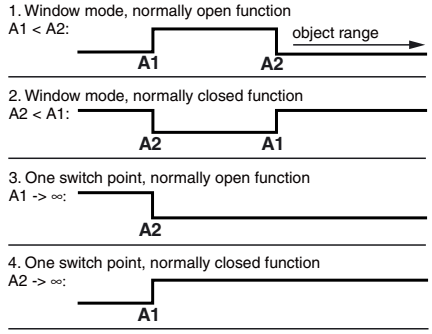
## Characteristic curves/additional information

### Characteristic response curve



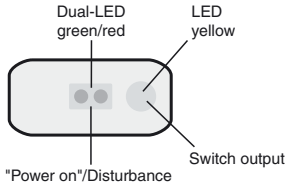

Curve 1: flat surface 100 mm x 100 mm
Curve 2: round bar, Ø 25 mm

### Programmed switching output function




5. A1 -> ∞, A2 -> ∞: Detection of object presence
Object detected: Switch output closed
No object detected: Switch output open

### LED-Window



Default setting of switching points: A1 = blind range, A2 = nominal distance

| Displays in dependence on operating mode | Green LED | Red LED | Yellow LED |
|---|---|---|---|
| Teach switching point<br>Object detected<br>No object detected<br>Object uncertain (TEACH-IN invalid) | <br>Flashing<br>Flashing<br>Off | <br>Off<br>Off<br>Flashing | <br>Off<br>On<br>Off |
| Normal operation | On | Off | Switching state |
| Interference (e.g. compressed air) | Off | Flashing | Previous state |