

## Ultrasonic sensor

## UB1500-30GM-U-V1

### Technical data

#### General Specifications

|                       |               |
|-----------------------|---------------|
| Sensing distance      | 65...1500mm   |
| Adjustment range      | 70...1500mm   |
| Unusable area         | 0...65mm      |
| Standard target plate | 100mm×100mm   |
| Transducer frequency  | About 175 kHz |
| Response delay        | About 65ms    |

#### Indicators/Operating means

|            |  |
|------------|--|
| LED blue   | Power on   |
| LED yellow | indication of the switching state<br>Flashing:program function object detected |
| LED red    | permanently red: Error Red,flashing:program function,object not detected       |

#### Electrical specifications

|                         |                        |
|-------------------------|------------------------|
| Operating voltage $U_B$ | 10...30VDC,ripple10%ss |
| No-load supply current  | $\leq 45\text{mA}$     |

#### Output

|             |                             |
|-------------|-----------------------------|
| Output type | 1 analogue output 0...10V   |
| Resolution  | 0.11mm at max.sensing range |

Deviation of the characteristic curve  $\pm 1\%$  of full-scale value

Repeat accuracy  $\pm 0.1\%$  of full-scale value

Load impedance  $> 1\text{k Ohm}$

Temperature influence  $\pm 1.5\%$  of full-scale value

#### Ambient conditions

Ambient temperature  $-25...70^\circ\text{C}$

Storage temperature  $-40...85^\circ\text{C}$

#### Mechanical specifications

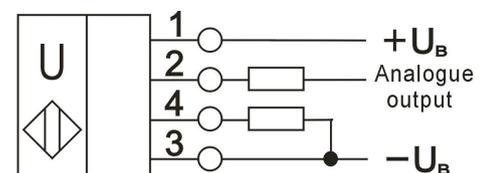
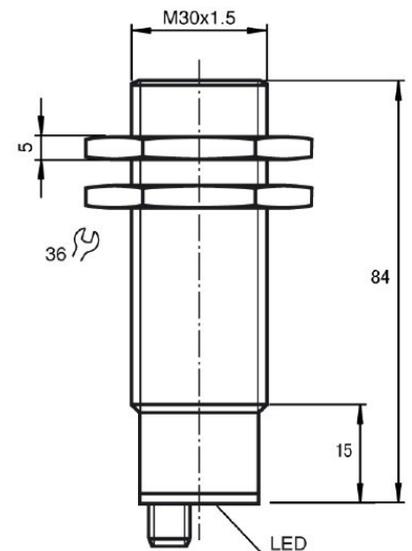
|                  |                       |
|------------------|-----------------------|
| Protection grade | IP67                  |
| Connection       | Connector M12x1,4-PIN |

#### Material

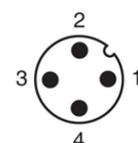
Housing brass,nickel-plated

Transducer epoxy resin/hollow glass sphere mixture;  
Polyurethane foam

Weight 60g



#### V1 Connector



**External synchronization**

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 synchronization**

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<sub>B</sub> or +U<sub>B</sub> 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<sub>B</sub>, A2 with +U<sub>B</sub>.

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<sub>B</sub>
- Position object at upper evaluation limit
- TEACH-IN upper limit A2 with + U<sub>B</sub>

**TEACH-IN falling ramp (A1 > A2):**

- Position object at lower evaluation limit
- TEACH-IN lower limit A2 with + U<sub>B</sub>
- Position object at upper evaluation limit
- TEACH-IN upper limit A1 with - U<sub>B</sub>

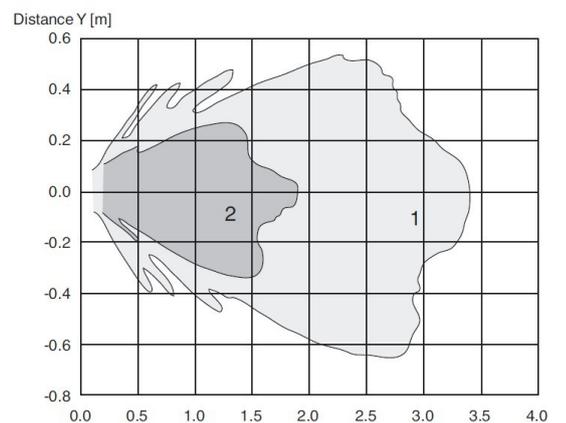
Default setting

A1: unusable area

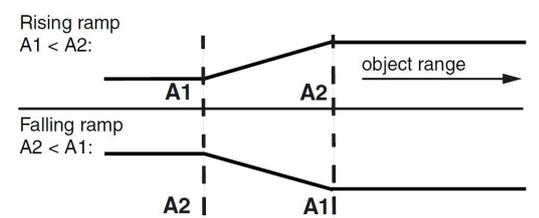
A2: nominal sensing range

Mode of operation: rising ramp

**Characteristic response curve**



**Programmed analogue output function**



**LED Displays**

| Displays in dependence on operating mode | Red LED | Yellow LED     |
|--|---------|----------------|
| <b>TEACH-IN evaluation limit</b>         |         |                |
| 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 the environment temperature fall below  $0^{\circ}\text{C}$ , It should do well on the protective measures. 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.