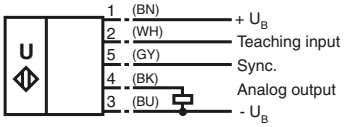
Ultrasonic sensor
UB500-18GM75-U-V15

Features

- Analogue output 0 V ... 10 V
- Measuring window adjustable
- Selectable sound lobe width
- TEACH-IN input
- Synchronisation options
- Deactivation option
- Temperature compensation
- Very small unusable area

Electrical connection

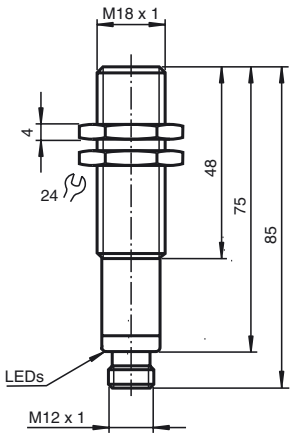
Standard symbol/Connections:
(version U)



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

Connector V15

Dimensions



Technical data

CE

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	permanently yellow: object in the evaluation range yellow, flashing: TEACH-IN function, object detected
LED red	permanently red: Error red, flashing: TEACH-IN function, object not detected
Electrical specifications	
Operating voltage	15 ... 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	
Common mode operation	≤ 95 Hz
Multiplex operation	≤ 95/n Hz, n = number of sensors
Input	
Input type	1 TEACH-IN input lower evaluation limit A1: -U_B ... +1 V, upper evaluation limit A2: +4 V ... +U_B input impedance: > 4.7 kΩ, pulse duration: ≥ 1 s
Output	
Output type	1 analogue output 0 ... 10 V
Resolution	0,11 mm at max. sensing range
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
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; polyurethane foam
Mass	60 g

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Notes

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)

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

Model number

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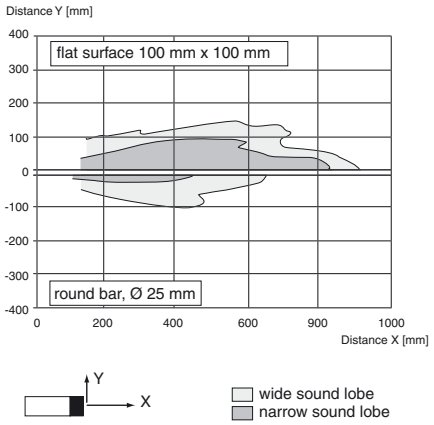
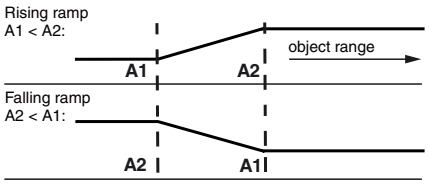
Characteristic curves/additional information

Characteristic response curve



Programmed analogue output function



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“.

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.