

Ultrasonic sensor UB500-F54-E4-V15

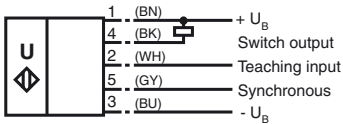


Features

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

Electrical connection

Standard symbol/Connections:
(version E4, npn)

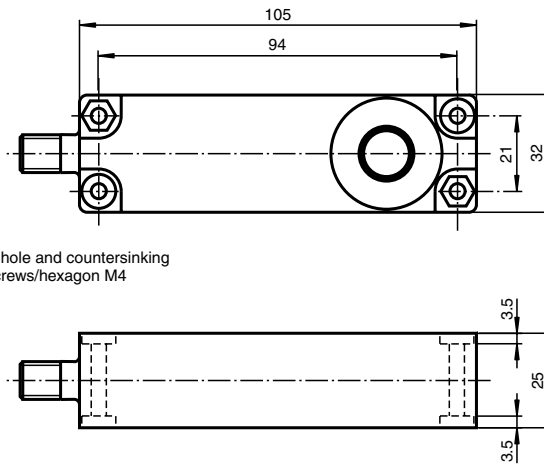


Core colours in accordance with EN 60947-5-2.

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	≤ 50 ms

Indicators/operating means

LED green	permanently green: monitoring system green flashing: TEACH-IN function indication of the switching state
LED yellow	flashing: TEACH-IN function object detected
LED red	flashing: normal mode: error TEACH-IN function: no object detected permanently: TEACH-IN mode, object uncertain

Electrical specifications

Operating voltage	10 ... 30 V DC, ripple 10 % _{SS}
No-load supply current I ₀	≤ 55 mA

Input/Output

Synchronisation	1 synchronous input 0 level: -U _B ...+1 V 1 level: +4 V...+U _B input impedance: > 12 KOhm synchronisation pulse: 0.1 ... 8 ms
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Synchronisation frequency	≤ 100 Hz
Common mode operation	≤ 100 / n Hz, n = number of sensors

Input

Input type	1 TEACH-IN input, switching point A1: -U _B ... +1 V, switching point A2: +4 V ... +U _B input impedance: > 4.7 kΩ, TEACH-IN pulse: ≥ 1 s
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Output

Output type	1 switch output E4, npn NO/NC
Repeat accuracy	≤ 1 % of full-scale value
Rated operational current I ₀	200 mA, short-circuit/overload protected
Voltage drop U _d	≤ 3 V
Switching frequency f	max. 10 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
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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	ABS
Housing	epoxy resin/hollow glass sphere mixture; polyurethane foam
Transducer	100 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 μ s. 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 of 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 switching point, normally-open function
4. One switching 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 one 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 one 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 $+U_B$

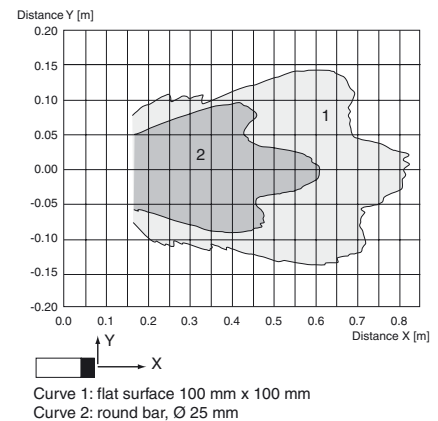
TEACH-IN detection of object presence

- 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 unit

UB-PROG2

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	Green LED
TEACH-IN switching point:			
Object detected	off	flashes	flashes
No object detected	flashes	off	flashes
Object uncertain (TEACH-IN invalid)	on	off	flashes
Normal operation	off	switching state	on
Fault	flashes	previous state	off