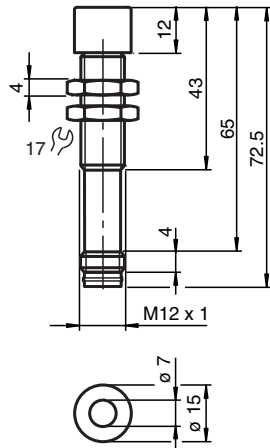# Ultrasonic sensor

# UBC250-12GM-E5-V1

- High chemical resistance through PTFE coated transducer surface
- Stainless Steel enclosure
- 1 switch output
- Temperature compensation
- Programmable output functions
- Program input

## Dimensions



## Technical Data

### General specifications

| | |
|---|---|
| Sensing range | 30 ... 250 mm |
| Adjustment range | 50 ... 250 mm |
| Dead band | 0 ... 30 mm |
| Standard target plate | 100 mm x 100 mm |
| Transducer frequency | approx. 310 kHz |
| Response delay | approx. 50 ms |

### Electrical specifications

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

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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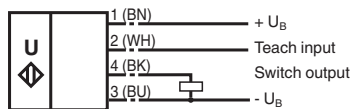Singapore: +65 6779 9091
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## Technical Data

| Input | | |
|---|---|---|
| Input type | | 1 program 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 switch output PNP Normally open/closed , programmable |
| Rated operating current | $I_e$ | 100 mA , short-circuit/overload protected |
| Default setting | | Switch point A1: 50 mm Switch point A2: 250 mm |
| Voltage drop | $U_d$ | ≤ 3 V |
| Repeat accuracy | | ≤ 1 % |
| Switching frequency | f | ≤ 8 Hz |
| Range hysteresis | H | 1 % of the set operating distance |
| Temperature influence | | ± 1.5 % of full-scale value |

| Compliance with standards and directives | | |
|---|---|---|
| Standard conformity | | |
| Standards | | EN IEC 60947-5-2:2020 |
| | | IEC 60947-5-2:2019 |

| Approvals and certificates | | |
|---|---|---|
| UL approval | | cULus Listed, Class 2 Power Source |
| CCC approval | | CCC approval / marking not required for products rated ≤36 V |

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

| Mechanical specifications | | |
|---|---|---|
| Connection type | | Connector plug M12 x 1 , 4-pin |
| Housing diameter | | 12 mm |
| Degree of protection | | IP68 / IP69K |
| Material | | |
| Housing | | Stainless steel 1.4404 / AISI 316L |
| | | O-ring for cover seal: Viton |
| Transducer | | PTFE (diaphragm surface) |
| Mass | | 35 g |

## Connection

**Standard symbol/Connections:**
(version E5, pnp)



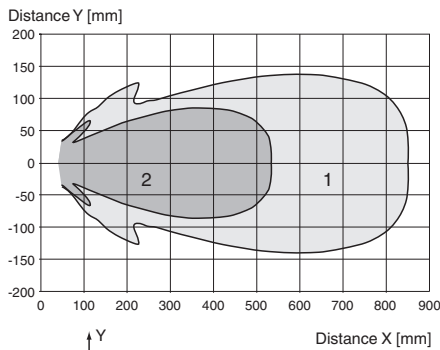Core colours in accordance with EN 60947-5-2.

## Connection Assignment

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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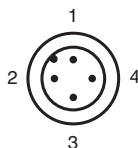
## Connection Assignment

Wire colors in accordance with EN 60947-5-2

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

## Characteristic Curve

### Characteristic response curve



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

### Programmable output modes

1. Window mode, normally open mode
   A1 < A2:

2. Window mode, normally closed mode
   A2 < A1:

3. One switch point, normally open mode
   A1 -> ∞:

4. One switch point, normally closed mode
   A2 -> ∞:

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

## Accessories

| | UB-PROG2 | Programming unit |
|---|----------|------------------|
| | BF 5-30 | Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm |
| | BF 12 | Mounting flange, 12 mm |
| | V1-G-2M-PVC | Female cordset single-ended M12 straight A-coded, 4-pin, PVC cable grey |

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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## Accessories

| | V1-W-2M-PUR | Female cordset single-ended M12 angled A-coded, 4-pin, PUR cable grey |
|---|---|---|
| | UVW90-M12 | Ultrasonic -deflector |
| | M12K-VE | Plastic nuts with centering ring for the vibration-free mounting of cylindrical sensors |

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## Additional Information

**Adjusting the 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. 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 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 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 objects presence**
- Cover sensor with hand or remove all objects from sensing range
- TEACH-IN switching point A1 with $-U_B$
- TEACH-IN switching point A2 with $+U_B$

**Default setting of switching points**

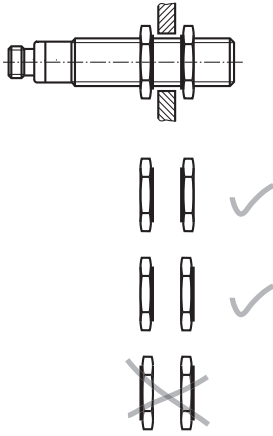A1 = blind range, A2 = nominal distance

## Additional Information

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 BF 12, BF 12-F or BF 5-30 must be used. In case of direct mounting of the sensor in a through hole, it has to be fixed at the middle of the housing thread.

## Installation Conditions

**Note**

If the sensor is used in an environment with strong electromagnetic interference, we recommend non-conductive mounting. For this, use the accompanying plastic nuts or the BF12 or BF12-F mounting flange.
Please observe proper application when using the accompanying plastic nuts. The hole for the sensor must be ≥ 14 mm.

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