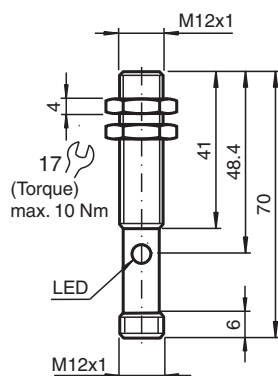# Ultrasonic sensor

# UB120-12GM-I-V1

- Extremely narrow projection cone
- Analog output 4 mA ... 20 mA
- Very small unusable area
- Measuring window adjustable
- Short response time

Single head system

CE  c(UL)us  UKCA

## Dimensions

M12x1

4

17 (Torque) max. 10 Nm

41

48.4

70

LED

6

M12x1

## Technical Data

### General specifications

| | |
|---|---|
| Sensing range | 15 ... 120 mm |
| Adjustment range | 20 ... 120 mm |
| Dead band | 0 ... 15 mm |
| Standard target plate | 10 mm x 10 mm |
| Transducer frequency | approx. 850 kHz |
| Response delay | approx. 27 ms |

### Indicators/operating means

| | |
|---|---|
| LED yellow | solid yellow: object in the evaluation range<br>yellow, flashing: program function, object detected |
| LED red | solid red: Error<br>red, flashing: program function, object not detected |

### Electrical specifications

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

### Input

| | |
|---|---|
| Input type | 1 program input<br>lower evaluation limit A1: -$U_B$ ... +1 V, upper evaluation limit A2: +4 V ... +$U_B$<br>input impedance: > 4.7 kΩ, pulse duration: ≥ 1 s |

### Output

| | |
|---|---|
| Output type | 1 analog output 4 ... 20 mA |

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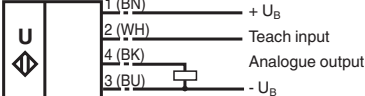
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## Technical Data

| | |
|---|---|
| Resolution | 0.17 mm |
| Deviation of the characteristic curve | ± 1 % of full-scale value |
| Repeat accuracy | ± 0.5 % of full-scale value |
| Load impedance | 0 ... 300 Ohm |
| Temperature influence | ± 1.5 % of full-scale value |
| **Compliance with standards and directives** | |
| Standard conformity | |
| Standards | EN IEC 60947-5-2:2020<br>IEC 60947-5-2:2019<br>EN 60947-5-7:2003<br>IEC 60947-5-7:2003 |
| **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 |
| Degree of protection | IP67 |
| Material | |
| Housing | brass, nickel-plated |
| Transducer | epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT |
| Mass | 25 g |
| Dimensions | |
| Length | 70 mm |
| Diameter | 12 mm |

## Connection Assignment

**Standard symbol/Connections:**
(version I)



1 (BN)    + $U_B$
2 (WH)    Teach input
4 (BK)    Analogue output
3 (BU)    - $U_B$

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

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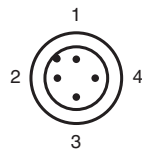
Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

## Connection Assignment

Wire colors in accordance with EN 60947-5-2

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

## 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 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.

## Characteristic Curve

### Characteristic response curve



Curve 1: flat surface 10 mm x 10 mm
Curve 2: round bar, Ø 8 mm
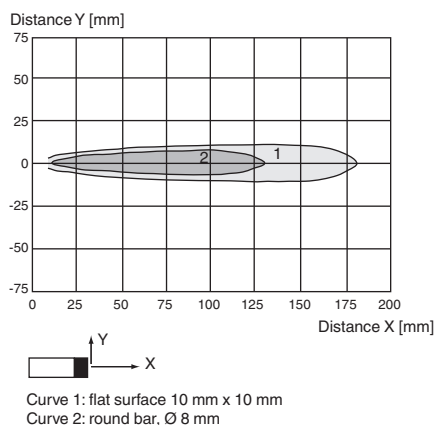
### Programming the analog output mode
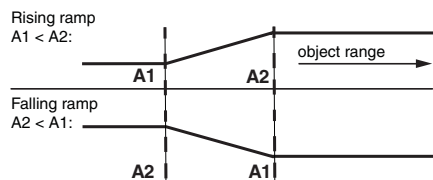


## Programming

The sensor features a programmable analog output with two programmable evaluation boundaries. Programming the evaluation boundaries and the operating mode is done 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 recognized the target during the programming procedure.

**Note**:
Evaluation boundaries may only be specified directly after Power on. A time lock secures the adjusted switching points against unintended modification 5 minutes after Power on. To modify the evaluation boundaries later, the user may specify the desired values only after a new Power On.

**Note**:
If a programming adapter UB-PROG2 is used for the programming procedure, button A1 is assigned to $-U_B$ and button A2 is assigned to $+U_B$.

**Programming the analog output**
**Rising ramp**
1. Place the target at the near end of the desired evaluation range
2. Program the evaluation boundary by applying $-U_B$ to the Teach-In input (yellow LED flashes)

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

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## Programming

3. Disconnect the Teach-In input from -$U_B$ to save the evaluation boundary

4. Place the target at the far end of the desired evaluation range

5. Program the evaluation boundary by applying +$U_B$ to the Teach-In input (yellow LED flashes)

6. Disconnect the Teach-In input from +$U_B$ to save the evaluation boundary

**Falling ramp**

1. Place the target at the far end of the desired evaluation range

2. Program the evaluation boundary by applying -$U_B$ to the Teach-In input (yellow LED flashes)

3. Disconnect the Teach-In input from -$U_B$ to save the evaluation boundary

4. Place the target at the near end of the desired evaluation range

5. Program the evaluation boundary by applying +$U_B$ to the Teach-In input (yellow LED flashes)

6. Disconnect the Teach-In input from +$U_B$ to save the evaluation boundary

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

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