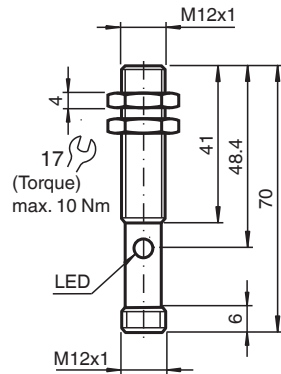# Ultrasonic sensor

UB120-12GM-E5-V1

- Extremely narrow projection cone
- Switching output
- Very small unusable area
- 5 different output functions can be set
- Short response time

Single head system

CE c(UL)us UKCA

Dimensions

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. 9 ms

Indicators/operating means

LED yellow	indication of the switching state flashing: program function object detected

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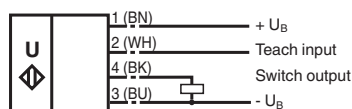Singapore: +65 6779 9091
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Technical Data

LED red		solid red: Error 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 operating distance 1: -U_B ... +1 V, operating distance 2: +6 V ... +U_B input impedance: > 4,7 kΩ program pulse: ≥ 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: 20 mm Switch point A2: 120 mm
Voltage drop	U_d	≤ 3 V
Repeat accuracy		≤ 1 %
Switching frequency	f	≤ 52 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		IP67
Material		
Housing		brass, nickel-plated
Transducer		epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Mass		25 g

Connection

Standard symbol/Connections:
(version E5, pnp)

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

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

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

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Connection Assignment

```
        1

  2   ( • • )   4
      ( • • )
        •
        3
```

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

Distance Y [mm]
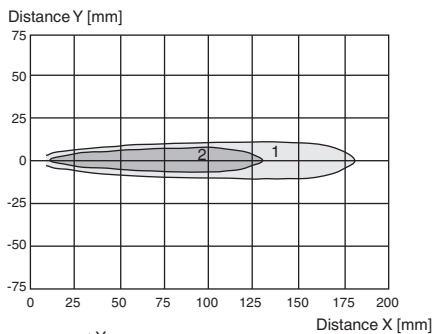
Curve 1: flat surface 10 mm x 10 mm
Curve 2: round bar, Ø 8 mm

Programmable output modes

1. Window mode, normally open mode
A1 < A2:
object distance
A1   **A2**

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

3. One switch point, normally open mode
A1 -> ∞:
A2

4. One switch point, normally closed mode
A2 -> ∞:
A1

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

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

Accessories

	BF 12	Mounting flange, 12 mm
	BF 12-F	Plastic mounting adapter, 12 mm
	V1-G-2M-PVC	Female cordset single-ended M12 straight A-coded, 4-pin, PVC cable grey
	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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Teach-In

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. 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 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

LED Displays

Displays in dependence on operating mode	Red LED	Yellow LED
TEACH-IN switching point:		
Object detected	off	flashes
No object detected	flashes	off
Object uncertain (TEACH-IN invalid)	On	off
Normal operation	off	Switching state
Fault	on	Previous state

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.

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