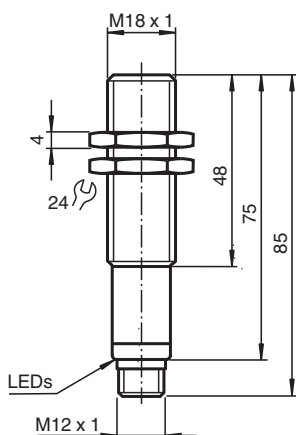# Ultrasonic sensor

UB500-18GM75-E6-V15-Y314727

- 2 switch outputs
- 3 different output functions can be set
- Selectable sound lobe width
- Program input
- Temperature compensation
- Very small unusable area
- Special version

Single head system

Dimensions

Technical Data

General specifications

Sensing range	30 ... 500 mm
Adjustment range	50 ... 500 mm
Dead band	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	indication of the switching state output 1 flashing: program function object detected

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

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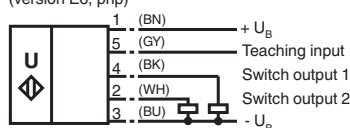Singapore: +65 6779 9091
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Technical Data

LED red		"Error", object uncertain in program function: No object detected
Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC , ripple 10 %$_{SS}$
No-load supply current	I_0	≤ 50 mA
Input		
Input type		1 program input, operating range 1: -U_B ... +1 V, operating range 2: +4 V ... +U_B input impedance: > 4.7 kΩ; program pulse: ≥ 1 s
Output		
Output type		2 switch outputs PNP, NO/NC, programmable
Rated operating current	I_e	2 x 100 mA , short-circuit/overload protected
Voltage drop	U_d	≤ 3 V
Repeat accuracy		≤ 1 %
Switching frequency	f	max. 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		
EAC conformity		TR CU 020/2011 TR CU 037/2016
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 , 5-pin
Housing diameter		18 mm
Degree of protection		IP67
Material		
Housing		brass, nickel-plated
Transducer		epoxy resin/hollow glass sphere mixture; foam polyurethane, cover PBT
Mass		60 g
Factory settings		
Output 1		Switching point: 50 mm output function: Switch point operation mode output behavior: NO contact
Output 2		Switching point: 500 mm output function: Switch point operation mode output behavior: NO contact
Beam width		wide

Connection

Standard symbol/Connections:
(version E6, pnp)

1 (BN)   + U_B
5 (GY)   Teaching input
4 (BK)   Switch output 1
2 (WH)   Switch output 2
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

Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

Characteristic Curve

Characteristic response curve

Distance Y [mm]

flat surface 100 mm x 100 mm

round bar, Ø 25 mm

Distance X [mm]

wide sound lobe
narrow sound lobe
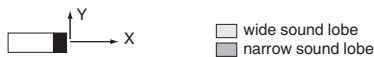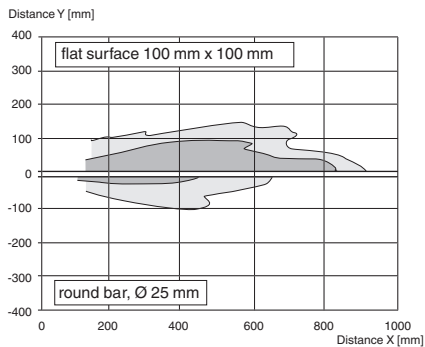
Programmed switching output function

1.
Switch point 1   Switch point 2
Switch output 1 (N.O.)
object range
Switch output 2 (N.O.)

2.
Switch point 2   Switch point 1
Switch output 2 (N.C.)
object range
Switch output 1 (N.C.)

3.
Switch point 1 -> ∞:   Switch output 1, (N.C.)
                         Detection of object presence
Switch point 2 -> ∞:   Switch output 2, (N.O.)
                         Detection of object presence
Switch point 1 a. 2 -> ∞: Both switch outputs, (N.O.)
                         Detection of object presence
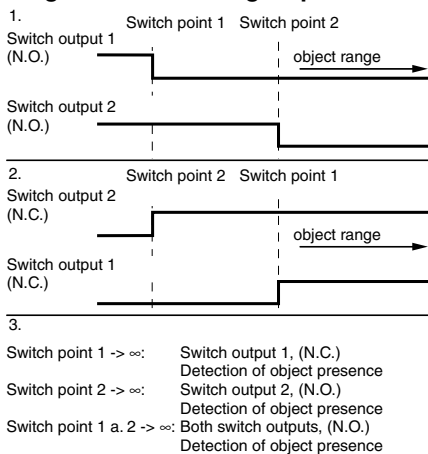
Accessories

	UB-PROG3	Programming unit
	OMH-04	Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

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Accessories

	BF 18	Mounting flange, 18 mm
	BF 18-F	Plastic mounting adapter, 18 mm
	BF 5-30	Universal mounting bracket for cylindrical sensors with a diameter of 5 ... 30 mm
	UVW90-K18	Ultrasonic -deflector
	V15-G-2M-PVC	Female cordset single-ended M12 straight A-coded, 5-pin, PVC cable grey
	M18K-VE	Plastic nuts with centering ring for the vibration-free mounting of cylindrical sensors

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Programming

Programming

The sensor features two programmable switching outputs, each with a programmable switch point. The switch point and operating mode are programmed by applying the voltage $-U_B$ or $+U_B$ to the teach-in input. The supply voltage must be applied to the teach-in input for a minimum of 1 s. LEDs indicate whether the sensor can detect the target object during the programming process.

Note:
The teach-in process for the switch points must take place immediately after switching on the voltage supply. A time lock secures the set values 5 minutes after the most recent teach-in to prevent unintentional changes. If you wish to modify the switch points at a later time, the power supply must be switched off and on again.
The yellow LED indicates the switch state for switching output 1. There is no yellow LED for switching output 2.

Note:
If a UB-PROG3 programming device is used for programming, button A1 represents $-U_B$ and button A2 represents $+U_B$.

Programming the switching outputs

NO contact function
The switch point for switching output 1 must be closer to the sensor than the switch point for switching output 2
1. Position the target object at the desired switch point for switching output 1
2. Program the switch point by applying $-U_B$ to the teach-in input (yellow LED flashes)
3. To save the switch point, disconnect the teach-in input from $-U_B$
4. Position the target object at the desired switch point for switching output 2
5. Program the switch point by applying $+U_B$ to the teach-in input
6. To save the switch point, disconnect the teach-in input from $+U_B$
Note: The order is not relevant. It is possible to teach in only one switch point.

NC contact function
The switch point for switching output 2 must be closer to the sensor than the switch point for switching output 1
1. Position the target object at the desired switch point for switching output 1
2. Program the switch point by applying $-U_B$ to the teach-in input (yellow LED flashes)
3. To save the switch point, disconnect the teach-in input from $-U_B$
4. Position the target object at the desired switch point for switching output 2
5. Program the switch point by applying $+U_B$ to the teach-in input
6. To save the switch point, disconnect the teach-in input from $+U_B$
Note: The order is not relevant. It is possible to teach in only one switch point. If both switch points are the same, the sensor works in NO contact mode.

Object detection mode
1. Cover the sensor with the palm of your hand or remove all objects from the detection range of the sensor
2. Program the switch point for switching output 1 by applying $-U_B$ to the teach-in input (red LED flashes)
3. Disconnect the teach-in input from $-U_B$
4. Program the switch point for switching output 2 by applying $+U_B$ to the teach-in input (red LED flashes)
5. Disconnect the teach-in input from $+U_B$
Note: It is possible to teach in only one switching output for detecting objects. In this configuration switches
The signal output switches when within the maximum sensing range of the sensor an object is detected.

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-In 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-In input wire from $-U_B$ and the changing is saved

2. Wide angle sound cone
- switch off the power supply
- connect the Teach-In 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-In input wire from $+U_B$ and the changing is saved

Factory Setting

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Factory settings
See technical data.

Indication

The sensor features LEDs to indicate the operating states.

	Red LED	Yellow LED
During normal operation		
Fault-free operation	Off	Switching state Output 1
Fault (e.g. compressed air)	On	Last valid state
Programming: switching output 1		
Object detected	Off	Flashing
No object detected	Flashing	Off
Uncertain object (programming invalid)	On	Off
Programming: switching output 2		
Object detected	Off	Off
No object detected	Flashing	Off
Uncertain object (programming invalid)	On	Off

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.

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