

# Ultrasonic sensor

## UB500-18GM75-E7-V15

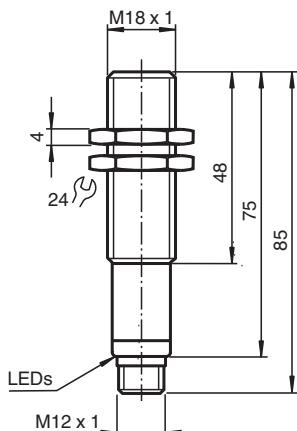


- 2 switch outputs
- 3 different output functions can be set
- Selectable sound lobe width
- Program input
- Temperature compensation
- Very small unusable area

Single head system



### Dimensions



### Technical Data

Release date: 2023-02-15 Date of issue: 2023-02-15 Filename: 130229\_eng.pdf

#### 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 flashing: program function object detected
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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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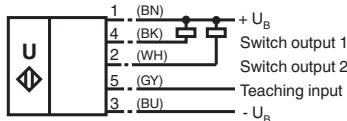
## Technical Data

LED red	"Error", object uncertain in program function: No object detected	
<b>Electrical specifications</b>		
Operating voltage	$U_B$	10 ... 30 V DC, ripple 10 % <sub>SS</sub>
No-load supply current	$I_0$	$\leq 50$ mA
<b>Input</b>		
Input type		1 program input, operating range 1: $-U_B \dots +1$ V, operating range 2: $+4$ V ... $+U_B$ input impedance: $> 4.7$ k $\Omega$ ; program pulse: $\geq 1$ s
<b>Output</b>		
Output type		2 switch outputs NPN, normally open/closed, programmable
Rated operating current	$I_e$	2 x 100 mA, short-circuit/overload protected
Voltage drop	$U_d$	$\leq 3$ V
Repeat accuracy		$\leq 1$ %
Switching frequency	$f$	max. 8 Hz
Range hysteresis	$H$	1 % of the set operating distance
Temperature influence		$\pm 1.5$ % of full-scale value
<b>Compliance with standards and directives</b>		
Standard conformity		
Standards		EN IEC 60947-5-2:2020 IEC 60947-5-2:2019
<b>Approvals and certificates</b>		
UL approval		cULus Listed, Class 2 Power Source
CCC approval		CCC approval / marking not required for products rated $\leq 36$ V
<b>Ambient conditions</b>		
Ambient temperature		-25 ... 70 °C (-13 ... 158 °F)
Storage temperature		-40 ... 85 °C (-40 ... 185 °F)
<b>Mechanical specifications</b>		
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
<b>Factory settings</b>		
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

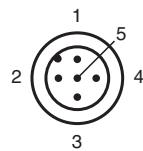
## Standard symbol/Connections:

(version E7, npn)



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

## Connection Assignment

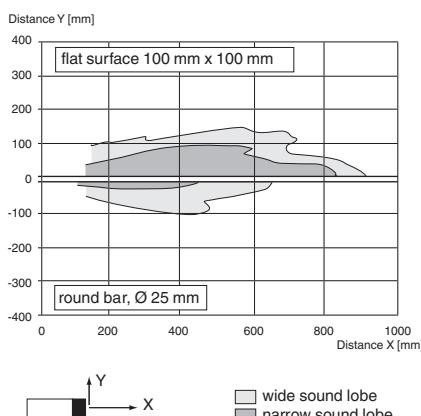


Wire colors in accordance with EN 60947-5-2

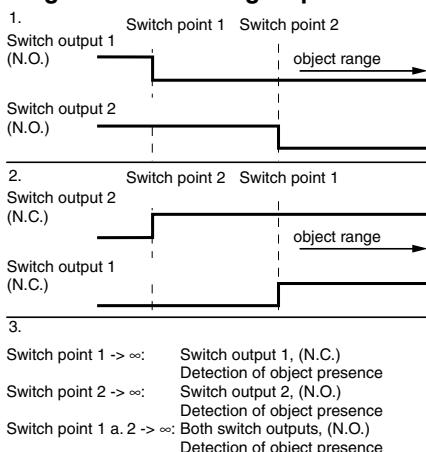
1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)
5	GY	(gray)

## Characteristic Curve

### Characteristic response curve



### Programmed switching output function



## Accessories

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

## Accessories

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

## Programming

### Programming procedure

The sensor features two programmable switch outputs with one programmable switch point, each. Programming the switch point and the operating mode is done by applying the supply voltage  $-U_B$  or  $+U_B$  to the Program input. The supply voltage must be applied to the Program input for at least 1 s. LEDs indicate whether the sensor has recognized the target during the programming procedure.

#### Note:

Switching points 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 switching points later, the user may specify the desired values only after a new Power On.

#### Note:

If a programming adapter UB-PROG3 is used for the programming procedure, button A1 is assigned to  $-U_B$  and button A2 is assigned to  $+U_B$ .

### Programming switch outputs

#### Normally open (NO) output

The switch point of switch output 1 has to be closer to the sensor than the switch point of switch output 2

1. Place the target at the desired switch point position of switch output 1
2. Program the switch point by applying  $-U_B$  to the Program input (corresponding yellow LED flashes)
3. Disconnect the Program input from  $-U_B$  to save the switch point
4. Place the target at the desired switch point position of switch output 2
5. Program the switch point by applying  $+U_B$  to the Program input (corresponding yellow LED flashes)
6. Disconnect the Program input from  $+U_B$  to save the switch point

**Note:** The order doesn't make any difference. If you want, you can set only one switching point.

#### Normally closed (NC) output

The switch point of switch output 2 has to be closer to the sensor than the switch point of switch output 1

1. Place the target at the desired switch point position of switch output 1
2. Program the switch point by applying  $-U_B$  to the Program input (corresponding yellow LED flashes)
3. Disconnect the Program input from  $-U_B$  to save the switch point
4. Place the target at the desired switch point position of switch output 2
5. Program the switch point by applying  $+U_B$  to the Program input (corresponding yellow LED flashes)
6. Disconnect the Program input from  $+U_B$  to save the switch point

**Note:** The order doesn't make any difference. If you want, you can set only one switching point. If both switching points are equal, the sensor works in close function.

### Programming detection of object presence

1. Cover the sensor face with hand or remove all objects from sensing range
2. Apply  $-U_B$  to the Program input (red LED flashes)
3. Disconnect the Program input from  $-U_B$
4. Apply  $+U_B$  to the Program input (red LED flashes)
5. Disconnect the Program input from  $+U_B$

**Note:** Only one switch output can be configured for detection of presence of objects. If the sensor detects an object within the maximum detection range, the switch output switches.

### 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

**Factory settings**

See technical data.

**Indication**

The sensor provides LEDs to indicate various conditions.

	Red LED	Yellow LED 1	Yellow LED 2
<b>During Normal operation</b>			
Proper operation	Off	Switching state output 1 remains in previous state	Switching state output 2 remains in previous state
Interference (e.g. compressed air)	On		
<b>Programming of output 1</b>			
Object detected	Off	Flashes	Off
No object detected	Flashes	Off	Off
Object uncertain (programming invalid)	On	Off	Off
<b>Programming of output 2</b>			
Object detected	Off	Off	Flashes
No object detected	Flashes	Off	Off
Object uncertain (programming invalid)	On	Off	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.