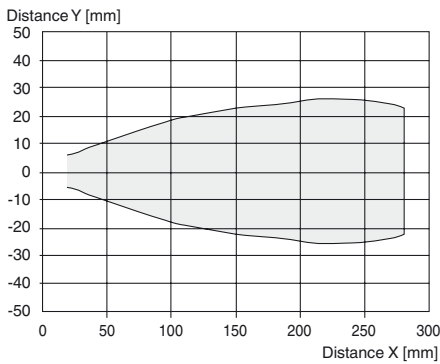## Model Number

**UB250-F77-E0-V31**

Ultrasonic direct detection sensor

## Features

- **Miniature design**
- **Program input**
- **Degree of protection IP67**
- **Switching status indicator, yellow LED**

## Diagrams

### Characteristic response curve



## Technical data

| General specifications | |
|---|---|
| Sensing range | 20 ... 250 mm |
| Adjustment range | 45 ... 250 mm |
| Dead band | 0 ... 20 mm |
| Standard target plate | 20 mm x 20 mm |
| Transducer frequency | approx. 400 kHz |
| **Nominal ratings** | |
| Time delay before availability $t_v$ | ≤ 150 ms |
| **Limit data** | |
| Permissible cable length | max. 300 m |
| **Indicators/operating means** | |
| LED yellow | switching state and flashing: Teach-In |
| **Electrical specifications** | |
| Rated operating voltage $U_e$ | 24 V DC |
| Operating voltage $U_B$ | 20 ... 30 V DC , ripple 10 %$_{SS}$ ; 12 ... 20 V DC sensitivity reduced to 90 % |
| No-load supply current $I_0$ | ≤ 20 mA |
| **Input** | |
| Input type | 1 program input |
| Level | low level : 0 ... 0.7 V (Teach-In active) high level : $U_B$ or open input (Teach-In inactive) |
| Input impedance | 16 kΩ |
| Pulse length | ≥ 3 s |
| **Output** | |
| Output type | 1 switch output E0, NPN, NO |
| Rated operating current $I_e$ | 200 mA , short-circuit/overload protected |
| Voltage drop $U_d$ | ≤ 2 V |
| Switch-on delay $t_{on}$ | ≤ 50 ms |
| Repeat accuracy | ± 1 mm |
| Switching frequency f | 10 Hz |
| Range hysteresis H | typ. 2.5 mm |
| Off-state current $I_r$ | ≤ 0.01 mA |
| Temperature influence | + 0.17 %/K |
| **Ambient conditions** | |
| Ambient temperature | -25 ... 70 °C (-13 ... 158 °F) |
| Storage temperature | -40 ... 85 °C (-40 ... 185 °F) |
| Shock resistance | 30 g , 11 ms period |
| Vibration resistance | 10 ... 55 Hz , Amplitude ± 1 mm |
| **Mechanical specifications** | |
| Connection type | M8 x 1 connector , 4-pin |
| Degree of protection | IP67 |
| Material | |
|   Housing | Polycarbonate |
|   Transducer | epoxy resin/hollow glass sphere mixture; polyurethane foam |
| Installation position | any position |
| Mass | 10 g |
| Tightening torque, fastening screws | max. 0.2 Nm |
| **Compliance with standards and directives** | |
| Standard conformity | |
|   Standards | EN 60947-5-2:2007+A1:2012 IEC 60947-5-2:2007 + A1:2012 |
| **Approvals and certificates** | |
| UL approval | cULus Listed, General Purpose |
| CCC approval | CCC approval / marking not required for products rated ≤36 V |

### Safety Note

⚠ The use of this device in applications, where the safety of persons depends from the devices function, is not allowed!

## Dimensions
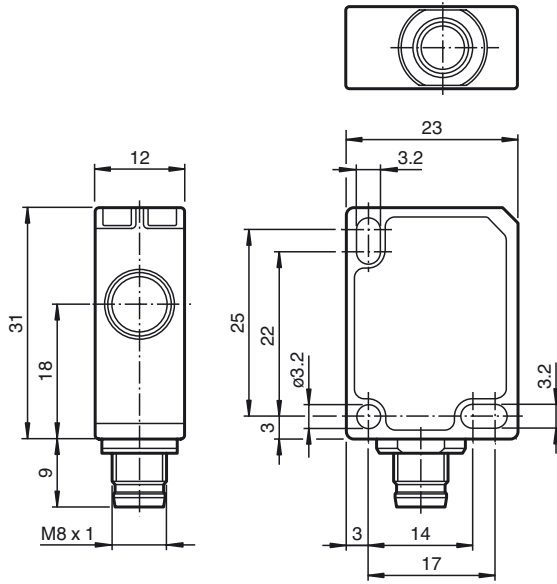


## Description of Sensor Function

The ultrasonic sensor transmits ultrasonic packets in quick succession and responds to their reflection off the detected object. The sensor has a switch output. The switching point is programmable (Teach-In). Objects beyond the taught-in switching point are not detected (background suppression).

## Teach-In of Switching Point SP

To teach in a switching point, proceed as follows:

1. Connect the sensor and turn on the operating voltage.
2. Place the object to be detected at the required distance.
3. Connect the teach-in input (ET) to -$U_B$. This can be done usingthepushbutton or the controller.
   The LED will start flashing after 3 seconds to indicate that the sensor is ready to start the teach-in process [*].
4. Disconnect the teach-in input (ET) with -$U_B$. The switching point SP has now been taught in [*].

(*)    If no object is detected within the sensing range of the sensor, the sensor will start flashing at a faster rate. The switching point remains unchanged.

## Switching characteristics and display LED

| unusable area | Sensing range | | | Output | LED |
|---|---|---|---|---|---|
| | Adjustment range | | | | |
| | | | | | |
| | | | ● | -$U_B$ | Off |
| | | ● | | +$U_B$ | On |
| ● | | | | Undefined | |

● = Object position

## Safety Note

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

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