



## Model Number

**UB250-F77-E1-V31**

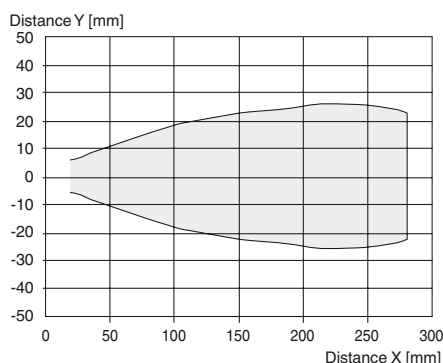
Ultrasonic direct detection sensor

## 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 $t_v$ | $\leq 150$ 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 $U_o$ | 24 V DC  |
| Operating voltage $U_B$       | 20 ... 30 V DC, ripple 10 % <sub>SS</sub> ; 12 ... 20 V DC sensitivity reduced to 90 % |
| No-load supply current $I_0$  | $\leq 20$ mA   |

### Input

|                 |   |
|-----------------|---|
| Input type      | 1 program input   |
| Level           | low level : 0 ... 0.7 V (Teach-In active)<br>high level : $U_B$ or open input (Teach-In inactive) |
| Input impedance | 16 k $\Omega$   |
| Pulse length    | $\geq 3$ s  |

### Output

|                               |  |
|-------------------------------|--|
| Output type                   | 1 switch output E1, NPN, NC              |
| Rated operating current $I_e$ | 200 mA, short-circuit/overload protected |
| Voltage drop $U_d$            | $\leq 2$ V                               |
| Switch-on delay $t_{on}$      | $\leq 50$ ms                             |
| Repeat accuracy               | $\pm 1$ mm                               |
| Switching frequency $f$       | 10 Hz                                    |
| Range hysteresis $H$          | typ. 2.5 mm                              |
| Off-state current $I_r$       | $\leq 0.01$ 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 $\pm 1$ 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<br>IEC 60947-5-2:2007 + A1:2012 |

### Approvals and certificates

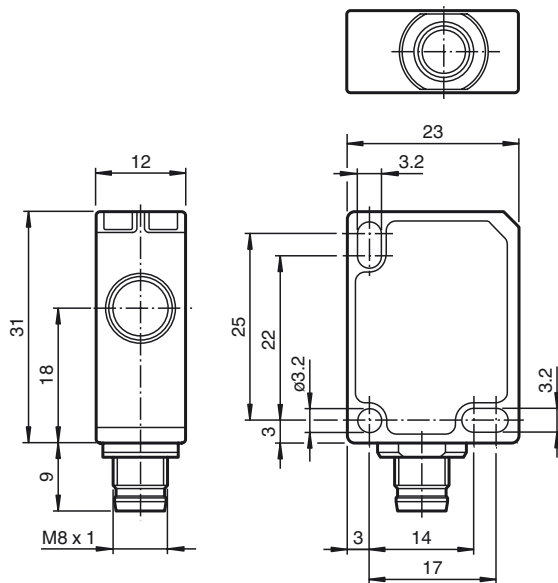
|              |  |
|--------------|--|
| UL approval  | cULus Listed, General Purpose                                      |
| CCC approval | CCC approval / marking not required for products rated $\leq 36$ V |

## 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 using the push button or the controller.  
The LED will start flashing after 3 seconds to indicate that the sensor is ready to start the teach-in process <sup>(\*)</sup>.
4. Disconnect the teach-in input (ET) with  $-U_B$ . The switching point SP has now been taught in <sup>(\*)</sup>.

- (\*) 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<br>area | Sensing range |                  | Output          | LED |
|------------------|---------------|------------------|-----------------|-----|
|                  |               | Adjustment range |                 |     |
|                  |               |                  | +U <sub>B</sub> | On  |
|                  |               |                  | -U <sub>B</sub> | Off |
|                  |               |                  | Undefined       |     |

● = Object position

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