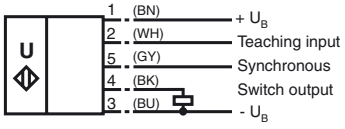
Ultrasonic sensor
UB2000 F6.110.2111/01

Features

- Switch output
- TEACH-IN input
- Synchronisation options
- Deactivation option
- Temperature compensation

Electrical connection

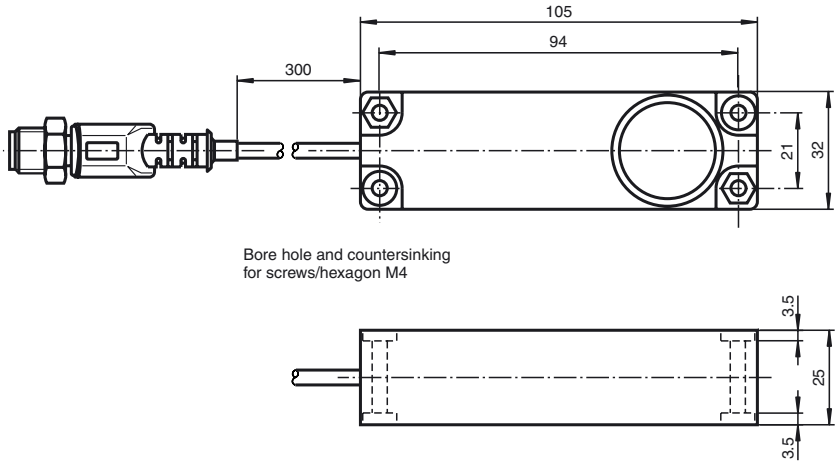
Standard symbol/Connections:
(version E5, pnp)



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

Connector V15

Dimensions



Technical data

CE

General specifications	
Sensing range	80 ... 2000 mm
Adjustment range	100 ... 620 mm
Unusable area	0 ... 80 mm
Standard target plate	100 mm x 100 mm
Transducer frequency	approx. 175 kHz
Response delay	≤ 50 ms (max. batch disposal speed: ≤ 0.67 m/s)
Indicators/operating means	
LED green	permanently green: monitoring system green off: TEACH-IN function or fault
LED yellow	indication of the switching state 3x flashing: TEACH-IN function object detected
LED red	permanently red: Error red, flashing: TEACH-IN function, object not detected
Electrical specifications	
Operating voltage	10 ... 30 V DC , ripple 10 $\%_{SS}$
No-load supply current I_0	≤ 55 mA
Input/output	
Synchronisation	1 synchronous input 0-level: -U_B...+1 V 1-level: +4 V...+U_B input impedance: > 12 KOhm synchronisation pulse: 0,1 ... 28 ms
Synchronisation frequency	
Common mode operation	≤ 40 Hz
Multiplex operation	≤ 40 Hz /n, n = number of sensors
Input	
Input type	1 TEACH_IN input, switching point A1 + 30mm: +5 V ... +U_B input impedance: > 4.7 kΩ, TEACH-IN pulse: ≥ 1 s
Output	
Output type	1 switch output pnp
Rated operational current I_e	200 mA , short-circuit/overload protected
Voltage drop U_d	≤ 3 V
Temperature influence	± 1.5 % of full-scale value
Performance characteristics	
Start-up drift	≤ 5 %
Standard conformity	
Standards	EN 60947-5-2
Ambient conditions	
Ambient temperature	0 ... 70 °C (273 ... 343 K)
Storage temperature	-40 ... 85 °C (233 ... 358 K)
Mechanical specifications	
Protection degree	IP65
Connection	fixed cable with plug connector V15 (M12 x 1), 5 pin
Material	
Housing	ABS
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Mass	135 g

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Notes

Synchronisation

The sensor features a synchronisation input for the suppression of mutual interference. If this input is not used, the sensor will operate using an internally generated clock rate. The synchronisation of multiple sensors can be realised as follows:

External synchronisation
The sensor can be synchronised by the external application of a square wave voltage. A synchronisation pulse at the synchronisation input starts a measuring cycle. The pulse must have a duration greater than 100 µs. The measuring cycle starts with the falling edge of a synchronisation pulse. A low level > 1 s or an open synchronisation input will result in the normal operation of the sensor. A high level at the synchronisation input disables the sensor.

Two operating modes are available

1. Multiple sensors can be controlled by the same synchronisation signal. The sensors are synchronised.
2. The synchronisation pulses are sent cyclically to individual sensors. The sensors operate in multiplex mode.

Internal synchronisation
The synchronisation connections of up to 5 sensors capable of internal synchronisation are connected to one another. When power is applied, these sensors will operate in multiplex mode. The response delay increases according to the number of sensors to be synchronised.

Note:

If the option for synchronization is not used, the synchronization input has to be connected to ground (0V) or the sensor has to be operated via a V1 cable connector (4-pin).

Adjustment of the switch output

For TEACH-IN of the switch output, a voltage > 5 V must be appied to the TEACH-input. After approx. 1 s the sensor goes into TEACH mode. Now the sensor evaluates the current object distance. In case of an object distance <620 mm, the sensor saves a value, which is 30 mm greater than the evaluated into the internal RAM after another half second. A successful TEACH-IN is indicated by triple flashing of the yellow LED. The switch output is now off, in case of constant object distance, becaus of the stored switching distance increased by 30 mm.

If the TEACH-IN was not successful (no object inside a range of 100 mm ... 620 mm) the red LED flashes. The switch output is switched off and gets locked. The ouput lock remains until anouther successful TEACH-IN is performed.

Switch on conditions for the output

For switching on the output, 2 conditions must be fulfilled:
- The object distance must exceed the teached object distance by more than 30 mm and
- at the TEACH-input a voltage > 5 V must be applied.

Switch off condition for the output

An activatet switch output remains in this state, until it is reset by applying $-U_B$ voltage (0 V) to the TEACH-input or a floating TEACH-input.

LED Display

Model number

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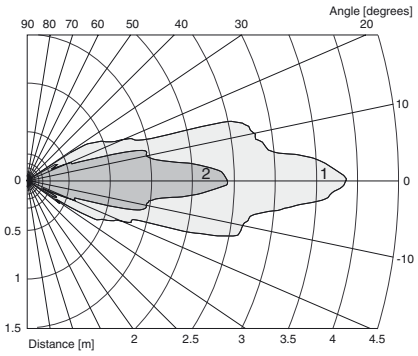
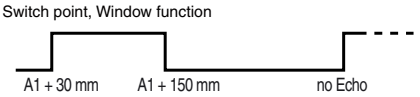
Characteristic curves/additional information

Characteristic response curves



Curve 1: flat plate 100 mm x 100 mm
Curve 2: round bar, Ø 25 mm

Programmed switching output function



Object detected: Switch output open
No object detected: Switch output closed

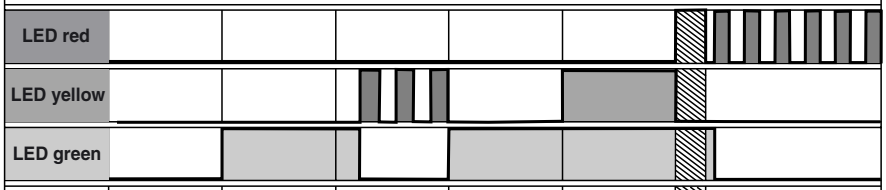
Accessories

Cable sockets *)

V15-G-2M-PVC
V15-W-2M-PUR

*) For additional cable sockets see section „Accessories“.

LED-timing ultrasonic-muting sensor for protection of the delivery tray



Sensor state	$+U_b$ = 0 V	Power ON reset, probe active, wait for Teach IN	Teach input = +Ub, wait 1 sec, storing the current distance + 30 mm in EEPROM, storing successful	Sensor active, detects unchanged stack position, Uout = 0 V	Output active, Uout = Ub Sensor waiting for Power ON, Reset or new Teach IN		Teach input = +Ub, storing the current distance + 30 mm in EEPROM **not** possible, storing not successfu
Phase	**0**	**1**	**2 a**	**3**	**4**		**2 b**
Machine state	OFF	Paper is being stacked	Paper stack has arrived down below	Paper stack remains unchanged in the delivery tray	Operator lifts up stack and pulls it > 30 mm out of its position		Paper stack cannot be detected, no paper stack present, too many interfering echoes, measuring not possible within valid range of values

*) red LED: lights up sporadically in these time periods when signal-to-noise ratio diminishes. No effect on measuring results