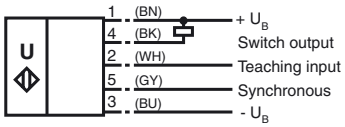
Ultrasonic sensor
UB2000-30GM-E4-V15

Features

- Switch output
- 5 different output functions can be set
- TEACH-IN input
- Synchronisation options
- Deactivation option
- Temperature compensation
- Insensitive to compressed air

Electrical connection

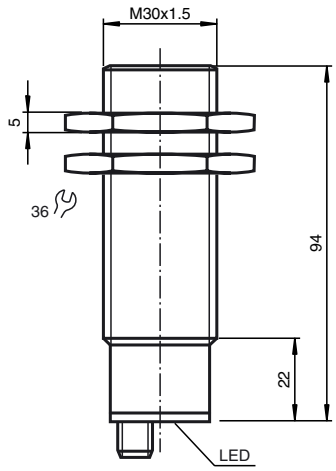
Standard symbol/Connections:
(version E4, npn)



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

Connector V15

Dimensions



Technical data

CE

General specifications	
Sensing range	80 ... 2000 mm
Adjustment range	120 ... 2000 mm
Unusable area	0 ... 80 mm
Standard target plate	100 mm x 100 mm
Transducer frequency	approx. 180 kHz
Response delay	approx. 150 ms
Indicators/operating means	
LED green	permanent: Power-on flashing: TEACH-IN function object detected
LED yellow	permanent: switching state switch output flashing: TEACH-IN function
LED red	normal operation: "fault" TEACH-IN function: no object detected
Electrical specifications	
Operating voltage	10 ... 30 V DC , ripple 10 $\%_{SS}$
No-load supply current I_0	≤ 50 mA
Input/Output	
Synchronisation	bi-directional 0 level -U_B...+1 V 1 level: +4 V...+U_B input impedance: > 12 KOhm synchronisation pulse: ≥ 100 µs, synchronisation interpulse period: ≥ 2 ms
Synchronisation frequency	
Common mode operation	≤ 30 Hz
Multiplex operation	≤ 30/n Hz, n = number of sensors
Input	
Input type	1 TEACH-IN input, operating range 1: -U_B ... +1 V, operating range 2: +4 V ... +U_B input impedance: > 4.7 kΩ; TEACH-IN pulse: ≥ 1 s
Output	
Output type	1 switch output E4, npn NO/NC, parameterisable
Repeat accuracy	≤ 0,5 % of switching point
Rated operational current I_e	200 mA , short-circuit/overload protected
Voltage drop U_d	≤ 2,5 V
Switching frequency f	≤ 3,3 Hz
Range hysteresis H	1 % of the set operating distance
Temperature influence	< 2 % of full-scale value
Standard conformity	
Standards	EN 60947-5-2
Ambient conditions	
Ambient temperature	-25 ... 70 °C (248 ... 343 K)
Storage temperature	-40 ... 85 °C (233 ... 358 K)
Mechanical specifications	
Protection degree	IP65
Connection	connector V15 (M12 x 1), 5 pin
Material	
Housing	brass, nickel-plated, plastic components PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Mass	140 g

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Notes

Description of the sensor functions

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. 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 state of the switch output will not change until the switching threshold has been exceeded five times as an average of the five measurements is determined internally. A low level > 1 s or an open synchronisation input will result in the normal operation of the sensor.
Synchronisation cannot be performed during TEACH-IN and vice versa. The sensors must be operated in an unsynchronised manner to teach the switching point.

A high level at the synchronisation input disables the sensor.

Note:

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

Adjusting the switching points

The ultrasonic sensor features an analogue output with two teachable evaluation limits. These are set by applying the supply voltage $-U_B$ or $+U_B$ to the TEACH-IN input. The supply voltage must be applied to the TEACH-IN input for at least 1 s. LEDs indicate whether the sensor has recognised the target during the TEACH-IN procedure. Evaluation limit A1 is taught with $-U_B$, A2 with $+U_B$. For simple setting the switching point and the output functions the programming unit UB-PROG2 can be used.

Five different output functions can be set:

1. Window mode, normally-open function
2. Window mode, normally-closed function
3. One switching point, normally-open function
4. One switching point, normally-closed function
5. Detection of object presence

TEACH-IN window mode, normally-open function
- Set target to near switching point
- TEACH-IN switching point A1 with $-U_B$
- Set target to far switching point
- TEACH-IN switching point A2 with $+U_B$

TEACH-IN window mode, normally-closed function
- Set target to near switching point
- TEACH-IN switching point A2 with $+U_B$
- Set target to far switching point
- TEACH-IN switching point A1 with $-U_B$

TEACH-IN one switching point, normally-open function
- Set target to near switching point
- TEACH-IN switching point A2 with $+U_B$
- Cover sensor with hand or remove all objects from sensing range
- TEACH-IN switching point A1 with $-U_B$

TEACH-IN one switching point, normally-closed function
- Set target to near switching point
- TEACH-IN switching point A1 with $-U_B$

Model number

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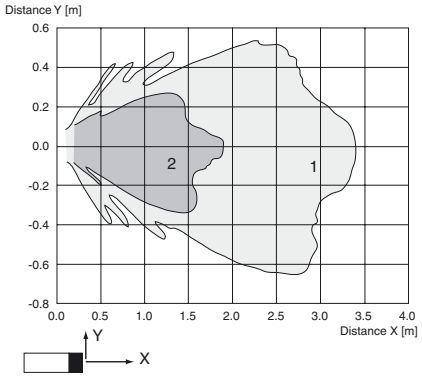
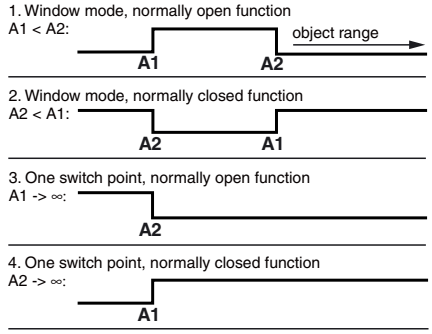
Characteristic curves/additional information

Characteristic response curve



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

Programmed switching output function



5. A1 -> ∞, A2 -> ∞: Detection of object presence
Object detected: Switch output closed
No object detected: Switch output open

Accessories

Mounting aid

BF30
BF30F
BF5-30
M-105

Sound deflectors

UVW90-M30
UVW90-K30

Programming Unit

UB-PROG2

Cable sockets *)

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

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

- Cover sensor with hand or remove all objects from sensing range
- TEACH-IN switching point A2 with $+U_B$

TEACH-IN detection of object presence

- Cover sensor with hand or remove all objects from sensing range
- TEACH-IN switching point A1 with $-U_B$
- TEACH-IN switching point A2 with $+U_B$

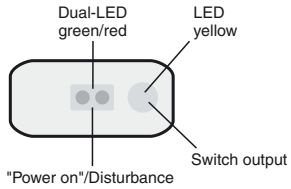
Default setting

A1: unusable area
A2: nominal sensing range

LED Displays

Displays in dependence on operating mode	Green LED	Red LED	Yellow LED
TEACH-IN switching point Object detected No object detected Object uncertain (TEACH-IN invalid)	 flashes off off	 off flashes flashes	 flashes flashes off
Normal operation	on	off	switching state
Interference	off	flashes	previous state

LED-Window



Mounting conditions

If the sensor is installed in places where the operating temperature can fall below 0 °C, the BF30, BF30-F or BF 5-30 fixing clamp must be used.