

Ultrasonic Sensors

Single Head System with one Switch Output

- Switch output
- 5 different output functions available
- Teaching input
- Can be synchronised
- Can be deactivated
- Watchdog

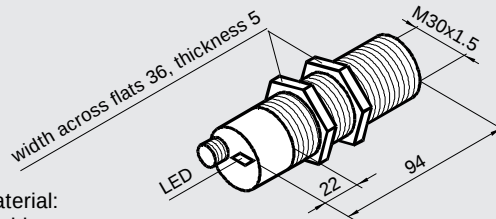


Figure 1

Housing material:
Nickel plated brass
Transducer material:
Epoxy resin/hollow glass sphere mixture
Polyurethane foam
Cover: PBT (Polybutylenterephthalate)

Synchronisation:

In order to suppress mutual interference, the sensor operates via one synchronised input. If the input is unswitched, the sensor operates at an internally generated pulse rate. The sensor can be synchronised by the super position of the square - shaped voltage. One synchronising pulse at the synchronisation input enables one measuring cycle to be completed. The pulse width must be greater than 100 µs. The measuring cycle commences with the descending flank. The state of the switching output changes after the switching threshold has been exceeded five times, as determined internally by five measurements. A low level ≥ 1 s, or an open synchronisation input results in normal operation of the sensor. Synchronisation cannot take place during teaching and vice versa.

Two operating modes are possible:

1. Multiple sensors are controlled with the same synchronising signal. The sensors operate on the same pulse.
2. The synchronising pulses are fed cyclically to only one sensor at a time. The sensor operate in multiplex mode. A high level at the synchronisation input deactivates the sensor.

To set the Switch Points:

The ultrasonic sensor is provided with a switching output with two teachable switch points. These are set up by applying the supply voltage $-U_B$ bzw. $+U_B$ to the teaching input. The supply voltage should be applied to the teaching input for at least 1 s. During the teaching process the LED's indicate whether the sensor has recognised the target. The switch points A1 and A2 are taught by voltage $-U_B$ and $+U_B$, respectively.

Five functions can be set:

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

Detection range:

200 mm ... 2000 mm

Figure 1

Version:

Transceiver with one switch output

Order code: pnp
nnp

UB 2000-30GM-E2-V15
UB 2000-30GM-E0-V15

Operating data:

Detecting range
Standart test plate (min. flat surface)
Close range (unsuitable for switching)
Aperture angle of sonic lobe
Transducer frequency
Response time
Switching hysteresis
Reproducibility
Temperature drift
Operating cycle frequency
Measuring cycle time t_m
Synchron. frequency equi-pulsed
Synchron. frequency multiplex

200 mm ... 2000 mm
100 mm x 100 mm
0 mm ... 200 mm
approx. 5° at -3 dB
approx. 175 kHz
approx. 145 ms
 $\leq 1\%$ of the set operating distance
 $\leq 1\%$
0.2 % / K
max. 3.4 Hz
approx. 25 ms
 $\leq 1 / t_{m1}$
 $\leq 1 / t_{m1} + 1 / t_{m2} + \dots$

Electrical Data:

Operating voltage U_B
Ripple
Rated operating current
Switch output
pnp
nnp
Teaching input
Synchronising input
Synchronisation pulse width
Synchronisation pause width
Indicators:
LED green
LED red
LED yellow

20 V DC ... 30 V DC
 $\pm 10\%$ $U_B = 33$ V
 ≤ 60 mA
200 mA (k), U_B -3 V short circuit/overload resistant
E2
E0
 $-U_B$... $(-U_B + 2$ V) near switch point
 $(+U_B - 2$ V) ... $+U_B$ far switch point
 $-U_B$... $(-U_B + 1$ V) Low level
 $(-U_B + 5$ V) ... $+U_B$ High level
Input impedance 27 kΩ
 ≥ 100 µs
 ≥ 100 µs
"Power on", teaching function object detected
"Fault", object uncertain
Switching condition indicator, teaching function, no object detected

Mechanical Data:

Operating temperature range
Storage temperature range
Protection class to DIN 40 050
Permissible shock and vibration loading⁵⁾
Connection type

248 Kelvin ... 343 Kelvin (-25 °C ... +70 °C)
233 Kelvin ... 358 Kelvin (-40 °C ... +85 °C)
IP 65
 $b \leq 30$ g, $T \leq 11$ ms
 $f \leq 55$ Hz, $a \leq 1$ mm
Equipment connector - V15

In compliance with

EN 60974-5-2

5) to IEC 68-2-6 and IEC 68-2-27

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Teach window operation, normally open function:

- Set target at near switch point
- Teach switch point A1 with - U_B
- Set target at far switch point
- Teach switch point A2 with + U_B

Teach window operation, normally closed function:

- Set target at near switch point
- Teach switch point A2 with + U_B
- Set target at far switch point
- Teach switch point A1 with - U_B

Teach one switch point, normally open function:

- Set target at near switch point
- Teach switch point A2 with + U_B
- Cover sensor with the palm of the hand, or remove all objects from the detection range of the sensor
- Teach switch point A1 with - U_B

Teach one switch point, normally closed function:

- Set target at near switch point
- Teach switch point A1 with - U_B
- Cover sensor with the palm of the hand, or remove all objects from the detection range of the sensor
- Teach switch point A2 with + U_B

Teach detection of presence of object:

- Cover sensor with the palm of the hand, or remove all objects from the detection range of the sensor
- Teach switch point A1 - U_B
- Teach switch point A2 + U_B

Pre-setting of the switch points:

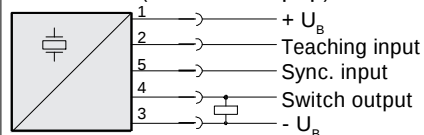
A1: Near range
A2: Nominal range

Note:

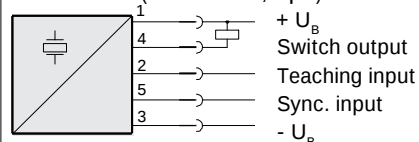
A programming Unit UB-PROG1 is obtainable for the basic setting of the switch points and output functions.

Standard symbol / Connections:

Transceiver (version E2, pnp)



Transceiver (version E0, npn)



V15 Connector arrangement:



Accessories:

Cable connectors, see catalogue of inductive, capacitive and magnetic sensors and section 3.9 - Accessories.

Operating condition - Indications	Green LED	Red LED	Yellow LED
Switch point teaching			
Object detected	flashing	off	off
No object detected	flashing	off	on
Object uncertain (teaching invalid)	off	flashing	off
Normal operation	on	off	switch condition
Interference (e.g. comp. air)	off	flashing	last condition

Programmed switching output function

Window operation, normally open function



Window operation, normally closed function



One switch point, normally open function



One switch point, normally closed function



A1 -> ∞, A2 -> ∞: Detection of presence of object

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