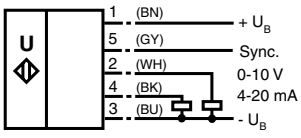
Ultrasonic sensor
UC2000-30GM-IUR2-V15

Features

- Parameterisation interface for the application-specific adjustment of the sensor setting via the service program ULTRA 2001
- Current and voltage output
- Synchronisation options
- Adjustable acoustic power and sensitivity
- Temperature compensation

Electrical connection

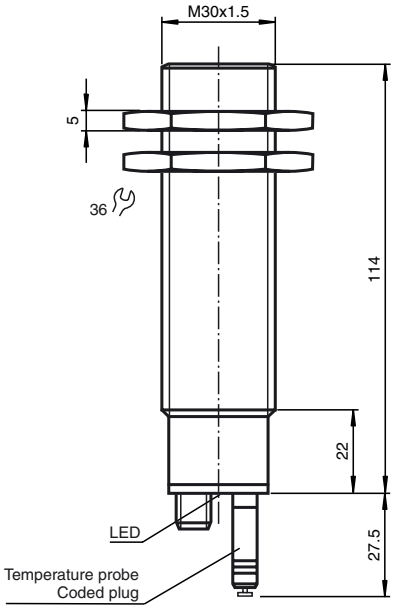
Standard symbol/Connection:
(version IU)



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	65 ms minimum 195 ms factory setting
Indicators/operating means	
LED green	permanent: Power-on flashing: Standby mode or TEACH-IN function object detected
LED yellow 1	permanent: object in evaluation range flashing: TEACH-IN function
LED yellow 2	permanent: object in detection range flashing: TEACH-IN function
LED red	permanent: temperature/TEACH-IN plug not connected flashing: fault or TEACH-IN function object not detected
Temperature/TEACH-IN connector	temperature compensation , TEACH-IN for evaluation range , output function setting
Electrical specifications	
Operating voltage	10 ... 30 V DC , ripple 10 $\%_{SS}$
Power consumption P_0	≤ 900 mW
Interface	
Interface type	RS 232, 9600 Bit/s , no parity, 8 data bits, 1 stop bit
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
Output	
Output type	1 current output 4 ... 20 mA 1 voltage output 0 ... 10 V
Resolution	evaluation range [mm]/4000, but ≥ 0.35 mm
Deviation of the characteristic curve	≤ 0.2 % of full-scale value
Repeat accuracy	≤ 0.1 % of full-scale value
Load impedance	current output: ≤ 500 Ohm Voltage output: ≥ 1000 Ohm
Temperature influence	≤ 2 % from full-scale value (with temperature compensation) ≤ 0.2 %/K (without temperature compensation)
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	stainless steel 1.4303 plastic parts PBT
Transducer	epoxy resin/hollow glass sphere mixture; polyurethane foam
Mass	170 g

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Notes

Description of the sensor functions

This ultrasonic sensor features a four-pole temperature/TEACH-IN plug, that can be connected in four different positions. These have the following significance.

Plug position	Meaning
A1	TEACH-IN evaluation limit A1
A2	TEACH-IN evaluation limit A2
E2/E3	Rising/falling ramp/output characteristic of the voltage output by zero point
T	Temperature compensation

Description of the TEACH-IN procedure

TEACH-IN the evaluation limits 1 or 2

- Cut supply voltage
- Remove TEACH-IN plug
- Restore supply voltage (Reset)
- Set object to desired switching point
- Plug and remove the TEACH-IN plug in pos. A1 or A2. This teaches the evaluation limits A1 or A2.
  Caution: Removing the temperature/TEACH-IN plug, the values of the object position will be adopted.
- The TEACH-IN procedure is controlled with the LED. The green LED flashes, when object is detected, the red LED flashes when no object is detected.
- Connect TEACH-IN plug in pos. T. This completes the TEACH-IN procedure and saves the distance.
- The sensor works in normal mode

TEACH-IN the analogue function

- Cut supply voltage
- Remove TEACH-IN plug
- Restore supply voltage (Reset)
- Connect TEACH-IN plug in pos. E2/E3. By multiple plugging, three different modes of operation can be set in cyclical sequence:
  1) rising ramp, LED A2 flashes,
  2) falling ramp, LED A1 flashes,
  3) zero line, LED A1 and A2 flash
- Connect TEACH-IN plug in pos. T. This completes the TEACH-IN procedure and saves the mode of operation.
- The sensor works in normal mode

Note: If the temperature/TEACH-IN plug has not been plugged in within 5 minutes in position T, the sensor will return to normal mode (with the latest permanent stored values) without temperature compensation.

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. It can be synchronised by applying a square wave voltage. A falling edge leads to the transmission of a single ultrasonic pulse. A low level ≥ 1 s or an open synchronisation input will result in the normal operation of the sensor.

A high level > 1 s will result in the standby mode of the sensor (indicator green LED). The outputs pause in the latest status.

Synchronisation cannot be performed during TEACH-IN and vice versa.

Multiple operating modes are possible:

1. Two to five sensors can be synchronised by interconnecting their synchronisation inputs. In this case, the sensors alternately transmit ultrasonic pulses.
2. Multiple sensors can be controlled by the same synchronisation signal. The sensors are synchronised.
3. The synchronisation pulses are sent cyclically to individual sensors. The sensors operate in multiplex mode.
4. A high level at the synchronisation input disables the sensor.

The response time increases when the sensor is synchronised, because the synchronisation increases the measurement cycle time.

Note:

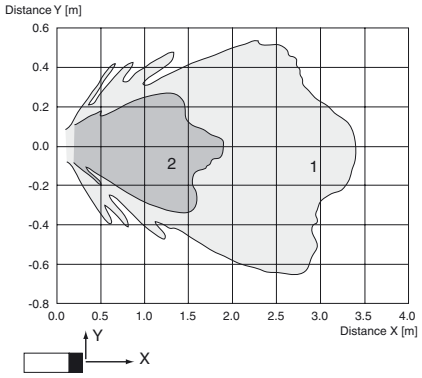
If the option for synchronisation is not used, the synchronisation input has to be connected to ground (0V) or the sensor has to be operated via a V1 cable connector (4-pin).

Model number

UC2000-30GM-IUR2-V15

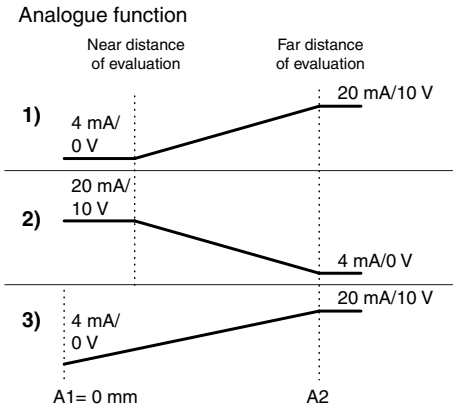
Characteristic curves/additional information

Characteristic response curve



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

Programmed analogue output function



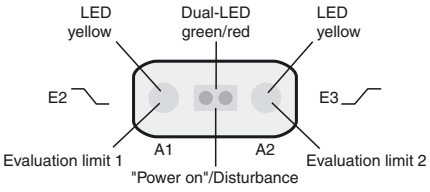
Default setting

A1: unusable area
A2: nominal sensing range
Mode of operation: rising ramp

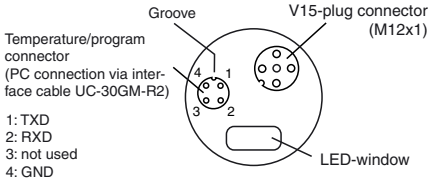
LED Displays/Analogue output

Displays in dependence on operating mode	Dual LED green	Dual-LED red	LED yellow A1	LED yellow A2	analogue output
TEACH-IN evaluation limit A1 object detected object not detected	 flashing off	 off flashing	 flashing flashing	 off off	unchanged
TEACH-IN evaluation limit A2 object detected object not detected	 flashing off	 off flashing	 off off	 flashing flashing	unchanged
TEACH-IN mode of operation (E2/E3) rising ramp falling ramp zero line	 on on on	 off off off	 off flashing flashing (synchronised)	 flashing off flashing (synchronised)	unchanged
Normal mode temperature compensated plug pulled/shorted	 on off	 off on	on, if target in evaluation range	on, if target in detection range	analogue value
Standby	flashing	off	previous state	previous state	unchanged
Interference (e.g. compressed air)	off	flashing	previous state	previous state	unchanged or error value

LED-Window



RS 232-connection



Note on communication with the UC-30GM-R2 interface cable

The UC-30GM-R2 interface cable allows for communication with the ultrasonic sensor using the ULTRA 2001 service program. The cable creates a connection between the PC-internal RS 232 interface and the plug-in connection for the temperature/program plug on the sensor. When setting up the connection on the sensor, make certain the plug is lined up correctly; otherwise no communication will be possible. The protrusion of the round plug must be inserted into the groove of the plug connection on the sensor side and **not** into the arrow symbol on the sensor.

Adjustable parameter with service program ULTRA 2001

- Evaluation limits A1 and A2
- Rising/falling ramp/zero line
- Mode of operation
- Sonic speed
- Temperature offset (The inherent temperature-rise of the sensor can be considered in the temperature compensation)
- Expansion of the unusable area (for suppression of unusable area echoes)
- Reduction of the detection range (for suppression of remote range echoes)
- Time of measuring cycle
- Acoustic power (interference of the burst duration)
- Sensitivity
- Behaviour of the sensor in case of echo loss
- Behaviour of the sensor in case of a fault
- Average formation via an allowed number of measuring cycles
- Selection of the parameter set, RS 232 or manually.

Accessories

Mounting aids

BF30
BF30F
BF5-30
M-105

Sound deflectors

UVW90-M30
UVW90-K30

External temperature probe

UC-30GM-TEMP

Extension cable

UC-30GM-PROG

Programming tools

Service program ULTRA 2001
Interface cable UC-30GM-R2

Process indication- and control unit

DA5-IU-2K-V

Cable sockets*)

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

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

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.