Ultrasonic sensor

UMC3000-30H-E5-5M-3G-3D

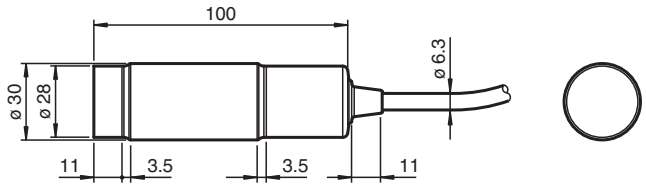
- ATEX-approval for zone 2 and zone 22
- Front of transducer and housing manufactured entirely from stainless steel
- Degree of protection IP68 / IP69K
- Programmable via DTM with PACTWARE

Single head system

Function

The enclosure and transducer of this ultrasonic sensor form a hermetically sealed unit. For reliable operation, due to the special design of this sensor, solely the enclosed mounting accessories must be used.
If the sensor is used in hazardous (classified) location, it will be necessary to follow the notes of the instruction manual.

Dimensions



Technical Data

General specifications		
Sensing range		200 ... 3000 mm
Adjustment range		240 ... 3000 mm
Dead band		0 ... 200 mm
Standard target plate		100 mm x 100 mm
Transducer frequency		approx. 100 kHz
Response delay		≤ 200 ms
Indicators/operating means		
LED green		Operating display
LED yellow		switching state
LED red		error
Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC

Release date: 2023-01-17 Date of issue: 2023-01-17 Filename: 287035_eng.pdf

Technical Data

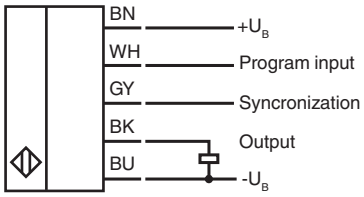
No-load supply current	I_0	≤ 50 mA
Input/Output		
Input/output type		1 synchronization connection, bidirectional
0 Level		0 ... 1 V
1 Level		4 V ... U_B
Input impedance		> 12 kΩ
Output rated operating current		< 12 mA
Pulse length		≥ 200 µs
Pulse interval		≥ 2 ms
Synchronization frequency		
Common mode operation		≤ 20 Hz
Multiplex operation		≤ 20/n Hz, n = number of sensors n ≤ 10 (factory setting: 5)
Input		
Input type		1 program input
Level (switch point 1)		0 ... 1 V
Level (switch point 2)		4 V ... U_B
Input impedance		> 10 kΩ
Pulse length		2 ... 5 s
Output		
Output type		1 switching output E5, PNP NO/NC, programmable
Rated operating current	I_e	200 mA , short-circuit/overload protected
Voltage drop	U_d	≤ 2 V
Repeat accuracy		≤ 0.1 % of full-scale value
Switching frequency	f	≤ 2.8 Hz
Range hysteresis	H	programmable , preset to 1 mm
Temperature influence		< 1.5 % of full-scale value
Compliance with standards and directives		
Standard conformity		
Standards		EN IEC 60947-5-2:2020 IEC 60947-5-2:2019
Approvals and certificates		
CCC approval		CCC approval / marking not required for products rated ≤36 V
Ambient conditions		
Ambient temperature		-25 ... 60 °C (-13 ... 140 °F)
Storage temperature		-40 ... 85 °C (-40 ... 185 °F)
Mechanical specifications		
Connection type		cable PUR , 5 m
Core cross section		5 x 0.5 mm²
Housing diameter		30 mm
Degree of protection		IP68 / IP69K
Material		
Housing		Stainless steel 1.4404 / AISI 316L LED window: VMQ Elastosil LR 3003/Shore 50 A
Transducer		Stainless steel 1.4435 / AISI 316L
Mass		425 g
Factory settings		
Output		near switch point: 240 mm far switch point: 3000 mm output function: Window mode output behavior: NO contact
Equipment protection level Gc (nC)		
Certificate		PF 17 CERT 3944 X
ATEX marking		Ⓔx II 3G Ex nC IIC T6 Gc X
Directive conformity		2014/34/EU
Standards		EN IEC 60079-0:2018 , EN 60079-15:2010

Release date: 2023-01-17 Date of issue: 2023-01-17 Filename: 287035_eng.pdf

Technical Data

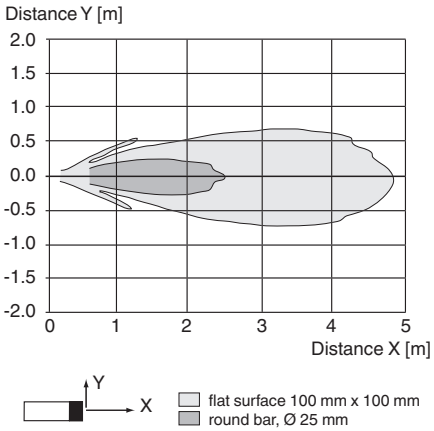
Equipment protection level Dc (tc)		
Certificate		PF 17 CERT 3944 X
ATEX marking		Ⓔx II 3D Ex tc IIIC T80°C Dc X
Directive conformity		2014/34/EU
Standards		EN IEC 60079-0:2018 , EN 60079-31:2014
General information		
Supplementary information		Switch settings of the external programming adapter: "output load": pull-down "output logic": inv

Connection

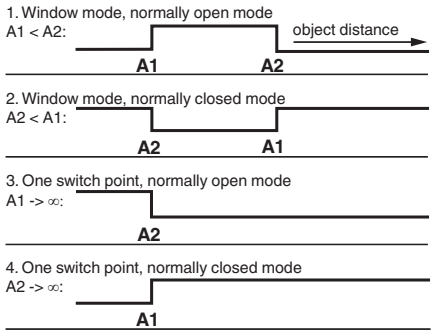


Characteristic Curve

Characteristic response curve



Programmable output modes



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

Release date: 2023-01-17 Date of issue: 2023-01-17 Filename: 287035_eng.pdf

Accessories

	**UC-PROG1-USB**	Programming adapter
	**V15S-G-0,3M-PUR-WAGO**	Male cordset, M12, 5-pin, PUR cable with WAGO terminals

Release date: 2023-01-17 Date of issue: 2023-01-17 Filename: 287035_eng.pdf

Mounting

Mounting

Comply with the minimum permissible bending radius of 70 mm, if you install the connecting cable!

For reliable operation, you must use the included sensor mounting aid.

Programming

Programming

The sensor can be adapted to the specific requirements of the application by means of programming. There are two methods of programming.

1. Basic functions can be set using the teach-in process. These are the position of the switch points and the output function. The teach-in process is connected either with $+U_B$ (1 level) or $-U_B$ (0 level).
2. With a programming adapter (see Accessories) and the DTM module for PACTware, a comprehensive range of parameterisable functions is available. A male cordset with WAGO terminals is needed for the connection to the programming adapter (see Accessories).

Note:

- The programming options are available in the first 5 minutes after switching on and are extended during programming. After 5 minutes without any programming activity, the sensor is locked to prevent programming.
- It is possible to exit programming without changing the sensor settings at any time. Simply stop any programming activity. After 10 seconds, the sensor exits programming mode and switches to normal operating mode with the last valid settings.

Programming the switch points

Note:

A flashing red LED during the programming process indicates unreliable object detection. In this case, adjust the alignment of the object until the yellow LED flashes. Only then are the settings stored in the memory of the sensor.

Teach-in of A1 switch point

1. Position the target object at the desired switch point A1
2. Connect the teach-in for > 2 sec with $+U_B$ or $-U_B$
3. Disconnect the teach-in process. The yellow LED begins to flash after 2 secs and the sensor is ready for teach-in*).
4. Connect the teach-in process within 8 secs for > 2 sec with -UB.
5. Disconnect the teach-in process within 8 secs. The green LED flashes three times briefly for confirmation. The switch point A1 has now been taught in.

Teach-in of switch point A2

1. Position the target object at the desired switch point A2
2. Connect the teach-in for > 2 sec with $+U_B$ or $-U_B$
3. Disconnect the teach-in process. The yellow LED begins to flash after 2 secs and the sensor is ready for teach-in*).
4. Connect the teach-in process within 8 secs for > 2 sec with +UB.
5. Disconnect the teach-in process within 8 secs. The green LED flashes three times briefly for confirmation. The switch point A2 has now been taught in.

*) If there are no objects within the sensor detection range while the sensor is ready for teach-in, this is indicated by fast flashing of the yellow LED. Teach-in is possible, however. In programming switch point A1, this is set to the end of the blind zone. In programming switch point A2, this is set to the detection range upper limit.

Programming the output function

You can choose between NC and NO function for the output function of the sensor. The position of the programmed switch points is critical here.
If switch point A1 is closer to the sensor than A2, the switching output operates as NO."
If switch point A2 is closer to the sensor than A1, the switching output operates as NC.

Indication

The sensor has 3 display LEDs to indicate various operating modes

Release date: 2023-01-17 Date of issue: 2023-01-17 Filename: 287035_eng.pdf

Operating state	Green LED	Yellow LED	Red LED
Normal operation	lights up	Object in evaluation range	Unreliable object
Programming the trip points Object reliably detected Unreliable object Confirmation for successful programming	 Off Off Flashes 3x	 Flashes Off Off	 Off Flashes Off

Commissioning

Synchronisation

The sensor has a synchronisation input for suppressing mutual interefence by third-party ultrasonic signals. If this input is not connected, the sensor works with internally generated clock pulses. It can be synchronised by connecting external rectangular pulses and through corresponding parameterisation via the DTM module for PACTware™. Each falling pulse edge triggers the sending of an individual ultrasonic pulse. If the signal at the synchronisation input carries ≥ 1 s low level, the sensor returns to normal, unsynchronised operating mode. This is also the case when the synchronisation input is disconnected from external signals (see note below).
If there is a high level > 1 s at the synchronisation input, the sensor enters standby mode. This is indicated by the flashing green LED. In this operating mode, the most recent output statuses are retained. For external synchronisation, please observe the software description.

Note:

- If the synchronisation option is not being used, the synchronisation input must be earthed (0 V).
- The synchronisation option is not available during programming, which means that the sensor cannot be programmed during synchronisation.

The following synchronisation methods are possible:

1. Multiple sensors (for max. number see Technical data) can be synchronised by simply connecting their synchronisation inputs. In this case, the sensors operate in a self-synchronised sequence in multiplex mode. Only one sensor transmits at any given time (see note below).
2. Multiple sensors (for max. number see Technical data) can be synchronised by simply connecting their synchronisation inputs. As a result of parameterisation via the DTM module for PACTware™, one of the sensors operates as a master and the others as slaves (see Interface description). In this case, the sensors operate synchronously, i.e. simultaneously in master/slave mode, whereby the master sensor performs the role of an intelligent external clock pulse generator.
3. Multiple sensors can be triggered jointly by an external signal. In this case, the sensors are triggered in parallel and operate synchronously, i.e. simultaneously. All sensors must be parameterised for external control by means of parameterisation via the DTM module for PACTware™ (see Software description).
4. Multiple sensors are triggered with a delay by an external signal. In this case, only one sensor operates with external synchronisation at any given time (see note below). All sensors must be parameterised for external control by means of parameterisation via the DTM module for PACTware™ (see Software description).
5. A high level (+U_B) or a low level (-U_B) at the synchronisation input puts the sensor in standby mode in the case of external parameterisation.

Note:

The response time of the sensors increases proportionally to the number of sensors in the synchronisation chain. Multiplexing means that the measurement cycles of the individual sensors run one after the other.

Note:

The synchronisation connection of the sensors delivers an output current at low level and an input impedance at high level. Please note that the synchronising device must have the following drive capability:
Drive current with +U_B: ≥ n * high level/input impedance (n = number of sensors to be synchronised)
Drive current with 0 V: ≥ n * output current (n = number of sensors to be synchronised)

Release date: 2023-01-17 Date of issue: 2023-01-17 Filename: 287035_eng.pdf