CE

## Model Number

**UMC3000-30H-E5-5M-FA**

Single head system

## Features

- **Front of transducer and housing manufactured entirely from stainless steel**
- **Hygienic design, easy to clean**
- **Degree of protection IP68 / IP69K**
- **Programmable via DTM with PACTWARE**
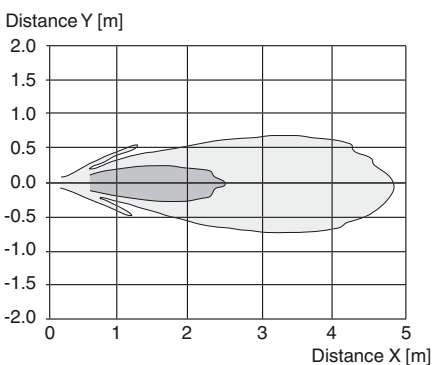- **Mounting bracket MH-30H-01-FA included in delivery**

## Description

**Functional description**

The enclosure and transducer of this ultrasonic sensor form a hermetically sealed unit. Due to its special design, this sensor is EHEDG compliant, and together with an appropriate fixture are especially suitable for applications where there are increased hygiene requirements, such as in the manufacture and handling of food.

For reliable operation, due to the special design of this sensor, solely the enclosed mounting accessories must be used, even in applications without special hygiene requirements.

## Diagrams

### Characteristic response curve



Distance Y [m]

Distance X [m]

flat surface 100 mm x 100 mm
round bar, Ø 25 mm

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## Technical data

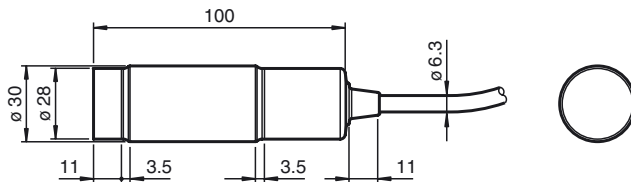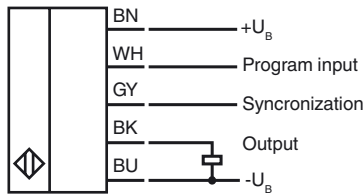| General specifications | |
|---|---|
| Sensing range | 200 ... 3000 mm |
| Adjustment range | 240 ... 3000 mm |
| Dead band | 0 ... 200 mm |
| Standard target plate | 100 mm x 100 mm |
| Transducer frequency | approx. 100 kHz |
| Response delay | $\leq$ 200 ms |
| **Indicators/operating means** | |
| LED green | Operating display |
| LED yellow | switching state |
| LED red | error |
| **Electrical specifications** | |
| Operating voltage $U_B$ | 10 ... 30 V DC |
| No-load supply current $I_0$ | $\leq$ 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 k$\Omega$ |
| Output rated operating current | < 12 mA |
| Pulse length | $\geq$ 200 $\mu$s |
| Pulse interval | $\geq$ 2 ms |
| Synchronization frequency | |
| Common mode operation | $\leq$ 20 Hz |
| Multiplex operation | $\leq$ 20/n Hz, n = number of sensors n $\leq$ 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 k$\Omega$ |
| 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 $U_d$ | $\leq$ 2 V |
| Repeat accuracy | $\leq$ 0.1  % of full-scale value |
| Switching frequency f | $\leq$ 2.8 Hz |
| Range hysteresis H | programmable , preset to 1 mm |
| Temperature influence | < 1.5  % of full-scale value |
| **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 , With FDA approval |
| Core cross-section | 5 x 0.5 mm$^2$ |
| 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 |
| **General information** | |
| Supplementary information | Switch settings of the external programming adapter: "output load": pull-down "output logic": inv FDA: All materials used for the sensor comply with CFR, title 21, §177.2600 (FDA) |
| **Compliance with standards and directives** | |
| Standard conformity | |
| Standards | EN 60947-5-2:2007+A1:2012 IEC 60947-5-2:2007 + A1:2012 |
| **Approvals and certificates** | |
| CCC approval | CCC approval / marking not required for products rated $\leq$36 V |
| EHEDG | Type EL Class I AUX |
| ECOLAB | yes |

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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## Dimensions



## Additional Information

### Programmable output modes

1. Window mode, normally open mode
A1 < A2:



2. Window mode, normally closed mode
A2 < A1:



3. One switch point, normally open mode
A1 -> ∞:



4. One switch point, normally closed mode
A2 -> ∞:



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

## Electrical Connection



| | |
|---|---|
| BN | $+U_B$ |
| WH | Program input |
| GY | Syncronization |
| BK | Output |
| BU | $-U_B$ |

## Accessories

**V15S-G-0,3M-PUR-WAGO**
Male cordset, M12, 5-pin, PUR cable with WAGO terminals

**MH-30H-01-FA**
Mounting aid, 30 mm acc. to EHEDG

**UC-PROG1-USB**
Programming adapter

**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. This also applies for applications without special hygiene requirements.

### Cleaning the Sensor in Areas with Hygiene Requirements

The sensor may only be used with the mounting aid included in the scope of delivery as the fixture. Please note the information in the enclosed package insert for the mounting aid with regard to the correct position of the seals and the correct process for tightening the screw connections.

If the sensor as a whole is located in an area subject to hygiene requirements, the sensor must be accessible from all sides for cleaning purposes. If the sensor is fitted with only the front in an area subject to hygiene requirements, the front must be accessible from all sides accordingly.

The sensor and corresponding fixture are certified by ECOLAB. The components were subjected to the cleaning agents listed in the certificate and are resistant to these agents. Use of other cleaning agents and chemicals is also possible. However, to ensure the sensor and fixture offer resistance to these substances, corresponding tests must be performed by the user.

For cleaning purposes, as a general rule you can completely cover the sensor including the fixture with foam and clean using a water jet. Cleaning at elevated temperatures of up to 85 °C is possible. It is not permitted to use high-pressure cleaning equipment for cleaning purposes in areas subject to hygiene requirements.

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## 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.

### LED indicators

The sensor has 3 display LEDs to indicate various operating modes

| 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 | Off | Flashes | Off |
| Unreliable object | Off | Off | Flashes |
| Confirmation for successful programming | Flashes 3x | Off | Off |

## 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[TM]. 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[TM], 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[TM] (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[TM] (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)

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