

# Ultrasonic Diffuse, Dual Transistor Outputs Type M18 and M30

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- M18 and M30 PBT housing
- Sensing distance: 60 - 3500 mm
- Remote Teach by wire
- Outputs: 2 multi function switching outputs PNP, NPN, NO or NC
- Setup of "Normal Switching", "Window" or "Adjustable Hysteresis" function
- Power supply: 12 to 30 VDC
- 8° beam angle
- Protection: Short-circuit, reverse polarity, transients
- Protection degree IP 67
- Cable or M12 plug, 5 pin

## Product Description

A self-contained multi function diffuse ultrasonic sensor with a sensing range of 60 to 3500 mm. 2 switching outputs - easily set up for 3 different switching modes and adjusted by teach-in - makes it ideal for level control tasks in a wide variety of vessels. A sturdy one-piece polyester housing provides

the perfect packaging for the sophisticated micro-processor controlled and digitally filtered sensor electronics. Excellent EMC performance and precision are typical features of this sensor based on true distance measurement.

## Ordering Key

**UA18CLD20PPM1TR**

|                      |       |
|----------------------|-------|
| Ultrasonic sensor    | _____ |
| Housing style        | _____ |
| Housing size         | _____ |
| Housing material     | _____ |
| Housing length       | _____ |
| Detection principle  | _____ |
| Sensing distance     | _____ |
| Output type          | _____ |
| Output configuration | _____ |
| Connection           | _____ |
| Remote teach         | _____ |

## Type Selection

| Housing dimensions | Connection      | Rated operating dist. (S <sub>n</sub> ) | Outputs        | Ordering no.    |
|--------------------|-----------------|-----------------------------------------|----------------|-----------------|
| M18 x 93 mm        | Plug M12, 5 pin | 60-500 mm                               | 2 x PNP, NO/NC | UA18CLD05PPM1TR |
| M18 x 93 mm        | Cable           | 60-500 mm                               | 2 x PNP, NO/NC | UA18CLD05PPTR   |
| M18 x 93 mm        | Plug M12, 5 pin | 60-500 mm                               | 2 x NPN, NO/NC | UA18CLD05NPM1TR |
| M18 x 93 mm        | Cable           | 60-500 mm                               | 2 x NPN, NO/NC | UA18CLD05NPTR   |
| M18 x 93 mm        | Plug M12, 5 pin | 100-800 mm                              | 2 x PNP, NO/NC | UA18CLD08PPM1TR |
| M18 x 93 mm        | Cable           | 100-800 mm                              | 2 x PNP, NO/NC | UA18CLD08PPTR   |
| M18 x 93 mm        | Plug M12, 5 pin | 100-800 mm                              | 2 x NPN, NO/NC | UA18CLD08NPM1TR |
| M18 x 93 mm        | Cable           | 100-800 mm                              | 2 x NPN, NO/NC | UA18CLD08NPTR   |
| M18 x 93 mm        | Plug M12, 5 pin | 200-2000 mm                             | 2 x PNP, NO/NC | UA18CLD20PPM1TR |
| M18 x 93 mm        | Cable           | 200-2000 mm                             | 2 x PNP, NO/NC | UA18CLD20PPTR   |
| M18 x 93 mm        | Plug M12, 5 pin | 200-2000 mm                             | 2 x NPN, NO/NC | UA18CLD20NPM1TR |
| M18 x 93 mm        | Cable           | 200-2000 mm                             | 2 x NPN, NO/NC | UA18CLD20NPTR   |
| M30 x 125 mm       | Plug M12, 5 pin | 300-3500 mm                             | 2 x PNP, NO/NC | UA30CLD35PPM1TR |
| M30 x 123.5 mm     | Cable           | 300-3500 mm                             | 2 x PNP, NO/NC | UA30CLD35PPTR   |
| M30 x 125 mm       | Plug M12, 5 pin | 300-3500 mm                             | 2 x NPN, NO/NC | UA30CLD35NPM1TR |
| M30 x 123.5 mm     | Cable           | 300-3500 mm                             | 2 x NPN, NO/NC | UA30CLD35NPTR   |

## Technical Data

|                                           |                                                |                                     |                                                |
|-------------------------------------------|------------------------------------------------|-------------------------------------|------------------------------------------------|
| Rated operational volt. (U <sub>e</sub> ) | 12 to 30 VDC (ripple included)                 | UA18..D35                           | 60 ms                                          |
| Ripple                                    | 10%                                            | Voltage drop (U <sub>d</sub> )      | < 1 V                                          |
| Output current (I <sub>e</sub> )          | max. 500 mA (continuous)                       | Off-state current (I <sub>r</sub> ) | < 10 µA                                        |
| No-load supply current (I <sub>o</sub> )  | ≤ 35 mA                                        | Teach-in Set point adjustment       | NO/NC selection<br>Switching modes selection   |
| Protection                                | Short-circuit, transients and reverse polarity | Indication                          | Set points, 2 LEDs yellow<br>Echo, 1 LED green |
| Rated insulation voltage                  | > 1 kV                                         | Rated operating distance            | 60 - 3500 mm                                   |
| Output                                    | 2 PNP open collector outputs, NO or NC         | Operating Frequency                 |                                                |
| Power-on delay                            |                                                | CLD05 + CLD08                       | 10 Hz                                          |
| UA18..D05/D08                             | 60 ms                                          | CLD20                               | 5 Hz                                           |
| UA18..D20                                 | 90 ms                                          | CLD35                               | 2.5 Hz                                         |

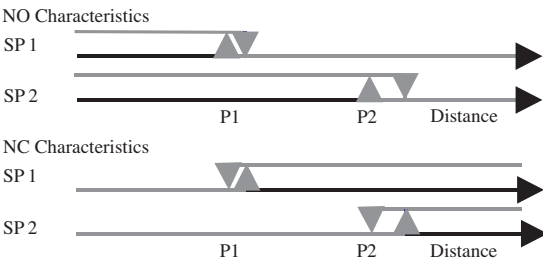


Technical Data Ccont.)

|                                      |       |                                       |        |                                              |  |                              |        |     |
|--------------------------------------|-------|---------------------------------------|--------|----------------------------------------------|--|------------------------------|--------|-----|
| Carrier Frequency                    | CLD05 | 330 kHz                               |        | Ambient temperature<br>Operating and Storage |  | -15° to +70°C (5° to +158°F) |        |     |
|                                      | CLD08 | 300 kHz                               |        |                                              |  |                              |        |     |
|                                      | CLD20 | 180 kHz                               |        |                                              |  |                              |        |     |
|                                      | CLD35 | 130 kHz                               |        |                                              |  |                              |        |     |
| Response time                        |       | Step response                         |        | Degree of protection                         |  | IP 67 (Nema 1, 3, 4, 6, 13)  |        |     |
|                                      | CLD05 | 20 ms                                 | 50 ms  |                                              |  |                              |        |     |
|                                      | CLD08 | 20 ms                                 | 50 ms  |                                              |  |                              |        |     |
|                                      | CLD20 | 40 ms                                 | 100 ms |                                              |  |                              |        |     |
|                                      | CLD35 | 80 ms                                 | 200 ms |                                              |  |                              |        |     |
| Hysteresis (H) (differential travel) |       | Programmable, min. 1%                 |        |                                              |  |                              |        |     |
| Repeatability                        |       | Connection                            |        |                                              |  |                              |        |     |
| CLD05 + CLD08                        |       |                                       |        |                                              |  |                              |        |     |
| CLD20                                |       |                                       |        |                                              |  |                              |        |     |
| CLD35                                |       |                                       |        |                                              |  |                              |        |     |
| Temperature compensation             |       | Yes                                   |        |                                              |  |                              |        |     |
| Beam angle                           |       | 8°                                    |        |                                              |  |                              |        |     |
|                                      |       |                                       |        | Tightening torque                            |  | M18                          | 2.6 Nm |     |
|                                      |       |                                       |        |                                              |  | M30                          | 7.5 Nm |     |
|                                      |       | Cable<br>Plug<br>Cables for plug (M1) |        |                                              |  |                              |        |     |
|                                      |       |                                       |        |                                              |  |                              |        |     |
|                                      |       |                                       |        |                                              |  |                              |        |     |
|                                      |       |                                       |        |                                              |  |                              |        |     |
|                                      |       |                                       |        | Weight                                       |  | UA 18 ...A.                  | 96 g   |     |
|                                      |       |                                       |        |                                              |  | UA 18 ...A.M1                | 57 g   |     |
|                                      |       |                                       |        |                                              |  | UA 30 ...A.                  | 199 g  |     |
|                                      |       |                                       |        |                                              |  | UA 30 ...A.M1                | 140 g  |     |
|                                      |       | CE-marking                            |        |                                              |  |                              |        | Yes |
|                                      |       |                                       |        |                                              |  |                              |        |     |

Switching Operation

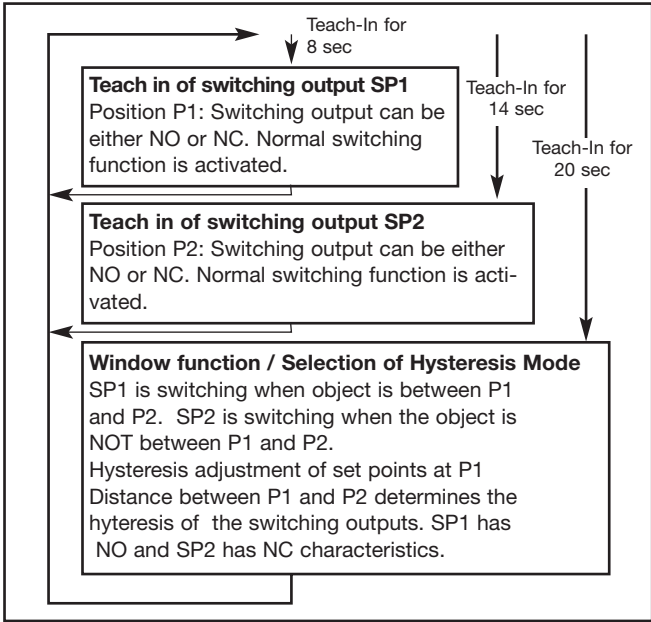
Normal Switching Operation



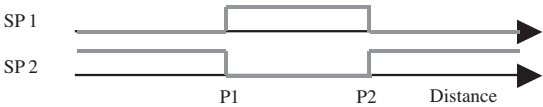
The following 3 different modes of the switching outputs can be selected:

- I Normal switching function
- II Window function
- III Adjustable hysteresis

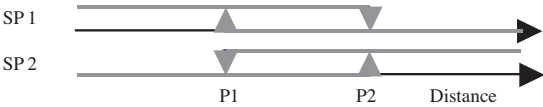
All these functions may be programmed/taught by means of the Teach-in input (pin 5) present in the connector. Each mode has a unique indication using the Echo, P1 and P2 LEDs. The programming/Teach-In procedure is shown in the following flow diagram:



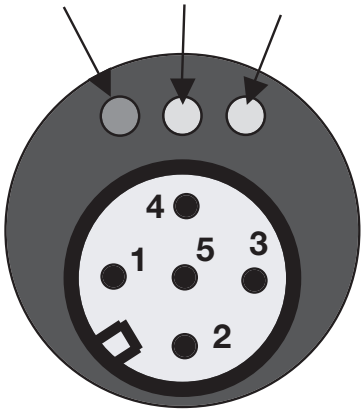
Windows Function



Hysteresis Adjustment



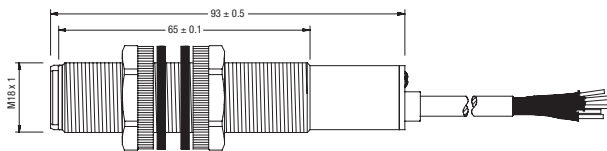
Echo P1 P2  
Green Yellow Yellow



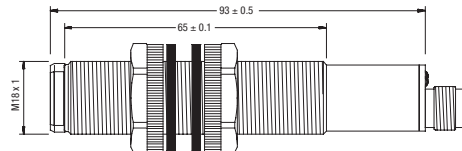
**Normal function:**  
The Echo LED is ON when an echo is received (alignment LED). P1 and P2 LEDs are indicating status of the switching outputs.

## Dimensions

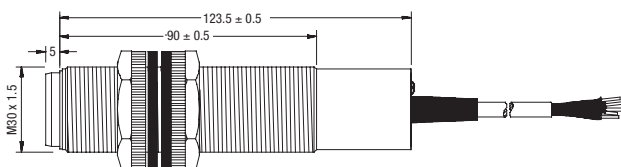
### M18 cable



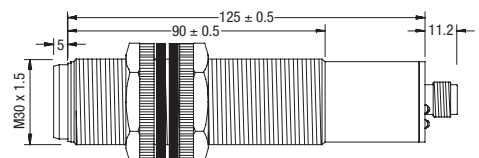
### M18 plug



### M30 cable

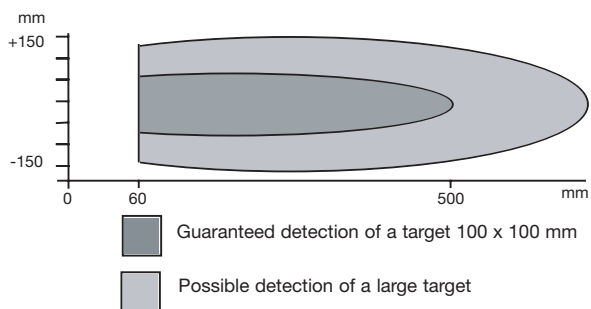


### M30 plug

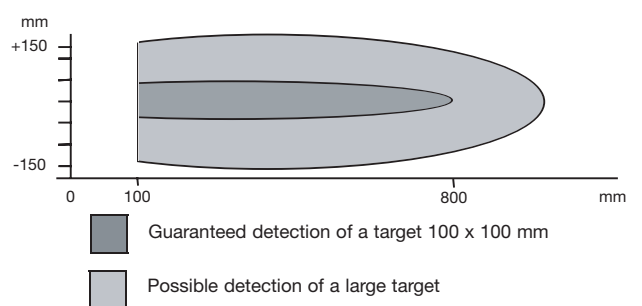


## Detection Range

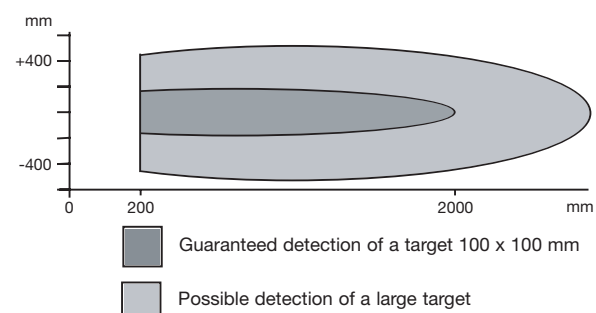
### UA18CLD05



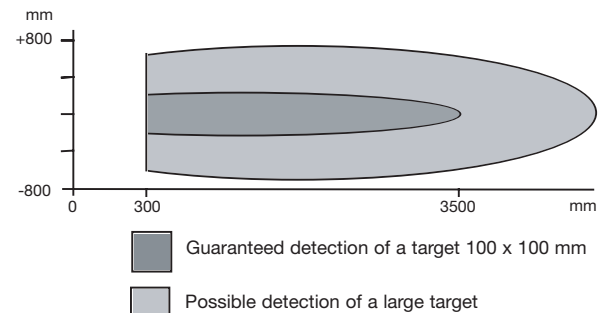
### UA18CLD08



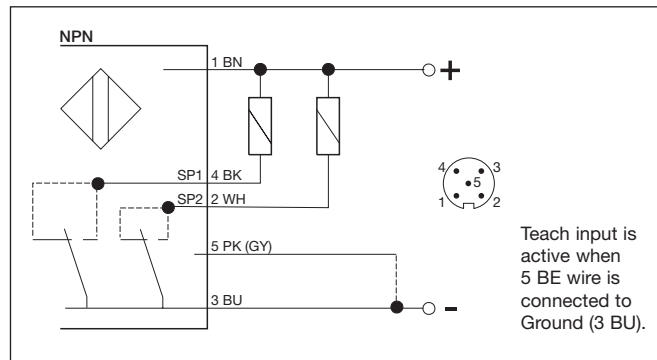
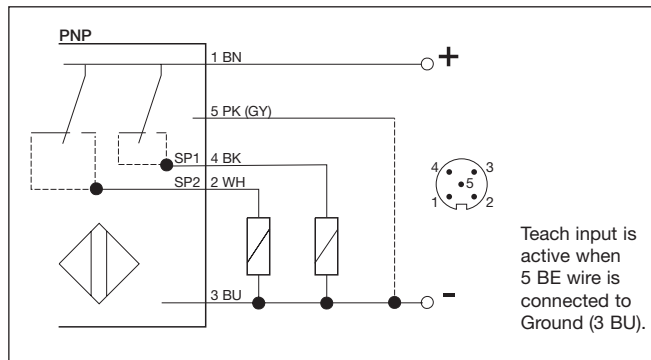
### UA18CLD20



### UA30CLD35



## Wiring Diagram



## Teach-in procedure

### Normal switching function

#### The Teach-In function

When - in the following paragraphs, the term "Activate Teach-In" is used, this means: make contact between the Teach-in wire and GND wire once (ON-OFF) - could be done with an externally mounted switch.

When - in the following paragraphs, the term "Hold Teach-In" is used, this means: make contact between the Teach-in wire and GND wire (ON) - could be done with an externally mounted switch.

#### Teach-In of P1 (SP1 position)

Hold Teach-In for 8 seconds until P1 and Echo LED's start flashing 2 times per second.

The sensor is now in teach mode for P1:

P1 LED will now flash once per second and the Echo LED returns to normal function (alignment LED).

The Teach-In function is now open for 1 minute to do the programming of P1.

Place the target at the new position P1.

Activate Teach-in: P1 is now programmed.

Sensor returns to normal function with new value for P1.

**Switching output characteristics** can be selected during teaching of the set point P1. If activating the Teach-In as the LED is ON - the switching output will have NO characteristics, if doing this as the LED is OFF, the switching output will have NC characteristics.

#### Teach-In of P2 (SP2 position)

Hold Teach-In for 14 seconds until the P2 and Echo LEDs start flashing 2 times per second. After 8 seconds, the P1 and Echo LEDs will start flashing, but this must be ignored and after an additional 5 seconds the P2 is reached.

The sensor is now in teach mode for P2:

P2 LED is flashing once per second. The Echo LED returns to normal function (alignment LED).

Teach-mode is now open for 1 minute to do the programming of P2.

Move the target to the new position P2.

Activate Teach-in: P2 is now programmed.

Sensor returns to normal function with new value for P2.

**Switching output characteristics** can be selected during teaching of the set point P2. If activating the Teach-In as the LED is ON - the switching output will have NO characteristics, if doing this as the LED is OFF, the switching output will have NC characteristics.

### Window function/ Hysteresis adjustment

Hold Teach-In for 20 seconds - to skip through the P1 and P2 teaching sequences - until P1, P2 and Echo LED's start flashing 2 times per second indicating the function teach mode.

De-activate Teach-In to enter teach mode for Window Function / Hysteresis Adjustment:

P1 LED is flashing once per second.

The Echo LED returns to normal function (alignment LED).

Teach-mode is now open for 1 minute to complete the programming.

Now activate Teach-In at the desired LED indication (see below):

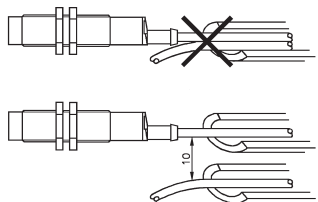
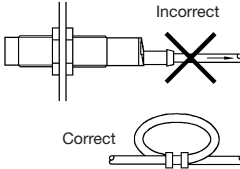
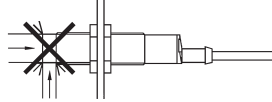
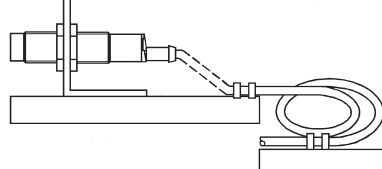
#### P1 LED is OFF = Window Function

Activating Teach-In now, makes the sensor operate in Windows Function mode. If there is an object between P1 and P2, SP1 will switch ON and SP2 will switch OFF. If there is no object between P1 and P2, SP1 will switch OFF and SP2 will switch ON.

#### P1 LED is ON = Hysteresis Adjustment

Activating Teach-In now, makes the sensor operate in Hysteresis Adjustment mode. (The switching output SP1 will be NO at P1 with hysteresis P1-P2 and switching output SP2 will be NC also at P1 with hysteresis P1-P2).

## Installation Hints

|                                                                                                                                                                                                                                                                          |                                                                                                                                                              |                                                                                                                                                                                               |                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><i>To avoid interference from inductive voltage/current peaks, separate the prox. switch power cables from any other power cables, e.g. motor, contactor or solenoid cables</i></p>  | <p><i>Relief of cable strain</i></p>  <p>The cable should not be pulled</p> | <p><i>Protection of the sensing face</i></p>  <p>A proximity switch should not serve as mechanical stop</p> | <p><i>Switch mounted on mobile carrier</i></p>  <p>Any repetitive flexing of the cable should be avoided</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|