

# Ultrasonic Diffuse, Dual Transistor Outputs Type M18 and M30

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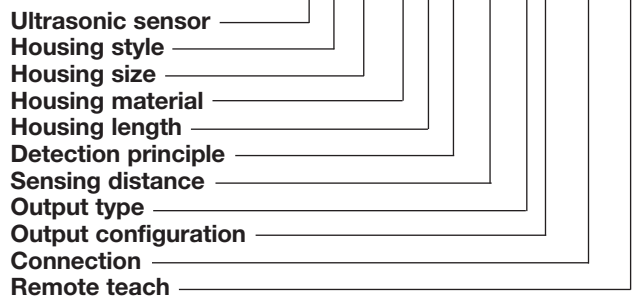
- M18 and M30 PBT housing
- Sensing distance: 60 - 3500 mm
- Remote Teach by wire
- Outputs: 2 multi function switching outputs PNP, NPN, NO or NC
- Setup of "Normal Switching", "Window" or "Adjustable Hysteresis" function
- Power supply: 12 to 30 VDC
- 8° beam angle
- Protection: Short-circuit, reverse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



## 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	<b>UA18CLD05PPM1TR</b>
M18 x 93 mm	Cable	60-500 mm	2 x PNP, NO/NC	<b>UA18CLD05PPTR</b>
M18 x 93 mm	Plug M12, 5 pin	60-500 mm	2 x NPN, NO/NC	<b>UA18CLD05NPM1TR</b>
M18 x 93 mm	Cable	60-500 mm	2 x NPN, NO/NC	<b>UA18CLD05NPTR</b>
M18 x 93 mm	Plug M12, 5 pin	100-800 mm	2 x PNP, NO/NC	<b>UA18CLD08PPM1TR</b>
M18 x 93 mm	Cable	100-800 mm	2 x PNP, NO/NC	<b>UA18CLD08PPTR</b>
M18 x 93 mm	Plug M12, 5 pin	100-800 mm	2 x NPN, NO/NC	<b>UA18CLD08NPM1TR</b>
M18 x 93 mm	Cable	100-800 mm	2 x NPN, NO/NC	<b>UA18CLD08NPTR</b>
M18 x 93 mm	Plug M12, 5 pin	200-2000 mm	2 x PNP, NO/NC	<b>UA18CLD20PPM1TR</b>
M18 x 93 mm	Cable	200-2000 mm	2 x PNP, NO/NC	<b>UA18CLD20PPTR</b>
M18 x 93 mm	Plug M12, 5 pin	200-2000 mm	2 x NPN, NO/NC	<b>UA18CLD20NPM1TR</b>
M18 x 93 mm	Cable	200-2000 mm	2 x NPN, NO/NC	<b>UA18CLD20NPTR</b>
M30 x 125 mm	Plug M12, 5 pin	300-3500 mm	2 x PNP, NO/NC	<b>UA30CLD35PPM1TR</b>
M30 x 123.5 mm	Cable	300-3500 mm	2 x PNP, NO/NC	<b>UA30CLD35PPTR</b>
M30 x 125 mm	Plug M12, 5 pin	300-3500 mm	2 x NPN, NO/NC	<b>UA30CLD35NPM1TR</b>
M30 x 123.5 mm	Cable	300-3500 mm	2 x NPN, NO/NC	<b>UA30CLD35NPTR</b>

## Technical Data

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



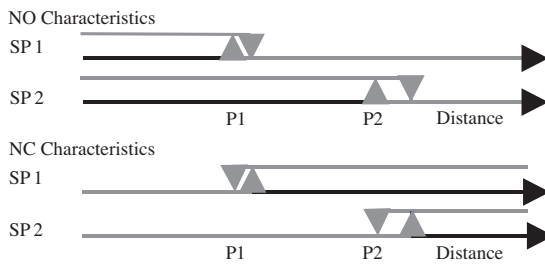
## Technical Data Ccont.)

<b>Carrier Frequency</b>	CLD05	330 kHz
	CLD08	300 kHz
	CLD20	180 kHz
	CLD35	130 kHz
<b>Response time</b>		Step response
	CLD05	20 ms 50 ms
	CLD08	20 ms 50 ms
	CLD20	40 ms 100 ms
	CLD35	80 ms 200 ms
<b>Hysteresis (H)</b> (differential travel)	Programmable, min. 1%	
<b>Repeatability</b>	CLD05 + CLD08	0.2% / 0.5 mm
	CLD20	0.1%
	CLD35	0.2% / 1.2 mm
<b>Temperature compensation</b>	Yes	
<b>Beam angle</b>	8°	

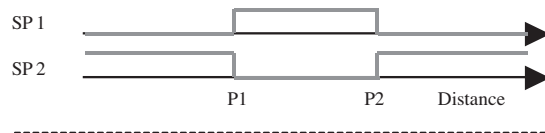
<b>Ambient temperature</b>		-15° to +70°C (5° to +158°F)
Operating and Storage		
<b>Degree of protection</b>		IP 67 (Nema 1, 3, 4, 6, 13)
<b>Housing material</b>		PBT
<b>Tightening torque</b>	M18	2.6 Nm
	M30	7.5 Nm
<b>Connection</b>		2 m, 5 x 0.25 mm <sup>2</sup> M12, 5-pin CONM15 series
Cable		
Cables for plug (M1)		
<b>Weight</b>	UA 18 ...A.	96 g
	UA 18 ...A.M1	57 g
	UA 30 ...A.	199 g
	UA 30 ...A.M1	140 g
<b>CE-marking</b>	Yes	

## Switching Operation

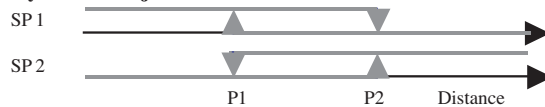
### Normal Switching Operation



### Windows Function



### Hysteresis Adjustment



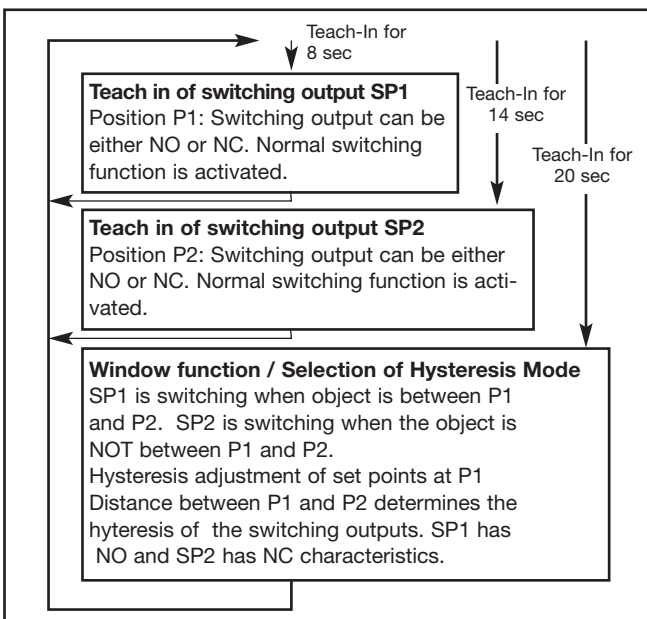
The following 3 different modes of the switching outputs can be selected:

#### I Normal switching function

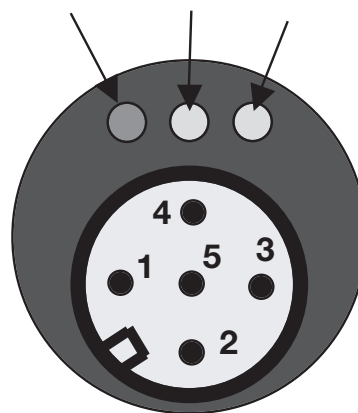
#### II Window function

#### 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:



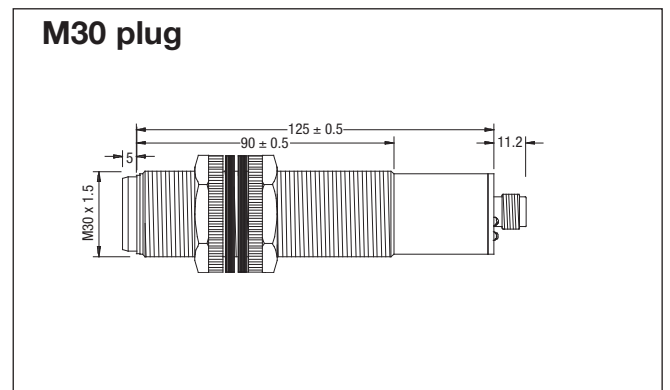
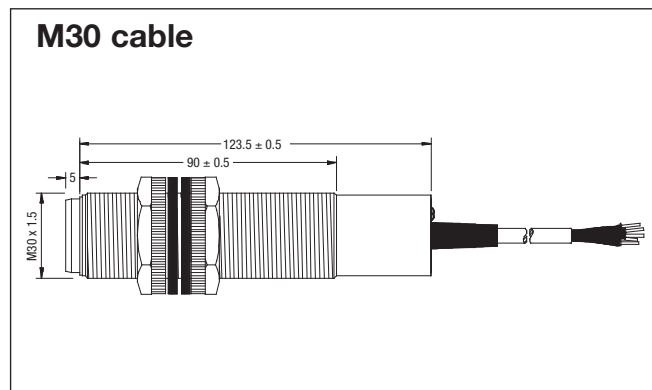
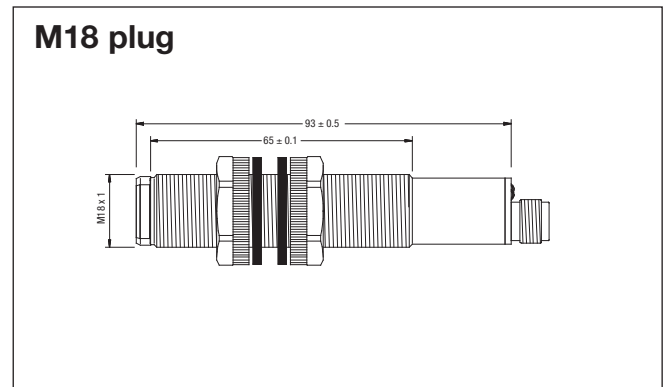
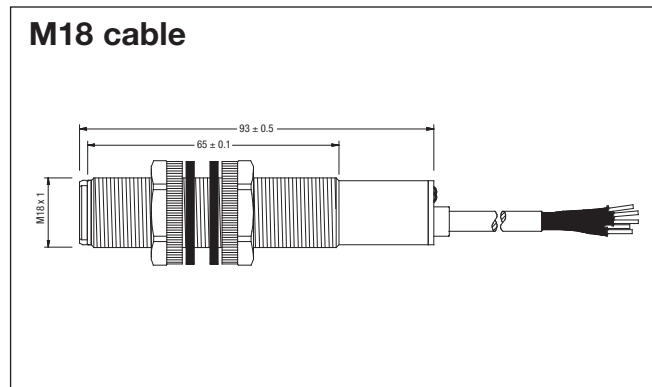
**Echo P1 P2**  
**Green Yellow Yellow**



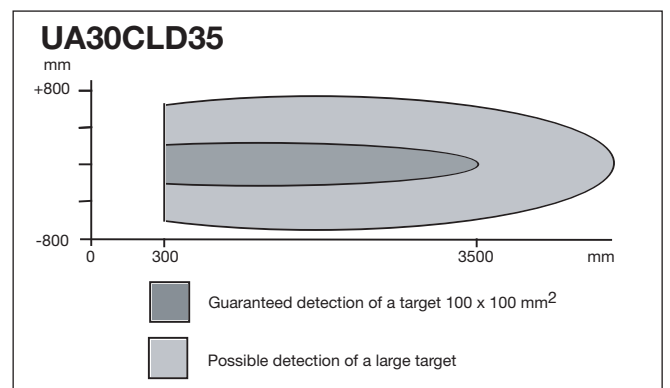
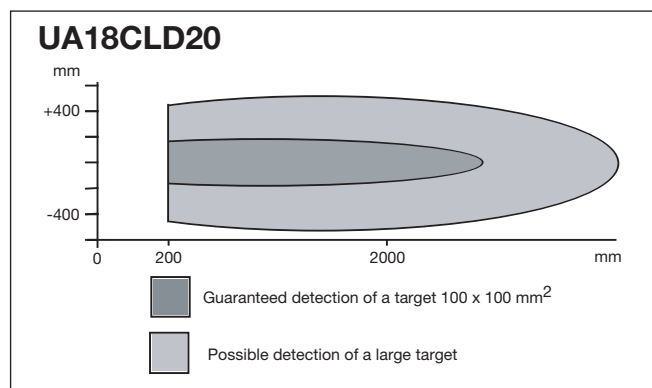
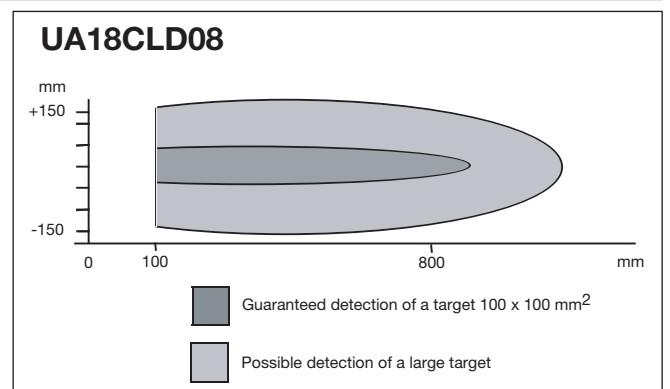
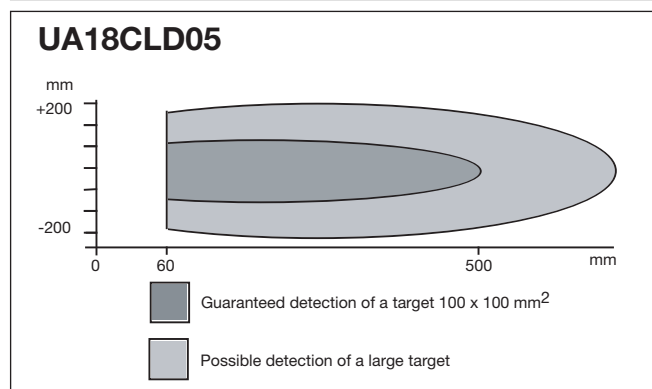
### Normal function:

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

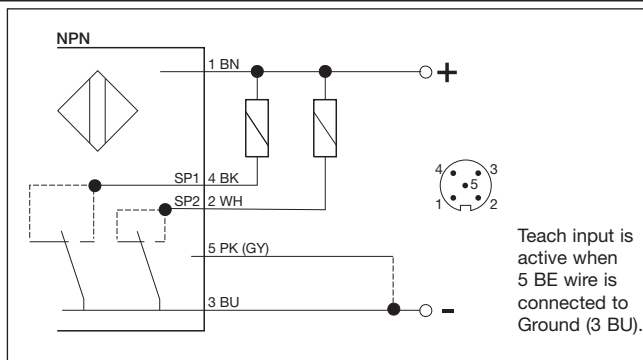
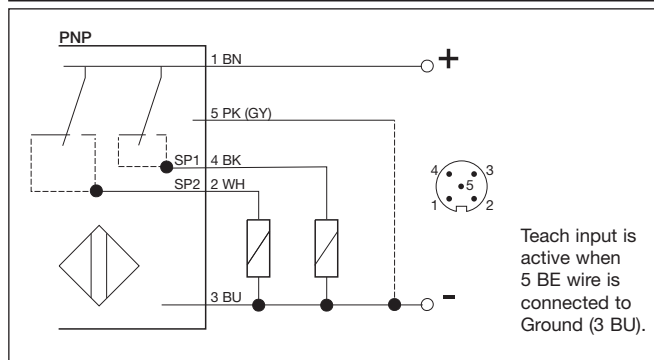
## Dimensions



## Detection Range



## 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 and P2 LED are 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):

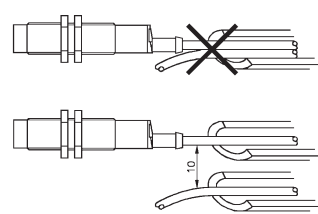
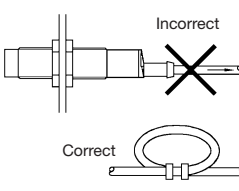
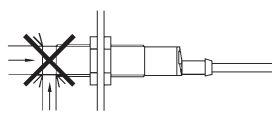
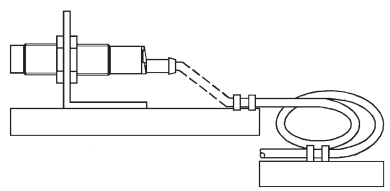
#### P1 and P2 LED are OFF = Window Function

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 and P2 LED are 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>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</p>  <p>The diagram shows two scenarios of cable routing. The top scenario shows a proximity switch with its power cables bundled together with other power cables, marked with a large 'X' to indicate it is incorrect. The bottom scenario shows the proximity switch power cables routed separately from other power cables, with a 90-degree bend indicated by a curved arrow and the number '90', indicating this is the correct installation method.</p>	<p>Relief of cable strain</p>  <p>The diagram shows two ways to handle cable strain. The top part shows a cable being pulled directly from the switch, marked with a large 'X' and labeled 'Incorrect'. The bottom part shows a cable loop with a strain relief device (a small ring) at the connection point, labeled 'Correct'.</p> <p>The cable should not be pulled</p>	<p>Protection of the sensing face</p>  <p>The diagram shows a proximity switch with its sensing face exposed to a cable bundle, marked with a large 'X' to indicate it is incorrect. The correct installation would involve protecting the sensing face from the cable bundle.</p> <p>A proximity switch should not serve as mechanical stop</p>	<p>Switch mounted on mobile carrier</p>  <p>The diagram shows a proximity switch mounted on a mobile carrier. The cable is shown with repetitive flexing, indicated by dashed lines and a circular arrow, which is noted as something to be avoided.</p> <p>Any repetitive flexing of the cable should be avoided</p>
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