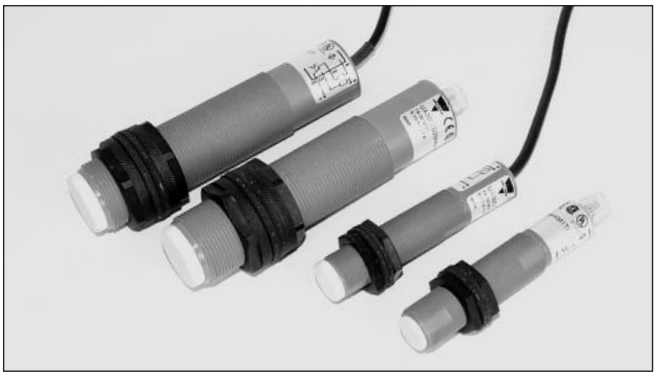
Ultrasonic
Diffuse, Dual Transistor Outputs
Type M18 and M30



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

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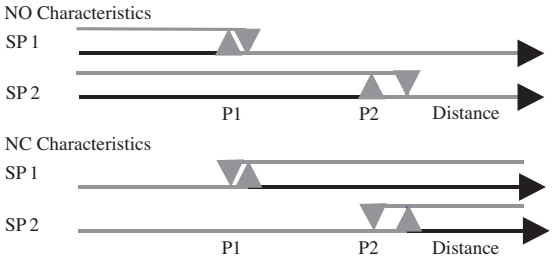
Technical Data Ccont.)

Carrier Frequency	CLD05	330 kHz	
	CLD08	300 kHz	
	CLD20	180 kHz	
	CLD35	130 kHz	
Response time			Step response
	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			
CLD05 + CLD08		0.2% / 0.5 mm	
CLD20		0.1%	
CLD35		0.2% / 1.2 mm	
Temperature compensation		Yes	
Beam angle		8°	

Ambient temperature		
Operating and Storage		-15° to +70°C (5° to +158°F)
Degree of protection		IP 67 (Nema 1, 3, 4, 6, 13)
Housing material		PBT
Tightening torque	M18	2.6 Nm
	M30	7.5 Nm
Connection		
Cable		2 m, 5 x 0.25 mm²
Plug		M12, 5-pin
Cables for plug (M1)		CONM15 series
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

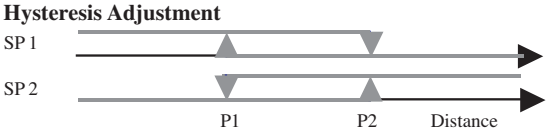
Switching Operation

Normal Switching Operation



Windows Function

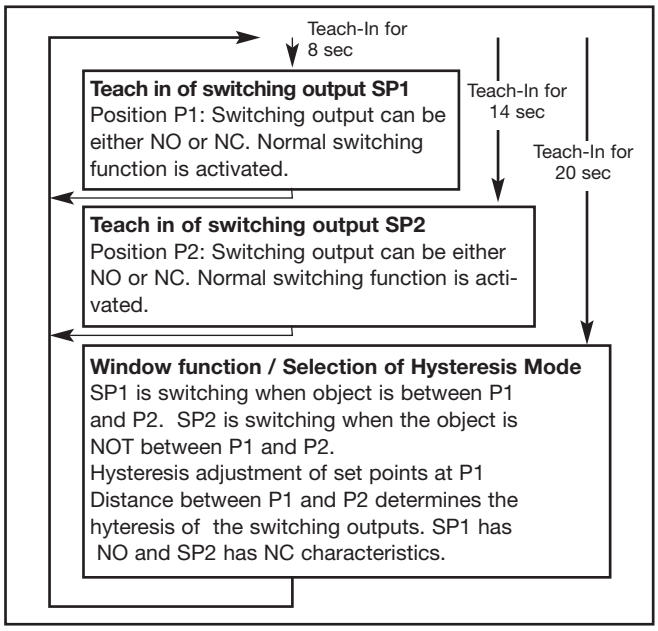
Hysteresis Adjustment



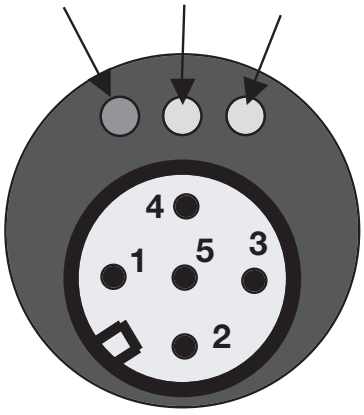
The following 3 different modes of the switching outputs can be selected:

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:



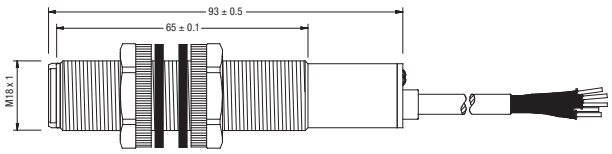
Echo Green P1 Yellow P2 Yellow



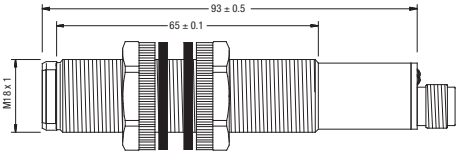
Normal function:
The Echo LED is ON when an echo is received (alignment LED). P1 and P2 LEDs are indicating status of the switching outputs.

Dimensions

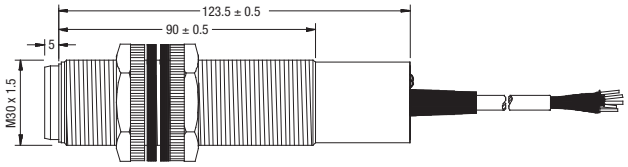
M18 cable



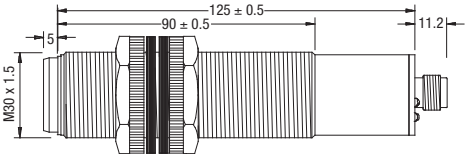
M18 plug



M30 cable

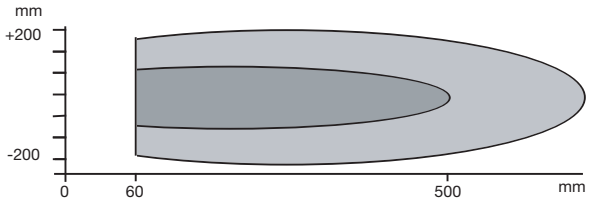


M30 plug



Detection Range

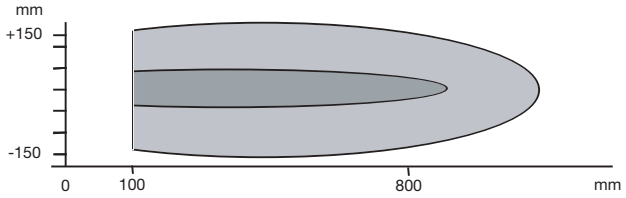
UA18CLD05



Guaranteed detection of a target 100 x 100 mm^2

Possible detection of a large target

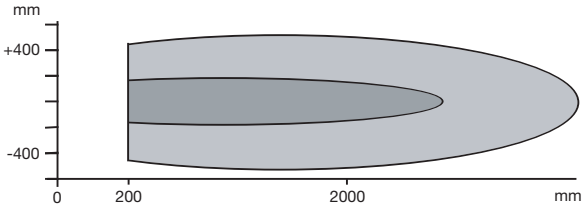
UA18CLD08



Guaranteed detection of a target 100 x 100 mm^2

Possible detection of a large target

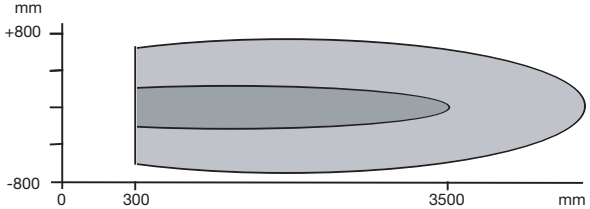
UA18CLD20



Guaranteed detection of a target 100 x 100 mm^2

Possible detection of a large target

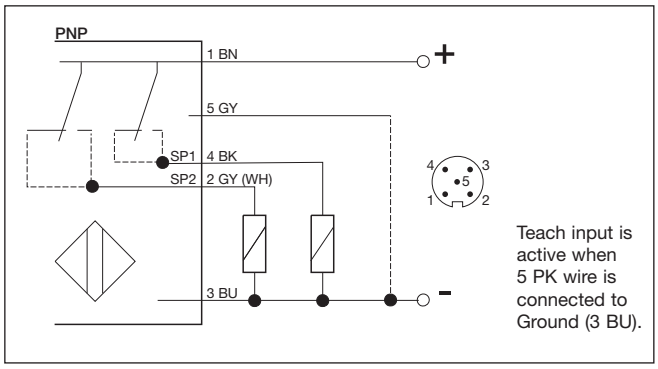
UA30CLD35

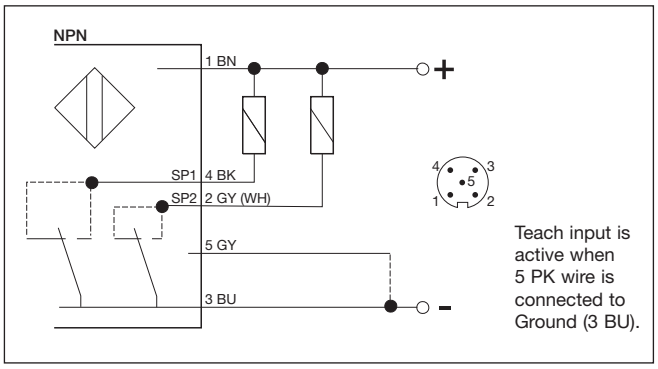


Guaranteed detection of a target 100 x 100 mm^2

Possible detection of a large target

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).

Specifications are subject to change without notice (07.07.2009)

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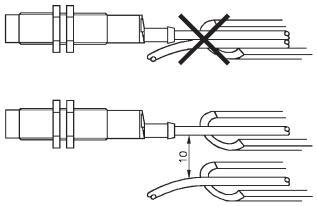
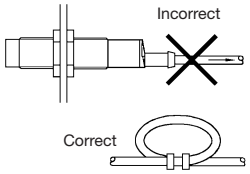
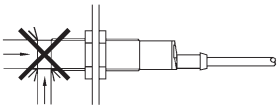
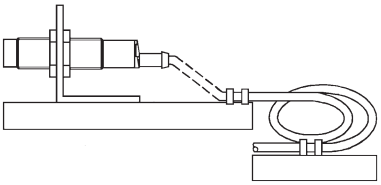
Installation Hints

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	*Relief of cable strain*	*Protection of the sensing face*	*Switch mounted on mobile carrier*
			
	The cable should not be pulled	A proximity switch should not serve as mechanical stop	Any repetitive flexing of the cable should be avoided