Ultrasonic
Diffuse, Dual Transistor Outputs
Type UC 80 CND 60 . P M1 TR

CARLO GAVAZZI

- Square 80 mm ABS housing
- Sensing distance: 600 - 6000 mm
- Remote Teach by wire
- Outputs: 2 multi function switching outputs PNP or NPN, NO or NC
- Setup of "Normal Switching", "Window" or "Adjustable Hysteresis" function
- Power supply: 15 to 30 VDC
- 8° beam angle
- Protection: Short-circuit, reverse polarity, transients
- Protection degree IP 67
- M12 plug, 5 pin

Product Description

A self-contained multi func-tion diffuse ultrasonic sensor with a sensing range of 600 to 6000 mm. 2 switching outputs - easily set up for 3 different switching modes and adjusted by teach-in - makes it ideal for level con-trol tasks in a wide variety of vessels. A sturdy one-piece ABS housing provides the perfect packaging for the sofisticated microprocessor controlled and digitally fil-tered sensor electronics. Excellent EMC performance and precision are typical features of this sensor based on true distance measurement.

Ordering Key   UC80CND60PPM1TR

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

Type Selection

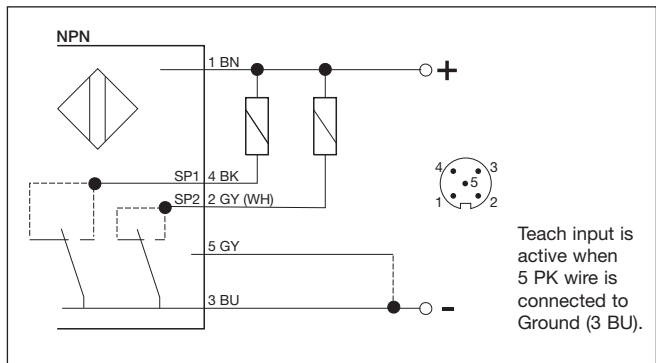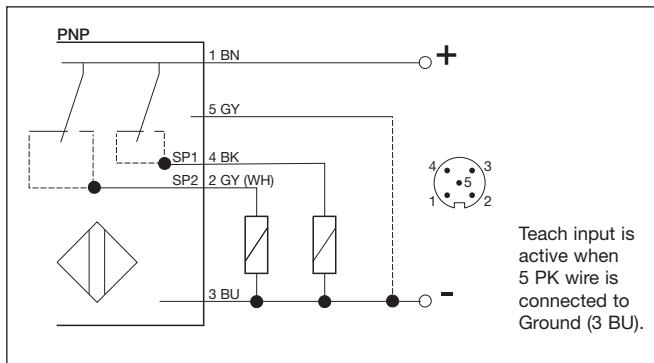| Housing dimensions	Connection	Rated operating dist. (S_n)	Outputs	Ordering no.
80 x 80 x 50 mm	Plug M12, 5 pin	600-6000 mm	2 x PNP, NO/NC	**UC 80 CND 60 PP M1 TR**
80 x 80 x 50 mm	Plug M12, 5 pin	600-6000 mm	2 x NPN, NO/NC	**UC 80 CND 60 NP M1 TR**

Technical Data

Rated operational volt. (Ue)	15 to 30 VDC (ripple included)	**Response time**	70 ms (target speed 1 m/s in beam direction) 700 ms (step response)
Ripple	≤ 10%		
Output current (Ie)	max. 500 mA (continuous)		
No-load supply current (Io)	≤ 80 mA	**Hysteresis** (H) (differential travel)	Programmable
Protection	Short-circuit, transients and reverse polarity	**Temperature compensation**	Yes
		Beam angle	8°
Rated insulation voltage	> 1 kV	**Ambient temperature** Operating and Storage	-15° to +70°C (5° to +158°F)
Output	2 PNP or NPN open collector outputs, NO or NC	**Environment** Overvoltage category	II (IEC 60664/60664A, 60947-1)
Power-on delay	200 ms	Pollution degree	3 (IEC 60664/60664A, 60947-1)
Voltage drop (Ud)	< 0.5 V	Degree of protection	IP 67 (IEC 60529, 60947-1)
Off-state current (Ir)	< 10 µA	**Housing material**	ABS
Teach-in Set point adjustment	NO/NC selection Switching modes selection	**Connection** Cables for plug (M1)	Plug M12, 5-pin CONM15 series
Indication	Set points, 2 LEDs yellow Echo, 1 LED green	**Weight**	300 g
Rated operating distance	600 - 6000 mm	**CE-marking**	Yes
Operating frequency	0.5 Hz		
Carrier frequency	80 kHz		

Specifications are subject to change without notice (07.07.2009)

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Wiring Diagram

PNP

1 BN   +
5 GY
SP1 4 BK
SP2 2 GY (WH)
3 BU   -

Teach input is active when 5 PK wire is connected to Ground (3 BU).

NPN

1 BN   +
SP1 4 BK
SP2 2 GY (WH)
5 GY
3 BU   -

Teach input is active when 5 PK wire is connected to Ground (3 BU).

Switching Operation

Normal Switching Operation

NO Characteristics

SP 1

SP 2

P1   P2   Distance

NC Characteristics

SP 1

SP 2

P1   P2   Distance
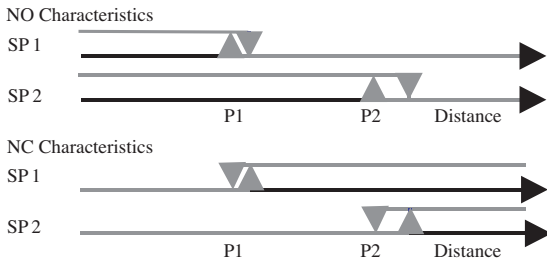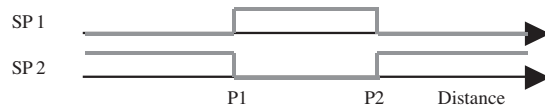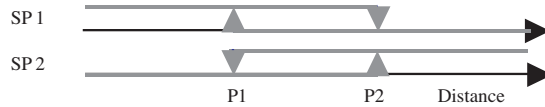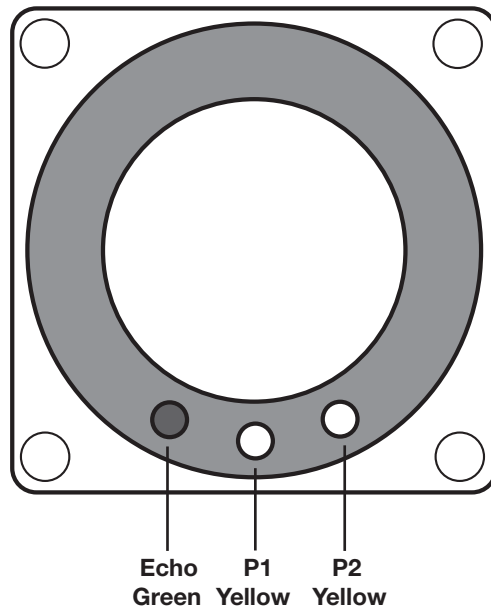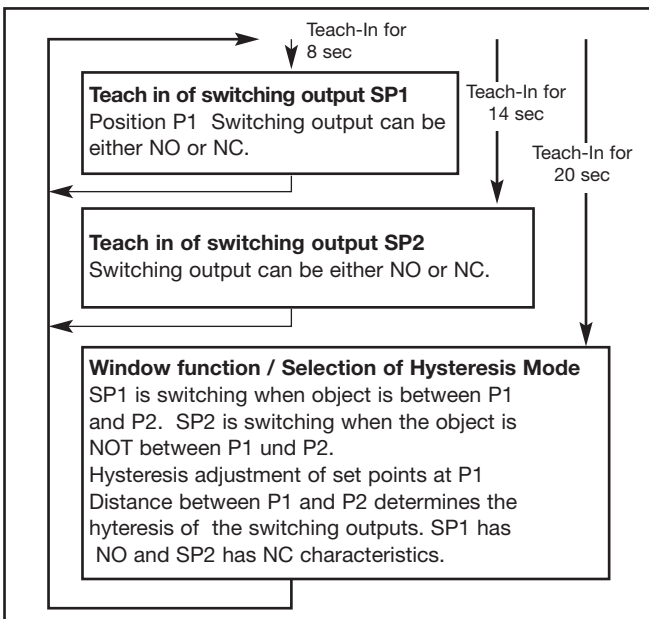
The following 3 different modes of the switching outputs can be selected:

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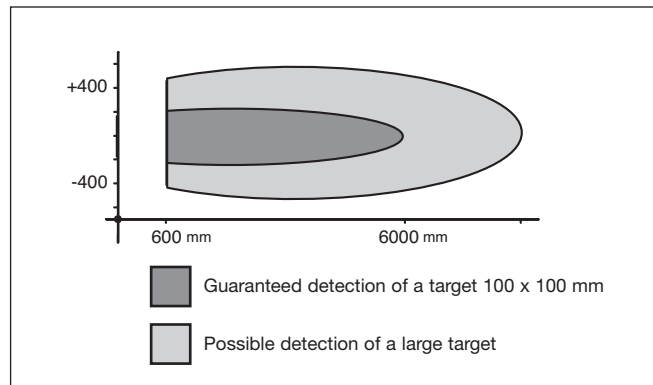II **Window function**
III **Adjustable hysteresis**

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:
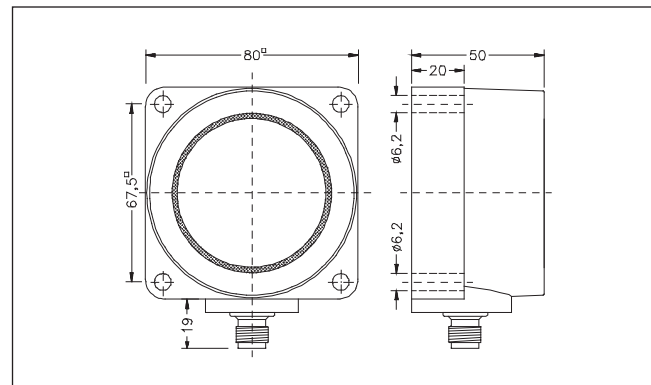

Teach-In for 8 sec

Teach in of switching output SP1
Position P1 Switching output can be either NO or NC.

Teach-In for 14 sec

Teach-In for 20 sec

Teach in of switching output SP2
Switching output can be either NO or NC.

Window function / Selection of Hysteresis Mode
SP1 is switching when object is between P1 and P2. SP2 is switching when the object is NOT between P1 und P2.
Hysteresis adjustment of set points at P1
Distance between P1 and P2 determines the hyteresis of the switching outputs. SP1 has NO and SP2 has NC characteristics.

Windows Function

SP 1

SP 2

P1   P2   Distance

Hysteresis Adjustment

SP 1

SP 2

P1   P2   Distance

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.

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Detection Range

+400

-400

600 mm   6000 mm

■ Guaranteed detection of a target 100 x 100 mm

□ Possible detection of a large target

Dimensions

Dimensions in mm.

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:
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 do the programming of P1.
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 hysteresis 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.

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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
	Incorrect / Correct — The cable should not be pulled	A proximity switch should not serve as mechanical stop	Any repetitive flexing of the cable should be avoided

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