Level measurement

Model **7358**   **Ultrasonic level sensor**

Specifications

Measuring range: 0.25m to 6m

Connection: 1" BSPP or 1"1/2 BSPP

Power supply: 18 to 36 VDC

Electrical output: 4–20mA (2 wires) or 0–10V (3 wires)

Accuracy: 0.15% of the measurement range

Max. pressure: 1 bar

Ambient temperature: - 30°C to +60°C

Material: PP housing, PVDF transducer
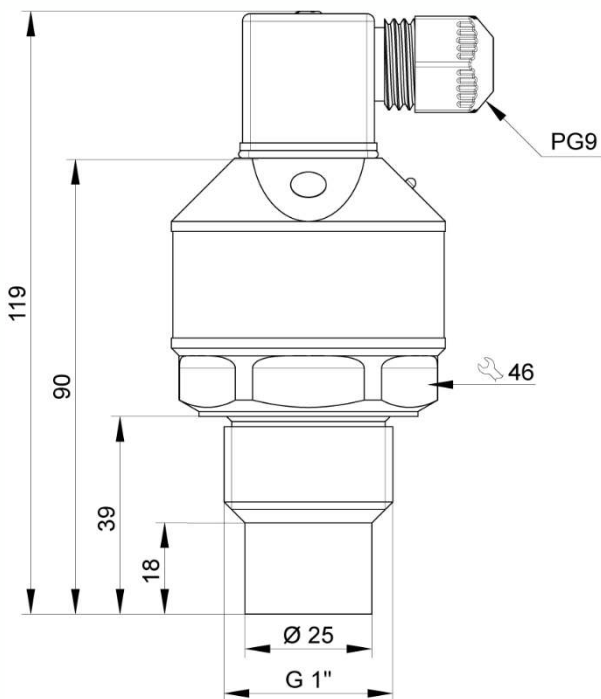
IP67

Delivered with 5m of cable

On request:

- ATEX version

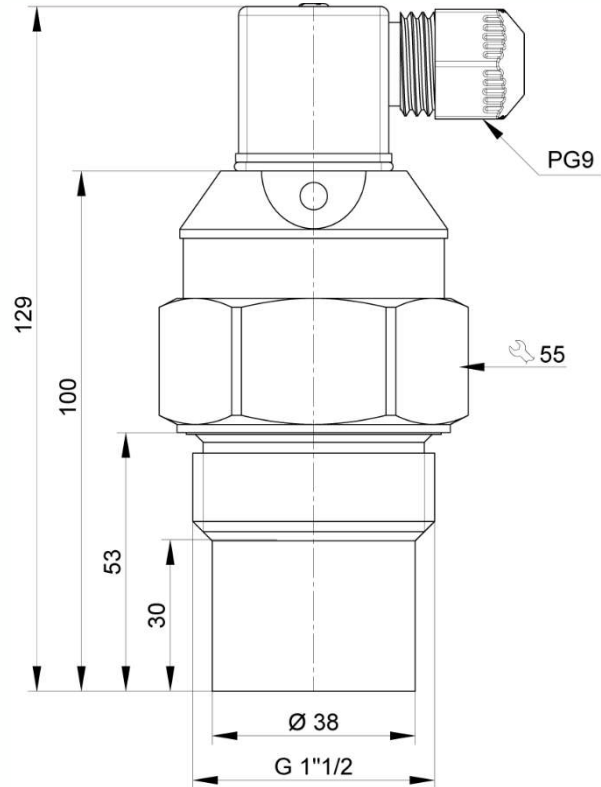- measuring range up to 20m

- flange connectors

PG9

119
90
39
18
Ø 25
G 1"

⚙ 46

Part number 973581-2I and 973581-2U

PG9

129
100
53
30
Ø 38
G 1"1/2

⚙ 55

Part number 973581-6I and 973581-6U

Measuring range (m)	Connection (inches)	Output signal	Weight (kg)	Part number
0.2 to 2	G 1" BSPP	4–20mA 2 wires	0.20	**973581-2I**
0.2 to 6	G 1"1/2 BSPP	4–20mA 2 wires	0.25	**973581-6I**
0.2 to 2	G 1" BSPP	0–10V 3 wires	0.20	**973581-2U**
0.2 to 6	G 1"1/2 BSPP	0–10V 3 wires	0.25	**973581-6U**

Use

Ultrasonic level sensors can be used to continuously measure fluid level without having to be in contact with the fluid being measured. They can be used with a range of fluids such as liquids, water containing particles, paste type mediums and resins etc.
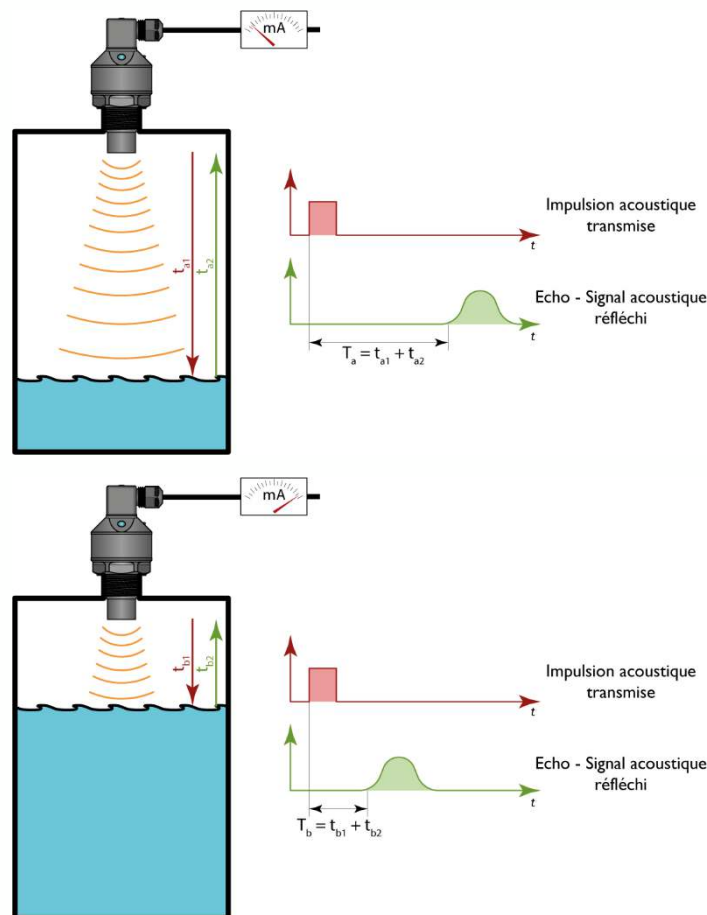
They are autonomous instruments which contain an electro-acoustic transducer as well as an electronic module to convert the signal. They work by transmitting a series of ultrasonic impulsions which are reflected off the surface of the fluid you want to measure. The reflected waves are received by the sensor and treated by the electronic module.

The distance between the sensor and the surface of the liquid is calculated based on the time it takes for a wave to travel between the sensor's transducer and the fluid's surface and back again.

You can configure the sensor using the two buttons on top of the sensor's body.

You can choose whether the sensor's output signal is 2 wires 4-20mA or 3 wires 0-10V.

Measurement principal:

If $T_a > T_b$ then $I_a < I_b$ (or $V_a < V_b$)

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Installation and configuration

You must install ultrasonic level sensors on the top of a tank (e.g. on the tank inlet or cover) so that their measuring axis is perpendicular to the fluid surface you want to measure.

If there is any foam present on the surface of the fluid this could absorb the signal emitted by the sensor and cause a measurement error. Due to this you should position the sensor where there is no, or only very little, foam formation.

You must protect the sensor from the sun as the material its housing is made from is sensitive to UV rays and will break up rapidly if it is directly exposed to them.

Installation diagram

Standard installation:
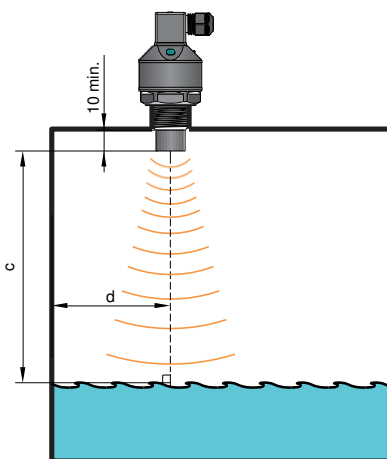
d = distance to the edge of the tank

c = the sensor's measuring range

c_{max} = max. measuring range (the lowest surface level that the liquid can have)

For 973581-2I and 973581-2U, G 1" connectors:

- Dead zone when c < 200mm
- $d > c_{max}/12$

For 973581-6I and 973581-6U, G 1"1/2 connectors:
- Dead zone when c < 200mm
- $d > c_{max}/8$

Sometimes the level of the liquid in the tank will rise too high and the fluid surface will be located in the sensor's dead zone (c<200mm). You can avoid this problem by installing the sensor higher up, but you must make sure that it is still installed following the installation rules.

Installation in a narrow neck:
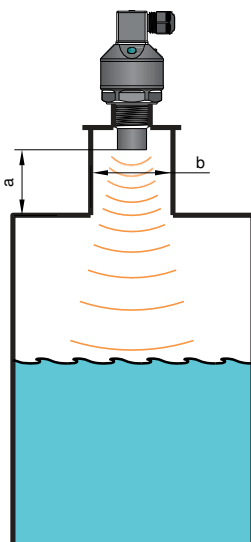
a = distance between the base of the neck and the transducer

b = neck diameter

c = the sensor's measuring range

- Dead zone when c < 200mm
- b > 100 mm
- a < 1.5 x b

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Wiring

The 7358 sensor is designed to be connected to a +18 to +36 VDC power supply.
You can connect it using a 2 or 3 wire cable with wires which have an external diameter of 6 to 8 mm. The recommended surface area for the cores is between 0.5 to 0.75 mm^2.

For a 4-20mA 2-wire signal:
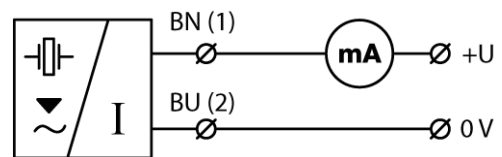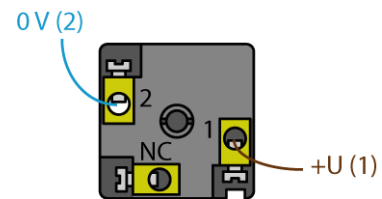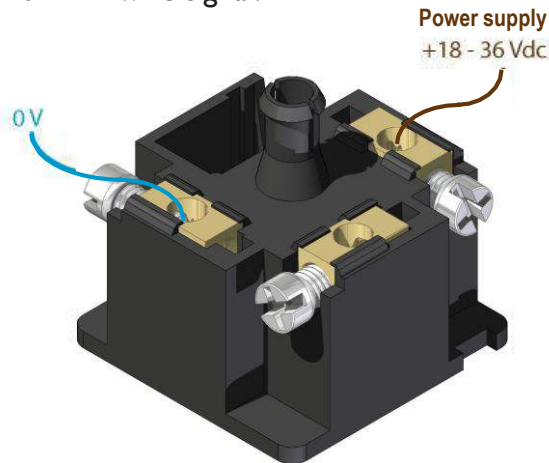
Connect the power supply to terminal 1. The feedback signal depends on the current (in mA) measured for this phase.
Connect the neutral (or the common) to terminal 2.

For a 0-10V 3-wire signal:
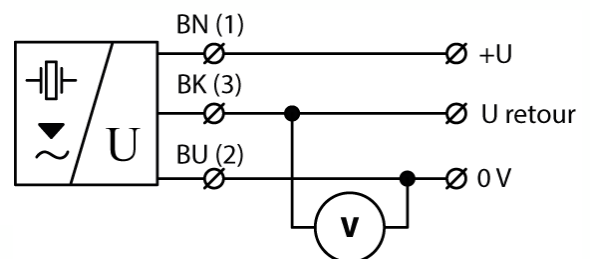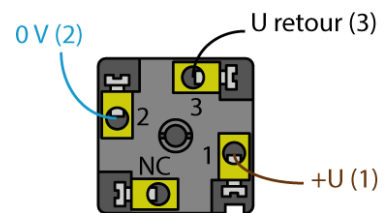
Connect the power supply to terminal 1.
Connect the neutral (or the common) to terminal 2.
Connect the measuring phase to terminal 3. The feedback signal depends on the voltage difference between terminal 3 and the neutral (terminal 2).

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Configuration

Configure the sensor using its 'UP' and 'DOWN' buttons. The sensor also has 2 state indicator LEDs.

How to configure the measurement range:

The 'DOWN' button allows you to:

- go into 'configuration' mode,
- save the lowest limit value (as either 4mA or 0V),
- change this lowest value (4mA or 0V) incrementally.

The 'UP' button allows you to:

- go into 'configuration' mode,
- save the highest limit value (as either 20mA or 10V),
- change this highest value (20mA or 10V) incrementally.

Bouton « UP »
(« ON »)

Bouton « DOWN »
(« OFF »)

DEL indicatrice
(« RUN »)

DEL indicatrice
(« STATE »)

How to configure the value corresponding to 4mA (or 0V):

1. Empty the tank until only the minimum required volume of fluid is left in it.
2. Press on the 'DOWN' button for at least 2 seconds to activate the 'configuration' mode (the 'STATE' LED will flash slowly). Hold the 'DOWN' button down for 3 more seconds to save the value 4mA or 0V directly. If you have saved one of these values go straight to step 4.
3. Press on the 'DOWN' or 'UP' button to configure the limit value incrementally (hold the corresponding button down to gradually increase or decrease the value).
4. Press on the two buttons ('UP' and 'DOWN') simultaneously for at least 1 second to validate the saved value. The 'STATE' LED will flash briefly 3 times.
5. If you need to change the value you will need to wait at least 2 seconds after this step (after you have released the buttons).

How to configure the value corresponding to 20mA (or 10V):

1. Fill the tank until it reaches the maximum required volume of fluid.
2. Press on the 'UP' button for at least 2 seconds to activate the 'configuration' mode (the 'STATE' LED will flash slowly). Hold the 'DOWN' button down for 3 more seconds to save the value 20mA or 10V directly. If you have saved one of these values go straight to step 4.
3. Press on the 'DOWN' or 'UP' button to configure the limit value incrementally (hold the corresponding button down to gradually increase or decrease the value).
4. Press on the two buttons ('UP' and 'DOWN') simultaneously for at least 1 second to validate the saved value. The 'STATE' LED will flash briefly 3 times.
5. If you need to change the value you will need to wait at least 2 seconds after this step (after you have released the buttons).

How to reset the sensor to the factory set values

1. Disconnect the sensor's electric power supply.
2. Press on the two buttons ('UP' and 'DOWN') simultaneously while the sensor is disconnected.
3. Turn on the sensor's electric power supply while you keep the two buttons ('UP' and 'DOWN') pressed down.
4. Wait for about 4 seconds until the 'STATE' LED flashes 3 times quickly. Then release the two buttons.
5. The sensor will be reconfigured with its original factory settings i.e. the limit values will be reinitialised.

How to configure the sensor in reverse mode:

You can configure the sensor in reverse mode (i.e. where 4mA corresponds to a full tank and 20mA to an empty tank) by configuring the 4mA value when the tank is full and the 20mA value when the tank is empty.

State indicators:

LED indicator	Colour	Function
'RUN'	Green	**Short flashes** (flash length is between 1 to 2 seconds depending on the measurement range): Reception of the signal (echo) reflected off the measurement surface. **Quick flashes**: The measurement surface is in the sensor's dead zone or the ultrasonic transducer is dirty. **No light**: The sensor cannot receive the echo – it is installed incorrectly or it is not working correctly.
'STATE'	Orange	**Slow flashes**: The 4mA (or 0V) limit is configured. **Quick flashes**: The 20mA (or 10V) limit is configured. **3 short flashes**: The limits are configured.

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