

The **S461TN probe** is used for the optical measure of turbidity in pure and process waters up to 1000 NTU or 4000NTU.

The probe uses the 90° scattered light method.

Applications

- Measure of turbidity in pure and drinkable water
- Measure of turbidity in primary, industrial, recirculating water

Features and benefits

- Reliable concentration measurement using optical measuring process
- Infrared light pulsing beams scattering method
- AISI 316 and black rigid PVC sensor body (optional only AISI 316 or only PVC)
- No mechanically moving parts
- Measured value pre-processing in sensor resulting in low signal transmission sensitivity
- Immediate installation and easy maintenance

Turbidity measurement with the 90° scattered light method

By turbidity we mean the scattered component of a light beam which is diverted away from its original course by optically denser particles in the medium e.g. solid matter particles.

Measurements are made using the standardised 90° scattered light method in accordance with ISO 7027 / EN 27027. The measuring method is based on the Tyndall effect.

The turbidity of the medium is determined from the amount of scattered light. The transmitted infra-red light beam is scattered by the particles in the medium.

The scattered beams are measured by scattered light receivers which are fixed at an angle of 90 to the transmitted light. The measured scattered light signals are converted to frequency signals.

The frequency signals are assigned to corresponding turbidity units and solid matter concentrations, and appear in the display.

Principle of 90° scattered beam Measurement:

$$I_s = I_0 \cdot A \cdot C \cdot f(\alpha)$$

I_0 = Intensity of transmitted light

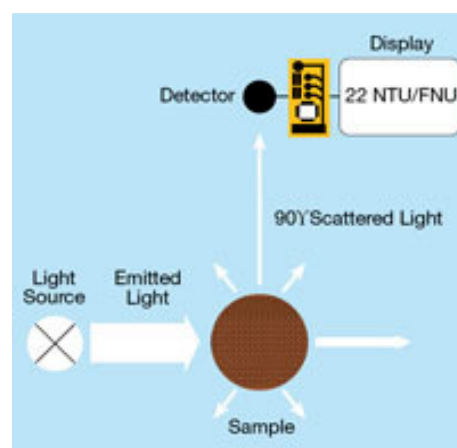
I_s = Intensity of scattered light

A = Geometrical factor

C = Concentration

$f(\alpha)$ = Angle correlation

P = Particle



Composition of the supply



The supply consists of a single package containing the following parts:

1. 1 S461TN Infrared Turbidity Probe with 10 meter cable
2. 1 Technical manual for instruction

Calibration of the probe

The S461TN probe can be calibrated in several ways:

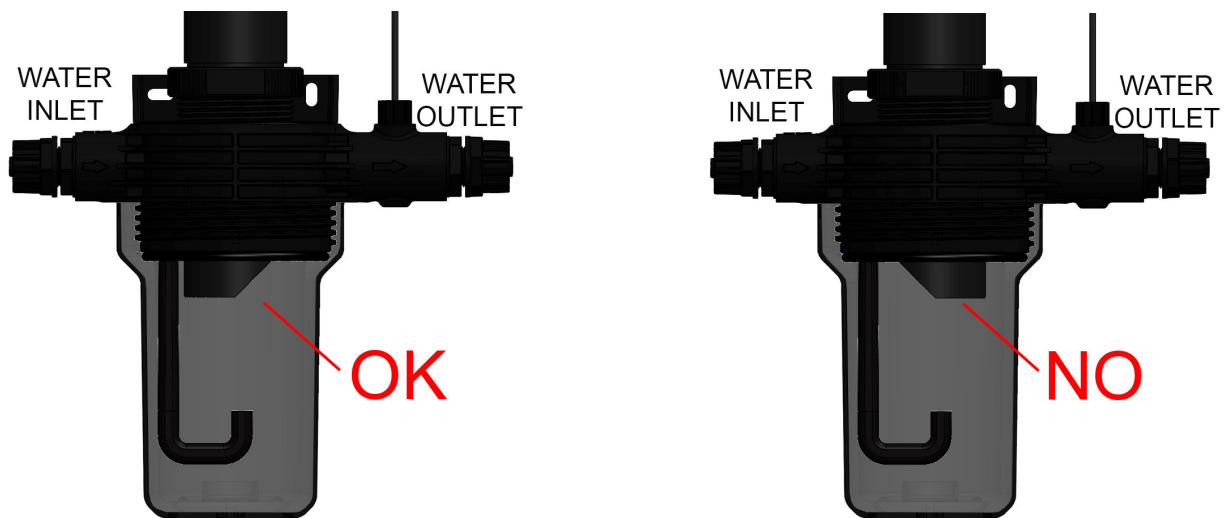
- On two points:
You trace the calibration line by using two known solutions: the first point near 0 NTU and the second to a value as close as possible to the working point.
- First point:
It calibrates the first point of the curve. You enter the calibration menu with two points, but you only perform a calibration of the first. In this way it is possible to align the reading when the read value is lower than 1 NTU, but discordant to a known reference.
- Second point:
It calibrates the second point of the curve. You enter the calibration menu with two points, but you only perform a calibration of the second. In this way it is possible to align the reading when the read value is higher than 1 NTU, but discordant to a known reference.
- Single point:
This calibration mode allows to change the offset of all the straight and must be performed only when the turbidity value of the point that we are calibrating is above 1 NTU, because the probe does not allow to change the offset if the values of turbidity are too low.

Circulate water with known solution, making sure that there are no air bubbles in the circuit: to eliminate them you can create a small pressure partially closing the output stream.

The liquid can also stay calm inside the probe holder, but you must be careful to deposit phenomena that could distort the reading.

Wait about 4-5 minutes for the reading to stabilize and proceed with calibration from the keyboard by entering the value of the known solution.

Installation in PSS8 Probeholder (PVC version only)



Install the probe in the pss8 respecting the position shown in the figure above.

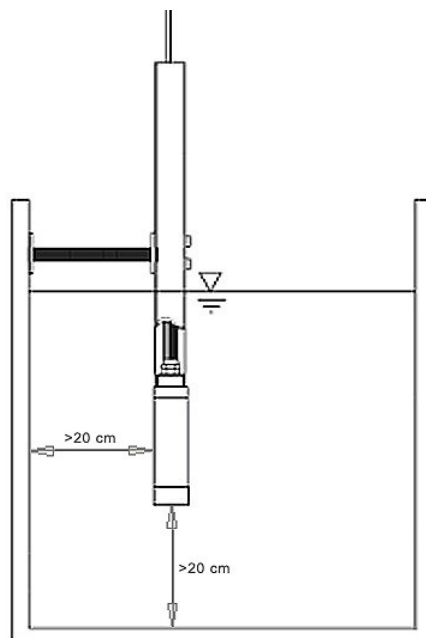
To facilitate the correct insertion of the probe body there is a signaling tag that indicates the direction of the flow.

When the probe is installed in PSS8 probeholder, the calibration curve must be changed to compensate the offset of the wall of the probeholder itself, which is why when ordering you must specify if the installation will be performed in bypass with the PSS8 probeholder.

CAUTION!!! each probe holder PSS8 has an inherent structure that may slightly interfere with the reading, so each system sensor + probeholder must be calibrated together.

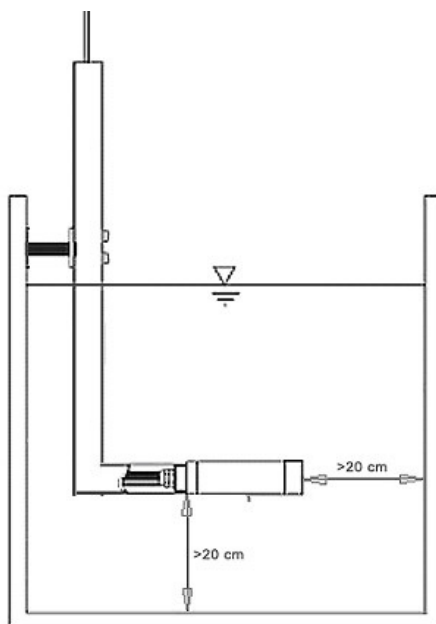
it is recommended to install a tap at the water output of the probeholder in order to reduce the flow and thus create a pressure inside of the probeholder itself able to favor the elimination of any air bubbles.

Installation in tank



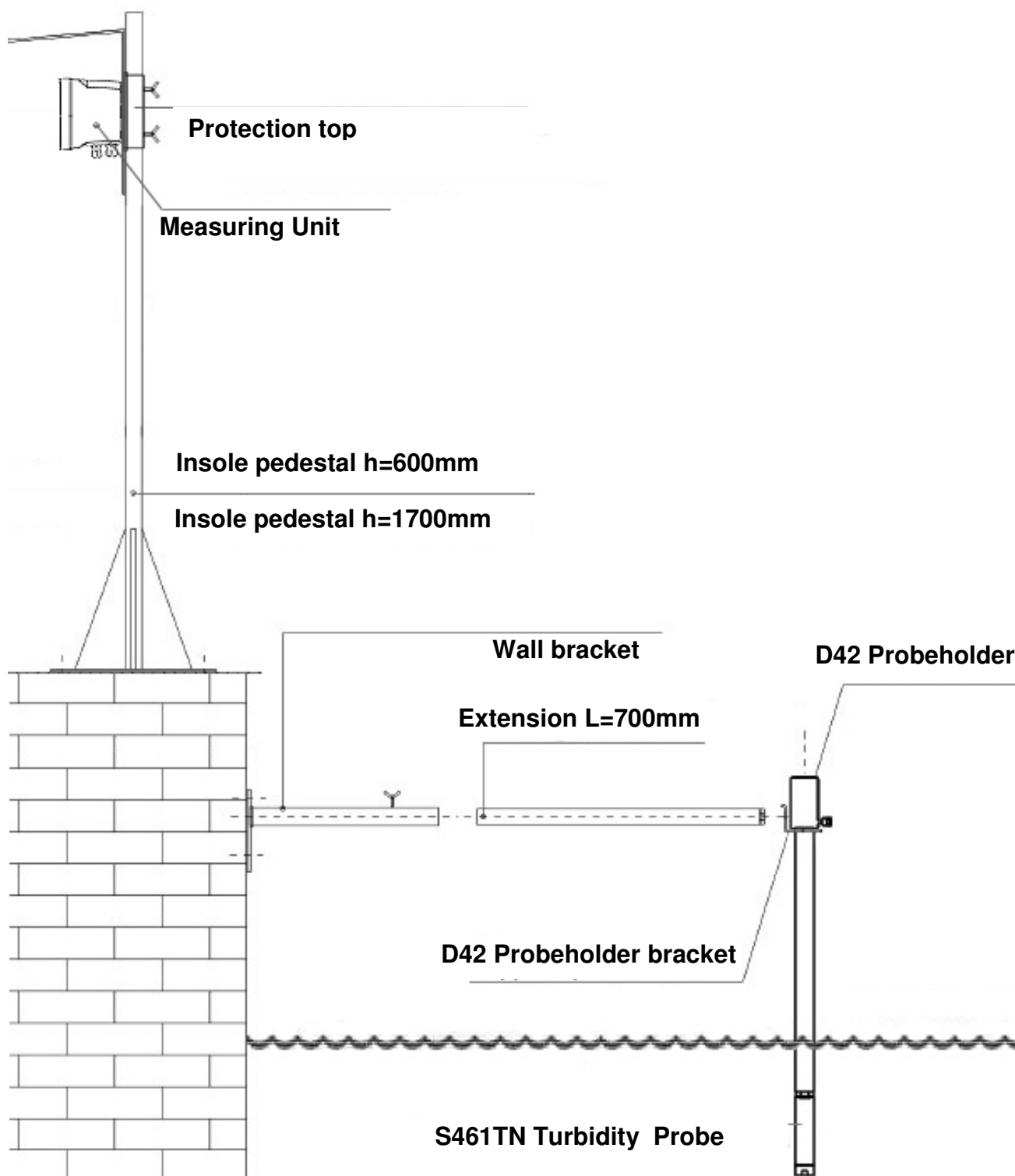
Install the probe in the tank so that it is immersed for at least 20 cm and the distance from the walls and the bottom of the tank is not less than 20 cm.

Installation in channel



Install the probe in the channel so that it is immersed for at least 20 cm and the distance from walls and bottom of the channel is not less than 20 cm.

Anchoring to poolside devices



Insertion in pipeline devices

Insertion probeholder

Code 9700740060

Nomenclature of the parts included in the delivery:

1. Valve ensemble
2. Probe ensemble
3. Stop Pole (2)
4. M12 Nut (4)
5. 12 Washer (8)
6. O-ring 4050 (8)
7. AISI 316 weld socket
8. M16x60 Bolt (2)
9. M16 Nut (2)

Instructions for a proper assembly:

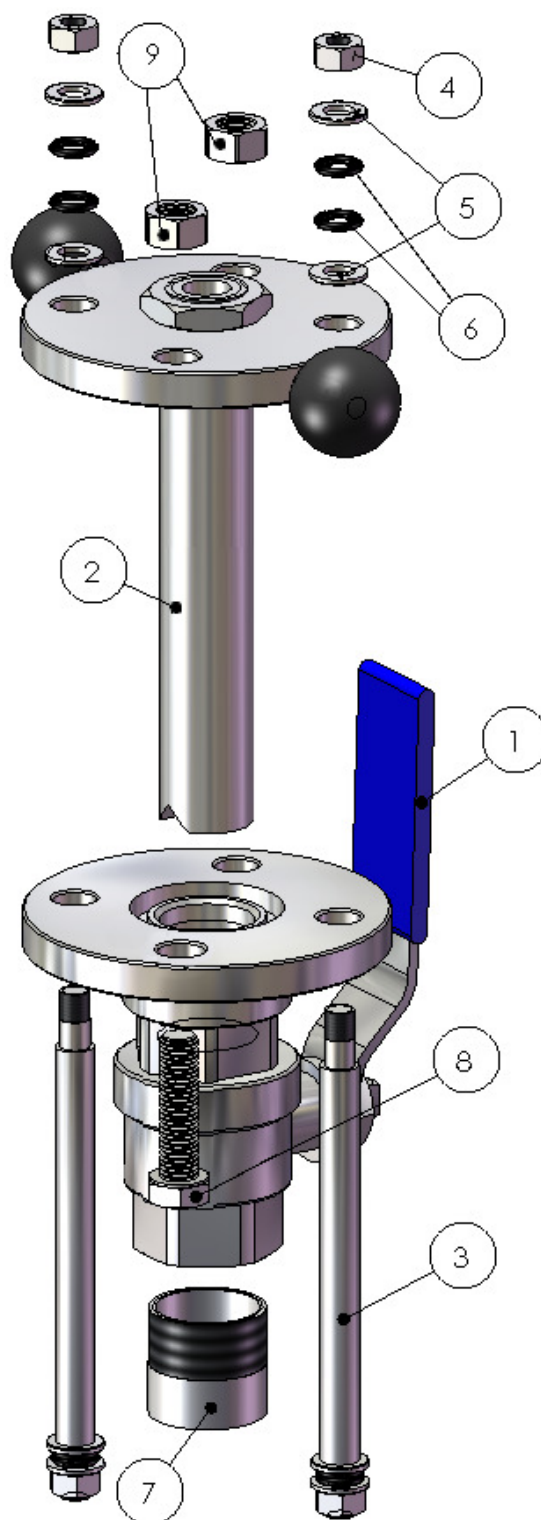
Unscrew the socket (7) from the valve ensemble (1) and weld it on the pipe.

Unscrew the two M16x60 bolts (8) from their respective nuts (9).

Unscrew the two superior M12 nuts (4) from the stop poles (3) and remove the superior washers (5) and O-rings (6).

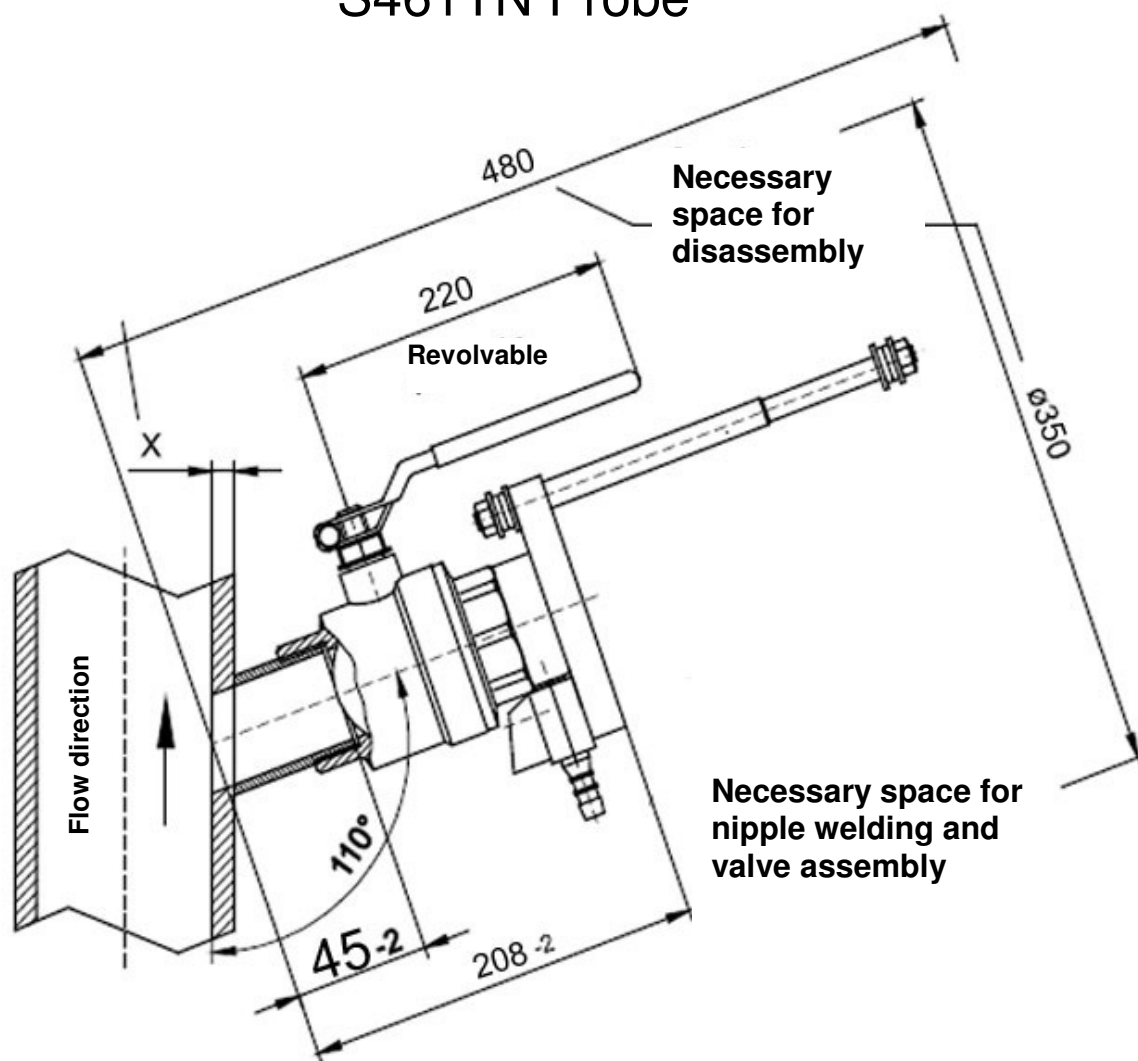
Then insert the probe ensemble (2) into the valve unit (1) until aligning the two flanges and the corresponding holes of the two blocks.

Let the stop poles (3) pass through the holes of the probe ensemble and then reinsert superior washers (5) and O-rings (6), then screw the M12 superior bolts (4) to the stop poles (3). Repeat this procedure with the M16x60 bolts (8), then tighten the corresponding M16 Nuts (9).



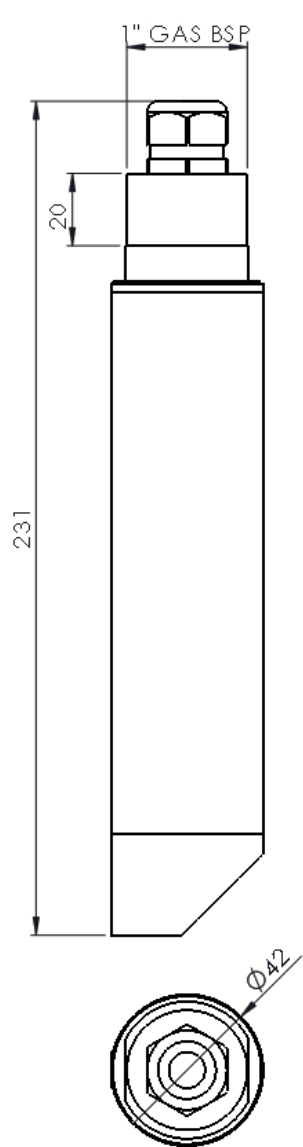
Precautions for installation in pipeline

S461TN Probe



Attention: measures refer to the inside part of the pipe

Attention: probe must be oriented with its glasses in the opposite direction of the flow

TECHNICAL DATA	DIMENSIONS											
Materials : <ul style="list-style-type: none"> — Black PVC and AISI 316 Body — Special Glass Optics with oleophobic treatment — NBR and Silicon OR 												
Thread: 1" GAS												
Measuring ranges: 0-1000 NTU, 0-4000 NTU												
Measuring method: 90° Scattered light												
Resolution: <ul style="list-style-type: none"> - 0.01 NTU range 0-1000 NTU - 0.01 NTU range 0-4000 NTU 												
Accuracy: <ul style="list-style-type: none"> - ±2% at the measuring point range 0-1000 NTU - ±5% at the measuring point range 0-4000 NTU 												
Ripeatability: <ul style="list-style-type: none"> - ±5 NTU range 0-1000 NTU - ±20 NTU range 0-4000 NTU 												
Responding time: $T_{90} < 60s$												
Calibration: 1-point for scale with formazin standard solution												
Working Temperature: 0÷50 °C												
Max Working Pressure: 4 bar												
Mechanical Protection: IP68 Sensor+cable												
Cable: 10m integral												
Power Supply: 12...24Vdc												
Max Absorption: 3W												
Outputs: RS485 (4-20mA optional)												
Cable colors coding <table> <tr> <td>RED</td><td>+24Vdc</td></tr> <tr> <td>BLACK</td><td>GROUND</td></tr> <tr> <td>YELLOW</td><td>A+ RS485</td></tr> <tr> <td>GREEN</td><td>B- RS 485</td></tr> <tr> <td>WHITE</td><td>+ 4-20 mA</td></tr> <tr> <td>BROWN</td><td>- 4-20 mA</td></tr> </table>		RED	+24Vdc	BLACK	GROUND	YELLOW	A+ RS485	GREEN	B- RS 485	WHITE	+ 4-20 mA	BROWN
RED	+24Vdc											
BLACK	GROUND											
YELLOW	A+ RS485											
GREEN	B- RS 485											
WHITE	+ 4-20 mA											
BROWN	- 4-20 mA											

Order codes

9710597063	S461TN AISI316 and PVC Turbidity probe 4-20mA output
9710598063	S461TN AISI316 and PVC Turbidity probe RS485 output
9710599063	S461TN/INS AISI316/PVC Insertion Turbidity probe 4-20mA output
9720597063	S461TN PVC Turbidity probe 4-20mA output
9720599063	S461TN/INS AISI316 Insertion Turbidity probe 4-20mA output
9730598063	S461TN PVC Turbidity probe RS485 output
9730599063	S461TN/INS AISI316 Insertion Turbidity probe RS485 output
9740597063	S461TN AISI316 Turbidity probe 4-20mA output
9740599063	S461TN/INS AISI316/PVC Insertion Turbidity probe RS485 output
9760598063	S461TN AISI316 Turbidity probe RS485 output