



S461ST

TURBIDITY AND S.S. PROBE



The sensor **S461ST** is used for the optical measurement of suspended solids in industrial water and process up to 500 g/l (depends on the type of sludge). The probe uses the method of measuring light absorption.

Applications

- Measure of Suspended solids and turbidity in wastewater
- Measure of Suspended solids and turbidity in industrial water

Features and benefits

- Reliable concentration measurement using infrared measuring method
- 90° e 140° scattering method
- Stainless Steel sensor body
- No mechanically moving parts
- Measured value pre-processing in sensor resulting in low signal transmission sensitivity
- Immediate installation and easy maintenance

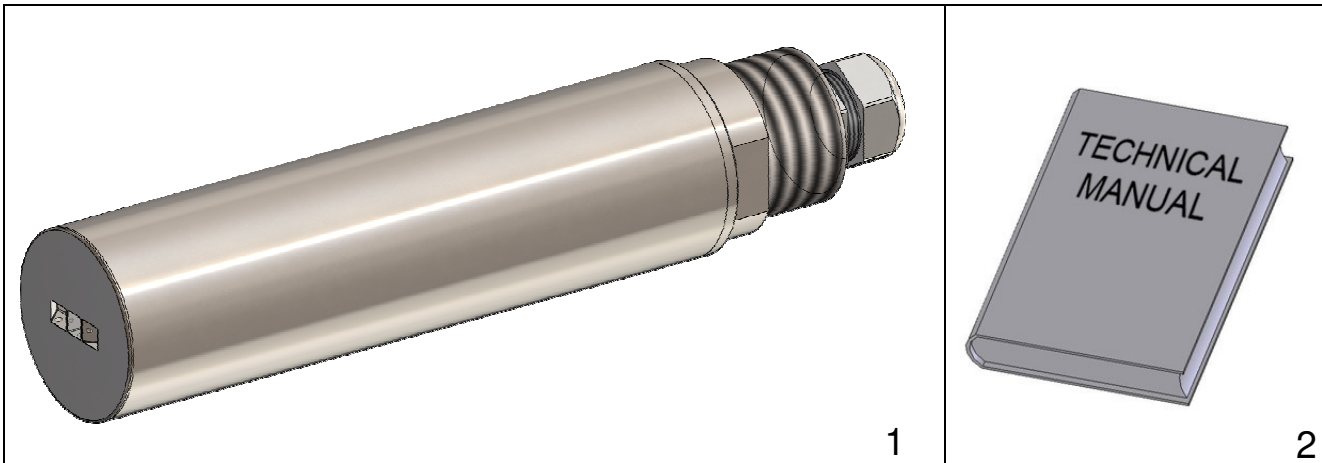
Measurement with the 90° and 140° scattered light method

Measurements are made using the standardised 90° and 140° scattered light method in accordance with ISO 7027 / EN 27027 with 860nm wavelength. 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 angles of 90 and 140 degrees to the transmitted light. The measured scattered light signals are converted to frequency signals.

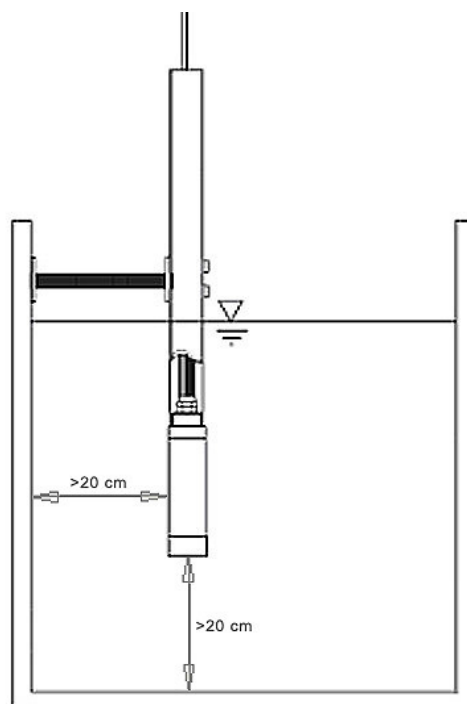
Composition of the supply



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

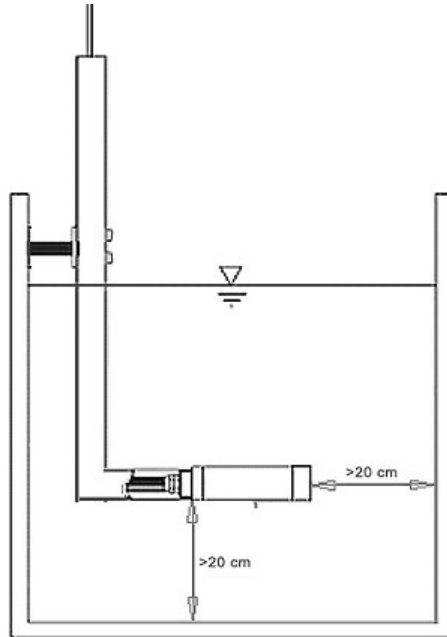
1. 1 S461ST Infrared Suspended Solids probe with 10m cable
2. 1 Technical manual for instruction

Installation in tank



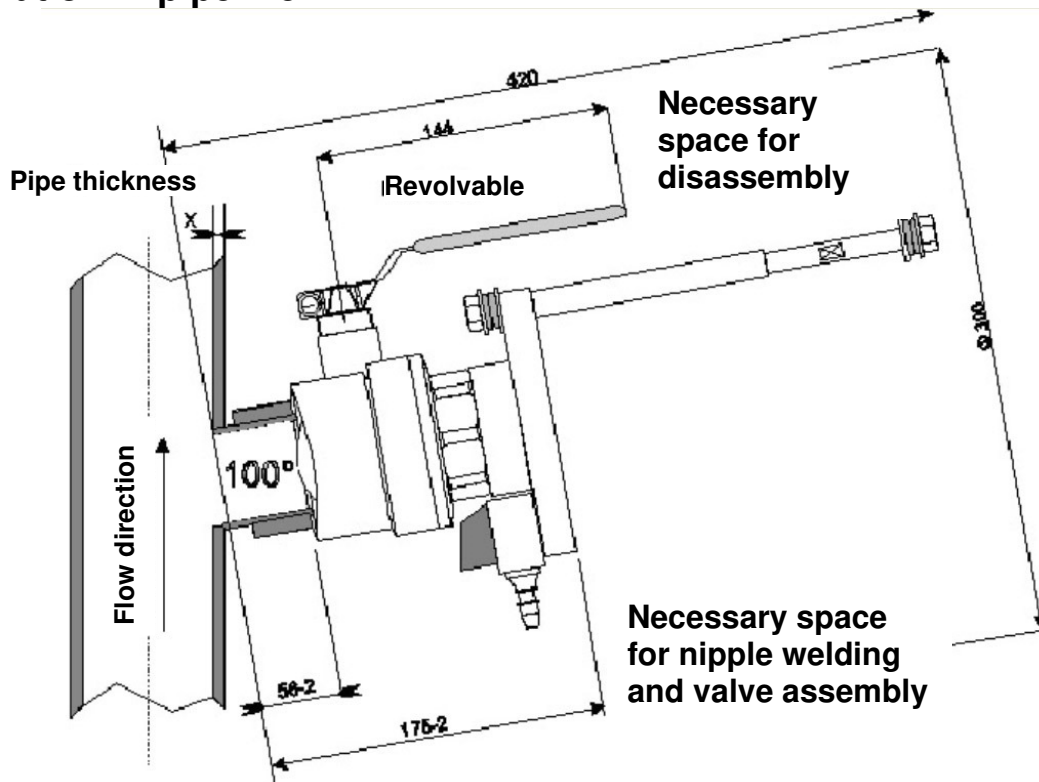
Install the probe in the tank so that it is immersed for at least 20 cm and the distance from the walls and the bottom of the tank is not less than 20 cm.

Installation in channel



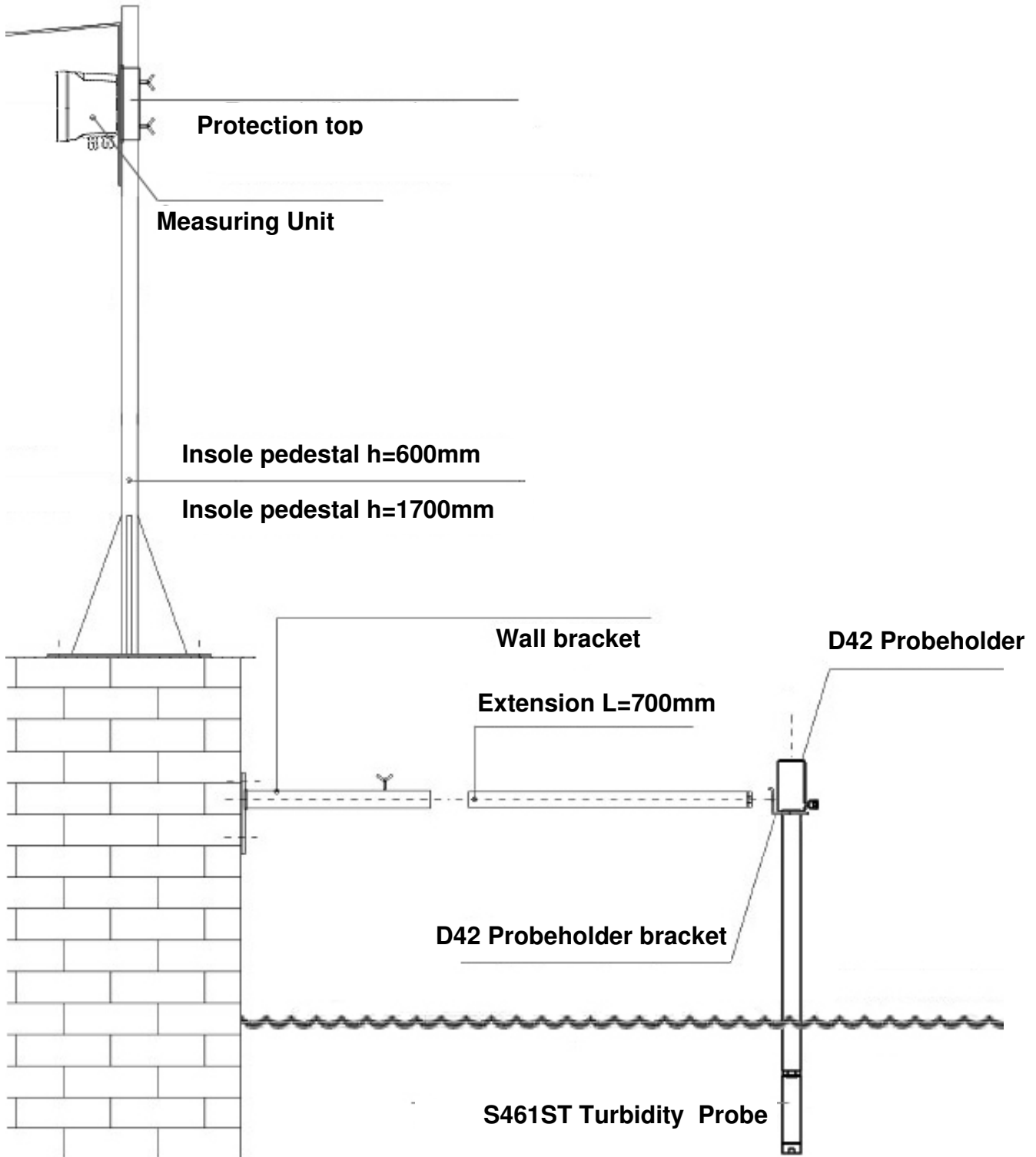
Install the probe in the channel so that it is immersed for at least 20 cm and the distance from walls and bottom of the channel is not less than 20 cm.

Installation in pipeline



Attention: measures refer to the inside part of the pipe. Min. tube DN: 100

Anchoring to poolside devices



Calibration procedure with Series 50 instrument

Probe compatible with 50 series controllers with firmware from version 7.3.

1. Choice of the operation matrix

Before starting to use the probe is necessary to perform a calibration by multipoint or single point, and you must choose the working matrix, which is the sludge matrix in which the probe will be operating.

The possible choices from the device are:

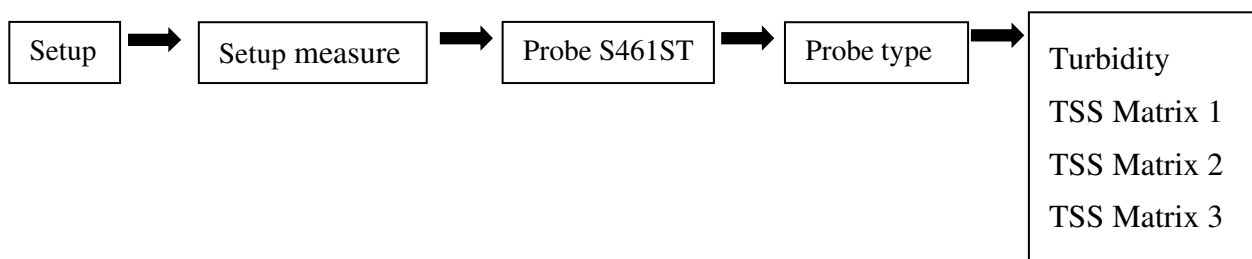
Turbidity: Clean water with few solids in suspension generally leaving the plant. Turbidity up to 4000NTU

Solids Matrix 1: Water with the presence of solids with values between 0 and 5g / l of primary biological oxidation sludge

Solids Matrix 2: Water with 0 solids and 12g / l of primary biological oxidation sludge (default)

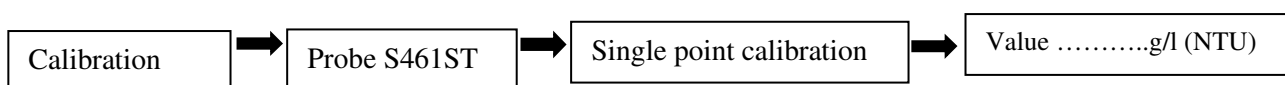
Solids Matrix 3: Water with the presence of solids with a value between 10g / l and above like recirculated or thickened sludge.

To select the type of calibration range on the 50 Series:



Once you have chosen the correct type of matrix for your application, you can proceed with one point or by multi point calibration .

To perform single point calibration



The single point mode allows you to change the value of the k factor of the calibration line.

This mode can be performed by immersing the probe in a known solution, or directly in the water matrix where the probe is immersed.

Attention! the accepted value of k is 0.5 - 5

Attention! the minimum calibration value is 4 NTU for the 0-4000NTU turbidity matrix

To perform multi-point calibration



The multi-point mode is performed when the curve loaded inside the probe is not consistent with the sludge used by the user.

The points that can be used are 3 or 5.

The procedure for multi-points calibration is described below.

Material needed for multi-point calibration

- ✓ 1 dark container 5/10 liters
- ✓ 3-5 dark containers for laboratory sample collection this depends on how many calibration point we decide to perform (default 3 points)
- ✓ Clean water for dilution

From the 50 Series device, proceed as follows:

MeasureSetup Menu

PROBE TYPE

Choose the type of matrix you want to use

NUMBER OF POINTS

Choose how many points you want to calibrate on (min 3, max 5)

Calibration menu

CALIBRATION

MULTI-POINT CALIBRATION

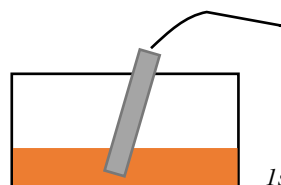
DIGIT CALIBRATION

- a) Take the sample from the tank, let it settle as much as possible, Attention, if we have chosen matrix 3 and the sludge concentration does not allow the sludge settling, skip point a) and go directly to point c)



Sedimented sample

- b) Remove the aqueous part on the surface in order to make the most sedimented part remain, SAMPLE 1



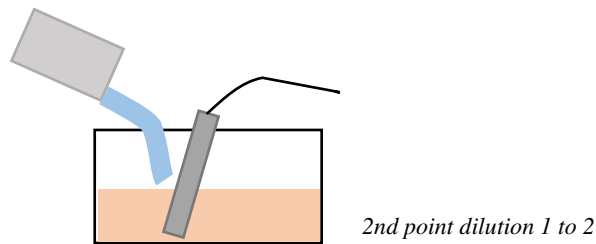
1st point maximum concentration

- c) Insert the probe in the more concentrated SAMPLE 1 keeping it in slight movement and maintaining a distance from the bottom of at least 10cm.
d) At this point the instrument will start reading the probe digits and will wait for stabilization until our confirmation with the ENTER key, in this way the digits of the first calibration point are stored.
e) Take a part of SAMPLE 1 into a container for laboratory analysis.

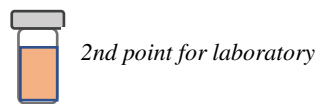


1st point for laboratory

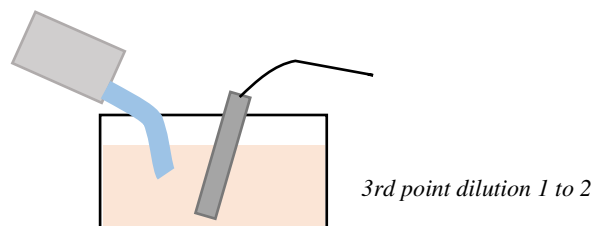
- f) Carry out a dilution of the sample 1, 1 to 2 by adding clean water



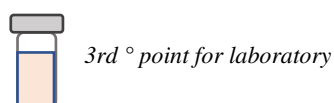
- g)** Store the digits of this second point as in point **d)**
- h)** Take a part of SAMPLE 2 into a container for laboratory analysis.



- i)** Carry out a dilution of the sample 2, 1 to 2 by adding clean water



- j)** Store the digits of this third point as in point **d)**
- k)** Take a part of SAMPLE 3 into a container for laboratory analysis.



At the end of this procedure we have stored on the device the raw data of the three mud samples. Once we have received the laboratory data of the three samples, we can insert the values in g/l in correspondence with the raw data.

To enter the data in g / l from the laboratory go to the menu

CALIBRATION

MULTI-POINT CALIBRATION

MEASURE CALIBRATION

As you can see, the first point (below) is the highest value in g/l of the table.

After entering the values of the solids, we will get the table like the one below.

SETTING LIST			
PNT	DIGIT		MEASURE
1	1905	DGT	0.9 g/l
2	4089	DGT	1.1 g/l
3	11864	DGT	1.9 g/l

ENTER=CONTINUE, ESC=EXIT

Troubleshooting

Problem	Suggested Correction	Reference
<p>Wrong readings (overestimation, underestimation) compared to laboratory results</p>	<p>1-If the laboratory values are different from the values read by the probe, proceed with one-point calibration keeping the probe in the process water, making sure that the solid part has not separated from the liquid part, i.e. the solution must be kept in agitation; for example in an oxidation tank, during one-point calibration, the blowers with the mixers must be switched on to maintain a homogeneous measurement solution.</p> <p>2- Verify that the probe is immersed in water in the area with the maximum concentration of solids paying attention to the solid-liquid separation zone.</p> <p>3- Verify that the probe is far from the walls of the containment tank at least 20 cm for each side.</p> <p>4- If you do not solve the problem checking the first 3 points, we should enter a specific calibration curve for that sludge because the curve inserted by default is relative to a standard biological sludge. This operation, however, can only be done by Chemitec.</p>	
<p>Oscillating measurements</p>	<p>1- In the presence of oscillating measurements we should check the installation position of the probe. If in presence of strong movements of water, for example near the outlet of the tank, the stability of reading can be altered because the sludge and the water move very fast near the point of measurement. Reposition the probe in a calm place, where there is a modest water movement.</p>	

Frozen measures	1- The probe has been installed at a point where the sludge is stratified, the water movement is at rest and the sludge sticks to the probe. Reposition the probe in an area with sufficient movement of water. 2- Thoroughly clean the probe before positioning; probe cleaning can be performed with water by carefully removing any sludge residue on the probe.	
Probe communication error	1- Check electrical connections. 2- Check that the presence of electric extensions is carried out correctly.	

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:

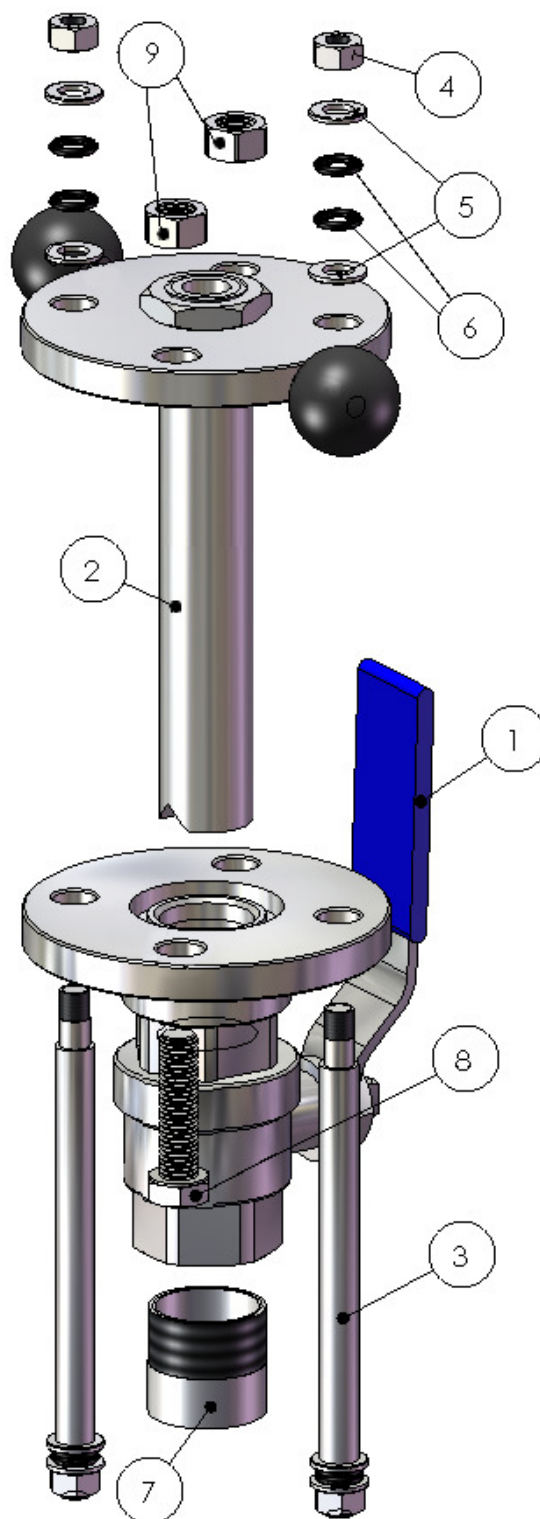
Unscrew the socket (7) from the valve ensemble (1) and weld it on the pipe.

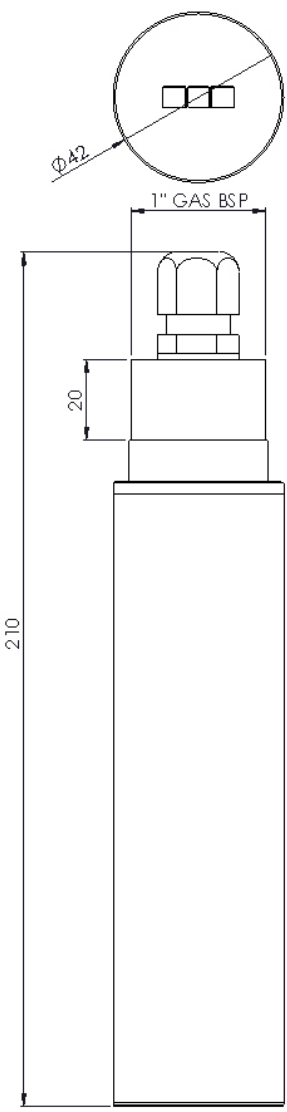
Unscrew the two M16x60 bolts (8) from their respective nuts (9).

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).



TECHNICAL DATA	DIMENSIONS
Materials : — Stainless Steel 1.4401 (316) body — Special glass windows — Viton O-ring	
Thread: 1" GAS	
S.S. measuring ranges: 0-500g/l depending on the sludge type Turbidity measuring ranges: 0-4000 NTU	
Measuring method: Multi sensor scattering	
Resolution of Suspended Solids: 0.5 g / l Turbidity Resolution: ± 1NTU	
Accuracy: ± 5% on the measuring point	
Repeatability of suspended solids: ± 0.5 g / l Repeatability of Turbidity: ± 1 NTU	
Calibration: by points with freely settable tables	
Responding time: T ₉₀ < 60s	
Working temperature: 0÷60 °C	
Max Working pressure: 5 bar	
Maximum absorption: 3W	
Mechanical Protection: IP68 – cable included	
Cable: 10m integral	
Power supply: 12...24Vdc	
Outputs: RS485 (4-20mA optional)	

Order codes

9701081063	S461ST Suspended solids and turbidity probe RS485 10m cable
9701081063	S461ST Turbidity and S.S. sensor Insertion Style RS485 10m cable