This manual contains safety information which, if ignored, could endanger life or cause serious injury to persons and property.

Keep the instrument protected from sun and water.
Avoid splashing water.

Depending on the configuration chosen, the main screen of the instrument may look different and some functions may not be present.

# “CENTURIO Tower” operating manual

REMOTE CONTROL AND SETUP
**https://www.e-nimbus.com**

PRINTED ON RECYCLED PAPER

Read carefully!

ENGLISH version

R1-11-24

| | |
|---|---|
| Descrizione Prodotto<br>*Product Description* | Sistema di controllo, serie CENTURIO<br>*Control system, CENTURIO series* |
| Codici Identificativi Prodotto<br>(i simboli "_" completano il codice del prodotto in base alla configurazione delle varianti)<br>*Product Identification Codes*<br>*(the "_" symbols complete the product code based on the configuration of the variants)* | CENT _ _ _ _ _ _ _ _ _ _ _ _ _ _ _<br>CENTP _ _ _ _ _ _ _ _ _ _ _ _ _ _ _<br>CENTPO _ _ _ _ _ _ _ _ _ _ _ _ _ _<br>CENTN _ _ _ _ _ _ _ _ _ _ _ _ _ _ _<br>CENTNP _ _ _ _ _ _ _ _ _ _ _ _ _ _<br>CENTNO _ _ _ _ _ _ _ _ _ _ _ _ _ _ |

# GENERAL SAFETY INFORMATION

Danger! During an emergency of any kind in the room where the pump unit is installed, immediately cut off the power to the system and disconnect the instrument from the power socket!

If particularly aggressive chemical materials are used, regulations on the use and storage of these substances must be strictly followed!

If installing the instrument outside the European Union, please observe local safety regulations! The manufacturer cannot be held liable for damage to persons or property caused by improper installation or use!

Caution! Install the instrument so that it is easily accessible whenever maintenance is required! Never obstruct the instrument location!

The instrument must be connected to an external control system. In the event of a water shortage, dosing must be stopped.

Service and maintenance of the instrument and all its accessories must always be carried out by qualified personnel!

Always carefully empty and wash any hoses that have been used with particularly aggressive chemical materials! Wear the most suitable safety equipment for the maintenance procedure!

Carefully read the chemical characteristics of the product to be dosed!

All installation and maintenance work must always be carried out when the instrument is not connected to the power supply!

Failure to activate the Min/Max alarm and the maximum dosing alarm can lead to dangerous overdosing!

# Introduction

"CENTURIO Tower" is a full-featured cooling tower instrument with two-way biocide options and inhibitor/bleed control with 5 channels. Cooling towers are gas-liquid heat exchangers in which the liquid phase yields energy to the gas phase, thus reducing its temperature. In the vast majority of cases, the gaseous phase consists of air or water vapour and the liquid phase of water of various types. The heat exchange can be carried out through contact between the phases, and in this case we speak of a cooling tower "tout court", or surface heat exchanger in a tube, plate or other heat exchanger, in which case it is most often referred to as a cooling coil.
All information is shown on a large colour LCD display (480x272). "CENTURIO Tower" is housed in a box with IP65 degree of protection. The main features are:

**BLEED (discharge)**

**INHIBITOR with 5 working modes**
(Feed&Bleed, % Feed&Bleed, % Time, Water Meter, Water Meter PPM)

**BIOCIDE with weekly programming**

**Conductivity and optional measuring modules**
pH, Tracer, Chlorine Meter with proportional and digital outputs, generic mA channel

# Touchscreen

The instrument can be operated using the touchscreen controls.

Scroll and press

**Press to confirm changes (right-hand corner of the screen)**

**Press to cancel changes and return to the previous menu (left-hand corner of the screen)**

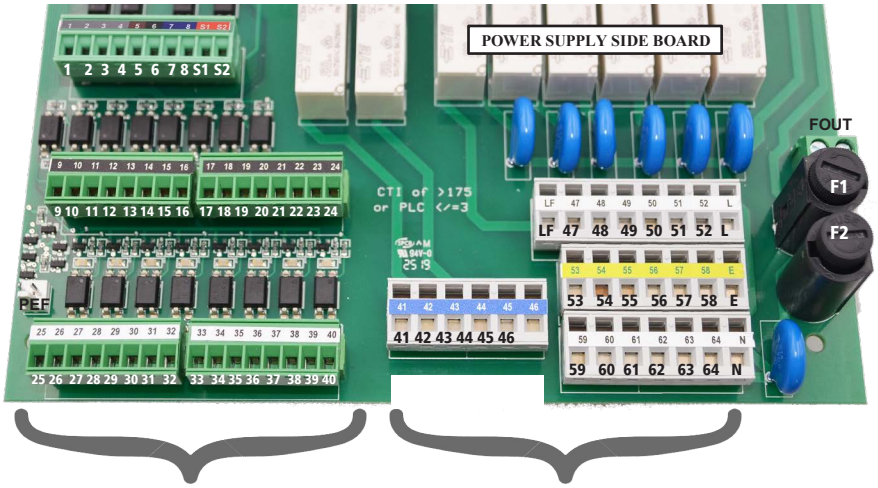
**Press to return to the main screen**

**A RED BAR WITHIN A CHANNEL INDICATES THAT THE USER'S ATTENTION IS REQUIRED; TAP IT FOR MORE INFORMATION**

**The capacitive touchscreen may not work when wearing gloves. If gloves must be worn for safety reasons, use a capacitive stylus to operate the controller screen.**

# Connections to the main board

Disconnect the instrument from the main power supply, then make the connections as shown below.
For easier understanding, the board has been divided into two parts: **I/O connections and Power Supply - Relay connections**. **See page 45 for mA connections and communication options (MODBUS).**




**Fuses:**

F1: Main fuse (6.3A T)
F2: Tool fuse (3.15A T)

**S1(+) - S2(GND)**: Standby
**PEF:** PEF ALARM lighting connector
**FOUT:** Remove the jumper to remove the phase (L) from relay outputs

**Power supply and relay connections:**

L (Phase) - E (Earth) - N (Neutral): Main power supply 230VAC (85-264VAC, 50 / 60Hz) or 24VAC * 50/60 Hz* *see instrument label LF (LIVE FUSE PROTECTED): Phase input for motorised valve supply, protected by a fuse

41 (N.C contact) - 42 (Common) - 43 (N.O contact): voltage-free contact (max. isolation 250V) RELAY No.1
44 (N.C contact) - 45 (Common) - 46 (N.O contact): voltage-free contact (max. isolation 250V) RELAY No.2
47 (L) - 53 (E) - 59 (N): RELAY No.3 setpoint
48 (L) - 54 (E) - 60 (N): RELAY No.4 setpoint
49 (L) - 55 (E) - 61 (N): RELAY No.5 setpoint
50 (L) - 56 (E) - 62 (N): RELAY No.6 setpoint
51 (L) - 57 (E) - 63 (N): RELAY No.7 setpoint
52 (L) - 58 (E) - 64 (N): RELAY No.8 setpoint

Fully configurable connections (e.g. motorised valve for bleed or **ALARM** assignment)

Warning: connections must only be carried out by qualified and trained personnel



Warning: Do not connect the power supply of the dosing pumps in PWM mode.
Warning: Maximum relay output power consumption in PWM mode: 5 W.

**I/O connections:**

1 (+); 2 (-): Pulse emitting water meter input No.1 (WM1) max. 300Hz

3 (+); 4 (-): Pulse emitting water meter input No.2 (WM2) max 300Hz

5 (+ brown) - 6 (black) - 7/8 (- blue; GND): flow sensor mod. “SEPR” (do not remove the jumper between blocks 7 and 8)*

* to use as voltage-free contact leave the jumper on blocks 7 and 8 and use blocks 5 and 6 as contact

9 (+); 10 (-): Level input No.1

11 (+); 12 (-): Level input No.2

13 (+); 14 (-): Level input No.3

15 (+); 16 (-): Level input No.4

17 (+); 18 (-): Level input No.5

19 (+); 20 (-): Level input No.6

21 (+); 22 (-): Level input No.7

23 (+); 24 (-): Level input No.8

25 (-); 26 (+): proportional pump (pulse-driven, opto-isolated signal) output No.1 NPN max. 50mA / 24VDC

27 (-); 28 (+): proportional pump (pulse-driven, opto-isolated signal) output No.2 NPN max. 50mA / 24VDC

29 (-); 30 (+): proportional pump (pulse-driven, opto-isolated signal) output No.3 NPN max. 50mA / 24VDC

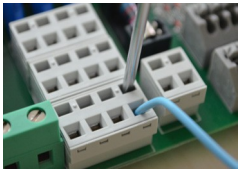
31 (-); 32 (+): proportional pump (pulse-driven, opto-isolated signal) output No.4 NPN max. 50mA / 24VDC

33 (-); 34 (+): proportional pump (pulse-driven, opto-isolated signal) output No.5 NPN max. 50mA / 24VDC

35 (-); 36 (+): proportional pump (pulse-driven, opto-isolated signal) output No.6 NPN max. 50mA / 24VDC

37 (-); 38 (+): proportional pump (pulse-driven, opto-isolated signal) output No.7 NPN max. 50mA / 24VDC

39 (-); 40 (+): proportional pump (pulse-driven, opto-isolated signal) output No.8 NPN max. 50mA / 24VDC



The wires in the “Power Supply and Relay” terminals must be inserted at the bottom after inserting the tip of a screwdriver into the top.

The wires in the “I/O Connections” terminals can be inserted by first removing the block from the board to facilitate the installation operation.

Warning: connections must only be carried out by qualified and trained personnel

# Information on evaporative towers.

### What is a cooling tower?

A cooling tower is a heat rejection device that extracts waste heat from the atmosphere by cooling a stream of water to a lower temperature. The type of heat rejection in a cooling tower is termed “evaporative” in that it allows a small portion of the water being cooled to evaporate into a moving stream of air to provide significant cooling to the rest of that water stream. The heat from the water stream transferred to the air stream increases the air temperature and relative humidity to 100%, and this air is discharged into the atmosphere. Evaporative heat dissipation devices such as cooling towers are commonly used to provide significantly lower water temperatures than can be achieved with “air-cooled” or “dry” air cooling devices such as a car radiator, thus achieving more cost-effective and energy-efficient operation of systems requiring cooling. Think of the times when you have seen something hot cool rapidly by putting water on it, which evaporates, cooling rapidly, like an overheated car radiator. The cooling potential of a wet surface is much better than a dry one.

Common applications for cooling towers are providing chilled water for air conditioning, production and electrical power generation. The smallest cooling towers are designed to handle flows of only a few gallons of water per minute supplied in pipes as small as those you might see in a residence, while the largest cool hundreds of thousands of gallons per minute supplied in pipes up to 15 feet (about 5 metres) in diameter on a large power plant.

The generic term “cooling tower” is used to describe both direct (open circuit) and indirect (closed circuit) heat dissipation equipment. While most people think of a “cooling tower” as an open direct contact heat discharge device, indirect cooling towers, sometimes referred to as a “closed-circuit cooling towers”, are nonetheless also cooling towers.

An open-circuit or direct cooling tower is an enclosed structure with internal means to distribute the hot water fed to it over a labyrinth-shaped packing or “fill”. The fill provides a greatly expanded air-water interface for air heating and evaporation to take place. The water is cooled as it descends through the fill by gravity while in direct contact with the air passing through it. The cooled water is then collected in a cold water basin below the fill from which it is pumped through the process to absorb more heat. The heated, moist air leaving the fill is discharged into the atmosphere at a point far enough away from the air intakes to prevent it from being drawn back into the cooling tower.

The fill may consist of several, mainly vertical, wetted surfaces over which a thin layer of water is spread (film fill), or several layers of horizontal elements that create a cascade of many small drops with a large combined area (fill).

A closed circuit or indirect cooling tower does not involve direct air contact and the fluid, usually water or a glycol mixture, is cooled. Unlike open cooling towers, indirect cooling towers have two separate fluid circuits. One is an external circuit in which water is recirculated to the outside of the second circuit, which is a bundle of pipes (closed coils) that are connected to the process for the hot fluid to be cooled and returned to a closed circuit. Air is drawn in through the recirculating water that cascades over the outside of the hot pipes, providing evaporative cooling similar to an open cooling tower. During operation, heat flows from the internal fluid circuit, through the walls of the coil pipe, to the external circuit and then from the heating of the air and evaporation of part of the water, into the atmosphere. Operation of indirect cooling towers is therefore very similar to the open cooling tower with one exception. The process fluid being cooled is contained in a “closed” circuit and is not directly exposed to the atmosphere or recirculated outside water.

In a counter-flow cooling tower, the air travels upwards through the fill or pipe bundles, opposite to the downward movement of the water. In a cross-flow cooling tower air moves horizontally through the fill as the water moves downward.

Cooling towers are also characterised by the way in which the air is moved. Mechanical draught cooling towers rely on motor-driven fans to draw or force air through the tower. Natural draught cooling towers use the buoyancy of the exhaust air rising in a tall chimney to provide the draught. A ventilated natural draught cooling tower uses a mechanical draught to increase the buoyancy effect. Many early cooling towers relied solely on prevailing wind to generate the air current.

If cooled water is returned from the cooling tower for reuse, some water must be added to replace or replenish the evaporating portion of the flow.
Since evaporation consists of pure water, the concentration of dissolved minerals and other solids in circulating water will tend to increase unless a means of controlling dissolved solids, such as blowing, is provided. Some water is also lost by droplets from exhaust air (drift), but this is usually reduced to a very small amount by installing baffle-shaped devices, called droplet eliminators, to collect the droplets. The amount of make-up has to be equal to the total of evaporation, blow-down, drift and other water losses such as wind and leakage, to maintain a constant water level.

Some useful terms, commonly used in the cooling tower industry:

**Drift:** Water droplets that are ejected from the cooling tower with the exhaust air. Drift droplets have the same concentration of impurities as the water entering the tower. The drift rate is typically reduced by employing baffle-shaped devices, called drift eliminators, through which the air must travel after leaving the fill and spray areas of the tower.

**Blow-out:** Water droplets are ejected from the cooling tower by the wind, usually at the air inlet openings. Water may also be lost, in the absence of wind, through splashing or misting. Devices such as wind screens, fins, splash guards and water diverters are used to limit these losses.

**Plume:** The flow of saturated exhaust air leaving the cooling tower. The plume is visible when the water vapour contains condensate in contact with colder ambient air, such as saturated air in breath mists on a cold day. Under certain conditions, a cooling tower plume can pose hazards of fogging or ice in its surroundings. Note that the water evaporated in the cooling process is “pure” water, in contrast to the very small percentage of drift droplets or water blown from the air intakes.

**Blow-down:** The part of the circulating water flow that is removed in order to keep the amount of dissolved solids and other impurities at an acceptable level.

**Leaching:** The loss of wood-preserving chemicals by the washing action of water flowing through a cooling tower of a wooden structure.

**Noise:** Sound energy emitted by a cooling tower and heard (recorded) at a given distance and direction. The sound is generated by the impact of falling water, by the movement of air by fans, fan blades moving through the structure, motors, gearboxes or drive belts.

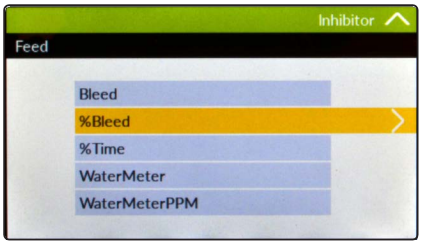
# “Centurio Tower” basic operation.

“CENTURIO Tower” essentially operates three main treatments to ensure cooling efficiency: inhibitor, purge and biocide.

**What is the purpose of the inhibitor?** An inhibitor is a chemical compound that, when added to water, reduces the corrosion rate of a metal or alloy. It helps the cooling tower system to maintain the efficiency of the pipes in the water circulation system.

Parameters to be set:

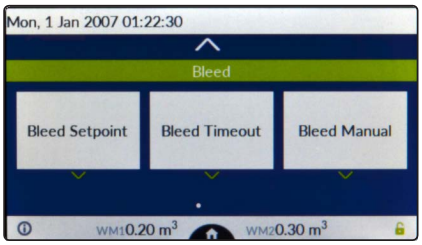
Bleed
%Bleed
%Time
Water Meter
Water Meter PPM




**What does “bleed” mean?** Bleeding/emptying of a cooling tower is the draining of a part of the cooling system water with a high concentration of minerals while replacing it with fresh water. This process dilutes the mineral concentrations of water in the system, which constantly increase due to water evaporation. Fouling occurs if the mineral concentration in the water of a cooling tower system increases to a level higher than the saturation point of the system water.

Parameters to be set:

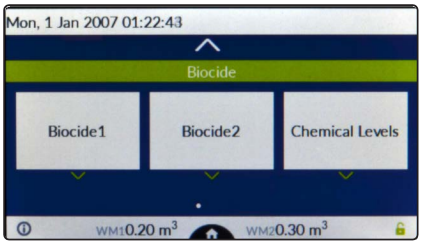
Setpoint & Dead Band
Bleed Timeout
Bleed Manual



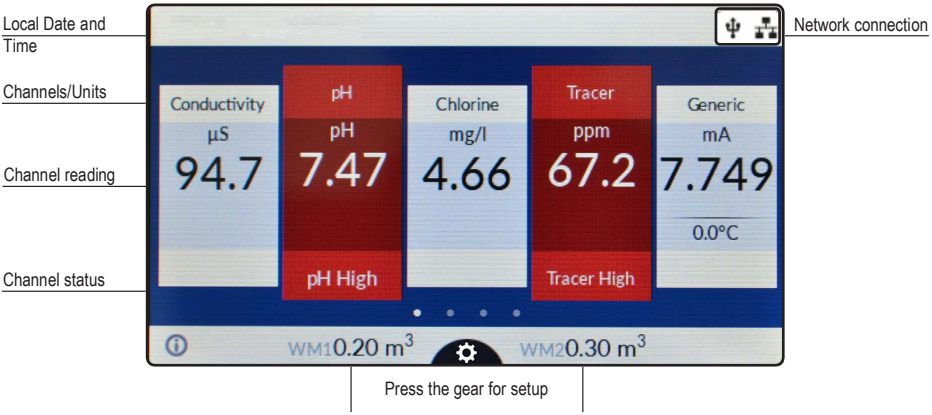

**What is biocide?** Biocide is a chemical substance capable of killing living organisms, usually selectively. It prevents fouling of cooling tower waters. Cooling tower users frequently apply biocides to circulating cooling water to control the growth of micro-organisms, algae and macro-organisms. Another very important reason for using biocides in cooling towers is to prevent the growth of Legionella, including species that cause legionellosis or Legionnaires’ disease, in particular L. pneumophila. “CENTURIO Tower” can also be set to perform pre-biocide activity (biocide activator or pre-biocide treatment) activity.

Parameters to be set:

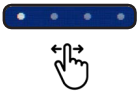
Pre-bleed
Pre-biocide
Biocide
Lockout
Week



# “Centurio Tower” main screen.




**Note: the appearance of the main screen may change due to installed modules/channels available (1 conductivity channel for basic tower functions and up to 4 extra channels)**



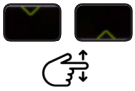
These dots represent how many screens are available for actual viewing. Scroll over the screen to see them.

For further information on channel status (alarms, readings, etc.), tap here to view an info pop-up.

For further information on the serial number/Nimbus code, tap here to view an info pop-up. The red icon requires the user's attention: tap it for more information.

Tap here for further information on the ETHERNET / USB / Nimbus network connection.

Tap the “X” icon to cancel changes / Tap the “tick” icon to save changes.



The actual screen can be moved up or down for further options.

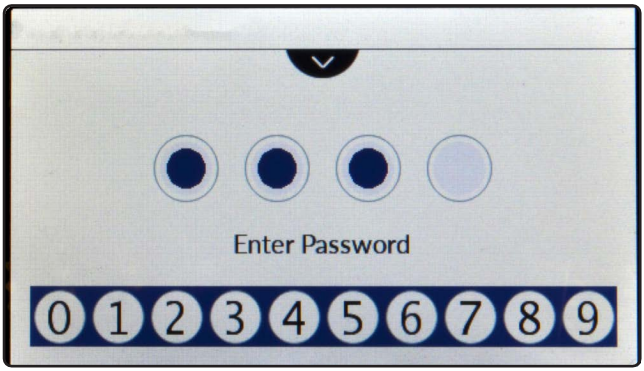
# “Centurio Tower” settings.

**The basic settings are:** PASSWORDs, Date and Time, Interface language and units of measurement.
**The standard settings are:** Probe calibration, working mode (bleed - inhibitor - biocide).
**The advanced settings are:** Pulse emitting water meter, flow, alarms and communication (WiFi, Mobile, Nimbus).

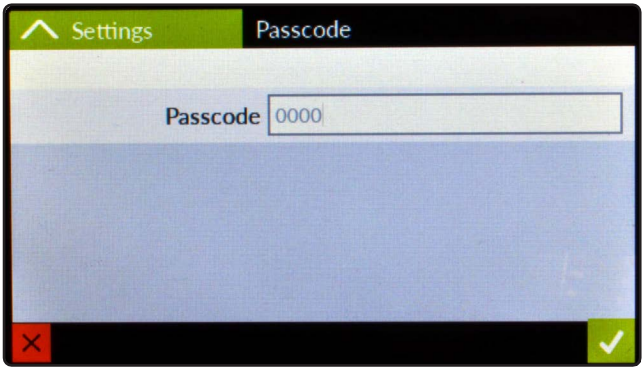
**All these settings must be set for the instrument to function correctly.**

## PASSWORD to access the settings menu.

To allow access to the main menu, tap ⚙ from the main screen and enter the PASSWORD using the keyboard on the right-hand side of the screen. The default PASSWORD is 0000 (factory setting).



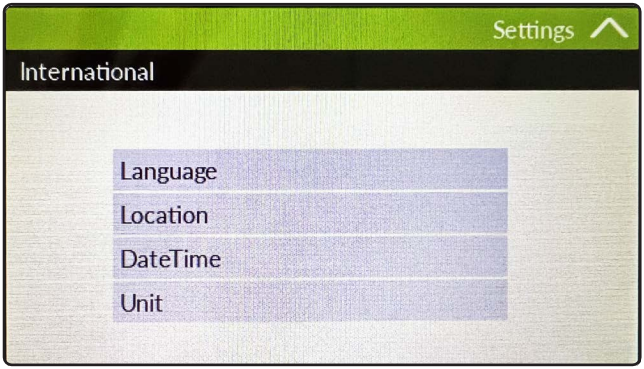

To set a new PASSWORD, select “PASSWORD” from the “Settings” menu and enter a four-number code. Confirm changes to activate the new PASSWORD.




**Lost your password?**
Call your local distributor for the unlocking procedure. There is no way for the user to recover a forgotten PASSWORD.

## International.

Before programming the instrument, Language, Location, Local time and date must be set (Settings/International). Since instrument activities are time-based, it is essential to set the time and date before anything else. Within the international menu, choose the language and location for the correct unit format.

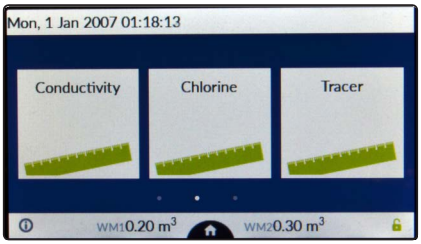


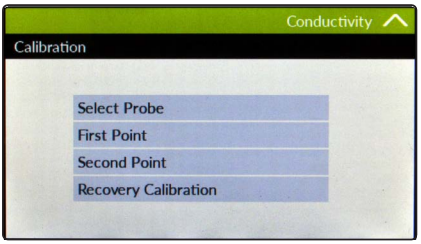

Units of measurement change according to local rules. To end the procedure, tap the tick icon after each change.

| EUROPE IS (International Standard) | USA |
|---|---|
| Date (DD/MM/YY) | Date (MM/DD/YY) |
| 24-hour format | AM/PM format |
| °C Celsius | °F Fahrenheit |
| Litres | Gallons |

## Standard “Centurio Tower” settings.

The standard settings are: Probe calibration and operating modes (bleed - inhibitor - biocide). To calibrate each channel, select it in the main menu. Channel availability is based on module configuration. The instrument will automatically add the correct channel when a new module is installed and detected.




**Conductivity calibration menu.**
This menu includes probe selection, conductivity calibration, temperature compensation and manual or automatic temperature compensation. The conductivity calibration procedure includes a zero calibration (first point) and a second calibration point (second point) requiring a buffer solution with a value close to the working range. The temperature and automatic compensation must also be set. **Note: this procedure assumes that the instrument is correctly installed, configured and connected to a functioning probe. Calibrate using the plant temperature, otherwise unexpected results may occur. Use RECOVERY CALIBRATION to restore the previous calibration.**

**First Point and Second Point.**
The probe must be dry, clean and not installed in the system during this procedure. Tap “First Point” (zero) and confirm. Tap “Second Point”, immerse the probe tip into the buffer solution and wait until the reading is stable, enter the buffer solution value and confirm. **Note: if the probe does not allow First Point calibration, it is only necessary to calibrate the Second Point using a buffer solution close to the value in the tank or using a buffer solution with a value close to the working value.**

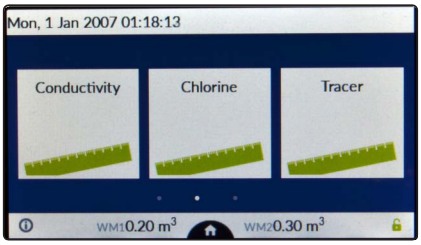
**Temperature compensation (if available)**
Conductivity measurements depend on temperature. The degree to which temperature affects conductivity varies from solution to solution and can be calculated using the following formula: C25 = C / {1+ [a / 100 (t-25)]} where: C25 = conductivity at 25°C, C = conductivity at operating temperature, a = solution temperature coefficient% / ° C.

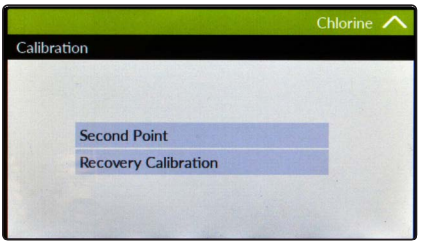
| Probe reading (uS or ppm) | Alpha (a) | Temperature (°C / °F) | Value shown (us or ppm) |
|---|---|---|---|
| 5227 | 1.2 | 35°C / 95°F | 4934 |
| 4524 | 3.5 | 27°C / 80.6°F | 4228 |
| 3924 | 2.1 | 40°C / 104°F | 2984 |

The alpha (a) samples are listed in the table above. To determine the “a” of other solutions, simply measure the conductivity at a range of temperatures and plot the change in conductivity against the change in temperature. “CENTURIO Tower” has a fixed or adjustable automatic temperature compensation referring to a standard temperature of 25°C. Otherwise, select automatic temperature compensation and set the % Alpha value.

## CHLORINE channel calibration.

The chlorine calibration procedure is based on the installed chlorine probe and may involve one or two calibration points depending on the probe model (see table on next page). From the main menu, select “Chlorine”, then tap “Calibration”. The installed probe will be detected automatically and, depending on the model, will be enabled for one or two calibration points.




**Note: this procedure assumes that the instrument is correctly installed, configured and connected to a functioning probe. Calibrate using the plant temperature, otherwise unexpected results may occur. Use RECOVERY CALIBRATION to restore the previous calibration.**

**Two point calibration method.**
The probe must be dry, clean and not installed in the system during this procedure. Use chlorine-free water (or a carbon filter system) and immerse the probe tip into it, wait until the reading is stable, then press “First Point” (zero) to confirm.

For calibration of the second point, use the system sampling water and analyse it using a DPD system to obtain the chlorine value. Enter this value as second point calibration and confirm.

**One point (second point) calibration method.**
For calibration of the second point, use the system sampling water and analyse it using a DPD system (e.g. photometer) to obtain the chlorine value. Enter this value as second point calibration and confirm.

Active carbon filter system

Photometer

## Chlorine probe table.

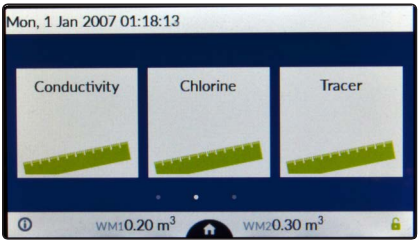
Use the following table to check the number of calibration points for the installed probe.

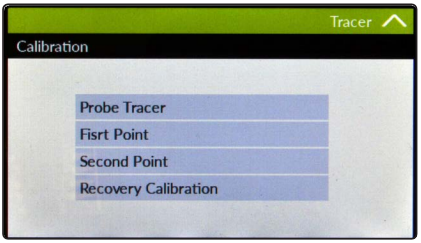
| Probe's model | Scale reading | Max reading value | |
|---|---|---|---|
| Scl 1/2 | Cl2 | 2.000 | Two Points Calibration |
| Scl 1/5 | Cl2 | 5.000 | |
| Scl 1/20 | Cl2 | 20.00 | |
| Scl 1/200 | Cl2 | 200.0 | |
| Scl 2/2 | ClO2 | 2.000 | Two Points Calibration |
| Scl 2/20 | ClO2 | 20.00 | |
| Scl 3/2 | Cl2 | 2.000 | Two Points Calibration |
| Scl 3/10 | Cl2 | 10.00 | |
| Scl 3/20 | Cl2 | 20.00 | |
| Ecl 6,7,12,20 | Cl2 | 10.00 | Two Points Calibration |
| Scl 8/2 | Clt | 2.000 | Two Points Calibration |
| Scl 8/20 | Clt | 20.00 | |
| Scl 9/200 | H2O2 | 200.0 | |
| Scl 9/2000 | H2O2 | 2000 | |
| Scl 10/1 | O3 | 1.000 | |
| Scl 10/10 | O3 | 10.00 | |
| Scl 11/200 | PAA | 200.0 | |
| Scl 11/2000 | PAA | 2000 | |
| Scl 13 | O2 | 60.00 | |
| Scl 17/10 | ClO2 | 10.00 | |
| Scl 18/10 | Cl2 | 10.00 | |
| Ecl 6,7,12,20 br | Br2 | 10.00 | Two Points Calibration |
| Scl 17/2 | ClO2 | 2.000 | Two Points Calibration |
| Scl 18/2 | Cl2 | 2.000 | Two Points Calibration |
| SBR 1/20 | Br2 | 20.00 | |
| SCL SC | Cl2 | 2.000 | Two Points Calibration |
| Ecl 4,5,6,7,12 | ClO2 | 10.00 | Two Points Calibration |
| SCL 17/20 | ClO2 | 20.00 | |
| SCL 18/20 | Cl2 | 20.00 | |
| SCL 10/2 | O3 | 2.000 | Two Points Calibration |
| SCL 10/20 | O3 | 20.00 | |
| SCLT/2 | ClO2 | 2.000 | Two Points Calibration |
| SCL11/50 | PAA | 50.00 | Two Points Calibration |
| SCL9/50 | H2O2 | 50.00 | Two Points Calibration |
| SCL2/0,5 | ClO2 | 0,50 | Two Points Calibration |

Note: Some probes are not supported.

## Tracer channel calibration.

The tracer calibration procedure is based on two buffer solutions (0 BTSA and “working value” BTSA buffer solution). Depending on the probe installed, configure the model using the “Probe Tracer” menu before calibration.




**Note: this procedure assumes that the instrument is correctly installed, configured and connected to a functioning probe. Calibrate using the plant temperature, otherwise unexpected results may occur. If something goes wrong, use RECOVERY CALIBRATION to restore the previous calibration.**

**Two point calibration method.**
The probe must be dry, clean and not installed in the system during this procedure. Tap “First Point” (zero) and confirm. Tap “Second Point”, immerse the probe tip into the buffer solution and wait until the reading is stable, enter the buffer solution value and confirm it. **Note: the value of the buffer solution may vary if the ambient temperature is different from 20°C. Read the solution label for further information. During calibration, LIGHT may interfere with the buffer solution reading. Perform calibration in a dark environment.**

## pH channel calibration.

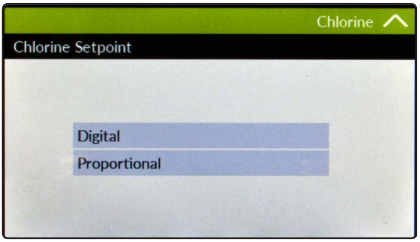
The pH calibration procedure is based on two buffer solutions (typically 7pH for the first point and 4pH for the second point).

**First point calibration.**
Tap “First Point”, then immerse the probe tip into the 7pH buffer solution. Wait until the reading is stable and, based on the buffer solution value, enter it into the calibration range. (“Cal. At” field). Confirm or discard if not satisfied. **Note: the value of the buffer solution may vary if the ambient temperature is different from 20°C. Read the solution label for further information. “Default pH” must be changed based on this event. If you are not satisfied with the results, use RECOVERY CALIBRATION to restore the previous calibration.**

**Second point calibration.**
Tap “Second Point”, then immerse the probe tip into the 4pH buffer solution. Wait until the reading is stable and, based on the buffer solution value, enter it into the calibration range. (“Cal. At” field). Confirm or discard if not satisfied. (“Cal. At” field). **Note: the value of the buffer solution may vary if the ambient temperature is different from 20°C. Read the solution label for further information. “Default pH” must be changed based on this event. If you are not satisfied with the results, use RECOVERY CALIBRATION to restore the previous calibration.**

## Channel setpoints.

A setpoint configuration (for DIGITAL and PROPORTIONAL outputs) must be set for each channel (except conductivity) for the outputs to function correctly. It is also possible to set the temperature setpoint (On/Off) and assign a free output for each reading channel.



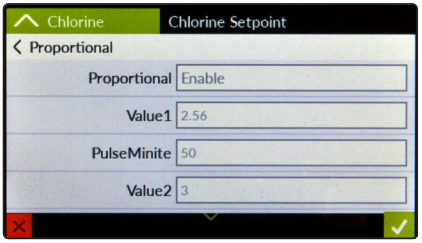

**Choose the working mode for each channel.**

**Settable parameters:**

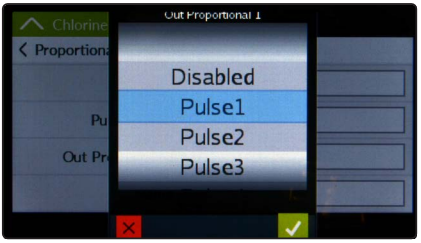
1) Working Mode (digital or proportional)
2) Working range
3) Activatable outputs (if available)
4) Pulses per minute

**The setpoint for digital outputs can be configured with two working values.**

**Available digital outputs.**




**The setpoint for digital outputs can be configured with two working values and the pulses per minute.**



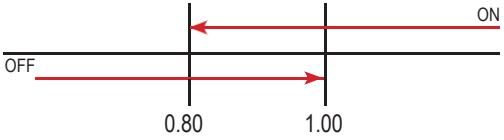

**Available proportional outputs.**

## “Cl Set-Point” (PWM) mode - Digital

This mode is valid for any available “digital” output. Pulse-width modulation, or PWM, is a type of digital modulation in which information is encoded in the form of the duration in time of each pulse of a signal. The duration of each pulse can be expressed in relation to the period between two successive pulses, implying the concept of “duty cycle”. A “duty cycle” of 0% indicates a pulse of zero duration, i.e. no signal, while a value of 100% indicates that the pulse ends as the next one begins. This mode works based on a settable time (from 0 to 100 seconds) of activation or deactivation of the selected output. If the reading tends to move towards the set value (On or Off) during the set time, the PWM will regulate the output in a timed manner. Once the set value is reached, the PWM will maintain the output in the On or Off state. The parameters to be set are:

Unit of measurement + %: (activity time relative to the set value. E.g.: 0% means 0 seconds. 100% means 100 seconds).
Cl range: Choose the two chlorine values to operate between in PWM mode

For example: set the first Cl value to 1.40 = 00% and the second to 0.80 = 60%.
For reading values ≥ 1.40 the output will be permanently OFF.
For reading values ≤ 0.80 the output will be ON for 60 seconds and OFF for 40 seconds.
If the reading value is 1.1 mg/l, the output will be active at 30% (ON for 30 seconds, OFF for 70 seconds).




## “Cl Set-Point” (on/off) mode - Digital

This mode is valid for any available “digital” output. Set the instrument to operate with two set values enabling or disabling the Cl pump. To use this mode, tap the working mode On/Off.

**ON/OFF mode**
Set the Cl value to 0.80 mg/l ON and 1.00 mg/l to OFF. The difference between the two Cl values is called HYSTERESIS.
The instrument will enable the chlorine pump when the reading decreases to 0.80 mg/l.
At 0.8 mg/l the chlorine pump will be enabled until the reading increases to 1.00 mg/l.

Pulse speed: to run the pump at pulses per minute, add one or more minutes (1 pulse every xx minutes).

Tap on main function to enable/disable
Tap on the value to change it according to preference
Tap Out to choose from any available output

## “Cl Set-Point” (Proportional) mode - Pulse

**This mode is valid for any available proportional/pulse output.**

Proportional mode makes it possible for the instrument to operate using a calculated percentage between two set values that enable or disable the Cl pump. To use this mode, tap “Proportional First Point”.

**PROPORTIONAL mode** between 1.00Cl (0 p/m) and 0.50Cl (180 p/m). p/m is: pulses per minute
In this mode, the Cl pump will be “ON” for values below 0.50 mg/l with pulse/minute capacity set (e.g. 180) and will be “OFF” for values above 1 mg/l. For values of 0.75 mg/l the pump will be “ON” with a dosing capacity of 90 p/m. The calculation is based on 180 pulses/minute.

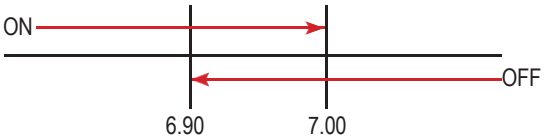
Tap on main function to enable/disable
Tap on the value to change it according to preference
Tap Out to choose from any available output

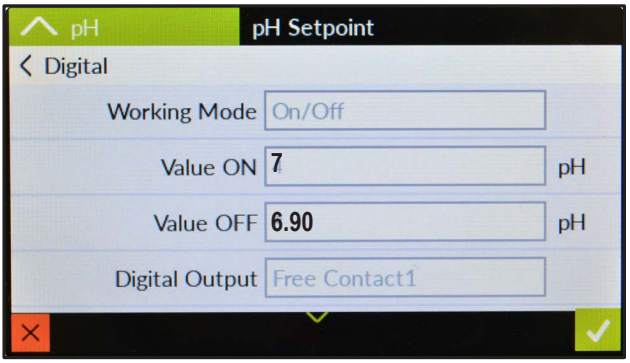
## “pH Set-Point” (on/off) ALKALI mode

**This mode is valid for any available digital output.** In On/Off mode, two values are set in the instrument that enable or disable the pH pump. To select this operating mode, highlight “Working Mode” with the cursor. Tap to select.

**ALKALINE SOLUTION dosing ON/OFF mode**

Set the pH value to 7.00 OFF and 6.90 ON.
The instrument will enable the pH pump until the reading is 7.00pH.
At 7.00pH the pump will be disabled until the reading drops to 6.90pH



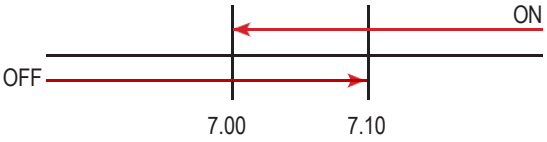



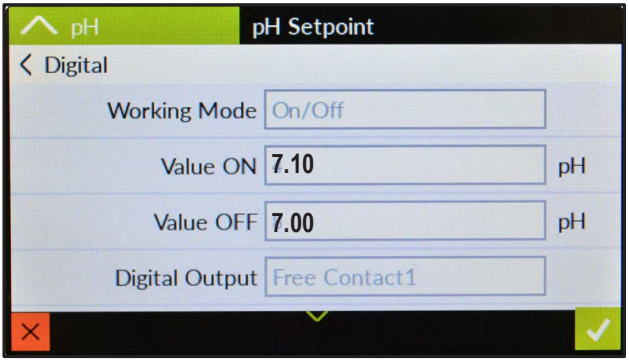

Tap on main function to enable/disable
Tap on the value to change it according to preference
Tap Out to choose from any available output

## “pH Set-Point” On/Off mode for Acid solutions

**This mode is valid for any available digital output. ON/OFF mode while dosing ACID**
**ACID SOLUTIONS dosing ON/OFF** mode Set the pH value to 7.00 OFF and 7.10 ON.

The instrument will enable the pH pump until the reading reaches 7.00pH. At 7.00pH the pump will be disabled until the reading goes back up to 7.10pH




Tap on main function to enable/disable
Tap on the value to change it according to preference
Tap Out to choose from any available output

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**IN-DEPTH ANALYSIS**

In chemistry, an alkaline substance is a base, ionic salt of alkali or alkaline earth metals. They are very strong reducing agents, reacting violently with water to reduce its hydrogen (producing hydroxide ions (OH-) when dissolved in water). The adjective alkaline comes from the Arabic al-qali, and this term referred to potash, obtained as a by-product of wood combustion. Since potash has basic characteristics, the convention became widespread to call all substances that, like potash, are capable of neutralising acids “alkalis”. So even today, alkaline can mean either a metal from the first group of the periodic table or a basic compound. An acid (often represented by the generic formula HA [H+A-]), according to the Arrhenius Theory, is a substance that dissociates in water to produce H+ ions. According to the more modern definition of Johannes Nicolaus Brønsted and Martin Lowry, an acid is a substance capable of yielding H+ ions to another chemical species, called a base. The Brønsted-Lowry theory extends the definition of a base to those substances whose behaviour in water cannot or is not practical to evaluate, as is de facto the case with the definition given by Arrhenius. He also introduces the concept of complementarity between acid and base, since the base is not such unless there is a counterpart from which it is possible to take an H+ ion, and vice versa. An acid-base reaction is therefore a reaction of one chemical species transferring protons to another species capable of accepting them. In such a reaction, the acid is transformed into its conjugate base. Thus the concept of complementarity between acid and base is introduced, since the acid is not such unless there is a counterpart from which to donate its H+ ion, and the base is not such unless there is a counterpart from which to accept an H+ ion. A substance is therefore not acidic or basic absolutely but relative to the reaction considered. Acid-base reactions thus differ from oxidation-reduction (or Redox) reactions, in which instead there is a variation in the oxidation state of at least one element involved in the reaction.

## “pH Set-Point” (PWM)

**This mode is valid for any available digital output.** Pulse-width modulation, or PWM, is a type of digital modulation in which information is encoded in the form of the duration in time of each pulse of a signal. The duration of each pulse can be expressed in relation to the period between two successive pulses, implying the concept of “duty cycle”. A “duty cycle” of 0% indicates a pulse of zero duration, i.e. no signal, while a value of 100% indicates that the pulse ends as the next one begins. This mode works based on a settable time (from 0 to 100 seconds) of activation or deactivation of the selected output. If the reading tends to move towards the set value (On or Off) during the set time, the PWM will regulate the output in a timed manner. Once the set value is reached, the PWM will maintain the output in the On or Off state.

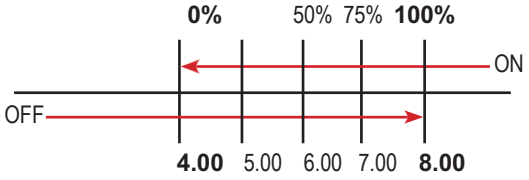
The parameters to be set are:

**Unit of measurement +** %: activity time relative to the set value. E.g.: 0% means 0 seconds; 100% means 100 seconds.

**pH range**: two pH values between which the PWM works.

Example: set the first pH value to 8.00 = 100% and the second pH value to 4.0 = 0%.
For reading values ≥ 8.00 the output will be permanently ON.
For reading values ≤ 4.0 the output will be permanently OFF.

For reading values at 7.00 pH the output will be OFF for 25 seconds and ON for 75 seconds.
For reading values of 6.00 the output will be OFF for 50 seconds and ON for 50 seconds.

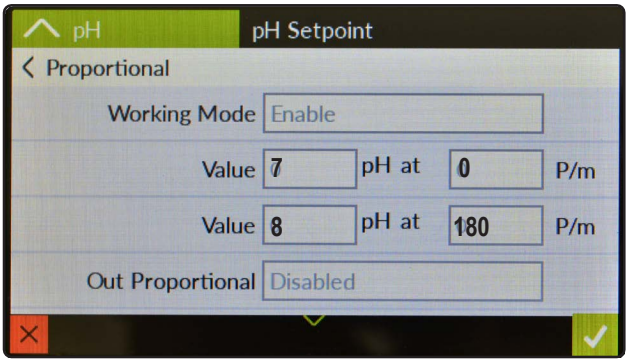


## “pH Set-Point”(Proportional) mode - Pulse

**This mode is valid for any available proportional/pulse output.**

This mode sets the instrument to operate using a calculated percentage between two set values that enable or disable the pH pump. To use this mode, tap “Proportional First Point”.

**PROPORTIONAL mode** between 7pH (0 P/m) and 8pH (180 P/m). p/m is: pulses per minute
In this mode, the pH pump will be “ON” for values above 8pH with a maximum pulse capacity per minute (e.g. 180) and will be “OFF” for values below 7pH. For values of 7.5pH the pump will be “ON” with a capacity of 90 pulses per minute.

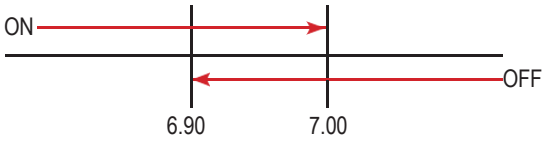


## “ppm Set-Point” (on/off) example 1 for tracer

This mode is valid for any available “digital” output. On/Off mode allows the instrument to be set to operate using two set values that enable or disable the TRACER pump. To use this mode tap “Working mode”.

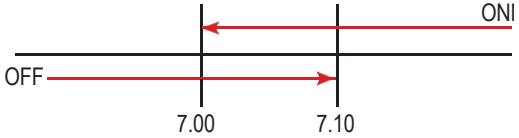
Example

Set the ppm value to 7.00 OFF and 6.90 ON. Set the pulse rate per minute (strokes per minute) according to the capabilities of the dosing device. The instrument will leave the TRACER pump on until the reading increases to 7.00 ppm. At 7.00 ppm the tracer pump will be disabled until the reading falls below 6.90 ppm.




## “ppm Set-Point” (on/off) example 2 for tracer

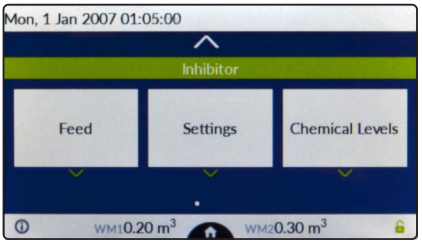
This mode is valid for any available “digital” output. ON/OFF mode
Set the ppm value to 7.00 OFF and 7.10 ON. Set the pulse rate per minute (strokes per minute) according to the capabilities of the dosing device. The instrument will leave the tracer pump on until the reading decreases to 7.00 ppm. At 7.00 ppm the TRACER pump will be disabled until the reading increases up to 7.10 ppm.



**Notes.**

## “Inhibitor” menu.

The inhibitor function can operate in 5 feeding modes. Tap on the wheel and rotate to choose the most suitable mode. The submenu “WM PPM” can be changed within “L / h” or “cc / st”.




**Feed & Bleed**.

This mode is used to activate the inhibitor with the same duration as set for the unloading phase (see “Bleed Menu” from “Setup Menu”). No further functions need to be set.

**Feed & % Bleed**.

This mode is used to activate the inhibitor for a time whose duration is in % of the unloading phase (see “Bleed Menu” from “Setup Menu”). Set the time percentage.

**Feed & % Time.**

This mode allows the inhibitor to be activated for a time whose duration is defined in % relative to Ct (cycle time). Example: Ct= 1h 00m and %=50. Inhibitor active for: 0h 30m.

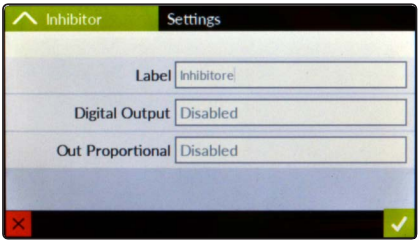
**Feed & Water Meter (WMI).**

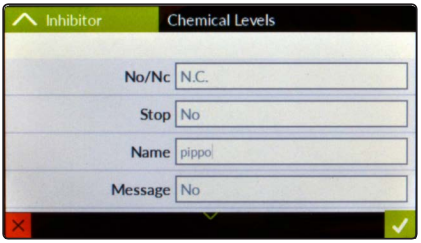
The inhibitor is active for a time (T) per series of pulses (C) received from the WMI water meter (make-up water). Before setting this mode, configure the water meter from the “Flow meter menu” option in the “Setup Menu”.

Example: T= 00h 30m and C=0050. Inhibitor activity: 30 minutes per 50 pulses received from the WMI water meter.

**Feed & WM Ppm (WMI).**

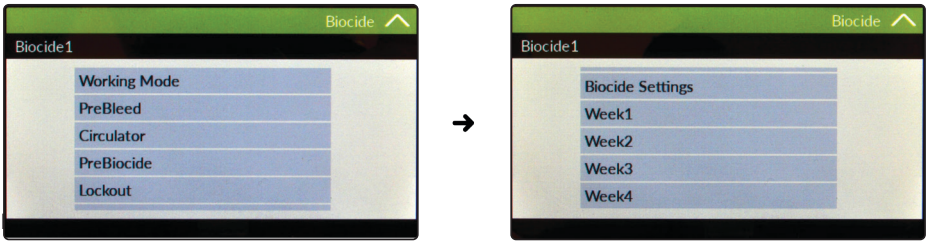
The inhibitor is active for as long as it takes to maintain the product concentration (ppm) based on the dosing capacity of the pump in litres per hour (L/h) and the pulses received from the WMI water meter (minimum 10 seconds of activity) or the cc per stroke capacity of the pump (cc/st). In this case, dosing (cc produced per stroke) is based on the ppm set. It is also possible to specify the % concentration of the product. Before setting this mode, connect the IS pump to the instrument and configure the water meter from the “Flow meter menu” option in the “Setup Menu”.



## “Biocide 1” and “Biocide 2” menu.

Usually two types of chemicals (e.g.: chlorine based chemical and bromine based chemical) are used to obtain best results in killing dangerous microorganisms. Use “Biocide 1” and “Biocide 2” menus to configure these tasks. Parameters to set are the same for both menus. **Note: “Biocide 1” can’t be changed if “Setpoint Cl” working mode is set to “Constant Mode”. The pulse output, if configured (Biocide Settings), will always provide 180 p/m.**




The Biocide time phase is used to control the activation of the setpoint on channel 2 when configured with the pH or ORP board.

**Constant Mode**
If the Biocide is set to Constant, the “Biocide” function is disabled. In this case, the setpoint on channel 2 is always active and continuously operates according to the probe reading (pH or ORP), without considering any time phase.

**Timer Biocide Mode**
If the Biocide is set to Timer Biocide, the “Biocide” function is enabled. In this case, the setpoint on channel 2 operates only during Biocide time phases, i.e., within the periods when the timer enables it. Outside these phases, the setpoint on channel 2 remains inactive even if the probe detects out-of-range values.

**Working Mode:** Constant / Timed operation for Biocide – Conductivity / Timed for Pre-Bleed
**Pre-bleed:** Pre-drain activity based on a set time or conductivity value (µS/PPM) of the setpoint.
**Circulator:** Timed activity of the recirculation pump connected to the selected digital output.
**Pre-biocide:** This option activates the Pre-Biocide dosing (1 or 2) for the configured time period
The Pre-Biocide is generally an activator for the subsequent Biocide dosing.
Pre-Biocide 1 activates output 5-E-N. Pre-Biocide 2 activates output 6-E-N.

**Lockout:** This option locks the bleed valve for the configured time perio at the end of the Biocide activity.

**Week 1…2…3…4:** This option enables dosing repetition based on the day of the week.
hh mm hh mm
Example: 00 01 @ 01:00
Biocide activity will take place every Tuesday for 60 seconds at 01:00 a.m.

**Biocide Settings:** This option assigns the proportional/digital output, name, and start time of the Biocide.

---

NOTES:

1) Activity execution order for selected options is: 1st Pre-bleed
2nd Pre-biocide
3rd Biocide
4th Lockout

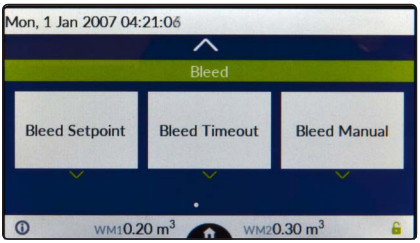
2) Pre-bleed option in conductivity mode has a time limit that can be set from “BLEED” menu. If conductivity value can’t be restored within a time then the bleed valve will be closed and an alarm generated (“Bleed Timeout”).

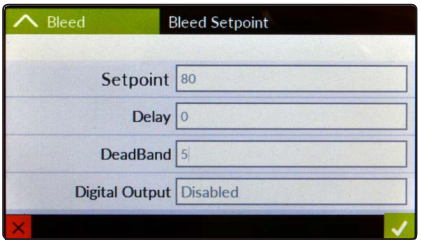
3) Set 00h 00m to disable single option

4) *Execution time, for selected options, will begin calculating total events time and it will begin prior biocide time activity. (see “WK” option for starting time).

## “Bleed” menu.

The continuous bleed of a certain amount of water is necessary to optimise the water quality in the evaporative tower, removing possible impurities that tend to accumulate within the basin. The parameters for configuring “Bleed” (up to 3 setpoints, timeout and manual) are as follows:



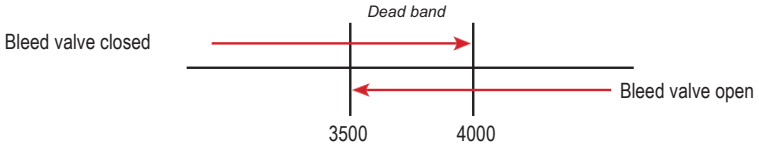




**Setpoint:** conductivity threshold intervention value.

**Delay**: activation delay (minutes) for the selected digital output.

**Dead Band (Neutral Zone):** The instrument activates the bleed valve when the setpoint is reached and keeps it active until the set neutral area (difference between setpoint and neutral zone) is exceeded. Select the “+“ symbol before the Dead Band value to invert the bleed valve opening logic.

Example: Setpoint is 4000 uS and dead band is 500 uS



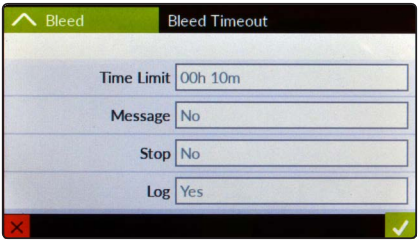

**Message:** this option creates a warning message when the timeout is exceeded (message service must be configured).

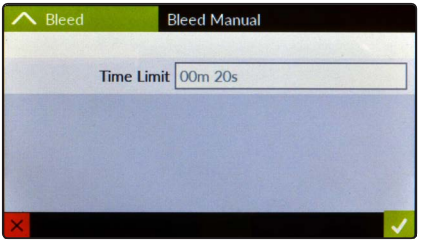
**Log:** creates a log for timeout activity (the log service must be configured).

**Stop:** NO, does not interrupt instrument activities - YES, stops the instrument until normal conditions are restored.

**Time Limit:** this option sets the maximum time for the set setpoint value to be reached, after which the bleeding activity stops and an alarm is generated.

**Manual Bleed:** This option allows for manual activation of the bleed valve for a settable time. The operation starts immediately after this time is confirmed.

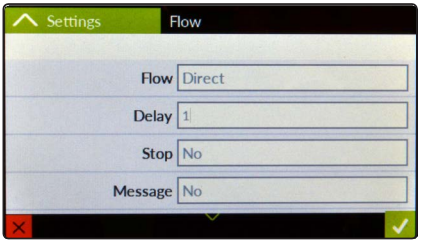


# “CENTURIO Tower” main menu: settings

The following options are present in the main menu: Flow, Label, PASSWORD, Flow meter, Log Setup and International

## “Flow Sensor”.




This menu is used to configure the flow sensor contact (5 - 6 - 7/8). The options are:

**Mode**: contact type, open (N.O.), closed (N.C.), disabled.

**Delay**: initial delay time.

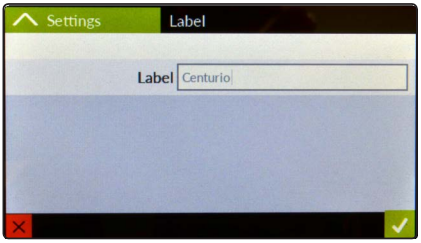
**Stop**: stops the instrument when contact status changes.

**Message**: sends warning message with the message system.

**Log**: saves operation activity to the logbook.

**Delay Send MSG**: adds a delay in sending flow alarm messages (0 disabled, maximum delay 999 minutes).

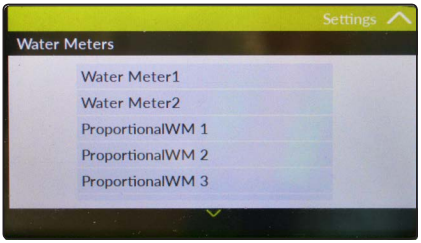
## “Label”.




This menu is used to customise the name of the instrument for improved recognition in network searches.

**Default name:** “Centurio”.

## “Water Meters”.



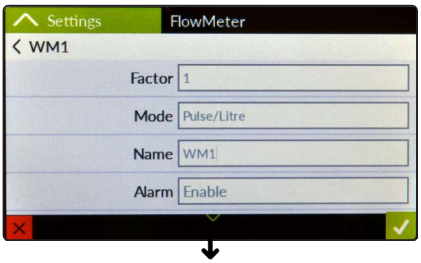

This menu is used to configure the pulse emitting water meters WM1 and WM2. The options are:

**WM1 / WM2:** working mode configuration.

**Proportional WM 1, 2, 3**: analogue output configuration. This mode allows dosing of a product in PPM (parts per million) with a configurable concentration percentage and based on the CC (cc per stroke) of the connected pump, thus achieving extremely accurate dosing results.

**Reset Counter**: resets all pulse emitting water meters.

## “Water Meters” settings.




This menu is used to configure the working modes for the two pulse emitting water meters connected to the instrument:

**WM1** (usually assigned to water input) and
**WM2** (usually assigned to bleed) . The options are:

**Factor:** based on the “pulse/litre” or “litre/pulse” mode; this option defines how many pulses made a litre or how many litres made a pulse

**Mode:** pulse ratio with Pulse/Litre or Litre/Pulse

**Name:** Name of water meter

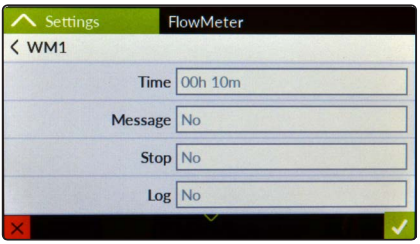
**Alarm:** instrument alarm on/off

**Time:** time for absent flow before generating an alarm

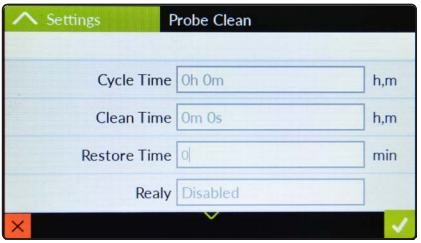
**Message**: sends warning message through the message system.

**Stop:** stops / does not stop the instrument if there is a change of status

**Log:** saves the status activity to the logbook




## “Probe Clean” settings.



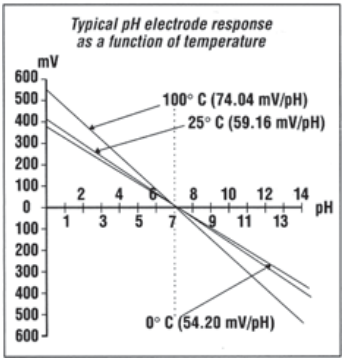

This menu lets you configure the cleaning mode of the sensor probes prepared for the sensor cleaning operation. It is possible to set the following by assigning the relay to which the cleaning motor is connected:

**Cycle Time:** time between one cleaning operation and the next
**Clean Time:** cleaning duration time
**Restore Time:** time to restore probe reading operation
**Relay:** relay connected to probe sensor cleaning motor
**Clean on alarm:** Possibility of activating (enable) or deactivating (disable) a cleaning cycle following an alarm

## pH/Temperature compensation curve.

pH measurements depend on temperature. The degree to which temperature affects mV readings varies from solution to solution and can be calculated using the following graph.

The instrument has a fixed or adjustable automatic temperature compensation referring to a standard temperature of 25°C.



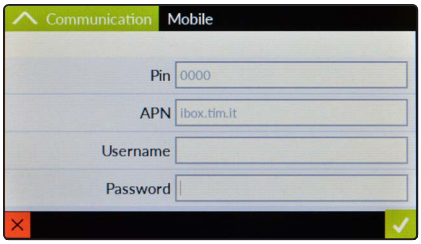
# “CENTURIO Tower” communication menu.

The configurable options for this menu are: Nimbus, Mobile, Ethernet, Proxy, WiFi, Message and Modbus

## “Nimbus”.

This menu enables or disables the “Nimbus” remote management system. The option is ENABLED OR DISABLED. Before enabling it, configure at least one communication protocol from among MOBILE, WiFi or Ethernet. Once Internet communication is established, a confirmation icon will be displayed on the main screen (e.g: ). Tap to complete the “Nimbus” configuration.

## “Mobile”.

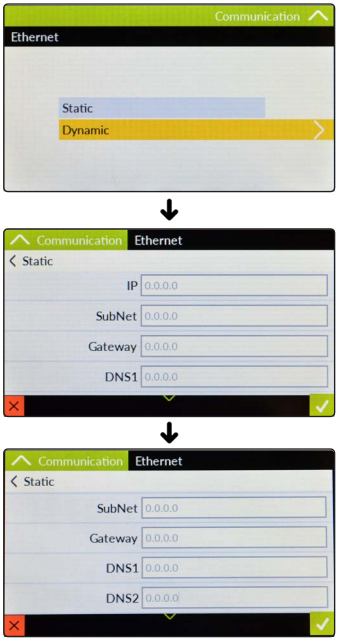



This menu allows mobile communication to be configured when the 3G GSM module has been installed.
The options are:

**PIN:** enter the SIM unlock code (if required)
**APN:** based on your mobile operator, enter the name of the access point, if required.
This field is usually assigned automatically.
**Username:** enter the SIM user name (if required)
**Password:** enter the SIM password (if required)

CAUTION: THIS FUNCTION MAY NOT BE FREE OF CHARGE.
DEPENDING ON THE MOBILE PLAN UNDERWRITTEN, IT MAY GENERATE SMS TRAFFIC AND/OR PAID DATA.

## “Ethernet”.



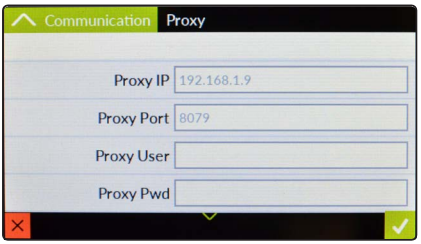

This menu is used to configure a wired connection when an Ethernet module has been installed. A dynamic configuration is usually suitable for most connections. A static, customised configuration can be enabled. If this is the case, the parameters to be set (ask your network administrator) are:

**IP**: static IP address assigned to the instrument
**Subnet:** subnet mask
**Gateway: (Internet)** gateway IP address for internet connections
**DNS1 and / or DNS2:** IP addresses for internet name resolution

**Note: per MODBUS access on TCP/IP, the PLC must connect to port 502.**

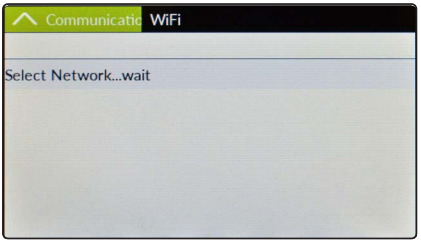
## “Proxy”.

This menu is used to configure the proxy server.
A proxy server is a server that acts as an intermediary for requests from clients searching for resources on other servers.
It is not necessary to configure this item in most configurations. Ask your local network ADMINISTRATOR for any parameters to be set.




## “WiFi”.

This menu is used to configure the wireless Internet connection if a WiFi module has been installed.
Usually, the tool automatically starts scanning for available networks. At the end of the scanning procedure, tap on the preferred network name and enter the password, if necessary. If the preferred network SSID name is hidden, ask your local network ADMINISTRATOR for the parameters to be set.



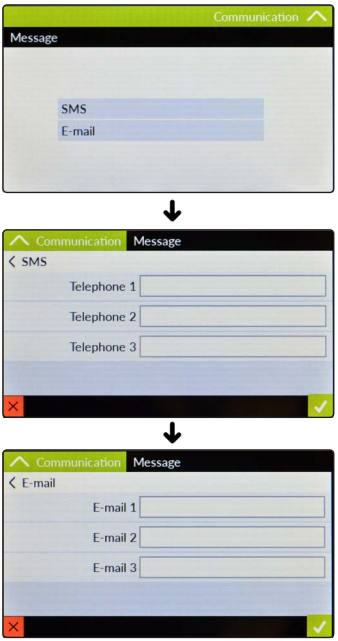

## “Message”.

This menu allows up to 3 telephone numbers and 3 e-mail addresses to be set up for instrument notification messages.
This option requires a properly installed and configured ETHERNET, WiFi or Mobile module. Tap on SMS or E-mail for configuration.

**The phone number format must be international. (e.g. +39344123456)**

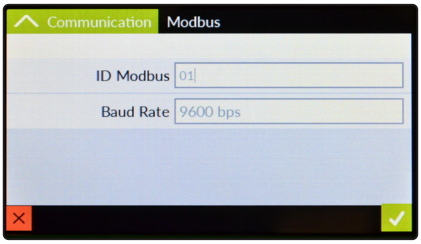
**The e-mail address format must be xxxx@xxxx**

CAUTION: THIS FUNCTION MAY NOT BE FREE OF CHARGE.
DEPENDING ON THE MOBILE PLAN UNDERWRITTEN, IT MAY GENERATE SMS TRAFFIC AND/OR PAID DATA.



## “RS485” / “MODBUS”

From this menu it is possible to choose RS485 connection operation. To set the instrument to MODBUS protocol operation, choose “MODBUS” and proceed to configuration.




Modbus is a serial communication protocol created in 1979 by Modicon (a company that is now part of the Schneider Electric group) to connect its programmable logic controllers (PLCs). It has become a de facto standard in industrial communication and is currently one of the world's most widely used connection protocols for industrial electronic devices. Each peripheral device that needs to communicate via Modbus is assigned a unique address. Each one of these can send a Modbus command, although generally only one peripheral acts as master (in the mandatory serial). A Modbus command contains the Modbus address of the peripheral device with which it wishes to communicate. Only the latter will act on the command, although the other peripheral devices will also receive it. All Modbus commands contain control information, which ensures that the command received is correct. Basic commands can ask an RTU to change a value in one of its logs, as well as command the peripheral to return one or more values contained in its logs.

**Set the ID that assigns a UNIQUE address to avoid conflicts. Depending on the device connected, check whether the transmission speed is supported. Usually the default value is the most suitable option.**
**In-depth analysis: APN**

The Access Point Name or APN is the name of an access point for GPRS or UMTS networks. An access point is:
- An Internet network to which a mobile device can be connected
- A configuration point used for the connection
- A particular option that is configured on a mobile phone

There are various types of APNs and they can be used in both public and private networks. For example: ibox.tim.it; web.omnitel.it; internet.wind; tre.it
Once the device is connected, it will use the DNS service to resolve the APN call process, which will return the real IP address of the access point.

**In-depth analysis: Static IP and Dynamic IP address.**

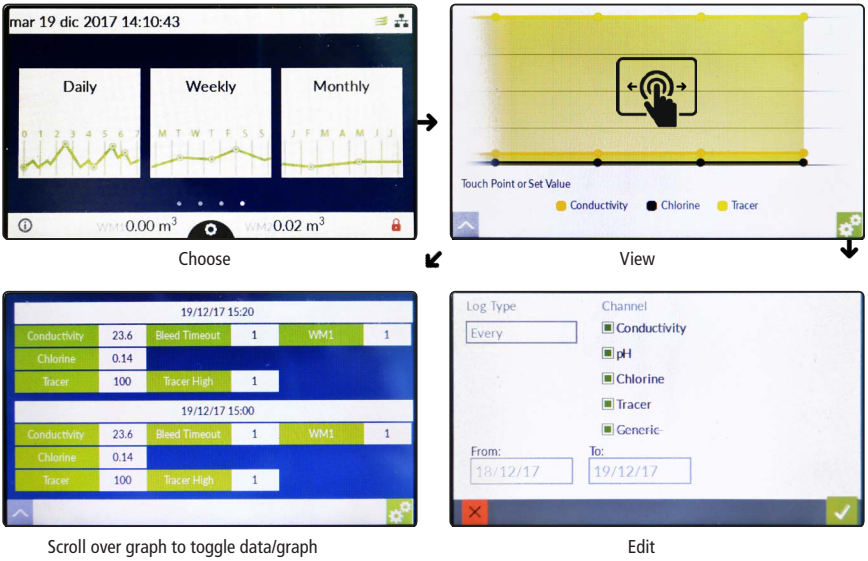
Dynamic Host Configuration Protocol (DHCP) is a protocol that allows network devices to receive the IP configuration required to operate on an Internet Protocol-based network.
In an IP-based network, each computer requires an IP address, chosen in such a way that it belongs to the sub-network to which it is connected and that it is unique, i.e. there are no other computers already using that address.
The task of manually assigning IP addresses to computers places a considerable burden on network administrators, especially in large networks or where there are numerous computers that only connect on a rotational basis at certain times or days. Furthermore, IPv4 addresses (currently used in almost all networks worldwide) have become scarce as more and more computers are connected to the Internet, thus reducing the availability of fixed IP addresses.
DHCP is mainly used in local networks, particularly on Ethernet. In other contexts, similar functions are performed within PPP.
DHCP protocol is also used to automatically assign various parameters to the computer which are necessary for its proper functioning on the network to which it is connected. The most common of these, in addition to dynamic IP address assignment, include:

- Subnet mask
- Default Gateway
- DNS server addresses
- Default DNS domain name

These parameters can be entered manually if you have a static IP address with manual DHCP.

## “Graphics”.

The “Centurio Tower” instrument can graphically represent the value of readings for each channel. Scroll to the left on the main screen until the option graphics screen appears (see screenshot below). Tap on the required graphic period (daily, weekly or monthly) and wait until all data has been collected. Once the graph is displayed, tap to change parameters (channel, date, time, etc.). Note: tracing time may be longer depending on the amount of data collected/period.




## “USB Pendrive”.

The “Centurio Tower” instrument can import/export data such as setpoint configuration (backup and restore), log activity and firmware updates via the USB port (located on the right-hand side of the case). Insert a pendrive previously formatted with FAT32 and wait for the instrument to detect it. Then choose from the available options.

**The USB port is located on the side of the instrument case.**

**The minimum size required for the pendrive is 1GB.**

## “CORROSION” Percentage/Proportional Modes

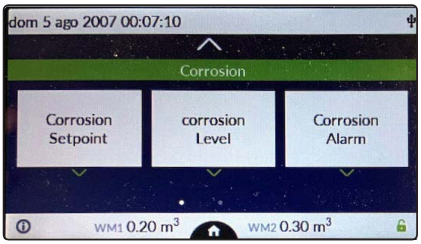
When the ECORR probe is installed, the instrument can be configured to read and monitor the corrosion rate in the pipes of a plant. Tap the corrosion icon in the main menu to access the main options.

**Setpoint:** enables / disables control on inhibitor dosing

**Corrosion Level:** tank level of anti-corrosion product

**Corrosion Alarm:** alarm management for high corrosion values

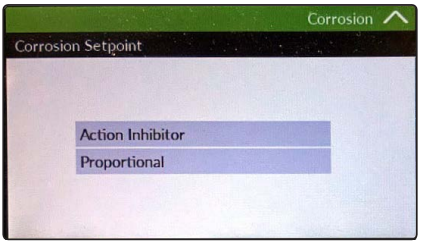
**Settings:** selection of alloy factor for type of pipes




**Example:** if the set MPY value is exceeded, then the PPM value of the inhibitor is increased by the set percentage. When corrosion returns below the set value, the % mode will no longer act.

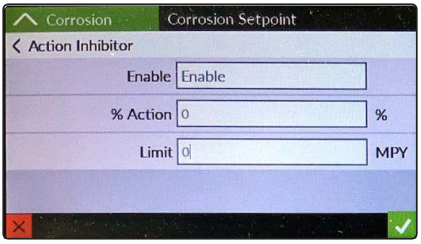
### “CORROSION SETPOINT”

This setpoint affects operation activity of the inhibitor if the instrument is set to WaterMeter PPM or CC/ST mode. The “Action Inhibitor” option must be configured for inhibitor operating mode. If the proportional operating mode is to be used, configure the “Proportional” option.



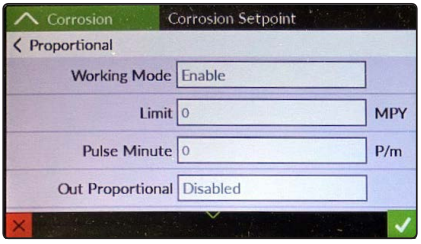

### Action Inhibitor (percentage)

**Enable:** enables/disables setpoint activity on inhibitor
**% Action:** increase value on inhibitor activity when the limit threshold is exceeded
**Limit:** limit threshold in MPY above which the percentage increase on inhibitor activity starts

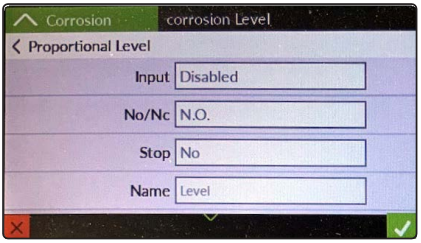



### Proportional

**Working Mode:** enables/disables proportional setpoint mode
**Limit:** threshold limit in MPY, after which the output is activated
**Pulse Minute:** activity in pulses/minute of pump “IS” if the set limit is exceeded
**Out Proportional:** choice of the analogue output to which the pump is connected to restore the corrosion values
**Name:** name of the activity

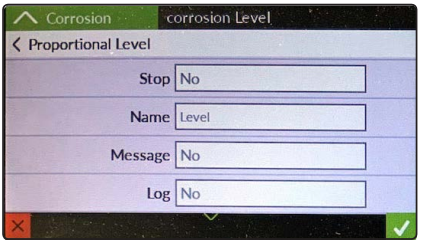


## CORROSION LEVEL




**Input:** enables/disables/selects level probe input

**NO/NC:** sets the type of contact for the level probe (normally open or normally closed)




**Stop:** enables to disables locking when contact changes state

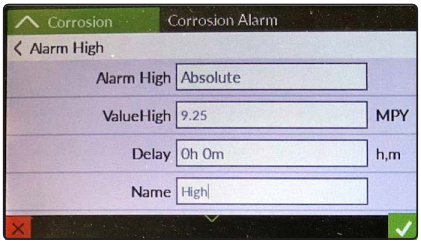
**Name:** Name of the label

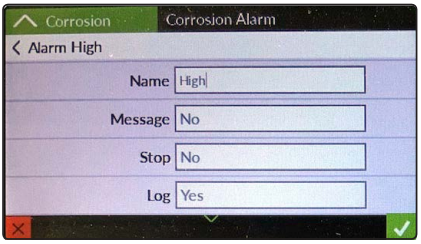
**Message:** Enables or disables alarm messages

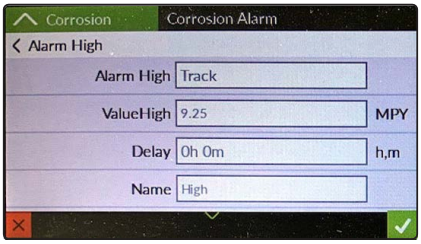
**Log:** Enables or disable event log logging

## CORROSION ALARM

**Absolute:** "absolute" alarm algorithm
**Track:** "track" alarm algorithm
Select either one of the two names to enable the alarm



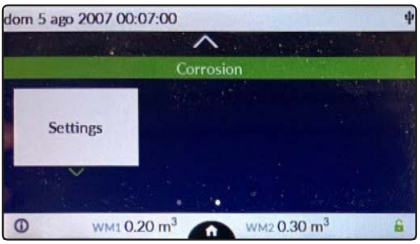



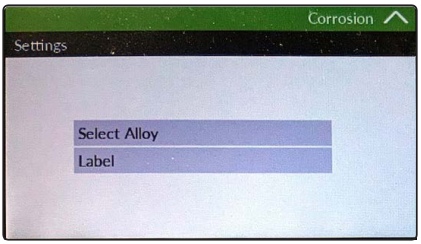




**Alarm High:** Enables or disables the alarm
**ValueHIgh:** Corrosion limit value (MPY unit)
**Delay:** Activation delay time
**Stop:** Enables or disables activity lock if active
**Message:** Enables or disables alarm messages
**Log:** Enables or disable event log logging
**Label:** Name of the label

**SETTINGS/ALLOY**

Depending on the pipe construction material, select the most suitable alloy factor value according to the table below:



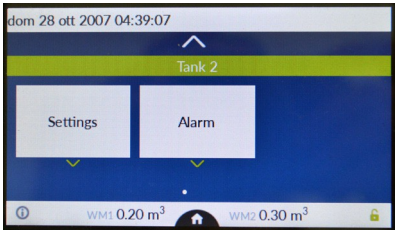

It is possible to assign a name to the material type by selecting LABEL.

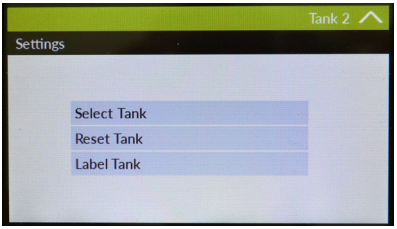
| Common Designation | UNS | Alloy Factor |
|---|---|---|
| Aluminum AA1100 | A91100 | 0.94 |
| Aluminum Alloy AA6061 | A96061 | 0.94 |
| Copper CDA110 | C11000 | 2.00 |
| Arsenical Admiralty Brass CDA443 | C44300 | 1.67 |
| Mild Steel C1010 | G10100 | 1.00 |
| Stainless Steel 304 | S30400 | 0.89 |

## Laser Level Sensor (via RS485) - Configuration

The SLL laser level sensor enables stable and accurate detection of the amount of liquids in different sized tanks. It is also capable of detection simply based on distance, regardless of shape, colour or surface finish. Connect the sensor to the instrument. The instrument will automatically detect the new probe. Confirm by selecting the tick.

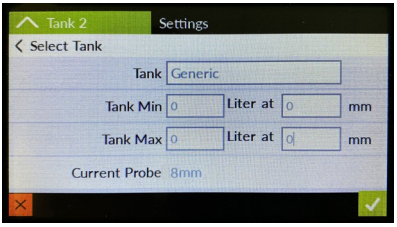
From the main menu select “TANK” and configure the tank assigned to the sensor by selecting “Settings”. In this menu you can set the type of tank (Select Tank), reset previously entered configuration parameters (Reset Tank) or assign a customised name to the tank (Label Tank).




If the tank is not listed (CNTxx), it is possible to assign a generic tank and proceed with its configuration. Select “GENERIC” from the “Select Tank” menu. You can configure the tank capacity parameters on the next screen.

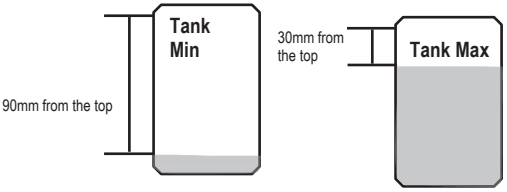
**Tank.**
Name of the container.




**Tank Min**
Minimum product threshold.
Enter the litres of minimum product value in relation to the height from the top. E.g.: At a height of 90 mm there are 5 litres of product.

**Tank Max**
Maximum product threshold.
Enter the litres of maximum product value in relation to the height from the top. E.g.: At a height of 30 mm there are 40 litres of product.

**Current Probe**
Value in mm product currently read.




**Visual probe indications**

The green LED indicates the connection status to the instrument and specifically:

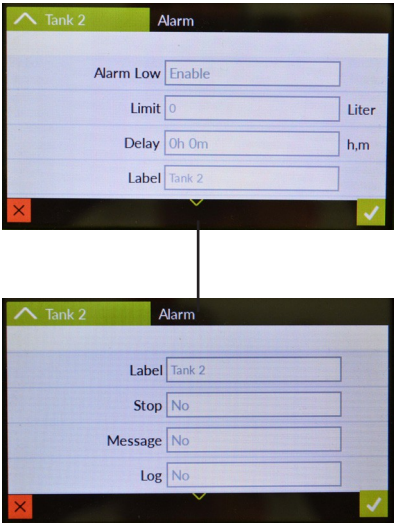
LED flashing fast: sensor not associated with instrument

LED flashing slowly: sensor associated with instrument, stand-by mode

LED on: sensor functioning

## Laser Level Sensor (via RS485) - Alarm Management

From the container menu (TANK) select the “Alarm” option and set the configuration parameters as follows:




**Alarm Low.**
Enables or Disables the low product tank alarm.

**Limit**
Defines the minimum level of product in litres in the canister for activation of the level alarm.

**Delay**
Defines the delay time in hours and minutes between detection of the minimum product level in the tank and activation of the level alarm.

**Label**
Assigns the name of the tank.

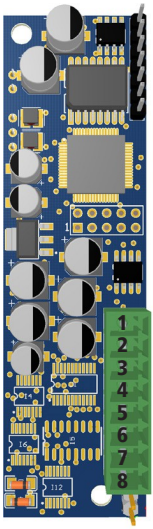
**Stop**
If set to “Yes”, instrument work activity stops and an alarm message is generated.
If set to “No”, an alarm message is generated but instrument activity is not stopped.

**Message**
If set to “Yes”, an alarm message is sent to the recipient configured in the communication menu.

**Log**
If set to “Yes”, logs sensor activity in the event log as configured in the communication menu.

## Appendix - Probe modules

**CD**



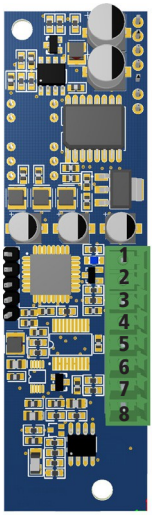

**This module is suitable for the CONDUCTIVITY PROBE**

1) not connected
2) + 3) PT100
4) + 5) PT100
6) CD PROBE (out) Signal
7) CD PROBE (in) Power

2) + 3) PT100
4) + 5) PT100
6) CD PROBE (out) Signal
7) CD PROBE (in) Power

For ECDHLCPT/1

**mA**



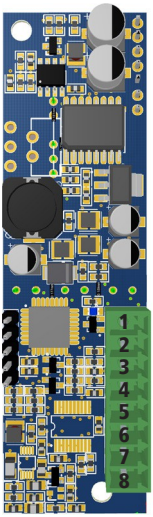

**This module is suitable for the mA/TRACER PROBE (10862021)**

1) GND (e.g.: black tracer probe wire)
2) + 12VDC (e.g.: red tracer probe wire)
3) external PT100 yellow wire
4) external PT100 white wire
5) external PT100 brown wire
6) external PT100 green wire
7) - mA signal INPUT (e.g.: brown/green tracer probe wire)
8) + mA signal INPUT (e.g.: orange tracer probe wire)

Caution: connections must only be carried out by qualified and trained personnel

## Appendix - Probe modules

**CDIND/CDINDS**



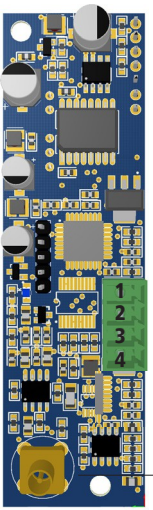

**Connections to INDUCTIVE CONDUCTIVITY PROBE**

1) not connected
2) + 3) PT100
4) + 5) PT100
6) PROBE power supply
7) PROBE signal
8) PROBE GND

**Connections to TYPE “S” INDUCTIVE CONDUCTIVITY PROBE**

1) not connected
2) + 3) PT100
4) + 5) PT100
6) PROBE power supply
7) PROBE signal
8) PROBE GND

**pH**




**This module is suitable for pH/Redox/Fluoride probes**

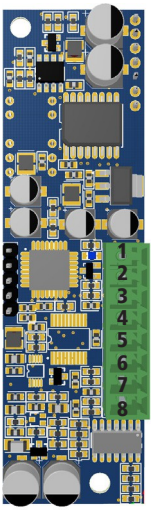
1) external PT100 yellow wire
2) external PT100 white wire
3) external PT100 brown wire
4) external PT100 green wire

Probe Input

Caution: connections must only be carried out by qualified and trained personnel

## Appendix - Probe modules

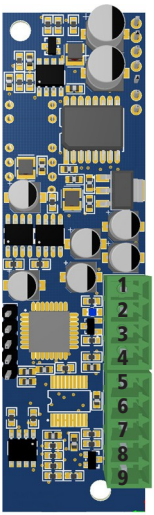
### CL




**This module is suitable for chlorine PROBE (suitable also for OPEN CELLS ECL6):**

1) -12 VDC probe
2) +12 VDC probe
3) external PT100 yellow wire
4) external PT100 white wire
5) external PT100 brown wire
6) external PT100 green wire
7) + probe mV (or ECL6 red wire)
8) - probe mV (or ECL6 black wire)

### CLDO




**This module is suitable for probes:**

**SCL (chlorine)**

1) external PT100 yellow wire
2) external PT100 white wire
3) external PT100 brown wire
4) external PT100 green wire
5) n/a
6) GND SCL probe
7) + 5VDC SCL probe
8) - RS485 SCL probe
9) + RS485 SCL probe

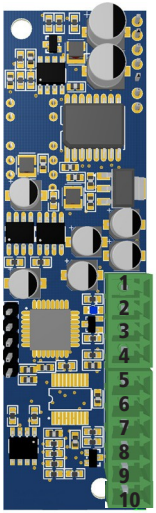
*colours version without extension

**DISSOLVED OXYGEN***

1) external PT100 yellow wire
2) external PT100 white wire
3) external PT100 brown wire
4) external PT100 green wire
5) yellow DO probe wire (+8 VDC)
6) grey DO probe wire (GND)
7) brown DO probe wire (-8VDC)
8) blue DO probe wire (-RS485)
9) pink DO probe wire (+RS485)

Caution: connections must only be carried out by qualified and trained personnel

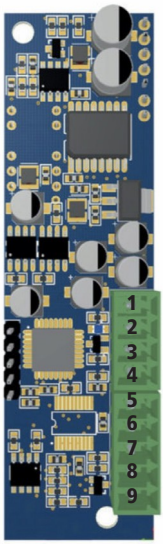
## POTENTIOSTATIC




**This module is suitable for the potentiostatic probe:**

1) External PT100: Yellow wire
2) External PT100: White wire
3) External PT100: Brown wire
4) External PT100: Green wire
5) n/a
6) n/a
7) n/a
8) WE
9) RE
10) CE

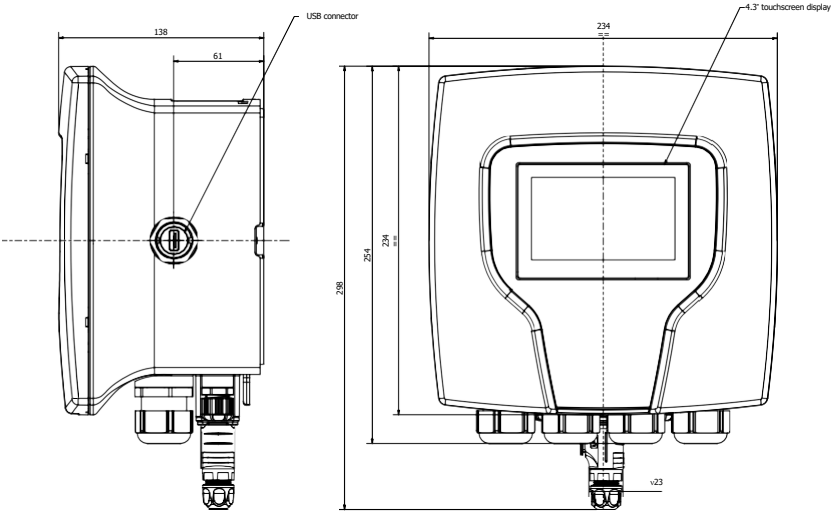
## ETRC2/ECORR MODULE

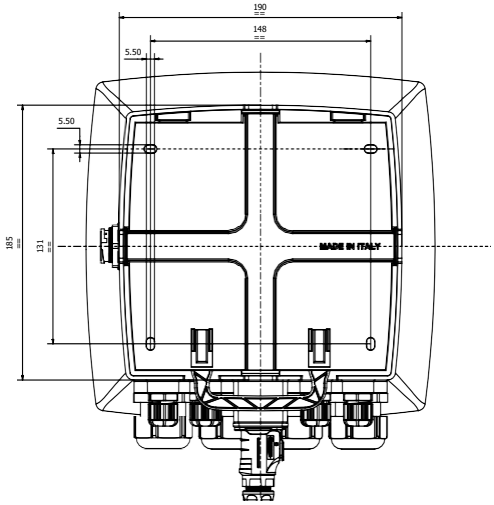



**This module is suitable for ETRC2/ECORR* (10887911) probes:**

1) from external PT100 probe: Yellow wire (ETRC2 probe only)
2) from external PT100 probe: White wire (ETRC2 probe only)
3) from external PT100 probe: Brown wire (ETRC2 probe only)
4) from external PT100 probe: Green wire (ETRC2 probe only)
5) Red wire 24 (+VDC)
6) Black or Brown wire* 24 (-VDC)
7) n/a
8) Yellow wire RS-485 B
9) Blue wire RS-485 A

## Appendix - DIMENSIONS (mm)




## ENCLOSURE

IP65 enclosure (NEMA4x)
Centurio PRO control CONTROLLER is manufactured in ABS housing to ensure protection against aggressive chemicals and tough environment.

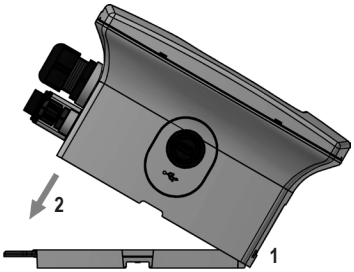
## ENVIRONMENT

-10°C ÷ 50°C (14°F ÷ 122°F)
0÷95% (non condensing) relative humidity

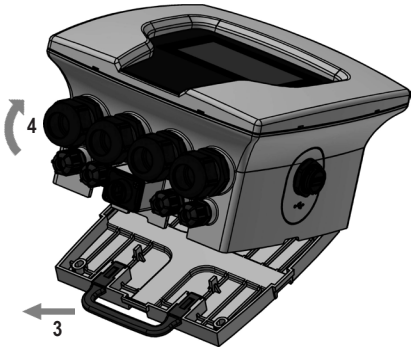
## WEIGHT

2.2 Kg | 4,8lb

## Appendix - Panel/wall mounting with lock/unlock function



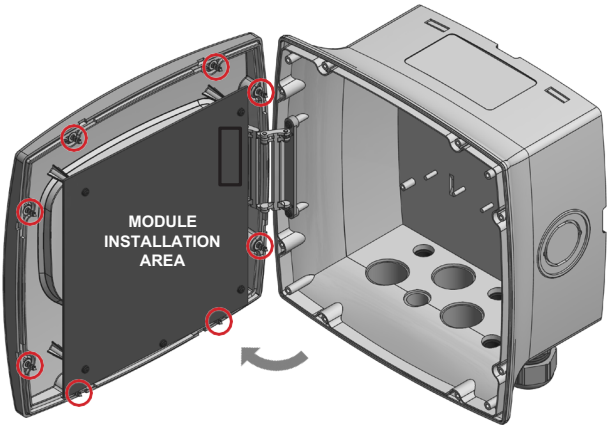

LOCK




UNLOCK

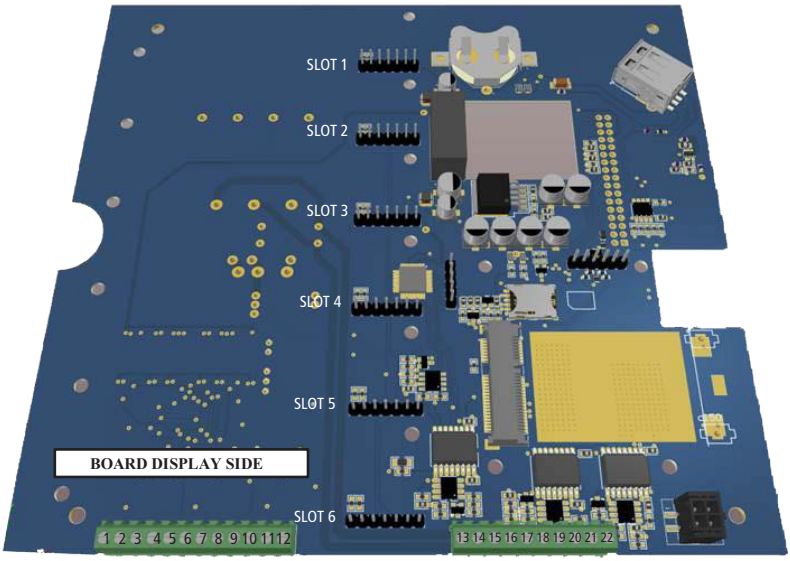
**To lock** the instrument to the wall, gently insert (1) the upper case onto the wall-mounting rack and move it (2) downwards until it locks into the lower part.

**To unlock** the instrument from the wall, pull (3) the handle from the mounting rack and lift (4) the instrument.



## Appendix - Installation / Removal of probe module / mA / communication module

To remove or add a module, first disconnect the instrument from the main power supply, then remove the white front cover by pulling it off. Unscrew the 8 screws and open the main panel to access the modules. Install the new module in any available slot or remove the desired module by unscrewing it from the main board.
The order of the slots shown on the display is progressive from left to right.




**I/O connections:**

Caution: connections must only be carried out by qualified and trained personnel

1: mA Output no. 6 (n/a)
3: mA Output no. 5
5: mA Output no. 4
7: mA Output no. 3
9: mA Output no. 2
11: mA Output no. 1
2 / 4 / 6 / 8 / 10 / 12: GND

**mA outputs**

mA Outputs Active – Do not connect any external voltage - Driver voltage without load: 15V

13: GND
14: VDC
15: -RS485 (B)
16: +RS485 (A)

**Communication port**
**Laser Sensor/Serial Probes/Pressure Level Sensor**
***immersion probe only**

17: -RS485 (B)
18: +RS485 (A)
19: GND

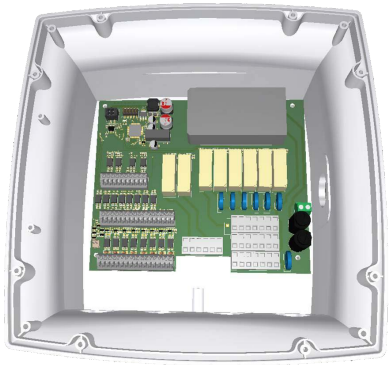
**Communication port**
**LD and LS series instruments**

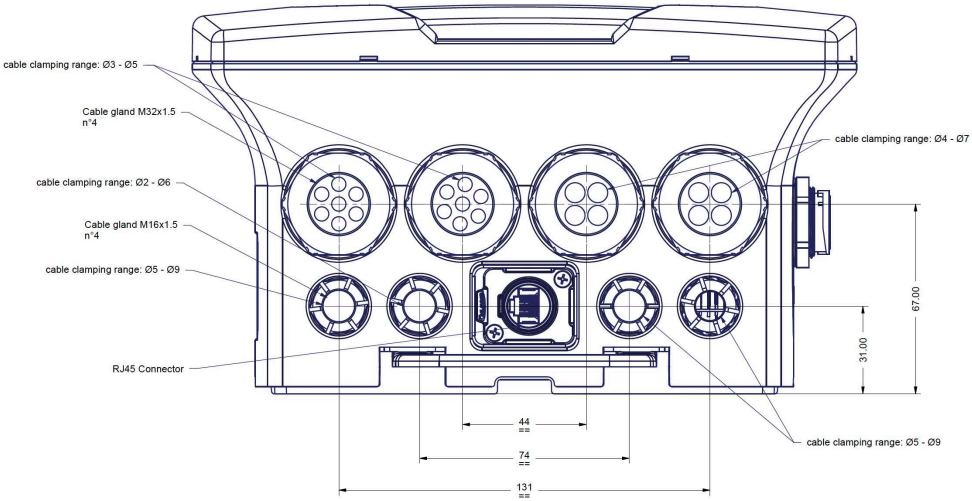
20: -RS485 (B)
21: +RS485 (A)
22: GND

**Communication port**
**CENTURIO - LDOSIN - MODBUS series instruments**

## Appendix - Communication module installation

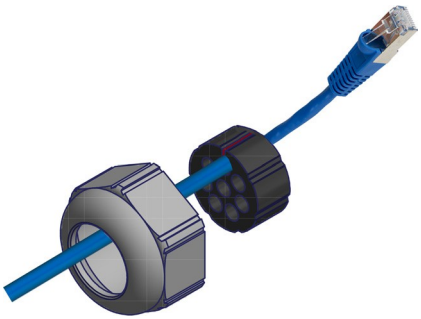
To remove or add a communication module, first disconnect the instrument from the main power supply, then remove the white front cover by pulling it off. Unscrew the 8 screws and open the main panel as shown in the figure. Install the required module, then close the instrument.

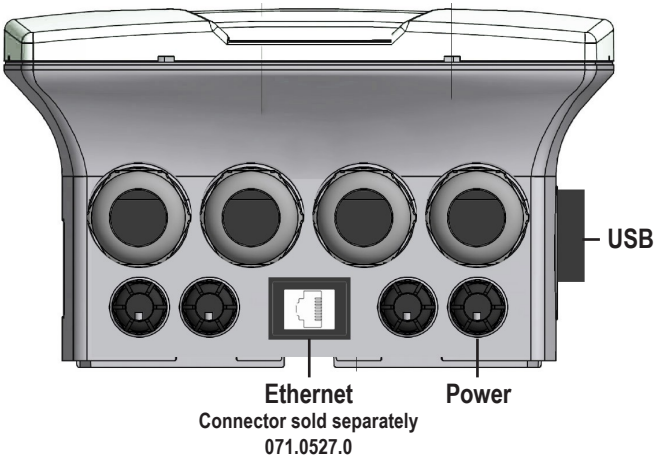




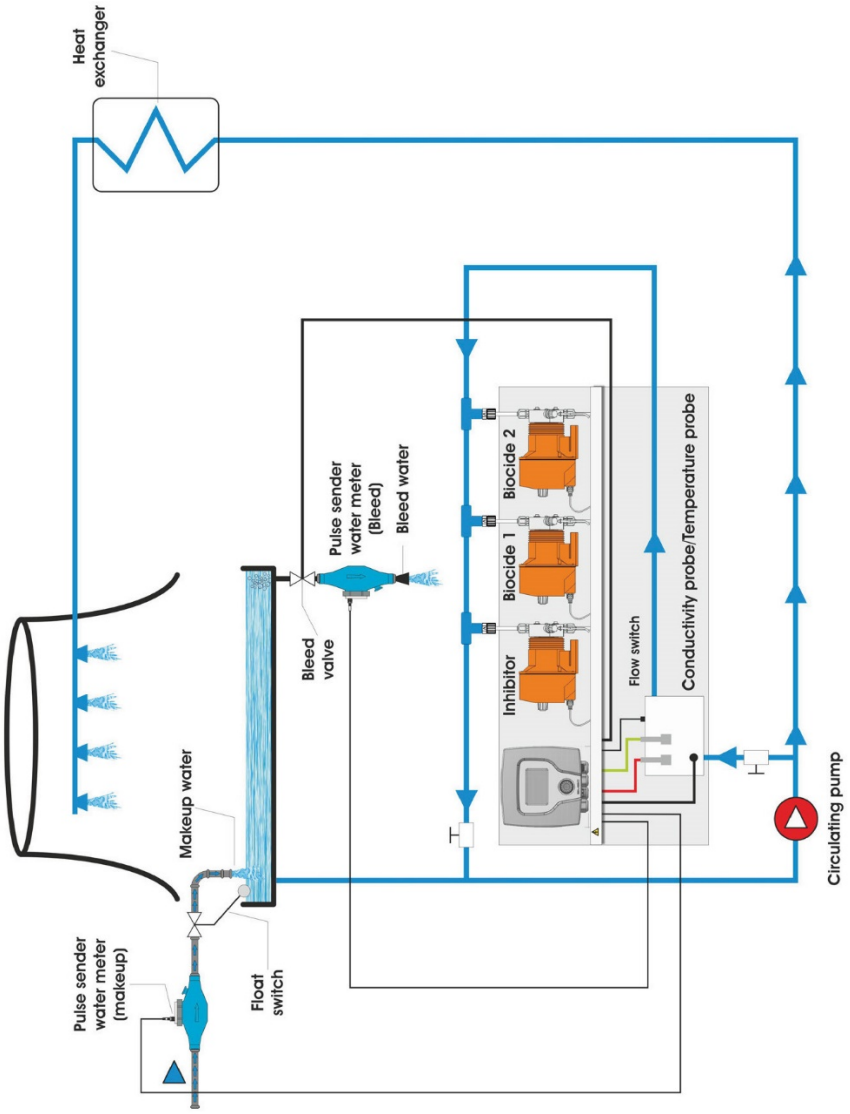
## Appendix - Passing the wires through the cable gland retaining grommet

To pass the probe cable/wires through the retaining grommet, a cut must be made at the hole to allow the probe cable to enter. Once the cable is inserted, it is possible to reassemble the grommet with the cable clamp by screwing it back onto the instrument box.

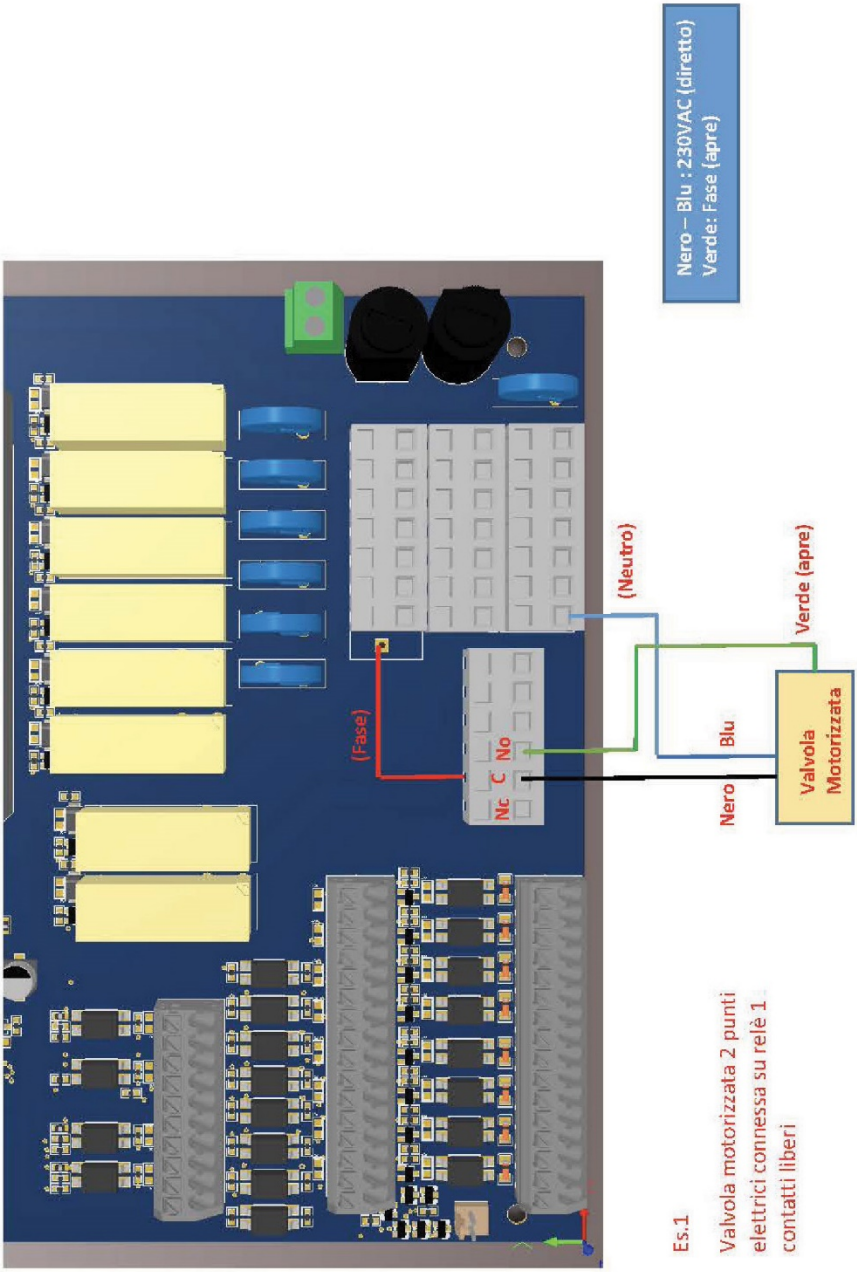




# Appendix - Operating logic diagram



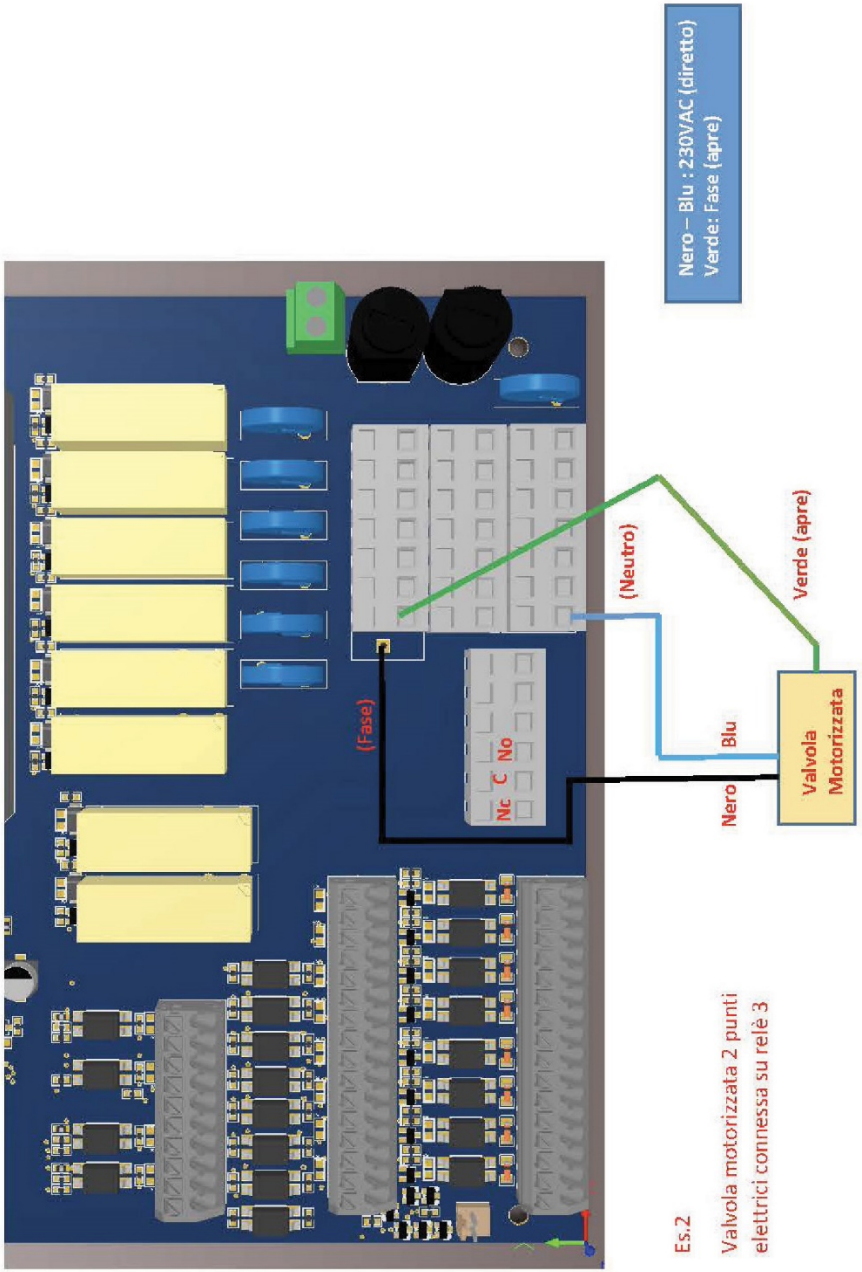
## Appendix - Motorised 2-point Valve Connection ex. 1




Es.1

Valvola motorizzata 2 punti elettrici connessa su relè 1 contatti liberi

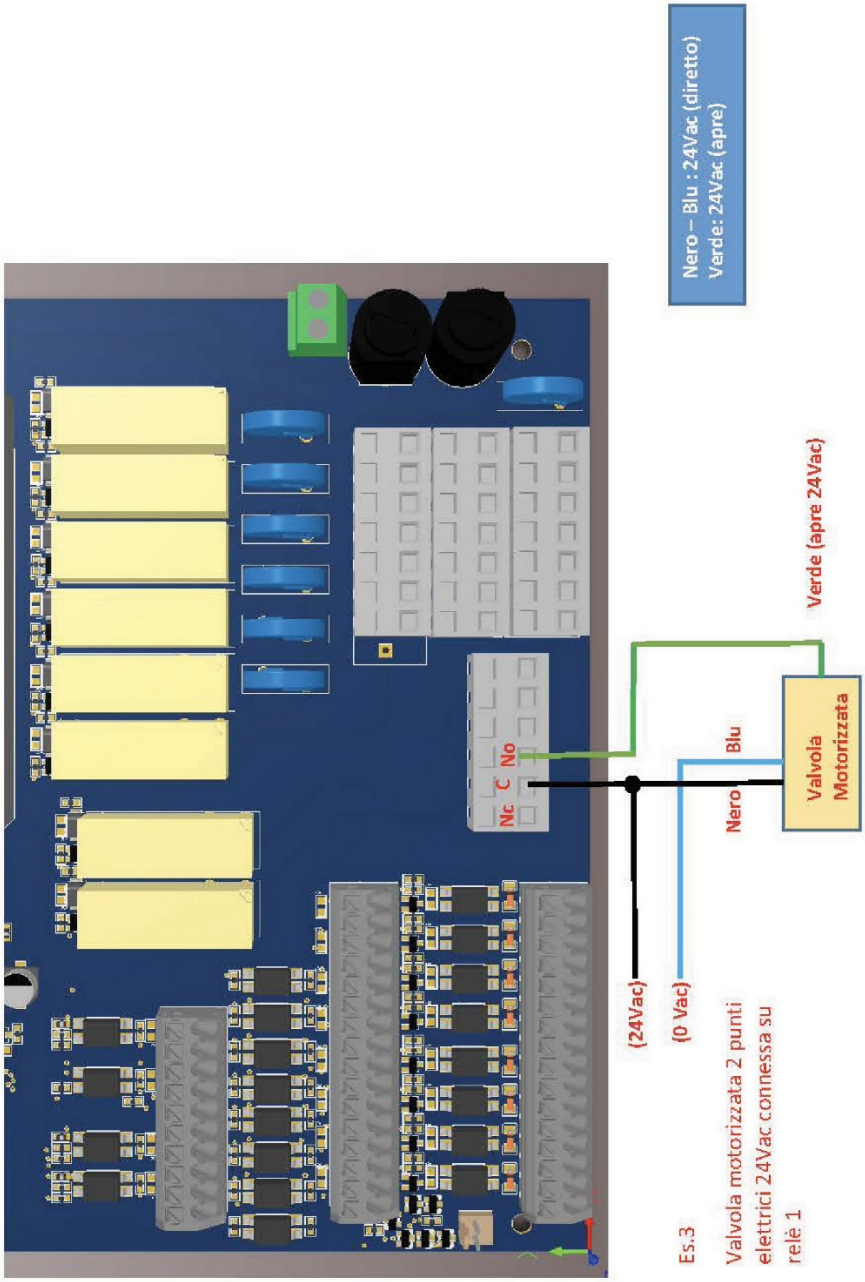
## Appendix - Motorised 2-point Valve Connection ex. 2




Es.2

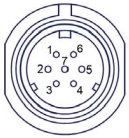
Valvola motorizzata 2 punti elettrici connessa su relè 3

## Appendix - Motorised 2-point Valve Connection ex. 3



## Appendix - Pressure Level Sensor

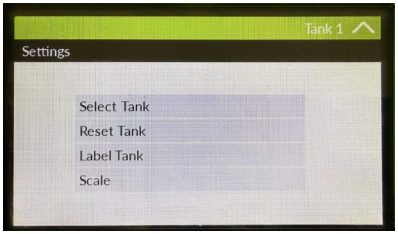
The SLP pressure sensor is the ideal solution for measuring liquids in tanks of any size. Based on Stevin's law, the sensor works by converting pressure into an analogue electrical signal. Pressure can be defined as the force per unit area that a fluid exerts on its surroundings. The basic physics of static pressure (P) is calculated as the force (F) divided by the area (A). Pressure transducers have a sensing element of constant area and respond to the force applied to this area by fluid pressure. The applied force will deflect the diaphragm within the pressure transducer. The deflection of the internal diaphragm is measured and converted into an electrical output. This enables pressure monitoring by microprocessors, programmable controllers and computers along with similar electronic instruments.

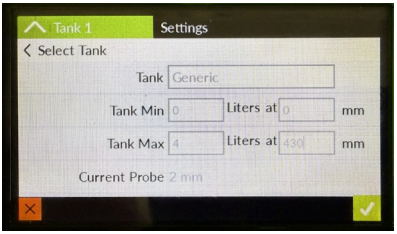



| Function | CONN. PIN# | |
|---|---|---|
| VDC (12) | 1 | → Centurio I/O PIN 14: VDC |
| GND EXT | 2 | → Centurio I/O PIN 3: GND |
| A (RS485) | 5 | → Centurio I/O PIN 15: -RS485 (B) |
| B (RS485) | 6 | → Centurio I/O PIN 16: +RS485 (A) |

Install the sensor in the container, in the lance version, taking care that a gap of a few millimetres remains between the pressure transducer (sensor tip) and the bottom. Switch off the Centurio and then connect the sensor as described above using PINS 1, 2, 5 and 6 to the Centurio I/O board.

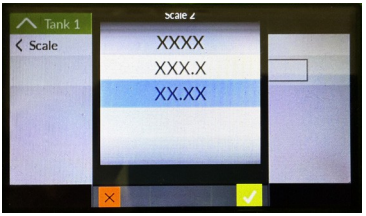
Switch the Centurio back on and proceed to sensor configuration by selecting the icon on the main screen and then the **TANK** option. Then select **SETTINGS**.




From this menu it is possible to set the tank by tapping on **SELECT TANK** and entering the value in minimum litres (empty tank) and minimum height, value in maximum litres (full tank) and maximum height, or select a predefined tank by tapping on **GENERIC** and then selecting the tank from the list.

Additional functions are: **RESET TANK** to reset the configuration to default values. **LABEL TANK** to name the container/product to be dosed. **SCALE** to set the display scale (decimals) of the pressure sensor reading.



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## PRECAUTIONS RELATING TO DIRECTIVES, REGULATIONS AND STANDARDS

### § CE/EU and UKCA marking

We guarantee that this product meets the essential requirements of the applicable Directives and Regulations based on the following specifications. Please carefully consider the following specifications for use of the product in European Union member countries and the United Kingdom.

**• CE/EU harmonized directives and standards**

**Directives**

DIRECTIVE 2014/35/EU
DIRECTIVE 2014/30/EU
DIRECTIVE 2011/65/EU
DELEGATED DIRECTIVE (EU) 2015/863

**Harmonized standards**

EN ISO 12100
EN IEC 61326-1
CEI EN 61010-1
EN IEC 63000

**• UKCA harmonized regulations and standards**

**Regulations**

2008 2016 No. 1091
2016 No. 1101
2012 No. 3032

**Harmonized standards**

BS EN ISO 12100
BS EN IEC 61326-1
BS EN 61010-1
BS EN IEC 63000

*When dismantling this product please separate material types and send them according to local recycling disposal requirements.*
*We appreciate your efforts in supporting your local environmental recycling program.*
*Working together we will form an active union to assure the world's invaluable resources are conserved.*